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December 15, 2009

Via Hand Delivery

Thomas S. Burack, Chairman
Site Evaluation Committee
N.H. Department of Environmental Services
29 Hazen Drive
Concord, NH 03302-0095

Re: Application of Laidlaw Berlin Biopower, LLC for a Certificate of Site and Facility for a Renewable Energy Facility in Berlin, New Hampshire

Dear Chairman Burack:

I enclose for filing with the New Hampshire Site Evaluation Committee an original and eighteen (18) copies of the Application of Laidlaw Berlin BioPower, LLC for a Certificate of Site and Facility for a renewable energy facility in Berlin, New Hampshire pursuant to RSA 162-H. I also enclose a disc containing an electronic pdf version of the Application and supporting materials.

Laidlaw Berlin BioPower, LLC ("LBB") is proposing to convert and upgrade much of the remaining facility equipment and infrastructure located at the former Fraser Pulp Mill in Berlin, New Hampshire in order to develop a biomass-fueled energy facility. LBB will use whole tree wood chips and other low-grade clean wood as fuel, and will be capable of generating up to nominally 70 megawatts (MW) of electric power (gross output).

The Project is a renewable energy facility under RSA 162-H:2. XII and is therefore subject to the review process and time frames established in RSA 162-H:6-a and Administrative Rule Site 301.05. The Project also qualifies for review by a subcommittee pursuant to RSA 162-H:4, V(b) and Administrative Rule Site 301.02 and 301.03.

The Application contains pre-filed testimony, exhibits and other information sufficient for the Subcommittee to commence its review. In preparing the Application, we have followed the format and content requirements of Administrative Rule Site 301.02 and 301.03.

LBB will assist the Subcommittee and its staff in any way necessary to facilitate an expeditious review of this Application. Assuming that the Application is deemed complete pursuant to RSA 162-H:6-a, we request that a prehearing conference be conducted to establish a procedural schedule for the duration of the adjudicative proceeding.

LBB looks forward to working with the subcommittee to arrange for the public comment hearing required under RSA 162-H:6-a, IV in Berlin. LBB also respectfully requests, pursuant to Administrative Rule Site 202.13, that the subcommittee and public counsel visit the site of the proposed facility. We suggest that visit coincide with the public hearing in Berlin.

Please do not hesitate to contact me if you have any questions. Thank you for your assistance with LBB's Application.

Very truly yours,

Barry Needleman

Enclosures
cc: Attorney General Michael L. Delaney
City of Berlin
Laidlaw Berlin BioPower, LLC

Application of Laidlaw Berlin BioPower, LLC for Certificate of Site and Facility

December 15, 2009

Submitted to:
New Hampshire Site Evaluation Committee
Docket No. 2009-XX

Prepared by:
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Supported by:
ESS Group, Inc.
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The McLane Law Firm
Waldron Engineering & Construction, Inc.
The Babcock & Wilcox Company
Stantec Engineering, Inc.

APPLICATION OF LAIDLAW BERLIN BIOPOWER, LLC FOR CERTIFICATE OF SITE AND FACILITY

BERLIN BIOPOWER
COOS COUNTY, NEW HAMPSHIRE

SUBMITTED TO
New Hampshire Site Evaluation Committee
Docket No. 2009 -

PREPARED BY
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The McLane Law Firm
Waldron Engineering & Construction, Inc.
The Babcock & Wilcox Company
Stantec Engineering, Inc.

December 15, 2009

NEW HAMPSHIRE SITE EVALUATION COMMITTEE

APPLICATION OF LAIDLAW BERLIN BIOPOWER, LLC. FOR CERTIFICATE OF SITE AND FACILITY

Berlin BioPower
Coos County, Berlin, New Hampshire

Prepared By:

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December 15, 2009

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LIST OF ACRONYMS

AAL	Annual Ambient Air Limit
AAQS	Ambient Air Quality Standards
ACSR	Aluminum conductor steel reinforced
ADT	Average daily traffic
AM/PM	*anti meridiem/post meridiem*
ANSI	American National Standards Institute
APE	Area of Potential Effect
AST	Above-ground storage tank
ATV	all terrain vehicle
AVER	Androscoggin Valley Economic Recovery Corporation
B&W	Babcock and Wilcox
BACT	Best Available Control Technology
BEDCO	Business Enterprise Development Corporation
BFB	Bubbling fluidized bed
BOP	Balance of plant
Btu	British thermal unit
CEMS	Continuous Emissions Monitoring System
CFR	Code of Federal Regulations
CI	Compression-ignition
CO	carbon monoxide
CO_2	carbon dioxide
COMS	Certified Continuous Opacity Monitoring System
CRU	Chemical Recovery Unit
CSCR	Cold Selective Catalytic Reduction
dB	decibel re: 20 micro-Pascals (μPa)
dBA	A-weighted decibel
DTM	Digital Terrain Model
EFSEC	Energy Facility Site Evaluation Council
EPS	Engineering Procurement and Construction
ESA	Environmental Site Assessment
ESP	Electrostatic Precipitator
ESS	ESS Group, Inc.
F&G	Fish and Game
FBC	Fluidized Bed Combustion
FEMA	Federal Emergency Management Agency
FGR	Flue Gas recirculation
GIS	Geographic Information System
GPS	Global Positioning System
GSU	generator step-up
H_2SO_4	Sulfuric Acid Mist
HAP	Hazardous Air Pollutant
HDPE	High-density polyethylene
Hp	Horsepower
HS 20+Mod	A design vehicle load category configuration consisting of a semi- or tractor trailer truck weighing 36 tons
Hz	hertz

ICE	Internal combustion engine
IPCC	International Panel on Climate Change
ISO-NE	Independent System Operator of New England
kcmil	thousand circular mils
kV	kilovolt
kVA	kilovolt ampere
kW	kilowatt
KWh	kilowatt-hour
L10	sound level that is exceeded for 10-percent of the time
L50	sound level that is exceeded for 50-percent of the time
L90	sound level that is exceeded for 90-percent of the time
LAER	Lowest Achievable Emission Rate
lb	pound
LBB	Laidlaw Berlin BioPower
L_{eq}	equivalent sound pressure level
LLC	Limited liability company
MACT	Maximum Achievable Control Technology
MGPD	million gallons per day
MMBtu	million British thermal units
mph	miles per hour
MW	Megawatt
MWe	Megawatt electric
N_2	nitrogen
NAAQS	National Ambient Air Quality Standards
NADC	North American Dismantling Company
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NH ARD	New Hampshire Department of Environmental Services Air Resources Division
NH DHR	New Hampshire Division of Historical Resources
NH DOT	New Hampshire Department of Transportation
NH F&G	New Hampshire Fish and Game Department
NH NHB	New Hampshire Natural Heritage Bureau
NH PUC	New Hampshire Public Utilities Commission
NH_3	aqueous ammonia
NHCAR	New Hampshire Code of Administrative Requirements
NHDES	New Hampshire Department of Environmental Services
NHOEP	New Hampshire Office of Energy and Planning
NIST	National Institute of Standards and Technology
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review
O_2	oxygen
°F psig	degrees Fahrenheit
op/ed	opposite the editorial page
OSHA	Occupational Safety and Health Agency

PM	particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
ppmvd	Parts per million volumetric dry
PSD	Prevention of Significant Deterioration
psig	pound-force per square inch gauge
PSNH	Public Service Company of New Hampshire
PUC	Public Utilities Commission
QA/QC	quality assurance/quality control
RACT	Reasonably Available Control Technology
RICE	Reciprocating Internal Combustion Engines
RPS	Renewable Energy Portfolio Standard
RSA	Revised Statutes Annotated
SACTI	Seasonal-Annual Cooling Tower Impact
SCR	Selective Catalytic Reduction
SILs	Significant Impact Levels
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SQG	Small Quantity Generator
STC	Sound Transmission Class
ULSD	Ultra Low Sulfur Diesel
US EPA	United States Environmental Protection Agency
US FWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
V	volt
VOC	volatile organic compounds
W	Watts
WWTF	Waste water treatment facility
WWTP	Waste water treatment plant
XLPE	Cross-linked polyethylene

EXECUTIVE SUMMARY

Laidlaw Berlin BioPower, LLC ("LBB") is proposing to convert and upgrade much of the remaining facility equipment and infrastructure located at the former Fraser Pulp Mill (also referred to as the Burgess Mill) in Berlin, New Hampshire (the "Site") in order to develop a biomass fueled energy generating facility. Berlin BioPower (the "Facility" or the "Project") will use whole tree wood chips and other low-grade clean wood as fuel, and will be capable of generating nominally 70 megawatts (MW) of electric power (gross output).

Project Benefits

The Project will provide a source of clean, carbon-neutral, renewable energy that will help support New Hampshire's goal of meeting 25% of the state's energy needs with renewable resources by 2025.[1] According to the Worldwatch Institute "Biopower currently provides only about 2 percent of U.S. electricity, but it has the potential to meet a much larger share of power demand while reducing pollution and revitalizing rural communities."[2] The U.S. Department of Energy states that in 2007 renewable energy accounted for 7% of total consumption in the U.S. with Biomass providing 53% of that followed by hydroelectric (36%), geothermal (5%),wind (5%) and Solar (1%).[3] The Project has been designed to incorporate advanced emissions control technologies and monitoring systems which will ensure that the unit meets the definition of "eligible biomass technologies" under New Hampshire's Electric Renewable Portfolio Standard.[4]

The Project's use of biomass fuel will also help reduce reliance on fossil fuels such as oil and natural gas that are in ever decreasing supply. Biomass fuel will be supplied to the Project predominantly from what has been defined as the Primary Source of Supply: an 11 million acre wood basket that is within a 100 mile (3 hour drive) radius of Berlin. According to a fiber study completed by LandVest, Inc. for LBB there is ample supply for the Project in excess of current demand (see Appendix P). In addition, as markets evolve, more low-grade biomass could be available on a long term sustained basis. The Project's use of this low-grade biomass, harvested in a sustainable manner, will significantly contribute to the health of the surrounding forests by providing a reliable long term market that supports timber stand management practices through the removal of inferior trees. Furthermore, it has been widely acknowledged that properly managed and healthy forests are an important tool in fighting global warming through their ability to sequester CO_2, a leading greenhouse gas.[5]

The Project will support economic development in the City of Berlin and the region commonly referred to as the North Country. Construction of the Project will infuse over $70 million into the local economy, and once operational, approximately 40 permanent jobs will be created to manage and operate the plant. On

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[1] House Bill 873, 26:1 VI (2207), see generally RSA 362-F.

[2] "American Energy, The Renewable Path to Energy Security", Worldwatch Institute, Center for American Progress, September 2006, at 22.

[3] EIA, *Reneable Energy Consumption and Electricity Preliminary 2007,* Statistics 2008.

[4] RSA 362-F:2, VIII.

[5] "*A Comparison of the Consequences of Power from Biomass Coal and Natural Gas*," Margaret Mann, National Renewable Energy Laboratory, Golden, Co. 2003

an annualized basis the plant will purchase approximately $20 million of clean biomass fuel, directly benefiting truckers, logging contractors, foresters and landowners. It is also expected that the Project will be one of the largest tax payers in the City of Berlin. Furthermore, LBB has a preliminary agreement with Fraser NH, LLC to supply hot water to the Gorham paper mill. Converting "waste" heat from the plant into usable hot water will increase the Project's overall energy efficiency and may allow Fraser to reduce their use of #6 fuel oil, and therefore lower their emissions and reduce their operating costs, a clear benefit to Fraser's paper mill and the environment. The Site also has unique characteristics that have allowed LBB to create a plan that will accommodate new business development on the Site without interfering with daily biomass plant operations. This will benefit not only the businesses that locate on the Site but also the City of Berlin, which presently has very limited real estate available for new business development.

Based on the most recent tax bill received in for property taxes due in December 2009, LBB currently pays approximately $170,000 in property taxes on an annualized basis. Upon completion of the Project this figure is expected to increase several fold to reflect the anticipated increase in property value related to the Project. This increase is expected to render LBB one of the largest property tax payers in the City of Berlin.

Project Site

The Project Site is a 62-acre parcel of land that comprises the southern half of the approximately 120 acre site formerly used as a pulp production facility. This pulp mill shut down in 2006, and much of the building infrastructure and equipment were removed. The Site is abutted to the northwest by the Androscoggin River and the remaining portion of the former pulp mill parcel on its northeastern edge. Adjacent properties also include a community ball field Community Street from the western end of the Site, and by a predominantly residential neighborhood across Coos and Hutchins Street to the south of the Site. The northern end of the downtown district of Berlin lies across the river from the southwest end of the Site. General commercial and business properties as well as a hydroelectric generating facility are located on the opposite side of the river along the remainder of the site.

Industrial activity at the Site dates back to the mid-1800's when the Brown Company built the first pulp and paper mill at the location. Although the mill changed owners several times, the Site has been used solely for pulp and paper manufacturing over the past 150 years. The Site and adjoining northern parcel remain zoned for industrial/business use. Refurbishment and reuse of the existing boiler and redevelopment of the Project Site will provide a beneficial use for the existing resources and a brownfield site that has limited future uses. The Project has been laid out on the Site to allow space for other businesses, with potential access to thermal energy from the biomass boiler.

Project Components

The Project's major components and layout on the Site are shown on the Site Plans contained in Appendix B of this Application. The black liquor recovery boiler currently located at the Site will be converted to a biomass fueled unit. The boiler was manufactured by Babcock & Wilcox (B&W) and originally installed in 1966 and refurbished in 1993. A bubbling fluidized bed (BFB), which represents highly efficient and advanced biomass combustion and power conversion technology, will be installed at the base of the boiler in place of the existing black liquor firing and recovery systems. The existing electrostatic precipitator (ESP) used to control particulate emissions will be refurbished or upgraded and a new selective catalytic reduction (SCR) system will be added to control NO_X emissions. The boiler and emissions control systems will be enclosed within a building (the "boiler building"), which will minimize noise impacts in the surrounding community and provide an aesthetically appropriate exterior finish, similar to a large commercial building.

Development of the overall Facility will also include construction of a new turbine building adjacent to the boiler building, which will house the steam turbine generator. A new cooling tower will be installed near the western edge of the property behind the boiler building. Two wood fuel off-loading and storage areas will be developed. Each wood handling and storage area will be paved and systems will be installed to properly manage stormwater. The fuel handling and storage area closest to the boiler will serve as the main fuel yard. Trucks delivering wood fuel to this area will be off loaded using three tilting truck dumpers. A rail siding that previously existed on the Site will also be re-constructed to allow for deliveries of wood fuel to the Site. The wood yard on the north east portion of the Site will be equipped with a single tilting truck dumper to accommodate delivery of wood chips, along with equipment to off-load whole logs. Equipment will be installed within a new building in this area to produce wood chips from whole logs. Chips produced in this area, along with those delivered directly to the main fuel yard will be mechanically conveyed to a wood processing building to assure uniform wood chip size. From the wood processing building, the chips will be conveyed into the boiler or returned to one of the storage piles adjacent to the boiler building in the main fuel yard.

An electric transmission interconnection line will be installed between the site and the existing high voltage transmission line operated by Public Service Company of New Hampshire (PSNH). A small switchyard will be installed adjacent to the turbine building, which will provide necessary power isolation systems and a step up transformer to increase the voltage of the power produced by the steam turbine generator to 115 kVA, consistent with the PSNH transmission line. From the switchyard, an underground transmission cable will be installed first through a new on-site duct bank, and then through an existing underground pipe formerly used to transport pulp from the site to the Fraser Gorham paper mill. The underground pipe exits the Site near the intersection of Coos and Community Streets and generally follows the route of the former rail line from the Site to Shelby Street and Devent Street. The transmission cable will transition to an overhead line approximately 0.75 miles south of the Site and 0.1 miles northwest of the existing PSNH East Side substation. The overhead transmission line will be installed within the existing cleared corridor between Devent Street and the PSNH substation.

In early December 2009, Laidlaw received the final version of an interconnection feasibility study (see body of the report provided in Appendix Q) from the Independent System Operator of the New England ("ISO-NE") transmission system the entity charged with oversight over the local transmission system. The results indicate that Laidlaw's project will be able to connect to the transmission system with upgrades estimated to be less than $1 million. The Study takes into account all existing facilities connected to the transmission system in the vicinity of the facility, as well as projects currently under development and ahead of Laidlaw in the ISO-NE queue. As the next step in the process, Laidlaw has authorized ISO-NE to commence a System Impact Study. While the results of the System Impact Study may identify certain additional costs related to system stability not taken into account in the Interconnection Feasibility Study, the results are not expected to provide any material impediment to the Facility being interconnected to the transmission system.

The Project will purchase water from the Berlin Water Works for cooling and process operations. Cooling water and process wastewater, comprised primarily of blowdown from the boiler and cooling tower, and all sanitary waste generated at the Facility, will be discharged to the Berlin Waste Water Treatment Facility. Stormwater will be collected and treated using a series of detention basins, swales, and structures. The stormwater collection system will reduce contaminant loadings prior to discharge at the existing outfall structure located across from the waste water treatment plant that once serviced the Pulp Mill. The Project will share this outfall structure with the Mt. Carberry Landfill under separate discharge permits.

Orderly Development of the Region

The construction and operation of the Project will have a very significant, positive effect on the City and region, as discussed more fully in this Application. The Project will convert a Brownfield site with environmental issues that are a barrier to development into an asset for the City of Berlin that will foster additional economic development and rising employment. LBB is ready and willing to work with the City to acquire the balance of the former Pulp Mill site (i.e. the remaining 40 acres of land that were part of the Pulp Mill site and located immediately adjacent to the Project Site) and prepare it for redevelopment. LBB has offered its support for the formation of a nonprofit organization under Internal Revenue Code § 501(c)(3) to acquire the property and help guide a plan to redevelop it. With that redevelopment, economically diverse and beneficial projects could be located adjacent to the Site.

The Project will provide for support and expansion of the local economic base. It will bring increased economic activity to the City and the region during construction and operation. Furthermore, the Project will be a major addition to the tax base in the City of Berlin without burdening public services.
Construction of the Project will inject approximately $80 million into the surrounding economy for the purchase of local goods and services such as such as earthwork, engineering, general construction services, specialized trades, construction materials and support services. The Project will have substantial long-term economic benefits, including permanent direct employment for 40 people related to the operation of the Project and indirect employment of up to 300 people for timber harvesting and processing, trucking, forestry consulting services, and mechanical services. LBB hopes to draw most of the Plant employees from the greater Berlin area. The Facility will provide increased commerce in the area from the purchases of local goods and services by the Project and employees.

The Project brings a new enterprise and diversity to the Berlin economy by shifting from the production of paper to renewable energy. LBB hopes to act as incubator for the development of new businesses that may be similarly involved in the clean energy sector. The plant is being designed to utilize "waste heat" which will be converted to hot water for use at the Fraser paper mill in Gorham. This feature offers the opportunity to help reduce fuel oil costs at the paper mill.

The Project is compatible with and supportive of the forest industry in the region. It will provide a steady, dependable market for wood and in turn providing strong incentives for long-term commercial forestry management. The regional logging and trucking industries, as well as landowners, will be able to rely on this dependable market that will be largely insulated from fluctuations in global markets. The facility will spend between $20 million and $25 million per year on biomass fuel purchases and will seek to keep the purchase of the renewable timber supply in the immediate vicinity of the power plant.

The Project is not expected to will have any impact on outdoor recreation in the region around Berlin where outdoor recreation activities include hiking, cross country skiing, all terrain vehicle and snowmobile riding, golf, hunting, fishing and boating. LBB has committed to working with the local community to allow a recreational path along the Site perimeter that abuts Hutchins Street so that ATV and snowmobiles may access the trail network to the north with directly traveling on Hutchins Street.

This project will contribute to energy security and reduced energy costs through the sale of clean renewable electricity into the New England power market. This integrated electric power market is vulnerable to price spikes as a result of the increasing demand for fossil fuels worldwide. With over half of its energy generation derived from fossil fuels, the New England region, including New Hampshire, has experienced increases and periodic spikes in electricity prices. Due to its low operating cost, biomass-produced electricity may help stabilize electricity prices in the New England electricity market.

Consistency With State Energy Policy

Pursuant to RSA 378:37, "it is the energy policy of this state to meet the energy needs of the citizens and businesses of the state at the lowest reasonable cost while providing for the reliability and diversity of energy sources; the protection of the safety and health of the citizens, the physical environment of the state, and the future supplies of nonrenewable resources; and consideration of the financial stability of the state's utilities." The Project is consistent with, and furthers that Policy.

The Project will provide clean, renewable electricity to meet current and future demands of the State's citizens and businesses. It will increase the diversity and reliability of New Hampshire's energy sources, thereby helping improve the financial stability of the State's utilities. The Project will also help New Hampshire utilities meet the requirements of the State Renewable Portfolio Standard (RSA 362-F). The use of clean biomass and advanced emissions control technology will ensure that the Project is consistent with State and regional environmental goals, and protective of the health and safety of New Hampshire citizens.

By reducing the generation of electricity from natural gas, currently one of the major electric energy fuel sources in New England, the negative consequences of price volatility are reduced through the use of renewables such as biomass. Biomass is a locally produced commodity with minimal barriers to entry which offers price stability.

Applicant's Capabilities

Homeland Renewable Energy, Inc. (HRE), an indirect equity owner of the Applicant, will provide substantial technical and managerial capabilities to the project. HRE's management and engineering team have extensive experience in the power industry with respect to the design, construction, operation and maintenance of biomass power plants. The HRE team recently oversaw the development, construction and operation of a 55 MW biomass plant in Benson, Minnesota.

The projected budget for the construction of the Project is $110 million. LBB has entered into a Development Agreement with PJPD Holdings, LLC, whereby PJPD has agreed to provide capital to fund the development of the project until such time as all construction financing is in place. To date PJPD has contributed approximately $10 million of capital. PJPD is an affiliate of NewCo Energy, Inc. NewCo's owners and its Board of Advisors include both the former and current managing partners of Accenture's Utilities Practice, as well as other individuals associated with Accenture, who have experience in the development, investment, and operations of power generation projects through its consulting practice and outsourcing practice.

LBB has agreed to enter into a long-term lease agreement with PJPD totaling 50 years (including automatic renewal options) and in consideration PJPD has agreed to provide 100 percent of the capital required to construct the Project. The cash flows of the Project, which will be supported by a long-term power purchase contract with an investment grade rated utility, will support debt financing for the Project while the lessor provides the equity capital. The capital structure of the Project is expected to be comprised of approximately $80 million of debt and $30 million of equity. The debt financing is expected to be provided by various institutional investors. The equity capital will be provided by PJPD. Additional information about the Applicant's financial, technical and managerial capabilities is found in Section (h)(5) of this Application, and in the Pre-filed Testimony of Michael Bartoszek and Carl Strickler.

Project Impacts

A brief description of the impacts associated with the Project and primary mitigation measures that have been incorporated into the Project design are provided below.

Air Quality

The boiler's existing emissions control system will be upgraded with Best Available Control Technology ("BACT") and Lowest Achievable Emission Rate ("LAER") technology[6] to provide the highest level of emissions control achievable in practice, assure compliance with applicable state and federal air quality regulations, and meet the emissions limitations specified in New Hampshire's Renewable Energy Portfolio Standards. LBB will obtain emissions reduction credits to offset the Project's potential emissions of nitrogen oxides. Emission rates of Hazardous Air

Pollutants ("HAPs") will meet levels deemed Maximum Achievable Control Technology ("MACT") for wood fueled boilers.

The existing ESP will be refurbished upgraded up to and including the possible addition of a third parallel ESP chamber, to achieve a particulate emission rate less than 0.012 pounds per million Btu of heat input to the boiler ("lbs/MMBtu"). This emission rate is approximately one-half of the applicable regulatory limit. A new SCR system will be installed following the ESP to control emissions of NO_X to no more than 0.065 lbs/MMBtu, a level previously deemed as LAER by the New Hampshire Department of Environmental Services, Air Resources Division ("ARD"). Emissions of carbon monoxide ("CO") and volatile organic compounds ("VOC") that typically result from incomplete fuel combustion will be minimized by the advanced and highly efficient BFB combustion technology that will be installed in the boiler. Emissions of sulfur compounds and trace metals will be minimized by the inherently clean composition of the wood fuel.

The ambient air quality impacts resulting from the boiler and the emissions control technologies summarized above have been evaluated using computer dispersion models approved by the US EPA and NH DES. The impacts to air quality are well below the levels established in the National Ambient Air Quality Standards ("NAAQS"), which have been developed to be protective of human health and the environment, including a margin of safety, for even the most sensitive of the population.

The Project will be subject to stringent ongoing performance testing, monitoring, recordkeeping and reporting to both NHDES and US EPA over its operating life to assure that the actual emissions from the Facility meet the proposed limits.

Noise

The Project has been designed with advanced equipment and added noise suppression measures to assure that the Project will not exceed the selected reference criteria for impacts in the surrounding community which mirror the level contained in the City of Berlin's noise performance standards. The primary sources of noise will be the boiler, ancillary plant equipment (fans, pumps, etc.), the cooling tower, wood unloading equipment, wood processing equipment (chippers and screen), an electric transformer, and mobile equipment such as fuel delivery trucks, front end loaders, and other equipment handling wood in the two wood yards. The boiler, its major supporting equipment, and the wood processing equipment will be located within buildings and/or in enclosures designed to reduce sound transmittance. Barrier walls will be installed near the cooling tower to reduce cooling tower sound levels at the nearby property line. A barrier wall will similarly be installed in the switchyard area to reduce off site noise impacts from the facility's step-up transformer. LBB has agreed with the community to only accept truck deliveries and operate the proposed on-site wood chipping process Monday through Saturday

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[6] BACT applies to those criteria pollutants for which the ambient air quality meets National Ambient Air Quality Standards. LAER applies to any criteria pollutants for which the ambient air quality exceeds NAAQS. In the case of the proposed Project, LAER

during daytime periods to avoid the impact of these noise sources during more sensitive nighttime periods.

Sophisticated computer modeling of the Project's sources of sound was conducted to predict potential off-site impacts. Predictions were developed using the Computer Aided Noise Abatement ("Cadna-A") model, which is advanced noise evaluation software used for analysis of sounds generated by energy and industrial facilities, transportation and other activities. The model is capable of processing sound power levels from multiple sources simultaneously, taking into account the affects of noise mitigation systems, structures, topography, land cover types, and producing three-dimensional graphical output results of predicted sound pressure levels. The results of the modeling predict that the Project will not result in sound pressure levels greater than 60 decibels (A-weighted scale, dBA) during nighttime hours or 70 dBA during daytime hours in the surrounding community. For comparative purposes, the sound level of a normal conversation is equivalent to approximately 60 dBA. The sound levels predicted for the Facility are below the reference criteria selected for the Project, which mirror the limits established in the City of Berlin's Zoning Ordinances noise Performance Standards.

As part of the Project development activities, background monitoring was conducted at the Site property line and at several locations in the community over a multi-day period to determine existing sound levels during both daytime and nighttime hours. Comparison of the Project's predicted noise levels to this baseline data indicates that the average existing ambient sound levels are predicted to increase by less than 4 dBA in most areas beyond the Project Site's boundaries.

Water Supply

The water supply for the Facility will be provided by the Berlin Water Works municipal supply and distribution system. The Facility will have a peak demand of up to 1.8 million gallons per day ("MGPD") of water, and annual average demand of approximately 1.0 MGD. Water will be used primarily for cooling tower and boiler make-up, periodic equipment washing, and sanitary uses. The Project incorporates water recycling and re-use strategies to minimize raw water demand.

The Berlin Water Works distribution system has a total storage capacity of 5 million gallons, and according to the Water Works Superintendent, the current system demand is approximately 1.1 MGPD. The Water Works Superintendent has indicated that the system supplied approximately 2.5 MGPD as recently as 2000, and that there is adequate capacity and infrastructure to meet the Project's requirements and allow for future growth in the City. System improvements have been made since 2000 that have served to reduce system losses and further expand system capacity to new users. Appendix N contains a letter from the Superintendent of the Berlin Water Works confirming the adequacy of the system to supply water to the Facility for its operations.

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applies only to emissions of nitrogen oxides, which contribute to moderate ozone non-attainment in northern, New Hampshire.

Wastewater

Wastewater generated by the Project will be comprised primarily of blowdown from the cooling tower, along with periodic equipment washing activities and sanitary uses. Wastewater blowdown from the boiler will be sent to the cooling tower to reduce make-up water demand and overall wastewater discharge from the Facility. All process wastewater, including water collected in floor drains from equipment washing, will be discharged to the City sewer system. The Facility is expected to have a peak discharge rate of up to 300,000 gallons per day of process and sanitary wastewater. Based on the proposed uses and the expected raw water treatment regimens, pretreatment of the wastewater discharges will not be required to meet all applicable discharge requirements. LBB has had preliminary conversation with the Superintendent of the Berlin Waste Water Treatment Plant indicating that the municipal sewer system and the City's Waste Water Treatment Facility can accept and properly handle the wastewater discharge from the Facility.

Stormwater

Stormwater from areas of significant activity or material storage on the Site will be collected and treated through a newly installed stormwater management system. The system will utilize a series of structures (detention basins, deep sump catch basins with hooded inlets, oil water separators, vegetated swales, etc.) that will control peak runoff rates to match historical conditions, provide pretreatment of stormwater runoff, and ensure compliance with the New Hampshire Department of Environmental Services ("NHDES") Stormwater Manual and Alteration of Terrain Program regulations.

The stormwater will leave the Site through an existing 30 inch diameter pipe that leads to the former Pulp Mill Wastewater Treatment Plant (WWTP). The stormwater pipe will be disconnected from the WWTP and interconnected to the existing outfall discharge pipe that services the WWTP currently operated by the Androscoggin Valley Regional Refuse Disposal District (the "District"). LBB has entered into agreements with the District to share the outfall structure with individual water quality sampling points located upstream of the confluence of the effluent streams to provide for individual compliance determinations.

Measures will be taken to prevent impacts to stormwater runoff generated during Project construction. Erosion and sedimentation control procedures will be implemented prior to and during construction activities, including silt fence and hay bale barriers on the upgradient side of resource areas. Storage and refueling of equipment will occur within properly designated areas that provide proper containment and avoid wetland resources. Areas of exposed soil will be kept to a minimum, and a permanent vegetative cover or other form of stabilization will be established as soon as possible.

Land Use

Current uses of properties surrounding the Site can be characterized as industrial, commercial, residential, and open space. The Site itself is zoned industrial/business. The current zoning designations and uses of properties surrounding the Site include:

- A vacant tract of land, which was part of the former Pulp Mill property, zoned Industrial/Business is located adjacent to the northeast property boundary of the Site. Residential Single-family properties exist north of this tract, along with vacant land, and the more distant Mt. Carberry Landfill.
- Residential and commercial properties are located to east and southeast of the Site in an area zoned as Residential Two-family and Single Family directly across Hutchins Street,.
- A small park (open space), residential properties, and a few commercial properties are located to the south of the Site directly across Hutchins, Coos, and Community Streets.
- The Androscoggin River directly abuts the Site to the west/northwest. The PSNH J. Brodie Smith Hydroelectric Generation Facility is located across the River from the Site to the west/northwest.
- The northern end of the Berlin Downtown District is located across the river from the south west end of the site.
- Several commercial properties are located across the river from the remainder of the Site, including a property which was part of the former Pulp Mill and is currently occupied by two buildings.

The Project is compatible with land uses on and around the Site, as represented by the Site's zoning designation and is consistent with other similar biomass generating facilities located in similar settings. Buffering for nearby residences is afforded by the size of the Site and the location of the primary structures in the southwest corner of the Site. LBB proposes to enhance landscaping along the site perimeter to provide additional visual buffering. As analyzed and summarized throughout this application, the Facility is being designed and will be operated to avoid adverse Project impacts on surrounding land uses related to air quality, dust, odor, noise, public safety or visual aesthetics.

Habitat

LBB completed and filed a database check request form with the Natural Heritage Bureau ("NHB") which described the proposed Project and sought information regarding known locations of rare species and exemplary natural communities. A similar request was filed with the US Fish and Wildlife Service ("US FWS") requesting information on federally-listed or candidate endangered and threatened species or habitats within or immediately adjacent to the Project area. The US FWS response indicated that no federally-listed or proposed, threatened or endangered species or critical habitat under their jurisdiction are known to occur in the Project area and preparation of a Biological Assessment or further consultation with US FWS is not required.

The NHB response indicated that the Bald Eagle, a threatened species, and the Common Nighthawk, an endangered species had been identified in the general Berlin area. However, maps provided by NHB showing the specific locations associated with these species indicated that their presence had only been identified in the general downtown area of Berlin in the case of the Nighthawk and along the Androscoggin River banks south of the Project Site in the case of the Bald Eagle. In response to additional information on the project provided by LBB, NHB replied that they do not expect impacts to the Bald Eagle provided that no trees within 50 feet of the Androscoggin River will be removed. NHB further indicated that allowing habitat along the River to revert back to native trees and shrubs would be encouraged to provide future perching and roosting sites for Bald Eagles. LBB has committed to not altering land within 50 feet of the river bank and allowing natural vegetation to establish within these areas. With regard to Common Nighthawks, NHB indicated that they have not received breeding reports for this species in Berlin for a number of years and do not expect impacts to the species as a result of the proposed Project.

Aesthetics

In general, views of the proposed Facility exist throughout the City of Berlin largely due to the local topography and the proximity to the Site. The Site is settled into a bowl-shaped valley at the center of Berlin along the banks of the Androscoggin River, and is surrounded by a series of small mountains just east of the White Mountain National Forest and within the southern reaches of the Great North Woods. Due to the local hilly terrain, views of the Site are limited to the settled downtown area and the residential communities immediately surrounding it. Direct lines of sight toward the Facility are often obstructed or partially screened by intervening structures and seasonal vegetative cover. The most prominent open views are found at close range, especially in the section of Berlin east of the Androscoggin River.

The current boiler structure and appurtenances located at the Site can best be described as industrial and rundown in appearance, with exposed metal superstructure, piping, and tanks. The Site itself shows significant evidence of the prior demolition activities, including demolition rubble, and large areas of unmaintained vegetation and gravel areas that are experiencing erosion. The planned improvements to the existing structures will serve to improve the appearance of the Facility from those locations within the City where it is visible. The main structures will be sided to appear similar to a large commercial facility, and will have siding and supports with low glare colors that are compatible with the background environments. Areas along the border of the Site will be landscaped and planted to improve visual appearance and buffering. Photographic simulations were developed that show several of these attributes and the expected appearance from nearby and far field view points. When compared with the same photographs showing existing conditions, the simulations of the as-built structures demonstrate a significant improvement in the aesthetic impacts of the Facility.

LBB has developed a lighting plan that will be responsive to site safety considerations but minimizes lighting along plant roadways, outside fuel handling areas, parking areas, and the main building. The lighting plan minimizes off site light impacts to levels below that established in the City of Berlin Zoning Ordinance.

Historic Resources

A number of historic properties are located within the City of Berlin, including properties listed on the National Register of Historic Places (NRHP). Specifically, the Congregational Church, St. Anne Church, and Holy Resurrection Orthodox Church are listed on the NRHP. In general, most of what has been deemed to possess cultural or historic significance in the Berlin area has been developed concurrent with the historic industrial activities at the Project Site. The conversion of the Site to operate as a biomass-fueled electric generating facility will have significantly smaller impacts than the prior Pulp Mill and will be less intrusive to the ongoing use, maintenance and enjoyment of cultural and historic resources in the community. LBB also plans to play a positive role in maintaining the strong cultural and historic significance of area and pride of the community. Development of the planned scenic riverwalk along the northwest portion of the Site will help facilitate the community's enjoyment of historic resources along the river.

LBB completed and filed a Request for Project Review with the New Hampshire Department of Historic Resources ("DHR") that included Project Site plans, photographs of historic and existing conditions, and photographic simulations of the built Project. DHR has requested completion of a Project Area Form by a qualified architectural historian to determine if any of the structures on the Site or in the surrounding neighborhoods are eligible for listing as historic resources. DHR has also requested to be kept informed of local outreach efforts and any proposed alterations to existing structures on the Site. LBB has committed to working with DHR in these reviews. DHR has confirmed that such discussions are a normal component of the SEC review process and are expected to conclude within the SEC review timeline.

Public Safety

- Traffic

The main truck entrance to the Project Site is located along Hutchins Street across from the entrance to the Mt. Carberry Landfill, at the same point where trucks carrying wood to the Pulp Mill historically entered and exited. The new on-site truck access road and scale house has been laid out to provide on-site queuing of approximately 16 trucks and prevent trucks from being parked along Hutchins Street. A separate Site entrance for employees, visitors and miscellaneous deliveries is provided off from Community Street to prevent conflicts with trucks.

Regional access to the Site is provided from the north and south of the site by New Hampshire Route 16. Vehicles approaching from the south leave Route 16 south of the downtown area and follow the designated truck route: Unity, Coos and Hutchins Streets to the Site. The streets all have adequate width to accommodate large vehicles and are equipped with breakdown lanes. The primary intersections where trucks will exist and enter Route 16 are controlled by traffic signals. Truck traffic levels during Project operation are expected to be similar or less than those that occurred when the Pulp Mill was operating and not result in adverse impacts to traffic flow or public safety.

Construction of the Project will take approximately 26 to 32 months, including commissioning and testing. The peak construction work force will be an estimated 300 personnel per day for approximately 4 months. The typical construction work force will range from 150 personnel or less in the initial and final months of construction, with up to 200-300 personnel per day for approximately 9 months. LBB will seek to implement and incentivize traffic demand measures where practicable to minimize construction related traffic. Work will typically be scheduled between 7:00 am and 5:00 pm which will help avoid construction traffic during peak roadway hours. Large equipment deliveries will be scheduled to occur during off peak times, to the extent practicable. The short-term period of high construction related traffic is not expected to cause unreasonable adverse impacts to traffic flows on City streets, or public safety.

Once construction is completed, the facility will be operated seven days a week, twenty-four hours per day with staff working two shifts maintaining a maximum of 25 personnel per shift. The estimated traffic to be generated by staff is approximately 100 vehicle trips per day. Truck traffic for delivery of wood fuel for the biomass boiler will consist of approximately 100-120 trucks per day, between the hours of 5 AM and 9 PM. Peak truck traffic to the site is expected to occur in the initial operating hours, before peak levels occur from daily commuting. The estimated total daily truck traffic is slightly more than one-third of the levels measured by NH DOT in 2005 when the Fraser Pulp Mill was operating. The Project is expected to generate daily truck traffic similar to or below the levels that occurred when the pulp mill was operating, and not result in adverse impacts to traffic flow on City roads.

- Cooling Tower Fogging & Icing

The Seasonal-Annual Cooling Tower Impact (SACTI) model, developed by Argonne National Labs for evaluating the behavior of cooling tower plumes was used to assess potential localized impacts of the Project's wet cooling tower. A year of meteorological data collected from the area of the Project Site was input to the model along with the worst case operating cooling tower parameters. The cooling tower was assumed to operate under maximum load conditions for all days of the year. The SACTI model predicted that no ground level icing or fogging conditions would occur due to the tower's operation.

- Hazardous Materials

Construction of the Project may encounter soils and/or groundwater with low levels organic or heavy metal contaminants. LBB has reviewed information on existing site conditions and has developed a soil and groundwater management plan (Appendix M) to assure that any contaminants encountered are identified and properly addressed. The plan includes provisions for proper soil handling, sampling and analysis, and re-use or off-site disposal. The plan also provides for air quality monitoring to assure that any encountered contaminants are not transported off-site due to excavation activities.

The Project, when operational, will utilize quantities of common industrial chemicals such as fuel oil, lubricating oils, aqueous ammonia, and water treatment additives. All chemicals will be stored in properly designed devices, which will be equipped with secondary containment. LBB has developed a Pollution Prevention and Emergency Response Plan (Appendix L) that identifies Best Management Practices and proper operating procedures to assure that chemical use at the Facility does not result in any adverse impacts to the environment or public safety. Plant personnel will receive proper hazardous materials training and will be provided with and trained in proper emergency response procedures in the event of equipment malfunction or failure or spills of hazardous materials. The Facility operators will contract with outside emergency response providers to respond to a spill of oil or hazardous materials.

- Fire and Security

The Facility will be designed, constructed and operated to ensure the safety of employees and the surrounding community. All designs, activities, and equipment for the Facility will be in accordance with good engineering practice and the latest editions of the standards and regulations and engineering associations, including organizations like the Occupational Safety and Health Agency ("OSHA"), National Electric Manufacturers Association, U.S. Department of Transportation, American Society of Mechanical Engineers, American National Standards Institute ("ANSI"), and the National Fire Protection Association ("NFPA").

Facility operation will be properly controlled and monitored. An efficient, functional, and proactive maintenance program will be implemented to ensure safe and reliable Facility operation. The maintenance program will include regular visual inspections, preventative maintenance checks, and continuous documentation of operating and maintenance parameters. Local responsible officials from the fire and police departments will be given site plans, access information and regular tours of the Facility.

The facility's fire protection system will be designed to meet NFPA specifications along with the requirements of state and local public safety officials. A complete on-site fire protection system will be installed for emergency use. The primary source of fire suppression water will be the existing municipal water supply system. That system will be backed up with a diesel powered fire water pump that will draw water from the cooling tower sump in the event that the municipal system supply pressure is not sufficient.

LIST OF APPENDICES

LIST OF FIGURES

Figure (h)(3)(iv)-9	Existing Conditions – View From Project Site
Figure (h)(3)(iv)-10	Proposed Conditions – Simulated View From Project Site

LIST OF TABLES

APPLICATION INFORMATION

(a) SIGNATURE OF APPLICANT

Certification by Executive Officer of Laidlaw Berlin BioPower, LLC.

In accordance with RSA 162-H:8, I, Michael B. Bartoszek, the chief executive officer of Laidlaw Berlin BioPower, LLC, do hereby swear and affirm that the information contained in this Application is true and accurate to the best of my knowledge and belief.

I also certify that, as an Applicant to the New Hampshire Site Evaluation Committee, Laidlaw Berlin BioPower, LLC, agrees to provide such information as the Committee shall require to carry out the purposes of RSA 162-H.

Laidlaw Berlin BioPower, LLC.
Michael Bartoszek

Name: Michael B. Bartoszek

Title: President + CEO

Date: 12/11/09

State of New York

County of New York

On this 11th day of December, 2009, personally appeared before me the above-named Michael B. Bartoszek, chief executive officer of Laidlaw Berlin BioPower, LLC and swore and affirmed that the information contained in this Application is true and accurate to the best of his knowledge and belief.

Notary Public

My commission expires on 08. 31. 2013

MICHAEL RAFKIND
Notary Public, State of New York
No. 01RA6127762
Qualified in New York County
My Commission Expires ~~[illegible]~~
8/31/13

(b) APPLICANT INFORMATION

(1) The name of the applicant

Laidlaw Berlin BioPower, LLC

(2) The applicant's mailing address, telephone and fax numbers, and e-mail address

90 John Street
Suite 401
New York, NY 10038
Tel. 212-480-8400
Fax 212-480-8448

Email: mbb@laidlawenergy.com

(3) The name and address of the applicant's parent company, association or corporation if the applicant is a subsidiary

The applicant is jointly owned by Laidlaw BioPower, LLC and Homeland Laidlaw Energy, LLC

(4) If the applicant is a corporation:

a. The state of incorporation

Delaware

b. The corporation's principal place of business

New Hampshire

c. The names and addresses of its directors, officers and stockholders

Michael B. Bartoszek, President & CEO, Director
Louis T. Bravakis, Vice President
Raymond S. Kusche, Vice President

c/o Laidlaw Energy Group, Inc.
90 John Street, Suite 401
New York, NY 10038

The stockholders of the applicant are as follows:

Laidlaw BioPower, LLC 50%
Homeland Laidlaw Energy, LLC 50%

(5) If the applicant is an association, the names and addresses of the residences of the members of the association

n/a

(6) Whether the applicant is the owner or lessee of the site or facility or has some legal or business relationship to it

LBB acquired the site on December 23, 2008 in connection with a "sale/leaseback" financing transaction and is the long term lessee and operator of the site.

In addition, LBB has procured the following:

- Easement for Railroad access and line maintenance with North American Dismantling
- Easement for Railroad access and line maintenance with Fraser NH, LLC
- Letter Agreement with Fraser NH, LLC to grant a Utility Easement for pipelines to Berlin Waste Water Treatment Facility and Mt. Carberry's Outfall Structure and transmission access to Public Service of New Hampshire's East Street Substation.
- Memorandum of Understanding ("MOU") with Mt. Carberry Landfill to grant an Easement to share use of existing outfall structure.

(7) A statement of assets and liabilities of the applicant

LBB's statement of assets and liabilities can be found in Appendix O.

(c) SITE INFORMATION

(1) The location and address of the site of the proposed facility

The Project Site is located along the northern sides of Community, Coos and Hutchins Streets in Berlin. The Androscoggin River runs along the northwest boundary of the site. The northeast border of the site abuts the remaining portion of the former Fraser Pulp Mill.

(2) Site acreage, shown on an attached property map and located by scale on a U.S. Geological Survey or GIS map

The Site is approximately 62 acres of land zoned as Industrial/Business, and consists of the southern portion of the property formerly known as the Burgess Mill, Berlin Mill, and most recently the Fraser Pulp Mill. Figure (c)(2)-1 is an Alta Plan used to support subdivision of the former mill property which shows the acreage of the Site. Figures (c)(2)-2 and (c)(2)-3 show the location of the Site and routes for the electric interconnection and stormwater discharge pipe on a U.S.G.S. map and an orthophotograph, respectively.

(3) The location of residences, industrial buildings, and other structures and improvements within or adjacent to the site

(i) Adjacent Properties

Figure (c)(3)-1 is an aerial photograph of the Site and the location of residences and buildings on other properties that surround the site.

Based on Site reconnaissance and review of available records, current uses of properties adjacent to the Site include industrial, commercial, residential, and open space. The Site itself is zoned industrial/business. The City of Berlin zoning designations for areas adjacent to the Site are shown in Figure (c)(3)-2. The current zoning designations and uses of these properties are summarized below:

Northeast end of the Site – Immediately adjacent to the Site is a vacant tract of land zoned as Industrial/Business, which is part of the former overall pulp mill property. Residential Single-family properties exist north of this tract, along with vacant land, and the nearby Mt. Carberry Landfill.

East and Southeast of the Site – Residential and commercial properties exist across Hutchins Street, zoned as Residential Two-family and Single Family.

South of the Site – A park (open space), residential properties, and a few commercial properties are located across Hutchins, Coos, and Community Streets from the Site.

West/Northwest of the Site – The Androscoggin River directly abuts the Site to the west/northwest. The northern end of the Berlin Downtown District is located across the river from the south west end of the site. Several commercial properties are located across the river from the northwest portions of the Site, including a property which was part of the former Burgess Mill and is currently occupied by two buildings. The river is also the site of a hydroelectric dam, penstocks, and a hydroelectric generating station.

(ii) Project Site – Existing Structures

Figure (c)(3)-3 is a Project Site Plan that shows both existing and proposed structures on the Site. The Site has a long history of industrial use and development, with many other buildings having been razed and replaced over the years. The original structure constructed on the Site was the Riverside Newsprint Building built in 1891, at which time pulping and papermaking activities began at the Site. The Site continued to be used for pulping operations until September 2001, when operations were temporarily suspended, resuming again in 2003 after the property was purchased by Fraser.

The pulp mill permanently closed in May of 2006 and the Site was sold to North American Dismantling Company (NADC), after which the majority of buildings and structures were razed. The extent of ground disturbance resulting from razing operations is portrayed in Photographs 1, 2 and 3 (Appendix J), which are photographs of the Site as it once stood. The boiler building and stack which will be re-used as part of the Project are the prominent features located on the left-hand side of Photographs 1 and 2. The other remaining structures on the Site which may be maintained or sold to others for future use are:

- The former Riverside Newsprint Shipping Department (c. 1891)
- The former bailed pulp storage building (c. 1941);
- The former waste mill (c. 1953);

The proposed Project is compatible with the Site’s zoning designation. Buffering for adjacent residences is afforded by the large size of the Site and the location of the primary structures in the southwest corner of the Site. LBB plans to work with the community in developing an enhanced landscaping plan for the Site perimeter to provide additional visual buffering.

(4) Identification of wetlands and surface waters of the state within or adjacent to the site

ESS reviewed the United States Geological Survey Map, United States Fish and Wildlife Wetlands Inventory Map, Natural Resources Conservation Services soils map, and New Hampshire Geographically Referenced Analysis and Information Transfer (“GRANIT”) System to initially identify wetlands and surface waters within and adjacent to the Site. Wetland areas identified by these resources are shown in Figure (c)(4)-1. According to these data resources, there are no previously mapped or identified wetlands or surface waters within the area formerly occupied by the mills.

ESS certified Professional Wetland Scientists then conducted a detailed inspection of the Site to further identify any wetlands resources. As a result of this assessment, a wetland area along the bank of the Androscoggin River was identified, along with a small area in the northwest portion of the Site where an underground stream briefly rises to the surface, and a similar location near the Site truck access point. These wetland areas were flagged during this assessment and field surveying was conducted to accurately identify their locations on the Site Plans contained in Appendix B. The surface waters adjacent to the Site and the on-site wetland areas are discussed further below.

The Androscoggin River runs in a generally north-south direction and abuts the Site for nearly the entire length of its western and northwestern borders. The Site is within the middle Androscoggin River watershed. The banks of the Androscoggin River are steep and the river drops in elevation along the Site. The former mills at the Site included buildings and infrastructure built into the bank and within the river.

The Androscoggin River level is controlled by multiple dams near the site. At the northwest end of the Site is the Sawmill Dam and the Riverside Dam is south of the southwest end of the Site. The flow rate and height of the Androscoggin River fluctuate as a result of changes in seasonal precipitation and the operation of these dams. The USGS classifies the Androscoggin River as a "large stream to river" (greater than 1,000 to 10,000 cubic feet per second). The FEMA Flood Insurance Rate Map shows the 100-year flood elevation ranging from approximately 1050 to 1015 feet.

NH DES classifies the Androscoggin River as a Class B surface water body. Class B waters are defined as the second highest quality waters acceptable for fishing, swimming, and other recreational purposes, and after adequate treatment, for use as water supplies. According to the State of New Hampshire 2000 Section 305(b) Water Quality Report, the Androscoggin River is considered "impaired" due to water quality exceedances of copper, dioxins, pathogens, and zinc. In addition, the Androscoggin River Watershed Council posted a swimming advisory for the Androscoggin River beginning one mile north of the Berlin and Gorham town line. It is unknown when the swimming advisory took effect (US Department of Health and Human Services 2007).

Currently, a vegetated waterfront buffer of trees and old mill infrastructure run along the river bank for the length of the Site that abuts the river. The extent of natural woodland buffer extends on average 50-feet (0–85 feet) from the reference line (high water mark) of the Androscoggin River. Trees along the buffer include paper birch (*Betula papyrifera*), quaking aspen (*Populus tremuloides*), and sparse red spruce (*Picea rubens*). In the understory is fire cherry (*Prunus pensylvanica*), striped maple (*Acer pensylvanicum*), elderberry (*Sambucus canadensis*), red osier dogwood (*Cornus stolonifera*), and staghorn sumac (*Rhus typhina*).

An intermittent stream flows from the hill east of the Site under Hutchins Avenue and into the Site. East of the Site, the stream is piped under Forebush Avenue, Kent Street, Hutchins Street, and then enters the Site near the western corner. On the Site, the stream "daylights" (is not contained in underground pipes or culverts) for several feet and is then piped underground again. Except for a small area where the stream daylights under a small railroad bridge, it is culverted underground across the majority of the Site and eventually drains into the Androscoggin River near the northwestern corner of the property. At the point where the stream daylights at the railroad bridge another drainage enters the stream from the northeast. This drainage follows the underground penstock that served the Fraser Pulp Mill.

As shown in soil map for the Site provided as Figure (c)(4)-2, the Site is mapped as containing soils that predominantly fall into the classifications of Tunbridge-Peru and Tunbridge-Berkshire-Lyman. The northeast corner of the Site is mapped as Dumps-organic, which is likely due to the historic wood handling activities. The surface soils of the Site currently exhibit few if any signs of native soils but rather consist of fill, including gravel, brick, and demolition debris, along with wood fiber and organic matter characteristic of Tunbridge soils.

(5) Identification of natural and other resources at or within or adjacent to the site

(i) Habitat

The availability of habitat resources at, within, or adjacent to the Site are limited primarily due to the long history of industrial use in the area. A Natural Resources Inventory was conducted for Berlin in October of 2005 by Watershed to Wildlife, Inc. The report details many habitat types that can be found in the Berlin area, including within and along the banks of the Androscoggin River. The report notes an absence of vegetative buffer for erosion control which is evident along portions of the river bank abutting the Site.

Table (c)(5)-1 provides the New Hampshire Natural Heritage Bureau's ("NHB") inventory listings for rare plants, rare animals, and exemplary natural communities in the City of Berlin. LBB completed and filed a database check request form with the NHB which described the proposed Project and sought information regarding known locations of rare species and exemplary natural communities in the area of the Project. A similar request was filed with the US Fish and Wildlife Service ("US FWS") requesting information on federally-listed or candidate endangered and threatened species or habitats within or adjacent to the Project area.

The US FWS response indicated that based on information currently available, no federally-listed or proposed, threatened or endangered species or critical habitat under their jurisdiction are known to occur in the Project area and preparation of a Biological Assessment or further consultation with US FWS is not required. The NHB response indicated that the Bald Eagle, a threatened species, and the Common Nighthawk, an endangered species had been identified in the general area of the Project. However, maps provided by NHB showing the specific locations associated with these species indicated that their presence had only been identified in the general downtown area of Berlin in the case of the Nighthawk and along the Androscoggin River banks south of the Project Site in the case of the Bald Eagle. In response to additional information on the project provided by LBB, NHB replied that they do not expect impacts to the Bald Eagle provided that no trees within 50 feet of the Androscoggin River will be removed. NHB further indicated that allowing habitat along the River to revert back to native trees and shrubs would be encouraged to provide future perching and roosting sites for Bald Eagles. LBB has committed to not altering land within 50 feet of the river bank which should allow the natural vegetation to reestablish within these areas. With regard to Common Nighthawks, NHB indicated that they have not had breeding reports for this species in Berlin for a number of years and do not expect impacts to the species as a result of the proposed project. Agency correspondence letters for the NH Natural Heritage Bureau are provided in Appendix K.

(ii) Cultural and Historic Resources

A number historic properties are located within the City of Berlin, including properties listed on the National Register of Historic Places (NRHP), such as the Congregational Church, St. Anne Church, and Holy Resurrection Orthodox Church. A map of cultural and historic resource resources found within a one half-mile radius is provided in Figure (c)(5)-1.

In general, most of what has been deemed to possess cultural or historic significance in the Berlin area has been developed during and previously impacted by the historic industrial activities at the Project Site. The conversion of the Site to operate as a biomass electric generating facility will have lesser impacts than the prior Pulp Mill and will offer a setting conducive to the ongoing use, maintenance and enjoyment of cultural and historic resources in the community. LBB also plans to play a positive role in maintaining the strong cultural and historic significance of area and pride of the community. Development of the planned scenic riverwalk along the northwest portion of the Site will help facilitate the community's enjoyment of historic resources along the river.

The Project is not expected to have an adverse impact on cultural and historic resources. A discussion of potential visual and aesthetic impacts is contained in Section h(3)-(iv) of this application and visual simulations of the proposed facility are provided as (h)(3)(iv)-2 through (h)(3)(iv)-10. In accordance with Section 106 of the National Historic Preservation Act, LBB is currently working with the New Hampshire Division of Historical Resources to confirm that the Project will not result in adverse impacts on historic and cultural resources in the area.

(iii) Community Resources and Development

The Project will not result in unreasonable impacts to Community resources of Berlin and will seek to facilitate further commercial development. The recreational resources of the community, which include the nearby Community Street Ball Field/Playground and the Hutchins Street Playground, will experience negligible noise, dust, odor, or emissions from the Project. The visual appearance of the Facility from these locations will be improved after the existing structures are rehabilitated and landscaping improved around the Site. LBB is also offering to provide a public parking lot along Community Street to facilitate safe use of the recreational facilities.

The Project is expected to produce minimal impacts on the City's current infrastructure. The City's existing infrastructure has adequate resources to provide water supply and wastewater treatment to service the Facility. The use of these services will provide revenue to the City that can be used for future infrastructure upgrades and development. The Site's storm water management systems will be vastly improved consistent with current standards[7] and will prevent infiltration or inflow to the City's sewer system.

Local public safety resources such as the Fire Department or emergency response units will not experience significant added burden due to the Project. The Facility will be equipped with on-site fire fighting systems and properly trained first responders to help address any emergency response conditions. LBB has consulted with the City of Berlin Fire Chief and reviewed the proposed Project plans. The Chief confirmed that the Project's site access and hydrant systems conform to their expectations and needs. Transportation demands of the Facility's construction and operation will be consistent with the local roadway's designation as a truck route and historic use of the Site. Truck traffic will be routed to prevent impacts in the downtown area.

The latest draft of the Berlin Master Plan[8] suggests that Berlin has been significantly impacted by the transition away from the wood and paper product manufacturing sectors; specifically, the closing of the Pulp Mill has contributed to job loss and economic instability. The redevelopment of the Project Site is a critical component of the City's Economic Development Plan as outlined in the draft Master Plan. The Project will help to address several issues, including concerns over employment growth, diversifying employment base, and reinstating Berlin as a regional employment center. The Project will facilitate business development in Berlin by directly and indirectly boosting the local economy.

(6) Information related to whether the proposed site and facility will unduly interfere with the orderly development of the region having given due consideration to the views of municipal and regional planning commissions and municipal governing boards

The Site for this new, modern renewable energy facility has been in industrial use for more than 100 years. It is the site of the former Fraser Pulp Mill which closed in 2006. The redevelopment of the Site will provide clearly identifiable direct and indirect benefits to the City and the region. The redevelopment of this Site, as proposed by this Project, will be entirely consistent with all aspects of the region's orderly development.

LBB has employed a collaborative effort to develop this Project involving the local and regional community. Since LLB first began exploring the opportunity to convert the former Pulp Mill into a biomass-fueled generating facility, it has engaged in extensive outreach efforts with public officials, community leaders and other interested parties in order to provide information to community members and develop public support for the Project.

Although RSA 162-H preempts local zoning requirements, LBB has made significant efforts to work cooperatively with representatives of the City of Berlin in a voluntary effort to address their concerns. LBB has met on numerous occasions with local officials as detailed below.

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[7] Ref – NH Stormwater Management Manual

[8] See: http://www.berlinnh.gov/Pages/BerlinNH_Planning/index

LBB initiated its outreach efforts in the spring of 2007 when it placed an op/ed in the Manchester Union Leader and Berlin Daily Sun regarding the State's new Renewable Portfolio Standard and LBB's potential role in meeting the goals of the RPS. Company officials have met informally with elected local and state officials. During 2007, LBB gave a presentation to former Berlin Mayor Bob Danderson, City Manager Pat McQueen, BEDCO Executive Director Jim Wagner, City Planner Pam LaFlamme, and Economic Development Director Norm Charest. This meeting was coincident with interviews with the Berlin Daily Sun, the Berlin Reporter, and New Hampshire Public Radio.

LBB provided information to various elected officials and has conducted meetings with the Audubon Society, the Society for the Protection of New Hampshire Forests, and the Wildlife Federation. LBB hosted a luncheon presentation to local officials and business and community leaders from which feedback about the Project was collected. LBB used the occasion of the smokestack demolition in September 2007 to meet further with local leaders. In October 2007, LBB representatives conducted another round of local press interviews.

In March 2008, Green Light Berlin was formed, a grassroots organization devoted to building support for the Project. Initially, this group circulated a petition addressed to the City's Mayor and City Council, which expressed citizens' support for the conversion of the Pulp Mill into a biomass-fueled generating facility. This early effort attracted over 500 citizens, representing a substantial portion of the City's voters. Subsequently, Green Light Berlin and LBB worked together to expand its outreach activities to inform other citizens in Berlin about the benefits attributable to converting the Pulp Mill. The group also generated several letters to the editor for publication.

In May 2008, LBB commissioned a public opinion survey which revealed that a plurality of Berlin residents supported the project, and that the top concerns of residents were economic issues. In June, LBB representatives presented an offer to the Mayor to place an unused portion of the property into a 501(c)(3) corporation to attract development.

Green Light Berlin and LBB worked cooperatively to launch a website accompanied by a series of informational ads in the local newspapers highlighting the benefits of the project (See www. CityThatTreesBuilt.com). The site contains an online portal for North Country citizens concerned about the region's economic future. This portal has garnered additional petition signatures and has also served as a clearinghouse for news regarding the Project and venue for discussion among local parties who are interested in the Project and how it compares to other potential opportunities for the redevelopment of Berlin.

In December 2008, LBB took control of the property. In February 2009 LBB gave a formal presentation to the Berlin City Council. LBB provided an overview of the Project and responded to a series of questions from the Council. In June, 2009, LBB also made a presentation to the City Planning Board and presented photo simulations of the Project along with the proposed Site plan. LBB answered questions and provided details on the Project.

In early to mid 2009, Green Light Berlin collected over two thousand signatures supporting the Project.

At the outset of the Project's development, LBB focused closely on communicating with interested individuals in the City and region as well as private organizations and governmental agencies. Out of these efforts, a "Community SEC Advisory Committee" was formed. The group is chaired by Max Makaitis, the Economic Development Director of the Androscoggin Valley Economic Recovery Corporation ("AVER"). The Committee is comprised of local civic and business leaders. According to the group's Statement of purpose:

> The Community SEC Advisory Committee will work to identify community issues, negotiate stipulations and other necessary information related to the Mill Site biomass plant SEC review process, which stipulations should protect and benefit the community, including its environmental, economic development and social concerns, while at the same time creating long term jobs and economic development in the community.

LBB has worked, and will continue to work closely with this group.

LBB has also engaged in extensive efforts to meet with other interested parties, formally and informally, in order to provide information about the Project and solicit input during its development. LBB met with the following entities:

- Coos County Commissioners
- North Country Council
- Androscoggin Valley Chamber of Commerce
- White Mountains Community College
- Androscoggin Valley Hospital
- Berlin - Gorham Rotary Club
- Tri-County Community Action
- COOS County Department of Resources and Economic Development
- Androscoggin Valley Regional Refuse Disposal District
- New Hampshire State Building and Construction Trades Council
- North Country Investment Corporation
- Business Enterprise Development Corporation
- COOS County Family Health Services
- Gorham City Officials

In addition to the meetings described above, LBB has used a variety of other mechanisms to communicate information about the Project to the community including:

- Brochures for handout (Q&A)
- Power Point Presentations
- Press Releases

- Informal small group meetings with town officials, business leaders, and ordinary citizens.
- Site tours for interested individuals and groups
- Sponsorship of local events (fireworks, Rally racing, hockey)
- Radio interviews

(d) INFORMATION ABOUT OTHER REQUIRED APPLICATIONS AND PERMITS

(1) Identification of all other federal and state government agencies having jurisdiction, under state or federal law, to regulate any aspect of the construction or operation of the proposed facility

- New Hampshire Public Utilities Commission (PUC) - authority under state law over public utilities, which includes investor-owned electric utilities. Although not required to file any permits before construction, the project will be required to comply with PUC rules regarding safety, such as DigSafe requirements, and annual reporting of electricity production (NHCAR 309.01).

- New Hampshire Department of Environmental Services (DES), Air Resources Division (ARD) - authority under state and federal law over air emissions and air quality impacts. The project will require an air emissions permit since it will involve a combustion source firing wood in a device with a gross heat input of greater than 2 million Btu per hour (NHCAR Chapter Env-A 607.01(c)). As DES has delegated authority to administer both the Nonattainment New Source Review (NSR) and Prevention of Significant Deterioration (PSD) programs, a separate permit application to EPA is not required. A complete Air Permit Application is provided in Appendix C of this application.

- New Hampshire Department of Environmental Services, Water Division, Site Specific Program - authority under state and federal law over alteration of terrain and pollutant discharge (NHCAR Chapter Env-Wq 1500). The Alteration of Terrain rules apply to the Project as it will involve excavation and construction of more than 100,000 square feet of contiguous area located on the borders of a surface water of the state. The focus of these rules is to protect the quality of surface waters from stormwater runoff and clearing of vegetation. A complete Alteration of Terrain Application is provided in Appendix D of this application.

- New Hampshire Department of Environmental Services, Water Division, Wetlands Bureau - authority under state and federal law over wetlands impacts. The Project falls under the Comprehensive Shoreland Protection Act (NHCAR Chapter Env-Wq 1400). This Act specifies minimum requirements for the development and use of all land within 250 feet of the high water elevation of rivers. A DES Shoreland Protection Permit is required for all construction, excavation, and/or filling activities within 250 feet of the high water elevation location. A complete Shoreland Protection Application is provided in Appendix E of this application.

- United States Environmental Protection Agency (EPA), National Pollutant Discharge Elimination System (NPDES) - authority under federal law over stormwater and wastewater discharges to surface water bodies and impacts. The Project will require a permit for storm water to be discharged to the Androscoggin River during Project operation. As New Hampshire is not authorized to administer the NPDES program, EPA will have jurisdiction for issuance of the required permit. However, NHDES staff compliance section staff share inspection and enforcement responsibilities with the EPA. A completed NPDES General Stormwater Permit Application for Construction Activities is provided in Appendix F. A completed NPDES Individual Permit Application for Stormwater Discharges from Industrial Activities is provided in Appendix G.

- New Hampshire Department of Environmental Services, Water Division, Wastewater Engineering Bureau - authority under state law over wastewater discharge and pretreatment. Wastewater from the Facility will be discharged to the municipal sewer system, to the Berlin WWTF, where it will be treated and discharged under the existing WWTF NPDES Permit. In accordance with the provisions of the Standards for Industrial Wastewater Pretreatment (NHCAR Env-Ws 904) the Project requires an Indirect Discharge Permit. A completed Industrial Wastewater Indirect Discharge Request Application is provided in Appendix I. A completed Sewer Connection Permit Application is provided in Appendix H. Copies of these application materials were provided to the City of Berlin on December 1, 2009 and are currently under their review.

- New Hampshire Department of Environmental Services, Waste Management Division - authority under state and federal law over hazardous and solid waste management (NH Statute Chapter 147-A:5). The Project, as proposed, will fall within the definition of a "small quantity generator" (SQG) of hazardous waste, since the Facility will generate hazardous waste onsite at a rate less than 100 kilograms of non-acute hazardous waste per month. The NH DES has established a Small Quantity Generator Self-Certification Program, which requires the submittal of a declaration of compliance with the applicable storage and recordkeeping requirements of the SQG regulations every three years. LBB will comply with all of the applicable requirements of the SQG regulations, including the submittal of the required self-certification forms every three years.

- New Hampshire Fish and Game Department (F&G) - authority under state and federal law over the protection of state fish, wildlife, and marine resources. LBB filed information with the New Hampshire Natural Heritage Bureau (NHB) and the U.S. Fish and Wildlife Service regarding the Project and requesting information regarding the presence of any state or federally listed protected species. As discussed in Section (h)3 of this application, both agencies have confirmed that the Project as proposed will not have adverse impacts to any listed protected species in the Project area.

- New Hampshire Division of Historical Resources (DHR) - authority under state and federal law over preserving state historical resources. LBB filed a Request for Project Review with DHR describing the historic resources in the Project area. As described in Section (h)3 of this application, DHR has requested that LBB provide additional information regarding resources in the Project area, work with the local community regarding potential impacts to such resources, and be consulted with regard to any future modifications to existing structures on the Site. LBB will continue to work with DHR during the SEC review process.

(2) Documentation that demonstrates compliance with the application requirements of such agencies

Documentation that demonstrates compliance with the application requirements of such agencies is included within the application forms included in the appendices, as described in Section (d)(3) below.

(3) A copy of the completed application form for each such agency

The completed application form for each such agency along with all necessary supporting materials are included in the appendices to this document as follows:

- Appendix C: State Air Permit Application
- Appendix D: Site Specific Alteration of Terrain Permit Application
- Appendix E: Shoreland Protection Permit Application
- Appendix F: National Pollutant Discharge Elimination System (NPDES) General Stormwater Permit Application for Construction Activities
- Appendix G: National Pollutant Discharge Elimination System (NPDES) Individual Permit Application for Stormwater Discharges From Industrial Activities
- Appendix H: Application for Sewer Connection Permit
- Appendix I: Industrial Wastewater Discharge Indirect Discharge Request Application

LBB has forwarded payment for the required application fees to NH DES under separate cover.

(4) Identification of any requests for waivers from the information requirements of any state agency or department whether represented on the committee or not

The Applicant is requesting a waiver of RSA 483-B:9, under the Minimum Shoreland Protection Standards of the Comprehensive Shoreland Protection Act (CSPA), for the redevelopment of a site that contains a "nonconforming structure" (ref. RSA 483-B:11); an existing mill building that sits within 50 of the shoreline. As presented in the Shoreland Protection Permit Application (see Appendix E) the project is "more nearly conforming" (ref. RSA 483-B:11 II) to the CSPA than existing conditions and that there will be at least the same degree of protection, or greater, provided to the public waters. The Project will achieve these protections by reducing the impervious area within the protected shoreland to below historical levels, protection the vegetation that exists within 50 feet of the shoreline, and implementing a well designed stormwater management system.

(e) ENERGY FACILITY INFORMATION

The Berlin Biomass Power Plant is a renewable energy facility, as defined in RSA 162-H:2, XII, and is not an energy facility, as defined in RSA 162-H:2, VII. This section does not apply to the Project.

(f) RENEWABLE ENERGY FACILITY INFORMATION

(1) Make, model and manufacturer of the unit

The Facility will be comprised of all of the individual components required to produce electrical energy from the fuel described below. The make, model and manufacturer of the majority of the components will not be finalized until the detailed engineering and procurement phase of the Project. One of the major components that is currently known is the existing boiler which will be converted to a bubbling fluidized bed boiler by Babcock and Wilcox, the original manufacturer.

(2) Capacity, in megawatts, as designed and as intended for operation

The rated electrical output of the steam turbine generator is expected to be approximately 70 MW. It is expected that the net electrical output of the Facility, after allowance for all internal "parasitic" loads, will be approximately 64 MW.

(3) Type of unit, including:

a. Fuel utilized

The biomass boiler will be fueled with clean biomass as defined in New Hampshire's Renewable Portfolio Standard (HB 0873, 2007 Session)[9], and ULSD auxiliary fuel used for boiler start-up and flame stabilization.

b. Method of cooling condenser discharge

The steam turbine condenser will be cooled with recirculating water from an open cycle wet cooling tower. The warmed cooling water will be cooled by direct contact with counter flowing ambient air that will be drawn through the cooling tower and exhausted vertically upward by electric motor driven fans.

c. Whether the unit will serve base, intermediate or peaking loads

The Facility is designed to serve base load duty, with occasional intermediate dispatch.

d. Unit efficiency

Based on the annual average heat input rate provided by B&W at a fuel moisture content of 37.6% (932 MMBtu/hr) and a gross power output of 70 MW, the Facility will have a gross heat rate of approximately 13,300 Btu/kWh. This equates to a fuel to gross power output efficiency of approximately 25%. This efficiency will vary to some degree with fuel moisture content, as added heat input is required to vaporize water contained in fuels with higher moisture content than the design fuel. The efficiency may be further improved during more detailed design engineering. Further, when completely designed and incorporated, the

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[9] *"Biomass Fuels" means plant-derived fuel including clean and untreated wood such as brush, stumps, lumber ends, and trimmings, wood pallets, bark, wood chips or pellets, shavings, sawdust, and slash, agricultural crops, biogas, or liquid biofuels, but shall exclude any materials derived in whole or in part from construction and demolition debris.* RSA 362-F:II.

overall thermal efficiency of the Facility may be further improved by recovering waste heat to provide pre-heated water to Fraser's Paper Mill in Gorham.

e. Impact on system stability and reliability

According to the Feasibility Study Report prepared for the Project by ISO-NE (see body of report provided in Appendix Q), no voltage violations caused by the Project were found. The short circuit analysis performed by Public Service of New Hampshire (PNSH) concluded that the addition of the Project will not cause any PNSH transmission breakers to become overdutied or exceed 80% of their current rating.

The Feasibility Study Report did identify minor thermal overloads on the system in certain light load conditions. The overloads occur during post project (our Facility is built and operating) and post contingency (Long Time Emergency Rating is applied, rather than pre-contingency conditions which assume normal ratings) conditions only. In order to address the post-contingency thermal overloads identified in the study analysis, the summer ratings of the following transmission lines need to be increased: Line S136 which runs between Whitefield and Berlin, Line D142 which runs between Whitefield and Lost Nation, and Line Q195 which runs between Whitefield and the Q195 Tap which is off the Coos Loop on the 115 kv lines between Whitefield-Littleton-Beebe River.

ISO-NE has estimated the cost to complete these upgrades will range from $0.33 to $0.61 involving only modifications to terminal substation facilities. With these upgrades, no thermal, voltage, or short circuit problems were predicted in the modeling exercises conducted for the Project. In conclusion, the Project will not result in negative impacts to the stability, reliability and operating characteristics of the New England bulk power transmission system.

The Project will operate as a base-load generating facility, and will be available on a predictable, steady and reliable basis. Unlike run of river hydroelectric plants, intermittent wind power turbines or solar power, the Project can plan and schedule its operations. This provides stability and dependability for PSNH and ISO-NE in scheduling power generation to meet the needs of its customers and the smooth operation of the transmission and distribution systems in New Hampshire and New England. As more and more intermittent renewable generation (such as wind power) are added to the New England grid, the challenges to ISO-NE to balance generation and load will become increasingly challenging and difficult. Base load facilities such as our Project will not create these problems, and can actually assist in balancing out the transmission system.

Base load generating facilities are also able to provide reactive power to the grid, allowing the transmission line operators to control power factor, which in turn allows them to improve the quality of the power and the efficiency of its transmission.

The Project can also schedule its normal routine maintenance periods to coincide with periods of lower power demands, an advantage to grid system planning and operations.

(4) Any associated new substations and transmission lines

There will be a new transmission line from the Facility to an existing PSNH substation located approximately 3,000 feet south of the Facility. See Section (g), below.

(5) Construction schedule, including start date and scheduled completion date

The Generating Facility is expected to begin construction in the fourth quarter of 2010 and achieve initial operation by the second quarter of 2013. The total construction period from full notice to proceed will be approximately 26 to 32 months, including commissioning and testing. The peak construction work force will be an estimated 300 personnel per day for approximately 4 months. The typical construction work force will range from 150 personnel or less in the initial and final months of construction, with up to 200-300 personnel per day for approximately 9 months. Construction activities will include the following:

- Preparation of a final Soil Management Plan and a Health & Safety Plan, followed by training of all workers involved with intrusive activities;
- Installation of erosion and sedimentation control measures;
- Implementation of dust control measures;
- Set-up and assembly of temporary office and warehouse;
- Installation of temporary utilities (electricity, water, phone);
- Preparation of construction parking and equipment staging areas;
- Site preparation;
- Fuel yard preparation and paving;
- Install underground utilities;
- Excavation and construction of footings and foundations;
- Erection of permanent facility equipment and buildings;
- Retrofit of existing boiler into new fluid bed configuration
- Installation of new SCR and retrofit of existing exhaust clean-up system
- Installation of fuel unloading, conveying and processing equipment
- Installation of power island equipment;
- Installation of balance of plant (BOP) equipment;
- Installation of mechanical system piping;
- Controls, electrical equipment and cable installation;
- Final architectural treatments, structural completion, and lighting;

- Startup, commissioning and testing;
- Installation of Project interconnections;
- Performance testing and turnover to owner; and
- Final paving, stabilization, of disturbed areas following completion of final grading, and landscaping.

The engineering, procurement and construction ("EPS") contractor will use appropriately qualified workers in accordance with applicable regulations and construction code standards.

Construction will proceed in a series of overlapping phases, beginning with the installation of sediment and erosion control measures to protect wetland resources, predominantly the Androscoggin River. This will lead to the delivery and installation of temporary buildings to house offices and worker facilities. An on-site area will be set aside for temporary laydown and storage of materials and equipment. A gravel parking area will be constructed to serve workers and park construction vehicles when not in use. Temporary utilities (electric, water, phone, etc.) will be installed.

Site preparation will begin during the mobilization and installation of the temporary construction services. This will start with the rough grading of the site and access road, and installation of the new stormwater detention basins and drainage structures. These tasks will be conducted early in the construction schedule.

The next major step will be start of the boiler fluid bed retrofit and conversion work, and excavation and construction of footings and foundations for the steam turbine building, boiler emissions control equipment and cooling tower, along with excavation, placement, and backfilling for underground piping and conduits. Excavated materials will be stored on-site and reused as fill and topsoil material in final grading to the extent possible. Dust from construction activities will be controlled by measures such as wetting of exposed soils on a regular basis and stabilizing storage piles by wetting and/or seeding.

Immediately following excavation, foundation pilings will be installed, if the engineering geotechnical assessment determines that they are required. If pilings are not required, spread footings will most likely be used. The concrete foundations will be formed, rebar and conduit will be installed and concrete will be poured.

Grading and preparation of the switchyard and grounding grid will occur following completion of the turbine area foundation. Switchyard equipment will then be installed. Concurrently, balance of plant mechanical and electrical work will be performed in the turbine building. During this time, site utilities will also be installed.

When the steam turbine and generator are delivered to the site, they will be set in place on the foundations with a crane. When crane work is complete, the turbine building can be erected. Mechanical and electrical connection of steam turbine, generator and balance of plant equipment will then be performed.

When the transformers arrive on site, they will be installed, and an initial backfeed to the main transformer will be performed. As the equipment installation and final connections of piping and wiring is nearing completion, the process of checking the electrical and control systems, starting up major equipment, cleaning pipelines, and testing all systems will begin.

When the "cold" commissioning process described above is complete, "hot" commissioning will begin with the first fire of the boiler. All of the safety systems of the plant will be thoroughly tested and confirmed. The plant will then undergo emissions testing and performance testing, confirming that all guarantees and specifications have been met. With the completion of the final performance run and acceptance by the equipment manufacturer and owner, the plant will be declared ready for commercial operation.

(g) ASSOCIATED TRANSMISSION LINE INFORMATION

(1) Location shown on U.S. Geological Survey Map

The regional transmission line with which the Facility will interconnect is shown in Figure (g)(1)-1. The route of the Project's electric transmission interconnection is shown in Figures (g)(1)-2. The route and transmission interconnection system is described below.

(2) Corridor width for:

a. New route

The transmission line from the Site will be a new 115kV cable installed within an existing underground 18-inch diameter fiberglass reinforced pipe formerly used to transport pulp from the Pulp Mill to Fraser's Paper Mill in Gorham. The underground pipe leaves the Site near the intersection of Coos and Community Streets and generally follows the route of the former rail bed from the south end of the Site to the north end of Shelby Street. The pipe follows Shelby Street and Devent Street along a right-of-way that is currently under easement control of LBB. The cable will transition to overhead conductors at the east side of Devent Street to the existing PSNH East Side Substation 300. The overhead conductors will run on one or two new steel monopole towers along with the existing Smith Hydro Z177 Line to the substation a distance of approximately 800 feet including elevation change.

b. Widening along existing route

The existing underground system will not require widening. There will be a pulling manhole installed at the Site and at least two more pulling manholes along the existing effluent pipe right-of-way. These manholes will be temporary and backfilled upon completion of the cable installation. There may be some clearing south of the existing Z177 line from Smith Hydro from Devent Street up the hill to the PSNH substation.

(3) Length of line

The length of the underground portion of the transmission line off from the Project Site is estimated at 3,200 feet and the portion above ground at 800 feet.

(4) Distance along new route

The distance along the new route is the underground portion of 3,200 feet.

(5) Distance along existing route

The distance along the existing route is the 800-foot long portion of the line that will be installed above ground from Devent Street to the substation. The overhead line will follow a cleared transmission corridor that includes several other existing overhead lines.

(6) Voltage (design rating)

The system is designed for 115 kV nominal.

(7) Any associated new generating unit or units

Same as application information (f) above.

(8) Type of construction (described in detail)

The 115 kV cable will be XLPE insulated single conductor installed within an electrical duct bank system. The electrical duct bank system will consist of electrical HDPE electrical conduits that are supported with spacers and filled with pourable grout that forms the electrical conduit duct bank. The overhead line construction will have a transition tower from underground to overhead. The conductor will be 477 kcmil ACSR and extend to a dual circuit steel monopole that will carry this conductor and the existing Smith Hydro Z177 line on the same structure into the PSNH East Side Substation 300.

(9) Construction schedule, including start date and scheduled completion date

The construction period for the electric transmission interconnection is expected to be six months. The facilities would need to be completed in time to “backfeed” power to the facility for startup and testing. It is estimated that the work would start in August 2011 and be completed by February 2012.

(10) Impact on system stability and reliability

Please refer to section (f)(3)(e) above.

(h) ADDITIONAL INFORMATION

(1) A description in detail of the type and size of each major part of the proposed facility

The Facility will be a base loaded electric energy generating facility with an expected nominal gross electrical output of approximately 70 MW. The heart of the Facility will be a BFB boiler; a highly efficient and advanced technology for the conversion of biomass fuel to energy. The boiler and other major components of the Project are described below.

(i) Biomass Boiler & Steam Generator

The existing B&W recovery boiler will be converted to a biomass-fueled BFB boiler with air-locked hopper bottoms for removal of bed sand particles and other non-combustible materials. An air distribution system consisting of fluidizing air and overfire air will be added to assure efficient fuel combustion. A flue gas recirculation system will be utilized to adjust the bed temperature depending on the moisture content of the incoming fuel. The existing feedwater economizer, which will preheat the feedwater to the boiler drum, will be modified to optimize boiler efficiency. The use of a tubular air pre-heater will ensure efficient use of the energy released in the boiler.

The boiler will be capable of generating up to 600,000 pounds per hour of steam at temperatures up to 900ºF and 850 psig. Stable operation and compliant emission levels will be maintained over the range of expected operating loads from 70% to 100% of maximum steam output. A series of double sided retractable soot blowers will be utilized on heat transfer surfaces within the superheater and convective sections of the boiler to maintain design performance levels.

The boiler will be capable of firing clean biomass and has been designed to handle variable fuel moisture contents ranging from 35% up to 50%. At an average moisture content of 37.6%[10], the wood fuel will have a higher heating value of approximately 5,060 Btu/lb. The heat input rate to the boiler will vary primarily depending on the moisture content of the wood fuel. The average heat input rate at maximum steam load will be 932 MMBtu/hr with 37.6% moisture content fuel. The maximum heat input rate will be 1,013 MMBtu/hr with 50% moisture content fuel. Individual fuel feeders will be equipped with adjustable air swept distributors to adjust the flow of fuel into the boiler. The fuel chutes will each be equipped with backdraft dampers.

The boiler will also be equipped with four No. 2 distillate oil fired burners for use during startup, with a maximum expected heat input capacity of 240 MMBtu/hr. The Facility will also include a 500 kW emergency diesel generator set and a 288 horsepower diesel fire pump. The boiler startup burners, the emergency generator, and the diesel fire pump will be

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[10] This fuel moisture content has been established as the design point for equipment supplier performance guarantee purposes.

fired with ULSD fuel which will be stored on-site in a 50,000 gallon storage tank equipped with secondary containment.

The steam turbine generator will be designed to match the steam production parameters of the boiler and projected power output levels. LBB is currently working with equipment vendors and the Project's engineers to design and select a steam turbine generator that will maximize power output and overall efficiency while appropriately balancing costs. The Facility will also include a 500 kW emergency diesel generator set and a 288 horsepower diesel fire pump.

(ii) Wood Fuel Handling Systems

The Facility will employ a wood handling system to provide adequate wood chip biomass fuel to operate the boiler continuously. The Site has been designed to provide fuel storage capacity up to the equivalent of 30 days of continuous operation (15 days processed, 15 days unprocessed). Round wood and wood chips will be transported to the Facility via trucks and weighed before unloading. Round wood will be unloaded and stored in the secondary wood storage area located on the northeast portion of the Site, before being chipped on-site and conveyed to the unprocessed fuel pile in the main wood fuel storage area. The wood chips transported to the Site by truck will generally be unloaded directly in the main wood fuel storage area in the vicinity of the boiler building using three truck dumpers. Provisions have been made to also install a tilting truck dumper in the secondary wood storage area located on the northeast portion of the Site and allow storage of wood chips in this area, along with round wood.

The round wood chipping facility located adjacent to the secondary wood storage area will consist of a purpose built structure to contain log milling equipment that will reduce round wood logs to chips suitable for boiler fuel. Logs stored in secondary wood storage area will be loaded by mobile crane arm and grapple equipment and fed lengthwise and horizontally into the chipping building by conveyor. Inside the building, an electric motor driven chipper will reduce the logs to fuel size chips. The wood chips will be conveyed from the chipping facility to the processed wood chip fuel storage piles in the main fuel storage area next to the boiler building.

The wood in the unprocessed fuel pile within the main fuel storage area will be manually loaded into hoppers to be conveyed to the fuel processing building. Wood processing in this building will include a magnet, disc screen, and grinders. Wood will be processed and stacked out using a single processing train equipped with two wood grinders. The processed wood will be stacked out by a conveying system, reclaimed, and screened before being conveyed to the boiler using individual feeders.

The weigh station will consist of two 60 ton weigh scales and scale house. Each of the truck dumpers will have a capacity of 60 tons and will be capable of unloading approximately five trucks, or 150 tons of wood per hour. The dumpers will be capable of tilt-up of 63 degrees from horizontal and will dump to grade.

The unprocessed fuel storage pile will be open and on paved ground with a drainage system to capture rain water from the storage area. Two reclaim hoppers will be used for the manual reclaiming of fuel from the unprocessed fuel storage area. Each hopper will discharge to a common 250 ton per hour unprocessed fuel out-feed conveyer, which will supply the fuel processing system.

A magnet will be installed over the truck dumper outfeed conveyer near the processing building. A disc screen capable of processing 250 tons per hour will be used to screen the unprocessed wood for boiler fuel. Two wood hogs will be used to reduce the wood fuel from the disc screen to a three inch minus size. Each hog will be capable of processing up to 75 tons per hour of wood fuel.

A 250 ton per hour stockout conveyer will receive the discharge from the processing building and convey it to the processed wood fuel storage area. The processed wood fuel storage area will be open and on paved ground with an under drain system to remove rain water from the storage area. The paved pile area will have a perimeter drain system.

Three 50 ton per hour mechanical reclaim hoppers located under the storage area will supply a single boiler feed conveyer. The boiler feed conveyer will feed the shuttle conveyers which will distribute fuel to individual boiler chutes. A single return conveyer will return excess fuel to the wood storage area. Each fuel metering bin will be equipped with screw feeders to meter wood fuel to the boiler feed chutes. There will be one inverted cone type chute connecting each pneumatic distributor on the boiler with a set of feeders at the metering bin.

(iii) Ash Handling Systems

The ash handling facilities will consist of separate collection and storage systems for fly ash, and for bed sand removal, screening and re-injection.

Fly ash will be continuously collected from the electrostatic precipitator and mechanical dust collector hoppers using a dry mechanical system. Collected fly ash will be conveyed to a dry storage bin inside of the boiler building. The storage capacity will be sufficient to accept twelve to twenty four hours of full-load operation. There will be an atmospheric vent on the ash silo equipped with a filter to minimize fugitive emissions. Ash from the elevated storage bin will be processed through a pug mill which mixes dry fly ash with water to produce a wet cake that minimizes dust generation during subsequent handling. The wetted fly ash will then be loaded onto trucks and transported off site for disposal or for beneficial re-use in agricultural land applications. LBB has confirmed that the ash can accepted and disposed at the nearby Mount Carberry landfill if not acceptable for beneficial re-use and until such time as adequate ash analytical data is available to file an application with DES for re-use of the material.

Bottom ash is virtually non-existent in a fluid bed boiler. Fuel is continually recirculated within the fluidized bed until fully combusted. A small stream of sand from the bed is continually withdrawn, screened and returned to the boiler, along with additional make-up sand as required. A small amount of noncombustible material such as rock, slag, glass or metal, is screened out of the bed material and collected for periodic disposal. The sand silo will be located within the boiler building and will have an atmospheric vent equipped with a filter to minimize fugitive emissions.

(iv) Water Systems

The power generation process will utilize two recirculating water systems; a steam generation system and a cooling water system. In the steam generation cycle, feedwater will be pumped through heat exchangers that will recover heat from downstream operations and into the boiler. The water will be circulated through metal tubes within the boiler where it will be converted to superheated steam. The steam will then be used to power a turbine which will mechanically drive an electric generator. After leaving the turbine, the steam will be cooled back to the liquid state in a condenser and returned to the feedwater pumps. In order to prevent the build up of contaminants in the recirculating steam system, a small fraction of the water will be "blown down" to the wastewater system.

The cooling water cycle will pump water to the steam condenser to remove heat and return the steam to water. The heated cooling water leaving the condenser will be delivered to a wet cooling tower. In the cooling tower, the water will be sprayed over the top of packing material and passed down through counterflowing ambient air drawn through the tower by large fans mounted in the top of the unit. The recirculating water will be cooled by both heat transfer to the air and evaporation as it passes through the tower flowing through the induced air stream. The exhaust system of the cooling tower will be equipped with mesh drift eliminators that will control entrained water droplets to less than 0.0005% of the recirculating water flow. The cooled water leaving the tower will be returned to the steam condenser system. Similar to the steam cycle, a portion of the recirculating water will be blown down to the wastewater discharge system to prevent the accumulation of contaminants.

The water for the Facility will be provided by the Berlin Water Works municipal supply and distribution system. The Facility will require up to 1.8 million gallons per day of water, primarily for boiler and cooling tower make-up, with the balance used for water purification system back wash, periodic equipment washing, and sanitary uses. A reverse osmosis water treatment system will be used to provide demineralized water to be used for steam cycle makeup for the boiler. A 15,000 gallon demineralized water tank will be used for on-site storage.

Water treatment for the boiler make-up water will consist of reverse osmosis and a treatment program consisting of phosphate, caustic, neutralizing amine and oxygen scavenger for water used in the closed loop steam system. The cooling water treatment program for the cooling tower makeup water will consist of corrosion inhibitor, dispersant and biocides to prevent biological growth in the cooling system components. All process wastewater, including water collected in floor drains from equipment washing, will be discharged to the City sewer system. The Facility will discharge up to 300,000 gallons per day of sanitary and process wastewater to the municipal sewer system. It is not expected that the Facility wastewater will require any pretreatment to meet all applicable discharge requirements.

The primary source of water for fire protection will also be City water. A diesel engine-driven fire pump will be used as a backup system. The entire wood storage area and power block will be served by an underground hydrant system. A wet standpipe system will be installed in all heated buildings. Unheated buildings and wood conveyers will be served by a dry standpipe with sprinklers. Portable hand extinguishers will be located throughout the Facility. Office areas will be equipped with wet pipe sprinkler systems. The steam turbine generator, lube oil tank area and the main transformer will be served with a fire protection system that will meet applicable codes and the requirements of the local Fire Chief. All fire detection and alarm systems will be installed to meet their respective codes and the requirements of the local Fire Chief.

(v) Air Pollution Control Systems

The BFB technology used in the Project's combustion system represents a highly efficient system for biomass fuel conversion and results in low levels of combustion emissions. Through good combustion efficiency, the BFB technology generates low emissions of pollutants resulting from incomplete combustion such as CO and VOC. The combustion system also incorporates FGR, a technology that helps to control combustion temperatures and therefore reduces the formation of NO_X.

In addition to the inherently low emitting technology associated with the combustion system, the Project will incorporate a number of additional systems that represent Best Available Control Technology and Lowest Achievable Emission Rate technology to further minimize air emissions.

The existing ESP will be upgraded, up to and including the possible addition of a third parallel ESP chamber, to maximize control of particulate emissions and meet the BACT emission limits. The ESP will provide greater than 99% control of particulate.

An SCR system will be installed to minimize NO_X emissions. The SCR system will utilize aqueous ammonia (NH_3) that will be injected into the flue gas in a stoichiometric ratio proportional to the mass of NO_X to be removed. The flue gas and NH_3 will pass through a catalyst bed where NO_X in the flue gas will be converted into diatomic nitrogen and water. An ammonia injection control system will be installed to accurately inject the needed amount of ammonia into the flue gas stream upstream of the catalyst to provide optimal conditions for the control and minimization of both NO_X and NH_3 and assure compliance with permit limits. The dilute liquid NH_3 for the SCR system will be stored on-site in a 19% aqueous solution in a 10,000 gallon storage tank equipped with secondary containment. The tank will provide sufficient storage for up to ten days of boiler operation, requiring only a single tanker truck delivery per week. The NH_3 storage tank will include an unloading system to accept deliveries by truck.

The existing 320-foot tall boiler exhaust stack will be used. A continuous emissions monitoring system (CEMS) will be installed on the boiler stack to monitor compliance with the permitted emission limits. The CEMS will monitor the concentrations of oxygen, CO and NO_X, and will be certified to meet all applicable NSPS, Acid Rain Program, and NHDES requirements. A certified continuous opacity monitoring system (COMS) will also be installed on the boiler stack to monitor compliance with Facility opacity limits.

(vi) Electrical Interconnection

The Facility will generate electrical power both for its own operation and for export off-site to the Public Service of New Hampshire (PSNH) 115 kV system. A switchyard, consisting of a step up transformer and single-breaker will be built adjacent to the turbine building. The Facility switchyard will be connected to the existing PSNH East Side Substation via a new underground 115 kV cable.

(vii) Fuel Oil and Chemical Storage

A 50,000 gallon ULSD storage tank will be used for the auxiliary boiler fuel. The roof of the existing oil storage tank at the Facility will be removed and a new tank will constructed within the former tank wall to provide proper secondary containment. Fuel unloading facilities will include a truck apron to positively control and capture any spillage during unloading operations.

The ULSD storage tank will be registered with the NH DES, as required by NHCAR Part Env-Ws 1400. LBB will comply with all applicable NH DES and local requirements pertaining to the ULSD storage tank, including construction standards, inspections, monitoring, and recordkeeping. The tank will be visually inspected monthly and integrity tested on an annual basis. A detailed inspection and cleaning of the tank will be conducted at least every 10 years. Records will be kept at the Facility of all ULSD tank inspections, integrity tests, and cleanings. The Facility Spill Prevention and Emergency Response Plan will be implemented to prevent releases from the ULSD storage tank and to establish procedures to respond to a potential release.

As a Small Quantity Generator, LBB will comply with all of the applicable storage and recordkeeping requirements of the SQG regulations, including the submittal of the required self-certification forms every three years. Contaminated wastes will be captured, collected and trucked off-site for proper disposal.

(viii) Stormwater Management Systems

Stormwater from areas of significant activity or material storage on the Site will be collected and treated through a newly installed stormwater management system. The system will utilize a series of structures (detention basins, deep sump catch basins with hooded inlets, oil water separators, vegetated swales, etc.) that will control peak runoff rates to match historical conditions, provide pretreatment of stormwater runoff, and ensure compliance with the NHDES Stormwater Manual, Alteration of Terrain Program regulations, and National Pollutant Discharge Elimination System ("NPDES") regulations.

Measures will be taken to prevent impacts to stormwater runoff generated during Project construction. Actions will include implementation of erosion and sedimentation control systems on the upgradient side of resource areas, BMPs to reduce potential sources of contamination, developing an inspection and maintenance plan, and sequencing activities appropriately to reduce impacts. Storage or refueling of equipment will occur only within designated areas equipped with proper containment and/or control measures. Areas of exposed soil will be kept to a minimum, and a permanent vegetative cover or other form of stabilization will be established as soon as possible.

(2) Identification of the applicant's preferred location and any other options for the site of each major part of the proposed facility

LBB's business model is to develop biomass generating facilities at sites with existing infrastructure that meet specified criteria. LBB was made aware of the attributes associated with the Project Site that were found to be consistent with their business model. These attributes include:

- an existing boiler system which can be upgraded to function as efficient biomass fueled generating facilities and meet all applicable environmental requirements;
- proximity to fuel suppliers;
- accessibility to truck routes and/or rail lines for the delivery of fuel;
- proximity to transmission lines and an electrical interconnection;
- adequate water supply and delivery systems;
- adequate wastewater treatment infrastructure and treatment capacity; and
- a local workforce with the skills necessary to operate a generating facility

The former Pulp Mill site in Berlin uniquely satisfies all of LBB's criteria for a biomass generating facility. The former black liquor recovery boiler provides a unique opportunity to upgrade and convert existing equipment for renewable energy generation. The Site provides adequate acreage for the development of the Facility, as well as for other tenants, who could potentially provide synergistic services, bringing much needed jobs, taxes, and other revenues to the City of Berlin. The Site's history as a Pulp Mill and location within the North Country provide unique demonstrated access to a wood supply that is more than adequate to meet the Project's needs. There is a well trained local workforce within the City of Berlin that has direct experience with the Site and boiler operations. The former Pulp Mill site was the ideal site that met each of the criteria established by LBB for the siting of such a facility.

Alternate locations of site equipment, roadways, fuel piles, and conveying systems were considered during the Facility design process. As a result of the consideration of reasonable alternatives, the current Site Plan was determined to best facilitate efficient Facility operation, while minimizing impacts to natural resources and the surrounding community, and preserving adequate acreage for additional tenants at the site to potentially provide synergistic services to the Facility.

The selection of generation technology for the Facility was driven by the capabilities of the existing equipment on the Site, the large available supply of wood biomass fuel from regional sources, and the need for additional renewable energy sources in the state to meet its RPS goals.

LBB considered the benefits and impacts associated with the use of either a mechanical draft wet cooling tower or an air cooled condenser to meet the Project's cooling demand. The impacts considered for this analysis included water use, wastewater discharge, equipment footprint, impervious area, noise, emissions, and cost.

The use of a wet cooling tower will result in more efficient Facility operation, less fuel use, and fewer emissions for the same power output as an air-cooled facility. The use of the wet cooling tower, with a much smaller footprint, minimizes the overall Project footprint. There will also be lower noise levels associated with the use of wet cooling technology. As a result of this analysis, the use of a wet cooling tower was determined to be a preferred alternative for the Facility over an air-cooled condenser.

LBB has considered alternatives for its electrical interconnection, including running an underground cable through the existing pipe which previously delivered pulp to the Fraser paper mill, installing a new underground ductbank, or installing new aboveground transmission poles and lines. The decision to run the 115kV electrical interconnection line through the existing pipe was selected as it is the alternative with the least potential impacts to natural resources, including impacts to wetland areas located along the interconnection route.

LBB considered numerous mitigation strategies to minimize the potential noise impacts from the Facility. These included the location of major sound producing equipment, enclosing or modifying equipment to reduce sound levels, increasing the sound mitigation capabilities of Facility buildings, and erecting barrier walls near significant sources of sound to minimize noise levels in the community. As a result of the consideration of these alternatives, the noise levels from the Site have been reduced to levels that meet the applicable City Noise Ordinances, and do not significantly increase existing background noise levels at community receptors.

(3) A description in detail of the impact of each major part of the proposed facility on the environment for each site proposed

(i) Air Quality

(i)(a) Existing Conditions

The potential ambient air impacts resulting from a source's emissions are dependent on various factors, including local topography and geographical features. Local climatology and meteorology can also have a significant effect on the dispersion of emissions, including the magnitude and location of the impacts. Compliance with ambient air quality standards is determined by comparison of the combined impacts of the Project and the existing background air quality levels to established air quality standards. The following sections describe the topography, climatology and meteorology, as well as the baseline ambient air quality, in the area surrounding the proposed Facility.

(1)(a)(1) Topography

The City of Berlin is located in Coos County, in northern New Hampshire, just north of the White Mountains. The Site is at an elevation of approximately 1,040 feet above sea level. It is located within the Androscoggin River valley and surrounded by several mountain peaks. The Site itself is relatively flat.

Because of the proximity of the Site to elevated terrain, which could have the potential to limit dispersion, the air quality impact analysis conducted for the Project has been completed considering impacts in complex terrain. The modeled impacts from the Facility in complex terrain will not cause or contribute to an exceedance of NAAQS.

(1)(a)(2) Climatology and Meteorology

According to meteorological data collected at the Berlin Regional Airport over the past three years (2006-2008), the average annual temperature in Berlin is approximately 41ºF, with average daily temperatures ranging from as low as -5ºF in the coldest winter months to 77ºF in the summer. The average precipitation is approximately 37.5 inches per year. The average wind speed is approximately 2.7 miles per hour (mph), with gust winds of up to 51 mph, primarily coming from the northwest.

The climatology and meteorology in the area of the Site is considered to be typical of the northeast U.S. and within the acceptable ranges of the dispersion models used to assess the air quality impacts from the Facility.

(1)(a)(3) Baseline Ambient Air Quality

The US EPA and NHDES have adopted National Ambient Air Quality Standards (NAAQS) to be protective of the public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly, along with the public welfare and the environment with a margin of safety. The NAAQS are established for the criteria air pollutants, which include ozone, PM, CO, SO_2, NO_X and lead. These pollutants are classified by the EPA as "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally-based criteria (science-based guidelines) for setting permissible levels. The six pollutants were selected within the original air quality regulations of the 1970's as they are found in the greatest prevalence throughout the U.S.

The ambient air quality concentrations in Coos County are below the NAAQS; Coos County is therefore designated as being in attainment with NAAQS for each of the criteria pollutants. Table (h)(3)(i)-1 summarizes the ambient air quality monitor values and background concentrations determined to be representative of the existing ambient air quality in the area of the Site, and thus used for the demonstration of compliance with NAAQS for the Facility.

(i)(b) Facility Air Emissions and Controls

The Facility will utilize an efficient BFB combustion system and will be equipped with advanced emissions control systems to minimize air emissions and ambient air quality impacts. The maximum stack concentrations and emission rates proposed for each pollutant from each emissions source are summarized on Table (h)(3)(i)-2. The biomass boiler maximum stack concentrations and emission rates apply at all loads greater than 70% of the maximum boiler steam output. The maximum mass flow (lb/hr) emission rates presented are derived from the maximum expected emission rates on a heat input basis (i.e. lb/MMBtu) for each pollutant, the maximum heat input rate to the boiler, and an additional 10% margin to account for short-term variability in the exhaust gas flow rate from the boiler. As such, these emission rates represent conservative worst-case levels. Even with these worst-case assumptions, the emissions from the Facility will be lower than all applicable state and federal emissions limitations.

(i)(b)(1) Biomass Boiler Emissions

The biomass boiler will have the type of emissions consistent with those generated by any combustion source. However, the advanced combustion and control technologies that will be employed, along with the low contaminant characteristics inherent in wood fuel, will result in emissions levels lower than most all fossil fueled types of generating facilities. The boiler emissions and control technologies are discussed further below.

Nitrogen Oxides

Emissions of nitrogen oxides result from excess air in the high temperature regions of a boiler and oxidation of nitrogen in fuel. The Facility's boiler will utilize a bubbling fluidized bed that provides staged combustion of the wood fuel and minimizes thermal NOx formation. To meet the requirements of the NH RPS program, the Facility will limit its wood biomass fuel to clean sources of wood, which can help minimize NO_X formation resulting from fuel-bound nitrogen. Good combustion practices as are indicative of the use of a BFB combustion process will help optimize the combustion temperature in the boiler to minimize thermal NO_X formation. A highly efficient Selective Catalytic Reduction ("SCR") system will eliminate over

70% of NO_X emissions formed within the boiler. The SCR system will inject vaporized aqueous NH_3 into the hot exhaust gas path which will react with the NOx in the exhaust gas to form nitrogen and water vapor as the exhaust gases pass through the catalyst beds. The use of the BFB technology, clean wood fuel, good combustion practices, and SCR will result in a NO_X emission rate from the biomass boiler no greater than 0.065 lb/MMBtu of heat input based on a 30-day rolling average during normal operation.

Carbon Monoxide

CO emissions are associated with incomplete combustion of fuel in a boiler. These emissions will be minimized by utilizing the highly efficient BFB combustion technology. The wood fuel will be combusted in a heated bed of sand-like material which is fluidized within a rising column of air. The hot bed material effectively liberates the carbon in the wood fuel, which allows the oxygen (O_2) in the combustion air to more freely react with the fuel, resulting in an efficient combustion process. The air to fuel ratio and combustion temperature in the boiler will be optimized and monitored to achieve the desired balance between CO and NO_X emissions. As mentioned earlier, the Facility also will utilize a fuel preparation system that will help optimize the quality, size and moisture content to promote efficient combustion, which will also help mitigate CO formation. The use of BFB combustion technology in the boiler design, good combustion practices, and fuel type will result in a CO emission rate from the biomass boiler no greater than 0.075 lb/MMBtu of heat input based on a 24-hour daily block average during normal operation.

Sulfur Dioxide/Sulfuric Acid Mist

Emissions of sulfur compounds result from oxidation of sulfur contained in a fuel. The Facility will utilize wood fuel which has an inherently low sulfur content to maintain SO_2 no greater than 0.025 lb/MMBtu of heat input during normal operation. The characteristics of wood fly ash also serve to capture much of the sulfur compounds and further minimize emissions. Based on experience with other generating facilities using an SCR control system, no more 10% of the SO_2 generated in the boiler is expected to be further oxidized to SO_3 and combine with water vapor in the flue gas to produce sulfuric acid mist (H_2SO_4). The resulting H_2SO_4 emission rate is expected to be less than 0.004 lbs/MMBtu of heat input.

Particulate Matter

Particulate matter is generated in a boiler by incomplete combustion and the non-combustible fraction of a fuel. The BFB combustion technology and operating controls provide a greater degree of complete combustion than most other wood fired boiler designs. The boiler's ESP will abate over 99 percent of the particulate emissions formed in the boiler. These measures will result in a filterable $PM/PM_{10}/PM_{2.5}$ emission rate no greater than 0.012 lb/MMBtu of heat input during normal operation.

Volatile Organic Compounds

Like CO, VOC emissions are formed by incomplete combustion of fuel. VOC emissions from the biomass boiler at the Facility will be minimized utilizing BFB combustion technology. The Facility will also utilize clean wood fuel, which can help promote efficient combustion, which will further minimize VOC emissions. The use of BFB combustion technology in the boiler design, good combustion practices, and woody biomass fuel will result in a VOC emission rate from the biomass boiler no greater than 0.010 lb/MMBtu of heat input during normal operation.

Ammonia

The SCR emissions control systems will utilize aqueous ammonia to reduce the NO_X emissions from the boiler by injecting this NH_3 into the flue gas stream upstream of an SCR catalyst. The NO_X and NH_3 will react to form nitrogen (N_2) and water (H_2O). While this system is efficient for the conversion of NOx emissions to form nitrogen and water, a small fraction of the injected NH_3 will pass through unreacted. This unreacted NH_3 is referred to as NH_3 slip. The SCR system to be utilized at the Facility will be designed to maintain a stack NH_3 slip concentration of no greater than 20 ppmvd@7%O_2 during normal operation.

Hazardous Air Pollutants

HAP emissions from the biomass boiler at the Facility will be controlled utilizing BFB technology. The Facility will also employ measures to provide a wood fuel to the boiler of good quality, size and moisture content to promote efficient combustion, which will further minimize HAP formation. The use of BFB combustion technology in the boiler design and good combustion practices will minimize the HAP emissions from the boiler during normal operation.

Carbon Dioxide

The use of biomass energy has the potential to greatly reduce greenhouse gas emissions in this biosphere over the life cycle of these technologies. Fossil fuels release carbon dioxide captured by photosynthesis millions of years ago — an essentially "new" greenhouse gas emission. Biomass, on the other hand, releases carbon dioxide that is, for the most part, already a part of the natural environment and is therefore balanced by the carbon dioxide captured in its own growth as well as new growth.

The direct firing of Biomass is recognized as carbon neutral by many of the world's energy experts. The National Renewable Energy Laboratory (NREL), as part of the US Department of Energy published a study in January 2004 entitled "Biomass Power and Conventional Fossil Systems with and without CO_2 Sequestration – Comparing the Energy Balance, Greenhouse Gas Emissions and Economics". The study was a comparison of the Global Warming Potential (GWP) of a standardized 600 MW power plant (or in the case of direct fired biomass, several smaller plants totaling 600 MW) to determine the effect on global warming over the complete life cycle of each process. The study included fossil fuel fired and biomass fired plants with and without carbon sequestration (recovery of CO_2 emissions). The study concluded that, for direct fired biomass plants without carbon sequestration, the total CO_2 emitted was actually a negative value when considering the avoided emissions from land-filling and mulching and the additional emissions of harvesting and transportation, of the same quantity of biomass. The GWP was a reduction of 148% when compared to a similar-sized coal fired power plant.

Similarly, the International Panel on Climate Change (IPCC) Task Force on National Greenhouse Gas Inventories published its "2006 IPCC Guidelines for National Greenhouse Gas Inventories". The document recommends that the CO_2 emissions from the combustion of wood and paper waste for the purposes of producing energy be excluded from national inventories as "biogenic emissions". It further states that where both fossil-based wastes (e.g. plastic, waste oil, rubber) are fired with biogenic-based wastes (e.g. wood, paper,), only the fossil-based portion of the CO_2 emissions be considered in national CO_2 inventories.

There are no add-on control systems available to control CO_2 emissions from wood-fired boilers. The use of BFB combustion technology in the boiler design, however assures a high degree of heat transfer from the fuel, thus minimizing the quantity of CO_2 released per MW of power produced.

Emissions During Startup

Periods of startup for biomass boiler following a prolonged shutdown can result in emissions higher than during normal operations. The Project has developed a well designed and carefully controlled startup process that will serve to minimize emissions during these events, which take place very infrequently. The emission levels during startup have been considered in the ambient air quality impact analysis for the Project which shows that they will not result in impacts above NAAQS and therefore will not result in adverse air quality levels, The cold startup process for the boiler is discussed below.

Startup of the boiler following periods of prolonged shutdown will involve a three step process. Initially, the biomass boiler will be operated on ULSD fuel over a period of six-to-eight hours until stable operating temperatures are achieved in the bed and boiler heat transfer surfaces. This initial heat up period will assure that the introduction of biomass fuel will not result in an emissions spike due to incomplete combustion. The next phase will be the gradual introduction of solid fuel and the reduction of fuel oil until the steam production rate is gradually increased to 50% over a two-to-three hour period and the fuel transitions to 100% biomass. The last phase is the gradual ramping up of the steam load from 50% to 100% capacity over a period of one-to-two hours. Therefore, a typical cold total startup period is expected to be approximately 10-12 hours in duration to achieve full-load operation on biomass fuel. The durations of startup periods for hot and warm starts of the boiler will be shorter.

The potential emissions during startup periods have been estimated on Table (h)(3)(i)-3. These boiler startup emissions estimates are conservatively based on a total of 4 cold starts per year of the biomass boiler. These estimates are conservative in that many of the boiler startups will actually be warm or hot starts of shorter duration and fewer emissions. For the purposes of the potential emissions calculations, it has been assumed that up to 48 hours of annual boiler operation will be during startup periods. Emissions during shutdown periods have been aggregated with emissions during normal operation for the purpose of determing the total maximum potential annual emissions of the Facility.

The Facility will conduct emissions testing to determine the actual emissions from the biomass boiler during startup and shutdown periods.

(i)(b)(2) Other Stationary Source Emissions

Cooling Tower PM_{10}

Wet cooling towers provide direct contact between the cooling water and the air stream being drawn through the tower. A portion of the cooling water can be entrained in the air stream. The water droplets entrained in the air stream is classified as drift, which results in particulate emissions from the solids contained in the droplets as the water evaporates. The quantity of the drift and resulting particulate emissions are primarily determined by the design and operation of the cooling tower.

The formation of drift and the resulting particulate emissions will be minimized by controlling the dissolved solids content of the recirculating water and controlling water droplet drift.

Drift eliminators are designed to remove the water droplets from the air stream before it exits the tower. The exhaust system of the Facility cooling tower will be equipped with mesh drift eliminators that will control entrained water droplets to less than 0.0005% of the recirculating water flow and minimize particulate emissions to maximum extent achievable for a wet cooling tower.

Emergency Generator

The Facility will include a 500 kW emergency diesel generator set. The emergency generator will be fired with ULSD fuel to minimize SO_2 and PM emissions and will be certified to meet the applicable EPA Tier 2 emission standards for diesel engines. The emergency generator will be limited to 300 hours of operation per year, and other than one hour per day for maintenance and testing, will not be operated concurrently with the biomass boiler.

Diesel Fire Pump

The Facility will also include a 288 horsepower diesel fire pump. The diesel fire pump will be fired with ULSD fuel to minimize SO_2 and PM emissions and will be certified to meet the applicable EPA Tier 2 emission standards for diesel engines. The diesel fire pump will be limited to 300 hours of operation per year, and other than one hour per day for maintenance and testing, will not be operated concurrently with the biomass boiler.

(i)(b)(3) Fugitive Emissions

Fugitive dust emissions potentially resulting from truck traffic on Site roadways and from wood fuel storage and handling operations will be minimized through a number of Best Management Practices and equipment designs. These measures will include the use of paved roadways, regular sweeping of roadways, wetting of fuel storage piles as needed during prolonged dry periods, and the use of covered trucks and conveyor systems. Fugitive dust emissions from the Facility's wood fuel handling and storage areas have been estimated using EPA published emission factors.

(i)(c) Applicable Regulatory Requirements

The US EPA and the NHDES have established regulations to assure that emissions sources such as those associated with the Facility do not result in adverse impacts to human health or the environment. This section provides a summary of those regulations that apply to the Project and the requirements that will be met by the Facility.

(i)(c)(1) State and Federal Permitting Requirements

State Air Permit

LBB will obtain a temporary permit prior to the construction of the Facility. The application to the NHDES, Air Resources Division, for the temporary permit, includes the required application forms and demonstrates compliance with all applicable elements of the State Implementation Plan (SIP). It also demonstrates that the proposed Facility will not cause or contribute to an exceedance of the State Ambient Air Quality Standards (NHCAR Chapter Env-A 300) and will comply with applicable state law governing pollution, and other Applicable requirements.

The temporary permit for the Facility will expire 18 months after the date of its issuance. LBB will file an application for a Title V Operating Permit at least 90 days prior to the designated expiration date of the temporary permit.

Nonattainment Review

The Facility will be a major stationary source of NO_X emissions, with potential emissions greater than 100 tons per year. The Facility will therefore be subject to state nonattainment review (NHCAR Part Env-A 618), which requires the implementation of LAER and the acquisition of offsets for its NO_X emissions. The LAER requirement will be met through the low NO_X emissions from the Facility resulting from the BFB design and SCR system. LBB will acquire sufficient emission reductions from regional sources to offset the annual NO_X emissions from the Facility by a ratio of at least 1.15 to 1 further assuring that the Project does not adversely impact regional air quality.

Prevention of Significant Deterioration of Air Quality

As a new major stationary source located in an attainment area, the Facility will also be subject to the applicable PSD permitting requirements. The NHDES implements the federal PSD Program permitting requirements which assure that a new major stationary source will not cause or contribute to significant deterioration of air quality in the state.

To satisfy the PSD requirements, an air quality impact analysis has been conducted to demonstrate that the Facility will not cause or contribute to an exceedance of the NAAQS, and that the maximum increases in pollutant concentrations over the existing baseline do not exceed the allowable incremental increases established by the PSD program. BACT will be implemented for each regulated pollutant with potential emissions above the PSD significance thresholds.

The PSD rules also require additional impact analyses, including an analysis of potential impairments to air quality, visibility, soils, and vegetation that would occur as a result of the Project along with impacts to general commercial, residential, industrial growth in the Project area. There are also additional impact analyses that are required due to the proximity of the Facility to designated Class I areas. These analyses have been initiated as presented in the air permit application contained in Appendix C. Preliminary results indicate that the Facility will not result in adverse impacts. LBB will continue to work with NH DES and Federal Land Manager during the review period to confirm these initial conclusions.

(i)(c)(2) State Emissions Control Requirements

In addition to requiring that projects control emissions sufficiently to prevent exceedance of NAAQS, NHDES has established regulations that impose specific emissions limitations or control requirements for certain pollutants from regulated sources. The following sections summarize the state emission control requirements applicable to the Facility, as well as how the Facility will comply with those requirements.

Ambient Air Quality Standards

NHCAR Chapter Env-A 300 establishes ambient air quality standards (AAQS) for various types of pollutants emitted in or transported into the State of New Hampshire. The standards are intended to be protective of the public health (primary standards) and the public welfare (secondary standards). An air dispersion modeling analysis has been completed, which demonstrates that the emissions from the Facility will not cause or contribute to an exceedance of the state AAQS.

Standards for Certain New or Modified Facilities and Sources of HAPS

NHCAR Chapter Env-A 500 establishes state standards to regulate certain new or modified facilities in accordance with authority delegated by the EPA under §111(c) of the Clean Air Act, and certain sources of HAPS in accordance with authority delegated by the EPA under §112(c) of the Clean Air Act. The Facility will be subject to the applicable requirements of

New Source Performance Standards ("NSPS") and will control emissions to well below all applicable limits of these rules. As a major source of HAP emissions, the Facility will also be subject to MACT requirements established in the National Emissions Standards for Hazardous Air Pollutants ("NESHAPS"). The air permit application contains a demonstration that the Facility will comply with these requirements.

Testing and Monitoring Procedures

NHCAR Chapter Env-A 800 establishes minimum testing and monitoring procedures, calculation procedures, standards, and requirements in order to determine compliance with applicable state and federal statutes and rules. An initial compliance stack test will be conducted to demonstrate the Facility's compliance with its permitted emission limits. This testing will be conducted in strict accordance with the procedures set forth in the regulations.

The Facility will have a certified continuous opacity monitoring system ("COMS") and a continuous emissions monitoring system ("CEMS") installed on the exhaust stack to meet the State and Federal regulatory requirements.

Recordkeeping and Reporting Obligations

NHCAR Chapter Env-A 900 specifies the records that must be kept at sources that discharge air pollutants so that the emissions of those pollutants can be readily calculated or estimated and reported to the NHDES for the purposes of demonstrating compliance, compiling emission inventories, and developing air-related strategic plans. To comply with this Part, the required records will be maintained at the Facility relating to energy production, fuel use, and equipment operating parameters.

An annual emissions report will be filed to NHDES which will include the actual emissions from the Facility. The reports will specify the emissions of each regulated air pollutant, as well as the annual Facility hours of operation and fuel use, and any other information required to demonstrate compliance with the Facility's permit approvals.

In the event of a permit deviation, Facility personnel will investigate and take immediate corrective action to restore the affected device to within allowable permit levels. If the permit deviation causes excess emissions, the NHDES will be notified within 24 hours of discovery of the permit deviation, and a written report will be submitted within 10 days of discovery of the permit deviation. Semiannual reports will be submitted to NHDES that summarize all permit deviations reported during the previous reporting period.

Prevention, Abatement and Control of Open Source Air Pollution

NHCAR Part Env-A 1002 limits open air source pollution by regulating the direct emissions of particulate matter from mining, transportation, storage, use, and removal activities. It requires that precautions be taken throughout the duration of such activities to prevent, abate, and control the emission of fugitive dust, including wetting, covering, shielding, or vacuuming. LBB will utilize such measures during the construction of the Facility, and for wood fuel transport and storage activities conducted during operation, to minimize the emissions of fugitive dust resulting from those activities.

Prevention, Abatement and Control of Stationary Source Air Pollution

NHCAR Part Env-A 1211 establishes Reasonably Available Control Technology (RACT) requirements for sources in New Hampshire. The NH NO_X RACT rule applies to electric steam utility boilers with a maximum heat input rate of 50 MMBtu per hour or more. As the Project is required to implement LAER for NO_X emissions, a standard significantly more stringent than RACT, the Facility's NOx emission rate will be well below the NH NO_X RACT emission standard applicable to biomass fired boilers. Compliance with the NO_X RACT emission standard will be demonstrated through the use of a certified CEMS. The applicable recordkeeping and reporting requirements of NHCAR Chapter Env-A 900 will be met for the Facility to satisfy the NO_X RACT rule.

NHCAR Part Env-A 1211.11 establishes emission standards and control options for emergency generators. It applies to emergency generators located at a source with potential NO_X emissions greater than 50 tons per year, unless the operation of the emergency generators at the source are limited to less than 500 during any consecutive 12-month period, and the potential NO_X emissions from the emergency generators are limited to less than 25 tons for any consecutive 12-month period. The emergency generator and fire pump at the Facility will be limited to 300 hours of operation during any consecutive 12-month period, and will have permitted potential NO_X emissions less than 25 tons per consecutive 12-month period. Therefore the emergency generator and fire pump are exempt from the provisions of NHCAR Part Env-A 1211.11.

Regulated Toxic Air Pollutants

NHCAR Chapter Env-A 1400 establishes rules to prevent, control, abate and limit the emissions of toxic air pollutants into the ambient air to promote public health. One of the source categories which is exempt from the requirements of the rule is the combustion of untreated wood. Therefore, the emissions from the biomass boiler are not subject to the state regulated toxic air pollutants rule requirements. Both the emergency generator and the fire pump will utilize virgin distillate fuel oil and are similarly exempt from the NH air toxics regulation.

Emissions of NH_3 from the SCR emissions control system, along with certain compounds contained in the water treatment chemicals used in the cooling tower are subject to the Air toxics Rules. The air dispersion modeling analysis conducted for the Facility demonstrates that the maximum predicted ambient air impacts resulting from these emissions will be less than the respective 24-hour and annual ambient air limits (AALs).

Fuel Specifications

NHCAR Chapter Env-A 1600 establishes limits on the content of fuels used in combustion processes to limit the emissions of pollutants into the ambient air. However, wood fuel is not listed as a solid fuel subject to this Chapter; therefore the Facility is not subject to its solid fuel requirements and limitations.

The Facility will utilize ULSD for the boiler startup burners, the emergency generator, and the fire pump. NHCAR Part 1604.01 limits the sulfur content of No. 2 distillate oil to 0.40 percent sulfur by weight. As the ULSD fuel to be utilized at the Facility has a maximum sulfur content of 15 parts per million (0.0015 percent by weight), the Facility will comply with the state distillate oil fuel sulfur content standard.

Fuel Burning Devices

NHCAR Chapter Env-A 2000 establishes emission standards for particulate matter and visible emissions from stationary fuel burning devices. A certified COMS will be installed on the boiler exhaust stack to monitor and continuously record compliance with the state opacity limits. The maximum particulate emission rate from the biomass boiler will comply with the state particulate matter emission standard. Periodic emissions testing will be conducted to demonstrate compliance with the state particulate matter standard.

The emergency generator and the diesel fire pump, each with a maximum heat input rating less than 100 MMBtu/hr, and installed after January 1, 1985, will be subject to a particulate matter emission limit of 0.30 lb/MMBtu. Both sources will be certified by their manufacturer to meet this standard.

NO_X Budget Trading Program

NHCAR Chapter Env-A 3200 implements the NO_X Budget Program, which requires reductions in ozone season NO_X emissions from budget sources to achieve the NAAQS for ozone. The biomass boiler at the Facility will utilize wood fuel for the generation of electricity. As the NO_X budget requirements apply only to fossil fuel fired sources, and the Facility is not subject to the requirements of the NO_X Budget Program.

Carbon Dioxide (CO_2) Budget Trading Program

NHCAR Chapter Env-A 4600 establishes the NH State CO_2 Budget Trading Program, which is designed to stabilize, and then reduce anthropogenic emissions of CO_2, a greenhouse gas, from CO_2 budget sources in the state, in an economically efficient manner. This program does not apply to generating facilities that utilize renewable fuels as they are generally accepted to be greenhouse gas neutral.

(i)(c)(3) Federal Emissions Control Requirements

New Source Performance Standards

Federal NSPS "Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units" (Subpart Db), apply to steam generating units that are capable of combusting more the 100 MMBtu/hr heat input of fuel, and for which construction, modification, or reconstruction is commenced after June 19, 1984. The biomass boiler at the Facility is subject to these requirements.

The facility's particulate emissions will be well below the regulatory limit of 0.10 lb/MMBtu heat input established in the NSPS regulations. The Facility will similarly comply with the opacity limits in the regulations which require that emissions must not exhibit greater than 20 percent opacity (on a 6-minute average basis), except for one 6-minute period per hour of no more than 27 percent opacity. There are no SO_2 or NO_X emission limits established for wood-fired boilers in Subpart Db.

Records will be maintained at the Facility including all information needed to demonstrate compliance with the NSPS regulations such as the results of performance tests, monitoring data, and calculations. The results of all performance tests and COMs/CEMS performance audits conducted at the Facility, and all recorded emissions data will be submitted to NH DES and the US EPA semiannually.

National Emissions Standards for Hazardous Air Pollutants

EPA has also established NESHAPS (40 CFR 63) which require MACT for major sources of HAPs, which are facilities with potential emissions greater than 25 tons per year of all listed HAPs or 10 tons per year of any individual listed HAP. The Facility will be a major source of HAP emissions.

EPA established national emission standards and operating limits for HAP emissions from industrial, commercial, and institutional boilers, process heaters, and electric steam utility generating boilers not fired by fossil fuels. Although the regulations were vacated on June 8, 2007 for further documentation and analysis, LBB has completed a project specific "case-by-case" MACT determination for the biomass boiler which confirms that the Project will meet the MACT requirement.

The Facility will be operated and maintained at all times in a manner consistent with safety and air pollution control practices for minimizing emissions. A written startup, shutdown, and malfunction plan will be developed for the Facility equipment, with procedures for operating and maintaining the equipment during such periods, and a program for corrective action during periods of equipment malfunction. Records will be kept at the Facility of all startup, shutdown, and malfunction periods, including all corrective actions taken, and compliance with the Facility plan for such periods.

(i)(d) Control Technology Analyses

The PSD program requires the implementation of BACT for each regulated NSR pollutant with potential emissions above the significance thresholds. For the Facility, these pollutants are NO_X, CO, PM, PM_{10}, $PM_{2.5}$, SO_2, and H_2SO_4. BACT is defined in the PSD rules as an emissions limitation based on the maximum degree of reduction for each pollutant, as determined on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, is achievable for such a source through the application of production processes or available methods, systems, or techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such a pollutant.

As a major source of NO_X emissions located in the northeast ozone transport region, the Facility is also required to implement LAER for its NO_X emissions. LAER is defined as the most stringent emission limitation contained in any State Implementation Plan (SIP) for a source category, or the most stringent emissions limitation which is achieved in practice for a source category. LAER may be achieved by a combination of a change in the raw material processes, a process modification, and/or add-on emission controls.

Detailed BACT/LAER analyses are included as part of the Facility Air Permit Application, which is included in Appendix C.

The MACT emission limitation for a new source is defined as the emission limitation which is not less stringent than the emission limitation achieved in practice by the best controlled similar source, and which reflects the maximum degree of deduction in emissions that the permitting authority determines is achievable. The detailed MACT determinations are included as part of the Facility Air Permit Application, which is included in Appendix C.

(i)(e) Air Quality Impact Analysis

An air quality impact analysis was performed using the EPA and NHDES approved dispersion models, to demonstrate that the combined emissions from the Facility will result in air quality impacts that are below established NAAQS and allowable incremental increases. The modeled impacts from the Facility were added to representative, regional background values to demonstrate compliance with the NAAQS and NH AAQS.

The maximum modeled air quality impacts from the Facility are summarized on Table (h)(3)(i)-4. As shown on Table (h)(3)(i)-4, the impacts from the Facility, combined with existing background concentrations, will not cause or contribute to an exceedance of NAAQS. The Facility will also have maximum impacts that are less than the Significant Impact Levels ("SILs") in Class II areas for all pollutants, thus demonstrating compliance with the respective PSD increments.

A complete description of the air dispersion modeling analysis is provided as part of the Facility Air Permit Application, which is included in Appendix C.

(i)(f) Additional Impact Analyses

The PSD regulations require sources to analyze potential impacts that may occur as a result of the proposed source and general commercial, residential, industrial, and other growth associated with the source. There are also additional PSD requirements for sources impacting designated Class I areas such as the Dry River and Great Gulf Wilderness area that are located in the White Mountain National Forest, approximately 20 kilometers or more south of the Project Site.

Although the maximum NO_2, SO_2 and $PM_{2.5}$ impacts from the Facility in Class I areas exceed their respective SILs, the impact levels are well below established PSD increment thresholds and result in minor increases to background air quality that doe not cause exceedance of NAAQS. LBB is currently working with NH DES and the Federal Land Manager to complete additional cumulative modeling analyses to confirm that the impacts from the Facility, when combined with the impacts from any other applicable increment consuming sources within the SIA, do not exceed their respective Class I PSD increments.

(i)(g) Regional Air Quality Benefits

(i)(g)(1) Emissions Displacement

The Facility will be equipped with efficient energy generating technology and air pollution control technology for a biomass fueled electric generating unit. The operation of the Facility will contribute to the State of New Hampshire achieving its Renewable Energy Portfolio Standard (RPS) generation goals. Because of its economic efficiency and contribution towards RPS goals, it is anticipated that the Facility will be dispatched ahead of older, less efficient generating resources with higher emissions that do not contribute to State RPS goals. With power generated by the Facility instead of higher emitting generating resources in the ISO-NE regional system, there will be a corresponding decrease in regional emissions.

(i)(g)(2) Acid Precipitation

The deposition of acidic compounds generated from the oxidation of NO_X and SO_2 emissions can impact aquatic and terrestrial ecological systems, agricultural resources, lakes and water supplies and building materials. The concern in New Hampshire and New England is the effect of acid deposition on resources resulting from the emissions from local sources, and from the transport of emissions, primarily from coal-fired power plants in the Midwest.

The Facility will be equipped with highly efficient emissions control systems, including the implementation of BACT for all regulated NSR pollutants, and LAER for its NO_X emissions. The economic efficiency of the Facility and its contribution to NH RPS goals will result in its dispatch in place of older, less efficient, higher-emitting generating resources, contributing to an overall lower level of acidic compound emissions (NO_X and SO_2) in the region. The Facility therefore has the potential to reduce regional acidic compound emissions, which is consistent with the goals of State and Federal programs established to minimize the potential impacts of acid deposition on local resources.

(i)(g)(3) Ozone Ambient Air Impacts

As previously noted, Coos County is designated as being in attainment with NAAQS for ozone, but is within the New Hampshire portion of the Northeast Ozone Transport Region. The Facility will be equipped with highly efficient emissions control systems, including the implementation of BACT for all regulated pollutants, and LAER for its NO_X emissions. LBB will acquire sufficient emission reductions from other regional sources to offset the annual NO_X emissions from the Facility by a ratio of at least 1.15 to 1 prior to receiving its temporary permit approval.

The economic efficiency of the Facility and its contribution to NH RPS goals may result in its dispatch in place of older, less efficient, higher-emitting generating resources, contributing to an overall lower level of ozone precursor (NO_X and VOC) emissions in the region. The Facility will further contribute to regional efforts to reduce the emissions of ozone precursor compounds and their ambient impacts by the acquisition of offsetting NO_X emission reductions from other regional sources of a quantity greater than the potential emissions of the Facility.

(ii) Noise

A background sound level analysis was conducted to establish the existing conditions at the Project Site and to characterize background sound levels experienced in the surrounding community. A predictive modeling analysis was also executed to assess potential noise impacts generated by the Facility and to evaluate mitigation measures within the Facility design to minimize those impacts. The Facility's potential noise impacts were also compared to limits established in the City of Berlin's Noise Ordinance to assess conformance with those standards. The methodology and results of the Facility noise impact assessment, including proposed mitigation measures, are described in detail below.

(ii)(a) Concepts of Environmental Sound

Sound levels based on the A-weighted scale are generally used to evaluate occupational and environmental sound because they correlate with how the human ear responds to sound. A-weighting significantly de-emphasizes those parts of the frequency spectrum from a sound source that occur both at lower frequencies (below about 500 Hz) and at very high frequencies (above 10,000 Hz), where the human ear is less sensitive to sound and forms the basis for the City of Berlin noise ordinance. Table (h)(3)(ii)-1 provides additional context for the human perception of sound.

The measured and predicted sound levels used in this analysis are summarized utilizing the noise metrics described below.

- **L_{eq}** is the value or level of a steady, non-fluctuating sound that represents the same sound energy as the actual time-varying sound evaluated over the same time period.
- **L_{50}** is the sound level that is exceeded for 50-percent of time.

(ii)(b) Applicable Regulations

There are no federal or state noise regulations applicable to the Project. Therefore LBB has looked at the City of Berlin's zoning ordinance for guidance. That ordinance states:

> *"Persistent noise at the property line from business or industrial uses shall not exceed a maximum of seventy (70) decibels at the A weighed response scale, as measured by a sound level meter meeting the current standards of the American National Standards Institute "Specification for Sound Level Meters", between 6:00 a.m. and 10:00 p.m., Monday thru Saturday and 8:00 a.m. to 10:00 p.m. on Sunday. Persistent noise at the property line shall not exceed sixty (60) decibels by the same measurement standard between 10:00 p.m. and 6:00 a.m. Sunday thru Saturday and 10:00 p.m. Saturday to 8:00 a.m. on Sunday."*

LBB has adopted these sound levels as reference points for design of the Project. As such, the goal has been to achieve predicted property line sound levels during daytime hours (defined as 6AM to 10PM) of 70 dBA or less and nighttime levels of 60 dBA or less. The Facility is expected to operate 24 hours per day, seven days per week. However, as discussed below, certain operations will be limited to only daytime hours to minimize sound impacts in the surrounding community during the quietest hours of the day.

(ii)(c) Background Sound Levels

(ii)(c)(1) Measurement Locations

Five community locations were selected for background monitoring due to their level of sensitivity and proximity to the Site. Background sound levels were measured at each location during four different time periods: nighttime, morning, afternoon, and early evening. Each sample was taken to observe the acoustic environment at that particular location for that time of day; each measurement period consisted of a continuous 20-minute sample. These short-term (ST) locations are mapped on both Figures (h)(3)(ii)-1 and Figure (h)(3)(ii)-2, with descriptions provided below:

- **ST1** – the corner of Success Street and Main Street is representative of the nearest residential buildings across the Androscoggin River along Main Street, north of downtown Berlin.

- **ST2** – this section of Spring Street is representative of the residential area on the eastern face of the hillside, west of the Site.

- **ST3** – the corner of Napert Street and Hutchins Street Extension is the closest residential neighborhood north of the Site.

- **ST4** – the corner of Belknap Street and Carroll Street is located near the residences in closest proximity to the southeast of the Site.

- **ST5** – the corner of Grafton Street and Hillsboro Street is a representative location within a community of single- and two-family houses to the south of the Site.

Additional unattended long-term noise measurements were performed at two locations along the property line of the Project Site. These property line (PL) locations are also mapped on Figures (h)(3)(ii)-1 and (h)(3)(ii)-2 with descriptions provided below:

- **PL-1** – is located along Hutchins Street, in the vicinity of Coos Street.
- **PL-2** – is located along Community Street, south of the existing stack and across the street from the baseball field.

(ii)(c)(2) Measurement Methodology

Noise measurements were conducted at a total of seven sites between April 29 and 30, 2009. The background noise measurements at the community locations were performed with a Larson Davis Model 831 precision integrating sound level meter that meets the requirements of American National Standards Institute (ANSI) Standards for Type I instruments. Noise measurements at the property line were performed with Larson Davis Model 824 precision integrating sound level meters that also meet the ANSI standards for Type I instruments. In each case, the microphone was fitted with a windscreen and set upon a tripod at a height of 5 feet above ground, and located out of the influence of any vertical reflecting surfaces. The sound level meters were calibrated at the beginning of measurement period using either Larson Davis Model CAL200 or Model CAL250 acoustic calibrators following procedures that are traceable to the National Institute of Standards and Technology (NIST).

The sound level meter sampled A-weighted sound level data including equivalent sound levels (L_{eq}) and percentile levels. The octave band frequency content of the existing acoustic environment was also determined from the sound level data collected. All of the ambient sound measurement procedures were performed to comply with the methods outlined in American National Standards Institute (ANSI) S12.18-1994.

ESS staff monitored weather forecasts for Berlin to ensure that the background noise measurements were performed during periods with favorable weather conditions (little or no precipitation and light winds). Throughout the measurement period, there was no precipitation, temperatures ranged from the high 20s at night to the high 50s / low 60s (degrees Fahrenheit) during the day, and wind speeds generally ranged from 0 to 11 mph, with observed wind speeds approaching 15 mph at the end of the measurement program.

(ii)(c)(3) Measurement Results

The results of the background sound level monitoring are summarized in Table (h)(3)(ii)-2, through Table (h)(3)(ii)-4, and Figure (h)(3)(ii)-3 through Figure (h)(3)(ii)-6 . The measured results at each monitoring location are discussed below.

Site ST-1 is located approximately 400 feet to the northwest of the nearest property line of the proposed Facility. Typical noise sources at this site included vehicle traffic along Main Street and Success Street, and river noise. During daytime hours, the measured L_{eq} ranged from to 65 to 67 dBA and the measured L_{50} ranged from 61 to 63 dBA. The measurement results at this site exhibited a strong diurnal pattern, as nighttime background sound levels dropped with a decrease in nighttime vehicle traffic on the local roads. During the night, the measured L_{eq} was 52 dBA and the measured L_{50} was 50 dBA.

Site ST-2 is located approximately 0.2 miles to the northwest of the nearest property line of the proposed Facility. Noise sources at this site included local vehicle traffic along Spring Street, and local noise typical of a residential neighborhood. During daytime hours, the measured L_{eq} ranged from to 56 to 62 dBA and the measured L_{50} ranged from 47 to 50 dBA. The measurement results at this site also exhibited a strong diurnal pattern, as nighttime background sound levels dropped with a decrease in nighttime vehicle traffic on the local roads. During the night, the measured L_{eq} was 52 dBA and the measured L_{50} was 41 dBA. This dataset reveals the higher degree of variability in the acoustic environment of a neighborhood set back from Main Street, where the sound levels from brief and infrequent (yet noisy) vehicles led to an increase in the difference between the L_{eq} and the other measurement metrics.

Site ST-3 is located approximately 400 feet to the northeast of the nearest property line of the proposed Facility. Typical noise sources at this site included vehicle traffic along Hutchins Street and river noise. During daytime hours, the measured L_{eq} ranged from to 44 to 49 dBA and the measured L_{50} ranged from 42 to 48 dBA. The measurement results at this site exhibited a weak diurnal pattern, as nighttime background sound levels did not drop significantly. During the night, the measured L_{eq} was 47 dBA and the measured L_{50} was 47 dBA. Overall, this location was the quietest of the short-term sites, and due to the lack of traffic and distance from the downtown area, maintained a relatively static acoustic environment.

Site ST-4 is located approximately 100 feet to the southeast of the nearest property line of the proposed Facility. Noise sources at this site included vehicle traffic along Hutchins Street and local noise typical of a residential neighborhood. During daytime hours, the measured L_{eq} ranged from to 55 to 59 dBA and the measured L_{50} ranged from 49 to 53 dBA. The measurement results at this site exhibited a strong diurnal pattern, as nighttime background sound levels dropped with the decrease in nighttime vehicle traffic on the local roads. During the night, the measured L_{eq} was 49 dBA and the measured L_{50} was 48 dBA.

Site ST-5 is located approximately 425 feet to the south of the nearest property line of the proposed Facility. Noise sources at this site included vehicle traffic along Grafton and Hillsboro Streets along with local noise typical of a residential neighborhood. During daytime hours, the measured L_{eq} ranged from to 58 to 65 dBA and the measured L_{50} ranged from 47 to 55 dBA. The measurement results at this site exhibited a very strong diurnal pattern, as nighttime background sound levels dropped significantly. During the night, the measured L_{eq} was 41 dBA and the measured L_{50} was 39 dBA. Similar to the results of ST-2, the data again reveals the higher degree of variability in the acoustic environment of a neighborhood set back from roads with steady daily traffic.

Site PL-1 is located at the southeastern property line along Hutchins Street. Noise sources at this site included vehicle traffic along Hutchins Street and nearby local roads as well as river noise. During daytime hours, the measured hourly L_{eq} ranged from to 60 to 70 dBA and the measured L_{50} ranged from 48 to 64 dBA. The measurement results at this site exhibited a strong diurnal pattern directly related to vehicle traffic along Hutchins Street. During the night, the measured L_{eq} ranged from 52 to 68 dBA and the measured L_{50} from 44 to 60 dBA. The higher end of these nighttime ranges corresponds to the early morning hours when truck traffic along Hutchins Street resumed.

Site PL-2 is located at the southwestern property line along Community Street, adjacent to the Community Street Ballfield. Noise sources at this site included vehicle traffic along Hutchins Street, downtown Berlin, and river noise. During daytime hours, the measured hourly L_{eq} ranged from to 46 to 53 dBA and the measured L_{50} ranged from 45 to 50 dBA. The measurement results at this site exhibited a strong diurnal pattern, as nighttime background sound levels dropped with a decrease in nighttime vehicle traffic along Hutchins Street. During the night, the measured L_{eq} ranged from 45 to 47 dBA and the measured L_{50} ranged from 45 to 46 dBA.

The measured background sound levels are presented to characterize the existing acoustic environment in the vicinity of the proposed Facility. The noise Performance Standards contained within the City of Berlin's Zoning Ordinances are exclusive of background sound levels.

(ii)(d) Noise Predictive Modeling Methodology and Assumptions

(ii)(d)(1) Noise Predictive Model

The Cadna-A® computer noise model was used to calculate sound pressure levels from the operation of Facility components at nearby noise-sensitive locations. An industry standard, Cadna-A® was developed by DataKustik GmbH to provide an estimate of sound levels at distances from specific noise sources. This model takes into account:

- Sound power levels from stationary and mobile sources;
- The effects of terrain features including relative elevations of noise sources;
- The locations of noise-sensitive land use;
- Intervening objects including buildings and sound barrier walls; and
- Ground effects due to areas of pavement and unpaved ground.

Cadna-A® accounts for shielding and reflections due to intervening buildings or other structures in the propagation path, as well as diffracted paths around and over structures, which tend to reduce computed noise levels. The shielding effects due to intervening buildings and other structures located on the Project Site were included within the model; however, the shielding effects due to off-site buildings and structures were not modeled. By excluding the shielding effects provided by off-site buildings, the predicted operational sound levels include a level of conservatism that represents higher than expected actual impacts.

The International Standards Organization current standard for outdoor sound propagation: ISO 9613 Part 2 – "Attenuation of sound during propagation outdoors" was used within Cadna-A®. This standard provides a method for calculating environmental noise in communities from a variety of sources with known emission levels. The method contained within the standard calculates the attenuation over the entire sound path under weather conditions that are favorable for sound propagation, such as for downwind propagation or "under a well-developed moderate ground-based temperature inversion." Application of such weather conditions to the modeling of the facility yields conservatively high estimates of operational noise levels in the surrounding community.

The output from Cadna-A® includes tabular sound level results at selected receiver locations and colored noise contour maps (isopleths) that show areas of equal and similar sound levels.

(ii)(d)(2) Methodology and Assumptions

The following components of the Facility were identified as the primary sources of operational noise and were included in the noise model for the Facility.

- **Wood Chipper** – Fuel (round wood) preparation
- **Conveyor System** – On-site fuel handling and delivery systems
- **Wood Grinder** – On-site fuel delivery/preparation system
- **Turbine Hall** – Steam turbine and electrical generator
- **Boiler Building** – Boiler, water pumps and air supply fans
- **Boiler Stack** – Flue gas exhaust
- **Cooling Tower** – Cooling water recirculation and exhaust fans
- **Electrostatic Precipitator** – Emissions control system
- **Generator Step-Up (GSU) Transformer** – rated at 80 MVA
- **Induced Draft Fan** – Flue gas handling
- **Transfer Tower** – Conveyor system

- **Front End Loaders** – Fuel handling equipment
- **Emergency Fire Water Pump** – Periodic equipment testing
- **Standby Diesel Generator** – Periodic equipment testing

Reference sound power levels used as input to Cadna-A® were provided by equipment manufacturers, based on information contained in reference documents, or developed using empirical methods. The sound power level (L_W) is defined as ten times the logarithm (to the base 10) of the ratio of a given sound power to the reference sound power of 1 picowatt (1 pW = 10^{-12} W). Sound power levels are expressed in terms of decibels (dB). Sound power is defined as the rate per unit time at which sound energy is radiated from a source and is expressed in terms of watts (W).[11]

Table (h)(3)(ii)-5 shows the A-weighted sound power levels and the corresponding octave band sound power levels for the major sources of sound associated with the operation of the proposed facility. Table (h)(3)(ii)-6 provides information regarding the sources of the sound power level data.

Table (h)(3)(ii)-7 shows the modeled noise reduction indices for on-site structures and buildings that were included in the model. This table also includes the modeled splash attenuation values that were provided by a representative cooling tower manufacturer.

All of the equipment previously identified was included in a typical daytime operational scenario for the hours from 6 AM to 10 PM. An operational scenario for nighttime hours (from 10 PM to 6 AM) also was developed. The nighttime scenario excludes the following pieces of equipment and/or processes:

- **Wood Chipper** – the wood chipper for the processing of round wood;
- **Conveyor System** – the conveyors from the wood chipper to the transfer tower and from the transfer tower to the wood grinder; and
- **Idling Trucks** – truck trips will not occur between the hours of 10 PM and 6 AM.

Offsite topography was determined using official USGS digital elevation data for the study area. A default ground attenuation factor of 1.0 was assumed for off-site sound propagation over acoustically "soft" ground. A ground attenuation factor of 0.0 was assumed for on-site sound propagation over acoustically "hard" ground.

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[11] Handbook of Acoustical Measurements and Noise Control, Third Edition, edited by C. M. Harris, McGraw-Hill, 1991.

(ii)(e) Project Impacts

(ii)(e)(1) Project Operation

Figures (h)(3)(ii)-1 and (h)(3)(ii)-2 provide mapping of the maximum sound levels from the Facility as noise contours in 5-dB intervals, for typical daytime and nighttime operating scenarios, respectively. The noise contours are graphical representations of the cumulative noise associated with full operation of the proposed facility, and show how operational noise would be distributed over the surrounding area. The contour lines shown in the figures are analogous to elevation contours on a topographic map, i.e. the noise contours are continuous lines of equal noise level around some source, or sources, of noise.

The noise contours in the figures are indicative of conditions that are favorable for sound propagation, such as those that occur under downwind propagation, as discussed above, in the explanation of the Noise Predictive Model. As a result, the noise contours shown in Figures (h)(3)(ii)-1 and (h)(3)(ii)-2 do include some level of conservatism that likely over predicts actual impacts. In reality, wind speeds and direction are constantly changing. At those times when a particular receiver is located downwind from the Facility (wind blowing from the Facility to the receiver), the noise contours shown would be applicable. However, at other times, a receiver may be upwind of the Facility (wind blowing from the receiver to the Facility). Under upwind conditions, the noise contours shown in Figures (h)(3)(ii)-1 and (h)(3)(ii)-2 would tend to overestimate operational noise levels.

Figure (h)(3)(ii)-1 demonstrates that the operational noise from the Facility will meet the selected reference criteria of daytime noise equal to or less than 70 dBA at the property line. The 70-dB contour interval lies completely within the property line of the Facility. Likewise, Figure (h)(3)(ii)-2 demonstrates that the operational noise from the Facility will meet the selected nighttime reference criteria of 60 dBA or less at the property line. The 60-dB contour interval lies almost completely within the property line of the Facility. It extends beyond the property line only slightly into the river just north of the main fuel piles. The 60-dB contour interval also extends beyond the property line a short distance onto Community Street to the south of the turbine hall and cooling tower. These two locations (in the river and along the center of Community Street) are not considered noise-sensitive, and so would not be adversely affected by the projected sound levels due to Facility operations.

Table (h)(3)(ii)-8 provides a tabular summary of the predicted maximum noise levels from full operation of the Facility at the measurement sites. During daytime hours (6 AM to 10 PM), the maximum predicted noise levels from the Facility range from a low value of 52 dBA at locations ST-3 and ST-5 to a high value of 57 dBA at location ST-1. The predicted property line noise levels range from 55 dBA at location PL-1 to 60 dBA at location PL-2 during the day. During the nighttime scenario (10 PM to 6 AM), the maximum predicted noise levels range from a low value of 40 dBA at location ST-3 to a high value of 54 dBA at location ST-1. The predicted property line noise levels range from 49 dBA at location PL-1 to 58 dBA at location PL-2 during the night.

Table (h)(3)(ii)-9 compares predicted noise levels from the Facility with measured background sound levels, expressed both in terms of the measured L_{eq} and the measured L_{50} at the five short-term sites. Average sound levels (L_{eq}) are expected to increase by 1 to 3 decibels at four of the short-term measurement location during daytime hours. At location ST-3, average sound levels in the community are expected to increase by up to 9 decibels during the day, in the event that there are multiple idling trucks in a queue at the scale house. At night, average sound levels are expected to increase by only 1 decibel at location ST-3, since truck operations will not occur at night, and by 2 to 8 decibels at the other short-term measurement locations.

Although the Facility will be audible in the community, operational noise levels are expected to conform with the noise Performance Standards in the City of Berlin's Zoning Ordinances, with the recommended noise control measures incorporated into the design of the Facility and the proposed operational scenarios being followed.

(ii)(e)(2) Project Construction

In comparison to operational noise, construction noise is considered "temporary" in nature. An increase in project area noise levels will occur during the construction of the proposed Facility. Construction noise may differ from that generated by operation of the Facility due to differences in the spectral and temporal characteristics of the noise. The degree of noise impact during construction will be a function of the number and types of equipment being used, and the distances between the construction equipment and the noise-sensitive areas. For example: an excavator running with a proper muffled engine will be found significantly more acceptable to the casual listener than a hammering of pile driving equipment from the same distance. The equipment expected to be used during the construction of the Facility constitute "standard" earth moving equipment including:

- Excavators
- Bulldozers
- Front end loaders
- Vibratory compactors
- Generators
- Dump trucks
- Graders
- Concrete trucks and related equipment
- Cranes.

Generally, most construction activity will occur during normal working hours on weekdays when higher sound levels are typically present, and are found acceptable. Therefore, noise impact experienced by local residents as a result of construction activities should not occur during sleeping hours. A number of measures will be utilized to minimize noise levels produced by construction activities. Such measures include, but are not limited to, the following:

- Internal combustion engines will be equipped with a properly operating muffler;
- Where possible, truck loading, unloading and hauling will be conducted using techniques and locations to minimize off-site noise impacts;
- Construction equipment and vehicles will be routed in areas away from the property lines to cause the least disturbance to nearby receptors where possible; and
- Continuously operated diesel-powered equipment, such as compressors and generators, will be placed in areas as far as possible from or shielded from noise-sensitive locations.

(ii)(f) Noise Control Measures

The noise modeling results indicate that the Facility will meet the selected noise criteria reference levels at the Site property lines. Several noise control measures have been included in modeling analysis to achieve this result and minimize off-site impacts, as outlined below:

- Locating the boiler and its supporting equipment within a building designed to minimize sound transmittance, with a minimum Sound Transmission Class (STC) Rating of 42.
- Locating the steam turbine generator and its supporting equipment within a building designed to minimize sound transmittance, with a minimum STC Rating of 42.
- Locating the electrostatic precipitator and its supporting equipment within a structure designed to minimize sound transmittance, with a minimum STC Rating of 42.
- Locating the wood chipper within a building and/or enclosure designed to minimize sound transmittance, with a minimum STC Rating of 52.
- Locating the induced draft fan within a building and/or enclosure designed to minimize sound transmittance, with a minimum STC Rating of 52.

- Providing a sound mitigation package for the cooling tower consisting of sound barrier walls on the fan deck and at ground level along its northwest side[12], as well as "splash" attenuation technology.
- Installing a sound barrier wall in the switchyard area to minimize off-site noise impacts from the facility's step-up transformer.[13]
- Installing a conveyor system designed to produce a sound pressure level no higher than 77 dBA at a distance of 3 feet.
- Installing a sound barrier wall[14] along the access road to the Facility to shield the Napert Street neighborhood from truck noise, in the event that there are multiple idling trucks in a queue at the scale house.

The Facility will employ these measures or alternative measures that may be identified during detailed Project design that will achieve similar or lower impacts. Furthermore, the Facility will only accept truck deliveries and operate the proposed on-site wood chipping process Monday through Saturday during daytime periods to further minimize noise during more sensitive nighttime periods. Under typical operating conditions, LBB anticipates operating the on-site wood whipping equipment between the hours of 6AM and 7PM, further reducing the expected sound levels during early evening periods.

(iii) Land Use

The original structure constructed on the Site was the Riverside Mill, built in 1891, at which time pulping and papermaking activities began. The Site has a long history of industrial use and development, with many buildings having been razed and replaced. The Site continued to be used for pulping operations until September 2001, when activity at the Site briefly ceased, only to resume again in 2003 after the property was purchased by Fraser in May of 2002. In 2004, a cogeneration facility was installed in the southwestern portion of the Site.

The Pulp Mill permanently closed in May of 2006 and was then sold to North American Dismantling Company (NADC), after which the majority of buildings and structures were razed, including the cogeneration facility. However, a number of structures still remain on the Site, including the recovery boiler/chemical recovery unit (CRU) building, the recovery boiler/CRU control building, the recovery boiler/CRU stack, the water filtration plant, two above-ground storage tanks (ASTs), a propane AST, the former bailed pulp storage building, the former receiving building, a waste water lift station, the former motor storage building, a scale house, and the T-1 Transformer Site substation.

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[12] The ground-mounted sound barrier wall for the cooling tower was modeled at an approximate height of 12 feet (above ground level) and a length of 275 feet.

[13] The sound barrier wall for the transformer was modeled at an approximate height of 11.5 feet (above ground level) and a length of 75 feet.

[14] The sound barrier wall along the access road to the facility was modeled at an approximate height of 18.4 feet (above ground level) and a length of 780 feet.

Presently, there are no manufacturing activities occurring on the Site. Areas zoned as Industrial/Business, found to the north, east, and southwest, bound the majority of the Site. The southeastern corner, across Hutchins, Coos, and Community Streets are zoned as either Residential Two-Family or Residential Single-Family. The Androscoggin River forms nearly the entire northwest boundary of the Site; the river runs through an area designated as Business General according to local zoning.

Appendix J contains photographs of the Site from various vantage points throughout the City of Berlin, and Figure (c)(3)-2 depicts the local zoning designations for Berlin. Based on this data, as well as observations made during Site reconnaissance and review of available records, current uses of properties adjoining the Site can be generally characterized as urban industrial, commercial, residential, and open space. The current zoning designations and uses of properties adjacent to the Site consist of the following:

> <u>North/Northeast of the Site</u> – Immediately adjacent to the property is a vacant tract of land zoned as Industrial/Business, formerly part of the Pulp Mill Site. Residential Single-Family properties exist north of this tract, along with vacant land, and the Mt. Carberry Landfill (former Dummer Yard Landfill).
>
> <u>East and Southeast of the Site</u> – Residential and commercial properties exist across Hutchins Street, zoned as Residential Two-Family and Single-Family.
>
> <u>South of the Site</u> – A park (open space), residential properties, commercial properties across Hutchins Street, Coos Street, and Community Street.
>
> <u>West/Northwest of the Site</u> – The Androscoggin River directly abuts the Site to the west/northwest and has a zoning designation of Business General. Downtown Berlin is located west of the river, along with a property which used to be part of the former Pulp Mill property and is currently occupied by two buildings.

The proposed Project is compatible with the Site’s zoning designation. Significant buffering for adjacent landowners is afforded by the size of the Site, approximately 62 acres.

(iv) Visual and Aesthetic Impacts

In general, views of the proposed Facility are available throughout the City of Berlin largely due to the local topography and proximity to the Site. The Site is settled into a bowl-shaped valley at the center of Berlin along the banks of the Androscoggin River, and is surrounded by a series of small mountains just east of the White Mountain National Forest and within the southern reaches of the Great North Woods. Mount Washington dominates the southern horizon as the Androscoggin River creates a generally north-to-south corridor and bisects the City. Due to the mountainous terrain, with Mount Jasper to the northwest, Mount Forest to the southwest, and Mount Carberry to the east, views of the Site are limited to the settled downtown area and the residential communities immediately surrounding it, which sprawl up the local hillsides.

Despite being centrally located in the city, the tallest existing structures at the Site proposed for rehabilitation and conversion fail to break the high horizon line created by the severe local topography. Consequently, long-range views of the Facility will only be found intermittently along the residential roads cutting across the face of the peaks. Direct lines of sight toward the Facility are often obstructed or partially screened by intervening structures. The location of the Site at the center of the bowl-shaped downtown area and surrounding communities does result in varied perspectives from which the tallest structures (the boiler stack and building) are visible currently and will remain so with the built Project. The most prominent open views are found at close range, especially in the section of Berlin east of the Androscoggin River. However, the planned improvements to the existing structures serve to enhance the views from any vantage points offering a view of the Facility.

(iv)(1) Site and Vicinity Description

The Site is located along the northern and western sides of Community, Coos, and Hutchins Streets in Berlin, and is bordered on the northwest by the Androscoggin River. The site also abuts the remaining portion of the former Pulp Mill to the north. A U.S.G.S. locus map is provided as Figure (c)(2)-2 and an Existing Conditions aerial is provided as Figure (c)(3)-1. The availability of cultural or historic resources at, within or immediately adjacent to the 62 acre Site is limited due to the extensive history of prior disturbance and industrial use in the area, as well as the recent razing of most of the former Pulp Mill. The Site is zoned as Industrial/Business, and consists of the southern portion of the property formerly known as the Burgess Mill, Berlin Mill, and most recently the Fraser Pulp Mill.

The original structure constructed on the Site was the Riverside Newsprint Building (Appendix J, Photo 5), built in 1891, at which time pulping and papermaking activities began at the Site. The Site has a storied history of industrial use and development, with many other buildings having been razed and replaced over the years.

The Pulp Mill permanently closed in May of 2006 after which the majority of buildings and structures were razed. Photographs 1, 2 and 3 in Appendix J are photographs of the Site as it stood prior to the demolition of most of the former facility. The boiler building and stack are the prominent features located on the left-hand side of Photographs 1 and 2; they are currently and are proposed to be the tallest structures on the Site. In contrast, Photographs 3 through 8 show the conditions of the Site as it exists today, including the remaining structures which may be maintained or sold to others as identified below:

- Photograph 4: the recovery boiler (c. 1993) and control building (c. 1966, rebuilt: 1993);
- Photograph 4: the recovery boiler stack (c. 1980);
- Photograph 5: the former Riverside Newsprint Shipping Department (c. 1891)
- Photograph 6: the former bailed pulp storage building (c. 1941);
- Photograph 7: the former waste mill (c. 1953);

- Photograph 8 and Photograph 9: the river water filter plant (c. 1900), and, the truck scale house (c.1974).

Presently, there are no manufacturing activities occurring on the Site. Current uses of properties abutting the Site range from industrial and commercial to residential and open space. The uses and zoning designations of the abutting properties are discussed in Section (h)-(3)(iii) of this Application. The proposed Project is consistent with the historic use of the Site and compatible with both existing and planned land uses on and around the Site, represented by the Site's zoning designation in Figure (c)(3)-2. Significant buffering for adjacent landowners is afforded by the size of the Site, the Site layout which sets the primary activities away from property lines that are closest to residential areas, and planned landscaping to be developed with input from the local community.

(iv)(2) Area of Potential Effect

The City of Berlin possesses both natural and historic resources consistent with a former mill town of the North Country. The stretch of the Androscoggin River that abuts the Site is unique in that from the dam within the City of Berlin to the Cascade Dam two miles downstream, the river drops nearly 300 feet in elevation, making it an ideal source of hydrologic power. Consequently, the mill town developed adjacent to the river with the downtown area residing on the opposite bank from the Site. A map of cultural and historic resource inventories in Berlin was created using data from the NH GRANIT web page, and is provided as Figure (c)(5)-1. In general, while the City of Berlin is home to listings of historical and cultural significance, including four listings on the National Register of Historic and three listings on the NH State Register of Historic Places, the Site itself, along with the abutting properties and near vicinity currently contain no listed parcels or structures. Table (c)(5)-2 and Figure (c)(5)-1 identify the listed resources within the City.

(iv)(2)(a) Project Site

Research conducted at the New Hampshire Division of Historical Resources (NHDHR) office revealed that a *New Hampshire Division of Historical Resources – Area Form* was filed in 2002 regarding a stretch of the former Berlin Mills Railway. This area was determined to be eligible for listing in the National Register by the NHDHR. Mapping contained in the Area Form shows a portion of the railway passing through the Site. However, the contributing factors for the eligibility of the Railway are the bridges to the north (Photograph 10 of Appendix J) and far south of the Site that cross the Androscoggin River. These structures remain intact and will be unaffected by the Project. The section of rail passing through the Site has since been removed during the razing operations of previous ownership, and no rail is currently present on the Site. Any railway development resulting from the Project would serve to help maintain the rail bridges to the north. LBB in conjunction with the local community is also planning a scenic riverwalk that would include an area on the northwest corner of the Site that provides excellent views of the rail bridges. Due to absence and previous disturbance, no impacts to either historic or archaeological resources are expected within the Site boundary or within the physical Area of Potential Effect (APE).

(iv)(2)(b) Surrounding Area

The topography and proximity of the City to the Project Site creates a localized visual APE. Views of the existing boiler and stack structure are available and varied from many parts of the City, including areas or districts containing historic properties. The appearance of the most visible components of the proposed Facility will be improved through the installation of new exterior wall surfaces. This rehabilitation would effectively enhance the views available from anywhere the Facility is visible, as depicted in the visual simulations provided as Figures (h)(3)(iv)-2 through (h)(3)(iv)-10. The visual simulations are further discussed below.

The *Record of NHDHR's Determination of Eligibility Decisions* contains four listed properties along the Main Street corridor that have been deemed eligible for the National Register (NR) of Historic Places either individually or within a NR district "with more information needed". The current views from these resources would not be adversely altered as they are obstructed or partially screened due to the intervening buildings and/or vegetation characteristic of the views in general from the downtown area.

Areas considered visually sensitive, such as aboveground historical architectural structures and districts listed on the State or National Registers of Historic Places (S/NRHP), parks, designated scenic areas, and nearby residential areas, were compiled within the visual study area, through review of maps, atlases and electronic databases. A total of 7 structures are currently listed on the S/NRHP. The inventory is provided in Table (c)(5)-2.

A *Request for Project Review Form* was sent to the DHR office on October 5, 2009. The package included Project Site plans, photographs of historic and existing conditions, and photographic simulations of the built Project. DHR has requested completion of a Project Area Form by a qualified architectural historian to determine if any of the structures on the Site or in the surrounding neighborhoods are eligible for listing as historic resources. DHR has also requested to be kept informed of local outreach efforts and any proposed alterations to existing structures on the Site. LBB has committed to working with DHR in these reviews. DHR has confirmed that such discussions are a normal component of the SEC review process and are expected to conclude within the SEC review timeline.

(iv)(3) Field Reconnaissance to Assess Potential Visibility

Field reconnaissance in the area of the Project and the City of Berlin was conducted to assess the extent of Project visibility. The first field effort occurred on March 5, 2009, while the second photographic field reconnaissance took place on April 29 and 30, 2009. Both were conducted prior to leaf-out on the trees and under clear weather conditions to maximize potential views toward the Site.

Field reconnaissance and observations were conducted via automobile and on foot, while utilizing USGS topographic and road maps, aerial photographs of the area surrounding the Site, along with the guidance of local knowledge. Photographs were taken to characterize the general landscape, document visibility of the Project from potentially sensitive sites, and identify potential viewpoint locations for visual simulations of the built Project.

Significant visual screening of the Site was determined to exist due to topography, vegetation, and intervening buildings and structures. Even along the roads that traverse ridgelines in the area, the Site is generally screened by single or two-family homes and vegetation, offering only intermittent glimpses or direct lines of sight toward the Site. From elevated viewpoints, the Project's structures do not rise above the horizon but are set against a backdrop of the regional land use and terrain.

The most open and direct views of the Project were found along Community, Hutchins and Coos Streets which border the Site. Multi-story buildings along the river bank serve to obstruct most street level views in the downtown area, though some open views just north of the downtown were observed.

(iv)(4) Photographic Methodology

Color photographs were taken of existing views toward the Project Site from visually sensitive areas and to generally characterize the area and overall landscape types. Photographs were taken with a Canon EOS Digital Rebel camera fitted with a Sigma lens. Photographs taken at locations considered for visual simulation (termed viewpoints) were taken with the camera mounted on a tripod when possible.

Viewpoint locations were selected to document views toward the Site from a range of distances and directions and at representative visually sensitive areas. At each viewpoint location, the most open view available from publicly accessible ground level areas at or near the location was photographed. When possible, viewpoint photographs were taken with the field of view centered on the existing structure. Viewpoint photograph locations were measured using a Trimble Geo XT Global Positioning (GPS) unit, which is capable of attaining sub-meter accuracy.

(iv)(5) Description of Viewpoint Locations

A variety of locations were selected for further evaluation based on observations made during initial field reconnaissance. The objective of these assessments was to identify viewpoints for visual simulations that would provide representative views of the built Project from various directions, elevations, distances and resources in the community. The viewpoint locations are summarized below and are mapped as Figure (h)(3)(iv)-1. Photographs of resources and existing views toward the Site from each viewpoint are provided in Appendix J.

Hutchins Street is approximately 0.5 miles northeast of the boiler stack and boiler building and runs along the entire eastern property line of the Site. The street provides access to the local residential communities, mixed use areas along the river to the north, and the neighboring town of Success. Residences and some commercial properties that line the street opposite the Site have the closest views of the Project. [Photograph 11]

Orthodox Church is a National Register Listed church along Petrograd Road approximately 0.8 miles to the west of the Site. It is located high upon the face of Mount Forest to the southwest of the Site, but offers limited long-range views. [Photograph 12]

6th Avenue is a residential road that offers the highest vantage point southwest of the Site along the face of Mount Forest. It consists of private homes approximately 0.75 miles from the Site. Only sporadic and intermittent views of the Site were observed during field reconnaissance. [Photograph 13]

Main Street runs immediately west of the Site along the opposite bank of the Androscoggin River. Despite its proximity, open views of the Site are limited. Two viewpoints along Main Street were evaluated; one from the eastern sidewalk across from the bowling alley downtown that provides a clear view of the Site during leaf-off conditions, and another viewpoint near the old Woods Department buildings approximately 0.25 miles north of downtown. [Photographs 14 and 15]

Mason Street Bridge is approximately 0.25 miles from the boiler stack and boiler building and borders the Community Street Playground on the south. It is one of the few roads to cross the Androscoggin River to access Berlin's East Side and offers views of the Androscoggin River and Mount Washington. [Photograph 16]

Bridge Street Walking Bridge is a public walking or biking bridge approximately 1.1 miles from the Site which offers scenic views of the Androscoggin River and Mount Washington. [Photograph 17]

Grandview Drive is a residential community of large single family homes high atop Mount Jasper, offering sweeping vistas of the White Mountains and North Country. In general, only very limited views of the boiler stack are available from the vantage points found along the roads on Mount Jasper, due to the elevation, topography and vegetative screening. [Photograph 18]

Various Locations throughout Project Site: Due to the size of the Site and the lack of open views along publicly accessible roads, the perimeter of the Site was evaluated for possible simulation to best portray the proposed facilities in an unobstructed viewscape, so as to demonstrate to the potential improvement upon the aesthetic quality of the existing Site. [Photographs 19 and 20]

As indicated previously, the viewpoint locations were chosen to provide views of the built Project from a range of distances and directions, and to represent potential views from other locations at similar distances and orientations. The viewpoints selected for simulation were:

Community Street Ball Field/Playground

The proximity of this public recreational resource affords the most open and direct views of the existing structures, as it is situated along the southern property line of the Site, immediately across Community Street from the boiler stack and boiler building. [Figures (h)(3)(iv)-2 through (h)(3)(iv)-4]

St. Anne's Church

This National Register Listed church along Main Street at the northern end of downtown Berlin offers one of the most open views of the Facility available in such close proximity to the Site. [Figures (h)(3)(iv)-4 through (h)(3)(iv)-6]

Grafton Street is a residential road that offers the highest vantage point east of the Site along the face of Mount Carberry. Properties along the street consist of private homes that lie approximately 0.5 miles from the Site. [Figures (h)(3)(iv)-7 through (h)(3)(iv)-8]

Site Property Line near Hutchins Street

This location was selected to represent the views of residences along Hutchins Street, which have clear views of the Site in very close proximity. [Figures (h)(3)(iv)-9 through (h)(3)(iv)-10]

(iv)(6) Visual Simulation Methodology

GIS, AutoCAD and GPS technologies were used to build accurate visual simulations. A base map was created in two dimensions using ESRI® ArcGIS and Autodesk® AutoCAD software, using georeferenced orthophotography (aerial photography) from the Geographic Information System (GIS) database. Orthophotography is used to illustrate and reference surrounding characteristics of the land (water bodies, structures, vegetation, etc.) in the viewpoint photos. Locations of the viewpoints were overlaid on top of the orthophotography. Digital Terrain Model (DTM) data derived from the orthophotography was then added to produce topography in the Project area. The final base map shows locations, alignments and elevations of existing structures in the field of view, without having to do detailed on-the-ground field surveys.

A three-dimensional model was then created for the visual simulation. The base map data generated in the first phase was imported into Autodesk® Viz 2007 to produce the foundation for the visual simulation. Waldron Engineering provided a three dimensional model that detailed the layout and dimensions of structures for the proposed Facility. The 3D model was then modeled in Viz and inserted into the viewpoint photos at the correct elevation and location. The heights and dimensions of existing structures on the Site were applied in order to properly align the base mapping with the orientation of the viewpoint photograph taken in the field.

Once the model was aligned with the viewpoint photograph, the Viz software applied correct lighting and shadowing on the model, based upon the structure's geographic location relative to the viewpoint photograph and the angle of the sun based upon the time of day and day of the year at that latitude. The end result is a realistic visual simulation of a proposed structure inserted into an existing viewscape. The visual simulations of the Facility are presented in Figures (h)(3)(iv)-2 through (h)(3)(iv)-10.

(iv)(7) Visual Simulations, Impacts and Conclusions

The Project's boiler stack (at 320 feet above finished grade) and boiler building (at a maximum height of approximately 165 feet above finished grade), will be the tallest structures on the Site. Newly constructed Project components, such as the cooling tower, turbine generator building, emission control systems building, fuel process building, wood chipping and conveyor systems, will be shorter structures and less visually prominent from most viewpoint locations. These components will not be visually obtrusive or prominent features of the Site with respect to visual character or aesthetics, with minimal impacts. The exterior of the Facility will be colored to minimize contrast with the surrounding area, to the extent feasible, and surfaces will be clad with a non-glare finish.

Visual impacts due to Project operation are evaluated below using the simulations of the built Facility as seen from the selected representative viewpoints, presented in Figures (h)(3)(iv)-2 through (h)(3)(iv)-10.

Generally, the visual impacts of the Project on residential areas less than 0.75 mile from the Site are expected to be low to minimal, due to terrain features, tree cover, and intervening structures which serve to at least partially screen many views toward the Site. Although open views toward the Site are available, the community and visually sensitive resources within the visual study area would likely experience an improvement in aesthetic quality related to the Site after the visible components have been rehabilitated.

The existing and simulated views from the locations selected for simulation are provided in Figures (h)(3)(iv)-2 through (h)(3)(iv)-10. The simulations show the general character of how these and similar views will change after the Facility is built. A near field simulation of the Facility was created from a viewpoint near the eastern property line along Hutchins Street in order to characterize the potential views from the residential neighborhood east of the Site. The simulation shows the improvement in the appearance of the existing boiler building and also portrays the buffering provided by the large size of the Site.

Views from more distant vantage points such as those from Grafton Street will not be significantly altered, as the change in most structures is not readily discernable.

The appearance of the Facility from near-field or close-range locations such as from St. Anne's Church (Figure (h)(3)(iv)-4 through (h)(3)(iv)-6) and similar vantage points west of the Androscoggin River are likely to be somewhat improved. The rehabilitated boiler building and structures will be free from the current iron superstructure and exterior piping systems that provide an unpleasing industrial appearance to the current structures. The simulation also shows the extent of visual screening provided by vegetation on both sides of the riverbank.

Views from the Community Street Ball Field and playground will be altered as shown in the simulation of Figure (h)(3)(iv)-3. New Project components along the southern property line will be visible from this and similar vantage points. The overall aesthetic quality and appearance of the Site from the recreational area will improve, as coloring, materials, and structural design has been selected to improve visual and aesthetic impacts to the extent practicable. Vegetation will be added to screen the views of Facility operations.

Facility lighting at night will be designed to be downward facing to minimize the Project's visibility. The lighting plan prepared for the Facility demonstrates that lighting levels at the property line and abutting properties will be within the Performance Standard established in the City of Berlin ordinances.

(v) Traffic

The following is an assessment of existing traffic conditions along the roadways surrounding the Facility, and the potential impacts on traffic that may result from its operation.

(v)(a) Existing Traffic Conditions

NH Route 16 is located to the northwest of the Site on the western side of the Androscoggin River. NH Route 16 is accessed from the Site via Unity Street to the south or via the 12th Street Bridge to the north. The access routes avoid truck traffic on the intervening portions of Route 16, which includes many businesses and the downtown district.

NH Route 16 southbound is a double lane road with center double yellow lines. The west side of NH Route 16 is lined with a bicycle lane and a concrete sidewalk. A series of commercial businesses are located along the roadway. NH Route 16 northbound is a double lane road with center double yellow lines. The roadway has concrete sidewalks on both sides with catch basins at strategic locations to manage stormwater. The junction at Unity Street and NH Route 16 is controlled by a three directional traffic light. The traffic signal is synchronized to limit waiting time and queue lengths. A dedicated lane is provided for traffic turning right onto Unity Street from NH Route 16. The intersection is designed with suitable radius and width to avoid turning trucks from crossing into oncoming traffic lanes.

Unity Street is a two-lane asphalt road with center double yellow lines and a bridge that crosses the Androscoggin River. Unity Street merges into Coos Street and Coos Street merges into Hutchins Street. The breakdown lanes along the length of Unity Street are separated from the travel lane by a white solid line. Street lighting is located on the west side of the bridge as well as on a concrete side walk. According to the City of Berlin bridges City data[15], the bridge was built in 1982, is approximately 43 feet in length, has a design load of "HS 20+Mod", which indicates acceptable vehicle weights up to 36 tons[15], and a minimum vertical clearance of 98 feet. According to the City of Berlin, the average daily traffic (ADT) along Unity Street in 2004 when the Pulp mill was in operation was 4,800 vehicles of which 4%, or 192 vehicles per day, was attributed to truck traffic.

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[15] See Federal Highway Administration, Covered Bridge Manual, April 2005, Publication No. FHWA-HRT-04-098

The junction at Mason Street and Unity Street is controlled by a stop sign when entering Unity Street. Mason Street is a two-lane asphalt road with a bridge that crosses the Androscoggin River, providing access to a residential community and downtown area. According to the City of Berlin bridges City data[16], this bridge was built in 1967, is approximately 12 feet in length, has a design load designated as "HS 20+Mod", which indicates acceptable vehicle weights up to 36 tons[17], and a minimum vertical clearance of 98 feet. In 2005, when the Pulp Mill was in operation, the ADT across the Mason Street bridge was 5,500 with truck traffic contributing 5% or 275 vehicles per day.

From Unity Street, the Site is accessed by continuing straight on Community Street (the route to be taken by Facility employees and visitors) or turning right onto Coos Street (the route to be taken by trucks coming from the south). The junction at Community Street and Coos Street is controlled by a stop sign. Community Street is approximately 1,000 foot long two-lane asphalt road, approximately 40 feet wide, with a concrete sidewalk the length of the south side of the street. The street dead ends at the bank of the Androscoggin River at the southwest end of the Project Site.

Traveling from Coos Street to Hutchins Street provides access to residential areas and to the Project Site. The residential areas are accessed via several streets that branch off the right hand side of Coos and Hutchins Streets. All of the junctions from the residential areas entering either Coos Street or Hutchins Street are controlled by stop signs.

Hutchins Street runs the length of the Project Site. Hutchins Street is a two-lane street with center double yellow lines from Community Street to Bridge Street. From Community Street to Cheshire Street, Hutchins Street has an asphalt sidewalk and breakdown lane on the east side of the street and a grass verge on the west side of the street. Hutchins Street, in between Cheshire Street and 12th Street Bridge has a bike lane on both sides with a 1-2 foot wide grass verge within a concrete curb. Catch basins are located along Hutchins Street near the majority of the intersections of Hutchins Street and adjacent roadways.

The 12th Street Bridge crosses the Androscoggin River and connects Hutchins Street and NH Route 16. The bridge is a two lane street with double yellow lines separating traffic flow. Concrete sidewalks are located on both sides of the bridge and street lights are located on the west side of the bridge. According to the City of Berlin, bridges City data, this bridge was built in 1975, is approximately 30 feet in length, has a design load designated as "HS 20+Mod" indicating acceptable vehicle weights up to 36 tons, and has a minimum vertical clearance of 98 feet. The 2005 when the Pulp Mill was operating, the ADT across the bridge

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[16] City of Berlin bridges information. http://www.city-data.com/bridges-Berlin-New-Hampshire.html Accessed on 29 April 2009

[17] See Federal Highway Administration, Covered Bridge Manual, April 2005, Publication No. FHWA-HRT-04-098

was 4,500 vehicles, of which 3% or 135 vehicles, was attributed to truck traffic. The intersection of 12th Street Bridge and NH Route 16 is controlled by a four way traffic signal. The intersection of 12th Street Bridge and Hutchins Street is controlled by a stop and yield sign accompanied by a flashing caution light.

According to the State of New Hampshire Department of Transportation Bureau[18], the following traffic volumes have been recorded on the following roads:

Location	**Average Daily Traffic Volumes**			
	2004	2005	2006	2007
Unity Street over Androscoggin River SB-NB	4,800			4,300
Mason Street east of NH Route 16		5,500		
Unity Street north of Mason Street	7,300			8,100
Hutchins Street north of Columbia Avenue			4,900	
NH 16 (Riverside Drive) north of Maple ST (SB/NB)		8,000		

The average daily traffic levels were calculated from a consecutive seven day collection of data in a particular month, with measurements taken every hour using a short-term automatic recorder.

(v)(b) Project Traffic Levels and Impacts

(v)(b)(i) Project Construction

Construction of the Project will take approximately 26 to 32 months, including commissioning and testing. The peak construction work force will be an estimated 300 personnel per day for approximately 4 months. The typical construction work force will range from 150 personnel or less in the initial and final months of construction, with up to 200-300 personnel per day for approximately 9 months. LBB will seek where appropriate and practicable to implement and incentivize traffic demand measures. To the extent feasible, construction start and finish times will be scheduled to avoid peak traffic hours. The short-term period of high construction related traffic is not expected to cause unreasonable adverse impacts to traffic flows on City streets, or public safety.

Peak construction activities, are estimated to involve 65 truck trips per day delivering construction materials, equipment and supplies to the Project Site during high levels of activities such as when pouring concrete. Work will typically be scheduled between 7 AM to

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[18] State of New Hampshire, Department of Transportation Bureau of Transportation Planning. "Bureau of Planning, Traffic Section, Traffic Reports" 12 May 2008.
http://www.nh.gov/dot/org/operations/traffic/tvr/locations/documents Accessed on 28 April 2009.

5 PM, which overlaps with the edges of the roadway peak hours. Large equipment deliveries will be scheduled to occur during off peak times, to the extent practicable.

(v)(b)(ii) Project Operation

Once construction is completed approximately 40 permanent staff will operate the Facility. The Facility will be operated seven days a week, twenty-four hours per day with staff working two shifts maintaining a maximum of 25 persons per shift.

The estimated traffic to be generated by staff is approximately 100 vehicle trips per day. Truck traffic for delivery of wood fuel for the biomass boiler will consist of approximately 100-120 trucks per day, between the hours of 6 AM and 9 PM. Peak truck traffic to the site is expected to occur in the initial operating hours, before peak levels occur from daily commuting. The estimated total daily truck traffic is slightly more than one-third of the levels measured by NH DOT in 2005 when the Pulp Mill was operating. The Project is expected to generate daily truck traffic well below the levels that occurred when the Pulp Mill was operating, and will result in less impact to traffic flow on City roads.

(vi) Natural Resources

LBB completed and filed a database check request form with the NHB which described the proposed Project and sought information regarding known locations of rare species and exemplary natural communities. A similar request was filed with the US Fish and Wildlife Service ("US FWS") requesting information on federally-listed or candidate endangered and threatened species or habitats within or immediately adjacent to the Project area. The US FWS response indicated that no federally-listed or proposed, threatened or endangered species or critical habitat under their jurisdiction are known to occur in the Project area and preparation of a Biological Assessment or further consultation with US FWS is not required.

The NHB response indicated that the Bald Eagle, a threatened species, and the Common Nighthawk, an endangered species had been identified in the general Berlin area. However, maps provided by NHB showing the specific locations on the species indicated that their presence had been identified in the general downtown area of Berlin in the case of the Nighthawk and along the Androscoggin River banks south of the Project Site in the case of the Bald Eagle. In response to additional information on the project provided by LBB, NHB replied that they do not expect impacts to the Bald Eagle provided that no trees within 50 feet of the Androscoggin River will be removed. NHB further indicated that allowing habitat along the River to revert back to native trees and shrubs would be encouraged to provide future perching and roosting sites for Bald Eagles. LBB has committed to not altering land within 50 feet of the river bank and allowing natural vegetation to reestablish. With regard to Common Nighthawks, NHB indicated that they have not received breeding reports for this species in Berlin for a number of years and do not expect impacts to the species as a result of the proposed Project.

(vii) Water Use & Wastewater Discharge

The water supply for the Facility will be provided by the Berlin Water Works municipal supply and distribution system. The Facility will require up to 1.8 million gallons per day ("MGPD") of water, primarily for cooling tower make-up, with the balance used to produce demineralized make-up water for the boiler, periodic equipment washing, and sanitary uses. On an annual average basis, the water consumption of the Facility will be approximately 1 MGPD. A water treatment system will be used to provide demineralized water to be used for steam cycle makeup for the boiler. A 15,000 gallon demineralized water tank will be used for on-site storage.

The Berlin Water Works distribution system has a total storage capacity of 5 MGPD, and according to the data available, the current system water demand is approximately 1.1 MGPD. In 2000, the system supplied 2.5 MGPD, demonstrating that there is adequate infrastructure to handle the additional water demand from the Project, and additional system improvements have been made since 2000. Appendix N contains a letter from the Superintendent of the Berlin Water Works confirming the adequacy of the system to supply water to the Facility for its operations.

Wastewater generated by the Project will be comprised primarily of blowdown from the cooling tower, along with periodic equipment cleaning activities. Wastewater blowdown from the boiler will be sent to the cooling tower to reduce make-up water demand and overall wastewater discharge from the Facility. All process wastewater, including water collected in floor drains from equipment cleaning, will be discharged to the city sewer system. The Facility will discharge up to 300,000 gallons per day of wastewater to the municipal sewer system. It is not expected that the Facility wastewater will require pretreatment to meet all applicable discharge requirements. LBB has had preliminary discussions with Superintendent of the City's WWTF indicating that the municipal sewer system and the treatment plant have adequate capacity to accept the wastewater discharge from the Facility. LBB has filed a Sewer Connection Permit Application and an Industrial Wastewater Indirect Discharge Request Application (see Appendix H and I, respectively) with the City which were under review at the time this Application was submitted.

(4) A description in detail of the applicant's proposals for studying and solving environmental problems

The Project has been designed to minimize environmental impacts. Section (h)(3) outlines the potential environmental impacts of the Project, and describes in detail the analyses completed to quantify those impacts. Further detail of these analyses can be found in the individual permit applications included in the appendices to this document. The results of these analyses demonstrate that the Project will meet all applicable federal, state, and local environmental regulations and guidelines.

(5) A description in detail of the applicant's financial, technical and managerial capability to construct and operate the proposed facility

Homeland Renewable Energy Inc (HRE) is an indirect equity owner of the Applicant, LBB, via its joint venture with Laidlaw BioPower, LLC, known as Homeland Laidlaw Energy, LLC ("HLE"). (See Exhibit 1 to Pre-filed Testimony of Michael Bartoszek). HRE is also the parent company of Fibrowatt Operations LLC, the operating company which will be supporting the Berlin Project

HRE's management and engineering teams have extensive experience with the design, construction, operation and maintenance of biomass power plants. This includes members that have had (a) responsibility for biomass boiler design, (b) responsibility for the management of the design and construction of biomass power plants, including experience while serving as the engineering, procurement, and construction contractor, (c) responsibility for site construction management, (d) fuel procurement, (e) plant operations management, and (f) regulatory compliance. For example, Fibrowatt's management and engineering team oversaw the design and construction of the Fibrominn Biomass project, a 55 MW plant in Benson, Minnesota. The Fibrominn plant is fueled with poultry litter (i.e. turkey manure and wood bedding) and other forms of biomass such as woody biomass. This team met the performance requirements of the relevant permits issued, including key air emissions permits, power plant siting requirements, as well as other federal, state and local permits and approvals. This work extended to the management of the various contractors involved in carrying out the detailed design, construction and testing of the plant. Fibrowatt's experience at the Fibrominn project, combined with the substantial experience of its key personnel in the power industry, provides it with the qualifications to construct the Facility in conformance with the Certificate.

Fibrowatt Operation operates and maintains the Fibrominn plant. Fibrominn plant personnel and management is led by the Plant Manager who is responsible for the overall operations, maintenance and administration of the facility. The Plant Manager is supported by the Operations Manager, who manages the plant operation and plant operators and the Maintenance Manager, who manages the plant mechanics and electrical and instrumentation technicians, and the Fuel Manager who is responsible for fuel procurement. In addition, the Plant Manager is supported by an Administrative Associate, Warehouse and Purchasing Specialist and home office environmental, engineering and financial accounting support. Total plant staffing is 32 personnel. The Plant Manager reports to the Vice President of Operations. Fibrowatt intends to use the operating philosophy and experience gained at the Fibrominn biomass plant to structure the operations of the Berlin Project.

Fibrowatt's management team oversaw the plant personnel selection and hiring, training and orientation, and implementation of plant administrative and personnel policies and procedures.[19]

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[19] Fibrowatt Operations is led by Ronald Davies, Vice President of Operations. Mr. Davies is responsible for the operation of the Group's power plants and individual Plant Managers report to him. Mr Davies joined Fibrowatt in 2007. His previous roles include senior plant and project management posts with Wheelabrator, Covanta, and General Electric. He also spent 13 years with Foster Wheeler managing a variety of engineering projects for solid fuel fired steam generators. Mr Davies has over 30 years of

Fibrowatt established the plant operating and maintenance procedures for the facility, which are designed consistent with the company's core values of personnel health and safety, environmental compliance, and operational excellence. Under the Fibrowatt operations and management principles, the plant has established an excellent safety record and has demonstrated the ability to operate at design output levels at a high capacity factor. The Fibrominn operations team has taken a very active role in various local programs and has been accepted by the community as a responsible and valued neighbor. Fibrowatt's experience at the Fibrominn project, together with the cumulative experience of the key Fibrowatt personnel here, qualifies it to operate the Berlin Project.

The projected budget for the construction of the Project is $110 million. LBB has entered into a Development Agreement, dated 12/23/08, with PJPD Holdings, LLC, whereby PJPD has agreed to provide capital to fund the development of the project until such time as all construction financing is in place. To date PJPD has contributed approximately $10 million of capital to acquire the former Fraser Pulp Mill and to pay for the various engineering, professional and other costs involved in converting it to a biomass-energy facility.

PJPD is an affiliate of NewCo Energy, Inc. NewCo's owners and its Board of Advisors include both the former and current managing partners of Accenture's Utilities Practice, as well as other individuals associated with Accenture, who have experience in the development, investment, and operations of power generation projects through its consulting practice and outsourcing practice. For example, these individuals have helped create and enable the licensing and design activities for three new nuclear plants in the U.S., created power plant strategies for multiple integrated investor-owned utilities in the U.S., performed plant and fleet optimization and implementations for more than twenty-five power plants for multiple investor-owned utilities, worked with plant operators to improve plant performance (addressing factors such as heat rates, capacity and asset maintenance), developed the RTO/ISO processes and systems for interfacing with power plants and utilities for most of the U.S., and conducted multiple strategy projects regarding renewable and alternative energy feasibility and allocations/generation mix . Access to current and former Accenture executives not only gives PJPD and NewCo access to a significant pool of financial resources but also provides PJPD and NewCo with a strong foundation of power plant capabilities. Accenture is a consultant to 96 of the Fortune Global 100, more than three-quarters of the Fortune Global 500, and major government agencies around the world. Accenture is one of the world's leading management consulting, technology services and outsourcing companies.

LBB has agreed to enter into a long-term lease agreement with PJPD totaling 50 years (including automatic renewal options) and in consideration PJPD has agreed to provide 100 percent of the

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experience in the operation, maintenance and management of alternative energy facilities and power plants. He has served in senior plant management roles for Penobscot Energy Recovery, Orrington, ME, and HPOWER Waste- to-Energy Facility, Honolulu, HI, and Falls Township Waste-To-Energy facility, Morrisville, PA. Mr. Davies was also associated with Stratton Energy Associates during the start up, commissioning and initial plant operations of a 45 MW wood biomass facility in Stratton, ME. He has a degree in Marine Engineering from the US Merchant Marine Academy at Kings Point. He will oversee all plant operations and maintenance functions with respect to the Berlin Project.

capital required to construct the Project. In a leveraged lease arrangement of this type, the cash flows of the Project, which will be supported by a long-term power purchase contract with an investment grade rated utility, support debt financing for the Project while the lessor provides the equity capital.

The capital structure of the Project is expected to be comprised of approximately $80 million of debt and $30 million of equity. The debt financing is expected to be provided by various institutional investors. The equity capital will be provided by PJPD. While PJPD may enter into one or more transactions to fund all or a portion of its equity commitment, as is often done in such leveraged lease transactions to further enhance the lessor's returns, PJPD has committed to providing this funding in the Development Agreement and has sufficient resources to fund its capital commitment if need be.

The principals and employees of HLE have extensive experience in the various areas necessary to take a project from conceptual stage through commercial operations. HLE's principals and employees have substantial experience in financing large capital projects in the power and other sectors and in the negotiation of material contracts, due diligence and financial modeling necessary to obtain project financing.

HRE's team has developed and arranged financing for other alternative energy projects, including the development in 2004 of the $235 million Fibrominn project. In addition, that project was financed using the same structure and process that will be used to finance the Berlin Project. Homeland subsidiaries are currently actively working on biomass projects in North Carolina, Arkansas, Mississippi and Maryland, with other projects planned for Alabama, Texas and other states. Homeland is lead by Rupert Fraser, its President & CEO. Mr. Fraser and his family have successfully built and operated three alternative energy projects in the UK similar to those in Benson, Minnesota.

The ongoing operations of the Project will largely be supported by the cash flows generated from a long-term Power Purchase Agreement ("PPA") that is being finalized with Public Service Company of New Hampshire ("PSNH") pursuant to an executed Letter of Intent. The PPA is an essential element of the Project's financial viability and will be the dominant positive factor in securing the debt financing. Under the PPA, PSNH will purchase 100% of Project electric output and capacity for a period of 20 years. As a hedge against rising fuel prices, the energy price will be adjusted based on the Project's cost of biomass fuel pursuant to the terms of the PPA. In addition, during the PPA term, 100% of the available renewable energy certificates that qualify for compliance under the New Hampshire renewable portfolio standard will be sold to PSNH. The price for RECs is based on the New Hampshire Alternative Compliance Payment.

(6) A statement of assets and liabilities of the applicant

LBB's statement of assets and liabilities can be found in Appendix O.

(7) Documentation that written notification of the proposed project, including appropriate copies of the application, has been given to the governing body of each community in which the facility is proposed to be located

Copies of this SEC Application have been provided to the Coos County Planning Board and the City of Berlin by certified U.S. Mail at the same time the Application was filed with the Committee. Copies of the return receipts will be filed with the Committee to supplement this answer.

(i) EFFECTS OF THE FACILITY AND PLANS FOR MITIGATION

(1) Aesthetics

In general, the Facility can be seen from various locations in the City of Berlin largely due to the local topography and the proximity to the Site. The Site is settled into a bowl-shaped valley at the center of Berlin along the banks of the Androscoggin River, and is surrounded by a series of small mountains just east of the White Mountain National Forest and within the southern reaches of the Great North Woods. Due to the local hilly terrain, views of the Site are limited to the settled downtown area and the residential communities immediately surrounding it. Direct lines of sight toward the Facility are often obstructed or partially screened by intervening structures. The most prominent open views are found at close range, especially in the section of Berlin east of the Androscoggin River.

The current boiler structure and appurtenances located at the Site have a very industrial appearance, with exposed metal superstructure, piping, and tanks. The Site itself shows significant evidence of the prior demolition activities, including demolition rubble, and large areas of unmaintained vegetation and gravel areas that are experiencing erosion. The planned improvements to the existing structures will serve to improve the appearance of the Facility. The structures will be sided to appear similar to a large commercial facility, and will be painted with non-glaring colors that harmonize with the background environments. Areas along the border of the Site will be landscaped and planted to improve visual appearance and buffering. Photographic simulations were developed that show several of these attributes and the expected appearance from nearby and far field view points. When compared to the photographs showing the existing conditions, the simulations of the built Project demonstrate an improvement in the aesthetic impacts of the Facility.

LBB has developed a lighting plan that provides for the minimum necessary lighting along plant roadways, outside fuel handling areas, parking areas, and the main building. The lighting plan minimizes off site impacts to less than the levels established in the City of Berlin Zoning Ordinance. During nighttime hours, and un-needed lights, such as those in the wood yard at the north end of the site, will be shut off.

The Project has been designed with advanced equipment and added noise suppression measures to assure that it does not have adverse impacts in the surrounding community. The boiler, its supporting equipment, and the wood processing equipment will be located within buildings and/or enclosures designed to minimize sound transmittance. Barrier walls will be installed at the fandeck of the cooling tower and at ground level along its northwest side to minimize sound levels over the nearby property line. A barrier wall will similarly be installed in the switchyard area to minimize off site noise impacts from the facility’s step-up transformer and along the north side of the site truck access road to shield the Napert Street neighborhood from truck noise, in the event that there are multiple trucks in a queue at the scale house. LBB will only accept truck deliveries and operate the proposed on-site wood chipping process Monday through Saturday during daytime periods to further minimize noise during more sensitive nighttime periods.

The model assessment predicts that the Project will not result in off-site sound pressure levels greater than 60 decibels (A-weighted scale, dBA) during nighttime hours or 70 dBA during daytime hours. These levels are within the noise Performance Standards contained in the City of Berlin's Zoning Ordinances.

Background monitoring was also conducted at the Site property line and at several locations in the community over a multi-day period to determine existing sound levels during both daytime and nighttime hours. Comparison of the Project's predicted noise levels to the baseline data indicates that the average existing ambient sounds are predicted to increase by less than 4 dBA in most areas off of the Project Site. The residential area located adjacent to the northeast end of the property may experience a greater increase above ambient sound levels during daytime hours if several trucks are queued and waiting to be weighed at the incoming scales. As the Project will not accept wood deliveries past 10 PM, average sound levels in this neighborhood are predicted to increase by less than 1 dBA during nighttime hours.

The highly efficient BFB technology that will be installed in the Facility's boiler assures complete combustion of fuel and prevents smoke and odors in the exhaust. LBB will employ Best Management Practices such as paved roadways, periodic sweeping and covered trucks and conveyors to prevent fugitive dust emissions and potential impacts in the surrounding community.

(2) Historic sites

A number historic properties are located in the City of Berlin, including several that are listed on the National Register of Historic Places (NRHP) including the Congregational Church, St. Anne Church, and Holy Resurrection Orthodox Church. In general, most of what has been deemed to possess cultural or historic significance in the Berlin area was developed during and previously impacted by the historic industrial activities at the Site. The conversion of the Site to operate as a biomass fueled electric generating facility will have less impact than the prior Pulp Mill and will not adversely impact the ongoing use, maintenance and enjoyment of cultural and historic resources in the community. LBB also plans to play a positive role in maintaining the strong cultural and historic significance of area and pride of the community. Development of the planned scenic riverwalk along the northwest portion of the Site will help facilitate the community's enjoyment of historic resources along the river.

LBB completed and filed a Request for Project Review with the New Hampshire Department of Historic Resources ("DHR") that included Project Site plans, photographs of historic and existing conditions, and photographic simulations of the built Project. DHR has requested completion of a Project Area Form by a qualified architectural historian to determine if any of the structures on the Site or in the surrounding neighborhoods are eligible for listing as historic resources. DHR has also requested to be kept informed of local outreach efforts and any proposed alterations to existing structures on the Site. LBB has committed to working with DHR in these reviews. DHR has confirmed that such discussions are a normal component of the Site Evaluation Committee ("SEC") review process and are expected to conclude within the SEC review timeline.

(3) Air Quality

The Facility will utilize an efficient BFB combustion system and will be equipped with advanced emissions control systems to minimize air emissions and ambient air quality impacts. BACT will be implemented for all regulated NSR pollutants with potential emissions that exceed the PSD Program significance levels. The Facility will implement LAER and offset its NO_X emissions by a ratio of 1.15:1.

The air dispersion modeling analysis conducted for the Facility has demonstrated that the maximum air quality impacts resulting from the emissions from the Facility are below the respective NAAQS and PSD increments established by the EPA. Furthermore, the modeling analysis demonstrated that the maximum ambient air quality impacts from the Facility, when combined with existing background concentrations, will not cause or contribute to an exceedance of state or federal ambient air quality standards.

The operation of the Facility will contribute to the State of New Hampshire achieving its Renewable Energy Portfolio Standard (RPS) generation goals. Because of its economic efficiency and contribution towards RPS goals, it is anticipated that the Facility will be dispatched ahead of older, less efficient generating resources with higher emissions that do not contribute to State RPS goals. With power generated by the Facility instead of by older, coal and oil fired generating resources in the ISO-NE regional system, there will be a corresponding decrease in regional emissions, and a corresponding improvement in the overall air quality.

(4) Water Quality

The water supply for the Facility will be provided by the Berlin Water Works municipal supply and distribution system and will not result in any adverse impacts to the quality of the Androscoggin River from water withdrawal. Wastewater generated by the Project will be discharged to the City sewer system and WWTF, which will provide adequate treatment to prevent adverse impacts to the Androscoggin River. Stormwater from areas of significant activity or material storage on the site will be collected and treated through a newly installed stormwater management system. The system will utilize a series of structures (detention basins, deep sump catch basins with hooded inlets, oil water separators, vegetated swales, etc.) that will control peak runoff rates to match historical conditions, provide pretreatment of stormwater runoff, and ensure compliance with the New NHDES Stormwater Manual and Alteration of Terrain Program regulations. Measures will be taken to prevent impacts to stormwater runoff generated during Project construction. Actions will include implementing BMPs, reducing potential sources of contamination, implementing stormwater management controls, developing an inspection and maintenance plan, and sequencing activities appropriately to reduce impacts.

(5) Natural Environment

The US FWS has confirmed that no federally-listed or proposed, threatened or endangered species or critical habitat under their jurisdiction are known to occur in the Project area and preparation of a Biological Assessment or further consultation with US FWS is not required. The

NHB has also confirmed that they Project will not result in adverse impacts to any state listed species or protected habitat.

(6) Public health and safety

Construction and operation of the Facility will be designed and managed to ensure maximum safety for employees and the surrounding community. All designs, activities, and equipment for the Facility will be in accordance with good engineering practice and the latest editions of the standards and regulations of all applicable governmental agencies and engineering associations, including the OSHA, National Electric Manufacturers Association, U.S. Department of Transportation, American Society of Mechanical Engineers, ANSI, and the NFPA.

Facility operation will be carefully controlled and continuously monitored. An efficient, functional, and proactive maintenance program will be implemented to ensure safe and reliable Facility operation. The maintenance program will include regular visual inspections, preventative maintenance checks, and continuous documentation of operating and maintenance parameters. Local officials such as heads of the fire and police departments will be given site plans, access information and regular tours of the Facility.

The facility's fire protection system will be designed to NFPA specifications. A complete on-site fire protection system will be installed for emergency use. The primary source of fire suppression water will be the existing municipal water supply system. That system will be backed up with a diesel powered fire water pump that will draw water from the cooling tower sump in the event that the municipal system is not sufficient or operating.

(j) EFFECTS OF THE FACILITY ON THE ODERLY DEVELOPMENT OF THE REGION; ESTIMATE OF THE IMPACTS OF THE CONSTRUCTION AND OPERATION OF THE FACILITY

(1) Local land use

The construction and operation of the Project will have a very significant, positive effect on the City and region, as discussed more fully in this Application. The Project will convert a Brownfield site with environmental constraints that serve as a barrier to development into an asset for the City of Berlin that will foster additional economic development and rising employment. This clean biomass facility, which will be located on an existing industrial site, makes full use of the boiler and stack previously used by a former pulp manufacturing operation. This is an ideal match between a facility and a site.

LBB is committed to the promotion of environmentally sound, sustainable forestry practices throughout the life of the Project. The LandVest Study that was commissioned by LBB concluded that the timberland supply area for the Facility has the potential to generate, on a sustained basis, 7.2 million tons per year of low-grade biomass, and that the existing consumption of operating pulp mills and power plants consume 6 million tons per year which indicates that there is ample additional supply for LBB and others. The Project is compatible with and supportive of the forest industry in the region. It will provide a steady, dependable market for wood as the fuel to produce electricity, in turn providing strong incentives for long-term commercial forestry management. The regional logging and trucking industries, as well as landowners, will be able to rely on this dependable market that will be largely insulated from fluctuations in global markets. The facility will spend between $20 million and $25 million per year on biomass fuel purchases and will seek to keep the purchase of the renewable timber supply in the immediate vicinity of the power plant. A conservative estimate is that the Plant will use approximately 750,000 tons of wood chips per year.

It is not expected that the Project will have any impact on outdoor recreation in the region around Berlin where outdoor recreation activities include hiking, cross country skiing, all terrain vehicle and snowmobile riding, golf, hunting, fishing and boating. LBB has agreed to provide trails for walking, snowmobiling and all terrain vehicles on the property for the enjoyment of the community in a manner that will not interfere with operations or cause unsafe conditions.

(2) Local Economy

The Project will provide for support and expansion of the local economic base. It will bring increased economic activity to the City and the region during construction and operation. Furthermore, the Project will be a major addition to the tax base in the City of Berlin without burdening public services.

The Project not only will develop the area's renewable energy resources, but will help rebuild timber harvesting, which in turn will produce much needed economic activity and improve the economic conditions that were adversely affected by the Berlin pulp mill closing in 2006.

The Project brings a new enterprise and some diversity to the Berlin economy by shifting from the production of paper to electricity. The plant is being designed to allow for the utilization of "waste heat" which can be converted to hot water for use at the Fraser paper mill in Gorham. This can allow the mill to reduce its consumption of oil which will lower costs and reduce emissions. It is expected that additional heat will be available to other businesses to entice them to locate near the Project.

LBB is ready and willing to work with the City to acquire the balance of the site (i.e. the remaining 40 acres of land that were part of the Pulp Mill site and located immediately adjacent to the Project Site) from North American Dismantling and to prepare it for redevelopment. LBB has offered its support for the formation of a nonprofit organization under Internal Revenue Code § 501(c)(3) to acquire the property and help guide a plan to redevelop it. This would become a significant economic development opportunity for the City and the 40 acre portion of the property would be controlled by the charitable organization created for that purpose. With that redevelopment, more economically diverse and beneficial projects could be located adjacent to the site. Potential uses for the undeveloped portion of the land include recreational walking, biking and skiing trails, light manufacturing, commercial enterprises, ATV and snowmobile trails.

LBB is sensitive to the level of unemployment in the City and will work with the Engineering, Procurement, and Construction (EPC) contractor to maximize the use of construction workers from the Berlin area . As a result of large numbers of construction workers, LBB anticipates there will be an increase in consumer spending in Berlin during the construction phase of the Project. The demand will increase for lodging, food and sundries required by the workforce during construction, to the extent workers do not already live in the area.

Construction of the Project will be an important part of the development of the region's renewable power resource. At approximately 70 megawatts in size, the cost of constructing the Project will be approximately $125 million, of which approximately $80 million will be injected into the surrounding economy for the purchase of local goods and services during construction such as such as land clearing, earthwork, project management, civil engineering, general construction, crane services, electrical services, plumbing, steel work, welding, excavation and transportation of sand and gravel, pouring concrete and other high value construction-related work.

In addition to the influx of construction dollars into the local economy, the Project will have substantial long-term economic benefits, including:

- Permanent direct employment for 40 people related to the operation of the Project and indirect employment of numerous others involved with timber harvesting and processing, trucking, forestry consulting services, mechanical services. LBB hopes to draw most of the Plant employees from the greater Berlin area.

- Increased commerce in the area from the purchases of local goods and service by the Project and its employees.

- Diversification of revenue sources for the City of Berlin: Property tax revenue associated with the biomass facility is anticipated to be in excess of $1 million.

- Increased economic diversification

- Enhanced sustainability of the existing forest industry and related economic benefits as well as providing an expanded market for the industry

- Fraser Paper may utilize waste heat from the Project to lower its energy costs. As mentioned LBB has an agreement with Fraser Paper to supply hot water to the Gorham mill. Waste heat from the power plant will be converted into hot water and delivered to the mill via the existing network of underground pipes that connect the two facilities. This will lower operating costs and reduce emissions for the paper mill while increasing the overall efficiency of the power plant.

- Additional tax revenues to the State of New Hampshire from payment of: statewide utility property tax, business enterprise tax, and business profits tax.

- This Project will contribute to energy security and reduced energy costs. The Project will sell electricity into the New England power market. This integrated electric power market is vulnerable to price spikes as a result of the increasing demand for fossil fuels worldwide. With over half of its energy generation derived from fossil fuels, the New England region, including New Hampshire, has experienced increases and periodic spikes in electricity prices. Due to its low operating cost, biomass-produced electricity may help stabilize electricity prices in the New England electricity market.

(3) Local Employment

The effect of the Project on local employment is certainly positive in the short term, during the construction phase, and in the long-term when the Plant is operational.

Construction activity and related employment provides good paying, temporary employment, income and associated spending in the local economy. Construction of the Project will result in the direct and indirect employment of numerous electrical workers, crane operators, equipment operators, carpenters, plumbers, welders, pipe fitters, millrights, boiler makers, and other workers. These workers will be drawn from the Berlin area to the extent they are available. Indirect employment resulting from the Project includes employees of firms supplying goods and services to LBB and its contractors. It is expected that at least some of the wages paid to the direct and indirect employees will be spent in the local economy.

The Project construction period is estimated to be 24 to 32 months. See Section (f)(5). The peak construction workforce is expected to be about 300 personnel per day, with an average workforce of approximately 150 employees at any one time. The construction contractor will qualify all employees in accordance with applicable construction codes.

(K) CONSISTENCY WITH STATE ENERGY POLICY (RSA 378:37)

The Project will be consistent with New Hampshire's State Energy Policy. RSA 378:37 provides that:

> [I]t is the energy policy of this state to meet the energy needs of the citizens and businesses of the state at the lowest reasonable cost while providing for the reliability and diversity of energy sources; the protection of the safety and health of the citizens, the physical environment of the state, and the future supplies of nonrenewable resources; and consideration of the financial stability of the state's utilities.

The Project proposes to use clean biomass to generate cost-efficient electricity. It will, if approved, be the largest commercial source of biomass power in the State, with installed gross generating capacity of approximately 70 megawatts. This additional capacity will be available to help meet current and future electricity demands of New Hampshire citizens and businesses. It will do so while increasing the diversity and reliability of the State energy supply. By relying on biomass as a fuel source, the Project will contribute to the diversification of New Hampshire's energy supply and help shift emphasis away from the State's traditional reliance on fossil fuel sources. On the basis of fuel heat value, the price of biomass is significantly lower than most fossil fuels, making it a low cost alternative to fossil fuel generated electricity. Furthermore biomass is locally produced and somewhat insulated from worldwide fluctuations in energy markets, which creates stability. Adding renewable biomass capacity to the State's portfolio of energy supply will help maintain stability while exerting a downward pressure on pricing for customers. Adding cost-efficient capacity to the State's energy supply mix will help maintain or lower prices for customers.

The use of clean biomass and state-of-the-art pollution control technology will ensure that this Project will be consistent with State and regional environmental goals and objectives, and help protect the health and safety of New Hampshire citizens. On a per megawatt basis, power generated from biomass produces low emissions, as detailed in Section h(3)(i) of this application, As discussed section h(3)(i) of this application and pages 1-3 of the LandVest Study, because biomass power production is carbon neutral, and by displacing fossil fuel sources, it can help reduce greenhouse gas emissions and global warming. The Project will consume a portion of the excess lowgrade biomass that could potentially be generated on a sustainable long term basis from the surrounding forests after current demands are satisfied.

State policy has evolved in recent years so that the use of renewable energy is now encouraged in a number of ways, both to increase energy diversity and to reduce pollution traditionally associated with non-renewable forms of energy generation. The most notable example is the passage of RSA 362-F, the State Renewable Portfolio Standard. That statute requires that by 2025, 25% of the electricity from New Hampshire retail suppliers must come from renewable sources. The purpose of the statute is clear:

> Renewable energy generation technologies can provide fuel diversity to the state and New England generation supply through use of local renewable fuels and resources that serve to displace and thereby lower regional dependence on fossil fuels. It is therefore in the public

> interest to stimulate investment in low emission renewable energy generation technologies in New England and, in particular, New Hampshire, whether at new or existing facilities.

RSA 362-F:1. In addition, legislation such as the Clean Power Act (RSA 125-O) and the Regional Greenhouse Gas Initiative statute (RSA 125-O:19-28) both focus on achieving pollution reductions from power generation sources in the State. The Project, if approved, will move the State closer to meeting the purposes and goals of all these statutes. It is also consistent with various other renewable energy policies, such as those advanced by the New Hampshire Office of Energy Planning[20].

The Project will also help contribute to the financial stability of the State's utilities. By providing renewable power consistent with RSA 362-F, the Project enables utilities to meet the requirements of that statute, thus diversifying their energy mix and enhancing their financial stability. Moreover, the Power Purchase Agreement that the Project is finalizing with PSNH will help assure long term dependable supply of renewable energy to the citizens of New Hampshire.

In sum, the Project meets both the specific goals of the New Hampshire Energy Policy under RSA 378:37, as well as being consistent with a variety of other statutory and non-statutory State policies related to energy production, including encouraging price stability and fuel diversity, reducing various air pollutants including greenhouse gases, increasing availability of reliable domestic energy sources and creating greater economic opportunities in the State.

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[20] *See* The New Hampshire Office of Energy & Planning, "Executive Summary" New Hampshire Energy Plan (www.nh.gov/oep/programs/energy/StateEnergyPlan.htm; various DES fact sheets (ARD-23 Global Climate Change and Its Impact on New Hampshire; ARD-24 Global Climate Change and Its Impact on New Hampshire Skiing; ARD-25 Global Climate Change and Its Impact on New Hampshire Fall Foliage and Maple Sugar Industry ; ARD-26 Global Climate Change and Its Impact on New Hampshire Cold Water Fishing; ARD-27 Global Climate Change and Its Impact on New Hampshire's Forest and Timber Industries); http://des.nh.gov/organization/divisions/air/tsb/tps/climate/index.htm
Information on Regional Greenhouse Gas Initiative (RGGI) July 15, 2008 ; July 15, 2008; July 15, 2008

(I) PRE-FILED TESTIMONY AND EXHIBITS SUPPORTING THE APPLICATION

STATE OF NEW HAMPSHIRE

BEFORE THE ENERGY FACILITY SITE EVALUATION COMMITTEE

Docket No. __________________

<u>Application of Laidlaw Berlin BioPower, LLC</u>

TESTIMONY OF MICHAEL B. BARTOSZEK ON BEHALF OF LAIDLAW BERLIN BIOPOWER, LLC

Q: Please state your name, title and business address for the record.

A: My name is Michael B. Bartoszek and my business address is 90 John Street, 4th Floor, New York, NY 10038. I am Chief Executive Officer of Laidlaw Energy Group, Inc. (LLEG).

Q: Please briefly summarize your relevant background and employment experience.

A: For the last ten (10) years I have held executive management positions in the energy industry. From 1999 – 2002 I owned and operated a natural gas fired power plant in Western, New York. After selling my holdings in that business I founded Laidlaw Energy Group, Inc.("LEG") and took it public in 2002 with the goal of developing and acquiring renewable energy assets, with a specific focus on biomass power. Shortly thereafter I developed a business strategy that involved acquiring existing generation assets and upgrading them to operate as advanced, RPS compliant biomass-energy power plants. Since that time, LEG, through its holdings in various affiliates, has built a portfolio of biomass-energy power projects in the Northeastern United States. Since its founding I have served as LEG's President & CEO and held the same position for the various affiliates the own the portfolio projects under development. Prior to founding LEG, I spent approximately ten (10) years in the securities industry with a number of top investment firms, including Merrill Lynch, Bear Stearns, Oppenheimer & Co, and several boutique investment firms. I provided advice and arranged financing for power and other major capital projects in the forest products, maritime and other sectors totaling nearly half a billion dollars.

Q: What is the purpose of your testimony?

A: The purpose of my testimony is provide general information about the various corporate entities involved in this project, most notably the applicant, Laidlaw Berlin Biopower, LLC (“LBB”), and to address LBB’s financial capability to construct and operate the project in compliance with the terms and conditions of the Certificate we are asking the Committee to issue to us.

Q: What is your role in the Berlin Project?

A: As CEO of Laidlaw Berlin BioPower, LLC, I am responsible for the executive management of the applicant. I provide oversight over the various aspects of the Berlin Project and am closely involved in its financing.

Q: Please describe who Laidlaw Berlin Biopower, LLC (“LBB”) is, and its purpose.

A: LBB is a special purpose entity that was formed in 2006. Its primary purpose was to acquire the former Fraser Paper Mill located in Berlin, New Hampshire with the objective of converting and upgrading the existing facility infrastructure in order to construct an approximately 66 - 70 megawatt biomass-energy power-plant.

Q: Please describe who LEG is, and its purpose.

A: LEG is a publicly traded corporation founded in 2002 with the objective of pursuing development and acquisition opportunities in the renewable energy and distributed power generation sector, with a particular emphasis on biomass power and the conversation of exiting power generation assets to advanced, RPS compliant biomass power plants.

Q: Please describe the relationship between LBB and LEG.

A: LBB is an affiliate of LEG. LEG is an indirect equity holder in LBB though its equity holdings in Laidlaw BioPower, LLC.

Q: Please describe who is Laidlaw BioPower, LLC is and it's purpose

A: Laidlaw BioPower, LLC is an affiliate of LEG that is engaged in the development of biomass energy power plants. It currently serves as the primary entity through which LEG owns its equity stake in the projects it develops. LEG is a 50% equity owner of Laidlaw BioPower, LLC., and the other equity holders are entities controlled by Louis T. Bravakis and Raymond S. Kusche, who are Vice Presidents of the applicant and serve in a similar capacity with LEG and Laidlaw BioPower, LLC. Former New Hampshire Congressman Charles Bass also serves as a director Laidlaw BioPower, LLC.

Q: Please provide the names and addresses of LBB's shareholders, officers and directors.

A: Laidlaw BioPower, LLC is the sole shareholder of LBB. LBB's officers are Michael B. Bartoszek, Raymond S. Kusche and Louis T. Bravakis. Michael B. Bartoszek and former New Hampshire U.S. Representative Charles Bass serve as directors of the applicant. The address for all of the foregoing is c/o Laidlaw Energy Group, Inc., 90 John Street, Suite 401, New York, NY 10038. An organization chart describing the various affiliates of the applicant is attached as Exhibit 1.

Q: Describe the relationship between Laidlaw BioPower, LLC and Homeland Renewable Energy.

A: In September 2009, Laidlaw BioPower, LLC and Homeland Renewable Energy formed a joint venture known as Homeland Laidlaw Energy, LLC ("HLE"). The combination of

Laidlaw's and Homeland's biomass-energy development businesses brings together approximately 30 professionals focused on making HLE the leading supplier of biomass-energy in North America. HLE is headquartered in New York and maintains offices or personnel in Pennsylvania, New Hampshire, Vermont, Maine and London, UK. In connection with the joint venture, Laidlaw BioPower, LLC contributed equity in LBB to the joint venture, making HLE an equity holder of LBB.

Q: Does the applicant or any of its affiliates or principals listed above operate any other power generation facilities?

A: The principals of the applicant have experience operating natural gas and biomass fueled power plants in New York and Maine respectively. Certain of HLE's principals currently operate a 55 megawatt biomass fueled power plants in Benson, Minnesota, which is fueled by both turkey manure and wood biomass chips.

Q: Who is PJPD Holdings, LLC and what is its relationship to LBB?

A: As discussed below, PJPD Holdings, LLC is an affiliate of a private equity firm that has agreed to provide the requisite equity financing for the Berlin Project pursuant to a Development Agreement dated 12/23/08.

Q: Please describe LBB's financial capability as it relates to the development, construction and operation of this Project.

A: Under RSA 162-H:16, in order to obtain a Certificate of Site and Facility the Applicant must show that it has adequate financial capability to construct and operate the Project in compliance with the terms and conditions of the Certificate. As demonstrated below, LBB and its investors possess the requisite financial capability.

The projected budget for the construction of the Project is $110 million. The Applicant has entered into a Development Agreement dated 12/23/08 with PJPD Holdings, LLC, whereby PJPD has agreed to provide initial capital to fund the development of the project until such time as all construction financing is in place. LBB considers the Development Agreement to be confidential business information but it would be willing to provide a copy to the Committee subject to a Protective Order. To date PJPD has contributed approximately $10 million of capital to acquire the former Fraser Pulp Mill and to pay for the various engineering, professional and other costs involved in converting it to a biomass-energy facility.

PJPD is an affiliate of NewCo Energy, Inc. NewCo's owners and its Board of Advisors include both the former and current managing partners of Accenture's Utilities Practice, as well as other individuals associated with Accenture, who have experience in the development, investment, and operations of power generation projects through its consulting practice and outsourcing practice. For example, these individuals have helped create and enable the licensing and design activities for three new nuclear plants in the U.S., created power plant strategies for multiple integrated investor-owned utilities in the U.S., performed plant and fleet optimization and implementations for more than twenty-five power plants for multiple investor-owned utilities, worked with plant operators to improve plant performance (addressing factors such as heat rates, capacity and asset maintenance), developed the RTO/ISO processes and systems for interfacing with power plants and utilities for most of the U.S., and conducted multiple strategy projects regarding renewable and alternative energy feasibility and allocations/generation mix . Access to current and former Accenture executives not only gives PJPD and NewCo access to a significant pool of financial resources but also provides PJPD and NewCo with a strong foundation of power plant capabilities. Accenture is a consultant to 96 of the Fortune Global

100, more than three-quarters of the Fortune Global 500, and major government agencies around the world. Accenture is one of the world's leading management consulting, technology services and outsourcing companies. For more information about Accenture, see http://www.accenture.com.

The Applicant has agreed to enter into a long-term lease agreement with PJPD totaling 50 years (including automatic renewal options) and in consideration PJPD has agreed to provide 100 percent of the capital required to construct the Project. In a leveraged lease arrangement of this type, the cash flows of the Project, which will be supported by a long-term power purchase contract with an investment grade rated utility, support debt financing for the Project while the lessor provides the equity capital.

The capital structure of the Project is expected to be comprised of approximately $80 million of debt and $30 million of equity. The debt financing is expected to be provided by various institutional investors. Expressions of interest to provide this financing can be provided if the Committee requires it. The equity capital will be provided by PJPD. While PJPD may enter into one or more transactions to fund all or a portion of its equity commitment, as is often done in such leveraged lease transactions to further enhance the lessor's returns, PJPD has committed to providing this funding in the Development Agreement and has sufficient resources to fund its capital commitment if need be.

Ongoing development and construction activities will be undertaken by Homeland Laidlaw Energy, LLC. ("HLE"). HLE is a joint venture between Laidlaw BioPower, LLC ("Laidlaw") and Homeland Renewable Energy, Inc. ("Homeland") The principals and employees of both Laidlaw and Homeland have extensive experience in the various areas necessary to take a project from conceptual stage through commercial operations. Laidlaw's principals have substantial experience in financing large capital projects in the power and other sectors and in the negotiation of material contracts, due diligence and financial modeling necessary to obtain project financing.

Homeland's team has substantial experience in the development, and operation of both traditional and alternative fuel projects. See http://www.homelandrenewableenergy.com/hre-team.html. These individuals have developed and arranged financing for other alternative energy projects, including the development in 2004 of a $235 million biomass power plant in Benson, Minn. developed by Homeland's subsidiary, Fibrowatt LLC, using technology similar to that which will be used by the Project. In addition, that project was financed using the same structure and process that will be used to finance this Project. Homeland subsidiaries are currently actively working on biomass projects in North Carolina, Arkansas, Mississippi and Maryland, with other projects planned for Alabama, Texas and other states. Homeland is lead by Rupert Fraser, its President & CEO. Mr. Fraser and his family have successfully built and operated three alternative energy projects in the UK similar to those in Benson, Minn.

The ongoing operations of the Project will largely be supported by the cash flows generated from a long-term Power Purchase Agreement ("PPA") that is being finalized with Public Service Company of New Hampshire ("PSNH") pursuant to an executed Letter of Intent. The PPA is an essential element of the Project's financial viability and will be the dominant positive factor in securing the debt financing. Under the PPA, PSNH will purchase 100% of Project electric output and capacity for a period of 20 years. As a hedge against rising fuel prices, the energy price will be adjusted based on the Project's cost of biomass fuel pursuant to the terms of the PPA. In addition, 100% of the available renewable energy certificates ("RECs") that qualify for compliance under the New Hampshire renewable portfolio standard will be sold to PSNH. The price for such RECs is based on the New Hampshire Alternative Compliance Payment.

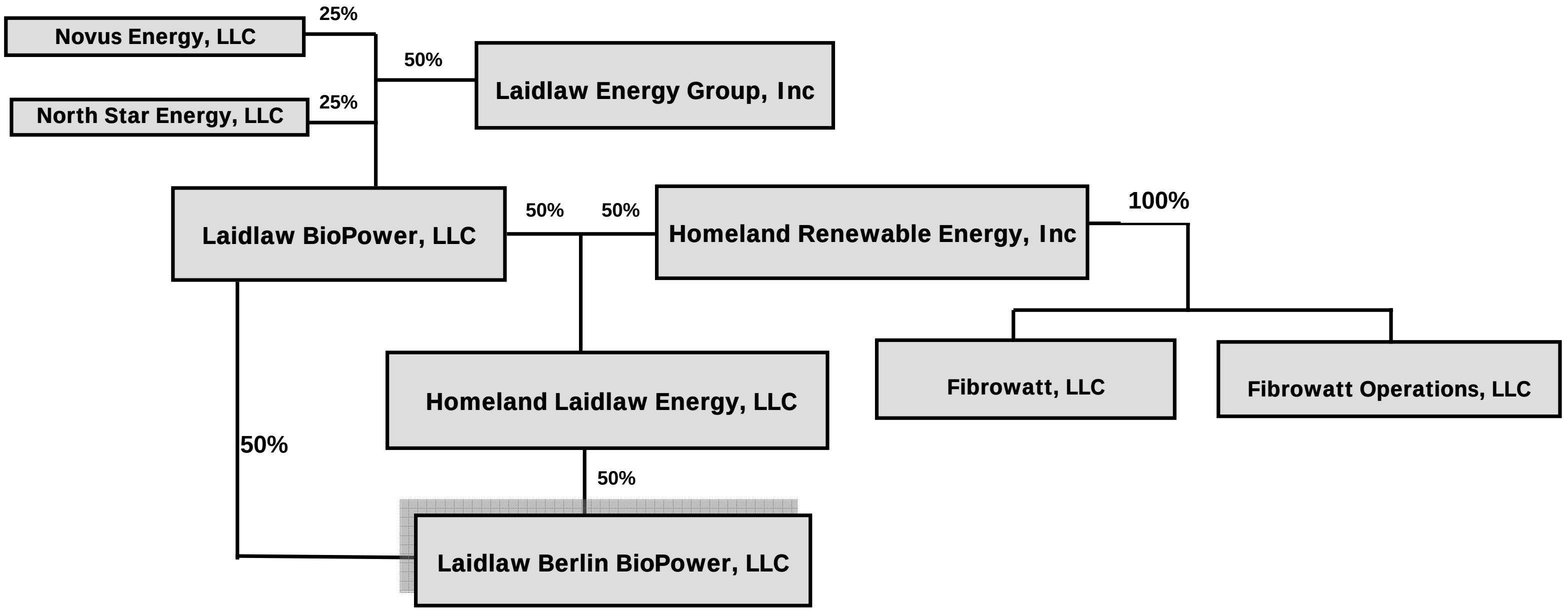
Similar to the Committee's course of action in Granite Reliable Power, LLC (Decision Granting Certificate of Site and Facility With Conditions, July 15, 2009, Docket No. 2008-04), the Applicant would be willing to accept a certificate condition that prohibits the commencement of construction until all construction financing is in place.

Q: Does this conclude your pre-filed testimony?

A: Yes, but I would be happy to answer any questions.

TESTIMONY OF MICHAEL B. BARTOSZEK

Exhibit 1



STATE OF NEW HAMPSHIRE

BEFORE THE SITE EVALUATION COMMITTEE

Docket No. ___________________

Application of Laidlaw Berlin BioPower, LLC

TESTIMONY OF CARL STRICKLER ON BEHALF OF LAIDLAW BERLIN BIOPOWER, LLC

Q: Please state your name, title and business address.

A: My name is Carl Strickler. I am Senior Vice President and Chief Operating Officer for Fibrowatt LLC. My business address is: One Summit Square, Suite 200, 1717 Langhorne-Newtown Road, Langhorne, PA 19047. My business telephone is (267) 352-0014.

Homeland Renewable Energy, Inc. is the parent company of Fibrowatt, LLC. Fibrowatt is Homeland's project development company for poultry litter fueled biomass projects. Homeland Renewable Energy is also the parent company of Fibrowatt Operations LLC, the operating company which will be supporting the Berlin Project through its personnel as described herein. As described in the testimony of Michael Bartoszek, Homeland and Laidlaw are joint venture partners in the Berlin Project.

Q: Briefly summarize your educational background and employment experience.

A: I have a B.S. in Mechanical Engineering from the University of Delaware. In addition to involvement with the applicant through Homeland Laidlaw Energy, I manage Fibrowatt's project development and operations businesses. I have served in a similar capacity since Fibrowatt's US development operations began in 2000. Previously, I was a principal member of Reading Energy and was involved in the development, operation, and management of three alternative-energy power projects representing over $600 million in capital investment.

Q: What is the purpose of your testimony?

A: I will be providing information about the applicant's technical and managerial capability to construct and operate the Berlin Project.

Q: What is your role in the Berlin Project?

A: I will oversee and ultimately be responsible for the final design, construction and operation of the Berlin Project.

Q: Please describe your experience and Homeland's experience as it relates to construction and operating facilities similar to the Berlin Project.

A: I have over 20 years of experience in the development, operation and management of independent power plants throughout the United States. Most recently, this included the development, permitting, financing, construction, and operation of the Fibrominn Biomass Power Plant in Benson, Minnesota. The Benson plant is a 55 MW plant, which has been in commercial operation since mid-2007. The Fibrominn plant is fueled with poultry litter and other forms of biomass such as woody biomass and agricultural by-products.

In addition to the Fibrominn project, members of Homeland Renewable Energy's management team previously developed three similar biomass plants in the United Kingdom between 1990 and 1998. These were the world's first three poultry litter fueled power plants. In thirteen years of operation, these plants have turned over 6 million tons of biomass into electricity.

Q: Briefly summarize the Applicant's technical and managerial capability to assure construction, operation and maintenance of the Berlin Project in compliance with the terms and conditions of the Certificate requested here.

A: Homeland Renewable Energy's management and engineering teams have extensive experience with the design, construction, operation and maintenance of biomass power plants. This includes members that have had (a) responsibility for biomass boiler design, (b) responsibility for the management of the design and construction of biomass power plants, including experience while serving as the engineering, procurement, and construction contractor, (c) responsibility for site construction management, (d) fuel procurement, (e) plant operations management, and (f) regulatory compliance. These management and engineering teams represent over 200 combined years of relevant construction, operation and maintenance experience.

Q: Please describe in some detail the Applicant's qualifications to construct the Facility in conformance with the Certificate requested here.

A: Fibrowatt's management and engineering team oversaw the design and construction of the Fibrominn Biomass project, meeting the performance requirements of the relevant permits issued, including key air emissions permits, power plant siting requirements, as well as other federal, state and local permit and approval requirements. This work extended to the management of the various contractors involved in carrying out the detail design, construction and testing of the plant. The Fibrominn plant is the first of its kind in the United States, and presented some unique engineering challenges, the management of which provide a solid foundation from which to develop and construct other biomass projects such as this project. Fibrowatt's experience with the Fibrominn project provides the applicant with the qualifications to construct the Facility in conformance with the Certificate.

Q: What is the construction timeline for the Berlin Project?

A: It is expected that construction will take twenty-four to thirty-two months based on the current development timeline.

Q: Please describe in some detail the Applicant's qualifications to operate the Berlin Project.

A: Fibrowatt Operations LLC currently operates and maintains the 55 MW biomass fueled power plant in Benson, MN. Fibrowatt oversaw plant personnel selection and hiring, training and orientation, and implementation of plant administrative and personnel policies and procedures. Fibrowatt established the plant operating and maintenance procedures for the facility which are aimed at its core company values of personnel health and safety, environmental compliance, and operational excellence. Under the Fibrowatt operations and management principles, the plant has established an excellent safety record and has demonstrated the ability to operate at design output levels at a high capacity factor. The operations team at Fibrominn has taken a very active role in various local outreach programs and has been accepted by the community as a responsible and valued neighbor. Fibrowatt's experience at the Fibrominn project, together with the cumulative experience of the key Fibrowatt personnel, qualifies it to operate the Berlin Project.

Q: How will the Facility be staffed once it is operational?

A: Plant staffing and management will be led by the Plant Manager who will be responsible for the overall operations, maintenance and administration of the Facility. The Plant Manager will report to the Vice President of Operations. Efforts will be made to recruit qualified local people for employment at the Facility.

Q: What is the maintenance plan for the Facility?

A: The Facility's design and construction is for full load operation 365 days a year, with sufficient redundancy to permit continuous operation during periods of routine equipment maintenance. The day-to-day operations and maintenance will be in accordance with a comprehensive operations and maintenance program, which will include an electronic maintenance management system and regular staff personnel training.

The scope and frequency of major maintenance work on the Facility's equipment will be in accordance with the power industry standards and equipment manufacturer's recommendations. The frequency of planned maintenance for major plant components will be based in part on the number of start-ups and operating hours and should fall into three categories:

- Yearly – example, furnace and major equipment inspection and maintenance;
- Every 2 years (typical) – example, flue gas-path inspection and component replacement;
- Every 5 to 6 years (typical) - Major equipment overhaul

Q: Do you have an emergency response plan for the Facility?

A: A draft Pollution Prevention and Emergency Response Plan has been included in Appendix L of the EFSEC Application. This Plan will be amended to properly represent the final plant design and will incorporate applicable procedures as provided by equipment suppliers for this project. The final Emergency Response Plan will identify the chain of command, external contacts to notify or assist with emergency response, and an inventory of site emergency response equipment and supplies. Within the plan will be procedures for emergency communication, securing the plant, evacuating non-essential employees and other personnel, and responding to emergency incidents. The final plan will also include employee training and drills.

Q: Does this conclude your pre-filed testimony?

A: Yes.

STATE OF NEW HAMPSHIRE

BEFORE THE SITE EVALUATION COMMITTEE

Docket No. __________________

<u>Application of Laidlaw Berlin BioPower, LLC</u>

TESTIMONY OF LOUIS T. BRAVAKIS ON BEHALF OF LAIDLAW BERLIN BIOPOWER, LLC

Q: Please state your name, title and business address for the record.

A: My name is Louis T. Bravakis and my business address is 45 State Street, Montpelier, VT. 05602.

Q: Briefly summarize your educational background and employment experience.

A: I received a BA in Economics from Franklin and Marshall College, Lancaster, Pa in 1965.

I founded Chiptec Corporation, a manufacturer of advanced close-coupled biomass gasification systems in 1986. Chiptec Corporation was located in South Burlington, Vermont. I served as President and Director of Business Development until I left the Company in 2000. During my tenure annual sales grew from less than $100,000 to over $2,000,000.

I then founded Novus Energy, LLC in 2000. Novus Energy, LLC is an energy consulting business specializing in assisting clients in developing biomass energy projects. Novus has been involved in numerous biomass Combined Heat and Power projects specializing in procuring energy funding through state agencies such as the New York State Energy Research and Development Authority ("NYSERDA") and the New Jersey Clean Energy Fund.

I joined Laidlaw Energy Group, Inc. ("LLEG") in 2005 where I serve as Vice President of Business Development. Laidlaw develops biomass power generating stations and is currently involved in numerous projects including the Berlin Project. My core responsibilities for LLEG include site selection; public outreach; fuel sourcing; coordination and management of consultants, fuel providers, and equipment suppliers; direct involvement with power purchase agreements; building detailed financial models; managing applications for state and federal assistance; and generally assisting in other deal-related matters.

Q: What is the purpose of your testimony?

A: I will describe the Berlin Project in detail, explain the significant efforts we have made to work with the community in developing this project, I will explain our fuel supply and I will discuss why the project will not have an adverse effect on the orderly development of the region.

Q: What is your role in the Berlin Project?

A: In my capacity as lead developer, along with my colleague Ray Kusche, I identified the opportunity of converting the Fraser Paper Mill recovery boiler into a biomass generating station. For the past two years I have been involved with all aspects of the Berlin Project's conceptual design and community relations. I have worked diligently to build solid relationships with community leaders, citizens and various organizations in the area. In addition, I have taken a lead role in managing the coordination and identification of numerous entities that are associated with the Project such as equipment providers, engineering consultants, fuel suppliers and forestry analysts.

Q: Please describe the type of facility the Applicant seeks to build.

A: The Facility is described in great detail in the Application, specifically in Sections (c), (f), (g) and (h). I will not repeat that detailed description here, but instead, summarize the key features.

Laidlaw Berlin Biopower, LLC (LBB) is proposing to convert and upgrade much of the remaining facility equipment and infrastructure at the former Fraser Pulp Mill in Berlin, New Hampshire in order to develop a clean biomass-fueled energy generating facility. LBB will use whole tree wood chips and other clean low-grade wood as fuel, and will be capable of generating nominally 70 megawatts ("MW") of electric power (gross output).

LBB will convert the existing Babcock & Wilcox boiler by installing a bubbling fluidized bed (BFB), which represents highly efficient and advanced biomass combustion and power conversion technology, at the base of the boiler in place of the existing black liquor firing and recovery systems. The boiler's emissions control system will be upgraded with Best Available Control Technology to ensure compliance with all applicable State and federal air quality regulations and meet New Hampshire's Renewable Energy Portfolio Standards. The development of the Project will include construction of a new turbine building and wet cooling tower, installation of a new steam turbine generator, construction of wood fuel handling and storage areas, installation of wood conveying equipment, and upgrades to site access roadways, grading and drainage systems.

An electric transmission interconnection line will be installed between the site and the existing high voltage transmission line operated by Public Service Company of New Hampshire ("PSNH"). All wastewater and sanitary sewage will be sent to the Berlin Waste Water Treatment Facility. All stormwater will be treated and discharged via the existing outfall structure located across from the waste water treatment facility that once serviced the pulp mill.

Q: Please describe the site on which the Applicant seeks to build the Facility.

A: The site is located on the northern sides of Community, Coos, and Hutchins Streets in Berlin, and is bordered by the Androscoggin River. The site abuts the remaining portion of the former Fraser Paper Mill to the north. The site is approximately 62 acres of land zoned as Industrial/Business, and consists of the southern portion of the property formerly known as the Burgess Mill, Berlin Mill, and most recently the Fraser Pulp Mill. *See* Section (c) of the Application.

Q: Describe in summary form the major components of the Facility.

A: Details about each major component are contained in Section (h) of the Application.

The Facility will be a base loaded electric energy generating facility capable of operating continuously at up to 70 MW gross electrical output, while firing wood in the biomass boiler. All areas of the site which are not used for the functioning of the Facility will be finished, graded, loamed and seeded to prevent soil erosion.

The existing B&W recovery boiler will be converted to a biomass fired bubbling fluidized bed (BFB) boiler with open hopper bottoms for removal of fuel ash, bed sand particles and other non-combustible materials. After the conversion the boiler will generate up to 600,000 pounds per hour of steam at 900ºF and 850 psig using clean biomass fuel consisting mainly of whole tree chips with a moisture range from 35% up to 50%. The boiler will also be equipped with four No. 2 distillate oil fired burners for use during startup. The steam turbine generator will be designed for a steam inlet pressure of 850 psig and a steam inlet temperature of 900ºF. The maximum capacity of the steam turbine generator will be 70 MW.

The Facility will use a wood handling system to provide adequate wood chip fuel to operate the boiler continuously, along with the capacity to store up to 30 days of fuel on site. The weigh station will consist of two 60 ton weigh scales and scale house. Round wood and wood chips will be transported to the Facility via trucks and or rail and weighed before dumping. Round wood will be unloaded and stored in dedicated storage areas, before being chipped on-site. The wood in the unprocessed fuel pile will be manually loaded into hoppers to be conveyed to the fuel processing building. The unprocessed fuel storage pile will be open and on paved ground, with drainage to the Facility's stormwater management system, to remove surface moisture from the storage area.

The ash handling facilities will consist of two separate collection and storage systems, one for boiler bed sand removal, screening and re-injection, and one for fly ash collected in the electrostatic precipitator emissions control system. The fly ash system will be a dry mechanical system. Fly ash will be continuously collected from the electrostatic precipitator and mechanical dust collector hoppers. It will be conveyed to a water spray ash conditioner and then to an enclosed storage area outside of the boiler building. Bottom ash is virtually non-existent in a fluid bed boiler. Fuel is continually recirculated within the fluidized bed until fully combusted

The power generation process utilizes two recirculating water systems; a steam generation system and a cooling water system. In the steam generation cycle, feedwater is pumped through heat exchangers that recover heat from downstream operations and into the boiler. The water is circulated through metal tubes within the boiler where it is converted to superheated steam. The steam is then used to power a turbine which mechanically drives an electric generator.

After leaving the turbine, the steam is cooled back to the liquid state in a condenser and is returned to the feedwater pumps. In order to prevent the build up of contaminants in the recirculating steam system, a small fraction of the water is "blown down" to the wastewater system.

The source of makeup water for the Facility will be city water provided by the Berlin Water Works. The bubbling fluidized bed technology used in the project's combustion system represents highly efficient fuel conversion and emissions minimization technology. By maximizing combustion efficiency, this technology generates low emissions of pollutants resulting from incomplete combustion such as carbon monoxide (CO) and volatile organic compounds (VOC). The combustion system also incorporates flue gas recirculation (FGR), a technology that cools the combustion process and reduces the formation of nitrogen oxides (NOx).

In addition to the inherently low emitting technology of the combustion system, the Project will incorporate a number of additional systems (an electrostatic precipitator and a selective catalytic reduction (SCR) system) that represent Best Available Control Technology and Lowest Achievable Emission Rate technology to further minimize air emissions.

The existing 320-foot tall, 11.25" diameter boiler exhaust stack will be used. A continuous emissions monitoring system ("CEMS") will be installed on the boiler stack to monitor compliance with the permitted emission limits. A certified continuous opacity monitoring system ("COMS") will also be installed on the boiler stack to monitor compliance with opacity limits.

The Facility will generate electrical power for its own operation and export the excess generated power to PSNH 115 kV system. A new switchyard will be built at or near the existing PSNH East Side Substation 300 (Berlin Substation). The switchyard will be connected to the Facility via a new underground 115 kV cable.

Wastewater and sanitary sewage will be sent to the Berlin Waste Water Treatment Facility. All treated stormwater will be discharged via the existing outfall structure that is across from the waste water treatment plant that once served the pulp mill and is now owned by the Androscoggin Valley Refuse District ("District"). The Project will share the outfall structure with the District under separate permits.

Q: Describe the effects the Facility will have on the community and explain why the proposed site and Facility will not unduly interfere with the orderly development of the region.

A: Section (j) of the Application describes in detail the positive effects of the Facility on the community and why it will not unduly interfere with the orderly development of the region.

The land on which the Facility is to be built is well suited for this Project. The Project will convert an abandoned industrial site into an economic asset for the region. LBB proposes to use the existing boiler at the site to burn clean wood to generate power. This Project is consistent and compatible with the region's forest industry. LBB is confident that there is an adequate supply of wood that can be sustainably harvested. The Facility's demand for clean biomass fuel will support and help sustain the region's timber based economy.

The local economy will also benefit from the construction and operation of the Facility. Berlin currently suffers from a relatively high unemployment rate. Construction of the Facility will create construction jobs, provided by skilled laborers. LBB expects many of the construction workers will be from the Berlin area. Once operational, the Facility will have approximately 40 full time employees. During both the construction phase and the operational phase, LBB expects consumer spending in the region to increase, supporting local businesses Furthermore the facility will purchase approximately $20 million of wood fuel annually most of which will be supplied and delivered by local contractors providing much needed relief for the timber industry that has recently been decimated by the decline of the pulp and paper industry.

In addition to providing the community with jobs, both direct and indirect, the Facility will also increase Berlin's tax base

Q: Explain the efforts made to consult and work with municipal and regional planning commissions and municipal governing bodies.

A: A thorough description of LBB's consultation and work with municipal and regional planning commissions and municipal governing bodies is set forth in Section (c)(6) of the application. This description includes lists of parties with which LBB has met and the other mechanisms it has employed to communicate information about the Project.

For the past two and one half years LBB has worked diligently to keep the community informed of its plans and progress. It has presented concept designs and development progress to the community through newspaper articles the internet and informal gatherings. In addition, LBB has briefed city, state and federal officials, business leaders and numerous community organizations on the Project. LBB believes that through these efforts, the community understands the impact the Facility will have on the region and has had an ongoing and meaningful opportunity to participate thus far in the development of the Project.

Q: Describe the types of fuel that will be used to generate electricity at the Facility.

A: The Project will uses use "biomass fuels" as defined in New Hampshire's Renewable Energy Portfolio statute, RSA 362-F:2, II.

Q: Will there be an adequate and sustainable supply of fuel for the Facility?

A: Yes, there will be an adequate and sustainable fuel supply for the Project. The Project will utilize approximately 700,000 – 750,000 wet tons of biomass annually. We asked LandVest, Inc. of Concord, New Hampshire to conduct a study to assess the availability of a sustainable supply of fiber within 100 miles of Berlin. LandVest completed their study in December 2009 and the analysis indicated that such supply unquestionably exists.

The findings of the study concluded that assuming current demand for lowgrade biomass remain constant at 6 million tons per year, the defined Primary Source of Supply (Wood Basket) has the capability to generate an additional 1.2 million tons per year on a sustained basis – roughly 35% more than what will be required for the Project

We are designing the project to be able to utilize both processed biomass chips that are produced remotely and transported by truck to Berlin, as well as low grade round wood which will be chipped on-site. It is important to maintain such flexibility in our fuel supply in order to efficiently utilize the biomass resources within the wood “basket”. With on-site chipping capability, we are expanding the range of potential fuel suppliers by allowing for wood deliveries from entities (timberland owners, managers and harvesters) that do not necessarily have their own chipping capability. We also will have the ability in the future to bring in biomass fuel by rail, if that becomes an economical option.

Q: Does this conclude your pre-filed testimony?

A: Yes.

STATE OF NEW HAMPSHIRE

BEFORE THE SITE EVALUATION COMMITTEE

Docket No. ___________________

Application of Laidlaw Berlin BioPower, LLC

TESTIMONY OF RAYMOND S. KUSCHE ON BEHALF OF LAIDLAW BERLIN BIOPOWER, LLC

Q: Please state your name, title and business address for the record.

A: My name is Raymond S. Kusche and my business address is 20 Island Park, Yarmouth, Maine 04096. I am a principal of Laidlaw Berlin BioPower, LLC ("LBB").

Q: Briefly summarize your educational background and employment experience.

A: I received a Master of Science Degree from the Forestry School at SUNY Syracuse in 1982 and a Bachelor of Science degree from Cornell University in 1976. From 1983 through 2005 I was employed by Hafslund USA as President, where I was responsible for the development and operations of a portfolio of hydroelectric and biomass projects, which included Errol Hydro and Pontook Hydro in Coos County, New Hampshire. From 2005 through October 2009 I managed the operations of Greenville Steam Company, a 16 MW biomass facility in Greenville, Maine, while also working with my colleagues at Laidlaw Energy to develop biomass projects.

Q: What is the purpose of your testimony?

A: The purpose of my testimony is to provide information about the Berlin Project's proposed transmission interconnection and the project's consistency with the State energy policy.

Q: What is your role in the Berlin Project?

A: I am involved in community affairs, project design and permitting, budgeting and pro forma development, contract origin and negotiation including power purchase agreements, engineering engagements, contractor selection for the EPC contract, and matters related to the Project's interconnection to the power grid which includes coordination with Public Service Company of New Hampshire ("PSNH") and the Independent System Operator of New England (ISO-NE).

Q: Please describe how the Berlin Project will connect to the electrical grid.

A: Laidlaw Berlin BioPower, LLC submitted its application for an Interconnection Feasibility Study to ISO-NE on February 15, 2008, and executed a Study Agreement with ISO-NE on May 7, 2008. The Project was assigned an ISO-NE Queue Position of #251. On November 9, 2009 LBB received from ISO-NE its "Feasibility Study for the Proposed Biomass Project Queue #251 Interconnecting to the Berlin 115 kV Substation in New Hampshire". Results included in this study report indicate that Laidlaw's Berlin BioPower facility will be able to connect to the transmission system with minimal upgrades estimated to cost less than $1 million. The interconnection study took into account all existing facilities as well as projects currently under development and already in the ISO-New England queue. The project has reviewed and accepted the feasibility study and authorized ISO-NE to commence the System Impact Study. Concurrently, we will authorize detailed design work to be undertaken, with coordinated efforts between ISO-NE, PSNH and Laidlaw Berlin BioPower.

Q: Are there any new substations or transmission lines associated with this Project?

A: The Project will interconnect to the electrical grid at PSNH's East Side Substation 300, which is located approximately three-quarters of a mile south of the project at the terminus of Goebel Street. This substation is located at the northern end of a spur line off of the 115kv transmission line, commonly referred to as the Coos Loop line. The loop line provides electricity to PSNH customers in Berlin and the surrounding area, in addition to transporting electrical energy from the numerous generators on the loop, principally hydroelectric power stations located on the Androscoggin River.

The project will construct one small substation on its land adjacent to the new powerhouse to contain a step-up transformer and a station service transformer. The step-up transformer will take electrical energy from the project's generator and increase it to 115 kv for export to the transmission line. The station service transformer will convert power from the project's generator voltage of 13.8 kV down to 4.16 kV for use inside the station, as required.

The existing PSNH East Side Substation will be expanded, most likely on its westerly side. The details of this expansion will not be finalized until PSNH completes certain engineering work, which is expected to occur by late 2010. The expansion will be necessary so the substation can accept the Project's incoming power lines (three cables – one for each phase) that will be connected via a single breaker switching station.

Q: Describe the main features and location of the new transmission line.

A: The project will construct a transmission line between its biomass generator and the PSNH substation. The route of this line will follow the existing easement owned by Fraser Paper which runs between the Burgess Mill site and the Gorham Paper Mill. Originating at our generator building, the powerline will flow into a step-up transformer located on the Berlin Project property, and from there run underground along Community Street, crossing beneath Unity Street and then running in a southwesterly direction within the existing pipeline easement parallel to Goebel Street, Shelby Street and Devent Street, ultimately rising above ground at a transition structure adjacent to Devent Street where it then turns approximately ninety degrees and proceeds on overhead lines in an easterly direction to enter the PSNH East Side substation. The approximate length of the route will be 3,200 feet of underground line from the generator substation to the transition structure on Devent Street, and 800 feet above ground from the transition structure to the PSNH East Side Substation.

LBB has an executed easement agreement with Fraser Paper for the use of the pipeline easement. This easement presently contains four underground pipelines, three of which run between the two mill sites and one which runs from the Burgess Mill site to the waste water treatment plant presently owned by Androscoggin Valley Regional Refuse Disposal District. One of these pipelines will be utilized to house the 115 kv power cable, which will be underground within the route of the easement. The power cable will transition from the buried cable to an overhead line due west of the East Side Substation at a location adjacent to Devent Street. This transition structure will be located within, or immediately adjacent to the easement. From here the line will run on overhead conductors in an easterly direction to the East Side Substation.

Q: Describe the construction of the transmission line.

A: The new transmission line will be constructed after the project has received all of its required permits and licenses and after LBB has completed all studies and agreements for interconnection with ISO-NE and PSNH. There will be three distinct portions of the transmission construction: 1) PSNH substation expansion and overhead line to the transition structure (buried to above-ground) adjacent to Devent Street; 2) the underground section running between the transition structure to the biomass project site on Community Street, and; 3) the section between the generator lead into and including the project substation where the line is routed underground to travel down the pipeline easement.

The exact sequence of construction activities will be determined in consultation with PSNH and the contractors involved with the Project. The East Side Substation expansion and the new project substation within the property will be designed in accordance with all applicable PSNH standards and specifications including geotechnical information, soil resistivity, drainage slope, and setbacks to maximize safety and meet any applicable codes and regulations. One of the existing underground fiberglass pipelines will be utilized to contain the new underground power line cable. This cable will be pulled through the existing pipeline, and will be specifically constructed for this purpose.

Q: What impact will the transmission line have on system stability and reliability?

A: The Project will interconnect to an existing 115 kV transmission line using a single breaker switching station installed beside the existing East Side Substation in Berlin, owned by PSNH. The Project entered into an agreement with ISO-NE in early 2008 to conduct the necessary interconnection studies. The November, 9, 2009 Interconnection Feasibility Study prepared by ISO-NE indicates that the project will not cause any voltage or short circuit problems on the line. The thermal impacts that the project interconnection causes under this study will be corrected through system upgrades estimated by ISO-NE to cost less than $1.0 Million. LBB has provided a copy of the ISO-NE Feasibility Study Report (see Appendix Q). LBB has authorized ISO-NE to proceed with the next level of interconnection study - the System Impact Study.

Q: Will the construction and operation of this Project be consistent with the State energy policy?

A: Yes. We discussed this issue extensively in the Application at Section (k) of the Application. In sum, the Project will use clean biomass to generate cost-efficient electricity. It will, if approved, be the largest commercial source of biomass power in the State, with installed capacity of 66 megawatts. This additional capacity will be available to help meet current and future electricity demands of New Hampshire citizens and businesses. It will do so while increasing the diversity and reliability of the State energy supply. By relying on biomass as a fuel source, the Project will contribute to the diversification of New Hampshire's energy supply. Adding cost-efficient renewable capacity to the State's energy supply mix will help reduce the State’s reliance on fossil fueled generation.

Q: **Does this conclude your pre-filed testimony?**

A: Yes.

STATE OF NEW HAMPSHIRE

BEFORE THE SITE EVALUATION COMMITTEE

Docket No. __________________

<u>Application of Laidlaw Berlin BioPower, LLC</u>

TESTIMONY OF DAMMON FRECKER ON BEHALF OF LAIDLAW BERLIN BIOPOWER, LLC

Q: Please state your name, title and business address.

A: My name is Dammon Frecker and my business address is 888 Worcester Street, Suite 240, Wellesley, Massachusetts. I am the Vice President of Energy & Industrial Services with ESS Group, Inc. ("ESS"). ESS is a full service environmental engineering and consulting firm with extensive experience in the energy sector.

Q: Briefly summarize your educational background and work experience.

A: I received my B.S. in Chemical Engineering from the University of Maine at Orono in 1984.

I have 25 years of experience in providing environmental permitting and compliance services to industrial facilities, utilities and independent power generation facilities, institutions, municipalities and government agencies with a particular focus on air quality and energy related programs. I have managed numerous projects involving the preparation of comprehensive environmental impacts statements, along with federal, state and local permit applications to support new project development. I have also assisted a wide variety of facilities in the areas of air emissions inventory development, process engineering, emissions control technology analysis and selection, regulatory analysis, and strategic planning. I also hold certification as a Toxics Use Reduction Planner in Massachusetts and served for three years as a Visiting Lecturer at Tufts University in Medford, Massachusetts on the topic of Air Pollution Control.

Q: What is the purpose of your testimony?

A: The purpose of my testimony is to provide general information about environmental and related issues associated with the Berlin Project.

Q: What is your role in the Berlin Project?

A: I am the Project Manager at ESS responsible for this project. ESS has worked in conjunction with LBB to evaluate the site and prepare the Application for a Certificate of Site and Facility.

I have directed all environmental impact and mitigation studies, including air quality, noise, water supply and wastewater, stormwater management, land use and alterations, visual and historical impacts, habitat, traffic, and safety.

Q: Have you identified what Federal and State governmental agencies have jurisdiction, under State and Federal law, over any aspect of the construction or operation of the facility?

A: Yes. We have identified all those agencies and provided a comprehensive list in Section (d)(1) of the Application.

Q: Have you made any requests for waivers from the information requirements of any State or Federal agency?

A: As discussed in Section (d)(4), The Applicant is requesting a waiver of RSA 483-B:9, under the Minimum Shoreland Protection Standards of the Comprehensive Shoreland Protection Act (CSPA), for the redevelopment of a site that contains a “nonconforming structure” (ref. RSA 483-B:11); an existing mill building that sits within 50 of the shoreline. As presented in the Shoreland Protection Permit Application (see Appendix E) the Project is “more nearly conforming” (ref. RSA 483-B:11 II) to the CSPA than existing conditions and that there will be at least the same degree of protection, or greater, provided to the public waters.

Q: Have you assessed how will the Facility affect air quality, water quality, the natural environment, and public health and safety?

A: Yes. We did extensive work to make those assessments and presented our analysis and conclusions in Sections (h)(3) and (i) of the Application. To summarize briefly, our studies indicate that the Berlin Project's air quality impacts, when considered in conjunction with existing background air quality levels, will not cause any exceedances of National Ambient Air Quality Standards ("NAAQS"). The NAAQS have been adopted by the US EPA and the NHDES to be protective of human health and the environment, including a margin of safety, for even the most sensitive of the population.

The Project will incorporate a recirculating cooling water system, along with water re-use strategies that will minimize wastewater discharges. The wastewater from the Project will be discharged to the Waste Water Treatment Facility operated by the City of Berlin, in accordance with their Sewer Use Regulations. Stormwater from areas on the Site with the potential to contribute pollutants will be collected and treated in a series of structures, basins, and vegetated swales that will minimize contaminants prior to discharge. The treated stormwater will be discharged in compliance with a permit issued by the EPA that will prescribe limits to protect surface water quality. The Project Team has designed features to prevent spills or releases of chemicals used at the Facility, and provide appropriate safety features and emergency response procedures to protect workers and the surrounding community.

Q: Have you evaluated the impacts, if any, from noise, dust, odor, smoke or other emissions at the Facility?

A: Yes. Our analysis and conclusions pertaining to those issues are presented in Sections (h)(3) and (i) of the Application. The Project's advanced fluidized bed combustion technology, along with highly advanced emissions control systems that will be installed, will prevent emissions of odor or smoke from the Project's boiler. The Facility will also employ Best

Management Practices for site housekeeping and materials management that will minimize fugitive dust emissions. We also conducted sophisticated modeling of the Project's sources of sound, which demonstrate that the resulting sound levels in the community will conform to the limits prescribed in the City of Berlin's Noise Ordinance.

Q: Please describe how issues associated with water supply and discharge will be addressed.

A: The water supply for the Facility will be provided by the Berlin Water Works municipal supply and distribution system. The Superintendent of the Berlin Water Works has confirmed the adequacy of the system to supply the quantity of water needed to meet the Facility's needs.

The wastewater from the Project will be discharged to the Waste Water Treatment Facility operated by the City of Berlin, in accordance with their Sewer Use Regulations.

Stormwater collected from areas on the Site with the potential to contribute pollutants will be collected and treated in a series of structures, basins, and vegetated swales. The treated stormwater will be discharged in compliance with a permit issued by the EPA that will prescribe limits to protect surface water quality.

Q: Have you assessed aesthetic issues?

A: Yes. Section (h)(3)(iv) of the Application contains a discussion of aesthetics and proposed mitigation plans. The Project has been designed to greatly improve the visual appearance of the structures on the Site. Visual simulations has been prepared that demonstrate the Project's appearance from various distances and view points representative of those available in the Project area. LBB is also working with the local community to develop site landscaping features that will further mitigate visual impacts in the surrounding community.

Q: Is the Facility located on or will it impact any historic sites or natural heritage locations?

A: The Project Site is not located on or adjacent to any properties listed on the National State Register of Historic Places. LBB completed and filed a Request for Project Review with the New Hampshire Department of Historic Resources ("DHR") that included Project Site plans, photographs of historic and existing conditions, and photographic simulations of the built Project. DHR has requested completion of a Project Area Form by a qualified architectural historian to determine if any of the structures on the Site or in the surrounding neighborhoods are eligible for listing as historic resources. DHR has also requested to be kept informed of local outreach efforts and any proposed alterations to existing structures on the Site. LBB has committed to working with DHR in these reviews. DHR has confirmed that such discussions are a normal component of the SEC review process and are expected to conclude within the SEC review timeline.

LBB has obtained confirmation from both the US Fish and Wildlife Service along with the New Hampshire Natural Heritage Bureau that the Project will not cause any adverse impacts to protected species.

Q: Have you assessed wetland, shore land and surface water impacts, if any?

A: Yes. The Site contains limited wetland areas, all of which have been avoided with proposed Project design and layout. Similarly, the Project layout has been designed to prevent alterations within 50 feet of the river's mean high water, in accordance with the provisions of the Shoreland Protection Act. The layout will prevent any alterations and help further growth of the vegetated buffer along the river bank. As noted above, the Project's only discharge to surface waters will be stormwater. Stormwater discharges will be managed in compliance with a permit issued by EPA with requirements and limits that will prevent adverse impacts to surface waters.

Q: Has an emergency response plan for the plant been prepared?

A: Yes. A preliminary Pollution Prevention and Emergency Response Plan is provided in Appendix L of the Application.

Q: Please describe what hazardous waste and materials, if any, will be present at the plant and how they will be managed.

A: The Project will involve limited quantities of hazardous materials. Distillate fuel oil and aqueous ammonia will be stored on site in bulk tanks installed within secondary containment systems. Lubricating oils and water treatment chemicals used at the facility will be stored within the facility's buildings and appropriate containment systems. The facility will generate limited quantities of hazardous wastes, primarily consisting of waste oils generated from facility maintenance.

Q: Describe in detail each major portion of the Facility's impact on the environment.

A: A detailed analysis of each portion of the facility's impact on the environment is contained in the Application at Section (h)(3). To briefly summarize that section, the Project will employ advanced combustion technology and air emissions control systems that meet Best Available Control Technology and Lowest Achievable Emission Rate technology. The resulting low emissions will not cause an exceedance of National Ambient Air Quality Standards established to protect human health and the environment.

The Project design and mitigation measures that will be incorporated will prevent adverse impacts of sound in the surrounding community. LBB will limit the operating hours for portions of the facilities operations to further prevent adverse impacts during the more noise sensitive evening and nighttime hours.

The Project will incorporate a well designed stormwater management system that will provide control of stormwater quality to prevent adverse impacts to surface waters. The design incorporates a variety of structures, basins, swales and control measures. The Facility will incorporate Best Management Practices to prevent contaminants from entering the stormwater as described with the Stormwater Pollution Prevention Plan provided in Appendix G.

LBB has evaluated potential visual impacts of the Project and has developed a Facility design that improves the appearance of the structures located on the Site and locates them on the Site away from local residences that exist across Hutchins and Coos Streets. LBB is committed to working with the local community to develop a landscaping plan that provides additional visual buffering along the Site property line.

The Project will utilize access routes that are designated truck routes and determined to provide proper access for trucks. The levels of truck traffic are expected to be similar to or less than those that were demonstrated when the Pulp Mill was in operation.

The Facility will use water from City's municipal supply system which has been determined to provide more than adequate supply capacity and infrastructure. Similarly, wastewater from the Facility will be discharged to the City's Waste Water Treatment Facility in accordance with an Indirect Discharge Permit and applicable discharge regulations.

Q: Describe in detail LBB's proposal for studying and solving environmental problems.

A: As stated in Section (h)(4), the project has been designed to minimize environmental impacts. Section (h)(3) outlines the potential environmental impacts of the

Project, and describes in detail the analyses completed to quantify those impacts. Further detail of these analyses can be found in the individual permit applications included in the appendices to this document. The results of these analyses demonstrate that the Project will meet all applicable federal, state, and local environmental regulations and guidelines.

Q: Does this conclude your pre-filed testimony?

A: Yes.

Tables

Tables

Table (c)(5)(i)-1 – New Hampshire Natural Heritage Bureau Listing of Rare Plants, Rare Animals, and Exemplary Natural Communities in Berlin

SPECIES NAME	LISTED		NUMBER REPORTED (in last 20 Yrs)	
	Federal	State	Town	State
Natural Communities - Terrestrial				
Red Oak – pine rocky ridge	-	-	Historical	14
Natural Communities – Palustrine				
**Herbaceous riverbank/floodplain	-	-	1	3
**Kettle hole bog system	-	-	1	23
***Medium level fen system	-	-	1	58
**Northern white cedar seepage forest	-	-	1	8
Plants				
Fragrant Fern *(Dryopteris fragrans)*	-	T	Historical	15
Mountain Firmoss *(Huperzia appalachiana)*	-	T	Historical	14
Mountain Sweet Cicely *(Osmorhiza berteroi)*	-	E	Historical	19
**New England Northern Reedgrass	-	T	1	14
One-leaf Orchis *(Amerorchis rotundifolia)*	-	E	Historical	1
Ovoid Spike-rush *(Eleocharis ovata)*	-	T	Historical	8
Reversed Bladderwort *(Utricularia*	-	T	Historical	15
Smooth Woodsia *(Woodsia glabella)*	-	E	Historical	4
**Squirrel Corn *Dicentra Canadensis)*	-	T	1	18
**Sweet Coltsfoot *(Petasites frigidus var.*	-	E	1	8
Vertebrates - Bird				
**Bald Eagle (*Haliaeetus leucocephalus)*	M	T	1	21
**Bicknell's Thrush *(Catharus bicknelli)*	-	-	1	18
**Common Loon *(Gavia immer)*	1	T	-	236
**Common Nighthawk *(Chordeiles minor)*	-	E	1	10
**Rusty Blackbird *(Euphagus carolinus)*	-	-	1	8

Listed: E = Endangered, T = Threatened, W = Special Concern (watch list), M = Monitored

Flags: ****= Highest Importance, ***= Extremely High Importance, **= Very High Importance, *=High Importance. These flags are based on a combination of (1) how rare the species or community is and (2) how large or healthy its examples are in that town.

Table (c)(5)(i)-2 - Cultural and Historic Resource Inventory (Berlin, NH Coos County)

Resource	Resource Type	Address	Approximate Distance to Site
Congregational Church	National Register of Historic Places ("NR") Listed	921 Main St	0.3 miles
Holy Resurrection Orthodox Church	NR Listed	Petrograd St	0.8 miles
St Anne Church	NR Listed	58 Church St	0.1 miles
Mount Jasper Lithic Source	NR Listed	1.5 miles NW from confluence of Dead/Androscoggin Rivers	1.5 miles
Brown Company Barns	State Register of Historic Places ("SR") Listed	137 East Milan Road	2.8 miles
Mount Forist Grange Cemetary	SR Listed	East Milan Road	>1.1 miles
St Kieran Community Center for the Arts	SR Listed	155 Emery Street	0.3 miles
Berlin Mills Railway	NHDHR Determined NR eligible (District, 2002)*	ROW extending 2.6 miles starting from Truss Bridges in Berl	0 - 2.0 miles
St Kieran's Parish Church	NHDHR Determined SR eligible (Individually, 2002)*	155 Emery Street	0.3 miles
Gerrish Block	NHDHR Determined NR eligible (Individually, 1998)*	123-127 Main Street	0.3 miles
Albert Theater	NHDHR Determined NR eligible (Within District, 2002)*	190-198 Main Street	0.15 miles
Berlin Armory	NHDHR Determined SR/NR eligible (Individually, 2006)*	2169 River Road (Rt 16)	3.25 miles
L.J. Cote Block	NHDHR Determined NR eligible (Individually, 2002)*	55-71 Main Street	0.4 miles
Guardian Angel School	NHDHR Determined NR eligible (Individually, 1998)*	610 Sullivan Street	0.1 miles
668 Carroll Street	NHDHR Determined NR eligible (Individually, 1991)*	668 Carroll Street	0.1 miles
715 First Avenue	NHDHR Determined NR eligible (Individually, 1990)*	715 First Avenue	0.5 miles
Brown & Co. Research Buldings	NHDHR Determined NR eligible (Individually, 2003)*	Main Street	0.1 - 0.5 miles
Androscoggin Valley Hospital/St. Regis Academy	NHDHR Determined NR eligible (Individually, 1978)*	Main, Pleasant, Church, School, and Success Streets	0.1 miles
Grand Trunk Railroad Station	NHDHR Determined NR eligible (Individually, 1995)*	Mt. Forist and Exchange Streets	0.5 miles
Brown Co. Guest House	Historic and Cultural Features Inventory (NH GRANIT data layer)**	Brown Avenue	0.5 miles
Old Brown Co. Store	Historic and Cultural Features Inventory (NH GRANIT data layer)**	Main Street	0.4 miles
Burgess School	Historic and Cultural Features Inventory (NH GRANIT data layer)**	Spring Street	0.3 miles
Mill Complex	Historic and Cultural Features Inventory (NH GRANIT data layer)**	Main Street	0.2 miles
Northern Lights	Historic and Cultural Features Inventory (NH GRANIT data layer)**	Main Street	0.3 miles
Berlin Fire Station	Historic and Cultural Features Inventory (NH GRANIT data layer)**	263 Main Street	0.4 miles
City Library	Historic and Cultural Features Inventory (NH GRANIT data layer)**	270 Main Street	0.4 miles
234-260 Main Street	Historic and Cultural Features Inventory (NH GRANIT data layer)**	234-260 Main Street	0.4 miles
Coos County Courthouse	Historic and Cultural Features Inventory (NH GRANIT data layer)**	Main Street	0.4 miles
Law Offices of Moynihan and Micha	Historic and Cultural Features Inventory (NH GRANIT data layer)**	206 Main Street	0.4 miles
Albert Theater	Historic and Cultural Features Inventory (NH GRANIT data layer)**	Main Street	0.4 miles
City Hall	Historic and Cultural Features Inventory (NH GRANIT data layer)**	168 Main Street	0.5 miles
B&M Depot	Historic and Cultural Features Inventory (NH GRANIT data layer)**	Unity Street	0.3 miles
Former King School	Historic and Cultural Features Inventory (NH GRANIT data layer)**	Grafton Street	0.2 miles
Blais House	Historic and Cultural Features Inventory (NH GRANIT data layer)**	Grafton Street	0.4 miles

Notes:

* Resources were identified in the *Record of NHDHR Determination of Eligibility Decisions* during a file review conducted at the office of the NH Division of Historic Resources as part the Project Notification process. Those resources contained within the *Record* that were determined to be eligible for National or State Register listing are reported in the above table.

** This data layer was constructed as part of a project to research and automate the historic and cultural features within the Route 16 corridor, funded by the Department of Transportation as part of the Route 16 Corridor Protection Study. Those resources which are located within 0.5 miles of the Site but are not currently listed on the National or State Registers of Historic Places are reported in the table above.

Table (h)(3)(i)-1 Air Quality Monitor Values & Background Concentrations

Pollutant	Averaging Period	2006	2007	2008	Background
CO	1-hr	**8.1 ppm** Pearl St., Manchester (Urban and City Center)	2.6 ppm Pearl St., Manchester (Urban and City Center)	6.0 ppm Pearl St., Manchester (Urban and City Center)	**8.1 ppm** 9,000 μg/m^3
	8-hr	3.0 ppm Pearl St., Manchester (Urban and City Center)	1.8 ppm Pearl St., Manchester (Urban and City Center)	**3.5 ppm** Pearl St., Manchester (Urban and City Center)	**3.5 ppm** 4,000 μg/m^3
NO_2	Annual	**0.001 ppm** Pack Monadnock Summit, Peterborough (Rural)	**0.001 ppm** Pack Monadnock Summit, Peterborough (Rural)	**0.001 ppm** Pack Monadnock Summit, Peterborough (Rural)	**0.001 ppm** 2 μg/m^3
$PM_{2.5}$	24-hr	**23 μg/m^3** Green Street, Laconia (Rural)	**19 μg/m^3** Green Street, Laconia (Rural)	**12 μg/m^3** Green Street, Laconia (Rural)	**18 μg/m^3** *(average)*
	Annual	**7.5 μg/m^3** Green Street, Laconia (Rural)	**6.9 μg/m^3** Green Street, Laconia (Rural)	**6.2 μg/m^3** Green Street, Laconia (Rural)	**6.9 μg/m^3** *(average)*
PM_{10}	24-hr	31 μg/m^3 Pearl St., Manchester (Urban and City Center)	**32 μg/m^3** Pearl St., Manchester (Urban and City Center)	25 μg/m^3 Pearl St., Manchester (Urban and City Center)	**32 μg/m^3**
	Annual	**16 μg/m^3** Pearl St., Manchester (Urban and City Center)	15 μg/m^3 Pearl St., Manchester (Urban and City Center)	14 μg/m^3 Pearl St., Manchester (Urban and City Center)	**16 μg/m^3**
SO2	3-hr	0.126 ppm Pleasant Street, Pembroke (Suburban)	**0.134 ppm** **Pleasant Street, Pembroke (Suburban)**	0.204 ppm Pleasant Street, Pembroke (Suburban)	**0.204 ppm** **530 μg/m3**
	24-hr	0.057 ppm Pleasant Street, Pembroke (Suburban)	**0.059 ppm** **Pleasant Street, Pembroke (Suburban)**	0.041 ppm Pleasant Street, Pembroke (Suburban)	**0.059 ppm** **153 μg/m3**
	Annual	0.007 ppm Pleasant Street, Pembroke (Suburban)	**0.008 ppm** Pleasant Street, Pembroke (Suburban)	0.006 ppm Pleasant Street, Pembroke (Suburban)	**0.008 ppm** 21 μg/m^3

Notes:

1. The short-term CO, PM_{10}, and SO_2 background concentrations (1-hr, 3-hr, 8-hr, and 24-hour) are the highest of the second-high values.
2. The annual NO_2, PM_{10} and SO_2 background concentrations are the highest of the annual mean values.
3. The 24-hour $PM_{2.5}$ background concentration is the 3-year average of the 98th percentile values.
4. The annual $PM_{2.5}$ background concentration is the 3-year average of the annual mean values.
5. The quarterly Pb background concentration is the highest of the maximum quarterly mean values.

Table (h)(3)(i)-2
Maximum Stack Concentrations & Emission Rates
Berlin BioPower - Berlin, New Hampshire

Pollutant	Biomass Boiler Normal Operation			Emergency Generator	Fire Pump	Cooling Tower
	Wood Fuel			Diesel	Diesel	
	ppm@7%O_2	lb/MMBtu	lb/hr	lb/hr	lb/hr	lb/hr
NO_x	39.0	0.065	72.4	8.5	2.3	
CO	74.0	0.075	83.6	0.59	0.28	
SO_2	11.0	0.025	27.9	0.0071	0.0028	
H_2SO_4		0.004	4.5			
PM (filterable)		0.012	13.4	0.027	0.037	0.30
PM_{10} (filterable)		0.012	13.4	0.027	0.037	0.30
$PM_{2.5}$ (filterable)		0.012	13.4	0.027	0.037	0.30
NH_3	20.0	0.012	13.4			
VOC	17.0	0.010	11.1	0.015	0.055	
Formaldehyde		0.0044	4.9	0.0056	0.0022	
Hydrogen Chloride		0.00083	0.92			
Lead		0.000048	0.1			
Mercury		0.0000030	0.0			

(1) The biomass boiler maximum stack concentrations and emission rates during normal operation do not apply at less than 70% of maximum load.

(2) The maximum lb/hr emission rates for the boiler are derived from the lb/MMBtu emission rate, the maximum heat input rate (1,013 MMBtu/hr), and a factor of 10% to account for expected variability in the exhaust gas volumetric flow rate from the boiler.

Table (h)(3)(i)-3
Facility Potential Emissions Summary
Berlin BioPower - Berlin, New Hampshire

Pollutant	Potential Total Emissions (tons per year)							
	Biomass Boiler	Emergency Generator	Fire Pump	Cooling Tower	PTE - Normal Operation(1)	Boiler Startup(2)	Fugitive Emissions(3)	Facility PTE(4)
Maximum Hours of Operation per Year	8,688	300	300	8,760	8,688	72	8,760	
NO$_x$	263.2	1.3	0.4	0.0	264.8	1.6	0.0	266.4
CO	303.6	0.1	0.0	0.0	303.8	3.7	0.0	307.5
SO$_2$	101.2	0.0	0.0	0.0	101.2	0.1	0.0	101.3
H_2SO_4	15.5	0.0	0.0	0.0	15.5	0.0	0.0	15.5
PM (filterable)	48.6	0.0	0.0	1.3	49.9	0.4	2.0	52.3
PM$_{10}$ (filterable)	48.6	0.0	0.0	1.3	49.9	0.4	0.9	51.1
PM$_{2.5}$ (filterable)	48.6	0.0	0.0	1.3	49.9	0.4	0.1	50.4
CO$_2$	894,864	116	46	0	895,026	1,924	0	896,950
NH$_3$	49.5	0.0	0.0	0.0	49.5	0.0	0.0	49.5
VOC	40.5	0.0	0.0	0.0	40.5	0.1	0.0	40.6
Formaldehyde	17.8	0.0	0.0	0.0	17.8	0.0	0.0	17.8
Hydrogen Chloride	3.4	0.0	0.0	0.0	3.4	0.0	0.0	3.4
Lead	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.2
Mercury	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total HAPS	65.0	0.0	0.0	0.0	65.0	0.1	0.0	65.1

(1) Total emissions represent maximum potential of all equipment operating independently in normal operation. The biomass boiler emissions are based on 932 MMBtu/hr average heat input. As all equipment will not run for maximum potential hours shown, actual emissions will be less.

(2) Boiler startup emissions have been estimated assuming a total of 6 cold startups per year. Emissions during shutdown periods are aggregated with emissions during normal boiler operation.

(3) Fugitive emissions resulting from wood fuel storage and handling activities.

(4) The Facility PTE is the sum of the PTE of all sources during normal operation, emissions during startup and shutdown of the Biomass Boiler, and fugitive emissions.

Table (h)(3)(i)-4
Summary of Maximum Air Quality Impacts - Criteria Pollutants

Pollutant	Averaging Period	National Ambient Air Quality Standard (μg/m^3)	New Hampshire Ambient Air Quality Standard (μg/m^3)	Significant Impact Level[(2)]		Maximum Modeled Impact[(1)]		Background Ambient Concentration[(3)] (μg/m^3)	Total Impact Concentration[(4)]	
				(μg/m^3)	% of NAAQS	(μg/m^3)	% of SIL		(μg/m^3)	% of AAQS
NO_2	Annual	100	100	1	1%	0.6	60%	2	3	3%
CO	8-hour	10,000	10,000	500	5%	43	9%	4,000	4,043	40%
	1-hour	40,000	40,000	2,000	5%	236	12%	9,000	9,236	23%
SO_2	Annual	80	80	1	1%	0.3	30%	21	21	27%
	24-hour	365	365	5	1%	2.3	46%	153	155	43%
	3-hour	1,300	1,300	25	2%	10.5	42%	530	541	42%
PM_{10}	Annual	No Standard	50	1	NA	0.1	10%	16	16	32%
	24-hour	150	150	5	3%	1.8	36%	32	34	23%
$PM_{2.5}$	Annual	15	15	0.3	2%	0.1	33%	6.9	7.0	47%
	24-hour	35	65	2.0	6%	1.8	90%	18	20	57%

(1) Maximum Modeled Impact is the maximum impactin a Class II area determined by dispersion modeling for each pollutant averaging period, considering the emissions from all project emissions sources.

(2) Significant Impact Levels are defined in EPA's Prevention of Significant Deterioration (PSD) Regulations for all pollutants expect $PM_{2.5}$. Although not yet promulgated by EPA or NHDES rulemaking, NHDES has adopted a draft policy of applying the PM2.5 SILs recommended by the Northeast States for Coordinated Air Use Management (NESCAUM).

(3) Background Ambient Concentrations are data from representative ambient monitoring stations located in New Hampshire.

(4) Total Impact Concentration is the sum of the Maximum Modeled Impact and the Background Ambient Concentrations, and is used to determine AAQS compliance.

Table (h)(3)(ii)-1 – Perceptible Changes in Broadband Sound Pressure Level

Change in Sound Pressure Level (dB)	Apparent Change in Loudness
3	Just noticeable
5	Clearly noticeable
10	Twice (or half) as loud

Table (h)(3)(ii)-2 – Measured A-weighted Sound Pressure Levels at Community Locations on April 30, 2009

Site No.	Description	Period	Time Start[1] (hh:mm)	Measured A-weighted Sound Pressure Level (dBA)	
				L50	Leq
ST-1	Corner of Success St & Main St	Morning	10:13	61	65
		Afternoon	13:34	63	65
		Evening	17:05	63	67
		Night	00:23	50	52
ST-2	Spring St	Morning	10:43	47	56
		Afternoon	14:05	50	58
		Evening	17:32	50	62
		Night	00:56	41	52
ST-3	Corner of Napert St & Hutchins St	Midday	12:17	42	45
		Afternoon	14:50	43	44
		Evening	18:05	48	49
		Night	01:26	47	47
ST-4	Corner of Belknap St & Carroll St	Morning	11:18	53	59
		Afternoon	15:50	55	59
		Evening	18:32	49	55
		Night	01:54	48	49
ST-5	Corner of Grafton St & Hillsboro St.	Midday	11:50	50	65
		Afternoon	16:31	55	60
		Evening	18:58	47	58
		Night	02:23	39	41

Source: ESS Group, Inc., 2009.

1 = Each short-term noise measurement was 20 minutes in duration. The start time of the measurement is given in terms of a 24-hour clock with 00:00 equal to 12:00 AM.

Table (h)(3)(ii)-3 – Measured Hourly Sound Levels at Site PL-1 from April 29 to 30, 2009

Start Time (hh:mm)	Measured Hourly Sound Pressure Level (dBA)	
	L50	Leq
15:35	62	67
16:35	63	68
17:35	57	65
18:35	56	65
19:35	55	63
20:35	52	62
21:35	48	60
22:35	44	59
23:35	44	56
0:35	45	52
1:35	45	54
2:35	44	53
3:35	44	54
4:35	46	61
5:35	60	68
6:35	62	68
7:35	63	70
8:35	60	67
9:35	58	66
10:35	60	68
11:35	60	68
12:35	63	70
13:35	63	69
14:35	64	70

Source: ESS Group, Inc., 2009.

1 = The start time of the measurement is given in terms of a 24-hour clock with 00:00 equal to 12:00 AM.

Table (h)(3)(ii)-4 – Measured Hourly Sound Levels at Site PL-2 from April 29 to 30, 2009

Start Time (hh:mm)	Measured Hourly Sound Pressure Level (dBA)	
	L50	Leq
15:00	50	53
16:00	49	50
17:00	48	51
18:00	47	49
19:00	46	47
20:00	45	46
21:00	45	46
22:00	45	47
23:00	45	46
0:00	45	45
1:00	45	45
2:00	45	45
3:00	45	45
4:00	45	46
5:00	46	47
6:00	47	48
7:00	47	50
8:00	46	49
9:00	45	49
10:00	47	48
11:00	47	48
12:00	48	50
13:00	49	52
14:00	49	51

Source: ESS Group, Inc., 2009.

1 = The start time of the measurement is given in terms of a 24-hour clock with 00:00 equal to 12:00 AM.

Table (h)(3)(ii)-5 – Modeled Sound Power Levels for Major Sources of Operational Noise

Name	Type[1]	Sound Power Levels (dB) in Octave Bands (Hz)									Overall (dBA)
		31.5	63	125	250	500	1000	2000	4000	8000	
Marley Class F400 CT [Air Inlet; Water+Fan; 1-cell]	Lw	102.1	108.4	104.4	103	98.6	100.8	101.2	102.6	101.3	108.4
Marley Class F400 CT [Fan Outlet; 1-cell]	Lw	104.7	104.7	104.7	100.8	97.9	95.1	87.7	83.6	79.5	99.9
Boiler (66 MWe)	Lw	107.3	106.3	101.3	95.3	94.3	92.3	90.3	90.3	90.3	98.7
Generator Step-up (GSU) Transformer 80 MVA	Lw	--	102.3	106.3	100.3	96.3	96.3	90.3	85.3	79.3	100.3
Steam Turbine Generator (66 MWe)	Lw	111.3	117.3	115.3	110.3	106.3	102.3	99.3	91.3	85.3	108.8
Fire Pump Driver (288 BHP @ 1760 RPM)	Lw (c)	82.4	83.4	84.4	86.4	86.4	89.4	86.4	82.4	76.4	93
Electrostatic Precipitator Rapper	Lw	94	94	95	98	103	106	111	105	96	114.1
Diesel Standby Generator	Lw	91	94	95	95	95	93	91	88	83	98.2
Front End Loader	Lw	--	106	111	114	109	107	104	98	92	112.3
Bldg: Wood Hogger Building (Hog and Screen)	Li	74	88	94	100	100	98	97	92	83	103.3
Wood Hogger: Hog	Li	71	85	91	97	97	95	94	89	80	100.3
Wood Hogger: Screen	Li	71	85	91	97	97	95	94	89	80	100.3
Wood Chipper	Li	86	100	106	112	112	110	109	104	95	115.3
Transfer Tower from Chipper to Hogger	Lw	116	116	116	114	112	111	109	103	96	115.8
Induced Draft Fan	Lw	--	133	133	124	119	115	110	104	97	122.4
Stack Top	Lw	--	94.4	101.5	101.2	94.2	88.2	83.2	77.2	70.2	96.5
Heavy Truck at Idle	Lw	--	116.6	113.9	108.6	102.2	102	97.8	99	96.6	108
Conveyor (average emission level)	Lw	--	80	81	81	80	74	70	60	51	80.3

Source: ESS Group, Inc., 2009.

1. The following notations are used within Cadna-A®: Lw = sound power level; Lw (c) = calculated sound power level; Li = interior sound pressure level.

Table (h)(3)(ii)-6 – Source of Information for Modeled Sound Power Levels

Name	Source
Marley Class F400 CT [Air Inlet; Water+Fan;1-cell]	SPX Cooling Tech., July-2009
Marley Class F400 CT [Fan Outlet; 1-cell]	SPX Cooling Tech., July-2009
Boiler (66 MWe)	EEI, Vol1, 2nd Ed, p 4-4, Rev 1984.
Generator Step-up (GSU) Transformer 80 MVA	Barron, Eqn 5-27, 2003.
Steam Turbine Generator (66 MWe)	EEI, Vol 1, 2nd Ed, p 4-8, 1984.
Fire Pump Driver (288 BHP @ 1760 RPM)	Cummins Fire Power (Model CFP83-F40)
Electrostatic Precipitator Rapper	EEI, Vol1, 2nd Ed, p 4-38, 1984.
Diesel Standby Generator	Hoover & Keith, 13th Printing, p 7-19, 2000.
Front End Loader	FHWA RCNM w/ OB levels re: Crocker, 1998.
Bldg: Wood Hogger Building (Hog and Screen)	as noted; combined Jeffrey Rader Screen & Hog
Wood Hogger: Hog	Jeffrey Rader Hog 100 dBA at 3 feet; estimated octave band levels re: Hoover & Keith, 2000.
Wood Hogger: Screen	Jeffrey Rader Screen 100 dBA at 3 feet; estimated octave band levels re: Hoover & Keith, 2000.
Wood Chipper	Andritz wood chipper 115 dBA at 3 feet; estimated octave band levels re: Hoover & Keith, 2000.
Transfer Tower from Chipper to Hogger	EEI, Vol 1, 2nd Ed, p 4-85, rev 1984.
Induced Draft Fan	Chicago Blower Corp, Design 1902 DW w/ inlet box
Stack Top	after Hoover & Keith, 13th Printing, pp. 9-10 to 9-13, 2000.
Heavy Truck at Idle	FHWA TNM Tech Manual & Adjusted re RCNM
Conveyor (average emission level)	after Lloyd George Acoustics Report

Source: ESS Group, Inc., 2009.

Table (h)(3)(ii)-7 – Modeled Noise Reduction Indices for On-site Buildings and Structures and Attenuation Factors

Name	ID	Noise Reductions (dB) in Octave Bands (Hz)										Source
		31.5	63	125	250	500	1000	2000	4000	8000	Rw	
Boiler Building Roof - Reinforced Gravel Concrete 150 mm	R03	--	--	39	41	50	57	63	71	--	54	VDI 2571
Boiler Building - Steel sheet with double-trapezoidal corrugations mineral fiber190 mm	R29	--	--	20	29	43	48	56	57	--	41	VDI 2571
Wood Chipping Building - Pumice stone concrete-solid block 365 mm	R19	--	--	44	44	50	56	58	62	--	54	VDI 2571
Wood Processing Building - Steel sheet with trapezoidal corrugations 45 mm	R26	--	--	14	16	20	25	29	23	--	25	VDI 2571
Emissions Control Building - Steel sheet with double-trapezoidal corrugations 190 mm	R27	--	--	18	23	33	43	48	39	--	35	VDI 2571
Turbine Building - Steel sheet with trapezoidal corrugations mineral fiber 120 mm	R28	--	--	15	20	28	37	43	40	--	32	VDI 2571
Cooling Tower - Splash Attenuation for Marley Class F400 CT [1-cell]	R42	0.0	0.0	0.0	0.0	0.6	4.3	7.6	14.2	14.9	5	SPX Cooling Tech., July 2009

Source: ESS Group, Inc., 2009.

Table (h)(3)(ii)-8 – Summary of Predicted Facility Noise Levels at the Measurement Sites

Site No.	Description	Daytime Facility Sound Pressure Level (dBA)	Nighttime Facility Sound Pressure Level (dBA)
ST-1	Corner of Success St & Main St	57	54
ST-2	Spring St	53	49
ST-3	Corner of Napert St & Hutchins St	52	40
ST-4	Corner of Belknap St & Carroll St	55	46
ST-5	Corner of Grafton St & Hillsboro St.	52	48
PL-1	Property line near parking lot	56	49
PL-2	Property line near turbine hall	60	58

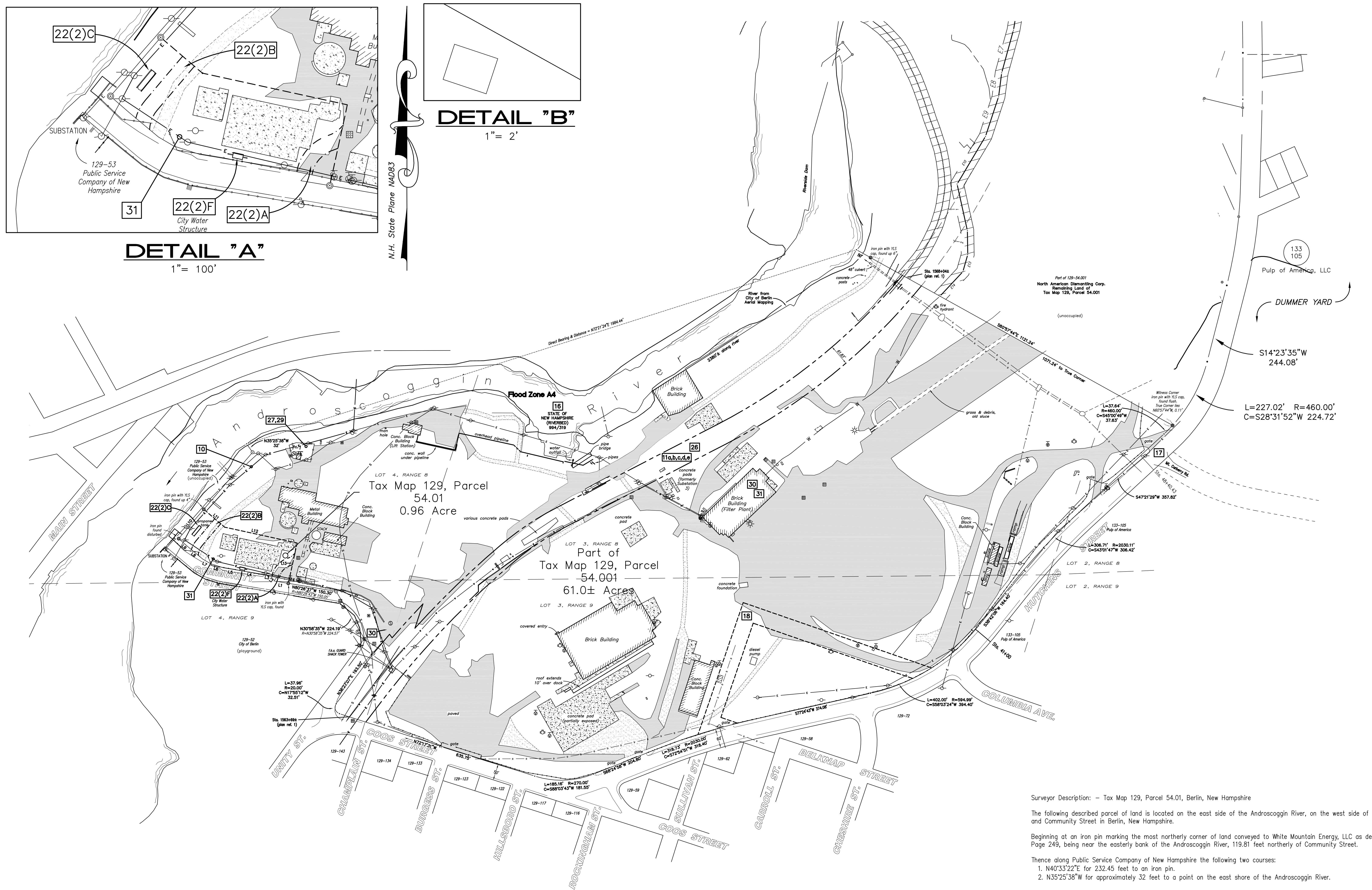
Source: ESS Group, Inc., 2009.

Table (h)(3)(ii)-9 – Comparison of Maximum Noise Levels and Measured Background Sound Levels (L50) at Short-term Sites

Time of Day	Description	Facility Maximum Noise Level Compared to Measured Leq (dBA)					Facility Maximum Noise Levels Compared to Measured L50 (dBA)				
		ST-1	ST-2	ST-3	ST-4	ST-5	ST-1	ST-2	ST-3	ST-4	ST-5
Daytime	Background	65	56	45	59	65	61	47	44	53	50
	Facility	57	53	52	55	52	57	53	52	55	52
	Total	66	58	53	60	65	62	54	53	57	54
Afternoon	Background	65	58	44	59	60	63	50	43	55	55
	Facility	57	53	52	55	52	57	53	52	55	52
	Total	66	59	53	60	61	64	55	53	58	57
Evening	Background	66	62	49	55	60	63	50	48	49	47
	Facility	57	53	52	55	52	57	53	52	55	52
	Total	67	63	54	58	61	64	55	53	56	53
Nighttime	Background	52	52	47	49	41	50	41	47	48	39
	Facility	54	49	40	46	48	54	49	40	46	48
	Total	56	54	48	51	49	55	50	48	50	49

Figures

Figures



PLAN REFERENCES:

1. "RIGHT OF WAY AND TRACK MAP, CONCORD & MONTREAL R.R., OPERATED BY THE BOSTON AND MAINE R.R.," SHEETS V24.2/30 & 31. DATED JUNE 30, 1914, REVISED 2-2-1966.
2. "MINOR SUBDIVISION OF FRASER N.H. LLC, COMMUNITY STREET, BERLIN, NEW HAMPSHIRE," DATED DECEMBER 30, 2002, REVISED 1-23-2003, BY YORK LAND SERVICES, RECORDED AT COOS COUNTY REGISTRY OF DEEDS AS PLAN NO. 1959. (YLS DWG# 02-008A)
3. "PLAT OF PROPERTY SURVEYED FOR FRASER N.H. LLC, TAX MAP 128, PARCEL 54, BERLIN, NEW HAMPSHIRE" DATED SEPTEMBER 28, 2006, BY YORK LAND SERVICES, RECORDED AT COOS COUNTY REGISTRY OF DEEDS AS PLAN NO. 2796 (YLS DWG# 06-110)
4. "BERLIN MILLS ADDITION, PLAN NO. 1, OFFICE OF PIKE, PERKINS & MACY, CIVIL ENGINEERS, BERLIN FALLS, N.H.," DATED JULY 28, 1893, RECORDED AT COOS COUNTY REGISTRY OF DEEDS VOL. 66, PG. 402. (BC FILE# B-5-24, YLS FILE# B-90)
5. "PLAN NO. 2, BERLIN MILLS ADDITION, LOT 3, RANGE 9, TOWN OF BERLIN, N.H.," DATED OCT. 30, 1893, BY PIKE, PERKINS & MACY, RECORDED AT COOS COUNTY REGISTRY OF DEEDS VOL. 67, PG. 400. (BC FILE# B-5-5)
6. "PLAN SHOWING LOTS BELONGING TO THE BERLIN MILLS CO., BERLIN, N.H., PLAN NO.4, BERLIN MILLS ADDITION," DATED JUNE 1905, BY EDWARD S, BRYANT, ENGR., RECORDED AT COOS COUNTY REGISTRY OF DEEDS VOL. 402, PG. 121. (BC FILE# B-5-27)
7. "PLAN SHOWING PROPERTY LINES OF BOSTON & MAINE R.R. IN LOT 3 RANGE 6, LOT 3 RANGE 7. LOT 3 RANGE 8, LOT 3 RANGE 9, IN BERLIN, N.H. AS CONVEYED BY BERLIN MILLS CO. JUNE 17, 1892. C.C.R. VOL. 64 PAGE 17," DATED OCT. 10, 1933, BY G.F. LOVETT (B.C. DWG# E-6307, YLS FILE# B-148)
8. "PLAN SHOWING THOMAS W. HORNE PROPERTY ON EAST SIDE OF RIVER," DATED 1917, BY F.L. BRANNEN, RECORDED AT COOS COUNTY REGISTRY OF DEEDS VOL. 188, PG. 1 (YLS FILE# B-151)
9. "PLAT SHOWING EASEMENTS ON TAX MAP 129, PARCEL 24 TO BE CONVEYED BY NORTH AMERICAN DISMANTLING CORP. TO CITY OF BERLIN, NEW HAMPSHIRE," DATED APRIL 30, 2007, BY YORK LAND SERVICES, RECORDED AT COOS COUNTY REGISTRY OF DEEDS AS PLAN NO. 2953. (YLS DWG# 07-036)
10. PLANS BY ANDERSON-NICHOLS PROVIDED BY BERLIN PUBLIC WORKS DEPT.
11. "MINOR LOT LINE ADJUSTMENT BETWEEN PROPERTIES OF NORTH AMERICAN DISMANTLING CORP., TAX MAP 129, PARCEL 54.001 AND WHITE MOUNTAIN ENERGY, LLC, TAX MAP 129, PARCEL 54.01, BERLIN, NEW HAMPSHIRE," DATED OCTOBER 1, 2007, REVISED 3-12-2008, BY YORK LAND SERVICES, RECORDED AT COOS COUNTY REGISTRY OF DEEDS AS PLAN NO. 3101 (YLS DWG# 07-096)
12.

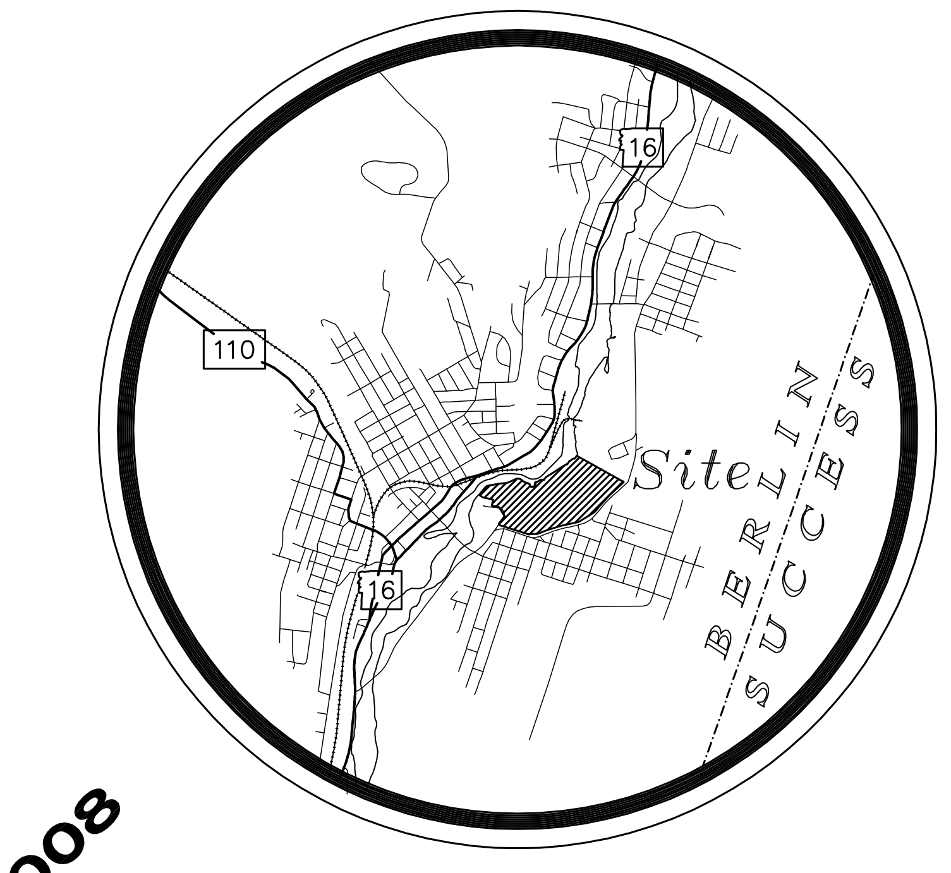
NOTES:

1. THIS SURVEY WAS PERFORMED WITH PRECISE GRADE G.P.S. EQUIPMENT AND AN ELECTRONIC TOTAL STATION WITH DATA COLLECTOR. REDUNDANT MEASUREMENTS WERE OBSERVED AND ANALYZED USING A LEAST SQUARES ADJUSTMENT ROUTINE. THE MAXIMUM COMPUTED POSITIONAL TOLERANCE OF THE CONTROL NETWORK IS 0.03 FEET AT THE 95% CONFIDENCE LEVEL.
2. DEDICATED AS PUBLIC USE, PARCEL 1, ORDER 11-27-1897, W.&J.R.R. TO CITY OF BERLIN (SEE PLAN REFERENCE 1)
3. THE CITY OF BERLIN HAS A 60' WIDE EASEMENT FOR HUTCHINS STREET FROM STATION 48+40.43 NEAR MT. CARBERRY ROAD INTERSECTION TO A POINT APPROXIMATELY 575' SOUTH OF BRIDGE STREET, VOL. 768, PG. 436. IT IS ASSUMED THAT THE DUMMER YARD PARCELS ON THE EASTERLY SIDE OF HUTCHINS STREET WOULD EXTEND TO THE CENTERLINE. IT IS ASSUMED THAT THE SURVEYED PARCEL EXTENDS TO THE CENTERLINE IN THIS SECTION. BETWEEN STATIONS 41+00 AND 48+40.43, THE 60' WIDE STREET HAS BEEN CONVEYED IN FEE – SEE VOL. 696, PG. 37. SEE VOL. 669, PG. 912 FOR PARCELS ALONG HUTCHINS STREET BETWEEN COOS STREET AND STATION 41+00.
4. THE SURVEYED PARCEL IS OCCUPIED BY SEVERAL BUILDINGS AND STRUCTURES FORMERLY USED AS A PAPER MILL. NONE ARE SHOWN ON THIS PLAT.
5. SEE EASEMENT AND SHARED FACILITIES AGREEMENT RECORDED IN VOL. 1064, PG. 256.
6. THIS PROPERTY IS PART OF LOT 2, RANGES 7 & 8, LOT 3, RANGES 6, 7, 8, & 9, AND LOT 4, RANGES 8 & 9. THIS PROPERTY IS ALSO THE TOTAL OF THREE TAX PARCELS MERGED ON SEPTEMBER 21, 2006 RECORDED AT COOS COUNTY REGISTRY OF DEEDS VOL. 1189, PG. 763.
7. THE LOCATIONS OF UNDERGROUND UTILITIES AS SHOWN HEREON ARE BASED ON ABOVE GROUND STRUCTURES AND RECORD DRAWINGS PROVIDED TO THE SURVEYOR AND MAY VARY. ONLY THOSE UNDERGROUND STRUCTURES REQUESTED BY CITY OF BERLIN CITY ENGINEER AND N.A.D.C. ARE SHOWN. THERE MAY BE OTHER BURRIED UTILITIES OR STRUCTURES ON THIS INDUSTRIAL PROPERTY NOT LOCATED AS PART OF THIS LOT LINE ADJUSTMENT.
8. FOR RIGHTS AND EASEMENTS OF GREAT LAKES HYDRO AMERICA, LLC SEE EASEMENT AGREEMENT TO AND SUPPLEMENT OF FRASER N.H. LLC TO GREAT LAKES HYDRO AMERIC, LLC RECORDED SEPTEMBER 26, 2006 RECORDED AT BOOK 1190, PAGE 23; SEE ALSO PLAN REFERENCE NUMBERS 4 AND 5 ABOVE.

CERTIFICATION:

I CERTIFY THAT THIS PLAT IS NOT A SUBDIVISION PURSUANT TO N.H.R.S.A. TITLE LXIV AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN, RSA 676:18,III

DATE ______________ ______________________________



LOCATION PLAN

1" = 4000'

SURVEYOR CERTIFICATION:

ARTHUR M. YORK A REGISTERED LAND SURVEYOR, LICENSE NO. 450, IN AND FOR THE STATE OF NEW HAMPSHIRE AND LEGALLY DOING BUSINESS IN COOS COUNTY, ("SURVEYOR") DOES HEREBY CERTIFY TO LAIDLAW BERLIN BIOPOWER, LLC.

(1) THE ACCOMPANYING SURVEY ("SURVEY") REPRESENTS A TRUE AND CORRECT SURVEY MADE BY ME IN JUNE, 2008 OF THE LAND THEREIN PARTICULARLY DESCRIBED;

(2) SUCH SURVEY WAS CONDUCTED BY THE SURVEYOR, OR UNDER HIS DIRECT SUPERVISION;

(3) THE SURVEY AND THE INFORMATION, COURSES AND DISTANCES SHOWN THEREON ARE CORRECT;

(4) THE TITLE LINES AND THE LINES OF ACTUAL POSSESSION ARE THE SAME;

(5) THE LAND DESCRIBED IN THE SURVEY IS THE SAME AS DESCRIBED IN VOLUME 1064, PAGE 249 ALONG WITH PART OF VOLUME 1190, PAGE 932 AT COOS COUNTY REGISTRY OF DEEDS;

(6) THE AREA OF THE SUBJECT PROPERTY, THE SIZE, LOCATION AND TYPE OF ABOVE GROUND BUILDINGS AND VISIBLE IMPROVEMENTS SITUATED ON THE SUBJECT PROPERTY ARE AS SHOWN; ALL ABOVE GROUND BUILDINGS AND VISIBLE IMPROVEMENTS ARE WITHIN THE BOUNDARY LINES AND THE BUILDINGS ARE WITHIN THE ZONED SETBACK LINES OF THE PROPERTY, UNLESS OTHERWISE SHOWN;

(7) ALL MONUMENTS SHOWN HEREON ACTUALLY EXIST, AND THE LOCATION, SIZE, AND TYPE OF MATERIAL THEREOF ARE CORRECTLY SHOWN;

(8) ALL PARCELS SHOWN HEREON ARE CONTIGUOUS WITH EACH OTHER AND NO GAPS OR GORES EXIST BETWEEN OR AMONG SUCH PARCELS;

(9) WITH RESPECT TO THE LOCATION OF THE BUILDINGS AND IMPROVEMENTS ON THE PROPERTY, THERE ARE NO VISIBLE VIOLATIONS OF RESTRICTIONS OR REGULATIONS KNOWN TO SURVEYOR TO AFFECT THE PROPERTY, NOR ARE THERE ANY VISIBLE VIOLATIONS OF THE ZONING ORDINANCES;

(10) THERE ARE NO VISIBLE EASEMENTS OR VISIBLE USES AFFECTING THIS PROPERTY APPEARING FROM CAREFUL PHYSICAL INSPECTION OF THE SAME, OTHER THAN THOSE SHOWN AND DEPICTED ON THE SURVEY;

(11) THERE ARE NO VISIBLE ENCROACHMENTS ON THE ADJOINING PROPERTIES, STREETS, OR ALLEYS BY ANY OF SAID BUILDINGS, STRUCTURES AND IMPROVEMENTS, OTHER THAN AS SHOWN ON THE SURVEY;

(12) THERE ARE NO PARTY WALLS OR VISIBLE ENCROACHMENTS ON SAID DESCRIBED PROPERTY BY STREETS, ALLEYS OR BUILDINGS, STRUCTURES OR ANY OTHER IMPROVEMENTS SITUATED ON ADJOINING PROPERTY, EXCEPT AS SHOWN ON THE SURVEY;

(13) ADEQUATE INGRESS AND EGRESS TO AND FROM THE PROJECT IS PROVIDED BY THE FOLLOWING STREETS AND DEDICATED PUBLIC RIGHT-OF-WAY: HUTCHINS STREET, COOS STREET AND COMMUNITY STREET, MAINTAINED BY CITY OF BERLIN.

(14) THE SURVEY SHOWS THE VISIBLE LOCATION OF UTILITIES SERVING THE PROPERTY;

(15) THE SURVEY SHOWS THE LOCATION OF ALL VISIBLE STORM DRAINAGE SYSTEMS FOR THE COLLECTION AND DISPOSAL OF ALL ROOF AND SURFACE DRAINAGE;

(16) ANY DISCHARGE INTO STREAMS, RIVERS OR OTHER CONVEYANCE SYSTEM IS NOT SHOWN ON THE SURVEY;

(17) PORTIONS OF THE SUBJECT PROPERTY DO LIE WITHIN A SPECIAL FLOOD HAZARD AREA ("SFHA") AS DEFINED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.

(18) THE SUBJECT PROPERTY HAS ACCESS TO AND FROM A DULY DEDICATED AND ACCEPTED PUBLIC STREET OR HIGHWAY;

(19) THE SUBJECT PROPERTY DOES NOT RELY ON AJOINING PROPERTY FOR INGRESS OR EGRESS; AND

(20) THE LEGAL DESCRIPTION, AS SHOWN ON THIS SURVEY FORMS A MATHEMATICALLY CLOSED FIGURE.

THE PARTIES LISTED ABOVE ARE ENTITLED TO RELY ON THE SURVEY AND THIS CERTIFICATE AS BEING TRUE AND ACCURATE.

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IS BASED WERE MADE IN ACCORDANCE WITH "MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS," JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS IN 2005 AND INCLUDES ITEMS 1, 2, 3, 4, 6, 10, 13 (INCLUDING USES AS OBSERVED FROM THE BOUNDARY LINE), 16, 17, AND 18 OF TABLE A THEREOF. PURSUANT TO THE ACCURACY STANDARDS AS ADOPTED BY ALTA AND NSPS AND IN EFFECT ON THE DATE OF THIS CERTIFICATION, UNDERSIGNED FURTHER CERTIFIES THAT IN MY PROFESSIONAL OPINION, AS A LAND SURVEYOR REGISTERED IN THE STATE OF NEW HAMPSHIRE, THE RELATIVE POSITIONAL ACCURACY OF THIS SURVEY DOES EXCEED THAT WHICH IS SPECIFIED THEREIN.

DATE: ______________

____

ARTHUR M. YORK

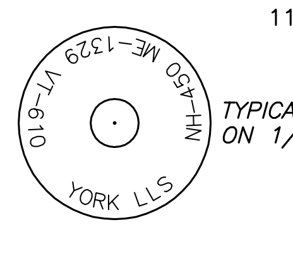
REGISTRATION NO. 450

* * * LEGEND * * *

◉	IRON PIPE OR PIN, FOUND
⊙	IRON PIN, SET
·	UNMONUMENTED POINT
⊡	WOOD POST
———	BOUNDARY LINE
21	SCHEDULE B ITEM NUMBER
	OTHER
	OTHER
U-1 99	TAX MAP & PARCEL NUMBER

RECORD OWNER:
White Mountain Energy, LLC
P.O. Box 307
Lapeer, MI 48448-0307
1064/249

RECORD OWNER:
North American Dismantling Corp.
P.O. Box 307
Lapeer, MI 48448-0307
1190/932



TYPICAL MARKING ON ALUMINUM CAPS ON 1/2"x30" REBAR SET

Surveyor Description: – Tax Map 129, Parcel 54.01, Berlin, New Hampshire

The following described parcel of land is located on the east side of the Androscoggin River, on the west side of Hutchins Street and on the north sides of Coos Street and Community Street in Berlin, New Hampshire.

Beginning at an iron pin marking the most northerly corner of land conveyed to White Mountain Energy, LLC as describe in Coos County Registry of Deeds, Volume 1064, Page 249, being near the easterly bank of the Androscoggin River, 119.81 feet northerly of Community Street.

Thence along Public Service Company of New Hampshire the following two courses:
1. N40°33'22"E for 232.45 feet to an iron pin.
2. N35°25'38"W for approximately 32 feet to a point on the east shore of the Androscoggin River.

Thence easterly along east shore of the Androscoggin River for approximately 2380 feet to a point.

Thence S60°57'44"E along other land of North American Dismantling Corporation for approximately 50 feet to an iron pin.

Thence continuing S60°57'44"E along other land of North American Dismantling Corporation for 1071.27 feet to an iron pin on the westerly sideline of Hutchins Street.

Thence southerly along westerly sideline of Hutchins Street the following nine courses:
1. Arc of a curve to the right for 37.64 feet to a point. Said curve has a radius of 460.00 feet and a long chord of S45°00'49"W, 37.63 feet.
2. S47°21'29"W for 357.82 feet to a point.
3. Arc of a curve to the left for 306.71 feet to a point. Said curve has a radius of 2030.11 feet and a long chord of S43°01'47"W, 306.42 feet.
4. S38°42'06"W for 164.40 feet to a point.
5. Arc of a curve to the right for 402.00 feet to a point. Said curve has a radius of 594.99 feet and a long chord of S58°03'24"W, 394.40 feet.
6. S77°24'43"W for 374.08 feet to a point.
7. Arc of a curve to the left for 318.73 feet to a point. Said curve has a radius of 2030.00 feet and a long chord of S72°54'51"W, 318.40 feet.
8. S68°24'58"W for 204.80 feet to a point.
9. Arc of a curve to the right for 185.16 feet to a point. Said curve has a radius of 270.00 feet and a long chord of S88°03'43"W, 181.55 feet.

Thence N72°17'31"W along the northerly sideline of Coos Street for 635.75 feet to a point.

Thence along an arc of a curve to the right for 37.96 feet to a point. Said curve has a radius of 20.00 feet and a long chord of N17°55'12"W, 32.51 feet.

Thence N36°27'07"E along the easterly sideline of Community Street and the westerly sideline of the former B&M Railroad for 193.50 feet to an iron pin.

Thence N30°59'15"W for 223.98 feet to an iron pin.

Thence along the northerly sideline of Community Street the following ten courses:
1. N80°26'43"W for 150.05 feet to an iron pin.
2. N80°26'43"W for 45.45 feet to a point.
3. N40°52'45"E for 17.33 feet to a point.
4. N80°50'46"W for 53.49 feet to a point.
5. N80°32'04"W for 69.27 feet to a point.
6. N80°28'00"W for 47.42 feet to a point.
7. N72°30'06"W for 41.74 feet to a point.
8. N59°34'00"W for 28.04 feet to a point.
9. N50°09'39"W for 58.81 feet to a point.
10. N48°55'17"W for 8.95 feet to a point.

Thence N40°33'22"E along Public Service Company of New Hampshire for119.81 feet to the point of beginning.

Meaning and intending to describe a parcel of land containing approximately 62.0 acres as shown on this survey.

PROGRESS PRINT 6-4-2008

Figure (c)(2)-1

YORK LAND SERVICES, LLC
Riverside Courtyards, 3 Twelfth Street
Berlin, New Hampshire 03570 – (603)752-7282

ALTA/ACSM LAND TITLE SURVEY
prepared for
LAIDLAW BERLIN BIOPOWER, LLC
Lands of
NORTH AMERICAN DISMANTLING CORP.
Tax Map 129, Parcel 54.001
and
WHITE MOUNTAIN ENERGY, LLC
Tax Map 129, Parcel 54.01
Berlin, New Hampshire

STATE OF NEW HAMPSHIRE
No. 450
ARTHUR M. YORK
LICENSED LAND SURVEYOR
SIGNATURE

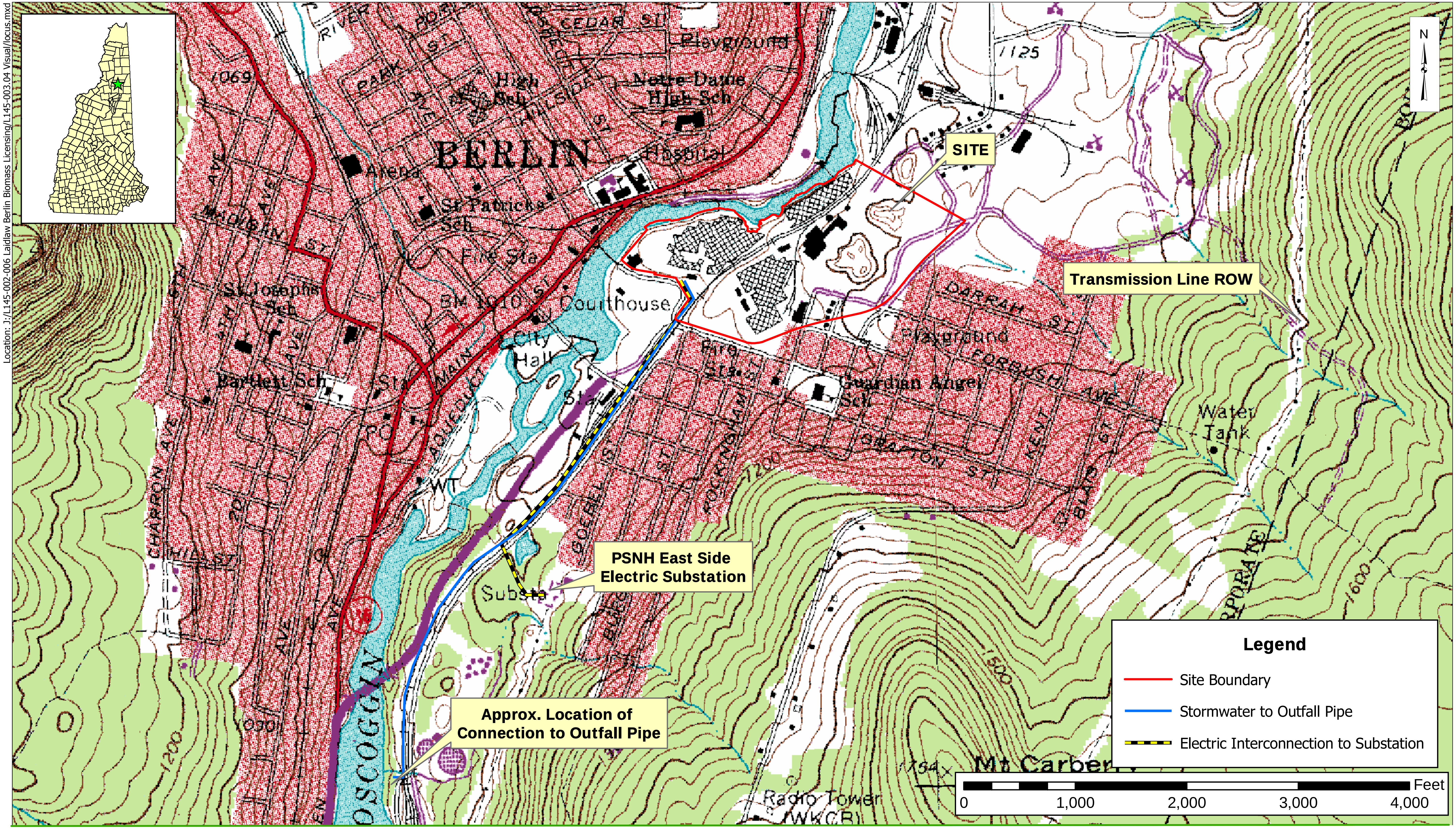
Revisions	Revisions	Revisions

200 0 100 200 400
SCALE IN FEET

Method GPS/Total Station	Made by AMY, BJY, DAS, RHL	Drawn by KSM	Date June 2, 2008
Precision see note 1	Checked by AMY	Scale 1 inch = 200 feet	Drawing No. 07-096B

RECORDED AT COOS COUNTY REGISTRY OF DEEDS AS PLAN ______

Location: J:/L145-002-006 Laidlaw Berlin Biomass Licensing/L145-003.04 Visual/locus.mxd



ESS Group, Inc.

Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Scale: 1" = 800'

Source: 1) NHGRANIT, 1:12,000 Ortho, 1998
2) ESS, Site Boundary, 2009

U.S.G.S. Locus Map -
Project Site and Ancillary Facilities

Figure
(c)(2)-2

Location: J:/L145-002-006 Laidlaw Berlin Biomass Licensing/L145-003.04 Visual/locus.mxd

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Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Scale: 1" = 800'

Source: 1) NHGRANIT, 1:12,000 Ortho, 1998
2) ESS, Site Boundary, 2009

**Ortho Locus Map -
Project Site and Ancillary Facilities**

**Figure
(c)(2)-3**

Location: G:/GIS-Projects/L145-002/LaidlawBerlinWellesley/00-mxd/Ortho11x17_Abut.mxd

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LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

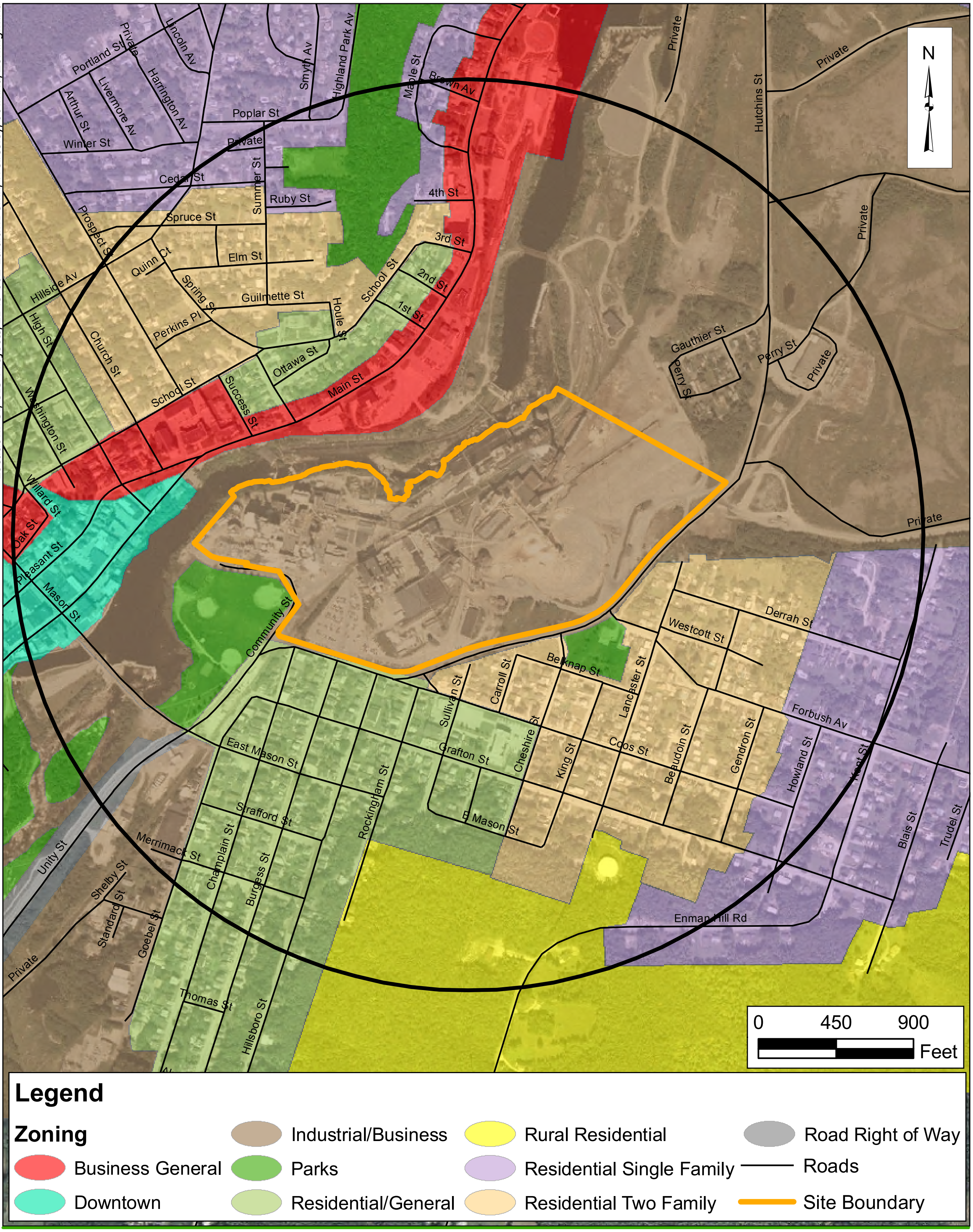
Scale: 1" = 250'

Source: 1) NHGRANIT, 1:12,000 Ortho, 1998
2) ESS, Site Boundary, 2009

Cultural & Historic Resources -
Site and Adjacent Properties

Figure
(c)(3)-1

Location: G:/GIS-Projects/L145-002 LaidlawBerlin/Wellesley/00.mxd/Zoning.mxd



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Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Scale: 1"= 800'

Source: 1) NH GRANIT, National Agricultural Imagery Program, 2003
2) City of Berlin Zoning Map, 2005-2009; 3) NH DOT Roads, 2008

Zoning Designations Within One- Half Mile of Site

Figure (c)(3)-2

Location: G:/GIS-Projects/L145-002 LaidlawBerlin/00-mxd

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Berlin, New Hampshire

Scale: 1" = 800'

Source: 1) NHGRANIT, 1:12,000 Ortho, 2003
2) USFWS NWI Wetlands, 2005

Legend

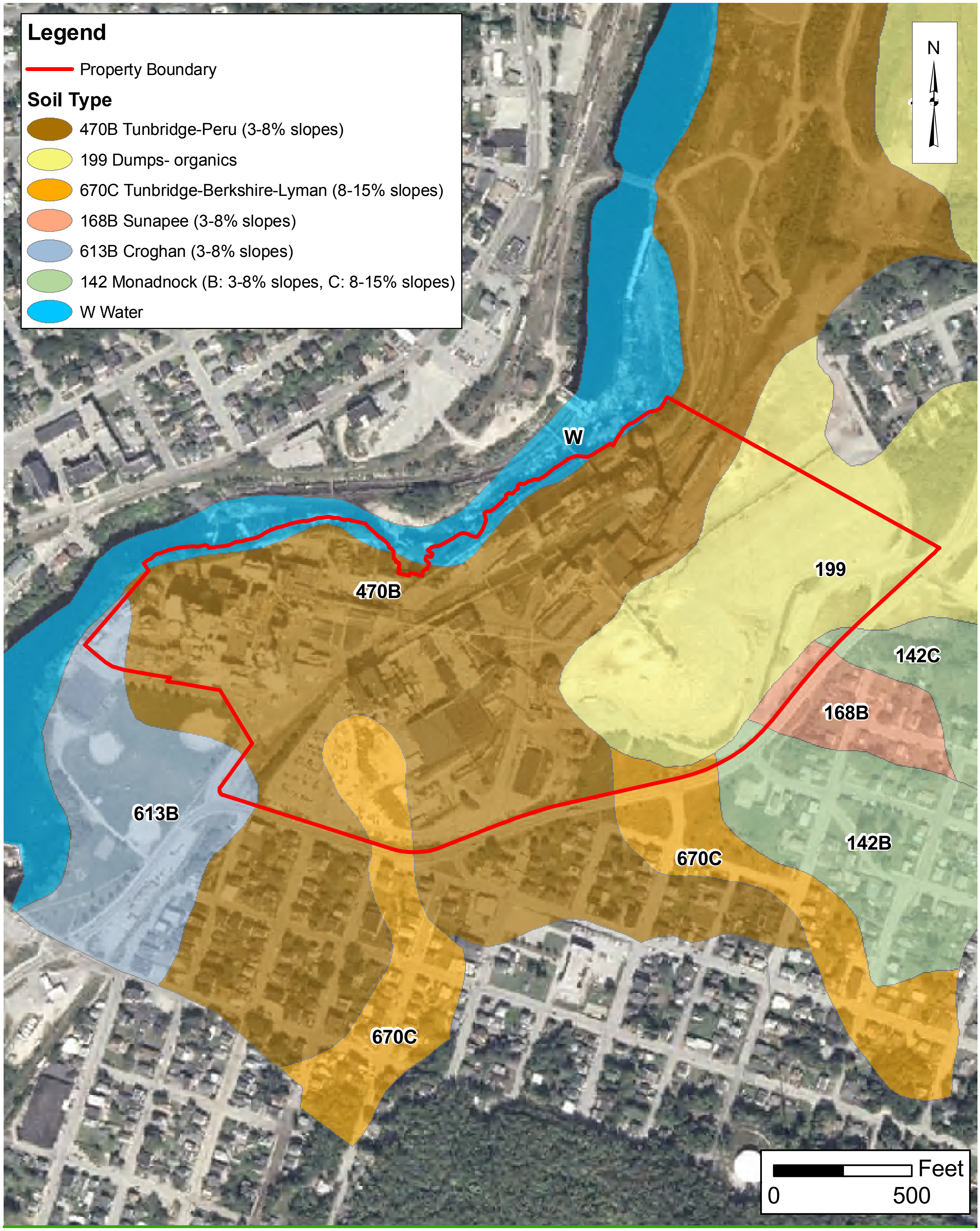
— Property Boundary

● National Wetland Inventory Wetlands

Wetland Locations

Figure (c)(4)-1

Location: G:/GIS-Projects/L145-002 LaidlawBerlin/Soils.mxd



Soils

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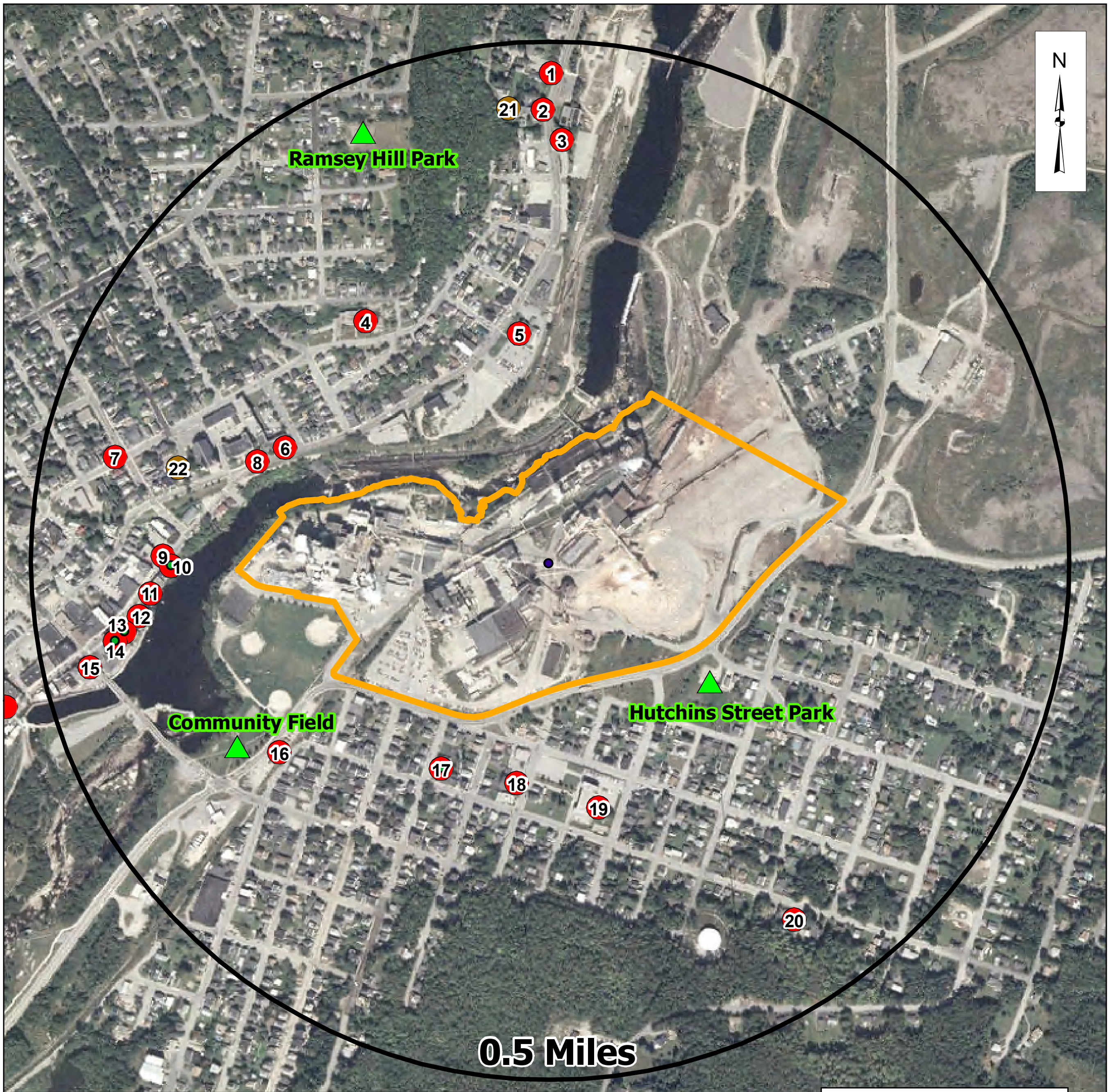
LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Scale: 1" = 500'

Source: 1) NHGRANIT, 1:12,000 Ortho, 1998
2) SSURGO Soils, 2009

Figure (c)(4)-2

Location: G:/GIS-Projects/L145-002 LaidlawBerlin/Wellesley/00-mxd/Berlin_resourcemap2.mxd



Cultural/Historic Resources Within 0.5 Miles of Site

ID	Name	ID	Name
1	BROWN CO. GUEST HOUSE	12	COOS COUNTY COURT HOUSE
2	CONGREGATIONAL CHURCH	13	LAW OFFICES MOYNIHAN AND MICHA
3	THE OLD BROWN CO./STORE	14	ALBERT THEATER
4	BURGESS SCHOOL	15	CITY HALL
5	MILL COMPLEX	16	B&M DEPOT
6	NORTHERN LIGHTS	17	FORMER KING SCHOOL
7	FIRST BAPTIST CHURCH	18	ANGEL GUARDIAN CHURCH
8	ST REGIS ACADEMY	19	ANGEL GUARDIAN SCHOOL
9	BERLIN FIRE STATION	20	BLAIS HOUSE
10	CITY LIBRARY	21	CONGREGATIONAL CHURCH (NRHP)
11	234-260 MAIN STREET	22	ST. ANNE CHURCH (NRHP)

0 450 900
Feet

Legend

━ Site Boundary

● Resources

● National Register Historic Places

▲ Recreation Areas

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LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Ortho Locus Map -
Site and Adjacent Structures

Scale: 1"= 800'

Source: 1) NH GRANIT, National Agricultural Imagery Program, 2003 2)Historic Graveyard, 1996
3) Office State Parks, Conservation Land, 1997 4) Historic Point Inventory, 1996
5) NH GRANIT, National Register Historic Places, 1994

Figure (c)(5)-1

Location: G:/GIS-Projects/L145-002 LaidlawBerlin/Wellesley/00.mxd/TransmissionLines.mxd

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Berlin, New Hampshire

Scale: 1"= 4,000'

Source: 1) NH GRANIT, National Agricultural Imagery Program, 2003

Ortho Locus Map -
Transmission Line ROWs

Figure
(g)(1)-1

Location: J:/L145-001 LLEG Berlin/GIS/00-mxd/locus8x11wutilitiesortho.mxd

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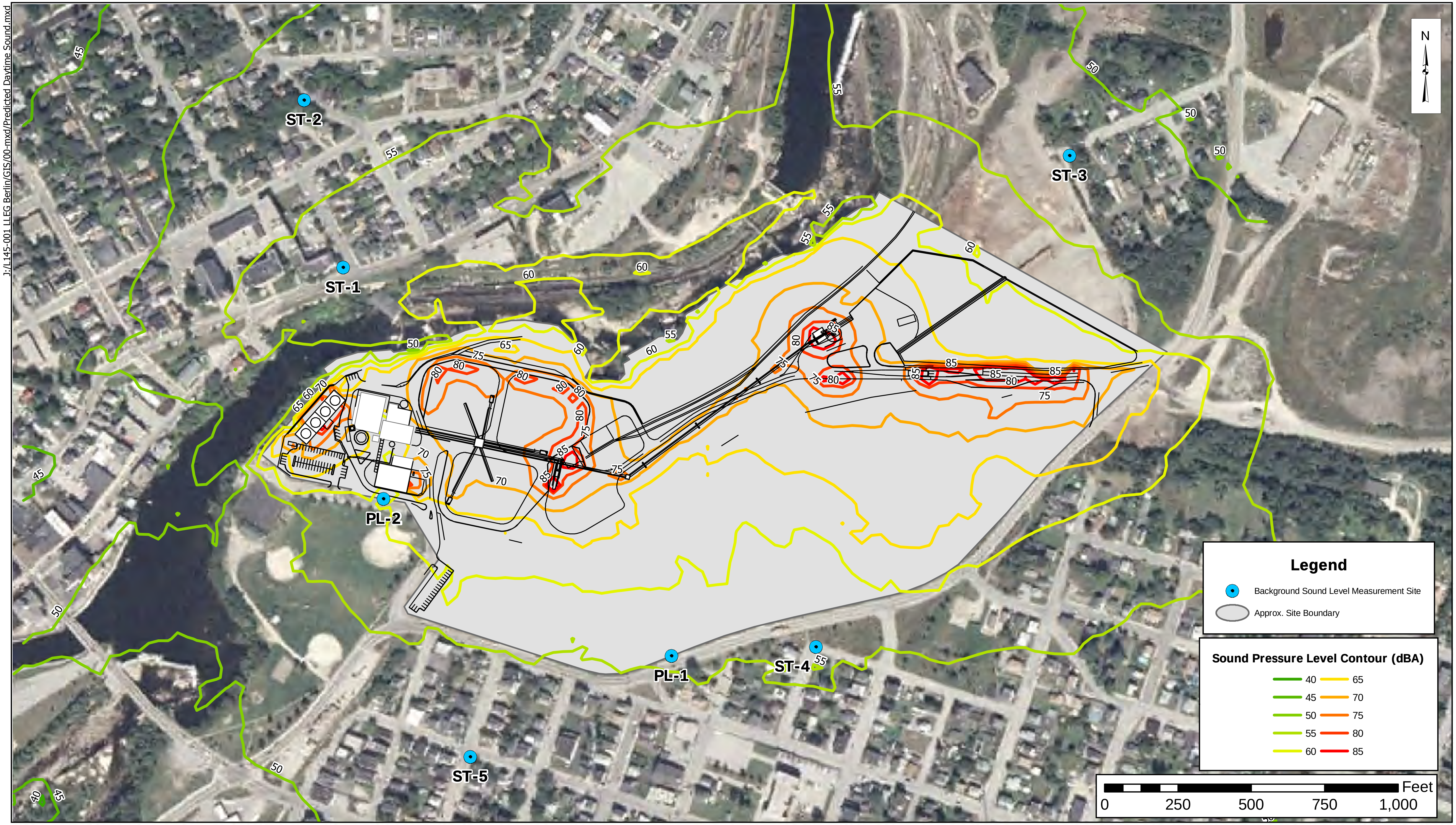
Berlin, New Hampshire

Electric Interconnection Route

Scale: 1" = 450'
Source: 1)NH GRANIT Ortho 1998
2) ESS, Site Boundary, 2009
3) ESS, Electric Interconnection, 2009

Figure (g)(1)-2

J:/L145-001 LLEG Berlin/GIS/00-mxd/Predicted Daytime Sound.mxd



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LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

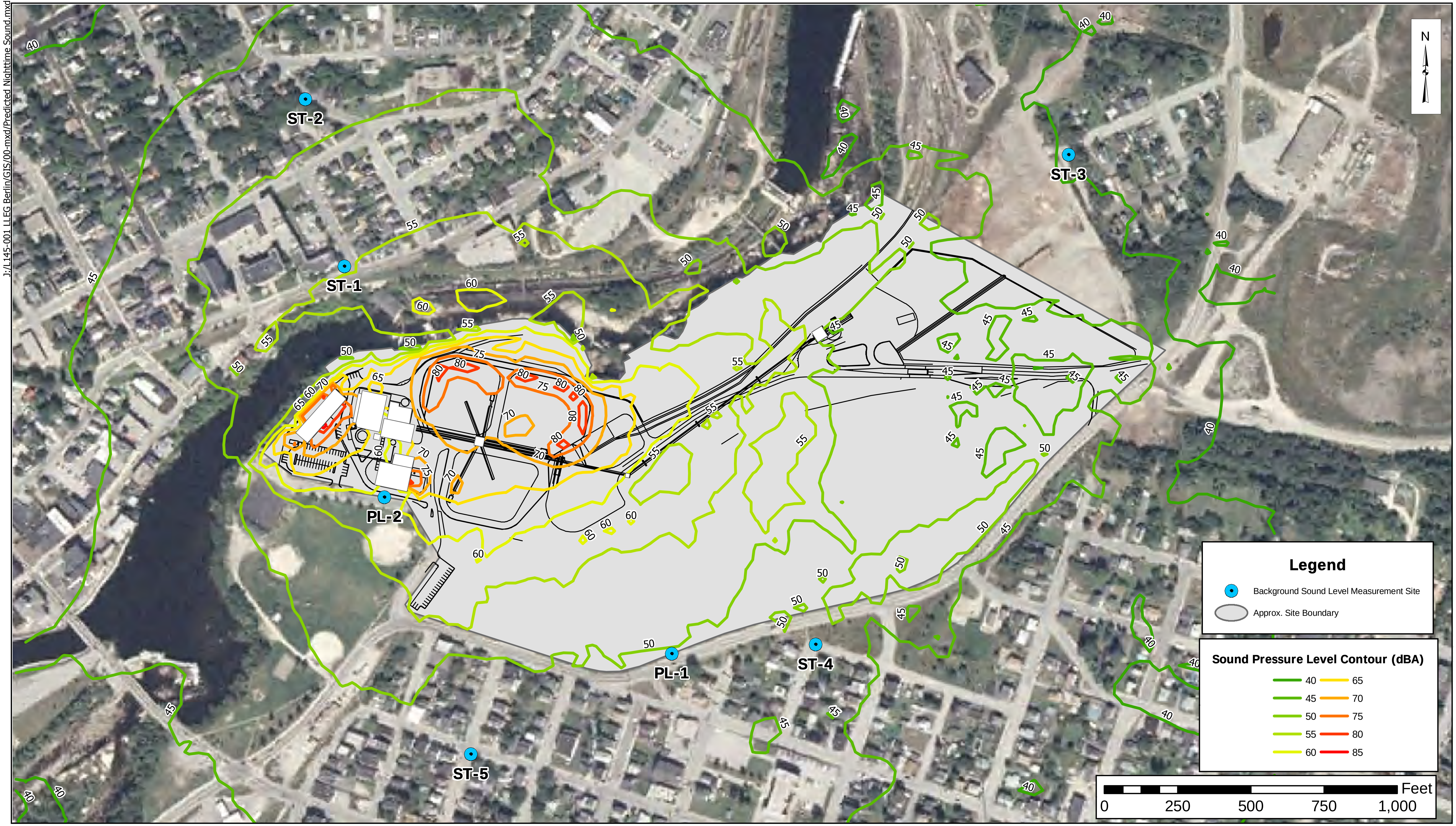
Scale: 1" = 300'

Source: 1) NHGRANIT, National Agricultural Imagery Program, 2003
2) ESS, Site Boundary, 2009 3) ESS, Noise Contours, 2009

Predicted Daytime Sound Pressure Levels

Figure
(h)(3)(ii)-1

J:/L145-001 LLEG Berlin/GIS/00-mxd/Predicted Nighttime Sound.mxd



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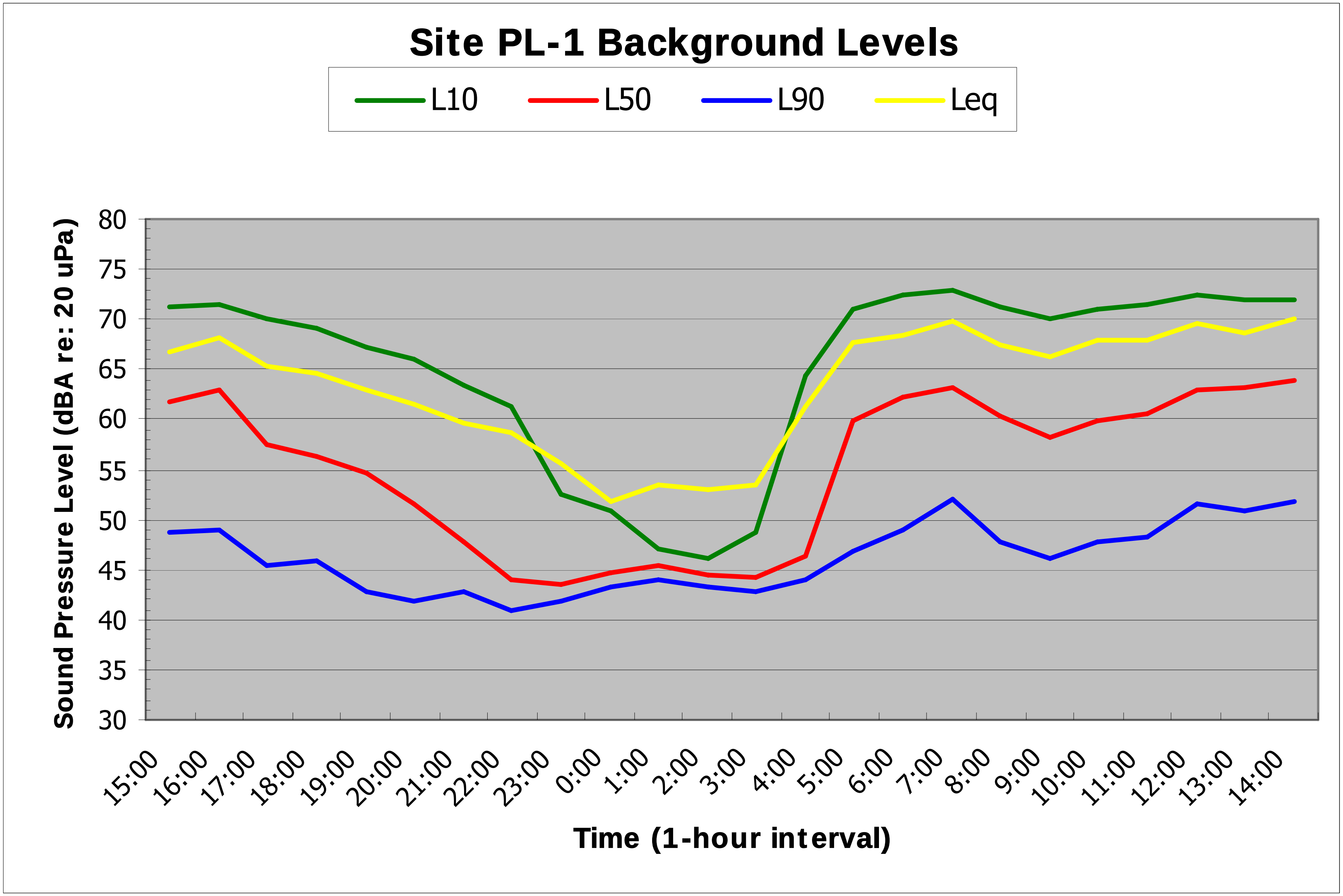
LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Scale: 1" = 300'

Source: 1) NHGRANIT, National Agricultural Imagery Program, 2003
2) ESS, Site Boundary, 2009 3) ESS, Noise Contours, 2009

Predicted Nighttime Sound Pressure Levels

Figure
(h)(3)(ii)-2



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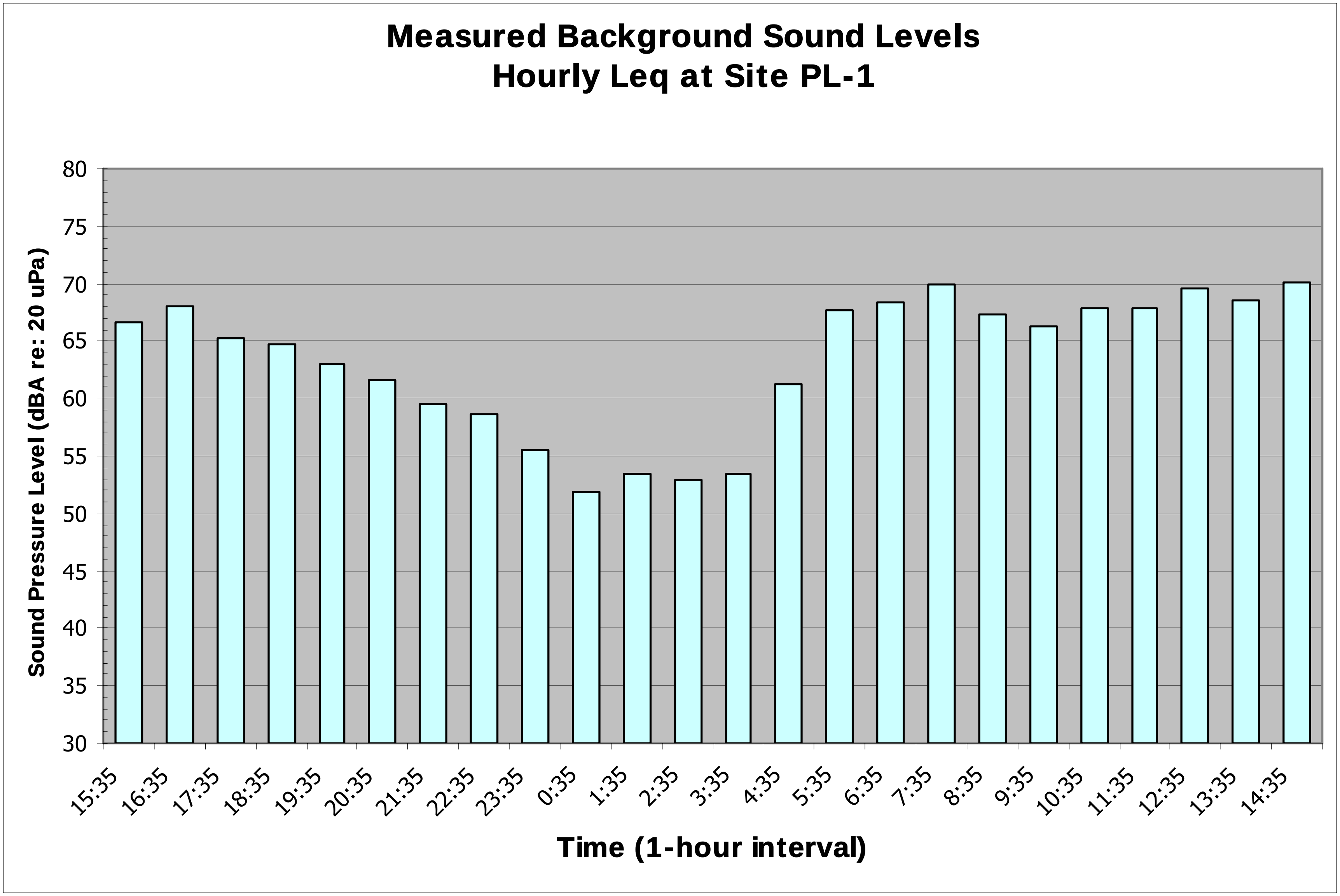
LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Background Sound Level Measurement Data
Property Line Site PL-1

Figure
(h)(3)(ii)-3



Measured Background Sound Levels
Hourly Leq at Site PL-1

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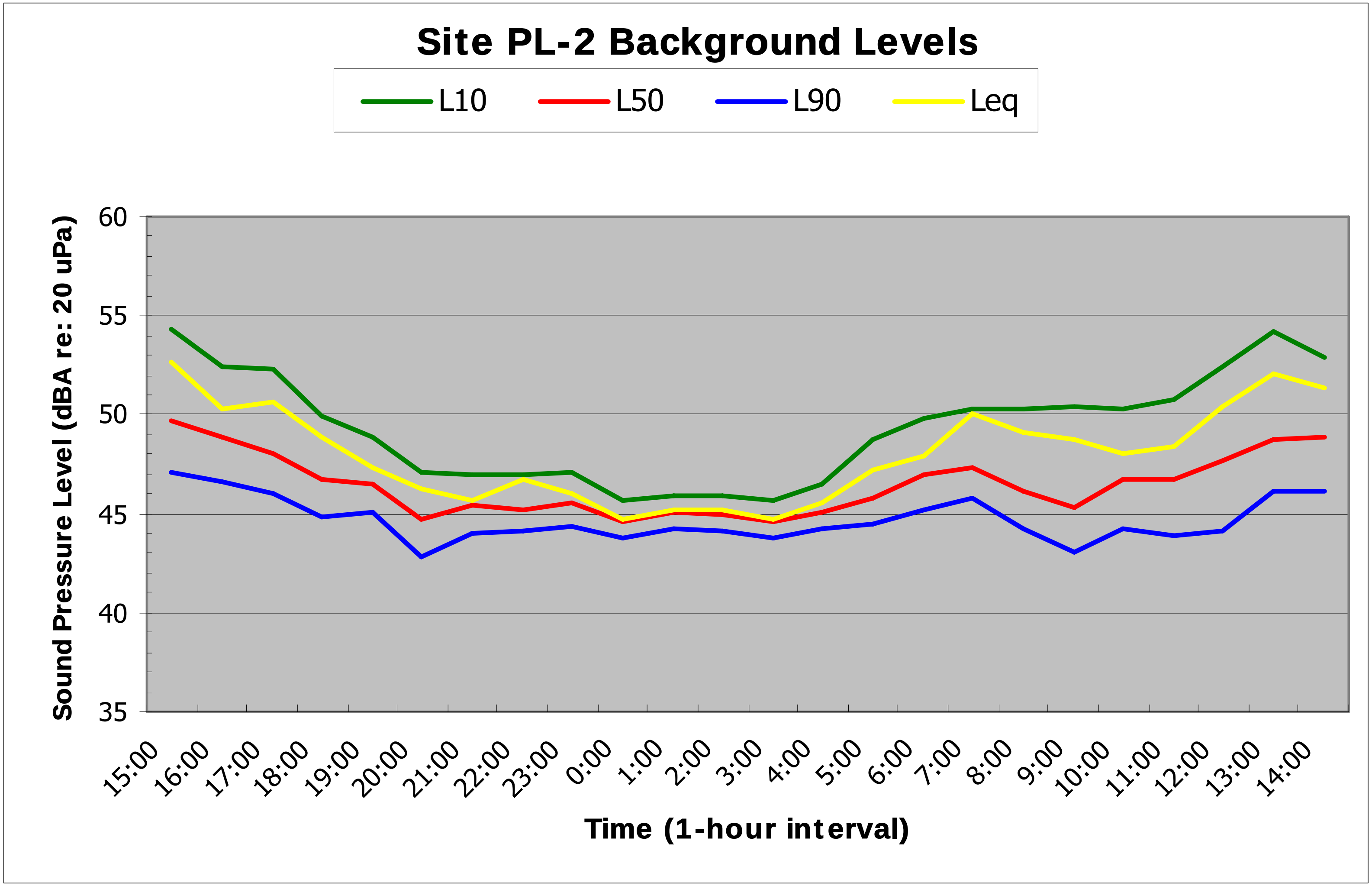
Berlin, New Hampshire

Background Sound Level Measurement Data
Property Line Site PL-1

Figure
(h)(3)(ii)-4



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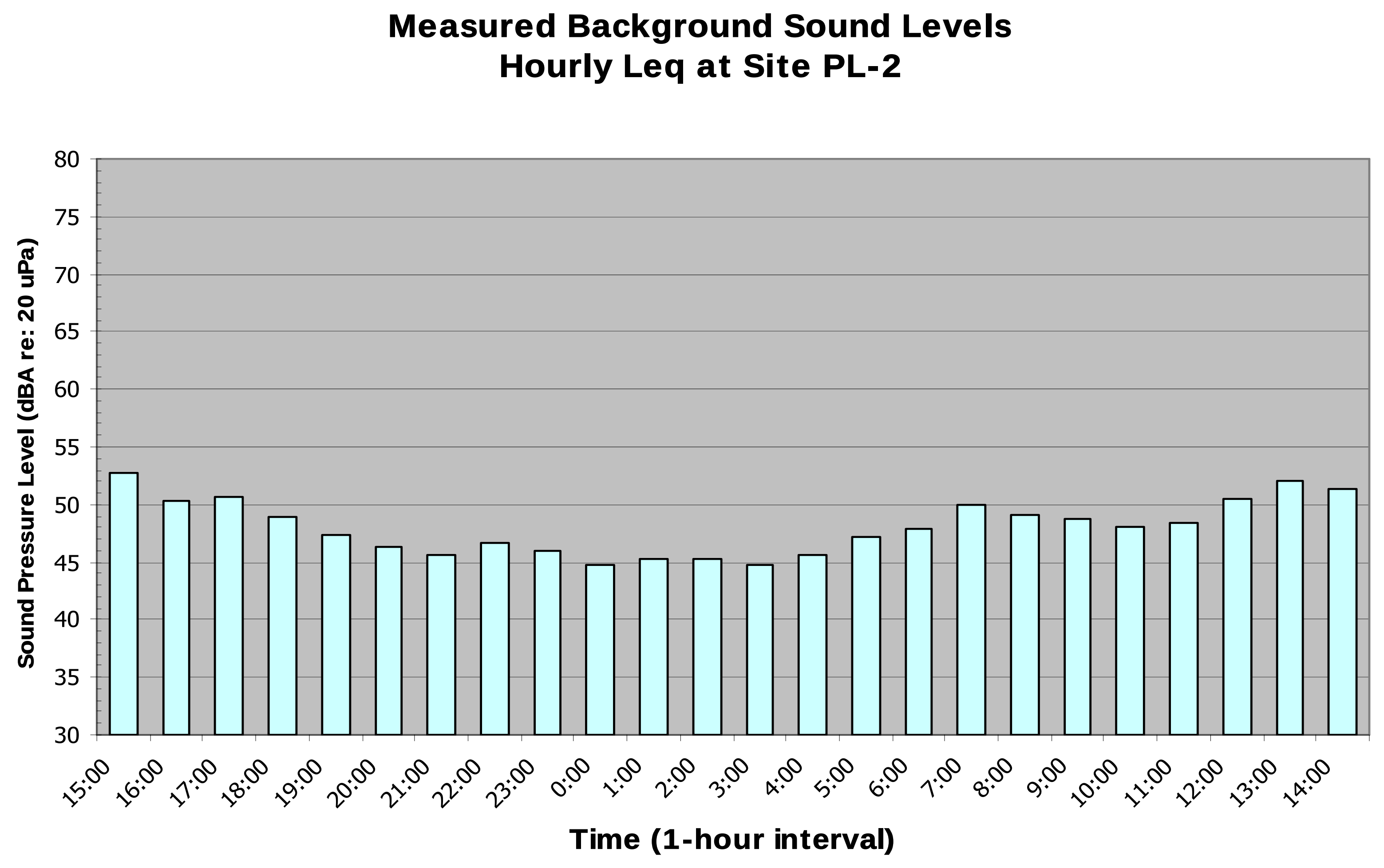
LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Background Sound Level Measurement Data
Property Line Site PL-2

Figure
(h)(3)(ii)-5



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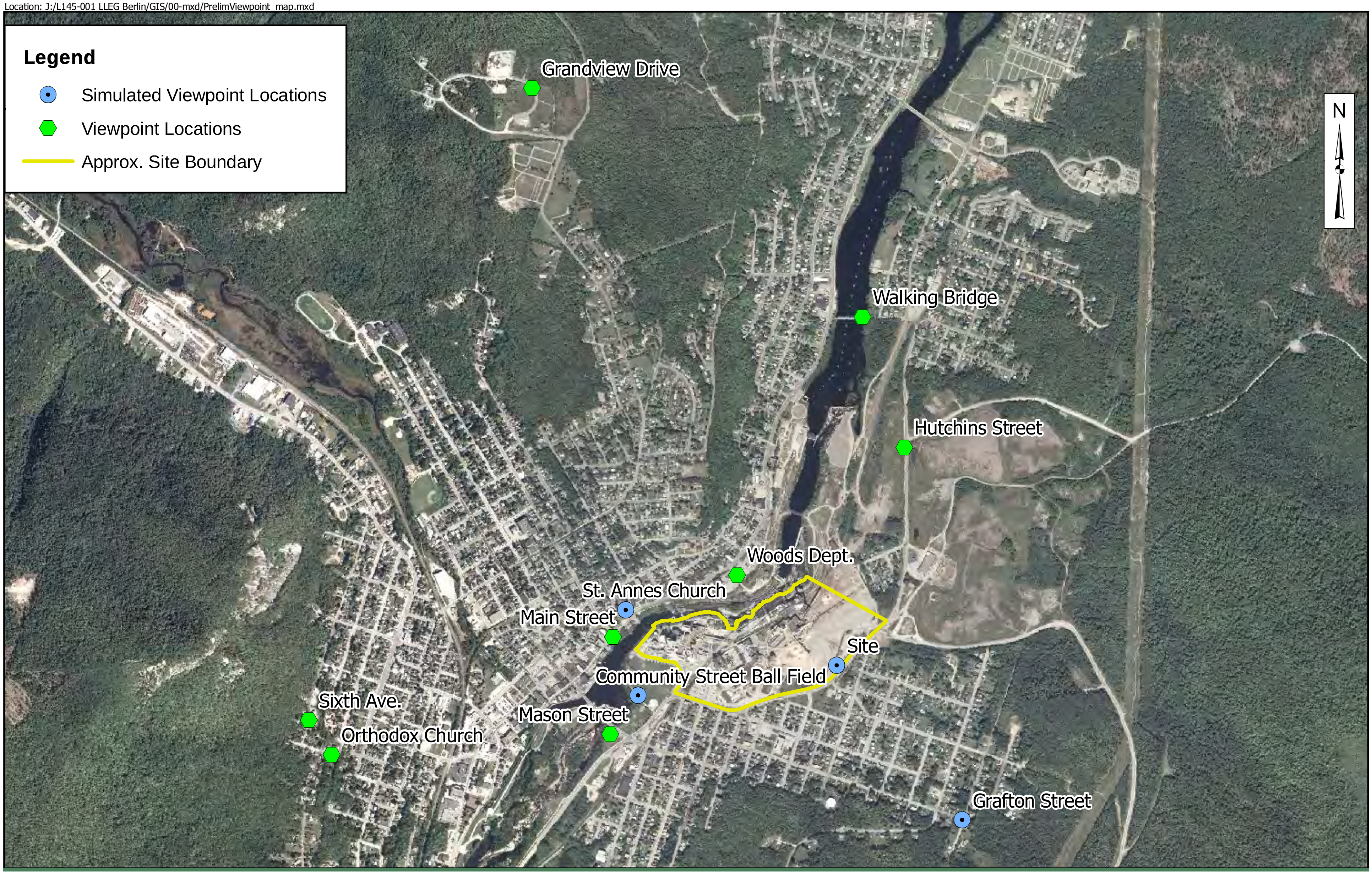
LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Background Sound Level Measurement Data
Property Line Site PL-2

Figure
(h)(3)(ii)-6

Location: J:/L145-001 LLEG Berlin/GIS/00-mxd/PrelimViewpoint_map.mxd



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LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Scale: 1" = 100'

0 1,000 Feet

Source: 1) New Hampshire GRANIT Ortho, 1998
2) ESS, Viewpoint Locations, 2009

Viewpoint Locations Map

Figure
(h)(3)(iv)-1

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LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions–
View From Community Street Ballfield

Figure
(h)(3)(iv) - 2

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LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Proposed Conditions–
Simulated View From Community Street
Ballfield

Figure
(h)(3)(iv) - 3

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Berlin, New Hampshire

Existing Conditions–
View From Main Street at St. Anne's Church

Figure
(h)(3)(iv) - 4

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Berlin, New Hampshire

Proposed Conditions–
Simulated View From Main Street at St. Anne's Church

Figure
(h)(3)(iv) - 5

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LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Proposed Conditions–
Simulated View From Main Street at St. Anne's Church
(Leaf On)

Figure
(h)(3)(iv) - 6

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LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions–
View From Grafton Street

Figure
(h)(3)(iv) - 7

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LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Proposed Conditions–
Simulated View From Grafton Street

Figure
(h)(3)(iv) - 8

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LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions–
View From Project Site

Figure
(h)(3)(iv) - 9

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Proposed Conditions–
Simulated View From Project Site

Figure
(h)(3)(iv) - 10

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Appendix A

Project Team Descriptions

Appendix A –
Project Team Descriptions

Berlin BioPower – Berlin, New Hampshire
Appendix A
Project Team Descriptions

Laidlaw Berlin BioPower, LLC

Laidlaw Berlin BioPower, LLC is the development entity that owns the project. Laidlaw Berlin BioPower, LLC is jointly owned by Laidlaw BioPower, LLC and Homeland Laidlaw Energy, LLC.

Laidlaw BioPower, LLC

Laidlaw BioPower, LLC an affiliate of Laidlaw Energy Group, Inc. is a developer of renewable energy projects. Laidlaw BioPower, LLC has extensive experience in the development, financing and operation of biomass generating facilities.

Homeland Laidlaw Energy, LLC

Homeland Laidlaw Energy, LLC ("HLE") is a joint venture company created by Homeland Renewable Energy Inc. and Laidlaw BioPower, LLC, an affiliate of Laidlaw Energy Group, Inc. HLE develops biomass energy plants throughout the Northeastern United States with the intention to expand across the country. The combination of Laidlaw's and Homeland's biomass energy development businesses brings together approximately 30 professionals focused on making HLE the leading supplier of biomass energy in North America. HLE is headquartered in New York, NY, and maintains offices or personnel in Pennsylvania, New Hampshire, Vermont, Maine and London, UK.

Homeland Renewable Energy, Inc.

Homeland Renewable Energy, Inc. ("HRE") is a developer, builder, owner and operator of biomass-fuelled power plants. HRE's first project in the U.S. was the 55-megawatt Fibrominn biomass power plant, located in Benson, Minnesota. Fibrominn began commercial operation in 2007 and is the first poultry-litter fueled power plant in the U.S.

ESS Group, Inc.

ESS Group, Inc ("ESS") is a full service, multi-media, environmental consulting and engineering firm with offices in Wellesley, Massachusetts and East Providence, Rhode Island. The firm is primarily responsible for all environmental related analyses and permitting for the proposed Project. ESS has been in business for over 20 years and has successfully licensed over 10,000 MW of fossil fuel and renewable energy generating facilities, along with overland and submarine transmission systems. Principals of ESS have provided expert testimony to numerous state and federal environmental agencies and energy facility licensing boards.

The McLane Law Firm

Founded in 1919, McLane is the largest and most diverse law firm in the state of New Hampshire. With more than 85 attorneys and more than 25 paralegals, their progressive approach has enabled them to work with all types of clients in New England and beyond. The firm regularly handles environmental matters for regional and national clients involving permitting, compliance counseling, auditing, and defense of administrative and judicial enforcement actions. McLane has done substantial work supporting the development of energy projects and has extensive experience in the EFSEC permitting process.

Waldron Engineering, Inc.

Waldron Engineering, Inc. was founded in 1992 provides consulting engineering services to the merchant power industry. Waldron has over 200 clients and executed over 600 projects, including numerous biomass energy generating facilities. Waldron is providing engineering consulting services with respect to the Project's equipment design, layout and balance of plant integration.

The Babcock & Wilcox Company

The Babcock and Wilcox Company ("B&W") is the world's leading boiler manufacturer and has successfully converted recovery boilers to state-of-the-art bubbling fluidizing bed combustion technology that is specifically designed to efficiently burn clean biomass. B&W also has extensive experience in supplying pollution control equipment to meet stringent low emission standards such as NH's Renewable Portfolio Standards. B&W is responsible for the existing boiler conversion and emissions control systems for the Project.

Stantec Engineering, Inc.

Stantec Engineering Inc. ("Stantec") is a global leader in wastewater engineering with specialized expertise in advanced wastewater conveyance and treatment technologies. They have designed more than 1,000 wastewater treatment plants worldwide with capacities up to 216 million gallons per day. Stantec is providing engineering design support for the Project's water supply and wastewater treatment systems.

Appendix B

Site Plan Set

Appendix B – Site Plan Set

SITE PLANS

for the
New Hampshire Energy Facility Site Evaluation Committee

LAIDLAW BERLIN BIOPOWER, LLC
HUTCHINS STREET
BERLIN, NEW HAMPSHIRE

December 15, 2009

PREPARED BY:

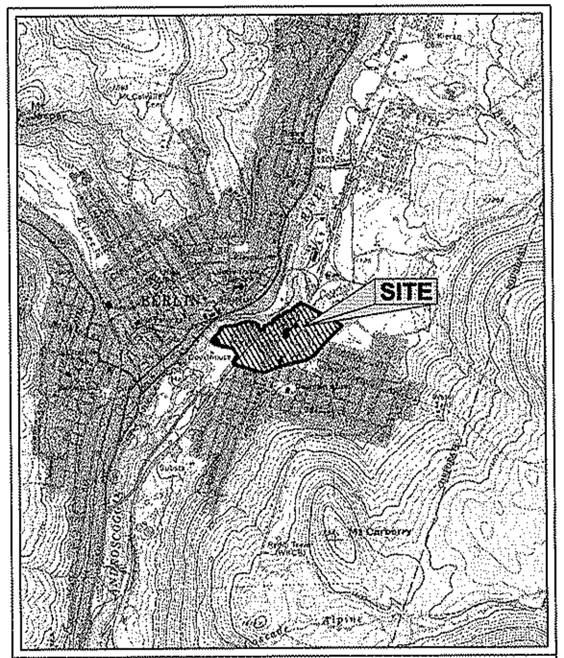
ESS Group, Inc.

Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

INDEX OF DRAWINGS

SHEET NO.	DRAWING NAME	DESCRIPTION
1		COVER SHEET
2	NO	GENERAL NOTES
3	EX	EXISTING CONDITIONS PLAN
4	ES	SOIL EROSION AND SEDIMENTATION CONTROL PLAN
5	DE	SITE PREPARATION & DEMOLITION PLAN
6	LM-0	OVERALL SITE LAYOUT & MATERIALS PLAN
7 - 9	LM-1, 2, 3	SITE LAYOUT & MATERIALS PLAN
10	GD-0	OVERALL SITE GRADING AND DRAINAGE PLAN
11 - 13	GD-1, 2, 3	SITE GRADING AND DRAINAGE PLAN
14	UT-0	OVERALL SITE UTILITIES PLAN
15 - 17	UT-1, 2, 3	SITE UTILITIES PLAN
18 - 19		SITE LIGHTING PLAN (BY WALDRON)
20 - 22	DS-1, 2, 3	DETAIL SHEETS



LOCATION MAP

SCALE: 1"=2000'±
SOURCE: USGS

APPLICANT

Laidlaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

Laidlaw Energy

IN ASSOCIATION WITH

York Land Services, LLC
Waldron Engineering & Construction, INC.

JANET C. BERNARDO
No. 11865

Janet Bernardo
12-15-09

FOR PERMITTING PURPOSES ONLY

GENERAL/SURVEY NOTES:

1. EXISTING CONDITIONS OBTAINED FROM SITE PLAN ENTITLED "ALTA/ACSM LAND TITLE SURVEY PREPARED FOR LAIDLAW BERLIN BIOPOWER, LLC" PREPARED BY YORK LAND SERVICES, LLC, DATED JUNE 2, 2008. SCALE: 1"=200'.
2. THE VERTICAL DATUM IS NGVD 29, NH STATE PLANE. EXISTING TOPOGRAPHY BASED ON A AERIAL SURVEY.
3. WETLAND DELINEATION WAS PERFORMED BY ESS GROUP, INC. ON MAY 13–14, 2009.
4. ALL OF LOCUS PROPERTY(S) IS LOCATED IN INDUSTRIAL/BUSINESS ZONE.
5. FLOOD INFORMATION BASED UPON FLOOD INSURANCE RATE MAP FOR THE CITY OF BERLIN. COMMUNITY PANEL #330029 0017 B, EFFECTIVE DATE JUNE 15, 1982.

SEDIMENTATION & SOIL EROSION CONTROL NOTES:

1. ALL SEDIMENTATION & SOIL EROSION CONTROLS SHALL BE PLACED PRIOR TO ANY CONSTRUCTION OR EARTH MOVING ACTIVITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING EROSION CONTROL MEASURES IN ORDER TO PREVENT OFF–SITE TRACKING OF EARTH, SEDIMENT AND DEBRIS. EROSION CONTROL MEASURES SHALL BE INSPECTED EVERY WEEK, AND DURING AND AFTER EVERY RAIN EVENT. ANY NECESSARY REPLACEMENT OR REPAIR SHALL BE PERFORMED PROMPTLY BY THE CONTRACTOR.
2. ALL AREAS SHALL BE STABILIZED WITHIN 30 DAYS OF INTIAL DISTURBANCE. AN AREA SHALL BE CONSIDERED STABILIZED IF ONE OF THE FOLLOWING HAS OCCURED:
   - BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED.
   - A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED.
   - A MINIMUM OF 3" OF NON–EROSIVE MATERIAL SUCH AS STONE OR RIP–RAP HAS BEEN INSTALLED.
   - OR, EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
3. ALL DISTURBED AREAS NOT OCCUPIED BY PAVEMENT, SIDEWALK OR RIPRAP SHALL BE COVERED WITH 6" (MIN.) OF LOAM AND SEED.
4. PERMANENT SEEDING SHALL OCCUR BETWEEN APRIL 1 AND JUNE 1, OR BETWEEN AUGUST 15 AND SEPTEMBER 15.
5. SOILS TO BE STOCKPILED FOR A PERIOD OF MORE THAN 30 DAYS SHALL BE SURROUNDED BY EROSION CONTROL BARRIERS AND TEMPORARILY SEEDED AND MULCHED.
6. ALL LOAM STOCKPILE AREAS SHALL BE SURROUNDED BY EROSION CONTROL BARRIERS UNTIL SUCH TIME AS THE LOAM IS RESPREAD AND STABILIZED.
7. TEMPORARY STORAGE OF MATERIALS ON–SITE IS TO BE LOCATED GREATER THAN 100 FEET FROM WETLAND AREAS, AND AS DIRECTED BY THE ENGINEER. THERE IS TO BE NO LONG TERM STORAGE OF MATERIAL ON–SITE. MATERIAL NOT USED ON–SITE IS TO BE TRUCKED TO AN ACCEPTABLE OFF–SITE DISPOSAL LOCATION.
8. EROSION CONTROL BLANKETS SHALL BE PLACED IN ALL TREATMENT SWALES AND ON ALL SLOPES 2:1 OR STEEPER, AS SHOWN ON THE PLANS AND IN ACCORDANCE WITH THE DETAILS.
9. TREATMENT SWALES AND DETENTION BASINS SHALL BE INSTALLED EARLY ON IN THE CONSTRUCTION SEQUENCE (BEFORE ROUGH GRADING THE SITE).
10. TREATMENT SWALES AND DETENTION BASINS SHALL BE PERMANENTLY STABILIZED WITH VEGETATION PRIOR TO DIRECTING RUNOFF THROUGH THE DRAINAGE SYSTEM.
11. DUST SHALL BE CONTROLLED AS NECESSARY THROUGH THE USE OF WATER, THE USE OF CALCIUM CHLORIDE FOR DUST CONTROL IS NOT ALLOWED, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
12. THE CONTRACTOR SHALL PHASE SITE CONSTRUCTION TO MINIMIZE THE AREA OF DISTURBED EARTH OPEN TO THE ELEMENTS AT ANY GIVEN TIME. THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION, BUT IN NO CASE SHALL EXCEED 5 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED. THIS SHALL BE ACHIEVED BY THE FOLLOWING METHODS OR OTHER BEST MANAGEMENT PRACTICES (BMP'S):
   A. LOAMING AND SEEDING CUT SLOPES IMMEDIATELY UPON COMPLETION OF SUBGRADE PREPARATION.
   B. PLACING AND COMPACTING GRAVEL BASE AND SUBBASE IMMEDIATELY UPON COMPLETION OF SUBGRADE PREPARATION.
   C. LIMITING STRIPPING AND STOCKPILING OF LOAM TO AREAS SLATED FOR IMMEDIATE CONSTRUCTION AND STABILIZATION (I.E., PLACEMENT OF GRAVELS, LOAM AND SEED, BUILDING PAD, EROSION CONTROL MATTING, ETC.).
13. ALL ROADWAY & PARKING LOTS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
14. ALL CUT & FILL SLOPES SHALL BE SEEDED/LOAMED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
15. ALL PROPOSED VEGETATED AREAS THAT DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHOR NETTING ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.
16. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
17. AFTER NOVEMBER 15, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3.

UTILITY NOTES:

1. THE CONTRACTOR SHALL CALL "DIG SAFE" AT 1–888–344–7233 AT LEAST 72 HOURS PRIOR TO EXCAVATION.
2. CONTRACTOR SHALL NOTIFY ALL APPROPRIATE AGENCIES AND UTILITY COMPANIES, IN WRITING, 48 HOURS PRIOR TO ANY CONSTRUCTION WITHIN 10 FEET OF A UTILITY LINE.
3. THE LOCATIONS OF UTILITIES SHOWN HEREON ARE THE RESULT OF SURFACE EVIDENCE AS LOCATED BY FIELD SURVEY, PLANS OF RECORD AND OTHER AVAILABLE SOURCES. THIS PLAN DOES NOT NECESSARILY DEPICT THE EXACT LOCATION OF THESE UTILITIES AND MAY NOT SHOW ALL OF THE UTILITIES WHICH EXIST WITHIN THE PREMISES SURVEYED. THE LOCATIONS AND ELEVATIONS OF ALL EXISTING UTILITIES SHALL BE CONSIDERED APPROXIMATE AND MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO ANY UTILITY CONNECTIONS OR CROSSINGS OF PROPOSED OR EXISTING UTILITIES. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER. THE CONTRACTOR SHALL CONTACT THE RESPECTIVE UTILITY COMPANIES RELATIVE TO THE LOCATIONS AND ELEVATIONS OF THESE LINES. THE CONTRACTOR IS RESPONSIBLE FOR HIS/HER OWN DETERMINATION AS TO THE TYPE AND LOCATION OF THE EXISTING UTILITIES AS MAY BE NECESSARY TO AVOID THEIR DAMAGE AND TO FACILITATE THE PROPOSED CONNECTION(S).
4. ALL UTILITY CONNECTIONS ARE SUBJECT TO THE APPROVAL OF AND GRANTING OF PERMITS BY, THE CITY OF BERLIN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SEE THAT ALL PERMITS AND APPROVALS ARE OBTAINED.
5. BEFORE STARTING CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MAKING ALL NECESSARY ARRANGEMENTS AND FOR PERFORMING ANY NECESSARY WORK INVOLVED IN CONNECTION WITH THE DISCONTINUANCE OR JURISDICTION OF THE UTILITY COMPANIES, SUCH AS ELECTRICITY, TELEPHONE, WATER, AND ANY SYSTEM OR SYSTEMS WHICH WILL BE AFFECTED BY THE WORK TO BE PERFORMED UNDER THIS CONTRACT.
6. CONSTRUCTION SHALL NOT INTERFERE WITH OR INTERRUPT UTILITIES WHICH ARE TO REMAIN IN OPERATION.
7. THE CONTRACTOR SHALL EXERCISE EXTREME CARE WHEN EXCAVATING NEAR AND BACKFILLING IN THE VICINITY OF EXISTING UTILITIES, INCLUDING THE USE OF HAND EXCAVATION WHERE APPROPRIATE.
8. ALL EXISTING PIPING AND STRUCTURES EXPOSED DURING EXCAVATION SHALL BE ADEQUATELY SUPPORTED, BRACED, OR OTHERWISE PROTECTED DURING CONSTRUCTION ACTIVITIES.
9. ALL WATER MAINS AND SANITARY FORCE MAINS SHALL BE INSTALLED AT A MINIMUM DEPTH OF 5 FEET FROM THE TOP OF THE PIPE. UNLESS OTHERWISE NOTED, PIPE TO BE INSTALLED AT LESS THAN 5 FEET OF COVER SHALL BE INSULATED USING MATERIALS AND METHODS APPROVED BY THE ENGINEER.
10. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
11. UNLESS OTHERWISE NOTED, A MINIMUM HORIZONTAL CLEARANCE OF 10 FEET SHALL BE MAINTAINED BETWEEN WATER AND SEWER LINES.
12. WHEN THE PROPOSED SEWER LINE MUST BE INSTALLED ABOVE AN EXISTING OR PROPOSED WATER MAIN, A MINIMUM OF 18 INCH VERTICAL CLEARANCE SHALL BE PROVIDED BETWEEN THE PIPES. THE PROPOSED SEWER LINE SHALL BE ALIGNED SO THAT THE LENGTH OF THE PIPE SECTION IS CENTERED ON THE WATER LINE. IF MINIMUM VERTICAL CLEARANCE CANNOT BE OBTAINED, THE CONTRACTOR SHALL ENCASE THE SEWER LINE WITH CEMENT CONCRETE FOR A DISTANCE OF 10 FEET IN EITHER DIRECTION OF THE CROSSING.
13. ALL DRAINAGE PIPES SHALL BE HIGH–DENSITY POLYETHYLENE UNLESS OTHERWISE NOTED.
14. IF REQUIRED BY THE CONTRACTOR, OVERHEAD LINES SHALL BE RELOCATED BY THE UTILITY COMPANY AT THE CONTRACTOR'S EXPENSE.

CONSTRUCTION NOTES:

1. LIMITS OF WORK HAVE BEEN SET ON THE DRAWINGS; HOWEVER, THESE MAY BE EXTENDED OR REDUCED AT THE DISCRETION OF THE ENGINEER TO MEET WITH FIELD CONDITIONS.
2. THE CONTRACTOR SHALL, UNDER THE DIRECTION OF THE OWNER, ESTABLISH "CONSTRUCTION LIMITS" ON THE SITE BY ACCEPTABLE VISIBLE MARKERS. ALL WORK AND EQUIPMENT SHALL BE CONFINED TO WITHIN THESE LIMITS, UNLESS OTHERWISE SPECIFICALLY AUTHORIZED.
3. NO CHANGES ARE TO BE MADE UNLESS AUTHORIZED BY THE DESIGN ENGINEER AND APPLICANT/OWNER.
4. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL SAFETY CODES, REGULATIONS, LEGAL REQUIREMENTS, PERMIT CONDITIONS, ETC.
5. THE CONTRACTOR SHALL TAKE ADEQUATE PRECAUTIONS TO PROTECT ALL WALKS, STREETS, PAVEMENTS, HIGHWAY GUARDS, CURBING, EDGING, TREES AND PLANTINGS ON OR OFF THE PREMISES, AND SHALL REPAIR AND REPLACE OR OTHERWISE MAKE GOOD AT HIS/HER OWN EXPENSE AS DIRECTED BY THE ENGINEER ANY ITEMS DAMAGED AS A RESULT OF THE CONTRACTOR'S WORK.
6. THE CONTRACTOR SHALL REMOVE FROM THE PROJECT SITE ALL STUMPS, RUBBISH, MANMADE FEATURES AND DEBRIS FOUND THEREON. UNLESS OTHERWISE NOTED STORAGE OF SUCH MATERIALS ON THE PROJECT SITE WILL NOT BE PERMITTED. ALL MATERIALS TO BE REMOVED SHALL BE DISPOSED OR RECYCLED IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS. THE CONTRACTOR SHALL LEAVE THE PROJECT SITE IN SAFE AND CLEAN CONDITION UPON COMPLETION OF THE SITE WORK.
7. THE CONTRACTOR SHALL PROVIDE ADEQUATE BRACING AND SHORING OF ALL EXCAVATIONS IN ACCORDANCE WITH THE REQUIREMENTS OF ALL GOVERNING CODES AND REGULATIONS.
8. ALL SURFACES DISTURBED BY THIS WORK SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AS DETAILED OR AS SPECIFIED BY THE ENGINEER.
9. CONSTRUCTION SEQUENCE SHALL BE COORDINATED TO MINIMIZE DISTURBANCE OF EXISTING CONDITIONS AND OPERATIONS.
10. ALL NECESSARY FEES AND PERMITS SHALL BE OBTAINED AND PAID FOR BY THE CONTRACTOR.
11. WHERE NEW PAVEMENT MEETS EXISTING PAVEMENT (INCLUDING DRIVEWAYS), SAW CUT EXISTING PAVEMENT AS SHOWN ON THE DETAILS. SAW CUTS SHALL BE SMOOTH AND STRAIGHT. WHERE NEW BITUMINOUS CONCRETE MEETS EXISTING BITUMINOUS CONCRETE SURFACES, SAW CUT EDGES ARE TO BE SEALED WITH BITUMEN AND BACKSANDED.
12. WORK WITHIN PUBLIC WAYS SHALL COMPLY WITH APPLICABLE MUNICIPAL AND STATE REQUIREMENTS.
13. A PERMEABLE HIGH–STRENGTH POLYESTER GEOTEXTILE FABRIC SHALL BE PLACED BENEATH ACCESS ROADS, PARKING AREAS, FUEL PILE AREAS AND STORAGE AREAS WHICH ARE TO BE LOCATED IN AREAS WHERE BUILDING DEBRIS/RUBBLE WILL NOT REMAIN IN ITS ENTIRETY.
14. AN IMPERMEABLE GEOMEMBRANE –POLYETHYLENE LINER SHALL BE PLACED BENEATH ANY STORMWATER DETENTION FACILITY OR DRAINAGE SWALE.

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DESIGNED BY: DJG	APPROVED BY: JCB

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Berlin, NH

GENERAL NOTES

PROJECT No.: L145-004	DRAWING No.
DATE OF ISSUE: 12/15/09	**NO**
SHEET No.: 2 of 22	
SCALE: N/A	

DATE: Dec. 14, 2009 - 2:51PM
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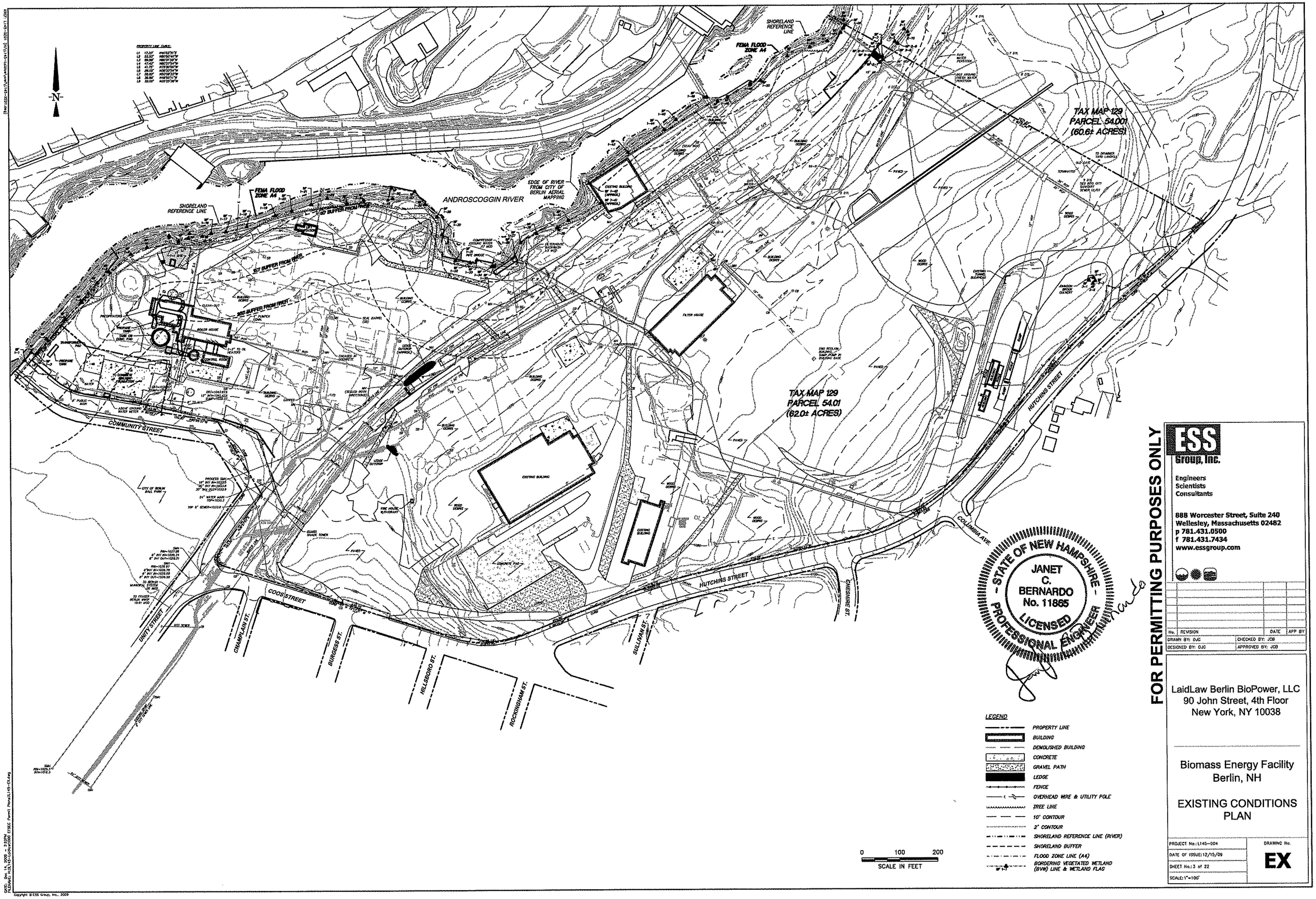

PROPERTY LINE TABLE

L1	17.33'	N46°53'51"E
L2	53.02'	N80°56'40"W
L3	89.36'	N80°29'39"W
L4	47.43'	N80°27'54"W
L5	41.75'	N73°30'00"W
L6	26.05'	N38°37'04"W
L7	58.62'	N50°08'33"W
L8	36.86'	N46°33'11"W
L9	33.00'	N43°25'36"W

LEGEND

▬ ‒ ‒ ▬	PROPERTY LINE
▭	BUILDING
‒ ‒ ‒	DEMOLISHED BUILDING
▨	CONCRETE
▨	GRAVEL PATH
■	LEDGE
‒•‒•‒	FENCE
‒ ‒ ‒	OVERHEAD WIRE & UTILITY POLE
‿‿‿	TREE LINE
‒ ‒ ‒	10' CONTOUR
‒ ‒ ‒	2' CONTOUR
‒ · · ‒	SHORELAND REFERENCE LINE (RIVER)
‒ ‒ ‒	SHORELAND BUFFER
‒ · ‒	FLOOD ZONE LINE (A4)
‒ · ‒ WF 1-1	BORDERING VEGETATED WETLAND (BVW) LINE & WETLAND FLAG

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EXISTING CONDITIONS PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 3 of 22
SCALE: 1"=100'
DRAWING No.
EX

DATE: Dec 14, 2009 - 2:52PM
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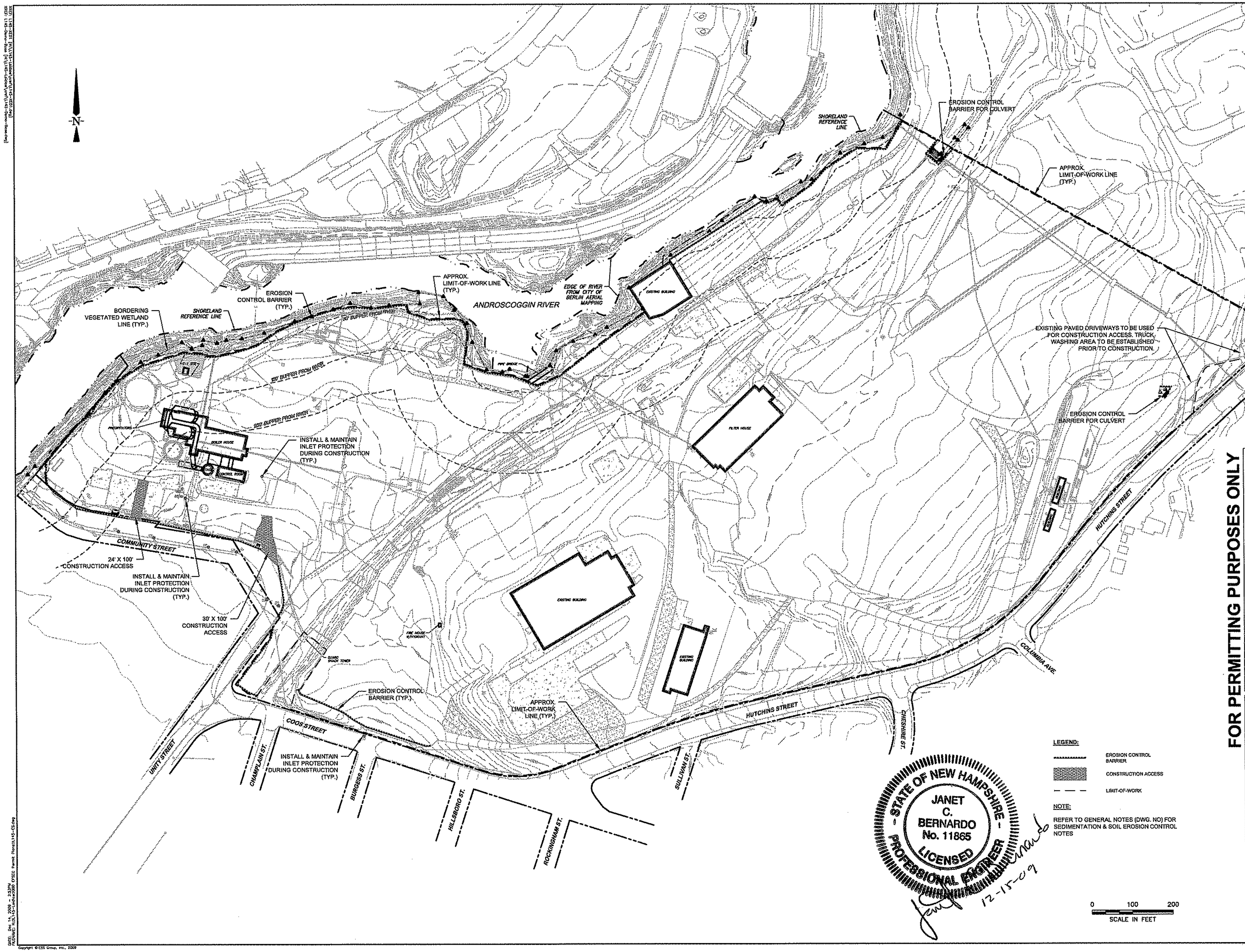

LEGEND:

┄┄┄	EROSION CONTROL BARRIER
▨	CONSTRUCTION ACCESS
— — —	LIMIT-OF-WORK

NOTE:

REFER TO GENERAL NOTES (DWG. NO) FOR SEDIMENTATION & SOIL EROSION CONTROL NOTES

0 100 200
SCALE IN FEET

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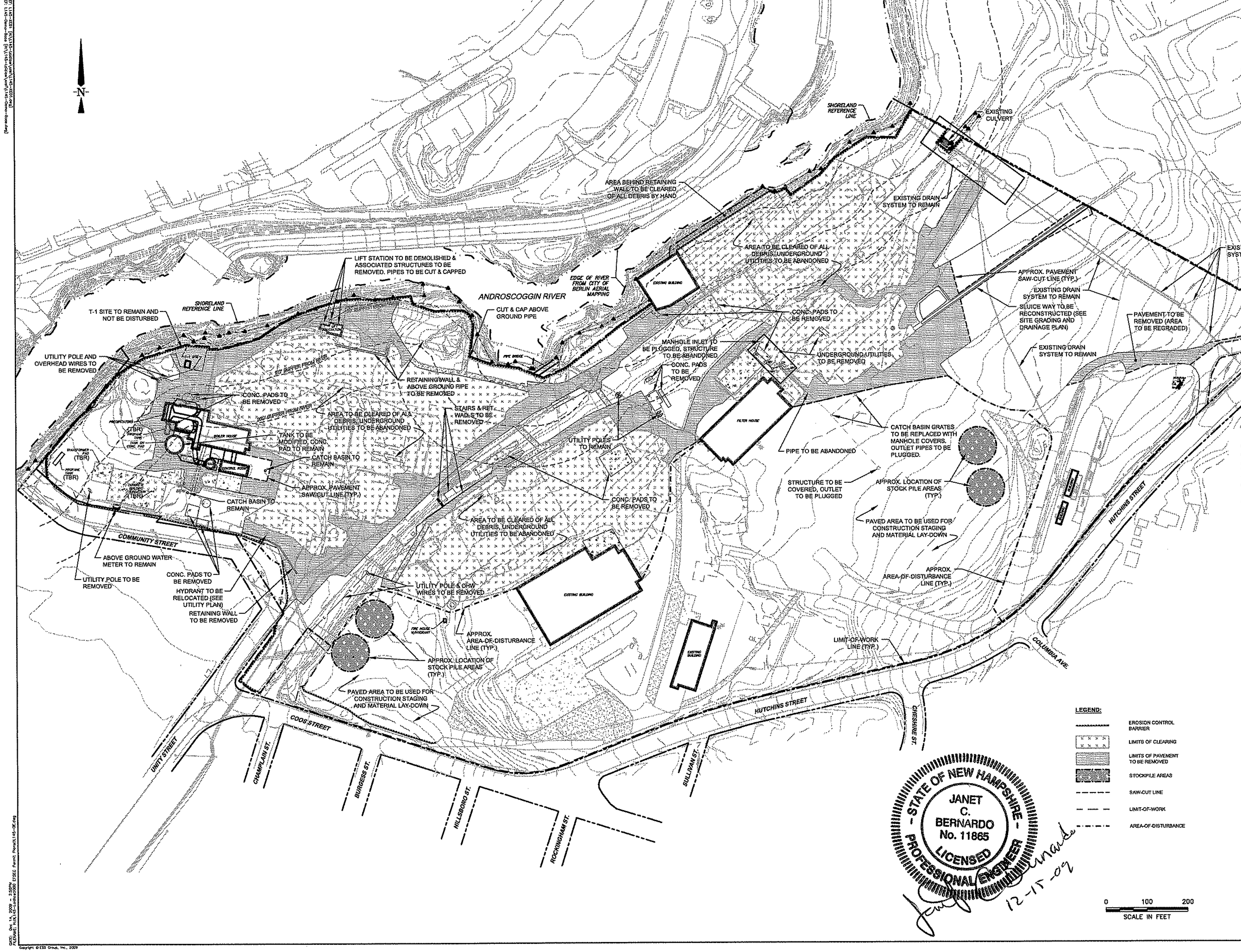
SOIL EROSION & SEDIMENTATION
CONTROL PLAN

PROJECT No.: L145-004	DRAWING No.
DATE OF ISSUE: 12/15/09	**ES**
SHEET No.: 4 of 22	
SCALE: 1" = 100'	



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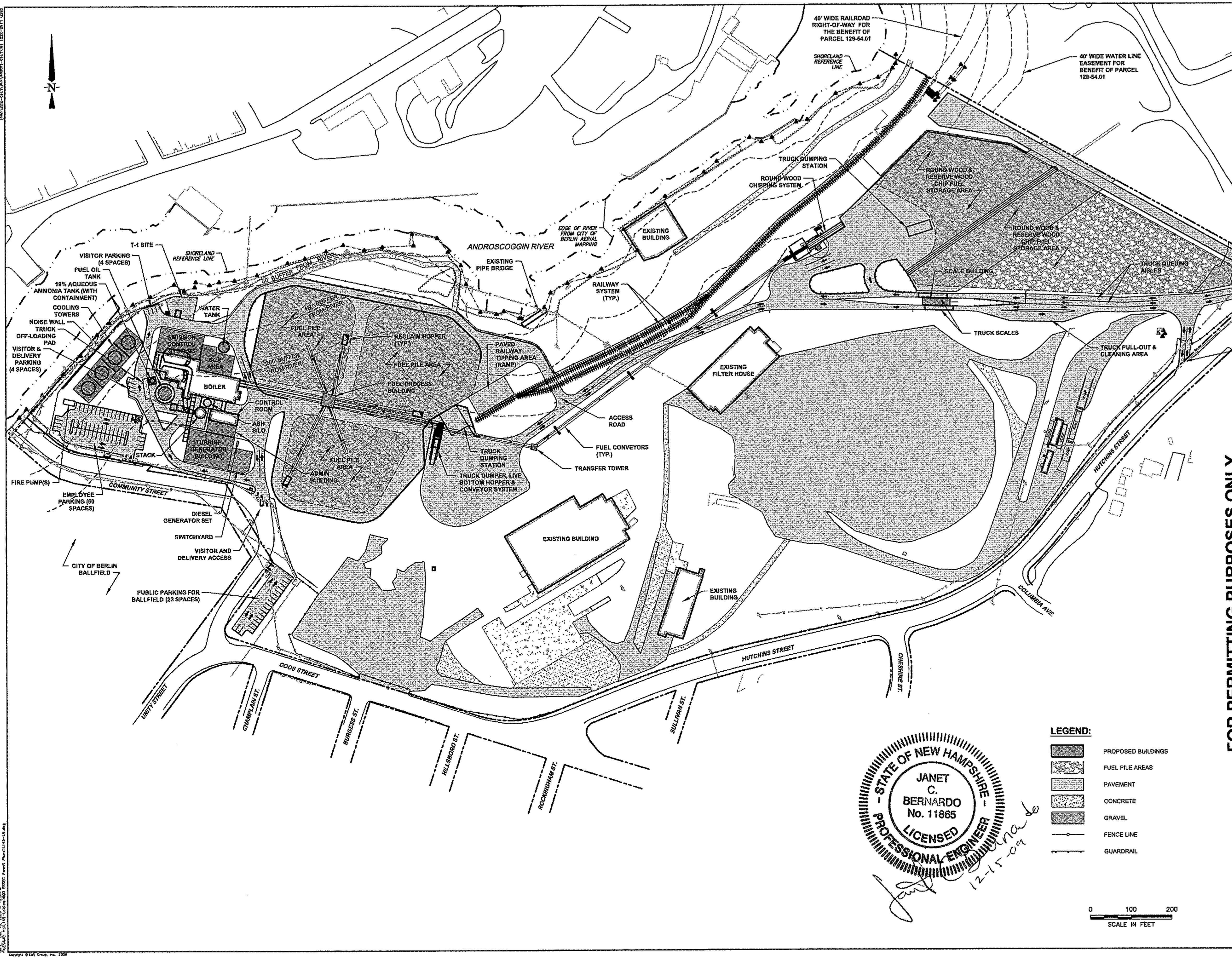
SITE PREPARATION &
DEMOLITION PLAN

PROJECT No.: L145-004	DRAWING No.
DATE OF ISSUE: 12/15/09	**DE**
SHEET No.: 5 of 22	
SCALE: 1"=100'	



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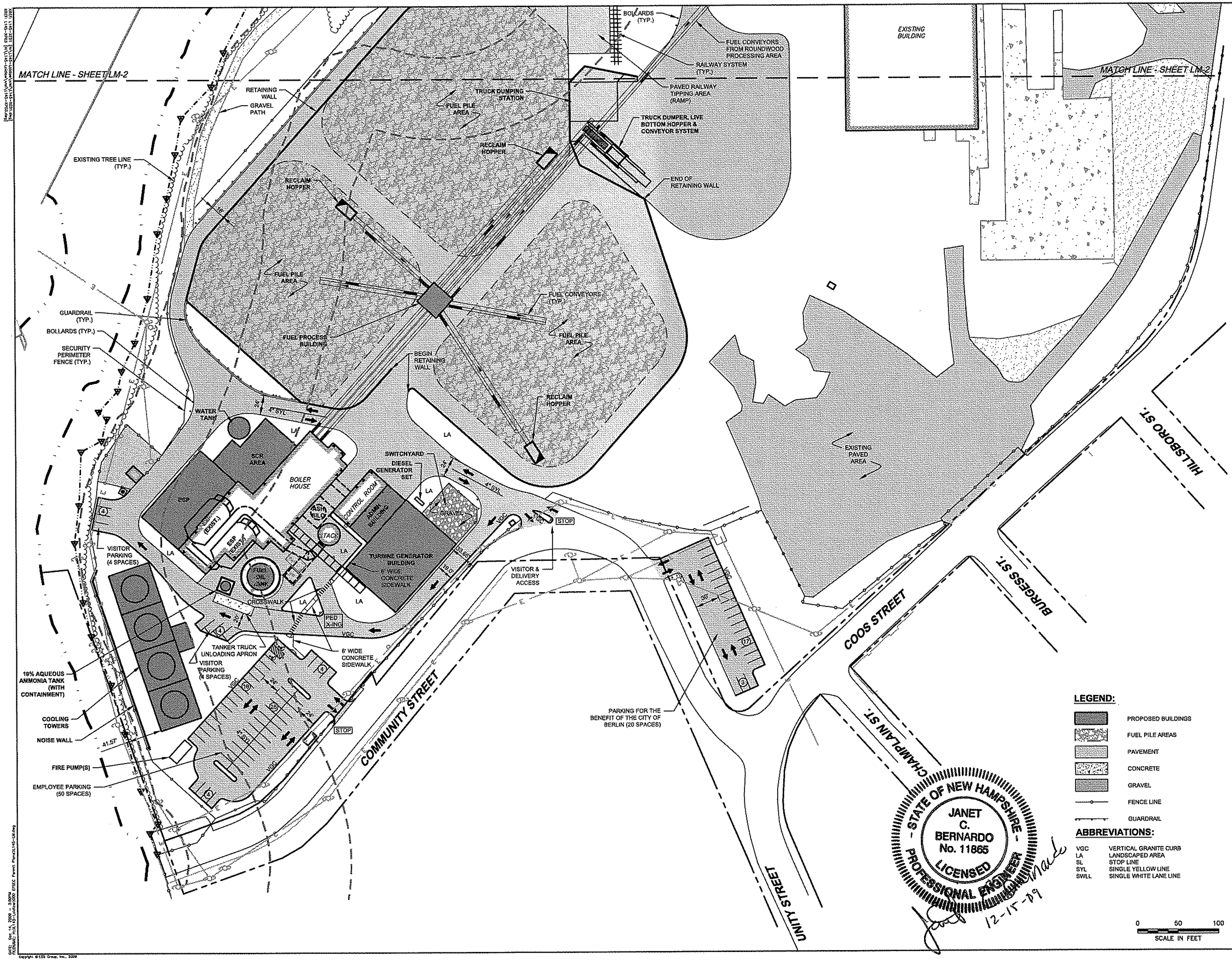
OVERALL SITE LAYOUT & MATERIALS PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 6 of 22
SCALE: 1"=100'

DRAWING No.
LM-0

DATE: Dec 15, 2009 — 12:37PM



LEGEND:

▩	PROPOSED BUILDINGS
▨	FUEL PILE AREAS
░	PAVEMENT
▒	CONCRETE
▓	GRAVEL
—o—	FENCE LINE
—▾—	GUARDRAIL

ABBREVIATIONS:

VGC	VERTICAL GRANITE CURB
LA	LANDSCAPED AREA
SL	STOP LINE
SYL	SINGLE YELLOW LINE
SWLL	SINGLE WHITE LANE LINE

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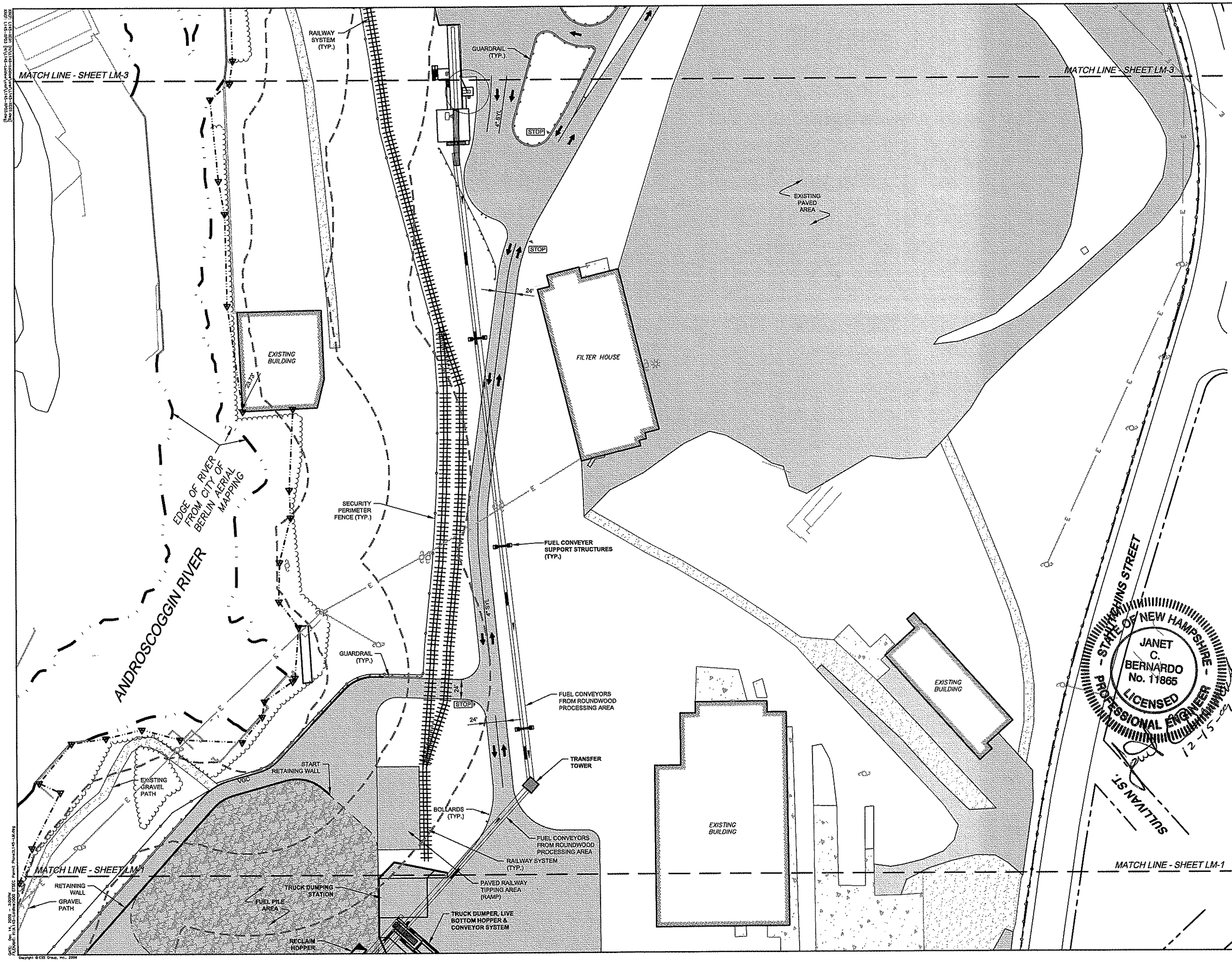
SITE LAYOUT
& MATERIALS PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 7 of 22
SCALE: 1"=50'

DRAWING No.
LM-1



LEGEND:

▩	PROPOSED BUILDINGS
▨	FUEL PILE AREAS
░	PAVEMENT
▒	CONCRETE
▓	GRAVEL
—o—	FENCE LINE
—•—•—	GUARDRAIL

ABBREVIATIONS:

VGC	VERTICAL GRANITE CURB
LA	LANDSCAPED AREA
SL	STOP LINE
SYL	SINGLE YELLOW LINE
SWLL	SINGLE WHITE LANE LINE

0 50 100
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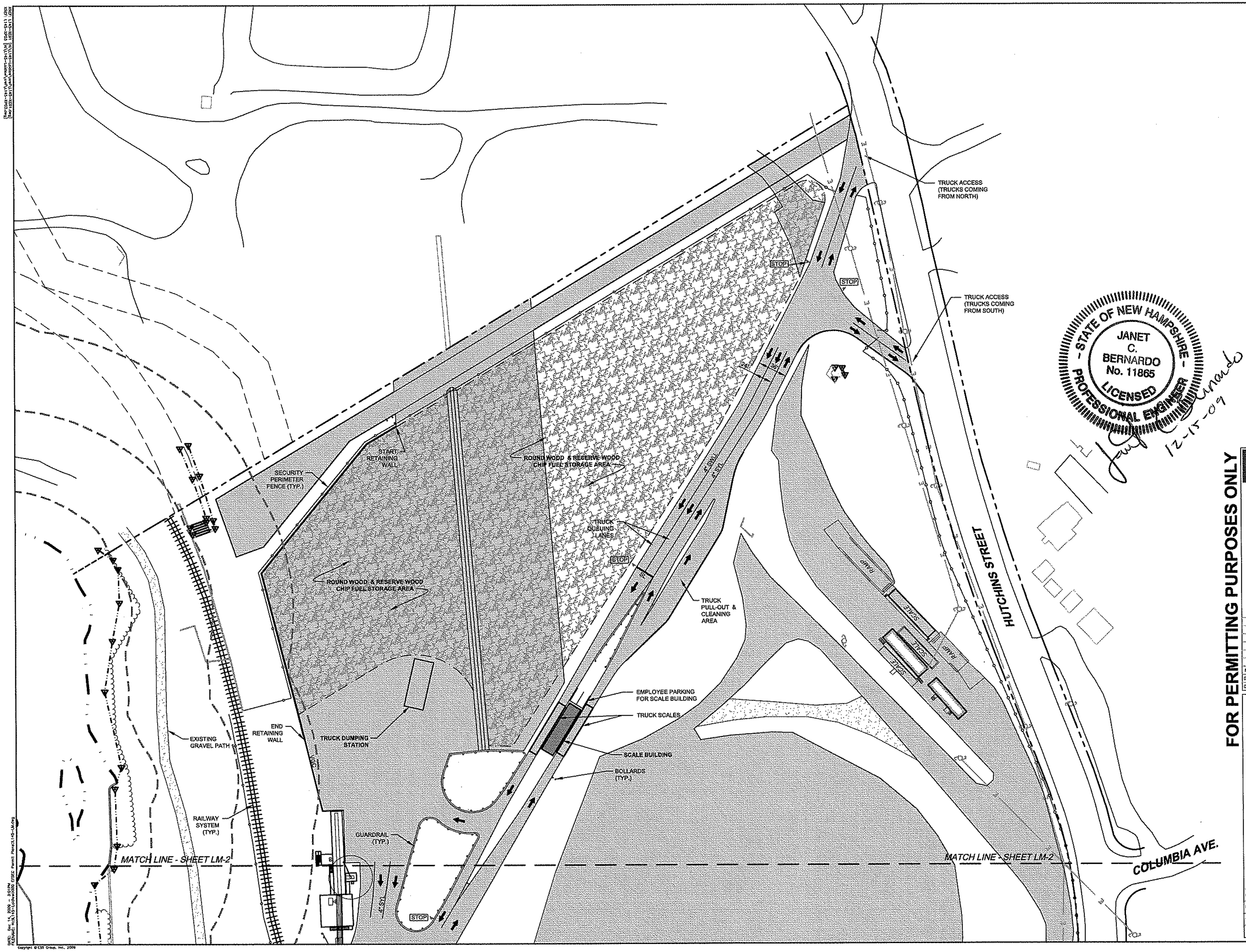
SITE LAYOUT
& MATERIALS PLAN

PROJECT No.: L145-004	DRAWNG No.
DATE OF ISSUE: 12/15/09	**LM-2**
SHEET No.: 8 of 22	
SCALE: 1"=50'	



LEGEND:

▩	PROPOSED BUILDINGS
▨	FUEL PILE AREAS
▒	PAVEMENT
░	CONCRETE
▓	GRAVEL
—o—	FENCE LINE
—•—	GUARDRAIL

ABBREVIATIONS:

VGC	VERTICAL GRANITE CURB
LA	LANDSCAPED AREA
SL	STOP LINE
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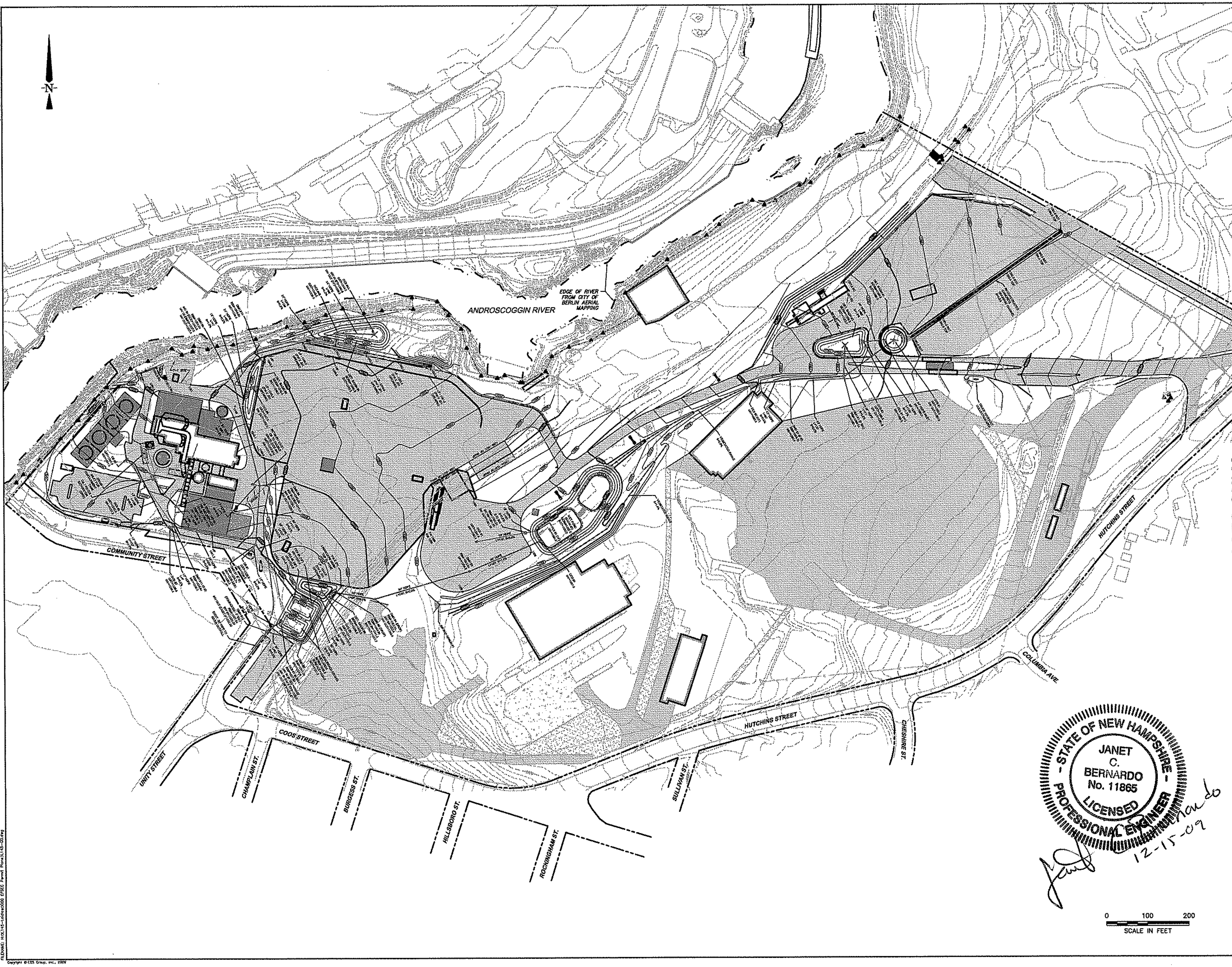
SITE LAYOUT
& MATERIALS PLAN

PROJECT No.:L145-004
DATE OF ISSUE:12/15/09
SHEET No.:9 of 22
SCALE:1"=50'

DRAWING No.
LM-3



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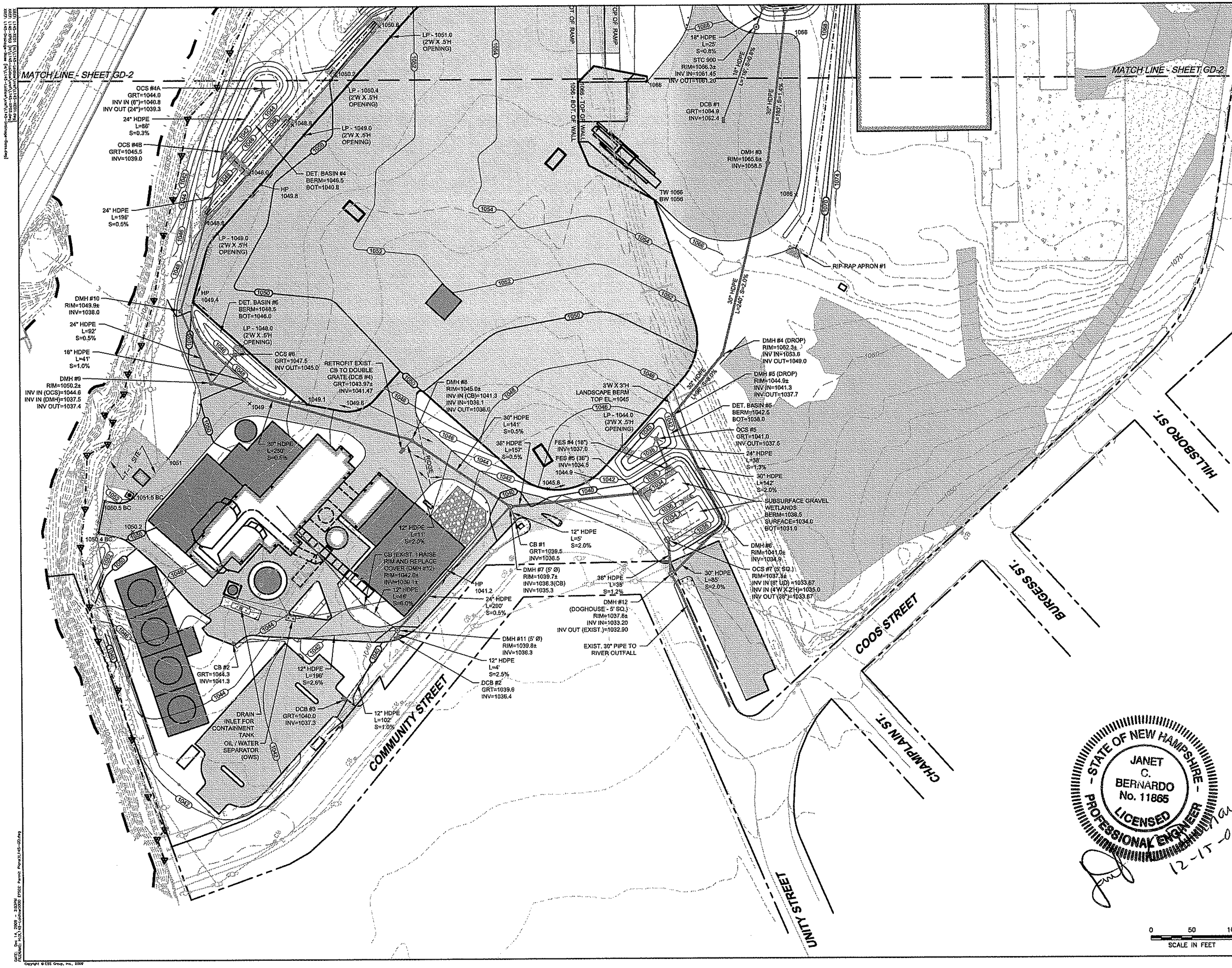
OVERALL SITE GRADING
& DRAINAGE PLAN

PROJECT No.:L145-004
DATE OF ISSUE:12/15/09
SHEET No.:10 of 22
SCALE:1"=100'

DRAWING No.
GD-0



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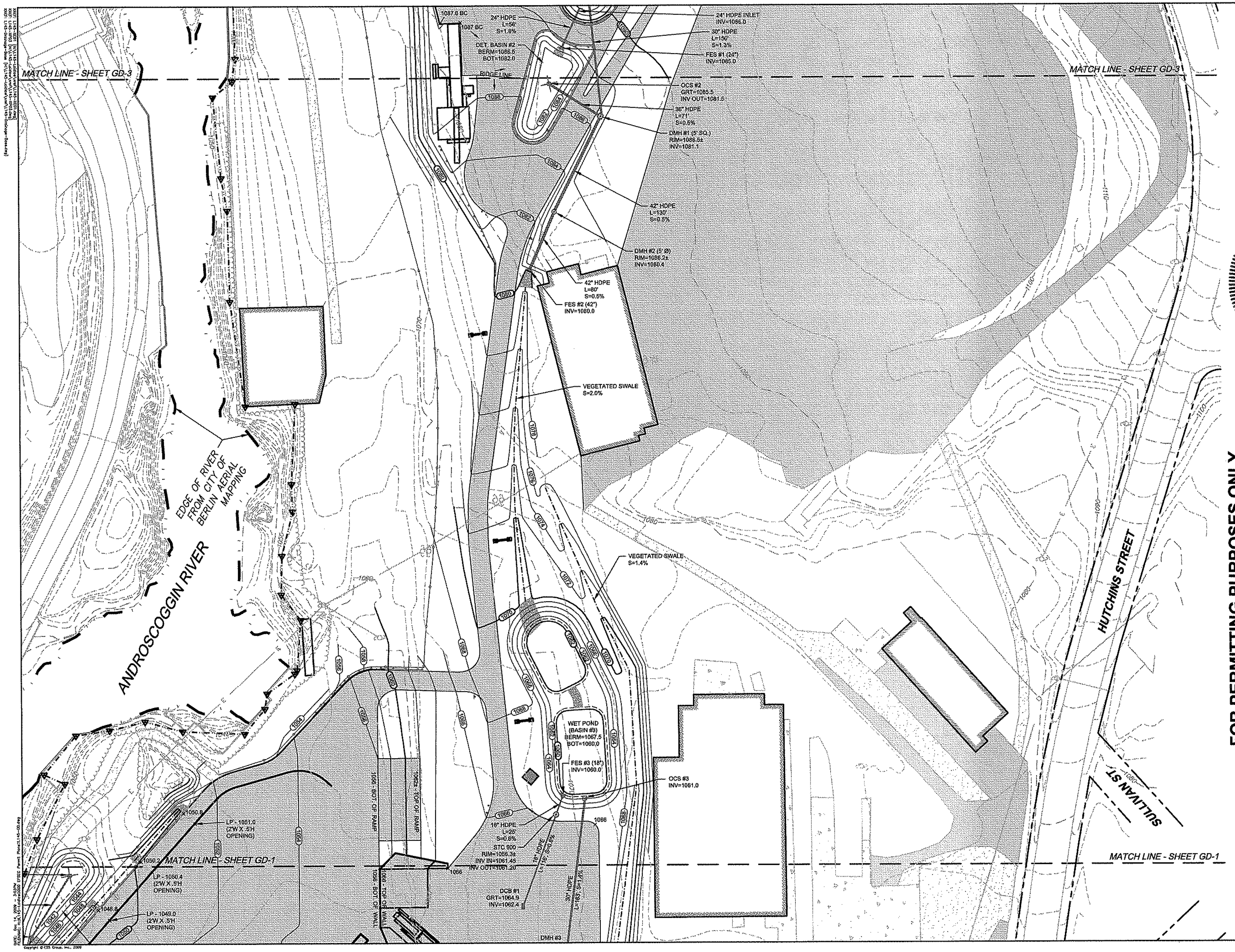
SITE GRADING
& DRAINAGE PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 11 of 22
SCALE: 1"=50'

DRAWING No.
GD-1



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DRAWN BY: DJG
CHECKED BY: JCB
DESIGNED BY: DJG
APPROVED BY: JCB

LaidLaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

Biomass Energy Facility
Berlin, NH

SITE GRADING & DRAINAGE PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 12 of 22
SCALE: 1"=50'
DRAWING No.
GD-2

DATE: Dec 14, 2009 - 3:03PM

JANET C. BERNARDO No. 11865

12-15-09

0 50 100
SCALE IN FEET

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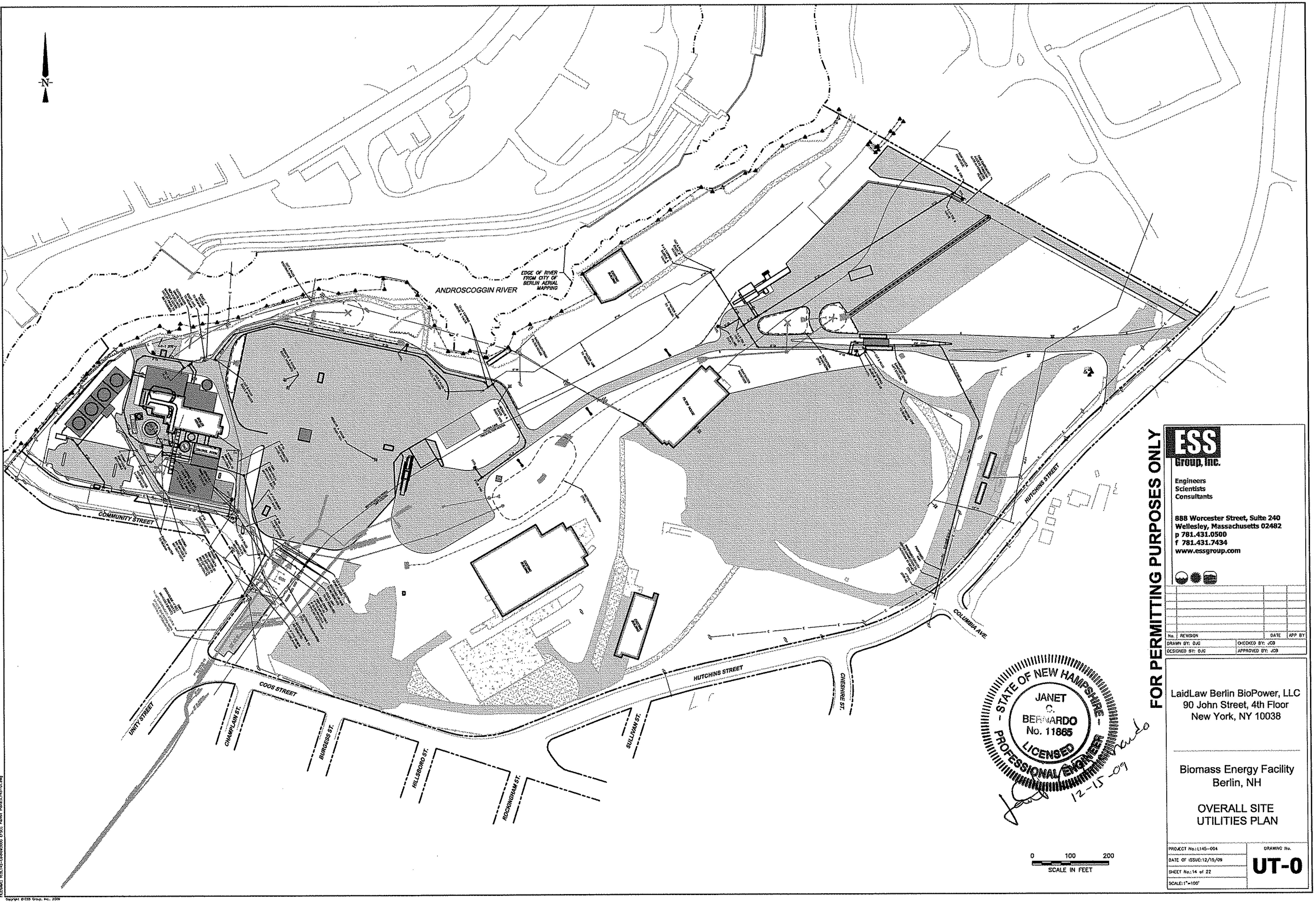
Berlin, NH

SITE GRADING & DRAINAGE PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 13 of 22
SCALE: 1"=50'
DRAWING No. **GD-3**



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No. 11865

12-15-09

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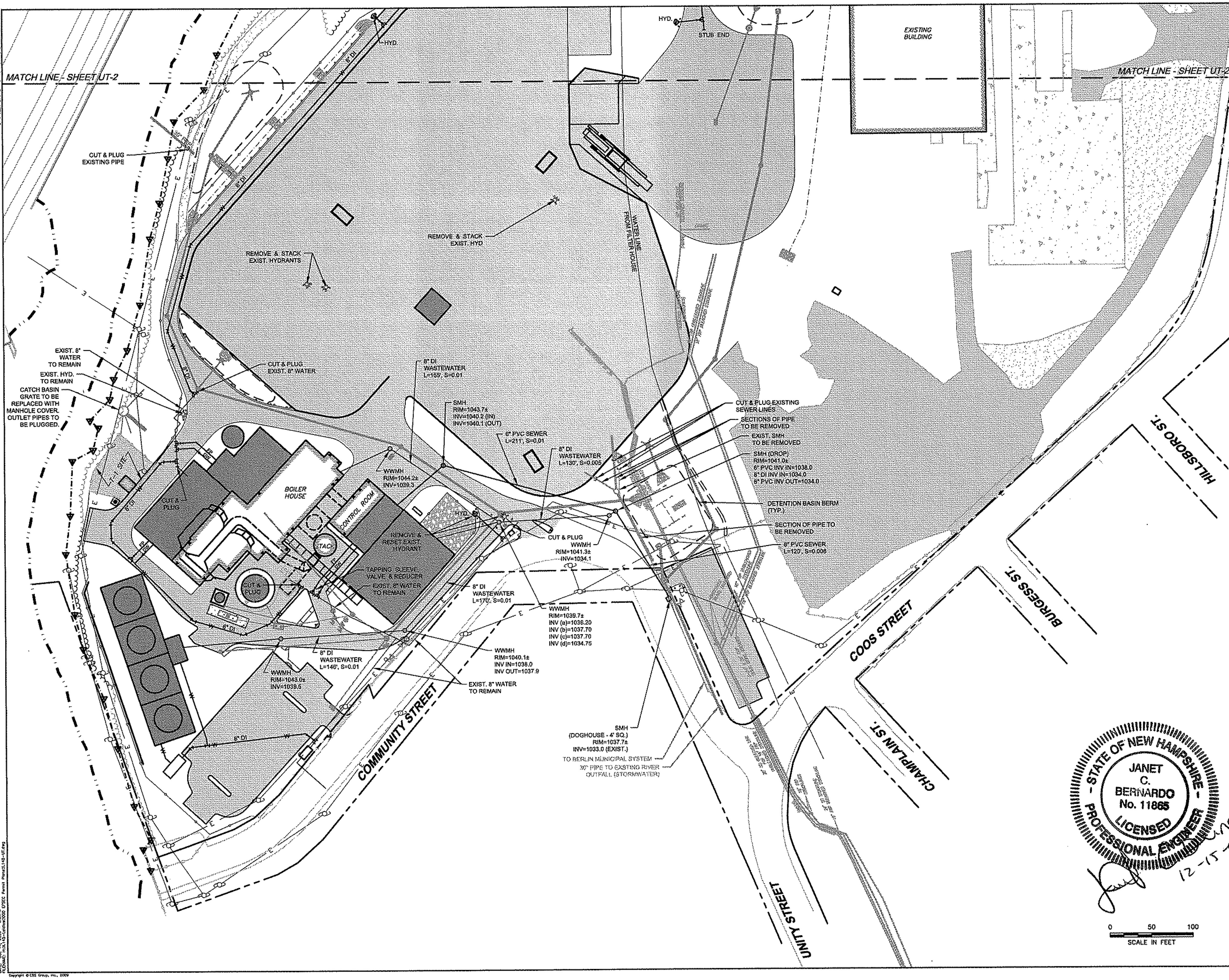
Berlin, NH

OVERALL SITE
UTILITIES PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 14 of 22
SCALE: 1"=100'

DRAWING No.
UT-0



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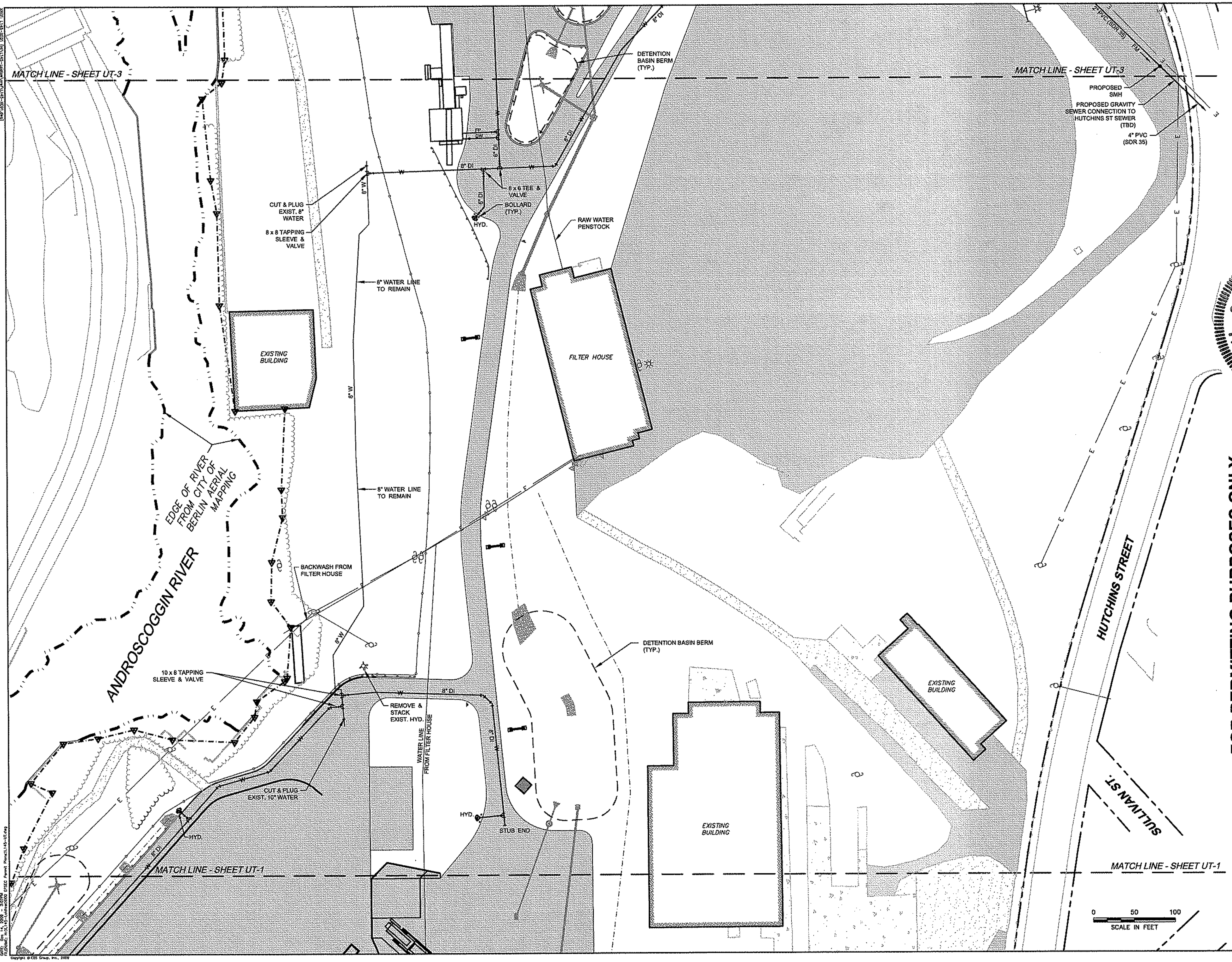
Berlin, NH

SITE UTILITIES PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 15 of 22
SCALE: 1"=50'

DRAWING No.
UT-1



JANET C. BERNARDO
No. 11865

Janet C. Bernardo
12-15-09

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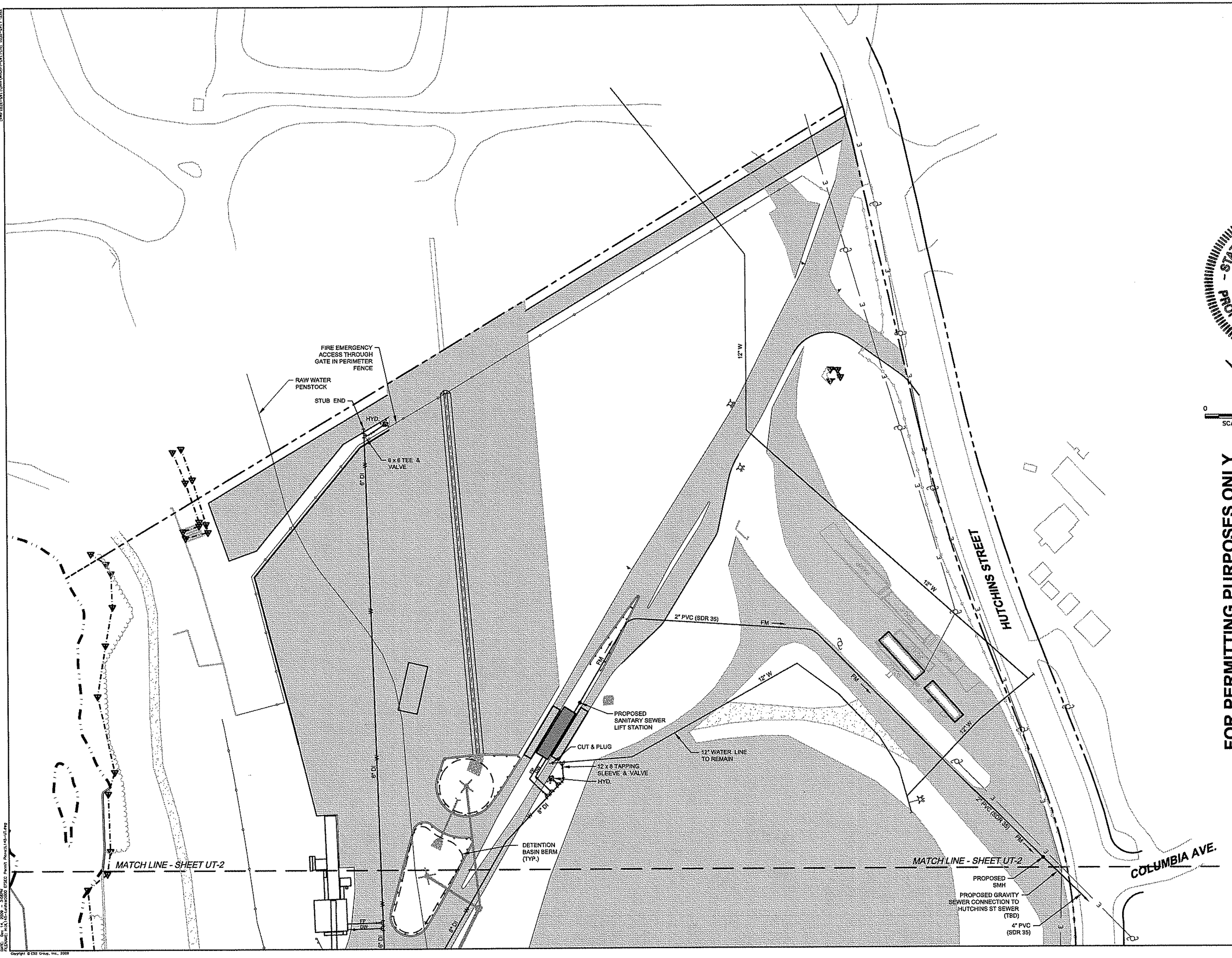
SITE UTILITIES PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 16 of 22
SCALE: 1"=50'

DRAWING No.
UT-2

DATE: Dec 14, 2009 - 3:07PM



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No. 11865

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0 50 100
SCALE IN FEET

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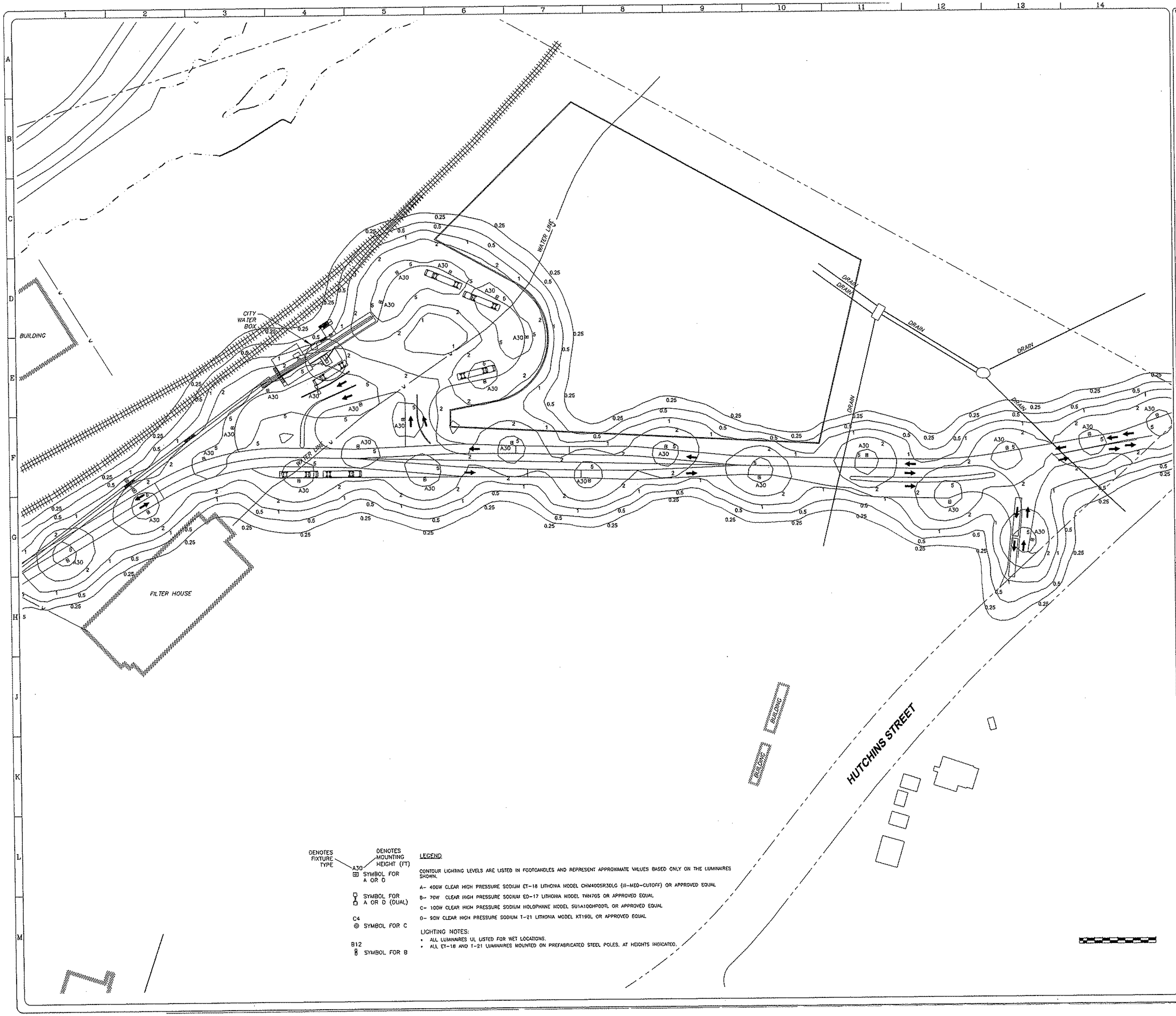
Berlin, NH

SITE UTILITIES PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 17 of 22
SCALE: 1"=50'

DRAWING No.
UT-3



DENOTES FIXTURE TYPE — A30 — DENOTES MOUNTING HEIGHT (FT)

▣ SYMBOL FOR A OR D

SYMBOL FOR A OR D (DUAL)

C4
◎ SYMBOL FOR C

B12
SYMBOL FOR B

LEGEND

CONTOUR LIGHTING LEVELS ARE LISTED IN FOOTCANDLES AND REPRESENT APPROXIMATE VALUES BASED ONLY ON THE LUMINAIRES SHOWN.

A– 400W CLEAR HIGH PRESSURE SODIUM ET–18 LITHONIA MODEL CHM400SR3DLG (III–MED–CUTOFF) OR APPROVED EQUAL

B– 70W CLEAR HIGH PRESSURE SODIUM ED–17 LITHONIA MODEL TWH70S OR APPROVED EQUAL

C– 100W CLEAR HIGH PRESSURE SODIUM HOLOPHANE MODEL SU1A100HP00TL OR APPROVED EQUAL

D– 90W CLEAR HIGH PRESSURE SODIUM T–21 LITHONIA MODEL KT190L OR APPROVED EQUAL

LIGHTING NOTES:

- ALL LUMINAIRES UL LISTED FOR WET LOCATIONS.
- ALL ET–18 AND T–21 LUMINAIRES MOUNTED ON PREFABRICATED STEEL POLES, AT HEIGHTS INDICATED.

NOTES

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A	MLH	9/18/09	ISSUED FOR PERMIT ONLY NOT FOR CONSTRUCTION	KCH	

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APPROVED BY	FDMaster	9/18/2009

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CLIENT
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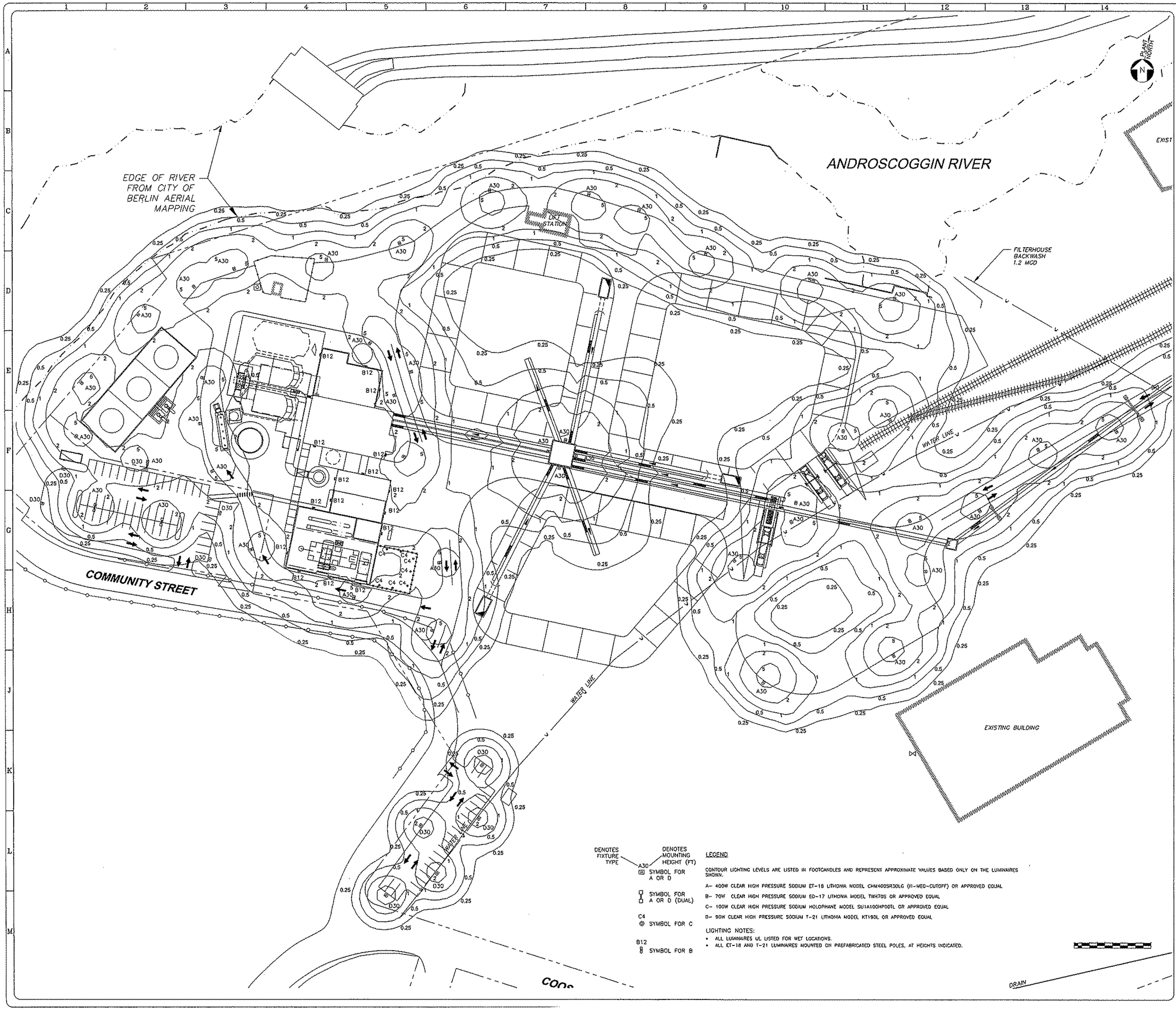
DRAWING TITLE
BERLIN BIOMASS ENERGY FACILITY
Berlin, New Hampshire

SITE LIGHTING PLAN

CLIENT DRAWING No.

W.E&C DRAWING No.
193.01–E71B–A



DENOTES FIXTURE TYPE — A30 — DENOTES MOUNTING HEIGHT (FT)

SYMBOL FOR A OR D

SYMBOL FOR A OR D (DUAL)

C4 SYMBOL FOR C

B12 SYMBOL FOR B

LEGEND

CONTOUR LIGHTING LEVELS ARE LISTED IN FOOTCANDLES AND REPRESENT APPROXIMATE VALUES BASED ONLY ON THE LUMINAIRES SHOWN.

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LIGHTING NOTES:

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NOTES

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DATE

	NAME	DATE
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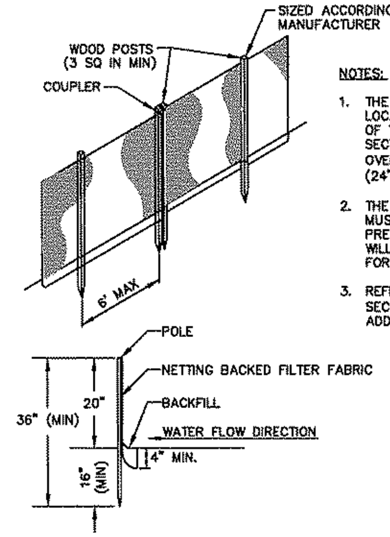
DRAWING TITLE

BERLIN BIOMASS ENERGY FACILITY
Berlin, New Hampshire

SITE LIGHTING PLAN

CLIENT DRAWING No.

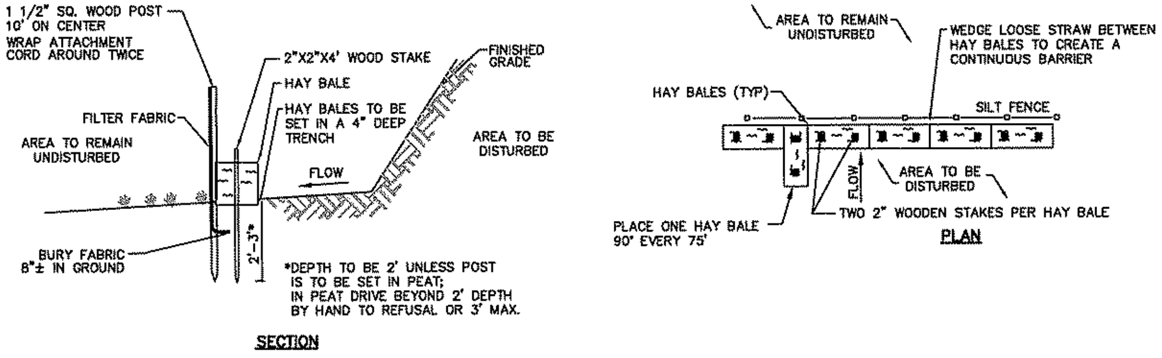
W.E&C DRAWING No.
193.01–E71A–A



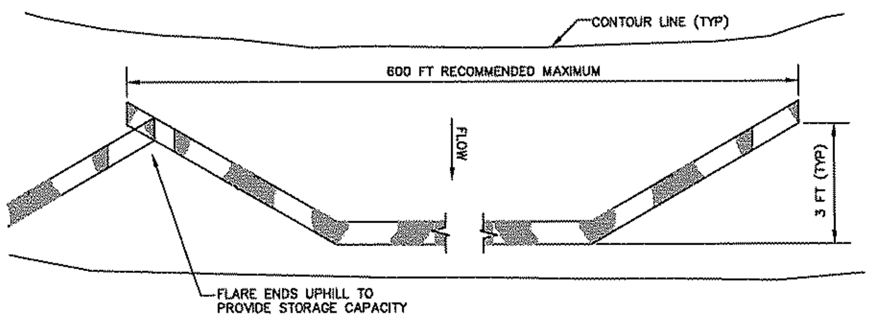
NOTES:

1. THE FILTER FABRIC MUST BE LOCATED ON THE UP-SLOPE SIDE OF THE FENCE. ADJOINING SECTIONS OF FENCE SHOULD BE OVERLAPPED BY A MINIMUM OF 6" (24" PREFERED).
2. THE BOTTOM 4" OF FILTER FABRIC MUST BE BURIED IN A PRE-EXCAVATED TRENCH WHICH WILL BE BACKFILLED AND TAMPED FOR STABILITY.
3. REFER TO NHSMM VOL. III, SECTION 4.2 (SILT FENCE) FOR ADDITIONAL INFORMATION

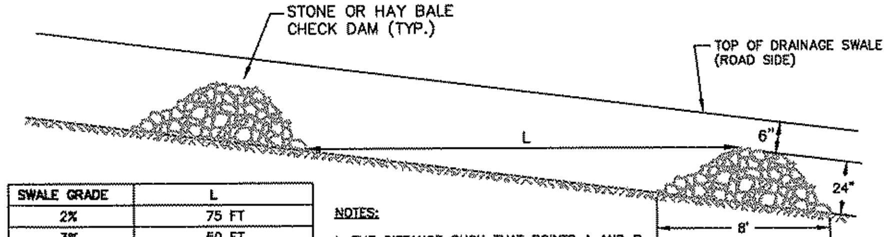
SILT FENCE DETAIL
NOT TO SCALE



HAY BALE AND SILT FENCE DETAIL
NOTTO SCALE



SILT FENCE LAYOUT
NOT TO SCALE

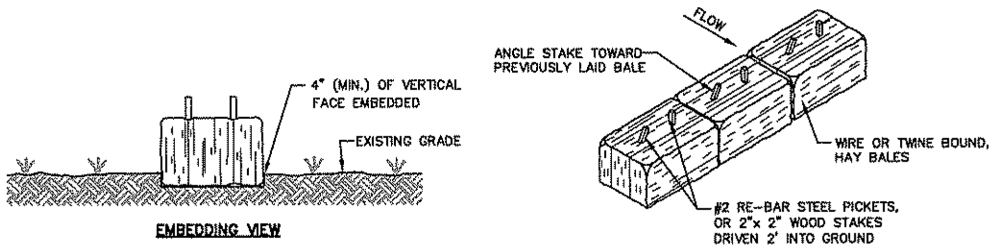


SWALE GRADE	L
2%	75 FT
3%	50 FT
4%	40 FT
5%	30 FT
6%	25 FT

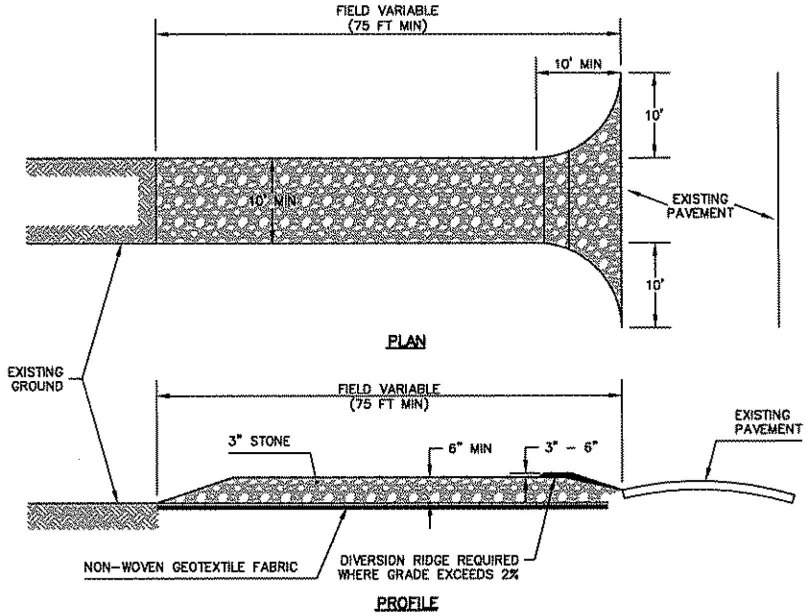
NOTES:

L=THE DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATION.

CHECK DAM SPACING
NOT TO SCALE



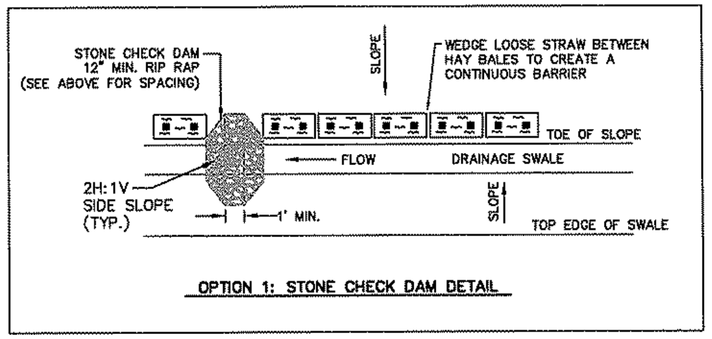
HAY BALE DETAIL
NOT TO SCALE



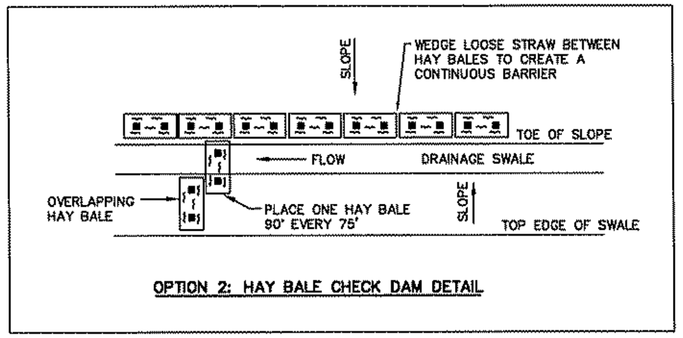
CONSTRUCTION SPECIFICATIONS:

1. USE 3" DIAMETER STONE.
2. RECOMMENDED LENGTH GREATER THAN 50 FEET WHERE PRACTICAL.
3. THICKNESS NOT LESS THAN 6 INCHES.
4. 10 FOOT MINIMUM WIDTH, BUT NOT LESS THAN FULL WIDTH AT POINTS WHERE INGRESS AND EGRESS OCCUR.
5. GEOTEXTILE FABRIC SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A DIVERSION RIDGE WILL BE PERMITTED.
7. ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AND REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED BY THE CONTRACTOR.
9. REMOVE STABILIZED CONSTRUCTION ENTRANCE PRIOR TO PLACEMENT OF BITUMINOUS CONCRETE PAVEMENT OR PREPARATION FOR LANDSCAPE PLANTING.
10. PAD SHOULD BE SLOPED AWAY FROM EXISTING ROADWAY.
11. MINIMUM LENGTH OF THE PAD SHOULD BE 75 FEET EXCEPT THAT THE MINIMUM LENGTH MAY BE REDUCED TO 50 FEET IF A 3 INCH TO 6 INCH BERM IS PROVIDED AT THE ENTRANCE.

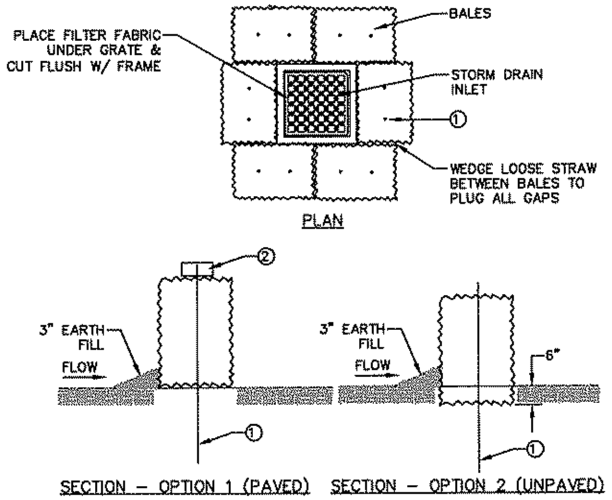
STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE



OPTION 1: STONE CHECK DAM DETAIL



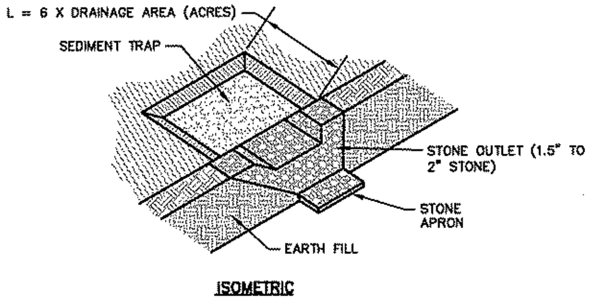
OPTION 2: HAY BALE CHECK DAM DETAIL

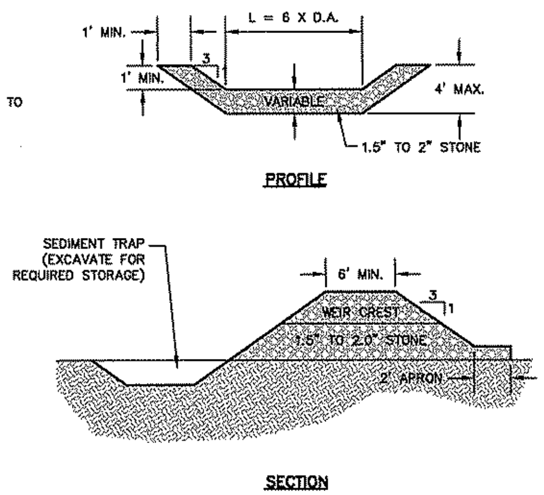


① TWO 1" X 1" WOOD STAKES OR REINFORCING BARS IN EACH BALE AND EMBEDDED IN THE GROUND 10" MINIMUM.

② PLACE DEAD WEIGHT AS NECESSARY TO HOLD HAYBALE IN PLACE.

HAYBALE EROSION CONTROL AT DRAIN INLETS
NOT TO SCALE





NOTES:

1. THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE SEDIMENT TRAP SHOULD BE LESS THAN 5 ACRES. THE MINIMUM VOLUME OF THE TRAP SHOULD BE 3,600 CU. FT. OF STORAGE FOR EACH ACRE OF DRAINAGE AREA.
2. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS, WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
3. THE STRUCTURE SHALL BE INSPECTED AT LEAST WEEKELY DURING CONSTRUCTION AND AFTER EACH RAINFALL. REPAIRS SHOULD BE MADE IMMEDIATELY IF NEEDED.
4. THE SEDIMENT TRAP SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE CONSTRUCTED DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
5. ALL CUT SLOPES SHALL BE 3:1 OR FLATTER.

TEMPORARY SEDIMENT TRAP
NOT TO SCALE

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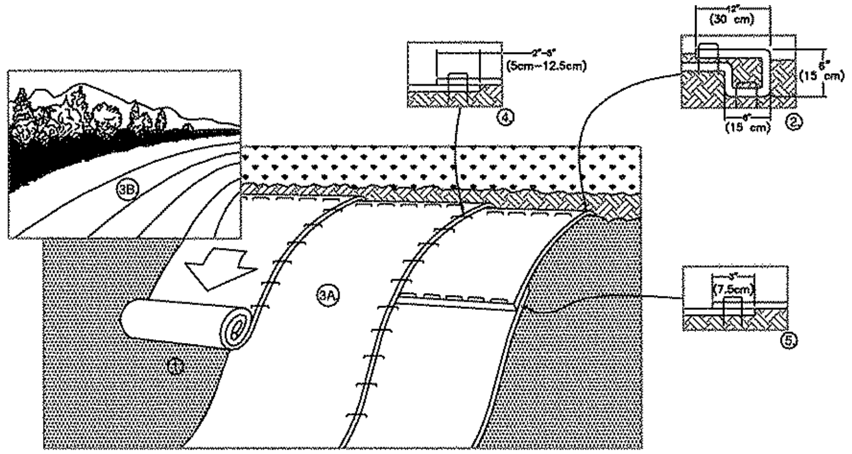
90 John Street, 4th Floor
New York, NY 10038

Biomass Energy Facility
Berlin, NH

DETAIL SHEET

PROJECT No.:L145-004
DATE OF ISSUE:12/15/09
SHEET No.:19 of 22
SCALE:NTS
DRAWING No.
DS-1

DATE: Dec 14, 2009 - 3:00PM

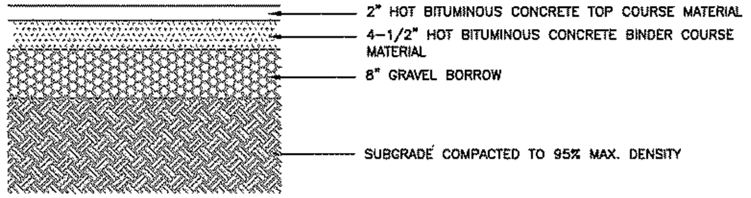


1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" (15cm) DEEP X 6" (15cm) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30cm) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30cm) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30cm) APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM™, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" (5cm-12.5cm) OVERLAP DEPENDING ON BLANKET TYPE. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH™ ON THE PREVIOUSLY INSTALLED BLANKET.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5cm) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30cm) APART ACROSS ENTIRE BLANKET WIDTH.

NOTE:
*IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15cm) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

EROSION CONTROL BLANKET DETAIL

NOT TO SCALE



TYPICAL PAVEMENT SECTION

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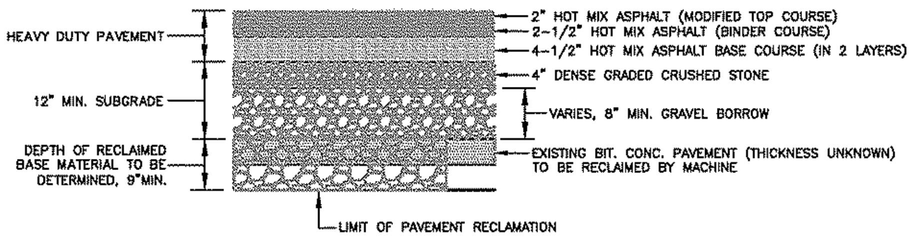
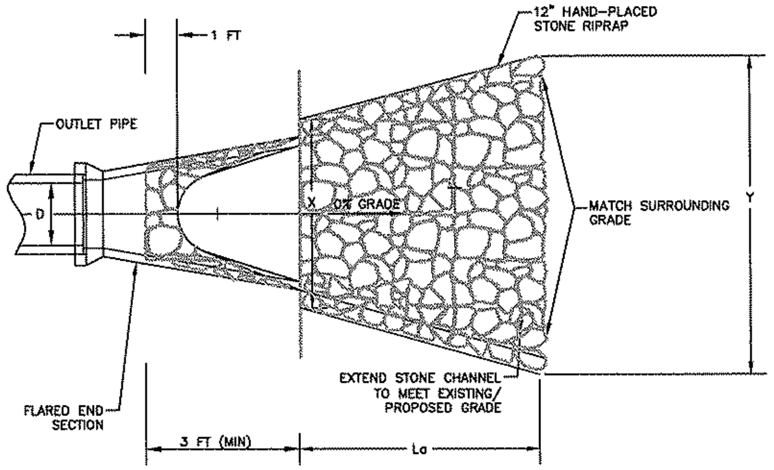


HEAVY DUTY HOT MIX ASPHALT PAVEMENT WITH RECLAIMED BASE MATERIAL

NOT TO SCALE



PLAN

NOTE:

STONE RIPRAP SHALL NOT BE LESS THAN 50 POUNDS NOR MORE THAN 125 POUNDS AND AT LEAST 75% OF THE VOLUME SHALL BE AT LEAST 75 POUNDS.

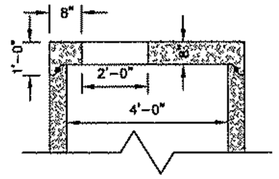
GEOTEXTILE FABRIC OR FILTER MATERIAL SHALL BE PLACED BETWEEN RIPRAP AND SOIL.

12" HAND PLACED STONE RIP RAP TO BE PLACED ON A 6" COMPACTED GRAVEL BEDDING.

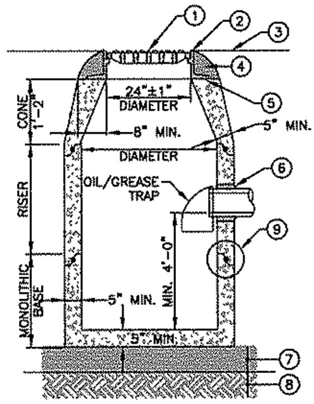
RIPRAP APRON TYPE	D(IN)	La (MIN.)	X	Y	RIPRAP
TYPE 1	D<=24"	10'	6'	16'	A
TYPE 2	24"<D<36"	12'	9'	19'	A
DISCHARGE OUTLET	N/A	12'	9'	19'	B

RIPRAP APRON OUTLET PROTECTION DETAIL

NOT TO SCALE



OPTIONAL TOP SLAB

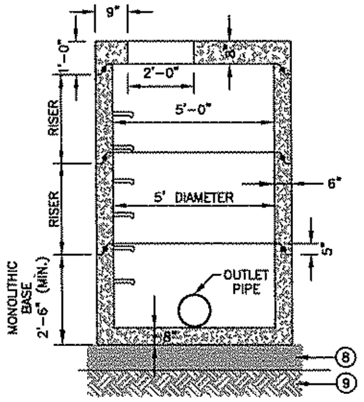


① FRAME AND GRATE
② FRAME TO BE SET IN FULL BED OF MORTAR
③ PAVED SURFACE
④ STIFF MORTAR
⑤ ADJUST TO GRADE WITH BRICK OR PRECAST CONCRETE RINGS: MAX. 8" ADJUSTMENT
⑥ MORTAR PIPE CONNECTIONS
⑦ 12" COMPACTED GRAVEL BORROW
⑧ UNDISTURBED SUBGRADE OR SUITABLE COMPACTED BACKFILL
⑨ BUTYL RUBBER JOINTS

NOTES:
1. PRECAST CONCRETE STRUCTURES AND CASTINGS SHALL BE SUITABLE FOR HS20 LOADINGS.
2. PRECAST CONCRETE STRUCTURES SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM-C-478.
3. ALTERNATE SLAB TOP MAY BE USED AS DICTATED BY DESIGN AND/OR FIELD CONDITIONS.
4. UNLESS OTHERWISE NOTED, MANHOLES SHALL BE 48" I.D.

PRECAST CONCRETE CATCH BASIN W/ TRAP

NOT TO SCALE



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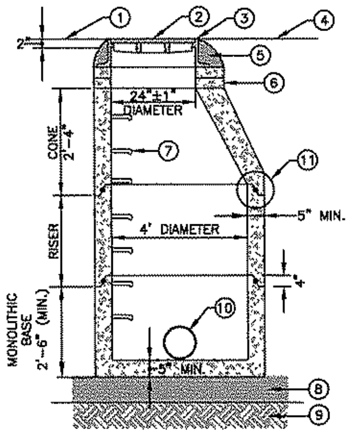
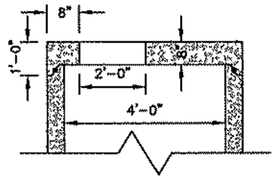
1. PRECAST CONCRETE STRUCTURES AND CASTINGS SHALL BE SUITABLE FOR HS20 LOADINGS.
2. PRECAST CONCRETE STRUCTURES SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM-C-478.
3. ALTERNATE SLAB TOP MAY BE USED AS DICTATED BY DESIGN AND/OR FIELD CONDITIONS.
4. UNLESS OTHERWISE NOTED, MANHOLES SHALL BE 48" I.D.

PRECAST CONCRETE DRAIN MANHOLE (5' DIA)

NOT TO SCALE





OPTIONAL TOP SLAB

① UNPAVED SURFACE
② MANHOLE FRAME & COVER
③ FRAME TO BE SET IN FULL BED OF MORTAR
④ PAVED SURFACE
⑤ MORTAR
⑥ ADJUST TO GRADE WITH BRICK OR PRECAST CONCRETE RINGS: MAX. 8" ADJUSTMENT
⑦ MANHOLE STEP @ 12" O.C. (TYP)
⑧ 12" COMPACTED GRAVEL BORROW
⑨ UNDISTURBED SUBGRADE
⑩ MORTAR AND GROUT PIPE CONNECTIONS
⑪ BUTYL RUBBER JOINTS

NOTES:
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2. PRECAST CONCRETE STRUCTURES SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM-C-478.
3. ALTERNATE SLAB TOP MAY BE USED AS DICTATED BY DESIGN AND/OR FIELD CONDITIONS.
4. UNLESS OTHERWISE NOTED, MANHOLES SHALL BE 48" I.D.

PRECAST CONCRETE DRAIN MANHOLE (4' DIA)

NOT TO SCALE

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Scientists
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No.	REVISION	DATE	APP BY

DRAWN BY: DJC
CHECKED BY: JCB
DESIGNED BY: DJC
APPROVED BY: JCB

LaidLaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

Biomass Energy Facility
Berlin, NH

DETAIL SHEET

PROJECT No.:L145-004
DATE OF ISSUE:12/15/09
SHEET No.:20 of 22
SCALE:NTS
DRAWING No.
DS-2

DATE: Dec 14, 2009 - 3:06PM
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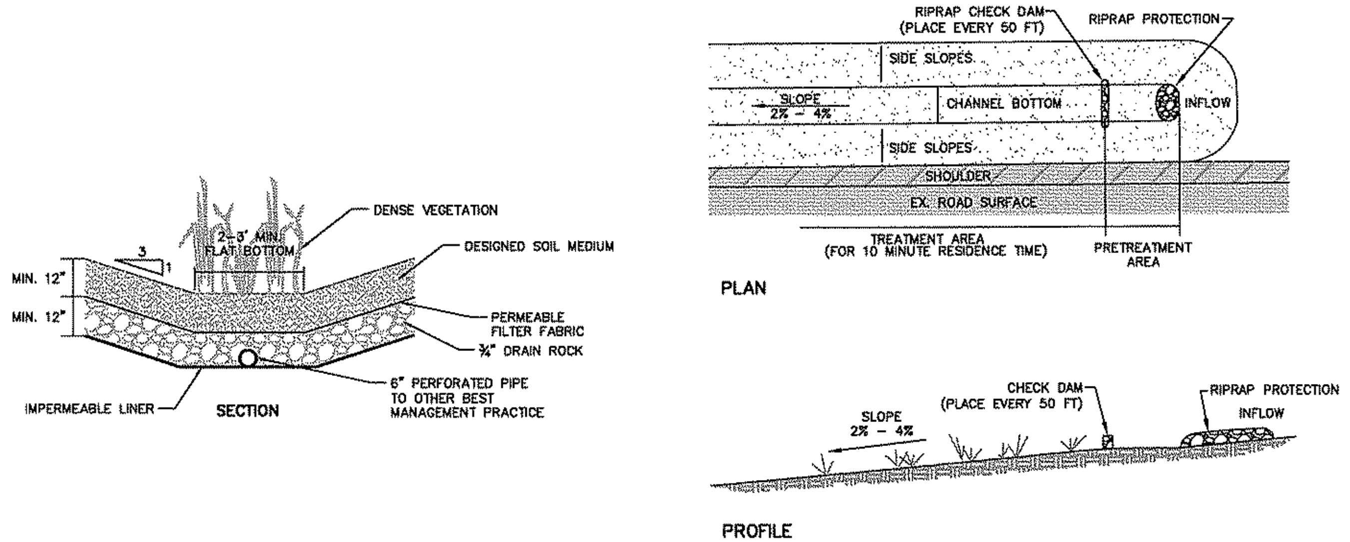

VEGETATED SWALE DETAIL

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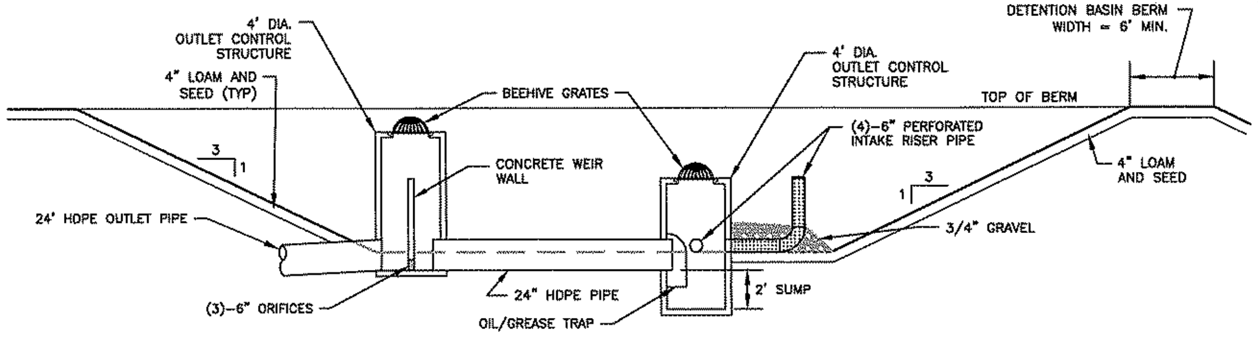
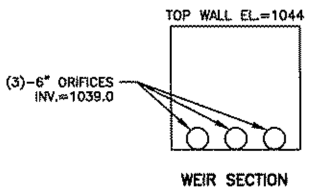


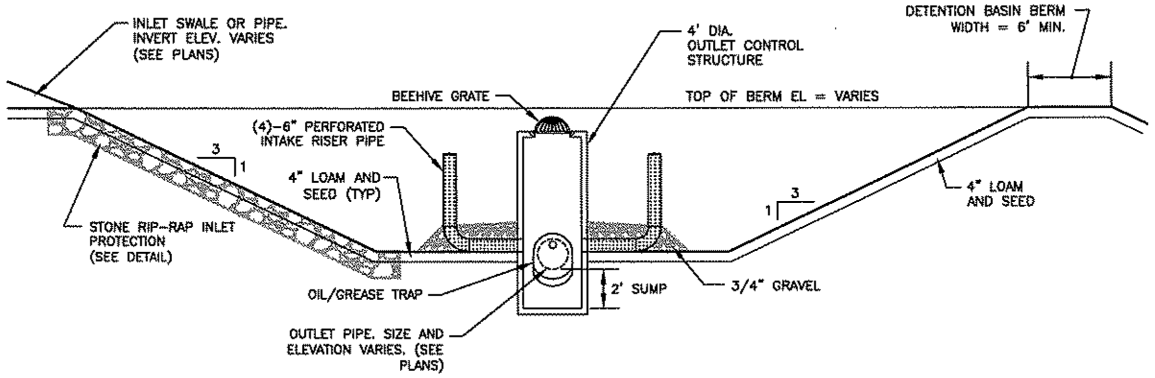


NOTES:

1. CONSTRUCT BERM IN 8" LIFTS AND COMPACT EACH LIFT TO 95% MODIFIED PROCTOR DENSITY. COMPACT SOIL AROUND ALL OUTLET STRUCTURES USING HAND TAMPERS.
2. INLET AND OUTLET PIPES SHOWN ARE SCHEMATIC.
3. DETENTION BASIN BERM DESIGN SHALL INCLUDE IMPERMEABLE CORE. BASIN SHALL ALSO BE LINED WITH IMPERMEABLE MEMBRANE.

DETENTION BASIN #4 SECTION & DETAIL

NOT TO SCALE



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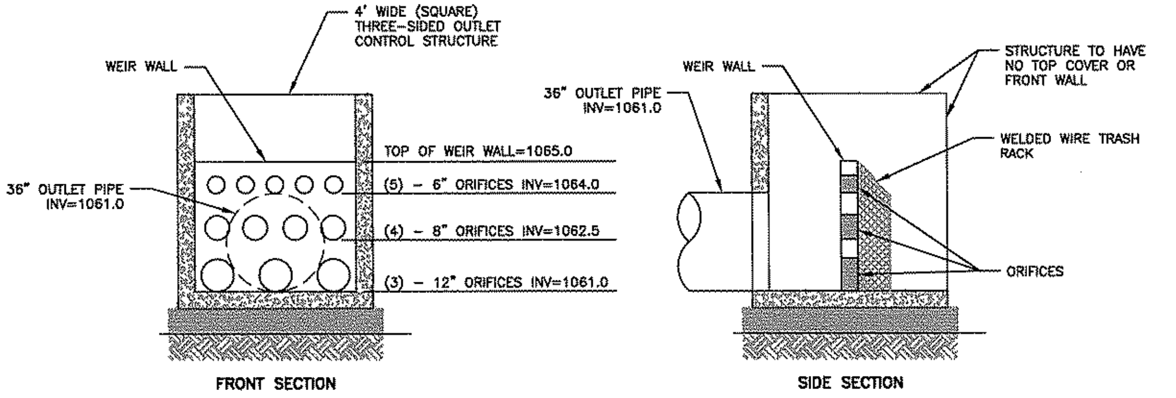
3. DETENTION BASIN BERM DESIGN SHALL INCLUDE IMPERMEABLE CORE. BASIN SHALL ALSO BE LINED WITH IMPERMEABLE MEMBRANE.

TYPICAL BASIN AND OUTLET CONTROL STRUCTURE SECTION & DETAIL

NOT TO SCALE



OUTLET CONTROL STRUCTURE #3 SECTIONS & DETAIL

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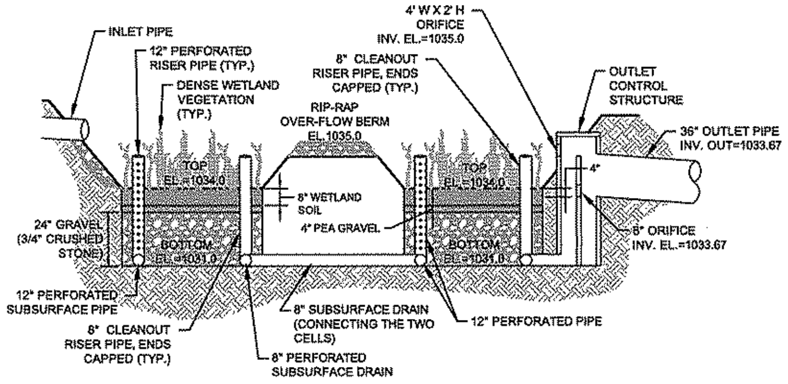

SUBSURFACE GRAVEL WETLANDS DETAIL

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New York, NY 10038

Biomass Energy Facility
Berlin, NH

DETAIL SHEET

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 22 of 22
SCALE: NTS

DRAWING No.
DS-3

Appendix C

State Air Permit Application

Appendix C – State Air Permit Application

CORPORATE AFFIDAVIT

I hereby certify that Laidlaw Berlin Biopower, LLC is the lessee of the real property located at 57 Hutchins Street, Berlin, NH 03570, and that Laidlaw Berlin Biopower, LLC has the legal right to use said property for the construction and/or operation of an approximately 70 megawatt biomass energy power plant.

LAIDLAW BERLIN BIOPOWER, LLC

By: Michael Bartoszek

Michael B. Bartoszek
(Company Officer's name)

President + CEO
Title of Corporate Officer

State of New York
County of NEW YORK

On this 11th day of December, 2009, before me, Michael B. Bartoszek, the undersigned officer, personally appeared Michael B. Bartoszek, who acknowledged him/herself to be the Chief Executive of Laidlaw Berlin Biopower, LLC, a limited liability company, and that he, as such Chief Executive, being authorized to do so, executed the foregoing instrument for the purposes therein contained, by signing the name of the corporation by himself as Chief Executive.

In witness whereof I hereunto set my hand and official seal.

MICHAEL RAFKIND

Notary Public

My commission expires on 08. 31. 2013

MICHAEL RAFKIND
Notary Public, State of New York
No. 01RA6127762
Qualified in New York County
My Commission Expires ~~May 31, 20~~
8/31/13

STATE AIR PERMIT APPLICATION

BERLIN BIOPOWER, LLC
57 HUTCHINS STREET
BERLIN, NEW HAMPSHIRE

PREPARED FOR

Laidlaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

PREPARED BY

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

Project No. L145-005.01

December 15, 2009

STATE AIR PERMIT APPLICATION
LAIDLAW BERLIN BIOPOWER, LLC
57 Hutchins Street
Berlin, New Hampshire

Prepared For:

Laidlaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, New York 10038

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

ESS Project No. L145-005.01

December 15, 2009

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1.0 INTRODUCTION

Laidlaw Berlin BioPower, LLC (LBB) is proposing to convert and upgrade the existing facility equipment and infrastructure located at the former Fraser Pulp Mill in Berlin, New Hampshire in order to develop a biomass fueled energy generating facility. Berlin BioPower (the Facility) will use whole tree wood chips and other low-grade clean wood as fuel, and will be capable of generating nominally 70 megawatts (MW) of electric power (gross output), making it one of the largest biomass-energy facilities in the United States. The Facility will provide a source of clean, carbon-neutral, renewable energy that will help support New Hampshire's goal of meeting 25% of the state's energy needs with renewable resources by 2025. The Facility's use of biomass fuel will also help reduce reliance on fossil fuels such as oil and natural gas that are in ever decreasing supply, and will provide a beneficial use of waste wood material.

The Facility will include a boiler, which will be a stationary source using wood with a design rating greater than 2 million British thermal units (MMBtu) per hour of gross heat input. Therefore, in accordance with the New Hampshire Code of Administrative Rules (NHCAR), Chapter Env-A 600, a temporary permit is required prior to the construction of the Facility. The Facility will also be required to comply with the applicable requirements of the NHDES Air Pollution Control Regulations (NHCAR Chapters Env-A 100-4800).

The Facility will be a major stationary source of nitrogen oxides (NO_X) emissions, with potential emissions greater than 100 tons per year. Coos County is designated as being in attainment for ozone, however is within the New Hampshire portion of the Northeast Ozone Transport Region. The Facility will therefore be subject to state nonattainment review (NHCAR Part Env-A 618), which requires the implementation of the lowest achievable emission rate (LAER), and offsets for its NO_X emissions.

As a major stationary source located in an attainment area, the Facility will also be subject to the applicable Prevention of Significant (PSD) of Air Quality permit requirements. The NHDES has implemented the federal PSD Program permitting requirements (NHCAR Part Env-A 619) to determine if a new major stationary source will cause or contribute to significant deterioration of air quality in the state. The PSD requirements include the completion of an air dispersion modeling analysis to demonstrate that the Project will not cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS), and that the maximum increases in pollutant concentrations over the existing baseline do not exceed the allowable PSD increments. The PSD program requires the implementation of Best Available Control Technology (BACT) for each regulated new source review (NSR) pollutant with potential emissions above the significance thresholds. The PSD program also requires specified additional impact analyses including an analysis of ambient air quality in the area the source would affect, and an analysis of other impacts that would occur as a result of the source and general commercial, residential, industrial, and other growth associated with the source, including potential impacts on Class I areas.

The Facility must also comply with the applicable subparts of the federal New Source Performance Standards (NSPS), and the National Emission Standards for Hazardous Air Pollutants (NESHAPS), which requires the application of Maximum Available Control Technology (MACT) for sources located at a facility which is a major source of HAP emissions.

This document provides all of the materials and supporting information necessary to comprise a complete application for a temporary permit for the construction of the Facility. Section 2 provides a complete description of the proposed Facility. Section 3 presents a discussion of the potential air emissions from the Facility along with the measures that will be used to minimize emissions and air quality impacts. Section 4 provides a discussion of the state and federal air regulations that apply to the Facility and how it will comply with those requirements. The BACT/LAER analyses conducted for the Facility are detailed in Section 5. The case-by-case MACT determination for the Facility is detailed in Section 6. The dispersion modeling analysis conducted for the Facility is summarized in Section 7. The additional impact analyses conducted to satisfy the PSD requirements for the Facility are also detailed in Section 7. The required completed permit application forms are included in Section 8. All necessary supporting materials are provided in the figures, tables, and appendices incorporated into this application document.

2.0 FACILITY DESCRIPTION

The Facility will be a base loaded electric generating facility with a nominal gross electrical output of 70 MW. The heart of the Facility will be a bubbling fluidized bed boiler; highly advanced technology considered state-of-the-art for maximum energy conversion of biomass fuel to power generation. The development of the Facility will include construction of a new turbine building adjacent to the boiler building, which will house the steam turbine generator. A new wet cooling tower will be installed near the western edge of the property behind the boiler building. Two wood fuel off-loading and storage areas will be developed. The Facility will also include a 500 kW emergency diesel generator set, and a 288 hp diesel fire pump.

Figure 1 is a United States Geologic Survey (U.S.G.S.) Map showing the location for the proposed Facility. A proposed site plan, which shows the property line of the Facility, and the location of all buildings and structures, has been included as Figure 2. Figure 3 shows the dimensions of the structures on the Site. Visual simulations of the proposed Facility have been provided in Appendix B. The following sections describe the components of the proposed Facility.

2.1 Biomass Boiler & Steam Generator

The existing B&W recovery boiler will be converted to a biomass fired bubbling fluidized bed (BFP) boiler with open hopper bottoms for removal of fuel ash, bed sand particles and other non-combustible materials. An air distribution system consisting of fluidizing air and overfire air will be used to assure efficient fuel combustion. A flue gas recirculation system will be utilized to cool the bed when required. The existing feedwater economizer, which will preheat the feedwater to the boiler drum, will be modified to optimize boiler efficiency. The boiler feedwater will be treated with sodium sulfite after the deaerator, as recommended by the boiler manufacturer. The use of a tubular air pre-heater will insure maximum use of the energy release in the boiler.

The boiler will be capable of generating up to 600,000 pounds per hour of steam at 825ºF and 850 psig. The boiler will be capable of maintaining stable operation and compliant emission levels from 70% to 100% of its maximum steam output. A series of double sided retractable soot blowers will be utilized on heat transfer surfaces within the superheater and convective sections of the boiler to maintain design performance levels.

The boiler will be capable of firing whole tree chips at a minimum moisture content of 35% and a design moisture content of up to 50%. At an average moisture content of 37.6%, the wood fuel will have a higher heating value of approximately 5,060 Btu/lb. The heat input rate to the boiler will vary depending on the moisture content of the wood fuel. The average heat input rate at maximum steam load will be 932 MMBtu/hr with 37.6% moisture content fuel. The maximum heat input rate will be 1,013 MMBtu/hr with 50% moisture content fuel. Individual fuel feeders will be equipped with adjustable air swept distributors to adjust the flow of fuel into the boiler. The fuel chutes will each be equipped with backdraft dampers.

The boiler will also be equipped with four No. 2 distillate oil fired burners for use during startup. Each of the oil burners will have a maximum heat input capacity of 60 MMBtu/hr. The oil burners will be fired with Ultra Low Sulfur Diesel (ULSD) fuel with a high heating value of approximately 18,698 Btu/lb. The emergency diesel generator set and diesel fire pump will also be fired with ULSD.

ULSD fuel for the boiler startup burners, the emergency generator, and the fire pump will be stored on-site in a 50,000 gallon storage tank equipped with secondary containment. An existing oil storage tank will be used by removing the roof and erecting a new tank inside to achieve a double wall storage design. The ULSD storage tank will be registered and LBB will meet all of the applicable state design, inspection, maintenance, testing, and reporting requirements for its use.

The steam turbine generator will be designed for a steam inlet pressure of 850 psig and a steam inlet temperature of 900ºF. The maximum capacity of the steam turbine generator will be 66 MW.

2.2 Wood Handling System

The Facility will employ a wood handling system to provide adequate wood chip fuel to operate the boiler continuously, along with approximately 30 days of fuel storage (15 days processed, 15 days unprocessed) available on-site at all times. Round wood and wood chips will be transported to the Facility via trucks and weighed before dumping. Round wood will be unloaded and stored in dedicated storage areas, before being chipped on-site and conveyed to the unprocessed fuel pile. The wood chips transported to the site by truck will be unloaded directly into the unprocessed fuel pile using three truck dumpers.

An on-site round wood chipping facility will consist of a purpose built structure to contain log milling equipment that will reduce round wood logs to chips suitable for boiler fuel. Logs will be delivered and unloaded in the round wood storage area located to the northeast of the power facility. From there they will be loaded by crane arm and grapple and fed lengthwise and horizontally into the chipping building by conveyor. Inside the building, an electric motor driven chipper will reduce the logs to fuel size chips. The wood chips will then be conveyed from the chipping facility to the processed wood chip fuel storage area adjacent to the power plant.

The wood in the unprocessed fuel pile will be manually loaded into hoppers to be conveyed to the fuel processing building. Wood processing will include a magnet, disc screen, and grinders (hogs). Wood will be processed and stocked out using a single train equipped with two hogs. The processed wood will be stacked out by a conveying system, reclaimed, and screened before being conveyed to the boiler using individual feeders.

The weigh station will consist of two 60 ton weigh scales and a scale house. Each of the three truck dumpers will have a capacity of 60 tons and will be capable of unloading approximately five trucks, or 150 tons of wood per hour. The dumpers will be capable of tilt-up of 63 degrees from horizontal and will dump to grade.

The unprocessed fuel storage pile will be open and on paved ground with an under drain system to remove rain water from the storage area. The paved pile area will have a perimeter drain system. Two reclaim hoppers will be used for the manual reclaiming of fuel from the unprocessed fuel storage area. Each hopper will discharge to a common 250 ton per hour unprocessed fuel out-feed conveyer, which will supply the fuel processing system.

A magnet will be installed over the truck dumper outfeed conveyer near the processing building. A disc screen capable of processing 250 tons per hour will be used to screen the unprocessed wood for boiler fuel. Two wood hogs will be used to reduce the wood fuel from the disc screen to a three inch minus size. Each hog will be capable of processing up to 75 tons per hour of wood fuel.

A 250 ton per hour stockout conveyer will receive the discharge from the processing building and convey it to the processed wood fuel storage area. The processed wood fuel storage area will be open and on paved ground with an under drain system to remove rain water from the storage area. The paved pile area will have a perimeter drain system.

Three 50 ton per hour reclaimers located under the storage area will supply a single boiler feed conveyer. The boiler feed conveyer will feed the shuttle conveyers which will distribute fuel to individual boiler chutes. A single return conveyer will return excess fuel to the wood storage area. Each fuel metering bin will be equipped with screw feeders to meter wood fuel to the boiler feed chutes. There will be one inverted cone type chute connecting each pneumatic distributor on the boiler with a set of feeders at the metering bin.

2.3 Ash Handling Systems

The ash handling facilities will consist of separate collection and storage systems for fly ash and for bed sand removal, screening and re-injection.

Fly ash will be continuously collected from the electrostatic precipitator and mechanical dust collector hoppers using a dry mechanical system. Collected fly ash will be conveyed to a dry storage bin inside of the boiler building. The storage capacity will be sufficient to accept twelve to twenty four hours of full-load operation. There will be an atmospheric vent on the ash silo equipped with a filter to minimize fugitive emissions. Ash from the elevated storage bin will be processed through a pug mill which mixes dry ash with water to produce a wet cake that minimizes dust generation during subsequent handling. The wetted fly ash will then be loaded onto trucks and transported off-site for beneficial re-use in agricultural land applications (in accordance with NHCAR Chapter Env-Sw 1700) or for disposal. LBB has confirmed that the ash can be accepted and disposed at the nearby Mount Carberry Landfill if it is not acceptable for beneficial re-use.

Bottom ash is virtually non-existent in a fluid bed boiler. Fuel is continually recirculated within the fluidized bed until fully combusted. A small stream of sand from the bed is continually withdrawn, screened and returned to the boiler, along with additional make-up sand as required. A small amount of noncombustible material such as rock, slag, glass or metal, is screened out of the bed material and collected for periodic disposal. The sand silo will be located within the boiler building and will have an atmospheric vent equipped with a filter to minimize fugitive emissions.

2.4 Water Systems

The power generation process will utilize two recirculating water systems; a steam generation system and a cooling water system. In the steam generation cycle, feedwater will be pumped through heat exchangers that will recover heat from downstream operations and into the boiler. The water will be circulated through metal tubes within the boiler where it will be converted to superheated steam. The steam will then used to power a turbine which will mechanically drive an electric generator. After leaving the turbine, the steam will be cooled back to the liquid state in a condenser and returned to the feedwater pumps. In order to prevent the build up of contaminants in the recirculating steam system, a small fraction of the water will be "blown down" to the wastewater system.

The cooling water cycle will pump water to the steam condenser to remove heat and return the steam to water. The heated cooling water leaving the condenser will be delivered to a wet cooling tower. In the cooling tower, the water will be sprayed over the top of packing material and will pass down through counterflowing ambient air drawn through the tower by large fans mounted in the top of the unit. The water will be cooled by both heat transfer and evaporation as it passes through the tower in an induced air stream. The exhaust system of the cooling tower will be equipped with mesh drift eliminators that will control entrained water droplets to less than 0.0005% of the recirculating water flow. The cooled water leaving the tower will be returned to the steam condenser system. Similar to the steam cycle, a portion of the recirculating water will be blow down to the wastewater discharge system to prevent the accumulation of contaminants.

The water for the Facility will be provided by the Berlin Water Works municipal supply and distribution system. The Facility will require up to 1.8 million gallons per day of water, primarily for cooling tower make-up, with the balance used to produce demineralized make-up water for the boiler, for human consumption, sanitary uses, and for other miscellaneous uses. A trailer mounted water treatment system will be used to provide demineralized water to be used for steam cycle makeup for the boiler. A 15,000 gallon demineralized water tank will be used for on-site storage.

Sanitary drains will collect and route the wastewater from potable uses to the city sewer system. Water treatment for the boiler make-up water will consist of reverse osmosis and a treatment program consisting of phosphate, caustic, neutralizing amine and oxygen scavenger for water used in the closed loop steam system. The cooling water treatment program for the cooling tower makeup water will consist of corrosion inhibitor, dispersant and biocides to prevent biological growth in the cooling system components. All process wastewater, including water collected in floor drains from equipment cleaning, will be discharged to the city sewer system. The Facility will discharge up to 300,000 gallons per day of sanitary and process wastewater to the municipal sewer system. It is not expected that the Facility wastewater will require any pretreatment to meet all applicable state and city discharge requirements.

The primary source of water for fire protection will also be city water. A motor-driven fire pump will be used at the Facility, with a diesel fire pump as a backup system. The entire wood storage area and power block will be served by an underground hydrant system. A wet standpipe system will be installed in all heated buildings. Unheated buildings and wood conveyers will be served by a dry standpipe with sprinklers. Portable hand extinguishers will be located throughout the Facility. Office areas will be equipped with wet pipe sprinkler systems. The steam turbine generator, lube oil tank area and the main transformer will be served with dry pipe, open spray deluge systems. All fire detection and alarm systems will be installed to meet their respective NFPA codes.

2.5 Air Pollution Control Systems

The BFB technology used in the boiler's combustion system represents state-of-the-art in efficient fuel conversion and emissions minimization. By maximizing combustion efficiency, the BFB technology generates vastly lower emissions of pollutants resulting from incomplete combustion such as carbon monoxide (CO) and volatile organic compounds (VOC). The combustion system also incorporates flue gas recirculation (FGR), a technology that cools the combustion process and reduces the formation of NO_X.

In addition to the inherently low emitting technology of the combustion system, the Facility will incorporate a number of additional systems that represent BACT and LAER technology to further minimize air emissions.

A mechanical dust collection system will be installed on the boiler immediately downstream of the air heater outlet to reduce particulate loading on the electrostatic precipitator (ESP) and to protect the ID fan from excessive wear. The dust collection system will have an efficiency of at least 80%. The ash collected will be classified and re-injected into the boiler. In addition to the mechanical dust collectors, the existing ESP will be expanded and upgraded to maximize control of particulate emissions and meet the BACT emission limits. The ESP will provide greater than 99% control of PM emissions.

A cold selective catalytic reduction (CSCR) system will be installed downstream of the ESP for the control NO_X emissions. The CSCR system will utilize aqueous ammonia (NH_3) that will be injected into the flue gas in a stoichiometric ratio proportional to the mass of NO_X to be removed. The aqueous NH_3 will evaporate in the inlet header. The flue gas and NH_3 will then pass through two beds of catalyst where the NO_X in the flue gas will be converted into nitrogen and water. An ammonia injection control system will be installed to accurately inject the correct amount of ammonia into the flue gas stream upstream of the catalyst to provide optimum control and minimization of both NO_X and NH_3 and assure compliance with permit limits. The NH_3 for the CSCR system will be stored on-site in 19% aqueous solution in a storage tank equipped with secondary containment. The NH_3 storage tank will include an unloading system to accept deliveries by truck.

The existing 320-foot tall, 11.25" diameter boiler exhaust stack will be used. A continuous emissions monitoring system (CEMS) will be installed on the boiler stack to monitor compliance with the permitted emission limits. The CEMS will monitor the concentrations of oxygen, CO and NO_X and will be certified to meet all applicable NSPS, Acid Rain Program, and NHDES requirements. A certified continuous opacity monitoring system (COMS) will also be installed on the boiler stack to monitor compliance with Facility opacity limits.

2.6 Electrical Interconnection

The Facility will generate electrical power for its own operation and export the excess generated power to the Public Service of New Hampshire (PSNH) 115 kV system. A small switchyard will be installed adjacent to the turbine building, which will provide necessary power isolation systems and a step up transformer to increase the voltage of the power produced by the steam turbine generator to 115 kVA, consistent with the PSNH transmission line. From the switchyard, an underground transmission cable will be installed first through a new on-site duct bank, and then through an existing underground pipe formerly used to transport pulp from the site to the Fraser Gorham paper mill. The underground pipe leaves the Site near the intersection of Coos and Community Streets and generally follows the route of the former rail line from the site to Shelby Street. The transmission cable will transition to an overhead line approximately 0.75 miles south of the Site and 0.1 miles northwest of the existing East Side substation. The overhead transmission line will be installed within the existing cleared corridor between Shelby Street and the substation.

3.0 FACILITY EMISSIONS

The Facility will be equipped with state-of-the-art emissions control systems to minimize air emissions and ambient air quality impacts. The Facility will comply with all applicable NH State Air Pollution Control Regulations. The Facility will implement LAER for its NO_X emissions, and BACT for all regulated NSR pollutants with potential emissions that exceed the significance levels defined in the PSD regulations. The emissions from the Facility will also comply with the applicable NSPS and NESHAP/MACT emission standards.

The maximum stack concentrations and emission rates proposed for each pollutant from each emissions source are summarized on Table 3.1. The biomass boiler maximum stack concentrations and emission rates do not apply at loads less than 70% of maximum load. The biomass boiler will not operate at steady-state at loads less than 70% of maximum load, except for during periods of startup and shutdown. The maximum lb/hr emission rates presented in Table 3.1 are derived from the maximum lb/MMBtu emission rate for each pollutant, the maximum heat input rate to the boiler (1,013 MMBtu/hr), and a 10% factor to account for expected short-term variability in the exhaust gas volumetric flow rate from the boiler.

The potential emissions from the Facility, including emissions occurring during startup periods, and fugitive emissions resulting from wood fuel storage and handling activities, are summarized on Table 3.2. The potential emissions for the biomass boiler presented in Table 3.2 are derived from the maximum lb/MMBtu emission rate for each pollutant and the average annual heat input rate for the boiler (932 MMBtu/hr). The potential emissions calculation summaries for the Facility emission sources are included in Appendix A of the application.

3.1 Biomass Boiler Emissions

3.1.1 Nitrogen Oxides

Emissions of NO_X result from excess air in the high temperature regions of a boiler and oxidation of nitrogen in fuel. The Facility's boiler will utilize a bubbling fluidized bed that provides staged combustion of the wood fuel and minimizes thermal NO_x formation. To meet the requirements of the NH RPS program, the Facility will limit its wood biomass fuel to clean sources of wood, which can help minimize NO_X formation resulting from fuel-bound nitrogen. Good combustion practices and the use of a BFB combustion process will help optimize the combustion temperature in the boiler to minimize thermal NO_X formation. A highly efficient Selective Catalytic Reduction (SCR) system will eliminate over 70% of NO_X emissions formed within the boiler. The SCR system will inject vaporized aqueous NH_3 into the hot exhaust gas path which will react with the NOx in the exhaust gas to form nitrogen and water vapor as the exhaust gases pass through the catalyst beds. The use of the BFB technology, clean wood fuel, good combustion practices, and SCR will result in a NO_X emission rate from the biomass boiler no greater than 0.065 lb/MMBtu of heat input based on a 30-day rolling average during normal operation.

3.1.2 Carbon Monoxide

CO emissions are associated with incomplete combustion of fuel in a boiler. These emissions will be minimized by utilizing the highly efficient BFB combustion technology. The wood fuel will be combusted in a heated bed of sand-like material which is fluidized within a rising column of air. The hot bed material effectively liberates the carbon in the wood fuel, which allows the oxygen (O_2) in the combustion air to more freely react with the fuel, resulting in an efficient combustion process. The air to fuel ratio and combustion temperature in the boiler will be optimized and monitored to achieve the desired balance between CO and NO_X emissions. As mentioned earlier, the Facility also will utilize a fuel preparation system that will help optimize the quality, size and moisture content to promote efficient combustion, which will also help mitigate CO formation. The use of BFB combustion technology in the boiler design, good combustion practices, and fuel type will result in a CO emission rate from the biomass boiler no greater than 0.075 lb/MMBtu of heat input based on a 24-hour daily block average during normal operation.

3.1.3 Sulfur Dioxide / Sulfuric Acid Mist

Emissions of sulfur compounds result from oxidation of sulfur contained in a fuel. The Facility will utilize wood fuel which has an inherently low sulfur content to maintain SO_2 no greater than 0.025 lb/MMBtu of heat input during normal operation. The characteristics of wood fly ash also serve to capture much of the sulfur compounds and further minimize emissions. Based on experience with other generating facilities using an SCR control system, no more 10% of the SO_2 generated in the boiler is expected to be further oxidized to SO_3, which will combine with water vapor in the flue gas to produce sulfuric acid mist (H_2SO_4). The resulting H_2SO_4 emission rate is expected to be less than 0.004 lbs/MMBtu of heat input.

3.1.4 Particulate Matter

Particulate matter is generated in a boiler by incomplete combustion and the non-combustible fraction of a fuel. The BFB combustion technology and operating controls provide a greater degree of complete combustion than most other wood fired boiler designs. The boiler’s ESP will abate over 99 percent of the particulate emissions formed in the boiler. These measures will result in a filterable PM/PM_{10}/$PM_{2.5}$ emission rate no greater than 0.012 lb/MMBtu of heat input during normal operation.

3.1.5 Volatile Organic Compounds

Like CO, VOC emissions are formed by incomplete combustion of fuel. VOC emissions from the biomass boiler at the Facility will be minimized utilizing BFB combustion technology. The Facility will also utilize clean wood fuel, which can help promote efficient combustion, which will further minimize VOC emissions. The use of BFB combustion technology in the boiler design, good combustion practices, and woody biomass fuel will result in a VOC emission rate from the biomass boiler no greater than 0.010 lb/MMBtu of heat input during normal operation.

3.1.6 Ammonia

The SCR emissions control systems will utilize aqueous ammonia to reduce the NO_X emissions from the boiler by injecting this NH_3 into the flue gas stream upstream of an SCR catalyst. The NO_X and NH_3 will react to form nitrogen (N_2) and water (H_2O). While this system is efficient for the conversion of NOx emissions to form nitrogen and water, a small fraction of the injected NH_3 will pass through unreacted. This unreacted NH_3 is referred to as NH_3 slip. The SCR system to be utilized at the Facility will be designed to maintain a stack NH_3 slip concentration of no greater than 20 ppmvd@7%O_2 during normal operation.

3.1.7 Hazardous Air Pollutants

HAP emissions from the biomass boiler at the Facility will be controlled utilizing BFB technology. The Facility will also employ measures to provide a wood fuel to the boiler of good quality, size and moisture content to promote efficient combustion, which will further minimize HAP formation. The use of BFB combustion technology in the boiler design and good combustion practices will minimize the HAP emissions from the boiler during normal operation.

3.1.8 Carbon Dioxide

The use of biomass energy has the potential to greatly reduce greenhouse gas emissions in this biosphere over the life cycle of these technologies. Fossil fuels release carbon dioxide captured by photosynthesis millions of years ago — an essentially "new" greenhouse gas emission. Biomass, on the other hand, releases carbon dioxide that is, for the most part, already a part of the natural environment and is therefore balanced by the carbon dioxide captured in its own growth as well as new growth.

The direct firing of Biomass is recognized as carbon neutral by many of the world's energy experts. The National Renewable Energy Laboratory (NREL), as part of the US Department of Energy published a study in January 2004 entitled "Biomass Power and Conventional Fossil Systems with and without CO_2 Sequestration – Comparing the Energy Balance, Greenhouse Gas Emissions and Economics". The study was a comparison of the Global Warming Potential (GWP) of a standardized 600 MW power plant (or in the case of direct fired biomass, several smaller plants totaling 600 MW) to determine the effect on global warming over the complete life cycle of each process. The study included fossil fuel fired and biomass fired plants with and without carbon sequestration (recovery of CO_2 emissions). The study concluded that, for direct fired biomass plants without carbon sequestration, the total CO_2 emitted was actually a negative value when considering the avoided emissions from land-filling and mulching and the additional emissions of harvesting and transportation, of the same quantity of biomass. The GWP was a reduction of 148% when compared to a similar-sized coal fired power plant.

Similarly, the International Panel on Climate Change (IPCC) Task Force on National Greenhouse Gas Inventories published its "2006 IPCC Guidelines for National Greenhouse Gas Inventories". The document recommends that the CO_2 emissions from the combustion of wood and paper waste for the purposes of producing energy be excluded from national inventories as "biogenic emissions". It further states that where both fossil-based wastes (e.g. plastic, waste oil, rubber) are fired with biogenic-based wastes (e.g. wood, paper,), only the fossil-based portion of the CO_2 emissions be considered in national CO_2 inventories.

There are no add-on control systems available to control CO_2 emissions from wood-fired boilers. The use of BFB combustion technology in the boiler design, however assures a high degree of heat transfer from the fuel, thus minimizing the quantity of CO_2 released per MW of power produced.

3.1.9 Emissions During Startup & Shutdown

During cold startups, a three phase process will be used. Initially, the biomass boiler will be operated on ULSD fuel over a period of six-to-eight hours until stable operating temperatures are achieved in the bed and boiler heat transfer surfaces. The next phase will be the gradual introduction of solid fuel and the reduction of fuel oil until the steaming rate is gradually increased to 50% over a two-to-three hour period and the fuel transitions to 100% biomass. The last phase is the gradual ramping up of steaming load from 50% to 70% capacity over a period of one-to-two hours. Therefore, a typical cold total startup period is expected to be approximately 10-12 hours in duration to achieve steady-state biomass operation. The durations of startup periods for hot and warm starts of the boiler will be shorter.

The potential emissions during startup periods have been estimated on Table 3.2. The boiler startup emissions estimates provided in Table 3.2 are based on a total of 6 cold starts per year of the biomass boiler. These emissions estimates are conservative in that boiler startups will typically be warm or hot starts of shorter duration and fewer emissions. For the purposes of the potential emissions calculations, it has been assumed that up to 72 hours of annual boiler operation will be during startup periods. Emissions during shutdown periods have been aggregated with emissions during normal operation.

The Facility will conduct emissions testing to determine the actual emissions from the biomass boiler during startup and shutdown periods. Permitted emissions for such periods will be determined from the results of startup/shutdown emissions testing.

3.2 Other Stationary Emissions Sources

3.2.1 Cooling Tower

Wet cooling towers provide direct contact between the cooling water and the air stream being drawn through the tower. A portion of the cooling water can be entrained in the air stream. The water droplets entrained in the air stream is classified as drift, which results in particulate emissions from the solids contained in the droplets as the water evaporates. The quantity of the drift and resulting particulate emissions are primarily determined by the design and operation of the cooling tower.

The formation of drift and the resulting particulate emissions will be minimized by controlling the dissolved solids content of the recirculating water and controlling water droplet drift.

Drift eliminators are designed to remove the water droplets from the air stream before it exits the tower. The exhaust system of the Facility cooling tower will be equipped with mesh drift eliminators that will control entrained water droplets to less than 0.0005% of the recirculating water flow and minimize particulate emissions to maximum extent achievable for a wet cooling tower.

3.2.2 Emergency Generator

The Facility will include a 500 kW emergency diesel generator set. The emergency generator will be fired with ULSD fuel to minimize SO2 and PM emissions and will be certified to meet the applicable EPA Tier 2 emission standards for diesel engines. The emergency generator will be limited to 300 hours of operation per year, and other than one hour per day for maintenance and testing, will not be operated concurrently with the biomass boiler.

3.2.3 Diesel Firewater Pump

The Facility will also include a 288 horsepower diesel fire pump. The diesel fire pump will be fired with ULSD fuel to minimize SO2 and PM emissions and will be certified to meet the applicable EPA Tier 2 emission standards for diesel engines. The diesel fire pump will be limited to 300 hours of operation per year, and other than one hour per day for maintenance and testing, will not be operated concurrently with the biomass boiler.

3.3 Fugitive Emissions

Fugitive dust emissions potentially resulting from truck traffic on Site roadways and from wood fuel storage and handling operations will be minimized through a number of Best Management Practices and equipment designs. These measures will include the use of paved roadways, regular sweeping of roadways, wetting of fuel storage piles as needed during prolonged dry periods, and the use of covered trucks and conveyor systems. Fugitive dust emissions from the Facility's wood fuel handling and storage areas have been estimated using EPA published emission factors.

4.0 REGULATORY FRAMEWORK

The United States Environmental Protection Agency (US EPA) and the NHDES have established several regulations to assure that emissions sources such as those associated with the Facility do not result in adverse impacts to human health or the environment. This section provides a discussion of the applicability of those regulations, a summary of the requirements imposed by the regulations that apply to the Facility, and a discussion of how the applicable requirements will be met.

4.1 State and Federal Permitting Requirements

4.1.1 State Air Permit

NHCAR Chapter Env-A 600 establishes the statewide permit system to regulate the operation and modification of new and existing stationary sources. It requires all stationary sources to possess a temporary permit, state permit to operate, or Title V operating permit prior to construction, installation, operation, or material modification of the source. NHCAR Env-A 700 establishes a fee system for the review and issuance of state permits. NHCAR Env-A 1700 states the information required for all applications for permits.

The Facility will include a boiler, which will be a stationary source using wood with a design rating greater than 2 MMBtu per hour of gross heat input. Therefore, in accordance with NHCAR Part Env-A 607, LBB is required to obtain a temporary permit prior to the construction of the Facility. The application to the NHDES, Air Resources Division, for the temporary permit, must include the required application forms and meet the applicable requirements of NHCAR Part Env-A 607.03 (temporary permit application requirements), Env-A 702.01 (temporary permit application review fees), and Env-A 1703 through Env-A 1709 (application forms).

The application must demonstrate compliance with all applicable elements of the State Implementation Plan (SIP). It also must demonstrate that the proposed Facility will not cause or contribute to an exceedance of the State Ambient Air Quality Standards (NHCAR Chapter Env-A 300) and will comply with applicable state law governing pollution, and all other Applicable requirements.

This application document satisfies the requirements for a temporary permit application. It includes the required completed application forms (Section 9), and addresses compliance with the applicable state and federal air permitting and pollution control requirements for the Facility (Section 4). It also includes an air dispersion analysis that demonstrates that the emissions from the Facility will not cause or contribute to an exceedance of state ambient air quality standards (Section 7).

The temporary permit for the Facility will expire 18 months after the date of its issuance. LBB will file an application for a Title V Operating Permit at least 90 days prior to the designated expiration date of the temporary permit. The Title V Operating Permit application for the Facility will meet all of the applicable requirements of NHCAR Part Env-A 609.

4.1.2 Nonattainment Review

The Facility will be a major stationary source of NO_X emissions, with potential emissions greater than 100 tons per year. Coos County is designated as being in attainment for ozone, however is within the New Hampshire portion of the Northeast Ozone Transport Region. The Facility will therefore be subject to state nonattainment review (NHCAR Part Env-A 618), which requires the implementation of LAER, and the acquisition of offsets for its NO_X emissions.

LAER is defined as the most stringent emissions limitation which is contained in the implementation plan of any State for such a class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or the most stringent emission limitation which is achieved in practice by such class or category of source, whichever is more stringent. LAER will be implemented for the NO_X emissions from the Facility. The LAER analysis conducted for the Facility, and the LAER proposal for its NO_X emissions, is included in Section 5.

Sources subject to NH nonattainment review are required to obtain sufficient emission reductions from other sources so that the emissions from the source are less than the emission reductions. A new or modified source located in New Hampshire, outside of the 4-county ozone classified nonattainment region, must achieve an emissions offset ratio of at least 1.15 to 1. For a source located outside of the ozone classified or not classified nonattainment regions of the state, the offsets may be obtained from donor sources located anywhere within the northeast ozone transport region. Offsets obtained outside of New Hampshire are subject to the approval of the state or governing jurisdiction in which the offset donor source is located, as ensured by a federally enforceable permit, or other federally enforceable document. The emission reductions must be identified prior to issuance of the permit approval.

LBB will acquire sufficient emission reductions to offset the annual NO_X emissions from the Facility by a ratio of at least 1.15 to 1 prior to commencing operation, in accordance with the NHDES nonattainment review requirements. LBB will identify the source of the offsets prior to issuance of the temporary permit approval.

New sources subject to NH nonattainment review are also required to demonstrate that the benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location and construction by providing an analysis of alternative sites, sizes , production processes, and environmental control techniques.

LBB's business model is to develop biomass generating facilities at sites with existing infrastructure that meet specified criteria. LBB was made aware of the attributes associated with the Project Site that were found to be consistent with their business model. These attributes include:

- an existing boiler system which can be upgraded to function as efficient biomass fueled generating facilities and meet all applicable environmental requirements;

- proximity to fuel suppliers;
- accessibility to truck routes and/or rail lines for the delivery of fuel;
- proximity to transmission lines and an electrical interconnection;
- adequate water supply and delivery systems;
- adequate wastewater treatment infrastructure and treatment capacity; and
- a local workforce with the skills necessary to operate a generating facility

The former Pulp Mill site in Berlin uniquely satisfies all of LBB's criteria for a biomass generating facility. The former black liquor recovery boiler provides a unique opportunity to upgrade and convert existing equipment for renewable energy generation. The Site provides adequate acreage for the development of the Facility, as well as for other tenants, who could potentially provide synergistic services, bringing much needed jobs, taxes, and other revenues to the City of Berlin. The Site's history as a Pulp Mill and location within the North Country provide unique demonstrated access to a wood supply that is more than adequate to meet the Project's needs. There is a well trained local workforce within the City of Berlin that has direct experience with the Site and boiler operations. The former Pulp Mill site was the ideal site that met each of the criteria established by LBB for the siting of such a facility.

Alternate locations of site equipment, roadways, fuel piles, and conveying systems were considered during the Facility design process. As a result of the consideration of reasonable alternatives, the current Site Plan was determined to best facilitate efficient Facility operation, while minimizing impacts to natural resources and the surrounding community, and preserving adequate acreage for additional tenants at the site to potentially provide synergistic services to the Facility.

The selection of generation technology for the Facility was driven by the capabilities of the existing equipment on the Site, the large available supply of wood biomass fuel from regional sources, and the need for additional renewable energy sources in the state to meet its RPS goals.

LBB considered the benefits and impacts associated with the use of either a mechanical draft wet cooling tower or an air cooled condenser to meet the Project's cooling demand. The impacts considered for this analysis included water use, wastewater discharge, equipment footprint, impervious area, noise, emissions, and cost.

The use of a wet cooling tower will result in more efficient Facility operation, less fuel use, and fewer emissions for the same power output as an air-cooled facility. The use of the wet cooling tower, with a much smaller footprint, minimizes the overall Project footprint. There will also be lower noise levels associated with the use of wet cooling technology. As a result of this analysis, the use of a wet cooling tower was determined to be a preferred alternative for the Facility over an air-cooled condenser.

Several different control technologies were evaluated for use at the Facility. Section 5 of this application provides details of the emissions control technologies considered for the Facility for the determination of BACT and LAER.

This alternatives analysis demonstrates that the benefits of the Facility significantly outweigh the environmental and social costs imposed as a result of its location and construction.

4.1.3 Prevention of Significant Deterioration of Air Quality

As a new major stationary source located in an attainment area, the Facility will also be subject to the applicable PSD permit requirements. The NHDES has implemented the federal PSD Program permitting requirements (NHCAR Part Env-A 619) to determine if a new major stationary source will cause or contribute to significant deterioration of air quality in the state.

The PSD requirements include the completion of an air dispersion modeling analysis to demonstrate that the Project will not cause or contribute to an exceedance of the NAAQS, and that the maximum increases in pollutant concentrations over the existing baseline do not exceed the allowable PSD increments. Section 7 details the air dispersion modeling analysis conducted for the Facility to demonstrate compliance with the PSD requirements.

The PSD program requires the implementation of BACT for each regulated NSR pollutant with potential emissions above the significance thresholds. Section 5 details the BACT analysis conducted for the Facility for each applicable pollutant.

The PSD program requires an analysis of ambient air quality in the area the source would affect for each pollutant with a potential to emit above the specified significance levels. According to the NHDES "Guidance and Procedure for Performing Air Quality Impact Modeling in New Hampshire", July, 2006, background data for modeling compliance with AAQS are established by ambient air monitors located at various sites throughout the state. This guidance document directs sources to consult with NHDES on the most representative and appropriate background monitoring site to use for the modeling analysis. It also requires sources subject to the PSD requirements to consult with NHDES to determine the need for pre-construction ambient air monitoring.

The ambient air monitoring data from nearby monitors used to determine the background concentrations is representative of the area of the Facility. The maximum ambient air impacts from the Facility, as determined through air dispersion modeling, are below the Significant Monitoring Concentrations (SMC) established in the PSD rules. According to the PSD rules, the Administrator can exempt a source from pre-construction monitoring for a pollutant if the impact concentration for that pollutant is less than its respective SMC. Therefore, consistent with the PSD rules, a Preconstruction Monitoring Waiver is requested from NHDES for the Facility.

The PSD requirements also include additional impact analyses, including an analysis of the impairment to air quality, visibility, soils, and vegetation that would occur as a result of the source and general commercial, residential, industrial, and other growth associated with the source. There are also additional impact analyses that are required due to the proximity of the Facility to a designated Class I area. Section 7 provides details on the additional impact analyses conducted for the Facility to address the additional PSD impact analysis requirements.

4.2 State Emissions Control Requirements

In addition to requiring that projects control emissions sufficiently to prevent exceedances of NAAQS, NHDES has established other regulations that impose specific emissions limitations or control requirements for certain pollutants from regulated sources. The following sections summarize the state emission control requirements applicable to the Facility, as well as how the Facility will comply with those requirements.

4.2.1 Ambient Air Quality Standards

NHCAR Chapter Env-A 300 establishes ambient air quality standards (AAQS) for various types of pollutants emitted in or transported into the State of New Hampshire. The standards are intended to be protective of the public health (primary standards) and the public welfare (secondary standards). The rule requires that the designated state AAQS be at least as stringent as the NAAQS, and that they not allow the significant deterioration of existing air quality in any portion of the state.

An air dispersion modeling analysis has been completed, which demonstrates that the emissions from the Facility will not cause or contribute to an exceedance of the state AAQS. Section 7 details the air dispersion modeling analysis completed for the Facility.

4.2.2 Standards for Certain New or Modified Facilities and Sources of HAPS

NHCAR Chapter Env-A 500 establishes state standards to regulate certain new or modified facilities in accordance with authority delegated by the EPA under §111(c) of the Clean Air Act, and certain sources of HAPS in accordance with authority delegated by the EPA under §112(c) of the Clean Air Act. It mandates compliance with the general provisions and the listed subparts of the NSPS and NESHAPS for the specified source categories.

The Facility will be subject to the applicable requirements of the NSPS, 40 CFR 60. As a major source of HAP emissions, the Facility will also be subject to the applicable MACT requirements of the NESHAPS established in 40 CFR 63. Section 4.3 details the NSPS and NESHAPS requirements applicable to the Facility, and the how LBB will comply with those requirements.

4.2.3 Testing and Monitoring Procedures

NHCAR Chapter Env-A 800 establishes minimum testing and monitoring procedures, calculation procedures, standards, and requirements in order to determine compliance with applicable state and federal statutes and rules. An initial compliance stack test will be conducted to demonstrate the Facility's compliance with its permitted emission limits. This testing will be conducted in strict accordance with the procedures of NHCAR Part Env-A 802, including submittal of a pre-test notice and a pre-test protocol at least 30 days prior to testing, conducting a pre-test meeting with NHDES staff at least 15 days prior to the test date, and submittal of a final test report documenting the results of the test no more than 60 days after completion of testing.

The Facility will have a certified continuous opacity monitoring system (COMS) and a continuous emissions monitoring system (CEMS) installed on the exhaust stack to meet the requirements of 40 CFR 60. The Facility COMS and CEMS will meet the minimum specifications of NHCAR Part Env-A 808.03. A CEM Monitoring Plan that meets the requirements of NHCAR Part Env-A 808.04 will be submitted to NHDES at least 90 days prior to installation of the monitoring systems. The performance specification testing required by NHCAR Part Env-A 808.05 will be conducted on the COMS and CEMS at the Facility within 180 days of initial system startup.

A quality assurance/quality control (QA/QC) plan that meets the requirements of NHCAR Part Env-A 808.06 will be prepared for the Facility COMS and CEMS. The Facility QA/QC plan will be reviewed and revised on an annual basis. The Facility COMS and CEMS will undergo quarterly auditing, in accordance with the specifications of NHCAR Parts Env-A 808.07 through 808.09. A written summary report of the results of all required audits will be submitted to NHDES within 30 calendar days following the end of each calendar quarter. LBB will also file quarterly emission reports with the NHDES within 30 days following the end of each calendar quarter, in accordance with NHCAR Parts Env-A 808.11 and 808.12.

4.2.4 Recordkeeping and Reporting Obligations

NHCAR Chapter Env-A 900 specifies the records that must be kept at sources that discharge air pollutants so that the emissions of those pollutants can be readily calculated or estimated and reported to the NHDES for the purposes of demonstrating compliance, compiling emission inventories, and developing air-related strategic plans. To comply with this Part, LBB will maintain records relating to energy production, material usage, equipment manufacturers' specifications, material safety data sheets, and fuel consumption. Records of fuel type and consumption will be maintained on a monthly basis. All records will be kept on file for a minimum of 5 years.

NHCAR Part Env-A 905 includes specific emission recording requirements for all sources with actual NO_X emissions greater than 10 tons per year, such as the Facility. To comply with this Part, LBB will maintain the required operational and fuel use records, including its operation schedule specifically during ozone season.

LBB will submit an annual emissions report to NHDES on or before April 15 of the year following the year covered by the report. The annual reports will include the actual emissions from the Facility, including the emissions of each regulated air toxic pollutant, as well as the annual Facility hours of operation and fuel usage, and any other information required to demonstrate compliance with the Facility's permit approvals.

In the event of a permit deviation, Facility personnel will investigate and take immediate corrective action to restore the affected device to within allowable permit levels. All information related to the permit deviation will be recorded, including the probable cause, duration, any corrective actions taken, and the amount of excess emissions which occurred as a result of the permit deviation. LBB will provide NHDES with the required notifications of permit deviations and submit semiannual reports that summarize all permit deviations reported during the previous reporting period.

4.2.5 Prevention, Abatement and Control of Open Source Air Pollution

NHCAR Part Env-A 1002 limits open air source pollution by regulating the direct emissions of particulate matter from mining, transportation, storage, use, and removal activities. It applies to activities that emit fugitive dust within the state, including commercial mining, construction, maintenance, demolition, bulk hauling, and storage activities. It requires that precautions be taken throughout the duration of such activities to prevent, abate, and control the emission of fugitive dust, including wetting, covering, shielding, or vacuuming. LBB will utilize such measures during the construction of the Facility, and for wood fuel transport and storage activities conducted during operation, to minimize the emissions of fugitive dust resulting from those activities.

4.2.6 Prevention, Abatement and Control of Stationary Source Air Pollution

NHCAR Part Env-A 1204 implements Reasonably Available Control Technology (RACT) requirements for certain VOC emitting sources in New Hampshire. The Facility does not have potential VOC emissions of 50 tons or more per year, and is therefore not subject to the NH VOC RACT regulations.

NHCAR Part Env-A 1211 implements the NO_X RACT requirements for sources in New Hampshire. According to NHCAR Part Env-A 1211.01(c), the NH NO_X RACT rule applies to electric steam utility boilers with a maximum heat input rate of 50 MMBtu or more. The Facility biomass boiler is subject to the NH NO_X RACT rule, and is required to meet the emission standards for electric utility boilers established in NHCAR Part Env-A 1211.04. The NO_X emission limits for electric utility boilers with a maximum heat input rate of 100 MMBtu or more, firing wood fuel, are 0.33 lb/MMBtu for boilers equipped with a traveling, shaker, or vibrating grate, and 0.25 lb/MMBtu for boilers equipped with a stationary grate, based on a 24-hour calendar day average.

The biomass boiler at the Facility will meet the applicable NH NO_X RACT emission standard. Compliance with the NO_X RACT emission standard will be demonstrated through the use of a certified CEMS. LBB will meet the applicable recordkeeping and reporting requirements of NHCAR Chapter Env-A 900 to satisfy the NO_X RACT rule.

NHCAR Part Env-A 1211.11 establishes emission standards and control options for emergency generators. It applies to emergency generators located at a source with potential NO_X emissions greater than 50 tons per year, unless the operation of the emergency generators at the source are limited to less than 500 during any consecutive 12-month period, and the potential NO_X emissions from the emergency generators are limited to less than 25 tons for any consecutive 12-month period. The emergency generator and fire pump at the Facility will be limited to 300 hours of operation during any consecutive 12-month period, and will have permitted potential

NO_X emissions less than 25 tons per consecutive 12-month period. Therefore the emergency generator and fire pump are exempt from the provisions of NHCAR Part Env-A 1211.11.

4.2.7 Regulated Toxic Air Pollutants

NHCAR Chapter Env-A 1400 establishes rules to prevent, control, abate and limit the emissions of toxic air pollutants into the ambient air to promote public health. One of the source categories which is exempt from the requirements of the rule is the combustion of untreated wood. Therefore, the emissions from the biomass boiler are not subject to the state regulated toxic air pollutants rule requirements. Both the emergency generator and the fire pump will utilize virgin distillate fuel oil and are similarly exempt from the NH air toxics regulation.

There will be emissions of NH_3 from the SCR emissions control system. Additionally, the use of certain water treatment chemicals in the cooling tower will result in emissions of sodium bisulfite and sodium hydroxide (contained in the cooling tower drift) above the de-minimis emission rate levels specified in Env-A 1400. The air dispersion modeling analysis conducted for the Facility demonstrates that the maximum predicted ambient air impacts for NH_3, sodium bisulfite, and sodium hydroxide, at or beyond the property line, are less than the respective 24-hour and annual ambient air limits (AALs) established in Table 1450-1 of NHCAR Chapter Env-A 1400. The Facility will therefore comply with the NH Regulated Air Toxics rule.

4.2.8 Fuel Specifications

NHCAR Chapter Env-A 1600 establishes limits on the content of fuels used in combustion processes to limit the emissions of pollutants into the ambient air. It contains content limitations for specified liquid, gaseous, and solid fuels. However, wood fuel is not listed as a solid fuel subject to this Chapter; therefore the Facility is not subject to its solid fuel requirements and limitations.

The Facility will utilize ULSD for the boiler startup burners, the emergency generator, and the diesel fire pump. NHCAR Part 1604.01 limits the sulfur content of No.2 distillate oil to 0.40 percent sulfur by weight. The Facility will utilize ULSD with a sulfur content of 0.0015 percent by weight, and will therefore comply with the state fuel oil sulfur content standard.

4.2.9 Fuel Burning Devices

NHCAR Chapter Env-A 2000 establishes emission standards for particulate matter and visible emissions from stationary fuel burning devices. For stationary fuel burning devices installed after May 13, 1970, the owner or operator may not cause or allow average opacity in excess of 20% for any continuous 6-minute period. For steam generating units subject to NSPS, during periods of startup, shutdown, and malfunction, average opacity is allowed in excess of 20% for one period of 6 continuous minutes in any 60-minute period. For stationary fuel burning devices installed after January 1, 1985, with a maximum gross heat input rate equal to or greater than 250 MMBtu/hr, the maximum allowable particulate matter emission rate is 0.10 lb/MMBtu.

A certified COMS will be installed on the boiler exhaust stack to monitor and record continuous compliance with the state opacity limits for fuel burning devices. The maximum PM emission rate from the biomass boiler of 0.012 lb/MMBtu complies with the state particulate matter emission standard. A stack test will be conducted to demonstrate compliance with the state particulate matter standard, in accordance with the requirements specified in Env-A 802.02.

The emergency generator and the diesel fire pump, each with a maximum heat input rating less than 100 MMBtu/hr, and installed after January 1, 1985, will be subject to a particulate matter emission limit of 0.30 lb/MMBtu. Both sources will be certified by their manufacturer to meet this emission standard.

4.2.10 NO_X Budget Trading Program

NHCAR Chapter Env-A 3200 implements the NO_X Budget Program, which requires reductions in ozone season NO_X emissions from budget sources to achieve the NAAQS for ozone. A NO_X budget source is defined as a fossil fuel fired boiler or heat exchanger with a maximum rated heat input capacity of 250 MMBtu/hr or more, and all electric generating devices with a rated output of 15 MW or more. An electric generating device is defined in the regulation as any fossil-fuel fired combustion device of 15 MW capacity or greater which provides electricity for sale or use.

The biomass boiler at the Facility will utilize wood fuel, not a fossil fuel, for the generation of electricity. The boiler is therefore not a NO_X budget source, and the Facility is not subject to the requirements of the NO_X Budget Program.

4.2.11 NO_X Emissions Reduction Fund for NO_X Emitting Generation Sources

NHCAR Chapter Env-A 3700 requires NO_X emitting generation sources to report power generation and NO_X emissions information, and to either acquire emissions reduction credit mechanisms, or to make direct payment of fees to the NO_X emissions reduction fund. NO_X emitting generation sources are defined as any internal combustion engine or combustion turbine which generates electricity for use or sale, except for sources which meet the definition of a NO_X budget source.

The biomass boiler at the Facility does not meet the definition of a NO_X emitting generation source, as it is not an internal combustion engine nor a combustion turbine. The Facility is therefore not subject to the requirements of NHCAR Chapter Env-A 3700.

4.2.12 Carbon Dioxide (CO_2) Budget Trading Program

NHCAR Chapter Env-A 4600 establishes the NH State CO_2 Budget Trading Program, which is designed to stabilize, and then reduce anthropogenic emissions of CO_2, a greenhouse gas, from CO_2 budget sources in the state, in an economically efficient manner. This program applies to any unit that, at any time on or after January 1, 2005, serves an electricity generator with a nameplate capacity equal to or greater than 25 MWe. A unit is defined as a fossil-fuel fired stationary boiler, combustion turbine, or combined cycle system. A source that includes one or more of such units is a CO_2 budget source.

The biomass boiler at the Facility will utilize wood fuel, not a fossil fuel, for the generation of electricity. As the Facility will utilize ULSD fuel only for startup, the boiler is not a CO_2 budget source, and the Facility is not subject to the requirements of the CO_2 Budget Trading Program.

4.3 Federal Emissions Control Requirements

4.3.1 New Source Performance Standards

4.3.1.1 Biomass Boiler

40 CFR 60, Subpart Db, "Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units" (Subpart Db), applies to steam generating units that are capable of combusting more than 100 MMBtu/hr heat input of fuel, and for which construction, modification, or reconstruction is commenced after June 19, 1984. The biomass boiler at the Facility is subject to the requirements of Subpart Db NSPS.

The PM emissions from an affected facility that commenced construction, reconstruction, or modification after February 28, 2005 must not exceed 0.10 lb/MMBtu heat input. The emissions must not exhibit greater than 20 percent opacity for a 6-minute average, except for one 6-minute period per hour of no more than 27 percent opacity. There are no SO_2 or NO_X emission limits established for wood-fired boilers in Subpart Db.

The oil-fired start up burners will take a federally enforceable limit to operate with less than a 10% annual capacity factor and will combust ULSD. Therefore, operation of the oil burners is not subject to the requirements of Subpart Db.

The Facility will demonstrate compliance with each applicable Subpart Db emission limit. An initial performance test will be conducted to demonstrate compliance with the PM emission limit. Subsequent PM performance tests will be conducted on an annual basis. A certified COMS will be installed on the boiler exhaust stack to continuously monitor and record compliance with the Subpart Db opacity standard. All monitoring systems will meet the design specifications and will undergo the certification and auditing procedures established in Subpart Db.

Written notification of the date construction of the boiler commenced will be postmarked within 30 days after that date. A notification of the actual date of initial startup will be postmarked within 15 days after that date. A notification of any physical or operational change which may increase the emission rate of any air pollutant for which a standard applies will be postmarked within 60 days or as soon as practicable before the change is commenced. A notification of the date upon which demonstration of the COMS/CEMS performance commences will be postmarked not less than 30 days prior to that date.

Records will be maintained at the Facility of all information needed to demonstrate compliance with Subpart Db, including performance tests, monitoring data, and calculations. The results of all performance tests and COMs/CEMS performance audits conducted at the Facility, and all recorded emissions data, including emissions exceedances, will be submitted to the Administrator semiannually for each six month period. All of the semiannual reports will be postmarked by the 30th day following the end of each six-month period.

4.3.1.2 Emergency Generator & Fire Pump

Stationary compression-ignition (CI) internal combustion engines (ICE) that commence construction after July 11, 2005, that are manufactured after April 8, 2006, and are not fire pump engines, must meet the requirements of 40 CFR 60, Subpart IIII, "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines." Subpart IIII also applies to certified National Fire Protection Association (NFPA) fire pump engines that are manufactured after July 1, 2006, and commence construction after July 11, 2005. Both the emergency generator and the diesel fire pump proposed for the Facility will be subject to this NSPS.

Owners and operators of 2007 model year or later emergency stationary CI ICE with a maximum engine power less than or equal to 2,237 kW and a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards for new non-road CI engines for the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants beginning in model year 2007. For new non-road CI engines with a model year after 2006 with a maximum engine power greater than 560 kW, the Tier 2 emission standards listed in 40 CFR 89.112, Table 1 apply. Fire pump engines must comply with the emission standards listed in Table 4 of the NSPS.

The diesel fuel fired by both the emergency generator and the fire pump must meet the requirements of 40 CFR 80.510(a), which limits the sulfur content to 500 ppm or less. Beginning October 1, 2010, the fuel requirements of 40 CFR 80.510(b) must be met, which limits fuel sulfur content to 15 ppm or less.

The emergency generator for the Facility will be certified by the manufacturer to meet the applicable emissions standards set forth at 40 CFR 89.112, Table 1, for Tier 2 engines. The diesel fire pump will be certified to meet the applicable emission standards set forth in Table 4 of the regulation. The emergency generator and the fire pump will be installed, configured and operated according to the manufacturer's specifications. The emergency generator and the fire pump will each be equipped with a non-resettable hour meter. Maintenance checks and readiness testing will be limited to 100 hours per year and annual operations of the emergency generator and the fire pump will be limited to 300 hours. The ULSD fuel fired by the emergency generator and the diesel fire pump will meet the NSPS fuel sulfur content limit.

Records will be kept of the operation of the emergency generator and the diesel fire pump, and of all non-emergency service that are recorded by the non-resettable hour meters. An initial notification will not be required for the emergency generator or the diesel fire pump, nor will there be any additional record keeping or reporting required to comply with the NSPS.

4.3.2 National Emissions Standards for Hazardous Air Pollutants

The EPA has also established NESHAPS (40 CFR 63) which require MACT for regulated emissions sources. These regulations apply to major HAP sources, or facilities with potential emissions greater than 25 tons per year of all listed HAPs or 10 tons per year of any individual listed HAP. The Facility will be a major source of HAP emissions and be subject to the General Provisions of 40 CFR 63 (Subpart A).

4.3.2.1 Biomass Boiler

40 CFR 63, Subpart DDDDD established national emission standards and operating limits for HAP emissions from institutional, commercial, and institutional boilers, process heaters, and electric steam utility generating boilers not fired by fossil fuels. Subpart DDDDD was vacated on June 8, 2007 for further documentation. Therefore, as a major source of HAP emissions, a case-by-case MACT determination is required for the Facility sources not subject to a 40 CFR 63 MACT standard, in accordance with 40 CFR 63, Subpart B. Section 6 details the case-by-case MACT determination conducted for the biomass boiler.

A notification of intention to construct a new affected source will be submitted in writing to the Administrator for the Facility. A notification of the actual date of startup of the Facility will be postmarked within 15 days after that date.

The Facility will be operated and maintained at all times in a manner consistent with safety and air pollution control practices for minimizing emissions. A written startup, shutdown, and malfunction plan will be developed for the Facility equipment, with procedures for operating and maintaining the equipment during such periods, and a program for corrective action during periods of equipment malfunction. Records will be kept at the Facility of all startup, shutdown, and malfunction periods, including all corrective actions taken, and compliance with the Facility plan for such periods.

A performance test will be conducted at representative operating conditions within 180 days of startup, to demonstrate compliance with the approved MACT emission standards. A notification of the performance test and a site-specific test plan will be submitted to the Administrator at least 60 days prior to the initial performance test. The results of the performance test will be submitted to the Administrator within 60 days following the completion of the testing.

Records will be kept at the Facility on the occurrence and duration of all startups, shutdowns, and equipment malfunctions, as well as on all required maintenance performed on all air pollution control and monitoring equipment. Records will also be kept of all performance tests and notifications. The Facility will submit semiannual reports of excess emissions to the Administrator.

4.3.2.2 Emergency Generator & Diesel Fire Pump

40 CFR 63, Subpart ZZZZ, establishes national emission and operating limitations for HAP emissions from stationary reciprocating internal combustion engines (RICE) located at major sources of HAP emissions. It also establishes requirements to demonstrate initial and continuous compliance with the emission and operating limitations.

In accordance with 40 CFR 63.6590(b)(1)(i), a new stationary emergency RICE with a site rating greater than 500 brake Hp does not have to meet the requirements of Subpart ZZZZ or the requirements of Subpart A, except for the initial notification requirements. The emergency generator proposed for the Facility meets the criteria for this limited requirement. An initial notification will be submitted for the emergency generator within 120 days after startup.

In accordance with 40 CFR 63.6590(c), a compression-ignition RICE with a site rating less than or equal to 500 brake Hp must meet the requirements of this part by meeting the requirements of 40 CFR 60, Subpart IIII. These criteria apply to the diesel fire pump at the Facility. The diesel fire pump will meet the requirements of 40 CFR 60, Subpart IIII, as described in Section 4.2.2.2.

5.0 BACT/LAER ANALYSIS

The PSD program requires the implementation of BACT for each regulated NSR pollutant with potential emissions above its respective significance threshold. For the Facility, these pollutants are NO_X, CO, PM, PM_{10}, $PM_{2.5}$, SO_2, and H_2SO_4. BACT is defined in the PSD rules as an emissions limitation based on the maximum degree of reduction for each pollutant, as determined on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, is achievable for such a source through the application of production processes or available methods, systems, or techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such a pollutant.

The determination of BACT is made through a "top-down" analysis of potentially viable control technologies starting with the approach that provides the greatest level of emission control. Technologies that result in higher emissions can only be considered if the more efficient control technology evaluated is determined to be either technically or economically infeasible. Applicants are required to consider all control measures that are potentially applicable and have been demonstrated in practice, including consideration of potential technology transfer from similar types of emissions sources. This requirement will assure that the emissions from the Facility are controlled to the greatest degree possible for a facility of this type.

The following steps are followed in this BACT top-down analysis:

Step 1 - Identify All Control Technologies

Step 2 - Eliminate Technologically Infeasible Options

Step 3 - Rank Remaining Control Technologies by Control Effectiveness

Step 4 - Cost Effectiveness Analysis

Step 5 - Select BACT

Control options are first evaluated for their technical feasibility. Options found to be technically feasible are ranked by control efficiency. In the event the most stringent level of control is ruled out due to cost, energy consumption, or environmental impacts, the next most stringent level of control is analyzed until BACT is determined. An analysis of other control technologies is not necessary if the technology proposed is the highest level of control found technically feasible.

As a major source of NO_X emissions located in the northeast ozone transport region, the Facility is also required to implement LAER for its NO_X emissions. LAER is defined as the most stringent emission limitation contained in any State Implementation Plan (SIP) for a source category, or the most stringent emissions limitation which is achieved in practice for a source category. LAER may be achieved by a combination of a change in the raw material processes, a process modification, and/or add-on emission controls.

To complete the BACT/LAER analysis for the Facility, control technologies demonstrated in practice for similar sources, and corresponding emission limits established by various state agencies and the EPA were reviewed. BACT/LAER determinations listed in the USEPA RACT/BACT/LAER Clearinghouse (RBLC), the South Coast Air Quality Management District BACT determinations, the California Air Resources Board's BACT Clearinghouse Database, and any available recently issued air permits were also reviewed. The review was limited to wood-fired boilers permitted since 2000. The information gathered from these sources was used in determining the proposed BACT/LAER emission levels. This control technology analysis demonstrates that the proposed biomass boiler emissions are consistent with recent BACT/LAER determinations for similar sources.

The following sections provide a discussion of the emission control techniques that were considered to control the emissions from the Facility and the selected BACT/LAER proposal for each pollutant.

5.1 Biomass Boiler

5.1.1 Nitrogen Oxides

NO_X emissions from boilers result from fuel-bound nitrogen and thermal NO_X formation in the combustion zone. Thermal NO_X is the predominate source of NO_X emissions for a boiler due to the high combustion temperatures. NO_X emissions from boilers are controlled though fuel optimization and combustion controls to minimize NO_X formation, and add-on air pollution control systems to reduce NO_X emissions.

5.1.1.1 Control Technologies

5.1.1.1.1 Selective Catalytic Reduction (SCR)

SCR using ammonia as a reagent represents the state-of-the-art and the most stringent level of control available for back-end NO_X removal for biomass-fired boilers. The technology uses ammonia (NH_3) to reduce NO_X to N_2 and H_2O in the presence of a catalyst. The general chemical reactions are:

$4NO + 4NH_3 + O_2 \rightarrow 4N_2 + 6H_2O$; and

$2NO_2 + 4NH_3 + O_2 \rightarrow 3N_2 + 6H_2O$.

Ammonia is injected into the SCR in excess of stoichiometric amounts to achieve maximum conversion of NO_X. Although this reduces NO_X emissions substantially, some of the ammonia does not react, passes through the SCR reactor, and is exhausted to the atmosphere. This is called "ammonia slip." The determination of the level for NH_3 "slip" is linked to the achievable NO_X level, in that achieving the lowest possible NO_X level will result in greater potential for NH_3 slip. Therefore, this LAER analysis considers the NO_X/NH_3 on a combined basis.

Several different types of catalysts can be used to accommodate various available flue gas temperatures. Base metal catalysts (typically containing vanadium and/or titanium oxides) have been commonly used in recent biomass boiler projects. Base metal catalysts are useful between 450°F and 800°F. Historically, SCR has been used successfully to achieve high levels of NO_X control (85 to 90%) where the catalyst can be placed in the ideal temperature zone of the combustion process. For natural gas and oil-fired combustion boilers, where PM emissions are relatively low, the catalyst is usually placed in the boiler exhaust prior to the economizer where temperatures allow for peak removal efficiency by the catalyst (Generally referred to as a 'hot-side' installation). However, in the case of biomass boilers, the high particulate matter loading from the combustion zone and boiler will cause the SCR catalyst bed to quickly plug. For applications with high PM loadings, such as coal and wood-fired boilers, one alternative is to locate the catalyst after the PM control device or "clean side" as it commonly referred to. Therefore, in order to achieve maximum NO_X control by 'hot side' SCR systems, the exhaust gas must then be re-heated to achieve the necessary higher temperatures (650°F to 800°F) prior to entering the SCR catalyst bed. The energy and equipment required to raise the exhaust gas temperature to the ideal range is extensive and very costly.

An alternative to this is the use of the same 'hot-side' SCR system; however, installing it in a location after the PM control device where the exhaust temperatures are at the lower end of the catalyst performance range (450°F to 600°F). This is commonly referred to as a 'cold-side' installation. Even at such a location, with proper gas and ammonia distribution across the catalyst bed, the SCR is able to achieve up to 70% NO_X removal. In a review of recent LAER determinations available from regulatory agencies or published in the BACT/LAER Clearinghouse database, the use of CSCR with a wood-fired boiler has been demonstrated to reduce NO_X to an emission rate of 0.065 lb/MMBtu.

5.1.1.1.2 Selective Non-Catalytic Reduction (SNCR)

Selective Non Catalytic Reduction (SNCR) is NO_X emissions control technology using the injection of a reagent NH_3 or Urea which in turn react with oxides of nitrogen to reduce those compounds to N_2 and water. This reaction takes place without the use of a catalyst but must take place in a narrow high temperature 'window' to be effective. The technique requires thorough mixing of the reagent into the furnace chamber with at least 0.5 seconds of residence time at a temperature above 1600ºF and below 2100ºF. Moderate NO_X reductions in the order of 40% to 60% are achievable in practice under ideal process and operating conditions.

5.1.1.1.3 Combustion Controls

Use of combustion controls to reduce NO_X is an available technology; however, there are limitations to its use on a biomass boiler. As mentioned above, the formation of NO_X from the combustion of wood is a result of two mechanisms; oxidation of nitrogen bound in the wood (fuel-bound NO_x) and the high temperature formation of NO_X from the nitrogen component of the required combustion air (thermal NO_X). Combustion controls for reduction consists primarily of staged combustion and control of the peak flame temperature by either use flue gas recirculation or controlled flame geometry. For solid-fuel fired combustion units, combustion controls have resulted in overall NO_X reductions in the range of 15% to 40%.

5.1.1.2 Prior BACT/LAER Determinations & Permit Limits

The lowest permitted NO_X emission rate for a wood fired boiler identified is 0.060 lb/MMBtu for the Russell Biomass project in Massachusetts, which was permitted in 2008, but not yet constructed. The Concord Steam project in New Hampshire was permitted at 0.065 lb/MMBtu in 2009, as was the Schiller Station project in 2004. All of these facilities proposed SCR as the BACT/LAER determination.

5.1.1.3 BACT/LAER Determination

The use of fuel optimization, good combustion practices, and CSCR will result in a NO_X emission rate from the biomass boiler no greater than 0.065 lb/MMBtu of heat input based on a 30-day rolling average during normal operation. This emission rate is consistent with permit limits for similar facilities recently permitted, and represents the lowest emission rate achieved in practice, and is therefore the BACT/LAER determination for the Facility.

5.1.2 Carbon Monoxide

Carbon monoxide (CO) formation in boilers results from incomplete combustion of the fuel. There are many factors that can impact CO formation in boilers, including the boiler design, the fuel quality and moisture content, the air to fuel mix and distribution, and the combustion temperature and residence time. CO emissions from boilers are reduced with increased excess air, higher combustion temperatures, and longer residence times. However, these measures can result in an increase in NO_X emissions, so good combustion practices must be utilized to balance the emissions of NO_X and CO from a boiler.

5.1.2.1 Control Technologies

5.1.2.1.1 Oxidation Catalyst

Oxidation catalysts can reduce CO emissions by promoting the oxidation of CO to CO_2 and water as the emission stream passes through the catalyst bed. The oxidation process takes places spontaneously, without the requirement for introducing reactants. Oxidation catalysts typically operate within a temperature range from 700 to 1,100ºF and are commonly installed on natural gas fired combustion turbines, with exhaust gases that are much cleaner than from wood fired boilers. Wood fired boilers operate at higher temperatures and their exhaust gases contain more particulates than gas fired sources which can contaminate and eventually plug the catalyst bed, requiring significant costs to maintain the catalyst to its design control efficiency.

5.1.2.1.2 Combustion Controls

The use of combustion controls to reduce the formation of CO is an effective control technology for solid fuel fired combustion processes. Combustion controls include BFB combustion technology, the use of FGR, excess air and fuel/air mixing to reduce products of incomplete reduction (CO and VOC) while not creating excessive thermal NO_X.

5.1.2.2 Prior BACT Determinations & Permit Limits

The lowest permitted CO emission rate for a wood fired boiler identified is 0.075 lb/MMBtu for the Russell Biomass project in Massachusetts, which was permitted in 2008 with oxidation catalyst. The Schiller Station project in New Hampshire was permitted at 0.100 lb/MMBtu in 2004 using a Fluidized Bed Combustor without an oxidation catalyst.

5.1.2.3 BACT Determination

The use of BFB combustion technology in the boiler design, good combustion practices, and fuel optimization will result in a CO emission rate from the biomass boiler no greater than 0.075 lb/MMBtu of heat input on a 24-hour daily block average when operating at 70% load or greater. This emission rate is consistent with permit limits for similar facilities recently permitted, and is therefore the BACT determination for the Facility.

5.1.3 Sulfur Dioxide/Sulfuric Acid Mist

Sulfur dioxide (SO_2) and sulfuric acid mist (H_2SO_4) emissions from boilers result from oxidation of the sulfur in the fuel. The primary means for controlling SO_2 and H_2SO_4 emissions from wood-fired boilers is to limit the sulfur content of the fuel. There are also add-on control systems in use for wood-fired boilers, including spray dryer adsorbers, lime or dry sodium bicarbonate injection, or wet scrubber systems.

5.1.3.1 Control Technologies

5.1.3.1.1 Spray Dryer/Adsorbers

The use of spray dryers or adsorbers to control SO_2 is an effective control technology. The technology involves the use of a vessel into which a slurry of a reagent such as sodium hydroxide, is sprayed into the hot gas flue stream. The intimate contact of the reagent with the SO_2 present in the flue gas (combined with proper humidity & retention time), results in the formation of sodium salts which can then be removed in the downstream particulate removal device. Spray Dryer/Adsorbers are generally used where the SO_2 content of the flue gas is significant and thus warrants high SO_2 removal efficiencies. Generally, biomass energy facilities operate with fuels of very low sulfur content not warranting high SO_2 removal efficiencies.

5.1.3.1.2 Dry Sorbent Inject

Dry sorbent injection involves the addition of a dry reagent such as limestone or sodium bicarbonate into the hot combustion zone to reduce the oxidation of fuel-bound sulfur to SO_2. Under proper high temperature conditions, mixing, and retention time, the sulfur converts directly to sodium salts in the combustion zone and then removed as a particulate downstream in the particulate removal device. Under conditions of low sulfur fuels such as wood biomass, the concentration of sulfur is too low to achieve any high efficiency of SO_2 reduction using this process.

5.1.3.1.3 Wet Scrubbers

Wet scrubbers generally utilize either cross-flow or counter flow vessels with packed beds and re-circulating scrubbing liquid streams. The water streams contain a reagent such as sodium hydroxide to react under saturated conditions with the SO_2 entering the scrubber. SO_2 is highly soluble in water and wet scrubbers can therefore, be very effective in controlling SO_2 emissions. However, several issues have precluded its use in biomass fired plants. The resulting saturated flue gas results in a highly visible, dense plume during most of the year. In colder climates, this saturated plume may cause icing or fogging of local roadways and vistas. If the flue gas requires further particulate matter control downstream of the wet scrubber, the gas must be re-heated to raise the temperature above the dew point to prevent condensation in the downstream equipment.

5.1.3.1.4 Fuel Sulfur Content Control

Emissions of SO_2 are a direct result of fuel sulfur content. Relative to other solid fuels, wood biomass has very low levels of sulfur which generally precludes the need for further SO_2 reduction. In recent stack testing of operating biomass units in the northeast, SO_2 levels have been demonstrated to be a fraction of the US EPA AP-42 emission factor used in the original permitting process for most biomass units.

5.1.3.2 Prior BACT Determinations & Permit Limits

The lowest permitted SO_2 emission rate for a wood fired boiler identified is the Schiller Station project in New Hampshire, which was permitted at 0.020 lb/MMBtu in 2004 using lime injection. The Russell Biomass project in Massachusetts was permitted in 2008 with an SO_2 emission rate of 0.025 lb/MMBtu using clean fuels and no add-on controls. The lowest permitted H_2SO_4 emission rate for a wood fired boiler identified is the Stevenson Mill project in Alabama, which was permitted at 0.022 lb/MMBtu in 2006 using clean fuels and no add-on controls.

5.1.3.3 BACT Determination

The Facility will utilize wood fuel which has an inherently low sulfur content to maintain an SO_2 emission rate no greater than 0.025 of heat input during normal operation. Based on experience with other generating facilities using an SCR system, no more than 10% of the SO_2 generated in the boiler is expected to be further oxidized to SO_3 and combine with water vapor in the flue gas to form H_2SO_4. The resulting H_2SO_4 emission rate is expected to be less than 0.004 lb/MMBtu. These emission rates are consistent with permit limits for similar facilities recently permitted, and are therefore the BACT determinations for the Facility.

5.1.4 Particulate Matter

Particulate matter (PM) from fuel combustion is primarily the result of non-combustible constituents (ash) in the fuel. In less efficient combustion systems, particulate may also be comprised of soot resulting from unburned hydrocarbons. In combustion systems that utilize CSCR controls, a small fraction of the particulate emissions is ammonium bisulfate compounds formed when the ammonia reagent reacts with sulfur trioxide.

5.1.4.1 Control Technologies

5.1.4.1.1 Mechanical Collectors (Multiclones or Centrifugal Separators)

The use of mechanical collectors such as multiclones or centrifugal separators, has primarily been limited to initial control of large particulate matter and burning embers from wood-fired boilers. Several installations have used these separators to prevent fires in the downstream fabric filters were applicable. Multiclones and centrifugal separators are not generally used as the primary control device for particulate matter based on their inherent low level of removal.

5.1.4.1.2 Electrostatic Precipitators

ESP are used on numerous solid fuel and wood-fired boilers in the US. ESP have been designed for very high levels of particulate removal, similar to a fabric filter, without the likelihood of fires caused by carry-over of burning embers. PM Removal efficiencies achieved by ESP approach or equal that of fabric filters when properly designed.

5.1.4.1.3 Fabric Filters

Fabric filters (or otherwise referred to as baghouses) utilize a filter media for capture of particulate from combustion processes and process sources. Fabric filters can provide a very high level of particulate removal on gas streams that are not likely to include burning embers or are located after spray dryer equipment for acid gas control. Fabric filters have been known to catch fire creating severe downtime and damage to equipment. For wood fired units without upstream mechanical collectors or spray dryer/adsorbers, the threat of fire generally warrants that other means of particulate control be used.

5.1.4.2 Prior BACT Determinations & Permit Limits

The lowest permitted PM emission rate for a wood fired boiler identified is 0.012 lb/MMBtu for the South Point Biomass project in Ohio, which was permitted in 2006 using a pulse jet baghouse. Several other wood fired boiler projects have been recently permitted with PM emission rates ranging from 0.012 to 0.020 lb/MMBtu.

5.1.4.3 BACT Determination

The Facility will use fuel optimization, combined with state-of-the-art combustion technology and operating controls, as well as an ESP to provide the most stringent degree of particulate emissions control available for a wood-fired boiler. These measures will result in a filterable PM/PM_{10}/$PM_{2.5}$ emission rate no greater than 0.012 lb/MMBtu of heat input during normal operation. This emission rate is consistent with permit limits for similar facilities recently permitted, and is therefore the BACT determination for the Facility.

5.2 Cooling Tower

The source of emissions from a cooling tower is the solids component in the droplets of recirculated water that are carried out of the tower by the cooling fans. This is known as cooling tower ‘drift’. The cooling tower proposed for the Facility will utilize a state-of-the-art drift eliminator that limits drift to 0.005% of the recirculating liquid rate. According to the RBLC, this level of control is consistent with other cooling towers recently permitted at similar projects, and is therefore considered the BACT determination for the Facility.

5.3 Standby Engines

The driver engines for the emergency generator and diesel fire pump will be fueled with ULSD and be certified to meet the applicable EPA Tier 2 emission standards from 40 CFR 89. Compliance with the EPA Tier 2 emission standards, the use of ULSD fuel, in combination with a limit of 300 hours per year of total operating time for each engine is considered BACT for these sources, consistent with the determinations from other similar, recently permitted projects.

6.0 CASE-BY-CASE MACT DETERMINATION

The NESHAP for electric utility boilers firing solid fuels (40 CFR 63, Subpart DDDDD) was vacated and remanded for further documentation in 2007. As the Facility will be a major source of HAP emissions, a case-by-case MACT determination is required for the biomass boiler to satisfy the requirements of Section 112(g) of the Clean Air Act and 40 CFR 63.40-44 (Subpart B). If EPA promulgates a revised final rule that establishes emission limits that are applicable to the biomass boiler that are more stringent than the Facility MACT determination, the Facility will be required to comply with those emission limits as expeditiously as possible, and within eight years from their promulgation.

40 CFR 63, Subpart B defines the MACT emission limitation for a new source as the emission limitation which is not less stringent than the emission limitation achieved in practice by the best controlled similar source, and which reflects the maximum degree of reduction in emissions that the permitting authority, taking into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements, determines is achievable by the constructed or reconstructed source. A similar source is defined as a stationary source or process that has comparable emissions and is structurally similar in design and capacity to a constructed or reconstructed major source such that the source could be controlled using the same control technology.

A case-by-case MACT analysis relies on available information regarding previous MACT determinations, permitted emission limits, and control technologies utilized for similar sources. The RBLC and available permits were reviewed during the completion of the MACT analysis for the Facility. The following sections detail the case-by-case MACT determination for each of the pollutants previously regulated by the vacated Boiler MACT standard.

6.1 Particulate Matter (PM)

6.1.1 Determination of MACT Floor for PM

A review of recent permit approvals and installations for similar wood-fired projects yielded limited results for previous MACT determinations. However, the most recent BACT/LAER determinations for PM are also considered. The most recent applicable determinations for PM emission rates for similar projects are as follows:

Schiller Station (NH)= 0.025 lb/MMBtu

Russell Biomass (MA) = 0.012 lb/MMBtu

South Point Biomass (OH) = 0.012 lb/MMBtu

Based on additional information from the RBLC, the range of determinations for PM over the previous five-year period was 0.15 to 0.02 lb/MMBtu. Therefore, the EPA's originally promulgated MACT Standard for PM (0.026 lb/MMBtu) for a new, solid fuel-fired boiler of this size is considered to be appropriate as the MACT floor.

The Berlin Biomass Project is proposing a PM limit of 0.012 lb/MMBtu as BACT and therefore, is more stringent than the MACT floor determined on a case-by-case basis.

6.1.2 Proposed PM Emission Limit

PM Emissions Limit	Control Technology Description	Monitoring Parameters
0.012 lb/MMBtu	Combustion Controls inherent to Bubbling Fluidized Bed Combustors	Continuous Opacity Monitoring Systems (COMS) and Combustion Parameters

6.2 Hydrogen Chloride (HCl)

6.2.1 Determination of MACT Floor for HCl

As with PM, a review of recent permit approvals and installations for similar wood-fired projects yielded limited results for previous MACT determinations for HCl. However, the most recent BACT/LAER determinations for HCl emission rates for similar projects are as follows:

Schiller Station (NH)= 0.02 lb/MMBtu

Russell Biomass (MA) = 0.02 lb/MMBtu

South Point Biomass (OH) = 0.0172 lb/MMBtu

Based on additional information from the RBLC, the range of determinations for HCl over the previous five-year period was 0.0172 to 0.026 lb/MMBtu. Therefore, the EPA's originally promulgated MACT Standard for HCl (0.02 lb/MMBtu) for a new solid fuel-fired boiler of this size seems to be appropriate as the MACT floor.

The Berlin Biomass Project is proposing an HCl limit of 0.000834 lb/MMBtu and therefore, is more stringent than the MACT floor determined on a case-by-case basis. The emissions limit is based on stack test data provided by the NHDES as well as recently issued permit determinations for similar facilities.

6.2.2 MACT HCl Emission Limit Recommendations

HCl Emissions Limit	Control Technology Description	Monitoring Parameters
0.000834 lb/MMBtu	Fuel Analysis or Stack Test	Fuel Quality

6.3 Mercury

6.3.1 Determination of MACT Floor for Mercury

A review of recent permit approvals and installations for similar wood-fired projects yielded limited results for previous MACT determinations for Mercury (Hg). However, the most recent BACT/LAER determinations for Hg emission rates for similar projects are as follows:

Schiller Station = 0.000003 lb/MMBtu

Russell Biomass = 0.000003 lb/MMBtu

South Point Biomass (OH) = 0.000009 lb/MMBtu

Based on additional information from the RBLC, the range of determinations for Hg over the previous five-year period was 0.000009 to 0.000003 lb/MMBtu. Therefore, the EPA's originally promulgated MACT Standard for Hg (0.000003 lb/MMBtu) for a new solid fuel-fired boiler of this size seems to be appropriate as the MACT floor.

The Berlin Biomass Project is proposing an Hg limit of 0.000003 lb/MMBtu and therefore, is as stringent as the MACT floor determined on a case-by-case basis.

6.3.2 MACT Hg Emission Limit Recommendations

Mercury Emissions Limit	Control Technology Description	Monitoring Parameters
0.000003 lb/MMBtu	Fuel Analysis or Stack Test	Fuel Quality

6.4 Organic HAPS (Carbon Monoxide as surrogate)

6.4.1 Determination of MACT Floor for Mercury

A review of recent permit approvals and installations for similar wood-fired projects yielded limited results for previous MACT determinations for Organic HAPS using Carbon Monoxide (CO) as the surrogate. However, the most recent BACT/LAER determinations for CO emission rates for similar projects are as follows:

Schiller Station = 400 ppm @ 7% O_2

Russell Biomass = 0.075 lb/MMBtu (equivalent to 95 ppm @ 3 % O_2)

South Point Biomass (OH) = 0.10 lb/MMBtu (equivalent to 130 ppm @ 3% O_2)

Based on additional information from the RBLC, the range of determinations for Hg over the previous five-year period was 0.78 to 0.1 lb/MMBtu (130 ppm to 1000 ppm). Therefore, the EPA's originally promulgated MACT Standard for CO (400 ppm @ 3% O_2) for a new solid fuel-fired boiler of this size seems to be appropriate as the MACT floor.

The Berlin Biomass Project is a CO limit of 0.075 lb/MMBtu (95 ppm @ 3% O_2) as BACT and therefore, is more stringent than the MACT floor determined on a case-by-case basis.

6.4.2 MACT Organic HAPS (CO) Emission Limit Recommendations

Organic HAPS (CO) Emissions Limit	Control Technology Description	Monitoring Parameters
0.075 lb/MMBtu	Combustion Controls	Monitor CO as the surrogate using a Continuous Emissions Monitoring System (CEMS).

7.0 DISPERSION MODELING

A dispersion modeling analysis was performed using the EPA and NHDES approved AERMOD model, to demonstrate that the combined emissions from the Facility will result in air quality impacts that are below EPA's significant impact levels (SILs) and allowable PSD increments. The modeled impacts from the Facility were added to regional background values to demonstrate compliance with the NAAQS and NH AAQS. All of the modeling input and output files have been provided to NHDES electronically on a CD-ROM.

7.1 Source Emissions and Stack Data

The proposed Facility will include a biomass boiler, emergency diesel generator, diesel engine powered fire pump and a wet cooling tower. The boiler and cooling tower will be permitted for unrestricted operation. The emergency diesel generator and fire pump will each be limited to no more than 300 hours of operation per year. Other than one hour per week for maintenance and testing, the diesel generator and fire pump will not operate concurrently with the boiler.

According to NHCAR Part Env-A 606.02, an emergency generator exempt from Env-A 1211.11 is also exempt from the requirement to perform an air pollution dispersion modeling impact analysis. The emergency generator and fire pump are exempt from Env-A 1211.11 because they will be limited to less than 500 hours of operation, and 25 tons of NO_X emissions, in any 12-month consecutive period. However, to fully satisfy the requirements of the PSD Program, and assure a complete analysis of potential air quality impacts, the emergency generator and fire pump have been included in the dispersion modeling analysis conducted for the Facility.

Figure 1 presents the site location and Project area on a USGS topographic map. Figure 2 provides a Project Site Plan showing the location of all major components of the Project. The 320 foot tall, 11.25-inch ID boiler stack is located at UTM coordinates 326,984 meters east, 4,926,531 meters north, [Zone 19, North American Datum (NAD) 83]. The height and inside diameter of the existing boiler stack were determined from design drawings, which have been included in Appendix C. The closest property boundary is approximately 150 feet south of the existing boiler stack.

Table 7.1 presents the exhaust gas characteristics of the boiler at various operating conditions, along with the dimensions of the exhaust stack. Exhaust parameters are presented for operation of the boiler at full load with fuel moisture contents of 37.6% and 50%, and for 70% (minimum) load with fuel moisture contents of 37.6% and 50%. The biomass boiler will not operate at steady-state at loads less than 70% of maximum load, except for during periods of startup and shutdown. The emissions from the biomass boiler were modeled at these fuel moisture contents because this is the expected range of the moisture content of the wood fuel for the Facility. In addition, the boiler was modeled at two different stack temperatures per operating scenario, in order to assess the impacts from the boiler during a potential operating condition where a portion of the heat from the exhaust gas stream is recovered by a heat exchanger.

Exhaust characteristics for both the diesel generator and fire pump, along with the stack dimensions for each source, are also presented in Table 7.1. As noted on Table 7.1, all of the emission rates from the boiler have been increased by a factor of 10% for the short-term (24 hours or less) impact analyses, to account for expected variability in the exhaust gas volumetric flow rate from the boiler. The annual impacts resulting from boiler operation have not been increased by this 10% factor, as the expected variability in exhaust gas volumetric flow rate will average out to the emission rates derived using heat input rate emission factors over an extended period of time. The cooling tower emissions are summarized on Table 7.2.

7.2 Dispersion Environment

Land use within a three-kilometer radius of the Facility was classified in accordance with the NHDES recommended method (Auer, 1978). This classification is necessary to determine if the modeled source is urban or rural. Urban sources require additional inputs to AERMOD. Information contained on USGS topographic maps was sufficient to determine that the area within three kilometers of the Site is predominantly rural. Therefore, rural dispersion coefficients were used in the screening modeling analysis.

7.3 Good Engineering Practice (GEP) Stack Height Determination

US EPA regulations establish limitations on the stack height that may be used in dispersion modeling to calculate air quality impacts of a source for regulatory purposes. Each source must be modeled at its actual physical height unless that height exceeds its calculated Good Engineering Practice (GEP) stack height. If the physical stack height is less than the GEP formula height, the actual stack height is input to the model and the potential for the plume to be affected by aerodynamic wakes created by nearby buildings must be evaluated in the dispersion modeling analysis.

A GEP stack height analysis was performed in accordance with the procedures set forth in the EPA guidance document "Guideline for Determination of Good Engineering Practice Stack Height" (EPA, 1985). A GEP stack height, as measured from the base elevation of the stack, is defined as the greater of 65 meters (213 feet) or the formula height (Hg) determined from the following equation:

$H_g = H + 1.5L$

where

H = height of the nearby structure which maximizes H_g

L = lesser dimension (height or projected width) of the building

The GEP formula height is based on the dimensions of buildings "nearby" the stack that result in the greatest justifiable height. For the purposes of determining the maximum GEP formula height, "nearby" is limited to the less of five building heights or widths from the trailing edge of the building (edge closest to the source).

The Facility structure heights are shown on Figure 3. The height and projected width of the structures used for the GEP analysis are shown in Table 7.3. The tiers are listed in descending order relative to the resulting formula GEP heights. The boiler house is the controlling structure for the boiler. The boiler building is a tall structure, 164.5 feet (50.1 meters) high, 118 feet (36.0 meters) wide and 84 feet (25.6 meters) long. The resulting GEP formula height is 381.8 feet (116.4 meters).

Since none of the proposed stack heights exceed the GEP height, assessment of building downwash in the modeling analysis is required.

7.4 Cavity Region

Buildings located near to stacks can create cavity regions which can trap the stack's emissions and result in locally high concentrations of air contaminants. The cavity region created by a building can extend out to three times the lesser of a building's height or its projected width. The cavity height can extend up to the structure height plus one-half the lesser of the structure height or projected width. Air quality impacts with the downwind cavity regions need to be analyzed when a stack's height is less than the cavity height.

As shown in Table 7.4, the boiler building results in the highest cavity height and greatest cavity region extent. The cavity region created by the 164.5 foot tall boiler building extends 435 feet from the structure and 237 feet above the ground. The closest fence line to the boiler building is approximately 200 feet to the south. The cavity region from the 164.5-foot structure has the potential to extend beyond the fence line and, therefore, is located in ambient air. Even though the boiler stack is above the calculated cavity height, cavity impacts were included in the modeling analysis in order to assure a complete assessment.

7.5 Local Topography

Local topography plays a role in the selection of an appropriate dispersion model. Dispersion models can be divided into two categories: (1) those applicable to areas where terrain is less than the height of the top of the stack (simple terrain), and (2) those applicable to areas where terrain is greater than the height of the top of the stack (complex terrain). The closest complex terrain is located approximately 900 meters from the boiler stack.

7.6 Models Selected for Use

The dispersion environment, potential of aerodynamic building downwash effects on ground-level concentrations, and the local topography help to determine the appropriate models for use in a dispersion modeling analysis. Simple terrain models are used to calculate concentrations in simple terrain (below stack-top elevation) and intermediate terrain (up to plume height). Complex terrain models are used to calculate concentrations in complex terrain (above stack-top elevation).

Based on stack heights that are less than the GEP formula height and terrain above the stack top elevation within eight kilometers of the stacks, preliminary screening modeling was performed with EPA's SCREEN3 (dated 96043) model. If the results of the conservative SCREEN3 model do not predict compliance with applicable standards and additional modeling is necessary, the preferred model is the EPA AERMOD model for both simple and complex terrain.

SCREEN3 can be applied to predict 1-hour, ground-level calculations for single sources. The model incorporates the effects of building downwash in both the cavity and wake regions (areas of plume downwash beyond the cavity region). The SCREEN3 model calculates 1-hour concentrations in simple terrain using algorithms from the US EPA Industrial Source Complex model, ISCST3. For complex terrain elevations, the SCREEN3 model calculates a 24-hour concentration using the VALLEY model. The VALLEY model concentrations are based on six hours of persistent meteorological conditions, and allow the plume to come no closer than 10 meters to the ground. The SCREEN3 model also makes an ISCST3 calculation for intermediate terrain receptors. Intermediate terrain receptors have elevations that are greater than stack-top elevation but less than plume height. The higher of the VALLEY and ISCST3 calculations is used in the screening results.

As discussed further below, following application of the SCREEN3 model, the US EPA AERMOD model was used as a refined tool to evaluate any pollutants and averaging periods for which SCREEN3 modeling yielded results above the Significant Impact Levels. AERMOD was used to calculate maximum 1-hour average ground-level concentrations at all receptor locations, including offsite locations within the cavity region, from which it determined block averages for the other required averaging periods. AERMOD is a refined model that can be applied to consider actual meteorological in the project area and the potential building downwash effects on ground-level concentrations and to estimate concentrations in either simple or complex terrain.

There are two nearby Class I areas. The Facility is located approximately 18.3 kilometers north of the Great Gulf Wilderness Area, and 26.2 kilometers north of the Dry River Wilderness Area. CALPUFF is a long-range transport model developed to evaluate impacts beyond 50 kilometers. The Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report recommended the use of CALPUFF for transport distances of 200 km and less, to eliminate the need to simulate the long-range impacts (greater than 50 km) separately, and then combine these results with those obtained using some other model for the local-scale impacts (less than 50 km). Because the Class I areas are within 50 kilometers of the Facility, long-range modeling was not required to determine the Class I impacts from the Facility, so AERMOD, an appropriate model for local-scale impacts was used. If long-range impact analyses are subsequently required to complete the Class I analysis, an appropriate model will be used, in consultation with NHDES, for the required transport distance.

7.7 Preliminary Screening Model Application

The SCREEN3 dispersion model was applied in accordance with the recommendations made in EPA's "Guideline on Air Quality Models" (EPA, 2003) to assess the magnitude of maximum pollutant concentrations from the Facility sources. SCREEN3 was applied using rural dispersion parameters, default meteorology, building downwash and terrain elevations. The model was applied for the full set of 54 default meteorological conditions that accompany the model and encompass all atmospheric stability classes and a range of wind speeds. The screening meteorological conditions are presented in Table 7.5. Default mixing heights are dependent upon the wind speed. The SCREEN3 mixing heights are presented in Table 7.6. Table 7.7 presents the distances and terrain elevations used in the SCREEN3 simple terrain analysis.

Simple terrain screening receptors were located along a single radial. Receptors were placed at 100-meter spacing out to 2 kilometers, 200-meter spacing out to 4 kilometers, 500-meter spacing out to 10 kilometers, 1-kilometer spacing out to 20 kilometers, and 5-kilometer spacing out to 50 kilometers.

AERMAP was used to assign receptor elevations for given distances, over all compass directions. The closest complex terrain receptor is located 0.9 kilometers from the Facility. For the simple terrain screening analysis, the stack-top elevation was assigned as the receptor elevation for all distances beyond 0.9 kilometers. SCREEN3 receptor terrain height values are based on the difference between the actual terrain elevation and the stack base elevation (1041 feet mean sea level).

Table 7.8 presents the terrain elevations and distances used in the SCREEN3 complex terrain screening analysis and determined using AERMAP, as discussed further below. The complex terrain receptors were based on the closest distance to the boiler stack for which elevations ranging from stack-top to the maximum elevation found within 50 kilometers. The closest complex terrain is found 0.9 kilometers from the Facility, with elevations extending to 1326 meters above stack-base elevation at 19 kilometers.

The SCREEN3 model calculates one-hour concentrations at simple terrain locations. The model calculates 24-hour concentrations in complex terrain. The VALLEY complex terrain concentrations are based on six hours of persistent meteorological conditions.

NAAQS have been established for various averaging periods. Short-term 1-hour and 8-hour standards have been established for carbon monoxide (CO). An annual standard has been established for nitrogen dioxide (NO_2). Annual, 3-hour, and 24-hour standards have been established for sulfur dioxide (SO_2). Annual ($PM_{2.5}$) and 24-hour (PM_{10} & $PM_{2.5}$) standards have been established for particulate matter. To estimate concentrations for each averaging period, scaling factors of 0.9, 0.7, 0.4, and 0.08 were applied to the 1-hour averages predicted by the SCREEN3 model to derive 3-hour, 8-hour, 24-hour, and annual average estimates.

The 24-hour average complex terrain results were first scaled to one-hour concentrations using a scaling factor of 4.0. The same scaling factors described above were then applied to the 1-hour estimates to obtain estimates for averaging periods other than the 24-hour average.

A simple terrain screening modeling analysis, a complex terrain screening modeling analysis and a cavity screening analysis were performed using the SCREEN3 model for the flue gas characteristics of the proposed boiler at each load condition. The cooling tower, emergency generator and fire pump were also evaluated with SCREEN3. Screening modeling was performed to determine the worst-case short-term and long-term operating conditions for each modeled pollutant.

Table 7.9 presents the maximum impact concentrations predicted by the SCREEN3 model for each load condition for the boiler and from the cooling tower, emergency generator and fire pump in Class II areas. Table 7.9a presents the maximum impact concentrations predicted by SCREEN3 in Class I areas. In each instance, the actual 1-hour average impacts predicted for each pollutant were determined by scaling the unit emission rate (i.e. 1 gram per second) normalized 1-hour concentrations by the maximum equipment emission rates presented in the tables. To estimate concentrations for other averaging periods, scaling factors discussed above were applied to the one-hour averages, along with the following operating limitations. The impact concentrations presented in Table 7.9 do not reflect any annual or short-term operating limits for any of the sources. As shown in Table 7.9, SCREEN3 calculated potential cavity impacts from the emergency generator.

Table 7.10 presents a summary of the maximum predicted SCREEN3 impact concentrations presented in Table 7.9 from each of the modeled sources in Class II areas. As determined from review of results provided in Table 7.9, the maximum boiler impact concentrations result at 100% load with heat recovery and with fuel moisture contents of 37.6% in simple terrain and 50% in complex terrain. These impacts are predicted to occur in simple terrain at a distance of 900 meters. This represents the closest stack-top elevation to the boiler stack. The highest modeled screening concentrations in complex terrain are predicted to occur at a distance of 1400 meters from the boiler stack.

Table 7.10a presents a summary of the maximum predicted SCREEN3 impact concentrations presented in Table 7.9a from each of the modeled sources in Class I areas. As with the Class II SCREEN3 results, the maximum boiler impact concentrations are predicted at 100% load with heat recovery for fuel moisture contents of 37.6% in simple terrain and 50% in complex terrain.

Annual impact concentrations for the individual sources are based on the annual operating limits; unrestricted operation for the boiler and cooling tower, and 300 hours for both the emergency generator and fire pump. These operating limits were used to determine the annual average emission rate for each pollutant from each source, which was the applied to the unit emission rate impacts to predict the annual average pollutant impacts. The total annual impacts concentrations shown in Tables 7.10 and 7.10a are based on the sum of the maximum values for the boiler, the cooling tower, emergency generator and fire pump.

Short-term averages (24 hours and less) are based on the following operating limitations: the boiler and cooling tower will be unrestricted and, other than one hour per week for maintenance testing, the diesel generator and fire pump will not operate concurrently with the boiler. The total short-term concentrations shown in Tables 7.10 and 7.10a are based on the sum of the maximum values for the boiler and cooling tower, and the 1-hour average impacts from both the emergency generator and fire pump.

The total estimates are conservative in that all sources were assumed to have maximum impacts at the same location and with the same meteorological conditions. The individual source and potential total concentrations are compared to the SILs in Tables 7.10 and 7.10a. As shown in the tables, screening values are greater than the SILs in both Class I and Class II areas for:

- Annual NO_2 ,
- 3-hour, 24-hour and annual SO_2, and
- 24-hour and annual PM_{10} and $PM_{2.5}$.

Based on conservative screening modeling, the maximum annual NO_2, 3-hour, 24-hour and annual SO_2, and annual and 24-hour PM_{10} and $PM_{2.5}$ impacts from SCREEN3 are greater than the SILs. The SCREEN3 results also identified the worst-case operating condition for the boiler. Refined modeling was performed to demonstrate the emissions associated with the Facility will result in impacts that are less than the SILs.

7.8 Preliminary Refined Modeling for Significant Impact Areas

A preliminary refined AERMOD modeling analysis was performed to determine the significant impact area of the proposed Project.

Meteorological data was collected by Fraser Paper in 1999 at the Burgess Mill Site, the location of the Facility. This data was supplied by NHDES (NHDES, 2009) and supplemented with surface observation data from nearby National Weather Service locations. These surface data were input to AERMOD with concurrent upper air data from Gray, Maine.

The Facility will utilize the existing 320-foot tall boiler stack, which serviced the former Recovery Boiler at the site. As such, ESS and DES agreed that the wind speed and direction data collected from the 100-meter high station of the Burgess Mill tower, coupled with other parameters collected from the tower, and supplemented with data from other regional monitoring stations to fill in missing data and upper air parameters, could provide a suitable meteorological data set for Facility modeling purposes (ESS, 2009). The final meteorological data set was compiled using the following methodology:

1. The temperature data and 100-m level wind data collected in 1999 from the Burgess Mill tower were used as the primary data set.
2. Temperature and wind data missing from the Burgess Mill data set was replaced with data from other substations using the following hierarchy:
    1) Burgess Mill 70-m level,
    2) Berlin Municipal Airport, and
    3) Whitefield Airport.

Based on DES' approval of this approach, ESS worked to prepare the MET data set as discussed below.

There are 244 hours where wind speeds were missing from the Burgess Mill 100-m data, of which 134 hours were replaced with 70-m level data, 107 hours from the Berlin Airport, and 1 hour from the Whitefield Airport. There were 243 hours of missing wind direction data from the Burgess Mill 100-m data, of which 133 hours were replaced with 70-m level data, 101 hours from the Berlin Airport, and 6 hours from the Whitefield Airport. The wind rose for this data is shown in Figure 1.

There were 81 hours where temperatures were missing from Burgess Mill data set. Berlin Airport observations were available to provide data for 72 of those hours.

The standard deviation of wind direction and temperature difference data were also collected at the Burgess Mill. These parameters can be used within AERMET to provide better estimates of boundary layer conditions than simply using standard National Weather Service data. There are 246 hours where standard wind deviation data was missing from the 100-m level of the Burgess Mill data set. Of this total, 134 hours can be replaced with wind deviation data from the 70-m level. The remaining hours were input to AERMET as missing.

Cloud cover and ceiling height observations were collected at the Berlin Airport. There were 412 hours of missing data, of which 160 hours could be replaced with observations from the Whitefield Airport.

The EPA guidance document "Procedures for Substituting Values for Missing NWS Meteorological Data for Use in Regulatory Air Quality Models" (EPA, 1992a) was followed for the remaining missing hours for which a valid substitution was not available from a regional monitoring station.

AERMET allows for the use of sectors to define land use within one kilometer of the meteorological data measurement location, classifying them among urban and rural categories. Sectors were determined for similar land use types. Land uses within one kilometer of the Burgess Mill are shown in Figure 1. Sectors for input to AERSURFACE and AERMET were defined as:

- 0-110 degrees (coniferous forest)
- 110-200 degrees (deciduous forest)
- 200-290 degrees (other cleared, residential/commercial), and
- 290-360 degrees (residential/commercial and transportation).

These sectors were input to AERSURFACE, an EPA program to compute surface roughness, albedo and Bowen ratio values to input to AERMET. The program follows EPA guidance presented in the "AERMOD Implementation Guide" (EPA, 2009) in developing the values. Surface roughness values were based on an inverse-distance weighted geometric mean for an upwind distance of one kilometer. Bowen ratio and albedo values were based on an arithmetic mean within a 10-km by 10-km area. The program was applied using average moisture conditions and winter snow cover.

7.9 Class II Impacts

A polar grid was centered at the existing boiler stack. Radials were placed from 0 degrees to 350 degrees at ten-degree increments. The proposed receptor grid was established to assure that these areas of maximum impact as determined from the SCREEN3 modeling were sufficiently covered in the refined modeling. Based on screening, the maximum SIA distance occurs for NO_X and extends 10 kilometers from the boiler stack. Receptor coverage was provided beyond the 10-km distance.

Receptor rings were located at:

- 50-meter increments out to 500 meters,
- 100-meter increments out to 2 kilometers,
- 200-meter increments out to 4 kilometers,
- 500-meter increments out to 10 kilometers, and
- 1-kilometer increments out to 15 kilometers.

At the request of NHDES, additional receptors were placed just beyond the western property boundary with 20-meter spacing to ensure that the maximum impacts from the cooling tower were determined.

The Facility will be fenced over nearly its entire perimeter. The rail spur shown on the Site Plan will be accessed only by employees and the rail line operator. Fenced, on-site locations were not included in the analysis, as these locations are not accessible to the general public and, therefore, are not considered ambient air.

The maximum terrain elevation and hill height were assigned for each receptor through the application of AERMAP. National Elevation Data (NED) data was input to AERMAP. The data was downloaded from the USGS website (http://sea,less.usgs.gov/index.php) and covered the area between 43.875 and 45.125 degrees north, and 70.375 and 72.0 degrees west.

AERMOD was run for the biomass boiler at the operation conditions identified by SCREEN3 as the worst-case for ambient impacts, 100% load at both 37.6% and 50% fuel moisture content with heat recovery.

Each source was modeled individually with a 1.0 gram per second emission rate. As was done with the SCREEN3 results, individual source pollutant concentrations were determined by multiplying the source emission rate for the applicable averaging period by the modeled unit emission rate impact. Refined concentrations from the individual sources were initially evaluated to examine potential cavity impacts and potential cumulative impacts.

Annual impact concentrations for the individual sources were based on the unrestricted operation of the boiler and cooling tower, and 300 hours for both the emergency generator and fire pump. The annual total concentrations were based on the sum of the maximum values for the boiler, cooling tower, emergency generator and fire pump.

Short-term averages (24 hours and less) were based on the unrestricted boiler and cooling tower operation. Other than one hour per week for maintenance testing, the diesel generator and fire pump will not operate concurrently with the boiler. The total short-term concentrations were based on the sum of the maximum values for the boiler, cooling tower and one hour from both the emergency generator and fire pump.

The individual source and potential total concentrations presented in Table 7.11 were compared to the SILs. The total estimates are conservative in that all sources are assumed to have maximum impacts at the same location and time. As shown in Table 7.11, the predicted potential annual NO_2 impacts were greater than the SIL. Potential impacts for all other pollutants and averaging periods were less than the SILs.

Pollutant specific refined modeling was performed to demonstrate that annual NO_2 impacts from the Facility. The annual emission rates were based on unrestricted operation of the boiler, and 300 hours of operation for both the emergency generator and the fire pump. The maximum, modeled annual NO_2 impact concentration at any receptor was 0.61 ug/m^3, less than the 1 ug/m^3 SIL (Table 7.17).

The Class II analysis demonstrated that the maximum ambient air impacts from the operation of the Facility will not exceed any of their respective SILs in a Class II area.

7.10 Class I Impacts

A preliminary refined AERMOD modeling analysis was performed to evaluate impacts from the proposed Project to the closest Class I areas. The Class I analysis used the same data and methodology as the Class II AERMOD analysis.

The Site is located 18 kilometers north of the Great Gulf Wilderness Area, and 26 kilometers north of the Dry River Wilderness Area. Receptor locations and elevations were downloaded from the National Park Service website (www.nature.nps.gov/air/Maps/Receptors/index.cfm). The Class I receptor locations were converted from the NAD27 to the NAD83 UTM coordinate system for the analysis. Hill heights were assigned for each receptor using an anchor location in NAD83 through the application of AERMAP.

AERMOD was run for the biomass boiler at the operation conditions identified by SCREEN3 as the worst-case for ambient impacts, 100% load at 37.6% and 50% fuel moisture content with heat recovery. Each source was modeled individually with a 1.0 gram per second emission rate. As was done with the Class II results, individual source pollutant concentrations were determined by multiplying the source emission rate for the applicable averaging period by the modeled unit emission rate impact. Refined concentrations from the individual sources were initially evaluated to examine potential cavity impacts and potential cumulative impacts.

Annual impact concentrations for the individual sources were based on the unrestricted operation of the boiler and cooling tower, and 300 hours for both the emergency generator and fire pump. The annual total concentrations were based on the sum of the maximum values for the boiler, cooling tower, emergency generator and fire pump.

Short-term averages (24 hours and less) were based on unrestricted boiler and cooling tower operation. Other than one hour per week for maintenance testing, the diesel generator and fire pump will not operate concurrently with the boiler. The total short-term concentrations were based on the sum of the maximum values for the boiler, cooling tower and one hour from both the emergency generator and fire pump.

The individual source and potential total concentrations presented in Table 7.12 were compared to the Class I SILs. At this time, EPA has proposed three options for Class I $PM_{2.5}$ SILs:

- Option 1: 0.04 ug/m^3 annual, 0.08 ug/m^3 24-hour,
- Option 2: 0.16 ug/m^3 annual, 0.24 ug/m^3 24-hour, and
- Option 3: 0.06 ug/m^3 annual, 0.07 ug/m^3 24-hour.

The predicted Facility impacts were compared to the most stringent of these options; 0.04 ug/m^3 for annual impacts (Option 1), and 0.07 ug/m^3 24-hour impacts (Option 3).

As shown in Table 7.12, the results of the Class I refined modeling indicates that the potential impacts for annual NO_2, 3-hour and 24-hour SO_2, and 24-hour $PM_{2.5}$ exceed the Class I SILs. The significant impacts are predicted to occur out to 21 kilometers for NO_2, 34 kilometers for SO_2, and out to 40 kilometers for 24-hour $PM_{2.5}$.

The major source increment baseline date for SO_2 is January 6, 1975 for all counties in New Hampshire. For NO_2, the major source baseline date is February 8, 1988. As the maximum Class I impacts are greater than the SO_2 and NO_2 SILs, the emissions from the Facility will be modeled along with other background increment-consuming SO_2 and NO_2 sources within the Significant Impact Area (SIA) to demonstrate that the total SO_2 and NO_2 impacts resulting from all significant sources within the SIA will not exceed their respective PSD thresholds. LBB requests that NHDES provide the required data for other applicable SO_2 and NO_2 sources located within the SIA to facilitate the completion of this analysis.

The EPA is in the process of formulating the $PM_{2.5}$ increment system. Three options are being considered, each with different significant impact levels. Under Option 1, the $PM_{2.5}$ baseline dates would need to be triggered and all existing sources would be considered part of the baseline. Under the other two options, the annual $PM_{2.5}$ increment would replace the annual PM_{10} increment, retaining baseline dates. However, the Option 1 24-hour $PM_{2.5}$ increment would be adopted, requiring establishment of new baseline dates.

The results of the Class I impact analysis indicate that the maximum Facility impacts would exceed the most stringent of the EPA's proposed 24-hour $PM_{2.5}$ SILs, but would not exceed any of the EPA's proposed annual $PM_{2.5}$ SILs. Under any of the scenarios described above, and assuming that the Facility impacts exceed the 24-hour $PM_{2.5}$ SIL adopted by the EPA, it is likely that the submittal of the Facility air permit application would trigger the 24-hour $PM_{2.5}$ baseline date. Any other existing sources in the SIA would be considered part of the baseline and would not need to be included in the PSD increment modeling analysis. The 24-hour $PM_{2.5}$ Facility impacts would then be compared to the EPA's adopted $PM_{2.5}$ 24-hour Class I PSD increment to demonstrate compliance with the PSD rules for $PM_{2.5}$.

7.11 Background Air Quality

When conducting an air quality impact analysis with respect to NAAQS, the existing background air quality in the absence of the proposed source must be considered in combination with the impacts resulting from the proposed source. When background air quality data is not available for the Project area, other representative background data from nearby monitoring stations must be used.

Background concentration data from nearby, representative monitoring stations for criteria pollutants during the most recent three years (2006-2008) were obtained from the EPA AirData website, http://www.epa.gov/air/data/index.html. Table 7.13 provides a summary of the monitor values and background concentrations selected for use in the modeling analysis for the Facility.

7.12 PSD Increment Analysis

The maximum NO_2, PM and SO_2 impacts from the proposed Facility were assessed for increment consumption in both Class I and Class II areas. The Facility will have maximum impacts that are less than the SILs in Class II areas for all pollutants, thus demonstrating compliance with the respective PSD increments. The maximum NO_2, SO_2 and $PM_{2.5}$ impacts in Class I areas exceed their respective SILs. An additional cumulative modeling analysis will be conducted to demonstrate that the impacts from the Facility, when combined with the impacts from any other applicable increment consuming sources within the SIA, do not exceed their respective Class I PSD increments.

7.13 NAAQS Compliance Analysis

Maximum CO, NO_2, PM and SO_2 impacts from the proposed Facility were also assessed for compliance with the National Ambient Air Quality Standards (NAAQS). The Facility will have maximum Class II impacts that are less than the SILs. Table 7.14 presents the total concentrations, based on the sum of the Facility modeled concentrations and representative background concentrations. As shown on Table 7.14, the impacts from the Facility, combined with existing background concentrations, will not cause or contribute to an exceedance of NAAQS.

7.14 Regulated Toxic Air Pollutants

NHCAR Chapter Env-A 1400 establishes rules to prevent, control, abate and limit the emissions of toxic air pollutants into the ambient air to promote public health. All stationary sources in New Hampshire that emit a regulated toxic air pollutant are subject to this regulation, except for specified exempt sources and activities. One of the source categories which is exempt from the requirements of the rule is the combustion of untreated wood. Therefore, the emissions from the biomass boiler are not subject to the state regulated toxic air pollutants rule requirements. Neither the emergency generator not the fire pump will emit a regulated toxic air pollutant at a rate that is above either its annual or 24-hour de minimis emissions level. These sources are therefore not subject to the rule.

There will be emissions of NH_3 from the SCR emissions control system. Additionally, the use of certain water treatment chemicals in the cooling towers will result in the emission of 'free chlorine' (as part of the cooling tower drift) above de-minimis emission rate levels of Env-A 1400. However, the air dispersion modeling analysis conducted for the Facility demonstrates that the maximum predicted ambient air impacts for NH_3 and free chlorine, at or beyond the property line, are less than the 24-hour and annual ambient air limits (AALs) established in Table 1450-1 of NHCAR Chapter Env-A 1400. The Facility will therefore comply with the NH Regulated Air Toxics rule. Table 7.16 summarizes the results of the RTAP analysis conducted for the Facility.

7.15 Boiler Startup Modeling

An air quality impact analysis was also performed to evaluate a cold startup scenario for the biomass boiler. According to the information provided by the vendor, a cold start will typically take approximately 12 hours. During the first 8 hours, the oil-fired startup burners will be operated up to their full capacity (240 MMBtu/hr) to heat up the bed material and boiler heat transfer surfaces. The biomass feed will then begin and gradually be increased over a 3 hour period, with the firing rates of the oil burners gradually decreased. When the boiler reaches approximately 50% of its steam capacity, the oil burners will no longer be in operation and the wood feed rate will be increased over an additional 1 hour period to achieve the minimum operating steady state load of 70% at which point the startup cycle will be completed. It is estimated that there will be up to six cold startups of the biomass boiler per year.

Other than one hour per week for maintenance testing, the diesel generator and fire pump will not operate concurrently with the boiler. Maintenance testing will not be performed during boiler startups so the emergency generator and the fire pump were not included in the short term impact analyses for cold startup periods. The cooling tower will be in operation during startup periods so the cooling tower emissions were included in the startup modeling analysis.

The expected boiler startup emissions and exhaust parameters are summarized on Table 7.18 for each startup phase. SCREEN3 was applied to evaluate the three start-up phases using the same methodology as was applied for normal boiler operation. The results of the SCREEN3 Class II analysis for the boiler cold startup operating scenario are presented in Table 7.19 for simple terrain, complex terrain and cavity impacts.

Annual impacts were based on 6 cold starts per year. Short-term impacts were based on the length of time for each phase. The highest CO impacts occur during Phase 1. Since Phase 1 lasts for 8 hours, the maximum Phase 1 CO impacts were used to evaluate the maximum 1-hour and 8-hour CO impacts in comparison to the SILs. The maximum 1-hour SO_2 impacts were predicted during Phase 2. Since Phase 2 lasts for three hours, the maximum Phase 2 SO_2 impacts were used to evaluate the maximum 3-hour SO_2 impact in comparison to the SIL. The maximum 24-hour SO_2, PM_{10} and $PM_{2.5}$ impacts and the maximum annual NO_2, SO_2, PM_{10} and $PM_{2.5}$ impacts were based on the cumulative impacts of Phase 1 (8 hours), Phase 2 (3 hours), Phase 3 (1 hour) and the maximum combined facility impact during normal operation (previously determined by refined modeling) for the remainder of the averaging period.

A summary of the Class II SCREEN3 combined impacts from startup and normal operation are summarized in Table 7.20. The maximum 24-hour and annual impacts from normal Facility operation were added to the startup impacts to determine the potential total Facility impact concentrations. This methodology was conservative because the 24-hour and annual boiler impacts during normal operation were not adjusted to account for reduced normal operation due to startups. Based on the SCREEN3 results, total impacts greater than the SILs were determined 24-hour PM_{10} and 24-hour $PM_{2.5}$.

AERMOD was then applied using a 1 gram per second emission rate to determine the maximum 8-hour Phase 1 impact concentration, the maximum 3-hour Phase 2 impact concentration, the maximum 1-hour Phase 3 impact concentration and the maximum 12-hour normal operation (boiler and cooling tower) impact concentration. These normalized values were multiplied by the PM_{10} and $PM_{2.5}$ emission rates and summed, without regard to location or time, to conservatively estimate the maximum potential 24-hour combined impact concentrations. The results of this AERMOD analysis are presented in Table 7.21. As shown in Table 7.21, the maximum 24-hour PM_{10} impact was less than the SIL. Additional refined modeling was then performed to demonstrate that the maximum 24-hour $PM_{2.5}$ impact concentration resulting from cold boiler startups would be less than the SIL.

AERMOD was applied using the $PM_{2.5}$ emission rates for the three cold startup phases and during normal operation to determine the maximum potential 24-hour $PM_{2.5}$ concentration. As a cold startup could commence anytime during the day, 24 scenarios were evaluated. The 24 scenarios were based on Phase 1 starting at each hour of the day, and lasting for 8 hours. Phase 1 was immediately followed by 3 hours of Phase 2, which was then followed by 1 hour of Phase 3. The boiler and cooling tower were assumed to be operating at normal load during the hours each day preceding Phase 1 and following Phase 3. These scenarios were modeled for the boiler during normal operation at both the 50% and 37.6% fuel moisture contents. The results of the twenty-four $PM_{2.5}$ AERMOD runs are presented in Table 7.22. As shown in Table 7.22, the maximum predicted 24-hour $PM_{2.5}$ concentration was 1.4 ug/m^3, less than the SIL of 2 ug/m^3.

The boiler startup modeling analysis demonstrated that the maximum ambient air quality impacts resulting from cold startups of the boiler will all be below their respective SILs.

7.16 Visibility Impacts

The PSD regulations protect Class I areas, such as wilderness areas and national parks, from plume visibility impacts. Sufficiently large particulate and nitrogen dioxide air emissions can cause visible plumes. When the components of the plume scatter or absorb light, the plume may contrast with the viewing background. EPA's Workbook for Plume Visual Impact Screening and Analysis (EPA, 1992b) was used to conduct a visibility impairment analysis for the closest Class I area. The workbook outlines the screening procedures to be used in assessing visibility impacts of any project. The Level I screening analysis used a series of conservative calculations designed to identify those emission sources that have the potential for adversely impacting visibility.

The EPA VISCREEN model (Version 1.01, dated 88341) incorporates the screening procedures. The values calculated through the model relate predicted source impacts to visibility degradation and are then compared to a standardized screening value. If the model results indicate calculated values less than the screening criteria, the source is projected to present no adverse impairment to visibility, and no further analysis is required.

VISCREEN was applied to determine the potential visual impacts from the Facility in the Great Gulf and Presidential-Dry River Wilderness Areas. The National Park Service Air Resources Division has developed a data base of receptor locations for modeling Class I areas. Based on the receptor locations for the two areas, the closest receptors are 18 and 26 km from the boiler stack for Great Gulf and Dry River, respectively.

VISCREEN was applied using the following inputs:

- 1.73 g/sec (13.7 lb/hr) PM
- 10.50 g/sec (83.3 lb/hr) NO_X
- Assumed no soot, primary nitrogen dioxide or sulfate emissions (model default)
- Background visual range = 60 km (from VISCREEN manual)

- Observer located at closest distance to Class I area
- Closest distance = 18.1 km (Great Gulf) and 26.0 (km) Dry River
- Maximum distance = 24.0 km (Great Gulf) and 44.8 km (Dry River)
- Model defaults for stability class/wind speed (F, 1.0 m/s), background ozone (0.04 ppm) and plume offset angle (11.25 degrees)

The emission rates represent the maximum emission rates from all sources. VISCREEN calculates screening values for the measure of the difference between two arbitrary colors as perceived by humans (delta E), and a green contrast value for both terrain and sky background. For Great Gulf, the worst-case delta E value is 8.1, compared to a screening guideline of 2.0. The worst-case contrast value is 0.095, compared to the screening guideline of 0.05.

Local visibility impacts resulting from the operation of the Facility sources will be minimal. The opacity of the plume from the biomass boiler will be maintained at levels compliant with the applicable state regulation. For stationary fuel burning devices installed after May 13, 1970, average opacity is prohibited in excess of 20% for any continuous 6-minute period. For steam generating units subject to NSPS, during periods of startup, shutdown, and malfunction, average opacity is allowed in excess of 20% for one period of 6 continuous minutes in any 60-minute period. The boiler will be equipped with a COMS to continuously monitor compliance with the permitted state opacity limits.

7.17 Impacts to Soils and Vegetation

The PSD regulations require an air quality impact analysis on sensitive types of soils and vegetation. The assessment was performed by adding the Facility impacts with ambient background concentrations and comparing the total to vegetation sensitivity screening levels presented in Table 3.1 of EPA's "A Screening Procedure for the Impacts of Air Pollution on Plants, Soils and Animals" (EPA, 1981). The screening levels represent the minimum screening levels at which visible damage or growth effects to vegetation may occur. Screening levels have been established for the following pollutants that will be emitted from the Facility:

- 1-hour, 3-hour and annual SO_2,
- 4-hour, 8-hour, monthly and annual NO_2,
- Weekly CO,
- Monthly beryllium, and
- Quarterly lead.

The proposed background air quality concentrations used in all modeling analyses for this Facility are based on 2005-2007 monitoring data. The highest annual averages over the three-year period were selected as the annual background values. Short-term background values (24-hours and less) were based on the highest of the yearly second-high values. The monitoring data is available on EPA's Aerometric Information Retrieval System (AIRS) internet site (www.epa.gov/aersweb). The closest lead monitoring location is at Kenmore Square in Boston. Monitoring data is not presented for beryllium. In addition, data found on the website is not presented for all averaging periods being examined. In those cases, the next shortest averaging period was used to conservatively estimate the background.

Background was conservatively estimated for:

- Use of 1-hour values for 4-hour, 8-hour and monthly NO_2, and
- Use of 8-hour CO values for weekly CO.

Refined AERMOD modeling was performed to determine individual source impacts from the boiler, cooling tower, diesel generator and fire pump. As shown in Table 7.15, the modeled concentrations from the Facility, in combination with representative background values, are less than the vegetation sensitivity concentrations. Therefore, the Facility will not adversely impact vegetation in the area.

7.18 Impacts to Growth

The construction and operation of the Facility will have a very significant, positive effect on the City and region. Its development will convert a Brownfield site with environmental issues that are a barrier to development into an asset for the City of Berlin that will foster additional economic development and rising employment. LBB is ready and willing to work with the City to acquire the balance of the former Pulp Mill site (i.e. the remaining 40 acres of land that were part of the Pulp Mill site and located immediately adjacent to the Project Site) and prepare it for redevelopment. LBB has offered its support for the formation of a nonprofit organization under Internal Revenue Code § 501(c)(3) to acquire the property and help guide a plan to redevelop it. With that redevelopment, economically diverse and beneficial projects could be located adjacent to the Site.

The Project will provide for support and expansion of the local economic base. It will bring increased economic activity to the City and the region during construction and operation. Furthermore, the Project will be a major addition to the tax base in the City of Berlin without burdening public services.

Construction of the Project will inject approximately $80 million into the surrounding economy for the purchase of local goods and services such as such as earthwork, engineering, general construction services, specialized trades, construction materials and support services. The Project will have substantial long-term economic benefits, including permanent direct employment for 40 people related to the operation of the Project and indirect employment of up to 300 people for timber harvesting and processing, trucking, forestry consulting services, and mechanical services. LBB hopes to draw most of the Plant employees from the greater Berlin area. The Facility will provide increased commerce in the area from the purchases of local goods and services by the Project and employees.

The Project brings a new enterprise and diversity to the Berlin economy by shifting from the production of paper to renewable energy. LBB hopes to act as incubator for the development of new businesses that may be similarly involved in the clean energy sector. The plant is being designed to utilize "waste heat" which will be converted to hot water for use at the Fraser paper mill in Gorham. This feature offers the opportunity to help reduce fuel oil costs at the paper mill.

The Project is compatible with and supportive of the forest industry in the region. It will provide a steady, dependable market for wood and in turn providing strong incentives for long-term commercial forestry management. The regional logging and trucking industries, as well as landowners, will be able to rely on this dependable market that will be largely insulated from fluctuations in global markets. The facility will spend between $20 million and $25 million per year on biomass fuel purchases and will seek to keep the purchase of the renewable timber supply in the immediate vicinity of the power plant.

7.19 Sulfate/Nitrate Deposition in Class I Areas

An analysis will be performed to assess the potential for sulfate and nitrate deposition within nearby Class I areas. The Great Gulf and Dry River Wilderness Areas are located approximately 18 and 26 kilometers south of the Project, respectively.

AERMOD will be used to perform the deposition modeling, as the Class I areas are less than 50 kilometers from the Project. AERMOD includes algorithms for both wet and dry deposition of gaseous emissions. Inputs required for gas deposition modeling include seasonal definitions, and land use characteristics for each of the 36 ten-degree wind sectors.

- Nine land use categories have been defined for input:
- Urban land, no vegetation
- Agricultural land
- Rangeland
- Forest
- Suburban areas, grassy
- Suburban areas, forested
- Bodies of water
- Barren land, mostly desert, and
- Non-forested wetlands

The inputs will be consistent with those used for AERSURFACE and AERMET. The seasons will be defined for winters with snow cover. Sectors for input to AERSURFACE and AERMET were defined as:

- 0-110 degrees (coniferous forest)
- 110-200 degrees (deciduous forest)
- 200-290 degrees (other cleared, residential/commercial), and
- 290-360 degrees (residential/commercial and transportation).

The predominant land use categories are shown above for the AERSURFACE sectors. Based on the above, the land use for the 36 ten-degree sectors will be assigned as:

Sectors 1-20: forest

Sectors 21-36: suburban areas, grassy

Hourly precipitation from the Burgess Mill met tower will be included in the analysis.

7.20 References

Auer, A. H., 1978. Correlation of Land Use and Cover with Meteorological Anomalies, Journal of Applied Meteorology, 17: 636-643.

EPA, 1981. A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals, Document Number EPA-45012-81-078. Office of Air Quality Planning and Standards, Research Triangle Park, NC. December.

EPA, 1985. Guidelines for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations), Document Number US EPA-450/4-80-023R. Office of Air Quality Planning and Standards, Research Triangle Park, NC.

EPA, 1992a. Procedures for Substituting Values for Missing NWS Meteorological Data for Use in Regulatory Air Quality Models. Dennis Atkinson and Russell F. Lee. July 7.

EPA, 1992b. Workbook for Plume Visual Impact Screening and Analysis. Document Number EPA-4541R-92-023. Office of Air Quality Planning and Standards, Research Triangle Park, NC. October.

EPA, 2003. Guideline on Air Quality Models, (Revised) EPA450/12-78-027R, Office of Air Quality Planning and Standards. Research Triangle Park, NC.

EPA, 2009. AERMOD Implementation Guide. AERMOD Implementation Workgroup, Office of Air Quality Planning and Standards. Research Triangle Park, NC. Revised March 19, 2009.

ESS, 2009. Email communication between Dammon Frecker, ESS and Lisa Landry, Gary Milbury and David Healey, NHDES. September 22.

NHDES, 2006. Guidance and Procedure for Performing Air Quality Impact Modeling in New Hampshire. New Hampshire Department of Environmental Services, Air Resources Division. July.

NHDES, 2009. Email communication between Lisa Landry, NHDES and Dammon Frecker, ESS. August 19.

EPA's Aerometric Information Retrieval System (AIRS), Website www.epa.gov/airsweb

National Park Service, Website www.nature.nps.gov/air/Maps/Receptors/index.cfm

8.0 APPLICATION FORMS

This section contains completed versions of the following required NHDES air permit application forms:

- Signed Affidavit - Demonstration of Title, Right and Interest in Property
- Form ARD-1: General Information for all Permit Applications
- Form ARD-2: Information Required for Permits for Fuel Burning Devices
    - Biomass Boiler
    - Emergency Generator
    - Fire Pump
- Form ARD-3: Information Required for Permits for a Unit of Processing or Manufacturing Equipment
    - Cooling Tower
- Form ARD-4: Information Required for Permits for Storage Tanks Containing Fuel or Volatile Organic Compounds
    - ULSD Storage Tank

STATE OF NEW HAMPSHIRE
Department of Environmental Services
Air Resources Division
P.O. Box 95
Concord, NH 03302-0095
Telephone: 603-271-1370

Form ARD-1

General Information for All Permit Applications

I. FACILITY INFORMATION - *Complete the following*:

A. Type of Application: ☒ New ☐ Renewal ☐ Modification

B. Physical Location:

Facility Name: Berlin BioPower
Street: 57 Hutchins Street
Town/City: Berlin State: NH Zip Code: 03570

C. Mailing Address:

Street/P.O. Box: 57 Hutchins Street
Town/City: Berlin State: NH Zip Code: 03570
Telephone Number:

D. USGS Coordinates:

UTM	
Easting:	326984
Northing:	4926531

or

Latitude/Longitude			
N Latitude:	Deg	Min	Sec
W Longitude:	Deg	Min	Sec

E. Owner:

Company: Laidlaw Berlin BioPower, LLC
Street/P.O. Box: 90 John Street - 4th Floor
Town/City: New York State: NY Zip Code: 10038
Telephone Number: 212-480-9884

F. Parent Corporation:

Company: Laidlaw Berlin BioPower, LLC
Contact Person/Title: Michael Bartoszek / CEO
Street/P.O. Box: 90 John Street - 4th Floor
Town/City: New York State: NY Zip Code: 10038
Telephone Number: 212-480-9884

G. Contact Information

1. General/Technical Contact:

Contact Person: Louis T. Bravakis
Title: Vice President
Address: 45 State Street
Town/City: Montpelier State: VT Zip Code: 05602
Telephone Number: 802-229-4146
E-mail Address: LTB@laidlawenergy.com

2. Application Preparation:

Company: ESS Group, Inc.
Contact Person: Dammon Frecker
Address: 888 Worcester Road - Suite 240
Town/City: Wellesley State: MA Zip Code: 02482
Telephone Number: 781-489-1146
E-mail Address: dfrecker@esssgroup.com

3. Legal Contact:

Barry Needleman
Contact Person

Project Counsel
Title

11 South Main Street - Suite 500
Address

Concord NH 03301
Town/City State Zip Code

603-230-4407
Telephone Number

Barry.Needleman@McLane.com
E-mail Address

4. Invoicing Contact:

Michael Bartoszek
Contact Person

President & CEO
Title

90 John Street - 4th Floor
Address

New York NY 10038
Town/City State Zip Code

212-480-9884
Telephone Number

mbb@laidlawenergy.com
E-mail Address

H. Major Activity or Product Descriptions - *List all activities performed at this facility and provide SIC code(s):*

Description of Activity or Product	SIC Code
Production and distribution of electricity	4911

I. Other Sources or Devices - *List sources or devices at the facility (other than those that are the subject of this application) that are permitted pursuant to Env-A 600:*

Source or Device	Permit #	Expiration Date
None		

II. Total Facility Emissions Data:

Pollutant	CAS #	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
NOx	10102-43-9	72.4	72.4	266.4	266.4
CO	630-08-0	83.6	83.6	307.5	307.5
SO2	89125-89-3	27.9	27.9	101.3	101.3
PM	N/A	13.7	13.7	52.3	52.3
VOC	N/A	11.1	11.1	40.6	40.6
Also see Attached Table 3.2					

Note: For Regulated Toxic Air Pollutants list name and Chemical Abstract Service Number (CAS #) – *use additional sheets if necessary.*

III. Support Data *The following data must be submitted with this application:*

☒ A copy of all calculations used in determining emissions;
☒ A copy of a USGS map section with the site location clearly indicated; and
☒ A to-scale site plan of the facility showing:

1. the locations of all emission points;
2. the dimensions of all buildings, including roof heights; and
3. the facility's property boundary.

IV. Certification (To be completed by a responsible official only):

I am authorized to make this submission on behalf of the affected source or affected units for which this submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the information submitted in this document and all of its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

Print/Type Name: Louis T. Bravakis
Title: Vice President

Signed:
Date: 12/14/09

STATE OF NEW HAMPSHIRE
Department of Environmental Services
Air Resources Division

Form ARD-2

1776

Information Required for Permits for Fuel Burning Devices

I. EQUIPMENT INFORMATION – *Complete a separate form for each device.*

Device Description: Wood-Fired Boiler

Date Construction Commenced: __________ **Device Start-Up Date:** __________

A. Boiler ☐ Not Applicable

B&W Boiler Manufacturer	N/A Boiler Model Number
N/A Boiler Serial Number	1,013 Gross Heat Input Nameplate Rating (MMBtu/hr)
N/A Burner Manufacturer	N/A Burner Model Number
N/A Burner Serial Number	124.9 ☐ gal/hr ☐ mmcf/hr ☒ ton/hr Potential Fuel Flow Rate

1. Type of Burner:

a. Solid Fuel:

- ☐ Cyclone
- ☐ Pulverized (☐ wet ☐ dry)
- ☐ Spreader Stoker
- ☐ Underfeed Stoker
- ☐ Overfeed Stoker
- ☐ Hand-Fired
- ☐ Fly Ash Re-injection
- ☒ Other (specify): Bubbling Fluidized bed

b. Liquid Fuel:

- ☐ Pressure Gun
- ☐ Rotary Cup
- ☐ Steam Atomization
- ☒ Air Atomization
- ☐ Other (specify): __________

c. Gaseous Fuel:

- ☐ Natural Gas
- ☐ Propane
- ☐ Other (specify): __________

2. Combustion Type:

- ☐ Tangential Firing
- ☐ Staged Combustion
- ☐ Other (specify): __________
- ☐ Opposite End Firing
- ☐ Biased Firing
- ☐ Limited Excess Firing
- ☐ One End Only Firing
- ☒ Flue Gas Recirculation

B. Internal Combustion Engines/Combustion Turbines ☒ Not Applicable

Manufacturer	Model Number
Serial Number	☐ gal/hr ☐ mmcf/hr Fuel Flow Rate
☐ hp ☐ kW Engine Output Rating	Reason for Engine Use

C. Stack Information

Is unit equipped with multiple stacks? ☐ Yes ☒ No *(if yes, provide data for each stack)*

Identify other devices on this stack: ____________________

Is Section 123 of the Clean Air Act applicable? ☐ Yes ☒ No

Is stack monitoring used? ☒ Yes ☐ No

If yes, Describe: Opacity COMS, NOx & CO CEMS

Is stack capped or otherwise restricted? ☐ Yes ☒ No

If yes, Describe: ____________________

Stack exit orientation: ☒ Vertical ☐ Horizontal ☐ Downward

Stack ☒ Inside Diameter (ft) ☐ Exit Area (ft^2): 11.25

Discharge height above ground level (ft): 320

Exhaust Flow (acfm): 382,000

Exhaust Velocity (ft/sec): 64

Exhaust Temperature (°F): 369

II. OPERATIONAL INFORMATION

A. Fuel Usage Information

1. Fuel Supplier:

Supplier's Name: Varies
Street:
Town/City: State: Zip Code:
Telephone Number:

2. Fuel Additives:

Manufacturer's Name: None
Street:
Town/City: State: Zip Code:
Telephone Number:
Identification of Additive:
Consumption Rate (gallons per 1000 gallons of fuel):

3. Fuel Information *(List each fuel utilized by this device)***:**

Type	% Sulfur	% Ash	% Moisture (solid fuels only)	Heat Rating (specify units)	Potential Heat Input (MMBtu/hr)	Actual Annual Usage (specify units)
Woodwaste	0.04	<12	37.6-50	5060 Btu/lb	1013	281,196 tons
No 2 Oil	0.0015	0.01	N/A	139,000 Btu/gal	240	82,272 gal.

B. Hours of Operation

Hours per day: 24 Days per year: 365

Device: ______________________

Form ARD-2

III. POLLUTION CONTROL EQUIPMENT ☐ Not Applicable

A. Type of Equipment *Note: if process utilizes more than one control device, provide data for each device*

☐ baffled settling chamber
☐ long cone cyclone
☐ multiple cyclone (______ inch diameter)
☒ electrostatic precipitator
☐ spray tower
☐ venturi scrubber
☐ afterburners (incineration)
☒ selective catalytic reduction
☐ reburn
☐ other (specify): ________________________

☐ wide bodied cyclone
☐ irrigated long cone cyclone
☐ carbon absorption
☐ irrigated electrostatic precipitator
☐ absorption tower
☐ baghouse
☐ packed tower/column
☐ selective non-catalytic reduction

B. Pollutant Input Information

Pollutant	Temperature (°F)	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
NOx	438	224	243	981	1064
PM	438	2237	2431	9798	10648
CO	438	69.9	83.6	306	366
SO2	438	23.3	27.9	102	122
VOC	438	9.3	11.1	41	49

Method used to determine entering emissions:

☐ stack test ☒ vendor data ☐ emission factor ☐ material balance

☐ other
(specify): ____

C. Operating Data

1. Capture Efficiency: 100% Verified by: ☐ test ☒ calculations
2. Control Efficiency: 70 NOx/99.5 PM% Verified by: ☐ test ☒ calculations
3. Normal Operating Conditions *(supply the following data as applicable)*

Total gas volume through unit (acfm): 498000
Temperature (°F): 438
Percent Carbon Dioxide (CO_2): nd
Voltage: nd
Spark Rate: nd
Milliamps: nd
Pressure Drop (inches of water): nd
Liquid Recycle Rate (gallons per minute): nd

IV. DEVICE EMISSIONS DATA:

Pollutant	Temperature (°F)	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
NOx	369	60.6	72.4	265	317
PM	369	11.2	13.4	49	59
CO	369	69.9	83.6	307	366
SO2	369	23.3	27.9	101	122
VOC	369	9.3	11.1	41	49

Method used to determine exiting emissions:

☐ stack test ☒ vendor data ☐ emission factor ☐ material balance

☐ other (specify): ____

STATE OF NEW HAMPSHIRE
Department of Environmental Services
Air Resources Division

Form ARD-2

1776

Information Required for Permits for Fuel Burning Devices

I. EQUIPMENT INFORMATION – *Complete a separate form for each device.*

Device Description: Emergency Generator

Date Construction Commenced: ____________ **Device Start-Up Date:** ____________

A. Boiler ☒ Not Applicable

Boiler Manufacturer: ____________

Boiler Model Number: ____________

Boiler Serial Number: ____________

Gross Heat Input Nameplate Rating (MMBtu/hr): ____________

Burner Manufacturer: ____________

Burner Model Number: ____________

Burner Serial Number: ____________

Potential Fuel Flow Rate: ____________ ☐ gal/hr ☐ mmcf/hr ☐ ton/hr

1. Type of Burner:

a. Solid Fuel:

- ☐ Cyclone
- ☐ Pulverized (☐ wet ☐ dry)
- ☐ Spreader Stoker
- ☐ Underfeed Stoker
- ☐ Overfeed Stoker
- ☐ Hand-Fired
- ☐ Fly Ash Re-injection
- ☐ Other (specify): ____________

b. Liquid Fuel:

- ☐ Pressure Gun
- ☐ Rotary Cup
- ☐ Steam Atomization
- ☐ Air Atomization
- ☐ Other (specify): ____________

c. Gaseous Fuel:

- ☐ Natural Gas
- ☐ Propane
- ☐ Other (specify): ____________

2. Combustion Type:

- ☐ Tangential Firing
- ☐ Staged Combustion
- ☐ Other (specify): ____________
- ☐ Opposite End Firing
- ☐ Biased Firing
- ☐ Limited Excess Firing
- ☐ One End Only Firing
- ☐ Flue Gas Recirculation

B. Internal Combustion Engines/Combustion Turbines ☐ Not Applicable

Manufacturer: Caterpillar

Model Number: CAT C15 ATTAC or equivalent

Serial Number: TBD

Fuel Flow Rate: 36.6 ☒ gal/hr ☐ mmcf/hr

Engine Output Rating: 500 ☐ hp ☒ kW

Reason for Engine Use: Emergency Power

Form ARD-2

C. Stack Information

Is unit equipped with multiple stacks? ☐ Yes ☒ No *(if yes, provide data for each stack)*

Identify other devices on this stack: ________________________________

Is Section 123 of the Clean Air Act applicable? ☐ Yes ☒ No

Is stack monitoring used? ☐ Yes ☒ No

If yes, Describe: ________________________________

Is stack capped or otherwise restricted? ☐ Yes ☒ No

If yes, Describe: ________________________________

Stack exit orientation: ☒ Vertical ☐ Horizontal ☐ Downward

Stack ☒ Inside Diameter (ft) ☐ Exit Area (ft²): 0.5

Discharge height above ground level (ft): 8

Exhaust Flow (acfm): 3,842

Exhaust Velocity (ft/sec): 326

Exhaust Temperature (°F): 942

II. OPERATIONAL INFORMATION

A. Fuel Usage Information

1. Fuel Supplier:

Supplier's Name: TBD

Street:

Town/City: State: Zip Code:

Telephone Number:

2. Fuel Additives:

Manufacturer's Name: NA

Street:

Town/City: State: Zip Code:

Telephone Number:

Identification of Additive:

Consumption Rate (gallons per 1000 gallons of fuel):

3. Fuel Information *(List each fuel utilized by this device)*:

Type	% Sulfur	% Ash	% Moisture (solid fuels only)	Heat Rating (specify units)	Potential Heat Input (MMBtu/hr)	Actual Annual Usage (specify units)
ULSD	0.0015	0.01	NA	140,000 Btu/galr	4.71	10,980 gal

B. Hours of Operation

Hours per day: 1 Days per year: 300 hr/yr

Device: ______________________

Form ARD-2

III. POLLUTION CONTROL EQUIPMENT ☒ Not Applicable

A. Type of Equipment *Note: if process utilizes more than one control device, provide data for each device*

☐ baffled settling chamber
☐ long cone cyclone
☐ multiple cyclone (______ inch diameter)
☐ electrostatic precipitator
☐ spray tower
☐ venturi scrubber
☐ afterburners (incineration)
☐ selective catalytic reduction
☐ reburn
☐ other (specify): ________________________

☐ wide bodied cyclone
☐ irrigated long cone cyclone
☐ carbon absorption
☐ irrigated electrostatic precipitator
☐ absorption tower
☐ baghouse
☐ packed tower/column
☐ selective non-catalytic reduction

B. Pollutant Input Information

Pollutant	**Temperature (°F)**	**Actual (lb/hr)**	**Potential (lb/hr)**	**Actual (ton/yr)**	**Potential (ton/yr)**

Method used to determine entering emissions:

☐ stack test ☐ vendor data ☐ emission factor ☐ material balance
☐ other (specify): ____

C. Operating Data

1. Capture Efficiency: ______% Verified by: ☐ test ☐ calculations
2. Control Efficiency: ______% Verified by: ☐ test ☐ calculations
3. Normal Operating Conditions *(supply the following data as applicable)*

____________________ Total gas volume through unit (acfm)	____________________ Temperature (°F)	____________________ Percent Carbon Dioxide (CO_2)
____________________ Voltage	____________________ Spark Rate	____________________ Milliamps
____________________ Pressure Drop (inches of water)	____________________ Liquid Recycle Rate (gallons per minute)	

Device: ______________________
Page 4 of 4

Form ARD-2

IV. DEVICE EMISSIONS DATA:

Pollutant	Temperature (°F)	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
NOx	942	8.48	8.48	1.2	37
CO	942	0.59	0.59	0.09	2.6
SO2	942	0.0071	0.0071	0.0011	0.031
PM	942	0.027	0.027	0.0041	0.12
VOC	942	0.015	0.015	0.0023	0.066

Method used to determine exiting emissions:

☐ stack test ☒ vendor data ☐ emission factor ☐ material balance

☐ other (specify): ____

STATE OF NEW HAMPSHIRE
Department of Environmental Services
Air Resources Division

Form ARD-2

1776

Information Required for Permits for Fuel Burning Devices

I. EQUIPMENT INFORMATION – *Complete a separate form for each device.*

Device Description: Diesel Fire Pump

Date Construction Commenced: ____________ **Device Start-Up Date:** ____________

A. Boiler ☒ Not Applicable

Boiler Manufacturer	Boiler Model Number
Boiler Serial Number	Gross Heat Input Nameplate Rating (MMBtu/hr)
Burner Manufacturer	Burner Model Number
Burner Serial Number	Potential Fuel Flow Rate ☐ gal/hr ☐ mmcf/hr ☐ ton/hr

1. Type of Burner:

a. Solid Fuel:

- ☐ Cyclone
- ☐ Pulverized (☐ wet ☐ dry)
- ☐ Spreader Stoker
- ☐ Underfeed Stoker
- ☐ Overfeed Stoker
- ☐ Hand-Fired
- ☐ Fly Ash Re-injection
- ☐ Other (specify): ____________

b. Liquid Fuel:

- ☐ Pressure Gun
- ☐ Rotary Cup
- ☐ Steam Atomization
- ☐ Air Atomization
- ☐ Other (specify): ____________

c. Gaseous Fuel:

- ☐ Natural Gas
- ☐ Propane
- ☐ Other (specify): ____________

2. Combustion Type:

- ☐ Tangential Firing
- ☐ Staged Combustion
- ☐ Other (specify): ____________
- ☐ Opposite End Firing
- ☐ Biased Firing
- ☐ Limited Excess Firing
- ☐ One End Only Firing
- ☐ Flue Gas Recirculation

B. Internal Combustion Engines/Combustion Turbines ☐ Not Applicable

Cummings	CFP83-F40 or equivalent
Manufacturer	Model Number
TBD	14.5 ☒ gal/hr ☐ mmcf/hr
Serial Number	Fuel Flow Rate
288 ☒ hp ☐ kW	Fire water pump
Engine Output Rating	Reason for Engine Use

Device: ______________________
Page 2 of 4

Form ARD-2

C. Stack Information

Is unit equipped with multiple stacks? ☐ Yes ☒ No *(if yes, provide data for each stack)*

Identify other devices on this stack: ____

Is Section 123 of the Clean Air Act applicable? ☐ Yes ☒ No

Is stack monitoring used? ☐ Yes ☒ No

If yes, Describe: ____

Is stack capped or otherwise restricted? ☐ Yes ☒ No

If yes, Describe: ____

Stack exit orientation: ☒ Vertical ☐ Horizontal ☐ Downward

Stack ☒ Inside Diameter (ft) ☐ Exit Area (ft^2): 0.5

Discharge height above ground level (ft): 8

Exhaust Flow (acfm): 1,632

Exhaust Velocity (ft/sec): 139

Exhaust Temperature (°F): 952

II. OPERATIONAL INFORMATION

A. Fuel Usage Information

1. Fuel Supplier:

Supplier's Name: TBD
Street:
Town/City: State: Zip Code:
Telephone Number:

2. Fuel Additives:

Manufacturer's Name: NA
Street:
Town/City: State: Zip Code:
Telephone Number:
Identification of Additive:
Consumption Rate (gallons per 1000 gallons of fuel):

3. Fuel Information *(List each fuel utilized by this device)*:

Type	% Sulfur	% Ash	% Moisture (solid fuels only)	Heat Rating (specify units)	Potential Heat Input (MMBtu/hr)	Actual Annual Usage (specify units)
ULSD	0.0015	0.01	NA	140,000	4.71	4,350 gal

B. Hours of Operation

Hours per day: 1 Days per year: 300 hr/yr

Device: ______________________
Page 3 of 4

Form ARD-2

III. POLLUTION CONTROL EQUIPMENT ☒ Not Applicable

A. Type of Equipment *Note: if process utilizes more than one control device, provide data for each device*

☐ baffled settling chamber
☐ long cone cyclone
☐ multiple cyclone (______ inch diameter)
☐ electrostatic precipitator
☐ spray tower
☐ venturi scrubber
☐ afterburners (incineration)
☐ selective catalytic reduction
☐ reburn
☐ other (specify): ________________________

☐ wide bodied cyclone
☐ irrigated long cone cyclone
☐ carbon absorption
☐ irrigated electrostatic precipitator
☐ absorption tower
☐ baghouse
☐ packed tower/column
☐ selective non-catalytic reduction

B. Pollutant Input Information

Pollutant	Temperature (°F)	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)

Method used to determine entering emissions:

☐ stack test ☐ vendor data ☐ emission factor ☐ material balance
☐ other (specify): ____

C. Operating Data

1. Capture Efficiency: ______% Verified by: ☐ test ☐ calculations
2. Control Efficiency: ______% Verified by: ☐ test ☐ calculations
3. Normal Operating Conditions *(supply the following data as applicable)*

____
Total gas volume through unit (acfm)

____
Temperature (°F)

____
Percent Carbon Dioxide (CO_2)

____
Voltage

____
Spark Rate

____
Milliamps

____
Pressure Drop (inches of water)

____
Liquid Recycle Rate (gallons per minute)

Device: ______________________
Page 4 of 4

Form ARD-2

IV. DEVICE EMISSIONS DATA:

Pollutant	Temperature (°F)	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
NOx	952	2.34	2.34	0.35	10.2
CO	952	0.28	0.28	0.042	1.2
SO2	952	0.0028	0.0028	0.00042	0.012
PM	952	0.037	0.037	0.0056	0.16
VOC	952	0.055	0.055	0.0083	0.24

Method used to determine exiting emissions:

☐ stack test ☒ vendor data ☐ emission factor ☐ material balance

☐ other (specify): ______________________________

STATE OF NEW HAMPSHIRE
Department of Environmental Services
Air Resources Division

Form ARD-3

Information Required for Permits for a Unit of Processing or Manufacturing Equipment

I. EQUIPMENT INFORMATION – *Complete a separate form for each device.*

Device Description: Cooling Tower - 4 cell

Date Construction Commenced: TBD **Device Start-Up Date:** TBD

Equipment Manufacturer: SPX Cooling Technologies

Model Number: F499-4.0-4 **Serial Number:** TBD

A. Raw Materials Entering Process

Description	Actual Usage (lb/hr)	Maximum Usage (lb/hr)	Actual Usage (tons/yr)
Cooling Water	496,860	496,860	2.18 million

B. Coatings and Solvents Entering Process

Description	Weight % of Solvent	Reason for Use	Actual Usage (lb/hr)	Maximum Usage (lb/hr)	Actual Usage (tons/yr)
NA					

C. Amount of Liquid Waste Discarded: NA

☐ gal/yr
☐ tons/yr

D. Stack Information

Is unit equipped with multiple stacks? ☒ Yes ☐ No *(if yes, provide data for each stack)*

Identify other devices on this stack: 4 cells, 4 exhausts

Is Section 123 of the Clean Air Act applicable? ☐ Yes ☒ No

Is stack monitoring used? ☐ Yes ☒ No

If yes, Describe: ______

Is stack capped or otherwise restricted? ☐ Yes ☒ No

If yes, Describe: ______

Stack exit orientation: ☒ Vertical ☐ Horizontal ☐ Downward

28 each Stack ☒ Inside Diameter (ft) ☐ Exit Area (ft^2)	48 Discharge height above ground level (ft)
1,300,000 Exhaust Flow (acfm)	27.6 Exhaust Velocity (ft/sec)
96 Exhaust Temperature (°F)	

II. OPERATIONAL INFORMATION

A. Supplemental Fuel Usage Information

1. Fuel Supplier:	**2. Fuel Additives:**
NA Supplier's Name	NA Manufacturer's Name
Street	Street
Town/City State Zip Code	Town/City State Zip Code
Telephone Number	Telephone Number
	Identification of Additive
	Consumption Rate (gallons per 1000 gallons of fuel)

3. Fuel Information *(List each fuel utilized by this device)***:**

Type	% Sulfur	% Ash	% Moisture (solid fuels only)	Heat Rating (specify units)	Potential Heat Input (MMBtu/hr)	Actual Annual Usage (specify units)

B. Hours of Operation

Hours per day: 24 Days per year: 365

III. POLLUTION CONTROL EQUIPMENT ☐ Not Applicable

A. Type of Equipment *Note: if process utilizes more than one control device, provide data for each device*

☐ baffled settling chamber
☐ long cone cyclone
☐ multiple cyclone (______ inch diameter)
☐ electrostatic precipitator
☐ spray tower
☐ venturi scrubber
☐ afterburners (incineration)
☐ selective catalytic reduction
☐ reburn
☒ other (specify): drift eliminators

☐ wide bodied cyclone
☐ irrigated long cone cyclone
☐ carbon absorption
☐ irrigated electrostatic precipitator
☐ absorption tower
☐ baghouse
☐ packed tower/column
☐ selective non-catalytic reduction

B. Pollutant Input Information

Pollutant	Temperature (°F)	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)
PM	96	600	600	2628	2628

Method used to determine entering emissions:

☐ stack test ☒ vendor data ☐ emission factor ☐ material balance

☐ other (specify): ____________________

C. Operating Data

1. Capture Efficiency: ______% Verified by: ☐ test ☐ calculations
2. Control Efficiency: 99.95% Verified by: ☐ test ☒ calculations
3. Normal Operating Conditions *(supply the following data as applicable)*

Total gas volume through unit (acfm): 1,300,000
Temperature (°F): 96
Percent Carbon Dioxide (CO_2): 0
Voltage: NA
Spark Rate: NA
Milliamps: NA
Pressure Drop (inches of water): NA
Liquid Recycle Rate (gallons per minute): NA

Form ARD-3

IV. DEVICE EMISSIONS DATA:

Pollutant	**Temperature (°F)**	**Actual (lb/hr)**	**Potential (lb/hr)**	**Actual (ton/yr)**	**Potential (ton/yr)**
PM	96	0.30	0.30	1.3	1.3

Method used to determine exiting emissions:

☐ stack test ☒ vendor data ☐ emission factor ☐ material balance

☐ other (specify): ______________________

STATE OF NEW HAMPSHIRE
Department of Environmental Services
Air Resources Division

Form ARD-4

1776

Information Required for Permits for Storage Tanks Containing Fuel or Volatile Organic Compounds

I. EQUIPMENT INFORMATION – *Complete a separate form for each tank.*

Tank Description: 50,000 gallon nominal capacity API-650 steel fuel tank

Date Construction Commenced: ____________ **Initial Fill Date:** ____________

Location: ☐ Underground ☒ Aboveground

A. Tank Type

1. Fixed Roof Tanks:

- ☒ Floating Roof Covered Type
- ☐ Floating Roof Open Type:
  - ☐ Pan
  - ☐ Pontoon
  - ☐ Double Deck

2. Variable Vapor Space Tanks:

- ☐ Lifter Roof
- ☐ Flexable Diaphram

Seal Type:

- ☐ Single
- ☐ Double
- ☐ Welded

Connected to Other Tanks? ☐ Yes ☐ No

Specify Other Tanks: ____________

3. Pressure Tanks:

- ☐ Spheroid
- ☐ Horizontal Cylinder
- ☐ Vertical Cylinder

Internal Pressure: ______ @ ______ °F

4. Other Tank Type (specify): ____________

B. Tank Information

16	23	API-650 self supporting conical roof
Height (feet)	Inside Diameter (feet)	Roof Slope (inches/ft)

white	white
Roof Color	Side Color
50,000	100,000
Tank Fill Capacity (gallons)	Annual Throughput (gallons/year)

	Yes	No	If Yes:	
Insulated?	☐	☒	Material Type:	
Heated?	☐	☒	Temperature (°F):	
Lined?	☐	☒	Liner Type:	

For variable vapor space systems:

Actual Annual Number of Shipments into Tank: ____________

Actual volume per shipment (gallons): ____________

Potential volume expansion capability of variable vapor space (gallons): ____________

Pressure Setting (lb/in^2): ____________ Vacuum Setting (lb/in^2): ____________

Form ARD-4

C. Liquid Information

Liquid Type: ULSD

Molecular Weight: 180

Average Bulk Liquid Temperature (°F): 70

True vapor pressure at average bulk liquid temperature (psia): 0.009

Average density at bulk liquid conditions (lbs/gal): 6.92

D. Stack Information

Is unit equipped with multiple stacks? ☐ Yes ☒ No *(if yes, provide data for each stack)*

Identify other devices on this stack: ______________________

Is Section 123 of the Clean Air Act applicable? ☐ Yes ☐ No

Is stack monitoring used? ☐ Yes ☒ No

If yes, Describe: ______________________

Is stack capped or otherwise restricted? ☐ Yes ☒ No

If yes, Describe: ______________________

Stack exit orientation: ☐ Vertical ☐ Horizontal ☒ Downward

Stack ☐ Inside Diameter (ft) ☐ Exit Area (ft^2): Tank will have an Atmospheric vent

Discharge height above ground level (ft): 16

Exhaust Flow (acfm): N/A

Exhaust Velocity (ft/sec): N/A

Exhaust Temperature (°F): ambient

E. Hours of Operation

Hours per day: 24 Days per year: 365

II. POLLUTION CONTROL EQUIPMENT ☒ Not Applicable

A. Type of Equipment *Note: if process utilizes more than one control device, provide data for each device*

- ☐ baffled settling chamber
- ☐ long cone cyclone
- ☐ multiple cyclone (______ inch diameter)
- ☐ electrostatic precipitator
- ☐ spray tower
- ☐ venturi scrubber
- ☐ afterburners (incineration)
- ☐ selective catalytic reduction
- ☐ reburn
- ☐ other (specify): ______________________
- ☐ wide bodied cyclone
- ☐ irrigated long cone cyclone
- ☐ carbon absorption
- ☐ irrigated electrostatic precipitator
- ☐ absorption tower
- ☐ baghouse
- ☐ packed tower/column
- ☐ selective non-catalytic reduction

Form ARD-4

B. Pollutant Input Information

Pollutant	Temperature (°F)	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)

Method used to determine entering emissions:

☐ stack test ☐ vendor data ☐ emission factor ☐ material balance

☐ other
(specify): ____

C. Operating Data

1. Capture Efficiency: ______% Verified by: ☐ test ☐ calculations
2. Control Efficiency: ______% Verified by: ☐ test ☐ calculations
3. Normal Operating Conditions *(supply the following data as applicable)*

____
Total gas volume through unit (acfm)

____
Temperature (°F)

____
Percent Carbon Dioxide (CO_2)

____
Voltage

____
Spark Rate

____
Milliamps

____
Pressure Drop (inches of water)

____
Liquid Recycle Rate (gallons per minute)

III. DEVICE EMISSIONS DATA:

Pollutant	Temperature (°F)	Actual (lb/hr)	Potential (lb/hr)	Actual (ton/yr)	Potential (ton/yr)

Method used to determine exiting emissions:

☐ stack test ☐ vendor data ☐ emission factor ☐ material balance

☐ other (specify): ____

Tables

Table 3.1
Maximum Stack Concentrations & Emission Rates
Berlin BioPower - Berlin, New Hampshire

Pollutant	Biomass Boiler Normal Operation			Emergency Generator	Fire Pump	Cooling Tower
	Wood Fuel			Diesel	Diesel	
	ppm@7%O_2	lb/MMBtu	lb/hr	lb/hr	lb/hr	lb/hr
NO_x	39.0	0.065	72.4	8.5	2.3	
CO	74.0	0.075	83.6	0.59	0.28	
SO_2	11.0	0.025	27.9	0.0071	0.0028	
H_2SO_4		0.004	4.5			
PM (filterable)		0.012	13.4	0.027	0.037	0.30
PM_{10} (filterable)		0.012	13.4	0.027	0.037	0.30
$PM_{2.5}$ (filterable)		0.012	13.4	0.027	0.037	0.30
NH_3	20.0	0.012	13.4			
VOC	17.0	0.010	11.1	0.015	0.055	
Formaldehyde		0.0044	4.9	0.0056	0.0022	
Hydrogen Chloride		0.00083	0.92			
Lead		0.000048	0.1			
Mercury		0.0000030	0.0			

(1) The biomass boiler maximum stack concentrations and emission rates during normal operation do not apply at less than 70% of maximum load.

(2) The maximum lb/hr emission rates for the boiler are derived from the lb/MMBtu emission rate, the maximum heat input rate (1,013 MMBtu/hr), and a factor of 10% to account for expected variability in the exhaust gas volumetric flow rate from the boiler.

Table 3.2
Facility Potential Emissions Summary
Berlin BioPower - Berlin, New Hampshire

Pollutant	Potential Total Emissions (tons per year)							
	Biomass Boiler	Emergency Generator	Fire Pump	Cooling Tower	PTE - Normal Operation(1)	Boiler Startup(2)	Fugitive Emissions(3)	Facility PTE(4)
Maximum Hours of Operation per Year	8,688	300	300	8,760	8,688	72	8,760	
NO_x	263.2	1.3	0.4	0.0	264.8	1.6	0.0	266.4
CO	303.6	0.1	0.0	0.0	303.8	3.7	0.0	307.5
SO_2	101.2	0.0	0.0	0.0	101.2	0.1	0.0	101.3
H_2SO_4	15.5	0.0	0.0	0.0	15.5	0.0	0.0	15.5
PM (filterable)	48.6	0.0	0.0	1.3	49.9	0.4	2.0	52.3
PM_{10} (filterable)	48.6	0.0	0.0	1.3	49.9	0.4	0.9	51.1
$PM_{2.5}$ (filterable)	48.6	0.0	0.0	1.3	49.9	0.4	0.1	50.4
CO_2	894,864	116	46	0	895,026	1,924	0	896,950
NH_3	49.5	0.0	0.0	0.0	49.5	0.0	0.0	49.5
VOC	40.5	0.0	0.0	0.0	40.5	0.1	0.0	40.6
Formaldehyde	17.8	0.0	0.0	0.0	17.8	0.0	0.0	17.8
Hydrogen Chloride	3.4	0.0	0.0	0.0	3.4	0.0	0.0	3.4
Lead	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.2
Mercury	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total HAPS	65.0	0.0	0.0	0.0	65.0	0.1	0.0	65.1

(1) Total emissions represent maximum potential of all equipment operating independently in normal operation. The biomass boiler emissions are based on 932 MMBtu/hr average heat input. As all equipment will not run for maximum potential hours shown, actual emissions will be less.

(2) Boiler startup emissions have been estimated assuming a total of 6 cold startups per year. Emissions during shutdown periods are aggregated with emissions during normal boiler operation.

(3) Fugitive emissions resulting from wood fuel storage and handling activities.

(4) The Facility PTE is the sum of the PTE of all sources during normal operation, emissions during startup and shutdown of the Biomass Boiler, and fugitive emissions.

Table 7.1
Biomass Boiler, Emergency Generator & Fire Pump Stack and Exhaust Parameters Summary - Normal Operation
Berlin BioPower - Berlin, New Hampshire

	Biomass Boiler									**Generator**	**Fire Pump**
Load (%)	Max (100%)	Max (100%)	Max (100%)	Max (100%)	Min (70%)	Min (70%)	Min (70%)	Min (70%)	Load (%)	Max (100%)	Max (100%)
Ambient Temp (F)	60	60	60	60	60	60	60	60			
Fuel Moisture (%)	37.6	37.6	50	50	37.6	37.6	50	50			
Stack Temperature (F)	369	260	366	260	375	260	370	260			
Heat Input Rate (MMBtu/hr)	932	932	1,013	1,013	654	654	711	711	Power Output (hp)	670	288
Exhaust Flow (acfm)	382,000	331,773	448,000	390,508	270,000	232,814	315,891	274,026	Exhaust Flow (acfm)	3,842	1,632
Exit Velocity (ft/sec)	64.05	55.63	75.12	65.48	45.27	39.04	52.97	45.95	Exit Velocity (ft/sec)	326.14	138.53
Exit Velocity (m/sec)	19.52	16.96	22.90	19.96	13.80	11.90	16.14	14.00	Exit Velocity (m/sec)	99.41	42.22
Temp (F)	369	260	366	260	375	260	370	260	Temp (F)	942	952
Temp (K)	460	400	459	400	464	400	461	400	Temp (K)	779	784
Emissions (lb/MMBtu)									Emissions (g/hp-hr)		
NOx	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	NOx	5.74	3.692
CO	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	CO	0.4	0.447
SO2	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	SO2		
PM10	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	PM10	0.018	0.059
PM2.5	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	PM2.5	0.018	0.059
Emissions (lb/hr) *									Emissions (lb/hr)		
NOx	66.64	66.64	72.43	72.43	46.76	46.76	50.82	50.82	NOx	8.48	2.34
CO	76.89	76.89	83.57	83.57	53.96	53.96	58.64	58.64	CO	0.59	0.28
SO2	25.63	25.63	27.86	27.86	17.99	17.99	19.55	19.55	SO2	0.0071	0.0028
PM10	12.30	12.30	13.37	13.37	8.63	8.63	9.38	9.38	PM10	0.027	0.037
PM2.5	12.30	12.30	13.37	13.37	8.63	8.63	9.38	9.38	PM2.5	0.027	0.037

Stack Height	320	feet/meters	97.5
Stack Diameter	11.25	feet/meters	3.43
Stack Area	99.40	sq ft	
Base Elevation	1041	ft/m msl	317.3
Stack Coordinates	718944.4049	State Plane ft N	
	1112520.156	State Plane ft S	

Stack Height	8	8
Stack Diameter	0.5	0.5
Stack Area	0.20	0.20
Base Elevation	1041	1041
Stack Coordinates		

* Short term boiler emission rates have been increased by 10% to account for variability in stack flow rates. Annual boiler impacts have been determined without the use of the 10% factor.

Table 7.2
Cooling Tower Emissions Summary
Berlin BioPower - Berlin, New Hampshire

Cooling Tower Specification	Data Source	Data Result
Hours of Operation:		8,760 hours
Circulating Water Flow Rate:	SPX	60,000 gpm
Drift Eliminator Efficiency:	SPX	0.0005 %
Total Liquid Drift:	calc.	0.30 gpm
Density of Water:	constant	8.34 lb/gal
Total Liquid Drift:	calc.	150.1 lb/hr
Circulating Water TDS:	calc.	2,000 ppm
PM_{10} Emission Rate:	calc.	0.30 lb/hr
PM_{10} Emission Rate:	calc.	1.32 ton/yr

<u>Calculations</u>

Total Liquid Drift (gpm) = (Circulating Water Flow Rate, gpm) x (Drift Eliminator Efficiency, %)

Total Liquid Drift (lb/hr) = (Total Liquid Drift, gpm) x (Density of Water, lb/gal)

PM_{10} Emission Rate (lb/hr) = (Total Liquid Drift, lb/hr) x ((Circulating Water TDS, ppm) / 10^6)

PM_{10} Emission Rate (ton/yr) = (PM_{10} Emission Rate, lb/hr) x (Hours of Operation) x (1 ton / 2000 lbs)

Table 7.3
GEP Stack Height Analysis
Berlin BioPower – Berlin, New Hampshire

Building Tiers	Height (ft)	Projected Width (ft)	Formula GEP Height (ft)	Stacks > GEP Height	Building Distance from Stack (ft)				'5L' Distance (ft)	Stacks within 5L?
					Boiler	Cooling Tower	Generator	Fire Pump		
Boiler House	164.5	144.8	381.8	None	40	162	120	280	724	All
SCR Area	132.5	111.7	300.1	Boiler	100	160	180	320	558	All
ESP	113.2	150.7	283.0	Boiler	96	60	200	200	566	All

Table 7.4
Cavity Analysis
Berlin BioPower – Berlin, New Hampshire

Building Tiers	Height (ft)	Projected Width (ft)	Cavity Height (1.5L) (ft)	Stacks > Cavity Height	Cavity Region Distance (ft)	Stacks Within Cavity Region	Distance From Property Line (ft)	Cavity Extends Offsite?
Boiler House	164.5	144.8	236.9	Boiler	434	All	200	Yes
SCR Area	132.5	111.7	188.4	Boiler	335	All	170	Yes
ESP	113.2	150.7	169.8	Boiler	340	All	200	Yes

Table 7.5
Stability Class/Wind Speed Combinations Used for the Screening Modeling
Berlin BioPower – Berlin, New Hampshire

Stability Class	Wind Speed (m/sec)
A	1, 1.5, 2, 2.5, 3
B	1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5
C	1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 8, 10
D	1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 8, 10, 15, 20
E	1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5
F	1, 1.5, 2, 2.5, 3, 3.5, 4

Table 7.6
Wind Speed/Mixing Height Combinations Used for the Screening Modeling
Berlin BioPower – Berlin, New Hampshire

Wind Speed (m/sec)	Mixing Height (m)
1	320
1.5	480
2	640
2.5	800
3	960
3.5	1,120
4	1,280
4.5	1,440
5	1,600
8	2,560
10	3,200
15	4,800
20	6,400

Table 7.8
Complex Terrain Screening Receptor Distances and Elevations
Berlin BioPower – Berlin, New Hampshire

Elevation (meters mean sea level)	Elevation (meters above stack base)	Distance (km)
419.2	102	0.9
436.9	120	1.0
455.4	138	1.1
475.8	159	1.2
499.8	183	1.3
510.8	194	1.4
514.3	197	1.5
570.3	253	1.7
575.1	258	1.8
617.2	300	1.9
618.9	302	2.0
653.1	336	3.4
710.2	393	3.6
731.7	414	4.0
736.3	419	4.5
762.6	445	5.0
861.3	544	6.0
888.7	571	6.5
925.3	608	8.5
1108.8	692	11.0
1051.6	734	15.0
1321.3	1004	17.0
1463.0	1147	18.0
1643.4	1326	19.0

Table 7.9
SCREEN3 Class II Modeling Results - Normal Operation
Berlin BioPower - Berlin, New Hampshire

Source		Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Cooling Tower	Generator	Fire Pump
ad (%)		Max (100%)	Max (100%)	Max (100%)	Max (100%)	Min (70%)	Min (70%)	Min (70%)	Min (70%)	100	100	100
nbient Temp (F)		60	60	60	60	60	60	60	60			
Fuel Moisture (%)		37.6	37.6	50	50	37.6	37.6	50	50			
Stack Temperature (F)		369	260	366	260	375	260	370	260			
Maximum Emission Rates (lb/hr)												
NOx		66.64	66.64	72.43	72.43	46.76	46.76	50.82	50.82	0.00	8.48	2.34
CO		76.89	76.89	83.57	83.57	53.96	53.96	58.64	58.64	0.00	0.59	0.28
SO2		25.63	25.63	27.86	27.86	17.99	17.99	19.55	19.55	0.00	0.0071	0.0028
PM10		12.30	12.30	13.37	13.37	8.63	8.63	9.38	9.38	0.30	0.027	0.037
PM2.5		12.30	12.30	13.37	13.37	8.63	8.63	9.38	9.38	0.30	0.027	0.037
Maximum Emission Rates (g/sec)												
NOx		8.40	8.40	9.13	9.13	5.89	5.89	6.40	6.40	0.00	1.07	0.30
CO		9.69	9.69	10.53	10.53	6.80	6.80	7.39	7.39	0.00	0.074	0.036
SO2		3.23	3.23	3.51	3.51	2.27	2.27	2.46	2.46	0.00	0.00089	0.00035
PM10		1.55	1.55	1.68	1.68	1.09	1.09	1.18	1.18	0.038	0.0034	0.0047
PM2.5		1.55	1.55	1.68	1.68	1.09	1.09	1.18	1.18	0.038	0.0034	0.0047
Simple Terrain Screening - Unit Emission Rate Impacts												
Emissions (g/sec)		1	1	1	1	1	1	1	1	1	1	1
1-hr Conc (ug/m3)		8.10	11.45	6.86	9.45	10.77	15.79	9.91	12.59	210.8	508.4	766.7
Simple Terrain Screening - Maximum Emission Rate Impacts												
NOx	1-hr	68.02	96.14	62.56	86.21	63.46	93.03	63.46	80.63	0.00	543.27	226.45
	Annual	4.95	6.99	4.55	6.27	4.61	6.77	4.62	5.86	0.00	43.46	18.12
CO	1-hr	78.48	110.93	72.18	99.47	73.22	107.35	73.23	93.03	0.00	37.86	27.42
	8-hr	54.94	77.65	50.53	69.63	51.25	75.14	51.26	65.12	0.00	26.50	19.19
SO2	1-hr	26.16	36.98	24.06	33.16	24.41	35.78	24.41	31.01	0.00	0.45	0.27
	3-hr	23.55	33.28	21.66	29.84	21.97	32.20	21.97	27.91	0.00	0.41	0.24
	24-hr	10.46	14.79	9.62	13.26	9.76	14.31	9.76	12.40	0.00	0.18	0.11
	Annual	1.90	2.69	1.75	2.41	1.77	2.60	1.78	2.26	0.00	0.036	0.022
PM10	1-hr	12.56	17.75	11.55	15.91	11.71	17.18	11.72	14.88	7.97	1.70	3.62
	24-hr	5.02	7.10	4.62	6.37	4.69	6.87	4.69	5.95	3.19	0.68	1.45
	Annual	0.91	1.29	0.84	1.16	0.85	1.25	0.85	1.08	0.64	0.14	0.29
PM2.5	1-hr	12.56	17.75	11.55	15.91	11.71	17.18	11.72	14.88	7.97	1.70	3.62
	24-hr	5.02	7.10	4.62	6.37	4.69	6.87	4.69	5.95	3.19	0.68	1.45
	Annual	0.91	1.29	0.84	1.16	0.85	1.25	0.85	1.08	0.64	0.14	0.29
Complex Terrain Screening - Unit Emission Rate Impacts												
nissions (g/sec)		1	1	1	1	1	1	1	1	1	1	1
-hr Conc (ug/m3)		15.80	19.10	14.39	18.07	18.57	20.54	17.01	19.88	32.62	47.92	49.52
24-hr Conc (ug/m3)		3.95	4.78	3.60	4.52	4.64	5.14	4.25	4.97	8.16	11.98	12.38
Complex Terrain Screening - Maximum Emission Rate Impacts												
NOx	1-hr	132.70	160.37	131.31	164.89	109.40	121.04	108.94	127.34	0.00	51.21	14.63
	Annual	9.65	11.66	9.55	11.99	7.96	8.80	7.92	9.26	0.00	4.10	1.17
CO	1-hr	153.11	185.04	151.51	190.26	126.23	139.66	125.70	146.93	0.00	3.57	1.77
	8-hr	107.18	129.53	106.06	133.18	88.36	97.77	87.99	102.85	0.00	2.50	1.24
SO2	1-hr	51.04	61.68	50.50	63.42	42.08	46.55	41.90	48.98	0.00	0.043	0.017
	3-hr	45.93	55.51	45.45	57.08	37.87	41.90	37.71	44.08	0.00	0.039	0.016
	24-hr	12.76	15.42	12.63	15.85	10.52	11.64	10.48	12.24	0.00	0.011	0.0044
	Annual	3.71	4.49	3.67	4.61	3.06	3.39	3.05	3.56	0.00	0.0034	0.0014
PM10	1-hr	24.50	29.61	24.24	30.44	20.20	22.35	20.11	23.51	1.23	0.16	0.23
	24-hr	6.12	7.40	6.06	7.61	5.05	5.59	5.03	5.88	0.31	0.040	0.058
	Annual	1.78	2.15	1.76	2.21	1.47	1.63	1.46	1.71	0.099	0.013	0.019
PM2.5	1-hr	24.50	29.61	24.24	30.44	20.20	22.35	20.11	23.51	1.23	0.16	0.23
	24-hr	6.12	7.40	6.06	7.61	5.05	5.59	5.03	5.88	0.31	0.040	0.058
	Annual	1.78	2.15	1.76	2.21	1.47	1.63	1.46	1.71	0.099	0.013	0.019
Cavity Screening - Unit Emission Rate Impacts												
Emissions (g/sec)		1	1	1	1	1	1	1	1	1	1	1
1-hr Conc (ug/m3)		0	0	0	0	0	0	0	0	314.6	519.4	684.9
Cavity Screening - Maximum Emission Rate Impacts												
NOx	1-hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	555.03	202.29
	Annual	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.40	16.18
CO	1-hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38.68	24.49
	8-hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.07	17.14
SO2	1-hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.24
	3-hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.22
	24-hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.10
	Annual	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.037	0.019
PM10	1-hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	1.74	3.23
	24-hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.76	0.70	1.29
	Annual	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.14	0.26
M2.5	1-hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.90	1.74	3.23
	24-hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.76	0.70	1.29
	Annual	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.14	0.26

Table 7.9a
SCREEN3 Class I Modeling Results - Normal Operation
Berlin BioPower - Berlin, New Hampshire

Source		Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Cooling Tower	Generator	Fire Pump
d (%)		Max (100%)	Max (100%)	Max (100%)	Max (100%)	Min (70%)	Min (70%)	Min (70%)	Min (70%)	100	100	100
bient Temp (F)		60	60	60	60	60	60	60	60			
uel Moisture (%)		37.6	37.6	50	50	37.6	37.6	50	50			
Stack Temperature (F)		369	260	366	260	375	260	370	260			
Maximum Emission Rates (lb/hr)												
NOx		66.64	66.64	72.43	72.43	46.76	46.76	50.82	50.82	0.00	8.48	2.34
CO		76.89	76.89	83.57	83.57	53.96	53.96	58.64	58.64	0.00	0.59	0.28
SO2		25.63	25.63	27.86	27.86	17.99	17.99	19.55	19.55	0.00	0.0071	0.0028
PM10		12.30	12.30	13.37	13.37	8.63	8.63	9.38	9.38	0.30	0.027	0.037
PM2.5		12.30	12.30	13.37	13.37	8.63	8.63	9.38	9.38	0.30	0.027	0.037
Maximum Emission Rates (g/sec)												
NOx		8.40	8.40	9.13	9.13	5.89	5.89	6.40	6.40	0.00	1.07	0.30
CO		9.69	9.69	10.53	10.53	6.80	6.80	7.39	7.39	0.00	0.074	0.036
SO2		3.23	3.23	3.51	3.51	2.27	2.27	2.46	2.46	0.00	0.00089	0.00035
PM10		1.55	1.55	1.68	1.68	1.09	1.09	1.18	1.18	0.038	0.0034	0.0047
PM2.5		1.55	1.55	1.68	1.68	1.09	1.09	1.18	1.18	0.038	0.0034	0.0047
Simple Terrain Screening - Unit Emission Rate Impacts												
Emissions (g/sec)		1	1	1	1	1	1	1	1	1	1	1
1-hr Conc (ug/m3)		1.02	1.34	0.92	1.22	1.30	1.60	1.15	1.48	4.13	10.67	9.89
Simple Terrain Screening - Maximum Emission Rate Impacts												
NOx	1-hr	8.59	11.23	8.39	11.14	7.68	9.40	7.38	9.47	0.00	11.40	2.92
	Annual	0.62	0.82	0.61	0.81	0.56	0.68	0.54	0.69	0.00	0.91	0.23
CO	1-hr	9.91	12.96	9.68	12.86	8.86	10.85	8.51	10.92	0.00	0.79	0.35
	8-hr	6.94	9.07	6.77	9.00	6.20	7.60	5.96	7.64	0.00	0.56	0.25
SO2	1-hr	3.30	4.32	3.23	4.29	2.95	3.62	2.84	3.64	0.00	0.010	0.0035
	3-hr	2.97	3.89	2.90	3.86	2.66	3.26	2.55	3.28	0.00	0.0086	0.0031
	24-hr	1.32	1.73	1.29	1.71	1.18	1.45	1.13	1.46	0.00	0.0038	0.0014
	Annual	0.24	0.31	0.23	0.31	0.21	0.26	0.21	0.26	0.00	0.00076	0.00028
PM10	1-hr	1.59	2.07	1.55	2.06	1.42	1.74	1.36	1.75	0.16	0.036	0.047
	24-hr	0.63	0.83	0.62	0.82	0.57	0.69	0.54	0.70	0.062	0.014	0.019
	Annual	0.12	0.15	0.11	0.15	0.10	0.13	0.10	0.13	0.012	0.0029	0.0037
PM2.5	1-hr	1.59	2.07	1.55	2.06	1.42	1.74	1.36	1.75	0.16	0.036	0.047
	24-hr	0.63	0.83	0.62	0.82	0.57	0.69	0.54	0.70	0.062	0.014	0.019
	Annual	0.12	0.15	0.11	0.15	0.10	0.13	0.10	0.13	0.012	0.0029	0.0037
Complex Terrain Screening - Unit Emission Rate Impacts												
issions (g/sec)		1	1	1	1	1	1	1	1	1	1	1
-hr Conc (ug/m3)		0.68	0.70	0.67	0.69	0.69	0.71	0.69	0.70	0.72	0.76	0.76
24-hr Conc (ug/m3)		0.17	0.17	0.17	0.17	0.17	0.18	0.17	0.18	0.18	0.19	0.19
Complex Terrain Screening - Maximum Emission Rate Impacts												
NOx	1-hr	5.70	5.86	6.12	6.31	4.08	4.18	4.40	4.51	0.00	0.81	0.22
	Annual	0.41	0.43	0.45	0.46	0.30	0.30	0.32	0.33	0.00	0.065	0.018
CO	1-hr	6.57	6.76	7.06	7.28	4.71	4.83	5.07	5.21	0.00	0.057	0.027
	8-hr	4.60	4.73	4.94	5.09	3.30	3.38	3.55	3.65	0.00	0.040	0.019
SO2	1-hr	2.19	2.25	2.35	2.43	1.57	1.61	1.69	1.74	0.00	0.00068	0.00027
	3-hr	1.97	2.03	2.12	2.18	1.41	1.45	1.52	1.56	0.00	0.00061	0.00024
	24-hr	0.55	0.56	0.59	0.61	0.39	0.40	0.42	0.43	0.00	0.00017	0.000067
	Annual	0.16	0.16	0.17	0.18	0.11	0.12	0.12	0.13	0.00	0.000054	0.000021
PM10	1-hr	1.05	1.08	1.13	1.16	0.75	0.77	0.81	0.83	0.027	0.0025	0.0036
	24-hr	0.26	0.27	0.28	0.29	0.19	0.19	0.20	0.21	0.0068	0.00064	0.00089
	Annual	0.076	0.079	0.082	0.085	0.055	0.056	0.059	0.061	0.0022	0.00020	0.00029
PM2.5	1-hr	1.05	1.08	1.13	1.16	0.75	0.77	0.81	0.83	0.03	0.0025	0.0036
	24-hr	0.26	0.27	0.28	0.29	0.19	0.19	0.20	0.21	0.01	0.00064	0.00089
	Annual	0.076	0.079	0.082	0.085	0.055	0.056	0.059	0.061	0.0022	0.00020	0.00029

Table 7.10
Comparison of Class II Screening Concentrations to Significant Impact Levels - Normal Operation
Berlin BioPower - Berlin, New Hampshire

Source		Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Cooling Tower	Egen	Firepump	Total	SIL
Load (%)		Max (100%)	Max (100%)	Max (100%)	Max (100%)	Min (70%)	Min (70%)	Min (70%)	Min (70%)	100	100	100		
Ambient Temp (F)		60	60	60	60	60	60	60	60					
Fuel Moisture (%)		37.6	37.6	50	50	37.6	37.6	50	50					
Stack Temperature (F)		369	260	366	260	375	260	370	260					
For Potential Combined Impacts														
Hours/3-hr Period		3	3	3	3	3	3	3	3	3	1	1		
Hours/8-hr Period		8	8	8	8	8	8	8	8	8	1	1		
Hours/24-hr Period		24	24	24	24	24	24	24	24	24	1	1		
Hours/8,760-hr Period		8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	300	300		
NOx	Annual	9.65	11.66	9.55	11.99	7.96	8.80	7.92	9.26	0.00	1.52	0.62	14.1	1
CO	1-hr	153.11	185.04	151.51	190.26	126.23	139.66	125.70	146.93	0.00	38.68	27.42	256.4	2000
	8-hr	107.18	129.53	106.06	133.18	88.36	97.77	87.99	102.85	0.00	3.38	2.40	139.0	500
SO2	3-hr	45.93	55.51	45.45	57.08	37.87	41.90	37.71	44.08	0.00	0.14	0.081	57.3	25
	24-hr	12.76	15.42	12.63	15.85	10.52	14.31	10.48	12.40	0.00	0.0077	0.0045	15.9	5
	Annual	3.71	4.49	3.67	4.61	3.06	3.39	3.05	3.56	0.00	0.0013	0.00074	4.6	1
PM10	24-hr	6.12	7.40	6.06	7.61	5.05	6.87	5.03	5.95	4.76	0.029	0.060	12.5	5
	Annual	1.78	2.15	1.76	2.21	1.47	1.63	1.46	1.71	0.95	0.0048	0.010	3.2	1
PM2.5	24-hr	6.12	7.40	6.06	7.61	5.05	6.87	5.03	5.95	4.76	0.029	0.060	12.5	2
	Annual	1.78	2.15	1.76	2.21	1.47	1.63	1.46	1.71	0.95	0.0048	0.010	3.2	0.3

Notes:
Individual source impacts reflect annual and short-term operating restrictions
Potential combined short-term values are based on 1-hour per day operation of the emergency generator and fire pump

Table 7.10a
Comparison of Class I Screening Concentrations to Significant Impact Levels - Normal Operation
Berlin BioPower - Berlin, New Hampshire

Source		Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Cooling Tower	Egen	Firepump	Total	SIL
Load (%)		Max (100%)	Max (100%)	Max (100%)	Max (100%)	Min (70%)	Min (70%)	Min (70%)	Min (70%)	100	100	100		
Ambient Temp (F)		60	60	60	60	60	60	60	60					
Fuel Moisture (%)		37.6	37.6	50	50	37.6	37.6	50	50					
Stack Temperature (F)		369	260	366	260	375	260	370	260					
For Potential Combined Impacts														
Hours/3-hr Period		3	3	3	3	3	3	3	3	3	1	1		
Hours/8-hr Period		8	8	8	8	8	8	8	8	8	1	1		
Hours/24-hr Period		24	24	24	24	24	24	24	24	24	1	1		
Hours/8,760-hr Period		8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	300	300		
NOx	Annual	0.62	0.82	0.61	0.81	0.56	0.68	0.54	0.69	0.00	0.031	0.0080	0.9	0.08
CO	1-hr	9.91	12.96	9.68	12.86	8.86	10.85	8.51	10.92	0.00	0.79	0.35	14.1	
	8-hr	6.94	9.07	6.77	9.00	6.20	7.60	5.96	7.64	0.00	0.070	0.031	9.2	
SO2	3-hr	2.97	3.89	2.90	3.86	2.66	3.26	2.55	3.28	0.00	0.0029	0.0010	3.9	1
	24-hr	1.32	1.73	1.29	1.71	1.18	1.45	1.13	1.46	0.00	0.00016	0.000058	1.7	0.2
	Annual	0.24	0.31	0.23	0.31	0.21	0.26	0.21	0.26	0.00	0.000026	0.000010	0.3	0.08
PM10	24-hr	0.63	0.83	0.62	0.82	0.57	0.69	0.54	0.70	0.062	0.00060	0.00078	0.9	0.2
	Annual	0.12	0.15	0.11	0.15	0.10	0.13	0.10	0.13	0.012	0.00010	0.00013	0.2	0.08
PM2.5	24-hr	0.63	0.83	0.62	0.82	0.57	0.69	0.54	0.70	0.062	0.00060	0.00078	0.9	0.07
	Annual	1.78	2.15	1.76	2.21	1.47	1.63	1.46	1.71	0.95	0.00010	0.00013	3.2	0.04

Notes:
Individual source impacts reflect annual and short-term operating restrictions
Potential combined short-term values are based on 1-hour per day operation of the emergency generator and fire pump

Table 7.11
Class II Analysis - Normal Operation
Refined Modeling - Individual Source Contributions and Cumulative Impacts[1]
Berlin BioPower - Berlin, New Hampshire

Source	Boiler	Boiler	Cooling Tower	Generator	Firepump
Load (%)	100	100	100	100	100
Fuel Moisture %	37.6	50			
Exit Temp	260	260			
Hours/Day	24	24	24	1	1
Hours/Year	8760	8760	8760	300	300
Maximum Emission Rates (g/sec)					
NOx	8.40	9.13	0.00	1.07	0.30
CO	9.69	10.53	0.00	0.074	0.036
SO2	3.23	3.51	0.00	0.00089	0.00035
PM10	1.55	1.68	0.038	0.0034	0.0047
PM2.5	1.55	1.68	0.038	0.0034	0.0047
AERMOD Results @ 1 g/sec Emission Rate					
1-hr	4.6320	4.1816	40.4756	2008.6031	1148.9239
3-hr	3.0127	2.6382	24.4330	1187.8332	928.8654
8-hr	1.9988	1.7664	14.9757	264.7054	635.4358
24-hr	0.6871	0.5948	7.0265	155.9668	405.9534
Annual	0.0837	0.0772	0.3945	15.4925	40.1342

AERMOD Results @ Maximum Emission Rates							**Total**	**SIL**
NOx	Annual	0.64	0.64	0.00	0.57	0.41	1.61	1
NO2	Annual	0.48	0.48	0.00	0.43	0.30	1.21	1
	1-hr	44.88	44.03	0.00	149.57	41.09	235.53	2000
CO	8-hr	19.36	18.60	0.00	18.70	5.14	43.20	500
SO2	3-hr	9.73	9.26	0.00	0.60	0.14	10.46	25
SO2	24-hr	2.22	2.09	0.00	0.075	0.017	2.31	5
SO2	Annual	0.25	0.25	0.00	0.00047	0.00048	0.25	1
PM10	24-hr	1.07	1.00	0.27	0.28	0.23	1.84	5
PM10	Annual	0.12	0.12	0.015	0.0018	0.0065	0.14	1
PM2.5	24-hr	1.07	1.00	0.27	0.28	0.23	1.84	2
PM2.5	Annual	0.12	0.12	0.015	0.0018	0.0065	0.14	0.3

1 - Cumulative impacts conservatively assume that all sources have maximum impact at the same location

2 - Short term total impacts are based on the maximum boiler and cooling tower impacts with 1 hour of maintenance of the generator and firepump.

3 - Annual NO_X impact adjusted by the Ambient Ratio Method factor of 0.75 to determine the NO_2 impact concentration.

4 - Pollutant specific refined modeling results demonstrated a maximum annual NO_2 impact of 0.61 ug/m^3, less than the SIL of 1.0 (Table 7.17).

Table 7.12
Class I Analysis - Normal Operation
Refined Modeling - Individual Source Contributions and Cumulative Impacts[1]
Berlin BioPower - Berlin, New Hampshire

Source		Boiler	Boiler	Cooling Tower	Generator	Firepump		
Load (%)		100	100	100	100	100		
Fuel Moisture %		37.6	50					
Exit Temp		260	260					
Hours/Day		24	24	24	1	1		
Hours/Year		8760	8760	8760	300	300		
Maximum Emission Rates (g/sec)								
NOx		8.40	9.13	0.00	1.07	0.30		
CO		9.69	10.53	0.00	0.074	0.036		
SO2		3.23	3.51	0.00	0.00089	0.00035		
PM10		1.55	1.68	0.038	0.0034	0.0047		
PM2.5		1.55	1.68	0.038	0.0034	0.0047		
AERMOD Results @ 1 g/sec Emission Rate								
1-hr		1.1427	1.0436	1.0139	1.6057	2.1458		
3-hr		0.6431	0.5930	0.7001	0.8526	1.0584		
8-hr		0.3074	0.2828	0.3273	0.4500	0.5106		
24-hr		0.1159	0.1116	0.1301	0.1597	0.1996		
Annual		0.0139	0.0136	0.0137	0.0179	0.0197		
AERMOD Results @ Maximum Emission Rates							**Total**	**SIL**
NOx	Annual	0.11	0.11	0.00	0.00065	0.00020	0.11	0.08
NO2	Annual	0.080	0.084	0.00	0.00049	0.00015	0.085	0.08
CO	1-hr	11.07	10.99	0.00	0.12	0.077	11.27	
CO	8-hr	2.98	2.98	0.00	0.015	0.0096	3.00	
O2	3-hr	2.08	2.08	0.00	0.00048	0.00025	2.08	1
SO2	24-hr	0.37	0.39	0.00	0.000060	0.000032	0.39	0.2
SO2	Annual	0.041	0.043	0.00	0.00000055	0.00000024	0.04	0.08
PM10	24-hr	0.18	0.19	0.0049	0.00022	0.00042	0.19	0.2
PM10	Annual	0.020	0.021	0.00052	0.0000020	0.0000032	0.02	0.08
PM2.5	24-hr	0.18	0.19	0.0049	0.00022	0.00042	0.19	0.07
PM2.5	Annual	0.020	0.021	0.00052	0.0000020	0.0000032	0.02	0.04

1 - Cumulative impacts conservatively assume that all sources have maximum impact at the same location

2 - Short term total impacts are based on the maximum boiler and cooling tower impacts with 1 hour of maintenance of the generator and firepump.

3 - Annual NO_X impact adjusted by the Ambient Ratio Method factor of 0.75 to determine the NO_2 impact concentration.

4 - $PM_{2.5}$ SIL taken from

EPA 40 CFR Parts 51 and 52 [EPA-HQ-OAR-2006-0605; FRL-8470-1]
RIN 2060-AO24
Prevention of Significant Deterioration (PSD) for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$)
Increments, Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC)
Proposed Rule, page 13
Option 1 provides most stringent annual SIL
Option 3 provides most stringent 24-hr SIL

Table 7.13
Monitor Values & Background Concentrations
Berlin BioPower – Berlin, New Hampshire

Pollutant	Averaging Period	2006	2007	2008	Background
CO	1-hr	**8.1 ppm** Pearl St., Manchester (Urban and City Center)	2.6 ppm Pearl St., Manchester (Urban and City Center)	6.0 ppm Pearl St., Manchester (Urban and City Center)	**8.1 ppm** 9,000 $\mu g/m^3$
	8-hr	3.0 ppm Pearl St., Manchester (Urban and City Center)	1.8 ppm Pearl St., Manchester (Urban and City Center)	**3.5 ppm** Pearl St., Manchester (Urban and City Center)	**3.5 ppm** 4,000 $\mu g/m^3$
NO_2	Annual	**0.001 ppm** Pack Monadnock Summit, Peterborough (Rural)	**0.001 ppm** Pack Monadnock Summit, Peterborough (Rural)	**0.001 ppm** Pack Monadnock Summit, Peterborough (Rural)	**0.001 ppm** 2 $\mu g/m^3$
$PM_{2.5}$	24-hr	**23 $\mu g/m^3$** Green Street, Laconia (Rural)	**19 $\mu g/m^3$** Green Street, Laconia (Rural)	**12 $\mu g/m^3$** Green Street, Laconia (Rural)	**18 $\mu g/m^3$** *(average)*
	Annual	**7.5 $\mu g/m^3$** Green Street, Laconia (Rural)	**6.9 $\mu g/m^3$** Green Street, Laconia (Rural)	**6.2 $\mu g/m^3$** Green Street, Laconia (Rural)	**6.9 $\mu g/m^3$** *(average)*
PM_{10}	24-hr	31 $\mu g/m^3$ Pearl St., Manchester (Urban and City Center)	**32 $\mu g/m^3$** Pearl St., Manchester (Urban and City Center)	25 $\mu g/m^3$ Pearl St., Manchester (Urban and City Center)	**32 $\mu g/m^3$**
	Annual	**16 $\mu g/m^3$** Pearl St., Manchester (Urban and City Center)	15 $\mu g/m^3$ Pearl St., Manchester (Urban and City Center)	14 $\mu g/m^3$ Pearl St., Manchester (Urban and City Center)	**16 $\mu g/m^3$**
SO_2	3-hr	0.126 ppm Pleasant Street, Pembroke (Suburban)	0.134 ppm Pleasant Street, Pembroke (Suburban)	**0.204 ppm** Pleasant Street, Pembroke (Suburban)	**0.204 ppm** 530 $\mu g/m^3$
	24-hr	0.057 ppm Pleasant Street, Pembroke (Suburban)	**0.059 ppm** Pleasant Street, Pembroke (Suburban)	0.041 ppm Pleasant Street, Pembroke (Suburban)	**0.059 ppm** 153 $\mu g/m^3$
	Annual	0.007 ppm Pleasant Street, Pembroke (Suburban)	**0.008 ppm** Pleasant Street, Pembroke (Suburban)	0.006 ppm Pleasant Street, Pembroke (Suburban)	**0.008 ppm** 21 $\mu g/m^3$

Notes:
1. The short-term CO, PM_{10}, and SO_2 background concentrations (1-hr, 3-hr, 8-hr, and 24-hour) are the highest of the second-high values.
2. The annual NO_2, PM_{10} and SO_2 background concentrations are the highest of the annual mean values.
3. The 24-hour $PM_{2.5}$ background concentration is the 3-year average of the 98th percentile values.
4. The annual $PM_{2.5}$ background concentration is the 3-year average of the annual mean values.
5. The quarterly Pb background concentration is the highest of the maximum quarterly mean values.

Table 7.14
Comparison of Maximum Pollutant Concentrations to NAAQS
Berlin BioPower – Berlin, New Hampshire

Pollutant	Averaging Period	Concentration ($\mu g/m^3$)			NAAQS ($\mu g/m^3$)
		Modeled	Background	Total	
NO_2	Annual	0.6	2	3	100
CO	1-hour	236	9,000	9,236	40,000
	8-hour	43	4,000	4,043	10,000
SO_2	3-hour	10.5	530	541	1300
	24-hour	2.3	153	155	365
	Annual	0.3	21	21	80
PM_{10}	24-hour	1.8	32	34	150
$PM_{2.5}$	24-hour	1.8	18	20	35
	Annual	0.1	6.9	7	15

Table 7.15
Comparison of Maximum Pollutant Concentrations to Vegetation Sensitivity Concentrations
Berlin BioPower – Berlin, New Hampshire

Pollutant	Averaging Period	Concentration ($\mu g/m^3$)			Vegetation Sensitivity Concentration ($\mu g/m^3$)		
		Modeled	Background	Total	Sensitive	Intermediate	Resistant
SO_2	1-hour	17.2	814	831	917	-	-
	3-hour	10.5	530	541	786	2096	13100
	Annual	0.3	21	21	18	18	18
NO_2	4-hour	647	68[2]	715	3760	9400	16920
	8-hour	327	68[2]	395	3760	7520	15040
	Monthly	109	68[2]	177	564	564	564
	Annual	0.6	2	3	94	94	94
CO	Weekly	14.6	4000[4]	4015	1800000	-	18000000
Beryllium	Monthly		-[5]		0.01	0.01	0.01
Lead	Quarterly		0.02		1.5	1.5	1.5

1. Modeled 4-hour concentration based on a 3-hour averaging period.
2. Monitored 4-hour, 8-hour and monthly NO_2 values based on a 1-hour averaging period.
3. Modeled monthly, weekly and quarterly concentrations based on a 24-hour averaging period.
4. Monitored weekly CO value based on an 8-hour averaging period.
5. Beryllium values are not reported on the AIRS website.

Table 7.16
RTAP Compliance Analysis
Berlin BioPower - Berlin, New Hampshire

Source	Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Boiler	Cooling Tower		
Load (%)	Max (100%)	Max (100%)	Max (100%)	Max (100%)	Min (70%)	Min (70%)	Min (70%)	Min (70%)	100		
Ambient Temp (F)	60	60	60	60	60	60	60	60			
Fuel Moisture (%)	37.6	37.6	50	50	37.6	37.6	50	50			
Stack Temperature (F)	369	260	366	260	375	260	370	260			
Heat Input Rate (MMBtu/hr)	932	932	1,013	1,013	654	654	711	711			
NH3 Emission Rate (lb/MMBtu)	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012			
NH3 Emission Rate (lb/hr)	11.18	11.18	12.16	12.16	7.85	7.85	8.53	8.53			
NH3 Emission Rate (g/sec)	1.41	1.41	1.53	1.53	0.99	0.99	1.07	1.07			
Chlorine Emission Rate (lb/hr)									0.50		
Chlorine Emission Rate (g/sec)									0.062		
	Maximum Impacts @ 1 g/sec										
1-hr Conc (ug/m^3)	15.80	19.10	14.39	18.07	18.57	20.54	17.01	19.88	40.48		
24-hr Conc (ug/m^3)	3.95	4.78	3.60	4.52	4.64	5.14	4.25	4.97	7.03		
Ammonia	µg/m^3									AAL	Pass/Fail
1-hr	22.27	26.92	22.04	27.67	18.36	20.31	18.28	21.37	N/A	N/A	N/A
24-hr	5.57	6.73	5.51	6.92	4.59	5.08	4.57	5.34	N/A	100	Pass
Annual	1.78	2.15	1.76	2.21	1.47	1.63	1.46	1.71	N/A	100	Pass
Chlorine	µg/m^3									AAL	Pass/Fail
1-hr	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.53	N/A	N/A
24-hr	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.44	7.5	Pass
Annual	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.20	7.5	Pass

Table 7.17
Pollutant-Specific Refined Modeling Analysis - Class II Areas - Normal Operation
Berlin BioPower - Berlin, New Hampshire

Source(s)	Boiler	Generator	Fire Pump	All
Fuel Moisture %	37.6			
Exit Temp (F)	260			
Averaging Period	Annual	Annual	Annual	Annual
Location				
UTM E (meters)	327574	326950	326924	326931
UTM N (meters)	4923183	4926633	4926603	4926627
NOx Concentration (ug/m3)	0.64	0.57	0.41	0.81
NO2 Concentration (ug/m3)	0.48	0.43	0.31	0.61

Table 7.18
Biomass Boiler Stack and Exhaust Parameters Summary - Cold Startup
Berlin BioPower - Berlin, New Hampshire

	Biomass Boiler - Cold Startup				
Startup Phase	Phase 1	Phase 2			Phase 3
Startup Phase Duration	8 hours	3 hours			1 hour
Boiler Fuel	ULSD	ULSD	Wood	Combined	Wood
Heat Input Rate (MMBtu/hr)	240	120	233	353	559
Exhaust Flow (acfm)	191,764	46,292	89,981	228,107	345,627
Exit Velocity (ft/sec)	32.15	7.76	15.09	38.25	57.95
Exit Velocity (m/sec)	9.80	2.37	4.60	11.66	17.66
Temp (F)	300	300	300	300	300
Temp (K)	422	422	422	422	422
Emissions (lb/MMBtu)					
NOx	0.20	0.20	0.065		0.065
CO	0.50	0.50	0.075		0.075
SO2	0.002	0.002	0.025		0.025
PM10	0.05	0.05	0.012		0.012
PM2.5	0.05	0.05	0.012		0.012
Emissions (lb/hr)					
NOx	48.00	24.00	15.15	39.15	36.35
CO	120.00	60.00	17.48	77.48	41.94
SO2	0.48	0.24	5.83	6.07	13.98
PM10	12.00	6.00	2.80	8.80	6.71
PM2.5	12.00	6.00	2.80	8.80	6.71

Stack Height	320	feet/meters	97.5
Stack Diameter	11.25	feet/meters	3.43
Stack Area	99.40	sq ft	
Base Elevation	1041	ft/m msl	317.3
Stack Coordinates	718944.4049	State Plane ft N	
	1112520.156	State Plane ft S	

* The Phase 1, Phase 2 combined, and Phase 3 exhaust flow rates also include additional stack flow (63,800 acfm) from the fluidizing bed fans.

Table 7.19
SCREEN3 Class II Analysis - Boiler Cold Startup
Berlin BioPower - Berlin, New Hampshire

Startup Phase		Phase 1	Phase 2	Phase 3
Startup Phase Duration (hours)		8	3	1
Boiler Fuel		ULSD	ULSD + Wood	Wood
Maximum Emission Rates (lb/hr)				
NOx		48.00	39.15	36.35
CO		120.00	77.48	41.94
SO2		0.48	6.07	13.98
PM10		12.00	8.80	6.71
PM2.5		12.00	8.80	6.71
Maximum Emission Rates (g/sec)				
NOx		6.05	4.93	4.58
CO		15.12	9.76	5.28
SO2		0.06	0.76	1.76
PM10		1.51	1.11	0.85
PM2.5		1.51	1.11	0.85
Simple Terrain Screening - Unit Emission Rate Impacts				
Emissions (g/sec)		1	1	1
1-hr Conc (ug/m3)		16.28	14.9	9.39
Simple Terrain Screening - Maximum Emission Rate Impacts				
NOx	1-hr	98.5	73.5	43.0
	Annual	0.043	0.012	0.0024
CO	1-hr	246.15	145.45	49.64
	8-hr	172.31	38.18	4.34
SO2	1-hr	0.98	11.39	16.55
	3-hr	0.89	10.25	4.96
	24-hr	0.13	0.57	0.28
	Annual	0.00043	0.0019	0.00091
PM10	1-hr	24.62	16.51	7.94
	24-hr	3.28	0.83	0.13
	Annual	0.011	0.0027	0.00044
PM2.5	1-hr	24.62	16.51	7.94
	24-hr	3.28	0.83	0.13
	Annual	0.011	0.0027	0.00044
Complex Terrain Screening - Unit Emission Rate Impacts				
Emissions (g/sec)		1	1	1
1-hr Conc (ug/m3)		20.79	20.08	17.95
24-hr Conc (ug/m3)		5.20	5.02	4.49
Complex Terrain Screening - Maximum Emission Rate Impacts				
NOx	1-hr	125.73	99.06	82.20
	Annual	0.055	0.016	0.0045
CO	1-hr	314.31	196.06	94.85
	8-hr	220.02	51.46	8.30
SO2	1-hr	1.26	15.35	31.62
	3-hr	1.13	13.81	9.48
	24-hr	0.10	0.48	0.33
	Annual	0.00055	0.0025	0.0017
PM10	1-hr	31.43	22.26	15.18
	24-hr	2.62	0.70	0.16
	Annual	0.014	0.0037	0.00083
PM2.5	1-hr	31.43	22.26	15.18
	24-hr	2.62	0.70	0.16
	Annual	0.014	0.0037	0.00083
Cavity Screening - Unit Emission Rate Impacts				
Emissions (g/sec)		1	1	1
1-hr Conc (ug/m3)		36.96	0	0
Cavity Screening - Maximum Emission Rate Impacts				
NOx	1-hr	223.53	0.00	0.00
	Annual	0.10	0.00	0.00
CO	1-hr	558.84	0.00	0.00
	8-hr	391.18	0.00	0.00
SO2	1-hr	2.24	0.00	0.00
	3-hr	2.01	0.00	0.00
	24-hr	0.30	0.00	0.00
	Annual	0.0010	0.00	0.00
PM10	1-hr	55.88	0.00	0.00
	24-hr	7.45	0.00	0.00
	Annual	0.024	0.00	0.00
PM2.5	1-hr	55.88	0.00	0.00
	24-hr	7.45	0.00	0.00
	Annual	0.024	0.00	0.00

Annual impacts conservatively based on 6 cold boiler startups per year

Table 7.20
Comparison of Class II Screening Concentrations to Significant Impact Levels - Boiler Startup & Normal Operation
Berlin BioPower - Berlin, New Hampshire

Startup Phase		Phase 1	Phase 2	Phase 3	Total Startup	Non-Startup	Total	SIL
Startup Phase Duration (hours)		8	3	1		(from refined)		
Boiler Fuel		ULSD	ULSD + Wood	Wood		Wood		
NOx	Annual	0.098	0.016	0.0045	0.12	0.81	0.93	1
NO2	Annual	0.073	0.012	0.0034	0.089	0.61	0.70	1
CO	1-hr	558.8	196.1	94.8	558.8	n/a	558.84	2000
	8-hr	391.2	51.5	8.30	391.2	n/a	391.18	500
SO2	3-hr	2.01	13.81	9.48	13.8	n/a	13.81	25
	24-hr	0.30	0.57	0.33	1.20	2.31	3.51	5
	Annual	0.0010	0.0025	0.0017	0.0052	0.25	0.26	1
PM10	24-hr	7.45	0.83	0.16	8.43	1.84	10.27	5
	Annual	0.024	0.0037	0.00083	0.029	0.14	0.17	1
PM2.5	24-hr	7.45	0.83	0.16	8.43	1.84	10.27	2
	Annual	0.024	0.0037	0.00083	0.029	0.14	0.17	0.3

Notes:
Maximum combined impacts from normal operation were added to the worst-case start-up boiler impacts for the 24-hour and annual periods
Non-Startup boiler were conservatively not reduced to reflect operating hours during cold startups

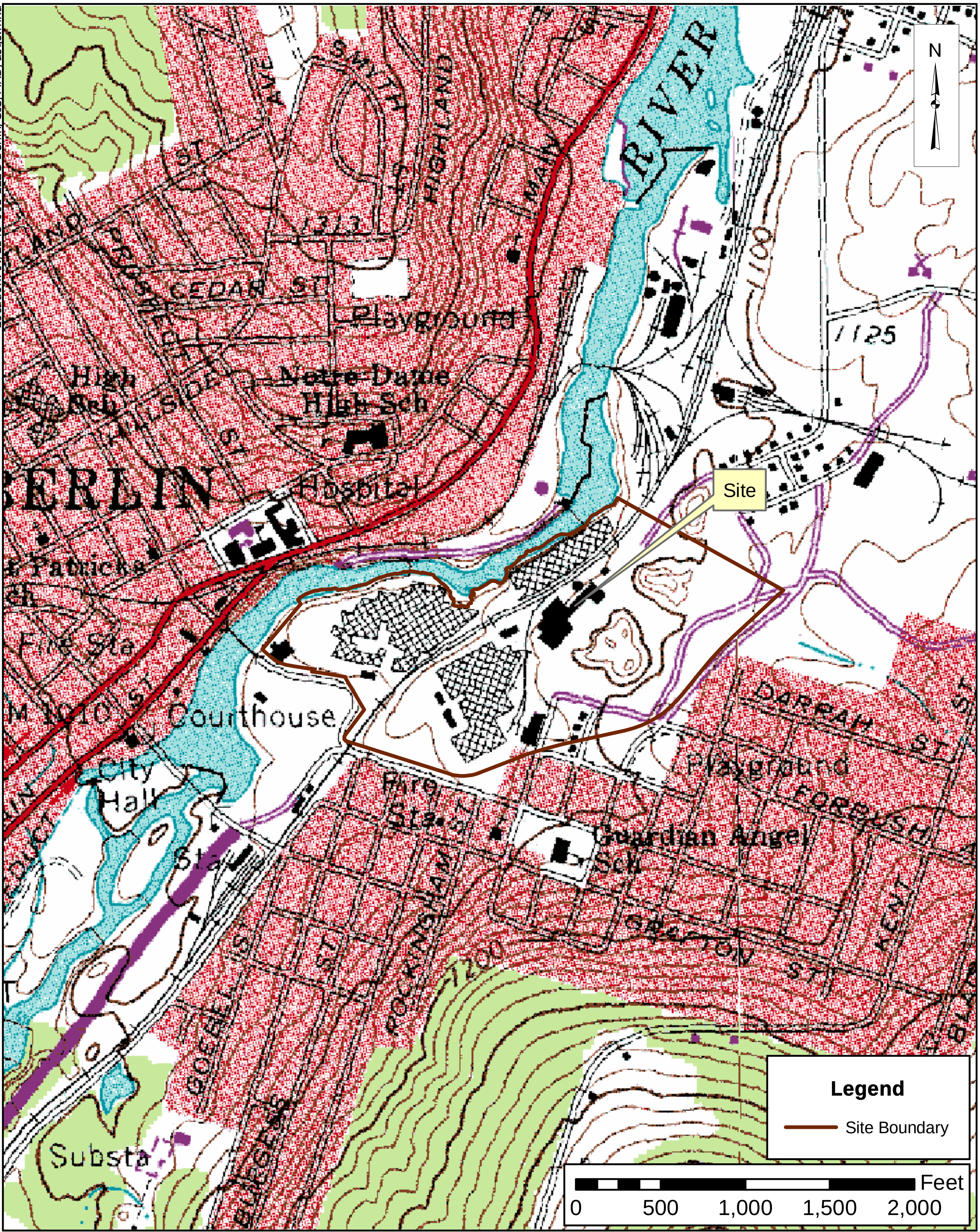
Table 7.21
Class II Analysis - Boiler Cold Startup and Normal Operation
Refined Modeling - Individual Source Contributions and Cumulative Impacts[1]
Berlin BioPower - Berlin, New Hampshire

Source		Boiler	Boiler	Cooling Tower	Phase 1	Phase 2	Phase 3		
Load (%)		100	100	100	Startup	Startup	Startup		
Fuel Moisture %		37.6	50						
Exit Temp		260	260						
Hours/Day		12	12	12	8	3	1		
Maximum Emission Rates (g/sec)									
PM10		1.55	1.68	0.038	1.51	1.11	0.85		
PM2.5		1.55	1.68	0.038	1.51	1.11	0.85		
AERMOD Results @ 1 g/sec Emission Rate									
1-hr		n/a	n/a	n/a	n/a	n/a	4.2741		
3-hr		n/a	n/a	n/a	n/a	3.5630	n/a		
8-hr		n/a	n/a	n/a	2.8342	n/a	n/a		
12-hr		1.1004	1.2404	10.6817	n/a	n/a	n/a		
AERMOD Results @ Maximum Emission Rates								**Total**	**SIL**
PM10	24-hr	0.85	1.04	0.20	1.43	0.49	0.15	3.32	5
PM2.5	24-hr	0.85	1.04	0.20	1.43	0.49	0.15	3.32	2

Table 7.22
Class II Analysis - Combined Project Startup Impacts
Refined Modeling - 24-Hour $PM_{2.5}$
Berlin BioPower - Berlin, New Hampshire

	Total Modeled Concentration (ug/m3)	
Startup Beginning Hour	Boiler @ 50% Fuel Moisture	Boiler @ 37.6% Fuel Moisture
1	1.33	1.33
2	1.32	1.32
3	1.24	1.27
4	1.24	1.26
5	1.19	1.2
6	1.19	1.2
7	1.14	1.18
8	1.14	1.18
9	1.19	1.21
10	1.26	1.28
11	1.26	1.28
12	1.26	1.28
13	1.27	1.28
14	1.28	1.29
15	1.28	1.29
16	1.26	1.28
17	1.19	1.18
18	1.21	1.21
19	1.21	1.23
20	1.19	1.18
21	1.27	1.28
22	1.32	1.33
23	1.36	1.36
24	1.35	1.35
SIL	2	2

Figures



ESS Group, Inc.

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Scientists
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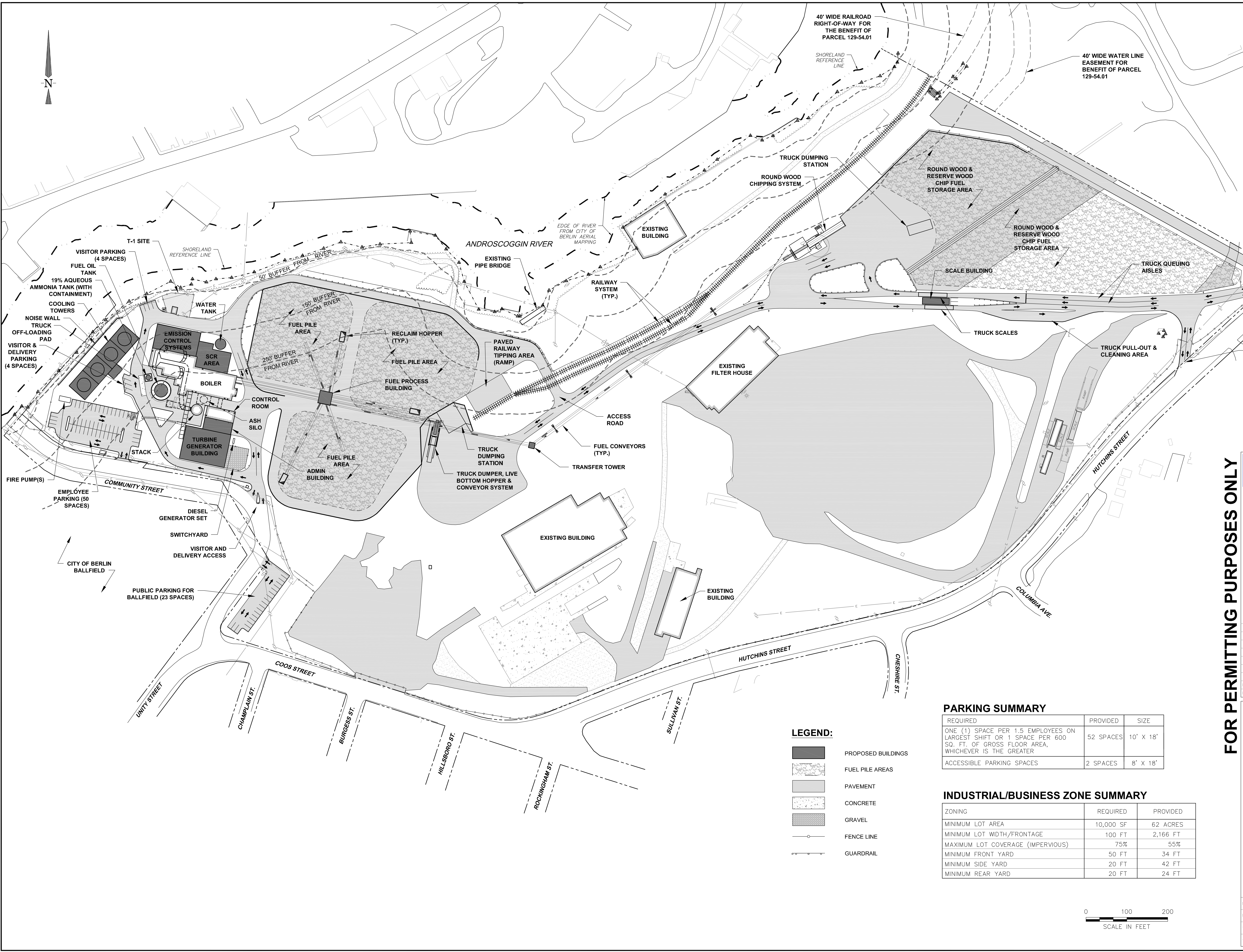
LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Scale: 1" = 800'

Source: 1) NHGRANIT, 1:24000 USGS

USGS Locus Map - Site

Figure 1



LEGEND:

■	PROPOSED BUILDINGS
▨	FUEL PILE AREAS
▒	PAVEMENT
░	CONCRETE
▦	GRAVEL
—o—	FENCE LINE
-o-o-	GUARDRAIL

PARKING SUMMARY

REQUIRED	PROVIDED	SIZE
ONE (1) SPACE PER 1.5 EMPLOYEES ON LARGEST SHIFT OR 1 SPACE PER 600 SQ. FT. OF GROSS FLOOR AREA, WHICHEVER IS THE GREATER	52 SPACES	10' X 18'
ACCESSIBLE PARKING SPACES	2 SPACES	8' X 18'

INDUSTRIAL/BUSINESS ZONE SUMMARY

ZONING	REQUIRED	PROVIDED
MINIMUM LOT AREA	10,000 SF	62 ACRES
MINIMUM LOT WIDTH/FRONTAGE	100 FT	2,166 FT
MAXIMUM LOT COVERAGE (IMPERVIOUS)	75%	55%
MINIMUM FRONT YARD	50 FT	34 FT
MINIMUM SIDE YARD	20 FT	42 FT
MINIMUM REAR YARD	20 FT	24 FT

FOR PERMITTING PURPOSES ONLY

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No.	REVISION	DATE	APP BY

DRAWN BY: DJG
CHECKED BY: JCB
DESIGNED BY: DJG
APPROVED BY: JCB

LaidLaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

Biomass Energy Facility
Berlin, NH

OVERALL SITE LAYOUT
& MATERIALS PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 11/06/09
SHEET No.:
SCALE: 1"=100'

FIGURE 2

DATE: Nov 17, 2009 - 1:40PM
FILENAME: H:\L145-Laidlaw\000 EFSEC Permit Plans\L145-LM.dwg

NOTES

REV. No.	REV. BY	DATE	DESCRIPTION	CHECKED BY	APPROVED BY
B	REG	5/19/09	REV'D:CLG TWR LOC.ADD'D:PILE,RECL +CONVS, DMPR W/LIVE BOT+CONV. RND WD CONV, ASH SILO, AMMONIA TK, TNKR UNLOAD'G & ROADS ETC		JDSweet
A	REG	10/9/07	STATUS ISSUE		

SEAL

PRELIMINARY

IN-PROCESS DOCUMENT
FOR INFORMATION ONLY

NO OTHER USE IS INTENDED
Noted 19May09 REGarland

SIGNATURE

DATE

	NAME	DATE
DRAWN BY	REGarland	7/17/2007
CHECKED BY		
APPROVED BY		

WALDRON
ENGINEERING & CONSTRUCTION, INC.
EXETER, NH 03833
www.waldron.com

CLIENT

Laidlaw Berlin BioPower,LLC
New York, NY
10038

DRAWING TITLE

BERLIN BIOMASS ENERGY
FACILITY
Berlin, New Hampshire

FACILITY STRUCTURE
DIMENSIONS

CLIENT DRAWING No.
FIGURE 3

W.E&C DRAWING No.
193.01-M1000A-B

Appendix A

Potential Emissions Calculation Summaries

Potential sions Summary
Biomass B lormal Operation
Berlin BioPowe. erlin, New Hampshire

Biomass Boiler		
Parameter	Wood Fuel	
Annual Operation	8,688	hr/yr
Heat Input Rate @ 100% Load (37.6% fuel H2O, 60F ambient)	932	MMBtu/hr
Fuel Heat Rate (HHV)	5,061.0	Btu/lb
Fuel Input Rate	92.1	ton/hr

Pollutant	HAP	Emission Factor Source	Emission Factor Units	Emission Factor	Emission Rate lb/hr	Emission Rate lb/yr	Emission Rate ton/yr
NOx		B&W	lb/MMBtu	0.065	60.6	526,319	263.2
CO		B&W	lb/MMBtu	0.075	69.9	607,291	303.6
SO2		B&W	lb/MMBtu	0.025	23.3	202,430	101.2
H2SO4 (assumes 10% SO2:SO3 Conv.)		Assumed	lb/MMBtu	0.004	3.6	30,997	15.5
PM (filterable)		B&W	lb/MMBtu	0.012	11.2	97,167	48.6
PM10 (filterable)		B&W	lb/MMBtu	0.012	11.2	97,167	48.6
PM2.5 (filterable)		B&W	lb/MMBtu	0.012	11.2	97,167	48.6
CO2		B&W	lb/MMBtu	221.0	206,000	1,789,728,000	894,864
NH3 (assumes 20 ppm slip)		Assumed	lb/MMBtu	0.012	11.4	99,064	49.5
VOC		B&W	lb/MMBtu	0.010	9.3	80,972	40.5
Antimony (HAP)	X	AP-42	lb/MMBtu	7.9E-06	7.4E-03	64	0.032
Arsenic (HAP)	X	AP-42	lb/MMBtu	2.2E-05	2.1E-02	178	0.089
Barium		AP-42	lb/MMBtu	1.7E-04	1.6E-01	1,377	0.688
Beryllium (HAP)	X	AP-42	lb/MMBtu	1.1E-06	1.0E-03	9	0.004
Cadmium (HAP)	X	AP-42	lb/MMBtu	4.1E-06	3.8E-03	33	0.017
Chromium, Total (HAP)	X	AP-42	lb/MMBtu	2.1E-05	2.0E-02	170	0.085
Cobalt (HAP)	X	AP-42	lb/MMBtu	6.5E-06	6.1E-03	53	0.026
Copper		AP-42	lb/MMBtu	4.9E-05	4.6E-02	397	0.198
Iron		AP-42	lb/MMBtu	9.9E-04	9.2E-01	8,016	4.008
Lead (HAP)	X	AP-42	lb/MMBtu	4.8E-05	4.5E-02	389	0.194
Manganese (HAP)	X	AP-42	lb/MMBtu	1.6E-03	1.5E+00	12,956	6.478
Mercury (HAP)	X	MACT	lb/MMBtu	3.0E-06	2.8E-03	24	0.012
Molybdenum		AP-42	lb/MMBtu	2.1E-06	2.0E-03	17	0.009
Nickel (HAP)	X	AP-42	lb/MMBtu	3.3E-05	3.1E-02	267	0.134
Phosphorous		AP-42	lb/MMBtu	2.7E-05	2.5E-02	219	0.109
Potassium		AP-42	lb/MMBtu	3.9E-02	3.6E+01	315,791	157.896
Selenium (HAP)	X	AP-42	lb/MMBtu	2.8E-06	2.6E-03	23	0.011
Silver		AP-42	lb/MMBtu	1.7E-03	1.6E+00	13,765	6.883
Sodium		AP-42	lb/MMBtu	3.6E-04	3.4E-01	2,915	1.457
Strontium		AP-42	lb/MMBtu	1.0E-05	9.3E-03	81	0.040
Tin		AP-42	lb/MMBtu	2.3E-05	2.1E-02	186	0.093
Titanium		AP-42	lb/MMBtu	2.0E-05	1.9E-02	162	0.081
Vanadium		AP-42	lb/MMBtu	9.8E-07	9.1E-04	8	0.004
Yttrium		AP-42	lb/MMBtu	3.0E-07	2.8E-04	2	0.001
Zinc		AP-42	lb/MMBtu	4.2E-04	3.9E-01	3,401	1.700
Acenaphthene		AP-42	lb/MMBtu	9.1E-07	8.5E-04	7	0.004
Acenaphthylene		AP-42	lb/MMBtu	5.0E-06	4.7E-03	40	0.020
Acetaldehyde (HAP)	X	AP-42	lb/MMBtu	8.3E-04	7.7E-01	6,721	3.360
Acetone		AP-42	lb/MMBtu	1.9E-04	1.8E-01	1,538	0.769
Acetophenone (HAP)	X	AP-42	lb/MMBtu	3.2E-09	3.0E-06	0	0.000
Acrolein (HAP)	X	Bridgewater	lb/MMBtu	4.3E-05	4.0E-02	348	0.174
Anthracene		AP-42	lb/MMBtu	3.0E-06	2.8E-03	24	0.012
Benzaldehyde		AP-42	lb/MMBtu	8.5E-07	7.9E-04	7	0.003
Benzene (HAP)	X	AP-42	lb/MMBtu	4.2E-03	3.9E+00	34,008	17.004
Benzo(a)anthracene		AP-42	lb/MMBtu	6.5E-08	6.1E-05	1	0.000
Benzo(a)pyrene		AP-42	lb/MMBtu	2.6E-06	2.4E-03	21	0.011
Benzo(b)fluoranthene		AP-42	lb/MMBtu	1.0E-07	9.3E-05	1	0.000
Benzo(e)pyrene		AP-42	lb/MMBtu	2.6E-09	2.4E-06	0	0.000
Benzo(g,h,i)perylene		AP-42	lb/MMBtu	9.3E-08	8.7E-05	1	0.000
Benzo(j,k)fluoranthene		AP-42	lb/MMBtu	1.6E-07	1.5E-04	1	0.001
Benzo(k)fluoranthene		AP-42	lb/MMBtu	3.6E-08	3.4E-05	0	0.000
Benzoic acid		AP-42	lb/MMBtu	4.7E-08	4.4E-05	0	0.000
bis(2-Ethylhexyl)phthalate (HAP)	X	AP-42	lb/MMBtu	4.7E-08	4.4E-05	0	0.000
Bromomethane		AP-42	lb/MMBtu	1.5E-05	1.4E-02	121	0.061
2-Butanone (MEK)		AP-42	lb/MMBtu	5.4E-06	5.0E-03	44	0.022
Carbazole	X	AP-42	lb/MMBtu	1.8E-06	1.7E-03	15	0.007
Carbon tetrachloride (HAP)	X	AP-42	lb/MMBtu	4.5E-05	4.2E-02	364	0.182
Chlorine (HAP)	X	AP-42	lb/MMBtu	7.9E-04	7.4E-01	6,397	3.198
Chlorobenzene (HAP)	X	AP-42	lb/MMBtu	3.3E-05	3.1E-02	267	0.134
Chloroform (HAP)	X	AP-42	lb/MMBtu	2.8E-05	2.6E-02	227	0.113
Chloromethane		AP-42	lb/MMBtu	2.3E-05	2.1E-02	186	0.093
2-Chloronaphthalene		AP-42	lb/MMBtu	2.4E-09	2.2E-06	0	0.000
2-Chlorophenol		AP-42	lb/MMBtu	2.4E-08	2.2E-05	0	0.000
Chrysene		AP-42	lb/MMBtu	3.8E-08	3.5E-05	0	0.000
Crotonaldehyde		AP-42	lb/MMBtu	9.9E-06	9.2E-03	80	0.040
Decachlorobiphenyl		AP-42	lb/MMBtu	2.7E-10	2.5E-07	0	0.000
Dibenzo(a,h)anthracene		AP-42	lb/MMBtu	9.1E-09	8.5E-06	0	0.000
1,2-Dibromoethene		AP-42	lb/MMBtu	5.5E-05	5.1E-02	445	0.223
Dichlorobiphenyl		AP-42	lb/MMBtu	7.4E-10	6.9E-07	0	0.000
1,2-Dichloroethane		AP-42	lb/MMBtu	2.9E-05	2.7E-02	235	0.117
Dichloromethane		AP-42	lb/MMBtu	2.9E-04	2.7E-01	2,348	1.174
1,2-Dichloropropane		AP-42	lb/MMBtu	3.3E-05	3.1E-02	267	0.134
2.4-Dinitrophenol		AP-42	lb/MMBtu	1.8E-07	1.7E-04	1	0.001
Ethylbenzene (HAP)	X	AP-42	lb/MMBtu	3.1E-05	2.9E-02	251	0.126
Fluoranthene		AP-42	lb/MMBtu	1.6E-06	1.5E-03	13	0.006
Fluorene		AP-42	lb/MMBtu	3.4E-06	3.2E-03	28	0.014
Formaldehyde (HAP)	X	AP-42	lb/MMBtu	4.4E-03	4.1E+00	35,628	17.814
Heptachlorobiphenyl		AP-42	lb/MMBtu	6.6E-11	6.2E-08	0	0.000
Hexachlorobiphenyl		AP-42	lb/MMBtu	5.5E-10	5.1E-07	0	0.000
Hexanal		AP-42	lb/MMBtu	7.0E-06	6.5E-03	57	0.028
Heptachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	2.0E-09	1.9E-06	0	0.000
Heptachlorodibenzo-p-furans		AP-42	lb/MMBtu	2.4E-10	2.2E-07	0	0.000
Hexachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	1.6E-06	1.5E-03	13	0.006
Hexachlorodibenzo-p-furans		AP-42	lb/MMBtu	2.8E-10	2.6E-07	0	0.000
Hydrogen Chloride (HAP)	X	NHDES Test Data	lb/MMBtu	8.3E-04	7.8E-01	6,753	3.377
Indeno(1,2,3,c,d)pyrene		AP-42	lb/MMBtu	8.7E-08	8.1E-05	1	0.000
Isobutyraldehyde		AP-42	lb/MMBtu	1.2E-05	1.1E-02	97	0.049
Methane		AP-42	lb/MMBtu	2.1E-02	2.0E+01	170,042	85.021
2-Methylnaphthalene		AP-42	lb/MMBtu	1.6E-07	1.5E-04	1	0.001
Monochlorobiphenyl		AP-42	lb/MMBtu	2.2E-10	2.1E-07	0	0.000
Naphthalene (HAP)	X	AP-42	lb/MMBtu	9.7E-05	9.0E-02	785	0.393
2-Nitrophenol		AP-42	lb/MMBtu	2.4E-07	2.2E-04	2	0.001
4-Nitrophenol (HAP)	X	AP-42	lb/MMBtu	1.1E-07	1.0E-04	1	0.000
Octachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	6.6E-08	6.2E-05	1	0.000
Octachlorodibenzo-p-furans		AP-42	lb/MMBtu	8.8E-11	8.2E-08	0	0.000
Pentachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	1.5E-09	1.4E-06	0	0.000
Pentachlorodibenzo-p-furans		AP-42	lb/MMBtu	4.2E-10	3.9E-07	0	0.000
Pentachlorobiphenyl		AP-42	lb/MMBtu	1.2E-09	1.1E-06	0	0.000
Pentachlorophenol (HAP)	X	AP-42	lb/MMBtu	5.1E-08	4.8E-05	0	0.000
Perylene		AP-42	lb/MMBtu	5.2E-10	4.8E-07	0	0.000
Phenanthrene		AP-42	lb/MMBtu	7.0E-06	6.5E-03	57	0.028
Phenol (HAP)	X	AP-42	lb/MMBtu	5.1E-05	4.8E-02	413	0.206
Propanal		AP-42	lb/MMBtu	3.2E-06	3.0E-03	26	0.013
Propionaldehyde (HAP)	X	AP-42	lb/MMBtu	6.1E-05	5.7E-02	494	0.247
Pyrene		AP-42	lb/MMBtu	3.7E-06	3.4E-03	30	0.015
Styrene (HAP)	X	AP-42	lb/MMBtu	1.9E-03	1.8E+00	15,385	7.692
2,3,7,8-Tetrachlorodibenzo-p-dioxins (HAP	X	AP-42	lb/MMBtu	8.6E-12	8.0E-09	0	0.000
Tetrachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	4.7E-10	4.4E-07	0	0.000
2,3,7,8-Tetrachlorodibenzo-p-furans		AP-42	lb/MMBtu	9.0E-11	8.4E-08	0	0.000
Tetrachlorodibenzo-p-furans		AP-42	lb/MMBtu	7.5E-10	7.0E-07	0	0.000
Tetrachlorobiphenyl		AP-42	lb/MMBtu	2.5E-09	2.3E-06	0	0.000
Tetrachloroethene		AP-42	lb/MMBtu	3.8E-05	3.5E-02	308	0.154
o-Tolualdehyde		AP-42	lb/MMBtu	7.2E-06	6.7E-03	58	0.029
p-Tolualdehyde		AP-42	lb/MMBtu	1.1E-05	1.0E-02	89	0.045
Toluene (HAP)	X	AP-42	lb/MMBtu	9.2E-04	8.6E-01	7,449	3.725
Trichlorobiphenyl		AP-42	lb/MMBtu	2.6E-09	2.4E-06	0	0.000
1,1,1-Trichloroethane		AP-42	lb/MMBtu	3.1E-05	2.9E-02	251	0.126
Trichloroethene		AP-42	lb/MMBtu	3.0E-05	2.8E-02	243	0.121
Trichlorofluoromethane		AP-42	lb/MMBtu	4.1E-05	3.8E-02	332	0.166
2,4,6-Trichlorophenol (HAP)	X	AP-42	lb/MMBtu	2.2E-08	2.1E-05	0	0.000
Vinyl Chloride (HAP)	X	AP-42	lb/MMBtu	1.8E-05	1.7E-02	146	0.073
o-Xylene (HAP)	X	AP-42	lb/MMBtu	2.5E-05	2.3E-02	202	0.101
Total HAPS				0.016057433	1.5E+01	130,021	65.010
Largest Single HAP (Formaldehyde)						37,260	18.630

Potent ions Summary
Biomass B ased Cold Startup
Berlin BioPow erlin, New Hampshire

Number of cold starts per year: 6

Phase 1 - #2 Fuel Oil Only (25% Load)

Biomass Boiler Startup	
Parameter	Fuel Oil
Duration of Start Up	8 hr
Heat Input Rate	240 MMBtu/hr
Fuel Firing Rate	1.714 kgal/hr

			#2 Fuel Oil				
Pollutant	HAP	Emission Factor Source	Emission Factor Units	Emission Factor	Emission Rate lb/hr	Emission Rate lb/start up	Emission Rate ton/start up
NOx		B&W	lb/MMBtu	0.20	48.00	384	0.19
CO		B&W	lb/MMBtu	0.50	120.00	960	0.48
SO2		B&W	lb/MMBtu	0.002	0.48	4	0.0019
PM (filterable)		B&W	lb/MMBtu	0.050	12.00	96	0.05
PM10 (filterable)		B&W	lb/MMBtu	0.050	12.00	96	0.05
PM2.5 (filterable)		B&W	lb/MMBtu	0.050	12.00	96	0.05
CO2		AP-42	lb/kgal	22,300	38,229	305,829	152.91
VOC		B&W	lb/MMBtu	0.015	3.60	29	0.014
Arsenic (HAP)	X	AP-42	lb/10^{12} Btu	4.00E+00	9.60E-04	8.E-03	3.84E-06
Beryllium (HAP)	X	AP-42	lb/10^{12} Btu	3.00E+00	7.20E-04	6.E-03	2.88E-06
Cadmium (HAP)	X	AP-42	lb/10^{12} Btu	3.00E+00	7.20E-04	6.E-03	2.88E-06
Chromium (HAP)	X	AP-42	lb/10^{12} Btu	3.00E+00	7.20E-04	6.E-03	2.88E-06
Copper		AP-42	lb/10^{12} Btu	6.00E+00	1.44E-03	1.E-02	5.76E-06
Lead (HAP)	X	AP-42	lb/10^{12} Btu	9.00E+00	2.16E-03	2.E-02	8.64E-06
Manganese (HAP)	X	AP-42	lb/10^{12} Btu	6.00E+00	1.44E-03	1.E-02	5.76E-06
Mercury (HAP)	X	AP-42	lb/10^{12} Btu	3.00E+00	7.20E-04	6.E-03	2.88E-06
Nickel (HAP)	X	AP-42	lb/10^{12} Btu	3.00E+00	7.20E-04	6.E-03	2.88E-06
Selenium (HAP)	X	AP-42	lb/10^{12} Btu	1.50E+01	3.60E-03	3.E-02	1.44E-05
Zinc		AP-42	lb/10^{12} Btu	4.00E+00	9.60E-04	8.E-03	3.84E-06
Acenaphthene		AP-42	lb/kgal	2.11E-05	3.62E-05	3.E-04	1.45E-07
Acenaphthylene		AP-42	lb/kgal	2.53E-07	4.34E-07	3.E-06	1.73E-09
Anthracene		AP-42	lb/kgal	1.22E-06	2.09E-06	2.E-05	8.37E-09
Benz(a)anthracene		AP-42	lb/kgal	4.01E-06	6.87E-06	5.E-05	2.75E-08
Benzene (HAP)	X	AP-42	lb/kgal	2.14E-04	3.67E-04	3.E-03	1.47E-06
Benzo(b,k)fluoranthene		AP-42	lb/kgal	1.48E-06	2.54E-06	2.E-05	1.01E-08
Benzo(g,h,i)perylene		AP-42	lb/kgal	2.26E-06	3.87E-06	3.E-05	1.55E-08
Chrysene		AP-42	lb/kgal	2.38E-06	4.08E-06	3.E-05	1.63E-08
Dibenzo(a,h)anthracene		AP-42	lb/kgal	1.67E-06	2.86E-06	2.E-05	1.15E-08
Ethylbenzene (HAP)	X	AP-42	lb/kgal	6.36E-05	1.09E-04	9.E-04	4.36E-07
Fluoranthene		AP-42	lb/kgal	4.84E-06	8.30E-06	7.E-05	3.32E-08
Fluorene		AP-42	lb/kgal	4.47E-06	7.66E-06	6.E-05	3.07E-08
Formaldehyde (HAP)	X	AP-42	lb/kgal	6.10E-02	1.05E-01	8.E-01	4.18E-04
Indeno(1,2,3-cd)pyrene		AP-42	lb/kgal	2.14E-06	3.67E-06	3.E-05	1.47E-08
Naphthalene (HAP)	X	AP-42	lb/kgal	1.13E-03	1.94E-03	2.E-02	7.75E-06
Phenanthrene		AP-42	lb/kgal	1.05E-05	1.80E-05	1.E-04	7.20E-08
Pyrene		AP-42	lb/kgal	4.25E-06	7.29E-06	6.E-05	2.91E-08
1,1,1-Trichloroethane (HAP)	X	AP-42	lb/kgal	2.36E-04	4.05E-04	3.E-03	1.62E-06
Toluene (HAP)	X	AP-42	lb/kgal	6.20E-03	1.06E-02	9.E-02	4.25E-05
o-Xylene (HAP)	X	AP-42	lb/kgal	1.09E-04	1.87E-04	1.E-03	7.47E-07
OCDD (HAP)	X	AP-42	lb/kgal	3.10E-09	5.31E-09	4.E-08	2.13E-11
Total HAPS					**1.30E-01**	**1.04E+00**	**5.20E-04**

Poten sions Summary
Biomass L hased Cold Startup
Berlin BioPow.. derlin, New Hampshire

Number of cold starts per year: 6

Phase 2 - #2 Fuel Oil & Biomass (25-50% Load)

Parameter	Fuel Oil
Duration of Start Up	3 hr
Heat Input Rate	120.0 MMBtu/hr
Fuel Firing Rate	0.857 kgal/hr

			#2 Fuel Oil				
Pollutant	HAP	Emission Factor Source	Emission Factor Units	Emission Factor	Emission Rate lb/hr	Emission Rate lb/start up	Emission Rate ton/start up
NOx		B&W	lb/MMBtu	0.20	24.00	72	0.036
CO		B&W	lb/MMBtu	0.50	60.00	180	0.090
SO2		B&W	lb/MMBtu	0.002	0.24	1	0.00036
PM (filterable)		B&W	lb/MMBtu	0.050	6.00	18	0.009
PM (filterable)		B&W	lb/MMBtu	0.050	6.00	18	0.009
PM10 (filterable)		B&W	lb/MMBtu	0.050	6.00	18	0.009
PM2.5 (filterable)		B&W	lb/MMBtu	0.050	6.00	18	0.009
CO2		AP-42	lb/kgal	22,300	19,114	57,343	28.67
VOC		B&W	lb/MMBtu	0.015	1.80	5	0.0027
Arsenic (HAP)	X	AP-42	lb/10^{12} Btu	4.0E+00	4.8E-04	1.4E-03	7.2E-07
Beryllium (HAP)	X	AP-42	lb/10^{12} Btu	3.0E+00	3.6E-04	1.1E-03	5.4E-07
Cadmium (HAP)	X	AP-42	lb/10^{12} Btu	3.0E+00	3.6E-04	1.1E-03	5.4E-07
Chromium (HAP)	X	AP-42	lb/10^{12} Btu	3.0E+00	3.6E-04	1.1E-03	5.4E-07
Copper		AP-42	lb/10^{12} Btu	6.0E+00	7.2E-04	2.2E-03	1.1E-06
Lead (HAP)	X	AP-42	lb/10^{12} Btu	9.0E+00	1.1E-03	3.2E-03	1.6E-06
Manganese (HAP)	X	AP-42	lb/10^{12} Btu	6.0E+00	7.2E-04	2.2E-03	1.1E-06
Mercury (HAP)	X	AP-42	lb/10^{12} Btu	3.0E+00	3.6E-04	1.1E-03	5.4E-07
Nickel (HAP)	X	AP-42	lb/10^{12} Btu	3.0E+00	3.6E-04	1.1E-03	5.4E-07
Selenium (HAP)	X	AP-42	lb/10^{12} Btu	1.5E+01	1.8E-03	5.4E-03	2.7E-06
Zinc		AP-42	lb/10^{12} Btu	4.0E+00	4.8E-04	1.4E-03	7.2E-07
Acenaphthene		AP-42	lb/kgal	2.1E-05	1.8E-05	5.4E-05	2.7E-08
Acenaphthylene		AP-42	lb/kgal	2.5E-07	2.2E-07	6.5E-07	3.3E-10
Anthracene		AP-42	lb/kgal	1.2E-06	1.0E-06	3.1E-06	1.6E-09
Benz(a)anthracene		AP-42	lb/kgal	4.0E-06	3.4E-06	1.0E-05	5.2E-09
Benzene (HAP)	X	AP-42	lb/kgal	2.1E-04	1.8E-04	5.5E-04	2.8E-07
Benzo(b,k)fluoranthene		AP-42	lb/kgal	1.5E-06	1.3E-06	3.8E-06	1.9E-09
Benzo(g,h,i)perylene		AP-42	lb/kgal	2.3E-06	1.9E-06	5.8E-06	2.9E-09
Chrysene		AP-42	lb/kgal	2.4E-06	2.0E-06	6.1E-06	3.1E-09
Dibenzo(a,h)anthracene		AP-42	lb/kgal	1.7E-06	1.4E-06	4.3E-06	2.1E-09
Ethylbenzene (HAP)	X	AP-42	lb/kgal	6.4E-05	5.5E-05	1.6E-04	8.2E-08
Fluoranthene		AP-42	lb/kgal	4.8E-06	4.1E-06	1.2E-05	6.2E-09
Fluorene		AP-42	lb/kgal	4.5E-06	3.8E-06	1.1E-05	5.7E-09
Formaldehyde (HAP)	X	AP-42	lb/kgal	6.1E-02	5.2E-02	1.6E-01	7.8E-05
Indeno(1,2,3-cd)pyrene		AP-42	lb/kgal	2.1E-06	1.8E-06	5.5E-06	2.8E-09
Naphthalene (HAP)	X	AP-42	lb/kgal	1.1E-03	9.7E-04	2.9E-03	1.5E-06
Phenanthrene		AP-42	lb/kgal	1.1E-05	9.0E-06	2.7E-05	1.4E-08
Pyrene		AP-42	lb/kgal	4.3E-06	3.6E-06	1.1E-05	5.5E-09
1,1,1-Trichloroethane (HAP)	X	AP-42	lb/kgal	2.4E-04	2.0E-04	6.1E-04	3.0E-07
Toluene (HAP)	X	AP-42	lb/kgal	6.2E-03	5.3E-03	1.6E-02	8.0E-06
o-Xylene (HAP)	X	AP-42	lb/kgal	1.1E-04	9.3E-05	2.8E-04	1.4E-07
OCDD (HAP)	X	AP-42	lb/kgal	3.1E-09	2.7E-09	8.0E-09	4.0E-12
Total HAPS					**6.5E-02**	**1.9E-01**	**9.7E-05**

Total Emissions for Start up

	Emissions Per Start up		Start up emissions Per Year	
Pollutant	Emission Rate lb/start up	Emission Rate ton/start up	Emission Rate lb/year	Emission Rate ton/year
NOx	538	0.269	3,227	1.61
CO	1,234	0.617	7,406	3.70
SO2	36	0.018	216	0.11
PM (filterable)	129	0.065	775	0.39
PM10 (filterable)	129	0.065	775	0.39
PM2.5 (filterable)	129	0.065	775	0.39
CO2	641,234	320.617	3,847,402	1923.70
VOC	48.2	0.024	289	0.14
Total HAPS	21	0.011	129	0.06

Biomass Boiler Startup

Parameter	Wood Fuel
Duration of Start Up	3 hr
Heat Input Rate	233.0 MMBtu/hr
Fuel Firing Rate	23.0 ton/hr

			Wood Fuel				
Pollutant	HAP	Emission Factor Source	Emission Factor Units	Emission Factor	Emission Rate lb/hr	Emission Rate lb/start up	Emission Rate ton/start up
NOx		B&W	lb/MMBtu	0.065	15.1	45	0.023
CO		B&W	lb/MMBtu	0.075	17.5	52	0.026
SO2		B&W	lb/MMBtu	0.025	5.8	17	0.009
H2SO4 (assumes 10% SO2:SO3 Conv)		Assumed	lb/MMBtu	0.004	0.9	3	0.0013
PM (filterable)		B&W	lb/MMBtu	0.012	2.8	8	0.0042
PM10 (filterable)		B&W	lb/MMBtu	0.012	2.8	8	0.0042
PM2.5 (filterable)		B&W	lb/MMBtu	0.012	2.8	8	0.0042
CO2		B&W	lb/MMBtu	221.0	51,493.0	154,479	77.240
NH3 (Assumes 20 ppm slip)		Assumed	lb/MMBtu	0.012	2.8	8	0.0042
VOC		B&W	lb/MMBtu	0.010	2.3	7	0.0035
Antimony (HAP)	X	AP-42	lb/MMBtu	7.9E-06	1.8E-03	5.5E-03	2.8E-06
Arsenic (HAP)	X	AP-42	lb/MMBtu	2.2E-05	5.1E-03	1.5E-02	7.7E-06
Barium		AP-42	lb/MMBtu	1.7E-04	4.0E-02	1.2E-01	5.9E-05
Beryllium (HAP)	X	AP-42	lb/MMBtu	1.1E-06	2.6E-04	7.7E-04	3.8E-07
Cadmium (HAP)	X	AP-42	lb/MMBtu	4.1E-06	9.6E-04	2.9E-03	1.4E-06
Chromium, Total (HAP)	X	AP-42	lb/MMBtu	2.1E-05	4.9E-03	1.5E-02	7.3E-06
Cobalt (HAP)	X	AP-42	lb/MMBtu	6.5E-06	1.5E-03	4.5E-03	2.3E-06
Copper		AP-42	lb/MMBtu	4.9E-05	1.1E-02	3.4E-02	1.7E-05
Iron		AP-42	lb/MMBtu	9.9E-04	2.3E-01	6.9E-01	3.5E-04
Lead (HAP)	X	AP-42	lb/MMBtu	4.8E-05	1.1E-02	3.4E-02	1.7E-05
Manganese (HAP)	X	AP-42	lb/MMBtu	1.6E-03	3.7E-01	1.1E+00	5.6E-04
Mercury (HAP)	X	MACT	lb/MMBtu	3.0E-06	7.0E-04	2.1E-03	1.0E-06
Molybdenum		AP-42	lb/MMBtu	2.1E-06	4.9E-04	1.5E-03	7.3E-07
Nickel (HAP)	X	AP-42	lb/MMBtu	3.3E-05	7.7E-03	2.3E-02	1.2E-05
Phosphorous		AP-42	lb/MMBtu	2.7E-05	6.3E-03	1.9E-02	9.4E-06
Potassium		AP-42	lb/MMBtu	3.9E-02	9.1E+00	2.7E+01	1.4E-02
Selenium (HAP)	X	AP-42	lb/MMBtu	2.8E-06	6.5E-04	2.0E-03	9.8E-07
Silver		AP-42	lb/MMBtu	1.7E-03	4.0E-01	1.2E+00	5.9E-04
Sodium		AP-42	lb/MMBtu	3.6E-04	8.4E-02	2.5E-01	1.3E-04
Strontium		AP-42	lb/MMBtu	1.0E-05	2.3E-03	7.0E-03	3.5E-06
Tin		AP-42	lb/MMBtu	2.3E-05	5.4E-03	1.6E-02	8.0E-06
Titanium		AP-42	lb/MMBtu	2.0E-05	4.7E-03	1.4E-02	7.0E-06
Vanadium		AP-42	lb/MMBtu	9.8E-07	2.3E-04	6.9E-04	3.4E-07
Yttrium		AP-42	lb/MMBtu	3.0E-07	7.0E-05	2.1E-04	1.0E-07
Zinc		AP-42	lb/MMBtu	4.2E-04	9.8E-02	2.9E-01	1.5E-04
						0.0E+00	
Acenaphthene		AP-42	lb/MMBtu	9.1E-07	2.1E-04	6.4E-04	3.2E-07
Acenaphthylene		AP-42	lb/MMBtu	5.0E-06	1.2E-03	3.5E-03	1.7E-06
Acetaldehyde (HAP)	X	AP-42	lb/MMBtu	8.3E-04	1.9E-01	5.8E-01	2.9E-04
Acetone		AP-42	lb/MMBtu	1.9E-04	4.4E-02	1.3E-01	6.6E-05
Acetophenone (HAP)	X	AP-42	lb/MMBtu	3.2E-09	7.5E-07	2.2E-06	1.1E-09
Acrolein (HAP)	X	Bridgewater	lb/MMBtu	4.3E-05	1.0E-02	3.0E-02	1.5E-05
Anthracene		AP-42	lb/MMBtu	3.0E-06	7.0E-04	2.1E-03	1.0E-06
Benzaldehyde		AP-42	lb/MMBtu	8.5E-07	2.0E-04	5.9E-04	3.0E-07
Benzene (HAP)	X	AP-42	lb/MMBtu	4.2E-03	9.8E-01	2.9E+00	1.5E-03
Benzo(a)anthracene		AP-42	lb/MMBtu	6.5E-08	1.5E-05	4.5E-05	2.3E-08
Benzo(a)pyrene		AP-42	lb/MMBtu	2.6E-06	6.1E-04	1.8E-03	9.1E-07
Benzo(b)fluoranthene		AP-42	lb/MMBtu	1.0E-07	2.3E-05	7.0E-05	3.5E-08
Benzo(e)pyrene		AP-42	lb/MMBtu	2.6E-09	6.1E-07	1.8E-06	9.1E-10
Benzo(g,h,i)perylene		AP-42	lb/MMBtu	9.3E-08	2.2E-05	6.5E-05	3.3E-08
Benzo(j,k)fluoranthene		AP-42	lb/MMBtu	1.6E-07	3.7E-05	1.1E-04	5.6E-08
Benzo(k)fluoranthene		AP-42	lb/MMBtu	3.6E-08	8.4E-06	2.5E-05	1.3E-08
Benzoic acid		AP-42	lb/MMBtu	4.7E-08	1.1E-05	3.3E-05	1.6E-08
bis(2-Ethylhexyl)phthalate (HAP)	X	AP-42	lb/MMBtu	4.7E-08	1.1E-05	3.3E-05	1.6E-08
Bromomethane		AP-42	lb/MMBtu	1.5E-05	3.5E-03	1.0E-02	5.2E-06
2-Butanone (MEK)		AP-42	lb/MMBtu	5.4E-06	1.3E-03	3.8E-03	1.9E-06
Carbazole	X	AP-42	lb/MMBtu	1.8E-06	4.2E-04	1.3E-03	6.3E-07
Carbon tetrachloride (HAP)	X	AP-42	lb/MMBtu	4.5E-05	1.0E-02	3.1E-02	1.6E-05
Chlorine (HAP)	X	AP-42	lb/MMBtu	7.9E-04	1.8E-01	5.5E-01	2.8E-04
Chlorobenzene (HAP)	X	AP-42	lb/MMBtu	3.3E-05	7.7E-03	2.3E-02	1.2E-05
Chloroform (HAP)	X	AP-42	lb/MMBtu	2.8E-05	6.5E-03	2.0E-02	9.8E-06
Chloromethane		AP-42	lb/MMBtu	2.3E-05	5.4E-03	1.6E-02	8.0E-06
2-Chloronaphthalene		AP-42	lb/MMBtu	2.4E-09	5.6E-07	1.7E-06	8.4E-10
2-Chlorophenol		AP-42	lb/MMBtu	2.4E-08	5.6E-06	1.7E-05	8.4E-09
Chrysene		AP-42	lb/MMBtu	3.8E-08	8.9E-06	2.7E-05	1.3E-08
Crotonaldehyde		AP-42	lb/MMBtu	9.9E-06	2.3E-03	6.9E-03	3.5E-06
Decachlorobiphenyl		AP-42	lb/MMBtu	2.7E-10	6.3E-08	1.9E-07	9.4E-11
Dibenzo(a,h)anthracene		AP-42	lb/MMBtu	9.1E-09	2.1E-06	6.4E-06	3.2E-09
1,2-Dibromoethene		AP-42	lb/MMBtu	5.5E-05	1.3E-02	3.8E-02	1.9E-05
Dichlorobiphenyl		AP-42	lb/MMBtu	7.4E-10	1.7E-07	5.2E-07	2.6E-10
1,2-Dichloroethane		AP-42	lb/MMBtu	2.9E-05	6.8E-03	2.0E-02	1.0E-05
Dichloromethane		AP-42	lb/MMBtu	2.9E-04	6.8E-02	2.0E-01	1.0E-04
1,2-Dichloropropane		AP-42	lb/MMBtu	3.3E-05	7.7E-03	2.3E-02	1.2E-05
2,4-Dinitrophenol		AP-42	lb/MMBtu	1.8E-07	4.2E-05	1.3E-04	6.3E-08
Ethylbenzene (HAP)	X	AP-42	lb/MMBtu	3.1E-05	7.2E-03	2.2E-02	1.1E-05
Fluoranthene		AP-42	lb/MMBtu	1.6E-06	3.7E-04	1.1E-03	5.6E-07
Fluorene		AP-42	lb/MMBtu	3.4E-06	7.9E-04	2.4E-03	1.2E-06
Formaldehyde (HAP)	X	AP-42	lb/MMBtu	4.4E-03	1.0E+00	3.1E+00	1.5E-03
Heptachlorobiphenyl		AP-42	lb/MMBtu	6.6E-11	1.5E-08	4.6E-08	2.3E-11
Hexachlorobiphenyl		AP-42	lb/MMBtu	5.5E-10	1.3E-07	3.8E-07	1.9E-10
Hexanal		AP-42	lb/MMBtu	7.0E-06	1.6E-03	4.9E-03	2.4E-06
Heptachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	2.0E-09	4.7E-07	1.4E-06	7.0E-10
Heptachlorodibenzo-p-furans		AP-42	lb/MMBtu	2.4E-10	5.6E-08	1.7E-07	8.4E-11
Hexachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	1.6E-06	3.7E-04	1.1E-03	5.6E-07
Hexachlorodibenzo-p-furans		AP-42	lb/MMBtu	2.8E-10	6.5E-08	2.0E-07	9.8E-11
Hydrogen Chloride (HAP)	X	NHDES Test Dat	lb/MMBtu	8.3E-04	1.9E-01	5.8E-01	2.9E-04
Indeno(1,2,3,c,d)pyrene		AP-42	lb/MMBtu	8.7E-08	2.0E-05	6.1E-05	3.0E-08
Isobutyraldehyde		AP-42	lb/MMBtu	1.2E-05	2.8E-03	8.4E-03	4.2E-06
Methane		AP-42	lb/MMBtu	2.1E-02	4.9E+00	1.5E+01	7.3E-03
2-Methylnaphthalene		AP-42	lb/MMBtu	1.6E-07	3.7E-05	1.1E-04	5.6E-08
Monochlorobiphenyl		AP-42	lb/MMBtu	2.2E-10	5.1E-08	1.5E-07	7.7E-11
Naphthalene (HAP)	X	AP-42	lb/MMBtu	9.7E-05	2.3E-02	6.8E-02	3.4E-05
2-Nitrophenol		AP-42	lb/MMBtu	2.4E-07	5.6E-05	1.7E-04	8.4E-08
4-Nitrophenol (HAP)	X	AP-42	lb/MMBtu	1.1E-07	2.6E-05	7.7E-05	3.8E-08
Octachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	6.6E-08	1.5E-05	4.6E-05	2.3E-08
Octachlorodibenzo-p-furans		AP-42	lb/MMBtu	8.8E-11	2.1E-08	6.2E-08	3.1E-11
Pentachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	1.5E-09	3.5E-07	1.0E-06	5.2E-10
Pentachlorodibenzo-p-furans		AP-42	lb/MMBtu	4.2E-10	9.8E-08	2.9E-07	1.5E-10
Pentachlorobiphenyl		AP-42	lb/MMBtu	1.2E-09	2.8E-07	8.4E-07	4.2E-10
Pentachlorophenol (HAP)	X	AP-42	lb/MMBtu	5.1E-08	1.2E-05	3.6E-05	1.8E-08
Perylene		AP-42	lb/MMBtu	5.2E-10	1.2E-07	3.6E-07	1.8E-10
Phenanthrene		AP-42	lb/MMBtu	7.0E-06	1.6E-03	4.9E-03	2.4E-06
Phenol (HAP)	X	AP-42	lb/MMBtu	5.1E-05	1.2E-02	3.6E-02	1.8E-05
Propanal		AP-42	lb/MMBtu	3.2E-06	7.5E-04	2.2E-03	1.1E-06
Propionaldehyde (HAP)	X	AP-42	lb/MMBtu	6.1E-05	1.4E-02	4.3E-02	2.1E-05
Pyrene		AP-42	lb/MMBtu	3.7E-06	8.6E-04	2.6E-03	1.3E-06
Styrene (HAP)	X	AP-42	lb/MMBtu	1.9E-03	4.4E-01	1.3E+00	6.6E-04
2,3,7,8-Tetrachlorodibenzo-p-diox	X	AP-42	lb/MMBtu	8.6E-12	2.0E-09	6.0E-09	3.0E-12
Tetrachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	4.7E-10	1.1E-07	3.3E-07	1.6E-10
2,3,7,8-Tetrachlorodibenzo-p-furans		AP-42	lb/MMBtu	9.0E-11	2.1E-08	6.3E-08	3.1E-11
Tetrachlorodibenzo-p-furans		AP-42	lb/MMBtu	7.5E-10	1.7E-07	5.2E-07	2.6E-10
Tetrachlorobiphenyl		AP-42	lb/MMBtu	2.5E-09	5.8E-07	1.7E-06	8.7E-10
Tetrachloroethene		AP-42	lb/MMBtu	3.8E-05	8.9E-03	2.7E-02	1.3E-05
o-Tolualdehyde		AP-42	lb/MMBtu	7.2E-06	1.7E-03	5.0E-03	2.5E-06
p-Tolualdehyde		AP-42	lb/MMBtu	1.1E-05	2.6E-03	7.7E-03	3.8E-06
Toluene (HAP)	X	AP-42	lb/MMBtu	9.2E-04	2.1E-01	6.4E-01	3.2E-04
Trichlorobiphenyl		AP-42	lb/MMBtu	2.6E-09	6.1E-07	1.8E-06	9.1E-10
1,1,1-Trichloroethane		AP-42	lb/MMBtu	3.1E-05	7.2E-03	2.2E-02	1.1E-05
Trichloroethene		AP-42	lb/MMBtu	3.0E-05	7.0E-03	2.1E-02	1.0E-05
Trichlorofluoromethane		AP-42	lb/MMBtu	4.1E-05	9.6E-03	2.9E-02	1.4E-05
2,4,6-Trichlorophenol (HAP)	X	AP-42	lb/MMBtu	2.2E-08	5.1E-06	1.5E-05	7.7E-09
Vinyl Chloride (HAP)	X	AP-42	lb/MMBtu	1.8E-05	4.2E-03	1.3E-02	6.3E-06
o-Xylene (HAP)	X	AP-42	lb/MMBtu	2.5E-05	5.8E-03	1.7E-02	8.7E-06
Total HAPS				1.6E-02	3.7E+00	1.1E+01	5.6E-03
Largest Single HAP (Formaldehyde)						3.1E+00	1.5E-03

Poter sions Summary
Biomass & hased Cold Startup
Berlin BioPower - Berlin, New Hampshire

Number of cold starts per year: 6

Phase 3 - Biomass Only (50-70% Load)

Parameter	Wood Fuel
Duration of Start Up	1 hr
Heat Input Rate	559.2 MMBtu/hr
Fuel Firing Rate	55.2 ton/hr

Wood Fuel

Pollutant	HAP	Emission Factor Source	Emission Factor Units	Emission Factor	Emission Rate lb/hr	Emission Rate lb/start up	Emission Rate ton/start up
NOx		B&W	lb/MMBtu	0.065	36.3	36	0.018
CO		B&W	lb/MMBtu	0.075	41.9	42	0.021
SO2		B&W	lb/MMBtu	0.025	14.0	14	0.007
H2SO4 (assumes 10% SO2:SO3 Conv)		Assumed	lb/MMBtu	0.004	2.1	2	0.0011
PM (filterable)		B&W	lb/MMBtu	0.012	6.7	7	0.0034
PM10 (filterable)		B&W	lb/MMBtu	0.012	6.7	7	0.0034
PM2.5 (filterable)		B&W	lb/MMBtu	0.012	6.7	7	0.0034
CO2		B&W	lb/MMBtu	221.0	123,583.2	123,583	61.792
NH3 (Assumes 20 ppm slip)		Assumed	lb/MMBtu	0.012	6.7	7	0.0034
VOC		B&W	lb/MMBtu	0.010	5.6	6	0.0028
Antimony (HAP)	X	AP-42	lb/MMBtu	7.9E-06	4.4E-03	4.4E-03	2.2E-06
Arsenic (HAP)	X	AP-42	lb/MMBtu	2.2E-05	1.2E-02	1.2E-02	6.2E-06
Barium		AP-42	lb/MMBtu	1.7E-04	9.5E-02	9.5E-02	4.8E-05
Beryllium (HAP)	X	AP-42	lb/MMBtu	1.1E-06	6.2E-04	6.2E-04	3.1E-07
Cadmium (HAP)	X	AP-42	lb/MMBtu	4.1E-06	2.3E-03	2.3E-03	1.1E-06
Chromium, Total (HAP)	X	AP-42	lb/MMBtu	2.1E-05	1.2E-02	1.2E-02	5.9E-06
Cobalt (HAP)	X	AP-42	lb/MMBtu	6.5E-06	3.6E-03	3.6E-03	1.8E-06
Copper		AP-42	lb/MMBtu	4.9E-05	2.7E-02	2.7E-02	1.4E-05
Iron		AP-42	lb/MMBtu	9.9E-04	5.5E-01	5.5E-01	2.8E-04
Lead (HAP)	X	AP-42	lb/MMBtu	4.8E-05	2.7E-02	2.7E-02	1.3E-05
Manganese (HAP)	X	AP-42	lb/MMBtu	1.6E-03	8.9E-01	8.9E-01	4.5E-04
Mercury (HAP)	X	MACT	lb/MMBtu	3.0E-06	1.7E-03	1.7E-03	8.4E-07
Molybdenum		AP-42	lb/MMBtu	2.1E-06	1.2E-03	1.2E-03	5.9E-07
Nickel (HAP)	X	AP-42	lb/MMBtu	3.3E-05	1.8E-02	1.8E-02	9.2E-06
Phosphorous		AP-42	lb/MMBtu	2.7E-05	1.5E-02	1.5E-02	7.5E-06
Potassium		AP-42	lb/MMBtu	3.9E-02	2.2E+01	2.2E+01	1.1E-02
Selenium (HAP)	X	AP-42	lb/MMBtu	2.8E-06	1.6E-03	1.6E-03	7.8E-07
Silver		AP-42	lb/MMBtu	1.7E-03	9.5E-01	9.5E-01	4.8E-04
Sodium		AP-42	lb/MMBtu	3.6E-04	2.0E-01	2.0E-01	1.0E-04
Strontium		AP-42	lb/MMBtu	1.0E-05	5.6E-03	5.6E-03	2.8E-06
Tin		AP-42	lb/MMBtu	2.3E-05	1.3E-02	1.3E-02	6.4E-06
Titanium		AP-42	lb/MMBtu	2.0E-05	1.1E-02	1.1E-02	5.6E-06
Vanadium		AP-42	lb/MMBtu	9.8E-07	5.5E-04	5.5E-04	2.7E-07
Yttrium		AP-42	lb/MMBtu	3.0E-07	1.7E-04	1.7E-04	8.4E-08
Zinc		AP-42	lb/MMBtu	4.2E-04	2.3E-01	2.3E-01	1.2E-04
Acenaphthene		AP-42	lb/MMBtu	9.1E-07	5.1E-04	5.1E-04	2.5E-07
Acenaphthylene		AP-42	lb/MMBtu	5.0E-06	2.8E-03	2.8E-03	1.4E-06
Acetaldehyde (HAP)	X	AP-42	lb/MMBtu	8.3E-04	4.6E-01	4.6E-01	2.3E-04
Acetone		AP-42	lb/MMBtu	1.9E-04	1.1E-01	1.1E-01	5.3E-05
Acetophenone (HAP)	X	AP-42	lb/MMBtu	3.2E-09	1.8E-06	1.8E-06	8.9E-10
Acrolein (HAP)	X	Bridgewater	lb/MMBtu	4.3E-05	2.4E-02	2.4E-02	1.2E-05
Anthracene		AP-42	lb/MMBtu	3.0E-06	1.7E-03	1.7E-03	8.4E-07
Benzaldehyde		AP-42	lb/MMBtu	8.5E-07	4.8E-04	4.8E-04	2.4E-07
Benzene (HAP)	X	AP-42	lb/MMBtu	4.2E-03	2.3E+00	2.3E+00	1.2E-03
Benzo(a)anthracene		AP-42	lb/MMBtu	6.5E-08	3.6E-05	3.6E-05	1.8E-08
Benzo(a)pyrene		AP-42	lb/MMBtu	2.6E-06	1.5E-03	1.5E-03	7.3E-07
Benzo(b)fluoranthene		AP-42	lb/MMBtu	1.0E-07	5.6E-05	5.6E-05	2.8E-08
Benzo(e)pyrene		AP-42	lb/MMBtu	2.6E-09	1.5E-06	1.5E-06	7.3E-10
Benzo(g,h,i)perylene		AP-42	lb/MMBtu	9.3E-08	5.2E-05	5.2E-05	2.6E-08
Benzo(j,k)fluoranthene		AP-42	lb/MMBtu	1.6E-07	8.9E-05	8.9E-05	4.5E-08
Benzo(k)fluoranthene		AP-42	lb/MMBtu	3.6E-08	2.0E-05	2.0E-05	1.0E-08
Benzoic acid		AP-42	lb/MMBtu	4.7E-08	2.6E-05	2.6E-05	1.3E-08
bis(2-Ethylhexyl)phthalate (HAP)	X	AP-42	lb/MMBtu	4.7E-08	2.6E-05	2.6E-05	1.3E-08
Bromomethane		AP-42	lb/MMBtu	1.5E-05	8.4E-03	8.4E-03	4.2E-06
2-Butanone (MEK)		AP-42	lb/MMBtu	5.4E-06	3.0E-03	3.0E-03	1.5E-06
Carbazole	X	AP-42	lb/MMBtu	1.8E-06	1.0E-03	1.0E-03	5.0E-07
Carbon tetrachloride (HAP)	X	AP-42	lb/MMBtu	4.5E-05	2.5E-02	2.5E-02	1.3E-05
Chlorine (HAP)	X	AP-42	lb/MMBtu	7.9E-04	4.4E-01	4.4E-01	2.2E-04
Chlorobenzene (HAP)	X	AP-42	lb/MMBtu	3.3E-05	1.8E-02	1.8E-02	9.2E-06
Chloroform (HAP)	X	AP-42	lb/MMBtu	2.8E-05	1.6E-02	1.6E-02	7.8E-06
Chloromethane		AP-42	lb/MMBtu	2.3E-05	1.3E-02	1.3E-02	6.4E-06
2-Chloronaphthalene		AP-42	lb/MMBtu	2.4E-09	1.3E-06	1.3E-06	6.7E-10
2-Chlorophenol		AP-42	lb/MMBtu	2.4E-08	1.3E-05	1.3E-05	6.7E-09
Chrysene		AP-42	lb/MMBtu	3.8E-08	2.1E-05	2.1E-05	1.1E-08
Crotonaldehyde		AP-42	lb/MMBtu	9.9E-06	5.5E-03	5.5E-03	2.8E-06

Pollutant	HAP	Emission Factor Source	Emission Factor Units	Emission Factor	Emission Rate lb/hr	Emission Rate lb/start up	Emission Rate ton/start up
Decachlorobiphenyl		AP-42	lb/MMBtu	2.7E-10	1.5E-07	1.5E-07	7.5E-11
Dibenzo(a,h)anthracene		AP-42	lb/MMBtu	9.1E-09	5.1E-06	5.1E-06	2.5E-09
1,2-Dibromoethene		AP-42	lb/MMBtu	5.5E-05	3.1E-02	3.1E-02	1.5E-05
Dichlorobiphenyl		AP-42	lb/MMBtu	7.4E-10	4.1E-07	4.1E-07	2.1E-10
1,2-Dichloroethane		AP-42	lb/MMBtu	2.9E-05	1.6E-02	1.6E-02	8.1E-06
Dichloromethane		AP-42	lb/MMBtu	2.9E-04	1.6E-01	1.6E-01	8.1E-05
1,2-Dichloropropane		AP-42	lb/MMBtu	3.3E-05	1.8E-02	1.8E-02	9.2E-06
2.4-Dinitrophenol		AP-42	lb/MMBtu	1.8E-07	1.0E-04	1.0E-04	5.0E-08
Ethylbenzene (HAP)	X	AP-42	lb/MMBtu	3.1E-05	1.7E-02	1.7E-02	8.7E-06
Fluoranthene		AP-42	lb/MMBtu	1.6E-06	8.9E-04	8.9E-04	4.5E-07
Fluorene		AP-42	lb/MMBtu	3.4E-06	1.9E-03	1.9E-03	9.5E-07
Formaldehyde (HAP)	X	AP-42	lb/MMBtu	4.4E-03	2.5E+00	2.5E+00	1.2E-03
Heptachlorobiphenyl		AP-42	lb/MMBtu	6.6E-11	3.7E-08	3.7E-08	1.8E-11
Hexachlorobiphenyl		AP-42	lb/MMBtu	5.5E-10	3.1E-07	3.1E-07	1.5E-10
Hexanal		AP-42	lb/MMBtu	7.0E-06	3.9E-03	3.9E-03	2.0E-06
Heptachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	2.0E-09	1.1E-06	1.1E-06	5.6E-10
Heptachlorodibenzo-p-furans		AP-42	lb/MMBtu	2.4E-10	1.3E-07	1.3E-07	6.7E-11
Hexachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	1.6E-06	8.9E-04	8.9E-04	4.5E-07
Hexachlorodibenzo-p-furans		AP-42	lb/MMBtu	2.8E-10	1.6E-07	1.6E-07	7.8E-11
Hydrogen Chloride (HAP)	X	HDES Test Dat	lb/MMBtu	8.3E-04	4.7E-01	4.7E-01	2.3E-04
Indeno(1,2,3,c,d)pyrene		AP-42	lb/MMBtu	8.7E-08	4.9E-05	4.9E-05	2.4E-08
Isobutyraldehyde		AP-42	lb/MMBtu	1.2E-05	6.7E-03	6.7E-03	3.4E-06
Methane		AP-42	lb/MMBtu	2.1E-02	1.2E+01	1.2E+01	5.9E-03
2-Methylnaphthalene		AP-42	lb/MMBtu	1.6E-07	8.9E-05	8.9E-05	4.5E-08
Monochlorobiphenyl		AP-42	lb/MMBtu	2.2E-10	1.2E-07	1.2E-07	6.2E-11
Naphthalene (HAP)	X	AP-42	lb/MMBtu	9.7E-05	5.4E-02	5.4E-02	2.7E-05
2-Nitrophenol		AP-42	lb/MMBtu	2.4E-07	1.3E-04	1.3E-04	6.7E-08
4-Nitrophenol (HAP)	X	AP-42	lb/MMBtu	1.1E-07	6.2E-05	6.2E-05	3.1E-08
Octachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	6.6E-08	3.7E-05	3.7E-05	1.8E-08
Octachlorodibenzo-p-furans		AP-42	lb/MMBtu	8.8E-11	4.9E-08	4.9E-08	2.5E-11
Pentachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	1.5E-09	8.4E-07	8.4E-07	4.2E-10
Pentachlorodibenzo-p-furans		AP-42	lb/MMBtu	4.2E-10	2.3E-07	2.3E-07	1.2E-10
Pentachlorobiphenyl		AP-42	lb/MMBtu	1.2E-09	6.7E-07	6.7E-07	3.4E-10
Pentachlorophenol (HAP)	X	AP-42	lb/MMBtu	5.1E-08	2.9E-05	2.9E-05	1.4E-08
Perylene		AP-42	lb/MMBtu	5.2E-10	2.9E-07	2.9E-07	1.5E-10
Phenanthrene		AP-42	lb/MMBtu	7.0E-06	3.9E-03	3.9E-03	2.0E-06
Phenol (HAP)	X	AP-42	lb/MMBtu	5.1E-05	2.9E-02	2.9E-02	1.4E-05
Propanal		AP-42	lb/MMBtu	3.2E-06	1.8E-03	1.8E-03	8.9E-07
Propionaldehyde (HAP)	X	AP-42	lb/MMBtu	6.1E-05	3.4E-02	3.4E-02	1.7E-05
Pyrene		AP-42	lb/MMBtu	3.7E-06	2.1E-03	2.1E-03	1.0E-06
Styrene (HAP)	X	AP-42	lb/MMBtu	1.9E-03	1.1E+00	1.1E+00	5.3E-04
2,3,7,8-Tetrachlorodibenzo-p-dioxins (H	X	AP-42	lb/MMBtu	8.6E-12	4.8E-09	4.8E-09	2.4E-12
Tetrachlorodibenzo-p-dioxins		AP-42	lb/MMBtu	4.7E-10	2.6E-07	2.6E-07	1.3E-10
2,3,7,8-Tetrachlorodibenzo-p-furans		AP-42	lb/MMBtu	9.0E-11	5.0E-08	5.0E-08	2.5E-11
Tetrachlorodibenzo-p-furans		AP-42	lb/MMBtu	7.5E-10	4.2E-07	4.2E-07	2.1E-10
Tetrachlorobiphenyl		AP-42	lb/MMBtu	2.5E-09	1.4E-06	1.4E-06	7.0E-10
Tetrachloroethene		AP-42	lb/MMBtu	3.8E-05	2.1E-02	2.1E-02	1.1E-05
o-Tolualdehyde		AP-42	lb/MMBtu	7.2E-06	4.0E-03	4.0E-03	2.0E-06
p-Tolualdehyde		AP-42	lb/MMBtu	1.1E-05	6.2E-03	6.2E-03	3.1E-06
Toluene (HAP)	X	AP-42	lb/MMBtu	9.2E-04	5.1E-01	5.1E-01	2.6E-04
Trichlorobiphenyl		AP-42	lb/MMBtu	2.6E-09	1.5E-06	1.5E-06	7.3E-10
1,1,1-Trichloroethane		AP-42	lb/MMBtu	3.1E-05	1.7E-02	1.7E-02	8.7E-06
Trichloroethene		AP-42	lb/MMBtu	3.0E-05	1.7E-02	1.7E-02	8.4E-06
Trichlorofluoromethane		AP-42	lb/MMBtu	4.1E-05	2.3E-02	2.3E-02	1.1E-05
2,4,6-Trichlorophenol (HAP)	X	AP-42	lb/MMBtu	2.2E-08	1.2E-05	1.2E-05	6.2E-09
Vinyl Chloride (HAP)	X	AP-42	lb/MMBtu	1.8E-05	1.0E-02	1.0E-02	5.0E-06
o-Xylene (HAP)	X	AP-42	lb/MMBtu	2.5E-05	1.4E-02	1.4E-02	7.0E-06
Total HAPS				1.6E-02	9.0E+00	9.0E+00	4.5E-03
Largest Single HAP (Formaldehyde)						2.5E+00	1.2E-03

Potential Emissions Summary
Emergency Generator
Berlin BioPower - Berlin, New Hampshire

Emergency Generator	
Parameter	Diesel Fuel
Annual Operation	300 hr/yr
Fuel Consumption @ 100% Load:	36.6 gal/hr
Heat Input Rate	4.71 MMBtu/hr
Power Output	670.2 hp
Power Output	500.0 kW

			Diesel Fuel				
Pollutant	HAP	Emission Factor Source	Emission Factor Units	Emission Factor	Emission Rate lb/hr	Emission Rate lb/yr	Emission Rate ton/yr
NOx		Caterpillar	g/hp-hr	5.74	8.48	2,544	1.3
CO		Caterpillar	g/hp-hr	0.40	0.59	177	0.1
SO2		AP-42	lb/MMBtu	0.0015	0.0071	2	0.0
PM10		Caterpillar	g/hp-hr	0.018	0.027	8	0.0
PM2.5		Caterpillar	g/hp-hr	0.018	0.027	8	0.0
CO2		AP-42	lb/MMBtu	164.00	772.80	231,840	115.9
VOC		Caterpillar	g/hp-hr	0.01	0.015	4	0.0
Benzene (HAP)	X	AP-42	lb/MMBtu	9.33E-04	4.40E-03	1	0.00
Toluene (HAP)	X	AP-42	lb/MMBtu	4.09E-04	1.93E-03	1	0.00
Xylenes (HAP)	X	AP-42	lb/MMBtu	2.85E-04	1.34E-03	0	0.00
Propylene (HAP)	X	AP-42	lb/MMBtu	2.58E-03	1.22E-02	4	0.00
1,3-Butadiene (HAP)	X	AP-42	lb/MMBtu	3.91E-05	1.84E-04	0	0.00
Formaldehyde (HAP)	X	AP-42	lb/MMBtu	1.18E-03	5.56E-03	2	0.00
Acetaldehyde (HAP)	X	AP-42	lb/MMBtu	7.67E-04	3.61E-03	1	0.00
Acrolein (HAP)	X	AP-42	lb/MMBtu	9.25E-05	4.36E-04	0	0.00
Naphthalene (HAP)	X	AP-42	lb/MMBtu	8.48E-05	4.00E-04	0	0.00
Acenaphthylene		AP-42	lb/MMBtu	5.06E-06	2.38E-05	0	0.00
Acenaphthene		AP-42	lb/MMBtu	1.42E-06	6.69E-06	0	0.00
Fluorene		AP-42	lb/MMBtu	2.92E-05	1.38E-04	0	0.00
Phenanthrene		AP-42	lb/MMBtu	2.94E-05	1.39E-04	0	0.00
Anthracene		AP-42	lb/MMBtu	1.87E-06	8.81E-06	0	0.00
Fluoranthene		AP-42	lb/MMBtu	7.61E-06	3.59E-05	0	0.00
Pyrene		AP-42	lb/MMBtu	4.78E-06	2.25E-05	0	0.00
Benz(a)anthracene		AP-42	lb/MMBtu	1.68E-06	7.92E-06	0	0.00
Chrysene		AP-42	lb/MMBtu	3.53E-07	1.66E-06	0	0.00
Benzo(b)fluoranthene		AP-42	lb/MMBtu	9.91E-08	4.67E-07	0	0.00
Benzo(k)fluoranthene		AP-42	lb/MMBtu	1.55E-07	7.30E-07	0	0.00
Benzo(a)pyrene		AP-42	lb/MMBtu	1.88E-07	8.86E-07	0	0.00
Indeno(1,2,3-cd)pyrene		AP-42	lb/MMBtu	3.75E-07	1.77E-06	0	0.00
Dibenzo(a,h)anthracene		AP-42	lb/MMBtu	5.83E-07	2.75E-06	0	0.00
Benzo(g,h,l)perylene		AP-42	lb/MMBtu	4.89E-07	2.30E-06	0	0.00
Total PAH		AP-42	lb/MMBtu	1.68E-04	7.92E-04	0	0.00
Total HAPS				**0.0063704**	**3.00E-02**	**9**	**0.0045**

Potential Emissions Summary
Fire Pump
Berlin BioPower - Berlin, New Hampshire

Fire Pump	
Parameter	Diesel Fuel
Annual Operation	300 hr/yr
Fuel Consumption @ 100% Load:	14.5 gal/hr
Heat Input Rate	1.87 MMBtu/hr
Power Output	288.0 bhp
Power Output	214.8 kW

			Diesel Fuel				
Pollutant	HAP's	Emission Factor Source	Emission Factor Units	Emission Factor	Emission Rate lb/hr	Emission Rate lb/yr	Emission Rate ton/yr
NOx		Cummings	g/bhp-hr	3.692	2.34	703	0.4
CO		Cummings	g/bhp-hr	0.447	0.28	85	0.0
SO2		AP-42	lb/MMBtu	0.0015	0.0028	1	0.0
PM10		Cummings	g/bhp-hr	0.059	0.037	11	0.0
PM2.5		Cummings	g/bhp-hr	0.059	0.037	11	0.0
CO2		AP-42	lb/MMBtu	164.00	306.16	91,849	45.9
VOC		Cummings	g/bhp-hr	0.086	0.055	16	0.0
Benzene (HAP)	X	AP-42	lb/MMBtu	9.33E-04	1.74E-03	1	0.00
Toluene (HAP)	X	AP-42	lb/MMBtu	4.09E-04	7.64E-04	0	0.00
Xylenes (HAP)	X	AP-42	lb/MMBtu	2.85E-04	5.32E-04	0	0.00
Propylene (HAP)	X	AP-42	lb/MMBtu	2.58E-03	4.82E-03	1	0.00
1,3-Butadiene (HAP)	X	AP-42	lb/MMBtu	3.91E-05	7.30E-05	0	0.00
Formaldehyde (HAP)	X	AP-42	lb/MMBtu	1.18E-03	2.20E-03	1	0.00
Acetaldehyde (HAP)	X	AP-42	lb/MMBtu	7.67E-04	1.43E-03	0	0.00
Acrolein (HAP)	X	AP-42	lb/MMBtu	9.25E-05	1.73E-04	0	0.00
Naphthalene (HAP)	X	AP-42	lb/MMBtu	8.48E-05	1.58E-04	0	0.00
Acenaphthylene		AP-42	lb/MMBtu	5.06E-06	9.45E-06	0	0.00
Acenaphthene		AP-42	lb/MMBtu	1.42E-06	2.65E-06	0	0.00
Fluorene		AP-42	lb/MMBtu	2.92E-05	5.45E-05	0	0.00
Phenanthrene		AP-42	lb/MMBtu	2.94E-05	5.49E-05	0	0.00
Anthracene		AP-42	lb/MMBtu	1.87E-06	3.49E-06	0	0.00
Fluoranthene		AP-42	lb/MMBtu	7.61E-06	1.42E-05	0	0.00
Pyrene		AP-42	lb/MMBtu	4.78E-06	8.92E-06	0	0.00
Benz(a)anthracene		AP-42	lb/MMBtu	1.68E-06	3.14E-06	0	0.00
Chrysene		AP-42	lb/MMBtu	3.53E-07	6.59E-07	0	0.00
Benzo(b)fluoranthene		AP-42	lb/MMBtu	9.91E-08	1.85E-07	0	0.00
Benzo(k)fluoranthene		AP-42	lb/MMBtu	1.55E-07	2.89E-07	0	0.00
Benzo(a)pyrene		AP-42	lb/MMBtu	1.88E-07	3.51E-07	0	0.00
Indeno(1,2,3-cd)pyrene		AP-42	lb/MMBtu	3.75E-07	7.00E-07	0	0.00
Dibenzo(a,h)anthracene		AP-42	lb/MMBtu	5.83E-07	1.09E-06	0	0.00
Benzo(g,h,l)perylene		AP-42	lb/MMBtu	4.89E-07	9.13E-07	0	0.00
Total PAH		AP-42	lb/MMBtu	1.68E-04	3.14E-04	0	0.00
Total HAPS				**0.0063704**	**9.24E-02**	**28**	**0.01**

Potential Emissions Summary
Cooling Tower
Berlin BioPower - Berlin New Hampshire

Cooling Tower Specification	Data Source	Data Result
Hours of Operation:		8,760 hours
Circulating Water Flow Rate:	SPX	60,000 gpm
Drift Eliminator Efficiency:	SPX	0.0005 %
Total Liquid Drift:	calc.	0.30 gpm
Density of Water:	constant	8.34 lb/gal
Total Liquid Drift:	calc.	150.1 lb/hr
Circulating Water TDS:	estimated	2,000 ppm
PM_{10} Emission Rate:	calc.	0.30 lb/hr
PM_{10} Emission Rate:	calc.	1.32 ton/yr

<u>Calculations</u>

Total Liquid Drift (gpm) = (Circulating Water Flow Rate, gpm) x (Drift Eliminator Efficiency, %)

Total Liquid Drift (lb/hr) = (Total Liquid Drift, gpm) x (Density of Water, lb/gal)

PM_{10} Emission Rate (lb/hr) = (Total Liquid Drift, lb/hr) x ((Circulating Water TDS, ppm) / 10^6)

PM_{10} Emission Rate (ton/yr) = (PM_{10} Emission Rate, lb/hr) x (Hours of Operation) x (1 ton / 2000 lbs)

RTAP Analysis for Water Teatment Chemicals

Laidlaw Berlin BioPower
NH Regulated Toxic Air Pollutant (RTAP) Applicability Analysis

Emissions Source	Product Name	Product Purpose	Product Use lb/day	Listed RTAP	CAS Number	RTAP Weight %	Emission Duration		Total Use Rate			Concentration*	RTAP Emission Rate Based on Drift Rate (evaporation for HCl) or Ammonia Slip for NH_3			De Minimis Value		Exempt Status
							hr/day	hr/yr	lb/hr	lb/day	lb/year	ppm	lb/hr	lb/day	lb/year	lb/day	lb/year	
Cooling Water Treatment	NALCO 8356D	Dispersant	25	Sodium Bisulfite	7631 - 90 - 5	5	24	8760	0.052	1.25	456.25	0.075	0.00001	0.00027	0.0986	0.20	72	Exempt
	NALCO 7341	Microbiocide	1250	Sodium Hydroxide	1310-73-2	1	24	8760	0.52	12.5	4562.5	0.003	0.00000	0.00001	0.0033	0.26	96	Exempt
			1250	(Sodium Hypochlorite) Free Chlorine**	7782-50-5	30	24	8760	15.63	375	136875	0.075	0.496	11.89	4,341	0.035	13	Not Exempt
Ammonia Slip from Biomass Boiler	NH3	Ammonia Slip from SCR System for Nox Control	N/A	Ammonia	7664-41-7	100	24	8760	N/A	N/A	N/A	20	12.6	302.4	109,640	0.79	287	Not Exempt

*= equivalent to total product concentration in cooling tower x RTAP Weight %

**= Chlorine assumptions based on an average CT liquid evaporation of 792,193 gpd equiv. to 6,606,889.62 lb/day multiplied by the ppm concentration.

Estimated PM, PM_{10}, and $PM_{2.5}$ Emissions Rates
Due To Wind Erosion on Outdoor Biomass Storage Piles
Berlin BioPower - Berlin, New Hampshire

Frequency of Disturbance (days per year)	365
Total Pile Area A (m2)	13503.2
Threshold Friction Velocity ut (m/s)	0.76
Anticipated Control Efficiency	0%

Disturbance*	Fastest Mile Wind speed for Disturbance $\mu^{+}_{z,t}$ (m/s)	Reference Anemometer Height, z (m)	10-m Ref. Ht. Anemometer Fastest Mile $\mu^{+}_{10,t}$ (m/s)	Friction Velocity $\mu^{*}_{10,t}$ (m/s)	Erosion Potential, P_i (gm/m^2)	Uncontrolled Fugitive Emission Rate, R (tons/year) (For all disturbances)		
						PM	PM_{10}	$PM_{2.5}$
1/7/1999	20.1	100	15.43	0.82	1.71	0.03	0.01	0.00
4/8/1999	36.3	100	27.86	1.48	48.07	0.72	0.36	0.05
4/8/1999	20.7	100	15.89	0.84	2.37	0.04	0.02	0.00
					TOTALS	**0.78**	**0.39**	**0.06**

* = The "Total Assumed Disturbances" represents the total number of days that the max wind speed was greater than the friction velocity (0.76) m/s.

	Footprint (Ft2)	Equiv. Diameter (D)	Height (ft)	Surface Area (ft2)
Pile Sizes	53200	260.2620675	35	55090.6
	72600	304.0348515	35	74499.4
	55800	133.2729967	35	15757.2
			Total All Piles	**145347.2**

Estimated PM, PM_{10}, and $PM_{2.5}$ Emissions Rates
Due To Wood Pile Processing Operations

Process	Material Silt Content, S (%)	Material Moisture Content, M (%)	Number of Dozers (n)	Annual Operating Hours,t (hr)	Emission Factor, EF (lb/hr/dozer)			Short-Term PTE (lb/hr)			Long-Term PTE (ton/year)		
					PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Bulldozing on Wood Biomass Piles	0.16	10	1	8760	0.0449	0.0039	0.0004	0.0449	0.0039	0.0004	0.197	0.017	0.002

Estimated PM, PM_{10}, and $PM_{2.5}$ Emissions Rates
Due To Material Handling Operations

	Wood Aggregate Throughput, T			Effective Wood Aggregate Handled, T_{eff}				Air Pollution Emission Factor, EF (lb-emitted/ton-throughput)			Uncontrolled Maximum Hourly Air Pollutant Emissions, Q_u (lb/hr)			Uncontrolled Annual Air Pollutant Emissions, Q_u (ton/yr)				Controlled Maximum Hourly Air Pollutant Emissions, Qu (lb/hr)			Controlled Annual Air Pollutant Emissions, Qu (ton/yr)		
Emission Source Operation	Maximum (ton/hr)	Average (ton/hr)	No. of Drop Points During handling, d	Hourly (ton/hr)	Annual (ton/yr)	Mean Wind Speed, U (mph)	Material Moisture Content, M (%)	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$	Control Efficiency, C (%)	PM	PM_{10}	$PM_{2.5}$	PM	PM_{10}	$PM_{2.5}$
Truck Dumpers (3)	450	450	3	1350	11826000	3.79	10.3	0.0002	0.00008	0.00001	0.2248	0.1063	0.0161	0.98	0.47	0.07	0%	0.225	0.106	0.016	0.985	0.466	0.071
Stockout Conveyor	250	250	1	250	2190000	3.79	10.3	0.0002	0.00008	0.00001	0.0416	0.0197	0.0030	0.18	0.09	0.01	100%	0.000	0.000	0.000	0.000	0.000	0.000

Particle Size Multiplier		
PM	PM_{10}	$PM_{2.5}$
0.74	0.35	0.053

Appendix B

Visual Simulations of Proposed Facility

Existing View looking from Baseball Field

Proposed View looking from Baseball Field

Existing view from Site 3

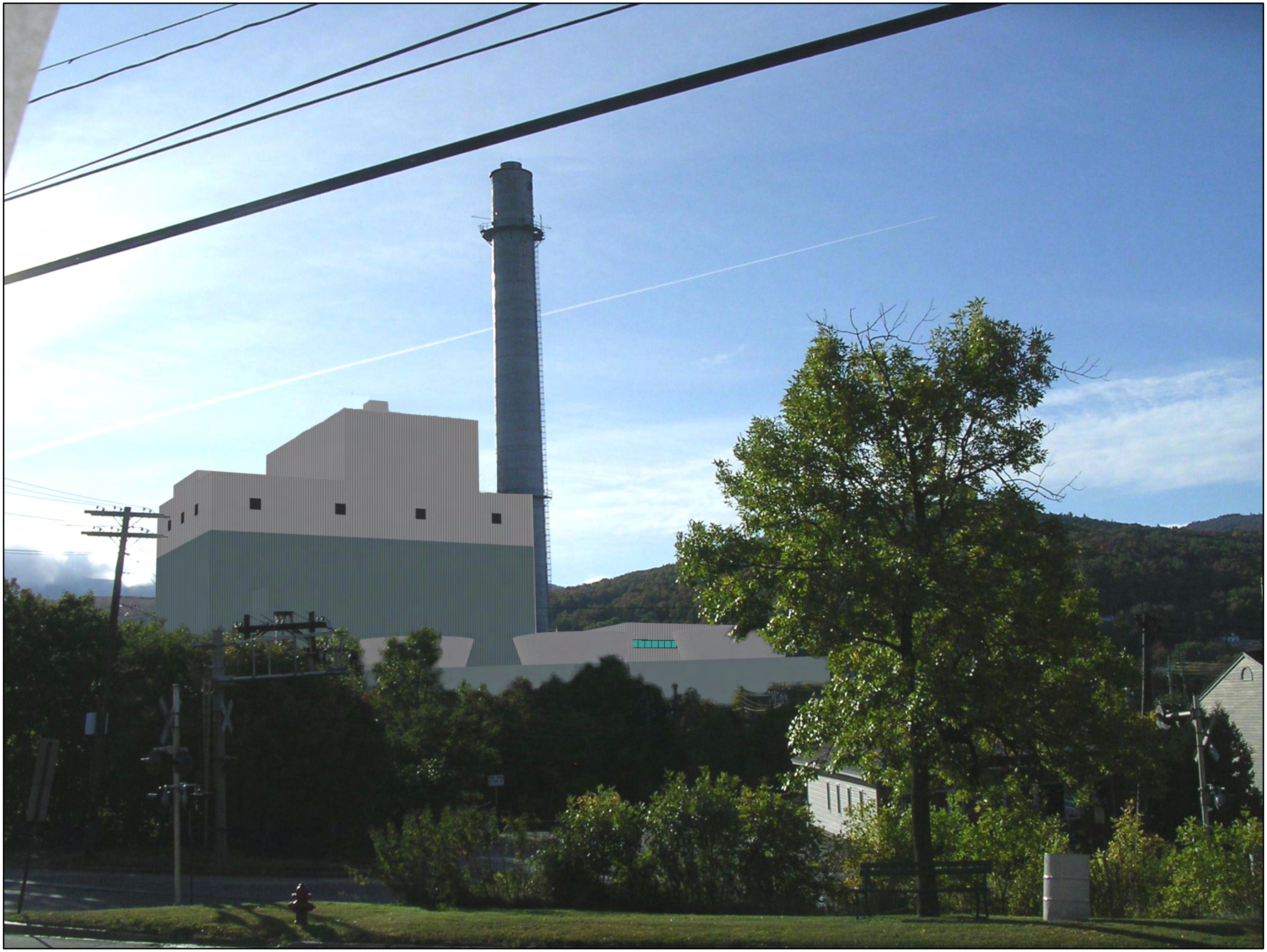
Proposed view from Site 3

Existing view from Grafton Street

Proposed view from Grafton Street

Existing view from Saint Anne's Church

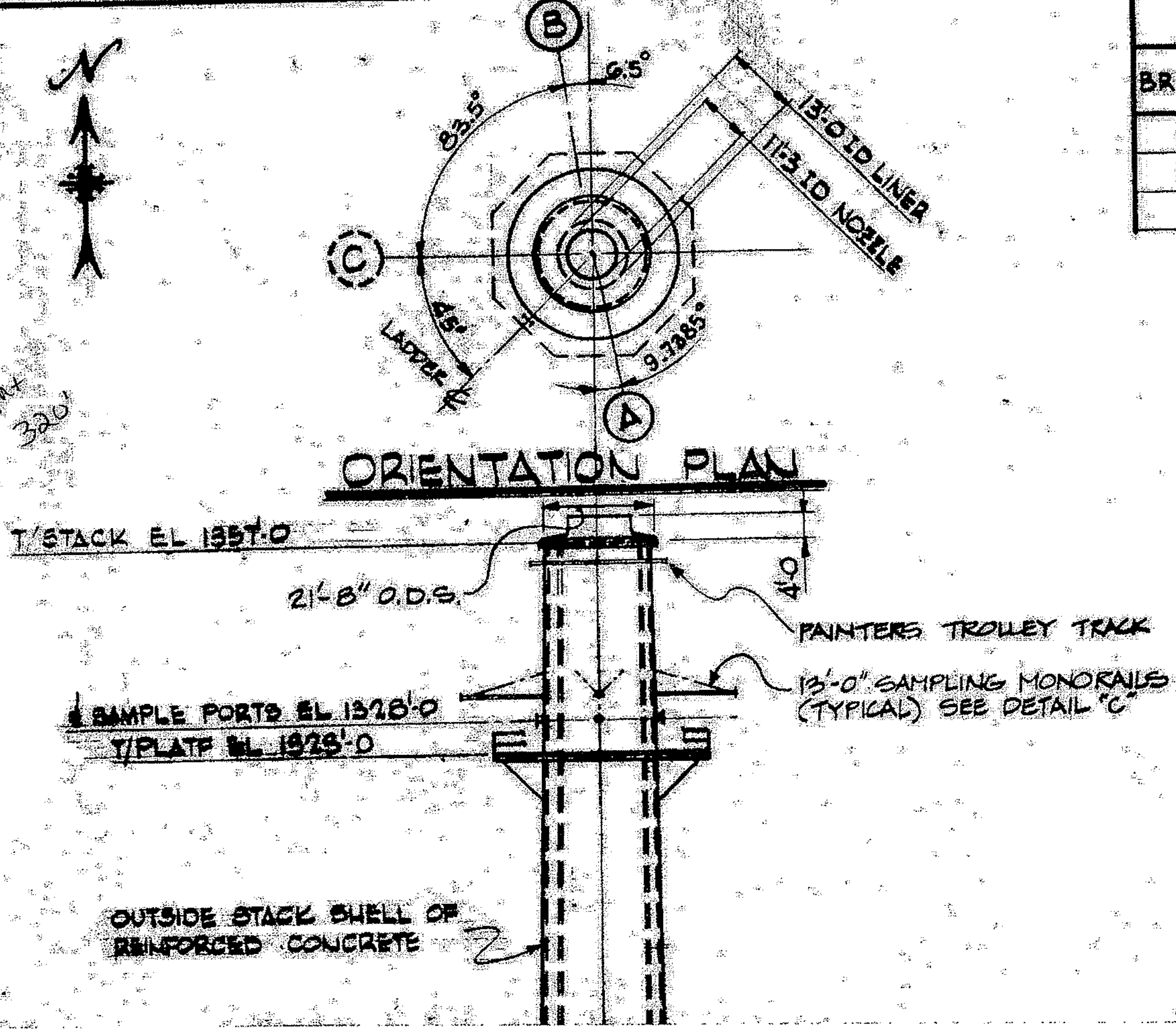
Proposed view from Saint Anne’s Church



Proposed view from Saint Anne’s Church (With Leaf Cover)

Appendix C

Equipment Specifications



Stack Height 320'

BREECI
A
B
C

BEST™ Version 2.49
Product Data: 6/25/2009

Berlin NH.opt
Revised 10/21/2009 3:09:30 PM by Jim Van Garsse

Customer

Berlin, NH
Waldron Engineering & Construction

Contact

SPX Cooling Technologies
30 Glenn Street Suite 403
White Plains, New York 10603
jim.vangarsse@spx.com

Jim Van Garsse
Tel 914-461-0194
Fax 914-461-0201

Definition

Model (ID 14)	F499-4.0-4	Fill	MC75 Log-4.0
Fan	336HP7-7	Eliminator	TU12C
Stack	336"x14' Rflx/V Rib	Louver	No louvers
Speed Reducer	4000, 14.88:1	Spray System	30x8 Rotomold
Drive	301 Shaft	Nozzles	432 NS5A-112 per cell
Motor	1800 rpm, TEFC		36 NS6-144 per cell

Dimensions

Tower Width	54.67 ft	Basin Width Min	60.00 ft
Tower Length	216.67 ft	Basin Length Min	217.00 ft
Tower Height (TOC)	47.84 ft	Basin Depth	4.00 ft
Fan Deck Height (TOC)	34.09 ft	Water Depth	3.00 ft
Static Lift (TOC)	16.12 ft	Curb Offset Min	3.00 ft
Pump Head (TOC)	19.49 ft	Plenum Height	11.69 ft
Air Inlet Elev. (TOC)	9.50 ft	Effective Air Inlet Ht.	10.50 ft
Closed Sides	0	Transverse Partitions	Yes
Closed Ends	2	Wind Walls	Yes

Conditions

–

Tower Water Flow	60000 gpm	Altitude	1200 ft
Tower Water Mass Flow	8281 lb/s	Barometric Pressure	28.64 in Hg
Hot Water Temperature	104.00 °F	Air Density In	0.06890 lb/ft³
Range	20.00 °F	Air Density Out	0.06671 lb/ft³
Cold Water Temperature	84.00 °F	Humidity Ratio In	0.0143
Approach	12.00 °F	Humidity Ratio Out	0.0403
Wet-Bulb Temperature	72.00 °F	Enthalpy In	36.52 Btu/lb
Dry-Bulb Temperature	86.68 °F	Enthalpy Out	67.62 Btu/lb
Relative Humidity	50 %	Wet-Bulb Temp. Out	96.42 °F
Total Dissolved Solids	0 ppm	Heat Rejection	595100000 Btu/h
Water Density In	61.95 lb/ft³	Evaporation	1041 gpm
Water Specific Heat In	0.998 Btu/lb·F	Drift	<0.0010 %
Site Factor	1.030		

Thermal Analysis

Fill Area	11270 ft²	Water Rate	5.324 gpm/ft²
Fill Height	4.00 ft	Dry Air Rate	29.59 lb/min/ft²
KaV/L (CTI)	1.577	L/G	1.490

Air Flow

Flow/Fan Tower Air Inlet	1227000 cfm	External P.D. In	0.000 in H2O
Flow/Fan Discharge	1300000 cfm	Entrance P.D.	0.040 in H2O
Inlet Velocity	1082 fpm	Louver P.D.	0.000 in H2O
Fill Velocity	448 fpm	Falling Water P.D.	0.084 in H2O
Eliminator Velocity	461 fpm	Fill P.D.	0.236 in H2O
Discharge Velocity	1655 fpm	Eliminator P.D.	0.034 in H2O
Air Inlet Pressure Ratio	5.29	Plenum P.D.	0.019 in H2O
Air Inlet Guide	No	Buoyancy P.D.	0.000 in H2O
Inlet P.D. Vel. Heads	0	External P.D. Out	0.000 in H2O
Outlet P.D. Vel. Heads	0	Static P.D.	0.414 in H2O

		Velocity P.D.	0.152 in H2O

Fan Information

Fan Speed (100 %)	119 rpm	Fan Tip Speed	10470 fpm
Fan Power	150.5 Hp	Static Fan Efficiency	56.2 %
Motor Output	156.7 BHp	Total Fan Efficiency	76.9 %
Motor Capacity	200.0 BHp	Fan Pitch	20.5 °

DIESEL GENERATOR SET

CATERPILLAR®

Image shown may not reflect actual package.

STANDBY

500 ekW 625 kVA
60 Hz 1800 rpm 480 Volts

Caterpillar is leading the power generation marketplace with Power Solutions engineered to deliver unmatched flexibility, expandability, reliability, and cost-effectiveness.

FEATURES

FUEL/EMISSIONS STRATEGY
- EPA Tier 2 and Low Emissions

DESIGN CRITERIA
- The generator set accepts 100% rated load in one step per NFPA 110 and meets ISO 8528-5 transient response.

UL 2200
- UL 2200 listed packages available. Certain restrictions may apply. Consult with your Caterpillar Dealer.

FULL RANGE OF ATTACHMENTS
- Wide range of bolt-on system expansion attachments, factory designed and tested
- Flexible packaging options for easy and cost effective installation

SINGLE-SOURCE SUPPLIER
- Fully prototype tested with certified torsional vibration analysis available

WORLDWIDE PRODUCT SUPPORT
- Caterpillar® dealers provide extensive post sale support including maintenance and repair agreements
- Caterpillar dealers have over 1,600 dealer branch stores operating in 200 countries
- The Cat® S•O•S^{SM} program cost effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by-products

CAT® C15 ATAAC DIESEL ENGINE
- Utilizes ACERT™ Technology
- Reliable, rugged, durable design
- Field-proven in thousands of applications worldwide
- Four-stroke diesel engine combines consistent performance and excellent fuel economy with minimum weight
- Electronic engine control

CAT GENERATOR
- Matched to the performance and output characteristics of Caterpillar engines
- Load adjustment module provides engine relief upon load impact and improves load acceptance and recovery time
- UL 1446 Recognized Class H insulation

CAT EMCP 3 SERIES CONTROL PANELS
- Simple user friendly interface and navigation
- Scalable system to meet a wide range of customer needs
- Integrated Control System and Communications Gateway

FACTORY INSTALLED STANDARD & OPTIONAL EQUIPMENT

System	Standard	Optional
Air Inlet	• Light Duty Air filter	• Canister Style Air Cleaners • Air Cleaner - single stage • Dual element • Heavy duty
Cooling	• Radiator package mounted(50°C) • Coolant drain line with valve terminated at edge of base • Fan and belt guards • Coolant level sight gauge • Caterpillar Extended Life Coolant	• Radiator removal • Radiator duct flange & guard
Exhaust	• Dry exhaust manifold • Flanged faced outlets • Stainless Steel Flex with split-cuff connection	• Mufflers • Manifold & Turbocharger guards • Elbows
Fuel	• Primary fuel filter with integral water separator • Secondary fuel filters • Fuel priming pump • Engine fuel transfer pump • Flex fuel lines • Fuel cooler* *Not included with packages without radiators	• Integral UL listed fuel tank base • Manual transfer pump • Fuel level switch
Generator	• Class H insulation • R448 voltage regulator with load adjustment module • IP23 Protection	• CDVR with KVAR/PF control • Oversize and premium generators • Bearing/Stator temperature detection (premium generator) • 3 phase sensing • Anti-condensation space heaters • Cable access box • Reactive droop
Power Termination	• Power Terminator Strips Mounted inside Power Center • Segregated low voltage wiring panel	• Circuit breakers, UL listed, 3 pole • Circuit breakers, IEC compliant, 3 pole • Circuit breaker Shunt trip • Circuit breaker Auxillary contact • Top & bottom power cable entry • Floor standing UL breakers
Governor	• ADEM™A4	• Load share module
Control Panels	• EMCP 3.1 (rear mounted) • Speed adjust • Emergency stop pushbutton • Voltage adjust	• EMCP 3.2 & EMCP 3.3 (can be RH mounted) • Local annuniciator modules (NFPA 99/110) • Remote annunicator modules (NFPA 99/110) • Discrete I/O module
Lube	• Lubricating oil and filter • Oil drain line with valves • Fumes disposal • Gear type lube oil pump	• Manual sump pump
Starting/Charging	• 24 volt starting motor • Battery with rack and cables (dry) • 45 amp charging alternator	• Jacket water heater with shut off valves • Block heater • Ether starting aids • Battery disconnect switch • Battery chargers (5 & 10 amp) • Oversized batteries
General	• Paint - Caterpillar yellow except rails and radiators gloss black • Flywheel and flywheel housing - SAE No.1	

SPECIFICATIONS

CAT GENERATOR

Frame size	LC6114F
Excitation	Self Excitation
Pitch	0.6667
Number of poles	4
Number of bearings	Single Bearing
Number of Leads	12
Insulation	UL 1446 Recognized Class H with tropicalization and antiabrasion

- Consult your Caterpillar dealer for available voltages

IP Rating	IP23
Alignment	Pilot Shaft
Overspeed capability	125% of rated
Wave form Deviation (Line to Line)	2%
Voltage regulator	Single phase sensing with selectible volts/Hz
Voltage regulation	Less than +/- 1/2% (steady state) Less than +/- ½% (w/ 3% speed change)
Telephone influence factor	Less than 50
Harmonic Distortion	Less than 5%

CAT DIESEL ENGINE

C15 ATAAC, L-6, 4-stroke water-cooled diesel

Bore	137.20 mm (5.4 in)
Stroke	171.40 mm (6.75 in)
Displacement	15.20 L (927.56 in^3)
Compression Ratio	16.1:1
Aspiration	ATAAC
Fuel System	MEUI
Governor Type	Caterpillar ADEM control system

CAT EMCP 3 CONTROL PANELS

- EMCP 3.1 (Standard)
- EMCP 3.2 / EMCP 3.3 (Option)
- Single location customer connector point
- True RMS metering, 3-phase
- Controls
  - Run / Auto / Stop control
  - Speed Adjust
  - Voltage Adjust
  - Emergency Stop Pushbutton
  - Engine cycle crank
- Digital Indication for:
  - RPM
  - Operating hours
  - Oil Pressure
  - Coolant temperature
  - System DC volts
  - L-L volts, L-N volts, phase amps, Hz
  - ekW, kVA, kVAR, kW-hr, %kW, PF (EMCP 3.2 / 3.3)
- Shutdowns with common indicating light for:
  - Low oil pressure
  - High coolant temperature
  - Low coolant level
  - Overspeed
  - Emergency stop
  - Failure to start (overcrank)
- Programmable protective relaying functions: (EMCP 3.2 & 3.3)
  - Under and over voltage
  - Under and over frequency
  - Overcurrent (time and inverse time)
  - Reverse power (EMCP 3.3)
- MODBUS isolated data link, RS-485 half-duplex (EMCP 3.2 & 3.3)
- Options
  - Vandal door
  - Local annunciator module
  - Remote annunciator module
  - Input / Output module
  - RTD / Thermocouple Modules
  - Monitoring software

STANDBY 500 ekW 625 kVA

60 Hz 1800 rpm 480 Volts

CATERPILLAR®

TECHNICAL DATA

Open Generator Set - - 1800 rpm/60 Hz/480 Volts	DM8155	
Tier 2 and Low Emissions		
Generator Set Package Performance		
Genset Power rating @ 0.8 pf	625 kVA	
Genset Power rating with fan	500 ekW	
Fuel Consumption		
100% load with fan	138.5 L/hr	36.6 Gal/hr
75% load with fan	106.1 L/hr	28.0 Gal/hr
50% load with fan	88.1 L/hr	23.3 Gal/hr
Cooling System[1]		
Air flow restriction (system)	0.12 kPa	0.48 in. water
Air flow (max @ rated speed for radiator arrangement)	822 m^3/min	29029 cfm
Engine Coolant capacity with radiator/exp. tank	57.8 L	15.3 gal
Engine coolant capacity	20.8 L	5.5 gal
Radiator coolant capacity	37.0 L	9.8 gal
Inlet Air		
Combustion air inlet flow rate	39.5 m^3/min	1394.9 cfm
Exhaust System		
Exhaust stack gas temperature	505.6 ° C	942.1 ° F
Exhaust gas flow rate	108.8 m^3/min	3842.2 cfm
Exhaust flange size (internal diameter)	152.4 mm	6.0 in
Exhaust system backpressure (maximum allowable)	6.8 kPa	27.3 in. water
Heat Rejection		
Heat rejection to coolant (total)	189 kW	10748 Btu/min
Heat rejection to exhaust (total)	486 kW	27639 Btu/min
Heat rejection to atmosphere from engine	119 kW	6768 Btu/min
Heat rejection to atmosphere from generator	29.1 kW	1654.9 Btu/min
Alternator[2]		
Motor starting capability @ 30% voltage dip	1428 skVA	
Frame	LC6114F	
Temperature Rise	130 ° C	234 ° F
Emissions (Nominal)[3]		
NOx g/hp-hr	5.74 g/hp-hr	
CO g/hp-hr	.4 g/hp-hr	
HC g/hp-hr	.01 g/hp-hr	
PM g/hp-hr	.018 g/hp-hr	

[1] For ambient and altitude capabilities consult your Caterpillar dealer. Air flow restriction (system) is added to existing restriction from factory.

[2] Generator temperature rise is based on a 40° C (104° F) ambient per NEMA MG1-32.

[3] Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77ºF, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 btu/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

RATING DEFINITIONS AND CONDITIONS

Meets or Exceeds International Specifications: AS1359, CSA, IEC60034-1, ISO3046, ISO8528, NEMA MG 1-22, NEMA MG 1-33, UL508A, 72/23/EEC, 98/37/EC, 2004/108/EC

Standby - Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year. Standby power in accordance with ISO8528. Fuel stop power in accordance with ISO3046. Standby ambients shown indicate ambient temperature at 100% load which results in a coolant top tank temperature just below the shutdown temperature.

Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

Fuel rates are based on fuel oil of 35° API [16° C (60° F)] gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29° C (85° F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.). Additional ratings may be available for specific customer requirements, contact your Caterpillar representative for details. For information regarding Low Sulfur fuel and Biodiesel capability, please consult your Caterpillar dealer.

DIMENSIONS

Package Dimensions		
Length	**3775.1 mm**	**148.63 in**
Width	**1110.0 mm**	**43.7 in**
Height	**2091.0 mm**	**82.32 in**
Weight	**3881 kg**	**8,556 lb**

NOTE: For reference only - do not use for installation design. Please contact your local dealer for exact weight and dimensions. (General Dimension Drawing #2781049).

Performance No.: DM8155

Feature Code: C15DE6X

Gen. Arr. Number: 2351211

Source: U.S. Sourced

www.CAT-ElectricPower.com

California ATCM Tier 2 Emission Data
EPA Tier 2 Emission Data

CFP83-F40 Fire Pump Driver

Type: 4 Cycle; In-Line; 6 Cylinder
Aspiration: Turbocharged, Charge Air Cooled

15 PPM Diesel Fuel																	
		Fuel Consumption		D2 Cycle Exhaust Emissions										Exhaust			
				Grams per BHP - HR					Grams per kW - HR					Temperature		Gas Flow	
RPM	BHP	Gal/Hr	L/hr	NMHC	NOx	NMHC+NOx	CO	PM	NMHC	NOx	NMHC+NOx	CO	PM	°F	°C	CFM	L/sec
1470	247	9.5	36.0	0.086	3.692	3.778	0.447	0.059	0.116	4.951	5.067	0.600	0.079	971	522	1247	589
1760	288	14.5	54.9											952	511	1632	770

The emissions values above are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.

300-500 PPM Diesel Fuel																	
		Fuel Consumption		D2 Cycle Exhaust Emissions										Exhaust			
				Grams per BHP - HR					Grams per kW - HR					Temperature		Gas Flow	
RPM	BHP	Gal/Hr	L/hr	NMHC	NOx	NMHC+NOx	CO	PM	NMHC	NOx	NMHC+NOx	CO	PM	°F	°C	CFM	L/sec
1470	247	9.5	36.0	0.104	4.004	4.109	0.447	0.067	0.14	5.370	5.510	0.600	0.090	971	522	1247	589
1760	288	14.5	54.9											952	511	1632	770

C8.3TAA Base Model Manufactured by Cummins Inc.
- Using fuel rating FR90940

Reference EPA Standard Engine Family: 4CEXL0505ACB
Reference CARB Executive Order: U-R-002-0240

No special options needed to meet current emission regulations for all 50 states

Test Methods:

EPA/CARB Nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A, for Constant Spe Engines (ref. ISO8178-4, D2).

Diesel Fuel Specifications:

Cetane Number: 40-48
Reference: ASTM D975 No. 2-D

Reference Conditions:

Air Inlet Temperature: 25°C (77°F)
Fuel Inlet Temperature: 40°C (104°F)
Barometric Pressure: 100 kPa (29.53 in Hg)
Humidity: 10.7 g/kg (75 grains H_2O/lb) of dry air; required for NOx correction

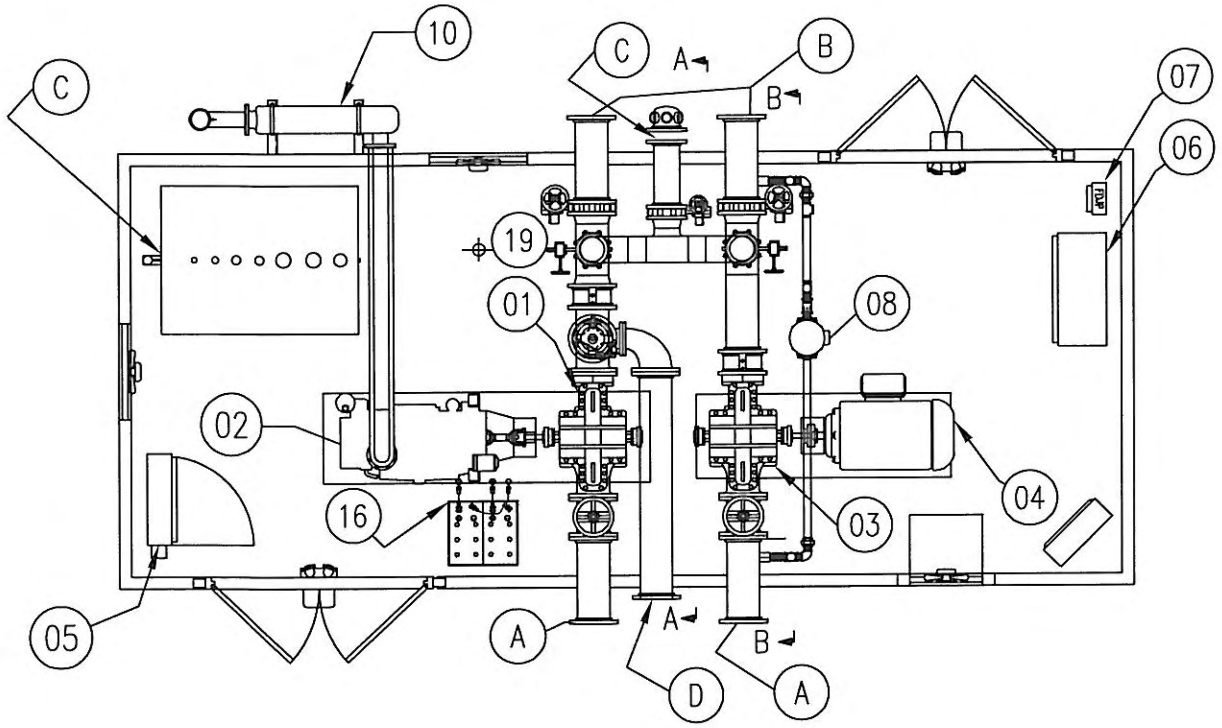
Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to maximum allowable limit.

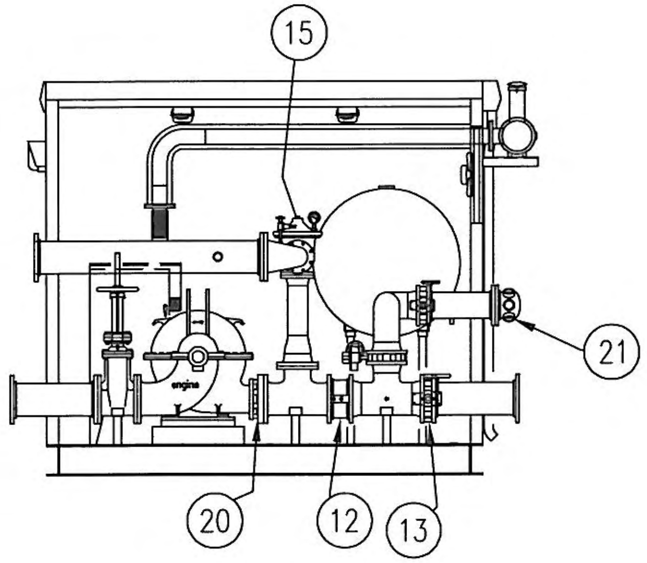
Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results.

Revision:

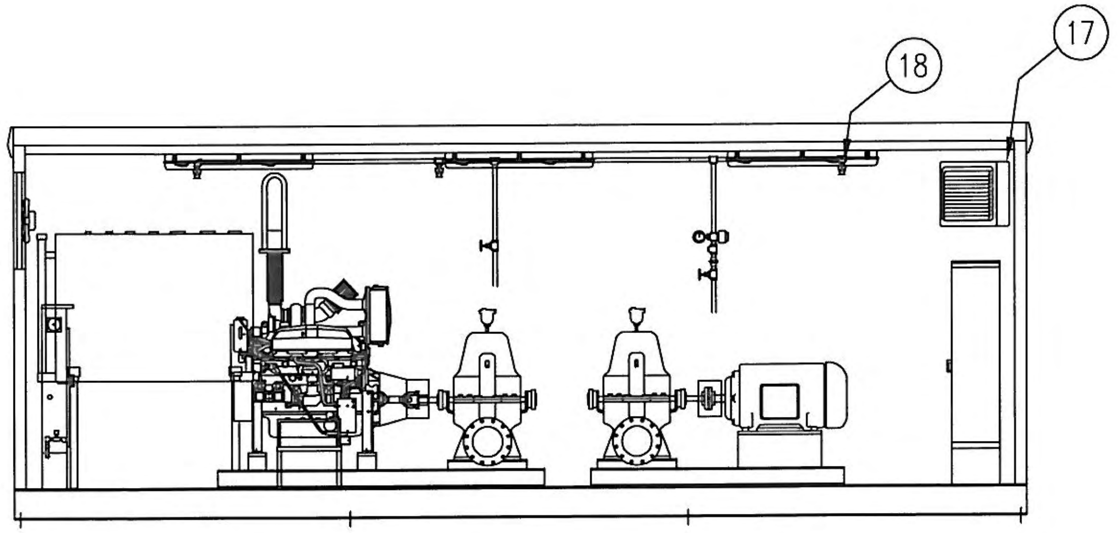
April 2008 - Listed NMHC and NOx separately
May 2008 - Corrected EPA Family Number
May 2008 - Added CARB Executive Order reference

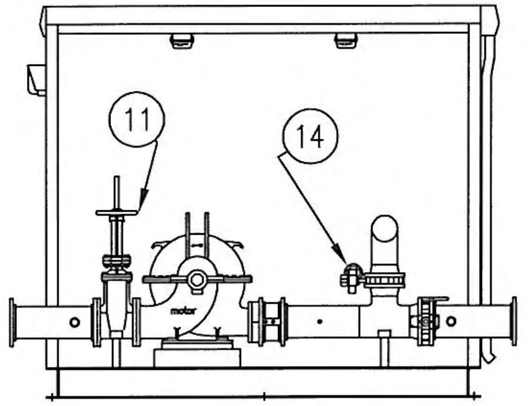
Revision Date 5/23/2008





VIEW A–A





VIEW B–B

1) FIRE PUMP: ITT AC SERIES 8100
2) ENGINE
3) FIRE PUMP: ITT AC SERIES 8100
4) MOTOR
5) DIESEL FIRE PUMP CONTROLLER
6) ELECTRIC FIRE PUMP CONTROLLER
7) JOCKEY PUMP CONTROLLER
8) JOCKEY PUMP
9) FUEL TANK, DOUBLE WALL
10) EXHAUST SILENCER
11) OS&Y GATE VALVE
12) CHECK VALVE
13) BUTTERFLY VALVE WITH TAMPER SWITCH
14) BUTTERFLY VALVE WITH TAMPER SWITCH
15) RELIEF VALVE
16) BATTERY, RACK AND CABLES
17) ELECTRIC HEATER
18) STANDARD RESPONSE SPRINKLER HEAD
19) COMMON DRAIN
20) FLANGE ADAPTER
21) HOSE HEADER WITH 2 1/2" NPTF CONNECTION

NOTES:

1) CUSTOMER PIPING MUST BE SUPPORTED NEAR ALL INTERFACE CONNECTIONS TO ELIMINATE STRAIN.
2) ALL PIPING(STUFFING BOX, BALL DRIP VALVE, ENGINE RAW WATER COOLING, CASING RELIEF VALVE, SPRINKLER TEST/DRAIN) TERMINATES AT THIS LOCATION(ITEM 19)
3) FUEL TANK VENT PIPING SHIP LOOSE
4) HOSE HEADER AND VALVES SHIP LOOSE
5) MUFFLER AND OUTDOOR FITTINGS SHIP LOOSE.

CUSTOMER INTERFACE CONNECTIONS:

A) SUCTION : TWO–FLANGED
B) DISCHARGE: TWO–FLANGED
C) HOSE HEADER CONNECTION: FLANGED.
D) RELIEF VALVE DISCHARGE: FLANGED

8					4				
7					3				
6					2				
5					1	REMOVED OVERALL DIMENSION	10/06/00	JZ	
	REVISION	DATE	BY	APP.		REVISION	DATE	BY	APP.

PROJECT NAME:
SKID MOUNTED SYSTEM
DUAL DRIVE, ENCLOSED

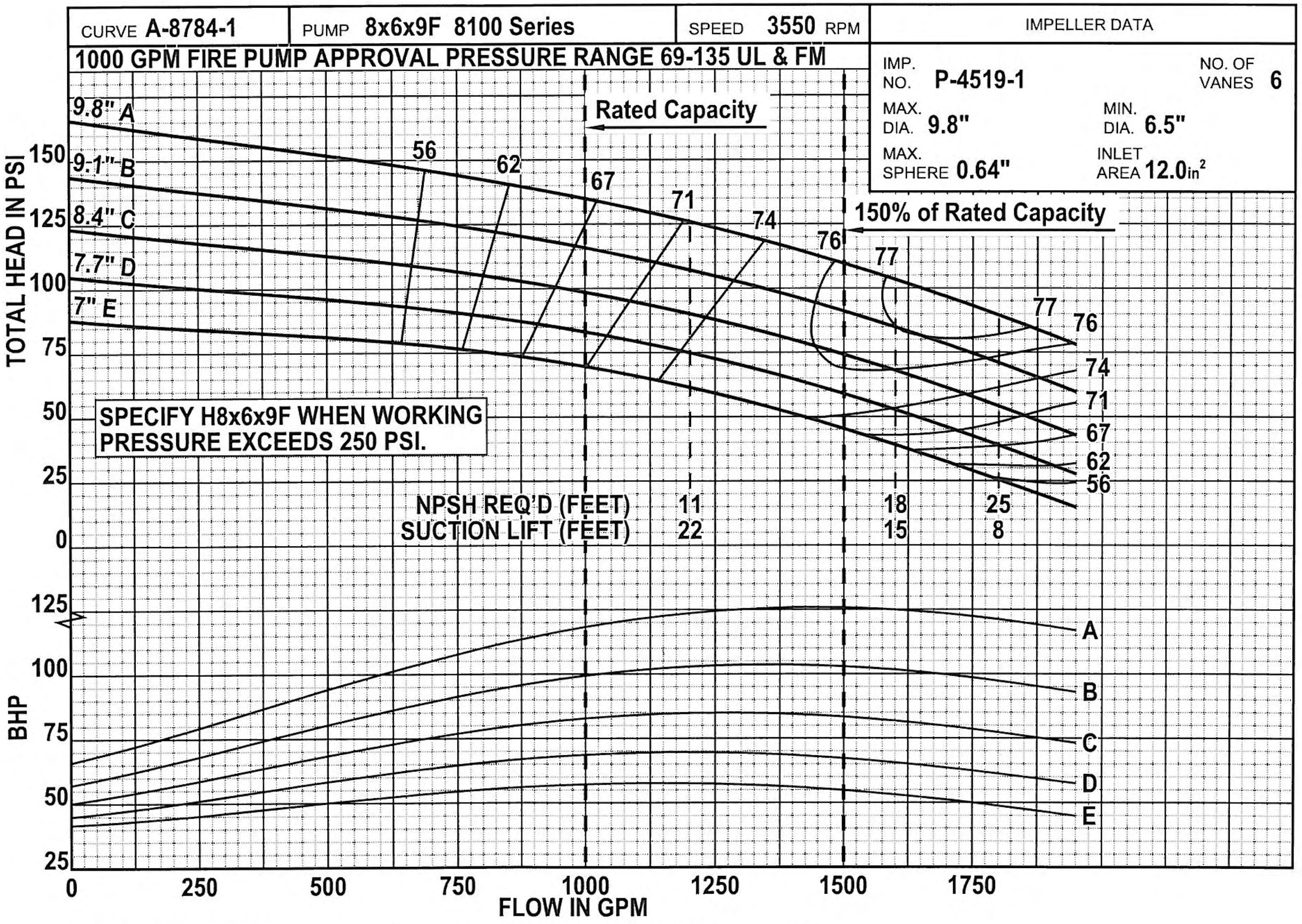
DWN.BY:	DATE:	CHKD.BY:	DATE:
RCS	05/10/00		

TOLERANCES UNLESS OTHERWISE SPECIFIED

DEC.:	FRAC.:	ANGLE:	SCALE:
± 0.25	± 1/4	±1/2°	1 : 66

PART NO.: 2MKT43

ITT
AC PUMP
PACKAGED SYSTEMS GROUP
ITT FLUID TECHNOLOGY CORPORATION
MORTON GROVE, ILLINOIS 60053



Curves show performance with clear water at 85°F. If specific gravity is other than 1.0, BHP must be corrected.

Appendix D

Site Specific Alteration of Terrain Permit Application

Appendix D –
Site Specific Alteration of Terrain Application

SITE SPECIFIC ALTERATION OF TERRAIN PERMIT APPLICATION

BERLIN BIOPOWER, LLC
57 HUTCHINS STREET
BERLIN, NEW HAMPSHIRE

PREPARED FOR	Laidlaw Berlin BioPower, LLC 90 John Street, 4th Floor New York, New York 10038
PREPARED BY	ESS Group, Inc. 888 Worcester Street, Suite 240 Wellesley, Massachusetts 02482

Project No. L145-005.03

December 15, 2009

SITE SPECIFIC ALTERATION OF TERRAIN PERMIT APPLICATION
LAIDLAW BERLIN BIOPOWER, LLC
57 Hutchins Street
Berlin, New Hampshire

Prepared For:

Laidlaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, New York 10038

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, MA 02482

ESS Project No. L145-005.02

December 15, 2009

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FIGURES

ATTACHMENTS

PROJECT DESCRIPTION

ESS Group, Inc. has completed this Alteration of Terrain Permit Application for the proposed biomass fueled energy generating facility in Berlin, New Hampshire. Laidlaw Berlin BioPower, LLC (LBB) is proposing to convert and upgrade existing facility equipment and infrastructure located at the former Fraser Pulp Mill. This permit application is required because the proposed Project will disturb more than 50,000 square feet within the protected shoreland of the Androscoggin River which is also listed as impaired and/or sensitive receiving water in accordance with New Hampshire Department of Environmental Services (NHDES).

The Project Site totals approximately 62.0± acres and is classified as a brownfield with existing subsurface contamination. In accordance with NHDES, infiltration or unlined filtering practices within areas of contaminated soils or groundwater is prohibited. Therefore, all proposed drainage Best Management Practices (i.e. - detention basins and vegetated swales) are to be lined due to the subsurface contamination.

Redevelopment of the Project Site will provide a beneficial use for the existing resources and brownfield site that has limited future uses due to existing subsurface contamination. The Berlin BioPower Facility (the Facility) will use whole tree wood chips and other low-grade clean wood as fuel, and will be capable of generating 66 megawatts (MW) of electric power. The development of the Facility will include a new turbine building and wet cooling towers, construction of wood fuel handling and storage areas, installation of wood conveying equipment, and upgrades to site access roadways, grading and drainage systems.

The City of Berlin’s Wastewater treatment plant will properly handle and treat wastewater discharged from the Project Site. Stormwater runoff will be treated on-site and then conveyed via an existing 30 inch pipe to an outfall where it will be discharged into the Androscoggin River.

The proposed stormwater management system uses multiple structural and non-structural Best Management Practices (BMPs) including street sweeping, deep sump catch basins, vegetated swales, detention basins, a wet pond, and subsurface gravel wetlands. No direct discharge of stormwater runoff generated from the proposed development will enter the Androscoggin River. All stormwater runoff generated from the development will be collected and treated on-site before being conveyed via a 30 inch underground pipe to an existing river outfall. Due to the strict adherence to the maintenance of structural and non-structural BMPs, the proposed stormwater management system will result in reductions of sediment loads and other potential sources of pollution to the Androscoggin River.

The Project will implement a system of permanent and temporary soil erosion and sediment control practices. Numerous features have been designed to prevent sediment transport. These objectives will be accomplished through the construction and maintenance of multiple structural and non-structural BMPs designed to collect and contain suspended sediments and their associated pollutants, while minimizing the amount of impact to the Androscoggin River. The soil erosion and sediment control practices to be implemented include silt fence and hay bales installed along the perimeter of the Site and hay bales installed around drain inlets. Refer to the Soil Erosion & Sedimentation Control Plan located in the Site Plan Set along with this application.

For the purposes of this application it is important to note that the Effective Impervious Cover (or EIC, which is the total impervious cover, having a low capacity for soil infiltration and having a CN value of 98 or greater) for the Project Site is 51%. The Undisturbed Cover (or UDC, which is land surface classified as reclaimed forest, forest, meadow, field, or other vegetated land area that has been allowed to return to its natural state and is not maintained) for the Project Site is 34%. Since the Project Site does not meet the target maximum EIC of 10% and minimum UDC of 65% (the 1065 rule) in accordance with NHDES, pollutant loading calculations were performed to quantify the effects of the development.

In compliance with Env-Wq 1504.07 Source Control Plans, a stormwater pollution prevention plan (SWPP) will be submitted in place of a source control plan (see Appendix F of the Application for Certification of Site and Facility). Redevelopment of the Project Site will not result in any disturbance within the 100-year floodplain.

The post-development pollutant loadings from the Project Site will be removed in accordance with the New Hampshire Stormwater Manual for industrial land uses. The removal of pollutant loads will be accomplished for total suspended solids (TSS), Total phosphorus (TP), and Total nitrogen (TN) using the on-site BMPs.

ALTERATION OF TERRAIN APPLICATION

R.S.A. 485-A:17
Department of Environmental Services - Water Division
29 Hazen Drive, PO Box 95
Concord, New Hampshire 03302-0095

Application Date: December 15, 2009 File Number (DES use): ____________

LAIDLAW BERLIN BIOPOWER
Name of Project

MAP 129, LOT 54.01
Map & Lot Number

BERLIN
Location of Project (town)

COOS
County

Check Project Type:

☐Excavation ☐Commercial ☐School ☐Agricultural ☐Landfill
☐Residential ☐Golf Course ☐Municipal ☐Land Conversion ☒Other *Industrial*

1. Owner Information

LAIDLAW BERLIN BIOPOWER, LLC
Name of Owner

MBB@LAIDLAWENERGY.COM
Email address (optional)

MICHAEL B. BARTOSZEK
Contact Name

212-480-9884
Telephone Number

90 JOHN STREET, 4TH FLOOR
Mailing Address

212-480-8448
Fax Number

NEW YORK
City/Town

NY 10038
State Zip Code

2. Permit Holder Information

LAIDLAW BERLIN BIOPOWER, LLC
Desired Permit Holder Name (if different from owner)

LTB@LAIDLAWENERGY.COM
Email address (optional)

LOUIS T. BRAVAKIS
Contact Name

802-229-4146
Telephone Number

45 STATE STREET
Mailing Address

802-224-9170
Fax Number

MONTPELIER
City/Town

VT 05602
State Zip Code

3. Agent Information

ESS GROUP, INC.
Agent Company

JBERNARDO@ESSGROUP.COM
Email address

JANET CARTER BERNARDO, PE
Contact Name

781-489-1151
Telephone Number

888 WORCESTER STREET, SUITE 240
Mailing Address

781-431-7434
Fax Number

WELLESLEY
City/Town

MA 02482
State Zip Code

4. Provide a *short* description of the project below (do not reply "see attached"):

LAIDLAW BERLIN BIOPOWER, LLC (LBB) IS PROPOSING TO CONVERT AND UPGRADE MUCH OF THE REMAINING FACILITY EQUIPMENT AND INFRASTRUCTURE LOCATED AT THE FORMER FRASER PULP MILL IN BERLIN. THE REDEVELOPMENT OF THE PROJECT SITE WILL INCLUDE CONSTRUCTION OF A NEW TURBINE BUILDING, WET COOLING TOWER, WOOD FUEL HANDLING AND STORAGE AREAS, AND UPGRADES TO SITE ACCESS ROADWAYS, GRADING AND DRAINAGE SYSTEMS.

5. If any work was done prior to receiving a permit, describe it below:

THE PROJECT SITE WAS PREVIOUSLY DEVELOPED AND USED AS A PULP MANUFACTURING FACILITY. MOST OF THE SITE BUILDINGS WERE DEMOLISHED BY THE PRIOR SITE OWNER FOLLOWING CLOSURE OF THE PULP MILL. NO SITE WORK FOR THE PROPOSED BIOPOWER PROJECT HAS YET BEEN INITIATED.

6. Please answer the questions below:

A. What date was a copy of a complete application sent to the municipality[1]? 12/15/09
DES recommends that you mail it by certified mail and retain a copy for yourself and for this application.

B. Total area of disturbance: 1,646,797 _____square feet

C. Total impervious cover: 1,382,360 _____ square feet

D. Total Undisturbed cover: 1,066,991 _____ square feet

E. Number of lots proposed: _____

F. Total length of roadway: __________ feet

G. Select plan type submitted: ☐ Land Conversion
☐ Excavation, grading, and reclamation
☒ Detailed Development Plan

H. Name of receiving waters: ANDROSCOGGIN RIVER
Are any of the receiving waters identified by the department as being impaired? YES☒ NO☐
If yes, for what pollutant(s)? DIOXIN & E. COLI
Guidance at: http://des.nh.gov/organization/divisions/water/wmb/tmdl/documents/onestop_gis_wgc_ref_guide.pdf

I. Any disturbance within a Designated River corridor? YES☐ NO☒
If yes what river[1]: __________
If yes, what date was a copy of a complete application sent to the Local Advisory Committee (LAC)?: _____
DES recommends that you mail it by certified mail and retain a copy for yourself and for this application.

J. Threatened or Endangered species or critical habitat potentially impacted? YES☐ NO☒
If yes, what? _____
Other natural resources potentially impacted? YES☐ NO☒
If yes, what? _____

K. Any disturbance within the 100-year floodplain? YES☐ NO☒
If yes, state the cut volume __________ cubic feet and the fill volume __________ cubic feet

L. Is the project within a Water Supply Intake Protection Area (WSIPA)? YES☐ NO☒
Is the project within a Groundwater Protection Area (GPA)? YES☐ NO☒
Read Env-Wq 1508.02, visit the OneStop Web GIS website at www2.des.state.nh.us/gis/onestop/, and read Chapter 3.1 in Volume 2 of the NH Stormwater Manual (des.nh.gov/organization/divisions/water/stormwater/manual.htm), for more information and be sure to observe Water Supply Well Set-Backs requirements.

M. Is the project a High Load area, in accordance with Env-Wq 1502.26? YES☐ NO☐
If yes, specify type of high load land use or activity? _____

N. Are there any drywells, infiltration trenches, or underground infiltration systems proposed? YES☐ NO☐
If yes, be sure to include a Registration and Notification Form for Storm Water Infiltration to Groundwater (download form at: des.nh.gov/organization/divisions/water/dwgb/dwspp/gw_discharge)

O. Other State Permits/Approvals	Note Status Below (NA, filed, not yet applied,
Wetlands permit required? YES☐ NO☒ If yes, total wetland impact: _____ square feet	Status: _____
Shoreland permit required? YES☒ NO☐ If exempt, why?_____	Status: _____
Large or small community well approval needed? YES☐ NO☒	Status: _____
Large groundwater withdrawal permit required? YES☐ NO☒	Status: _____
List other DES permits required and state their status? See attached.	

---

[1] - A copy of the application, including all items in #7, must be sent to the applicable municipality and, if applicable, to the local rivers management advisory committee at the same time (or before) filing this AoT permit application.

7. In the order listed, please include the following as part of your application, if applicable:

CHECK ALL THAT APPLY:

- ☒ Application fee – des.nh.gov/organization/divisions/water/aot/fees.htm
- ☒ This signed application form – des.nh.gov/organization/divisions/water/aot/index.htm

Bind in a report in the following order:

- ☐ Copy of the signed application
- ☐ Copy of the check
- ☐ If available, a copy of the certified mail receipts for mailings to the town and LAC (if applicable).
- ☒ USGS map (1" = 2,000' scale with the site boundaries outlined) - color copy preferred but not required
- ☒ Application Checklist – des.nh.gov/organization/divisions/water/aot/index.htm
- ☒ Narrative of the project with a summary table of the peak discharge rate for the off-site discharge points
- ☐ Web GIS printout – with the "Surface Water Impairments" layer turned on - www2.des.state.nh.us/gis/onestop/
- ☐ Web GIS printouts – with the AoT screening layers turned on - www2.des.state.nh.us/gis/onestop/
- ☒ NHB letter using DataCheck Tool – www.nhdfl.org/about-forests-and-lands/bureaus/natural-heritage-bureau/
- ☒ The Web Soil Survey Map with project's watershed outlined – websoilsurvey.nrcs.usda.gov
- ☒ Aerial photograph (1" = 2,000' scale with the site boundaries outlined)
- ☒ Photographs representative of the site
- ☐ Groundwater Recharge Volume calculations (one worksheet for each permit application) – des.nh.gov/organization/divisions/water/aot/documents/bmp_worksh.xls
- ☒ BMP worksheets (one worksheet for each treatment system) – des.nh.gov/organization/divisions/water/aot/documents/bmp_worksh.xls
- ☒ Drainage analysis (see Application Checklist for a list of printouts required)
- ☒ Riprap apron or other energy dissipation or stability calculations
- ☐ Site Evaluation Report & Infiltration calcs (see Vol.2, Ch.2-4, of the NH Stormwater Management Manual)
- ☐ Registration and Notification Form for Storm Water Infiltration to Groundwater (for underground systems only, including drywells and trenches) – (http://des.nh.gov/organization/divisions/water/dwgb/dwspp/gw_discharge)
- ☒ Inspection and maintenance manual with long term maintenance agreements
- ☒ Source control plan

Plans:

- ☒ One set of design plans (34 - 36" by 22 - 24" on white paper)
- ☒ Color coded hydrologic soil group plan
- ☒ Pre-development and post-development drainage area plans

100-year Floodplain Report – submitted as a separate report:

- ☐ All information required in Env-Wq 1503.09

8. Signature Required:

Signature (owner or agent) and Date

LOUIS T. BRAVAKX
Name (owner or agent)

Note: In accordance with Env-Wq 1503.20(e), within one week after permit approval, the applicant shall submit a copy of all approved documents to the department in PDF format on a CD.

Addendum to Alteration of Terrain Permit application.

Question 6 (o) -
List other DES permits/approvals and state their status:

- STATE AIR PERMIT (APPLICATION FILED 12/15/09)
- ENERGY FACILITY SITE EVALUATION COMMITTEE, CERTIFICATE OF SITE & FACILITY (APPLICATION FILED 12/15/09)
- SHORELAND PROTECTION PERMIT (APPLICATION FILED 12/15/09)

REVIEW CHECK LIST FOR
COMPLETING AN ALTERATION OF TERRAIN APPLICATION

CHECK the box if the item has been provided and please be sure to review your application, prior to submitting. If an item does not apply, please state why. Don't forget to review the check list on the application form as well.

On plans provide:
- ☒ PE stamp
- ☒ Wetland delineation
- ☒ Temporary erosion control measures
- ☒ Treatment for all stormwater runoff from impervious surfaces such as roadways (gravel roadways too), parking areas, and non-residential roof runoff. Guidance on treatment BMPs can be found in Volume 2, Chapter 4 of the NH Stormwater Management Manual.
- ☒ Pre-existing 2-foot contours
- ☒ Proposed 2-foot contours
- ☐ Drainage easements protecting the drainage/treatment structures
- ☒ Compliance with the Wetlands Bureau, RSA 482-A
  http://des.nh.gov/organization/divisions/water/wetlands/index.htm
  Note that artificial detention in wetlands is not allowed.
- ☒ Compliance with the Comprehensive Shoreland Protection Act, RSA 483-B
  http://des.nh.gov/organization/divisions/water/wetlands/cspa
- ☐ Benches. Benching is needed if you have more than 20 feet change in elevation on a 2:1 slope, 30 feet change in elevation on a 3:1 slope, 40 feet change in elevation on a 4:1 slope.

Provide the following details on the plans, as applicable:
- ☒ Typical roadway x-section
- ☒ Detention basin with inverts noted on the outlet structure
- ☐ Stone berm level spreader
- ☒ Outlet protection – riprap aprons
- ☒ A general installation detail for an erosion control blanket
- ☒ Silt fences or mulch berm
- ☒ Storm drain inlet protection – note that since hay bales must be embedded 4 inches into the ground, they are not to be used on hard surfaces such as pavement.
- ☒ Hay bale barriers
- ☒ Stone check dams
- ☒ Gravel construction exit
- ☒ The treatment BMPs proposed
- ☒ Any innovative BMPs proposed

Construction Sequence/Erosion Control Notes
- ☒ Note that perimeter controls shall be installed prior to earth moving operations.
- ☒ Note that ponds and swales shall be installed early on in the construction sequence (before rough grading the site).
- ☒ Note that all ditches and swales shall be stabilized prior to directing runoff to them.
- ☒ Note that all roadways and parking lots shall be stabilized within 72 hours of achieving finished grade.
- ☒ Note that all cut and fill slopes shall be seeded/loamed within 72 hours of achieving finished grade.
- ☒ Note that all erosion controls shall be inspected weekly AND after every half-inch of rainfall.
- ☒ Note the limits on the open area allowed, see Env-Wq 1505.02 for detailed information.
  Example note: *The smallest practical area shall be disturbed during construction, but in no case shall exceed 5 acres at any one time before disturbed areas are stabilized.*

☐ Note the definition of the word "stable." For example:

An area shall be considered stable if one of the following has occurred:

- *Base course gravels have been installed in areas to be paved.*
- *A minimum of 85 percent vegetated growth has been established.*
- *A minimum of 3 inches of non-erosive material such stone or riprap has been installed.*
- *Or, erosion control blankets have been properly installed.*

☒ Note the limit of time an area may be exposed. For example:

All areas shall be stabilized within 45 days of initial disturbance.

☒ Provide temporary and permanent seeding specifications.

(Reed canary grass is listed in the Green Book; however, this is a problematic species according to the Wetlands Bureau and therefore should not be specified).

☒ Provide winter construction notes that meet or exceed our standards.

Standard Winter Notes:

- *All proposed vegetated areas that do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting, elsewhere. The installation of erosion control blankets or mulch and netting shall not occur over accumulated snow or on frozen ground and shall be completed in advance of thaw or spring melt events.*
- *All ditches or swales which do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions.*
- *After November 15, incomplete road or parking surfaces, where work has stopped for the winter season, shall be protected with a minimum of 3 inches of crushed gravel per NHDOT item 304.3.*

☐ Note at the end of the construction sequence that "Lot disturbance, other than that shown on the approved plans, shall not commence until after the roadway has the base course to design elevation and the associated drainage is complete and stable". – This note is applicable to single/duplex family subdivisions, when lot development is not part of the permit.

Stormwater Management Report – preferably double sided, 1 page per side.

☒ PE stamp

☒ Discussion of the discharge rates directed off-site. If there is an increase, provide a justification.

Drainage analyses, *preferably in the following order:*

- ☒ Pre-development analysis: Drainage diagram
- ☒ Pre-development analysis: Area Listing and Soil Listing
- ☒ Pre-development analysis: Node listing 1-year (if applicable), 2-year, 10-year and 50-year
- ☒ Pre-development analysis: Full summary of the 10-year storm
- ☒ Post-development analysis: Drainage diagram
- ☒ Post-development analysis: Area Listing and Soil Listing
- ☒ Post-development analysis: Node listing for the 2-year, 10-year and 50-year
- ☒ Post-development analysis: Full summary of the 10-year storm

Pre and post-development drainage area plans with the following – **submit this as a separate plan from the soil plans**:

- ☒ Labeled subcatchments, reaches and ponds
- ☒ Tc lines
- ☒ A clear delineation of the sub-catchment boundaries
- ☐ Roadway station numbers
- ☒ Culverts and other conveyance structures

☒ Color coded Site Specific Soil plan – **submit this as a separate plan from the drainage area plans**. This can be an 11" x 17" if soil symbols and subcatchment boundaries are readable. It should be color coded: A = Green, B = yellow, C= orange, D=red, Water=blue, & Impervious = gray

Review the Area Listing and Soil Listing reports.

- ☒ Hydrologic soil groups (HSG) match the HSGs on the soil maps provided.
- ☒ There is the same or less HSG A soil area after development (check for each HSG).
- ☒ There is the same or less "woods" cover in the post-development.
- ☒ Undeveloped land was assumed to be in "good" condition.
- ☒ The amount of impervious cover in the analyses is correct.
  Hint: A good check is to subtract the total impervious area used in the pre analysis from the total impervious area used in the post-analysis, does this number make sense? For residential projects without demolition occurring, a good check is to take this change in impervious area, subtract out the roadway and divide the remaining by the number of houses/units proposed. Does this number make sense?

☒ Check the storage input used to model the ponds.
☒ Check to see if the artificial berms pass the 50-year storm, i.e., make sure the constructed berms on ponds are not overtopped.
☒ Check to see if the ponds need state Dam permits
http://des.nh.gov/organization/divisions/water/dam/documents/damdef.pdf
☒ Check the outlet structure proposed and make sure it matches that modeled
☒ Check to see if the total areas in the pre and post analyses are same
☒ Check to make sure the correct rainfall amount and SCS storm type was modeled.
Hint: Coos, Carroll, and Grafton counties are Type II, all others Type III.
☒ Submit the Site Evaluation Report and infiltration calculations (Env-wq 1504.12 and 1504.13).
See Volume 2, Chapter 2-4, of the NH Stormwater Management Manual for guidance.

Please note that excavation projects, e.g., gravel pits, have similar requirements to that above, however the following are common exceptions/additions:

☐ Drainage report is not needed if site does not have off-site flow.
☐ 5 foot contours allowed rather than 2 foot.
☐ No PE stamp needed.
☐ Add a note to the plans that the applicant must submit to the Department of Environmental Services a written update of the project and revised plans documenting the project status every five years from the date of the Alteration of Terrain permit.
☐ Reclamation notes.
See NRCS publication titled: *Vegetating New Hampshire Sand and Gravel Pits* for a good resource.

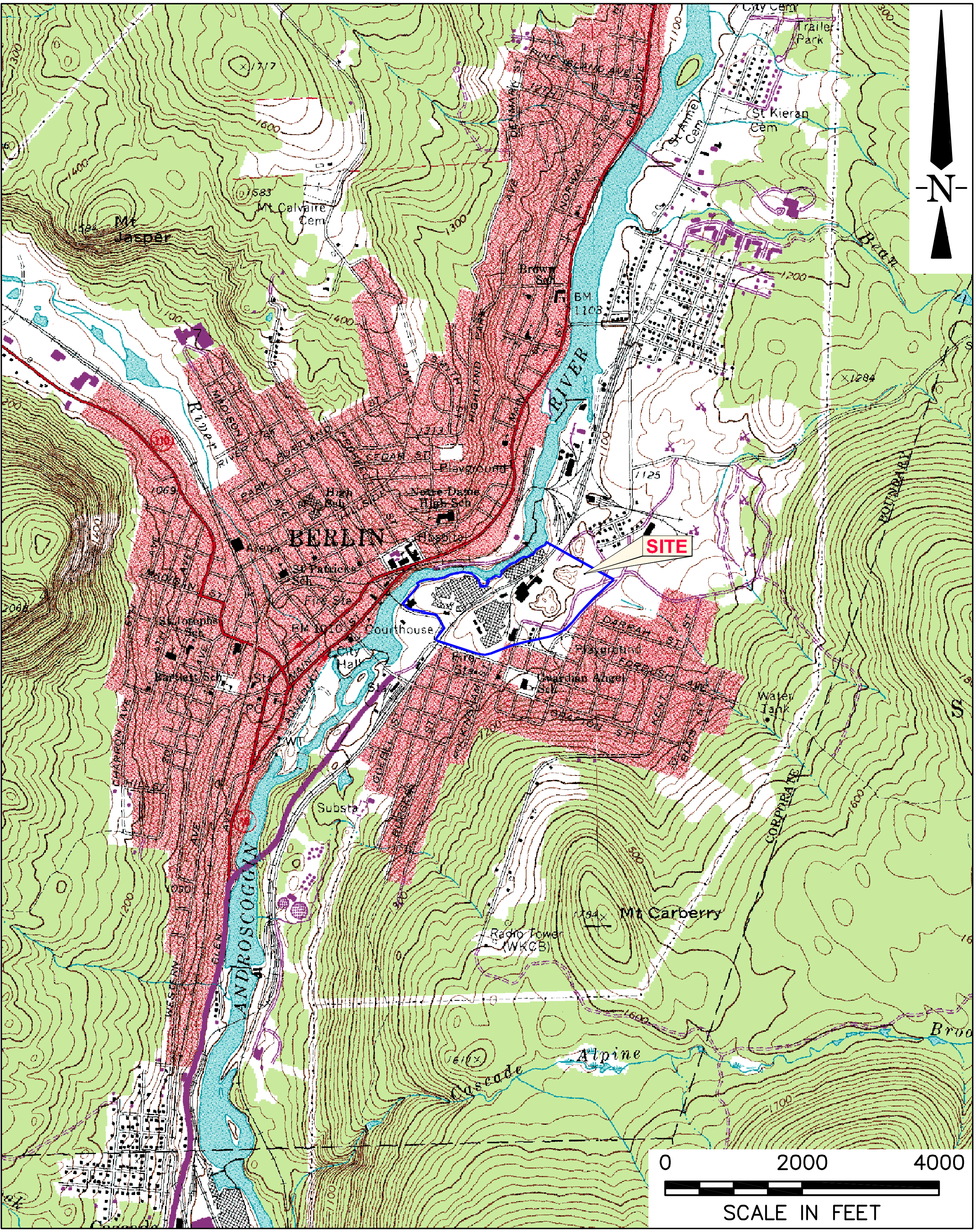
	LOUIS T. BRAVAKIS	12/14/09
SIGNATURE OF PERMITTEE	PRINT NAME	DATE

**Please double-side your 8 ½" x 11" sheets where possible. However, please do not reduce the text such that more than one page fits on one side.*

Please visit http://des.nh.gov/organization/divisions/water/aot for more information about our program.
Thank you.

Figures

DATE: Nov 04, 2009 – 5:25PM
FILENAME: H:□L145-Laidlaw□FIGURES□L145-USGS.dwg



ESS Group, Inc.
Engineers
Scientists
Consultants

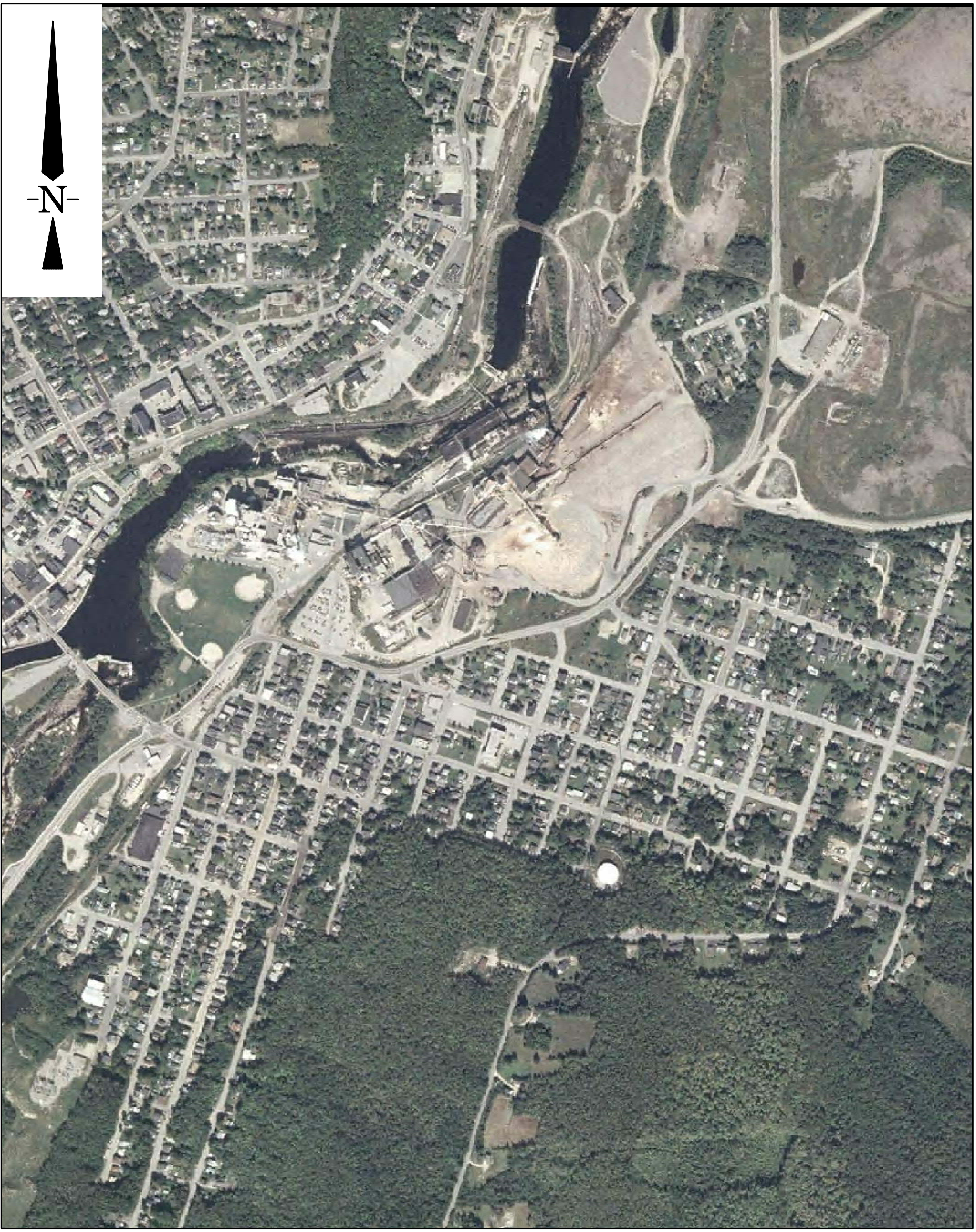
Ortho Locus Map -
Site and Adjacent Structures

USGS Topographic Quadrangle

Source: NHGRANIT, 1:24000 USGS
Scale: 1" = 1500'

Figure
1

Copyright © ESS Group, Inc., 2009



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Ortho Locus Map -
Transmission Line ROWs

0 750 1500

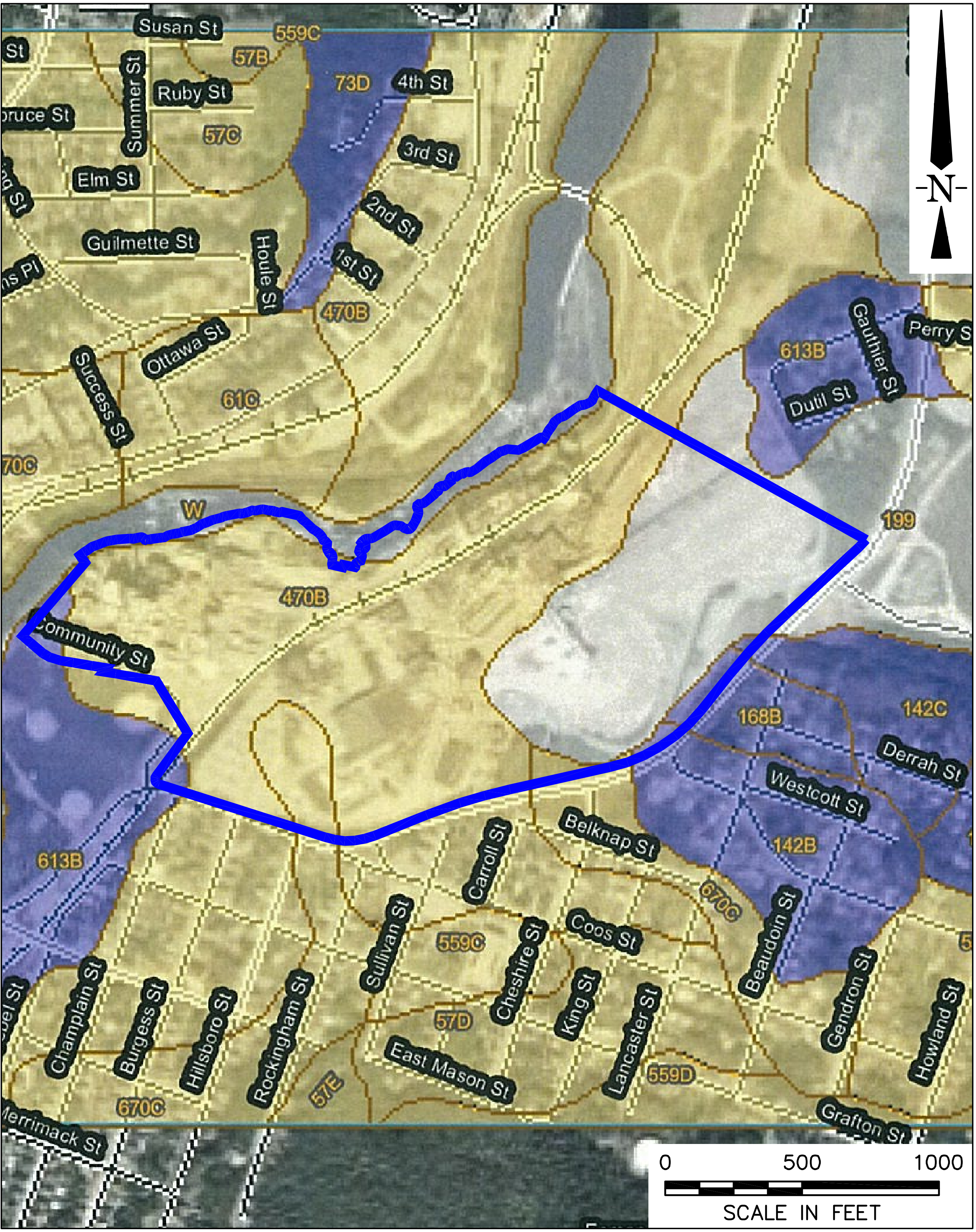
SCALE IN FEET

Aerial

Scale: 1"=750'

Figure
2

DATE: Oct 28, 2009 – 3:00PM
FILENAME: H:\L145-Laidlaw\FIGURES\L145-Soils_SW-Report.dwg



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Ortho Locus Map -
Site and Adjacent Structures

Source: NRCS Web Soil Survey 2.0
Scale: 1" = 500'

NRCS Soil Survey

Figure
3

MAP LEGEND

Area of Interest (AOI)

☐ Area of Interest (AOI)

Soils

☐ Soil Map Units

Soil Ratings

- 🟫 A
- 🟩 A/D
- 🟪 B
- 🟦 B/D
- 🟨 C
- ⬛ C/D
- 🟥 D
- ▨ Not rated or not available

Political Features

● Cities

Water Features

🟦 Oceans

~ Streams and Canals

Transportation

- ┼┼┼ Rails
- ~ Interstate Highways
- ~ US Routes
- ~ Major Roads
- ~ Local Roads

MAP INFORMATION

Map Scale: 1:10,800 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 19N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Coos County Area, New Hampshire
Survey Area Data: Version 12, May 21, 2009

Date(s) aerial images were photographed: 9/3/2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Coos County Area, New Hampshire

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
14B	Sheepscot cobbly very fine sandy loam, 1 to 8 percent slopes	B	9.0	2.0%
57B	Becket fine sandy loam, 3 to 8 percent slopes, very stony	C	1.4	0.3%
57C	Becket fine sandy loam, 8 to 15 percent slopes, very stony	C	7.1	1.6%
57D	Becket fine sandy loam, 15 to 25 percent slopes, very stony	C	45.9	10.4%
57E	Becket fine sandy loam, 25 to 35 percent slopes, very stony	C	1.8	0.4%
61C	Tunbridge-Lyman-Rock outcrop complex, 8 to 15 percent slopes	C	12.1	2.7%
73D	Berkshire very fine sandy loam, 15 to 25 percent slopes, very stony	B	6.8	1.5%
142B	Monadnock fine sandy loam, 3 to 8 percent slopes	B	13.6	3.1%
142C	Monadnock fine sandy loam, 8 to 15 percent slopes	B	9.2	2.1%
143B	Monadnock fine sandy loam, 3 to 8 percent slopes, very stony	B	4.8	1.1%
168B	Sunapee fine sandy loam, 3 to 8 percent slopes	B	4.4	1.0%
199	Dumps—bark, chips and organic material		78.0	17.7%
470B	Tunbridge-Peru complex, 3 to 8 percent slopes	C	120.0	27.2%
558C	Skerry fine sandy loam, 8 to 15 percent slopes	C	22.5	5.1%
559C	Skerry fine sandy loam, 8 to 15 percent slopes, very stony	C	4.8	1.1%
559D	Skerry fine sandy loam, 15 to 25 percent slopes, very stony	C	6.9	1.6%
613B	Croghan loamy fine sand, 1 to 8 percent slopes	B	29.4	6.7%
670C	Tunbridge-Berkshire-Lyman complex, 8 to 15 percent slopes	C	39.1	8.9%
W	Water		24.3	5.5%
Totals for Area of Interest			**441.0**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Lower

Attachment A

Natural Heritage Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
http://www.fws.gov/northeast/newenglandfieldoffice

January 2, 2009

To Whom It May Concern:

This project was reviewed for the presence of federally-listed or proposed, threatened or endangered species or critical habitat per instructions provided on the U.S. Fish and Wildlife Service's New England Field Office website:

(http://www.fws.gov/northeast/newenglandfieldoffice/EndangeredSpec-Consultation.htm)

Based on the information currently available, no federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service (Service) are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under Section 7 of the Endangered Species Act is not required.

This concludes the review of listed species and critical habitat in the project location(s) and environs referenced above. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your cooperation. Please contact Mr. Anthony Tur at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

March 3, 1849

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
http://www.fws.gov/northeast/newenglandfieldoffice

REF: Biomass energy generating facility, Berlin, NH

July 14, 2009

Meghann J. Murray
ESS Group, Inc.
888 Worcester St., Suite 240
Wellesley, MA 02482

RECEIVED
July 17/09

Dear Ms. Murray:

We received your letter (enclosed) requesting an endangered species review in regard to the proposed project identified above.

The New England Field Office has developed measures to streamline the endangered species consultation process and other requests for technical assistance. The information you have requested is available on our website at:

(http://www.fws.gov/northeast/newenglandfieldoffice/EndangeredSpec-Consultation.htm)

Please review these streamlining measures. We are confident they will adequately address your request. For assistance in navigating the website, please contact Phil Leeser at 603-223-2541.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

Enclosure

Memo

NH NATURAL HERITAGE BUREAU

To: Meghann Murray, ESS Group, Inc.
888 Worcester Street
Suite 240
Wellesley, MA 02482

From: Melissa Coppola, NH Natural Heritage Bureau
Date: 6/24/2009 (valid for one year from this date)
Re: Review by NH Natural Heritage Bureau
NHB File ID: NHB09-1209
Town: Berlin
Project type: Buildings and Related Structures: Single commercial building lot, etc.
Location: Tax Maps: 129-54.01, 54.001, and 55
cc: Kim Tuttle

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments:

Vertebrate species	**State**[1]	**Federal**	**Notes**
Bald Eagle (*Haliaeetus leucocephalus*)	T	M	Contact the NH Fish & Game Dept (see below).
Common Nighthawk (*Chordeiles minor*)	E	--	Contact the NH Fish & Game Dept (see below).

[1] Codes: "E" = Endangered, "T" = Threatened, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

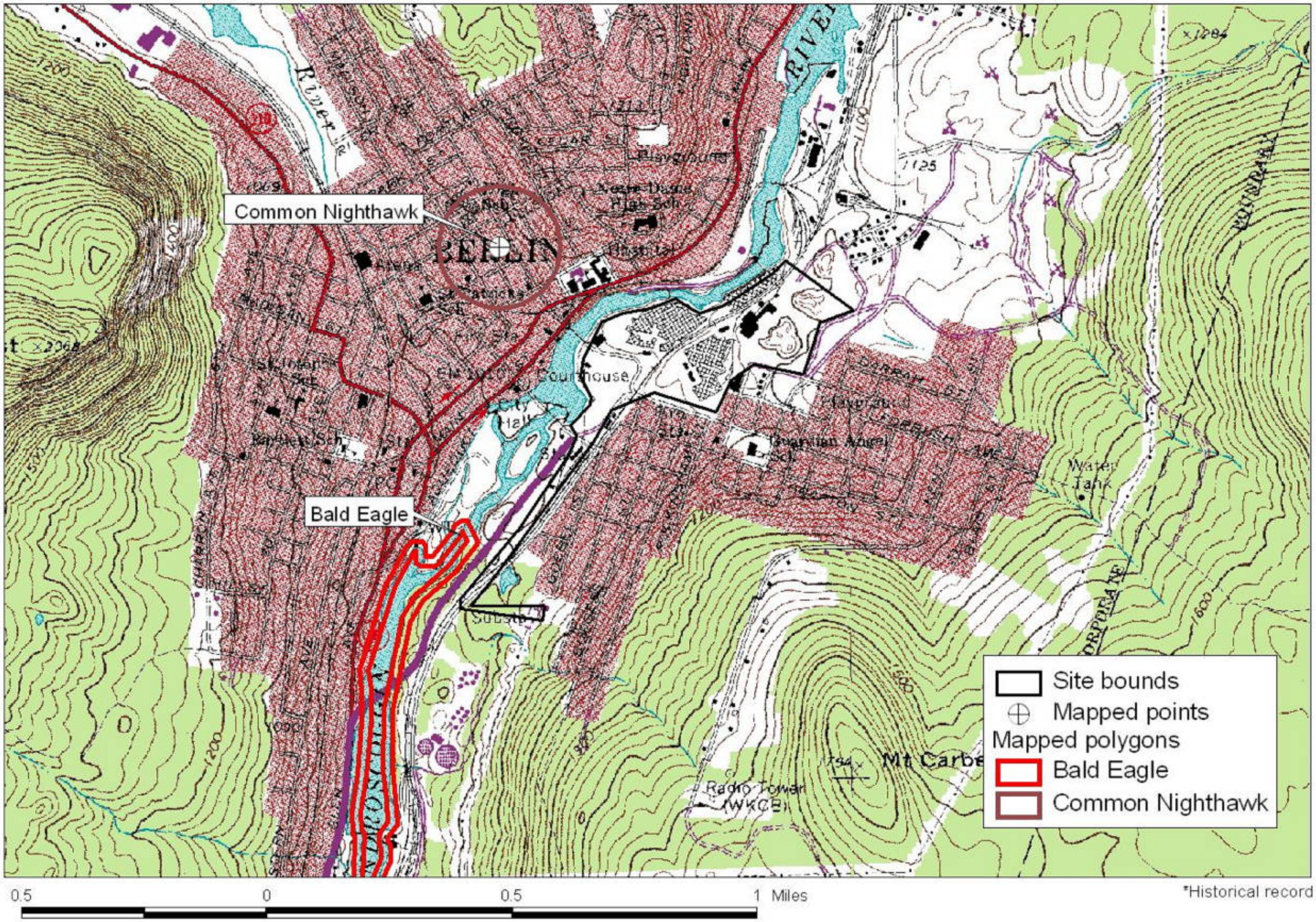
Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. For some purposes, including legal requirements for state wetland permits, the fact that no species of concern are known to be present is sufficient. However, an on-site survey would provide better information on what species and communities are indeed present.

NH NATURAL HERITAGE BUREAU

Known locations of rare species and exemplary natural communities

Note: Mapped locations are not always exact. Occurrences that are not in the vicinity of the project are not shown.



*Historical record

1:18000

Valid for one year from this date: 24 Jun 2009

New Hampshire Natural Heritage Bureau - Animal Record

Bald Eagle (*Haliaeetus leucocephalus*)

Legal Status		**Conservation Status**	
Federal:	Monitored	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 1993: Occasional observations from Rte. 16 between Berlin and Gorham.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Androscoggin River
Managed By: Drew Easement

County:	Coos	USGS quad(s):	Berlin (4407142)
Town(s):	Gorham	Lat, Long:	442539N, 0711129W
Size:	165.3 acres	Elevation:	800 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: All along the Androscoggin River.

Dates documented

First reported: 1993 Last reported: 1993

Deluca, Diane. Audubon Society of New Hampshire. 1993. Results of Annual Eagle Wintering Surveys.

New Hampshire Natural Heritage Bureau - Animal Record

Common Nighthawk (*Chordeiles minor*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Not ranked (need more information)

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 1990: 26 adults, sex unknowns (Obs_id 939).
General Area: 1990: Terrestrial - Urban / suburban (Obs_id 939).
General Comments: 1990: Number above represents the high count for the period 1982-1992. Young were documented in 1985, and perhaps other years during this period (Obs_id 939).
Management Comments:

Location

Survey Site Name: Berlin
Managed By:

County:	Coos	USGS quad(s):	Berlin (4407142)
Town(s):	Berlin	Lat, Long:	442827N, 0711050W
Size:	30.8 acres	Elevation:	

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 1990: Downtown [Berlin] (Obs_id 939).

Dates documented

First reported:	1990-07-22	Last reported:	1990-07-29

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

Darrell Oakley

From:	Tuttle, Kim [Kim.Tuttle@wildlife.nh.gov]
ent:	Monday, October 19, 2009 8:36 AM
,o:	Darrell Oakley
Subject:	NHB09-1209 Laidlaw Berlin BioPower LLC

Darrell,

The NHFG Nongame and Endangered Species Program has reviewed NHB09-1209 for the proposed Laidlaw Berlin BioPower project in Berlin, NH. Bald eagle and common nighthawk were identified in the NHB review as occuring in the vicinity of the project. Both species are protected by the NH Endangered Species Conservation Act (RSA 212-A). We do not expect impacts to bald eagle as no trees within 50 ft. of the Androscoggin River will be removed. If there is any opportunity to allow more habitat along the River to revert back to native trees and shrubs, we would encourage that as it would provide future perching and roosting sites for bald eagle.

Common nighthawks nest on the ground in gravel lots and on flat rooftops covered in small stone. We have not had breeding reports for this species in Berlin for a number of years now so we do not expect impacts to common nighthawk as a result of the proposed project. Please feel free to call me at 271-6544 if you have any further questions regarding this job.

Sincerely,

Kim Tuttle
Wildlife Biologist
NH Fish and Game
Nongame and Endangered Species Program
03-271-6544

Attachment B

Stormwater Management Report

Stormwater Management Report

BERLIN BIOPOWER, LLC
57 HUTCHINS STREET
Berlin, New Hampshire

PREPARED FOR	Laidlaw Berlin BioPower, LLC 90 John Street, 4th Floor New York, New York 10038
PREPARED BY	ESS Group, Inc. 888 Worcester Street, Suite 240 Wellesley, Massachusetts 02482

Project No. L145-004.05

December 15, 2009

ESS Group, Inc.

STORMWATER MANAGEMENT REPORT
LAIDLAW BERLIN BIOPOWER, LLC
57 Hutchins Street
Berlin, New Hampshire

Prepared For:

Laidlaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, New York 10038

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

ESS Project No. L145-004.05

December 15, 2009

STATE OF NEW HAMPSHIRE
JANET C. BERNARDO
No. 11865
LICENSED
PROFESSIONAL ENGINEER

12-15-09

TABLE OF CONTENTS

SECTION **PAGE**

TABLES

FIGURES

ATTACHMENTS

1.0 STORMWATER MANAGEMENT ANALYSIS

ESS Group, Inc. has performed a stormwater management analysis for the proposed biomass fueled energy generating facility in Berlin, New Hampshire. Laidlaw Berlin BioPower, LLC (LBB) is proposing to convert and upgrade existing facility equipment and infrastructure located at the former Fraser Paper Mill. Berlin BioPower (the Facility) will use whole tree wood chips and other low-grade clean wood as fuel, and will be capable of generating 66 megawatts (MW) of electric power.

Redevelopment of the Project Site will provide a beneficial use for the existing resources and brownfield site that has limited future uses due to existing subsurface contamination. The development of the Facility will include construction of a new turbine building and wet cooling towers, construction of wood fuel handling and storage areas, installation of wood conveying equipment, and upgrades to site access roadways, grading and drainage systems.

The City of Berlin’s Wastewater treatment plant will properly handle and treat wastewater discharged from the Project Site. Stormwater runoff will be treated on-site and then conveyed via an existing 30 inch pipe to an outfall where it will be discharged into the Androscoggin River.

The stormwater management system designed for the Project Site will mitigate stormwater runoff impacts on water quantity and quality. The following sections describe the proposed stormwater management plan and analysis conducted to ensure compliance with the New Hampshire Department of Environmental Services (NHDES) Stormwater Manual, dated December 2008 and the Alteration of Terrain (AoT) Program Administrative Rules. Existing stormwater conditions were modeled and evaluated for comparison to the post-development conditions. A water quality analysis was performed to ensure that the proposed stormwater management system meets the necessary pollutant load removals.

1.1 Existing Stormwater Conditions

The Site is located along the northern sides of Community, Coos, and Hutchins Streets in Berlin, and is bordered on the northwest by the Androscoggin River. The site abuts the remaining portion of the former Fraser Pulp Mill to the north. The availability of resources at, within or immediately adjacent to the 62 acre site is limited due to the long history of industrial use in the area as well as the recent razing of most of the former Fraser Pulp Mill. The Site is zoned as Industrial/Business, and consists of the southern portion of the property formerly known as the Burgess Mill, Berlin Mill, and most recently the Fraser Pulp Mill. See Figure 1.

The existing drainage area is comprised of approximately 26-acres of impervious area, 11-acres of woods, 16-acres of grass, and 16-acres of urban industrial complex. The urban industrial complex contains building rubble and wood debris that is scattered throughout the property. The topography of the Site varies from 1130 feet to 1012 feet (NGVD 29 New Hampshire State Plane) descending in elevation from the southeast corner of the Site to the northwest corner of the Site downward towards the Androscoggin River.

The development associated with the Project Site is located outside the 100-year floodplain as shown on Figure 2.

For the purpose of analysis, the Site is divided into three existing watersheds. Each watershed flows to a separate design point along the property: design point one (DP-1) denotes the Androscoggin River, design point two (DP-2) denotes the City of Berlin's municipal drainage system, design point three (DP-3) denotes an existing 48-inch pipe located near the northeast corner of the Site, and design point four (DP-4) denotes the WWTP. The outlet of the existing 48-inch pipe (DP-3) drains to the river. Descriptions of the existing watersheds are listed below:

Existing Watershed EW-1 – is approximately 32.8 acres and encompasses wooded areas, building rubble from demolition, grassed areas, pavement, several existing buildings, and a bordering vegetated wetland located along the bank of the Androscoggin River (approximately 840 linear feet). The southeasterly limit of the watershed, at the Hutchins Street entrance of the Site, is defined by a high point in the road. The watershed continues to encompass a portion of Hutchins Street up to the intersection of Columbia Avenue. The stormwater runoff generated from this watershed sheet flows to the Androscoggin River (DP-1). The existing on-site closed drainage system is to be abandoned-in-place.

Existing Watershed EW-2 - is approximately 32.4 acres and encompasses wooded areas, building rubble from demolition, grassed areas, pavement, and several existing buildings. The watershed is bound between watershed EW-1, Hutchins Street, Coos Street, and Community Street. The majority of the stormwater runoff generated from this watershed overland flows to the municipal drainage system (DP-2) in Coos Street and Community Street. However, a portion of the stormwater runoff generated from this watershed is also collected by an existing closed drainage system that connects to the WWTP (DP-4). The amount of stormwater runoff discharged to the wastewater treatment plant is currently unknown due to the poor condition of the existing drainage system and its unknown functionality. The existing on-site closed drainage system is to be abandoned-in-place.

Existing Watershed EW-3 - is approximately 4.3 acres and encompasses wooded areas, grassed areas, pavement, and a bordering vegetated wetland (approximately 1,235 square feet). The watershed is bound to the south by watershed EW-1. The stormwater runoff generated from this watershed flows to an existing culvert that drains to the 48-inch pipe (DP-3) which discharges to the Androscoggin River.

The existing watersheds described above are shown on the Existing Watershed Plan, Drawing No. EWP.

1.2 Proposed Stormwater Conditions

The proposed Site will incorporate approximately 34.2 acres of impervious area including the access roadway, buildings, parking areas/driveway, cooling towers, holding tanks, equipment, and paved areas designated to store the wood fuel piles.

For the purpose of analysis, the Site is divided into four proposed watersheds. The proposed watersheds continue to flow to the design points designated under existing conditions; the Androscoggin River (DP-1), the City of Berlin's municipal drainage system (DP-2), the existing 48-inch pipe (DP-3), and the existing 30 inch pipe to the river outfall (DP-4). Descriptions of the proposed watersheds are listed below:

Proposed Watershed PW-1 - is approximately 10.3 acres and encompasses wooded areas, grassed areas, an existing building (to remain), gravel roads, the proposed cooling towers, and a bordering vegetated wetland located along the bank of the Androscoggin River (approximately 840 linear feet). Similar to existing watershed EW-1, stormwater runoff generated from this watershed overland flows to the river (DP-1).

Proposed Watershed PW-2 - is approximately 19.9 acres and encompasses wooded areas, grassed areas, several existing buildings (to remain), pavement, and a proposed parking area for the community ball field adjacent to the Project Site. A portion of the stormwater runoff generated from this watershed is routed through a proposed vegetated swale located along the northerly boundary of the watershed prior to discharging to the municipal drainage system (DP-2) in Coos Street. The remaining stormwater runoff generated from the watershed will continue to overland flow to the municipal drainage system (DP-2) located in Coos Street and Community Street.

Proposed Watershed PW-3 – is approximately 4.2 acres and encompasses wooded areas, grassed areas, pavement, and a bordering vegetated wetland (approximately 1,235 square feet). The watershed is bound to the south by watersheds PW-1 and PW-4a. Similar to existing watershed EW-3, the stormwater runoff generated from this watershed flows to the existing culvert that drains to the 48-inch pipe (DP-3) which discharges to the Androscoggin River.

Proposed Watershed PW-4 - is divided into ten (10) sub-watersheds labeled PW-4a through PW-4j. This watershed encompasses the Facility and the majority of the Site development. The stormwater runoff generated from this watershed is ultimately conveyed via an existing 30 inch pipe to an outfall where it discharges into the Androscoggin River (DP-4).

- **Proposed Sub-watershed PW-4a** – is approximately 10.8 acres and encompasses wooded areas, grass areas, pavement, and reserve wood chip fuel storage areas. The entrance to the Site is located off of Hutchins Street at the southeasterly edge of the sub-watershed where a high point in the road defines the limit of the sub-watershed. The majority of the stormwater runoff generated from this sub-watershed flows to a concrete swale (S-1) that conveys the stormwater runoff to a lined detention basin (P-1) via a riprap splash pad. The outlet control structure of the detention basin discharges stormwater runoff to a lined vegetated swale (S-2) located in sub-watershed PW-4c. A 24-inch overflow pipe, a secondary outlet from the detention basin, conveys any additional stormwater runoff to a lined detention basin (P-2) located in sub-watershed PW-4b.

- **Proposed Sub-watershed PW-4b** - is approximately 2.3 acres and encompasses grass areas and pavement. The stormwater runoff generated from this sub-watershed flows to a lined detention basin (P-2). The outlet control structure of the detention basin conveys stormwater runoff to a lined vegetated swale (S-2) located in sub-watershed PW-4c.

- **Proposed Sub-watershed PW-4c** – is approximately 8.5 acres and encompasses grass areas, pavement and a portion of an existing building. The stormwater runoff generated from this sub-watershed flows to a lined vegetated swale (S-2) that conveys the stormwater to a lined wet pond (P-3) located in sub-watershed PW-4d via a riprap splash pad.

- **Proposed Sub-watershed PW-4d** – is approximately 0.9 acres and encompasses grass areas and pavement. The stormwater runoff generated from this sub-watershed flows to a lined wet pond (P-3). The outlet control structure of the wet pond discharges stormwater runoff to the closed drainage system that connects to the existing 30 inch pipe (DP-4).

- **Proposed Sub-watershed PW-4e** - is approximately 1.5 acres and encompasses grass areas, pavement, and Facility equipment. The stormwater runoff generated from this sub-watershed flows to the lined wet pond located in sub-watershed PW-4d where it is treated then conveyed via the closed drainage system to the existing 30 inch pipe (DP-4).

- **Proposed Sub-watershed PW-4f** - is approximately 3.5 acres and encompasses grass areas, pavement, Facility equipment, and a wood chip fuel pile area. The stormwater runoff generated from this sub-watershed overland flows to a lined detention basin (P-4) via a lined vegetated swale (S-3). The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands (P-7) located in sub-watershed PW-4g via a closed drainage system.

- **Proposed Sub-watershed PW-4g** - is approximately 2.4 acres and encompasses grass areas, pavement, Facility equipment, and a wood chip fuel pile area. The stormwater runoff generated from this sub-watershed overland flows to a lined detention basin (P-5). The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands (P-7) for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe (DP-4).

- **Proposed Sub-watershed PW-4h** - is approximately 1.3 acres and encompasses grass areas, pavement, and a wood chip fuel pile area. The stormwater runoff generated from this sub-watershed flows to a lined detention basin (P-6). The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands (P-7) for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe (DP-4).

- **Proposed Sub-watershed PW-4i** - is approximately 3.5 acres and encompasses grass areas, pavement, gravel roads, existing/proposed buildings, and parking areas. The major components of the Facility are located within this sub-watershed including the boiler, turbine generator building, and holding tanks. The stormwater runoff generated from this sub-watershed flows to the subsurface gravel wetlands (P-7) for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe (DP-4).

- **Proposed Sub-watershed PW-4j** – is approximately 0.3 acres and encompasses a proposed lined detention basin (P-4). The stormwater runoff generated from this sub-watershed flows to a lined vegetated swale (S-3) that conveys the stormwater runoff to the detention basin. The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands (P-7) for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe (DP-4).

The proposed watersheds described above are shown on the Proposed Watershed Plan, Drawing No. PWP.

1.2 Methodology and Analysis

The hydrologic model created to analyze this site was developed using the Soil Conservation Service (SCS) Technical Release No. 20 (SCS unit hydrograph procedures), SCS Technical Release No. 55 (for Times of Concentration and Curve Numbers), and the TP 40 (for Rainfall Depths). The stormwater detention facilities were modeled using the SCS Storage Indication Method.

Pipe sizing calculations utilize the Rational Method. The pipes were sized to handle the 10-year storm event. The U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, dated December 10, 1982 was used to obtain rainfall intensity data.

HydroCAD® software (developed by Applied Microcomputer Systems) was used to assist in the hydrologic analysis. The HydroCAD® program calculates the runoff based on rainfall and watershed characteristics, and produces a runoff hydrograph (a runoff rate versus time curve). Then the stage-storage-discharge curves for a specific detention area are used to compute an outflow hydrograph by hydraulically routing an inflow hydrograph through a basin. This procedure calculates the relationship of the inflow hydrograph with the characteristics of the detention area to determine the outflow, stage, and storage capacity of the detention area for a given time during the specified storm event.

According to the Natural Resources Conservation Service (NRCS) Soil Survey of Coos County, New Hampshire, the existing soils on the Site are Tunbridge-Peru complex (3 to 8 percent slopes); Dumps-bark, chips and organic material; Croghan loamy fine sand (1 to 8 percent slopes); Tunbridge-Berkshire-Lyman complex (8 to 15 percent slopes); Sunapee fine sandy loam (3 to 8 percent slopes); Monadnock fine sandy loam (3 to 8 percent slopes); and Monadnock fine sandy loam (8 to 15 percent slopes) soils. The Croghan loamy fine sand, Sunapee fine sandy loam, and Monaduck fine sandy loams are classified as hydrologic soil group B. These soils have moderate infiltration rates when thoroughly wet and are moderately well drained to well drained soils with a moderately fine texture to moderately coarse texture. The Tunbridge-Peru complex and Tunbridge-Berkshire-Lyman complex are classified as hydrologic soil group C. These soils have slow infiltration rates when thoroughly wet and consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture to fine texture. The soil labeled as Dumps-bark, chips and organic material is assumed to be classified as hydrologic soil group D which have very slow infiltration rates with high runoff potential. These soils are accurately accounted for in the HydroCAD model. The NRCS Soil Survey of the Site is provided in Figure 3.

Hydrographs were generated based on watershed area, cover characteristics, soil group, hydrologic curve number (CN), time of concentration, and rainfall amount. The CN values for each watershed and sub-watershed were estimated by determining the composite value of the CN for the soil groups and ground cover mixture.

The watershed characteristics for existing conditions were estimated based on an Alta Survey prepared by York Land Services, LLC dated June 26, 2008, to determine flow patterns and characteristic cover and to evaluate the existing wetland areas. A Photo Log of the existing property is provided in Attachment G, as documentation of the existing site conditions. Watershed characteristics for proposed conditions were taken from the proposed site plan.

Stormwater model runs were performed for the 24-hour rainfall for the 2-, 10-, and 50-year storm events using a Type II storm distribution. Times of Concentration (Tc) were calculated utilizing the NRCS TR-55 methodology. A minimum Tc of six minutes was maintained for all conditions. The 24-hour rainfall amounts used were 3.2, 4.4, and 5.6 inches for the 2-, 10-, and 50-year storms, respectively. These rainfall depths were obtained from the 24-hour SCS Rainfall Chart for New Hampshire shown in Figure 4.

1.3 Stormwater Analysis Results

The proposed Project includes the design and construction of a stormwater management system in accordance with the New Hampshire Stormwater Manual and AoT Program Administrative Rules. Stormwater quality and quantity on the Site will be managed by implementing a series of Best Management Practices (BMPs) that will include street sweeping, deep sump catch basins, lined vegetated swales, and lined detention basins. The primary objectives for the Project's stormwater management system are as follows:

1.3.1 Controlling Peak Rates of Runoff

The proposed stormwater management system incorporates a series of BMPs including numerous vegetated swales and dry detention basins to control peak rates of stormwater runoff leaving the Site. The detention basins will reduce the post-development peak discharges to values that do not exceed the existing peak discharge rate for the 2-, 10-, and 50-year, 24-hour storm events. The stormwater hydrologic model and calculations for the existing and proposed conditions were modeled using HydroCAD modeling software.

1.3.2 Channel Protection

The existing and proposed HydroCAD models were analyzed to ensure the protection of downstream receiving waters from erosion and associated sedimentation resulting from the development. Off-site flows or flows into receiving channels within the Project Area, meet the following criteria:

The 2-year, 24-hour post-development storm volume does not increase due to the development. Therefore, the 2-year, 24-hour post-development peak flow rate is controlled to the 2-year, 24-hour pre-development level. See attached HydroCAD models, in Attachment E.

1.3.3 Groundwater Recharge Volume

The Project Site is classified as a brownfield with existing subsurface contamination. In accordance with NHDES, infiltration or unlined filtering practices within areas of contaminated soils or groundwater is prohibited. Therefore, the Site does not meet the annual pre-development groundwater recharge. All proposed vegetated swales, detention basins, wet pond and subsurface gravel wetlands are to be lined due to the subsurface contamination.

1.3.4 Water Quality Volume

The proposed stormwater management system uses multiple structural and non-structural BMPs including street sweeping, deep sump catch basins, vegetated swales, detention basins, a wet pond, and subsurface gravel wetlands. These measures, together with strict adherence to the maintenance of structural and non-structural BMPs will result in reductions in the sediment loads and other potential sources of pollution to the Androscoggin River. The recommended water quality volume captured and treated for pollutant removal in accordance with the New Hampshire Stormwater Manual is the first one-inch of rainfall. Refer to the BMP worksheets located in Attachment C.

1.3.5 Water Quality Flow

The water quality flow was determined using the water quality volume, NRCS soils, and the TR-55 Graphical Peak Discharge Method to calculate the flow rate associated with the water quality volume for sizing the pre-treatment swales. Refer to the BMP Worksheets located in Attachment C.

1.3.6 Effective Impervious Cover

The Effective Impervious Cover (EIC) is the total impervious cover of a site, having a low capacity for soil infiltration and having a CN value of 98 or greater. The EIC for the Project Site is 51%.

1.3.7 Undisturbed Cover

The Undisturbed Cover (UDC) is land surface classified as reclaimed forest, forest, meadow, field, or other vegetated land area that has been allowed to return to its natural state and is not maintained. The UDC for the Project Site is 34%.

1.3.8 The “1065” Rule

The Project Site does not meet the target maximum EIC of 10% and minimum UDC of 65% in accordance with the NHDES. Therefore, pollutant-loading calculations were performed to quantify the effects of the development.

1.3.9 Pre- and Post-Development Annual Pollutant Loads

The post-development pollutant loadings from the Project Site will be removed in accordance with the New Hampshire Stormwater Manual for industrial land uses. The removal of pollutant loads will be accomplished for total suspended solids (TSS), Total phosphorus (TP), and Total nitrogen (TN) using the on-site BMPs.

2.0 BEST MANAGEMENT PRACTICES

2.1 "High-Load Area" Land Use

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented. The use of unlined detention basins or unlined swales is prohibited to avoid potential contamination of water resources. There are several types of areas on the Site that could be described as "high-load areas". These areas are:

- **Fuel and aqueous ammonia storage tank containment areas** – the fuel and aqueous ammonia storage tanks will be contained in 110 percent containment areas. Rain water captured inside the fuel containment area will be inspected for contamination prior to discharge to the closed drainage system.

- **Fuel and aqueous ammonia truck unloading areas** – The fuel and aqueous ammonia truck unloading areas will be constructed as a containment area to capture any liquid which leaks during the transfer. The stormwater discharge pipes from these areas will each have a valve which can be closed in the event of a spill.

- **Ash silo area and wood fuel pile areas** – Stormwater from the ash silo and wood fuel pile areas will be collected in a closed pipe system consisting of deep sump catch basins and Stormceptors that will remove sediment, debris, and other floatables from being transported downstream to the Androscoggin River.

- **Roadways and parking areas** – Stormwater from roadways and parking areas will be collected in a closed pipe system consisting of deep sump catch basins and Stormceptors that will remove sediment, debris, and other floatables from being transported downstream to the Androscoggin River.

2.2 Water Supply Areas

The Project Site is located outside water supply wells, groundwater protection areas, and water supply intake protection areas.

2.3 Sensitive Receiving Waters

The Project Site is located within one-mile of an impaired body of water. The Androscoggin River is listed as impaired water or sensitive receiving water in accordance with NHDES. No direct discharge of stormwater runoff generated from the proposed development will enter the Androscoggin River. All stormwater runoff generated from the development will be collected and treated on-site before being conveyed to the existing 30 inch pipe and then ultimately discharged into the Androscoggin River.

2.4 BMP Descriptions and Removal Efficiencies

The stormwater quality and quantity on the Site are managed by implementing a series of BMPs that include street sweeping, deep sump catch basins, lined vegetated swales, lined detention basins, a wet pond, and subsurface gravel wetlands. All BMPs are designed in accordance with specifications outlined in the AoT Program Administrative Rules. The pollutant removal efficiencies for these BMPs are provided in Figure 5 as indicated by the New Hampshire Stormwater Manual.

2.4.1 Source Control BMPs

Source control measures are designed to minimize or prevent the release of pollutants so they are not available for mobilization by runoff. Source controls to be implemented on-site include the following practices:

Materials management will be implemented to prevent contact between substances handled on-site and precipitation or runoff.

Landscaping practices will be implemented to manage and control the storage and use of fertilizers, herbicides, and pesticides on-site.

Street sweeping will be conducted routinely on all paved surfaces in accordance with the New Hampshire Stormwater Manual. Street sweeping will help reduce the export of sand, debris, trash, and other pollutants deposited by vehicle traffic to the closed drainage systems and receiving waters.

Snow and ice management will be implemented to regulate and track the use of sand and deicing agents (such as salt).

2.4.2 Pre-Treatment Practices

Deep sump catch basins with hoods consist of a manhole-type structure with an inlet grate, an outlet pipe connected to the piped drainage system, a 4-foot sump, and hood. The deep sump will allow sediment from the stormwater runoff to settle out and the hoods will help prevent oil/grease, debris, and other floatables from being transported downstream. The proposed deep sump catch basins will remove approximately 15% of TSS.

Stormceptors are typically flow-through proprietary structures which contain a settling unit that uses non-turbulent swirling action to treat stormwater runoff. The swirling action will allow free oils to rise and sediment to settle to the bottom of the unit. The proposed stormceptor will remove 35% of TSS.

Lined vegetated swales are shallow, linear, earthen channels designed to convey flows while capturing a limited amount of sediment and associated pollutants. The vegetated swales will be lined to prevent stormwater from infiltrating into the ground and possibly contaminating the groundwater table.

Lined detention basins are stormwater impoundments designed to collect, detain, and release stormwater runoff at a controlled rate. The detention basins will be lined to prevent stormwater from infiltrating into the ground and possibly contaminating the groundwater table. The detention basins have been designed with outlet control structures so they act as pre-treatment sediment forebays to the wet pond and subsurface gravel wetlands.

2.4.3 Treatment Practices

Wet ponds are designed to maintain a permanent pool of water throughout the year. The pool, located below the outlet invert, allows for pollutant removal through settling and biological uptake, or decomposition. The proposed Wet pond will remove 80% TSS, 55% TN and 68% TP.

Subsurface Gravel Wetlands are designed with two or more flow through constructed wetland cells, preceded by a forebay. The cells are filled with gravel media, supporting an organic substrate that is planted with wetland vegetation. Water quality treatment occurs through microbial, chemical, and physical processes within this media. Treatment may also be enhanced by vegetative uptake. The proposed gravel wetlands will remove 95% TSS, 85% TN, and 64% TP.

2.5 Inspection and Maintenance Manual

The Project includes a long-term Inspection and Maintenance Manual to maintain efficient operation of the proposed stormwater management system. The plan clearly identifies inspection activities, schedules, record keeping requirements, and contingency measures for ensuring the long-term integrity of the stormwater management facilities. The plan identifies each BMP used on the site and its specific maintenance activities and schedules. Refer to the Inspection and Maintenance Manual located in Attachment A.

2.5.1 Road Salt and Deicing Minimization Plan

To address the concerns associated with the application of chlorides and other deicing materials, a Road Salt and Deicing Minimization Plan has been developed as part of the Inspection and Maintenance Manual to minimize salt and other deicer use after the Project has been completed. The Road Salt and Deicing Minimization Plan shall track the use of salt and other deicers for each storm event. Refer to the Road Salt and Deicing Minimization Plan located in Attachment A.

3.0 EROSION AND SEDIMENT CONTROL PRACTICES

The Project will implement a system of permanent and temporary soil erosion and sediment control practices. Numerous features have been designed to prevent sediment transport. These objectives will be accomplished through the construction and maintenance of multiple structural and non-structural BMPs designed to collect and contain suspended sediments and their associated pollutants, while minimizing the amount of impact to the Androscoggin River; an impaired water body in New Hampshire. The soil erosion and sediment control practices to be implemented include silt fence and haybales installed along the perimeter of the Site and hay bales installed around drain inlets. Refer to the Erosion & Sediment Control Narrative and Soil Erosion & Sediment Control Plan located in Attachment B.

4.0 CONCLUSION

To conclude, the stormwater management system has been designed in accordance with the New Hampshire Stormwater Manual, dated December 2008 and has incorporated all practical measures to ensure the peak rate of runoff from the site will be maintained or decreased and the quality of runoff will be controlled by best management practices to remove suspended solids before leaving the site and ultimately being discharged into the Androscoggin River.

Table 1 summarizes the hydrologic analysis for the existing and proposed conditions for the 2-, 10-, and 50-year storm events.

Table 1: Peak Discharge Rates from Existing and Proposed Watersheds

(DP-1) - Peak Discharge Rates to the Androscoggin River* (CFS)			
Storm Event	2	10	50
Existing Conditions	94.53	144.44	194.54
Proposed Conditions	23.71	41.16	59.60

*Includes flow from Ex. 48-inch pipe outlet (DP-3)

(DP-2) - Peak Discharge Rates to the City of Berlin Municipal System (CFS)			
Storm Event	2	10	50
Existing Conditions	95.02	138.84	182.29
Proposed Conditions	62.62	95.29	128.02

(DP-3) - Peak Discharge Rates to the Existing 48-inch Pipe* (CFS)			
Storm Event	2	10	50
Existing Conditions	8.80	14.74	20.92
Proposed Conditions	8.81	14.72	20.88

*The 48-inch pipe outlets to the Androscoggin River

(DP-4) Peak Discharge Rates to the Existing 30-inch Pipe* (CFS)			
Storm Event	2	10	50
Proposed Conditions	48.93	78.15	117.24

*The 30-inch pipe outlets to the Androscoggin River

Total Peak Discharge Rates to the Androscoggin River (CFS)			
Storm Event	2	10	50
Existing Conditions	94.53	144.44	194.54
Proposed Conditions*	72.64	119.31	176.84

*Summation of proposed runoff to DP-1 and DP-4

Figures

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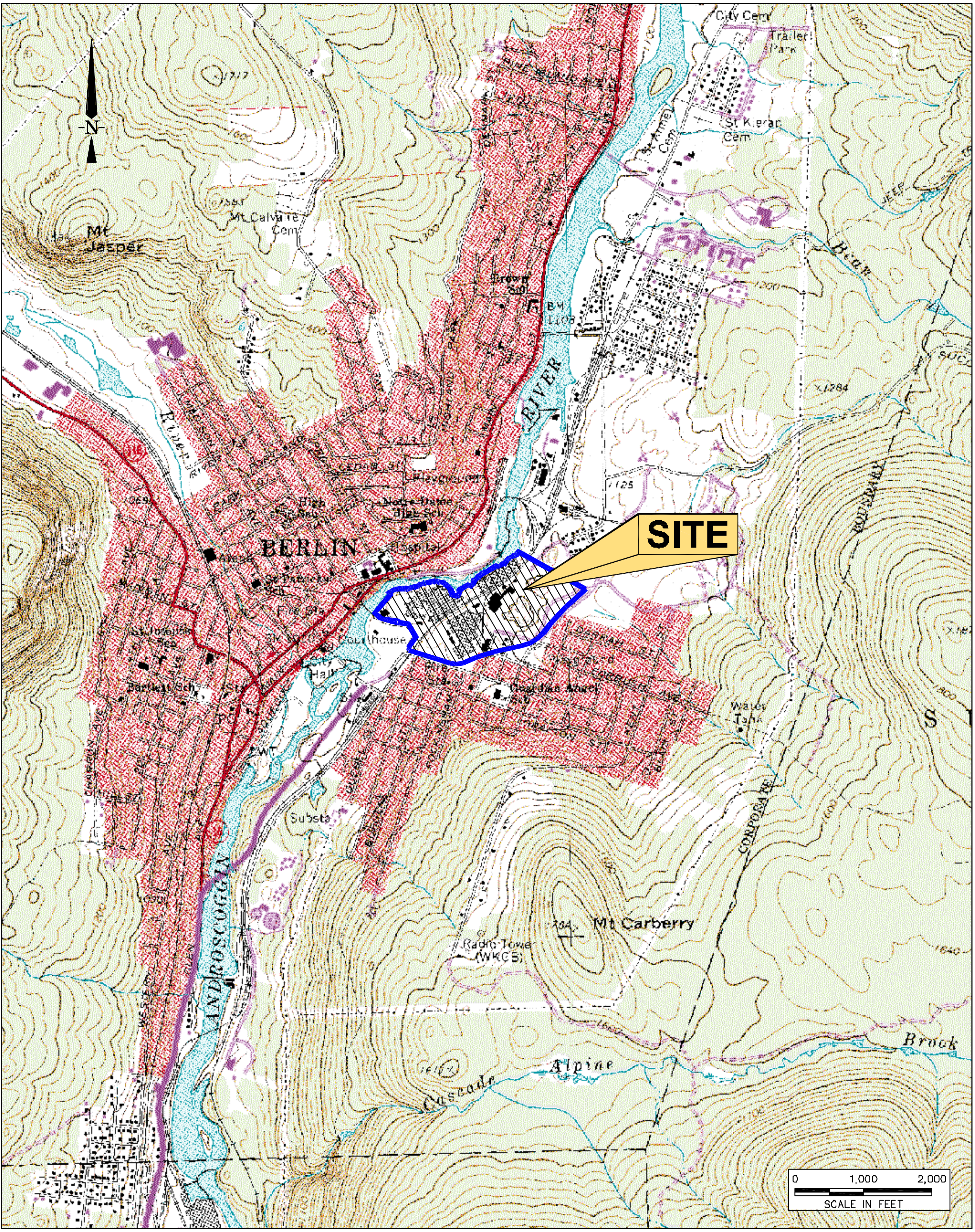

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LAIDLAW BERLIN BIOPOWER, LLC
Hutchins Street
Berlin, New Hampshire

Source: USGS
Scale: 1"=2,000'

Site Locus

Figure
1

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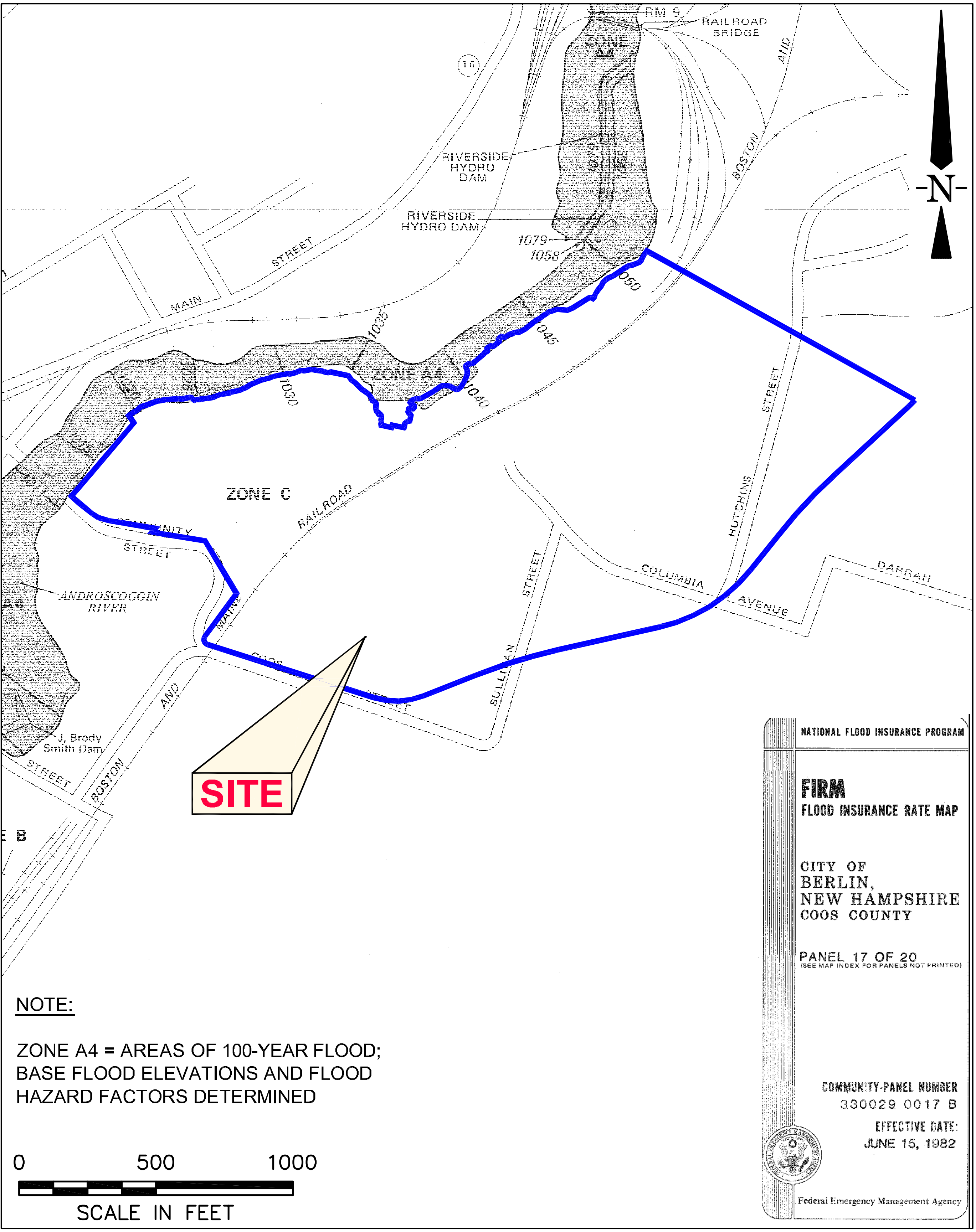

NOTE:

ZONE A4 = AREAS OF 100-YEAR FLOOD; BASE FLOOD ELEVATIONS AND FLOOD HAZARD FACTORS DETERMINED

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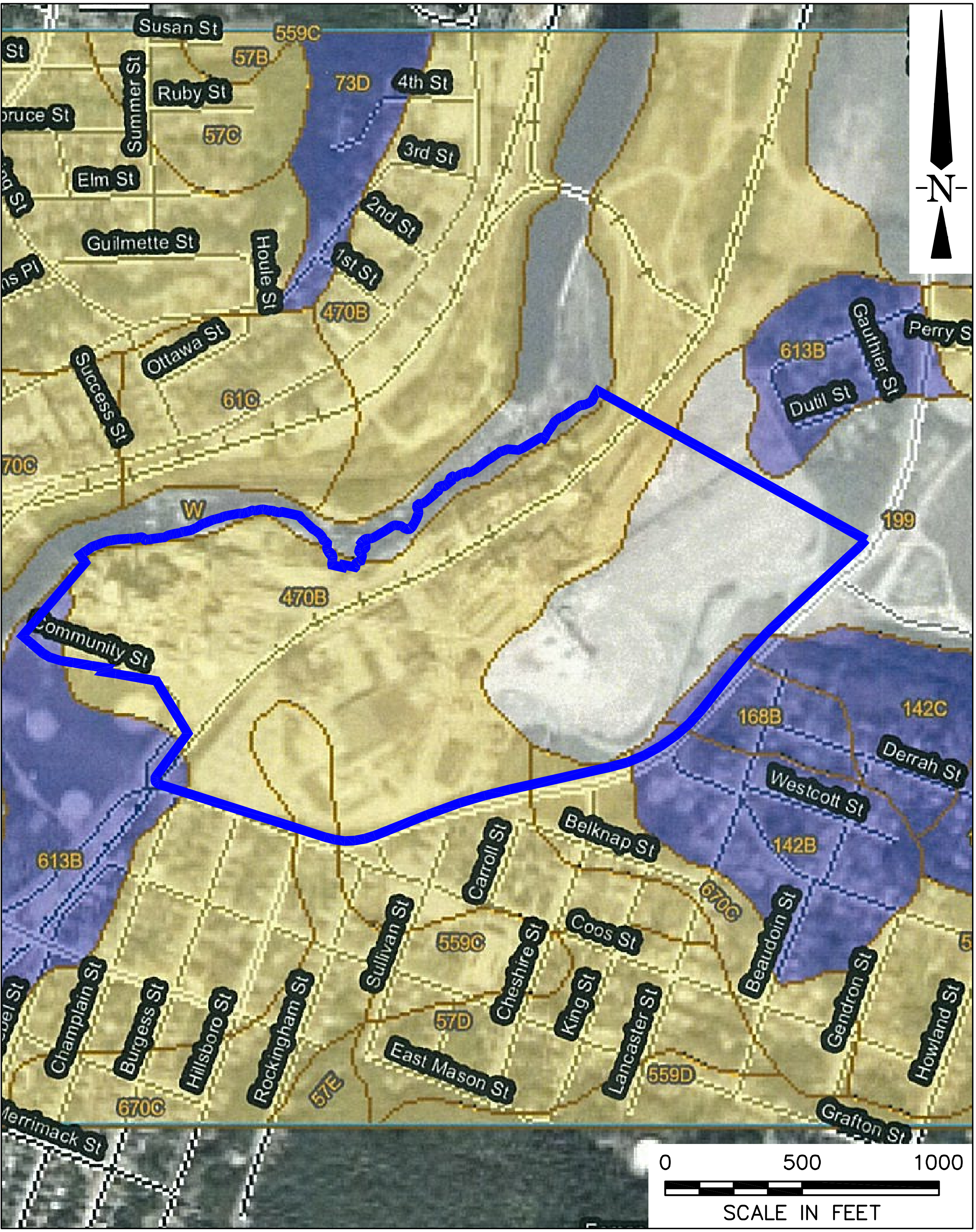
FEMA Flood Insurance Rate Map

Source: FEMA
Scale: 1" = 500'

Figure
2



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NRCS Soil Survey

Source: NRCS Web Soil Survey 2.0
Scale: 1" = 500'

Figure 3

MAP LEGEND

Area of Interest (AOI)

□ Area of Interest (AOI)

Soils

□ Soil Map Units

Soil Ratings

🟫 A

🟩 A/D

🟪 B

□ B/D

🟨 C

■ C/D

🟪 D

▨ Not rated or not available

Political Features

● Cities

Water Features

🟦 Oceans

～ Streams and Canals

Transportation

┼┼┼ Rails

～ Interstate Highways

～ US Routes

～ Major Roads

～ Local Roads

MAP INFORMATION

Map Scale: 1:10,800 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 19N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Coos County Area, New Hampshire
Survey Area Data: Version 12, May 21, 2009

Date(s) aerial images were photographed: 9/3/2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Coos County Area, New Hampshire				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
14B	Sheepscot cobbly very fine sandy loam, 1 to 8 percent slopes	B	9.0	2.0%
57B	Becket fine sandy loam, 3 to 8 percent slopes, very stony	C	1.4	0.3%
57C	Becket fine sandy loam, 8 to 15 percent slopes, very stony	C	7.1	1.6%
57D	Becket fine sandy loam, 15 to 25 percent slopes, very stony	C	45.9	10.4%
57E	Becket fine sandy loam, 25 to 35 percent slopes, very stony	C	1.8	0.4%
61C	Tunbridge-Lyman-Rock outcrop complex, 8 to 15 percent slopes	C	12.1	2.7%
73D	Berkshire very fine sandy loam, 15 to 25 percent slopes, very stony	B	6.8	1.5%
142B	Monadnock fine sandy loam, 3 to 8 percent slopes	B	13.6	3.1%
142C	Monadnock fine sandy loam, 8 to 15 percent slopes	B	9.2	2.1%
143B	Monadnock fine sandy loam, 3 to 8 percent slopes, very stony	B	4.8	1.1%
168B	Sunapee fine sandy loam, 3 to 8 percent slopes	B	4.4	1.0%
199	Dumps—bark, chips and organic material		78.0	17.7%
470B	Tunbridge-Peru complex, 3 to 8 percent slopes	C	120.0	27.2%
558C	Skerry fine sandy loam, 8 to 15 percent slopes	C	22.5	5.1%
559C	Skerry fine sandy loam, 8 to 15 percent slopes, very stony	C	4.8	1.1%
559D	Skerry fine sandy loam, 15 to 25 percent slopes, very stony	C	6.9	1.6%
613B	Croghan loamy fine sand, 1 to 8 percent slopes	B	29.4	6.7%
670C	Tunbridge-Berkshire-Lyman complex, 8 to 15 percent slopes	C	39.1	8.9%
W	Water		24.3	5.5%
Totals for Area of Interest			**441.0**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Lower

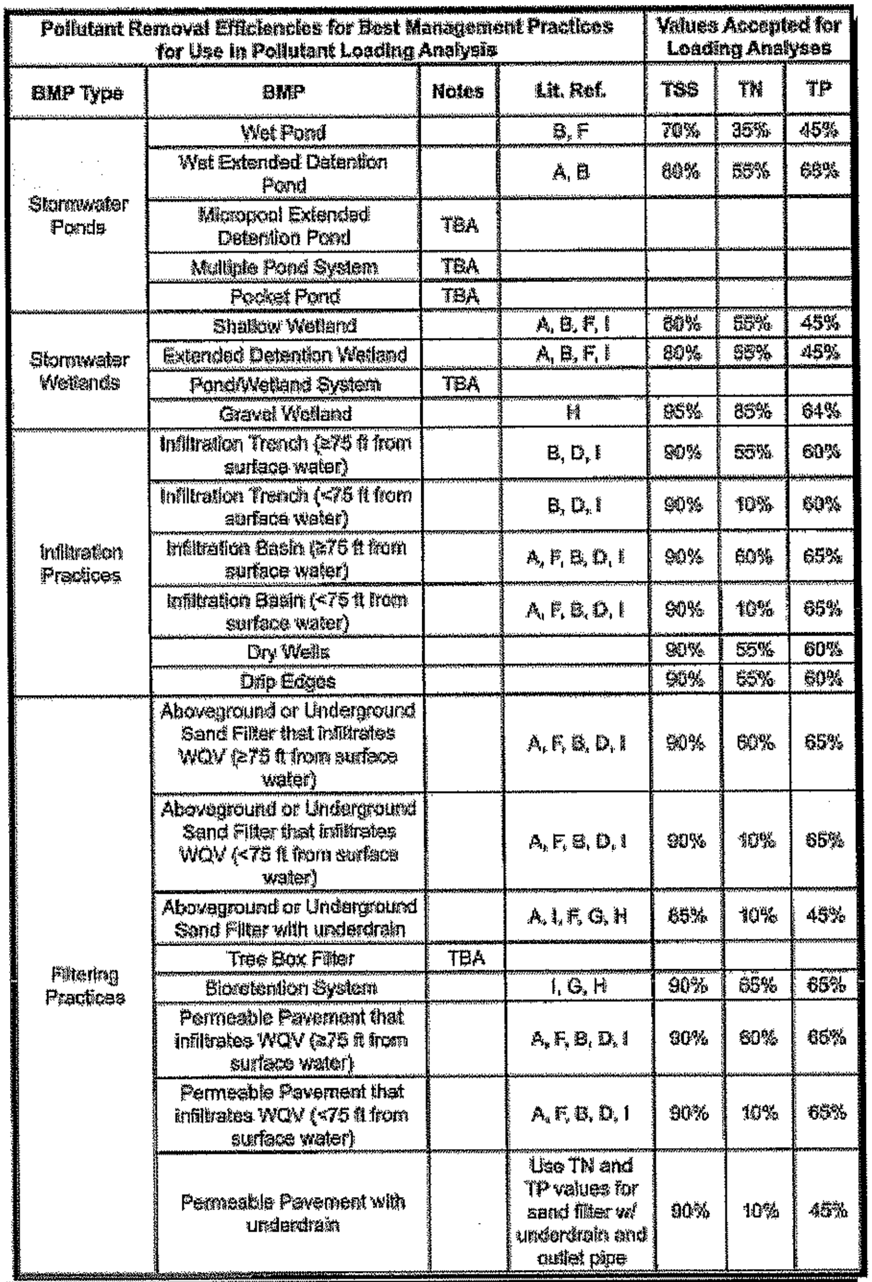
	24-hour SCS Rainfall*					
TOWN	1 yr	2 yr	10 yr	25 yr	50 yr	100 yr
ACWORTH	2.3	2.7	4.1	4.8	5.4	6.1
ALBANY	2.7	3.2	4.8	5.5	6.1	6.4
ALEXANDRIA	2.4	2.7	4.1	4.9	5.3	6.0
ALLENSTOWN	2.5	2.9	4.3	5.1	5.6	6.3
ALSTEAD	2.3	2.7	4.1	4.9	5.4	6.1
ALTON	2.4	2.9	4.2	5.1	5.5	6.2
AMHERST	2.5	2.9	4.3	5.1	5.7	6.4
ANDOVER	2.3	2.8	4.1	4.9	5.4	6.0
ANTRIM	2.4	2.8	4.2	5.0	5.6	6.2
ASHLAND	2.4	2.8	4.2	5.0	5.4	6.0
ATKINSON	2.5	3.0	4.4	5.2	5.8	6.5
ATKINSON & GILMANTON ACADEMY GRANT	2.3	2.5	3.8	4.6	4.9	5.4
AUBURN	2.5	3.0	4.3	5.1	5.7	6.4
BARNSTEAD	2.4	2.9	4.2	5.1	5.6	6.2
BARRINGTON	2.5	3.0	4.3	5.1	5.7	6.3
BARTLETT	3.0	3.5	5.1	5.9	6.4	7.0
BATH	2.3	2.5	3.9	4.7	5.0	5.7
BEAN'S GRANT2.80	3.6	4.5	5.9	6.4	7.2	
BEAN'S PURCHASE	3.0	3.7	5.2	6.1	6.6	7.2
BEDFORD	2.5	2.9	4.3	5.1	5.7	6.4
BELMONT	2.4	2.8	4.2	5.0	5.5	6.1
BENNINGTON	2.4	2.8	4.2	5.0	5.6	6.3
BENTON	2.3	2.6	4.0	4.8	5.1	5.8
BERLIN	2.5	3.2	4.4	5.0	5.6	6.2
BETHLEHEM EAST	2.4	3.3	4.5	5.2	6.0	6.6
BETHLEHEM WEST	2.4	2.8	4.0	4.9	5.2	5.9
BOSCAWEN	2.4	2.8	4.2	5.0	5.5	6.1
BOW	2.4	2.9	4.2	5.0	5.6	6.3
BRADFORD	2.3	2.8	4.1	4.9	5.5	6.1
BRENTWOOD	2.6	3.0	4.3	5.2	5.7	6.4
BRIDGEWATER	2.4	2.7	4.1	4.9	5.4	6.0
BRISTOL	2.4	2.7	4.1	4.9	5.4	6.0
BROOKFIELD	2.4	2.9	4.2	5.2	5.5	6.2
BROOKLINE	2.5	2.9	4.3	5.1	5.7	6.4
CAMBRIDGE	2.5	2.8	4.0	4.9	5.2	6.0
CAMPTON	2.4	2.8	4.2	4.9	5.3	6.0
CANAAN	2.3	2.6	4.0	4.8	5.3	5.9
CANDIA	2.5	3.0	4.3	5.1	5.7	6.3
CANTERBURY	2.4	2.8	4.2	5.0	5.5	6.2
CARROLL	2.5	3.2	4.5	5.1	6.0	6.4
CENTER HARBOR	2.4	2.8	4.2	5.0	5.4	6.0
CHANDLER'S PURCHASE	2.8	3.6	5.0	5.8	6.4	7.1

*Rainfall data is interpolated from *Technical Paper No. 40 (TP40) Rainfall Frequency Atlas of the Eastern United States* . Other data may be used (e.g., *Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada* by Cornell University, Northeast Regional Climate Center, September, 1993.)

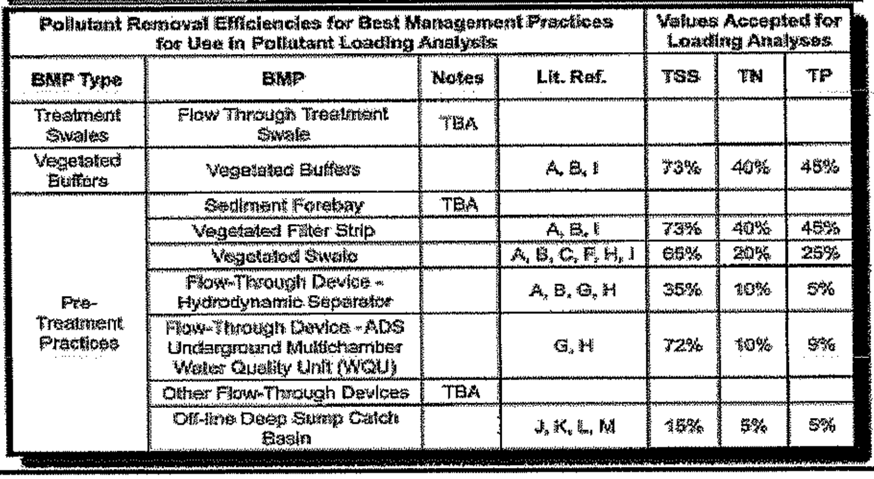
Source: New Hampshire Stormwater Management Manual (2008)
Volume 2:199

24-hour
SCS Rainfall

Figure 4



Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis				Values Accepted for Loading Analyses		
BMP Type	**BMP**	**Notes**	**Lit. Ref.**	**TSS**	**TN**	**TP**
Stormwater Ponds	Wet Pond		B, F	70%	35%	45%
	Wet Extended Detention Pond		A, B	80%	55%	65%
	Micropool Extended Detention Pond	TBA				
	Multiple Pond System	TBA				
	Pocket Pond	TBA				
Stormwater Wetlands	Shallow Wetland		A, B, F, I	80%	55%	45%
	Extended Detention Wetland		A, B, F, I	80%	55%	45%
	Pond/Wetland System	TBA				
	Gravel Wetland		H	95%	85%	64%
Infiltration Practices	Infiltration Trench (≥75 ft from surface water)		B, D, I	90%	55%	60%
	Infiltration Trench (<75 ft from surface water)		B, D, I	90%	10%	60%
	Infiltration Basin (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Infiltration Basin (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Dry Wells			90%	55%	60%
	Drip Edges			90%	55%	60%
Filtering Practices	Aboveground or Underground Sand Filter that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Aboveground or Underground Sand Filter that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Aboveground or Underground Sand Filter with underdrain		A, I, F, G, H	85%	10%	45%
	Tree Box Filter	TBA				
	Bioretention System		I, G, H	90%	55%	65%
	Permeable Pavement that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Permeable Pavement that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Permeable Pavement with underdrain		Use TN and TP values for sand filter w/ underdrain and outlet pipe	90%	10%	45%



Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis				Values Accepted for Loading Analyses		
BMP Type	**BMP**	**Notes**	**Lit. Ref.**	**TSS**	**TN**	**TP**
Treatment Swales	Flow Through Treatment Swale	TBA				
Vegetated Buffers	Vegetated Buffers		A, B, I	73%	40%	45%
Pre-Treatment Practices	Sediment Forebay	TBA				
	Vegetated Filter Strip		A, B, I	73%	40%	45%
	Vegetated Swale		A, B, C, F, H, I	65%	20%	25%
	Flow-Through Device - Hydrodynamic Separator		A, B, G, H	35%	10%	5%
	Flow-Through Device - ADS Underground Multichamber Water Quality Unit (WQU)		G, H	72%	10%	9%
	Other Flow-Through Devices	TBA				
	Off-line Deep Sump Catch Basin		J, K, L, M	15%	5%	5%

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Best Management Practices Removal Efficiencies

Source: New Hampshire Stormwater Management Manual (2008) Volume 2:208

Figure 5

Attachment A

Operation & Maintenance

Inspection & Maintenance Manual

CITY OF BERLIN
BIOMASS ENERGY FACILITY
COOS COUNTY, NEW HAMPSHIRE

INSPECTION AND MAINTENANCE MANUAL

Responsible Party: Laidlaw Berlin BioPower, LLC (Laidlaw)

Included as part of this Inspection and Maintenance (I&M) manual are the following items to be used during all inspections and maintenance activities:

1. BMP Location Plan
2. Inspection and Maintenance Log
3. Anti-icing Route Data Form with deicing application rate table

All record keeping required by the I&M manual shall be maintained by Laidlaw and any transfer of responsibility for I&M activities or transfer in ownership shall be documented to the NHDES in writing.

Laidlaw is responsible for the inspection, maintenance and reporting of all Best Management Practices (BMPs) in accordance with the following schedules:

INSPECTION AND MAINTENANCE SCHEDULE DURING CONSTRUCTION

Sediment Control	Inspection	Maintenance Thresholds	Maintenance Action
Erosion control silt fences, and hay bales	Weekly and after large storm events (more than 1.0-inch of rainfall in 24-hour period)	If integrity of the system is compromised	Restore the integrity of the system and/or clean sediment out
Catch basins with deep sump	Weekly and after large storm events (more than 2.0-inches of rainfall in 24-hour period)	If the sump is 2/3 full with sediment	Clean sediment out
Detention Basins	Weekly and after large storm events (more than 2.0-inches of rainfall in 24-hour period)	If standing water in the basin remains for 72 hours	Remove accumulated sediment and debris from outlet structures
Vegetated Swales	Weekly and after large storm events (more than 2.0-inches of rainfall in 24-hour period)	Sediment accumulation; Evidence of erosion	Remove sediment; Remove and replace dead vegetation; Re-vegetate swale
Gravel Wetlands	Weekly and after large storm events (more than 2.0-inches of rainfall in 24-hour period)	Sediment accumulation; Evidence of erosion	Remove sediment; Remove and replace dead vegetation; Repair embankments
Wet Pond	Weekly and after large storm events (more than 2.0-inches of rainfall in 24-hour period)	Sediment accumulation; Evidence of erosion	Remove sediment; Repair embankment

INSPECTION AND MAINTENANCE SCHEDULE AFTER CONSTRUCTION

Sediment Control	Inspection	Maintenance Thresholds	Maintenance Action
Catch basins with deep sump	Quarterly and after large storm events (more than 4.0-inches of rainfall in 24-hour period	When the deposits is ≥ ½ the depth from the bottom of the invert of the lowest pipe in the basin	Clean sediment out

Street Sweeping	Semi-Annually (Spring and Fall)		Mechanically sweep pavement
Detention Basins	Two times per year	If integrity of the system is compromised	Mow berm area, side slopes and basin bottom and remove sediment & debris as necessary, and at least once every 10 years
Vegetated Swales	Semi-Annually (Spring and Fall)	Sediment accumulation; Evidence of erosion	Remove sediment; Remove and replace dead vegetation; Re-vegetate swale
Gravel Wetlands	Semi-Annually (Spring and Fall)	Sediment accumulation; Evidence of invasive wetland vegetation with cells, embankment slope erosion	Remove sediment & debris; Remove and replace dead vegetation and/or invasive vegetation; Mow & repair embankments as neccesary
Wet Pond	Two times per year	Sediment accumulation	Mow embankment areas and remove sediment & debris as necessary

General Information

Project Name			
NPDES Tracking No.		**Location**	
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			

Type of Inspection:
☐ Regular ☐ Pre-storm event ☐ During storm event ☐ Post-storm event

Weather Information

Has there been a storm event since the last inspection? ☐Yes ☐No
If yes, provide:
Storm Start Date & Time: Storm Duration (hrs):

Approximate Amount of Precipitation (in):

Weather at time of this inspection?
☐ Clear ☐Cloudy ☐ Rain ☐ Sleet ☐ Fog ☐ Snowing ☐ High Winds
☐ Other: Temperature:

Have any discharges occurred since the last inspection? ☐Yes ☐No
If yes, describe:

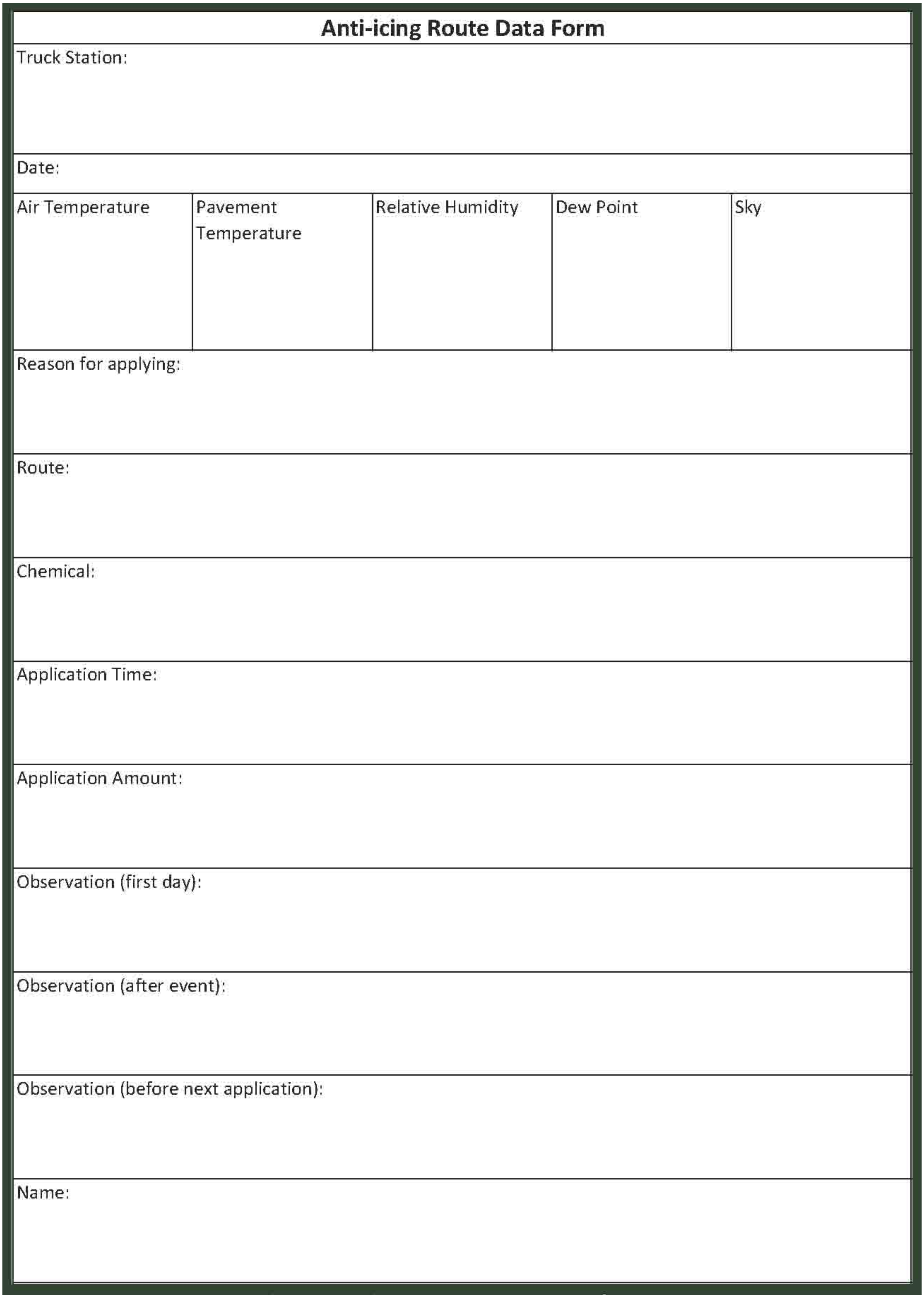
Are there any discharges at the time of inspection? ☐Yes ☐No
If yes, describe:

	BMP	Inspected	Maintenance Required	Corrective Action Needed and Notes
1	**Street Sweeping**	☐ Yes ☐ No	☐ Yes ☐ No	
2	**Deep Sump Catch Basins**	☐ Yes ☐ No	☐ Yes ☐ No	
3	**Lined Detention Basin 1**	☐ Yes ☐ No	☐ Yes ☐ No	
4	**Lined Detention Basin 2**	☐ Yes ☐ No	☐ Yes ☐ No	
5	**Wet Pond Basin 3**	☐ Yes ☐ No	☐ Yes ☐ No	
6	**Lined Detention Basin 4**	☐ Yes ☐ No	☐ Yes ☐ No	
7	**Lined Detention Basin 5**	☐ Yes ☐ No	☐ Yes ☐ No	
8	**Lined Detention Basin 6**	☐ Yes ☐ No	☐ Yes ☐ No	

9	**Concrete Swale**	☐ Yes ☐ No	☐ Yes ☐ No	
10	**Lined Vegetated Swale 1**	☐ Yes ☐ No	☐ Yes ☐ No	
11	**Lined Vegetated Swale 2**	☐ Yes ☐ No	☐ Yes ☐ No	
12	**Subsurface Gravel Wetlands**	☐ Yes ☐ No	☐ Yes ☐ No	

Road Salt & Deicer Minimization Plan

CITY OF BERLIN
BIOMASS ENERGY FACILITY
COOS COUNTY, NEW HAMPSHIRE



Anti-icing Route Data Form

Truck Station:

Date:

Air Temperature	Pavement Temperature	Relative Humidity	Dew Point	Sky

Reason for applying:

Route:

Chemical:

Application Time:

Application Amount:

Observation (first day):

Observation (after event):

Observation (before next application):

Name:

Source: New Hampshire Stormwater Management Manual (2008)
Volume 1:107

Deicing Application Rate Guidelines

24' of pavement (typcial two-lane road)

These rates are not fixed values, but rather the middle of a range to be selected and adjusted by an agency according to its local conditions and experience.

			Pounds per two-lane mile			
Pavement Temp. (°F) and Trend (↑↓)	Weather Condition	Maintenance Actions	Salt Prewetted / Pretreated with Salt Brine	Salt Prewetted / Pretreated with Other Blends	Dry Salt*	Winter Sand (abrasives)
> 30° ↑	Snow	Plow, treat intersections only	80	70	100*	Not recommended
	Freezing Rain	Apply Chemical	80 - 160	70 - 140	100 - 200*	Not recommended
30° ↓	Snow	Plow and apply chemical	80 - 160	70 - 140	100 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↑	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↓	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↑	Snow or Freezing Rain	Plow and apply chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↓	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↑	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↓	Snow or Freezing Rain	Plow and apply chemical	240 - 320	210 - 280	300 - 400*	500 for freezing rain
0° - 15° ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	300 - 400	Not recommended	500 - 750 spot treatment as needed
< 0°	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	400 - 600**	Not recommended	500 - 750 spot treatment as needed

* Dry salt is not recommended. It is likely to blow off the road before it melts ice.

** A blend of 6 - 8 gal/ton $MgCl_2$ or $CaCl_2$ added to NaCl can melt ice as low as -10°.

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Source: New Hampshire Stormwater Management Manual (2008)
Volume 1:107

Attachment B

Erosion & Sedimentation Control

EROSION AND SEDIMENT CONTROL NARRATIVE

1. Perimeter soil and erosion controls, hay bales and silt fence, shall be placed along the limit of work line as indicated on the Soil Erosion & Sediment Control Plan. The hay bales and silt fence shall be operational prior to any construction activities. All soil and erosion controls shall be checked weekly and repaired as necessary. Weekly inspections shall be recorded using the Erosion & Sediment Control Log attached.

2. Supplemental erosion control measures, such as a stone construction entrance, shall be provided in order to prevent off-site transport of earth, sediment and debris. Vehicle mud and dirt carry-out, material spills, and soil wash-out onto public roadways and walkways, will be cleaned up as necessary.

3. Areas to remain unstabilized for a period of more than 30 days shall be temporarily seeded and mulched. Permanent seeding shall occur between April 1 and June 1, or between August 15 and September 15.

4. Stockpiles of earthen materials shall be surrounded by erosion control barriers and covered (if necessary) until such time as the material is spread and stabilized or transported to an acceptable off-site disposal location. Stockpiles shall be placed outside the 250 foot Protected Shoreland Buffer of the adjacent resource areas. Soils to be stockpiled for a period of more than 30 days shall be temporarily seeded and mulched.

5. Erosion control measures should be inspected weekly, and during and after every heavy rain event (0.5-inches of precipitation or greater). Any necessary repair or replacement shall be performed promptly. Sediment shall be removed from the up-gradient side of the erosion control barrier if depth exceeds six (6) inches. Hay bales and siltation fence shall be replaced if any evidence of crushing, tearing, or rotting is present.

6. If necessary, Erosion control blankets shall be placed on slopes 3:1 or steeper, and in accordance with the plans and specifications.

7. Dust shall be controlled in accordance with the specifications. Only water, not chemicals, shall be used as a wetting agent to control dust in the buffer zone.

8. Throughout excavation, necessary precautions shall be implemented, including installation of temporary drainage swales, sumps/filtration dams, check dams, hay bales, silt fences, and temporary pipes to direct and control drainage from disturbed areas on the site so that erosion and siltation is minimal.

9. Site Construction shall be phased to minimize the area disturbed or left open to the elements at any given time. This shall be achieved by loaming and seeding cut slopes immediately upon

completion of subgrade preparation and by limiting stripping and stockpiling of loam to areas slated for immediate construction and stabilization.

10. Remove all erosion control measures, including hay bales, silt fence, sumps and check dams only when construction is completed, upland surfaces are stabilized and the piped drainage system is fully operational.

CONSTRUCTION SCHEDULE

1. Install perimeter siltation barriers as shown on the Soil Erosion & Sediment Control Plan.
2. Install stone construction entrance.
3. Construct necessary temporary diversion swales and/or sedimentation basins as needed.
4. Complete bulk tree removal, earthwork and grading activities.
5. Install drainage infrastructure (pipes, manholes, and catch basins). Hay bale filters shall be installed around all catch basins to remain and other drainage system inlets and maintained until permanent groundcover is established.
6. Complete installation of other site work items, including utilities, curbing, pavement and landscaping.

General Information

Project Name			
NPDES Tracking No.		**Location**	
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			

Type of Inspection:
☐ Regular ☐ Pre-storm event ☐ During storm event ☐ Post-storm event

Weather Information

Has there been a storm event since the last inspection? ☐Yes ☐No
If yes, provide:
Storm Start Date & Time: Storm Duration (hrs):

Approximate Amount of Precipitation (in):

Weather at time of this inspection?
☐ Clear ☐Cloudy ☐ Rain ☐ Sleet ☐ Fog ☐ Snowing ☐ High Winds
☐ Other: Temperature:

Have any discharges occurred since the last inspection? ☐Yes ☐No
If yes, describe:

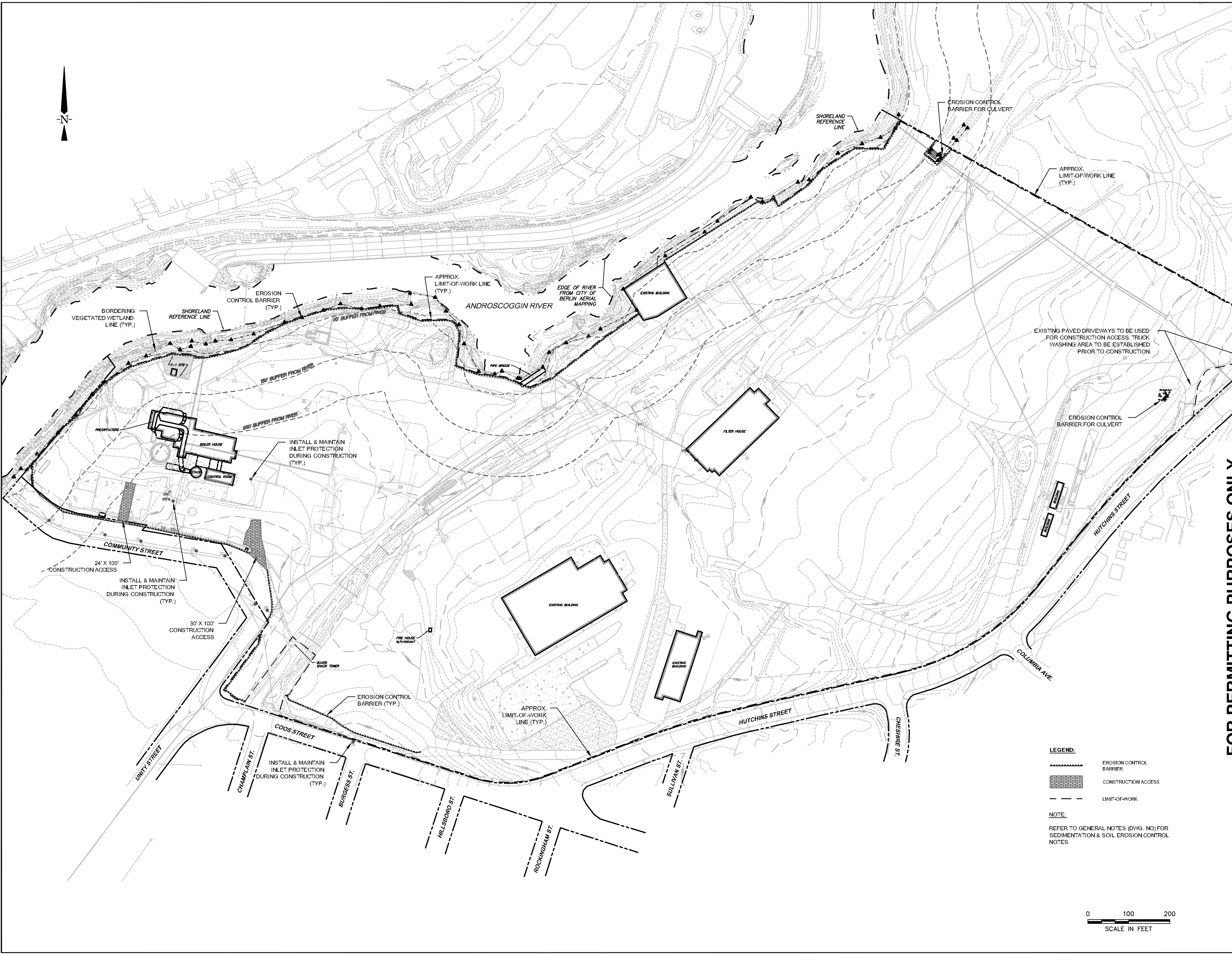
Are there any discharges at the time of inspection? ☐Yes ☐No
If yes, describe:

	BMP	BMP Installed	Maintenance Required	Corrective Action Needed and Notes
1		☐Yes ☐No	☐Yes ☐No	
2		☐Yes ☐No	☐Yes ☐No	
3		☐Yes ☐No	☐Yes ☐No	
4		☐Yes ☐No	☐Yes ☐No	
5		☐Yes ☐No	☐Yes ☐No	
6		☐Yes ☐No	☐Yes ☐No	
7		☐Yes ☐No	☐Yes ☐No	
8		☐Yes ☐No	☐Yes ☐No	
9		☐Yes ☐No	☐Yes ☐No	
10		☐Yes ☐No	☐Yes ☐No	

	BMP	BMP Installed	Maintenance Required	Corrective Action Needed and Notes
11		☐Yes ☐No	☐Yes ☐No	
12		☐Yes ☐No	☐Yes ☐No	
13		☐Yes ☐No	☐Yes ☐No	
14		☐Yes ☐No	☐Yes ☐No	
15		☐Yes ☐No	☐Yes ☐No	
16		☐Yes ☐No	☐Yes ☐No	
17		☐Yes ☐No	☐Yes ☐No	
18		☐Yes ☐No	☐Yes ☐No	
19		☐Yes ☐No	☐Yes ☐No	
20		☐Yes ☐No	☐Yes ☐No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	☐Yes ☐No	☐Yes ☐No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	☐Yes ☐No	☐Yes ☐No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	☐Yes ☐No	☐Yes ☐No	
4	Are discharge points and receiving waters free of any sediment deposits?	☐Yes ☐No	☐Yes ☐No	
5	Are storm drain inlets properly protected?	☐Yes ☐No	☐Yes ☐No	
6	Is the construction exit preventing sediment from being tracked into the street?	☐Yes ☐No	☐Yes ☐No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	☐Yes ☐No	☐Yes ☐No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	☐Yes ☐No	☐Yes ☐No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	☐Yes ☐No	☐Yes ☐No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	☐Yes ☐No	☐Yes ☐No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	☐Yes ☐No	☐Yes ☐No	
12	(Other)	☐Yes ☐No	☐Yes ☐No	



LEGEND:

▬▬▬	EROSION CONTROL BARRIER
▨	CONSTRUCTION ACCESS
— — —	LIMIT-OF-WORK

NOTE:

REFER TO GENERAL NOTES (DWG. NO) FOR SEDIMENTATION & SOIL EROSION CONTROL NOTES

FOR PERMITTING PURPOSES ONLY

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No.	REVISION	DATE	APP BY

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CHECKED BY: JCB
DESIGNED BY: DJG
APPROVED BY: JCB

LaidLaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

Biomass Energy Facility
Berlin, NH

SOIL EROSION & SEDIMENTATION CONTROL PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 4 of 22
SCALE: 1" = 100'

DRAWING No.
ES

Attachment C

Stormwater Calculations

TREATMENT SWALE DESIGN CRITERIA (Env-Wq 1508.07)

Node Name: Vegetated Swale (S-2)
(for example, Reach TS5)

Yes	Yes/No	Are you familiar with the restrictions on unlined treatment swales outlined in Env-Wq 1508.07(b)	
Yes	Yes/No	Is the system lined?	
21.6	ac	Area (A) draining to the swale	
11.5	ac	Impervious area draining to the swale	
6.0	minutes	Time of Concentration	
0.53	decimal	Percent Impervious area (I) draining to the swale	
0.53	unitless	Runoff coefficient (Rv) = 0.05 + (0.9 x I)	
11.44	ac-in	WQV= 1" x Rv x A	
41,522	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1	inches	P is the rainfall. For WQF in NH, P = 1".	
0.53	inches	Q is the water quality depth. Q = WQV/A	
94	unitless	CN is the unit peak discharge curve number. $CN = 1000/(10+5P+10Q-10*[Q^2 + 1.25*Q*P]^{0.5})$	
0.59	inches	S is the potential maximum retention. S = (1000/CN) - 10	
0.118	inches	Ia is the initial abstraction. Ia = 0.2S	
985	cfs/mi^2/in	qu is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III	
17.60	cfs	$WQF = q_u$ x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640 ac	
390	feet	Swale length [1]	**← ≥ 100'**
5.0	feet	Bottom of the swale width	**← 0 - 8 feet [2]**
	feet	Elevation of SHWT (E_{SHWT}). If none found, use the lowest elev. of the test pit.	
1,070.00	feet	Elevation of the bottom of the practice	**← $\geq E_{SHWT}$**
3.0	:1	Right Side slope	**← ≥3:1**
3.0	:1	Left Side slope	**← ≥3:1**
0.023	ft/ft	Longitudinal slope, if >2% check dams are required	**← 0.5% - 5%**
4.0	inches	Maximum flow depth at WQF; attach a stage-discharge rating table for swale	**← ≤ 4"**
0.15	unitless	WQF depth < 4" therefore Manning's n is 0.15	
2.00	ft^2	Cross-sectional area check (assume trapezoidal channel)	
7.11	feet	Check Wetted perimeter	
1.30	cfs	WQF_{check}. Correct depth selected from stage-discarge? $WQF_{check} = WQF$ [3]	**← $WQF_{check}=WQF$**
-1258%		Percent difference between WQF_{check} and WQF [3]	**← +/- 10%**
1	minutes	Hydraulic residence time during the WQF	**← ≥ 10 min**
2	ft	Peak elevation of the 10-year storm event	
2	ft	Elevation of the top of the swale	
YES	Yes/No	10 peak elevation ≤ the top of swale	**← yes**

*Design criteria in bold font, located in the right margin, are requirements of Env-Wq 1508.07

**The colored cells contain formulas and cannot be edited.

1. Any portion of the swale that is in a roadside ditch shall not count towards the swale length.
2. Widths up to 16' shall be allowed if a dividing berm or structure is used such that neither width is more than 8'.
3. The WQF_{check} and the WQF should be near equal (within 10%) to confirm that you have selected the correct depth off the stage-discharge table. If the depth is not accurate the Hydraulic residence time will be incorrect.

Designer's Notes: Vegetated Swale S-2 is part of a long treatment train of structural BMPs that includes detention basins (which are located before and after this swale). Further, stormwater flows from these BMP's are ultimately conveyed (via 30" underground pipe) to the existing Androscoggin River outfall.

TREATMENT SWALE DESIGN CRITERIA (Env-Wq 1508.07)

Node Name: **Vegetated Swale S-3**
(for example, Reach TS5)

Yes	Yes/No	Are you familiar with the restrictions on unlined treatment swales outlined in Env-Wq 1508.07(b)	
Yes	Yes/No	Is the system lined?	
3.5	ac	Area (A) draining to the swale	
2.8	ac	Impervious area draining to the swale	
6.0	minutes	Time of Concentration	
0.80	decimal	Percent Impervious area (I) draining to the swale	
0.77	unitless	Runoff coefficient (Rv) = 0.05 + (0.9 x I)	
2.70	ac-in	WQV= 1" x Rv x A	
9,783	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
1	inches	P is the rainfall. For WQF in NH, P = 1".	
0.77	inches	Q is the water quality depth. Q = WQV/A	
98	unitless	CN is the unit peak discharge curve number. $CN = 1000/(10+5P+10Q-10*[Q^2 + 1.25*Q*P]^{0.5})$	
0.23	inches	S is the potential maximum retention. S = (1000/CN) - 10	
0.046	inches	Ia is the initial abstraction. Ia = 0.2S	
1,000	$cfs/mi^2/in$	qu is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III	
4.21	cfs	WQF = q_u x WQV. Conversion: to convert "$cfs/mi^2/in$ * ac-in" to "cfs" multiply by $1mi^2/640$ ac	
358	feet	Swale length [1]	← **≥ 100'**
5.0	feet	Bottom of the swale width	← **0 - 8 feet [2]**
	feet	Elevation of SHWT (E_{SHWT}). If none found, use the lowest elev. of the test pit.	
946.00	feet	Elevation of the bottom of the practice	← **≥ E_{SHWT}**
3.0	:1	Right Side slope	← **≥3:1**
3.0	:1	Left Side slope	← **≥3:1**
0.011	ft/ft	Longitudinal slope, if >2% check dams are required	← **0.5% - 5%**
4.0	inches	Maximum flow depth at WQF; attach a stage-discharge rating table for swale	← **≤ 4"**
0.15	unitless	WQF depth < 4" therefore Manning's n is 0.15	
2.00	ft^2	Cross-sectional area check (assume trapezoidal channel)	
7.11	feet	Check Wetted perimeter	
0.90	cfs	WQF_{check}. Correct depth selected from stage-discarge? WQF_{check} = WQF [3]	← **WQF_{check}=WQF**
-366%		Percent difference between WQF_{check} and WQF [3]	← **+/- 10%**
3	minutes	Hydraulic residence time during the WQF	← **≥ 10 min**
1	ft	Peak elevation of the 10-year storm event	
1	ft	Elevation of the top of the swale	
YES	Yes/No	10 peak elevation ≤ the top of swale	← **yes**

*Design criteria in bold font, located in the right margin, are requirements of Env-Wq 1508.07

**The colored cells contain formulas and cannot be edited.

1. Any portion of the swale that is in a roadside ditch shall not count towards the swale length.
2. Widths up to 16' shall be allowed if a dividing berm or structure is used such that neither width is more than 8'.
3. The WQF_{check} and the WQF should be near equal (within 10%) to confirm that you have selected the correct depth off the stage-discharge table. If the depth is not accurate the Hydraulic residence time will be incorrect.

igner's Notes: Vegetated Swale S-3 is part of a treatment train of structural & non-structrual BMPs. Stormwater
s from these BMP's are ultimately conveyed (via 30" underground pipe) to the existing Androscoggin River outfall.

STORMWATER POND DESIGN CRITERIA (Env-Wq 1508.03)

Type/Node Name: **Wet Pond (Basin #3, P-3)**
(for example, Wet Pond/Pond P1)

24.2	ac	Area (A) draining to the pond	
13.9	ac	Impervious area draining to the pond	
0.57	decimal	Percent Impervious area (I) draining to the pond	
0.57	unitless	Runoff coefficient (Rv) = 0.05 + (0.9 x I)	
13.72	ac-in	WQV= 1" x Rv x A	
49,804	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
4,980	cf	10% x WQV (check calc for sediment forebay volume)	
24,902	cf	50% x WQV (check calc for extended detention volume, if extended detention proposed)	
25,457	cf	Sediment forebay volume	**← ≥ 10%WQV**
10,900	cf	Permanent pool volume (V_P)	
38,016	cf	Extended detention volume (V_{ED}), if applicable	
48,916	cf	$V_P + V_{ED}$	**← ≥ WQV**
0.4	cfs	If Ext. Detention is provided: *design* Qavg = V_{ED} / 24 hrs * (1hr / 3600 sec)	
0.9	cfs	If Ext. Detention is provided: 2 * *design* Qavg (use to check Q_{max} below)	
	cfs	If Ext. Detention is provided: Actual Q_{max} at the E_{ED} (attach orifice/weir calc)	**← ≤ 2Qavg**
-	hours	If Ext. Detention is provided: Actual drawdown time = $2V_{ED}/Q_{max}$	**← ≥ 24-hrs**
3.0	:1	Pond side slopes	**← ≥3:1**
1.0	ft	Average pool depth	**← 3 - 6 ft**
1.0	ft	Maximum depth of permanent pool	**← ≤ 8 ft**
225.0	ft	Length of the flow path between the inlet and outlet at mid-depth	
77.0	ft	Average Width ([average of the top width + average bottom width]/2)	
2.9	:1	Length to Average Width ratio	**← ≥ 3:1**
	Yes/No	The perimeter should be curvilinear.	
	Yes/No	The inlet and outlet should be located as far apart as possible.	
	Yes/No	Is there a manually-controlled drain provided to dewater the pond over a 24-hour period?	
If no state why:			
Trash rack		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")? (e.g. trash rack, gravel pack, internal OS, or NA)	
1,067	ft	Peak elevation of the 50-year storm event	
1,068	ft	Berm elevation of the pond	
YES		50 peak elevation ≤ the berm elevation?	**← yes**

Qualified professional that developed the planting plan:
Name, Profession:

*Design criteria in bold font, located in the right margin, are requirements of Env-Wq 1508.03
**The colored cells contain formulas and cannot be edited.

Designer's Notes:

Summary for Pond P-3: Wet Pond

```
Inflow Area =    24.169 ac, 57.40% Impervious, Inflow Depth >  0.35"   for  WQV event
Inflow    =       6.32 cfs @  12.08 hrs, Volume=        0.711 af
Outflow   =       0.88 cfs @  14.03 hrs, Volume=        0.416 af, Atten= 86%, Lag= 117.1 min
Primary   =       0.88 cfs @  14.03 hrs, Volume=        0.416 af
```

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
Peak Elev= 1,061.34' @ 14.03 hrs Surf.Area= 12,896 sf Storage= 15,093 cf
Flood Elev= 1,067.50' Surf.Area= 24,347 sf Storage= 122,770 cf

Plug-Flow detention time= 273.9 min calculated for 0.416 af (59% of inflow)
Center-of-Mass det. time= 142.2 min (1,021.7 - 879.5)

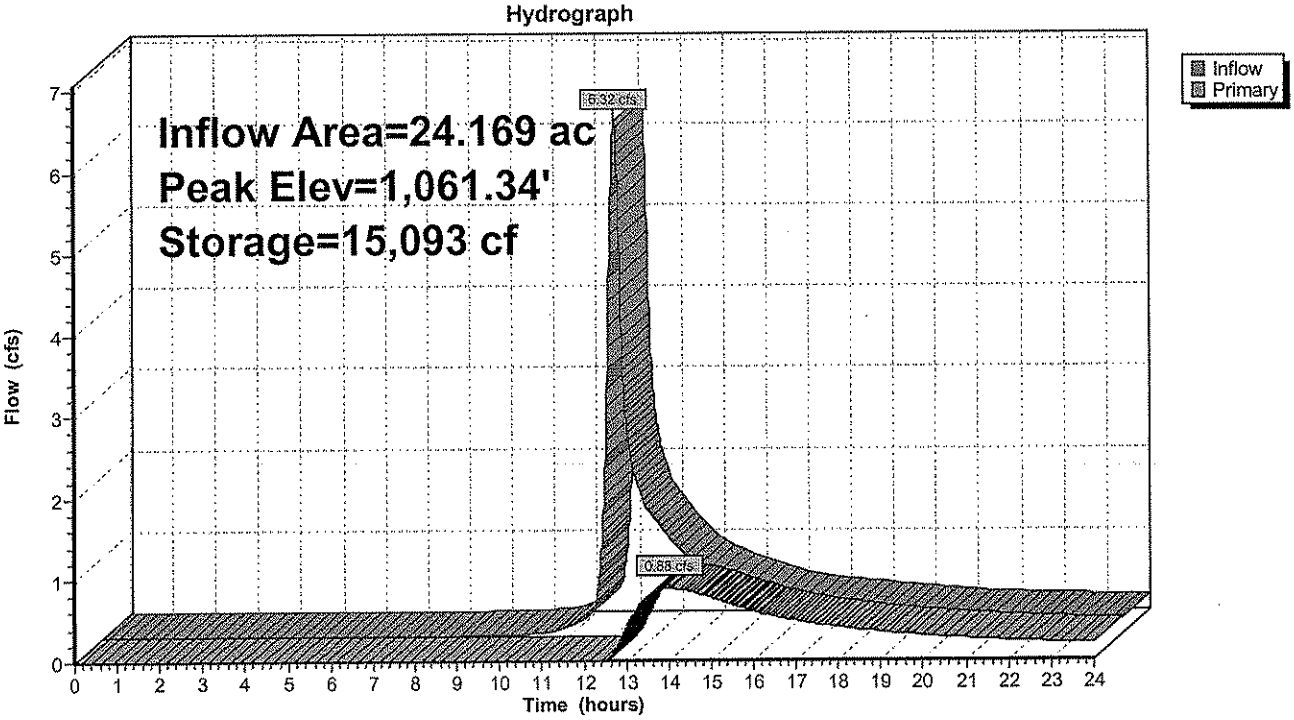
Volume	Invert	Avail.Storage	Storage Description
#1	1,060.00'	122,770 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,060.00	10,068	543.0	0	0	10,068
1,061.00	11,752	581.0	10,899	10,899	13,513
1,062.00	15,265	558.0	13,470	24,369	15,674
1,064.00	18,728	596.0	33,934	58,303	19,350
1,066.00	22,418	634.0	41,091	99,394	23,267
1,067.00	24,347	653.0	23,376	122,770	25,317

Device	Routing	Invert	Outlet Devices
#1	Primary	1,061.00'	**36.0" x 185.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 1,058.50' S= 0.0135 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	1,061.00'	**12.0" Vert. Orifice/Grate X 3.00** C= 0.600
#3	Device 1	1,062.50'	**8.0" Vert. Orifice/Grate X 4.00** C= 0.600
#4	Device 1	1,064.00'	**6.0" Vert. Orifice/Grate X 5.00** C= 0.600
#5	Device 1	1,065.00'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

```
Primary OutFlow  Max=0.88 cfs @ 14.03 hrs  HW=1,061.34'   (Free Discharge)
└─1=Culvert  (Inlet Controls 0.88 cfs @ 1.99 fps)
   ├─2=Orifice/Grate  (Passes 0.88 cfs of 1.41 cfs potential flow)
   ├─3=Orifice/Grate  ( Controls 0.00 cfs)
   ├─4=Orifice/Grate  ( Controls 0.00 cfs)
   └─5=Broad-Crested Rectangular Weir  ( Controls 0.00 cfs)
```

Pond P-3: Wet Pond



STORMWATER WETLAND DESIGN CRITERIA (Env-Wq 1508.04)

Type/Node Name: Subsurface Gravel Wetlands (P-7)
(for example, Gravel Wetland/Pond P2)

11.0 ac	Area (A) draining to the pond	
9.2 ac	Impervious area draining to the pond	
0.84 decimal	Percent Impervious area (I) draining to the pond	
0.81 unitless	Runoff coefficient (Rv) = 0.05 + (0.9 x I)	
8.87 ac-in	WQV= 1" x Rv x A	
32,184 cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
3,218 cf	10% x WQV (check calc for sediment forebay volume)	
14,483 cf	45% x WQV (check calc for treatment bay volume, if a gravel wetland is proposed)	
16,092 cf	50% x WQV (check calc for extended detention volume, if extended detention proposed)	
32,502 cf	Sediment forebay volume	**← ≥ 10%WQV**
8,304 cf	If a Gravel Wetland: Volume of Treatment bay 1 (V_{TB})	**← ≥ 45%WQV**
8,304 cf	If a Gravel Wetland: Volume of Treatment bay 2 (V_{TB})	**← ≥ 45%WQV**
cf	Permanent pool volume (V_P)	
cf	Extended detention volume (V_{ED}), if applicable	**← ≤ 50%WQV**
- cf	$V_P + V_{ED}$	**← ≥ WQV**
- cfs	If Ext. Detention is provided: *design* Qavg = V_{ED} / 24 hrs * (1hr / 3600 sec)	
- cfs	If Ext. Detention is provided: 2 * *design* Qavg (use to check Q_{max} below)	
cfs	If Ext. Detention is provided: Actual Q_{max} at the E_{ED} (attach orifice/weir calc)	**← ≤ 2Qavg**
- hours	If Ext. Detention is provided: Actual drawdown time = $2V_{ED}/Q_{max}$	**← ≥ 24-hrs**
3.0 :1	Pond side slopes	**← ≥3:1**
ft	Maximum depth of permanent pool	**← ≤ 8 ft**
ft	Elevation of the permanent pool (E_{PP})	
1,037.7 ft	Peak elevation of the 50-year storm event (E_{50})	
1,037.7 ft	Depth above the permanent pool (E_{50} - E_{PP})	**← ≤ 4'**
15.0 ft	Length of the flow path between the inlet and outlet at mid-depth	
30.0 ft	Average Width ([average of the top width + average bottom width]/2)	
0.5 :1	Length to Average Width ratio	**← ≥ 3:1**
Yes/No	The perimeter should be curvilinear.	
Yes/No	The inlet and outlet should be located as far apart as possible.	
Yes/No		
If no state why:		
	What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")? (e.g. trash rack, gravel pack, internal OS, or NA)	
1,037.7 ft	Peak elevation of the 50-year storm event (E_{50})	
1,039 ft	Berm elevation of the pond	
YES	E_{50} ≤ the berm elevation?	**← yes**

Qualified professional that developed the planting plan:
Name, Profession:

*Design criteria in bold font, located in the right margin, are requirements of Env-Wq 1508.04
**The colored cells contain formulas and cannot be edited.

Designer's Notes:

Summary for Pond P-7: Gravel Wetlands

Inflow Area =	10.986 ac, 83.98% Impervious,	Inflow Depth > 0.51"	for WQV event
Inflow =	4.23 cfs @ 11.99 hrs,	Volume=	0.467 af
Outflow =	1.51 cfs @ 12.62 hrs,	Volume=	0.399 af, Atten= 64%, Lag= 37.6 min
Primary =	1.51 cfs @ 12.62 hrs,	Volume=	0.399 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 1,034.81' @ 12.62 hrs Surf.Area= 3,267 sf Storage= 5,675 cf
Flood Elev= 1,038.50' Surf.Area= 11,311 sf Storage= 21,763 cf

Plug-Flow detention time= 114.5 min calculated for 0.399 af (85% of inflow)
Center-of-Mass det. time= 49.8 min (904.5 - 854.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,031.00'	10,309 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) x 2
#2	1,036.00'	11,454 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
		21,763 cf	Total Available Storage

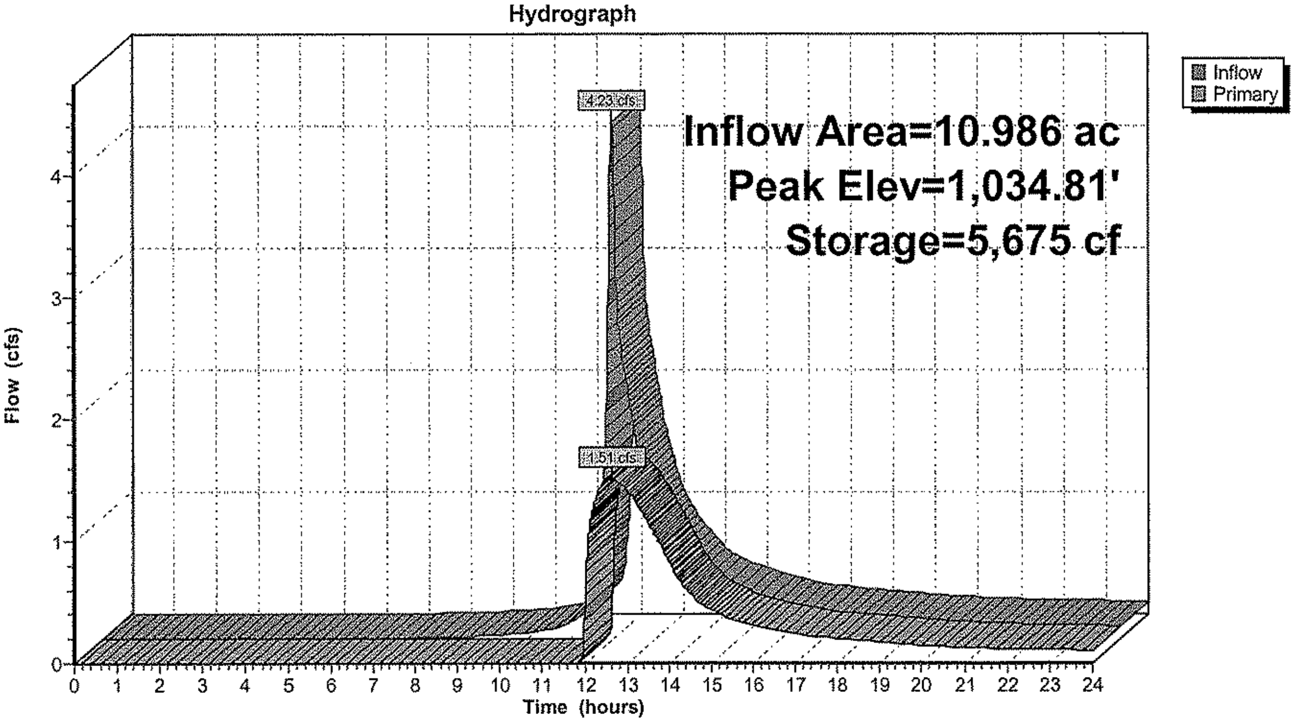
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,031.00	1,250	150.0	40.0	0	0	1,250
1,033.00	1,250	150.0	30.0	750	750	1,550
1,033.33	1,250	150.0	20.0	82	832	1,599
1,034.00	1,250	150.0	100.0	838	1,670	1,700
1,036.00	2,286	193.0	100.0	3,484	5,154	2,923

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,036.00	4,572	386.0	0	0	4,572
1,037.00	5,817	298.0	5,182	5,182	9,374
1,038.00	6,739	317.0	6,272	11,454	10,354

Device	Routing	Invert	Outlet Devices
#1	Primary	1,033.67'	**36.0" x 38.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 1,033.20' S= 0.0124 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	1,033.67'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	1,031.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	1,035.00'	**4.00' W x 2.00' H Vert. Orifice/Grate** C= 0.600

```
Primary OutFlow  Max=1.51 cfs @ 12.62 hrs  HW=1,034.81'  (Free Discharge)
└─1=Culvert  (Passes 1.51 cfs of 8.25 cfs potential flow)
   ├─2=Orifice/Grate  (Orifice Controls 1.51 cfs @ 4.33 fps)
   │  └─3=Orifice/Grate  (Passes 1.51 cfs of 1.80 cfs potential flow)
   └─4=Orifice/Grate  ( Controls 0.00 cfs)
```

Pond P-7: Gravel Wetlands



ESS Group, Inc.
Engineers
Scientists
Consultants

PROJECT LAIDLAW PROJECT NO. L145-004.05
PREPARED BY R. QUANT DATE Nov. 4, 2009
CHECKED BY JCB DATE Nov. 5, 2009
SCALE N/A PAGE NO. 1 OF 1

RIP-RAP APRON DESIGN

	Apron 1	Apron 2 (FES #2)	
Type Soil	C Tunbridge-Berkshire-Lyman	C Tunbridge-Peru	
Pipe outlet D_o	5 ft (width of bottom of channel	36 in = 3 ft	Pipe Doutside = 42 in
Q_{25y}	112.78 cfs. (for entire watershed)	36.88 cfs	(from HydroCAD)

La = length of the apron (feet)
D_o = maximum inside width of outlet pipe or channel (feet)
Q = outlet discharge (cfs)
TW = tailwater elevation (feet)
W = width of apron (feet)

Assume: no tailwater

$TW < \frac{D_o}{2}$	$TW < \frac{5}{2} = 2.5$	$TW < \frac{3}{2} = 1.5$
Apron Length $La = \frac{1.8Q}{D_o*1.5 + 7D_o}$	$\frac{1.8 * 112.78}{(5*1.5) + 7(5)} = 4.78$ ft	$\frac{1.8 * 36.88}{(3*1.5) + 7(3)} = 2.60$ ft.
Apron Width $W = 3D_o + La$	$(3*5) + 4.78 = 19.78$ feet	$(3*3) + 2.60 = 11.60$ ft.
Apron Width at the Culvert Outlet $W = 3*D_o$	$3*5 = 15$ ft	$3 \times 3 = 9$ ft
Side slopes	2:1 or 1:1	2:1 or 1:1
Bottom Grade	0%	0%
Riprap Diameter (assume TW=1 ft) $D_{50} = \frac{0.02Q^{1.3}}{(TW * D_o)}$	$D_{50} = \frac{0.02 * 112.78^{1.3}}{1*5} = 1.86$ ft	$D_{50} = \frac{0.02 * 36.88^{1.3}}{1*3} = 0.73$ ft
$D_{100} = 1.5 * D_{50}$	$D_{100} = 2.8$ ft	$D_{100} = 0.73*1.5 = 1.09$ ft

Attachment D

Closed Drainage Calculations

ESS Group Inc.

CLOSED DRAINAGE SYSTEM CALCULATIONS

Storm Drainage Pipe Design Computations

Name: *Laidlaw Biomass Energy Facility*
Berlin, NH
Client: *Laidlaw*

Proj. No.: *L145*
Date: 12/15/2009
Computed by: DJG

Design Parameters: I=5.6"
10 Year Storm **Area** NH
Checked by: JCB

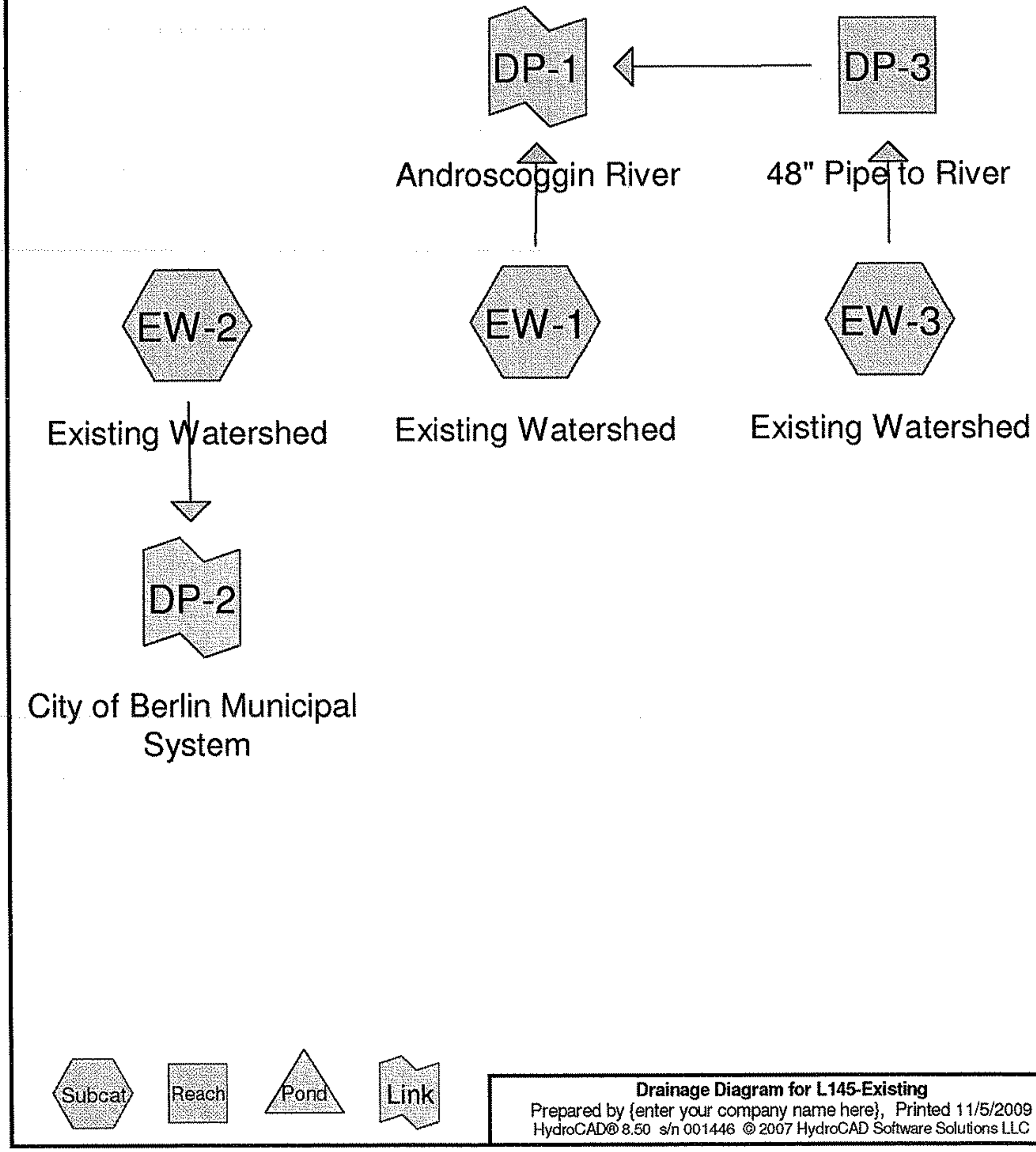
LOCATION		AREA	C	C x A	AREA	C	C x A	SUM	FLOW TIME (MIN)		I	DESIGN						CAPACITY		PROFILE					
FROM	TO	(AC.)			(AC.)			C x A	PIPE	CONC TIME		Q	V	PIPE TYPE	n	PIPE SIZE	SLOPE	Q full ft^3/s	V full ft/s	LENGTH ft	FALL ft	RIM	INV UPPER	INV LOWER	GROUND COVER (FT)
OCS #1	DMH #1											32.9	9.5	HDPE	0.012	30	1.30%	50.66	10.3	150	1.90	1088.0	1083.00	1081.10	2.500
24" INLET	FES #1											21.3	9.7	HDPE	0.012	24	1.80%	32.88	10.5	56	1.00	N/A	1086.00	1085.00	N/A
OCS #2	DMH #1											34.0	6.7	HDPE	0.012	36	0.50%	51.09	7.2	71	0.40	1085.5	1081.50	1081.10	1.000
DMH #1	DMH #2											66.9	8.0	HDPE	0.012	42	0.50%	77.07	8.0	130	0.70	1086.5	1081.10	1080.40	1.900
DMH #2	FES #2											66.9	8.0	HDPE	0.012	42	0.50%	77.07	8.0	80	0.40	1086.2	1080.40	1080.00	2.300
OCS #3	DMH #3											50.6	7.7	HDPE	0.012	30	1.40%	52.58	7.4	183	2.50	N/A	1061.00	1058.50	N/A
DCB #1	STC	1.35	0.90	1.22	0.20	0.45	0.09	1.31	0.35	6.0	5.6	7.3	5.5	HDPE	0.012	18	0.80%	10.18	5.8	116	0.95	1064.9	1062.40	1061.45	1.000
STC	FES #3	1.35	0.90	1.22	0.20	0.45	0.09	1.31	0.08	6.0	5.6	7.3	5.5	HDPE	0.012	18	0.80%	10.18	5.8	25	1.20	1066.3	1061.20	1060.00	3.600
DMH #3	DMH#4											50.6	12.6	HDPE	0.012	30	2.00%	62.84	12.8	240	4.90	1065.6	1058.50	1053.60	4.600
DMH #4	DMH #5											50.6	20.6	HDPE	0.012	30	8.00%	125.68	25.6	96	7.70	1062.3	1049.00	1041.30	10.800
DMH #5	DMH #6											50.6	12.6	HDPE	0.012	30	2.00%	62.84	12.8	142	2.80	1044.9	1037.70	1034.90	4.700
DMH #6	DMH #12											50.6	12.6	HDPE	0.012	30	2.00%	62.84	12.8	85	1.70	1041.0	1034.90	1033.20	3.600
OCS #4A	OCS #4B											8.3	3.9	HDPE	0.012	24	0.30%	13.42	4.3	86	0.30	1044.0	1039.30	1039.00	2.700
OCS #4B	DMH #10											8.3	4.7	HDPE	0.012	24	0.50%	17.33	5.5	196	1.00	1045.5	1039.00	1038.00	4.500
DMH #10	DMH #9											8.3	4.7	HDPE	0.012	24	0.50%	17.33	5.5	92	0.50	1049.9	1038.00	1037.50	9.900
OCS #6	DMH #9											8.0	6.1	HDPE	0.012	18	1.00%	11.38	6.4	41	0.40	1047.5	1045.00	1044.60	1.000
DMH #9	DMH #8											16.3	5.5	HDPE	0.012	30	0.50%	31.42	6.4	250	1.30	1050.2	1037.40	1036.10	10.300
DCB #4	DMH #8	0.53	0.90	0.48	0.16	0.45	0.07	0.55	0.03	6.0	5.6	3.1	6.2	HDPE	0.012	12	2.00%	5.46	6.9	11	0.17	1043.9	1041.47	1041.30	1.430
DMH #8	DMH #7											19.4	5.8	HDPE	0.012	30	0.50%	31.42	6.4	141	0.70	1045.0	1036.00	1035.30	6.500
CB #2	DMH #11	0.16	0.90	0.14	0.05	0.45	0.02	0.17	0.68	6.0	5.6	0.9	4.8	HDPE	0.012	12	2.60%	6.22	7.9	196	5.00	1044.3	1041.30	1036.30	2.000
DMH #12**	DMH #11**	0.88	0.90	0.79	0.00	0.45	0.00	0.79	0.08	6.0	5.6	4.4	10.1	HDPE	0.012	12	6.00%	9.45	12.0	46	2.80	1042.0	1039.10	1036.30	1.900
DCB #3	DMH #11	0.47	0.90	0.42	0.21	0.45	0.09	0.52	0.36	6.0	5.6	2.9	4.7	HDPE	0.012	12	1.00%	3.86	4.9	102	1.00	1040.0	1037.30	1036.30	1.700
DCB #2	DMH #11	0.53	0.90	0.48	0.10	0.45	0.05	0.52	0.01	6.0	5.6	2.9	6.6	HDPE	0.012	12	2.50%	6.10	7.8	4	0.10	1039.6	1036.40	1036.30	2.200
DMH #11	DMH #7											11.1	5.1	HDPE	0.012	24	0.50%	17.33	5.5	200	1.00	1039.8	1036.30	1035.30	1.500
CB #1	DMH #7	0.23	0.90	0.21	0.15	0.45	0.07	0.27	0.02	6.0	5.6	1.5	5.0	HDPE	0.012	12	2.00%	5.46	6.9	5	0.20	1039.5	1036.50	1036.30	2.000
DMH #7	FES #5											32.0	6.6	HDPE	0.012	36	0.50%	51.09	7.2	157	0.80	1039.7	1035.30	1034.50	1.400
OCS #5	FES #4											14.2	19.6	HDPE	0.012	24	1.30%	27.94	22.8	38	0.50	1041.0	1037.50	1037.00	1.500
OCS #7	DMH #12											41.5	56.0	HDPE	0.012	36	1.20%	79.15	64.5	38	0.47	1037.3	1033.67	1033.20	0.630

*NOTE: HYDROCAD CALCULATIONS USED FOR PIPE RUNS WHERE NO AREA CALCULATIONS ARE PRESENT

LOW RATE CALCULATED FROM BUILDING AREA ROOF RUNOFF

Attachment E

HydroCAD



Drainage Diagram for L145-Existing
Prepared by {enter your company name here}, Printed 11/5/2009
HydroCAD® 8.50 s/n 001446 © 2007 HydroCAD Software Solutions LLC

Soil Listing (all nodes)

Area (acres)	Soil Goup	Subcatchment Numbers
0.000	HSG A	
2.305	HSG B	EW-1, EW-2, EW-3
30.804	HSG C	EW-1, EW-2, EW-3
10.377	HSG D	EW-1, EW-2, EW-3
26.101	Other	EW-1, EW-2, EW-3
69.587		**TOTAL AREA**

Summary for Subcatchment EW-1: Existing Watershed

Runoff = 86.14 cfs @ 12.07 hrs, Volume= 5.696 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description
1.042	65	Woods/grass comb., Fair, HSG B
2.003	82	Woods/grass comb., Fair, HSG D
4.211	76	Woods/grass comb., Fair, HSG C
0.084	79	50-75% Grass cover, Fair, HSG C
0.584	69	50-75% Grass cover, Fair, HSG B
5.743	84	50-75% Grass cover, Fair, HSG D
6.850	91	Urban industrial, 72% imp, HSG C
12.431	98	Paved parking & roofs
32.948	89	Weighted Average
15.585		Pervious Area
17.363		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.25		**Sheet Flow, A to B** Smooth surfaces n= 0.011 P2= 3.50"
0.9	110	0.0900	2.10		**Shallow Concentrated Flow, B to C** Short Grass Pasture Kv= 7.0 fps
0.1	30	0.0670	5.25		**Shallow Concentrated Flow, C to D** Paved Kv= 20.3 fps
4.3	415	0.0530	1.61		**Shallow Concentrated Flow, D to E** Short Grass Pasture Kv= 7.0 fps
3.7	433	0.0090	1.93		**Shallow Concentrated Flow, E to F** Paved Kv= 20.3 fps
4.5	824	0.0360	3.05		**Shallow Concentrated Flow, F to G** Unpaved Kv= 16.1 fps
0.5	107	0.0370	3.90		**Shallow Concentrated Flow, G to H** Paved Kv= 20.3 fps
0.7	110	0.2700	2.60		**Shallow Concentrated Flow, H to I** Woodland Kv= 5.0 fps
15.4	2,079	Total			

Summary for Subcatchment EW-2: Existing Watershed

Runoff = 94.88 cfs @ 12.07 hrs, Volume= 6.312 af, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description
0.580	69	50-75% Grass cover, Fair, HSG B
1.101	89	<50% Grass cover, Poor, HSG D
7.967	86	<50% Grass cover, Poor, HSG C
9.628	91	Urban industrial, 72% imp, HSG C
13.041	98	Paved parking & roofs
32.317	92	Weighted Average
12.344		Pervious Area
19.973		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0400	1.65		**Sheet Flow, A to B** Smooth surfaces n= 0.011 P2= 3.50"
1.0	134	0.1000	2.21		**Shallow Concentrated Flow, B to C** Short Grass Pasture Kv= 7.0 fps
3.3	811	0.0400	4.06		**Shallow Concentrated Flow, C to D** Paved Kv= 20.3 fps
8.8	759	0.0080	1.44		**Shallow Concentrated Flow, D to E** Unpaved Kv= 16.1 fps
1.4	354	0.0450	4.31		**Shallow Concentrated Flow, E to F** Paved Kv= 20.3 fps
15.0	2,108	Total			

Summary for Subcatchment EW-3: Existing Watershed

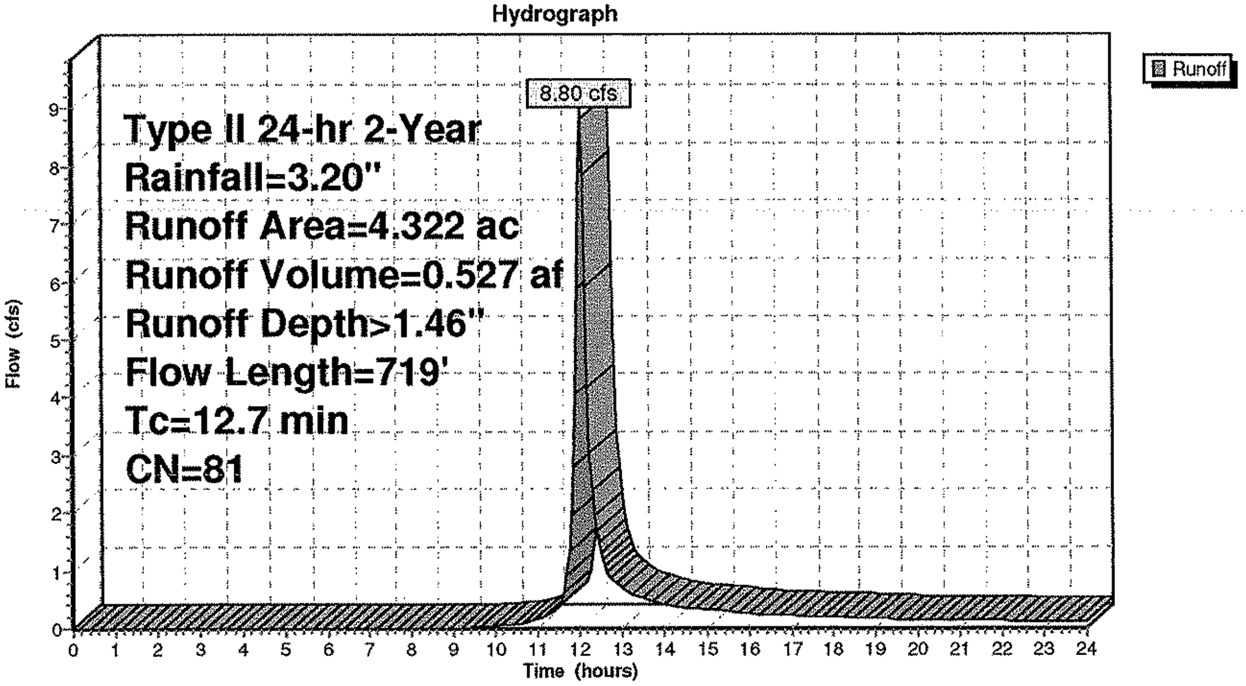
Runoff = 8.80 cfs @ 12.05 hrs, Volume= 0.527 af, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description
0.099	65	Woods/grass comb., Fair, HSG B
1.530	82	Woods/grass comb., Fair, HSG D
2.064	76	Woods/grass comb., Fair, HSG C
0.629	98	Paved parking & roofs
4.322	81	Weighted Average
3.693		Pervious Area
0.629		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0400	1.65		**Sheet Flow, A to B** Smooth surfaces n= 0.011 P2= 3.50"
11.6	527	0.0230	0.76		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
0.6	142	0.3600	4.20		**Shallow Concentrated Flow, C to D** Short Grass Pasture Kv= 7.0 fps
12.7	719	Total			

Subcatchment EW-3: Existing Watershed

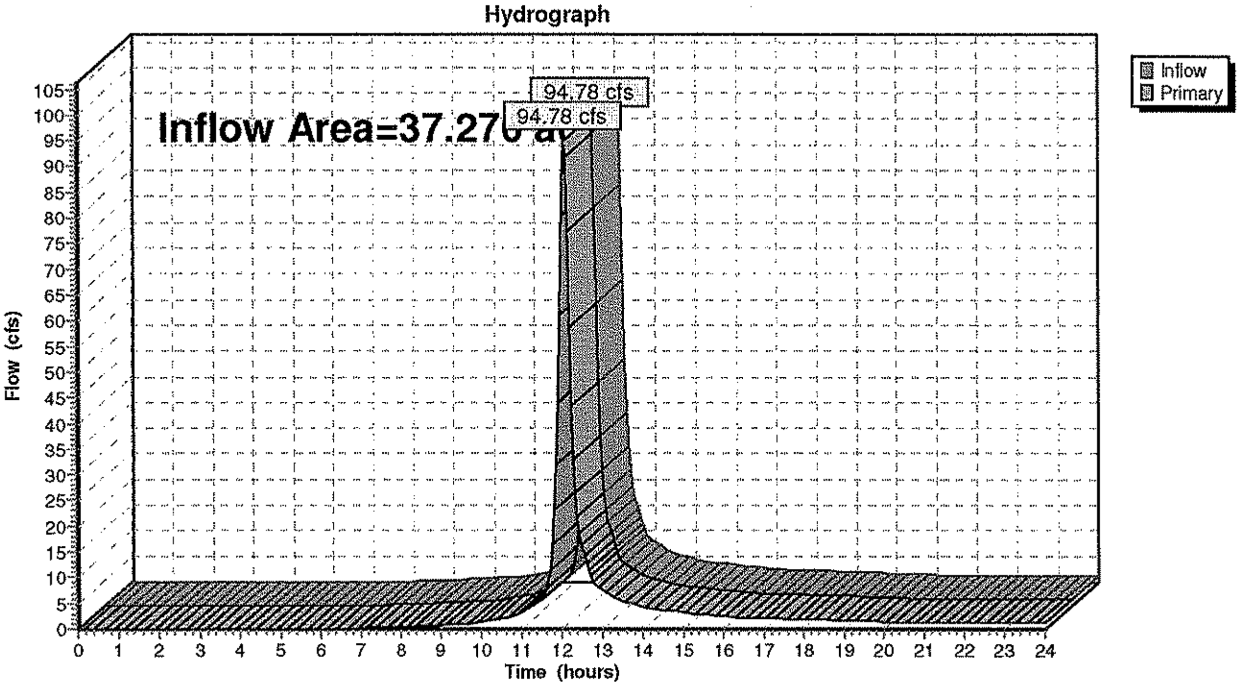


Summary for Link DP-1: Androscoggin River

Inflow Area = 37.270 ac, 48.27% Impervious, Inflow Depth > 2.00" for 2-Year event
Inflow = 94.78 cfs @ 12.07 hrs, Volume= 6.224 af
Primary = 94.78 cfs @ 12.07 hrs, Volume= 6.224 af, Atten= 0%, Lag= 0.0 min

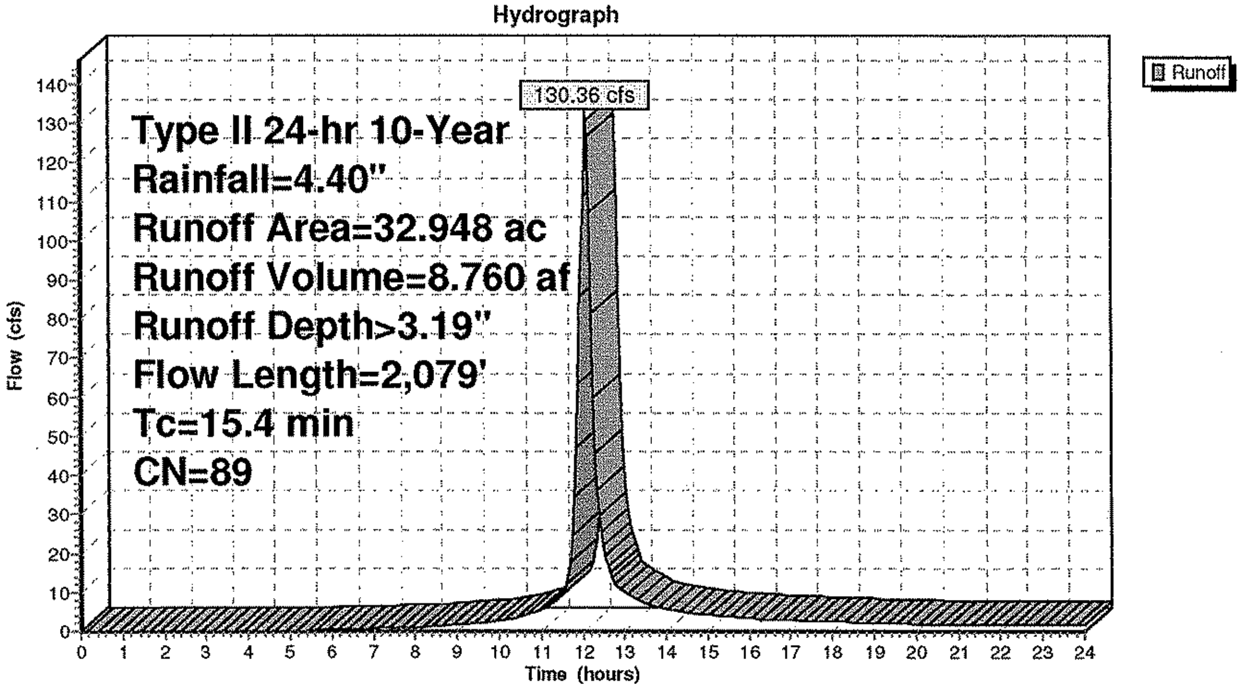
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-1: Androscoggin River

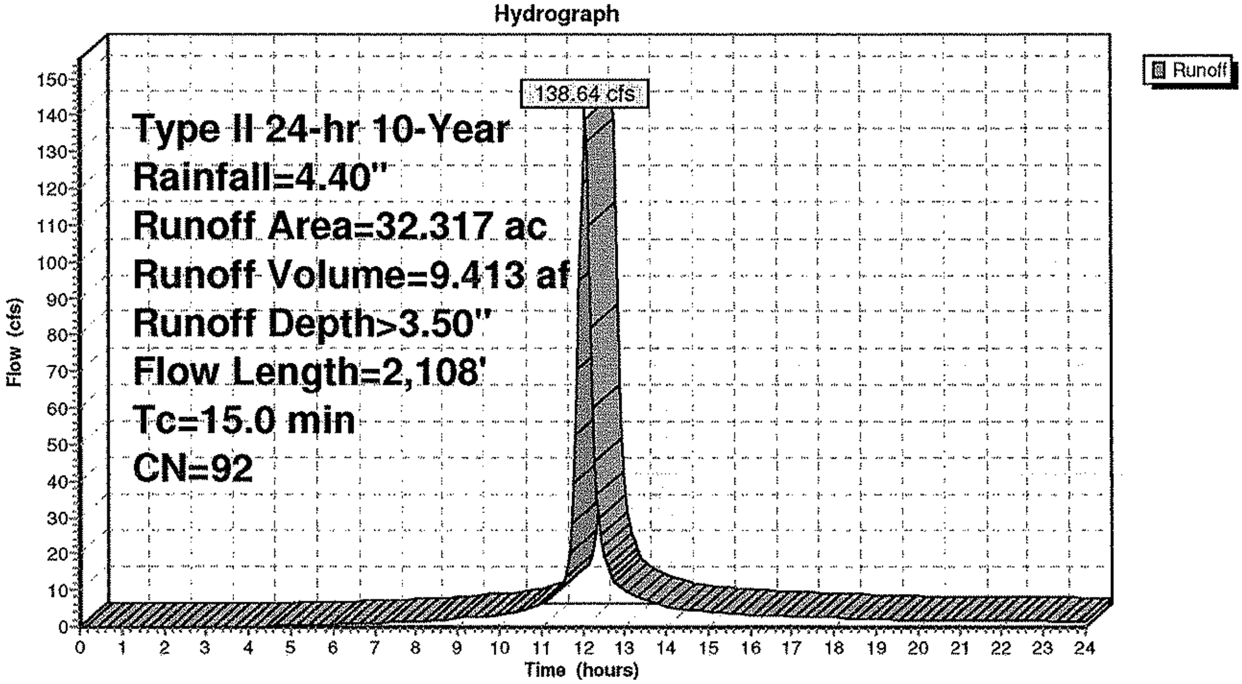


```
                        Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
                              Runoff by SCS TR-20 method, UH=SCS
              Reach routing by Stor-Ind+Trans method  -  Pond routing by Stor-Ind method

Subcatchment EW-1: Existing Watershed       Runoff Area=32.948 ac  52.70% Impervious  Runoff Depth>3.19"
                                        Flow Length=2,079'  Tc=15.4 min  CN=89  Runoff=130.36 cfs  8.760 af

Subcatchment EW-2: Existing Watershed       Runoff Area=32.317 ac  61.80% Impervious  Runoff Depth>3.50"
                                        Flow Length=2,108'  Tc=15.0 min  CN=92  Runoff=138.64 cfs  9.413 af

Subcatchment EW-3: Existing Watershed        Runoff Area=4.322 ac  14.55% Impervious  Runoff Depth>2.45"
                                          Flow Length=719'  Tc=12.7 min  CN=81  Runoff=14.74 cfs  0.884 af

Reach DP-3: 48" Pipe to River                                                   Inflow=14.74 cfs  0.884 af
                                                                               Outflow=14.74 cfs  0.884 af

Link DP-1: Androscoggin River                                                  Inflow=144.82 cfs  9.644 af
                                                                              Primary=144.82 cfs  9.644 af

Link DP-2: City of Berlin Municipal System                                     Inflow=138.64 cfs  9.413 af
                                                                              Primary=138.64 cfs  9.413 af

             Total Runoff Area = 69.587 ac   Runoff Volume = 19.057 af   Average Runoff Depth = 3.29"
                                      45.44% Pervious = 31.622 ac     54.56% Impervious = 37.965 ac
```

Subcatchment EW-1: Existing Watershed



Subcatchment EW-2: Existing Watershed

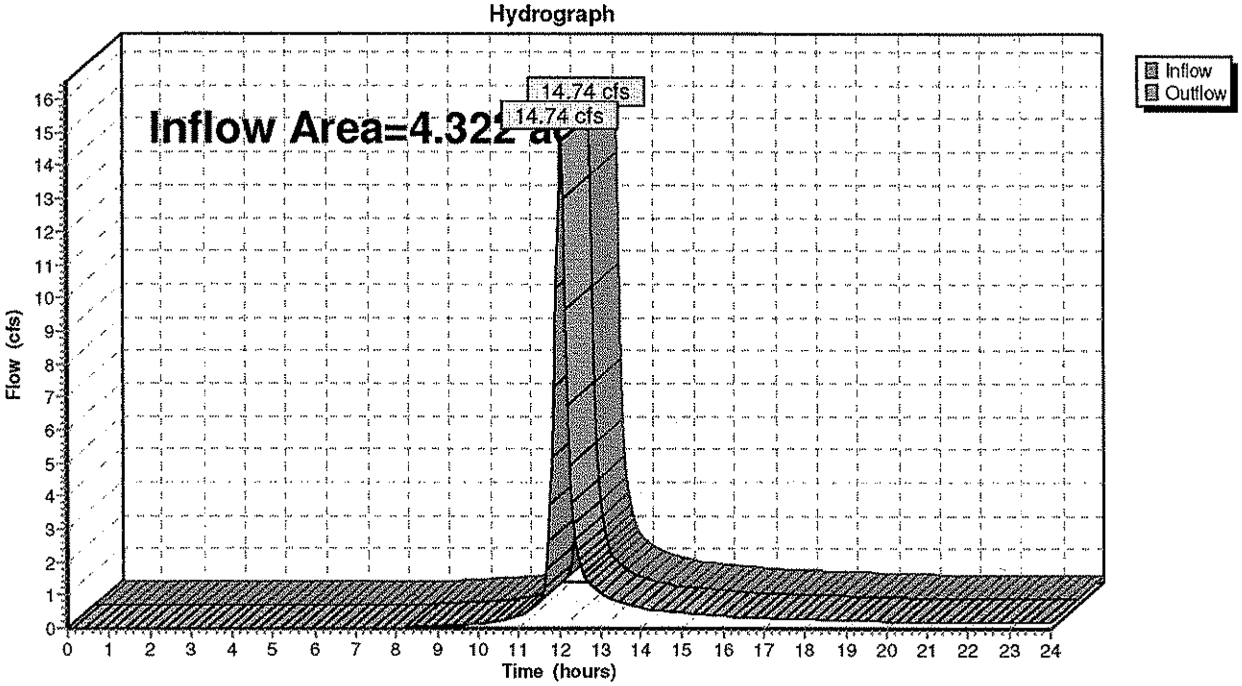


Summary for Reach DP-3: 48" Pipe to River

Inflow Area =	4.322 ac,	14.55% Impervious,	Inflow Depth > 2.45"	for 10-Year event
Inflow =	14.74 cfs @	12.05 hrs, Volume=	0.884 af	
Outflow =	14.74 cfs @	12.05 hrs, Volume=	0.884 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach DP-3: 48" Pipe to River

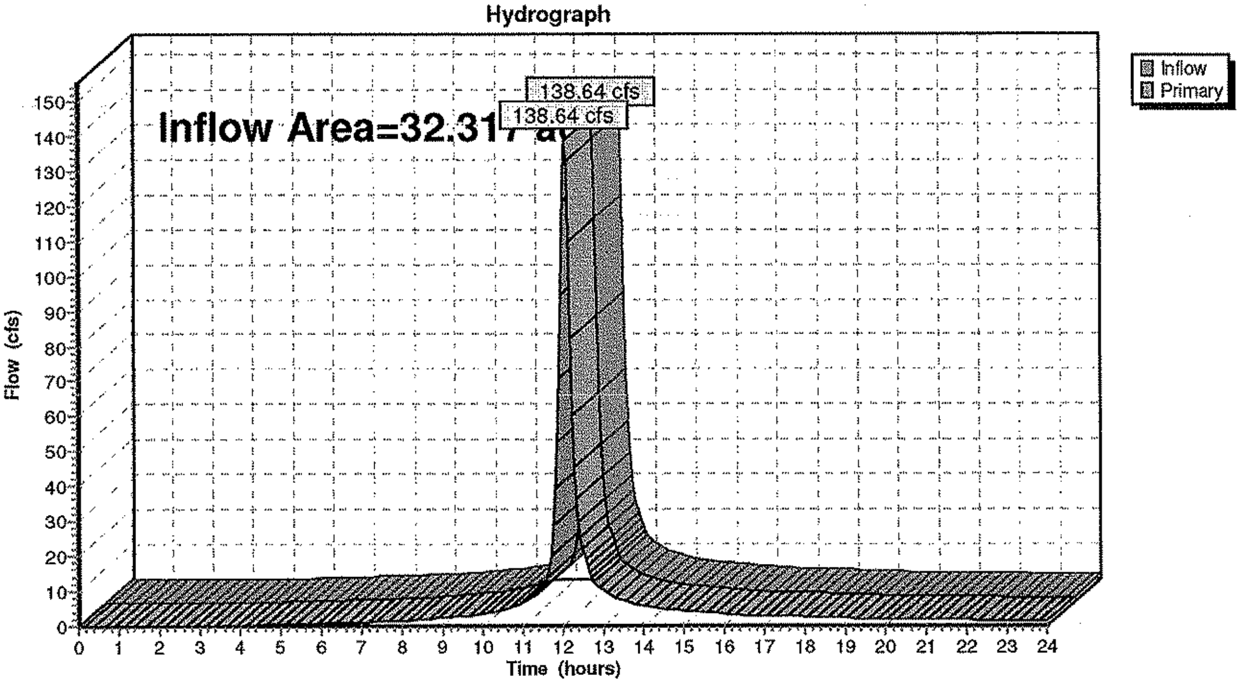


Summary for Link DP-2: City of Berlin Municipal System

```
Inflow Area =      32.317 ac, 61.80% Impervious, Inflow Depth >  3.50"   for 10-Year event
Inflow      =    138.64 cfs @  12.06 hrs, Volume=        9.413 af
Primary     =    138.64 cfs @  12.06 hrs, Volume=        9.413 af, Atten= 0%, Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-2: City of Berlin Municipal System



Summary for Subcatchment EW-1: Existing Watershed

Runoff = 174.54 cfs @ 12.07 hrs, Volume= 11.905 af, Depth> 4.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-Year Rainfall=5.60"

Area (ac)	CN	Description
1.042	65	Woods/grass comb., Fair, HSG B
2.003	82	Woods/grass comb., Fair, HSG D
4.211	76	Woods/grass comb., Fair, HSG C
0.084	79	50-75% Grass cover, Fair, HSG C
0.584	69	50-75% Grass cover, Fair, HSG B
5.743	84	50-75% Grass cover, Fair, HSG D
6.850	91	Urban industrial, 72% imp, HSG C
12.431	98	Paved parking & roofs
32.948	89	Weighted Average
15.585		Pervious Area
17.363		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	50	0.0200	1.25		**Sheet Flow, A to B** Smooth surfaces n= 0.011 P2= 3.50"
0.9	110	0.0900	2.10		**Shallow Concentrated Flow, B to C** Short Grass Pasture Kv= 7.0 fps
0.1	30	0.0670	5.25		**Shallow Concentrated Flow, C to D** Paved Kv= 20.3 fps
4.3	415	0.0530	1.61		**Shallow Concentrated Flow, D to E** Short Grass Pasture Kv= 7.0 fps
3.7	433	0.0090	1.93		**Shallow Concentrated Flow, E to F** Paved Kv= 20.3 fps
4.5	824	0.0360	3.05		**Shallow Concentrated Flow, F to G** Unpaved Kv= 16.1 fps
0.5	107	0.0370	3.90		**Shallow Concentrated Flow, G to H** Paved Kv= 20.3 fps
0.7	110	0.2700	2.60		**Shallow Concentrated Flow, H to I** Woodland Kv= 5.0 fps
15.4	2,079	Total			

Summary for Subcatchment EW-2: Existing Watershed

Runoff = 182.03 cfs @ 12.06 hrs, Volume= 12.561 af, Depth> 4.66"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-Year Rainfall=5.60"

Area (ac)	CN	Description
0.580	69	50-75% Grass cover, Fair, HSG B
1.101	89	<50% Grass cover, Poor, HSG D
7.967	86	<50% Grass cover, Poor, HSG C
9.628	91	Urban industrial, 72% imp, HSG C
13.041	98	Paved parking & roofs
32.317	92	Weighted Average
12.344		Pervious Area
19.973		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0400	1.65		**Sheet Flow, A to B** Smooth surfaces n= 0.011 P2= 3.50"
1.0	134	0.1000	2.21		**Shallow Concentrated Flow, B to C** Short Grass Pasture Kv= 7.0 fps
3.3	811	0.0400	4.06		**Shallow Concentrated Flow, C to D** Paved Kv= 20.3 fps
8.8	759	0.0080	1.44		**Shallow Concentrated Flow, D to E** Unpaved Kv= 16.1 fps
1.4	354	0.0450	4.31		**Shallow Concentrated Flow, E to F** Paved Kv= 20.3 fps
15.0	2,108	Total			

Summary for Subcatchment EW-3: Existing Watershed

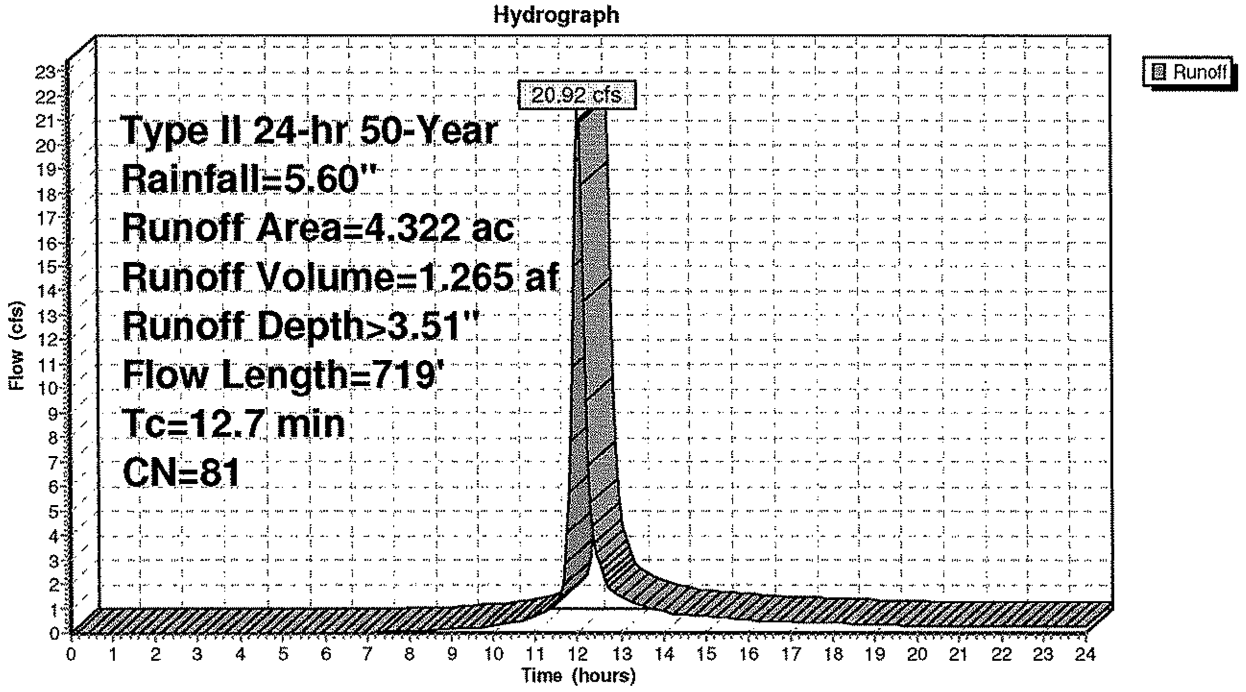
Runoff = 20.92 cfs @ 12.04 hrs, Volume= 1.265 af, Depth> 3.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-Year Rainfall=5.60"

Area (ac)	CN	Description
0.099	65	Woods/grass comb., Fair, HSG B
1.530	82	Woods/grass comb., Fair, HSG D
2.064	76	Woods/grass comb., Fair, HSG C
0.629	98	Paved parking & roofs
4.322	81	Weighted Average
3.693		Pervious Area
0.629		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0400	1.65		**Sheet Flow, A to B** Smooth surfaces n= 0.011 P2= 3.50"
11.6	527	0.0230	0.76		**Shallow Concentrated Flow, B to C** Woodland Kv= 5.0 fps
0.6	142	0.3600	4.20		**Shallow Concentrated Flow, C to D** Short Grass Pasture Kv= 7.0 fps
12.7	719	Total			

Subcatchment EW-3: Existing Watershed

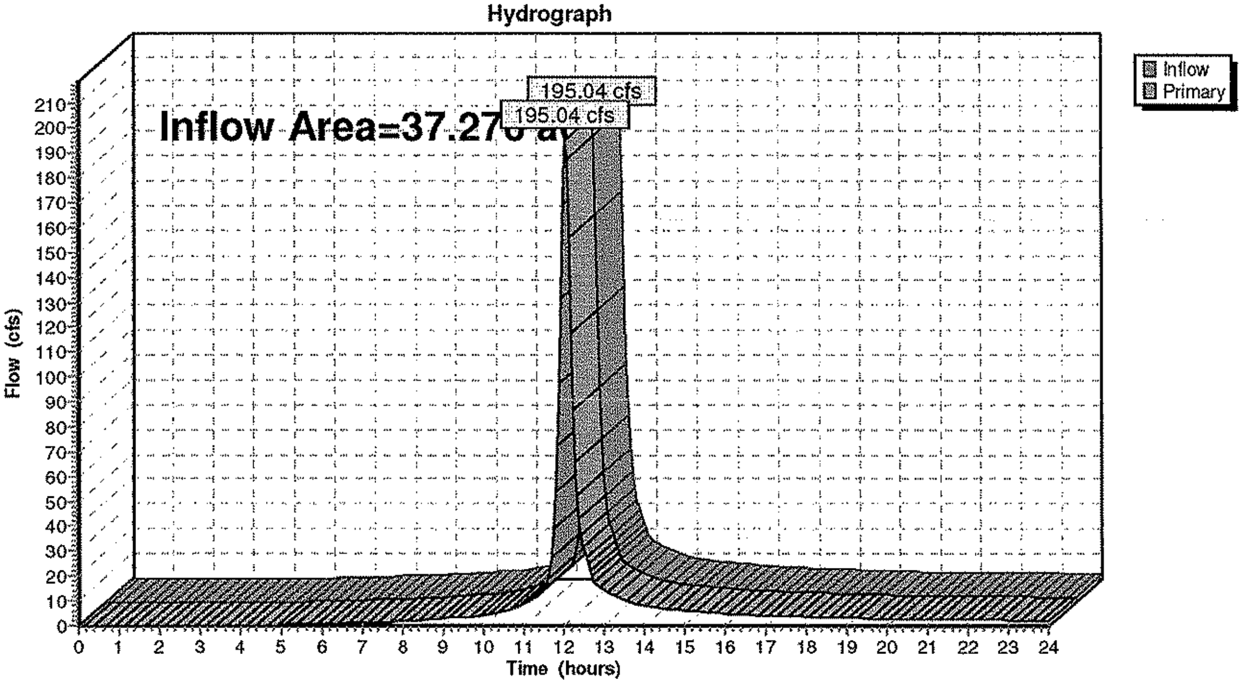


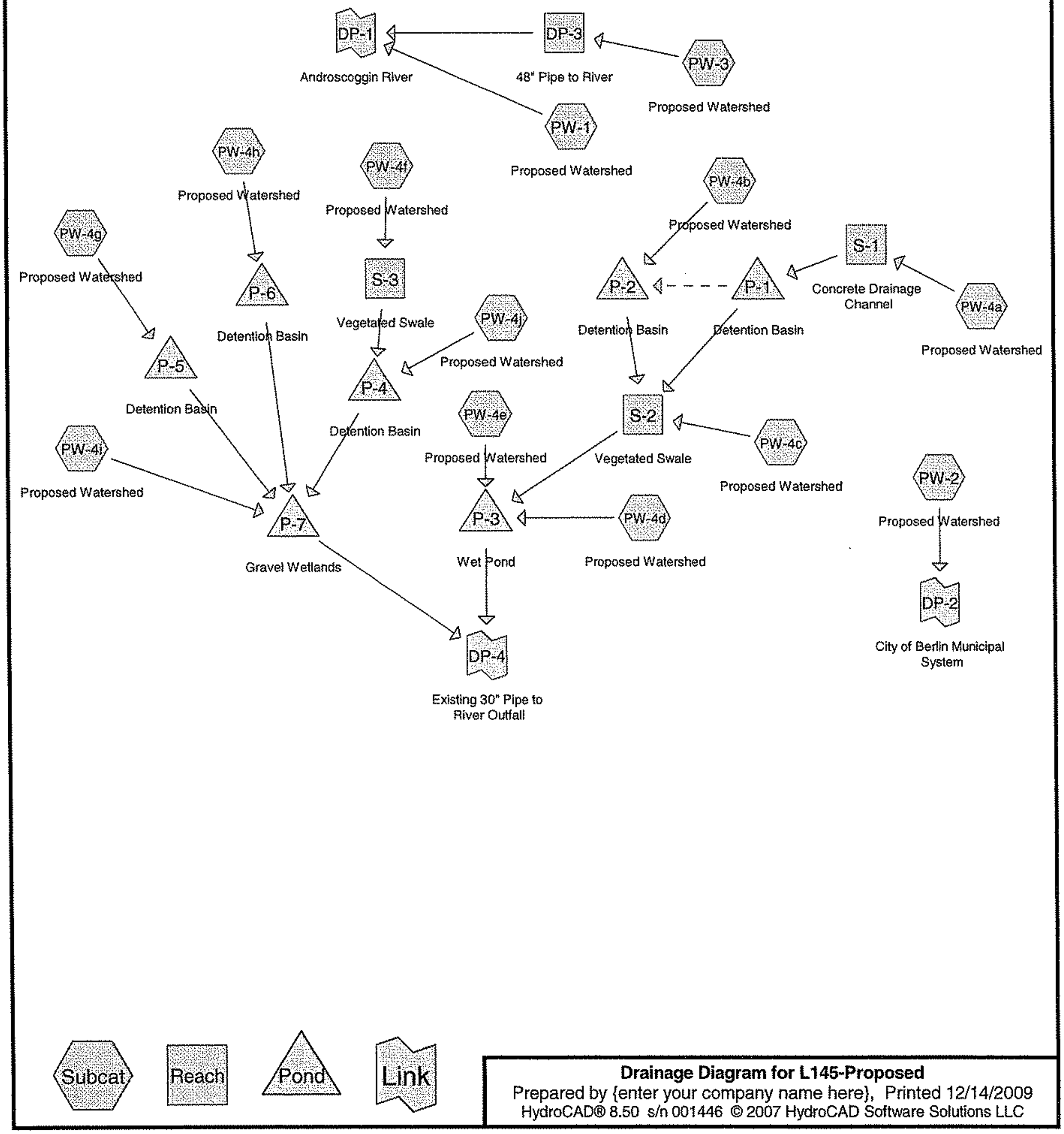
Summary for Link DP-1: Androscoggin River

```
Inflow Area =      37.270 ac, 48.27% Impervious, Inflow Depth >  4.24"   for 50-Year event
Inflow      =    195.04 cfs @  12.06 hrs, Volume=        13.170 af
Primary     =    195.04 cfs @  12.06 hrs, Volume=        13.170 af, Atten= 0%, Lag= 0.0 min
```

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link DP-1: Androscoggin River





Drainage Diagram for L145-Proposed

Prepared by {enter your company name here}, Printed 12/14/2009

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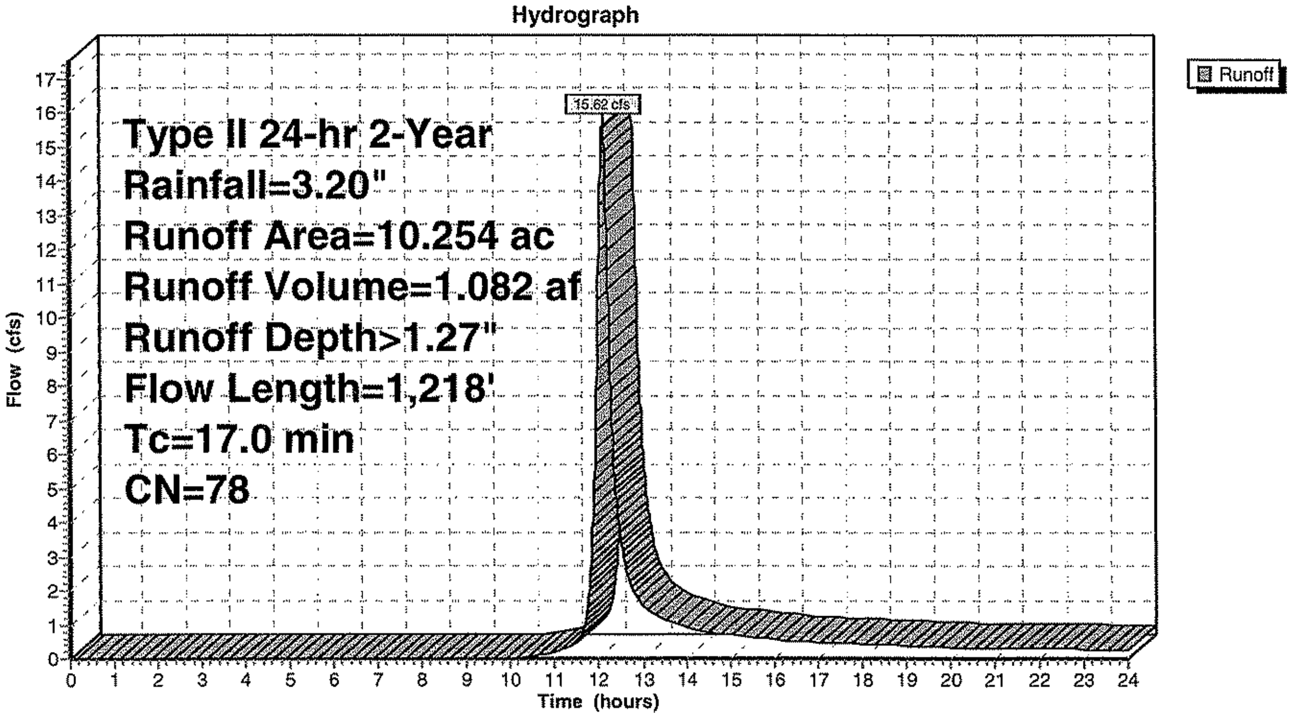
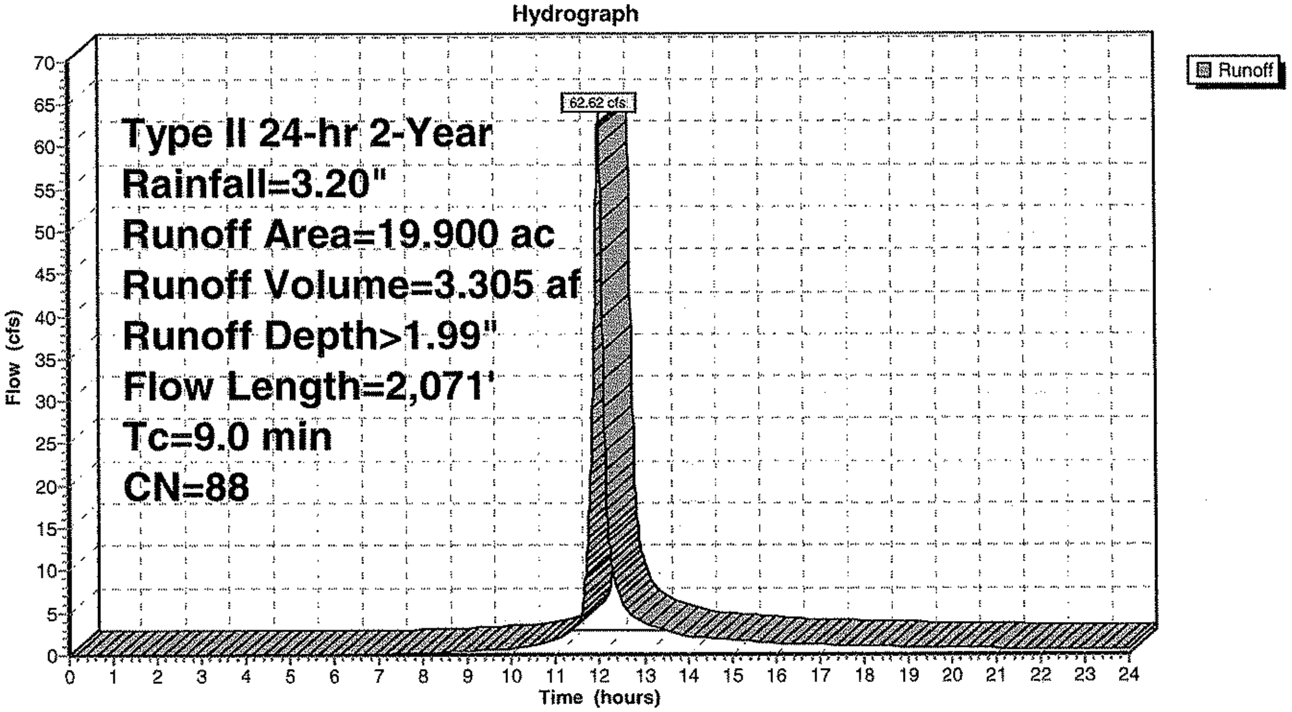
Soil Listing (all nodes)

Area (acres)	Soil Goup	Subcatchment Numbers
0.000	HSG A	
2.054	HSG B	PW-1, PW-2, PW-3, PW-4a, PW-4c, PW-4i
23.949	HSG C	PW-1, PW-2, PW-3, PW-4a, PW-4b, PW-4c, PW-4d, PW-4e, PW-4f, PW-4g, PW-4h, PW
10.078	HSG D	PW-2, PW-3, PW-4a, PW-4b, PW-4c
33.435	Other	PW-1, PW-2, PW-3, PW-4a, PW-4b, PW-4c, PW-4d, PW-4e, PW-4f, PW-4g, PW-4h, PW
69.516		**TOTAL AREA**

Subcatchment PW-1: Proposed Watershed



Subcatchment PW-2: Proposed Watershed



Summary for Subcatchment PW-4a: Proposed Watershed

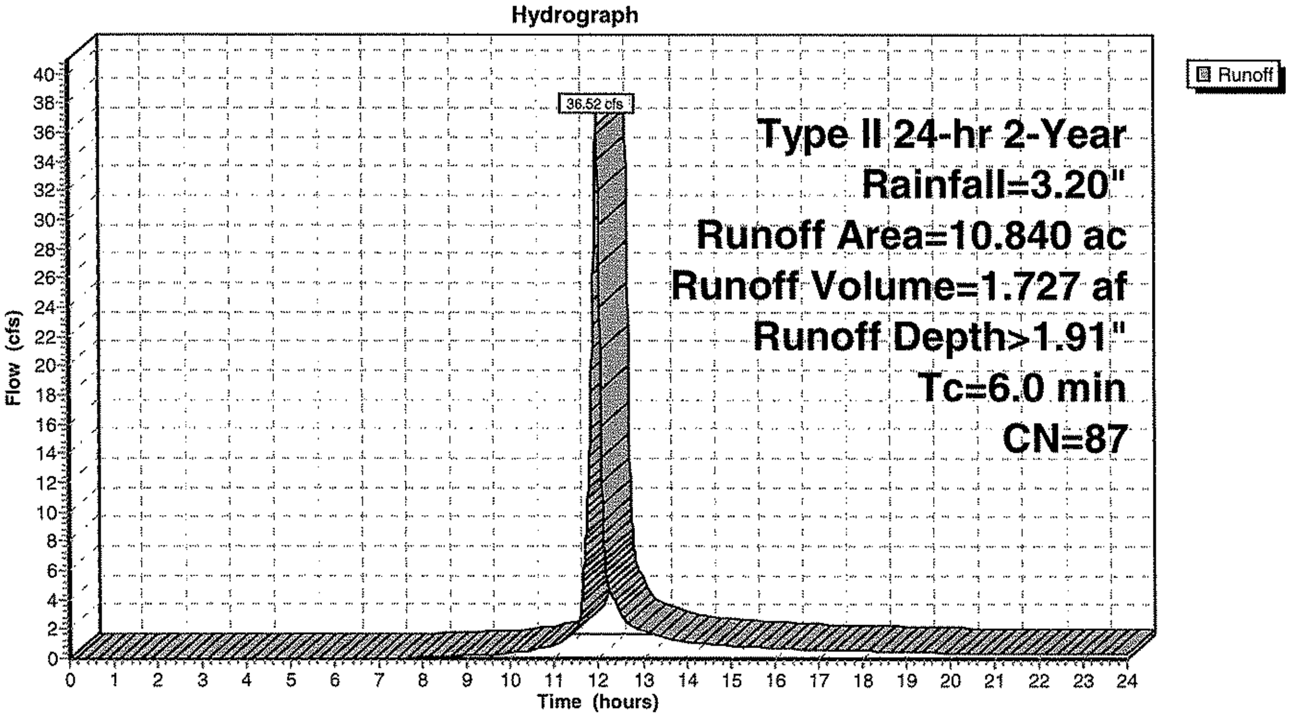
Runoff = 36.52 cfs @ 11.97 hrs, Volume= 1.727 af, Depth> 1.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description
0.528	65	Woods/grass comb., Fair, HSG B
0.477	69	50-75% Grass cover, Fair, HSG B
5.023	84	50-75% Grass cover, Fair, HSG D
0.799	82	Woods/grass comb., Fair, HSG D
3.992	98	Paved parking & roofs
0.021	74	>75% Grass cover, Good, HSG C
10.840	87	Weighted Average
6.848		Pervious Area
3.992		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4a: Proposed Watershed



Summary for Subcatchment PW-4c: Proposed Watershed

Runoff = 28.36 cfs @ 12.03 hrs, Volume= 1.664 af, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description
0.129	69	50-75% Grass cover, Fair, HSG B
1.693	84	50-75% Grass cover, Fair, HSG D
1.075	74	>75% Grass cover, Good, HSG C
5.619	98	Paved parking & roofs
8.516	92	Weighted Average
2.897		Pervious Area
5.619		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.95		**Sheet Flow, A to B** Smooth surfaces n= 0.011 P2= 3.50"
2.1	500	0.0400	4.06		**Shallow Concentrated Flow, B to C** Paved Kv= 20.3 fps
2.1	173	0.0400	1.40		**Shallow Concentrated Flow, C to D** Short Grass Pasture Kv= 7.0 fps
0.5	101	0.0300	3.52		**Shallow Concentrated Flow, D to E** Paved Kv= 20.3 fps
2.0	144	0.0280	1.17		**Shallow Concentrated Flow, E to F** Short Grass Pasture Kv= 7.0 fps
3.7	270	0.0300	1.21		**Shallow Concentrated Flow, F to G** Short Grass Pasture Kv= 7.0 fps
11.3	1,238	Total			

Summary for Subcatchment PW-4d: Proposed Watershed

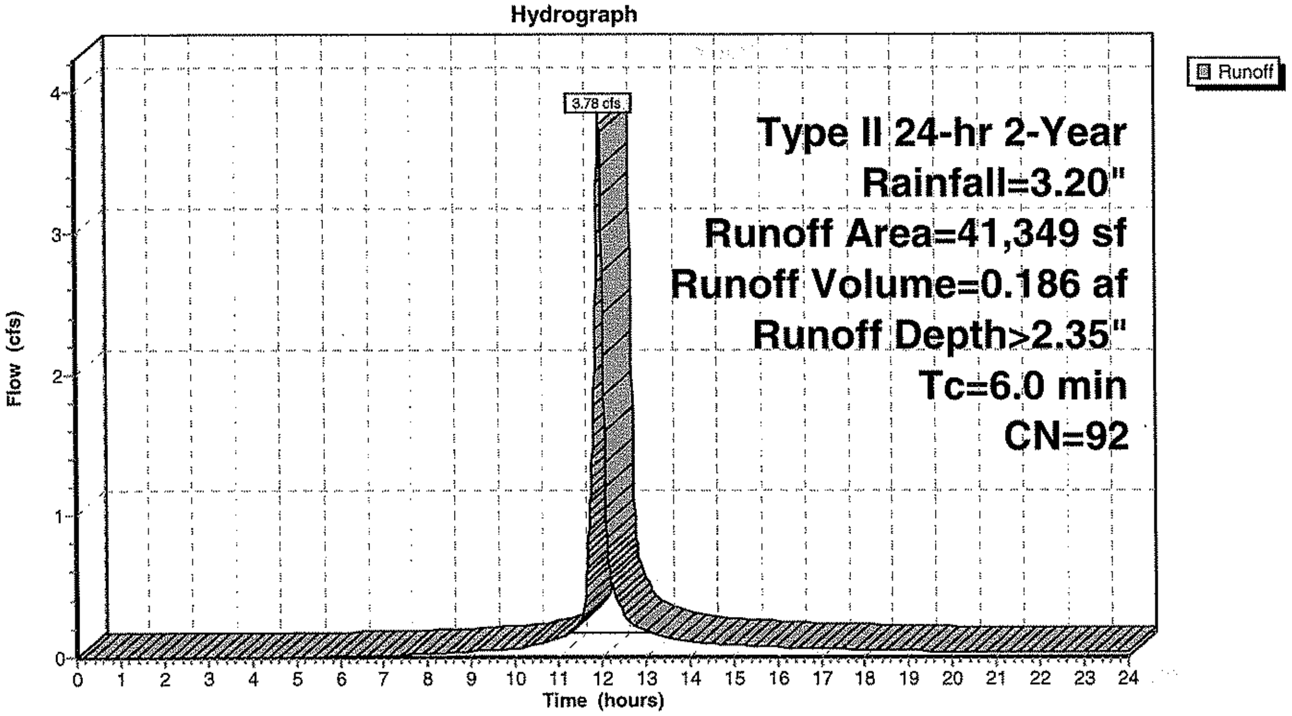
Runoff = 3.78 cfs @ 11.97 hrs, Volume= 0.186 af, Depth> 2.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.20"

Area (sf)	CN	Description
10,957	74	>75% Grass cover, Good, HSG C
30,392	98	Paved parking & roofs
41,349	92	Weighted Average
10,957		Pervious Area
30,392		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4d: Proposed Watershed



Summary for Subcatchment PW-4f: Proposed Watershed

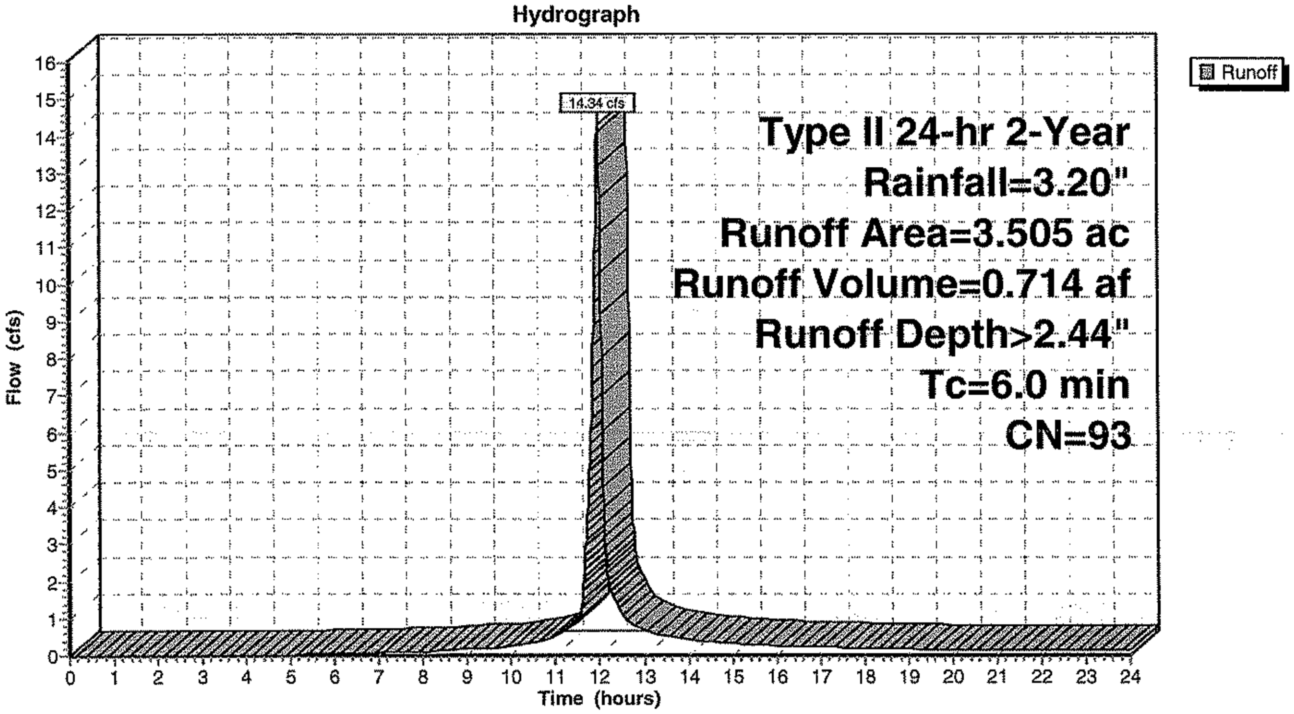
Runoff = 14.34 cfs @ 11.97 hrs, Volume= 0.714 af, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description
0.631	74	>75% Grass cover, Good, HSG C
0.077	89	Gravel roads, HSG C
2.797	98	Paved roads w/curbs & sewers
3.505	93	Weighted Average
0.708		Pervious Area
2.797		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4f: Proposed Watershed



Summary for Subcatchment PW-4h: Proposed Watershed

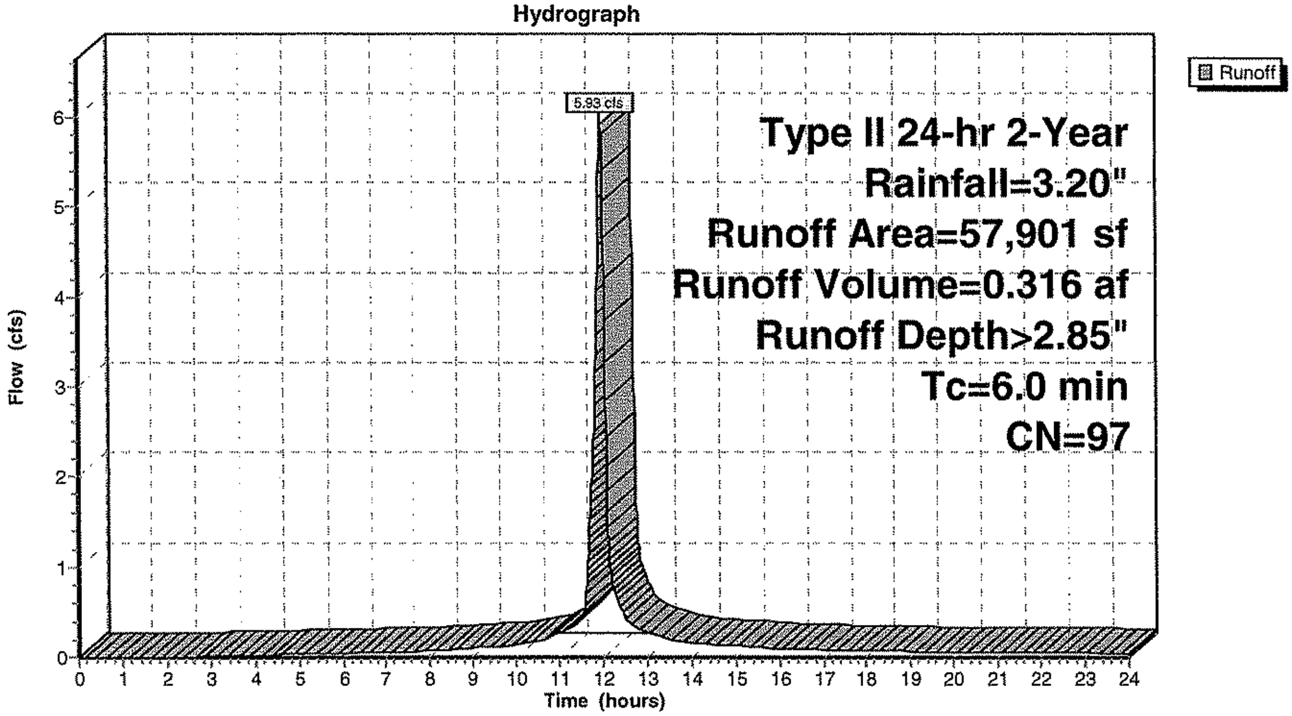
Runoff = 5.93 cfs @ 11.97 hrs, Volume= 0.316 af, Depth> 2.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.20"

Area (sf)	CN	Description
2,501	74	>75% Grass cover, Good, HSG C
55,400	98	Paved parking & roofs
57,901	97	Weighted Average
2,501		Pervious Area
55,400		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4h: Proposed Watershed



Summary for Subcatchment PW-4j: Proposed Watershed

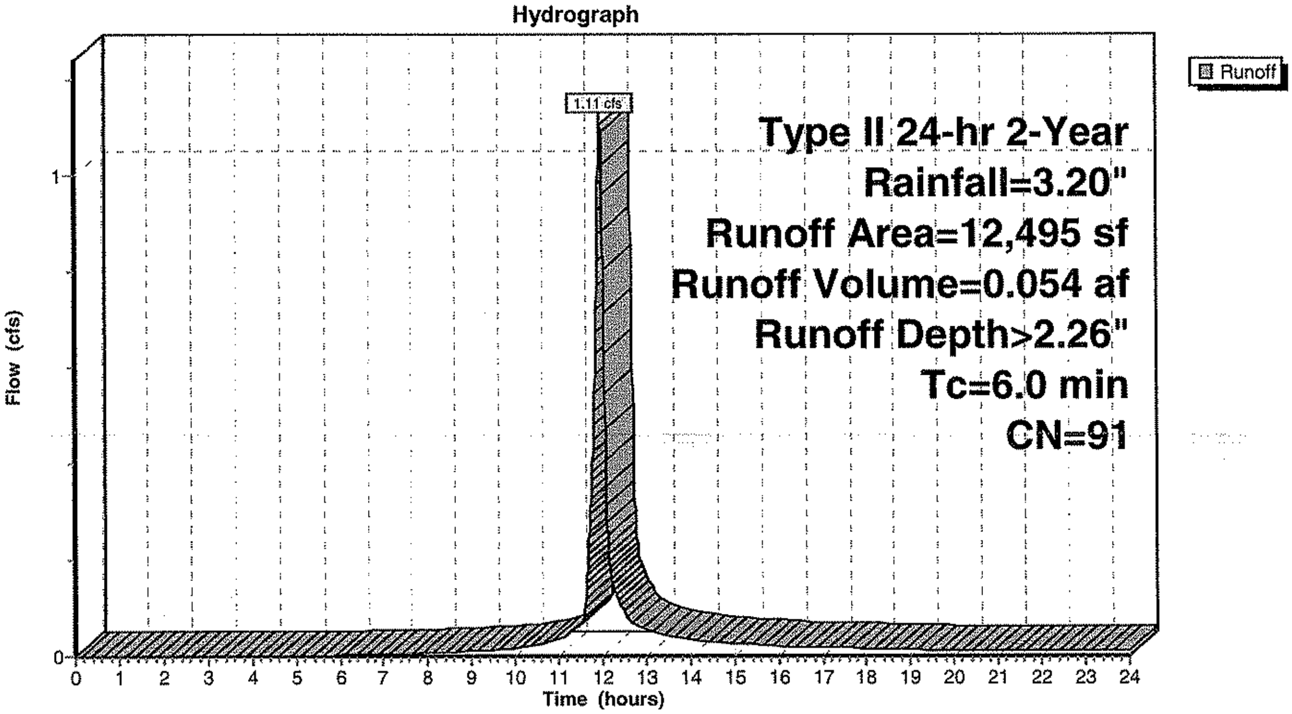
Runoff = 1.11 cfs @ 11.97 hrs, Volume= 0.054 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.20"

Area (sf)	CN	Description
8,171	98	Water Surface
798	89	Gravel roads, HSG C
3,526	74	>75% Grass cover, Good, HSG C
12,495	91	Weighted Average
4,324		Pervious Area
8,171		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4j: Proposed Watershed



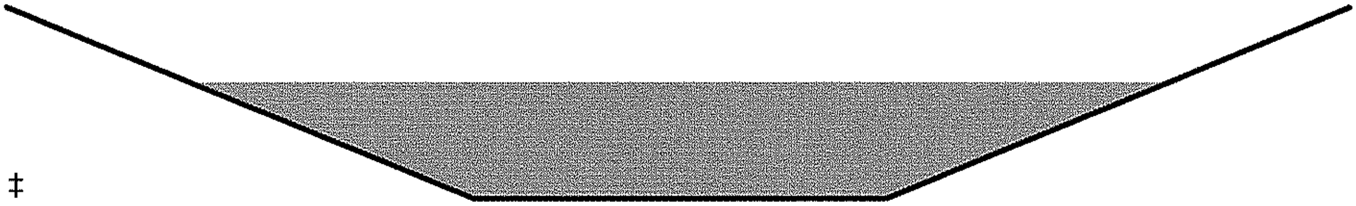
Summary for Reach S-1: Concrete Drainage Channel

Inflow Area = 10.840 ac, 36.83% Impervious, Inflow Depth > 1.91" for 2-Year event
Inflow = 36.52 cfs @ 11.97 hrs, Volume= 1.727 af
Outflow = 35.64 cfs @ 12.01 hrs, Volume= 1.724 af, Atten= 2%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 4
Max. Velocity= 5.85 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 1.58 fps, Avg. Travel Time= 5.2 min

Peak Storage= 2,988 cf @ 11.99 hrs, Average Depth at Peak Storage= 0.91'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 98.25 cfs

4.00' x 1.50' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 3.0 '/' Top Width= 13.00'
Length= 490.0' Slope= 0.0049 '/'
Inlet Invert= 1,093.00', Outlet Invert= 1,090.60'



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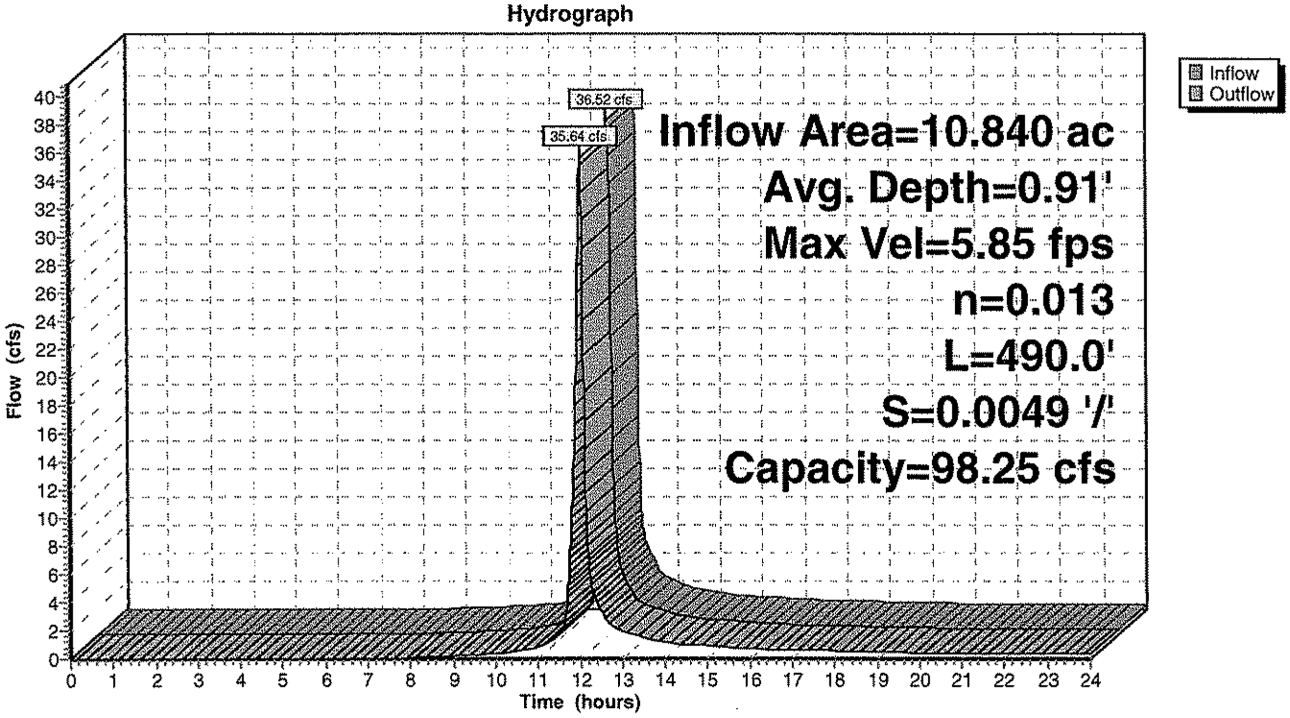
Reach S-1: Concrete Drainage Channel



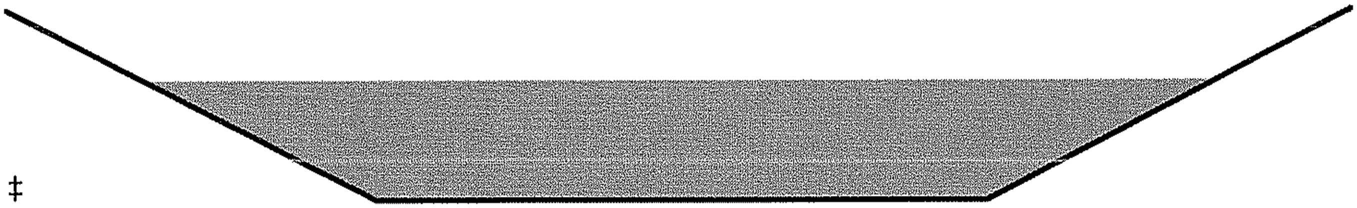
Summary for Reach S-3: Vegetated Swale

Inflow Area = 3.505 ac, 79.80% Impervious, Inflow Depth > 2.44" for 2-Year event
Inflow = 14.34 cfs @ 11.97 hrs, Volume= 0.714 af
Outflow = 13.88 cfs @ 12.02 hrs, Volume= 0.712 af, Atten= 3%, Lag= 3.0 min

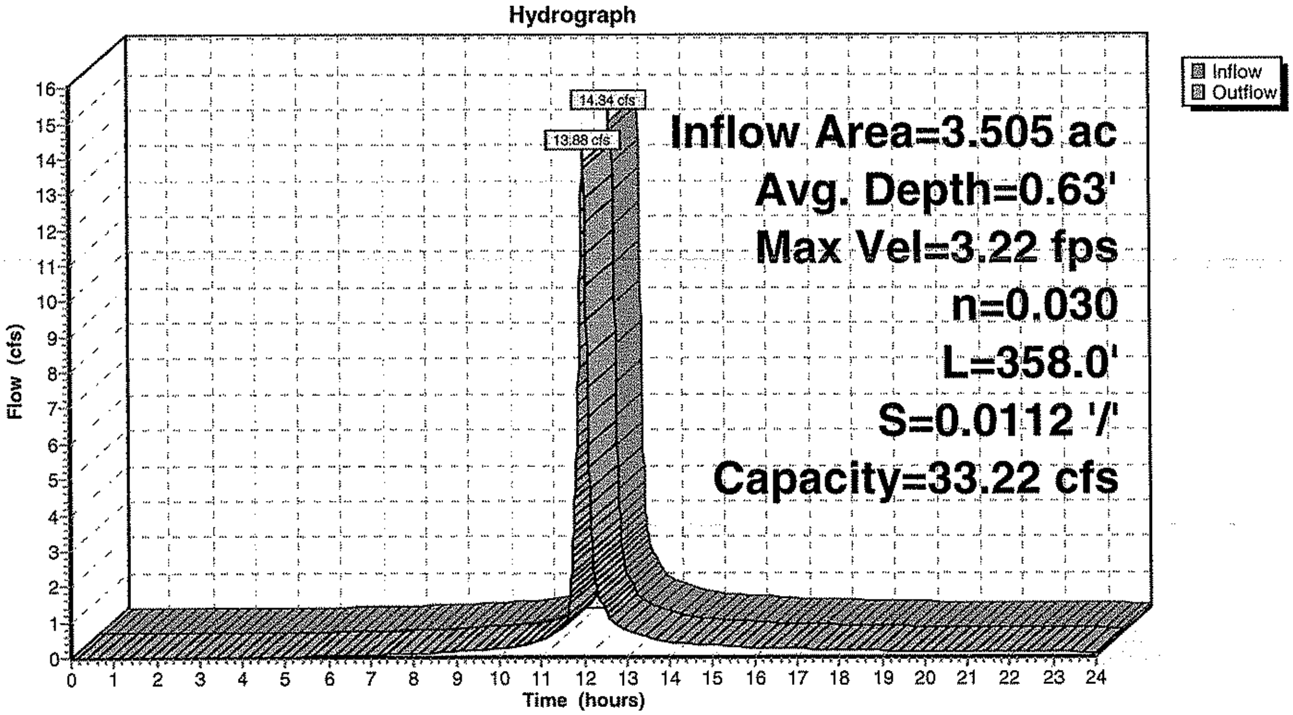
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.22 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 0.76 fps, Avg. Travel Time= 7.8 min

Peak Storage= 1,546 cf @ 11.99 hrs, Average Depth at Peak Storage= 0.63'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 33.22 cfs

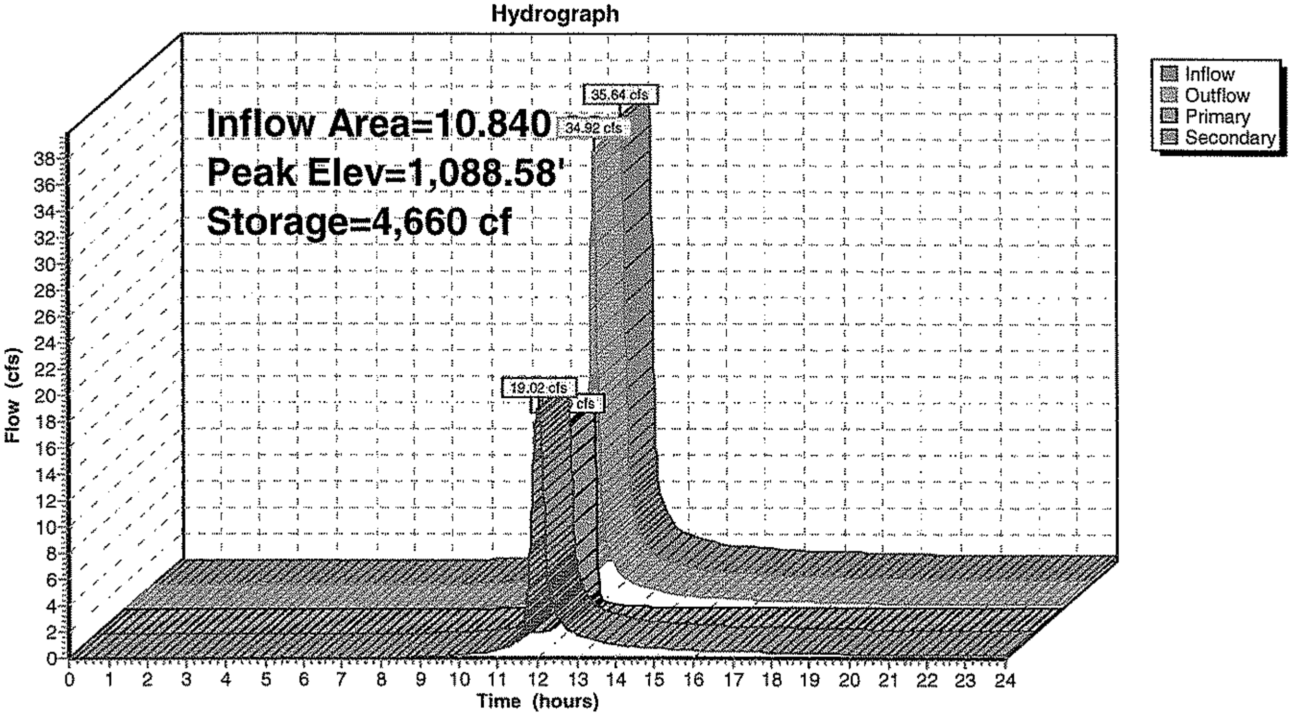
5.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 11.00'
Length= 358.0' Slope= 0.0112 '/'
Inlet Invert= 1,050.00', Outlet Invert= 1,046.00'



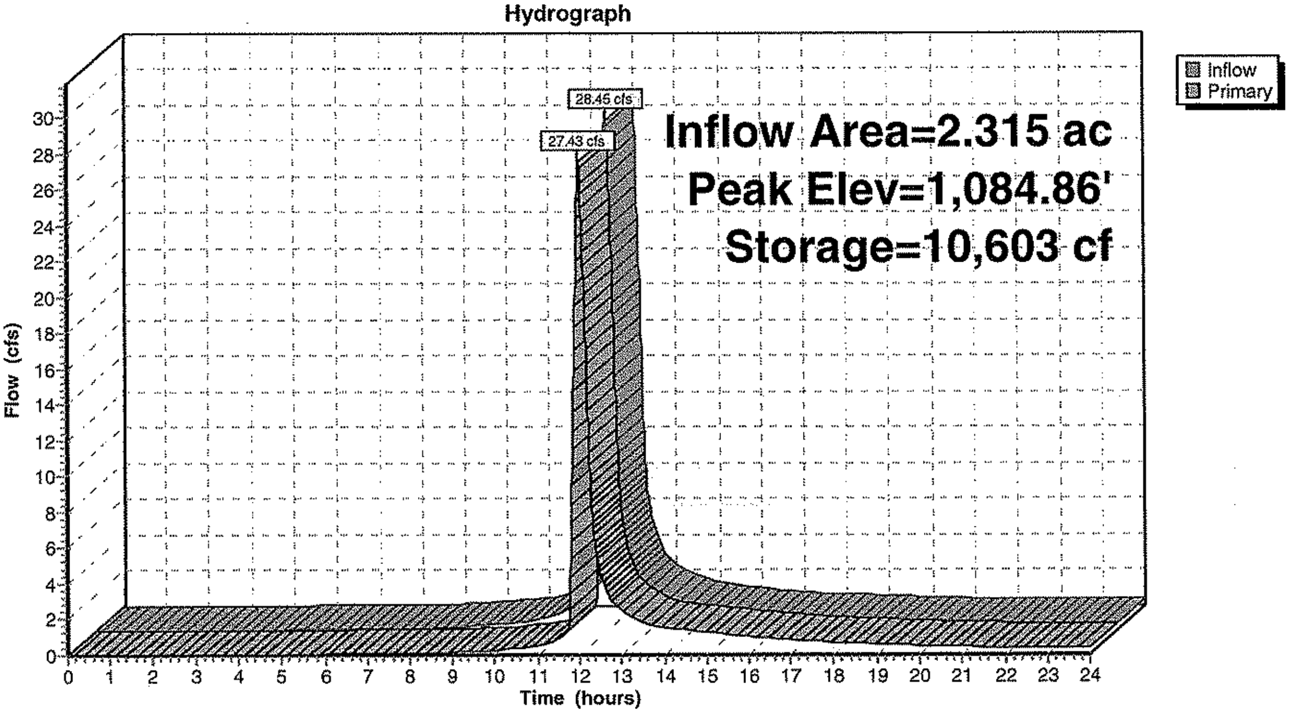
Reach S-3: Vegetated Swale



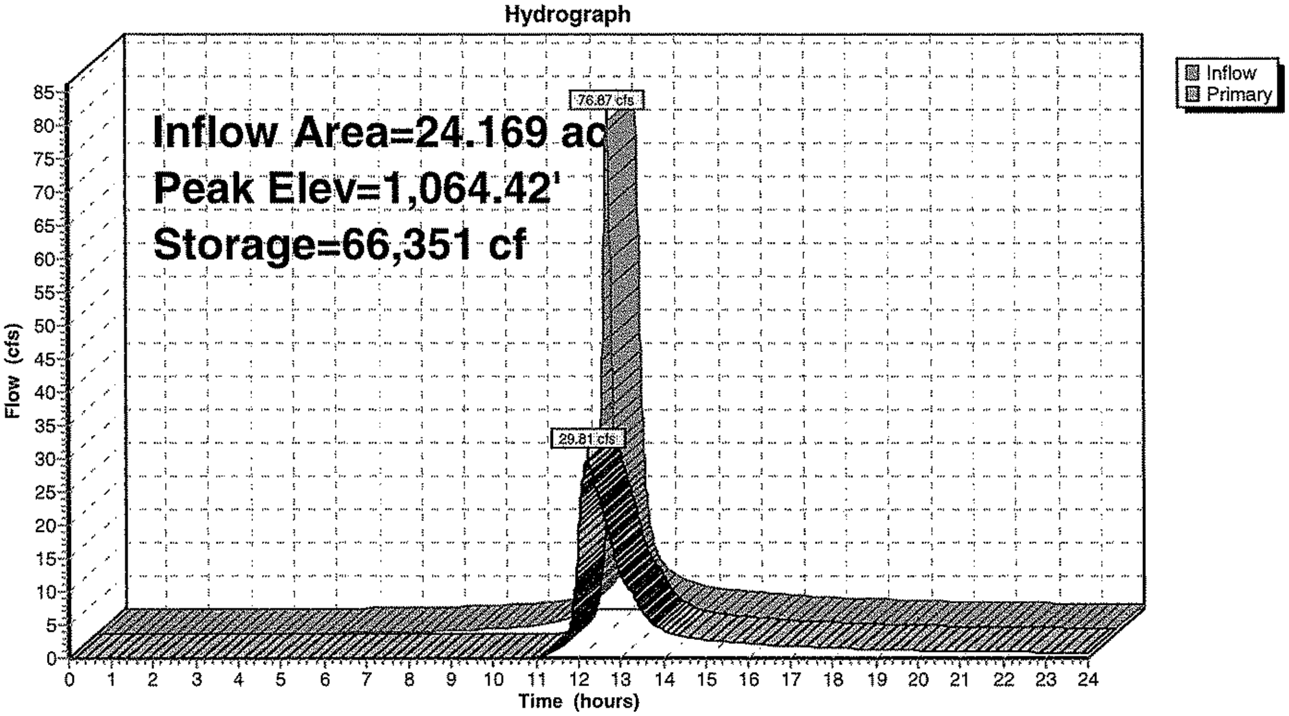
Pond P-1: Detention Basin



Pond P-2: Detention Basin

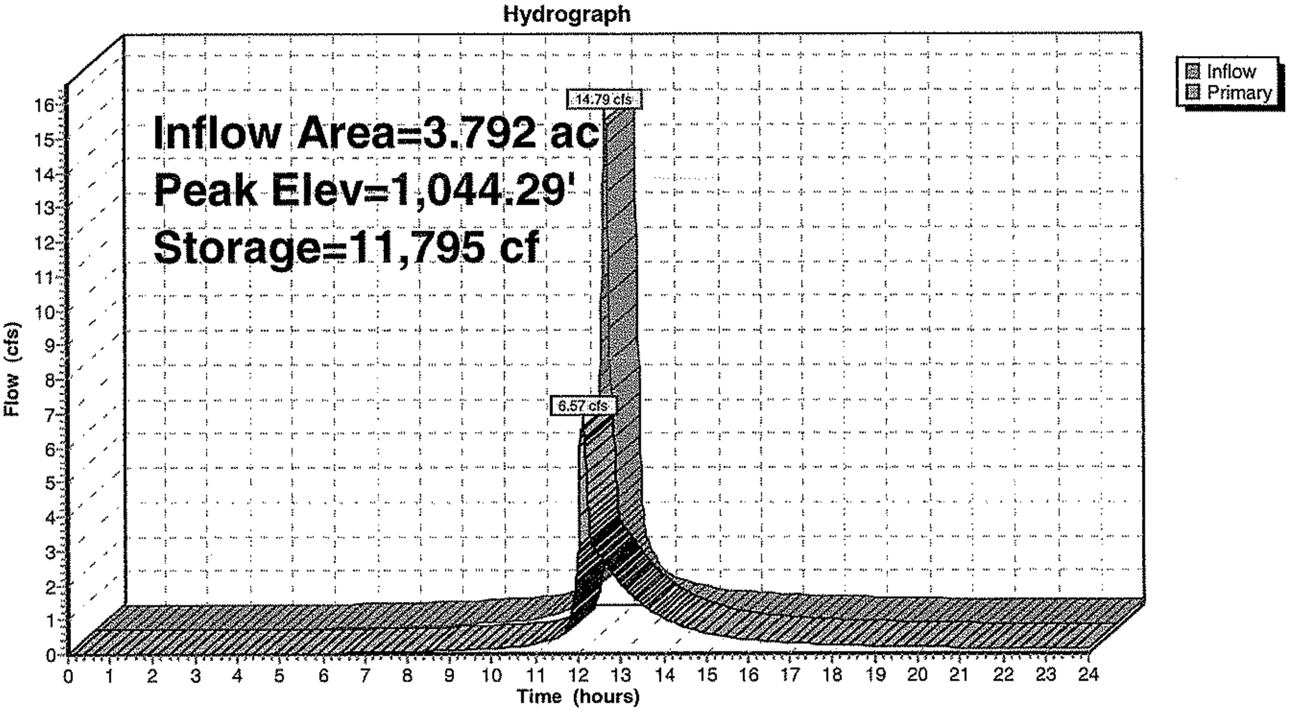


Pond P-3: Wet Pond

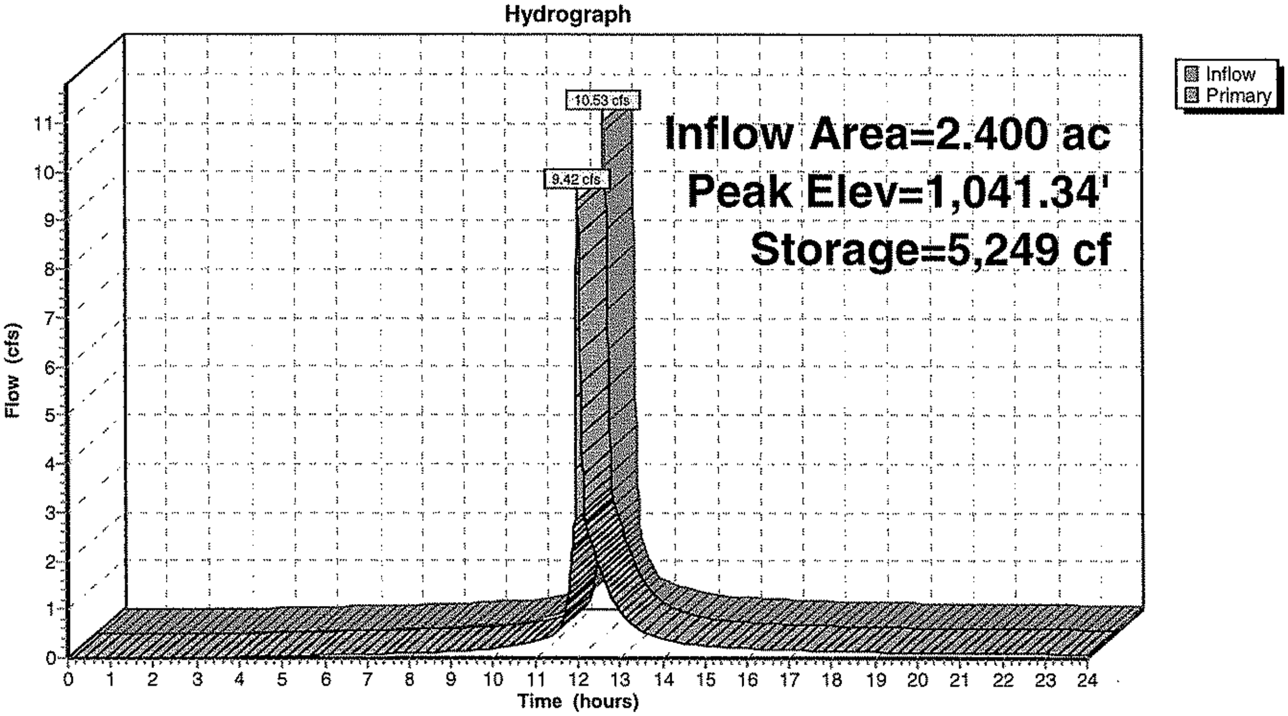


Primary OutFlow Max=6.56 cfs @ 12.13 hrs HW=1,044.29' (Free Discharge)
└─**1=Culvert** (Passes 6.56 cfs of 26.31 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 6.37 cfs @ 10.81 fps)
  │ └─**3=Culvert** (Passes 6.37 cfs of 28.53 cfs potential flow)
  │   ├─**4=6" Perf. Riser** (Passes < 3.57 cfs potential flow)
  │   └─**6=Orifice/Grate** (Passes < 4.90 cfs potential flow)
  ├─**5=Broad-Crested Rectangular Weir** (Weir Controls 0.20 cfs @ 1.33 fps)
  └─**7=Orifice/Grate** (Controls 0.00 cfs)

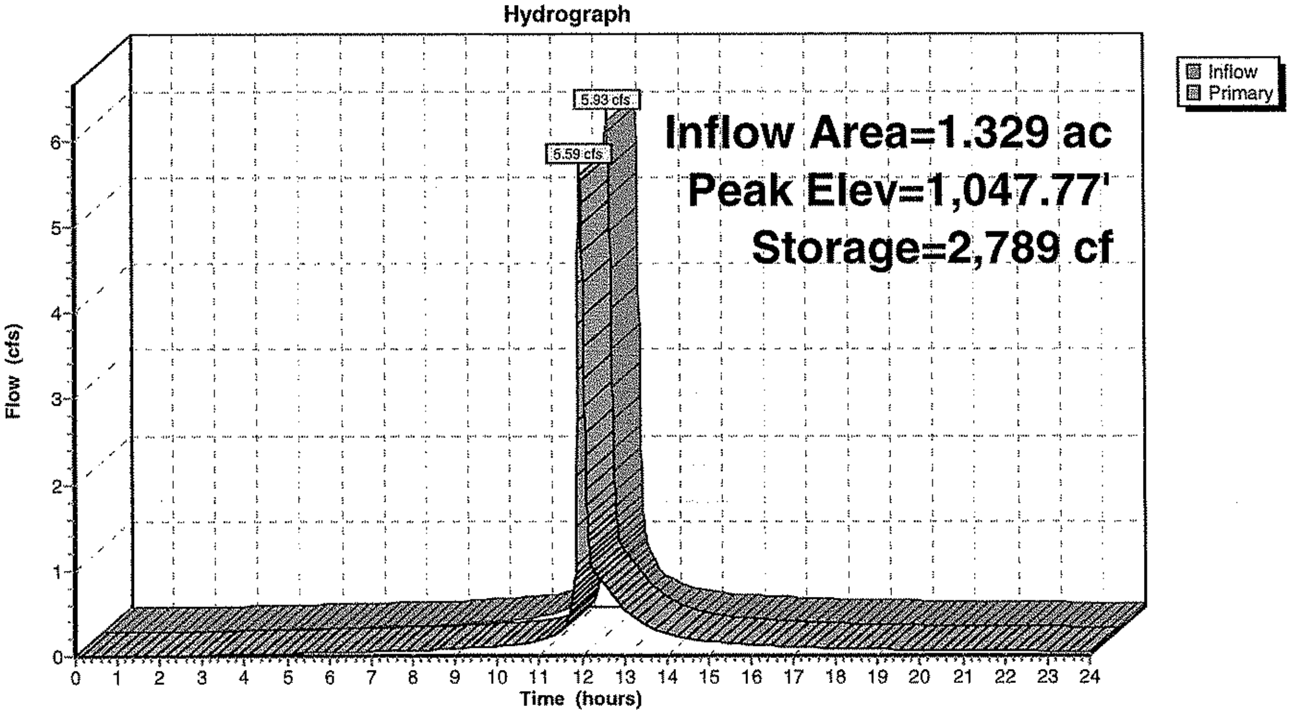
Pond P-4: Detention Basin



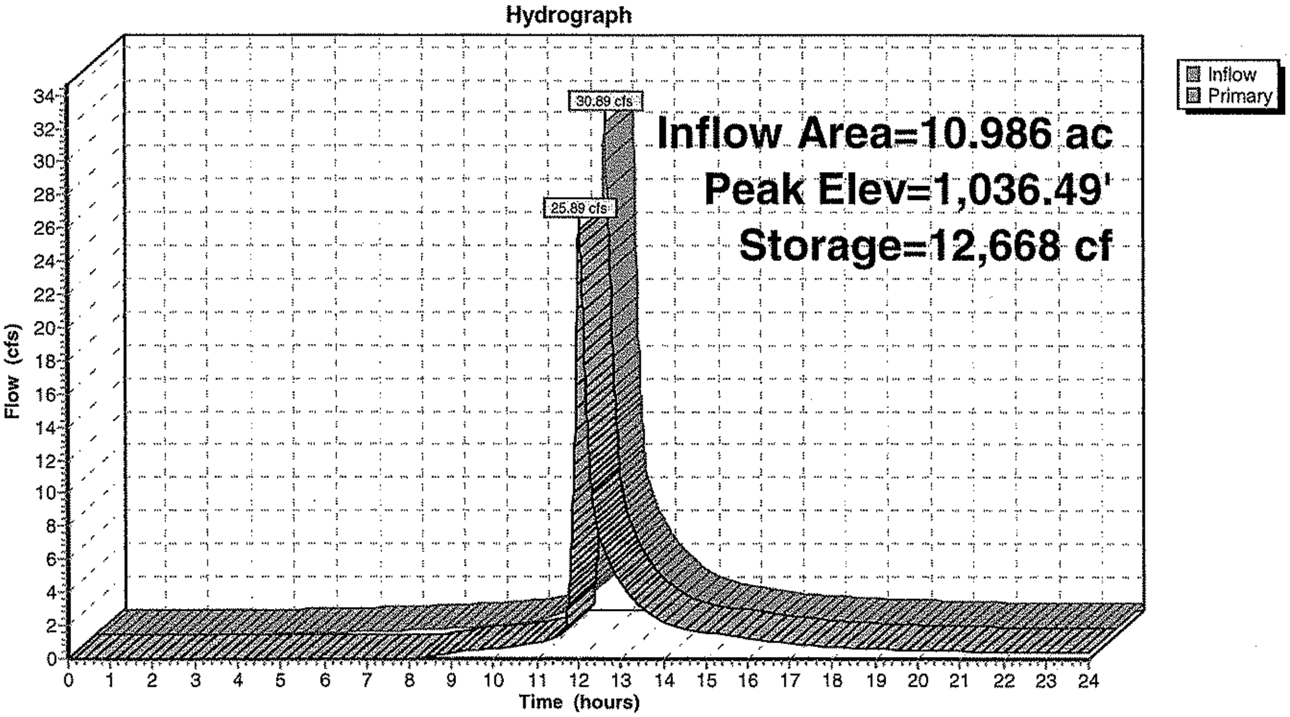
Pond P-5: Detention Basin



Pond P-6: Detention Basin



Pond P-7: Gravel Wetlands

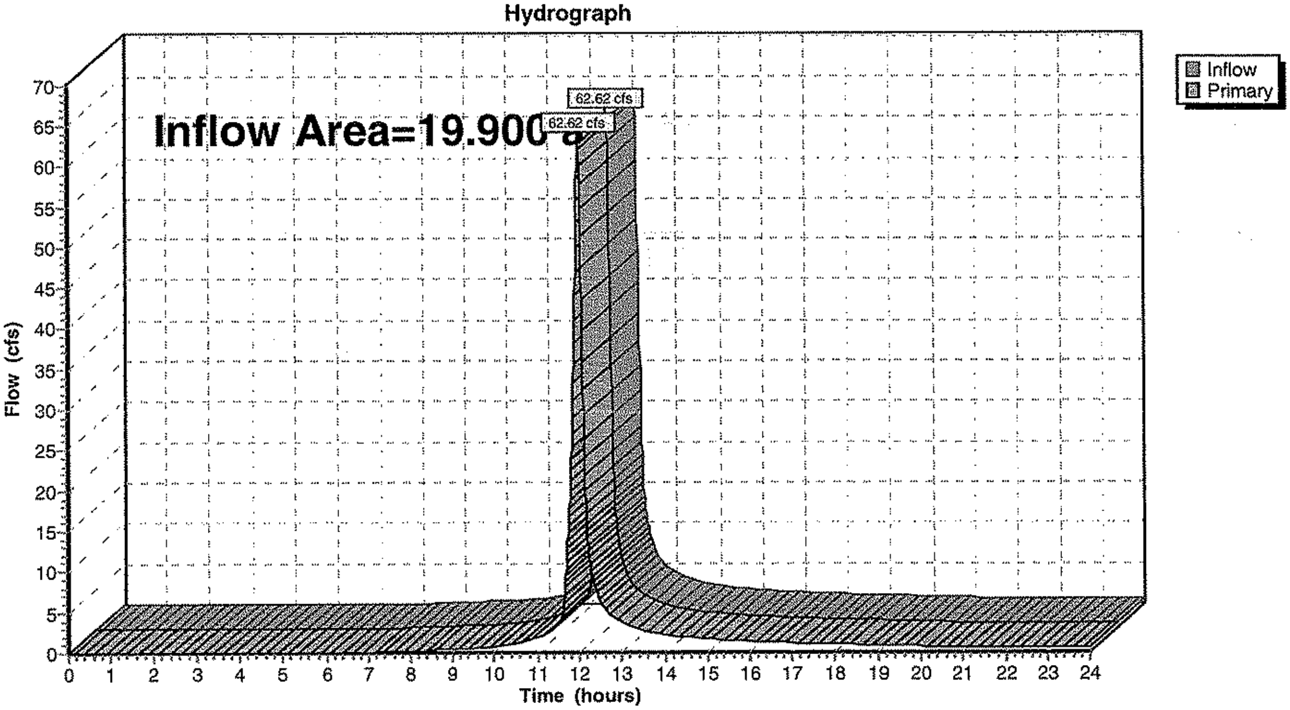


Summary for Link DP-2: City of Berlin Municipal System

Inflow Area =	19.900 ac,	45.95% Impervious,	Inflow Depth > 1.99"	for 2-Year event
Inflow =	62.62 cfs @	12.01 hrs, Volume=	3.305 af	
Primary =	62.62 cfs @	12.01 hrs, Volume=	3.305 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-2: City of Berlin Municipal System



Summary for Subcatchment PW-1: Proposed Watershed

Runoff = 27.54 cfs @ 12.09 hrs, Volume= 1.880 af, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.40"

Area (ac)	CN	Description
0.586	98	Paved parking & roofs
0.824	89	Gravel roads, HSG C
0.454	65	Woods/grass comb., Fair, HSG B
8.390	76	Woods/grass comb., Fair, HSG C
10.254	78	Weighted Average
9.668		Pervious Area
0.586		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.1	50	0.2000	0.39		**Sheet Flow, A to B** Grass: Short n= 0.150 P2= 3.50"
5.5	329	0.0200	0.99		**Shallow Concentrated Flow, B to C** Short Grass Pasture Kv= 7.0 fps
2.0	280	0.0200	2.28		**Shallow Concentrated Flow, C to D** Unpaved Kv= 16.1 fps
7.3	484	0.0250	1.11		**Shallow Concentrated Flow, D to E** Short Grass Pasture Kv= 7.0 fps
0.1	75	0.3700	9.12		**Shallow Concentrated Flow, E to F** Grassed Waterway Kv= 15.0 fps
17.0	1,218	Total			

Summary for Subcatchment PW-2: Proposed Watershed

Runoff = 95.29 cfs @ 12.00 hrs, Volume= 5.134 af, Depth> 3.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.40"

Area (ac)	CN	Description
0.360	69	50-75% Grass cover, Fair, HSG B
9.294	79	50-75% Grass cover, Fair, HSG C
1.102	84	50-75% Grass cover, Fair, HSG D
9.144	98	Paved parking & roofs
19.900	88	Weighted Average
10.756		Pervious Area
9.144		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	50	0.0400	1.65		**Sheet Flow, A to B** Smooth surfaces n= 0.011 P2= 3.50"
1.0	134	0.1000	2.21		**Shallow Concentrated Flow, B to C** Short Grass Pasture Kv= 7.0 fps
3.2	783	0.0400	4.06		**Shallow Concentrated Flow, C to D** Paved Kv= 20.3 fps
1.7	680	0.0140	6.79	149.34	**Trap/Vee/Rect Channel Flow, D to E** Bot.W=5.00' D=2.00' Z= 3.0 '/' Top.W=17.00' n= 0.030 Earth, grassed & winding
1.5	136	0.0440	1.47		**Shallow Concentrated Flow, E to F** Short Grass Pasture Kv= 7.0 fps
1.1	288	0.0500	4.54		**Shallow Concentrated Flow, F to G** Paved Kv= 20.3 fps
9.0	2,071	Total			

Summary for Subcatchment PW-3: Proposed Watershed

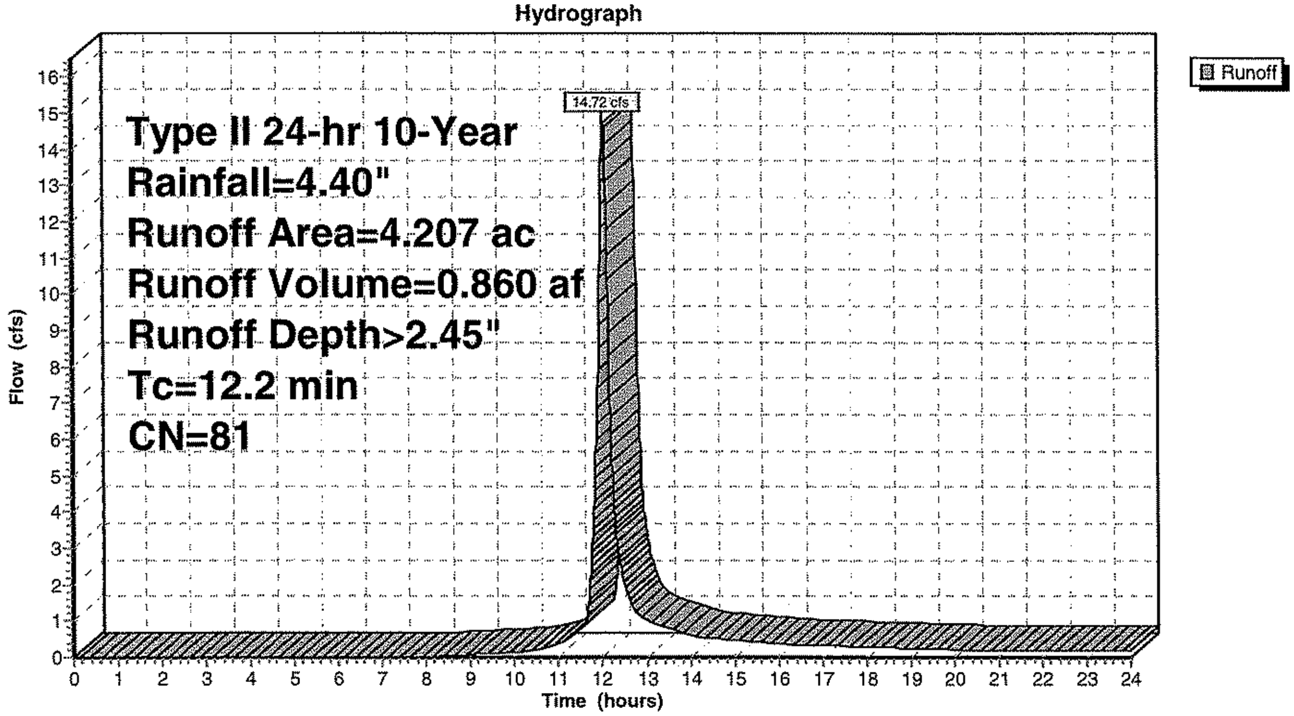
Runoff = 14.72 cfs @ 12.04 hrs, Volume= 0.860 af, Depth> 2.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.40"

Area (ac)	CN	Description
2.074	76	Woods/grass comb., Fair, HSG C
1.428	82	Woods/grass comb., Fair, HSG D
0.606	98	Paved parking & roofs
0.099	65	Woods/grass comb., Fair, HSG B
4.207	81	Weighted Average
3.601		Pervious Area
0.606		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2					**Direct Entry,**

Subcatchment PW-3: Proposed Watershed



Summary for Subcatchment PW-4b: Proposed Watershed

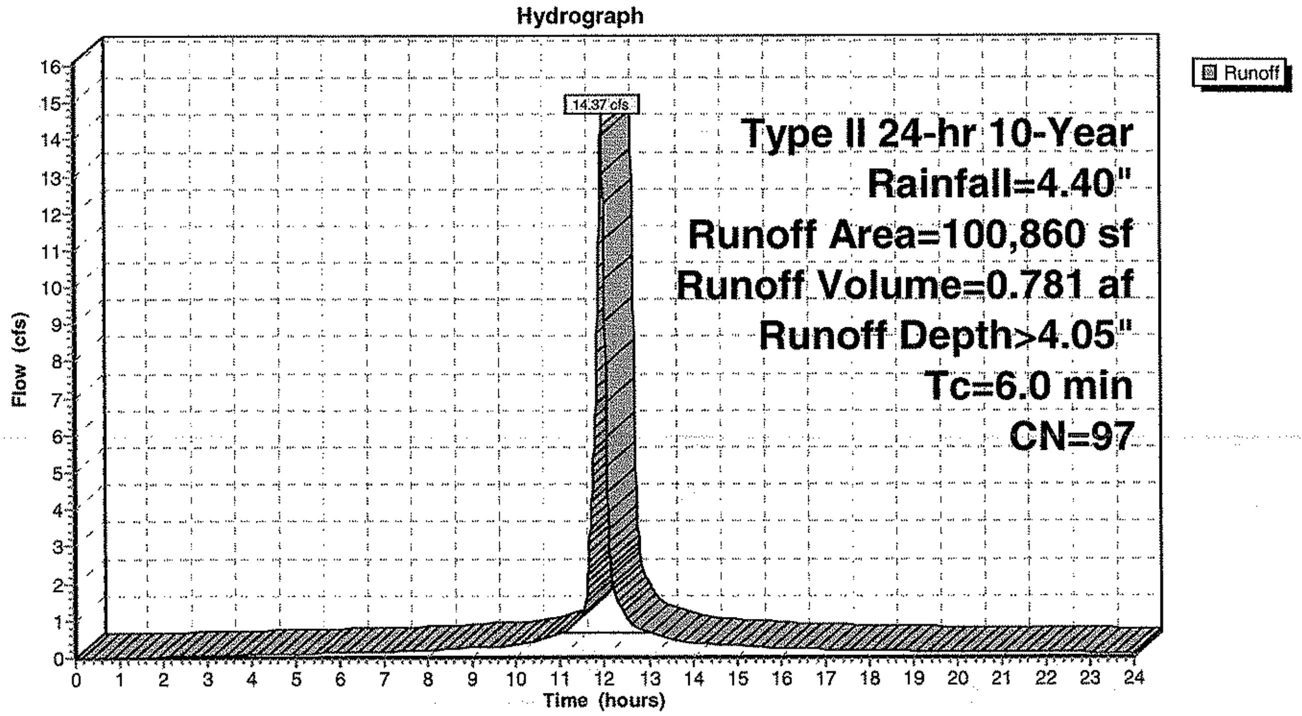
Runoff = 14.37 cfs @ 11.97 hrs, Volume= 0.781 af, Depth> 4.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.40"

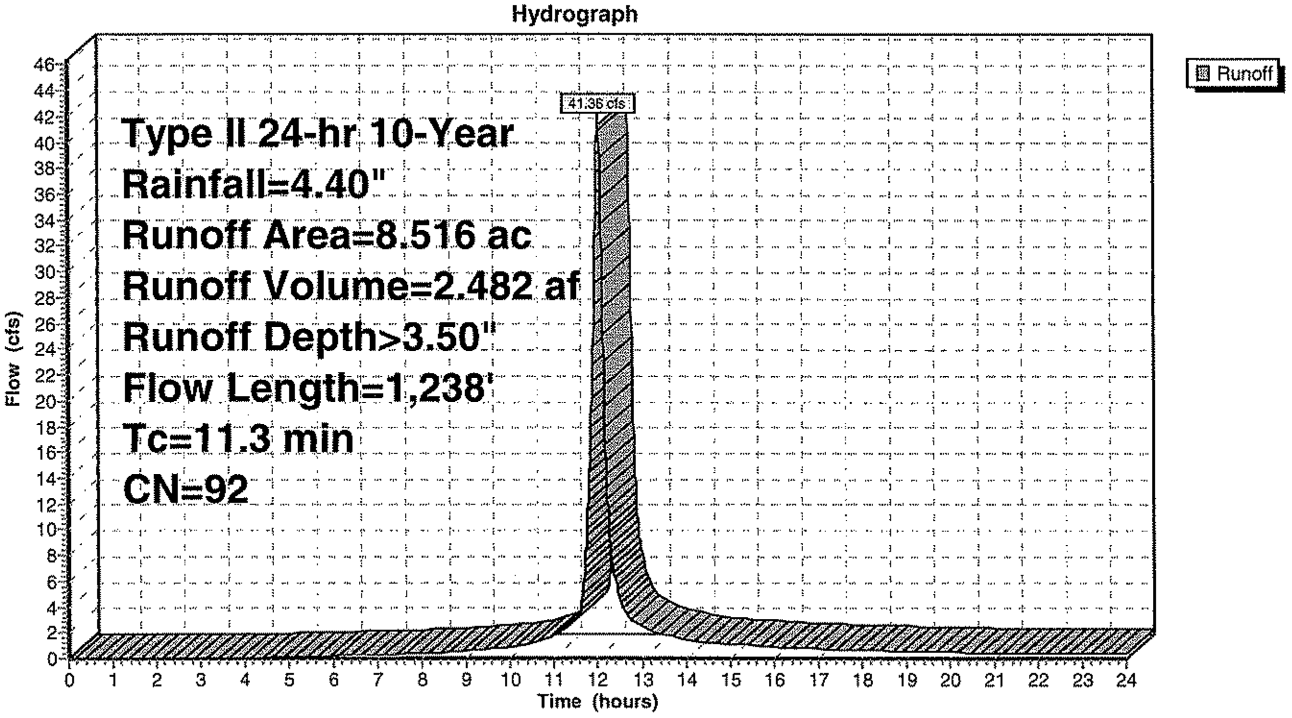
Area (sf)	CN	Description
2,949	74	>75% Grass cover, Good, HSG C
1,451	80	>75% Grass cover, Good, HSG D
96,460	98	Paved parking & roofs
100,860	97	Weighted Average
4,400		Pervious Area
96,460		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4b: Proposed Watershed



Subcatchment PW-4c: Proposed Watershed



Summary for Subcatchment PW-4e: Proposed Watershed

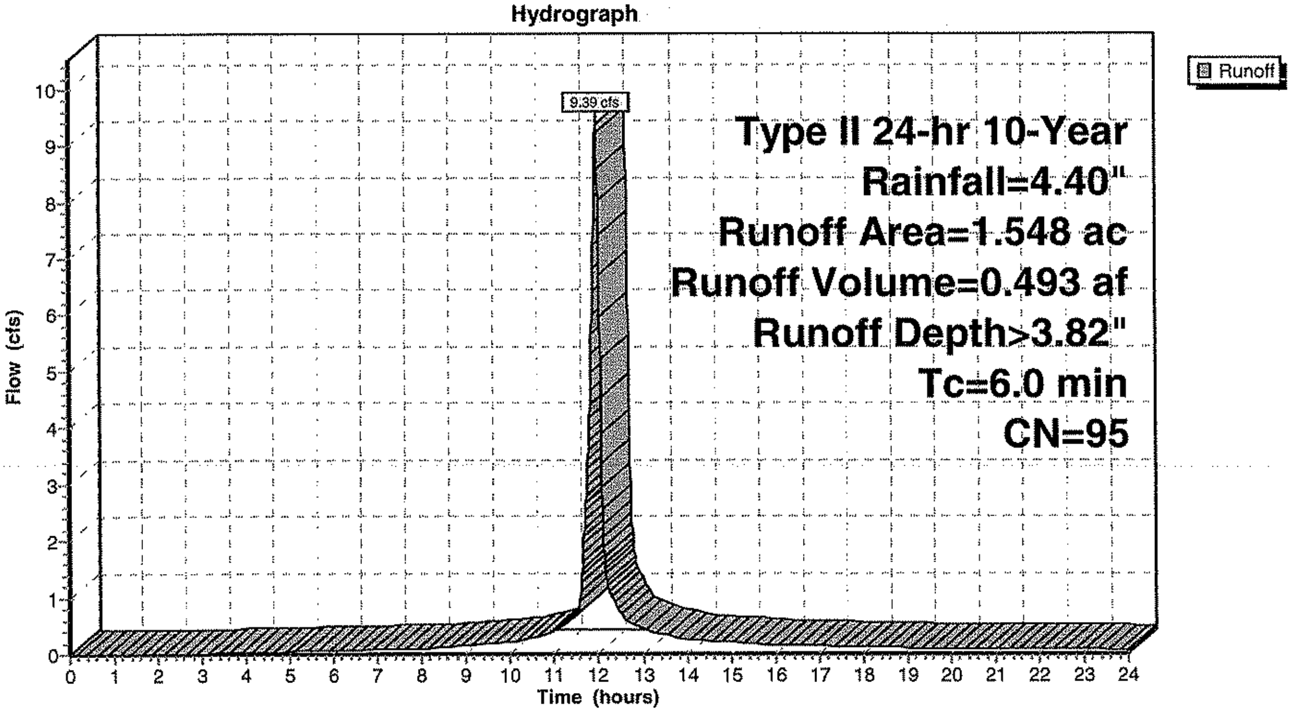
Runoff = 9.39 cfs @ 11.97 hrs, Volume= 0.493 af, Depth> 3.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.40"

Area (ac)	CN	Description
0.199	74	>75% Grass cover, Good, HSG C
1.349	98	Paved parking & roofs
1.548	95	Weighted Average
0.199		Pervious Area
1.349		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4e: Proposed Watershed



Summary for Subcatchment PW-4g: Proposed Watershed

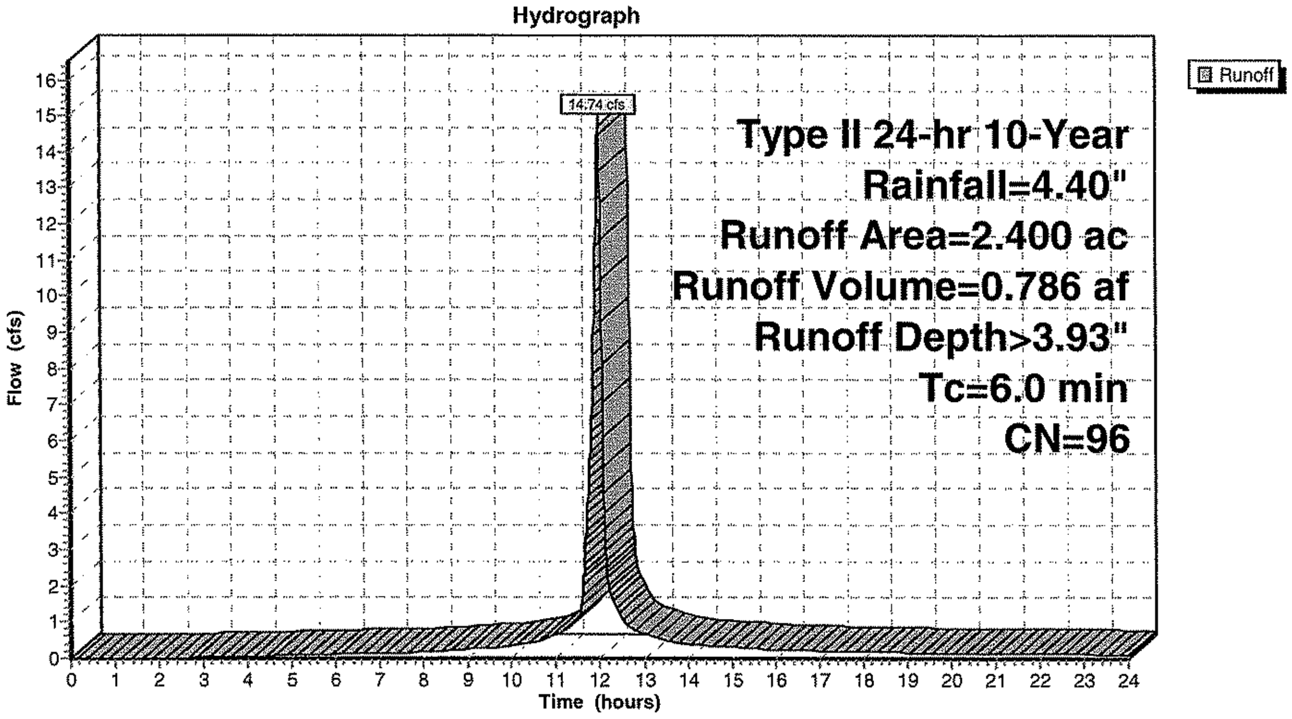
Runoff = 14.74 cfs @ 11.97 hrs, Volume= 0.786 af, Depth> 3.93"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.40"

Area (ac)	CN	Description
0.220	74	>75% Grass cover, Good, HSG C
2.180	98	Paved parking & roofs
2.400	96	Weighted Average
0.220		Pervious Area
2.180		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4g: Proposed Watershed



Summary for Subcatchment PW-4i: Proposed Watershed

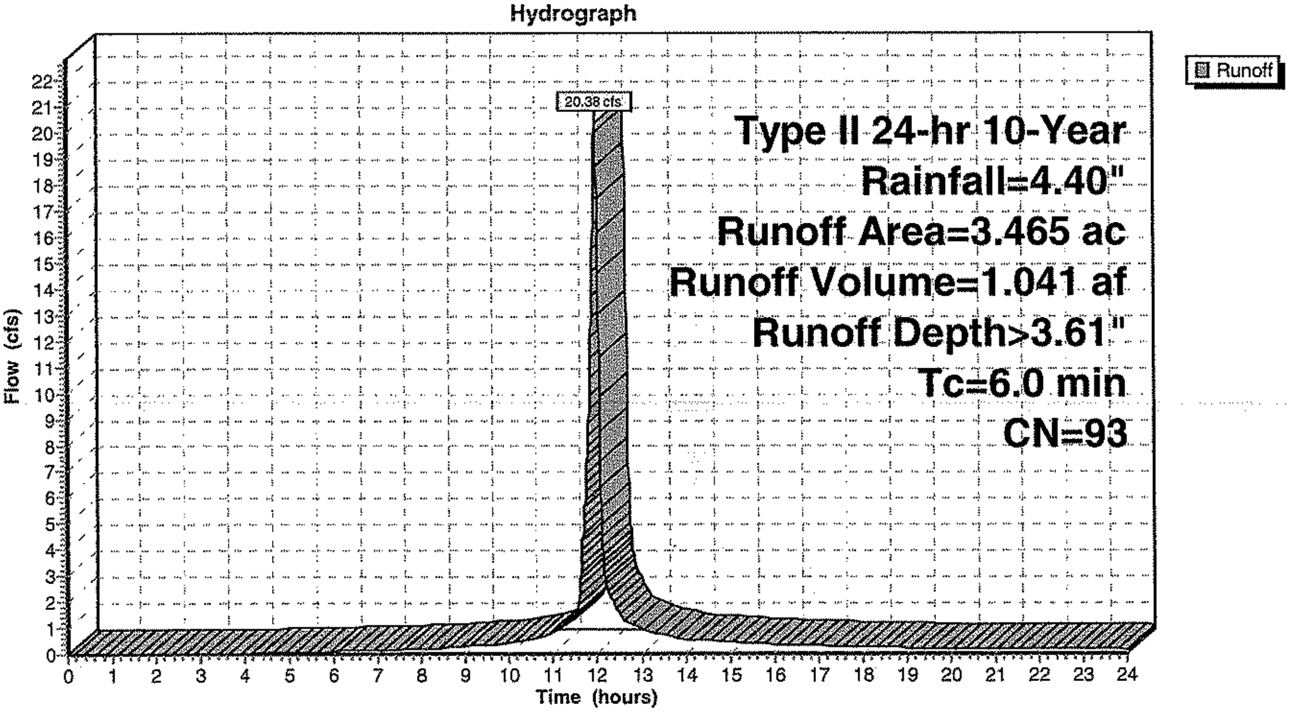
Runoff = 20.38 cfs @ 11.97 hrs, Volume= 1.041 af, Depth> 3.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=4.40"

	Area (ac)	CN	Description
	0.668	74	>75% Grass cover, Good, HSG C
*	0.883	98	Building Roof Area
	0.007	61	>75% Grass cover, Good, HSG B
	1.907	98	Paved parking & roofs
	3.465	93	Weighted Average
	0.675		Pervious Area
	2.790		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4i: Proposed Watershed

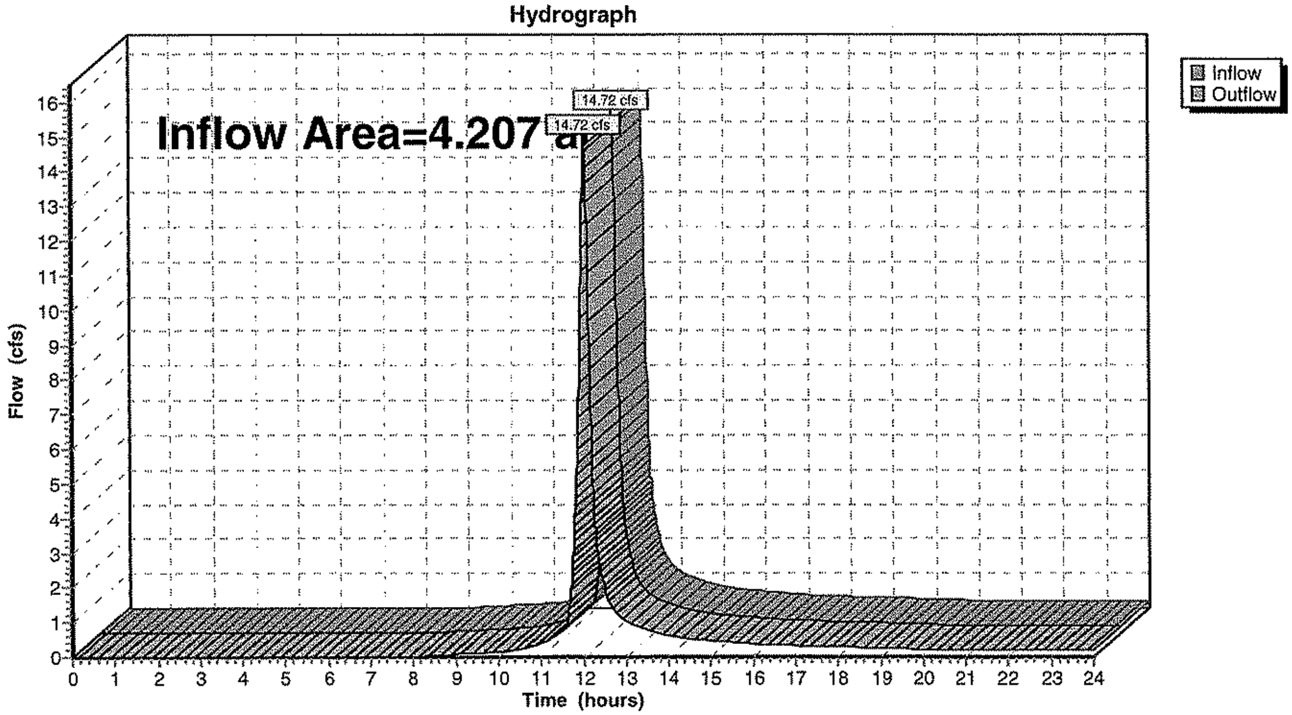


Summary for Reach DP-3: 48" Pipe to River

Inflow Area = 4.207 ac, 14.40% Impervious, Inflow Depth > 2.45" for 10-Year event
Inflow = 14.72 cfs @ 12.04 hrs, Volume= 0.860 af
Outflow = 14.72 cfs @ 12.04 hrs, Volume= 0.860 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach DP-3: 48" Pipe to River



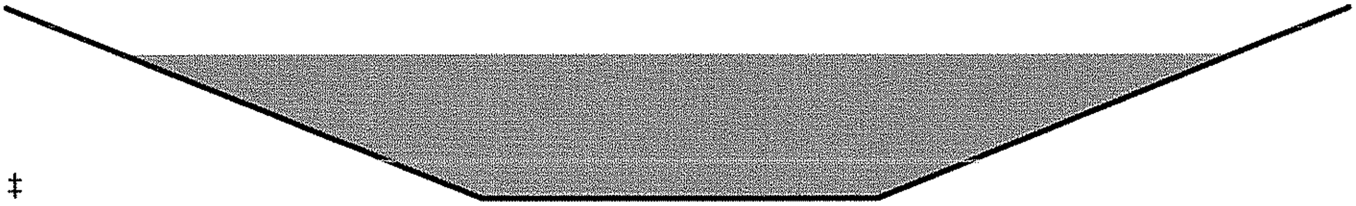
Summary for Reach S-2: Vegetated Swale

Inflow Area = 21.671 ac, 54.57% Impervious, Inflow Depth > 3.26" for 10-Year event
Inflow = 107.93 cfs @ 12.02 hrs, Volume= 5.896 af
Outflow = 106.91 cfs @ 12.04 hrs, Volume= 5.890 af, Atten= 1%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 4
Max. Velocity= 7.46 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.90 fps, Avg. Travel Time= 3.4 min

Peak Storage= 5,596 cf @ 12.03 hrs, Average Depth at Peak Storage= 1.51'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 191.74 cfs

5.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 17.00'
Length= 390.0' Slope= 0.0231 '/'
Inlet Invert= 1,078.00', Outlet Invert= 1,069.00'



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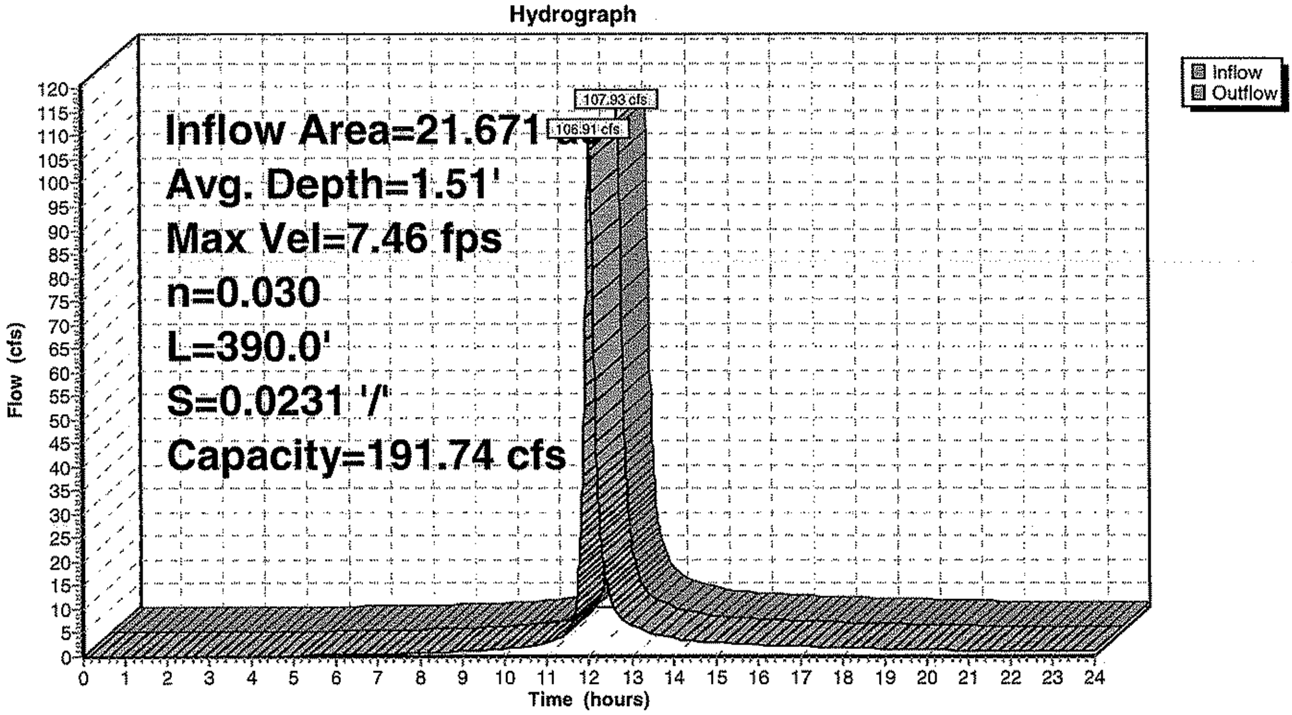
Reach S-2: Vegetated Swale



Summary for Pond P-1: Detention Basin

Inflow Area =	10.840 ac, 36.83% Impervious, Inflow Depth > 3.00"	for 10-Year event	
Inflow =	55.06 cfs @ 12.00 hrs, Volume=	2.707 af	
Outflow =	54.22 cfs @ 12.02 hrs, Volume=	2.700 af,	Atten= 2%, Lag= 0.8 min
Primary =	32.91 cfs @ 12.02 hrs, Volume=	0.695 af	
Secondary =	21.31 cfs @ 12.02 hrs, Volume=	2.005 af	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
Peak Elev= 1,088.98' @ 12.02 hrs Surf.Area= 2,634 sf Storage= 5,680 cf
Flood Elev= 1,090.50' Surf.Area= 3,217 sf Storage= 8,647 cf

Plug-Flow detention time= 5.2 min calculated for 2.700 af (100% of inflow)
Center-of-Mass det. time= 3.4 min (808.5 - 805.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,086.00'	8,647 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,086.00	1,257	126.0	0	0	1,257
1,088.00	2,124	163.0	3,343	3,343	2,156
1,090.00	3,217	201.0	5,303	8,647	3,315

Device	Routing	Invert	Outlet Devices
#1	Primary	1,083.00'	**30.0" x 150.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 1,081.00' S= 0.0133 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	1,086.00'	**6" Perf. Risers X 4.00** Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 Disch. (cfs) 0.000 0.051 0.139 0.253 0.388 0.541 0.710 0.894 1.091
#3	Device 1	1,088.00'	**36.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#4	Secondary	1,086.00'	**24.0" x 56.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 1,085.00' S= 0.0179 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=32.85 cfs @ 12.02 hrs HW=1,088.98' (Free Discharge)
↑—**1=Culvert** (Passes 32.85 cfs of 51.42 cfs potential flow)
  ↑—**2=6" Perf. Risers** (Custom Controls 2.82 cfs)
  └—**3=Orifice/Grate** (Weir Controls 30.03 cfs @ 3.24 fps)

Secondary OutFlow Max=21.30 cfs @ 12.02 hrs HW=1,088.98' (Free Discharge)
↑—**4=Culvert** (Inlet Controls 21.30 cfs @ 6.78 fps)

Summary for Pond P-2: Detention Basin

Inflow Area = 2.315 ac, 95.64% Impervious, Inflow Depth > 14.44" for 10-Year event
Inflow = 34.93 cfs @ 11.98 hrs, Volume= 2.785 af
Outflow = 33.97 cfs @ 12.00 hrs, Volume= 2.720 af, Atten= 3%, Lag= 1.5 min
Primary = 33.97 cfs @ 12.00 hrs, Volume= 2.720 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
Peak Elev= 1,085.01' @ 12.00 hrs Surf.Area= 5,061 sf Storage= 11,313 cf
Flood Elev= 1,086.50' Surf.Area= 6,018 sf Storage= 16,810 cf

Plug-Flow detention time= 38.7 min calculated for 2.719 af (98% of inflow)
Center-of-Mass det. time= 24.5 min (825.6 - 801.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,082.00'	16,810 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,082.00	2,561	246.0	0	0	2,561
1,084.00	4,176	288.0	6,672	6,672	4,424
1,086.00	6,018	326.0	10,138	16,810	6,380

Device	Routing	Invert	Outlet Devices
#1	Primary	1,081.50'	**36.0" x 75.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 1,081.10' S= 0.0053 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	1,082.00'	**6" Perf. Riser X 4.00** Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 Disch. (cfs) 0.000 0.051 0.139 0.253 0.388 0.541 0.710 0.894 1.091
#3	Device 1	1,084.00'	**36.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=33.94 cfs @ 12.00 hrs HW=1,085.01' (Free Discharge)
↑—**1=Culvert** (Passes 33.94 cfs of 42.92 cfs potential flow)
  ↑—**2=6" Perf. Riser** (Custom Controls 2.85 cfs)
  └—**3=Orifice/Grate** (Weir Controls 31.09 cfs @ 3.28 fps)

Summary for Pond P-3: Wet Pond

Inflow Area = 24.169 ac, 57.40% Impervious, Inflow Depth > 3.31" for 10-Year event
Inflow = 116.60 cfs @ 12.03 hrs, Volume= 6.659 af
Outflow = 50.59 cfs @ 12.17 hrs, Volume= 6.296 af, Atten= 57%, Lag= 8.3 min
Primary = 50.59 cfs @ 12.17 hrs, Volume= 6.296 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
Peak Elev= 1,065.81' @ 12.17 hrs Surf.Area= 22,049 sf Storage= 95,115 cf
Flood Elev= 1,067.50' Surf.Area= 24,347 sf Storage= 122,770 cf

Plug-Flow detention time= 70.5 min calculated for 6.293 af (94% of inflow)
Center-of-Mass det. time= 39.9 min (841.8 - 801.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,060.00'	122,770 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,060.00	10,068	543.0	0	0	10,068
1,061.00	11,752	581.0	10,899	10,899	13,513
1,062.00	15,265	558.0	13,470	24,369	15,674
1,064.00	18,728	596.0	33,934	58,303	19,350
1,066.00	22,418	634.0	41,091	99,394	23,267
1,067.00	24,347	653.0	23,376	122,770	25,317

Device	Routing	Invert	Outlet Devices
#1	Primary	1,061.00'	**36.0" x 185.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 1,058.50' S= 0.0135 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	1,061.00'	**12.0" Vert. Orifice/Grate X 3.00** C= 0.600
#3	Device 1	1,062.50'	**8.0" Vert. Orifice/Grate X 4.00** C= 0.600
#4	Device 1	1,064.00'	**6.0" Vert. Orifice/Grate X 5.00** C= 0.600
#5	Device 1	1,065.00'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=50.61 cfs @ 12.17 hrs HW=1,065.81' (Free Discharge)
└─**1=Culvert** (Passes 50.61 cfs of 61.89 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 23.54 cfs @ 9.99 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 11.59 cfs @ 8.30 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 5.90 cfs @ 6.01 fps)
  └─**5=Broad-Crested Rectangular Weir** (Weir Controls 9.57 cfs @ 2.96 fps)

Summary for Pond P-4: Detention Basin

Inflow Area = 3.792 ac, 78.71% Impervious, Inflow Depth > 3.58" for 10-Year event
Inflow = 21.44 cfs @ 12.01 hrs, Volume= 1.132 af
Outflow = 8.56 cfs @ 12.13 hrs, Volume= 1.110 af, Atten= 60%, Lag= 7.0 min
Primary = 8.56 cfs @ 12.13 hrs, Volume= 1.110 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
Peak Elev= 1,045.16' @ 12.13 hrs Surf.Area= 5,999 sf Storage= 16,575 cf
Flood Elev= 1,046.50' Surf.Area= 6,997 sf Storage= 22,025 cf

Plug-Flow detention time= 53.8 min calculated for 1.110 af (98% of inflow)
Center-of-Mass det. time= 41.4 min (824.2 - 782.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,040.80'	22,025 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,040.80	1,889	219.0	0	0	1,889
1,042.00	2,858	276.0	2,828	2,828	4,154
1,044.00	4,747	344.0	7,526	10,354	7,566
1,046.00	6,997	395.0	11,671	22,025	10,655

Device	Routing	Invert	Outlet Devices
#1	Primary	1,039.00'	**24.0" x 196.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 1,038.00' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	1,039.00'	**6.0" Vert. Orifice/Grate X 3.00** C= 0.600
#3	Device 2	1,039.30'	**24.0" x 86.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 1,039.00' S= 0.0035 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#4	Device 3	1,040.80'	**6" Perf. Riser X 4.00** Head (feet) 0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50 4.00 Disch. (cfs) 0.000 0.051 0.139 0.253 0.388 0.541 0.710 0.894 1.091
#5	Device 1	1,044.00'	**0.5' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#6	Device 3	1,044.00'	**36.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600
#7	Device 1	1,045.50'	**36.0" Vert. Orifice/Grate** C= 0.600

Summary for Pond P-5: Detention Basin

```
Inflow Area =      2.400 ac, 90.83% Impervious, Inflow Depth >  3.93"   for 10-Year event
Inflow     =     14.74 cfs @  11.97 hrs, Volume=          0.786 af
Outflow    =     14.21 cfs @  11.99 hrs, Volume=          0.781 af, Atten= 4%, Lag= 1.2 min
Primary    =     14.21 cfs @  11.99 hrs, Volume=          0.781 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
Peak Elev= 1,041.49' @ 11.99 hrs   Surf.Area= 2,681 sf   Storage= 5,653 cf
Flood Elev= 1,042.10'   Surf.Area= 3,052 sf   Storage= 7,108 cf

Plug-Flow detention time= 23.1 min calculated for 0.781 af (99% of inflow)
Center-of-Mass det. time= 18.6 min ( 779.7 - 761.1 )

Volume      Invert     Avail.Storage   Storage Description
   #1    1,038.00'          7,108 cf   Custom Stage Data (Irregular) Listed below (Recalc)

 Elevation       Surf.Area    Perim.        Inc.Store       Cum.Store        Wet.Area
    (feet)         (sq-ft)    (feet)      (cubic-feet)    (cubic-feet)         (sq-ft)
  1,038.00             727     135.0                0               0             727
  1,040.00           1,731     184.0            2,387           2,387           2,011
  1,042.00           3,052     234.0            4,721           7,108           3,726

Device  Routing           Invert   Outlet Devices
   #1   Primary        1,037.50'   24.0"  x 38.0' long Culvert  CPP, square edge headwall,  Ke= 0.500
                                   Outlet Invert= 1,037.00'  S= 0.0132 '/'  Cc= 0.900
                                   n= 0.013  Corrugated PE, smooth interior
   #2   Device 1       1,038.00'   6" Perf. Riser X 4.00
                                   Head  (feet) 0.00  0.50  1.00  1.50  2.00  2.50  3.00  3.50  4.00
                                   Disch. (cfs) 0.000  0.051  0.139  0.253  0.388  0.542  0.710  0.894
                                   1.091
   #3   Device 1       1,041.00'   36.0" Horiz. Orifice/Grate    Limited to weir flow   C= 0.600

Primary OutFlow  Max=14.19 cfs @ 11.99 hrs  HW=1,041.49'   (Free Discharge)
└─1=Culvert  (Passes 14.19 cfs of 26.16 cfs potential flow)
   ├─2=6" Perf. Riser  (Custom Controls 3.56 cfs)
   └─3=Orifice/Grate  (Weir Controls 10.62 cfs @ 2.29 fps)
```

Summary for Pond P-6: Detention Basin

Inflow Area = 1.329 ac, 95.68% Impervious, Inflow Depth > 4.05" for 10-Year event
Inflow = 8.25 cfs @ 11.97 hrs, Volume= 0.448 af
Outflow = 7.95 cfs @ 11.99 hrs, Volume= 0.445 af, Atten= 4%, Lag= 1.2 min
Primary = 7.95 cfs @ 11.99 hrs, Volume= 0.445 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 6
Peak Elev= 1,047.86' @ 11.99 hrs Surf.Area= 2,477 sf Storage= 3,001 cf
Flood Elev= 1,048.50' Surf.Area= 2,633 sf Storage= 3,369 cf

Plug-Flow detention time= 28.7 min calculated for 0.444 af (99% of inflow)
Center-of-Mass det. time= 23.4 min (777.3 - 753.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,046.00'	3,369 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,046.00	890	241.0	0	0	890
1,048.00	2,633	312.0	3,369	3,369	4,063

Device	Routing	Invert	Outlet Devices
#1	Primary	1,045.00'	**18.0" x 43.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 1,044.60' S= 0.0093 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	1,046.00'	**6" Perf. Riser X 4.00** Head (feet) 0.00 0.50 1.00 1.50 2.00 Disch. (cfs) 0.000 0.051 0.139 0.253 0.388
#3	Device 1	1,047.50'	**36.0" Horiz. Orifice/Grate** Limited to weir flow C= 0.600

Primary OutFlow Max=7.93 cfs @ 11.99 hrs HW=1,047.86' (Free Discharge)
↑—**1=Culvert** (Passes 7.93 cfs of 12.35 cfs potential flow)
  ↑—**2=6" Perf. Riser** (Custom Controls 1.40 cfs)
  └—**3=Orifice/Grate** (Weir Controls 6.54 cfs @ 1.95 fps)

Summary for Pond P-7: Gravel Wetlands

Inflow Area = 10.986 ac, 83.98% Impervious, Inflow Depth > 3.69" for 10-Year event
Inflow = 48.77 cfs @ 11.98 hrs, Volume= 3.377 af
Outflow = 41.52 cfs @ 12.03 hrs, Volume= 3.293 af, Atten= 15%, Lag= 2.8 min
Primary = 41.52 cfs @ 12.03 hrs, Volume= 3.293 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 8
Peak Elev= 1,037.10' @ 12.03 hrs Surf.Area= 10,474 sf Storage= 16,051 cf
Flood Elev= 1,038.50' Surf.Area= 11,311 sf Storage= 21,763 cf

Plug-Flow detention time= 37.2 min calculated for 3.292 af (97% of inflow)
Center-of-Mass det. time= 22.3 min (815.8 - 793.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,031.00'	10,309 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) x 2
#2	1,036.00'	11,454 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
		21,763 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,031.00	1,250	150.0	40.0	0	0	1,250
1,033.00	1,250	150.0	30.0	750	750	1,550
1,033.33	1,250	150.0	20.0	82	832	1,599
1,034.00	1,250	150.0	100.0	838	1,670	1,700
1,036.00	2,286	193.0	100.0	3,484	5,154	2,923

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1,036.00	4,572	386.0	0	0	4,572
1,037.00	5,817	298.0	5,182	5,182	9,374
1,038.00	6,739	317.0	6,272	11,454	10,354

Device	Routing	Invert	Outlet Devices
#1	Primary	1,033.67'	**36.0" x 38.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 1,033.20' S= 0.0124 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior
#2	Device 1	1,033.67'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Device 2	1,031.00'	**8.0" Vert. Orifice/Grate** C= 0.600
#4	Device 1	1,035.00'	**4.00' W x 2.00' H Vert. Orifice/Grate** C= 0.600

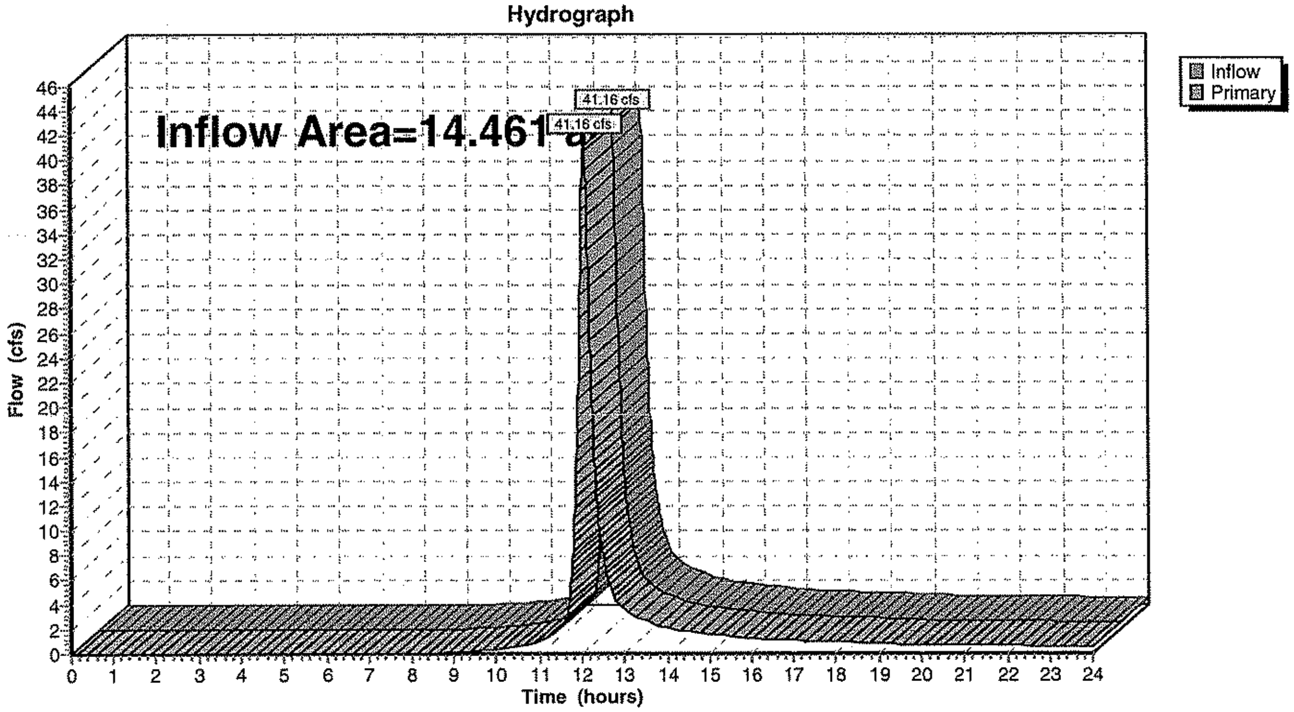
Primary OutFlow Max=41.52 cfs @ 12.03 hrs HW=1,037.10' (Free Discharge)
1=Culvert (Passes 41.52 cfs of 45.49 cfs potential flow)
  2=Orifice/Grate (Orifice Controls 2.96 cfs @ 8.47 fps)
    3=Orifice/Grate (Passes 2.96 cfs of 3.11 cfs potential flow)
  4=Orifice/Grate (Orifice Controls 38.56 cfs @ 4.82 fps)

Summary for Link DP-1: Androscoggin River

Inflow Area = 14.461 ac, 8.24% Impervious, Inflow Depth > 2.27" for 10-Year event
Inflow = 41.16 cfs @ 12.07 hrs, Volume= 2.740 af
Primary = 41.16 cfs @ 12.07 hrs, Volume= 2.740 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-1: Androscoggin River

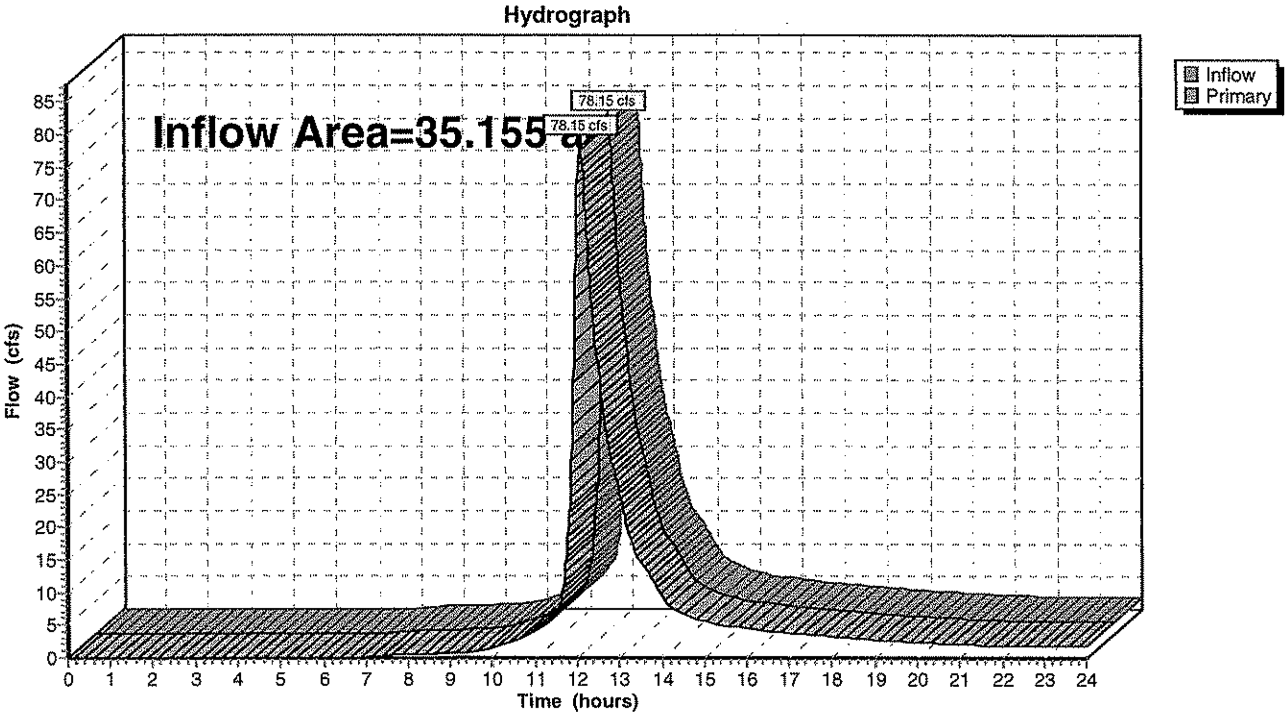


Summary for Link DP-4: Existing 30" Pipe to River Outfall

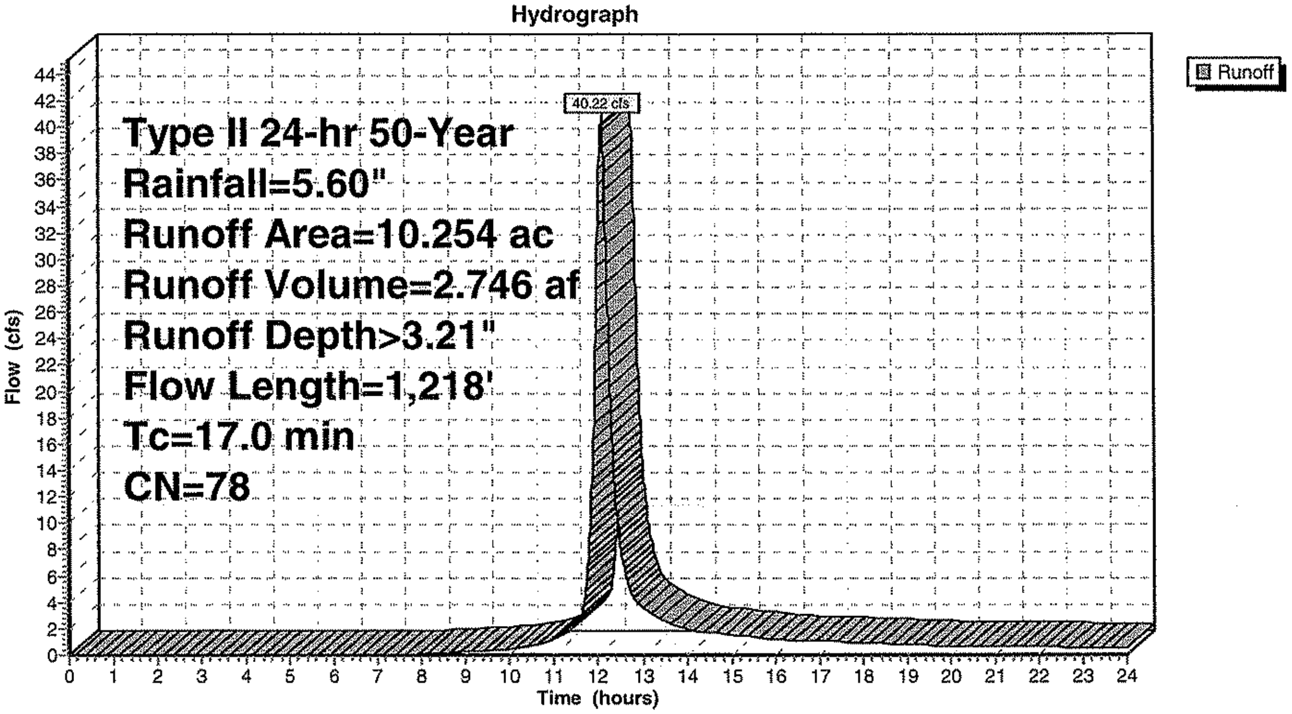
Inflow Area = 35.155 ac, 65.71% Impervious, Inflow Depth > 3.27" for 10-Year event
Inflow = 78.15 cfs @ 12.10 hrs, Volume= 9.589 af
Primary = 78.15 cfs @ 12.10 hrs, Volume= 9.589 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

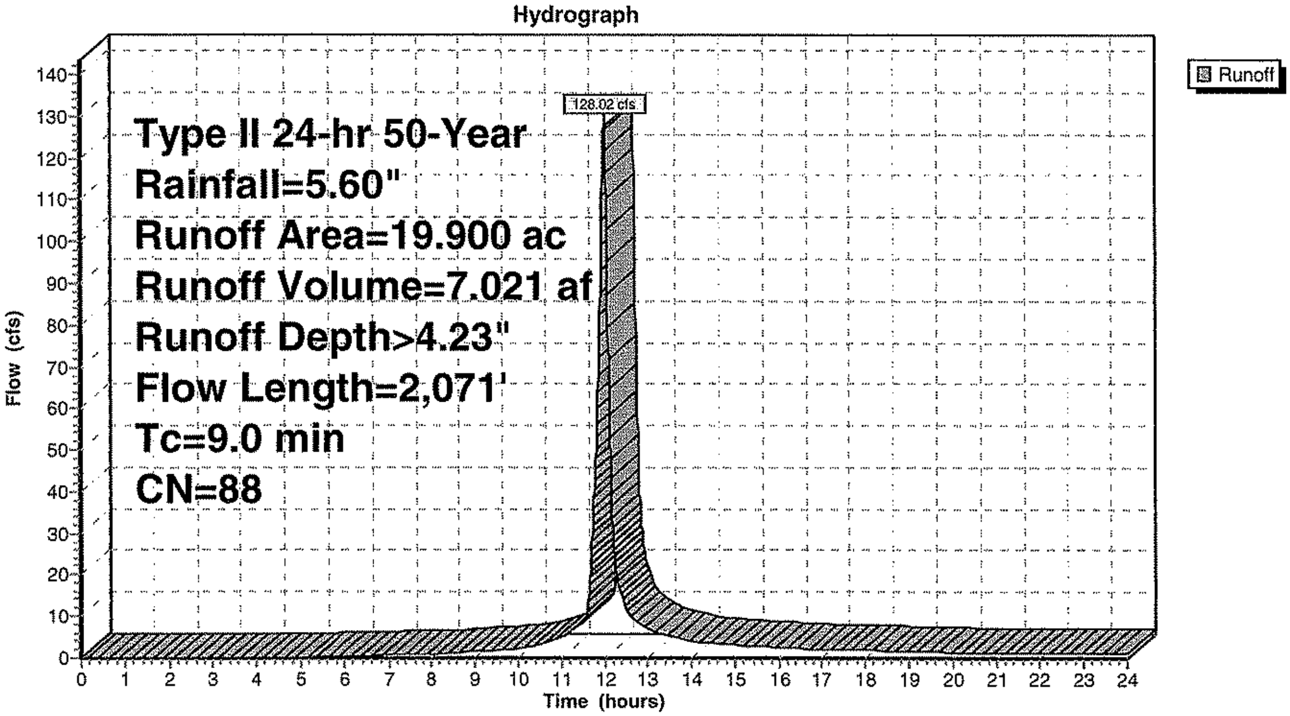
Link DP-4: Existing 30" Pipe to River Outfall



Subcatchment PW-1: Proposed Watershed



Subcatchment PW-2: Proposed Watershed



Summary for Subcatchment PW-4a: Proposed Watershed

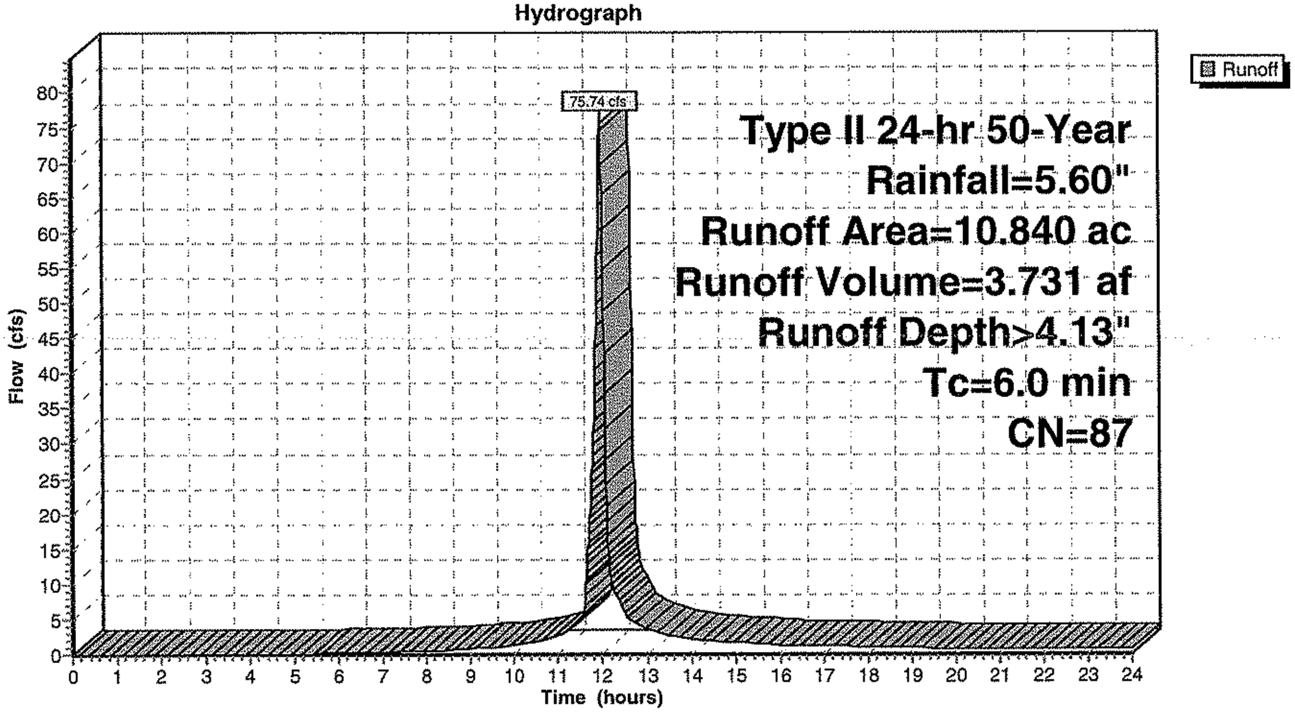
Runoff = 75.74 cfs @ 11.97 hrs, Volume= 3.731 af, Depth> 4.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-Year Rainfall=5.60"

Area (ac)	CN	Description
0.528	65	Woods/grass comb., Fair, HSG B
0.477	69	50-75% Grass cover, Fair, HSG B
5.023	84	50-75% Grass cover, Fair, HSG D
0.799	82	Woods/grass comb., Fair, HSG D
3.992	98	Paved parking & roofs
0.021	74	>75% Grass cover, Good, HSG C
10.840	87	Weighted Average
6.848		Pervious Area
3.992		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4a: Proposed Watershed



Summary for Subcatchment PW-4c: Proposed Watershed

Runoff = 54.24 cfs @ 12.02 hrs, Volume= 3.312 af, Depth> 4.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-Year Rainfall=5.60"

Area (ac)	CN	Description
0.129	69	50-75% Grass cover, Fair, HSG B
1.693	84	50-75% Grass cover, Fair, HSG D
1.075	74	>75% Grass cover, Good, HSG C
5.619	98	Paved parking & roofs
8.516	92	Weighted Average
2.897		Pervious Area
5.619		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.95		**Sheet Flow, A to B** Smooth surfaces n= 0.011 P2= 3.50"
2.1	500	0.0400	4.06		**Shallow Concentrated Flow, B to C** Paved Kv= 20.3 fps
2.1	173	0.0400	1.40		**Shallow Concentrated Flow, C to D** Short Grass Pasture Kv= 7.0 fps
0.5	101	0.0300	3.52		**Shallow Concentrated Flow, D to E** Paved Kv= 20.3 fps
2.0	144	0.0280	1.17		**Shallow Concentrated Flow, E to F** Short Grass Pasture Kv= 7.0 fps
3.7	270	0.0300	1.21		**Shallow Concentrated Flow, F to G** Short Grass Pasture Kv= 7.0 fps
11.3	1,238	Total			

Summary for Subcatchment PW-4d: Proposed Watershed

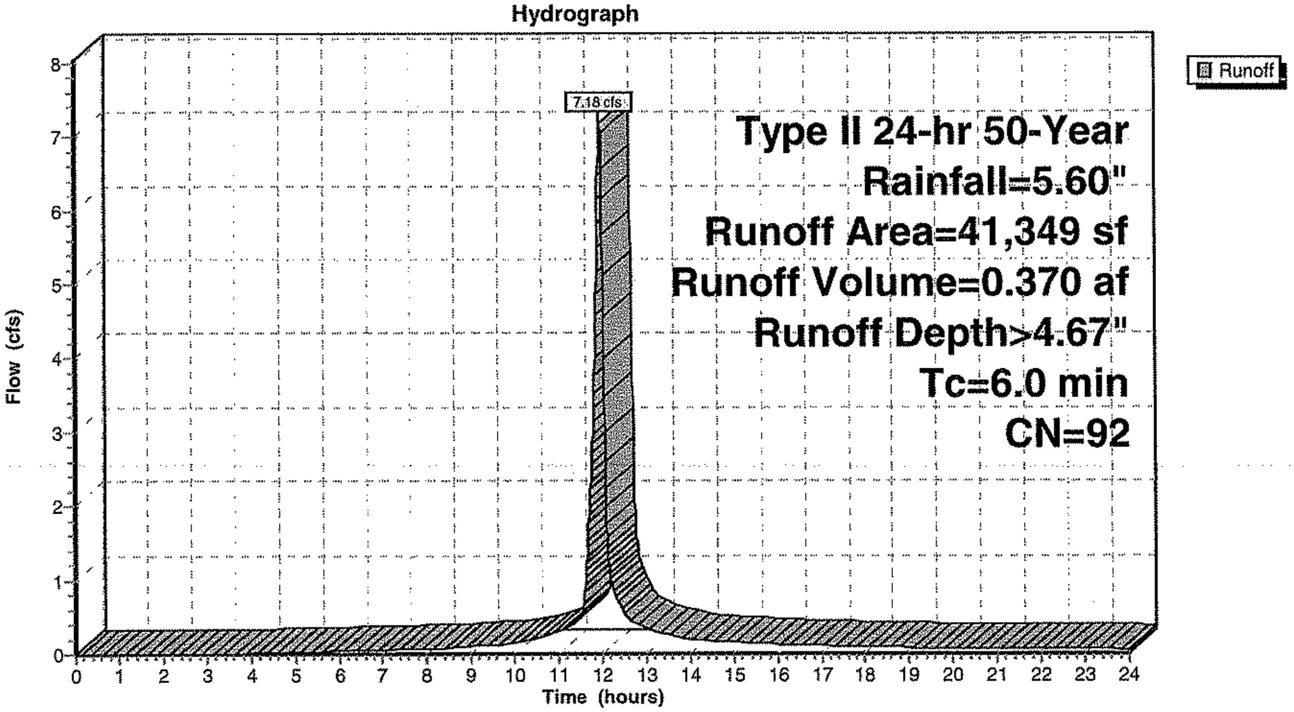
Runoff = 7.18 cfs @ 11.97 hrs, Volume= 0.370 af, Depth> 4.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-Year Rainfall=5.60"

Area (sf)	CN	Description
10,957	74	>75% Grass cover, Good, HSG C
30,392	98	Paved parking & roofs
41,349	92	Weighted Average
10,957		Pervious Area
30,392		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4d: Proposed Watershed



Summary for Subcatchment PW-4f: Proposed Watershed

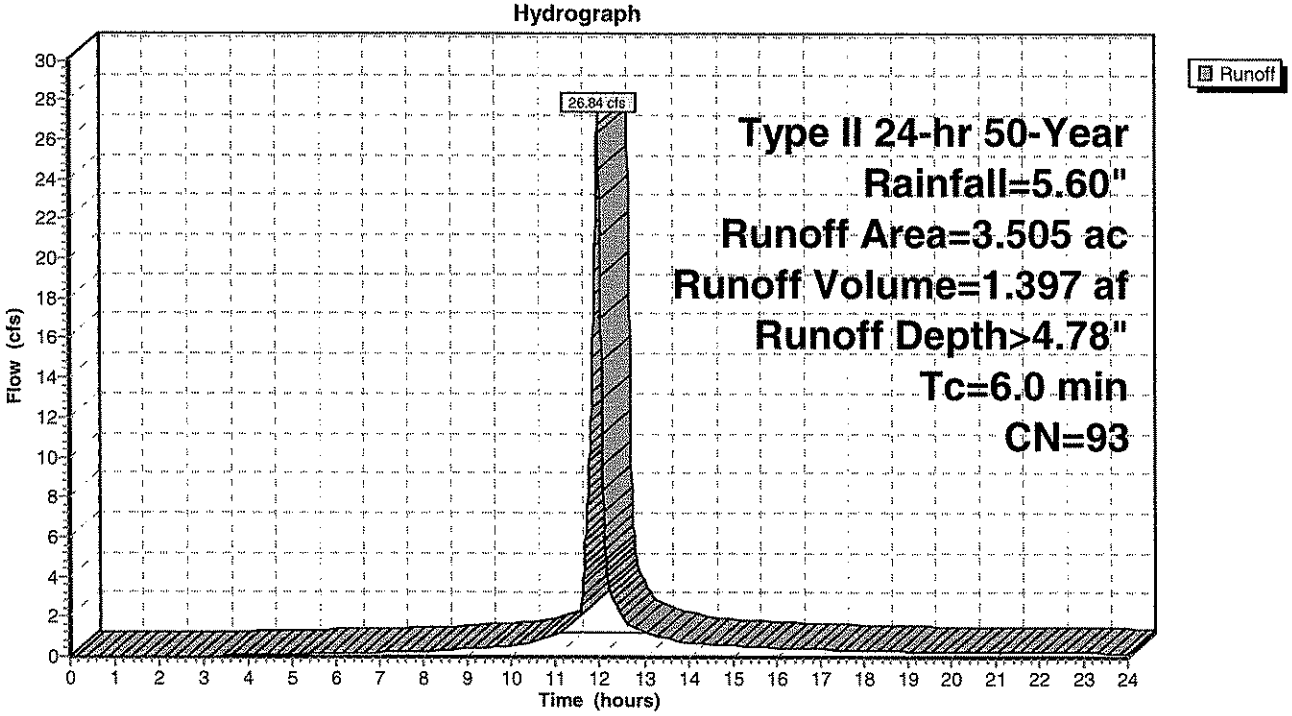
Runoff = 26.84 cfs @ 11.97 hrs, Volume= 1.397 af, Depth> 4.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-Year Rainfall=5.60"

Area (ac)	CN	Description
0.631	74	>75% Grass cover, Good, HSG C
0.077	89	Gravel roads, HSG C
2.797	98	Paved roads w/curbs & sewers
3.505	93	Weighted Average
0.708		Pervious Area
2.797		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4f: Proposed Watershed



Summary for Subcatchment PW-4h: Proposed Watershed

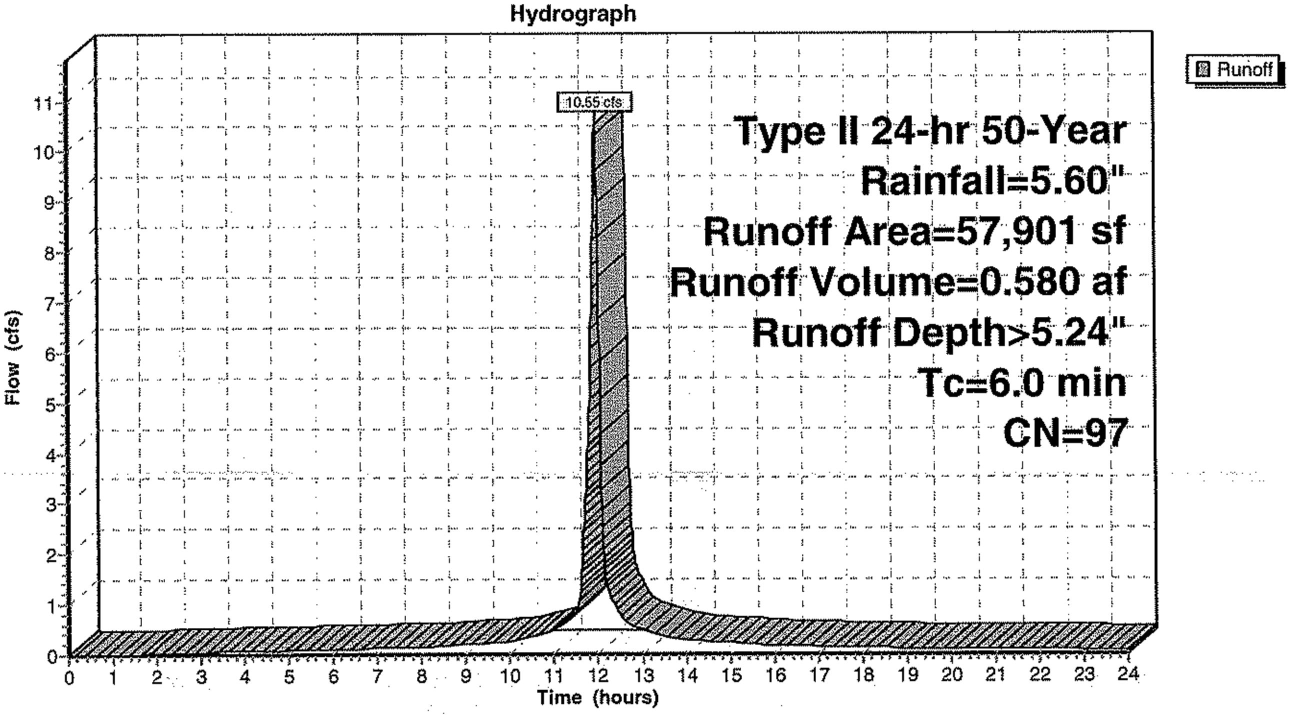
Runoff = 10.55 cfs @ 11.97 hrs, Volume= 0.580 af, Depth> 5.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-Year Rainfall=5.60"

Area (sf)	CN	Description
2,501	74	>75% Grass cover, Good, HSG C
55,400	98	Paved parking & roofs
57,901	97	Weighted Average
2,501		Pervious Area
55,400		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4h: Proposed Watershed



Summary for Subcatchment PW-4j: Proposed Watershed

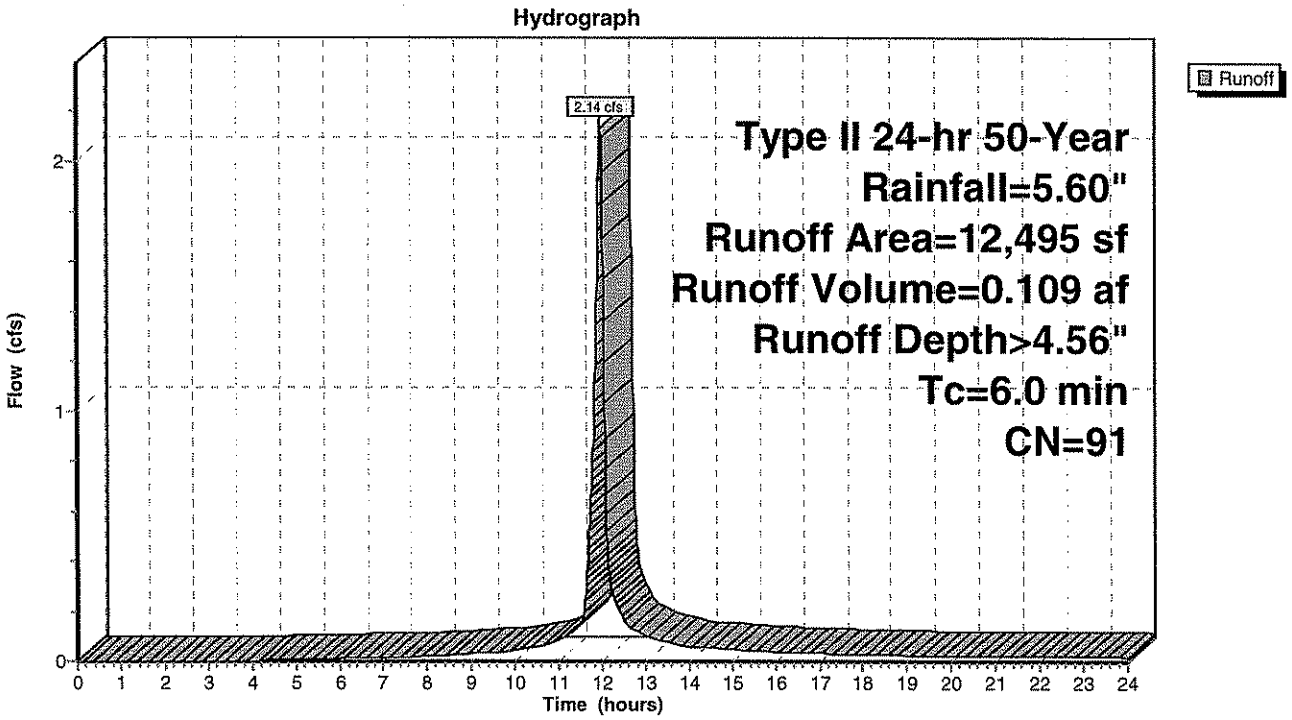
Runoff = 2.14 cfs @ 11.97 hrs, Volume= 0.109 af, Depth> 4.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type II 24-hr 50-Year Rainfall=5.60"

Area (sf)	CN	Description
8,171	98	Water Surface
798	89	Gravel roads, HSG C
3,526	74	>75% Grass cover, Good, HSG C
12,495	91	Weighted Average
4,324		Pervious Area
8,171		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment PW-4j: Proposed Watershed



Summary for Reach S-1: Concrete Drainage Channel

Inflow Area =	10.840 ac,	36.83% Impervious, Inflow Depth > 4.13"	for 50-Year event	
Inflow =	75.74 cfs @	11.97 hrs, Volume=	3.731 af	
Outflow =	74.50 cfs @	12.00 hrs, Volume=	3.725 af,	Atten= 2%, Lag= 1.9 min

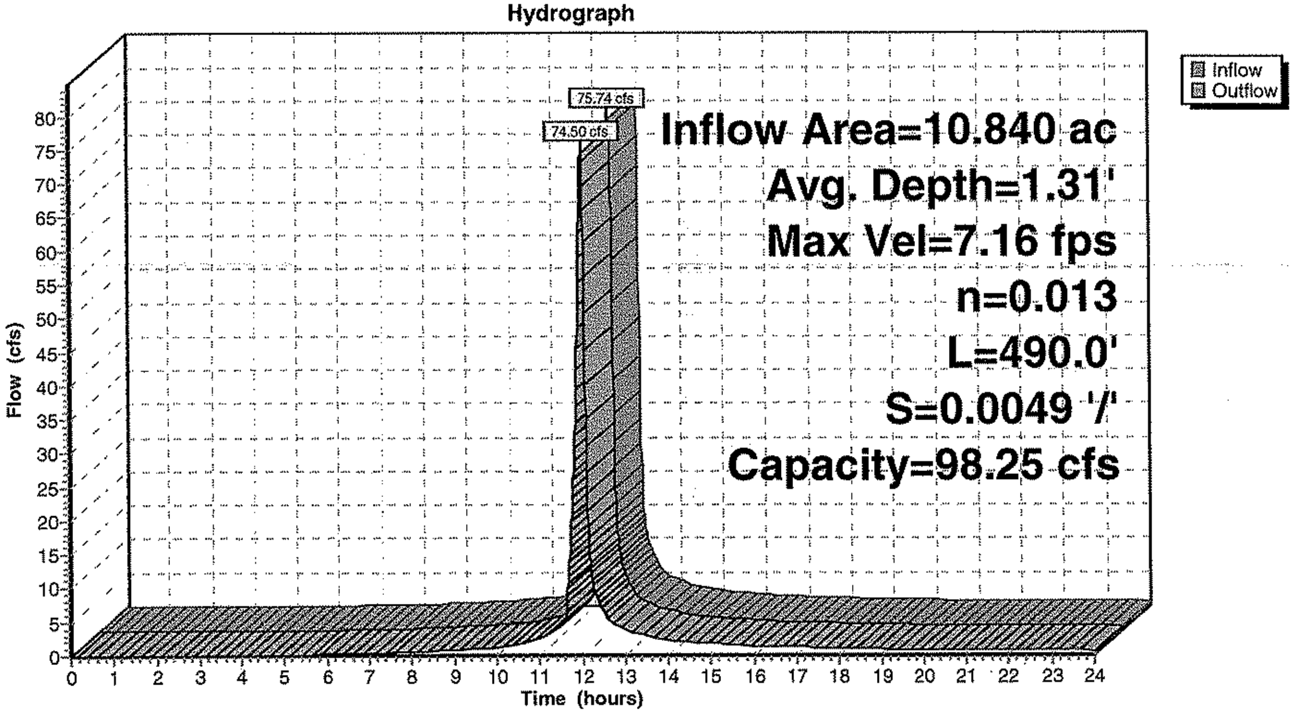
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 4
Max. Velocity= 7.16 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.96 fps, Avg. Travel Time= 4.2 min

Peak Storage= 5,102 cf @ 11.98 hrs, Average Depth at Peak Storage= 1.31'
Bank-Full Depth= 1.50', Capacity at Bank-Full= 98.25 cfs

4.00' x 1.50' deep channel, n= 0.013 Concrete, trowel finish
Side Slope Z-value= 3.0 '/' Top Width= 13.00'
Length= 490.0' Slope= 0.0049 '/'
Inlet Invert= 1,093.00', Outlet Invert= 1,090.60'

‡

Reach S-1: Concrete Drainage Channel



Summary for Reach S-3: Vegetated Swale

Inflow Area = 3.505 ac, 79.80% Impervious, Inflow Depth > 4.78" for 50-Year event
Inflow = 26.84 cfs @ 11.97 hrs, Volume= 1.397 af
Outflow = 26.18 cfs @ 12.01 hrs, Volume= 1.394 af, Atten= 2%, Lag= 2.5 min

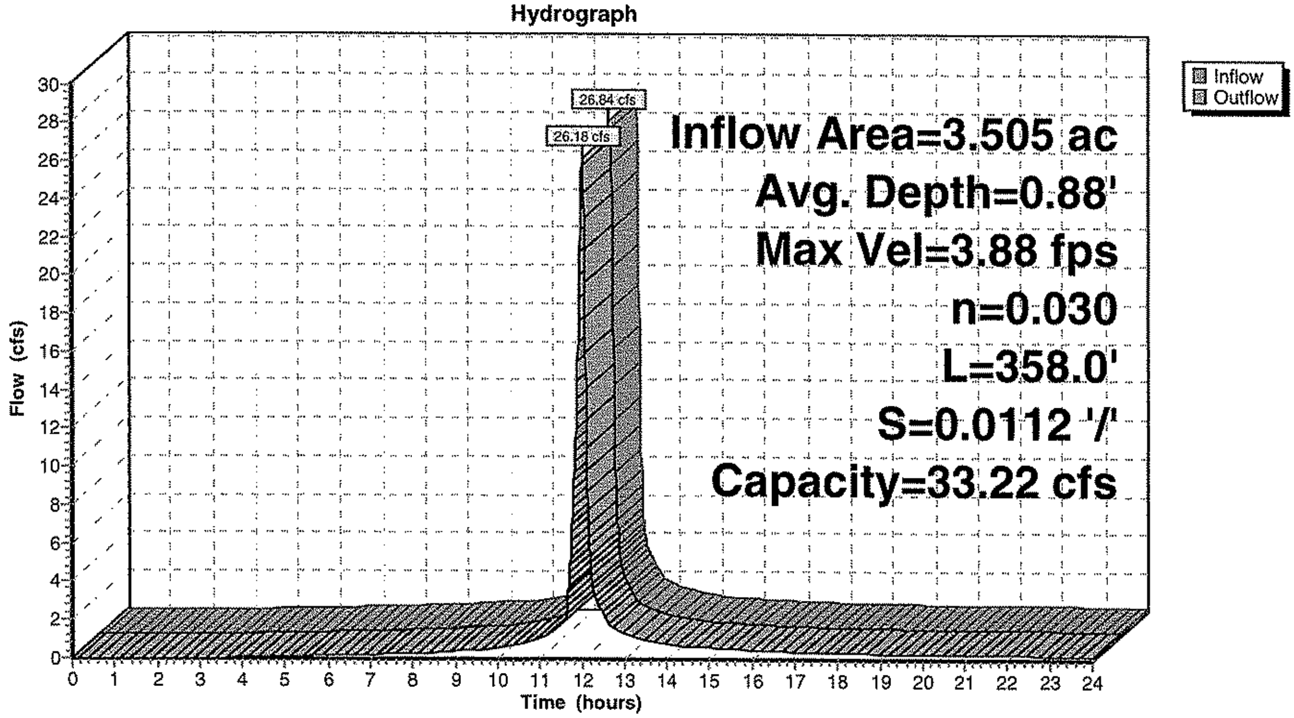
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.88 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 6.2 min

Peak Storage= 2,419 cf @ 11.98 hrs, Average Depth at Peak Storage= 0.88'
Bank-Full Depth= 1.00', Capacity at Bank-Full= 33.22 cfs

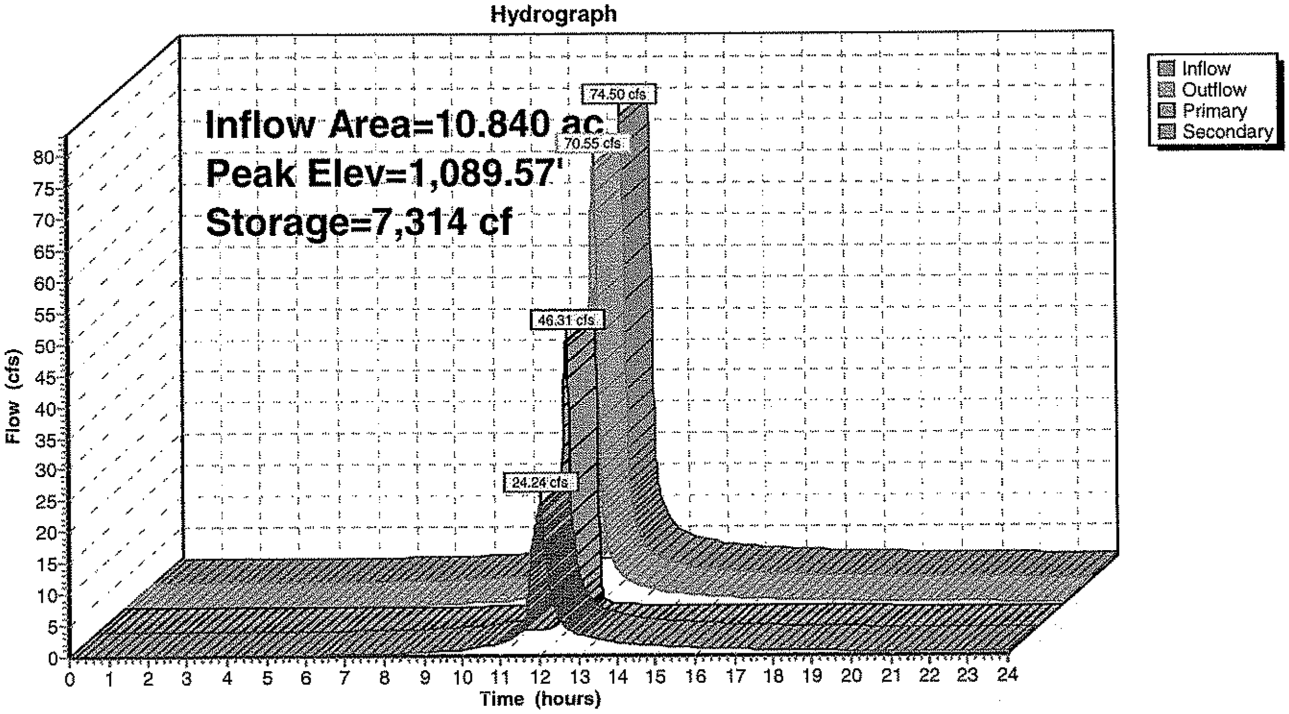
5.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 '/' Top Width= 11.00'
Length= 358.0' Slope= 0.0112 '/'
Inlet Invert= 1,050.00', Outlet Invert= 1,046.00'

‡

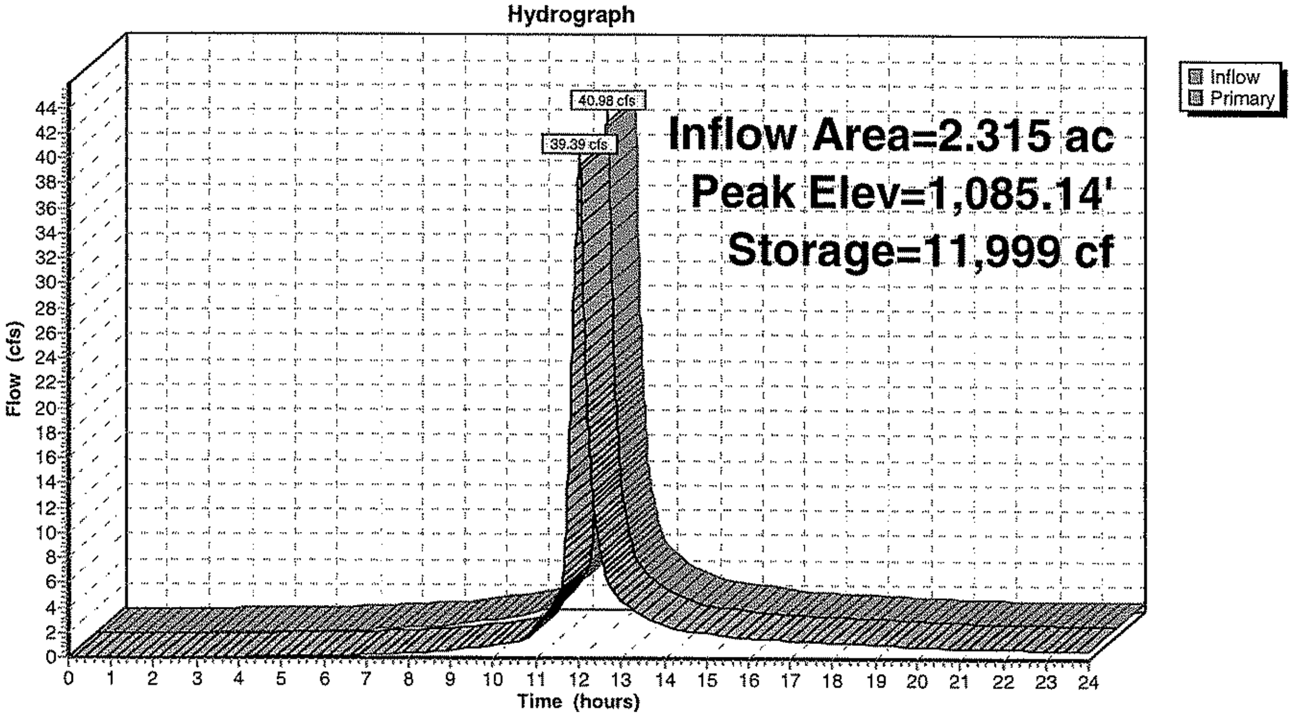
Reach S-3: Vegetated Swale



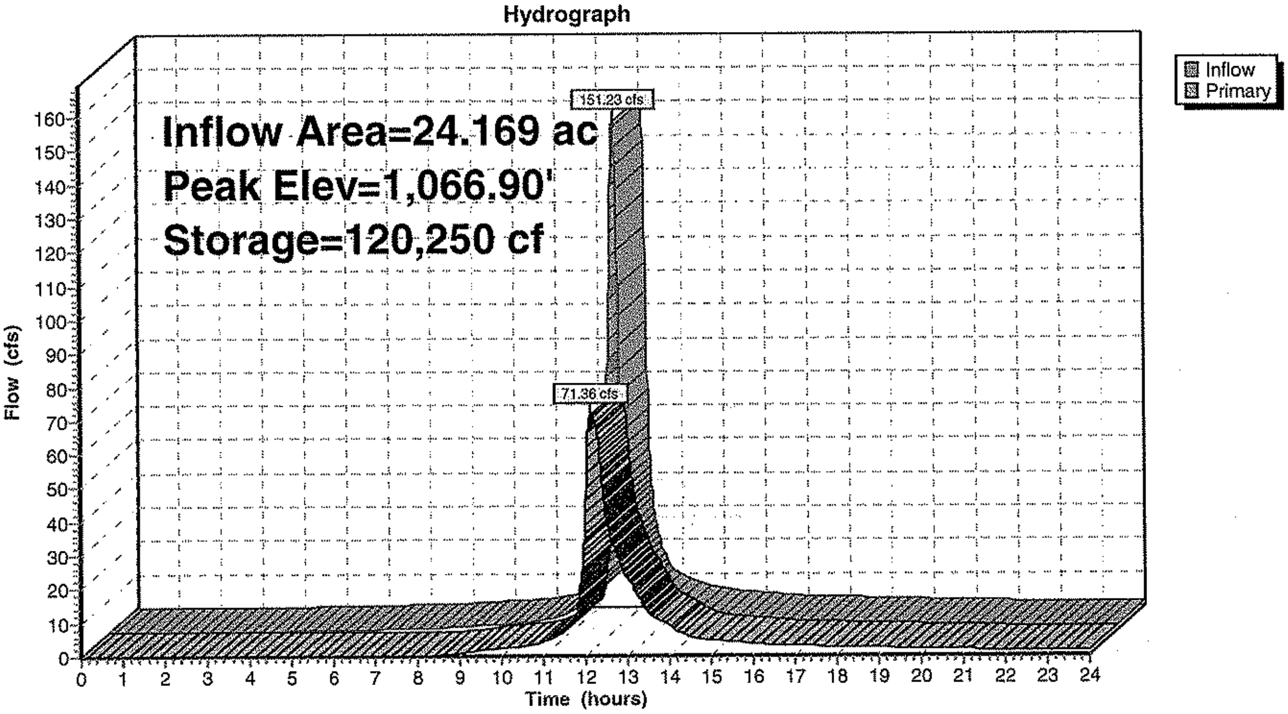
Pond P-1: Detention Basin



Pond P-2: Detention Basin

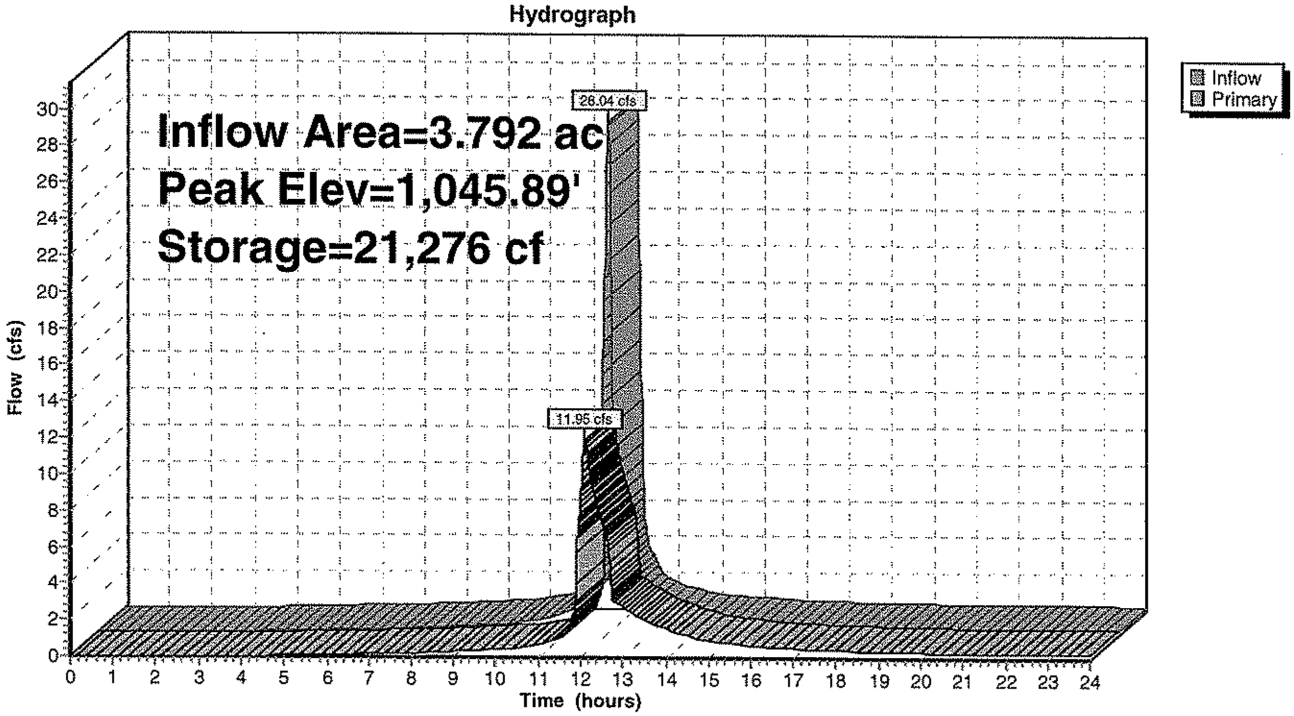


Pond P-3: Wet Pond

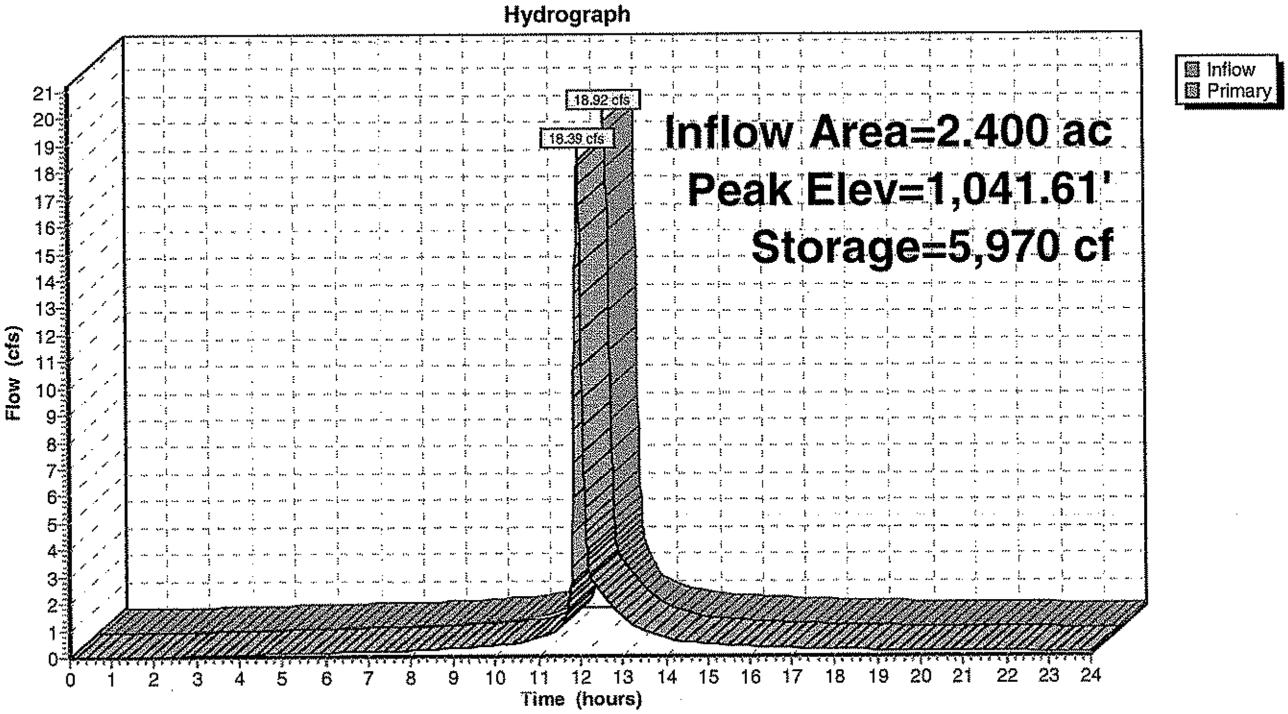


```
Primary OutFlow  Max=11.94 cfs @ 12.12 hrs  HW=1,045.89'   (Free Discharge)
└─1=Culvert  (Passes 11.94 cfs of 30.82 cfs potential flow)
  ├─2=Orifice/Grate  (Orifice Controls 7.31 cfs @ 12.41 fps)
  │ └─3=Culvert  (Passes 7.31 cfs of 34.77 cfs potential flow)
  │   ├─4=6" Perf. Riser  (Passes < 4.36 cfs potential flow)
  │   └─6=Orifice/Grate  (Passes < 46.81 cfs potential flow)
  ├─5=Broad-Crested Rectangular Weir  (Weir Controls 3.47 cfs @ 3.67 fps)
  └─7=Orifice/Grate  (Orifice Controls 1.16 cfs @ 2.13 fps)
```

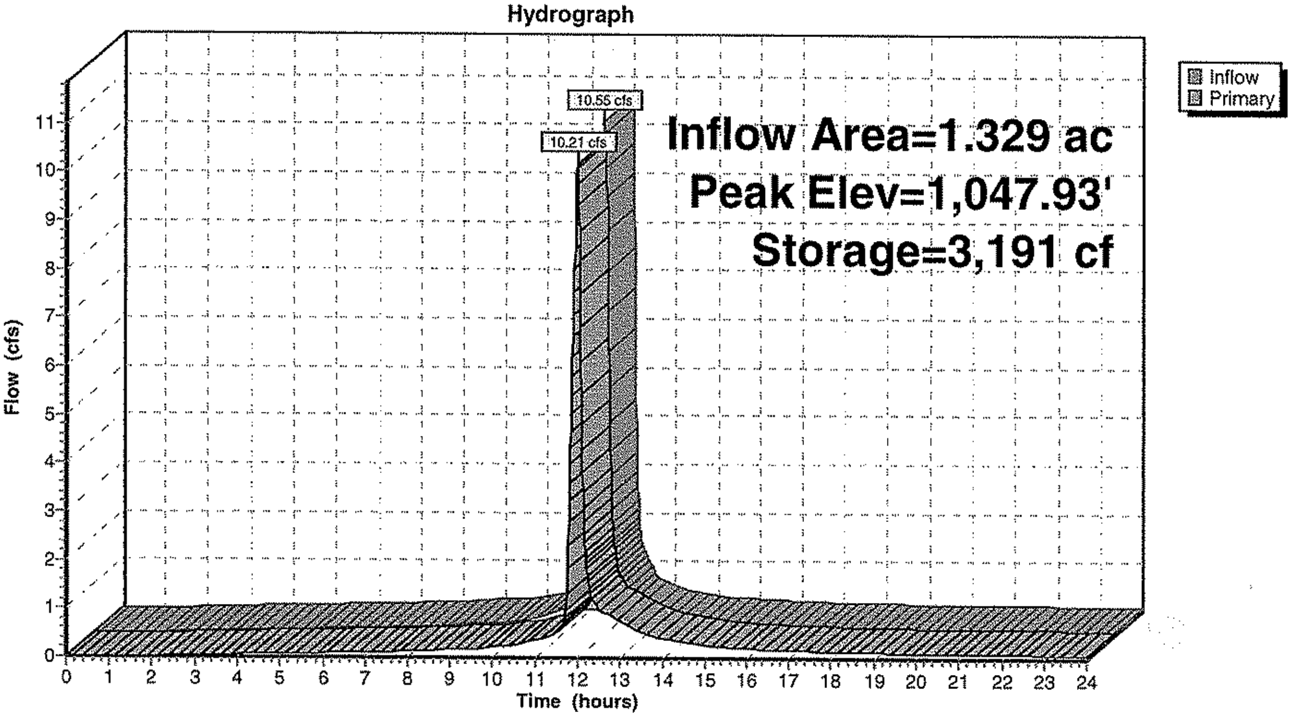
Pond P-4: Detention Basin



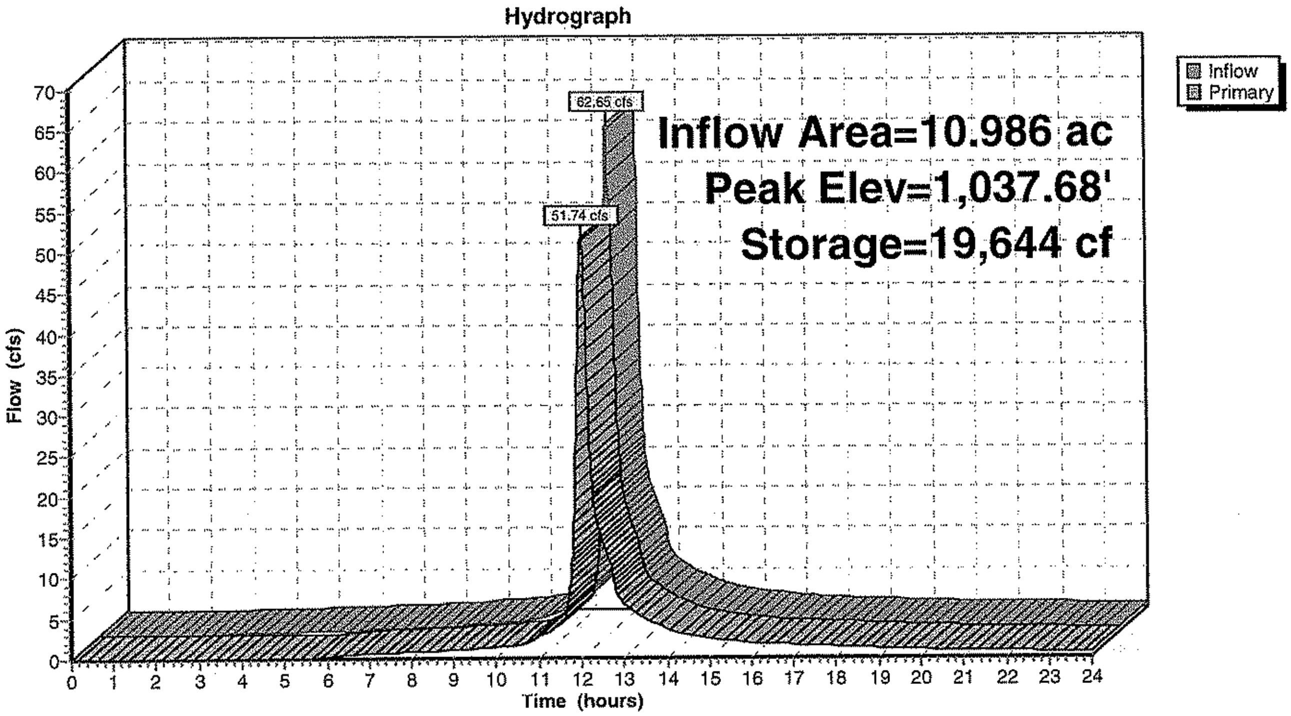
Pond P-5: Detention Basin



Pond P-6: Detention Basin



Pond P-7: Gravel Wetlands

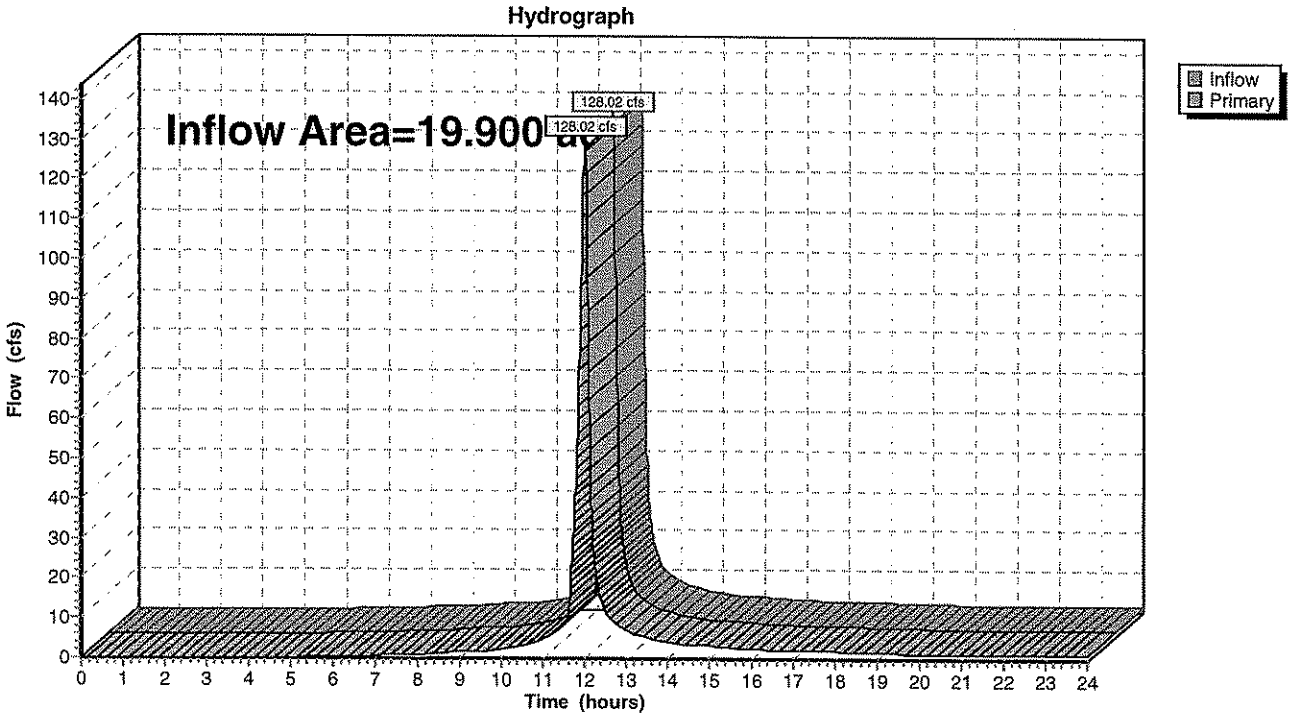


Summary for Link DP-2: City of Berlin Municipal System

Inflow Area = 19.900 ac, 45.95% Impervious, Inflow Depth > 4.23" for 50-Year event
Inflow = 128.02 cfs @ 12.00 hrs, Volume= 7.021 af
Primary = 128.02 cfs @ 12.00 hrs, Volume= 7.021 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link DP-2: City of Berlin Municipal System

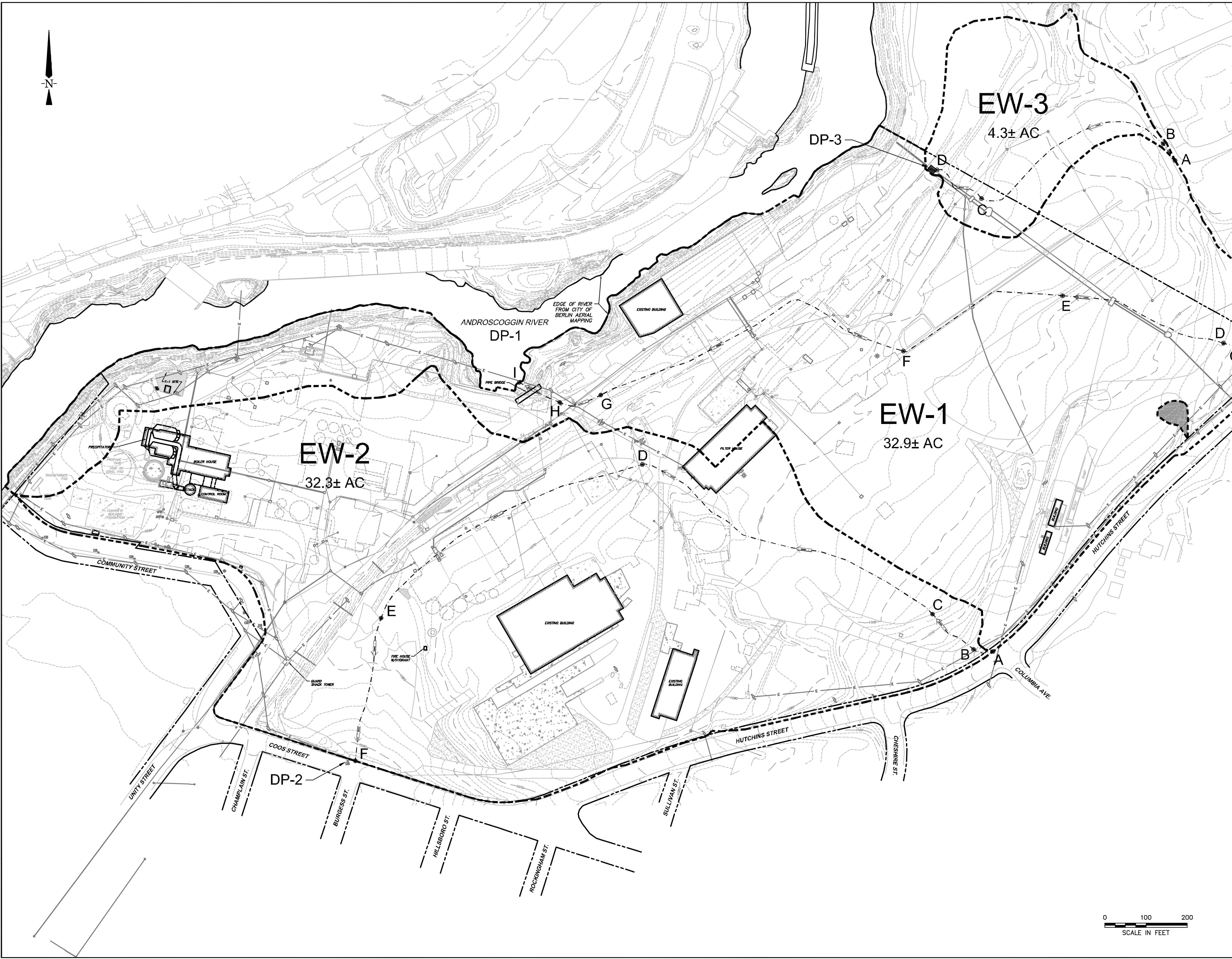


Attachment F

Watershed Plans

XREF: L145-XE01 [H:\L145-Laidlaw\xref\L145-XE01.dwg]
XREF: L145-Soils [H:\L145-Laidlaw\Figures\L145-Soils.dwg]

IMAGE: G:\Data_NH\GRANIT\DRG USGS\Berlin\drg39.tif



PROGRESS PRINT

ESS Group, Inc.

Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: DJG	CHECKED BY:
DESIGNED BY: DJG	APPROVED BY:

Laidlaw Berlin BioPower, LLC
Berlin, NH

Existing Watershed Plan

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 1 of 2
SCALE: 1"=100'

DRAWING No.
EWP

DATE: Dec 15, 2009 - 4:50PM
FILENAME: H:\L145-Laidlaw\DRAINAGE\L145-Existing_Watershed.dwg

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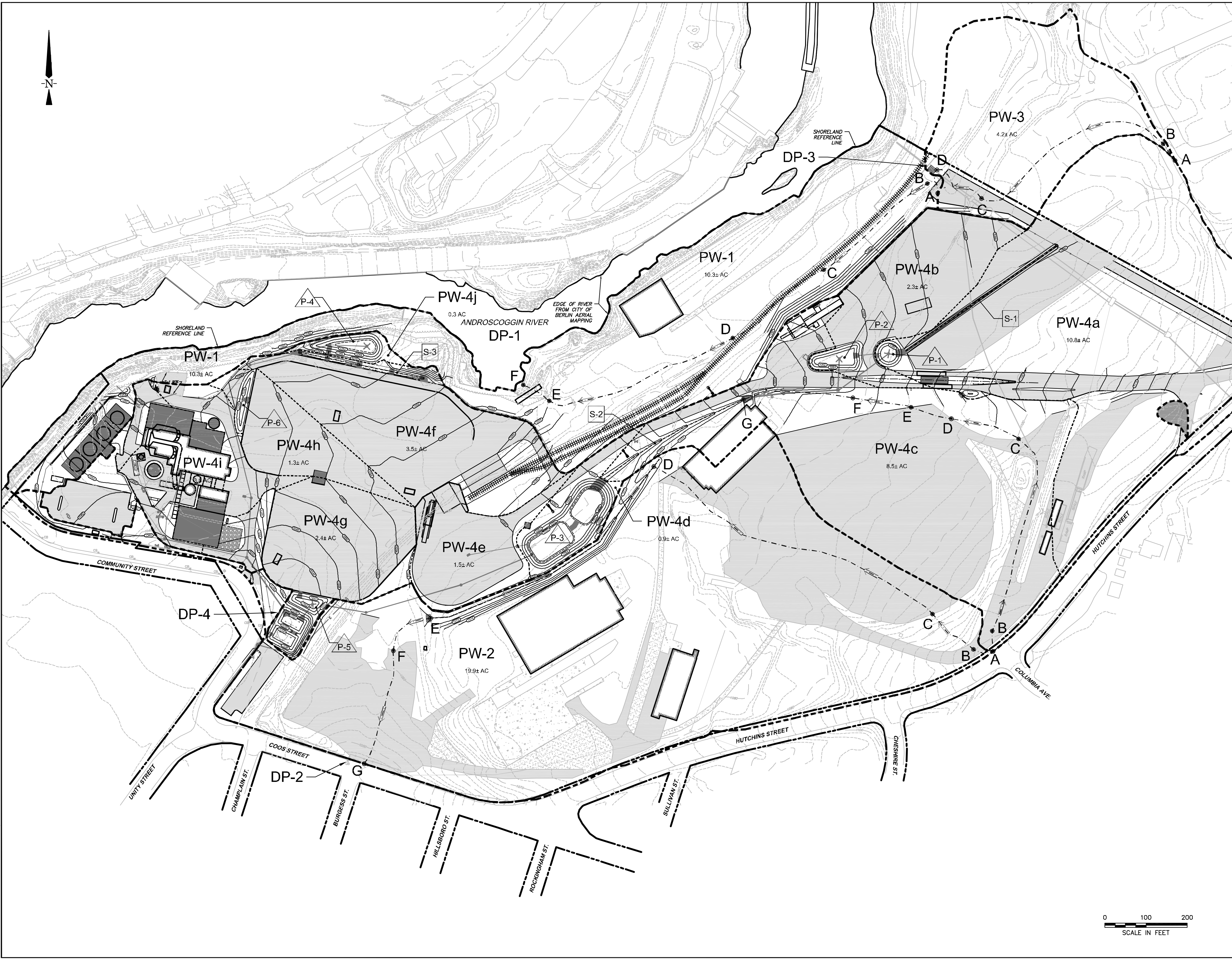
XREF: L145-XP03 [H:\L145-Laidlaw\xref\L145-XP03.dwg]
XREF: L145-Drainage-Base [H:\L145-Laidlaw\xref\L145-Drainage-Base.dwg]
XREF: L145-Soils [H:\L145-Laidlaw\Figures\L145-Soils.dwg]

IMAGE: G:\Data_NH\GRANIT\DRG USGS\Berlin\drg39.tif



DATE: Dec 15, 2009 - 4:47PM
FILENAME: H:\L145-Laidlaw\DRAINAGE\L145-Proposed_Watershed.dwg

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Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: DJG
CHECKED BY:
DESIGNED BY: DJG
APPROVED BY:

Laidlaw Berlin BioPower, LLC
Berlin, NH

Proposed Watershed Plan

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 2 of 2
SCALE: 1"=100'
DRAWING No.
PWP

Attachment G

Photo Log

Photograph No. 1: View looking westerly towards existing stack and facility.

Photograph No. 2: View looking towards the west.

Photograph No. 3: View looking towards the west. Existing facility in foreground.

Photograph No. 4: View looking southerly towards Hutchins Street.

Photograph No. 5: View looking towards the west.

Photograph No. 6: View looking towards the southwest.

Photograph No. 7: View looking northerly towards the existing building along the Androscoggin River.

Photograph No. 8: View looking towards the south.

Photograph No. 9: View looking towards the east.

Photograph No. 10: View looking towards the west.

Attachment H

Project Certification

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

"I certify under penalty of law, as provided by RSA 485-A:22, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title:____

Signature:____

Date:____________________

Appendix E

Shoreland Protection Permit Application

Appendix E – Shoreland Protection Permit Application

SHORELAND PROTECTION PERMIT APPLICATION

BERLIN BIOPOWER, LLC
57 HUTCHINS STREET
BERLIN, NEW HAMPSHIRE

PREPARED FOR	Laidlaw Berlin BioPower, LLC 90 John Street, 4th Floor New York, New York 10038
PREPARED BY	ESS Group, Inc. 888 Worcester Street, Suite 240 Wellesley, Massachusetts 02482
	Project No. L145-005.03
	December 15, 2009

SHORELAND PROTECTION PERMIT APPLICATION
LAIDLAW BERLIN BIOPOWER, LLC
57 Hutchins Street
Berlin, New Hampshire

Prepared For:

Laidlaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, New York 10038

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, MA 02482

ESS Project No. L145-005.03

December 15, 2009

TABLE OF CONTENTS

PROJECT DESCRIPTION

ESS Group, Inc. has completed this Shoreland Protection Permit Application for the proposed biomass fueled energy generating facility in Berlin, New Hampshire. Laidlaw Berlin BioPower, LLC (LBB) is proposing to convert and upgrade existing facility equipment and infrastructure located at the former Fraser Pulp Mill. This permit application is required due to the proximity of the Project Site to the Androscoggin River which is listed as impaired and/or sensitive receiving water in accordance with New Hampshire Department of Environmental Services (NHDES).

The Project Site totals approximately 62.0± acres and is classified as a brownfield with existing subsurface contamination. In accordance with NHDES, infiltration or unlined filtering practices within areas of contaminated soils or groundwater is prohibited. Therefore, all proposed drainage Best Management Practices (i.e. - detention basins and vegetated swales) are to be lined due to the subsurface contamination.

Redevelopment of the Project Site will provide a beneficial use for the existing resources and brownfield site that has limited future uses due to existing subsurface contamination. The Berlin BioPower Facility (the Facility) will use whole tree wood chips and other low-grade clean wood as fuel, and will be capable of generating 66 megawatts (MW) of electric power. The development of the Facility will include a new turbine building and wet cooling towers, construction of wood fuel handling and storage areas, installation of wood conveying equipment, and upgrades to site access roadways, grading and drainage systems.

The City of Berlin's Wastewater treatment plant will properly handle and treat wastewater discharged from the Project Site. Stormwater runoff will be treated on-site and then conveyed via an existing 30 inch pipe to an outfall where it will be discharged into the Androscoggin River.

The proposed stormwater management system uses multiple structural and non-structural Best Management Practices (BMPs) including street sweeping, deep sump catch basins, vegetated swales, detention basins, a wet pond, and subsurface gravel wetlands. No direct discharge of stormwater runoff generated from the proposed development will enter the Androscoggin River. All stormwater runoff generated from the development will be collected and treated on-site before being conveyed via a 30 inch underground pipe to an existing river outfall. Due to the strict adherence to the maintenance of structural and non-structural BMPs, the proposed stormwater management system will result in reductions of sediment loads and other potential sources of pollution to the Androscoggin River.

The Project will implement a system of permanent and temporary soil erosion and sediment control practices. Numerous features have been designed to prevent sediment transport. These objectives will be accomplished through the construction and maintenance of multiple structural and non-structural BMPs designed to collect and contain suspended sediments and their associated pollutants, while minimizing the amount of impact to the Androscoggin River. The soil erosion and sediment control practices to be implemented include silt fence and hay bales installed along the perimeter of the Site and hay bales installed around drain inlets. Refer to the Soil Erosion & Sedimentation Control Plan located in the Site Plan Set along with this application.

For the purposes of this application it is important to note that existing impervious cover (pavement, structural debris, etc.) located within the 50-foot Waterfront Buffer will be removed, vegetated, and be left to remain unaltered with the exception of an existing building (See Redevelopment Waiver Request Form) and an existing gravel path. As shown in the Shoreland Application Worksheet, total impervious area within the 250-foot Protected Shoreland Buffer will be reduced under proposed conditions, from 59.4% to 38.2%. The Project will also meet the requirements for areas between the 50-foot and 150-foot buffers to be vegetated and to remain unaltered (see Existing & Proposed Areas within Protected Shoreland Plans)

NEW HAMPSHIRE DEPARTMENT OF
Environmental
Services

NH DEPARTMENT OF ENVIRONMENTAL SERVICES
WETLANDS BUREAU
29 Hazen Drive PO Box 95
Concord, NH 03302-0095
Phone: (603) 271-2147 Fax: (603) 271-6588
website: www.des.nh.gov email: shoreland@des.state.nh.us

SHORELAND PERMIT APPLICATION

Application for a permit to fill, dredge, or construct structures within the protected shoreland as regulated under RSA 483-B. See Env-Wq 1406.02, Env-Wq 1406.03, and Env-Wq 1406.03 for a list of activities that do not require a permit.

GENERAL INSTRUCTIONS: Type or print clearly. Please answer any question that does not apply to your project with "N/A." **Please note that failure to complete this form, and submit the plans, information, and attachments, as required per Rule Part Env-Wq 1406, Permitting of Projects, will delay the processing of your application and may result in denial of the requested permit.**

1. Name of Owner Bartoszek (Last) Michael (First) B (Middle Initial)

2. Mailing Address: 90 John Street, 4th Floor, (Box # / Street) New York (Town/City) NY (State) 10038 (Zip code)

212-480-9884 (Daytime Telephone Number) 212-480-8448 (Fax Number) mbb@LaidlawEnergy.com (Email)

3. Location of Proposed Project: 57 Hutchins Street (Street # Street/Road/Highway) Berlin (Town/City) NH (State) 03570 (Zip code)

Waterbody Name Androscoggin River Tax Map Number: 129 Block/Lot Number: 54.01

4. Contractor or Agent: Janet Bernardo of ESS Group, Inc. (Name of Contact and Company Name (if any))

888 Worcester Street, Suite 240 (Box # / Street) Wellesley (Town/City) MA (State) 02482 (Zip code)

(781) 489-1151 (Daytime Telephone Number) (781) 431-7434 (Fax Number) jbernardo@essgroup.com (Email)

5. Does this application include a request for a (circle appropriate answer):

Waiver of RSA 483-B:9? [✓ YES] / NO **Variance** of RSA 483-B:9, V? YES / [✓ NO]

6. Please provide a brief description of the proposed project.

Laidlaw Berlin BioPower (Laidlaw) is proposing to convert and upgrade the existing facility equipment and infrastructure located at the former Fraser Pulp Mill in Berlin. The redevelopment of the Project Site will include construction of a new turbine building, wet cooling towers, construction of wood fuel handling and storage areas, installation of wood conveying equipment, and upgrades to site access roadways, grading and drainage systems.

FOR INTERNAL USE ONLY

For internal use only:	check #	Date received	Amount	Initials	Check date	DES File#
Fee received:						

7. Please indicate if applications for any of the permits listed below have been submitted or will need to be submitted:

☐ Wetlands Permit per RSA 482-A
☐ Individual sewage disposal system per RSA 485-A:29
☑ Alteration of Terrain Permit per RSA 485-A:17
☐ Subdivision Permit per RSA 485-A:29

8. Length of shoreline frontage on the property: 2,438 feet

To determine the length of shoreline frontage, add the length of the natural navigable shoreline to the length of a straight line drawn between the two property boundaries at the shoreline edge, and divide by two. (Both lengths are measured at the normal high water line).

9. Reference line elevation: N/A - River (only needed for lakes, ponds and artificial impoundments).

Reference line elevations for lakes, ponds and artificial impoundments greater than 10 acres in size are listed in the Official List of Public Waters as found on the DES website at www.des.nh.gov. Please see RSA 483-B:4 XVII for the appropriate definition of Reference line.

10. Area of proposed impervious surface: 251,425 square feet

11. Area of pervious or innovative alternatives used: 406,098 square feet

12. Total area to be excavated or filled, including areas to be regraded: 406,139 square feet

13. Area of temporary impacts: 0 square feet

14. By initialing within the blank before each of the following numbered statements, and signing below, you are certifying that:

LTB 1) To the best of my knowledge, the information provided is true, complete, and not misleading.

LTB 2) I understand that any permit, waiver or variance granted based on false, incomplete, or misleading information shall be subject to revocation.

LTB 3) I am aware that obtaining a Shoreland Permit will not exempt the work I am proposing from other state, local, or federal approvals;

LTB 4) All existing structures have been constructed in accordance with, or prior to the effective date of, RSA 483-B;

LTB 5) I have notified all the appropriate parties **by certified mail** as required per RSA 483-B:5-a, IV-a;

LTB 6) I have provided a copy of this application and all other attachments to the clerk of the municipality in which the proposed work will be performed.

15. **FILING FEE**

A non-refundable filing fee of $100 plus $0.10 per square foot of impact (both permanent and temporary) is required at the time the application is submitted. Fees are capped at $750 for projects impacting less than 10,000 sq ft, $1,875 for projects impacting between 10,000 and 25,000 sq ft, and $3,750 for projects impacting more than 25,000 sq ft. Please note that your application will not be considered complete if it does not include the appropriate fee. **Please make checks payable to the Treasurer, State of NH.**

REQUIRED SIGNATURES

Signature of Owner or Authorized Agent (circle one)

LOUIS T. BRAVAKU
Print name clearly

12/14/09
Date

Please mail this application and all other attachments to the Department of Environmental Services Wetlands Bureau, PO Box 95, Concord NH 03302-0095. Missing information will delay processing of your application and may result in denial of a Shoreland Permit.

NEW HAMPSHIRE
DEPARTMENT OF
Environmental
Services

1776

SHORELAND REDEVELOPMENT WAIVER REQUEST FORM

This form is used to request a waiver of **RSA 483-B:9,** under the Minimum Shoreland Protection Standards of the Comprehensive Shoreland Protection Act (CSPA), for the redevelopment or expansion of a “nonconforming structure” (ref. RSA 483-B:11). To be eligible for a waiver, an owner must demonstrate that the project is **“more nearly conforming**” (ref. RSA 483-B:11 II) to the CSPA than existing conditions and that there will be at least the same degree of protection provided to the public waters. **Projects that involve complete removal of existing non-conforming structures on lots that could support conforming structures may not be eligible for a waiver.**

You may use this form for the following project types: 1) redevelopment of sites that contain non-conforming structures built prior to July 1, 1994; 2) expansion of the footprint of an existing, non-conforming structure as defined in RSA 483-B:4, XI-b. **This form may not be used to request a waiver of any administrative rules or other sections of the Act.**

Please identify the Minimum Shoreland Protection Standard(s) for which the waiver is being requested, with a specific reference to the appropriate paragraph or subparagraph of RSA 483-B:9.

II,b) Primary structures shall be set back behind the primary building line which is 50 feet from the reference line.

Please check the appropriate box(es) below to indicate how the project will make the property more nearly conforming to the CSPA, and provide an explanation of how each applies to your project:

☑**Significant changes to the location or size of existing structures**

This includes moving structures back from the reference line to attain greater conformity with the 50 ft primary building setback or 20 ft accessory structure setback, reduction of building footprint, or removal of other structures which results in a significant reduction of impervious surface.

Removal of pavement and structural debris within the 50 foot buffer. These areas will be vegetated and remain in an unaltered state.

☐ **Significant improvements to wildlife habitat**

This includes planting native trees, shrubs, and ground cover, preferably within the 50 ft woodland buffer, creating multiple canopy layers to provide a significant benefit to surrounding wildlife and water quality.

☑ **Stormwater management**

This includes installation of dry wells, infiltration trenches, drainage swales, water gardens, water bars, or porous materials in place of existing impervious surfaces to improve stormwater infiltration.

Installation of detention basins and drainage swales within the 150 ft. buffer in place of what was existing pavement.

☐ **Wastewater treatment**

This includes replacement or modifications to existing wastewater treatment systems that provide a greater level of resource protection.

☑ **Other**

This may include a proposal to improve traffic flow or volume, regrading of disturbed areas to create a less severe slope, improvements to an existing erosion problem, or other proposals which significantly improve wildlife habitat or resource protection.

Areas of pavement and debris removal within the 150 ft. buffer in the eastern section of the site will become vegetated and remain in an unaltered state. See Proposed Areas within Protected Shoreland Plan (Sheet 2).

Please provide written verification that a copy of this application along with a Shoreland Permit Application was provided to the city or town clerk and, if applicable, local river advisory committee and all abutters as required by Env-Wq 1406.12(d).

Note* This form is for use with the Shoreland Permit Application to be submitted with those projects that will require a waiver of one or more of the minimum standards found in RSA 483-B:9. Failure to provide the requested information for projects requiring a redevelopment or expansion of structures waiver will delay processing of your application and may result in denial of the Shoreland Permit. This form is NOT to be used to request a waiver of any of the Administrative Rules of Chapter Env-Wq 1400.

NEW HAMPSHIRE
DEPARTMENT OF
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Services

Shoreland Application Worksheet

This form must be submitted to the Department of Environmental Services Wetlands Bureau along with a Shoreland Permit Application

For the purposes of this worksheet, "**Existing**" impervious areas include all man-made impervious surfaces currently in existence on the property, whether to be removed or to remain after the project is completed. "**Proposed**" impervious areas should include all impervious surfaces that will exist on the property upon completion of the project, including both new and any remaining pre-existing impervious surfaces. **All answers shall be given in square feet.**

Calculating the Impervious Area Within 250 feet of the Reference Line

	Description	Existing	Proposed
Primary structure:	Buildings	21,056	41,293
(Including all attached decks and porches)			
Accessory structures:	Pavement &	115,078	210,132
(All other impervious surfaces	Conc. Pads		
excluding lawn furniture, well heads,	& Structural	254,300	
fences and septic systems)	Debris		
Total:		390,434 **(A)**	**251,425** **(B)**

Area of the lot located within 250 ft of reference line: 657,523 **(C)**

Percentage of lot covered by **existing** impervious surfaces within 250 ft of the reference line: 59.4 %
*[Divide **(A)** by **(C)** x 100]*

Percentage of lot to be covered by **proposed** impervious surface within 250 ft of the reference line upon completion of the project: 38.2 %
*[Divide **(B)** by **(C)** x 100]*

Note: If the percentage of proposed impervious surfaces is greater than 20% a stormwater management system will be required pursuant to RSA 483-b:9, V (g) (2).

Calculating The Area To Remain Unaltered

Total area of the lot within 150 ft of the reference line: ___392,158 sf__ **(D)**

Total area of the lot between 50 ft and 150 ft from the reference line: ___269,062____ **(E)**

If (D) is less than or equal to 21,780 sq ft, then at least 25 percent of area **(E)** shall be maintained in an unaltered state. (see definition below)

Minimum area required to remain unaltered: ______________ **(F)**

If (D) is greater than 21,780 sq ft, the vegetation within at least 50 percent of the area **(E)**, exclusive of impervious surfaces (take total form the Application Worksheet), shall be maintained in an unaltered state.

Area between the 50 ft and 150 ft not covered by impervious surfaces: ___160,285____ **(G)**

Minimum area required to remain unaltered: ___134,531_____ **(F)**

Actual area to remain unaltered (must be greater than value of (F)): ___136,536_____(H)

Name of person who prepared this worksheet: ___David J. Guerra_____________

Name and date of the plan this worksheet is based upon: Existing and proposed areas within protected shoreland (2 sheets dated Nov. 2)

HELPFUL DEFINTIONS

Env-Wq 1402.12 **"Impervious area"** means, for purposes of the impervious surfaces limitation specified in RSA 483-B:9, V(g), the area that is occupied, covered, or over hung by any impervious surface.

RSA 483-B:4 VII-a. **"Impervious surface"** means any modified surface that cannot effectively absorb or infiltrate water. Examples of impervious surfaces include, but are not limited to, roofs, decks, patios, and paved, gravel, or crushed stone driveways, parking areas, and walkways unless designed to effectively absorb or infiltrate water.

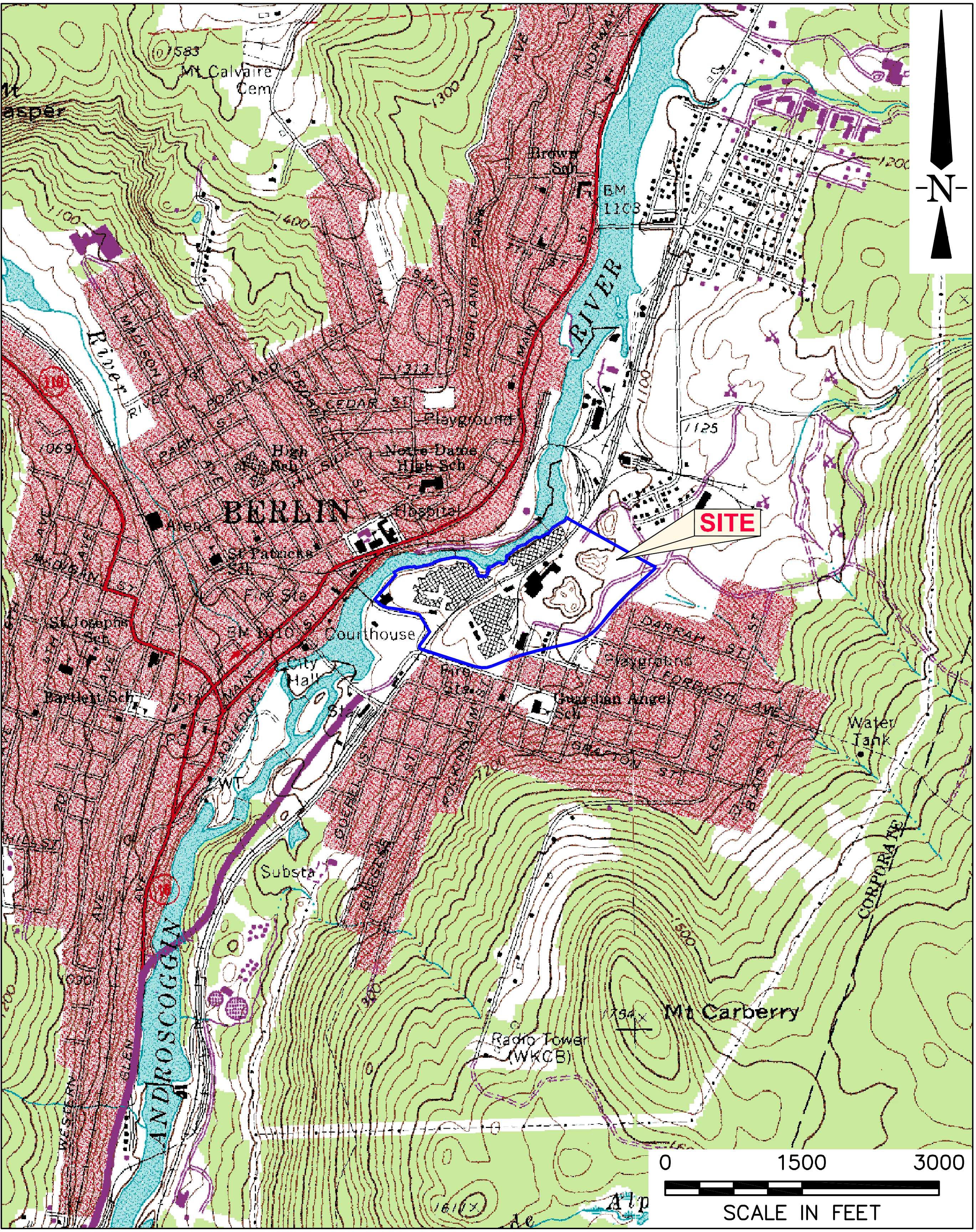
RSA 483-B:4 XXII. "**Structure**" means anything built for the support, shelter or enclosure of persons, animals, goods, or property of any kind, as well as anything constructed or erected with a fixed location on or in the ground, exclusive of fences.

RSA 483-B:4 XXIV-a. **"Unaltered state"** means native vegetation allowed to grow without cutting, limbing, trimming, pruning, mowing, or other similar activities.

EXCEPTIONS

Per Env-Wq 1403.03, Construction Within the Protected Shoreland. (c) A retaining wall shall not be included in the calculation of impervious area if the wall has a footprint of less than 12 inches in width and the total footprint of all such walls is less than 150 square feet.

Figures



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Ortho Locus Map -
Transmission Line ROWs

Source: NHGRANIT, 1:24000 USGS
Scale: 1" = 1500'

USGS Topographic Quadrangle

Figure
1

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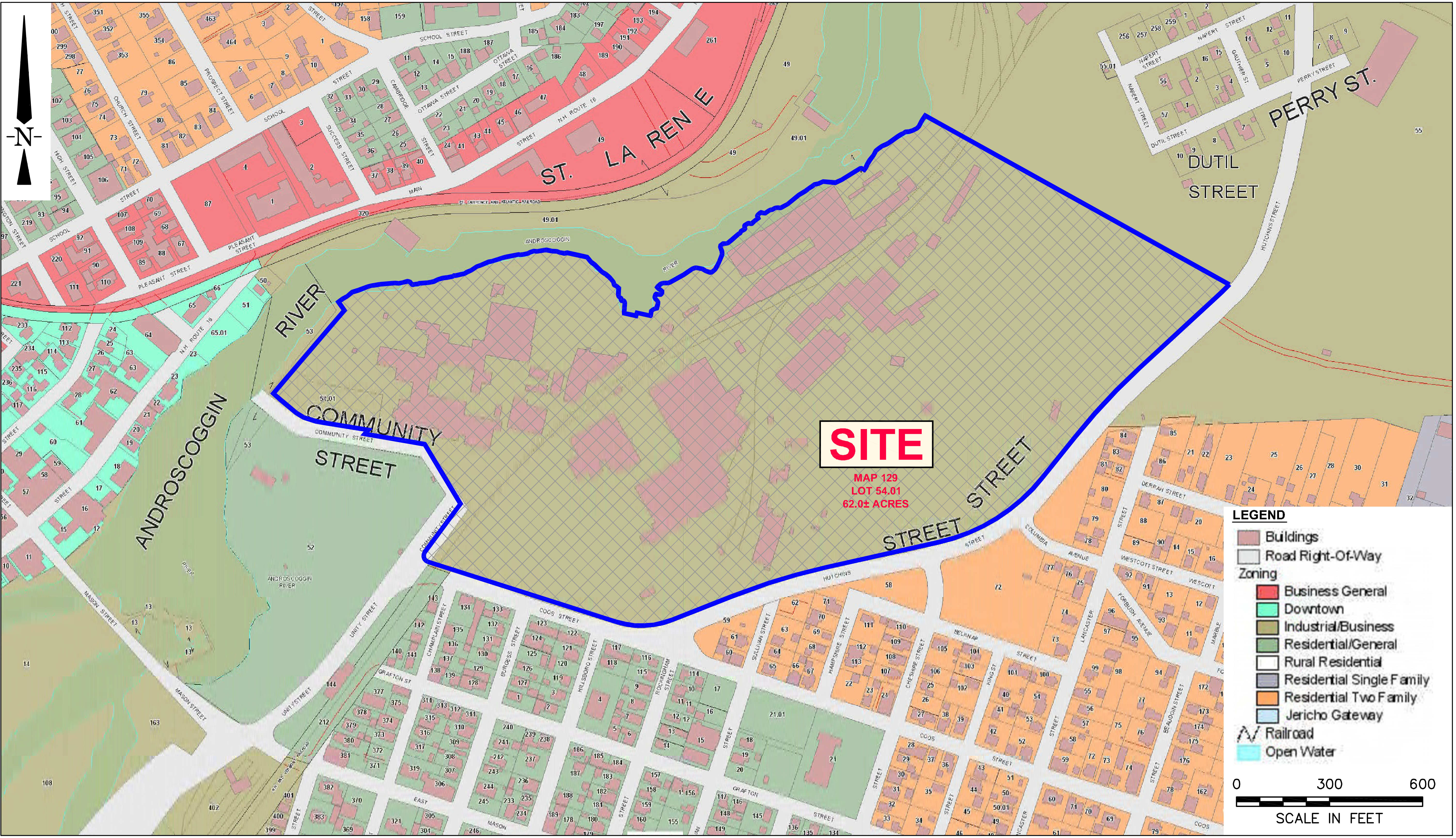

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Ortho Locus Map -
Site and Adjacent Structures

Source: City of Berlin Online Zoning Map 2009
Scale: 1"=300'

Zoning Tax Map

Figure
2

Attachment A

Copy of Recorded Deed

10,500TY

Doc # 0000047 Jan 8, 2009 9:53 AM
Coos County Registry of Deeds
Carole A. Lamirande, Registrar

C/H
L-CHIP
COA00210

STATE OF NEW HAMPSHIRE
DEPARTMENT OF REVENUE ADMINISTRATION
REAL ESTATE TRANSFER TAX
***10 Thousand 5 Hundred 00 Dollars
DATE 01/08/2009 CO002208s AMOUNT ***10500.00
VOID IF ALTERED

Wiggin & Nourie, P.A.
670 North Commercial St.
PO Box 808
Manchester, NH 03105-0808

QUITCLAIM DEED

North American Dismantling Corp., a Michigan Corporation, with a mailing address of PO Box 307, Lapeer, Michigan 48446 AND **WHITE MOUNTAIN ENERGY, LLC**, a Delaware limited liability company with a mailing address of PO Box 307, Lapeer, Michigan 48446

for consideration paid, grants to

PJPD Holdings, LLC, a Delaware limited liability company, with a mailing address of 130 Clinton Street, Portsmouth, New Hampshire 03801

with QUITCLAIM COVENANTS:

Two certain tracts or parcels of land with the buildings and improvements thereon situated in the City of Berlin, Coos County, State of New Hampshire, being bounded and described as follows:

PARCEL ONE

A certain tract or parcel of land with buildings and improvements thereon located on the east side of the Androscoggin River, on the west side of Hutchins Street and on the north sides of Coos Street and Community Street in Berlin, Coos County, State of New Hampshire, being shown as **Tax Map 129, Parcel 54.001**, on a plan of land entitled "Survey Plat Lands of North American Dismantling Corp. Tax Map 129, Parcel 54.001 and White Mountain Energy, LLC Tax Map 129, Parcel 54.01 Berlin, New Hampshire", dated December 12, 2008 as prepared by York Land Services, LLC, Plan No. 08-045A and recorded as Plan No. 3217, (the "Plan"), being bounded and described as follows:

Beginning at an iron pin marking the most northerly corner of land conveyed to White Mountain Energy, LLC as described in Coos County Registry of Deeds, Volume 1064, Page 249, being near the easterly bank of the Androscoggin River, 119.82 feet northerly of Community Street; thence

Along Public Service Company of New Hampshire the following two courses:

1. N40°33'28"E a distance of 232.47 feet to an iron pin.
2. N35°25'38"W a distance of 32 feet to a point on the east shore of the Androscoggin River; thence

Easterly along the east shore of the Androscoggin River a distance of approximately 2380 feet to a point; thence

S 60°57'44"E along other land of North American Dismantling Corporation a distance of 50 feet to an iron pin; thence continuing

S 60°57'44"E along other land of North American Dismantling Corporation a distance of 1071.24 feet to a point on the westerly sideline of Hutchins Street witnessed by an iron pin with YLS cap, found flush lying S60°57'44"E, 0.11 feet distant; thence

Southerly along the westerly sideline of Hutchins Street the following nine courses:

1. Arc of a curve to the right having a length of 37.64 feet to a point; said curve having a radius of 460.00 feet and a long chord of S45°00'49"W, 37.63 feet.
2. S47°21'29"W a distance of 357.82 feet to a point.
3. Arc of a curve to the left having a length of 306.71 feet to a point.; said curve having a radius of 2030.11 feet and a long chord of S43°01'47"W, 306.42 feet.
4. S38°42'06"W a distance of 164.40 feet to a point.
5. Arc of a curve to the right having a length of 402.00 feet to a point; said curve having a radius of 594.99 feet and a long chord of S58°03'24"W, 394.40 feet.
6. S77°24'43"W a distance of 374.08 feet to a point.
7. Arc of a curve to the left having a length of 318.73 feet to a point; said curve having a radius of 2030.00 feet and a long chord of S72°54'51"W, 318.40 feet.
8. S68°24'58"W a distance of 204.80 feet to a point.
9. Arc of a curve to the right having a length of 185.16 feet to a point; said curve having a radius of 270.00 feet and a long chord of S88°03'43"W, 181.55 feet; thence

N72°17'31"W along the northerly sideline of Coos Street a distance of 635.75 feet to a point; thence

Northerly, along the arc of a curve to the right having a length of 37.96 feet to a point; said curve having a radius of 20.00 feet and a long chord of N17°55'12"W, 32.51 feet; thence

N36°27'07"E along the easterly sideline of Community Street and the westerly sideline of the former B&M Railroad a distance of 193.50 feet to an iron pin; thence

N30°58'35"W a distance of 224.19 feet to an iron pin; thence

N80°26'37"W along the northerly sideline of Community Street a distance of 150.30 feet to an iron pin; thence

Along White Mountain Energy property the following three courses:

1. N12°18'02"E a distance of 128.05 feet to a point.
2. N77°41'58"W a distance of 229.83 feet to a point.
3. N49°28'23"W a distance of 85.21 feet, to the point of beginning.

PARCEL TWO

A certain tract or parcel of land with buildings and improvements thereon located on the east side of the Androscoggin River, on the west side of Hutchins Street and on the north sides of Coos Street and Community Street in Berlin, Coos County, State of New Hampshire, being shown as **Tax Map 129, Parcel 54.01**, on a plan of land entitled "Survey Plat Lands of North American Dismantling Corp. Tax Map 129, Parcel 54.001 and White Mountain Energy, LLC Tax Map 129, Parcel 54.01 Berlin, New Hampshire", dated December 12, 2008 as prepared by York Land Services, LLC, Plan No. 08-045A and recorded as Plan No. 3217, (the "Plan"), being bounded and described as follows:

Commencing at the southwesterly corner of the lot on the northerly side of Community Street on the easterly side of the Androscoggin River; thence

N40°33'28"E along land of Public Service Company of New Hampshire for 119.82 feet to an iron pin. Said pin also marks the beginning point of Parcel One described above; thence

Along North American Dismantling Corporation property the following three courses:

1. S49°28'23"E a distance of 85.21 feet, to a point.
2. S77°41'58"E a distance of 229.83 feet to an iron pin.
3. S12 °18'02"W a distance of 128.05 feet to an iron pin on the northerly sideline of Community Street; thence

Westerly along the northerly sideline of Community Street the following nine courses:

1. N80°26'37"W a distance of 45.46 feet to a point
2. N40°52'51"E a distance of 17.33 feet to a point
3. N80°50'40"W a distance of 53.50 feet to a point
4. N80°31'58"W a distance of 69.28 feet to a point
5. N80°27'54"W a distance of 47.42 feet to a point
6. N72°30'00"W a distance of 41.75 feet to a point
7. N59°33'54"W a distance of 28.05 feet to a point
8. N50°09'33"W a distance of 58.82 feet to a point

9. N48°55'11"W a distance of 38.96 feet to a point of beginning.

Shown to contain 0.96 acre, more or less. See also "Site Plan, Cluster Rule/Energy Project, White Mountain Energy, LLC, Community Street, Berlin, New Hampshire" prepared by York Land Service, LLC recorded at the Coos County Registry of Deeds as Plan #1960 (the "Site Plan").

Parcels One and Two combined, contain a total of 62.0 acres, more or less.

TOGETHER WITH the rights and benefits granted under of Easement Agreement for Railroad Spur Track from North American Dismantling Corp. to PJPD Holdings, LLC dated December 23, 2008 and recorded with the Coos County Registry of Deeds at Book 1265, Page 1016, and being depicted on Plan No. 3218.

TOGETHER WITH AND SUBJECT TO the rights and benefits granted under the Amendment and Restatement of Easement and Shared Use Agreement for Water Distribution System and Filtration Plant between North American Dismantling Corp, PJPD Holdings, LLC, and Fraser N.H., LLC dated December 23, 2008 and recorded with the Coos County Registry of Deeds at Book 1265, Page 981.

The Premises conveyed herein are subject to the right and easement of the Grantor to tie-in to any utilities that may be required to benefit the Grantor's real property which abuts the northern portion of the Premises (being shown as parcel 54.001 on Plan 3101). In the event that the Grantor's exercise of the rights retained hereby shall result in damage or interruption of utility services to the Premises conveyed herein, the Grantor shall be responsible for the cost and expense of restoring the damaged Premises to their prior condition or restoring such services, as the case may be, to such extent as may be reasonably practicable as soon as may be reasonably practicable. If Grantor, after reasonable notice from Grantee, fails to restore any damage to the Premises caused by Grantor as provided above, then Grantee shall have the right to restore the Premises and Grantor shall reimburse Grantee the costs of such restoration within fifteen (15) days after delivery by Grantee to Grantor of satisfactory evidence of the amounts incurred by Grantee. The cost of constructing such tie-in and connection, hookup or metering fees and all costs of utilities hereafter used by the Grantor shall be borne by the Grantor. Any cost of maintenance, repair or replacement of any line, pipe or conduit to which the Grantor connects (a) which is used solely by the Grantor shall be borne by the Grantor, and (b) which is used jointly by the Grantee and the Grantor shall be borne by the Grantee and the Grantor equally. The Grantee shall have no liability for any interruption of utility service experienced by the Grantor from and after the time of such connection. Any such connection shall be accomplished in such a manner so as to not unreasonably interfere with the use and enjoyment of the Premises conveyed herein by Grantee.

The Grantor also reserves for itself, its successors and assigns, invitees and licensees an access easement for ingress and egress and utilities as may be required to benefit the Grantor's real property which abuts the northern portion of the Premises (being shown as parcel 54.001 on Plan 3101). In the event that the Grantor's exercise of the rights retained hereby shall result in damage to the Premises conveyed herein, the Grantor shall be responsible for the cost and expense of restoring the damaged Premises to their prior condition to such extent as may be reasonably practicable as soon as may be reasonably practicable. Grantor's use of the easement rights retained herein shall be accomplished in such a manner so as to not unreasonably interfere with the use and enjoyment of the Premises conveyed herein by Grantee.

The Premises herein conveyed are subject to all rights of way, easements, covenants, conditions and restrictions of record.

Meaning and intending to describe a portion of the premises described in the deed of Fraser N.H., LLC to North American Dismantling Corp., dated October 3, 2006 and recorded with the Coos County Registry of Deeds at Book 1190, Page 932; and the same premises conveyed to White Mountain Energy, LLC by deed of Fraser N.H., LLC dated December 19, 2003 and recorded with the Coos County Registry of Deeds at Book 1064, Page 249.

Reference is also made to the plan of land entitled, "Minor Lot Line Adjustment between properties of North American Dismantling Corp., Tax Map 129, Parcel 54.001 and White Mountain Energy, LLC, Tax Map 129, Parcel 54.01, Berlin, New Hampshire", dated October 1, 2007, revised March 12, 2008, recorded at Coos County Registry of Deeds as Plan No. 3101.

This is not homestead property.

Dated this 23 day of December, 2008.

North American Dismantling Corp.

____
Witness

By:_______________
Rick Marcicki
its duly authorized President

White Mountain Energy, LLC

____
Witness

By:_______________
Rick Marcicki,
its duly authorized Manager

STATE OF NEW HAMPSHIRE
Hillsborough, ss.

On this 23 day of December, 2008, before me the undersigned officer, personally appeared the above-named Rick Marcicki, the duly authorized President of North American Dismantling Corp., known to me (or satisfactorily proven) to be the person whose name is affixed to the foregoing instrument and acknowledged that he executed the same on behalf of the corporation, for the purposes therein contained.

Print Name: Tracy A. Uhrin
Notary Public
My Comm. Exp. 1/24/12

STATE OF NEW HAMPSHIRE
Hillsborough, ss.

On this 23 day of December, 2008, before me the undersigned officer, personally appeared the above-named Rick Marcicki, the duly authorized Manager of White Mountain Energy, LLC., known to me (or satisfactorily proven) to be the person whose name is affixed to the foregoing instrument and acknowledged that he executed the same on behalf of the limited liability company, for the purposes therein contained.

Print Name: Tracy A. Uhrin
Notary Public
My Comm. Exp. 1/24/12

Doc # 0000048 Jan 6, 2009 9:53 AM
Coos County Registry of Deeds
Carole A. Lamirande
Carole A. Lamirande, Registrar

Wiggin & Nourie, P.A.
670 North Commercial St.
PO Box 808
Manchester, NH 03105-0808

ASSIGNMENT & ASSUMPTION AGREEMENT

ASSIGNMENT AND ASSUMPTION AGREEMENT (this "Assignment") by and among **North American Dismantling Corp.**, a Michigan corporation, **White Mountain Energy, LLC**, a Delaware limited liability company (together, "Assignors"), **Laidlaw Berlin Biopower, LLC** ("Laidlaw"), a Delaware limited liability company and **PJPD Holdings, LLC**, a Delaware limited liability company (together with Laidlaw, "Assignees"). Certain capitalized terms used in this Assignment shall have the meaning ascribed to them in the Asset Purchase Agreement dated as of May 9, 2008, by and among Assignors and Laidlaw, as amended.

WHEREAS, in consideration of the receipt of the Purchase Price and the assumption of obligations hereunder, the sufficiency of which is hereby acknowledged, Assignors desire to assign to Assignees the Covenant Not to Sue to the extent, and solely to the extent, such Covenant relates to the Premises (the "Agreement").

NOW, THEREFORE:

1. Assignors with respect to the Premises, unconditionally and irrevocably grant, bargain, transfer, sell, assign and convey to Assignees all of Assignors' right, title and interest in and to the Agreement, heretofore held by Assignors, for Assignees' own use and benefit from this day forward. Assignees hereby undertake and agree to comply with all requirements and obligations of Fraser under the Agreement to be fulfilled or performed after the Closing Date, but shall not assume any such requirements or obligations to be fulfilled or performed prior to the Closing Date. Assignors shall retain all its right, title and interest in and to the Agreement with respect to any and all property it acquired contemporaneously with acquiring the Premises.

2. Assignors hereby covenant and warrant that Assignors:

(a) are the lawful owners of, and have absolute title to, the Agreement free and clear of all claims, liens, encumbrances and all other defects of title of any kind whatsoever;

(b) have the right, power, and authority to assign the same and have not made, or contracted to make, any prior sale, assignment, lien, encumbrance or transfer of the Agreement to, or for the benefit of, any person or entity;

(c) shall warrant and defend the sale, assignment, transfer, conveyance and delivery of the Agreement to Assignees against the claims and demands of any and all persons and entities; and

(d) shall, whenever and as often as reasonably requested to do so by Assignees, do, execute, acknowledge and deliver any and all such other acts, assignments, or instruments as may be required by law or requested by Assignees to establish, maintain and protect Assignees' rights, title and interest in and to said property.

3. This Assignment may be amended or modified only by an instrument in writing executed by all parties. This Assignment may be executed in counterparts, all of which together shall constitute one agreement binding on all the parties hereto, notwithstanding that all such parties are not signatories to the original or the same counterpart. If any provision of this Assignment shall be or become invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions contained herein shall not be affected. This Assignment sets forth the entire agreement of the parties with respect to the subject matter hereof and is intended to supersede all prior negotiations, understandings and agreements.

4. This Assignment shall be construed in accordance with and governed by the laws of the State of New Hampshire, without regard to its principles of conflicts of law. Any and all disputes, controversies or claims arising out of or concerning or relating to this Assignment or its interpretation, breach, cancellation, performance or non-performance may be brought only before State or federal courts sitting in the State of New Hampshire. The parties hereby consent to the exclusive jurisdiction thereof and consent that service of all papers in any proceeding hereunder may be made by first class mail, certified or registered, return receipt requested. The prevailing party in any such proceeding shall be awarded all of its Costs and Fees. "Costs and Fees" means all reasonable expenses of the litigation, including administrative fees, travel expenses, out-of-pocket expenses such as copying and telephone, court costs, witness fees, and attorneys' fees.

[signatures next page]

IN WITNESS WHEREOF, each of Assignors and Assignee have executed this Assignment as of December 29, 2008.

NORTH AMERICAN DISMANTLING CORP.,
a Michigan corporation

By:
Name: Rick Myrnicki
Title: President

WHITE MOUNTAIN ENERGY, LLC,
a Delaware limited liability company

By:
Name: Rick Myrnicki
Title: Director

ACCEPTED AND AGREED AS OF
THE DATE SET FORTH ABOVE:

PJPD HOLDINGS, LLC,
a Delaware limited liability company

By: Richard
Name: Richard Ryan
Title: Manager

LAIDLAW BERLIN BIOPOWER, LLC,
a Delaware limited liability company

By: Michael Bartosz
Name: Michael Bartoszek
Title: President

C:\Documents and Settings\tdow\Local Settings\Temporary Internet Files\OLKEF\Assign CNTS.doc

STATE OF NEW HAMPSHIRE
COUNTY OF HILLSBOROUGH

This instrument was acknowledged before me on December 23, 2008 by Rick J. Marcicki, President of North American Dismantling Corp.

~~Notary Public~~/Justice of the Peace
My Commission Expires:______________

STATE OF NEW HAMPSHIRE
COUNTY OF HILLSBOROUGH

This instrument was acknowledged before me on December 23, 2008 by Rick J. Marcicki, Director of White Mountain Energy, LLC.

~~Notary Public~~/Justice of the Peace
My Commission Expires:______________

JOHN J. McCORMACK
Justice of the Peace - New Hampshire
My Commission Expires May 2, 2012

STATE OF NEW HAMPSHIRE
COUNTY OF HILLSBOROUGH

This instrument was acknowledged before me on December 23, 2008 by Richard Cyr, Manager of PJPD Holdings, LLC.

~~Notary Public~~/Justice of the Peace
My Commission Expires:______________

JOHN J. McCORMACK
Justice of the Peace - New Hampshire
My Commission Expires May 2, 2012

STATE OF NEW HAMPSHIRE
COUNTY OF HILLSBOROUGH

This instrument was acknowledged before me on December 23, 2008 by Michael Bartoszen, President of Laidlaw Berlin Biopower, LLC.

~~Notary Public~~/Justice of the Peace
My Commission Expires:______________

JOHN J. McCORMACK
Justice of the Peace - New Hampshire
My Commission Expires May 2, 2012

Attachment B

Abutter's List

ABUTTER'S LIST

Rick Marcicki – President
North American Dismantling
P.O. Box 307
Lapeer, Michigan 48446-0307
810-664-3697

Attachment C

Certified Mailing Receipts

Attachment D

Natural Heritage Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
http://www.fws.gov/northeast/newenglandfieldoffice

January 2, 2009

To Whom It May Concern:

This project was reviewed for the presence of federally-listed or proposed, threatened or endangered species or critical habitat per instructions provided on the U.S. Fish and Wildlife Service's New England Field Office website:

(http://www.fws.gov/northeast/newenglandfieldoffice/EndangeredSpec-Consultation.htm)

Based on the information currently available, no federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service (Service) are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under Section 7 of the Endangered Species Act is not required.

This concludes the review of listed species and critical habitat in the project location(s) and environs referenced above. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your cooperation. Please contact Mr. Anthony Tur at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

March 3, 1849

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
http://www.fws.gov/northeast/newenglandfieldoffice

REF: Biomass energy generating facility, Berlin, NH

July 14, 2009

Meghann J. Murray
ESS Group, Inc.
888 Worcester St., Suite 240
Wellesley, MA 02482

RECEIVED
July 17/09

Dear Ms. Murray:

We received your letter (enclosed) requesting an endangered species review in regard to the proposed project identified above.

The New England Field Office has developed measures to streamline the endangered species consultation process and other requests for technical assistance. The information you have requested is available on our website at:

(http://www.fws.gov/northeast/newenglandfieldoffice/EndangeredSpec-Consultation.htm)

Please review these streamlining measures. We are confident they will adequately address your request. For assistance in navigating the website, please contact Phil Leeser at 603-223-2541.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

Enclosure

Memo

NH Natural Heritage Bureau

To: Meghann Murray, ESS Group, Inc.
888 Worcester Street
Suite 240
Wellesley, MA 02482

From: Melissa Coppola, NH Natural Heritage Bureau
Date: 6/24/2009 (valid for one year from this date)
Re: Review by NH Natural Heritage Bureau
NHB File ID: NHB09-1209
Town: Berlin
Project type: Buildings and Related Structures: Single commercial building lot, etc.
Location: Tax Maps: 129-54.01, 54.001, and 55
cc: Kim Tuttle

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments:

Vertebrate species	**State**[1]	**Federal**	**Notes**
Bald Eagle (*Haliaeetus leucocephalus*)	T	M	Contact the NH Fish & Game Dept (see below).
Common Nighthawk (*Chordeiles minor*)	E	--	Contact the NH Fish & Game Dept (see below).

[1] Codes: "E" = Endangered, "T" = Threatened, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

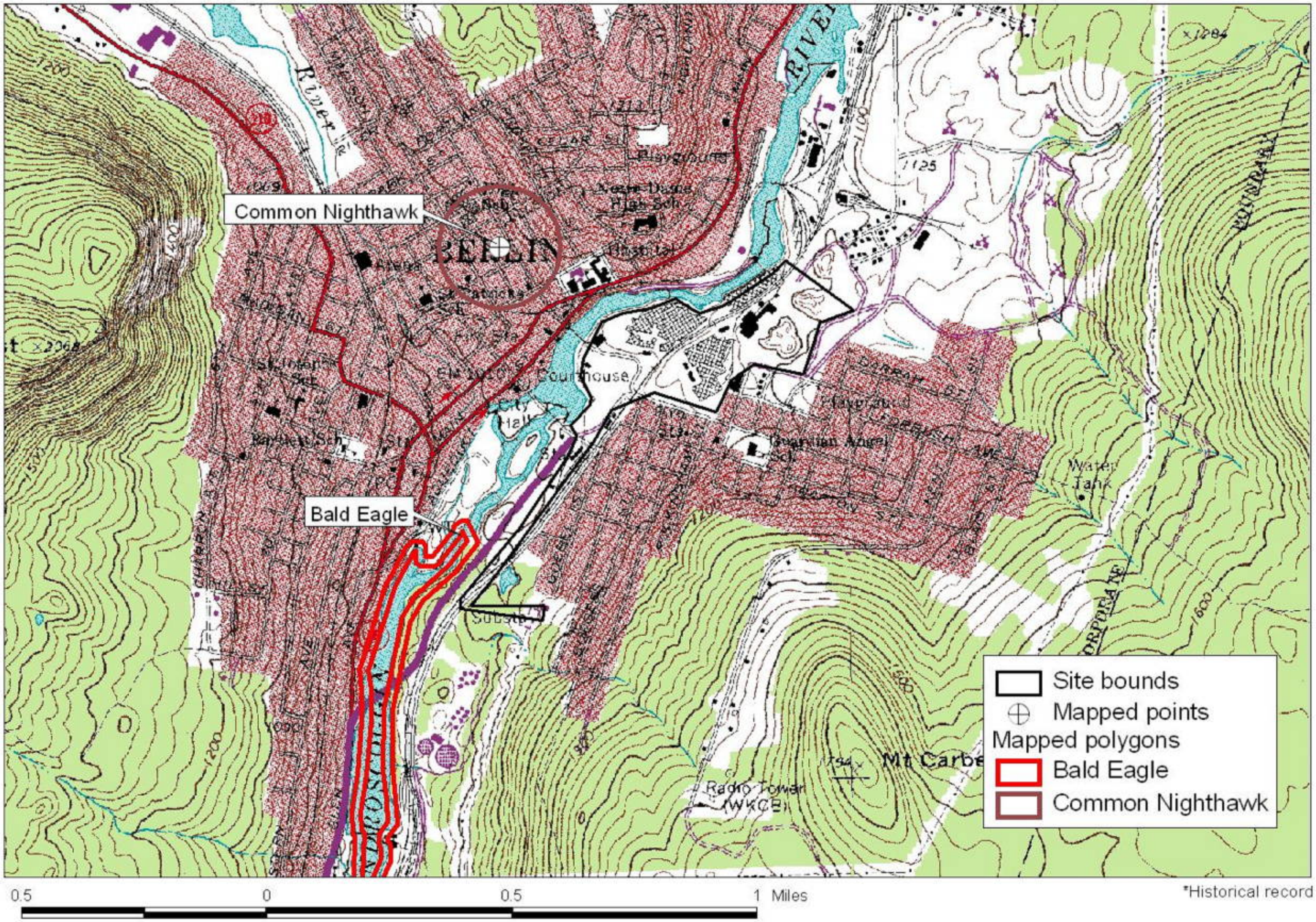
Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. For some purposes, including legal requirements for state wetland permits, the fact that no species of concern are known to be present is sufficient. However, an on-site survey would provide better information on what species and communities are indeed present.

NH Natural Heritage Bureau

Known locations of rare species and exemplary natural communities

Note: Mapped locations are not always exact. Occurrences that are not in the vicinity of the project are not shown.



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Valid for one year from this date: 24 Jun 2009

New Hampshire Natural Heritage Bureau - Animal Record

Bald Eagle (*Haliaeetus leucocephalus*)

Legal Status		**Conservation Status**	
Federal:	Monitored	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 1993: Occasional observations from Rte. 16 between Berlin and Gorham.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Androscoggin River
Managed By: Drew Easement

County:	Coos	USGS quad(s):	Berlin (4407142)
Town(s):	Gorham	Lat, Long:	442539N, 0711129W
Size:	165.3 acres	Elevation:	800 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: All along the Androscoggin River.

Dates documented

First reported: 1993 Last reported: 1993

Deluca, Diane. Audubon Society of New Hampshire. 1993. Results of Annual Eagle Wintering Surveys.

New Hampshire Natural Heritage Bureau - Animal Record

Common Nighthawk (*Chordeiles minor*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Not ranked (need more information)

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 1990: 26 adults, sex unknowns (Obs_id 939).
General Area: 1990: Terrestrial - Urban / suburban (Obs_id 939).
General Comments: 1990: Number above represents the high count for the period 1982-1992. Young were documented in 1985, and perhaps other years during this period (Obs_id 939).
Management Comments:

Location

Survey Site Name: Berlin
Managed By:

County:	Coos	USGS quad(s):	Berlin (4407142)
Town(s):	Berlin	Lat, Long:	442827N, 0711050W
Size:	30.8 acres	Elevation:	

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 1990: Downtown [Berlin] (Obs_id 939).

Dates documented

First reported:	1990-07-22	Last reported:	1990-07-29

Darrell Oakley

From: Tuttle, Kim [Kim.Tuttle@wildlife.nh.gov]
ent: Monday, October 19, 2009 8:36 AM
o: Darrell Oakley
Subject: NHB09-1209 Laidlaw Berlin BioPower LLC

Darrell,

The NHFG Nongame and Endangered Species Program has reviewed NHB09-1209 for the proposed Laidlaw Berlin BioPower project in Berlin, NH. Bald eagle and common nighthawk were identified in the NHB review as occuring in the vicinity of the project. Both species are protected by the NH Endangered Species Conservation Act (RSA 212-A). We do not expect impacts to bald eagle as no trees within 50 ft. of the Androscoggin River will be removed. If there is any opportunity to allow more habitat along the River to revert back to native trees and shrubs, we would encourage that as it would provide future perching and roosting sites for bald eagle.

Common nighthawks nest on the ground in gravel lots and on flat rooftops covered in small stone. We have not had breeding reports for this species in Berlin for a number of years now so we do not expect impacts to common nighthawk as a result of the proposed project. Please feel free to call me at 271-6544 if you have any further questions regarding this job.

Sincerely,

Kim Tuttle
Wildlife Biologist
NH Fish and Game
Nongame and Endangered Species Program
03-271-6544

Attachment E

Photograph Log

Photograph No. 1: View looking northerly towards the existing building located near the Androscoggin River.

Photograph No. 2: View looking easterly towards the property line. Photo taken within the 150 foot buffer.

Photograph No. 3: View looking easterly towards the existing gravel path along the Androscoggin River.

Photograph No. 4: View looking westerly towards the existing building located near the Androscoggin River. Existing facility in background.


20 10:32AM

Photograph No. 5: View looking southerly towards Hutchins Street. Photo taken within the 150 foot buffer.


20 10:36AM

Photograph No. 6: View looking northerly towards the Androscoggin River. Photo taken within 150 foot buffer.

Photograph No. 7: View looking northerly towards the Androscoggin River. Photo taken just outside of the 250 foot buffer.

Photograph No. 8: View looking northerly towards the Androscoggin River. Photo taken within 50 foot buffer.

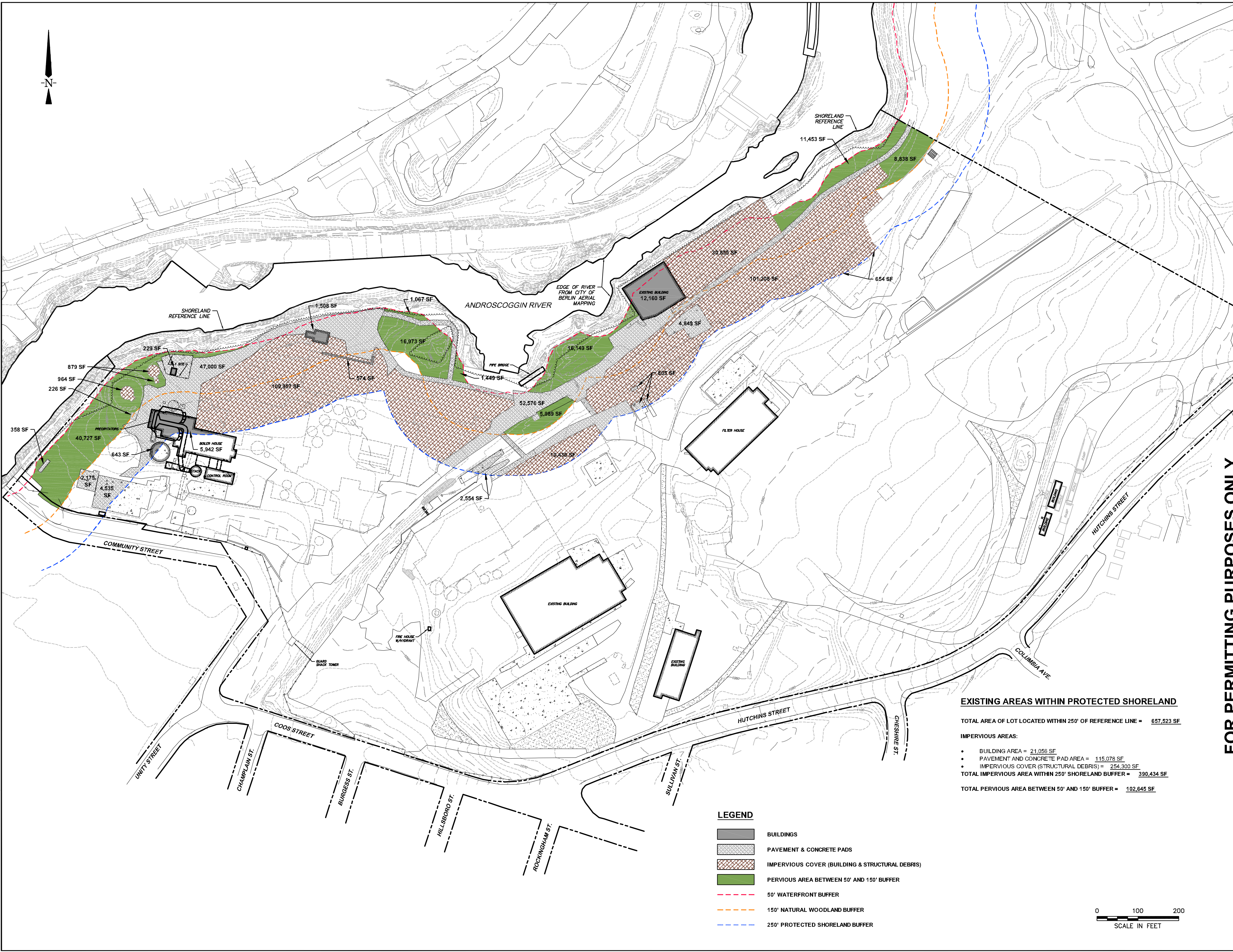
Photograph No. 9: View looking towards the western portion of site. Photo taken within the 250 foot buffer.

Photograph No. 10: View looking northerly towards the existing sewer lift station and paved areas within the 150 foot buffer.

Plans

SITE PLAN SET

Please see Appendix B of the Application for Certification of Site and Facility.



LEGEND

- ▨ BUILDINGS
- ▨ PAVEMENT & CONCRETE PADS
- ▨ IMPERVIOUS COVER (BUILDING & STRUCTURAL DEBRIS)
- 🟩 PERVIOUS AREA BETWEEN 50' AND 150' BUFFER
- - - - 50' WATERFRONT BUFFER
- - - - 150' NATURAL WOODLAND BUFFER
- - - - 250' PROTECTED SHORELAND BUFFER

EXISTING AREAS WITHIN PROTECTED SHORELAND

TOTAL AREA OF LOT LOCATED WITHIN 250' OF REFERENCE LINE = 657,523 SF

IMPERVIOUS AREAS:

- BUILDING AREA = 21,056 SF
- PAVEMENT AND CONCRETE PAD AREA = 115,078 SF
- IMPERVIOUS COVER (STRUCTURAL DEBRIS) = 254,300 SF

TOTAL IMPERVIOUS AREA WITHIN 250' SHORELAND BUFFER = 390,434 SF

TOTAL PERVIOUS AREA BETWEEN 50' AND 150' BUFFER = 102,645 SF

FOR PERMITTING PURPOSES ONLY

ESS Group, Inc.
Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

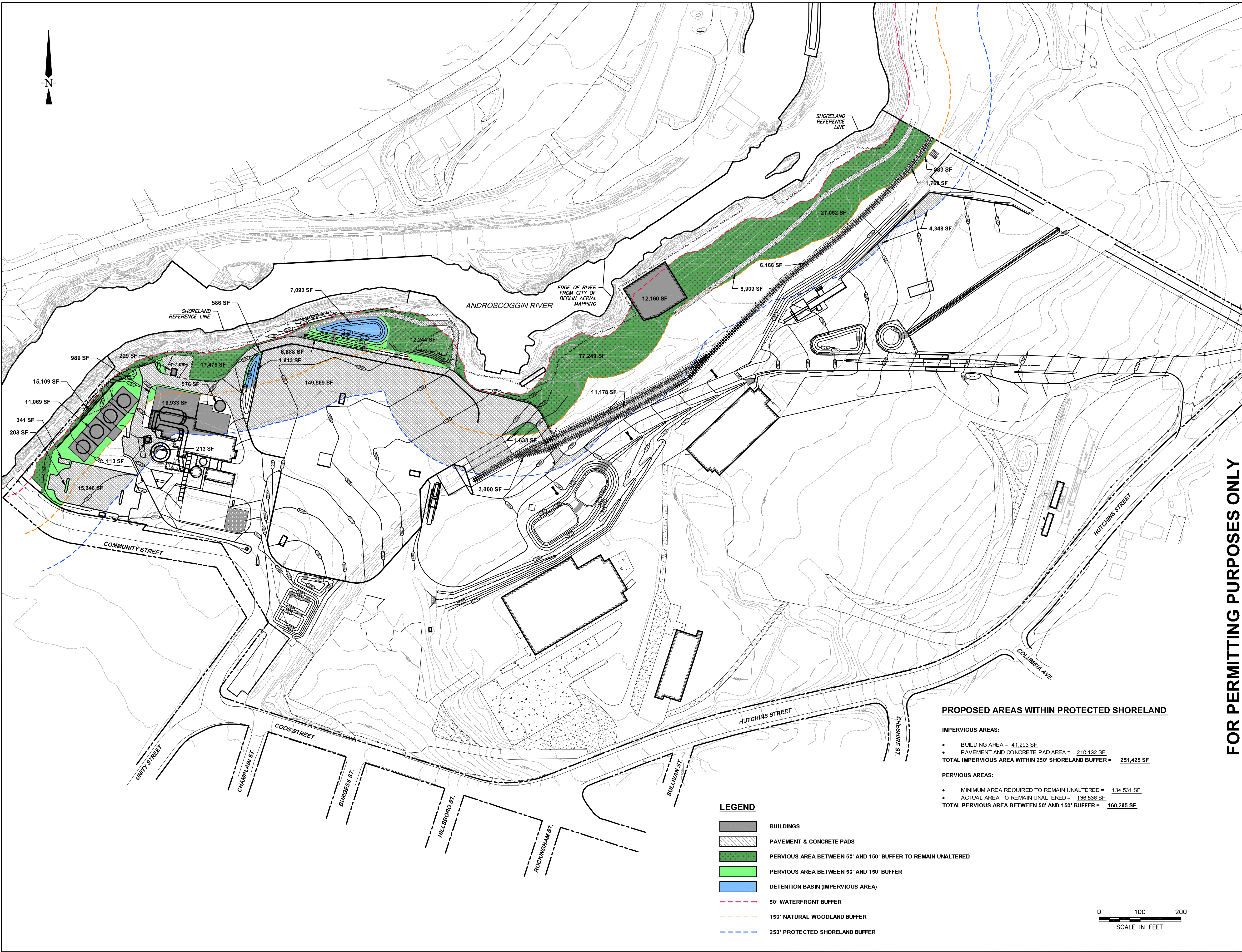
DRAWN BY: DJG
CHECKED BY: JCB
DESIGNED BY: DJG
APPROVED BY: JCB

Laidlaw Berlin BioPower, LLC
Berlin, NH

Existing Areas Within Protected Shoreland

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 1 of 2
SCALE: 1"=100'
DRAWING No.
1

XREF: L145-XE01 [H:\L145-Laidlaw\xref\L145-XE01.dwg]
XREF: L145-XP03 [H:\L145-Laidlaw\xref\L145-XP03.dwg]
XREF: L145-Drainage-Base [H:\L145-Laidlaw\xref\L145-Drainage-Base.dwg]



PROPOSED AREAS WITHIN PROTECTED SHORELAND

IMPERVIOUS AREAS:

- BUILDING AREA = 41,293 SF
- PAVEMENT AND CONCRETE PAD AREA = 210,132 SF

TOTAL IMPERVIOUS AREA WITHIN 250' SHORELAND BUFFER = 251,425 SF

PERVIOUS AREAS:

- MINIMUM AREA REQUIRED TO REMAIN UNALTERED = 134,531 SF
- ACTUAL AREA TO REMAIN UNALTERED = 136,536 SF

TOTAL PERVIOUS AREA BETWEEN 50' AND 150' BUFFER = 160,285 SF

LEGEND

■	**BUILDINGS**
▨	**PAVEMENT & CONCRETE PADS**
🟩	**PERVIOUS AREA BETWEEN 50' AND 150' BUFFER TO REMAIN UNALTERED**
🟩	**PERVIOUS AREA BETWEEN 50' AND 150' BUFFER**
🟦	**DETENTION BASIN (IMPERVIOUS AREA)**
- - -	**50' WATERFRONT BUFFER**
- - -	**150' NATURAL WOODLAND BUFFER**
- - -	**250' PROTECTED SHORELAND BUFFER**

FOR PERMITTING PURPOSES ONLY

ESS Group, Inc.

Engineers
Scientists
Consultants

888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482
p 781.431.0500
f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: DJG
CHECKED BY: JCB
DESIGNED BY: DJG
APPROVED BY: JCB

Laidlaw Berlin BioPower, LLC
Berlin, NH

Proposed Areas
Within Protected Shoreland

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 2 of 2
SCALE: 1"=100'

DRAWING No.
2

DATE: Dec 15, 2009 - 5:17PM
FILENAME: H:\L145-Laidlaw\001 Shoreland Permit Plans\L145-Shoreland_Areas.dwg

Appendix F

NPDES General Stormwater Permit Application for Construction Activities

Appendix F –
NPDES General Stormwater Permit Application for Construction Activities

Stormwater Pollution Prevention Plan for Construction Activities

BERLIN BIOPOWER
57 HUTCHINS STREET
BERLIN, NEW HAMPSHIRE

PREPARED FOR

Laidlaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, New York 10038

PREPARED BY

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

Project No. L145-005.04

December 15, 2009

STORMWATER POLLUTION PREVENTION PLAN FOR CONSTRUCTION ACTIVITIES
BERLIN BIOPOWER
57 Hutchins Street
Berlin, New Hampshire

Prepared For:

Laidlaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, New York 10038

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, MA 02482

ESS Project No. L145-005.04

December 15, 2009

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SECTION **PAGE**

FIGURES

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ATTACHMENTS

Notice of Intent Form

This Form Replaces Form 3510-9 (8-98)
Refer to the Following Pages for Instructions

Form Approved OMB Nos. 2040-0188 and 2040-0211

NPDES Form

United States Environmental Protection Agency
Washington, DC 20460

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit

Submission of this Notice of Intent (NOI) constitutes notice that the party identified in Section II of this form requests authorization to discharge pursuant to the NPDES Construction General Permit (CGP) permit number identified in Section I of this form. Submission of this NOI also constitutes notice that the party identified in Section II of this form meets the eligibility requirements of the CGP for the project identified in Section III of this form. Permit coverage is required prior to commencement of construction activity until you are eligible to terminate coverage as detailed in the CGP. To obtain authorization, you must submit a complete and accurate NOI form. Refer to the instructions at the end of this form.

I. Permit Number

NHR050000

II. Operator Information

Name: LAIDLAW BERLIN BIOPOWER ,LLC

IRS Employer Identification Number (EIN): -

Mailing Address:

Street: 90 JOHN STREET, 4TH FLOOR

City: NEW YORK State: NY Zip Code: 10038 -

Phone: 212 - 480 - 9884 Fax (optional): 212 - 480 - 8448

E-mail (optional):

III. Project/Site Information

Project/Site Name: LAIDLAW BERLIN BIOPOWER, LLC

Project Street/Location: 57 HUTCHINS STREET

City: BERLIN State: NH Zip Code: 03570 -

County or similar government subdivision: COOS COUNTY

Latitude/Longitude (Use one of three possible formats, and specify method)

Latitude 1. 44° 28′ 16″ N (degrees, minutes, seconds)
2. __° __ . __′ N (degrees, minutes, decimal)
3. __ . ____° N (decimal)

Longitude 1. 71° 10′ 15″ W (degrees, minutes, seconds)
2. ___° __ . __′ W (degrees, minutes, decimal)
3. ___. ____° W (decimal)

Method: ☑ U.S.G.S. topographic map EPA web site GPS Other:
• If you used a U.S.G.S. topographic map, what was the scale: 1:24000

Project Located in Indian country? ☐ Yes ☑ No
If so, name of Reservation or if not part of a Reservation, put "Not Applicable":

Estimated Project Start Date: 12 / 01 / 2010 (Month / Date / Year)
Estimated Project Completion Date: 01 / 30 / 2013 (Month / Date / Year)

Estimated Area to be Disturbed (to the nearest quarter acre): 37.81

IV. SWPPP Information

Has the SWPPP been prepared in advance of filing this NOI? ☑ Yes ☐ No

Location of SWPPP for viewing: ☐ Address in Section II ☑ Address in Section III ☐ Other

If Other:

SWPPP Street:

City:

State: Zip Code: -

SWPPP Contact Information (if different than that in Section II):

Name: LOUIS T. BRAVAKIS

Phone: 802 - 229 - 4146 Fax (optional): - -

E-mail (optional): LTB@LAIDLAWENERGY.COM

V. Discharge Information

Identify the name(s) of waterbodies to which you discharge. ANDROSCOGGIN RIVER

Is this discharge consistent with the assumptions and requirements of applicable EPA approved or established TMDL(s)?

☑ Yes ☐ No

VI. Endangered Species Information

Under which criterion of the permit have you satisfied your ESA eligibility obligations?

☑ A ☐ B ☐ C ☐ D ☐ E ☐ F

- If you select criterion F, provide permit tracking number of operator under which you are certifying eligibility:

VII. Certification Information

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: Louis T. Bravakis

Print Title: Vice President

Signature:

Date: 12/14/09

Instructions for Completing EPA Form 3510-9

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit

NPDES Form This Form Replaces Form 3510-9 (8/98) Form Approved OMB Nos. 2040-0188 and 2040-0211

Who Must File an NOI Form

Under the provisions of the Clean Water Act, as amended (33 U.S.C. 1251 et.seq.; the Act), federal law prohibits storm water discharges from certain construction activities to waters of the U.S. unless that discharge is covered under a National Pollutant Discharge Elimination System (NPDES) Permit. Operator(s) of construction sites where one or more acres are disturbed, smaller sites that are part of a larger common plan of development or sale where there is a cumulative disturbance of at least one acre, or any other site specifically designated by the Director, must submit an NOI to obtain coverage under an NPDES general permit. Each person, firm, public organization, or any other entity that meets either of the following criteria must file this form: (1) they have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or (2) they have day-to-day operational control of those activities at the project necessary to ensure compliance with SWPPP requirements or other permit conditions. If you have questions about whether you need an NPDES storm water permit, or if you need information to determine whether EPA or your state agency is the permitting authority, refer to *www.epa.gov/npdes/stormwater/cgp* or telephone the Storm Water Notice Processing Center at (866) 352-7755.

Where to File NOI Form

See the applicable CGP for information on where to send your completed NOI form.

Completing the Form

Obtain and read a copy of the appropriate EPA Storm Water Construction General Permit for your area. To complete this form, type or print, using uppercase letters, in the appropriate areas only. Please place each character between the marks (abbreviate if necessary to stay within the number of characters allowed for each item). Use one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions on this form, refer to *www.epa.gov/npdes/stormwater/cgp* or telephone the Storm Water Notice Processing Center at (866) 352-7755. Please submit original document with signature in ink - do not send a photocopied signature.

Section I. Permit Number

Provide the number of the permit under which you are applying for coverage (see Appendix B of the general permit for the list of eligible permit numbers).

Section II. Operator Information

Provide the legal name of the person, firm, public organization, or any other entity that operates the project described in this application. An operator of a project is a legal entity that controls at least a portion of site operations and is not necessarily the site manager. Provide the employer identification number (EIN from the Internal Revenue Service; IRS), also commonly referred to as your taxpayer ID. If the applicant does not have an EIN enter “NA” in the space provided. Also provide the operator’s mailing address, telephone number, fax number (optional) and e-mail address (if you would like to be notified via e-mail of NOI approval when available). Correspondence for the NOI will be sent to this address.

Section III. Project/Site Information

Enter the official or legal name and complete street address, including city, state, zip code, and county or similar government subdivision of the project or site. If the project or site lacks a street address, indicate the general location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for permit coverage to be granted.

The applicant must also provide the latitude and longitude of the facility either in degrees, minutes, seconds; degrees, minutes, decimal; or decimal format. The latitude and longitude of your facility can be determined in several different ways, including through the use of global positioning system (GPS) receivers, U.S. Geological Survey (U.S.G.S.) topographic or quadrangle maps, and EPA’s web-based siting tools, among others. Refer to *www.epa.gov/npdes/stormwater/cgp* for further guidance on the use of these methodologies. For consistency, EPA requests that measurements be taken from the approximate center of the construction site. Applicants must specify which method they used to determine latitude and longitude. If a U.S.G.S. topographic map is used, applicants are required to specify the scale of the map used.

Indicate whether the project is in Indian country, and if so, provide the name of the Reservation. If the project is in Indian Country Lands that are not part of a Reservation, indicate “not applicable” in the space provided.

Enter the estimated construction start and completion dates using four digits for the year (i.e., 05/27/1998). Enter the estimated area to be disturbed including but not limited to: grubbing, excavation, grading, and utilities and infrastructure installation. Indicate to the nearest quarter acre. Note: 1 acre = 43,560 sq. ft.

Section IV. SWPPP Information

Indicate whether or not the SWPPP was prepared in advance of filing the NOI form. Check the appropriate box for the location where the SWPPP may be viewed. Provide the name,

Instructions for Completing EPA Form 3510-9

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit

NPDES Form   This Form Replaces Form 3510-9 (8/98)   Form Approved OMB Nos. 2040-0188 and 2040-0211

fax number (optional), and e-mail address (optional) of the contact person if different than that listed in Section II of the NOI form.

Section V. Discharge Information

Enter the name(s) of receiving waterbodies to which the project's storm water will discharge. These should be the first bodies of water that the discharge will reach. (Note: If you discharge to more than one waterbody, please indicate all such waters in the space provided and attach a separate sheet if necessary.) For example, if the discharge leaves your site and travels through a roadside swale or a storm sewer and then enters a stream that flows to a river, the stream would be the receiving waterbody. Waters of the U.S. include lakes, streams, creeks, rivers, wetlands, impoundments, estuaries, bays, oceans, and other surface bodies of water within the confines of the U.S. and U.S. coastal waters. Waters of the U.S. do not include man-made structures created solely for the purpose of wastewater treatment. U.S. Geological Survey topographical maps may be used to make this determination. If the map does not provide a name, use a format such as "unnamed tributary to Cross Creek". If you discharge into a municipal separate storm sewer system (MS4), you must identify the waterbody into which that portion of the storm sewer discharges. That information should be readily available from the operator of the MS4.

Indicate whether your storm water discharges from construction activities will be consistent with the assumptions and requirements of applicable EPA approved or established TMDL(s). To answer this question, refer to *www.epa.gov/npdes/stormwater/cgp* for state- and regional-specific TMDL information related to the construction general permit. You may also have to contact your EPA regional office or state agency. If there are no applicable TMDLs or no related requirements, please check the "yes" box in the NOI form.

Section VI. Endangered Species Information

Indicate for which criterion (i.e., A, B, C, D, E, or F) of the permit the applicant is eligible with regard to protection of federally listed endangered and threatened species, and designated critical habitat. See Part 1.3.C.6 and Appendix C of the permit. If you select criterion F, provide the permit tracking number of the operator under which you are certifying eligibility. The permit tracking number is the number assigned to the operator by the Storm Water Notice Processing Center after EPA acceptance of a complete NOI.

Section VII. Certification Information

All applications, including NOIs, must be signed as follows:
For a corporation: By a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or

For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

Include the name and title of the person signing the form and the date of signing. An unsigned or undated NOI form will not be considered eligible for permit coverage.

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 3.7 hours. This estimate includes time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Chief, Information Policy Branch 2136, U.S. Environmental Protection, Agency, 1200 Pennsylvania Avenue, NW, Washington, D.C. 20460. Include the OMB control number on any correspondence. Do not send the completed form to this address. **Visit this website for mailing instructions:**

http://cfpub.epa.gov/npdes/stormwater/application_coverage.cfm#mail

Project Narrative

1.0 INTRODUCTION

Section 402 of the Clean Water Act requires permits for stormwater discharges associated with construction activities under the National Pollutant Discharge Elimination System (NPDES) program or by an equivalent state permit program. Pursuant to Environmental Protection Agency's (EPA) NPDES program, a Construction General Permit (CGP) is required for any construction activity that disturbs one or more acres of land. The CGP authorizes the discharge of stormwater pollution from construction activities in accordance with the terms and conditions of the general permit and is included in Attachment 1. The general permit includes provisions for development of a Stormwater Pollution Prevention Plan (SWPPP) to maximize the potential benefits of pollution prevention and sediment and erosion control measures at construction sites.

A SWPPP is a comprehensive guide which, when followed, is designed to prevent stormwater pollution impacts to wetlands and surface water resources from construction activities. The SWPPP will:

- Define the characteristics of the site and the type of construction which will be occurring;
- Describe the site plan for the facilities/structures to be constructed;
- Describe the practices that will be implemented to control erosion and the release of pollutants in stormwater;
- Certification and notification of the SWPPP by an authorized representative;
- Create an implementation schedule to ensure that the practices described in this SWPPP are, in fact, implemented and provide a means to evaluate the plan's effectiveness in reducing erosion, sediment, and pollutant levels in stormwater discharged from the site; and
- Describe the final stabilization/termination design to minimize erosion and prevent stormwater impacts after construction is complete.

1.1 SWPPP Content

This SWPPP includes the following items:

- Identification of the SWPPP coordinator's duties;
- Identification of the stormwater pollution prevention team that will assist in implementation of the SWPPP during construction;
- Description of the existing site conditions including existing land use, soil types at the site, as well as the location of surface waters which are located on or next to the site (wetlands, streams, rivers, lakes, ponds, etc.);
- Identification of the body of water(s) which will receive runoff from the construction site, including the ultimate body of water that receives the stormwater;
- Identification of potential stormwater contaminants;
- Description of stormwater management controls and various Best Management Practices (BMPs) necessary to reduce erosion, sediment and pollutants in stormwater discharge;

- Description of the Facility monitoring plan and how controls will be coordinated with construction activities; and
- Description of the implementation schedule and provisions for amendment of the plan.

2.0 SWPPP COORDINATOR AND DUTIES

The construction site SWPPP coordinator for the Facility will be determined prior to starting construction. The coordinators duties will include the following:

- Implement the SWPPP plan with the aid of the SWPPP team;
- Oversee maintenance practices identified as BMPs in the SWPPP;
- Implement and oversee employee training;
- Conduct or provide for inspection and monitoring activities;
- Identify other potential pollutant sources and make sure they are added to the plan;
- Identify any deficiencies in the SWPPP and make sure they are corrected; and
- Ensure that any changes in construction plans are addressed in the SWPPP.

3.0 PROJECT DESCRIPTION

Laidlaw Berlin BioPower, LLC is proposing to convert and upgrade the remaining facility equipment and infrastructure located at the former Fraser Pulp Mill in Berlin, New Hampshire in order to develop a biomass fueled energy generating facility. Berlin BioPower (the "Facility" or the "Project") will use whole tree wood chips and other low-grade clean wood as fuel, and will be capable of generating nominally 70 megawatts (MW) of electric power (gross output), making it one of the largest biomass-energy facilities in the United States.

3.1 Site Location

The Project Site is a 62-acre parcel of land that comprises the southern half of the approximately 120 acre site formerly used as a pulp production facility. Figure 1 provides a USGS topographic map of the area with the Site identified. The Site is abutted to the northwest by the Androscoggin River, by the adjoining former pulp mill parcel on its northeastern edge, by a community ball field at its western end, and by a predominantly residential neighborhood to the south. The northern end of the downtown district of Berlin lies directly across the river from the southwest end of the Site. General commercial and business properties are located on the opposite side of the river along the remainder of the Site.

Industrial activity at the Site dates back to the mid-1800's when the Brown Company built the first pulp mill at the location. Although the mill changed owners several times, the Site has been used solely pulp manufacturing over the past 150 years. The Site and adjoining northern parcel remain zoned for industrial/business use. Redevelopment of the existing boiler and Project Site will provide a beneficial use for the existing resources and a brownfield site that has limited future uses due to existing subsurface contamination. The Project has been laid out on the Site to allow space for other businesses and potential development, with access to low cost thermal energy from the biomass boiler.

3.2 Existing Land Use

Current uses of properties adjoining the Site can be generally characterized as industrial, commercial, residential, and open space. The Site itself is zoned industrial/business. The current zoning designations and uses of adjoining properties include:

- A vacant tract of land, which was part of the former Pulp Mill property, zoned Industrial/Business is located adjacent to the northeast property boundary of the Site. Residential Single-family properties exist north of this tract, along with vacant land, and the Mt. Carberry Landfill.
- Residential and commercial properties are located to east and southeast of the site in an area zoned as Residential Two-family and Single Family directly across Hutchins Street,.
- A small park (open space), residential properties, and a few commercial properties are located to the south of the Site directly across Hutchins, Coos, and Community Streets.
- The Androscoggin River directly abuts the Site to the west/northwest.
- The northern end of the Berlin Downtown District is located across the river from the south west end of the Site.
- Several commercial properties are located across the river from the remainder of the Site, including a property which was part of the former Burgess Mill and is currently occupied by two buildings.

The proposed Project is compatible with both existing and planned land uses on and around the Site, as represented by the Site's zoning designation, along with examples of biomass generating facilities located in similar settings. Some buffering for adjacent residences is afforded by the size of the Site and the location of the primary structures in the southwest corner of the Site. LBB proposes to enhance landscaping along the site perimeter to provide additional visual buffering. As analyzed and summarized throughout this application, adjacent land uses will not incur adverse impacts on air quality, dust, odor, noise, public safety or visual aesthetics due to the proposed Project.

3.3 Soil Types

Previous environmental investigations have identified impact to Site soils and groundwater. The impact is not widespread. It is located in specific areas and related to specific historical use of the property.

Soil characterization on the Project Site was based on the USDA-NRCS Web Soil Survey and Soil Series Descriptions (2009). Figure 2, Soil Map, overlays the mapped soil types on the aerial photo. The Soil Survey Report indicates that six soils occur on the Site: Tunbridge-Peru complex, Dump (bark, chips, organic material), Tunbridge-Berkshire-Lyman complex, Sunapee fine sandy loam, Croghan loamy fine sand and Monadnock fine sandy loam.

- **Tunbridge-Peru Complex (470B)** – These soils are moderately-well to well drained and variable in composition. Tunbridge consists of deep soils found on glaciated uplands. This soil ranges from unweathered bedrock at deeper profiles to silt loam at the surface. The majority of Tunbridge areas are wooded. Peru, having been formed from dense glacial till, has a shallower depth to its restrictive layer of dense material and is mixed with moderately decomposed plant material at the surface. Peru soils are found on drumlins and sloped areas of glaciated uplands.

- **Dumps - organic (199)** – These soils consists of variable components highly influenced by barks, chips and organic material. The typical profile for this soil type is variable from the surface through to a depth of 65 inches.

- **Tunbridge – Berkshire – Lyman Complex (670C)** – These soils consists of variable components highly influenced by bark, wood chips, sawdust, paper mill sludge, cinders, waste paper, ashes, and other similar refuse from the operation of paper mills and sawmills. Permeability is moderate to moderately rapid.

- **Sunapee (168B)** – These soils are a fine to sandy loam which is moderately well-drained. Sunapee soils are nearly level to very steep soils of glaciated uplands that are primarily forested. Cleared areas are used for hay or pasture.

- **Croghan (613B)** – Croghan soils are very deep and moderately well-drained. These soils were formed in deltaic or glacial outwash sand and are found on terraces and sand plains. This loamy fine sand is primarily forested or idle; some areas are cropped. Croghan sediments are dominated by quartz.

- **Monadnock (142B, 142C)** – These soils are formed in a loamy mantle overlying sand glacial till on upland hills, plains, and mountain side slopes. Monadnock is a fine sandy loam which is well-drained. The till often contains stones and boulders. Use of this soil type is dominated by forest, with some areas cleared and cultivated.

Previous environmental investigations have identified impacts to Site soils and groundwater from historic industrial activities. The impacts are not widespread but rather located in specific areas and related to specific prior use of the property.

Soil samples collected in the general vicinity of where the Project's major components will be constructed showed relatively low levels of certain organic compounds and heavy metals. These compounds and locations have been documented as part of the site investigation activities, and will be confirmed prior to the initiation of Project construction.

No specific remediation activities are required at this time or to allow development of the Project. Soil and groundwater assessments and management actions will be conducted to assure proper handling of any potentially contaminated media in locations where construction of the Project is proposed. Proper handling of contaminated media includes proper on-site and/or off-site disposal of soil, and dewatering and treatment of potentially contaminated groundwater.

3.4 Surface Water Bodies

The only water body that would receive stormwater from the Project Site is the Androscoggin River. The USGS classifies the Androscoggin as a "large stream to river" (HHS, 2007). The Androscoggin abuts the western boundary of the Project Site and flows from north to south. The flow rate and height of the river fluctuate as a result of changes in seasonal precipitation and the operation of dams located near the Site (HHS, 2007).

Wastewater generated by the Project will consist of blowdown from the boiler and cooling tower and periodic equipment cleaning. All wastewater will be sent to the City's municipal Waste Water Treatment Facility under an Indirect Discharge Permit. Stormwater from areas of industrial activity on the Site will be collected using catchment systems, detention basins, swales and a closed drainage system. Stormwater runoff is currently estimated to total approximately 2.1 MGD during a 2-year storm event and up to 3.7 MGD during a 25-year storm event.

The Androscoggin River is classified as a Class B surface water body by New Hampshire Department of Environmental Service (DES). Class B waters are defined as the second highest quality waters acceptable for fishing, swimming, and other recreational purposes, and after adequate treatment, for use as water supplies. According to the State of New Hampshire 2008 Section 305(b) Water Quality Report, the Androscoggin River in Berlin is considered "impaired" due to dioxin (including 2,3,7,8-TCDD) and *Escherichia coli*. In addition, the Androscoggin River Watershed Council posted a swimming advisory for the Androscoggin River beginning one mile north of the Berlin and Gorham town line (HHS, 2007).

According to a local conservation officer, the Androscoggin River near Gorham is an "excellent trophy trout fishery" (HHS, 2007). Recreational fishing activities in the area have apparently increased significantly according to reports from Trout Unlimited, and as indicated by the increased number of licensed fishing guides whose clients fish the river in the towns of Gorham and Shelburne. The New Hampshire Fish and Game Department has designated the stretch of the Androscoggin River from Sawmill Dam in Berlin, downstream through the towns of Gorham and Shelburne to the Maine border as open to fishing, but closed to harvest (taking of fish). This "no-kill" regulation was put in place primarily due to dioxin contamination in the river, and secondarily as an effort to conserve larger sport fish (HHS, 2007)

3.5 Federally Endangered Species

A request was filed with the US Fish and Wildlife Service ("US FWS") asking for information on federally-listed or candidate endangered and threatened species or habitats within or immediately adjacent to the Project area. The US FWS response dated July 14, 2009 indicated that no federally-listed or proposed, threatened or endangered species or critical habitat under their jurisdiction are known to occur in the Project area and preparation of a Biological Assessment or further consultation with US FWS is not required (Attachment 2).

A June 24, 2009 NHB response indicated that the Bald Eagle, a threatened species, and the Common Nighthawk, an endangered species had been identified in the general Berlin area (Attachment 2).

However, maps provided by NHB showing the specific locations on the species indicated that their presence had been identified in the general downtown area of Berlin in the case of the Nighthawk and along the Androscoggin River banks south of the Project Site in the case of the Bald Eagle. NHB does not expect impacts to the Bald Eagle as no trees within 50 feet of the Androscoggin River will be removed. NHB further indicated that allowing habitat along the River to revert back to native trees and shrubs would be encouraged to provide future perching and roosting sites for Bald Eagles. LBB has committed to not altering land within 50 feet of the river bank and allowing natural vegetation to prosper. With regard to Common Nighthawks, NHB indicated that they had no breeding reports for this species in Berlin for a number of years and do not expect impacts to the species as a result of the proposed Project.

3.6 Construction Details

The former black liquor recovery boiler currently located at the Site will be converted to a biomass fired unit. The boiler was manufactured by Babcock & Wilcox (B&W) and originally installed in 1966 and refurbished in 1993. A bubbling fluidized bed (BFB), which represents highly efficient and advanced biomass combustion and power conversion technology, will be installed at the base of the boiler in place of the existing black liquor firing and recovery systems. The existing electrostatic precipitator (ESP) used to control particulate emissions will be upgraded and a new selective catalytic reduction (SCR) system will be added to control NOx emissions. The boiler and emissions control systems will be enclosed within a building (the "boiler building"), which will help prevent noise impacts in the surrounding community and provide an aesthetically pleasing exterior finish, similar to a large commercial building.

Development of the overall Facility will also include construction of a new turbine building adjacent to the boiler building, which will house the steam turbine generator. A new wet cooling tower will be installed near the western edge of the property behind the boiler building. Two wood fuel off-loading and storage areas will be developed, which will include a paved base and systems to properly manage stormwater. The area closest to the boiler will be served by two hydraulic truck dumpers and a single hopper and conveyor system to service off-loading of live bottom trailers. The wood yard on the north east corner of the Site will be equipped with a single truck dumper along with a building and equipment to produce wood chips from whole logs. Chips produced in this area, along with those delivered to the storage area on the west side of the site will be mechanically conveyed to a wood processing building to assure uniform size. From the wood processing building, the chips will be conveyed into the boiler or returned to one of the storage piles adjacent to the boiler building.

An electric transmission interconnection line will be installed between the site and the existing high voltage transmission line operated by Public Service Company of New Hampshire (PSNH). A small switchyard will be installed adjacent to the turbine building, which will provide necessary power isolation systems and a step up transformer to increase the voltage of the power produced by the steam turbine generator to 115 kVA, consistent with the PSNH transmission line. From the switchyard, an underground transmission cable will be installed first through a new on-site duct bank, and then through an existing underground pipe formerly used to transport pulp from the site to the paper mill. The transmission cable will transition to an overhead line approximately 0.6 miles south of the site and 0.1 miles northwest of the existing Goebel Street substation.

The Project will draw water for cooling and process operations from the Androscoggin River via an existing withdrawal line that formerly serviced the pulp mill and is currently used to provide water to the Fraser paper mill in Gorham. Non-contact cooling water and process wastewater comprised primarily of blowdown from the boiler and cooling tower will be discharged to the treatment plant that previously serviced the Fraser Pulp Mill. The treatment plant will be modified as necessary to properly handle and treat stormwater runoff and wastewater discharged from the Project and Site.

4.0 ASSESSMENT OF IMPACTS

The following site preparation and construction activities have the potential to affect stormwater runoff quality.

- Grading and topsoil segregation;
- Trenching for utilities and drainage;
- Backfilling and rough grading.

Site preparation activities have been designed utilizing best practical measures to prevent erosion and control sediment to avoid adverse effects on adjacent resource areas and surface water bodies. Once sedimentation and erosion control devices are installed, the Project areas will be cleared and grubbed of vegetation within the proposed limits of work.

5.0 STORMWATER CONTROL AND CONSTRUCTION MITIGATION MEASURES

Measures will be taken to prevent impacts from stormwater runoff generated by the Project during construction. Actions will include implementing best management practices (BMPs), reducing potential sources of contamination, implementing stormwater management controls, developing an inspection and maintenance plan, and sequencing activities appropriately to reduce impacts.

During construction, the site Operator will comply with the precautionary measures provided in the design documents, and conduct construction activities in such a manner as to prevent damage or impairment to the environment. It is the Operator’s responsibility not to undertake, at any time or in any particular area, more than that magnitude of work that can be safely and adequately controlled by the methods at the Operator’s disposal. The Operator’s approach will emphasize the control of erosion before it occurs.

To minimize the potential for erosion during construction, erosion and sedimentation control procedures will be implemented prior to and during construction activities. Erosion and sedimentation control measures implemented will include silt fence and hay bale barriers on the upgradient side of resource areas.

No storage or refueling of machines and equipment will occur within or adjacent to wetland resource areas. Areas of exposed soil will be kept to a minimum, and a permanent vegetative cover or other form of stabilization will be established as soon as possible.

5.1 Erosion Control Barriers

Prior to commencing construction activities, erosion control barriers will be installed between the work areas and adjacent waterbodies and wetlands to reduce the risk of soil erosion and siltation. Erosion control measures will also be installed down-slope of any temporarily stockpiled soils in the vicinity of waterbodies and wetlands. The erosion control barriers will consist of toed-in silt fence and staked hay bales. Hay bale/silt fence barriers will be maintained in functioning condition and repaired or replaced as necessary, and will remain in place until all upgradient areas have been stabilized. The location of erosion control barriers has been carefully selected to establish a clear limit of work and to protect the adjacent areas. Refer to Attachment 6 Drawing ES for location of erosion control barrier.

5.2 De-Watering Measures

Construction dewatering requirements, if necessary, will likely be minor and limited to control of surface water runoff. Some seepage into excavations may occur during wet seasonal periods or as pockets of perched water are encountered during excavation. It is anticipated that dewatering can likely be accomplished by open pumping from sumps, temporary ditches, and trenches within and around excavations. Surface water runoff during construction should be controlled and directed away from excavations.

5.3 Source Control and Stockpile Locations

Proper site management during construction can decrease the risk of sediment loading during construction. If it becomes necessary to stockpile materials, stockpiles will be protected and covered when necessary with erosion and sediment controls installed around the perimeter. Stockpiles will be placed in a properly graded area so as not to be affected by, or contribute to, potential runoff areas. Any non-hazardous waste materials (i.e. trash, rubbish) will be placed in large roll-off containers (or dumpsters) and removed by a contract hauler to a properly licensed landfill. The roll-off containers will be covered with a properly secured tarp before the hauler exits the site.

5.4 Dust Control

Dust control measures will be implemented throughout the active construction stage and during non-construction stages to control potential exposures to workers and local residents throughout the Project duration. If visual observations suggest that the dust control measures are insufficient, the activity will be suspended until improved control measures are implemented. Control measures include:

- Real-time air monitors will be used during excavation, upwind and downwind of the activity. Monitors will be read daily and programmed to sounds an alarm if the action level is exceeded at any time during the field work.
- The site may be sprinkled with water until the surface is wet if deemed necessary.

5.5 Spill Prevention and Response Plan

The material or substances listed below are expected to be present in varying quantities during construction.

- Asphalt
- Concrete products
- Steel and steel fabrication materials
- Acids
- Petroleum products and lubricants
- Adhesives
- Detergents
- Packaging materials
- Miscellaneous chemical additives
- Rubber and plastic products
- Cement
- Gravel and sand
- Wood products
- Sanitary wastes
- Glass products
- Paints
- Solvents
- Paper products

The following material management practices will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff:

1. An effort will be made to store only enough products required to complete the job.
2. All materials stored on site must be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
3. Materials will be kept in their original containers with the original manufacturer's label.
4. Substances will not be mixed with one another, unless recommended by the manufacturer.
5. Manufacturer's recommendations for proper use and disposal will be followed.
6. The Operator will perform inspections to ensure the proper storage, use and disposal of materials.
7. Whenever possible, all of the hazardous material will be used before disposing of the container.
8. On-site vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage.
9. Petroleum products will be stored in tightly sealed containers that are clearly labeled.
10. Asphalt substances used on-site will be applied according to manufacturer's recommendations.
11. All containers will be tightly sealed and stored when not in use. Excess paint will be properly disposed of according to the manufacturer's instructions or applicable regulations.

The Operator will be responsible for preventing spills in accordance with the project specifications and applicable federal, state and local regulations and will identify an appropriately trained site employee involved with the day-to-day site operations to be the spill prevention and cleanup coordinator. The name(s) of the responsible spill personnel will be posted in the material storage area(s) and the on-site office. Each employee will be instructed that all spills are to be reported to the spill prevention and cleanup coordinator.

Spill control/containment equipment will be stored locally in the area of construction. Materials and equipment necessary for spill cleanup will be kept in the on-site material storage area. Equipment and materials will include, but not be limited to, absorbent booms or mats, brooms, dust pans, mops, rags, gloves, goggles, sand and plastic and metal trash containers, specifically for this purpose. It is the responsibility of the Operator to ensure the inventory will be readily accessible and maintained.

Spills will be contained with granular sorbent materials, sand, sorbent pads, booms, or all of the above to prevent spreading. Spill clean up should be completed by trained, certified clean-up contractors. Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies. Following a spill of oil or hazardous material the Operator will fill out a spill report form. The spill report form is included in Attachment 3. Emergency contact information is provided in Attachment 4. Upon completion of clean-up, spill reports and appropriate completion forms shall be provided to the proper authorities.

5.6 Inspection and Maintenance Program

The Operator shall be responsible for inspecting the sediment and erosion controls on a regular basis to note any escape of sediments. Inspections shall cover disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, and locations where vehicles enter or exit the site. Where discharge points are accessible, they must be inspected to ascertain whether erosion control measures are effective in preventing impacts to receiving waters.

Inspections shall be completed by qualified personnel at least once every seven calendar days and within 24 hours of any storm event of 0.5 inches or greater. EPA also recommends that permittees perform a "walk through" inspection of the construction site before anticipated storm events that could possible yield a significant amount of runoff. Where sites have been finally or temporarily stabilized, or runoff is unlikely due to winter conditions, such inspections shall be conducted at least once every month.

A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection and major observations relating to the implementation of the SWPPP shall be made and retained as part of the SWPPP for at least three years from the date that the site is finally stabilized. Major observations should include: the location(s) of discharges of sediment or other pollutants from the site; location(s) of BMPs that need to be maintained; location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location; and location(s) where additional BMPs are needed that did not exist at the time of inspection. The maintenance inspection report will be made after each inspection. A copy of the report form to be completed by the SWPPP coordinator is provided in Attachment 5 of this SWPPP. Completed forms will be maintained on-site during the entire construction project.

The report shall be signed in accordance with the certification language in the General Permit, namely:

> *I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

6.0 RECORD KEEPING AND UPDATING OF SWPPP

The following records shall be maintained and attached to the SWPPP by the site Operator:

- Dates when major grading activities occur;
- Dates when construction activities temporarily or permanently cease on a portion of the site; and
- Dates when stabilization measures are initiated.

Inspection reports shall be retained as part of the SWPPP for at least three years from the date that the site is finally stabilized. Such reports shall identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report shall contain a certification that the Facility complies with the SWPPP and the General Permit.

The site Operator shall have a copy of the SWPPP available at a central location on-site for the use of all Operators and those identified as having responsibilities under the SWPPP whenever they are on the construction site. This SWPPP shall be updated as necessary to remain consistent with any changes applicable to protecting surface water resources in sediment erosion site plans or site permits.

7.0 TERMINATION OF SWPPP

The Owner(s) and/or Operator shall submit a completed Notice of Termination (NOT) when stormwater discharges associated with construction activity have been eliminated (i.e., regulated discharges of stormwater are being terminated) or the permittee is no longer an Owner and/or Operator at the site.

8.0 CERTIFICATION OF SWPPP

8.1 Certification by a Responsible Corporate Officer

I certify under penalty of law that this Stormwater Pollution Prevention Plan dated February 2006 and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: ______________________________

Name (Printed) ______________________________

Title: ______________________________

Company: ______________________________

Date: ______________________________

8.2 Certification for Construction Activities

I, being the primary officer for all on-site construction activities associated with the Berlin BioPower Project, have reviewed the Stormwater Pollution Prevention Plan dated December 15, 2009 and assume responsibility for the daily implementation of the Stormwater Pollution Prevention Plan by all contractors working under the direction of Berlin BioPower, LLC on the Project Site. I certify under penalty of law that I understand the terms and conditions of the general SPDES permit that authorizes the stormwater discharges from the construction site as part of this certification.

Signature: ______________________________

Name (Printed) ______________________________

Title: ______________________________

Company: ______________________________

Date: ______________________________

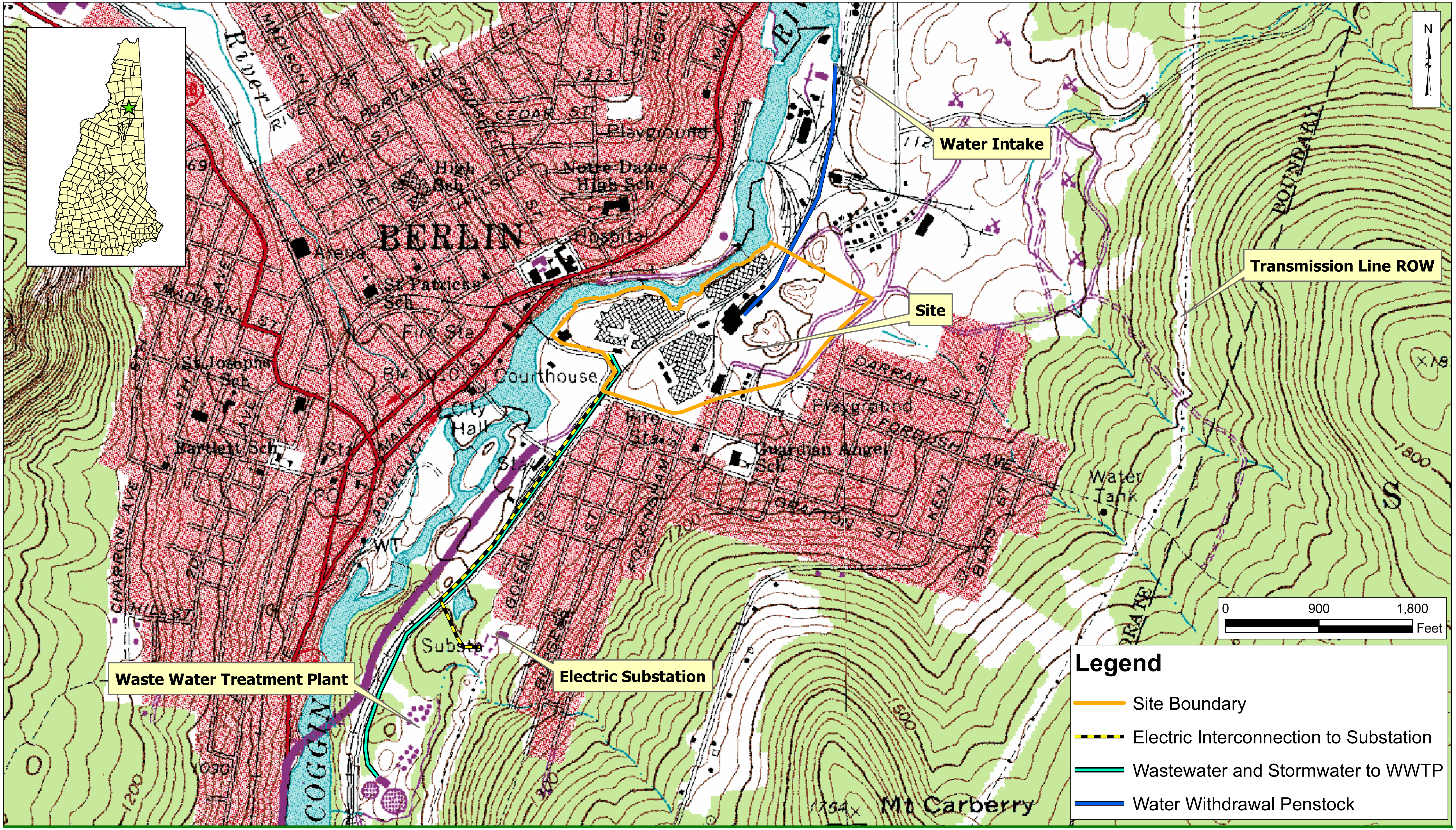
9.0 REFERENCES

United States Department of Agriculture Natural Resources Conservation Service (USDA-NRCS). "Web Soil Survey." 2009. USDA. Accessed on 11 Nov. 2009 < http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>.

U.S. Department of Health and Human Services Public Health Service. 2007. Public Health Assessment for Fomer Chlor Alkali Facility Below Saw Mill Dam Berlin New Hampshire EPA Facility ID: NHN000103313 February 7, 2007.

Figures

Location: G:/GIS-Projects/L145-002/LaidlawBerlinWellesley/00-mxd/Ortho11x17_wUtilities.mxd



ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

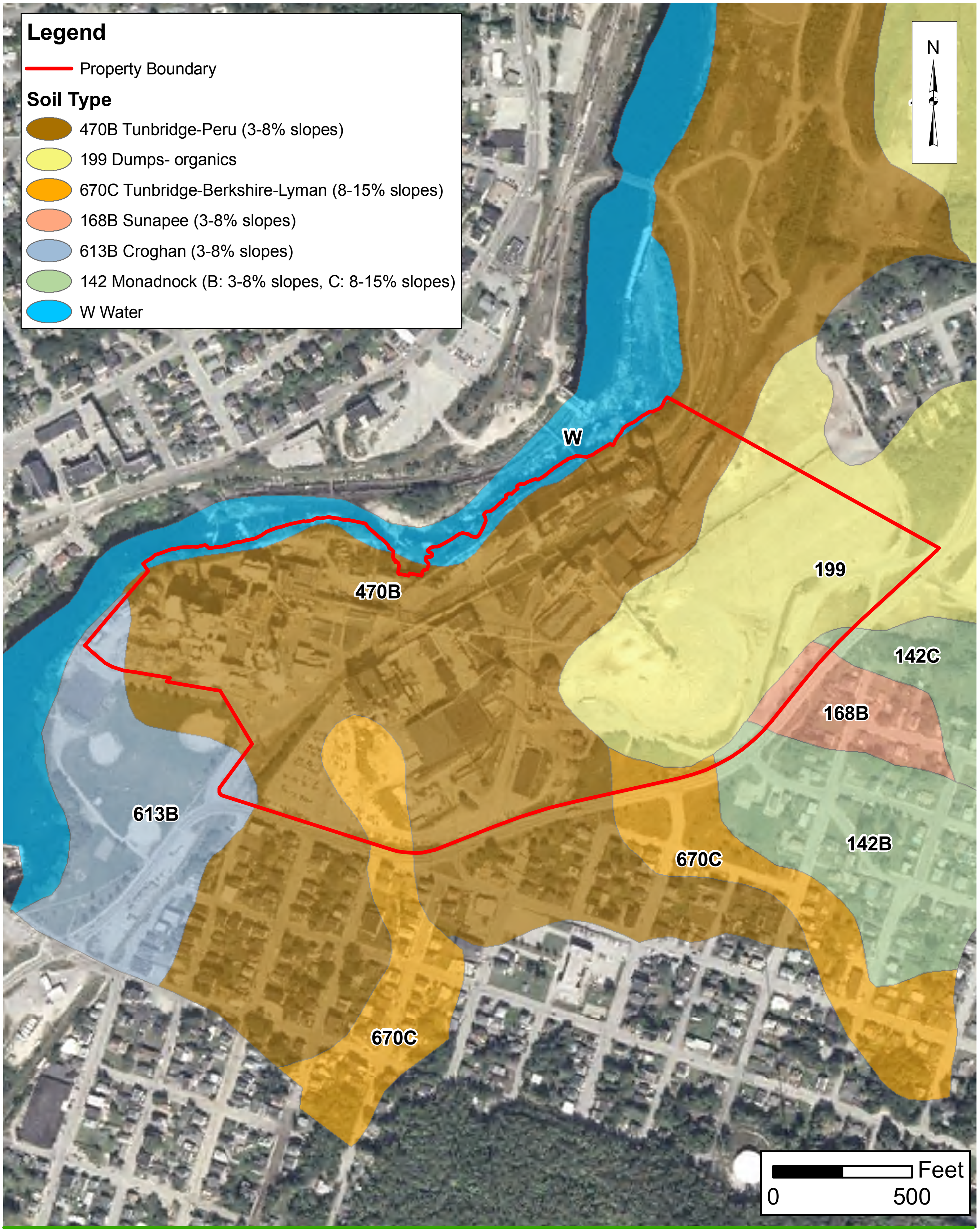
Scale: 1" = 900'

Source: 1) NHGRANIT, 1:24000 USGS, 2003
2) ESS, Site Boundary, 2009

USGS Locus Map

Figure 1

Location: G:/GIS-Projects/L145-002 LaidlawBerlin/Soils.mxd



ESS Group Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Scale: 1" = 500'

Source: 1) NHGRANIT, 1:12,000 Ortho, 1998
2) SSURGO Soils, 2009

Soils

Figure 2

Attachment A

EPA Construction General Permit

NPDES General Permit for Stormwater Discharges From Construction Activities

As modified effective January 8, 2009

Table of Contents

National Pollutant Discharge Elimination System
General Permit for Discharges from Large and Small Construction Activities

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et. seq., (hereafter CWA or the Act), as amended by the Water Quality Act of 1987, P.L. 100-4, operators of large and small construction activities that are described in Part 1.3 of this National Pollutant Discharge Elimination System (NPDES) general permit, except for those activities excluded from authorization of discharge in Part 1.3.C of this permit are authorized to discharge pollutants to waters of the United States in accordance with the conditions and requirements set forth herein. Permit coverage is required from the "commencement of construction activities" until "final stabilization" as defined in Appendix A.

This permit shall become effective on June 30, 2008.

This permit and the authorization to discharge shall expire at midnight, June 30, 2010.

Signed:

Stephen S. Perkins, Director, Office of Ecosystem Protection
EPA Region 1

Barbara Finazzo, Director, Division of Environmental Planning and Protection
EPA Region 2

Carl-Axel P. Soderberg, Division Director, Caribbean Environmental Protection Division
EPA Region 2

Jon M. Capacasa, Director, Water Protection Division
EPA Region 3

Tinka Hyde, Director, Water Division
EPA Region 5

Miguel I. Flores, Director, Water Quality Protection Division
EPA Region 6

William A. Spratlin, Director, Water, Wetlands and Pesticides Division
EPA Region 7

Stephen S. Tuber, Assistant Regional Administrator, Office of Partnerships & Regulatory Assistance
EPA Region 8

Alexis Strauss, Director, Water Division
EPA Region 9

Michael Gearheard, Director, Office of Water and Watersheds
EPA Region 10

The signatures are for the permit conditions in Parts 1 through 10 and Appendices A through G, and for any additional conditions which apply to facilities located in the corresponding state, Indian country, or other area.

PART 1: COVERAGE UNDER THIS PERMIT

1.1 Introduction

This Construction General Permit (CGP) authorizes stormwater discharges from large and small construction activities that result in a total land disturbance of equal to or greater than one acre, where those discharges enter surface waters of the United States or a municipal separate storm sewer system (MS4) leading to surface waters of the United States subject to the conditions set forth in this permit. This permit also authorizes stormwater discharges from any other construction activity designated by EPA where EPA makes that designation based on the potential for contribution to an excursion of a water quality standard or for significant contribution of pollutants to waters of the United States. This permit replaces the permit issued in 2003 (68 FR 39087, July 1, 2003), including the modification made to that permit in 2004 (69 FR 76743, December 22, 2004).

This permit is presented in a reader-friendly, plain language format. This permit uses the terms "you" and "your" to identify the person(s) who owns or operates a "facility" or "activity" as defined in Appendix A and who must comply with the conditions of this permit. This format should allow you, the permittee and operator of a large or small construction activity, to easily locate and understand applicable requirements.

The goal of this permit is to minimize the discharge of stormwater pollutants from construction activity.

1.2 Permit Area

If your large or small construction activity is located within the areas listed in Appendix B, you may be eligible to obtain coverage under this permit. Permit coverage is actually provided by legally separate and distinctly numbered permits covering each of the areas listed in Appendix B.

1.3 Eligibility

Permit eligibility is limited to discharges from "large" and "small" construction activity, and to "new projects" and "unpermitted ongoing projects," as defined in Appendix A or as otherwise designated by EPA. This general permit contains eligibility restrictions, as well as permit conditions and requirements. You may have to take certain actions to be eligible for coverage under this permit. In such cases, you must continue to satisfy those eligibility provisions to maintain permit authorization. If you do not meet the requirements that are a pre-condition to eligibility, then resulting discharges constitute unpermitted discharges. By contrast, if you eligible for coverage under this permit and do not comply with the requirements of the general permit, you may be in violation of the general permit for your otherwise eligible discharges.

A. Allowable Stormwater Discharges

Subject to compliance with the terms and conditions of this permit, you are authorized to discharge pollutants in:

1. Stormwater discharges associated with large and small construction activity from "new projects" and "unpermitted ongoing projects" as defined in Appendix A;
2. Stormwater discharges designated by EPA as needing a stormwater permit under 40 CFR §122.26(a)(1)(v) or §122.26(b)(15)(ii);
3. Discharges from support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided:
    a. The support activity is directly related to the construction site required to have NPDES permit coverage for discharges of stormwater associated with construction activity;
    b. The support activity is not a commercial operation serving multiple unrelated construction projects by different operators, and does not operate beyond the completion of the construction activity at the last construction project it supports; and
    c. Pollutant discharges from support activity areas are minimized in compliance with Part 3.1.G; and
4. Discharges composed of allowable discharges listed in 1.3.A and 1.3.B commingled with a discharge authorized by a different NPDES permit and/or a discharge that does not require NPDES permit authorization.

B. Allowable Non-Stormwater Discharges

You are authorized for the following non-stormwater discharges, provided the non-stormwater component of the discharge is in compliance with Part 5.4 (Non-Stormwater Discharges):

1. Discharges from fire-fighting activities;
2. Fire hydrant flushings;
3. Waters used to wash vehicles where detergents are not used;
4. Water used to control dust in accordance with Part 3.1.B;
5. Potable water including uncontaminated water line flushings;
6. Routine external building wash down that does not use detergents;
7. Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used;
8. Uncontaminated air conditioning or compressor condensate;
9. Uncontaminated ground water or spring water;
10. Foundation or footing drains where flows are not contaminated with process materials such as solvents;
11. Uncontaminated excavation dewatering;
12. Landscape irrigation.

C. Limitations on Coverage

1. This permit does not authorize post-construction discharges that originate from the site after construction activities have been completed and the site has achieved final stabilization, including any temporary support activity. Post-construction

stormwater discharges from industrial sites may need to be covered by a separate NPDES permit.

2. This permit does not authorize discharges mixed with non-stormwater. This exclusion does not apply to discharges identified in Part 1.3.B, provided the discharges are in compliance with Part 5.4 (Non-Stormwater Discharges).
3. This permit does not authorize stormwater discharges associated with construction activity that have been covered under an individual permit or required to obtain coverage under an alternative general permit in accordance with Part 2.6.
4. This permit does not authorize discharges that EPA, prior to authorization under this permit, determines will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard. Where such a determination is made prior to authorization, EPA may notify you that an individual permit application is necessary in accordance with Part 2.6. However, EPA may authorize your coverage under this permit after you have included appropriate controls and implementation procedures in your permit designed to bring your discharge into compliance with water quality standards.
5. *Discharging into Receiving Waters With an Approved or Established Total Maximum Daily Load Analysis*
    a. You are not eligible for coverage under this permit for discharges of pollutants of concern to waters for which there is a total maximum daily load (TMDL) established or approved by EPA unless implement measures or controls that are consistent with the assumptions and requirements of such TMDL. To be eligible for coverage under this general permit, you must implement conditions applicable to your discharges necessary for consistency with the assumptions and requirements of such TMDL. If a specific wasteload allocation has been established that would apply to your discharge, you must implement necessary steps to meet that allocation.
    b. In a situation where an EPA-approved or established TMDL has specified a general wasteload allocation applicable to construction stormwater discharges, but no specific requirements for construction sites have been identified in the TMDL, you should consult with the State or Federal TMDL authority to confirm that meeting the effluent limits in Part 3 of this permit will be consistent with the approved TMDL. Where an EPA-approved or established TMDL has not specified a wasteload allocation applicable to construction stormwater discharges, but has not specifically excluded these discharges, compliance with the effluent limits in Part 3 of this permit will generally be assumed to be consistent with the approved TMDL. If the EPA-approved or established TMDL specifically precludes such discharges, the operator is not eligible for coverage under the CGP.
6. *Endangered and Threatened Species and Critical Habitat Protection*
    a. Coverage under this permit is available only if your stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities, as defined in Appendix A, are not likely to jeopardize the continued existence of any species that are federally-listed as endangered or threatened ("listed") under the Endangered Species Act (ESA) or result in the adverse

modification or destruction of habitat that is federally-designated as critical under the ESA ("critical habitat").

b. You are not eligible to discharge if the stormwater discharges, allowable non-stormwater discharges, or stormwater discharge-related activities would cause a prohibited "take" of federally-listed endangered or threatened species (as defined under section 3 of the ESA and 50 CFR 17.3), unless such takes are authorized under sections 7 or 10 of the ESA.

c. Determining Eligibility: You must use the process in Appendix C (ESA Review Procedures) to determine eligibility *PRIOR* to submittal of the Notice of Intent (NOI). You must meet one or more of the following six criteria (A-F) for the entire term of coverage under the permit:

Criterion A. No federally-listed threatened or endangered species or their designated critical habitat are in the project area as defined in Appendix C; or

Criterion B. Formal consultation with the Fish and Wildlife Service and/or the National Marine Fisheries Service under section 7 of the ESA has been concluded and that consultation:

- i. Addressed the effects of the project's stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities on federally-listed threatened or endangered species and federally-designated critical habitat, and
- ii. The consultation resulted in either:
  - a. Biological opinion finding no jeopardy to federally-listed species or destruction/adverse modification of federally-designated critical habitat, or
  - b. Written concurrence from the Service(s) with a finding that the stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities are not likely to adversely affect federally-listed species or federally-designated critical habitat; or

Criterion C. Informal consultation with the Fish and Wildlife Service and/or the National Marine Fisheries Service under section 7 of the ESA has been concluded and that consultation:

- i. Addressed the effects of the project's stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities on federally-listed threatened or endangered species and federally-designated critical habitat, and
- ii. The consultation resulted in either:
  - a. Biological opinion finding no jeopardy to federally-listed species or destruction/adverse modification of federally-designated critical habitat, or
  - b. Written concurrence from the Service(s) with a finding that the stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities are

not likely to adversely affect federally-listed species or federally-designated critical habitat; or

Criterion D. The construction activities are authorized through the issuance of a permit under section 10 of the ESA, and that authorization addresses the effects of the stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities on federally-listed species and federally-designated critical habitat; or

Criterion E. Stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities are not likely to adversely affect any federally-listed threatened or endangered species or result in the destruction or adverse modification of federally-designated critical habitat; or

Criterion F. The project's stormwater discharges, allowable non-stormwater discharges, and stormwater discharge-related activities were already addressed in another operator's valid certification of eligibility under Criteria A-E which included your construction activities and there is no reason to believe that federally-listed species or federally-designated critical habitat not considered in the prior certification may be present or located in the project area. By certifying eligibility under this criterion, you agree to comply with any measures or controls upon which the other operator's certification was based.

You must comply with any applicable terms, conditions, or other requirements developed in the process of meeting the eligibility requirements of the criteria in this section to remain eligible for coverage under this permit.

7. *Historic Properties*

   [Reserved]

   You are reminded that you must comply with applicable state, tribal and local laws concerning the protection of historic properties and places.

1.4 Waivers for Certain Small Construction Activities

Three scenarios exist under which small construction activities (see definition in Appendix A) may be waived from the NPDES permitting requirements detailed in this general permit. These exemptions are predicated on certain criteria being met and proper notification procedures being followed. Details of the waiver options and procedures for requesting a waiver are provided in Appendix D.

PART 2: AUTHORIZATION FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITY

2.1 How to Obtain Authorization

To obtain coverage under this general permit, you, the operator, must prepare and submit a complete and accurate Notice of Intent (NOI), as described in this Part. Discharges are not authorized if your NOI is incomplete or inaccurate or if you were never eligible for permit coverage.

2.2 How to Submit Your NOI

You must either use EPA's electronic NOI system (accessible at www.epa.gov/npdes/eNOI or use a paper form (included in Appendix E) and then submit that paper form to:

For Regular U.S. Mail Delivery:
EPA Stormwater Notice Processing Center
Mail Code 4203M
U.S. EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460

For Overnight/Express Mail Delivery:
EPA Stormwater Notice Processing Center
Room 7420
U.S. EPA
1201 Constitution Avenue, NW
Washington, DC 20004

2.3 Authorization to Discharge Date

You are authorized to discharge stormwater from construction activities under the terms and conditions of this permit seven (7) calendar days after acknowledgment of receipt of your complete NOI is posted on EPA's NPDES website http://www.epa.gov/npdes/stormwater/cgp. The exception to this 7-day timeframe is if EPA delays your authorization based on eligibility considerations of Part 1.3 (e.g., ESA concerns). Under this circumstance, you are not authorized for coverage under this permit until you receive notice from EPA of your eligibility.

2.4 Submission Deadlines

A. *New Projects:* To obtain coverage under this permit, you must submit a complete and accurate NOI and be authorized consistent with Part 2.3 prior to your commencement of construction activities.

B. *Permitted Ongoing Projects:* Permitted ongoing projects are not eligible for coverage under this permit. If you previously received authorization to discharge for your project under the 2003 CGP, your authorization will be automatically continued under that permit until the expiration of this permit and the issuance of a new CGP, or the termination of coverage by you under the 2003 CGP, whichever is earlier. Note: If you are an operator of a permitted ongoing project and you transfer ownership of the project, or a portion thereof, to a different operator, that operator will be required to submit a complete and accurate NOI for a new project in accordance with Part 2.2.

C. *Unpermitted Ongoing Projects:* If you previously did not receive authorization to discharge for your project under the 2003 CGP and you wish to obtain coverage under this permit, you must submit an NOI within 90 days of the issuance date of this permit.

D. *Late Notifications:* Operators are not prohibited from submitting NOIs after initiating clearing, grading, excavation activities, or other construction activities. When a late NOI is submitted, authorization for discharges occurs consistent with Part 2.3. The Agency reserves the right to take enforcement action for any unpermitted discharges that occur between the commencement of construction and discharge authorization.

2.5 Continuation of the Expired General Permit

If this permit is not reissued or replaced prior to the expiration date, it will be administratively continued in accordance with the Administrative Procedure Act and remain in force and effect. If you were granted permit coverage prior to the expiration date, you will automatically remain covered by the continued permit until the earliest of:

A. Reissuance or replacement of this permit, at which time you must comply with the conditions of the new permit to maintain authorization to discharge; or

B. Your submittal of a Notice of Termination; or

C. Issuance of an individual permit for the project's discharges; or

D. A formal permit decision by EPA to not reissue this general permit, at which time you must seek coverage under an alternative general permit or an individual permit.

2.6 Requiring Coverage Under an Individual Permit or an Alternative General Permit

A. EPA may require you to apply for and/or obtain either an individual NPDES permit or coverage under an alternative NPDES general permit. Any interested person may petition EPA to take action under this paragraph. If EPA requires you to apply for an individual NPDES permit, EPA will notify you in writing that a permit application is required. This notification will include a brief statement of the reasons for this decision and an application form. In addition, if you are an existing permittee covered under this permit, the notice will set a deadline to file the application, and will include a statement that on the effective date of issuance or denial of the individual NPDES permit or the coverage or denial of coverage under the alternative general permit as it applies to you, coverage under this general permit will automatically terminate. Applications must be submitted to EPA at the applicable EPA Regional offices listed in Appendix B of this permit. EPA may grant additional time to submit the application upon your request. If you are covered under this permit and you fail to submit in a timely manner an individual NPDES permit application as required by EPA, then the applicability of this permit to you is automatically terminated at the end of the day specified by EPA as the deadline for application submittal.

B. You may request to be excluded from coverage under this general permit by applying for an individual permit. In such a case, you must submit an individual application in accordance with the requirements of 40 CFR §122.26(c)(1)(ii), with reasons supporting the request, to EPA at the applicable EPA Regional office listed in

Appendix B of this permit. The request may be granted by issuance of an individual permit or coverage under an alternative general permit if your reasons are adequate to support the request.

C. When an individual NPDES permit is issued to you (as an entity that is otherwise subject to this permit), or you are authorized to discharge under an alternative NPDES general permit, the applicability of this permit to you is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. If you (as an entity that is otherwise subject to this permit) are denied an individual NPDES permit or an alternative NPDES general permit, the applicability of this permit to you is automatically terminated on the date of such denial, unless otherwise specified by EPA.

PART 3: EFFLUENT LIMITS

This section includes technology-based and water quality-based effluent limits that apply to all dischargers, unless otherwise specified. You must select, install, and maintain control measures (e.g., Best Management Practices ("BMPs"), controls, practices, etc.) for each major construction activity, identified in your Part 5 project description, to meet these effluent limits. All control measures must be properly selected, installed, and maintained in accordance with any relevant manufacturer specifications and good engineering practices. You must implement the control measures from commencement of construction activity until final stabilization is complete.

The term "minimize" as used in Part 3 means reduce and/or eliminate to the extent achievable using control measures that are technologically available and economically practicable and achievable in light of best industry practice.

3.1 Effluent Limits to Reduce Pollutants in Stormwater Discharges

You must implement control measures to minimize pollutants in stormwater discharges.

A. ***Sediment Controls:*** You must implement the following, where applicable:

1. Sediment Basins: For common drainage locations that serve an area with 10 or more acres disturbed at one time, a temporary (or permanent) sediment basin that provides storage for a calculated volume of runoff from the drainage area from a 2-year, 24-hour storm, or equivalent control measures, must be provided where attainable until final stabilization of the site. Where no such calculation has been performed, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, must be provided where attainable until final stabilization of the site. When computing the number of acres draining into a common location, it is not necessary to include flows from offsite areas and flows from on-site areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin. In determining whether installing a sediment basin is attainable, the operator may consider factors such as site soils,

slope, available area on-site, etc. In any event, the operator must consider public safety, especially as it relates to children, as a design factor for the sediment basin, and alternative sediment controls must be used where site limitations would preclude a safe design.

2. For drainage locations which serve 10 or more disturbed acres at one time and where a temporary sediment basin or equivalent controls is not attainable, smaller sediment basins and/or sediment traps should be used. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries (and for those side slope boundaries deemed appropriate as dictated by individual site conditions).

3. For drainage locations serving less than 10 acres, smaller sediment basins and/or sediment traps should be used. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries (and for those side slope boundaries deemed appropriate as dictated by individual site conditions) of the construction area unless a sediment basin providing storage for a calculated volume of runoff from a 2-year, 24-hour storm or 3,600 cubic feet of storage per acre drained is provided.

B. ***Off-Site Sediment Tracking and Dust Control:*** You must minimize off-site vehicle tracking of sediments onto paved surfaces and the generation of dust. If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize off-site impacts.

C. ***Runoff Management:*** You must divert flows from exposed soils, retain/detain flows or otherwise minimize runoff and the discharge of pollutants from exposed areas of the site. You must avoid placement of structural practices in floodplains to the degree technologically and economically practicable and achievable.

D. ***Erosive Velocity Control:*** You must place velocity dissipation devices at discharge locations and along the length of any outfall channel to provide a non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g., no significant changes in the hydrological regime of the receiving water).

E. ***Post-Construction Stormwater Management:*** You must comply with any applicable federal, local, state, or tribal requirements regarding the design and installation of post-construction stormwater controls. Structural measures should be placed on upland soils to the degree practicable and achievable.

F. ***Construction and Waste Materials:*** You must:

1. Prevent the discharge of solid materials, including building materials, to waters of the United States, except as authorized by a permit issued under section 404 of the CWA;

2. Minimize exposure of construction and waste materials to stormwater, and the occurrence of spills, through the use of storage practices, prevention and response practices, and other controls;
3. Prevent litter, construction debris, and construction chemicals (e.g., diesel fuel, hydraulic fluids, and other petroleum products) that could be exposed to stormwater from becoming a pollutant source in stormwater discharges.

G. ***Non-Construction Wastes:*** You must minimize pollutant discharges from areas other than construction (including stormwater discharges from dedicated asphalt plants and dedicated concrete plants).

H. ***Erosion Control and Stabilization:***

1. ***General Requirements:*** You must stabilize the site. You must ensure that existing vegetation is preserved where possible and that disturbed portions of the site are stabilized. You should avoid using impervious surfaces for stabilization.
2. ***Initiation Deadlines:*** You must initiate stabilization measures, except as provided below, as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.
    - i. Where stabilization by the 14th day is precluded by snow cover or frozen ground conditions, stabilization measures must be initiated as soon as practicable.
    - ii. Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 14 days, temporary stabilization measures do not have to be initiated on that portion of the site.
    - iii. In arid, semiarid, and drought-stricken areas where initiating perennial vegetative stabilization measures is not possible within 14 days after construction activity has temporarily or permanently ceased, final vegetative stabilization measures must be initiated as soon as practicable.

I. ***Spills / Releases in Excess of Reportable Quantities:*** You are not authorized to discharge hazardous substances or oil resulting from an on-site spill. This permit does not relieve you of the federal reporting requirements of 40 CFR Part 110, 40 CFR Part 117 and 40 CFR Part 302 relating to spills or other releases of oils or hazardous substances.

Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a 24-hour period:

- you must provide notice to the National Response Center (NRC) (800–424–8802; in the Washington, DC, metropolitan area call 202–267–2675) in accordance with the requirements of 40 CFR Part 110, 40 CFR Part 117 and 40 CFR Part 302 as soon as site staff have knowledge of the discharge; and

- you must, within 7 calendar days of knowledge of the release, provide a description of the release, the circumstances leading to the release, and the date of the release. You must also implement measures to prevent the reoccurrence of such releases and to respond to such releases.

3.2 Effluent Limits to Reduce Pollutants in Non-Stormwater Discharges

You must minimize any non-stormwater discharges authorized by this permit.

3.3 Effluent Limits Related to Endangered Species

You must protect federally-listed endangered or threatened species, or federally-designated critical habitat to maintain eligibility under Part 1.3.C.6.

3.4 Attainment of Water Quality Standards

A. You must select, install, implement and maintain control measures at your construction site that minimize pollutants in the discharge as necessary to meet applicable water quality standards. In general, except in situations explained in Part 3.4.B below, your stormwater controls developed, implemented, and updated consistent with the other provisions of Part 3 are considered as stringent as necessary to ensure that your discharges do not cause or contribute to an excursion above any applicable water quality standard.

B. At any time after authorization, EPA may determine that your stormwater discharges may cause, have reasonable potential to cause, or contribute to an excursion above any applicable water quality standard. If such a determination is made, EPA will require you to:

  i. Modify your stormwater controls in accordance with Part 3.6 to address adequately the identified water quality concerns;
  ii. Submit valid and verifiable data and information that are representative of ambient conditions and indicate that the receiving water is attaining water quality standards; or
  iii. Cease discharges of pollutants from construction activity and submit an individual permit application according to Part 2.6.

All written responses required under this part must include a signed certification consistent with Appendix G, Section 11.

3.5 Consistency with Total Maximum Daily Loads

If you are discharging into a water with an EPA established or approved TMDL, you must implement measures to ensure that your discharge of pollutants from the site is consistent with the assumptions and requirements of the EPA-established or approved TMDL, including any specific wasteload allocation that has been established that would apply to your discharge. See Part 1.3.C.5 for further information on determining permit eligibility related to TMDLs.

3.6 Maintenance of Control Measures

A. You must maintain all control measures and other protective measures in effective operating condition. If site inspections required by Part 4 identify BMPs that are not operating effectively, you must perform maintenance as soon as possible and before the next storm event whenever practicable to maintain the continued effectiveness of stormwater controls.

B. If existing BMPs need to be modified or if additional BMPs are necessary for any reason, you must complete implementation before the next storm event whenever practicable. If implementation before the next storm event is impracticable, you must implement alternative BMPs as soon as possible.

C. You must remove sediment from sediment traps or sedimentation ponds when design capacity has been reduced by 50 percent.

D. You must remove trapped sediment from a silt fence before the deposit reaches 50 percent of the above-ground fence height (or before it reaches a lower height based on manufacturer's specifications).

3.7 Training of Employees

You must train employees and subcontractors as necessary to make them aware of the applicable control measures implemented at the site so that they follow applicable procedures.

3.8 Applicable State, Tribal, or Local Programs

You must ensure that the stormwater controls implemented at your site are consistent with all applicable federal, state, tribal, or local requirements for soil and erosion control and stormwater management.

PART 4: INSPECTIONS

A. ***Inspection Frequency:*** You must conduct inspections in accordance with one of the two schedules listed below. You must specify in your SWPPP which schedule you will be following.
   1. At least once every 7 calendar days, OR
   2. At least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.

B. ***Case-by-Case Reductions in Inspection Frequency:*** You may reduce your inspection frequency to at least once every month if:
   1. The entire site is temporarily stabilized,
   2. Runoff is unlikely due to winter conditions (e.g., site is covered with snow, ice, or the ground is frozen), or
   3. Construction is occurring during seasonal arid periods in arid areas and semi-arid areas.

C. ***Inspection Waiver for Frozen Conditions:*** A waiver of the inspection requirements is available until one month before thawing conditions are expected to result in a discharge if all of the following requirements are met:
   1. The project is located in an area where frozen conditions are anticipated to continue for extended periods of time (i.e., more than one month);
   2. Land disturbance activities have been suspended; and
   3. The beginning and ending dates of the waiver period are documented in the SWPPP.

D. ***Qualified Personnel:*** Inspections must be conducted by qualified personnel (provided by the operator or cooperatively by multiple operators). "Qualified personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls who possesses the skills to assess conditions at the construction site that could impact stormwater quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of stormwater discharges from the construction activity.

E. ***Scope of Inspections:*** Inspections must include all areas of the site disturbed by construction activity and areas used for storage of materials that are exposed to precipitation. Inspectors must look for evidence of, or the potential for, pollutants entering the stormwater conveyance system. Sedimentation and erosion control measures must be observed to ensure proper operation. Discharge locations must be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to waters of the United States, where accessible. Where discharge locations are inaccessible, nearby downstream locations must be inspected to the extent that such inspections are practicable. Locations where vehicles enter or exit the site must be inspected for evidence of off-site sediment tracking.

F. ***Reductions in Scope of Inspections for Stabilized Areas:*** Once a definable area has been finally stabilized, no further inspection requirements apply to that portion of the site (e.g., earth-disturbing activities around one of three buildings in a complex are done and the area is finally stabilized, one mile of a roadway or pipeline project is done and finally stabilized, etc).

G. ***Utility Line Inspections:*** Utility line installation, pipeline construction, and other examples of long, narrow, linear construction activities may limit the access of inspection personnel to the areas described in Part 4.E above. Inspection of these areas could require that vehicles compromise temporarily or even permanently stabilized areas, cause additional disturbance of soils, and increase the potential for erosion. In these circumstances, controls must be inspected on the same frequencies as other construction projects, but representative inspections may be performed. For representative inspections, personnel must inspect controls along the construction site for 0.25 mile above and below each access point where a roadway, undisturbed right-of-way, or other similar feature intersects the construction site and allows access to the areas described above. The conditions of the controls along each inspected 0.25 mile segment may be considered as representative of the condition of controls along that reach extending from the end of the 0.25 mile segment to either the end of the next 0.25 mile inspected segment, or to the end of the project, whichever occurs first.

H. ***Inspection Report:*** For each inspection required above, you must complete an inspection report. At a minimum, the inspection report must include:
   1. The inspection date;
   2. Names, titles, and qualifications of personnel making the inspection;
   3. Weather information for the period since the last inspection (or since commencement of construction activity if the first inspection) including a best estimate of the beginning of each storm event, duration of each storm event, approximate amount of rainfall for each storm event (in inches), and whether any discharges occurred;
   4. Weather information and a description of any discharges occurring at the time of the inspection;
   5. Location(s) of discharges of sediment or other pollutants from the site;
   6. Location(s) of BMPs that need to be maintained;
   7. Location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location;
   8. Location(s) where additional BMPs are needed that did not exist at the time of inspection; and
   9. Corrective action required including implementation dates.

The inspection report must be signed in accordance with Appendix G, Section 11 of this permit.

PART 5: STORMWATER POLLUTION PREVETNION PLANS (SWPPPs)

5.1 Stormwater Pollution Prevention Plan Framework

You must prepare a SWPPP <u>before</u> submitting your Notice of Intent (NOI) for permit coverage. At least one SWPPP must be developed for each construction project covered by this permit and the stormwater controls implemented at your site must be documented in the SWPPP. If you prepared a SWPPP for coverage under a previous NPDES permit, you must review and update the SWPPP prior to submitting your NOI.

The SWPPP does not contain effluent limitations; the technology and water quality-based effluent limitations are contained in Part 3 of this permit. The SWPPP is intended to document the selection, design, installation, and implementation of control measures that are being used to comply with the effluent limitations set forth in Part 3.

The SWPPP must:
   1. Identify all potential sources of pollutants that may reasonably be expected to affect the quality of stormwater discharges from the construction site; and
   2. Describe control measures to be used to meet the effluent limits set forth in Part 3.

5.2 SWPPP Contents: Site and Activity Description

A. ***Construction Site Operators:*** The SWPPP must identify all operators for the project site, and the areas of the site over which each operator has control.

B. ***Nature of Construction Activity:*** The SWPPP briefly must describe the nature of the construction activity, including:
   1. The function of the project (e.g., low density residential, shopping mall, highway, etc.);
   2. The intended sequence and timing of activities that disturb soils at the site;
   3. Estimates of the total area expected to be disturbed by excavation, grading, or other construction activities, including dedicated off-site borrow and fill areas; and
   4. A general location map (e.g., USGS quadrangle map, a portion of a city or county map, or other map) with enough detail to identify the location of the construction site and waters of the United States within one mile of the site.

C. ***Site Map:*** The SWPPP must contain a legible site map, showing the entire site, identifying:
   1. Direction(s) of stormwater flow and approximate slopes anticipated after grading activities;
   2. Areas of soil disturbance and areas that will not be disturbed (or a statement that all areas of the site will be disturbed unless otherwise noted);
   3. Locations of major structural and nonstructural BMPs identified in the SWPPP;
   4. Locations where stabilization practices are expected to occur;
   5. Locations of off-site material, waste, borrow or equipment storage areas;
   6. Locations of all waters of the United States (including wetlands);
   7. Locations where stormwater discharges to a surface water; and
   8. Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.

D. ***Construction and Waste Materials:*** The SWPPP must include a description of construction and waste materials expected to be stored on-site with updates as appropriate.

E. ***Locations of Other Industrial Stormwater Discharges:*** The SWPPP must describe and identify the location and description of any stormwater discharge associated with industrial activity other than construction at the site. This includes stormwater discharges from dedicated asphalt plants and dedicated concrete plants that are covered by this permit.

5.3 Description of Control Measures to Reduce Pollutant Discharges

A. ***Control Measures:*** The SWPPP must include a description of all control measures that will be implemented to meet the effluent limits in Part 3. For each major activity identified in the project description the SWPPP must clearly document appropriate control measures, the general sequence during the construction process in which the measures will be implemented, and which operator is responsible for the control measure's implementation.

B. ***Stabilization:*** The SWPPP must include a description of interim and permanent stabilization practices for the site, including a schedule of when the practices will be implemented.

C. ***Post-Authorization Records:*** The following records must be maintained with the SWPPP following authorization under this permit:
   1. Dates when grading activities occur;
   2. Dates when construction activities temporarily or permanently cease on a portion of the site; and
   3. Dates when stabilization measures are initiated.

5.4 Non-Stormwater Discharges

The SWPPP must identify all allowable sources of non-stormwater discharges listed in Part 1.3.B of this permit, except for flows from fire fighting activities that are combined with stormwater discharges associated with construction activity at the site. The SWPPP must also describe the pollution prevention measures used to eliminate or reduce non-stormwater discharges consistent with Part 3.2.

5.5 Documentation of Permit Eligibility Related to Endangered Species

The SWPPP must include documentation supporting a determination of permit eligibility with regard to Endangered Species, including:

A. Information on whether federally-listed endangered or threatened species, or federally-designated critical habitat may be in the project area;

B. Whether such species or critical habitat may be adversely affected by stormwater discharges or stormwater discharge-related activities from the project;

C. Results of the Appendix C listed species and critical habitat screening determinations;

D. Confirmation of delivery of NOI to EPA or to EPA's electronic NOI system. This may include an overnight, express or registered mail receipt acknowledgment; or electronic acknowledgment from EPA's electronic NOI system;

E. Any correspondence for any stage of project planning between the U.S. Fish and Wildlife Service (FWS), EPA, the U.S. National Marine Fisheries Service (NMFS), or others and you regarding listed species and critical habitat, including any notification that delays your authorization to discharge under this permit; and

F. A description of measures necessary to protect federally-listed endangered or threatened species, or federally-designated critical habitat.

5.6 Documentation of Permit Eligibility Related to Total Maximum Daily Loads

The SWPPP must include documentation supporting a determination of permit eligibility with regard to waters that have an EPA-established or approved TMDL, including:

A. Identification of whether your discharge is identified, either specifically or generally, in an EPA-established or approved TMDL and any associated allocations, requirements, and assumptions identified for your discharge;

B. Summaries of consultation with State or Federal TMDL authorities on consistency of SWPPP conditions with the approved TMDL, and

C. Measures taken by you to ensure that your discharge of pollutants from the site is consistent with the assumptions and requirements of the EPA-established or approved TMDL, including any specific wasteload allocation that has been established that would apply to your discharge.

See Part 1.3.C.5 for further information on determining permit eligibility related to TMDLs.

5.7 Copy of Permit Requirements

Copies of this permit and of the signed and certified NOI form that was submitted to EPA must be included in the SWPPP. Also, upon receipt, a copy of the letter from the EPA Stormwater Notice Processing Center notifying you of their receipt of your administratively complete NOI must also be included as a component of the SWPPP.

5.8 Applicable State, Tribal, or Local Programs

The SWPPP must be updated as necessary to reflect any revisions to applicable federal, state, tribal, or local requirements that affect the stormwater controls you implement at your site.

5.9 Inspections

A record of each inspection and of any actions taken in accordance with Part 4 must be retained with the SWPPP for at least three years from the date that permit coverage expires or is terminated. The inspection reports must identify any incidents of non-compliance with the permit conditions. Where a report does not identify any incidents of non-compliance, the report must contain a certification that the construction project or site is in compliance with this permit.

5.10 Maintaining an Updated Plan

The SWPPP must be modified:

A. To reflect modifications to stormwater control measures made in response to a change in design, construction, operation, or maintenance at the construction site that has or could have a significant effect on the discharge of pollutants to the waters of the United States that has not been previously addressed in the SWPPP.

B. If during inspections or investigations by site staff, or by local, state, tribal or federal officials, it is determined that the existing stormwater controls are ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the construction site.

C. Based on the results of an inspection, as necessary to properly document additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP must be completed within seven (7) calendar days following the inspection.

5.11 Signature, Plan Review and Making Plans Available

A. ***Retention of SWPPP:*** A copy of the SWPPP (including a copy of the permit), NOI, and acknowledgement letter from EPA must be retained at the construction site (or other location easily accessible during normal business hours to EPA, a state, tribal or local agency approving sediment and erosion plans, grading plans, or stormwater management plans; local government officials; the operator of a municipal separate storm sewer receiving discharges from the site; and representatives of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service) from the date of commencement of construction activities to the date of final stabilization. If you have day-to-day operational control over SWPPP implementation, you must have a copy of the SWPPP available at a central location on-site for the use of all those identified as having responsibilities under the SWPPP whenever they are on the construction site. If an on-site location is unavailable to store the SWPPP when no personnel are present, notice of the plan's location must be posted near the main entrance at the construction site.

B. ***Main Entrance Signage:*** A sign or other notice must be posted conspicuously near the main entrance of the construction site. If displaying near the main entrance is infeasible, the notice can be posted in a local public building such as the town hall or public library. The sign or other notice must contain the following information:

1. A copy of the completed Notice of Intent as submitted to the EPA Stormwater Notice Processing Center; and
2. If the location of the SWPPP or the name and telephone number of the contact person for scheduling SWPPP viewing times has changed (i.e., is different than that submitted to EPA in the NOI), the current location of the SWPPP and name and telephone number of a contact person for scheduling viewing times.

For linear projects, the sign or other notice must be posted at a publicly accessible location near the active part of the construction project (e.g., where a pipeline project crosses a public road).

C. ***Availability of SWPPP:*** SWPPPs must be made available upon request by EPA; a state, tribal or local agency approving sediment and erosion plans, grading plans, or stormwater management plans; local government officials; the operator of a municipal separate storm sewer receiving discharges from the site; and representatives of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service to the requestor. The copy of the SWPPP that is required to be kept on-site or locally available must be made available, in its entirety, to the EPA staff for review and copying at the time of an on-site inspection.

D. ***Signature and Certification:*** All SWPPPs must be signed and certified in accordance with Appendix G, Section 11.

5.12 Requirements for Different Types of Operators

You may meet one or both of the operational control components in the definition of operator found in Appendix A. Part 5.12.C applies to all permittees having control over only a portion of a construction site.

A. If you have operational control over construction plans and specifications, you must ensure that:
   1. The project specifications meet the minimum requirements of this Part and all other applicable permit conditions;
   2. The SWPPP indicates the areas of the project where the operator has operational control over project specifications, including the ability to make modifications in specifications;
   3. All other permittees implementing portions of the SWPPP (or their own SWPPP) who may be impacted by a change to the construction plan are notified of such changes in a timely manner; and
   4. The SWPPP indicates the name of the party(ies) with day-to-day operational control of those activities necessary to ensure compliance with the SWPPP or other permit conditions.

B. If you have operational control over day-to-day activities, you must ensure that:
   1. The SWPPP meets the minimum requirements of this Part and identifies the parties responsible for implementation of control measures identified in the plan;
   2. The SWPPP indicates areas of the project where you have operational control over day-to-day activities;
   3. The SWPPP indicates the name of the party(ies) with operational control over project specifications (including the ability to make modifications in specifications).

C. If you have operational control over only a portion of a larger project (e.g., one of four homebuilders in a subdivision), you are responsible for compliance with all applicable effluent limits, terms, and conditions of this permit as it relates to your activities on your portion of the construction site, including protection of endangered species, critical habitat, and historic properties, and implementation of control measures described in the SWPPP. You must ensure either directly or through coordination with other permittees, that your activities do not render another party's pollutant discharge controls ineffective. You must either implement your portion of a common SWPPP or develop and implement your own SWPPP.

   For more effective coordination of BMPs and opportunities for cost sharing, a cooperative effort by the different operators at a site to prepare and participate in a comprehensive SWPPP is encouraged. Individual operators at a site may, but are not required to, develop separate SWPPPs that cover only their portion of the project provided reference is made to other operators at the site. In instances where there is more than one SWPPP for a site, cooperation between the permittees is encouraged to ensure the stormwater discharge control measures are consistent with one another (e.g., provisions to protect listed species and critical habitat).

PART 6: TERMINATION OF COVERAGE

6.1 Submitting a Notice of Termination

Submit a complete and accurate Notice of Termination (NOT) either electronically (strongly encouraged) at www.epa.gov/npdes/eNOI or by completing the paper Notice of Termination form included in Appendix F of this permit and submitting that form to the address listed in Part 2.2.

6.2 When to Submit a Notice of Termination

You may only submit a Notice of Termination (NOT) after one or more of the following conditions have been met:

A. Final stabilization has been achieved on all portions of the site for which you are responsible;

B. Another operator has assumed control according to Appendix G, Section 11.C over all areas of the site that have not been finally stabilized;

C. Coverage under an individual or alternative general NPDES permit has been obtained; or

D. For residential construction only, temporary stabilization has been completed and the residence has been transferred to the homeowner.

The NOT must be submitted within 30 days of one of the above conditions being met. Authorization to discharge terminates at midnight of the day the NOT is signed.

PART 7: RETENTION OF RECORDS

Copies of the SWPPP and all documentation required by this permit, including records of all data used to complete the NOI to be covered by this permit, must be retained for at least three years from the date that permit coverage expires or is terminated. This period may be extended by request of EPA at any time.

PART 8: REOPENER CLAUSE

8.1 Procedures for Modification or Revocation

Permit modification or revocation will be conducted according to 40 CFR §122.62, §122.63, §122.64 and §124.5.

8.2 Water Quality Protection

If there is evidence indicating that the stormwater discharges authorized by this permit cause, have the reasonable potential to cause or contribute to an excursion above any applicable water quality standard, you may be required to obtain an individual permit in accordance with Part 2.6 of this permit, or the permit may be modified to include different limitations and/or requirements.

8.3 Timing of Permit Modification

EPA may elect to modify the permit prior to its expiration (rather than waiting for the new permit cycle) to comply with any new statutory or regulatory requirements, such as for effluent limitation guidelines that may be promulgated in the course of the current permit cycle.

PART 9: STANDARD PERMIT CONDITIONS

The federal regulations require that the Standard Conditions provisioned at 40 CFR §122.41 be applied to all NPDES permits. You are required to comply with those Standard Conditions, details of which are provided in Appendix G.

PART 10: PERMIT CONDITIONS APPLICABLE TO SPECIFIC STATES, INDIAN COUNTRY, OR TERRITORIES

The provisions of this Part provide modifications or additions to the applicable conditions of this permit to reflect specific additional conditions required as part of the state or tribal CWA Section 401 certification process, or the Coastal Zone Management Act (CZMA) certification process, or as otherwise established by the permitting authority. The specific additional revisions and requirements only apply to activities in those specific states, Indian country, and federal facilities. States, Indian country, and federal facilities not included in this Part do not have any modifications or additions to the applicable conditions of this permit.

A. Region 1

1. MAR100000: Commonwealth of Massachusetts, except Indian country
   a. State Water Quality Statutes, Regulations, and Policies:
      i. You must comply with the Massachusetts Clean Waters Act (Ch. 21, ss. 26-53).
      ii. You must comply with the conditions in 314 CMR 4.00 - Surface Water Quality Standards.
      iii. You must comply with the conditions in 314 CMR 3.00 - Surface Water Discharge Permit Program.
      iv. You must comply with the Wetlands Protection Act, Ch. 131, s. 40 and its regulations, 310 CMR 10.00 and any order of Conditions issued by a Conservation Commission or a Superseding Order of Conditions issued by the Massachusetts Department of Environmental Protection.

b. Department of Environmental Protection Storm Water Management Policy:
    i. You must comply with the Massachusetts Storm Water Management Policy, and applicable Storm Water Performance Standards, as prescribed by state regulations promulgated under the authority of the Massachusetts Clean Waters Act, MGL Ch. 21, ss. 26-53 and the Wetlands Protection Act Ch. 131, s. 40.

c. Other State Environmental Laws, Regulations, Policies:
    i. You must comply with the Massachusetts Endangered Species Act [MESA] (MGL Ch. 313A and regulations at 321 CMR 10.00) and any actions undertaken to comply with this storm water permit, shall not result in non-compliance with the MESA.
    ii. You must not conduct activities under this permit that will interfere with implementation of mosquito control work conducted in accordance with Chapter 252 including, s. 5A thereunder and MassDEP Guideline Number BRP G01-02, West Nile Virus Application of Pesticides to Wetland Resource Areas and Buffer Zones, and Public Water Systems.

d. Other Department Directives:
    i. The Department may require you to perform water quality monitoring during the permit term if monitoring is necessary for the protection of public health or the environment as designated under the authority at 314 CMR 3.00.
    ii. The Department may require you to provide measurable verification of the effectiveness of BMPs and other control measures in your management program, including water quality monitoring.
    iii. The Department has determined that compliance with this permit does not protect you from enforcement actions deemed necessary by the Department under its associated regulations to address an imminent threat to the public health or a significant adverse environmental impact which results in a violation of the Massachusetts Clean Waters Act, Ch. 21, ss. 26-53.
    iv. The Department reserves the right to modify the 401 Water Quality Certification if any changes, modifications or deletions are made to the general permit. In addition, the Department reserves the right to add and/or alter the terms and conditions of its 401 Water Quality Certification to carry out its responsibilities during the term of this permit with respect to water quality, including any revisions to 314 CMR 4.00, Surface Water Quality Standards.

e. Permit Compliance
    i. Should any violation of the Massachusetts Surface Water Quality Standards (314 CMR 4.00) or the conditions of this certification occur, the Department will direct you to correct the violations(s). The Department has the right to take any action as authorized by the General Laws of the Commonwealth to address the violation of this permit or the MA Clean Waters Act and the regulations promulgated thereunder. Substantial civil and criminal penalties are authorized under MGL Ch. 21, s. 42 for discharging into Massachusetts' waters in violation of an order or permit issued by this Department. This

certification does not relieve you of the duty to comply with other applicable Massachusetts statutes and regulations.

2. NHR100000: State of New Hampshire
   a. If you disturb 100,000 square feet or more of contiguous area, you must also apply for a "Significant Alteration of the Terrain Permit from DES pursuant to RSA 485-A:17 and Env-Ws 415. This requirement applies to the disturbances of only 50,000 square feet when construction occurs within the protected shoreline (see RSA 483-B and Env-Ws 1400).
   b. You must determine that any excavation dewatering discharges are not contaminated before they will be authorized as an allowable non-storm water discharge under this permit (see Subpart 1.3.B). The water is considered uncontaminated if there is no groundwater contamination within 1,000 feet of the discharge. Information on groundwater contamination can be generated over the Internet via the NHDES web site http://www.des.state.nh.us (One Stop Data Retrieval, Onestop Master Site Table). The web site also provides E-mail access to an NHDES Site Remediation Contact to answer questions about using the Web site.
   c. You must treat any uncontaminated excavation dewatering discharges as necessary to remove suspended solids and turbidity. The discharges must be sampled at a location prior to mixing with storm water at least once per week during weeks when discharges occur. The samples must be analyzed for total suspended solids (TSS) and must meet monthly average and maximum daily TSS limitations of 50 milligrams per liter (mg/L) and 100 mg/L, respectively. TSS (a.k.a. Residue, Nonfilterable) analysis and sampling must be performed in accordance with Tables IB (parameter, units and method) and II (required containers, preservation techniques and holding times) in 40 CFR 136.3 (see: http://www.access.gpo.gov/nara/cfr/waisidx_02/40cfr136_02.html). Records of any sampling and analysis must be maintained and kept with the SWPPP for at least three years after final site stabilization.
   d. During site design and preparation of the storm water pollution prevention plan (SWPPP), you must consider opportunities for groundwater recharge using on-site infiltration. The SWPPP must include a description of any on-site infiltration that will be installed as a post construction storm water management measure (see Subpart 3.4.E) or reasons for not employing such measures. For design considerations for infiltration measures see the September 2001 DES publication titled "Managing Storm Water as a Valuable Resource" which is available online at: http://www.des.state.nh.us/StormWater/construction.htm. Loss of annual recharge to groundwater should be minimized through the use of infiltration measures wherever feasible.

B. Region 2 – No additional requirements.

C. Region 5

1. MNR100000: Indian Country within the State of Minnesota

a. *Fond du Lac Band of Lake Superior Chippewa*

  i. A copy of the Storm Water Pollution Prevention Plan must be submitted to the following office at least thirty (30) days in advance of sending the Notice of Intent (NOI) to EPA:

  Fond du Lac Reservation
  Office of Water Protection
  1720 Big Lake Road
  Cloquet, MN 55720

  CGP applicants are encouraged to work with the FDL Office of Water Protection in the identification of all proposed receiving waters.

  ii. Copies of the NOI and the Notice of Termination (NOT) must be sent to the Fond du Lac Office of Water Protection at the same time they are submitted to EPA.
  iii. This certification does not pertain to any new discharge to Outstanding Reservation Resource Waters (ORRW) as described in §105 b.3 of the Fond du Lac Water Quality Standards (Ordinance #12/98). Although additional waters may be designated in the future, currently Perch Lake, Rice Portage Lake, Miller Lake, Deadfish Lake and Jaskari Lake are designated as ORRWs. New dischargers wishing to discharge to an ORRW must obtain an individual permit for stormwater discharges from large and small construction activities.
  iv. All work shall be carried out in such a manner as will prevent violations of water quality criteria as stated in the Water Quality Standards of the Fond du Lac Reservation, Ordinance 12/98 as amended. This includes, but is not limited to, the prevention of any discharge that causes a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of water of the Fond du Lac Reservation for any of the uses designated in the Water Quality Standards of the Fond du Lac Reservation. These uses include wildlife, aquatic life, warm and cold water fisheries, subsistence fishing (netting), primary contact recreation, cultural, wild rice areas, aesthetic waters, agriculture, navigation and commercial.
  v. Appropriate steps shall be taken to ensure that petroleum products or other chemical pollutants are prevented from entering waters of the Fond du Lac Reservation. All spills must be reported to the appropriate emergency management agency, and measures shall be taken immediately to prevent the pollution of waters of the Fond du Lac reservation, including groundwater.
  vi. This certification does not authorize impacts to cultural, historical, or archeological features or sites, or properties that may be eligible for such listing.

b. *Grand Portage Band of Lake Superior Chippewa* **[Coverage not yet available]**

2. WIR100000: Indian Country within the State of Wisconsin, except the Sokaogon Chippewa Community.

   a. No additional requirements

Note: Facilities within the Sokaogon Chippewa Community are not eligible for stormwater discharge coverage under this permit. Contact the Region 5 office for an individual permit application.

D. Region 6

1. NMR100000: The State of New Mexico, except Indian country
   a. In addition to all other provisions of this permit, operators who intend to obtain authorization under this permit for all new stormwater discharges must satisfy the conditions in Part 10.C.1.b., unless a TMDL has been established for the receiving stream which specifies a waste load allocation (WLA) for construction stormwater discharges or the receiving stream is a Tier 3 water, in which case Part 10.C.1.c. applies.
   b. The SWPPP must include site-specific interim and permanent stabilization, managerial, and structural solids, erosion, and sediment control best management practices (BMPs) and/or other controls that are designed to prevent to the maximum extent practicable an increase in the sediment yield and flow velocity from pre-construction, pre-development conditions to assure that applicable standards in 20.6.4 NMAC, including the antidegradation policy, or WLAs are met. This requirement applies to discharges both during construction and after construction operations have been completed. The SWPPP must identify, and document the rationale for selecting these BMPs and/or other controls. The SWPPP must also describe design specifications, construction specifications, maintenance schedules (including a long term maintenance plan), criteria for inspections, as well as expected performance and longevity of these BMPs. BMP selection must be made based on the use of appropriate soil loss prediction models (such as SEDCAD 4.0, RUSLE, SEDIMOT II, MULTISED, etc.), or equivalent, generally accepted (by professional erosion control specialists), soil loss prediction tools. The operator(s) must demonstrate, and include documentation in the SWPPP, that implementation of the site-specific practices will assure that the applicable standards or WLAs are met, and will result in sediment yields and flow velocities that, to the maximum extent practicable, will not be greater than the sediment yield levels and flow velocities from pre-construction, pre-development conditions. The SWPPP must be prepared in accordance with good engineering practices by qualified (e.g., CPESC certified, engineers with appropriate training, etc.) erosion control specialists familiar with the use of soil loss prediction models and design of erosion and sediment control systems based on these models (or equivalent soil loss prediction tools). The operator(s) must design, implement, and maintain BMPs in the manner specified in the SWPPP.
   c. Operators are not eligible to obtain authorization under this permit for all new stormwater discharges to outstanding national resource waters (ONRWs) (also referred to as "Tier 3: waters). According to the Antidegradation Policy at Paragraph 3 of Subsection A of 20.6.4.8 NMAC, in part, "ONRWs may include, but are not limited to, surface waters of the state within national and state monuments, parks, wildlife refuges, waters of exceptional recreational or

ecological significance, and waters identified under the Wild and Scenic Rivers Act." No ONRWs exist at the time this permit is being finalized; however, during the term of the permit, if a receiving water is designated as an ONRW, the operator must obtain an individual permit for stormwater discharges from large and small construction activities.

d. Stormwater discharges associated with construction activity that the State has determined to be or may reasonably be expected to be contributing to a violation of an applicable standard, including the antidegradation policy, are not authorized by this permit. *Note: Upon receipt of this determination, NMED anticipates that, within a reasonable period of time, EPA will notify the general permittee to apply for and obtain an individual NPDES permit for these discharges per 40 CFR Part 122.28(b)(3).*

e. Inspections required under Part 4 must be conducted at least once every 14 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater. The option for inspections at least once per 7 calendar days is not available. The Inspection Waivers provided in Part 4.B and C still apply.

f. Permittees can use temporary erosion controls as described in item 3 of the Appendix A definition of "Final Stabilization" as a method for final stabilization under the permit only under the following conditions:

If this option is selected, you must notify SWQB at the address listed in item g. below at the time the NOT is submitted to EPA. The information to be submitted includes:

- A copy of the NOT;
- Contact information, including individual name or title, address, and phone number for the qualified (see CGP Part 4.10.D) party responsible for implementing the final stabilization measures; and
- The date that the temporary erosion control practice was implemented (this is always prior to, and sometimes significantly prior to, submission of an NOT) and the projected timeframe that the 70% native vegetative cover requirements are expected to be met. (Note that if more than three years is required to establish 70 percent of the natural vegetative cover, this technique cannot be used or cited for fulfillment of the final stabilization requirement – you remain responsible for establishment of final stabilization)

SWQB also requires that you periodically (minimum once/year) inspect and properly maintain the area until the criteria for final stabilization, as defined in Appendix A, item 3 of the CGP, have been met. You must prepare an inspection report documenting the findings of these inspections and signed in accordance with Appendix G, Section 11 of the CGP. This inspection record must be retained along with the SWPPP for three years after the NOT is submitted for the site and additionally submitted to SWQB at the address listed in item g. below. The inspections must at a minimum include the following:

- Observations of all areas of the site disturbed by construction activity;

- Best Management Practices (BMPs)/post-construction storm water controls must be observed to ensure they are effective;
- An assessment of the status of vegetative re-establishment; and
- Corrective actions required to ensure vegetative success within three years, and control of pollutants in storm water runoff from the site, including implementation dates.

  Signed copies of discharge monitoring reports, individual permit applications, and all other reports required by the permit to be submitted, shall also be sent to:

  Program Manager
  Point Source Regulation Section
  Surface Water Quality Bureau
  New Mexico Environment Department
  P.O. Box 26110
  Santa Fe, NM 87502

2. NMR10000I: Indian country within the State of New Mexico, except Navajo Reservation Lands that are covered under Arizona permit AZR10000I and Ute Mountain Reservation Lands that are covered under Colorado permit COR10000I
   a. *Pueblo of Acoma.* The following conditions apply only to facilities on or bordering the Pueblo of Acoma with discharges into or flowing into waters of the Pueblo.
      i. A copy of the Notice of Intent and Notice of Termination must be submitted to the Haaku Water Office at the address below at the same time they are submitted to EPA. A copy of the storm water pollution prevention plan must be provided to the Haaku Water Office upon request.
      ii. HAAKU WATER OFFICE

          PO Box 309

          Pueblo of Acoma, NM 87034
   b. *Pueblo of Isleta.* The following conditions apply only to discharges on the Pueblo of Isleta.
      i. Subpart 1.3.C.4, (Eligibility, Limitations on Coverage) first sentence, is revised to read: "This permit does not authorize discharges that EPA or the Pueblo of Isleta, prior to authorization under this permit, determines will cause, have the reasonable potential to cause, or contribute to an excursion above any applicable water quality standard or impairment of a designated use of receiving waters."
      ii. Subpart 2.2. (How to Submit) is amended to require: Copies of all Notices of Intent submitted to EPA must also be sent concurrently to the Pueblo of Isleta at the following address. Discharges are not authorized by this permit unless an accurate and complete Notice of Intent has been submitted to the Pueblo of Isleta.

          <u>Regular U.S. Mail Delivery</u>
          Natural Resources Department
          Pueblo of Isleta

P.O. Box 1270
Isleta, NM 87022

Overnight/Express Mail Delivery
Natural Resources Department
Building L
11000 Broadway, SE
Albuquerque, NM 87105

iii. Part 2 (Authorizations for Discharges of Storm Water from Construction Activity), second sentence, is amended to read: "Discharges are not authorized if your NOI is incomplete or inaccurate, if you failed to submit a copy of the NOI to the Pueblo of Isleta, or if you were never eligible for permit coverage.

iv. Subpart 5.3 (Description of Control Measures to Reduce Pollutant Discharges), section A, last sentence, is amended to read: "For each major activity identified in the project description the SWPPP must clearly describe appropriate control measures, the general sequence during the construction process in which the measures will be implemented, and which operator is responsible for the control measure's implementation and maintenance."

v. Subpart 5.7 (Copy of Permit Requirements), first sentence, is revised to read "Copies of this permit and of the signed and certified NOI form that was submitted to the Pueblo of Isleta and EPA must be included in the SWPPP."

vi. Subpart 4. (Inspections), section A is revised to read "Inspections must be conducted at least once every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater."

vii. Subpart 4. (Inspections), section H, last paragraph, is amended to add: "Copies of inspection reports that identify incidents of noncompliance shall be sent to Pueblo of Isleta at the address listed in Subpart 2.2." (See above)

viii. Subpart 5.11. (Signature, Plan Review and Making Plans Available), section A, first sentence is amended to read:

> "A copy of the SWPPP (including a copy of the permit), NOI, and acknowledgement letter from EPA must be retained at the construction site (or other location easily accessible during normal business hours to the Pueblo of Isleta's Natural Resources Department, EPA, a state, tribal or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; the operator of a municipal separate storm sewer receiving discharges from the site; and representatives of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service) from the date of commencement of construction activities to the date of final stabilization."

ix. Subpart 5.11. (Signature, Plan Review and Making Plans Available), section C. is amended to read: "SWPPPs must be made available upon request by EPA; representatives of the Pueblo of Isleta Natural Resources Department, a state, tribal or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; the operator of a municipal separate storm sewer receiving discharges from the site; and representatives of the U.S. Fish and Wildlife Service or the National Marine Fisheries Service to the requestor. The copy of the SWPPP that is required to be kept on-site or locally available must be made available, in its entirety, to the EPA staff and the Pueblo of Isleta's Natural Resources Department staff for review and copying at the time of an on-site inspection.

x. Subpart 3.1.A (Sediment Controls), is amended to add: "Erosion and sediment controls shall be designed to retain sediment on-site."

xi. Subpart 3.1.I (Spills/Releases in Excess of Reportable Quantities), first bullet is amended to read: "you must provide notice to the Pueblo of Isleta Natural Resources Department (505-869-5748) and the National Response Center (NRC) (800–424–8802; in the Washington, DC, metropolitan area call 202–426– 2675) in accordance with the requirements of 40 CFR Part 110, 40 CFR Part 117 and 40 CFR Part 302 as soon as site staff have knowledge of the discharge; and"

xii. Subpart 3.4.B (Attainment of Water Quality Standards After Authorization), is amended to add: "You must provide the Pueblo of Isleta, at the address listed in Subpart 2.2, with a copy of the EPA notification, modifications to your storm water controls, data and certification required by EPA."

xiii. Subpart 6.1. (Submitting a Notice of Termination) is amended to add: Copies of all Notices of Termination submitted to EPA must also be sent concurrently to the Pueblo of Isleta at the following address in Subpart 2.2.

xiv. Any correspondence, other than NOIs and NOTs, with the Pueblo of Isleta concerning storm water discharges authorized by this permit shall sent one of the addresses in Subpart 2.2.

xv. Appendix G, Section 9, first sentence is amended to read: "You must allow the Pueblo of Isleta's Natural Resources Department, EPA, or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:…"

xvi. Appendix G, Section 12, subsections A- H are amended to require that when you must notify EPA of an event (e.g., planned changes, anticipated noncompliance, transfers, required reporting due to potential adverse effects or environmental impacts or other noncompliance matters), the Pueblo of Isleta must also be notified.

xvii. Parties wishing to apply for an Equivalent Analysis Waiver (see Appendix D, Section C) must provide a copy of the waiver analysis to the Pueblo of Isleta at the address specified in Subpart 2.2 at the time it is submitted to EPA.

c. *Ohkay Owingeh (San Juan Pueblo).* The following conditions apply only to discharges on Ohkay Owinegeh.

- i. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Pueblo at the time it is provided to the Environmental Protection Agency, at the following address. A copy of the Storm Water Pollution Prevention Plan must be provided to the Pueblo upon request.

  Office of Environmental Affairs
  P.O. Box 717
  Ohkay Owingeh, NM 87566

- ii. Appendix G, Section 10 (Monitoring and records), item D is amended to add: "All monitoring must be conducted in accordance with the Pueblo of San Juan's Quality Assurance Project Plan."

d. *Pueblo of Nambé.* The following conditions apply only to discharges on the Pueblo of Nambé.

- i. Copies of the Notice of Intent (NOI), Notice of Termination (NOT), and any analytical data must be provided to the Nambé Pueblo Department of Environment and Natural Resources (DENR) at the time it is provided to the Environmental Protection Agency, at the following address. A copy of the Storm Water Pollution Prevention Plan must be provided to the Pueblo upon request.
- ii. All correspondence chall be sent to:

  Pueblo of Nambé
  Department of Environment and Natural Resources
  Rt. 1 Box 117-BB
  Santa Fe, NM 87506
  505-455-2036 ext. 120 fax: 505-455-8873

e. *Pueblo of Picuris.* The following conditions apply only to discharges on the Pueblo of Picuris.

- i. Copies of the Notice of Intent (NOI), Notice of Termination (NOT), and any analytical data (e.g. Discharge Monitoring Reports, etc.) or any other reports must be provided to the Pueblo at the time it is provided to the Environmental Protection Agency. A copy of the Storm Water Pollution Prevention Plan must be provided to the Pueblo upon request.
- ii. All correspondence shall be sent to:

  Cordell Arellano
  Director, Environment Department
  Pueblo of Picuris
  PO Box 158
  Penasco, NM 87553

f. *Pueblo of Pojoaque.* The following conditions apply only to discharges on the Pueblo of Pojoaque.

- i. Copies of the Notice of Intent (NOI), Notice of Termination (NOT), and any analytical data (e.g. Discharge Monitoring Reports, etc.) or any other reports must be provided to the Pueblo at the time it is provided to the Environmental Protection Agency. A copy of documents related to the

Storm Water Pollution Prevention Plan must be provided to the Pueblo upon request.

ii. All correspondence shall be sent to:

Luke Mario Duran
Director, Environment Department
Pueblo of Pojoaque
5 West Gutierrez, Suite 2b
Santa Fe, NM 87506

g. *Pueblo of Taos.* The following conditions apply only to discharges on the Pueblo of Taos.
   i. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Taos Pueblo Governor's Office and the Taos Pueblo Environmental Office at the same time as or prior to submission to the Environmental Protection Agency. A copy of the Storm Water Pollution Prevention Plan must be provided to Pueblo environmental personnel upon request.
   ii. All correspondence for both the Taos Pueblo Governor's Office and the Taos Pueblo Environmental Office (same address) shall be sent to:

Governor/ Taos Pueblo Environmental Office (as applicable)
Taos Pueblo
PO Box 1846
Taos, NM 87571

h. *Pueblo of Sandia*. The following conditions apply only to discharges on the Pueblo of Sandia.
   i. A copy of the Notice of Intent (NOI) must be provided to the Pueblo at the same, (or prior to) the time it is submitted to the Environmental Protection Agency.
   ii. The Pueblo of Sandia objects to use of Low Rainfall Erosivity Waivers (see Appendix D, Part A) for any small construction activities on the Pueblo, so this waiver will not be available for construction projects on the Pueblo. Permittees wishing to apply for all other waivers (see Appendix D) must provide a copy of the waiver certification or analysis to the Pueblo of Sandia Environment Department.
   iii. The Storm Water Pollution Prevention Plan (SWPPP) must be available to the Pueblo of Sandia either electronically or hard copy upon request for review. The SWPPP must be made available at least fourteen (14) days before construction begins. The fourteen (14) day period will give Tribal staff time to become familiar with the project site, prepare for construction inspections, and determine compliance with the Pueblo of Sandia Water Quality Standards. Failure to provide a SWPPP to the Pueblo of Sandia may result in denial of the discharge or construction delay.
   iv. Discharges are not authorized by this permit unless and until:
      a. An accurate and complete NOI has been submitted to the Pueblo; AND

   b. An "Authorization to Proceed Letter" with any site specific mitigation requirements has been received from the Pueblo of Sandia following their review of the NOI and SWPPP and the permittee complies with all applicable requirements therein.

v. Before submitting a Notice of Termination (NOT), permittees must clearly demonstrate to the Pueblo of Sandia Environment Department though a site visit or documentation that requirements for site stabilization have been met and any temporary erosion control structures have been removed (or operational control is being passed to another operator). A short letter concurring that conditions for submittal of an NOT have met will be sent to the permittee by the Pueblo. Upon receipt of this letter, and provided the all other applicable requirements of the permit are met, the permittee will be eligible to submit and NOT.

vi. You must telephone the Pueblo of Sandia Environment Department at (505) 867-4533 of any noncompliance that may endanger human health or the environment within ten (10) hours of becoming aware of the circumstance.

vii. All corresondance shall be sent to:

Scott Bulgrin, Water Quality Manager
Pueblo of Sandia
481 Sandia Loop
Bernalillo, NM 87004

i. *Santa Clara Pueblo*. The following conditions apply only to discharges on the Santa Clara Pueblo.

   i. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Pueblo of Santa Clara Office of Environmental Affairs when they are submitted to the Environmental Protection Agency.
   ii. A copy of the storm water pollution prevention plan must be made available to the Pueblo of Santa Clara Office of Environmental Affairs upon request.
   iii. Construction site operators must notify the Pueblo of Santa Clara Office of Environmental Affairs by telephone at (505) 753-7326 of any non-compliance discharges that may endanger human health or the environment within twenty-fout (24) hours of becoming aware of the discharge.
   iv. All correspondence shall be sent to:

Santa Clara Office of Environmental Affairs Taos Pueblo
One Kee Street
PO Box 580
Espanola, NM 87532
505-753-7326 Tel
505-747-2728 Fax

j. *Pueblo of Tesuque.* The following conditions apply only to discharges on the Pueblo of Tesuque.

   i. Copies of the Notice of Intent (NOI), Notice of Termination (NOT), and any analytical data (e.g. Discharge Monitoring Reports, etc.) or any other reports must be provided to the Pueblo at the time it is provided to the Environmental Protection Agency.

ii. A copy of documents related to the Storm Water Pollution Prevention Plan must be provided to the Pueblo upon request.

iii. All correspondence shall be sent to:

Ryan Swazo-Hinds
Sr. Envirionmental Technician
Pueblo of Tesuque
Environment Department
Rt. 42, Box 360-T
Santa Fe, NM 87506

3. OKR10000F: Discharges in the State of Oklahoma that are not under the authority of the Oklahoma Department of Environmental Quality, including activities associated with oil and gas exploration, drilling, operations, and pipelines (includes SIC Groups 13 and 46, and SIC codes 492 and 5171), and point source discharges associated with agricultural production, services, and silviculture (includes SIC Groups 01, 02, 07, 08, 09).
   a. In accordance with Oklahoma's Water Quality Standards (OAC 785:45-5-25), Subpart 1.3.C. (Limitations on Coverage) is modified to add paragraphs 8 and 9 as follows:

      "8. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Big Lee Creek or any water or watershed designated "ORW" (Outstanding Resource Water) in Oklahoma's Water Quality Standards, this permit may only be used to authorize discharges from temporary construction activities. Discharges from any on-going activities such as sand and gravel mining or any other mineral mining are not authorized.

      9. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Big Lee Creek or any water or watershed designated "ORW" (Outstanding Resource Water) in Oklahoma's Water Quality Standards, this permit may not be used to authorize discharges from support activities, including concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, or borrow areas."
4. OKR10000I: Indian country within the State of Oklahoma.
   a. In order to protect downstream waters subject to the state of Oklahoma's Water Quality Standards (OAC 785:45-5-25) where receiving waters flow from Indian Country to State waters, Subpart 1.3.C. (Limitations on Coverage) is modified to add paragraphs 8 and 9 as follows:

      "8. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Big Lee Creek or any water or watershed designated

"ORW" (Outstanding Resource Water) in Oklahoma's Water Quality Standards, this permit may only be used to authorize discharges from temporary construction activities. Discharges from any on-going activities such as sand and gravel mining or any other mineral mining are not authorized.

9. For activities located within the watershed of any Oklahoma Scenic River, including the Illinois River, Flint Creek, Barren Fork Creek, Upper Mountain Fork, Little Lee Creek, and Big Lee Creek or any water or watershed designated "ORW" (Outstanding Resource Water) in Oklahoma's Water Quality Standards, this permit may not be used to authorize discharges from support activities, including concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, or borrow areas."

b. *Pawnee Nation of Oklahoma*. The following conditions apply only to discharges on the Pawnee Nation of Oklahoma.
   i. Copies of the Notice of Intent (NOI) and Notice of Termination (NOT) must be provided to the Pawnee Nation at the same time they are submitted to the Environmental Protection Agency.
   ii. A copy of the storm water pollution prevention plan must be made available to Pawnee Nation Department of Environmental Conservation and Safety upon request.
   iii. Construction site operators must notify the Pawnee Nation Department of Environmental Conservation and Safety by telephone at (918) 762-3655 immediately of any non-compliance with any provision of the permit conditions.
   iv. All correspondence shall be sent to:

Pawnee Nation
Department of Environmental Conservation and Safety
PO Box 470
Pawnee, OK 74058

5. TXR10000F: Discharges in the State of Texas that are not under the authority of the Texas Commission on Environmental Quality, including activities associated with the exploration, development, or production of oil or gas or geothermal resources, including transportation of crude oil or natural gas by pipeline.

NOTE: This permit does not create an obligation to obtain a permit where such obligation does not already exist under federal statute or regulation. For more information on the Clean Water Act §§ 402(l)(2) permitting exemption for uncontaminated discharges of storm water from oil and gas exploration, production, processing, or treatment operations or transmission facilities, visit: http://cfpub.epa.gov/npdes/stormwater/oilgas.cfm

D. Region 8

1. MTR10000I:

   a. Confederated Salish and Kootenai Tribes. The following conditions only apply for projects on the Flathead Indian Reservation:

   - i. Permittees must send a Stormwater Pollution Prevention Plan (SWPPP) to the Tribe at least 30 days before construction starts;
   - ii. Before submitting a Notice of Termination (NOT), permittees must clearly demonstrate to an appointed tribal staff person during an on-site inspection that requirements for site stabilization have been met;
   - iii. Permittees submitting electronic Notices of Intents (eNOI's) to USEPA must cc a copy to NRD-EPD@cskt.org; and
   - iv. Written NOIs, SWPPPs, and NOTs shall be mailed to:

     Confederated Salish and Kootenai Tribes
     National Resources Department
     Department Head
     P.O. Box 278
     Pablo, MT 59855

     Permittees may also submit their SWPPP and NOT to NRD-EPD@cskt.org

b. Fort Peck Tribes. The following conditions only apply for projects on the Fort Peck Indian Reservation:
   - i. The permittee must send a copy of the Notice of Intent (NOI) and the Notice of Termination (NOT) to the Tribes at the same time that the NOI and NOT is submitted to EPA. Copies of the NOI and NOT shall be accepted either electronically or hard copy format and should be sent to:

     Deb Madison
     Environmental Programs Manager
     Fort Peck Assiniboine & Sioux Tribes
     P.O. Box 1027
     Poplar, MT 59255
     Tel: 406.768.2389 Fax: 406.768.5606
     E-mail: 2horses@nemont.net
   - ii. A copy of the proposed SWPPP at the time of NOI/NOT submissions must be sent to the Tribes to ensure that upon closure of the site and/or activities all environmental commitments have been met.

c. Northern Cheyenne Reservation. The following conditions only apply for projects on the Northern Cheyenne Indian Reservation:
   - i. Permittees must contact the Northern Cheyenne Environmental Protection Department at (406) 477-6506 prior to authorization to discharge under the general permit;
   - ii. The Tribe shall review and approve SWPPPs prior to approval; and
   - iii. The Tribe shall review and improve BMPs on site to ensure that Tribal water quality standards are protected.

E. Region 9

1. ASR100000: The Island of American Samoa
   a. Discharges authorized by the general permit shall meet all applicable American Samoa water quality standards.
   b. Permittees discharging under the general permit shall comply with all conditions of the permit.
3. AZR10000I: Indian country lands within the State of Arizona, including Navajo Reservation lands in New Mexico and Utah
   a. White Mountain Apache Tribe. The following condition applies only for projects on the White Mountain Apache Reservation: All NOIs for proposed stormwater discharge coverage shall be provided to the following address:

      Tribal Environmental Planning Office
      P.O. Box 2109
      Whiteriver, AZ 85941

   b. Hoopa Valley Tribe. The following conditions apply only for projects on the Hoopa Valley Reservation:
      i. All notices of intent submitted for stormwater discharges under the general permit in Hoopa Valley Indian Reservation (HVIR) shall be submitted to the Tribal Environmental Protection Agency (TEPA); and
      ii. All pollution prevention plans for stormwater discharge in HVIR shall be submitted to TEPA for review and approval.
   c. 29 Palms Band of Mission Indians. The following conditions apply only for projects on the 29 Palms Band of Mission Indians Reservation:
      i. The 29 Palms Tribal EPA is informed of any future changes made to the proposed CGP;
      ii. For each permitted activity, the U.S. EPA will ensure that all terms and conditions of the proposed CGP are complied with;
      iii Notices of intent must be submitted to the 29 Palms Tribal EPA for review, comment and tracking;
      iv. Copies of stormwater pollution prevention plans (SWPPPs) and supporting Best Management Practices (BMPs) must be submitted to the 29 Palms Tribal EPA for review and compliance;
      v. Copies of all monitoring reports must be provided to the 29 Palms Tribal EPA;
      vi. Depending on the permitted activity, the 29 Palms Tribal EPA reserves the right to stipulate additional monitoring requirements; and
      vii. In order to meet the requirements of Tribal law, including water quality standards, each of the conditions cited in the proposed CGP and the Twenty-Nine Palms Band of Mission Indians certification shall not be made any less stringent.

d. Hualapai Tribe. The following conditions apply only for projects on the Hualapai Reservation:

   i. All notices of intent for proposed stormwater discharges under the CGP and all pollution prevention plans for stormwater discharges on Hualapai Tribal lands shall be submitted to the Water Resource Program through the Tribal Chairman for review and approval, P.O. Box 179, Peach Springs, AZ 86434.

e. Pyramid Lake Paiute Tribe. The following conditions apply only for projects on the Pyramid Lake Paiute Reservation:

   i. All notices of intent (NOIs) must be submitted to the Tribe for review, comments and tracking;

   ii. copies of all Stormwater Pollution Prevention Plan (SWPPPs) and supporting Best Management Practices (BMPs) must be submitted to the Pyramid Lake Paiute Tribe for review and concurrence;

   iii. copies of the criteria for Effluent Limitations Guidelines (ELGs) and the criteria for proposed Qualifying Local Programs (QLPs) to be used for sediment and erosion control pursuant to 40 CFR 122.44(s) be provided to the Pyramid Lake Paiute Tribe; and

   iv. copies of all monitoring reports must be provided to the Pyramid Lake Paiute Tribe.

4. MPR100000: Commonwealth of the Northern Mariana Islands (CNMI)

   a. An Earthmoving and Erosion Control Permit shall be obtained from the CNMI DEQ prior to any construction activity covered under the NPDES general permit.

   b. All conditions and requirements set forth in the USEPA NPDES general permit for discharges from large and small construction must be complied with.

   c. A SWPPP for storm water discharges from construction activity must be approved by the Director of the CNMI DEQ prior to the submission of the NOI to USEPA. The CNMI address for the submittal of the SWPPP for approval is:

   Commonwealth of the Northern Mariana Islands
   Office of the Governor
   Director, Division of Environmental Quality (DEQ)
   P.O. Box 501304 C.K.
   Saipan, MP 96950-1304

   d. An NOI to be covered by the general permit for discharges from large and small construction sites must be submitted to CNMI DEQ (use above address) and USEPA, Region 9, in the form prescribed by USEPA, accompanied by a SWPPP approval letter from CNMI DEQ.

   e. The NOI must be postmarked seven (7) calendar days prior to any storm water discharges and a copy must be submitted to the Director of CNMI DEQ (use above address) no later than seven (7) calendar days prior to any stormwater discharges.

f. Copies of all monitoring reports required by the NPDES general permit must be submitted to CNMI DEQ (use above address).
g. In accordance with section 10.3(h) and (i) of the CNMI water quality standards, CNMI DEQ reserves the right to deny coverage under the general permit and to require submittal of an application for an individual NPDES permit based on a review of the NOI or other information made available to the Director.

F. Region 10

1. AKR100000: The State of Alaska, except Indian country
   a. For Storm Water Pollution Prevention Plans
      i. Operators of construction projects disturbing at least one acre of land but less than five acres of land shall submit a copy of the Notice of Intent (NOI) to the Alaska Department of Environmental Conservation (ADEC) at the same time it is submitted to the EPA. Submittals to ADEC shall be made to the following address

Alaska Department of Environmental Conservation
Wastewater Discharge/Storm Water
555 Cordova St.
Anchorage, AK 99501

      ii. Operators of construction projects that disturb five or more acres of land and that are located outside the areas of the local governments described in numbers iii, iv, v, or vi below, shall submit a copy of the Storm Water Pollution Prevention Plan (SWPPP) and a copy of the NOI to ADEC for review. The SWPPP shall be accompanied by the state-required plan review fee (see 18 AAC 72.955).
      iii. Within the Municipality of Anchorage
         (1) Operators of construction projects disturbing one or more acres of land shall submit a copy of the SWPPP to either ADEC or the Municipality based on the project type and operator as shown in the following table

Project Type	Submit SWPPP to
Government (federal, state, municipal) road projects and other government transportation projects such as ports, railroads or airports	ADEC
Utility projects for which the utility is initiating the work	Municipality
Work that requires a Building Permit	Municipality
Non-publicly funded transportation projects	Municipality

(2) Submittal of the SWPPP to the Municipality should be made before or at the same time the NOI is submitted to the EPA and ADEC and shall be accompanied by any Municipality-required fee. Copies of the SWPPP shall be submitted to the Municipality at the following address

Municipality of Anchorage
Office of Planning Development and Public Works
4700 South Elmore Rd.
PO Box 196650
Anchorage, AK 99519-6650

(3) Submittals to ADEC shall include a copy of the SWPPP and a copy of the NOI for review and shall be accompanied by the state-required plan review fee (see 18 AAC 72.995).

iv. Within the urbanized area boundary of the Fairbanks North Star Borough check with the Borough for the latest requirements.

Fairbanks North Star Borough
Department of Public Works
PO Box 71267
Fairbanks, AK 99707

v. Within the urbanized area boundary of the City of Fairbanks

(1) Operators of privately-funded construction projects disturbing one or more acres of land shall submit a copy of the SWPPP to the City of Fairbanks.

(2) Submittal of the SWPPP to the City of Fairbanks should be made before or at the same time the NOI is submitted to the EPA and ADEC and shall be accompanied by any City-required fee. Copies of the SWPPP shall be submitted to the City of Fairbanks at the following address

City of Fairbanks
Engineering Division
800 Cushman St
Fairbanks, AK 99701

(3) Operators of publicly-funded projects disturbing one or more acres of land shall submit a copy of the SWPPP and a copy of the NOI to ADEC for review, and shall be accompanied by the state-required plan review fee (see 18 AAC 72.995).

vi. Within the urbanized area boundary of the City of North Pole

(1) Operators of privately-funded construction projects disturbing one or more acres of land shall submit a copy of the SWPPP to the City of North Pole.

(2) Submittal of the SWPPP to the City of North Pole should be made before or at the same time the NOI is submitted to the EPA and ADEC and shall be accompanied by any City-required fee. Copies of the SWPPP shall be submitted to the City of North Pole at the following address

City of North Pole
Department of Public Works
125 Snowman Lane
North Pole, AK 99705

(3) Operators of publicly-funded projects disturbing one or more acres of land shall submit a copy of the SWPPP and a copy of the NOI to ADEC for review, and shall be accompanied by the state-required plan review fee (see 18 AAC 72.995).

vii. For hardrock mines that are designed to process 500 or more tons per day and intend to file a Notice of Intent to begin construction under this permit

(1) The operator shall submit their SWPPP to ADEC for review at least 90 days before the start of construction,

(2) Representatives of the operator and the prime site construction contractor shall meet with ADEC representatives in a pre-construction conference at least 20 days before the start of construction to discuss the details of the SWPPP and stormwater management during construction,

(3) The operator shall submit to ADEC addendums to the SWPPP that address any planned physical alterations, additions to the permitted facility, or unanticipated conditions that arise during planned construction that could significantly change the nature, or increase the quantity, of pollutants discharged from the facility, and

(4) The operator shall have at least one person on-site during construction who is qualified and trained in the principles and practices of erosion and sediment control and has the authority to direct the maintenance of storm water best management practices.

b. For Post-Construction (Permanent) Storm Water Control Measures (Section 3.1.E *[Post-Construction Stormwater Management]* of the CGP)

   i. Operators of construction projects who construct, alter, install, modify, or operate any part of a storm water treatment system and are located outside the Municipality of Anchorage, shall submit a copy of the engineering plans to ADEC for review at the address given above (see 18 AAC 72.600).

   ii. Operators of construction projects who construct, alter, install, modify, or operate any part of a storm water treatment system and are located inside the Municipality of Anchorage, shall submit a copy of the engineering plans to the respective government agency based on project type, as indicated in the table in a.iii.*(1)* above, for review at the addresses given in a.i. or a.iii.*(2)* above.

2. IDR100000: The State of Idaho, except Indian country

a. *303(d)-listed Water Bodies with Approved TMDLs.*
Discharges of storm water will be consistent with load allocations established by the applicable TMDL.

b. *303(d)-listed Water Bodies without Approved TMDLs (High Priority)*
If a TMDL has not been established for a high priority 303(d)-listed water body, then discharges of storm water may not cause an increase in the total load of listed pollutant(s) in the receiving water body.

c. *303(d)-listed Water Bodies without Approved TMDLs (Medium or Low Priority)*
If a TMDL has not been established for a medium or low priority 303(d)-listed water body, then best management practices shall be employed as necessary to prohibit further impairment of the designated or existing beneficial uses in the receiving water body.

d. *Best Management Practices (BMPs)*
BMPs must be designed, implemented, and maintained by the permittee to fully protect and maintain the beneficial uses of the receiving water body. The permittee should select appropriate BMPs that are either authorized by the

appropriate designated agency as defined in Idaho Water Quality Standards (IDAPA 58.01.02), recommended in IDEQ's *Catalog of Stormwater BMPs for Idaho Cities and Counties*, or recommended by other local government entities or guidance documents.

e. *Equivalent Analysis Waiver* - Use of the "Equivalent Analysis Waiver" in Appendix D of the permit is not authorized.

f. Operators may contact the Idaho Department of Environmental Quality regional office nearest the construction activity for more information about impaired waterways:

<u>Boise Regional Office:</u>
1445 N. Orchard
Boise ID 83706-2239
Tel: (208)373-0550
Fax: (208)373-0287

<u>Grangeville Satellite Office:</u>
300 W. Main
Grangeville ID 83530
Tel: (208)983-0808
Fax: (208)983-2873

<u>Pocatello Regional Office</u>:
444 Hospital Way #300
Pocatello ID 83201
Tel: (208)236-6160
Fax: (208)236-6168

<u>McCall Satellite Office</u>:
502 N. 3rd Street #9A
P.O. Box 4654
McCall, ID 83638
Tel: (208)634-4900
Fax: (208)634-9405

<u>Idaho Falls Regional Office</u>:
900 N. Skyline, Suite B
Idaho Falls, ID 83402
Tel: (208)528-2650
Fax: (208)528-2695

<u>Twin Falls Regional Office</u>:
1363 Fillmore
Twin Falls, ID 83301
Tel: (208)736-2190
Fax: (208)736-2194

Coeur d'Alene Regional Office:
2110 Ironwood Parkway
Coeur d'Alene ID 83814
Tel: (208)769-1422
Fax: (208)769-1404

Lewiston Regional Office:
1118 "F" Street
Lewiston, ID 83501
Tel: (208)799-4370
Toll Free: 1-877-541-3304
Fax: (208)799-3451

3. ORR10000I: Indian country within the State of Oregon, except Fort McDermitt Reservation lands (see Region 9):

a. Confederated Tribes of the Umatilla Indian Reservation.
   The following conditions apply only for projects within the exterior boundaries of the Umatilla Indian Reservation:
   - i. The operator shall be responsible for achieving compliance with the Confederated Tribes of the Umatilla Indian Reservation's (CTUIR) Water Quality Standards.
   - ii. The operator must submit all Storm Water Pollution Prevention Plans required under this general permit to the CTUIR Water Resources Program for review and determination that the SWPPP is sufficient to meet Tribal Water Quality Standards prior to the beginning of any discharge activities taking place.
   - iii. The operator must submit a copy of the Notice of Intent (NOI) to be covered by this general permit to the CTUIR Water Resources Program at the address below, at the same time it is submitted to EPA.
   - iv. The operator shall be responsible for reporting an exceedance of Tribal Water Quality Standards to the CTUIR Water Resources Program at the same time it is reported to EPA.
     Confederated Tribes of the Umatilla Indian Reservation
     Water Resources Program
     P.O. Box 638
     Pendleton, OR 97801
     (541) 966-2420
   - v. At least 45 days prior to beginning any discharge activities, the operator must submit a copy of the Notice of Intent to be covered under this general permit and an assessment of whether the undertaking has the potential to affect historic properties to CTUIR Tribal Historic Preservation Office (THPO) at the address below. If the project has potential to affect historic properties, the operator must define the area of potential effect (APE). The operator must provide the THPO at least 30 days to comment on the APE as defined.

vi. If the project is an undertaking, the operator must conduct a cultural resource investigation. All fieldwork must be conducted by qualified personnel (as outlined by the Secretary of the Interior's Standards and Guidelines found at http://www.nps.gov/history/local-law/arch_stnds_0.htm). All fieldwork must be documented using Oregon Reporting Standards (as outlined at http://egov.oregon.gov/OPRD/HCD/ARCH/arch_pubsandlinks.shtml). The resulting report must be submitted to the THPO for concurrence before any ground disturbing work can occur. The operator must provide the THPO at least 30 days to review and respond to all reports.
The operator must obtain THPO concurrence in writing. If historic properties are present, this written concurrence will outline measures to be taken to prevent or mitigate effects to historic properties.

Confederated Tribes of the Umatilla Indian Reservation
Cultural Resources Protection Program
Tribal Historic Preservation Office
P.O. Box 638
Pendleton, OR 97801
(541) 966-2340

b. Confederated Tribes of Warm Springs.
The following conditions apply only for projects on the Warm Springs Indian Reservation:

i. All activities covered by this NPDES general permit occurring within a designated riparian buffer zone as established in Ordinance 74 (Integrated Resource Management Plan or IRMP) must be reviewed, approved and permitted through the Tribe's Hydraulic Permit Application process, including payment of any applicable fees.

ii. All activities covered by this NPDES general permit must follow all applicable land management and resource conservation requirements specified in the IRMP.

iii. Operators of activities covered by this NPDES general permit must submit a Storm Water Pollution Prevention Plan to the Tribe's Water Control Board at the following address for approval at least 30 days prior to beginning construction activity:

Chair, Warm Springs Water Control Board
P.O. Box C
Warm Springs, Oregon 97761

4. WAR10000F: Federal Facilities in the State of Washington, except those located on Indian Country

a. Discharges shall not cause or contribute to a violation of surface water quality standards (Chapter 173-201A WAC), ground water quality standards (Chapter 173-200 WAC), sediment management standards (Chapter 173-204 WAC), and human health-based criteria in the National Toxics Rule (40 CFR Part 131.36). Discharges that are not in compliance with these standards are not authorized.

b. Prior to the discharge of stormwater and non-stormwater to waters of the state, the Permittee shall apply all known, available, and reasonable methods of prevention, control, and treatment (AKART). This includes the preparation and implementation of an adequate Stormwater Pollution Prevention Plan (SWPPP), with all appropriate best management practices (BMPs) installed and maintained in accordance with the SWPPP and the terms and conditions of this permit.

c. Sampling & Numeric Effluent Limitations – For Sites Discharging to Certain Waterbodies on the 303(d) List or with an Applicable TMDL

   i. Permittees that discharge to water bodies listed as impaired by the State of Washington under Section 303(d) of the Clean Water Act for turbidity, fine sediment, high pH or phosphorus, shall conduct water quality sampling according to the requirements of this section.

      (1) The operator must retain all monitoring results required by this section as part of the SWPPP. All data and related monitoring records must be provided to EPA or the Washington Department of Ecology upon request.

      (2) The operator must notify EPA when the discharge turbidity or discharge pH exceeds the water quality standards as defined in Parts 10.F.4.d.ii and e.ii below, in accordance with the reporting requirements of Part G.12.F of this permit. All reports must be submitted to EPA at the following address:

      U.S EPA Region 10
      NPDES Compliance Unit - Attn: Federal Facilities Compliance Officer
      1200 6th Avenue, Suite 900
      OCE-133
      Seattle, WA 98101
      (206) 553-1846

   ii. All references and requirements associated with Section 303(d) of the Clean Water Act mean the most current listing by Ecology of impaired waters that exists on November 16, 2005, or the date when the operator's complete NOI is received by EPA, whichever is later.

Parameter identified in 303(d) listing	Parameter/Units	Analytical Method	Sampling Frequency	Water Quality Standard
Turbidity Fine Sediment Phosphorus	Turbidity/NTU	SM2130 or EPA180.1	Weekly, if discharging	If background is 50 NTU or less: 5 NTU over background; or If background is more than 50 NTU: 10% over background
High pH	pH/Standard Units	pH meter	Weekly, if discharging	In the range of 6.5 – 8.5

d. Discharges to waterbodies on the 303(d) list for turbidity, fine sediment, or phosphorus

   i. Permittees which discharge to waterbodies on the 303(d) list for turbidity, fine sediment, or phosphorus shall conduct turbidity sampling at the following locations to evaluate compliance with the water quality standard for turbidity:

- *(1)* Background turbidity shall be measured in the 303(d) listed receiving water immediately upstream (upgradient) or outside the area of influence of the discharge; and
- *(2)* Discharge turbidity shall be measured at the point of discharge into the 303(d) listed receiving waterbody, inside the area of influence of the discharge; **or**
  Alternatively, discharge turbidity may be measured at the point where the discharge leaves the construction site, rather than in the receiving waterbody.

ii. Based on sampling, if the discharge turbidity ever exceeds the water quality standard for turbidity (more than 5 NTU over background turbidity when the background turbidity is 50 NTU or less, or more than a 10% increase in turbidity when the background turbidity is more than 50 NTU), all future discharges shall comply with a numeric effluent limit which is equal to the water quality standard for turbidity. If a future discharge exceeds the water quality standard for turbidity, the permittee shall:

- *(1)* Review the SWPPP for compliance with the permit and make appropriate revisions within 7 days of the discharge that exceeded the standard;
- *(2)* Fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, but no later than 10 days of the discharge that exceeded the standard;
- *(3)* Document BMP implementation and maintenance in the site log book;
- *(4)* Continue to sample daily until discharge turbidity meets the water quality standard for turbidity.

e. Discharges to waterbodies on the 303(d) list for High pH

i. Permittees which discharge to waterbodies on the 303(d) list for high pH shall conduct sampling at one of the following locations to evaluate compliance with the water quality standard for pH (in the range of 6.5 – 8.5):

- *(1)* pH shall be measured at the point of discharge into the 303(d) listed waterbody, inside the area of influence of the discharge; or
- *(2)* Alternatively, pH may be measured at the point where the discharge leaves the construction site, rather than in the receiving water.

ii. Based on the sampling set forth above, if the pH ever exceeds the water quality standard for pH (in the range of 6.5 – 8.5), all future discharges shall comply with a numeric effluent limit which is equal to the water quality standard for pH. If a future discharge exceeds the water quality standard for pH, the permittee shall:

- *(1)* Review the SWPPP for compliance with the permit and make appropriate revisions within 7 days of the discharge;

        (2) Fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible, but no later than 10 days of the discharge that exceeded the standards;
        (3) Document BMP implementation and maintenance in the site log book;
        (4) Continue to sample daily until discharge meets the water quality standard for pH (in the range of 6.5 – 8.5).

f. Sampling & Limitations – For Sites Discharging to TMDLs
    i. Discharges to waterbodies subject to an applicable Total Maximum Daily Load (TMDL) for turbidity, fine sediment, high pH, or phosphorus, shall be consistent with the assumptions and requirements of the TMDL.
        (1) Where an applicable TMDL sets specific waste load allocations or requirements for discharges covered by this permit, discharges shall be consistent with any specific waste load allocations or requirements established by the applicable TMDL.
            a. Discharges shall be sampled weekly, or as otherwise specified by the TMDL, to evaluate compliance with the specific waste load allocations or requirements.
            b. Analytical methods used to meet the monitoring requirements shall conform to the latest revision of the Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136.
        (2) Where an applicable TMDL has established a general waste load allocation for construction stormwater discharges, but no specific requirements have been identified, compliance with this permit will be assumed to be consistent with the approved TMDL.
        (3) Where an applicable TMDL has not specified a waste load allocation for construction stormwater discharges, but has not excluded these discharges, compliance with this permit will be assumed to be consistent with the approved TMDL.
        (4) Where an applicable TMDL specifically precludes or prohibits discharges from construction activity, the operator is not eligible for coverage under this permit.
    ii. Applicable TMDL means a TMDL for turbidity, fine sediment, high pH, or phosphorus, which has been completed and approved by EPA prior to November 16, 2005, or prior to the date the operator's complete NOI is received by EPA, whichever is later.
    Information on impaired waterways is available from the Department of Ecology website at:
    http://www.ecy.wa.gov/programs/wq/stormwater/construction/impaired.html
    or by phone: 360-407-6460.

5. WAR10000I: Indian country within the State of Washington
    a. Kalispel Tribe.
    The following conditions apply only for projects on the Kalispel Reservation:

   i. The permittee shall be responsible for achieving compliance with the Kalispel Tribe's Water Quality Standards.
   ii. The permittee shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to the Kalispel Tribe Natural Resources Department at the same time as it submitted to the U.S. EPA
   iii. The permittee shall submit all Storm Water Prevention Plans (SWPP) to the Kalispel Tribe Natural Resources Department thirty (30) days prior to beginning any discharge activities for review.
   iv. Prior to any land disturbing activities on the Kalispel Indian Reservation and its dependent communities, the permittee shall obtain a cultural resource clearance letter from the Kalispel Natural Resource Department.
   v. All tribal correspondence pertaining to the general permit for discharges of construction stormwater shall be sent to:

Kalispel Tribe Natural Resources Department
PO Box 39
Usk, WA 99180

b. Lummi Nation

The following conditions apply only for projects on the Lummi Reservation:

   i. Pursuant to Lummi Code of Laws (LCL) 17.05.020(a), the operator must obtain a land use permit from the Lummi Planning Department as provided in Title 15 of the Lummi Code of Laws and regulations adopted thereunder.
   ii. Pursuant to LCL 17.05.020(a), each operator shall develop and submit a Storm Water Pollution Prevention Plan to the Lummi Water Resources Division for review and approval by the Water Resources Manager prior to beginning any discharge activities.
   iii. Pursuant to LCL Title 17, each operator shall be responsible for achieving compliance with the Water Quality Standards for Surface Waters of the Lummi Indian Reservation (Lummi Administrative Regulations [LAR] 17 LAR 07.010 through 17 LAR 07.210).
   iv. Each operator shall submit a copy of the Notice of Intent to the Lummi Water Resources Division at the same time it is submitted to the Environmental Protection Agency (EPA).
   v. Storm Water Pollution Prevention Plans and Notices of Intent shall be submitted to:

Lummi Natural Resources Department
ATTN: Water Resources Manager
2616 Kwina Road
Bellingham, WA 98226

   vi. Refer to the Lummi Nation website at *http://www.lummi-nsn.gov* to review a copy of Title 17 of the Lummi Code of Laws and the references upon which the conditions identified above are based.

c. Makah Tribe

The following conditions apply only for projects on the Makah Reservation:

   i. The operator shall be responsible for achieving compliance with the Makah Tribe's Water Quality Standards.
   ii. The operator shall submit a Storm Water Pollution Prevention Plan to the

Makah Tribe Water Quality Program and Makah Fisheries Habitat Division for review and approval at least thirty (30) days prior to beginning any discharge activities.

iii. The operator shall submit a copy of the Notice of Intent to the Makah Tribe Water Quality Program and Makah Fisheries Habitat Division at the same time it is submitted to EPA.

iv. Storm Water Pollution Prevention Plans and Notices of Intent shall be submitted to:

Makah Fisheries Water Quality and Habitat Division
PO Box 115
Neah Bay, WA 98357

d. Puyallup Tribe of Indians.

The following conditions apply only to stormwater discharges from large and small construction activities that result in a total land disturbance of equal to or greater than one acre, where those discharges enter surface waters of the Puyallup Tribe:

i. Each permittee shall be responsible for achieving compliance with the Puyallup Tribe's Water Quality Standards, including antidegradation provisions. The Puyallup Natural Resources Department will conduct an antidegradation review for permitted activities that have the potential to affect water quality. The antidegradation review will be consistent with the Tribe's Antidegradation Implementation Procedures.

ii. The permittee shall be responsible for meeting any additional permit requirements imposed by EPA necessary to comply with the Puyallup Tribe's antidegradation policies if the discharge point is located within 1 linear mile upstream of waters designated by the Tribe.

iii. Each permittee shall submit a copy of the Notice of Intent (NOI) to be covered by the general permit to the Puyallup Tribal Natural Resources Department at the address listed below at the same time it is submitted to EPA.

Puyallup Tribe of Indians
3009 E. Portland Avenue
Tacoma, WA 98404
ATTN: Natural Resources Department

iv. All supporting documentation and certifications in the NOI related to coverage under the general permit for Endangered Species Act purposes shall be submitted to the Puyallup Tribal Natural Resources Department for review.

v. If EPA requires coverage under an individual or alternative permit, the permittee shall submit a copy of the permit to the Puyallup Tribal Natural Resources Department at the address listed above.

vi. The permittee shall submit all stormwater pollution prevention plans to the Puyallup Tribal Natural Resources Department for review and approval prior to beginning any activities resulting in a discharge to tribal waters.

Appendix A - Definitions and Acronyms

Definitions

"Arid Areas" means areas with an average annual rainfall of 0 to 10 inches.

"Best Management Practices" (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practice to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

"Commencement of Construction Activities" means the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction-related activities (e.g., stockpiling of fill material).

"Control Measure" as used in this permit, refers to any BMP or other method used to prevent or reduce the discharge of pollutants to waters of the United States.

"CWA" means the Clean Water Act or the Federal Water Pollution Control Act, 33 U.S.C. section 1251 et seq.

"Discharge" when used without qualification means the "discharge of a pollutant."

"Discharge of Stormwater Associated with Construction Activity" as used in this permit, refers to a discharge of pollutants in stormwater from areas where soil disturbing activities (e.g., clearing, grading, or excavation), construction materials or equipment storage or maintenance (e.g., fill piles, borrow area, concrete truck chute washdown, fueling), or other industrial stormwater directly related to the construction process (e.g., concrete or asphalt batch plants) are located.

"Eligible" means qualified for authorization to discharge stormwater under this general permit.

"Facility" or "Activity" means any "point source" or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the NPDES program.

"Federal Facility" means any buildings, installations, structures, land, public works, equipment, aircraft, vessels, and other vehicles and property, owned by, or constructed or manufactured for the purpose of leasing to, the Federal government.

"Final Stabilization" means that:

1. All soil disturbing activities at the site have been completed and either of the two following criteria are met:
    a. a uniform (e.g,, evenly distributed, without large bare areas) perennial vegetative cover with a density of 70 percent of the native background

vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or
    b. equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.
2. When background native vegetation will cover less than 100 percent of the ground (e.g., arid areas, beaches), the 70 percent coverage criteria is adjusted as follows: if the native vegetation covers 50 percent of the ground, 70 percent of 50 percent (0.70 X 0.50 = 0.35) would require 35 percent total cover for final stabilization. On a beach with no natural vegetation, no stabilization is required.
3. In arid and semi-arid areas only, all soil disturbing activities at the site have been completed and both of the following criteria have been met:
    a. Temporary erosion control measures (e.g., degradable rolled erosion control product) are selected, designed, and installed along with an appropriate seed base to provide erosion control for at least three years without active maintenance by you,
    b. The temporary erosion control measures are selected, designed, and installed to achieve 70 percent vegetative coverage within three years.
4. For individual lots in residential construction, final stabilization means that either:
    a. The homebuilder has completed final stabilization as specified above, or
    b. The homebuilder has established temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for, and benefits of, final stabilization.
5. For construction projects on land used for agricultural purposes (e.g., pipelines across crop or range land, staging areas for highway construction, etc.), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to ‘‘water of the United States,’’ and areas which are not being returned to their preconstruction agricultural use must meet the final stabilization criteria (1) or (2) or (3) above.

“Indian country” is defined at 40 CFR §122.2 to mean:

1. All land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation;
2. All dependent Indian communities with the borders of the United States whether within the originally or subsequently acquired territory thereof, and whether within or without the limits of a state; and
3. All Indian allotments, the Indian titles to which have not been extinguished, including rights-of-ways running through the same.

“Large Construction Activity” is defined at 40 CFR §122.26(b)(14)(x) and incorporated here by reference. A large construction activity includes clearing, grading, and excavating resulting in a land disturbance that will disturb equal to or greater than five acres of land or will disturb less than five acres of total land area but is part of a larger common plan of development or sale that will ultimately disturb equal to or greater than five acres. Large construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site.

“Municipal Separate Storm Sewer System” or “MS4" is defined at 40 CFR §122.26(b)(8) to mean a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains):

1. Owned and operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;
2. Designed or used for collecting or conveying stormwater;
3. Which is not a combined sewer; and
4. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR §122.2.

“New Project” means the “commencement of construction activities” occurs after the effective date of this permit.

“Ongoing Project” means the “commencement of construction activities” occurs before the effective date of this permit.

“Operator” for the purpose of this permit and in the context of stormwater associated with construction activity, means any party associated with a construction project that meets either of the following two criteria:

1. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or
2. The party has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions). This definition is provided to inform permittees of EPA’s interpretation of how the regulatory definitions of “owner or operator” and “facility or activity” are applied to discharges of stormwater associated with construction activity.

“Owner or operator” means the owner or operator of any ‘‘facility or activity’’ subject to regulation under the NPDES program.

“Permitting Authority” means the United States Environmental Protection Agency, EPA, a Regional Administrator of the Environmental Protection Agency or an authorized representative.

"Point Source" means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

"Pollutant" is defined at 40 CFR §122.2. A partial listing from this definition includes: dredged spoil, solid waste, sewage, garbage, sewage sludge, chemical wastes, biological materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial or municipal waste.

"Project Area" means:
− The areas on the construction site where stormwater discharges originate and flow toward the point of discharge into the receiving waters (including areas where excavation, site development, or other ground disturbance activities occur) and the immediate vicinity. (Example: 1. Where bald eagles nest in a tree that is on or bordering a construction site and could be disturbed by the construction activity or where grading causes stormwater to flow into a small wetland or other habitat that is on the site that contains listed species.)
− The areas where stormwater discharges flow from the construction site to the point of discharge into receiving waters. (Example: Where stormwater flows into a ditch, swale, or gully that leads to receiving waters and where listed species (such as amphibians) are found in the ditch, swale, or gully.)
− The areas where stormwater from construction activities discharge into receiving waters and the areas in the immediate vicinity of the point of discharge. (Example: Where stormwater from construction activities discharges into a stream segment that is known to harbor listed aquatic species.)
− The areas where stormwater BMPs will be constructed and operated, including any areas where stormwater flows to and from BMPs. (Example: Where a stormwater retention pond would be built.)
− The areas upstream and /or downstream from construction activities discharges into a stream segment that may be affected by the said discharges. (Example: Where sediment discharged to a receiving stream settles downstream and impacts a breeding area of a listed aquatic species.)

"Receiving water" means the "Water of the United States" as defined in 40 CFR §122.2 into which the regulated stormwater discharges.

"Runoff coefficient" means the fraction of total rainfall that will appear at the conveyance as runoff.

"Semi-Arid Areas" means areas with an average annual rainfall of 10 to 20 inches.

"Site" means the land or water area where any "facility or activity" is physically located or conducted, including adjacent land used in connection with the facility or activity.

"Small Construction Activity" is defined at 40 CFR §122.26(b)(15) and incorporated here by reference. A small construction activity includes clearing, grading, and excavating resulting in a land disturbance that will disturb equal to or greater than one (1) acre and less than five (5) acres of land or will disturb less than one (1) acre of total land area but is part of a larger common plan of development or sale that will ultimately disturb equal to or greater than one (1) acre and less than five (5) acres. Small construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of the site.

"Stormwater" means stormwater runoff, snow melt runoff, and surface runoff and drainage.

"Stormwater Discharge-Related Activities" as used in this permit, include: activities that cause, contribute to, or result in stormwater point source pollutant discharges, including but not limited to: excavation, site development, grading and other surface disturbance activities; and measures to control stormwater including the siting, construction and operation of BMPs to control, reduce or prevent stormwater pollution.

"Total Maximum Daily Load" or "TMDL" means the sum of the individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background. If a receiving water has only one point source discharger, the TMDL is the sum of that point source WLA plus the LAs for any nonpoint sources of pollution and natural background sources, tributaries, or adjacent segments. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure.

"Waters of the United States" is as defined at 40 CFR §122.2.

"Wetland" means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

ACRONYMS

BMP - Best Management Practices
CGP - Construction General Permit
CFR - Code of Federal Regulations
CWA - Clean Water Act
EPA - United States Environmental Protection Agency
ESA - Endangered Species Act
FWS - United States Fish and Wildlife Service
MS4 - Municipal Separate Storm Sewer System
MSGP - Multi-Sector General Permit
NHPA - National Historic Preservation Act
NMFS - United States National Marine Fisheries Service
NOI - Notice of Intent

NOT - Notice of Termination
NPDES - National Pollutant Discharge Elimination System
POTW - Publicly Owned Treatment Works
SHPO - State Historic Preservation Officer
SWPPP - Stormwater Pollution Prevention Plan
THPO - Tribal Historic Preservation Officer
TMDL - Total Maximum Daily Load
WQS - Water Quality Standard

Appendix B - Permit Areas Eligible for Coverage

Permit coverage for stormwater discharges from construction activity occurring within the following areas is provided by legally separate and distinctly numbered permits:

1. EPA Region 1: CT, MA, ME, NH, RI, VT

US EPA, Region 01
Office of Ecosystem Protection
NPDES Stormwater Program
1 Congress St, Suite 1100 (CMU)
Boston, MA 02114-2023

The States of Connecticut, Maine, Rhode Island, and Vermont are the NPDES Permitting Authority for the majority of discharges within their respective states.

Permit No.	Areas of Coverage/Where EPA is Permitting Authority
MAR100000	Commonwealth of Massachusetts (except Indian country)
MAR10000I	Indian country within the State of Massachusetts
CTR10000I	Indian country within the State of Connecticut
NHR100000	State of New Hampshire
RIR10000I	Indian country within the State of Rhode Island
VTR10000F	Federal Facilities in the State of Vermont

2. EPA Region 2: NJ, NY, PR, VI

For NJ, NY, and VI:
US EPA, Region 02
NPDES Stormwater Program
290 Broadway, 24th Floor
New York, NY 10007-1866

For PR:
US EPA, Region 02
Caribbean Environmental Protection Division
NPDES Stormwater Program
1492 Ponce de Leon Ave
Central Europa Building, Suite 417
San Juan, PR 00907-4127

The State of New York is the NPDES Permitting Authority for the majority of discharges within its state. The State of New Jersey and the Virgin Islands are the NPDES Permitting Authority for all discharges within their respective states.

Permit No.	**Areas of Coverage/Where EPA is Permitting Authority**
NYR10000I	Indian country within the State of New York
PRR100000	The Commonwealth of Puerto Rico

3. EPA Region 3: DE, DC, MD, PA, VA, WV

US EPA, Region 03
NPDES Stormwater Program
1650 Arch St
Philadelphia, PA 19103

The State of Delaware is the NPDES Permitting Authority for the majority of discharges within its state. Maryland, Pennsylvania, Virginia, and West Virginia are the NPDES Permitting Authority for all discharges within their respective states.

Permit No.	**Areas of Coverage/Where EPA is Permitting Authority**
DCR100000	The District of Columbia
DER10000F	Federal Facilities in the State of Delaware

4. EPA Region 4: AL, FL, GA, KY, MS, NC, SC, TN

US EPA, Region 04
Water Management Division
NPDES Stormwater Program
61 Forsyth St SW
Atlanta, GA 30303-3104

Coverage Not Available. Construction activities in Region 4 must obtain permit coverage under an alternative permit.

5. EPA Region 5: IL, IN, MI, MN, OH, WI

US EPA, Region 05
NPDES & Technical Support
NPDES Stormwater Program
77 W Jackson Blvd
(WN-16J)
Chicago, IL 60604-3507

The States of Michigan, Minnesota, and Wisconsin are the NPDES Permitting Authority for the majority of discharges within their respective states. The States of Illinois, Indiana, and Ohio are the NPDES Permitting Authorities for all discharges within their respective states.

Permit No.	**Areas of coverage/where EPA is Permitting Authority**
MIR10000I	Indian country within the State of Michigan
MNR10000I	Indian country within the State of Minnesota, except the Grand Portage Band of Chippewa
WIR10000I	Indian country within the State of Wisconsin, except the Sokaogon Chippewa (Mole Lake) Community.

6. EPA Region 6: AR, LA, OK, TX, NM (except see Region 9 for Navajo lands, and see Region 8 for Ute Mountain Reservation lands)

US EPA, Region 06
NPDES Stormwater Program
1445 Ross Ave, Suite 1200
Dallas, TX 75202-2733

The States of Louisiana, Oklahoma, and Texas are the NPDES Permitting Authority for the majority of discharges within their respective state. The State of Arkansas is the NPDES Permitting Authority for all discharges within its respective state.

Permit No.	**Areas of coverage/where EPA is Permitting Authority**
LAR10000I	Indian country within the State of Louisiana
NMR100000	The State of New Mexico, except Indian country
NMR10000I	Indian country within the State of New Mexico, except Navajo Reservation Lands that are covered under Arizona permit AZR10000I and Ute Mountain Reservation Lands that are covered under Colorado permit COR10000I.
OKR10000I	Indian country within the State of Oklahoma
OKR10000F	Discharges in the State of Oklahoma that are not under the authority of the Oklahoma Department of Environmental Quality, including activities associated with oil and gas exploration, drilling, operations, and pipelines (includes SIC Groups 13 and 46, and SIC codes 492 and 5171), and point source discharges associated with agricultural production, services, and silviculture (includes SIC Groups 01, 02, 07, 08, 09).
TXR10000F	Discharges in the State of Texas that are not under the authority of the Texas Commission on Environmental Quality (formerly TNRCC), including activities associated with the exploration, development, or production of oil or gas or geothermal resources, including transportation of crude oil or natural gas by pipeline.
TXR10000I	Indian country within the State of Texas.

7. EPA Region 7: IA, KS, MO, NE (except see Region 8 for Pine Ridge Reservation Lands)

US EPA, Region 07
NPDES Stormwater Program
901 N 5th St
Kansas City, KS 66101

The States of Iowa, Kansas, and Nebraska are the NPDES Permitting Authority for the majority of discharges within their respective states. The State of Missouri is the NPDES Permitting Authority for all discharges within its state.

Permit No.	Areas of coverage/where EPA is Permitting Authority
IAR10000I	Indian country within the State of Iowa
KSR10000I	Indian country within the State of Kansas
NER10000I	Indian country within the State of Nebraska, except Pine Ridge Reservation lands (see Region 8)

8. EPA Region 8: CO, MT, ND, SD, WY, UT (except see Region 9 for Goshute Reservation and Navajo Reservation Lands), the Ute Mountain Reservation in NM, and the Pine Ridge Reservation in NE.

US EPA, Region 08
NPDES Stormwater Program
999 18th St, Suite 300
(EPR-EP)
Denver, CO 80202-2466

The States of Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming are the NPDES Permitting Authority for the majority of discharges within their respective states.

Permit No.	Areas of coverage/where EPA is Permitting Authority
COR10000F	Federal Facilities in the State of Colorado, except those located on Indian country
COR10000I	Indian country within the State of Colorado, as well as the portion of the Ute Mountain Reservation located in New Mexico
MTR10000I	Indian country within the State of Montana
NDR10000I	Indian country within the State of North Dakota, as well as that portion of the Standing Rock Reservation located in South Dakota (except for the portion of the lands within the former boundaries of the Lake Traverse Reservation which is covered under South Dakota permit SDR10000I listed below)
SDR10000I	Indian country within the State of South Dakota, as well as the portion of the Pine Ridge Reservation located in Nebraska and the portion of the lands within the former boundaries of the Lake

	Traverse Reservation located in North Dakota (except for the Standing Rock Reservation which is covered under North Dakota permit NDR10000I listed above)
UTR10000I	Indian country within the State of Utah, except Goshute and Navajo Reservation lands (see Region 9)
WYR10000I	Indian country within the State of Wyoming

9. EPA Region 9: CA, HI, NV, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, the Goshute Reservation in UT and NV, the Navajo Reservation in UT, NM, and AZ, the Duck Valley Reservation in ID, and the Fort McDermitt Reservation in OR.

US EPA, Region 09
NPDES Stormwater Program
75 Hawthorne St
San Francisco, CA 94105-3901

The States of Arizona, California and Nevada are the NPDES Permitting Authority for the majority of discharges within their respective states. The State of Hawaii is the NPDES Permitting Authority for all discharges within its state.

Permit No.	**Areas of coverage/where EPA is Permitting Authority**
ASR100000	The Island of American Samoa
AZR10000I	Indian country within the State of Arizona, as well as Navajo Reservation lands in New Mexico and Utah
CAR10000I	Indian country within the State of California
GUR100000	The Island of Guam
JAR100000	Johnston Atoll
MWR100000	Midway Island and Wake Island
MPR100000	Commonwealth of the Northern Mariana Islands
NVR10000I	Indian country within the State of Nevada, as well as the Duck Valley Reservation in Idaho, the Fort McDermitt Reservation in Oregon and the Goshute Reservation in Utah

10. EPA Region 10: AK, WA, ID (except see Region 9 for Duck Valley Reservation Lands), and OR (except see Region 9 for Fort McDermitt Reservation).

US EPA, Region 10
NPDES Stormwater Program
1200 6th Ave (OW-130)
Seattle, WA 98101-1128
Phone: (206) 553-6650

The States of Oregon and Washington are the NPDES Permitting Authority for the majority of discharges within their respective states.

Permit No.	Areas of coverage/where EPA is Permitting Authority
AKR100000	The State of Alaska, except Indian country
AKR10000I	Indian country within the state of Alaska
IDR100000	The State of Idaho, except Indian country
IDR10000I	Indian country within the State of Idaho, except Duck Valley Reservation lands (see Region 9)
ORR10000I	Indian country within the State of Oregon, except Fort McDermitt Reservation lands (see Region 9)
WAR10000F	Federal Facilities in the State of Washington, except those located on Indian country
WAR10000I	Indian country within the State of Washington

Appendix C - Endangered Species Act Review Procedures

You must meet at least one of the six criteria in Part 1.3.C.6 to be eligible for coverage under this permit. You must follow the procedures in this Appendix to assess the potential effects of stormwater discharges and stormwater discharge-related activities on listed species and their critical habitat. When evaluating these potential effects, operators must evaluate the entire project area.

For purposes of this Appendix, the term "project area" is inclusive of the term "Action Area." Action area is defined in 50 CFR §402.02 as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action.

This includes areas beyond the footprint of the construction area that may be affected by stormwater discharges and stormwater discharge related activities. "Project area" is defined in Appendix A.

(Operators who are eligible and able to certify eligibility under Criterion B, C, D, or F of Part 1.3.C.6 because of a previously issued ESA section 10 permit, a previously completed ESA section 7 consultation, or because the operator's activities were already addressed in another operator's certification of eligibility may proceed directly to Step Four.)

Step One: Determine if Listed Threatened or Endangered Species are Present On or Near Your Project Area

You must determine, to the best of your knowledge, whether listed species are located on or near your project area. To make this determination, you should:

- Determine if listed species are in your county or township. The local offices of the U.S. Fish and Wildlife Service (FWS), National Marine Fisheries Service (NMFS), and State or Tribal Heritage Centers often maintain lists of federally listed endangered or threatened species on their internet sites. Visit http://www.epa.gov/npdes/stormwater/cgp to find the appropriate site for your state or check with your local office. In most cases, these lists allow you to determine if there are listed species in your county or township.
- If there are listed species in your county or township, check to see if critical habitat has been designated and if that area overlaps or is near your project area.
- Contact your local FWS, NMFS, or State or Tribal Heritage Center to determine if the listed species could be found on or near your project area and if any critical habitat areas have been designated that overlap or are near your project area. Critical habitat areas maybe designated independently from the listed species for your county, so even if there are no listed species in your county or township, you must still contact one of the agencies mentioned above to determine if there are any critical habitat areas on or near your project area.

You can also find critical habitat designations and associated requirements at 50 CFR Parts 17 and 226. http://www.access.gpo.gov.

- If there are no listed species in your county or township, no critical habitat areas on or near your project area, or if your local FWS, NMFS, or State or Tribal Heritage Center indicates that listed species are not a concern in your part of the county or township, you may check box A on the Notice of Intent Form.
- If there are listed species and if your local FWS, NMFS, or State or Tribal Heritage Center indicates that these species could exist on or near your project area, you will need to do one or more of the following:
  - Conduct visual inspections: This method may be particularly suitable for construction sites that are smaller in size or located in non-natural settings such as highly urbanized areas or industrial parks where there is little or no natural habitat, or for construction activities that discharge directly into municipal stormwater collection systems.
  - Conduct a formal biological survey. In some cases, particularly for larger construction sites with extensive stormwater discharges, biological surveys may be an appropriate way to assess whether species are located on or near the project area and whether there are likely adverse effects to such species. Biological surveys are frequently performed by environmental consulting firms. A biological survey may in some cases be useful in conjunction with Steps Two, Three, or Four of these instructions.
  - Conduct an environmental assessment under the National Environmental Policy Act (NEPA). Such reviews may indicate if listed species are in proximity to the project area. Coverage under the CGP does not trigger such a review because the CGP does not regulate new sources (that is, dischargers subject to New Source Performance Standards under section 306 of the Clean Water Act), and is thus statutorily exempted from NEPA. See CWA section 511(c). However, some construction activities might require review under NEPA for other reasons such as federal funding or other federal involvement in the project.
  - If listed threatened or endangered species or critical habitat are present in the project area, you must look at impacts to species and/or habitat when following Steps Two through Four. Note that many but not all measures imposed to protect listed species under these steps will also protect critical habitat. Thus, meeting the eligibility requirements of this CGP may require measures to protect critical habitat that are separate from those to protect listed species.

Step Two: Determine if the Construction Activity's Stormwater Discharges or Stormwater Discharge- Related Activities Are Likely to Adversely Affect Listed Threatened or Endangered Species or Designated Critical Habitat

To receive CGP coverage, you must assess whether your stormwater discharges or stormwater discharge related activities is likely to adversely affect listed threatened or endangered species or designated critical habitat that are present on or near your project area.

Potential adverse effects from stormwater discharges and stormwater discharge-related activities include:

- *Hydrological.* Stormwater discharges may cause siltation, sedimentation or induce other changes in receiving waters such as temperature, salinity or pH. These effects will vary with the amount of stormwater discharged and the volume and condition of the receiving water. Where a stormwater discharge constitutes a minute portion of the total volume of the receiving water, adverse hydrological effects are less likely. Construction activity itself may also alter drainage patterns on a site where construction occurs that can impact listed species or critical habitat.
- *Habitat.* Excavation, site development, grading, and other surface disturbance activities from construction activities, including the installation or placement of stormwater BMPs, may adversely affect listed species or their habitat. Stormwater may drain or inundate listed species habitat.
- *Toxicity.* In some cases, pollutants in stormwater may have toxic effects on listed species.

The scope of effects to consider will vary with each site. If you are having difficulty determining whether your project is likely to adversely affect listed species or critical habitat, or one of the Services has already raised concerns to you, you must contact the appropriate office of the FWS, NMFS or Natural Heritage Center for assistance. If adverse effects are not likely, then you may check box E on the NOI form and apply for coverage under the CGP. If the discharge may adversely effect listed species or critical habitat, you must follow Step Three.

Step Three: Determine if Measures Can Be Implemented to Avoid Adverse Effects

If you make a preliminary determination that adverse effects are likely to occur, you can still receive coverage under Criterion E of Part 1.3.C.6 of the CGP if appropriate measures are undertaken to avoid or eliminate the likelihood of adverse effects prior to applying for CGP coverage. These measures may involve relatively simple changes to construction activities such as re-routing a stormwater discharge to bypass an area where species are located, relocating BMPs, or by changing the “footprint” of the construction activity. You should contact the FWS and/or NMFS to see what appropriate measures might be suitable to avoid or eliminate the likelihood of adverse impacts to listed species and/or critical habitat. (See 50 CFR §402.13(b)). This can entail the initiation of informal consultation with the FWS and/or NMFS (described in more detail in Step Four).

If you adopt measures to avoid or eliminate adverse affects, you must continue to abide by those measures for the duration of the construction project and coverage under the CGP. These measures must be described in the SWPPP and are enforceable CGP conditions and/or conditions for meeting the eligibility criteria in Part 1.3. If appropriate measures to avoid the likelihood of adverse effects are not available, you must follow Step Four.

Step Four: Determine if the Eligibility Requirements of Criterion B, C, D, or F of Part 1.3.C.6 Can Be Met

Where adverse effects are likely, you must contact the FWS and/or NMFS. You may still be eligible for CGP coverage if any likely adverse effects can be addressed through meeting Criterion B, C, D, or F of Part 1.3.C.6 of the CGP. These criteria are as follows:

1. *An ESA Section 7 Consultation Is Performed for Your Activity (See Criterion B or C of Part 1.3.C.6 of the CGP).*

Formal or informal ESA section 7 consultation is performed with the FWS and/or NMFS that addresses the effects of your stormwater discharges and stormwater discharge-related activities on federally-listed and threatened species and designated critical habitat. FWS and/or NMFS may request that consultation take place if any actions are identified that may affect listed species or critical habitat. In order to be eligible for coverage under this permit, consultation must result in a "no jeopardy opinion" or a written concurrence by the Service(s) on a finding that your stormwater discharge(s) and stormwater discharge-related activities are not likely to adversely affect listed species or critical habitat (For more information on consultation, see 50 CFR §402). If you receive a "jeopardy opinion," you may continue to work with the FWS and/or NMFS and your permitting authority to modify your project so that it will not jeopardize listed species or designated critical habitat.

Most consultations are accomplished through informal consultation. By the terms of this CGP, EPA has automatically designated operators as non-federal representatives for the purpose of conducting informal consultations. See Part 1.3.C.6 and 50 CFR §402.08 and §402.13. When conducting informal ESA section 7 consultation as a non-federal representative, you must follow the procedures found in 50 CFR Part 402 of the ESA regulations. You must notify FWS and/or NMFS of your intention and agreement to conduct consultation as a non-federal representative.

Consultation may occur in the context of another federal action at the construction site (e.g., where ESA section 7 consultation was performed for issuance of a wetlands dredge and fill permit for the project or where a NEPA review is performed for the project that incorporates a section 7 consultation). Any terms and conditions developed through consultations to protect listed species and critical habitat must be incorporated into the SWPPP. As noted above, operators may, if they wish, initiate consultation with the Services at Step Four.

Whether ESA section 7 consultation must be performed with either the FWS, NMFS or both Services depends on the listed species that may be affected by the operator's activity. In general, NMFS has jurisdiction over marine, estuaries, and anadromous species. Operators should also be aware that while formal section 7 consultation provides protection from incidental takings liability, informal consultation does not.

2. *An Incidental Taking Permit Under Section 10 of the ESA is Issued for the Operators Activity (See Criterion D of Part 1.3.C.6 of the CGP).*

Your construction activities are authorized through the issuance of a permit under section 10 of the ESA and that authorization addresses the effects of your stormwater discharge(s) and stormwater discharge-related activities on federally-listed species and designated critical habitat. You must follow FWS and/or NMFS procedures when applying for an ESA Section 10 permit (see 50 CFR §17.22(b)(1) for FWS and §222.22

for NMFS). Application instructions for section 10 permits for FWS and NMFS can be obtained by accessing the FWS and NMFS websites (http://www.fws.gov and http://www.nmfs.noaa.gov) or by contacting the appropriate FWS and NMFS regional office.

3. *You are Covered Under the Eligibility Certification of Another Operator for the Project Area (See Criterion F of Part 1.3.C.6 of the CGP).*

Your stormwater discharges and stormwater discharge-related activities were already addressed in another operator's certification of eligibility under Criteria A through E of Part 1.3.C.6 which also included your project area. For example, a general contractor or developer may have completed and filed an NOI for the entire project area with the necessary Endangered Species Act certifications (criteria A-E), subcontractors may then rely upon that certification and must comply with any conditions resulting from that process. By certifying eligibility under Criterion F of Part 1.3.C.6, you agree to comply with any measures or controls upon which the other operator's certification under Criterion B, C, or D of Part 1.3.C.6 was based. Certification under Criterion F of Part 1.3.C.6 is discussed in more detail in the Fact Sheet that accompanies this permit.

You must comply with any terms and conditions imposed under the eligibility requirements of Criterion A through F to ensure that your stormwater discharges and stormwater discharge-related activities are protective of listed species and/or critical habitat. Such terms and conditions must be incorporated in the project's SWPPP. If the eligibility requirements of Part 1.3.C.6 cannot be met, then you are not eligible for coverage under the CGP. In these instances, you may consider applying to EPA for an individual permit.

Appendix D - Small Construction Waivers and Instructions

These waivers are only available to stormwater discharges associated with small construction activities (i.e., 1-5 acres). As the operator of a small construction activity, you may be able to qualify for a waiver in lieu of needing to obtain coverage under this general permit based on: (A) a low rainfall erosivity factor, (B) a TMDL analysis, or (C) an equivalent analysis that determines allocations for small construction sites are not needed. Each operator, otherwise needing permit coverage, must notify EPA of its intention for a waiver. It is the responsibility of those individuals wishing to obtain a waiver from coverage under this general permit to submit a complete and accurate waiver certification as described below. Where the operator changes or another is added during the construction project, the new operator must also submit a waiver certification to be waived.

A. Rainfall Erosivity Waiver

Under this scenario the small construction project's rainfall erosivity factor calculation ("R" in the Revised Universal Soil Loss Equation) is less than 5 during the period of construction activity. The operator must certify to the EPA that construction activity will occur only when the rainfall erosivity factor is less than 5. The period of construction activity begins at initial earth disturbance and ends with final stabilization. Where vegetation will be used for final stabilization, the date of installation of a stabilization practice that will provide interim non-vegetative stabilization can be used for the end of the construction period, provided the operator commits (as a condition of waiver eligibility) to periodically inspect and properly maintain the area until the criteria for final stabilization as defined in the construction general permit have been met. If use of this interim stabilization eligibility condition was relied on to qualify for the waiver, signature on the waiver with its certification statement constitutes acceptance of and commitment to complete the final stabilization process. The operator must submit a waiver certification to EPA prior to commencing construction activities.

> *Note: The rainfall erosivity factor "R" is determined in accordance with Chapter 2 of Agriculture Handbook Number 703, Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE), pages 21–64, dated January 1997; United States Department of Agriculture (USDA), Agricultural Research Service.*

EPA has developed an online rainfall erosivity calculator to help small construction sites determine potential eligibility for the rainfall erosivity waiver.You can access the calculator from EPA's website at: www.epa.gov/npdes/stormwater/lew. The R factor can easily be calculated by using the construction site latitude/longitude or address and estimated start and end dates of construction. This calculator may also be useful in determining the time periods during which construction activity could be waived from permit coverage. You may find that moving your construction activity by a few weeks or expediting site stabilization will allow you to qualify for the waiver. Use this online calculator or the Construction Rainfall Erosivity Waiver Fact Sheet (www.epa.gov/npdes/pubs/fact3-1.pdf) to assist in determining the R Factor for your small construction site.

If you are the operator of the construction activity and eligible for a waiver based on low erosivity potential, you may submit a rainfall erosivity waiver electronically via EPA's eNOI system (www.epa.gov/npdes/eNOI) or provide the following information on the waiver certification form in order to be waived from permitting requirements:

1. Name, address and telephone number of the construction site operators;
2. Name (or other identifier), address, county or similar governmental subdivision, and latitude/longitude of the construction project or site;
3. Estimated construction start and completion (i.e., final stabilization) dates, and total acreage (to the nearest quarter acre) to be disturbed;
4. The rainfall erosivity factor calculation that applies to the active construction phase at your project site; and
5. A statement, signed and dated by an authorized representative as provided in Appendix G, Subsection 11, that certifies that the construction activity will take place during a period when the value of the rainfall erosivity factor is less than five.

You can access the waiver certification form from EPA's website at: (http://www.epa.gov/npdes/pubs/construction_waiver_form.pdf). Paper copies of the form must be sent to one of the addresses listed in Part D of this section.

> *Note: If the R factor is 5 or greater, you cannot apply for the rainfall erosivity waiver, and must apply for permit coverage as per Subpart 2.1 of the construction general permit, unless you qualify for the Water Quality Waiver as described below.*

If your small construction project continues beyond the projected completion date given on the waiver certification, you must recalculate the rainfall erosivity factor for the new project duration. If the R factor is below five (5), you must update all applicable information on the waiver certification and retain a copy of the revised waiver as part of the site SWPPP. The new waiver certification must be submitted prior to the projected completion date listed on the original waiver form to assure your exemption from permitting requirements is uninterrupted. If the new R factor is five (5) or above, you must submit an NOI as per Part 2.

B. TMDL Waiver

This waiver is available if EPA has established or approved a TMDL that addresses the pollutant(s) of concern and has determined that controls on stormwater discharges from small construction activity are not needed to protect water quality. The pollutant(s) of concern include sediment (such as total suspended solids, turbidity or siltation) and any other pollutant that has been identified as a cause of impairment of any water body that will receive a discharge from the construction activity. Information on TMDLs that have been established or approved by EPA is available from EPA online at http://www.epa.gov/owow/tmdl/ and from state and tribal water quality agencies.

If you are the operator of the construction activity and eligible for a waiver based on compliance with an EPA established or approved TMDL, you must provide the following information on the Waiver Certification form in order to be waived from permitting requirements:

1. Name, address and telephone number of the construction site operator(s);
2. Name (or other identifier), address, county or similar governmental subdivision, and latitude/longitude of the construction project or site;
3. Estimated construction start and completion (i.e., final stabilization) dates, and total acreage (to the nearest quarter acre) to be disturbed;
4. The name of the water body(s) that would be receiving stormwater discharges from your construction project;
5. The name and approval date of the TMDL;
6. A statement, signed and dated by an authorized representative as provided in Appendix G, Subsection 11, that certifies that the construction activity will take place and that the stormwater discharges will occur, within the drainage area addressed by the TMDL.

C. Equivalent Analysis Waiver

This waiver is available for non-impaired waters only. The operator can develop an equivalent analysis that determines allocations for his small construction site for the pollutant(s) of concern or determines that such allocations are not needed to protect water quality. This waiver requires a small construction operator to develop an equivalent analysis based on existing in-stream concentrations, expected growth in pollutant concentrations from all sources, and a margin of safety.

If you are a construction operator who wants to use this waiver, you must develop your equivalent analysis and provide the following information to be waived from permitting requirements:

1. Name, address and telephone number of the construction site operator(s);
2. Name (or other identifier), address, county or similar governmental subdivision, and latitude/longitude of the construction project or site;
3. Estimated construction start and completion (i.e., final stabilization) dates, and total acreage (to the nearest quarter acre) to be disturbed;
4. The name of the water bodies that would be receiving stormwater discharges from your construction project;
5. Your equivalent analysis;
6. A statement, signed and dated by an authorized representative as provided in Appendix G, Subsection 11, that certifies that the construction activity will take place and that the stormwater discharges will occur, within the drainage area addressed by the equivalent analysis.

D. Waiver Deadlines and Submissions

1. Waiver certifications must be submitted prior to commencement of construction activities.
2. If you submit a TMDL or equivalent analysis waiver request, you are not waived until EPA approves your request. As such, you may not commence construction activities until receipt of approval from EPA.
3. Late Notifications: Operators are not prohibited from submitting waiver certifications after initiating clearing, grading, excavation activities, or other construction activities. The Agency reserves the right to take enforcement for any unpermitted discharges that occur between the time construction commenced and waiver authorization is granted.

Submittal of a waiver certification is an optional alternative to obtaining permit coverage for discharges of stormwater associated with small construction activity, provided you qualify for the waiver. Any discharge of stormwater associated with small construction activity not covered by either a permit or a waiver may be considered an unpermitted discharge under the Clean Water Act. As mentioned above, EPA reserves the right to take enforcement for any unpermitted discharges that occur between the time construction commenced and either discharge authorization is granted or a complete and accurate waiver certification is submitted. EPA may notify any operator covered by a waiver that they must apply for a permit. EPA may notify any operator who has been in non-compliance with a waiver that they may no longer use the waiver for future projects. Any member of the public may petition EPA to take action under this provision by submitting written notice along with supporting justification.

Complete and accurate Rainfall Erosivity waiver certifications not otherwise submitted electronically via EPA's eNOI system (www.epa.gov/npdes/eNOI) must be sent to one of the following addresses:

Regular U.S. Mail Delivery
EPA Stormwater Notice Processing Center
Mail Code 4203M
U.S. EPA
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Overnight/Express Mail Delivery
EPA Stormwater Notice Processing Center
Room 7420
U.S. EPA
1201Constitution Avenue, NW
Washington, DC 20004

Complete and accurate TMDL or equivalent analysis waiver requests must be sent to the applicable EPA Region office specified in Appendix B.

Appendix E - Notice of Intent Form and Instructions

From the effective date of this permit, operators are to use the Notice of Intent Form contained in this Appendix to obtain permit coverage.

This Form Replaces Form 3510-9 (8-98)
Refer to the Following Pages for Instructions

Form Approved OMB Nos. 2040-0188 and 2040-0211

NPDES
FORM

EPA

United States Environmental Protection Agency
Washington, DC 20460

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit

Submission of this Notice of Intent (NOI) constitutes notice that the party identified in Section II of this form requests authorization to discharge pursuant to the NPDES Construction General Permit (CGP) permit number identified in Section I of this form. Submission of this NOI also constitutes notice that the party identified in Section II of this form meets the eligibility requirements of the CGP for the project identified in Section III of this form. Permit coverage is required prior to commencement of construction activity until you are eligible to terminate coverage as detailed in the CGP. To obtain authorization, you must submit a complete and accurate NOI form. Refer to the instructions at the end of this form.

I. Permit Number

II. Operator Information

Name:

IRS Employer Identification Number (EIN): –

Mailing Address:

Street:

City: State: Zip Code: -

Phone: - - Fax (optional): - -

E-mail:

III. Project/Site Information

Project/Site Name:

Project Street/Location:

City: State: Zip Code: -

County or similar government subdivision:

Latitude/Longitude (Use one of three possible formats, and specify method)

Latitude	1. __ __° __ __′ __ __″ N (degrees, minutes, seconds)	Longitude	1. __ __ __° __ __′ __ __″ W (degrees, minutes, seconds)
	2. __ __° __ __. __ __′ N (degrees, minutes, decimal)		2. __ __ __° __ __. __ __′ W (degrees, minutes, decimal)
	3. __ __. __ __ __ __° N (degrees decimal)		3. __ __ __. __ __ __ __° W (degrees decimal)

Method: ☐ U.S.G.S. topographic map ☐ EPA web site ☐ GPS ☐ Other:

If you used a U.S.G.S. topographic map, what was the scale? ____________________

Project located in Indian Country? ☐ YES ☐ NO

If yes, name of reservation, or if not part of a reservation, put “Not Applicable:” ____________________

Estimated Project Start Date: / / (Month Day Year)

Estimated Project Completion Date: / / (Month Day Year)

Estimated Area to be Disturbed (to the nearest quarter acre): .

IV. SWPPP Information

Has the SWPPP been prepared in advance of filing this NOI? ☐ YES ☐ NO

Location of SWPP for Viewing: ☐ Address in Section II ☐ Address in Section III ☐ Other

If other:

SWPPP Street:

City: State: Zip Code: -

SWPPP Contact Information (if different than that in Section II):

Name:

Phone: - - Fax (optional): - -

E-mail:

V. Discharge Information

Identify the name(s) of waterbodies to which you discharge. ______________________

Is this discharge consistent with the assumptions and requirements of applicable EPA approved or established TMDL(s)? ☐ YES ☐ NO

VI. Endangered Species Protection

Under which criterion of the permit have you satisfied your ESA eligibility obligations?

☐ A ☐ B ☐ C ☐ D ☐ E ☐ F

If you select criterion F, provide permit tracking number of operator under which you are certifying eligibility:

VII. Certification Information

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name:

Title:

Signature: ______________________ Date:

E-mail: ______________________

NOI Preparer (Complete if NOI was prepared by someone other than the certifier)

Prepared by:

Organization:

Phone: - - Ext. E-mail: ______________________

Instructions for Completing EPA Form 3510-9

Notice of Intent (NOI) for Storm Water Discharges Associated with Construction Activity Under an NPDES General Permit

NPDES Form Date   This Form Replaces Form 3510-9 (8/98)   Form Approved OMB Nos. 2040-0188 and 2040-0211

Who Must File an NOI Form

Under the provisions of the Clean Water Act, as amended (33 U.S.C. 1251 et. seq.; the Act), federal law prohibits storm water discharges from certain construction activities to waters of the U.S. unless that discharge is covered under a National Pollutant Discharge Elimination System (NPDES) Permit. Operator(s) of construction sites where one or more acres are disturbed, smaller sites that are part of a larger common plan of development or sale where there is a cumulative disturbance of at least one acre, or any other site specifically designated by the Director, must submit an NOI to obtain coverage under an NPDES general permit. Each person, firm, public organization, or any other entity that meets either of the following criteria must file this form: (1) they have operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or (2) they have day-to-day operational control of those activities at the project necessary to ensure compliance with SWPPP requirements or other permit conditions. If you have questions about whether you need an NPDES storm water permit, or if you need information to determine whether EPA or your state agency is the permitting authority, refer to *www.epa.gov/npdes/stormwater/cgp* or telephone the Storm Water Notice Processing Center at (866) 352-7755.

Where to File NOI Form

See the applicable CGP for information on where to send your completed NOI form.

Completing the Form

Obtain and read a copy of the appropriate EPA Storm Water Construction General Permit for your area. To complete this form, type or print uppercase letters, in the appropriate areas only. Please place each character between the marks (abbreviate if necessary to stay within the number of characters allowed for each item). Use one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions on this form, refer to *www.epa.gov/npdes/stormwater/cgp* or telephone the Storm Water Notice Processing Center at (866) 352-7755. Please submit original document with signature in ink . do not send a photocopied signature.

Section I. Permit Number

Provide the number of the permit under which you are applying for coverage (see Appendix B of the general permit for the list of eligible permit numbers).

Section II. Operator Information

Provide the legal name of the person, firm, public organization, or any other entity that operates the project described in this application. An operator of a project is a legal entity that controls at least a portion of site operations and is not necessarily the site manager. Provide the employer identification number (EIN from the Internal Revenue Service; IRS), also commonly referred to as your taxpayer ID. If the applicant does not have an EIN enter "NA" in the space provided. Also provide the operator's mailing address, telephone number, fax number (optional) and e-mail address (to be notified via e-mail of NOI approval when available). Correspondence for the NOI will be sent to this address.

Section III. Project/Site Information

Enter the official or legal name and complete street address, including city, state, zip code, and county or similar government subdivision of the project or site. If the project or site lacks a street address, indicate the general location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for permit coverage to be granted.

The applicant must also provide the latitude and longitude of the facility either in degrees, minutes, seconds; degrees, minutes, decimal; or decimal format. The latitude and longitude of your facility can be determined in several different ways, including through the use of global positioning system (GPS) receivers, U.S. Geological Survey (U.S.G.S.) topographic or quadrangle maps, and EPA's web-based siting tools, among others. Refer to *www.epa.gov/npdes/stormwater/cgp* for further guidance on the use of these methodologies. For consistency, EPA requests that measurements be taken from the approximate center of the construction site. Applicants must specify which method they used to determine latitude and longitude. If a U.S.G.S. topographic map is used, applicants are required to specify the scale of the map used.

Indicate whether the project is in Indian country, and if so, provide the name of the Reservation. If the project is in Indian Country Lands that are not part of a Reservation, indicate "not applicable" in the space provided.

Enter the estimated construction start and completion dates using four digits for the year (i.e., 05/27/1998). Enter the estimated area to be disturbed including but not limited to: grubbing, excavation, grading, and utilities and infrastructure installation. Indicate to the nearest quarter acre. Note: 1 acre = 43,560 sq. ft.

Section IV. SWPPP Information

Indicate whether or not the SWPPP was prepared in advance of filing the NOI form. Check the appropriate box for the location where the SWPPP may be viewed. Provide the name, fax number (optional), and e-mail address of the contact person if different than that listed in Section II of the NOI form.

Section V. Discharge Information

Enter the name(s) of receiving waterbodies to which the project's storm water will discharge. These should be the first bodies of water that the discharge will reach. (Note: If you discharge to more than one waterbody, please indicate all such waters in the space provided and attach a separate sheet if necessary.) For example, if the discharge leaves your site and travels through a roadside swale or a storm sewer and then enters a stream that flows to a river, the stream would be the receiving waterbody. Waters of the U.S. include lakes, streams, creeks, rivers, wetlands, impoundments, estuaries, bays, oceans, and other surface bodies of water within the confines of the U.S. and U.S. coastal waters. Waters of the U.S. do not include man-made structures created solely for the purpose of wastewater treatment. U.S. Geological Survey topographical maps may be used to make this determination. If the map does not provide a name, use a format such as “unnamed tributary to Cross Creek”. If you discharge into a municipal separate storm sewer system (MS4), you must identify the waterbody into which that portion of the storm sewer discharges. That information should be readily available from the operator of the MS4.

Indicate whether your storm water discharges from construction activities will be consistent with the assumptions and requirements of applicable EPA approved or established TMDL(s). To answer this question, refer to *www.epa.gov/npdes/stormwater/cgp* for state- and regional-specific TMDL information related to the construction general permit. You may also have to contact your EPA regional office or state agency. If there are no applicable TMDLs or no related requirements, please check the “yes” box in the NOI form.

Section VI. Endangered Species Information

Indicate for which criterion (i.e., A, B, C, D, E, or F) of the permit the applicant is eligible with regard to protection of federally listed endangered and threatened species, and designated critical habitat. See Part 1.3.C.6 and Appendix C of the permit. If you select criterion F, provide the permit tracking number of the operator under which you are certifying eligibility. The permit tracking number is the number assigned to the operator by the Storm Water Notice Processing Center after EPA acceptance of a complete NOI.

Section VII. Certification Information

All applications, including NOIs, must be signed as follows: *For a corporation:* By a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or

For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

Include the name, title, and email address of the person signing the form and the date of signing. An unsigned or undated NOI form will not be considered eligible for permit coverage. If the NOI was prepared by someone other than the certifier (for example, if the NOI was prepared by the facility SWPPP contact or a consultant for the certifier’s signature), include the name, organization, phone number and email address of the NOI preparer.

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 3.7 hours. This estimate includes time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form, including any suggestions which may increase or reduce this burden to: Chief, Information Policy Branch 2136, U.S. Environmental Protection, Agency, 1200 Pennsylvania Avenue, NW, Washington, D.C. 20460. Include the OMB control number on any correspondence. Do not send the completed form to this address.

Visit this website for mailing instructions:
www.epa.gov/npdes/stormwater/mail

Visit this website for instructions on how to submit electronically:
www.epa.gov/npdes/stormwater/enoi

Appendix F - Notice of Termination Form and Instructions

From the effective date of this permit, operators are to use the Notice of Termination Form contained in this Appendix to terminate permit coverage.

This Form Replaces Form 3517-7 (8-98)
Refer to the Following Page for Instructions

Form Approved OMB Nos. 2040-0086 and 2040-0211

NPDES
FORM

EPA

United States Environmental Protection Agency
Washington, DC 20460

Notice of Termination (NOT) of Coverage Under an NPDES General Permit for Stormwater Discharges Associated with Construction Activity

Submission of this Notice of Termination constitutes notice that the party identified in Section II of this form is no longer authorized to discharge stormwater associated with construction activity under the NPDES program from the site identified in Section III of this form. All necessary information must be included on this form. Refer to the instructions at the end of this form.

I. Permit Information

NPDES Stormwater General Permit Tracking Number:

Reason for Termination (Check only one):

☐ Final stabilization has been achieved on all portions of the site for which you are responsible.

☐ Another operator has assumed control, according to Appendix G, Section 11.C of the CGP, over all areas of the site that have not been finally stabilized.

☐ Coverage under an alternative NPDES permit has been obtained.

☐ For residential construction only, temporary stabilization has been completed and the residence has been transferred to the homeowner.

II. Operator Information

Name:

IRS Employer Identification Number (EIN): –

Mailing Address:

Street:

City: State: Zip Code: -

Phone: - - Fax (optional): - -

E-mail:

III. Project/Site Information

Project/Site Name:

Project Street/Location:

City: State: Zip Code: -

County or similar government subdivision:

IV. Certification Information

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name: ______________________________

Print Title: ______________________________

Email: ______________________________

Signature: ______________________________

Date: ______________________________

Instructions for Completing EPA Form 3510-13

Notice of Termination (NOT) of Coverage Under an NPDES General Permit for Stormwater Discharges Associated with Construction Activity

NPDES Form | This Form Replaces Form 3517-7 (8-98) | Form Approved OMB Nos. 2040-0086 and 2040-0211

Who May File an NOT Form

Permittees who are presently covered under the EPA-issued National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction Activity may submit an NOT form when final stabilization has been achieved on all portions of the site for which you are responsible; another operator has assumed control in accordance with Appendix G, Section 11.C of the General Permit over all areas of the site that have not been finally stabilized; coverage under an alternative NPDES permit has been obtained; or for residential construction only, temporary stabilization has been completed and the residence has been transferred to the homeowner.

“Final stabilization” means that all soil disturbing activities at the site have been completed and that a uniform perennial vegetative cover with a density of at least 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed. See “final stabilization” definition in Appendix A of the Construction General Permit for further guidance where background native vegetation covers less than 100 percent of the ground, in arid or semi-arid areas, for individual lots in residential construction, and for construction projects on land used for agricultural purposes.

Completing the Form

Type or print, using uppercase letters, in the appropriate areas only. Please place each character between the marks. Abbreviate if necessary to stay within the number of characters allowed for each item. Use only one space for breaks between words, but not for punctuation marks unless they are needed to clarify your response. If you have any questions about this form, refer to *www.epa.gov/npdes/stormwater/cgp* or telephone the Stormwater Notice Processing Center at (866) 352-7755. Please submit original document with signature in ink - do not send a photocopied signature.

Section I. Permit Number

Enter the existing NPDES Stormwater General Permit Tracking Number assigned to the project by EPA’s Stormwater Notice Processing Center. If you do not know the permit tracking number, refer to *www.epa.gov/npdes/stormwater/cgp* or contact the Stormwater Notice Processing Center at (866) 352-7755.

Indicate your reason for submitting this Notice of Termination by checking the appropriate box. Check only one:

> *Final stabilization has been achieved on all portions of the site for which you are responsible.*
>
> *Another operator has assumed control according to Appendix G, Section 11.C over all areas of the site that have not been finally stabilized.*
>
> *Coverage under an alternative NPDES permit has been obtained.*
>
> *For residential construction only, if temporary stabilization has been completed and the residence has been transferred to the homeowner.*

Section II. Operator Information

Provide the legal name of the person, firm, public organization, or any other entity that operates the project described in this application and is covered by the permit tracking number identified in Section I. The operator of the project is the legal entity that controls the site operation, rather than the site manager. Provide the employer identification number (EIN from the Internal Revenue Service; IRS). If the applicant does not have an EIN enter “NA” in the space provided. Enter the complete mailing address, telephone number, and email address of the operator. Optional: enter the fax number of the operator.

Section III. Project/Site Information

Enter the official or legal name and complete street address, including city, state, zip code, and county or similar government subdivision of the project or site. If the project or site lacks a street address, indicate the general location of the site (e.g., Intersection of State Highways 61 and 34). Complete site information must be provided for termination of permit coverage to be valid.

Section IV. Certification Information

All applications, including NOIs, must be signed as follows:
For a corporation: By a responsible corporate officer. For the purpose of this Part, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy-or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or

For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

Include the name, title, and email address of the person signing the form and the date of signing. An unsigned or undated NOT form will not be considered valid termination of permit coverage.

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 0.5 hours per notice, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments regarding the burden estimate, any other aspect of the collection of information, or suggestions for improving this form including any suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, 2136, U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue, NW, Washington, DC 20460. Include the OMB number on any correspondence. Do not send the completed form to this address.

Visit this website for mailing instruction:
www.epa.gov/npdes/stormwater/mail

Visit this website for instructions on how to submit electronically:
www.epa.gov/npdes/stormwater/enoi

Appendix G - Standard Permit Conditions

STANDARD PERMIT CONDITIONS

1. Duty To Comply

You must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

A. You must comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.

B. The Clean Water Act provides that any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed the maximum amounts authorized by Section 309(d) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. §2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. §3701 note) (currently $27,500 per day for each violation).

The Clean Water Act provides that any person who negligently violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both. Any person who knowingly violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.

C. Any person may be assessed an administrative penalty by the Administrator for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Pursuant to 40 CFR Part 19 and the Act, administrative penalties for Class I violations are not to exceed the maximum amounts authorized by Section 309(g)(2)(A) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. §2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. §3701 note) (currently $11,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $27,500). Pursuant to 40 CFR Part 19 and the Act, penalties for Class II violations are not to exceed the maximum amounts authorized by Section 309(g)(2)(B) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. §2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. §3701 note) (currently $11,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $137,500).

2. Duty to Reapply

If you wish to continue an activity regulated by this permit after the expiration date of this permit, you must apply for and obtain a new permit.

3. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for you in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

4. Duty to Mitigate

You must take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

5. Proper Operation and Maintenance

You must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by you to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by you only when the operation is necessary to achieve compliance with the conditions of this permit.

6. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. Your filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

7. Property Rights

This permit does not convey any property rights of any sort, or any exclusive privileges.

8. Duty to Provide Information

You must furnish to EPA, within a reasonable time, any information which EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. You must also furnish to EPA upon request, copies of records required to be kept by this permit.

9. Inspection and Entry

You must allow EPA, or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

A. Enter upon your premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
B. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
C. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
D. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

10. Monitoring and Records

A. Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity.
B. You must retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of EPA at any time.
C. Records of monitoring information must include:
   1. The date, exact place, and time of sampling or measurements;
   2. The individual(s) who performed the sampling or measurements;
   3. The date(s) analyses were performed
   4. The individual(s) who performed the analyses;
   5. The analytical techniques or methods used; and
   6. The results of such analyses.
D. Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, unless other test procedures have been specified in the permit.
E. The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

11. Signatory Requirements

A. All applications, including NOIs, must be signed as follows:
   1. For a corporation: By a responsible corporate officer. For the purpose of this Part, a responsible corporate officer means: (i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any

other person who performs similar policy- or decision-making functions for the corporation, or (ii) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

2. For a partnership or sole proprietorship: By a general partner or the proprietor, respectively; or
3. For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official. For purposes of this Part, a principal executive officer of a federal agency includes (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrator of EPA).

B. All reports required by this permit, including SWPPPs, must be signed by a person described in Appendix G, Subsection 11.A above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
   1. The authorization is made in writing by a person described in Appendix G, Subsection 11.A;
   2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
   3. The signed and dated written authorization is included in the SWPPP. A copy must be submitted to EPA, if requested.

C. Changes to Authorization. If an authorization under Part 2.1 is no longer accurate because a different operator has responsibility for the overall operation of the construction site, a new NOI satisfying the requirements of Part 2.1 must be submitted to EPA prior to or together with any reports, information, or applications to be signed by an authorized representative. The change in authorization must be submitted within the time frame specified in Part 2.4, and sent to the address specified in Part 2.2.

D. Any person signing documents required under the terms of this permit must include the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

E. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

12. Reporting Requirements

A. Planned changes. You must give notice to EPA as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:
   1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR §122.29(b); or
   2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR §122.42(a)(1).

B. Anticipated noncompliance. You must give advance notice to EPA of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. Transfers. This permit is not transferable to any person except after notice to EPA. EPA may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act. (See 40 CFR §122.61; in some cases, modification or revocation and reissuance is mandatory.)

D. Monitoring reports. Monitoring results must be reported at the intervals specified elsewhere in this permit.
   1. Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by EPA for reporting results of monitoring of sludge use or disposal practices.
   2. If you monitor any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in the permit, the results of this monitoring must be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by EPA.
   3. Calculations for all limitations which require averaging of measurements must use an arithmetic mean.

E. Compliance schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date.

F. Twenty-four hour reporting.

   1. You must report any noncompliance which may endanger health or the environment. Any information must be provided orally within 24 hours from the time you become aware of the circumstances. A written submission must also be provided within five days of the time you become aware of the circumstances. The written submission must contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.
   2. The following shall be included as information which must be reported within 24 hours under this paragraph.
      a. Any unanticipated bypass which exceeds any effluent limitation in the permit. (See 40 CFR §122.41(g).)
      b. Any upset which exceeds any effluent limitation in the permit
      c. Violation of a maximum daily discharge limitation for any of the pollutants listed by EPA in the permit to be reported within 24 hours. (See 40 CFR §122.44(g).)
   13. EPA may waive the written report on a case-by-case basis for reports under Appendix G, Subsection 12.F.2 if the oral report has been received within 24 hours.

G. Other noncompliance. You must report all instances of noncompliance not reported under Appendix G, Subsections 12.D, 12.E, and 12.F, at the time monitoring reports are submitted. The reports must contain the information listed in Appendix G, Subsection 12.F.

H. Other information. Where you become aware that you failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Permitting Authority, you must promptly submit such facts or information.

13. Bypass

A. Definitions.
   1. Bypass means the intentional diversion of waste streams from any portion of a treatment facility
   2. Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

B. Bypass not exceeding limitations. You may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Appendix G, Subsections 13.C and 13.D.

C. Notice–
   1. Anticipated bypass. If you know in advance of the need for a bypass, you must submit prior notice, if possible at least ten days before the date of the bypass.
   2. Unanticipated bypass. You must submit notice of an unanticipated bypass as required in Appendix G, Subsection 12.F (24-hour notice).

D. Prohibition of bypass.
  1. Bypass is prohibited, and EPA may take enforcement action against you for bypass, unless:
    a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
    b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
    c. You submitted notices as required under Appendix G, Subsection 13.C.
  2. EPA may approve an anticipated bypass, after considering its adverse effects, if EPA determines that it will meet the three conditions listed above in Appendix G, Subsection 13.D.1.

14. Upset

A. Definition. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond your reasonable control. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

B. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of Appendix G, Subsection 14.C are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

C. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
  1. An upset occurred and that you can identify the cause(s) of the upset;
  2. The permitted facility was at the time being properly operated; and
  3. You submitted notice of the upset as required in Appendix G, Subsection 12.F.2.b(24 hour notice).
  4. You complied with any remedial measures required under Appendix G, Section 4.

D. Burden of proof. In any enforcement proceeding, you, as the one seeking to establish the occurrence of an upset, has the burden of proof.

Attachment B

Rare Species Correspondence

March 3, 1849

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
http://www.fws.gov/northeast/newenglandfieldoffice

January 2, 2009

To Whom It May Concern:

This project was reviewed for the presence of federally-listed or proposed, threatened or endangered species or critical habitat per instructions provided on the U.S. Fish and Wildlife Service's New England Field Office website:

(http://www.fws.gov/northeast/newenglandfieldoffice/EndangeredSpec-Consultation.htm)

Based on the information currently available, no federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service (Service) are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under Section 7 of the Endangered Species Act is not required.

This concludes the review of listed species and critical habitat in the project location(s) and environs referenced above. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your cooperation. Please contact Mr. Anthony Tur at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
http://www.fws.gov/northeast/newenglandfieldoffice

REF: Biomass energy generating facility, Berlin, NH

July 14, 2009

Meghann J. Murray
ESS Group, Inc.
888 Worcester St., Suite 240
Wellesley, MA 02482

RECEIVED July 17/09

Dear Ms. Murray:

We received your letter (enclosed) requesting an endangered species review in regard to the proposed project identified above.

The New England Field Office has developed measures to streamline the endangered species consultation process and other requests for technical assistance. The information you have requested is available on our website at:

(http://www.fws.gov/northeast/newenglandfieldoffice/EndangeredSpec-Consultation.htm)

Please review these streamlining measures. We are confident they will adequately address your request. For assistance in navigating the website, please contact Phil Leeser at 603-223-2541.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

Enclosure

Memo

NH NATURAL HERITAGE BUREAU

To: Meghann Murray, ESS Group, Inc.
888 Worcester Street
Suite 240
Wellesley, MA 02482

From: Melissa Coppola, NH Natural Heritage Bureau
Date: 6/24/2009 (valid for one year from this date)
Re: Review by NH Natural Heritage Bureau
NHB File ID: NHB09-1209 Town: Berlin
Project type: Buildings and Related Structures: Single commercial building lot, etc. Location: Tax Maps: 129-54.01, 54.001, and 55
cc: Kim Tuttle

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments:

Vertebrate species	**State**[1]	**Federal**	**Notes**
Bald Eagle (*Haliaeetus leucocephalus*)	T	M	Contact the NH Fish & Game Dept (see below).
Common Nighthawk (*Chordeiles minor*)	E	--	Contact the NH Fish & Game Dept (see below).

[1]Codes: "E" = Endangered, "T" = Threatened, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

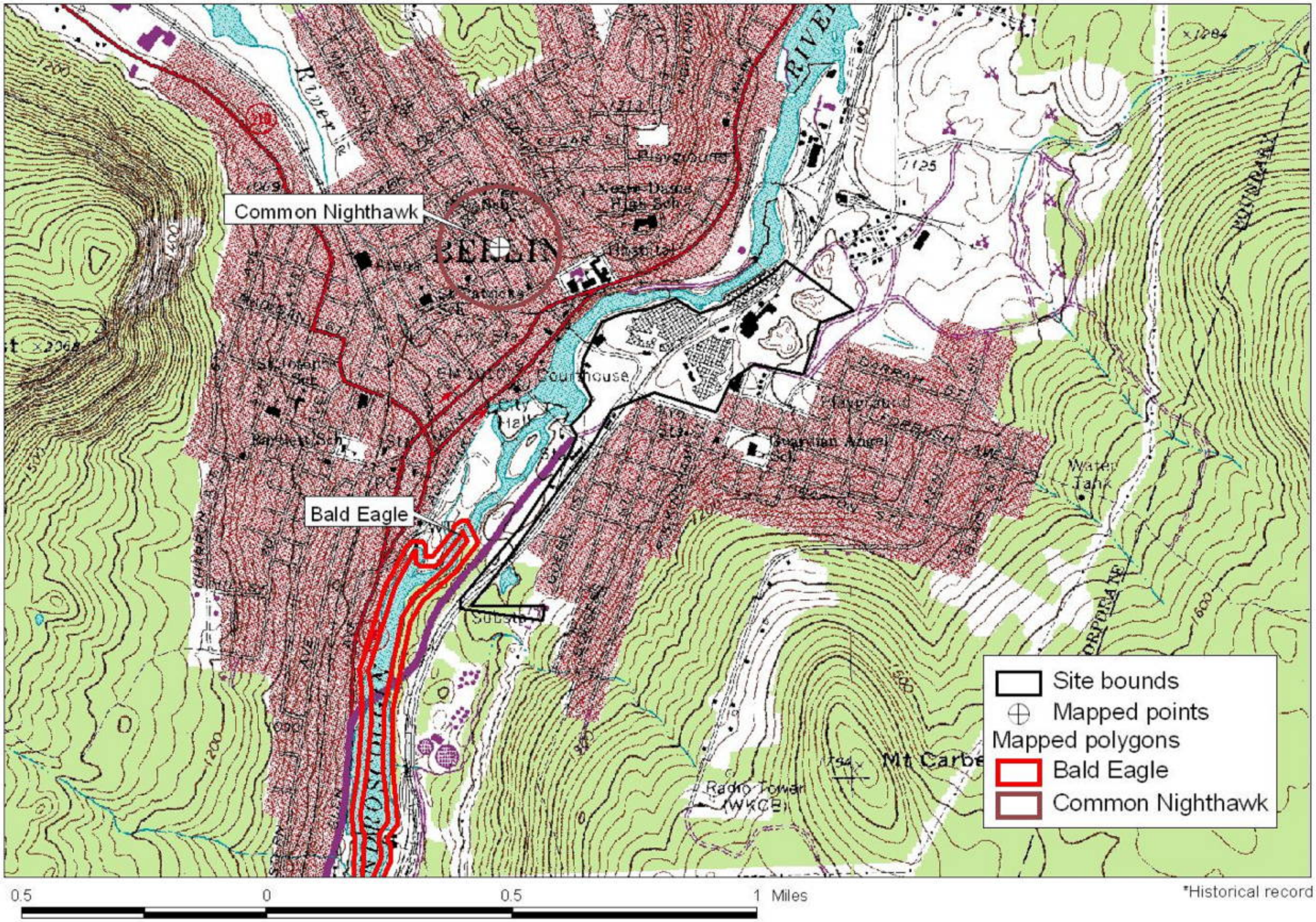
Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. For some purposes, including legal requirements for state wetland permits, the fact that no species of concern are known to be present is sufficient. However, an on-site survey would provide better information on what species and communities are indeed present.

NH NATURAL HERITAGE BUREAU

Known locations of rare species and exemplary natural communities

Note: Mapped locations are not always exact. Occurrences that are not in the vicinity of the project are not shown.



*Historical record

1:18000

Valid for one year from this date: 24 Jun 2009

New Hampshire Natural Heritage Bureau - Animal Record

Bald Eagle (*Haliaeetus leucocephalus*)

Legal Status		**Conservation Status**	
Federal:	Monitored	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 1993: Occasional observations from Rte. 16 between Berlin and Gorham.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Androscoggin River
Managed By: Drew Easement

County:	Coos	USGS quad(s):	Berlin (4407142)
Town(s):	Gorham	Lat, Long:	442539N, 0711129W
Size:	165.3 acres	Elevation:	800 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: All along the Androscoggin River.

Dates documented

First reported: 1993
Last reported: 1993

Deluca, Diane. Audubon Society of New Hampshire. 1993. Results of Annual Eagle Wintering Surveys.

New Hampshire Natural Heritage Bureau - Animal Record

Common Nighthawk (*Chordeiles minor*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Not ranked (need more information)

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 1990: 26 adults, sex unknowns (Obs_id 939).
General Area: 1990: Terrestrial - Urban / suburban (Obs_id 939).
General Comments: 1990: Number above represents the high count for the period 1982-1992. Young were documented in 1985, and perhaps other years during this period (Obs_id 939).
Management Comments:

Location

Survey Site Name: Berlin
Managed By:

County:	Coos	USGS quad(s):	Berlin (4407142)
Town(s):	Berlin	Lat, Long:	442827N, 0711050W
Size:	30.8 acres	Elevation:	

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 1990: Downtown [Berlin] (Obs_id 939).

Dates documented

First reported: 1990-07-22 Last reported: 1990-07-29

Darrell Oakley

From: Tuttle, Kim [Kim.Tuttle@wildlife.nh.gov]
ent: Monday, October 19, 2009 8:36 AM
o: Darrell Oakley
Subject: NHB09-1209 Laidlaw Berlin BioPower LLC

Darrell,

The NHFG Nongame and Endangered Species Program has reviewed NHB09-1209 for the proposed Laidlaw Berlin BioPower project in Berlin, NH. Bald eagle and common nighthawk were identified in the NHB review as occuring in the vicinity of the project. Both species are protected by the NH Endangered Species Conservation Act (RSA 212-A). We do not expect impacts to bald eagle as no trees within 50 ft. of the Androscoggin River will be removed. If there is any opportunity to allow more habitat along the River to revert back to native trees and shrubs, we would encourage that as it would provide future perching and roosting sites for bald eagle.

Common nighthawks nest on the ground in gravel lots and on flat rooftops covered in small stone. We have not had breeding reports for this species in Berlin for a number of years now so we do not expect impacts to common nighthawk as a result of the proposed project. Please feel free to call me at 271-6544 if you have any further questions regarding this job.

Sincerely,

Kim Tuttle
Wildlife Biologist
NH Fish and Game
Nongame and Endangered Species Program
03-271-6544

Attachment C

Spill Report Form

Laidlaw Berlin BioPower, LLC
Berlin, New Hampshire

Spill Report Form

Observer: ________________________________ Date: ____________________________

Type of Material: ________________________________ Quantity: ________________________

Description of Release:
____
____
____
____
____
____
____

Circumstances Leading to Release:
____
____
____
____
____
____
____

Location of Release:
____
____
____
____
____
____
____

Response Actions:
____
____
____
____
____
____
____

Attach documentation of notification and corrective measures implemented to prevent reoccurrence.

Laidlaw Berlin BioPower, LLC
Berlin, New Hampshire

Spill Clean-up Report

Start Date and Time: ________________ Finish Date and Time: ______________

Clean-up Contractor Name: ____

Street Address:
____

City: ______________________ State: __________________ Zip Code: ________________

Spill Type and Description:
____
____
____
____

Amount of Material(s) Removed:
____
____
____
____

Material Disposal Location:
____
____
____
____

Street Address:
____

City: ______________________ State: __________________ Zip Code: ________________

I certify that clean up was performed and completed on the above listed dates in accordance with RSA 485-C Groundwater Protection Act (NH). Spills in excess of reportable concentrations, as described in Subpart 4.3, must be reported as required under 40 CFR 100 of the Clean Water Act and certain provision of 301 and 402 of the Clean Water Act are also applicable.

Operator Signature: __________________________________ Date: _____________

Attachment D

Emergency Contact Information

EMERGENCY NOTIFICATION PHONE NUMBERS

1. PROJECT SUPERINTENDANT
   NAME: __________________ Phone: __________________________

   CONTRACTOR:
   NAME: __________________ Phone: ___________________________

2. BERLIN FIRE DEPARTMENT
   DIRECT EMERGENCY PHONE: 911/ (603)752-3134

4. NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES
   HAZARDOUS MATERIALS/SPILLS: (603) 271-3899
   MAIN NUMBER: (603) 271-3503

5. NATIONAL RESPONSE CENTER
   PHONE: (800) 424-8802

6. ALTERNATE: U.S. ENVIRONMENTAL PROTECTION AGENCY
   ENVIRONMENTAL EMERGENCY: (800) 424-8802
   NEW ENGLAND CUSTOMER CENTER: (888) 372-7341

Attachment E

Inspection and Maintenance Form

Laidlaw Berlin BioPower, LLC
Berlin, New Hampshire

Storm Water Pollution Prevention Plan
Inspection and Maintenance Report Form

To be completed every week and within 24 hours of a rainfall event of 0.5 inches or more

Inspector:____________________________ Date:________________________

Days since last rainfall:_________________ Amount of last rainfall:_________

EROSION CONTROL INSPECTION

Area	Condition of Erosion Controls	Is there evidence of washout or overtopping?	Improvement Needed?	Area Stabilized?
Roadway Entrance				
Rail Easement				
Northern Limit of Work				
Southern Limit of Work				
Prefab Building				
Other				

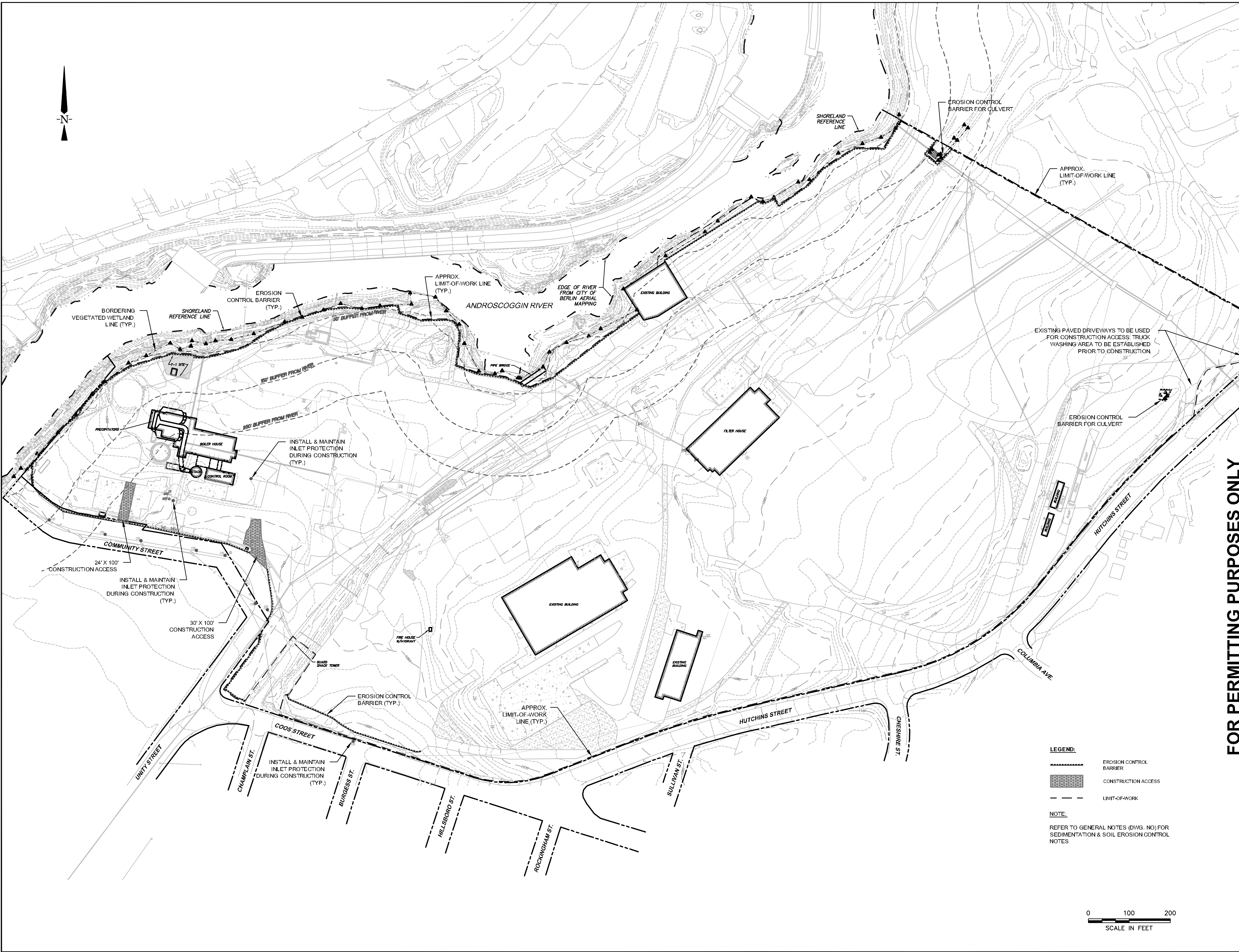
Laidlaw Berlin BioPower, LLC
Berlin, New Hampshire

SWPPP Addendum Form

Date	Change to SWPPP	Reason for Change

Attachment F

Project Plans



LEGEND:

▬ ▬ ▬	EROSION CONTROL BARRIER
▨	CONSTRUCTION ACCESS
— — —	LIMIT-OF-WORK

NOTE:

REFER TO GENERAL NOTES (DWG. NO) FOR SEDIMENTATION & SOIL EROSION CONTROL NOTES

0 100 200
SCALE IN FEET

FOR PERMITTING PURPOSES ONLY

ESS Group, Inc.
Engineers
Scientists
Consultants

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No.	REVISION	DATE	APP BY

DRAWN BY: DJG
CHECKED BY: JCB
DESIGNED BY: DJG
APPROVED BY: JCB

LaidLaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

Biomass Energy Facility
Berlin, NH

SOIL EROSION & SEDIMENTATION
CONTROL PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 11/06/09
SHEET No.: 4 of 20
SCALE: 1" = 100'

DRAWING No.
ES

Appendix G

NPDES Individual Permit Application for Stormwater

Appendix G –
NPDES Individual Stormwater Discharge Permit Application

NPDES Individual Stormwater Discharge Permit Application

BERLIN BIOPOWER
BERLIN, NEW HAMPSHIRE

PREPARED FOR	Laidlaw Berlin BioPower, LLC 90 John Street, Fourth Floor New York, New York 10038
PREPARED BY	ESS Group, Inc. 888 Worcester Street, Suite 240 Wellesley, Massachusetts 02482

Project No. L145-005.05

December 15, 2009

BERLIN BIOPOWER
NPDES INDIVIDUAL STORMWATER DISCHARGE PERMIT APPLICATION
Berlin, New Hampshire

Prepared For:

Laidlaw Berlin BioPower, LLC
90 John Street, Fourth Floor
New York, New York 10038-3202

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482-3747

ESS Project No. L145-005.05

December 15, 2009

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1.0 INTRODUCTION

Laidlaw Berlin BioPower, LLC ("LBB") is proposing to convert and upgrade much of the remaining facility equipment and infrastructure located at the former Fraser Pulp Mill (also referred to as the Burgess Mill) in Berlin, New Hampshire (the "Site") in order to develop a biomass fueled energy generating facility. Berlin BioPower (the Facility) will use whole tree wood chips and other low-grade wood as fuel, and will be capable of generating nominally 70 megawatts (MW) of electric power. The Facility will provide a source of clean renewable energy that will help support New Hampshire's Renewable Energy goals, reduce reliance on fossil fuels such as oil and natural gas that are in ever decreasing supply, support sustainable forest management in northern New England, and provide a long term reliable market for low grade biomass which will significantly contribute to the health of the surrounding forests.

In addition to the biomass boiler, the Facility will include a wet cooling tower, steam turbine generator, wood fuel handling and storage areas, wood conveying equipment, and site access roadways. Wastewater sources include boiler blow down; cooling tower blow down; raw water reverse osmosis system reject water; and wastewater from periodic equipment washing.

Stormwater from areas of significant activity or material storage on the Site will be collected and treated through a newly installed stormwater management system. The system will utilize a series of structures (detention basins, deep sump catch basins with hooded inlets, oil water separators, vegetated swales, etc.) that will control peak runoff rates to match historical conditions, provide pretreatment of stormwater runoff, and ensure compliance with the New Hampshire Department of Environmental Services ("NHDES") Stormwater Manual and Alteration of Terrain Program regulations.

The stormwater will leave the Site through an existing 30 inch diameter pipe that leads to the former Pulp Mill Wastewater Treatment Plant (WWTP). The pipe will be disconnected from the WWTP and interconnected to the existing outfall discharge pipe that services the WWTP currently operated by the Androscoggin Valley Regional Refuse Disposal District (the "District"). LBB has entered into agreements with the District to share the outfall structure with individual water quality sampling points located upstream of the confluence of the effluent streams to provide for individual compliance determinations.

The water supply for the Facility will be provided by the Berlin Water Works municipal supply and distribution system. The Facility will have a peak demand of up to 1.8 million gallons per day ("MGPD") of water, and annual average demand of approximately 1.0 MGD. Water will be used primarily for cooling tower and boiler make-up, periodic equipment washing, and sanitary uses. The Project incorporates water recycling and re-use strategies to minimize raw water demand.

The Facility is located in the city of Berlin, New Hampshire, north and east of Community, Coos, and Hutchins Streets. The Facility is bordered on the north and west by the Androscoggin River and the remaining portion of the former Fraser Pulp Mill site. Figure 1 provides a Project Locus Map showing the location of the Facility Site and the interconnection to the downstream outfall. An Overall Site Layout Plan is provided in Figure 2 showing the layout and location of the Facility's components.

2.0 WATER SYSTEMS

The power generation process will utilize two recirculating water systems; a steam generation system and a cooling water system. In the steam generation cycle, feedwater will be pumped through heat exchangers that will recover heat from downstream operations and into the boiler. The water will be circulated through metal tubes within the boiler where it will be converted to superheated steam. The steam will then be used to power a turbine which will mechanically drive an electric generator. After leaving the turbine, the steam will be cooled back to the liquid state in a condenser and returned to the feedwater pumps. In order to prevent the build up of contaminants in the recirculating steam system, a small fraction of the water will be "blown down" to the wastewater system.

The cooling water cycle will pump water to the steam condenser to remove heat and return the steam to water. The heated cooling water leaving the condenser will be delivered to a wet cooling tower. In the cooling tower, the water will be sprayed over the top of packing material and passed down through counterflowing ambient air drawn through the tower by large fans mounted in the top of the unit. The recirculating water will be cooled by both heat transfer to the air and evaporation as it passes through the tower flowing through the induced air stream. The exhaust system of the cooling tower will be equipped with mesh drift eliminators that will control the discharge of entrained water droplets to less than 0.0005% of the recirculating water flow. The cooled water leaving the tower will be returned to the steam condenser system. Similar to the steam cycle, a portion of the recirculating water will be blown down to the wastewater discharge system and raw water added to prevent the accumulation of contaminants.

The flows of raw water and waste water through the facility are shown in Figure 4 and tabulated in Table 1. The water for the Facility will be provided by the Berlin Water Works municipal supply and distribution system. The Facility will require up to 1.8 million gallons per day of water, primarily for boiler and cooling tower make-up, with the balance used for water purification system back wash, periodic equipment washing, and sanitary uses. A reverse osmosis water treatment system will be used to provide demineralized water to be used for steam cycle makeup for the boiler. A 15,000 gallon demineralized water tank will be used for on-site storage.

A preliminary list of water treatment chemicals is provided in Table 2. Water treatment for the boiler make-up water will consist of reverse osmosis and a treatment program consisting of phosphate, caustic, neutralizing amine and oxygen scavenger for water used in the closed loop steam system. The cooling water treatment program for the cooling tower makeup water will consist of corrosion inhibitor, dispersant and biocides to prevent biological growth in the cooling system components. All process wastewater, including water collected in floor drains from equipment washing, will be discharged to the city sewer system that connects to the municipal Waste Water Treatment Facility. The Facility will discharge up to 300,000 gallons per day of sanitary and process wastewater to the municipal sewer system. It is not expected that the Facility wastewater will require any pretreatment to meet all applicable state and city discharge requirements.

The primary source of water for fire protection will also be city water. A diesel engine-driven fire pump will be used as a backup system. The entire wood storage area and power block will be served by an underground hydrant system. Fire protection for buildings will be designed to meet applicable codes and the requirements of the local Fire Department.

3.0 STORMWATER

The proposed Site will incorporate approximately 34.2 acres of impervious area including the access roadway, buildings, parking areas/driveway, cooling towers, holding tanks, equipment, and paved areas designated to store the wood fuel piles. The overall Site Grading and Drainage Systems are shown in Figure 3.

For the purpose of designing the stormwater management system, the Site is divided into four proposed watersheds. The proposed watersheds continue to flow to the same locations as they do under existing conditions but will incorporate new controls in areas where facility activities present the potential for contaminants to enter stormwater. Descriptions of the proposed watersheds are listed below:

Proposed Watershed PW-1 - is approximately 10.3 acres and encompasses wooded areas, grassed areas, an existing building (to remain), gravel roads, the proposed cooling towers, and a bordering vegetated wetland located along the bank of the Androscoggin River (approximately 840 linear feet). Similar to existing conditions, stormwater runoff generated from this watershed overland flows to the river in sheet fashion.

Proposed Watershed PW-2 - is approximately 19.9 acres and encompasses wooded areas, grassed areas, several existing buildings (to remain), pavement, and a proposed parking area for the community ball field adjacent to the Project Site. A portion of the stormwater runoff generated from this watershed is routed through a proposed vegetated swale located along the northerly boundary of the watershed prior to discharging to the municipal drainage system in Coos Street. The remaining stormwater runoff generated from the watershed will continue to overland flow to the municipal drainage system located in Coos Street and Community Street.

Proposed Watershed PW-3 – is approximately 4.2 acres and encompasses wooded areas, grassed areas, pavement, and a bordering vegetated wetland (approximately 1,235 square feet). The watershed is bound to the south by watersheds PW-1 and PW-4a. Similar to existing conditions, the stormwater runoff generated from this watershed flows to the existing culvert that drains to the 48-inch pipe which discharges to the Androscoggin River.

Proposed Watershed PW-4 - is divided into ten (10) sub-watersheds labeled PW-4a through PW-4j. This watershed encompasses the Facility and the majority of the Site development. The stormwater runoff generated from this watershed will be conveyed via an existing 30 inch pipe to an outfall that services the former pulp mill wastewater treatment plant, where it discharges into the Androscoggin River.

- **Proposed Sub-watershed PW-4a** – is approximately 10.8 acres and encompasses wooded areas, grass areas, pavement, and reserve wood chip fuel storage areas. The entrance to the Site is located off of Hutchins Street at the southeasterly edge of the sub-watershed where a high point in the road defines the limit of the sub-watershed. The majority of the stormwater runoff generated from this sub-watershed flows to a concrete swale that conveys the stormwater runoff to a lined detention basin via a riprap splash pad. The outlet control structure of the detention basin discharges stormwater runoff to a lined vegetated swale located in sub-watershed PW-4c. A 24-inch overflow pipe, a secondary outlet from the detention basin, conveys any additional stormwater runoff to a lined detention basin located in sub-watershed PW-4b.

- **Proposed Sub-watershed PW-4b** - is approximately 2.3 acres and encompasses grass areas and pavement. The stormwater runoff generated from this sub-watershed flows to a lined detention basin. The outlet control structure of the detention basin conveys stormwater runoff to a lined vegetated swale located in sub-watershed PW-4c.

- **Proposed Sub-watershed PW-4c** – is approximately 8.5 acres and encompasses grass areas, pavement and a portion of an existing building. The stormwater runoff generated from this sub-watershed flows to a lined vegetated swale that conveys the stormwater to a lined wet pond located in sub-watershed PW-4d via a riprap splash pad.

- **Proposed Sub-watershed PW-4d –** is approximately 0.9 acres and encompasses grass areas and pavement. The stormwater runoff generated from this sub-watershed flows to a lined wet pond. The outlet control structure of the wet pond discharges stormwater runoff to the closed drainage system that connects to the existing 30 inch pipe leading to the outfall at the river.

- **Proposed Sub-watershed PW-4e** - is approximately 1.5 acres and encompasses grass areas, pavement, and Facility equipment. The stormwater runoff generated from this sub-watershed flows to the lined wet pond located in sub-watershed PW-4d where it is treated then conveyed via the closed drainage system to the existing 30 inch pipe leading to the outfall at the river.

- **Proposed Sub-watershed PW-4f** - is approximately 3.5 acres and encompasses grass areas, pavement, Facility equipment, and a wood chip fuel pile area. The stormwater runoff generated from this sub-watershed overland flows to a lined detention basin via a lined vegetated swale. The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands located in sub-watershed PW-4g via a closed drainage system.

- **Proposed Sub-watershed PW-4g** - is approximately 2.4 acres and encompasses grass areas, pavement, Facility equipment, and a wood chip fuel pile area. The stormwater runoff generated from this sub-watershed overland flows to a lined detention basin. The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe leading to the outfall at the river.

- **Proposed Sub-watershed PW-4h** - is approximately 1.3 acres and encompasses grass areas, pavement, and a wood chip fuel pile area. The stormwater runoff generated from this sub-watershed flows to a lined detention basin. The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands for further treatment.

Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe leading to the outfall at the river.

- **Proposed Sub-watershed PW-4i** - is approximately 3.5 acres and encompasses grass areas, pavement, gravel roads, existing/proposed buildings, and parking areas. The major components of the Facility are located within this sub-watershed including the boiler, turbine generator building, and holding tanks. The stormwater runoff generated from this sub-watershed flows to the subsurface gravel wetlands for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe leading to the outfall at the river.

  Proposed Sub-watershed PW-4j – is approximately 0.3 acres and encompasses a proposed lined detention basin. The stormwater runoff generated from this sub-watershed flows to a lined vegetated swale that conveys the stormwater runoff to the detention basin. The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe leading to the outfall at the river.

The watersheds described above are shown on the Watershed Plan provided as Figure 4 Appendix A.

4.0 RECEIVING WATER BODY

The Androscoggin River runs in a generally north-south direction and abuts the Site for nearly the entire length of its western and northwestern borders. The Site is within the middle Androscoggin River watershed. The banks of the Androscoggin River are steep and the river drops in elevation along the Site. The former mills at the Site included buildings and infrastructure built into the bank and within the river.

The Androscoggin River level is controlled by multiple dams near the site. At the northwest end of the Site is the Sawmill Dam and the Riverside Dam is south of the southwest end of the Site. The flow rate and height of the Androscoggin River fluctuate as a result of changes in seasonal precipitation and the operation of these dams. The USGS classifies the Androscoggin River as a "large stream to river" (greater than 1,000 to 10,000 cubic feet per second). The FEMA Flood Insurance Rate Map shows the 100-year flood elevation ranging from approximately 1050 to 1015 feet.

NH DES classifies the Androscoggin River as a Class B surface water body. Class B waters are defined as the second highest quality waters acceptable for fishing, swimming, and other recreational purposes, and after adequate treatment, for use as water supplies. According to the State of New Hampshire 2000 Section 305(b) Water Quality Report, the Androscoggin River is considered "impaired" due to water quality exceedances of copper, dioxins, pathogens, and zinc. In addition, the Androscoggin River Watershed Council posted a swimming advisory for the Androscoggin River beginning one mile north of the Berlin and Gorham town line. It is unknown when the swimming advisory took effect (US Department of Health and Human Services 2007).

5.0 RATIONAL FOR PROPOSED EFFLUENT LIMITS

Proposed effluent limits are presented below as determined from the following sources:

- 40 CFR 423: Steam Electric Power Generating Point Source Category. This Point Source Category, as defined in 40 CFR 423.10, applies to processes that utilize fossil fuel (coal, oil, or gas) or nuclear fuel, but does not apply to wood biomass units. However, wastewater discharges from wood biomass power units are similar to fossil fuel units. Therefore, the effluent limitations on fossil fuel units found in 40 CFR 423 will serve as a guideline.

- New Hampshire Surface Water Quality Regulations: Chapter 1700. The expected stormwater discharges from the Facility were used in conjunction with the 7Q10 for the portion of the Androscoggin River in area of the outfall proposed for use by the Facility's to calculate a dilution ratio for the discharges. In all instances, the limits presented in the categorical standard were found to be more restrictive. However, the water quality standards have also been considered with respect to pollutants not listed in the categorical standard, as discussed below.

The following limits were developed using the sources listed.

5.1 Conventional Pollutants

The five conventional pollutants, as defined in 40 CFR 401.16, are biochemical oxygen demand (BOD), total suspended solids (TSS), pH, fecal coliform, and oil and grease. The proposed limits were developed as follows:

- BOD: no limit was proposed for BOD, as the BOD of the wastewater is not expected to be an issue. Rather, Chemical Oxygen Demand (COD), was used as a gauge of wastewater effluent quality.

- TSS: the TSS limit of 100 mg/L was taken from the New Source Performance Standard in the Steam Electric Power Generating Source.

- pH: the pH limit of 6.5 to 8.0 was taken from New Hampshire Surface Water quality standards (NHDES Env-Ws 1703.18).

- Fecal Coliform: no sanitary wastewater will be treated in LBB's WWTP.

- Oil and Grease: The proposed limit is 20 mg/L, from the New Source Performance Standard in the Steam Electric Power Generating Source.

5.2 Toxic Pollutants

Toxic (or Priority) Pollutants are defined in the Clean Water Act, section 307(a)(1). They include man-made organic compounds and metals. Currently, this list includes 126 chemicals and/or chemical categories. The list was developed by the EPA as a set of chemical pollutants for which EPA has published analytical test methods. Proposed toxic pollutant effluent limits are as follows:

- Total Copper: the maximum daily discharge limit of 1.0 mg/L is based on the New Source Performance Standard in the Steam Electric Power Generating Source.

- Total Chromium: the maximum daily discharge limit of 0.2 mg/L is based on the New Source Performance Standard in the Steam Electric Power Generating Source.

- Total Zinc: the maximum daily discharge limit of 1.0 mg/L is based on the New Source Performance Standard in the Steam Electric Power Generating Source.

- Total Iron: the limit of 1.0 mg/L is based on the New Source Performance Standard in the Steam Electric Power Generating Source.

- 126 Priority Pollutants (not including Cadmium, Copper, and Zinc): the limit of "non-detect" is based on the New Source Performance Standard in the Steam Electric Power Generating Source.

- Whole Effluent Toxicity: in order to protect fish in the Androscoggin River, Whole Effluent Toxicity (WET) has been included as a proposed effluent limit. This is based on the potential to discharge water treatment chemicals used in the boiler water and cooling tower systems for which chemical specific limits are not available. A $LC_{50} \geq 100$ permit limit for whole effluent toxicity will be considered to be the maximum daily limit.

5.3 Non-Conventional Pollutants

Non-Conventional Pollutants are those parameters which do not fall under either conventional or toxic pollutants. Proposed limits for non-conventional pollutants include:

- Chemical Oxygen Demand (COD): the proposed limit of 120 mg/L is based on the COD limit for the Timber Product industry, from EPA's Multi-Sector General Permit for Storm Water Discharges from Industrial Activity.

- Total Residual Chlorine: the daily maximum limit of 0.2 mg/L is based on the New Source Performance Standard in the Steam Electric Power Generating Source.

- Turbidity: the limit of 10 NTUs is based on New Hampshire Surface Water quality standards (NHDES Env-Ws 1703.10).

- Phosphorous and Nitrogen: there is no proposed limit for phosphorous and nitrogen. Rather, LBB will report the values of these parameters. The New Hampshire Surface Water quality standards (NHES Env-Ws 1703.14) states that "Class B waters shall contain no phosphorous or nitrogen in such concentrations that would impair any existing or designated uses, unless naturally occurring." It is not expected that phosphorous and nitrogen discharges in the stormwater effluent from the Facility will exceed natural background levels.

- Alkalinity: the daily maximum limit of 20 mg/L is based on the fresh acute and chronic criteria of the New Hampshire Surface Water quality standards (NHDES Env-Ws 1703.21).

- Temperature: the proposed daily maximum temperature limit is 85 degrees Fahrenheit (^{o}F), and a temperature differential of 20^{o}F. These proposed limits meet the narrative temperature criteria in the New Hampshire Surface Water quality standards (NHDES Env-Ws 1703.13(b)). LBB expects that the facility's maximum discharge temperature would cause an indiscernible rise in ambient stream flow temperature.

6.0 FUTURE COMPLIANCE

During construction, LBB will prevent storm water pollution by complying with a Construction Storm Water Pollution Prevention Plan. A Notice of Intent (NOI) will be filed with the EPA before construction begins.

Once the project commences, LBB will comply with a Pollution Prevention and Emergency Response Plan, which includes elements of EPA's SPCC rule (40 CFR 112), as well as the EPA's MSGP for Storm Water Discharges from Industrial Activities.

Tables

Table 1 - Water Balance Table

Stream	Description	Average Annual (gpd)	Peak Annual (gpd)
1	From City Water Supply to Boiler Plant	1,246,244	1,796,966
2	Raw Water Usage at CT and Plant	1,219,888	1,772,968
3	To RO Inlet for Feedwater Process	23,998	23,998
4	Reject from RO to Wastewater	4,800	4,800
5	Various Internal Plant Uses	1,440	1,440
6	Makeup to CT Basin from City Water Supply	1,218,304	1,771,528
7	Evaporation & Drfit Losses at CT	1,032,833	1,492,272
8	Boiler Blowdown - Cont. & Intermittent	19,198	19,198
9	Circulating Water Returen to CT	86,400,000	86,400,000
10	Bottom Ash Quenching	2,160	2,160
11	CT Blowdown to Wastewater	206,566	298,454
12	Wastewater Discharge to Sewer	205,775	297,734
13	Wastewater from Oil Water Separator	1,440	1,440
14	Potable Water to Plant Domestic Use	1,440	1,440
15	Domestic System Discharge to Sewer	1,440	1,440
16	Total Discharge to Sewer	212,612	303,974
17	Makeup to Boiler Feedwater	19,198	19,198

Table 2
Raw Water Treatment Preliminary Chemical List

Chemical Function	Active Constituents	Feedpoint	PPM as Product		PPM Active	As Product
			Min ppm	Max ppm	Average	daily Max LBS
Phosphate/Dispersant	Phosphate/Polymethacrelate (1.8 to 1 Na:PO4 ratio)	HP Steam Drum	10	15	12	20
Neutralizing Amine	Diethylaminoethanol/ Morpholine	DA Dropleg	1.0	3.0	0.152	40
Caustic	NaOH	HP Steam Drum				
Oxygen Scavenger	Carbohydrazide	DA Dropleg	0.1	1	0.5	25
Dispersant	Anionic Polymer	condenser water return	1	2	1.5	25
Corrosion Inhibitor	Pyrophosphate	condenser water return	30	40	10	50
Microbiocide	12.5% Bleach	Cooling Tower Sump			0.25	1250
Microbiocide	Sodium Bromide	Cooling Tower Sump	5	20	15	1329
Dechlorination	sodium Bisulfite 40%	RO inlet after filters/with Cl2 analyzer	~4	~8		13
RO Antiscalant	polymer	RO inlet after filters	3	5		6
Alkaline Cleaner	Proprietary	Cleaning tank				
Acidic Cleaner	Proprietary	Cleaning tank				

Figures

Location: J:/L145-001 LLEG Berlin/GIS/00-mxd/wastewater.mxd

ESS Group, Inc.

Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Scale: 1" = 1,500'

0 1,000 Feet

Source: 1) New Hampshire GRANIT Ortho, 1998

Project Locus Map

Figure 1

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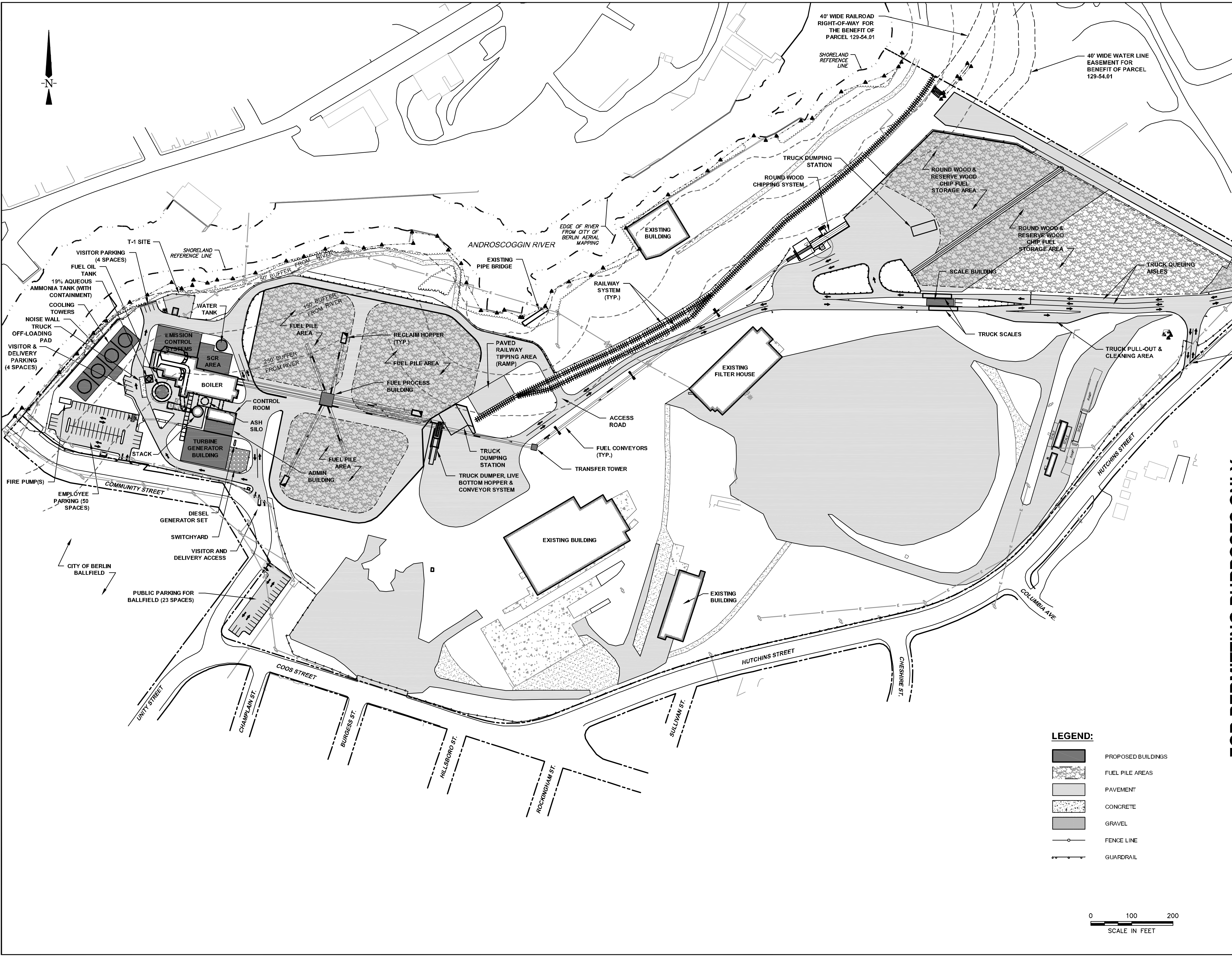
XREF: L145-Drainage-Base [H:\L145-Laidlaw\XREF\L145-Drainage-Base.dwg]
XREF: L145-Utilities-Base [H:\L145-Laidlaw\XREF\L145-Utilities-Base.dwg]



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No.	REVISION	DATE	APP BY

DRAWN BY: DJG	CHECKED BY: JCB
DESIGNED BY: DJG	APPROVED BY: JCB

LaidLaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

Biomass Energy Facility
Berlin, NH

OVERALL SITE LAYOUT & MATERIALS PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 6 of 22
SCALE: 1"=100'

Fig. 2

XREF: L145-XE01 [H:\L145-Laidlaw\xref\L145-XE01.dwg]
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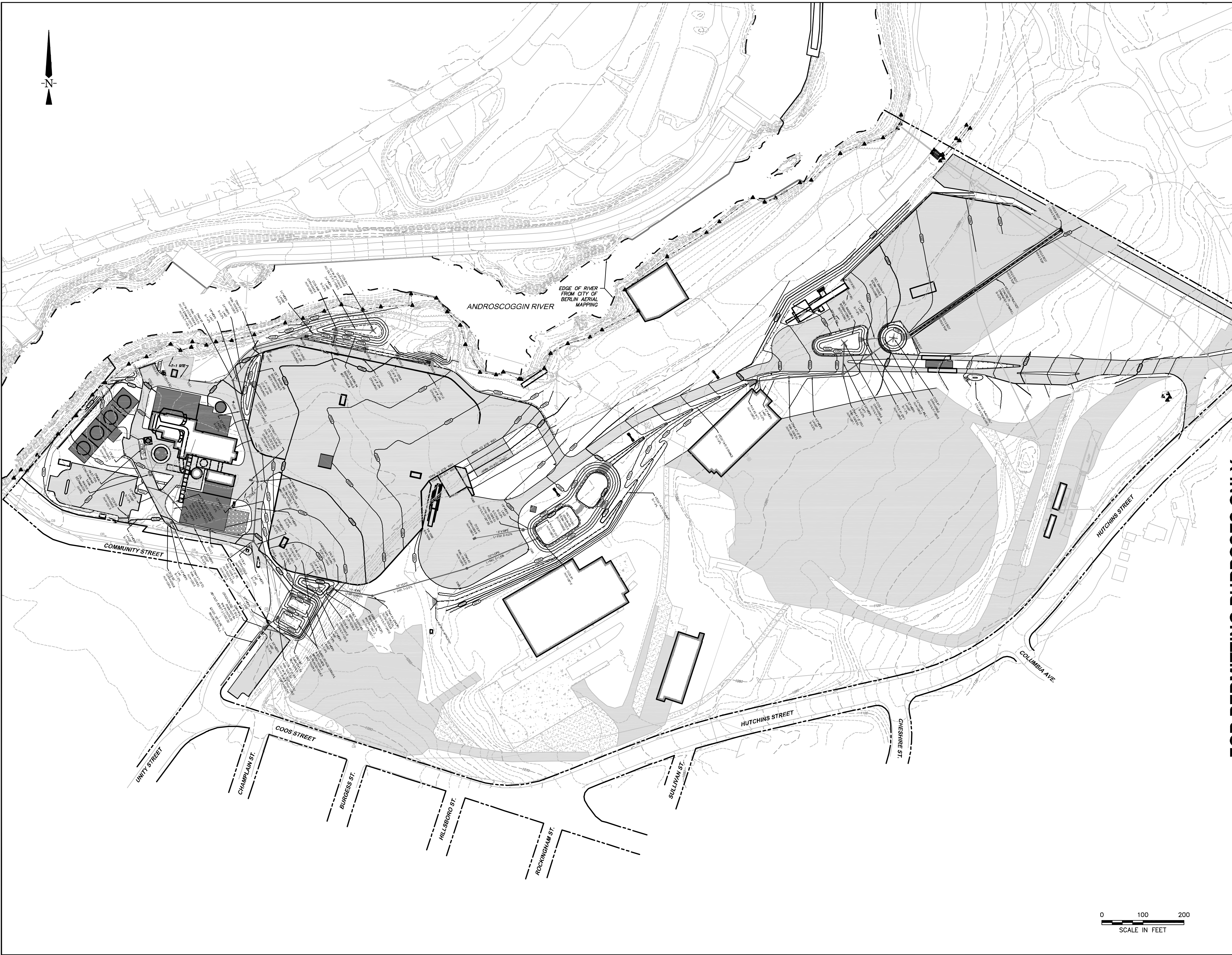

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CHECKED BY: JCB
DESIGNED BY: DJG
APPROVED BY: JCB

LaidLaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

Biomass Energy Facility
Berlin, NH

OVERALL SITE GRADING & DRAINAGE PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.:
SCALE: 1"=100'

Fig. 3

DATE: Dec 15, 2009 - 10:28AM
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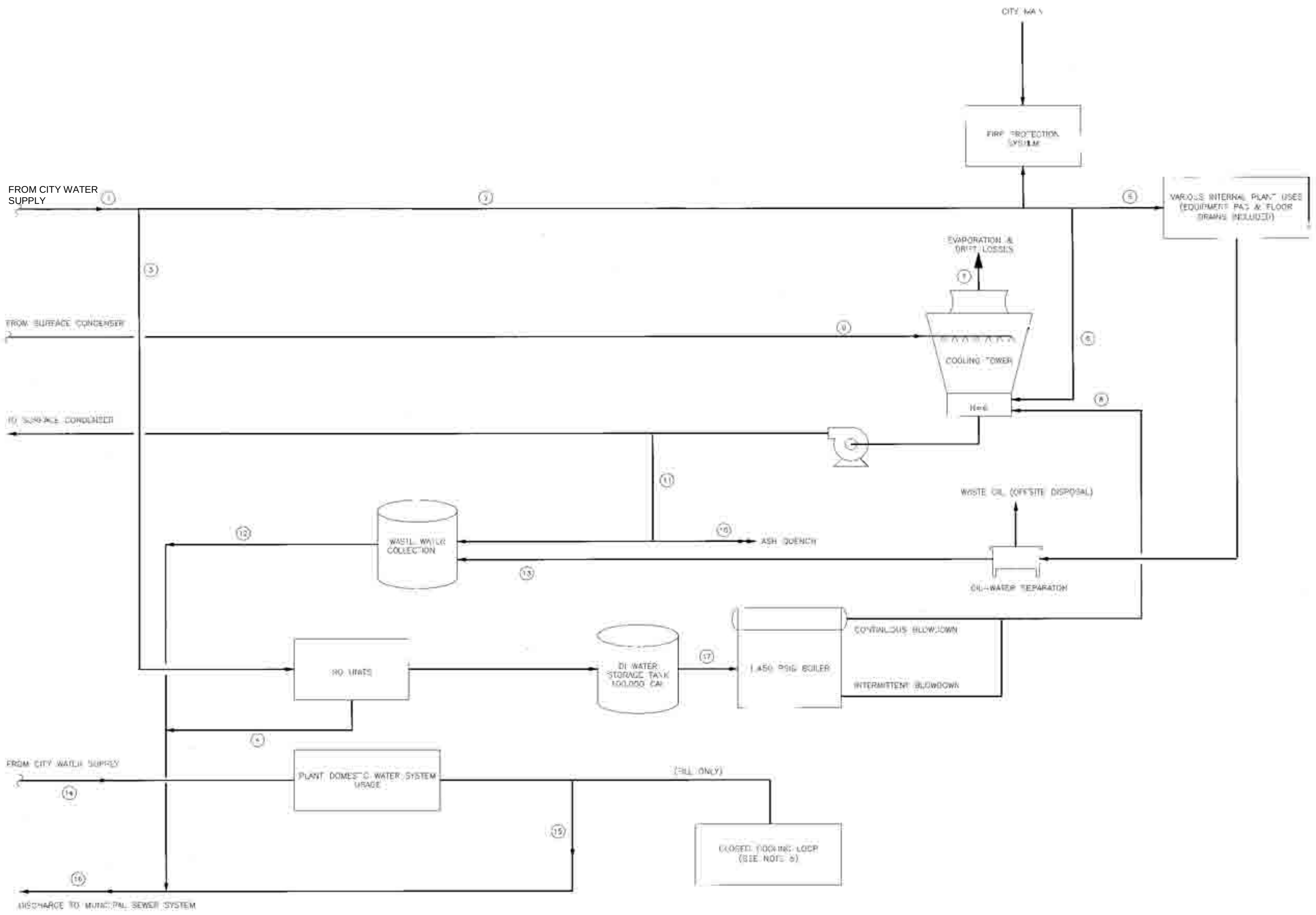

NOTES:

1. TURBINE PERFORMANCE [illegible] UNIT, STG DESIGN DATA DATED 6-12-5.

2. FUEL BASED ON B&W BOILER DATA DATED 9-18-09.

3. CLOSED COOLING SYSTEM IS A CLOSED PIPING LOOP WITH NO MAKE UP OR DISCHARGE DURING NORMAL OPERATION. SMALL PORTIONS OF THE SYSTEM WILL BE DRAINED PERIODICALLY FOR MAINTENANCE PURPOSES ONLY, AND THE WATER REMOVED FROM THE SYSTEM WILL BE DISPOSED OF OFF-SITE.

4. THE FIRE PROTECTION SYSTEM ONLY CONSUMES WATER DURING FIRST FILL AND IN THE EVENT OF EMERGENCY. FOR THE PURPOSES OF THE BALANCE, THE NET CONSUMPTION IS ZERO.

REV. NO.	REV. BY	DATE	DESCRIPTION	CHECKED BY	APPROVED BY
B			REV'D FOR 6 CELL COOLING TOWER		
A	DMM	9/18/09	ISSUED FOR PERMITTING ONLY		

SEAL:

PRELIMINARY

IN-PROCESS DOCUMENT FOR INFORMATION ONLY

NO OTHER USE IS INTENDED

10/27/09

SIGNATURE:

DATE:

	NAME	DATE
DRAWN BY		9-1?-09
CHECKED BY		
APPROVED BY		9-1?-09

WALDRON

ENGINEERING & CONSTRUCTION INC.

EXETER, NH 03833

www.waldron.com

CLIENT

HOMELAND LAIDLAW ENERGY, LLC

Figure 4

DRAWING TITLE

BERLIN BIOMASS ENERGY FACILITY

Berlin, New Hampshire

WATER BALANCE DIAGRAM

CLIENT DRAWING No.

W-E&C DRAWING No.

103.01-02-WB1A-B

Appendix A

EPA Form 1

Please print or type in the unshaded areas only. Form Approved. OMB No. 2040-0086.

FORM 1 GENERAL

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

S		T/A	C
F			D
1	2 … 13	14	15

LABEL ITEMS	
I. EPA I.D. NUMBER	PLEASE PLACE LABEL IN THIS SPACE
III. FACILITY NAME	
V. FACILITY MAILING ADDRESS	
VI. FACILITY LOCATION	

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of **bold-faced terms**.

SPECIFIC QUESTIONS	Mark "X" YES	Mark "X" NO	Mark "X" FORM ATTACHED	SPECIFIC QUESTIONS	Mark "X" YES	Mark "X" NO	Mark "X" FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a **discharge** to **waters of the U.S.**? (FORM 2A)	16	17	18	B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a **discharge** to **waters of the U.S.**? (FORM 2B)	19	20	21
C. Is this a facility which currently results in **discharges** to **waters of the U.S.** other than those described in A or B above? (FORM 2C)	22	23	24	D. Is this a proposed facility *(other than those described in A or B above)* which will result in a **discharge** to **waters of the U.S.**? (FORM 2D)	25	26	27
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)	28	29	30	F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)	31	32	33
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)	34	35	36	H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)	37	38	39
I. Is this facility a proposed **stationary source** which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)	40	41	42	J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an **attainment area**? (FORM 5)	43	44	☐ 45

III. NAME OF FACILITY

C			
1	SKIP	Ortho Locus Map - Site and Adjacent Structures	
15	16 – 29	30 … 69	

IV. FACILITY CONTACT

C	A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
2	Ortho Locus Map -	(802) 229-4146
15	16 … 45	46 48 49 51 52- 55

V. FACILTY MAILING ADDRESS

C	A. STREET OR P.O. BOX
3	45 State Street
15	16 … 45

C	B. CITY OR TOWN	C. STATE	D. ZIP CODE
4	Montpelier	VT	05602
15	16 … 40	41 42	47 … 51

VI. FACILITY LOCATION

C	A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER
5	57 Hutchins Street
15	16 … 45

B. COUNTY NAME
Coos County
46 … 70

C	C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
6	Berlin	NH	03570	0 0 7
15	16 … 40	41 42	47 … 51	52 -54

EPA Form 3510-1 (8-90) CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

VII. SIC CODES (*4-digit, in order of priority*)

A. FIRST	B. SECOND
7 4911 (*specify*) ELECTRIC SERVICES	7 (*specify*)
C. THIRD	D. FOURTH
7 (*specify*)	7 (*specify*)

VIII. OPERATOR INFORMATION

A. NAME

8 LAIDLAW BERLIN BIOPOWER, LLC

B. Is the name listed in Item VIII-A also the owner? ☑ YES ☐ NO

C. STATUS OF OPERATOR (*Enter the appropriate letter into the answer box: if "Other," specify.*)

F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC (*other than federal or state*)
O = OTHER (*specify*)

P (*specify*)

D. PHONE (*area code & no.*)

A (212) 480-8400

E. STREET OR P.O. BOX

90 John Street, 4th Floor

F. CITY OR TOWN

B New York

G. STATE

NY

H. ZIP CODE

10038

IX. INDIAN LAND

Is the facility located on Indian lands? ☐ YES ☑ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (*Discharges to Surface Water*)	D. PSD (*Air Emissions from Proposed Sources*)
9 N	9 P
B. UIC (*Underground Injection of Fluids*)	E. OTHER (*specify*)
9 U	9 (*specify*)
C. RCRA (*Hazardous Wastes*)	E. OTHER (*specify*)
9 R	9 (*specify*)

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers, and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (*provide a brief description*)

Laidlaw Berlin BioPower, LLC ("LBB") is proposing to convert and upgrade much of the remaining facility equipment and infrastructure located at the former Fraser Pulp Mill (also referred to as the Burgess Mill) in Berlin, New Hampshire (the "Site") in order to develop a biomass fueled energy generating facility. Berlin BioPower (the "Facility" or the "Project") will use whole tree wood chips and other low-grade clean wood as fuel, and will be capable of generating nominally 70 megawatts (MW) of electric power (gross output).

Stormwater from areas of significant activity or material storage on the Site will be collected and treated through a newly installed stormwater management system. The system will utilize a series of structures (detention basins, deep sump catch basins with hooded inlets, oil water separators, vegetated swales, etc.) that will control peak runoff rates to match historical conditions, provide pretreatment of stormwater runoff, and ensure compliance with the New Hampshire Department of Environmental Services ("NHDES") Stormwater Manual and Alteration of Terrain Program regulations.

The stormwater will be leave the Site through an existing 30 inch diameter pipe that leads to the former Pulp Mill Wastewater Treatment Plant (WWTP). The pipe will be disconnected from the WWTP and interconnected to the existing outfall discharge pipe that services the WWTP currently operated by the Androscoggin Valley Regional Refuse Disposal District (the "District"). LBB has entered into agreements with the District to share the outfall structure with individual water quality sampling points located upstream of the confluence of the effluent streams to provide for individual compliance determinations.

XIII. CERTIFICATION (*see instructions*)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (*type or print*)	B. SIGNATURE	C. DATE SIGNED
Louis T. Bravakis, Vice President		12/14/09

COMMENTS FOR OFFICIAL USE ONLY

C

Appendix B

EPA Form 2

Please print or type in the unshaded areas only.

EPA ID Number (*copy from Item 1 of Form 1*)
`Ortho Locus Map -`

Form Approved. OMB No. 2040-0086
Approval expires 5-31-92

FORM
2F
NPDES

U.S. Environmental Protection Agency
Washington, DC 20460

Application for Permit to Discharge Storm Water Discharges Associated with Industrial Activity

Paperwork Reduction Act Notice

Public reporting burden for this application is estimated to average 28.6 hours per application, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate, any other aspect of this collection of information, or suggestions for improving this form, including suggestions which may increase or reduce this burden to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue, NW, Washington, DC 20460, or Director, Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

I. Outfall Location

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. Outfall Number (*list*)	B. Latitude			C. Longitude			D. Receiving Water (*name*)

II. Improvements

A. Are you now required by any Federal, State, or local authority to meet any implementation schedule for the construction, upgrading or operation of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.

1. Identification of Conditions, Agreements, Etc.	2. Affected Outfalls		3. Brief Description of Project	4. Final Compliance Date	
	number	source of discharge		a. req.	b. proj.

B: You may attach additional sheets describing any additional water pollution (or other environmental projects which may affect your discharges) you now have under way or which you plan. Indicate whether each program is now under way or planned, and indicate your actual or planned schedules for construction.

III. Site Drainage Map

Attach a site map showing topography (or indicating the outline of drainage areas served by the outfalls(s) covered in the application if a topographic map is unavailable) depicting the facility including: each of its intake and discharge structures; the drainage area of each storm water outfall; paved areas and buildings within the drainage area of each storm water outfall, each known past or present areas used for outdoor storage of disposal of significant materials, each existing structural control measure to reduce pollutants in storm water runoff, materials loading and access areas, areas where pesticides, herbicides, soil conditioners and fertilizers are applied; each of its hazardous waste treatment, storage or disposal units (including each area not required to have a RCRA permit which is used for accumulating hazardous waste under 40 CFR 262.34); each well where fluids from the facility are injected underground; springs, and other surface water bodies which received storm water discharges from the facility.

Continue on Page 2

Continued from the Front

IV. Narrative Description of Pollutant Sources

A. For each outfall, provide an estimate of the area (include units) of imperious surfaces (including paved areas and building roofs) drained to the outfall, and an estimate of the total surface area drained by the outfall.

Outfall Number	Area of Impervious Surface *(provide units)*	Total Area Drained *(provide units)*	Outfall Number	Area of Impervious Surface *(provide units)*	Total Area Drained *(provide units)*
0001	23.8 acres	35.2 acres			

B. Provide a narrative description of significant materials that are currently or in the past three years have been treated, stored or disposed in a manner to allow exposure to storm water; method of treatment, storage, or disposal; past and present materials management practices employed to minimize contact by these materials with storm water runoff; materials loading and access areas, and the location, manner, and frequency in which pesticides, herbicides, soil conditioners, and fertilizers are applied.

Aee Application test Section 2.0 and SWPPP provided in Appendix A.

C. For each outfall, provide the location and a description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff; and a description of the treatment the storm water receives, including the schedule and type of maintenance for control and treatment measures and the ultimate disposal of any solid or fluid wastes other than by discharge.

Outfall Number	Treatment	List Codes from Table 2F-1
0001	See Application text Section 3.0	

V. Nonstormwater Discharges

A. I certify under penalty of law hat the outfall(s) covered by this application have been tested or evaluated for the presence of nonstormwater discharges, and that all nonstormwater discharged from these outfall(s) are identified in either an accompanying Form 2C or From 2E application for the outfall.

Name and Official Title *(type or print)*	Signature	Date Signed
Louis T. Bravakis	L T Bravakis	12/14/09

B. Provide a description of the method used, the date of any testing, and the onsite drainage points that were directly observed during a test.

Engineering design of project.

VI. Significant Leaks or Spills

Provide existing information regarding the history of significant leaks or spills of toxic or hazardous pollutants at the facility in the last three years, including the approximate date and location of the spill or leak, and the type and amount of material released.

Not Applicable

Continue on Page 3

Continued from Page 2

EPA ID Number *(copy from Item 1 of Form 1)*

VII. Discharge Information

A, B, C, & D: See instructions before proceeding. Complete one set of tables for each outfall. Annotate the outfall number in the space provided.
Table VII-A, VII-B, VII-C are included on separate sheets numbers VII-1 and VII-2.

E. Potential discharges not covered by analysis – is any toxic pollutant listed in table 2F-2, 2F-3, or 2F-4, a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

☐ Yes (*list all such pollutants below*) ☑ No (*go to Section IX*)

VIII. Biological Toxicity Testing Data

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

☐ Yes (*list all such pollutants below*) ☑ No (*go to Section IX*)

IX. Contract Analysis Information

Were any of the analyses reported in Item VII performed by a contract laboratory or consulting firm?

☐ Yes (*list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below*) ☑ No (*go to Section X*)

A. Name	B. Address	C. Area Code & Phone No.	D. Pollutants Analyzed

X. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name & Official Title (*Type Or Print*) Louis T. Bravakis	B. Area Code and Phone No. (802) 229-4146
C. Signature	D. Date Signed 12/14/04

Continued from Page 2

EPA ID Number (*copy from Item 1 of Form 1*)
10038

VII. Discharge Information

A, B, C, & D: See instructions before proceeding. Complete one set of tables for each outfall. Annotate the outfall number in the space provided.
Table VII-A, VII-B, VII-C are included on separate sheets numbers VII-1 and VII-2.

E. Potential discharges not covered by analysis – is any toxic pollutant listed in table 2F-2, 2F-3, or 2F-4, a substance or a component of a substance which you currently use or manufacture as an intermediate or final product or byproduct?

☐ Yes (*list all such pollutants below*) ☑ No (*go to Section IX*)

VIII. Biological Toxicity Testing Data

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

☐ Yes (*list all such pollutants below*) ☑ No (*go to Section IX*)

IX. Contract Analysis Information

Were any of the analyses reported in Item VII performed by a contract laboratory or consulting firm?

☐ Yes (*list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below*) ☑ No (*go to Section X*)

A. Name	B. Address	C. Area Code & Phone No.	D. Pollutants Analyzed

X. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name & Official Title (*Type Or Print*)	B. Area Code and Phone No.
C. Signature	D. Date Signed

EPA ID Number (*copy from Item 1 of Form 1*)

Form Approved. OMB No. 2040-0086
Approval expires 5-31-92

VII. Discharge information *(Continued from page 3 of Form 2F)*

Part A – You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		
Oil and Grease		N/A				
Biological Oxygen Demand (BOD5)						
Chemical Oxygen Demand (COD)						
Total Suspended Solids (TSS)						
Total Nitrogen						
Total Phosphorus						
pH	Minimum	Maximum	Minimum	Maximum		

Part B – List each pollutant that is limited in an effluent guideline which the facility is subject to or any pollutant listed in the facility's NPDES permit for its process wastewater (if the facility is operating under an existing NPDES permit). Complete one table for each outfall. See the instructions for additional details and requirements.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		

Continued from the Front

Part C - List each pollutant shown in Table 2F-2, 2F-3, and 2F-4 that you know or have reason to believe is present. See the instructions for additional details and requirements. Complete one table for each outfall.

Pollutant and CAS Number *(if available)*	Maximum Values *(include units)*		Average Values *(include units)*		Number of Storm Events Sampled	Sources of Pollutants
	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite	Grab Sample Taken During First 20 Minutes	Flow-Weighted Composite		

Part D – Provide data for the storm event(s) which resulted in the maximum values for the flow weighted composite sample.

1. Date of Storm Event	2. Duration of Storm Event *(in minutes)*	3. Total rainfall during storm event *(in inches)*	4. Number of hours between beginning of storm measured and end of previous measurable rain event	5. Maximum flow rate during rain event *(gallons/minute or specify units)*	6. Total flow from rain event *(gallons or specify units)*

7. Provide a description of the method of flow measurement or estimate.

Appendix C

Stormwater Pollution Prevention Plan

Storm Water Pollution Prevention Plan

BERLIN BIOPOWER
BERLIN, NEW HAMPSHIRE

PREPARED FOR

Laidlaw Berlin Biopower, LLC
57 Hutchins Street
Berlin, New Hampshire 03581

PREPARED BY

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482-3747

Project No. L145-005.05

December 15, 2009

LAIDLAW BERLIN BIOPOWER, LLC
STORM WATER POLLUTION PREVENTION PLAN
Berlin, New Hampshire

Prepared For:

Berlin BioPower
57 Hutchins Street
Berlin, New Hampshire 03581

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482-3747

ESS Project No. L145-005.05

December 15, 2009

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FIGURES

1.0 INTRODUCTION

Laidlaw Berlin BioPower, LLC ("LBB") is proposing to convert and upgrade much of the remaining facility equipment and infrastructure located at the former Fraser Pulp Mill (the "Site") in Berlin, New Hampshire in order to develop a biomass fueled energy generating facility. Berlin BioPower (the "Facility") will use whole tree wood chips and other low-grade wood as fuel, and will be capable of generating nominally 70 megawatts ("MW") of electric power (gross output). The Facility will provide a source of clean, carbon-neutral, renewable energy that will help support New Hampshire's goal of meeting 25% of the state's energy needs with renewable resources by 2025.

This Stormwater Pollution Prevention Plan ("SWPPP") has been prepared in accordance with the United States Environmental Protection Agency ("EPA") National Pollutant Discharge Elimination System ("NPDES") regulations. The EPA's Storm Water Multi-Sector General Permit ("MSGP" or the "General Permit") for Industrial Activities for Steam Electric Generating Facilities (Sector O)[1] has also been used as a general guidance document in the preparation of this SWPPP.

This Plan contains information pertaining to the identification of potential sources of pollutants in discharges from the Site and outlines Best Management Practices (BMPs) to be used by the Facility to prevent pollutants from entering navigable waters of the United States.

2.0 FACILITY DESCRIPTION

1. Name of facility: Berlin BioPower.
2. Type of facility: Renewable Energy Generating Facility.
3. Location of facility: 57 Hutchins Street, Berlin, New Hampshire 03581 (See Figure 1).
4. Storm Water Runoff Flow and Spill Flow Prediction: See Figure 3.
5. Receiving Water Body: Androscoggin River.

The Facility includes a boiler building, turbine building, wet cooling tower, wood fuel handling and storage areas, wood conveying equipment, and site roadways.

The Facility will operate 24 hours per day and will be open year round. The Facility will employ a total of approximately 40 employees.

Site plans have been prepared and incorporated into this plan which include:

- Figure 1 depicts the Facility location on a United States Geological Survey (USGS) Topographic Map.
- Figure 2 shows the project site plan, potential pollutant sources, and exposed equipment and operations (loading/unloading areas, material storage, oil storage tank, wood fuel processing and storage areas, access roads, machinery) described in this Plan.

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[1] The Source Category Standard for Steam Electric Generating Facilities only applies to fossil and nuclear fuel generating facilities. However, the Best Management Practices set forth in that standard have been considered in the development of this Plan.

- Figure 3 shows the site grading and drainage plan, which identifies the contours of the Site, stormwater management systems, and discharge pipe.

- Figure 4 shows the watershed areas of the Site and the direction of drainage for each watershed.

2.1 Storm Water Pollution Prevention Team

The following employees are expected to members of the Storm Water Pollution Prevention Team (the Team). The Team will be responsible for implementing the SWPPP:

Plant Manager – Team Leader and Storm Water Coordinator	Responsibilities include for signatory authority, overall responsibility for SWPPP approval and implementation, including maintenance and inspection responsibilities
Plant Foreman - Team Member	Responsibilities include for overseeing SWPPP/BMP implementation, maintenance and inspection procedures.
Plant Operator - Team Member	Responsible for general site conditions and maintenance of facility and equipment.
Maintenance - Team Member	Responsible for maintenance of facility grounds
Environmental Manager – Team Member	Responsibilities include performing routine inspections and overseeing environmental compliance

3.0 FACILITY DRAINAGE AND MANAGEMENT OF RUNOFF

The proposed Site will incorporate approximately 34.2 acres of impervious area including the access roadway, buildings, parking areas/driveway, cooling towers, holding tanks, equipment, and paved areas designated to store the wood fuel piles.

For the purpose of designing the stormwater management system, the Site is divided into four proposed watersheds. The proposed watersheds continue to flow to the same locations as they do under existing conditions but will incorporate new controls in areas where facility activities present the potential for contaminants to enter stormwater. Descriptions of the proposed watersheds are listed below:

Proposed Watershed PW-1 - is approximately 10.3 acres and encompasses wooded areas, grassed areas, an existing building (to remain), gravel roads, the proposed cooling towers, and a bordering vegetated wetland located along the bank of the Androscoggin River (approximately 840 linear feet). Similar to existing conditions, stormwater runoff generated from this watershed overland flows to the river in sheet fashion.

Proposed Watershed PW-2 - is approximately 19.9 acres and encompasses wooded areas, grassed areas, several existing buildings (to remain), pavement, and a proposed parking area for the community ball field adjacent to the Project Site. A portion of the stormwater runoff generated from this watershed is routed through a proposed vegetated swale located along the northerly boundary of the watershed prior to discharging to the municipal drainage system in Coos Street. The remaining stormwater runoff generated from the watershed will continue to overland flow to the municipal drainage system located in Coos Street and Community Street.

Proposed Watershed PW-3 – is approximately 4.2 acres and encompasses wooded areas, grassed areas, pavement, and a bordering vegetated wetland (approximately 1,235 square feet). The watershed is bound to the south by watersheds PW-1 and PW-4a. Similar to existing conditions, the stormwater runoff generated from this watershed flows to the existing culvert that drains to the 48-inch pipe which discharges to the Androscoggin River.

Proposed Watershed PW-4 - is divided into ten (10) sub-watersheds labeled PW-4a through PW-4j. This watershed encompasses the Facility and the majority of the Site development. The stormwater runoff generated from this watershed will be conveyed via an existing 30 inch pipe to an outfall that services the former pulp mill wastewater treatment plant, where it discharges into the Androscoggin River.

- **Proposed Sub-watershed PW-4a** – is approximately 10.8 acres and encompasses wooded areas, grass areas, pavement, and reserve wood chip fuel storage areas. The entrance to the Site is located off of Hutchins Street at the southeasterly edge of the sub-watershed where a high point in the road defines the limit of the sub-watershed. The majority of the stormwater runoff generated from this sub-watershed flows to a concrete swale that conveys the stormwater runoff to a lined detention basin via a riprap splash pad. The outlet control structure of the detention basin discharges stormwater runoff to a lined vegetated swale located in sub-watershed PW-4c. A 24-inch overflow pipe, a secondary outlet from the detention basin, conveys any additional stormwater runoff to a lined detention basin located in sub-watershed PW-4b.
- **Proposed Sub-watershed PW-4b** - is approximately 2.3 acres and encompasses grass areas and pavement. The stormwater runoff generated from this sub-watershed flows to a lined detention basin. The outlet control structure of the detention basin conveys stormwater runoff to a lined vegetated swale located in sub-watershed PW-4c.
- **Proposed Sub-watershed PW-4c** – is approximately 8.5 acres and encompasses grass areas, pavement and a portion of an existing building. The stormwater runoff generated from this sub-watershed flows to a lined vegetated swale that conveys the stormwater to a lined wet pond located in sub-watershed PW-4d via a riprap splash pad.
- **Proposed Sub-watershed PW-4d** – is approximately 0.9 acres and encompasses grass areas and pavement. The stormwater runoff generated from this sub-watershed flows to a lined wet pond. The outlet control structure of the wet pond discharges stormwater runoff to the closed drainage system that connects to the existing 30 inch pipe leading to the outfall at the river.
- **Proposed Sub-watershed PW-4e** - is approximately 1.5 acres and encompasses grass areas, pavement, and Facility equipment. The stormwater runoff generated from this sub-watershed flows to the lined wet pond located in sub-watershed PW-4d where it is treated then conveyed via the closed drainage system to the existing 30 inch pipe leading to the outfall at the river.

- **Proposed Sub-watershed PW-4f** - is approximately 3.5 acres and encompasses grass areas, pavement, Facility equipment, and a wood chip fuel pile area. The stormwater runoff generated from this sub-watershed overland flows to a lined detention basin via a lined vegetated swale. The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands located in sub-watershed PW-4g via a closed drainage system.

- **Proposed Sub-watershed PW-4g** - is approximately 2.4 acres and encompasses grass areas, pavement, Facility equipment, and a wood chip fuel pile area. The stormwater runoff generated from this sub-watershed overland flows to a lined detention basin. The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe leading to the outfall at the river.

- **Proposed Sub-watershed PW-4h** - is approximately 1.3 acres and encompasses grass areas, pavement, and a wood chip fuel pile area. The stormwater runoff generated from this sub-watershed flows to a lined detention basin. The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe leading to the outfall at the river.

- **Proposed Sub-watershed PW-4i** - is approximately 3.5 acres and encompasses grass areas, pavement, gravel roads, existing/proposed buildings, and parking areas. The major components of the Facility are located within this sub-watershed including the boiler, turbine generator building, and holding tanks. The stormwater runoff generated from this sub-watershed flows to the subsurface gravel wetlands for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe leading to the outfall at the river.

  Proposed Sub-watershed PW-4j – is approximately 0.3 acres and encompasses a proposed lined detention basin. The stormwater runoff generated from this sub-watershed flows to a lined vegetated swale that conveys the stormwater runoff to the detention basin. The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe leading to the outfall at the river.

The watersheds described above are shown on the Watershed Plan provided in Figure 4.

4.0 DESCRIPTION OF POTENTIAL POLLUTANT SOURCES

The Project Site Plan (Figure 2) depicts the location of all buildings, equipment, roadways, wood fuel storage and handling areas as well as all outdoor oil and chemical storage tanks at the Site. A listing of all oil and chemicals expected to stored at the site, their locations, and quantities is provided in Table 1.

Ultra Low Sulfur Distillate (ULSD) fuel oil which will used for startup of the boiler, and aqueous ammonia (19% concentration) which will be used in the Facility's emissions control system are stored in exterior tanks. With the exception of fuel and lubricating oils contained within the stationary fire pump engine, emergency generator, and mobile diesel powered equipment used in the wood handling areas, all other oil and chemicals are stored in containers and process equipment located within the buildings at the Facility. In order to prevent releases, controls and countermeasures have been implemented, including secondary containment for tanks and containers, providing adequate engineering controls on tanks, conducting routine inspections, implementing delivery procedures, providing adequate security, training employees, and developing spill response procedures. These measures are described in this Plan.

All outdoor storage tanks (including oil reservoirs on transformers) are equipped with berms, which provide 110% secondary containment. All valves on outdoor tanks are kept closed and locked when not in use. All indoor storage tanks are equipped with berms, which provide at least 100% secondary containment. All tanks have level gauges equipped with overfill alarms. There are no floor drains within the bermed storage areas in the building, and therefore materials stored within the building are not expected to impact storm water. The following summarizes material storage at the facility, and the BMPs in place to minimize the potential for the pollutants to impact storm water runoff.

4.1 Exterior Storage

Exterior storage on site includes the following:

- **Wood piles**: the northern section of the Site contains a wood storage area and chipping building. Three chipped wood piles are located east of the boiler.
- **Aboveground Storage Tanks (ASTs)**: used for storage of ULSD fuel oil (used for startup of the boiler, and aqueous ammonia (19% concentration).
- **Electrical Transformers**: located in the switchyard. The transformers contain dielectric oil for cooling.
- **Solid waste dumpsters**: used to store solid waste materials until scheduled pickup.
- **Other miscellaneous materials:** Clean metal parts, equipment, etc., may be stored outside on a temporary basis.

4.2 Interior Storage

Interior storage on site includes the following:

- **Totes and drums**: used to store lube oil, and water treatment chemicals.

- **Gas storage**: includes hydrogen (associated with the electric generator), and compressed gas cylinders of propane, oxygen, nitrogen, carbon dioxide, acetylene, and argon.
- **Miscellaneous Products**: includes cleaning solutions, solvents, and lubricants, stored in small containers (no more than 10-gallon containers).

4.3 Spills and Leaks

There have been no spills of oil or any other hazardous substance in excess of reportable quantities at the Facility in the previous three years.

4.4 Salt Storage

No salt is stored in bulk at the Facility.

5.0 BEST MANAGEMENT PRACTICES

The proposed Project includes the design and construction of a storm water management system to meet the guidelines specified in the NHDES "New Hampshire Storm Water Manual." Stormwater quality and quantity on the Site will be managed by implementing a series of Best Management Practices (BMPs) that will include periodic cleaning of facility roadways by mechanical sweeping or equivalent methods, installation of deep sump catch basins, and detention basins, and other structural controls. These proposed BMPs are expected to remove at least 80 percent of the TSS from storm water runoff.

Fuel Oil and aqueous ammonia storage tank containment areas – the fuel oil and aqueous ammonia storage tanks will be located in 110 percent containment areas. Rain water captured inside the containment areas will be inspected for contamination prior to discharge through an oil/water separator.

Wood Pile areas – the wood pile areas will be completely paved and bermed with outlet controls to direct storm water. A perimeter drain system will then route the storm water to nearby detention basins.

Fly Ash silo – the fly ash silo will be totally enclosed. Exhaust from the silo will be vented through a highly efficient fabric filter.

Transformer containment area - the electrical transformers in the switchyard will be contained within berms capable of holding 110 percent of the maximum oil storage capacity. Storm water captured inside the containment areas will be inspected for contamination prior to discharge through an oil/water separator.

ULSD Fuel Oil and Aqueous Ammonia truck unloading area – The fuel and aqueous ammonia truck unloading area will be constructed as a containment area to capture any liquid which leaks during the transfer. The storm water discharge pipe from this area will be equipped with a valve which will be kept closed during truck off loading.

Roadways and parking areas – Storm water from roadways and parking areas will be collected in a closed pipe system which will be routed to the storm water detention basins and discharge system.

Turbine equipment area – the turbine equipment lube oil systems will be located within the main building which will prevent any release of oils to the storm water system.

Lube oil storage area – Lube oil stored onsite will be located in inside the buildings in storage areas with no floor drains. The areas will be curbed and/or containers will be stored on spill containment pallets.

5.1 Preventative Maintenance and Housekeeping

When used in conjunction with regular inspections, good housekeeping is an effective and inexpensive method of pollution prevention. The following general maintenance/housekeeping practices will be performed at LBB:

- Regularly pick up and dispose of garbage, waste materials, windblown materials, and any spilled materials. Contractors will remove garbage and other waste refuse from the Site regularly.
- Properly operate and maintain air pollution control equipment to ensure that designed effectiveness is achieved.
- During extremely dry periods, clean roadway surfaces as needed to minimize tracking dust off-site.
- Quickly clean up any spilled materials.
- Routinely inspect facility for housekeeping, leaks, windblown materials, etc.
- Ensure that facility personnel are trained in and perform spill cleanup procedures.
- Store containers, drums, etc. away from direct traffic routes to prevent accidental spills.
- Clean oil/water separators every three months, or as needed.

In addition, personnel will perform routine preventative maintenance on plant equipment to identify conditions that could cause breakdowns or failures resulting in discharges of pollutants. Maintenance activities are performed, as required, to ensure the following equipment functionality:

- Integrity of the storage tanks, piping, and containment structures;
- Integrity of vehicles and equipment systems (petroleum or other fluids);
- Proper performance of air pollution control equipment; and
- Proper performance of storm water collection system.

5.2 Loading/Unloading Procedures

Deliveries of wood, oil, and chemicals involve transferring materials from the delivery truck to the storage tanks or storage areas. In order to ensure that trucks or containers do not leak or spill their contents while traveling onsite, facility personnel will visually inspect delivery vehicles as they arrive. In addition, facility personnel will immediately address leaks or spills from delivery vehicles and will ensure that proper safety and spill control equipment and response measures are available to protect personnel and the environment.

5.2.1 Bulk Deliveries of Oil and Chemicals

The general procedures to be used for bulk delivery of oil and aqueous ammonia are described below. These procedures are to be used by contractors when petroleum products (and other bulk chemicals, such as ammonia) are being unloaded into the facility's tanks.

Note: Smoking and ignition sources are not permitted in the unloading areas.

1. The driver informs LBB personnel of his/her presence onsite.
2. LBB personnel inspect the overall integrity of the delivery vehicle and containers. If the vehicle or containers are determined to be in poor condition (e.g., signs of corrosion or leaks), the delivery is aborted and the vehicle's driver is informed that repairs must be made, or a new shipment must be ordered, before LBB can accept a delivery from the vehicle.
3. The driver positions the vehicle, shuts of the engine, and sets the handbrake, to prevent vehicular movement during container transfer.
4. The operator must be wearing proper personal protective equipment, including hard hat, safety glasses, and long sleeves.
5. Obtain the plant operator's permission before hooking up to the tank.
6. Ensure that an LBB employee is aware of the unloading process.
7. Prior to unloading, ensure the valve on the containment system is closed.
8. Stay with the truck while unloading and stay alert.
9. Follow proper procedures for unloading system pumps and valves.
10. No rags or buckets are to be left on site.

REPORT ANY SPILLS TO THE PLANT OPERATOR IMMEDIATELY. DRIVERS ARE RESPONSIBLE FOR CLEANING UP ANY SPILLS.

As a Best Management Practice, LBB will assure color coding of fill pipes, covers, and adjoining surfaces.

5.2.2 Container Loading/Unloading

When materials are received in containers (e.g. 55-gallon drums), the delivery truck should park near the container storage area. If containers are transported onsite using a forklift or dolly, they must be secured to prevent the containers from falling during movement. The following outlines delivery and transport procedures for containers:

1. The driver informs LBB personnel of his/her presence onsite.
2. LBB personnel inspect the overall integrity of the delivery vehicle and containers. If the vehicle or containers are determined to be in poor condition (e.g., signs of corrosion or leaks), the delivery is aborted and the vehicle's driver is informed that repairs must be made, or a new shipment must be ordered, before LBB can accept a delivery from the vehicle.
3. The driver turns positions the vehicle, shuts of the engine, and sets the handbrake to prevent vehicular movement during container transfer.
4. LBB personnel ensure that each container is closed prior to moving.
5. The container is secured on forks or pallets to prevent the container from falling during movement.
6. Once all the above steps have been taken, the driver proceeds to transfer the container, with LBB personnel monitoring. If any material is spilled during transfer, the supervisor will be notified and cleanup will begin immediately, as appropriate.

5.2.3 Wood Unloading

LBB will maintain a multi-day supply of wood fuel (round wood and wood chips) onsite. The following outlines delivery and transport procedures for wood fuel:

1. The driver informs LBB personnel of his/her presence onsite.
2. LBB personnel inspect the wood in the delivery vehicle. If the wood shows signs of contamination (e.g. covered in oil or other chemicals), the delivery is aborted and the vehicle's driver is informed that the wood has not been accepted.
3. The truck is weighed at the scale building.
4. The driver positions the vehicle, turns off the engine, and sets the handbrake to prevent vehicular movement during container transfer.
5. LBB personnel ensure that no people are located near the unloading procedure.
6. Only properly trained LBB personnel are allowed to operate truck unloading equipment.
7. Smaller wood chips and sawdust will be swept from open truck beds before leaving the site.

6.0 INSPECTIONS AND SAMPLING

LBB will conduct inspections on a regular basis to minimize the likelihood of pollutants entering the storm water system. In addition, facility personnel will conduct periodic visual monitoring of storm water to verify that pollutants are not entering the storm water system.

6.1 Inspections

This section describes periodic inspections of the Facility and the annual comprehensive site evaluation. The Plant Manager or his/her designee is responsible for overseeing routine inspections and conducting comprehensive inspections. Any member of the pollution prevention team may conduct these inspections.

The following describes the inspection schedule for the facility. Inspection forms will be prepared and attached to this SWPPP prior to startup of the Facility.

6.1.1 Routine Daily Walk-Through

LBB will perform visual checks of the facility each operating day. The plant operator will check the plant for any leaks or spills. Personnel will check each oil tank for any signs of leaks. In addition, the dumpsters and surrounding areas will be inspected for overflowing debris, and general good housekeeping procedures. These daily walk-through inspections will not be recorded, but if any observations of potential pollutants entering the storm system are observed, they will immediately be brought to the attention of the Plant Manager and will be remedied as soon as possible, but no later than 14 days after detection.

6.1.2 Visual Site Inspections

Facility personnel will conduct weekly visual site inspections to determine if there is any evidence of pollutants entering the drainage system or waters of the state. The exposed areas discussed in Section 4.0, including oil/material storage and handling areas, storage tanks, and emissions control systems, are included in such inspections. Visual inspections will be performed on all tanks that are in use, and include visible portions of all storage locations including containers, tanks, piping/pumps for oil transfer, drains that may be impacted by pollutants, secondary containment systems, level gauges, leak detection equipment, drain trenches, and detention basins.

If a weekly site inspection reveals that a tank is not in good condition, the tank will be taken out of service as appropriate and repaired as soon as possible. If an inspection reveals that a container is not in good condition, the container will be replaced immediately. In the event that any other problems are identified during the inspections, corrective actions will be noted in inspection logs. Required actions will be determined by the Plant Manager and/or members of the pollution prevention team to ensure that they are appropriate. Deficiencies will be corrected within 14 days of detection, or more quickly if possible.

The findings of each inspection will be recorded and retained at the Facility.

6.1.3 Annual Comprehensive Site Compliance Evaluation

At least once per year, a Comprehensive Site Compliance Evaluation will be conducted by the Pollution Prevention Team.

A report documenting each Comprehensive Site Compliance Evaluation will include the following:

- The date and time of the inspection
- The scope of the inspection
- The personnel who participated in the inspection
- Major observations relating to implementation of the Plan
- Description of incidents of noncompliance or, if there are no such incidents, a certification that the facility is in compliance with the Plan and General Permit
- A discussion of any non-compliance situations observed and the response/action(s) needed (If no situations of non-compliance are observed, a statement certifying that the facility is in compliance with the General Permit will be included.)
- Identification of the changes required in the Plan as a result of the site compliance evaluation
- Means to track implementation of required actions (via independent log or through weekly inspections)

6.1.4 Integrity Testing

Every five (5) years, or more frequently, LBB will perform integrity testing for the fuel oil storage tank and aqueous ammonia storage tank at the site. The testing will consist of not only visual inspection, but also another form of non-destructive shell testing that demonstrates that the tanks are in sound structural condition. For containers such as drums or totes, LBB will use only DOT-approved drums and totes that are appropriate for the materials stored.

6.2 Storm Water Sampling

LBB will conduct storm water sampling at a location downstream of the Site, prior to commingling of the Site storm water with any other streams using the commo0n outfall. All samples will be grab samples taken during the first 30 minutes of a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable storm event. If there is not sufficient rainfall to produce a runoff event, if frozen conditions prevent runoff, or if other adverse weather conditions or hazardous conditions prevent sampling, sampling is not required. When these types of conditions prevent the collection of a sample, a substitute sample will be taken during the next qualifying event (i.e., collect two samples during the next quarter). Documentation that it was not possible to sample during a particular quarter will be maintained in the Plan, if these conditions are encountered.

Information for a particular storm event can be obtained by calling the local National Weather Service office in Whitefield, New Hampshire at (603) 837-2769.

The following describes the sampling for the facility.

6.2.1 Quarterly Visual Assessment

At least once each calendar quarter, visual inspections will be conducted by LBB personnel, to determine the quality of the storm water discharge. As part of the quarterly visual examinations, at least one grab sample will be taken, for visual inspection only, during a measurable storm event, during each of the following periods: January to March, April to June, July to September, and October to December.

The samples are visually inspected for the following water quality characteristics:

- Color;
- Odor;
- Clarity;
- Floating solids;
- Settled solids;
- Suspended solids;
- Foam;
- Oil sheen; and
- Other obvious indicators of storm water pollution.

Once the visual assessment has taken place, the results of the visual assessments will be documented and maintained with this SWPP Plan. Visual assessment findings are not submitted to the EPA or MassDEP, unless specifically requested. At a minimum, documentation of the visual assessment includes:

- Sample location(s).
- Sample collection date and time, and visual assessment date and time for each sample.
- Personnel collecting the sample and performing visual assessment, and their signatures.
- Nature of the discharge (i.e., runoff or snowmelt).
- Results of observations of the storm water discharge.
- Probable sources of any observed storm water contamination.
- If applicable, why it was not possible to take samples within the first 30 minutes.
- Any corrective action required as a result of the visual assessment.

Logs will be maintained to document that visual monitoring has been conducted.

If the visual examination indicates that pollutants may be entering the storm water system, more detailed analysis will be performed to determine the source of the pollutants and correction actions that should be taken.

6.2.2 Numerical Effluent Limitations Sampling

LBB anticipates that the Individual Stormwater Permit to be issued by the US EPA under the National Pollutant Discharge Elimination System (NPDES) program requirements will specify periodic monitoring and laboratory analysis to demonstrate compliance with specified numerical effluent limitations. LBB will conduct such sampling in accordance with the schedule specified by the permit and will contract with a properly certified laboratory to conduct analysis in accordance with EPA approved procedures.

7.0 RECORDKEEPING AND REPORTING

This section describes the records that will maintained and reports that will be submitted for the facility. In addition to the requirements for recording inspections and submitting quarterly sampling reports, site personnel will report any releases of hazardous materials to the appropriate agencies, as required by applicable regulations. A copy of this Plan and all related records will be maintained at the facility.

7.1 Inspection Reports and Comprehensive Site Evaluations

Weekly inspections will be documented on detailed forms to be developed after the Site design is completed and prior to Facility startup. A Comprehensive Site Evaluation report will be prepared in accordance with EPA guidance. The report will be submitted to EPA annually. Copies of all inspections and evaluations will be retained on site for three years from the date of the inspection.

LBB will submit an annual report to the EPA that includes the findings from the comprehensive site inspection and any corrective action documentation. If corrective action is not yet completed at the time of submission, the report will describe the status of any outstanding corrective action(s). In addition to the information required in Corrective Action Reports and Comprehensive Site Inspections, the following information will be included with the annual report: (i) Facility Name; (ii) NPDES permit tracking number; (iii) Facility physical address; and (iv) Contact Person Name, Title, and Phone Number.

7.2 Storm Water Sampling

All monitoring data collected, including benchmark sampling and impaired waters monitoring, must be submitted to the EPA using the online eNOI system at www.epa.gov/npdes/eNOI no later than 30 days after receiving the complete laboratory results for all monitored outfalls for the reporting period. If eNOI cannot be accessed, paper reporting forms must be submitted by the same deadline to the following address: U.S. Environmental Protection Agency; Office of Water, Water Permits Division; Mail Code 4203M, ATTN: MSGP Report; 1200 Pennsylvania Ave, NW; Washington, DC 20460. It is recommended that if reports are mailed, that certified mail receipts be purchased. If using paper reporting forms, EPA strongly recommends that the discharge monitoring report (DMR) available at www.epa.gov/npdes/stormwater/msgp be used.

For benchmark monitoring, submit sampling results to EPA no later than 30 days after receiving laboratory results for each quarter that benchmark sampling is required. If multiple samples are collected in a single quarter (e.g., due to adverse weather conditions, climates with irregular storm water runoff, or areas subject to snow), submit all sampling results to EPA within 30 days of receiving the laboratory results.

8.0 SECURITY

LBB maintains security measures to minimize the possibility of vandalism and identify releases when the facility is shut down for annual maintenance outage. Contract personnel are informed of emergency procedures including who to contact in the event of an emergency. The facility is gated, and the gate is kept closed. Facility lighting is adequate for security purposes and the identification of oil spills and prevention of oil spills through vandalism. A visitor must be recognized by the plant operator through a video camera and call box located at the gate to gain access to the facility.

9.0 PERSONNEL TRAINING

Employee training is conducted initially and on an annual basis to inform personnel responsible for implementing the activities described in this Plan, or otherwise responsible for oil pollution control, storm water management, emergency response, and other components and goals of this Plan. Personnel will be trained as appropriate for their job duties, on good housekeeping measures, proper operation and maintenance of equipment, proper handling procedures for raw materials and wastes, and procedures to follow during an emergency. The purpose of the training is to ensure that discharges are prevented and spill response procedures are reviewed. Training may be provided in a formal classroom type setting, as on-the-job training, or during safety meetings as appropriate.

The Plant Manager is responsible for ensuring that affected facility personnel have received appropriate training. Training is documented on the form provided in Appendix C, or an equivalent form.

10.0 ENDANGERED SPECIES AND HISTORIC PLACES

10.1 National Historic Preservation Act Certification

The National Register of Historic Places was reviewed to determine if there are any historic properties at or near the Facility. Based on an online review of the National Register Information System database (http://www.nr.nps.gov), the following properties were identified near the Facility:

Resource	Resource Type	Address	Approximate Distance to Site
Congregational Church	National Register of Historic Places ("NR") Listed	921 Main Street	0.3 miles
Holy Resurrection Orthodox Church	NR Listed	Petrograd Street	0.8 miles

Mt. Jasper Lithic Source	NR Listed	1 ½ mile NW of confluence of Dead R. and Androscoggin R.	1.5 miles
St Anne Church	NR Listed	58 Church Street	0.1 miles

The Facility's stormwater discharges are not expected to have any impact on any of the above listed properties.

10.2 Endangered Species Act Certification

LBB completed and filed a database check request form with the Natural Heritage Bureau ("NHB") which described the proposed Project and sought information regarding known locations of rare species and exemplary natural communities. A similar request was filed with the US Fish and Wildlife Service ("US FWS") requesting information on federally-listed or candidate endangered and threatened species or habitats within or immediately adjacent to the Project area. The US FWS response indicated that no federally-listed or proposed, threatened or endangered species or critical habitat under their jurisdiction are known to occur in the Project area and preparation of a Biological Assessment or further consultation with US FWS is not required.

The NHB response indicated that the Bald Eagle, a threatened species, and the Common Nighthawk, an endangered species had been identified in the general Berlin area. However, maps provided by NHB showing the specific locations associated with these species indicated that their presence had only been identified in the general downtown area of Berlin in the case of the Nighthawk and along the Androscoggin River banks south of the Project Site in the case of the Bald Eagle. In response to additional information on the project provided by LBB, NHB replied that they do not expect impacts to the Bald Eagle provided that no trees within 50 feet of the Androscoggin River will be removed. NHB further indicated that allowing habitat along the River to revert back to native trees and shrubs would be encouraged to provide future perching and roosting sites for Bald Eagles. LBB has committed to not altering land within 50 feet of the river bank and allowing natural vegetation to establish within these areas. With regard to Common Nighthawks, NHB indicated that they have not received breeding reports for this species in Berlin for a number of years and do not expect impacts to the species as a result of the proposed Project.

11.0 PLAN AMENDMENTS

This SWPP Plan will be modified whenever necessary to address any of the triggering conditions for corrective action in Section 11.1 and to ensure that they do not reoccur, or to reflect changes implemented when a review following the triggering conditions in Section 11.2 indicates that changes to the control measures are necessary to meet the effluent limits in this permit. Changes to this SWPP Plan document will be made in accordance with the corrective action deadlines, and will be signed and dated by a Corporate Responsible Official.

The discovery of any of the conditions listed in Sections 11.1 and/or 11.2 will be documented within 24 hours. Subsequently, within 14 days of such discovery, any corrective action(s) to be taken to eliminate or further investigate the deficiency will be documented, or if no corrective action is needed, the basis for that determination. If it is determined that changes are necessary following the review, any modifications to the control measures will be made before the next storm event if possible, or as soon as practicable following that storm event. These time intervals are not grace periods, but are schedules considered reasonable for documenting the findings and for making repairs and improvements. They are included in this permit to ensure that the conditions prompting the need for these repairs and improvements are not allowed to persist indefinitely.

Within 24 hours of discovery of any condition listed in Parts 11.1 or 11.2, document the following information (i.e., questions 3-5 of the Corrective Actions section in the Annual Reporting Form):

- Identification of the condition triggering the need for corrective action review.
- Description of the problem identified.
- Date the problem was identified.

Within 14 days of discovery of any condition listed in Parts 11.1 or 11.2, document the following information (i.e., questions 7-11 of the Corrective Actions section in the Annual Reporting Form):

- Summary of corrective action taken or to be taken (or, for triggering events identified in Part 11.2 where it is determined that corrective action is not necessary, the basis for this determination.
- Notice of whether SWPP Plan modifications are required as a result of this discovery or corrective action.
- Date corrective action initiated.
- Date corrective action completed or expected to be completed.

LBB must submit this documentation in the annual report (see Section 7.1) and retain a copy at the Facility with this SWPP Plan.

11.1 Conditions Requiring Review and Revision to Eliminate Problem

If any of the following conditions occur, review and revise the selection, design, installation, and implementation of the control measures to ensure that the condition is eliminated and will not be repeated in the future:

- An unauthorized release or discharge (e.g., spill, leak, or discharge of non-storm water not authorized by this or another NPDES permit) occurs at the Facility;
- LBB becomes aware, or EPA determines, that the control measures are not stringent enough for the discharge to meet applicable water quality standards;

- An inspection or evaluation of the Facility by an EPA official, or local, State, or Tribal entity, determines that modifications to the control measures are necessary to meet the non-numeric effluent limits in this permit; or
- LBB finds during the routine facility inspection, quarterly visual assessment, or comprehensive site inspection that the control measures are not being properly operated and maintained.

11.2 Conditions Requiring Review to Determine if Modifications are Necessary

If any of the following conditions occur, review the selection, design, installation, and implementation of the control measures to determine if modifications are necessary to meet the effluent limits in this permit:

- Construction or a change in design, operation, or maintenance at the Facility significantly changes the nature of pollutants discharged in storm water from the Facility, or significantly increases the quantity of pollutants discharged; or
- The average of four quarterly sampling results exceeds an applicable benchmark. If less than 4 benchmark samples have been taken, but the results are such that an exceedence of the 4 quarter average is mathematically certain (i.e., if the sum of quarterly sample results to date is more than 4 times the benchmark level) this is considered a benchmark exceedence, triggering this review.

Tables

Table 1
Summary of Expected Chemicals and Storage Quantities During Facility Operation

Ref No.	Chemical Description	Chemical Use	System	Potential Storage Volume			Storage Method
				Range (To/From)			
				Min Vol.	Max Vol.	Units	
1	ULSD No. 2 Fuel Oil	Fuel	Boiler (Startup)	25,000	50,000	Gallons	Above Ground Tank
2	ULSD No. 2 Fuel Oil	Fuel	Emergency Diesel Generator	500	1,000	gal	Tank
3	ULSD No. 2 Fuel Oil	Fuel	Fire Pump	500	1,000	gal	Tank
4	Diesel Fuel	Fuel	Wood Yard Equipment	1,000	2,000	gal	fuel truck
5	Lubricating Oil	Equipment Lubrication	Steam Turbine (ST)	5,000	10,000	gal	Internal Tank
6	Lubricating Oil	Equipment Lubrication	Waste Lube Oil	200	500	gal	Drums
7	Lubricating Oil [3]	Equipment Lubrication	Cooling Tower Fan Gear Box	50	100	gal	Tote [2]
8	Conventional Transformer Oil [3]	Dielectric Oil	Step-Up Transformer	10,000	20,000	gal	Transformer
9	Conventional Transformer Oil [3]	Dielectric Oil	Aux Transformer	2,000	4,000	gal	Transformer
10	Aqueous Ammonia (N_4OH) – 19% Concentration	Emissions Control	SCR System	5,000	10,000	gal	Above Ground Tank
11	Hydrazide Solution [4]	Removal of oxygen	Boiler, Condensate System	275	550	gal	Tote [2]
12	Amine Solution [4]	Corrosion inhibitor	Boiler, Condensate System	275	550	gal	Tote [2]
13	Sodium Tripolyphosphate Solution[4]	Boiler water pH Control	Boiler, Condensate System	275	550	gal	Tote [2]
14	Sodium Hydroxide Solution[4]	Boiler water pH Control	Boiler, Condensate System	275	550	gal	Tote [2]
15	Sodium Bisulfite Solution[4]	Removal of residual chlorine	Demineralized Water Treatment	275	550	gal	Tote [2]
16	Polymer Solution[4]	Antiscalant	Demineralized Water Treatment	275	550	gal	Tote [2]
17	Cleaning Solutions	Cleaning of RO System	Demineralized Water Treatment	550	1100	gal	Tote [2]
18	Sodium Hypochlorite Solution (Bleach)	Disinfection, slime and/or algae control	Cooling Tower	275	550	gal	Tote [2]

Table 1
Summary of Expected Chemicals and Storage Quantities During Facility Operation

Ref No.	Chemical Description	Chemical Use	System	Potential Storage Volume Range (To/From)			Storage Method
				Min Vol.	Max Vol.	Units	
19	Sodium Bromide Solution	Microbiocide	Cooling Tower	275	550	gal	Tote [2]
20	Hydrogen (H_2)	Generator Hydrogen Cooler	Generator	240,000	240,000	scf	Tube Trailers or Cylinders
21	Nitrogen (N_2)	Lay up	Boiler	12	24	bottles	Compressed gas cylinders
22	Carbon Dioxide (CO_2)	Fire Protection	Plant Buildings	12	24	bottles	Compressed gas cylinders
23	Acetylene (C_2H_2) [1]	Maintenance – Cutting Gas	NA	2	10	bottles	Compressed gas cylinders
24	Oxygen (O_2) [1]	Maintenance – Cutting Gas	NA	2	10	bottles	Compressed gas cylinders
25	Propane (C_3H_8) [1]	Maintenance – Temp Heat	NA	2	10	bottles	Compressed gas cylinders
26	Argon (Ar) [1]	Maintenance – Welding Gas	NA	2	10	bottles	Compressed gas cylinders
27	Cleaning Solution and Solvents[1]	Cleaners	NA	20	40	gal	<10 gal Containers

Notes:

[1] Primarily used during construction but may be present during operation for maintenance.

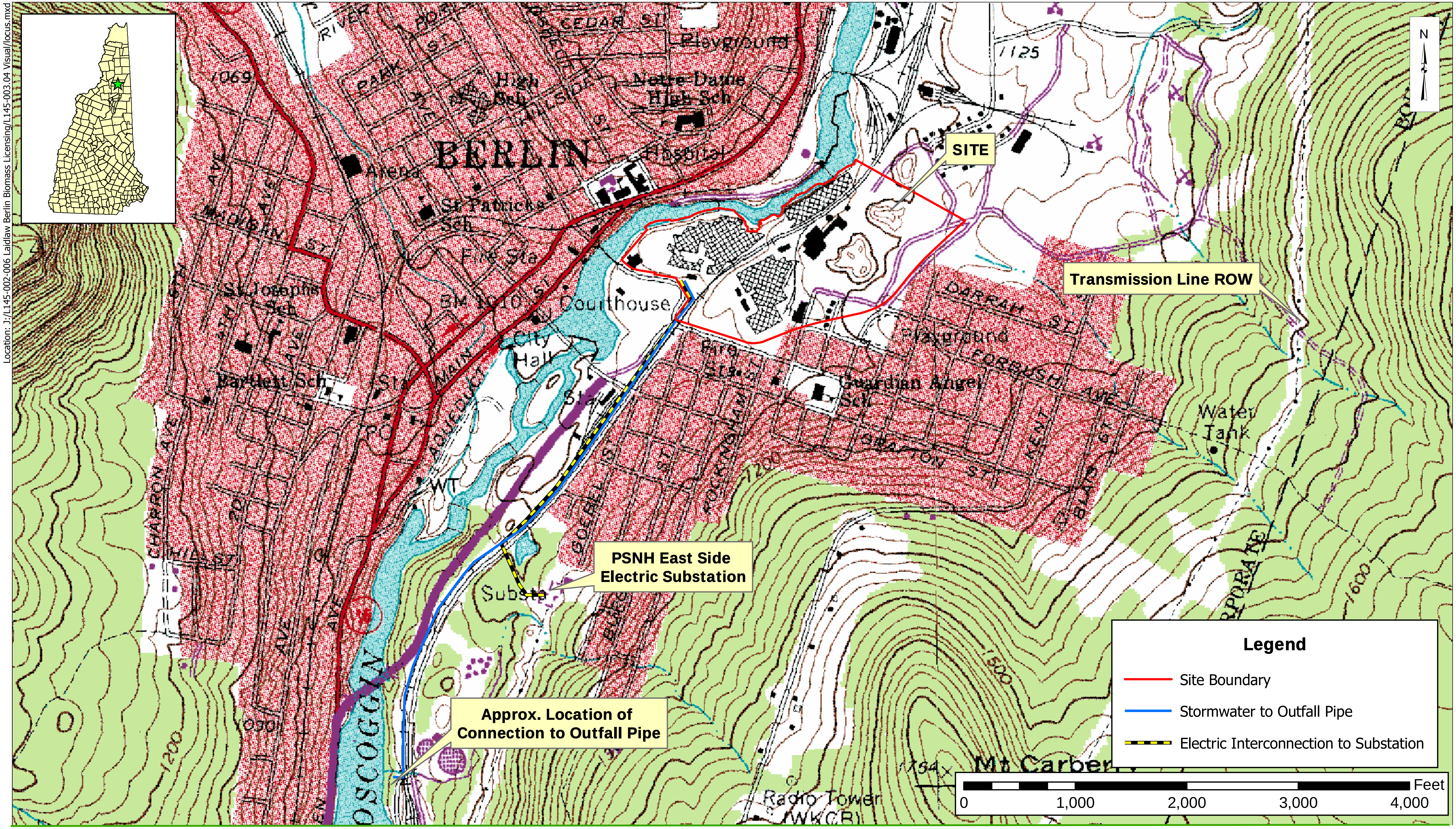
[2] Single tote volume based on 275 gallons.

[3] Volume typically contained within the equipment or system.

[4] Boilerwater treatment chemicals are provided for a range of treatments.

Figures

Location: J:/L145-002-006 Laidlaw Berlin Biomass Licensing/L145-003.04 Visual/locus.mxd



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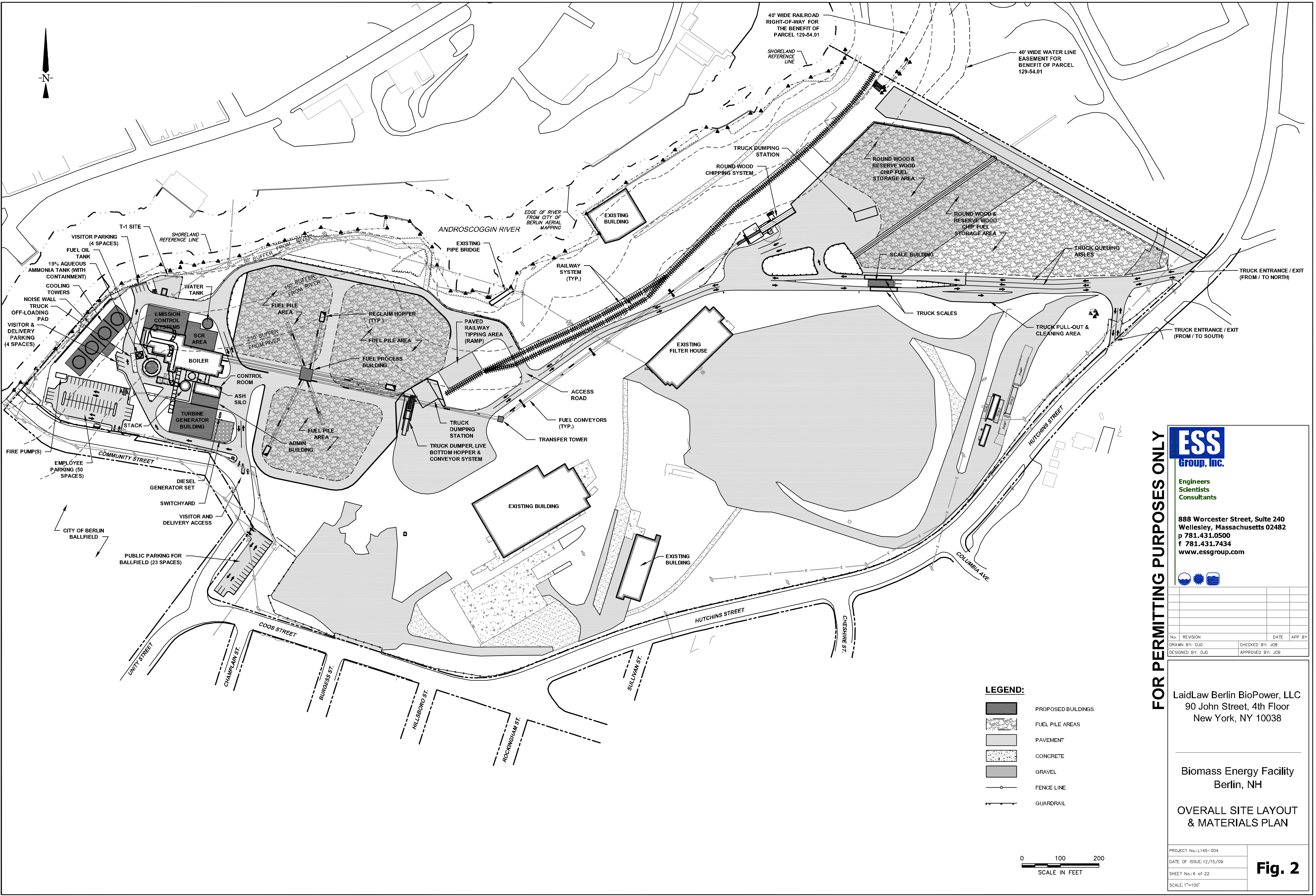
LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Scale: 1" = 800'

Source: 1) NHGRANIT, 1:12,000 Ortho, 1998
2) ESS, Site Boundary, 2009

U.S.G.S. Locus Map -
Project Site and Ancillary Facilities

Ortho Locus
Map -



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CHECKED BY: JCB
DESIGNED BY: DJG
APPROVED BY: JCB

LaidLaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

Biomass Energy Facility
Berlin, NH

OVERALL SITE LAYOUT
& MATERIALS PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 6 of 22
SCALE: 1"=100'

Fig. 2

DATE: Dec 15, 2009 - 12:49PM
FILENAME: H:\L\L145-Laidlaw\L000 EFSEC Permit Plans\L145-LM.dwg

XREF: L145-XE01 [H:\L145-Laidlaw\xref\L145-XE01.dwg]
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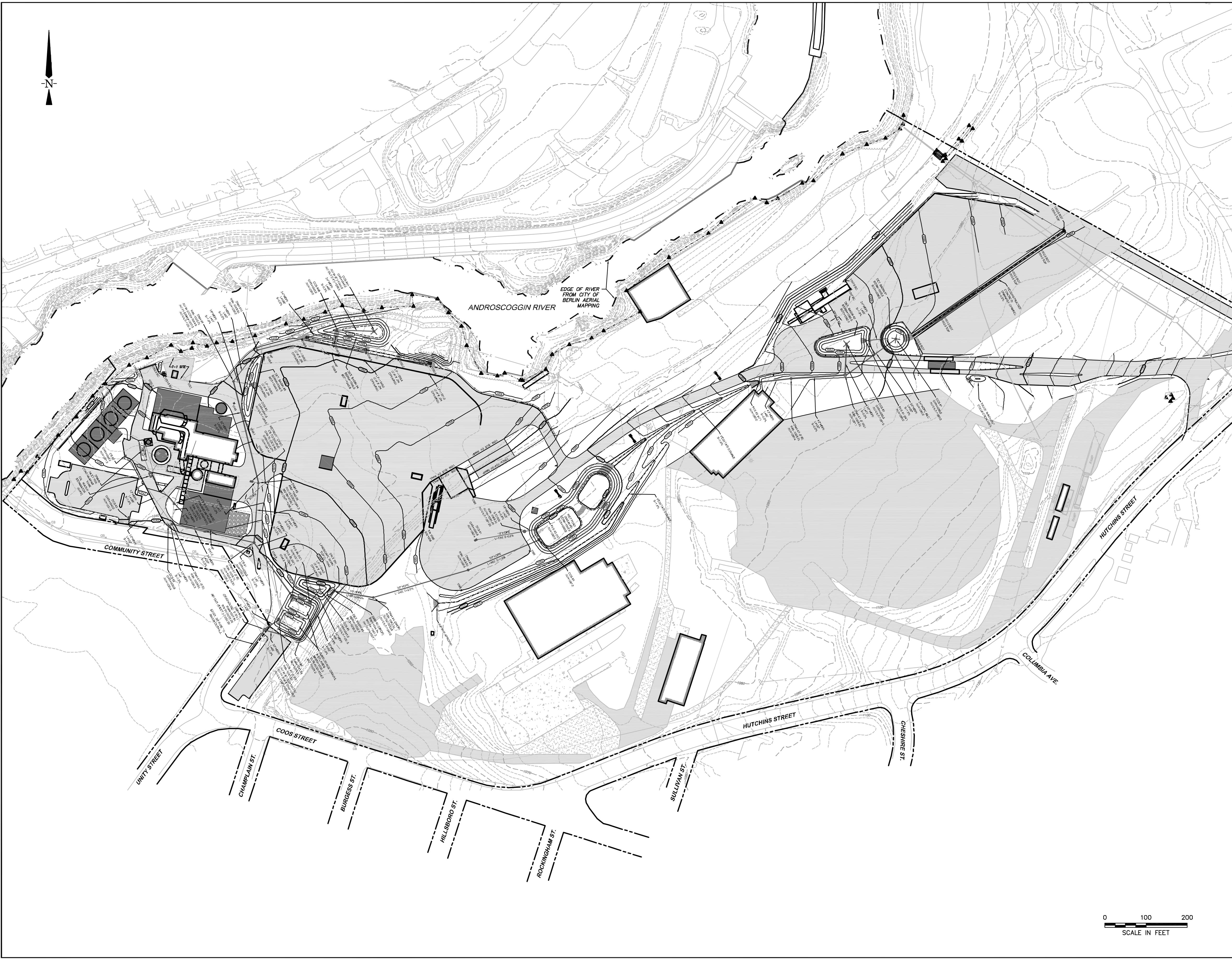

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LaidLaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

Biomass Energy Facility
Berlin, NH

OVERALL SITE GRADING & DRAINAGE PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.:
SCALE: 1"=100'

Fig. 3

DATE: Dec 15, 2009 - 10:28AM
FILENAME: H:\L145-Laidlaw\FIGURES\L145-GD.dwg

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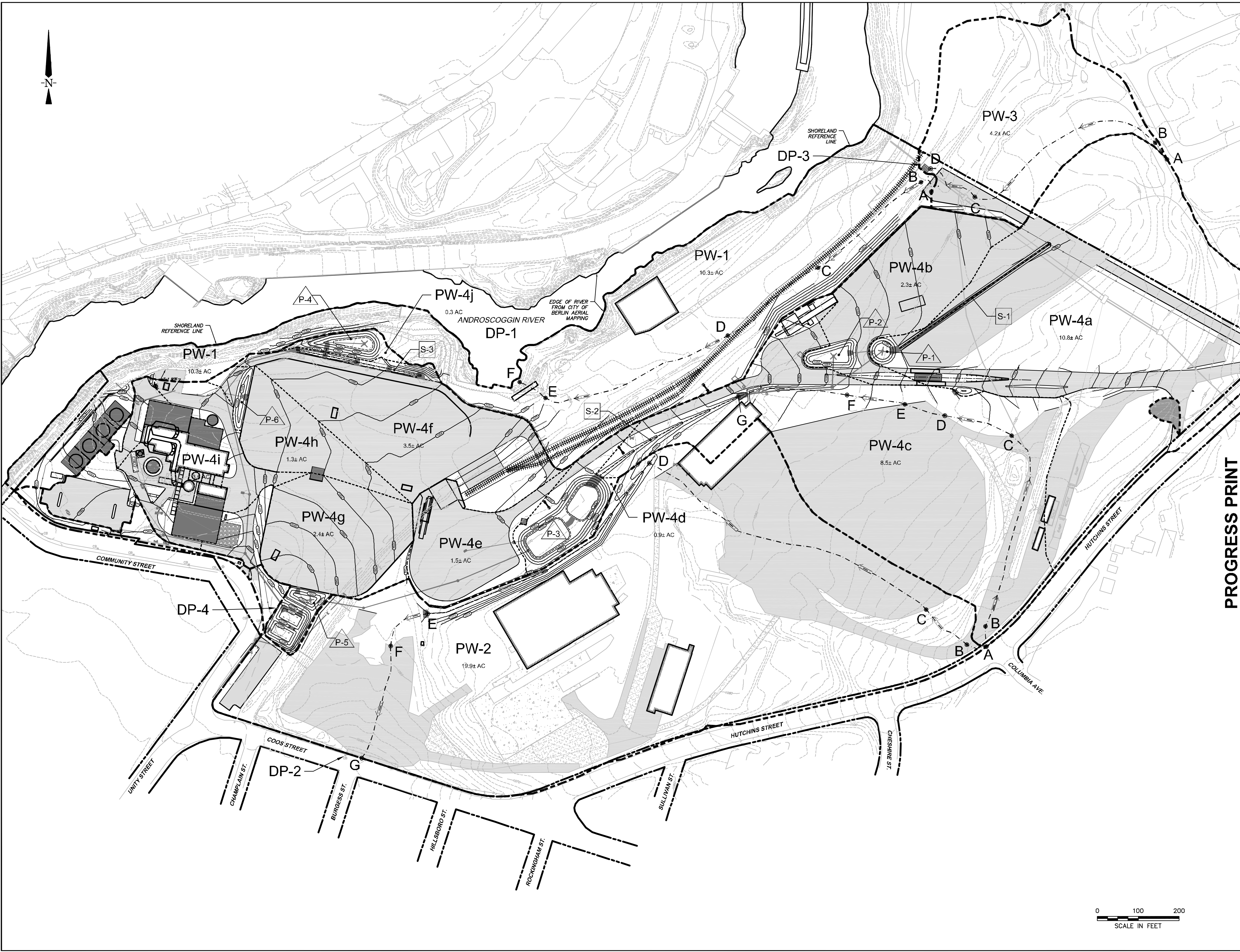

PROGRESS PRINT

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No.	REVISION	DATE	APP BY

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APPROVED BY:

Laidlaw Berlin BioPower, LLC
Berlin, NH

Proposed Watershed Plan

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.:
SCALE: 1"=100'

Fig. 4

DATE: Dec 15, 2009 - 10:39AM
FILENAME: H:\L145-Laidlaw\DRAINAGE\L145-Proposed_Watershed.dwg

Appendix H

Application for Sewer Connection Permit

Appendix H – Application for Sewer Connection Permit

Application for Sewer Connection Permit

LAIDLAW BERLIN BIOPOWER

PREPARED FOR

Laidlaw Berlin BioPower, LLC
Hutchins Street
Berlin, New Hampshire 03570

PREPARED BY

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

Project No. L145-005.05

www.essgroup.com

CoverSCP.doc

State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
WASTEWATER ENGINEERING BUREAU
HAZEN DRIVE - P.O. BOX 95
CONCORD, NH 03302-0095
TEL (603) 271-3503 FAX (603) 271-4128

APPLICATION FOR SEWER CONNECTION PERMIT

On behalf of Laidlaw Berlin BioPower ,
(Project Name or Description)

The Town/City of Berlin hereby requests authorization to

A. Connect additional domestic wastewater to its existing wastewater collection, treatment and disposal system, in the amount of :

212,476 gallons / day;

and/or

B. Extend its existing wastewater collection system by installing the following :

________ LF of ___________-inch sewer at ____________________ Street

________ " ___________ " " ____________________

NA

This proposed sewer connection and/or sewerage design plans meet with the approval of the local jurisdictional authorities. The municipal sewage collection system has no history of surcharge and there is no record of objections from persons presently connected to this system.

Name: ______________________________ Title: ____________________
(Municipal Offical; Please Print or Type)

Signature: ____________________________ Date: ____________________

See reverse side for additional instructions. Contact the NHDES/Wastewater Engineering Bureau at the address on the masthead if you need clarification regarding this form or connection permit requirements.

Appendix I

Industrial Wastewater Indirect Discharge Request Application

Appendix I – Industrial Wastewater Indirect Discharge Request Application

Industrial Wastewater Indirect Discharge Request Application

LAIDLAW BERLIN BIOPOWER

PREPARED FOR	Laidlaw Berlin BioPower, LLC Hutchins Street Berlin, New Hampshire 03570
PREPARED BY	ESS Group, Inc. 888 Worcester Street, Suite 240 Wellesley, Massachusetts 02482

Project No. L145-005.05

www.essgroup.com

NH DES WATER DIVISION
29 Hazen Drive - PO Box 95
CONCORD, NEW HAMPSHIRE 03302-0095
(603)271-3908 FAX (603)271-4128

INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST (IDR) APPLICATION

PART I. MUNICIPAL

The **Town/City** of Berlin proposes:

To discharge to its publicly owned treatment works the industrial flow from:

Applicant Laidlaw Berlin BioPower
(Name of Indirect Discharger)

New Discharge ~ or **Modified** Discharge ~

Flow: Average Process Wastewater Volume (gallons/day):

Previous Permitted Total:	NA
This Request:	* 211,036
TOTAL:	211,036

CERTIFICATION:

> **"This proposal meets with the approval of all local authorities having jurisdiction over the request."**

Name ______________________ Title ______________________
(Print or Type)

Signature: ______________________ Date ______________
(Authorized Municipal Official)

------------------------✧------------------------

Notes:

- ✧ By signing this discharge request form, the municipal official certifies that the municipality has evaluated and approves the proposed discharge and the ability of the POTW to take the discharge based on the information submitted by the industrial user, and that the application is complete.
- ✧ The proposed discharge shall meet the requirements of state and federal pretreatment standards, and local pretreatment programs / sewer use ordinances.
- ✧ No treatment plant shall allocate or accept for treatment more than 90 percent of the headworks or loading limit

* This value is the average daily process flow requested by the Applicant on Page 2

NHDES INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION

PART II. APPLICANT

(a) DISCHARGER NAME & ADDRESS

Name:	Laidlaw Berlin BioPower
Street Address:	Hutchins Street, Berlin, NH 03570
Mailing Address:	90 John Street, 4th floor, New York, NY 10038

(b) RESPONSIBLE OFFICIAL

Official - Name	Louis T. Bravakis
Position:	Vice President of Development
Phone #:	(802) - 229 - 4146
Contact - Name:	
Position:	
Phone #:	

(c) INDUSTRY TYPE

Product(s) / Description:	Biomass Energy Generating Facility		
NAICS Code # (s):	221119	**SIC Code # (s):**	4911

(d) SIU or CATEGORICAL STANDARDS ☐ Yes ☒ No

CIU-Category(s) Name:	**40CFR Part:**	**Subpart:**
SIU Description:		

(e) FLOW INFORMATION:

This IDR- Ave. Process (gpd):	**# of Connections to sewer:**	**# of Employees:**	**# of Shifts:**
* 211,036			

FLOW SUMMARY	**Source**	**Average (gpd)**	**Maximum (gpd)**	**Time/Duration**
Previous	Sanitary	0	0	NA
	Process	0	0	NA
	TOTAL	0	0	NA
Change - This IDR:	Sanitary	1,440	1,440	Continuous
	Process	* 211,036	302,534	Continuous
	TOTAL	212,476	303,974	Continuous
TOTAL :	Sanitary	1,440	1,440	Continuous
	Process	211,036	302,534	Continuous
	TOTAL	212,476	303,974	Continuous

* This value to match the value of "This Request" on Page 1

NHDES INDUSTRIAL WASTEWATER INDIRECT DISCHARGE REQUEST APPLICATION

(g) ENGINEER FOR TREATMENT SYSTEM PLANS & SPECS [$ 1,000 Review Fee]

Engineer:	NA
Company:	NA
NH P.E. #	NA

ATTACHMENTS Check List

	Attached	Remarks/Explanation
(f) TREATMENT PROCESS SCHEMATIC	☒	NA - No treatment processes
(g) PLANS, SPECS, O&M PROCEDURES	☒	NA - No treatment processes
(h) PRODUCTION PROCESS DIAGRAM	☒	See Figure 4
(i) WASTE STREAM POLLUTANTS LIST	☒	See Project Narrative Section D % Table 2
(j) TOXICITY/TREATABILITY INFO.	☒	See Project Narrative Section D & Table 2
(k) LOCATION MAP	☒	See Figure 1
(l) CHEMICAL LIST	☒	See Table 3
(m) SAMPLING LOCATION	☒	See Figure 4
(n) H_2O REDUCTION / P2 NARRATIVE	☒	See Project Narrative Section F
(o) ENVIRONMENTAL PERMITS LIST	☒	See Table 4

CERTIFICATION : (b)

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete.

I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Name Louis T. Bravakis
(Print or Type)

Title Vice President of Development

Signature:
(Indirect Discharger Official)

Date 12-1-2009

◆

Notes:

- ◆ Please attach additional pages as needed.
- ◆ Information not designated with shading is requested but optional.

Attachment A
Project Narrative

A. Project Description

Laidlaw Berlin BioPower, LLC ("LBB") is proposing to convert and upgrade much of the remaining facility equipment and infrastructure located at the former Fraser Pulp Mill (also referred to as the Burgess Mill) in Berlin, New Hampshire (the "Site") in order to develop a biomass fueled energy generating facility. Figure 1 provides a Project Locus Map showing the location of the Site in relation to the City of Berlin and its municipal wastewater treatment plant. Berlin BioPower (the "Facility" or the "Project") will use whole tree wood chips and other low-grade clean wood as fuel, and will be capable of generating nominally 70 megawatts (MW) of electric power (gross output).

The Project will provide a source of clean, carbon-neutral, renewable energy that will help support New Hampshire's goal of meeting 25% of the state's energy needs with renewable resources by 2025. The Project supports the economic development efforts of the City of Berlin and the region, will infuse millions of dollars into the local economy, and create many new long-term jobs.

Figure 2 provides a Project Site Plan showing the location of all major components of the Project. The former black liquor recovery boiler currently located at the Site will be converted to a biomass fueled unit. The boiler was manufactured by Babcock & Wilcox (B&W) and originally installed in 1966 and refurbished in 1993. A bubbling fluidized bed (BFB), which is a very efficient approach to biomass combustion and power conversion technology, will be installed at the base of the boiler in place of the existing black liquor firing and recovery systems. Development of the overall Facility will also include construction of a new turbine building adjacent to the boiler building, which will house the steam turbine generator. A new wet cooling tower will be installed near the western edge of the property behind the boiler building. Two wood fuel off-loading and storage areas will be developed. Each wood handling and storage area will be paved and systems will be installed to properly manage stormwater run off from these areas along with Site roadways and other impervious areas.

The Facility will have a proposed peak discharge of approximately 300,000 gallons per day of process and sanitary wastewater to the existing municipal sewer system with a planned average daily discharge of approximately 213,000 gallons per day. As discussed in more detail below, wastewater will be comprised primarily of discharge from the cooling tower, water purification system effluent water, and periodic equipment wash-down activities. Wastewater blowdown from the boiler will be sent to the cooling tower to reduce make-up water demand and overall wastewater discharge from the Facility. It is not expected that the Facility wastewater will require pretreatment to meet discharge requirements established by the City of Berlin Sanitary Sewer System Ordinances. There are no federal Categorical Pretreatment Standards that apply to the Project[1].

B. Facility Water Systems & Wastewater Discharge Sources

The water supply for the Facility will be provided by the Berlin Water Works municipal supply and distribution system. The Facility will have an annual average water demand of approximately 1.2 million gallons per day, primarily for cooling tower make-up. The balance of the water supplied will

---

[1] The Steam Electric Power Generating Point Source Category (40 CFR 423) applies only to fossil fuel and nuclear generating facilities.

be used for boiler make-up, periodic equipment cleaning, and sanitary uses. An on-site treatment system will be used to produce demineralized make-up water for the boiler steam cycle. A 15,000 gallon demineralized water tank will be used for on-site storage.

The power generation process will utilize two recirculating water systems; a steam generation system and a cooling water system. In the steam generation cycle, feedwater will be pumped through heat exchangers that will recover heat from downstream operations and into the boiler. The pre-heated water will be circulated through metal tubes within the boiler where it will be converted to superheated steam. The steam will then be used to power a turbine which will mechanically drive an electric generator. After leaving the turbine, the steam will be cooled back to the liquid state in a condenser and returned to the feedwater pumps. In order to prevent the build up of contaminants in the recirculating steam system, a small fraction of the water referred to as "blow down" will be extracted from the system. In order to help conserve water, the blow down from the steam cycle will be directed to the Project's cooling tower to meet a portion of its water demand.

The cooling water cycle will pump water to the steam condenser to remove heat and return the steam to water. The heated cooling water leaving the condenser will be delivered to a wet cooling tower. In the cooling tower, the water will be sprayed over the top of packing material and will flow down through counter flowing ambient air drawn through the tower by large fans mounted in the top of the unit. The water will be cooled by both heat transfer and evaporation as it passes down through the tower. The exhaust system of the cooling tower will be equipped with mesh drift eliminators that will minimize entrained water droplet loss to less than 0.0005% of the recirculating water flow. The cooled water leaving the tower will be returned to the steam condenser system. Similar to the steam cycle, a portion of the recirculating water will be blown down to prevent the accumulation of contaminants. The cooling tower blow down will be discharged to the process wastewater system.

Sanitary drains will collect and route the wastewater from potable uses to the city sewer system. Water treatment for the boiler make-up water will consist of reverse osmosis and a treatment program consisting of phosphate, caustic, neutralizing amine and oxygen scavenger for water used in the closed loop steam system. The cooling water treatment program for the cooling tower makeup water will consist of corrosion inhibitor, dispersant and biocides to prevent biological growth in the cooling system components. All process wastewater, including water collected in floor drains from equipment cleaning, will be discharged to the city sewer system. The Facility will have a peak discharge rate of approximately 304,000 gallons per day of sanitary and process wastewater to the municipal sewer system. It is not expected that the Facility wastewater will require any pretreatment to meet all applicable state and city discharge requirements.

A Site Utility Plan (Figure 3) is attached, showing the location of the proposed water supply lines wastewater discharge lines, stormwater handling systems and connection to the municipal sewer system. A wastewater sampling location is proposed at the manhole servicing the combined wastewater lines, prior to combining with the sanitary discharge lines.

C. Facility Wastewater Discharge Volumes

Figure 4 is a Water Balance diagram that shows the general flow of water and wastewater through the Facility. Table 1 provides a summary of the currently planned peak and annual average flow rate of each stream shown in Figure 4. As shown on Table 1, Stream 16, the maximum wastewater discharge rate will be approximately 304,000 gallons per day (gpd), which would occur during very hot, dry days when the cooling tower will experience maximum evaporative conditions. The average wastewater discharge rate from the Facility on annual basis will be approximately 213,000 gpd. This rate represents the discharge rate while the Facility operates under average ambient temperatures typical for the City of Berlin.

D. Wastewater Contaminants

Wastewater discharged from the Facility will contain trace levels of the same constituents found in the city water supply, along with chemicals added to the water used in the Facility's operations. As both the boiler and cooling tower recirculate water, they will increase the levels of metals, salts and solids contained in the city water supply. However, the water supply purification system, along with the continuous blowdown and make-up water systems serve to minimize contaminant loadings and increase the "cycles of concentration". The concentrations of constituents in the incoming water will be increased by a factor of 7 or less yet will occur only in low part per million levels in the resulting discharge.

The attached Table 2 provides a summary of a typical water treatment program used by an electric generating facility. The table provides a listing of treatment chemicals that are typically used in the boiler water, cooling water, and reverse osmosis water purification system. The functionality of each chemical, its feedpoint, the expected concentration range of active constituents, and the maximum expected daily usage of each chemical is provided. Although the exact treatment chemicals and vendor have not been selected at this early stage in the design process, the chemicals shown in Table 2 are expected to be representative of those that will be used at the Facility and their constituents are indicative of those that be contained in the process wastewater.

The constituents that will be contained in the wastewater from the Facility will be readily treated and reduced to acceptable discharge levels by the City's Waste Water Treatment Facility. In the levels contained in the wastewater from the Facility, none of the chemicals exhibit high levels of toxicity or will interfere with the WWTF's treatment operations.

In addition to the chemicals used to treat the water used in the Facility's operations, other chemicals such as fuel oil, lubricating oils, and chemical cleaning agents will be stored and used the Facility. A preliminary list of chemicals and storage quantities is provided in Table 3. All chemicals will be stored within systems or buildings that provide proper containment of the maximum quantity to be held on site at any time. LBB will prepare and comply with a Spill Prevention, Control and Countermeasure Plan, as well as a Stormwater Pollution Prevention, which will detail the systems and procedures used to prevent releases and harm to the environment or public safety in the unlikely event that a release does occur.

E. Wastewater Monitoring

The Facility will utilize continuous flow metering, pH monitoring, and temperature monitoring of the process wastewater discharge, with alarms to the Operations Control Room, which will be staffed around-the-clock. The Facility will also utilize a heat exchanger cooling system to control the temperature of the blowdown streams and assure that the limitations[2] established in the City's Sewer Use Regulations are not exceeded.

F. Water Reduction and Pollution Prevention

The Facility will be designed with several features that serve to minimize water consumption and wastewater discharge, and prevent pollutants from entering the wastewater. The most notable features include:

- Use of a nearly closed-loop recirculating cooling water system, in lieu of once through cooling employed by some large generating facilities.
- Use of high efficiency mist eliminators in the Facility's cooling tower that greatly reduce the discharge of water droplets entrained in the unit's exhaust stream.
- Discharge of the boiler blowdown to the cooling tower, rather than directly to the sewer system, which reduces both raw water consumption and wastewater discharge levels.
- Use of high efficiency steam traps to reduce water losses from the electric generating steam cycle.

As noted above, the Facility will be equipped with containment systems for all chemicals to prevent releases to the environment. LBB will also prepare and implement plans that prescribe proper material handling procedures, ongoing inspections, and employee training to prevent pollutants from entering the environment.

---

[2] Wastewater temperature is limited to no greater than 150°F (65°C), or which will inhibit biological activity in the treatment plant resulting in interference, but in no case that causes the temperature at the introduction into the POTW treatment plant to exceed 104°F (40°C).

Attachment B
Figures

Location: J:/L145-001 LLEG Berlin/GIS/00-mxd/wastewater.mxd

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Engineers
Scientists
Consultants

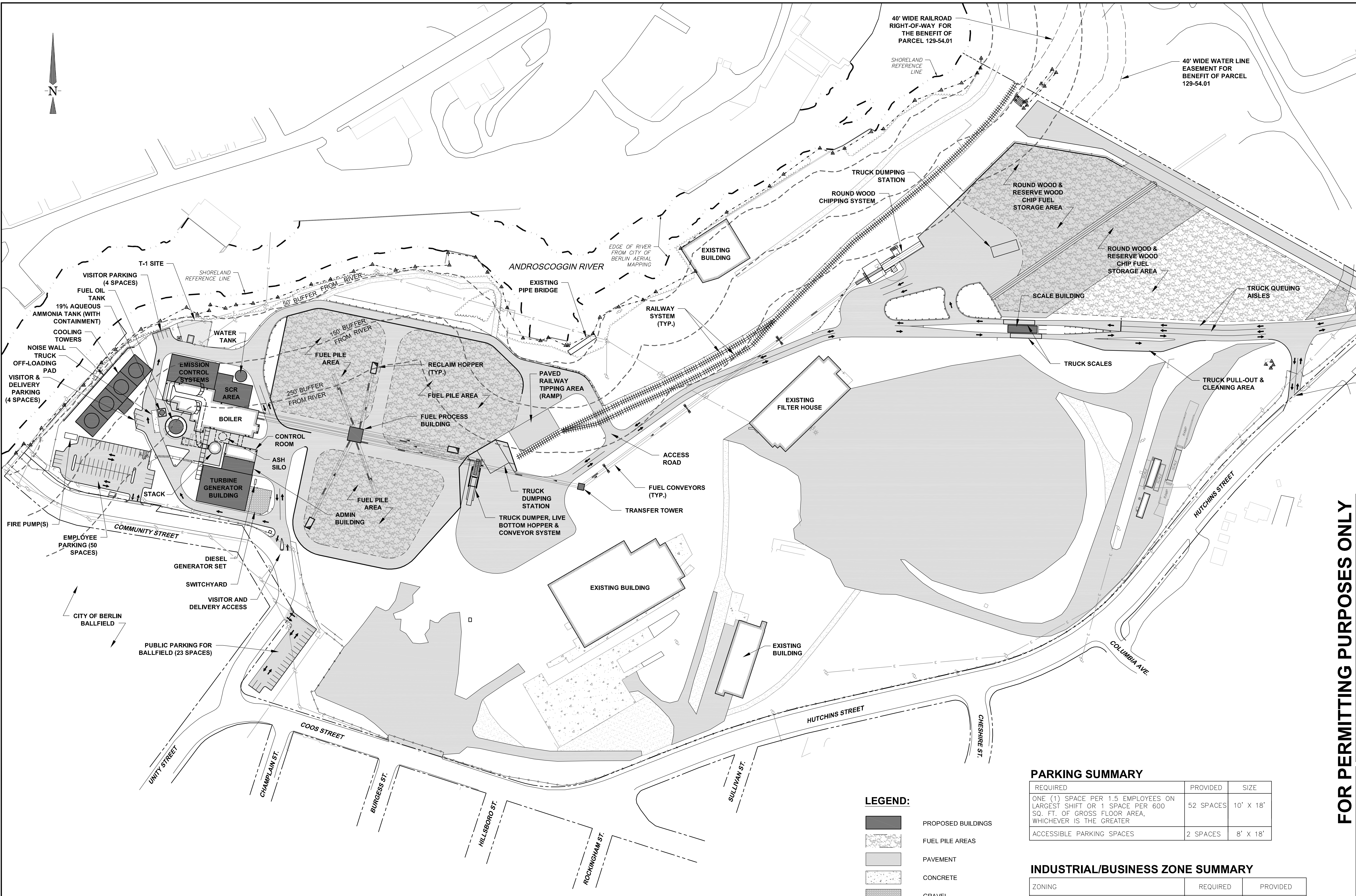
LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Scale: 1" = 1,500'

Source: 1) New Hampshire GRANIT Ortho, 1998

Project Locus Map

Figure 1



LEGEND:

■	PROPOSED BUILDINGS
▨	FUEL PILE AREAS
▒	PAVEMENT
░	CONCRETE
▩	GRAVEL
—○—	FENCE LINE
—•—•—	GUARDRAIL

PARKING SUMMARY

REQUIRED	PROVIDED	SIZE
ONE (1) SPACE PER 1.5 EMPLOYEES ON LARGEST SHIFT OR 1 SPACE PER 600 SQ. FT. OF GROSS FLOOR AREA, WHICHEVER IS THE GREATER	52 SPACES	10' X 18'
ACCESSIBLE PARKING SPACES	2 SPACES	8' X 18'

INDUSTRIAL/BUSINESS ZONE SUMMARY

ZONING	REQUIRED	PROVIDED
MINIMUM LOT AREA	10,000 SF	62 ACRES
MINIMUM LOT WIDTH/FRONTAGE	100 FT	2,166 FT
MAXIMUM LOT COVERAGE (IMPERVIOUS)	75%	55%
MINIMUM FRONT YARD	50 FT	34 FT
MINIMUM SIDE YARD	20 FT	42 FT
MINIMUM REAR YARD	20 FT	24 FT

0 100 200
SCALE IN FEET

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CHECKED BY: JCB
DESIGNED BY: DJG
APPROVED BY: JCB

LaidLaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

Biomass Energy Facility
Berlin, NH

Project Site Plan

PROJECT No.: L145-004
DATE OF ISSUE: 11/06/09
SHEET No.: 6 of 20
SCALE: 1"=100'

Fig. 2

DATE: Nov 30, 2009 - 4:26PM
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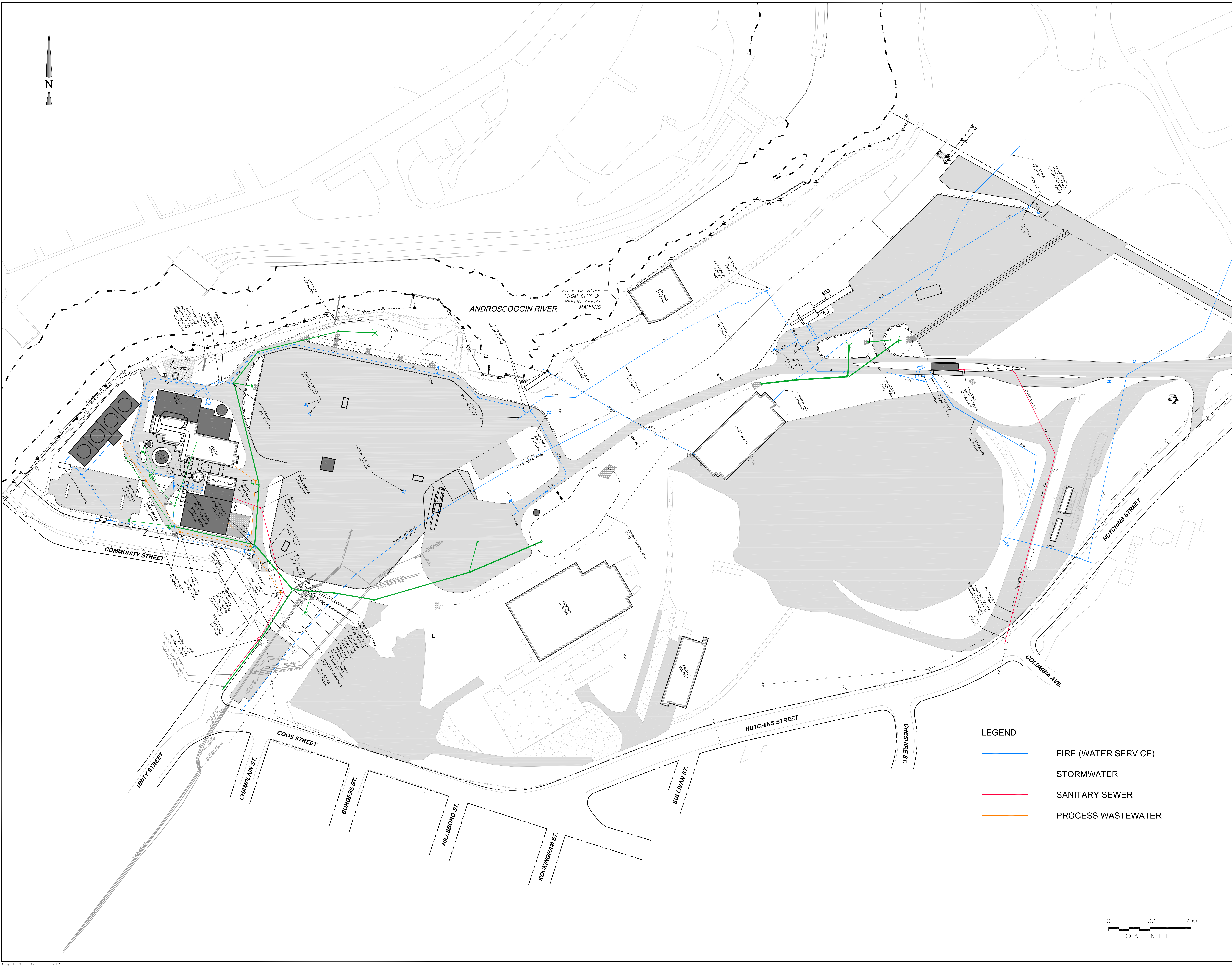

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DESIGNED BY: DJG
APPROVED BY: JCB

LaidLaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

Biomass Energy Facility
Berlin, NH

Project Utilities Site Plan

PROJECT No.: L145-004
DATE OF ISSUE:
SHEET No.:
SCALE: 1"=100'

Fig. 3

DATE: Nov 30, 2009 - 4:22PM
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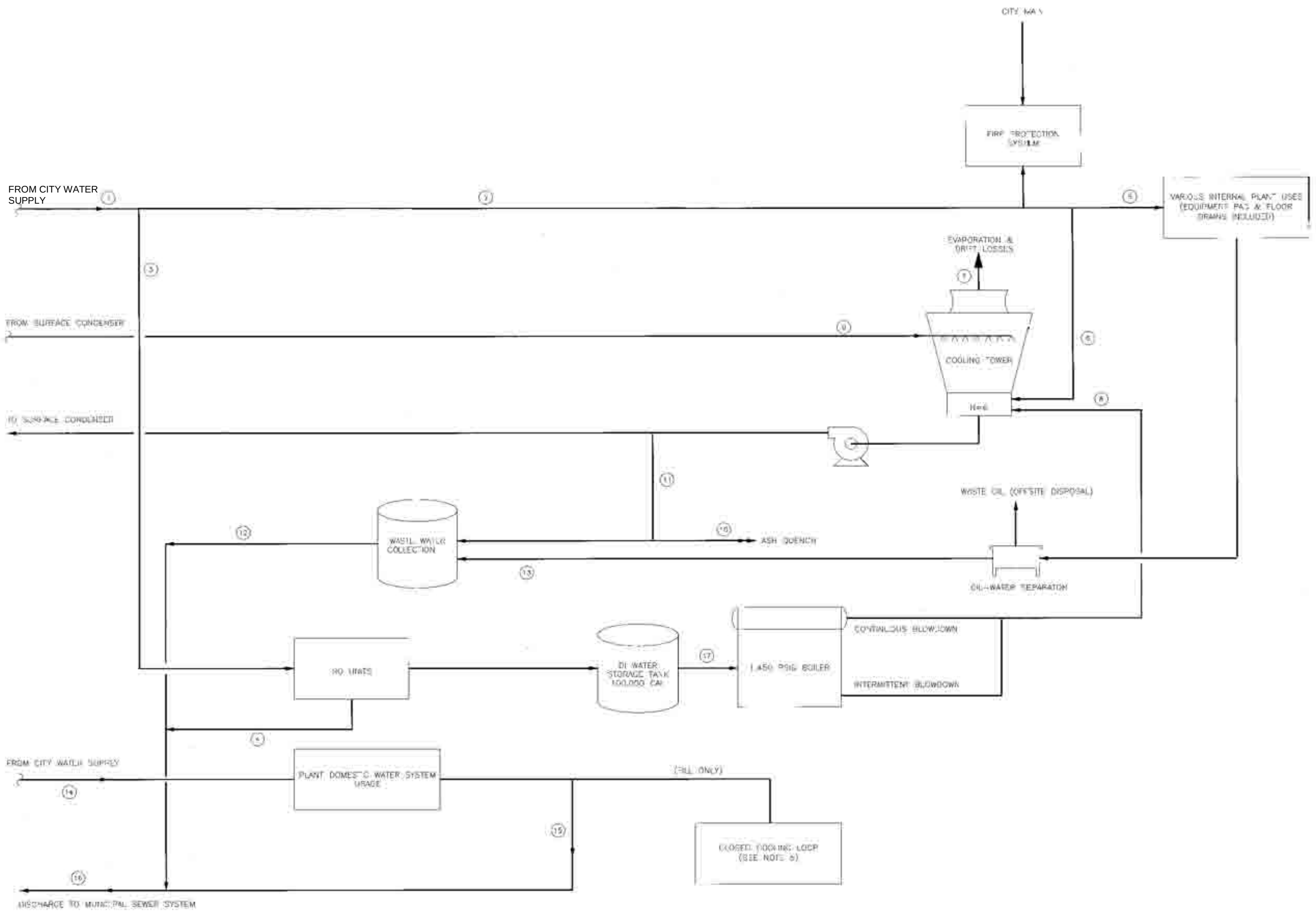


NOTES:

1. TURBINE PERFORMANCE (... UNIT) STG DESIGN DATA DATED 6-12-5_.

2. FUEL BASED ON B&W BOILER DATA DATED 8-13-09.

3. CLOSED COOLING SYSTEM IS A CLOSED PIPING LOOP WITH NO MAKE UP OR DISCHARGE DURING NORMAL OPERATION. SMALL PORTIONS OF THE SYSTEM WILL BE DRAINED PERIODICALLY FOR MAINTENANCE PURPOSES ONLY, AND THE WATER REMOVED FROM THE SYSTEM WILL BE DISPOSED OF OFF-SITE.

4. THE FIRE PROTECTION SYSTEM ONLY CONSUMES WATER DURING FIRST FILL AND IN THE EVENT OF EMERGENCY. FOR THE PURPOSES OF THE BALANCE, THE NET CONSUMPTION IS ZERO.

B		REV'D FOR 6 CELL COOLING TOWER	
A	0/15/09	ISSUED FOR PERMITTING ONLY	
REV	DATE	DESCRIPTION	

PRELIMINARY
IN-PROCESS DOCUMENT
FOR INFORMATION ONLY
NO OTHER USE IS INTENDED
10/27/09

	NAME	DATE
DRAWN BY		8-13-09
CHECKED BY		
APPROVED BY		8-13-09

WALDRON
ENGINEERING & CONSTRUCTION INC.
EXETER, NH 03833
www.waldron.com

HOMELAND LAIDLAW
ENERGY, LLC

Figure 4

BERLIN BIOMASS ENERGY
FACILITY
Berlin, New Hampshire

WATER BALANCE
DIAGRAM

103.01-02-WB1A-B

Attachment C
Tables

Table 1 - Water Balance Table

Stream	Description	Average Annual (gpd)	Peak Annual (gpd)
1	From City Water Supply to Boiler Plant	1,246,244	1,796,966
2	Raw Water Usage at CT and Plant	1,219,888	1,772,968
3	To RO Inlet for Feedwater Process	23,998	23,998
4	Reject from RO to Wastewater	4,800	4,800
5	Various Internal Plant Uses	1,440	1,440
6	Makeup to CT Basin from City Water Supply	1,218,304	1,771,528
7	Evaporation & Drfit Losses at CT	1,032,833	1,492,272
8	Boiler Blowdown - Cont. & Intermittent	19,198	19,198
9	Circulating Water Returen to CT	86,400,000	86,400,000
10	Bottom Ash Quenching	2,160	2,160
11	CT Blowdown to Wastewater	206,566	298,454
12	Wastewater Discharge to Sewer	205,775	297,734
13	Wastewater from Oil Water Separator	1,440	1,440
14	Potable Water to Plant Domestic Use	1,440	1,440
15	Domestic System Discharge to Sewer	1,440	1,440
16	Total Discharge to Sewer	212,612	303,974
17	Makeup to Boiler Feedwater	19,198	19,198

Table 2 - Chemical Treatment Program Summary

	Chemical Function	Active Constituents	Feedpoint	PPM as Product		PPM Active	As Product
				Min ppm	Max ppm	Average	daily Max LBS
Boiler Water Treatment Program							
	Phosphate/Dispersant	Phosphate/Polymethacrelate (1.8 to 1 Na:PO4 ratio)	HP Steam Drum	10	15	12	20
	Neutralizing Amine	Diethylaminoethanol/ Morpholine	DA Dropleg	1.0	3.0	0.152	40
	Caustic	NaOH	HP Steam Drum				
	Oxygen Scavenger	Carbohydrazide	DA Dropleg	0.1	1	0.5	25
Cooling Water Treatment Program							
	Dispersant	Anionic Polymer	condenser water return	1	2	1.5	25
	Corrosion Inhibitor	Pyrophosphate	condenser water return	30	40	10	50
	Microbiocide	12.5% Bleach	Cooling Tower Sump			0.25	1250
	Microbiocide	Sodium Bromide	Cooling Tower Sump	5	20	15	1329
RO Chemical Feed							
	Dechlorination	sodium Bisulfite 40%	RO inlet after filters/with Cl2 analyzer	~4	~8		13
	RO Antiscalant	polymer	RO inlet after filters	3	5		6
	Alkaline Cleaner	Proprietary	Cleaning tank				
	Acidic Cleaner	Proprietary	Cleaning tank				

Table 3
Summary of Chemicals and Storage

Ref No.	Chemical Description	Chemical Use	System	Potential Storage Volume			Storage Method
				Range (To/From)			
				Min Vol.	Max Vol.	Units	
1	ULSD No. 2 Fuel Oil	Fuel	Boiler (Startup)	50,000	100,000	Gallons	Above Ground Tank
2	ULSD No. 2 Fuel Oil	Fuel	Emergency Diesel Generator	500	1,000	gal	Tank
3	ULSD No. 2 Fuel Oil	Fuel	Fire Pump	500	1,000	gal	Tank
4	Diesel Fuel	Fuel	Wood Yard Equipment	1,000	2,000	gal	Above ground storage tank or fuel truck
5	Lubricating Oil	Equipment Lubrication	Steam Turbine (ST)	5,000	10,000	gal	Internal Tank
6	Lubricating Oil	Equipment Lubrication	Waste Lube Oil	200	500	gal	Drums
7	Lubricating Oil [3]	Equipment Lubrication	Cooling Tower Fan Gear Box	50	100	gal	Tote [2]
8	Conventional Transformer Oil [3]	Dielectric Oil	Step-Up Transformer	10,000	20,000	gal	Transformer
9	Conventional Transformer Oil [3]	Dielectric Oil	Aux Transformer	2,000	4,000	gal	Transformer
10	Aqueous Ammonia (N_4OH) – 19% Conc	Emissions Control	SCR System	5,000	15,000	gal	Above Ground Tank
11	Hydrazide Solution [4]	Removal of oxygen	Boiler, Condensate System	275	550	gal	Tote [2]
12	Amine Solution [4]	Corrosion inhibitor	Boiler, Condensate System	275	550	gal	Tote [2]
13	Sodium Tripolyphosphate Solution[4]	Boiler water pH Control	Boiler, Condensate System	275	550	gal	Tote [2]
14	Sodium Hydroxide Solution[4]	Boiler water pH Control	Boiler, Condensate System	275	550	gal	Tote [2]
15	Sodium Bisulfite Solution[4]	Removal of residual chlorine	Demineralized Water Treatment	275	550	gal	Tote [2]
16	Polymer Solution[4]	Antiscalant	Demineralized Water Treatment	275	550	gal	Tote [2]
17	Cleaning Solutions	Cleaning of RO System	Demineralized Water Treatment	550	1100	gal	Tote [2]
18	Sodium Hypochlorite Solution (Bleach)	Disinfection, slime and/or algae control	Cooling Tower	275	550	gal	Tote [2]

Table 3
Summary of Chemicals and Storage

Ref No.	Chemical Description	Chemical Use	System	Potential Storage Volume			Storage Method
				Range (To/From)			
				Min Vol.	Max Vol.	Units	
19	Sodium Bromide Solution	Microbiocide	Cooling Tower	275	550	gal	Tote [2]
20	Hydrogen (H_2)	Generator Hydrogen Cooler	Generator	240,000	240,000	scf	Tube Trailers or Cylinders
21	Nitrogen (N_2)	Lay up	Boiler	12	24	bottles	Compressed gas cylinders
22	Carbon Dioxide (CO_2)	Fire Protection	Plant Buildings	12	24	bottles	Compressed gas cylinders
23	Acetylene (C_2H_2) [1]	Maintenance – Cutting Gas	NA	2	10	bottles	Compressed gas cylinders
24	Oxygen (O_2) [1]	Maintenance – Cutting Gas	NA	2	10	bottles	Compressed gas cylinders
25	Propane (C_3H_8) [1]	Maintenance – Temp Heat	NA	2	10	bottles	Compressed gas cylinders
26	Argon (Ar) [1]	Maintenance – Welding Gas	NA	2	10	bottles	Compressed gas cylinders
27	Thinners, Solvents [1]	Cleaners	NA	20	40	gal	Containers
28	Polywater® Lubricant [1]	Cable pulling	NA	200	400	gal	Containers

Notes:

[1] Primarily used during construction but may be present during operation for maintenance.

[2] Single tote volume based on 275 gallons.

[3] Volume typically contained within the equipment or system.

[4] Boilerwater treatment chemicals are provided for a range of treatments.

Table 4 - List of Required Permits

Permits
State Air Permit Application
Site Specific Alteration of Terrain Permit Application
Shoreland Protection Permit Application
National Pollutant Discharge Elimination System (NPDES) General Stormwater Permit Application for Construction Activities
National Pollutant Discharge Elimination System (NPDES) Stormwater Permit Application for Industrial Activities
Application for Sewer Connection Permit

Appendix J

Site Photographs

Appendix J - Site Photographs

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Previous Site Conditions–
Aerial Photograph of Site / City of Berlin

Photograph
1

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

**Previous Site Conditions–
Aerial Photograph of Site**

**Photograph
2**

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

**Previous Site Conditions–
Photograph of Site**

**Photograph
3**

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions– Boiler Building and Stack

Photograph
4

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions – Former Riverside News Print Building w/ Boiler Building and Stack

Photograph 5

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions – Former Bailed Pulp Storage Building

Photograph 6

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions - Former Waste Mill Building

Photograph
7

Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions – Water Filtration Building with Boiler Building and Stack

Photograph 8

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions– Truck Scale House Building

Photograph 9

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions– Former Berlin Mills Railway Bridges (North of Project Site)

Photograph 10

Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions–
View From Hutchins Street

Photograph
11

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions–
View From Orthodox Church (Petrograd St)

Photograph
12

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions–
View From Sixth Ave

Photograph
13

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

**Existing Conditions–
View From Main Street**

**Photograph
14**

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions–
View From Woods Department Parking Lot

Photograph
15

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions–
View From Mason St Bridge

Photograph
16

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions–
View From Bridge Street Walking Bridge

Photograph
17

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions–
View From Grandview Drive

Photograph
18

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions–
View From Center of Project Site

Photograph
19

ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Existing Conditions–
View From Southern Portion of Site

Photograph
20

Appendix K

National Heritage Bureau Correspondence

Appendix K

National Heritage Bureau Correspondence

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
http://www.fws.gov/northeast/newenglandfieldoffice

January 2, 2009

To Whom It May Concern:

This project was reviewed for the presence of federally-listed or proposed, threatened or endangered species or critical habitat per instructions provided on the U.S. Fish and Wildlife Service's New England Field Office website:

(http://www.fws.gov/northeast/newenglandfieldoffice/EndangeredSpec-Consultation.htm)

Based on the information currently available, no federally-listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service (Service) are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under Section 7 of the Endangered Species Act is not required.

This concludes the review of listed species and critical habitat in the project location(s) and environs referenced above. No further Endangered Species Act coordination of this type is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your cooperation. Please contact Mr. Anthony Tur at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
http://www.fws.gov/northeast/newenglandfieldoffice

REF: Biomass energy generating facility, Berlin, NH

July 14, 2009

Meghann J. Murray
ESS Group, Inc.
888 Worcester St., Suite 240
Wellesley, MA 02482

RECEIVED
July 17/09

Dear Ms. Murray:

We received your letter (enclosed) requesting an endangered species review in regard to the proposed project identified above.

The New England Field Office has developed measures to streamline the endangered species consultation process and other requests for technical assistance. The information you have requested is available on our website at:

(http://www.fws.gov/northeast/newenglandfieldoffice/EndangeredSpec-Consultation.htm)

Please review these streamlining measures. We are confident they will adequately address your request. For assistance in navigating the website, please contact Phil Leeser at 603-223-2541.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

Enclosure

Memo

NH NATURAL HERITAGE BUREAU

To: Meghann Murray, ESS Group, Inc.
888 Worcester Street
Suite 240
Wellesley, MA 02482

From: Melissa Coppola, NH Natural Heritage Bureau
Date: 6/24/2009 (valid for one year from this date)
Re: Review by NH Natural Heritage Bureau
NHB File ID: NHB09-1209
Town: Berlin
Project type: Buildings and Related Structures: Single commercial building lot, etc.
Location: Tax Maps: 129-54.01, 54.001, and 55
cc: Kim Tuttle

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments:

Vertebrate species	**State**[1]	**Federal**	**Notes**
Bald Eagle (*Haliaeetus leucocephalus*)	T	M	Contact the NH Fish & Game Dept (see below).
Common Nighthawk (*Chordeiles minor*)	E	--	Contact the NH Fish & Game Dept (see below).

[1] Codes: "E" = Endangered, "T" = Threatened, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. For some purposes, including legal requirements for state wetland permits, the fact that no species of concern are known to be present is sufficient. However, an on-site survey would provide better information on what species and communities are indeed present.

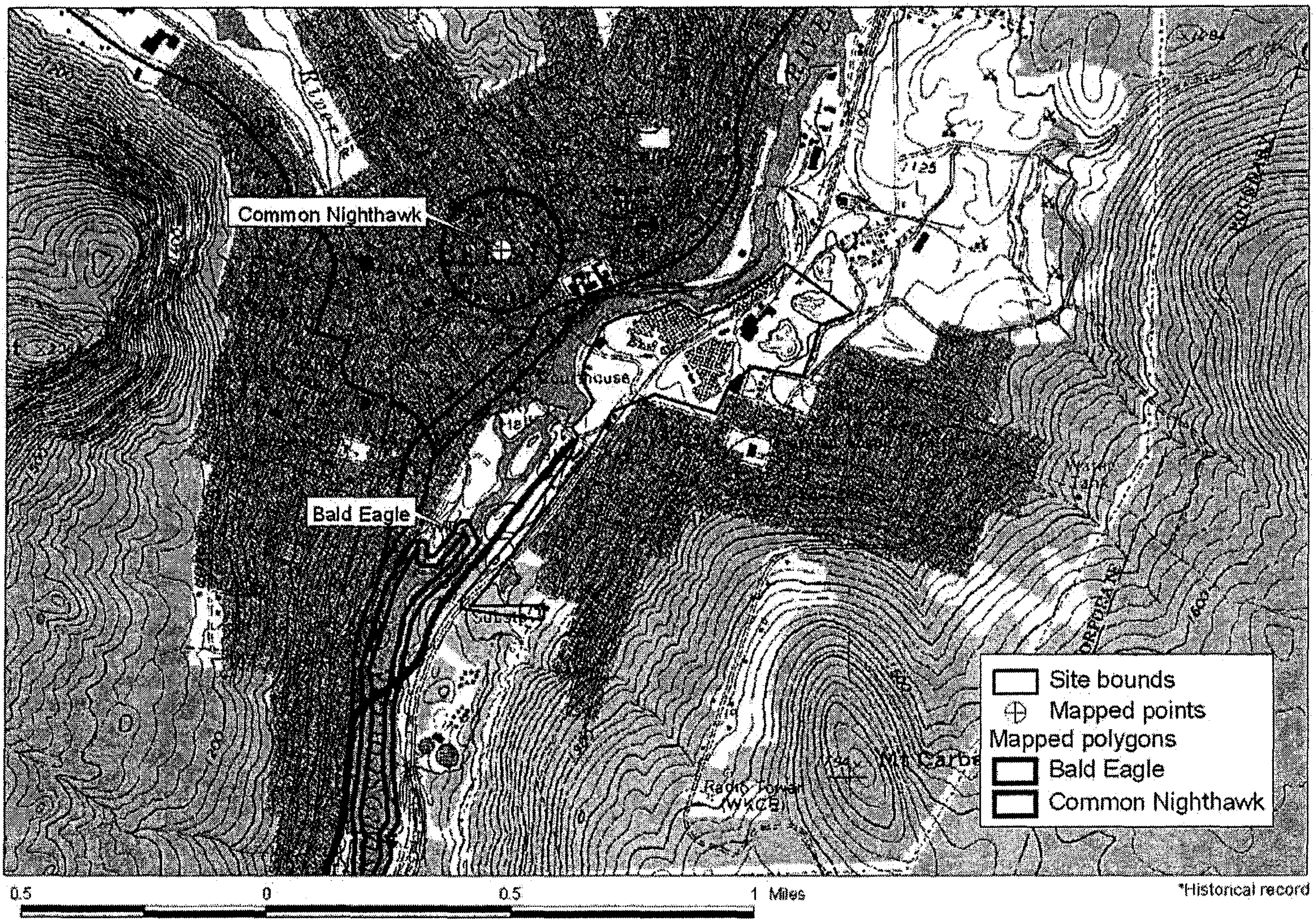
Department of Resources and Economic Development
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DRED/NHB
PO Box 1856
Concord NH 03302-1856

NH NATURAL HERITAGE BUREAU

Known locations of rare species and exemplary natural communities

Note: Mapped locations are not always exact. Occurrences that are not in the vicinity of the project are not shown.



*Historical record

1:18000

Valid for one year from this date: 24 Jun 2009

New Hampshire Natural Heritage Bureau - Animal Record

Bald Eagle (*Haliaeetus leucocephalus*)

Legal Status		**Conservation Status**	
Federal:	Monitored	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 1993: Occasional observations from Rte. 16 between Berlin and Gorham.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Androscoggin River
Managed By: Drew Easement

County:	Coos	USGS quad(s):	Berlin (4407142)
Town(s):	Gorham	Lat, Long:	442539N, 0711129W
Size:	165.3 acres	Elevation:	800 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: All along the Androscoggin River.

Dates documented

First reported: 1993 Last reported: 1993

Deluca, Diane. Audubon Society of New Hampshire. 1993. Results of Annual Eagle Wintering Surveys.

The U.S. Fish & Wildlife Service has jurisdiction over Federally listed species. Please contact them at 70 Commercial Street, Suite 300, Concord NH 03301 or at (603) 223-2541.

New Hampshire Natural Heritage Bureau - Animal Record

Common Nighthawk (*Chordeiles minor*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Not ranked (need more information)

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description:	1990: 26 adults, sex unknowns (Obs_id 939).
General Area:	1990: Terrestrial - Urban / suburban (Obs_id 939).
General Comments:	1990: Number above represents the high count for the period 1982-1992. Young were documented in 1985, and perhaps other years during this period (Obs_id 939).
Management Comments:	

Location

Survey Site Name: Berlin
Managed By:

County:	Coos	USGS quad(s):	Berlin (4407142)
Town(s):	Berlin	Lat, Long:	442827N, 0711050W
Size:	30.8 acres	Elevation:	

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 1990: Downtown [Berlin] (Obs_id 939).

Dates documented

First reported: 1990-07-22 Last reported: 1990-07-29

Darrell Oakley

From: Tuttle, Kim [Kim.Tuttle@wildlife.nh.gov]
ent: Monday, October 19, 2009 8:36 AM
o: Darrell Oakley
Subject: NHB09-1209 Laidlaw Berlin BioPower LLC

Darrell,

The NHFG Nongame and Endangered Species Program has reviewed NHB09-1209 for the proposed Laidlaw Berlin BioPower project in Berlin, NH. Bald eagle and common nighthawk were identified in the NHB review as occuring in the vicinity of the project. Both species are protected by the NH Endangered Species Conservation Act (RSA 212-A). We do not expect impacts to bald eagle as no trees within 50 ft. of the Androscoggin River will be removed. If there is any opportunity to allow more habitat along the River to revert back to native trees and shrubs, we would encourage that as it would provide future perching and roosting sites for bald eagle.

Common nighthawks nest on the ground in gravel lots and on flat rooftops covered in small stone. We have not had breeding reports for this species in Berlin for a number of years now so we do not expect impacts to common nighthawk as a result of the proposed project. Please feel free to call me at 271-6544 if you have any further questions regarding this job.

Sincerely,

Kim Tuttle
Wildlife Biologist
NH Fish and Game
Nongame and Endangered Species Program
03-271-6544

Appendix L

Spill Prevention & Emergency Response Plan

Appendix L –
Spill Prevention & Emergency Response Plan

Pollution Prevention & Emergency Response Plan

BERLIN BIOPOWER
BERLIN, NEW HAMPSHIRE

PREPARED FOR	Laidlaw Berlin Biopower, LLC 90 John Street, Fourth Floor New York, New York 10038-3202
PREPARED BY	ESS Group, Inc. 888 Worcester Street, Suite 240 Wellesley, Massachusetts 02482-3747

Project No. L145-006.01

December 15, 2009

POLLUTION PREVENTION AND EMERGENCY RESPONSE PLAN
BERLIN BIOPOWER
Berlin, New Hampshire

Prepared For:

Laidlaw Berlin BioPower, LLC
90 John Street, Fourth Floor
New York, New York 10038-3202

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482-3747

ESS Project No. L145-006.01

December 15, 2009

TABLE OF CONTENTS

TABLES

FIGURES

PLAN REVIEW LOG

The purpose of this log is to demonstrate that the appropriate reviews have been completed and that the Plan does or does not require amendments.

Date Of Review	Person Completing Review	Amendments Required? (Indicate Yes Or No)	If Amendments Are Required, Provide Details	Date Next Review Is Required
	Printed Name: Printed Title: Signature:		Brief reason for amendments: Plan must be amended by (date): Is PE certification required (indicate yes or no)?	
	Printed Name: Printed Title: Signature:		Brief reason for amendments: Plan must be amended by (date): Is PE certification required (indicate yes or no)?	
	Printed Name: Printed Title: Signature:		Brief reason for amendments: Plan must be amended by (date): Is PE certification required (indicate yes or no)?	
	Printed Name: Printed Title: Signature:		Brief reason for amendments: Plan must be amended by (date): Is PE certification required (indicate yes or no)?	

EMERGENCY CONTACT NUMBERS

Company Name:	Laidlaw Berlin BioPower, LLC
Address:	57 Hutchins Street, Berlin, NH 03570
Fire / Ambulance / Police:	911
Northern New England Poison Center:	1-800-222-1222

Laidlaw Internal Company Contacts:

Name	Position	Work #	Home #	Mobile #
TBD	Plant Manager/ Primary Emergency Coordinator			
TBD	Shift Foreman/ Secondary Emergency Coordinator			
TBD	Plant Operator			
TBD	Operations and Maintenance Manager			
TBD	Environmental Manager			

External Hazardous Substance Release Reporting / Response Contacts:

Type of Spill	Who to Orally Notify	Phone #	1-Hour	Immediate
Any spill	Emergency Coordinators	Listed Above		X
Oil spills greater than 25 gallons to land or oil spills to the Androscoggin River	NH Dept of Environmental Services and Berlin Fire Dept	DES: 1-800-346-4009 (reports to NH Dept. of Safety) FD: 1-603-752-3134 or 911		X
Oil spills that cause a film or sheen on waters of the U.S.	NRC (Reports to the Coast Guard)	1-800-424-8802		X
Spills of hazardous substances equal to or greater than the federal Reportable Quantity (RQ)[1]	NRC	1-800-424-8802		X
Spills of hazardous substances equal to or greater than the federal or state RQ, whichever is more stringent	NH Dept of Environmental Services	DES: 1-800-346-4009 (reports to NH Dept. of Safety)	X	
Any spill determined to require outside assistance for spill response	Spill response contractor	TBD		X

---

[1] Reportable Quantities can be found on the EPA website: http://www.epa.gov/superfund/programs/er/triggers/haztrigs/355table01.pdf

1.0 INTRODUCTION

Laidlaw Berlin BioPower, LLC (LBB) is a biomass fueled energy generating facility located at the site of the former Fraser Pulp Mill (also known as the Burgess Mill) in Berlin, New Hampshire (the Site). Berlin BioPower (the Facility) will use whole tree wood chips and other low-grade wood as fuel, and will be capable of generating nominally 70 megawatts (MW) of electric power.

The Facility will include a turbine building and wet cooling tower, steam turbine generator, wood fuel handling and storage areas, along with site access roadways and stormwater management systems.

The Site, zoned for industrial use, is a 62-acre parcel of land located north of Community, Coos, and Hutchins Streets in Berlin, New Hampshire. The area is bordered by residential housing to the south, the Androscoggin River to the west, the Mount Carberry Landfill and Hutchins Street to the east, and the remaining portion of the former mill site to the north. Figure 1 locates the proposed Facility on a United States Geological Survey (USGS) Locus Map. The Facility will be classified under the SIC code 4911 (Electric Services, other electric power generation) and NAICS code 221119 (Other Electric Power Generation).

Onsite chemical storage will include lube oil, aqueous ammonia, water treatment chemicals (including salts, amines, trisodium phosphate, sodium hypochlorite, and dilute sulfuric acid), ultra low sulfur diesel (ULSD) fuel oil, cleaning agents, lubricants, compressed gases, and dielectric transformer oil.

This Plan combines elements of a Spill Prevention, Control, and Countermeasure (SPCC) Plan; a Storm Water Pollution Prevention Planning (SWPPP); and an Emergency Response Plan (ERP). This Plan contains information pertaining to prevention of spills, containment of spills, clean-up measures, and reporting procedures for the LBB facility. In addition, this Plan is intended to identify potential sources of pollutants in discharges from the Facility and to outline Best Management Practices (BMPs) to prevent pollutants from entering navigable waters of the United States. This Plan has been prepared to address the requirements and guide compliance with the terms and conditions in the following regulations:

- The spill prevention and planning requirements of the United States Environmental Protection Agency's (US EPA) Oil Pollution Prevention Regulations - 40 CFR 112;
- New Hampshire Code of Administrative Rules Petroleum Storage Facilities Regulations – NH Env-Wm 1400; and
- US EPA's Multi-Sector General Permit (MSGP or General Permit), for Sector O, Steam Electric Generating Facilities[2].

---

[2] Although the Steam Electric Generating Facility Sector requirements apply only to fossil and nuclear fueled facility's, the Best Management Practices presented in the standard have been considered in the development of this plan.

2.0 FACILITY DESCRIPTION

1. Name of facility: Berlin BioPower
2. Type of facility: Energy Generating Facility
3. Location of facility: north of Community, Coos, and Hutchins Streets, Berlin, NH 03570 (see Figure 1)
4. Maximum oil storage/handling capacity: 50,000 gallons aboveground
5. Designated person accountable for storm water pollution prevention and spill prevention, control, and countermeasures at facility: Plant Manager
6. Oil Spill History: None – Start up facility
7. Storm Water Runoff Flow and Spill Flow Prediction: See Site Drainage Plan (Figure 4)
8. Sensitive Receptor: Androscoggin River
9. Pollution Prevention Team Members (See Emergency Contact List, located at the beginning of the document, for corresponding names and telephone numbers):

   Plant Manager - Team Leader
   Responsibilities include: signatory authority, overall responsibility for plan approval and implementation, including maintenance and inspection responsibilities.

   Plant Foreman - Team Member
   Responsibilities include: overseeing plan implementation, maintenance and inspection procedures.

   Plant Operator - Team Member
   Responsible for general site conditions and maintenance of facility and equipment.

   Maintenance - Team Member
   Responsible for maintenance of facility grounds.

   Environmental Manager – Team Member
   Responsibilities include: performing routine inspections and overseeing environmental compliance.

The facility will operate 24 hours per day, year round. There will be approximately twenty employees at the site at any time.

Site plans were developed in general accordance with the requirements of the SPCC regulations and the NPDES MSGP, and are found in Figure 3. Figure 1 depicts the facility's location on a United States Geological Survey (USGS) Topographic Map. Figure 2 shows an orthophotography locus map for the site. Figure 4 provides the site drainage plan, depicting direction of flow, structural BMPs, potential pollutant sources, and outfalls. Figure 5 details the Surface Material Plan, showing the various pervious and impervious surface types and locations on the site.

3.0 FACILITY DRAINAGE AND MANAGEMENT OF RUNOFF

The proposed Site will incorporate approximately 34.2 acres of impervious area including the access roadway, buildings, parking areas/driveway, cooling towers, holding tanks, equipment, and paved areas designated to store the wood fuel piles.

For the purpose of designing the stormwater management system, the Site is divided into four proposed watersheds. The proposed watersheds continue to flow to the same locations as they do under existing conditions but will incorporate new controls in areas where facility activities present the potential for contaminants to enter stormwater. Descriptions of the proposed watersheds are listed below:

Proposed Watershed PW-1 - is approximately 10.3 acres and encompasses wooded areas, grassed areas, an existing building (to remain), gravel roads, the proposed cooling towers, and a bordering vegetated wetland located along the bank of the Androscoggin River (approximately 840 linear feet). Similar to existing conditions, stormwater runoff generated from this watershed overland flows to the river in sheet fashion.

Proposed Watershed PW-2 - is approximately 19.9 acres and encompasses wooded areas, grassed areas, several existing buildings (to remain), pavement, and a proposed parking area for the community ball field adjacent to the Project Site. A portion of the stormwater runoff generated from this watershed is routed through a proposed vegetated swale located along the northerly boundary of the watershed prior to discharging to the municipal drainage system in Coos Street. The remaining stormwater runoff generated from the watershed will continue to overland flow to the municipal drainage system located in Coos Street and Community Street.

Proposed Watershed PW-3 – is approximately 4.2 acres and encompasses wooded areas, grassed areas, pavement, and a bordering vegetated wetland (approximately 1,235 square feet). The watershed is bound to the south by watersheds PW-1 and PW-4a. Similar to existing conditions, the stormwater runoff generated from this watershed flows to the existing culvert that drains to the 48-inch pipe which discharges to the Androscoggin River.

Proposed Watershed PW-4 - is divided into ten (10) sub-watersheds labeled PW-4a through PW-4j. This watershed encompasses the Facility and the majority of the Site development. The stormwater runoff generated from this watershed will be conveyed via an existing 30 inch pipe to an outfall that services the former pulp mill wastewater treatment plant, where it discharges into the Androscoggin River.

- **Proposed Sub-watershed PW-4a** – is approximately 10.8 acres and encompasses wooded areas, grass areas, pavement, and reserve wood chip fuel storage areas. The entrance to the Site is located off of Hutchins Street at the southeasterly edge of the sub-watershed where a high point in the road defines the limit of the sub-watershed. The majority of the stormwater runoff generated from this sub-watershed flows to a concrete swale that conveys the stormwater runoff to a lined detention basin via a riprap splash pad. The outlet control structure of the detention basin discharges stormwater runoff to a lined vegetated swale located in sub-watershed PW-4c. A 24-inch overflow pipe, a secondary outlet from the detention basin, conveys any additional stormwater runoff to a lined detention basin located in sub-watershed PW-4b.

- **Proposed Sub-watershed PW-4b** - is approximately 2.3 acres and encompasses grass areas and pavement. The stormwater runoff generated from this sub-watershed flows to a lined detention basin. The outlet control structure of the detention basin conveys stormwater runoff to a lined vegetated swale located in sub-watershed PW-4c.

- **Proposed Sub-watershed PW-4c** – is approximately 8.5 acres and encompasses grass areas, pavement and a portion of an existing building. The stormwater runoff generated from this sub-watershed flows to a lined vegetated swale that conveys the stormwater to a lined wet pond located in sub-watershed PW-4d via a riprap splash pad.

- **Proposed Sub-watershed PW-4d** – is approximately 0.9 acres and encompasses grass areas and pavement. The stormwater runoff generated from this sub-watershed flows to a lined wet pond. The outlet control structure of the wet pond discharges stormwater runoff to the closed drainage system that connects to the existing 30 inch pipe leading to the outfall at the river.

- **Proposed Sub-watershed PW-4e** - is approximately 1.5 acres and encompasses grass areas, pavement, and Facility equipment. The stormwater runoff generated from this sub-watershed flows to the lined wet pond located in sub-watershed PW-4d where it is treated then conveyed via the closed drainage system to the existing 30 inch pipe leading to the outfall at the river.

- **Proposed Sub-watershed PW-4f** - is approximately 3.5 acres and encompasses grass areas, pavement, Facility equipment, and a wood chip fuel pile area. The stormwater runoff generated from this sub-watershed overland flows to a lined detention basin via a lined vegetated swale. The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands located in sub-watershed PW-4g via a closed drainage system.

- **Proposed Sub-watershed PW-4g** - is approximately 2.4 acres and encompasses grass areas, pavement, Facility equipment, and a wood chip fuel pile area. The stormwater runoff generated from this sub-watershed overland flows to a lined detention basin. The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe leading to the outfall at the river.

- **Proposed Sub-watershed PW-4h** - is approximately 1.3 acres and encompasses grass areas, pavement, and a wood chip fuel pile area. The stormwater runoff generated from this sub-watershed flows to a lined detention basin. The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe leading to the outfall at the river.

- **Proposed Sub-watershed PW-4i** - is approximately 3.5 acres and encompasses grass areas, pavement, gravel roads, existing/proposed buildings, and parking areas. The major components of the Facility are located within this sub-watershed including the boiler, turbine generator building, and holding tanks. The stormwater runoff generated from this sub-watershed flows to the subsurface gravel wetlands for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe leading to the outfall at the river.

- **Proposed Sub-watershed PW-4j** – is approximately 0.3 acres and encompasses a proposed lined detention basin. The stormwater runoff generated from this sub-watershed flows to a lined vegetated swale that conveys the stormwater runoff to the detention basin. The outlet control structure of the detention basin discharges stormwater runoff to the subsurface gravel wetlands for further treatment. Stormwater will then be discharged to the closed drainage system then conveyed to the existing 30 inch pipe leading to the outfall at the river.

4.0 POTENTIAL POLLUTANT SOURCES AND BEST MANAGEMENT PRACTICES

The Site Layout Plan (Figure 3) depicts the location of all wood fuel storage and handling areas as well as all outdoor oil and chemical storage activities at the site. A listing of all oil and chemicals expected to be stored at the site, their locations, and quantities is provided in Table 1.

Oil and other chemicals will be stored in exterior tanks, containers, and process equipment at the facility. In order to prevent releases, controls and countermeasures will be implemented, including secondary containment for tanks and containers, providing adequate engineering controls on tanks, conducting routine inspections, implementing delivery procedures, providing adequate security, training employees, and developing spill response procedures. These measures are generally described in this Plan and will be updated as design of the Facility progresses and prior to the startup of Facility operations.

All outdoor storage tanks (including oil reservoirs on transformers) will be equipped with dikes, which provide 110% secondary containment. All valves on outdoor tanks will be closed and locked when not in use. All indoor storage will be equipped with dikes, which will provide at least 100% secondary containment. All tanks will have level gauges equipped with overfill alarms. There will be no floor drains within the bermed storage areas in the building, and therefore materials stored within the building are not expected to impact storm water. The following summarizes the expected material storage at the facility, and the BMPs that will be used to minimize the potential for the pollutants to impact storm water runoff.

4.1 Exterior Storage

Exterior storage on site includes the following:

- **Wood pile**: the northern section of the Site will contain a round wood storage area and chipping building. Wood chips may also be stored in this area. Three chipped wood piles will be located east of the boiler.
- **Aboveground Storage Tanks (ASTs)**: will be used for storage aqueous ammonia and ULSD fuel oil (used in the Start-Up boiler, emergency generator, fire pump engine).
- **Electrical Transformers**: located in the switchyard. The transformers will contain dielectric oil for cooling.
- **Trash dumpsters**: used to store trash materials until scheduled pickup.
- **Other miscellaneous materials:** metal parts, equipment, etc., may be stored outside on a temporary basis.

4.2 Interior Storage

Interior storage on site is expected to include the following:

- **Totes and drums**: used to store lube oil, sodium sulfite, amines, trisodium phosphate, sodium bisulfite, antiscalant, sodium hypochlorite, sulfuric acid, and dispersant.

- **Gas storage**: includes hydrogen (associated with the generators), propane (used in small heating units), and compressed gas cylinders of propane, oxygen, nitrogen, carbon dioxide, acetylene, and argon.

- **Miscellaneous Products**: includes cleaning solutions and solvents, lubricants, and gasoline stored in small containers (no more than 10-gallon containers).

4.3 Best Management Practices

The proposed Project includes the design and construction of a storm water management system to meet the guidelines specified in the NHDES "New Hampshire Storm Water Manual." Stormwater quality and quantity on the Site will be managed by implementing a series of Best Management Practices (BMPs) that will include periodic cleaning of facility roadways by mechanical sweeping or equivalent methods, installation of deep sump catch basins, and other control structures. These proposed BMPs are expected to remove at least 80 percent of the TSS from storm water runoff.

Fuel Oil and aqueous ammonia storage tank containment areas – the fuel oil and aqueous ammonia storage tanks will be located in 110 percent containment areas. Rain water captured inside the containment areas will be inspected for contamination prior to discharge.

Wood Pile areas – the wood pile areas will be completely paved and bermed with outlet controls to direct storm water from these areas.

Fly Ash silo – the fly ash silo will be totally enclosed. Exhaust from the silo will be vented through a highly efficient fabric filter.

Transformer containment areas - the electrical transformers in the switchyard will be contained within bermed areas capable of holding 110 percent of the maximum oil storage capacity. Storm water captured inside the containment areas will be inspected for contamination prior to discharge.

ULSD Fuel Oil and Aqueous ammonia truck unloading area – The fuel and aqueous ammonia truck unloading area will be constructed as a containment area to capture any liquid which leaks during the transfer. The storm water discharge pipe from this area will be equipped with a valve which will be closed during truck off loading.

Roadways and parking areas – Storm water from roadways and parking areas will be collected in a closed pipe system which will be routed to the storm water collection and treatment systems.

Turbine equipment area – the turbine equipment lube oil systems will be located within the main building which will prevent any release of oils to the storm water system.

Lube oil storage area – Lube oil stored onsite will be located in a bulk storage area inside the warehouse in an area with no floor drains. The area will be curbed and/or containers will be stored on spill containment pallets.

5.0 PREVENTATIVE MAINTENANCE AND HOUSEKEEPING

When used in conjunction with regular inspections, good housekeeping is an effective and inexpensive method of pollution prevention. The following general maintenance/housekeeping practices will be performed at the Facility:

- Regularly pick up and dispose of garbage, waste materials, windblown materials, and spilled materials. Contractors will remove garbage and other waste refuse from the site regularly.
- Routinely clean and adjust air pollution control equipment to ensure that designed effectiveness is achieved.
- During extremely dry periods, clean roadway surfaces as needed to minimize dust tracking off-site.
- Quickly clean up any spilled materials.
- Routinely inspect facility for housekeeping, leaks, windblown materials, etc to ensure no discharge of chemicals.
- Ensure that facility personnel are trained in and perform spill cleanup procedures.
- Store containers, drums, etc. away from direct traffic routes to prevent accidental spills.
- Keep an up-to-date material inventory to prevent overstocking.
- Clean oil/water separators every three months, or as needed.

In addition, personnel will perform routine preventative maintenance on plant equipment to identify conditions that could cause breakdowns or failures resulting in discharges of pollutants. Maintenance activities will be performed, as required, to ensure the following equipment functionality:

- Integrity of the storage tanks, piping, and containment structures;
- Integrity of vehicles and equipment systems (petroleum or other fluids);
- Operational effectiveness of air pollution control equipment; and
- Operational effectiveness of storm water collection system.

6.0 LOADING/UNLOADING PROCEDURES

Deliveries of wood, oil, and chemicals will involve transferring materials from the delivery truck to the storage tanks or storage areas. In order to ensure that trucks or containers do not leak or spill their contents while traveling onsite, facility personnel will visually inspect delivery vehicles as they arrive onsite. In addition, facility personnel will immediately address leaks or spills from delivery vehicles and will ensure that proper measures are available to protect personnel and the environment.

6.1 Bulk Deliveries of Oil and Chemicals

This Procedure describes procedures for bulk delivery of oil and chemicals. This procedure is used by contractors when petroleum products (and other bulk chemicals, such as ammonia) are being unloaded into the facility's tanks.

Note: Smoking and ignition sources are not permitted in the unloading areas.

1. The operator must be wearing proper personal protective equipment, including hard hat, safety glasses, and long sleeves.
2. Obtain the plant operator's permission before hooking up to the tank.
3. Ensure a LBB employee is aware of the unloading process.
4. Prior to unloading, ensure the valve on the truck is closed.
5. Stay with the truck while unloading and stay alert.
6. Hook the hose to the truck and open the correct valves.
7. Prior to completing the unloading process, watch the top of the truck to see when the level in the tank is low and notify a LBB employee when the truck is empty.
8. Turn off the valve when the transfer is complete.
9. Unhook the hose from the pump.
10. No rags or buckets are to be left on site.

REPORT ANY SPILLS TO THE PLANT OPERATOR IMMEDIATELY. DRIVERS ARE RESPONSIBLE FOR CLEANING UP ANY SPILLS.

As a Best Management Practice, LBB will provide color coding of fill pipes, covers, and adjoining surfaces.

6.2 Container Loading/Unloading

When materials are received in containers (e.g. 55-gallon drums), the delivery truck will park near the container storage area. If containers are transported onsite using a forklift or dolly, they will be secured to prevent the containers from falling during movement. The following outlines delivery and transport procedures for containers:

1. The driver informs LBB personnel of his/her presence onsite.
2. LBB personnel will inspect the overall integrity of the delivery vehicle and containers. If the vehicle or containers are determined to be in poor condition (e.g., signs of corrosion or leaks), the delivery will be aborted and the vehicle's driver is informed that repairs must be made, or a new shipment must be ordered, before LBB can accept a delivery from the vehicle.
3. The driver turns off the vehicle and sets the handbrake, to prevent vehicular movement during container transfer.
4. LBB personnel ensure that each container is closed prior to moving.
5. The container is secured on forks or pallets to prevent the container from falling during movement.
6. Once all the above steps have been taken, the driver proceeds to transfer the container, with LBB personnel monitoring. If any material is spilled during transfer, the supervisor will be notified and cleanup will begin immediately, as appropriate.

6.3 Wood Unloading

LBB will maintain up to a 30-day supply of wood fuel (round wood and wood chips) onsite. The following outlines delivery and transport procedures for wood fuel:

1. The driver informs LBB personnel of his/her presence onsite.
2. LBB personnel inspect the wood in the delivery vehicle. If the wood shows signs of contamination (e.g. covered in oil or other chemicals), the delivery will be aborted and the vehicle's driver will be informed that the wood has not been accepted.
3. The truck is weighed at the scale building.
4. The driver turns off the vehicle and sets the handbrake, to prevent vehicular movement during container transfer.
5. LBB personnel ensure that the truck that is unloading the wood is unloading it in the proper area.
6. LBB personnel ensure that no people are located near the unloading procedure.
7. Once all the above steps have been taken, the driver proceeds to unload the wood, with LBB personnel monitoring.
8. Smaller wood chips and sawdust will be swept from open truck beds before leaving the site.

7.0 INSPECTIONS AND SAMPLING

LBB will conduct inspections on a regular basis to minimize the likelihood of pollutants entering the storm water system. In addition, facility personnel will conduct monitoring of storm water, as required by the Facility's storm water permit, to ensure that pollutants are not entering the storm water system.

7.1 Inspections

This section describes periodic inspections of the facility and the annual comprehensive site evaluation. The Plant Manager or his/her designee will be responsible for overseeing routine inspections and conducting comprehensive inspections. Any member of the pollution prevention team may conduct these inspections.

The following describes the inspection schedule for the facility. Detailed inspection forms will be developed and attached as an Appendix to the final plan before startup of the Facility.

7.1.1 Routine Daily Walk-Through

LBB will perform visual checks of the facility each operating day. The plant operator will check the plant for any leaks or spills. Personnel will check each oil tank for any signs of leaks. In addition, the dumpsters and surrounding areas will be inspected for overflowing debris, and general good housekeeping procedures. These daily walk-through inspections will not be recorded, but if any observations of potential pollutants entering the storm system are observed, they will immediately be brought to the attention of the Plant Manager and will be remedied as soon as possible, but no later than 14 days after detection.

7.1.2 Visual Site Inspections

Facility personnel will conduct weekly visual site inspections to determine if there is any evidence of pollutants entering the drainage system or waters of the state. The exposed areas discussed in Section 4.0, including oil/material storage and handling areas, storage tanks, and emissions control systems, are included in such inspections. Visual inspections will be performed on all tanks that are in use, and include visible portions of all storage locations including containers, tanks, piping/pumps for oil transfer, drains that may be impacted by pollutants, secondary containment systems, level gauges, leak detection equipment, drain trenches, and detention basins.

If a weekly site inspection reveals that a tank is not in good condition, the tank will be taken out of service as appropriate and repaired as soon as possible. If an inspection reveals that a container is not in good condition, the container will be replaced immediately. In the event that any other problems are identified during the inspections, corrective actions will be noted in inspection logs. Required actions will be determined by the Plant Manager and/or members of the pollution prevention team to ensure that they are appropriate. Deficiencies will be corrected within 14 days of detection, or more quickly if possible.

The findings of each inspections will be recorded and retained at the Facility.

7.1.3 Annual Comprehensive Site Compliance Evaluation

At least once per year, a Comprehensive Site Compliance Evaluation will be conducted by the Pollution Prevention Team.

A report documenting each Comprehensive Site Compliance Evaluation will include the following:

- The date and time of the inspection
- The scope of the inspection
- The personnel who participated in the inspection
- Major observations relating to implementation of the Plan
- Description of incidents of noncompliance or, if there are no such incidents, a certification that the facility is in compliance with the Plan and General Permit
- A discussion of any non-compliance situations observed and the response/action(s) needed (If no situations of non-compliance are observed, a statement certifying that the facility is in compliance with the General Permit will be included.)
- Identification of the changes required in the Plan as a result of the site compliance evaluation
- Means to track implementation of required actions (via independent log or through weekly inspections)

7.1.4 Integrity Testing

Every five (5) years, or more frequently, LBB will perform integrity testing for the fuel oil storage tank and aqueous ammonia storage tank at the site. The testing will consist of not only visual inspection, but also another form of non-destructive shell testing that demonstrates that the tanks are in sound structural condition. For containers such as drums or totes, LBB will use only DOT-approved drums and totes that are appropriate for the materials stored.

7.2 Storm Water Sampling

LBB will conduct storm water sampling at a location downstream of the Site, prior to commingling of the Site storm water with any other streams using the commo0n outfall. All samples will be grab samples taken during the first 30 minutes of a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable storm event. If there is not sufficient rainfall to produce a runoff event, if frozen conditions prevent runoff, or if other adverse weather conditions or hazardous conditions prevent sampling, sampling is not required. When these types of conditions prevent the collection of a sample, a substitute sample will be taken during the next qualifying event (i.e., collect two samples during the next quarter). Documentation that it was not possible to sample during a particular quarter will be maintained in the Plan, if these conditions are encountered.

Information for a particular storm event can be obtained by calling the local National Weather Service office in Whitefield, New Hampshire at (603) 837-2769.

The following describes the sampling for the facility.

7.2.1 Quarterly Sampling for Visual Inspection

At least once each calendar quarter, visual inspections will be conducted by LBB personnel, to determine the quality of the storm water discharge. As part of the quarterly visual examinations, at least one grab sample will be taken, for visual inspection only, during a measurable storm event, during each of the following periods: January to March, April to June, July to September, and October to December.

Logs will be maintained to document that visual monitoring has been conducted.

If the visual examination indicates that pollutants may be entering the storm water system, more detailed analysis will be performed to determine the source of the pollutants and correction actions that should be taken.

7.2.2 Numerical Effluent Limitation Sampling

LBB anticipates that the Individual Stormwater Permit to be issued by the US EPA under the National Pollutant Discharge Elimination System (NPDES) program requirements will specify periodic monitoring and laboratory analysis to demonstrate compliance with specified numerical effluent limitations. LBB will conduct such sampling in accordance with the schedule specified by the permit and will contract with a properly certified laboratory to conduct analysis in accordance with EPA approved procedures.

8.0 RECORD KEEPING AND REPORTING

This section describes the records that will maintained and reports that will be submitted for the facility. In addition to the requirements for recording inspections and submitting quarterly sampling reports, site personnel will report any releases of hazardous materials to the appropriate agencies, as required by applicable regulations. A copy of this Plan and all related records will be maintained at the facility for at least three years from the date the General Permit expires.

8.1 Inspection Reports and Comprehensive Site Evaluations

Weekly inspections will be documented on detailed forms to be developed after the Site design is completed and prior to Facility startup. A Comprehensive Site Evaluation report will be prepared in accordance with EPA guidance. The report will be submitted to EPA annually. Copies of all inspections and evaluations will be retained on site for three years from the date of the inspection.

LBB will submit an annual report to the EPA that includes the findings from the comprehensive site inspection and any corrective action documentation. If corrective action is not yet completed at the time of submission, the report will describe the status of any outstanding corrective action(s). In addition to the information required in Corrective Action Reports and Comprehensive Site Inspections, the following information will be included with the annual report: (i) Facility Name; (ii) NPDES permit tracking number; (iii) Facility physical address; and (iv) Contact Person Name, Title, and Phone Number.

8.2 Storm Water Sampling

All monitoring data collected for demonstration of compliance with numerical effluent limitations will be submitted to the EPA using the online eNOI system at www.epa.gov/npdes/eNOI no later than 30 days after receiving the complete laboratory results for the reporting period. If eNOI cannot be accessed, paper reporting forms will be submitted by the same deadline to the following address: U.S. Environmental Protection Agency; Office of Water, Water Permits Division; Mail Code 4203M, ATTN: MSGP Report; 1200 Pennsylvania Ave, NW; Washington, DC 20460. It is recommended that if reports are mailed, that certified mail receipts be purchased. If using paper reporting forms, EPA strongly recommends that the discharge monitoring report (DMR) available at www.epa.gov/npdes/stormwater/msgp be used.

9.0 SECURITY

LBB will maintain security measures to minimize the possibility of vandalism and identify releases when the Facility is shut down for annual maintenance outage. Contract personnel will be informed of emergency procedures including who to contact in the event of an emergency. The facility will be gated, and the gate will be kept closed. Facility lighting will be adequate for security purposes and the identification of oil spills and prevention of oil spills through vandalism. A visitor must be recognized by the plant operator through a video camera and call box located at the gate to gain access to the Facility.

10.0 PERSONNEL TRAINING

Employee training will be conducted initially and on an annual basis to inform personnel responsible for implementing the activities described in this Plan, or otherwise responsible for oil pollution control, storm water management, emergency response, and other components and goals of this Plan. Personnel will be trained as appropriate for their job duties, on good housekeeping measures, proper operation and maintenance of equipment, proper handling procedures for raw materials and wastes, and procedures to follow during an emergency. The purpose of the training will be to ensure that discharges are prevented and spill response procedures are reviewed. Training may be provided in a formal classroom type setting, as on-the-job training, or during safety meetings as appropriate.

The Plant Manager will be responsible for ensuring that affected facility personnel have received appropriate training. Documentation of the training will be retained by the Facility.

11.0 EMERGENCY RESPONSE

11.1 Spill Response Equipment

Oil spill clean-up kits/materials will be maintained at strategic locations at the facility (in the Maintenance areas and by the loading stations). The spill kit/materials will allow a prompt response to incidental spill situations. Spill containment and clean-up kits are expected to include oil absorbent materials (loose sorbents, pads, pillow, wipers, and/or booms), gloves, disposal bags, and a broom or shovel. The spill kit/materials will be organized and stored out of the weather in a suitable, well-marked and closed container or designated area. Information on spill response supplies will be located inside the container for easy inspection and reordering.

11.2 Emergency Response Procedure – Site Procedure

The following lists the Emergency Response Procedure:

1. Identify type of emergency (fire, terrorist threat, medical, etc).
2. Notify Plant Manager, or appropriate Manager in charge, and radio fellow employees of emergency and type. If appropriate Manager is not available, notify the next employee in line on the Emergency Contact List.
3. Any available person shall call 911, if necessary.
4. For fire emergencies, meet at plant exit, if necessary and instructed to do so.
5. The Plant Manager, or his/her designee, shall ensure all employees are accounted for (headcount, perimeter of area safe), ensure no unauthorized personnel enter the area, and meet emergency personnel. If the Plant Manager is not available, an appropriate Manager in charge shall do so.
6. If possible and only if safe, minimize risk: contain, reduce area of impact, shut off electrical source.

The Plant Manager shall call the Environmental Manager. If the Plant Manager is not available, the appropriate Manager in charge shall do so. Remain in the meeting area until the Manager in charge designates the area safe to return to work areas.

11.3 Emergency Spill Procedure – Site Procedure

If an employee discovers a spill, he/she will follow the following emergency procedure:

1. Shut off supply.
2. Dike around spill using speedy dry, booms, sand, or other available material.
3. Notify the Plant Manager or other Manager in charge.
4. After the spill is absorbed, place the used absorbents in a bag or container or within a bermed area with a non-absorbent surface so there is no risk of storm water mingling with and carrying away the contamination.

5. The Plant Manager shall contact an appropriate contractor to dispose of the contaminated absorbents in accordance with local, state, and federal regulations.

Procedures for the Plant Manager, or other Manager in charge:

1. Notify the local fire department of the spill. Provide the name of the chemical or oil that has spilled, the approximate quantity of the substance, the location of the spill, and the fate of the spill. You should also have the Material Safety Data Sheet available.
2. Notify the Environmental Manager as soon as possible. If the spill is greater than 25 gallons or has entered a water body, the spill will need to be reported to NH DES immediately by calling 1-800-346-4009.
3. If necessary, contact an appropriate contractor to assist with the clean-up of the spill.

11.4 Procedure for Accidental Spills to Water – Site Procedure

This procedure shall be used by employees in the event of an oil or chemical spill into water.

1. Contact the Plant Manager or Manager in charge immediately.
2. The Manager or other responsible individual shall contact the Environmental Manager. The EPA and NHDES must be notified immediately (within 15 minutes).
3. If safe to do so, use the long booms in the spill kit and place them around the substance that spilled into the water. This should prevent the spilled substance from traveling outside the circle you created with the boom(s).
4. Use spill pads to absorb the substance from within the circle created by the boom.
5. Once all the free substance from the surface of the water is absorbed, remove the contaminated absorbent material from the water.
6. Place the used absorbents in a bag or container or within a bermed area with a non-absorbent surface so there is no risk of storm water mingling with and carrying away the contamination.
7. The Plant Manager shall contact an appropriate contractor to dispose of the contaminated absorbents in accordance with local, state, and federal regulations.

12.0 NOTIFICATIONS

Oral and written notifications required in the event of a release of oil to a surface water body or to the environment are described below.

12.1 Oral Notifications

Notifications to the New Hampshire Department of Environmental Services (NHDES) will be in accordance with "Requirements for Hazardous Waste Generators" (Env-Wm 500) and "Contaminated Sites Management" (Env-Or 600), as applicable. These regulations require notification for releases and threats of releases meeting certain conditions. In general, a release of petroleum-based oil in excess of 25 gallons requires that notification be given to the NHDES immediately. In addition, spills to water require an immediate notification of the National Response Center (NRC) and the Coast Guard.

The appropriate authorities to be immediately notified in the event of an oil release or oil spill, are located in the front of this document, along with emergency contact information and telephone numbers on the Emergency Contacts list.

12.2 Written Notifications

Written reports for certain spills may be required to be submitted to NHDES (within 30 days), in accordance with Env-Or 605.06, "Emergency and Initial Response Action Reporting Requirements." Written reports should be submitted to other agencies if requested. This written report will generally include at least the following information:

- Facility name
- Facility owner or operator name
- Facility telephone number
- Facility location and address
- Date and year of initial facility operation
- Date, time, and place of release
- Names, addresses, and telephone numbers of all persons potentially responsible for or liable for the release
- Maximum storage or handling capacity of the facility and normal daily throughput
- Description of the facility, including site maps, flow diagrams, and topographical maps, if requested
- A complete copy of the SPCC/SWPP plan with any amendments, if requested
- The cause of the oil spill, including a failure analysis of the system or subsystem in which the failure occurred, the amount and type of material released, and the location where the material flowed (e.g. onto pavement, onto pervious surface, into a catch basin, etc.)
- Description of containment and removal operations, including costs of these operations

- The corrective actions and/or countermeasures taken, including an adequate description of equipment repairs and/or replacements (including any third-party damages and costs of containment and removal operations)
- Additional measures taken or contemplated to minimize the possibility of recurrence
- Any other information the authority may reasonably require pertinent to the SPCC plan or spill event

In addition to notification requirements specified above, a written report must be submitted to the Regional Administrator of the Environmental Protection Agency (EPA) whenever the facility has:

- Discharged more than 1,000 gallons of oil into or upon navigable waters of the state or adjoining shorelines in a single spill event.
- Discharged more than 42 gallons of oil into or upon navigable waters of the state or adjoining shorelines in two spill events within any 12-month period.

This report must be submitted within 30 days and shall contain the information required by Env-Or 605.06. Information submitted to the NHDES should be sent to:

New Hampshire Department of Environmental Services

Oil Remediation and Compliance Bureau

29 Hazen Drive, PO Box 95

Concord, NH 03302-0095

Information sent to the EPA should be sent to:

EPA Region 1, New England

1 Congress Street, Suite 1100

Boston, MA 02114-2023

13.0 PLAN AMENDMENTS

13.1 Plan Review By the Pollution Prevention Team

Plan reviews will be undertaken as follows:

- At a minimum, once every five (5) years from the date on which the Plan is first approved.
- If the actions outlined in the Plan are shown to be deficient in controlling spills.
- To clarify the measures that were taken to remedy a spill, where the actions in the Plan are not considered to be deficient in controlling the spill.
- When there is a change in facility design, construction, operation, or maintenance that materially affects the facility's potential to discharge oil or pollutants into or upon waters of the state, for example:
  - Tank commissioning or decommissioning;
  - Replacement, reconstruction, or movement of tanks, piping systems, or secondary containment;
  - Changes in products or services, if such changes would affect the facility's potential to discharge pollutants; or
  - Revision of operating procedures.

The Plan will be updated as needed to include more effective prevention and control technologies if the technology has been field proven at the time of the review and will significantly reduce the likelihood of a discharge. Each review will be documented in the log provided in the front of this Plan, or an equivalent form, regardless of whether amendments to the Plan are necessary.

13.2 Professional Engineer (PE) Certification

PE certification is required for the SPCC portion of this document and for technical amendments that require the application of good engineering practice for oil storage operations. Non-technical changes (i.e., those not requiring PE certification) would include:

- Changes to the facility contact information (names, titles, and phone numbers);
- More stringent requirements for storm water discharges associated with NPDES rules that are not addressed by and do not impact the SPCC Plan;
- Product changes if the new product is compatible with conditions in the existing tank and secondary containment; and
- Other changes that do not materially increase or decrease the facility's potential to discharge oil.

The required certification will be provided following completion of Facility design and prior to the startup of Facility operations.

Tables

Table 1
Summary of Expected Chemicals and Storage Quantities During Facility Operation

Ref No.	Chemical Description	Chemical Use	System	Potential Storage Volume			Storage Method
				Range (To/From)			
				Min Vol.	Max Vol.	Units	
1	ULSD No. 2 Fuel Oil	Fuel	Boiler (Startup)	25,000	50,000	Gallons	Above Ground Tank
2	ULSD No. 2 Fuel Oil	Fuel	Emergency Diesel Generator	500	1,000	gal	Tank
3	ULSD No. 2 Fuel Oil	Fuel	Fire Pump	500	1,000	gal	Tank
4	Diesel Fuel	Fuel	Wood Yard Equipment	1,000	2,000	gal	fuel truck
5	Lubricating Oil	Equipment Lubrication	Steam Turbine (ST)	5,000	10,000	gal	Internal Tank
6	Lubricating Oil	Equipment Lubrication	Waste Lube Oil	200	500	gal	Drums
7	Lubricating Oil [3]	Equipment Lubrication	Cooling Tower Fan Gear Box	50	100	gal	Tote [2]
8	Conventional Transformer Oil [3]	Dielectric Oil	Step-Up Transformer	10,000	20,000	gal	Transformer
9	Conventional Transformer Oil [3]	Dielectric Oil	Aux Transformer	2,000	4,000	gal	Transformer
10	Aqueous Ammonia (N_4OH) – 19% Concentration	Emissions Control	SCR System	5,000	10,000	gal	Above Ground Tank
11	Hydrazide Solution [4]	Removal of oxygen	Boiler, Condensate System	275	550	gal	Tote [2]
12	Amine Solution [4]	Corrosion inhibitor	Boiler, Condensate System	275	550	gal	Tote [2]
13	Sodium Tripolyphosphate Solution[4]	Boiler water pH Control	Boiler, Condensate System	275	550	gal	Tote [2]
14	Sodium Hydroxide Solution[4]	Boiler water pH Control	Boiler, Condensate System	275	550	gal	Tote [2]
15	Sodium Bisulfite Solution[4]	Removal of residual chlorine	Demineralized Water Treatment	275	550	gal	Tote [2]
16	Polymer Solution[4]	Antiscalant	Demineralized Water Treatment	275	550	gal	Tote [2]
17	Cleaning Solutions	Cleaning of RO System	Demineralized Water Treatment	550	1100	gal	Tote [2]
18	Sodium Hypochlorite Solution (Bleach)	Disinfection, slime and/or algae control	Cooling Tower	275	550	gal	Tote [2]

Table 1
Summary of Expected Chemicals and Storage Quantities During Facility Operation

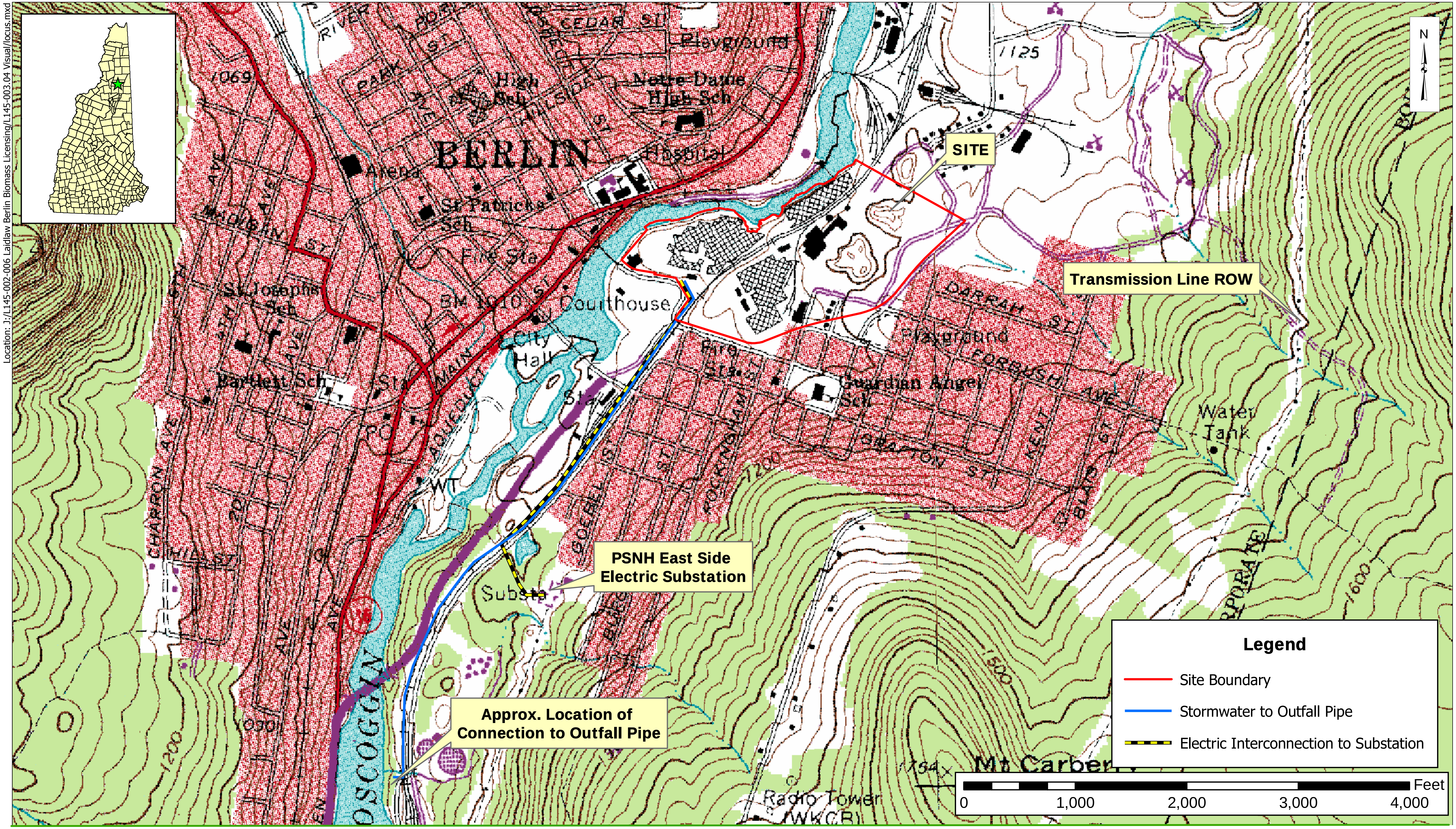
Ref No.	Chemical Description	Chemical Use	System	Potential Storage Volume			Storage Method
				Range (To/From)			
				Min Vol.	Max Vol.	Units	
19	Sodium Bromide Solution	Microbiocide	Cooling Tower	275	550	gal	Tote [2]
20	Hydrogen (H_2)	Generator Hydrogen Cooler	Generator	240,000	240,000	scf	Tube Trailers or Cylinders
21	Nitrogen (N_2)	Lay up	Boiler	12	24	bottles	Compressed gas cylinders
22	Carbon Dioxide (CO_2)	Fire Protection	Plant Buildings	12	24	bottles	Compressed gas cylinders
23	Acetylene (C_2H_2) [1]	Maintenance – Cutting Gas	NA	2	10	bottles	Compressed gas cylinders
24	Oxygen (O_2) [1]	Maintenance – Cutting Gas	NA	2	10	bottles	Compressed gas cylinders
25	Propane (C_3H_8) [1]	Maintenance – Temp Heat	NA	2	10	bottles	Compressed gas cylinders
26	Argon (Ar) [1]	Maintenance – Welding Gas	NA	2	10	bottles	Compressed gas cylinders
27	Cleaning Solution and Solvents[1]	Cleaners	NA	20	40	gal	<10 gal Containers

Notes:

[1] Primarily used during construction but may be present during operation for maintenance.
[2] Single tote volume based on 275 gallons.
[3] Volume typically contained within the equipment or system.
[4] Boilerwater treatment chemicals are provided for a range of treatments.

Figures

Location: J:/L145-002-006 Laidlaw Berlin Biomass Licensing/L145-003.04 Visual/locus.mxd



ESS Group, Inc.
Engineers
Scientists
Consultants

LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

U.S.G.S. Locus Map -
Project Site and Ancillary Facilities

Scale: 1" = 800'

Source: 1) NHGRANIT, 1:12,000 Ortho, 1998
2) ESS, Site Boundary, 2009

Ortho Locus Map -
Site and Adjacent
Structures

Location: J:/L145-002-006 Laidlaw Berlin Biomass Licensing/L145-003.04 Visual/locus.mxd

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Engineers
Scientists
Consultants

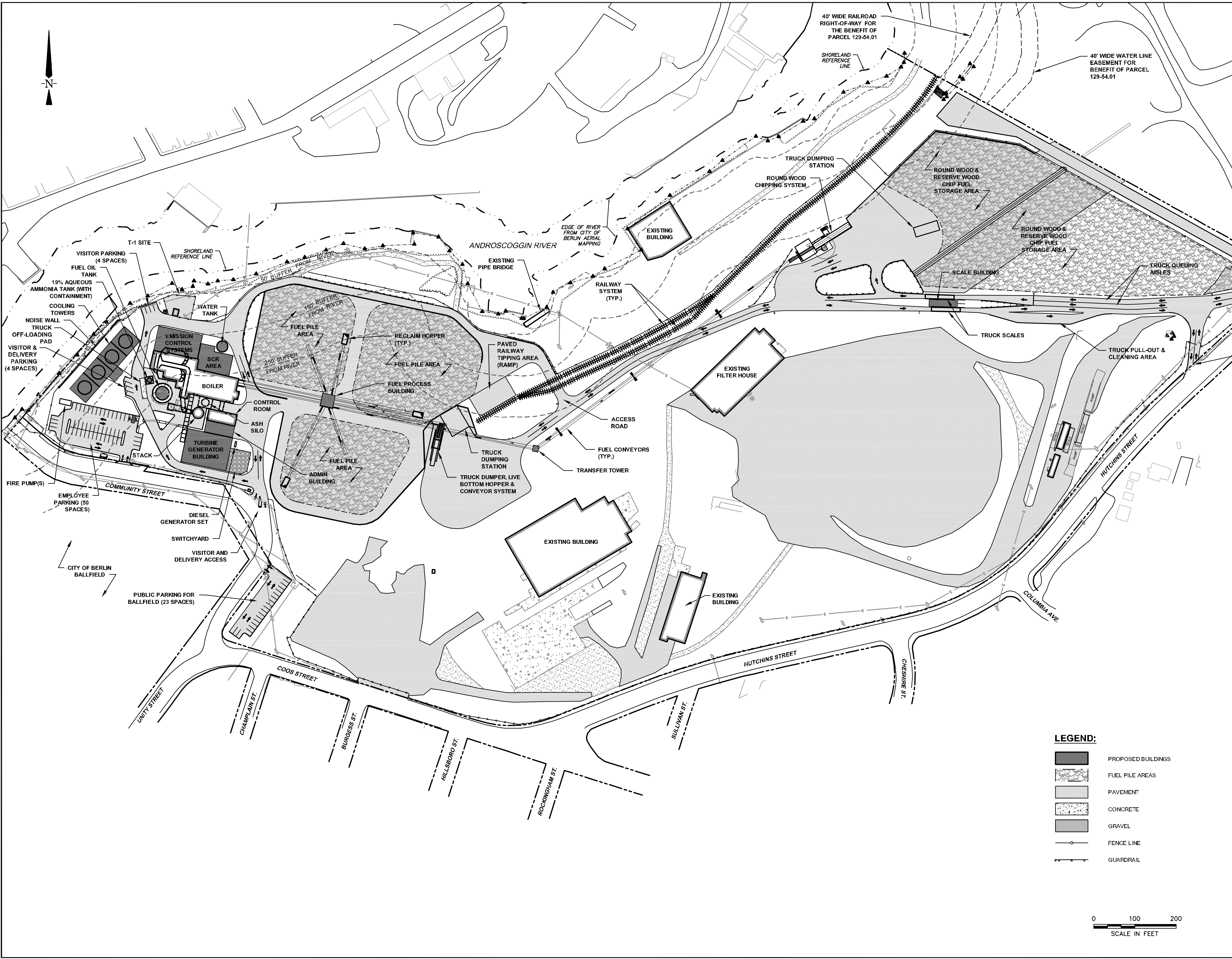
LAIDLAW BERLIN BIOPOWER
Berlin, New Hampshire

Scale: 1" = 800'

Source: 1) NHGRANIT, 1:12,000 Ortho, 1998
2) ESS, Site Boundary, 2009

Ortho Locus Map -
Project Site and Ancillary Facilities

Ortho Locus
Map -



FOR PERMITTING PURPOSES ONLY

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f 781.431.7434
www.essgroup.com

No.	REVISION	DATE	APP BY

DRAWN BY: DJG
CHECKED BY: JCB
DESIGNED BY: DJG
APPROVED BY: JCB

LaidLaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, NY 10038

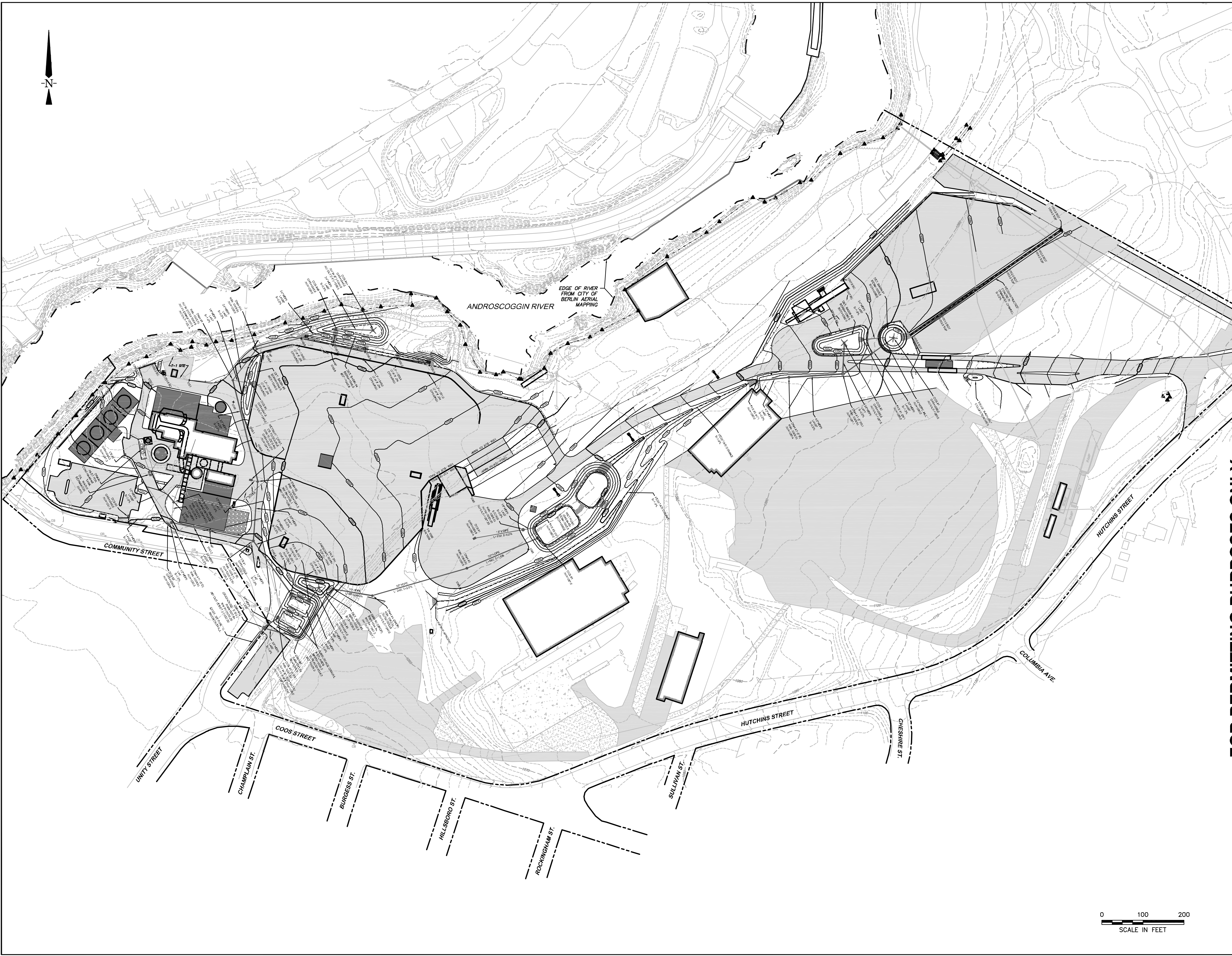
Biomass Energy Facility
Berlin, NH

SITE LAYOUT PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.: 6 of 22
SCALE: 1"=100'

Fig. 3

XREF: L145-XE01 [H:\L145-Laidlaw\xref\L145-XE01.dwg]
XREF: L145-XP03 [H:\L145-Laidlaw\xref\L145-XP03.dwg]
XREF: L145-Drainage-Base [H:\L145-Laidlaw\xref\L145-Drainage-Base.dwg]



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New York, NY 10038

Biomass Energy Facility
Berlin, NH

GRADING & DRAINAGE PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.:
SCALE: 1"=100'

Fig. 4

DATE: Dec 15, 2009 - 9:42AM
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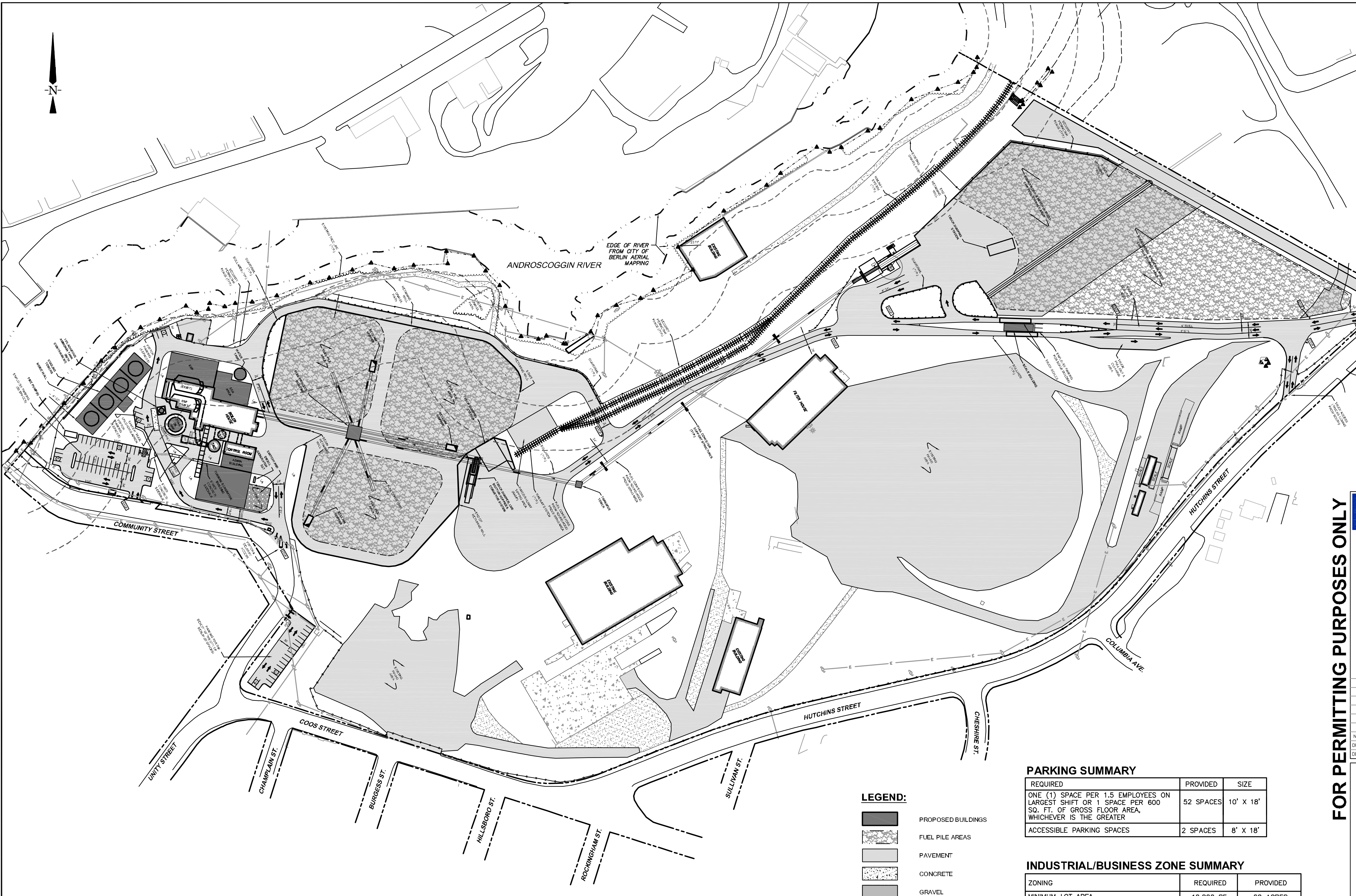

LEGEND:

■	PROPOSED BUILDINGS
▨	FUEL PILE AREAS
▢	PAVEMENT
░	CONCRETE
▩	GRAVEL
—○—	FENCE LINE
—┼—	GUARDRAIL

PARKING SUMMARY

REQUIRED	PROVIDED	SIZE
ONE (1) SPACE PER 1.5 EMPLOYEES ON LARGEST SHIFT OR 1 SPACE PER 600 SQ. FT. OF GROSS FLOOR AREA, WHICHEVER IS THE GREATER	52 SPACES	10' X 18'
ACCESSIBLE PARKING SPACES	2 SPACES	8' X 18'

INDUSTRIAL/BUSINESS ZONE SUMMARY

ZONING	REQUIRED	PROVIDED
MINIMUM LOT AREA	10,000 SF	62 ACRES
MINIMUM LOT WIDTH/FRONTAGE	100 FT	2,166 FT
MAXIMUM LOT COVERAGE (IMPERVIOUS)	75%	55%
MINIMUM FRONT YARD	50 FT	34 FT
MINIMUM SIDE YARD	20 FT	42 FT
MINIMUM REAR YARD	20 FT	24 FT

0 100 200
SCALE IN FEET

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New York, NY 10038

Biomass Energy Facility
Berlin, NH

SURFACE MATERIALS PLAN

PROJECT No.: L145-004
DATE OF ISSUE: 12/15/09
SHEET No.:
SCALE: 1"=100'

Fig. 5

DATE: Dec 15, 2009 - 9:38AM
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Appendix M

Soil Management Plan

Appendix M –
Soil Management Plan

(DRAFT)
CONSTRUCTION SOIL MANAGEMENT PLAN

BERLIN BIOPOWER
BERLIN, NEW HAMPSHIRE

PREPARED FOR

Laidlaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, New York 10038

PREPARED BY

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

December 15, 2009

(DRAFT)

CONSTRUCTION SOIL MANAGEMENT PLAN

Berlin BioPower
Berlin, New Hampshire
December 15, 2009

Prepared For:

Laidlaw Berlin BioPower, LLC
90 John Street, 4th Floor
New York, New York

Prepared By:

ESS Group, Inc.
888 Worcester Street, Suite 240
Wellesley, Massachusetts 02482

December 15, 2009

TABLE OF CONTENTS

1.0 INTRODUCTION

This Soil Management Plan (SMP) has been prepared by ESS Group, Inc. (ESS) on behalf of Laidlaw Berlin BioPower, LLC (LBB) for use during the construction of the proposed biomass fueled energy generating facility at the former Fraser Pulp Mill in Berlin, New Hampshire.

The objectives of the SMP are as follows:

1. Identify the portions of the Project Site that will require excavation associated with the proposed construction;

2. Based on previous subsurface investigations, identify areas that may be impacted with certain oil and/or hazardous materials;

3. Develop a plan for properly handling the soil from each potentially impacted area, and non-impacted areas. The plan will include precautions for excavation activities, including identifying the proper personnel and developing Health and Safety requirements for on-site personnel and off-site areas.

4. Provide procedures for properly managing soil at the Site in a manner consistent with the requirements of the New Hampshire Department of Environmental Services (NHDES), and/or Local and Federal requirements, as applicable.

2.0 SUBJECT PORTION OF THE PROPERTY

2.1 Existing Conditions

Previous environmental investigations have identified impacts to Site soils and groundwater from historic industrial activities. The impacts are not widespread but rather located in specific areas and related to specific prior use of the property.

Soil samples collected in the general vicinity of where the Project's major components will be constructed showed relatively low levels of certain organic compounds and heavy metals. These compounds and locations have been documented as part of the site investigation activities, and will be confirmed prior to the initiation of Project construction.

No specific remediation activities are required at this time or to allow development of the Project. Soil and groundwater assessments and management actions will be conducted to assure proper handling of any potentially contaminated media in locations where construction of the Project is proposed. Proper handling of contaminated media includes proper on-site and/or off-site disposal of soil, and dewatering and treatment of potentially contaminated groundwater.

3.0 RESPONSIBILITY

ESS Group, Inc., has prepared this plan on behalf of LBB. The responsibilities for implementing and amending this SMP, and ensuring that the SMP is adhered to, will be defined prior to Project construction. Specifically, the parties responsible for the actions with regard to the SMP will be defined:

1. Training of designated employees and applicable contractors in the terms of the SMP;
2. Record keeping of the training of designated employees and contractors;
3. Ensuring that environmental investigations conducted at the Property are available to designated employees and applicable contractors that will be conducting work in the area where the SMP will be implemented;
4. Ensuring that all applicable soil intrusive work conducted on the subject portion of the property is monitored by an environmental professional and is conducted in accordance with this SMP; and
5. Preparing all required submittals to the NHDES and maintain record keeping of all correspondence with the NHDES and other regulators, as necessary.

4.0 EXCAVATION ACTIVITIES ASSOCIATED WITH THE PROPOSED CONSTRUCTION

The following general excavation activities are anticipated as necessary to construct the proposed facility:

- **Clearing & Grubbing –** Portions of the top soil will be removed and stockpiled.
- **Bedrock Removal –** Any bedrock that may be removed may be crushed on Site for potential reuse as rip rap material.
- **Pavement Reclamation –** In some locations, the pavement and base course materials may be removed, stockpiled and reused for proposed paved areas.
- **Structure Removal** – In those locations where new structures will be built with deep foundations or footings, pipes, manholes, concrete pads, building foundations, etc. may be removed and the base and sub-base material stockpiled and reused on Site.
- **General Grading –** The Site will be graded in order to meet the required specifications. The graded material will be stocked on Site for potential reuse.
- **Structural Excavation –** Excavation for proposed pipes, manholes, building footings, retaining walls, and detention basins. The excavated material will be stockpiled on Site for potential reuse.

The general activities described above require proper handling of soil and materials per this SMP, including identification of material generated from impacted areas, segregation, stockpiling, and on-site and/or off-site disposal. Other construction activities that require proper soil management will be identified and added to this SMP, as needed.

4.1 Soil Disturbance

At a minimum, the following procedures shall be adhered to during all subsurface work:

1. The work should be performed under the over-sight of a qualified environmental professional who is familiar with the SMP and New Hampshire's Waste Management Regulations. The NHDES shall be notified of the intent to perform the work prior to initiation of intrusive activities.

2. Excavation work shall not be conducted in a manner which allows the uncontrolled migration of soil outside of the work area and the work area will be restored at the completion of work in accordance with the SMP.

3. Physical barriers, such as temporary fencing, shall be utilized to prohibit access to the work area by unauthorized persons, and the barriers shall be maintained so that they effectively prohibit such access for the duration of the work.

4. If necessary, dust suppression measures shall be conducted for the duration of the work to prevent the wind-borne entrainment and migration of soil particles from the work area. Dust suppression activities may include: maintaining levels of soil moisture by means of wetting of the work area; covering the work area with a solid membrane; application of appropriate organic or inorganic chemicals used for dust control; or a combination of means, provided that dust entrainment and migration is effectively controlled.

5. Erosion control measures shall be employed, as needed, to prevent the runoff of soil from the work area. Erosion control measures may include staked hay bales, plastic membrane, or other suitable means, provided that erosion is effectively prevented for the duration of the work.

6. The persons performing the work shall prepare and implement a Health and Safety Plan (HASP) as outlined in Section 4.4, herein.

7. All equipment and vehicles used in the work area shall be used in a manner that minimizes the potential transport of contaminants across the Property. Any residual soil or contaminants on equipment and/or vehicles shall be brushed down in the work area to remove visible soil. Residual solid debris and cleaning fluids shall be containerized for proper off-site disposal or disposed of in the work area.

4.2 Soil Stockpiling

At a minimum, all soil that is excavated and which is either stockpiled on-site or placed directly in DOT-approved shipping containers should be handled in the following manner:

1. Soil shall be stored in a manner that prevents the uncontrolled migration of soil or soil liquids away from the soil pile for the duration of time that the stockpile exists.

2. Stockpiled soil shall be surrounded by a physical barrier or a combination of barriers, such as temporary fencing, to prohibit access to the stockpiled soil by unauthorized persons. The barriers shall be maintained so that they effectively prohibit such access for the duration of the work.

3. Stockpiled soil shall be located in an area of the Property where non-excavation workers will not be impacted.

4. Dust suppression measures shall be employed to prevent the wind-borne entrainment and migration of soil particles from stockpiled soil. Dust suppression measures may include: maintaining levels of soil moisture by means of wetting the stockpile; covering the stockpile with

a solid membrane; application of appropriate organic or inorganic chemicals used for dust control; or a combination of means, provided that dust entrainment and migration is effectively prevented for the duration of time that the stockpile is present. Additional information regarding dust monitoring and control measures are included in Section 5.0.

5. Erosion control measures shall be employed, as needed, to prevent the runoff of soil from the stockpile. Erosion control measures may include staked hay bales, plastic membrane, the covering of storm drain catch basins, or other suitable means, provided that erosion is effectively prevented for the duration of time that the stockpile is present.

4.3 Soil Transportation and Off-Site Disposal

At a minimum, prior to shipping soil that was excavated, proper sampling and waste characterization activities must be completed. Soil must be sampled for parameters and at a frequency acceptable to the receiving recycling/disposal facility and the NHDES. The transporter must have all New Hampshire licenses, permits, etc. required to transport the soil off-site and fulfill all other out-of-state requirements if the soil is transported out of New Hampshire. When transported upon public roadways, all soils shall be covered to minimize fugitive dust. The tracking of soil onto the ground or roadways outside of the work area by trucks shall be prevented. Preventative measures may include truck tire and undercarriage washing or other effective methods. All soil removed from the subject portion of the property shall be handled in accordance with New Hampshire's Waste Management and all other pertinent federal or local regulations.

4.4 Health and Safety Plan

The contractor(s) selected to complete work associated with construction activities will develop and maintain a site specific HASP that will be applicable to all subsurface work conducted at the Site. The HASP shall be prepared so that it is consistent with site-specific conditions and in compliance with all applicable U.S. Environmental Protection Agency (U.S. EPA), Occupational Safety and Health Administration (OSHA), and National Institute of Occupational Safety and Health (NIOSH) requirements. The site-specific HASP must be prepared in accordance with 29 CFR 1926. This SMP does not relieve a contractor from identifying and complying with all applicable laws and regulations.

4.5 Site Restoration

All off-site fill brought on-site shall meet NHDES Waste Management Regulations criteria. Documentation of all Site activities shall be completed by an environmental professional.

4.6 Recordkeeping and Reporting

A log shall be kept of all excavation activities conducted as part of the proposed construction. These records shall include, but not be limited to, the following:

- The location of intrusive activity, including site plans and/or sketches showing underground utility lines, sampling locations, and pertinent surficial features;

- The persons and type of equipment conducting the work;
- A copy of the Health and Safety Plan used;
- Copies of any shipping slips for soils brought on-site and off-site
- Copies of all laboratory analyses of soil brought on-site and off-site.

5.0 DUST MONITORING AND CONTROL PLAN

5.1 Environmental Monitoring

Stockpiling of soil will be minimized; however, any fill that is excavated and stockpiled on site will be properly managed to minimize the generation of dust from the soil stockpiles. When the stockpile is moved, dust control measures will continue to be employed.

During excavation activities in those area identified as involving contaminated media, the following environmental monitoring activities will be performed: (i) the Contractor will be responsible for wetting soil to reduce the potential for airborne particulates; (ii) the Contractor and on-Site Environmental Monitor[1] will be equipped with the appropriate level of personal protective equipment (PPE), as determined by the risk characterization and HASP; (iii) the on-Site Environmental Monitor will monitor ambient air quality with a photoionization detector (PID) for the potential presence of volatile organic vapors; (iv) the on-Site Environmental Monitor will ensure that the Contractor is adhering to the appropriate soil handling and managing protocols and vehicle/equipment decontamination procedures; and (v) the erosion and sediment control devices erected on the Site will be inspected by the Contractor on a daily basis and upgraded and/or repaired as needed.

5.2 Site Specific Air/Dust Monitoring Program

An air/dust monitoring program will be implemented during excavation activities that may involve contaminated media. The type of air monitor to be used is a MIE DataRAM Aerosol Monitors equipped with MIE Omnidirectional Sampling Inlets and MIE PM_{10} Sampling Heads, or equivalent. Two monitors will be used during excavation, one each located at upwind (northern portion of Site) and downwind (southern portion of Site) locations. The monitors will be properly calibrated prior to use and programmed to take dust readings at regularly established intervals (e.g. every five minutes). The on-Site ESS representative will compile the raw air monitoring data at the end of each field day. The monitors will be programmed to sound an alarm if the action level (as summarized below) is exceeded at anytime during the field work. For security reasons, the monitors will be removed from the Site at the end of each workday.

Real-time air monitoring action levels for particulate matter with an aerodynamic diameter of 10 microns or less will be developed using an approach described by Weidner, Fitzgerald, and Vallatini (October 1997) and accepted by many state environmental agencies. The methodologies,

---

[1] The Environmental Monitor will be an scientist/engineer who has the appropriate level of knowledge and training to oversee the Project.

calculations and findings for the action level risk assessment will be presented. The action level will be determined using the maximum constituent concentrations detected in soil at the Site.

Dust emissions from construction activities (i.e., soil/fill excavation actions) will be considered acceptable if the difference between upwind and downwind concentrations is less than the action level. If the upwind and downwind concentrations exceed the action level, construction activities will temporarily cease. By comparing the difference between upwind and downwind concentrations, exceedances due to background conditions (specifically dust being generated from heavy vehicular traffic) can be avoided.

In summary, dust control measures will be implemented throughout the active construction stage and during non-construction stages to control potential exposures to workers and local residents throughout the project duration. If visual observations suggest that the dust control measures are insufficient, the activity will be suspended until improved control measures are implemented.

6.0 CERTIFICATION

Prior to performing construction work at the Site for the proposed construction, a representative from each subcontracting company shall receive and review a copy of this SMP, and sign a certification attesting to such.

Appendix N

Water Supply & Wastewater Discharge Municipal System Adequacy Letters

Appendix N –
Water Supply System Adequacy Letter

BERLIN WATER WORKS

OFFICE OF THE WATER COMMISSION
55 Willow Street, Berlin, NH

PLEASE ADDRESS REPLY TO:
55 Willow Street
Berlin, NH 03570-1883
Tel: 603-752-1677
Fax: 603-752-3055

November 30, 2009

Mr. Louis T. Bravakis
Vice President-Development
Laidlaw Biopower, LLC
PMB 148
457 State Street
Montpelier, VT 05602

RE: Water Pricing Estimate

Dear Mr. Bravakis:

As a follow up to our meeting on November 5, 2009 and your letter dated November 17, 2009 this letter is in response to your request. Berlin Water Works has the adequate water supply and infrastructure to provide Laidlaw Biopower, LLC with up to 1.8 million gallons of water per day and more if needed for process operations.

As requested we have calculated an annual price for an estimated annual average use of 1.4 million gallons per day in the amount of $3,140,399.24. This annual amount is based on present rate structure billed quarterly in the following breakdown:

Water Charge	$279,736.16
Assessment Charge	$505,356.60
Customer Charge	$ 2.05
Fire Protection	$ 5.00
Quarterly Charge	$785,099.81

This estimate given may be adjusted through negotiation with the Board of Water Commissioners. A written letter to the Board requesting a meeting with the Board of Water Commissioners would be required for the negotiation to be listed on the Board's Agenda.

If you have any further questions, please call us at 752-1677.

Sincerely,

Roland L. Viens, P.E.
Superintendent

RLV:db

Appendix O

Applicant Statement of Assets & Liabilities

Appendix O - Applicant Statement of Assets & Liabilities

Balance Sheet	
Cash	-
Land (Note 1)	-
Capitalized Project Cost	1,488,000
Total Assets	1,488,000
AP	-
Payable to CSC	1,488,000
	1,488,000
Equity (Note 2)	-
Total Liabilities & Equity	1,488,000

Cash Flow	
Net Loss	-
Total Cash used in Operating Activities	-
Cash from Investing Activities	
Project Development Costs	(1,488,000)
Purchase of Land	-
Total Cash used in Investing Activities	(1,488,000)
Cash from Financing Activities	
Project development funding from CSC	1,488,000
Total Cash provided by Financing Activities	1,488,000
Net Change in Cash and Cash Equivalents	-
Beginning Cash	-
Ending Cash	-

Notes to Financial Statements

This amount does not include site and associated costs of purchasing the land due to the financing arrangement.
These items if included would account for an additional $5.6 million of total costs to the project.

No P&L currently exists for the project as it is expected to materialize and as such all related costs are currently capitalized.

Appendix P
LandVest Report – Biomass Supply Study

Appendix P -
Land Vest Report – Biomass Supply Study

Forestry Consulting · Real Estate Consulting & Appraisal · Distinctive Properties

Research Report: Phase I

Biomass Supply Study for Laidlaw Biopower Plant, Berlin, NH

12/14/2009

Presented by:

Timberland Division
LandVest, Inc.
16 Centre Street
Concord, NH 03301
Phone: 603-228-2020
Fax: 603-226-4391

Disclaimer

The estimates herein are based on the data sources we believe to be reliable and the analysis is based on our best professional judgment. Any changes in the assumptions or specifics may change the findings of this report. Neither LandVest, Inc., Laidlaw Biopower, LLC. nor any other agency or entities thereof assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, product or process disclosed in this report.

Executive Summary

LandVest, Inc ("LandVest) has prepared this Biomass Supply study for Laidlaw Berlin BioPower, LLC ("Laidlaw") the developer of a 70 MW Biomass Generating Facility in Berlin, NH. LandVest has conducted several wood supply studies and is very familiar with the forestlands of Northern New England.

In preparing this review LandVest utilized existing studies of the forests of Northern New England along with published data. The overall purpose of the study is to quantify the potential supply of low-grade fiber that can be sustainably harvested from a defined area that could supply the Laidlaw plant. This supply volume was then compared to the current demand to ascertain whether or not the study area could support new projects such as Laidlaw's.

Based upon the projected annual consumption (70 MW) of the Laidlaw project and the historical supply range for similar facilities LandVest defined the Primary Source of Supply to be a wood basket that is roughly 100 miles or within a 3 hr drive of Berlin, NH. Forest Inventory and Analysis (FIA) data is used as the primary data source for this study. To conduct the analysis LandVest used published data sources that identify the ownership types, species composition, inaccessible acreage, net growth rates and harvesting volumes. To identify the potential supply LandVest assumed that removals equaled net growth and sustainable forestry practices were adhered to. From our analysis, it was determined that the study area could generate on a sustained basis 6.7 million tons of low-grade fiber per year along with 3.6 million tons of lumber produced from high-grade logs ("sawtimber").

LandVest also researched secondary sources of supply: biomass backhauls from Southern New England and rail. This report concludes that at this time these secondary sources will not contribute significantly to the supply; however it is acknowledged that rail might play an important role in the future.

In analyzing the impact of the Laidlaw (or other) projects on the area with respect to current consumption LandVest conducted a geographical analysis and determined that there are currently ten (10) biomass plants and seven (7) Pulp and Paper mills that collectively consume roughly 6 million tons per year of low-grade fiber (biomass and pulp) from the study area.

The findings of this study conclude that assuming current demand for low-grade biomass remains constant at 6 million tons per year, the defined Primary Source of Supply (Wood Basket) has the capability to generate an additional 710,000 tons per year on a sustained basis. A key element in this study is the estimate that biomass utilization has been at about 50% of what is available. We believe that if there is a solid, consistent demand for biomass and pricing that is attractive, more could be utilized. To estimate how much more we looked at recommendations developed by the Forest Guild, and implemented in, a number of states that suggest removal of up to 70% would not have a detrimental effect on the forest health. If this 70% figure were used the available biomass in this study area would be up to 1.2 million tons. Additional biomass is available via backhauls from southern New England, and there is additional potential supply via rail and perhaps from Canada. Our conclusion then is that historical data support an estimate that 710,000 tons of biomass in excess of current demand is available and that it appears to be entirely feasible that significant additional volume is sustainably available in a more competitive situation

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Introduction

LandVest, Inc. has been retained by Laidlaw Berlin BioPower, LLC to conduct an independent, biomass availability assessment for a proposed biomass power plant which Laidlaw intends to build on the former Burgess Mill site, in Berlin, New Hampshire. LandVest has conducted several wood supply studies, including a recent study for the North Country Council on the excess availability of low-grade fiber for a hypothetical facility sited in Berlin. LandVest has been in business for 40 years and currently manages 1.3 million acres of timberland, nearly all in northern New England and the Adirondacks. Over the years LandVest has gained specific knowledge and experience within the study area and understands the regional timber markets supply and demand curves as it pertains to the forest products industry. In addition LandVest has developed relationships with many logging and trucking contractors, foresters, landowners and others who are integral to the supply chain.

Given the ever increasing need for environmentally friendly energy sources, the use of biomass as a viable sustainable fuel to produce energy is becoming more and more important. The wood products manufacturing industry has used wood energy for many years, and in the 1980's a number of biomass electrical generation facilities commenced operation in Northern New England. New Hampshire's North Country has the capability to provide a sustainable biomass supply due to its extensive resource base and current stocking levels coupled with its long history of forest product utilization and timber management. The increased use of woody biomass for electricity generation will provide much needed economic benefit to the timber industry in the northern New Hampshire and Vermont. Recent mill closings and downsizings have had severe negative economic impacts on communities that rely on the forest products industry. Increased demand for wood residues, such as biomass fuel, will stimulate local businesses which in turn will directly augment the regional economy.

There are some who oppose the construction of new biomass power plants. Though some opponents are sincere in their desire to understand that using biomass for energy will not adversely affect the environment and forest health, others simply fall into the Not In My Back Yard (NIMBY) category. On environmental issues the notion that biomass plants create more pollution than fossil fuel plants is unfounded. Over long time periods, the displacement of fossil fuel either directly, or through production of wood products, is likely to be more effective in reducing Carbon emissions (Brown 1997). Brown (1997) also said "recent studies suggest that there is the potential to manage forests to conserve and sequester C to mitigate emissions of carbon dioxide by an amount equivalent to 11-15% of the fossil fuel emissions over the same time period." In addition, using woody biomass would produce much less Sulfur dioxide and Nitrogen oxide pollution than fossil fuel (Table 1). Therefore, woody biomass is much cleaner than fossil fuel.

Table 1. Sulfur dioxide, nitrogen oxide, and carbon dioxide emission factors for different energy sources (U.S. DOE, 2003, Sommer et al. 2008)

Pollutant	**Woody Biomass**	**Coal**	**Heavy Oil**	**Natural Gas**
Sulfur Dioxide	0.08 lbs/ton	39 lbs/ton	157 lbs/ton	0.6 lbs/10^6 cubic feet (cf)
Nitrogen Dioxide	1.6 lbs/ton	21 lbs/ton	47 lbs/ton	170 lbs/ 10^6 cf
Carbon Dioxide	0[1] lbs/ million Btu	225 lbs/mBtu	174 lbs/mBtu	117 lbs/mBtu

On forest sustainability, the belief that biomass power plants would deplete forest resources would only be true if the consumption of the plants exceeded a sustainable level of production from the forest resource. For the past 100 years the pulp and paper industries of Northern New England have consumed enormous volumes of the forest resources; however it is widely acknowledged that today the North Country forest resource is robust and intact. This is due to the fact that net growth exceeds removals for New England according to the 2002-2006 FIA data. There does appear to have been a period of time recently when annual harvesting exceeded annual growth within a close working circle around Berlin. This is very normal, because forests generally develop into even-aged cohorts so it would be impractical for harvests to exceed growth on a regular basis. Furthermore according to the study even when heightened levels of removal are taken into account, net growth (supply) exceeds demand within a 100 mile radius of Berlin. In the recent survey of state foresters, state energy biomass experts, and national council of forestry association executives, the use of combustion as the woody biomass energy platform is rated the highest potential to become a sustainable source of energy at the state level (Aguilar and Garrett 2009). In addition the majority of the forestlands that comprise

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[1] Assumes wood grown and harvested for this purpose. lbs=pound and Btu=British thermal unit.

the primary source of supply for the Laidlaw project are either regulated by State or Federal legislation, are operating under Conservation Easements and/or adhere to Best Management Practices ("BMP") for sustainability. Many of the lands are also enrolled in third party certification such as the Sustainable Forestry Initiative ("SFI").

Recent Wood Supply Studies

Four wood supply studies have been completed covering Coos County and/or areas adjacent to Coos County:

1. LandVest (Shi et al), "Timber Supply Study for the North Country of New Hampshire" prepared for the North Country Council, November 2008.
2. Innovative Natural Resource Solutions LLC (INRS, 2008) "Biomass Fuel Availability" prepared for Clean Power Development, May 2008
3. L.E. Caldwell Company (Caldwell, T.). "Modeling Project Summary Report for NHTOA and SPNHF", 2007.
4. Department of Forests, Parks and Recreation and Vermont Department of Buildings and General Services. (Sherman, A.R.). "The Vermont wood fuel supply study for Vermont", 2007

LandVest's wood supply study for the North Country of NH is the most recent one (Shi et al. 2008). In this study, the aggregate timber assessment system (ATLAS) and sub-regional timber supply model were used for a 50-year simulation. According to the base model simulation, there are 4.62 million green tons of roundwood (i.e., sawtimber and pulpwood) available. Correspondingly, there is approximately 3.58 million green tons of low-grade (i.e., pulpwood and biomass) fiber available, of which 0.67 million green tons are from tops and branches and the rest is pulpwood. This study is just based on a hypothetical facility and the wood supply is the average over 50 year. After the 50-year average supply is assigned to the existing wood using facilities with geographical analysis, there are 600,000 green tons of low-grade wood available.

The study compiled by Innovative Natural Resource Solutions LLC (INRS, 2008) evaluated the availability of biomass within roughly a one-hour drive of the Clean Power Development's proposed biomass facility in Berlin, NH. This study used the USDA Forest Service forest inventory and analysis (FIA) data, the annual harvests of Coos County as reported on the NH Department of Revenue Administration Report of Cut (1998-2005) and delivery prices to estimate the potentially available biomass fuel. From that report, and according to interviews of potential suppliers, if the delivered price of biomass was $32 per ton, there would be 350,000 tons of biomass available annually. Additional modeling by INRS indicates that approximately 300,000 green tons of biomass is available in Coos County, NH.

The Caldwell study focused on the state of New Hampshire. Using model simulations the analysis indicated the annual available timber to be approximately 3 million greens tons of roundwood per year. Other trends outlined in this report show that the softwood inventory is expected to increase faster than hardwood and that overall inventory tends to increase over the 50-year model simulation. The result is consistent with the wood supply study for the states of New York, Vermont, New Hampshire and Maine (Turner and Caldwell 2001).

The Sherman study analyzed the forestlands in Vermont. The goal was to understand the forest resource capacity and future availability of wood that would be available for potential biomass energy plants located in Vermont. The study area included all 14 counties of Vermont and the surrounding 10 adjacent counties of New York, Massachusetts and New Hampshire. The net available low grade growth ranges from 0.4 million green tons to 2.3 million greens tons[2] of biomass per year under different assumptions (from conservative to aggressive).

Different objectives lead to the four studies cited above. LandVest's wood supply study (Shi et al. 2008) focused on the possible supply of low-grade fiber for a hypothetical wood using facility sited in the North Country of NH. This could be any type of facility that utilizes low-grade fiber. INRS'study was to analyze biomass supply for a specific facility – a biomass power plant which Clean Power Development, LLC. is developing in Berlin, NH. Its objective was to identify supply available at a maximum cost of $32/ton within 30 miles around Berlin, NH. The other two studies, Caldwell and Sherman, are more general with an emphasis to quantify potential wood or biomass supply statewide, New Hampshire and Vermont respectively.

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[2] The estimate is from all VT counties only.

Study Purpose

The primary purpose of this study is to examine potential sources of woody biomass suitable for combustion at Laidlaw's proposed biomass power plant in Berlin, NH under the condition of forest resources sustainability. This facility will not use construction and demolition debris. It will be fully supplied from forestry operations. The second purpose of this study is to identify the volume of additional biomass, over and above current consumption by existing facilities (energy and paper) that could be harvested on a sustained basis and delivered to the proposed Laidlaw power plant in Berlin, N.H.

Defining the Primary Source of Supply – Wood Basket

In order to ascertain the feasible reach of the Laidlaw facility, a Primary Source of Supply ("Wood Basket") was defined, based upon the size of the facility and projected annual consumption of up to 750,000 tons per year, to be a three-hour drive polygon approximately 100-mile radius centered at Berlin (Figure 1). Further refinement defined the area to only include whole counties due to availability of harvest data. The LandVest 2008 wood supply study noted that there are several wood using facilities situated in the five counties (i.e., Oxford, Franklin, Androscoggin, Cumberland and York) of southwestern Maine, therefore this analysis did not project any wood travelling through them from beyond. Portions of counties were not included, so there are some counties where a small proportion of land could have been included and others where a small proportion should have been excluded. Thus, the study area has been determined to be the following counties covering a three state area: (Figure 1). The wood basket includes (a). All of New Hampshire; (b). Essex, Caledonia, Washington, Orange, Orleans, Washington, Chittenden, Franklin and Windsor Counties, Vermont; and (c). Androscoggin, Cumberland, Franklin, Oxford, and York Counties, Maine (Figure 1). Overall, the study area covers approximately 10,757,208 timberland acres.

Data and Analysis

The USDA Forest Inventory and Analysis database (FIA) was used to determine the forest stocking, growth and loss (including mortality and removal) for the defined wood basket and the timberland within this area was grouped into four primary ownerships:

Federal, State, Forest Industry/ Investor, and Other Private ownerships.

In an effort to conduct detailed data analysis and modeling, the timberland was further classified into six habitat types which are defined by the FlexFiber program (Solomon et al. 1995). These six habitat types are Sugar maple/Ash (SM/AS), Beech/Red maple (BE/RM), Oak/White pine (OK/WP), Hemlock/Red spruce (HE/RS), Spruce/Fir (SP/FR), and Cedar/Black spruce (CE/BS, Solomon et al. 1995, Brann and Solomon 2001). They are classified in terms of ecological and physical boundaries as well as biological characteristics. Each habitat type is further categorized into four site classes which are defined in the FIA database.

Timberland Acres and Stocking levels

This study determines that 10,757,208 timberland acres are within the defined Primary Source of Supply: the three hour drive wood basket that surrounds the facility. 73% of this land is privately owned, with the balance split between State / Federal governments and investment groups (Figure 2). Typical of a northern hardwood stand Sugar Maple and White Ash comprise over 50% of the species mix with the balance made up of Beech, Red Maple, White Pine, Birch, Spruce and Fir (Figure 3). The age distribution is close to normal, but somewhat skewed to an older forest: 53% of the stands are over 70 years old. This review estimates that there are approximately 585 million green tons of growing stock of which 170 are tops and branches (Table 2). The majority of this fiber is privately owned.

Table 2. 2002-2006 FIA Growing stocks by ownership types in the three-hour drive wood basket

Ownership	Growing Stock (Green Ton)	Growing Stock Proportion	Top and Branches (Green Ton)
Federal	48,884,414	8%	14,176,480
State	48,146,135	8%	13,962,379
Industry/Investor	71,508,886	12%	20,737,577
Other Private	416,875,511	71%	120,893,898
Grand Total	585,414,947	100%	169,770,335

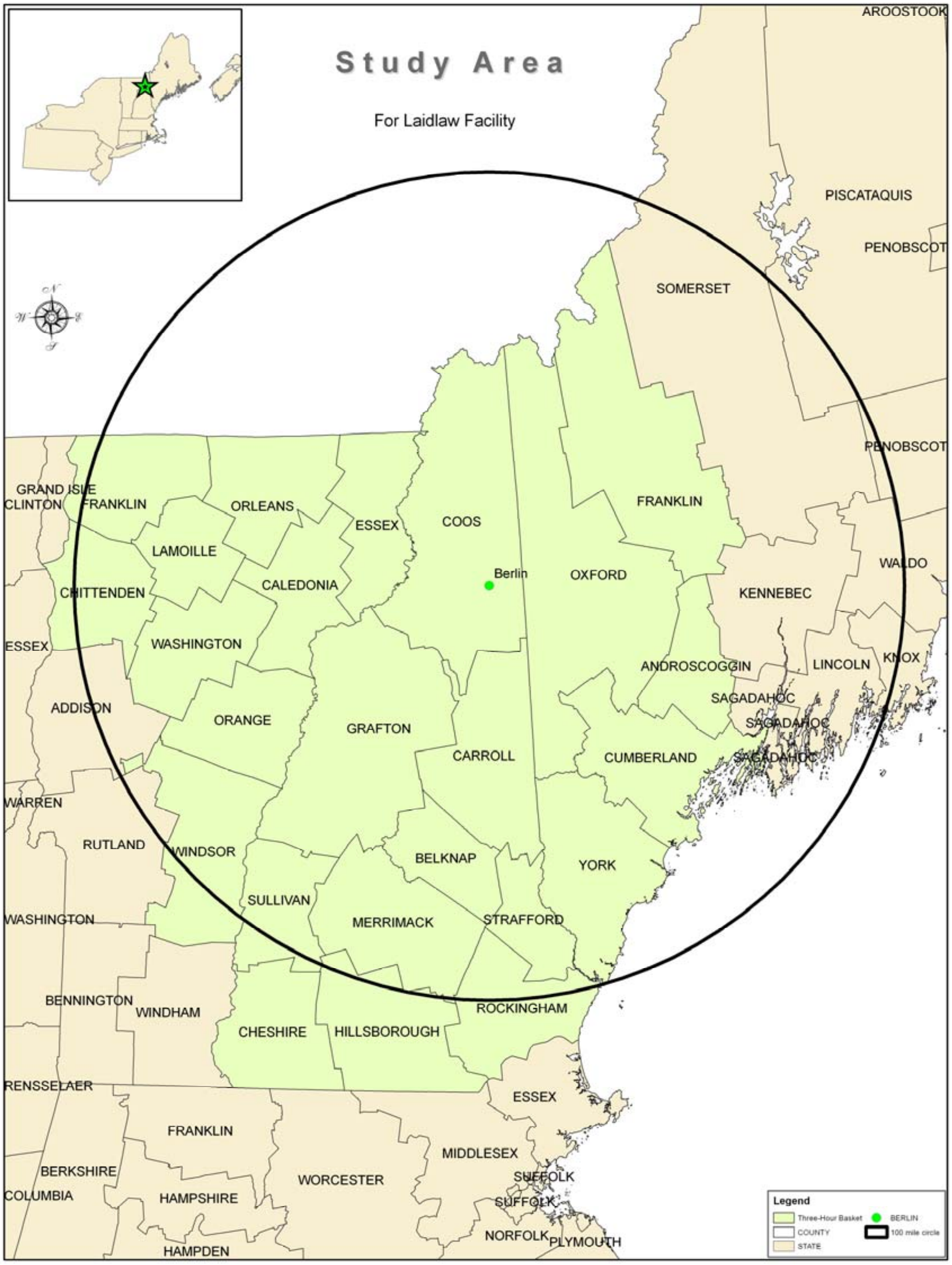
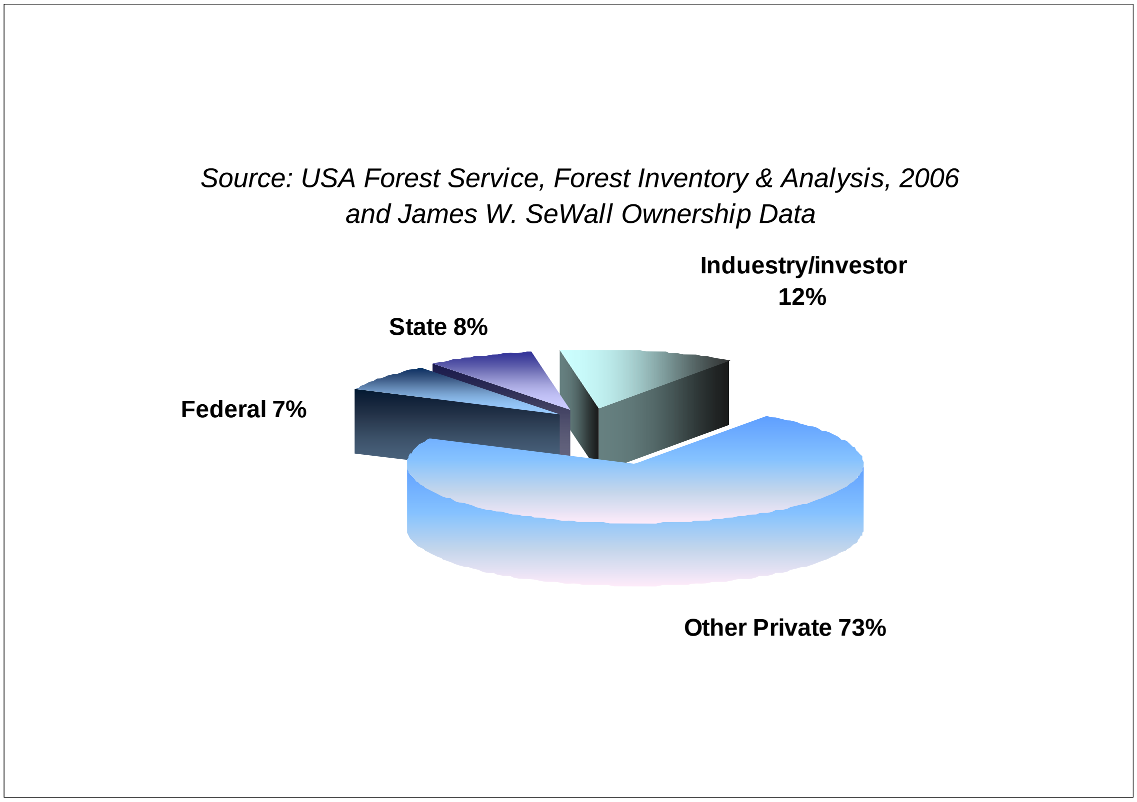


Figure 1. Wood Basket



Source: USA Forest Service, Forest Inventory & Analysis, 2006 and James W. SeWall Ownership Data

Figure 2. Timberland ownership types in the three-hour drive wood basket

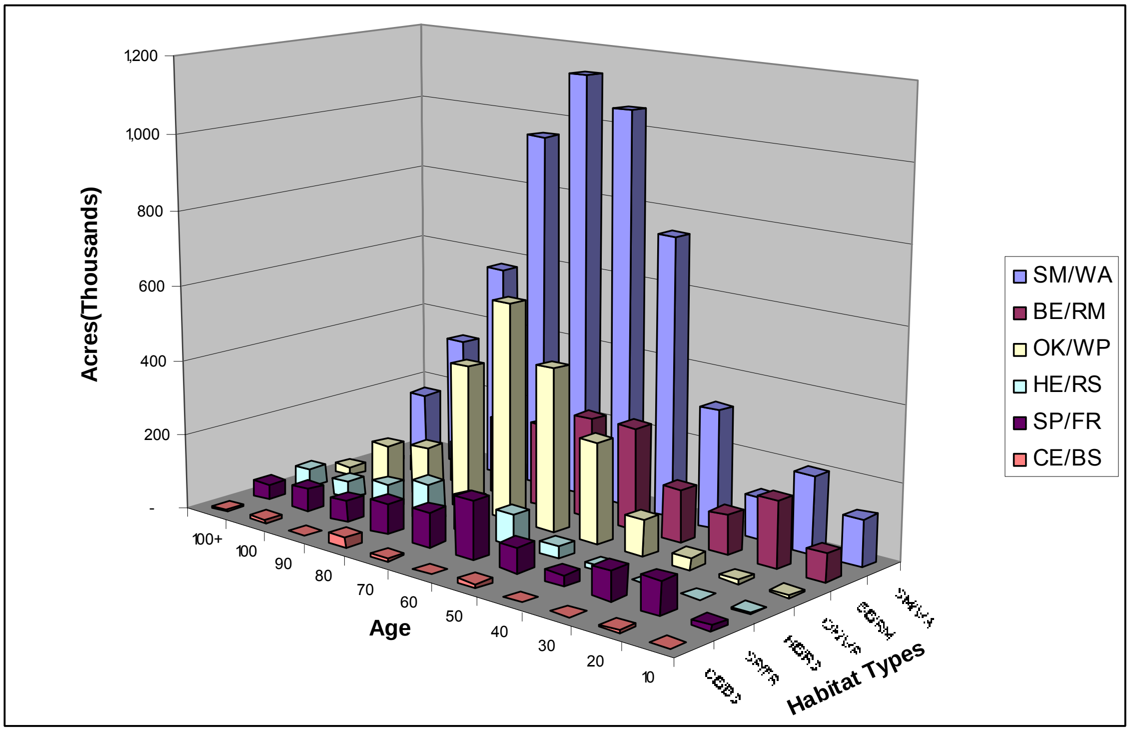


Figure 3. Timberland acres by habitat types and age classes in the three-hour drive wood basket

Inoperable/Inaccessible Timberland

Not all timberland acres are available for harvest, so an adjustment is made to account for inoperable/inaccessible timberland acres. Similar to the LandVest 2008 wood supply study (Shi et al. 2008), this determination of inoperable/inaccessible timberland acres is based on personal interview, current spatial data, and historical documentation. Factors for consideration in the analysis of inoperable/inaccessible timberland acres are: (1) Steep slopes and mountain tops along with fragile or sensitive areas; (2) Wildlife habitat, such as a deer yards; (3) Acreage within watersheds and/or riparian areas; (4) Some areas may be too remote to be economically reached by the current road system; (5) Some areas are prohibited from harvesting due to easements and other encumbrances. According to the FIA data, there are about 196,836 acres (1.8% of the total timberland acres) which are located on slopes > 55%, which is too steep to do any operation[3]. Using the same criteria that was used in the 2008 wood supply study (Shi et al. 2008), a determination is made that 6% of the timberland acres are inoperable and inaccessible. Without any addition notes, all numbers refer to the operable/accessible timberland in the following sections.

Growth and Removal

FIA data from 2002-2006 indicates that net annual growth exceeds net annual removal within this wood basket (Table 3)[4].

Table 3. 2002-2006 FIA Growth and Removal in the wood basket (Green Tons)

	Roundwood[5]	**Sawtimber**	**Pulpwood**	**Tops and Branches**
Federal Net Growth	306,581	273,256	33,326	88,909
State Net Growth	741,639	564,435	177,204	215,075
Industry/Investor Net Growth[6]	1,196,639	820,268	376,372	347,025
Private Others Net Growth	6,780,957	4,648,183	2,132,774	1,966,477
Total Net Growth	9,025,817	6,306,141	2,719,676	2,617,487
Federal Removals	39,487	13,875	25,613	11,451
State Removals	909,106	490,517	418,588	263,641
Industry/Investor Removals	1,200,781	652,236	548,545	348,226
Private Others Removals	6,804,423	3,696,002	3,108,421	1,973,283
Total Removal	**8,953,796**	**4,852,630**	**4,101,167**	**2,596,601**
Removals from Harvesting Data	6,172917[7]	2,947,202	3,344,093	1,729,275

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[3] See LandVest's wood supply study (Shi et al. 2008).

[4] Although there is a discrepancy between the removal from the FIA and state provided harvesting data. As before removals from the harvesting data are much less than the FIA removals, and also as before, we think the two estimates provide a reasonable range of estimate – though would posit that given the distinct possibility of underreporting taxable income, the FIA data is probably more reliable – thus we think the upper end of the range of removals is where we should place our emphasi

[5] Roundwood includes sawtimber and pulpwood.

[6] For Industry/Investor and Private Others, the net growth and removal are prorated according to the timberland acres based on James Sewall ownership data.

[7] This is the simple mean from 2001 to 2007 and we assume that the whole tree chips do not include any poor quality roundwood.

Recent Harvest

The data indicates that roundwood supply in this wood basket has been decreasing since 2001. However sawtimber supply has remained constant but pulpwood has dropped off significantly especially during the years 2003 to 2005. There are a number of plausible reasons for this: first, it is possible that there has been a reduction in mature growing stock as a result of recent timber harvests which would mean that harvesting levels would decline until the trees once again reach merchantable size; second, there has been an overall decline in demand due to the changing dynamics of the timber market worldwide and in the U.S. over the last decade. The impact of this has been felt in North Country with the recent closings of paper and pulp mills in Berlin(Fraser/Nexfor) Groveton (Wausau) and Gilman, VT (Gilman Paper). As a result of these changes the travel distance for roundwood pulp to remaining markets has increased to a level where much of this material was chipped and sent to closer biomass plants. Regionally, it is also likely that regulations have constricted supply to some degree. For example, the State of Vermont recently enacted harvest regulations that limit and restrict heavy cuts and clear cuts. Whatever the mix of reasons the supply of pulpwood declined (Figure 4). Related to that the volume of whole tree chips increased from 2003 to 2007 and there are currently about 1.7 million green tons of wood harvested annually for energy fuel.

Potential Supply

With respect to growth and removal the data indicates that net growth exceeds removals within the defined three-hour drive wood basket. Using the FIA growth data from Table 5, the annual net growth of trees in the wood basket is approximately 11.6 million tons comprised of: roundwood (pulpwood and sawtimber) at 9 million tons: and tops and branches at 2.6 million tons. In interviews with logging contractors and foresters and according to the INRS 2008 study 50% of the tops and branches typically are removed as part of the harvesting operation. However as biomass markets evolve and paper markets decline this percentage could increase to levels adopted by a number of states as sustainable and beneficial to forest health. To help us understand that potential source of fiber we used the guideline suggested by the Forest Guild that site protection would not be harmed as long as least 30% of the total biomass were left on site. So from that one

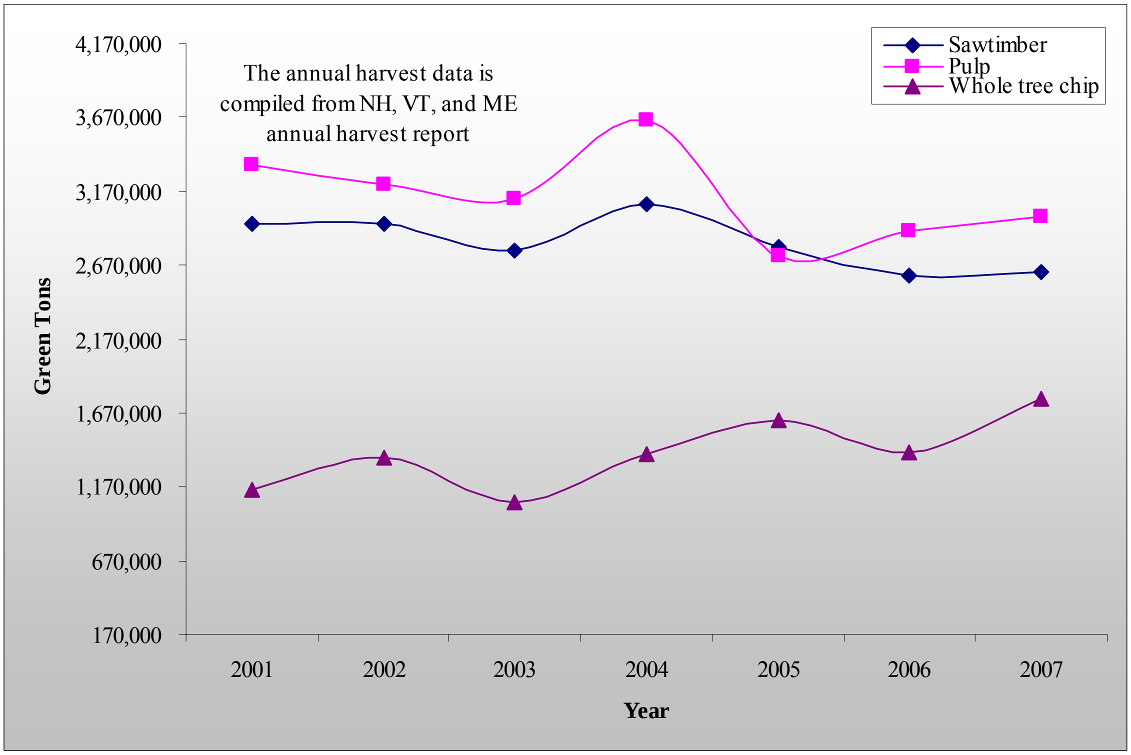

Figure 4. 2001-2007 harvest in the three-hour drive wood basket

could posit that up to 70% (versus the 50% that has been used) could be available under environmentally sensible forest practices during harvest. State harvest data indicates that from 2005 to 2007 biomass represented 22% of the total removals (roundwood and tops and branches) but this percentage should increase in the future as demand for biomass grows. Additional biomass for energy is provided from unusable portions of sawtimber (bark, fines, and scraps) which is approximately 15% of the total sawtimber tonnage (630,000 tons per yr). This analysis concludes that the supply of biomass as provided by net growth within the defined wood basket is (using 50% of tops and branches):

Tops and branches	1.31 million tons per yr
Residue from sawtimber	0.62 tons per yr
Lowgrade roundwood	4.78 million tons per yr
Total	6.71 million tons per yr

Secondary Sources of Supply

This study also reviewed two additional potential sources of biomass – both from outside the study area. One possible additional source is using the backhauled biomass from MA, RI and even CT and the other is utilizing the railroad (given that the proposed Laidlaw Berlin site has rail access).

Backhauled biomass

According to our interviews with the trucking contractors, backhaul trucking rates from southern NH and MA range between $13.5 and $17.5 per ton depending on the backhauled distance. Through interviews it was discovered that the usual discount on backhauls can be as much as 30%-50% compared to normal trucking rates. [8]. Another interviewee indicated that prior to the recent recession 2,000-3,000 loads/year of bark were taken to MA, with more than that coming north as backhauls of clean chips (but there has been a 20-25% drop in business over last 3-5 years). It is the opinion of this review that there is additional availability of approximately 50,000 tons of biomass per year as a result of trucking backhauls.

The only published information available for biomass price is from the INRS research (2008) for the North Country of NH, and that study indicates that it is feasible to backhaul biomass from southern NH or northern MA to Berlin if the price is at least $30/ton. This is economically viable only if the lower backhaul rate applies and the biomass is generated through other activities such as land clearing or line trimming. This is not a source that cannot be relied on for the long term since according to the news from *Hill Country Observer* (08/2009) David Scribner reported that there are "half-dozen biomass power plants now on the drawing board across north-central and western Massachusetts". This review concludes that biomass from backhauls should not be included in the analysis as a viable long term source of supply.

Railroad

Laidlaw's Berlin facility has an active railroad track and unloading capability. This track is connected with the VT, ME, NY and Canadian railroad system, so biomass could be transported to Berlin from these and other locations. From the data collected, the

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[8] Personal communication.

transportation prices range from $3,600 to $4,000 per car[9] (Table 4) and the load per car cannot be more than 263,000 pounds[10]. An estimate of pricing for other railroad companies was made (Table 5), and it was determined that costs equated to about $30 per ton for shipping. This does not include any other costs, such as paying loggers for biomass and truckers for transporting the biomass to the closest rail sidings, etc. At this time it appears that railroad transport is economically unviable in the near term.

However, the rail infrastructure is available and could be utilized in the future if conditions change especially with respect to climate change legislation and over the road trucking, or temporary opportunities to capture wood as a result of weather events from other locations outside of the defined wood basket.

Table 4. Pricing quote from Canadian Pacific Railway (CPR)

Canadian Pacific Railway	
Origin: Glens Falls, NY	Origin: Whitehall , NY
Destination: Berlin , NH	Destination: Berlin , NH
Routing: CPRS-STLUC-CN	Routing: CPRS-STLUC-CN
Mileage: 389	Mileage: 362
Rate: $ 3,734.00 USD Per Car	Rate: $ 3,684.00 USD Per Car

Table 5. Estimated pricing for shipping biomass or timber to Berlin, NH[11]

Railroad Company	Price ($ per car)	Origin
Canadian National Railroad	$2900-$3600	Ontario, Quebec
CSXT (Chips)	$3000-$3700	NY
CSXT (longlog and shortlog)	$2600-$3400	NY
Pan AM (Timber)	$2500-$3200	NY,VT

Comparative Analysis – Potential Supply / Current and Future Demand

This report expanded on LandVest's 2008 report for the North Country Council where an analysis was conducted comparing potential supply to existing demand within a two hour drive radius of Berlin. In this study the analysis was conducted within the defined Laidlaw Primary Source of supply: three hour drive of Berlin. The purpose is to assess the relative competitive position of the proposed facility and provide an indication of whether the forest resource within a reasonable procurement distance (wood basket) could supply

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[9] Including additional fess, for example fuel cost adjustment. This is the actual quote from CPR.

[10] http://www.rpc.windham.vt.us/trans/freight. Generally, it is 286,000 lbs. Currently VT rail infrastructure cannot accommodate 286,000 lbs cars.

[11] Based on their online pricing database.

enough low grade biomass for the Laidlaw project and the existing and operating facilities. The approach of this study is similar to the LandVest 2008 study whereby the supply data is compared to projected consumption/demand of existing facilities from the defined wood basket.

To estimate demand a geographical analysis was utilized to roughly estimate the available low-grade fiber which the existing wood using facilities procure from both the inside and outside of the wood basket (Shi et al. 2008). An assumption was made that each existing facility would procure their fiber within a circle around the facility (Figure 5); the radius of which is determined by annual consumption (Table 6). The geographical analysis simply uses the percentage of the timberland acreage inside the wood basket versus the total timberland acreage around each facility to assign how much wood each facility can get from the wood basket.

Assuming that facilities continue to consume at their historical rates, an estimate was made of total consumption by all facilities in the study area. It was determined that these biomass plants and paper mills would consume approximately 6 million tons of low grade biomass from the defined wood basket every year (Table 6). As previously presented a sustainable net harvest from the wood basket is 9 million tons of roundwood per year. From the harvesting data it is determined that the sawtimber portion of the annual roundwood harvest is 47%, or 4,230,000 tons, of which (see prior discussion) 15%, or 634,500 tons become potential biomass. The remainder is pulpwood (4,770,000 tons), and as per industry standards for every ton of roundwood harvested approximately 0.29 tons of tops and branches are available, and of that amount established forestry guidelines for a number of states suggest that 50% (1,309,000 tons) can be removed as biomass. These three figures total 6.71 million green tons – which is the estimate of potential total low-grade fiber available within three hours of Berlin depending on market development.

The annual harvest is assumed to be the annual net growth with no changes expected in the near future, the available low-grade fiber would only depend on the consumption of these existing wood using facilities along with new projects that get built. Base on this analysis there could potentially be is up to 0.71 million tons of low grade fiber available on an annual basis that is in excess of the current usage. Meeting this potential will ultimately depend on how long the existing facilities operate at historic rates and what new projects get built within the study area.

In 2008 LandVest wood study compiled for the North Country Council, the wood basket is 6.3 million timberland acres and the lower and upper limits on excess low grade available are 250,000 and 950,000 green tons. In this current study, the study area is 10.7 million timberland acres with resulting 710,000 million tons. The available low grade fiber does not proportionally increase due to two major reasons: first the existing facilities can procure more wood from the wood basket due to the bigger wood basket; second, the annual harvest is based on the net growth from the FIA data and it is not based on model simulations. In the LandVest 2008 wood supply study, the annual growth would be relatively increased because of the improvement by forest management over time which is built in the simulation models.

From the geographical analysis, there is basically 710,000 green tons of low-grade fiber available in the three-hour drive wood basket by assuming 50% of the tops and branches can be utilized. While a number of states have enacted guidelines that allow for removal of tops and branches up to 70% without having detrimental affects on the forest health (Evans and Perschel 2009). If there was more low-grade wood using facilities built in or around the three-hour wood basket, the competition and demand would be up. Hence there is an additional 500,000 green tons of biomass available from tree tops and branches if the utilization percentage is up to 70%. Taking this into account the total volume of low-grade fiber could be up to 1.2 million green tons in the three-hour drive wood basket (with additional potential from Rail, Backhauls and Canada).

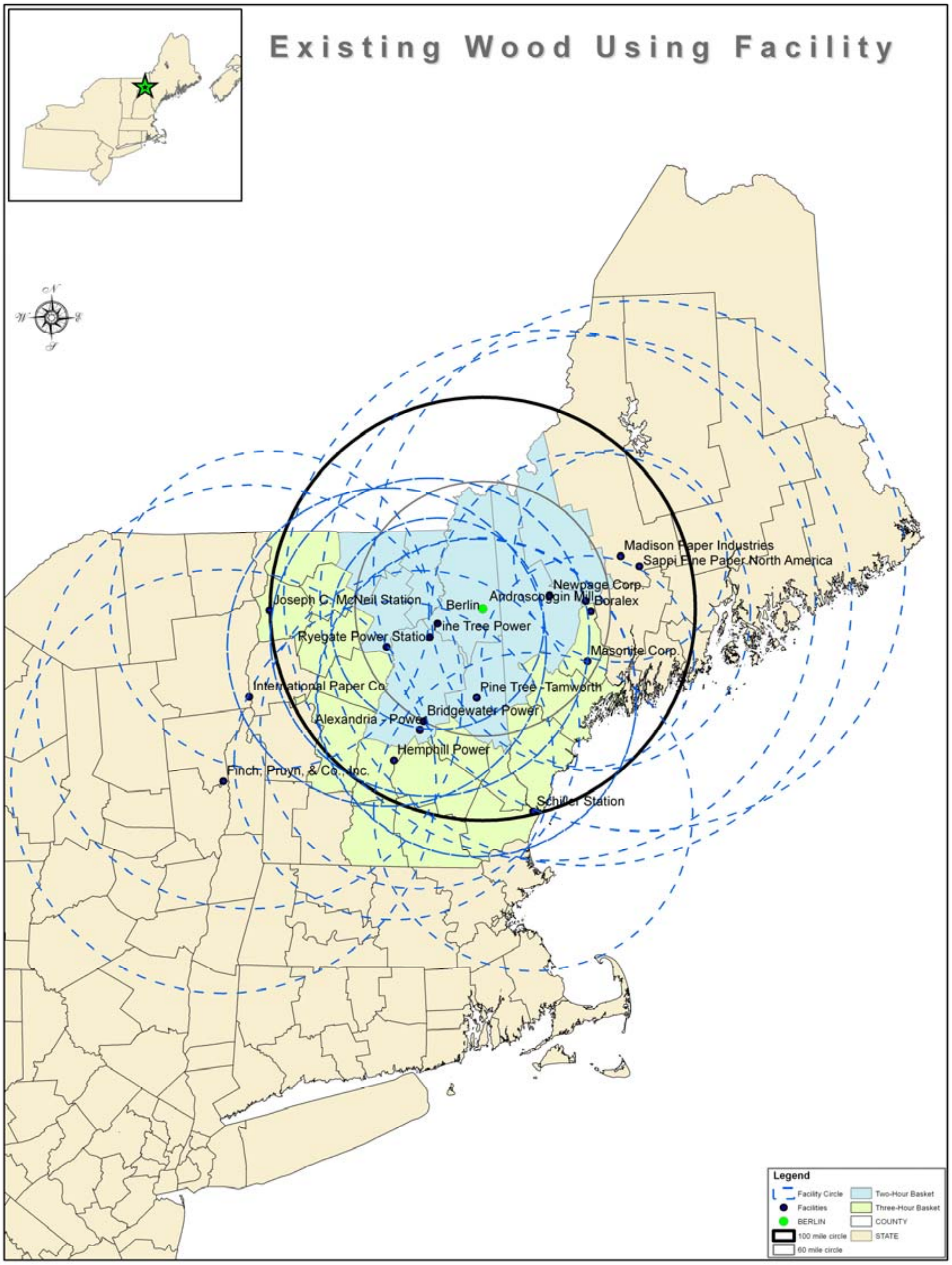

Figure 5. The procurement range of existing wood using facilities

Table 6. Analysis of fiber available to existing wood using facilities

Plant Name	Type	Consumption (Green Ton)	Radius	Acres in the Study Area	Acres of Each Facility	Geographical Analysis	100% capacity	90% and 95% Capacity
Androscoggin Mill	Pulp	2,000,000	125	8,810,983	16,679,231	52.83%	1,056,521	950,869
Madison Paper Industries	Pulp	400,000	50	1,364,917	4,111,343	33.20%	132,795	119,516
Masonite Corp.	Pulp	100,000	50	1,692,342	2,698,907	62.70%	62,705	56,434
Newpage Corp.	Pulp	2,200,000	125	9,800,165	16,864,509	58.11%	1,278,446	1,150,601
Sappi Fine Paper	Pulp	2,300,000	125	6,359,931	17,042,103	37.32%	858,335	772,502
Bridgewater Power	Power plant	229,000	75	7,053,629	8,377,035	84.20%	192,823	183,181
Whitefield Power and Light	Power plant	187,000	50	4,077,687	4,077,687	100.00%	187,000	177,650
Pine Tree Power	Power plant	230,000	75	8,109,391	8,418,486	96.33%	221,555	210,478
Hemphill Power	Power plant	208,000	75	6,048,745	8,464,339	71.46%	148,640	141,208
PSNH Schiller Station	Power plant	450,000	75	3,536,302	4,336,563	81.55%	366,958	348,610
Finch, Pruyn, & Co., Inc.	Pulp	638,000	100	3,006,480	12,165,734	24.71%	157,667	141,900
International Paper Co.	Pulp	750,000	100	4,532,595	11,899,043	38.09%	285,691	257,122
Joseph C. McNeil Station	Power plant	380,000	75	2,915,249	5,798,031	50.28%	191,064	181,511
Ryegate Power Station	Power plant	260,000	75	6,934,641	7,804,296	88.86%	231,027	219,476
Pine Tree -Tamworth	Power plant	300,000	75	7,802,191	8,014,101	97.36%	292,067	277,464
Alexandria - Power	Power plant	200,000	75	6,843,218	8,365,359	81.80%	163,608	155,428
Boralex - Livermore Falls	Power plant	350,000	75	4,571,587	7,885,834	57.97%	202,903	192,757
Total		10,332,000					6,029,806	5,536,708
Available wood		6,709,500					679,694	1,172,792

Conclusion

FIA growth and removals data was analyzed and compared to harvesting data from states to formulate the basic understanding of biomass supply and demand dynamics within the defined study area. This analysis utilized the findings from previous studies and conducted interviews with procurement specialists, local logging and trucking contractors and foresters to acquire detailed and anecdotal information to generate and support the findings.

This report concludes that within a three-hour drive wood basket the total low-grade potential on a sustainable net growth basis is at least 6.71 million tons per year with possibly an additional 0.5 million green tons of biomass from tops and branches if the state biomass removal guideline is applied (i.e., 30% of biomass remained in the forest, Evans and Perschel 2009). There is also biomass available from railroad system and backhauls to the Berlin region. Therefore, there is potentially up to 1.2 million green tons of low-grade fiber available from the geographical analysis in the three-hour dive wood basket.

Currently it is estimated that existing facilities consume 6 million tons per year from this area which is consistent with the data that suggests that current annual removal is less than net annual growth. Of the annual low-grade removal roughly 36% goes to existing biomass power plants and 64% to the pulp and paper mills, however it cannot be assumed that this is the breakdown of pulp and biomass fuel since some of the wood that goes to the pulp mills is used for energy, and this report did not analyze that. The future supply and demand patterns will depend on the viability of the paper industry to continue operations in the Northeast and the continued operation of existing and future development of new biomass power plants.

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Appendix I: Terms

Average annual gross growth. Average annual increase in volume of trees 5.0 inches d.b.h. and larger in the absence of cutting and mortality. Gross growth includes survivor growth, ingrowth, growth on ingrowth, growth on removals before removal, and growth on mortality before death.

Average annual mortality. Average annual volume of trees 5.0 inches d.b.h. and larger that died from natural causes during the intersurvey period.

Average annual net growth: Average annual net change in volume of trees 5.0 inches d.b.h and larger in the absence of removals during the intersurvey period. Average annual net growth is equal to average annual gross growth minus average annual mortality.

Average annual removals: Average volume of trees removed from growing stock each year due to timber harvests and land use changes.

Average annual mortality: Average volume of trees that died each year due to insects, diseases and other natural causes.

Biomass: Aboveground weight of live trees 5-inch d.b.h. and larger including buck, top and branches.

Growing stock: All live trees 5.0 inches DBH or larger that meet regional merchantability requirements in terms of sawlog length, grade, and cull deductions. Excludes rough and rotten cull trees.

DBH: Diameter at breast height. The diameter for tree stem, located at 4.5 feet (1.37 m) above the ground (breast height) on the uphill side of a tree. The point of diameter measurement may vary on abnormally formed trees.

Forest Type: A classification of forest land based upon and named for the tree species that forms the plurality of live-tree stocking. A forest type classification for a field location indicates the predominant live-tree species cover for the field location; hardwoods and softwoods are first grouped to determine predominant group, and Forest Type is selected from the predominant group.

Ownership: A legal entity having an ownership interest in land, regardless of the number of people involved. An ownership may be an individual; a combination of persons; a legal entity such as corporation, partnership, club, or trust; or a public agency. An ownership has control of a parcel or group of parcels of land.

Poletimber: Softwood trees 5-9 inches d.b.h.; Hardwood trees 5-11 inches d.b.h.

Hardwood: tree species belonging to the botanical subdivision Angiospermae, class Dicotyledonous, usually broad-leaved and deciduous.

Sawtimber: Softwood trees greater than 9 inches d.b.h.; Hardwood trees greater than 11 inches d.b.h.

Seedlings-saplings: Trees less than 5 inches in diameter at breast height (d.b.h.).

Softwoods: Coniferous trees, usually evergreen having needles or scale-like leaves.

Stand Age: A stand descriptor that indicates the average age of the live dominant and codominant trees in the predominant stand size-class of a condition.

Stocking: 1) At the tree level, stocking is the density value assigned to a sampled tree (usually in terms of numbers of trees or basal area per acre), expressed as a percent of the total tree density required to fully utilize the growth potential of the land. 2) At the stand level, stocking refers to the sum of the stocking values of all trees sampled.

Appendix II: Conversion factors

SM/ASH: 1 Cord = 2.65 Green Tons
BE/RM: 1 Cord = 2.45 Green Tons
OK/WP: 1 Cord = 2.77 Green Tons
HE/RS: 1 Cord = 2.25 Green Tons
SP/FR: 1 Cord = 2.15 Green Tons
CE/BS: 1 Cord = 2.10 Green Tons
1 MBF = 2 Cords

Appendix Q

ISO-NE Interconnection Feasibility Study

Appendix Q –
ISO-NE Interconnection Feasibility Study

The contents of Appendix Q have been removed until such time as the Committee has had a chance to consider a motion for protective order.