

2913-C-16

2011-313

116 Bishop St.
Substation Yard Expansion
CMP

on spreadsheet

Shukria Wiar - RE: CMP- Bishop Street

From: "Christopher, Mark (Augusta,ME-US)" <mchristopher@trcsolutions.com>
To: 'Shukria Wiar' <SHUKRIAW@portlandmaine.gov>
Date: 10/24/2011 11:05 AM
Subject: RE: CMP- Bishop Street

There is an existing driveway off Bishop Street and two gates for entrance into the substation. The gates are shown on the plan as are the topographic contours of the driveway. The driveway is gravel, but due to low use some weeds are growing in. CMP had not planned to upgrade this driveway as it suites their purpose as is.

This driveway looks different as is shown on the final plan *due to the City's requirement for the sidewalk and curb*. Since the City required the sidewalk we needed to re-grade the driveway to accommodate the elevation and grade of the sidewalk and to add the apron. In order to match the grade for the sidewalk additional gravel is needed between the sidewalk and the gates. The sidewalk and curb and the modifications to the driveway are not necessary for the substation, rather are provided per the City's request.

The zoning line between the industrial and residential districts is provided as a dashed line just south of the control house.

I will forward a CADD file with the site plan. It is 5 MB. Let me know if your server cannot handle files of this size. I can mail more hard copies to you. CMP will provide their contractor with the final site plan.

Thanks

Mark

Mark W. Christopher, M.S., CWB
 Environmental Scientist
 TRC Solutions, Inc
 14 Gabriel Drive
 Augusta, ME 04330
 207-620-3844 phone
 207-621-8226 fax

207-441-4225 cell

From: Shukria Wiar [mailto:SHUKRIAW@portlandmaine.gov]
Sent: Monday, October 24, 2011 10:23 AM
To: Christopher, Mark (Augusta,ME-US)
Subject: CMP- Bishop Street

- driveway not shown
 - mountable curb

Easement?
 - only access?
 - may need to move *fa*
 meet standards
 - get rid of detectable warning
 - containment berm



14 Gabriel Drive
Augusta, ME 04330

207.620.3800 PHONE
207.621.8226 FAX

www.TRCSolutions.com

September 15, 2011

Mr. Eric Giles
Planner, City of Portland
389 Congress Street, 4th Floor
Portland, ME 04101

Re: Level 1 Site Alteration Permit Application (Project ID: 2011-313) for the Central Maine Power Company (CMP) Bishop Street Substation Expansion, Portland, Maine

Dear Eric:

The follow provides responses to the comments and questions provided in the August 22, 2011 based on the review of the CMP application by City of Portland staff.

1.1: Written description of easements. CMP has reviewed their real estate files and at this time has not located the documentation regarding access across the lodge property. CMP intends to obtain an agreement or easement and wishes to make obtaining this as a condition of approval with the intent that it will be obtained prior to issuance of the building permit.

1.2 (i. a-b): Landscaped buffers. Attachment 2 provides a landscape buffer plan consistent with CMP standards relative to transmission line and substation safety and security. CMP maintains standards consistent with National Electrical Reliability Corporation (NERC) standards for preventing electrical transmission lines and substation hazards. To meet these standards CMP does not plant any species that is generally capable of growing more than 10 feet in height. The "drip-line" of all mature plantings must be ten-feet from the substation security fence to avoid potential electrical hazards. It has been CMP's preference to use native shrub species that are winter hardy, drought tolerant, generally do not grow taller than ten-feet, grow at a moderate to fast pace, and do not require maintenance. Tree and some shrub species that are capable and regularly grow to heights over ten feet are not acceptable. Dense plantings of northern bayberry (*Myrica pennsylvanica*) are proposed along the north, east, and west boundaries of the site as this species meets the above criteria. Bayberry will provide a dense screening and often hold many of their leaves during the winter. The locations of the plantings and planting specifications are provided in the stormwater plan on the sheet labeled "Site Plan 520-3-11 Rev C"

1.2 (i.c): Buffer along residential areas. The residentially zoned area outside of CMP ownership and adjacent to the substation will be screened by the existing vegetation that will remain after construction as such plantings are not proposed along the south substation yard fence.

2.1-2.2: Zoning. The control house has been moved four feet to the north, such that it is completely within the I-M zone and is less than 100 feet from the north property line. This effort required adjusting the locations of some of the electrical components as such the general arrangement is slightly different.

3: Stormwater Engineering. General and Flooding Standards: The Stormwater Management Report is included in this submission. Areas that require treatment are the substation yard expansion area which is approximately 7,058-square feet and the control house which is 354-square feet. Per agreement with the Maine Department of Environmental Protection (agreement letter included), water quality standards are met if the substation yard is built using the typical CMP substation profile overlaying the natural ground surface. A CMP typical cross section profile consists of a minimum of 4-inches of a crushed stone topping with 18" of MDOT 703.06 Type gravel fill. In this design the cross section calls for a 6-inch stone topping which exceed the minimum specifications as described on the CMP/MDEP agreement letter. Based on this criterion, the substation meets the general standards for water quality.

Based on Section 5 of the Portland Stormwater Management requirements and the requirements of a Level 1 Site Alteration Plans, flooding standards are required for this project. A Pre-development and post-development watershed map and model is included in the stormwater report and calculations provided in this response package. The calculations show a net decrease of approximately 19.5 percent in the total peak outflow from the developed site following a 25-year, 24-hour storm event. The decrease can be attributed to the curve number assigned to the substation yard.

Urban Impaired Stream Standard: The proposed expansion of the Bishop Street Substation in Portland is within the Capisic Brook Watershed, which is listed as an Urban Impaired Stream in the Maine Department of Environmental Protection's (MDEP) Chapter 502 – Direct Watersheds of Lakes Most at Risk from New Development and Urban Impaired Streams.

This substation expansion does not meet the minimum thresholds for the Urban Impaired Stream Standard. In order to trigger the urban impaired stream standard the site would have 3 or more acres of impervious area and 20 acres or more of developed area. The total impervious area for the Bishop Street substation is approximately 0.29 acres (existing) and 0.41 acres (proposed expansion area), which totals 0.7 acres. Based on the project size the Urban Impaired Stream Standard is not applicable to this project.

Gravel Berm: The gravel berm is designed to restrict the overland flow of oil and allow the spill to be absorbed within the surficial soil with the substation yard. Generally most substation oil releases are slow leaks or weeps, are identified during scheduled inspections, and pose no threat or impact outside of the substation fence. These small leaks are effectively contained within the top few inches or less of crushed stone, and are cleaned up when found. Large oil releases from electrical equipment within substations are very uncommon. Larger releases typically cause equipment failure and power outages, and are therefore found very soon after they occur. In the case of a large release, the 6-inches of crushed stone along with the 18-inches of gravel base contain the oil such that the oil is usually restricted to the top foot or less of material. These spills are quickly cleaned up by removing and replacing the contaminated stone and gravel. In

the few larger oil releases at CMP substations, this system has proven very effective in containing the spilled oil. A copy of the Bishop Street SPCC plan is included in this response.

Cable Trench Underdrain: The cable trench underdrain detail has been removed. No cable trench or cable trench underdrain is to be installed as part of this project. All control cables will be run from the control house to the substation equipment through a series of electrical conduits.

Wetlands: The project site was surveyed by wetland biologist with TRC and they concluded that no wetlands occur on the proposed expansion site.

4.1: Sidewalk and Curbing. The project meets the criteria of Section 14-506 of the City Curb and Sidewalk Waiver Criteria for the sidewalks as such adding a sidewalk is not proposed. Regarding sidewalks there is no pedestrian usage coming from or going to the site. There appears to be very limited potential for pedestrian usage traversing Bishop Street in front of the site. There are no businesses along Bishop Street that would serve as a destination for workers within the commercial and industrial neighborhood. There are no sidewalks on Bishop Street thus providing one along the short section of frontage would not contribute to pedestrian use of the area.

Regarding curbing, a section of curb has been added to the site development plan.

4.2: Parking. Operation of the substation does not require daily visits by CMP staff, in fact work at the substation is infrequent and usually by one or two light duty vehicles. There is ample parking within the substation yard and driveway for CMP or contractor's staff. Expansion of the substation will not generate additional traffic.

4.3: Access. CMP concurs with this comment as such please refer to the response under question 1.1 above.

5.1: Property Corners: The property boundary was surveyed during the summer of 2011 and three property corners that were previously set were recovered.

5.2: Bench Mark Datum: The Professional Engineers that prepared the site plan used the most current 1988 topographic datum. This datum is used on all CMP projects where TRC Engineers prepares site plans, such as substations. Using the older datum would not alter the site plan, excavation and fill quantities, and stormwater plan.

5.3: Sidewalk and Curbs. Please refer to response 4.1 above.

6.1: Vegetation Clearing. Expansion of the substation requires clearing of all vegetation within the development footprint. Vegetation outside the expansion area, primarily to the south, will remain. Prior to clearing the extent of the construction will be staked onsite and a sedimentation barrier, typically silt fence, will be installed and maintained along this boundary. There is ample room for staging equipment and materials within the development footprint and if needed underneath the transmission lines.

6.2: Landscaping. Please refer to the response to question 1.2 and Attachment 2 for specifics on the planting plan. The plan has been approved by regulatory agencies on other CMP substations. It is CMP's practice to not plant trees near substations and underneath transmission lines. CMP also prefers to use

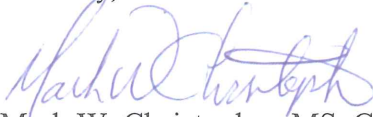
Mr. Eric Giles
September 15, 2011
Page 4 of 4

native species, which limits the planting options, but is environmentally sound. Ornamental species and varieties are not used.

6.3: *Parking*. A guardrail has been added to the site plan to deter off street parking and dumping of trash.

Please feel free to contact me with any additional questions or concerns.

Sincerely,

A handwritten signature in blue ink, appearing to read "Mark W. Christopher".

Mark W. Christopher, MS, CWB
Environmental Scientist

Cc: Gerry Mirabile
David Libby
Scott McKernan
TRC File # 182847.0001

Enclosures

**CENTRAL MAINE POWER COMPANY
Portland Substations District
SPCC Plan**

SPCC Plan – Part 1

Facility Conformance [112.7(a)(1)]

This plan has been prepared to meet the requirements of 40CFR Part 112 - Oil Pollution Prevention, and will be followed in the event of an oil spill. This plan supplements the procedures outlined in the Spill Management and Prevention section of CMP's Environmental Procedures Manual. The plan consists of two parts: Part 1 which includes generic information applicable to all substations in the District; and Part 2 which includes specific information for individual substations and site specific diagrams.

Contact List [112.7(a)(3)(vi)]

Substation Operations Supervisor:

Scott Murray

Office Phone: (207) 828-2863
Cell Phone: (207) 242-6097
Pager: (207) 851-9870

Home Phone: (207) 772-0796
Camp Phone: N/A
Radio: 400

Other CMP Contacts:

Communications Center: (207) 622-7421
Dispatcher: (800) 750-2976
Environmental: (207) 622-7421
S/S Crew: (207) 622-7421
NASC Crew: (207) 622-7421

Agency Contacts:

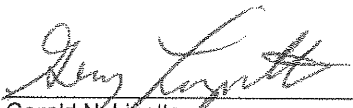
Dept. of Environmental Protection (800) 482-0777
Dept. of Public Safety (800) 452-4664
National Response Center (800) 424-8802

Clean up Contractor Contacts:

Allstate Environmental Services	Gorham	(207) 838-4076; -4077
Clean Harbors	So. Portland	(800) 526-9191
Environmental Projects	Gray	(207) 657-2400
ENPRO Services	So. Portland	(888) 367-6660

Management Approval [112.7]

CMP management fully supports the adoption of this plan, including committing the necessary manpower, equipment, and materials to expeditiously control and remove any quantity of oil that may be harmful to the environment.


Gerald N. Lizotte
Manager, Substation Operations

2/28/11
Date

Substation Classification: Substations in this Area range from small facilities with minimal oil-filled equipment to large facilities with substantial oil quantities. The stations have been divided into four categories:

- Not Required
 - Very small facilities containing less than the threshold for SPCC plans (1320 gal oil); in some cases plans are included for informational purposes only.

Blue Rock	Long Creek	Westbrook 115
Buxton 345	North Gorham	West Buxton Hydro
Falmouth	Shaws Mill Road	
- Tier I
 - has had no single discharge as described in §112.1(b) exceeding 1,000 U.S. gallons or no two discharges as described in §112.1(b) each exceeding 42 U.S. gallons within any twelve month period in the three years prior to the SPCC Plan self-certification date, or since becoming subject to this part if the facility has been in operation for less than three years (other than discharges as described in §112.1(b) that are the result of natural disasters, acts of war, or terrorism),
 - has an aggregate aboveground oil storage capacity of 10,000 U.S. gallons or less, and
 - has no individual aboveground oil storage container with a capacity greater than 5,000 U.S. gallons

Bishop Street	East Deering	Lambert Street	Scarborough
Bonny Eagle (Out)	Forest Avenue	North Limington	Swett Road
Brighton Avenue	Fort Hill	North Windham	Westbrook
Cape Elizabeth	Hinckley Pond	Rigby Road	Western Ave
- Tier II
 - has had no single discharge as described in §112.1(b) exceeding 1,000 U.S. gallons or no two discharges as described in §112.1(b) each exceeding 42 U.S. gallons within any twelve month period in the three years prior to the SPCC Plan self-certification date, or since becoming subject to this part if the facility has been in operation for less than three years (other than discharges as described in §112.1(b) that are the result of natural disasters, acts of war, or terrorism), and
 - has an aggregate aboveground oil storage capacity of 10,000 U.S. gallons or less.

Mussey Road	Red Brook
-------------	-----------
- PE Certified
 - Facilities containing an aggregate aboveground oil storage capacity greater than 10,000 U.S. gallons, or facilities with oil discharges that disqualify them from Tier I or Tier II qualification.

Cape 115	Moshers	Sewall Street	Union Street
Elm Street	Pleasant Hill	South Gorham	Wyman 115
Fore River	Prides Corner	Spring Street	West Buxton 115

For Tier I and II Plans (Self Certification) [112.6]:

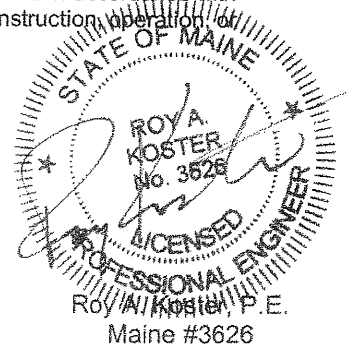
- i. I am familiar with the applicable requirements of 40 CFR part 112;
- ii. I have visited and examined the facility;
- iii. I prepared the Plan in accordance with accepted and sound industry practices and standards;
- iv. I have established procedures for required inspections and testing in accordance with industry inspection and testing standards or recommended practices;
- v. I will fully implement the Plan;
- vi. The facility meets the qualification criteria in §112.3(g)(1) [Tier I] or in §112.3(g)(2) [Tier II];
- vii. The Plan does not deviate from any requirement of this part as allowed by §112.7(a)(2) and 112.7(d) or include measures pursuant to §112.9(c)(6) for produced water containers and any associated piping; and
- viii. The Plan and individual(s) responsible for implementing this Plan have the approval of management, and the facility owner or operator has committed the necessary resources to fully implement this Plan.


 Roy A. Koster
 Supervisor, Compliance

Technical Amendments [112.6(a)(2) and 112.6(b)(2)] Self Certified plans must be certified in accordance with 112.6(a)(1) [Tier I] or 112.6(b)(2) [Tier II] when there is a change in the facility design, construction, operation, or maintenance that affects its potential for a discharge as described in 112.1(b).

For PE Certified Plans: Professional Engineer Certification [112.3(d)]:

By means of this certification I attest that I am familiar with the requirements of 40 CFR 112 (Oil Pollution Prevention); that I or my agent has visited and examined the facility; that the Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards, and the requirements of this part; that procedures for required inspections and testing have been established; and that the Plan is adequate for this facility.



Roy A. Koster, P.E.
Maine #3626

2/17/11

Discharge Prevention Measures [112.7(a)(3)(ii)] and Transfer Operations [112.8(d)]

When taking oil samples from equipment or transferring oil follow procedures to prevent spillage such as:

1. Place spill pads and/or 5 gallon pails beneath valves to collect drippage.
2. Ensure the hose is tightly connected prior to transferring oil.
3. If tank is sealed, open vents prior to transferring oil.
4. Prior to transferring oil from electrical equipment to a portable tank, ensure all valves for the portable tank are closed.
5. When re-filling electrical equipment from a portable tank, make use of the remote start and stop buttons.
6. Take care not to overfill the equipment by watching sight glass or floats, as appropriate.
7. Never leave equipment unattended during transfer operations.

Countermeasures for Discharge Discovery, Response and Cleanup [112.7(a)(3)(iv); 112.7(a)(5)]

Spill Response:

1. If danger of safety or fire, call fire department - do not allow fire department action without approval by responsible CMP Co. supervision.
2. Stop source of spill if possible.
3. Notify on-duty supervisor. If unable to contact supervisor, call CMP dispatcher.
4. If possible, keep spill from reaching navigable waters by use of sorbent material, small dams of sandbags or earth, trenches or pits.

Spill Reporting: Responsible supervisor shall immediately report all spills and/or releases to Environmental Compliance by calling the Communications Center and requesting them to page the person on duty, or by calling the Environmental pager directly (750-3500). Environmental Compliance shall report oil spills to the MDEP and for water related spills to the National Response Center. Follow up spill reports will be forwarded to agencies as required.

Spill Clean-up: CMP personnel will clean up small spills and/or releases using the available spill control equipment. If the spill is extensive and requires considerable time, effort and equipment to control and/or clean up, a clean up contractor may be called for assistance (see contact list). Spill control resources such as drums, bags, shovels, brooms, rags and power cleaner are available at the Portland, Biddeford and North Augusta Service Centers. Additional resources are listed below:

Spill Control Resources:

<i>Material</i>	<i>Quantity</i>	<i>Storage Location</i>	<i>Capabilities</i>
Sorbents	8 bags	Portland Service Center	25 gal/bag
Sorbents	7 bags	Biddeford Service Center	25 gal/bag
Speedi-Dry	30 bags	Portland Service Center	15 gal/bag
Speedi-Dry	10 bags	Biddeford Service Center	15 gal/bag
Emergency Spill Kit	1 kit	Company Vehicles	

Weepers: Periodically, minor equipment "weeps" may occur that create staining within the substations. When identified, temporary measures shall be taken to contain oil and limit staining until the equipment can be repaired. These measures may include placement and regular replacement of sorbent pads beneath the weep area. Gravel or crushed stone cover will keep pads in place and prevent sunlight degradation. Notify Environmental whenever oil leak is identified and when temporary spill pads are installed.

Information to Report in Event of Spill [112.7(a)(4)]

- Facility address
- Phone number
- Date and time of discharge
- Type of material discharged
- Estimated quantity spilled
- Damages or injuries
- Source of discharge
- Mitigation steps undertaken
- Media affected by discharge
- Need for evacuation
- Cause of discharge
- Names of individuals/organizations contacted

Spill Clean-up Debris Management [112.7(a)(3)(v)]

All contaminated soil and debris will be containerized and properly disposed of per State and Federal requirements.

Bulk Storage Containers [112.7(d), 112.8(c)(6)]

Bulk storage containers, including drums 55 gallons and greater and tanks used for oil transfer, if not elevated shall be stored on pallets so that they can be visually inspected for leaks. Inspections of these facilities shall occur at least quarterly during regular substation inspections. The tanks shall be inspected for leaks, settlement of the supports and deterioration of the container. Electrical equipment does not meet the definition of Bulk Storage Container; however, oil-filled electrical equipment (55 gallons or greater) shall be visually inspected for leaks on a quarterly basis at a minimum.

Personal Protective Equipment (PPE)

Employees working in a substation are required to wear hard hats, safety glasses and steel toe shoes in accordance with CMP's Accident Prevention Manual. In the event of a spill and/or release the following PPE is available in the spill cleanup kit, located on each company vehicle: 2 Tyvek suits, 2 pair rubber boots, 6 pair non-porous gloves and duct tape. Additional PPE is available at NASC.

Inspections, Testing and Recordkeeping [112.7(e)]

Inspections will take place quarterly in accordance with CMP Co. Inspection and Maintenance procedures. Inspections are recorded electronically using the Mobile Assets Management (MAM) Program. The data is uploaded into SAP, CMP's asset accounting database. If an oil spill is detected during an inspection, employees shall follow the spill response procedures above. Inspection records can be accessed by the Substation Operations Supervisor.

Training records and spill reports are retained in the Environmental Compliance Department for a minimum of three years. This SPCC Plan must be reviewed and updated at least every 5 years.

Training [112.7(f)(1,3)]

All substation personnel and supervisors shall be trained annually on the use of this plan and in measures to prevent, report, and clean up spills. In addition, they shall receive annual training in RCRA, OSHA Hazwoper (Awareness Level) and OSHA Hazard Communication.

Availability of Plan [112.3(e)]

A complete set of the plan for Portland Substations can be found:

- Original – General Office, Environmental Compliance Department
- Copy – North Augusta Service Center, Manager Substation Operations
- Copy – Portland Service Center, Supervisor Substation Operations
- Copy – CMP Intranet under Environmental Services Department / SPCC Plans

Certification of Substantial Harm Determination
[112.20(e); (f)(1)]

Facility Name: **Portland Substations** – This certification applies individually to each substation within the Portland Substations District.

1. Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?
 Yes No

2. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation within any aboveground storage tank area?
 Yes No

3. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula) such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments?
 Yes No

4. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula) such that a discharge from the facility would shut down a public drinking water intake?
 Yes No

5. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and has the facility experienced a reportable oil spill in an amount greater than or equal to 10,000 gallons within the last 5 years?
 Yes No

Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate, and complete.



Roy A. Koster
Supervisor, Compliance

Feb 17, 2011
Date

S/S Area: Portland
S/S No. 607

CENTRAL MAINE POWER COMPANY
Substations SPCC Plan - Part 2

Facility: Bishop Street
Bishop Street
Portland

Security [112.7(g)]:

All Substations are fenced and locked. Lighting is available at each substation, but the yard is generally not lit at night. Danger signs warning of the electrical hazards are posted on the fences.

Facility Diagram [112.7(a)(3)(i)]:
See Attached

Customer:
Contact No.:

Regulated Oil-Containing Equipment (> or = 55 gal) [112.7(a)(3)(i)]:

Unless otherwise noted, type of oil is Mineral Oil

# of Units	Manufacturer	Equipment	Gallons	Serial No.	PCB (ppm)	Largest Single Container - Gallons
1	HD	Transformer (T1) - LTC	215	GM290638	11	2,440
1	HD	Transformer (T1) - Main Tank	2,440	GM290638	6	4,445
1	ME	Transformer (T2) - LTC	95	C0375051	<5	
1	ME	Transformer (T2) - Main Tank	1,695	C0375051	<5	Total Storage - Gallons

DRAINAGE

Type of System: Gravel base **Discharge:** Natural runoff **Proximity to Navigable Waters:** South embankment slopes to stream approximately 250' south of S/S

Prediction of Spill Characteristics [112.7(b)]:

Drainage likely to northeast and southwest.

Flow from an oil spill could range from minor weeps and drips to sheet flow over the yard surface if an entire unit failed. Rate of flow is not measureable.

Discharge Containment Structures [112.7(a)(3)(iii), 112.7(c), 112.8(b)]:

Berms on northeast and southwest corners of station.

The facility is designed to absorb spills within porous surface soils. Affected soil will be removed during cleanup.

Deviation from Requirements of 112.7 [112.7(a)(2)]:

None

Non-practicality of Discharge Prevention Measures [112.7(d)]:

N/A

Unloading Racks [112.7(h)] / Repair of Field Constructed Aboveground Containers [112.7(i)]:

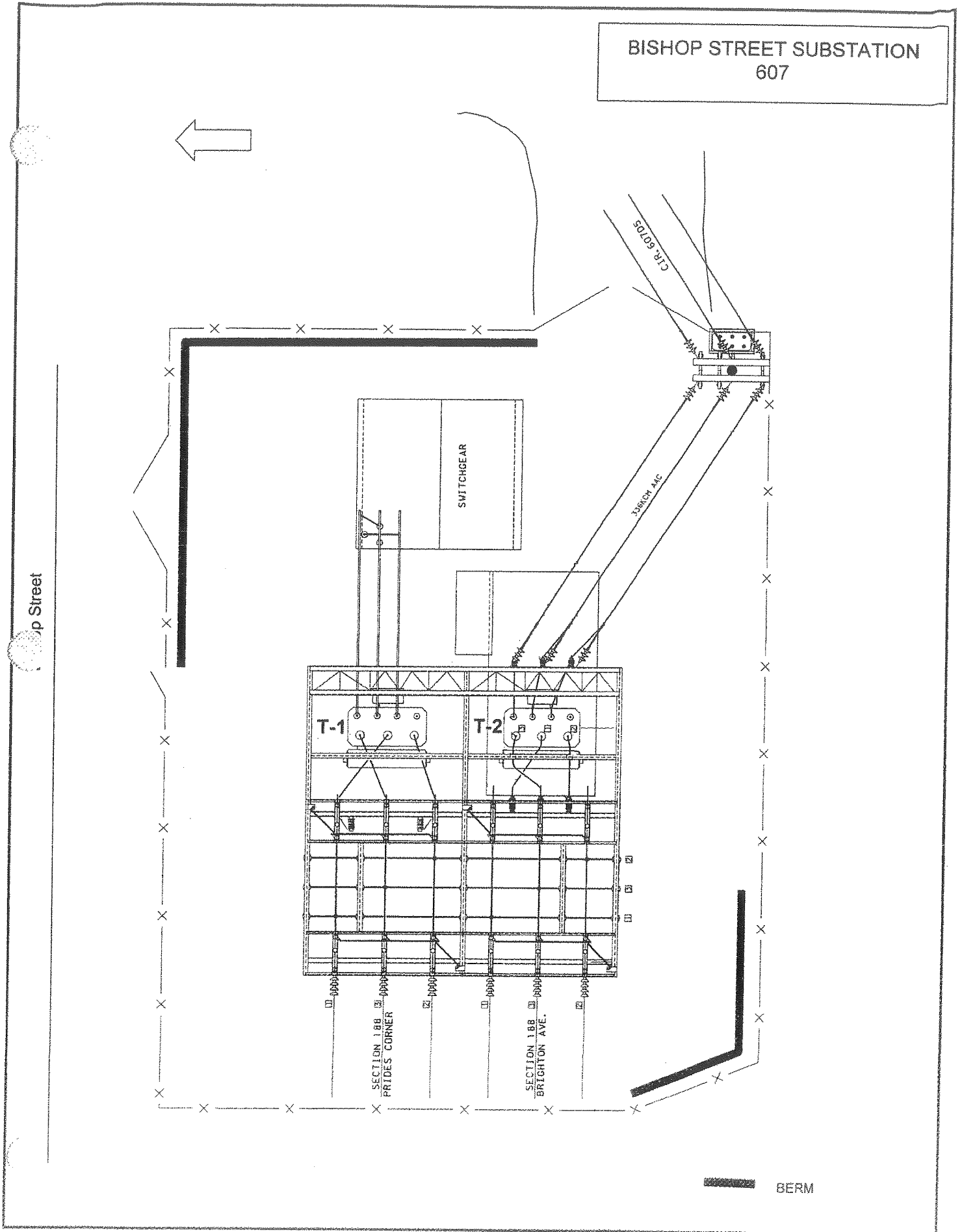
N/A

Additional Preventative Measures [112.7(j)]:

N/A

MODIFICATIONS/COMMENTS

BISHOP STREET SUBSTATION
607



Bishop Street

SWITCHGEAR

T-1

T-2

SECTION 188
PRIDES CORNER

SECTION 188
BRIGHTON AVE.

C.R. 60705

BRICH A/C

BERM

STORMWATER MANAGEMENT REPORT

Central Maine Power Company Bishop Street Substation Expansion Portland, Maine

Prepared for:

**Central Maine Power Company
83 Edison Drive
Augusta, ME 04336**

Prepared by:

**TRC
249 Western Avenue
Augusta, ME 04330**

September 2011

Project Location

The Bishop Street Substation Expansion is located at 116 Bishop Street on a 0.82 acre parcel owned by Central Maine Power. The substation expansion will involve expanding the yard to the west by another 30-feet and to the south by another 24-feet. The expansion will create another 4,792 square feet of additional substation yard. The expansion will also include a 384-foot (16-feet by 24-feet) control house along with some equipment upgrades to the existing portion of the substation yard. The property is bounded by Bishop Street to the North, a commercial building to the East, a vacant tract to the South and the transmission corridor to the west.

General Topography

According to the site survey, the high point of the parcel is about elevation 105 feet NGVD. This occurs on the north side of the substation. The low point, about elevation 89 feet NGVD, occurs at the southern property boundary. The property generally slopes from north to south, with slopes ranging from 2% to a steep portion at 70%.

Land Cover

The expansion area of the parcel consists of a vegetated mixed scrub/shrub to a forested cover type. On the west side of the parcel within the transmission corridor the vegetation consists of a mixed scrub/shrub. The southern portion of the parcel is primarily forested and makes up half of the property's land area.

Soil Types

Soil types on the project site are derived from the USDA-NRCS Soil Survey of Cumberland County, Maine January 2009.

The following soils are located within the project boundaries:

Soil Symbol	Soil Name	Hydrologic Group
BgB	Belgrade very fine sandy loam	C
BuC2	Buxton silt loam	C

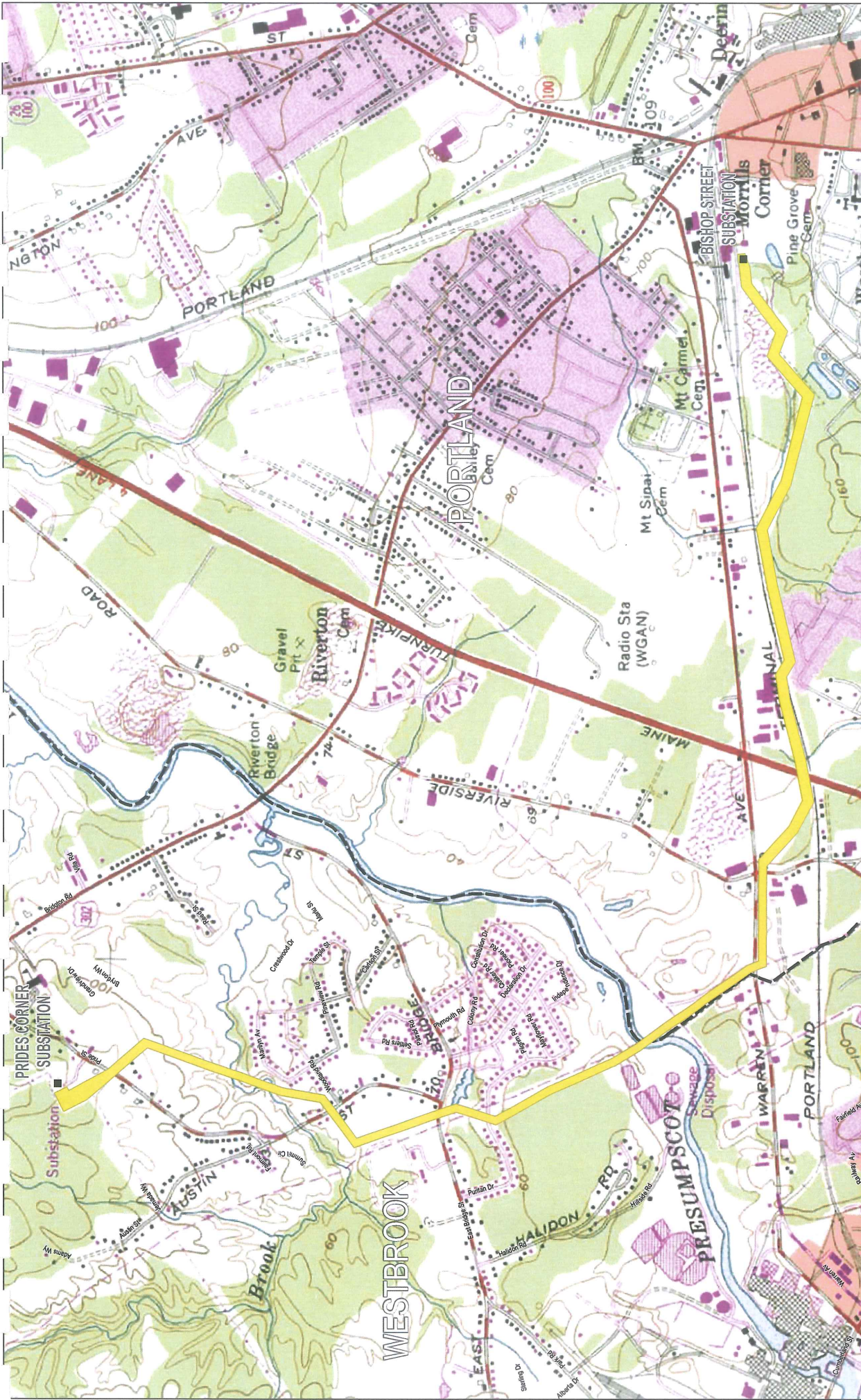
Surface Water on or Abutting the Site

There are no water bodies within the area of proposed development. The site generally drains from north to south where it drains off site in the southwest corner of the property. The site runoff eventually drains into Capisic Brook.

METHODOLOGY

Computation of stormwater runoff quantities was completed with HydroCAD Version 9.0. The following resources were incorporated into the computations:

- A. Site topographic survey by TRC, April 2011
- B. Surficial Soils of Cumberland County, Maine, USDA-NRCS
- C. Site reconnaissance by TRC personnel in April, 2011



Central Maine
Power Company

Figure 1
Project Location

14 Gabriel Drive
Augusta, ME 04330
Created: 5/17/2011

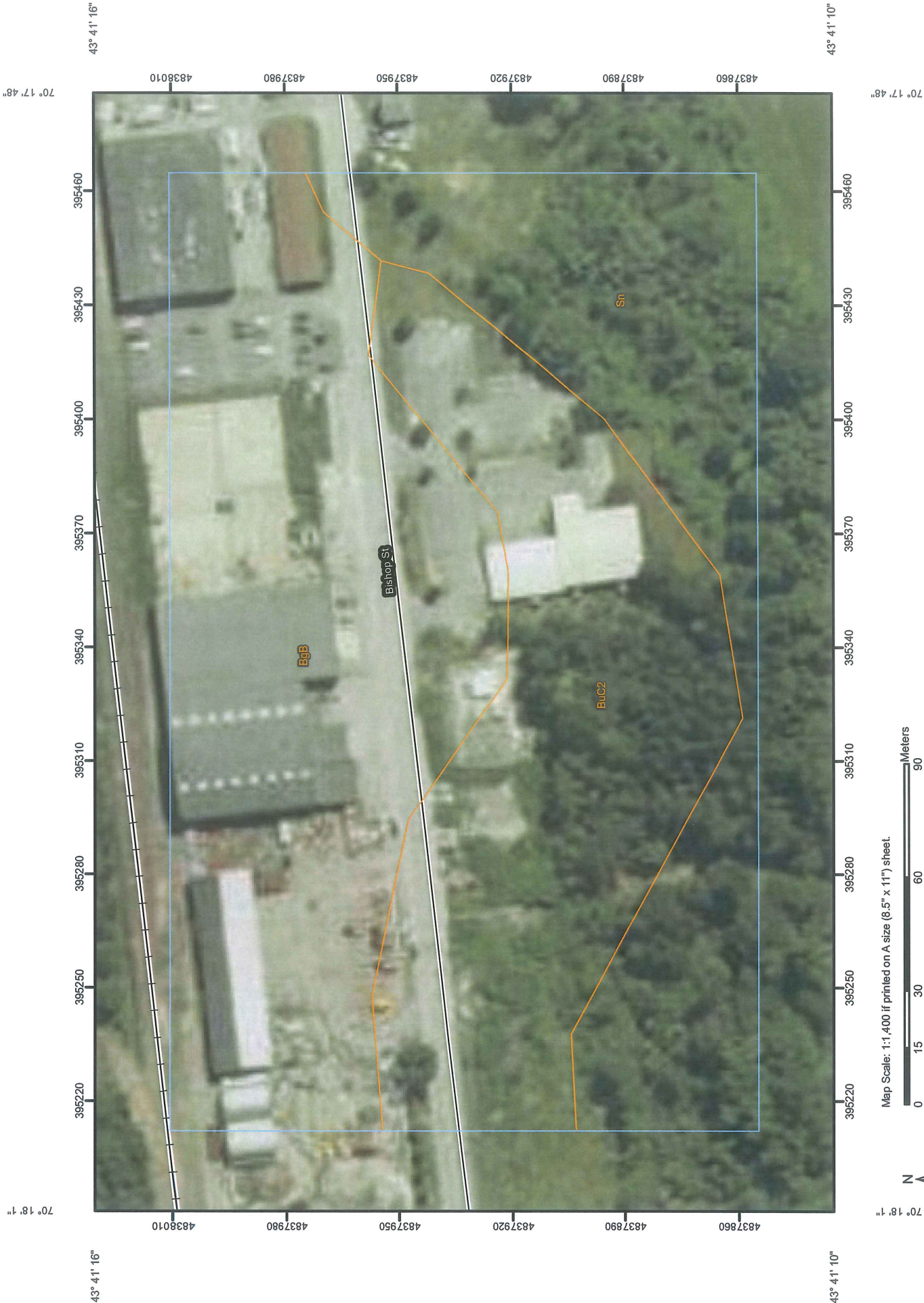
Legend

- Project Area
- Substation
- CMP Section 188
- Town Boundary

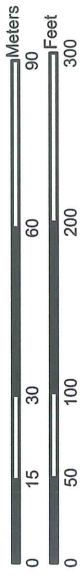
0 0.5 Miles

Westbrook
Portland






























Sources: Maine office of GIS, USGS 24k Topographic Map, CMP, TRC
 INFORMATION DEPICTED HEREON IS FOR REFERENCE PURPOSES ONLY AND IS COMPILED FROM BEST AVAILABLE DATA SOURCES. TRC ASSUMES NO RESPONSIBILITY FOR ERRORS ARISING FROM MISUSE OF THIS MAP.



Map Scale: 1:1,400 if printed on A size (8.5" x 11") sheet.



MAP LEGEND

 Area of Interest (AOI)	 Very Stony Spot
 Soils	 Wet Spot
 Area of Interest (AOI)	 Other
 Soil Map Units	Special Line Features
 Special Point Features	 Gully
 Blowout	 Short Steep Slope
 Borrow Pit	 Other
 Clay Spot	Political Features
 Closed Depression	 Cities
 Gravel Pit	Water Features
 Gravelly Spot	 Streams and Canals
 Landfill	Transportation
 Lava Flow	 Rails
 Marsh or swamp	 Interstate Highways
 Mine or Quarry	 US Routes
 Miscellaneous Water	 Major Roads
 Perennial Water	 Local Roads
 Rock Outcrop	
 Saline Spot	
 Sandy Spot	
 Severely Eroded Spot	
 Sinkhole	
 Slide or Slip	
 Sodic Spot	
 Spoil Area	
 Stony Spot	

MAP INFORMATION

Map Scale: 1:1,400 if printed on A size (8.5" x 11") sheet.
The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Cumberland County and Part of Oxford County, Maine
Survey Area Data: Version 7, Jan 8, 2009

Date(s) aerial images were photographed: Data not available.

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.

Map Unit Legend

Cumberland County and Part of Oxford County, Maine (ME005)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BgB	Belgrade very fine sandy loam, 0 to 8 percent slopes	4.1	42.3%
BuC2	Buxton silt loam, 8 to 15 percent slopes, eroded	3.1	32.0%
Sn	Scantic silt loam	2.5	25.7%
Totals for Area of Interest		9.7	100.0%

Storm Frequency

Peak flows were generated using the 2-year, 10-year, and 25-year, 24-hour rainfall events. The Type III rainfall distribution was applied to these storms. Based on the SCS County Rainfall Data for the State of Maine the precipitation amounts for the southeastern portion of Cumberland County are as follows:

Table 1	
24-Hour Precipitation for Somerset County (South), Maine	
Storm Frequency	Precipitation, inches
2 Year	3.0
10 Year	4.7
25 Year	5.5

Time of Concentration

The time of concentration for each drainage area was estimated using the criteria developed by the SCS and as modified by the Maine DEP. The time of concentration (T_c) paths were selected to represent the most hydrologically remote point of the drainage area in terms of travel time. All T_c paths, divided into sheet flow (SF), shallow concentrated flow (SCF) and channel flow (CF) segments. Calculations are included in Appendix A and the plans are included in Appendix B.

The contours generated by the site-specific topographic survey and contour data from USGS maps were used to establish the time of concentrations.

Switchyard Conveyance Ditch Sizing

As part of the yard expansion, two relief ditches will be constructed, one on the north side of the yard and one on the east side of the yard. The yard is graded such that the ditching will not see much runoff but are mainly constructed to keep the substation base free draining.

General Standards

A general standards summary is included in this submission. Areas that require treatment are the substation yard expansion area which is approximately 7,058-square feet and the control house which is 354-square feet. Per agreement with the Maine DEP (agreement letter included), water quality standards are met if the substation yard is built using the typical CMP substation profile overlaying the natural ground surface. A CMP typical cross section profile consists of a minimum of 4-inches of a crushed stone topping with 18” of MDOT 703.06 Type gravel fill. In this design the cross section calls for a 6-inch stone topping, exceeding the minimum specifications as described on the CMP/Maine DEP agreement letter. Based on this criterion, the substation meets the general standards for water quality.

For further information please refer to the calculations provided in Appendix A.

Flooding standards

Based on Section 5 of the Portland Stormwater Management requirements and the requirements of a Level 1 Site Alteration Plan, flooding standards are required for this project. The pre- and post-development stormwater analysis calculations are provided in Appendix A. The analyses

include computations for determining the runoff curve numbers (CN values) for the pre and post-development sub-watersheds and the HydroCAD output, which includes time of concentrations calculations, travel time calculations, peak discharge calculations for the 24-hour storms of 2-, 10- and 25-year frequencies, and routing calculations.

Curve Number Calculations

The runoff curve numbers were developed from Appendix A-12: "Runoff Curve Numbers for use in TR-55 and TR-20" of the MDEP *Maine Stormwater Best Management Practices Manual, Volume III* and HydroCAD, based on the observed cover types and hydrologic soil groups. The only curve number that is not referenced directly from TR55 and TR20 is the one used for the substation yard. An engineering study was conducted by TRC, detailing the "typical" cross section and surface materials of a substation yard covered with gravel and crushed stone to calculate its permeability rate. The study was reviewed by John Simon, a USDA-NRCS engineer in Maine. The conclusions of this report were used as the basis of an agreement between CMP and MDEP that a CN value of 55 may be used for substations and switchyards that are mapped as HSG "A", "B", "C", and a CN value of 60 must be used when the area is mapped as HSG "D". A copy of the letter agreement is included at the back of the stormwater calculations (Appendix 12-3). For the existing substation a curve number of 55 is used in the model because the Hydrologic Soil Group classification is a "C" soil.

Time of Concentration Calculations

Time of concentration was calculated using USDA-SCS TR-55 methodologies for each sub-watershed considering the hydrologic flow lengths, slope, vegetative cover, surface roughness, and each stage-storage relationship. The type and length of each hydrologic flow line for determining time of concentration and travel times in the area to be developed are indicated on the Pre- and Post-Development Drainage Plans. For the Pre-Development watershed the flow lengths beyond 150 feet were assumed to be shallow concentrated flows. Shallow concentrated flow lengths varied for each watershed and were extended until they reached the end of the watershed.

A summary of the input data used to estimate the time of concentration for each sub-watershed is provided in the calculation package.

Runoff Modeling

Peak discharge calculations are included in the HydroCAD output located in Appendix A. A summary comparison of pre- and post-development peak discharge calculations for the watershed affected by the proposed development is summarized in Tables 1, 2, and 3.

Table 2 Pre-Development Peak Runoff by Watershed

Storm Frequency	Discharge Rates, cfs		
	Boundary Node 1R	Boundary Node 2R	Total Watershed
2-Year	0.09	0.19	0.28
10-Year	0.21	0.67	0.88
25-Year	0.27	0.93	1.20

Table 3 Post-Development Peak Runoff by Watershed

Storm Frequency	Discharge Rates, cfs		
	Boundary Node 1R	Boundary Node 2R	Total Watershed
2-Year	0.08	0.17	0.25
10-Year	0.18	0.67	0.85
25-Year	0.24	0.94	1.18

Table 4 Net Change in Peak Runoff by Watershed

Storm Frequency	Discharge Rates, cfs		
	Boundary Node 1R	Boundary Node 2R	Total Watershed
2-Year	(-)0.01	(-)0.02	(-)0.03
10-Year	(-)0.03	0.00	(-)0.03
25-Year	(-)0.03	0.01	(-)0.02

The routing calculations show a net decrease of approximately 1 percent in the total peak outflow from the developed site following a 25-year, 24-hour storm event. However, boundary

node 2R shows a slight increase in peak runoff during the 25-year, 24-hour storm event. This increase will occur as sheet flow over a 150-foot property line (an average depth of 0.00012-feet) and is therefore a negligible increase.

Urban Impaired Stream Standard

The proposed expansion of the Bishop Street Substation in Portland is within the Capisic Brook Watershed, which is listed as an Urban Impaired Stream in the Maine Department of Environmental Protection's (MDEP) Chapter 502 – Direct Watersheds of Lakes Most at Risk from New Development and Urban Impaired Streams.

This substation expansion does not meet the minimum thresholds for the Urban Impaired Stream Standard. In order to trigger the urban impaired stream standard the site would have 3 or more acres of impervious area and 20 acres or more of developed area. The total impervious area for the Bishop Street substation is approximately 0.29 acres and 0.41 acres, which includes the existing substation yard and proposed expansion area. Based on the project size the Urban Impaired Stream Standard is not applicable.

Basic standards

Erosion and sedimentation control measures will be implemented and maintained per the Maine Erosion and Sedimentation Control BMP's during substation construction. Stabilization measures for the site will include temporary and permanent erosion and sedimentation controls; appropriate design of swales, channel protection and related evaluation of slope stability and erosion protection for earthen cut and fill slopes; revegetation of disturbed areas; and provisions for future maintenance of the site. These treatment practices will be used to reduce the impacts of site runoff on downstream water quality.

Central Maine Power will be responsible for the inspection and maintenance of the stormwater management system after construction is completed. A Stormwater Management System Inspection and Maintenance log is included in Appendix C.

APPENDIX A

CALCULATIONS



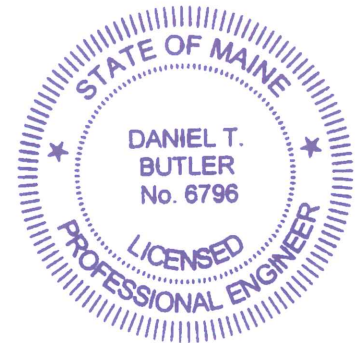
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Augusta, ME 04330

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207.621.7001 FAX

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APPENDIX A Stormwater Management Calculations Table of Contents

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Pre Development Model (Hydro CAD Routings)	8 – 19
Post Development Model (Hydro CAD Routings)	20 – 34
General BMP Standard Treatment Calculations	35-36
DEP/CMP agreement letter	37-38





9/9/11

Date

PROJECT: CMP
 Bishop St Substation
 Proj: 182847

Calculated By: PGT
 Checked By: PMM
 Date: September 8, 2011

Time of Concentration Equations:

1. Where $T_t := \frac{0.007 \cdot (N \cdot L)^{0.8}}{P_2^{0.5} \cdot S^{0.4}}$ from SCS TR-55. For Sheet Flow (300 feet or less)
2. Where $v := 20,3282 \cdot \sqrt{S}$ from the SCS Upland Method *Channel Flow Chart* For Shallow Concentrated Flow (Paved surfaces)
3. Where $T_t := \frac{L}{3600 \cdot V}$ from the SCS Upland Method *Channel Flow Chart* Travel time equation
4. Where: $v = 7 \sqrt{S}$ from the SCS Upland Method *Channel Flow Chart* For Shallow Concentrated Flow (Short Grass Pasture)
5. Where: $v = 5 \sqrt{S}$ from the SCS Upland Method *Channel Flow Chart* For Shallow Concentrated Flow (Woodland)
6. Where $v := 12 \cdot \sqrt{S}$ from the SCS Upland Method *Channel Flow Chart* For waterways and swamps, no channels
7. Where $v := 15 \cdot \sqrt{S}$ from the SCS Upland Method *Channel Flow Chart* For grassed waterways and roadside ditches
8. Where $v := 21 \cdot \sqrt{S}$ from the SCS Upland Method *Channel Flow Chart* Small Tributary & Swamp w/Channels
9. Where $v := 35 \cdot \sqrt{S}$ from the SCS Upland Method *Channel Flow Chart* Large Tributary
10. Where $v := 60 \cdot \sqrt{S}$ from the SCS Upland Method *Channel Flow Chart* Main River
11. Where $v := \frac{1.49 \cdot R^{0.667} \cdot \sqrt{S}}{N}$ Culvert Flow
12. Where $P_2 = 2$ -Year, 24 Hour Rainfall (in) (In Cumberland County is 3.0 inches)

Mannings Roughness Coefficients Table

Surface Description	n - value
Smooth surfaces	0.011
Crush Stone/Substation Yards	0.025
Fallow	0.050
Cultivated: Residue <= 20%	0.060
Cultivated: Residue >= 20%	0.170
Grass: Short	0.150
Grass: Dense	0.240
Grass: Bermuda	0.410
Range	0.130
Woods: Light underbrush	0.400
Woods: Dense underbrush	0.800

PROJECT:	CMP Bishop St Substation	Calculated By:	PGT
	182847	Checked By:	PMM
Proj:	1S Pre-development (Cumberland County)	Date:	September 8, 2011
Watershed:		Revised:	

Time of Concentration Determination Worksheet, SCS Methods

	Seg 1	Seg 2	Seg 3							
SHEET FLOW										
Manning's No.	0.025	0.41	0.41							
Length, ft	4	15	4							
P2, in	3.0	3.0	3.0							
Slope, ft/ft	0.06	0.055556	0.25							
T _i ¹ , hr	0.002	0.055	0.010							0.0674
SHALLOW CONCENTRATED FLOW										
Paved										
Length, ft										
Slope, ft/ft										
Velocity ² , ft/sec										
T _i ³ , hr										0.0000
Short Grass Pasture										
Length, ft										
Slope, ft/ft										
Velocity ⁴ , ft/sec										
T _i ³ , hr										0.0000
Woodland										
Length, ft										
Slope, ft/ft										
Velocity ⁵ , ft/sec										
T _i ³ , hr										0.0000
CHANNEL FLOW										
Waterways & Swamps, No Channels										
Length, ft										
Slope, ft/ft										
Velocity ⁵ , ft/sec										
T _i ³ , hr										0.0000
Grassed Waterways/Roadside Ditches										
Length, ft										
Slope, ft/ft										
Velocity ⁶ , ft/sec										
T _i , hr										0.0000
Small Tributary & Swamp w/Channels										
Length, ft										
Slope, ft/ft										
Velocity ⁷ , ft/sec										
T _i , hr										0.0000
Large Tributary										
Length, ft										
Slope, ft/ft										
Velocity ⁸ , ft/sec										
T _i , hr										0.0000
Main River										
Length, ft										
Slope, ft/ft										
Velocity ⁹ , ft/sec										
T _i , hr										0.0000
Culvert										
Diameter, ft										
Area, ft ²										
Wetted Perimeter, ft										
Hydraulic Radius, R, ft										
Slope, ft/ft										
Manning's No.										
Velocity ¹⁰ , ft/sec										
Length, L, ft										
T _i , hr										0.0000

Calculated time of concentration less than minimum, therefore use 6 minutes

HR	0.067
Min	4.04

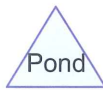
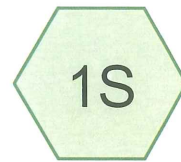
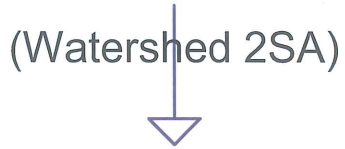
PROJECT:	CMP Bishop St Substation 182847	Calculated By:	PGT
Proj:	182847	Checked By:	PMM
Watershed:	2S Post-development (Cumberland County)	Date:	September 8, 2011
		Revised:	

Time of Concentration Determination Worksheet, SCS Methods

	Seg 1	Seg 2	Seg 3	Seg 4	Seg 5						
SHEET FLOW											
Manning's No.	0.8	0.41	0.8	0.8	0.8						
Length, ft	28	10	12	9	37						
P2, in	3.0	3.0	3.0	3.0	3.0						
Slope, ft/ft	0.035714	0.04545	0.0455	0.1111	0.2700	avg 10/37					
T ₁ ¹ , hr	0.184	0.043	0.085	0.047	0.103						0.4621
SHALLOW CONCENTRATED FLOW											
Paved											
Length, ft											
Slope, ft/ft											
Velocity ² , ft/sec											
T ₁ ³ , hr											0.0000
Short Grass Pasture											
Length, ft											
Slope, ft/ft											
Velocity ⁴ , ft/sec											
T ₁ ³ , hr											0.0000
Woodland											
Length, ft											
Slope, ft/ft											
Velocity ⁵ , ft/sec											
T ₁ ³ , hr											0.0000
CHANNEL FLOW											
Waterways & Swamps, No Channels											
Length, ft											
Slope, ft/ft											
Velocity ⁵ , ft/sec											
T ₁ ³ , hr											0.0000
Grassed Waterways/Roadside Ditches											
Length, ft											
Slope, ft/ft											
Velocity ⁶ , ft/sec											
T ₁ , hr											0.0000
Small Tributary & Swamp w/Channels											
Length, ft											
Slope, ft/ft											
Velocity ⁷ , ft/sec											
T ₁ , hr											0.0000
Large Tributary											
Length, ft											
Slope, ft/ft											
Velocity ⁸ , ft/sec											
T ₁ , hr											0.0000
Main River											
Length, ft											
Slope, ft/ft											
Velocity ⁹ , ft/sec											
T ₁ , hr											0.0000
Culvert											
Diameter, ft											
Area, ft ²											
Wetted Perimeter, ft											
Hydraulic Radius, R, ft											
Slope, ft/ft											
Manning's No.											
Velocity ¹⁰ , ft/sec											
Length, L, ft											
T ₁ , hr											0.0000

HR	0.462
Min	27.73

PROJECT:	CMP		Calculated By:						PGT	
	Starks Substation		Checked By:						PMM	
Proj:	182847		Date:						September 8, 2011	
Watershed:	2SA Post-development (Cumberland County)		Revised:							
Time of Concentration Determination Worksheet, SCS Methods										
	Seg 1	Seg 2	Seg 3	Seg 3	Seg 4					
SHEET FLOW										
Manning's No.	0.025	0.025								
Length, ft	90	5								
P2, in	3.0	3.0								
Slope, ft/ft	0.0075	0.12								
T _i ¹ , hr	0.055	0.002							0.0565	
SHALLOW CONCENTRATED FLOW										
Paved										
Length, ft										
Slope, ft/ft										
Velocity ² , ft/sec										
T _i ³ , hr									0.0000	
Short Grass Pasture										
Length, ft										
Slope, ft/ft										
Velocity ⁴ , ft/sec										
T _i ³ , hr									0.0000	
Woodland										
Length, ft										
Slope, ft/ft										
Velocity ⁵ , ft/sec										
T _i ³ , hr									0.0000	
CHANNEL FLOW										
Waterways & Swamps, No Channels										
Length, ft										
Slope, ft/ft										
Velocity ⁵ , ft/sec										
T _i ³ , hr									0.0000	
Grassed Waterways/Roadside Ditches										
Length, ft										
Slope, ft/ft										
Velocity ⁶ , ft/sec										
T _i , hr									0.0000	
Small Tributary & Swamp w/Channels										
Length, ft										
Slope, ft/ft										
Velocity ⁷ , ft/sec										
T _i , hr									0.0000	
Large Tributary										
Length, ft										
Slope, ft/ft										
Velocity ⁸ , ft/sec										
T _i , hr									0.0000	
Main River										
Length, ft										
Slope, ft/ft										
Velocity ⁹ , ft/sec										
T _i , hr									0.0000	
Culvert										
Diameter, ft										
Area, ft ²										
Wetted Perimeter, ft										
Hydraulic Radius, R, ft										
Slope, ft/ft										
Manning's No.										
Velocity ¹⁰ , ft/sec										
Length, L, ft										
T _i , hr									0.0000	
								HR	0.057	
Calculated time of concentration less than minimum, therefore use 6 minutes								Min	3.39	



Drainage Diagram for Bishop Street Substation - Pre-dev
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Bishop Street Substation - Pre-dev

Prepared by TRC Environmental Corp

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.120	55	Substation, HSG C (1S, 2SA)
0.160	65	Brush, Good, HSG C (2S)
0.370	70	Woods, Good, HSG C (2S)
0.060	77	Brush, Poor, HSG C (1S)
0.020	89	Gravel roads, HSG C (1S, 2S)
0.020	98	Roofs, HSG C (2SA)
0.750		TOTAL AREA

Bishop Street Substation - Pre-dev

Prepared by TRC Environmental Corp

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Printed 9/7/2011

Page 3

Soil Listing (all nodes)

Area (acres)	Soil Goup	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.750	HSG C	1S, 2S, 2SA
0.000	HSG D	
0.000	Other	
0.750		TOTAL AREA

Bishop Street Substation - Pre-dev Type III 24-hr 2-yr Cumberland County S. Rainfall=3.00"

Prepared by TRC Environmental Corp

Printed 9/7/2011

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Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points

Runoff by SCS TR-20 method, UH=SCS

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: (Watershed 1S)	Runoff Area=0.080 ac 0.00% Impervious Runoff Depth=1.02" Tc=6.0 min CN=76 Runoff=0.09 cfs 0.007 af
Subcatchment 2S: (Watershed 2S)	Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=0.67" Tc=34.2 min CN=69 Runoff=0.19 cfs 0.030 af
Subcatchment 2SA: (Watershed 2SA)	Runoff Area=0.130 ac 15.38% Impervious Runoff Depth=0.40" Tc=6.0 min CN=62 Runoff=0.04 cfs 0.004 af
Reach 1R: (Bndy)	Inflow=0.09 cfs 0.007 af Outflow=0.09 cfs 0.007 af
Reach 2R: (Bndy)	Inflow=0.19 cfs 0.034 af Outflow=0.19 cfs 0.034 af
Reach 3R: (Reach through 2S)	Avg. Depth=0.01' Max Vel=0.06 fps Inflow=0.04 cfs 0.004 af n=0.400 L=106.0' S=0.1472 '/' Capacity=2.92 cfs Outflow=0.02 cfs 0.004 af

Total Runoff Area = 0.750 ac Runoff Volume = 0.041 af Average Runoff Depth = 0.66"
97.33% Pervious = 0.730 ac 2.67% Impervious = 0.020 ac

Summary for Subcatchment 1S: (Watershed 1S)

Runoff = 0.09 cfs @ 12.10 hrs, Volume= 0.007 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-yr Cumberland County S. Rainfall=3.00"

Area (ac)	CN	Description
* 0.010	55	Substation, HSG C
0.010	89	Gravel roads, HSG C
0.060	77	Brush, Poor, HSG C
0.080	76	Weighted Average
0.080		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Minimum

Summary for Subcatchment 2S: (Watershed 2S)

Runoff = 0.19 cfs @ 12.56 hrs, Volume= 0.030 af, Depth= 0.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-yr Cumberland County S. Rainfall=3.00"

Area (ac)	CN	Description
0.010	89	Gravel roads, HSG C
0.160	65	Brush, Good, HSG C
0.370	70	Woods, Good, HSG C
0.540	69	Weighted Average
0.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.2					Direct Entry, See Spreadsheet

Summary for Subcatchment 2SA: (Watershed 2SA)

Runoff = 0.04 cfs @ 12.13 hrs, Volume= 0.004 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-yr Cumberland County S. Rainfall=3.00"

Area (ac)	CN	Description
0.020	98	Roofs, HSG C
* 0.110	55	Substation, HSG C
0.130	62	Weighted Average
0.110		84.62% Pervious Area
0.020		15.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Minimum

Summary for Reach 1R: (Bndy)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.080 ac, 0.00% Impervious, Inflow Depth = 1.02" for 2-yr Cumberland County S. event
 Inflow = 0.09 cfs @ 12.10 hrs, Volume= 0.007 af
 Outflow = 0.09 cfs @ 12.10 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach 2R: (Bndy)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.670 ac, 2.99% Impervious, Inflow Depth > 0.62" for 2-yr Cumberland County S. event
 Inflow = 0.19 cfs @ 12.58 hrs, Volume= 0.034 af
 Outflow = 0.19 cfs @ 12.58 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach 3R: (Reach through 2S)

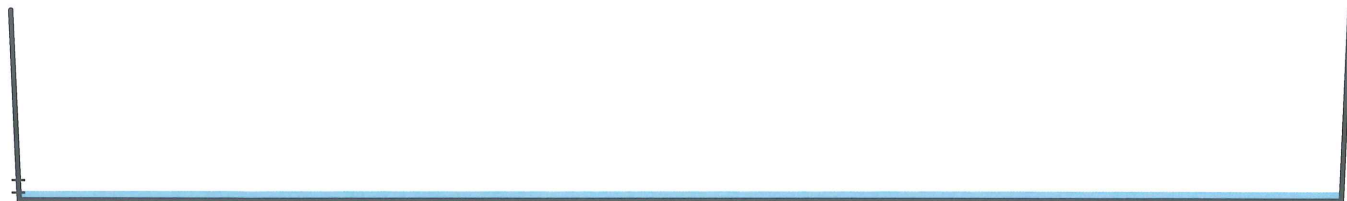
Inflow Area = 0.130 ac, 15.38% Impervious, Inflow Depth = 0.40" for 2-yr Cumberland County S. event
 Inflow = 0.04 cfs @ 12.13 hrs, Volume= 0.004 af
 Outflow = 0.02 cfs @ 12.96 hrs, Volume= 0.004 af, Atten= 50%, Lag= 49.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 0.06 fps, Min. Travel Time= 27.8 min
 Avg. Velocity = 0.03 fps, Avg. Travel Time= 58.6 min

Peak Storage= 30 cf @ 12.50 hrs, Average Depth at Peak Storage= 0.01'
 Bank-Full Depth= 0.20', Capacity at Bank-Full= 2.92 cfs

30.00' x 0.20' deep channel, n= 0.400 Sheet flow: Woods+light brush
 Side Slope Z-value= 1.0 '/' Top Width= 30.40'
 Length= 106.0' Slope= 0.1472 '/'
 Inlet Invert= 104.00', Outlet Invert= 88.40'



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: (Watershed 1S)	Runoff Area=0.080 ac 0.00% Impervious Runoff Depth=2.29" Tc=6.0 min CN=76 Runoff=0.21 cfs 0.015 af
Subcatchment 2S: (Watershed 2S)	Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=1.74" Tc=34.2 min CN=69 Runoff=0.57 cfs 0.078 af
Subcatchment 2SA: (Watershed 2SA)	Runoff Area=0.130 ac 15.38% Impervious Runoff Depth=1.26" Tc=6.0 min CN=62 Runoff=0.17 cfs 0.014 af
Reach 1R: (Bndy)	Inflow=0.21 cfs 0.015 af Outflow=0.21 cfs 0.015 af
Reach 2R: (Bndy)	Inflow=0.67 cfs 0.092 af Outflow=0.67 cfs 0.092 af
Reach 3R: (Reach through 2S)	Avg. Depth=0.03' Max Vel=0.13 fps Inflow=0.17 cfs 0.014 af n=0.400 L=106.0' S=0.1472 '/' Capacity=2.92 cfs Outflow=0.11 cfs 0.014 af

Total Runoff Area = 0.750 ac Runoff Volume = 0.107 af Average Runoff Depth = 1.72"
97.33% Pervious = 0.730 ac 2.67% Impervious = 0.020 ac

Summary for Subcatchment 1S: (Watershed 1S)

Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Cumberland County S. Rainfall=4.70"

Area (ac)	CN	Description
* 0.010	55	Substation, HSG C
0.010	89	Gravel roads, HSG C
0.060	77	Brush, Poor, HSG C
0.080	76	Weighted Average
0.080		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Minimum

Summary for Subcatchment 2S: (Watershed 2S)

Runoff = 0.57 cfs @ 12.51 hrs, Volume= 0.078 af, Depth= 1.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Cumberland County S. Rainfall=4.70"

Area (ac)	CN	Description
0.010	89	Gravel roads, HSG C
0.160	65	Brush, Good, HSG C
0.370	70	Woods, Good, HSG C
0.540	69	Weighted Average
0.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.2					Direct Entry, See Spreadsheet

Summary for Subcatchment 2SA: (Watershed 2SA)

Runoff = 0.17 cfs @ 12.10 hrs, Volume= 0.014 af, Depth= 1.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Cumberland County S. Rainfall=4.70"

Area (ac)	CN	Description
0.020	98	Roofs, HSG C
* 0.110	55	Substation, HSG C
0.130	62	Weighted Average
0.110		84.62% Pervious Area
0.020		15.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Minimum

Summary for Reach 1R: (Bndy)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.080 ac, 0.00% Impervious, Inflow Depth = 2.29" for 10-yr Cumberland County S. event
 Inflow = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af
 Outflow = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach 2R: (Bndy)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.670 ac, 2.99% Impervious, Inflow Depth = 1.65" for 10-yr Cumberland County S. event
 Inflow = 0.67 cfs @ 12.50 hrs, Volume= 0.092 af
 Outflow = 0.67 cfs @ 12.50 hrs, Volume= 0.092 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach 3R: (Reach through 2S)

Inflow Area = 0.130 ac, 15.38% Impervious, Inflow Depth = 1.26" for 10-yr Cumberland County S. event
 Inflow = 0.17 cfs @ 12.10 hrs, Volume= 0.014 af
 Outflow = 0.11 cfs @ 12.47 hrs, Volume= 0.014 af, Atten= 38%, Lag= 22.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.13 fps, Min. Travel Time= 13.6 min
 Avg. Velocity = 0.04 fps, Avg. Travel Time= 43.4 min

Peak Storage= 87 cf @ 12.24 hrs, Average Depth at Peak Storage= 0.03'
 Bank-Full Depth= 0.20', Capacity at Bank-Full= 2.92 cfs

30.00' x 0.20' deep channel, n= 0.400 Sheet flow: Woods+light brush
 Side Slope Z-value= 1.0 '/' Top Width= 30.40'
 Length= 106.0' Slope= 0.1472 '/'
 Inlet Invert= 104.00', Outlet Invert= 88.40'



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: (Watershed 1S)	Runoff Area=0.080 ac 0.00% Impervious Runoff Depth=2.95" Tc=6.0 min CN=76 Runoff=0.27 cfs 0.020 af
Subcatchment 2S: (Watershed 2S)	Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=2.33" Tc=34.2 min CN=69 Runoff=0.77 cfs 0.105 af
Subcatchment 2SA: (Watershed 2SA)	Runoff Area=0.130 ac 15.38% Impervious Runoff Depth=1.76" Tc=6.0 min CN=62 Runoff=0.25 cfs 0.019 af
Reach 1R: (Bndy)	Inflow=0.27 cfs 0.020 af Outflow=0.27 cfs 0.020 af
Reach 2R: (Bndy)	Inflow=0.93 cfs 0.124 af Outflow=0.93 cfs 0.124 af
Reach 3R: (Reach through 2S)	Avg. Depth=0.04' Max Vel=0.16 fps Inflow=0.25 cfs 0.019 af n=0.400 L=106.0' S=0.1472 '/' Capacity=2.92 cfs Outflow=0.17 cfs 0.019 af

Total Runoff Area = 0.750 ac Runoff Volume = 0.143 af Average Runoff Depth = 2.30"
97.33% Pervious = 0.730 ac 2.67% Impervious = 0.020 ac

Summary for Subcatchment 1S: (Watershed 1S)

Runoff = 0.27 cfs @ 12.09 hrs, Volume= 0.020 af, Depth= 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Cumberland County S. Rainfall=5.50"

Area (ac)	CN	Description
* 0.010	55	Substation, HSG C
0.010	89	Gravel roads, HSG C
0.060	77	Brush, Poor, HSG C
0.080	76	Weighted Average
0.080		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Minimum

Summary for Subcatchment 2S: (Watershed 2S)

Runoff = 0.77 cfs @ 12.50 hrs, Volume= 0.105 af, Depth= 2.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Cumberland County S. Rainfall=5.50"

Area (ac)	CN	Description
0.010	89	Gravel roads, HSG C
0.160	65	Brush, Good, HSG C
0.370	70	Woods, Good, HSG C
0.540	69	Weighted Average
0.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.2					Direct Entry, See Spreadsheet

Summary for Subcatchment 2SA: (Watershed 2SA)

Runoff = 0.25 cfs @ 12.10 hrs, Volume= 0.019 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Cumberland County S. Rainfall=5.50"

Area (ac)	CN	Description
* 0.020	98	Roofs, HSG C
0.110	55	Substation, HSG C
0.130	62	Weighted Average
0.110		84.62% Pervious Area
0.020		15.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Minimum

Summary for Reach 1R: (Bndy)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.080 ac, 0.00% Impervious, Inflow Depth = 2.95" for 25-yr Cumberland County S. event
 Inflow = 0.27 cfs @ 12.09 hrs, Volume= 0.020 af
 Outflow = 0.27 cfs @ 12.09 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach 2R: (Bndy)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.670 ac, 2.99% Impervious, Inflow Depth = 2.22" for 25-yr Cumberland County S. event
 Inflow = 0.93 cfs @ 12.47 hrs, Volume= 0.124 af
 Outflow = 0.93 cfs @ 12.47 hrs, Volume= 0.124 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach 3R: (Reach through 2S)

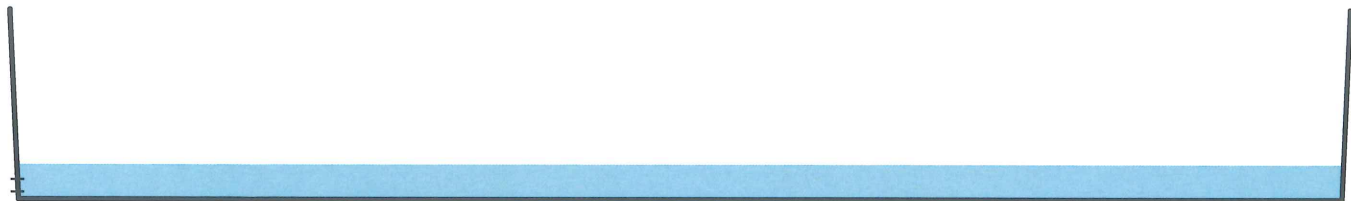
Inflow Area = 0.130 ac, 15.38% Impervious, Inflow Depth = 1.76" for 25-yr Cumberland County S. event
 Inflow = 0.25 cfs @ 12.10 hrs, Volume= 0.019 af
 Outflow = 0.17 cfs @ 12.40 hrs, Volume= 0.019 af, Atten= 32%, Lag= 17.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 0.16 fps, Min. Travel Time= 11.3 min
 Avg. Velocity = 0.04 fps, Avg. Travel Time= 39.7 min

Peak Storage= 116 cf @ 12.20 hrs, Average Depth at Peak Storage= 0.04'
 Bank-Full Depth= 0.20', Capacity at Bank-Full= 2.92 cfs

30.00' x 0.20' deep channel, n= 0.400 Sheet flow: Woods+light brush
 Side Slope Z-value= 1.0 '/' Top Width= 30.40'
 Length= 106.0' Slope= 0.1472 '/'
 Inlet Invert= 104.00', Outlet Invert= 88.40'





(Bndy)



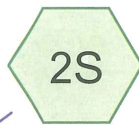
(Watershed 1S)



(Watershed 2SA)



(Reach through 2S)



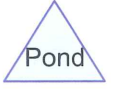
(Watershed 2S)



(Reach through 2S)



(Bndy)



Drainage Diagram for Bishop Street Substation - Post dev
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Bishop Street Substation - Post dev

Prepared by TRC Environmental Corp

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Soil Listing (all nodes)

Area (acres)	Soil Goup	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.750	HSG C	1S, 2S, 2SA
0.000	HSG D	
0.000	Other	
0.750		TOTAL AREA

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: (Watershed 1S)	Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=1.02" Tc=6.0 min CN=76 Runoff=0.08 cfs 0.006 af
Subcatchment 2S: (Watershed 2S)	Runoff Area=0.420 ac 0.00% Impervious Runoff Depth=0.63" Tc=27.7 min CN=68 Runoff=0.15 cfs 0.022 af
Subcatchment 2SA: (Watershed 2SA)	Runoff Area=0.260 ac 11.54% Impervious Runoff Depth=0.33" Tc=6.0 min CN=60 Runoff=0.05 cfs 0.007 af
Reach 1R: (Bndy)	Inflow=0.08 cfs 0.006 af Outflow=0.08 cfs 0.006 af
Reach 2R: (Bndy)	Inflow=0.17 cfs 0.029 af Outflow=0.17 cfs 0.029 af
Reach 3R: (Reach through 2S)	Avg. Depth=0.00' Max Vel=0.49 fps Inflow=0.05 cfs 0.007 af n=0.050 L=25.0' S=0.5000 '/' Capacity=43.06 cfs Outflow=0.05 cfs 0.007 af
Reach 4R: (Reach through 2S)	Avg. Depth=0.02' Max Vel=0.06 fps Inflow=0.05 cfs 0.007 af n=0.400 L=53.0' S=0.0491 '/' Capacity=1.69 cfs Outflow=0.03 cfs 0.007 af
Total Runoff Area = 0.750 ac Runoff Volume = 0.035 af Average Runoff Depth = 0.56"	
96.00% Pervious = 0.720 ac 4.00% Impervious = 0.030 ac	

Summary for Subcatchment 1S: (Watershed 1S)

Runoff = 0.08 cfs @ 12.10 hrs, Volume= 0.006 af, Depth= 1.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-yr Cumberland County S. Rainfall=3.00"

Area (ac)	CN	Description
0.010	89	Gravel roads, HSG C
* 0.010	55	Substation, HSG C
0.050	77	Brush, Poor, HSG C
0.070	76	Weighted Average
0.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Minimum

Summary for Subcatchment 2S: (Watershed 2S)

Runoff = 0.15 cfs @ 12.46 hrs, Volume= 0.022 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-yr Cumberland County S. Rainfall=3.00"

Area (ac)	CN	Description
0.010	89	Gravel roads, HSG C
0.180	70	Woods, Good, HSG C
0.230	65	Brush, Good, HSG C
0.420	68	Weighted Average
0.420		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.7					Direct Entry, See spreadsheet

Summary for Subcatchment 2SA: (Watershed 2SA)

Runoff = 0.05 cfs @ 12.16 hrs, Volume= 0.007 af, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-yr Cumberland County S. Rainfall=3.00"

Area (ac)	CN	Description
0.030	98	Roofs, HSG C
* 0.230	55	Substation, HSG C
0.260	60	Weighted Average
0.230		88.46% Pervious Area
0.030		11.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Minimum

Summary for Reach 1R: (Bndy)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.070 ac, 0.00% Impervious, Inflow Depth = 1.02" for 2-yr Cumberland County S. event
 Inflow = 0.08 cfs @ 12.10 hrs, Volume= 0.006 af
 Outflow = 0.08 cfs @ 12.10 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach 2R: (Bndy)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.680 ac, 4.41% Impervious, Inflow Depth = 0.51" for 2-yr Cumberland County S. event
 Inflow = 0.17 cfs @ 12.53 hrs, Volume= 0.029 af
 Outflow = 0.17 cfs @ 12.53 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach 3R: (Reach through 2S)

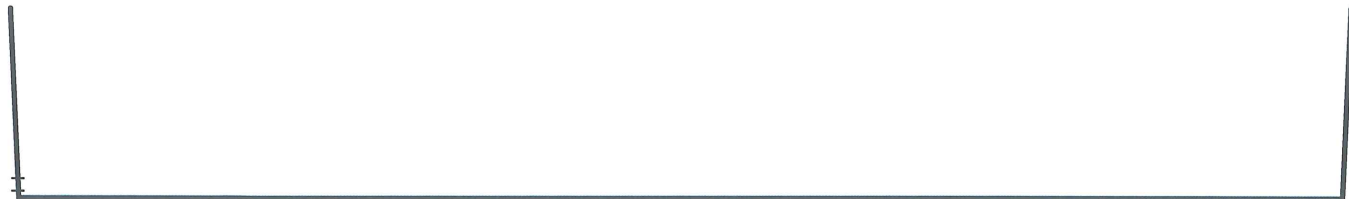
Inflow Area = 0.260 ac, 11.54% Impervious, Inflow Depth = 0.33" for 2-yr Cumberland County S. event
 Inflow = 0.05 cfs @ 12.16 hrs, Volume= 0.007 af
 Outflow = 0.05 cfs @ 12.20 hrs, Volume= 0.007 af, Atten= 3%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Max. Velocity= 0.49 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 0.34 fps, Avg. Travel Time= 1.2 min

Peak Storage= 3 cf @ 12.17 hrs, Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 0.20', Capacity at Bank-Full= 43.06 cfs

30.00' x 0.20' deep channel, n= 0.050 Earth, cobble bottom, clean sides
 Side Slope Z-value= 1.0 ' / ' Top Width= 30.40'
 Length= 25.0' Slope= 0.5000 ' / '
 Inlet Invert= 103.50', Outlet Invert= 91.00'



Summary for Reach 4R: (Reach through 2S)

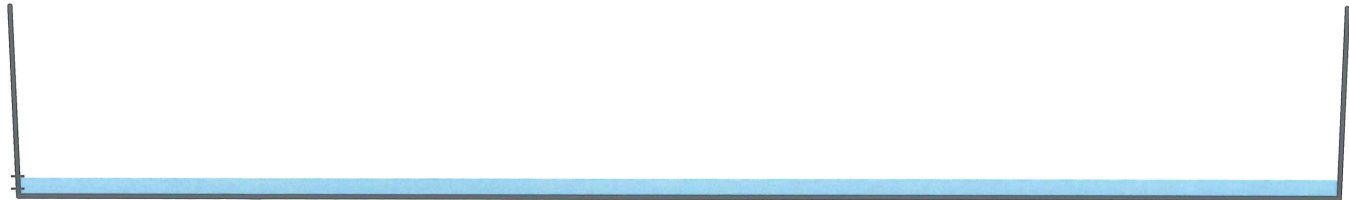
[62] Warning: Exceeded Reach 3R OUTLET depth by 0.02' @ 12.50 hrs

Inflow Area = 0.260 ac, 11.54% Impervious, Inflow Depth = 0.33" for 2-yr Cumberland County S. event
Inflow = 0.05 cfs @ 12.20 hrs, Volume= 0.007 af
Outflow = 0.03 cfs @ 12.71 hrs, Volume= 0.007 af, Atten= 26%, Lag= 31.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.06 fps, Min. Travel Time= 14.8 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 36.3 min

Peak Storage= 31 cf @ 12.47 hrs, Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 0.20', Capacity at Bank-Full= 1.69 cfs

30.00' x 0.20' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 1.0 '/' Top Width= 30.40'
Length= 53.0' Slope= 0.0491 '/'
Inlet Invert= 91.00', Outlet Invert= 88.40'



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: (Watershed 1S)	Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=2.29" Tc=6.0 min CN=76 Runoff=0.18 cfs 0.013 af
Subcatchment 2S: (Watershed 2S)	Runoff Area=0.420 ac 0.00% Impervious Runoff Depth=1.67" Tc=27.7 min CN=68 Runoff=0.46 cfs 0.058 af
Subcatchment 2SA: (Watershed 2SA)	Runoff Area=0.260 ac 11.54% Impervious Runoff Depth=1.13" Tc=6.0 min CN=60 Runoff=0.30 cfs 0.024 af
Reach 1R: (Bndy)	Inflow=0.18 cfs 0.013 af Outflow=0.18 cfs 0.013 af
Reach 2R: (Bndy)	Inflow=0.67 cfs 0.083 af Outflow=0.67 cfs 0.083 af
Reach 3R: (Reach through 2S)	Avg. Depth=0.01' Max Vel=0.98 fps Inflow=0.30 cfs 0.024 af n=0.050 L=25.0' S=0.5000 '/' Capacity=43.06 cfs Outflow=0.29 cfs 0.024 af
Reach 4R: (Reach through 2S)	Avg. Depth=0.06' Max Vel=0.13 fps Inflow=0.29 cfs 0.024 af n=0.400 L=53.0' S=0.0491 '/' Capacity=1.69 cfs Outflow=0.23 cfs 0.024 af
Total Runoff Area = 0.750 ac Runoff Volume = 0.096 af Average Runoff Depth = 1.54"	
96.00% Pervious = 0.720 ac 4.00% Impervious = 0.030 ac	

Summary for Subcatchment 1S: (Watershed 1S)

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Cumberland County S. Rainfall=4.70"

Area (ac)	CN	Description
0.010	89	Gravel roads, HSG C
* 0.010	55	Substation, HSG C
0.050	77	Brush, Poor, HSG C
0.070	76	Weighted Average
0.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Minimum

Summary for Subcatchment 2S: (Watershed 2S)

Runoff = 0.46 cfs @ 12.41 hrs, Volume= 0.058 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Cumberland County S. Rainfall=4.70"

Area (ac)	CN	Description
0.010	89	Gravel roads, HSG C
0.180	70	Woods, Good, HSG C
0.230	65	Brush, Good, HSG C
0.420	68	Weighted Average
0.420		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.7					Direct Entry, See spreadsheet

Summary for Subcatchment 2SA: (Watershed 2SA)

Runoff = 0.30 cfs @ 12.11 hrs, Volume= 0.024 af, Depth= 1.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-yr Cumberland County S. Rainfall=4.70"

Area (ac)	CN	Description
0.030	98	Roofs, HSG C
* 0.230	55	Substation, HSG C
0.260	60	Weighted Average
0.230		88.46% Pervious Area
0.030		11.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Minimum

Summary for Reach 1R: (Bndy)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.070 ac, 0.00% Impervious, Inflow Depth = 2.29" for 10-yr Cumberland County S. event
 Inflow = 0.18 cfs @ 12.09 hrs, Volume= 0.013 af
 Outflow = 0.18 cfs @ 12.09 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach 2R: (Bndy)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.680 ac, 4.41% Impervious, Inflow Depth = 1.46" for 10-yr Cumberland County S. event
 Inflow = 0.67 cfs @ 12.37 hrs, Volume= 0.083 af
 Outflow = 0.67 cfs @ 12.37 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

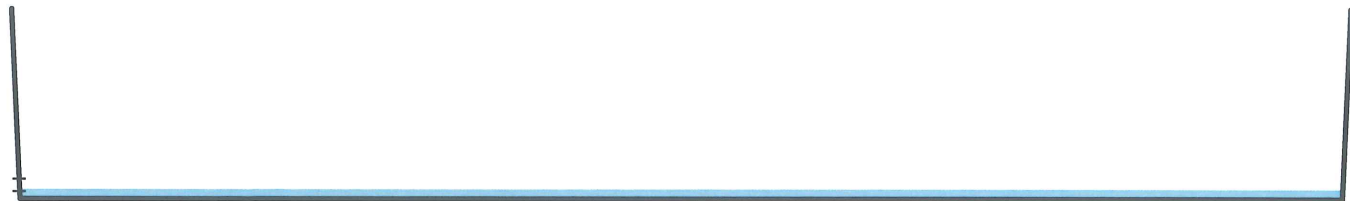
Summary for Reach 3R: (Reach through 2S)

Inflow Area = 0.260 ac, 11.54% Impervious, Inflow Depth = 1.13" for 10-yr Cumberland County S. event
 Inflow = 0.30 cfs @ 12.11 hrs, Volume= 0.024 af
 Outflow = 0.29 cfs @ 12.12 hrs, Volume= 0.024 af, Atten= 2%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Max. Velocity= 0.98 fps, Min. Travel Time= 0.4 min
 Avg. Velocity = 0.37 fps, Avg. Travel Time= 1.1 min

Peak Storage= 8 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.01'
 Bank-Full Depth= 0.20', Capacity at Bank-Full= 43.06 cfs

30.00' x 0.20' deep channel, n= 0.050 Earth, cobble bottom, clean sides
 Side Slope Z-value= 1.0 '/' Top Width= 30.40'
 Length= 25.0' Slope= 0.5000 '/'
 Inlet Invert= 103.50', Outlet Invert= 91.00'



Summary for Reach 4R: (Reach through 2S)

[62] Warning: Exceeded Reach 3R OUTLET depth by 0.05' @ 12.20 hrs

Inflow Area = 0.260 ac, 11.54% Impervious, Inflow Depth = 1.13" for 10-yr Cumberland County S. event
Inflow = 0.29 cfs @ 12.12 hrs, Volume= 0.024 af
Outflow = 0.23 cfs @ 12.32 hrs, Volume= 0.024 af, Atten= 21%, Lag= 12.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.13 fps, Min. Travel Time= 7.0 min
Avg. Velocity = 0.03 fps, Avg. Travel Time= 25.4 min

Peak Storage= 97 cf @ 12.20 hrs, Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 0.20', Capacity at Bank-Full= 1.69 cfs

30.00' x 0.20' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 1.0 '/' Top Width= 30.40'
Length= 53.0' Slope= 0.0491 '/'
Inlet Invert= 91.00', Outlet Invert= 88.40'



Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points
 Runoff by SCS TR-20 method, UH=SCS
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: (Watershed 1S)	Runoff Area=0.070 ac 0.00% Impervious Runoff Depth=2.95" Tc=6.0 min CN=76 Runoff=0.24 cfs 0.017 af
Subcatchment 2S: (Watershed 2S)	Runoff Area=0.420 ac 0.00% Impervious Runoff Depth=2.24" Tc=27.7 min CN=68 Runoff=0.63 cfs 0.079 af
Subcatchment 2SA: (Watershed 2SA)	Runoff Area=0.260 ac 11.54% Impervious Runoff Depth=1.60" Tc=6.0 min CN=60 Runoff=0.45 cfs 0.035 af
Reach 1R: (Bndy)	Inflow=0.24 cfs 0.017 af Outflow=0.24 cfs 0.017 af
Reach 2R: (Bndy)	Inflow=0.94 cfs 0.113 af Outflow=0.94 cfs 0.113 af
Reach 3R: (Reach through 2S)	Avg. Depth=0.01' Max Vel=1.16 fps Inflow=0.45 cfs 0.035 af n=0.050 L=25.0' S=0.5000 '/' Capacity=43.06 cfs Outflow=0.44 cfs 0.035 af
Reach 4R: (Reach through 2S)	Avg. Depth=0.08' Max Vel=0.15 fps Inflow=0.44 cfs 0.035 af n=0.400 L=53.0' S=0.0491 '/' Capacity=1.69 cfs Outflow=0.37 cfs 0.035 af
Total Runoff Area = 0.750 ac Runoff Volume = 0.130 af Average Runoff Depth = 2.09"	
96.00% Pervious = 0.720 ac 4.00% Impervious = 0.030 ac	

Summary for Subcatchment 1S: (Watershed 1S)

Runoff = 0.24 cfs @ 12.09 hrs, Volume= 0.017 af, Depth= 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Cumberland County S. Rainfall=5.50"

Area (ac)	CN	Description
0.010	89	Gravel roads, HSG C
* 0.010	55	Substation, HSG C
0.050	77	Brush, Poor, HSG C
0.070	76	Weighted Average
0.070		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Minimum

Summary for Subcatchment 2S: (Watershed 2S)

Runoff = 0.63 cfs @ 12.41 hrs, Volume= 0.079 af, Depth= 2.24"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Cumberland County S. Rainfall=5.50"

Area (ac)	CN	Description
0.010	89	Gravel roads, HSG C
0.180	70	Woods, Good, HSG C
0.230	65	Brush, Good, HSG C
0.420	68	Weighted Average
0.420		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.7					Direct Entry, See spreadsheet

Summary for Subcatchment 2SA: (Watershed 2SA)

Runoff = 0.45 cfs @ 12.10 hrs, Volume= 0.035 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25-yr Cumberland County S. Rainfall=5.50"

Area (ac)	CN	Description
0.030	98	Roofs, HSG C
* 0.230	55	Substation, HSG C
0.260	60	Weighted Average
0.230		88.46% Pervious Area
0.030		11.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Minimum

Summary for Reach 1R: (Bndy)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.070 ac, 0.00% Impervious, Inflow Depth = 2.95" for 25-yr Cumberland County S. event
 Inflow = 0.24 cfs @ 12.09 hrs, Volume= 0.017 af
 Outflow = 0.24 cfs @ 12.09 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

Summary for Reach 2R: (Bndy)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.680 ac, 4.41% Impervious, Inflow Depth = 2.00" for 25-yr Cumberland County S. event
 Inflow = 0.94 cfs @ 12.33 hrs, Volume= 0.113 af
 Outflow = 0.94 cfs @ 12.33 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs

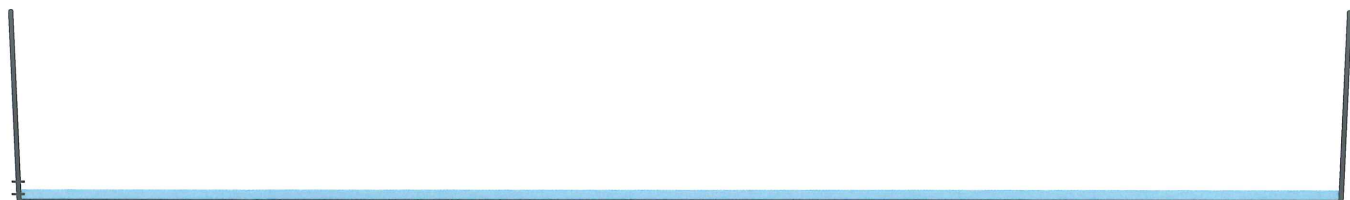
Summary for Reach 3R: (Reach through 2S)

Inflow Area = 0.260 ac, 11.54% Impervious, Inflow Depth = 1.60" for 25-yr Cumberland County S. event
 Inflow = 0.45 cfs @ 12.10 hrs, Volume= 0.035 af
 Outflow = 0.44 cfs @ 12.11 hrs, Volume= 0.035 af, Atten= 2%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Max. Velocity= 1.16 fps, Min. Travel Time= 0.4 min
 Avg. Velocity = 0.39 fps, Avg. Travel Time= 1.1 min

Peak Storage= 10 cf @ 12.11 hrs, Average Depth at Peak Storage= 0.01'
 Bank-Full Depth= 0.20', Capacity at Bank-Full= 43.06 cfs

30.00' x 0.20' deep channel, n= 0.050 Earth, cobble bottom, clean sides
 Side Slope Z-value= 1.0 '/' Top Width= 30.40'
 Length= 25.0' Slope= 0.5000 '/'
 Inlet Invert= 103.50', Outlet Invert= 91.00'



Summary for Reach 4R: (Reach through 2S)

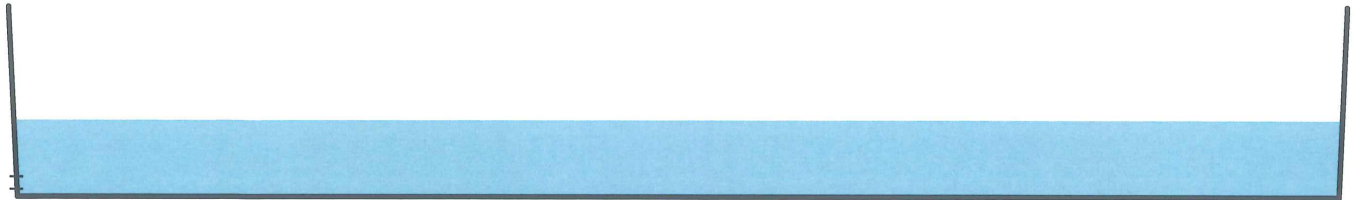
[62] Warning: Exceeded Reach 3R OUTLET depth by 0.07' @ 12.20 hrs

Inflow Area = 0.260 ac, 11.54% Impervious, Inflow Depth = 1.60" for 25-yr Cumberland County S. event
Inflow = 0.44 cfs @ 12.11 hrs, Volume= 0.035 af
Outflow = 0.37 cfs @ 12.27 hrs, Volume= 0.035 af, Atten= 15%, Lag= 9.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.15 fps, Min. Travel Time= 5.8 min
Avg. Velocity = 0.04 fps, Avg. Travel Time= 22.9 min

Peak Storage= 129 cf @ 12.17 hrs, Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 0.20', Capacity at Bank-Full= 1.69 cfs

30.00' x 0.20' deep channel, n= 0.400 Sheet flow: Woods+light brush
Side Slope Z-value= 1.0 '/' Top Width= 30.40'
Length= 53.0' Slope= 0.0491 '/'
Inlet Invert= 91.00', Outlet Invert= 88.40'



PROJECT:	CMP	Calculated By:	PGT
	Bishop Street Substation	Checked By:	PMM
TRC Proj:	182847.0000.0000	Date:	September 2, 2011
		Revised:	

GENERAL BMP WATER QUALITY STANDARDS CALCULATIONS SUMMARY

Description	New Impervious Area	Percent of Total Impervious Area Treated	New Developed Area	Percent of Total Developed Area Treated	Comments
Substation Expansion (A)	0.162	95.3%	0.162	95.3%	"Self-treating"
Control house (B)	0.008	4.7%	0.008	4.7%	No treatment
Total Area	0.17	100%	0.17	100%	

Site Treatment Summary	
Percent of Total Impervious Area Treated	Treatment Provided
Percent of Total Developed Area Treated	Required Treatment
	95.3%
	80%

* Grassed areas outside of substation will not be mowed more than twice per year, therefore, new grassed areas outside of the substation are not considered new developed area.



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

ELIAS BALDACCIO
GOVERNOR

DAVID
COMMISSIONER

June 5, 2008

Roy Koster
Central Maine Power
83 Edison Drive
Augusta, ME 04336

RE: DEP Stormwater Management Regulations and how they apply to
Central Maine Power Company Substations and Switchyards

Dear Mr. Koster:

I am writing to provide clarification on how substations and switchyards designed by Central Maine Power Company (CMP) can meet DEP Stormwater Management rules, Chapter 500 and the Site Location of Development Law. This letter supersedes a previous DEP letter on this subject dated February 29, 2008 and is a follow-up to further discussions between CMP and DEP staff.

Based on the report prepared by John Simon of Balance Engineering, dated March 8, 2008, regarding the stormwater runoff coefficient at CMP substations and switchyards, the required gravel fill and surface nature of these structures performs differently than most common construction practices and a modeling variance will be allowed for CMP substations and switchyards as follows:

When Flooding Standard requirements apply to a CMP project, modeling must demonstrate that peak runoff from the substation structure does not exceed predevelopment flow rates at the property line. Because of the permeability plus storage within the gravel fill and roughness of the crushed rock surface, the curve number (CN) specified in John Simon's report (March 2008) may be used for the substation area. As reported, a CN of 55 may be used for substations and switchyards that are built on areas that are mapped as HSG "A", "B", and "C", and a CN of 60 must be used when the area is mapped as HSG "D" for the HydroCAD model. However, all impervious surfaces will have to be added for an averaged curve number.

The General Standards of Chapter 500 (water quality) will be considered as met by the CMP substation/switchyard design specifications as long as the structure includes the typical CMP substation profile overlaying the natural ground surface. The soil layers within the CMP substation profile consist of 4 inches of crushed stone, 50:50 mix of 1.5"

LUSTA STATE HOUSE STATION LUSTA, MAINE 04113-0017 287-5688 FAX: (207) 287-7926 BLDG., HOSPITAL ST.	BANGOR 106 HOGAN ROAD BANGOR, MAINE 04401 (207) 940-4570 FAX: (207) 940-4584	PORTLAND 512 CANCO ROAD PORTLAND, MAINE 04103 (207) 822-6300 FAX: (207) 822-6303	PRESQUE ISLE 1235 CENTRAL DRIVE, SKYW PRESQUE ISLE, MAINE 04765 (207) 764-0477 FAX: (207) 76
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www.maine.gov/dep

printed on:

and 0.75" diameter stone overlaying 18 inches or more of gravel fill, MDOT 703.06 Type A. Saturation within the granular fill will detain and provide treatment for the one-inch design standard under that requirement. Groundwater can never be any higher than 18 inches below the top of the gravel fill. Other treatment considerations will need to be provided for all impervious structures anticipated on the substation and switchyard and for the roadway.

The Basic Standards of Chapter 500 (erosion and sedimentation control, inspection and maintenance, and housekeeping) will be met by the standard CMP substation and switchyard design specification and erosion control/construction plan as developed by CMP for each Stormwater Management application. These are minimum erosion control measures that will need to be maintained until the site is fully stabilized. However, based on site and weather conditions during construction, additional erosion control measures may be needed.

While there are several ways to approach the design standards discussed above, these must be considered the minimum requirements in meeting the Stormwater Management and Site Location of Development Laws. However, in some situations where the local hydrology and site conditions warrant more resource protection, additional BMPs may be required. Also, the access drive and associated roadside swales are included in the disturbed area for permitting purposes and the treatment of these areas must be addressed separately from the substation or switchyard and be treated with standard practices. The natural hydrology of these areas will need to be maintained and will have to meet all applicable standards as established in Chapter 500 (page 11, Section 5).

I hope this addresses your request and will make the DEP permitting process more straight forward. If you have further questions, please contact Marianne Hubert at (207) 287-4140.

Sincerely,



Don Witherill, Director
Watershed Management Division
Bureau of Land and Water Quality

Cc: Marianne Hubert, PE, DEP program manager
Andy Fisk, DEP L&W Bureau Director
Dan Butler, PE, TRC
Gerry Mirabile, CMP

APPENDIX B

STORMWATER MANAGEMENT PLANS AND DETAILS

City of Portland
 Development Review Application
 Planning Division Transmittal form

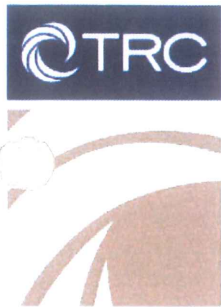
Application Number: 2011-313 **Application Date:** 8/2/2011 12:00:00 AM
CBL: 293-C-16
Project Name: Central Maine Power
Project Address: 116 Bishop Street

Project Description: Substation Yard Expansion
Zoning:
Other Reviews Required:
Review Type: Level I: Site Alteration

Distribution List:

<input type="checkbox"/> Planner	Erick Giles	<input type="checkbox"/> Parking	John Peverada
<input type="checkbox"/> Zoning Administrator	Marge Schmuckal	<input type="checkbox"/> Design Review	Alex Jaegerman
<input type="checkbox"/> Traffic	Tom Errico	<input type="checkbox"/> Corporation Counsel	Danielle West-Chuhta
<input type="checkbox"/> Stormwater	David Senus	<input type="checkbox"/> Sanitary Sewer	John Emerson
<input type="checkbox"/> Fire Department	Chris Pirone	<input type="checkbox"/> Inspections	Tammy Munson
<input type="checkbox"/> City Arborist	Jeff Tarling	<input type="checkbox"/> Historic Preservation	Deb Andrews
<input type="checkbox"/> Engineering	David Margolis-Pineo	<input type="checkbox"/> Outside Agency	
		<input type="checkbox"/> DRC Coordinator	Phil DiPierro

Comments due by: August 10, 2011



14 Gabriel Drive
Augusta, ME 04330

207.620.3800 PHONE
207.621.8226 FAX

www.TRCSolutions.com

July 29, 2011

Barbara Barhydt
Development Review Services Manager
Planning Division
389 Congress Street 4th Floor
Portland, ME 04101

Re: Level 1 Site Alteration Permit Application for the Central Maine Power Company (CMP)
Bishop Street Substation Expansion, Portland, Maine

Dear Barbara:

Enclosed is the Site Alteration application for the CMP Bishop Street Substation that we discussed back in late May. The substation expansion is important to improving electrical transmission and distribution service to that portion of Portland and neighboring Westbrook. The proposed work includes expanding the substation yard to include an additional 4,575 square-feet of impervious surface, adding specific electrical components, and adding a control house. I will be preparing a building permit application for the control house for submission within the next week or two.

Thanks for your advice and guidance with the project and I hope the application provides all the information the City staff needs to have for review. If there is anything I need to add or if there are any questions please call me at your earliest convenience.

Sincerely,

A handwritten signature in blue ink, appearing to read "Mark W. Christopher", is written over a faint, larger version of the same signature.

Mark W. Christopher, MS, CWB
Environmental Scientist

Cc: CMP, TRC, File 182847
Enclosures

**Application for a
Level 1-Site Alteration Development Permit**

**Central Maine Power Company
Bishop Street Substation Expansion
Portland, Maine**

Prepared for:

**Central Maine Power Company
83 Edison Drive
Augusta, ME 04336**

Prepared by:

**TRC Companies, Inc.
14 Gabriel Drive
Augusta, ME 04330**

July 2011



EXHIBITS

- Exhibit 1: Level 1 – Site Alteration Development Review Application Form
- Exhibit 2: Project Summary
- Exhibit 3: Documentation of Title, Right or Interest
- Exhibit 4: Financial and Technical Capability
- Exhibit 5: Key Resumes
- Exhibit 6: Boundary Survey
- Exhibit 7a: Existing Conditions Plan & Proposed Substation Expansion Site Plan
- Exhibit 7b: Stormwater Plan Details & Erosion Control plan
- Exhibit 7c: Control House Floor Plan & Exterior Elevation

EXHIBIT 1

**LEVEL 1-SITE ALTERATION DEVELOPMENT REVIEW
APPLICATION FORM**



Level I – Site Alteration Development Review Application Portland, Maine

Planning and Urban Development Department
Planning Division

Portland's Planning and Urban Development Department coordinates the development review process for site plan, subdivision and other applications under the City's Land Use Code. Attached is the application form for a Level I: Site Alteration site plan.

Level I: Site Alteration Development includes:

- Alteration of a watercourse or wetland as defined in Section 14-47 of the City Code.
- Alteration of a site. The disturbance of land areas of less than one (1) acre that are stripped, graded, grubbed, filled or excavated. The Planning Authority shall exempt from review the loam and seeding of lawns and the cumulative placement of less than fifteen (15) cubic yards of fill on any lot provided such loaming or placement does not alter a drainage course, swale, wetland or redirect water onto adjoining property and does not violate any other provision of the Portland City Code or state or federal law. "Disturbed area" does not include routine maintenance, but does include re-development and new impervious areas.
- The construction of any temporary or permanent parking area, paving of existing unpaved surface parking areas between 1,000 and 7,500 square feet, or creation of other impervious surface areas between 1,000 and 7,500 square feet.
- The rehabilitation or reconstruction, but not new construction, of piers, docks, wharves, bridges, retaining walls, and other structures located within the shoreland zone.
- A site alteration in which vehicle access is proposed from more than one (1) street;

The Land Use Code (including Article V), the Technical Manual, and the Design Manual are available on the City's web site at <http://www.portlandmaine.gov/planning/default.asp> or copies may be purchased at the Planning Division Office.

Planning Division
Fourth Floor, City Hall
389 Congress Street
(207) 874-8721

Office Hours
Monday thru Friday
8:00 a.m. – 4:30 p.m.

PROJECT NAME: Central Maine Power Co. Bishop Street Substation Expansion

PROPOSED DEVELOPMENT ADDRESS:

116 Bishop Street

PROJECT DESCRIPTION:

Expansion of the substation yard by 5,000 sqft. Addition of electrical components such as breakers, distribution line, transformer, and control house.

CHART/BLOCK/LOT: 293/C/16

CONTACT INFORMATION:

Applicant – must be owner, Lessee or Buyer Name: Central Maine Power Company Business Name, if applicable: c/o Gerry Mirabile Address: 83 Edison Drive City/State: Augusta, ME Zip Code: 04336	Applicant Contact Information Work # 207-626-9557 Home# Cell # 207-242-1682 Fax# 207-626-4044 e-mail: gerry.mirabile@cmpco.com
Owner – (if different from Applicant) Name: Address: City/State : Zip Code:	Owner Contact Information Work # Home# Cell # Fax# e-mail:
Agent/ Representative Name: TRC Engineers Mark Christopher Address: 14 Gabriel Drive City/State : Augusta, ME Zip Code: 04330	Agent/Representative Contact information Work # 207-620-3844 Cell # 207-441-4225 e-mail: mchristopher@trcsolutions.com
Billing Information Name: TRC Mark Christopher Address: Same as above City/State : Zip Code:	Billing Information Work # Same as above Cell # Fax# e-mail:

Engineer Name: TRC Engineers (Paul Nadeau) Address: 400 Southborough Dr City/State: S. Portland, ME Zip Code: 04106	Engineer Contact Information Work # 207-879-1930 (129) Cell # Fax# e-mail: pnadeau@trcsolutions.com
Surveyor Name: TRC Engineers (Dan Butler) Address: 249 Western Ave City/State: Augusta, ME Zip Code: 04330	Surveyor Contact Information Work # 207-621-7061 Cell # Fax# e-mail: dbutler@trcsolutions.com

APPLICATION FEES:

Check all reviews that apply. Payment may be made by Check or Cash addressed to the City of Portland.

Level I Site Alteration Site Plan <input checked="" type="checkbox"/> Application Fee (\$200.00) The City invoices separately for the following: <ul style="list-style-type: none"> • Notices (\$.75 each) • Legal Ad (% of total Ad) • Planning Review (\$40.00 hour) • Legal Review (\$75.00 hour) Third party review is assessed separately.	Fees Paid (office use) —
Performance Guarantee: A performance guarantee is required to cover all public and private site improvements.	Required
Inspection Fee: An inspection fee of 2% of the performance guarantee is due prior to the release of permits	2% of the performance guarantee

Application Check List


Refer to the application checklist for a detailed list of submittal requirements.

As of December 1, 2010, all site plans and written application materials must be uploaded to a website for review. At the time of application, instructions for uploading the plans will be provided to the applicant. One paper set of the plans, written materials and application fee must be submitted to the Planning Division Office to start the review process.

Portland's development review process and requirements are outlined in the Land Use Code (Chapter 14), which includes the Subdivision Ordinance (Section 14-491) and the Site Plan Ordinance (Section 14-521).

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Planning Authority and Code Enforcement's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

This application is for a Site Plan review only, a Performance Guarantee, Inspection Fee, Building Permit Application and associated fees will be required prior to construction.

Signature of Applicant: 	Date: 7/29/11
---	-------------------------

Please refer to Article V, Site Plan of the City of Portland Land Use Code for detailed information concerning the City's site plan review process, thresholds and standards. Should you have any questions regarding the submittal requirements or any other aspect of the site plan review process, please contact the Planning Division.

PROJECT DATA

The following information is required where applicable, in order complete the application

Total Site Area	35,719	sq. ft.
Proposed Total Disturbed Area of the Site	27,635	sq. ft.
IMPERVIOUS SURFACE AREA		
• Proposed Total Paved Area	0	sq. ft.
• Existing Total Impervious Area	17,510	sq. ft.
• Proposed Total Impervious Area	22,085	sq. ft.
• Proposed Impervious Net Change	4,575	sq. ft.
PARKING SPACES		
• Existing Number of Parking Spaces		N/A
• Proposed Number of Parking Spaces		N/A
TOTAL Number of Parking Spaces		N/A

General Submittal Requirements – Level I Site Alteration

Applicant Checklist	Planner Checklist	Number of Paper Copies	Submittal Requirement
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Completed application form.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Application fees.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Written description of project.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Evidence of right, title and interest.
<input type="checkbox"/> N/A	<input type="checkbox"/>	1	Copies of required state and/or federal permits.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Written assessment of zoning.
<input type="checkbox"/> N/A	<input type="checkbox"/>	1	Written description of existing and proposed easements or other burdens.
<input type="checkbox"/> N/A	<input type="checkbox"/>	1	Written requests for waivers from individual site plan and/or technical standards.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Evidence of financial and technical capacity.

Site Plans and Boundary Survey Requirements – Level I Site Alteration

Applicant Checklist	Planner Checklist	Number of Copies	Submittal Requirement
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Boundary Survey meeting the requirements of Section 13 of the City of Portland Technical Manual.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	Site Plan Including the following:
<input checked="" type="checkbox"/>	<input type="checkbox"/>		▪ Existing structures with distance from property line (including location of proposed piers, docks or wharves if in Shoreland Zone)
<input type="checkbox"/> N/A	<input type="checkbox"/>		▪ Location and dimension of existing and proposed paved areas.
<input checked="" type="checkbox"/>	<input type="checkbox"/>		▪ Location and details of proposed infrastructure improvements (e.g. - curb and sidewalk improvements, utility connections, roadway improvements).
<input checked="" type="checkbox"/>	<input type="checkbox"/>		▪ Identification of and proposed protection measures for any significant natural features on the site (including wetlands, ponds, watercourses, floodplains, significant wildlife habitats and fisheries or other important natural features listed in Section 14-526 (b)1. of the Land Use Code.
<input type="checkbox"/> N/A	<input type="checkbox"/>		▪ Details of proposed pier rehabilitation (Shoreland areas only).
<input checked="" type="checkbox"/>	<input type="checkbox"/>		▪ Existing utilities.
<input checked="" type="checkbox"/>	<input type="checkbox"/>		▪ Existing and proposed grading and contours.
<input checked="" type="checkbox"/>	<input type="checkbox"/>		▪ Proposed stormwater management and erosion controls.
<input checked="" type="checkbox"/>	<input type="checkbox"/>		▪ Total area and limits of proposed land disturbance.
<input checked="" type="checkbox"/>	<input type="checkbox"/>		▪ Existing vegetation to be preserved and proposed site landscaping.
<input checked="" type="checkbox"/>	<input type="checkbox"/>		▪ Existing and proposed easements or public or private rights of way.

Site Plan Standards for Review of Level I: Site Alteration

Level I: Site alteration plans shall only be subject to the following site plan standards, as applicable, as contained in section 14-526:

- (a) Transportation standards
 - 1, 2, and 4.
- (b) Environmental quality standards
 - 1. and 3.
- (c) Public infrastructure and community safety standards.
 - 1.
- (d) Site design standards
 - 5, 6, 8 and 9.

Except as provided in article III, or to conditions imposed under section 14-526(e) only, or to those submission requirements set forth in section 14-527 as relate solely thereto.



PORTLAND FIRE DEPARTMENT SITE REVIEW FIRE DEPARTMENT CHECKLIST



A separate drawing[s] shall be provided to the Portland Fire Department for all site plan reviews.

1. Name, address, telephone number of applicant.
2. Name address, telephone number of architect
3. Proposed uses of any structures [NFPA and IBC classification]
4. Square footage of all structures [total and per story]
5. Elevation of all structures
6. Proposed fire protection of all structures
 - **As of September 16, 2010 all new construction of one and two family homes are required to be sprinkled in compliance with NFPA 13D. This is required by City Code. (NFPA 101 2009 ed.)**
7. Hydrant locations

EXHIBIT 2
PROJECT SUMMARY

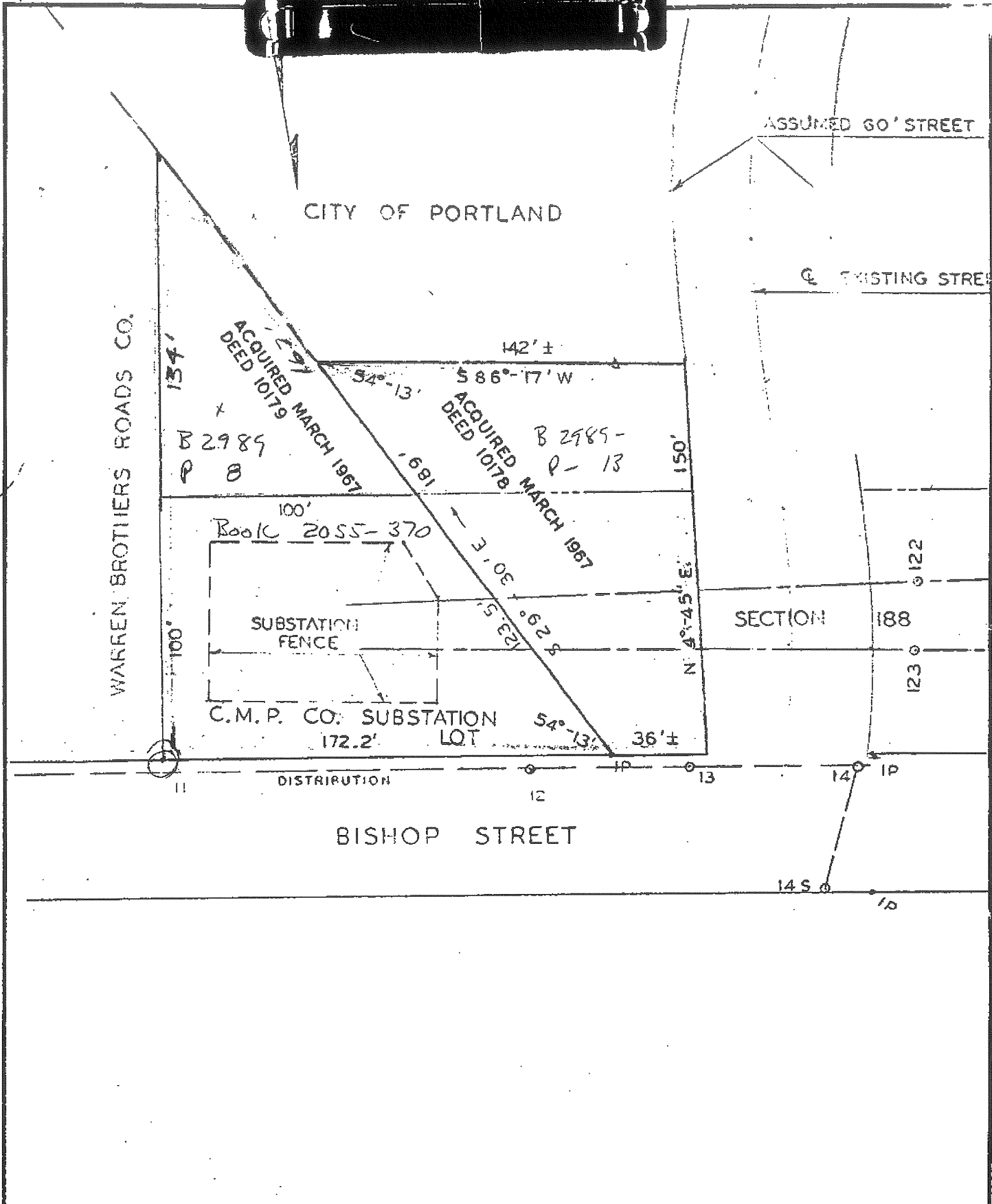
PROJECT SUMMARY

Central Maine Power Company (CMP) is expanding the existing Bishop Street 34.5 kV substation and installing several new electrical components and a control house. The substation is located at 116 Bishop Street (tax map 293-C-16) on a 0.82 acre parcel. The substation and proposed expansion area is within an area zoned as Industrial use and the site is surrounded by industrial and commercial uses. The substation expansion involves expanding the west fence line boundary 30 feet to the west and the south fence line boundary 24 feet to the south. The total area of new impervious expansion is approximately 4,575 square-feet. Outside the fence line the site will be stabilized with pervious materials such as riprap. New components that will be installed include adding two 34.5 kV breakers, adding a fourth distribution circuit into the existing switchgear, and replacing existing transformer T1 with a new transformer. The breakers and transformer are all supported by new concrete slab foundations. A control house will be constructed within the southeast corner to the expanded portion of the substation yard. The control house contains the monitoring and protection and control components of the substation. It is largely a prefabricated steel building 16 feet by 24 feet on a concrete slab foundation.

The project components will improve service and reliability to residents and businesses that are served by the distribution circuits that originate from this substation. These areas largely include the west side of Portland including industrial, commercial, and residential areas, and many parts of Westbrook, which are largely residential. Expansion of the substation yard is necessary to provide the area for the control house, access for low-bed trailer trucks to bring in the new transformer, improve the grounding grid, and create room for possible future expansion. The entire site expansion will require approximately 1,000 cubic yards of fill including crush rock, gravel, and riprap.

EXHIBIT 3

DOCUMENTATION OF TITLE, RIGHT, or INTEREST



BY FBC	NO.	REVISION	DATE	BY
CK.	1	CHANGES	1-27-67	FBC
APPR.	2	CHANGES	2-1-67	FBC
	3	CORRECT BEARINGS	2-17-67	PL

BISHOP ST. SUBSTATION LOT
PORTLAND

CENTRAL MAINE POWER COMPANY
DEPARTMENT

ENG. PREVIEW	WORK ORDER	ACCOUNT
--------------	------------	---------

10179

51

(CORPORATION)

Warranty Deed

From

WARREN BROTHERS COMPANY

To

CENTRAL MAINE POWER COMPANY

Dated March 13, 19 67

State of Maine,

ss. Registry of Deeds,

Received MAR 17 1967, 19

at H., M., M., and
recorded in Book , Page

Attest: Register.

FROM THE OFFICE OF
Verrill Dana Philbrick
Whitehouse & Putnam
57 Exchange Street
Portland, Maine

LURING, SHORT & HARMON, LAW STATIONERS
PORTLAND MAINE

SEARCHED	INDEXED
SERIALIZED	FILED
MAR 17 1967	
FBI - PORTLAND	
HARRIS	

H.S.A. 67-11/13470-30
Verrill Dana Philbrick
Whitehouse & Putnam
57 Exchange Street
Portland, Maine

(90)

Know all Men by these Presents,

That WARREN BROTHERS COMPANY, formerly known as ~~Company,~~
Delaware Roads Company, a Delaware
a corporation organized and existing under the laws of the State
of Delaware and located at Cambridge
in the County of Middlesex and State of Massachusetts
in consideration of One Dollar (\$1.00) and other valuable
considerations, and being less than One
Hundred (\$100.00) Dollars

paid by CENTRAL MAINE POWER COMPANY, a corporation duly
organized and existing under the Laws of the State
of Maine and located at Portland in the County of
Cumberland and State of Maine

the receipt whereof it does hereby acknowledge, does hereby give.

grant, bargain, sell and convey, unto the said CENTRAL MAINE POWER

COMPANY, its successors ~~hereby~~ and assigns forever,

a certain lot or parcel of land situated in the City of Portland,
County of Cumberland and State of Maine, bounded and described as
follows:

Beginning at a stake at the southwesterly corner of a lot conveyed
to the Central Maine Power Company by Warren Brothers Roads Company
by deed dated November 15, 1951 and recorded in the Cumberland
County Registry of Deeds in Book 2055, Page 370, thence easterly
by the southerly side line of said lot one hundred (100) feet to the
southeasterly corner of said lot; thence southerly at right angles
to the last described course one hundred thirty-four (134) feet,
more or less, to a point in the dividing line between land of the
Grantor and land conveyed to the City of Portland by Administrator's
deed of James Gulliver dated August 23, 1935 and recorded in said
Registry of Deeds in Book 1476, Page 441; thence North 29°30' West
along said dividing line one hundred sixty-seven (167) feet, more
or less, to the point of beginning.

Being a part of the property conveyed to Delaware Roads Company as
Parcel 1 by Warren Brothers Company by deed dated August 25, 1965
and recorded in said Registry of Deeds in Book 2974, Page 513.

The name of the Delaware Roads Company was changed to Warren
Brothers Company on August 8, 1966.

To have and to hold, the aforegranted and bargained premises
with all the privileges and appurtenances thereof to the said

CENTRAL MAINE POWER COMPANY, its successors

heirs and assigns, to its and their use and behoof forever.

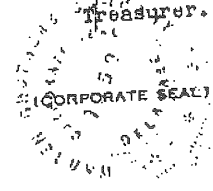
And the said Grantor Corporation does hereby COVENANT with the
said Grantee, its ^{successors} ~~heirs~~ and assigns, that it is lawfully seized
in fee of the premises, that they are free of all incumbrances;

that it has good right to sell and convey the same to the said
Grantee to hold as aforesaid; and that it and its successors,
shall and will WARRANT AND DEFEND the same to the said Grantee,
successors ~~heirs~~ and assigns forever, against the lawful claims and
demands of all persons.

In Witness Whereof, the said Warren Brothers Company has caused this instrument to be sealed with its corporate seal and signed in its corporate name by WAYNE O. WHITING, its Treasurer, thereunto duly authorized, this 13th day of March in the year one thousand nine hundred and sixty-seven.

Signed, Sealed and Delivered in presence of
Kenneth S. Cleary Warren Brothers Company.

By *Wayne O. Whiting* Treasurer.

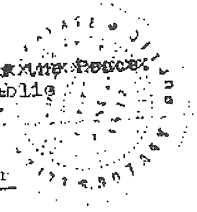


~~State of Maine~~
COMMONWEALTH OF MASSACHUSETTS
County of *Middlesex* ss. *March 13, 1967*

Then personally appeared the above named *Wayne O. Whiting* Treasurer of said Grantor Corporation as aforesaid, and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of said corporation.

Before me.

Joseph M. Harvey Notary Public



REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE MAR 17 1967
Received at 1:04 P.M. and recorded in
BOOK 2989 PAGE 8 *Edward P. Taylor* Register

10178

Quit-Claim Deed

CORPORATION - WITH COVENANT

Front

THE CITY OF PORTLAND

To

CENTRAL MAINE POWER COMPANY

Dated Feb 27, 1957

State of Maine

Registry of Deeds

Received MAR 17 1967 19

at H., M., and

recorded in Book Page

Attest:

Register

FROM THE OFFICE OF
Verrill Dana Philbrick
Whitehouse & Putnam
57 Exchange Street
Portland, Maine

LORING, SHORT & HARMON, LAW STATIONERS
PORTLAND, MAINE

C. AMES CO. NOTATIONS
OPER. DEPT. <i>WHAZ</i> OK AS TO SUBSTANTIVE
LEI <i>quy</i>
TR. DEPT. H. INDEXED & APPROVED <i>WJ</i>
CLAIMS DEPT. NOTED & APPROVED <i>WJ</i>
RECORDS INDEXED <i>WJ</i> 6/19/67
PLANT
DN FOR PLANT <i>Harris</i>

W.O.# 69-91/342050

Ch. # 7747

Received of fee

Amount \$ 115.00

1-61

(24)

1935
11/16/35
12/16/35

10128
10

Portland
Maine

Know all Men by these Presents,

That THE CITY OF PORTLAND

Municipal
a Corporation organized and existing under the laws of the State
of Maine and located at Portland
in the County of Cumberland and State of Maine
in consideration of ONE DOLLAR (\$1.00) and other valuable
considerations

paid by CENTRAL MAINE POWER COMPANY, a corporation duly organized
and existing under the laws of the State of Maine and
located at Portland in said County and State of Maine

the receipt whereof it does hereby acknowledge, does hereby release,
release, bargain, sell and convey, and forever quit-claim unto the said

CENTRAL MAINE POWER COMPANY,
its successors hereinafter and assigns forever,

A certain lot or parcel of land on the southerly side of
Bishop Street in said City of Portland, in said County
and State of Maine, bounded and described as follows:

Beginning at an iron pipe located in the southerly side
line of Bishop Street in the dividing line between land
of the Grantor and land conveyed to the Grantee by
Warren Brothers Roads Company by deed dated December 16,
1951 and recorded in the Cumberland County Registry of
Deeds in Book 2055, Page 370, said pipe being one hundred
seventy-two and two tenths (172.2) feet, more or less,
westerly as measured along said southerly side line of
said Bishop Street from the northeasterly corner of the
Grantee's substation lot, so-called; thence South 29°
30' East along said dividing line one hundred eighty-nine
(189) feet to a point in the dividing line between land
of the Grantor and land formerly of said Warren Brothers
Roads Company; thence South 86°17' West one hundred forty-
two (142) feet; thence North 4°45' East one hundred fifty
(150) feet, more or less, to a point in the southerly side
line of said Bishop Street; thence easterly by said Bishop
Street a distance of thirty-six (36) feet, more or less, to
the point of beginning.

Reserving all rights and easements previously conveyed to
the Grantee as lie within the limits of the above described
parcel.

Also conveying a right of way to the Grantee along the
traveled way as located along the westerly side of the
parcel herein conveyed for the purpose of egress and
ingress to said parcel.

Being a part of the same property as conveyed to the Grantor
by Administrator's deed of James Gulliver dated August 23,
1935 and recorded in said Registry of Deeds in Book 1476,
Page 441.

To Have and to Hold the same, together with all the privileges and appurtenances thereunto belonging, to the said

CENTRAL MAINE POWER COMPANY, its successors

Heirs and Assigns forever.

And the said Grantor Corporation does covenant with the said CENTRAL MAINE POWER COMPANY, its successors

Heirs and Assigns, that it will Warrant and Forbear Defend the premises to the said Grantee, its successors Heirs and Assigns forever, against the lawful claims and demands of all persons claiming by, through, or under it.

In Witness Whereof, the said THE CITY OF PORTLAND

has caused this instrument to be sealed with its corporate seal and signed in its corporate name by John E. Menario

its Director of Finance thereunto duly authorized, this 27th day of February in the year one thousand nine hundred and sixty-seven.

Signed, Sealed and Delivered in presence of

Patricia E. Mealey

THE CITY OF PORTLAND
By *John E. Menario*
Director of Finance

(Corporate Seal)



State of Maine, } ss.
Cumberland

February 27, 1967

Personally appeared the above named John E. Menario, Director of Finance of said Grantor Corporation

as aforesaid, and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of said corporation.

Before me, *Patricia E. Mealey*
Notary Public

MAR 17 1967
REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 11:54 AM, and recorded in
BOOK 2989 PAGE 13 *Local RT* Register

Chubbick
pp 10 5/14 3/3017

Quit-Claim Deed
(WITH COVENANT)

FROM

WARREN BROTHERS ROADS COMPANY

TO

CENTRAL MAINE POWER COMPANY

Dated November 19 51

Cumberland Registry at Meads

Received NOV 17 1951

at 10 A.M. 57 N. 22 and

recorded in Book 2055 Page 370

ATTEST:
Robert W. Camp Registrar

FROM THE OFFICE OF

VERRELL DANA WALKER PHILBRIK
& WHITEHOUSE

No. 101, REGENTS OFFICE SUPPLY COMPANY
Portland - Maine - Lewiston

5017

10-57

Know all Men by these Presents,

That WARREN BROTHERS ROADS COMPANY, a corporation organized and existing under the laws of the Commonwealth of Massachusetts and having its principal place of business in Cambridge in the County of Middlesex and said Commonwealth of Massachusetts

in consideration of One Dollar (\$1.00) and other valuable considerations

paid by CENTRAL MAINE POWER COMPANY, a corporation duly organized and existing under the laws of the State of Maine and having its principal place of business at Augusta in the County of Kennebec and State of Maine,

the receipt whereof it does hereby acknowledge, do hereby remise, release, bargain, sell and convey, and forever quit-claim unto the said CENTRAL MAINE POWER COMPANY, its successors **Heirs and Assigns forever,**

a certain lot or parcel of land situated in Portland in the County of Cumberland and State of Maine and bounded and described as follows:

Beginning at an iron pipe set in the Southerly side of Bishop Street on the line of land of the City of Portland and at the Northwesterly corner of the lot hereby conveyed; thence Southeasterly by said City of Portland land one hundred twenty-three (123) feet to a stake; thence Easterly parallel with and one hundred (100) feet Southerly at right angles from said Southerly side of Bishop Street one hundred (100) feet to a stake; thence Northerly at right angles to the last course one hundred (100) feet to Bishop Street; thence Westerly by said Bishop Street one hundred seventy-two (172) feet to the point of beginning. Being a part of the premises conveyed to this Grantor by Annie G. Atwood by deed dated April 10, 1916 and recorded in Cumberland County Registry of Deeds in Book 1817, Page 127.

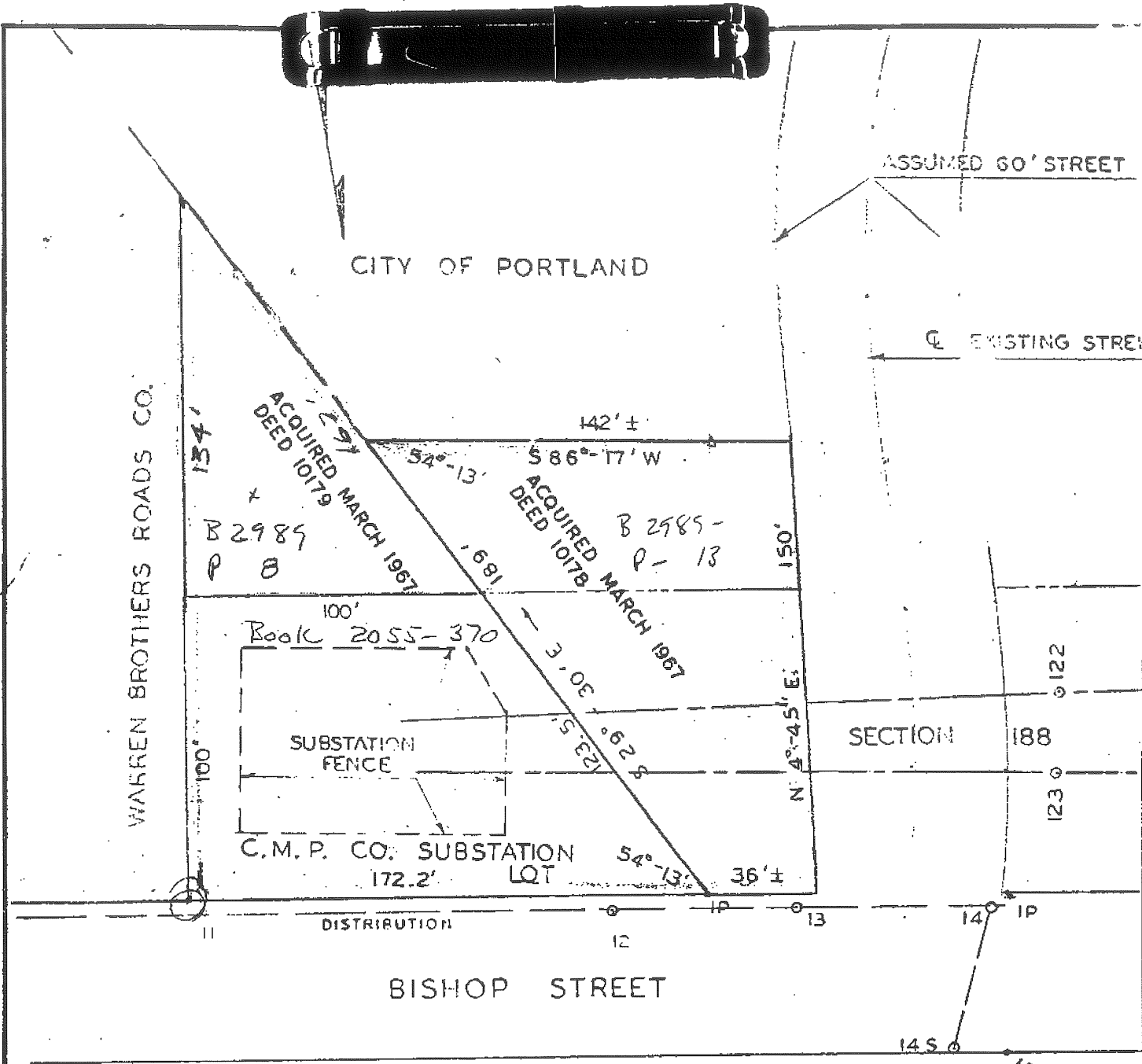
This conveyance is made subject to the right of the Grantor to store and use chemicals on its land adjoining the above described premises and the Grantee by the acceptance of this deed covenants and agrees that no claim shall accrue to it, its successors and assigns for damage to its substation to be built on said premises or to any equipment used in connection therewith by reason of such storage or use of chemicals on said adjoining land by the Grantor, its successors and assigns.

This conveyance is also made subject to the right of the Grantor to operate an asphalt paving plant on Bishop Street and the Grantee by the acceptance of this deed covenants and agrees that no claim shall accrue to it, its successors or assigns, for damage to its substation to be built on said premises or to any equipment used in connection therewith by reason of such operation by the Grantor, its successors or assigns.

On here and in hold the same, together with all the
privileges and appurtenances thereunto belonging to it
the said Central Maine Power Company, its successors

~~here~~ assigns forever, except as aforesaid.

And it do as ~~impart~~ with the said grantee its successors
and assigns, that it will warrant and forever defend the premises
to it the said grantee its successors and assigns forever,
against the lawful claims and demands of all persons claiming by
through, or under it, except as aforesaid.



BY	FBC	NO.	REVISION	DATE	BY
CK.		1	CHANGES	1-27-67	FBC
APPR.		2	CHANGES	2-1-67	FBC
		3	CORRECT BEARINGS	2-17-67	FBC

BISHOP ST. SUBSTATION LOT
PORTLAND

CENTRAL MAINE POWER COMPANY
DEPARTMENT

ENG. PREVIEW WORK ORDER ACCOUNT

10179

Quit-Claim Deed

CORPORATION - WITH COVENANT

From

THE CITY OF PORTLAND

To

CENTRAL MAINE POWER COMPANY

Dated Feb. 27, 1967

State of Maine.

Registry of Deeds

Received MAR 17 1967 19

at H., M., and

recorded in Book Page

Attest:

Register.

FROM THE OFFICE OF
Verrill Dana Philbrick
Whitehouse & Putnam
57 Exchange Street
Portland, Maine

LORING, SHORT & HARMON, LAW STATIONERS
PORTLAND, MAINE

C. M. & H. CO. NOTATIONS	
OPER. DEPT. OK AS TO SUBSTANCE	WHARF
LEA	9/24
TR. DEPT. REVIEWED & APPROVED	MM
CLAIMS DEPT. REVIEWED & APPROVED	HAB
NOTED	LOTT 6/14/67
PLANT	
OK FOR PLUNG	Hansen

77-01-27 47-11/34-20 80

CA. # 77978

Proceeds # 72

6/15/67

1-4-1

Know all Men by these Presents,

1918
Portland
12/16/17

That THE CITY OF PORTLAND

Municipal

a/Corporation organized and existing under the laws of the State

of Maine and located at Portland

in the County of Cumberland and State of Maine

in consideration of ONE DOLLAR (\$1.00) and other valuable considerations

paid by CENTRAL MAINE POWER COMPANY, a corporation duly organized and existing under the laws of the State of Maine and located at Portland in said County and State of Maine

the receipt whereof it does hereby acknowledge, does hereby grant,

release, bargain, sell and convey, and forever quit-claim unto the said

CENTRAL MAINE POWER COMPANY,
its successors

heirs and assigns forever,

A certain lot or parcel of land on the southerly side of Bishop Street in said City of Portland, in said County and State of Maine, bounded and described as follows:

Beginning at an iron pipe located in the southerly side line of Bishop Street in the dividing line between land of the Grantor and land conveyed to the Grantee by Warren Brothers Roads Company by deed dated December 16, 1951 and recorded in the Cumberland County Registry of Deeds in Book 2055, Page 370, said pipe being one hundred seventy-two and two tenths (172.2) feet, more or less, westerly as measured along said southerly side line of said Bishop Street from the northeasterly corner of the Grantee's substation lot, so-called; thence South 29° 30' East along said dividing line one hundred eighty-nine (189) feet to a point in the dividing line between land of the Grantor and land formerly of said Warren Brothers Roads Company; thence South 85° 17' West one hundred forty-two (142) feet; thence North 4° 45' East one hundred fifty (150) feet, more or less, to a point in the southerly side line of said Bishop Street; thence easterly by said Bishop Street a distance of thirty-six (36) feet, more or less, to the point of beginning.

Reserving all rights and easements previously conveyed to the Grantee as lie within the limits of the above described parcel.

Also conveying a right of way to the Grantee along the traveled way as located along the westerly side of the parcel herein conveyed for the purpose of egress and ingress to said parcel.

Being a part of the same property as conveyed to the Grantor by Administrator's deed of James Gulliver dated August 23, 1935 and recorded in said Registry of Deeds in Book 1476, Page 441.

To Have and to Hold the same, together with all the privileges and appurtenances thereunto belonging, to the said

CENTRAL MAINE POWER COMPANY, its successors

Heirs and Assigns forever.

And the said Grantor Corporation does covenant with the said CENTRAL MAINE POWER COMPANY, its successors

Heirs and Assigns, that it will warrant and forever defend the premises to the said Grantee, its successors Heirs and Assigns forever, against the lawful claims and demands of all persons claiming by, through, or under it.

In Witness Whereof, the said THE CITY OF PORTLAND

has caused this instrument to be sealed with its corporate seal and signed in its corporate name by John E. Menario its Director of Finance thereunto duly authorized, this 27th day of February in the year one thousand nine hundred and sixty-seven.

Signed, Sealed and Delivered in presence of

Patricia E. Mearley

THE CITY OF PORTLAND
By *John E. Menario*
Director of Finance

(Corporate Seal)



State of Maine }
Cumberland

February 27, 1967

Personally appeared the above named John E. Menario, Director of Finance of said Grantor Corporation

as aforesaid, and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of said corporation.

Before me,

Patricia E. Mearley
Notary Public

MAR 17 1967

REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 1154 W. St. and recorded in
BOOK 2989 PAGE 13

Register

Philbrick 2-1911
810 5/12 5/17

Quit-Claim Deed
(WITH COVENANT)

FROM
WARREN BROTHERS ROADS COMPANY
TO
CENTRAL MAINE POWER COMPANY

Dated November 19 1951

Subscribed in presence of Register of Deeds
Received NOV 17 1951
at 10 H. 57 M. A. M., and
recorded in Book 2055 Page 370.

ATTEST:
Robert W. Camp, Registrar

FROM THE OFFICE OF
VERRILL DANA WALKER PHILBRICK
& WHITCHOUSE

No. 101, Rooms 18, Office Supply Company
Portland - Maine - Lewiston

5017

10-57

Know all Men by these Presents,

That WARREN BROTHERS ROADS COMPANY, a corporation organized and existing under the laws of the Commonwealth of Massachusetts and having its principal place of business in Cambridge in the County of Middlesex and said Commonwealth of Massachusetts

in consideration of One Dollar (\$1.00) and other valuable considerations

paid by CENTRAL MAINE POWER COMPANY, a corporation duly organized and existing under the laws of the State of Maine and having its principal place of business at Augusta in the County of Kennebec and State of Maine, the receipt whereof it does hereby acknowledge, do hereby remise,

release, bargain, sell and convey, and forever quit-claim unto the said CENTRAL MAINE POWER COMPANY, its successors Heirs and Assigns forever,

a certain lot or parcel of land situated in Portland in the County of Cumberland and State of Maine and bounded and described as follows:

Beginning at an iron pipe set in the Southerly side of Bishop Street on the line of land of the City of Portland and at the Northwesterly corner of the lot hereby conveyed; thence Southeasterly by said City of Portland land one hundred twenty three (123) feet to a stake; thence Easterly parallel with and one hundred (100) feet Southerly at right angles from said Southerly side of Bishop Street one hundred (100) feet to a stake; thence Northerly at right angles to the last course one hundred (100) feet to Bishop Street; thence Westerly by said Bishop Street one hundred seventy two (172) feet to the point of beginning. Being a part of the premises conveyed to this Grantor by Annie G. Atwood by deed dated April 10, 1946 and recorded in Cumberland County Registry of Deeds in Book 1815, Page 127.

This conveyance is made subject to the right of the Grantor to store and use chemicals on its land adjoining the above described premises and the Grantee by the acceptance of this deed covenants and agrees that no claim shall accrue to it, its successors and assigns for damage to its substation to be built on said premises or to any equipment used in connection therewith by reason of such storage or use of chemicals on said adjoining land by the Grantor, its successors and assigns.

This conveyance is also made subject to the right of the Grantor to operate an asphalt paving plant on Bishop Street and the Grantee by the acceptance of this deed covenants and agrees that no claim shall accrue to it, its successors or assigns, for damage to its substation to be built on said premises or to any equipment used in connection therewith by reason of such operation by the Grantor, its successors or assigns.

To have and to hold the same, together with all the
privileges and appurtenances thereunto belonging to it
the said Central Maine Power Company, its successors

~~and~~ assigns forever, except as aforesaid.

And it do ~~as~~ ~~in~~ ~~the~~ ~~said~~ ~~grantee~~, its successors
and assigns, that it will warrant and forever defend the premises
to it the said Grantee, its successors, and assigns forever,
against the lawful claims and demands of all persons claiming by,
through, or under it, except as aforesaid.

10179

51

(CORPORATION)

Warranty Deed

From

WARREN BROTHERS COMPANY

To

CENTRAL MAINE POWER COMPANY

Dated March 13, 19 67

State of Maine.

ss. Registry of Deeds.

Received MAR 17 1967, 19

at H., M., and

recorded in Book Page

Attest: Register.

FROM THE OFFICE OF
Verrill Dana Philbrick
Whitehouse & Putnam
57 Exchange Street
Portland, Maine

LORING, SHORT & HARMON, LAW STATIONERS
PORTLAND, MAINE

CLERK	MS
GENERAL	10179
DATE	3/13/67
BY	guy
CLERK	ABB
ADD.	
NO.	10-44 3/13/67
PLANT	
RECORDS	
CK. BY	
FILED	Hurley

77-6-4 67-7-11/3426-30
Verrill Dana Philbrick
Whitehouse & Putnam
57 Exchange Street
Portland, Maine

1-9

1966
7/27/66
4/21

Know all Men by these Presents,

That WARREN BROTHERS COMPANY, formerly known as ~~Delaware Roads Company~~ **Company,**
Delaware Roads Company, a Delaware

a corporation organized and existing under the laws of the State
of Delaware and located at Cambridge

in the County of Middlesex and State of Massachusetts

in consideration of One Dollar (\$1.00) and other valuable
considerations, and being less than One
Hundred (\$100.00) Dollars

paid by CENTRAL MAINE POWER COMPANY, a corporation duly
organized and existing under the Laws of the State
of Maine and located at Portland in the County of
Cumberland and State of Maine

the receipt whereof it does hereby acknowledge, does hereby give,

grant, bargain, sell and convey, unto the said CENTRAL MAINE POWER

COMPANY, its successors ~~holds~~ and assigns forever,

a certain lot or parcel of land situated in the City of Portland,
County of Cumberland and State of Maine, bounded and described as
follows:

Beginning at a stake at the southwesterly corner of a lot conveyed
to the Central Maine Power Company by Warren Brothers Roads Company
by deed dated November 16, 1951 and recorded in the Cumberland
County Registry of Deeds in Book 2055, Page 370, thence easterly
by the southerly side line of said lot one hundred (100) feet to the
southeasterly corner of said lot; thence southerly at right angles
to the last described course one hundred thirty-four (134) feet,
more or less, to a point in the dividing line between land of the
Grantor and land conveyed to the City of Portland by Administrator's
deed of James Gulliver dated August 23, 1935 and recorded in said
Registry of Deeds in Book 1476, Page 441; thence North 29°30' West
along said dividing line one hundred sixty-seven (167) feet, more
or less, to the point of beginning.

Being a part of the property conveyed to Delaware Roads Company as
Parcel 1 by Warren Brothers Company by deed dated August 25, 1965
and recorded in said Registry of Deeds in Book 2974, Page 513.

The name of the Delaware Roads Company was changed to Warren
Brothers Company on August 8, 1966.

To have and to hold, the aforegranted and bargained premises
with all the privileges and appurtenances thereof to the said

CENTRAL MAINE POWER COMPANY, its successors

heirs and assigns, to its and their use and behoof forever.

And the said Grantor Corporation does hereby COVENANT with the
said Grantee, its ^{successors} ~~heirs~~ and assigns, that it is lawfully seized
in fee of the premises, that they are free of all incumbrances;

that it has good right to sell and convey the same to the said
Grantee to hold as aforesaid; and that it and its successors,
shall and will WARRANT AND DEFEND the same to the said Grantee,
successors ~~heirs~~ and assigns forever, against the lawful claims and
demands of all persons.

In Witness Whereof, the said

Warren Brothers

Company has caused this instrument to be sealed with its corporate

seal and signed in its corporate name by WAYNE O. WHITING

, its Treasurer,

thereunto duly authorized, this 13th

day of March

in the year one thousand nine hundred and

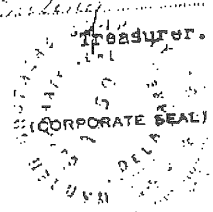
sixty-seven.

Signed, Sealed and Delivered
in presence of

Kenneth S. Cleaves

Warren Brothers Company.

By Wayne O. Whiting
Treasurer.



~~State of Massachusetts~~
COMMONWEALTH OF MASSACHUSETTS

County of Middlesex

ss.

March 13, 1967

Then personally appeared the above named Wayne O.

Treasurer of said Grantor

Whiting

Corporation as aforesaid, and acknowledged the foregoing instrument

to be his free act and deed in his said capacity, and the free act

and deed of said corporation.

Before me,

Richard M. Savage
Notary Public



REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE MAR 17 1967

Received at 1:07 PM, and recorded in

BOOK 2989 PAGE 8

Register

EXHIBIT 4
FINANCIAL AND TECHNICAL CAPABILITY

CMP Financial Capacity

The total cost of the Bishop Street Substation expansion is estimated at \$2.94 million. This includes costs for design, permitting, and construction. This work will be financed by CMP and will be financially responsible for operation and maintenance of the transmission line.

CMP is a wholly owned subsidiary of IBERDROLA USA, a Spain-based holding company primarily engaged in the energy sector. On December 31, 2007 Energy East (precursor of IBERDROLA USA) had book equity capital of \$3.2 billion and assets of \$11.9 billion on a consolidated basis. On May 28, 2008, Energy East Corporation and its subsidiaries had a debt and equity market capitalization of approximately \$8 billion. On December 31, 2007, CMP had a book equity capital of \$754 million and assets of \$1,950 million¹.

CMP has direct access to the debt capital markets through its medium-term note program (MTN), under which it issues unsecured long-term debt. There is \$355 million in MTNs outstanding at an currently average coupon of 5.92%. All of the currently outstanding long-term debt has been issued since 2001. CMP's MTNs are rated BBB+ by S&P, A3 by Moody's, A- by Fitch.

CMP is a party to a joint revolving credit facility along with five other Energy East regulated affiliate companies. CMP has access to up to \$100 million in short-term credit through this facility and is able to borrow at 19 basis points over the London Inter-Bank Offer Rate (LIBOR). LIBOR is a daily reference rate based on the interest rates banks offer to lend unsecured funds to other banks. LIBOR rates are widely used as a reference rate for financial instruments such as forward rate agreements, short-term interest rate futures, interest rate swaps, syndicated loans, etc. This agreement currently has an expiration date in June 2012. CMP had outstanding balances under the revolving credit agreement of \$24 million and \$28 million at December 31, 2007 and March 31, 2008, respectively. CMP has access to equity capital through the retention of earnings and from equity capital infusions from Energy East.

In addition to dividends paid to Energy East by its operating subsidiaries, Energy East has access to debt and equity capital markets and to short-term credit. Energy East's unsecured debt is rated BBB by S&P, Baa2 by Moody's, and BBB by Fitch. Energy East's most recent debt capital transaction took place in the 3rd quarter of 2006 when it issued \$500 million of 30-year debt bearing a coupon of 6.75%. Energy East has \$1.3 billion in outstanding long-term debt with an average coupon of 7.9%². In March 2007, Energy East accessed the equity markets, issuing 10 million shares of common stock, for net proceeds of \$237 million.

Energy East accesses the short-term capital markets through a \$300 million commercial paper program, backstopped by a \$300 million revolving credit facility that carries an expiration date

¹ CMP book values include Goodwill of \$325 million.

² This figure applies to the holding company only. On a consolidated basis Energy East had approximately \$4 billion of outstanding long-term debt at December 31, 2007.

of June 2012. Energy East had no commercial paper outstanding and no outstanding balances under its revolving credit facility at either December 31, 2007 or March 31, 2008. Energy East carried cash balances at the holding company of \$274 million and \$325 million at December 31, 2007 and March 31, 2008, respectively.

Technical Capability

CMP has significant experience in the development of electric infrastructure projects, and will utilize staff capabilities and consultants for this effort. To support the proposed development, CMP has retained a team of highly qualified and experienced consultants and contractors to supplement its staff. CMP has not yet chosen the contractor that will build the various project components. CMP rigorously evaluates the credentials, capabilities, staff, and experience of the contractors they hire for this type of work. They also evaluate these same aspects of the subcontractors, which must be approved by CMP.

TRC is providing civil and electrical engineering and permitting support for the substation design. TRC has over 25 years of experience working on all aspects of electrical power transmission and distribution in Maine. Experience includes environmental licensing for the Maritimes & Northeast Pipeline Project, the Bangor Hydro-Electric Company 345 kV Transmission Line Project, and design and construction management of several 115 kV transmission line and substation projects throughout the CMP service territory. Resumes for key TRC staff are attached.

EXHIBIT 5
KEY RESUMES

GARY L. BEANE, PE

EDUCATION

B.S., Engineering, University of Maine at Orono, 1983

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS

Professional Engineer, Maine (#10141), 2002

Professional Engineer, Massachusetts (#45552), 2003

Professional Engineer, Connecticut (#25034), 2005

Professional Engineer, New York (#083342), 2005

Professional Engineer, New Hampshire(#11903), 2006

Member IEEE (#85021547)

AREAS OF EXPERTISE

Mr. Gary L. Beane, PE has management and technical experience in the following general areas:

- Engineering Management
- Relay & Protection Design
- EPC Project Management
- Detailed Engineering Design
- Project Scheduling
- Project Estimating
- Bus, Transmission, Transformer, Generation Protection
- Relay & Control Cabinet Design

REPRESENTATIVE EXPERIENCE

Mr. Beane has over 23 years of experience and progressive responsibility in the electric utility industry. His qualifications include over 15 years experience in electrical engineering involving electrical control design and protective relaying. Mr. Beane's background also includes supervision and support of field construction as well as commissioning electrical controls, relaying and instrumentation systems. He currently serves in the capacity of Principal Electrical Engineer with responsibility for the project management for a team of Electrical Engineers and Designers involving cost estimating, design & construction scheduling, cost tracking and problem solving. Work environments have included transmission, distribution, substations, and hydroelectric plants.

Rochester Gas & Electric, Rochester Transmission Project – Rochester, NY (Principal Electrical Engineer: 2005 – 2006)

Mr. Beane serves as a Project Manager for this multi-year, EPC contract. Currently he is responsible for managing a team of electrical and substation designers and engineers in the installation and design of necessary substations and transmission lines to upgrade Rochester Gas and Electric Company's transmission system in the Rochester, NY area. This involves necessary scheduling and coordination between various disciplines involved to insure

prompt and economical completion within project deadlines. (Transmission, civil, structural, electrical, commissioning, etc.) He also was involved in the development and approval of equipment specifications, functional reviews of control and relaying designs and schedules for client to ensure milestone dates were met and cost over runs were avoided.

Central Maine Power Company, Calpine Energy East Project – Westbrook, ME (Electrical Engineer: 1999 – 2000)

Mr. Beane managed a team of electrical and substation designers in the installation and design of necessary substations and transmission lines to interface a new gas fired generation plant to Central Maine Power Company's transmission system. This involved necessary scheduling and coordination between various disciplines involved to insure prompt and economical completion within project deadlines. (Transmission, civil, structural, electrical, commissioning, etc.) Mr. Bean was also involved developing cost estimates for client to ensure milestone dates were met and cost over runs were avoided.

Central Maine Power Company, Red Brook 34 kV Substation – ME (Electrical Engineer: 1997 – 1999)

Mr. Bean provided electrical design drafting, equipment specification and procurement necessary for the installation of a new six breaker ring bus. This included all necessary design drawings and material necessary for installation and integration of Central Maine Power Company's first fully automated PLC based substation. This also required design of necessary communications to interface with existing SCADA system. The completed design included metering integration, automatic reclosing functions, synchronizing check functions, automatic tracking of relay outputs, automatic recording of breaker duty, time synchronism, event logging and a PC based operator interface terminal.

Central Maine Power Company, Buxton 345 kV Substation (Electrical Engineer: 1995 – 1997)

Mr. Bean supplied the design and drafting necessary to add four new breakers to the existing 345 kV substation in a breaker and a half scheme. This included the design and installation of the new primary and back-up relaying for the four new breakers and existing line sections. This also included the installation of new PLC based annunciation and reclosing of new breakers. Mr. Bean was responsible for specification and procurement of necessary equipment. (345 kV breaker, relays, PLC, OIT, relay cabinets, etc.) He oversaw the coordination of necessary departments during installation to insure prompt, economical project completion. He was responsible for supervision of construction and final commissioning insure proper system operation and integrity.

Central Maine Power Company, Wyman Hydro Automation (Electrical Engineer: 1993 – 1995)

Mr. Bean provided the design and drafting necessary for installation of new static voltage exciter and interface with existing generator field circuit. This included the

design and installation of a new electronic governor for generator #1, interfacing to existing oil pump and servos. Mr. Bean participated in the complete redesign of generator #1 breaker control, auxiliary system control and relay panels.

Central Maine Power Company, Harris Hydro Voltage Regulators (Electrical Engineer: 1991 – 1993)

Mr. Bean supplied the conceptual design and drafting necessary for installation of new static voltage regulators and interface with existing generator rotary pilot excitation system. This included specification and procurement of necessary equipment. (Basler Static Voltage Regulator, Loss of Field Relay, Lockout Relay, Switches, Auxiliary Relays, Power Transformer, etc.) Mr. Bean also coordinated the necessary departments during installation to insure prompt, economical project completion.

Central Maine Power Company, Gulf Island Hydro Voltage Regulations & Autosynchronizing (Electrical Engineer: 1989 – 1991)

Mr. Bean provided design and drafting necessary for installation of new static voltage regulators and interface with existing generator rotary pilot excitation system. The design and installation of autosynchronizing for the three generators was also necessary. He was responsible for the specification and procurement of necessary equipment. (Static Voltage Regulator, Loss of Field Relay, Autosynchronizing Relay, Lockout Relay with electric reset, Switches, Auxiliary Relays, Power Transformer, I/O Interface blocks, etc.) He was held accountable for the coordination of necessary departments during installation to ensure prompt, economical project completion. He provided construction supervision and final commissioning to ensure proper system operation and integrity.

Public Service of New Hampshire, Deerfield 345 kV Substation (Electrical Engineer: 1987 – 1989)

Mr. Bean supplied the design and installation of the new primary and back-up relaying for an existing line section. He was in charge of specification and procurement of necessary equipment. (relays, relay cabinets, etc.) Mr. Bean coordinated necessary departments during installation to insure prompt, economical project completion. He provided construction supervision and final commissioning to insure proper system operation and integrity.

Meriden Combined Cycle Facility, Interconnection Facilities (Electrical Engineer: 1985 – 1987)

Mr. Bean managed a team of electrical designers in the design of necessary substations and transmission line to interface new gas fired generation plant to Northeast Utilities Service Company transmission system. This involved necessary scheduling and coordination between various disciplines involved to insure prompt and economical completion within project deadlines. (Transmission, civil, structural, electrical, commissioning, etc.) Mr. Bean was also involved in meeting necessary interface requirements between the utilities and

the Independent Power Producer to ensure milestone dates were met and cost over runs were avoided.

AES Granite Ridge Project (Electrical Engineer: 1983 – 1985)

Mr. Bean managed a team of electrical and substation designers in the installation and design of necessary substations and transmission lines to interface new gas fired generation plant to Public Service of New Hampshire and National Grid transmission systems. This involved necessary scheduling and coordination between various disciplines involved to insure prompt and economical completion within project deadlines. (Transmission, civil, structural, electrical, commissioning, etc.) This also involved meeting necessary interface requirements between the utilities and the Independent Power Producer to ensure milestone dates were met and cost over runs were avoided.

Long Creek 34 kV Substation (Electrical Engineer: 1981 – 1983)

Mr. Bean managed a team of electrical designers in the installation and design of a substation feed in the National Semiconductor and Fairchild in the Portland, Maine area. This involved necessary scheduling and coordination between various disciplines involved to insure prompt and economical completion within project deadlines. (electrical designers, PLC programmers, fabrication shop, electrical contractors, commissioning engineers, etc.) Mr. Bean was also involved with meeting necessary interface requirements between the utility and the customers to ensure milestone dates were met and cost over runs were avoided.

PAUL E. NADEAU

EDUCATION

B.S., Forest Engineering, University of Maine, 1997

AREAS OF EXPERTISE

Mr. Paul E. Nadeau has management and technical experience in the following general areas:

- Project Management
- Construction Management
- Project Estimating
- Contract Negotiation
- Equipment Specifications
- Project Scheduling

REPRESENTATIVE EXPERIENCE

Mr. Nadeau has over 11 years of experience and progressive responsibility in engineering consulting. His qualifications include extensive hands-on planning, construction management, cost estimating, and over eight years of project management with substation construction projects throughout the Northeast with values ranging from \$1,000 to \$100,000,000 bringing the projects to completion on-time and on-budget. Mr. Nadeau's background includes extensive service to public and private-sector clientele including Rochester Gas & Energy, Northeast Utilities, and National Grid. He currently serves in the capacity of Senior Project Manager for the Project Management Division.

Rochester Gas & Electric Corporation, Rochester Power Delivery Joint Venture – Rochester, NY (Construction Manager/Project Manager: 2006 – 2008)

Mr. Nadeau served as Construction Manager / Project Manager overseeing all construction activities associated with 2 new electrical substations, and modernizations to 9 existing electrical substations throughout the greater Rochester Area. This included procurement, construction oversight and financial responsibility. He also provided oversight for the underground construction of (3) 115kV circuits.

Northeast Utilities, Portsmouth Substation Installation of 34.5Kv Feeder & Breaker – Portsmouth, NH (Project Manager: 2005)

Mr. Nadeau served as the Project Manager associated with the installation of a new 34.5Kv feeder and breaker into the Portsmouth Substation Yard. This included protection & control work within the control house. Mr. Nadeau's functions included procurement, construction oversight, and financial responsibility.

Northeast Utilities, Resistance Substation Installation of 34.5Kv Feeder & Breaker – Portsmouth, NH (Project Manager: 2005)

Mr. Nadeau served as the Project Manager associated with the installation of a new 34.5Kv feeder and breaker into the Resistance Substation. This included protection & control work within the control house. Mr. Nadeau's functions included procurement, construction oversight, and financial responsibility.

Northeast Utilities, Madbury Substation Installation of New Capacitor Bank – Dover, NH (Project Manager: 2005)

Mr. Nadeau served as the Project Manager associated with the installation of a new capacitor bank and associated yard improvements at the Madbury Substation. This included installation and upgrade of protection and control systems within the control house. Mr. Nadeau's functions included procurement, construction oversight, and financial responsibility.

Northeast Utilities, Various CL&P Substations – Southern CT (Project Manager: 2005 – 2006)

Mr. Nadeau served as the Project Manager associated with the upgrade of both primary and backup relay systems at various substations throughout CL&P Substations. Mr. Nadeau's functions included procurement, construction oversight, and financial responsibility.

Northeast Utilities, Various WMECO Substations – Western MA (Project Manager: 2006)

Mr. Nadeau served as the Project Manager associated with 115kV breaker and switch replacement projects throughout various WMECO Substations. This included installation and upgrade of protection and control systems within the control house. Mr. Nadeau's functions included procurement, construction oversight, and financial responsibility.

National Grid, Johnston Substation – Johnston, RI (Project Manager: 2006)

Mr. Nadeau served as the Project Manager associated with the installation of new regulators and associated equipment at the Johnston, RI substation. This included protection / control work and breaker automation within the control house. Mr. Nadeau's functions included procurement, construction oversight, and financial responsibility.

National Grid, Everett Substation – Everett, MA (Project Manager: 2006)

Mr. Nadeau served as the Project Manager associated the installation of new regulations and associated equipment at the Everett Substation. This included protection/control work and breaker automation within the control house. Mr. Nadeau's functions included procurement, construction oversight, and financial responsibility.

National Grid, Manchester Substation – Manchester, MA (Project Manager: 2006)

Mr. Nadeau served as the Project Manager associated the installation of a RTU system and breaker upgrade. Mr. Nadeau's functions included procurement, construction oversight, and financial responsibility.

National Grid, Glendale Substation – Malden, MA (Project Manager: 2006)

Mr. Nadeau served as the Project Manager associated with the installation of a RTU system upgrade. Mr. Nadeau's functions included procurement, construction oversight, and financial responsibility.

SPECIALIZED TRAINING

- Lessons In Leadership, FISH! Camp, Creating a World-Class Workspace, Dr. Stephen Lundin, April 2002
- Lessons in Leadership, 7 Habits of Highly Effective People, Dr. Stephen R. Covey, April 2001

PETER G. TROTTIER, EI

EDUCATION

B.S., Architectural Engineering Technology, Wentworth Institute of Technology, 1989

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS

Engineering Intern, Massachusetts (#18717)

AREAS OF EXPERTISE

Mr. Trottier has experience in the following general areas:

- Planning Studies
- Preliminary & Conceptual Design
- Construction Specifications
- Detailed Engineering Design
- Spill Prevention, Control & Countermeasure Plans (SPCC)
- Site Layout
- Licensing & Permitting
- Water Management Permitting

REPRESENTATIVE EXPERIENCE

Mr. Trottier has over 15 years of extensive experience in State and local permitting, site planning/layout, grading, storm water management design, sanitary sewer design, Potable water system design and permitting for a number of projects in Maine, New York and Florida. Mr. Trottier currently serves as Civil Engineer.

Florida Power and Light Company, Broward Substation Facility Relocation Feasibility Project – Broward County FL (Lead Civil Engineer: 2006 – 2007)

Served as the Lead Civil Engineer for the substation site planning and transmission line corridor layout for multiple alternatives as part of the feasibility study. Provided state and local permitting research and environmental support for the project.

Fieldstone Landing, LLC, Fieldstone Landing Subdivision Project (Project Manager: 2007 – 2008)

Responsible for the site grading and layout, storm water management design and State and local permitting for 80-acre site in Waterville, Maine.

Rochester Gas & Electric Corp. – NY (Project Engineer: 2005 – 2006)

Provided site and storm water management design and erosion control for the expansion of several substations for the Rochester Transmission project located in and around Rochester, NY.

Maritimes & Northeast Pipeline, Phase IV Expansion Project – ME (Project Engineer 2006 – 2007)

Responsible for providing the site grading and layout, storm water management design and state permitting for natural gas compression pump stations sites throughout Maine.

Estuary at Grey Oaks – Collier County, FL (Project Engineer: 2000 – 2002)

Responsible for surface water management master planning, state and local permitting, utility master planning and site grading design for an upscale 360-acre residential community with an 18-hole golf course. Responsible for the coordination of a 138kV transmission line relocation with FPL.

Collier Regional Medical Center – Collier County, FL (Project Manager: 2003 – 2004)

Responsible for the engineering services consisting of state and local permitting, utility master planning, and site grading design for a 60 acre 100 bed hospital campus. Responsible for the coordination of an 138kV transmission line access relocation with FPL.

Magnolia Square – Collier County, FL (Project Manager: 2003 – 2004)

Responsible for state and local permitting, utility master planning, and design for an upscale 30-acre site for 240,000 square feet of commercial/retail space.

Veracruz at Cape Marco – Marco Island, FL (Project Manager: 2001 – 2002)

Responsible for surface water management, utility master planning, State and local permitting, and design for a four-acre site with a 23-story high rise condominium building.

PROFESSIONAL AFFILIATIONS

- Member of the American Society of Civil Engineers

EXHIBIT 6
BOUNDARY SURVEY

EXHIBIT 7c

**Control House Floor Plan
Exterior Elevation**

EXHIBIT 7b

**STORMWATER PLAN DETAILS
EROSION CONTROL PLAN**

EXHIBIT 7a

**EXISTING CONDITIONS PLAN
PROPOSED SUBSTATION EXPANSION SITE PLAN**