



STATE OF MAINE  
DEPARTMENT OF TRANSPORTATION  
16 STATE HOUSE STATION  
AUGUSTA, MAINE  
04333-0016

JOHN ELIAS BALDACCI  
GOVERNOR

DAVID A. COLE  
COMMISSIONER

June 26, 2009  
Subject: **Portland Rail Trail**  
Federal Project No: STP-1184(400)S  
State Pin No: 011844.00  
**Amendment No. 2**

Dear Sir/Ms:

Make the following changes to the Bid Documents:

In the Bid Book (page 4), "NOTICE TO CONTRACTORS", **CHANGE** the bid opening date from July 8, 2009 to read "**July 15, 2009**". Make this change in pen and ink.

In the Bid Book (pages 7 through 17), **REMOVE** the "SCHEDULE OF ITEMS" 11 pages dated 090619 (and replaced in Amendment #1) and **REPLACE** with the attached new "SCHEDULE OF ITEMS" 14 pages dated 090626.

In the Bid Book (pages 41 through 43), **REMOVE** "SPECIAL PROVISION, SECTION 104.7, Previously Purchased Materials" 3 pages dated May 11, 2009 and **REPLACE** with the attached new "SPECIAL PROVISION, SECTION 104.7, Previously Purchased Materials" 5 pages dated June 15, 2009.

In the Bid Book, after page 104, **INSERT** the attached "SPECIAL PROVISION, SECTION 832, CONTRACTOR ALLOWANCE" 1 page dated June 26, 2009.

In the Bid Book (pages 174 through 181), **REMOVE** "SUPPLEMENTAL SPECIFICATION, SECTION 203, EXCAVATION AND EMBANKMENT" 8 pages undated and **REPLACE** with the attached new "SUPPLEMENTAL SPECIFICATION, SECTION 203, EXCAVATION AND EMBANKMENT" 10 pages amended June 25, 2009.

In the Bid Book (page 184), **REMOVE** "SUPPLEMENTAL SPECIFICATION, SECTION 304, AGGREGATE BASE AND SUBBASE COURSE" 1 page undated and **REPLACE** with the attached new "SUPPLEMENTAL SPECIFICATION, SECTION 304, AGGREGATE BASE AND SUBBASE COURSE" 1 page amended June 25, 2009.

In the Bid Book (page 186), **REMOVE** "SUPPLEMENTAL SPECIFICATION, SECTION 403, HOT BITUMINOUS PAVEMENT" 1 page undated and **REPLACE**



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with the attached new “SUPPLEMENTAL SPECIFICATION, SECTION 403, HOT BITUMINOUS PAVEMENT” 1 page amended June 25, 2009.

In the Bid Book (pages 189 through 193), **REMOVE** “SUPPLEMENTAL SPECIFICATION, SECTION 603, PIPE CULVERTS AND STORM DRAINS” 5 pages undated and **REPLACE** with the attached new “SUPPLEMENTAL SPECIFICATION, SECTION 603, PIPE CULVERTS AND STORM DRAINS” 6 pages amended June 25, 2009.

In the Bid Book (pages 200 and 201), **REMOVE** “SUPPLEMENTAL SPECIFICATION, SECTION 607, FENCES” 2 pages undated and **REPLACE** with the attached new “SUPPLEMENTAL SPECIFICATION, SECTION 607, FENCES” 2 pages amended June 25, 2009.

In the Bid Book (pages 202 through 208), **REMOVE** “SUPPLEMENTAL SPECIFICATION, SECTION 608, SIDEWALKS” 7 pages undated and **REPLACE** with the attached new “SUPPLEMENTAL SPECIFICATION, SECTION 608” 8 pages amended June 25, 2009.

In the Bid Book (page 209), **REMOVE** “SUPPLEMENTAL SPECIFICATION, SECTION 609, CURB” 2 pages undated and **REPLACE** with the attached new “SUPPLEMENTAL SPECIFICATION, SECTION 609, CURB” 2 pages amended June 25, 2009.

In the Bid Book (page 212), **REMOVE** “SUPPLEMENTAL SPECIFICATION, SECTION 615, LOAM” 1 page undated and **REPLACE** with the attached new “SUPPLEMENTAL SPECIFICATION, SECTION 615, LOAM” 2 pages amended June 25, 2009.

In the Bid Book (page 213), **REMOVE** “SUPPLEMENTAL SPECIFICATION, SECTION 620, GEOTEXTILES” 1 page undated and **REPLACE** with the attached new “SUPPLEMENTAL SPECIFICATION, SECTION 620, GEOTEXTILES” 2 pages amended June 25, 2009.

In the Bid Book (after page 238), **ADD** the attached “ELECTRONIC MEDIA RELEASE FORM” 1 page undated

In the Bid Book, **ADD** the following “Attachments” to the back of the book in the order specified:

Attachment A, letter from TEWHEY ASSOCIATES , 4 pages dated April 28, 2009

Attachment B, letter to Mr. Dale Doughty and Ms. Cynthia Scarano, 2 pages dated July 26, 2001

Attachment B, letter to Mr. Nickolas J Hodgkins, 8 pages dated 15 June 2001 revised 23 July 2001.

Attachment C, "HEALTH AND SAFETY PLAN" 49 pages dated June 2009.

Attachment D, "City of Portland and Portland Water District Industrial Waste Report" 5 pages undated.

In the Plans, **REMOVE** and **REPLACE** the below listed Plan Sheets with the attached updated Plan Sheets:

4 OF 33	7 OF 33	8 OF 33	11 OF 33
12 OF 33	13 OF 33	28 OF 33	29 OF 33
30 OF 33	31 OF 33	32 OF 33	33 OF 33

NOTE: Plan Sheets will be FedExed/mailed to plan holders who purchased plans in the size and quantity ordered.

In the Plans, on Sheets' # 17 OF 33, 18 OF 33 and 33 OF 33, **REMOVE** all references to "ADS N12 HP" pipe and **REPLACE** it with "**RCP**" pipe. Make this change in pen and ink.

The following questions have been received:

**Question:** In the Schedule of items, line no. 0490, Item Description 648.53, Remove Existing Track – at grade. Can we please get a scope of work for both the item and for the measurement TF?

**Response:** Refer to Section 3-Supplemental Specifications within the Bid Book; Section 202 Removing Structures and Obstructions describes the scope of work, method of measurement, and basis for payment.

**Question:** Due to the fact that item 203.20 Common Excavation is Lump Sum and a few of the existing contours don't have an elevation label, can bidders obtain copies of the Auto-Cad drawings to help obtain Earthwork cut and fill quantities?

**Response:** Yes, Contractors may request sitework related AutoCAD files directly from Woodard & Curran. Prior to Woodard & Curran releasing AutoCAD files, Contractors requesting the files should transmit a signed/completed Electronic Media Release Form (see attached) to Woodard & Curran by fax to the Attention of Richelle Hawk, Administrative Assistant at 207-774-6635. Drawing files will be provided at NO COST to Contractors in AutoCAD release 2004 DWG format. Files shall be sent to the indicated email or mailing address (CD by US Postal Service) on the completed form. Files represent approximately 3MB of data (zipped). Woodard & Curran will not

retransmit email that is returned undeliverable, but will in that case place the files onto CD and transmit via US Postal Service. Please see the attached release form.

Consider these changes and information prior to submitting your bid on **July 15**, 2009.

Sincerely,

A handwritten signature in dark ink, appearing to read "Scott Bickford". The signature is written in a cursive style with a large initial "S" and a distinct "B".

Scott Bickford  
Contracts & Specifications Engineer

SCHEDULE OF ITEMS

REVISED:

CONTRACT ID: 011844.00

PROJECT(S): STP-1184(400)S

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0001 PROJECT ITEMS						
0010	201.111 CLEARING	LUMP	LUMP			
0020	202.01 REMOVING STRUCTURES AND OBSTRUCTIONS	LUMP	LUMP			
0030	202.211 DECORATIVE BOULDER RELOCATION	EA	17.000			
0040	203.200 COMMON EXCAVATION	LUMP	LUMP			
0050	203.233 DISPOSAL OF SPECIAL EXCAVATION SURPLUS GRP 2 SOILS	CY	1560.000			
0060	203.24 COMMON BORROW	CY	955.000			
0070	203.2401 COMMON BORROW WITH PREVIOUSLY PURCHASED MATERIALS	CY	1880.000			
0080	203.2501 GRANULAR BORROW WITH PREVIOUSLY PURCHASED MATERIALS	CY	10.000			
0090	203.35 CRUSHED STONE FILL TYPE 'A' (OVERDEPTH)	CY	10.000			
0100	203.3501 CRUSHED STONE CHOKER COURSE WITH PREVIOUSLY PURCHASED MATERIALS	CY	46.000			

SCHEDULE OF ITEMS

REVISED:

CONTRACT ID: 011844.00

PROJECT(S): STP-1184(400)S

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0110	203.3502 CRUSHED STONE CHOKER COURSE	7.000 CY				
0120	203.3503 CRUSHED STONE DRAINAGE COURSE WITH PREVIOUSLY PURCHASED MATERIAL	121.000 CY				
0130	206.061 STRUCTURAL EARTH EXCAVATION - DRAINAGE AND MINOR STRUCTURES, BELOW GRADE	10.000 CY				
0140	206.07 STRUCTURAL ROCK EXCAVATION - DRAINAGE AND MINOR STRUCTURES	10.000 CY				
0150	304.0901 AGGR BASE CRS- CRUSHED WITH PREVIOUSLY PURCHASED MATERIAL	274.000 CY				
0160	304.10 AGGREGATE SUBBASE COURSE - GRAVEL	1740.000 CY				
0170	304.1001 AGGR SUBB COURSE GRAVEL WITH PREVIOUSLY PURCHASED MATERIAL	600.000 CY				
0180	403.207 HOT MIX ASPHALT 19.0 MM HMA	76.000 T				
0190	403.2073 HOT MIX ASPHALT 19.0 MM HMA WITH PREVIOUSLY PURCHASED MAT.	150.000 T				
0200	403.208 HOT MIX ASPHALT 12.5 MM HMA SURFACE	541.000 T				

SCHEDULE OF ITEMS

REVISED:

CONTRACT ID: 011844.00

PROJECT(S): STP-1184(400)S

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0210	403.2082 HOT MIX ASPHALT 12.5 MM HMA WITH PREV. PURCHASED MAT.	200.000 T				
0220	403.209 HOT MIX ASPHALT 9.5 MM HMA (SIDEWALKS, DRIVES, INCIDENTALS)	15.000 T				
0230	411.14 CRUSHED STONE DUST SURFACE COURSE	LUMP	LUMP			
0240	603.149 10" DIAMETER PVC PIPE	143.000 LF				
0250	603.1491 10" DIA. PVC PIPE WITH PREV. PURCHASED MAT.	468.000 LF				
0260	603.157 12 INCH PVC PIPE	252.000 LF				
0270	603.1571 12" DIA. PVC PIPE WITH PREV. PURCHASED MAT.	286.000 LF				
0280	603.1651 15" DIA. RCP CLASS III WITH PREV. PURCHASED MAT.	120.000 LF				
0290	603.177 18 INCH PVC PIPE	506.000 LF				
0300	603.1771 18" DIA. PVC PIPE WITH PREV. PURCHASED MAT.	598.000 LF				
0310	603.195 24 INCH REINFORCED CONCRETE PIPE CLASS III	530.000 LF				

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REVISED:

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PROJECT(S): STP-1184(400)S

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0320	604.131 4' DIAMETER CATCH BASIN	14.000 EA				
0330	604.15 MANHOLE	5.000 EA				
0340	604.153 60 INCH MANHOLE	2.000 EA				
0350	604.156 96 INCH MANHOLE	1.000 EA				
0360	604.164 REBUILDING CATCH BASIN	1.000 EA				
0370	604.18 ADJUSTING MANHOLE OR CATCH BASIN TO GRADE	1.000 EA				
0380	604.2411 24" NYLOPLAST AREA DRAIN	26.000 EA				
0390	605.09 6 INCH UNDERDRAIN TYPE B	441.000 LF				
0400	606.611 TIMBER GUARDRAIL	55.000 LF				
0410	607.163 CHAIN LINK FENCE - 4 FOOT P.V.C. COATED	240.000 LF				
0420	607.173 CHAIN LINK FENCE - 6 FOOT PVC COATED	228.000 LF				

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CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0430	607.24 REMOVE AND RESET FENCE	116.000 LF				
0440	608.0901 BRICK SIDEWALK WITH PREV. PURCHASED MAT.	275.000 SY				
0450	608.241 PRECAST CONCRETE PAVERS	747.000 SF				
0460	608.2511 PRECAST CONC. PAVERS WITH PREV. PURCHASED MAT.	3429.000 SF				
0470	608.2911 PERM. CONC. PAVING STONE WITH PREV. PURCHASED MAT.	183.000 SY				
0480	608.2912 PERV. CONC. WITH PREV. PURCHASED MAT.	14.000 CY				
0490	609.38 RESET CURB TYPE 1	808.000 LF				
0500	609.40 RESET CURB TYPE 5	85.000 LF				
0510	613.319 EROSION CONTROL BLANKET	429.000 SY				
0520	614.14 MASONRY PLUG	1.000 EA				
0530	615.07 LOAM	305.000 CY				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0540	615.0702 LOAM WITH PREV. PURCHASED MAT.	1700.000 CY				
0550	615.12 RAIN GARDEN SOIL ENHANCEMENT	244.000 CY				
0560	618.13 SEEDING METHOD NUMBER 1	140.000 UN				
0570	619.12 MULCH	140.000 UN				
0580	620.54 STABILIZATION GEOTEXTILE	3722.000 SY				
0590	620.541 STABILIZATION GEOTEXTILE WITH PREV. PURCHASED MAT.	3000.000 SY				
0600	620.58 NON WOVEN GEOTEXTILE	7315.000 SY				
0610	620.581 NON WOVEN GEOTEXTILE WITH PREV. PURCHASED MAT.	10200.000 SY				
0620	626.2111 WIRING DEVICE, FOUNDATIONS, CONDUIT, JUNCTION BOXES, SECONDARY WIRING, LUMINAIRES, SERVICE EQUIPMENT	LUMP	LUMP			
0630	627.711 WHITE OR YELLOW PAINTED PAVEMENT MARKING LINE (PLAN QUANTITY)	1153.000 LF				

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0640	639.19 FIELD OFFICE TYPE B	1.000 EA				
0650	645.3031 SIGNAGE POLES	LUMP	LUMP			
0660	648.53 REMOVE EXISTING TRACK - AT GRADE	4575.000 TF				
0670	652.31 TYPE I BARRICADE	40.000 EA				
0680	652.311 TYPE II BARRICADE	10.000 EA				
0690	652.33 DRUM	40.000 EA				
0700	652.34 CONE	200.000 EA				
0710	652.35 CONSTRUCTION SIGNS	144.000 SF				
0720	652.36 MAINTENANCE OF TRAFFIC CONTROL DEVICES	250.000 CD				
0730	652.38 FLAGGER	400.000 HR				
0740	656.75 TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL	LUMP	LUMP			

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CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0750	659.10 MOBILIZATION	LUMP	LUMP			
0760	803.01 TEST PITS	EA	11.000			
0770	830.1011 WATER MAIN RELOCATION	LUMP	LUMP			
0780	832.071 CONTRACTOR ALLOWANCE CMP	LUMP	LUMP		10000	.00
0790	841.02 RECYCLED GRANITE BOLLARDS AND BLOCKS	EA	22.000			
0800	841.46 WOOD BOLLARD	EA	244.000			
0810	841.481 REMOVABLE BOLLARD	EA	11.000			
0820	890.07 BIKE RACKS	EA	1.000			
	SECTION 0001 TOTAL					.

SECTION 0002 ADDITIONAL TRAIL CONSTRUCTION OPTION

0830	201.111 CLEARING	LUMP	LUMP			
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SCHEDULE OF ITEMS

REVISED:

CONTRACT ID: 011844.00

PROJECT(S): STP-1184(400)S

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0840	202.01 REMOVING STRUCTURES AND OBSTRUCTIONS	LUMP	LUMP			
0850	203.24 COMMON BORROW	1080.000 CY				
0860	203.2501 GRANULAR BORROW WITH PREVIOUSLY PURCHASED MATERIALS	10.000 CY				
0870	203.35 CRUSHED STONE FILL TYPE 'A' (OVERDEPTH)	10.000 CY				
0880	203.3502 CRUSHED STONE CHOKER COURSE	66.000 CY				
0890	203.3503 CRUSHED STONE DRAINAGE COURSE WITH PREVIOUSLY PURCHASED MATERIAL	235.000 CY				
0900	206.061 STRUCTURAL EARTH EXCAVATION - DRAINAGE AND MINOR STRUCTURES, BELOW GRADE	10.000 CY				
0910	206.07 STRUCTURAL ROCK EXCAVATION - DRAINAGE AND MINOR STRUCTURES	10.000 CY				
0920	304.09 AGGREGATE BASE COURSE - CRUSHED	20.000 CY				
0930	304.0901 AGGR BASE CRS-CRUSHED WITH PREVIOUSLY PURCHASED MATERIAL	176.000 CY				

SCHEDULE OF ITEMS

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0940	304.10 AGGREGATE SUBBASE COURSE - GRAVEL	104.000 CY				
0950	403.207 HOT MIX ASPHALT 19.0 MM HMA	96.000 T				
0960	403.208 HOT MIX ASPHALT 12.5 MM HMA SURFACE	46.000 T				
0970	603.149 10" DIAMETER PVC PIPE	251.000 LF				
0980	603.157 12 INCH PVC PIPE	175.000 LF				
0990	604.131 4' DIAMETER CATCH BASIN	1.000 EA				
1000	604.15 MANHOLE	1.000 EA				
1010	604.164 REBUILDING CATCH BASIN	1.000 EA				
1020	604.2411 24" NYLOPLAST AREA DRAIN	3.000 EA				
1030	605.09 6 INCH UNDERDRAIN TYPE B	515.000 LF				
1040	608.09 BRICK SIDEWALK	132.000 SY				

SCHEDULE OF ITEMS

REVISED:

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PROJECT(S): STP-1184(400)S

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1050	608.0901 BRICK SIDEWALK WITH PREV. PURCHASED MAT.	280.000 SY				
1060	608.2511 PRECAST CONC. PAVERS WITH PREV. PURCHASED MAT.	2412.000 SF				
1070	608.291 PERVIOUS CONCRETE WITH BASE	8.000 SY				
1080	608.2911 PERM. CONC. PAVING STONE WITH PREV. PURCHASED MAT.	275.000 SY				
1090	608.2912 PERV. CONC. WITH PREV. PURCHASED MAT.	36.000 CY				
1100	608.47 SAND CEMENT BASE	30.000 CY				
1110	609.38 RESET CURB TYPE 1	98.000 LF				
1120	613.319 EROSION CONTROL BLANKET	360.000 SY				
1130	615.07 LOAM	735.000 CY				
1140	615.12 RAIN GARDEN SOIL ENHANCEMENT	69.000 CY				
1150	618.13 SEEDING METHOD NUMBER 1	35.000 UN				

SCHEDULE OF ITEMS

REVISED:

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CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1160	619.12 MULCH	35.000 UN				
1170	620.54 STABILIZATION GEOTEXTILE	1284.000 SY				
1180	620.58 NON WOVEN GEOTEXTILE	4399.000 SY				
1190	626.2111 WIRING DEVICE, FOUNDATIONS, CONDUIT, JUNCTION BOXES, SECONDARY WIRING, LUMINAIRES, SERVICE EQUIPMENT	LUMP	LUMP			
1200	627.711 WHITE OR YELLOW PAINTED PAVEMENT MARKING LINE (PLAN QUANTITY)	12.000 LF				
1210	633.01 SEAT WALLS	202.000 LF				
1220	645.3031 SIGNAGE POLES	LUMP	LUMP			
1230	652.311 TYPE II BARRICADE	10.000 EA				
1240	652.33 DRUM	10.000 EA				
1250	652.34 CONE	40.000 EA				

SCHEDULE OF ITEMS

REVISED:

CONTRACT ID: 011844.00

PROJECT(S): STP-1184(400)S

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
1260	652.35 CONSTRUCTION SIGNS	8.000 SF				
1270	652.36 MAINTENANCE OF TRAFFIC CONTROL DEVICES	13.000 CD				
1280	652.38 FLAGGER	40.000 HR				
1290	656.75 TEMPORARY SOIL EROSION AND WATER POLLUTION CONTROL	LUMP	LUMP			
1300	803.01 TEST PITS	1.000 EA				
1310	841.02 RECYCLED GRANITE BOLLARDS AND BLOCKS	9.000 EA				
1320	841.481 REMOVABLE BOLLARD	1.000 EA				
	SECTION 0002 TOTAL					.

SECTION 0003 POWER OPTION

1330	626.41 POWER TO PLAZAS	LUMP	LUMP			
	SECTION 0003 TOTAL					.

SCHEDULE OF ITEMS

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PROJECT(S): STP-1184(400)S

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS

SECTION 0004 ADDITIONAL BIKE RACK OPTION

1340	890.07 BIKE RACKS	4.000				
		EA				
	SECTION 0004 TOTAL					
	TOTAL BID (SECTION 1 ONLY)					

**SPECIAL PROVISION  
SECTION 104.7**

**Previously Purchased Materials**

In September of 2009, the City of Portland purchased certain materials for use on the trail between Franklin Street and Elm Street. These materials were purchased with an EPA Brownfields Grant and they were purchased last fall in order to meet the Grant's expenditure deadline. The materials outlined below will be provided to the contractor, as outlined below. **These materials may only be used on the portion of the trail from Elm Street to Franklin Street.** This is a requirement of the Brownfield's Grant. With the exception of the contractor's responsibilities listed below, the previously purchased materials will be provided to the contractor at no cost. Please adjust your bids accordingly.

Certain materials such as bricks pavers and geotextile are already in the City possession while the remaining 'loose' materials such as loam, gravel and pavement remain in the supplier's possession.

Copies of the City of Portland's Notice and Specifications (BID #2309) and the City's purchase orders for these materials are attached to this specification for your reference.

**1. Materials in the City of Portland's Possession**

The materials listed below will be provided to the contractor at their current locations (indicated below) on Portland's waterfront. **The contractor will be responsible for scheduling a pick up time with the City of Portland, loading these materials and delivering them to the project site.**

The contact for the City of Portland is Kathy Alves of Portland's Public Facilities Department  
Phone: 233-8523  
Email: [kra@portlandmaine.gov](mailto:kra@portlandmaine.gov)

Begin CHANGE

The City of Portland will provide perspective bidders an opportunity to view the materials on **Tuesday the 30 of June, 2009** at. Perspective bidders should meet at the International Marine Terminal on Commercial Street in Portland at **8:00 am. Please Contact Randy at 899-9227 regarding this meeting.**

End CHANGE

Geotextile

10,200 square yards of geotextile is currently located on the Maine State Pier off of Commercial Street in Portland. This material will satisfy the requirements for **Non Woven Geotextile: 620.581**

Permeable Concrete Pavers

5,000 square feet of permeable concrete pavers are currently located at the International Marine Terminal off of Commercial Street in Portland. This material will satisfy the requirements for **Permeable Concrete Unit Pavers: 608.2911**

Concrete Pavers

7,000 square feet of concrete pavers are currently located at the International Marine Terminal off of Commercial Street in Portland. This material will satisfy the requirements for **Precast Concrete Pavers: 608.2511**

Bricks

5,000 square feet of concrete pavers are currently located at the International Marine Terminal off of Commercial Street in Portland. This material will satisfy the requirements for **Brick Sidewalk: 608.0901**

**2. Materials Remaining in the Supplier's Possession**

The materials listed below will be delivered to the project site by the material suppliers listed below. The Contractor is required to contact the material suppliers listed below within 3 weeks (21 days) executing a contract with the Maine Department of Transportation to arrange a schedule for delivery.

Stone Choker Course

46 cubic yards of stone choker course will be provided by Portland Sand and Gravel Inc. of 61 Rose Drive in Cumberland, ME. This material will satisfy the requirements for **Permeable Concrete Paving Stone: 608.2911 or Pervious Concrete with Base: 608.2912**

To schedule delivery contact Anthony Mancini at: 657-3226

Drainage Stone

417 cubic yards of drainage stone will be provided by Portland Sand and Gravel Inc. of 61 Rose Drive in Cumberland, ME. This material will satisfy the requirements for **Permeable Concrete Paving Stone: 608.2911 or Pervious Concrete with Base: 608.2912**

To schedule delivery contact Anthony Mancini at: 657-3226

MDOT Type A Gravel

450 cubic yards of MDOT Type A Gravel will be provided by Portland Sand and Gravel Inc. of 61 Rose Drive in Cumberland, ME. This material will satisfy the requirements for **Aggregate Base Course – Crushed Type “B”: 304.0901**

To schedule delivery contact Anthony Mancini at: 657-3226

Pervious Concrete

50 cubic yards of Pervious Concrete will be provided by Dragon Products Co. Inc. of Portland Maine. This material will satisfy the requirements for **Pervious Concrete with Base: 608.2912**

To schedule delivery contact Phillip Nunley at: 774-6355

Loam

1,700 cubic yards Loam will be provided by CPRC Management LLC of Scarborough, ME. This material will satisfy the requirements for **Loam: 615.0702**

To schedule delivery contact Tom Kane at: 883-3325

City: Portland  
State PIN 011844.00  
Date: June 15, 2009

MDOT Type D Gravel

600 cubic yards MDOT Type D Gravel will be provided by Shaw Brothers Construction Inc of Gorham, ME. This material will satisfy the requirements for **Aggregate Subbase Course – Gravel Type “D”:**  
**304.1001**

To schedule delivery contact Mark Barnes at: 839-2552

Begin CHANGE

MDOT Gravel Borrow

**1,900** cubic yards of MDOT Gravel Borrow will be provided by Shaw Brothers Construction Inc of Gorham, ME. This material will satisfy the requirements for **Common Borrow: 203.2401** or **Granular Borrow: 203.2501**

To schedule delivery contact Mark Barnes at: 839-2552

10" Diameter DR35 PVC Pipe

468 linear feet of 10" Diameter DR35 PVC Pipe will be provided by Shaw Brothers Construction Inc of Gorham, ME. This material will satisfy the requirements for **10" Diameter DR35 PVC Pipe: 603.1491**

To schedule delivery contact Mark Barnes at: 839-2552

12" Diameter DR35 PVC Pipe

286 linear feet of 12" Diameter DR35 PVC Pipe will be provided by Shaw Brothers Construction Inc of Gorham, ME. This material will satisfy the requirements for **12" Diameter DR35 PVC Pipe: 603.1571**

To schedule delivery contact Mark Barnes at: 839-2552

15" Diameter RCP Pipe

130 linear feet of 15" Diameter RCP Pipe will be provided by Shaw Brothers Construction Inc of Gorham, ME. This material will satisfy the requirements for **15" Diameter RCP Pipe: 603.1651**

To schedule delivery contact Mark Barnes at: 839-2552

18" Diameter DR35 PVC Pipe

598 linear feet of 18" Diameter DR35 PVC Pipe will be provided by Shaw Brothers Construction Inc of Gorham, ME. This material will satisfy the requirements for **18" Diameter DR35 PVC Pipe: 603.1771**

To schedule delivery contact Mark Barnes at: 839-2552

Stabilization/Reinforcement Geotextile

Six rolls of 500 square yards each of woven stabilization geotextile will be provided by Shaw Brothers Construction Inc of Gorham, ME. This material will satisfy the requirements for **Stabilization/Reinforcement Geotextile: 620.541**

To schedule delivery contact Mark Barnes at: 839-2552

End CHANGE

City: Portland  
State PIN 011844.00  
Date: June 15, 2009

Hot Bituminous Pavement, Grading "B" (19.0mm)

150 tons of Hot Bituminous Pavement, Grading "B" (19.0mm) will be provided by Pike Industries of 58 Main Street in Westbrook ME. This material will satisfy the requirements for **Hot Bituminous Pavement, Grading "B" (19.0mm): 403.2073**

To schedule delivery contact James Hanley at: 854-2561

Hot Bituminous Pavement, Grading "C" (12.5 mm)

200 tons of Hot Bituminous Pavement, Grading "C" (12.5 mm) will be provided by Pike Industries of 58 Main Street in Westbrook ME. This material will satisfy the requirements for **Hot Bituminous Pavement, Grading "C" (12.5 mm): 403.2082**

To schedule delivery contact James Hanley at: 854-2561

END OF SECTION.

SPECIAL PROVISION  
SECTION 832  
CONTRACTOR ALLOWANCE

832.071 Central Maine Power Service Charge Allowance: \$10,000

Payment: Allowance price as stated in the Bid Form. DEPARTMENT will only reimburse CONTRACTOR for the invoice price from Central Maine Power (or sub-contractor to Central Maine Power) not to exceed the allowance price as stated in the bid form. Markups of Central Maine Power's invoice price will not be accepted.

Measurement: Determine value of Work completed to date from detailed cost breakdown approved by RESIDENT.

Includes: Pole mounted transformers on existing utility poles and secondary transformer connection of electrical contractor provided service entrance cables.

Pay Item

Pay Unit

832.071

Lump Sum

**SUPPLEMENTAL SPECIFICATION  
SECTION 203  
EXCAVATION AND EMBANKMENT**

The provisions of Section 203 of the Standard Specifications shall apply with the following additions and modifications:

**203.01 Description**

Paragraph (b) Rock Excavation shall be modified to read: “each having a volume of one-half cubic yard or more”.

Excavation of the Group 2 soils shall be included under “Common Excavation”. The off-site disposal of surplus Group 2 soils shall be measured separately.

The Disposal of Surplus Group 2 Soils shall include all work associated with the offsite disposal of surplus Group 2 soils, including stockpiling, handling, transportation and disposal. All material disposals shall be completed in accordance with local, state and federal regulations. All The identification of Group 2 soils shall be in accordance with recommendations of the City of Portland Brownfields Project Manager, Tewhey Associates as described in the Attachment A, *Soil and Groundwater Handling Information for Construction Documents Bayside Railyard Subdivision and Bayside Trail, Portland Maine* by John Tewhey dated April 28, 2009. All handling of Group 2 soils shall be in accordance with the Voluntary Remedial Action Plan application submitted by the City of Portland to the Maine Department of Environmental Protection on July 23, 2001 and the Maine Department of Environmental Protection’s “No Action Assurance” letter dated July 26, 2001. Copies of the application and the response letter are included as Attachment B for reference. Suitable Group 2 soils shall be reused onsite to the maximum extent possible.

Decorative Boulder Relocation shall include all work associated with the on-site relocation of the existing, above grade, decorative boulders within the project limits of work and as directed by the Department. Decorative Boulder Relocation shall include removal, handling, hauling, and placement.

Requirements for Crushed Stone Choker Courses and Crushed Stone Drainage Courses beneath Permeable Concrete Pavers and Pervious Concrete are further described in Supplemental Specification Section 608.

**203.04 General**

This subsection shall be amended by the addition of the following paragraphs:

Group 2 soil identification will be made onsite by Tewhey Associates in accordance with the guidelines described in Appendix A, *Soil and Groundwater Handling Information for Construction Documents Bayside Railyard Subdivision and Bayside Trail, Portland Maine* by John Tewhey dated April 28, 2009. The costs of soil identification services by Tewhey Associates will be paid by the Department.

An Environmental Health and Safety Plan (HASp) for the Bayside Trail Project has been prepared by Tewhey Associates, and is included as Attachment C. The Contractor shall comply

with the requirements and recommendations of the plan. All costs associated with HASP compliance will be incidental to Pay Item 203.233.

Group 2 soils suitable for reuse under the trail, plazas and jogging path shall be granular in nature and must be able to be placed in lifts and compacted in accordance with the requirements outlined herein. Suitable Group 2 soils shall not contain appreciable amounts of topsoil, organic matter or miscellaneous debris.

Group 2 soils may be used as fill onsite if capped with geotextile filter fabric and one (1) foot of clean fill material (see Plan details). Group 2 soils shall be reused prior to reuse of Group 1 soils. The Contractor shall not remove any soils from the site without notifying the Department.

The Contractor shall excavate rock if encountered to the lines and grades indicated on the drawings, shall dispose of the excavated material, and shall furnish acceptable material for backfill in place of the excavated rock.

In general, rock in pipe trenches shall be excavated so as to be not less than six inches (6") from the pipe after it has been laid. If needed, before the pipe is laid, the trench shall be backfilled to the established trench profile with thoroughly compacted, suitable material or, when so specified or indicated on the drawings, with the same material as that required for bedding the pipe, furnished and placed at no additional cost.

The Contractor shall remove all dirt and loose rock from the designated areas and shall clean the surface of the rock thoroughly, using steam to melt snow and ice, if necessary. Water in depressions shall then be removed as required so that the whole surface of the designated area can be inspected to determine whether seams or other defects exist.

The surface of rock foundations shall be left sufficiently rough to bond well with the masonry and embankments to be built thereon; and, if required, shall be cut to rough benches or steps. Before any masonry or embankment is built on or against the rock, the rock shall be scrupulously freed from all vegetation, dirt, sand, clay, boulders, scale, excessively cracked rock, loose fragments, ice, snow, and other objectionable substances. Picking, barring, wedging, streams of water under sufficient pressure, stiff brushes, hammers, steam jets, and other effective means may be used to accomplish this cleaning. All free water left on the surface of the rock shall be removed.

### **203.042 Explosives**

This subsection shall be amended by the addition of the following paragraphs:

The Contractor shall keep explosives on the site only in such quantity as may be needed for the work under way and only during such time as they are to be used. Contractor shall notify the Department, in advance, of his intention to store and use explosives. Explosives shall be stored in a secure manner and separate from all tools. Caps or detonators shall be safely stored at a point over 100 feet distant from the explosives. When the need for explosives has ended, all such materials remaining on the work shall be promptly removed from the premises.

The Contractor shall observe all municipal ordinances and State and Federal laws relating to the transportation, storage, handling, and use of explosives. In the event that any of the above mentioned laws, ordinances, or regulations require a licensed blaster to perform or supervise the work of blasting, said licensed blaster shall, at all times, have his license on the work and shall permit examination thereof by the Department or other officials having jurisdiction.

### **203.043 Basting Precautions**

No blasting shall be performed with prior notification of Department. All operations involving explosives shall be conducted with all possible care to avoid injury to persons and property. Blasting shall be done only with such quantities and strengths of explosives and in such manner as will break the rock approximately to the intended lines and grades and yet will leave the rock not excavated in an unshattered condition. Care shall be taken to avoid excessive cracking of the rock upon or against which any structure will be built, and to prevent injury to existing pipes or other structures and property above or below ground. Rock shall be well covered with logs or mats, or both, when required. Sufficient warning shall be given to all persons in the vicinity of the work before a charge is exploded.

Pre-blast Survey shall be the responsibility of the Contractor. Provide pre-blast survey prior to any blasting or blasting related operations. A written report of the preblast survey will be provided to the Department by the Contractor and will be available for review by the City of Portland. A copy of the blasting plan will be submitted to the City of Portland and Department for review and approval prior to the initiation of the site preparation work.

All owners of dwellings or residences located within 500-feet of the blasting location shall be notified, in writing, by the Contractor a minimum of 30 days prior to the scheduled blasting date about the proposed blasting and how to request a pre-blast survey. Upon request, the Contractor shall determine the pre-blasting condition of any structure located within this area and prepare a written report. The pre-blast survey shall be limited to the surface conditions of the structures but shall comply in all respects with 30 CFR, Chapter VII, Section 816.62.

Pre-blast Survey shall include, but not be limited to:

1. Video tape of each structure within 500-feet of the blasting location to show pre-blast conditions. Highlight existing defects in structures and pavements. Provide some means of establishing scale of existing defects (i.e., include tape measure or folding ruler at defect during video taping).
2. Video taping shall be done with commercial grade equipment to allow equipment still viewing without distortion of the viewed area.
3. Still photos and videotapes shall be retained by the pre-blast surveyor and shall be available for viewing by the Department within 24 hours upon request.

A blasting plan shall be prepared which addresses:

1. Airblast Limits
2. Ground Vibrations
3. Maximum Peak Particle Velocity

The blasting plan shall meet criteria established in Chapter 3 (Control of Adverse Effects) in the Blasting Guidance Manual of the United States Department of the Interior Office of Surface Mining Reclamation and Enforcement.

The blasting plan and preblast survey shall conform to all recommendations of the project geotechnical report and supplemental geotechnical evaluations included in these Specifications.

Particle Velocities: Maximum allowable peak particle velocity shall be limited to 1.25 inches per second within 300 feet of the blast site. Monitor at location designated by the Department.

Documentation: Submit an accurate record of the blasting operation to the Department. A copy should be retained by the blasting firm for at least 3 years. This record shall consist of the following information as listed in 30 CFR, Chapter VII, Section 816.68.

1. Name of the firm conducting the blast.
2. Location, date, and time of the blast.
3. Name, signature, and certification number of the blaster conducting the blast.
4. Identification, direction, and distance, in feet, from the nearest blast hole to the nearest dwelling, public building, school, church, community or institutional building outside the project area.
5. Weather conditions, including those that may cause possible adverse blasting effects.
6. Type of material blasted.
7. Sketches of the blast pattern including number of holes, burden, spacing, decks, and delay pattern.
8. Diameter and depth of holes.
9. Types and total weight of explosives used.
10. Mats or other protections used.
11. Seismographic and airblast records, which shall include: type of instrument, sensitivity, and calibration signal or certification of annual calibration; exact location of instrument and the date, time, and distance from the blast; and the vibration and/or airblast level recorded.

All blasting shall be performed in accordance with all pertinent provisions of the "Manual of Accident Prevention in Construction", issued by the Associated General Contractors of America, Inc., of the "Construction Safety Rules and Regulations", as adopted by the State Board of Construction Safety, Augusta, Maine, and the Maine Department of Transportation "Standard Specifications" Section 105.2.6, Use of Explosives. Blasting through the overburden will not be allowed.

Drilling Equipment will be equipped with suitable dust control apparatus that must be kept in repair and used during all drilling operations.

#### **203.044 Excess Rock Excavation**

If rock is excavated beyond the limits of payment indicated in the drawings, specified, or authorized in writing by the Department, the excess excavation, whether resulting from over-breakage or other causes, shall be backfilled, by the Contractor at no additional cost, as specified below in this section.

In pipe trenches, excess excavation below the elevation of the bottom of the bedding, cradle, or envelope shall be filled with material of the same type, placed and compacted in the same manner, as specified for bedding, cradle, or envelope. Excess excavation above said elevation shall be filled with earth as specified in the specifications at no additional cost.

#### **203.045 Blasting Records**

The Contractor shall keep and submit to the Department an accurate record of each blast. The record shall show the general location of the blast, the depth and number of drill holes, the kind and quantity of explosives used, and other data required for a complete record.

### **203.046 Shattered Rock**

If the rock below normal depth is shattered due to drilling or blasting operations of the Contractor, and the Department considers such shattered rock to be unfit for foundations, the shattered rock shall be removed and the excavation shall be backfilled with concrete as required, except that in pipe trenches crushed stone may be used for backfill, if approved. All such removal and backfilling shall be done by the Contractor, at no additional cost.

### **203.047 Removal of Boulders**

Piles of boulders or loose rock encountered within the limits of earth embankments shall be removed to a suitable place of disposal. Large decorative boulders shall be relocated onsite at the direction of the Department and to extent possible. Surplus boulders shall be disposed of as specified in 203.06 Waste Areas.

### **203.048 Disposal of Excavated Rock**

Excavated rock may be used in backfilling trenches subject to the following limitations:

1. Pieces of rock larger than permitted under the section titled Excavation and Embankment: Section 203.01, shall not be used for this purpose.
2. The quantity of rock used as backfill in any location shall not be so great as to result in the formation of voids.
3. Rock backfill shall not be placed within 18 inches of the surface of the finish grade.

Surplus excavated rock shall be disposed of as specified in Section 203.06, "Waste Areas".

### **203.049 Backfilling Rock Excavations**

When rock has been excavated and the excavation is to be backfilled, the backfilling above normal depth shall be done as specified under the "Excavation and Embankment, Section 203". If material suitable for backfilling is not available in sufficient quantity from other excavations, the Contractor shall furnish and install suitable material from outside sources, under pay item 203.25 "Granular Borrow".

### **203.06 Waste Area**

This subsection is revised to read as follows:

1. Surplus Earth and Rock Excavation:

The disposal of surplus earth and rock unacceptable as trench backfill materials and excavated rock shall be the responsibility of the Contractor. The Contractor shall be responsible to provide evidence of a fill permit if the disposal location is in the City of Portland.

2. Trees, Stumps and other Material, Excepting Granular Material:

The disposal of trees, stumps, stubs and brush shall be the responsibility of the Contractor.

If the disposal site is within private property, the Contractor shall be required to obtain written permission from the landowner for use of the disposal site for the above

mentioned materials. A copy of the permission and evidence of a fill permit if required shall be provided to the Department. The Contractor or landowner shall obtain a dumping permit at 55 Portland Street.

3. Cobblestones, Bricks, and Curbing Material:

Cobblestones, bricks and curbing removed shall remain the property of the City and shall be disposed of, after removing all excess granular materials there from, at a site to be determined at the time of construction and as directed by the Department. Bricks and cobblestones shall be palletized and curbing shall be stockpiled in an organized manner at the approved location.

4. Dewatering:

Contractor to provide, install, and maintain all necessary material and equipment used to keep excavation free of standing or flowing water and to transport water to a suitable discharge point. All water shall be disposed of in accordance with all local, state and federal regulations. Notify the Department and Steve Harris at the City of Portland Environmental Engineering Department prior to conduction dewatering operations.

At least 2 weeks prior to the start of construction in any areas of anticipated dewatering, submit to the Department and City of Portland Environmental Engineering Department, a written plan for removal, storage, treatment, and disposal of groundwater from excavations. Do not proceed with construction in any of these areas until the plan has been reviewed and approved by the Department and City of Portland Environmental Engineering Department.

Only trained personnel are authorized to conduct dewatering, storage, and discharge operations.

The contractor shall perform all work in the dry and prevent surface water or groundwater from flowing into excavations and from flooding project site and surrounding area. Do not allow water to accumulate in excavations.

The contractor shall provide and maintain pumps, well points, gravel-pack walls, sumps, hoses, filters, and all other dewatering system components necessary to convey water away from excavations. The contractor should note that several trenches will extend several feet below the observed/measured groundwater levels at the site (please refer to the groundwater level information summarized in Attachment A).

The contractor shall minimize the suspended solids content in the water by lining the excavation collection area with crushed stone and placing the pump intake in a perforated bucket.

Any damages to existing facilities or new work resulting from the failure of the Contractor to maintain the work areas in a dry condition shall be repaired by the Contractor, as directed by the Department, at no additional expense to the Department. Pumping shall be continuous where specified or directed or as necessary to protect the work and to maintain satisfactory progress.

The contractor shall convey water removed from excavations to a frac tank. The dewatering pump line shall be placed at the opposite end from the tank outlet. Do not

use trench excavations as temporary drainage ditches. Do not allow silt laden water to discharge to gutters or storm drainage system. Do not discharge water directly to the storm, sanitary or combined sewer. Limit circulating tank contents to prevent freezing. Do not discharge from the tank while the circulation pump is operating to allow adequate settling time before discharge. If needed for additional storage and treatment volume, provide a second tank to be placed in series for secondary settlement. Transfer the water from the first tank to the second tank by suspending the intake line immediately below the water level to minimize disturbance of sediment at the bottom of the tank.

Prior to discharge of the initial tank load, the Contractor must collect a water sample for laboratory analysis of the parameters identified with an "X" in the lists included as Attachment D.

The Contractor must provide the test results to the Department and City of Portland Environmental Engineering Department. The City will use these test results to develop a baseline for testing of future frac tank loads. All future frac tank loads shall be required to be tested in accordance to the baseline developed by these initial analyses. The City must provide approval to Contractor prior to additional effluent discharge.

The Contractor must provide access to the tanks for the City of Portland Environmental Engineering Department to take independent water samples. Do not add water or other materials to the frac tank after collecting the water sample.

Managing and treating water determined to have contaminant levels exceeding the City's Industrial Pretreatment Program limits shall be in accordance with local, state, and federal regulations.

The contractor shall work with the City of Portland and the Department to identify any other contaminants exceeding the Industrial Pretreatment Program discharge limits. The City of Portland and the Department shall provide recommended treatment methods for water found to exceed the City of Portland's Industrial Pretreatment Program discharge limitations.

Recent environmental analysis conducted at the site indicates that Total Petroleum Hydrocarbons (TPH) will likely be encountered in certain areas of the site. Free product and water with a visible sheen cannot be discharged to the sanitary and/or combined sewer. This situation shall be controlled by spill pads typical of hydrophobic pads by SPC Sorbent Products Company or approved equal which soak visible sheens off the surface of the water. The Contractor may submit an alternative method for free product and sheen removal for review and approval by both the City and the Department.

The Contractor shall obtain all local, state, and federal approvals necessary for the discharge of the water. If water is discharged to the combined or sanitary sewer, bag filters must be installed on the discharge piping and water must meet the City of Portland's Industrial Pretreatment Program discharge limitations.

The Department, City of Portland and/or the Portland Water District reserve the right to stop the Contractor from discharging flow to the combined sewer system during periods of time when the Combined Sewer Overflow (CSO) is or has the potential to be active.

5. Diversion of Water:

The contractor shall be responsible for providing and maintaining all ditching, grading, sheeting, and bracing, pumping and appurtenant work for the protection from flooding as necessary to permit the construction of work in the dry.

Upon completion of the contract work, the contractor shall remove all temporary construction and shall do all necessary earthwork and grading to restore the areas disturbed to their original condition or to such other conditions as indicated or directed by the Department.

Water shall not be permitted to flow into or through excavations in which work is under way or has been partially completed. The contractor shall not restrict or close off the natural flow of water in such a way that ponding or flooding will occur, and shall at all times prevent flooding of public and private property. All damages resulting from flooding or restriction of flows shall be the sole responsibility of the Contractor, at no additional expense.

**203.18 Method of Measurement**

Test pits will be measured per each test pit conducted.

In the fourth paragraph of this subsection, the sentence stating, “when measured in vehicles, the quantity for payment shall be 90 percent of the quantity determined for earth”, delete 90 percent and insert 80 percent.

Decorative Boulder Relocation will be measured for each decorative boulder to be relocated on site at the direction of the Department.

Common Excavation will be measured as a single lump sum item.

Crushed Stone Choker Course and Crushed Stone Drainage Course will be measured per cubic yard complete in place.

**203.19 Basis of Payment**

The third sentence of the first paragraph shall be replaced with “It shall also include full compensation for disposing of unsuitable and surplus Group 1 material when necessary. Disposal of Surplus Group 2 soils shall be measured under Pay Item 203.233. Group 2 soil identification will be made onsite by Tewhey Associates in accordance with the guidelines described in Appendix A, *Soil and Groundwater Handling Information for Construction Documents Bayside Railyard Subdivision and Bayside Trail, Portland Maine* by John Tewhey dated April 28, 2009. The costs of soil identification services by Tewhey Associates will be paid by the Department.

Paragraph Nine of this section shall be replaced with “Multiple handling of excavation materials, including Group 2 soils, backfill, and loam and common excavation stockpiles, shall be incidental to the contract. “

This subsection shall be amended by the addition of the following paragraphs:

The accepted quantity of Decorative Boulder Relocation will be paid for at the contract unit price for each decorative boulder to be relocated. Payment shall be full compensation for furnishing all labor, materials, and equipment necessary for relocation of the boulders within the project limits of work as directed by the Department.

The accepted quantity of Common Excavation will be paid for at the contract lump sum price. Payment shall be full compensation for furnishing all labor, materials, and equipment necessary excavation, stockpiling, placing, grubbing, dewatering, water diversion, grading hauling and compacting soils within the construction limits of work. Common Excavation will include excavation of all soils; including the 2000 CY of Group 2 Soils previously relocated onsite (See Note 4 on Plan and Profile Sheets). The off-site disposal of Group 2 soils shall be measured separately under Pay Item 203.233. Placement of geotextile filter fabric shall be measured separately as specified in Section 620.

The accepted quantity for Disposal of Surplus Group 2 Soils will be paid for at the contract unit price for each cubic yard. Payment shall be full compensation for furnishing all labor, materials, and equipment necessary for stockpiling, handling, and disposal of Group 2 Soils offsite per local, state and federal regulations.

The accepted quantity of test pit excavation will be paid for at the contract unit price per each test pit. Payment shall be full compensation for furnishing all labor, materials and equipment necessary for excavation, test excavation, backfilling, and pavement replacement, disposal of materials and protection of utilities.

The cost of common borrow shall be paid for at the contract unit price per cubic yard and shall be full compensation for all materials, labor and equipment necessary to satisfactorily complete the work.

The City has previously purchased a portion of the borrow, crushed stone choker and drainage courses; see Section 104.7 for additional information regarding previously purchased materials. The cost to place these previously purchased materials will be paid under Pay Items 203.2401, 203.2501, 203.3501 and 203.3503 at the contract unit price per cubic yard. The borrow, choker course, and drainage course materials shall be delivered to the project site by the material supplier. Contractor is responsible for coordination of the delivery. The contract unit price shall include all labor and equipment necessary to place materials previously purchased by the City; and shall be full compensation for all labor and equipment necessary to satisfactorily complete the work.

Payment will be made under:

<b><u>Pay Item</u></b>		<b><u>Pay Unit</u></b>
202.211	Decorative Boulders Relocation	Each
203.200	Common Excavation	Lump Sum
203.233	Disposal of Surplus Group 2 Soils	Cubic Yard
203.24	Common Borrow	Cubic Yard
203.2401	Common Borrow (with Previously Purchased Materials)	Cubic Yard
203.2501	Granular Borrow (with Previously Purchased Materials)	Cubic Yard
203.35	Crushed Stone, 703.11 – Type “A” (Overdepth)	Cubic Yard

203.3501	Crushed Stone Choker Course (with Previously Purchased Materials)	Cubic Yard
203.3502	Crushed Stone Choker Course	Cubic Yard
203.3503	Crushed Stone Drainage Course (with Previously Purchased Materials)	Cubic Yard
803.01	Test Pit Excavation	Each

**SUPPLEMENTAL SPECIFICATION  
SECTION 304  
AGGREGATE BASE AND SUBBASE COURSE**

The provisions of Section 304 of the Standard Specifications shall apply with the following additions and modifications:

**304.02 Aggregate**

Sources of Aggregate and preliminary test results shall be submitted ten working days prior to any placement of material on the job. Failure of these preliminary tests will be grounds for rejection of material from that source. Aggregates will be tested on the job at Department's discretion and shall meet these specifications as the material is incorporated into the work.

**304.07 Basis of Payment**

The cost of aggregates shall be paid for at the contract unit price per cubic yard and shall be full compensation for all materials, labor and equipment necessary to satisfactorily complete the work. The costs for laboratory testing and source documentation shall be incidental to providing Type "B" and Type "D" gravel. The costs for all failing tests shall be the responsibility of the contractor.

The City has previously purchased a portion of the aggregate base and subbase course materials; see Section 104.7 for additional information regarding previously purchased aggregate. The cost to place the aggregate base and subbase courses utilizing previously purchased materials will be paid under Pay Items 304.0901 and 304.1001, respectively. Previously purchased aggregates shall be delivered to the project site by the material supplier. Contractor shall be responsible for coordinating delivery. The contract unit price shall include all work necessary to place aggregate previously purchased by the City; and shall be full compensation for all labor and equipment necessary to satisfactorily complete the work.

Payment will be made under:

<b><u>Pay Item</u></b>		<b><u>Pay Unit</u></b>
304.09	Aggregate Base Course – Crushed Type "B"	Cubic Yard
304.0901	Aggregate Base Course – Crushed Type "B" (with Previously Purchased Materials)	Cubic Yard
304.10	Aggregate Subbase Course – Gravel Type "D"	Cubic Yard
304.1001	Aggregate Subbase Course – Gravel Type "D" (with Previously Purchased Materials)	Cubic Yard

**SUPPLEMENTAL SPECIFICATIONS  
SECTION 403  
HOT BITUMINOUS PAVEMENT**

The provisions of Section 403 of the Standard Specifications shall apply with the following additions and modifications:

**403.02 General**

Hot Mix Asphalt placement at bituminous sidewalks and the bituminous base of brick and concrete paver sidewalks shall also adhere to the requirements of Supplemental Specification Section 608.

**403.05 Basis of Payment**

The accepted quantity of bituminous pavement will be paid for at the contract unit price complete in place, and shall be full compensation for all labor, materials and equipment necessary to complete the work shall be included. Fine grading shall be considered incidental to the pay items of this section.

The City has previously purchased a portion of the bituminous pavement materials; see Section 104.7 for additional information regarding previously purchased materials. The cost to place the previously purchased hot mix asphalt will be paid under Pay Items 403.2073 and 403.2082. Previously purchased bituminous pavement shall be delivered to the project site by the material supplier. Contractor shall be responsible for coordinating delivery of previously purchased Hot Mix Asphalt. The contract unit price shall include all work necessary to place the previously purchased hot mix asphalt; and shall be full compensation for all labor and equipment necessary to satisfactorily complete the work.

Payment will be made under:

<b><u>Pay Item</u></b>		<b><u>Pay Unit</u></b>
403.207	Hot Mix Asphalt, 19.0mm	TON
403.2073	Hot Mix Asphalt, 19.0mm (with Previously Purchased Materials)	TON
403.208	Hot Mix Asphalt, 12.5mm	TON
403.2082	Hot Mix Asphalt, 12.5mm (with Previously Purchased Materials)	TON
403.209	Hot Mix Asphalt, 9.5mm (Sidewalks, Drives, and Incidentals)	TON

**SUPPLEMENTAL SPECIFICATION  
SECTION 603  
PIPE CULVERTS AND STORM DRAINS**

The provisions of Section 603 of the Standard Specifications shall apply with the following additions and modifications:

**603.01 Description**

This work shall consist of the construction of storm drains, sewer pipes by means of trenched or trenchless installation, service leads hereinafter referred to as "pipe" as shown on the plans, details, and specified herein.

When the alternative of pipe material is listed in the Bid, the Contractor shall signify his choice of pipe to be used by inserting his mark in the proper space provided.

The Contractor shall install locating/warning tape over the centerline of all sanitary, storm, and combined sewer pipes including main lines, service leads and catch basin laterals both within the right of way and outside of the established street as required by City ordinance. Both a green warning tape and a number 10 or 12 gauge single strand coated wire shall be installed at a maximum of 24 inches below finish surface grade for the entire length of the pipe. Magnetic warning tape may be used in place of the separate warning tape and wire.

All connections shall be made in conformance with the Plumbing Code of the City of Portland and the Maine State Plumbing Code.

**603.02 Materials**

Pipe materials shall be limited to and meet the requirements specified for the various subsections of the specifications listed below:

Reinforced Concrete Pipe-----	Stand. Spec.-----	706.02
P.V.C. Ring Type Sewer Pipe - (SDR 35 or Equal)-----	ASTM-----	D3034

**603.03 Construction Requirements**

Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings:

Open ends of pipe shall be closed by suitable temporary bulkheads to prevent entrance of earth and other materials when pipe laying is not in progress. Contractor shall take all necessary precautions to prevent floatation of the pipe as a result of the water in the trench.

Each pipe length shall be inspected before being laid. Pipe shall be laid to conform to the lines and grades indicated on the drawings. Each pipe shall be so laid as to form a close joint with the next adjoining pipe and bring the inverts continuously to the required grade.

Bell holes shall be excavated or provided in the base material to receive the bell or coupling so that only the barrel of the pipe receives bearing pressure from the supporting material.

When each pipe has been properly bedded, enough of the backfill material shall be placed and compacted between the pipe and the sides of the trench to hold the pipe in correct alignment.

No pipe or fitting shall be permanently supported on blocks, wedges, boards or stones.

All joints shall be made in a dry trench and in accordance with the manufacturer's recommendations.

All PVC Gravity Sewer Pipe supplied shall conform to all aspects of ASTM specification D3034-73A and/or ASTM Spec. F789 for PVC sewer pipe, joints and fittings. Joints shall be rubber gasketed "Bell and Spigot" type. Installation of materials shall be as suggested in ASTM D2321. Minimum "pipe stiffness" at 4% deflection shall be 46 psi for all sizes when tested in accordance with ASTM D2421.

It is the responsibility of the Contractor to assure that the trench and the backfill around the pipe has been compacted sufficiently to limit deflection in the pipe to no more than 4%. All flexible pipe installed under this contract shall be tested by a "go-no-go" mandrel permitting no greater than 4% deflection. Testing of the pipe shall be done in the presence of a Department inspector. The inspector shall be given a minimum of 24 hour advance notice before testing is to take place. All pipe not passing the 4% deflection limit test shall be removed and replaced at no additional cost.

Pipe bundles shall be stored on a flat surface so as to support the barrels evenly. This is important as in hot weather PVC pipe will deflect or warp causing installing problems in line and grade. If a warped section is found, the Contractor shall not use such length of pipe.

In order to ensure proper compaction, alignment, and grade, and eliminate any construction problems that may be encountered, the Contractor shall be required to use only the 12-1/2 foot lengths of PVC pipe.

Pipe shall remain stacked in the original shipping bundles, and only pipe taken off the bundle for one day's laying shall be distributed along the trench.

PVC pipe will not bond to concrete or mortar and therefore connection to a cast-in-place or brick manhole and catch basin shall be made as shown on the pipe connection detail of the project plans.

#### Reinforced Concrete Pipe:

Reinforced concrete pipe shall be obtained only from a manufacturer of established good reputation in the industry. The pipe shall have a smooth and even interior surface, free from projections, indentations, or irregularities of any kind.

The joint shall be such that when joined the pipes will form a continuous and uniform line without projections, off-sets or irregularities and be capable of satisfying the specified leakage requirements.

Pipes shall be joined with rubber or rubber type gaskets that conform to the requirements established in ASTM Designation 443-67.

Each length of pipe shall be provided with proper ends made either of concrete formed on machined rings to ensure accurate joint surfaces or of metal rings. The diameters of the joints surface, depended upon to compress the gasket, shall not vary from the theoretical diameters

by more than 1/16 inch. The joint shall be sealed by the rubber gasket so that the joint will remain tight under all conditions of service.

The rubber gasket shall be applied in accordance with the manufacturer's recommendations.

After the pipes are aligned in the trench and are ready to be jointed, all joint surfaces shall be cleaned. Immediately before jointing the pipe, the inside surface of the groove shall be thoroughly lubricated with a recommended lubricant. Pipe shall then be coupled immediately by carefully pushing each pipe into place without damage to pipe or gasket. The position of the gasket in the joint shall then be inspected to be sure it is properly put together and is tight.

Pipes shall be coupled by any suitable arrangement of come-along, winch, jack, or other power equipment that can exert sufficient force to couple pipe to its tightest position.

All pipe thirty-six inches in diameter or larger shall be sealed on the inside with cement mortar or with gunite by the grout-weld method using a pneumatic machine of the Nicholson, Bondactor, or equal type. Cement mortar if used shall be applied by trowel and the joint shall be thoroughly filled and finished smoothly with the inside surface of the pipe. The grout-weld seal shall be applied only by experienced and skilled workmen in accordance with the instructions of the manufacturers of the machine.

The pipe shall be laid accurately to line and grade. Pipe bedded in compacted crushed stone shall not be supported on blocking, wedges, brick, or anything except the bedding material. Pipe on concrete cradle shall be supported on solid concrete blocks or precast concrete saddles which become part of the completed cradle.

Each length of pipe shall be shoved home against the pipe previously laid, and held securely in position. Joints shall not be "pulled" or "cramped". Holes provided for jointing shall be filled and compacted.

Pipe from which a core has been cut and the resulting hole repaired shall be placed with the cored hole located forty-five degrees above or below the horizontal centerline of the pipe.

To prevent the entrance of earth and other materials when pipe laying is not actually in progress, the open ends of pipe shall be closed by suitable temporary bulkheads. The Contractor shall take all necessary precautions to prevent floatation of the pipe because of flooding of the trench. If water is in the trench when work is resumed, the bulkheads shall not be removed until the danger of earth and other materials entering the pipe has passed.

All pipe joints and structures shall be made water tight. There shall be no visible leakage, spurting or gushing of water, sand, silt, clay or soil of any description entering the pipe lines at the joints or structures. Where there is evidence of water or soil entering the pipeline, connecting pipes or structures, defects shall be repaired.

### **603.034 Inspection**

Pipe may be inspected at the manufacturing plant, or on the work site, and shall be subject to rejection at any time, even though sample pipes may have been accepted as satisfactory at the manufacturing plant.

All pipe shall be subject to thorough inspection and tests. All tests shall be made in accordance with the methods prescribed by, and the acceptance or rejections shall be based on, applicable ASTM specifications.

Pipe will be inspected upon delivery and all pipe which does not conform to the requirements of this contract will be rejected and shall be immediately removed from the work area by the Contractor.

Unsatisfactory pipe will be either permanently rejected or minor repairs made. After delivery, any pipe will be rejected which has been damaged beyond the possibility of satisfactory repair.

If such pipe is found in the pipeline, it shall be removed and replaced or encased in a Class A concrete collar or envelope as directed, at no additional cost.

An inspection of the interior of all mainline pipe and catch basin lateral connections installed as part of the project shall be completed prior to final paving of the project by experienced personnel trained in locating breaks, obstacles and service connections by closed circuit television. A video tape and suitable log shall be provided to the Department and City for review prior to final paving.

#### **603.11 Method of Measurement**

The Department shall have the right to take samples of the concrete after it has been mixed, or as it is being placed in the forms, and to require cores to be cut from the finished pipe for any inspection and tests Department may require. Holes left by the removal of cores shall be filled in an approved manner by the Contractor at no additional cost.

Pipes will be measured by the linear foot in place within the limits specified below.

For measurement purposes the end of the pipe in closed structures will be considered at the centerline of the structure, and in masonry headwalls it will be considered to be at least the face of the headwall.

#### **603.12 Basis of Payment**

The accepted quantities of pipe for culverts, drains and sewers will be paid for at the contract unit price per linear foot, complete in place.

Payment for trench excavation to the established trench profile indicated on the plans with the exception of structural rock excavation and pavement section removal will be included in this item.

All sheeting, shoring, or temporary bracing will be included in this item. Payment for approved undercuts below the established trench profile will be paid for as Earth Excavation, Below Grade, as specified in Section 206 of the Supplemental Specifications.

Overdepth rock excavation will be paid for as Structural Rock Excavation as specified in Section 206 of the Supplemental Specifications.

Backfilling of the trench shall be incidental to this item, except in the case where the Department requires the contractor to backfill with Granular Borrow. Granular Borrow, in this case, will be paid for under pay item 203.25.

Should the Contractor elect to utilize "drag boxes" during storm drain line installation work, overcutting of the trench beyond the limits for excavation shown on the Pipe Installation Detail will be allowed to accommodate the boxes. However, no payment will be made for the excess excavation and backfill material beyond the payment limit, dimension "A", as shown on the Pipe Installation Detail.

If any excavation including a utility trench is extended to a depth of more than twenty (20) feet, it will be necessary to have the sideslopes or trench sheeting and shoring designed by a professional engineer registered in the State of Maine. No extra payment will be made for the engineered sheeting and shoring methods, materials or equipment used by the Contractor, or engineering services. All trench stabilization shall be considered incidental to the applicable pay items.

The costs of all necessary shoring and bracing of existing structures, pipes, or utilities in or near the trench shall be considered incidental to the applicable pay items.

The costs for PVC bends, retainer glands and thrust blocking shall be incidental to the appropriate pipe item.

The costs for providing Inserta Tees, and exterior drops to manholes, as called out on the plans and as detailed within the detail sheets, shall be incidental to the appropriate pipe item.

The cost of locating/warning tape including installation shall be considered incidental to the appropriate pipe item.

The cost of maintaining flows in existing sewer lines and manholes and any maintenance and cleaning of said sewers that may be required as a result of new sewer installation shall be incidental to the related pay item and no separate payment for this work will be made.

The accepted quantity of service leads will be paid for at the contract unit price per linear foot of pipe installed, complete in place. The amount bid for each lateral shall be full compensation for furnishing all labor, equipment, tools, adapters, reducers, and materials necessary to satisfactorily connect all laterals.

Payment for trench excavation, with the exception of structural rock excavation, will be included in this item. Pipe bedding materials, backfilling and backfilling materials shall also be included in this item for payment.

The City has previously purchased a portion of the pipe materials; see Section 104.7 for additional information regarding previously purchased materials. Previously purchased pipe material shall be delivered to the project site by the material supplier. Contractor shall be responsible for coordinating delivery. The contract unit price shall include all work necessary to place the previously purchased pipe material; and shall be full compensation for all labor and equipment necessary to satisfactorily complete the work.

Payment will be made under:

<b><u>Pay Item</u></b>		<b><u>Pay Unit</u></b>
603.149	10" Diameter DR35 PVC Pipe	Linear Foot
603.1491	10" Diameter DR35 PVC Pipe (with Previously Purchased Materials)	Linear Foot
603.157	12" Diameter DR35 PVC Pipe	Linear Foot
603.1571	12" Diameter DR35 PVC Pipe (with Previously Purchased Materials)	Linear Foot
603.1651	15" Diameter RCP Class III (with Previously Purchased Materials)	Linear Foot
603.177	18" Diameter DR35 PVC Pipe	Linear Foot
603.1771	18" Diameter DR35 PVC Pipe (with Previously Purchased Materials)	Linear Foot
603.195	24" Diameter RCP Pipe Class III	Linear Foot

**SUPPLEMENTAL SPECIFICATION  
SECTION 607  
FENCES**

The provisions of Section 607 of the Standard Specifications shall apply with the following additions and modifications:

**607.01 Description**

This work shall include all new fencing to be installed within the Franklin Arterial center island median, the resetting of existing chain link fence, and the installation of new 6' high chain link fence as shown on the Drawings.

**607.02 Materials**

Franklin Arterial Median Fence: WireWall welded mesh 1.5" x 1.5", 12.5GA marine grade PVC Green (25-year warranty), standard rolls 48" wide x 100' long, manufactured by Riverdale Mills, Northbridge, MA and locally distributed by Brooks Inc., Thomaston, Maine (800) 426-4526.

Franklin Arterial Median Fence Posts: Vertical Posts "Standard C" Posts with two (2) horizontal rails (top and bottom), PVC green (25-year warranty), manufactured by Gregory Industries, Inc., 4100 13th Street, SW, Canton, Ohio 44710 and distributed by Master Halco, Boston, MA. (800) 969-1669.

New Chain Link Fence shall be 6' high, green vinyl.

Reset or replace chain link: Reuse materials whenever practicable, replace with materials matching existing fences as needed or as directed.

All materials shall meet the requirements of the subsection specified in the Standard Specifications.

**607.03 Construction Requirements**

Install fencing as per manufacturer's recommendation in the locations indicated on the plans and in accordance with the details.

The Contractor is responsible for locating, marking and avoiding all subsurface utilities during the post driving.

Direct drive post.

**607.06 Method of Measurement**

New fence will be measured by the linear foot complete in place. Measurement will be along the gradient of the fence from outside to outside of the end posts of each continuous run replaced. Remove and Reset Fence shall be measured as a single lump sum price.

**607.07 Basis of Payment**

The accepted quantities of fence will be paid for at the contract unit price per linear foot of type and size installed, removed and/or replaced. Payment shall be full compensation for removal

and disposal of existing fence and for furnishing and assembling all materials, for excavation and backfilling holes, cleaning, stockpiling and for all incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>		<u>Pay Unit</u>
607.163	Chain Link Fence – 4 ft, PVC Coated (Franklin Arterial Median Fence)	Linear Foot
607.173	Chain Link Fence – 6 ft, PVC Coated	Linear Foot
607.24	Remove and Reset Fence	Linear Foot

**SUPPLEMENTAL SPECIFICATIONS  
SECTION 608  
SIDEWALKS**

The provisions of Section 608 of the Standard Specifications shall apply with the following additions and modifications:

**608.01 Description**

This work shall consist of the construction of asphalt sidewalks, brick paved sidewalks and concrete unit pavers on a crushed gravel base, pervious surfaces on drainage stone, and pedestrian ramps with truncated domes in accordance with these specifications and in reasonably close conformity with the lines and grades and shown on the plans. Limits of the work where new bituminous asphalt or sidewalk will match existing shall be cleanly saw cut prior to demolition operations.

**608.02 Materials**

Materials shall meet the requirements as specified in the following sections.

**608.04 Bituminous Sidewalk**

Description

Bituminous sidewalks shall be defined as all asphalt surface pedestrian walkways excluding the proposed 12-foot wide bituminous trail.

Materials

Material for bituminous concrete base courses and surface courses for sidewalks and driveways shall conform to the requirements of Section 403 of the Standard Specifications for Hot Bituminous Pavement, Grading "B" and Grading "C" respectively. Crushed gravel base shall conform to the requirements of Section 304 of these specifications for Aggregate Base Course - Crushed, Type "A".

Construction Methods

1. Excavation: Excavation shall be made to the required depth and width. The foundation shall be shaped and compacted to a firm even surface conforming to the section shown on the plans and typical details. All soft and yielding material shall be removed and replaced with acceptable material.
2. Sidewalk Construction: Sidewalks shall be constructed as shown on the Site Details Sheet.
3. Placing Bituminous Material: Bituminous material shall be placed on the compacted base course in two courses, one base and one surface, so as to give the required depth when rolled. Compaction shall be accomplished by means of a power roller having a minimum total weight of 2,000 pounds with a minimum of 65 pounds per inch of width of the drive roll or by satisfactory power vibratory compaction equipment. In areas inaccessible to other equipment, hand tamping will be permitted. In any case the bituminous material shall be uniformly compacted.

## **608.041 Brick Sidewalk**

### Materials

Materials shall conform to the requirements of the various subsections of the specifications listed below:

Used Brick: The Contractor shall salvage existing bricks from the project area as specified in Section 203 of the Supplemental Specifications. The Department shall have full authority in the choice of brick to be disposed of.

The discarded brick shall become the property of the City and shall be delivered by the Contractor to a designated City stockyard.

New Brick: Conform to the various subsections of the specifications listed below.

Brick - Brick shall conform to requirements of ASTM Standard Specifications for Building Brick (made of clay or shale) Designation C62-66 for Grade SW with the following modifications:

1. The absorption limits shall be from 8 to 12 per cent for the average of 5 bricks.
2. The compressive strength shall not be less than 8000 pounds per square inch (psi).
3. The modulus of rupture shall not be less than 1000 pounds per square inch (psi).
4. The bricks shall be No. 1, wire cut type for paving.
5. Bricks shall be of standard size (2-1/4" x 3-5/8" x 7 5/8") with permissible variations not to exceed 1/16" in depth, 1/8" in width or 1/4" in length.

Bricks shall be as manufactured by the Morin Brick Co. of Auburn, Maine or an approved equal. Prior to ordering the brick, samples shall be submitted in whole straps to show color range.

All base courses and joints shall conform to the applicable subsections of Division 700 of the Standard Specifications.

### Construction Methods

1. Subgrade: The subgrade for the sidewalks and driveways shall be shaped parallel to the proposed surface of the walks and drives and shall be thoroughly compacted. All depressions occurring shall be filled with a suitable material and again compacted until the surface is smooth and hard.
2. Foundation: After the subgrade has been prepared, a foundation of crushed gravel shall be placed upon it. After being thoroughly compacted, the foundation shall have a thickness as shown on the plans and typical details and shall be parallel to the proposed surface of the work.
3. Bituminous Base: A layer of hot bituminous pavement grading "B" shall be spread upon the properly prepared crushed gravel. After being thoroughly compacted, the bituminous base course shall have a minimum thickness of two (2") inches and shall be parallel to the proposed finish grade.
4. Sand-Cement Base: A layer of sand-cement base course material one (1") inch in thickness shall be spread upon the properly prepared bituminous base course. The course shall be thoroughly compacted and present a hard smooth surface parallel to the proposed finished slope and grade of the walks and drives. The ratio shall be six (6) parts of washed mortar sand to one (1) part Portland Cement.
5. Brick Placement: After the sand base course has been properly prepared, the brick shall be placed in the pattern shown on the plans and typical details. The brick shall be

placed as closely together as possible and the sand joints between the brick shall be no wider than that allowed by the natural texture of the brick itself. NO OPEN JOINTS WILL BE ALLOWED. Brick shall be saw-cut to fit spaces requiring less than a whole brick. No cut brick shall be less than two (2") inches in length. A journeyman brick mason shall supervise all brick placement.

After the bricks are carefully set upon the properly prepared sand-cement base, a plank or heavy sheet of plywood covering several courses of brick shall be placed upon the bricks and carefully rammed with a heavy hammer until the bricks reach a firm, unyielding bed and present a surface of the proper slope and grade. Any divergence from line and grade shall be corrected by taking up and relaying the bricks. After the ramming of the bricks, a sufficient amount of sand-cement shall be spread over the surface and thoroughly swept or raked so as to fill the joints. All surplus sand-cement remaining on the sidewalk and driveway after the joints have been properly filled, shall be carefully removed by sweeping. Care shall be taken to avoid raking out the joints during removal of excess sand-cement. A final application of sand only shall be spread on the sidewalk. The application of sand shall then be removed by sweeping while the aforementioned precautions are being exercised.

### **608.045 Unit Pavers**

#### **Material**

Materials for the unit pavers shall conform to the requirements of the various subsections of the specifications listed below:

Permeable Concrete Unit Pavers: Paver unit materials and fabrication shall meet or exceed the requirements of USPSI Designation CPS7180 Standard Specifications for Concrete Paving Stone:

1. Portland cement: ASTM C-150, Type 1.
2. Aggregate: ASTM C-33.
3. Compressive strength: Minimum 8,000 psi at time of delivery.
4. Absorption: Maximum 5%.
5. Freeze-thaw test: ASTM C67, no breakage and maximum 1% loss in dry weight after 50 cycles.
6. Abrasion resistance: ASTM C418, maximum volume loss 15 cu. cm. per 50 cu. cm. Average thickness loss 3 mm.
7. Provide only sound units free of defects that would interfere with proper placing of units or impair strength or permanence of construction. Minor cracks and minor chipping incidental to methods of manufacture, handling in shipment, and delivery will be subject to Department's review and acceptance. Pavers with excessive cracks and chipping, as determined by the Department, will be rejected as not complying with specification requirements.
8. Concrete unit pavers shall be "Cambridge Cobble III with Armortec", size and color as follows:  
Cambridge Cobble III, color "Onyx-Natural" blend, square (size 2-3/8" x 6-1/16" x 6-1/16"), Or product equivalent in size, color, and functional performance, approved by the Department.
9. Underdrains shall be 6" in diameter and shall be constructed as shown on the plans and specified herein. The pipe material shall be perforated SDR-35. Coiled pipes shall not be used.

Concrete Unit Pavers: Paver unit materials and fabrication shall meet or exceed the requirements of USPSI Designation CPS7180 Standard Specifications for Concrete Paving Stone:

1. Portland cement: ASTM C-150, Type 1.
2. Aggregate: ASTM C-33.
3. Compressive strength: Minimum 8,000 psi at time of delivery.
4. Absorption: Maximum 5%.
5. Freeze-thaw test: ASTM C67, no breakage and maximum 1% loss in dry weight after 50 cycles.
6. Abrasion resistance: ASTM C418, maximum volume loss 15 cu. cm. per 50 cu. cm. Average thickness loss 3 mm.
7. Provide only sound units free of defects that would interfere with proper placing of units or impair strength or permanence of construction. Minor cracks and minor chipping incidental to methods of manufacture, handling in shipment, and delivery will be subject to Department's review and acceptance. Pavers with excessive cracks and chipping, as determined by the Department, will be rejected as not complying with specification requirements.
8. Concrete unit pavers shall be Cambridge Pavers "Roundtable Collection with Armor-Tec", size and color as follows:
  - a. Square pavers (6" x 6" x 2-3/8" thick) color "Onyx-Natural" blend, Or product equivalent in size, color, and functional performance, approved by the Department.
  - b. Square pavers (6" x 6" x 2-3/8" thick) color "Onyx", Or product equivalent in size, color, and functional performance, approved by the Department.
  - c. Mixed size pavers (small 2-13/16" x 5-13/16" x 2-3/8" thick, medium 4-3/8" x 5-13/16" x 2-3/8" thick, large 5-13/16" x 8-13/16" x 2-3/8" thick) color "Onyx-Natural" blend, Or product equivalent in size, color, and functional performance, approved by the Department.

Edge Treatment: Pavers edge treatment shall be installed as indicated on the drawings and considered incidental to contract pay items 608.09, 608.0901, 608.241, 608.2511 and 608.2911,

#### Construction Methods

1. Spread the bedding sand evenly over the base course and screed to a nominal 1 in. thickness, not exceeding 1-1/2 in. thickness. The screeded sand should not be disturbed. Place sufficient sand to stay ahead of the laid pavers. Do not use the bedding sand to fill depressions in the base surface.
2. Ensure that pavers are free of foreign material before installation.
3. Lay the pavers in the pattern(s) as shown on the drawings. Maintain straight pattern lines.
4. Points between the pavers on average shall be between 1 /16 in. and 3 /16 in. wide.
5. Fill gaps at the edges of the paved area with cut pavers or edge units.
6. Cut pavers to be placed along the edge with masonry saw.
7. Use a low amplitude plate compactor capable of at least 5,000 lbf compaction at a frequency of 75 hz –100 hz.
8. Compact the pavers, sweeping dry joint sand into the joints and vibrating until they are full. This will require at least two or three passes with the compactor. Do not compact within 3 ft of the unrestrained edges of the paving units.

9. All work to within 3 ft of the laying face must be left fully compacted with sand-filled joints at the end of each day. Cover the laying face with plastic sheets overnight if not closed with cut and compacted pavers.
10. Sweep off excess sand when the job is complete.
11. The final surface elevations shall not deviate more than 3/8 in. under a 10 ft long straightedge.
12. The surface elevation of pavers shall be 1/8 to 1/4 in. above adjacent drainage inlets, concrete collars or channels.
13. After removal of excess sand, check final elevations for conformance to the drawings.

**608.046 Pervious Concrete**

Material

Materials shall conform to the requirements of the various subsections of the specifications listed below:

Pervious Concrete Aggregates: Nominal maximum aggregate size shall not exceed one-third of the specified pavement thickness and shall meet the following gradation or approved equal:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieve
1/2"-----	100
3/8"-----	95 – 100
No. 4-----	15 – 40
No. 8-----	3 – 15
No. 16-----	1 – 10
No. 30-----	1 – 6
No. 50-----	1 – 3
No. 100-----	<1

Pervious Concrete Admixtures: Chemical admixtures that facilitate the production and placement of pervious concrete shall meet the following mix design or equivalent mix design, approved by Department. The quantities are given in the oven dried state (no free or absorbed moisture).

Material Name	Unit Quantity
Ciment Quebec II-----	600 lbs
3/8 Stone-----	2600 lbs
Water-----	20 gallons
Glenium 7500-----	18 oz. (3 oz. / cwt.)
Delvo-----	30 oz. (5 oz. / cwt.)
Microair-----	1 oz.
Rheomac VMA 362-----	60 oz. (10 oz. / cwt.)

Pigments: Use pigments complying with ASTM C979 if specified in Contract Documents.

Aggregate Base Courses: base courses for pervious concrete shall conform to the requirements of Section 703 of these specifications for Choker Course and Drainage Course.

Hot and Cold Weather Construction:

1. When hot weather is anticipated, submit detailed procedures for the production and transportation of concrete during hot weather.
2. In cold weather, comply with ACI 306.1, recording concrete temperature no less than twice per 24-hour period.

Underdrains: Underdrains shall be 6" in diameter and shall be constructed as shown on the plans and specified herein. The pipe material shall be perforated SDR-35. Coiled pipes shall not be used.

### Construction Methods

1. Subgrade preparation:
  - a. Prepare subgrade as specified in the contract documents.
  - b. Construct subgrade to ensure that the required pavement thickness is obtained in all locations.
  - c. Keep all traffic off of the subgrade during construction to the maximum extent practical. Regrade subgrade disturbed by concrete delivery vehicles or other construction traffic, as needed.
2. Subbase: Prepare subbase in accordance with contract documents.
3. Setting formwork:
  - a. Set, align, and brace forms so that the hardened pavement meets the tolerances specified in the contract documents.
  - b. Apply form release agent to the form face which will be in contact with concrete, immediately before placing concrete.
  - c. The vertical face of previously placed concrete may be used as a form.
4. Batching, mixing, and delivery: Batch and mix in compliance with ASTM C 94/C 94M.
5. Placing and finishing pavement:
  - a. Do not place concrete on frozen subgrade or subbase.
  - b. Spread the concrete using a come-along, short-handle, square-ended shovel or rake.
  - c. Do not use steel trowels or power finishing equipment.
  - d. Finish the pavement to the elevations and thickness specified in Contract Documents.
6. Final surface texture: Compact the concrete to a dense, pervious surface.
7. Curing:
  - a. Begin curing within 20 minutes of concrete discharge unless longer working time is accepted by the Department.
  - b. Completely cover the pavement surface with a minimum 4 mil thick polyethylene sheet. Cut sheeting to a minimum of a full placement width.
  - c. Cover all exposed edges of pavement with polyethylene sheet.
  - d. Secure curing cover material, protect concrete from sediments.
  - e. Cure pavement for a minimum of 7 uninterrupted days, unless otherwise specified.
8. Jointing:
  - a. Construct joints at the locations indicated on the Contract Documents.
  - b. When jointing requirements are not indicated on the project drawings, submit drawings describing proposed jointing in accordance with Contract Documents.
    - 1) Provide control joints and score joints as specified on Landscape Plans.
    - 2) Use isolation joints only where pavement abuts fixed objects, such as buildings, foundations, and manholes.
    - 3) Extend isolation joints through the full depth of the pavement. Fill the entire isolation joint with expansion joint material.

- c. Create contraction joints by one of the following methods:
  - 1) Tool contraction joints to the specified depth and width in fresh concrete immediately after the concrete is compacted.
  - 2) Saw-cut concrete after concrete has hardened sufficiently to prevent aggregate from being dislodged and soon enough to control pavement cracking. To minimize drying, ensure that curing materials are removed only as needed to make cuts.
  - 3) Contractor shall seal all joints with a semi ridged material. This will help reduce raveling at the joints.
- 9. Opening to traffic:
  - a. Do not open the pavement to light traffic until the concrete has cured for at least 14 days and (28 days for heavy traffic), and not until the pervious pavement is accepted by the Department.
  - b. Contractor shall mechanically sweep pavement before it is opened to vehicular traffic.
  - c. Protect pervious pavement from sediments during construction.

**608.05 Method of Measurement**

Bricks and Permeable Concrete paving Stones with Sand Base will be measured by the square yard of finished surface.

Precast Concrete Unit Pavers will be measured by the square foot of finished surface.

Pervious Concrete will be measured by the cubic yard complete in place.

Underdrain will be measured by the linear foot, complete in place.

Please refer to Sections 203, 304, and 403 for measurement requirements of Crushed Stone Choker and Drainage Courses, base aggregates, and pavement.

**608.06 Basis of Payment**

The accepted quantities of underdrain, brick, precast concrete unit pavers, permeable concrete paving stones, and pervious concrete will be paid for at the contract unit price complete in place and shall be full compensation for all materials, labor and equipment necessary to satisfactorily complete the work. Edge treatment, sand, and sand-cement bases will be considered incidental to the Pay Items of this section.

The City has previously purchased a portion of these materials; see Section 104.7 for additional information regarding previously purchased materials. Previously purchased pervious concrete shall be delivered to the project site by the material supplier. Contractor shall be responsible for coordinating delivery. Previously purchased bricks and pavers are located at the City Stock Yard. The contract unit price shall include all labor and equipment necessary to load and deliver previously purchased bricks and pavers and to place all materials previously purchased by the City. The contract unit price will also include furnishing of incidental materials, such as edge treatment, sand, and sand-cement bases.

Payment will be made under:

<b><u>Pay Item</u></b>		<b><u>Pay Unit</u></b>
605.09	6" Underdrain	Linear Foot

608.09	Brick (sidewalks)	Square Yard
608.0901	Brick (sidewalks) with Previously Purchased Materials	Square Yard
608.241	Precast Concrete Unit Pavers	Square Feet
608.2511	Precast Concrete Unit Pavers with Previously Purchased Materials	Square Yard
608.291	Pervious Concrete	Cubic Yard
608.2911	Permeable Concrete Paving Stones and Sand Base with Previously Purchased Materials	
608.2912	Pervious Concrete with Previously Purchased Materials	Cubic Yard

**SUPPLEMENTAL SPECIFICATION  
SECTION 609  
CURB**

The provisions of Section 609 of the Standard Specifications shall apply with the following additions and modifications:

**609.01 Description**

This work shall include all resetting of existing curb as well as setting of City-salvaged curb as shown in the drawings. Contractor may examine City-salvaged materials at the Stock-yard prior to bidding, as described in the Contract Documents.

Material shall be in accordance with Section 712.04 except that drill holes through the curb will not be allowed.

**609.03 Vertical Stone Curb, Terminal Section and Transition Sections**

All joints of the curb shall have a four inch (4") by eight and one half inch (8-1/2") pad on the back side. The pad shall be filter fabric equal to Mirafi 140N. The pad shall be placed in full contact with the curb from a half inch (1/2") below top of curb to two inches (2") below gutter grade and backfilled to hold in place.

**609.081 Removing and Stacking Vertical Curbing, Terminal Curbing, Transition Sections, Curb Inlets, and Curb Corners (Types 1 and 5)**

The Contractor shall be responsible for the removal without damage, cleaning and stacking, all straight and curved curbing, terminal sections and curb corners. Contractor shall layout all curbing for visual inspection by the Department. Contractor to dispose of curbing materials not designated for reuse by the Department. Contractor to assume 20% of existing curbing is not suitable for reuse. Removal of curbing shall be in accordance with the requirements of Subsection 202.03. Contractor may utilize City-Salvaged granite curbs for curbing materials to complete the curb installation shown on the contract plans. Contractor to provide all loading, handling, cleaning and transportation required for delivery of City-Salvaged materials from the City Stock Yard.

Each section of straight curbing shall have its overall length painted legibly and plainly on one end. Each section of circular curbing shall have its overall arc length and radius painted on one end.

Removing and stacking curb or edging shall include all labor, equipment, tools and materials for excavating, removing, cleaning, backfilling, handling, stacking and any incidental work necessary.

**609.09 Method of Measurement**

The first sentence of this section shall be replaced by: Reset Curbing will be measured as a single item with a lump sum price and will include the loading, delivery, and setting of City-Salvaged curbs.

The third sentence of this section shall be replaced by: All transition sections, terminal curb, sloped curb shall be incidental to Pay Item 609.38.

**609.10 Basis of Payment**

Materials and equipment necessary to complete the work of this Section shall be paid for per linear foot, and will include the resetting of existing granite curbing as well as the loading, delivery, and installation of City-salvaged curbs from the City stockyard.

<b><u>Pay Item</u></b>	Payment will be made under:	<b><u>Pay Unit</u></b>
609.38	Reset Curb Type 1	Linear Foot
609.40	Reset Curb Type 5	Linear Foot

**SUPPLEMENTAL SPECIFICATIONS  
SECTION 615  
LOAM**

The provisions of Section 615 of the Standard Specifications shall apply with the following additions and modifications:

**615.01 Description**

This work shall consist of loaming and seeding areas as shown on the plans or as required.

Loam and its applications shall conform to the requirements of Section 615 of the Standard Specifications. Loam shall have a finished depth as shown on the contract plans and shall be screened through a one (1") inch square mesh screen.

Seeding shall be Method Number 1 and shall conform to the requirements of Section 618 of the Standard Specifications. The Contractor shall be required to continually seed area of loam and seed until a satisfactory growth of grass is established.

If so required, all areas to be loamed and seeded shall be mulched with an approved wood cellulose fiber compatible with recommended hydroseeding practices. This mulch shall be applied simultaneously with the seed and shall be of sufficient quantity to protect the seed and hold moisture in to insure a satisfactory growth of grass.

The specifications for the wood cellulose fiber proposed to be used shall be presented to the Department for acceptance at least ten (10) working days prior to the application thereof.

The Contractor shall also be responsible for mowing any and all areas loamed and seeded. The mowings will be required if deemed necessary to insure and maintain a satisfactory growth of grass and shall not exceed two mowings.

**615.06 Basis of Payment**

The accepted quantity of loam will be paid for at the contract unit price per square yard. Seeding and Mulch will be paid for at the contract unit price per Units of 1000 square feet. Excavation and all labor, materials, and equipment necessary to satisfactorily complete the work shall be included. All costs for watering, furnishing labor and equipment for mowing will not be paid for separately, but shall be considered as incidental to this pay item.

The City has previously purchased a portion of the loam materials; see Section 104.7 for quantities of previously purchased materials. The cost to place the previously purchased loam will be paid under Pay Item 615.0702. Previously purchased loam materials shall be delivered to the project site by the material supplier. Contractor shall be responsible for coordinating delivery. The contract unit price shall include all labor and equipment necessary to place material previously purchased by the City.

Payment will be made under:

<b><u>Pay Item</u></b>		<b><u>Pay Unit</u></b>
615.07	Loam	Square Yard
615.0702	Loam (w/ Previously Purchased Materials)	Square Yard

618.13	Seeding Method Number 1	Units
619.12	Mulch	Units

**SUPPLEMENTAL SPECIFICATION  
SECTION 620  
GEOTEXTILES**

The provisions of Section 620 of the Standard Specifications shall apply with the following additions and modifications:

**620.01 Description**

This work shall consist of the installation of geotextile fabric as shown on the plans. Filter Fabric will be installed above all Group 2 Soils, except where Stabilization Fabric is required. Stabilization Fabric will be installed where trail width is 10 feet or greater. Stabilization Fabric shall have a minimum width of 15 feet.

**620.02 Materials**

Geotextiles shall be as follow:

Filter Fabric: Contractor shall use Mirafi 160N Nonwoven Polypropylene geotextile by TenCate Nicolon, Geotex 601 by Propex Geosynthetics, or approved equal.

Stabilization Fabric: Contractor shall use Mirafi 600x Woven geotextile by TenCate Nicolon, or approved equal.

**620.03 Placement**

Geotextile fabric shall be installed in accordance with manufacturer's install instructions. Overlap multiple widths of fabric a minimum of 12 inches. It is not necessary to sew seems.

Vehicles shall not drive directly on the fabric nor puncture it. Maintain at least a 6 to 12 inch cover between the truck tires and the geotextile.

**620.08 Method of Measurement**

The geotextile fabric shall be measured by square yard, complete in place.

**620.09 Basis of Payment**

The accepted quantity of geotextile fabric will be paid for at the contract unit price per square yard.

The City has previously purchased a portion of the stabilization geotextile and non-woven geotextile materials; see Section 104.7 for quantities of previously purchased materials. The cost to place the previously purchased stabilization geotextile and non-woven geotextile will be paid under Pay Items 620.541 and 620.581, respectively. Previously purchased stabilization geotextiles shall be delivered to the project site by the material supplier. Contractor shall be responsible for coordinating delivery. Previously purchased non woven geotextiles are located at the City Stock Yard. The contract unit price shall include all labor and equipment necessary to load and deliver previously purchased non woven geotextiles and to place all materials previously purchased by the City.

Payment will be made under:

<u>Pay Item</u>		<u>Pay Unit</u>
620.54	Stabilization/Reinforcement Geotextile	Square Yard
620.541	Stabilization/Reinforcement Geotextile with Previously Purchased Material	Square Yard
620.58	Non-Woven Geotextile (Filter Fabric)	Square Yard
620.581	Non-Woven Geotextile (Filter Fabric) with Previously Purchased Material	Square Yard

**ELECTRONIC MEDIA RELEASE FORM**

Woodard & Curran, Inc. (WC) has provided CADD and other information in electronic form pursuant to the terms specified below which the recipient understands and is acknowledged by the signator and all recipients:

1. These files are solely for the use of the Recipient and may only be used in association with the below referenced project.
2. None of the electronic files, nor any portion thereof, may be provided to anyone other than the Recipient and its agents without the express written approval of WC.
3. The use of the electronic files will be at the Recipient's own risk without liability to WC.
4. WC accepts no responsibility for the accuracy or completeness of any data, specifications, design or other materials transferred on electronic media.
5. WC reserves its right to remove any and all professional seals and title block information transferred on electronic media.
6. The Recipient shall indemnify and hold WC, WC's agents and employees harmless from and against any and all claims, damages, losses, and expenses, including but not limited to attorneys' fees arising out of reuse, authorized or unauthorized, of the electronic files.
7. The electronic files do not necessarily represent the Contract Documents for the below referenced project.
8. The recipient acknowledges electronic media can be intentionally or unintentionally altered without indication due to errors in transmission or conversion, media degradation, or human interference and such alteration is not the fault or responsibility of WC.
9. The recipient shall not be entitled to rely on the electronic files.
10. The controlling instrument of service is the hard copy of what has been transferred via electronic media.
11. If a conflict arises between the hard copy and the transferred electronic files, that hard copy retained by WC shall govern.

Project Name: Bayside Trail

Project Number: 203943.65

W&C Client: City of Portland

Date of Release: \_\_\_\_\_

Electronic Files Released: 20394365-X00C.dwg and 20394365-X01C.dwg

Recipients Name: \_\_\_\_\_

Recipient's Agent: \_\_\_\_\_  
Agent's Name

Recipient's Signature: \_\_\_\_\_  
Agent's Signature

Recipient's Mailing and Email Address Preferred Mailing:  Email  US Postal Service

Recipient's Title: \_\_\_\_\_  
Agent's Title

Date Received: \_\_\_\_\_



**TEWHEY ASSOCIATES**

P.O. Box 238

Gorham, Maine 04038

(207) 839-4261 • FAX (207) 839-3834 • E-mail: [info@tewhey.com](mailto:info@tewhey.com)

**Hydrogeologic and  
Environmental  
Consultants**

April 28, 2009

m975Trail

Barry Sheff  
Woodard & Curran  
41 Hutchins Drive  
Portland, ME 04102

**RE: Soil and Groundwater Handling Information for Construction Documents  
Bayside Railyard Subdivision and Bayside Trail, Portland, Maine.**

Dear Barry:

In the process of developing soil and groundwater handling information for future construction activities on the Bayside Railyard Subdivision (BRS) and Bayside Trail sites in Portland, Tewhey Associates has reviewed the previous environmental reports (bold) and correspondence related to the Bayside area:

- ✓ **Site Assessment and Environmental Analysis: Phase I of the Portland Brownfields Project, Portland, Maine,** Tewhey Associates, April 1999.
- ✓ **Environmental Remediation Plan, Phase III of the Portland Brownfields Project, Portland, Maine,** Tewhey Associates, March 1999.
- ✓ **Phase II Environmental Site Assessment, Union Branch Rail Line Property, Portland, Maine,** Haley & Aldrich, Inc., December 2000.
- ✓ Maine DOT letter from D. Doughty et al to N. Hodgkins of the Maine DEP, RE: Voluntary Remedial Action Plan, Union Branch Rail Line Property, Portland, Maine, June 15, 2001; rev.1 July 23, 2001.
- ✓ Maine DEP letter from N. Hodgkins to D. Doughty et al of the Maine DOT, RE: Union Branch Rail Line Property, Portland, Maine, Voluntary Response Action Program No Action Assurance Letter, July 26, 2001.
- ✓ Tewhey Associates letter from J. Tewhey to R. Knowland of the City of Portland, RE: Soil Remediation Considerations Related to the Development of the Union Branch Rail Line Parcel in Bayside, January 31, 2002.

- ✓ Tewhey Associates memorandum from J. Tewhey to R. Knowland of the City of Portland, RE: Results of Recent Testing of Soils at the Former Rail Yard Site in Bayside, April 8, 2003.
- ✓ Tewhey Associates Memorandum from J. Tewhey to M. Adelson of the City of Portland, RE: Results of Testing of Excavated Soil at the Former Rail Yard Site in Bayside, December 13, 2003.
- ✓ **Geotechnical Data Report, MaineHealth / United Way Development, Somerset and Chestnut Streets, Portland, Maine**, Haley & Aldrich, Inc., September 2008.
- ✓ City of Portland letter from P. Littell to N. Hodgkins of the Maine DEP, RE: Voluntary Remedial Action Plan, Bayside Railyard Subdivision – Lots 1, 2, 3, 4, and 9, Portland, Maine, November 13, 2008.
- ✓ Maine DEP letter from N. Hodgkins to P. Littell et al of the City of Portland, RE: Bayside Railyard Subdivision, Somerset Street, Portland, Maine – Voluntary Response Action Program (VRAP) No Action Assurance Letter, November 21, 2008.

**Soil Conditions.** The requirements for soil categorization and handling during construction at the BRS and Bayside Trail sites have been developed on the basis of the documents listed above, in particular, (1) the VRAP approval document of July 2001 for the rail yard area in Bayside, (2) the revised and updated VRAP approval for the BRS site of November 2008, and (3) the soil analytical results of the previous site investigations of the BRS site completed by Tewhey Associates during the period 1997 to present. The VRAP documents describe three soil groups on the rail yard property for the purpose of testing, handling, and remediation.

The three soil groups described in the Maine DEP VRAP approvals for the BRS and Bayside Trail sites are described below:

- **Group One Soils.** Group 1 soils are clean, uncontaminated soils. They have no visible or olfactory evidence of contamination and exhibit field photoionization detections (PID) of less than 20 ppm. It has been the experience of Tewhey Associates and other Bayside investigators that Group 1 soils comprise the majority of subsurface fill soils on the BRS and Bayside Trail sites. Surficial soils to a depth of 1 to 3 feet are often stained black and contain coal and cinders as a result of long-term exposure to railroad operations in the Bayside area and the BRS and Bayside Trail sites, in particular. The surficial soils on the BRS and Bayside Trail sites and vicinity are likely to fall into the Group 2 category (see below).
- **Group Two Soils.** Group 2 soils have visible evidence of contamination. Visual evidence of contamination includes coal, ash, cinders, and dark brown or

black color. Group 2 soils occasionally have a petroleum or tar odor. Group 2 soils are considered to be contaminated unless field and laboratory testing confirms that contaminant concentrations are present at levels less than one-half of the Maine DEP Remedial Action Guidelines for soil. Group 2 soils can be used in construction projects if they are capped by at least one-foot of clean gravel or are covered by foundations or paving.

- **Group Three Soils.** If Group 2 soils are found to fall into the category of hazardous waste on the basis of Toxic Characteristic Leaching Procedure (TCLP) or other laboratory testing, those soils are characterized as Group 3 soils. Group 3 soils must be removed from the BRS and Bayside Trail sites and be properly disposed of as hazardous waste. Extensive testing of soils at the BRS site has shown that no Group 3 soils are present on the BRS and Bayside Trail sites.

**Soil Handling Recommendations.** Group 1 soils at the BRS and Bayside Trail sites typically consist of gray-olive-blue marine clay fill and light brown to yellow sand fill. Group 1 soils are typically subsurface soils and are rarely found at the ground surface. Group 2 soils are typically surficial fill materials that have been stained and contaminated by past railroad and industrial operations. In past construction projects in the rail yard area, soils that have Group 2 characteristics have typically been stockpiled adjacent to the construction project and either (1) utilized judiciously on the construction site as fill material in low areas and subsequently covered as required by VRAP requirements or (2) spread under controlled conditions on other portions of the rail yard site that require filling. No Group 2 soils have been removed from the rail yard site in former construction projects.

At the BRS and Bayside Trail site, it is expected that most surficial soils will fall into the Group 2 category. Upon encountering these soils during construction, they will typically be removed, stockpiled, and reused in the manner described above. On previous rail yard construction projects in Bayside, a Tewhey Associates representative or other knowledgeable person was present on the site during initial soil excavation and was available to assist in the identification and handling of Group 2 soils. Stockpiled Group 2 soils should be covered and protected from erosion by means of standard construction site practices. A Tewhey Associates representative or other knowledgeable person will be available during construction to (1) brief construction crews on soil handling and safety issues and (2) assist in soil classifications and handling decisions.

**Groundwater Conditions.** There are three groundwater monitoring wells on the BRS site. The three wells were installed by the firm of Haley & Aldrich on Lot 3 of the BRS site in August 2008. The three monitoring wells are designated HA08-5, HA08-7, and HA08-12. Transducers were installed in the three wells and groundwater elevation data were collected during the period August 7-22, 2008. Groundwater levels were measured between 6 and 8 feet below existing ground surface and did not appear to be influenced by tidal fluctuations in Back Cove. The field and laboratory data indicate that (1) the average depth to perched groundwater at the three locations is 7 feet, (2) there were no PID indications of volatile organic contaminants in the groundwater regime on the BRS

site, (3) there is no significant organic or inorganic contaminants in groundwater as determined by previous testing in monitoring wells that are adjacent to the BRS site, and (4) there has been no free-product petroleum floating on groundwater in monitoring wells and test pits within or adjacent to the BRS site. The analytical results of previous soils investigations at the BRS site by Tewhey Associates supports the premise that that is little or no volatile organic contaminants (VOCs) in groundwater on and near the BRS site. The quality of groundwater beneath the BRS site is likely to be acceptable by the Portland Water District for release to the municipal sewer subsequent to settling of sediments in a holding tank. A Tewhey Associates representative or other knowledgeable person will be available to conduct groundwater testing, should groundwater management and handling be necessary on the BRS and/or Bayside Trail sites.

**Groundwater Handling Recommendations.** It is unlikely that dewatering will be required at the BRS or Bayside Trail sites. Perched groundwater is common in areas of clay fill material. A perched water table consists of the presence of a shallow groundwater perched on layers of clay fill. Breaching the clay layer allows the perched water to drain to the static water table. The static water table is at a depth of about 7 feet. On the basis of monitoring wells installed within and immediately adjacent to the BRS site, the water quality of the static water table is such that it is likely that, if dewatering were to be necessary, it could be released to the municipal sewer after solids are settled out. A settling or holding tank will be required for settling of solids if dewatering should be required. Steve Harris of the City of Portland Engineering Department can provide information on the VOC and metals limits for discharge to the Portland POTW. A Tewhey Associates representative or other knowledgeable person will be available during construction to (1) provide field and lab testing of groundwater encountered on the site and (2) assist in safety and handling issues associated with groundwater.

Very truly yours,

**Tewhey Associates**

*signed*

John D. Tewhey, Ph.D  
Principal



STATE OF MAINE  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Attachment B

ANGUS S. KING, JR.  
GOVERNOR

MARTHA KIRKPATRICK  
COMMISSIONER

July 26, 2001

**FILE COPY**

Mr. Dale Doughty  
Office of Environmental Services  
Maine Department of Transportation  
16 State House Station  
Augusta, Maine 04333-0016

Ms. Cynthia Scarano  
Guilford Rail Line  
Iron Horse Park  
North Billerica, Massachusetts 01862-1688

Re: Union Branch Rail Line Property, Portland, Maine-Voluntary Response  
Action Program No Action Assurance Letter

Mr. Doughty and Ms. Scarano:

The Maine Department of Environmental Protection ("Department") has received and reviewed the revised "Voluntary Remedial Action Plan, Union Branch Rail Line Property, Portland, Maine", dated July 23, 2001, submitted by the Maine Department of Transportation ("MDOT") and the Portland Terminal Company (a member of the Guilford Rail System). The remedial action plan outlines the remedial approach for the approximately 2 mile long Union Branch Line. Actual remedial actions will occur as the portions of the property are redeveloped. It is the Department's understanding that each portion of the property will participate in the Department's Voluntary Response Action Program ("VRAP") as it is redeveloped.

Based on the Department's review of the revised remedial action plan, we concur that the proposed approach, which classifies soils into three groups by specific contaminant characteristics, will be sufficient to meet the Department's remedial objectives for the property. The Department's decision is based on the understanding that although future development plans for the property have not been finalized at this time, future use will be limited to commercial/industrial or passive recreational uses (unless approved by the Department); that groundwater at the property will not be used for drinking water or other uses without prior permission from the Department, and; that future developers of portions of the property must agree to classify, handle, and dispose of soils in accordance

AUGUSTA  
17 STATE HOUSE STATION  
AUGUSTA, MAINE 04333-0017  
(207) 287-7688  
RAY BLDG., HOSPITAL ST.

BANGOR  
106 HOGAN ROAD  
BANGOR, MAINE 04401  
(207) 941-4570 FAX: (207) 941-6584

PORTLAND  
312 CANCO ROAD  
PORTLAND, MAINE 04103  
(207) 822-6100 FAX: (207) 822-6303

PRESQUE ISLE  
1235 CENTRAL DRIVE, SKYWAY PARK  
PRESQUE ISLE, MAINE 04769  
(207) 764-0477 FAX: (207) 764-1500

with the remedial action plan unless an alternative, site-specific remediation plan is approved by the Portland Terminal Company, MDOT and the Department.

Attachment B

Provided that the remedial action plan (or an alternative acceptable to Portland Terminal Company, MDOT, and the Department) is successfully implemented as each portion of the property is developed, the Portland Terminal Company, MDOT and their successors and/or assigns, will be granted, the liability protection provided by 38 M.R.S.A. § 343-E(1) for the property known as the Union Branch Rail Line, which extends from the railroad bridge over St. John Street to the AAA office building near Tukey's Bridge, Portland, Maine. The Department will take no action against the Portland Terminal Company, MDOT and those persons identified in 38 M.R.S.A. § 343-E(6).

Once the recommended tasks are completed for a portion of the property, a report summarizing the successful implementation of the tasks should be sent to the VRAP. The applicant redeveloping that portion of the property will then receive a VRAP Certificate of Completion for that portion of the property. Once all the portions of the property and successfully remediated and redeveloped, a summary report should be sent to the VRAP. Upon review and concurrence with the summary report, the Department will issue to the Portland Terminal Company and the MDOT a Commissioner's Certificate of Completion.

If you have any questions regarding this letter, please feel free to call me at 207-287-4854.

Sincerely,



Nicholas J. Hodgkins  
Voluntary Response Action Program  
Division of Remediation

Cc: Stephen J. Kelley, Haley & Aldrich



Attachment B  
STATE OF MAINE  
DEPARTMENT OF TRANSPORTATION  
16 STATE HOUSE STATION  
AUGUSTA, MAINE  
04333-0016

ANGUS B. KING, JR.  
GOVERNOR

JOHN G. MELROSE  
COMMISSIONER

15 June 2001  
23 July 2001 (revised per DEP comment)

Mr. Nicholas J. Hodgkins  
Maine Department of Environmental Protection  
Bureau of Hazardous Materials and Solid Waste Control  
Division of Site Investigation and Remediation  
State House Station #17  
Augusta, Maine 04333-0017

Subject: Voluntary Remedial Action Plan  
Union Branch Rail Line Property  
Portland, Maine

Dear Nick:

Enclosed is an Application for Assistance under the Voluntary Remedial Action Plan Program (VRAP) for the former Union Branch Rail Line property in Portland. Haley & Aldrich, Portland Terminal Company (PT) and the Maine Department of Transportation (MDOT) have prepared this letter and the attached documents. MDOT and PT, owners of the property, will be co-applicants for assistance under VRAP. MDOT is planning to acquire the property from PT.

**PROPERTY DESCRIPTION**

The Union Branch rail line is approximately 2 miles long, extending through the heart of the Portland Bayside area. The rail line has been abandoned for some time. The Portland Terminal Company, a member of Guilford Rail System, owns the rail line. The former Union Branch Rail Line begins at the railroad bridge over St. John Street and ends at the AAA office building near Tukey's Bridge.

Portions of the Union Branch line rails have been removed at street crossings and several short sections have been purchased by abutters. These out-sales have resulted in the line being broken into five separate sections. One section includes an eight-acre former railyard.

The five sections are as follows:

- Sta. 4+32 to Sta. 45+90      St. John St. railroad bridge to Forest Avenue
- Sta. 45+90 to Sta. 55+30      Forest Avenue to Hanover Street



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- Sta. 58+55 to Sta. 78+22      Preble Street to Franklin Arterial      former railyard
- Sta. 78+22 to Sta. 82+60      Franklin Arterial to Boyd Street
- Sta. 87+57 to Sta. 105+60      Diamond Street to Anderson Street

**ENVIRONMENTAL INVESTIGATIONS**

Tewhey Associates of South Portland, Maine has completed several investigations of the former railyard for the City of Portland Brownfields project. MDOT has completed a Phase I environmental site assessment of other portions of the rail line. Haley & Aldrich and Tewhey Associates completed a Phase II environmental site assessment (ESA) of the former Union Branch rail line property in Portland, Maine for MDOT in December 2000. The purpose of the Phase II ESA was to explore and test areas of concern identified during the previous investigations, as well as general conditions along portions of the rail line. A copy of the Phase II report was provided to the DEP Voluntary Remedial Action Program (VRAP) during a meeting in Augusta on 4 May 2001.

Previous studies have revealed the presence of subsurface contaminants that are associated with the fill materials that underlie the entire project site. These contaminants include polycyclic aromatic hydrocarbons (PAHs), coal, cinders, and coal ash that has been used as fill in the Bayside area, demolition debris fill, and volatile organic compounds (VOCs) associated with the unsorted fill materials and many underground petroleum storage tanks that have been present in the general area. Former railroad and industrial operations, two active metal recycling operations, and the uncontrolled disposal of trash and other waste materials on vacant sites have had the potential to contribute contaminants to surficial soils along the rail line.

Based on the lack of evidence for the presence of oil and hazardous materials, explorations and testing were not conducted along the rail line from St. John Street to Forest Avenue. Explorations were done from Franklin Street Arterial to North Boyd Street but, based on field observations, testing were not completed. Between Forest Avenue and Hanover Street subsurface explorations, testing and observations uncovered no significant contaminant concerns.

However, several contaminants were detected along the other two sections of the Union Branch project site (the former railyard and from Diamond Street to Anderson Street). In general, low to moderate concentrations of metals, particularly arsenic and lead were detected in all of the submitted soil samples. Semi-volatile organic compounds (particularly PAHs) were detected in most of the soil samples. VOCs were detected in two soil samples. Diesel Range Organics were detected in soil at the location where odors were noted in groundwater. Low concentrations of PCBs and pesticides were detected at one location. Contaminants in some samples exceed Maine's residential, adult worker, and trespasser Remedial Action Guidelines (RAGS). Also, the soils generally did not meet the generic beneficial use standards in Appendix A of Chapter 418 of Maine's Solid Waste Management Rules.

Fill, up to 14 ft. thick, was encountered in all explorations. The fill included ash, coal, cinders, metals pieces, pottery and other manmade items. Water levels in observation wells along the rail line ranged from 1 to 8 ft. below ground surface. A weathered fuel oil odor was noted in the water in one observation well. However, no evidence of non-aqueous phase liquid hydrocarbons (free product) was noted in any of the observation wells.

Based on a review of MDEP files, discussions with several MDEP staff members and other environmental professionals familiar with this section of Portland the contaminants, the soil materials, ash, cinders, and contaminants found along the Union Branch Railroad line are similar to those found at other sites in the area.

### **SUMMARY OF ENVIRONMENTAL CONDITIONS**

Based on: 1) the concentrations of compounds detected in the soil, 2) the presence of visual indications of contaminants in the observed soil, and 3) the industrial setting of the project site, subsurface conditions beneath the former rail line Union Branch property have been impacted by oil or hazardous materials. The findings show that in all areas along the Union Branch rail line, where present, the dark surficial soils have been impacted by previous land use.

Groundwater in the area is not used for potable water supplies. The entire Bayside area of Portland has previously been deemed a Maine Department of Environmental Protection (MDEP) groundwater non-attainment zone where groundwater is assumed to be contaminated and only free petroleum products require remediation.

The results of this Phase II ESA are compatible with and confirm the findings of the previously conducted Portland Brownfields studies. Observations in borings and test pits along the Union Branch rail line show surficial impacts along the railbeds, and in locations where the scrap metal yards have encroached upon the project site. The stratigraphy of fill containing soil materials, ash, cinders, and demolition debris over mudflat deposits is consistent with other sites in the Bayside area. Contaminants including PAHs, lead and arsenic are also consistent with the contaminants in other fill materials in the Bayside area.

### **POTENTIAL DEVELOPMENT OF RAIL LINE**

Specific developments along the former rail line have not been proposed, other than to limit development to industrial/commercial purposes by a restriction in the deed conveying the property. However, the railyard portion of the rail line is part of the City of Portland identified Brownfields project. Industrial and commercial businesses may locate in this area in the future. In addition, MDOT is investigating the possibility of operating a rail line along a portion of the former Union Branch line. The City is also considering constructing paved recreational trails along portions of the former rail line, consistent with the use restriction.

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PT and MDOT agree that certain land use restrictions are appropriate based on the findings of the Phase II ESA. Residential development will be prohibited by deed agreement between PT and MDOT. Also, extraction of groundwater for drinking water will not be allowed.

PT and MDOT request liability assurances and protection from state enforcement from VRAP for the following potential future development within the Union Branch rail line property:

- Paved Recreational Trails - walking and bicycle
- Industrial Buildings - including below grade construction
- Commercial and Municipal Buildings- including below grade construction
- Rail Lines
- Roadways
- Paved Parking and Access Areas

PT and MDOT understand that without completion of development along the Union Branch that is consistent with the deeded use restrictions, liability protections from state enforcement cannot be provided by VRAP. However, MDOT and PT are requesting a letter of assurance from the VRAP program that if certain remedial actions and land-use restrictions are included during development that the liability protection will be granted at the end of the development process. MDOT and PT will submit documentation of the completion of development to VRAP once the soil with contaminant concentrations above DEP's Remedial Action Guidelines have been capped by development or 12 inches of clean, stabilized soil material. Soils will be stabilized in accordance with MDOT's Best Management Practices for Erosion and Sediment Control. Until a Certificate of Completion is provided by VRAP, PT and MDOT will prepare and submit or require potential developers to prepare and submit a site-specific soil and water sampling and handling plan to MDEP prior to each stage of development, and will not permit work to be done unless the work will be in conformance with the VRAP conditions.

**POTENTIAL RISKS**

The contaminants and concentrations of contaminants encountered along the Union Branch rail line property are similar to those found in other areas at other sites in the Bayside and Marginal Way areas of Portland. Therefore, there is no significant difference in potential risks along the Union Branch rail line than are present at other sites in the area, including the recently constructed Department of Human Services building, U-Haul VRAP Site, and the health food store currently under construction on Marginal Way.

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Site soils that have metals (lead and arsenic) and PAHs that exceed Maine Remedial Action Guidelines (RAGs) are considered a human health risk through direct contact. Although VOCs and petroleum products are present in the soil and groundwater along some areas of the rail line property, at the low concentrations detected, these contaminants will not pose a vapor hazard in the air spaces of future buildings and basements. The land use restrictions and remedial activities designed to isolate contaminated media from direct contact with humans will significantly reduce future risks to human health and the environment.

The water table in some areas is approximately 1 ft. below ground surface and dewatering could be required in order to excavate in these areas. Although groundwater could be contaminated in some areas, groundwater in the area is not used for potable water and is unlikely to be extracted for other uses. Therefore, there is little future risk to human health and the environment.

### PROPOSED REMEDIAL ACTIONS

To the extent possible, a goal for all future developments along the rail line will be to minimize excavations and promote re-use of excavated soils on the development site. Excavated soils exceeding Maine RAGs that are removed from the site shall be disposed of or treated at licensed facilities. Soils that exceed the Maine RAGs but will not be excavated, or will be excavated and reused on the site shall be covered during the process of site development with uncontaminated onsite or imported materials as part of the development of the Union Branch rail line property.

PT and MDOT propose to develop cleanup standards of 1/2 the Maine RAGs for the Union Branch rail line property. Excavated soils shall be classified as Group 1, Group 2, and Group 3. Future developers must agree to classify the soils and use the following remediation concepts or develop alternative, site-specific remediation plans approved by PT, MDOT and VRAP.

#### Group 1 Soils

Group 1 soils shall have no visible or olfactory evidence of contamination and field screening readings using a photoionization detector (PID) shall be less than or equal to 20 parts per million (ppm). Visual evidence of contamination shall include coal, ash, cinders, black discoloration, solvent or petroleum odors, oil stains, and metal pieces. Generally the fill materials that underlie the Union Branch rail line will not be classified as Group 1 soils. The Phase II testing indicates that elevated concentrations of metals, specifically lead and arsenic, and other contaminants are detected in soils and fill where visual evidence of contamination, as defined above, was observed.

Group 1 soils are not considered contaminated. Special handling and disposal are not required. ~~Developers and contractors can dispose or waste Group 1 soils on or off site at their discretion.~~

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### Group 2 Soils

Group 2 soils shall have visible or olfactory evidence of contamination and/or field screening readings using a photoionization detector (PID) shall be more than 20 ppm. Visual evidence of contamination shall include coal, ash, cinders, black discoloration, solvent or petroleum odors, oil stains, and metal pieces. Generally the fill materials that underlie the Union Branch rail line will be classified as Group 2 soils.

Group 2 soils are considered contaminated unless testing confirms that contaminants are present at concentrations less than or equal to  $\frac{1}{2}$  the Maine RAGs for adult workers or trespassers, whichever is less. Field testing by techniques approved by MDOT and MDEP, such as x-ray fluorescence (XRF) and immunoassay, may be used. *If these field-testing methods are employed during excavation then one in every twenty samples shall be split and the subsample will be submitted to a fixed laboratory for confirmatory analysis.* If the testing confirms that concentrations are less than or equal to  $\frac{1}{2}$  the Maine RAGs for adult workers or trespassers, special handling and disposal are not required and developers and contractors can dispose or waste these soils on or off-site at their discretion (See Group 1).

If the testing confirms that concentrations are greater than  $\frac{1}{2}$  the Maine RAGs for adult workers or trespassers, special handling and disposal are required. *Group 2 soils shall not include hazardous waste, petroleum saturated soil, or free petroleum product.* Group 2 soils shall be used on site when possible or disposed of as special waste. If used on-site, these soils shall be capped by Group 1 soils, clean soil materials, buildings, or pavement to prevent direct human contact. Soil caps shall be covered by loam, seeded and documented by the engineer of record. The capped areas will require periodic maintenance to assure that the Group 2 soils do not become exposed or otherwise become a contact risk. As part of any development plan, those areas to be capped will be identified, and the manner of capping specified. It is envisioned that any areas that are not developed would be capped with 12 inches of clean, stabilized soil. Soils will be stabilized in accordance with MDOT's Best Management Practices for Erosion and Sediment Control

### Group 3 Soils

Group 3 soils shall be hazardous by characteristic according to State of Maine Hazardous Waste Management Rules, dated 23 January 2001. This testing shall be required if soil concentrations exceed Maine RAGs and the soil must be disposed off-site with the record owner documented as generator. Group 3 soils must be disposed as hazardous waste. It should be noted that evidence of Group 3 soils was not observed in the previous testing.

*Group 3 soils shall also include any petroleum saturated soil or free petroleum product on the groundwater table that is encountered during construction activities. Petroleum saturated soil or free floating product will be collected and removed from the site and disposed of as special waste or recycled at a licensed facility.*

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*Developers will include provisions in their plans to remediate petroleum-contaminated soils to DEP's "intermediate" standards around proposed basements and along subterranean utility corridors so that petroleum vapors and contaminants do not migrate into structures or along these corridors (see Procedural Guidelines for Establishing Action Levels for Remediation of Oil Contaminated Soil and Groundwater). If petroleum contaminants cannot efficiently be removed then the developer may submit a proposal for alternative engineering controls to DEP-VRAP for review and approval.*

**Groundwater**

Groundwater from beneath the Union Branch rail line property shall not be used for drinking water supplies or extraction for other purposes such as irrigation. Dewatering may be required for construction below grade especially in areas where the water table is just below the ground surface.

If possible, groundwater from construction dewatering will be re-injected into ground by sumps excavated on-site and engineer of record shall document the location. If groundwater must be discharged into the municipal sewer system or into storage tanks, the water must be tested and pre-treated prior to disposal to meet discharge requirements of the sewer district.

The goal will be to create or construct barriers to prevent water seepage into below grade structures rather than use active dewatering systems after construction. This will minimize the need to handle, test and pre-treat groundwater perpetually and reduce the chance of settlement of existing structures due to lowering of the water table.

**CLOSURE**

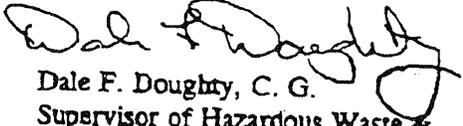
PT and the Maine Department of Transportation desire that liability assurances and protection from state enforcement actions for related issues along the Union Branch Rail Line can be obtained during the VRAP process. PT and MDOT understand that some limitations to site use will be required and have proposed conceptual remedial actions that will minimize the potential risks as the area is developed in the future. We look forward to the opportunity to work with you on this project.

We trust that this information will be sufficient for VRAP to provide an assurance letter to PT and MDOT prior to transfer of property ownership and initiation of site development activities. We understand that we will be notified in two weeks about the site's eligibility under the Voluntary Remedial Action Plan Program. If you have any questions or comments please do not hesitate to call Dale F. Doughty at (207) 287-8312 or Cynthia S. Scarano at (978) 663-6957. MDOT will contact you directly to arrange for the review fee to be paid through the State's internal billing system.

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Sincerely,

  
Dale F. Doughty, C. G.  
Supervisor of Hazardous Waste &  
Groundwater  
Maine Department of Transportation

Sincerely,

  
Cynthia S. Scarano  
Environmental Director and Project Manager and  
Guilford Rail System

CC: MDOT, Legal Office  
MDOT, Office of Passenger Transportation

Attachments: VRAP application

**HEALTH AND SAFETY PLAN**

**BAYSIDE TRAIL PROJECT**  
STP-1184(400)S PIN011844.00

**FORMER UNION BRANCH RAIL LINE**  
**PORTLAND, MAINE**

**June 2009**

**Prepared for**

**City of Portland, Maine**  
**in accordance with**  
**CFR 1910.120**  
**OSHA HAZWOPER GUIDANCE DOCUMENT**



**Prepared by**  
**Tewhey Associates**  
**P.O. Box 238**  
**Gorham, ME 04038**  
**207-839-4261**

**PROJECT NAME:** Bayside Trail Project - STP-1184(400)S PIN011844.00

**LOCATION:** Former Union Branch Rail Line  
Elm Street to Tukey's Bridge  
Bayside Area, Portland, Maine

**DATE PREPARED:** June 8, 2009

**VALID UNTIL:** June 8, 2010

**DEVELOPED BY:** John Tewhey  
Tewhey Associates

**Preamble**

- The purpose of this plan is to inform all personnel who will perform on-site tasks on the Bayside Trail Project located on the former Union Branch rail line of safety and health hazards on the site, procedures to be followed in the handling and management of on-site soils, and personal protection equipment to be used at the site.
- There will be an onsite briefing of this plan prior to initiating work on the site in order to familiarize all participants with the components of the plan so that they may follow the requirements of the plan in conducting site work.
- Project personnel should sign the Master Sheet indicating that have been informed of the information included in the Health and Safety Plan and that they will, to the best of their ability, comply with the requirements of the plan. In the course of the project, any changes to the Health and Safety Plan will be brought to the attention of all site personnel.
- Periodic update of this document will be made if and when conditions and circumstances change on the site.
- Site contractors should have appropriate HAZWOPER training.





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Appendix 3.	MSDS for Arsenic
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## 1.0 INTRODUCTION

### 1.1 Site History.

The former Union Branch rail yard and rail line in the Bayside area of Portland was initially constructed in the early 1900s on fill land reclaimed from Back Cove. The rail yard and rail lines were operated by the Portland Terminal Company from approximately 1910 to the late 1970s, when the rail line between Congress Street and Tukey's Bridge was abandoned. The rail yard and rail line were vacant and unused until late 1997, when the rail yard and adjacent privately-owned properties became part of the USEPA/Maine DEP Portland Brownfields Project. A Brownfields grant from the USEPA to the City of Portland allowed site assessment of rail yard soils to be done by the Brownfields contractor, Tewhey Associates. The initial site assessment of rail yard soils in the late 1990s indicated that mild contamination was present in shallow soil, derived from former railroad operations. The presence of shallow soil contamination on the former rail line which extends north and south of the rail yard was confirmed by a MDOT-contracted study of the rail yard and rail line in 2000, conducted by the firm of Haley and Aldrich. A site location plan is provided in Figure 1.

Subsequent to the two environmental studies of the former Union Branch rail line, the Maine Department of Transportation (MDOT) exercised its option to purchase the former Union Branch rail line and rail yard from Portland Terminal Company (Guilford). In 2001, the buyer (MDOT) and the seller (Guilford) submitted a VRAP application and site remediation plan for the former Union Branch property to the Maine DEP and received a VRAP No Action Assurance letter. The MDOT/Guilford VRAP application contained provisions for future site remediation and development of the rail yard and rail line. Under the VRAP agreement of 2001, MDOT and/or any future owners and developers of the rail yard and rail line site were required to adhere to the specific VRAP provisions of 2001 in conducting site remediation and development. Subsequent to completing the remediation provisions of the 2001 VRAP Plan, the owner/developer of the rail yard and rail line would receive a VRAP Certificate of Completion.

### 1.2 Site Description.

**Recent Events Affecting the Former Union Branch Site.** Subsequent to the completion of the VRAP process of 2001, the Downtown Portland Corporation (DPC) purchased the former Union Branch rail line and rail yard from MDOT. The DPC is intended to be an interim owner of the rail yard property. In late 2008, the DPC anticipated transfer of a portion of the rail yard property to private developers and to the City of Portland for the construction of (1) a new medical facility and office building and (2) a multi-story parking lot on the rail yard property, and (3) the development of a Bayside trail system through the rail yard area and beyond. In anticipation of development activity on the former Union Branch property, the City of Portland and the DPC submitted a supplemental VRAP application to the Maine DEP in November 2008 in order to obtain VRAP recognition of a subdivided rail yard. For the purposes of

private development and trail construction, the rail yard was subdivided into five lots, three lots were to be used for private development (Lots 1,2, and 3) and two lots were to be used for development of the Bayside trail system (Lots 4 and 9). The four remaining rail yard lots (Lots 5, 6, 7, and 8) are located east of the Chestnut Street extension and include with the current New England Metals Recycling (NEMR) facility. Lots 5, 6, 7, and 8 were not part of the City of Portland supplemental VRAP application of November 2008. A site plan which describes the rail yard lots on which the Bayside Trail will be constructed attached (Figure 2).

**Site Assessments.** There have been two principal site investigations and soil assessments of the Union Branch rail line and rail yard which have served as the basis for all regulatory review and actions. They two reports are as follows:

- Site Assessment and Environmental Analysis, Portland Brownfields Project, Portland, Maine, April 1999. Tewhey Associates.
- Phase II Environmental Site Assessment, Union Branch Rail Line Property, Portland, Maine, December 2000. Haley & Aldrich.

The investigations described in the two reports included 18 soil borings and 35 test pits on the former railroad property. Thirty-six samples of surficial and subsurface soils from the 53 explorations were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds, (SVOCs), metals, polychlorinated biphenyls (PCBs), and petroleum hydrocarbons.

**Classification of Site Soils.** In the VRAP application of July 23, 2001, surficial and subsurface soils were classified into three groups. The classification scheme was designed to facilitate soil handling on the rail line and rail yard areas. A brief description of the three soil classifications is described below:

- Group 1 Soils - Clean soil, no special handling required.
- Group 2 Soils - Group 2 soils are identified in the field by their dark brown or black color and the presence of cinders, coal and ash in the soil. Group 2 soils contain low-to-moderate levels of railroad-related contaminants, lead, arsenic and polyaromatic hydrocarbons (PAHs). Lead, arsenic, and PAHs are generated in ash and soot by the burning of coal and diesel fuel. Group 2 soils represent a potential contact risk to site users. A contact risk is defined as a contamination pathway that depends upon physical contact or ingestion of the site soils. The rail yard and rail line soils do not represent an inhalation risk because all of the identified contaminants have low volatility and solubility. The lead, arsenic, and PAHs in rail yard and rail line soils is typically confined to the upper foot of soil. The contaminants were deposited on the ground surface from the air and by gravity and have remained in the near surface soil due to their low solubility and volatility. Photos of Group 2 soil profiles from rail yard test pit excavations are provided in Appendix 1. The Maine DEP

has determined that Group 2 soils are to remain on the site and can be used in site construction projects as long as they are either (1) covered by at least one foot of Group 1 soil or other clean fill, (2) covered with asphalt or concrete paving, or (3) covered by slab foundations or other construction-related barriers.

- Group 3 Soils - Soil that fail the diagnostic Toxic Characteristic Leaching Procedure (TCLP) in the laboratory are designated as Group 3 soils. Group 3 soil must be removed from the rail line or rail yard and properly disposed of at an off-site facility. No Group 3 soils have been identified in the TCLP testing of rail line and rail yard soils.

A decision-tree diagram for the differentiation and identification of Group 1, Group 2 and Group 3 soils on the rail line and rail yard is attached (Figure 3).

### 1.3. Project Description

**Current Project.** The principal objective of the exploration and sampling programs performed as part of the Portland Brownfields Program and MDOT studies have been to provide diagnostic information on the presence and distribution of hazardous chemicals and petroleum residues in soil within the project area. Numerous other smaller studies have been conducted in the former Portland Terminal Co. rail yard since 2000. Those studies have been well documented and provide additional detailed information of the degree and extent of contamination within the rail yard and rail line.

There is now proposed development plans for the former rail yard and rail line. Office buildings and a parking garage were proposed for the site in 2008, but have been put on indefinite hold due to factors related to the economy. The Bayside Trail Project has been in the planning stages for several years and construction is scheduled to proceed in the summer of 2009.

**Contamination in Soil.** In 1997, the rail yard had been for sale and untouched for 20 years. It was overgrown and there was a uniform veneer of black-colored rail yard soils over most of the site. Sampling and analysis of the black rail-yard soils showed that they contained typical rail yard contaminants: lead and arsenic associated with the presence of coal, ash, and cinders and polychlorinated aromatic hydrocarbons (PAHs) associated with soot from the combustion of coal and diesel fuel in locomotives. Sporadic diesel fuel staining was present in some surface soils on the site

Since 1997, there have been numerous construction projects on the rail yard and rail line sites which have resulted in the excavation and relocation of site soils and there have been additional soils brought to the site which has resulted in the covering of the original rail yard and rail line soil. Construction projects that have occurred since the late 1990s include (1) the placement of city-plowed snow on the western portion of the rail yard site, including the dirt and debris that is contained in plowed snow; (2) a large foundation and

one underground storage tank (UST) were removed from the western portion of the rail yard site and the foundation hole was filled with clean fill; (3) excess soil from the development of the Chestnut Street extension (which traverses the rail yard at Chestnut Street) was placed in the western portion of the rail yard site; (4) excess soil from the replacement of the Somerset Street sewer was also placed in the western portion of the rail yard site; and (5) Group 1 and 2 soil removed from development lots No.1, 2, and 3 on the western portion of the rail yard were relocated to the ground surface on the eastern portion of the rail yard. Therefore, at a number of locations in the western portion of the rail yard, the rather uniform layer of Group 2 soils that was originally at the surface of the rail yard, is now covered by one to two feet of transported fill. Also, there are Group 2 soils that have been transported to the eastern portion of the rail yard and represent a two-to-three foot thickness at some locations.

At the start of the Bayside Trail construction project, a representative from Tewhey Associates will be on the site to assist the project personnel in identifying Group 2 soils and assist in the description of methods of handling and management of the Group 2 soil. The Tewhey Associates representative will continue to be on the site during the project, as necessary, to assist with the identification and management of Group 2 soils. However, the transfer of information during the initial phase of the project will greatly assist project personnel in handling identification and management tasks on their own.

Lead, arsenic and PAHs exhibit low volatility and low solubility. The common pathway of the three chemicals to human receptors is through (1) physical contact, (2) ingestion of contaminated soil or, in the case of extended dry conditions on the site, (3) inhalation of dust from contaminated soil. The remedial plan for the rail yard focuses on eliminating human and creature contact with black rail yard soils which are categorized as Group 2 soil as described herein and in Figure 3.

## **2.0 SCOPE OF WORK**

All soils designated in the Group 2 category, i.e., contaminated soil, may be used in trail construction if these soils are covered by at least one foot of Group 1 soil or other clean fill that has been brought to the site. The Group 2 soils may also be appropriately utilized in trail building if placed in areas where they will be covered with asphalt paving, concrete, brick work or other solid trail construction materials. Group 2 soils that, on the basis of their geotechnical properties or other characteristics, are considered to be unsuitable for subsurface base soil for trail construction will be stockpiled in an appropriate designated area of the site for future use in (1) off-trail areas where soil characteristics are less important for construction purposes or (2) in other future projects on the rail yard site.

The only soils that require to be transported off the site for disposal are Group 3 soils that have been found to be designated as hazardous waste as a result of testing by means of the Toxic Characteristic Leaching Procedure (TCLP). In extensive prior testing of the rail yard site by Tewhey Associates during the period 1997 to present, there have been no soils on the site that have been found to be designated as hazardous waste, i.e., Group 3 soil. It is highly unlikely that any site soils will require removal for off-site disposal during the trail construction project. Any required or necessary sampling of rail yard or rail line soils during the course of the trail construction project will be conducted by Tewhey Associates with analysis carried out by Katahdin Analytical Services of Scarborough.

### **3.0 SITE ORGANIZATION**

John Tewhey of Tewhey Associates will be the principal contact and evaluator at the site for soil quality designations. In coordination with MDOT personnel, Woodard & Curran personnel, and the site contractor, Mr. Tewhey will be responsible for the evaluation and decision-making concerning the handling, management, and disposition of contaminated soil as described in the Decision-Tree diagram in Figure 3. During the early phases of the construction program, Mr. Tewhey will make every effort to educate and train designated site personnel in the identification of contaminated (i.e., Group 2) soils. In the event that the Tewhey Associates representative is unavailable at the site to identify and provide soil handling information, there will always be a designated alternant to determine the soil contamination category and determine appropriate handling and management practices on the site.

John Tewhey of Tewhey Assocites will serve as Site Safety Officer when he is on the site. At other times, Mr. Tewhey will designate an alternant Site Safety Officer, which is likely to be the Project Manager.

## **4.0 SITE SECURITY AND CONTROL**

The soil contaminants present on the site do not represent a high-level risk to site workers. Simple measures employed in the field to prevent physical contact with designated Group 2 soils will be adequate to protect site workers from health risks presented by the soils that were contaminated over time from normal rail road operations.

As such, there is no need to establish Command Posts or Staging and Support Areas that are commonly used on Superfund sites or other sites in which the toxic levels are higher and the contaminants are more mobile so as to result in acute illness on the site.

Safety-related site procedures for the Bayside Trail project, will include the following items. The items will be discussed and assignments made during the initial safety briefing at the site.

- The site supervisor or project manager should have knowledge of the nearest available phone (likely to be a designated cell phone);
- A copy of the HASP should be available on the site for reference at all times; and
- One vehicle and a driver should be designated as an emergency transport vehicle at all times.

All work on the site will be limited to daylight hours and no eating or smoking is allowed in the working area during working hours.

## 5.0 TASK/HAZARD EVALUATION

### 5.1 Chemical Hazards

The principal hazard to personnel conducting construction work in the field will be dermal contact and inadvertent ingestion of contaminated soil. Principal contaminants are lead, arsenic, and PAHs. Any concern regarding health or safety issues in the field should be addressed and prompt medical or rehabilitative attention should be administered. All injuries or onsite health issues should be reported to the Site Safety Officer in a timely fashion. Refer to appendices for information concerning the potential health hazards associated with lead, arsenic, PAHs and diesel fuel in soil.

### 5.2 Task Hazards

The following hazards may be encountered on-site:

#### 5.2.1 Working in the Vicinity of Heavy Equipment

Workers may conduct activities in close proximity to heavy equipment such as excavators and other earth moving equipment. Workers whose job assignments include working near this equipment will use safe operational practices established by the subcontractor. They will also wear a hard hat and steel toes work boots and have safety glasses and hearing protection available for use as needed.

Activity around vehicles and equipment will be monitored in order to prevent injury. Work procedures will be reviewed with the sub-contractor to avoid hazards working near equipment. In coordination with the Site Engineer, the Site Safety Officer will define the work area (e.g., use of flagging, physical barriers, traffic cones, etc.) and keep the general public remote from the earth moving activities.

#### 5.2.2 Temperature.

Ambient temperatures can substantially affect work conditions and worker safety. All personnel shall remain alert to changing conditions affecting their safety.

### **HEAT EMERGENCIES**

The site will be evaluated for the potential for heat emergency. Personal protective equipment and environmental conditions can contribute to possible heat emergencies. If the Site Safety Officer determines that the environment (temperature, humidity, PPE) has a potential for creating a heat emergency, the following equipment should be accessible.

- potable water source with disposable drinking cups
- first aid equipment including sheets and towels for cooling
- transport vehicle

Some examples of Heat Emergencies are described below:

**Heat Stress** - Operations requiring protective clothing require constant surveillance to ensure personnel are not affected adversely by high temperatures or humidity. Work/rest regimens should be adjusted to accommodate temperature extremes. Signs and symptoms of Heat Stress (in order of increasing severity) are: heat rash, cramps, heat exhaustion, and heat stroke.

**Heat Rash** - Not only a nuisance, but can affect the body's ability to tolerate heat. Treat with drying lotions and keep area clean.

**Heat Cramps** - Generally occur after prolonged exposure to high temperatures coupled with profuse sweating, and inadequate re-placement of salt.

**Heat Exhaustion** - Signs include dizziness, profuse sweating, cool moist skin.

**Heat Stroke** - An extremely serious medical condition! Symptoms may include dizziness, nausea, severe headaches, hot dry skin, high body temperature. If cooling of the victims body is not begun immediately, irreversible damage or death may result.

During each break or rest period, all workers are encouraged to remove protective clothing to facilitate cooling as needed.

Appropriate supplies of water must be readily available for all personnel. Fluids should be taken regularly while conducting operations in protective clothing. Thirst does not serve as an adequate indicator of the need for fluids.

## **6.0 METHODS OF PERSONNEL PROTECTION**

### **6.1 Personnel Protective Equipment**

A personal protective equipment ensemble of a modified Level D PPE ensemble will be worn on-site when petroleum-contaminated soils are present. Caution will be taken to prevent dermal and respiratory contact with contaminated soils.

#### **Modified Level D:**

- o work suit**
- o eye protection**
- o gloves**
- o hard hat**
- o safety boots**

## **7.0 DECONTAMINATION PROCEDURE**

The principal contaminants at the site are lead, arsenic, and PAHs and they are present in certain dark-colored site soil. The soil has a high clay content and tends to cling to boots, gloves and tools. It is important for the health and welfare of site workers and their families that site dirt is not tracked into vehicles and into homes where children are present. Brooms and brushes will be available in a designated area of the site to remove caked soil from work boots and tools before leaving the site. Group 2 soils from the site should stay on the site.

## **8.0 AIRBOURNE CONTAMINANT MONITORING AND CONTROL**

The Site Safety Officer will have air monitoring devices available if needed. It is unlikely that organic vapors will be present in site soils. In the event that organic vapors are encountered at the site, the Site Safety Officer will undertake air monitoring at the location where organic vapors are suspected. Monitoring will be done by means of a Thermo 580B OVM photoionization detector (PID) that will be available at the site. An action level of 150 parts per million (ppm) of organic vapor in air measured a foot above the ground surface has been chosen for the site. If the action level is detected, all work in the area will be suspended temporarily to assess conditions. Preference will be given to implementation of site control procedures, i.e., working from an upwind location or breaking to let vapors dissipate. If vapors persist at the location, work will be suspended until positive measures are taken to understand the source of the vapors and eliminate them by excavation and removal of the suspect soil or source.

If dry and dusty conditions are experienced at the site, particulates in air will be monitored by means of a Thermo MIE pDR-1000 Personal Data Ram dust monitoring device that will be available at the site. An action level of 50 mg/m<sup>3</sup> in air measured at breathing level has been chosen for the site. If the action level is detected, all work in the area will be suspended temporarily to assess conditions. Preference will be given to implementation of site control procedures, i.e., watering the surface soil or wearing dust masks.

## 9.0 EMERGENCY RESPONSE PLAN

This section is designed to assist on-site personnel and encourage safe and structured site activities. All personnel shall be made aware of the contents of this plan and shall observe the requirements herein.

### 9.1 Emergency Contacts

AMBULANCE	911
FIRE	911
POLICE	911
HOSPITAL	911 or (207) 879-3266 Mercy Hospital Emergency Department (207) 879-3205 Mercy Hospital Emergency Response (Lifeline)
USEPA/USCG EMERGENCY RESPONSE CENTER	800-424-8802
NATIONAL POISON CONTROL CENTER	800-492-2414
CMA CHEMICAL REFERRAL CENTER	800-262-8200
MAINE DEP AUGUSTA OFFICE	207-287-2651
MAINE DEP PORTLAND OFFICE	207-822-6300

### 9.2 Medical Emergencies

If a medical emergency exists on site, immediate response first-aid shall be conducted by site personnel who are trained in first-aid. Appropriate services (ambulance, fire, paramedics) will be called immediately.

Nearest Emergency Medical Treatment Facility

Name: Mercy Hospital  
Address: 144 State Street, Portland  
Telephone: (207) 879-3000 (General Number)

Hospital Facility Briefing (optional): Not done

The following person was contacted at the hospital and briefed on the particular hazards associated with this response.

Person Contacted: None - contaminant levels are not expected to be elevated.

Title/Position

Date/Time Contacted:

Contacted by:

**Directions to Work Site:** The site will be accessed via Somerset Street or Marginal Way from Franklin Arterial. The site is located adjacent to I-295 in the central portion of the Portland peninsula.

**Directions To Nearest Hospital:** Mercy Hospital is located at 144 State Street in Portland. From the Brownfields site in Portland, drive west on Marginal Way to Forest Avenue; continue across Forest Avenue onto State Street, which runs through Deering Oaks Park. Drive straight up the hill, across Congress Street at Longfellow Square. Mercy Hospital is located on State Street, approximately 200 yards beyond Longfellow Square (statue of Longfellow is on left at intersection of State Street and Congress Street). The emergency entrance is located 200 feet beyond a right turn onto Pine Street at the south end of the Mercy Hospital Building. The hospital can also be reached via Chestnut and Congress Streets (see map). The hospital is located approximately 1.5 miles to the southwest of the Portland Brownfields site.

See the attached Hospital Route Map (Figure 4).

### **9.3 On-site Personnel With Medical Training**

The following on-site individuals have completed Adult CPR and standard First-Aid Training Courses:

John D. Tewhey

### **9.4 Emergency Procedures**

The following standard emergency procedures will be used by on-site personnel. The Site Safety Officer shall be notified of any on-site emergencies and be responsible for ensuring that the appropriate procedures are followed.

#### **9.4.1 Spill Procedures**

Anyone handling spilled material will wear as a minimum the following protective equipment:

Rubber, neoprene, or nitrile gloves.

Rain suits or disposable coveralls where clothing contamination is likely to occur.

All containers of spilled material will be labeled. The label will include the identity of the spilled material and appropriate hazard warnings.

#### **9.4.2 Fire/Explosion**

Upon notification of a fire or explosion on site, the designated emergency signal (horn/car blasts) shall be sounded and all site personnel will be assembled at the decontamination line. The fire department shall be alerted and all personnel will be moved to a safe distance from the involved area.

#### **9.4.3 Personal Protective Equipment Failure**

If any site worker experiences a failure or alteration of protective equipment that may affect his/her health and safety, that person and his/her buddy shall immediately leave the Exclusion Zone. Reentry shall not be permitted until the equipment has been replaced or repaired.

#### **9.4.4 Other Equipment Failure**

If any other equipment on site fails to operate properly, the Field Team Leader and Site Safety Officer shall be notified and then determine the effect of this failure on continuing operations on site. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

### **10.0 TRAINING REQUIREMENTS**

Site personnel are trained in HAZWOPER in accordance with 29 CFR 1910.120.

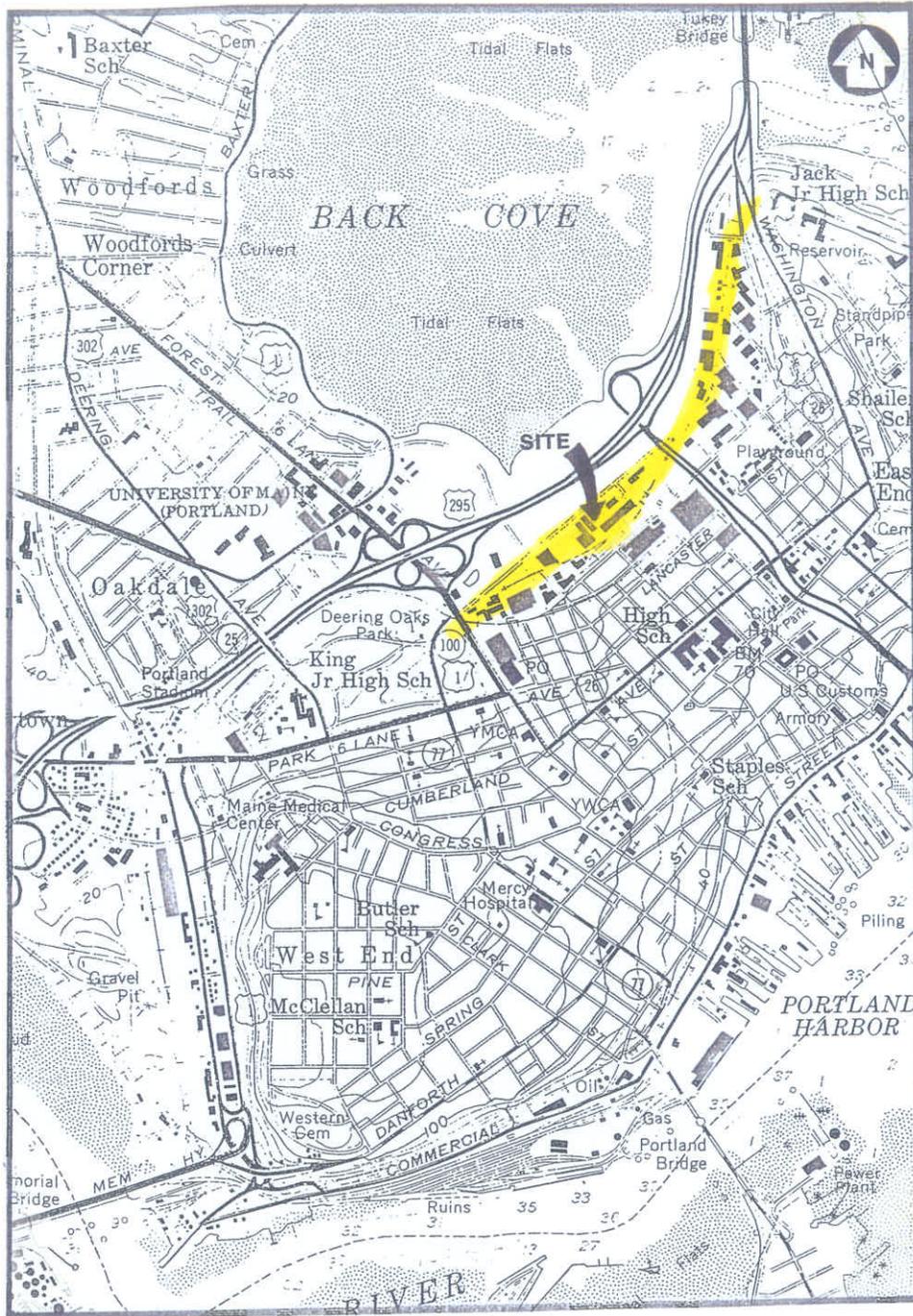
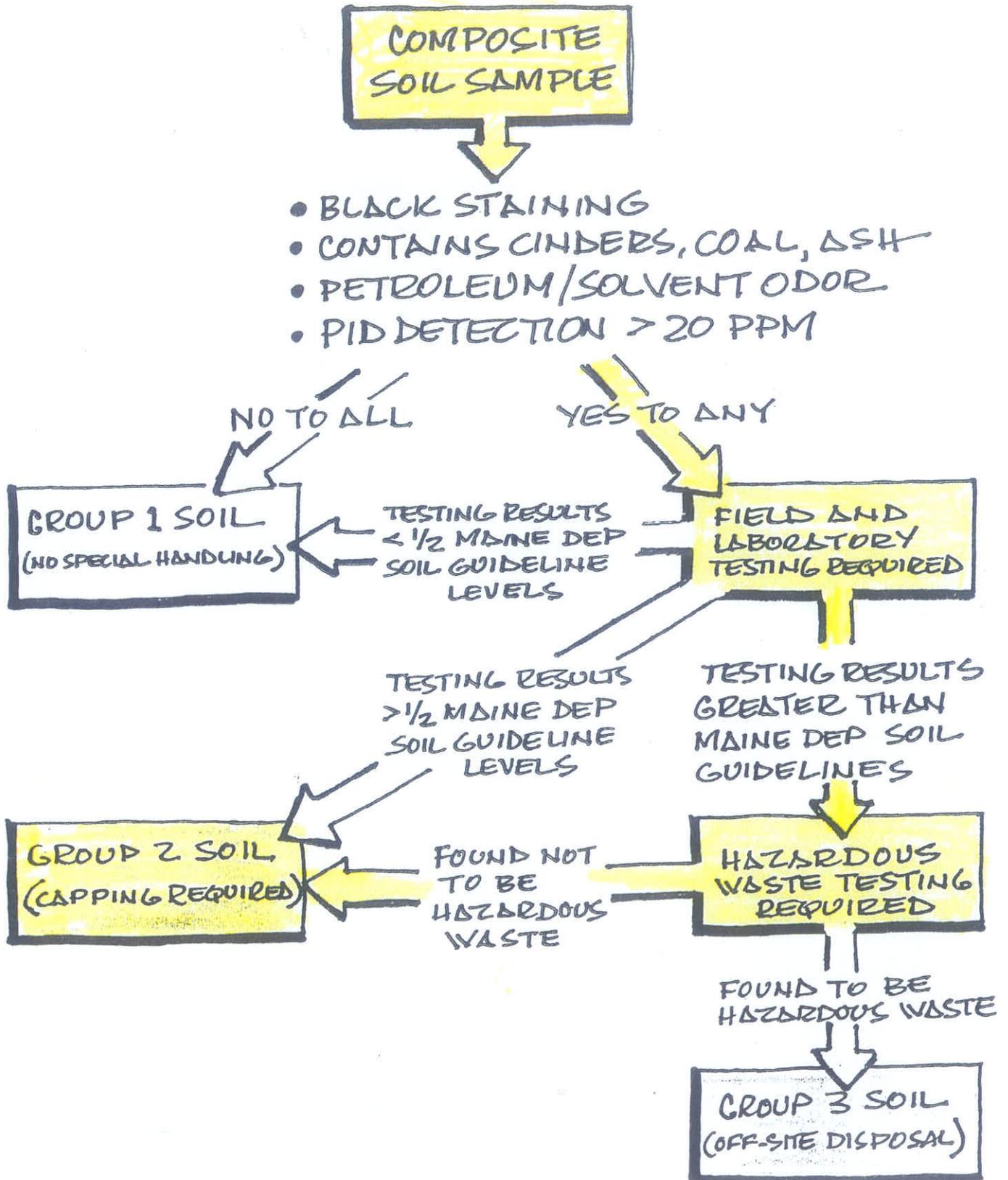


FIGURE 1  
SITE LOCATION



# DECISION-TREE DIAGRAM FOR TESTING, HANDLING, AND REMEDIATION OF SOILS AT UNION BRANCH RAIL LINE SITE, PORTLAND, MAINE.

Figure 3





## **Appendix 1**

### **Site Photos of Original Rail Yard (1997)**





Attachment C





**Appendix 2**  
**MSDS for Lead**

## Safety (MSDS) data for lead



---

### General

Synonyms: lead shot, C.I. 77575. [Note: the exact formulation of lead obtained as lead shot may vary; it may contain small amounts of antimony, arsenic and other materials.]

Molecular formula: Pb  
CAS No: 7439-92-1  
EINECS No:

### Physical data

Appearance: grey metal granules, shot, foil, sheet or powder  
Melting point: 327 C  
Boiling point: 1744 C  
Vapour density:  
Vapour pressure:  
Density (g cm<sup>-3</sup>): 11.34  
Flash point:  
Explosion limits:  
Autoignition temperature:  
Water solubility: insoluble

### Stability

Stable. Incompatible with strong oxidizing agents, potassium, sodium.

### Toxicology

Toxic by ingestion or inhalation. **Chronic poison.** Typical TLV/TWA as powder 0.15 mg/m<sup>3</sup>. Typical PEL 0.05 mg/m<sup>3</sup>

## Transport information

Non-hazardous for air, sea and road transport.

## Personal protection

Solid lead is believed to present a relatively low hazard to health, but it is a cumulative poison, and can cause serious harm if inhaled as a powder, or ingested over a long period. Most lead salts are very poisonous, as are many organic compounds containing lead, such as [lead tetraethyl](#).

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

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This information was last updated on September 4, 2003. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

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## **Appendix 3**

### **MSDS for Arsenic**

## Safety (MSDS) data for arsenic



---

### General

Synonyms: arsenic black  
Molecular formula: As  
CAS No: 7440-38-2  
EINECS No: 231-148-6

### Physical data

Appearance: grey powder  
Melting point:  
Boiling point:  
Vapour density:  
Vapour pressure:  
Density ( $\text{g cm}^{-3}$ ):  
Flash point:  
Explosion limits:  
Autoignition temperature:

### Stability

Stable. Incompatible with acids, oxidizing agents, halogens. Heat and air-sensitive.

### Toxicology

**Very toxic. May be fatal if inhaled, swallowed or absorbed through the skin. This is a known human carcinogen. May cause reproductive disorders.**

#### Toxicity data

(The meaning of any abbreviations which appear in this section is given [here](#).)

ORL-RAT LD50 763  $\text{mg kg}^{-1}$

IPR-RAT LD50 13 mg kg<sup>-1</sup>  
ORL-MUS LD50 145 mg kg<sup>-1</sup>  
IPR-MUS LD50 46 mg kg<sup>-1</sup>

### **Risk phrases**

(The meaning of any risk phrases which appear in this section is given [here.](#))  
R23 R25.

## **Transport information**

(The meaning of any UN hazard codes which appear in this section is given [here.](#))  
CGD UK Major hazard class: 6.1. Packing group: II

## **Personal protection**

Gloves, safety glasses, good ventilation. Handle as a carcinogen.

### **Safety phrases**

(The meaning of any safety phrases which appear in this section is given [here.](#))  
S20 S21 S28 S45.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

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This information was last updated on August 26, 2003. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

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## **Appendix 4**

### **MSDS for PAHs (Benzo(a)pyrene)**

## Safety (MSDS) data for benzo(a)pyrene



### General

Synonyms: 6,7-benzopyrene, benzo[a]pyrene, B(a)P, BP, 3,4-benzopyrene, benzo [d,e,f]chrysene, 3,4-benzpyrene, benzpyrene, 3,4-benzylpyrene, 3,4-benz[a]pyrene, 3,4-BP, 3,4-benzopyrene

Molecular formula:  $C_{20}H_{12}$

CAS No: 50-32-8

EINECS No: 200-028-5

EU Index No: 601-032-00-3

### Physical data

Appearance: yellow crystals or powder [found in cigarette smoke, coal tar, fuel exhaust gas and in many other sources]

Melting point: 176 C

Boiling point: 495 C

Vapour density: 8.7 (air = 1)

Vapour pressure:

Density ( $g\ cm^{-3}$ ): 1.351

Flash point:

Explosion limits:

Autoignition temperature:

Water solubility: slight

### Stability

Stable. Incompatible with strong oxidising agents.

### Toxicology

**POISON. This material is an experimental carcinogen, mutagen, tumorigen, neoplastigen and teratogen. It is a probable carcinogen in humans and a known human mutagen. IARC Group 2A carcinogen. It is believed to cause bladder, skin and lung cancer. Exposure to it may damage the developing foetus. May cause reproductive damage. May be transferred to nursing infants through mother's milk. Skin, respiratory and eye irritant. May cause changes to the colour and properties of skin. Exposure to sunlight can increase the skin damage caused by this chemical.**

#### **Toxicity data**

(The meaning of any abbreviations which appear in this section is given [here.](#))

SCU-RAT LD50 50 mg kg<sup>-1</sup>

IPR-MUS LDLO 500 mg kg<sup>-1</sup>

IRN-FRG LDLO 11 mg kg<sup>-1</sup>

#### **Risk phrases**

(The meaning of any risk phrases which appear in this section is given [here.](#))

R45 R46 R50 R53 R60 R61.

## **Transport information**

(The meaning of any UN hazard codes which appear in this section is given [here.](#))

Un No 2811. Packing group III. Hazard class 6.1.

## **Environmental information**

Very toxic in the environment - may cause long-term damage.

## **Personal protection**

Restricted material. Only to be used by trained workers. Prepare a full risk assessment before starting work. Safety glasses, gloves, good ventilation. Handle as a carcinogen. Do not dry sweep spills because of the risk of increasing the amount of airborne material.

#### **Safety phrases**

(The meaning of any safety phrases which appear in this section is given [here.](#))

S45 S53 S60 S61.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

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This information was last updated on September 2, 2003. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

## **Appendix 5**

### **MSDS for Diesel Fuel**

## Safety (MSDS) data for diesel

---

### General

Synonyms: diesel fuel, diesel oil

Molecular formula: depends upon formulation, typically composed of a hydrocarbon mix together with (often proprietary) additives. May contain a dye to indicate, for example, whether or not excise duty has been paid on the product.

CAS No: 68334-30-5

EC No:

### Physical data

Appearance: clear colourless or dyed liquid

Melting point:

Boiling point: typically > 149 C

Vapour density:

Vapour pressure: at 20 C typically < 1 mm

Specific gravity:

Flash point: typically > 52 C

Explosion limits:

Autoignition temperature:

### Stability

Stable. Flammable. Incompatible with strong acids, strong oxidizing agents, halogens.

### Toxicology

Respiratory and skin irritant. The product may contain polycyclic aromatic hydrocarbons which may be carcinogenic. Generally regarded as being of low toxicity unless contact is repeated and/or prolonged.

#### Toxicity data

(The meaning of any abbreviations which appear in this section is given [here.](#))

ORL-RAT LD50 >2000 mg kg<sup>-1</sup>

## Personal protection

Avoid skin contact and inhalation. Ensure good ventilation.

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

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This information was last updated on January 14, 2003. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

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# The Physical and Theoretical Chemistry Laboratory Oxford University

## How to interpret MSDS information sheets

---

This web page provides a little guidance on the interpretation of MSDS data sheets. These sheets may at first seem complicated and difficult to understand, but they are a reliable source of the data you need to handle chemicals safely.

We discuss here the different sections into which MSDS sheets are generally divided, using portions of a sheet provided by a commercial supplier.

Extracts from the MSDS for benzene (note that these are only extracts - the complete data sheet is long) are shown in blue, with a commentary (in black) where necessary.

---

Section 1 gives details of the company issuing the data sheet....

### 1 Identification of substance:

Trade name: Benzene

Manufacturer/Supplier:

Alfa Aesar, A Johnson Matthey Company Johnson Matthey Catalog Company, Inc. 30 Bond Street Ward Hill, .....

.... and, often, emergency call-out information.

Emergency information: During normal hours the Health, Safety and Environmental Department. After normal hours call .....

---

The second section identifies the material, and gives the CAS and other registry numbers.

## 2 Composition/Data on components:

Benzene (CAS# 71-43-3); 100%

Identification number(s):

EINECS Number: 200-753-7

EU Number: 601-020-00-8

---

The third section summarizes the major hazards associated with use of the chemical. The R and S codes in this section are followed by explanatory text.

## 3 Hazards identification

Hazard description:

T Toxic F Highly flammable

Information pertaining to particular dangers for man and environment

R 45 Can cause cancer - Group I (extremely hazardous)

R 11 Highly flammable.

R 48/23/24/25 Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.

---

The fourth section outlines first aid measures.

## 4 First aid measures

After inhalation: Supply fresh air. If required, provide artificial respiration. Keep patient warm. Seek immediate medical advice. After skin contact .....

---

Section 5 covers fire fighting and protective equipment.

## 5 Fire fighting measures

Suitable extinguishing agents Carbon dioxide, extinguishing powder or water spray. Fight larger fires .....

---

Section 6 outlines the procedures to be followed in case of accidental release of the chemical, including methods to be used to clean up spills. Note that these measures are unlikely to be sufficiently detailed if the chemical is particularly hazardous, and local procedures should be drawn up to supplement what is given in the MSDS sheet.

## 6 Accidental release measures

Person-related safety precautions: Wear protective equipment.....

Measures for environmental protection..... Do not allow material to be released to the environment without proper governmental permits. Measures for cleaning/collecting: Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust). Dispose contaminated material as waste according to item 13 .....

---

Section 7 is self-explanatory. This is an important section, sometimes overlooked by those using chemicals in the laboratory. It contains information about the possible formation of peroxides in storage, flammability, explosive risks, etc. Pay particular attention to the possible need for flammable storage cabinets, explosion-proof fridges, and also the need to avoid storage near incompatible chemicals.

## 7 Handling and storage

Information for safe handling:

Keep container tightly sealed. Store in cool, dry place in tightly closed containers. Ensure good ventilation at the workplace. Information about protection against explosions and fires: Keep ignition sources away. Protect against electrostatic charges. Fumes can combine with air to form an explosive mixture.

Storage

Requirements to be met by storerooms and receptacles: Store in a cool location. Store away from oxidizing agents .....

---

Section 8 provides information on regulatory standards for exposure, in other words, the maximum permitted concentration of the material in the environment to which you are allowed to be exposed. It also usually contains information on suitable types of PPE (personal protective equipment)

## 8 Exposure controls and personal protection

Additional information about design of technical systems: Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute. Components with limit values that require monitoring at the workplace: Benzene mg/m<sup>3</sup> ml/m<sup>3</sup> ACGIH TLV short term 1.6 0.5 ACGIH TLV long term 8 2.5 B VME 1,6 0,5 .....

Personal protective equipment General protective and hygienic measures The usual precautionary measures for handling chemicals should be followed. Keep away from foodstuffs, beverages and feed. Remove all soiled and contaminated clothing immediately..... Wash hands before breaks and at the end of work. Breathing equipment:.....

Protection of hands: Impervious gloves

Eye protection: Safety glasses, Full face protection .....

---

Section 9 is self-explanatory

## 9 Physical and chemical properties:

Form: Liquid

Color: Colorless

Odor: Aromatic

Change in condition

Melting point/Melting range: 5.51 ° C

Boiling point/Boiling range: 80.1 ° C

.....

---

The next section is also largely self-explanatory.

## 10 Stability and reactivity

Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.

Materials to be avoided: Oxidizing agents

Dangerous reactions No dangerous reactions known

## Dangerous products of decomposition: Carbon monoxide and carbon dioxide

---

Section 11 outlines the risks to which you may be exposed when using the chemical. It is therefore a section of crucial importance!

### 11 Toxicological information

**Acute toxicity:** (The acute toxicity gives an indication of the kind of quantities of the chemical which may cause immediate damage to health if swallowed, inhaled or absorbed through the skin.)

**LD/Lc50 values that are relevant for classification:** If you have never heard of LD50s, look in the [glossary on this site](#).

Oral: LD50: 3306 mg/kg (rat)  
Dermal: LD50: 48 mg/kg (mus)  
Inhalative: LC50/7H: 10.000 ppm/7H (rat)

(There follows a section which gives, often in some detail, an indication of the health effects which may be attributable to this chemical. This section should be read particularly carefully, since the range of health effects may be broad, and may include carcinogenic or sensitizer effects.)

**Primary irritant effect:**

on the skin: Irritant to skin and mucous membranes.

on the eye: Irritating effect.

**Sensitization:** No sensitizing effects known. (Chemical sensitisation, for example by platinum compounds, is a potentially debilitating problem. Pay particular attention to any information which may suggest that the chemical is a sensitiser.)

**Subacute to chronic toxicity:** (Here we find details of the possible long-term effects of exposure to the chemical.)

Benzene has a strong irritating effect, producing erythema and burning. Edema and blistering is possible in more severe cases. Absorption through the skin may cause the same symptoms as inhalation or ingestion. These include gastrointestinal irritation, low blood pressure, headache, blurred vision, nausea, vomiting, dizziness, loss of balance and coordination, confusion, unconsciousness, coma, respiratory failure and death. Blood, liver and kidney damage is possible. Benzene is a

recognized leukemogen and an experimental mutagen and teratogen.

Additional toxicological information:

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known. (For this chemical there now follow important comments regarding the carcinogenicity. The acronyms such as IARC refer to regulatory or health agencies.)

EPA-A: human carcinogen: sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer.

IARC-2A: Probably carcinogenic to humans: limited human evidence; sufficient evidence in experimental animals

NTP-2: Reasonably anticipated to be a carcinogen: limited evidence from studies in humans or sufficient evidence from studies in experimental animals.

ACGIH A2: Suspected human carcinogen: Agent is carcinogenic in experimental animals at dose levels, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) considered relevant to worker exposure. Available epidemiologic studies are conflicting or insufficient to confirm an increased risk of cancer in exposed humans.

---

Section 12 is largely self-explanatory

## 12 Ecological information:

General notes: Do not allow material to be released to the environment without proper governmental permits.

---

Section 13, which deals with disposal, is often not sufficiently detailed for you to be able to undertake disposal yourself. If you need to dispose of the chemical after use, ensure that you know how to do this safely.

## 13 Disposal considerations

Consult state, local or national regulations for proper disposal.

Section 14 gives transport information, generally as a list of codes indicating the dangers associated with the chemical (flammable, radioactive, very toxic, etc) and the type of transport which may be used. There are usually UN hazard codes given in this section. A guide to these is available [here](#).

## 14 Transport information

DOT regulations:

Hazard class: 3 Identification number: UN1114 Packing group: II .....

---

Section 15 lists the hazard codes (see [glossary](#) if you are not familiar with these) which indicate the principle hazards associated with the chemical and the precautions which should be taken when working with it.

## 15 Regulations

Hazard symbols:

T Toxic F Highly flammable

Risk phrases:

45 Can cause cancer - Group I (extremely hazardous)

11 Highly flammable.

48/23/24/25 Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.

A full list of these risk phrases is given [here](#).

Safety phrases:

20 When using do not eat or drink.

28 After contact with skin, wash immediately with plenty of ... .

36/37/39 Wear suitable protective clothing, gloves and eye/face protection.

45 In case of accident or if you feel unwell, seek medical advice immediately.

A full list of safety phrases is available [here](#).

National regulations (This may include a variety of country-specific detail) All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical Substance Inventory .....

This product contains a chemical known to the state of California to cause cancer or reproductive toxicity.

This product contains benzene and is subject to the reporting requirements of

## Attachment C

section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40CFR372.

---

Finally, a section of an additional information, such as the name of the person preparing the data sheet, a list of references from which data have been drawn, disclaimers, etc.

## 16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees ....

Contact:

---

[Return to [Physical & Theoretical Chemistry Lab. Safety home page.](#)]

This information was last updated on September 2, 2003. We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse, or accuracy. We have not verified this information, and cannot guarantee that it is up-to-date.

---

## City of Portland and Portland Water District Industrial Waste Report

<b>Location:</b>		Bayside Trail, Portland			<b>Sample Date:</b>				
<b>Sample Type</b>					<b>Sample Condition</b>				
<b>Composite</b>	X	<b>Grab</b>		<b>Discrete</b>		<b>Refrigerated</b>			
• <b>Methods 40 CFR Part 136</b> •									
	ID No	Parameter	Preservative	Method	Report Value	Duplicate % Recovery	Analysis Date	Analyst	
X	23	<b>pH (Composite)</b>	Analysis (ASAP)	150.1					
X	1	<b>Caustic Alk.</b>	Refrigerate	310.1					
X	30	<b>TSS</b>	Refrigerate	160.2					
X	14	<b>Cadmium</b>	HNO <sub>3</sub> to pH <2	200.7					
X	14	<b>Copper</b>	HNO <sub>3</sub> to pH <2	200.7					
X	14	<b>Chromium</b>	HNO <sub>3</sub> to pH <2	200.7					
X	14	<b>Lead</b>	HNO <sub>3</sub> to pH <2	200.7					
X	14	<b>Nickel</b>	HNO <sub>3</sub> to pH <2	200.7					
X	14	<b>Zinc</b>	HNO <sub>3</sub> to pH <2	200.7					
X	32	<b>Silver</b>	HNO <sub>3</sub> to pH <2	200.7					
X	54	<b>Mercury</b>	HNO <sub>3</sub> to pH <2	245.1					
X	62	<b>Arsenic</b>	HNO <sub>3</sub> to pH <2	206.2/200.7					
<b>Person(s) Sampling:</b>			<b>Community:</b>			<b>Location:</b>			
<b>Type Of System:</b>			Industrial	Combined	Sanitary	Storm	Surface		
<b>Automatic Sampler Information:</b>									
<b>Date/Time Set:</b>		<b>Start Time:</b>			<b>Time Period:</b>				
<b>Time Interval:</b>		<b>Samples per Bottle:</b>			<b>No. of Bottles:</b>				
<b>Date/Time Pulled:</b>		<b>Comments:</b>							
<b>Grab Sample Information (including bottle size &amp; type)</b>									
<b>Date/Time Pulled:</b>					<b>No. of Samples:</b>				
1000 ml HDPE Amber		1000 ml Glass		950 ml Plastic					
Other Bottle Type:									
<b>Relinquished by:</b>			<b>Received by:</b>			<b>Date / Time:</b>			
<b>Reviewed for release by:</b>						<b>Date:</b>			

Notes: Copy Thomas Wiley, PWD and Return Original to Stephen Harris or Charles Moore at Portland Public Works

**City of Portland and Portland Water District Industrial Waste Report**

<b>Location:</b>		Bayside Trail, Portland			<b>Sample Date:</b>			
<b>Sample Type</b>					<b>Sample Condition</b>			
<b>Composite</b>		<b>Grab</b>	<b>Discrete</b>					
• <i>Methods 40 CFR Part 136</i> •								
	ID No	Parameter	Preservative	Method	Report Value	Duplicate % Recovery	Analysis Date	Analyst
X	56	<b>Tot. Cyanide (Grab)</b>	NaOH to pH >12, Refrigerate	335.2				
<b>Person(s) Sampling:</b>				<b>Community:</b>				<b>Location:</b>
<b>Type Of System:</b>		Industrial	Combined	Sanitary	Storm	Surface		
<b>Automatic Sampler Information:</b>								
<b>Date/Time Set:</b>				<b>Start Time:</b>				<b>Time Period:</b>
<b>Time Interval:</b>				<b>Samples per Bottle</b>				<b>No. of Bottle</b>
<b>Date/Time Pulled:</b>				<b>Comments:</b>				
<b>Grab Sample Information (including bottle size &amp; type)</b>								
<b>Date/Time Pulled:</b>				<b>No. of Samples</b>				
1000 ml HDPE Ambe		1000 ml Glass		950 ml Plastic				
<b>Other Bottle Type:</b>								
<b>Relinquished by:</b>			<b>Received by:</b>			<b>Date / Time:</b>		
<b>Reviewed for release by:</b>						<b>Date:</b>		

**Notes:** Copy Thomas Wiley, PWD and Return Original to Stephen Harris or Charles Moore at Portland Public Works

**City of Portland and Portland Water District Industrial Waste Report**

<b>Location:</b>		Bayside Trail, Portland			<b>Sample Date:</b>			
<b>Sample Type</b>					<b>Sample Condition</b>			
<b>Composite</b>		<b>Grab</b>	<b>Discrete</b>					
<b>• Methods 40 CFR Part 136 •</b>								
	ID No	Parameter	Preservative	Method	Report Value	Duplicate % Recovery	Analysis Date	Analyst
X	1	<i>pH</i>	Analyze (ASAP)	150.1				
		<i>Caustic Alk.</i>	Refrigerate	310.1				
<b>Person(s) Sampling:</b>					<b>Community:</b>		<b>Location:</b>	
<b>Type Of System:</b>		<b>Industrial</b>	<b>Combined</b>	<b>Sanitary</b>	<b>Storm</b>	<b>Surface</b>		
<b>Automatic Sampler Information:</b>								
<b>Date/Time Set:</b>				<b>Start Time:</b>				<b>Time Period:</b>
<b>Time Interval:</b>				<b>Samples per Bottle:</b>				<b>No. of Bottl:</b>
<b>Date/Time Pulled:</b>				<b>Comments:</b>				
<b>Grab Sample Information (including bottle size &amp; type)</b>								
<b>Date/Time Pulled:</b>					<b>No. of Sample:</b>			
1000 ml HDPE Amber		1000 ml Glass		950 ml Plastic				
<b>Other Bottle Type:</b>								
<b>Relinquished by:</b>			<b>Received by:</b>			<b>Date / Time:</b>		
<b>Reviewed for release by</b>						<b>Date</b>		

Notes: Copy Thomas Wiley, PWD and Return Original to Stephen Harris or Charles Moore at Portland Public Works

**City of Portland and Portland Water District Industrial Waste Report**

<b>Location:</b>		Bayside Trail, Portland				<b>Sample Date:</b>			
<b>Sample Type</b>						<b>Sample Condition</b>			
<b>Composite</b>		<b>Grab</b>		<b>X</b>		<b>Discrete</b>			
<b>• Methods 40 CFR Part 136 •</b>									
ID No	Parameter	Preservative	Method	Report Value	Duplicate % Recovery	Analysis Date	Analyst		
X	FLASHPOINT (Closed Cup)	None							
<b>Person(s) Sampling:</b>			<b>Community:</b>			Portland		<b>Location:</b>	
<b>Type Of System:</b>		<b>X</b>							
		Industrial		Combined		Sanitary		Storm	
								Surface	
<b>Automatic Sampler Information:</b>									
<b>Date/Time Set:</b>			<b>Start Time:</b>			<b>Time Period:</b>			
<b>Time Interval:</b>			<b>Samples per Bottle:</b>			<b>No. of Bottle:</b>			
<b>Date/Time Pulled:</b>			<b>Comments:</b>						
<b>Grab Sample Information (including bottle size &amp; type)</b>									
<b>Date/Time Pulled:</b>					<b>No. of Samples</b>				
1000 ml HDPE Amber			1000 ml Glass			950 ml Plastic			
<b>Other Bottle Type:</b>									
<b>Relinquished by:</b>				<b>Received by:</b>				<b>Date / Time:</b>	
<b>Reviewed for release by</b>						<b>Date:</b>			

**Notes:** Copy Thomas Wiley, PWD and Return Original to Stephen Harris or Charles Moore at Portland Public Works

**City of Portland and Portland Water District Industrial Waste Report**

<b>Location:</b>		Bayside Trail, Portland				<b>Sample Date:</b>			
<b>Sample Type</b>					<b>Sample Condition</b>				
<b>Composite</b>		<b>Grab</b>		<b>Discrete</b>					
<b>• Methods 40 CFR Part 136 •</b>									
	<b>ID No</b>	<b>Parameter</b>	<b>Preservative</b>	<b>Method</b>	<b>Report Value</b>	<b>Duplicate % Recovery</b>	<b>Analysis Date</b>	<b>Analyst</b>	
		<i>PCB's and Pesticides</i>		EPA 608					
		<i>(GRO) Gasoline Range Organics</i>		Me HETL 4.2.17					
		<i>(DRO) Diesel Range Organics</i>		Me HETL 4.1.25					
X		<i>Hydrocarbon (PAH Range)</i>		EPA 8015					
<b>Person(s) Sampling:</b>			<b>Commu</b>			<b>Location</b>			
<b>Type Of System:</b>			<b>Industrial</b>		<b>Combined</b>		<b>Sanitary</b>		<b>Storm</b>
									<b>Surface</b>
<b>Automatic Sampler Information:</b>									
<b>Date/Time Set:</b>		<b>Start Time:</b>			<b>Time Period</b>				
<b>Time Interval:</b>		<b>Samples per Bottl</b>			<b>No. of Bottl</b>				
<b>Date/Time Pulled:</b>		<b>Comments:</b>							
<b>Grab Sample Information (including bottle size &amp; type)</b>									
<b>Date/Time Pulled:</b>						<b>No. of Samples</b>			
1000 ml HDPE Amber		1000 ml Glass		950 ml Plastic					
<b>Other Bottle Type:</b>									
<b>Relinquished by:</b>			<b>Received by:</b>			<b>Date / Time:</b>			
<b>Reviewed for release by:</b>							<b>Date:</b>		

Notes: Copy Thomas Wiley, PWD and Return Original to Stephen Harris or Charles Moore at Portland Public Works

End of Section

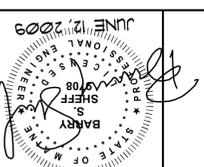




SHEET # 7 OF 33  
PLAN NUMBER

CITY OF PORTLAND, MAINE  
PUBLIC SERVICES DEPARTMENT  
ENGINEERING SECTION

BAYSIDE TRAIL  
LAYOUT - 5

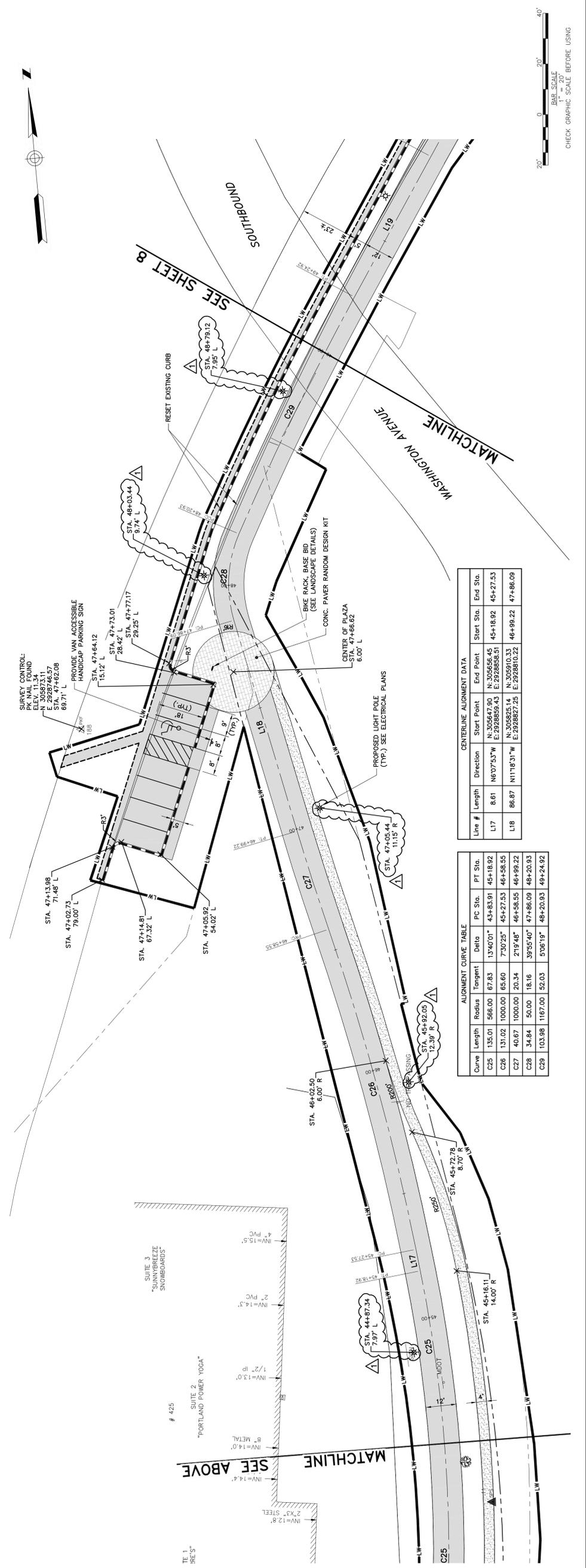
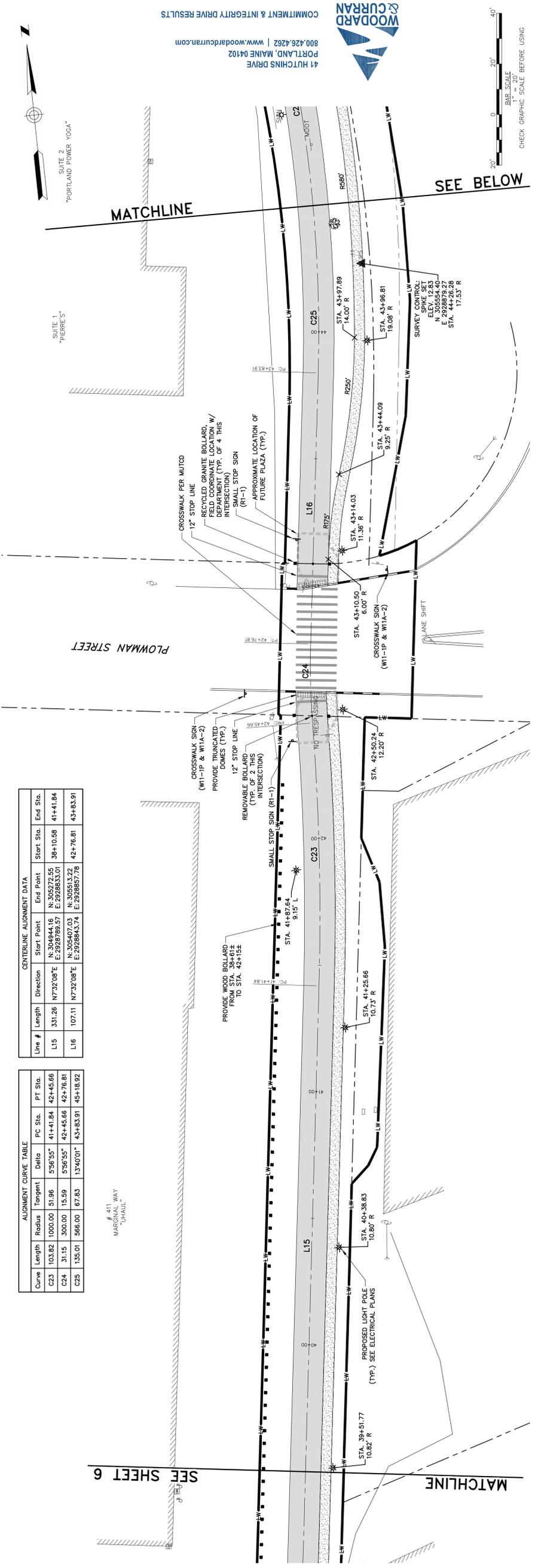


DESIGNED BY: BARRY S. BESS  
DATE: 06/22/2009

REFERENCES:  
STRIP\_663001.dwg

REV	DESCRIPTION	DATE
1	ADDENDUM 1	6/12/2009

LDD PROJECT NAME:  
DRAWING NAME:  
20394365-C00B.DWG  
FIELD BOOK USED:



CENTERLINE ALIGNMENT DATA

Line #	Length	Direction	Start Point	End Point	Start Sta.	End Sta.
L15	331.26	N7°32'08"E	N: 304944.16 E: 2926789.57	N: 305272.55 E: 2926853.01	38+10.58	41+41.84
L16	107.11	N7°32'08"E	N: 305407.03 E: 2926843.74	N: 306513.22 E: 2926857.78	42+76.81	43+83.91

ALIGNMENT CURVE TABLE

Curve	Length	Radius	Tangent	Delta	PC Sta.	PT Sta.
C23	103.82	1000.00	51.86	5°36'55"	41+41.84	42+45.66
C24	31.15	300.00	15.59	5°36'55"	42+45.66	42+76.81
C25	135.01	566.00	67.83	1°34'01"	43+83.91	45+18.92

CENTERLINE ALIGNMENT DATA

Line #	Length	Direction	Start Point	End Point	Start Sta.	End Sta.
L17	8.61	N6°07'53"W	N: 305647.90 E: 2926859.43	N: 305656.45 E: 2926858.51	45+18.92	45+27.53
L18	86.87	N11°16'31"W	N: 305825.14 E: 2926827.25	N: 305910.33 E: 2926810.22	46+99.22	47+86.09

ALIGNMENT CURVE TABLE

Curve	Length	Radius	Tangent	Delta	PC Sta.	PT Sta.
C25	135.01	566.00	67.83	1°34'01"	43+83.91	45+18.92
C26	131.02	1000.00	65.60	7°30'25"	45+27.53	46+58.55
C27	40.87	1000.00	20.34	2°19'48"	46+58.55	46+99.22
C28	34.84	50.00	18.16	39°55'40"	47+86.09	48+20.93
C29	103.98	1167.00	52.03	5°06'19"	48+20.93	49+24.92



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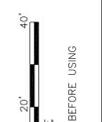
COMMITMENT & INTEGRITY DRIVE RESULTS



CHECK GRAPHIC SCALE BEFORE USING



CHECK GRAPHIC SCALE BEFORE USING



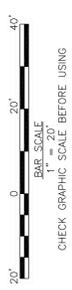
CHECK GRAPHIC SCALE BEFORE USING



CITY OF PORTLAND, MAINE  
PUBLIC SERVICES DEPARTMENT  
ENGINEERING SECTION

BAYSIDE TRAIL  
LAYOUT - 6

SHEET #  
8 OF 33  
PLAN NUMBER



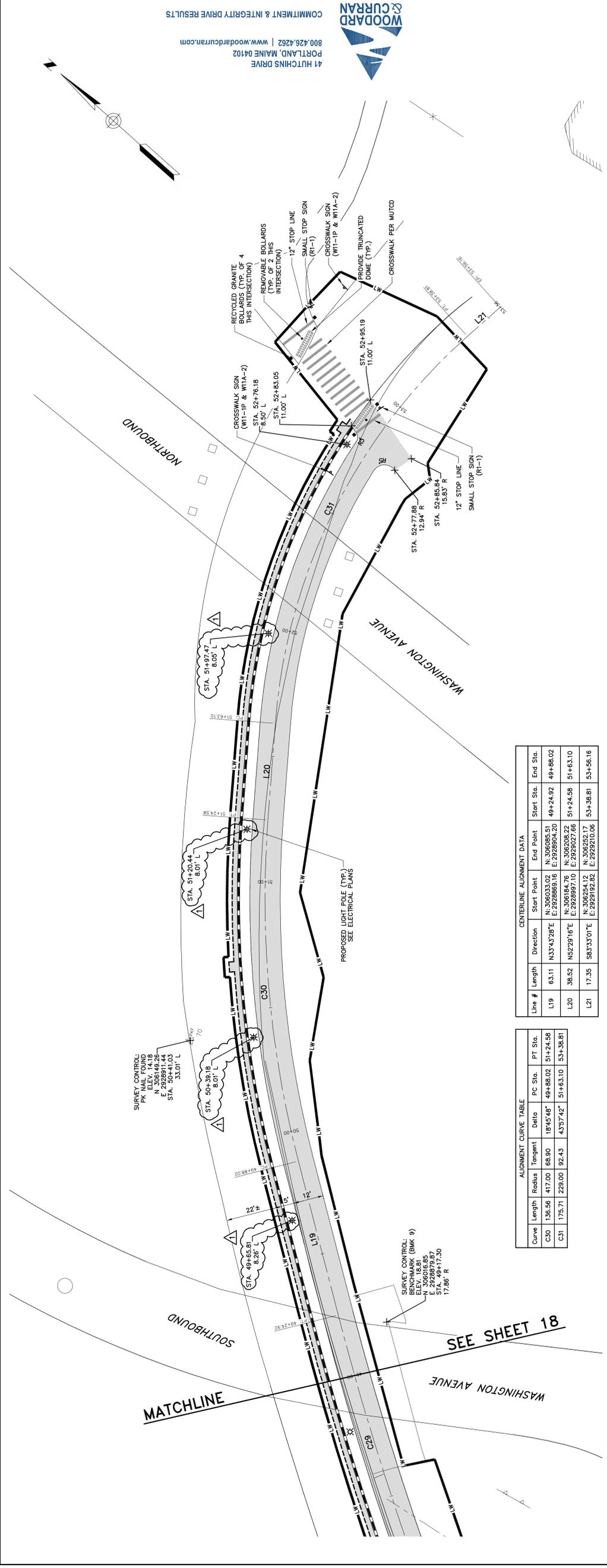
DESIGNED BY: BARRY S. CURRAN  
DRAWN BY: BSS  
CHECKED BY: BSS  
SCALE: 1"=20'  
DATE: 06/22/2009



REFERENCES:  
STRIP\_663001.dwg

REV	DESCRIPTION	DATE
1	ADDENDUM 1	6/12/2009

LDD PROJECT NAME:  
DRAWING NAME:  
20394365-C00B.DWG  
FIELD BOOK USED:



Line #	Length	Direction	Start Point	End Point	Start Sta.	End Sta.
L19	63.11	N33°43'28"E	N: 305653.02 E: 232689.40	N: 305656.51 E: 232694.40	49+24.92	49+88.02
L20	36.52	N82°29'16"E	N: 305689.76 E: 232620.22	N: 305691.12 E: 232625.06	51+24.58	51+63.10
L21	17.35	S63°33'01"E	N: 305692.82 E: 232619.82	N: 305695.06 E: 232621.06	53+38.81	53+56.16

Curve	Length	Radius	Tangent	Delta	PC Sta.	PT Sta.
C30	136.56	417.00	66.90	18°45'48"	49+88.02	51+24.58
C31	175.71	229.00	92.43	43°57'42"	51+63.10	53+38.81

SURVEY CONTROL:  
PK NAIL FOUND  
ELEV. 14.18  
E: 232681.44  
STA. 50+41.03  
33.01' L

SURVEY CONTROL:  
BENCHMARK (BMK 9)  
ELEV. 18.81  
N: 306016.99  
E: 232694.40  
STA. 49+17.30  
17.86' R

MATCHLINE  
SEE SHEET 18  
WASHINGTON AVENUE

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COMMITMENT & INTEGRITY DRIVE RESULTS











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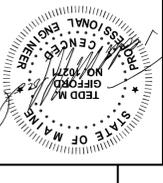
GRAPHIC SCALE  
1" = 30'  
0 30' 60'

SHEET #  
30 OF 33  
PLAN NUMBER



CITY OF PORTLAND, MAINE  
PUBLIC SERVICES DEPARTMENT  
ENGINEERING SECTION

BAYSIDE TRAIL  
ELECTRICAL - 3

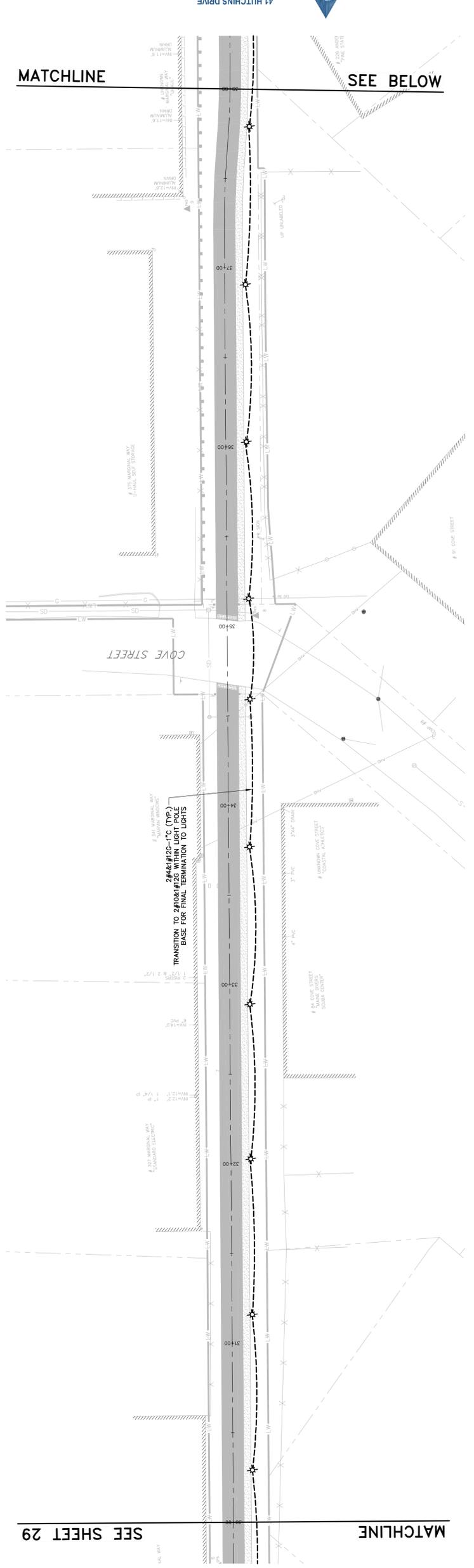
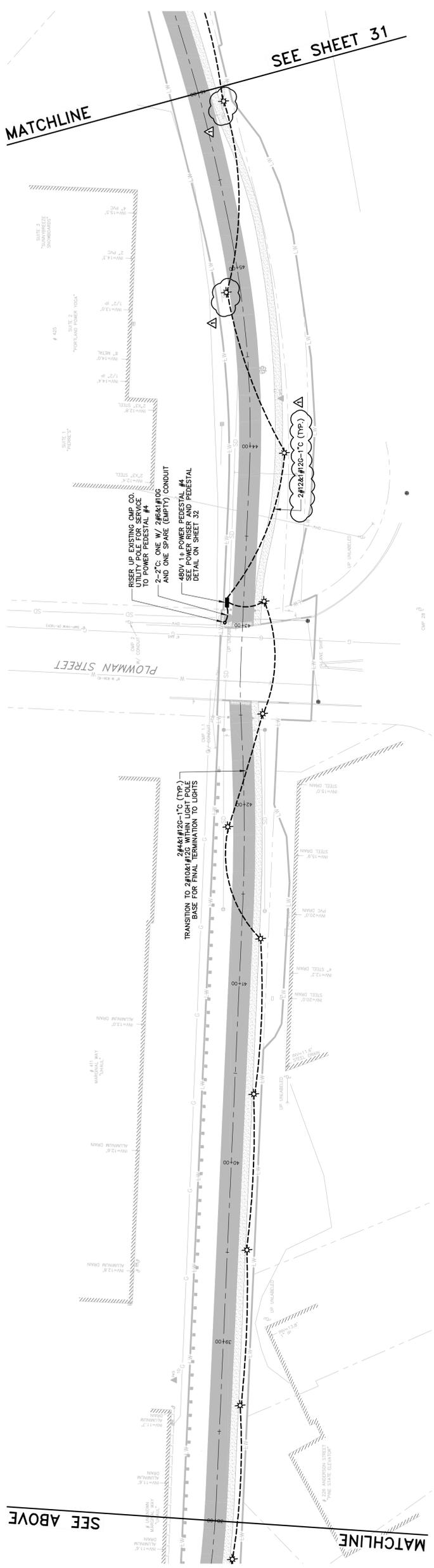


DESIGNED BY: KRM  
DRAWN BY: KRM  
CHECKED BY: TMC  
SCALE: AS NOTED  
DATE: 05/22/2009

REFERENCES:  
STRIP\_663001.dwg

REV	DESCRIPTION	DATE
1	ADDENDUM 1	6/12/2009

LDD PROJECT NAME:  
DRAWING NAME:  
20394365-E00A.DWG  
FIELD BOOK USED:



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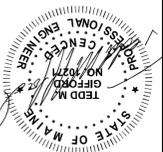




CITY OF PORTLAND, MAINE  
PUBLIC SERVICES DEPARTMENT  
ENGINEERING SECTION

BAYSIDE TRAIL

ELECTRICAL - 4



DESIGNED BY: KRM  
DRAWN BY: KRM  
CHECKED BY: TMG  
SCALE: AS NOTED  
DATE: 06/22/2009

REFERENCES:  
STRIP\_663001.dwg

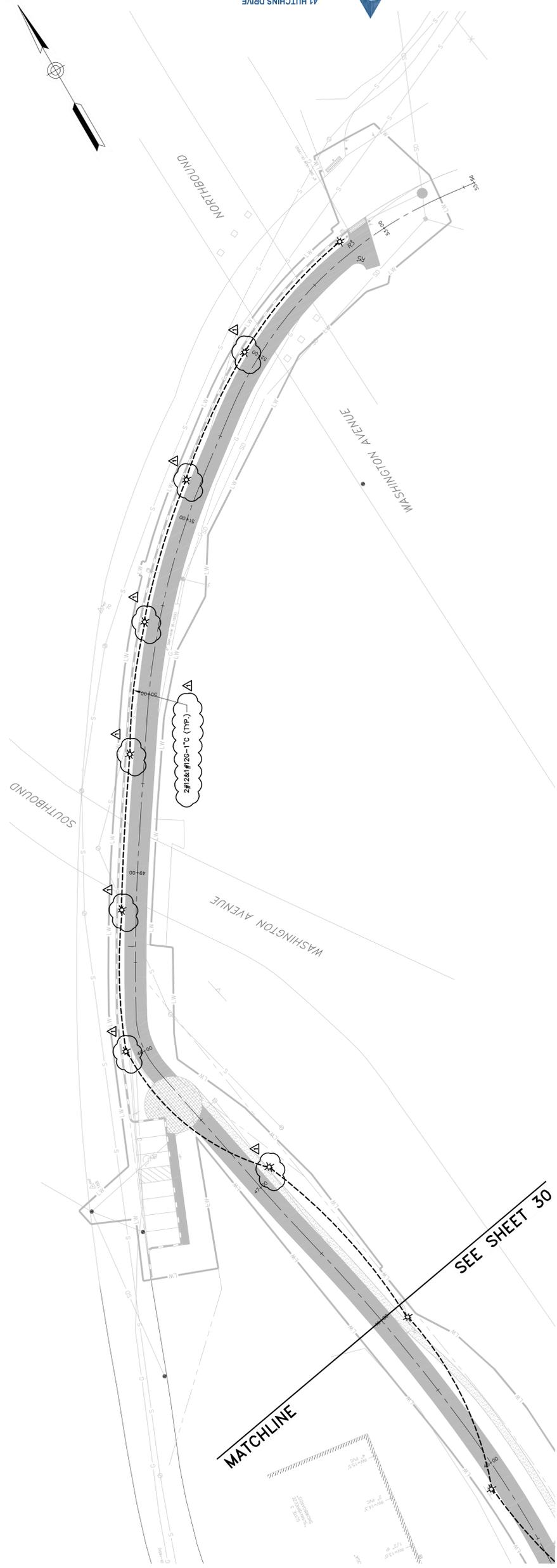
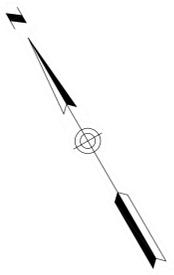
REV	DESCRIPTION	DATE
1	ADDENDUM 1	6/12/2009

LDD PROJECT NAME:  
DRAWING NAME:  
20394365-E00A.DWG  
FIELD BOOK USED:

SHEET # 31 OF 33  
PLAN NUMBER  
1"  
1" = 30'  
B.B.E. SCALE  
CHECK GRAPHIC SCALE BEFORE USING



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REV	DESCRIPTION	DATE
1	ADDENDUM 1	6/12/2009

REFERENCES:  
STRIP\_663001.dwg

DESIGNED BY:  
KRM  
DRAWN BY:  
KRM  
CHECKED BY:  
TMG  
SCALE:  
AS NOTED  
DATE:  
06/22/2009

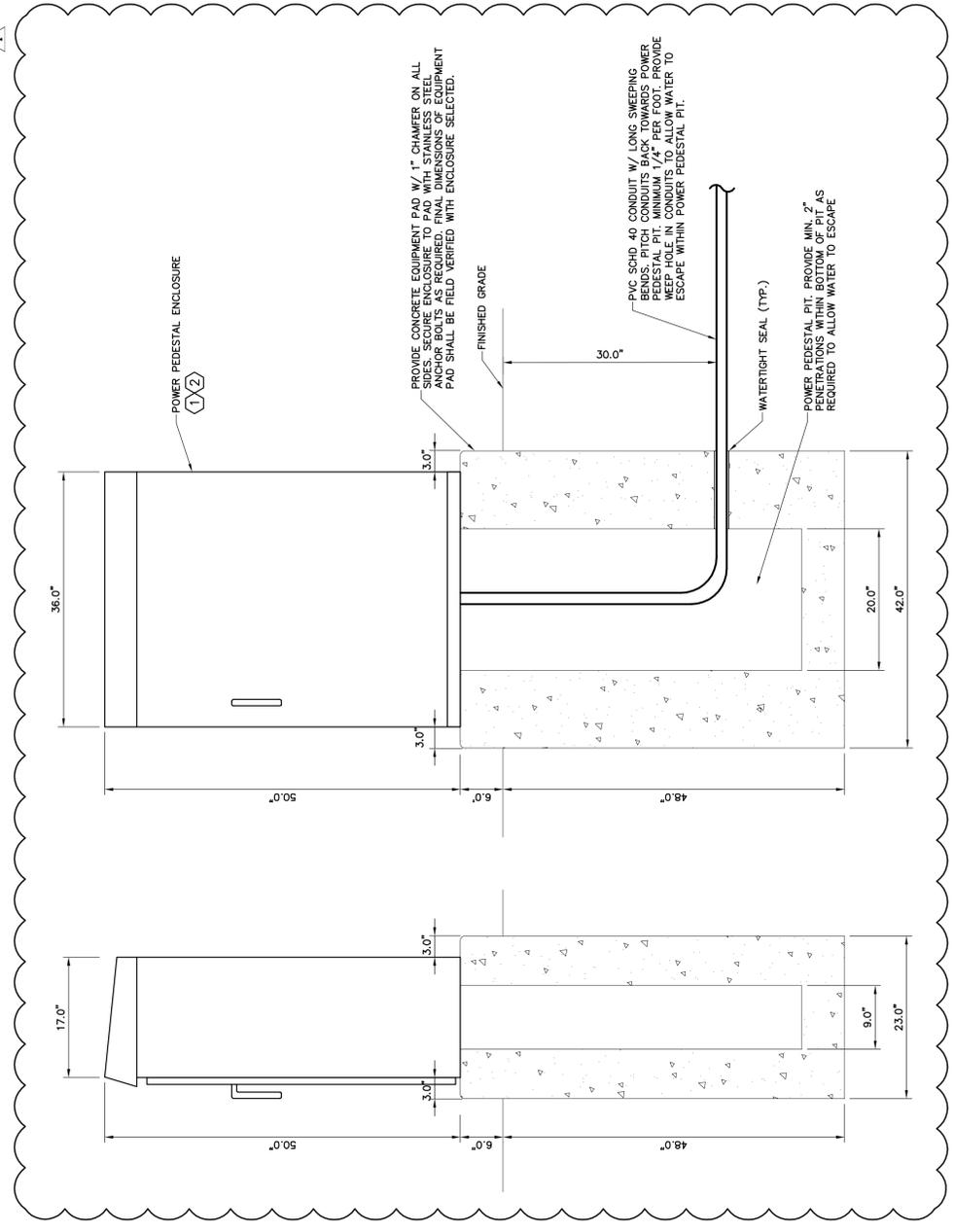
BAYSIDE TRAIL  
ELECTRICAL DETAILS - 1

CITY OF PORTLAND, MAINE  
PUBLIC SERVICES DEPARTMENT  
ENGINEERING SECTION

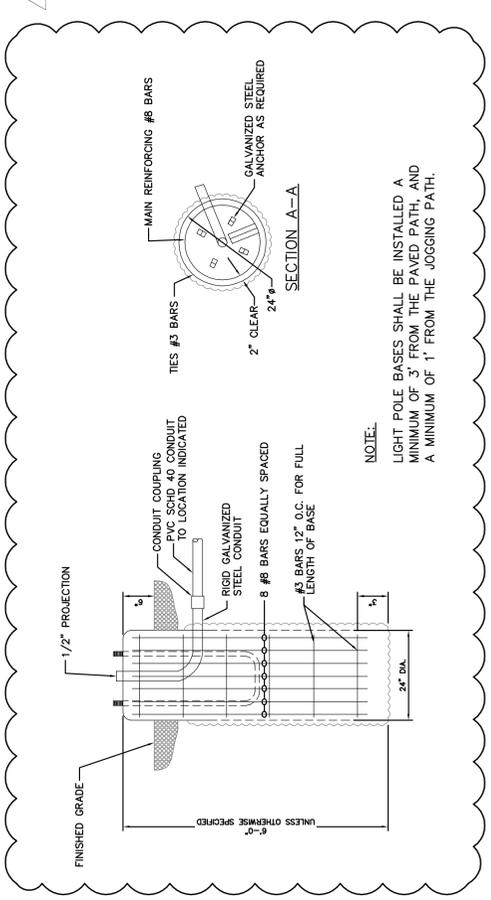


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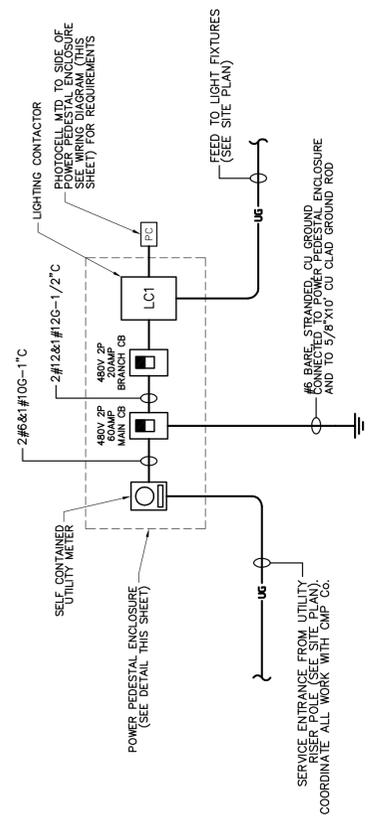
- NOTES:
1. PROVIDE LOCKABLE NEMA 3R ALUMINUM ENCLOSURE WITH INTEGRAL BACKPANEL EQUAL TO APX MODEL #APX503617, OR APPROVED EQUAL.
  2. ALL WIRING & CABLES TO BE INSTALLED WITHIN THE ENCLOSURE SHALL BE TAGGED APPROPRIATELY TO DESIGNATE INTENDED USE AND CONNECTED LOAD. ALL CABLES SHALL BE BUNDLED NEATLY, THE WRAPPED, DRESSED APPROPRIATELY AND SHALL RUN PARALLEL AND PERPENDICULAR AT 90 DEGREES TO EACH OTHER. USE THE FOLLOWING MOUNTING METHODS TO SUPPORT THE BACK PANEL (ADHESIVE BACK MOUNTS, WHICH UTILIZE A SCREW MOUNTING METHOD TO SUPPORT TO THE BACK PANEL (ADHESIVE BACK SUPPORTS ARE NOT ACCEPTABLE), WIRE BUNDLE STRAPS SHALL BE SIMILAR TO PANDUIT WBS56 SERIES, AND CABLE TIE MOUNTS SHALL BE SIMILAR TO PANDUIT TMEH SERIES (OR APPROVED EQUAL).
  3. DETAIL IS TYPICAL FOR POWER PEDESTALS 1, 2, 3, & 4.



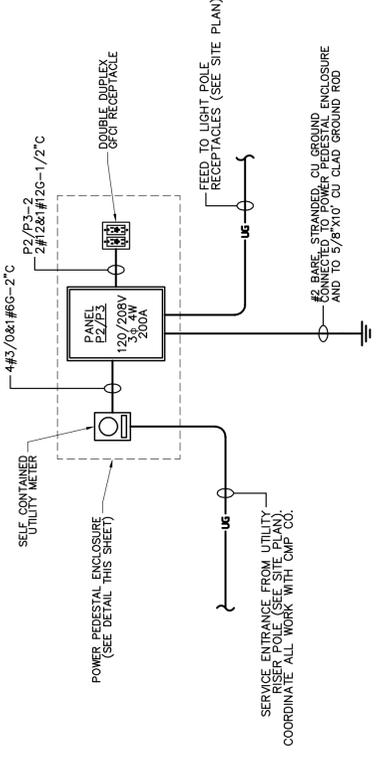
TYPICAL POWER PEDESTAL ENCLOSURE DETAIL  
SCALE: NO SCALE



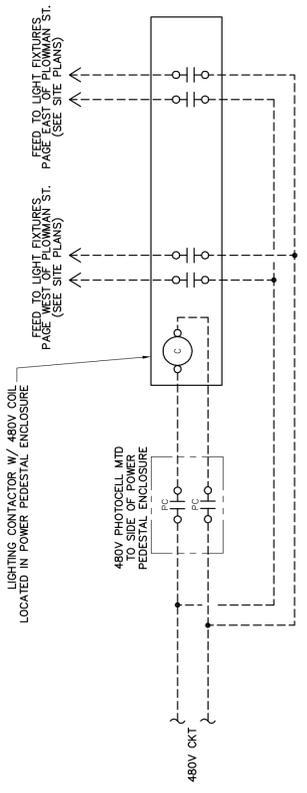
LIGHT POLE BASE DETAIL  
SCALE: NO SCALE



POWER PEDESTAL #1 AND #4  
POWER RISER DIAGRAM  
SCALE: NO SCALE



POWER PEDESTAL #2 & #3  
POWER RISER DIAGRAM  
SCALE: NO SCALE



TYPICAL PHOTOCELL AND LIGHTING CONTACTOR  
WIRING DIAGRAM  
SCALE: NO SCALE

LIGHTING FIXTURE SCHEDULE						
ALL FIXTURES SHALL BE FURNISHED COMPLETE WITH ALL HARDWARE, LAMPS, HANGERS, FITTINGS, ETC., FOR A COMPLETE AND PROPER INSTALLATION.						
TYPE	MANUFACTURER	CATALOG NUMBER	LAMP TYPE	LAMP WATT	LAMP NO.	VOLTAGE
☼			LED	88	60	480
POLE MOUNTED LED FIXTURE W/ TYPE II DISTRIBUTION			4" ROUND ALUMINUM POLE			
FIXTURE: 15A-WP952-LSK480-LSSTL			MOUNT FIXTURE 16"-0" AFG.			
POLE: HAPCO SRA-1884-4-CUSTOM						
REMARKS/RECOMMENDATIONS						

**LIGHT FIXTURE SCHEDULE**  
SCALE: NO SCALE

DIRECTORY	BRKR	POLE	CCT #	KVA	KVA LOADS			CCT #	POLE	BRKR	DIRECTORY
					A	B	C				
LIGHT POLE RCPTS	20	1	1	0.54	0.80	0.72	0.36	2	1	20	INTERIOR POWER PEDESTAL (CPO)
SPARE	20	1	3	0.72				4	1	20	SPARE
SPARE	20	1	5		0.00			6	1	20	SPARE
SPARE	20	1	7		0.00			8	1	20	SPARE
SPARE	20	1	9		0.00			10	1	20	SPARE
SPARE	20	1	11		0.00			12	1	20	SPARE
SPARE	20	1	13		0.00			14			SPARE
SPARE	20	1	15		0.00			16			SPARE
SPARE	20	1	17		0.00			18			SPARE
SPARE	20	1	19		0.00			20			SPARE
SPARE	20	1	21		0.00			22			SPARE
SPARE	20	1	23		0.00			24			SPARE
SPARE	20	1	25		0.00			26			SPARE
SPARE	20	1	27		0.00			28			SPARE
SPARE	20	1	29		0.00			30			SPARE
SUBTOTAL				0.90	0.72	0.00	0.00	SUBTOTAL			
TOTAL KVA				1.62							
TOTAL AMPS				5							
VOLTAGE:				120/208			PANEL NAME: P2				
MAIN BREAKER:				200			LOCATION: POWER PEDESTAL #2				
BUSES:				225			MOUNTING: SURFACE				
PH & WIRES:				3P-WH			A/C RATINGS: 125 KVA				
NOTES:											

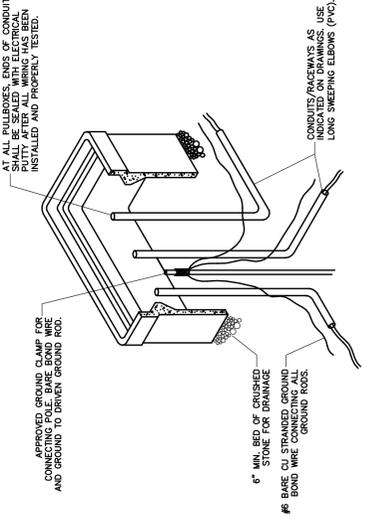
DIRECTORY	BRKR	POLE	CCT #	KVA	KVA LOADS			CCT #	POLE	BRKR	DIRECTORY
					A	B	C				
LIGHT POLE RCPTS	20	1	1	0.72	1.08	0.00	0.36	2	1	20	INTERIOR POWER PEDESTAL (CPO)
SPARE	20	1	3		0.00			4	1	20	SPARE
SPARE	20	1	5		0.00			6	1	20	SPARE
SPARE	20	1	7		0.00			8	1	20	SPARE
SPARE	20	1	9		0.00			10	1	20	SPARE
SPARE	20	1	11		0.00			12	1	20	SPARE
SPARE	20	1	13		0.00			14			SPARE
SPARE	20	1	15		0.00			16			SPARE
SPARE	20	1	17		0.00			18			SPARE
SPARE	20	1	19		0.00			20			SPARE
SPARE	20	1	21		0.00			22			SPARE
SPARE	20	1	23		0.00			24			SPARE
SPARE	20	1	25		0.00			26			SPARE
SPARE	20	1	27		0.00			28			SPARE
SPARE	20	1	29		0.00			30			SPARE
SUBTOTAL				1.08	0.00	0.00	0.00	SUBTOTAL			
TOTAL KVA				1.08							
TOTAL AMPS				3							
VOLTAGE:				120/208			PANEL NAME: P3				
MAIN BREAKER:				200			LOCATION: POWER PEDESTAL #3				
BUSES:				225			MOUNTING: SURFACE				
PH & WIRES:				3P-WH			A/C RATINGS: 125 KVA				
NOTES:											

**PANEL SCHEDULES**  
SCALE: NO SCALE

- POWER**
- WRING IN RACEWAY
  - WRING IN RACEWAY CONCEALED UNDERGROUND OR UNDERSLAB, MINIMUM 3/4" C
  - WRING IN RACEWAY CONCEALED UNDERGROUND, MINIMUM 3/4" C
  - AERIAL ELECTRIC
  - CONDUIT TURNING UP
  - CONDUIT TURNING DOWN
  - ELECTRICAL HANDHOLE
  - KEY NOTE
  - POWER COMPANY METER
  - GFCI DUPLEX RECEPTACLE, NEMA 5-20R
  - KEY NOTE
  - GROUND
- ABBREVIATIONS**
- AFG ABOVE FINISHED FLOOR
  - AFG AUTHORITY HAVING JURISDICTION
  - AIC AMPERE INTERRUPT CAPACITY
  - CKT CIRCUIT
  - EA ELECTRICAL
  - E.C. EACH
  - EXG. EXISTING
  - F.W.E. FURNISHED WITH EQUIPMENT
  - GFCI GROUND FAULT CIRCUIT INTERRUPTER
  - G.GND GROUND
  - MCB MAIN CIRCUIT BREAKER
  - MTD MOUNTED
  - NEC NATIONAL ELECTRICAL CODE
  - RGS RIGID STEEL CONDUIT
  - T-STAT THERMOSTAT
  - TVSS TRANSIENT VOLTAGE SURGE SUPPRESSOR
  - UP UNDERGROUND
  - WP WEATHER PROOF
  - XFMR TRANSFORMER
  - XP EXPLOSION PROOF

**ELECTRICAL LEGEND**  
SCALE: NO SCALE

- PULLBOX NOTES:**
- CONDUITS NOT TERMINATING IN OR AT THE PULLBOXES SHALL NOT RUN THROUGH PULLBOXES, UNLESS REQUIRED FOR PULLING.
  - FINAL DIMENSIONS OF PULLBOXES SHALL BE AS VERIFIED IN THE FIELD. PULLBOXES SHALL BE CAST IRON, PROVIDE EXTENSION AS REQUIRED.
  - PULLBOX COVERS SHALL BE CAST IRON, PROVIDE EXTENSION AS REQUIRED.
  - PULLBOXES SHALL BE PRECAST, AND SHALL BE ROW H20 RATED.



**ELECTRICAL HANDHOLE DETAIL**  
SCALE: NO SCALE

DESIGNED BY: KRM  
CHECKED BY: TMC  
SCALE: 1/8\"/>

BAYSIDE TRAIL

ELECTRICAL DETAILS - 2

CITY OF PORTLAND, MAINE  
PUBLIC SERVICES DEPARTMENT  
ENGINEERING SECTION

DATE: 06/22/2009  
SCALE: 1/8\"/>

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COMMITMENT & INTEGRITY DRIVE RESULTS

SHEET # 33 OF 33  
PLAN NUMBER