

PART 1 - GENERAL

<u>1.1 Related Sections</u>	.1	Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
	.2	Section 01 35 43 - Environmental Procedures.
<u>1.2 Measurement Procedures</u>	.1	Excavation: All excavation work and disposal of material will be included in the item for payment under Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
	.2	Granular Backfill (R5): New granular backfill material, R5 random rip-rap, will be measured by the metric tonnes of material supplied and acceptably placed in the works to the lines and grades specified. Payment will also include handling, stockpiling, mixing, compacting, trucking and all related work. .1 All drainage fill material required for the new french drain as shown will be measured under this item.
	.3	Granular Base Material: will be measured by the metric tonnes of material supplied and acceptably placed in the works to the lines and grades as shown on drawings. Payment will also include handling, stockpiling, mixing, compacting, trucking and all related work.
	.4	Granular Sub-Base Material: will be measured by the metric tonnes of material supplied and acceptably placed in the works to the lines and grades as shown on drawings. Payment will also include handling, stockpiling, mixing, compacting, trucking and all related work.
<u>1.3 References</u>	.1	Canadian General Standards Board (CGSB) .1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

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| <u>1.3 References</u>
(Cont'd) | .2 | American Society for Testing and Materials (ASTM)
.1 ASTM D 4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate. |
| <u>1.4 Submittals</u> | .1 | Samples:
.1 Submit samples in accordance with Section 01 33 00.
.2 Inform Departmental Representative at least 4 weeks prior to commencing Work, of proposed source of fill materials and provide access for sampling. |
| <u>1.5 Protection of Existing Features</u> | .1 | Existing buried utilities and structures:
.1 Maintain and protect from damage, water, electric, and other utilities and structures encountered.
.2 Where utility lines or structures exist in area of excavation, obtain direction of the Departmental Representative before removing or re-routing. Costs for such Work to be paid by the Departmental Representative.
.3 Record location of maintained, re-routed and abandoned underground lines. |
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PART 2 - PRODUCTS

2.1 Materials

- .1 Granular Backfill: to consist of hard, durable, quarry or pit run material of an approved quality. The material will be free from frost, snow stumps, weeds, sod, roots, logs, silt, organic material, garbage, or any other waste materials and must be capable of being compacted to degree as specified herein and meeting approval of the Departmental Representative. Material to be uniformly graded having a stone size between 75 to 200 mm (R5 random rip-rap) on any dimension. Slate, sandstone or shale rock will not be accepted. Specific gravity not less than 2.65 when tested to ASTM C127-12 (AASHTO T85-14).

.1 Gradation to meet NBDOT 'R5' Random Rip-Rap limits as follows:

ASTM Sieve size	% passing
220 mm	100
190 mm	70 - 90
150 mm	40 - 55
70 mm	0 - 15

- .2 Granular Base and Sub-Base:

.1 Granular Base rock, clear, hard durable, angular, crushed quarried rock aggregate free from silt, clay lumps, organic matter, foreign substances and free from splits, seams or defects. Specific gravity not less than 2.6 when tested to ASTM C127-12 (AASHTO T85-14).

.2 Gradation to be within following limits when tested to ASTM C136-06 and ASTM C117-13 and giving a smooth curve without sharp breaks when plotted on a semi-log grading chart.

- .3 Gradation - Granular Base:

ASTM Sieve Size	% Passing
31.5 mm	95-100
25.0 mm	81-100
19.0 mm	66-90
12.5 mm	50-77

2.1 Materials .1 (Cont'd)

9.5 mm	41-70
4.75 mm	27-54
2.36 mm	17-43
1.18 mm	11-32
300 µm	4-19
75 µm	0-8

.4 Gradation - Granular sub-base material:

ASTM Sieve Size	% Passing
75.0 mm	100
0.425 mm	30 max
0.075 mm	8 max

PART 3 - EXECUTION

3.1 EXCAVATION .1 Site excavation to consist of the removal of all material and substrate bottom material to the excavation limits as indicated on the drawing and as directed by the Departmental Representative.

.2 Contractor to submit excavation method adjacent to existing wharf structures. Method to define protection of existing structures and foundations.

3.2 Backfilling .1 Do not proceed with backfilling operations until the Departmental Representative has inspected and approved areas to be backfilled.

.2 Install filter fabric on back side of panels and on top of existing fill material as shown.

.3 Place R5 random rip-rap backfill material into the bottom of the backfilled areas. Backfilling below LNT and up to 400 mm above LNT may be end dumped.

- 3.2 Backfilling
(Cont'd)
- .4 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
 - .5 Do not use backfill material which is frozen or contains ice, snow or debris.
 - .6 Place backfill material in uniform layers not exceeding 300 mm compacted thickness. Compact each layer to create a firm, dense and rigid base before placing succeeding layer.
 - .7 When using hand operated tamping devices, place backfill material in layers not exceeding 100 mm in thickness.
 - .8 Backfilling around installations.
 - .1 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
 - .9 Place backfill material in uniform layers simultaneously on sides of the tie-back anchor blocks so that loading is equivalent.

- 3.3 Granular Base
- .1 Do not place granular base until sub-base surface is compacted, inspected and approved.
 - .2 Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow and ice.
 - .3 Place materials to the lines, grades, and depths as indicated on Plan or as directed by the the Departmental Representative.
 - .4 Remove and replace portion of work in which material becomes segregated during spreading.
 - .5 Compact to a density not less than 98% of maximum dry density ASTM D698-12, (AASHTO T99-10, Method D).
 - .6 Shape and roll alternately to obtain a smooth, even and uniformly compacted base.
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| 3.3 Granular Base
(Cont'd) | .7 | Apply water as is necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected. |
| | .8 | In areas not accessible to rolling equipment, compact to required density with approved mechanical tampers. |
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| 3.4 Granular
Sub-Base | .1 | Do not place granular sub-base until finished sub-grade is inspected and approved by the Departmental Representative. |
| | .2 | Place material only on a clean unfrozen surface, properly shaped and compacted and free from snow and ice. |
| | .3 | Begin spreading sub-base material on a crown line or high side of a one way slope. |
| | .4 | Place material in uniform layers not exceeding 150mm when compacted or to such other depth as approved by the Departmental Representative. |
| | .5 | Shape each layer to a smooth contour and compact to specified density before a succeeding layer is placed. |
| | .6 | Remove and replace portion of a layer in which material has becomes segregated during spreading. |
| | .7 | Compact to 95% maximum density, AASHTO T99-10, Method D except last 150mm up to subgrade elevation. Compact last 150mm to 100% maximum density, AASHTO T99-10, Method D. |
| | .8 | Shape and roll alternately to obtain a smooth, even and uniformly compacted sub-base. |
| | .9 | Apply water as is necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected. |
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3.4 Granular Sub-Base <u>(Cont'd)</u>	.10	In areas not accessible to rolling equipment, compact to required density with approved mechanical tampers.
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<u>3.5 Restoration</u>	.1	Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21.
	.2	Remove surplus materials and debris and correct defects noted by the Departmental Representative.

PART 1 - GENERAL

1.1 Description .1 This section specifies requirements for the supply and installation of synthetic non-woven filter fabric and geogrid to be used as shown no drawings.

1.2 RELATED SECTIONS .1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

1.3 MEASUREMENT PROCEDURES .1 Supply and installation of filter fabric and geogrid of surface covered as shown on drawings will be measured as a fixed price item.

.2 Damaged material shall be replaced at no cost to the owner.

.3 No extra payment will be made for overlapping of fabric i.e. overlaps are measured as a single layer of fabric.

1.4 REFERENCES .1 American Society for Testing and Materials International, (ASTM)

.1 ASTM D 4491-99a, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

.2 ASTM D 4595-11, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

.3 ASTM D 4751-12, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-4.2 No. 11.2-M89(April 1997), Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).

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| <u>1.4 REFERENCES</u>
(Cont'd) | .2 | (Cont'd) |
| | .2 | CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes. |
| <u>1.5 SUBMITTALS</u> | .1 | Submit samples in accordance with Section 01 33 00 - Submittal Procedures. |
| | .2 | Submit to the Departmental Representative the following at least 2 weeks prior to beginning Work. |
| | .1 | manufactures specifications on the proposed materials to be used. |
| | .2 | samples of proposed materials. |
| <u>1.6 DELIVERY, STORAGE AND HANDLING</u> | .1 | During delivery and storage, protect geotextiles from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris and rodents. |
| <u>1.7 WASTE MANAGEMENT AND Disposal.</u> | .1 | Separate waste materials for reuse and recycling in accordance with Section 01 74 21. |
| | .2 | Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material. |
| | .3 | Fold up metal banding, flatten and place in designated area for recycling. |

PART 2 - PRODUCTS

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| <u>2.1 Filter Fabric</u> | .1 | Non-woven synthetic fibre fabric, rot proof, unaffected by action of oil or salt water and not subject to attack by marine life, insects or rodents to be supplied in rolls. |
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- 2.1 Filter Fabric (Cont'd)
- .2 Fabric to be of non woven construction supplied in rolls of minimum 3.0 metres width, minimum thickness of 4.0 mm and to the following properties or equivalent:
 - .1 Mass(g/m²) 250 to 270
 - .2 Tear (N) 500
 - .3 Tensile Strength (N) 950
 - .4 Elongation at Break(%) 70-100
 - .5 Mullen Burst Strength (kPa) 2500
 - .6 Opening Size (um) 50 to 150
 - .7 Permeability (K cm s⁻¹) 2.7x10⁻¹.
 - .3 Factory seams: sewn in accordance with manufacturer's recommendations.
 - .4 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.
- 2.2 Geogrid
- .1 Geogrid: open grid polymer having biaxial orientation, free of striations, roughness, pinholes, blisters, undispersed raw materials or any sign of contamination by foreign matter.
 - .1 Roll width: 4 m minimum.
 - .2 Roll length: 5 m minimum.
 - .3 Rib thickness: 2.2 mm minimum.
 - .4 Junction thickness: 5 mm minimum.
 - .5 Aperture size:
 - .1 Machine direction: 39 mm.
 - .2 Cross machine direction: 39 mm.
 - .6 Polymer: polypropylene: to ASTM D 4101-02b with inhibitors added to resist deterioration by ultra-violet and heat exposure.
 - .2 Geogrid physical properties:
 - .1 Peak tensile strength: to GRI GG1. (Geosynthetic Research Institute).
 - .1 Machine direction: minimum 30 kN/m.
 - .2 Tensile secant modulus at 2% elongation: to GRI GG1, minimum 10.5 kN/m.
 - .3 Carbon black content: to ASTM D 4218-96(2001), minimum 2 %.
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PART 3 - EXECUTION

- 3.1 INSTALLATION
- .1 Place geotextile material by unrolling in orientation, manner and locations indicated and retain in position with securing pins and washers or weights.
 - .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
 - .3 Overlap each successive strip of geotextile 600 mm over previously laid strip.
 - .4 Pin successive strips of geotextile with securing pins as recommended by manufacturer.
 - .5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material.
 - .6 Replace damaged or deteriorated geotextile to approval of Departmental Representative .

PART 1 - GENERAL

1.1 RELATED
SECTIONS

- .1 Section 31 62 16.16 - Steel H-Piles.

1.2 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: submit manufacturer's printed product literature, specifications and datasheet.
- .3 Spliced piles are not permitted.
- .4 Quality assurance submittals:
.1 Test reports: submit 3 copies of certified test reports for piles from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.3 DELIVERY,
STORAGE AND
HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's instructions.
- .2 Protect piles from damage due to excessive bending stresses, impact, abrasion or other causes during delivery, storage and handling.
- .3 Piles damaged by the contractor will be replaced as directed by the Departmental Representative at contractor's cost.
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- 1.4 EXISTING CONDITIONS
- .1 Sub-surface investigation report is available for viewing at PWGSC office 4th floor Unit 100, 1045 Main Street, Moncton, N.B., during the following business hours: 8:30 to 12:00 noon and from 13:00 to 16:00, Monday to Friday. Contact the Department Representative.
 - .2 Any information pertaining to soils and all borehole logs are furnished by the Departmental Representative as a matter of general information only. Borehole descriptions shown on the logs are only descriptive of conditions at locations described by the boreholes themselves.
 - .3 The Contractor must make his own evaluation of soil conditions.

- 1.5 SCHEDULING
- .1 Provide schedule of planned sequence of pile installation to Departmental Representative for review, not less than two weeks prior to commencement of pile driving.

PART 2 - PRODUCTS

- 2.1 MATERIALS
- .1 Supply full length steel H-piles as per section 31 62 16.16 and provide equipment to handle full length piles without cutting and splicing.

- 2.2 EQUIPMENT
- .1 Prior to pile installation, submit to Departmental Representative for review, details of equipment and method for installation of piles.
 - .1 Contractor may set H-piles into sandstone bedrock by driving or pre-drilling 600mm diameter holes filled with concrete.
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- 2.2 EQUIPMENT
(Cont'd)
- .2 Impact hammers: provide manufacturer's name, type, rated energy per blow at normal working rate, mass of striking parts of hammer, mass of driving cap and type and elastic properties of hammer and pile cushions.
 - .3 Non-impact methods of installation such as augering, jacking, vibratory hammers or other means: provide full details of characteristics necessary to evaluate performance.
 - .4 Hammer:
 - .1 When required criteria can not be achieved with the proposed hammer, use larger hammer and take other measures as required.

PART 3 - EXECUTION

- 3.1 PREPARATION
- .1 Protection:
 - .1 Protect adjacent structures, services and work of other sections from hazards due to pile driving operations.
 - .2 Arrange sequencing of pile installation operations and methods to avoid damages to adjacent existing structures.
 - .3 When damages occur, remedy damaged items to restore to original or better condition at own expense.
 - .2 Ensure that structures and ground conditions at pile locations are adequate to support pile installation operation.
 - .1 Make provision for access and support of piling installation equipment during performance of Work.
 - .2 Contractor to assess state of access structure(s) for load carrying capability.

- 3.2 INSTALLATION
- .1 The steel H-piles are to be installed true and plumb along the baseline as shown on drawings. H-piles may be set by either driving or pre-drilling into bedrock.
 - .1 **Driving;**
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- 3.2 INSTALLATION .1 (Cont'd)
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- (Cont'd) .1 (Cont'd)
- .1 Leads: construct pile driver leads to provide free movement of hammer.
 - .1 Hold leads in position at top and bottom, with guys, stiff braces, or other means to ensure support to pile while being driven.
 - .2 Length: except for piles driven through water, provide sufficient length of leads to ensure that use of follower is unnecessary.
 - .3 Swing Lead:
 - .1 Obtain approval from Departmental Representative prior to using swing leads.
 - .2 Firmly guy top and bottom to hold pile in position during driving operation.
 - .2 Use driving caps and cushions to protect piles.
 - .1 Reinforce pile heads as required by Departmental Representative.
 - .2 Piles with damaged heads as determined by Departmental Representative will be rejected.
 - .3 Deliver hammer blows along axis of pile.
 - .4 Restrike already driven piles lifted during driving of adjacent piles to assure set.
 - .1 All piles should be re-tapped 24 hours after the end of initial drive.
 - .5 Cut off piles neatly and squarely at elevations as indicated on drawings.
 - .1 Provide sufficient length above cut-off elevation so that part damaged during driving is cut off.
 - .6 Installation of each pile will be subject to review of Departmental Representative.
 - .1 Departmental Representative will be sole judge of acceptability of each pile with respect to final driving resistance, depth of penetration or other criteria used to determine load capacity.
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- 3.2 INSTALLATION .1 (Cont'd)
- (Cont'd) .1 (Cont'd)
- .2 Departmental Representative to review final driving of all piles prior to cutting and removal of pile driving rig from site
- .2 **Pre-Drilling;**
- .1 Pre- drilling a 600 mm diameter (minimum) sockets by the full embedment length of the piles into bedrock, to achieve satisfactory plumpness and the depth shown on plan.
- .2 All piles are to be installed a minimum of 1.5 meters into the bedrock unless noted otherwise as shown on the drawings. The bottom elevations may vary depending on the exact location of the bedrock.
- .3 Hold piles securely and accurately in position while installation.
- .4 Cut off piles neatly and squarely at elevations indicated.
- .5 Remove cut-off lengths from site on completion of work.
- 3.3 Field Measurements .1 Maintain accurate and daily records of each pile, including:
- .1 Pile size and length, location of pile in pile group, and location or designation of pile group.
- .2 Toe elevation upon termination of installation of pile and cutoff elevations upon completion of pile group.
- .3 Other pertinent information, such as interruption, observed pile damage, etc.
- .4 Type and make of hammer, rated energy, observed stroke, and observed number of blows per minute.
- .5 Other installation equipment including details on use of pile cushion, follower, etc.
- .6 Time for start and finish of driving pile and sequence of pile driving for piles in group.
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- 3.3 Field Measurements (Cont'd)
- .1 (Cont'd)
- .7 Penetration for own weight and weight of hammer, number of blows per meter of penetration from start of driving and numbers of blows per 100 mm for the last meter.
- .8 Records of elevations of adjacent piles before and after driving of pile.
- 3.4 Driving Criteria
- .1 Installation of each pile will be subject to approval of Departmental Representative, who will be sole judge of acceptability of pile with respect to final penetration resistance, depth of penetration, or other criteria. Departmental Representative to approve final penetration resistance of all piles prior to removal of pile driving equipment from site.
- .2 Each pile shall be installed as shown. Do not overdrive to cause damage to piles.
- .3 Departmental Representative will determine refusal criteria for piles.
- .1 Steel H-Piles: Drive each pile a minimum of 1.5 metres into the sandstone bedrock layer as indicated unless noted otherwise. Supply hammer of suitable size (minimum 100,000 joules energy) to advance the piles into substrate as indicated.
- 3.5 OBSTRUCTIONS
- .1 Where obstruction is encountered that causes sudden unexpected change in specified tolerances, proceed as directed by Departmental Representative.
- 3.6 REPAIR AND RESTORATION
- .1 Pull out rejected piles and replace with new piles.
- .2 No extra compensation will be made for removing and replacing or other work made necessary through rejection of defective piles.

PART 1 - GENERAL

1.1 RELATED
SECTIONS

- .1 Submittal Procedures: Section 01 33 00
- .2 Underwater Placed Concrete: Section 03 37 26
- .3 Miscellaneous Metals: Section 05 50 00
- .4 Pile Foundation, General Requirements: Section 31 61 13
- .5 New Berlin Wall: Section 31 63 26.16

1.2 Delivery and
Handling

- .1 Protect piles from damage due to excessive handling during delivery, storage and bending stress, impact, abrasion or other causes handling.

1.3 MEASUREMENT
PROCEDURES

- .1 Steel H-Piles: The supply and installation of steel H-piles needed for this work will be paid by the linear meter of piling acceptably incorporated in the work, following trimming and cutting of the piles. Measurement will be taken from final pile tip to top of pile elevation remaining in the work. The additional pile at corners will also be measured for payment. Welding will be considered incidental.
 - .1 H-piles may be set into sandstone bedrock by either driving or pre-drilling 600mm diameter holes filled with concrete. Either method will be paid at tendered rate with no additional compensation for method chosen.
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1.3 MEASUREMENT PROCEDURES <u>(Cont'd)</u>	.1 (Cont'd) .1 (Cont'd) .1 Pre-drilling; will include all equipment, labour and material for pre-drilling 600 mm diameter holes by the full embedment length of the piles into bedrock strata as shown, the supply and installation of underwater concreting and any additional excavation material required to carry out the work. Material excavated will be disposed as described in section 01 74 21. .2 The supply and installation of all miscellaneous steel cover plates, welding of corner piles will be considered incidental to this section. Clip steel angles will be included under section 31 63 26.16.
1.4 REFERENCES <u></u>	.1 Canadian Standards Association (CSA International) .1 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel Structures. .2 CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
1.5 SUBMITTALS <u></u>	.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures. .2 Quality Assurance: .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
1.6 WASTE MANAGEMENT AND DISPOSAL <u></u>	.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.

PART 2 - PRODUCTS

- 2.1 MATERIALS
- .1 Steel H piles: to CSA-G40.20/G40.21, Grade 350.
 - .1 Size and weight as indicated.
 - .2 Minimum lengths: Contractor is responsible to order required pile lengths to complete the work as shown.
 - .2 Welding materials: to CSA W48.
 - .3 Do not splice piles.

PART 3 - EXECUTION

- 3.1 INSTALLATION
- .1 The steel H-piles are to be installed true and plumb along the baseline as shown on drawings.
 - .2 Hold piles securely and accurately in position while installation.
 - .3 Prior to commencement of pile installation operation, submit to the Departmental Representative for approval, details of equipment and method to be used for the installation of piles.
 - .4 Cut off piles squarely at required elevation.

- 3.2 Tolerances
- .1 H-piles are to be install as shown on the plans and specified herein.
 - .2 Deviations from the vertical in any direction shall not exceed 1 to 50 for all piles.
 - .3 Piles must be install in such a manner so the face of the wharf is straight. Maximum rotation tolerance about axis of pile layout to be ± 10 .
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- 3.2 Tolerances
(Cont'd)
- .4 The piles at the mud line to be within ± 30 mm of the location indicated on the drawing for the direction parallel to the wharf, with no two adjacent piles having a centerline spacing less than 2500 mm unless otherwise indicated. Tolerance at the top of the wharf will be ± 15 mm.
- .5 Pile heads to be within 20 mm of the location indicated on the drawing.
- 3.3 WELDING
- .1 Weld to CSA W59.
- .2 Welding certification of companies: to CSA W47.1.
- 3.4 RECORDS
- .1 Keep complete and accurate record of each pile driven/installation.
- .2 Indicate:
- .1 Pile location.
 - .2 Deviations from design location.
 - .3 Cross section shape and dimensions.
 - .4 Original length.
 - .5 Ground elevation.
 - .6 Tip elevation.
 - .7 Cutoff elevation.
- 3.5 CLEANING
- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

PART 1 - GENERAL

<u>1.1 Definition</u>	.1	This section specifies the requirements for supply and installation of the Berlin Wall Construction.
<u>1.2 Related Work</u>	.1	Submittal Procedures Section 01 33 00
	.2	Environmental Protection Section 01 35 44
	.3	Excavating, Trenching and Backfilling Section 31 23 10
	.4	Steel H-Piles Section 31 62 16.16
	.5	Concrete Reinforcement Section 03 20 00
	.6	Structural Concrete Section 03 30 00
	.7	Miscellaneous Metals: Section 05 50 00
<u>1.3 Measurement for Payment</u>	.1	<p>New Berlin Wall: The supply and installation of the new Berlin Wall Construction as shown including all material, equipment and labour to complete the work under this section will be a Fixed price item. This will include:</p> <p>.1 Concrete Panels and anchor blocks: The supply and installation of the reinforced concrete panels (plain and ladder panels), and anchor blocks, all labour, equipment and materials for the completion of the work. Curing will be considered incidental to this work. Price will also include the supply and placement of "Lifting Anchors" and grout bags to seal voids under panels. Concrete used in the casting of concrete cylinders for testing will not be measured for payment but will be considered incidental to the work. There will be no additional payment for enclosures or heating of enclosures to complete cast in place concrete or precast concrete work.</p>

1.3 Measurement for .1	(Cont'd)
Payment	.2 Ladders: the supply and installation of all the steel components and inserts as shown to complete the ladder units, and modification to reinforcing bars and formwork of concrete panels to accommodate ladder unit will be considered incidental to this section. Two(2) holdfasts per ladder as shown will be included under this section. Galvanizing of all ladder components will be incidental to this section.
(Cont'd)	.3 Steel Angles or clips: The supply and installation of all the steel angles or clips, and miscellaneous steel required to complete the work for the Berlin Wall as shown will be considered incidental to this section. The welding, cutting, drilling and other work necessary to complete the project will also be considered incidental to this Section.
	.4 Steel tie rod, Washers and nuts: The supply and installation of all the tie-rods, washers, nuts, bearing plates and miscellaneous steel for connections to H-piles required to complete the work for the Berlin Wall will be considered incidental to this section. The welding, cutting, drilling and other work necessary to complete the project will also be considered incidental to this Section.
	.5 Other Miscellaneous steel: The supply and installation of all other miscellaneous steel and any other associated hardware to complete the work for the Berlin Wall as indicated.

PART 2 - PRODUCTS

<u>2.1 Steel H-piles</u>	.1	The supply of steel H-piles for the construction of Berlin Wall must meet the requirements of Section 31 62 16.16.
<u>2.2 Steel Angles, Tie-Rods, and Miscellaneous Steel</u>	.1	The supply of steel angles, as shown on plan, must meet the requirements of Section 05 50 00.

2.3 Concrete Panels And Anchor Blocks .1 The supply of concrete panels and anchor wall, as shown on plan, must meet the requirements of Section 03 30 00.

2.4 Lifting Anchors .1 'Swift Lift' anchors (recessed) as per Manufacturer's recommendation; Dayton Superior or equivalent.
.1 Supply shop drawings for review.

PART 3 - EXECUTION

3.1 Installation .1 The installation of the steel H-piles, steel angles, tie-rods, concrete panels and anchor blocks for the construction of the Berlin Wall must be carried out in accordance with their applicable Sections.

3.2 Lifting Anchors .1 Submit to the Departmental Representative the method for lifting the Pre-Cast Concrete panels and anchor blocks for review.