

EXCAVATION AND BACKFILLING FOR STRUCTURES

1. GENERAL

1.1 Work Included

- .1 Work under this Section includes, but is not necessarily limited to, the following items:
 - .1 Excavation to required elevations for the base slabs and footings.
 - .2 Supply and placement of granular levelling material below void form.
 - .3 Supply, placement, and compaction of backfill and fill materials to attain indicated grades and profiles.
 - .4 Disposal of surplus excavated material.
 - .5 Dewatering of excavations.

1.2 Reference Standards

- .1 Conform to requirements of the NBC and the Canadian Construction Safety Code.
- .2 Comply with excavation and trenching regulations of Provincial authorities.

1.3 Submittals

- .1 Submit Shop Drawings in accordance with Section 01300 – Submittals.
- .2 If shoring, bracing, or sheet piling are used, submit design documentation signed and sealed by a qualified Professional Engineer registered in the Province of Manitoba.

1.4 Samples

- .1 For granular materials, submit a 25 kg sample for coarse, gravelly soil or 75 kg sample for coarse, crushed stone of each type, clearly labelled for type and source of the materials, for analysis by testing laboratory. Ship samples prepaid or deliver in tightly closed containers to testing laboratory designated by Contract Administrator.
- .2 There shall be no charge for any materials taken by the Contract Administrator for testing purposes.
- .3 All materials shall be reviewed and accepted by the Contract Administrator at least ten (10) days before any construction is undertaken.
- .4 Costs for analysis will be paid by the City.

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1.5 Compaction Testing

- .1 Testing of compacted fill materials will be performed by an independent inspection and testing firm appointed and paid by the City. Testing will be performed so as to least encumber the performance of the Work.
- .2 The City will pay for the first series of tests only, on the area being evaluated. Pay costs for additional testing, if required, due to improper performance of Work.
- .3 Tests will be performed in accordance with ASTM D698 for Standard Proctor Density on representative samples to control compaction requirements. The Contract Administrator will decide the frequency and number of tests required.
- .4 The field density of the compacted layers shall be verified by field density tests in accordance with ASTM D2922, using nuclear methods performed by the inspection and testing firm. The frequency and number of tests required will be decided by the Contract Administrator.
- .5 Notify the Contract Administrator when Work of this Section or portions of Work are completed to own satisfaction. Do not proceed with additional portions of Work until test results have been verified and accepted.
- .6 If tests indicate that compacted materials do not meet specified required materials, remove defective Work, replace, and re-test at own expense as directed by the Contract Administrator.
- .7 Ensure compacted fills are tested and accepted before proceeding with placement of surface materials.

1.6 Geotechnical Information

- .1 Refer to Specification E2 for a list of test hole logs and reports available associated with the Site.

2. PRODUCTS

2.1 General

- .1 All materials to be subject to Contract Administrator's acceptance.
- .2 Granular materials to be composed of sound, hard, uncoated particles, free from injurious quantities of clay, flaky particles, soft shale, friable materials, roots, vegetable matter, and frozen lumps.
- .3 Grading of granular materials to show no marked fluctuations between opposite ends of extreme limits.

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- .1 Type 1: pit run granular backfill shall consist of a clean, well-graded, and free-draining pit run material with a maximum size of 75 mm, and less than 5% by weight finer than 0.075 mm.
- .2 Type 2: crushed gravel graded within following limits:

Canadian Metric Sieve Size	Percent Passing	
	Crushed Granular	Crushed Limestone
25,000	100	-
20,000	80 - 100	100
5,000	40 - 70	40 - 70
2,500	25 - 55	25 - 60
315	13 - 30	8 - 25
80	5 - 15	6 - 17

At least 60% of material retained on 5 mm sieve to have at least one (1) freshly fractured face.

- .4 Type 3: pit run sand for levelling with maximum stone size 40 mm.
- .5 Type 4: common clay backfill shall be free from organic material and rocks larger than 150 mm in size and building debris. Fill under landscaped areas to be free from alkali, salt, petroleum products and other materials detrimental to plant growth. Common backfill shall be obtained from Disposal Sites 1 and 2 indicated on the Drawings subject to review by Contract Administrator.

3. EXECUTION

3.1 Finish Elevations and Lines

- .1 For setting and establishing finish elevations and lines, secure the services of a registered surveyor or experienced instrumentman acceptable to the Contract Administrator.
- .2 Carefully preserve all data and all monuments set by the registered surveyor. If displaced or lost, immediately replace to the acceptance of the Contract Administrator, at no additional cost to the City.

3.2 Excavation

- .1 Perform excavation in strict compliance to Work Place Safety and Health and authorities have jurisdiction.
- .2 Excavate to noted limits and as required for walls and foundations. Stockpile material to be used for backfilling on-site as directed by the Contract Administrator. Excess material is to be disposed of immediately as per Item 3.6, Disposal.
- .3 When complete, request Contract Administrator to review excavations.

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- .4 Local pockets of material which, in the opinion of the Contract Administrator are unsuitable, shall be removed to such depths as required by the Contract Administrator.
- .5 The completed excavation shall provide clean, level, solid, and water-free surfaces at the required elevations, ready to receive construction.
- .6 Excavations are not to encroach on existing slopes and as indicated in the geotechnical information.
- .7 Backfill and compact all over-excavated areas under structure surfaces with Type 1 fill and compact to 90% Standard Proctor Density and at no additional cost to the City.
- .8 Make good all damage occurring as a result of inadequate, unauthorized, or defective methods of protection.
- .9 Areas used for temporary stockpiling shall be restored to existing condition or better.

3.3 Shoring, Bracing, and Sheet Piling

- .1 Supply and install all shoring, bracing, and sheet piling required to prevent injury to personnel and damage to existing structures and excavations, and where necessary for safe work within the excavated areas.
- .2 Comply with all applicable rules and regulations of governmental authorities.
- .3 Erect shoring, bracing, and sheet piling independent of utilities and structures.
- .4 Prefabricated cages or shields may be used to supplement or replace conventional shoring, provided they comply with all applicable safety regulations and permit placing and compacting of backfilling material around new construction.
- .5 Maintain shoring, bracing, and sheet piling during backfilling and remove in stages as backfilling progresses.
- .6 Remove all shoring, bracing, and sheet piling unless otherwise permitted by the Contract Administrator.
- .7 If shoring, bracing, and sheet piling are allowed to remain, cut off to an elevation at least 1,000 mm below finish grade and structures.
- .8 Assume full responsibility for any failure, collapse, or movement of existing structures, shoring, bracing, sheet piling, earth banks, trenches, and other excavations.

3.4 Dewatering

- .1 Provide Site drainage and dewatering around the structures in accordance with Specification E7.

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3.5 Backfilling, Fill, and Compaction

- .1 Preparation
 - .1 Ensure areas to be backfilled are free from debris, snow, ice, and water and that ground surfaces are not in a frozen condition.
- .2 Backfilling and Filling
 - .1 Backfill and fill to grades, contours, levels, and elevations indicated on Drawings.
 - .2 Do not backfill against foundation walls until the perimeter drainage system has been installed and accepted by the Contract Administrator.
 - .3 Do not backfill against foundation walls until the floor slab framing into the walls has been completed and without the prior permission of the Contract Administrator. The wall concrete must have attained the twenty eight (28) day minimum compressive strength and the slab concrete must have attained 75% of the twenty eight (28) day minimum compressive strength before backfilling.
 - .4 Maintain optimum moisture content of materials to permit compaction to specified densities.
 - .5 Compact each soil layer to at least the specified minimum degree; repeat compaction process until plan grade is attained. Compaction densities indicated herein are based on ASTM D698 for Standard Proctor Density.
- .3 Bedding over Sub-Grade
 - .1 Type 1 pit run gravel fill for over excavation shall be placed in uniform lifts not greater than 200 mm in thickness and shall be compacted to a density of at least 95% Standard Proctor Density.
 - .2 Type 3 pit run sand for the levelling layer shall be spread on the subgrade in varying thickness as required (nominal 50 mm) to attain smooth surfaces and required elevations indicated on the Drawings for the placement of the voidform under the footings and base slabs.
- .4 Backfill around Structure Walls
 - .1 Type 1 pit run gravel fill and Type 4 common clay backfill shall be placed in lifts not greater than 200 mm in thickness to the extents shown on the Drawings and shall be compacted to a density of at least 95% Standard Proctor Density to allow equipment tractability and limit settlement, but not result in a significant decrease in permeability of the Type 1 pit run gravel.

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- .2 Successive lift placement of Type 1 and Type 4 shall be coordinated so that the maximum difference in the elevations of the respective working surfaces shall not exceed 200 mm.
 - .3 The top three layers of Type 4 common clay fill shall be placed in lifts not great than 150 mm in thickness and each compacted lift shall be scarified a minimum of 50 mm prior to placement of successive lifts to ensure adequate bonding between each lift. A homogeneous, continuous, low permeability zone of impervious clay shall be achieved, free from any clay lumps, cracks, rutting, or deleterious material, to the satisfaction of the Contract Administrator.
 - .4 Type 2 crushed gravel under concrete slabs on grade shall be placed in uniform lifts not greater than 150 mm in thickness and shall be compacted to a density of at least 100% Standard Proctor.
 - .5 Care shall be taken when placing fill materials immediately adjacent to the structure to ensure no damage occurs to the wall and any covering materials. Any damage shall be repaired by the Contractor at his expense.
- .5 Sub-drain
- .1 Requirements for the sub-drain coarse granular drainage material for the perimeter and roof are specified in Section 02620 – Sub-Drainage.

3.6 Disposal

- .1 Surplus material not required for backfill and fill purposes shall be disposed of on Site to a location designated by the Contract Administrator at no extra cost to the City.

3.7 Clean-Up

- .1 As excavation proceeds, keep roads, streets, and sidewalks clean of dirt and excavated material.
- .2 Clean-up and wash down to remove all dirt and excavated materials caused by Work of this Section.
- .3 Clean at the end of each working day.

END OF SECTION

PILE FOUNDATIONS, GENERAL

1. GENERAL

1.1 Work Included

- .1 Supply, pick-up, delivery, and installation of precast concrete piles.

1.2 Storage, Handling, and Installation

- .1 Protect piles from damage due to excessive bending stresses, impact, abrasion, or other causes from point of pick-up and during storage and handling. Install piles to stated driving tolerances.
- .2 The Contract Administrator shall be the sole judge of the acceptability of supplied piles.
- .3 Replace rejected piles to satisfaction of Contract Administrator. Causes for pile rejection are as follows:
 - .1 Out of fabrication tolerances at time of installation
 - .2 Cracked, spalled, or broken piles
 - .3 Out of stated driving tolerances

1.3 Geotechnical Information

- .1 Refer to Specification E2 for a list of test hole logs and reports available associated with the Site.
- .2 Notify Contract Administrator in writing if subsurface conditions at Site differ materially from those indicated and await further instructions from Contract Administrator.

2. PRODUCTS

2.1 Materials

- .1 Piles shall be fabricated and supplied as specified in Section 02468 – Precast Concrete Piles.
- .2 Piles shall be fabricated full length piles without cutting and splicing requirements. Contractor shall provide equipment to handle full length piles.
- .3 If pile extensions are required and allowed by the Contract Administrator, the pile extensions shall be constructed in accordance with the details shown on the Drawings.

PILE FOUNDATIONS, GENERAL

3. EXECUTION

3.1 Delivery, Storage, and Handling

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

3.2 Equipment

- .1 Prior to the commencement of pile installation, submit details of equipment for installation of piles to Contract Administrator for review.

.2 Hammer:

- .1 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.
- .2 Hammers with proven performance in local conditions for piles of the same size specified for this Work will be accepted for use on this Work. For other hammers the driveability analysis as outlined in the following paragraphs shall be submitted to the Contract Administrator for review prior to driving piles.
- .3 Hammers to be selected on the basis of driveability analysis using wave equation theory, performed to show that piles can be driven to levels indicated.
- .4 The driveability analysis shall include, but not be limited to, the following: hammer, cushion, and capblock details; static soil parameters; quake and damping factors, total soil resistance, blow count, pile stresses, and energy throughput at representative penetrations.
- .5 Driveability analysis shall be submitted to the Contract Administrator for review of the hammer or hammers.
- .6 When required criteria cannot be achieved with the proposed hammer, use larger hammer and take other measures as required.

- .7 Drop hammers are not permitted.

.3 Leads:

- .1 Construct pile driver leads to provide free movement of hammer. 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: provide length of leads so that use of a follower is unnecessary.
- .3 Swing leads: firmly guy top and bottom to hold pile in position during driving operation.

PILE FOUNDATIONS, GENERAL

.4 Followers:

- .1 When permitted, provide followers of such size, shape, length, and mass to permit driving pile in desired location to required depth and resistance.
- .2 Provide followers with socket or hood carefully fitted to top of pile to minimize loss of energy and prevent damage to pile.

3.3 Preparation

- .1 Ensure that ground conditions at pile locations are adequate to support pile driving operation and load testing operation. Make provision for access and support of piling equipment during performance of work.
- .2 Pre-bore with a 400 mm diameter auger bit to a depth no lower than elevation 224.600.

3.4 Field Measurement

- .1 Contractor shall cooperate with the Contract Administrator and shall allow access during the pile installation operations so that all the field measurements can be performed expeditiously.
- .2 Field measurements for each pile will include:
 - .1 Type and make of hammer, stroke, and related energy
 - .2 Other driving equipment including water jet, driving cap, and cushion
 - .3 Pile size and length, location of pile in pile group, and location or designation of pile group
 - .4 Sequence of driving piles in group
 - .5 Number of blows per 25 mm for last 150 mm
 - .6 Initial tip, final tip, and cut-off elevations
 - .7 Re-driving records
 - .8 Other pertinent information such as interruption of continuous driving and pile damage
 - .9 Record elevation taken on adjacent piles during, before, and after driving of each pile

3.5 Driving

- .1 Drive precast piles only when concrete has attained strength of 35 MPa as determined by related concrete compression testing in accordance with CAN/CSA A23.2-00. Use driving caps and cushions to protect piles. Reinforce pile heads as required by Contract

PILE FOUNDATIONS, GENERAL

Administrator. Piles with damaged heads as determined by Contract Administrator will be rejected.

- .2 Hold piles securely and accurately in position while driving.
- .3 Deliver hammer blows along axis of pile.
- .4 Drive piles to practical refusal, as outlined in the geotechnical information. Blow count requirements shall be determined by the Contract Administrator. If followers are used, established criteria for refusal will be increased by 50%.
- .5 When driving piles, adjust hammer as required to deliver reduced impact, so that reflected tensile stress in pile does not exceed allowable.
- .6 Do not drive piles within 10 m of masonry or concrete that has been in place less than seven (7) calendar days. Do not drive piles within 30 m of masonry or concrete that has been in place less than one calendar (1) day.
- .7 Re-strike already driven piles lifted during driving of adjacent piles to confirm and assure set.
- .8 Remove loose and displaced material from around piles after completion of driving, and leave clean, solid surfaces to receive foundation concrete.
- .9 Cut off piles neatly and squarely at elevation ranges as indicated on the Drawings. Final cut off elevations will be confirmed during construction. Provide sufficient length above cut-off elevation so that the part damaged during driving is cut off. Do not cut tendons or other reinforcement which will be used to tie supported structure above to pile. A minimum of 450 mm of strands shall remain for this purpose. The cut off surface of the piles shall be mechanically chipped to expose sound concrete.
- .10 Remove cut-off lengths from site on completion of work.

3.6 Design Load Capacity

- .1 Allowable design load capacity of piles at specified loads is:
 - .1 400 millimetres diameter hex - 800 kN
- .2 Installation of each pile will be subject to the review of the Contract Administrator. Contract Administrator will be the sole judge of acceptability of each pile with respect to final driving resistance, depth of penetration, or other criteria used to determine load capacity. Contractor shall allow Contract Administrator to review final driving of all piles prior to removal of pile driving rig from Site.

PILE FOUNDATIONS, GENERAL

3.7 Driving Tolerances

- .1 Pile heads shall be within ± 100 mm of locations as indicated.
- .2 Piles shall not to be more than 2% of length out of vertical alignment.

3.8 Obstructions

- .1 Where obstruction is encountered that causes sudden unexpected change in penetration resistance or deviation from specified tolerances, proceed as directed by the Contract Administrator.

3.9 Repair/Restoration

- .1 The Contract Administrator may require one (1) or more of the following remedial measures:
 - .1 Remove rejected pile and replace with a new, and if necessary, a longer pile
 - .2 Remove rejected piles, fill holes, and replace with new piles
 - .3 Leave rejected piles in place and cut off as directed by Contract Administrator
 - .4 Leave rejected pile in place, place adjacent pile(s), and modify pile cap as directed by Contract Administrator
- .2 No extra compensation will be made for removing and replacing or other work made necessary through rejection of defective piles.

3.10 Protection

- .1 Protect adjacent structures, services, and Work of other Sections from hazards due to pile driving operations.
- .2 Arrange sequencing of pile driving operations and methods such that no damage occurs to adjacent existing structures. If damaged, remedy damaged items to restore to original or better condition at own expense.
- .3 Undertake review of all adjacent infrastructure with the Contract Administrator complete with a photographic record sufficient to establish pre-driving conditions of the existing adjacent infrastructure.
- .4 Protection for pile strand ends:
 - .1 Highly visible protection safety caps shall be installed for all pile reinforcing strand ends immediately following strand exposure operations. One (1) protection cap may be used for each pile by grouping and securely tying the strands.

PILE FOUNDATIONS, GENERAL

- .2 The protection caps shall be highly visible and shall be made secure so that accidental contact will not easily dislodge the caps. Dislodged caps shall be re-installed immediately.
- .3 Pile reinforcing strands shall be protected from severe bending. Kinked or broken strands shall be repaired to the satisfaction of the Contract Administrator.

END OF SECTION

PRECAST CONCRETE PILES

1. GENERAL

1.1 Work Included

- .1 Fabrication, storage, and loading of 400 mm diameter precast concrete piles.

1.2 References

.1 CSA

- .1 CAN/CSA-A23.1-00/A23.2-00, Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.
- .2 CSA A23.4, Precast Concrete – Materials and Construction.
- .3 CAN/CSA-A3000, Cementitious Materials Compendium (consists of A3001, A3002, A3003, A3004, and A3005).

.2 ASTM

- .1 ASTM A416/A416M, Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete.
- .2 ASTM C260, Standard Specification for Air-Entraining Admixtures for Concrete.

1.3 Shop Drawings

- .1 Submit Shop Drawings in accordance with Section 01300 – Submittals.
- .2 Each drawing submitted shall bear the signature and stamp of a qualified Professional Engineer registered in the Province of Manitoba.
- .3 Indicate the following items:
 - .1 Lifting point details and locations
 - .2 Storage support point locations
 - .3 Mechanical pile splice details complete with calculations
 - .4 Rock points
 - .5 Concrete strength
 - .6 Reinforcing details
 - .7 Type and grade of steel

PRECAST CONCRETE PILES

1.4 Certificates

- .1 Piles delivered to the Site to be certified by Manufacturer that each batch of piles to have strength of 35 MPa at twenty eight (28) days.

1.5 Review and Monitoring

- .1 Provide free access to all portions of Work and cooperate with testing and inspection firm retained and paid by the City.

2. PRODUCTS

2.1 Materials

- .1 Concrete mixes and materials: to CSA-A23.1-00 and CSA-A23.4.
- .2 Reinforcing steel: to CAN/CSA-G30.18.
- .3 Cold-drawn steel wire for concrete reinforcement: to ASTM A416/A416M.
- .4 Spiral reinforcing: 6 mm diameter hot-rolled rod conforming to Chemical Composition Specification C1008, minimum yield strength 250 MPa.
- .5 Supply or fabricate full length piles as indicated and provide equipment to handle full length piles without cutting and splicing.

2.2 Concrete Mixes

- .1 Proportion normal density concrete in accordance with CSA-A23.1-00, Alternative 1, to give following properties:
 - .1 Class of exposure: S-1
 - .2 Cement: Type 50 Portland Cement in accordance with CAN/CSA-A3000
 - .3 Minimum compressive strength at twenty eight (28) days: 35 MPa
 - .4 Maximum water to cementitious material ratio: 0.34
 - .5 Nominal size of coarse aggregate: 19 mm maximum
 - .6 Air content: 3 to 6%, to ASTM C260
 - .7 Chemical admixtures: in accordance with CAN/CSA-A3000
 - .8 Pozzolanic mineral admixtures: in accordance with CAN/CSA-A3000

PRECAST CONCRETE PILES

3. EXECUTION

3.1 Fabrication

- .1 Fabricate precast concrete piles to lengths as specified.
- .2 Fabricate piles to following finish tolerances:
 - .1 Length: ± 3 mm/m of length
 - .2 Cross section:
 - .1 Solid sections: - 5 to plus 10 mm
 - .2 Deviation from straight line: not more than 3 mm/m of length and not more than 10 mm in full length
 - .3 Deviation of reinforcing cage from true position: 10 mm
 - .4 Pile head: 10 mm/m from true right angle plane; surface irregularities 3 mm
 - .5 Location of reinforcing steel main reinforcing cover: - 3 to plus 5 mm; spiral: 10 mm
 - .6 Strand projection: strands shall be cut off flush or slightly below pile head surface for driving
- .3 Prestress piles under the direction of an experienced and competent supervisor. All personnel operating the stressing equipment shall have been trained in its use.
- .4 De-tension in a manner to keep eccentricity to a minimum.

3.2 Handling, Storage, and Delivery

- .1 Inspection of the fabricated product upon shipment and certification that the product is free from any damage or defects.
- .2 Replace damaged piles to satisfaction of Contract Administrator.
- .3 Protect piles from damage due to excessive bending stresses, impact, abrasion, or other causes during storage and handling.

END OF SECTION

PIPE CULVERTS

1. GENERAL

- .1 Culvert Installation shall for the GWWD Railway embankment shall be in accordance with Specification CW 3170-R3, "Installation of Culverts" except where noted, revised, or supplemented in this Specification.

2. PRODUCTS

2.1 General

- .1 The Contractor shall supply railway ballast in accordance with the requirements hereinafter specified.
- .2 Railway ballast shall be composed of hard, strong and durable particles, clean and free from injurious amounts of deleterious substances and conforming to the following requirements of this Specification
 - .1 The limits for deleterious substances are as follows:

.1 Soft and friable pieces	5.0%
.2 Material finer than No. 200 Sieve	2.0%
.3 Clay lumps	0.5%
 - .3 The percentage of wear shall be less than 32%, as determined by the LA Abrasion Test, ASTM Designation C131.
 - .4 The soundness loss shall be less than 13.0%, as determined by the magnesium sulphate soundness test for coarse aggregate, ASTM Designation C88.
 - .5 The railway ballast shall contain less than 25% by mass of flat pieces. In case of dispute, the test method "Determination of Flakiness Index", British Standard B12, shall be used.
 - .6 The minimum bulk specific gravity shall be 2.60, ASTM Designation C127.
 - .7 At least 60% of the railway ballast shall have two (2) or more fractured faces.
 - .8 Railway ballast shall conform to the following gradation in accordance with ASTM Designation C136 and C117:

PIPE CULVERTS

Sieve Opening Size	Permissible Range (% by Weight Passing)
2 inch	100
1½ inch	90 – 100
1 inch	20 – 55
¾ inch	0 – 15
¾ inch	0 – 5
No. 200	0 - 2

3. EXECUTION

3.1 General

- .1 The City of Winnipeg will be responsible for removing and re-installing the ties and rail. At least two days notice shall be given to the GWWD (City of Winnipeg). The Contractor shall notify the Contractor Administrator.
- .2 The Contractor shall complete the excavating, culvert installation, and backfilling within a twenty four (24) hour period following removal of the ties and rail.
- .3 The Contractor shall excavate to the lines and grades as specified by the Contract Administrator and install the culvert according to CW3170-R3.
- .4 After proper placement and backfill of the culvert the Contractor shall rebuild the subgrade and sub-ballast structure to match the existing.
- .5 The sub-ballast layer shall be a minimum of 300 mm in thickness. The Contractor shall utilize a 50 mm down crushed limestone material meeting CW3110-R7. It shall be placed and compacted according to CW3110-R7.
- .6 The ballast material layer shall be a minimum of 300 mm in thickness. The Contractor shall supply this material and place in a stockpile location as approved by the Contract Administrator. The material will then be utilized by the GWWD when the ties and rails are re-installed.

END OF SECTION