

## 1.0 GENERAL

### 1.1 Related Work

#### 1.1.1 Section 02212 - Planting Soil and Finish Grading

### 1.2 Site Conditions

#### 1.2.1 Contractor to establish and verify all underground and surface utility lines before starting work.

### 1.3 Protection

#### 1.3.1 Prevent damage to fencing, trees, landscaping, natural features, bench marks, existing buildings, existing pavement, surface or underground utility lines which are to remain. Make good any damages.

## 2.0 PRODUCTS

### 2.1 Materials

#### 2.1.1 Obtain approval of excavated or graded material used as fill for grading work. Protect approved material from contamination.

## 3.0 EXECUTION

### 3.1 Removal of Topsoil

#### 3.1.1 Remove topsoil from areas to be re-graded. Strip topsoil when dry enough to prevent contamination with sub grade material. Contractor shall import topsoil if quality of existing topsoil is doubtful as judged by the Consultant.

#### 3.1.2 Do not handle topsoil in wet or frozen condition.

#### 3.1.3 Stockpile topsoil on-site where directed by the Consultant.

##### .1 Piles not to exceed 2 m in height.

### 3.2 Grading

#### 3.2.1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.

#### 3.2.2 Rough grade to following depths below finish grades:

- .1 185 mm for sodded areas.
- .2 200 mm for seeded areas.
- .3 500 mm for shrub beds.

### 3.3 Placing Fill

3.3.1 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

3.3.2 Place fill in 150 mm lifts.

3.3.3 Compact filled and disturbed areas to corrected maximum dry density as follows:

- .1 85% under soft landscaped areas.
- .2 95% under paved and walk areas.

3.3.4 Do not disturb soil within branch spread of trees or shrubs to remain unless indicated.

### 3.4 Testing

3.4.1 Inspection and testing of soil compaction will be carried out by designated testing laboratory.

3.4.2 Costs of tests will be paid by the Contractor.

### 3.5 Surplus Material

3.5.1 Legally dispose of all surplus material from the site or as directed by the Consultant.

3.5.2 Legally dispose of all unsuitable materials or fill, grading or landscaping from site.

## 1.0 GENERAL

### 1.1 Related Work

- 1.1.1 Section 02210 - Site Grading – Rough
- 1.1.2 Section 02930 - Seeding – Irrigated
- 1.1.3 Section 02931 - Seeding – Native
- 1.1.4 Section 02950 - Trees, Shrubs and Ground Covers

### 1.2 Source Quality Control

- 1.2.1 Inspection and testing of soil materials will be carried out by the Contractor.
- 1.2.2 Contractor shall inform the Consultant of proposed source of topsoil to be supplied.
- 1.2.3 Acceptance of soil materials subject to inspection and/or soil analysis test results. Do not commence work until materials are accepted by the Consultant.

### 1.3 Scheduling of Work

- 1.3.1 Schedule placing of planting soil and finish grading to permit sodding or seeding operations under optimum conditions.

### 1.4 Measurement for Payment

- 1.4.1 Preparation of sub-grade for placing of planting soil will be measured in square metres of area prepared.
- 1.4.2 Topsoil stockpiled will not be measured.
- 1.4.3 Supplying and placing planting soil will be measured in cubic metres determined by truck box measurement as loaded. Each truck to have predetermined capacity computed from its box dimensions. Each truck to be loaded to not less than predetermined capacity. Loading in excess of predetermined capacity to allow for settlement will not be required. No deduction will be made for settlement of load during transit provided such settlement is not caused by spillage or leakage.
- 1.4.4 Supply only of fertilizer will be measured in kilograms supplied as ordered by the Consultant in writing.
- 1.4.5 Supply and application of fertilizer will be incidental to the supply and placing of planting soil.

## 2.0 PRODUCTS

### 2.1 Materials

2.1.1 Planting soil for planting of trees, shrubs, and ground covers: mix 3 parts topsoil with 1 part peat moss, manure, or compost and 1 part sand. Incorporate 16-32-6 controlled release, sulfur coated urea (SCU) or ammonium sulfate, fertilizer at a rate of 0.5 kg per 10 cubic metres of planting soil at time of placing.

2.1.2 Planting soil for seeded or sodded areas: mix 3 parts topsoil with 1 part peat moss, manure, or compost and 1 part sand. Incorporate 16-32-6 controlled release, sulfur coated urea (SCU) or ammonium sulfate, fertilizer at a rate of 2.5 kg per 100 m<sup>2</sup> or as recommended by soils test.

2.1.3 Topsoil: friable, neither heavy clay nor of very light sandy nature consisting of:

<u>Name of Separate</u>	<u>Diameter, mm</u>	<u>Percentage in Soil</u>
Sand	0.050 – 2.000	20% - 45%
Clay	0.000 – 0.002	27% - 40%
Organic matter	N/A	4% - 6%

.1 Soil pH to range from 6.5 – 8.0 inclusive.

.2 Salinity level as measured by conductivity of extract should be less than 2mS/cm.

.3 Soil shall be free of any roots, rhizomes, living vegetation, weed seeds and quack grass.

.4 Soil shall be free of any clay lumps, coarse sand and gravel 2mm larger, and of any other foreign matter.

### 2.1.4 Peat Moss

.1 Derived from partially decomposed fibrous or cellular stems and leaves of species of Sphagnum Mosses. Sedge Peat is not permitted.

.2 Elastic and homogeneous, brown in colour.

.3 Free of wood and deleterious material which could prohibit growth.

.4 Shredded particle minimum size: 5 mm.

2.1.5 Manure

- .1 Manure shall be well decomposed cattle excrement, rich in organic matter and humus containing balanced proportions of nitrogen, phosphorus and potash. It shall be reasonably free of living vegetation, weed seeds, quack grass or bromegrass rhizomes. It shall be in a pulverized, friable condition and shall not contain any fresh, or "green", manure, clay, silt, gravel or other foreign material.

2.1.6 Sand

- .1 Sand shall be coarse and sharp with grains measuring from 0.5 to 1.5mm.

2.1.7 Fertilizer

- .1 Formulation ratio and application rate to be determined by the Contractor based on recommendation of approved soils test. Submit test results to Consultant for approvals.
- .2 Fertilizer shall be sulfur based sulfur coated urea (SCU) or ammonia sulfate, and controlled release.

2.2 Testing

- 2.2.1 Topsoil: Test for pH level, salinity and nutrients; one test per 300 m<sup>3</sup> of material used.
- 2.2.2 Sand: One gradation test per 100m<sup>3</sup> of material used.
- 2.2.3 Planting Soil: Test for pH level, salinity, nutrients, organic matter, particle size (texture) and fertilizer recommendations. One test per 500m<sup>3</sup> of material placed.

### 3.0 EXECUTION

3.1 Preparation of Existing Grade

- 3.1.1 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage. Remove soil contaminated with toxic materials. Dispose of removed materials as directed by the Consultant.
- 3.1.2 Cultivate entire area which is to receive topsoil to depth of 100 mm. Repeat cultivation in those areas where equipment used for hauling and spreading has compacted soil.
- 3.1.3 Remove surface debris, roots, vegetation branches and stones in excess of 40 mm diameter.

3.2 Spreading of Topsoil/Planting Soil

- 3.2.1 Spread topsoil after the Consultant has inspected and approved subgrade.
  - 3.2.2 Spread topsoil with adequate moisture in uniform layers over approved, unfrozen subgrade, where planting is indicated.
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- 3.2.3 For sodded areas keep topsoil 15 mm below finished grade.
- 3.2.4 Apply planting soil mix to follow minimum consolidated depths:
  - .1 185 mm planting soil for sodded areas.
  - .2 200 mm planting soil for seeded areas.
  - .3 200 mm planting soil for perennial beds.
  - .4 500 mm planting soil for shrub beds.
- 3.2.5 Manually spread planting soil around trees, shrubs and obstacles.
- 3.3 Application of Fertilizer
  - 3.3.1 Spread fertilizer uniformly over entire area of planting soil at manufacturer's recommended rate of application, rate determined on basis of soil sample test, and as directed by the Consultant.
  - 3.3.2 Mix fertilizer thoroughly to full depth of the planting soil.
- 3.4 Finish Grading
  - 3.4.1 Fine grade and loosen topsoil. Eliminate rough spots and low areas to ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.
  - 3.4.2 Roll to consolidate planting soil for areas to be seeded or sodded leaving surface smooth, uniform, firm against deep foot printing, and with a fine loose texture to approval of the Consultant.
- 3.5 Restoration of Stockpile Sites
  - 3.5.1 Restore stockpile sites acceptable to the Consultant.
- 3.6 Surplus Material
  - 3.6.1 Legally dispose of materials not required off site as directed by the Consultant.

## 1.0 GENERAL

### 1.1 Related Work

- 1.1.1 Section 02210 - Site Grading – Rough
- 1.1.2 Section 02212 - Planting Soil and Finish Grading

### 1.2 Measure for Payment

- 1.2.1 Rip-rap without cement mortar will be measured in square metres in place.

## 2.0 PRODUCTS

### 2.1 Stone

- 2.1.1 Hard, durable quarry stone, free from seams, cracks or other structural defects, to meet following size distribution for use intended:

- .1 Stones shall be between 300 mm and 600 mm in diameter.
- .2 Not more than 10% of the total volume of stones shall be less than 400 mm in diameter.
- .3 Not more than 50% of the total volume of stones shall be more than 500 mm in diameter.

### 2.2 Landscape Fabric

- 2.2.1 Non-woven, polyester geotextile such as Mirafi 140 NL or approved equal.

## 3.0 EXECUTION

### 3.1 Placing

- 3.1.1 Where rip-rap is to be placed on slopes, excavate a trench at the toe of slope (except where the toe of the slope is under water) in accordance with dimensions indicated, or as directed by the Consultant.
- 3.1.2 Fine grade area to be rip-rapped to a uniform even surface. Fill depressions with suitable material and compact to provide firm bed.
- 3.1.3 Place landscape fabric on prepared surface. Place rip-rap on fabric carefully to avoid puncturing fabric. Do not drive vehicles directly on landscape fabric.
- 3.1.4 Place rip-rap in accordance with thickness and details indicated, or as directed by Consultant.
- 3.1.5 Place stones in approved manner to secure surface and a stable mass. Place larger stones at bottom of slopes.
- 3.1.6 Hand placing:

- .1 Use large stones for lower courses and as headers for subsequent courses.
- .2 Place boulders so that the bottom one-third of the bottom course of boulders is below grade.
- .3 Stagger vertical joints and fill voids with rock spalls or cobbles.
- .4 Finished surface to be even, free of large openings and neat in appearance.



## 1.0 GENERAL

### 1.1 Scope

1.1.1 This specification refers to trench excavation and backfill.

### 1.2 Codes and Standards

1.2.1 Carry out all operations relating to excavation, shoring and backfill in strict conformance with all applicable Legislation, Codes, Standards and Ordinances of authorities having competent jurisdiction.

### 1.3 Definitions

1.3.1 Trench excavation is an excavation open from ground surface to the full depth of the pipe zone. A trench excavation may have vertical sidewalls for its full depth, maintained by bracing and sheeting or sloped sidewalls from a maximum of 1200 mm above the bottom of the trench excavation to the ground surface.

1.3.2 The pipe zone is the portion of the trench excavation between the bottom level of the trench excavation to a height of 150 mm above the top of the pipe. For more detail refer to Standard Drawing W-04.

1.3.3 Foundation is over excavation in the pipe zone that is required to provide a stable foundation for the bedding.

1.3.4 Pipe bedding is that portion of the pipe zone that supports the pipe and other appurtenances.

1.3.5 Haunching is that portion of the pipe zone from the bottom of the pipe to the springline of the pipe.

1.3.6 Initial backfill occupies the area between the springline of the pipe and a maximum 300 mm above the top of the pipe.

1.3.7 Unstable trench bottom is an inadequate bedding condition caused by organic material, "quick" sand or other similar material being present in the bottom of the trench.

1.3.8 Drainage ditch excavation is common excavation required for routing of surface or pumped water to a drainage course.

1.3.9 Standard Proctor Density (SPD) is the soil density achieved by application of compactive mechanical effort to a soil mass.

1.3.10 Classify excavation by the type of material as follows:

- .1 Common excavation is the excavation of all materials other than rock and shall include hard pan, frozen materials and partially cemented materials that can be ripped and excavated by heavy equipment.
- .2 Rock excavation is defined as boulders, pieces of concrete or masonry exceeding 1.0 m<sup>3</sup> in volume or solid ledge rock, concrete or masonry which requires drilling and blasting or other mechanical means for its removal. No soft or disintegrated rock, concrete or masonry which can be removed with a hand pick or power-operated excavator will be considered rock excavation. No loose, shaken or previously blasted work will be considered rock excavation.
- .3 Rubble excavation is the removal of broken material resulting from the decay or destruction of a building or other structure.

1.3.11 Classify backfill by the type of fill material as follows:

- .1 In situ material is defined as material excavated from the trench from which all boulders larger than 100 mm in maximum dimension, large roots, stumps or other debris that would prevent consolidation of the backfill have been removed.
- .2 Low shrink material is a sand/cement/water mixture.
- .3 Granular material is material such as sand, natural gravel and reclaimed concrete aggregate. Granular material must be free of reclaimed asphalt.
- .4 Coarse gravel is clean angular material required for stabilization of trench bottom due to over excavation of unsuitable trench bottom conditions.
- .5 Topsoil is humus, peat, or other material containing organics, which make up the top layer of the soil.

## 2.0 PRODUCT

### 2.1 Insitu Backfill Material

2.1.1 Insitu Backfill Material is original trench material that does not contain boulders or rocks larger than 100 mm diameter, organic soils, frozen lumps of earth, rubble or debris from trench excavation.

### 2.2 Low Shrink Material

2.2.1 Do not supply or place low shrink backfill until a mix design has been submitted to and approved by the Engineer.

- 2.2.2 Maximum aggregate size shall be 6 mm using sand. The proportions of materials shall be such as to produce a concrete mixture that will meet the following standards:

Strength at 28 days	0.5 MPa ± 0.25 (measured in accordance with CAN3-A23.2-9C)
Slump	175 ± 25 mm (measured in accordance with CAN3-A23.2-5C)

Note: Type 30 Portland cement may be used for winter construction.

2.3 Bedding Material

- 2.3.1 Do not supply or place bedding material until a sieve analysis has been submitted to and approved by the Engineer.

- 2.3.2 Provide bedding material having the following gradation limits:

SIEVE SIZE	PERCENT PASSING
10 mm	100
5 mm	95 - 100
630 µm	25 - 60
80 µm	0 - 5

2.4 Granular Material

- 2.4.1 Provide granular material having the following gradation limits.

SIEVE	% PASSING
28 mm	100
20 mm	90 - 100
12.5 mm	70 - 100
5 mm	45 - 85
2 mm	30 - 65
800 µm	15 - 40
400 µm	12 - 30
160 µm	9 - 20
80 µm	7 - 15

Maximum Permeability  $1 \times 10^{-4}$  cm/sec.

2.4.2 Do not supply or place imported material until a sieve analysis has been submitted to and approved by the Engineer.

2.5 Coarse Gravel

2.5.1 Do not supply or place coarse gravel until a sieve analysis has been submitted to and approved by the Engineer.

2.5.2 Provide clean angular rock material for stabilization of trench bottom with the following gradation limits:

SIEVE SIZE	PERCENT PASSING
80 mm	100
50 mm	95 - 100
25 mm	20 - 100
20 mm	0 - 80
10 mm	0 - 10
5 mm	2

2.6 Drainage Material

2.6.1 Do not supply or place drainage material until a sieve analysis has been submitted to and approved by the Engineer.

2.6.2 Provide material for drainage with the following gradation limits:

SIEVE SIZE	PERCENT PASSING
40 mm	100
25 mm	75 - 100
20 mm	20 - 80
10 mm	0 - 10
5 mm	0 - 5

**3.0 EXECUTION**

3.1 Protection of Existing Utilities and Surface Features

3.1.1 Refer to Section 01001 – General Requirements

3.2 Site Preparation

3.2.1 Strip topsoil as shown on the drawings or as directed by the Engineer.

3.2.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.3 Excavation

3.3.1 Location of Excavation

.1 The Engineer will provide stakes offset from the centreline of the trench to indicate trench alignment.

.2 Excavate trenches only as far in advance as safety, traffic and weather conditions permit.

.3 Protect structures, piping and other manmade objects existing within the working area.

.4 Do not excavate more than 120 m in advance of the pipe laying operation. Allow no more than 15 metres of trench to remain open at the end of each day.

3.3.2 Depth

.1 Excavate trench to dimensions shown on Drawing W04 or as required to provide sufficient space for pipe bedding and to permit erection of forms, shoring, waterproofing and inspection of foundations. Excavate to clean lines to minimize the quantity of fill required.

.2 Adhere to City of Regina standards for minimum bury depths unless specifically shown or directed otherwise in the Contract Documents or by the Engineer.

3.3.3 Excavated Trench Material

.1 Pile material along side the trench provided working space is adequate and by doing so it does not spill onto private properties disturbing fences, buildings, shrubs, lawns, crops or other items of value.

.2 Locate spoil pile to minimize blockage of traffic and drainage facilities.

.3 Where excavated material cannot be piled along the trench, stockpile at locations approved by the Engineer and return for backfilling as required.

3.3.4 Trench Alignment

- .1 Prior to excavation of the trench, establish the pipe installation alignment by setting stakes at 20 m intervals along a line offset from the centreline of the proposed alignment.
- .2 Excavate the trench so that the pipe can be laid to the established alignment and depth with allowance made for specified trench wall clearance and bedding.
- .3 Install the pipe to a predetermined grade according to a grade sheet showing the depth of cut to the invert or top of pipe relative to the grade stake elevation at the respective locations along the pipeline.

3.3.5 Trench Width

- .1 Excavate to produce clearance of not less than 150 mm between the outside of the pipe at its largest section and the trench sheeting or earth wall and not more than 300 mm clearance between the pipe and earth wall regardless of trench support works. Refer to Standard Drawing W-04.
- .2 The above condition governs from the trench bottom to 300 mm above the top of the pipe.
- .3 Excavate widths above this point in conformance with the requirements of the latest edition of the *Occupational Health and Safety Act*.
- .4 Remove ledge rock, boulders and large stones to provide a minimum clearance of 150 mm below the pipe.
- .5 Where the maximum trench width is exceeded provide special bedding or other precautions as directed by the Engineer.

3.3.6 Bracing and Sheeting

- .1 Shore the trench in a manner that conforms with the latest edition of the *Occupational Health and Safety Act*, and as necessary to protect life, property and structures adjacent to the Work, the Work itself, or to maintain trench widths within specified limits.
- .2 Install shoring so that it does not extend below the springline of the pipe. Do not locate shoring closer than 150 mm to the widest section of the installed pipe. When it is necessary to place the shoring below the pipe springline, raise the shoring in 600 mm lifts and compact each lift to fill the void left by the raised sheeting.
- .3 Cut off shoring left in place no higher than 900 mm below the ground surface.
- .4 Remove shoring in a manner which permits backfill compaction.

3.3.7 Dewatering

- .1 Control entry of ground and surface water to the extent that excavation and pipe installation can proceed and the trench bottom condition is not compromised to the detriment of the pipe installation.
- .2 Continuously pump or bail out water from the trench. Do not use the pipe being installed as a drain for such water.
- .3 Ensure that dewatering operations do not compromise or damage the foundation of any structure in the vicinity.
- .4 Locate and direct dewatering discharge such that loss, damage, nuisance or injury to the public does not occur. Direct discharge into natural drainage channels, drains or storm sewers.

3.3.8 Safety

- .1 Excavate trench in conformance with the requirements of the latest edition of the *Occupational Health and Safety Act* and as is necessary to protect life, property and work.
- .2 Sheet and brace open cut trenches in strict conformance with the latest edition of the *Occupational Health and Safety Act*, Municipal Ordinances and as necessary to protect life, property and Work.
- .3 Blasting for excavation will not normally be permitted. When permitted, blasting methods and procedures must strictly conform to Provincial Statutes and Municipal Ordinances. If there are structures in the vicinity that may be affected by the blasting, engage and pay for the services of a structural engineer and carry out a comprehensive structural investigation with the property Owner(s), Sub-contractor and the Engineer to establish the existing condition of these structures. Provide all damage mitigation measures prescribed. Provide all additional insurance as may be directed by the Owner. Bear all costs for damage and injury resulting from blasting operations.
- .4 Work between sunset and sunrise will be allowed only with prior written permission from the Engineer or if necessary to correct Work that is deemed to constitute an immediate hazard to the public or existing utilities. When any Work is carried out at night, supply a sufficient number of electric or other approved and efficient lights to enable the Work to be done in a safe, satisfactory manner. Operations will not be permitted if the Engineer believes there insufficient light to perform the Work safely and satisfactorily.

3.3.9 Trench Bottom Conditions

- .1 Maintain trench conditions to facilitate pipe installation without water, muck, silt, gravel or other foreign material entering the pipe.

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- .2 Provide a firm trench bottom capable of supporting the pipe to be installed. Stabilize trench bottom by means of over excavation or special foundation designed to support the pipe.
  - .3 Remove all deleterious material from the trench bottom prior to pipe installation.

#### 3.3.10 Over Excavation and Backfill

- .1 Excavate the trench in a manner that provides a uniform and continuous support for the pipe and fittings on solid, undisturbed ground. Over excavate unstable trench bottom to a level at which stable material is encountered.
- .2 Backfill over excavation with coarse gravel material to the level of normal bedding.
- .3 Compact coarse gravel material in lifts having a maximum compacted depth of 300 mm to provide a thoroughly consolidated pipe zone using approved mechanical compactors.

#### 3.3.11 Unstable/Non-Uniform Ground Conditions

- .1 Excavate loose or deleterious material to the width, depth and length as required and backfill with coarse gravel in 300 mm compacted layers or with insitu backfill material in 150 mm compacted layers. Compaction to 95% Standard Proctor Density.
- .2 Provide and maintain minimum clearance between the pipe and trench walls of not less than 150 mm for pipes up to and including 600 mm O.D. and not less than 200 mm for pipe larger 600 mm O.D.
- .3 Finish subgrade with hand tools to provide a uniform and continuous support for the pipe bedding.

#### 3.3.12 Coring

- .1 Provide straight walled shafts for coring.
- .2 Provide proper shoring and any other means required to ensure safety of workmen and stability of surrounding soils.
- .3 Obtain the prior approval of the Engineer for size, location and extent of coring shaft(s).
- .4 Maintain a minimum 1.0 metre clearance from nearest edge of coring shaft to pavement or other structures, unless otherwise approved
- .5 Carry out shaft excavation and backfill in accordance with the relevant section(s) of the specifications and all safety regulations.
- .6 Provide cored hole that does not exceed the largest dimension of the pipe to be installed by more than 50 mm.



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- .7 Carefully establish and maintain line and grade and provide a finished coring hole which does not vary more than 50 mm vertically or 100 mm horizontally from the established grade.
  - .8 Recore any hole that exceeds the specified deviation limits.
  - .9 Adequately plug the leading end of pipe inserted in a core hole to prevent damage or entrance of foreign material.
  - .10 Provide adequate support of pipe within the core hole as recommended by the pipe manufacturer and/or as detailed in the contract documents.
  - .11 Carry out pipe insertion into cored holes using techniques and equipment recommended by the pipe manufacturer and approved by the Engineer.

### 3.4 Trench Backfill and Compaction

#### 3.4.1 Backfill within the Pipe Zone

- .1 Backfill with granular material placed in uniform layers and compacted by mechanical means for the full width of the trench. Backfill in layers not exceeding 150 mm compacted thickness and compact to completely fill spaces under and adjacent to the pipe.
- .2 Place bedding material to lines and depths required. Provide bell and coupling holes along the trench bottom so that the pipe barrel is evenly supported throughout the entire length.
- .3 Mechanically compact the pipe bedding, haunching and initial backfill material to 95% Standard Proctor Density.
- .4 Mechanically compact pipe haunching while exercising care not to contact or damage the pipe. For compaction of haunching on pipe 300 mm and larger, employ pneumatically powered, single leg 'pogostik' tamper or as approved by the Engineer.
- .5 Where specified, backfill with low shrink material such that the material flows into the excavation and fills the entire space under the pipe. Place low shrink material to the springline of the pipe. Ensure that the pipe or pipe bedding is not disturbed during backfill placement and air is not trapped beneath horizontal projections or the other locations within the pipe zone excavation.

#### 3.4.2 Backfill above the Pipe Zone

- .1 Insitu Material
  - .1 Backfill in uniform layers not exceeding the thickness required to obtain the specified density. The maximum allowable compacted layer thickness shall be 150 mm unless

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- otherwise approved by the Engineer. Compact backfill to a minimum 95% Standard Proctor Density.
- .2 Control the moisture content of the insitu backfill material to within  $\pm 3\%$  of the insitu material in the adjacent trench walls. Supply and add water or dry the insitu backfill material as required to meet the moisture specification.
  - .3 Areas to be backfilled shall be free from debris, snow, ice, water or frozen ground. Backfill material shall not be frozen or contain ice, snow or debris.
  - .4 Haul and dispose of all material that is unsuitable for use as backfill. Import and place acceptable material.
  - .5 Import and place acceptable material to makeup any shortage of material caused by the construction operation or removal and disposal of rock, boulders or other material.
  - .6 Bear all costs for locating, providing and placing acceptable replacement backfill material.
- .2 Granular Material
- .1 Provide granular material having sufficient moisture content to prevent dust generation during handling.
  - .2 Backfill in uniform layers not to exceed the thickness required to obtain the specified density. The maximum allowable compacted layer thickness shall be 150 mm for granular materials unless otherwise approved by the Engineer.
  - .3 Compact backfill to 95% Standard Proctor Density.
  - .4 Repair and pay for damage resulting from any subsidence or heaving of the backfill occurring within the maintenance period.
- .3 Low Shrink Material
- .1 Place low shrink backfill such that the material flows into the excavations and fills the entire space. Initial depth of material may not exceed one (1) metre. The initial depth must set to a point where the concrete is no longer fluid before additional material may be placed on top of it.
  - .2 Ensure that the pipe or pipe bedding is not disturbed during low shrink placement and air is not trapped beneath horizontal projections or the other locations within the excavation.
  - .3 Where required, cover low shrink material with steel plates having sufficient strength to support traffic. Maintain this

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support until the Engineer advises that the low shrink material has developed sufficient strength to allow its removal. Where support of traffic is not required, cover and fence the excavation until the Engineer advises that the low shrink material has developed sufficient strength to allow placement of further material on top of it.

- .4 Use of low shrink material above the pipe zone requires the approval of the Engineer unless it is specifically indicated on the drawings.

### 3.4.3 Backfilling of Structures

- .1 Structures include buildings, manholes, vaults and buried valves.
- .2 Backfill structures with insitu fill or granular material compacted to 95% Standard Proctor Density, in maximum compacted lifts of 150 mm within 5 m of structure. Excavations to be free of ice, snow, debris and water at the time of backfilling.
- .3 Compact backfill adjacent to or under slabs, footings and pipes to 100% Standard Proctor Density. Use either hand operated tamper or pneumatically powered, single leg 'pogostik' tamper within 1000 mm of structures. Place and compact backfill around structures so as to keep load distributed evenly around the perimeter.
- .4 Place and compact pipe trench backfill under and within 4 metres of pipe vaults to 95% Standard Proctor Density.

### 3.4.4 Responsibility for Materials Testing - Private Consultant as Engineer

- .1 In all instances where the 'Engineer' for the Work is not the City of Regina, Public Works Division, materials testing is the responsibility of the Contractor.
  - .1 Retain and pay for a materials testing laboratory, satisfactory to the Engineer, to test materials compacted in place. Pay all costs for re-testing required as a result of initial or subsequent test results not conforming to the requirements of this specification.
  - .2 Inform the testing agency of the name and number of the Engineer for the project and instruct the testing agency to immediately advise the Engineer of the use of any material or procedure contrary to the specifications or good construction practice.
  - .3 Locations for density tests to be selected by the testing laboratory under the direction of the Engineer.
  - .4 Submit copies of test results to the Engineer within 24 hours of each test.

3.4.5 Responsibility for Material Testing – Public Works Division as Engineer

- .1 In all instances where the ‘Engineer’ for the Work is the City of Regina Public Works Division, materials testing will be the responsibility of the Public Works Division Materials Testing Standards
- .1 Standard for laboratory determination of SPD:
  - .1 ASTM D698 and ASTM D2216 - standard test methods for laboratory determination of density and of water (moisture) content of soil, rock and soil-aggregate mixtures.
  - .2 Standards for field determination of density and moisture.
    - .1 ASTM D2167 - standard test by the rubber balloon method for density and unit weight of material compacted in place.
    - .2 ASTM D1556 - standard test by the sand cone method for density and unit weight of material compacted in place.
    - .3 ASTM D2922 and/or D3017 - Nuclear methods testing for density and moisture content of material compacted in place.
- .3 Testing firm to choose and employ the most appropriate field test method(s) for the specific conditions.

3.4.6 Materials Testing Requirements

- .1 Materials testing requirements are as follow:
  - .1 Determination of Standard Proctor Density of each of the primary materials, such as clay, silty clay, silt, silty sand and sand.
  - .2 Perform density using method(s) appropriate for the conditions.
  - .3 Perform a minimum of one test per 1000 sqm/150 mm compacted lift.

3.4.8 Disposal of Boulders

- .1 Locate a suitable disposal site for boulders and bear all costs for hauling and disposing of them.

3.4.9 Disposal of Excess Common Excavation

- .1 Spread excess material, other than rock, asphalt and concrete, over the entire right-of-way prior to replacement of topsoil. Do not interrupt or alter existing drainage. Remove any remaining material from site.

- .2 Remove and dispose of all site excavated debris.

#### 3.4.10 Surface Maintenance during Construction

- .1 Maintain all trench surfaces and working surfaces affected by construction until the project is accepted by the Engineer.
- .2 Finish berms over trenches as specified prior to acceptance. Provide and place material to fill depressions resulting from the settlement of backfill.
- .3 Maintain gravelled surfaces free of potholes and washboard conditions. Promptly re-grade surfaces when irregularities occur.
- .4 Provide approved traffic hazard warning signage and barricades at all locations which cannot be promptly reinstated to the specified standard. Maintain traffic protection until the defects are rectified.

#### 3.5 Deep Trench Excavation and Backfill

- 3.5.1 Deep trench installations are defined as those with depth equal to or greater than 5.0 m finished grade to pipe invert.

##### 3.5.2 Deep Trench Excavation

- .1 Unless otherwise noted, excavate trench in accordance with the requirements elsewhere in this section.
- .2 Separate the excavated insitu material, by stock piling in a convenient location adjacent to the trench excavation, to the satisfaction of the Engineer.
- .3 Separate excavated insitu materials by primary classifications, such as clay, silty clay, silt, silty sand and sand.

##### 3.5.3 Deep Trench Backfill

- .1 Unless otherwise noted, backfill trench in accordance with the requirements elsewhere in this section.
- .2 Replace and compact the insitu material in the reverse order of removal, to the satisfaction of the Engineer.
- .3 Compacted thickness of trench backfill not to exceed 150 mm per lift unless the Engineer specifically advises otherwise.
- .4 Moisture condition backfill as required to achieve the density requirements.

## 1.0 GENERAL

### 1.1 Related Work

1.1.1 Section 02528 – Concrete Walks, Slabs, Curbs and Gutters

### 1.2 Measure for Payment

1.2.1 Pavement marking will be measured by lump sum.

1.2.2 Pavement marking including reflective glass beads will be measured by lump sum.

1.2.3 Supply of paint will be measured in litres.

## 2.0 PRODUCTS

### 2.1 Materials

2.1.1 Paint applicator to be an approved distributor capable of applying paint in singles and dashed lines and that will ensure uniform application and having a positive shut-off.

2.1.2 Thinner: as per CGSB 1-GP-SM.

2.1.3 Paint to be a weather resistant traffic paint colour and product to be approved in advance by Consultant prior to applying.

## 3.0 EXECUTION

### 3.1 Equipment Requirements

3.1.1 Paint applicator to be an approved pressure type unless otherwise approved by the Consultant.

3.1.2 Work with a paint brush by approval of Consultant only.

### 3.2 Condition of Surfaces

3.2.1 Pavement surface to be free from surface water, frost, ice, dust, oil, grease and other foreign materials.

### 3.3 Application

3.3.1 Lay out pavement markings.

3.3.2 Unless otherwise approved by Consultant, apply paint only when air temperature is above 10°C and no rain in forecast.

3.3.3 Apply paint evenly at a rate of 3m<sup>2</sup>/L.

3.3.4 Do not thin paint unless approved by Consultant.

3.3.5 Symbols, letter, and lines to conform to dimensions indicated.

3.3.6 Apply other specified marking materials as directed by the Consultant.

- 3.3.7 Paint lines to be of uniform colour and density with sharp edges.
- 3.3.8 Thoroughly clean applicator before painting with a different colour.
- 3.3.9 Apply paint using specified equipment only.
- 3.4 Tolerance
  - 3.4.1 Paint markings to be within plus or minus 12 mm of dimensions specified.
  - 3.4.2 Paint markings to be 50 mm wide.
- 3.5 Protection of Completed Work
  - 3.5.1 Protect pavement markings until dry.

## 1.0 GENERAL

### 1.1 Related Work

- 1.1.1 Section 02210 - Site Grading – Rough
- 1.1.2 Section 02212 - Planting Soil and Finish Grading
- 1.1.3 Section 02930 - Seeding – Irrigated
- 1.1.4 Section 02931 - Seeding – Native

### 1.2 Delivery and Storage

- 1.2.1 Deliver grass seed in original containers showing:
  - .1 Analysis of seed mixture
  - .2 Percentage of pure seed
  - .3 Year of production
  - .4 Net mass
  - .5 Date when tagged and location
  - .6 Percentage germination
  - .7 Name and address of distributor
- 1.2.2 Deliver wood fibre mulch in moisture-proof containers indicating manufacturer, content and net air-dry mass.
- 1.2.3 Deliver erosion control agent in moisture-proof containers showing manufacturer, content and net mass.

### 1.3 Measurement Payment

- 1.3.1 Supply of seed will be measured in kilograms.
- 1.3.2 Seeding will be measured in square metres of actual surface areas.

## 2.0 PRODUCTS

### 2.1 Materials

- 2.1.1 Grass seed: Certified No. 1 Grade to Government of Canada, Seeds Regulations and having minimum germination of 85% and minimum purity of 97%.
- 2.1.2 Mulch:
  - .1 Straw: oat, barley, alfalfa or wheat straw, reasonably free from weeds, foreign matter detrimental to plant life, in dry condition to allow even distribution when processed through blower. Other vegetative material (hay, chopped cornstalks) may be used when approved by the Consultant.



- 
- .2 Fibre: wood or wood cellulose fibre free of germination or growth-inhibiting ingredients and forming blotter like ground cover allowing absorption and percolation of water.
  - .3 Erosion Control Agent: water dilatable liquid dispersion containing thermoplastic resin (Curasol AH).
  - .4 Water: potable, free of impurities that would inhibit germination.
  - .5 Fertilizer: shall be high in phosphorous (e.g. 16-32-6) and delivered to the site in unopened containers. Rate of application to be 2.5 kg per 100 m<sup>2</sup>.

## 2.2 Grass Seed Mixture

- 2.2.1 Seed: See Sections 02930 & 02931. All grass seed must be obtained from a recognized seed house or supplier. Seed shall be delivered in bags bearing tags.

## 3.0 EXECUTION

### 3.1 Workmanship

- 3.1.1 Keep site well drained.
- 3.1.2 Clean up immediately, soil, mulch, or other debris spilled onto pavement, dispose of deleterious materials.
- 3.1.3 Take reasonable care to prevent contamination by slurry of structures, signs, guiderails, fences and utilities.
- 3.1.4 Where contamination occurs, remove slurry to satisfaction of owner and by means approved by the Consultant.

### 3.2 Preparation of Surfaces

- 3.2.1 Cultivate areas to be seeded to a depth of 50 mm. Fine grade free of humps and hollows and free of deleterious and refuse material.
- 3.2.2 Obtain Consultant's approval of topsoil grade and depth before start seeding.

### 3.3 Seeding

- 3.3.1 Seed mechanically as outlined in Section 02930 & 02931.
- 3.3.2 Seed area during early spring or after 15<sup>th</sup> August to within 2 weeks of freeze-up.

### 3.4 Preparation of Slurry

- 3.4.1 Apply when winds less than 10 km/h using equipment suitable for area involved to the approval of the Consultant.

- 3.4.2 Measure quantities of material by mass or mass-calibrated volume measurement to satisfaction of Consultant. Supply all equipment required for this work.
  - 3.4.3 Charge required water into the tank. Add material into hydraulic mulching tank under agitator. Pulverize mulching material and charge slowly into tank.
  - 3.4.4 Add erosion control agent, into tank and mix thoroughly to complete mulch slurry.
- 3.5 Application of Slurry
- 3.5.1 Apply mulch slurry immediately after seeding is complete.
  - 3.5.2 Complete mulch slurry to be applied per hectare:
    - .1 Mulch: 2,200 kg
    - .2 Erosion Control Agent: 340 kg
    - .3 Water, minimum: 30,000 L
  - 3.5.3 Blend applications into existing, adjacent grass areas or sodded areas.
  - 3.5.4 Apply slurry in a uniformly distributed ground cover of uniform thickness.
  - 3.5.5 After application of mulching slurry, ensure that the areas are left undistributed until maintenance has started.
- 3.6 Maintenance
- 3.6.1 Ensure maintenance equipment suitable to Consultant.
  - 3.6.2 Keep soil moist during germination period and adequately water grassed areas until accepted by the Consultant.
  - 3.6.3 Apply water to ensure moisture penetration of 75 to 100 mm. Control sprinkling to prevent wash-outs.
  - 3.6.4 Cut grass when it reaches height of 60 mm and cut to height of 40 to 50 mm. Remove clippings which exceed 10 mm in depth.
  - 3.6.5 Maintain grassed areas free of pests and disease.
  - 3.6.6 Fertilize seeded areas one month after seeding. Spread evenly and water in well. Postpone fertilizing until next spring if application falls within four week period prior to expected end of growing season in locality.
- 3.7 Acceptance
- 3.7.1 Conform to Section 02930 & 02931.

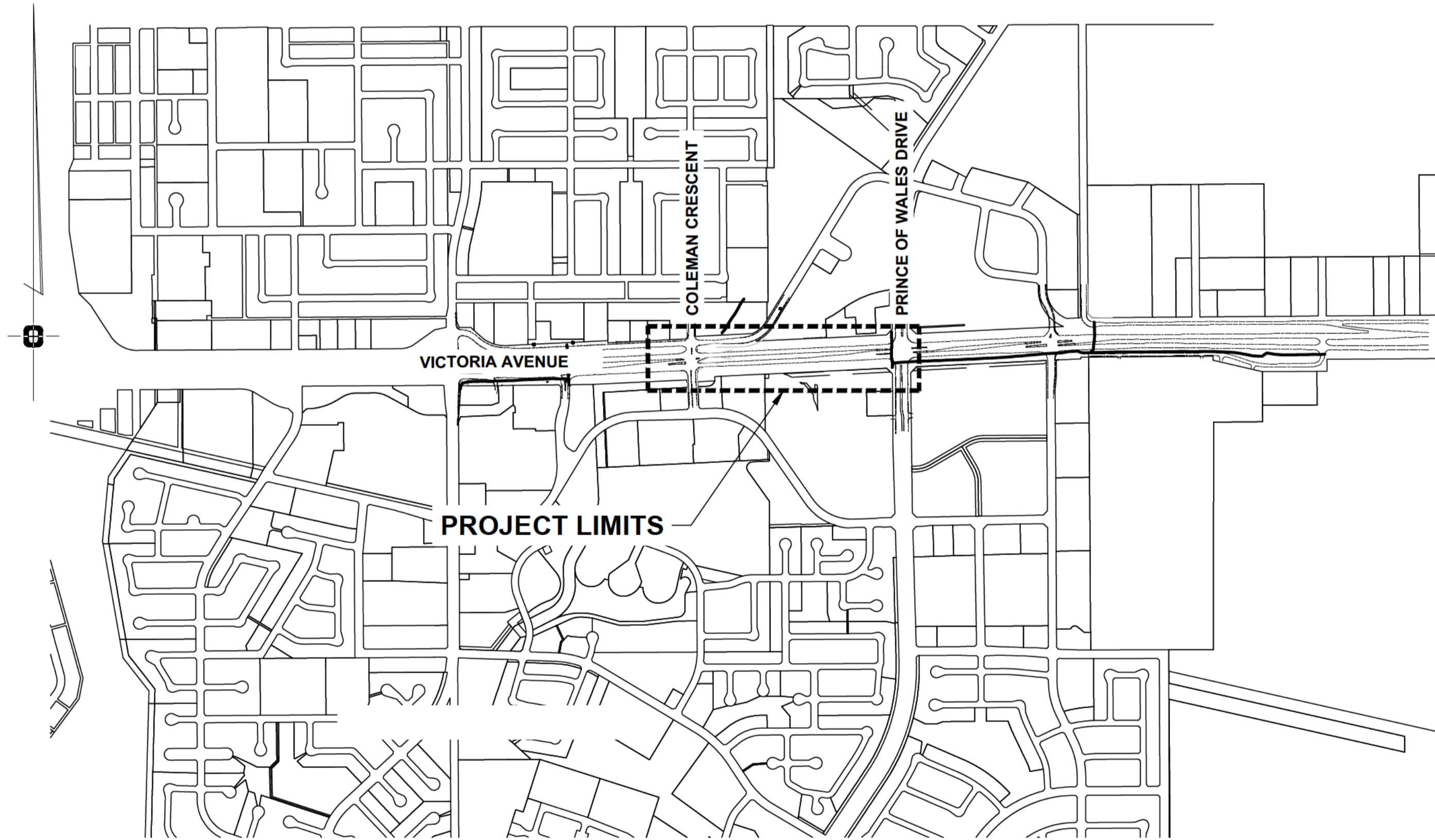
City of Regina



060700079

**DRAWING LIST**

DRAWING NO.	DRAWING TITLE
G-0000	COVER SHEET
S-0001	GENERAL ARRANGEMENT
S-0002	INFORMATION SHEET AND CONSTRUCTION STAGING
S-0003	EXISTING VICTORIA AVENUE BRIDGE (WB) DEMOLITION
S-0004	EXISTING VICTORIA AVENUE BRIDGE (EB) DEMOLITION
S-0005	EXISTING EASTGATE DRIVE BRIDGE DEMOLITION
S-0006	PRE-CAST F-TYPE BARRIER DETAILS
S-0007	PRE-CAST BOX CULVERT DETAILS
D-0001	DETOUR ALIGNMENT & DETAIL PLAN
D-0002	DETOUR PAVEMENT MARKING & SIGNAGE PLAN
D-0003	ALIGNMENT PLAN - WEST
D-0004	ALIGNMENT PLAN - EAST
D-0005	DETAIL PLAN - WEST
D-0006	DETAIL PLAN - EAST
D-0007	DETAIL PLAN - ALTERNATE
D-0008	GRADE PLAN - WEST (NOT INCLUDED IN TENDER)
D-0009	GRADE PLAN - EAST (NOT INCLUDED IN TENDER)
D-0010	STANDARD DETAILS & CROSS SECTION
D-0011	PAVEMENT MARKING & SIGNAGE PLAN - WEST
D-0012	PAVEMENT MARKING & SIGNAGE PLAN - EAST
D-0013	UTILITY PLAN - WEST
D-0014	UTILITY PLAN - EAST



**CITY OF REGINA  
VICTORIA AVENUE**

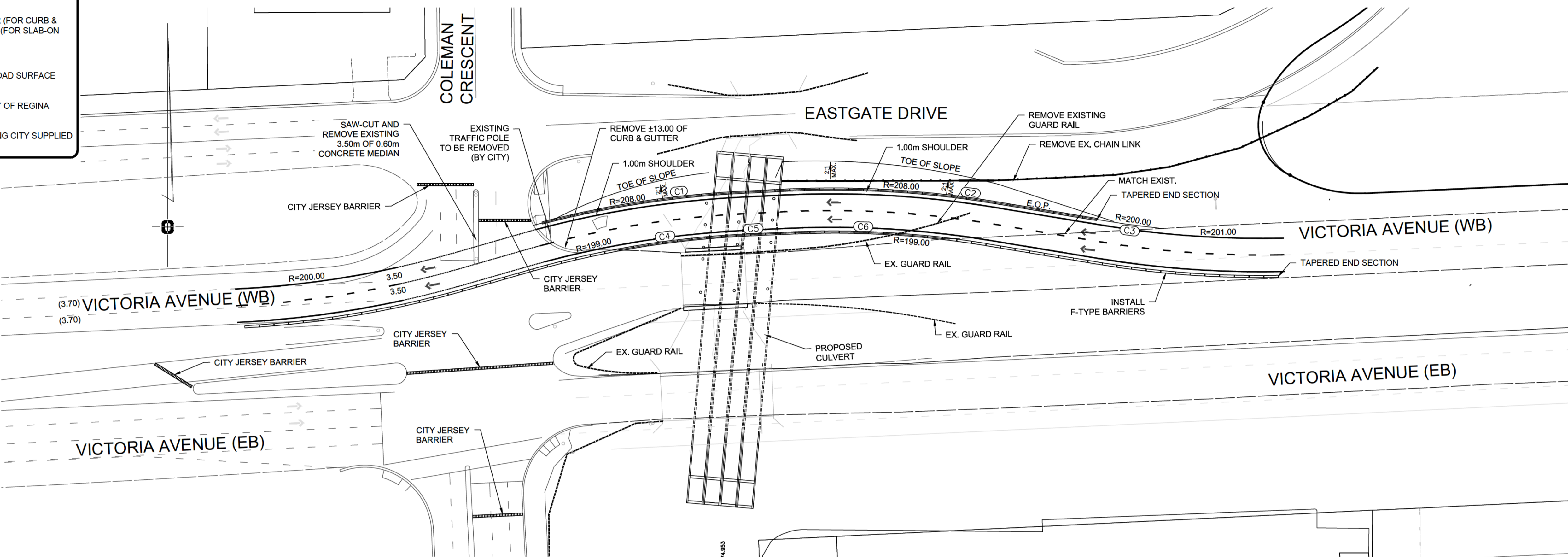
CONTRACT No: 2435

**ISSUED FOR TENDER - 2015**

**ALIGNMENT NOTES:**

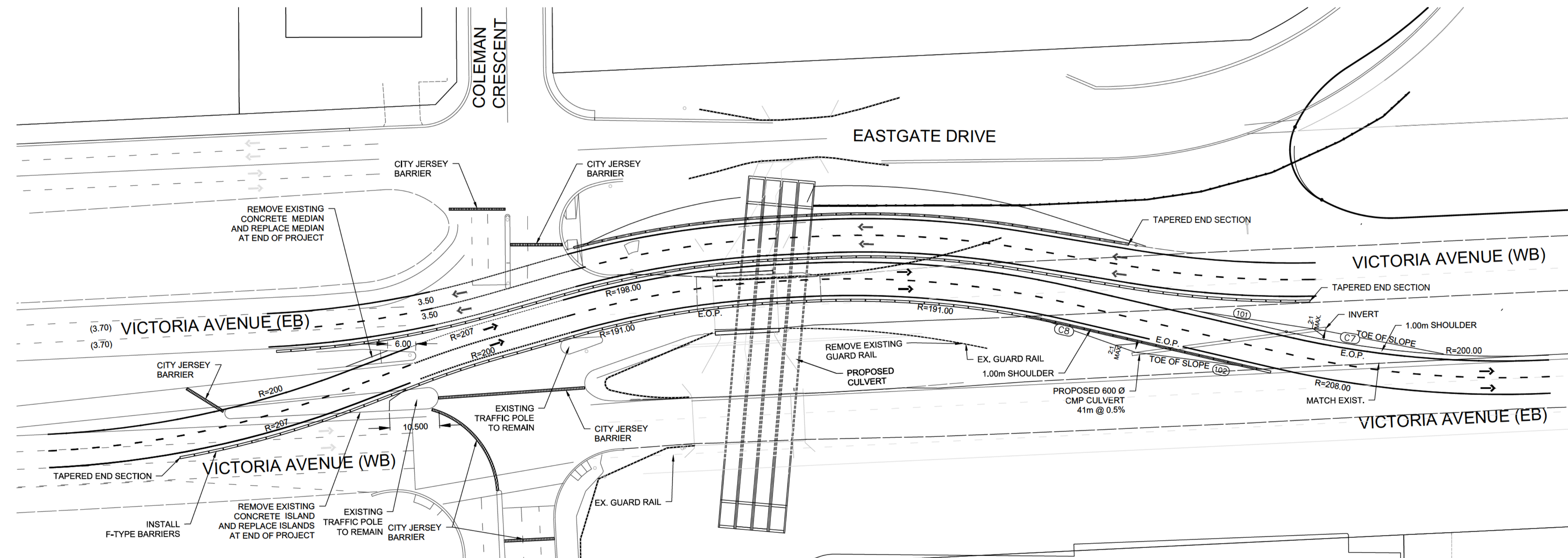
- ALL COORDINATES, CURVE DATA AND TIES ARE TO LIP OF GUTTER (FOR CURB & GUTTER CONSTRUCTION), EDGE OF PAVEMENT OR TO CURB FACE (FOR SLAB-ON CONSTRUCTION), UNLESS OTHERWISE NOTED.
- ALL DIMENSIONS ARE TO CURB FACE.
- CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE ON DETOUR ROAD SURFACE UPON COMPLETION.
- ANY LEFT-OVER F-TYPE BARRIERS WILL BE TRANSPORTED TO CITY OF REGINA YARD AND BECOME PROPERTY OF THE CITY.
- CONTRACTOR RESPONSIBLE FOR PICKUP, PLACING AND RETURNING CITY SUPPLIED JERSEY BARRIERS

TEMP C OF GUARD RAIL					
NAME	C1	POINT	STATION	NORTH	EAST
R	208.000	PC		5588493.723	532631.921
Lc	44.640	PI		5588499.556	532653.555
DELTA	12°17'48"	CC		5588292.895	532686.069
T	22.406	PT		5588500.648	532675.934
NAME	C2	POINT	STATION	NORTH	EAST
R	208.000	PC		5588501.063	532684.448
Lc	44.349	PI		5588502.148	532706.680
DELTA	12°12'59"	CC		5588293.310	532694.583
T	22.259	PT		5588498.503	532728.639
NAME	C3	POINT	STATION	NORTH	EAST
R	200.000	PC		5588494.680	532751.674
Lc	12.139	PI		5588493.686	532757.664
DELTA	3°28'39"	CC		5588691.981	532784.420
T	6.071	PT		5588493.057	532763.702
NAME	C4	POINT	STATION	NORTH	EAST
R	199.000	PC		5588488.502	532649.478
Lc	18.462	PI		5588490.200	532658.558
DELTA	5°18'56"	CC		5588292.895	532686.069
T	9.238	PT		5588491.050	532667.757



**DETOUR ALIGNMENT & DETAIL PLAN STAGE 1**

TEMP C OF GUARD RAIL					
NAME	C5	POINT	STATION	NORTH	EAST
R	350.142	PC		5588491.050	532667.757
Lc	17.162	PI		5588491.772	532676.309
DELTA	2°48'30"	CC		5588142.148	532697.196
T	8.583	PT		5588492.074	532684.887
NAME	C6	POINT	STATION	NORTH	EAST
R	199.000	PC		5588492.074	532684.887
Lc	34.355	PI		5588492.913	532702.087
DELTA	9°53'29"	CC		5588293.310	532694.583
T	17.220	PT		5588490.785	532719.175
NAME	C7	POINT	STATION	NORTH	EAST
R	200.000	PC		5588476.588	532783.218
Lc	55.382	PI		5588470.295	532810.368
DELTA	15°51'57"	CC		5588671.422	532828.380
T	27.869	PT		5588471.664	532838.203
NAME	C8	POINT	STATION	NORTH	EAST
R	199.000	PC		5588479.738	532729.012
Lc	8.256	PI		5588478.974	532733.069
DELTA	2°22'38"	CC		5588284.181	532692.156
T	4.129	PT		5588478.041	532737.092

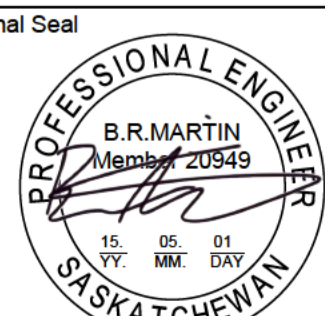


**DETOUR ALIGNMENT & DETAIL PLAN STAGE 2**

CONTROL LINE - VICTORIA AVENUE				
NAME	POINT	STATION	NORTH	EAST
101	POT		5588481.353	532762.661
102	POT		5588478.041	532737.092

**Notice:**  
 - Utilities may not be as shown.  
 - City Crews must coordinate utility locations for ALL utilities (including traffic control facilities) through the City Dispatch Office.  
 - All Third-Party Contractors must coordinate utility locations through their own offices.  
 - The City of Regina is NOT responsible for any damage related to any inaccuracies in this drawing/trap or any third-party contractor's failure to properly complete utility locations.  
 - Dimensions are in metres unless otherwise noted.  
 - Elevations are metric grade.

Professional Seal



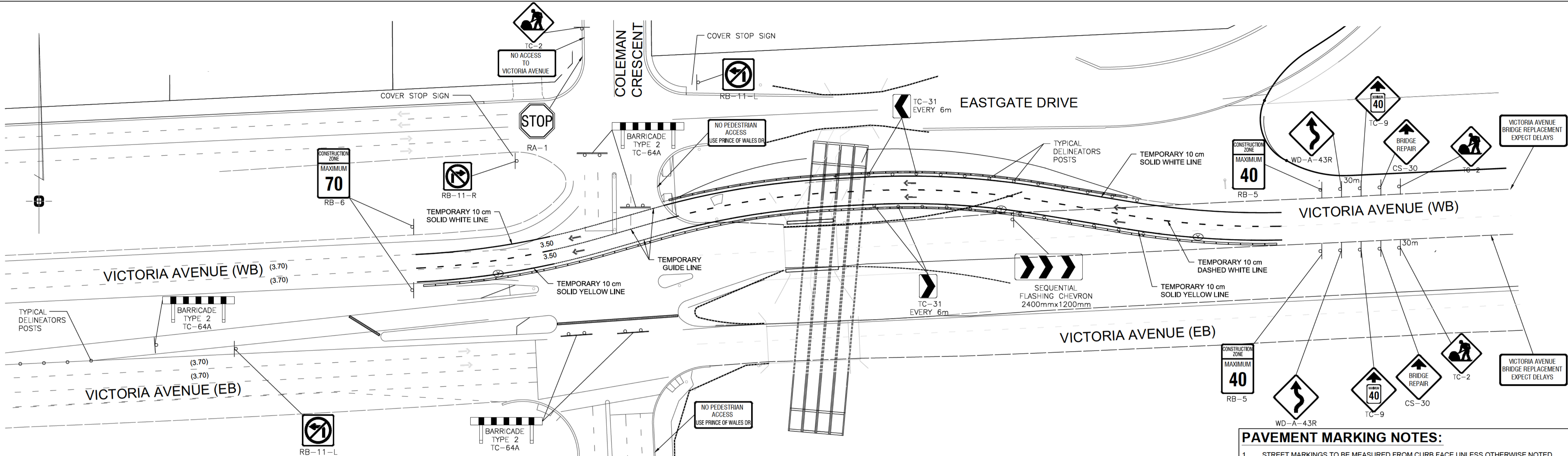
Association of Professional Engineers & Geoscientists of Saskatchewan  
**CERTIFICATE OF AUTHORIZATION**  
 WSP Canada Inc.  
 Number C0868  
 Permission to Consult held by:  
 Discipline Sk. Reg. No. Signature  
 CIVIL 22577

Revisions			
M/D/Y	Ref.	Description	By For
04/29/15	B	ISSUED FOR TENDER	V.X. B.M.



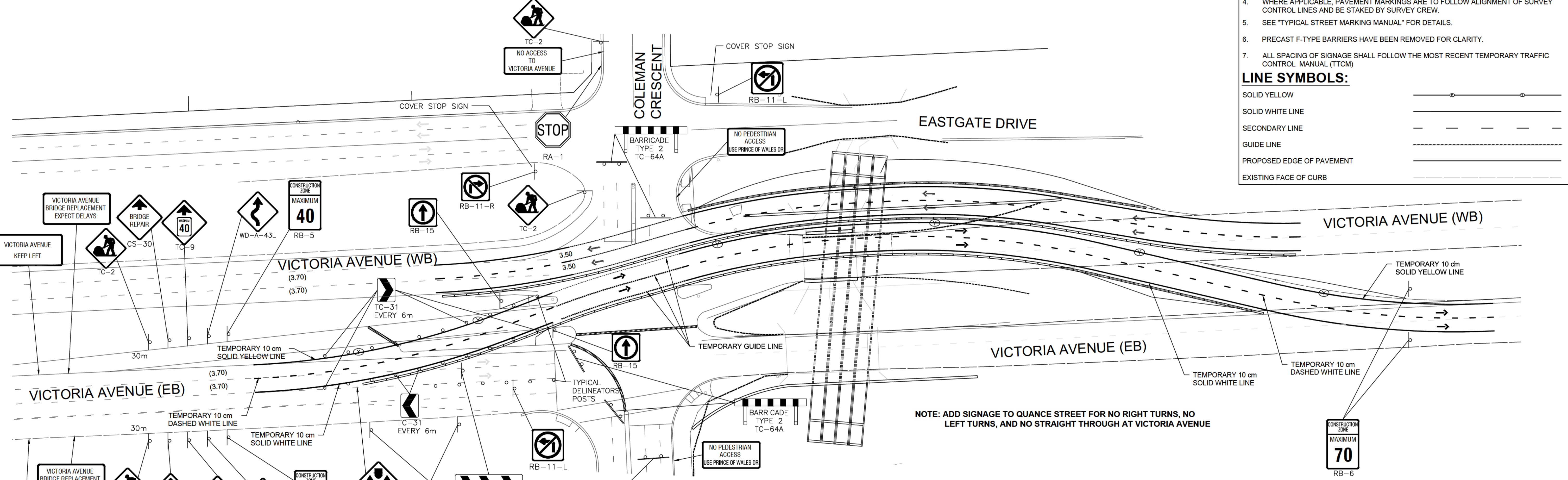
**VICTORIA AVENUE  
 DETOUR ALIGNMENT & DETAIL PLAN**

Date	MAY 1, 2015	Project	VICTORIA AVENUE
Design	D.D.	Drawn	V.X.
Contract No.	2435	Digital File:	060700079
Scale	1:500	File:	D-0001
Rev.	8	Sht.	21
Cat.	B		



**DETOUR PAVEMENT MARKING PLAN STAGE 1**

- PAVEMENT MARKING NOTES:**
- STREET MARKINGS TO BE MEASURED FROM CURB FACE UNLESS OTHERWISE NOTED.
  - SECONDARY LEAD-IN TO BE 30m BACK FROM STOP LINE UNLESS OTHERWISE NOTED.
  - CENTER LINE LEAD-IN TO BE 50m BACK FROM CROSSWALK UNLESS OTHERWISE NOTED.
  - WHERE APPLICABLE, PAVEMENT MARKINGS ARE TO FOLLOW ALIGNMENT OF SURVEY CONTROL LINES AND BE STAKED BY SURVEY CREW.
  - SEE "TYPICAL STREET MARKING MANUAL" FOR DETAILS.
  - PRECAST F-TYPE BARRIERS HAVE BEEN REMOVED FOR CLARITY.
  - ALL SPACING OF SIGNAGE SHALL FOLLOW THE MOST RECENT TEMPORARY TRAFFIC CONTROL MANUAL (TTCM)
- LINE SYMBOLS:**
- SOLID YELLOW
  - SOLID WHITE LINE
  - SECONDARY LINE
  - GUIDE LINE
  - PROPOSED EDGE OF PAVEMENT
  - EXISTING FACE OF CURB



**DETOUR PAVEMENT MARKING PLAN STAGE 2**

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 - Dimensions are in metres unless otherwise noted.  
 - Elevations are metric geoidetic.



Association of Professional Engineers & Geoscientists of Saskatchewan  
**CERTIFICATE OF AUTHORIZATION**  
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Revisions			
M/D/Y	Ref.	Description	By For
04/29/15	A	ISSUED FOR TENDER	V.X. B.M.



**VICTORIA AVENUE**  
**DETOUR PAVEMENT MARKING & SIGNAGE PLAN**

Date	MAY 1, 2015	Project	VICTORIA AVENUE
Design	D.D.	Drawn	V.X.
Contract No.	2435	Digital File:	060700079
Scale	1:500	File:	D-0002
Rev.	9	Sht.	21
Cat.	B		

**ALIGNMENT NOTES:**

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- ALL DIMENSIONS ARE TO CURB FACE.

**CONTROL LINE - VICTORIA AVE**

NAME	POINT	STATION	NORTH	EAST
101	POT	1+000.000	5588444.005	532551.189
102	POT	1+650.000	5588475.469	533200.427

**CONTROL LINE - CURVE DATA**

NAME	POINT	STATION	NORTH	EAST
201	POT	1+095.448	5588444.005	532551.189
CL-1	PC	1+175.921	5588497.204	532724.737
	CC	1+194.602	5588537.156	532722.766
	PT	1+210.875	5588513.023	532754.666
CL-2	PC	1+218.744	5588519.299	532759.414
	CC	1+232.935	5588471.032	532823.215
	PT	1+246.833	5588538.297	532779.906
CL-3	PC	1+261.833	5588546.417	532792.519
	CC	1+279.987	5588613.682	532749.211
	PT	1+297.536	5588571.698	532817.309
202	POT	1+297.536	5588475.469	533200.427

**CONTROL LINE CURVE DATA**

NAME	R	LC	DELTA	T
CL-1	40.000	34.954	50°04'04"	18.681
CL-2	80.000	28.088	20°06'59"	14.190
CL-3	80.000	35.703	25°34'13"	18.154

**CONTROL LINE - CURVE DATA**

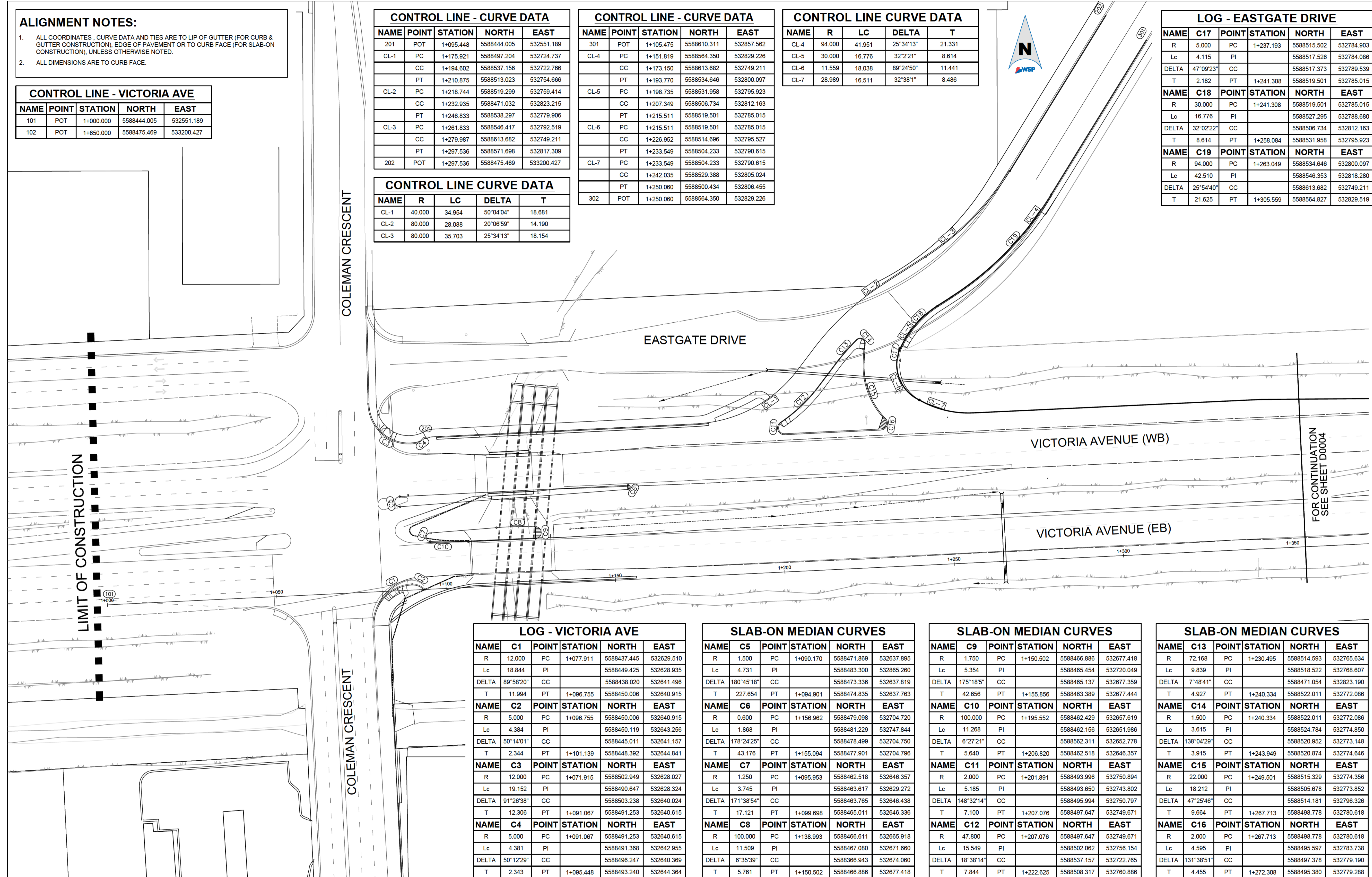
NAME	POINT	STATION	NORTH	EAST
301	POT	1+105.475	5588610.311	532857.562
CL-4	PC	1+151.819	5588564.350	532829.226
	CC	1+173.150	5588613.682	532749.211
	PT	1+193.770	5588534.646	532800.097
CL-5	PC	1+198.735	5588531.958	532795.923
	CC	1+207.349	5588506.734	532812.163
	PT	1+215.511	5588519.501	532785.015
CL-6	PC	1+215.511	5588519.501	532785.015
	CC	1+226.952	5588514.696	532795.527
	PT	1+233.549	5588504.233	532790.615
CL-7	PC	1+233.549	5588504.233	532790.615
	CC	1+242.035	5588529.388	532805.024
	PT	1+250.060	5588500.434	532806.455
302	POT	1+250.060	5588564.350	532829.226

**CONTROL LINE CURVE DATA**

NAME	R	LC	DELTA	T
CL-4	94.000	41.951	25°34'13"	21.331
CL-5	30.000	16.776	32°2'21"	8.614
CL-6	11.559	18.038	89°24'50"	11.441
CL-7	28.989	16.511	32°38'11"	8.486

**LOG - EASTGATE DRIVE**

NAME	C17	POINT	STATION	NORTH	EAST
R	5.000	PC	1+237.193	5588515.502	532784.903
Lc	4.115	PI		5588517.526	532784.086
DELTA	47°09'23"	CC		5588517.373	532789.539
T	2.182	PT	1+241.308	5588519.501	532785.015
NAME	C18	POINT	STATION	NORTH	EAST
R	30.000	PC	1+241.308	5588519.501	532785.015
Lc	16.776	PI		5588527.295	532788.680
DELTA	32°02'22"	CC		5588506.734	532812.163
T	8.614	PT	1+258.084	5588531.958	532795.923
NAME	C19	POINT	STATION	NORTH	EAST
R	94.000	PC	1+263.049	5588534.646	532800.097
Lc	42.510	PI		5588546.353	532818.280
DELTA	25°54'40"	CC		5588613.682	532749.211
T	21.625	PT	1+305.559	5588564.827	532829.519



**LOG - VICTORIA AVE**

NAME	C1	POINT	STATION	NORTH	EAST
R	12.000	PC	1+077.911	5588437.445	532629.510
Lc	18.844	PI		5588449.425	532628.935
DELTA	89°58'20"	CC		5588438.020	532641.496
T	11.994	PT	1+096.755	5588450.006	532640.915
NAME	C2	POINT	STATION	NORTH	EAST
R	5.000	PC	1+096.755	5588450.006	532640.915
Lc	4.384	PI		5588450.119	532643.256
DELTA	50°14'01"	CC		5588445.011	532641.157
T	2.344	PT	1+101.139	5588448.392	532644.841
NAME	C3	POINT	STATION	NORTH	EAST
R	12.000	PC	1+071.915	5588502.949	532628.027
Lc	19.152	PI		5588490.647	532628.324
DELTA	91°26'38"	CC		5588503.238	532640.024
T	12.306	PT	1+091.067	5588491.253	532640.615
NAME	C4	POINT	STATION	NORTH	EAST
R	5.000	PC	1+091.067	5588491.253	532640.615
Lc	4.381	PI		5588491.368	532642.955
DELTA	50°12'29"	CC		5588496.247	532640.369
T	2.343	PT	1+095.448	5588493.240	532644.364

**SLAB-ON MEDIAN CURVES**

NAME	C5	POINT	STATION	NORTH	EAST
R	1.500	PC	1+090.170	5588471.869	532637.895
Lc	4.731	PI		5588483.300	532685.260
DELTA	180°45'18"	CC		5588473.336	532637.819
T	227.654	PT	1+094.901	5588474.835	532637.763
NAME	C6	POINT	STATION	NORTH	EAST
R	0.600	PC	1+156.962	5588479.098	532704.720
Lc	1.868	PI		5588481.229	532747.844
DELTA	178°24'25"	CC		5588478.499	532704.750
T	43.176	PT	1+155.094	5588477.901	532704.796
NAME	C7	POINT	STATION	NORTH	EAST
R	1.250	PC	1+095.953	5588462.518	532646.357
Lc	3.745	PI		5588463.617	532629.272
DELTA	171°38'54"	CC		5588463.765	532646.438
T	17.121	PT	1+099.698	5588465.011	532646.336
NAME	C8	POINT	STATION	NORTH	EAST
R	100.000	PC	1+138.993	5588466.811	532665.918
Lc	11.509	PI		5588467.080	532671.660
DELTA	6°35'39"	CC		5588366.943	532674.060
T	5.761	PT	1+150.502	5588466.886	532677.418

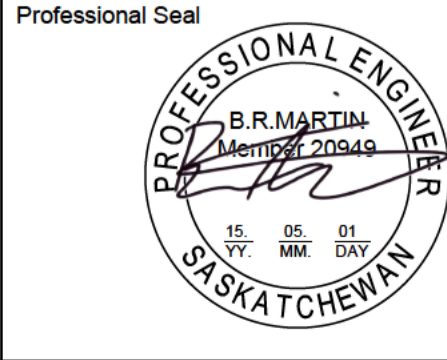
**SLAB-ON MEDIAN CURVES**

NAME	C9	POINT	STATION	NORTH	EAST
R	1.750	PC	1+150.502	5588466.886	532677.418
Lc	5.354	PI		5588465.454	532720.049
DELTA	175°18'5"	CC		5588465.137	532677.359
T	42.656	PT	1+155.856	5588463.389	532677.444
NAME	C10	POINT	STATION	NORTH	EAST
R	100.000	PC	1+195.552	5588462.429	532657.619
Lc	11.268	PI		5588462.156	532651.986
DELTA	6°27'21"	CC		5588562.311	532652.778
T	5.640	PT	1+206.820	5588462.518	532646.357
NAME	C11	POINT	STATION	NORTH	EAST
R	2.000	PC	1+201.891	5588493.996	532750.894
Lc	5.185	PI		5588493.650	532743.802
DELTA	148°32'14"	CC		5588495.994	532750.797
T	7.100	PT	1+207.076	5588497.647	532749.671
NAME	C12	POINT	STATION	NORTH	EAST
R	47.800	PC	1+207.076	5588497.647	532749.671
Lc	15.549	PI		5588502.062	532756.154
DELTA	18°38'14"	CC		5588537.157	532722.765
T	7.844	PT	1+222.625	5588508.317	532760.886

**SLAB-ON MEDIAN CURVES**

NAME	C13	POINT	STATION	NORTH	EAST
R	72.168	PC	1+230.495	5588514.593	532765.634
Lc	9.839	PI		5588518.522	532768.607
DELTA	7°48'41"	CC		5588471.054	532823.190
T	4.927	PT	1+240.334	5588522.011	532772.086
NAME	C14	POINT	STATION	NORTH	EAST
R	1.500	PC	1+240.334	5588522.011	532772.086
Lc	3.615	PI		5588524.784	532774.850
DELTA	138°04'29"	CC		5588520.952	532773.148
T	3.915	PT	1+243.949	5588520.874	532774.646
NAME	C15	POINT	STATION	NORTH	EAST
R	22.000	PC	1+249.501	5588515.329	532774.356
Lc	18.212	PI		5588505.678	532773.852
DELTA	47°25'46"	CC		5588514.181	532796.326
T	9.664	PT	1+267.713	5588498.778	532780.618
NAME	C16	POINT	STATION	NORTH	EAST
R	2.000	PC	1+267.713	5588498.778	532780.618
Lc	4.595	PI		5588495.597	532783.738
DELTA	131°38'51"	CC		5588497.378	532779.190
T	4.455	PT	1+272.308	5588495.380	532779.288

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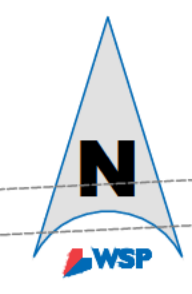
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**CERTIFICATE OF AUTHORIZATION**  
 WSP Canada Inc.  
 Number C0868  
 Permission to Consult held by:  
 Discipline: CIVIL, Sk. Reg. No.: 22577, Signature: [Signature]

M/D/Y	Ref.	Description	By	For
04/29/15	A	ISSUED FOR TENDER	V.X.	B.M.



**VICTORIA AVENUE**  
**ALIGNMENT PLAN - WEST**

Date: MAY 1, 2015	Project: VICTORIA AVENUE
Design: D.D.	Drawn: V.X.
Contract No.: 2435	Digital File: 060700079
Scale: 1:500	File: D-0003
Sheet: 10 of 21	Rev. B



**ALIGNMENT PLAN**

FOR CONTINUATION  
SEE SHEET D0003

- ALIGNMENT NOTES:**
- ALL COORDINATES, CURVE DATA AND TIES ARE TO LIP OF GUTTER (FOR CURB & GUTTER CONSTRUCTION), EDGE OF PAVEMENT OR TO CURB FACE (FOR SLAB-ON CONSTRUCTION), UNLESS OTHERWISE NOTED.
  - ALL DIMENSIONS ARE TO CURB FACE.

**CONTROL LINE - VICTORIA AVENUE**

NAME	POINT	STATION	NORTH	EAST
102	POT	1+650.000	5588475.469	533200.427

LOG - SOUTH					
NAME	C21	POINT	STATION	NORTH	EAST
R	6.000	PC	1+570.740	5588471.483	533121.268
Lc	4.772	PI		5588473.366	533122.943
DELTA	45°34'23"	CC		5588467.495	533125.751
T	2.521	PT	1+575.512	5588473.488	533125.460
NAME	C22	POINT	STATION	NORTH	EAST
R	15.000	PC	1+575.512	5588473.488	533125.460
Lc	6.482	PI		5588473.648	533128.749
DELTA	24°45'34"	CC		5588458.506	533126.186
T	3.292	PT	1+581.994	5588472.415	533131.802
LOG - NORTH					
NAME	C23	POINT	STATION	NORTH	EAST
R	5.000	PC	1+572.924	5588512.274	533121.477
Lc	3.889	PI		5588510.941	533123.032
DELTA	44°33'48"	CC		5588516.070	533124.731
T	2.049	PT	1+576.813	5588511.082	533125.076

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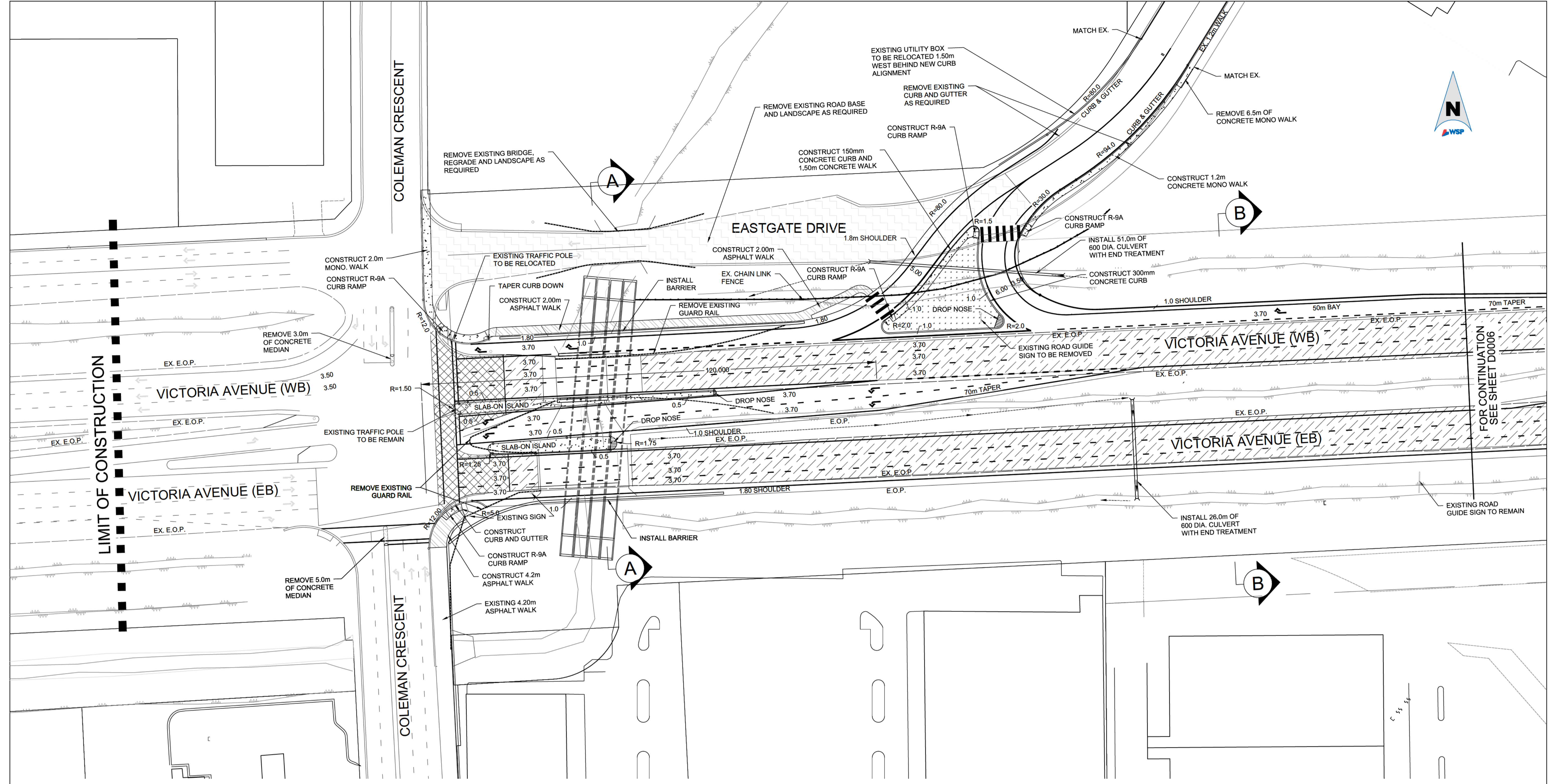
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Revisions				
M / D / Y	Ref.	Description	By	For
04/29/15	B	ISSUED FOR TENDER	V.X.	B.M.



**VICTORIA AVENUE**  
**ALIGNMENT PLAN - EAST**

Date	MAY 1, 2015	Project	VICTORIA AVENUE
Design	D.D.	Drawn	V.X.
Digital File:	060700079		
Contract No.	2435	Sht.	11 / 21
Scale	1:500	File:	D-0004
Rev.	B	Cat:	



**DETAIL PLAN**

**LEGEND**

	PERMANENT PAVEMENT STRUCTURE 150mm AGO 3-20A GRAVEL (VARIES)		ASPHALT WALK
	MILL 50mm - 70mm INLAY 0mm - 70mm ASPHALT CONCRETE 50mm - 150mm		CONCRETE
	MILL 50mm - 70mm INLAY 50mm - 70mm ASPHALT CONCRETE 150mm		LANDSCAPE
	EXISTING ROAD REMOVAL		

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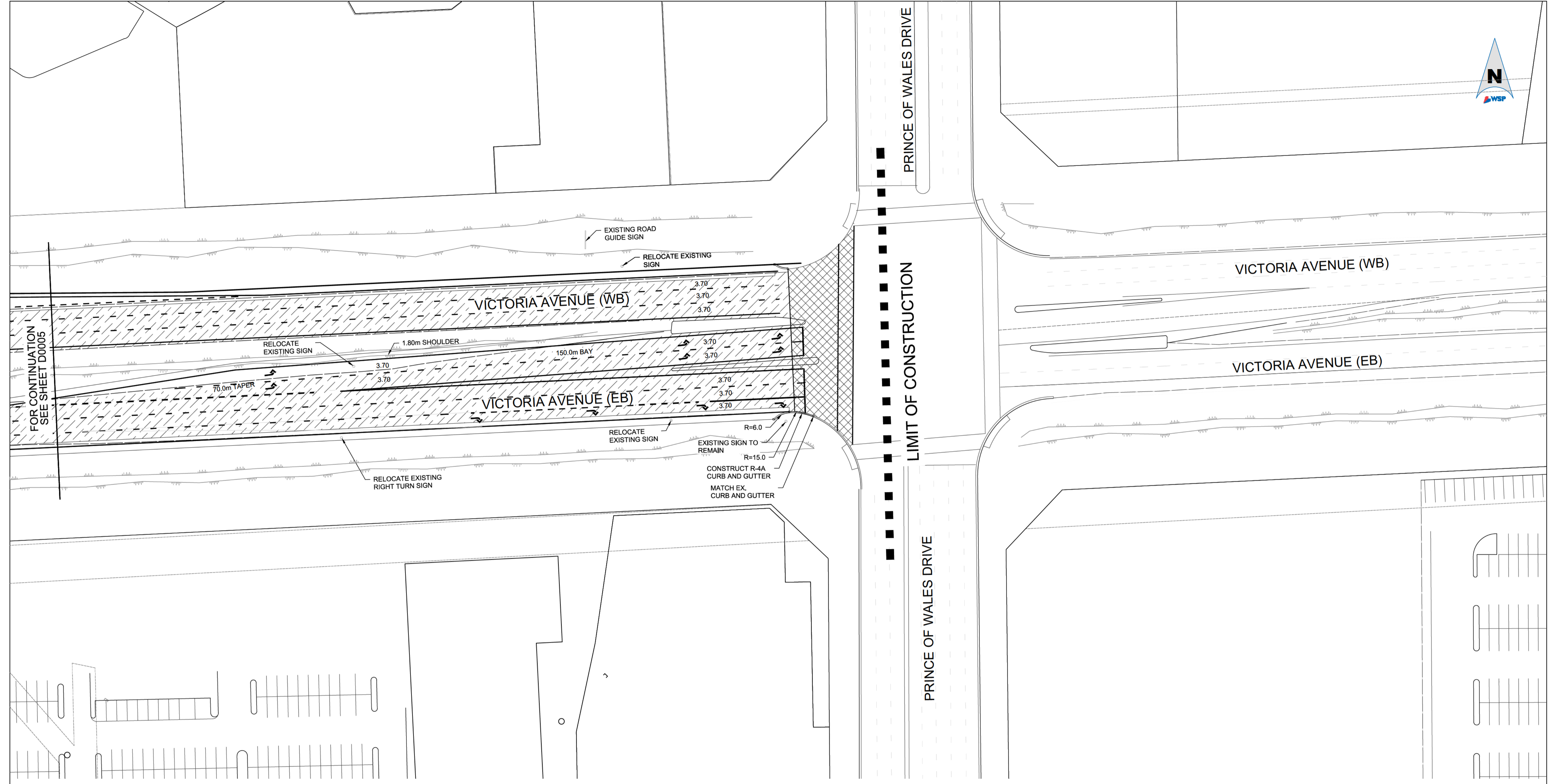
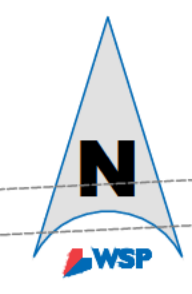
Revisions			
M/D/Y	Ref.	Description	By For
04/29/15	A	ISSUED FOR TENDER	V.X. B.M.



**VICTORIA AVENUE**  
**DETAIL PLAN - WEST**

Date	MAY 1, 2015	Project	VICTORIA AVENUE
Design	D.D.	Drawn	V.X.
Contract No.	2435	Digital File:	060700079
Scale	1:500	File:	D-0005
		Sht. 12 of 21	Rev. B
			Cat:





**DETAIL PLAN**

**LEGEND**

	PERMANENT PAVEMENT STRUCTURE 150mm ACO 3-20A GRAVEL (VARIES)
	MILL 50mm - 70mm INLAY 0mm - 70mm ASPHALT CONCRETE 50mm - 150mm
	MILL 50mm - 70mm INLAY 50mm - 70mm ASPHALT CONCRETE 150mm

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CIVIL	22577	<i>[Signature]</i>

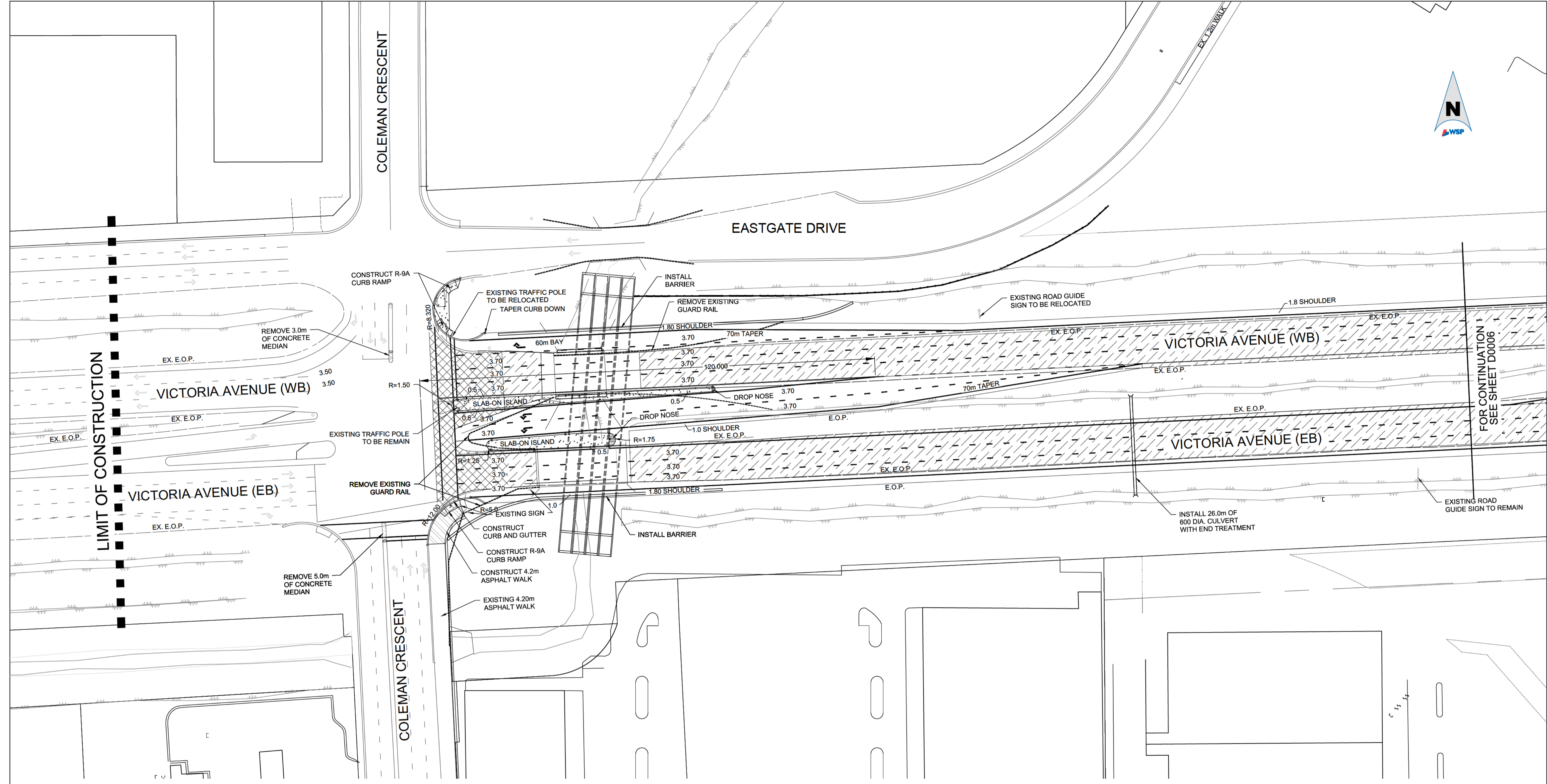
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M / D / Y	Ref.	Description	By	For
04/29/15	A	ISSUED FOR TENDER	V.X.	B.M.



**VICTORIA AVENUE**

**DETAIL PLAN - EAST**

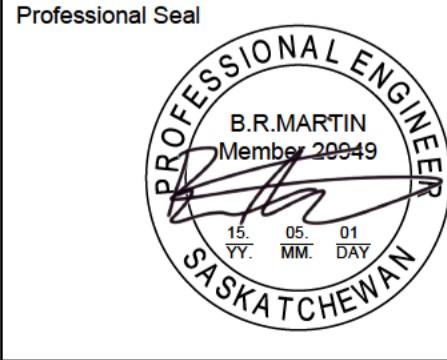
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Contract No.	2435	Digital File:	060700076
Scale	1:500	File:	D-0006
Sht.	13	Rev.	B
	21	Cat.	B



**DETAIL PLAN - ALTERNATE**

LEGEND	
	PERMANENT PAVEMENT STRUCTURE 150mm AGO 3-20A GRAVEL (VARIES)
	ASPHALT WALK
	MILL 50mm - 70mm INLAY 0mm - 70mm ASPHALT CONCRETE 50mm - 150mm
	CONCRETE
	MILL 50mm - 70mm INLAY 50mm - 70mm ASPHALT CONCRETE 150mm
	LANDSCAPE
	EXISTING ROAD REMOVAL

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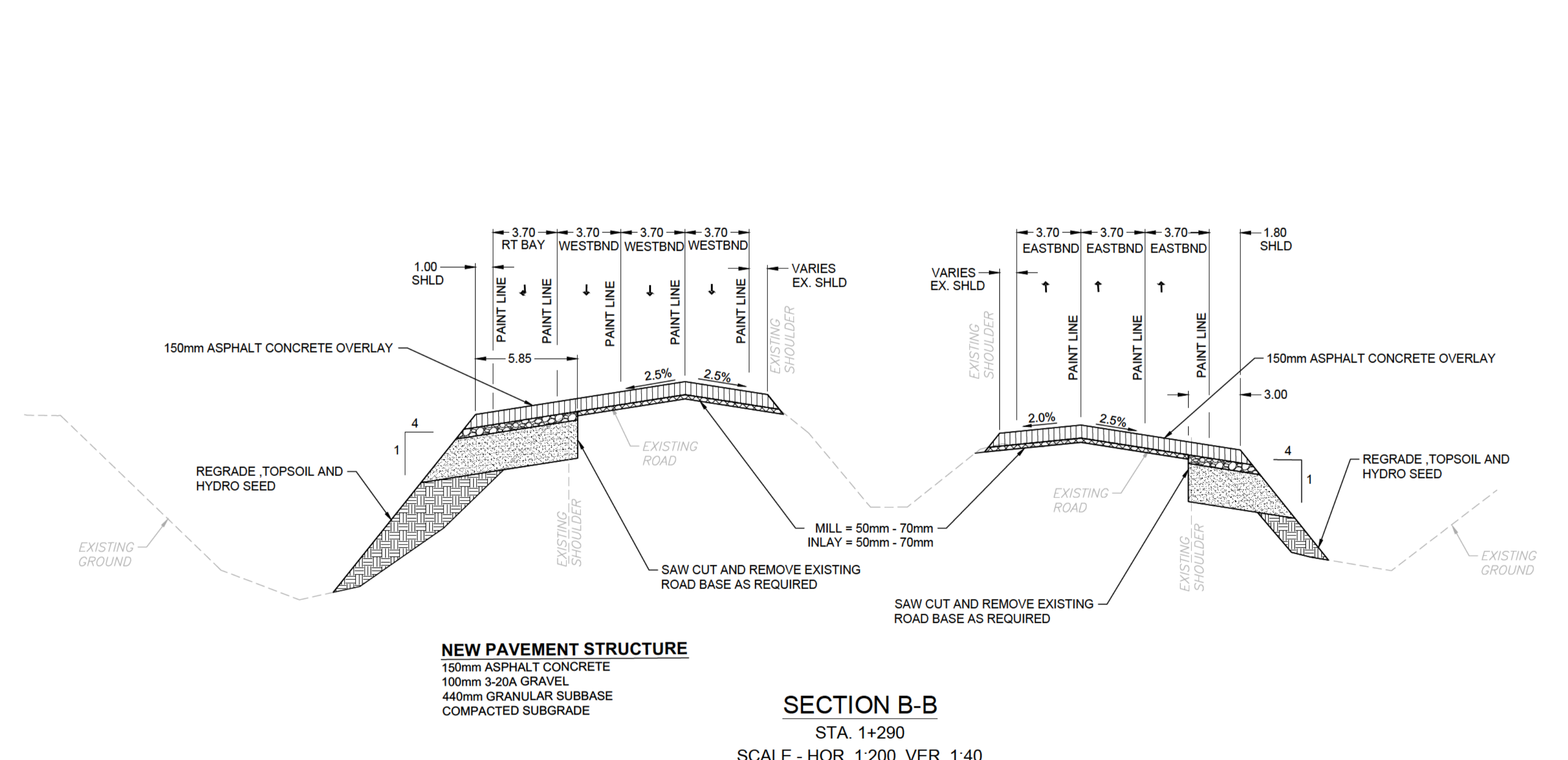
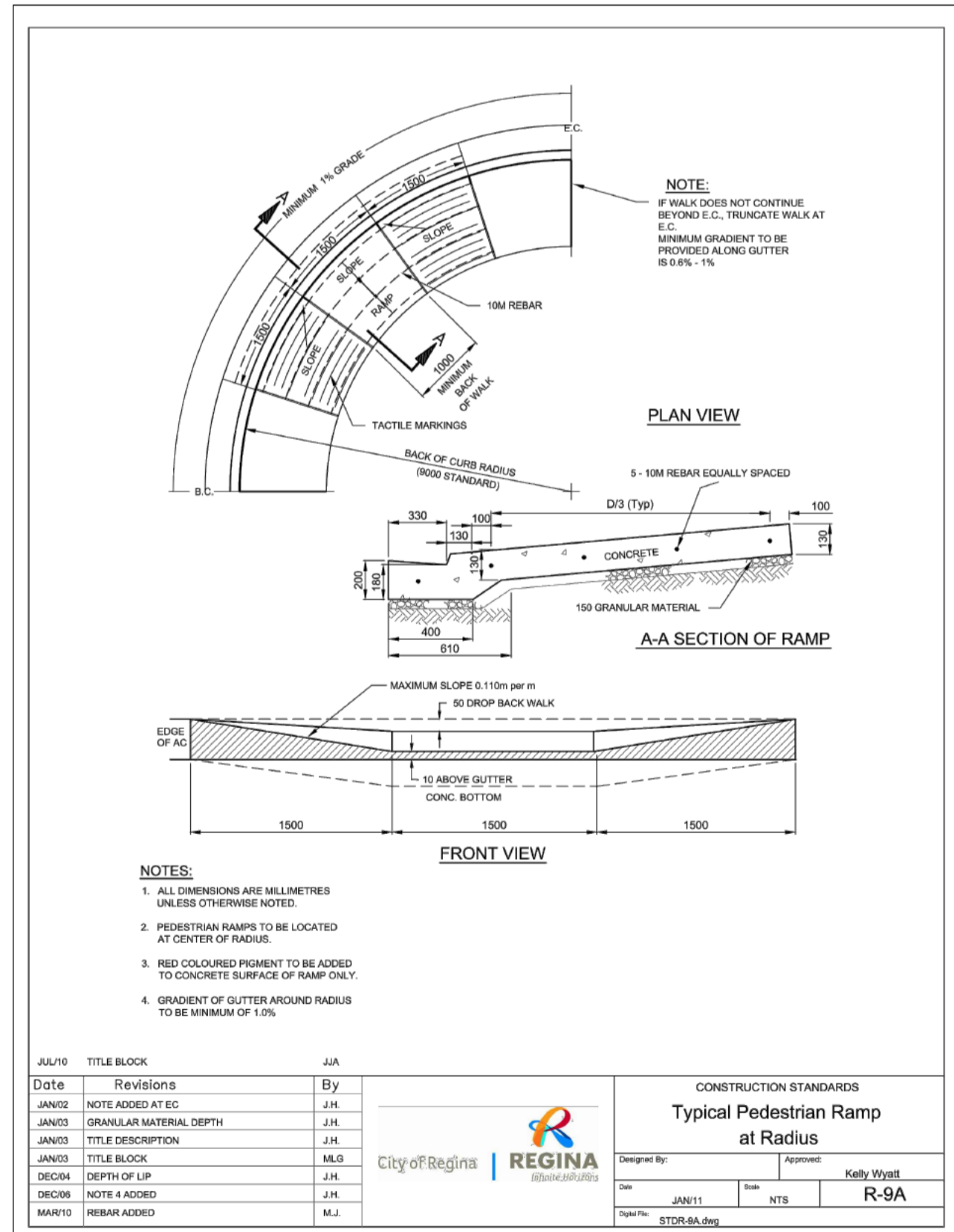
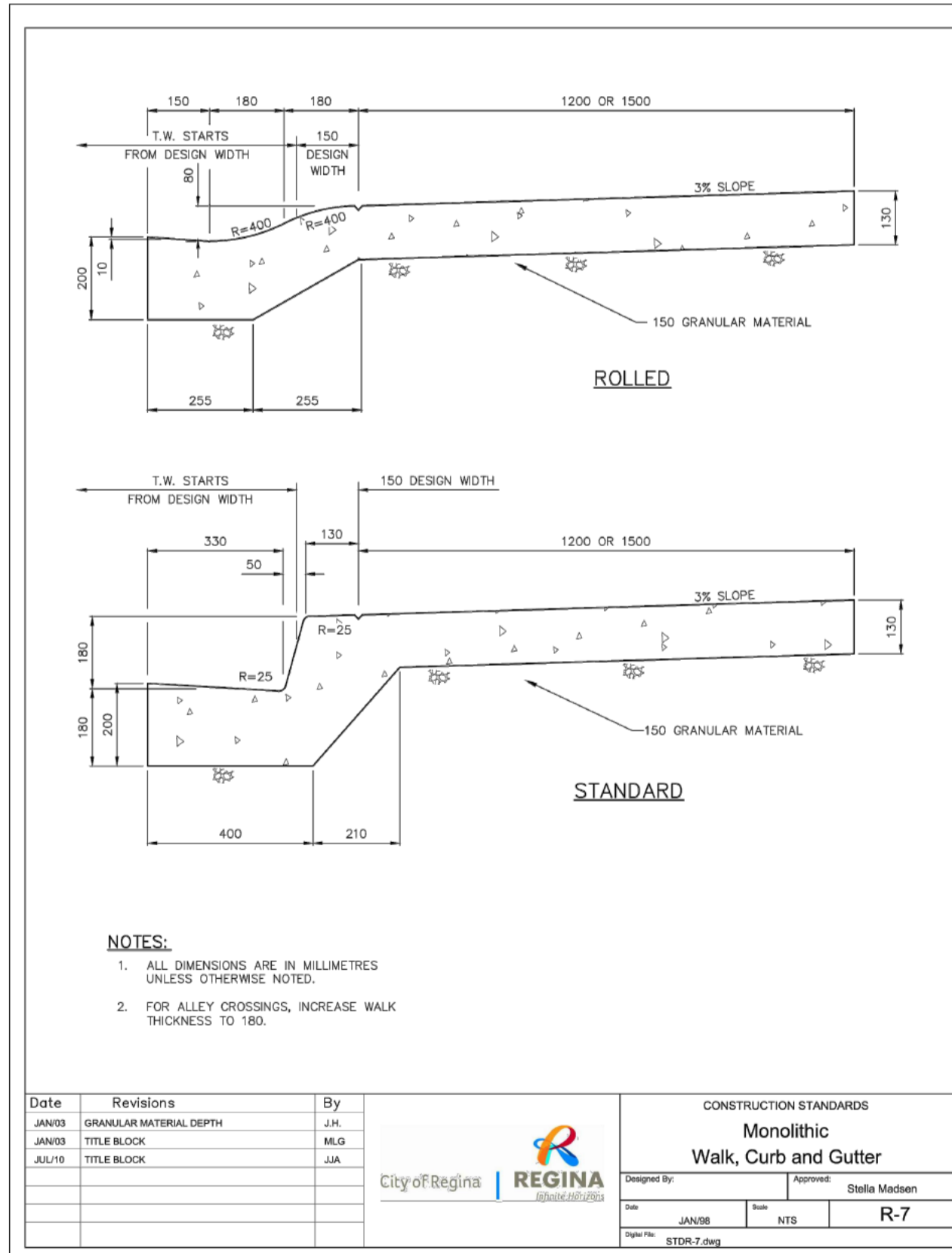
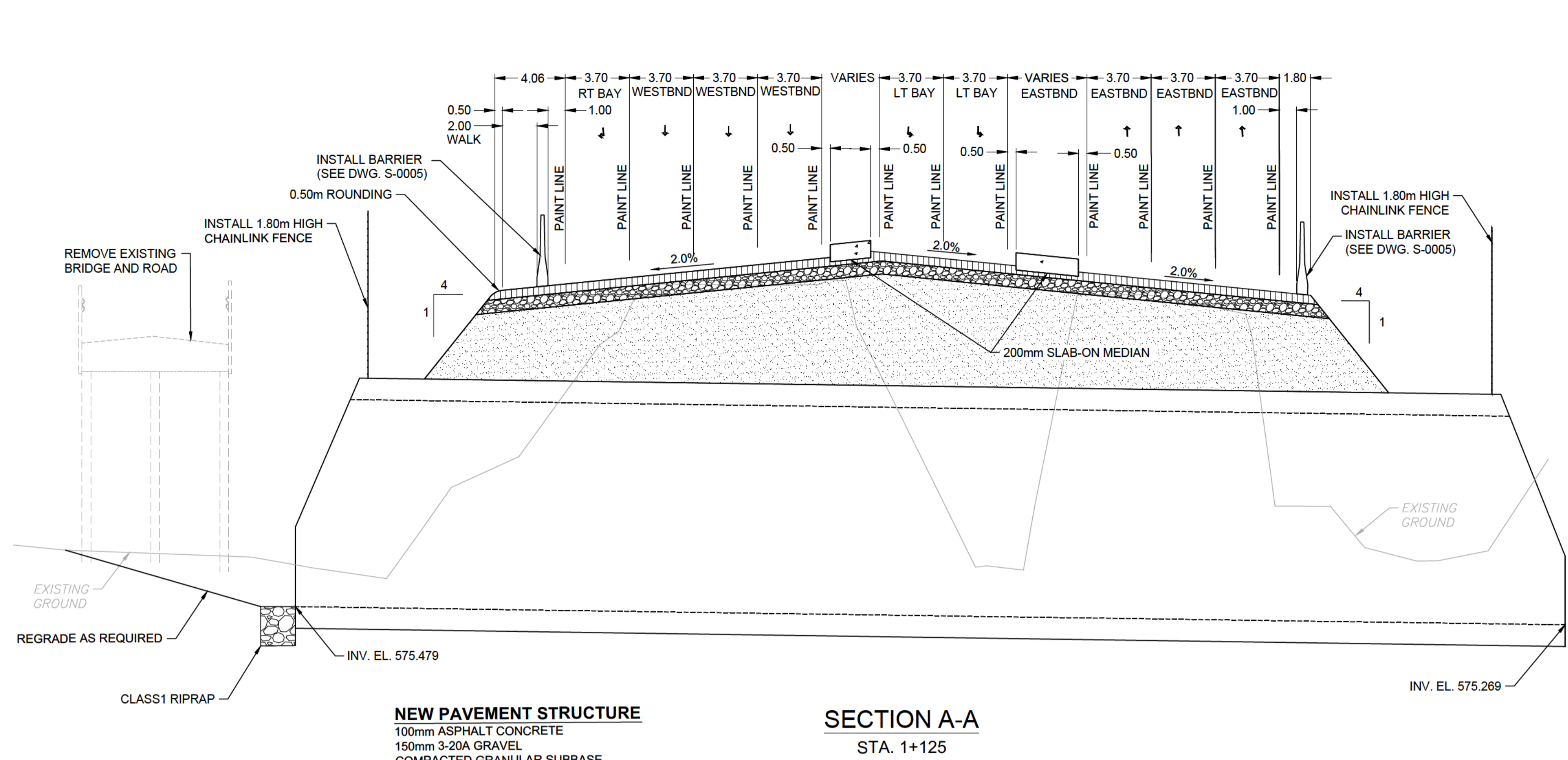
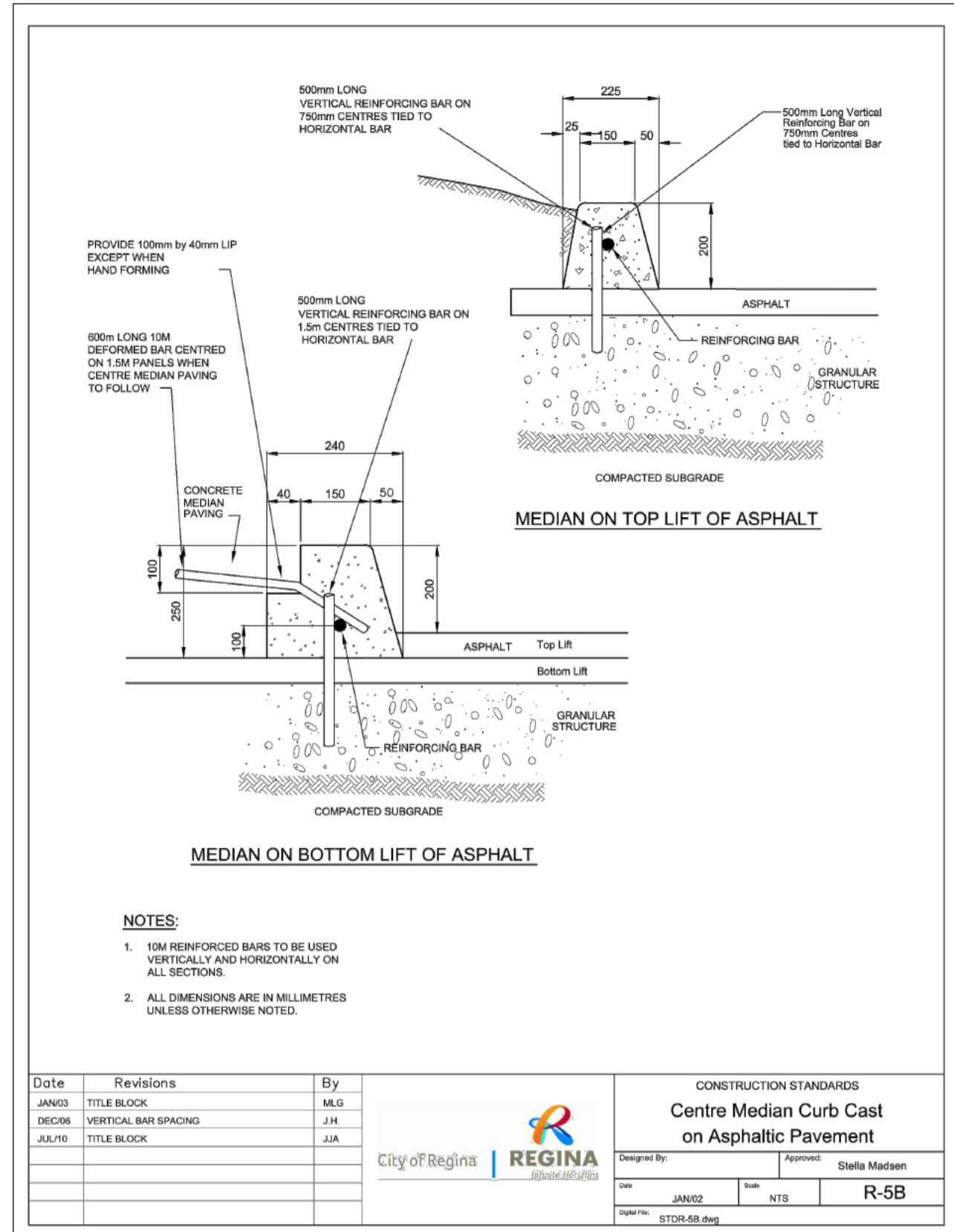
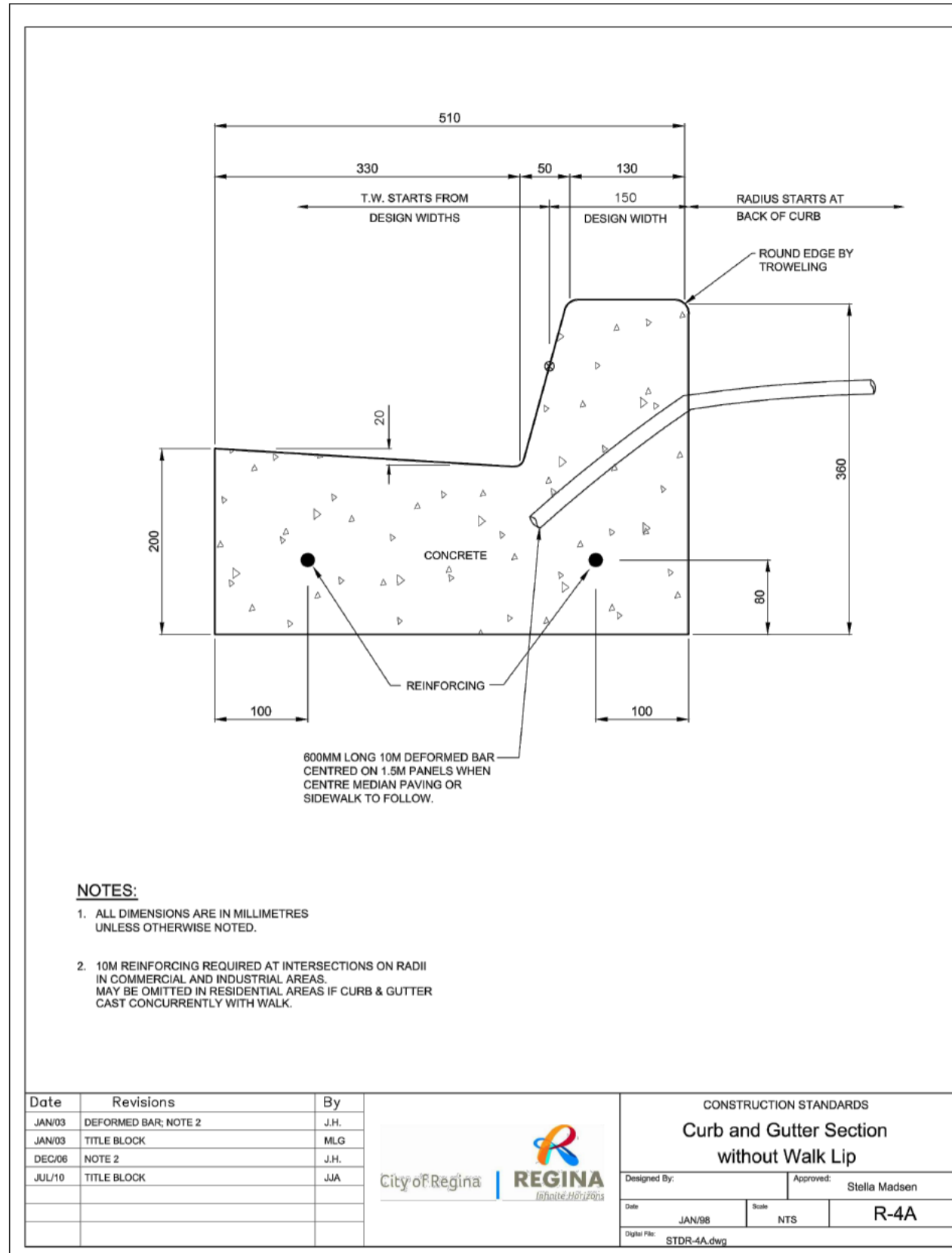
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Revisions			
M / D / Y	Ref.	Description	By / For
04/29/15	A	ISSUED FOR TENDER	V.X. / B.M.



**VICTORIA AVENUE**  
**DETAIL PLAN - ALTERNATE**

Date: MAY 1, 2015	Project: VICTORIA AVENUE
Design: D.D.	Drawn: V.X.
Contract No.: 2435	Digital File: 060700079
Scale: 1:500	File: D-0007
Sht. 14 of 21	Rev. B
Cat:	



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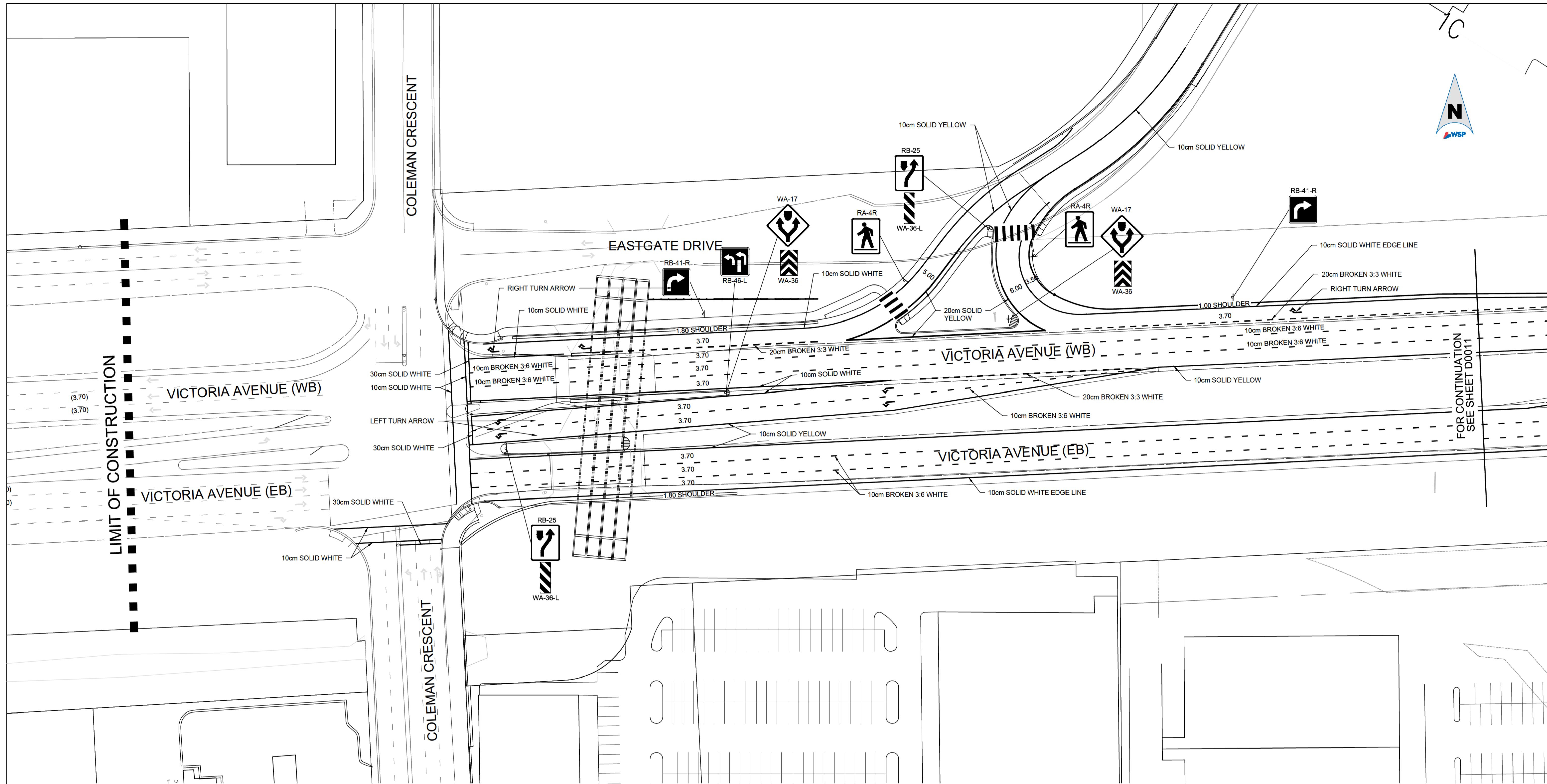
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M/D/Y	Ref.	Description	By For
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**VICTORIA AVENUE**  
**STANDARD DETAILS & CROSS SECTION**

Date	Project
MAY 1, 2015	VICTORIA AVENUE
Design D.D.	Drawn V.X.
Contract No. 2435	Digital File: 060700079
Scale 1:500	File: D-0010
Sheet 17 of 21	Rev. B
Cat:	



**PAVEMENT MARKINGS AND SIGNAGE PLAN**

**PAVEMENT MARKING NOTES:**

1. STREET MARKINGS TO BE MEASURED FROM CURB FACE UNLESS OTHERWISE NOTED.
2. SECONDARY LEAD-IN TO BE 30m BACK FROM STOP LINE UNLESS OTHERWISE NOTED.
3. CENTER LINE LEAD-IN TO BE 50m BACK FROM CROSSWALK UNLESS OTHERWISE NOTED.
4. WHERE APPLICABLE, PAVEMENT MARKINGS ARE TO FOLLOW ALIGNMENT OF SURVEY CONTROL LINES AND BE STAKED BY SURVEY CREW.
5. SEE "TYPICAL STREET MARKING MANUAL" FOR DETAILS.
6. FOR REPAINTING OF EXISTING PRIVATE PARKING LOTS, AFFECTED EXISTING PAINT LINES TO BE PAINTED OVER (BLACK) AND REPAINTED WITH STANDARD PAINT.
7. SHARROWS TO BE INSTALLED AT 1.9m OFFSET FROM CURB LINE TO CENTERLINE OF MARKING.
8. SHARROW TO BE INSTALLED 10m - 15m AFTER INTERSECTION.
9. ALL PAVEMENT MARKINGS ARE TO BE THERMO PLASTIC EXCEPT AS NOTED.

**LINE SYMBOLS:**

SOLID YELLOW	
SOLID WHITE LINE	
SECONDARY LINE	
GUIDE LINE	
PROPOSED LIP OF GUTTER & FACE OF CURB	
EXISTING FACE OF CURB	

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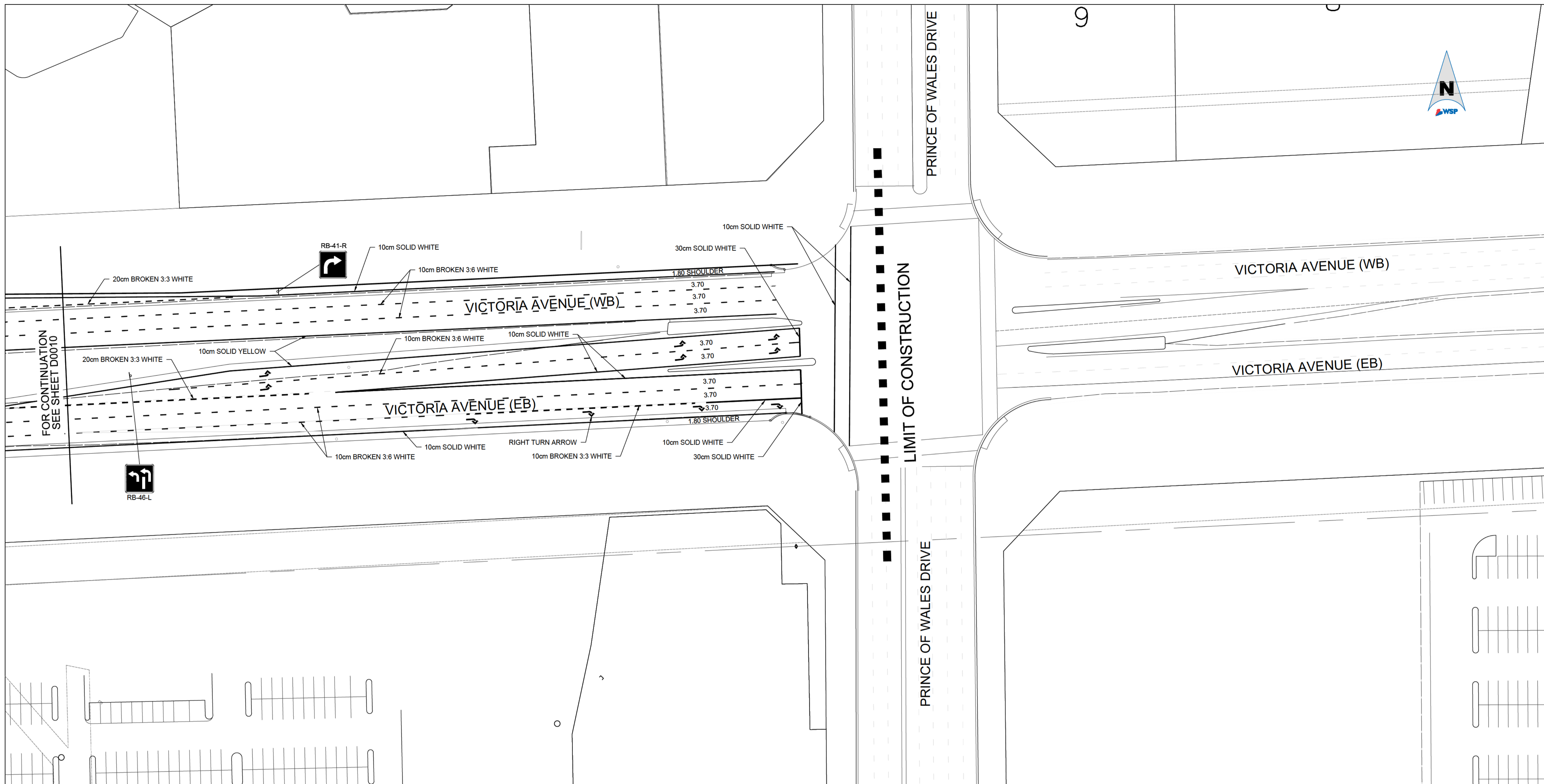
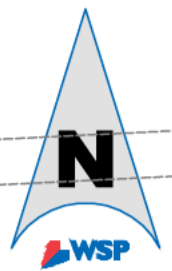
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M / D / Y	Ref.	Description	By	For
04/29/15	B	ISSUED FOR TENDER	V.X.	B.M.



**VICTORIA AVENUE**  
**PAVEMENT MARKING & SIGNAGE PLAN - WEST**

Date	MAY 1, 2015	Project	VICTORIA AVENUE
Design	D.D.	Drawn	V.X.
Contract No.	2435	Digital File:	060200079
Scale	1:500	File:	D-0011
Sht.	18	Rev.	B
Cat.	21		



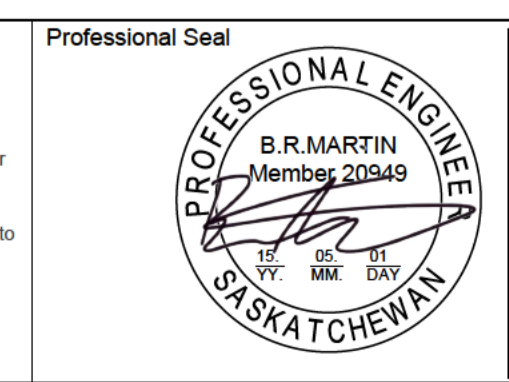
**PAVEMENT MARKING & SIGNAGE PLAN**

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  4. WHERE APPLICABLE, PAVEMENT MARKINGS ARE TO FOLLOW ALIGNMENT OF SURVEY CONTROL LINES AND BE STAKED BY SURVEY CREW.
  5. SEE "TYPICAL STREET MARKING MANUAL" FOR DETAILS.
  6. FOR REPAINTING OF EXISTING PRIVATE PARKING LOTS, AFFECTED EXISTING PAINT LINES TO BE PAINTED OVER (BLACK) AND REPAINTED WITH STANDARD PAINT.
  7. SHARROWS TO BE INSTALLED AT 1.9m OFFSET FROM CURB LINE TO CENTERLINE OF MARKING.
  8. SHARROW TO BE INSTALLED 10m - 15m AFTER INTERSECTION.
  9. ALL PAVEMENT MARKINGS ARE TO BE THERMO PLASTIC EXCEPT AS NOTED.

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SOLID WHITE LINE	
SECONDARY LINE	
GUIDE LINE	
PROPOSED LIP OF GUTTER & FACE OF CURB	
EXISTING FACE OF CURB	

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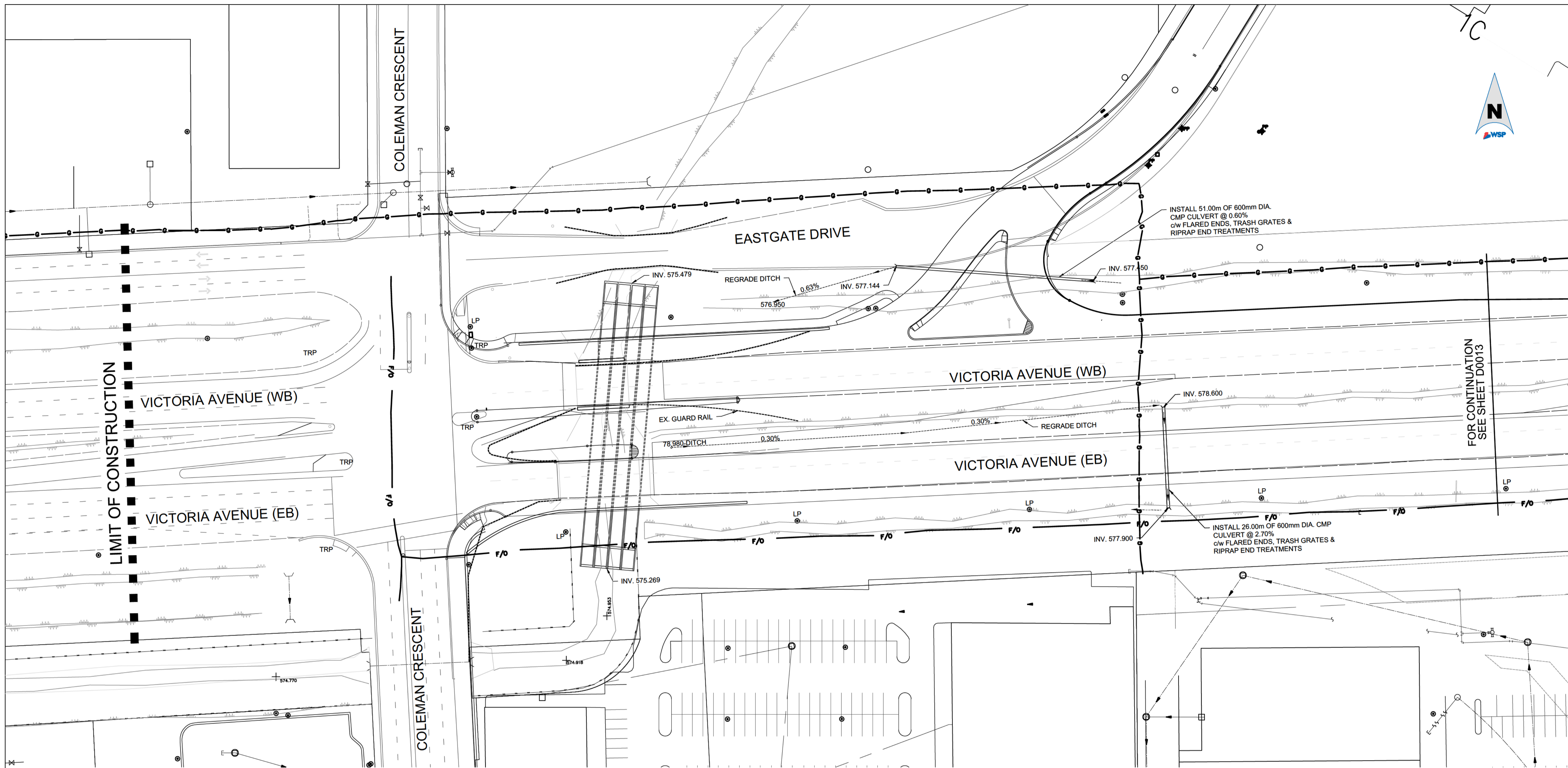
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M / D / Y	Ref.	Description	By	For
04/29/15	A	ISSUED FOR TENDER	V.X.	B.M.



**VICTORIA AVENUE**  
**PAVEMENT MARKING & SIGNAGE PLAN - EAST**

Date	MAY 1, 2015	Project	VICTORIA AVENUE
Design	D.D.	Drawn	V.X.
Digital File:	060700079		
Contract No.	2435	Sht.	19 / 21
Scale	1:500	File:	D-0012
Rev.	B	Cat:	



**UTILITY PLAN**

- Underground Utilities**
- Water
  - Storm
  - Sanitary
  - Power
  - Telephone
  - Gas
  - Fibre Optics
  - Cable

- Profile Legend**
- Center Line
  - 1m B.O.W.
  - Gutter
  - Med. Gutter
  - Prop. T.O.C.
  - Catch Basin
  - Door
  - Walk
  - Driveway

**SURFACE UTILITY LEGEND**

✕ REMOVE WOOD POWER POLE (BY OTHERS)	□ TELEPHONE MANHOLE
○ WOODEN POWER POLE	● DRAINAGE MANHOLE (SANITARY)
⊙ STREET LIGHT POLE	○ DRAINAGE MANHOLE (STORM)
□ POWER BASE POLE	⊕ CATCH BASIN MANHOLE
⊙ TRAFFIC POLE	△ CATCH BASIN
□ POWER MANHOLE	● FIRE HYDRANT
→ POLE ANCHOR	⊗ WATER VALVE
	⊥ WATER TEE

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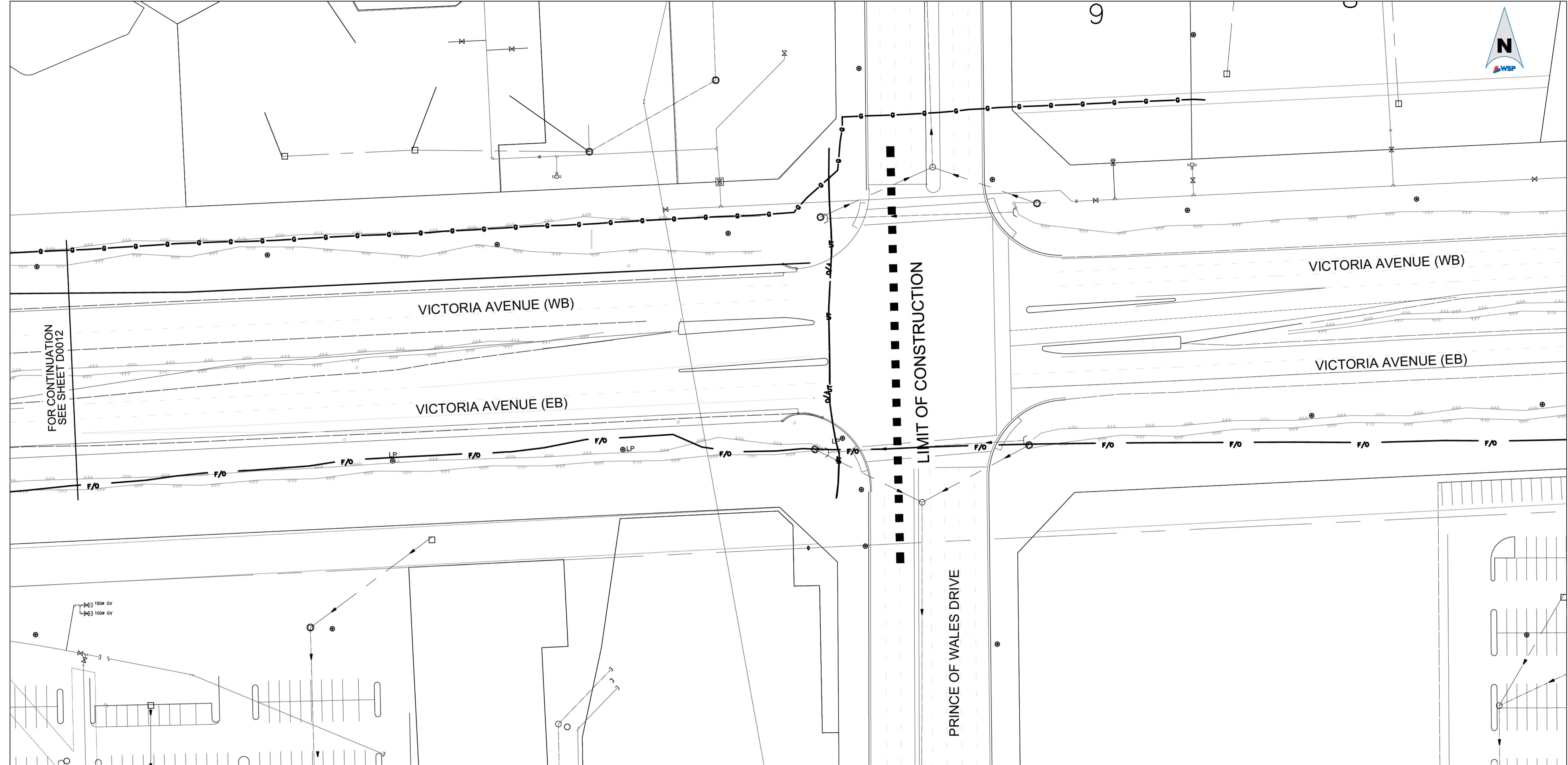
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Revisions			
M/D/Y	Ref.	Description	By For
04/29/15	B	ISSUED FOR TENDER	V.X. B.M.



**VICTORIA AVENUE**  
**UTILITY PLAN - WEST**

Date	MAY 1, 2015	Project	VICTORIA AVENUE
Design	D.D.	Drawn	V.X.
Contract No.	2435	Digital File:	060700079
Scale	1:500	File:	D-0013
Sht.	20	Rev.	B
	21	Cat.	B



UTILITY PLAN

- Underground Utilities**
- Water
  - Storm
  - Sanitary
  - Power
  - Telephone
  - Gas
  - Fibre Optics
  - Cable

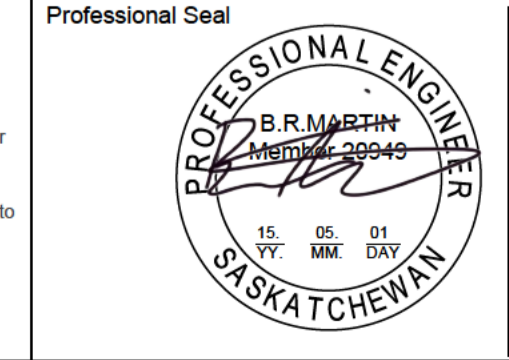
**SURFACE UTILITY LEGEND**

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○ WOODEN POWER POLE	● DRAINAGE MANHOLE (SANITARY)
⊙ STREET LIGHT POLE	○ DRAINAGE MANHOLE (STORM)
□ POWER BASE POLE	⊖ CATCH BASIN MANHOLE
⊙ TRAFFIC POLE	⊖ CATCH BASIN
□ POWER MANHOLE	● FIRE HYDRANT
→ POLE ANCHOR	✕ WATER VALVE
	⊖ WATER TEE

- Profile Legend**
- Center Line
  - 1m B.O.W.
  - Gutter
  - Med. Gutter
  - Prop. T.O.C.
  - Catch Basin
  - Door
  - Walk
  - Driveway

**Notice:**

- Utilities may not be as shown.
- City Crews must coordinate utility locates for ALL utilities (including traffic control facilities) through the City Dispatch Office.
- All Third-Party Contractors must coordinate utility locates through their own offices.
- The City of Regina is NOT responsible for any damage related to any inaccuracies in this drawing/trap or any third-party contractor's failure to properly complete utility locates.
- Dimensions are in metres unless otherwise noted.
- Elevations are metric geoidic.



Association of Professional Engineers & Geoscientists of Saskatchewan  
**CERTIFICATE OF AUTHORIZATION**  
 WSP Canada Inc.  
 Number C0868  
 Permission to Consult held by:  
 Discipline Sk. Reg. No. Signature  
 CIVIL 22577

Revisions				
M / D / Y	Ref.	Description	By	For
04/29/15	B	ISSUED FOR TENDER	V.X.	B.M.



**VICTORIA AVENUE**  
**UTILITY PLAN - EAST**

Date	MAY 1, 2015	Project	VICTORIA AVENUE
Design	D.D.	Drawn	V.X.
Digital File:	060700079		
Contract No.	2435	Sht.	21
Scale	1:500	File:	D-0014
Rev.	B	Cat.	

**SCHEDULE C - SUBCONTRACTORS AND PRODUCT SUPPLIERS**

**Subcontractors:**

We understand that the following listed elements of the work are a required part of the tender evaluation. The following are the responsible parties, whether our own forces or that of a subcontractor, whom we propose to use in the event of an award. We agree that the list will not change without the permission of the Engineer. If Bidder intends to use its own forces for an element of work, check "Own Forces".

Type of Work	Subcontractor Name	City/Province	Own Forces
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>
			<input type="checkbox"/>

**Product Suppliers:**

We understand that the following listed products to be used are a required part of the tender evaluation. The following is a list of Product and their suppliers who will be used for the Work. Neither the Product manufacturer nor the supplier will be changed without the express permission of the Engineer.

Product Name/Type	Supplier	City/Province

(Use additional sheets as necessary)