REQUEST FOR TENDERS

Dunsmuir Community Park Upgrade Project – 326 Horne Lake Road, Qualicum Bay, B.C.

ISSUED: May 28, 2018

CLOSING DATE AND TIME:
Tenders are requested to be received at the Closing Location prior to:
3:00 PM (15:00 hrs) Pacific Time on June 12, 2018

CLOSING LOCATION:
Oceanside Place Arena
830 West Island Highway
Parksville, B.C., V9P 2X4
Attention: Elaine McCulloch

Tenders will not be opened in public

Regional District of Nanaimo (RDN) Contact for Questions:
Elaine McCulloch, Parks Planner, Recreation and Parks
Telephone: 250-248-4744 ext. 3656
Email: emcculloch@rdn.bc.ca

Deadline for questions is three (3) business days before the closing date.

Optional Site Visit Meeting:
A non-mandatory site visit will be held on June 4, 2018 at 10:00 am at 326 Horne Lake Road, Qualicum Bay, B.C.. Interested parties will have the opportunity to view the site, take any measurements and ask any questions. All persons in attendance must bring their own personal protection equipment (i.e. steel toe footwear, high visibility vest, etc.). A sign-in sheet will be provided.

Invitation

Qualified and experienced Contractors are invited to submit tenders for the "Dunsmuir Community Park Upgrade" project as per the specifications provided herein by Victoria Drake Landscape Architect and Kate Stefiuk Studio.

This project is phase one of a park upgrade at 326 Horne Lake Road in Qualicum Bay, B.C. and consists of the following:

- A new asphalt play court for ball hockey, pickle ball and basketball.
- A gravel driveway and parking lot.
- A temporary gravel path, grass swale, grass hills, seeding, and irrigation.

The Regional District of Nanaimo will be responsible for the Building Permit, Hydro Pole relocation and Canada Post mailbox relocation.

The successful contractor will be responsible for making their own provisions for power, water and sanitary facilities.

Anticipated project start date is August 2, 2018 with substantial completion by October 31, 2018.

Instructions to Bidders

Article 1. Closing Date/Time/Location
Bidders are requested to submit their Tender prior to the closing time of 3:00 PM (15:00 hrs), Pacific Time, June 12, 2018 as follows:

By hand/courier delivery only: One (1) copy of the Tender Form, Bid Bond and Consent of Surety enclosed and sealed in an envelope clearly marked: "Dunsmuir Community Park Upgrade" delivered to the:

Oceanside Place Arena
830 West Island Highway
Parksville, B.C., V9P 2X4
Attention: Elaine McCulloch

Tenders received by email or facsimile will not be accepted.

ARTICLE 2. Examine Documents
The Tenderer must carefully examine all of the Documents and the site of the proposed works, judging for and satisfying himself as to the probable conditions to be encountered. Should a Tenderer find discrepancies in, or omissions from the documents, or should he be in doubt as to their meaning, he should, prior to submitting his tender, notify the RDN in writing. The Tenderer may not claim, after the

submission of a tender, that there was any misunderstanding with respect to the conditions imposed by the documents.

No verbal agreement or conversation made or had at any time with any officer, agency or employee of the Owner shall affect or modify any of the terms or obligations herein stated, or deemed to be any representation of warranty.

Article 3. Bonding
All tenders must be accompanied by a Bid Bond in an amount of 10% of the total Contract Value along with a Consent of Surety. The successful contractor will have to supply a Performance Bond and a Labour & Material Payment Bond each in the amount of 50% of the total Contract Value.

Article 4. Addenda
If the RDN determines that an addendum is required for this TENDER, the RDN will post the addendum on the RDN website and the BC Bid website. Each addendum will be incorporated into and become part of the TENDER. No amendment of any kind to the TENDER is effective unless it is contained in a written addendum issued by the RDN. It is the sole responsibility of Bidders to check the websites and ensure any and all addendums are included prior to submitting their final Tender submission.

ARTICLE 5. Tender Price
Pricing, in Canadian dollars, shall be filled in where indicated on the Tender Form. In the event of a price discrepancy when calculating the total contract value, the RDN reserves the right to correct the totals without changing the lump sum amount.

ARTICLE 6. Federal and Provincial Sales Taxes
Prices shall include provincial sales tax payable on all applicable materials and equipment incorporated in the work. GST is not to be included in the price. GST shall be shown separately on the Tender Form based on the total contract value.

ARTICLE 7. Tender Signing
The tender must be executed by an authorized signatory in a position to legally bind their Company to the information contained in the Tender Form.

ARTICLE 8. Revisions to Tenders
Any revision to the tender by the Tenderer must be in writing properly executed and received prior to the posted closing date and time as per the submission instructions outlined in Article 1.

Multiple Revisions
Where a Tenderer submits multiple revisions to the original tender price, each revision should be numbered sequentially by the Tenderer. Unless the Tenderer clearly stipulates to the contrary on the face of the revision, each successive revision will nullify and replace any previous revision to the identified item or tender price.

Unclear or Ambiguous Revisions
If in the opinion of the RDN, any revision is unclear, ambiguous as to meaning or intent, or does not comply with the requirements of Article 9, that revision will be disregarded and the original tender price, or the tender price determined by consideration of any other revisions will prevail. The RDN, its employees and agents will not assume any responsibility for timely receipt of any revisions.

ARTICLE 9. Tender Withdrawal
A Tenderer may, without prejudice to himself, withdraw his tender on written request received prior to the posted closing date and time to the RDN contract administrator.

ARTICLE 10. Tender Rejection
.1 The RDN reserves the right to reject any or all tenders, or accept other than the lowest tender and to accept the tender which it deems most advantageous.

.2 The RDN may reject a tender if:

a) After investigation and consideration, the RDN concludes that the Tenderer is not qualified to do the work and/or cannot do the work and perform the Contract in a manner satisfactory to the RDN.
b) A tender contains qualifying conditions or otherwise fails to conform to these Instructions to Tenderers.
c) A tender is incomplete, is considered incomplete in the Instructions to Tenderers, is obscure or irregular, which has erasures or corrections in the Tender Form, in which prices are omitted or are unbalanced, or which has an insufficient or irregular surety.
d) The RDN may, in its absolute discretion, reject a Tender submitted by Tenderer if the Tenderer, or any officer or director of the Tenderer is or has been engaged either directly or indirectly through another corporation in a legal action against the RDN, its elected or appointed officers and employees in relation to:
    - any other contract for works or services; or
    - any matter arising from the RDN's exercise of its powers, duties, or functions under the Local Government Act or another enactment within five years of the date of this Call for Tenders.

In determining whether to reject a tender under this clause, the RDN will consider whether the litigation is likely to affect the Tenderer's ability to work with the RDN, its consultants and representatives and whether the RDN's experience with the Tenderer indicates that the RDN is likely to incur increased staff and legal costs in the administration of this contract if it is awarded to the Tenderer.

.4 The RDN may reject all tenders if for any reason the RDN considers to be in its best interest to do so, including without limitation for any of the following reasons;

a) the lowest tender that the RDN considers otherwise acceptable is higher than the funds budgeted or otherwise available for the project;
b) the RDN decides not to proceed with the project or to defer the project;
c) the RDN is delayed in obtaining, or is unable to obtain, all approvals or consents it considers necessary, whether required by law or otherwise.

.5 The RDN reserves the right to consider and to reject any tender or all tenders without notice to a Tenderer or Tenderers and without permitting a Tenderer to provide additional information.

.6 In no event will the RDN be responsible for a Tenderer's costs of preparing or submitting a tender.

ARTICLE 10. Award

Awards shall be made on tenders that will give the greatest value based on quality, service and price. The RDN will, following receipt of an acceptable tender, issue in writing a Notice of Award to the successful Tenderer.

ARTICLE 11. Form of Agreement

The form of agreement is CCDC2-2008 including the Supplementary Conditions.

TENDER FORM
Dunsmuir Community Park Upgrade – 326 Horne Lake Road, Qualicum Bay, B.C.

Date: _____

Company: _____

Address: _____

Telephone:_____ Email: _____

To: Regional District of Nanaimo

Having examined the Project site and having carefully examined all of the tender documents including all Addenda issued as supplements thereto, and having examined and complied with Instructions to Bidders, we hereby offer to perform the Work set forth in the aforesaid documents for the Pricing in Canadian Dollars. Prices include the Contractor's labour, material, equipment, material costs, overhead and profit, all taxes and duties, and shall represent the cost to the RDN of such charges excluding GST which shall be shown separately.

LUMP SUM PRICING:

Lump Sum Total: $ _____

GST (5%): $ _____

Total Contract Price: $ _____

ACCEPTANCE

.1 This Bid is open to acceptance for a period of sixty (60) days from the date of bid closing.

.2 Submission of this Bid implies acceptance of the existing conditions at the site.

.3 We understand that the lowest or any Bid will not necessarily be accepted. The RDN may also elect not to proceed with the Project.

.4 The RDN reserves the right to waive minor defects or irregularities in the bid.

.5 We agree to enter into a CCDC2-2008 agreement with the Supplementary General Conditions.

REGIONAL DISTRICT OF NANAIMO

TENDER FORM
Dunsmuir Community Park Upgrade – 326 Horne Lake Road, Qualicum Bay, B.C.

.6 The Tenderer agrees to be designated as the Prime Contractor for this project per WorkSafe BC OH&S Regulations Sections 20.2 Notice of Project and 20.3 Coordination of Multiple Employer Workplaces and Workers' Compensation Act, Section 118 Coordination of Multiple-Employer Workplaces (1) and (2). We are qualified and are willing to accept the responsibilities as Prime Contractor for the project.

.7 CHANGES
When the Consultant establishes that the method of valuation for Changes in the Work will be net cost plus a percentage fee in accordance with CCDC2-2008 - Article GC 12.1 - Article of the General Conditions, the percentage fee will be:

.1 10% of the actual cost of the Contractor's work for Contractor overhead and profit;
.2 5% of the Subcontractor's work for Contractor overhead and profit
.3 10% of the actual cost of the Subcontractor's work for Subcontractor overhead and profit

.8 We can complete the work by October 31, 2018.

Company: _____

Signature: _____
(Authorized Officer)

Printed: _____
(Authorized Officer)

PLANT LIST

Key	Qty	Botanical Name	Common Name	Pot Size	Spacing
Deciduous Shade Tree					
Am		Acer macrophyllum	Big Leaf Maple	#5	
Play Space Plantings					
Evergreen Shrubs					
Gs		Gaultheria shallon	Salal	#1	60 cm o.c.
Mn		Mahonia nervosa	Dull Oregon Grape	#1	60 cm o.c.
Vo		Vaccinium ovatum	Evergreen Huckleberry	#1	60 cm o.c.
Ground Cover					
Auu		Arctostaphylos uva-ursi	Kinnikinnick	10 cm	45 cm o.c.
Fv		Frageria vesca	Wild Strawberry	10 cm	45 cm
Ferns					
Pm		Polystichum munitum	Sword Fern	#1	60 cm o.c.
Perennials/Grasses					
My		Miscanthus yaku jima	Maiden Grass	#1	60 cm o.c.
Nd		Nepeta dropmore blue	Catmint	#1	60 cm o.c.
Pa		Penisetum alopecuroides	Fountain Grass	#1	60 cm o.c.
Buffer with Neighbours					
Deciduous Shrubs					
Aa		Amelanchier alnifolia	Saskatoon	#1	1.2m o.c.
Cs		Cornus sericea	Red Osier Dogwood	#1	1.2m o.c.
Hd		Holodiscus discolor	Ocean Spray	#1	1.2m o.c.
Oc		Oemleria cerasiformis	Indian Plum	#1	1.2m o.c.
Pca		Physocarpus capitatus	Pacific Ninebark	#1	1.2m o.c.
Rs		Ribes sanguineum	Red Flowering Currant	#1	1.2m o.c.
Rn		Rosa nutkana	Nootka Rose	#1	1.2m o.c.
Rp		Rubus parviflorus	Thimbleberry	#1	1.2m o.c.
B		Vaccinium	Blueberries	#1	1.2m o.c.
Wetland Plants for Bioswale					
Co		Carex obnupta	Slough Sedge	#1	60 cm o.c.
Ie		Iris ensata	Blue Flag Iris	#1	60 cm o.c.
Sm		Scirpus microcarpus	Small-flowered Bulrush	#1	60 cm o.c.

NOTES:

1. Seed Mix to be Pickseed Coastal Native Sodgrass Mixture, or equivalent.

DESIGN ELEMENTS


1 PLAY POLES
special feature for the play ground, marks the entrance, directs children's movement around and through space, makes space visible from a distance, adds colour & interest to the area


2 BOARDWALK & LOOKOUT
focal point for playground, provides sheltered space for sitting, marks edge of playground and forest/wetland


3 CIRCULAR PAVED PATH
defines space, connects play ground elements, provides continous movement for children on foot or on wheels, accessible to most users


4 NATURAL PLAY AREA
provides play for younger children, utilizes natural elements for play, logs for balancing, sitting, imaginative play (log is a boat, house, kitchen, dinosaur, etc.), sand to manipulate, enclosed by low grassy meadow hill


5 GRASSY HILLS
shape the play space, provide up & down movement for children, form a look out over the play ground, create a barrier from adjacent properties and parking

VICTORIA DRAKEFORD
LANDSCAPE ARCHITECT
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250-754-4335
victorialandscapearchitect@gmail.com

KATE STEFIUK STUDIO
1070 Nelson St Nanaimo BC V9S 2K2
250-753-8093
kate.stefiuk@gmail.com

CLIENT

NO. | DATE | ISSUE

1 18-02-05 80%

NO. | DATE | REVISION

PROJECT

DUNSMUIR COMMUNITY PARK

326 Horne Lake Road
Qualicum Beach, BC

CONCEPT PLAN

PROJECT 17010
DB KS **CB** VD

SCALE 1:250
DATE Febuary 05, 2018

L1.01

Dunsmuir Community Park
Phase One

Regional District of Nanaimo

ISSUED FOR TENDER
NOT FOR CONSTRUCTION

May 28, 2018

Drawing Schedule

VICTORIA DRAKEFORD
LANDSCAPE ARCHITECT

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250-754-4335
victoria@island.net

KATE STEFIUK STUDIO

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250-753-8093
kate.stefiuk@gmail.com

CLIENT

NO.	DATE	ISSUE
1	5/28/18	Issued For Tender

NO.	DATE	REVISION

PROJECT

DUNSMUIR COMMUNITY PARK

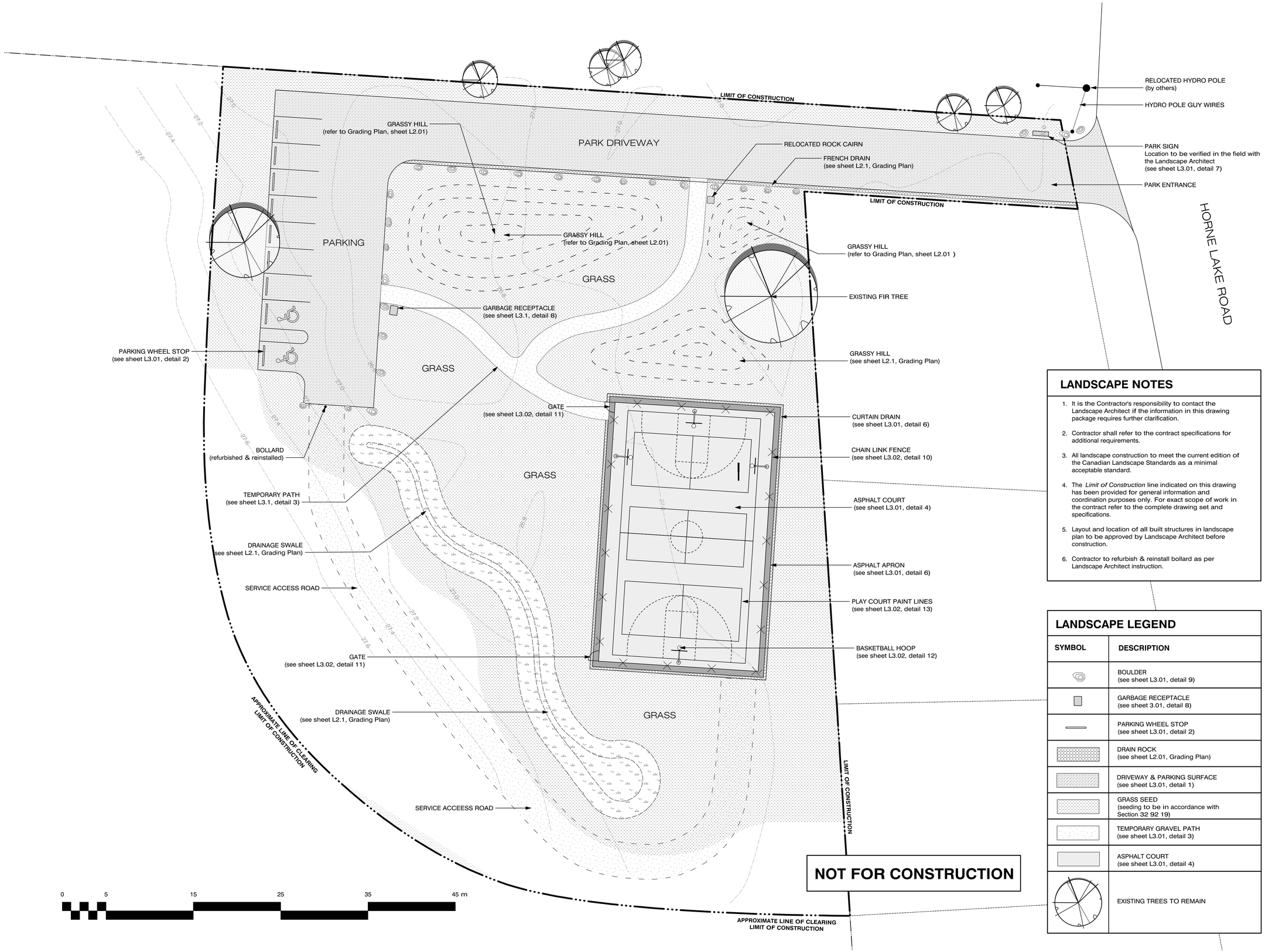
326 Horne Lake Road
Qualicum Bay, B.C.

DRAWING SCHEDULE

PROJECT 17010
DB KS **CB** VD

SCALE NTS
DATE May 28, 2018

L0.00



LANDSCAPE NOTES

1. It is the Contractor's responsibility to contact the Landscape Architect if the information in this drawing package requires further clarification.
2. Contractor shall refer to the contract specifications for additional requirements.
3. All landscape construction to meet the current edition of the Canadian Landscape Standards as a minimal acceptable standard.
4. The *Limit of Construction* line indicated on this drawing has been provided for general information and coordination purposes only. For exact scope of work in the contract refer to the complete drawing set and specifications.
5. Layout and location of all built structures in landscape plan to be approved by Landscape Architect before construction.
6. Contractor to refurbish & reinstall bollard as per Landscape Architect instruction.

LANDSCAPE LEGEND

SYMBOL	DESCRIPTION
	BOULDER (see sheet L3.01, detail 9)
	GARBAGE RECEPTACLE (see sheet 3.01, detail 8)
	PARKING WHEEL STOP (see sheet L3.01, detail 2)
	DRAIN ROCK (see sheet L2.01, Grading Plan)
	DRIVEWAY & PARKING SURFACE (see sheet L3.01, detail 1)
	GRASS SEED (seeding to be in accordance with Section 32 92 19)
	TEMPORARY GRAVEL PATH (see sheet L3.01, detail 3)
	ASPHALT COURT (see sheet L3.01, detail 4)
	EXISTING TREES TO REMAIN

NOT FOR CONSTRUCTION

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PROJECT

DUNSMUIR COMMUNITY PARK

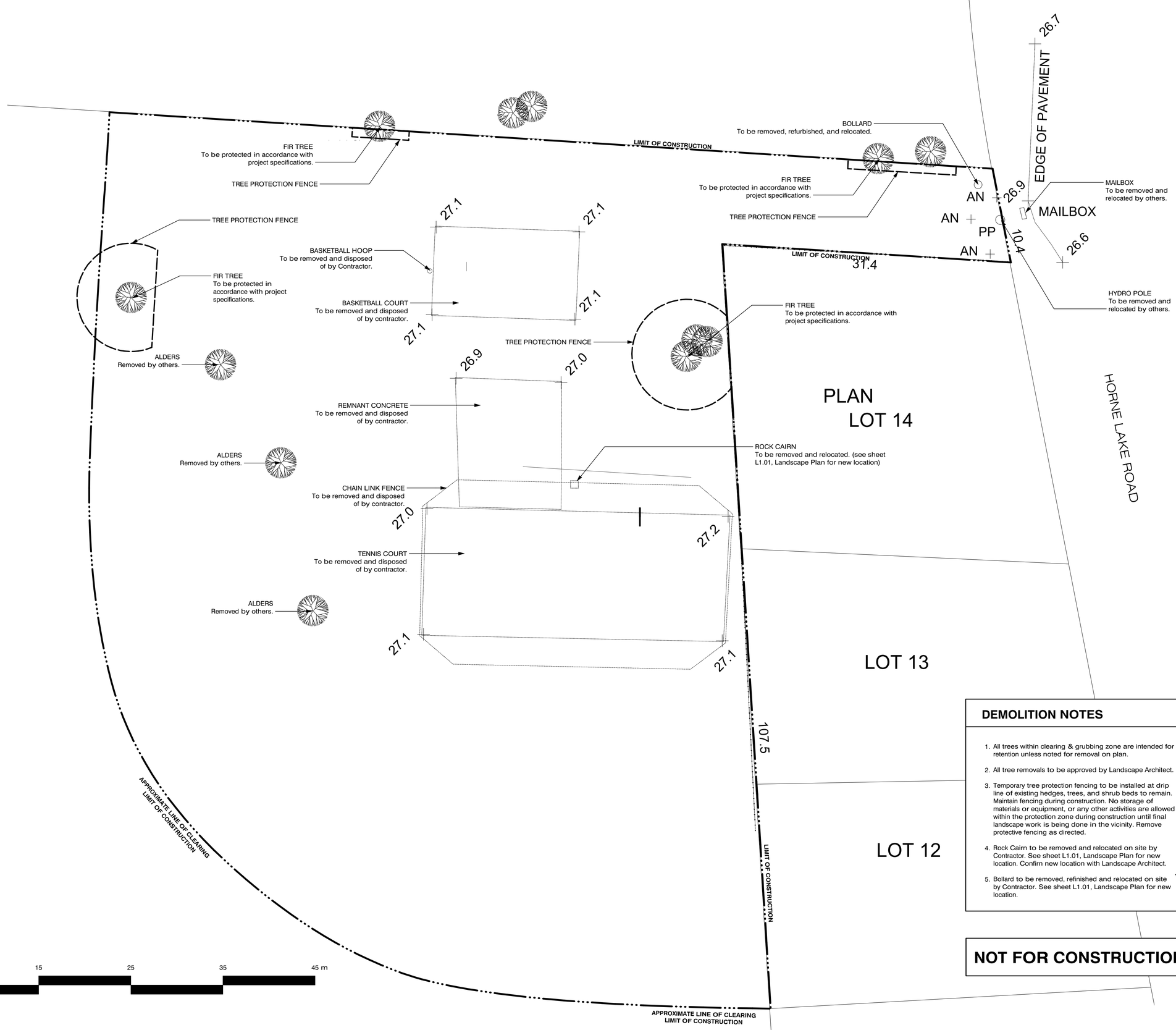
326 Horne Lake Road
Qualicum Beach, B.C.

LANDSCAPE PLAN PHASE ONE

PROJECT 17010
DB KS **CB** VD

SCALE 1:200
DATE May 28, 2018

L1.01



DEMOLITION NOTES

1. All trees within clearing & grubbing zone are intended for retention unless noted for removal on plan.
2. All tree removals to be approved by Landscape Architect.
3. Temporary tree protection fencing to be installed at drip line of existing hedges, trees, and shrub beds to remain. Maintain fencing during construction. No storage of materials or equipment, or any other activities are allowed within the protection zone during construction until final landscape work is being done in the vicinity. Remove protective fencing as directed.
4. Rock Cairn to be removed and relocated on site by Contractor. See sheet L1.01, Landscape Plan for new location. Confirm new location with Landscape Architect.
5. Bollard to be removed, refinished and relocated on site by Contractor. See sheet L1.01, Landscape Plan for new location.

NOT FOR CONSTRUCTION

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PROJECT

DUNSMUIR COMMUNITY PARK

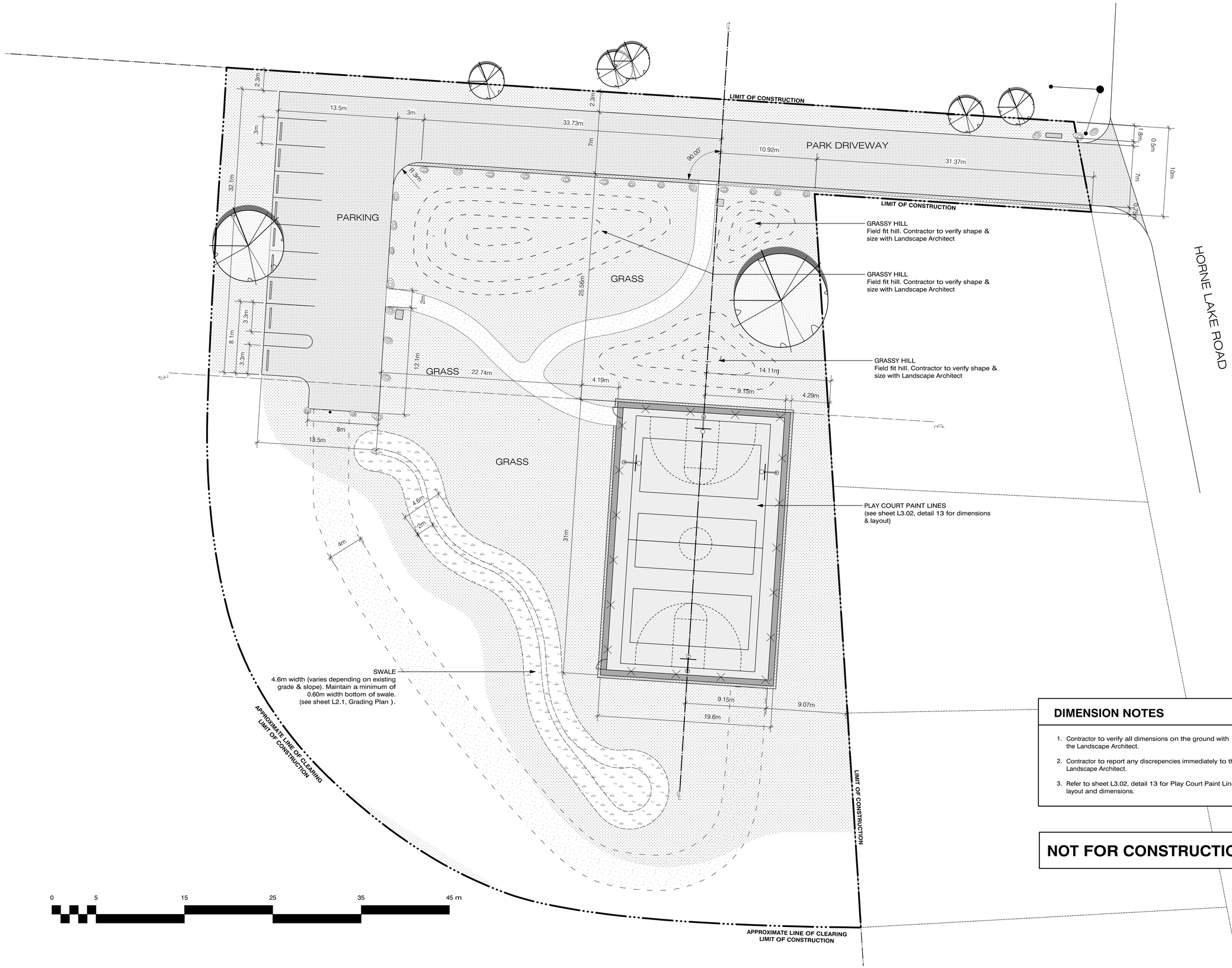
326 Horne Lake Road
Qualicum Beach, B.C.

DEMOLITION PLAN

PROJECT 17010
DB KS **CB** VD

SCALE 1:200
DATE May 28, 2018

L1.02



DIMENSION NOTES

1. Contractor to verify all dimensions on the ground with the Landscape Architect.
2. Contractor to report any discrepencies immediately to the Landscape Architect.
3. Refer to sheet L3.02, detail 13 for Play Court Paint Line layout and dimensions.

NOT FOR CONSTRUCTION

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CLIENT

NO.	DATE	ISSUE
1	5/28/18	Issued For Tender

NO. | DATE | REVISION

PROJECT

DUNSMUIR COMMUNITY PARK

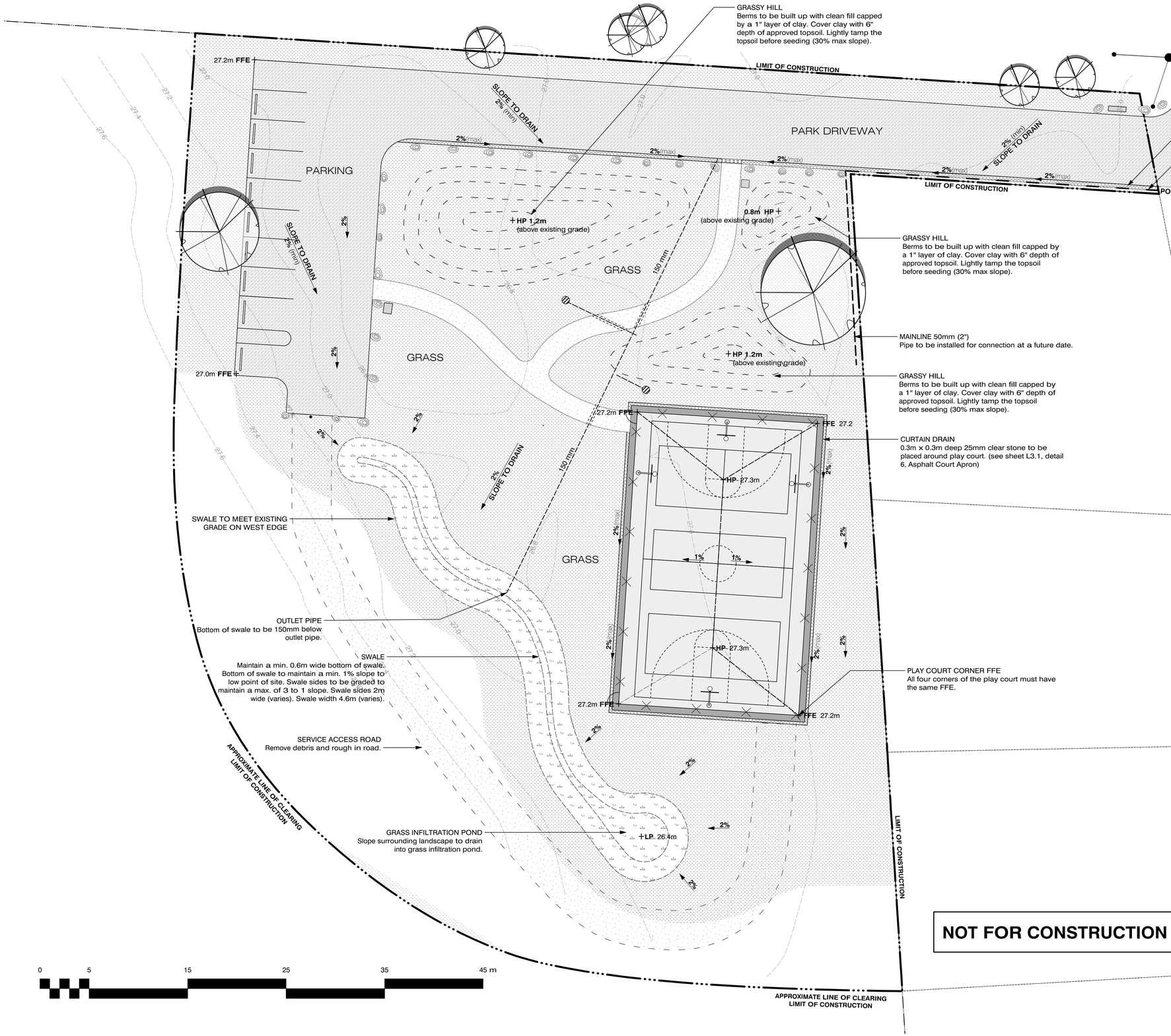
326 Horne Lake Road
Qualicum Beach, B.C.

DIMENSION PLAN

PROJECT 17010
DB KS **CB** VD

SCALE 1:200
DATE May 28, 2018

L1.03



GRADING NOTES

1. Contractor shall field verify all grades prioir to construction and report any discrepencies in grade to Landscape Architect.
2. Slope all paving as shown.
3. A prefered slope of 2% will be accommodated wherever possible in areas indicationg minimum slope requirements, while retaining a positive drainage condition.

GRADING LEGEND

SYMBOL	DESCRIPTION
2% →	PROPOSED SLOPE OF FINISHED GRADE
+ FFE 27.2m	PROPOSED GRADE
27.0	EXISTING CONTOURS
150 mm	150mm PERFORATED PVC DRAIN PIPE
⊘	AREA DRAIN (connect to pipe)

ABBREVIATIONS

FFE	FINISHED FLOOR ELEVATION
LP	LOW POINT
HP	HIGH POINT
BS	BOTTOM OF SWALE

IRRIGATION LEGEND

SYMBOL	DESCRIPTION
POC	50mm (2") Point of Connection. Installed by others, contractor to verify location with RDN.
— — —	Schedule 40, CSA approved 50mm PVC (2") mainline
- - - -	Schedule 40 PVC conduit (sleeve) to be twice the diameter of the carried pipe unless otherwise noted.

IRRIGATION NOTES

1. No mainline or lateral line shall be installed beyond any known limit of work, property line or road right-of-way.
2. All mainlines and lateral lines connecting beneath paved surfaces or surfaces that will be subject to significant compaction shall be installed within a sleeve. Only one line per sleeve will be installed.

NOT FOR CONSTRUCTION

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CLIENT

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1	5/28/18	Issued For Tender

NO. | DATE | REVISION

PROJECT

DUNSMUIR COMMUNITY PARK

326 Horne Lake Road
Qualicum Beach, B.C.

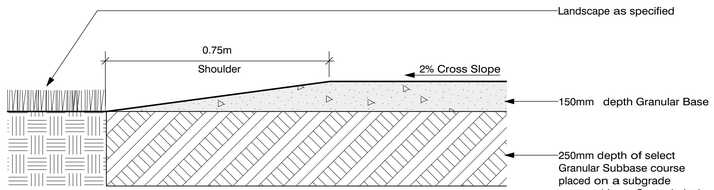
GRADING DRAINAGE & IRRIGATION PLAN

PROJECT 17010
DB KS **CB** VD

SCALE 1:200
DATE May 28, 2018

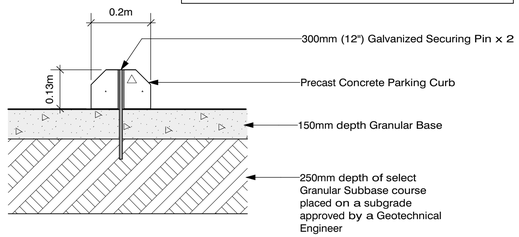
L2.01

Notes:
Subgrade to be approved by Geotechnical Engineer.



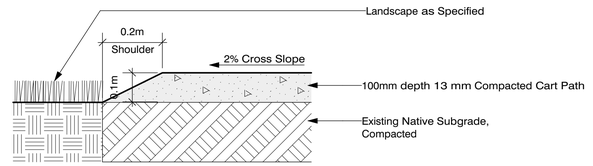
1 L3.01 **Gravel Driveway & Parking**
Scale: 1:10 **Section**

Notes:
Precast concrete curb, with 2 holes for securing pins, reinforced with 10mm rebar.
Size: 2130mm (7') length x 130mm (5") height x 200mm (8') width at base.



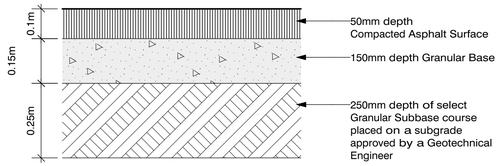
2 L3.01 **Parking Wheel Stop**
Scale: 1:10 **Section**

Notes:
Temporary cart path to be laid down on existing site subgrade. Existing subgrade to be prepped, cleared, graded and compacted prior to laying cart path.



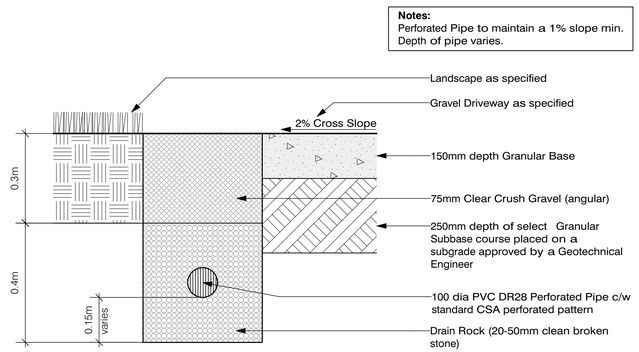
3 L3.01 **Temporary Gravel Path**
Scale: 1:10 **Section**

Notes:
Subgrade to be approved by Geotechnical Engineer.

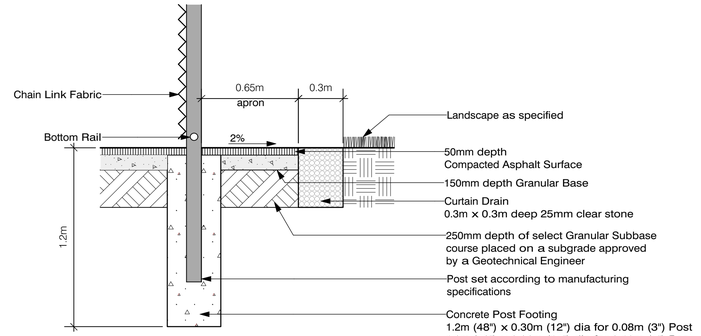


4 L3.01 **Asphalt Court**
Scale: 1:10 **Section**

Notes:
Perforated Pipe to maintain a 1% slope min.
Depth of pipe varies.

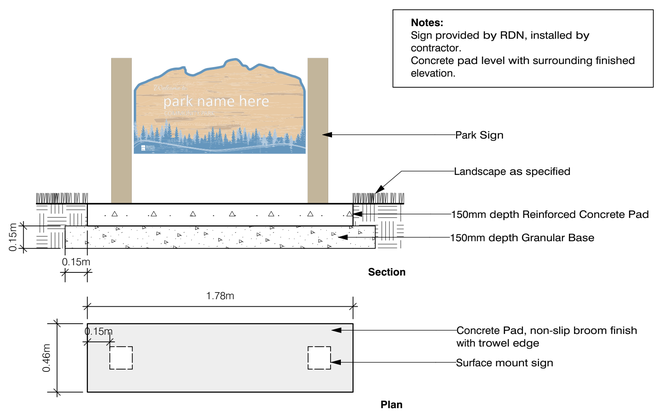


5 L3.01 **French Drain**
Scale: 1:10 **Section**



6 L3.01 **Asphalt Apron**
Scale: 1:20 **Section**

Notes:
Sign provided by RDN, installed by contractor.
Concrete pad level with surrounding finished elevation.



7 L3.01 **Entrance Sign**
Scale: 1:20

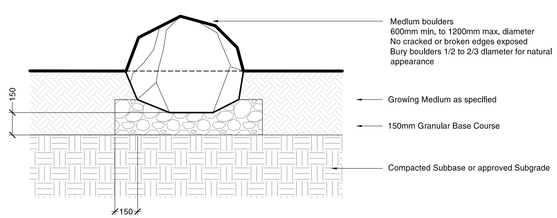
Supplier: Rollins Machinery Ltd.
1137 Smithers Rd.
Parksville, BC
250-248-9472

Model: Hide a bag, single bear-proof refuse container N6

Notes:
Contractor to supply and install.
Includes concrete mounting pad.

8 L3.01 **Garbage Receptacle**
NTS

NOT FOR CONSTRUCTION



9 L3.01 **Boulder**
Scale: 1:20

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PROJECT

DUNSMUIR COMMUNITY PARK

326 Horne Lake Road
Qualicum Beach, B.C.

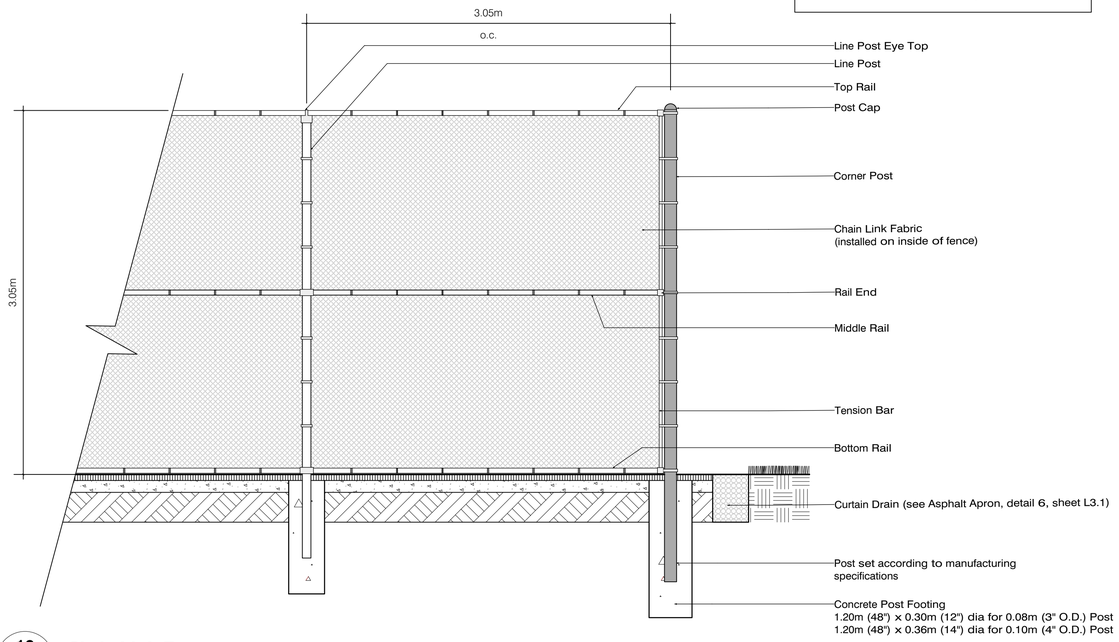
LANDSCAPE DETAILS

PROJECT 17010
DB KS **CB** VD

SCALE SEE DETAIL
DATE May 28, 2018

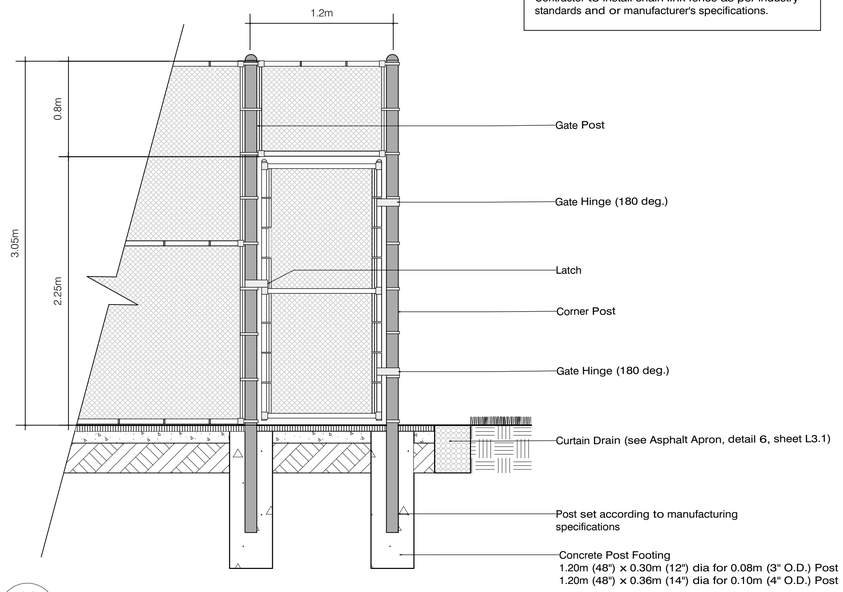
L3.01

Notes:
Contractor to install chain link fence as per industry standards and or manufacturer's specifications.



10 L3.02 **Chain Link Fence**
Scale: 1:25 **Section**

Notes:
Contractor to install chain link fence as per industry standards and or manufacturer's specifications.



11 L3.02 **Gate**
Scale: 1:25 **Section**


Backboard

Pole

Notes:
Contractor to supply and install four (4) Gooseneck Basketball Systems or equivalent (see sheet L3.02, detail 13 for locations)

Two Gooseneck Basketball Systems to be installed at 10' (regular height) as per manufacturers specifications.

Two Gooseneck Basketball Systems to be installed at 9' (one foot is to be cut off the Gooseneck Pole). Installation as per manufacturers specifications.

Product Code: SB-GNAF5

Manufacturer: Tomko Sports Systems
Vancouver, BC
604-273-0257

1) Gooseneck Pole: - 4.5" O.D. , Schedule 40, Hot Dipped Galvanized Steel, 0.237" wall thickness, c/w 4' 6" extension - 200 lbs.
Code: SB-GNP c/w 4' 6" extension - 200 lbs.

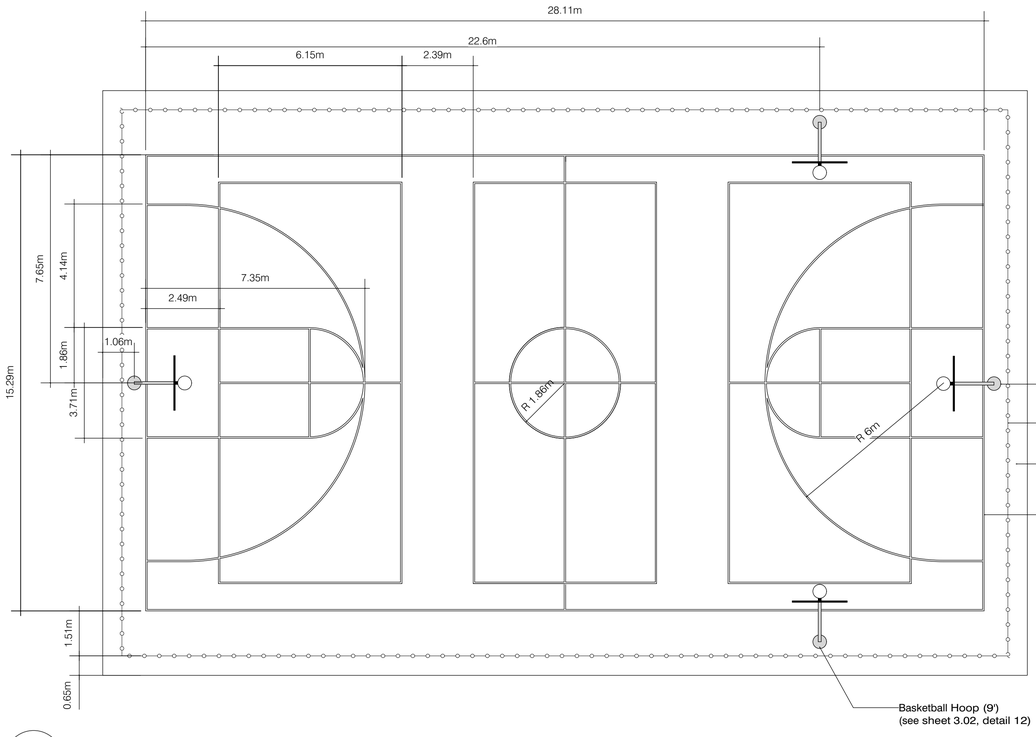
2) Aluminum Backboard: - Fan shaped 54" w x 36 1/2" h Cast Aluminum, w/ reinforcing ribs
Code: SB-AFB

3) Ultimate Double Goal: - 1/4" thick back plate, 2 - 5/8" cold rolled steel rims & 1 piece formed brace
Code: SB-UFM3

4) Heavy Duty Net: - 6.0 mm standard nylon cloth net.
Code: SB-144

12 L3.02 **Basketball Hoop**
NTS

NOT FOR CONSTRUCTION



Notes:
Court includes one full college size basketball court, 3 pickleball courts, and one small basketball court

All painted lines to be 51mm (2") wide

Lines shall be completed with court specific acrylic anti-slip paint

Contractor to verify layout of paint lines prior to painting

13 L3.02 **Play Court Paint Line Layout**
Scale: 1:100 **Plan**

VICTORIA DRAKEFORD
LANDSCAPE ARCHITECT

236 Pine Street Nanaimo BC V9S 2K2
250-754-4335
victoria@island.net

KATE STEFIUK STUDIO

1070 Nelson Street Nanaimo BC V9S 2K2
250-753-8093
kate.stefiuk@gmail.com

CLIENT

NO.	DATE	ISSUE
A	5/28/18	Issued for Tender

NO. | DATE | REVISION

PROJECT

DUNSMUIR COMMUNITY PARK

326 Horne Lake Road
Qualicum Beach, B.C.

LANDSCAPE DETAILS

PROJECT 17010
DB KS **CB** VD

SCALE SEE DETAIL
DATE May 28, 2018

L3.02

Dunsmuir Community Park Upgrade

Qualicum Bay, BC

PROJECT SPECIFICATIONS

ISSUED FOR TENDER
May 28, 2018

Owner
Regional District of Nanaimo

Prime Consultant
Victoria Drakeford Landscape Architect
Kate Stefiuk Studio

PROJECT DIRECTORY

OWNER
Regional District of Nanaimo
Tel. 250-248-4744

LANDSCAPE ARCHITECT
Prime Consultant
Victoria Drakeford Landscape Architect
Tel. 250.754.4335

LANDSCAPE CONSULTANT
Kate Stefiuk Studio
Tel. 250.753.8093

LIST OF SPECIFICATIONS

1.0 GENERAL

1.1 DRAWINGS

.1 The following list of drawings represents the sole and complete list of drawings for ***Dunsmuir Community Park Upgrade***, which form part of the Contract Documents.

.2 For convenience only, a separate list of drawings may be shown on a drawing sheet. In the event of any conflict or inaccuracy between the two lists, the drawings listed in this section shall govern.

.3 ***Dunsmuir Community Park Upgrade, Qualicum beach, BC,*** all drawings dated May 28, 2018 unless otherwise noted.

.1 **List of Drawings:**

L1.01 Landscape Plan Phase 1
L1.02 Demolition Plan
L1.03 Dimension Plan
L2.01 Grading, Drainage & Irrigation Plan
L3.01 Landscape Details
1. Gravel Driveway & Parking
2. Parking Wheel Stop
3. Temporary Gravel Path
4. Asphalt Court
5. French Drain
6. Asphalt Court Apron
7. Entrance Sign
8. Garbage Receptacle
9. Boulder

L3.02 Landscape Details
10. Chain Link Fence
11. Gate
12. Basketball Hoop
13. Play Court Paint Line Layout

END OF SECTION 01 01 15

PART 1 - GENERAL

1.1 GENERAL INSTRUCTIONS

.1 Streets, Walkways and Entrances: Keep streets, walkways and entrances serving the adjoining premises clear at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

.2 Partial Owner Occupancy: The Owner reserves the right to occupy and to place and install equipment in completed areas of the Project prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.

1.2 DEFINITIONS

.1 Contractor: within individual sections Contractor means the Trade Contractor for work described in the section.

1.3 SPECIFICATION LANGUAGE

.1 These specifications are a special form of technical writing and contain deviations from traditional writing formats. Capitalization, underlining and bold print is used to assist the reader in finding information and no other meaning will be implied.

.2 Except where specifically indicated otherwise, the subject of imperative statements is the Contractor.

.3 Streamlined language is generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Owner or by others when so noted.

.4 The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

.5 “Provide”: means furnish and install, compete with necessary components and accessories, ready for intended use.

.6 “Indicated”: is a reference to other portions of the Contract Documents.

.7 "Approved": except where specifically stated otherwise, the words "approved", "directed", "requested", "selected", "accepted", mean "approved by the Owner or Consultant", "directed by the Owner or Consultant" and so on. The words "approved" and "accepted" shall be held to the limitations stated in the General and Supplementary Conditions. In no case shall "approval" or "acceptance" by the Owner be interpreted as a release of Contractor of their responsibilities to fulfill all of the requirements of the Contract Documents.

.8 "Observe, Observation": Except as otherwise defined, the Consultant's observation of the work will be held to the limitations stated in the General and Supplementary Conditions and the Owner/Consultant Agreement. In no case shall observation by the Owner or Consultant be interpreted as a release of Contractor of their responsibilities to fulfill all of the requirements of the Contract Documents.

.9 "Furnish": Except as otherwise defined in greater detail, furnish means supply, including shop fabrication if applicable, and delivery to project site, ready for unloading, unpacking, assembly, installation and similar operations as applicable in each instance.

.10 "Install": Except as otherwise defined in greater detail, install means operations at project site including but not limited to, unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, placing in service and similar operations as applicable in each instance.

.11 "Installer": The person or firm engaged by Contractor for performance of a specific unit of installation work at the project site. It is a general requirement that Installers be expert and experienced in the work they are engaged to perform.

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Project Coordination:

.1 Coordinate Work with Owner or Other Contracts.

.2 Submittals:

.1 Submit required product data, shop drawings and samples to the Consultant for approval in accordance with Section 01 33 00 Submittal Procedures. Monies spent or work performed without prior approval is done solely at the Contractor's risk.

.3 Substitutions:

.1 Substitution of items for specified or shown items will not be permitted unless approved in advance by the Owner. Refer to Sections 01 25 00 Substitutions and 01 25 01 Substitution Request Form.

.4 Special Procedures:

.1 Perform work at the Site during hours and days set forth in local by-laws and ordinances. No work will be permitted other times except with the prior written permission of the Owner and local authority having jurisdiction.

.2 Be responsible for properly laying out the Work and for lines and measurements for the Work. Verify the figures shown on the Drawings before laying out the Work and report errors or inaccuracies in writing to the Consultant before commencing work.

1.5 REGULATORY REQUIREMENTS

.1 This project is intended to conform with the British Columbia Building Code 2012 edition. Comply with applicable codes, ordinances, regulations and requirements of authorities having jurisdiction.

.2 Submit copies of permits, licenses, certifications, inspection reports, releases, notices, judgments, and communications from authorities having jurisdiction.

.3 Apply for, obtain and pay for permits, other than Building Permit and Development Permit, required to perform the Work.

.4 Referenced standards are part of the Contract Documents and have the same force and effect as if bound with these specifications.

.5 Except where specifically indicated otherwise, comply with the latest standard in effect as of the date of the Owner/Contractor Agreement, unless an earlier standard is recognized by the authorities having jurisdiction.

.6 Obtain copies of industry standards directly from publisher.

.7 The titles of industry standard organizations are commonly abbreviated; full titles may be found in Encyclopedia of Associations or consult Consultant.

.8 Where conflicts arise between one document or authority and another, the more stringent regulation shall apply.

1.6 TEMPORARY FACILITIES

.1 NOT APPLICABLE

1.7 EXECUTION REQUIREMENTS

.1 Examination:

.1 Inspect existing conditions, and substrates, including elements subject to damage or movement during cutting and patching, prior to each phase of the work.

.2 Inspect conditions affecting the performance of the work. Correct unsatisfactory conditions prior to the start of each new element of work.

.3 Start of work means acceptance of existing conditions.

.2 Preparation:

.1 Prepare completely for the work of the Section, including review of shop drawings, preparation of substrates, and required testing.

.3 Execution:

.1 Maintain the premises and the job site in a neat and orderly condition, free from accumulations of waste materials and rubbish during the entire construction period. Remove crates, cartons and other flammable waste materials or trash from the Work areas each working day.

.2 Care shall be taken by workers not to mark, soil or otherwise deface finished surfaces. In the event that finished surfaces become defaced, clean and restore such surfaces to their original condition.

.3 Clean up immediately upon completion of each trade's work.

.4 Upon completion of the work, remove surplus materials and rubbish of every kind from the site.

.4 Cleaning, Protecting and Adjusting:

.1 During Construction:

.1 Execute periodic cleaning to keep the work the site and adjacent properties free from accumulations of waste materials, rubbish and wind blown debris, resulting from construction operations.

.2 Provide on-site containers for the collection of waste materials, debris and rubbish. Remove and dump as required to maintain orderly, neat site. Do not allow overflow of debris onto adjacent sites under any condition.

.2 Immediately clean dust and debris related to deliveries or construction.

.3 Do not close or obstruct sidewalks, streets or lanes without prior consent from Owner. Do not store or place materials on public property. Conduct operations with minimum traffic interference.

.4 Execute the work in a careful and orderly manner, with the least possible disturbance to the public.

.5 Cutting and Patching:

.1 When alterations occur, cut, remove, patch, repair or refinish the adjacent surfaces and leave in as good a condition as existed prior to the commencing of the work.

.2 Materials and workmanship employed in the alternations, unless otherwise shown or specified, shall comply with that of the original work. Alteration work shall be performed by the various respective trades that normally perform the particular items of work.

.3 Finish new and adjacent existing surfaces as specified for new work. Clean existing surfaces of dirt, grease and loose paint before refinishing.

.6 Provide temporary protection required to adequately protect the adjoining property, the public and construction personnel.

.7 Provide temporary weather protection for portions of the Work that become exposed to weather. Be responsible for damage caused by insufficient protection.

END OF SECTION 01 00 00

PART 1 - GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Work under this Contract.

.2 Construction Staging Area.

.3 Contractor's use of premises.

.4 Existing Conditions.

.5 Conflicts and Omissions on Drawings and Specifications.

.6 Objections to Specified Products.

1.2 REFERENCED DOCUMENTS

.1 Work shall conform to the requirements of British Columbia Building Code 2012 Edition.

1.3 WORK UNDER THIS CONTRACT

.1 The project is phase one of a park upgrade at 326 Horne Lake Road and consists of the following:

- A new asphalt play court for ball hockey, pickle ball and basketball.
- A gravel driveway and parking lot.
- The project also includes temporary gravel path, grass swale, grass hills, seeding, and irrigation.

1.4 CONSTRUCTION STAGING AREA

.1 Contractor parking and staging areas to be determined with Owner.

1.5 CONTACTOR'S USE OF PREMISES

.1 Coordinate use of premises with the Owner.

.2 Limit use of the premises to Work of this Contract, storage, and facilities required for completion of this Work.

.3 Assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.

.4 Obtain and pay for the use of additional storage or work areas needed for operations so as to not encumber Project site.

.5 Maintain Project site in a neat and orderly manner to avoid accumulation of unnecessary debris, equipment, and materials.

.6 Maintain pedestrian and vehicular access to and around site. Make provision for free, convenient, unencumbered, and direct access to properties neighboring the Project Site.

.7 Establish program to maintain streets, walks, and other public ways in and around Project site free of spillage, tracking, dirt, and construction debris resulting from Work of this Contract.

.8 Promptly patch, repair, replace, or make reimbursement as necessary to return to original or better condition damage to existing paving, utilities, planting, and other property adjacent to Project site, outside of Project area as directed by Owner.

1.6 EXISTING CONDITIONS

.1 Surveys and reports of existing topographical and subsurface conditions, including locations of utilities, are provided by the Owner without warranty as to their accuracy or completeness and are intended as general reference to probable conditions.

.2 Field verify site and geological conditions.

1.7 CONFLICTS AND OMISSIONS IN DRAWINGS AND SPECIFICATIONS

.1 Bring immediately to Owner's attention for interpretation and direction.

1.8 OBJECTIONS TO SPECIFIED PRODUCTS

.1 Where Contractor has reasonable objection to specified products, or valid reason for proposing substitutions, comply with provisions of Section 01 25 00 Product Substitution Procedures.

.2 Where not approved by Owner, substitutions to specified Products constitutes Non-Conforming Work, as defined by General Conditions, and requires removal and replacement with specified or approved Products.

PART 2 - PRODUCTS

.1 NOT APPLICABLE

PART 3 - EXECUTION

.1 NOT APPLICABLE

END OF SECTION 01 11 00

PART 1 - GENERAL

1.1 RELATED SECTION

.1 Substitution Request Form Section 01 25 01.

1.2 DEFINITIONS

.1 Performance Specifications: No manufacturer is specified, and requirements are specified by descriptive requirements, design requirements, performance requirements, reference standards, and codes. Product options complying with or exceeding provisions of Contract Documents are acceptable and require no Substitution Request.

.2 Closed Proprietary Specifications: Products by one or more manufacturers are specified and specification Section does not allow for approval of other products by Substitution Request. No other product options will be accepted. Provide products and Work specified.

.3 Open Proprietary Specifications: Products by one or more manufacturers are specified, and specification Section allows for approval of other products by Substitution Request. Submit Substitution Request for other products to Consultant under provisions of this Section.

1.3 SUBSTITUTION REQUESTS DURING CONSTRUCTION PERIOD

.1 Substitution Requests, submitted by Contractor will be considered within 15 days of notice to proceed. Subsequent substitutions will be considered only for the following reasons. Indicate one or more reasons why substitution is required with Substitution Request.

.1 Unavailability: Specified item has been discontinued or is unavailable in time to meet Construction Schedule through no fault of Contractor or subcontractor.

.2 Unsuitability: Subsequent information discloses specified item is unsuitable, inappropriate, unable to perform properly, or fit designated space.

.3 Regulatory Requirements: Substitution is required to comply with Code interpretations or insurance regulations.

.4 Warranty: Manufacturer or fabricator declare specified item to be unsuitable for use intended or refuses to certify or warrant performance of specified item for Project.

.5 Items were bid and contracted before specifications were finalized, or incorporated into Owner – Contractor agreement.

.2 During Construction Period, Contractor will be notified by Consultant in writing of Consultant's decision to accept or reject Substitution Request.

1.4 SUBMITTAL REQUIREMENTS

.1 Submit two copies of Substitution Request. Limit each request to one Substitution Request form.

.2 Burden of proof is upon Substitution Request, as proposed, to show compliance with specified requirements. Submit drawings, product data, samples, certified test results, and as needed to fully describe Substitution request for evaluation by Owner and Consultant.

.3 Where product data includes other than that proposed by substitution Request, clearly mark, or otherwise indicate, exact substitution.

.4 Document each Substitution Request with complete data substantiating that proposed substitution complies with provisions of Contract Documents.

.5 Submission of Substitution Request constitutes representation that Bidder or Contractor:

.1 Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.

.2 Shall provide the same or better warranty for substitution as for specified product.

.3 Shall be responsible for effect of substitution upon related Work, shall coordinate installation, and be responsible for other changes which may be required for Work to be complete in all respects, in compliance with design intent and in compliance with applicable codes and regulatory requirements.

.4 Be responsible for additional costs, which may subsequently become apparent. This includes additional costs for required additional Consultant's services made necessary by the substitution.

.5 Shall provide cost savings to Contract Sum as credits.

.6 Shall provide specified product, material, or system should substitution be rejected, at no change in Contract Sum.

.6 Substitutions indicated or implied on submittals, such as Shop Drawings, will not be accepted.

.7 Products and materials included in the Work, not specified or approved by Substitution Request, are defined as Non-Conforming Work. Remove and replace with conforming Work at Contractor's expense with no increase in Contract Time, as directed by Consultant.

1.5 OWNER WILL NOT CONSIDER

.1 Substitution Requests, which do not provide adequate or clearly defined information for complete and timely appraisal.

.2 Substitutions, which, if accepted, will require substantial revisions of Contract Documents.

.3 Substitution indicated or implied by Shop Drawings and other submittals.

.4 Substitutions not approved in writing by the Owner during Construction period.

.5 Substitutions not submitted on completed Substitution Request Form.

PART 2 - PRODUCTS

.1 NOT APPLICABLE

PART 3 – EXECUTION

.1 NOT APPLICABLE

END OF SECTION 01 25 00

PROJECT: **Dunsmuir Park Upgrade**

SUBMITTED TO: Victoria Drakeford Landscape Architect
236 Pine Street
Nanaimo, BC V9R 2B6

SPECIFIED ITEM:

_____ _____ _____
(Section Number) (Paragraph Number). (Description of Specified Item)

The undersigned requests consideration for following substitution to that specified.

PROPOSED SUBSTITUTION

What is the projected lump sum installed cost difference between proposed substitution and least expensive specified item.

_____ Increase/Decrease $_____
_____ Increase/Decrease $_____

ATTACHED DATA

Include product description, specifications, drawings, photographs, performance, and test data as necessary for evaluation. Clearly identify proposed substitution and portions of data from other items where more than one item is described. Include description of changes to Contract Documents required by proposed substitution.

CERTIFICATION

Undersigned certifies that the following paragraphs are correct, except as modified by attachments:

.1 Proposed substitution does not affect dimensions shown on Drawings.

.2 Undersigned will pay for changes to building design, including engineering design, detailing, and construction costs, caused by requested substitution.

.3 Proposed substitution request clearly states adverse affects on other trades, Construction Schedule, or specified warranty requirements.

.4 Maintenance and service parts will be locally available for proposed substitution.

.5 That the appearance and quality of the proposed substitution are equivalent or superior to specified item.

SUBMITTED BY:

Name: _____
as noted

Firm: _____
too late

Address: _____
information

_____

Date: _____

Telephone: (____) _____

Fax: (____) _____

LIST ATTACHMENTS

_____

Approved for Consultant's Review:
as Noted

_____
(Contractor's Signature)

FOR USE BY CONSULTANT

_____ Reviewed _____ Reviewed

_____ Not Approved _____ Received

_____ Not Approved – inadequate

By: _____

Date: _____

Remarks: _____

_____

_____

_____

❒ Accepted ❒ Not Accepted ❒ Accepted

_____
(Owner/Consultant's Signature)

END OF SECTION 01 25 01

PART 1 - GENERAL

1.1 SUMMARY

.1 This Section includes requirements for coordinating construction operations including, but not necessarily limited to, the following:

.1 Coordination drawings and requirements for coordination of space.

.2 Administrative and supervisory personnel.

.3 Cleaning and protection.

.4 General project coordination procedures.

.2 Subcontractor/Supplier Substitution Requirements: Refer to Section 01 25 00 and 01 25 01.

.3 Substitutions: Refer to Section 01 25 00 and 01 25 01.

1.2 COORDINATION

.1 Coordinate construction to assure efficient and orderly installation of each part of the Work. Coordinate operations that depend on each other for proper installation, connection, and operation.

.1 Schedule operations in the sequence required to obtain the best results where installation of one part depends on installation of other components, before or after its own installation.

.2 Coordinate installation of different components to use spaces efficiently and assure maximum accessibility for maintenance, service, and repair.

.3 Follow routing shown for pipes, ducts and conduits as closely as possible; make runs parallel with lines of building.

.4 Make provisions to accommodate items scheduled for later installation.

.2 Where necessary, prepare memoranda for Owner and separate subcontractors where coordination of their work is required and distribute to each party involved, outlining procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

.3 Administrative Procedures: Coordinate scheduling and timing of required procedures with other activities to avoid conflicts and assure orderly progress.

.4 Conservation: Coordinate construction to assure that operations are carried out with consideration for conservation of energy, water, and reduction of waste materials.

.1 Salvage materials and equipment involved in performance of, but not incorporated in, the Work.

.5 Carefully study and compare Contract Documents before proceeding with fabrication and installation of work. Promptly advise Consultant of errors, inconsistencies, omissions, or apparent discrepancies discovered.

.6 Verify that characteristics of operating equipment are compatible with building utilities and services.

.7 Verify characteristics of elements of interrelated operating equipment are compatible; coordinate work of various specification sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

.8 Execute cutting and patching to integrate elements of work, uncover ill-timed, defective, and non-conforming work, provide openings for penetrations of existing surfaces, and provide samples for testing. Seal penetrations through floors, walls and ceilings.

.9 Coordination Drawings: Prepare coordination drawings if needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space necessitates maximum utilization of space for efficient installation of different components.

.1 Show the relationship of components shown on separate shop drawings.

.2 Indicate required installation sequences.

.3 Comply with requirements contained in Section 01 33 00 Submittal Procedures.

1.3 REQUEST FOR INFORMATION

.1 Allot time in construction scheduling for liaison with Consultant and Owner. Where possible allow two weeks for Consultant/Owner review and routing of Request for Information (RFI's).

.2 Submit RFI's to the lead Consultant, on Contractor's standard form, in sequentially numbered requests in typewritten or e-mail form.

PART 2 - PRODUCTS

.1 NOT APPLICABLE

PART 3 - EXECUTION

3.1 GENERAL

.1 Inspection of Conditions: Installers of major components to inspect substrates and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected. Commencement of work immediately confirms acceptance of the substrate.

.2 Coordinate temporary enclosures with inspections and tests to minimize the need to uncover completed construction.

.3 Clean and protect construction in progress and adjoining materials, during handling and installation. Apply protective covering to assure protection from damage.

.4 Clean and maintain completed construction as necessary through the construction period. Adjust and lubricate operable components to assure operability without damaging effects.

.5 Limiting Exposures: Supervise construction to assure that no part is subject to harmful, dangerous, or damaging exposure. Such exposures include, but are not limited to, the following:

.1 Excessive static or dynamic loading.

.2 Excessive internal or external pressures.

.3 Excessively high or low temperatures or humidity.

.4 Water or ice.

.5 Solvents and chemicals.

.6 Abrasion.

.7 Soiling, staining, and corrosion.

.8 Combustion.

.9 Air contamination or pollution.

.10 Excessive weathering.

.11 Unprotected storage.

3.2 REFERENCES

.1 For products specified by association or trade standards, comply with requirements of the standard except when more rigid requirements are specified or are required by applicable codes.

.2 The date of the standard is that in effect as of the Bid date, or date of Owner-Contractor Agreement when there are no bids, except when a specific date is specified.

.3 Obtain copies of standards when required by Contract Documents. Maintain copy at jobsite during progress of the specified work.

3.3 FIELD ENGINEERING

.1 Provide field-engineering services; establish grades, lines, and levels, by use of recognized engineering survey practices.

3.4 PROJECT RECORD DOCUMENTS

.1 Maintain a complete set of record documents which clearly and neatly indicate changes from the Contract Documents, and uncovered existing conditions, which will be subsequently concealed.

.1 Contract drawings.

.2 Specifications.

.3 Reviewed Shop drawings, product data and samples.

.2 Record documents shall be used for no other purpose and shall be stored separate from those used for construction.

.3 Keep documents current; do not permanently conceal work until required information has been recorded.

.4 Mark specifications legibly and record at each Product section a description of actual products installed. Include the manufacturer’s name and product model and number.

.5 At Contract Closeout, submit documents with transmittal letter containing date, project title, Contractor’s name and address, list of documents and signature of Contractor.

END OF SECTION 01 31 00

PART 1 – GENERAL

1.1 SUMMARY

.1 This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:

.1 Preconstruction conferences.

.2 Preinstallation conferences.

.3 Progress meetings.

1.2 GENERAL MEETING REQUIREMENTS

.1 Make physical arrangements for meetings, prepare agenda a minimum of 24 hours before the meeting and submit to Owner and Consultant, with copies for participants.

.2 Take meeting minutes, and distribute copies within two days, to the Owner, Consultant and attendees. Distribute copies to other parties as appropriate.

.3 Representatives attending meetings shall be authorized to act on behalf of the entity each represents.

.4 Consultant will periodically attend meetings to ascertain the work is expedited and is consistent with Contract Documents and construction schedules.

1.3 PRE-CONSTRUCTION CONFERENCE

.1 As necessary, Contractor will schedule a preconstruction conference before starting construction. Responsibilities and personnel assignments will be reviewed. See each division for pre-installation conferences required for that aspect of the work.

.2 Attendees:

.1 As necessary, authorized representatives of the Owner, Consultant, and the Owner’s Consultants; the Owner's superintendent; major subcontractors; and other concerned parties shall attend.

.2 Subcontractor participants shall be familiar with the Project and authorized to conclude matters relating to the Work.

.3 Agenda:

.1 Discuss items that could affect progress, including the following:

.2 Tentative construction schedule.

.3 Critical work sequencing.

.4 Submittal of Shop Drawings, Product Data, and Samples.

.5 Use of the premises, site mobilization and review of Owner Contractor responsibilities and administrative procedures.

1.4 PRE-INSTALLATION CONFERENCES

.1 As necessary the Contractor will conduct a conference before each activity that requires coordination with other operations. If requested by Contractor, Subcontractors are required to attend the conferences.

.2 Attendees:

.1 The Installer and representatives of manufacturers and fabricators involved in or affected by the installation shall attend. As necessary the Owner will advise Consultant of scheduled meeting dates.

.2 Review the progress of other operations and preparations for the activity under consideration at each preinstallation conference, including requirements for the following:

.1 Compatibility problems and acceptability of substrates.

.2 Time schedules and deliveries.

.3 Manufacturer's recommendations.

.4 Warranty requirements.

.5 Inspecting and testing requirements.

.3 Contractor will record significant discussions and distribute the record of the meeting to everyone concerned, including the Consultant.

.4 Subcontractor is not to proceed with the installation if the conference cannot be successfully concluded. Subcontractor is responsible for initiating actions necessary to resolve problems and reconvene the conference.

.5 Unless otherwise required, notify Consultant a minimum of seven calendar days prior to each scheduled meeting.

1.5 PROGRESS MEETINGS

.1 Progress meetings will be conducted at the Project Site at regular intervals as agreed to by Owner and Consultant.

.2 Attendees:

.1 The Owner, Consultant, and other entities concerned with current progress or involved in planning, coordination, or future activities shall be represented. Participants shall be authorized to conclude matters relating to the Work.

.3 Agenda:

.1 Review and correct or approve minutes of the previous meeting. Review items of significance that could affect progress. Include topics for discussion appropriate to Project status.

.2 Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Construction Schedule. Determine how to expedite construction behind schedule; secure commitments from parties involved to do so. Discuss revisions required to insure subsequent activities will be completed within the Contract Time.

.3 Provide RFI log and discuss status of RFI's.

.4 Provide change proposal log and discuss status of proposed changes.

.5 Provide submittal log and discuss status of submittals.

.6 Reporting: Meeting minutes will be distributed to each party present and to parties who should have been present.

.7 Schedule Updating: The Construction Schedule will be revised as necessary after each meeting where revisions have been made.

PART 2 - PRODUCTS

.1 NOT APPLICABLE

PART 3 - EXECUTION

.1 NOT APPLICABLE

END OF SECTION 01 31 19

PART 1 - GENERAL

1.1 SUMMARY

.1 This Section specifies submittal procedures for project meetings, including, but not limited to, the following:

.1 Submittal Procedures, format, coordination, and consolidation.

.2 Review, processing, turn-around time, and resubmittal requirements.

.3 Product Data.

.4 Shop Drawings.

.5 Samples.

.6 Design Data.

.7 Certificates.

.8 Manufacturer Instructions.

.9 Manufacturer Field Reports.

.10 Field Submittals

.11 Construction Schedule.

1.2 RELATED SECTIONS

.1 01 43 00 Quality Assurance.

.2 01 25 00 Product Substitution Procedures.

.3 01 77 00 Closeout Procedures.

1.3 GENERAL REQUIREMENTS AND PROCEDURES

.1 Review submittals prior to submission. Verify specified requirements of products, field measurements, and field construction requirements.

.2 Stamp and sign each submittal as certification that the Contractor has reviewed the submittal. The Consultant will return submittals not stamped and signed by the Contractor without review for resubmittal.

.3 Coordinate each submittal with requirements of the work and of the Contract Documents.

.4 At time of submission, notify the Consultant in writing of deviations in the submittals from requirements of the Contract Documents.

.5 Forward submittals to Owner for review by Consultant or Owner's other consultants as required to cause no delay in the work.

.6 Submit as specified under individual Sections. Submittals not requested will not be recognized or processed.

.7 Verify field measurements and affected adjacent work are coordinated.

.8 Submit as necessary to complete Work of this Contract within Contract Time.

.9 Substitutions to Specified Items: Do not indicate or otherwise imply substitutions to specified items on submittals. Submit for approval in accordance with Section 01 25 00 - Product Substitution Procedures and Section 01 25 01 Substitution Request Form. Keep a reviewed copy of each submission on site.

.10 Schedule submittals to allow sufficient time for possible revision and resubmittal of rejected submittals, without affecting the Construction Schedule.

.11 Make the following submittals prior to starting construction within ten (10) days of the notice to proceed:

.1 Certificates of Insurance.

.2 Construction Schedule.

.3 List of Subcontractors and Suppliers.

1.4 SUBMITTAL FORMAT

.1 Transmittal Form: Accompany each submittal with a dated Contractor's Submittal Cover Sheet. Do not address more than one topic or portion of the Work on each transmittal.

.2 Submittal Numbering: Sequentially number Submittals (i.e. #22) in order submitted. Add revision suffix to original submittal number of re-submittals (i.e. #22R1).

.3 Submittal Identification: Include Project, Contractor, subcontractor or supplier, Drawing and Detail number, specification Section number, manufacturer, fabrication, product and material as appropriate.

.4 Contractor's Certification: Apply Contractor's stamp, signed or initialed, certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of Contract Documents. Review submittals for adequate installation interface with work of other trades, including requirements for lighting, ductwork, and sprinklers.

.5 Review Stamp Space: Provide minimum 4" x 6" blank space each for Consultant's stamps.

1.5 COORDINATION AND CONSOLIDATION

.1 Schedule and coordinate Submittals for review in an orderly sequence and in manageable quantity to aid in review of independent elements of the Work. Submittals received from other than Contractor will be rejected.

.2 Coordinate and consolidate Submittals to include complete assemblies and systems. Partial or incomplete submittals will not be reviewed until complete submittal is received.

.3 Deviations on Submittals: Identify deviations from Contract Documents, conforming to standard shop practices or industry standards by drawing cloud or other identifying marking around deviation and noting change.

.4 Product and System Limitations: Indicate condition, which may be detrimental to successful performance or completion of the Work.

1.6 PRODUCT DATA

.1 Number of Copies: Submit one (1) copy, plus additional copies that Contractor will require for distribution.

.2 Submittal Procedures: Submit for Consultant review in accordance with Submittal Procedures specified this Section.

.3 Distribution: Where printing of Product Data sheets is applicable, proceed as specified for Shop Drawings. Otherwise original product data literature designated for Contractor’s use will be returned. After review, distribute to subcontractors and other applicable entities. Maintain one copy for Project Record Documents to be delivered to Owner at Project completion.

.4 Identification: Mark each copy to identify specific products, models, options, tolerances, dimensions and other pertinent data.

.5 Manufacturer's Standard Data: Modify drawings and diagrams to delete inapplicable information. Supplement to provide information unique to Project. Include manufacturer’s printed installation instructions.

1.7 SHOP DRAWINGS

.1 Number and Format: Submit one (1) electronic copy formatted to 11” x 17”. Where text or drawings are illegible in 11 x 17 format, issue three (3) sets of full size hard copy drawings.

.2 Submittal Procedures: Submit for Consultant's review in accordance with Submittal Procedures specified this Section.

.3 Submit shop drawings required by individual sections of the specifications, and as otherwise required for proper performance of the work.

.4 Illustrate fully the requirements of the Specifications and the Contract Drawings, and accurately show quantities, kinds of materials, methods of assembly, and data required for fabrications, erection and installation.

.5 Show the relationship of adjoining work, relevant field conditions and dimensions; coordinate with affected subcontractors and suppliers if in conflict.

.6 Maintain one copy of each Shop Drawing as Project Record Document for delivery to Owner as part of operation and maintenance package at Project completion.

.7 Sheet Size: Establish uniform size, as agreed upon between Contractor and Consultant, maximum size 24” x 36”, and no size smaller than 8.5” x 11”, or multiples thereof.

.8 Identification: Reference Shop Drawing details same as referenced on Contract Documents, including sheet and detail designations, schedules, and room numbers. Indicate installer, supplier or by whom materials, products, work, and installations are provided. Do not use the expression "by others".

.9 Presentation: Hand drafted or computer generated, delineated to present information in a clear and thorough manner. Freehand drawings not approved unless in the form of an attached RFI. Do not use Contract Drawings as Shop Drawings.

.10 Variations from Contract Documents due to Standard Shop Practices: Make transmittal outlining variation.

.11 Changes to Submittals, which affect Contract Sum or Contract Time: Do not distribute or begin work related to Submittal. Promptly notify Consultant.

1.8 SAMPLES

.1 Quantity or Number: Submit two (2) samples each, except as otherwise specified plus additional samples as required for distribution.

.2 Submittal Procedure: Submit for Consultant's review in accordance with Submittal Procedures specified this Section. After review, distribute to applicable entities, including Owner.

.3 Size and Completeness: As specified by individual Sections. When not specified, submit samples of sufficient size and completeness to clearly illustrate product.

.4 Identification: Label each sample with project title and complete product identification, including manufacturer, model number, descriptive name, supplier, and as applicable, to sample identification.

.5 Functional Characteristics: Include parts, attachments, and components, as applicable. Coordinate with interfacing work.

.6 Aesthetic Characteristics: As required for selection of colors, finishes, patterns, and as required or requested to finalize selection process. Furnish full range of manufacturer's custom and standard selections. Where selection is specified, submit as required to show conformance to Contract Documents.

1.9 DESIGN DATA AND TEST REPORTS

.1 Number: Submit 1 copy each.

.2 Content: Include information necessary for assessing conformance with and design concept expressed by Contract Documents.

1.10 CERTIFICATES

.1 Number: Submit 1 copy each.

.2 Content: Written certification, signed by manufacturer's representative, supplier, Contractor, or others as specified. Indicate that material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, current test results, and other certification as appropriate. Include statements to certify compliance with provisions for certified specialists, product performance, Code compliance, and as specified. Meet or exceed specified requirements.

1.11 PRODUCTS LIST

.1 Prior to final completion, submit complete list of major products used in the project, with name of manufacturer, trade name and model number of each product.

1.12 MANUFACTURER INSTRUCTIONS

.1 Number: Submit 1 copy each.

.2 Content: Include Manufacturer's printed instructions for delivery storage, preparation, assembly, installation, start-up, adjusting, balancing, and finishing as specified for individual specification Sections. Include special procedures, project conditions, and environmental criteria required for application or installation.

1.13 MANUFACTURER FIELD REPORTS

.1 Number: Submit 1 electronic copy of reports within 10 days of observation.

.2 Content: Include information necessary for assessing conformance with and design concept expressed by Contract Documents.

1.14 FIELD SUBMITTALS

.1 Provide templates, inserts, and as applicable in timely fashion to other trades.

.2 Field Samples and Mock-ups: Provide under provisions of Section 01 43 00 Quality Assurance.

1.15 CONSULTANT'S REVIEW

.1 Consultant is responsible for reviewing Submittals as verification to the design intent, and conformance to provisions of Contract Documents.

.2 Consultant to review and return submittals within ten (10) working days from receipt. Where a 10 day turnaround time is not possible, the Consultant will notify the Contractor and provide a reasonable date for issuing the reviewed submittal. Contractor to allow additional time for review by others.

.3 Consultant's review does not relieve Contractor from:

.1 Establishing necessary dimensions, tolerances, clearances, qualities, and fabrication processes.

.2 Taking responsibility for necessary means and methods to complete the Work.

.3 Conforming to provisions of Contract Documents, except where deviations are approved by Consultant.

.4 Consultant will stamp and sign each submittal. Where Consultant indicates that Submittal has been reviewed or no exceptions have been taken to submittal, proceed in accordance with Contract Documents. Otherwise make corrections or resubmit as indicated.

1.16 RESUBMITTALS

.1 Revise initial Submittal as directed and resubmit. Follow procedures specified for the initial submittal. Make corrections or changes in the submittals required by Consultant.

.2 Revise and make resubmittals until no exceptions are taken. Identify changes on resubmittal made since previous submittal.

1.17 LETTERS OF CONFORMANCE

.1 Letter of Conformance: Short-form informational submittals which are to be used instead of, or to supplement, shop drawings, product data and samples. A sample “Letter of Conformance” is located at the end of this Section. Use copies of this form for each submittal where it is allowed unless a more specific Letter of Conformance is located at the end of a particular Specification Section.

.2 Not less than 90 days prior to Substantial Completion, submit Letter of Conformance indicating Contractor’s selections for products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

.3 Procedures:

.1 Submit one copy, which will be retained by the Consultant and Owner.

.2 Submit a completed Letter of Conformance for products selected as indicated within each section.

.3 Fill-in required information on form and sign in ink by person authorized to sign on behalf of the Contractor.

.4 Attach product data to each Letter of Conformance.

.5 No Modifications to form permitted.

.6 Letters of Conformance are not to be used for substitution requests.

.3 By submitting a Letter of Conformance, the Contractor declares that the Product identified by manufacturer’s name and model number:

.1 Is one of the product(s) specified.

.2 Is suitable for the intended use as defined within the Contract documents, and

.3 Will be provided and placed in operational condition in accordance with the Contract Documents and manufacturer's published instructions.

PART 2 - PRODUCTS

.1 NOT APPLICABLE

PART 3 - EXECUTION

.1 NOT APPLICABLE

LETTER OF CONFORMANCE

PROJECT: **Dunsmuir Community Park Upgrade**

CONTRACTOR:_____

The following product(s) has been selected for use in the above referenced project from the list of specified items.

Section Number: _____ Section Name:_____

Drawing Number(s): _____ Detail Number(s):_____

SPECIFIED ITEM TO BE USED:

_____

_____

_____

_____

_____

_____

STATEMENT OF CONFORMANCE:

This Letter of Conformance is provided as a Submittal for Information in accordance with Section 01 33 00 – Submittals. The undersigned hereby declares that the Product identified above by manufacturer's name and model number is (one of) the product(s) specified and is suitable for the intended use as defined within the Contract Documents and has been provided and placed in operational condition in accordance with the manufacturer's published instructions and the Contract Documents.

SUBCONTRACTOR/SUPPLIER:

_____ Phone Number:_____

(Contact name of subcontractor/supplier offering above product)

_____

(Subcontractor/supplier name and address)

CONTRACTOR:

_____ _____

(Contact name of Contractor) (Contractor signature and Title of Signatory)

END OF SECTION 01 33 00

PART 1 - GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 General requirements.

.2 Workmanship.

.3 Special installation procedures.

.4 Manufacturer's instructions.

.5 Manufacturer's certificates.

.6 Mock-ups.

.7 Manufacturer's field services.

.8 Testing laboratory services.

1.2 RELATED SECTIONS

.1 01 33 00 Submittal Procedures. Submittal of manufacturer's instructions.

.2 General Contractor-Subcontractor Agreement.

1.3 GENERAL

.1 Quality-control services include inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract administration activities performed by the Owner or Consultant.

.2 Contractor Responsibilities: Unless they are the responsibility of another entity, provide inspections and tests specified elsewhere and required by authorities having jurisdiction. Costs for these services are included in the Contract Sum.

.1 Where inspections and tests are the Owner's responsibility, the Owner shall employ and pay for a qualified independent testing agency to perform services. Such inspections include: concrete, structural steel, reinforcing steel, soils testing.

.2 Notify Consultant, Owner and Testing Laboratory 48 hours prior to expected time for operations requiring inspection and testing. When tests

or inspections cannot be performed, through the fault of the Contractor, reimburse the Owner for additional costs incurred.

.3 If initial tests and inspections indicate deficient work, remove and replace work not complying with the Contract Documents. Remedies shall be in accordance with the Contract Documents and Code requirements.

.4 Retesting: The retest where results of inspections and tests prove unsatisfactory and indicate noncompliance with requirements, regardless of whether the original test was the contractor's responsibility.

.1 The cost of retesting is the Contractor's responsibility where tests performed indicated noncompliance with requirements.

.5 Auxiliary Services: Cooperate with agencies performing inspections and tests. Provide auxiliary services as requested. Notify the agency in advance of operations to permit assignment of personnel. Auxiliary services include the following:

.1 Providing access to the Work.

.2 Furnishing incidental labor, tools, samples, test reports, equipment, design mixes and facilities to assist inspections and tests.

.3 Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.

.4 Providing preliminary design mix proposed for use for materials mixes that require control by the testing agency.

.5 Providing security and protection of samples and test equipment at the Project Site.

.6 Coordination: Coordinate activities with each agency engaged to accommodate services with a minimum of delay. Avoid removing and replacing construction to accommodate inspections and tests.

.1 Schedule inspections, tests, taking samples, and similar activities.

.2 Schedule testing and inspection to be as continuous and brief as possible. Utilize lab services efficiently.

1.4 TESTING AGENCY DUTIES

.1 The testing agency shall cooperate with the Owner, the Consultant, and the Contractor in performing its duties. The agency shall provide qualified personnel to perform inspections and tests.

.1 The agency shall notify the Owner, Consultant and the Contractor of irregularities or deficiencies observed in the Work during performance of its services.

.2 The agency shall not release, revoke, alter or enlarge requirements or approve or accept any portion of the Work.

.3 The agency shall not perform duties of the Contractor.

1.5 SUBMITTALS

.1 The testing agency shall submit a certified written report, in duplicate, of each inspection and test to the Consultant and Owner. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection or test through the Contractor.

.2 The testing agency shall submit additional copies of each report to the governing authority, when the authority so directs.

.3 Report Data: Reports of each inspection, test, or similar service include, but are not limited to, the following:

.1 Date of issue.

.2 Project title and number.

.3 Name, address, and telephone number of testing agency.

.4 Dates and locations of samples and tests or inspections.

.5 Names of individuals making the inspection or test.

.6 Designation of the Work and test method.

.7 Identification of product and Specification Section.

.8 Complete inspection or test data.

.9 Test results and an interpretation of test results.

.10 Ambient conditions at the time of sample taking and testing.

.11 Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.

.12 Name and signature of laboratory inspector.

.13 Recommendations on retesting.

1.6 QUALITY ASSURANCE

.1 Service Agency Qualifications: Engage prequalified inspection and testing service agencies that specialize in the types of inspections and tests to be performed.

.1 Each agency shall be authorized by authorities having jurisdiction to operate in the province where the Project is located.

.2 Maintain quality control over suppliers, manufacturers, products, services, site conditions and workmanship, to produce work of specified quality.

.3 Workmanship:

.1 Comply with industry standards, except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

.2 Perform work with persons qualified to produce workmanship of specified quality.

.3 Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration and racking.

.4 Manufacturer's Instructions:

.1 Unless specified otherwise, comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Consultant before proceeding.

.5 Mock-ups:

.1 Provide mock-ups as specified in the individual specification sections. Provide additional mock-ups, as required by the Consultant and Owner's representative, until approval is obtained.

.2 Do not proceed with subsequent work until approval of the mock-up is obtained.

.3 Approval of mock-up shall be the standard of workmanship and materials for the remainder of the work similar to the mock-up.

.4 Maintain mock-up in approved condition, until directed otherwise.

.5 Unless specified otherwise, remove mock-up at completion, when directed by Owner's representative. Prior to removal photo-document mock-up with prints to Owner.

.6 Unless specified or approved otherwise, schedule mock-ups a minimum of 5 working days prior to actual installation of the work represented by the mock-up.

.7 Notify the Consultant and Owner a minimum of 5 working days prior to mock-up.

.8 For each mock-up, provide conditions, which will duplicate the conditions of the actual installation, including lighting.

PART 2 - PRODUCTS

.1 NOT APPLICABLE

PART 3 – EXECUTION

3.1 GENERAL

.1 Repair and Protection: Upon completion of inspection, testing, and sample taking, repair damaged construction. Restore substrates and finishes. Comply with Section 01 00 00 General Requirements for cutting and patching requirements.

.2 Protect construction exposed by or for quality-control service activities, and protect repaired construction.

.3 Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for inspection and testing.

END OF SECTION 01 43 00

PART 1 - GENERAL

1.1 SUMMARY

.1 This Section specifies temporary services and facilities, including utilities, construction and support facilities, security and protection.

1.2 GENERAL

.1 Inspections:

.1 Subcontractors to arrange for authorities having jurisdiction to inspect and test each temporary utility before use and obtain required certifications and permits.

.2 Conditions of Use:

.1 Keep facilities clean and neat. Operate in a safe and efficient manner. Take necessary fire prevention measures.

.2 Do not overload, or permit facilities to interfere with progress.

.3 Do not allow hazardous, dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

.3 Materials and Equipment:

.1 Provide new materials and equipment or undamaged previously used materials and equipment in serviceable condition, and suitable for the use intended.

.2 Tarpaulins: Waterproof, fire-resistant, ULC labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.

.3 Metal fencing is required around the entire construction site, and be a minimum of 6 feet in height. Fencing to be “Modu-Loc” or equivalent, and is to be approved by **RDN** before installation. The Contractor is to ensure fencing is secure at all times, so as to prevent intrusion into the construction site by any unauthorized persons. Contractor is responsible for maintaining the integrity of the fencing at all times, with the fencing in a vertical position. Fencing is to be in place before the start of any construction and is to be in place until Final Acceptance.

PART 2 - PRODUCTS

.1 NOT APPLICABLE

PART 3 – EXECUTION

.1 NOT APPLICABLE

END OF SECTION 01 50 00

PART 1 GENERAL

1.1 DOCUMENTS

1.1.1 This section of the specification forms part of the Contract Documents and is to be read, interpreted and coordinated with other parts.

1.2 DESCRIPTION

1.2.1 Work Included: Furnish all labour, materials, equipment and services necessary to protect existing trees on site as shown on drawing L1.02, including but not limited to:

.1 Survey and layout for locations of protective barriers.

.2 Installation, maintenance, adjustment during construction, and final removal of protective barriers and signs.

.3 Pruning as approved by the Owner, including hand excavation and root pruning.

.4 Watering, fertilizing and all other measures directed by the Consultant as required to maximize the health and prospects for survival of the trees.

1.3 GENERAL

1.3.1 The “Tree Protection Area” (T.P.A.) must be established on site under direct supervision of the Consultant. It must be demarcated on site and fenced off from all impacts of construction. The T.P.A. is defined on the drawings.

1.3.2 Excavation, soil stabilizing measures, shoring (if necessary) and related work shall be planned and executed such that no excavation or other construction activities occur within the Tree Protection Area.

1.3.3 **No approvals for root pruning beyond the limits of the T.P.A. are required. All severed or fractured roots over 2cm in diameter outside the T.P.A. are to be neatly cut back a min of 10 cm above damage with a clean sharp saw.**

1.4 QUALITY ASSURANCE

1.4.1 Inspection: The Contractor shall give at least forty-eight (48) hours notice to the Consultant of the timing for root pruning, branch pruning, installation of protective barrier, and all other tree protection measures. The protective barrier shall be accurately located on site, prior to starting any hand excavation or root pruning.

PART 2 PRODUCTS

2.1 PROTECTIVE BARRIER: SNOW FENCE

2.1.1 Orange plastic web snow fencing, 1.2m high “Tenax”, as supplied by Ronco Sales Ltd., or pre-approved equal. Posts, minimum 75mm dia. or square wood posts or steel “Tee-Bar” posts minimum 1.8m lengths. Posts maximum 2.4m o.c.

2.2 TREE PROTECTION AREA SIGNS

2.2.1 Tree Protection Area signs shall be signs at least 900mm x 450mm, on painted plywood or other acceptable weather resistant material, stating:

TREE PROTECTION AREA, DO NOT REMOVE FENCE DURING CONSTRUCTION:
No Dumping No Burning
No Storage No Cutting
No Machinery No Toxic Substances (paint, solvents, fuel, oils)
TO REPORT VIOLATIONS PHONE: 257-8400

2.3 WATER, FERTILIZERS, MISCELLANEOUS

2.3.1 Water, fertilizers and miscellaneous materials shall be as specified in other sections of the specification and as directed by the Consultant.

PART 3 EXECUTION

3.1 PROTECTIVE BARRIER FENCE ERECTION

3.1.1 Before starting site work, install a clearly visible 1.2m high continuous protective barrier fence at the approved lines for the “Tree Protection Area” (locations as shown on Drawings). Maintain this barrier until Substantial Performance and remove from the site at that time. Support fence on steel posts driven vertically into the ground at 2.4m on centre, or as otherwise approved by the Consultant.

3.2 TREE PROTECTION AREA SIGNS

3.2.1 Install Tree Protection Area signs as specified on the protective barrier fence. For large areas, install a minimum of four signs, one each side of the T.P.A. Signs shall be well secured and shall be maintained in place until Substantial Performance.

3.2.2 Take all measures necessary to prevent the following activities within tree protection areas except as authorized by the Consultant.

.1 Storage of materials or equipment.
.2 Stockpiling of soil or excavated materials.
.3 Burning of any kind.
.4 Excavation or trenching.
.5 Cutting of roots or branches.
.6 Travel of equipment or vehicles.
.7 Disposal or spillage of toxic matter.

3.3 ROOT PRUNING

3.3.1 Before the start of any machine excavation, hand excavate along the established limit of excavation and prune all roots along the line. Cuts shall be clean, to approved arboricultural practice.

3.4 BRANCH PRUNING

3.4.1 Do not branch prune any “top growth” of any retained tree to compensate for reduction of roots unless specifically instructed by the Consultant.

3.5 WATERING AND FERTILIZING

3.5.1 Retained trees shall be watered thoroughly and deeply, as necessary to supplement rainfall to maintain plant turgidity without prolonged saturation of the root zone. The method, amount and frequency of watering shall be as recommended by the Consultant. Suggested Summer Watering Schedule: The T.P.A. is to be watered via sprinkler, soaker hose, or by tank with a watering wand as directed by the Consultant.

3.5.2 Fertilize Retained Trees to stimulate regeneration of lost roots and foliage. Fertilization program as recommended by the Consultant.

3.6 OTHER MEASURES

3.6.1 Other measures may be necessary for tree protection and ongoing survival, depending on site conditions. These may be determined during the initial planning for retention and excavation, or may be recommended by the consultant during the course of construction. All additional measures not clearly identified at time of bid will be considered “extra” to the work of this Contract.

END OF SECTION 01 56 39

PART 1 - GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Products.

.2 Manufacturer's Instructions.

.3 Transportation and Handling.

.4 Storage and Protection.

.5 Product Options.

.6 Substitutions.

1.2 RELATED SECTIONS

.1 01 43 00 Quality Assurance, submittal of manufacturer's certificates.

.2 01 25 01 Substitution Request Form.

1.3 REFERENCES

.1 This Section applies to Technical Specification sections, and supplements the General and Supplemental Conditions, and General-Subcontractor Agreement.

1.4 GENERAL

.1 Products include material, equipment and systems.

.2 Comply with size, make, type and quality specified, unless otherwise approved in writing by the Consultant. Specifications and referenced standards are minimum requirements.

.3 A required component to be supplied in quantity shall be the same, and shall be interchangeable. This requirement applied to items furnished under one or several sections of the specifications.

.4 Unless specified or indicated otherwise, materials employed for construction purposes, such as formwork, scaffolding, and temporary lighting, shall not be incorporated into the work.

.5 Unless indicated or specified otherwise, products incorporated into the Work shall be new, and of the most suitable grade of their respected kinds for the intended use.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Transport products by methods to avoid product damage.

.2 Deliver products in manufacturer's original containers or packaging, with identifying labels intact and legible.

.3 Furnish equipment and personnel to handle products by methods to prevent soiling or damage.

.4 Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

.5 Immediately replace non-conforming products with new conforming products, at no additional cost to the Owner.

1.6 STORAGE AND PROTECTION

.1 Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.

.2 Store sensitive products in weather-tight enclosures. Maintain within temperature and humidity ranges required by manufacturer's instructions, and as otherwise required to prevent damage.

.3 For exterior storage of fabricated products, place on sloped supports above ground. Protect from soiling or staining through ground contact. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.

.4 Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.

.5 Arrange storage of products to furnish convenient access for inspection and inventory.

1.7 GENERAL INSTALLATION REQUIREMENTS

.1 Unless indicated or specified otherwise, install each product in accordance with the product manufacturer's instructions.

.2 Obtain and distribute copies of manufacturer's instructions to parties involved in the installation, including two copies to Consultant.

1.8 PRODUCT OPTIONS

.1 Product specified by Reference Standards or by Description Only: Provide product meeting those standards.

.2 Product Specified by Naming One or More Manufacturers with an “or approved” provision: Use specified product or submit a request for substitution in accordance with the specified substitution requirements. When approved a substitute product may be used.

.3 Product Specified by Naming One or More Manufacturers, without a provision for Substitution: No substitution will be allowed, except as specified under the Article on Substitutions.

1.9 SUBSTITUTIONS

.1 Refer to Section 01 25 00 and 01 25 01.

PART 2 - PRODUCTS

.1 NOT APPLICABLE

PART 3 – EXECUTION

.1 NOT APPLICABLE

END OF SECTION 01 60 00

PART 1 - GENERAL

1.1 SUMMARY

.1 Removal of Temporary Facilities

.2 Final Cleaning

.3 Systems demonstrations.

.4 Project commissioning.

.5 Closeout procedures.

.6 Closeout submittals.

1.2 RELATED SECTIONS

.1 General Conditions of the Contract: fiscal provisions, legal submittals, and other administrative requirements.

.2 01 33 00 Submittal Procedures.

1.3 REMOVAL OF TEMPORARY FACILITIES

.1 Remove construction barriers and enclosures.

.2 Clean and restore areas to eliminate evidence of temporary facilities, fencing, barriers and enclosures.

1.4 FINAL CLEANING

.1 Execute cleaning, during progress of the work, and at completion of the work, as specified herein.

.2 Materials: use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces. Use as recommended by surface material manufacturer and cleaning material manufacturer.

.3 Disposal Requirements:

.1 Conduct cleaning and disposal operations to comply with codes, ordinances, regulations and anti-pollution laws.

.2 Dispose of rubbish, debris and waste materials at periodic intervals away from the site and in a legal manner.

.4 Final Cleaning:

.1 Employ only skilled workers for final cleaning.

.2 Touch-up damaged finishes to approval of Consultant.

.3 Remove stains, spots, marks and dirt from decorative work.

.4 Neatly dress and finish all planting areas.

.5 Remove dirt and other disfigurations from exterior surfaces.

.6 Clean and sweep decks, gutters, walkways, sumps and catch basins.

.7 Sweep and wash clean paved areas.

1.5 SYSTEMS DEMONSTRATION

.1 Prior to final inspection, demonstrate operation of each system to the Consultant's and Owner's representatives.

.2 Instruction of Owner's representative in starting and adjusting of project equipment using provided operation and maintenance data as the basis for instruction.

.3 Arrange and coordinate instruction of Owner's staff in operation, maintenance, and adjustment of building equipment, systems and finishes by suppliers and Subcontractors, using submitted operation and maintenance manuals as the basis for instruction.

.4 Whether specified or not, furnish published information whenever special maintenance procedures are required to assure the proper operation and durability of project material, equipment or finishes.

.5 Assist Owner in producing maintenance schedules for buildings, equipment and systems.

1.6 PROJECT COMMISSIONING

.1 Expedite and complete deficiencies and defects identified by the Owner.

.2 Attend "end of work" testing and break-in or start-up demonstrations.

.3 Review inspection and testing reports to verify conformance to the intent of the documents and that changes, repairs or replacements have been completed.

.4 Provide on-going review, inspection and attendance to project callback, maintenance and repair problems during the warranty periods.

1.7 CLOSEOUT SUBMITTALS

.1 Review for completeness and submit, maintenance manual contents, operating and maintenance instructions, project record documents, project record "as-built" drawings, extra stock and materials.

.2 Documentation:

.1 Submit required documentation such as statutory declarations, warranties, and certificates of approval or acceptance from regulating bodies.

.2 Manufacturer’s warranties: Furnish original and duplicate copies of each manufacturer warranty executed to the Owner. Warranty shall be dated from the date of Owner’s acceptance, unless noted otherwise.

.3 Certificates: Submit certificates of inspection provided by authorities having jurisdiction including without limitation:

.1 Certificates of inspection.

.2 Other forms as determined by the Owner.

.4 Operation and Maintenance Data:

.1 Whether specified or not, furnish published information whenever special maintenance procedures are required to assure the proper operation and durability of project material, equipment or finishes.

.2 Number of copies: unless otherwise specified, submit three of each at time of project substantial completion.

.3 Submit operation data and maintenance data bound in a three ring binder. Include divider tabs to separate data for each component. Include name of project, Contractor and Consultant.

.4 The General Contractor shall submit information to the Consultant.

1.8 CLOSEOUT PROCEDURES

.1 When the Contractor considers the Work ready for review by Owner for Substantial Completion, submit to the Owner written certification that Contract Documents have been reviewed, that the Work has been inspected, “Punch List” items have been corrected, and that requirements for Substantial Completion have been completed.

.2 Submit certified copy of Contractor's final "Punch List”, itemizing work completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed, and dated by Contractor.

.3 Comply with procedures stated in General Conditions of the Contract for Substantial Completion.

.4 Submit items identified in Article 1.7 above.

.5 Provide statement indicating closeout submittals are complete, as required by this section.

.6 Within reasonable time upon receipt of certification, the Owner will either review the Work to determine completion status, or advise the Contractor of prerequisites not fulfilled.

.7 Should the Owner consider Work to be incomplete or defective, the Owner will promptly notify the Contractor in writing, listing incomplete or defective work to be performed prior to Substantial Completion.

.1 Perform necessary work, and when complete, make new submittal for Substantial Completion.

.2 The Owner and Consultant will review the Work for second time without additional reimbursement.

.8 Following determination that Work is complete, Consultant will make recommendation to Owner recommending Final Acceptance of Work.

.9 Owner will issue Final Acceptance letter after determination that requirements for Substantial Completion have been fulfilled.

PART 2 - PRODUCTS

.1 NOT APPLICABLE

PART 3 – EXECUTION

.1 NOT APPLICABLE

END OF SECTION 01 77 00

1.0 GENERAL:

.1 The Contractor shall keep one set of all contract drawings, including all addenda, revisions, clarification's, change orders and approved shop drawings in the site office and clearly identify the as 'as-built drawings'.

.2 As the work proceeds, the Contractor's Superintendent or Foreman is to record clearly and indelibly in red pencil 'as-built' conditions wherever they deviate from the original directions on the contract drawings.

.3 As per Section 01 77 00 Closeout Procedures, the Contractor will submit As-Built drawing to the Consultant.

.4 The Contractor shall certify to the Consultant that the prints provided represent the work 'as-built'.

.5 The deviations that are to be recorded shall include, in general, items that are hidden from view and items of major importance to future operations and maintenance and to future alterations and additions. Detailed requirements in this connection are set out in the body of the specification of work.

.6 Approval for backfilling underground services will not be given before the Owner is satisfied that the exact location of the underground service has been surveyed and recorded. The Contractor must employ a qualified surveyor to record the horizontal and vertical location of underground services. This survey information is to be shown on the As-Built drawings and must indicate the location of all buried services as well as, those capped or exposed by the work of this contract.

.7 A holdback from the monies due to the Contractor will be maintained until all the 'as-built' yellow prints are certified as correct and delivered to the Consultant.

END OF SECTION 01 78 39

PART 1 - GENERAL

1.1 DESCRIPTION

Provide all labour, materials, equipment and services required for cast-in-place concrete including but not limited to:

.1 All concrete walls and landscape structures indicated on plans and details

1.2 REFERENCES

.1 Related work specified elsewhere:

.1	Concrete Reinforcing	Section 03 20 00
.2	Cast-in-place Concrete	Section 03 30 00
.3	Concrete Finishing	Section 03 35 00

1.3 INSPECTION AND TESTING

.1 Immediately before concrete is placed, all forms shall be carefully inspected to ensure that they are properly placed, sufficiently rigid and tight, thoroughly clean, properly treated and free from snow, ice and other foreign materials.

.2 Temporary openings shall be provided at the bottom of all deep units, such as columns and walls, to facilitate cleaning and inspection. In restricted units they shall be located so that water can be used to wash out debris. They shall be closed with patches flush on the inside. Cleanouts shall be located bearing architectural considerations in mind.

.3 Forms shall not have patches, broken edges, or joint widths greater than 1.5 mm, except for cleanouts as noted above.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Forms

.1 Non-Exposed Concrete Surfaces: Plywood or Shiplap, for Rough-Form Finish in accordance with CAN/CSA A23.1 Section 24, Item 24.3.2.

.2 Form Release Agent: Chemically active release agents containing compounds that react with free lime present in concrete to provide water insoluble soaps, preventing concrete from sticking to forms.

.3 Form Ties: Removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia, in concrete surface.

2.2 DESIGN

.1 Formwork design and inspection is solely the responsibility of the Contractor.

PART 3 - EXECUTION

3.1 PLACING:

.1 Erect and brace formwork plumb and true.

.2 Forms shall be so constructed that the finished concrete will conform to the shapes, lines, grade and dimensions indicated on the drawings. Particular care to be taken with all exposed concrete.

.3 Apply form coating in accordance with manufacturer's recommendations prior to placing of reinforcing steel. Remove any excess form coating.

.4 Install all inserts including anchors, ties, bolts, nailers, forms for holes and such like as required by work of this or other trades.

.5 Untreated forms shall be kept wetted down to prevent shrinkage prior to the placing of the concrete and shall be surface wetted at the time of placing.

.6 Where concrete is to be exposed, forms shall be laid so that joints are kept to a minimum and located in an orderly and symmetrical arrangement where possible. Consultant to review.

.7 Strength and rigidity of forms shall be such that they will not deflect or leak mortar.

.8 Forms for Exposed Exterior Concrete: Shall not be reused of there is any evidence of surface wear and tear which will impair the quality of the concrete. Forms shall be thoroughly cleaned and relubricated with approved form oils before reuse.

.9 Removal of form ties shall be done carefully to avoid marking concrete and to allow for patching. Grout bottom of form tie hole to prevent rust staining.

.10 At times of placing, all form work shall have been thoroughly washed and shall be clean and free of all dirt and debris. Formwork shall be wetted down to eliminate suction as far as practicable and wash water shall be drained away.

END OF SECTION 03 11 00

PART 1 - GENERAL

1.1 DESCRIPTION

Provide all labour, materials, equipment and services required for cast-in-place concrete including but not limited to:

.1 All concrete areas indicated on plans and details

1.2 REFERENCES

.1 Related work specified elsewhere:

.1	Concrete Forming	Section 03 11 30
.2	Cast-In-Place Concrete	Section 03 30 00
.3	Concrete Finishing	Section 03 35 00

.2 CAN/CSA-A23.1-M94 “Concrete Materials and Methods of Concrete Construction” shall be incorporated into this section.

.3 CSA G30.18-M92.

.4 Provide weldable reinforcement to G30.18-M92 and perform welding to CSA W186-M90.

1.3 INSPECTION AND TESTING

.1 Placing and reinforcement shall be reviewed by the Consultant prior to any concrete being placed in the section to be poured.

.2 All steel required for the section shall be placed, before permission will be given to place concrete.

3. Furnish mill certificates of physical and chemical analysis in accordance with CSA G30.18-M92, if requested.

1.4 SHOP DRAWINGS

.1 Prepare and check reinforcing steel and mesh placing drawings and bar bending and cutting schedules for all steel reinforcing for structural concrete. All drawings and schedules shall be prepared and checked by competent personnel experienced with this type of work.

.2 Structural drawings take precedence over placement drawings and bar schedules unless otherwise instructed in writing by the Consultant.

1.5 DELIVERY AND STORAGE

.1 Reinforcing steel, welded wire fabric and accessories shall be delivered, handled and stored in a manner which prevents contamination from bond-reducing foreign matter and damage to its fabricated form.

.2 Ship bundles of bar reinforcement, identified clearly in accordance with bar list.

1.6 CLEANING

.1 All reinforcement, before being placed, shall be clean from loose, scaly rust, dirt, oil, paint or other coatings that may be detrimental. A slight film of red rust will not be considered objectionable.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 All reinforcing steel, unless otherwise noted, shall be deformed bars of Grade 400 new billet steel conforming to the current CSA Specifications G30.18-M92.

.2 Welded wire fabric shall conform to CSA G30.5-M1983, (R1991), sizes and gauges as shown in the drawings.

.3 Provide all accessories such as stirrups, hanger bars, spirals, wire ties, chairs, spacers, supports and other devices required to install and secure the reinforcing properly, to CAN/CSA-A23.1-94.

2.2 FABRICATION

.1 All reinforcing bars shall be bent cold. Reinforcing bars shall not be straightened or re-bent.

.2 Location of reinforcement splices not shown on the drawing shall be approved by the Consultant and shall, for beams and slabs, be away from points of maximum stress in the steel. Splices shall provide sufficient lap to transfer the stress between bars by bond and shear in accordance with CAN3 A23.3-94.

.3 All welded wire fabric of 5.89 mm diameter and larger bar sizes shall be provided in flat sheet unless otherwise authorized by the Consultant.

PART 3 - EXECUTION

3.1 PLACING

.1 Reinforcement of the size and shapes shown on the drawings shall be accurately placed in accordance with the Placement Drawings, Structural Drawings, requirements of the B.C. Building Code, CAN/CSA A23.1-94 and A23.3-94

.2 Clear distance between bars, except for columns, shall be not less than the nominal diameter of the bar, or 25 mm or one and one third (1-1/3) times the maximum size of the coarse aggregate. Bars placed in two or more layers shall have minimum clear distance between the layers of not less than 25 mm and shall be placed directly above and below each other.

.3 Clear distance between bars in columns shall be not less than one and one half the nominal diameter of the bars or 38 mm or one and one half (1-1/2) times the maximum size of the coarse aggregate.

.4 Reinforcing steel shall, where not otherwise shown on the structural drawings, be protected by the clear cover of concrete over the reinforcements as follows:

.1 Were concrete is deposited against the ground without the use of forms, not less then 75 mm.

.2 Where concrete is placed against forms to be exposed to weather, or be in contact with the ground, not less than 50 mm for bars larger than 15M and not less than 38 mm for bars 15 M and smaller.

.3 In slabs and walls not exposed to the ground or weather, not less than 25 mm.

.4 In beams, girders and columns not exposed to the ground or weather, not less than 38 mm.

.5 The foregoing clear covers shall be maintained within $\pm$ 6 mm.

.6 Reinforcement shall be adequately supported by metal chairs, spacers or hangers and secured against displacement within the tolerance permitted, and in accordance with CAN/CAS-A23.1-94 and CAN3-A23.3-94

.7 For concrete exposed to view, all chairs and items in contact with the exposed surface shall be to the Consultant’s approval.

3.2 FIELD BENDING

.1 Do not field bend reinforcement except where indicated or authorized by the Consultant.

.2 When field bending is authorized, bend without hear, applying slow, steady pressure as instructed.

.3 Replace bars which develop cracks or splits.

END OF SECTION 03 20 00

PART 1 – GENERAL

1.1 DESCRIPTION

Provide all labour, materials, equipment and services required for cast-in-place concrete including but not limited to:

.1 All areas indicated on plans and details

1.2 REFERENCES

.1 Related work specified elsewhere:

.1	Granular Base Courses	Section 32 11 23
.2	Concrete Forming	Section 03 11 00
.3	Concrete Reinforcing	Section 03 20 00
.4	Concrete Finishing	Section 03 35 00

.2 CAN/CSA-A23.1-94 “Concrete Materials and Methods of Concrete Construction” shall be incorporate into this section.

1.3 INSPECTION AND TESTING

.1 All required sampling, preparation of specimens and testing shall be performed by an independent testing agency appointed by the Owner and approved by the Consultant. The testing agency shall report immediately to the Consultant when any procedure is contrary to the specifications and good practice.

.2 Testing costs will be paid by the Owner. The testing agency shall submit all invoices for services rendered to the Owner for approval.

.3 Cost of supplying materials for samples shall be borne by the Contractor. Contractor to inform Testing Agency with sufficient notice prior to concrete pour, and cooperate with same in obtaining required samples.

.4 The testing agency will perform the following:

.1 Review mix designs for conformance with specifications, providing written report to Engineer.

.2 Test cement and aggregates for conformance with the materials requirements of the specification.

.3 Supply cylinder moulds, sample the concrete, make and cure test cylinders and perform compression strength tests in accordance with current CSA Standards CAN/CSA-A23.2-94.

.3 Supply cylinder moulds, sample the concrete, make and cure test cylinders and perform compression strength tests in accordance with current CSA Standards CAN/CSA-A23.2-94.

4. Make slump tests and air content tests in accordance with current CSA Standards CAN/CSA-A23.2-94 for each concrete test.

.5 Take three (3) test cylinders for each 50 cu.yd. or fraction thereof and for each class of concrete placed in any one day, except that in no case shall a class of concrete be represented by less than three (3) tests.

.6 All cylinders shall be made from concrete taken from the forms.

.7 The Consultant may at his discretion reduce or eliminate the rest cylinders to be taken for minor pours or pours not of structural significance.

.8 A compression strength of one cylinder of each set shall be performed at the test specimen age of seven (7) days.

.9 Compression strength test of the remaining two cylinders of each group shall be performed at the test specimen age of twenty-eight (28) days.

.10 One 28-day strength test shall mean the average compressive strength of two (2) compression test specimens.

.11 Test results shall meet “Concrete Test Strength Requirements” of the B.C. Building Code 1992.

.12 Certified copies of the test reports shall be forwarded to the Consultant, Contractor and Concrete Producer.

.5 Should any test indicate concrete below strength, the Consultant shall have the right to stop work on the suspect area until subsequent tests are made. The Contractor shall bear the cost of such required tests. Should all tests indicate below strength concrete, the Contractor shall remove the portion of the work at the Consultant’s request. The removal and replacement of the work will be at the Contractor’s expense.

.6 Contractor shall supply proposed mix designs to Testing Agency and obtain approval from Engineer minimum 14 days prior to first concrete pour.

1.4 PROTECTION

.1 Cold Weather Requirements: Shall be in accordance with CAN3-A23.1-94, Section 20.

.2 Hot Weather Requirements: Shall be in accordance with CAN3-A23.1-94, Section 20.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Cement: Type 10, Normal Portland, shall conform CSA CAN3-A5-93.

.2 Aggregates: Fine and coarse, shall conform to CAN3-A23.1-94, Part 5.

.3 Water: Mixing water for concrete shall be clean and free from injurious amounts of oils, acids, alkali, organic matter, or other deleterious substances.

.4 Air Entraining Admixtures: Shall conform to the requirements of the latest issue of ASTM C260, such as:

.1 "N.V.R." by Sternson Ltd.
.2 "DAREX AEA" by Grace Construction Materials.
.3 "MB-VR" by Maters Builders.

.5 Curing Compounds: to CAN3/CSA-A23.1 white Type 1 – chlorinated rubber, suitable for interior use and compatible with floor finish adhesives.

.6 Form Coatings: Non-staining form coatings such as "NOX-CRETE" by Grace Construction Materials or other pre-approved.

.7 Isolation Joint Filler: 12 mm thick asphalt impregnated rigid board of cane fiber such as:

.1 "FLEXCELL" by Sternson Ltd.
.2 "GIVENTAKE" by Spicers.
.3 "KORK-PAK" by Grace Construction Materials.

.8 Water Stops:

.1 Size 6" x 3/8".
.2 Type DURAJOINT TYPE '5' or other pre-approved.
.3 Material: P.V.C. shall be as shown on drawings

.9 Under slab damp proof membrane/vapour barrier:
6 mil thick polyethylene film.

.10 Joint Sealant: Shall be self-leveling two (2) part polyurethane type, conforming to CGSB 19.24-M80 Type 1, or Federal Specifications TT-S-00227E, Type II, Class A.

Approved Type: Iso-Flex 880 GB (Self-Leveling) Sealant as manufactured by Harry S. Peterson Co. Inc., Sternson RC2-SL, Vulkem 245, or other pre-approved sealant.

Colour as selected by the Consultant from standard range

Primers and bond breakers as required to install the perimeter joint sealant system shall be provided in strict accordance with sealant manufacture's recommendations.

2.2 MIXES

.1 Proportions: As recommended in CSA CAN3-A23.1-M90; to be a guide for the water cement ratio to give durable concrete. Minimum cement content for concrete exposed to view to be 300 kg per cubic meter, unless otherwise specified.

.2 Strengths, Slumps, Sizes of Aggregates: See Structural Drawings.

.3 Admixtures:

.1 Specified air entraining agent shall be added to all concrete exposed to weather. The amount of air entrainment to be 6% ± 1%, unless noted otherwise on structural drawings or approved by the Consultant.

.2 Obtain Consultant's approval before using chemical admixtures other than those specified. Chloride admixtures not permitted without the Consultant's approval.

.4 Consistency:

Concrete materials shall be proportioned to provide a workable mix that can be handled, placed and worked into angles and corners of forms and around reinforcing steel and inserts. The mix proportions shall not be such that the concrete will easily segregate or cause excessive water to collect on the surface.

.5 Colour:

Provide coloured concrete where specified by the Consultant with specified finish. Colour of concrete matrix and aggregates to be selected by Consultant from manufacture's complete range of colours. Colour samples of concrete matrix and aggregates to be submitted to Consultant for approval prior to start of work.

PART 3 - EXECUTION

3.1 GENERAL

.1 All concrete shall be "controlled concrete" according to CAN3-A23.1-M90 and as defined by B.C. Building Code 1992.

3.2 OPENINGS AND INSERTS

.1 Provide and cast-in sleeves, frameouts, inserts and fastening devices shown on the drawings, except as otherwise specified. Sleeves, openings, ect., greater than 300 mm x 300 mm not indicated on structural drawings must be approved by the structural engineer.

.2 Anchor bolts and other anchoring devices for beams, columns and wall panels shall be supplied by the respective trade and installed under this section in accordance with the trade-approved shop drawings.

.3 Sleeves, inserts and fastening devices required by other trades, but not shown in the drawings shall be supplied by the respective trade and installed under this section. The installation shall be checked and verified by the respective trade.

.4 Openings and driven fasteners required in the concrete work after the concrete is placed shall be approved by the Consultant.

.5 Notify other trades sufficiently in advance to ensure that provision is made for openings, inserts and attachments.

.6 Paint exposed threads of anchor bolts with a mixture of molybdenum disulfide in oil before nuts are installed.

.7 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as indicated, obtain approval of all modifications from structural engineer before placing concrete.

.8 Check locations and sizes of sleeves, openings, etc., shown on structural drawings with architectural, mechanical and electrical drawings.

3.3 CONCRETE SUPPLY

.1 Submit a copy of the proposed concrete mixes, approved by the Testing Agency for review by the Consultant before any concrete is delivered to the site.

.2 Transportation shall be done in such a fashion that no segregation occurs.

.3 Concrete with has commenced to stiffen shall not be used nor shall it be re-tempered with additional water or cement for use.

3.4 MIXING AND DELIVERLY

.1 Concrete shall be mixed in a mechanical batch mixer of a type approved by the Consultant and meeting requirements of CAN/CSA-A23.2-94.

.2 Mixing time shall conform to CAN/CSA-A23.1-94. Mixers shall be rotated at the rate recommended by the manufacturer of the equipment.

.3 Ready-mixed or transit-mixed concrete shall be batched, mixed and transported in accordance with CAN/CSA-A23.1-94.

3.5 CONVEYING

.1 Concrete shall be conveyed from the mixer to the place of final deposit by method that will prevent separation or loss of materials.

.2 Equipment for chuting, pumping and pneumatically conveying concrete shall be of such size and design as to ensure a practically continuous flow of concrete at the delivery end without separation of materials.

.3 Conveying of concrete shall be in accordance with CAN?CSA-A23.1-M90, Section 14.2.

3.6 PLACING

.1 Preparation:

.1 Notify the Consultant and the independent testing agency at least 48 hours prior to any concrete operation. No concrete shall be delivered to the project unless permission to pour has been obtained form the Consultant.

.2 All excavations for footings and all forms shall be pumped clear of water before placing concrete therein.

.3 Formwork shall have been completed, reinforcement shall have been secured in place; expansion joint material, anchors, and other embedded items shall have been positioned; and the entire preparation reviewed by the Consultant prior to placing concrete.

.4 Formwork shall have been thoroughly washed and shall be clean and free of all dirt and debris. Formwork to be wetted down to eliminate suction as far as practicable and wash water to be drained away

.5 Under slab dampproof membrane/vapour barrier: Install membrane over prepared granular base to entire areas of slabs-on-grade. Lap membrane minimum 150 mm at joints and seal using tape or sealant, to produce continuous installation. Seal punctures in membrane before placing concrete. Use patching material at least 150 mm larger than puncture and seal using tape or sealant.

.2 Depositing:

.1 Concrete shall be deposited in the forms as close as is practicable to its final position to avoid segregation due to rehandling of flow and in approximately horizontal lifts to maintain a level surface.

.2 To prevent segregation, the vertical height of free fall of concrete shall not exceed 1500 mm.

.3 When placing has started, it shall be carried on as a continuous operation until placement of the panel or section is completed. The top surface shall be kept level throughout the pour.

.4 White concrete is being placed, it shall be consolidated thoroughly and uniformly by means of vibrators or finishing machines to secure a dense, homogeneous structure, close bond with reinforcing and smooth formed surfaces.

.5 Vibrator to be the internal type having a minimum frequency of 7,000 revolutions per minute. A spare vibrator shall be on hand during all concrete placing. Extreme care shall be taken to ensure that internal type vibrators do not disturb the reinforcing steel or the forms.

.6 Ensure reinforcement and inserts are not disturbed during concrete placement.

3.7 FINISHING – UNFORMED SURFACES

.1 Finishing shall conform to CAN/CSA-A23.1 – Section 22 as specified under Section 03 35 00 - Concrete Finishing.

.2 Unless noted otherwise, floor finishes shall have gaps less than or equal to 8 mm under a 3000 straight edge.

3.8 FINISHES – FORMED SURFACES

.1 All formed surfaces shall be treated in accordance with CAN/CSA-23.1, Section 24 as specified under Section 03 35 00 Concrete Finishing.

.2 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.

.3 Sand blast finish to all exposed concrete

3.9 CURING

.1 Concrete shall be cured in accordance with CAN/CSA-A23.1-94.

.2 Slabs shall be cured using curing compound as specified. Coverage rate and method of application shall be in accordance with manufacturer's printed specifications.

.3 Freshly placed concrete shall be protected from the effects of direct sunshine, drying winds, cold, excessive heat and running water, by the use of adequate tarpaulins or other suitable material to cover completely or enclose all freshly finished surfaces, until the end of the curing period.

3.10 CONSTRUCTION JOINTS

.1 The location and detail of all construction joints not detailed on the Structural Drawings shall be approved by the Consultant.

.2 Construction joints shall conform to CAN/CSA-A23.1-94

.3 In beams and slabs, construction joint locations shall be approved by the Consultant prior to their installation. Proper key and dowels or extensions of reinforcing shall be provided at all construction joints

3.11 JOINT FILLERS AND SEALERS

.1 Provide joint fillers and sealers at interior slabs on grade at junctions with vertical surfaces and at exterior concrete paving at the location and to the details shown on the drawings.

.2 Particular care shall be taken to construct clean joints free from any foreign material which will impair the proper function of the joint.

.3 Joint filler material shall be anchored to the previously poured concrete surface.

.4 Unless shown otherwise, joint filler shall extend for the full depth of the joint and shall terminate 12 mm below the top joint. The 12 mm space shall be filled with joint sealer specified.

END OF SECTION 03 30 00

PART 1 - GENERAL

1.1 DESCRIPTION

.1 Section Includes:

.1 Furnishing of all labour, material equipment and services necessary to provide concrete finishes for the structures as indicated on drawings, schedules and specified herein.

.2 This Section of the Specifications describes the finish requirements for cast-in-place concrete surfaces. It is intended to supplement and be read in conjunction with other sections of the specification governing concrete work.

1.2 RELATED WORK

.1	Section 03 11.00:	Concrete Forming
.2	Section 03 20 00:	Concrete Reinforcing
.3	Section 03 30 00:	Cast-in-Place Concrete

1.3 REFERENCES

.1 CAN3-A23.1-94, “Concrete Materials and Methods of Concrete Construction”

.2 ACI 303R-91 – Guide to Cast-in-Place Architectural Concrete Practice.

1.4 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Shop Drawings: Submit shop drawings of concrete formwork for architectural concrete indicating all necessary construction detail, including:

.1 Type of forming material.
.2 Location of joints in forming material
.3 Location of construction and expansion joints
.4 Location and type of form ties.
.5 Sealing of forms between construction joints.
.6 Sealing of forms between panel joints.
.7 Conduit and reinforcing fixed method.

.3 Formwork review will be for landscape features only. Contractor shall ensure that forms are designed for adequate strength, rigidity and safety.

1.5 QUALITY ASSURANCE

.1 Standards: Conform to CSA-A23.1-94, for concrete finishes

.2 Qualifications: Work shall be carried out by personnel having proven experience in the type of work in accordance with the drawings and specifications.

1.6 FINISH SYSTEMS

.1

Finish	Surface
Light – medium Sandblasted	Exposed concrete surfaces where indicated
Form Finish	Unexposed Surfaces

.2 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges unless otherwise detailed.

1.7 SAMPLES

.1 Approved samples establish a minimum standard of quality and workmanship for all sand blast concrete work. Store on job site for later comparison with finished work.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Concrete material shall conform to requirements of Section 03 30 00 - Cast-In –Place Concrete and CSA-A23.2-94.

.2 Bonding Agent: Formulated for bonding new concrete to cured concrete. Acceptable Products:

.1 “K-710 Krystobond” by Kryton International Inc.
.2 “Polymer Bonding Agent” by Target Products Ltd.
.3 “710 Flex-Con” by Elsro Construction Products.
.4 Or approved alternative.

.3 Concrete Curing & Sealing Compound: To ASTM C-309-81. Acceptable Products:

.1 “K-748 Krystol CLR” by Kryton International Inc.
.2 “Cure and Seal” by Target Products Ltd.
.3 “702 Clear Acrylic Sealer” by Elsro Construction Products.
.4 Or approved alternative.

.4 Natural Hardener: Premixed, abrasion resistant non-metallic hardener. Acceptable Products:

.1 “Non-Metallic Floor Hardener” by Target Products Ltd
.2 “785 Genflor Non-Metallic Floor Hardener” by Elsro Construction

Products.
.3 "Diamag 7" by Sternson Ltd.
.4 Or approved alternative.

.5 Non-Shrink Grout (for patching): Acceptable Products:

.1 "K-510 Krystol Patch/Grout" by Kryton International Inc.
.2 Pre-Mixed "Fast-Set Patching Concrete" by Target Products Ltd.
.3 "810 Genfrout" by Elsro Construction Products.
.4 Or approved alternative.

.6 Liquid Concrete Surface Hardener and Dustproofer: Acceptable Products:

.1 "Krystol Floor Hardener" by Kryton International Inc.
.2 "Eucosil #638" by Elsro Construction Products.
.3 "Seaklhard 400" by Sternson Ltd.
.4 Or approved alternative.

.7 Safety Nosings (Concrete Stairs): Anti-Slip adhesive strips of aluminium oxide/silicon carbide abrasive. Colour as selected by Consultant from manufacture's available colour range. Layout as indicated on drawings. Accepted Products: "Flex-Tred Anti-Slip Safety Strips" as manufactured by Wooster Products Inc., or approved alternative.

.8 Abrasives for sandblasting: Target Industrial fine sand supplied by Target Concrete Products Ltd., Burnaby, B.C. or approved equal. Abrasives must be free from foreign matters. Fine particles shall be no smaller than those retained on a .425 mm mesh.

PART 3 - EXECUTION

3.1 FINISHING - GENERAL

.1 Do Concrete finishing work in accordance with CSA-A23.1-94, unless otherwise indicated.

.2 Form Materials:

.1 Form materials for concrete surfaces which will be exposed to view, or which require smooth and uniform surfaces for applied finishes or other purposes, shall consist of square edged smooth panels of plywood. Panels shall be made in a true plane, clean, free of holes, surface markings and defects.

.2 Architectural Concrete: High density overlay grade plywood consisting of a translucent, hard and smooth resin-impregnated cellulose fibre sheet bonded to plywood face, with sealed edges. Seal joints between panels with closed cell PVC foam tape with pressure sensitive adhesive on one side.

.3 Form release agent and curing agents shall be compatible with applied finishes where applicable. Do not use release agents containing wax or oil in connection with concrete to receive applied coatings.

.3 Ties:

.1 Exposed Work: Plastic cone snap ties for concrete exposed to view in completed structure. Ties in exposed work shall generally be placed symmetrically about any section with plywood sheets and from each wall section.

.2 Architectural Concrete: Ties shall be placed in accordance with reviewed shop drawings and mock-up. Ties shall be placed in close proximity to corners to minimize or prevent water run-off at exposed concrete walls.

.3 Cone Tie Hole Plugs: Performed concrete tie hole plugs shall be inserted and sealed into cone tie holes in exposed architectural concrete areas with 10 mm recess to plug surface as referenced in Section 03 30 00 – Cast-in-Place Concrete.

.4 All permanent corners below grade or hidden from view, may be chamfered using uniformly sized triangular fillets, 20 mm x 20 mm. Triangular fillets shall be milled from clean straight-grain lumber and shall be smooth surfaced on all sides.

Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges unless otherwise detailed. Special care and attention to properly reinforce corners to prevent leakage of laitance and cement milk. Removal of forms must be carefully done to prevent breakage for corners.

.5 Concrete shall be deposited continuously, or in layers of such thickness that no concrete shall be deposited on concrete which has hardened sufficiently to cause the formation of seams or plains of weakness as described in Section 03 30 00 – Cast-in-Place Concrete.

3.2 FORMED SURFACES

.1 Inspect concrete surfaces for defects immediately after removal of formwork

.2 Remove or cut back to a depth of 19 mm (3/4") from the surface of the concrete all bolds, ties, nails, or other metal that is not required and repair immediately. Patch all cone and sleeve holes flush with concrete surface in strict accordance with manufacture's printed instructions. Grout all steel inserts in strict conformance with grout manufacture's printed instructions.

.3 Remove imperfections such as bulges, fins, lips, and stains to permanently exposed surfaces as directed by Consultant by chipping or grinding and patch to match adjacent surfaces. Do not proceed with grinding until the concrete has sufficiently hardened to prevent dislodgement of coarse aggregate particles.

.4 Repair exposed surfaces (including Mechanical Room) or surfaces to receive paint type finishes: Repair to be carried out under the direction of the Consultant. Blend cement and aggregate so that, when dry, patching mortar will match colour of surrounding. Provide test areas at inconspicuous location to verify mixture and colour match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface. Patch and fill at concrete imperfection such at "blow holes", "honeycomb" and voids as directed.

.5 Strike off smooth and finish tops of walls, horizontal offsets, and similar uniformed surfaces occurring adjacent to formed surfaces with a texture matching the adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise shown.

.6 Sack-Rubbed Finish (When directed by Consultant): In accordance with Clause 24.3.44-CSA-A23.1-94.

.7 Grinding to be with a carborundum stone and to be ground to complete all surface area, including patched and non-patched surfaces, as necessary, to provide a uniform colour and texture to the exposed concrete surface.

3.3 HORIZONTAL SURFACES

.1 Where floor drains occur, floors to be level around walls and have a 2% uniform pitch to drains, unless indicated otherwise. Stairs, landings and curbs shall have positive slopes to provide complete water drainage with no ponding.

.2 Finish horizontal concrete surfaces as follows:

.1 Exposed horizontal surfaces not intended to receive additional concrete: light sandblast finish or as indicated on the drawings.

.2 Horizontal concrete surfaces intended to receive waterproofing membrane: Smooth, steel trowel finish.

.3 Horizontal concrete surfaces intended to receive additional concrete toppings, quarry tile or ceramic tile: Screeded off to true lines and levels shown, roughened to an amplitude of 5 mm (3/16"), cleaned of laitance and loose concrete and left ready to receive finish. Depress slabs to accommodate finish where indicated.

.4 Broom Finish: After completion of floating and when excess moisture or surface sheen has disappeared, complete surface finishing by drawing a fine-hair broom across concrete surface, perpendicular to line of traffic. Repeat operation of required to provide a find line texture acceptable to Consultant.

.5 Stair Nosings: Install anti-slip safety strips to layout as indicated on drawings in accordance with manufacturer's recommendations. Terminate not more than 100 mm (4") from ends of steps.

3.4 SANDBLASTING

.1 Prior to commencement of sandblasting, examine surfaces scheduled to be worked on. Report in writing to the Consultant any condition which might affect the work adversely. Do not proceed until all defects have been corrected. Commencement of work indicates acceptance of surfaces. Notify Consultant for inspection prior to sandblasting.

.2 All work and material shall conform to the Master Painters and Decorators Association of B.C. (MPDA), Sandblasting Specification latest edition and as specified.

.3 Any Provincial regulations and local requirements shall be carefully observed during sandblasting operations.

.4 The sandblasting contractor shall have a record of satisfactory performance in the trade and shall maintain a qualified crew of sandblasters throughout the duration of the work.

.5 Protect surrounding or adjoining work by adequately covering with tarpaulin or other necessary protective covering. Make good any damage caused by failure to provide suitable protection.

.6 Protect the work of other trades against damage and make good any work damaged during sandblasting.

3.5 LIQUID CONCRETE SURFACE HARDENER

.1 Not Applicable

.2 Examine floors to ensure suitability for application of liquid concrete surface hardener and dustproofer in accordance with manufacturer's printed instructions and recommendations.

.3 Apply first coat of liquid concrete surface hardener, dilute to manufacturer's recommendations and spread evenly using mop, hair broom or rubber squeegees.

.4 Allow first application to dry. Remove areas of dried surplus hardener in low spots as necessary

.5 Apply second coat of liquid concrete surface hardener, dilute to manufacturer's recommendations and spread evenly using mop, hair broom or rubber squeegee.

.6 Allow floors to dry, minimum of 24 hours, before placing in service.

3.6 BONDING AGENT

.1 Apply bonding agent to all concrete when new concrete will be applied against it under the following conditions:

.1 Patching

.2 Feathering.

.3 Construction joints.

.4 Bonding of topping slabs.

3.7 DEFECTIVE CONCRETE

.1 Repair honeycombing, rock, pockets, chips, spalls and other voids in exposed concrete surfaces, using patching material as specified to provide a smooth surface. Remove fins and other protrusions in concrete surfaces.

.2 Consult with Consultant on the repair of defective concrete surfaces prior to execution of the work.

.3 Patch form tie holes in all exposed concrete surfaces and surfaces designated to receive waterproofing.

3.8 PROTECTION

.1 Take every precaution to protect finished surfaces from stains and abrasions. Surfaces and edges likely to be damaged during the construction period shall be especially protected.

.2 Protect Work of other sections from damage resulting from Work of this section.

.3 Provide suitable enclosures for collecting grit and dust from sandblasting operation.

.4 Erect barricades to prevent traffic on newly finished surfaces.

3.9 ADJUSTING & CLEANING

.1 At completion and during progress of the Work maintain premises in a neat and orderly manner. Rubbish and debris resulting from work of this Section shall be collected regularly and removed from the project site and disposed of.

.2 Repair, remove and clean all drips or smears resulting from the work of this section on exposed, finished surfaces or surfaces to be subsequently finished.

END OF SECTION 03 35 00

PART 1 - GENERAL

1.1 SUMMARY

.1 Preparing subgrades for slabs-on-grade, walks, and pavements.

.2 Excavate and backfill for buildings and structures.

.3 Provide drainage course for slabs-on-grade.

.4 Provide subsurface drainage backfill for walls and trenches.

.5 Excavate and backfill trenches within building lines.

.6 Excavate and backfill trenches for buried mechanical and electrical utilities and pits for buried utility structures.

1.2 RELATED SECTIONS

.1 03 30 00 Cast-in-Place Concrete.

1.3 REFERENCES

.1 ASTM D448-98 Standard Classification for Sizes of Aggregate for Road and Bridge Construction.

.2 ASTM D698-00a Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).

.3 ASTM D2487-00 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

.4 ASTM D2940-98 Standard Specification for Graded Aggregate Material For Bases or Subbases for Highways or Airports.

1.4 DEFINITIONS

.1 Backfill: Soil materials used to fill an excavation.

.2 Base Course: Layer placed between the subbase course and asphalt paving.

.3 Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

.4 Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

.5 Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.

.6 Excavation: Removal of material encountered above subgrade elevations.

.7 Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Consultant. Unauthorized excavation, as well as remedial work directed by Consultant, shall be without additional compensation.

.8 Fill: Soil materials used to raise existing grades.

.9 Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material 3/4 cu. yd. (0.57 cu. m) or more in volume.

.10 Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

.11 Subbase Course: Layer placed between the subgrade and base course for asphalt paving and a concrete pavement or walk.

.12 Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

.13 Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

.1 Submit in accordance with Section 01 33 00 Submittal Procedures.

.2 Samples: Submit proposed back fill and fill samples to Owner's Geotechnical Consultant for review and approval prior to ordering material.

1.6 QUALITY ASSURANCE

.1 Compaction of fills to Proctor Density Standards.

.2 General Materials testing in to ASTM standards.

1.7 PROJECT CONDITIONS

.1 Examine the site and make every enquiry which deemed necessary to determine the character of materials to be encountered, and allow in the Bid Price, the cost of excavation and filling to produce the stated finished rough grades and

excavations for buildings and services as indicated on the drawings and specified herein.

.2 Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Consultant and then only after arranging to provide temporary utility services according to requirements indicated:

.1 Notify Consultant not less than two days in advance of proposed utility interruptions.

.2 Do not proceed with utility interruptions without Consultant's written permission.

.3 Contact utility-locator service for area where Project is located before excavating.

.3 Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

1.8 COORDINATION

.1 Coordinate the work of this section with installation of Landscaping and Civil works. Clear surplus excavation and debris from the site for the work of this section.

1.9 INSPECTION AND TESTING

.1 Contractor will engage an independent soil testing and inspection service for quality control testing during earthwork operations.

.2 Quality Control Testing During Construction: Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.

.3 If in opinion of Consultant based on testing service reports and inspection, subgrade or fills that have been placed are below specified density, provide additional compaction and testing at no additional expense.

PART 2 - MATERIALS

2.1 GENERAL

.1 General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations. Fill and Backfill shall be subject to the Owner's Geotechnical Consultant's approval.

.2 Satisfactory Soils: ASTM D2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

.3 Unsatisfactory Soils: ASTM D2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

.4 Backfill and Fill: Satisfactory soil materials.

.5 Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

.6 Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2- inch (38-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

.7 Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.

.8 Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 ACCESSORIES

.1 Vapour Barrier: 6 mil polyethylene.

.2 Erosion protection material: 6 mil polyethylene.

PART 3 - EXECUTION

3.1 SETTING OUT

.1 Set out lines and levels for buildings as detailed. Maintain stakes, bench marks and witness points during construction.

.2 The Owner will provide and indicate one bench mark adjacent to site and confirm elevation of same.

.3 Coordinate work of this section with foundation drainage requirements as indicated on Mechanical Drawings.

3.2 PROTECTION, SHORING AND DEWATERING

.1 Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

.2 Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

.3 Convey water removed from excavations and rain water to collecting or run-off areas. Establish and maintain temporary storm water management system and sedimentation control system. Do not use trench excavations as temporary drainage ditches.

.4 Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation. Firmly secure polyethylene sheeting over exposed banks for erosion protection.

.5 Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.

.6 Provide shoring, bracing, stabilization required to prevent caving in of banks and excavations. Place shoring so as to be independent of footings and foundation walls. Leave in position until forms have been removed, dampproofing or waterproofing completed, building drainage installed and approval given to proceed with backfilling.

.7 Make good immediately damage or disturbance, settlement of collapse caused due to inadequate measures being taken to prevent same at no additional cost to Owner.

.8 Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 1^{O}C (35^{O}F). Subgrade soils and fills below buildings must not be allowed to freeze at anytime.

3.3 BULK OR MASS EXCAVATION

.1 Clear organic material from the building footprint and other structures. Coordinate with Landscaping and Civil requirements to avoid duplication.

.2 Completely subexcavate from beneath the proposed buildings and dispose of surficial soils fills and other deleterious materials. The anticipated depth of stripping will vary between 15” and 30’-0”. It should be noted that local deeper pockets of fills and deleterious materials may be encountered. The Contractor's attention is drawn to the presence of cobbles and boulders.

.3 Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1” (25 mm). Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

.4 Cut and fill as required, bring to contours, grades and elevations allowing for slab and granular subbase. Compact to densities specified.

.5 Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work. Set excavations back from footing locations with a minimum slope of 2 horizontal to 1 vertical.

.6 Grading Surface of Fill Under Building Footings and Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of + or - 12mm when tested with a 3 meter straight edge.

.7 If soft silt or sand-silt soil mixtures are present at the footing level it may be necessary to excavate and lower the footing elevation to competent native soil.

.1 Prior to over-excavating, identify areas to be over-excavated and estimate volume of material to be excavated.

.2 Any over excavations to be approved by Geotechnical Consultant.

.3 Additions to the Contract will be dealt with by Change Order, as per Unit Price.

3.4 EXCAVATION FOR TRENCHES

.1 Provide shoring and bracing to trenches, pits and excavations to meet the Workers’ Compensation Board Standards and requirements of local authorities having jurisdiction.

.2 Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room.

.3 Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.

.4 Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

.5 Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Consultant.

3.5 STORAGE OF SOIL MATERIALS

.1 Stockpile borrow materials and satisfactory excavated soil materials and store according to slopes specified. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

.2 Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.6 BACKFILL AND FILL

.1 General: Place acceptable material in lifts not exceeding 200 mm thickness, to required subgrade elevations, as specified.

.2 Place and compact backfill in excavations promptly, but not before completing the following:

.1 Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.

.2 Surveying locations of underground utilities for record documents.

.3 Inspecting and testing underground utilities.

.4 Removing concrete formwork.

.5 Removing trash and debris.

.6 Removing temporary shoring and bracing, and sheeting.

.7 Installing permanent or temporary horizontal bracing on horizontally supported walls.

.3 Do not backfill trenches or foundations until tests and inspections have been made and backfilling authorized by Consultant. Use care in backfilling to avoid damage or displacement of pipe systems and concrete works.

.4 Backfill: Fill under strip footings and slabs on grade shall conform to the recommendations of the Geotechnical Report.

.5 Backfill Against Structure/Structural Backfill:

.1 Material for backfill against foundations walls and grade beams: acceptable free draining granular material.

.2 Imported material shall be free from building or organic debris, large rocks or excess vegetable matter.

.3 Spread in uniform compacted layers, and mechanically compact each layer to firm bearing to 100% Standard Proctor Dry Density.

.4 Do not use heavy equipment for compaction adjacent to basement walls, perimeter grade beams and footings.

.5 Do not over compact fills within 16” (400 mm) of these elements.

.6 Backfill between basement walls and shored excavations shall consist of pea gravel.

.6 Drainage Course - Fills supporting slabs on grade: well graded, free draining, inorganic, uncontaminated, soil consisting of 150 mm base layer of 19 mm minus compacted gravel. If additional fill is required provide 75 mm minus compacted gravel.

.7 Fill supporting roads, parking areas, sidewalk structures: well graded, free draining, inorganic gravel.

.8 Fill supporting medium vehicle traffic loading: 50 mm thick asphaltic concrete on 100 mm base layer of 19 mm minus compacted gravel and a minimum 300 mm thick sub-base layer of 75 mm minus compacted gravel.

.9 Fill supporting heavy vehicle traffic loading: 75 mm thick asphaltic concrete on 100 mm base layer of 19 mm minus compacted gravel and a minimum 450 mm thick sub-base layer of 75 mm minus compacted gravel.

.10 Deep Utility Trenches in Landscape areas: backfill with native site soils in the same strata configuration as the surround area.

.11 Deep Utility Trenches beneath roads, buildings, and side walks, backfill with 75 mm minus gravel in depths indicated and where not indicated as directed by Geotechnical Consultant.

.12 Backfill of utility and service trenches: Backfill service trenches and around pits, sumps, catchbasins, with approved granular materials using vibratory compactors to ensure a permanent level at finish grade.

.13 At areas around buried pipe, hand backfill a minimum of 6 inches (150 mm) of material and tamp in 6 inches (150 mm) layers prior to using earth moving equipment. Do not use as fill in or over pipe trenches, boulders over 3 inches (75mm) diameter, frozen material, or debris which could damage pipe or make re-excavation of trenches. Coordinate with the requirements of Division 15 Mechanical for pipe bedding and surrounding backfill requirements.

3.7 COMPACTION

.1 General: Control compaction during construction providing minimum percentage of density specified. Utilize double drum vibrating roller driven or hand type to suit conditions and as approved by Consultant. Utilize sled type vibrator adjacent to confined areas.

.2 Structures: Compact backfill or fill material in maximum 12 inches (300 mm) layers including drainage layer.

.3 Surface compact sand Fill identified at the Subgrade elevation by several passes with a heavy vibratory roller to 100 per cent of Modified Proctor maximum dry density prior to placing Fill to raise grades, footings or floor slabs.

.4 Place backfill and fill materials in layers not more than 12 inches (300 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 9 inches (225 mm) in loose depth for material compacted by hand-operated tampers.

.5 Compact soil to not less than the percentages of Standard Proctor Density indicated for the following:

PART OF STRUCTURE	STANDARD PROCTOR DENSITY
Foundation Wall – Interior	100 % ASTM D698
Around Columns or Piers	100 % ASTM D698
Under Slabs on Grade	98 % ASTM D698
Foundation Walls – Exterior	98 % ASTM D698
Sidewalks	98 % ASTM D698
Under Parking and Roads	100 % ASTM D698

3.8 GRADING

.1 General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

.1 Provide a smooth transition between adjacent existing grades and new grades.

.2 Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

.2 Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances: Lawn, Unpaved Areas and Walks: Plus or minus 1 inch (25 mm). Pavements: Plus or minus 1/2 inch (13 mm).

.3 Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

3.9 DRAINAGE COURSE

.1 Under slabs-on-grade, place at least 6 inches (150 mm) of clean crushed rock or well graded sand and gravel.

1.10 PROTECTION

.1 Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

.2 Repair and reestablish grades in settled, eroded and rutted areas to specified tolerances.

.3 Reconditioning compacted areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, refill as required and compact to required density prior to further construction.

1.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS

.1 Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 31 00 00

PART 1 - GENERAL

1.1 DESCRIPTION:

Provide all labour, materials, equipment and services required for clearing and grubbing including but not limited to:

.1 all areas indicated on the Demolition Plan

1.2 RELATED WORK:

.1	Temporary Tree and Plant Protection	Section 01 56 39

1.3 DEFINITIONS:

.1 Clearing consists of cutting off trees and brush vegetative growth to not more than a specified height above ground and disposing of felled trees and surface debris.

.2 Close-cut clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing flush with existing grade and disposing of fallen timber and surface debris.

.3 Clearing isolated trees consists of cutting off to not more than a specified height above ground of trees designated and disposing of felled trees and debris.

.4 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm diameter and disposing of all fallen timber and surface debris.

.5 Grubbing consists of excavation and disposal of stumps and roots, boulders and rock fragments to not less than a specified depth below existing ground surface.

1.4 PROTECTION:

.1 Prevent damage to fencing, trees, landscaping, natural features, bench marks, existing buildings, existing pavement, utility lines, site appurtenances, water courses, and root systems of trees which are to remain. Make good damage.

PART 2 - PRODUCTS

No materials required to be supplied except contractor's equipment, tools and consumables.

PART 3 – EXECUTION

3.1 CLEARING:

.1 Clear trees, shrubs, uprooted stumps and surface debris not designated to remain.

.2 Cut off trees, brush, and scrub as indicated or as directed by Consultant, at a height of not more than 300 mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 1000 mm above existing ground.

.3 Cut off unsound branches and cut down trees overhanging area cleared at no extra cost.

3.2 CLOSE CUT CLEARING:

.1 Cut off trees, shrubs, stumps and other vegetation at ground level.

.2 Perform close cut clearing by hand so that existing insulation of fibrous material is not damaged.

.3 Cut off unsound branches and cut down trees overhanging area cleared at no extra cost.

3.3 ISOLATED TREES:

.1 Cut off isolated trees as indicated or as directed by Consultant at height of not more than 300 mm above existing ground.

.2 Grub out isolated tree stumps.

3.4 UNDERBRUSH CLEARING:

.1 Clear underbrush from areas as indicated at ground level.

3.5 GRUBBING:

.1 Grub out stumps and roots to not less than 200 mm below existing ground surface.

.2 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m 3.

3.6 REMOVAL AND DISPOSAL:

.1 Remove cleared and grubbed materials off site to disposal area designated by Consultant.

.2 Timber greater than 125 mm diameter cut to 1000 mm lengths and stockpiled, becomes property of Owner.

3.7 FINISHED SURFACE:

.1 Leave ground surface in condition suitable for stripping of topsoil.

END OF SECTION 31 11 00

PART 1 GENERAL

1.1 DOCUMENTS

1.1.1 This section of the specification forms part of the Contract Documents and is to be read, interpreted and co-ordinated with other parts.

1.2 DESCRIPTION

1.2.1 Work Included: Furnish all labour, materials, equipment and services necessary to prepare the site suitable for subsequent work, including but not limited to:

.1 Preservation and protection of existing plants, site features and intertidal habitat.
.2 Draining of wet areas of the site by means of temporary ditches, pumping and other means approved by the Consultant.
.3 Tree removal and removal of tree roots only as required to obtain satisfactory base for paving.
.4 Stripping and disposal of all existing materials to prepare for path and base as detailed. All other deleterious materials, including unsuitable material under areas to be filled, shall be treated as over excavation.
.5 Stripping and removal of all deleterious materials.
.6 Stripping and stockpiling topsoil (if any).
.7 Grading of the site, including the importation of and relocation of fill to create compacted subgrades as required for subsequent work as detailed and specified.
.8 Work from existing conditions and grades shown on plans. The intent is to balance structural cut and fill on site.
.9 Placing approved fill, subbase, base and associated materials as detailed.
.10 Finished grading of the site for landscaping.

1.2.2 Related Work in other Sections:

.1 Temporary Tree and Plant Protection	Section 01 56 39
.2 Subsurface	Section 33 41 00
.3 Irrigation	Section 32 80 00
.4 Soil Preparation	Section 32 91 13

1.3 JOB CONDITIONS

1.3.1 Use all means necessary to control dust, dirt and debris on and near the worksite, including Construction Access Route (C.A.R.), caused by the Contractor’s operations. Thoroughly moisten all surfaces, when necessary, to prevent dust being a nuisance in adjoining areas.

1.3.2 Use all means to protect all materials of this Section before, during and after installation. Protect all trees designated to remain. Make good any damage. Protect existing fencing, walls, curbs, sidewalks, pavement, bench marks, surface or underground utilities which are to remain. Notify the Consultant immediately if any damage occurs. Restore to original or better condition, unless directed otherwise.

1.3.3 Protect adjacent construction and all surrounding properties, including municipal streets, sidewalks, above and under ground services.

1.3.4 Obtain approval from the Consultant on designated Construction Access Route (C.A.R.). Ensure C.A.R. is appropriately signed and maintained during course of construction. Remediate to original condition prior to Substantial Performance.

1.3.5 Maintain any existing fence barriers currently on site surrounding areas of preserved existing vegetation. Do not enter areas of preserved existing vegetation without the approval of the Consultant.

1.4 QUALITY ASSURANCE

1.4.1 Codes and Standards: Perform backfilling work in compliance with applicable requirements of governing authorities having jurisdiction.

1.4.2 Inspection: The Consultant or their representative is to inspect and approve all stages of the work. The Contractor shall give forty-eight (48) hours notice to the Consultant when inspection is required.

1.5 SITE EXAMINATION

1.5.1 Start of work shall signify acceptance of site as satisfactory and no claim will be recognized for extra work nor any allowance made for defective work due to site conditions.

1.5.2 Investigate the site to verify information shown in Contract Documents. **Verify that existing grades are as shown on Drawings and notify the Consultant immediately of any discrepancies.**

1.6 TESTING

1.6.1 A testing agency will be retained by the Consultant or its representative to perform periodic testing of the subgrade preparation if required, to ensure the requirements of the Contract and General Conditions are being met. Any retesting due to non-conformance shall be provided by the Contractor at no extra cost to the contract.

1.6.2 Cooperate and assist as required the testing agency in the execution of their work.

1.7 MATERIALS DEFINITIONS

1.7.1 The terms “subgrade”, “subbase”, and “base”, wherever used in the contract documents shall mean materials that meet the requirements stated herein for each class of material.

1.8 SAMPLES

1.8.1 Provide representative samples for subbase, base, drain rock (clear crush), quarry tailings, rip-rap or any another aggregate materials used on site, at least fourteen (14) days before scheduled time of delivery to site.

PART 2 PRODUCTS

2.1 SUBGRADE

2.1.1 Subgrade is a dense surface which has been proof rolled as specified and which has been treated to eliminate all soft or spongy areas. Compaction and uniformity of subgrade shall be subject to approval by the Consultant.

2.1.2 Subgrade may be existing undisturbed material resulting from cutting or may be built up using Type 1 fill or Type 2 fill, depending on the applications.

2.2 FILL

2.2.1 Fill material shall be natural mineral material of a consistent quality throughout, free from foreign matter such as construction debris, plant and grass seeds, organic matter (except within limits shown for Type 1) and pests, and meeting the requirements set out for Type 1 or Type 2 fill, depending on the application.

2.2.2 Obtain the Consultant's approval of fill material before delivering to the site if imported, or before moving on site if native. **If imported material is approved for use, supply Consultant with written notification a minimum of thirty (30) days prior to beginning fill operations a complete statement of origin, compensation, suitability, environmental clearance and proposed location of all deposits that is intended for imported fill.**

2.2.3 Fill shall be classed as Type 1 or Type 2, depending on its application and shall meet the following requirements for each type:

TYPE	APPLICATION	REQUIREMENTS
Type 1	Under planted and grass areas	Maximum aggregate size 200mm evenly graded, containing not more than 20% fines (clay and silt) and not more than 5% organic matter, or as approved by the Consultant.
Type 2	Under subbase for pathways, paved areas, structures	Maximum aggregate size 200mm evenly graded, containing not more than 15% fines passing a No. 200 (0.075mm) sieve when tested according to ASTM designation C-136. Alternatives may be approved by the Consultant.

2.3 SUBBASE

2.3.1 Subbase shall be crushed granular aggregate composed of inert, clean, tough, durable particles capable of withstanding the effects of handling, spreading and compaction without excessive degradation or production of deleterious fines. The aggregate shall be reasonably uniform in quality and free from an excess of flat or elongated pieces.

2.3.2 All subbase aggregate shall have a gradation within the limits set out herein when tested according to ASTM designation C-136.

Sieve Size (mm)	Total Percent Passing
75.0	100
37.5	60 - 100
20.0	40 - 80
9.5	30 - 60
4.75	20 - 45
2.36	15 - 35
1.18	10 - 25
0.300	4 - 16
0.075	2 - 9

2.4 FILTER FABRIC

2.4.1 Needle-punched, non-woven filter fabric, Mirafi P-150 as manufactured by Dominion Geotextile Inc. or pre-approved equivalent.

2.5 BASE

2.5.1 20mm diameter minus domestic or imported material below all paved surfaces. Material shall be free of organic and other deleterious material with the following particle size breakdown:

Sieve Size (mm)	Total Percent Passing
20.0	100
9.5	60 - 95
4.75	40 - 70
2.36	30 - 60
1.18	20 - 45
0.300	8 - 45
0.075	2 - 9

2.6 CONSTRUCTION FENCING

2.6.1 Metal fencing is required around the entire construction site, and be a minimum of 6 feet in height. Fencing to be “Modu-Loc” or equivalent, and is to be approved by Consultant before installation. The Contractor is to ensure fencing is secure at all times, so as to prevent intrusion into the construction site by any unauthorized persons. Contractor is responsible for maintaining the integrity of the fencing at all times, with the fencing in a vertical position. Fencing is to be in place before the start of any construction and is to be in place until Final Acceptance.

PART 3 EXECUTION

3.1 LIMITS OF WORK

3.1.1 Before starting work, identify the limits of work on site by accurate survey. Prior to grading, excavating or trenching the Contractor shall locate and expose all utility lines, drain pipes and all other services which are within the areas of this work, and where the existing services are located less than 300mm below the proposed depth of trenching or excavation, such existing services shall be exposed by hand and adequately marked and protected. All separation distance requirements of the local authorities having jurisdiction over the service shall be observed.

3.1.2 Take all measures necessary to prevent the following activities outside the limits of work except as authorized by the Consultant:

- travel of equipment and vehicles
- storage of materials or equipment
- stockpiling of soil or excavated materials
- burning
- excavating or trenching
- cutting of roots or branches
- disposal or spilling of toxic matter

3.2 TREE REMOVAL

3.2.1 Remove trees only as shown on the plan, or as requested by the Consultant. Remove all debris from site. Remove all roots and parts that would be detrimental to the construction.

3.2.2 Strip topsoil, surface silts and organics, down to approved subgrade. Remove topsoil, surface silts and organics from the site, except for clean topsoil approved by the Consultant for stockpiling for future use.

3.3 UNSUITABLE MATERIAL

3.3.1 Remove from the site all material unsuitable for use as fill.

3.4 DRAINAGE

3.4.1 Drain and/or dewater all areas to be regraded using methods acceptable to the Consultant and local environmental authorities having jurisdiction.

3.4.2 Slope rough grades away from any building envelopes/ structures at a minimum 2%, unless specifically shown on drawings or directed by Consultant.

3.5 EXCAVATION AND FILLING

3.5.1 Cut, fill and import material as required to create subgrades as detailed and specified herein.

3.5.2 Remove all deleterious material and ponded water from the site.

3.5.3 Compact exposed ground surface beneath all fill areas with a minimum 5 ton vibrator roller, except in “soft” landscape areas, i.e. areas to receive grass or planting.

3.5.4 Any soft or spongy areas shall be sub-excavated, removed and replaced with granular subbase material. Such fill shall be placed in maximum 200mm lifts and compacted to the densities required for Type 1 or Type 2 fill.

3.5.5 Scarify existing grades to a minimum depth of 150mm prior to placing of fill. Move excavated material intended for reuse as fill directly from the cut to the fill area, spread and compact to the required densities.

3.5.6 Place fill in maximum 200mm lifts and compact each lift to the following Standard Proctor Densities, to ASTM D698 using approved vibratory compaction equipment, prior to placing subsequent layers as follows:

Type 1 Fill: 95% S.P.D.
Type 2 Fill: 98% S.P.D.

3.5.7 Compact fill materials only when the moisture content is suitable for obtaining the specified density. If moisture content is too low, apply water by means of approved distribution. If moisture content is too high, dry the fill material by blading, discing, or other approved method. **DO NOT OVER COMPACT FILL TYPE 1.**

3.5.8 Excavated material used as Fill Type 2, shall be overlaid with a minimum of 200mm of subbase, compacted to 98% Standard Proctor Density.

3.6 GRADING

3.6.1 **DO NOT GRADE SOIL WHEN SOIL IS WET.** Uniformly grade areas within limits of grading under this Section. Smooth finished surface within specified tolerances, compact with levels or slopes between elevations as shown, or between such points and existing grades.

3.6.2 Grade areas to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and to allow for specified depths of base courses and finished materials.

3.6.3 Remove particles larger than 100mm diameter from the surface leaving a smooth compacted surface to required subgrade.

3.6.5 Compact subgrade as required, to stated densities in the above section.

3.7 SUBBASE AND BASE

3.7.1 Ensure base materials and existing surface are at approximately the same moisture content to facilitate bonding.

3.7.2 Install subbase, base and filter fabric as detailed. Place in maximum 200mm lifts and compact to minimum 98% S.P.D.

3.7.3 Finish to subgrades as detailed, suitable for subsequent installation of path and base, structures and paving.

3.8 TOLERANCES

3.8.1 Maximum subgrade tolerance is ± 25mm when checked with a 3 m straight edge placed in any direction, and the subgrade shall not be consistently above or below the design grades.

3.9 MAINTENANCE

3.9.1 Protect newly-graded areas from traffic, erosion, standing water and free of debris. Provide temporary drainage ditches from graded areas as required.

3.9.2 The site surface shall at all times be contoured to direct precipitation and run-off to drainage ditches or slopes leading away from the work area. Surfaces shall always be left graded smooth and rolled with a smooth drum roller to minimize infiltration of water and subsequent deterioration of material due to excessive moisture content. The surface shall never be left with undrained depressions or with a rough texture.

3.9.3 Repair and re-establish grades in settled, eroded and rutted areas to specified tolerances.

3.9.4 Repair and make good and clean up any damage and/or debris to municipal roads and streets caused by work of this Contract. Obtain and pay for all permits required for use of municipal roads and streets.

3.10 DISPOSAL OF EXCESS AND WASTE MATERIALS

3.10.1 Remove excess excavated material, trash, debris and waste materials and dispose of off site as directed by Consultant at no additional cost to the Owner.

END OF SECTION 31 22 00

PART 1 - GENERAL

1.1 Source Sampling

.1 At least two (2) weeks prior to commencing work inform Consultant of proposed source of aggregates and provide access for sampling.

.2 If materials have been tested by an independent testing laboratory within previous three (3) months and have successfully passed tests equal to requirements of this specification, submit test certificates from testing laboratory showing suitability of materials for this project.

1.2 Protection

.1 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled below 38°C. Do not permit stationary loads on pavement until 24 hours after placement.

.2 Arrange paving schedule so as not to interfere with normal use of premises.

1.3 Mix Design

.1 Submit asphalt mix design for Consultant to review.

1.4 Limited Warranty

.1 The Contractor warrants to the RDN that all products furnished will be free from defects in material and/or workmanship.

.2 This warranty shall be extended for a period of two (2) years following the date of Substantial Completion of the project overall.

PART 2 - PRODUCTS

2.1 Materials

.1 Granular sub-base:

.1 Crushed or screened stone, gravel or sand consisting of hard, durable particles free from clay lumps, cementation, organic material, frozen material and other deleterious materials.

.2 Gradations to be within limits specified when tested to ASTM C136-84a and ASTM C117-84. Sieve sizes to CAN/CGSB-8.1-87 rather than ASTM E11-81.

ASTM Sieve Designation	% Passing
75 mm	100
4.75 mm	20 - 80
0.425 mm	5 - 30
0.075 mm	0 - 10

.2 Granular base:

.1 Crushed stone or gravel consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.

.2 Gradations to be within limits specified when tested to ASTM C136-84a and ASTM C117-84. Sieve sizes to CAN/CGSB-8.1-87 rather than ASTM E11-81.

ASTM Sieve Designation	% Passing
25 mm	100
19.0 mm	65 - 95
9.5 mm	45 - 90
4.75 mm	25 - 75
2.00 mm	15 - 45
0.425 mm	5 - 25
0.075 mm	3 - 8

.3 Crushed particles: At least 60% of particles by mass within each of following sieve designation ranges to have at least one freshly fractured face. Material to be divided into ranges using methods of ASTM C136-84a.

Retained on Min.	% by Mass
4.50mm to 4.75mm	60

.3 Granular base:

.1 Liquid limit: D4318, Maximum 25.

.2 Plasticity index: D4318-84, Maximum 6.

.4 Asphalt concrete aggregates:

.1 Coarse aggregate is aggregate retained on 4.75mm sieve and fine aggregate passing 4.75mm sieve when tested to ASTM C117-84.

.2 When dryer drum plant or plant without hot screening is used, process fine aggregate through 4.75mm sieve and stockpile separately from course aggregate.

.3 Separate stock piles for coarse and fine aggregate are not required for sheet asphalt.

.4 Do not use aggregates having known polishing characteristics in mixes for surface courses.

.5 Aggregates material:

- Crushed Stone or gravel consisting of hard, durable, angular particles free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
- Gradations to be within limits specified when tested to ASTM C136-84a and ASTM C117-84. Sieve sizes to CAN/CGSB-8.1-87 rather than ASTM E11-81.

ASTM Sieve Designation	% Passing
12.5 mm	100
4.75 mm	55 - 75
2.00 mm	35 - 55
0.425 mm	15 - 30
0.180 mm	5 - 20
0.075 mm	3 - 8

.6 Sand: Equivalent to ASTM D2419-74 (1979) Min. 50.

.7 Magnesium Sulphate Soundness: ASTM C88-83 Max % loss by weight:
Coarse aggregate: 12
Fine aggregate: 16

.8 Los Angeles Abrasion: ASTM C131-81
Max % loss by weight: Less than 1.95
Relative density: 1.5.

.9 Absorption: ASTM C127-84.
Max % by weight: Coarse aggregate, 1.75

.10 Lightweight Particles: ASTM C123-83
Max % by weight: Less than 1.95
Relative density: 1.5

.11 Flat and Elongated Particles (with length to thickness ratio greater than 5):
Max % by weight: Coarse aggregate 15

.12 Crushed particles: At least 60% of particles by mass within each of following sieve designation ranges to have at least 1 freshly fractured face. Material to be divided into ranges using methods of ASTMC136-84a.

Retained on Min.	% by Mass
12.5mm to 4.75mm	60

.13 Regardless of compliance with specified physical requirements, fine aggregates may be accepted or rejected on basis of past field performance.

.5 Mineral filler:

.1 Finely ground particles of limestone, hydrated lime, Portland cement or other approved non-plastic mineral matter, thoroughly dry and free from lumps.

.2 Add mineral filler when necessary to meet job mix aggregate gradation or as directed by Consultant to improve mix properties.

.6 Asphalt cement: To CGSB 16-GP-3M, grade 85-100.

2.2 Mix Design

.1 Design of mix: By Marshall method to requirements below and as directed by Consultant.

.1 Compaction blows on each face of test specimens: 50.

.2 Mix physical requirements:

Property	Unit	Roads
Marshall Stability at 60° C	kN min.	5.5
Flow Value	mm	2 - 4
Air Voids in Mixture	%	3 - 5
Voids in Mineral Aggregate	% min.	14.0
Index of Retained Stability	% min.	75.0

.3 Measure physical requirements as follows:

- Marshall load and flow value: To ASTM D1559-82.
- Air voids: To ASTM D3203-83.

.4 Do not change job-mix without prior approval of Consultant. Should change in material source be proposed, new job-mix formula to be reviewed Consultant.

.5 Return plant dust collected during processing to mix in quantities acceptable to Consultant.

PART 3 - EXECUTION

3.1 Subgrade

.1 Subgrade to be prepared with a positive slope of 0.83% (1:120) from side to side.

.2 Exposed subgrade is to be scarified, moisture conditioned and compacted to 98% of standard Proctor maximum density (SPMDD)

.3 The prepared subgrade is to be protected from freezing, drying and ponding water.

.4 Base courses to be placed as soon as possible following subgrade preparation.

.5 Verify grades of subgrade drains and other items set in paving area for conformities with elevations and sections before placing granular sub-base material.

.6 Obtain approval of subgrade by Consultant before placing granular sub-base.

3.2 Granular Sub-base and Granular Base

.1 Place granular sub-base to compacted thickness as indicated.

.2 Place granular base to compacted thickness as indicated.

.3 Place in layers not exceeding 100mm (4") compacted thickness. Compact to density not less than 98% Corrected maximum dry density.

.4 Finished base surface to be within 6mm (1/2") of specified grade, but not uniformly high or low.

3.3 Asphalt Concrete Paving

.1 Obtain approval of base from Consultant before placing asphalt.

.2 Place asphalt mix only when base or previous course is dry and air temperature is above 5°C.

.3 Apply a binder coat – SS1 or equivalent on the entire area.

.4 Place and compact 1 – 60mm lift of bottom course hot mix asphalt to 98% of its maximum density.

.5 Place and compact 1 – 40mm lift of 3/8” minus mix asphalt to 98% of its maximum density.

.6 Asphalt oil content to be a minimum of 6.2% (A.C) on final lift.

.7 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.

.8 For both asphalt lifts, the area must be string-lined or lasered to ensure exact slope (no bird baths).

.9 Roll until roller marks are eliminated. Compact to density not less than 95% of density obtained with Marshall specimens prepared in accordance with ASTM D1559-82 from samples of mix being used.

.10 Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.

.11 Moisten roller wheels with water to prevent mix adhesion.

.12 Compact mix with hot tampers or other approved equipment in areas inaccessible to roller.

.13 Finish surface smooth, true to grade to within 6mm (1/4') and with no irregularities greater than 10mm (3/8") in 4.5m (15').

3.4 Joints

.1 Cut bituminous course to full depth in neat lines to expose fresh vertical surfaces. Remove broken and loose material.

.2 Paint exposed vertical edge of asphaltic joints, edges of manholes and catch basin frames, curbs and similar items with hot asphalt cement.

.3 Carefully place and compact hot asphaltic material against joints.

END OF SECTION – 32 10 00

PART 1 - GENERAL

1.1 DESCRIPTION

Provide all labour, materials, equipment and services required for granular base including but not limited to:

.1 Areas indicated on plans and details.

1.2 TESTING GRANULAR MATERIAL

.1 Preliminary approval of the granular material shall not constitute general acceptance of all material in the deposit or source of supply, and acceptance shall be subject to field tests taken at the discretion of the Consultant. Materials may be considered suitable even though particle sizes are within the limits of the gradation sizes required if particle shapes are thin or elongated or any other characteristic precludes satisfactory compaction. Rejected material will not be paid for. The acceptability of the final material will be determined by the Consultant.

.2 Field density, moisture content, and sieve analysis will be carried out by an independent testing agency paid for by the Owner.

PART 2 – PRODUCTS

2.1 MATERIALS

.1 Do not use rounded river gravel, base and bedding materials must be crushed aggregates

.2 Gradation Criteria
Note: Dx is the particle diameter size at which x percent of the particles are finer. For example, D15 is the particle size of the aggregate for which 15% of the particles are smaller and 85% are larger.

a. D15 base stone/D50 bedding stone <5.
b. D50 base stone/D50 bedding stone >2

.3 Crushed stone with 90% fractured faces, LA Abrasion <40, minimum CBR of 80%.

.4 Grading Requirements for Bedding Coarse (ASTM No.8)

Percentage Passing for each Type of Aggregate

Sieve Size	Percent Passing
1/2” (12.5 mm)	100
3/8” (9.5mm)	85-100
No. 4 (4.75mm)	10-30
No. 8 (2.36mm)	0-10
No.16 (1.16mm)	0-5

.5 However, should the Contractor be able to produce an aggregate differently graded than specified above and the Consultant is satisfied that stability, permeability, and workability requirements can be met and that the use of coarser grade aggregate will lead to the maximum utilization of the aggregate source, the Consultant may direct in writing that the coarser grade aggregate can and shall be used.

.6 Once a crushed aggregate gradation has been accepted, the maximum permissible variation of the mean of any 4 consecutive tests from the accepted gradation curve shall be within the limits specified below:

Sieve Size	Variation Limits % Passing
No. 4 and larger - 4.75 mm and larger	+5
No. 16 to No. 4 - 1.18 mm to 4.75 mm	+3.5

Should there be a substantial change in the type of aggregate exposed as the work proceeds, the Consultant may authorize a change in the mean gradation.

.7 Plasticity Index 04318-84 for crushed gravel shall not exceed 6.

PART 3 - EXECUTION

3.1 INSPECTION OF UNDERLYING SUB-GRADE

.1 After the sub-grade has been approved by the Consultant, the placing of crushed granular base material shall proceed as quickly as practicable to preserve and prevent drying out the surface of the sub-grade.

3.2 PLACING

.1 Place material only on clean unfrozen surface, properly shaped and compacted and free from snow and ice.

.2 The crushed granular base shall be constructed in such a manner that the aggregate is neither segregated, contaminated, nor degraded. End dumping will not be permitted.

.3 The thickness of the crushed granular surfacing shall be substantially uniform, and the minimum thickness shall not be less than the nominal thickness shown on the drawings or ordered by the Consultant.

.4 If the Contractor is unable to provide adequate manually operated equipment or workers of sufficient skill to lay the crushed granular base within the tolerances specified, the Consultant may require that the contractor lay the aggregate through an approved electronically controlled spreading machine. In such an event the Contractor will set out the necessary reference line required to guide the electronic control equipment and the spreading machine.

.5 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Consultant may authorize thicker lifts if specified compaction can be achieved.

3.3 COMPACTING

.1 Immediately following spreading, the crushed granular base aggregate shall be compacted to a minimum of 100% of corrected maximum dry density.

.2 The method of compaction to be employed may be selected by the Contractor but shall be subject to review or alteration by the Consultant. If the Contractor is unable to obtain the specified density, the crushed granular base shall be compacted in lifts less than 75 mm in thickness until the specified density is obtained.

.3 Apply water as necessary during compacting to obtain specified density. If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected.

.4 In areas not accessible to rolling equipment, compact to specified density with approved mechanical tampers.

3.4 SHAPING

.1 The completed surface of the crushed granular base course shall conform to the required line, cross-section and grade within a tolerance of plus or minus 1/2” (15 mm).

3.5 CROSS-SECTIONS

.1 Levels at centre line and road edge shall be taken by the Consultant at 20' stations as a record of tolerances and as a check on thickness of material placed.

3.6 INSPECTION

.1 Before approval by the Consultant, the crushed granular base course surface shall be true to cross-section and grade, and shall conform to the density specified.

END OF SECTION 32 11 23

1.0 GENERAL

1.1 GENERAL REQUIREMENTS

.1 Refer to Division 1, General Requirements
.2 All contract documents form an integral part of this section

1.2 RELATED WORK

.1	Soil Preparation	Section 32 91 13
.2	Grading	Section 31 22 00

1.3 DESCRIPTION

.1 Furnish all labour, materials, equipment and services necessary to supply and install and grade crushed granular base course and top course of crushed granite granular paving as shown on the drawings and as specified herein.

1.4 LAYOUT

.1 Before proceeding with construction, stake layout of all crushed granite paving for review. Verify all locations and dimensions and report to the Consultant any deviation or conflicts between drawings, specifications and site conditions.

1.5 PROTECTION

.1 Protect all work from damage and protect all property from damage arising from this contract. Take every precaution necessary to avoid damage to all buried utilities, drainage lines and irrigation systems.

1.6 EXISTING UTILITIES AND STRUCTURES

.1 Exact location of all existing utilities and structures, whether or not indicated on the drawings will be determined by the Contractor. Conduct work so as to prevent interruption of service or damage.
.2 Contractor will be responsible for repair of any utilities damaged in the course of his work.
.3 Coordinate all drainage, water service and electrical work with crushed granite paving.

1.7 SAMPLES

.1 Submit sample of crushed granite for review.

2.0 PRODUCTS

2.1 MATERIALS

.1 Crushed Granite Granular Paving: shall consist of sound durable particles. Granite material shall be free of clay, organic material or other deleterious matter, evenly grated to meet the following gradation requirements:

Sieve Size (mm)	Sieve Size (inches/#)	Percent Passing
19	¾”	100
12.5	½”	98-100
9.5	3/8”	50-80
4.75	#4	70-90
2.0	#10	40-70
0.42	#40	15-35
0.177	#80	7-15
0.149	#100	5-12
0.074	#200	3-8

.2 Crushed Granular Base Course: The 19mm (3/4”) crushed granular base course shall consist of sound, durable particles free of clay, organic material or other deleterious matter, evenly graded to meet the following gradation requirements:

Sieve Size (mm)	Sieve Size (inches/#)	Percent Passing
19	¾”	100
12.5	½”	75-100
9.5	3/8”	60-90
4.75	#4	40-70
2.36	#8	27-55
1.18	#16	16-42
0.60	#30	8-30
0.30	#50	5-20
0.15	#100	5-15
0.074	#200	2-8

3.0 EXECUTION

3.1 INSPECTION

.1 Areas of work to receive crushed granite and base course shall be examined and unsatisfactory conditions shall be reported to the Consultant. Commencement of work shall imply acceptance of conditions.

3.2 PREPARATION OF SUBGRADE

.1 Compact subgrade to 95% Standard Proctor Density.

.2 Excavate soft and unstable areas of subgrade that cannot be compacted to specification, fill and compact with approved granular material.

.3 Ensure subgrade is true to line and grade and allows for sufficient depth to ensure finish grade can be established as noted on plans.

3.3 CRUSHED GRANITE BASE COURSE

.1 Place granular base course over subgrade in maximum 150 mm lifts compacted to 95% Standard Proctor Density.

3.4 CRUSHED GRANITE GRANULAR PAVING

.1 The Consultant shall review crushed granular base prior to placement of the granite paving.

.2 Finish grade and compact crushed granite paving to 95% Standard Proctor Density.

.3 After final compaction, the surface shall be true to elevation and shall not vary by more than 5mm tested with a 3m straight edge at any location on the surface. Surfaces shall be crowned at a minimum of 2% and abut flush with adjacent grades.

3.4 ADJUST AND CLEAN

.1 All paved areas or adjacent surfaces shall be brushed clean and excess materials shall be removed from the work site and disposed of in an approved dump location.

END OF SECTION 32 15 00

PART 1 GENERAL

1.1 DOCUMENTS

1.1.1 This section of the specification forms part of the Contract Documents and is to be read, interpreted and coordinated with other parts.

1.2 DESCRIPTION

1.2.1 Section 32 16 00 refers to those portions of the work that are unique to the construction of Portland Cement concrete walks, curbs and gutters. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.

1.3 RELATED WORK

1.3.1

Grading	Section 31 22 00
Cast in Place Concrete	Section 03 30 00

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Granular subbase: to Section 32 11 23.

2.1.2 Granular base: to Section 32 11 23

2.1.3 Non-staining type form release agent: chemically active release agents containing compounds that react with free lime to provide water soluble soap.

2.1.4 Concrete mixes and materials: to Section 03 30 00 Cast in Place Concrete with the following criteria specific to this Section:

.1 Hand-formed and hand-placed concrete:
Slump: 74mm
Air entrainment: 4 to 6%
Maximum aggregate size: 19mm
Minimum cement content: 350kg/m3
Minimum 28 day compressive strength: 30MPa.

.2 Extruded concrete:
Slump: 0-25mm
Air entrainment: 6 to 8%
Maximum aggregate size: 9.5mm
Fitness Modulus: 2.1 to 2.4
Minimum cement content: 350kg/m3
Minimum 28 day compressive strength: 30MPa.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

3.1.1 Excavate or fill to design subgrade.

3.1.2 Compact to minimum 95% Standard Proctor density in compliance with ASTM D698 (all following references to density imply compliance with ASTM D698).

3.2 GRANULAR SUBBASE AND BASE

3.2.1 Place subbase and minimum of 100mm granular base material to design grade as shown on Contract Drawings, including Standard Detail Drawings.

3.2.2 Compact subbase and base to specification density.

3.2.3 Obtain the Consultants approval of compacted base prior to placing forms or control devices for extruding equipment.

3.3 FORMWORK

3.3.1 Steel forms to be approved design and free from twists and warp.

3.3.2 Wood forms to be of select dressed lumber, straight and free from defects and thoroughly cleaned.

3.3.3 Flexible forms to be used for all curves less than 60m radius.

3.3.4 After obtaining the Consultant's approval of compacted base, set forms to line and grade as shown on Contract Drawings, free from waves or irregularities in line or grade.

3.3.5 Set special forms as required around catch basins, manholes, poles or other objects as shown on Contract Drawings or as directed by the Consultant.

3.3.6 Tolerances:
Maximum Horizontal deviation: 6mm
Maximum vertical deviation: 6mm
Maximum deflection from horizontal or vertical alignment to be 6mm in 3m.

3.3.7 Adequately brace forms to maintain specified tolerances after concrete is placed.

3.3.8 Treat forms lightly with approved form release agent and remove surplus agent.

3.4 EXTRUDED SECTIONS

3.4.1 Extruding machine to be of type approved by Consultant and fitted with approved template consistent with sections shown on Standard Detail Drawings.

3.5 INSPECTION

3.5.1 Immediately prior to placement of concrete, carefully inspect all formwork to ensure forms are properly set at required horizontal and vertical alignment, sufficiently rigid, clean, surface treated and ready for placement of concrete. Obtain Consultant's approval of formwork and compacted base.

3.6 CONCRETE PLACEMENT

3.6.1 Place concrete to Section 03 30 00 Cast in Place Concrete and the following criteria

specific to this Section.

3.6.2 Do not place concrete during rain or on wet or frozen base.

3.6.3 Do not place concrete when air temperature appears likely to fall below 5 degrees Celsius within 24 hours, unless specified precautions are taken and approved by Consultant.

3.6.4 Schedule concrete placement to ensure sufficient daylight hours available to permit edging and finishing.

3.6.5 Moisten granular base immediately prior to placing concrete.

3.6.6 Place concrete within 1.5 hours of batching time.

3.6.7 Place concrete in forms, ensuring no segregation of aggregate and consolidate with approved mechanical vibrator or power screed.

3.6.8 Concrete to be placed in continuous operation until entire panel or section completed. Do not place fresh concrete which has achieved partial set.

3.6.9 Incorporate all castings into concrete at time of placement.

3.6.10 Discontinue placement at expansion, construction or isolation joints only.

3.6.11 Remove face forms as soon as practical to permit face finishing. Do not leave face forms in place overnight.

3.7 EXTRUDED SECTIONS

3.7.1 Extruded sections to be true to line, grade and cross section.

3.7.2 Finished appearance, quality and workmanship to comply with all Contract Drawings and conditions of this Specification and with Standard Detail Drawings.

3.7.3 Where Consultant is not satisfied with finished product, approval of extruding equipment may be withdrawn, defective product removed, and replacement and subsequent work done by hand placement procedures.

3.7.4 Cost of removal of defective work at Contractor’s expense.

3.7.5 Subsequent hand placed concrete to be paid at tendered price for extruded product.

3.8 DRIVEWAY CROSSINGS AND WHEELCHAIR RAMPS

3.8.1 Construct driveway crossings and wheelchair ramps where shown on Contract Drawings and to Standard Detail Drawings.

3.9 EXPANSION JOINTS

3.9.1 Form transverse expansion joints at both end of curb returns and at a maximum spacing

of 10m for sidewalks, 30m for curb and cutter, at each end of driveway crossings and at tangent points on circular walk.

3.9.2 Extend through full depth of concrete.

3.9.3 Fill with 13mm approved expansion joint material.

3.9.4 Bond break compound may be used in lieu of expansion joint between sidewalk and back of abutting curb and gutter.

3.10 CONTROL JOINTS

3.10.1 In sidewalks, construct control joints at maximum 1.5m intervals.

3.10.2 In curb or curb gutter, construct control joints at maximum 3m intervals and match with control joints in abutting sidewalk.

3.10.3 Construct to minimum 1/4 depth of concrete section at point of cut or as otherwise shown on Standard Detail Drawings.

3.11 ISOLATION JOINTS

3.11.1 Form isolation joints around all poles, hydrants, manholes and all structures or fixed objects located within the concrete section by using approved bond breaking compound.

3.11.2 Form longitudinal isolation joints between sidewalk and abutting curb and gutter, abutting utility strips, abutting structures using 13mm approved joint filling material.

3.11.3 Use 13mm pre-molded hardboard joint material to form isolation joints between sidewalks and abutting walls and structures.

3.11.4 Bond break compound may be used in lieu of joint filler material between sidewalk and back of abutting curb and gutter.

3.12 FINISHING

3.12.1 Finish surface of concrete sidewalks and utility strips to smooth surface with magnesium or wood float trowel and brush or broom to provide uniform non-skid surface.

3.12.2 Broom or brush crossways or as otherwise required to match adjacent finish or as directed by Consultant.

3.12.3 Grooves or scoring (dummy joints) used for aesthetic purposes as shown on the Contract Drawings or as directed by Consultant, to be marked with proper tools and set 15mm deep.

3.12.4 Finish driveway crossing and wheelchair ramps as shown on Standard Detail Drawings.

3.12.5 Round edges with steel edging tool to a width of 50mm around perimeter of each panel or as shown on Standard Detail Drawings or as directed otherwise by Consultant.

3.12.6 Under no circumstances is concrete to be overworked by troweling, dusted with dry cement or finished with a mortar coat.

3.12.7 Finished surface to be as specified and to satisfaction of Consultant.

3.13 PROTECTION

3.13.1 Protect freshly finished concrete from dust, rain or frost by using tarpaulins or other suitable protective coverings. Keep clear of finished surface.

3.13.2 Place and maintain suitable barriers to protect finished concrete from equipment, vehicles or pedestrian traffic.

3.13.3 Provide personnel as required to prevent vandalism until concrete has set.

3.13.4 Do not run vehicles or construction equipment on concrete for at least 7 days or as directed by Consultant.

3.14 CURING

3.14.1 Apply approved curing compound to all exposed concrete surfaces at rate recommended by manufacturer or alternatively, use moist curing procedures for a minimum of 7 days.

3.14.2 When temperature is below 5 degrees Celsius maintain all concrete at temperatures not less than 10 degrees Celsius for at least 72 hours and protect from freezing for at least another 72 hours or such time as required to ensure proper curing of concrete. Admixtures are not to be used for prevention of freezing.

3.15 ACCEPTANCE

3.15.1 Before acceptance of finished concrete, all irregular, cracked or otherwise defective sections to be entirely removed and replaced to satisfaction of Consultant.

END OF SECTION 32 16 00

PART 1 GENERAL

1.1 CONFORMANCE

1.1.1 Conform to Division 1 - General Requirements.

1.1.2 This section of the specification forms part of the Contract Documents and is to be read, interpreted and coordinated with other parts.

1.1.3 This section refers to those portions of the work that are unique to the application of painted pavement markings. **This section must be referenced to and interpreted simultaneously with all other sections relevant to the works described herein and detailed on the Drawings.**

1.2 DESCRIPTION

1.2.1 Furnish all labour, material, tools, equipment and services necessary for and incidental to the completion of the field applied painted pavement markings, as indicated on the drawings including supervision for the cartage, unloading, storage, surface preparation, application and clean-up of the paint and allied products covered under the Work of this Section.

1.2.2 Includes painting of vehicular and pedestrian parking and walking surfaces, parking stall lines, speed bumps, pedestrian walkway demarcation, and specialty vehicular and bicycle traffic symbols, graphics, markings and sports court game lines.

1.2.3 Related Work in Other Sections:

.1	Grading	Section 31 22 00
.2	Asphalt Paving	Section 32 12 16

1.2.4 Include in the work co-ordination of all inspections by RDN staff.

1.3 QUALITY STANDARDS

1.3.1 Product delivery, environmental requirements, preparation of surfaces and application shall be in accordance with the applicable chapters of Canadian Painting Contractors Association/Master Painters Institute Architectural Painting Specification Manual: Ext. 2.1 Asphalt Surfaces or Ext. 3.2 Concrete Horizontal Surfaces and/or Maintenance Repainting Manuals Rex 2.1 Asphalt Surfaces or Rex 3.2 Concrete Horizontal Surfaces (CPCA/MPDA), latest editions.

1.3.2 A copy of the applicable chapters of the Canadian Painting Contractors

Association/ Master Painters Institute Architectural Painting Specification Manual and/or Maintenance Repainting Manual shall be kept on site during the duration of the painting work.

1.3.3 Should modifications to the standards occur in this specification, **then the modifications shall govern**.

1.3.4 **All new asphalt to be painted over must be allowed to cure for a minimum of 14 days prior to painting application.**

1.3.5 **All new concrete to be painted over must be allowed to cure for a minimum of 28 days prior to painting application.**

1.4 QUALIFICATIONS

1.4.1 The paint products of the paint manufacturer shall be as listed in the CPCA Manual, latest edition, under Paint Product Recommendation Section and shall be from a single source supplier/manufacturer. **Mixing of different manufacturer's products will not be allowed.**

1.4.2 The Painting Contractor shall have a minimum of five (5) years proven record of satisfactory performance on projects of similar size within the Painting and Decorating Trade(specifically Pavement/Concrete Marking) and shall show proof before commencement of work that he will maintain a crew of **Trades Qualified Journeymen Painters** ensuring they hold a Provincial or Interprovincial Painter & Decorator or Painting & Decorating Certificate of Qualification throughout the duration of this work.

1.4.3 Qualifications of Workers:

.1 Only competent and **Trades Qualified Journeymen Painters,** as defined by local jurisdiction, who have a Provincial or Interprovincial Painter & Decorator or Painting & Decorating Certificate of Qualification and who are thoroughly experienced with the material and methods specified, may perform Painting and Decorating (Pavement/Concrete Marking) work. Registered apprentices may be employed provided they work under the direct supervision of a Trades Qualified Journeyman Painter in accordance with trade regulations.

.2 General labour type activities may be performed by labourers and trades helpers who are thoroughly experienced with preparation procedures provided they work under the direct supervision of a skilled Trades Qualified Journeyman Painter.

.3 Individual trade certification and apprentice registration number must be presented to the Coatings and Finishes Inspector or his designated Inspector

upon request. A skilled Trades Qualified Journeyman Painter shall be present at all times during the execution of the work.

.4 **Requests for exemption from the prescribed Qualifications of Workers noted in 1.4.3.1 thru 1.4.3.3 as they pertain to some projects must be submitted in writing to the Coatings and Finishes Inspector. Final approval on relaxation of any qualifications is at sole discretion of the Board.**

1.4.4 Painting inspection shall be performed by an inspector acceptable to the Consultant (and MPDA inspector if applicable).

1.5 HANDLING & STORAGE OF MATERIALS AND EQUIPMENT - FIELD OPERATIONS

1.5.1 The location of storage areas for paint, materials and equipment shall be subject to approval by the Consultant. The areas shall be kept in a neat and orderly fashion, with all waste material removed regularly and every precaution shall be taken to prevent fire. Storage areas set up by the contractor shall be designed and maintained by the contractor to safely contain any spilled materials.

1.5.2 At the end of the painting contract, all materials surplus to the job shall be removed by the contractor. This includes used and unused abrasive, pallets, empty cans and other material surplus to the job requirements. The area must be cleaned to the satisfaction of the Consultant.

1.5.3 Throughout the progress of the contract work all waste materials must be handled and disposed of in a safe and environmentally sound manner in accordance with all applicable Municipal, Provincial and Federal regulations. Waste disposal will only be at approved and authorized disposal sites.

1.6 PROTECTION/SAFETY

1.6.1 Protect surrounding or adjoining work by adequately covering with drop sheets/localized masking or other necessary protective covering; make good any damage caused by failure to provide such protection. **Protect all painted pavement markings until dry.**

1.6.2 Safety: The contractor will be responsible for all aspects of job safety at the work site. All work must be carried out in a safe and workmanlike manner. All pertinent safety regulations of the RDN and Workers' Compensation Board of British Columbia “Occupational Health and Safety Regulations” shall be adhered

to rigidly.

1.6.3 In the Field the Contractor will be responsible for ensuring adequate public safety in his work area, at all times. Post wet paint signs at newly painted areas, barrier tape, traffic cones and/or barriers around the work area to prevent public access and undue touching. No operating equipment is to be left unattended and work area is to be left in a safe, secure condition at the end of each work day.

1.7 SUBMITTALS/SAMPLES AND COLOURS

1.7.1 Submit samples/colour chips as requested from standard manufacturer's colour range as directed by Consultant (as required).

1.7.2 The Consultant/RDN Parks will determine all colours and patterns and issue an instruction showing where the various colours and finishes shall be applied. On site work to match selected samples. No extra allowed for repainting surfaces which do not conform with approved samples.

1.7.3 Submit copies of all manufacturer's product data sheets and Workplace Hazardous Material Information System (WHMIS) Material Safety Data Sheets (MSDS) of the products being used to the Consultant. These recommendations will be adhered to strictly. Copies of the MSDS for all controlled products and manufacturer's product data sheets for each product used shall be kept on site and readily available upon request.

1.8 PRODUCT DELIVERY/STORAGE

1.8.1 Product delivery and storage of materials shall be in accordance with applicable chapter of CPCA Specification Manual.

1.8.2 Deliver paint materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, colour designation and instructions for mixing and/or reducing.

1.8.3 Store paint materials at a minimum ambient temperature of 10 degrees Celsius in a well-ventilated area. If stored on site, obtain approval from the Consultant.

1.8.4 All materials and paints shall be lead and mercury free and shall have low Volatile Organic Compounds (VOC) content where possible.

1.9 ENVIRONMENTAL REQUIREMENTS

1.9.1 Environmental requirements for painting shall be in accordance with applicable

chapter of CPCA Specification Manual.

1.9.2 Paint shall not be applied in damp weather or over wet surfaces. **Ensure surface temperature of the surface to be painted is above 10 deg. C (50 deg .F) before applying any paint. Paint should not be applied if the dew point is less than 3 deg. C(5 deg. F) below the ambient or surface temperature or when rain is imminent. The minimum ambient drying temperatures shall be 10 deg. C (50 deg. F) and rising. Relative humidity is 85 % maximum. Painting in direct sunlight on a hot day can cause many adhesive failures leading to blistering, cracking or wrinkling of the paint film and will not be permitted.**

1.10 APPROVED EQUALS

1.10.1 All items as specified or **pre-approved** equals.

1.11 WARRANTY

1.11.1 RDN Parks require a minimum 2 year standard warranty including same on all repainted work. The contractor shall warrant unconditionally against fading, cracking, spalling, blistering, peeling and excessive wear. **This warranty extends only to failure of the painted pavement surfacing and does not cover base or asphalt/concrete failure underneath the surface.**

PART 2 PRODUCTS

2.1 APPROVED MATERIALS

2.1.1 Paint:

.1 Alkyd Zone/Traffic Marking Paint to CGSB 1-GP-74M (MPI Product 32) or Ministry of Highways and Transportation approved equal. **This paint is not approved for sports court game lines.**

.2 Latex Zone/Traffic Marking Paint (MPI Product 97) **This paint is also approved for sports court game lines.**

.3 Hi-Hide Plexicolor Line Paint as available from Tomko Sports Systems Inc., Richmond, B.C. **This paint is approved for sports court game lines only.**

.4 Colour: White or as specified by the RDN.

.5 Glass Beads: Overlay Type, to CGSB 1-GP-74M.

2.1.2 The paint shall be suitable for use over all types of concrete and bituminous surfaces and when applied over emulsified asphalt, it shall not cause lifting, crazing, peeling or other damage to the base.

2.1.3 Specialty undercoats, fillers, primers and paint systems shall be of same manufacture as the final finish coat.

2.1.4 All materials shall bear manufacturer's label. Materials in unidentified containers shall be removed from the site.

2.1.5 Materials shall be used and applied in strict accordance to manufacturer's directions and **shall be a finishing system from a single source supplier to ensure compatibility of the coating system**.

PART 3 EXECUTION

3.1 INSPECTION

3.1.1 The Painting Contractor shall inspect all surfaces prior to commencement of work. Any deficiencies shall be reported to the Inspector prior to starting work.

3.1.2 Commencement of work shall indicate acceptance of surfaces and job conditions.

3.2 SURFACE PREPARATION

3.2.1 Remove all surface contaminants such as dirt, dust, loose mortar or asphalt, loose paint, oil, grease or wax, peeling paint, water and other foreign matter from all asphalt and concrete surfaces to be painted.

3.2.2 Pressurewash the surface with minimum 2000 psi gas powered power washer to thoroughly clean surface.

3.2.3 Concrete substrates must be free of curing compounds, release agents, efflorescence and sealing compounds.

3.2.4 Prior to application of any coating over masonry surfaces test for alkalinity (pH test) and report results to the RDN.

3.2.5 All cracks and openings in the surface to be painted are to be chipped out as required and filled with an approved patching material. All patches shall be made flush with the adjoining surfaces and spot primed with an approved primer. All thick and sharp edges of paint build-ups shall be sanded and feathered to achieve a smooth uniform appearance to the approval of the RDN.

3.2.6 All remaining old paint shall have adequate sound adhesion.

3.3 COATING APPLICATION

3.3.1 Application:

.1 Layout the pavement markings as indicated on the Drawings (and in accordance with the rules of the applicable game). All game lines shall be taped/masked both sides and shall be sealed to the surface prior to painting to ensure straight and sharp lines. Apply two coats of paint by brush or roller. **Application of paint on sports court game lines by hand held spray equipment is not permitted. Requests to apply paint on sports court game lines by airless spray or conventional spray striping machines shall be submitted in writing and may or may not be granted.** No residue of tape adhesives shall be left after removal.

.2 Painted pavement markings shall be of uniform colour and density with sharp edges.

.3 All symbols and letters to conform to dimensions shown on Standard Detail Drawings.

.4 Do not thin paint without approval of the Consultant. If approved, the coating materials shall be thinned only if necessary and then with the proper thinner as supplied by the paint manufacturer and only up to the recommended amount. **Thinning shall only be done in strict accordance with the manufacturer's directions. Dilution or misuse will not be allowed.**

.5 Apply paint at even rate in accordance with the manufacturer's recommendations.

.6 Unless otherwise directed by the Consultant, apply paint only when the air temperature is above 10 deg. Celsius and no rain is imminent.

.7 Apply glass beads at rate specified in Supplemental Specifications.

.8 Apply other specified markings as directed by the RDN.

.9 Close the sport court areas to public access for a period of 24 hours minimum after painting or until the paint is sufficiently cured to accept traffic.

Paint shall be applied to a minimum dry film thickness (DFT) of 8.0-10 mils (200-250 microns DFT).

3.4 INSPECTION/APPROVAL

3.4.1 Finished work shall be of approved colour, uniform in appearance, texture and sheen, smooth and free from excessive flooding, brush marks, lap marks, runs, sags or any other film defects. Any and all such defects shall be removed/repaired at the Contractor's expense and made good to the satisfaction

of the Consultant.

3.4.2 **The Consultant requires a min. 24 hrs. notice in order to schedule all inspections.** No delay claims filed by the Contractor resulting from failure to provide adequate notice of inspection required will be entertained. All aspects of this work shall be subject to inspection by the Consultant or their designated inspector. Inspection/approval points shall be of a frequency sufficient to ensure adequate Quality Control in accordance with this specification and will occur throughout the duration of the Contract. The contractor must supply access to the work for the Consultant. As a minimum, Inspections will occur as follows:

.1 After layout of painted pavement markings.
.2 After any required cleaning and before any finish coating application.
.3 After finished coat application.
.4 At Substantial Performance.

3.4.3 Independent Inspection/ Testing agencies may be engaged by the owner (VPB) for the purpose of inspecting and testing portions of the work to ensure compliance with this specification. All costs associated with such a service shall be borne by the Contractor.

3.4.4 At the discretion of the Consultant, occasional small spot tests may be made with a sharp instrument to physically gauge film thickness or determine other qualities of the coating(s). Such area(s) shall be repainted at the expense of the Contractor.

3.4.5 Painted/Coated surfaces will be inspected and may be rejected for defects including but not limited to: sags, runs, inadequate dry film thickness, coating continuity, evidence of poor coverage at any location or any misses.

3.4.6 The Contractor shall carry out repair work to identified defects, omissions and handling damage in such a manner so as to produce a coating equal to or better than the original coating. Re-inspection of corrective work and all retesting costs associated shall be entirely at the expense of the Contractor.

3.5 SITE MAINTENANCE/CLEAN-UP

3.5.1 The job site shall be kept in a neat, clean and orderly condition at all times during the painting process.

3.5.2 Spilled, splashed and spattered paint shall be cleaned promptly. Remove cotton waste, cloths and materials which may constitute a fire hazard and place in a

closed metal container and remove daily from the site.

3.5.3 Any damage to paving, planting or any other structures/elements due to work of this Section shall be immediately repaired at the Contractor's expense to satisfaction of the Consultant.

3.5.4 Remove and dispose of off site all surplus material, excess materials, trash, debris and waste material from the work of this Section. Dispose of all hazardous wastes to Municipal, Provincial and Federal Guidelines.

3.5.5 At the conclusion of the work, leave the premises neat and clean to the satisfaction of the Consultant.

END OF SECTION 32 17 23.13

PART 1 - GENERAL

1.1 SUMMARY

.1 This section includes specifications for galvanized (zinc) coated chain link fabric with galvanized steel framework and gates.

1.2 SCOPE

.1 The Contractor shall supply and install all new chain link fencing, including gates and concrete for post foundations and install the fencing and gates on the location shown on the drawing and as directed by the Consultant.

1.3 SUBMITTALS

.1 Construction Drawings: Layout of fences and gates with dimensions, details, accessories and post foundations.

1.4 QUALITY ASSURANCE

.1 Follow all manufacturer instructions for handling, erection and installation.

.2 To ensure system integrity, obtain the chain link system, framework, fabric, fittings, gates and accessories from a single source.

PART 2 - PRODUCTS

2.1 STANDARDS

.1 Steel Pipe to ASTM A53.

.2 Chain Link Fabric to CAN2-138.1.

.3 Fence, Chain Link, Frame Work, Zinc-Coated, Steel to CAN2-138.2.

.4 Fence, Chain Link Installation to CAN2-138.3.

2.2 MATERIALS

.1 Pipe: Steel butt weld, Schedule 40, hot dip galvanized to 550 g/m2 coating.

.2 Mesh Wire: Galvanized steel wire hot-dipped galvanized to 490 g/m2

.3 Concrete: Normal Portland cement, 20 MPa @ 28 days, 50 mm to 80 mm slump, 20 mm aggregate, 6% air entrainment.

2.3 COMPONENTS

.1 Line Posts: 3” O.D.

.2 Corner, Terminal and Straining posts: 4” O.D.

.3 Gate Posts: 4” O.D.

.4 Top, Middle and Bottom Rail: 1 5/8” O.D. plain end, sleeve coupled.

.5 Tension bar: 6mm x 20mm (1/4" x 3/4") minimum galvanized steel.

.6 Tension bar bands: 3mm x 20mm (1/8" x 3/4") minimum galvanized steel.

.7 Gate Frame: 1 5/8” O.D. Gate leaves to have horizontal and vertical intermediate brace on gate leaves 3.0 m wide and over.

.8 Post Caps: Cast aluminum, sized to post diameter, set screw retained.

.9 Line Post Eye tops: Cast aluminum.

.10 Rail Ends: Cast aluminum.

.11 Fittings: Sleeves, bands, clips, tension bars, fasteners and fittings galvanized steel.

.12 Fabric: 1 ½” 9 gauge galvanized steel, bottom selvage knuckle end closed.

.13 Single Gate Hardware: 2 piece lift latch and latch catch. Gate hinge 180° male and female hardware for padlock.

PART 3 – EXECUTION

3.1 GRADING

.1 Remove debris and correct ground undulations along fenceline to obtain smooth uniform gradient between posts. Provide clearance between bottom of fence and ground surface neither less than 40mm (1-1/2") nor more than 75mm (3").

.2 Locate and protect all existing underground services. The Contractor assumes full responsibility for protection of existing underground services.

3.2 ERECTION OF FENCE

.1 Erect fence along lines indicated and in accordance with CAN 2-138.3- M80.

.2 Excavate post holes 1219mm (48”) depth x 305mm (12”) diameter for 1.52m (5') high or higher fence and 919mm (36”) depth x 305mm (12”) diameter for 1.22m (4') high fence. Bulb bottom of holes for corner, end and gate posts.

.3 Space line posts 3.05m (10') apart, measured parallel to ground surface.

.4 Install additional straining posts at sharp changes in grade and where directed.

.5 Install end posts at end of fence. Install gate posts on both sides of gate openings.

.6 Place concrete in post holes then embed posts into concrete to depths indicated. Brace to hold posts in plumb position and true to alignment and elevation until concrete has set.

.7 Do not install fence fabric until concrete has cured a minimum of five (5) days.

.8 Install brace between end and gate posts and nearest line post, placed in centre of panel and parallel to ground surface. Install braces on both sides of corner and straining posts in similar manner.

.9 Install overhang tops and caps.

.10 Install top rail between posts and fasten securely to terminal posts and secure waterproof caps and overhang tops.

.11 Install bottom rail between posts and fasten securely to terminal posts and secure waterproof caps.

.12 Lay out fence fabric. Stretch tightly to tension recommended by manufacturer and fasten to end, corner, gate and straining posts with tension bar secured to post with tension bar bands spaced at 300mm (12") intervals. Knuckled selvedge at top. Twisted selvedge at bottom.

.13 Secure fabric to top rails, line posts and bottom rail with tie wires at 450mm (18") intervals. Give tie wires minimum two (2) twists.

3.3 INSTALLATION OF GATES

.1 Install gates complete with hardware and accessories in locations indicated.

.2 Set gate bottom approximately 40mm (1-1/2") above ground surface.

.3 Install gate stops where indicated.

3.4 REPAIRING OF DAMAGED GALVANIZED SURFACES

.1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two coats of approved zinc pigmented paint to damaged areas.

3.5 CLEANING

.1 Clean and trim areas disturbed by preparations. Dispose of surplus excavated material and replace damaged sod as directed by the Consultant.

END OF SECTION 31 32 13.23

1 General

1.1 SCOPE OF WORK

.1 Irrigation work required includes supply of all labour and equipment to install a complete and operational irrigation system as specified herein and as shown on the drawings including:

.1 Excavation, piping, valves, heads, controller, and complete installation, testing, maintenance, adjustment and guarantee of the system.

.2 Connection to metered water service, backflow prevention including supply, excavation and installation.

.3 Low voltage electrical wiring including supply, excavation and installation.

.4 Restoration of all existing landscape areas to condition prior to commencement of work on site, to the satisfaction of the Consultant.

1.2 PERMITS AND FEES

.1 Obtain all permits and pay required fees to any governmental agency having jurisdiction over the work. Inspections required by local ordinances during the course of construction shall be arranged as required. On completion of the work, satisfactory evidence shall be furnished to the Consultant to show that all work has been installed in accordance with the ordinances and code requirements, including certificates from the Electrical Inspector.

1.3 STANDARDS

.1 Work shall be in accordance with mechanical (plumbing) and electrical standards, codes and regulations including the following:

.1 The National Building Code of Canada and its supplements.

.2 PVC water pipe: CSA B137.3 or ASTM D2241.

.1 copper pipe: ASTM B42.

.2 PVC water pipe: CSA B137.3 or ASTM D2241.

.3 PVC fittings: ASTM D2466 or ASTM D2467.

.4 PVC solvent cement: ASTM D2564.

.3 The B.C. Plumbing Code.

.2 The Irrigation installer should have Certified Irrigation Contractor – Turf /Commercial status with the Irrigation Association of British Columbia.

.1 A company employee should be a certified cross-connection control tester.

.2 A company employee should have a low voltage electrical ticket.

1.4 DELIVERY AND STORAGE

.1 Shipping and handling and installation of materials shall be to manufacturer's recommended instructions, and best workmanship. Particular care shall be taken to avoid scratches and nicks on the plastic pipe. Pipe must be properly stacked and stored in a clean place on the site, keeping dirt out of the pipe at all times.

1.5 **"AS-BUILT" IRRIGATION DRAWINGS**

.1 Prepare "As-Built" documents.

.2 Supply drawings (2 copies) on prints in red ink which shall include the following information:

.1 Deviations from the bid documents made during construction affecting the main line pipe, controller and valve locations, and all laterals and sprinkler heads.

.2 Indicate approved substitutions including size, material and manufacturer's name and model name and catalog number.

.3 Documents shall be delivered to the Consultant before final acceptance of work.

.3 After the system has been completed, the Contractor shall instruct the Owner (Maintenance Department) in the proper use of the equipment and submit written maintenance instructions (3 copies) to the Consultant.

.4 The Contractor shall professionally draft as-builts and shall submit as-builts and maintenance manuals to the Consultant.

1.6 **FINAL ACCEPTANCE**

.1 Final acceptance of the work may be obtained from the Consultant upon the satisfactory completion of all work, at the end of the one year maintenance and guarantee period.

1.7 **GUARANTEE AND MAINTENANCE**

.1 All work shall be guaranteed and maintained for one year from the date of Substantial Performance of the project overall, or completion of the landscape construction, whichever is later, against all defects in material, equipment and workmanship.

.2 Guarantee shall also cover repair of damage to any part of the premises resulting from leaks or other defects in material, equipment, and workmanship to the satisfaction of the Consultant. Repairs, if required, shall be done promptly at no cost to the Owner. Maintenance shall include required minor adjustments for adequate water distribution and irrigation coverage of landscape areas, winterization, and spring start-up.

1.8 **WORKMANSHIP**

.1 Lay out work as accurately as possible to the drawings. The drawings, though carefully drawn, are generally diagrammatic. Swing joints, offsets and all fittings are not shown.

.2 Mainline locations are diagrammatic. The contractor shall not willfully install irrigation pressure mainlines as a literal interpretation of the plans. Mainlines shall be installed so as not to interfere with structures concrete formwork and foundations.

.3 The Contractor shall be responsible for full and complete irrigation distribution and coverage of all irrigated areas.

2 Products

2.1 PLASTIC PIPING

.1 Plastic pipe shall be semi-rigid, extruded from PVC resin type 1 grade 2 normal impact in accordance with applicable codes and standards.

.2 All polyvinyl chloride (PVC) plastic pipe and fittings must be marked as to size and class and their pressure and strength rating must exceed that of the working pressure of the system.

.3 All PVC pipe in diameter sizes of 31.25 mm (1 1/4") and larger shall be a minimum of Schedule 40, smaller sizes shall be Class 200.

.4 Velocities shall always be considered to minimize head loss and should not exceed 1.52 metres per second (5 ft. per second).

2.2 PLASTIC FITTINGS

.1 All plastic fittings shall be a minimum of schedule 40 PVC molded fittings.

2.3 SWING JOINT ASSEMBLIES

.1 Triple swing joint assemblies for all sprinklers shall consist of:
3 schedule 40 PVC street elbows (MIPT x FIPT)
1 schedule 80 PVC threaded nipple, length to suit (MIPT x MIPT)
1 schedule 40 PVC threaded tee (slip x slip x FIPT)

.2 Triple swing joint assemblies for quick coupler valves shall consist of:
1 schedule 40 PVC threaded tee
2 galvanized threaded nipples, length to suit (MIPT x MIPT)
2 galvanized threaded elbows (FIPT x FIPT)
1 galvanized threaded street elbow (MIPT x FIPT)
1 galvanized threaded riser, 100 mm (4") length, (MIPT x MIPT)

Alternate swing joint assemblies (e.g. funny pipe or flexible fittings) shall be subject to the approval of the Consultant prior to installation.

2.4 METAL PIPE AND FITTINGS

.1 All exposed pipe and fittings, above-ground or in vaults or chambers shall be copper.

2.5 SOLVENT CEMENT

.1 Solvent cement shall be a type and make recommended by the pipe manufacturer.

2.6 SPRINKLER HEAD RISERS

.1 Where risers are not of the pop-up type, sprinkler head risers shall be schedule 80 PVC pipe. Pipe shall be cut in a standard pipe cutting tool with sharp cutters. Ream only to full

diameter of pipe and clean all rough edges or burrs. Cut all threads accurately with sharp dies. Not more than three (3) full threads shall show beyond fittings when pipe is made up. Use Teflon tape on all PVC threaded connections.

2.7 **BEDDING MATERIAL**

.1 Bedding material shall be native material, selected to be 19 mm minus. If select native material is not available that is 19mm minus, bedding shall be sand.

.2 Bedding material for pipes installed under hard surface and structures shall be bedded in sand unless carried by a sleeve.

2.8 **SPRINKLER HEADS**

.1 Sprinkler heads shall be as shown on irrigation plans. See legend and notes for correct model numbers and operating pressures.

.2 Sprinklers shall perform to manufacturer's specifications including diameter of throw and gallonage at specified pressures.

2.9 **VALVES**

.1 Valves as shown on irrigation plans. See legend and notes for correct model numbers.

2.10 **SUPPLY CONNECTIONS**

.1 Water and electrical supply connections shall be as noted on the irrigation and mechanical plans.

2.11 **SLEEVES**

.1 Under sidewalk, through walls or driveway paving, SDR 35 pipe.

.2 Sleeves shall be twice the size of the combined diameter of the carried pipe(s), unless otherwise specified on the drawings.

.3 Where sleeves are installed across roadways, an additional redundant sleeve of the same size shall be installed under all roadways for future use.

.4 The Contractor shall be responsible for locating all sleeves.

2.12 **CONTROLLERS**

.1 Controller model numbers shall be as noted on the irrigation plans.

.2 Automatic controllers shall provide all necessary features for programming as is shown on the irrigation design plan. Controllers shall be encased in a sturdy, lockable, mounting box and must be easily accessible for maintenance. All electrical controllers should be as shown on plans and approved by local electrical authorities.

2.13 **MOUNTING AND HOUSING**

.1 Controller mounting and housing shall be as noted on the irrigation plan.

2.14 **VALVE BOXES**

.1 All in-line valves shall be grouped wherever possible and installed in NDS Pro Series 14”x19” valve boxes (or pre-approved equivalent) with a locking lid. Quantity as required; see irrigation plan.

2.15 **BACKFLOW PREVENTION DEVICE**

.1 All exposed pipe and fittings, above ground or in vaults or chambers shall be copper.

2.16 **VOLT CONTROL WIRING**

.1 24-volt electric control lines from controller to automatic valves shall be CSA approved direct burial minimum (#14 AWG TWU-40) wire of a different color than the 110-volt power to controllers.

.2 Splicing shall be minimized with such splices made waterproof with the use of water-proof Scotchlok or Pen-Tite kits.

.3 All 24-volt wiring shall be buried a minimum of 300 mm (12") as per the amended B.C. Electrical Code.

2.17 **POWER WIRING**

.1 All 110-volt AC wiring shall be installed in accordance with local electrical codes and buried a minimum depth of 600 mm.

.2 All splices in wiring shall be made watertight using approved methods. All wire splices shall occur within valve boxes or installed in a separate accessible junction box.

2.18 **GATE VALVES**

.1 Gate valves 100 mm (4") or larger may shall be bronze or cast iron. Gate valves smaller than 100 mm (4") in size shall be bronze.

.2 Gate valves or approved quarter turn ball valves shall also be used in any case where a manual drain valve is required.

2.19 **QUICK COUPLING VALVES**

.1 Quick coupling valves and keys shall be #3 quick coupler c/w iron pipe to hose bib, #33k key, SHO swivel elbow.

.2 Internal parts to be removable and with adjustable flow control.

2.20 **ACCEPTABLE PRODUCTS**

.1 The irrigation system of solenoid valves, heads, and controllers has been designed based on Irrigation Products as listed in the irrigation legend.

3 **Execution**

3.1 **EXISTING CONDITIONS**

.1 Ensure that existing site features and improvement areas are disturbed as little as possible. Protect existing vegetation throughout installation and do not damage root

systems. Return landscape areas to prior condition immediately after irrigation installation and testing.

.2 Prior to excavation, the Contractor shall satisfy himself as to the finished grade elevations and density of compaction in existing lawn and planting areas, to ensure restoration of disturbed areas to grades and compaction matching existing.

.3 Existing sod removed to accommodate irrigation installation shall be preserved and replaced subsequent to installation and backfilling.

.4 If trenching is required through paved areas, the Contractor shall saw-cut and remove paving to the width of the trench. Removal and replacement of paving to match existing shall be the responsibility of the Contractor.

.5 Where trenching for piping or wiring is required through paved areas, provide minimum SDR 35 sleeves with minimum 600 mm (24") cover. Extend sleeves minimum 300 mm (12") into soft landscape areas.

3.2 **EXCAVATION AND TRENCHING**

.1 Excavated materials shall be carefully placed adjacent to the trench in separate piles to avoid contamination of topsoil and excavated materials.

.2 Perform all excavations as required for the installation of the work included under this section, including shoring of earth banks to prevent cave-ins. Restore all surfaces, existing underground installations, etc., damaged or cut as a result of the excavations to their original condition and in a manner approved by the Consultant.

.3 Excavations through landscape areas shall be carried out such that adjacent areas are not contaminated with excavated materials. Backfilling and replacement of topsoil shall be performed in accordance with the specifications such that all existing planting areas are restored to their original condition.

.4 Trenches shall be made wide enough to allow a minimum of 50 mm (2") between parallel pipe lines. Trenches for pipe lines shall be made of sufficient depths to provide the minimum cover from finish grade as follows:

.1 450 mm (18") minimum cover over main lines

.2 300 mm (12") minimum cover over lateral lines to heads.

.5 Maintain all warning signs, shoring, barricades, flares and red lanterns as required.

3.3 **SUPPLY CONNECTION**

.1 Connection to potable water supply and all electrical supply connections must comply with local building by-laws.

.2 The contractor shall confirm the available static pressure at the metered water service and advise the Consultant immediately of any discrepancy from the designed system pressure requirements.

.3 Contractor shall have a qualified Electrician connect the controllers to the electrical supply, if this connection is included in the scope of work.

3.4 **PIPE LINE ASSEMBLY AND INSTALLATION**

.1 Do not drag pipe along ground whether single lengths or assembled sections. Damaged pipe shall be rejected and replaced by new pipe and couplings.

.2 Keep pipes clean at all times, blow out with compressed air or water on completion.

.3 Plastic pipe that is not in sleeves shall be laid on bedding materials as per clause 2.7 installed compacted to a depth of 50 mm (2"). A further 50 mm (2") depth of bedding material shall be placed and compacted over plastic pipe prior to trench backfilling.

.4 Plastic pipe and fittings shall be solvent welded using solvents and methods as recommended by manufacturer of the pipe, except where threaded connections are required. Pipe and fittings shall be thoroughly cleaned of dirt, dust and moisture before applying solvent with a non-synthetic bristle brush.

.5 Pipe may be assembled and welded on the surface. Snake pipe slightly from side to side to allow for expansion and contraction.

.6 Install no irrigation line directly over another such line or a line of another trade.

.7 Leave minimum clearance of 50 mm (2") between lines laid in a common trench.

.8 Make all connections between plastic pipe and metal valves with threaded fittings using plastic male adapters.

.1 Screw fittings shall be carefully tightened with strap wrenches or by other means that do not mark the plastic pipe or plastic fittings.

.2 Pipe wrenches shall not be used on plastic fittings, unless the fittings are a type designed for use with a pipe wrench. Should the Contractor wish to use a lubricant it shall be a type manufactured for this purpose, such as Permatex No. 2 or Pipe Tite Stick.

3.5 **VALVES AND CONTROL WIRING**

.1 Install valve boxes such that top of structure is at finished grade, accessible for maintenance.

.2 Coil additional 600 mm (24") length of each electrical wire within valve box as extra material.

3.6 **SPRINKLER HEADS**

.1 Install all sprinklers according to manufacturer's specifications.

.2 Use pipe joint compound on galvanized iron fittings.

3.7 **CLOSING OF PIPE AND FLUSHING LINES**

.1 Cap or plug all openings as soon as lines have been installed to prevent the entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.

.2 Thoroughly flush out all water lines before installing heads, valves and other hydrants.

.3 Test in accordance with paragraph on Hydrostatic Tests.

.4 Upon completion of the testing, the Contractor shall complete assembly and adjust sprinkler heads for proper distribution.

3.8 **HYDROSTATIC TESTS**

.1 Request the presence of the Consultant at least 48 hours in advance of testing.

.2 Testing to be accomplished at the expense of the Contractor and in the presence of the Consultant.

.3 Center load piping with small amount of backfill to prevent arching or slipping under pressure.

.4 After welded plastic joints have cured at least 24 hours, fill test section with water and expel all air and cap risers for an additional 24 hours prior to testing. Contractor shall pre-test the circuits, and call the Consultant for a supervised test once the circuits to be demonstrated meet the test requirements. Contractor shall supply and temporarily install, until tests are approved, a pressure gauge and hosebib to each main and circuit to be tested. Tests to be conducted at maximum pressure (continuous and static water pressure of 90 psi) in the presence of the Consultant as follows:

.1 Main lines and sub-mains to be tested for 2 hours

.2 Lateral lines to be tested for 1 hour.

.5 Repair leaks resulting from tests by cutting out and replacing fittings. Leaks shall not be repaired by patching. Maintain test pressure for a minimum of one hour after replacement of defective parts and re-inspect as per Clause 3.8.4 above.

.6 After approval by the Consultant, backfill excavations, maintaining pressure in the lines. If there is any indication of a leak, the defective section shall be located and replaced. Flush out the system to remove dirt and then attach the sprinklers using a non-setting pipe thread compound.

3.9 **BACKFILL AND COMPACTING**

.1 After system is operating and required tests and inspections have been made, backfill excavations and trenches.

.2 All sprinkler head excavations shall be backfilled with compacted native soil free of rocks up to within 50 mm (2") of finish grade.

.3 After bedding material is in place and approved by the Consultant, the balance of the trench shall be backfilled with pre-approved material free of stones, debris, and objects greater than 25 mm (1") at widest point, compacting to same density as adjacent undisturbed soil to eliminate differential settlement.

.4 Compact trenches in areas to be planted by thoroughly flooding the backfill. Jetting process may be used in those areas.

.5 Ensure that lawn and planting areas are disturbed as little as possible.

.6 Dress off all areas to finish grades.

3.10 **CLEAN-UP**

.1 Remove from the site all debris and surplus material resulting from work of this section.

3.11 **BALANCING AND ADJUSTMENTS**

.1 Balance and adjust all components of the system to achieve the most efficient system operation, with attention to water conservation and city water restriction bylaws. Balancing and adjustment to include seasonal adjustments of controllers in spring, summer and fall at a minimum, synchronization of controllers, adjustments to pressure regulators, pressure relief valves, sprinkler heads and individual station adjustments on controllers.

.2 Lawn sprinkler heads shall be set flush with the final turf grade by shortening or lengthening the riser as required. During the guarantee period, return twice and adjust the heads as required to be flush with the final turf grade. These call backs shall be done within five (5) days of notification by the Owner and shall be considered part of the Contract.

3.12 **FINAL ACCEPTANCE**

.1 The Consultant's Certificate of Substantial Performance shall be issued for the irrigation system and landscape work when the system has been installed as specified, adjustments and submittals have been made to the satisfaction of the Consultant and maintenance instructions have been provided as specified.

.2 Repair any settling of backfilled trenches occurring during the guarantee period after Substantial Performance at no cost to the Owner. Include complete restoration or replacement of all damaged planting, paving or other improvements.

3.13 **MAINTENANCE**

.1 Maintenance of irrigation system shall include monitoring of irrigation controller scheduling including adjustments in spring, summer and fall seasons at a minimum to provide water conservation, periodic adjustment as required, and winterization of the system at the close of the growing season.

.2 Winterization shall include flushing, draining and shut-off of all system components.

.3 The system shall be turned on, checked and adjusted at the start of the growing season in the spring.

END OF SECTION 32 80 00

PART 1 GENERAL

1.1 DOCUMENTS

1.1.1 This section of the specification forms part of the Contract Documents and is to be read, interpreted and coordinated with other parts.

1.2 DESCRIPTION

1.2.1 Work included: Supply all labour, services and material necessary to prepare, supply and install growing medium and mulch as specified herein.

1.2.2 Related Work in Other Sections:

.1 Plants	Section 32 93 00
.2 Seeding	Section 32 92 19
.3 Operation and Maintenance of Planting	Section 32 01 90

1.3 APPLICABLE STANDARDS AND LEGISLATION

1.3.1 Conform to the requirements of the latest editions of the following standards and legislation:

.1 BCSLA/BCLNA British Columbia Landscape Standard
.2 Canadian System of Soil Classification
.3 Canadian National Master Construction Specification, 32 91 13 Soil Preparation

1.4 DEFINITIONS

1.4.1 For the purpose of this specification the term “growing medium” shall mean a mixture of mineral particulates, micro organisms and organic matter which provides a suitable medium capable of supporting the intended plant growth.

1.5 TYPES AND LOCATIONS OF GROWING MEDIUM

1.5.1 Provide and install the following types of growing medium at the locations shown for each type:

1.5.2 GROWING MEDIUM
TYPE AND NAME

TYPE A On Site/Imported Soil
TYPE B Growing Medium

1.5.3

LOCATIONS	GROWING MEDIUM TYPE
Shrub Beds/Groundcover Areas	Type B
Sodded Lawn Areas	Type B

1.6 INSPECTION

1.6.1 Verify the size, location and depth of all existing site services and sub-surface utilities prior to commencement of the work. Repair all damage as result of failure to perform

adequate inspection at no cost to the Owner

1.6.2 Notify the Consultant when the site is prepared for growing medium placement. Do not place growing medium until subgrades have been inspected and approved.

1.6.3 Provide at least two days (48 hours) notice in advance of each required inspection.

1.7 SUBMITTALS

1.7.1 Submit to the Consultant a copy of an analysis by an approved independent soil testing laboratory, (such as Pacific Soil Analysis; Ms. Bev Herman, #5 11720 Voyageur Way, Richmond B.C. Ph. 273-8226). The analysis shall be of tests done on the proposed growing medium and additives proposed for the work from samples taken at the supply source, within three weeks immediately prior to growing medium placement. Costs of the initial analysis, and subsequent tests to ensure compliance with the specification shall be borne by the Contractor. **Failure to submit soils analysis is cause for immediate rejection of any placed growing medium.**

1.7.2 The analysis shall include a breakdown of the following components: total nitrogen by weight, available levels of phosphorous, potassium, calcium, magnesium, soluble salt content, organic matter by weight, % sand, % fines (silt and clay) and pH value. In addition, the analysis shall clearly indicate the Project Name, Date Tested and Contractor's Name.

1.7.3 Submit with the above analysis, the testing laboratory's recommendations for amendments, fertilizers and other modifications to make the proposed growing medium meet the requirements of this specification.

1.7.4 Submit to the Consultant one composite sample of each type of proposed growing medium for each different application within the project (e.g. lawns, shrubs). Each sample shall be a composite of at least three samples from the proposed source and shall be at least one (1) litre in volume.

1.7.5 At the discretion of the Consultant, submit up to two additional samples, including samples of proposed additives to the growing medium from material delivered to the site as required to ascertain compliance with this specification. Results of these tests shall be submitted to the Consultant for approval.

1.7.6 After the completion of the soils analysis, a one litre sample of the completed/mixed growing medium, including all amendments shall be submitted **at least twenty-one (21)** days before placement of growing medium to allow for **evaluation of samples and testing for noxious weed content by the Consultant.** The Consultant will advise of test results.

1.8 QUALITY CONTROL

1.8.1 Advise the Consultant of sources of growing medium to be utilized on this Project a

minimum of thirty days (30) prior to starting work of this Section.

1.8.2 Carry out growing medium preparation and placement such that the final product matches the standard set by the samples submitted, within a range of variation that may reasonably be expected with good quality control.

1.8.3 The Consultant may appoint an independent testing laboratory to ascertain compliance with this specification and to recommend modifications to make the growing medium meet the requirements of this specification.

1.9 PRODUCT HANDLING

1.9.1 DO NOT MOVE OR WORK GROWING MEDIUM OR ADDITIVES WHEN THEY ARE EXCESSIVELY WET, EXTREMELY DRY, OR FROZEN OR IN ANY MANNER WHICH WILL ADVERSELY AFFECT GROWING MEDIUM STRUCTURE. **Growing medium whose structure has been destroyed by handling under these conditions will be rejected**.

1.9.2 Protect growing medium and additives against extreme wetting by rain or other agents, and against contamination by weeds and insects.

1.9.3 Stockpile materials in bulk form in paved areas and provide protection by storing under roof or tarpaulins. Take all necessary precautions to prevent contamination of component materials from wind blown soils, weed seeds and insects. Contamination of individual components may result in rejection, if used.

1.9.4 Deliver and store fertilizers and other chemical ingredients in the manufacturer's original containers. Protect against damage and moisture until incorporated into the work.

1.10 APPROVED EQUALS

1.10.1 All items as specified or pre-approved equals.

PART 2 PRODUCTS

2.1 ON SITE /IMPORTED SOIL (TYPE A)

2.1 On site/ imported soil shall be friable “A Horizon” topsoil to the requirements of the B.C. Landscape Standard, stripped and stockpiled on site in an approved location. Stripping and stockpiling work shall be such that the soil is not damaged or contaminated. (refer to 1.9 Product Handling).

2.1.2 Mineral particle sizes shall be within the following ranges by weight:
100% shall pass a 10mm (3/8") sieve.
Maximum of 10% shall pass a #200 sieve. (silt and clay)

Soil shall be of a sandy loam or loamy sand texture containing between 3% and 15%

organic matter (dry weight basis). Soil shall be virtually free from subsoil, wood including woody plant parts, weeds, stones over 30mm, pests, undesirable grasses or weeds, and seeds or parts thereof and foreign objects. Soil shall be free from crabgrass, couch grass, equisetium, convolvulus or other weeds or seeds or parts thereof.

2.1.3 Soil shall be suitable for modification by screening and additives to meet the requirements for Screened Growing Medium (Type B as specified) except where specified and approved for use as unscreened On Site Soil(Type A).

2.2 ADDITIVES

2.2.1 Manure: Well rotted farm animal manure or compost, to the requirements of the BCSLA/BCLNA B.C. Landscape Standard. Animal manures and compost often have excessive levels of water soluble salts. The growing medium shall be leached via fresh water from the irrigation system or through natural rainfall until an electrical conductivity of 3.0mmho/cm or less is achieved.

2.2.2 Compost: A uniform blend of natural source-separated organic materials, composted such that it is brown-black in colour and has carbon to nitrogen ratio of 25 to 1 or lower. pH 6 to 7. Substantially free from subsoil, pests, roots, wood, construction debris, undesirable grasses or weeds, and seeds or parts thereof. Free from toxic materials, crabgrass, couchgrass, equisetum, weeds, and seeds or parts thereof.

2.2.3 Sand: Approved medium river pump sand, well washed and free of contaminants, chemical and organic matter. Gradation of particle sizes shall fall within the following range (“Percent” to be reported as the mass of the particles whose size is less than the designated sieve opening but greater than the next designated sieve opening):

USBS Sieve Number	Sieve Size (mm)	Percent	Class
4	4.76	0 - 3	Fine gravel
10	2.00	0 - 20	Very coarse sand
18	1.00	0 - 20	Coarse sand
35	0.50	60 - 80	Medium sand
60	0.25	0 - 40	Fine sand
140	0.105	0 - 4	Very fine sand
270	0.063	0 - 2	Silt & clay

2.2.4 Sand shall have a saturated hydraulic conductivity between 100 mm. and 300 mm. per hour. Test conditions shall be for saturated sand, 15 blows compaction.

2.2.5 Sand shall have:

Organic content	< 0.5% by weight.
Water Soluble Salt content	< 0.5mmhos/cm
Ph of between	5.0 and 7.0

2.2.6 Available copper, zinc and manganese following acid digest test in 0.1N HC1 and shaken for ½ hour shall be less than 25 PPM when analyzed by atomic absorption spectroscopy.

2.2.7 Peatmoss: Horticultural grade, to the B.C. Landscape Standard.

2.2.8 Wood Residuals: Content of wood residuals such as fir or hemlock sawdust shall not cause a Carbon to Nitrogen ratio higher than 25:1. Cedar or redwood sawdust shall not be present in the growing medium mix.

2.2.9 Dolomite Lime: Approved commercial brands for horticultural purposes, coarsely ground; containing not less than 20% calcium by weight.

2.3 FERTILIZERS

2.3.1 Standard commercial brands, meeting the requirements of the Canada Fertilizer Act, packed in waterproof containers, clearly marked with the name of the manufacturer, weight and analysis.

2.3.2 Generally Fertilizers must be those fertilizers specified in the soils analysis report/ recommendations. Contractor shall not make any substitutions without prior written approval from the Consultant.

2.4 SLAB DRAINAGE / FILTER FABRIC

2.4.1 Drainage Layer: 19mm (3/4") diameter drain gravel free from any silt or clay.

2.4.2 Filter Fabric: Non-woven geotextile fabric designed for filtration, minimum average roll values; permitivity 2.5 sec., flow rate 120l/sec/M2 mullen burst strength 1.5MPa, trapezoidal tear strength 200N, AOS 2200um, Approved filter fabrics: Amoco 4545, Terrafix 270, 300R,360R,400R and Nilex C14.

2.5 GROWING MEDIUM (TYPE B)

2.5.1 Growing Medium shall be predominantly sand based and screened with additives and fertilizers as required to make it meet the following specifications:

.1 Substantially free from roots, sticks, building materials, wood chips, chemical pollutants and other extraneous materials.

.2 Population of plant pathogenic nematodes: maximum 1000 per litre for any single species.

.3 Maximum requirement of dolomite lime to required pH: 50kg/100M2.

.4 Salinity: maximum saturation extract conductivity of 3.0 mmho/cm @25 deg. C

.5 Fertility: Total Nitrogen 0.4-0.8% by weight
Available Phosphorous 70-80 ppm
Available Potassium 150-250ppm

.6 Cation Exchange Capacity: 30-50 meq.

.7 Carbon to Nitrogen Ratio: max. 40:1

.8 pH: Lawns, 6.0 to 7.0; Planting Areas, 5.5 to 6.0

.9 Boron: the concentration in the saturation extract shall not exceed 1.0 ppm
.10 Sodium: the sodium absorption ratio (SAR) as calculated from analysis of the saturation extract shall not exceed 8.0
.11 Total Nitrogen shall be 0.2% to 0.6% by weight.
.12 Available phosphorous shall be 20-100 ppm
.13 Available potassium shall be 50-250 ppm.
.14 Tolerances: Samples of growing medium taken just before planting shall have the specified properties to within the tolerances of plus or minus 20% of the stated values, except for salinity, which shall be less than the stated limit.
.15 The textural properties and organic content shall have the following composition AFTER MIXING (BY DRY WEIGHT):

For <u>PLANTING BEDS</u> growing medium shall consist of the following AFTER MIXING (% BY DRY WEIGHT):
80- 88% round sand (>0.05mm-<2mm)
3 % max silt (>0.0002mm - <0.05mm)
2 % max clay (<0.002mm)
Total fines max 5%
12-15% organic matter
pH 5 .0 to 6.0

Nutrient Content :
Nitrogen 0.2 - 0.6%
Phosphorus : 50 -150ppm
Potassium 50 - 300 ppm
C/N ratio max 25 : 1

For <u>LAWN AREAS</u> growing medium shall consist of the following AFTER MIXING (% BY DRY WEIGHT):

85- 92% round sand (>0.05mm-<2mm)
3 % max silt (>0.0002mm - <0.05mm)
2 % max clay (<0.002mm)
Total fines max 5%
8- 10% organic matter
pH 6 .0 to 6.5

Nutrient Content :
Nitrogen 0.2 - 0.6%
Phosphorus : 50 -150ppm
Potassium 50 - 300 ppm
C/N ratio max 25 : 1

2.6.2 Provide a 1 litre sample and a particle size analysis of the sand proposed for use. Provide an additional 1 litre sample and particle size analysis from the third quarter

volume of sand delivered to the site.

2.6.3 **ALL GROWING MEDIUM TO BE PRE MIXED, TESTED AND APPROVED PRIOR TO DELIVERY ON SITE.**

2.7 MULCH

2.7.1 Decomposed leaf mulch.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

3.1.1 Scarify compacted subgrade to a minimum depth of 150mm (6") immediately before placing growing medium.

3.1.2 Verify that subgrades are at the proper elevations before placing growing medium. Obtain approval of the Consultant prior to placing any growing medium. **Placement of growing medium implies acceptance of subgrade conditions**.

3.1.3 Remove debris, roots, branches stones in excess of 50mm dia. and other deleterious materials as directed by the Consultant. Remove any soil contaminated with calcium chloride, toxic materials or petroleum products. Remove any materials which protrude 25mm above the surface. Dispose of removed material off site.

3.2 PLACING GROWING MEDIUM - ALL TYPES

3.2.1 Growing medium shall be moist but not wet when placed (25% of field capacity). It shall not be handled in anyway if it is wet or frozen. Refer to 1.9.

3.2.2 Place all growing medium to the required finished grades. **Except where drawings or details show otherwise**, place to the following minimum depths and levels (measured after initial settling of growing medium):

Depths:

Tree Planting Areas on grade	600mm(24") minimum or depth of root ball, whichever is greater. For as large an area as possible around the base of each tree. Recommended 10m^2 or twice the size of the root ball whichever greater. Refer to Section 32 93 00.
Shrub and Groundcover Areas on grade	450mm (18") minimum depth
Low or High Traffic Lawn Areas on grade	250mm (10") minimum depth

Notes: If subgrade/subsoil drains rapidly increase soil depths as directed by Consultant

to ensure adequate moisture retention. On slab depth of growing medium to achieve finished grades in all cases. Sand fill or additional growing medium may be used where required build-up over the drainage layer exceeds the required minimum depths stated above.

Levels:

For Lawn Areas	Flush with adjacent surfaces after initial settlement
For Planting Areas	As detailed on drawings. Crown all planting beds.

Refer to drawings for top of slab and finished elevations, as applicable.

3.2.3 Growing medium shall be placed over prepared subgrade and shall be allowed to settle or compacted by light rolling such that it is firm against deep footprints **to the approval of the Consultant**. Do not compact more than is necessary to meet this requirement.

3.2.4 Spread growing medium in uniform layers not exceeding 150mm in depth unless pre-approved by the Consultant.

3.2.5 Crown or slope for positive surface drainage as shown on the drawings.

3.3 APPLICATION OF FERTILIZERS

3.3.1 Apply fertilizers as specified and recommended by soils analysis to bring growing medium fertility to required fertility as set out in this specification.

3.3.2 Spread evenly over the placed growing medium surface by means of a suitable mechanical spreader.

3.3.3 Rake fertilizers into top 50mm minimum of the placed growing medium.

3.3.4 **Ensure minimum 7 days separation time between the application of any lime treatment or fertilizers and plant material installation.**

3.4 TREE PLANTING

3.4.1 See Section 32 93 00 and specifically as detailed.

3.5 FINISH GRADING

3.5.1 All growing medium shall be fine graded after placing to the finished elevations and contours as detailed and specified herein. Surfaces shall be true to intended grades, smooth, uniform, and firm against deep foot printing, with a fine loose surface texture. Ensure all rough spots and low areas are eliminated to ensure positive surface drainage. Tolerance for finish grading to be 5mm.

3.6 MULCHING

3.6.1 Place mulch over all growing medium except grass areas. Moisten uniformly and spread to a consistent settled depth of 50mm in tree and shrub planting areas, 25mm in ground

cover areas.

3.7 ACCEPTANCE

3.7.1 The Consultant will inspect and test growing medium and determine acceptance of material as placed, depth and finish grading prior to any planting or sodding operations commencing.

3.7.2 Approval of placed growing medium subject to additional soil test analysis if requested. Costs for additional testing of placed growing medium shall be at the Contractor's expense.

3.8 CLEAN UP

3.8.1 All excess materials and other debris resulting from growing medium preparation and placement operations shall be removed from the job site.

3.8.2 Flush all walks and paved areas clean to the satisfaction of the the Consultant.

END OF SECTION 32 91 13

PART 1 GENERAL

1.1 DOCUMENTS

1.1.1 This section of the specification forms part of the Contract Documents and is to be read, interpreted and coordinated with other parts.

1.2 DESCRIPTION

1.2.1 Work Included: Supply and install all materials necessary to provide a completely operating drainage system as specified and detailed.

1.2.2 Related Work in Other Sections:

.1 Grading	Section 31 22 00
.2 Soil Preparation	Section 32 91 13
.3 Plants	Section 32 93 00

1.3 SUBMITTALS

1.3.1 Record Drawings: Submit a suitably scaled reproducible copy of the "as-constructed" condition of the system. This drawing should be professionally drawn or produced with the use of computer aided drafting/design (CADD) where possible. All components of the subsurface drainage system shall be shown as installed with clear measurements provided from an identifiable reference point.

1.3.2 Submit one graphic sieve analysis of the proposed bedding material and a one litre sample of the proposed drain rock.

1.3.3 If an alternative is proposed to any specified drainage components, submit samples and or manufacturer's data sheets for approval by the Consultant.

1.4 APPROVED EQUALS

1.4.1 All items as specified or **pre-approved** equivalent equals.

1.5 PROTECTION

1.5.1 Protect existing buildings, equipment, sidewalks, landscape reference points, monuments, markers and other completed work. Make good any damage resulting from work of this Contract at no expense to the Owner.

1.5.2 Do not park vehicles on the site in areas where the work will be undertaken without express written consent of the Owner. Utilize only such equipment/vehicles essential for construction of the system.

1.5.3 Trenching and other excavations for vaults, valve boxes etc. are not to be left open during non work hours of operation unless they are protected to current Worker's Compensation Board Standards. Cover/mark/protect as necessary all open excavations to ensure public safety.

1.6 SITE CONDITIONS

1.6.1 Existing Conditions/Underground Services: Verify the existence and location of all on site utilities/underground services by hand digging or use of an electronic toning device or M-Scope. Mark the location of all buried cables, conduits, pipes etc. **prior to any trenching**. Cooperate with the Owner and utility companies to keep their respective utilities in operation. Notify the Consultant immediately for directions as to the procedure should any piping utilities be encountered during excavation.

1.6.2 Site Preparation: Prior to the work of this Section, carefully inspect any installed work of other trades or contractors and verify all such work is complete to the extent that this work may commence properly.

1.6 3 Field Measurements: Make all measurements in the field and adjust the design to meet the on site conditions to ensure precise fit of items in accordance with the original design.

1.6.4 Discrepancies: In the event of a major discrepancy, errors or conflicts between the drawings and the actual site conditions, immediately notify the Consultant as to procedure before proceeding with work.

1.6.5 Repair to Underground Services: Repair all damage to underground services caused by the work of this Contract. Damage to services that are shown on the drawings or have been brought to the Contractor's attention in the field prior to commencement or during construction of the work shall be repaired in entirety at the Contractor's expense. Damage to services which were clearly unforseen/unknown of existence (provided that all reasonable measures were undertaken by the Contractor to ascertain the existence of these services) shall be repaired in accordance with the Changes clause of the General Conditions. Notify the Consultant/Owner of damage immediately.

PART 2 PRODUCTS

2.1 DRAIN PIPE

2.1.1 All pipes and fittings to be polyvinyl chloride (PVC) conforming to CSA B182.1-96M.

2.1.2 Perforated Pipe: 100mm dia. **CSA** Rigid Perforated Drain Pipe.

2.1.3 Solid Pipe: 250 mm dia. SDR 35 Rigid Non Perforated Drain Pipe.

2.2 DRAINAGE STRUCTURES

2.2.1 Area Drains: Area drains should be designed for outdoor use, complete with square bolt-down cast iron or bronze grate and sediment bucket. Product to be heavy duty grade and by Zurn, or pre-approved equivalent. All area drains shall be sized for area and to be a minimum of 8 inches square.

2.2.2 Lawn Basins/Catch Basins: Precast concrete barrels, lids and riser rings to ASTM C478 complete with galvanized steel rungs (where specified), sized to suit application and a minimum diameter of 600 mm. As supplied by Ocean Construction Supplies **or pre-approved equivalent**. Cast Iron grate and frame by Dobney Foundry (typical, No. B26 B grate and frame for 600 dia. precast concrete barrels).

2.2.3 Drain Rock: 19 to 25 mm (3/4"-1") diameter clear gravel drain rock (uniform clear crush or round free) and free of silt, sand and clay with the following gradations:

Sieve size	**% Passing (by weight)**
25 mm (1 in)	100
19 mm (3/4 in)	0 - 100
12.5 mm (No. 8)	0 - 30
9.5 mm (No. 16)	0 - 3

2.2.4 Filter Gravel: Shall be bird's-eye clean gravel with 98% passing the 7.5mm (5/16") sieve, 95% retained by the 4.76 sieve and less than 1% passing the 2.36mm sieve. The material will be clean free of organic, oil, grease or toxic materials.

2.3 FILTER FABRIC

Needle-punched, non-woven filter fabric, Mirafi P-150 as manufactured by Dominion Geotextile Inc. or pre-approved equivalent.

2.4 CLEAN-OUTS

Cleanouts are required all drain lines.

PART 3 EXECUTION

3.1 INSPECTION AND LAYOUT

3.1.1 Provide the Consultant **48 hours advance notice for inspection and approval of all subgrade prior to placing drain lines**. Report any unsatisfactory conditions to the Consultant

3.1.2 Layout the piping and drainage structure locations with flags or stakes and obtain the Consultant approval before proceeding. The layout shall be in accordance with the drawing(s). Route piping to take into account site elevation changes and locate drainage structures to maximize run-off collection. Alternative layouts shall be approved by the Consultant and indicated on the Record Drawings.

3.1.3 Coordinate exact locations of lines, clean-outs and structures, with planting locations to avoid conflicts and damage to plants during installation. Stake locations for approval by

the Consultant. Verify grades for all drainage components.

3.1.4 Closing in Uninspected Work:
- .1 Obtain approval of the Consultant before backfilling any sections of the subsurface drainage system.
- .2 Any work closed in before inspection will be required to be exposed for inspection at no extra cost to the Owner.

3.2 INSTALLATION

3.2.1 Area Drains: Excavate as required and perform all inlet and outlet connections as per drawings and or manufacturer's recommended installation methods. Backfill with drain rock and install as per details.

3.2.2 Lawn Basins: Excavate as required and perform all inlet and outlet connections as per drawings and or manufacturer's recommended installation methods. Backfill with drain rock and install as per details.

3.2.3 Clean-Outs: Excavate as required and perform all inlet and outlet connections as per drawings and or manufacturer's recommended installation methods. Backfill with drain rock and install as per details.

3.2.4 Trenching and Drain Pipe Installation:
- .1 Open excavation shall be carried out in a safe and orderly manner and in accordance with the requirements of the Workers' Compensation Act of B.C. Approved shoring shall be used where required for safe working conditions.
- .2 All trenches are to be hand or machine excavated. All trenches shall be dug on the alignment and to the depth required as shown on the drawings and as stated herein. Trenches are to be straight with uniform slopes to the bottom of all trenches.
- .3 Where the pipes are to be laid in sub-surface material the trench shall be excavated to a depth at least 75 mm below the bottom of the pipe elevation or as detailed. **The top of pipes are to be a minimum of 500 mm (20 in) below the final grades**.
- .4 Prior to backfilling, all lines, connections and fittings shall be inspected by Consultant where required.
- .5 Trenches shall be at least 600mm away from paving stones or other hard surfaces to avoid undermining such surface or its edge retention.
- .6 Backfilling shall take place in an orderly fashion. Place drain rock material to the full width of the trench bottom, with minimum bedding depth to be 75 mm. Shape bed true to grade to provide continuous, uniform bearing surface for pipe. After pipe is in place, backfill to allow for a minimum of 125 mm of drain rock over the surface of the pipe. Place a uniform 75 mm of bird's eye gravel on top of drain rock. The remainder of the backfill to finish grade shall be with growing medium

free of rocks and other unsuitable materials which could damage the pipe or create unusual settling conditions.

.7 Compact the growing medium to the same density as the native material in the trench sidewalls to prevent differential settlement.

.8 Contractor is responsible to repair all trenches which have settled below the adjacent grade for a period of one (1) year from date of Substantial Performance.

.9 **Do not leave any material refuse such as pipe pieces, rags, fittings or other waste as backfill in any trenches.**

.10 No drainage line shall be directly over and parallel to another drainage line or service line of any other trade. Ensure minimum horizontal and vertical clearance requirements as dictated by Canadian Electrical Code for all piping installations near any electrical conduit/service.

.11 **Perforated and Solid PVC Pipe**: Place bedding and/or drain rock material and install pipe in locations shown as per details and plans. Comply with all the manufacturer's printed data and recommendations regarding pipe installation, cleaning, fitting preparation and correct joining techniques.

.12 All pipe inverts shall be installed within 15mm of design grades and bedded to provide uniform falls to drain structures.

3.3 SITE MAINTENANCE/CLEAN-UP

3.3.1 The job site shall be kept in a neat, clean and orderly condition at all times during the installation process.

3.3.2 Trenching, laying pipe and backfilling shall be continuous so that the amount of open trenching at the end of each work day is minimized. Any open trench or other excavations shall be barricaded and marked with high visibility marking tape to current Worker's Compensation Board requirements.

3.3.3 Any damage to paving, planting or any other structures/elements due to settlement of improperly compacted trenches shall be immediately repaired at the Contractor's expense to satisfaction of the Consultant.

3.3.4 Remove and dispose of off site all surplus material, excess excavated materials, trash, debris and waste material from the work of this Section.

END OF SECTION 33 41 00

Lewkowich Engineering Associates Ltd.
geotechnical • health, safety & environmental • materials testing

GEOTECHNICAL FIELD REVIEW

Regional District of Nanaimo (Recreation and Parks Dept.)
1490 Springhill Road
Parksville, BC V9P 2T2

File: F5473.01
Date: February 8, 2018

ATTENTION: **Ms. Elaine McCullough**

PROJECT: **DUNSMUIR COMMUNITY PARK, 326 HORNE LAKE ROAD, QUALICUM BEACH, BC**

SUBJECT: **GEOTECHNICAL ASSESSMENT: PARK RENOVATION**

1. As requested, Lewkowich Engineering Associates Ltd. (LEA) has reviewed site conditions at the Dunsmuir Community Park in relation to the planned renovation and expansion of the existing park. The purpose of this memo is to comment on the feasibility of the proposed development. LEA conducted a site visit on February 2, 2018, which entailed a visual assessment of the site topography and testing in six (6) locations of ground consistency using a 1.5m long steel t-bar probe. The following are our observations of the site and comments regarding the planned development.

2. Dunsmuir Community Park is a small community park along Horne Lake Road in Qualicum Beach, BC, consisting of grassed areas in addition to a paved basketball court and tennis court areas. The park is accessed to the rear of a row of residential properties via a grass pathway accessed on the west side of Horne Lake Road between intersecting Whistler and Berkshire Roads. The existing Park grounds are bound by developed land (single family residences) to the south and east, isolated dense thickets of Wild Rose, Himalayan Blackberry, Alder, and grasses to the west, and undeveloped land consisting of moderate to large sized Douglas Fir trees to the north. Photos of conditions at the time of our site visit are included as part of the attachments following the text of this report.

3. We understand the proposed development consists of a renovation and expansion of the existing park facilities, with multiple play areas and recreational courts as well as a parking area as part of the renovation. A plan showing the approximate area of disturbance and plans for the proposed development is attached following the text of this letter. The area of disturbance will expand the total footprint of the developed portion of the park.

4. Site topography is predominantly flat along the access path and the area of the existing tennis and basketball courts. A low area or depression (less than 2.0m deep) that appears to pond water seasonally and saturate the soil is located to the west. There was less than 0.5m of standing water in isolated areas immediately to the southwest of the tennis court and to the west of the basketball courts at the time of our assessment following heavy rainfall throughout the previous month of January. The elevation rises further to the west where moderately sized Douglas Fir and Alder trees are mapped in Figure 1 of the attachments. Dense stratum was encountered at depths ranging from 0.43 m to 0.65 m, with an average depth from ground surface of approximately 0.5 m to dense stratum throughout the site.

5. It is LEA's opinion that the proposed development is feasible from a geotechnical perspective. Stormwater management will need to be a consideration in the design of the park facilities. LEA recommends the following for areas in the disturbance area supporting park facilities:

   a. Stripping the top 50-60cm of soft surficial soils to reveal dense, naturally deposited soils; and,

   b. Placement and compaction of freely draining granular material to level and bring the development area up to grade; and,

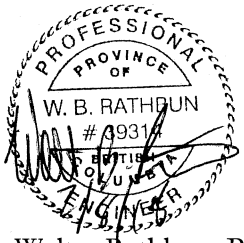
   c. Incorporation of one or more French Drains, with positive drainage to the northwest to divert surface water away from the playground structures and paved pathways.

6. Alternatively, the play courts could be relocated to the eastern extents of the property to reduce the amount of site drainage requirements.

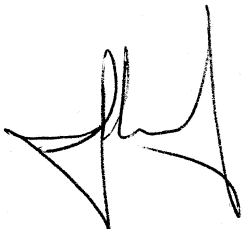
7. It should be noted that if a paved parking area is being considered, a stormwater detention facility may need to be incorporated into the parking area design. Without proper subgrade preparation and stormwater management practices, stormwaters could inundate a portion of the park facilities, saturate site soils, and/or potentially cause subsidence and cracking of paved structures over the long term.

8. Lewkowich Engineering Associates Ltd. appreciates the opportunity to be of service on this project. If you have any comments, or if we can be of further assistance, please contact us at your convenience.

Respectfully Yours,
Lewkowich Engineering Associates Ltd.



Walter Rathbun, P.Eng.
Geotechnical Engineer



John Hessels, AScT
Senior Technologist

Attachments:
-Three (3) Photos from February 2, 2018 Site Visit
-Figure 1 showing planned development and disturbance outline (provided by RDN Recreation and Parks Dept.)

Photo 1: Looking across existing Tennis and basketball courts.

Photo 2: Ponded water in southwest corner of tennis courts and dense undergrowth with Alder trees in background.

Photo 3: Looking towards Douglas Fir from low area west of the basketball courts.

REV No.	DATE	BY	P.Eng.	REVISION DESCRIPTION
0	02/08/2018	WR	WR	ISSUED WITH GEOTECH ASSESSMENT

DRAWING TITLE
DUNSMUIR COMMUNITY PARK RENOVATION

PROJECT NAME
326 HORNE LAKE ROAD
QUALICUM BEACH, BC

LEGAL DESCRIPTION
PARK, DISTRICT LOT 31, NEWCASTLE DISTRICT, PLAN 37285

ENGINEER'S SEAL

PLOT DATE	DRAWN BY
2018-02-08	WR
REVIEWED BY	SCALE
JH	NTS
PROJECT No.	DRAWING No.
F5473	FIGURE 1

Lewkowich Engineering Associates Ltd.

REGIONAL DISTRICT OF NANAIMO	**Prime Contractor** **Preconstruction Meeting Form**

Date: _____ Meeting Location: _____

Firm Name: _____ Contract : _____

Prime Contractor: _____

Prime Contractor's Superintendent: _____

RDN's Contract Representative: _____

AGREEMENT

The Prime Contractor:

- ❑ Acknowledges appointment as Prime Contractor defined by WorkSafe BC OH&S Regulations Sections 20.2 and 20.3, and in the *Workers' Compensation Act, Sections 118 Clauses 1 and 2*.
- ❑ Understands the Owners duties as defined in the *Workers' Compensation Act, Section 119*.
- ❑ Understands for any discrepancy establishing health and safety protocol, WorkSafe BC OH&S Regulation and/or the *Workers' Compensation Act (Part 3)* shall prevail.
- ❑ Acknowledges being informed of any known workplace hazards by the owner or owner's delegate, by signing attached "Existing Known Hazard Assessment" form.
- ❑ Shall communicate known hazards to any persons who may be affected and ensure appropriate measures are taken to effectively control or eliminate the hazards.
- ❑ Shall ensure all workers are suitably trained and qualified to perform the duties for which they have been assigned.
- ❑ Shall ensure or coordinate first aid equipment and services as required by WorkSafe BC OH&S Regulation.
- ❑ Shall coordinate the occupational health and safety activities for the project.
- ❑ Assumes responsibility for the health and safety of all workers and for ensuring compliance by all workers with the *Workers Compensation Act (Part 3)* and WorkSafe BC OH&S Regulation.
- ❑ Understands any WorkSafe BC violation by the Prime Contractor may be considered a breach of contract resulting in possible termination or suspension of the contract and/or any other actions deemed appropriate at the discretion of the RDN.
- ❑ Understands any penalties, sanctions or additional costs levied against the Prime Contractor will be the responsibility of the Prime Contractor.
- ❑ Confirms the Prime contractor's safework procedures and risk assessments were prepared by, or approved by a Qualified Person as defined by WorkSafe BC OH&S Regulations.
- ❑ Accepts the following required documents shall be maintained and made available upon request from the RDN and/or WorkSafe BC Prevention officer at the workplace.

REGIONAL DISTRICT OF NANAIMO	**Prime Contractor** **Preconstruction Meeting Form**

The documents required to be maintained and available by the Prime Contractor will include, but not be limited to:

- ❑ All notices which the Prime Contractor is required to provide to WorkSafe BC as per WorkSafe BC OH&S Regulation.
- ❑ Any written summaries of remedial action taken to reduce occupational health and safety hazards within the area of responsibility.
- ❑ All directives and inspection reports issued by WorkSafe BC.
- ❑ Records of any incidents and accidents occurring within the Prime Contractor's area of responsibility.
- ❑ Completed accident investigations for any incidents and accidents occurring within the Prime Contractor's area of responsibility.

On a construction workplace, these additional documents are required to be maintained and available by the Prime Contractor:

- Records of all orientation and regular safety meetings held between contractors and their workers, including topics discussed, worker names and companies in attendance.
- Written evidence of regular inspections within the workplace.
- Occupational first aid records.
- Worker training records.
- Current list of the name of a qualified person designated to be responsible for each subcontractor (employer's) site health and safety activities.
- Diagram of the emergency route to the hospital.

The following information must be provided to the RDN Contract Representative:

- ❑ WorkSafe BC Notice of Project
- ❑ WorkSafe BC Clearance Letter
- ❑ Prime Contractor's OH&S Safety Program
- ❑ Prime Contractor's OH&S Safety Program Document

First Aid Attendant: _____

Safety Supervisor: _____

Location of First Aid Station: _____

Signature of Prime Contractor: _____

Signature of RDN Contract Rep: _____

REGIONAL DISTRICT OF NANAIMO	**Prime Contractor Preconstruction Meeting Form**

EXISTING KNOWN HAZARD ASSESSMENT

Discussion between the Prime Contractor and the RDN Contract Representative

Date: _____ Meeting Location: _____

Prime Contractor: _____

Prime Contractor Representative: _____

- RDN Contract Representative to make the Prime Contractor aware of any known extraordinary pre-existing hazards peculiar to the contract.
- It is recognized the known pre-existing hazards identified may not be a comprehensive list and due caution is always required.
- Use additional pages if necessary.

Identified Extraordinary Hazards	Action required to eliminate or control hazards and ensure worker safety
Comment:	
Comment:	

Prime Contractor Representative (signature) _____ **RDN Contract Representative (signature)** _____

Prime Contractor Representative (printed) _____ **RDN Contract Representative (printed)** _____

REGIONAL DISTRICT OF NANAIMO

1.0 CCDC2-2008 AGREEMENT SUPPLEMENT

The Agreement for the Standard Construction Document - CCDC 2 - 2008, Stipulated Price Contract is hereby amended as follows:

1.1 ARTICLE A.5 PAYMENT

.1 Insert to Paragraph 5.1: "Ten percent (10%)"
Insert to Paragraph 5.3.1: "The Royal Bank of Canada"

1.2 SUPPLEMENTARY DEFINITIONS

.1 Definitions used in the Standard Construction Document - CCDC2 - 2008, Stipulated Price Contract are hereby amended as follows, and wherever the Definitions are referred in the Contract Documents, it shall be understood that such reference means as amended by these Supplementary Definitions.

.1 Definition 20. Substantial Performance of the Work

Line 4, change "certified" to "verified".

.2 Paragraph 27: Add new paragraph:

"27. Dictionary. In case of dispute, The Concise Oxford Dictionary of Current English (current edition), shall prevail except for those definitions given in CCDC2 - 2008 and in various other places in the Contract Documents."

2.0 SUPPLEMENTARY CONDITIONS

.1 The General Conditions of Standard Construction Document - CCDC2 - 2008, Stipulated Price Contract are hereby amended as follows and wherever the General Conditions are referred to in the Contract Documents, it shall be understood that such reference means as amended by the Supplementary Conditions.

2.1 GC 1.1 CONTRACT DOCUMENTS

.1 Paragraph 1.1.8: Delete entirely and replace with the following:

"The Owner shall provide the Contractor, without charge, two (2) copies of the contract documents to perform the Work. Additional copies of the Contract

Documents or parts thereof required by the Contractor shall be provided at the 'Contractor's expense'."

2.2 GC 2.2 ROLE OF THE CONSULTANT

.1 Paragraph 2.2.1: Delete entirely and replace with the following:

"The Consultant will provide administration of the Contract as described in the Contract Documents during the construction until issuance of Final Certificate for Payment, and subject to GC 2.1 - Authority of the Consultant."

.2 Delete Paragraph 2.2.3.

.3 Delete Paragraph 2.2.4

2.3 GC 2.3 REVIEW AND INSPECTION OF THE WORK

.1 Paragraph 2.3.8: Add new paragraph:

"Where standards of performance are specified and the Work does not comply with the performance specified, such deficiency shall be corrected as directed by the Consultant. Any subsequent testing (including retesting by the Owner) to verify performance shall be done at the 'Contractor's expense'."

2.4 GC 2.4 DEFECTIVE WORK

.1 Paragraph 2.4.3: Delete the words:

"the difference in value between the Work as performed and that called for by the Contract Documents", and replace with the words, "the value of such work as is necessary to correct any non-compliance with the Contract Documents".

2.5 GC 3.5 CONSTRUCTION SCHEDULE

.1 Paragraph 3.5.1.1: Delete the words:

"Prior to the first application for payment", and replace with the words "within seven (7) days of award of Contract".

2.6 GC 3.7 SUBCONTRACTORS AND SUPPLIERS

.1 Paragraph 3.7.7: Add new paragraph:

"The specifications are arranged in sections for convenience. They shall be read as a whole. This arrangement places no responsibility upon the Owner or Consultant to settle disputes between Subcontractors and Suppliers or between the Contractor and Subcontractors and Suppliers."

2.7 GC 3.8 LABOUR AND PRODUCTS

.1 Paragraph 3.8.4: Add new paragraph:

“Carpenters and journeyman utilized on site must either be certified provincial or interprovincial tradespersons or currently entered into a recognized apprenticeship program.”

2.8 GC 3.10 SHOP DRAWINGS

.1 Paragraph 3.10.12: Delete the words:

"in accordance with the schedule agreed upon, or in the absence of such schedule, with reasonable promptness so as to cause no delay in the performance of the work", and replace with the words, "to Contractor within ten (10) working days of receipt.”

2.9 GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

.1 Paragraphs 5.1.1 and 5.1.2: Delete paragraphs.

2.10 GC 5.2 APPLICATION FOR PROGRESS PAYMENT

.1 Paragraph 5.2.3 delete the words "and Products delivered to the Place of the Work", and insert the following sentence to the end of the paragraph: "Payment will not be made for Products delivered to the Place of the Work but not yet incorporated into the Work."

.2 Delete Paragraph 5.2.7.

.3 Paragraph 5.2.7: Add new paragraph:

"5.2.7 Accompanying each application for payment, excepting the first, the Contractor shall submit a Statutory Declaration. The Consultant's issuance of a

Certificate for Payment shall be conditional upon the Contractor's submission of the Statutory Declaration. The Statutory Declaration shall include the following information:

.1 The names of the contracting parties.
.2 The name of the Project.
.3 A declaration attesting that all accounts affiliated with the Contract have been paid.
.4 A declaration attesting that all assessments and deductions required by all applicable acts have been deducted and/or paid.
.5 The date of the declaration."

.4 Paragraph 5.2.8. Add new paragraph:

"Upon establishing that the Work, or a portion of the Work, has been Completed (as per the governing Builder's Lien Legislation), the Contractor's applications for payment for those portions of the Work deemed Complete, shall reflect the balance of the Contract price less:

.1 the aggregate amount, if any, determined in accordance with GC 5.4.2 multiplied by two, and
.2 the amount, if any, determined in accordance with GC 5.8 - Withholding of Payment.

Until all of the deficient and incomplete work for which amounts are withheld pursuant to subparagraphs .1 and .2 of this Paragraph 5.2.8 are rectified and completed to the satisfaction of the Consultant, the Owner may withhold the full amounts set out in Subparagraphs .1 and .2 of this Paragraph 5.2.8 respectively."

.5 Paragraph 5.2.9. Add new paragraph:

"The Contractor shall complete the deficient and incomplete work in a timely manner, and at the discretion and convenience of the Owner. Acceptance of the Work or occupancy of the Project or any portion thereof shall not relieve the Contractor from the obligation of correcting deficiencies which are not identified at the time of establishing the list of deficient and incomplete items of work."

.6 Add new paragraph 5.2.10:

"Unless all independent material testing results of products supplied to the site have been received, the maximum percent of work completed that can be claimed by the Contractor and certified by the Consultant for any item of work is 90%."

2.11 GC 5.3 PROGRESS PAYMENTS

.1 Paragraph 5.3.1, Sentence .1: Delete Sentence

.2 Paragraph 5.3.1, Sentence .2: Add the following sentences on to the end of the paragraph:

"Certificates for Payment may provide for retention of amounts as determined by the Consultant to ensure correction of deficient work done or unacceptable product provided, and may also provide for retainers in addition to the statutory holdback provided for in the Contract sufficient to protect the Owner against all liens of which he has notice. Each application for payment, except the first, shall be accompanied by a Statutory Declaration and such other supporting data and documentation as the Consultant may require indicating that all indebtedness incurred by the Contractor in the performance of the Work for the previous month has been fully paid."

.3 Paragraph 5.3.1, Sentence .3: Delete in it's entirety and replace with the following:

.3 "The Owner shall make payment to the Contractor on account as provided in Article A-5 of the Agreement no later than 30 calendar days after the date of a certificate of payment issued by the Consultant".

2.12 GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK

.1 Paragraph 5.4.2: Delete the words:

"and shall promptly, and in any event"

and replace with the following words:

"in accordance with the applicable Lien legislation, or in the absence of such legislation,"

2.13 GC 5.6 PROGRESSIVE RELEASE OF HOLDBACK

.1 Paragraph 5.6.1: Delete entirely and substitute the following:

"No holdback on subcontracts shall be released prior to the expiration of the statutory limitation period of the contract stipulated in the lien legislation applicable to the Place of the Work."

2.14 GC 5.7 FINAL PAYMENT

.1 Paragraph 5.7.2: Add the following sentence:

"The Consultant will not consider the application valid until materials installed are tested and conform to the requirements specified."

.2 Paragraph 5.7.4: Delete the words:

"Five (5) days" and replace with the words "thirty (30) calendar days".

2.15 GC 5.8 WITHHOLDING OF PAYMENT

1. Add the following new Paragraph:

"5.8.2 Upon the award of the contract the Owner may withhold total or partial payments to cover third party liability claims as a result of the work in the case of a dispute between the Owner and the Contractor regarding responsibility for the claim. Payments to the third parties are to be released immediately; any unresolved disputes with respect to the responsibility of the claim shall be settled prior to total completion of the project. The main purpose of the funds is to ensure that third parties receive compensation as soon as possible. The receipts of payments made shall be returned to the Contractor upon total completion of the project."

2.16 GC 6.1 OWNER'S RIGHT TO MAKE CHANGES

.1 Paragraph 6.1.2: Add to the paragraph:

"The valuation for the change shall include the following maximum adjustments for overhead and profit based on the actual costs:

for Subcontractors - 10% for overhead and 5% for profit on the cost of their work.

for Contractor - 2.5% for overhead and 2.5% for profit on the cost the Subcontractors' work.

for Contractor - 10% for overhead and 5% for profit on the cost of his work.

Profit to be based on the value of work including overhead."

2.17 GC 6.2 CHANGE ORDERS

.1 **Add Paragraph 6.2.3**

"6.2.3 The Contractor shall obtain written confirmation from their Surety Company the extent of changes that necessitate notification to the Surety Company of said changes so as to not jeopardize bonding of the Work. The Contractor shall be responsible for notifying the Surety, on this basis, of any approved changes, providing copies of notifications to the Consultant. The work outlined in a Change Order will not be considered complete until copies of the written notifications are received by the Consultant."

2.18 GC 6.5 DELAYS

.1 Paragraph 6.5.3: Revise as follows:

1. In Sentence .4, replace "one" with "ones".
2. In Sentence .4, insert the phrase, "except lack of funds or breakdown of Construction Equipment," and, after the word "control".

.2 Add the following new paragraph;

6.5.6 "If the area of the work outlined in these specifications is not available to the Owner after the project completion date deadline, the Contractor will be responsible for all damages resulting from the delay in the work schedule (i.e. the Owner's cost and reduced revenues associated with extended work schedule)."

2.19 GC 7.2 CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT

.1 Delete Paragraph 7.2.3.1 entirely.

.2 Paragraph 7.2.4: Delete the words:

"Five (5)", and insert the words, "Ten (10)".

.3 Paragraph 7.2.6: Add the following paragraph:

"7.2.6 This condition, GC 7.2, shall not apply to the withholding of certificates and/or payments because of the Contractor's failure to pay all just claims promptly nor because of the registration or notice of liens against the Owner's property, until such claims and liens are discharged."

2.20 GC 10.4 WORKERS' COMPENSATION

.1 Paragraph 10.4.3: Add the following paragraph:

"10.4.3. The Contractor shall indemnify and hold harmless the Owner from and against all claims, demands, actions, suits or proceedings by any of the employees of the Contractor or Subcontractors with respect to worker's compensation insurance. This indemnity shall survive the completion of the Work or the termination for any reason of the Contract."

2.21 GC 12.1 INDEMNIFICATION

.1 Paragraph 12.1.1: Delete entirely and substitute the following:

"12.1.1 Without restricting the parties' obligation to indemnify as described in paragraphs 12.1.4 and 12.1.5:

.1 The Contractor and the Owner shall indemnify and hold harmless each other, and their respective agents and employees from and against all claims, demands, losses, costs or damages of third parties arising or alleged to arise directly, indirectly or incidentally by reason of the operations of the party from whom indemnification is sought in the carrying out of the contract. This indemnification shall survive the completion or termination for any reason of this Contract.

.2 The Contractor shall indemnify and hold harmless the Consultant and their respective agents and employees from and against all claims, demands, losses, costs or damages of third parties arising or alleged to arise directly, indirectly or incidentally by reason of the operations of the Contractor, his Subcontractors and their respective agents or employees, in the carrying out of the contract. This indemnification shall survive the completion or termination for any reason of this Contract."

.2 Paragraph 12.1.2.2: Delete the value "$2,000,000" and insert the value, "$5,000,000".

2.22 GC 12.3 WARRANTY

.1 Paragraph 12.3.3: Delete the words:

"through the Consultant".

.2 Paragraph 12.3.6: Delete entirely.

END OF SECTION

REGIONAL DISTRICT OF NANAIMO

GENERAL TERMS AND CONDITIONS

1. Indemnity

The Contractor will indemnify and save harmless the RDN, its employees and agents, from and against any and all losses, claims, damages, actions, causes of action, costs and expenses that the RDN may sustain, incur, suffer or be put to at any time either before or after the expiration or termination of this Contract, where the same or any of them are based upon, arise out of or occur, directly or indirectly, by reason of any act or omission of the Contractor or of any agent, employee, officer, director or subcontractor of the Contractor pursuant to this Contract, excepting always liability arising out of the independent negligent acts of the RDN.

2. Insurance

The Contractor shall, without limiting its obligations or liabilities herein and at its own expense, provide and maintain the following insurances with insurers licensed in British Columbia and in forms and amounts acceptable to the RDN:

a. **Comprehensive General Liability** in an amount not less than Five Million Dollars ($5,000,000.00) inclusive per occurrence against bodily injury and property damage. The RDN is to be added as an additional insured under this policy. Such insurance shall include, but not be limited to:

.01 Products or Completed Operations Liability;
.02 RDN's and Contractor's Protective Liability;
.03 Blanket Written Contractual Liability;
.04 Contingent employer's Liability;
.05 Personal Injury Liability;
.06 Non-Owned Automobile Liability;
.07 Cross Liability;
.08 Employees as additional Insureds;
.09 Broad Form Property Damage;
.10 Broad Form Completed Operations;

and where such further risk exists:

.11 Shoring Blasting, Excavating, Underpinning, Demolition, Piledriving and Caisson Work, Work Below Ground Surface, Tunneling and Grading, as applicable;
.12 Elevator and Hoist Liability; and
.13 Operation of Attached Machinery.

b. **Automobile Third Party Liability** on all owned or leased vehicles in an amount not less than Two Million Dollars ($2,000,000.00)

c. **Aircraft and/or Watercraft Liability**, where applicable, for all owned or non-owned craft operating or used in the performance of the Work by the Contractor, in an amount not less than Two Million Dollars ($2,000,000.00) per occurrence and including aircraft passenger hazard liability, where applicable.

d. **Property** insurance which shall cover all property, of every description, to be used in the construction of the Work, against "All Risks" of physical loss or damage, while such property is being transported to the site, and thereafter throughout erection, installation and testing and such insurance shall be maintained until Substantial Performance of the Work. Such policy of insurance shall extend to protect the interest of the RDN, and shall contain a waiver of subrogation against the RDN.

All the foregoing insurance shall be primary and not require the sharing of any loss by any insurer of the RDN.

The Contractor shall provide the RDN with evidence of all required insurance prior to the commencement of the Work or services. Such evidence shall be in a form acceptable to the RDN. When requested by the RDN, the Contractor shall provide certified copies of required insurance policies.

All required insurance shall be endorsed to provide the RDN with thirty days (30) advance written notice of cancellation or material change.

The Contractor hereby waives all rights of recourse against the RDN with regard to damage to the Contractor's property.

The Contractor shall require and ensure that each subcontractor maintain liability insurance comparable to that required above.

Unless specified otherwise, the duration of each insurance policy shall be from the date of commencement of the Work until the date of the final certificate for payment.

3. Competency and Qualifications

The successful contractor must have the necessary competence, experience, qualified personnel and equipment to carry out all aspects of the work of the Contract. The successful Contractor will employ properly licensed, trained and unimpaired workers throughout the duration of the contract. Failure to do so could result in termination. Copies of certifications may be requested by the RDN. Smoking is not permitted. Alcohol and Drug consumption is not permitted on RDN property.

4. Cancellation

The entire process is subject to final award approval by the Regional District of Nanaimo whom retains the ability to cancel the process for any reason whatsoever without any compensation to anyone prior to making an award.

5. Governing Law

This agreement shall be governed by the laws of the Province of British Columbia.

6. Correspondence

Both parties shall designate one person from their respective organizations to be primarily responsible for coordinating contractual and financial matters.

REGIONAL DISTRICT OF NANAIMO

7. Invoicing

The Contractor will be solely responsible for invoicing the RDN ensuring to include the RDN's Purchase Order number on all invoices to assure timely payment.

All invoices are subject to prior review and approval by the RDN and approved invoices will be paid on a net 30 day basis unless otherwise negotiated and agreed to in writing.

If the RDN does not approve of the services or part of them which are the subject of the invoice, the RDN shall advise the Contractor in writing of the reasons for non-approval and the Contractor shall remedy at no additional cost to the RDN before the RDN shall be obliged to pay the invoice or any part of it, as the case may be.

8. Force Majeure (Act of God)

Neither party shall be responsible for any delay or failure to perform its obligations under this Agreement where such delay or failure is due to fire, flood, explosion, war, embargo, governmental action, Act of Public Authority, Act of God or to any other cause beyond its control, except labour disruption.

In the event Force Majeure occurs, the party who is delayed or fails to perform shall give prompt notice to the other party and shall take all reasonable steps to eliminate the cause.

Should the Force Majeure event last longer than 30 calendar days, the RDN may terminate this Agreement immediately by written notice to the Contractor without further liability, expense, or cost of any kind.

9. Dispute Resolution

In the event of a dispute, the parties agree to resolve the dispute by:

a. Frank and open negotiations whereby both parties use their best efforts to resolve the dispute by mutual agreement including the most Senior Management of both parties.

b. If, after 30 calendar days, the dispute is not resolved, both parties agree to appoint a mediator to resolve the dispute and their decision will be final. The mediation shall take place in Nanaimo, British Columbia, unless agreed otherwise. Parties will be responsible for their own costs.

10. Conflict of Interest

The contractor declares that it has no financial interest, directly or indirectly in the business of any third party that would be or be seen to be a conflict of interest in carrying out the services. It warrants that neither it nor any of its officers or directors, or any employee with authority to bind the Bidder, has any financial or personal relationship or affiliation with any elected official or employee of the RDN or their immediate families which might in any way be seen by the RDN to create a conflict.

11. Independent Contractor

The Contractor shall be, and in all respects be deemed to be, an independent contractor and nothing in this *Agreement* shall be construed to mean that the Contractor is an employee of the RDN or that any agency, joint venture or partnership exists between the *Contractor* and the *RDN*.

12. Irrevocability

Submissions will be irrevocable and remain open for acceptance by the RDN for a period of sixty (60) calendar days, after the closing time.

13. Bankruptcy

The RDN reserves the right to stop the work, or, terminate the contract if the contractor commits an act of bankruptcy, threatens to commit an act of bankruptcy.

14. Collusion

The bidder shall not engage in collusion of any sort and shall ensure that no person or other legal entity, other than the bidder has an interest in the bidder's submission and prepare the submission without any knowledge of, comparison of figures with, or arrangement with any other person or firm preparing a Submission for the same work.

15. Costs

All costs to prepare a submission will be borne solely by the Bidder.

16. No Claim for Compensation

Except as expressly and specifically permitted in these Instructions to Tenderers, no Tenderer shall have any claim for any compensation of any kind whatsoever, as a result of participating in the tender, and by submitting a bid each Tenderer shall be deemed to have agreed that it has no claim.

17. Solicitation of Board Members

"If a member of the Board, or a person who was a member of the Board in the previous six months has a direct or indirect interest in the contract, then the Tenderer shall report this to the RDN in accordance with Section 107 of the *Community Charter* upon being notified of the award of the contract.

The Tenderer warrants and represents that it has not received any information or a record from any Board member or former Board member contrary to Section 108 of the *Community Charter*." The successful Tenderer will be required to direct all communications related to their contract through the staff members responsible for the project.

18. Freedom of Information and Protection of Privacy Act

All documents submitted to the RDN will be held in confidence by the RDN, subject to the provisions of the Province of British Columbia's *Freedom of Information and Protection of Privacy Act.*

19. Builder's Lien Holdback

If applicable, payments will be subject to a 10% holdback as per the Province of British Columbia's Builder's Lien Act.

20. Permits, Regulations and Building Codes

Unless otherwise specified, the Contractor shall at his own expense, obtain all applicable permits, certificates, and licences required by law for the conduct of the work and shall comply with all Federal, Provincial and City Laws, Regulations, Building Codes and Ordinances affecting the execution of the work. The Contractor will be responsible for the coordination of all inspections required under the permits.

21. Utility Location

It is the responsibility of the Contractor to locate any utilities in the vicinity of any construction, exploration or investigation.