



City of
Richmond

Report to Development Permit Panel

To: Development Permit Panel

Date: November 6, 2023

From: Wayne Craig
Director of Development

File: DP 21-944169

Re: Application by Weaver Technical Corp. for a Development Permit at
11191 Twigg Place

Staff Recommendation

That a Development Permit be issued at 11191 Twigg Place to facilitate the installation of a barge loading facility on a site designated as Environmentally Sensitive Area (ESA).

Wayne Craig
Director of Development

WC:bb
Att. 3

Staff Report

Origin

Weaver Technical Corp. has applied to the City of Richmond for an Environmentally Sensitive Area (ESA) Development Permit (DP) to allow development of a barge ramp at 11191 Twigg Place on a site zoned “Industrial (I)” to facilitate the transloading of aggregate materials between the barge and commercial vehicles (trucks). As the proposed barge ramp would occur within the portion of the site designated as an ESA, an ESA DP is required. The location of the site is provided in Attachment 1.

There is no servicing agreement associated with the proposed ESA Development Permit.

Development Information

Please refer to the attached Development Application Data Sheet (Attachment 2) for a comparison of the proposed development data with the relevant Bylaw requirements.

Background

The site currently contains no permanent structures and is used for storage of trucks and industrial equipment. There are also two shipping containers being currently used as an office space at the southeast corner of the site. The City has no record of building permits for the said structures and the owner will be required to submit building permits for these structures.

Development surrounding the subject site is as follows:

To the north, North Arm of the Fraser River, which is currently being used for log storage;

To the east, an industrial operation on a site zoned “Industrial (I)”;

To the south, across Twigg Place, two training facilities operated by the BC Maritime Employers Association, zoned “Industrial (I)”;

To the west, an industrial outdoor storage operation on a site zoned “Industrial (I)”.

Staff Comments

The subject site’s 30 m wide northern portion from the river’s high water mark along the foreshore is designated as “Shoreline” Environmentally Sensitive Area (ESA). The 30 m wide portion of the water lot north of the high river mark (upland lot) is designated as “Intertidal” Environmentally Sensitive Area (ESA). The aforementioned ESA designated areas are impacted by the proposed barge ramp. Industrial uses and other uses allowed under the site’s current zoning are not subject to a Development Permit, however, the proposal for a barge loading facility requires the installation of a barge ramp and associated infrastructure within the aforementioned ESA, and as such, an ESA Development Permit (ESA DP) is required.

The proposed scheme attached to this report has satisfactorily addressed the environmental concerns and other staff comments identified as part of the review of the subject Development Permit application. In addition, it complies with the intent of the applicable sections of the Official Community Plan and is generally in compliance with the “Industrial (I)” zone. In addition, the activities and use associated with the Provincial Water Lot, are subject to separate

approval from the Province with regard to Water Sustainability Act (WSA) for Change In About A stream and Crown Land Lease with respect to the Water Lot, which must be obtained prior to the issuance of this Development Permit.

Analysis

Site Planning

- The owner is proposing to construct a barge ramp in the water lot fronting the subject site (upland lot) for the purpose of transporting aggregate materials from ships and boats onto the commercial vehicles and vice-versa. This proposal would complement the existing construction and trucking business in operation at the subject site.
- The applicant is not proposing to store any aggregate materials on-site. Any storage of aggregate materials onsite would require additional approvals and permits from the City and Metro Vancouver.
- The water lot north of the subject site (upland lot) is currently leased by Howe Sound and Paper Corporation and is currently being used to store tree logs in the same fashion as the nearby industrially-used lots on the adjacent properties along Twigg Place. In order to be able to pursue and make possible the development of the barge ramp in the water lot, the owner of the subject site (upland lot) has entered into a memorandum of understanding (MOU) with the current leaseholder, and has submitted a crown land lease application to the Province for the change in the water lot tenure and use from its current use to the propose barge ramp installation and future use in front of the subject site (upland lot). The owner must provide proof of Provincial Approval regarding the land tenure (water lot) prior to the DP being forwarded to Council for consideration.
- Trucks would be provided access to the ramp via a truck staging area and an 8 m wide drive isle on the northeast corner of the subject site.
- The proposed development would not include any buildings or structures beyond the barge ramp and associated components within the ESA. The existing office operation within the shipping containers on the southeast corner of the subject site outside the ESA is proposed to remain.
- The subject site (upland lot) would be raised to an elevation of 4.7 m within the 30 m ESA buffer along the foreshore to prepare the site for future dike improvements and effects of climate change.
- The raised lands would be protected and strengthened through installation of lock block walls along the side property lines. The lock block walling would be installed at the existing grade elevation (approximately 3.5 m) along the side property lines within the property and spanning the entire 30 m width of the raised lands along the foreshore. The lock block wall on both side of the property would terminate at an elevation of 5 m.
- Traffic access for trucks to the barges off-shore via the proposed ramp would traverse on top of the raised SRW.

Senior Governmental Approvals

The proposed barge ramp facility requires approvals from multiple regulatory governmental agencies in addition to the City of Richmond. The agencies and their associated scope of review are listed below:

- Department of Fisheries and Oceans Canada (DFO) under the Fisheries Act due to proposed works within the Fraser River in the water lot;
- Transport Canada (TC) with respect to the Navigation Protection Permit;
- Ministry of Environment and Climate Change Canada (ECCC) with respect to the required Disposal at Sea Permit (DAS) in order to dispose of on-site materials resulting from works associated with the installation and construction of the proposed barge ramp facility;
- Province of BC Crown Lands for the continued lease and change in use of the water lot;
- Province of BC with respect to the Water Sustainability Act and as applied to Changes In and About a Stream; and
- Provincial Dike Authority.

The proposed development has received the following approvals with respect to proposed barge ramp installation and associated works in the foreshore and the water lot:

- Department of Fisheries and Oceans Canada (DFO);
- Transport Canada; and
- Provincial Diking Authority.

The following approvals are expected to be completed in the near future and are required to be submitted to the City prior to issuance of this ESA Development Permit by the City:

- Disposal at Sea Permit approvable by the Ministry of Environment and Climate Change Canada (ECCC); and
- Provincial Water Lot Lease and the Changes In and About a Stream by the Province of BC (FLNROD).

Flood Protection

- As the subject site is along the foreshore of the North Arm of the Fraser River, it is subject to future dike raising requirements set out by the City in order to prepare the City for future impacts from climate change due to anticipated water level rises and flooding.
- This Development Permit proposes to raise the elevation of the upland portion of the site within 30m of the foreshore to 4.7m GSC.
- A 20 m wide Statutory Right-of-Way (SRW) along the north property line is required to permit future dike construction. This 20 m SRW will further be complemented with a 4 m wide SRW along the west portion of the subject site granting City access from Twigg Place to the 20 m-wide Dike SRW.
- Construction of the dike is not required at this time; however, raising the lands within the 30 m ESA buffer, as noted earlier, would prepare this subject site for future dike construction by the City or other.
- The owner would be required to register a flood covenant against title identifying a minimum habitable elevation of 4.35 m.

ESA Environmental Inventory

- The subject site's northern portion, comprising a 30 m buffer from the river's high water mark along the foreshore, is within the designated "Shoreline" ESA while the water lot in front of and the subject site (upland lot) includes another 30 m designated "Intertidal" ESA buffer off-shore.
- The responsibility for managing and regulating the "Intertidal" ESA in the waterlot in front of the upland lot falls under the jurisdiction of the Department of Fisheries and Oceans Canada (DFO).
- Existing ecological habitats in both the water lot and the subject site (land lot) are heavily disturbed due to already established industrial uses and associated operations on the site as well as the overall environs of Mitchell Island. The owner's Qualified Environmental Professional (QEP) has determined that historical activities such as foreshore armouring, seasonal erosions and deposition from upland activities partially account for the existing disturbance of the ecological habitat on-site.
- The proposed development and installation of the barge ramp and associated infrastructure would result in the permanent disturbance of approximately 2,458 m² of designated ESA, comprising of 144 m² marsh habitat, 165 m² riparian habitat, and 1,938 m² mudflat and subtidal river bed habitat. The proposed ramp will disturb a further 211 m² of designated ESA on the subject site (upland lot) although this area is currently void of any habitat. An area of approximately 3,041 m² of the river bed (water lot) would be temporarily disturbed due to dredging and other construction-related activities for the barge ramp and would be expected to be re-established naturally within a short time post-construction. The areas of disturbed ESA due to proposed construction are detailed on the DP's Reference Plans (pages 9 and 12).
- Of the 2,458m² of area designated as ESA, the QEP has provided reporting confirming that 935m² of the designated area serves a current low-grade ecological function and is generally divided into the following three categories:
 - Low vegetated bank (marsh habitat) totalling an area of 255 m²;
 - High vegetated bank (riparian vegetation) with a total assessed area of 680 m²; and
 - Mudflat and riverbed habitat, located within the water lot north of the subject site and not containing any ecologically significant area.
- The low vegetated bank (marsh habitat area) is dominated by the following marsh plant species:
 - Sedge;
 - Wapato; and
 - Common cattails.
- With regard to the high vegetated bank (riparian vegetation), the QEP's assessment notes that the said vegetated area includes both native and non-native plant species and is primarily dominated by Himalayan blackberry bushes (invasive species) and juvenile Balsam poplars.
- The mudflat and riverbed habitat is predominantly un-vegetated and currently disturbed due to the storage of log booms. The QEP report indicates the presence of small amount of duckweed plant in this portion of the ESA.

ESA Compensation

- To compensate for impacts to 2,458 m² of ESA designated lands to accommodate the proposed barge ramp and associated infrastructure, a habitat offsetting plan has been prepared by the owner's QEP on a compensation ratio of 1.4:1.
- ESA compensation would be provided in the form of planting and comprised of marsh vegetation planting as well as riparian vegetation planting and establishment of ecologically significant habitats. ESA Compensation would cover an area of 3,036 m² within the 30 m ESA on the subject site ("shoreline" ESA) for riparian vegetation planting and 382 m² of marsh planting in the water lot within the "Intertidal" ESA. The planting areas and associated plant materials are detailed on the DP Plan# 7 & 8).
- The ESA compensation plan would include removal of invasive species from the site and replacing those species with native species.
- The area slated to house ESA marsh planting will be planted by a mix of native plants such as sedges and Wapato with the bulk of the plants being salvaged from the site and reseeded in the 382 m² marsh area north of the subject site, as highlighted in the colour purple and noted as "Marsh Bench".
- The riparian ESA compensation area, comprising the majority of the ESA compensation plan, will be planted with a mix of trees and shrubs totalling 2,537 individual plantings within the 3,036 m² ESA designated lands along the 30 m north buffer of the subject site.
- As the riparian ESA planting area is also to be raised to a 4.7 m height, the owner's QEP would undertake measures to ensure planting methodology would be prescribed and employed in such ways to ensure adequate rooting uptake and long-term longevity in lieu of the land being raised.
- The owner would install lock block walls along the west and east property lines spanning the full 30 m width of the riparian ESA compensation area in order to protect the planted area from all activities taking place on adjacent properties and to ensure safety and stability of the raised lands.
- To ensure that the proposed plantings have the optimum chance for survival and that invasive species are controlled, monitoring and annual report by a QEP will occur annually for five years. A legal agreement securing the monitoring requirements will be registered on Title prior to the DP proceeding to Council for consideration.
- The owner's QEP has submitted a Construction and Environmental Management Plan (CEMP) for the project that addresses all Federal and Provincial Regulatory Requirements and Guidelines.
- The proposed development has been reviewed and approved by the DFO. As a condition of the DFO approval the applicant has provided Department a \$78,587.08 Letter of Credit security covering the cost of ecological enhancement and restoration on the site, providing assurance that the proposed ecological compensation would be undertaken within the parameters and specifications required by the DFO.
- Staff have contacted the DFO and have confirmed that the amount of the Letter of Credit is sufficient to cover the entire scope of work including the proposed ESA compensation identified in this permit.

Legal Encumbrances

The property has a charge (Registration number BK187446) registered against title. This charge is an old flood covenant and should be discharged and replaced with the new flood covenant detailed above in this report.

Site Servicing

Utility connections and any frontage improvements will be addressed at Building Permit stage via Work Order. These improvements are identified in the Development Permit Considerations.

Financial Impact

This development application results in an insignificant Operational Budget Impact (OBI) for the off-site City infrastructure (such as roadworks, waterworks, storm sewers, sanitary sewers, street lights, street lights and traffic lights).

Conclusions

As the proposed development would meet applicable policies and Development Permit Guidelines, staff recommend that the Development Permit be endorsed, and issuance by Council be recommended. A full list of the conditions and considerations which must be completed prior to council issuance are attached (Attachment 3).



Babak Behnia
Planner 2

BB:cas

Attachments:

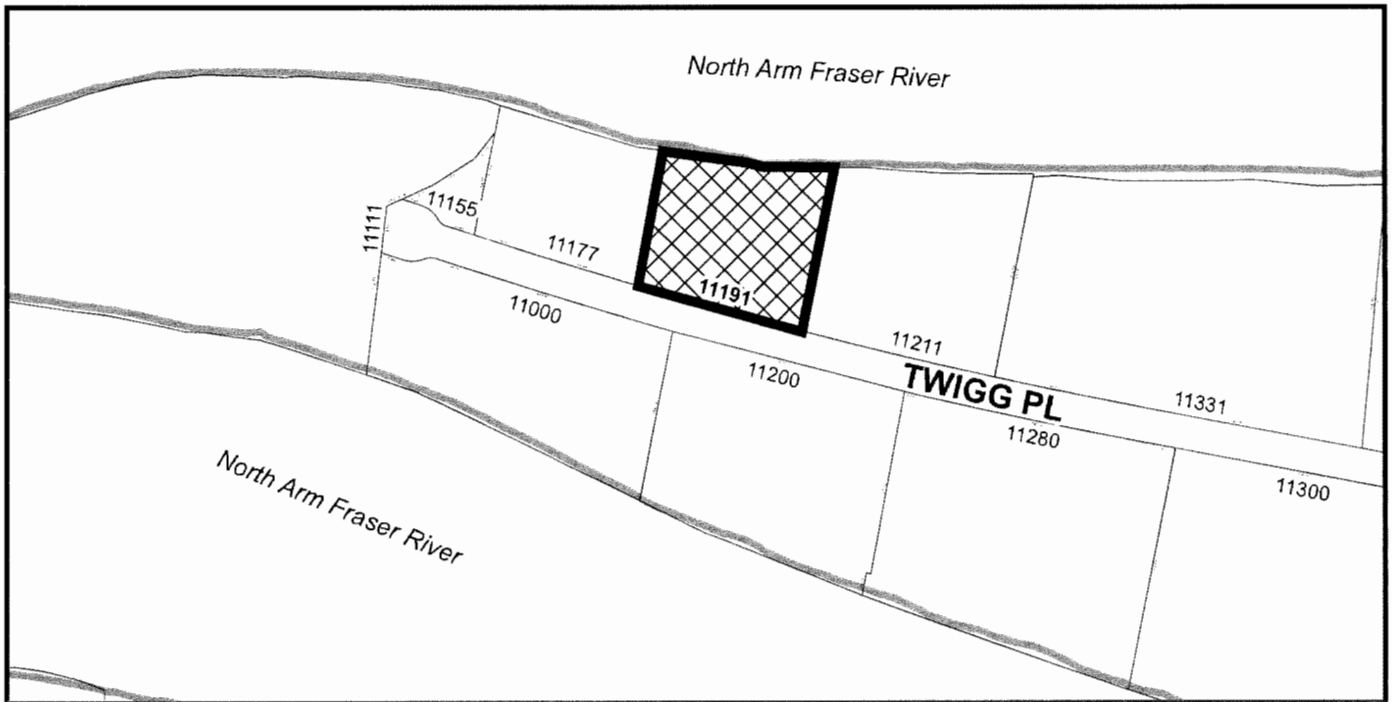
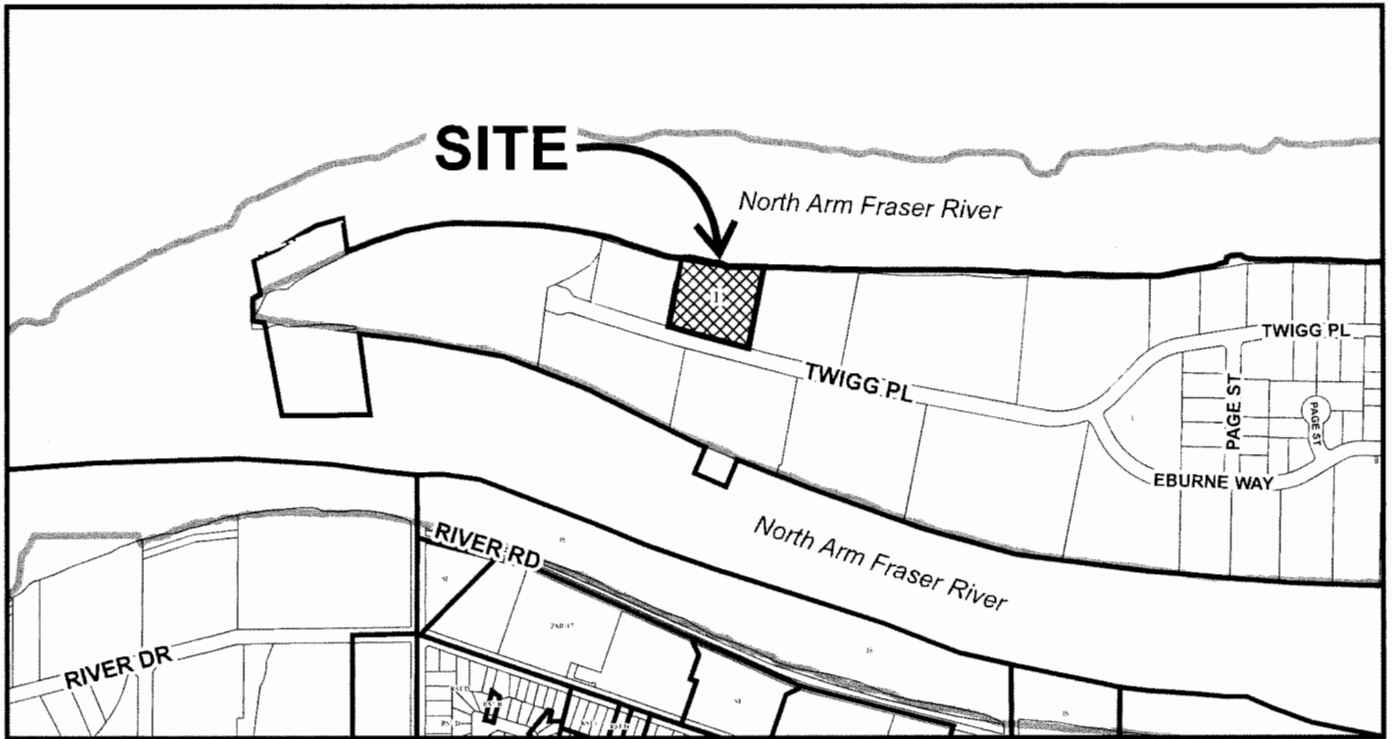
Attachment 1: Location Map

Attachment 2: Development Application Data Sheet

Attachment 3: Development Permit Considerations



City of Richmond



DP 21-944169
SCHEDULE "A"

Original Date: 12/03/21

Revision Date: 12/06/21

Note: Dimensions are in METRES



DP 21-944169

Attachment 2

Address: 11191 Twigg Place

Applicant: Weaver Technical Corp.

Owner: 1068800 BC LTD

Planning Area(s): Bridgeport

	Existing	Proposed
Site Area:	1.12 Ha	No change
Land Uses:	Industrial	No change
OCP Designation:	Industrial	No change
Zoning:	Industrial (I)	No change

FAR	Bylaw Requirement	Proposed	Variance
FAR	1.0	0.0	none
Lot Coverage:	Max. 75%	0% (no buildings)	none
Setback – Front Yard:	Min. 3.0 m	Consistent with zone	none
Setback – Side Yard:	Min. 0 m	Consistent with zone	none
Setback – Side Yard:	Min. 0 m	Consistent with zone	none
Setback – Rear Yard:	Min. 3.0 m	Consistent with zone	none
Lot Size:	No minimum	Consistent with zone	none



Address: 11191 Twigg Place

File No.: DP 21-944169

Prior to approval of the Development Permit, the developer is required to complete the following:

1. Submission of Confirmation of Approval from the Department of Fisheries and Oceans Canada (DFO) with regard to proposed ecological impacts as well as the proposed ecological remediation.
2. Submission of Confirmation of Approval from the B.C Ministry of Forests, Lands and Natural Resources (FLNROD) with regard to the Water Sustainability Act Change In About a Stream (WSA).
3. Submission of Confirmation of Approval from the B.C Ministry of Forests, Lands and Natural Resources (FLNROD) with regard to Crown Lands Use Application.
4. Submission of Approval to Dispose at Sea (Disposal at Sea Permit) from the Federal Ministry of Environment and Climate Change Canada (ECCC).
5. Registration of a 20.0 m wide statutory right-of-way along the foreshore area of the upland lot covering an approximate area of 2,023 m² for the future dike development by the City. Future roles and responsibilities in terms of maintenance and repairs of the future dike will be provided by City's Engineering Department and appended into the agreement.
6. Registration of a 4.0 m wide statutory right-of-way along the west property line of the upland lot covering an approximate area of 371 m² to provide access to the future dike along the foreshore.
7. Discharge of the existing flood plain covenant on title with the registration number BK187446.
8. Registration of a flood plain covenant on title identifying a minimum habitable elevation of 4.35 m GSC.
9. Registration of a legal agreement on title to identify ESA restoration, protection and enhancement area in lieu of the proposed development in the ESA and to ensure that landscaping is planted and retained as identified in the Environmental Assessment Report prepared by Weaver Technical Corp., dated August 2023. The legal agreement will also include language to allow City access to the property in case the enhancement works identified in Weaver Technical Corp. submission in August 2023 are not completed, maintained and monitored as proposed.
10. Submission of a Contract entered into between the owner and a Qualified Environmental Professional (QEP) to monitor and provide annual reporting to the City on the ESA for 5 years following City approval of substantial completion.
11. Payment of all fees in full for the cost associated with the Development Permit Panel Meeting Notices, consistent with the City's Consolidated Fees Bylaw No 8636, as amended.

Prior to Building Permit Issuance, the developer must complete the following requirements:

1. At the owner's cost via City Work Order*, design and construct/install utility connections and frontage improvements, as applicable, works include, but not limited to water works and storm sewer works and review of street lighting levels along road frontage.
2. Submission of a Construction Parking and Traffic Management Plan to the Transportation Department. Management Plan shall include location for parking for services, deliveries, workers, loading, application for any lane closures, and proper construction traffic controls as per Traffic Control Manual for works on Roadways (by Ministry of Transportation) and MMCD Traffic Regulation Section 01570.
3. Obtain a Building Permit (BP) for any construction hoarding. If construction hoarding is required to temporarily occupy a public street, the air space above a public street, or any part thereof, additional City approvals and associated fees may be required as part of the Building Permit. For additional information, contact the Building Approvals Department at 604-276-4285.

Initial: _____

4. Installation of appropriate fencing and other ecological protection mechanism according to a Construction Environmental Management Plan approved by staff and as per the recommendations of and specifications listed by the Qualified Environmental Professional (QEP).
5. Submit a Building Permit to the City for the existing shipping containers on the subject site being used as office space and receive inspection review and the permit for the said shipping containers' continued use.

Note:

- * This requires a separate application.
- Where the Director of Development deems appropriate, the preceding agreements are to be drawn not only as personal covenants of the property owner but also as covenants pursuant to Section 219 of the Land Title Act.
All agreements to be registered in the Land Title Office shall have priority over all such liens, charges and encumbrances as is considered advisable by the Director of Development. All agreements to be registered in the Land Title Office shall, unless the Director of Development determines otherwise, be fully registered in the Land Title Office prior to enactment of the appropriate bylaw.
The preceding agreements shall provide security to the City including indemnities, warranties, equitable/rent charges, letters of credit and withholding permits, as deemed necessary or advisable by the Director of Development. All agreements shall be in a form and content satisfactory to the Director of Development.
- Additional legal agreements, as determined via the subject development's Servicing Agreement(s) and/or Development Permit(s), and/or Building Permit(s) to the satisfaction of the Director of Engineering may be required including, but not limited to, site investigation, testing, monitoring, site preparation, de-watering, drilling, underpinning, anchoring, shoring, piling, pre-loading, ground densification or other activities that may result in settlement, displacement, subsidence, damage or nuisance to City and private utility infrastructure.
- Applicants for all City Permits are required to comply at all times with the conditions of the Provincial *Wildlife Act* and Federal *Migratory Birds Convention Act*, which contains prohibitions on the removal or disturbance of both birds and their nests. Issuance of Municipal permits does not give an individual authority to contravene these legislations. The City of Richmond recommends that where significant trees or vegetation exists on site, the services of a Qualified Environmental Professional (QEP) be secured to perform a survey and ensure that development activities are in compliance with all relevant legislation.

Signed

Date



City of Richmond

Development Permit

No. DP 21-944169

To the Holder: 1068800 BC LTD
 Property Address: 11191 Twigg Place
 Address: UNIT 228 - 2680 SHELL ROAD
 RICHMOND, BC V6X 4C9

1. This Development Permit is issued subject to compliance with all of the Bylaws of the City applicable thereto, except as specifically varied or supplemented by this Permit.
2. This Development Permit applies to and only to those lands shown cross-hatched on the attached Schedule "A" and any and all buildings, structures and other development thereon.
3. Subject to Section 692 of the Local Government Act, R.S.B.C.: buildings and structures; off-street parking and loading facilities; roads and parking areas; and landscaping and screening shall be constructed generally in accordance with Plans #1 to #8 attached hereto.
4. Sanitary sewers, water, drainage, highways, street lighting, underground wiring, and sidewalks, shall be provided as required.
5. If the Holder does not commence the construction permitted by this Permit within 24 months of the date of this Permit, this Permit shall lapse and the security shall be returned in full.
6. The land described herein shall be developed generally in accordance with the terms and conditions and provisions of this Permit and any plans and specifications attached to this Permit which shall form a part hereof.

This Permit is not a Building Permit.

AUTHORIZING RESOLUTION NO.
DAY OF

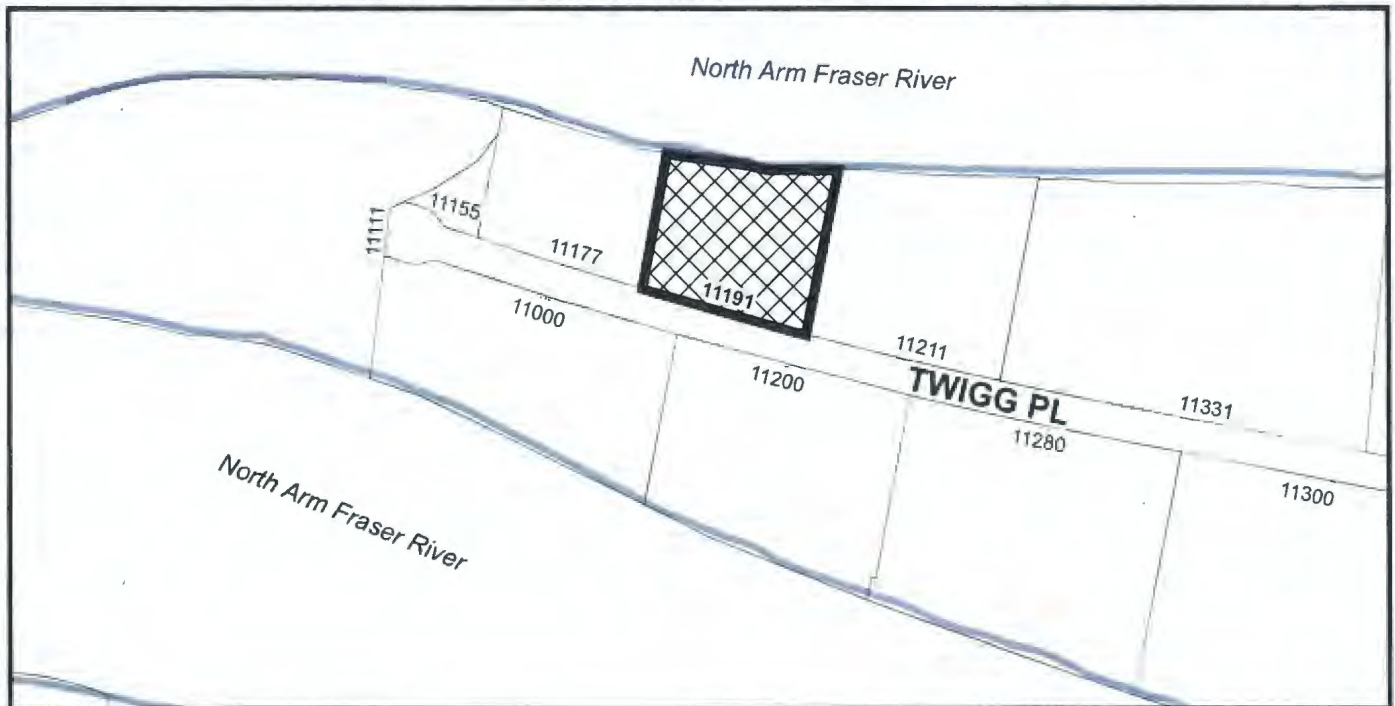
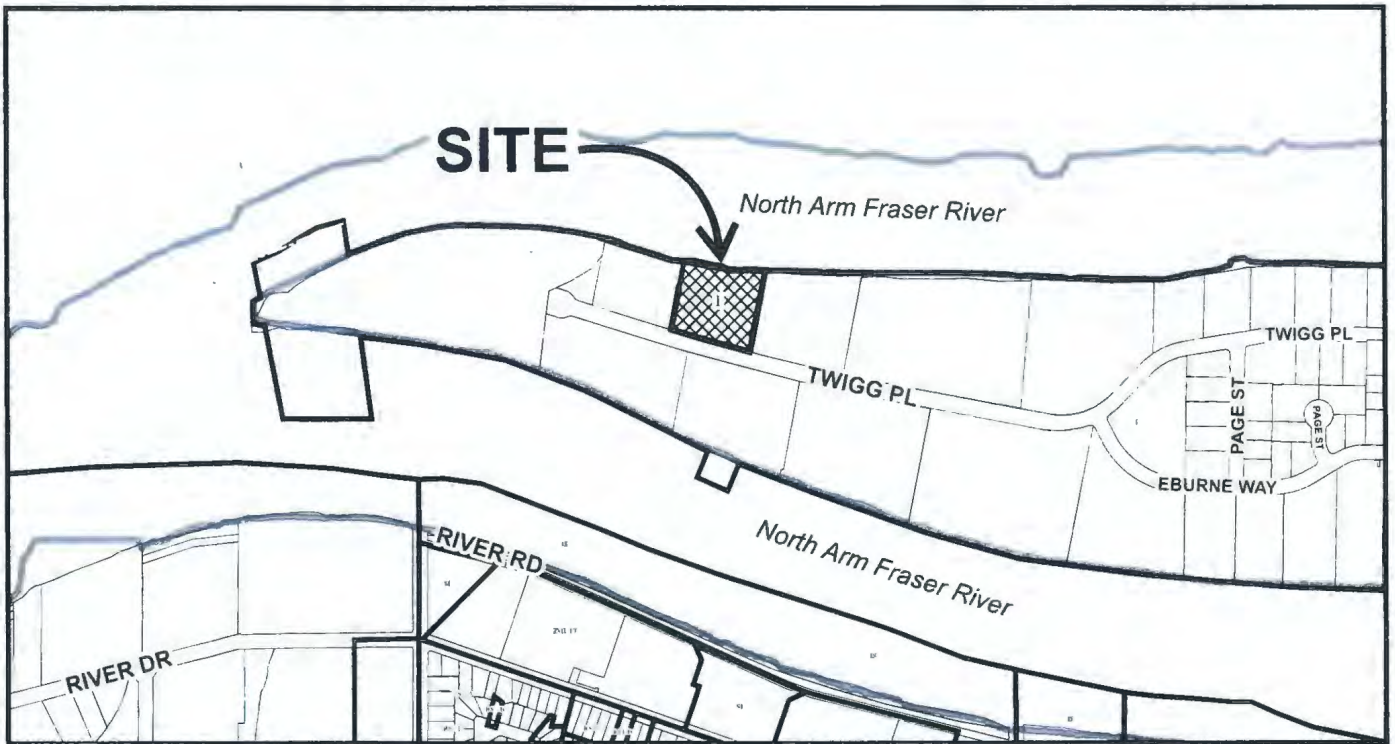
ISSUED BY THE COUNCIL THE

DELIVERED THIS DAY OF

MAYOR



City of Richmond

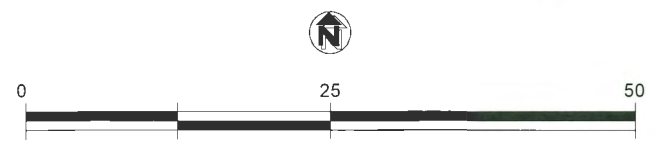
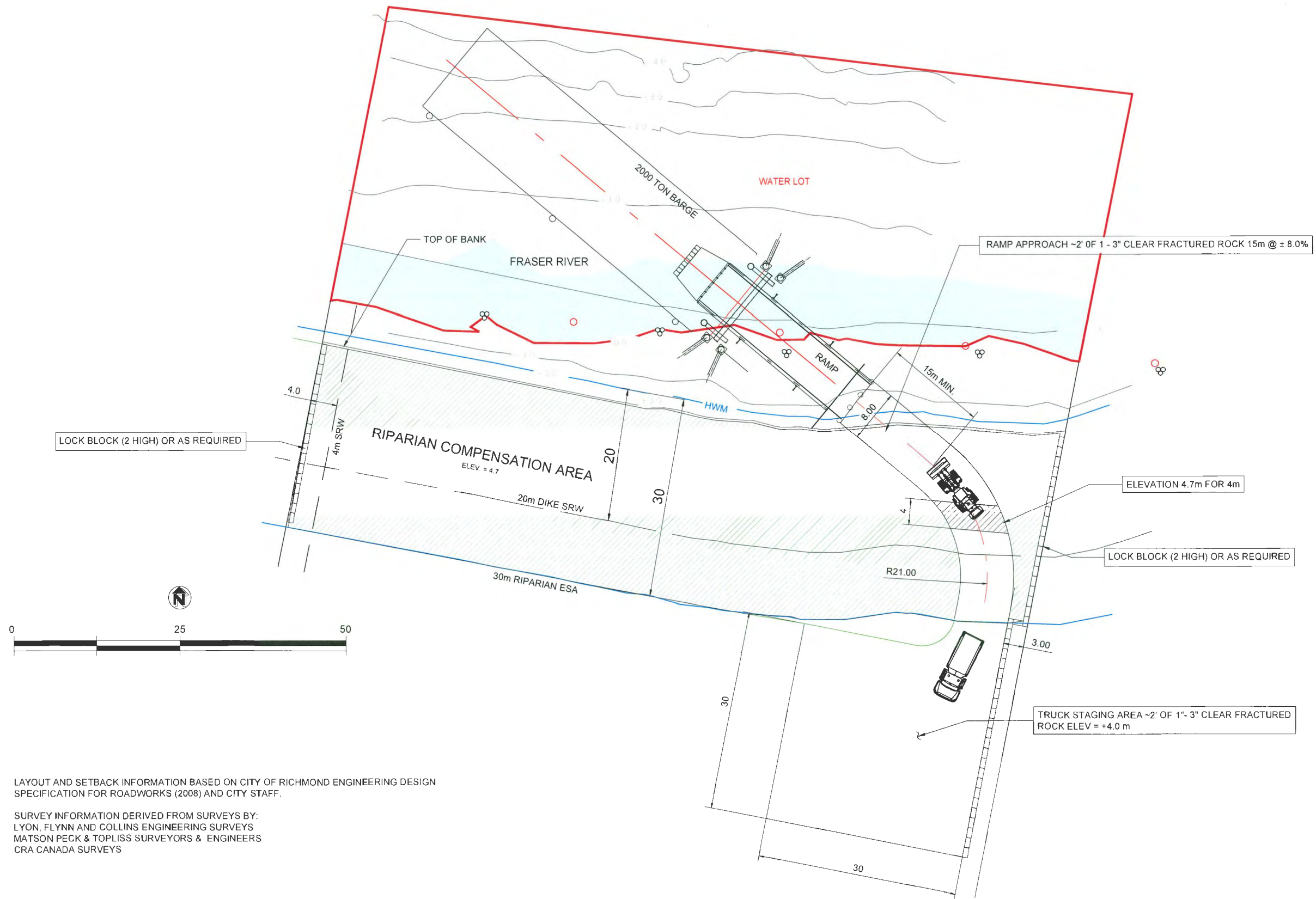


DP 21-944169
SCHEDULE "A"

Original Date: 12/03/21

Revision Date: 12/06/21

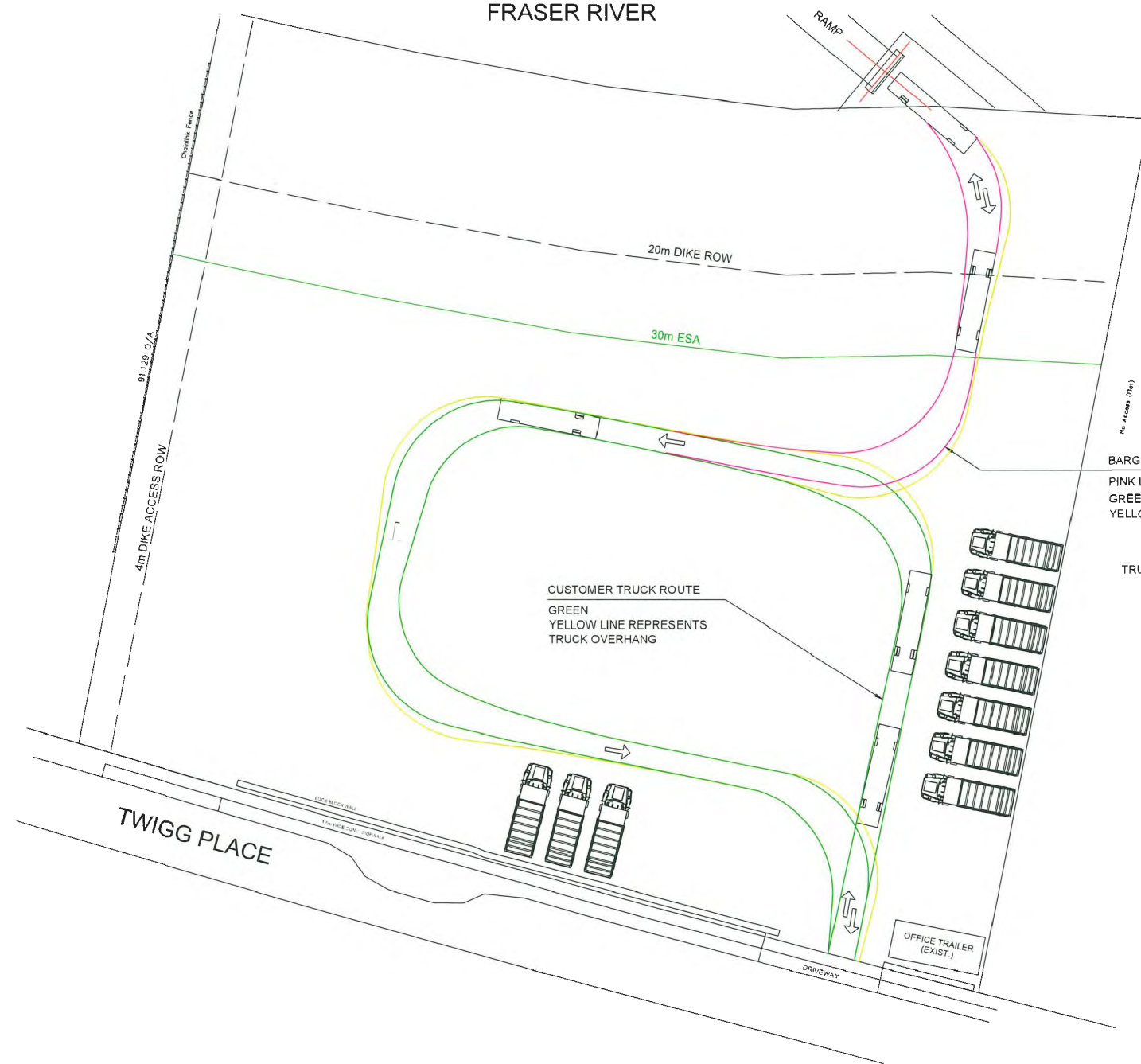
Note: Dimensions are in METRES



LAYOUT AND SETBACK INFORMATION BASED ON CITY OF RICHMOND ENGINEERING DESIGN SPECIFICATION FOR ROADWORKS (2008) AND CITY STAFF.

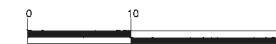
SURVEY INFORMATION DERIVED FROM SURVEYS BY:
 LYON, FLYNN AND COLLINS ENGINEERING SURVEYS
 MATSON PECK & TOPLISS SURVEYORS & ENGINEERS
 CRA CANADA SURVEYS

NORTH BRANCH NORTH ARM
FRASER RIVER



BARGE TRUCK ROUTE
PINK LINE IS LOADER ROUTE
GREEN IS TRUCK ROUTE
YELLOW LINE REPRESENTS TRUCK OVERHANG

TRUCK OVERHANG



NOTES:

1. NO ADDITIONAL OFFICE SPACE (BUILDINGS OR TRAILERS) ARE PROPOSED AS PART OF THIS DEVELOPMENT PERMIT
2. PROPOSED USE OF THE SITE IS FOR STORAGE OF TRUCKS. THE SITE WILL BE USED FOR LOADING/UNLOADING OF CONSTRUCTION MATERIALS FROM A BARGE.

PREPARED BY:



PERMIT TO PRACTICE #1001178

CLIENT:

SEAL

DATE

REVISIONS

BY

TRAFFIC PLAN

DESIGN BY:

AYR

DRAWN BY:

JC

APPROVED BY:

TW

DATE:

Oct 16, 2023

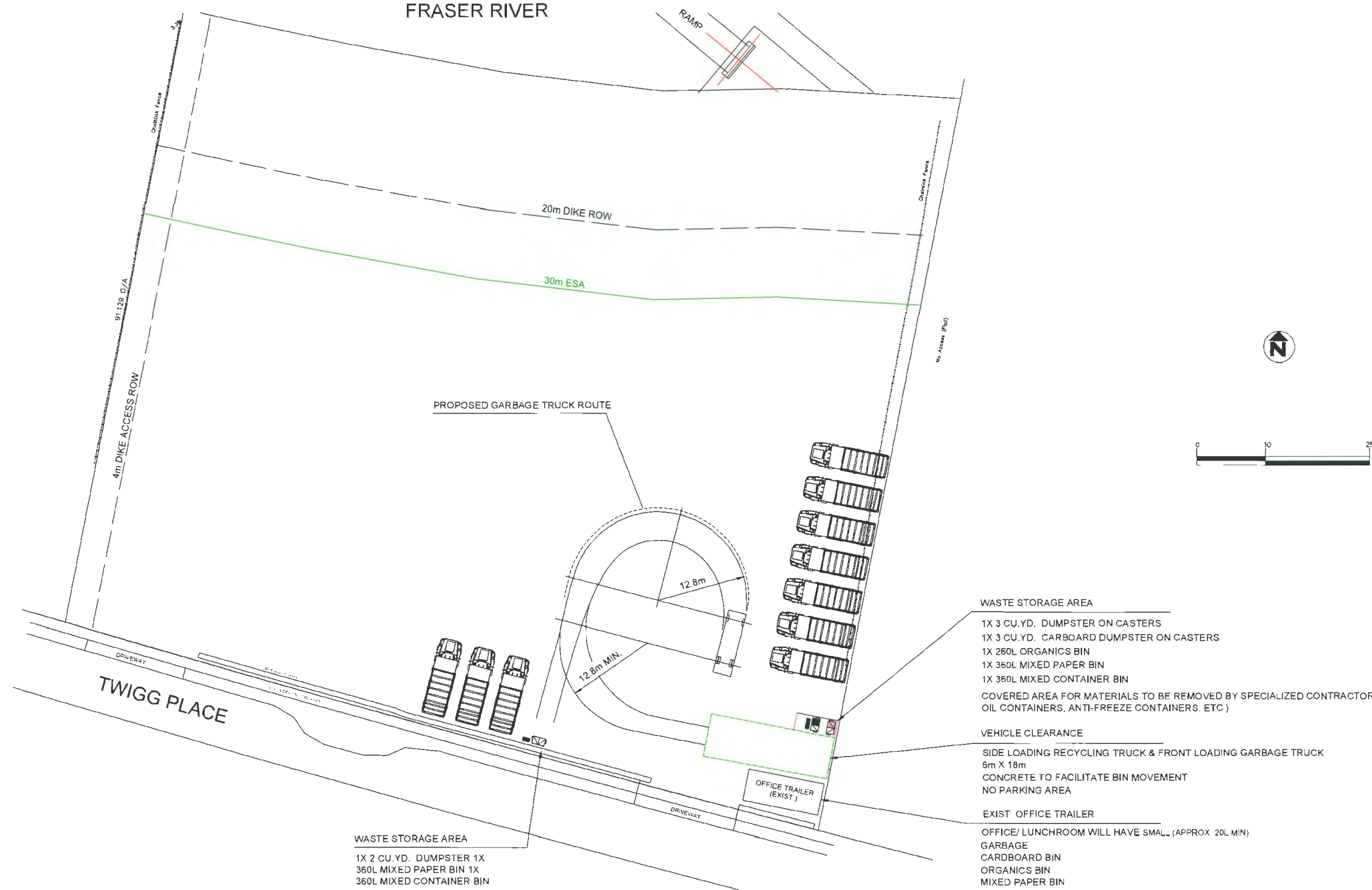
SCALE:

AS SHOWN

ROCMAN CONTRACTING
BARGE RAMP NEW CONSTRUCTION
TWIGG PLACE, RICHMOND BC

DRAWING NO.:

NORTH BRANCH NORTH ARM
FRASER RIVER



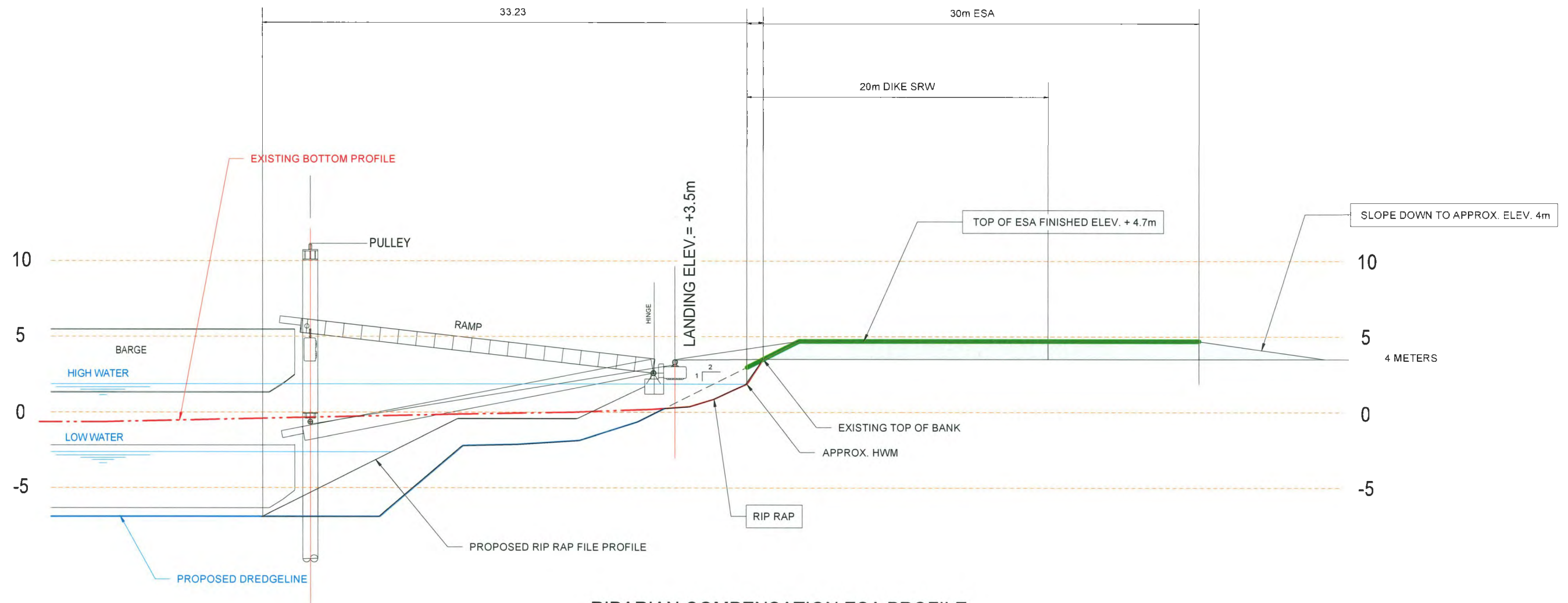
WASTE STORAGE AREA
1X 2 CU. YD. DUMPSTER 1X
360L MIXED PAPER BIN 1X
360L MIXED CONTAINER BIN

WASTE STORAGE AREA
1X 3 CU. YD. DUMPSTER ON CASTERS
1X 3 CU. YD. CARBOARD DUMPSTER ON CASTERS
1X 260L ORGANICS BIN
1X 360L MIXED PAPER BIN
1X 360L MIXED CONTAINER BIN
COVERED AREA FOR MATERIALS TO BE REMOVED BY SPECIALIZED CONTRACTOR (PALLETES,
OIL CONTAINERS, ANTI-FREEZE CONTAINERS, ETC.)

VEHICLE CLEARANCE
SIDE LOADING RECYCLING TRUCK & FRONT LOADING GARBAGE TRUCK
5m X 18m
CONCRETE TO FACILITATE BIN MOVEMENT
NO PARKING AREA

EXIST OFFICE TRAILER
OFFICE/ LUNCHROOM WILL HAVE SMALL (APPROX 20L MIN)
GARBAGE
CARDBOARD BIN
ORGANICS BIN
MIXED PAPER BIN
MIXED CONTAINER BIN

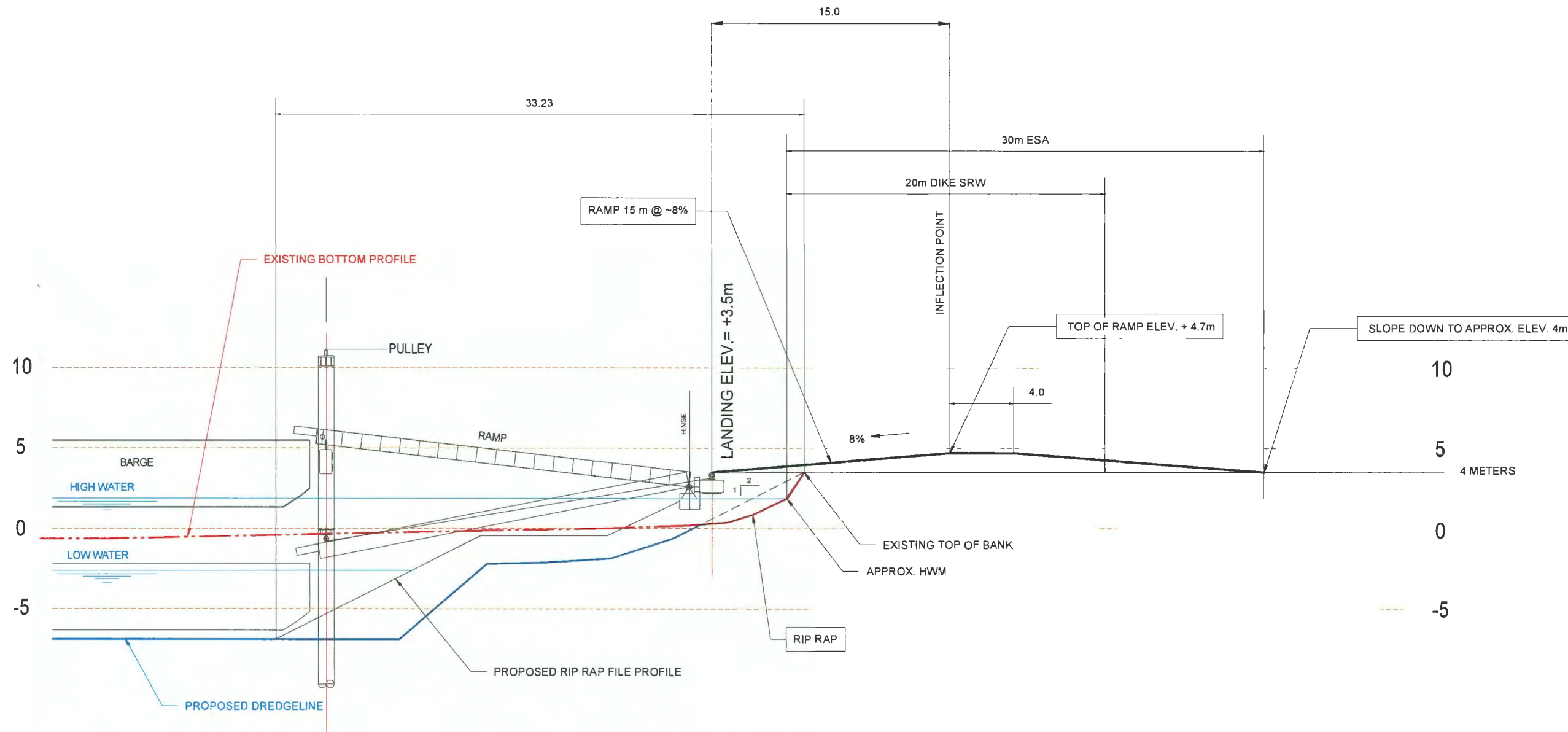
PREPARED BY Weaver Tech Science - Construction - Engineering	CLIENT	SEAL	DATE	REVISIONS	BY	WASTE MANAGEMENT PLAN	DESIGN BY AVR	ROCMAN CONTRACTING BARGE RAMP NEW CONSTRUCTION TWIGG PLACE, RICHMOND BC	
							DRAWN BY JC		APPROVED BY TW
PERMIT TO PRACTICE #1001178							DATE Oct 16, 2023	SCALE AS SHOWN	DRAWING NO 02



RIPARIAN COMPENSATION ESA PROFILE

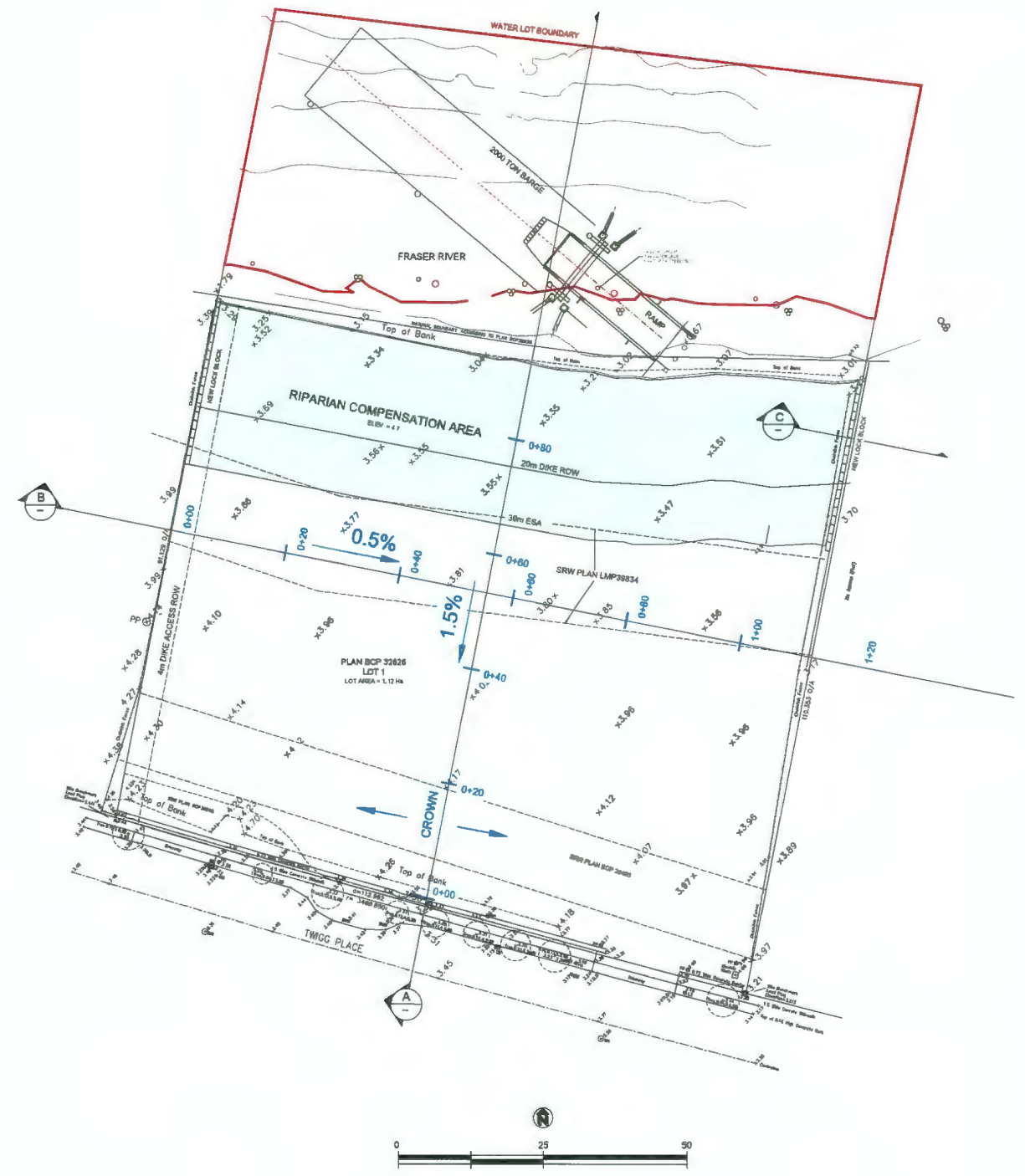
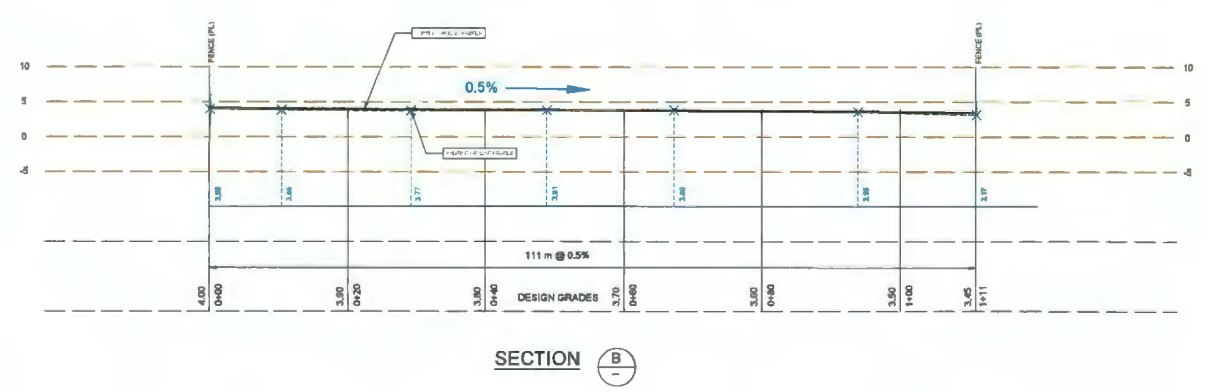
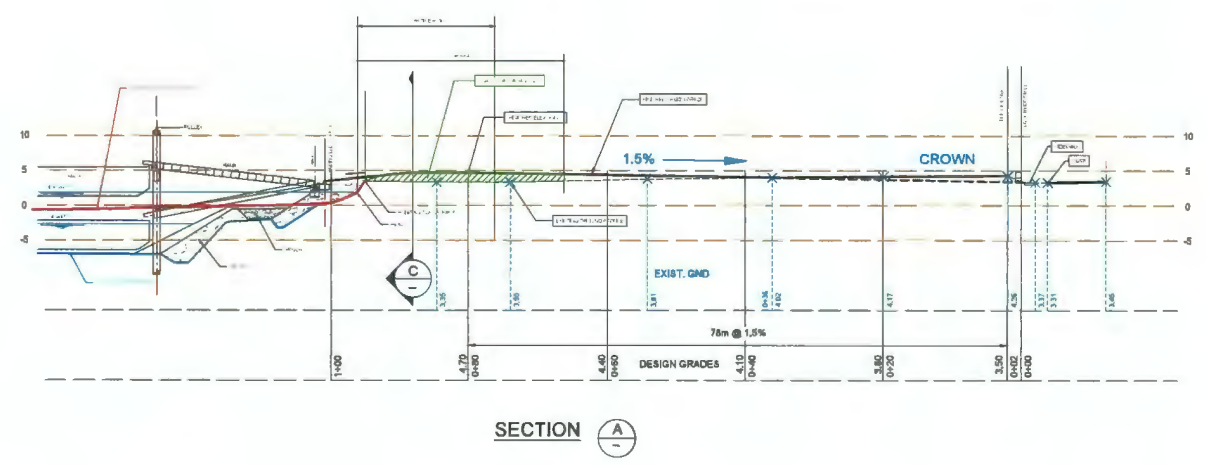
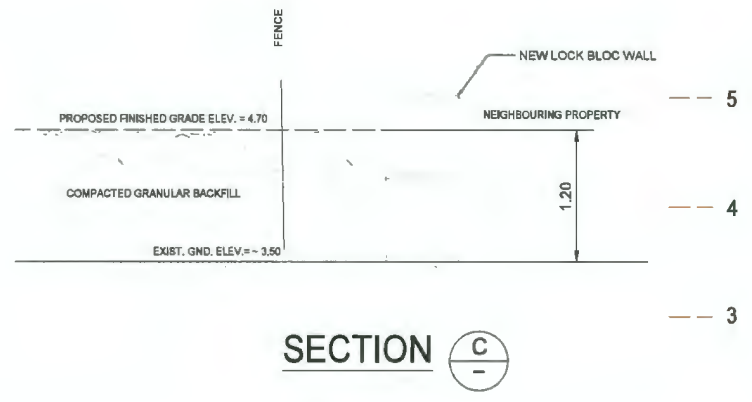


PREPARED BY Weaver Tech Science · Construction · Engineering	TITLE RIPARIAN COMPENSATION PROFILE	ENG. SEAL	DRW: GMR	DES: AVR/GFr	1068800 Ltd. 11191 TWIGG PLACE, LOT 1, PLAN 32828 NEW WESTMINSTER LAND DISTRICT
			DATE: JULY 31 2023	DWG: 110	

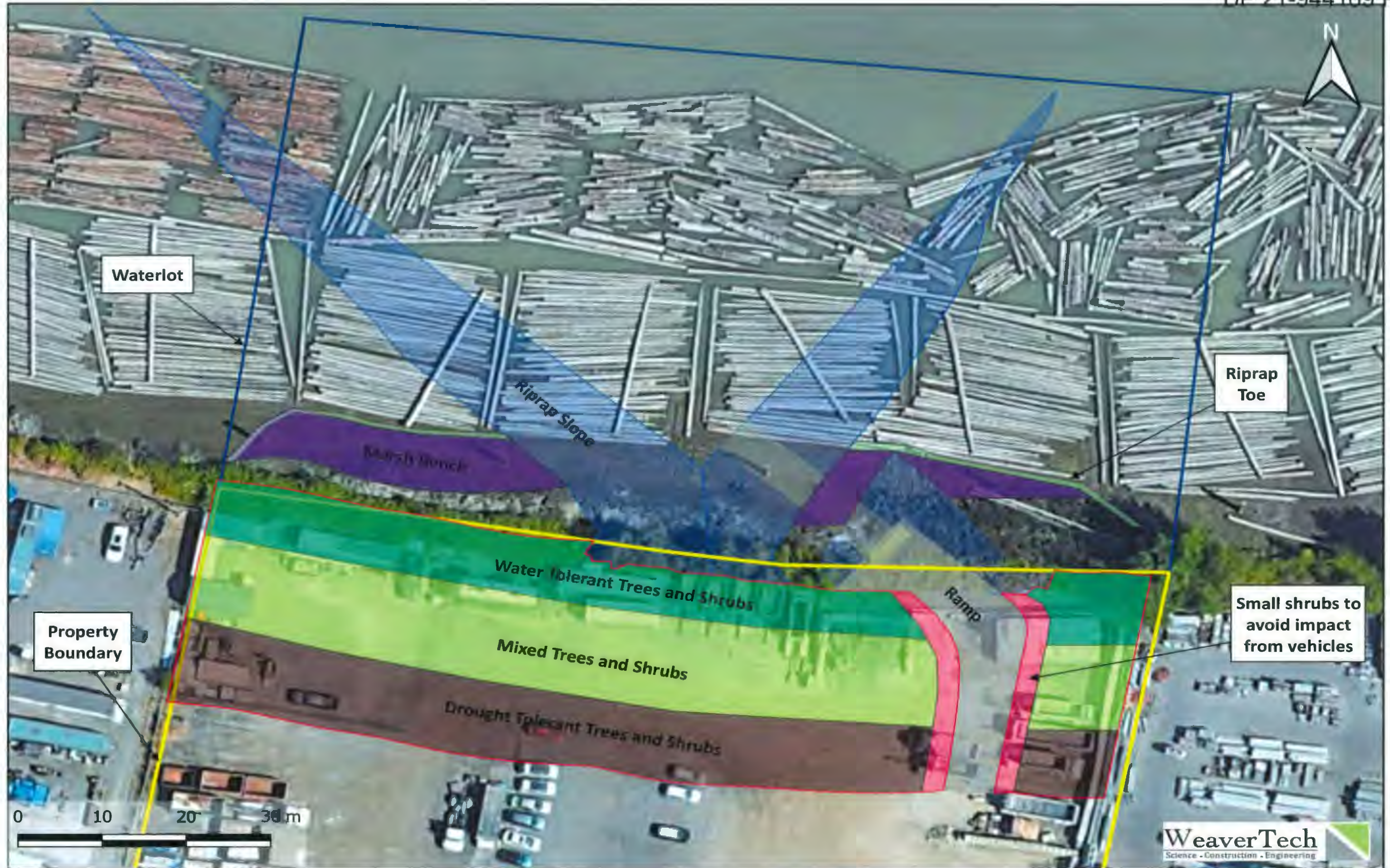


BARGE RAMP PROFILE





PREPARED BY: Weaver Tech Science - Construction - Engineering PERMIT TO PRACTICE #1001178	CLIENT: 1068800 LTD.	SEAL	DATE	REVISIONS	BY	SUBJECT: SITE GRADING PLAN & PROFILE	DESIGN BY:	GPV/JYR	ADDRESS: 11191 TWIGG PLACE LOT1, PLAN 32626 NEW WESTMINSTER LAND DISTRICT
							DRAWN BY:	GMK	



Waterlot

Riprap Slope

Riprap Toe

Marshy Bench

Water Tolerant Trees and Shrubs

Mixed Trees and Shrubs

Drought Tolerant Trees and Shrubs

Ramp

Small shrubs to avoid impact from vehicles

Property Boundary

0 10 20 30 m

WeaverTech
Science • Construction • Engineering

List, Number and Density of Prescribed Plant Species in the ESA Compensation Area

Plant Type	Species	Scientific Name	Size	Percent of Species	Percent of Total Area	Number of Plants
Trees	Black Cottonwood	<i>Populus trichocarpa</i>	#3	20%	6.6%	100
	Red Alder	<i>Alnus rubra</i>	#3	12.5%	4.1%	63
	Pacific crab apple*	<i>Malus fusca</i>	#3	5%	1.7%	25
	Big Leaf Maple	<i>Acer macrophylla</i>	#3	5%	1.7%	25
	Bitter cherry*	<i>Prunus emarginata</i>	#3	5%	1.7%	25
	Black hawthorn*	<i>Crataegus douglasii</i>	#3	2.5%	0.8%	13
	Douglas fir	<i>Pseudotsuga menziesii</i>	#3	20%	6.6%	100
	Western Hemlock	<i>Tsuga heterophylla</i>	#3	10%	3.3%	50
	Sitka Spruce	<i>Picea sitchensis</i>	#3	10%	3.3%	50
	Western Red Cedar	<i>Thuja plicata</i>	#3	10%	3.3%	50
Tree Total:				100%	33.0%	501
Shrubs	Red Osier Dogwood *	<i>Cornus stolonifera</i>	#1	15.0%	10.1%	305
	Salmonberry *	<i>Rubus spectabilis</i>	#1	12.5%	8.4%	254
	Red Elderberry *	<i>Sambucus racemose</i>	#1	10%	6.7%	203
	Nootka Rose *	<i>Rosa nutkana</i>	#1	10%	6.7%	203
	Common Snowberry*	<i>Symphoricarpos albus</i>	#1	7.5%	5.0%	153
	Oceanspray	<i>Holodiscus discolor</i>	#1	7.5%	5.0%	153
	Pacific Ninebark	<i>Physocarpus capitatus</i>	#1	7.5%	5.0%	153
	Salal*	<i>Gaultheria shallon</i>	#1	5%	3.4%	102
	Hardhack	<i>Spirea douglasii</i>	#1	5%	3.4%	102
	Black Twinberry*	<i>Lonicera involucrata</i>	#1	5%	3.4%	102
	Willow	<i>Salix spp</i>	Stake	5%	3.4%	102
	Sword Fern	<i>Polystichum munitum</i>	#1	5%	3.4%	102
	Dull Oregon Grape *	<i>Mahonia nervosa</i>	#1	5%	3.4%	102
Shrub Total:				100%	67.0%	2,036
Combined Total:						2,537

Existing Marsh Habitat



Existing Riparian Habitat

