

# Terrace Bay Waterfront Masterplan

## Phase One Implementation Study



July 26, 2017

Township of Terrace Bay

## Waterfront Masterplan – Phase One Implementation Study

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July 26, 2017

## Township of Terrace Bay

# Waterfront Masterplan – Phase One Implementation Study

## INTRODUCTION

FORM Architecture Engineering was retained in 2016, together with True Grit Engineering, Cuthbertson Engineering and AG Engineering to further develop schematic designs for Phase One of the proposed Terrace Bay Waterfront Redevelopment to support more detailed cost estimating, funding applications and subsequent implementation.

We are pleased to provide in this report a summary of our work further developing the following elements of the original master plan prepared by The Planning Partnership with our assistance:

- The Beachfront master plan
- The Beachfront walkway
- Access road, parking, walkway and site servicing
- The Beach Gazebo
- The Beach Pavilion
- Kayak Storage Stations
- Education Area and Interpretive Signage
- Wind Sculpture opportunities
- Beach Viewing Stations

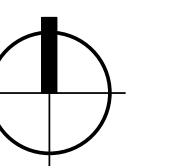
A more detailed project budget is included in this report which projects a total project budget of \$3,338,000 for these works.

We are excited to present these plans to you as we feel that together they will help establish the Terrace Bay Beach as a distinctive destination attraction, building on the strengths of the Lake Superior North Shore Experience while successfully differentiating it from other similarly beautiful experiences and at the same time connecting it to the character, look and feel of the Terrace Bay Downtown.

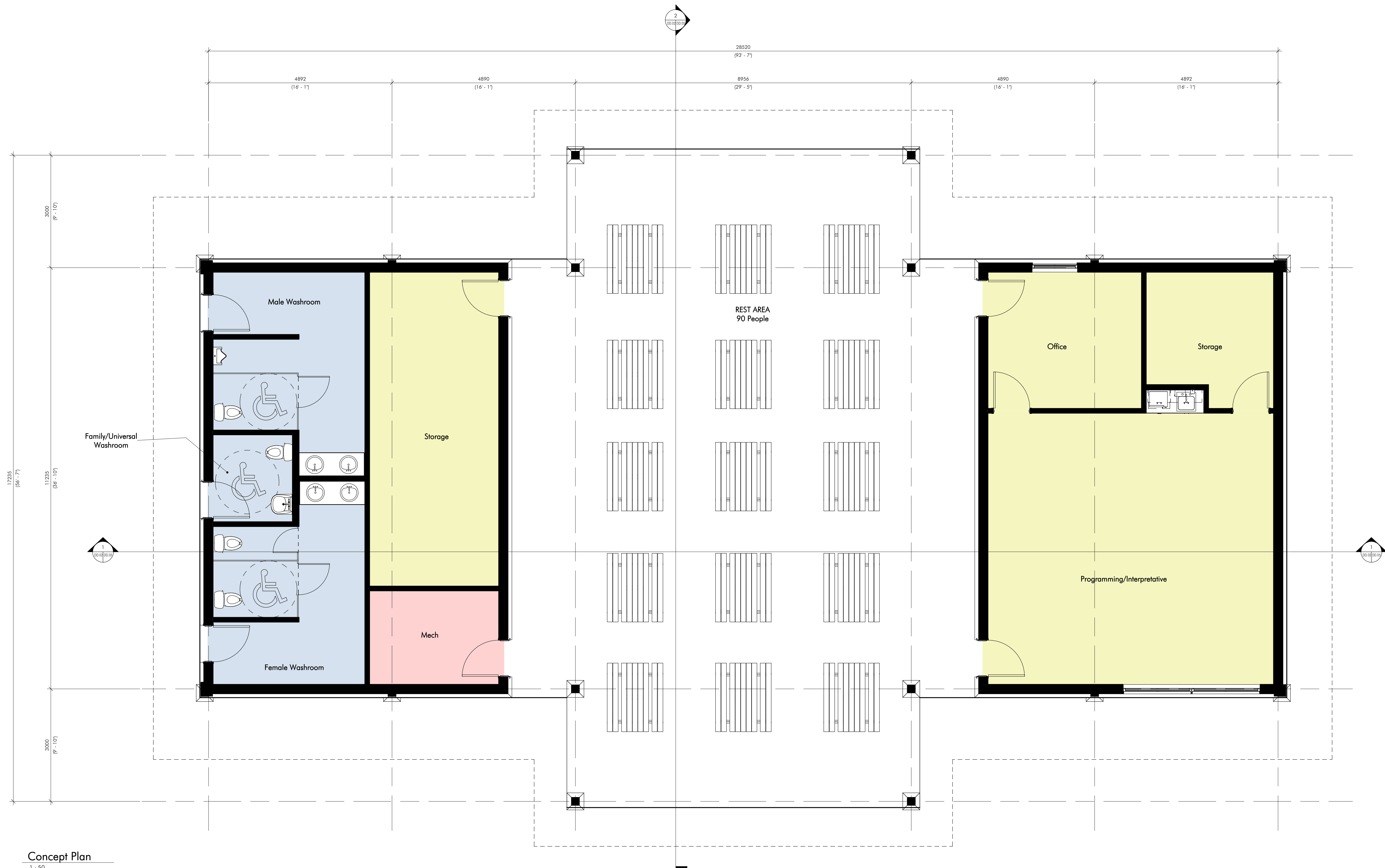




1 Enlarged Site Plan  
scale = 1 : 500





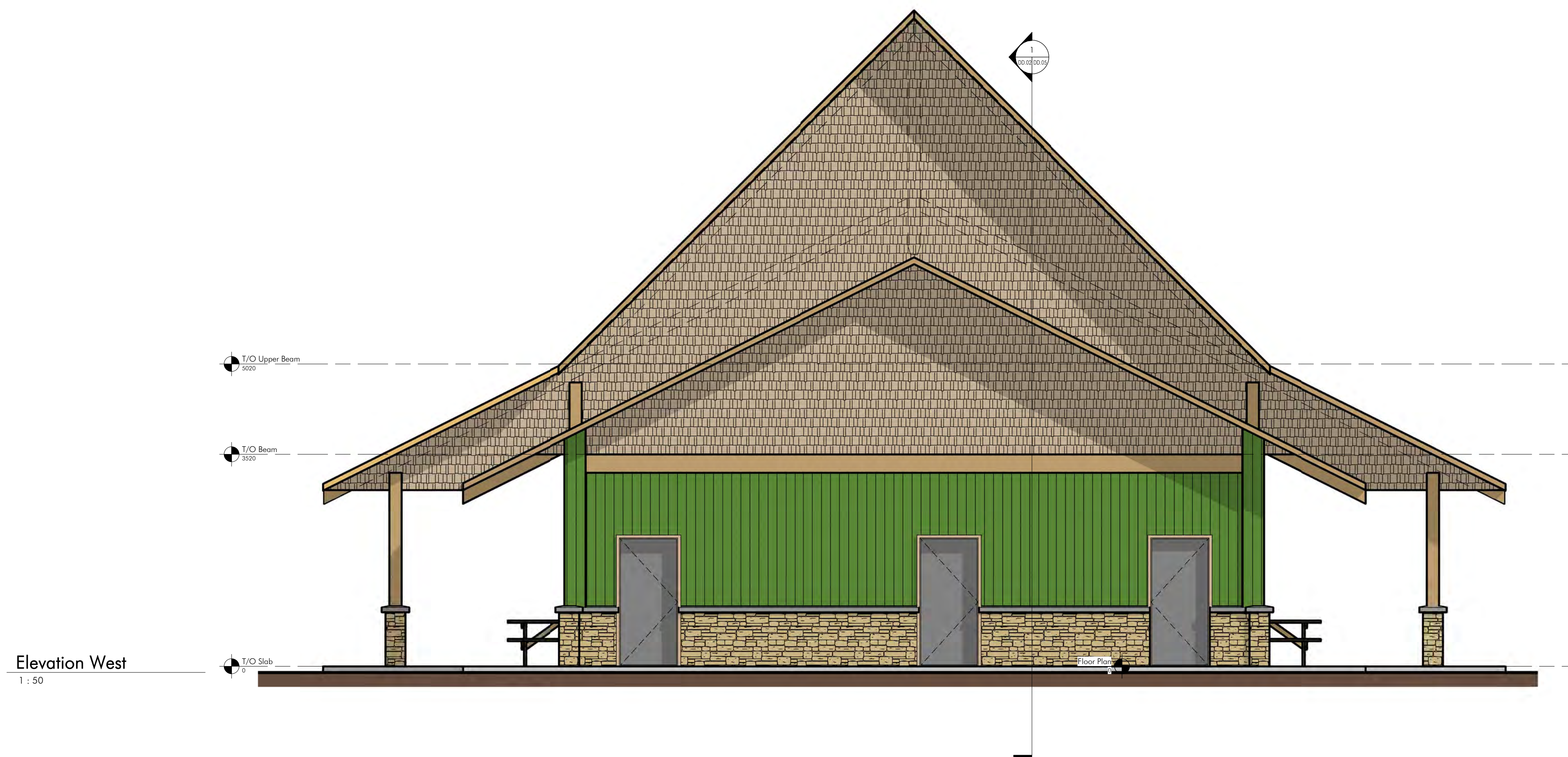
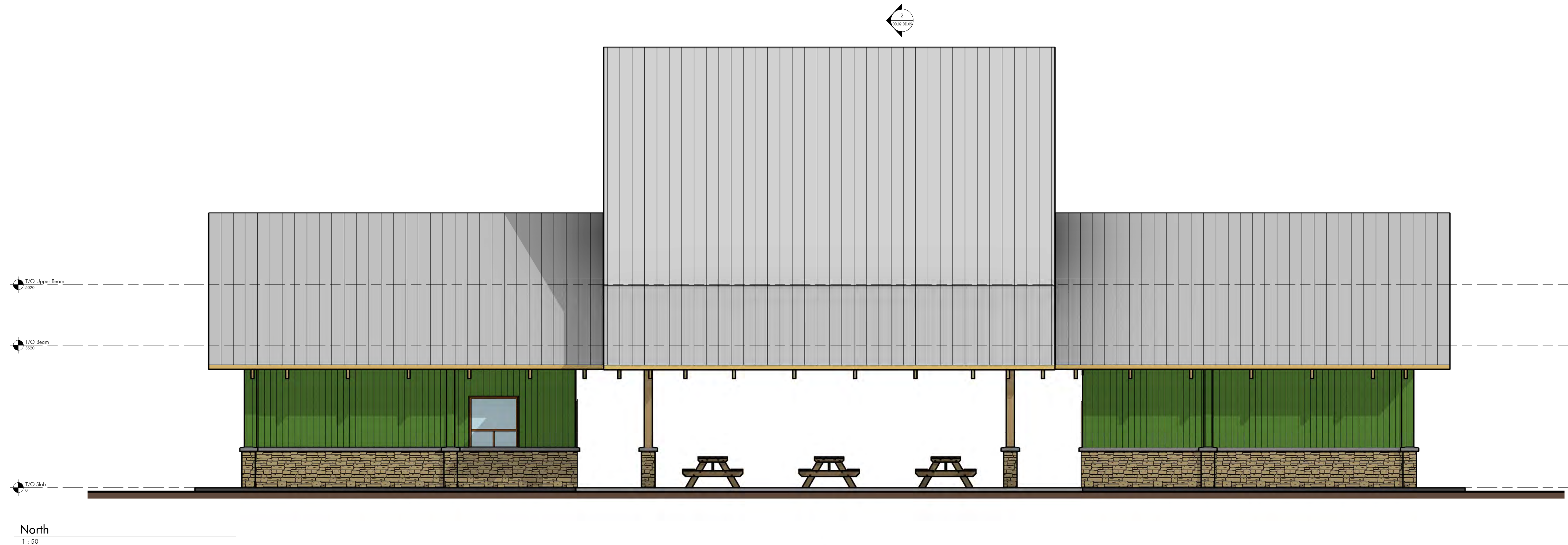


Concept Plan  
1 : 50

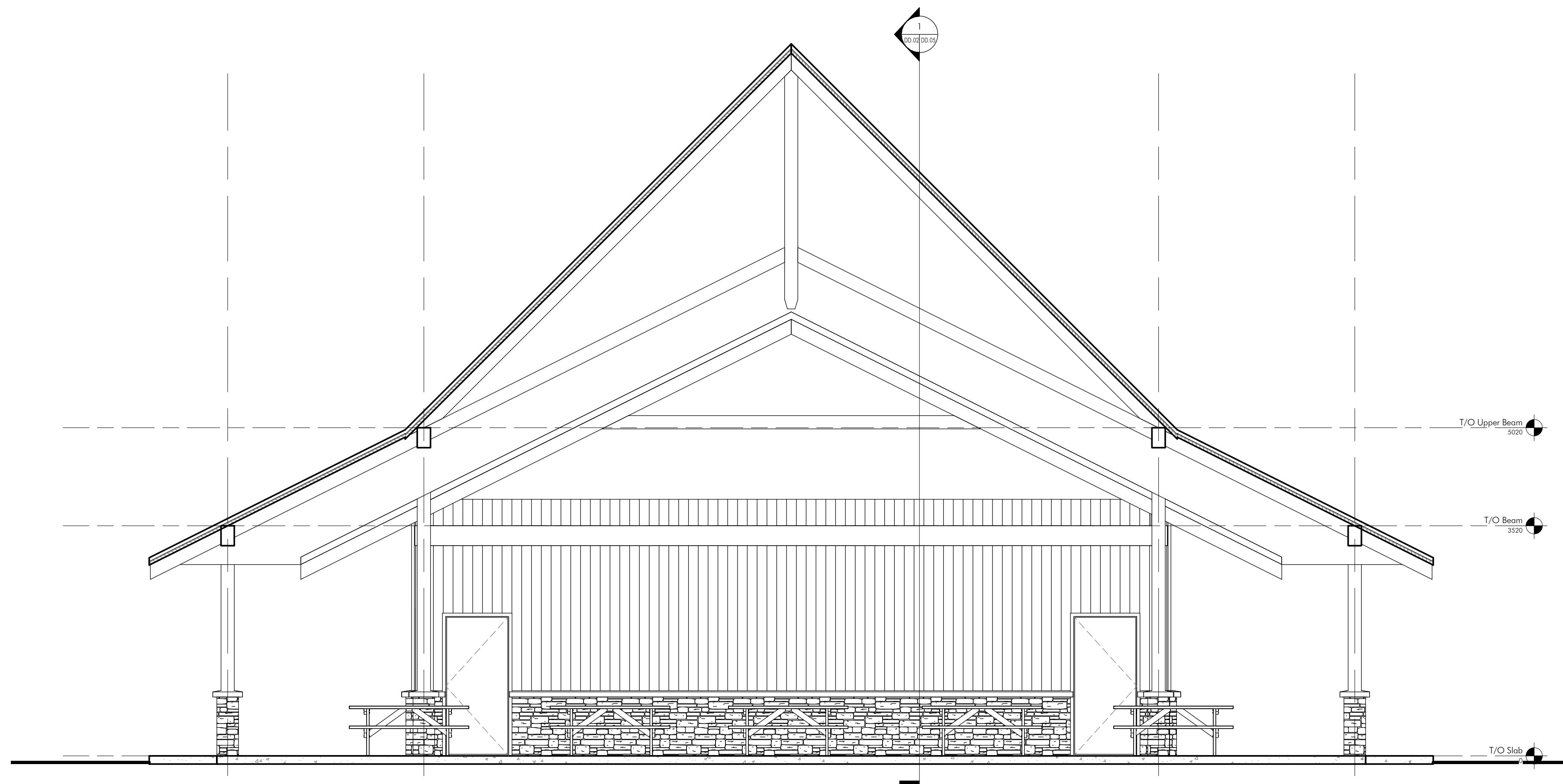




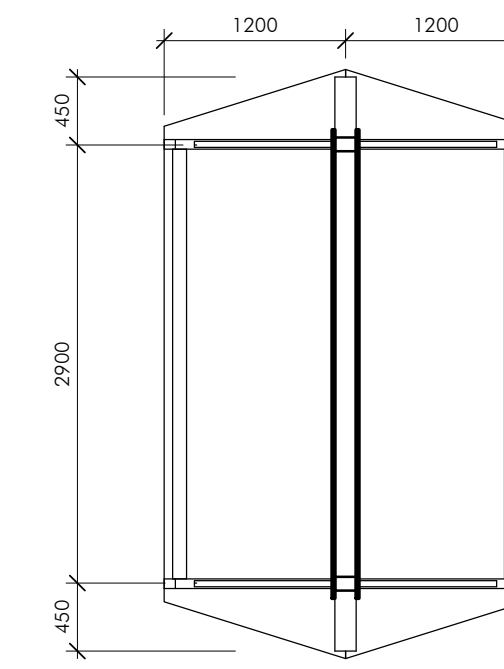




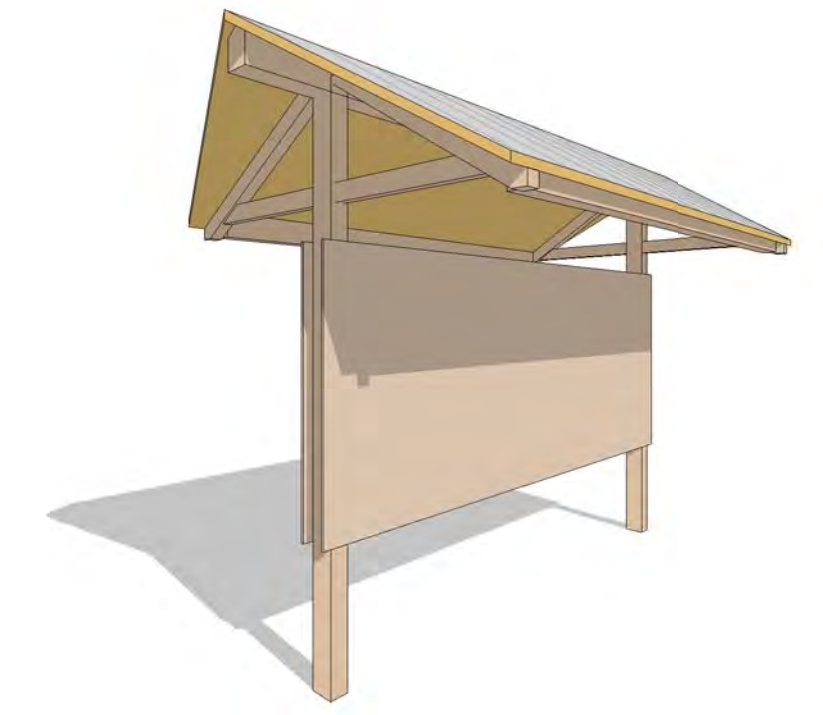




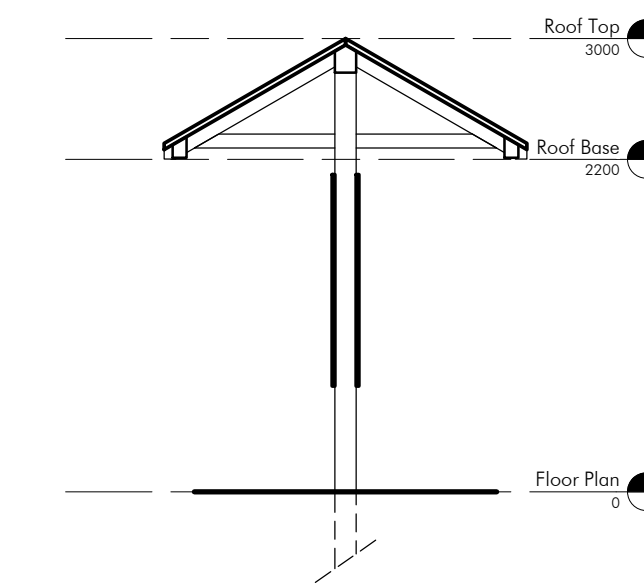
Transversal Section  
1 : 50



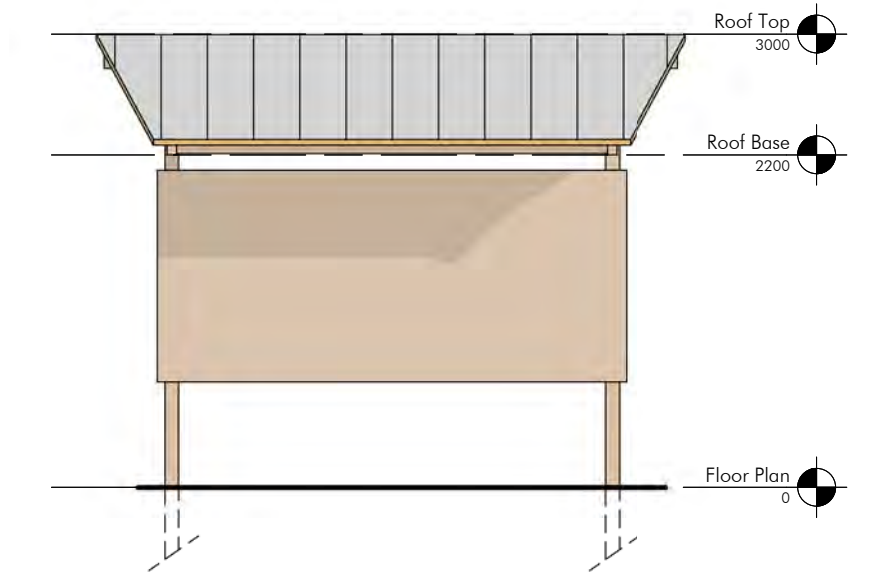
Interpretive Signage - Reflected Plan  
1 : 50



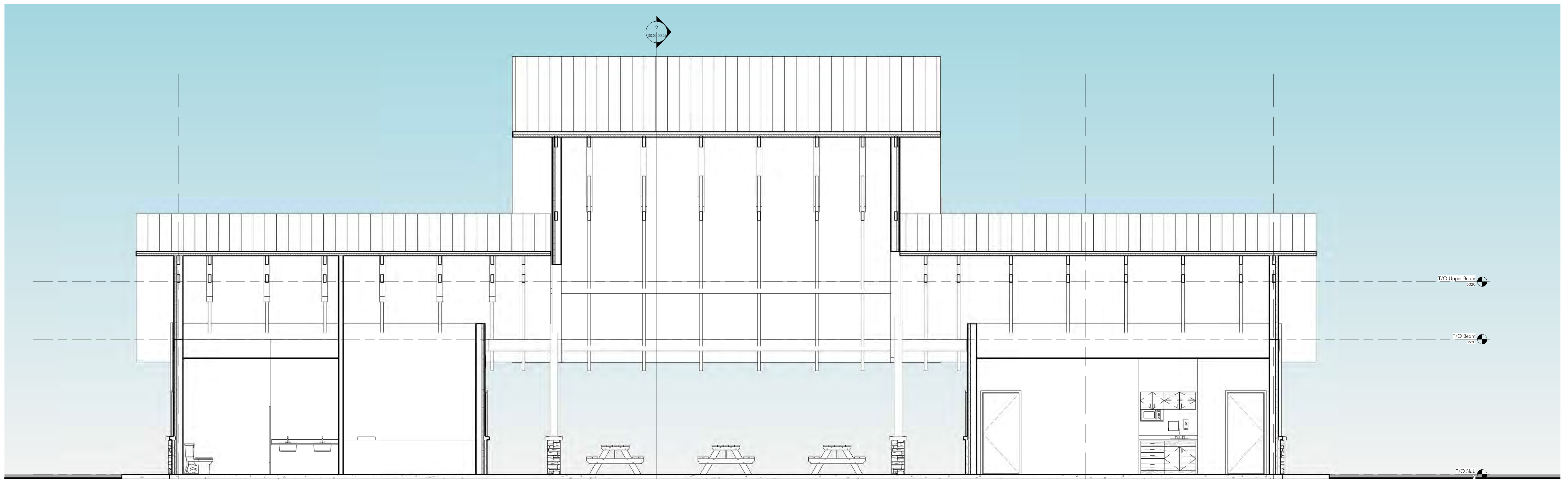
Interpretive Signage - 3D View



Interpretive Signage - Section  
1 : 50

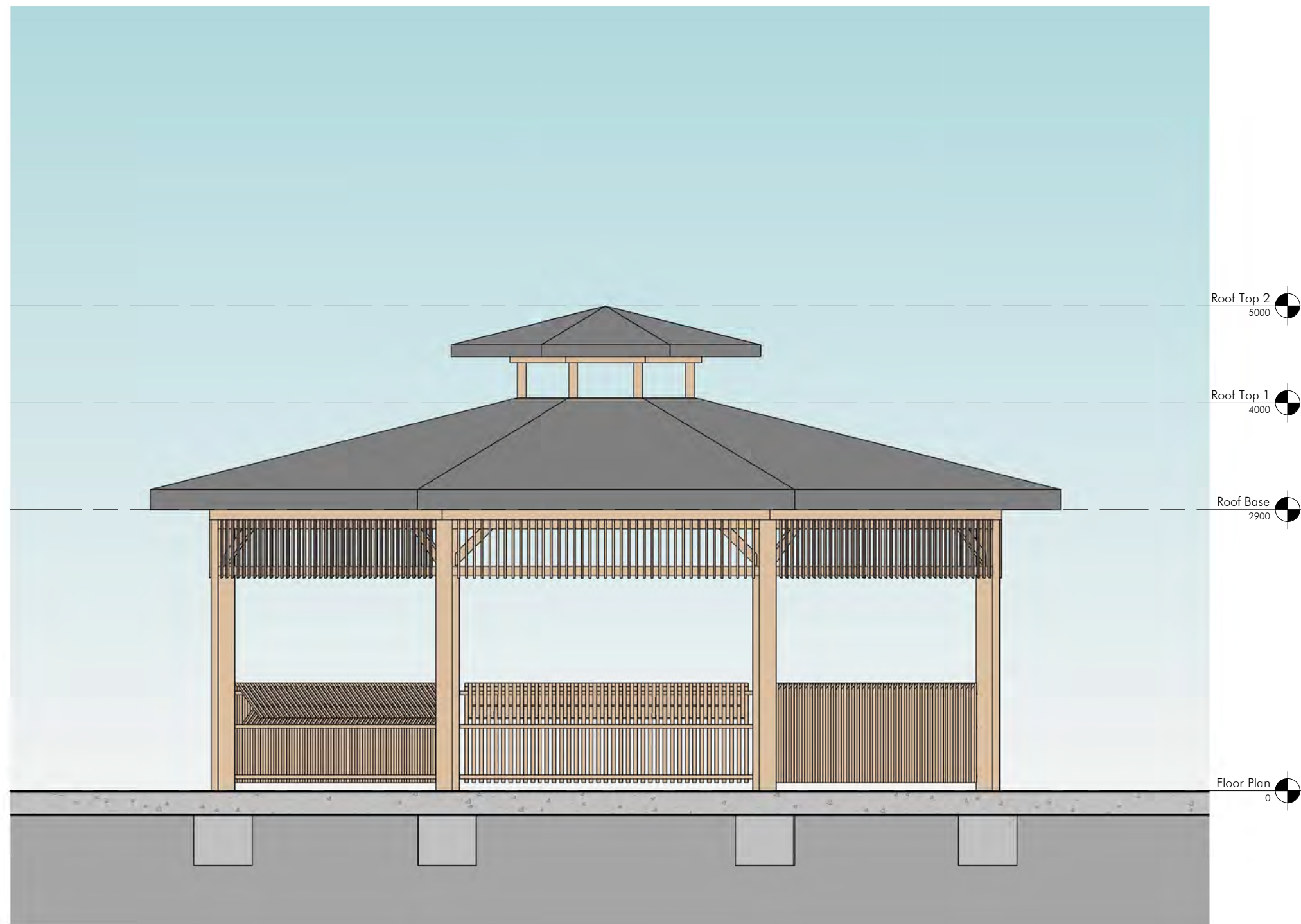


Interpretive Signage - Elevation  
1 : 50

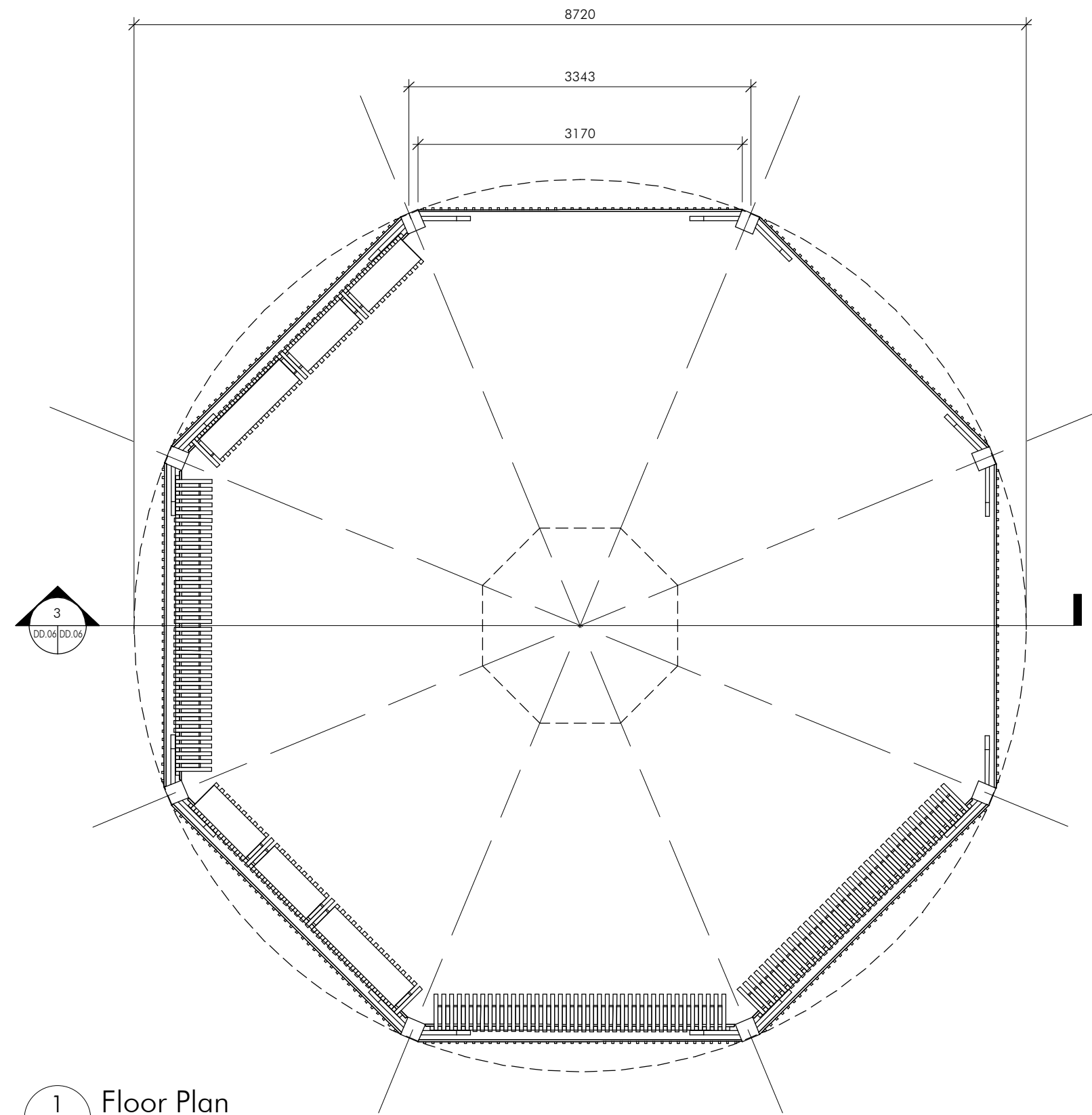


Longitudinal Section  
1 : 50

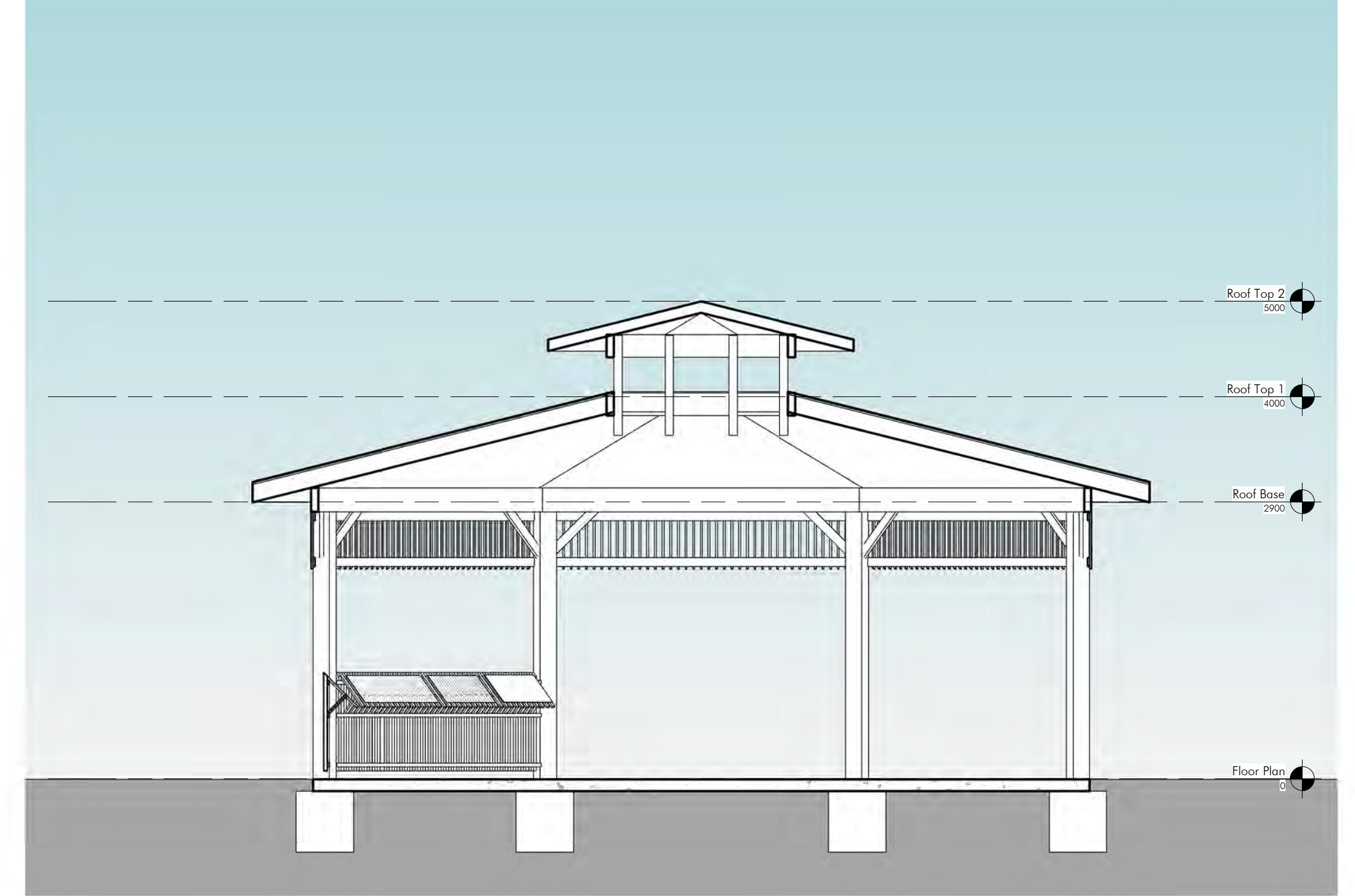




2 Elevation  
DD.06  
scale = 1 : 50



1 Floor Plan  
DD.06 DD.07 DD.08  
scale = 1 : 50



3 Section 1  
DD.06 DD.07 DD.08  
scale = 1 : 50







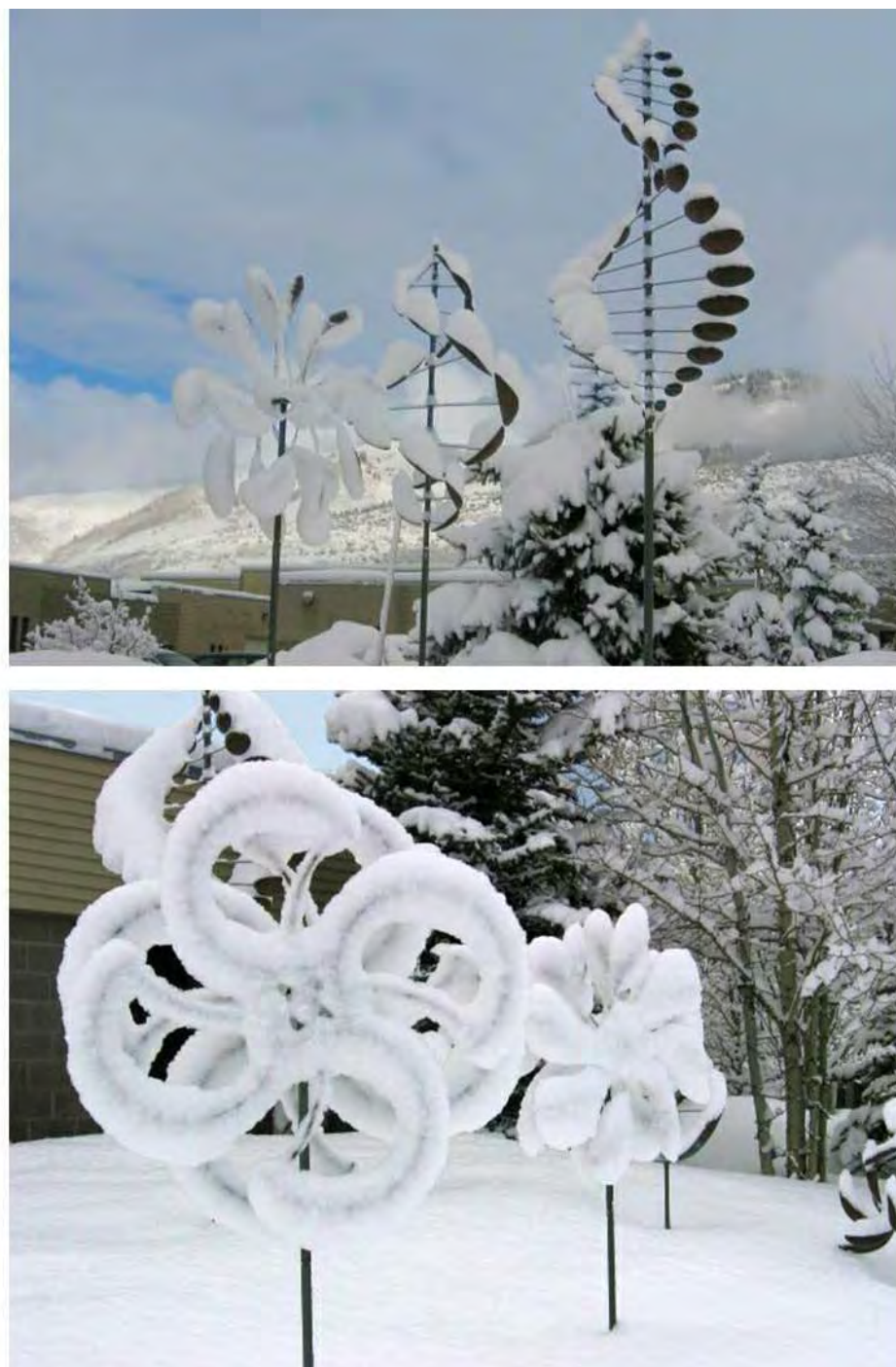
Kinetic Wind Sculptures by Anthony Howe - Orcas Island, USA



Aeolian Harp by Geoffrey Stinton - Arundel Castle - England



Kinetic Sculpture by Lyman Whitaker - Wilkeson Pointe, Buffalo USA





**TERRACE BAY WATERFRONT PROJECT - PHASE ONE**  
**CLASS 'C' CAPITAL COST WORKSHEET**

No	Description	Qty	Unit	Rate	Total
1	Gazebo				
	Foundation and Base	54	SM	\$350	\$18,900
	Structure and Framing	54	SM	\$170	\$9,180
	Roof Structure and Finishes	60	SM	\$260	\$15,600
	Finishing	54	SM	\$80	\$4,320
	Sub-Total #1				<u>\$48,000</u>
2	Beach Pavillion				
	Site Preparation	473.75	SM	\$25	\$11,844
	Foundation / Concrete Slab	394	SM	\$66	\$26,004
	Exterior Walls w/ finishes	390	SM	\$245	\$95,550
	Roof Structure w/ finish	642	SM	\$260	\$166,920
	Interior Wall Assemblies	146	SM	\$180	\$26,280
	Doors	9	per	\$2,800	\$25,200
	Windows	5.64	SM	\$750	\$4,230
	Millwork and Accessories	5	LM	\$1,200	\$6,000
	Interior Finishes	379	SM	\$40	\$15,160
	Exterior Furnishings	1	LS	\$39,000	\$39,000
	Electrical (AGE)	1	LS	\$42,500	\$42,500
	Mechanical (Cuthbertson)	1	LS	\$65,000	\$65,000
	Sub-Total #2				<u>\$523,688</u>
3	Kayak Storage, Racks, Lockers				
	Storage Structures	2	ea	\$12,500	\$25,000
	Sub-Total #3				<u>\$25,000</u>
4	Education Area				
	Interpretative Signge	7	ea	\$15,000	\$105,000
	Pay Parking Meter	1	ea	\$55,000	\$55,000
	Sub-Total #4				<u>\$160,000</u>
5	Wind Sculptures				
	Wind Sculptures (budget)	4	ea	\$20,000	\$80,000
	Sub-Total #5				<u>\$80,000</u>
6	Viewing Station				
	Viewing Stations w/ wind screens and chairs	2	ea	\$32,000	\$64,000
	Sub-Total #6				<u>\$64,000</u>
7	Civil / Roadworks / Parking (re: TGE Cost)				
	Watermain Extension (Option 1)	1	LS	\$499,950	\$499,950
	Asphalt Pedestrian Path - WF to CH	1	LS	\$130,124	\$130,124
	Asphalt Pedestrian Path (Option 1)	1	LS	\$210,463	\$210,463



**TERRACE BAY WATERFRONT PROJECT - PHASE ONE**  
**CLASS 'C' CAPITAL COST WORKSHEET**

No	Description	Qty	Unit	Rate	Total
	Parking Facilities (35 spcs)	1	LS	\$153,671	\$153,671
	Granular Access Road Upgrade w/pkg	1	LS	\$236,343	\$236,343
	Boardwalk	1	LS	\$246,363	\$246,363
	New Gravel Pathway	1	LS	\$5,344	\$5,344
	New Septic Field Installation	1	LS	\$35,000	\$35,000
	Sub-Total #7				<u>\$1,517,257</u>
8	Site Electrical (AGE)				
	Overhead Line Extension	1	LS	\$65,000	\$65,000
	Service at Pavillion	1	LS	\$20,000	\$20,000
	Roadway Lighting / 120V Distribution	1	LS	\$18,500	\$18,500
	Phone and Data Connections	1	LS	\$17,500	\$17,500
	Site Lighting	1	LS	\$100,000	\$100,000
	Sub-Total #8				<u>\$221,000</u>

**PROJECT COST SUMMARY**

	Totals
Gazebo	\$48,000
Beach Pavillion	\$523,688
- allowance for four season use	\$ 75,000
Kayak Storage, Racks, Lockers	\$25,000
Education Area	\$160,000
Wind Sculptures	\$80,000
Viewing Station	\$64,000
Civil / Roadworks / Parking (re: TGE Cost)	\$1,517,257
Site Electrical (AGE)	\$221,000
Sub-Total Construction:	\$2,713,945
Contingency (10%):	\$271,395
Total Construction:	\$2,985,340
Design and Soft Costs (15%):	\$447,800
Total Estimated Project Cost:	<u>\$3,433,140</u>





April 24, 2017

Project No. 16-095-52E

**VIA EMAIL:** ([john.s@formarchitecture.ca](mailto:john.s@formarchitecture.ca))

Mr. John Stephenson  
Managing Partner  
FORM Architecture Engineering  
131 N Court Street  
Thunder Bay, ON P7A 4V1

Dear Mr. Stephenson:

**Re: Terrace Bay Waterfront Project  
Detailed Design Drawings and Cost Estimate**

True Grit Engineering (TGE) was retained by FORM Architecture Engineering (FORM) to complete a conceptual design and cost estimate for the proposed waterfront project in the Township of Terrace Bay (Township), Ontario.

It is TGE's understanding that the new development is proposed at the waterfront area adjacent to Lake Superior at the south end of Terrace Bay. The area is within the Urban Settlement Area and is zoned as Waterfront Development according to the Township of Terrace Bay 2014-2034 Official Plan.

The purpose of this conceptual design and cost estimate is to provide the Township with a greater level of detail for the proposed major components for budgeting purposes. Background information, including zoning policies and by-laws, as provided by the Township, was reviewed to ensure compatibility with the proposed development. In addition, the *Terrace Bay Waterfront Development, Pre-Engineering Infrastructure Assessment and Cost Estimate*, True Grit Consulting Ltd., Project No. 14-602-01E, March 14, 2015, was utilized to support this assignment.

This report assists in the achievement of the minimum requirements set out by the Ministry of Environment and Climate Change (MOECC), the American Water Works Association (AWWA), and the Ontario Building Code (OBC). This report shall be read in conjunction with the attached drawings, which are included as part of this letter brief submission.

**Proposed Development**

The proposed development is expected to consist of a pavilion building, two parking lot facilities, one pedestrian bike path, and a boardwalk. The proposed building will be provided water supply and a septic field.

**Proposed Water Supply**

For commercial water demands, the estimation was conducted based on the associated Fixture Unit (FU) count for the proposed pavilion building. Based on the Fixture Unit (FU) count calculated and Figure 4-3 of the *AWWA Sizing Water Service Lines and Meters, Third Edition* (2014), the probable water demand is estimate to be 2.8 l/s. The minimum size of water service shall be 25 mm  $\phi$  for the proposed pavilion building.

The required water supply for firefighting purposes for the proposed pavilion building is based on the building volume, type of construction and spatial separation. According to section A-3.2.5.7 of the OBC (2012), the required minimum water supply is 30 l/s.



Two options would be apparent to support the development:

*Option 1 – Watermain Extension (Potable water supply)*

Extend the watermain from the existing water supply system within Lakeview Drive south approximately 1270 metres to the proposed development located adjacent to Lake Superior. See the attached Drawing No. 1 for location of proposed watermain, valves and fire hydrants.

As part of the watermain extension, the dead-end system will require additional infrastructure until a looped system can be provided to ensure water quality is achieved. This may include a valve chamber with air release, drain line and backflow preventer. The municipality shall implement a monitored flushing program to ensure water quality standards are achieved as per the Drinking Water System Regulation (O. Reg. 170/03) under the Safe Drinking Water Act 2002. An automatic flushing hydrant may be used to monitor water quality of the dead-end system and be programmed to flush on a scheduled sequence to eliminate the presence of stagnant water.

The extension of the watermain needs to consider the availability of water pressure. For future development, the proposed watermain shall connect to a suitable size main. During detail design, more due diligence and investigation shall be performed. For budgetary purposes, the proposed 200 mm Ø watermain shall connect the existing 200 mm Ø watermain on Lakeview Drive.

*Option 2 – Well System (Non-potable/potable water supply)*

One drilled well to provide the pavilion building with non-potable water supply. The drilled well will require a treatment system for clean potable water for the pavilion building. It should be noted that the well system does not have the capacity to provide water supply for firefighting purposes. It is TGE's understanding that the pavilion building is scheduled for seasonal use only; therefore, according to section A-3.2.5.7 of the OBC (2012), buildings not serviced by a municipal water supply system may be natural or man-made. Lake Superior is located adjacent to the pavilion building and may serve as natural water supply for firefighting purposes. On-site water storage is required for firefighting purposes if the pavilion building is used year-round. The capacity of the on-site water storage system is estimated to be approximately 54,000 litres.

**Proposed Septic System**

The septic system will be located north of the pavilion building. The septic system will be designed for 200 people. Using 20 L/person/day for Public Parks according to the Table 8.2.1.3.B of the OBC (2012), the daily design flow for the septic system is 4,000 L/d. The septic system will consist of a 12,000 L septic tank, a 1,125 L pump tank with one or two pumps, and a 20 m × 10 m leaching field. The leaching field was sized based on a soil percolation time (T-time) of 5 min/cm, which was evaluated by two soil samples obtained near the proposed field location. The leaching field will consist of a 100 mm Ø header pipe and 5 runs of 20 m Infiltrator Chambers (a total of 100 m), and will be an in-ground field based on the groundwater table information obtained from a preliminary geotechnical investigation completed at the end of May, 2013.



### **Proposed Pedestrian Path**

A three (3) metre asphalt pedestrian path is proposed to provide accessibility to the proposed waterfront development. The path will extend north from the waterfront approximately 895 metres along the west side of Beach Road until it reaches the existing Aquasabon Clubhouse. From this location, two options for the alignment would be feasible:

#### *Option 1 – Aquasabon Clubhouse to Kenogami Road*

Extend the pedestrian path northeast approximately 870 metres along the north side of Beach Road to Kenogami Road. This alignment will require a significant cut into the embankment along the north side of Beach Road to accommodate the proposed pedestrian path.

#### *Option 2 – Aquasabon Clubhouse to Lakeview Drive*

Extend the pedestrian path north approximately 340 metres through an existing access road to Lakeview Drive. This alignment will be required to overcome a significant grade change.

### **Proposed Board Walk**

A board walk is proposed to connect the two (2) proposed parking lot facilities and to provide access to the beach. The board walk will be approximately 350 metres and will border the north end of the beach. The east portion of the boardwalk after the new gazebo will transition to a gravel pathway for approximately 60 metres. Two new red chairs will be located at the end of the proposed gravel pathway.

### **Proposed Parking Lot Facilities**

The proposed waterfront development will be provided with two (2) parking lot facilities. The first parking lot facility will be located at the existing boat launch location and will provide a total of 24 parking stalls; 15 for large recreational vehicles and/or trailers and 9 for passenger sized vehicles. The second parking lot will consist of 40 – 90 degree on street parking stalls for passenger sized vehicles.

### **Proposed Road**

The existing gravel access road oriented in an east-to-west direction located north of the beach will be upgraded to a 6.0 meter wide asphalt roadway. The proposed asphalt access road will provide on street parking along the south side of the asphalt roadway. The roadway will terminate with a snowplow turn-around at the eastern limits of development.



### Limitation and Caveats

- Additional survey data is required for the proposed pedestrian path alignments (options 1 and 2) to confirm feasibility.
- During detailed design, the existing water distribution system requires investigation to ensure the demands generated by the proposed development can be achieved.
- The conceptual design proposes a dead end system for the watermain. A flushing program is required to meet water quality standards in accordance with Drinking Water Systems Regulation (O. Reg. 170/03) under the Safe Drinking Water Act 2002.
- The *Well System* option for water supply is for seasonal use only. On-site water storage is required for firefighting purposes if the pavilion building is used year-round. The capacity of the on-site water storage system is estimated to be approximately 54,000 litres.
- The attached cost estimate is based on conceptual design and shall be considered Class C. Quantities are subject to change during detailed design. The cost estimate does not include mobilization/demobilization or contingency for civil works.

## Closure

The information and data contained in this report, including without limitation, the results of any assessment, sampling and analyses conducted by TGE pursuant to its Agreement with the client, have been developed or obtained through the exercise of TGE's professional judgment and are set forth to the best of TGE's knowledge, information and belief. Although efforts have been made to confirm that this information is factual, complete and accurate, TGE makes no guarantees or warranties whatsoever, whether expressed or implied, with respect to such information or data.

The information and data presented in this report are based on the purpose and scope of the project and form the basis for any conclusions and recommendations presented herein. Any conclusions and recommendations presented herein do not preclude the existence of environmental or engineering concerns other than those that may have been identified.

Work performed by TGE personnel employed sound engineering principles. TGE cannot guarantee the accuracy and reliability of information provided by others or third parties. Therefore, TGE does not claim responsibility for undisclosed concerns or conditions that may result in costs for exceedances and/or remediation. This report is intended for information purposes only.

Sincerely,

**TRUE GRIT ENGINEERING**



Luke Viljakainen, B. Eng.  
Engineer-in-Training  
[lviljakainen@truegriteng.com](mailto:lviljakainen@truegriteng.com)



Adam Rose, P. Eng.  
Principal/Manager of Engineering  
[arose@truegriteng.com](mailto:arose@truegriteng.com)

LV/AR:sd

Enclosures:      Drawing Set  
                         Cost Estimate





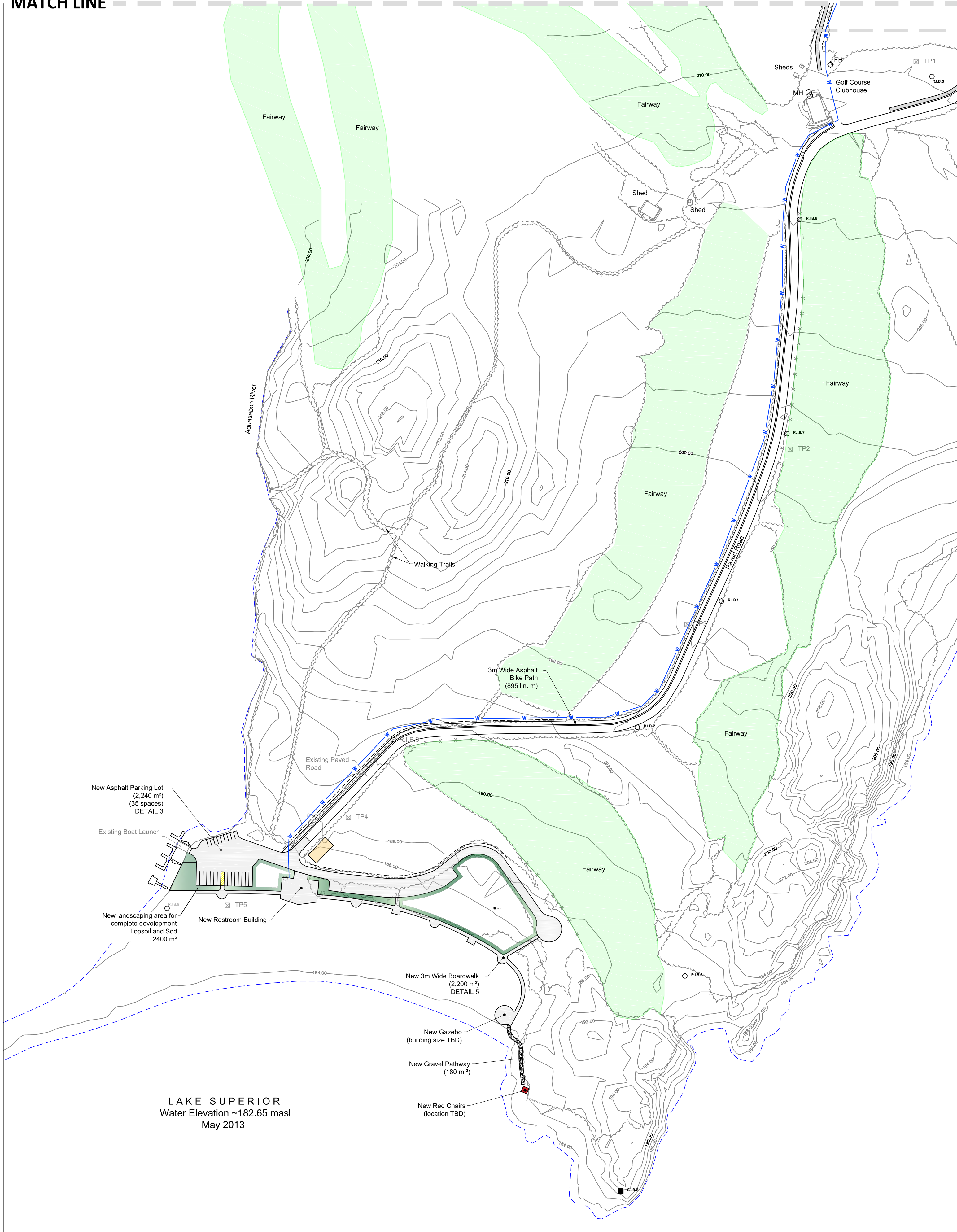
## Drawing Set

1263 Innovation Drive, Thunder Bay, ON, P7B 0A2  
Tel: (807) 626-5640 | Fax: (807) 623-5690

[www.truegriteng.com](http://www.truegriteng.com)



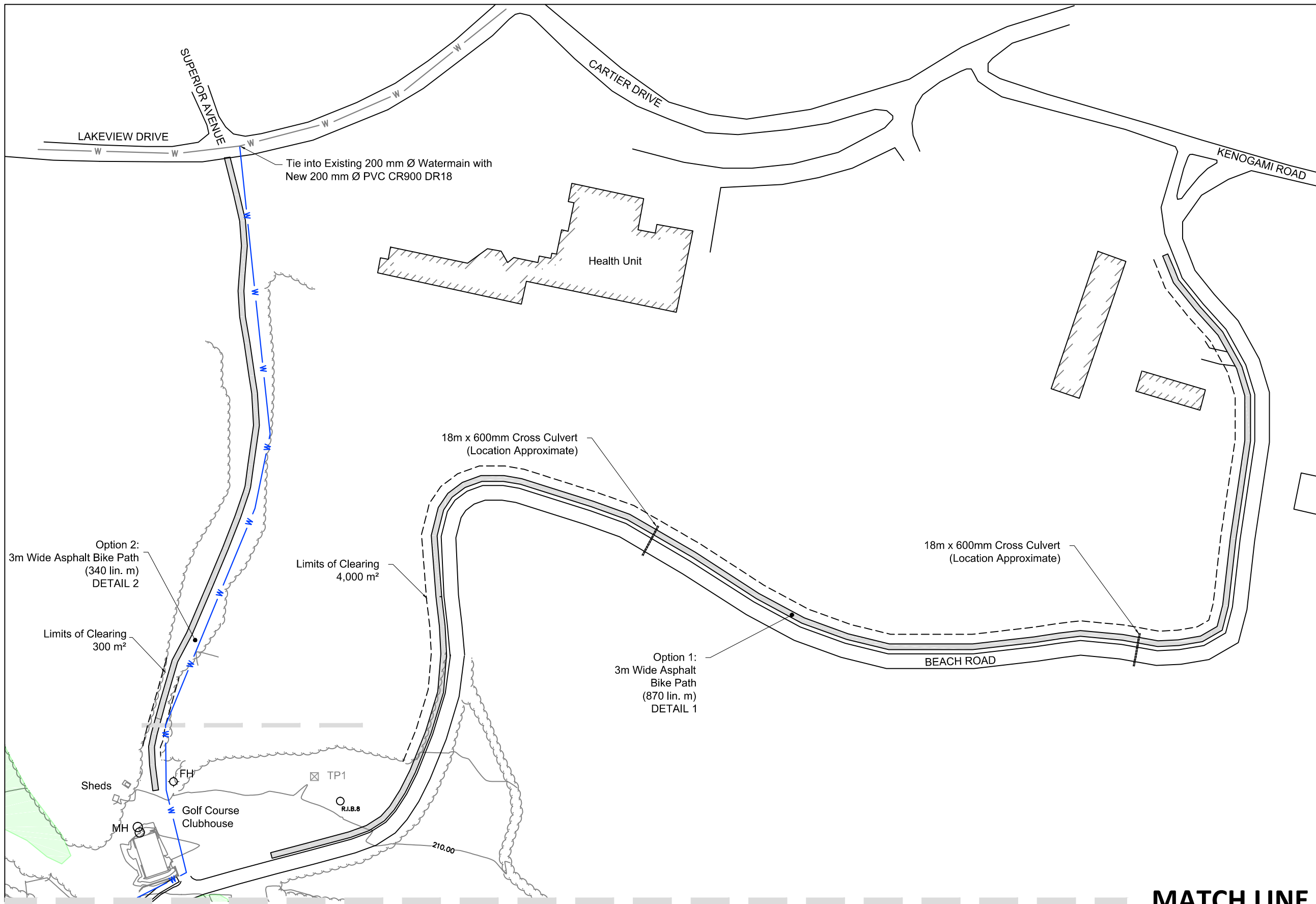
MATCH LINE



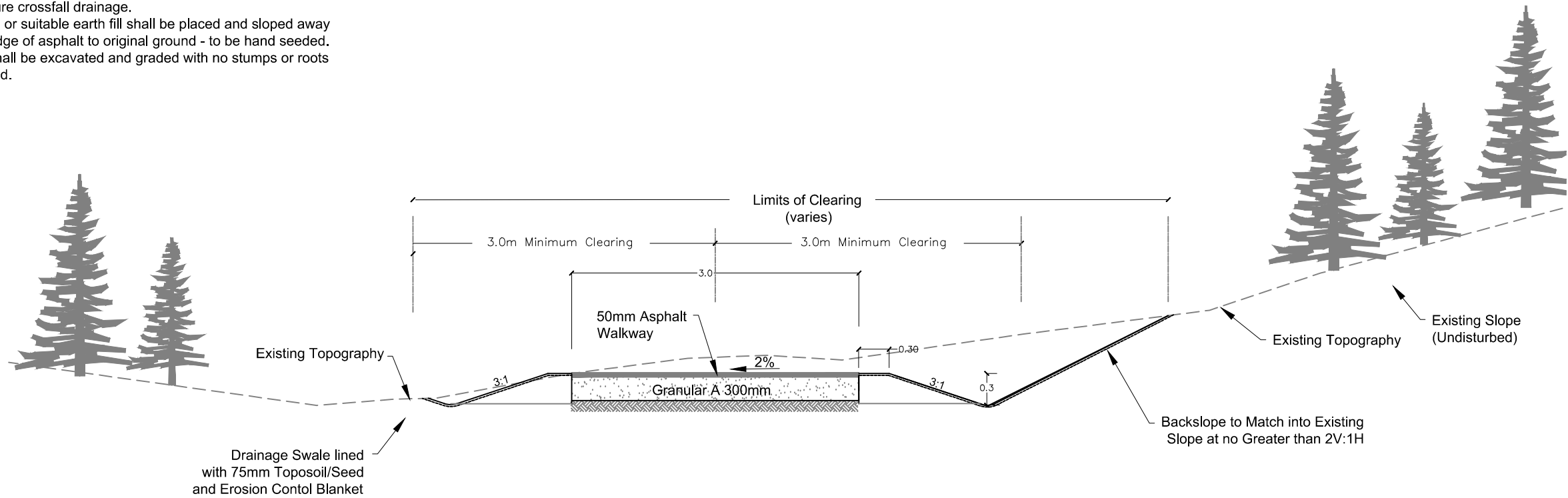
LAKE SUPERIOR  
Water Elevation ~182.65 masl  
May 2013

SEE CONSTRUCTION NOTES:

1. Top of asphalt to be a minimum of 50mm above original ground to ensure crossfall drainage.
2. Topsoil or suitable earth fill shall be placed and sloped away from edge of asphalt to original ground - to be hand seeded.
3. Cuts shall be excavated and graded with no stumps or roots exposed.



DETAIL 1 - Asphalt Walkway - Beach Road  
Typical - N.T.S.



DETAIL 2 - Asphalt Walkway - North of Clubhouse  
Typical - N.T.S.

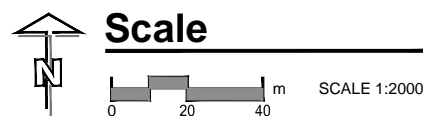
LEGEND

	Surveyed Shoreline
	Approximate Shoreline (derived from Aerial photography)
	Treeline
	Fenceline
	TP1
	Test Pit Location
	Round Iron Bar (Temporary Control Point)
	Standard Iron Bar (Found)

Benchmark Data Table

RIB1	Northing : 5402284.830m Easting : 491853.439m Elevation : 198.517m
RIB2	Northing : 5402177.148m Easting : 491781.575m Elevation : 196.332m
RIB3	Northing : 5402166.722m Easting : 491572.767m Elevation : 190.841m
RIB4	Northing : 5402051.788m Easting : 491477.245m Elevation : 185.687m
RIB5	Northing : 5401964.645m Easting : 491822.193m Elevation : 188.850m
RIB6	Northing : 5402610.915m Easting : 491920.229m Elevation : 206.045m
RIB7	Northing : 5402427.933m Easting : 491909.272m Elevation : 201.581m
RIB8	Northing : 5402732.970m Easting : 492033.190m Elevation : 210.300m
RIB9	Northing : 5402022.396m Easting : 491378.834m Elevation : 184.800m
SIB1	Northing : 5402022.370m Easting : 491659.533m Elevation : 187.833m
SIB2	Northing : 5401780.917m Easting : 491767.428m Elevation : 189.533m

Coordinates expressed in UTM NAD 83, Zone 16U and derived using information processed through the Canadian Spatial Reference System to provide geodetic reference values.



TRUE GRIT  
ENGINEERING

Prime Consultant

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DD.MM.YY	Issue/Revision/Description	Dwn	Chk	Des	Eng
10.11.16	Issued for Prelim. Cost Estimate	TR	CL	CL	AR
02.12.16	Issued for Cost Estimate	TR	CL	LV	AR
24.02.17	Issued as Final	TR	CL	LV	AR

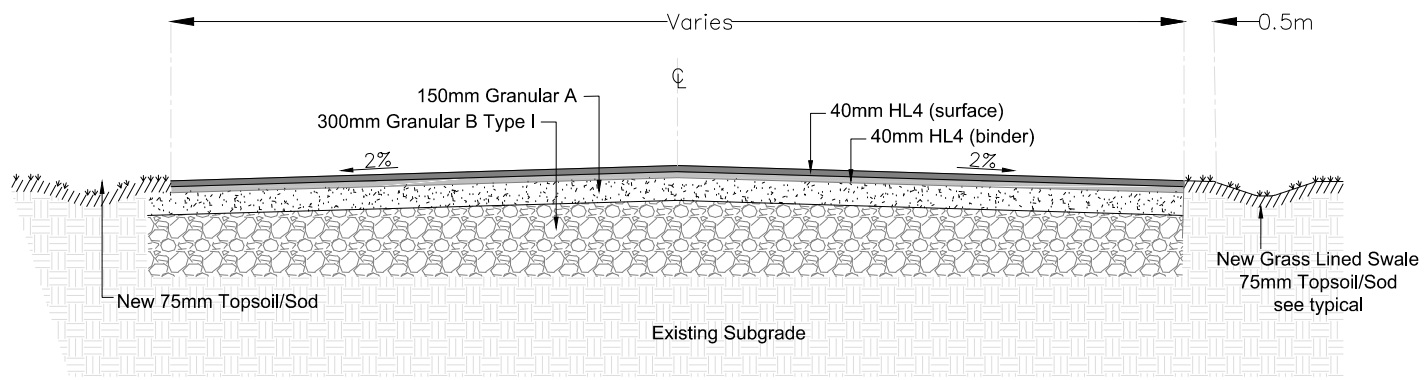
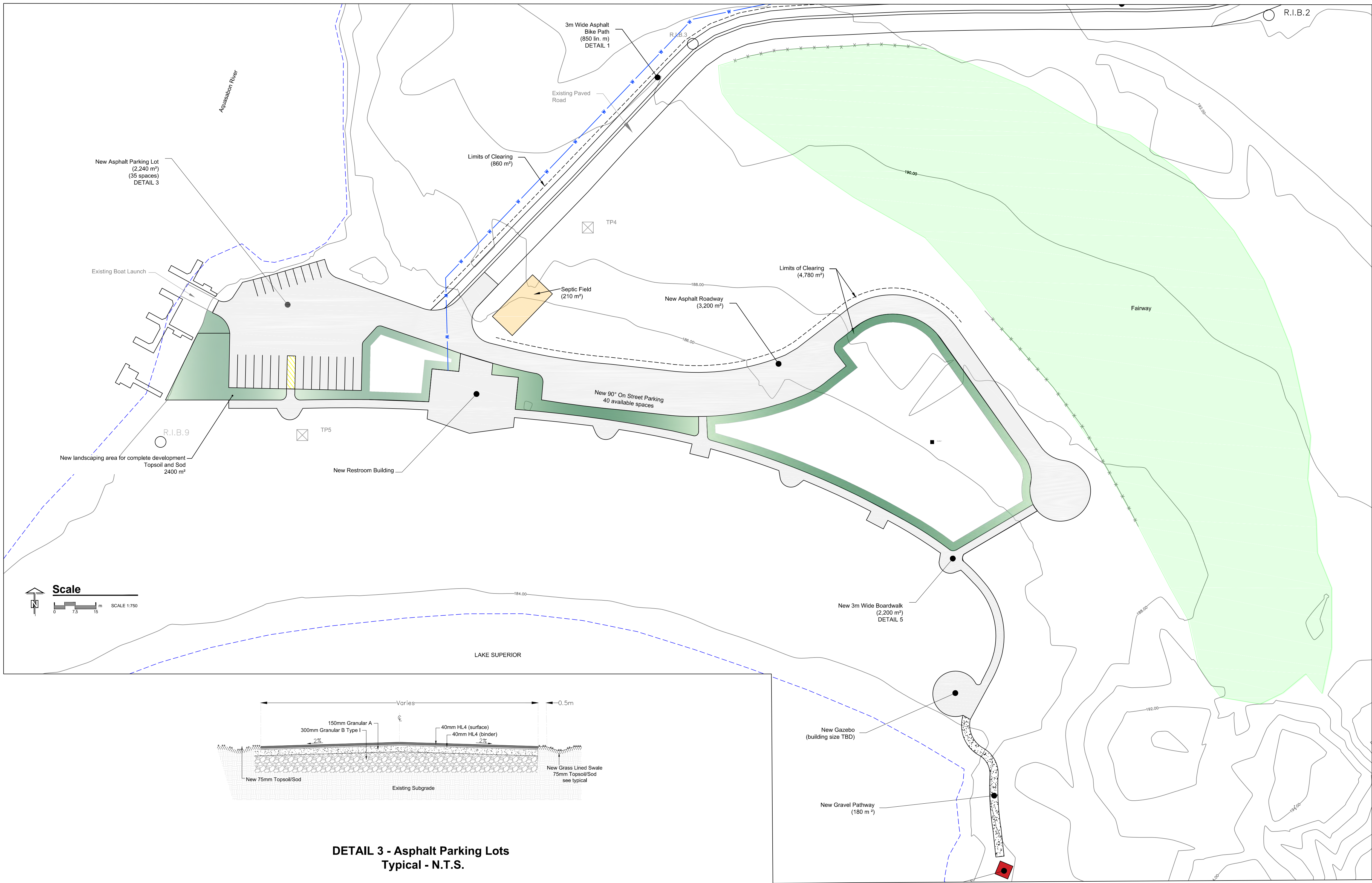
ELECTRONIC STAMP

FORM Architecture  
Terrace Bay Waterfront  
Conceptual Design & Costing

Site Layout & Conceptual  
Design

Project No. 16-095-52E	Drawing No. 01	Revision 03
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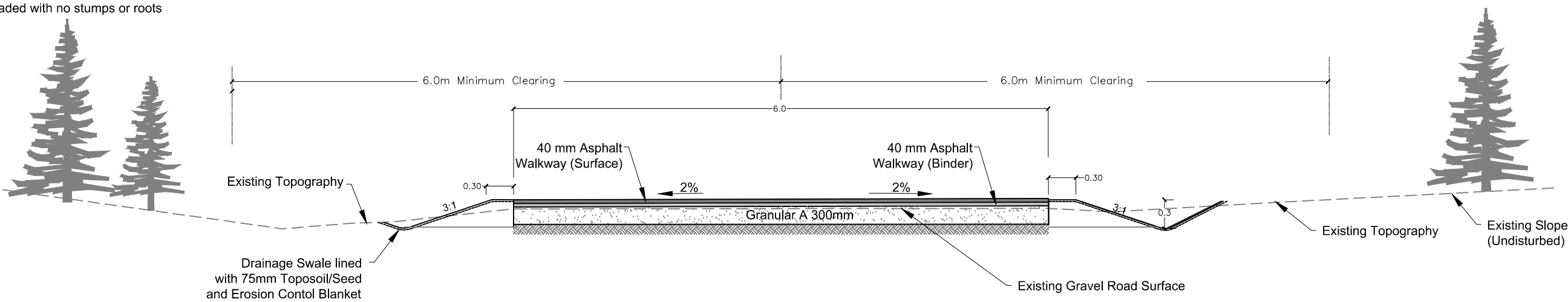




DETAIL 3 - Asphalt Parking Lots  
Typical - N.T.S.

SEE CONSTRUCTION NOTES:

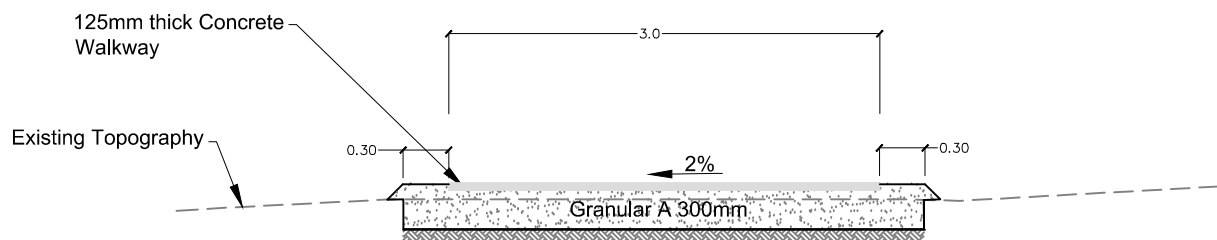
1. Top of asphalt to be a minimum of 100mm above original road surface to ensure crossfall drainage.
2. Topsoil or suitable earth fill shall be placed and sloped away from edge of asphalt to original ground - to be hand seeded.
3. Cuts shall be excavated and graded with no stumps or roots exposed.



DETAIL 4 - Granular Access Road Upgrade  
Typical - N.T.S.

SEE CONSTRUCTION NOTES:

1. Top of asphalt to be a minimum of 100mm above original ground to ensure crossfall drainage.



DETAIL 5 - Asphalt Beachfront Walkway  
Typical - N.T.S.

LEGEND	
	Surveyed Shoreline
	Approximate Shoreline (derived from Aerial photography)
	Treeline
	Fenceline
	TP1
	Test Pit Location
	Round Iron Bar (Temporary Control Point)
	Standard Iron Bar (Found)

Benchmark Data Table			
RIB1	Northing :	5402284.830m	
	Easting :	491853.439m	
	Elevation :	198.517m	
RIB2	Northing :	5402177.148m	
	Easting :	491781.575m	
	Elevation :	196.332m	
RIB3	Northing :	5402166.722m	
	Easting :	491572.767m	
	Elevation :	190.941m	
RIB4	Northing :	5402051.788m	
	Easting :	491477.245m	
	Elevation :	185.687m	
RIB5	Northing :	5401964.645m	
	Easting :	491822.193m	
	Elevation :	188.850m	
RIB6	Northing :	5402610.915m	
	Easting :	491920.229m	
	Elevation :	206.045m	
RIB7	Northing :	5402427.933m	
	Easting :	491909.272m	
	Elevation :	201.581m	
RIB8	Northing :	5402732.970m	
	Easting :	492033.190m	
	Elevation :	210.300m	
RIB9	Northing :	5402022.396m	
	Easting :	491378.834m	
	Elevation :	184.800m	
SIB1	Northing :	5402022.370m	
	Easting :	491659.533m	
	Elevation :	187.833m	
SIB2	Northing :	5401780.917m	
	Easting :	491767.428m	
	Elevation :	189.533m	

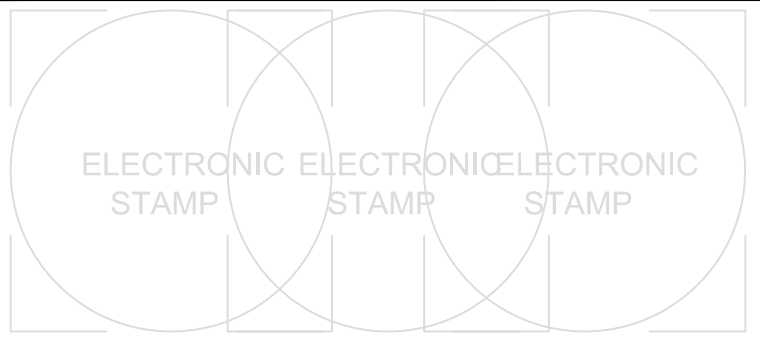
Coordinates expressed in UTM NAD 83, Zone 16U and derived using information processed through the Canadian Spatial Reference System to provide geodetic reference values.



Prime Consultant

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DD.MM.YY	Issue/Revision/Description	Drn	Chk	Des	Eng
10.11.16	Issued for Prelim. Cost Estimate	TR	CL	CL	AR
02.12.16	Issued for Cost Estimate	TR	CL	LV	AR
24.02.17	Issued as Final	TR	CL	LV	AR



FORM Architecture  
Terrace Bay Waterfront  
Conceptual Design & Costing

**Beach Front Conceptual  
Development & Details**

Project No.	Drawing No.	Revision
16-095-52E	02	03



## Cost Estimate



Terrace Bay Waterfront - Conceptual Costing					
Item	Description	Unit	Quantity	Unit Price	Total
<b>Section A - Water Supply</b>					
<b>Option 1: Watermain Extension (Waterfront to Lakeview Drive)</b>					
A.01	200 mm PVC C900 DR18	M	1270.00	\$ 300.00	\$ 381,000.00
A.02	Fire Hydrant with Gate Valve and Appurtenances	EA	8	\$ 10,000.00	\$ 80,000.00
A.03	200 mm Gate Valve	EA	5	\$ 4,500.00	\$ 22,500.00
A.04	Connection at Existing Watermain	EA	1	\$ 2,000.00	\$ 2,000.00
A.05	Flushing and Disinfection to Watermain	EA	1	\$ 2,500.00	\$ 2,500.00
A.06	Mechanical Joint End Cap	EA	1	\$ 750.00	\$ 750.00
A.07	25 mm Water Service for Pavillion	M	20.0	\$ 60.00	\$ 1,200.00
A.08	Watermain Dead-End Distribution System Apparatus	EA	1	\$ 10,000.00	\$ 10,000.00
<b>Total</b>					<b>\$ 499,950.00</b>
<b>Option 2: Well System (Adjacent to New Restroom Building)</b>					
A.09	New Well Installed (No Treatment)	EA	1	\$ 20,000.00	\$ 20,000.00
A.10	Storage Tank for Fire Protection	EA	1	\$ 68,000.00	\$ 68,000.00
<b>Total</b>					<b>\$ 88,000.00</b>
<b>Section B - Asphalt Pedestrian Path</b>					
<b>Waterfront to Aquasabon Clubhouse</b>					
B.01	Earth Excavation	M3	1200.00	\$ 15.00	\$ 18,000.00
B.02	Granular A (300 mm depth)	T	1691.55	\$ 35.00	\$ 59,204.25
B.03	Hot Mix Asphalt - HL4 (50 mm lift)	T	328.91	\$ 120.00	\$ 39,469.50
B.04	Grading for Roadside Ditch	M	895.00	\$ 10.00	\$ 8,950.00
B.05	Clearing and Grubbing	M2	300.00	\$ 15.00	\$ 4,500.00
<b>Total</b>					<b>\$ 130,123.75</b>
<b>Option 1: Aquasabon Clubhouse to Kenogami Road via Beach Road</b>					
B.06	Earth Excavation	M3	2523.00	\$ 15.00	\$ 37,845.00
B.07	Granular A (300 mm depth)	T	1644.30	\$ 35.00	\$ 57,550.50
B.08	Hot Mix Asphalt - HL4 (50 mm lift)	T	319.73	\$ 120.00	\$ 38,367.00
B.09	Grading for Roadside Ditch	M	870.00	\$ 10.00	\$ 8,700.00
B.10	600 mm CSP Culverts	M	32.00	\$ 350.00	\$ 11,200.00
B.11	Clearing and Grubbing	M2	4000.00	\$ 15.00	\$ 60,000.00
<b>Total</b>					<b>\$ 213,662.50</b>
<b>Option 2: Aquasabon Clubhouse to Lakeview Drive</b>					
B.12	Earth Excavation	M3	646.00	\$ 15.00	\$ 9,690.00
B.13	Granular A (300 mm depth)	T	642.60	\$ 35.00	\$ 22,491.00
B.14	Hot Mix Asphalt - HL4 (50 mm lift)	T	124.95	\$ 120.00	\$ 14,994.00
B.15	Grading for Roadside Ditch	M	680.00	\$ 10.00	\$ 6,800.00
B.16	Clearing and Grubbing	M2	300.00	\$ 15.00	\$ 4,500.00
<b>Total</b>					<b>\$ 58,475.00</b>
<b>Section C - Parking Lot Facilities (24 Spaces)</b>					
C.01	Earth Excavation	M3	1008.0	\$ 15.00	\$ 15,120.00
C.02	Granular B - Type 1 (300 mm depth)	T	1344.0	\$ 25.00	\$ 33,600.00
C.03	Granular A (150 mm depth)	T	705.6	\$ 35.00	\$ 24,696.00
C.04	Hot Mix Asphalt - HL4 (80 mm depth)	T	439.0	\$ 120.00	\$ 52,684.80
C.05	Line Painting	M	300.0	\$ 4.00	\$ 1,200.00
C.06	Clearing and Grubbing	M2	1758.0	\$ 15.00	\$ 26,370.00
<b>Total</b>					<b>\$ 153,670.80</b>
<b>Section D - Granular Access Road Upgrade with On Street Parking (40 Spaces)</b>					
D.01	Earth Excavation	M3	1584.00	\$ 15.00	\$ 23,760.00
D.02	Clearing and Grubbing	M2	4780.00	\$ 15.00	\$ 71,700.00
D.03	Granular A (300 mm depth)	T	2350.64	\$ 35.00	\$ 82,272.23
D.04	Hot Mix Asphalt - HL4 (80 mm depth)	T	431.20	\$ 120.00	\$ 51,744.00
D.05	Line Painting	M	250.00	\$ 4.00	\$ 1,000.00
D.06	Grading for Roadside Ditch	M	586.67	\$ 10.00	\$ 5,866.67
<b>Total</b>					<b>\$ 236,342.89</b>
<b>Section E - Boardwalk</b>					
E.01	Earth Excavation	M3	726.00	\$ 20.00	\$ 14,520.00
E.02	Granular A (300 mm depth)	T	1386.00	\$ 35.00	\$ 48,510.00
E.03	130 mm depth Concrete	M	733.33	\$ 250.00	\$ 183,333.33
<b>Total</b>					<b>\$ 246,363.33</b>
<b>Section F - New Gravel Pathway</b>					
F.01	Earth Excavation	M3	59.40	\$ 20.00	\$ 1,188.00
F.02	Granular A (300 mm depth)	T	113.40	\$ 15.00	\$ 1,701.00
F.03	Clearing and Grubbing	M2	163.64	\$ 15.00	\$ 2,454.55
<b>Total</b>					<b>\$ 5,343.55</b>
<b>Section G - Septic Field</b>					
G.01	New Septic Field Installed	EA	1.00	\$ 35,000.00	\$ 35,000.00
<b>Total</b>					<b>\$ 35,000.00</b>



## **Mechanical Design**

### **Description of HVAC system & HVAC Distribution**

#### **Design Criteria**

The design of the new facility will be carried out in accordance with requirements of the most recent applicable codes and standards including.

- Ontario Building Code, OBC 2012
- ASHRAE Guide and Data Book
- ASHRAE Standard 62 Ventilation for Acceptable Indoor Air Quality
- ASHRAE Standard 90.1 Energy Efficient Design of New Buildings
- Model National Energy Code of Canada for Buildings
- LEED Green Building principles

#### **Heating System**

As this building is a seasonal use facility (no winter use) there is no central heating system proposed for this facility.

We do recommend however that two (2) 1KW electric baseboard heaters, one in each washroom, be installed for supplemental heat on cooler days and during Spring/Fall operation. It should be noted that these proposed heaters would not provide enough heat for winter operation.

No heating of any kind is proposed for the remaining interior space.

#### **Ventilation/ Air Conditioning**

Two (3) 100 cfm ceiling type exhaust fans with associated ductwork to outdoors will be provided. One in each washroom. Fans shall be switched on/off with lights on motion sensors with run delay timers of approx 15 minutes following last person leaving.



### **Controls**

Electric baseboard heaters would be controlled by individual line voltage wall thermostats mounted in vandal-proof covers.

Exhaust fans would be controlled with lights.

### **Plumbing and Drainage**

#### **Design Criteria**

The design of the new facility will be carried out in accordance with requirements of the most recent applicable codes and standards including.

- Ontario Building Code, Part 7, OBC (Ontario Regulation 403/97), 2012
- Model National Energy Code of Canada for Buildings.

#### **Water Supply**

The facility will be serviced by a new domestic water feed. See Civil design for water service details. This water supply will include domestic water supply for water closet, urinal, lavatory and sink operation.

One (1) 6 gallon, 1.5kw electric hot water heater either wall mounted or under-counter will be provided for hot water provisions. Final mounting location to be determined.

#### **Sewage Disposal**

Sewage generated by the facility will be collected and piped by gravity via a building drain to the sanitary drainage system. For sanitary drainage system details, see Civil design.



### **Plumbing and Drainage Fixtures**



All plumbing fixtures will be low water consumption type in order to minimize the impact on the sewage disposal system, reduce water usage and meet the OBC.

All drains will be trapped and vented in accordance with the requirements of the OBC Part 7. Floor drain traps in all areas will be fitted with trap primers to prevent the migration of gasses into the building.

Two separate proposed plumbing fixture specification schedules are attached. One schedule utilizes all stainless steel type fixtures while the other utilizes more traditional commercial grade fixtures. **These include estimated equipment supply costs, but do not include installation costs.** These are provided to illustrate cost implications of upgrading to stainless steel fixtures for information purposed only.





PLUMBING FIXTURE SCHEDULE (Stainless Fixtures)

LOCATION	PRODUCTS		DESCRIPTION	ACCESSORIES	SAN	TRAP	HW	CW	NOTES/COMMENTS	COST	QTY	TOTAL
WC-1	Toilet		Acorn #2105-W-1-FV-HET-1.28, 'Dura-Ware', Toilet, stainless steel, elongated bowl. (CAD \$3,463.00)	Watts #ISCA-101-M11, mounted on concrete floor single horizontal, Adjustable Toilet Carrier. (CAD \$921.90)					Estimated Total:CAD \$4,384.90	\$4,384.90	3	\$13,154.70
WC-2	Toilet		Acorn #2105-W-1-FV-HET-1.28, 'Dura-Ware', Toilet, stainless steel, elongated bowl. (CAD \$3,463.00)	Watts #ISCA-101-M11, mounted on concrete floor single horizontal, Adjustable Toilet Carrier. (CAD \$921.90)					Estimated Total:CAD \$4,384.90	\$4,384.90	1	\$4,384.90
UR-1	Urinal		Acorn #1709HEU-1-W-FVL-0.5 GPF-ADA, 'Penal-Ware Series', Urinal, 14 GA. (1.9 mm) type 304 stainless steel seamless weld construction, wall hung. (CAD \$1,928.00)	Champion MI-HUB TR Coupling (CAD \$6.75)					Estimated Total:CAD \$1,934.75	\$1,934.75	1	\$1,934.75
LV-1A	Washfountain / Multi-Lav		Acorn #3701-1-H-DMJ Meridian UNI-BASIN) basin, off-floor, wall outlet, x x 730 mm (28-3/4"), stainless steel. (CAD \$4,687.00)	McGuire #LFH170BV, polished brass Faucet Supplies. (CAD \$36.04) Watts #CA-311, mounted on concrete floor, Fixture Carrier. (CAD \$308.70)					Estimated Total:CAD \$5,031.74	\$5,031.74	5	\$25,158.70
KS-1	Sink		Franke Commercial #LBD6408-1/1, Countertop Mount Sink.	Chicago Faucets #430-ABCP, Single Handle faucet, 5.7 LPM (1.5 GPM) pressure compensating Laminar Flow (non-aerating) outlet, Chicago Faucets #430-ABCP Single Handle Faucet, chrome plated, center hole only, ECAST construction lead free (equal or less than 0.25%) ECAST brass construction, volume control and Hot Water Limit Stop cartridge, 5.7 LPM (1.5 GPM) pressure compensating Laminar Flow (non-aerating) outlet, 241 mm (9-1/2") projection rigid cast brass spout, single metal lever handle.. Lawler #TMM-1070, Below Deck Mechanical Water Mixing Valve, integral checks. McGuire #LFH170BV, polished brass Faucet Supplies. McGuire #8912CB, P-Trap.					Estimated Total:CAD \$905.75	\$905.75	1	\$905.75

\$45,538.80



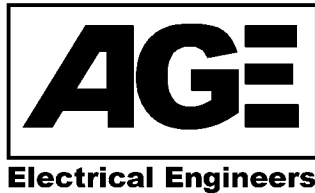
## PLUMBING FIXTURE SCHEDULE (Traditional Commercial)

LOCATION	PRODUCTS	DESCRIPTION	MATERIAL	ACCESSORIES	SAN	TRAP	HW	CW	NOTES/COMMENTS	COST	QTY	Total
WC-1	Toilet	 American Standard #3351.101.020, 'Atwall Millennium Flowise Elongated', Toilet, white Vitreous china, wall hung, operates in the range of 4.2 L to 6 L (1.1 US Gal to 1.6 US Gal) per flush, elongated bowl. (CAD \$325.00)		Centoco #500STSCC.001, Heavy Duty Toilet Seat, white solid plastic, open front WITH cover. (CAD \$34.79) Sloan #111-1.6-XL-CP, 'Regal', Exposed Manual Flushometer for Top Spud Toilet, 6 L (1.6 US Gal) factory set flow. (CAD \$142.03) Watts #ISCA-101-M11, mounted on concrete floor single horizontal, Adjustable Toilet Carrier. (CAD \$921.90) Champion MI-HUB TR-440 Coupling (CAD \$11.25)					Estimated Total:CAD \$1,434.97	\$1,434.97	3	\$4,304.91
WC-2	Toilet	American Standard #3351.101.020, 'Atwall Millennium Flowise Elongated', Toilet, white Vitreous china, wall hung, operates in the range of 4.2 L to 6 L (1.1 US Gal to 1.6 US Gal) per flush, elongated bowl. (CAD \$325.00)		Centoco #500STSCC.001, Heavy Duty Toilet Seat, white solid plastic, open front less cover. (CAD \$34.79) Sloan #111-1.6-XL-CP, 'Regal', Exposed Manual Flushometer for Top Spud Toilet, 6 L (1.6 US Gal) factory set flow. (CAD \$142.03) Watts #ISCA-101-M11, mounted on concrete floor single horizontal, Adjustable Toilet Carrier. (CAD \$921.90) Champion MI-HUB TR-440 Coupling (CAD \$11.25)					Estimated Total:CAD \$1,434.97	\$1,434.97	1	\$1,434.97
UR-1	Urinal	American Standard #6590.001, 'Washbrook Flowise', Urinal, vitreous china, operates in the range of 0.5 L to 3.8 L (0.125 US Gal to 1.0 US Gal) per flush, wall hung. #7301242-100 chrome plated, non-metallic strainer. (CAD \$411.00)		Sloan #186-1.0-XL, 'Regal', Exposed Manual Flushometer for Top Spud urinal, 3.8 L (1.0 US Gal) factory set flow. (CAD \$179.05) Watts #CA-321, mounted on concrete floor, Fixture Carrier. (CAD \$353.85) Watts #WUCO Urinal Wall Access Cleanout. (CAD \$136.50) Champion MI-HUB TR Coupling (CAD \$6.75)					Estimated Total:CAD \$1,087.15	\$1,087.15	1	\$1,087.15
LV-1	Basin	 Franke Commercial #WHB2221-7/1 'WHB Series' Basin. (CAD \$958.00)		Sloan #EPX-300-000-0040, 'BASYS', Electronic 'No Touch' faucet, Sloan BASYS #EPX-300-000-0040 Electronic 'No Touch' Faucet, chrome plated finish, center hole only, die cast body, integral water supply shut off. "Low" profile spout to minimizes the potential for vandalism, 147 mm (5-13/16") projection reach, 6VDC power requirement per unit, above access to key components including solenoid valve, water shut-off, battery canopy, active IR sensing, 0.5 GPM (1.9 LPM) multi-laminar, alkaline battery provided, box mount.. (CAD \$639.78) Lawler #TMM-1070, Below Deck Mechanical					Estimated Total:CAD \$2,245.78	\$2,245.78	5	\$11,228.90



KS-1	Sink		Franke Commercial #LBD6408-1/1, Countertop Mount Sink.	Chicago Faucets #430-ABCP, Single Handle faucet, 5.7 LPM (1.5 GPM) pressure compensating Laminar Flow (non-aerating) outlet, Chicago Faucets #430-ABCP Single Handle Faucet, chrome plated, center hole only, ECAST construction lead free (equal or less than 0.25%) ECAST brass construction, volume control and Hot Water Limit Stop cartridge, 5.7 LPM (1.5 GPM) pressure compensating Laminar Flow (non-aerating) outlet, 241 mm (9-1/2") projection rigid cast brass spout, single metal lever handle., Lawler #TMM-1070, Below Deck Mechanical Water Mixing Valve, integral checks. McGuire #LFH170BV, polished brass Faucet Supplies. McGuire #8912CB, P-Trap.						Estimated Total:CAD \$905.75	\$905.75	1	\$905.75
<b>\$18,961.68</b>													





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Thunder Bay, Ontario P7C 1B7  
Telephone: (807) 622-3654  
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John Stephenson, OAA, MRAIC

November 29, 2016

**FORM ARCHITECTURE ENGINEERING**

131 Court Street North  
Thunder Bay, ON P7A 4V1

Subject: Terrace Bay Beach Waterfront Phase 1 Electrical Report

We have been asked to review the Architectural conceptual plans and provide options for the electrical servicing, lighting of the pathways and roadways and service connection at the Pavilion. A brief description with costing will be provided for each component. We will also include Off-grid option which will limit the scope to the Pavilion and the boardwalk.

**Hydro Grid Connection**

There is currently only Single Phase Primary available in the area and the dead end pole is near the Golf Clubhouse. It is proposed to extend the primary along the paved road which is roughly 1km long. Setting poles at 75 meters to 100 meters apart is typical and an option is to locate roadway LED lighting on each pole or every second pole depending on the photometric design.

At the end of the Primary extension will be a new dead end pole located near the Pavilion. This new dead end pole will have a service transformer installed on it to provide a new service feeder to the Pavilion. Distribution will be located within the pavilion to run 120V power to the Pavilion Building, Boardwalk lighting, illuminated signage as well as parking lot lighting. Lighting options will be described in more detail.

**Costing**

Primary Overhead Line extension	\$65,000.00
Service at Pavilion	\$20,000.00
Roadway Lighting and 120V distribution	\$18,500.00

**Telephone and Data Connections**

We would make use of the new pole line entering the site and run either copper multi-pair telephone or a fibre optic line. This will most likely be at the discretion of the service provider, Bell Canada. In any case, the intent is to provide telephone and internet services





at the Pavilion Area and possible wireless access points. A wireless access point could be installed within the Pavilion Building with sufficient signal strength that visitors on the beach could obtain wireless internet access providing they are within the range of the antenna.

### Costing

Copper Multi-pair	\$5,000.00
Fibre Optic Cable	\$10,000.00
Wireless access point at Pavilion	\$2,500.00

### Lighting Option

#### Roadway

The Main access road as previously noted could be illuminated using standard LED Roadway (Cobra head) style fixtures. Although less aesthetically pleasing, they offer a low cost effective way to light up the roadway to make it safe for vehicle passage as well as pedestrians. An alternative to this approach is a lower level pole lighting option and install concrete bases every 12 to 15 meters and install 4 meter tall poles with LED lighting. Power for this lighting option would most likely be buried secondary feeds run along the side of the road.

#### Parking lots near beach

The two parking lots near the Pavilion will be illuminated as typical Parking lots would be. A standard concrete base with 10 meter poles complete with LED flood light would be provided. The larger parking lot would see about 4 lighting standards and the smaller one would see 2. Some roadway lighting connecting the lots would need to be installed and the same pole/light would be used.

#### Boardwalk Lighting

Low level vandal resistant bollard style lighting would be proposed for this walkway. Lighting would be about 1.5 meters high and have an LED source. These bollards could be spaced at 10 meters apart but exact distances would be based on selection of fixture and photometric data at time of design. Each bollard would be mounted on a concrete base.





### Costing

Alternate Roadway lighting	\$50,000
Parking Lot Lighting	\$20,000
Boardwalk Lighting	\$30,000

### **Pavilion Building**

The Pavilion would be provided with a 200A service, general interior and exterior lighting as needed. Adequate service will need to be provided for events that require power for outdoor shows and concerts. Washrooms will be installed complete with lighting and electric heaters as well as electric fired hot water tanks. All lighting for the interior as well as the exterior will be vandal resistant LED. Power for all parking lot lighting and boardwalk lighting will be fed from the Pavilion building. There is a proposed illuminated sign to be powered from the Pavilion distribution.

### Costing

Electrical panels and connections	\$20,000
General Lighting	\$15,000
Power for general receptacles and mech loads	\$7,500

### **Alternative Energy Option**

Options exist to provide off-grid power for the pavilion building with some limited amounts of site lighting including the boardwalk and some way finding low level lighting around the smaller parking lot. Solar and wind are an options but need to be supplemented by a standby generator capable of carrying the entire load of the building and site lighting.

Based on the building loading a 10kW PV system and a small 3kW wind turbine would be appropriate. During the day the PV Panels will charge the battery bank and in the evening or cloudy days the wind turbine could top up the batteries. During significant load events like a large gathering or outdoor concert, the standby generator will most likely be needed to supplement to load. The Generator size will be in the range of 30kW's and be self-contained with a sub-base fuel tank.





### Costing

30kW Diesel Generator and distribution	\$60,000
10kW PV System w/ stand or tracker(s)	\$60,000
Battery Bank	\$10,000
3kW vertical axis wind turbine w/foundation	\$10,000

Space in the Pavilion would be required to house the batteries and a well ventilated room of 8'x5' would be required. Batteries will only have a 10 year life at the most so the ongoing maintenance costs will need to be accounted for. Another point to be mindful of is that with the off-grid option there will be no internet services at the beach.

If you have any questions about this report please contact me directly.

Sincerely,

A handwritten signature in black ink, appearing to be 'AG' with a long, sweeping underline.

**Anthony Gazzola, P.Eng, PE, LEED® AP, [Partner](#)**

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**AG ENGINEERING**