Lake Michigan "Riprap" Projects

Reed Gaedtke – Manitowoc County Code Administrator

Kathi Kramasz – DNR Waterway and Wetland Specialist

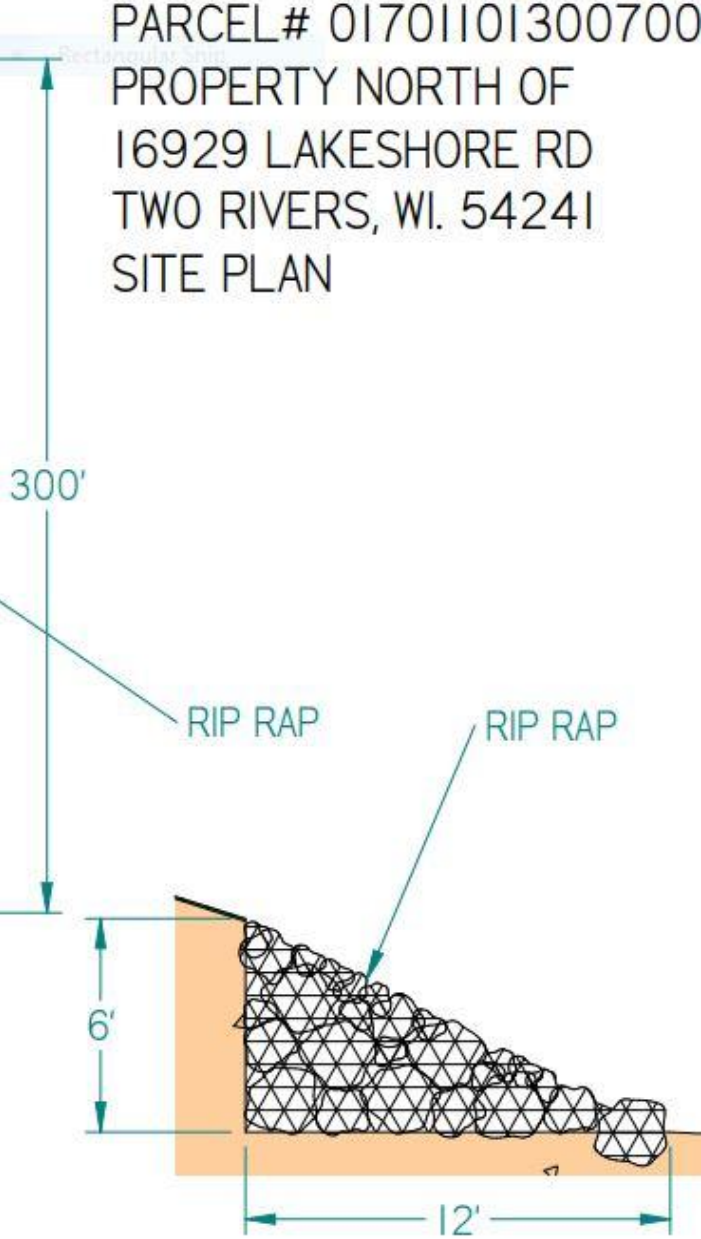
Three different DNR applications/projects

1. McHugh North – 300’
2. McHugh South – 600’
3. Mansukhani - 750’

Three ways DNR can approve Shore Protection Projects

1. Exemption
2. General Permit
3. Individual Permit

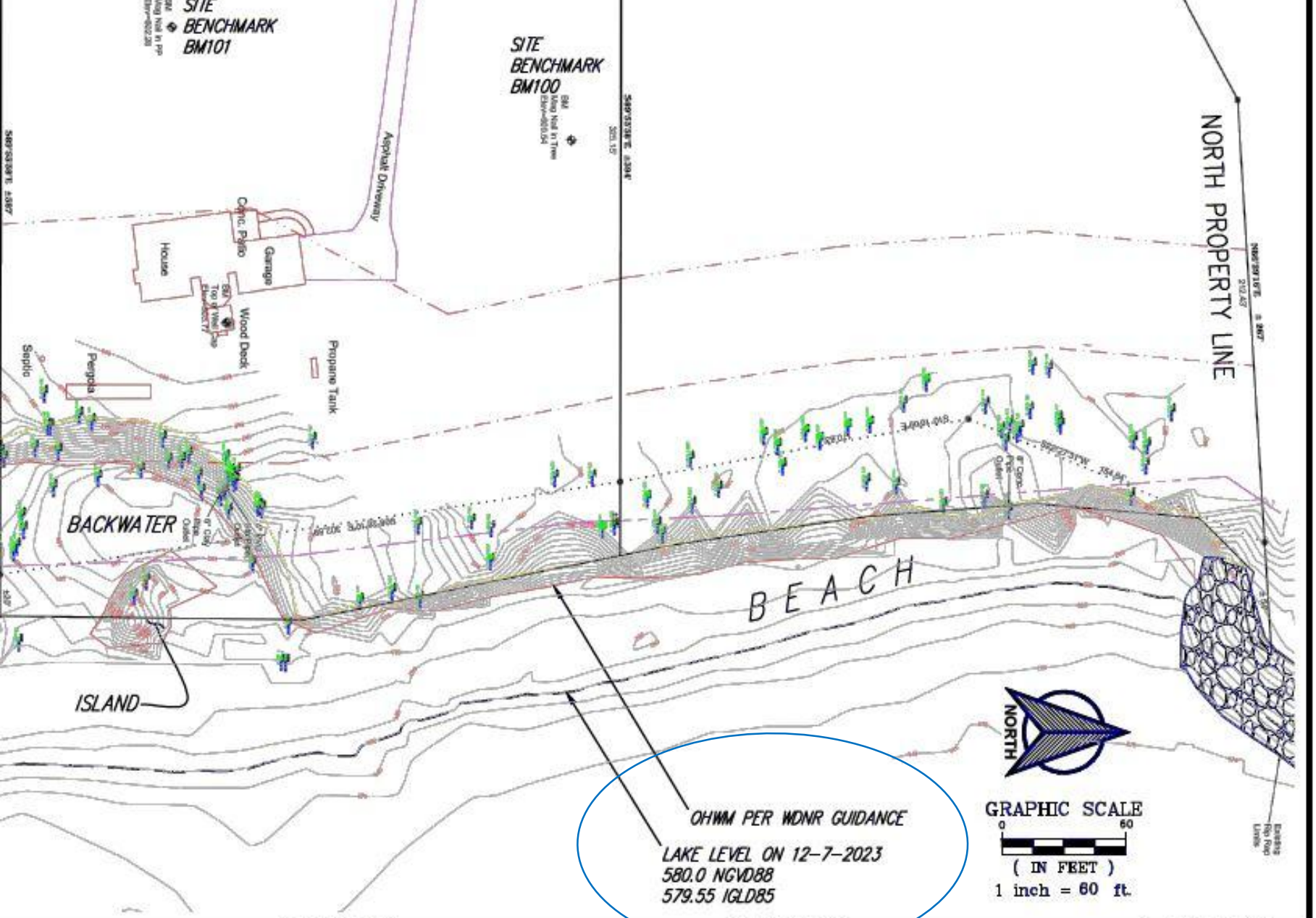
PARCEL# 0170110130070O
PROPERTY NORTH OF
16929 LAKESHORE RD
TWO RIVERS, WI. 54241
SITE PLAN



First Step Determining Jurisdiction

1. DNR regulates from OHWM waterward
2. County regulates from OHWM landward


Set OHWM at
neighboring property



LUFF REMEDIATION AND SHORE PROTECTION IMPROVEMENTS	SHEET NAME: BLUFF AND SHORE TOPOGRAPHY AND NEAR SHORE BATHYMETRY	PLAN DATE: 1/15/2024	TAMCOR, LTD. 740 WATERS EDGE ROAD RACINE, WISCONSIN 53402 www.tamcorconsulting.com PHONE: 847-404-1868 ©	PROJECT NO. 23925 SHEET 3 OF 11

Date: July 18, 2023

Owner:
John McHugh
16929 Lakeshore Rd
Two Rivers, WI. 54241

Project Location:
Parcel# 01701101300700
North of 16929 Lakeshore Rd.
Two Rivers, WI. 54241

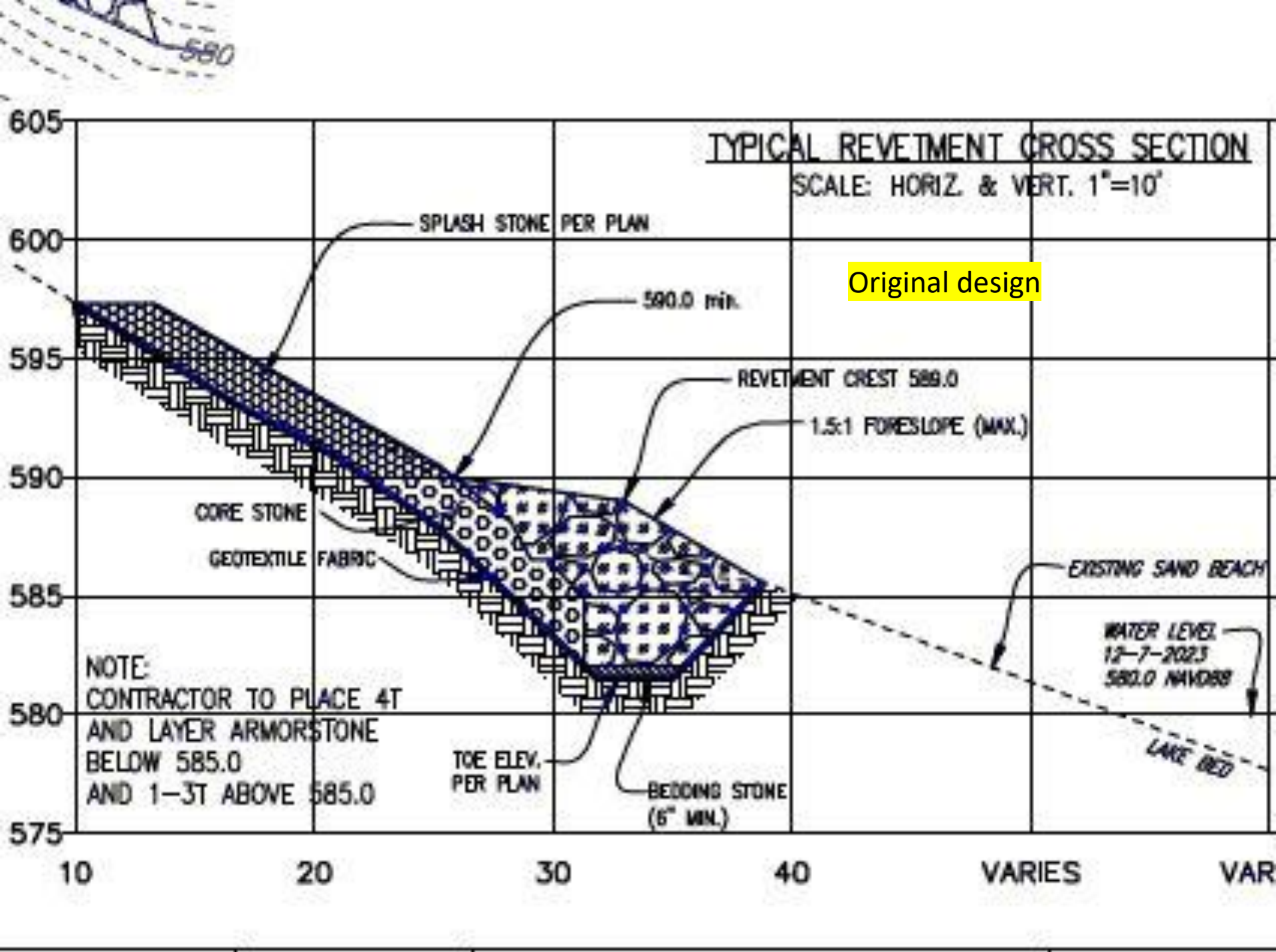
Project description: What: Rip rap, Purpose: Prevent erosion Need: bank being eroded.

Description of work: Shoreline restoration. PWS will start by removing any fallen trees on northern parcel. Once the bluff face is cleaned off PWS will lay fabric against bluff, dig a 3ft trench at toe of slope and start placing stone. Stone to be placed at an average of 6' high at a 2:1 slope and will follow the natural contour of the shoreline. The total length of Riprap placed to be 300'.

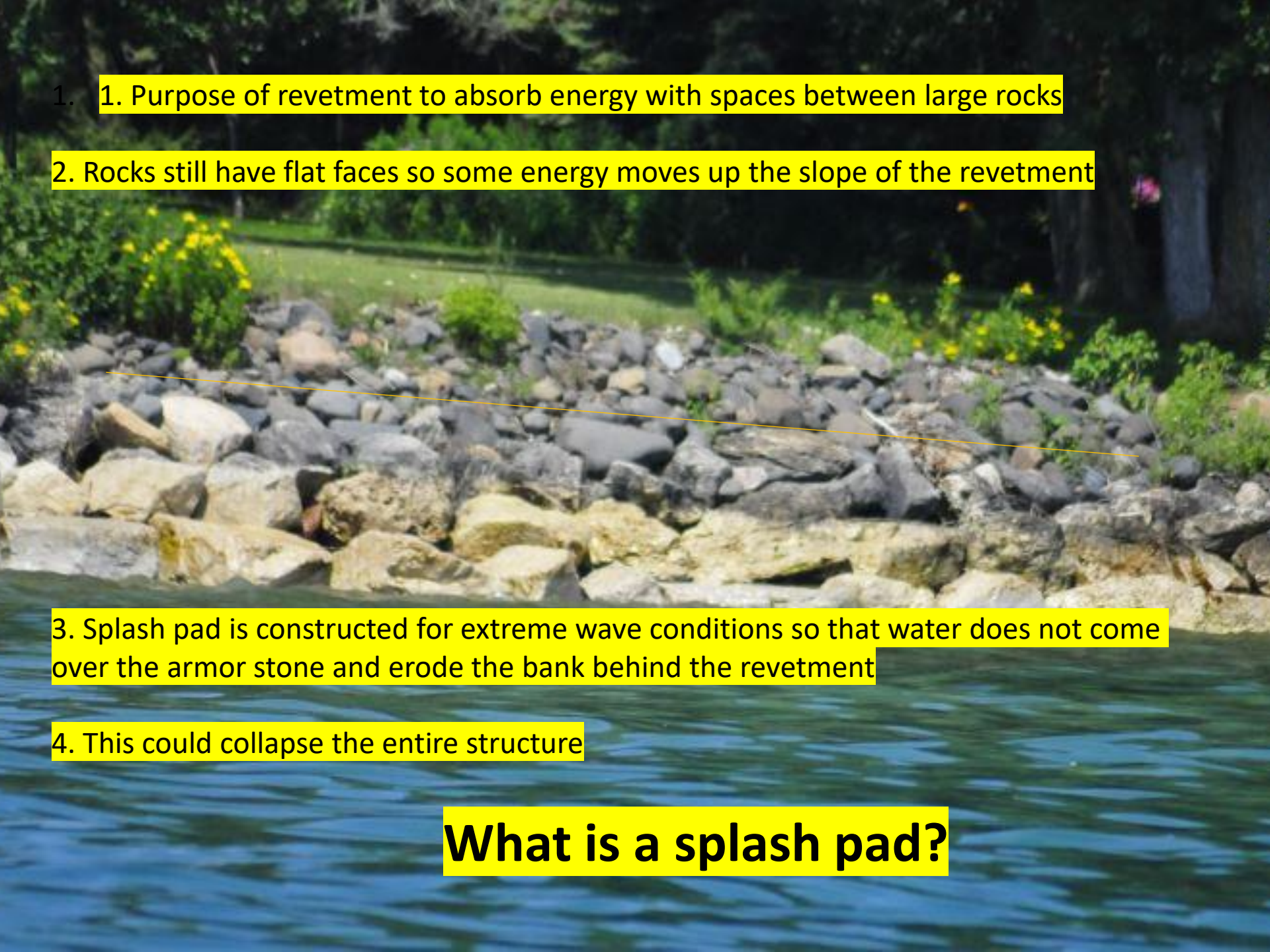
Timeline:
Start date: We have this project tentatively scheduled for December 4th, 2023. However, we may have to start earlier or later due to the weather or other unforeseen circumstances. Also, we are willing to shift dates to comply with any work blackout dates the WI. DNR needs.
Sequence of work: Day 1 – Inspect equipment for fluid leaks. Drop off equipment and brief job with crew. Start to remove fallen trees. Day 2 continue removing fallen trees and line the bank with geo-textile fabric. Day 3-66 finish laying fabric, dig trench to key toe stone of rip rap, lay rip rap. Day 67 (last day) ensure all material is accounted for, no contamination of area, at our facility inspect and remove aquatic plants, animals, and mud from equipment, drain all water from equipment, wash all equipment with high pressure water and other WI DNR BMP's
End date: We have this project tentatively scheduled to end on March 7th, 2024. However, this day may change due to pace of work, weather, or other unforeseen circumstances.

Materials: All stone will be natural stone obtained from a local quarry and it will be irregular in size and shape.

~~Geo-Textile fabric~~ – **~~As needed~~.**
24" - 36" Rip rap – 1000 ton
12" - 18" Rip rap – 100 ton



Original design



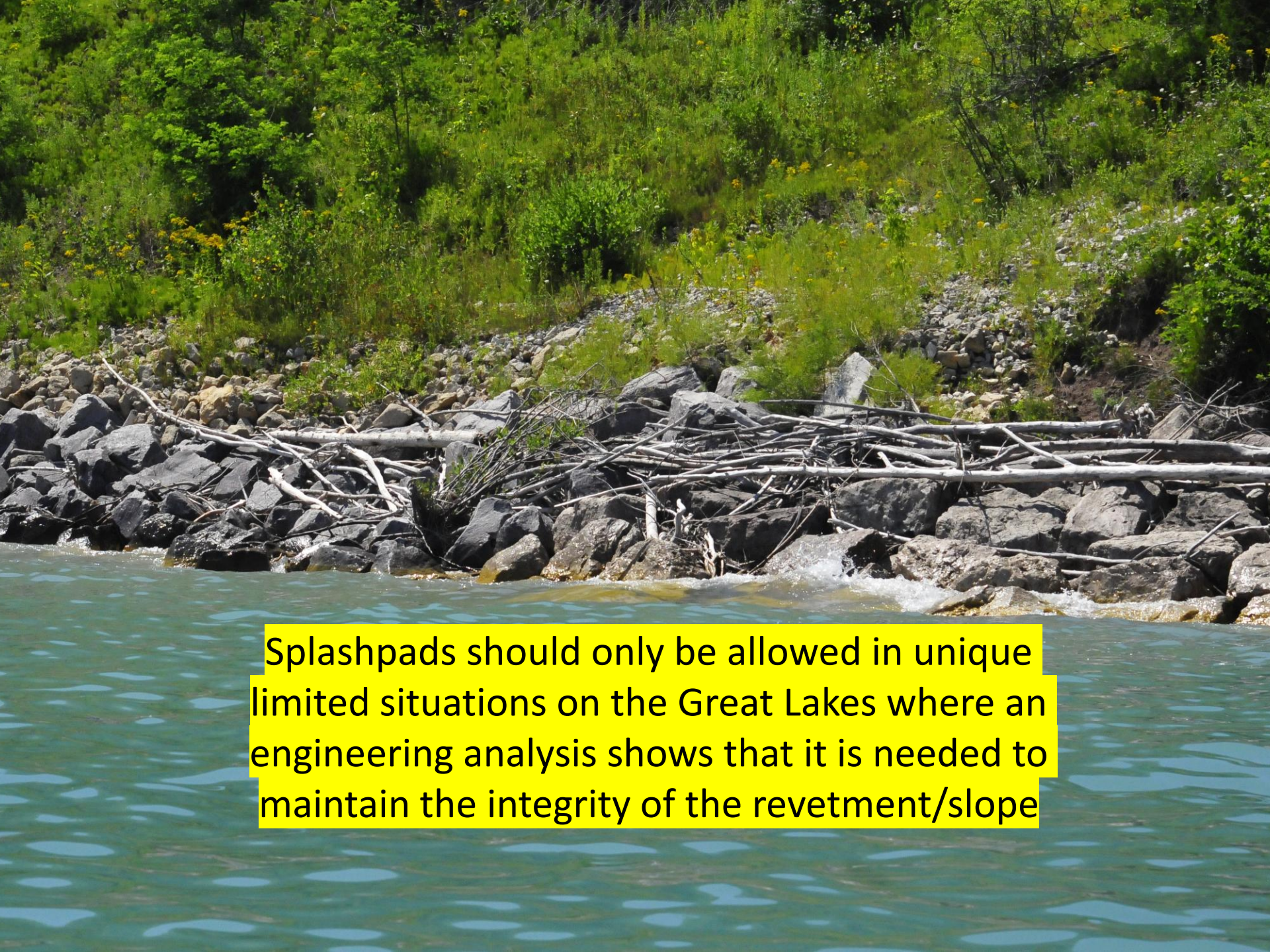
1. 1. Purpose of revetment to absorb energy with spaces between large rocks

2. Rocks still have flat faces so some energy moves up the slope of the revetment

3. Splash pad is constructed for extreme wave conditions so that water does not come over the armor stone and erode the bank behind the revetment

4. This could collapse the entire structure

What is a splash pad?


Splashpads should only be allowed in unique limited situations on the Great Lakes where an engineering analysis shows that it is needed to maintain the integrity of the revetment/slope

DNR Review of a Revetment Project

- Will the project have an impact on fisheries, wildlife, natural scenic beauty, water quality, etc?
- Has the applicant provided enough information to show that the revetment will not fail and cause environmental degradation?
- Will the project impact neighboring properties?
- All revetments change the near shore area, what is the cost/benefit to the landowner vs environmental change?
- Equipment operating below the OHWM


Lakebed downcutting example


Less than 60 days

ANT: READ CAREFULLY

ROJECT GROUND-DISTURBING ACTIVITIES AND DNR PERMITTING: as the project footprint overlies and/or is immediately proximal
historic structures as well) the applicant:

ST consult with the Wisconsin Historical Society (WHS) (Contact: Compliance WHS compliance@wisconsinhistory.org) **before proc**
th CRM firm to facilitate same) - *conduct archaeological investigations and/or monitoring, as required by WHS* (cf. attached form). *Includ*

ST forward one (1) copy original (digital) of all materials submitted to WHS to DNR (including report of archaeological investigations
st, 1027 W. St. Paul Ave, Milwaukee, WI 53233, Richard.kubicek@wisconsin.gov ... *these materials must include a copy of a USGS top*
footprint(s)

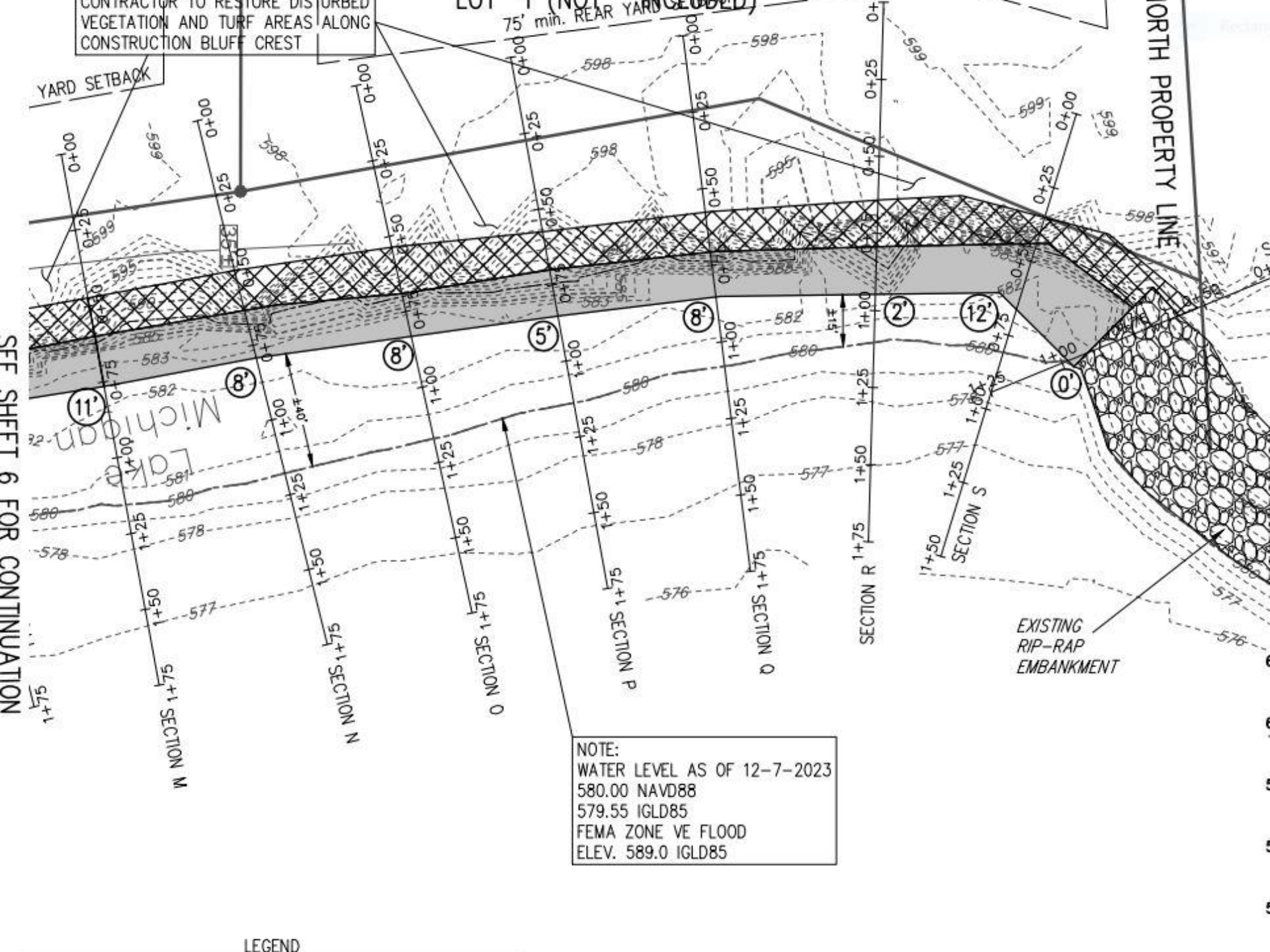
*if project includes non-burial components and/or sites, those components/sites **must** also be investigated/reported or the report of inve*

*rt of investigations (ROI) **must** include WHPD map (as attached below) with the project footprint delineated thereon or the project will no*
ill not be cleared:

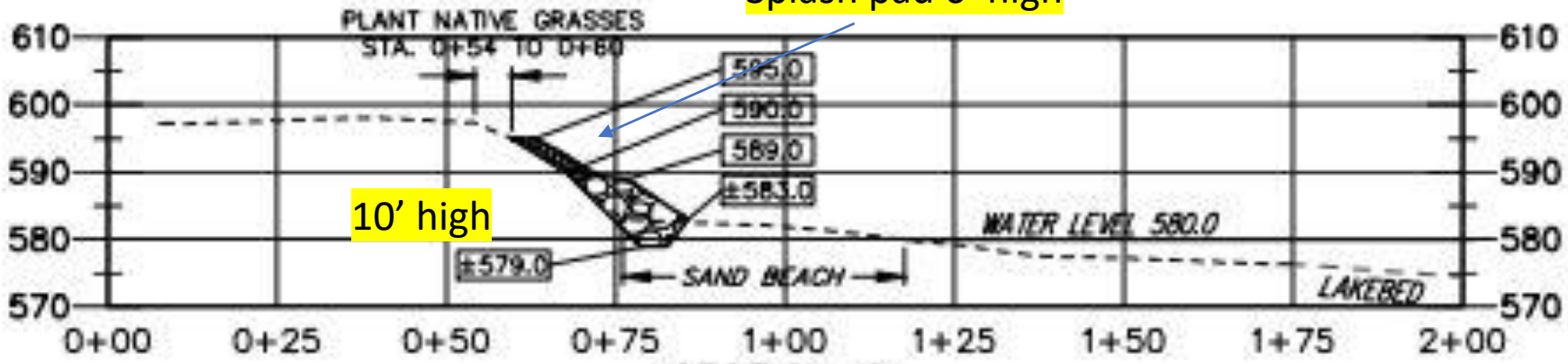
ST forward to DNR written "burial site project clearance" documentation from the WHS before the permit application will be cle
ferencing the burial site and other project related archaeological site numbers [as indicated]).

nformation should be copied exactly and provided to the applicant, along with attached map – INCLUDING the archaeological s
espondence).

VIDE the attached "Request to Disturb a Human Burial Site" form


CONTRACTOR TO RESTORE DISTURBED VEGETATION AND TURF AREAS ALONG CONSTRUCTION BLUFF CREST
YARD SETBACK
75' min. REAR YARD
NORTH PROPERTY LINE
SECTION S
SECTION R
SECTION Q
SECTION P
SECTION O
SECTION N
SECTION M
EXISTING RIP-RAP EMBANKMENT
SEE SHEET 6 FOR CONTINUATION
NOTE:
WATER LEVEL AS OF 12-7-2023
580.00 NAVD88
579.55 IGLD85
FEMA ZONE VE FLOOD
ELEV. 589.0 IGLD85
LEGEND

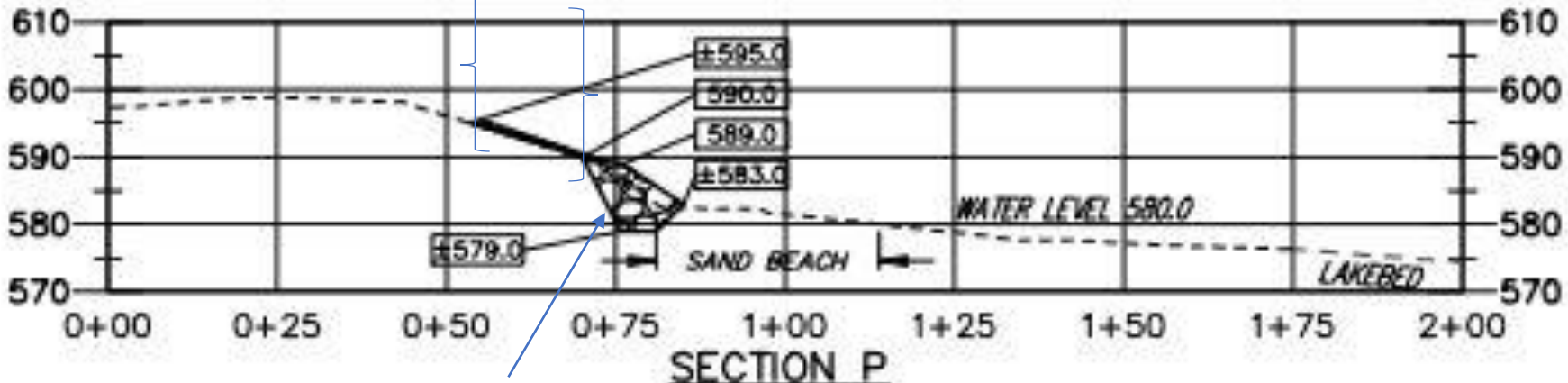
Splash pad 6’ high



SECTION Q
SCALE: H&V: 1"=40'

Original plan

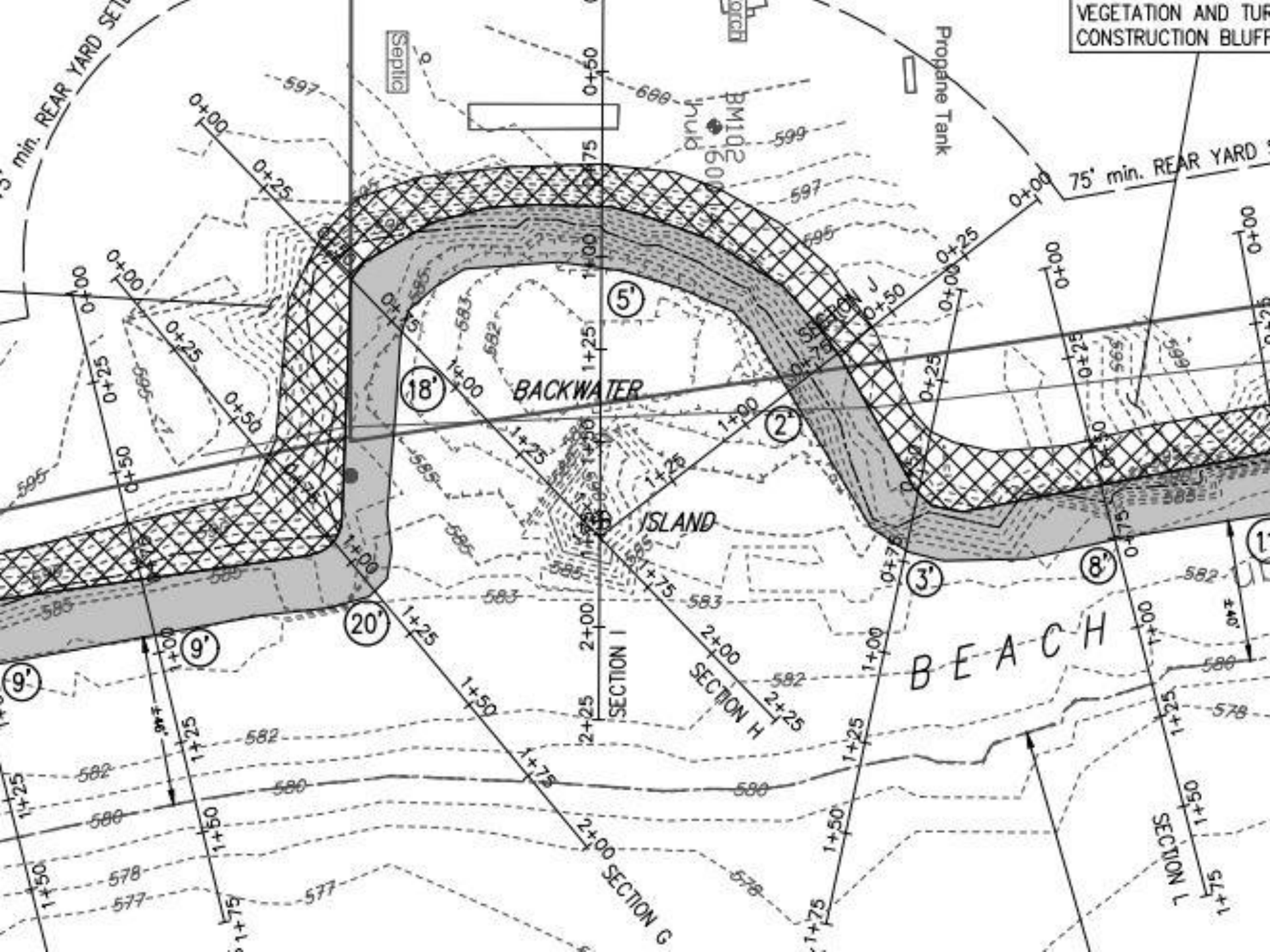
Splash pad width from OHWM 20’+



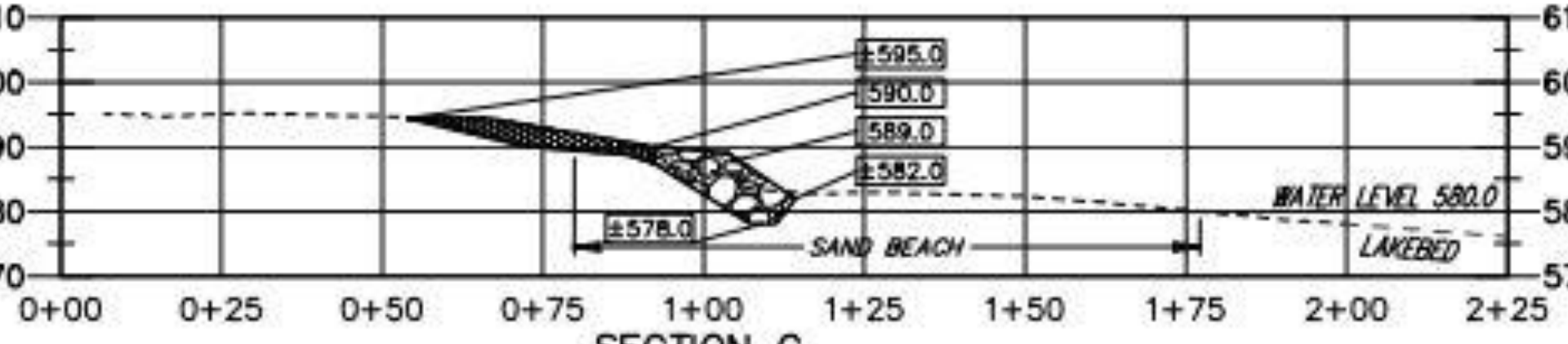
SECTION P
SCALE: H&V: 1"=40'


Vegetated shoreline


Low bluff, shallow slopes


VEGETATION AND TUR
CONSTRUCTION BLUFF
75' min. REAR YARD
75' min. REAR YARD SETB
Septic
Propane Tank
BM102
BACKWATER
ISLAND
SECTION I
SECTION H
SECTION G
SECTION J
SECTION L
BEACH
5'
18'
2'
3'
8'
20'
9'
9'

Splash pad 40’ wide

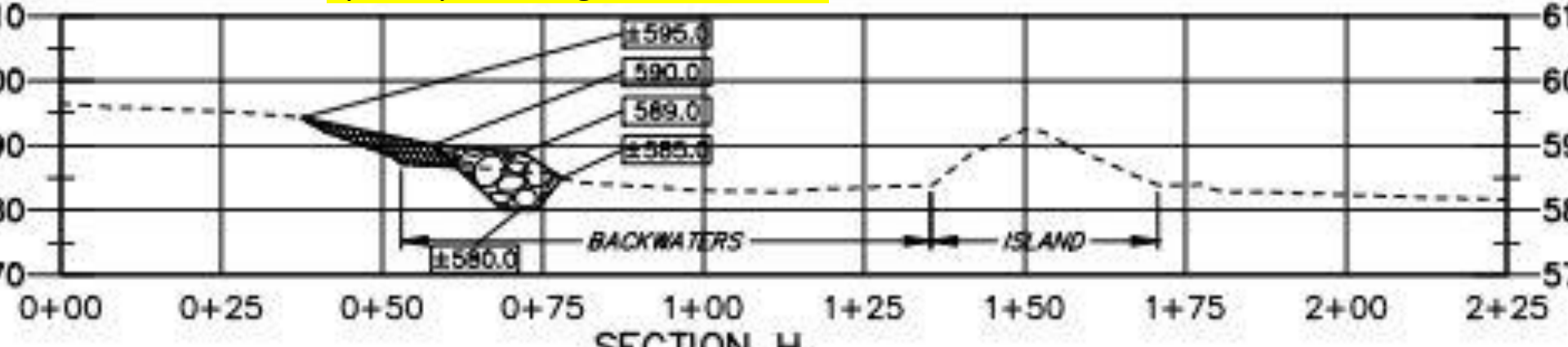


SECTION G

SCALE: H&V: 1"=40'

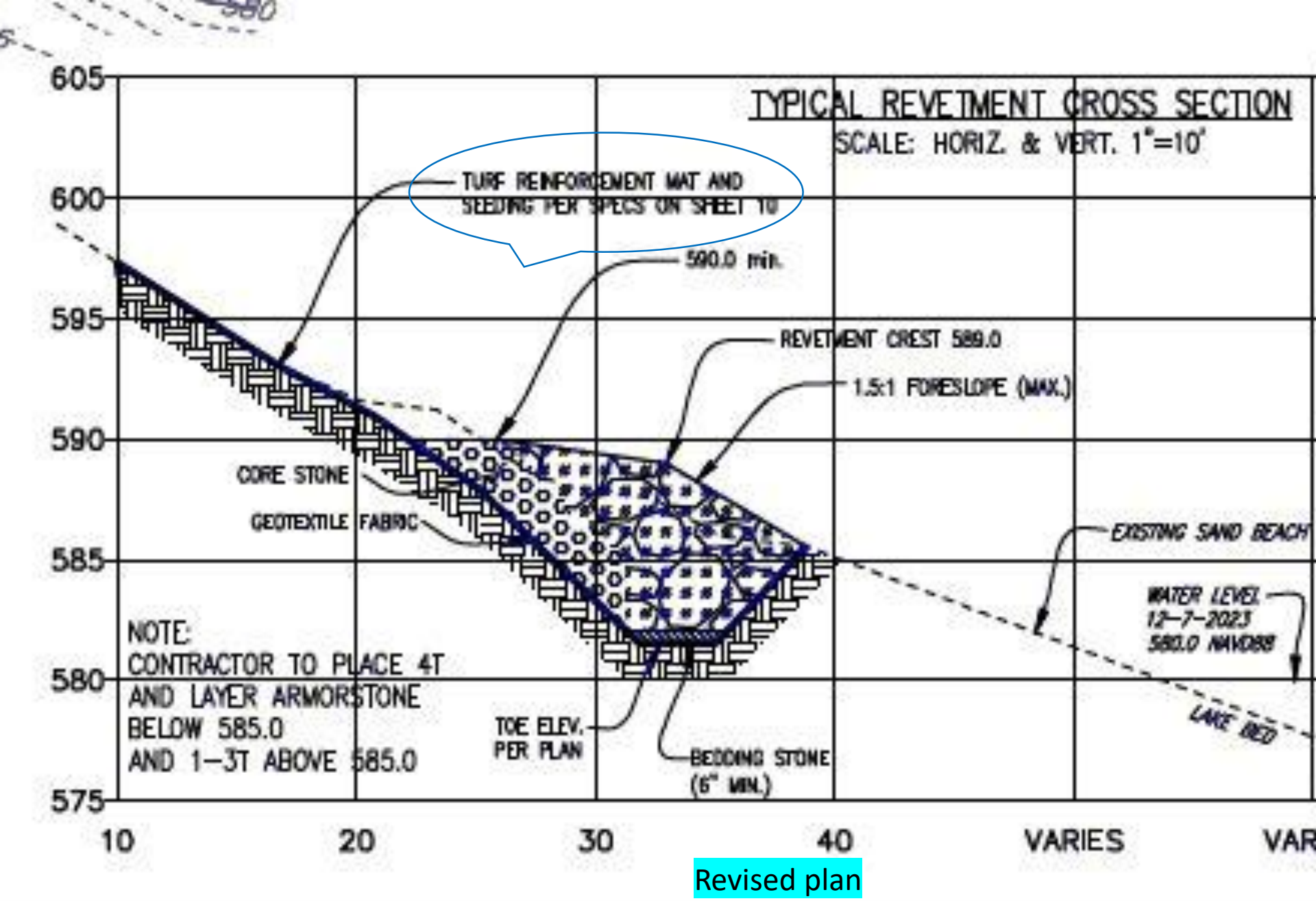
Original plan

Splash pad 4’ high and 35’ wide



SECTION H

SCALE: H&V: 1"=40'



Revised plan

PLAN DATE: 1/15/2024

TAMCOR, LTD.

PROJECT N

COLBOND

Enkamat®

General Installation for Slopes and Channels Used for Enkamat 7000, 7200, 7900 Series

These suggestions represent generally accepted procedures for successful installation of Enkamat. These instructions may be followed, modified, or rejected by the owner, engineer, contractor or their representative since they, not Colbond, Inc. are responsible for planning and executing procedures appropriate to a specific application.

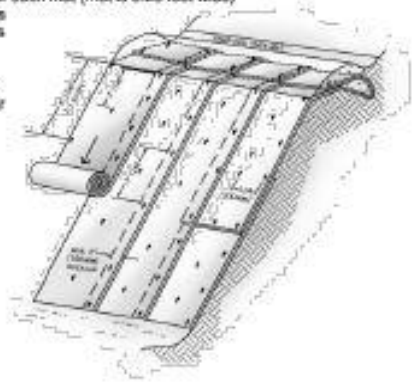
Enkamat is packaged in rolls that are easy to ship, store and install. No heavy equipment is needed for installation of matting: a roll can be handled by one or two workers.

1. **Site Preparation:** Whether slope or channel, the site must be shaped to the design specifications (grade, geometry, density of soil, etc.) and then dressed to be free of soil clods, clumps, rocks, or vehicle imprints of any significant size that would prevent the Enkamat from lying flush to surface contours.

2. **Anchor Trench:** Anchor trenches are required to securely fasten the Enkamat to the ground surface. In channel applications, the initial anchor trench is installed at the beginning of the channel and intermediate check slots are spaced at approximately 25 feet* intervals downstream depending on flow conditions and whether you soil fill or not. The Enkamat is installed into the bottom of the trench and fastened with pins spaced 3 feet apart. The anchor trench / intermediate check slots are then backfilled and compacted in a manner as to not damage the Enkamat.

   * In lieu of excavated check slots, a double row of pins [or a number 1 or 2 rebar pinned across the mat] may be used at 25-foot intervals.

3. **Enkamat Installation:** Roll the Enkamat down the slope or channel. The overlap between rolls is 3 to 4 inches. The splice between rolls is between 2 and 3 feet. Shingle the roll in the direction of water flow. Install pins down the center of each mat (mat is 3.25 feet wide) staggering them between the outside pins with a spacing interval of 3 to 5 feet. Pins patterns will vary depending upon application, soil type, slope or channel slope, geometry, etc. A rule of thumb for estimating the amount of pins required for a project is:



1:1 to 2:1 slopes
3-4 pins per sq. yd.

3:1 and lesser slopes
2-3 pins per sq. yd.

Enkamat® 7010

Turf Reinforcement Mat

Description

Enkamat 7010 is a 3-dimensional turf reinforcement mat (TRM) made of continuous monofilaments fused at their intersections. 95% percent of the Enkamat is open and available for soil, mulch and root interaction, creating the most effective root reinforcement mat (RSM) available. Enkamat is manufactured from nylon to eliminate the buoyancy factor associated with submerged conditions. It provides permanent TRM protection in vegetated channels, as well as on slopes.

Recommended Applications

- Permanent erosion control for vegetated channels with expected shear stresses ≤ 8 psf
- Permanent erosion control for moderate to steep slopes (≤3H:1V)
- Support and enhance performance of ecosystem plants
- Substrate for hydraulically applied Flexible Growth Medium (FGM) or Bonded Fiber Matrix (BFM)
- Meets requirements of **FHWA HPS3 Type 3B TRM**
- Material **Specific Gravity of > 1.14** prevents buoyancy— the No Float TRM.

Technical Data

Mechanical Properties

	Test Method	Units	MARV Roll Value
Tensile Strength	ASTM D 6818	kN/m (lbs/ft)	1.8 (125)
Thickness	ASTM D 6525	mm (in)	6.25 (0.25)
Mass/Unit Area	ASTM D 6566	g/m² (oz/yd²)	150 (4.5)
Resiliency	ASTM D 6524	%	≥ 80
UV Stability	ASTM D 4355	% strength retained	80 @ 3000 hr

Performance Properties

		Test Method	Units	Typical Roll Value
Permissible Velocity	60 minute, vegetated	Flume test	m/s (ft/s)	5.8 (19)
	50 hour, vegetated	Flume test	m/s (ft/s)	4.2 (17)
Permissible Shear Stress	60 minute, vegetated	Flume test	kN/m² (lbs/ft²)	0.38 (8.0)
	50 hour, vegetated	Flume test	kN/m² (lbs/ft²)	0.29 (6.0)
Manning's "n" Range		Flume test		0.028— 0.042

Packaging

Property	Units	Nominal Value
Roll Dimensions [w x l]	m (ft)	2.4 X 61.4 (8.0 X 169)
Roll Area	m² (yd²)	125.4 (150)
Estimated Roll Diameter	m (in)	0.61-0.71 (24-28)
Estimated Roll Weight	kg (lb)	34 (75)
Color		Black

To the best of our knowledge, the information contained herein is accurate. However, Low & Bonar Inc. cannot assume any liability whatsoever for the accuracy or completeness hereof. Final determination of the suitability of any information or material for the use contemplated, of the manner of use and whether the suggested use infringes any patent, is the sole responsibility of the user. These products may be covered by patents or patents pending.

Progress through performance
A Low&Bonar solution

Low & Bonar Inc.
PO Box 1089 / Irmo / SC 29078 /
1-800-845-7591 / 1-888-445-8669
www.enkamat.com / info.us@lowandbonar.com

BLUFF PLANTING DIRECTIONS:

1.) SCARIFY FINISH-GRADED BLUFF SURFACES

2.) INSTALL TURF REINFORCEMENT MATTING PER ABOVE INSTRUCTIONS

3.) PLACE ±3" ORGANIC LOAM/COMPOST BLEND

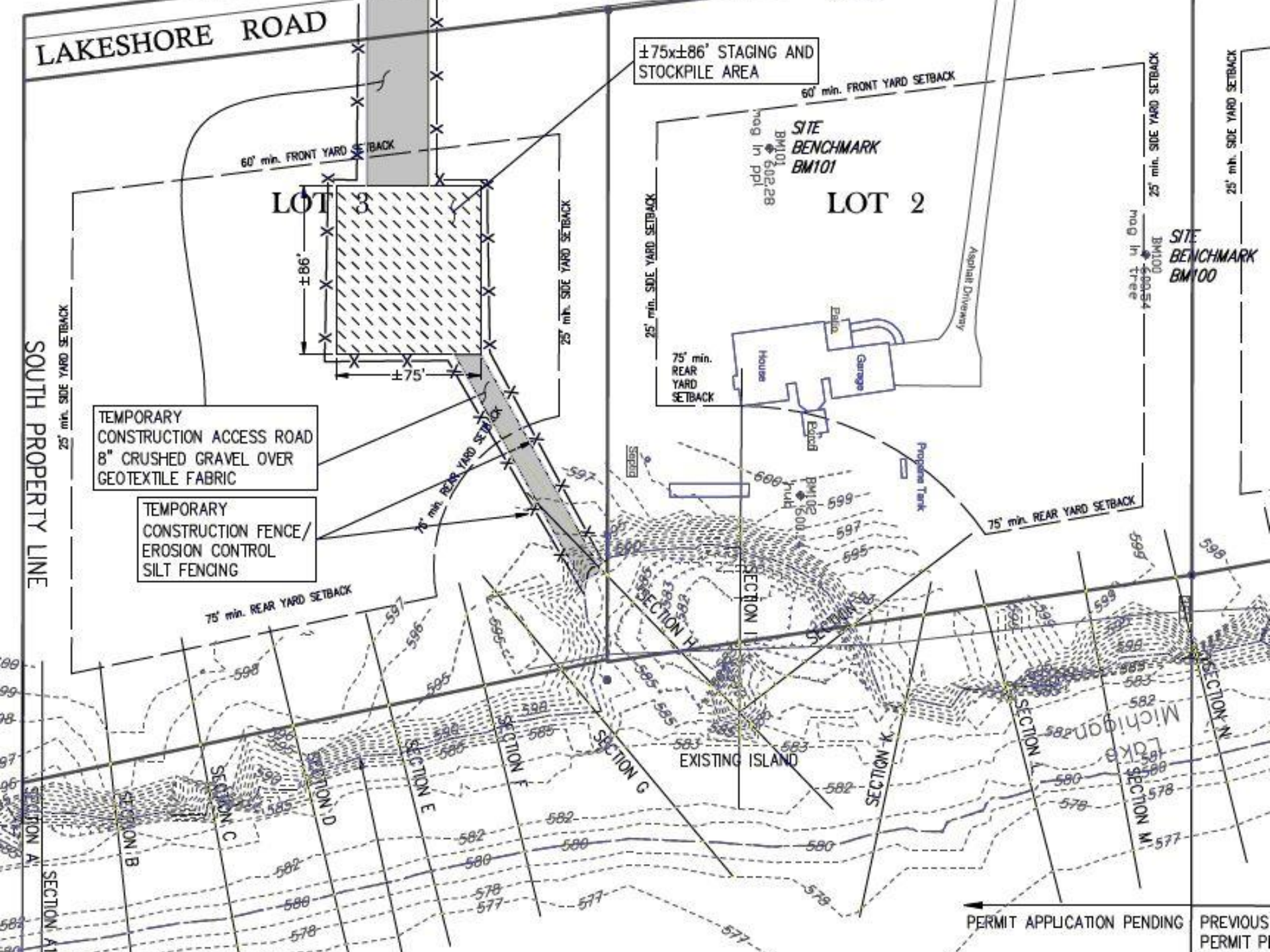
4.) SOW NATIVE BLUFF SEED MIXES PER SUPPLIERS RECOMMENDATIONS

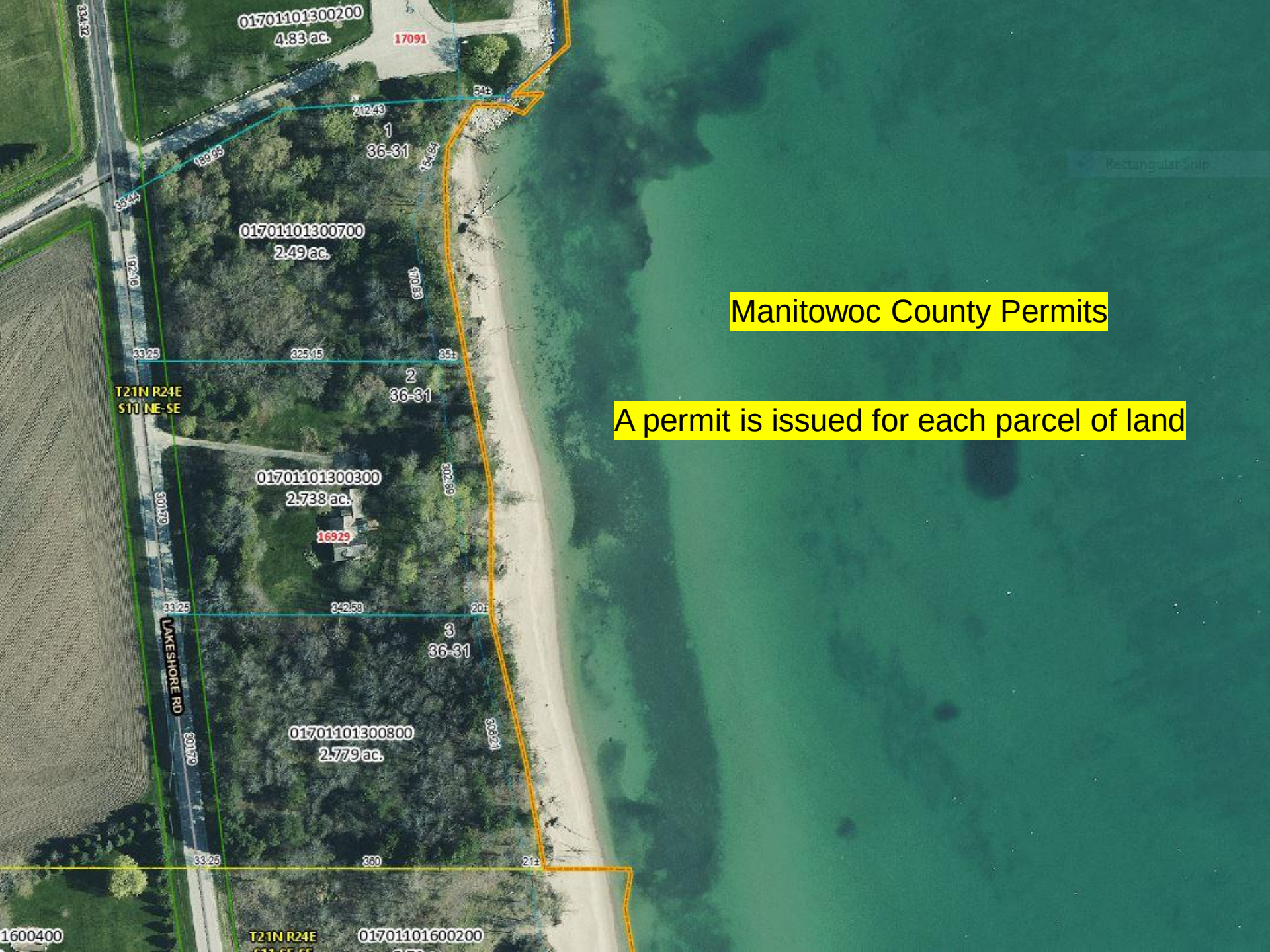
5.) PLACE AND STAKE STRAW EROSION BLANKETS ACROSS ALL SEEDED SURFACES

6.) IRRIGATE AS NEEDED

BLUFF BANK AND NEARSHORE GEOLOGY

BLUFF: 600.0 TO 574.0 HAVEN & TWO RIVERS TILL LEAN CLAY, STIFF TO VERY STIFF PER WISCONSIN SHORELINE INVENTORY & OBLIQUE VIEWER AT SECTIONS 30-4 AND 30-5b, JUST NORTH AND SOUTH OF SUBJECT SITE. DATA CONFIRMED BY ONSITE SOIL BORINGS.


LAKESHORE ROAD
±75x±86' STAGING AND STOCKPILE AREA
60' min. FRONT YARD SETBACK
SITE BENCHMARK BM101
BM101 602.28
mag in ppl
LOT 3
LOT 2
±86'
±75'
25' min. SIDE YARD SETBACK
75' min. REAR YARD SETBACK
SITE BENCHMARK BM100
BM100 600.54
mag in tree
House
Garage
Patio
Asphalt Driveway
Propane Tank
Septic
TEMPORARY CONSTRUCTION ACCESS ROAD 8" CRUSHED GRAVEL OVER GEOTEXTILE FABRIC
TEMPORARY CONSTRUCTION FENCE/ EROSION CONTROL SILT FENCING
SOUTH PROPERTY LINE
EXISTING ISLAND
SECTION A
SECTION B
SECTION C
SECTION D
SECTION E
SECTION F
SECTION G
SECTION H
SECTION I
SECTION J
SECTION K
SECTION L
SECTION M
SECTION N
Michigan
Lake
PERMIT APPLICATION PENDING
PREVIOUS PERMIT P



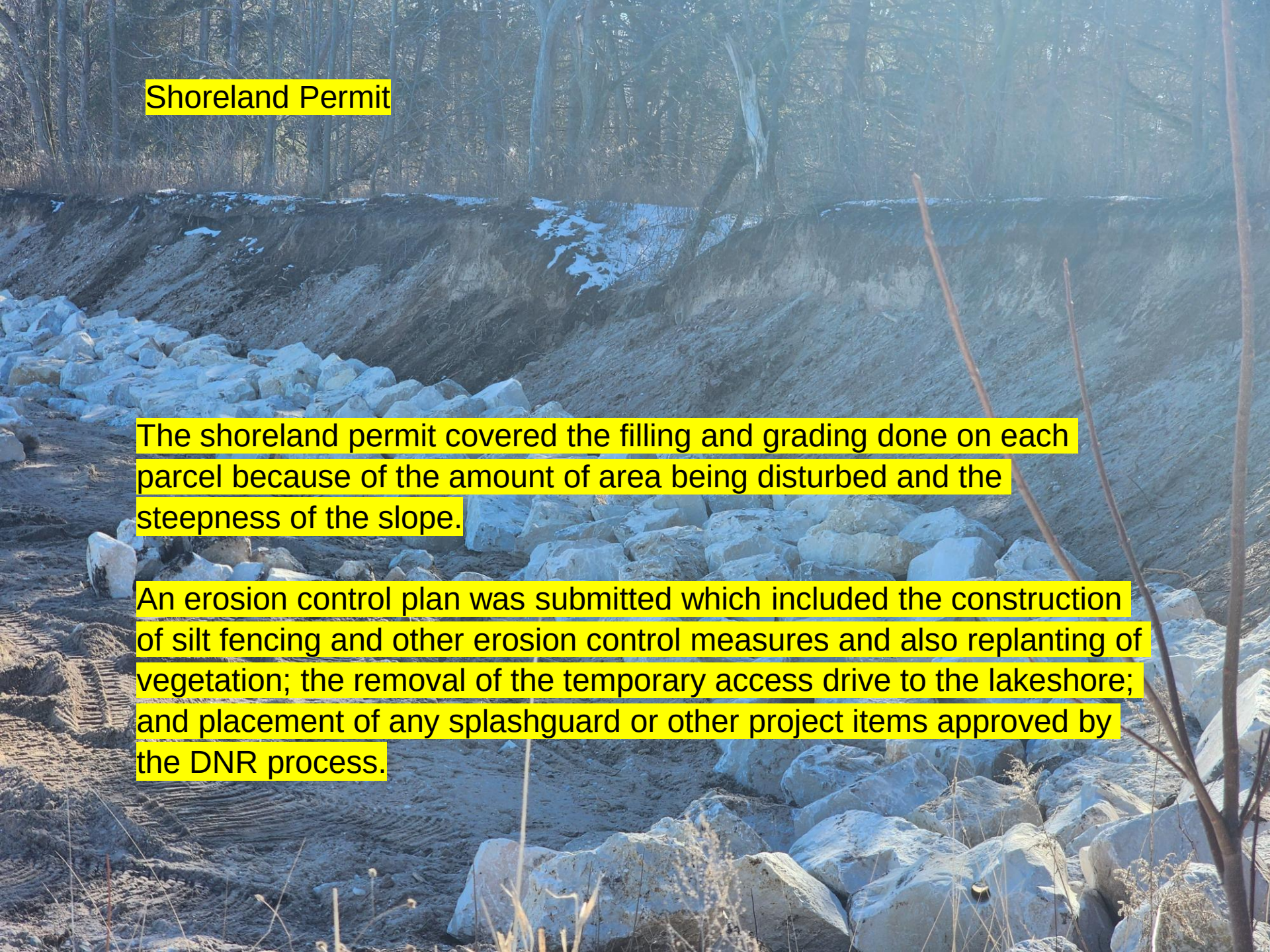
Manitowoc County Permits

A permit is issued for each parcel of land

Floodplain Permit

Digging was going to occur at the toe of the slope and beach area which is classified as floodplain. Therefore a permit to perform work in a floodplain was issued.

All spoils must be removed from the floodplain area and deposited upland or offsite.

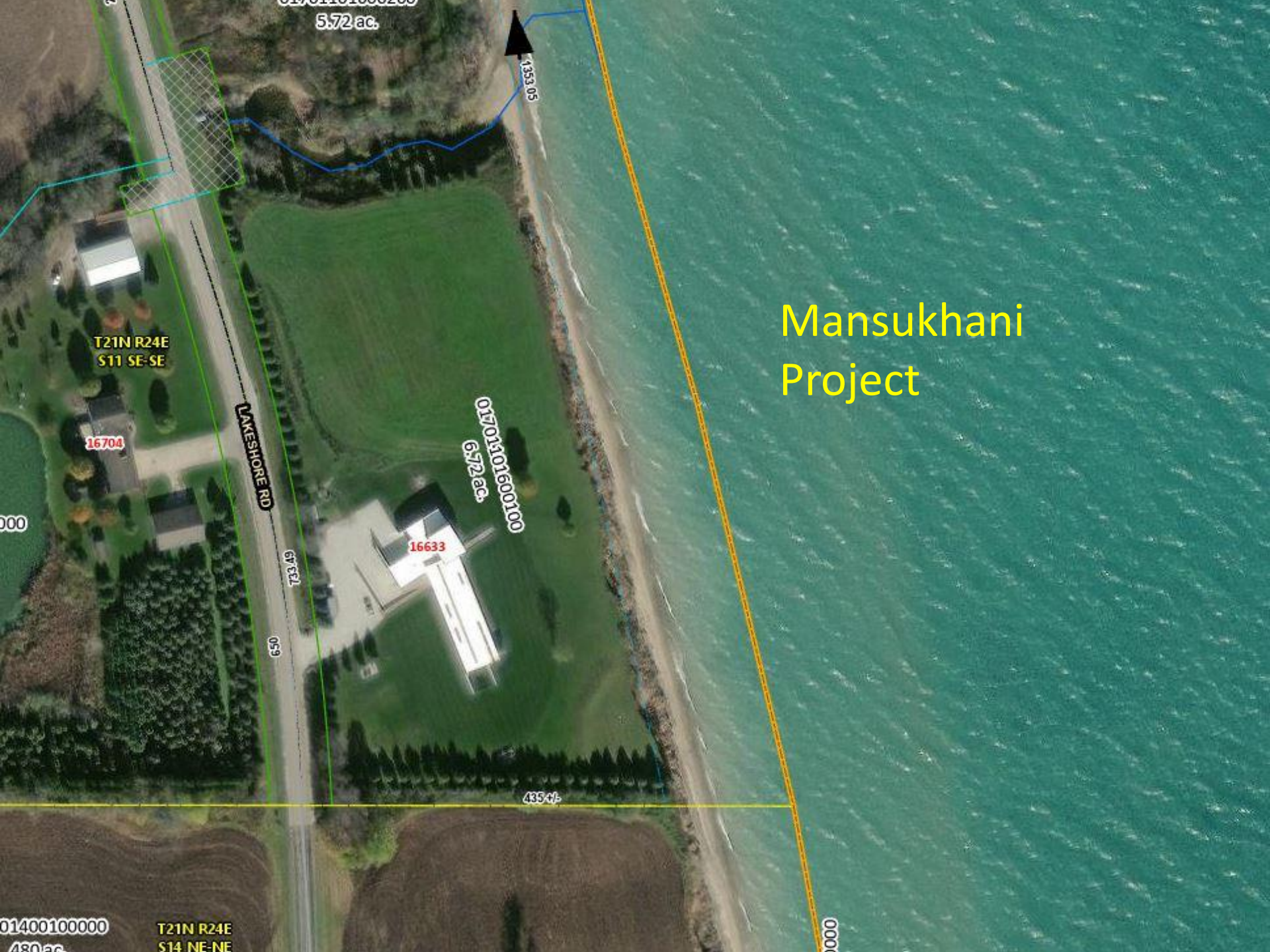


Shoreland Permit

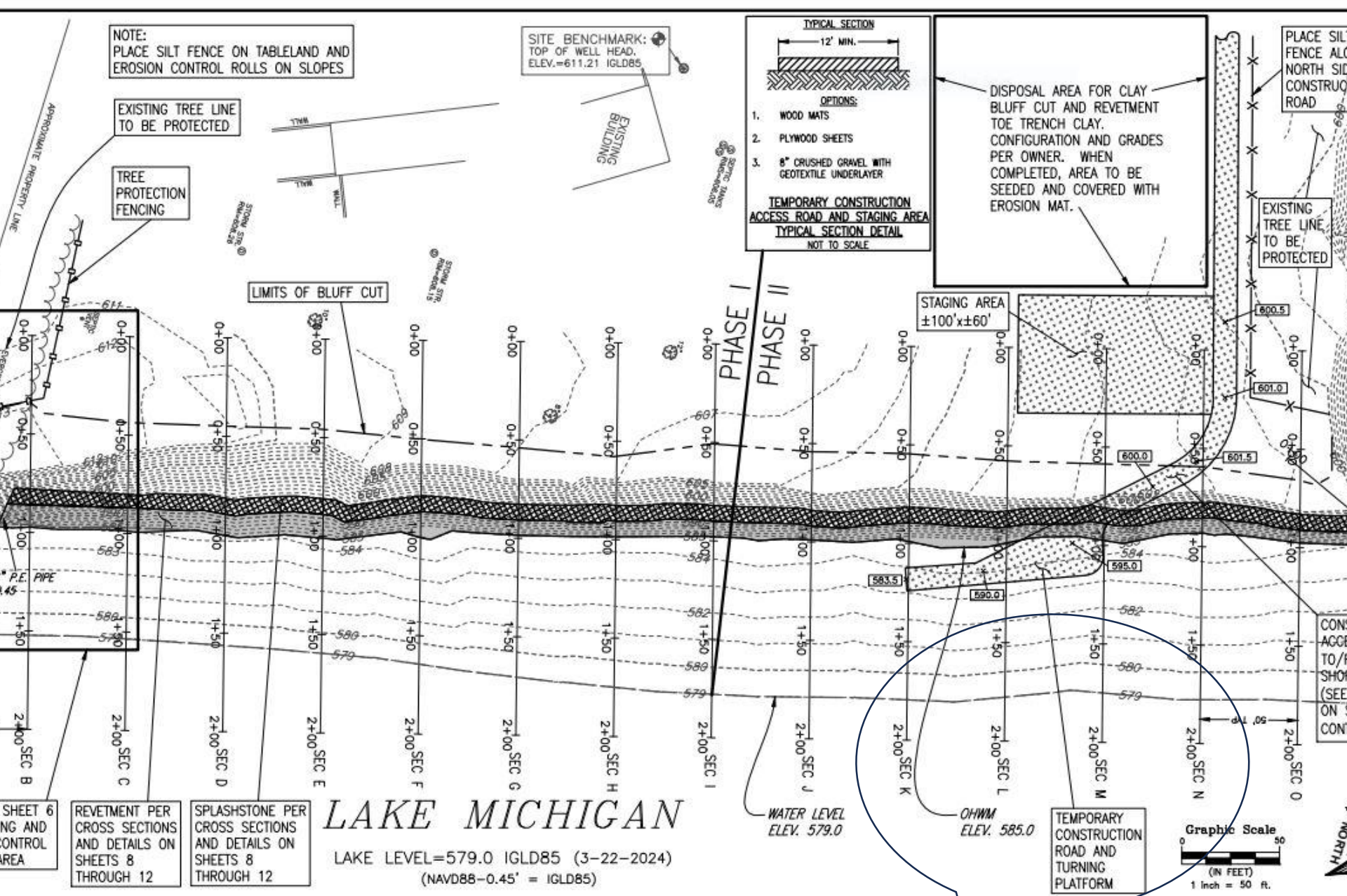
The shoreland permit covered the filling and grading done on each parcel because of the amount of area being disturbed and the steepness of the slope.

An erosion control plan was submitted which included the construction of silt fencing and other erosion control measures and also replanting of vegetation; the removal of the temporary access drive to the lakeshore; and placement of any splashguard or other project items approved by the DNR process.


CASE


Mansukhani
Project
5.72 ac.
1353.05
T21N R24E
S11 SE-SE
16704
LAKESHORE RD
6732.49
059
017011016001000
6.72 ac.
16633
435 +/-
01400100000
T21N R24E
S14 NE-NE

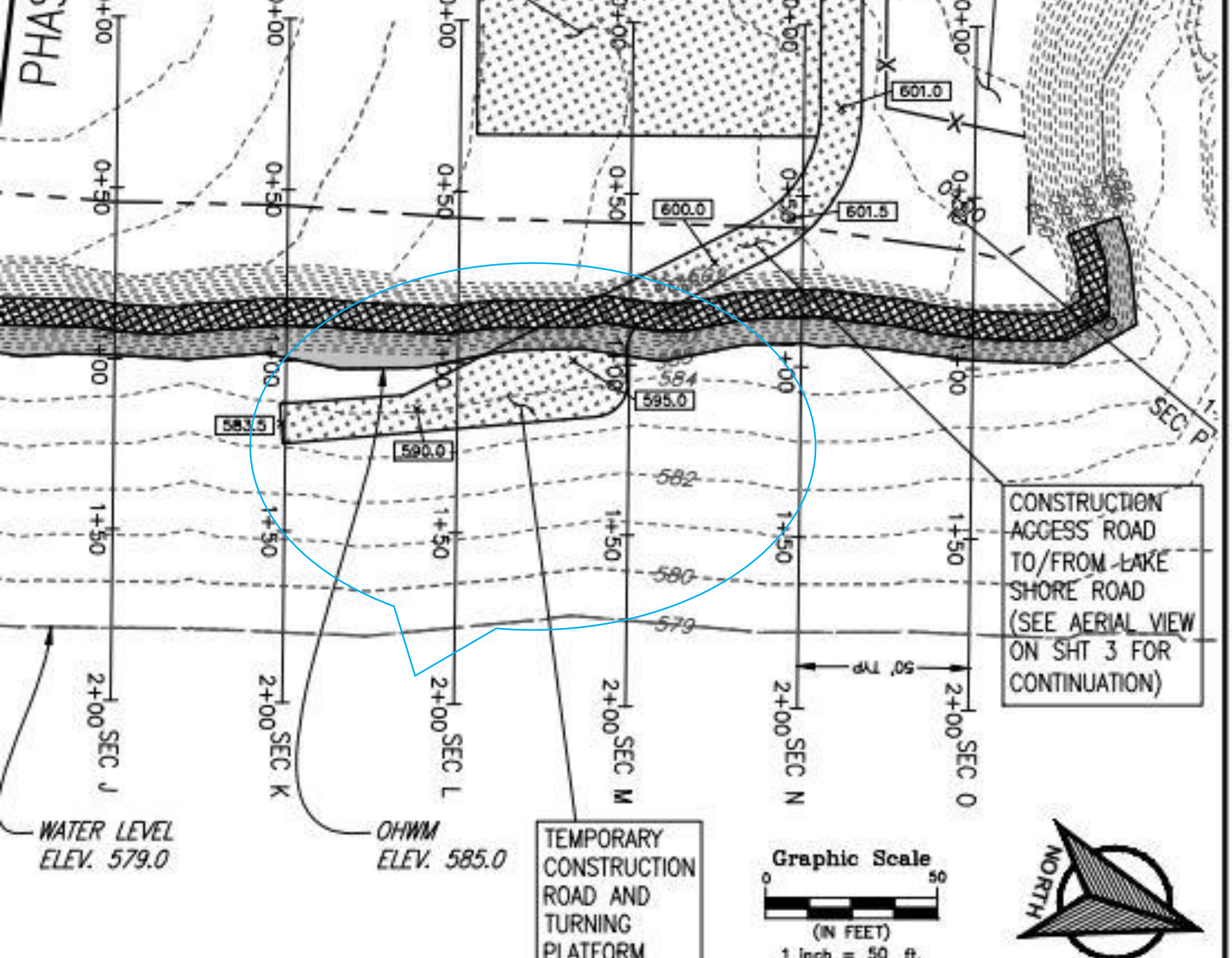

300
017011014005002.36 ac.
6312
017011013003.5 ac.
017011013004007.39 ac.
017011014002007.3 ac.
017011013007002.49 ac.
017011013003002.738 ac.
16929
017011013008002.779 ac.
16816
017011016004003.48 ac.
017011015002011.47 ac.
017011016002005.72 ac.
017011016005006.52 ac.
017011015003007.35 ac.
017011015000004.54 ac.
16704
017011016000009.61 ac.
017011016001006.72 ac.
16633
01701400100000

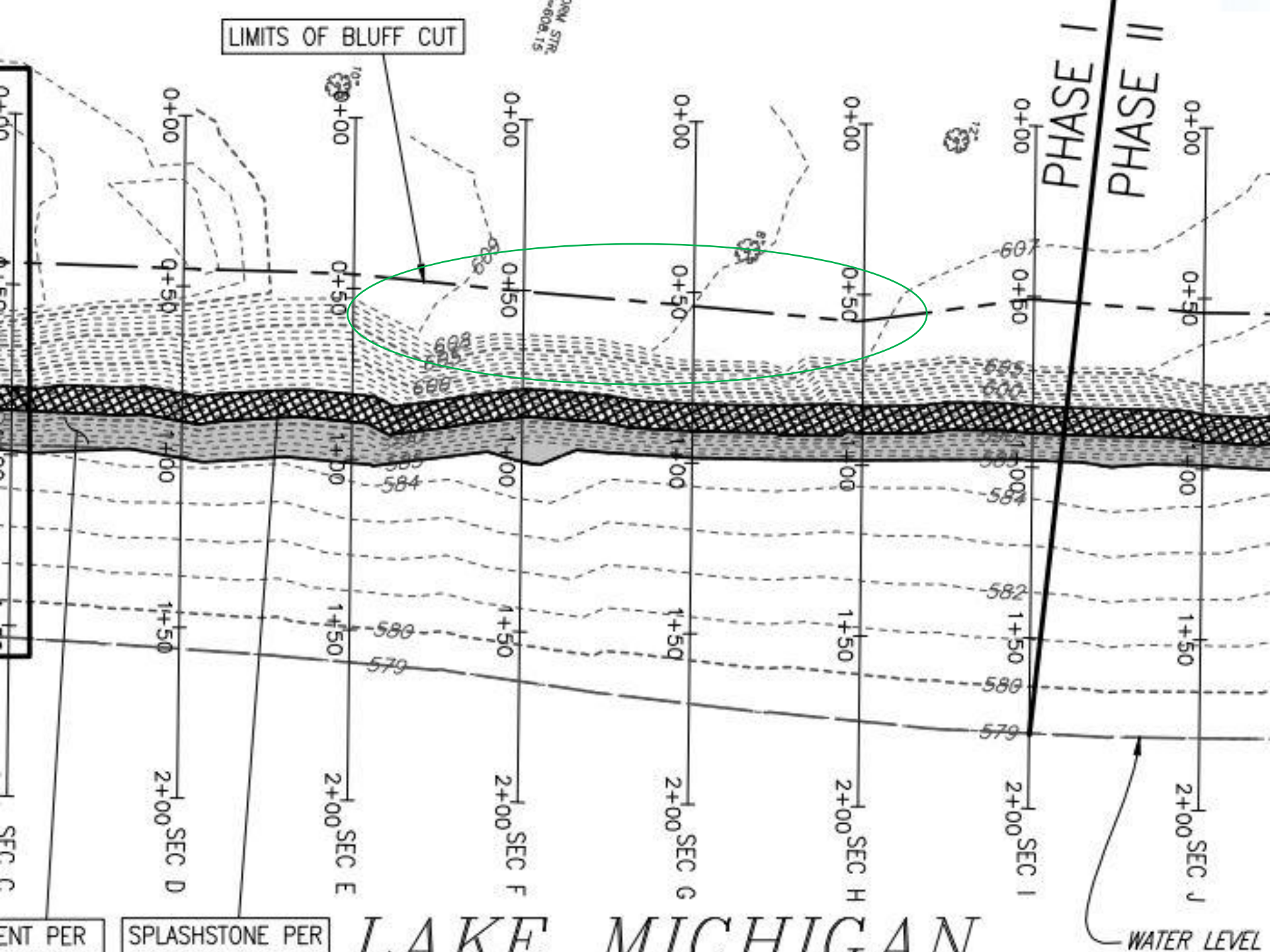


.	LOCATION:	PROJECT:	SHEET NAME:	PLAN DATE:	TAMCOR, LTD.
General	16633 LAKESHORE ROAD TOWN OF TWO CREEKS, WI	BLUFF REMEDIATION AND SHORE PROTECTION IMPROVEMENTS	PROPOSED CONDITIONS SHORE AND BLUFF IMPROVEMENT PLAN, TEMP. CONSTRUCTION ROAD ACCESS, STAGING AREA AND EROSION CONTROL	9/15/2022	740 WATERS EDGE ROAD RACINE, WISCONSIN 53402 www.tamcorconsulting.com PHONE: 847-404-1868
General					
REVISION					

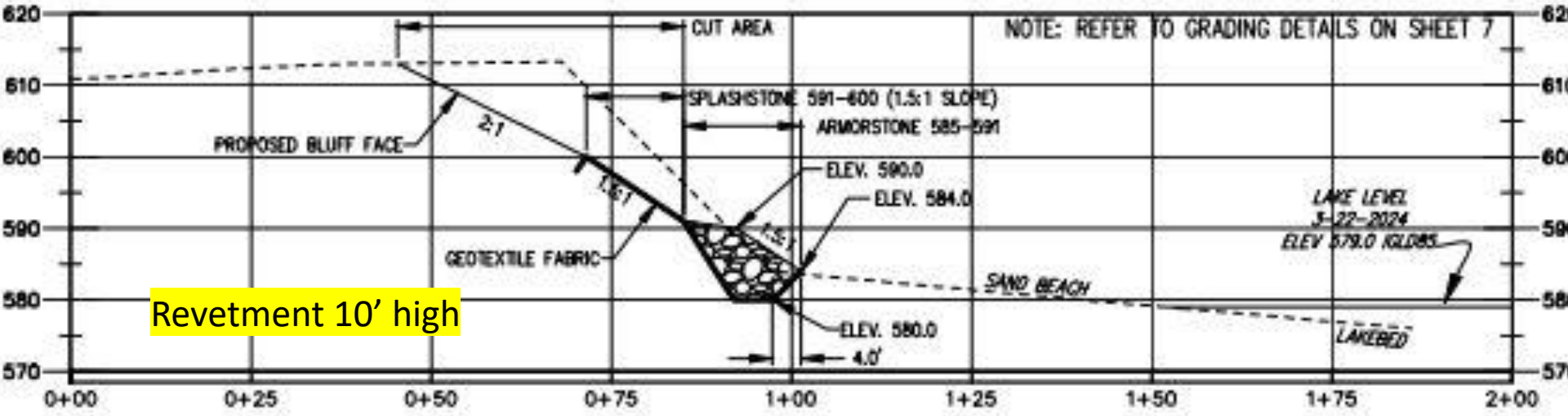

2018


2020


PHA
0+00
0+50
1+00
1+50
2+00
SEC J
SEC K
SEC L
SEC M
SEC N
SEC O
SEC P
601.0
600.0
601.5
595.0
590.0
583.5
584
582
580
579
50' TYP
CONSTRUCTION ACCESS ROAD TO/FROM LAKE SHORE ROAD (SEE AERIAL VIEW ON SHT 3 FOR CONTINUATION)
WATER LEVEL ELEV. 579.0
OHWM ELEV. 585.0
TEMPORARY CONSTRUCTION ROAD AND TURNING PLATFORM
Graphic Scale
0
50
(IN FEET)
1 inch = 50 ft.
NORTH


LIMITS OF BLUFF CUT
PHASE I
PHASE II
SEC D
SEC E
SEC F
SEC G
SEC H
SEC I
SEC J
WATER LEVEL
LAKE MICHIGAN
SPLASHSTONE PER

Bluff cut >35’



Revetment 10’ high

SECTION B

SCALE: H&V: 1"=30'

Revetment width 20’+

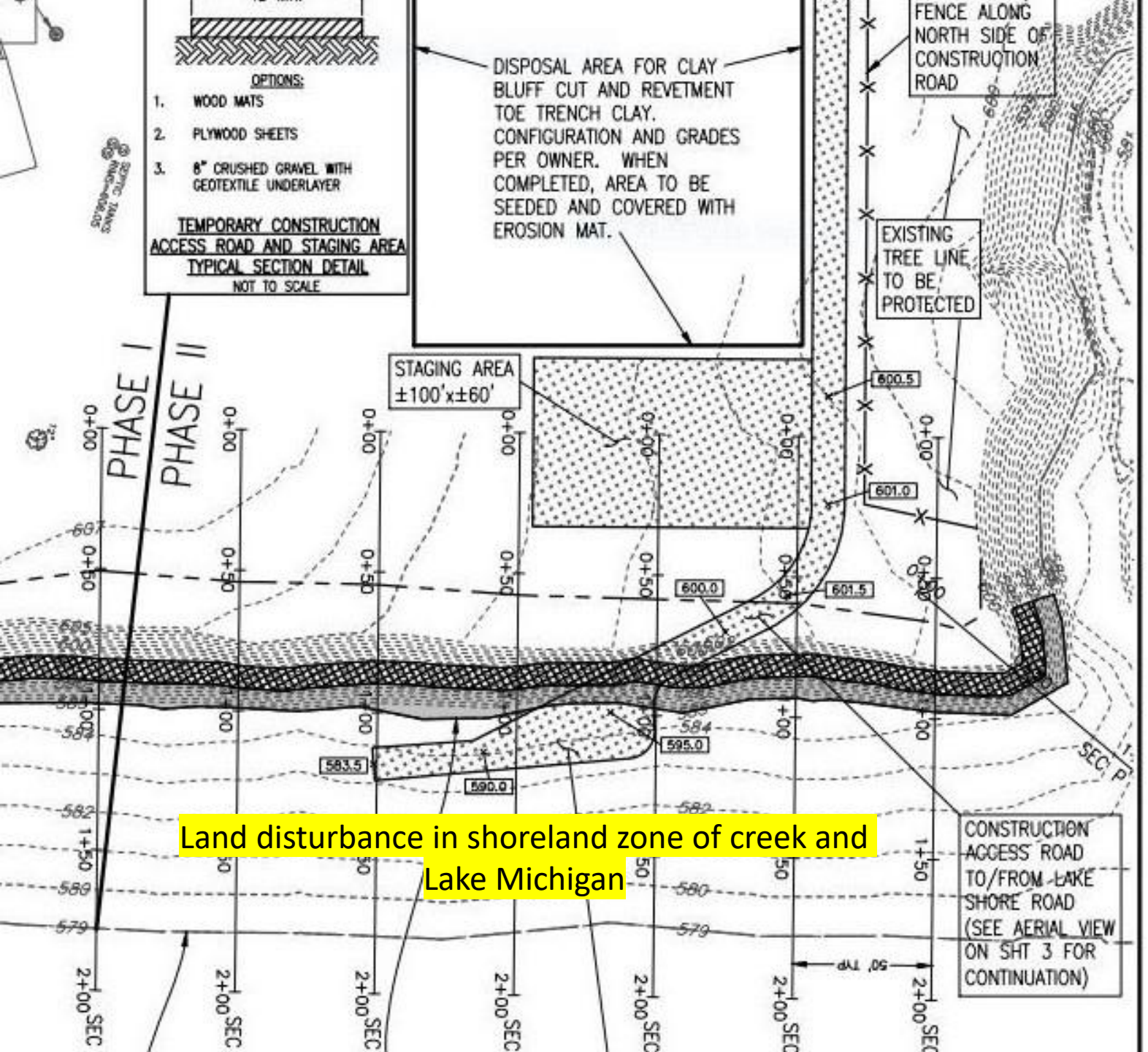
	.	.
4	ck	General
4	ck	General
	BY	REVISION

LOCATION:

16633 LAKESHORE ROAD
TOWN OF TWO CREEKS, WI

PROJECT:

BLUFF REMEDIATION AND SHORE PROTECTION IMPROVEMENTS


OPTIONS:
1. WOOD MATS
2. PLYWOOD SHEETS
3. 6" CRUSHED GRAVEL WITH GEOTEXTILE UNDERLAYER
TEMPORARY CONSTRUCTION ACCESS ROAD AND STAGING AREA TYPICAL SECTION DETAIL
NOT TO SCALE
DISPOSAL AREA FOR CLAY BLUFF CUT AND REVETMENT TOE TRENCH CLAY. CONFIGURATION AND GRADES PER OWNER. WHEN COMPLETED, AREA TO BE SEEDED AND COVERED WITH EROSION MAT.
FENCE ALONG NORTH SIDE OF CONSTRUCTION ROAD
EXISTING TREE LINE TO BE PROTECTED
STAGING AREA ±100'x±60'
PHASE I
PHASE II
600.5
601.0
600.0
601.5
595.0
583.5
590.0
CONSTRUCTION AGGESS ROAD TO/FROM LAKE SHORE ROAD (SEE AERIAL VIEW ON SHT 3 FOR CONTINUATION)
Land disturbance in shoreland zone of creek and Lake Michigan


2024


KOBELCO
1. Create work zone in yard area
Work above OHWM


2. Grade top of bank back

3. Topsoil stockpile at top of bluff

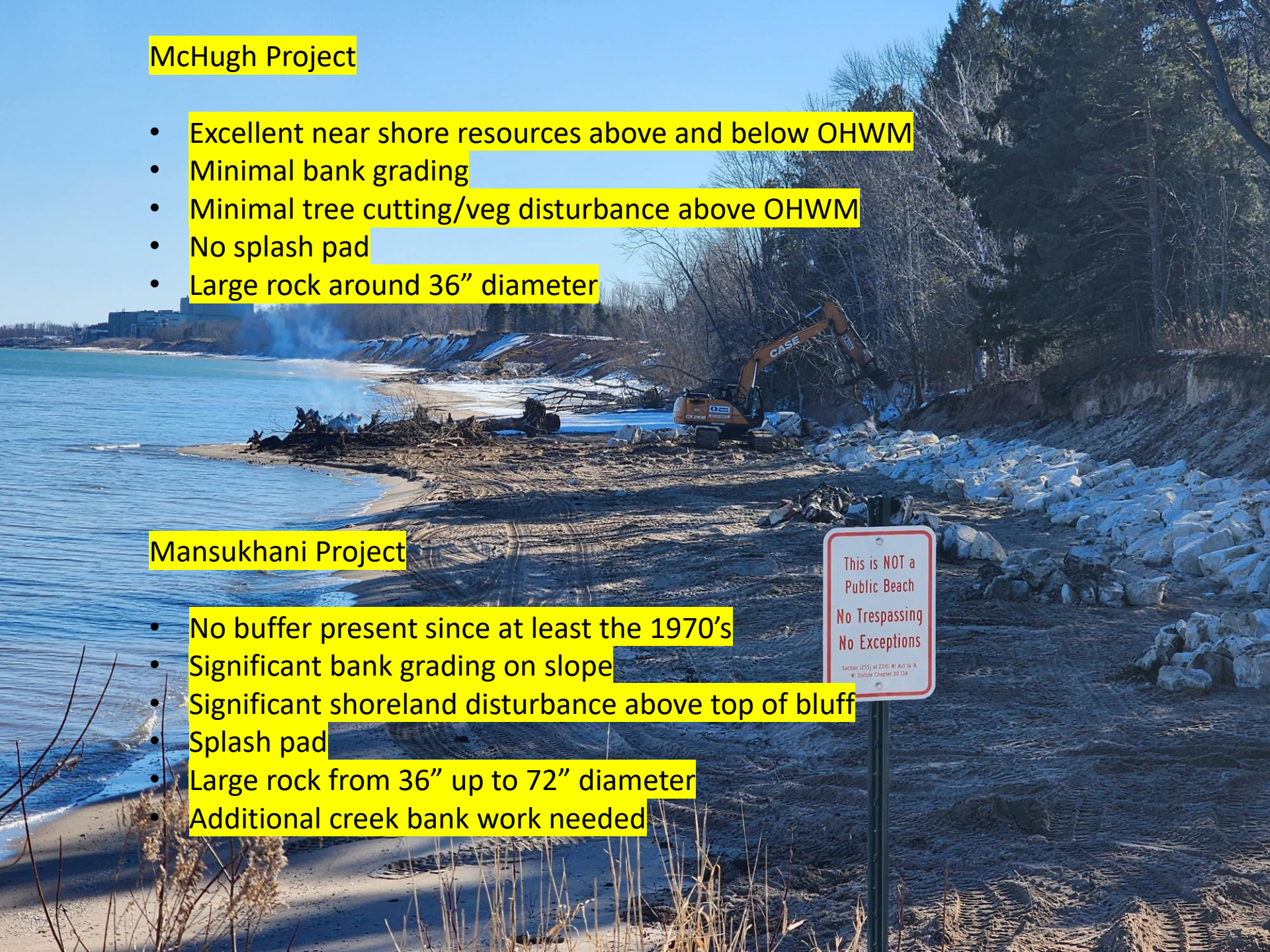

4. Create access road


KOBELCO


Dig the trench
Place fabric
Place filter stone
Place armor stone
Revetment Process


Site stabilization above OHWM done after spring rains


Finalize site restoration



McHugh Project

- Excellent near shore resources above and below OHWM
- Minimal bank grading
- Minimal tree cutting/veg disturbance above OHWM
- No splash pad
- Large rock around 36” diameter

Mansukhani Project

- No buffer present since at least the 1970’s
- Significant bank grading on slope
- Significant shoreland disturbance above top of bluff
- Splash pad
- Large rock from 36” up to 72” diameter
- Additional creek bank work needed


This is NOT a
Public Beach
No Trespassing
No Exceptions