



1510 – B Third Street  
Tillamook, Oregon 97141  
[www.tillamook.or.us](http://www.tillamook.or.us)  
Building (503) 842-3407  
Planning (503) 842-3408  
Sanitation (503) 842-3409  
FAX (503) 842-1819  
Toll Free 1(800) 488-8280

*Land of Cheese, Trees and Ocean Breeze*

**Floodway Development Permit, 851-21-000096-PLNG: MOHLER SAND & GRAVEL/BOSWELL**

*NOTICE TO MORTGAGEE, LIENHOLDER, VENDOR OR SELLER:  
ORS 215 REQUIRES THAT IF YOU RECEIVE THIS NOTICE,  
IT MUST BE PROMPTLY FORWARDED TO THE PURCHASER*

**NOTICE OF ADMINISTRATIVE REVIEW**

**Date of Notice: August 10, 2021**

Notice is hereby given that the Tillamook County Department of Community Development is considering the following:

**851-21-000096-PLNG:** A review of a Floodway Development Permit for the extraction and redeposition of 45,000-cubic yards of gravel within the Floodway. The subject property is accessed from Foss Road, a County road, and is designated as Tax Lot 1100, of Section 5 of Township 2 North, Range 9 West of the Willamette Meridian, Tillamook County, Oregon. The property is located in the Rural Industrial (RI) Zone. The applicants are Mohler Sand & Gravel and Todd Boswell. The property owner is Nancy M Smith.

Written comments received by the Department of Community Development prior to 4:00p.m. on August 24, 2021 will be considered in rendering a decision. Comments should address the criteria upon which the Department must base its decision. A decision will be rendered no sooner than the next business day, August 25, 2021.

Notice of the application, a map of the subject area, and the applicable criteria are being mailed to all property owners within 250 feet of the exterior boundaries of the subject parcel for which an application has been made and other appropriate agencies at least 14 days prior to this Department rendering a decision on the request.

A copy of the application, along with a map of the request area and the applicable criteria for review are available for inspection on the Tillamook County Department of Community Development website: <https://www.co.tillamook.or.us/commdev/landuseapps> and is also available for inspection at the Department of Community Development office located at 1510-B Third Street, Tillamook, Oregon 97141.

If you have any questions about this application, please call the Department of Community Development at 503-842-3408 Ext. 3301 or [mjenck@co.tillamook.or.us](mailto:mjenck@co.tillamook.or.us)

Sincerely,

  
Melissa Jenck, CFM, Land Use Planner II



Sarah Absher, CFM, Director  
Enc. Applicable Ordinance Criteria, Maps

REVIEW CRITERIA

ARTICLE III – ZONE REGULATIONS

**TCLUO SECTION 3.510: FLOOD HAZARD OVERLAY ZONE**

(14) DEVELOPMENT PERMIT PROCEDURES

...  
(b) Development Permit Review Criteria

(1) The fill is not within a Coastal High Hazard Area.

(1) The fill is not within a Coastal High Hazard Area.

(2) Fill placed within the Regulatory Floodway shall not result in any increase in flood levels during the occurrence of the base flood discharge.

(3) The fill is necessary for an approved use on the property.

(4) The fill is the minimum amount necessary to achieve the approved use.

(5) No feasible alternative upland locations exist on the property.

(6) The fill does not impede or alter drainage or the flow of floodwaters.

(7) If the proposal is for a new critical facility, no feasible alternative site is available.

(8) For creation of new, and modification of, Flood Refuge Platforms, the following apply, in addition to (14)(a)(1-4) and (b)(1-5):

i. The fill is not within a floodway, wetland, riparian area or other sensitive area regulated by the Tillamook County Land Use Ordinance.

ii. The property is actively used for livestock and/or farm purposes,

iii. Maximum platform size = 10 sq ft of platform surface per acre of pasture in use, or 30 sq ft per animal, with a 10-ft wide buffer around the outside of the platform,

iv. Platform surface shall be at least 1 ft above base flood elevation,

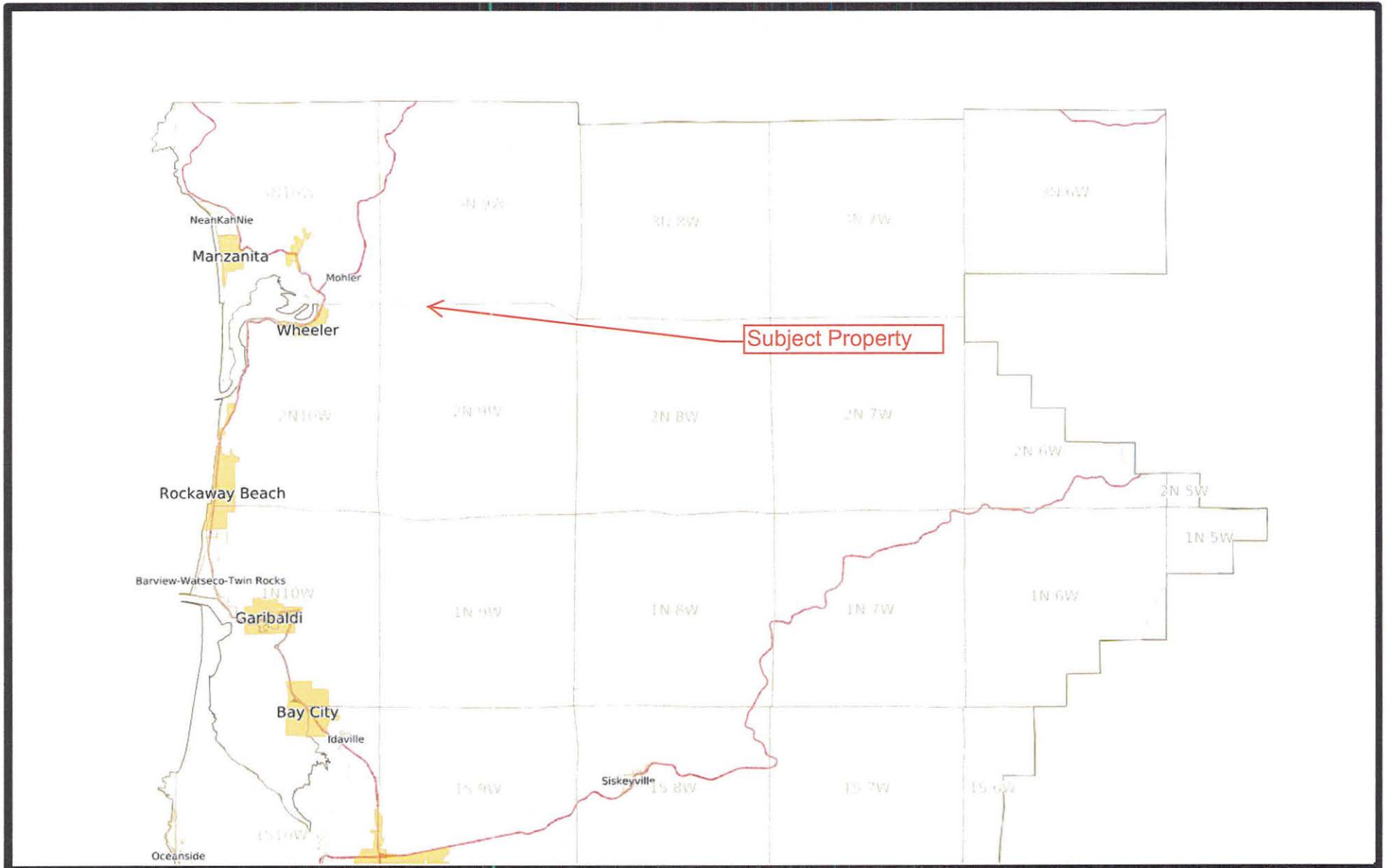
v. Slope of fill shall be no steeper than 1.5 horizontal to 1 vertical,

vi. Slope shall be constructed and/or fenced in a manner so as to prevent and avoid erosion.

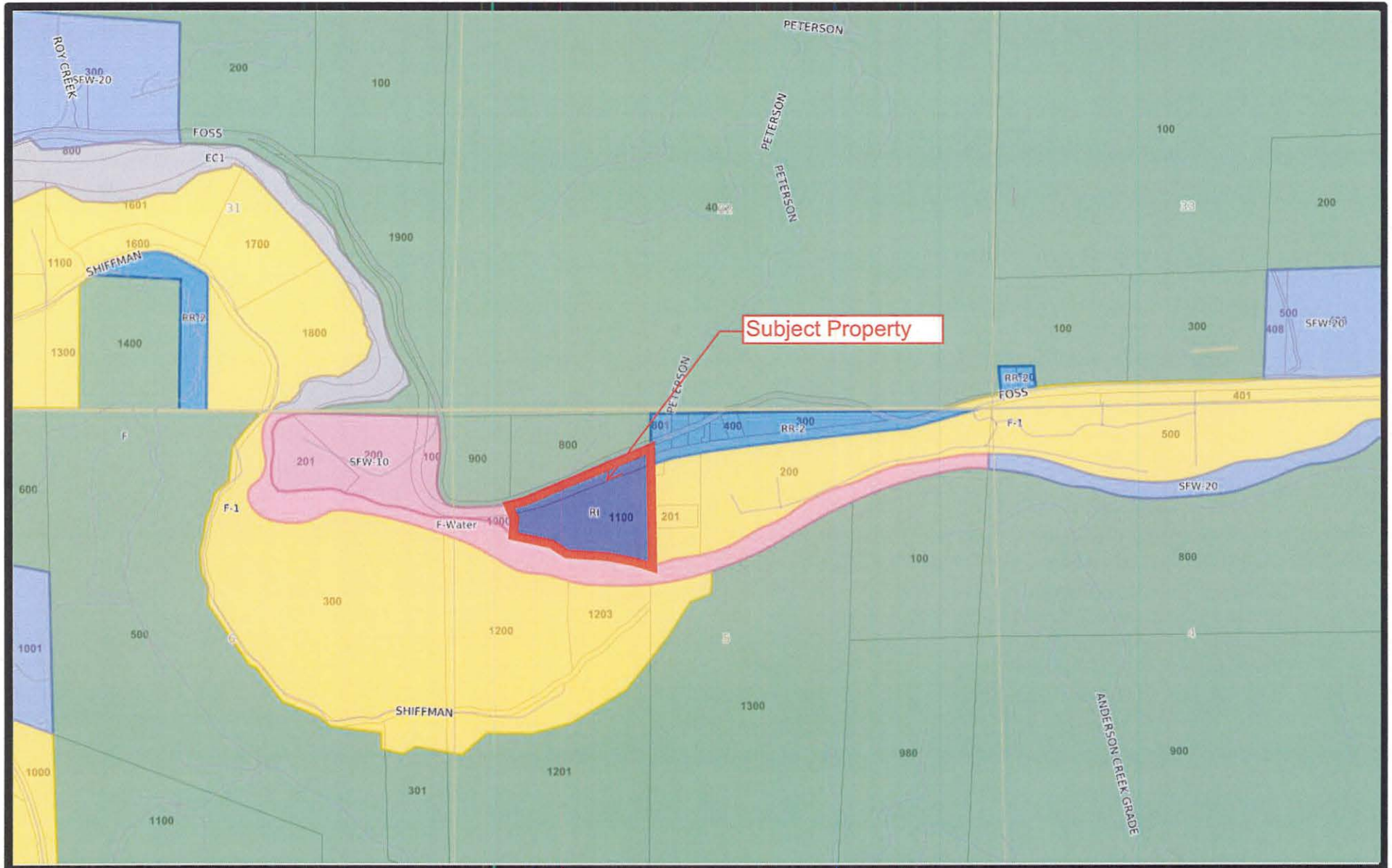
Conditions of approval may require that if the fill is found to not meet criterion (5), the fill shall be removed or, where reasonable and practical, appropriate mitigation measures shall be required of the property owner. Such measures shall be verified by a certified engineer or hydrologist that the mitigation measures will not result in a net rise in floodwaters and be in coordination with applicable state, federal and local agencies, including the Oregon Department of Fish and Wildlife.

# EXHIBIT A

# Vicinity Map



# Zoning Map

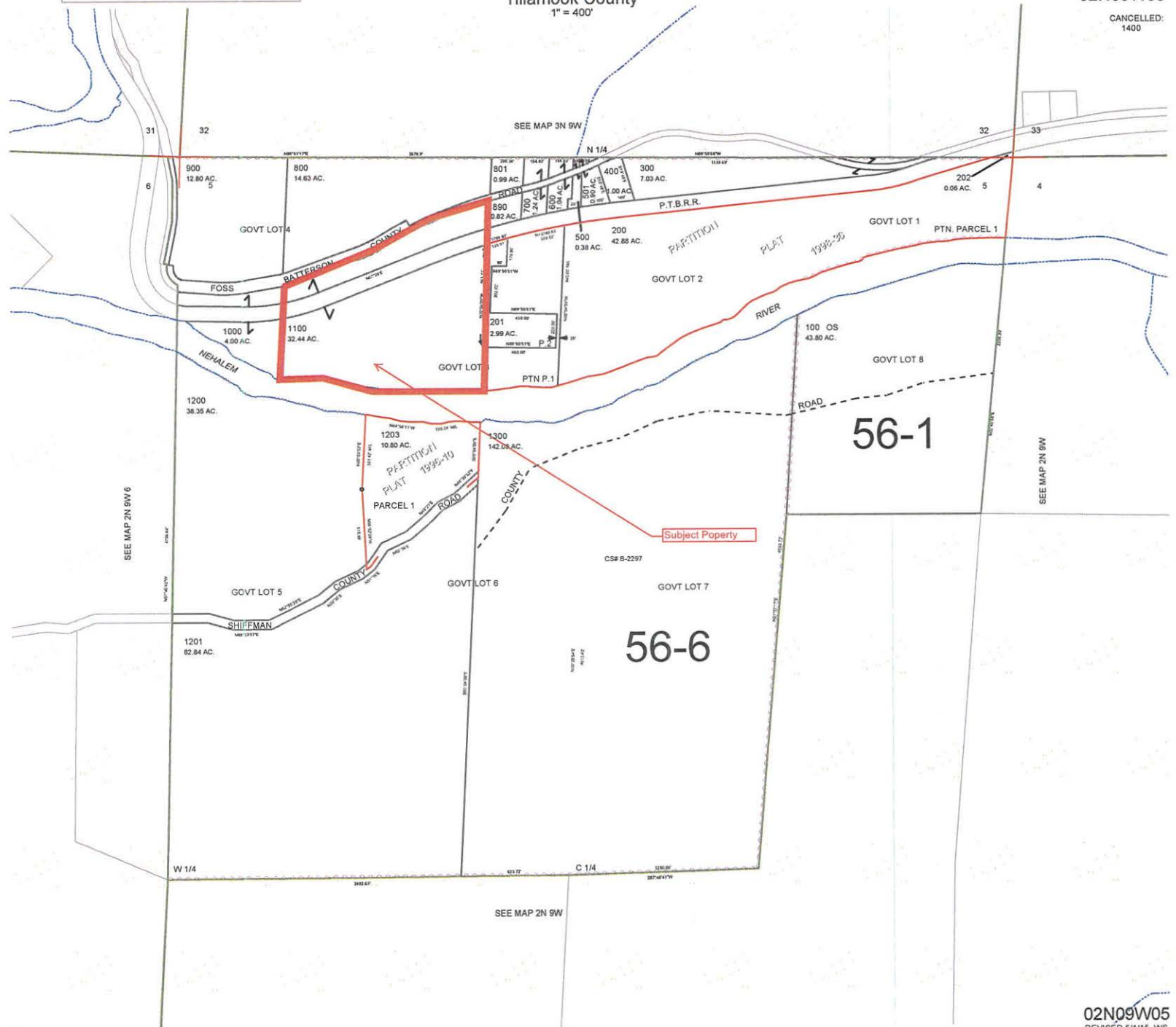


FOR ASSESSMENT AND TAXATION ONLY. NOT SUITABLE FOR  
LEGAL, ENGINEERING, OR SURVEY PURPOSES

SECTION 5 T.2N. R.9W. W.M.  
Tillamook County  
1" = 400'

02N09W05

CANCELLED:  
1400



# TILLAMOOK County Assessor's Summary Report

## Real Property Assessment Report

FOR ASSESSMENT YEAR 2020

August 10, 2021 1:26:03 pm

<b>Account #</b> 72904 <b>Map #</b> 2N09050001100 <b>Code - Tax #</b> 5606-72904  <b>Legal Descr</b> See Record  <b>Mailing Name</b> SMITH, NANCY M TRUSTEE <b>Agent</b> <b>In Care Of</b> <b>Mailing Address</b> PO BOX 399 NEHALEM, OR 97131-0399  <b>Prop Class</b> 301 <b>MA</b> <b>SA</b> <b>NH</b> <b>Unit</b> <b>RMV Class</b> 301      07   AC   RPR   31215-2	<b>Tax Status</b> ASSESSABLE <b>Acct Status</b> ACTIVE <b>Subtype</b> NORMAL  <b>Deed Reference #</b> 2014-6403 <b>Sales Date/Price</b> 11-21-2014 / \$0.00 <b>Appraiser</b> KARI FLEISHER
---	--

<b>Situs Address(s)</b>	<b>Situs City</b>
ID# 1 20805 FOSS RD	COUNTY

Code Area	RMV	MAV	Value Summary AV	RMV Exception	CPR %
5606 Land	91,740			Land	0
Impr.	170,810			Impr.	0
<b>Code Area Total</b>	<b>262,550</b>	<b>308,040</b>	<b>262,550</b>		<b>0</b>
<b>Grand Total</b>	<b>262,550</b>	<b>308,040</b>	<b>262,550</b>		<b>0</b>

Code Area	ID#	RFPD	Ex	Plan Zone	Value Source	Land Breakdown			Land Class	Trended RMV
						TD%	LS	Size		
5606	1	<input checked="" type="checkbox"/>		RI	Industrial Site	108	A	4.73	MKT	15,550
5606	1	<input checked="" type="checkbox"/>		RI	Industrial Site	108	A	19.37	MKT	63,690
5606					OSD - AVERAGE	100				12,500
<b>Grand Total</b>								<b>24.10</b>		<b>91,740</b>

Code Area	ID#	Yr Built	Stat Class	Description	Improvement Breakdown			Total Sq. Ft.	Ex% MS Acct #	Trended RMV
					TD%					
5606	1	1981	790	Miscellaneous Industrial	100		0		170,810	
<b>Grand Total</b>								<b>0</b>		<b>170,810</b>

Code Area	Type	Exemptions/Special Assessments/Potential Liability								
5606		<b>SPECIAL ASSESSMENT:</b>								
		■ SOLID WASTE	Amount	12.00	Acres	0	Year	2020		
		<b>NOTATION(S):</b>								
		■ R P R ( COUNTY RESPONSIBILITY )								

**PP Account(s):** 5606-759

**Comments:** Real Property Return (RPR) processing. gbs 8/6/02 // RPR processing with new construction as exception for 2003. gbs 8/22/03 // .27 acre partitioned from this site to create TL# 1100S1 (409593) per lease from Nancy M. Smith to the City of Wheeler. No change in value. gbs 9/11/03 // RPR processing for 2004. gbs 7/16/04 // RPR processing for 2005. gbs 4/19/05 7/26/06 RPR Processing for 2006. KF // 8/17/07 RPR Processing for 2007. KF // 4/22/08 RPR Processing for 2008-09. KF 6/2/09 RPR Processing for 2009/10. KF 7/21/09 Adjusted acreage per cartographer and moved 27.44 acres to code 56.01 due to dual fire coverage. KF 4/1/10 RPR Processing for 2010/11. KF 3/18/11 RPR Processing for 2011/12. KF 5/16/12 RPR Processing for 2012/13. KF 5/16/12 RPR Processing for 2012/13. KF 5/16/13 Confirmed farming activity with owner. Moved 8.07 acres of farm land to new S2 account. EJ. 4/23/14 RPR Processing for 2014/15. KF 3/11/15 IPR Processing for 2015/16. Tabled land. KF 6/17/16 RPR Processing for 2016/17. KF 6/5/17 RPR Processing for 2017/18. KF 6/15/18 RPR Processing for 2018/19. KF 5/6/19 RPR Processing for 2019/20. KF 4/22/20 RPR Processing for 2020/21. KF 7/23/20 Removed FP per ODF. LM

**Tillamook County Assessor**  
**Personal Property Assessment Summary Report**  
 For Assessment Year 2020

Account # 759

NEHALEM BAY READY MIX, MSG LLC  
 MOHLER SAND & GRAVEL, LLC  
 SMITH, BRETT A  
 PO BOX 399  
 NEHALEM OR 97131

**Tax Status** Assessable  
**Acct Status** Active  
**Business Class** 765 ROCK/ CEMENT & GRAVEL  
**Return Mailed**  
**Last Transaction** 4/22/2020  
**Process Code** RPR

Code Area	Tax Account	AV	RMV	RMV Exception
5606	282358	\$1,471,780	\$1,471,780	\$15,050
<b>Total</b>		<b>\$1,471,780</b>	<b>\$1,471,780</b>	<b>\$15,050</b>

Real Acct ID	Code Area	Address
72904	5606	20805 FOSS RD COUNTY

Notation	Comments
OMITTED PROPERTY - ADD'L TAX OWING 311.216 - 232	NEW EQUIPMENT RAISED AV FOR 2007, OMIT PROCESSED FOR 2008/AJD



# National Flood Hazard Layer FIRMette



123°49'23"W 45°41'43"N



### Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Area of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile (Zone J)
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance
		17.5 Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
OTHER FEATURES		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

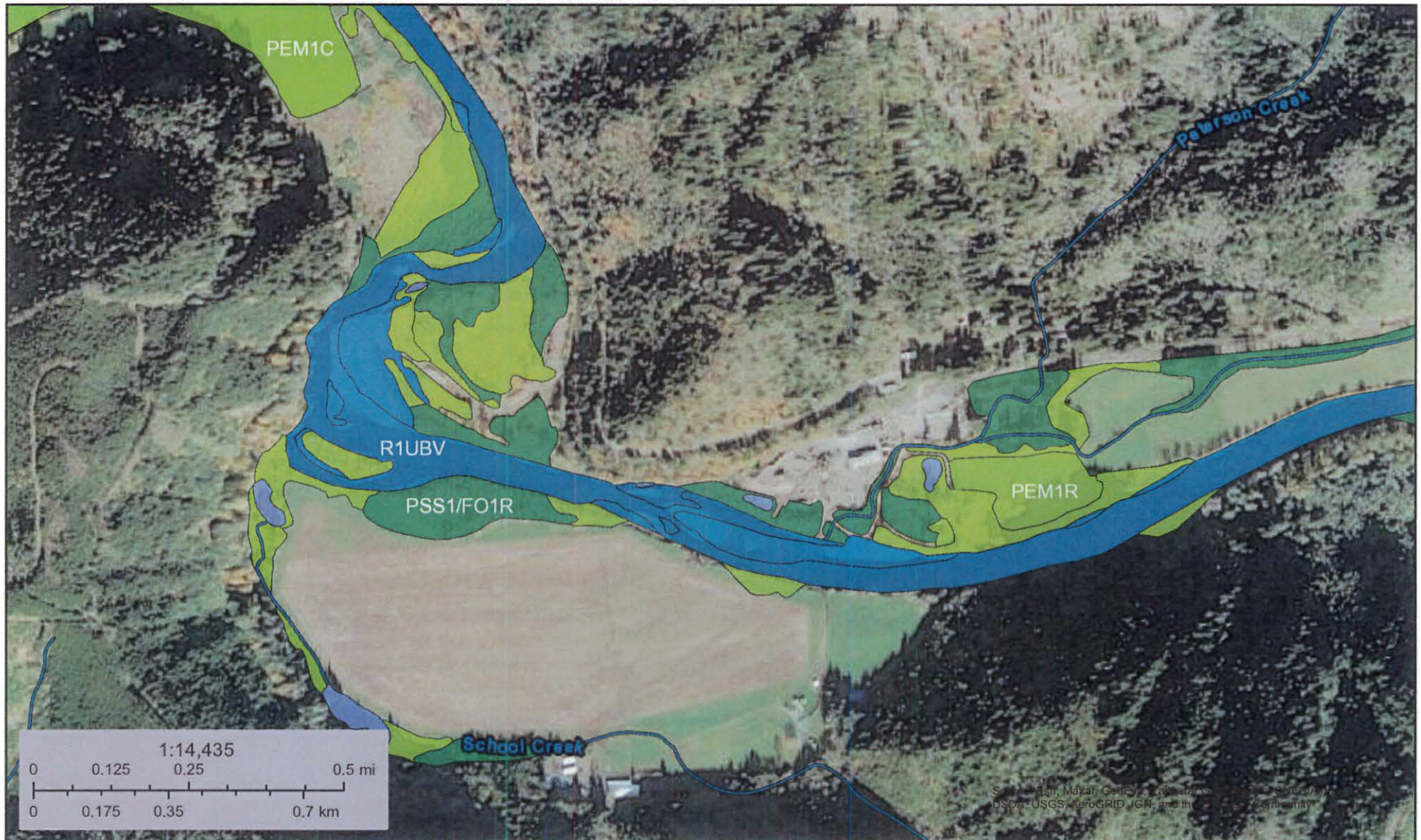
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/10/2021 at 4:24 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.









This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

0 250 500 1,000 1,500 2,000 Feet 1:6,000 123°48'45"W 45°41'18"N



August 10, 2021

**Wetlands**

- |   |                                |   |                                   |   |          |
|---|--------------------------------|---|-----------------------------------|---|----------|
|  | Estuarine and Marine Deepwater |  | Freshwater Emergent Wetland       |  | Lake     |
|  | Estuarine and Marine Wetland   |  | Freshwater Forested/Shrub Wetland |  | Other    |
|   |                                |  | Freshwater Pond                   |  | Riverine |

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

# EXHIBIT B



Tillamook County Department of Community Development  
 1510-B Third Street, Tillamook, OR 97141 | Tel: 503-842-3408 Fax: 503-842-1819  
[www.co.tillamook.or.us](http://www.co.tillamook.or.us)

## PLANNING APPLICATION

Name: Todd Boswell (Rep) Phone: 503 686 4470  
 Address: 35980 Underhill lane  
 City: Nehalem State: OR Zip: 97131  
 Email: Boswell.todd@gmail.com

**Property Owner Name:** Mohler Sand & Gravel Phone: 5033685157  
 Address: 20805 Foss Rd  
 City: Nehalem State: OR Zip: 97131

**Applicant X** (Check Box if Same as Property Owner)

Email: [mohlersand@nehalem.tel.net](mailto:mohlersand@nehalem.tel.net)

<b>TOFFICE USE ONLY</b>	
Date Stamp	<b>RECEIVED</b> MAR 19 2021 BY: <i>DD</i>
<input type="checkbox"/> Approved	<input type="checkbox"/> Denied
Received by:	<i>SS</i>
Receipt #:	<i>119694</i>
Fees:	<i>983.00</i>
Permit No:	<i>85121-000096-PLNG</i>

**Request:**

We are obtaining a Floodway Development permit based on recommendations made from the LUCS type 1 permit process. An H & H study was completed and now the type 2 application process will be review by Tillamook county planning. Mohler Sand & Gravel is not proposing new activities at this time. The gravel extraction process was detailed as an attachment to the LUCS application and is also included with this application as well.

*\* H & H Study already submitted to Melissa Jenck thru email correspondences w/ Ed Salminen*

Type II

Type III

Type IV

- Farm/Forest Review
- Conditional Use Review
- Variance
- Exception to Resource or Riparian Setback
- Nonconforming Review (Major or Minor)
- Development Permit Review for Estuary Development
- Non-farm dwelling in Farm Zone
- Foregone Grading Permit Review
- Neskowin Coastal Hazards Area

- Appeal of Director's Decision
- Extension of Time
- Detailed Hazard Report
- Conditional Use (As deemed by Director)
- Ordinance Amendment
- Map Amendment
- Goal Exception

- Appeal of Planning Commission Decision
- Ordinance Amendment
- Large-Scale Zoning Map Amendment
- Plan and/or Code Text Amendment

**Location:**

Site Address:

Map Number

: 2N Township      9W Range      5 Section      #201,200,1000,1100 Tax Lot(s)

Clerk's Instrument #: \_\_\_\_\_ **Authorization**

This permit application does not assure permit approval. The applicant and/or property owner shall be responsible for obtaining any other necessary federal, state, and local permits. The applicant verifies that the information submitted is complete, accurate, and consistent with other information submitted with this application.

Fred A. Smith

Property Owner Signature (Required)

3-15-2021

Date

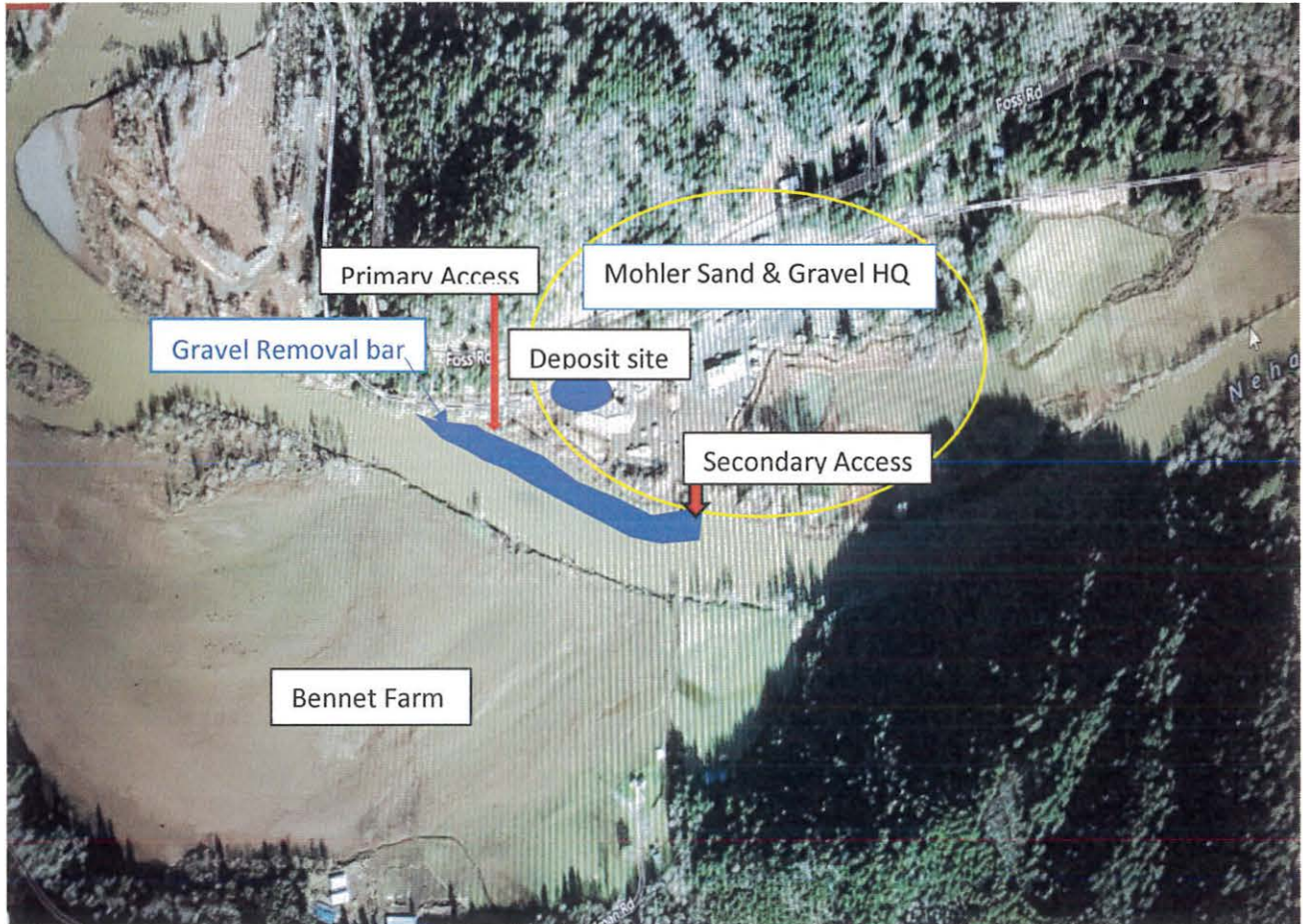
John B. Borell

Applicant Signature

3-16-2021

Date

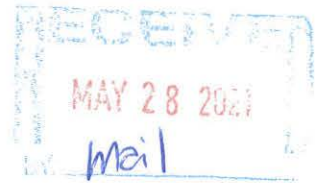
**Map of Nehalem River**  
**Surrounding the Mohler Sand and Gravel Company Property**  
**Details of Gravel Removal Operations**



Scale =====  
500m

**Map points of interest**

- The Bar where Gravel Removal is conducted is conveniently located adjacent to the Mohler Sand & Gravel Company Headquarters
- One single access point to the gravel bar for excavators, dump trucks, and vehicles.
- None of the operations from access to bar sculping require contact with the water
- All activities for gravel removal are conducted during the lowest flows of the year when the bar is high and dry
- Buffer strips are located on both side of the removal area to protect the river water on one side and the stream bank on the other
- During low flows the Nehalem river is a narrow single channel and runs along the terrace next to the Bennet farm



ENGINEERING "NO-RISE" CERTIFICATION

This is to certify that I am a duly qualified engineer licensed to practice in the State of Oregon.

It is to further certify that the attached technical data supports the fact that proposed Mohler Sand and Gravel LLC gravel extraction will not impact the 100-year flood elevations, floodway elevations and floodway widths on the Nehalem River at published sections in the Flood Insurance Study for Tillamook County, Oregon, And Unincorporated Areas dated 9/28/2018 and will not impact the 100-year flood elevations, floodway elevations, and floodway widths at unpublished cross-sections in the vicinity of the proposed development.

Attached are the following documents that support my findings:

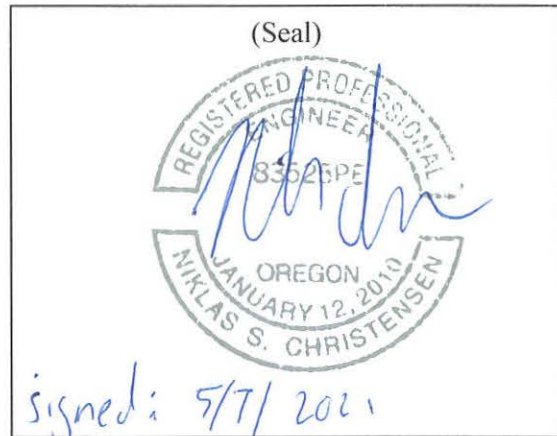
- Mohler Sand and Gravel Hydrologic and Hydraulic Analysis, September 21, 2020
- Appendix 1 – Original FEMA models (PDF documents)
- Appendix 2 – Reconstructed Original FEMA model (HEC-RAS model)
- Appendix 3 – Modified FEMA model – pre gravel extraction (HEC-RAS model)
- Appendix 4 – Modified FEMA model – post gravel extraction (HEC-RAS model)

Date 5/7/2021

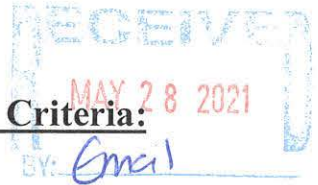
Signature *Niklas S. Christensen*

Title engineer / partner

Address WPN  
701 June Street  
Hood River, OR  
97031



**TLCUO SECTION 3.510(14)(b) Development Permit Review Criteria:**



(1) The fill is not within a Coastal High Hazard Area.

**No, it is not.**

(2) Fill placed within the Regulatory Floodway shall not result in any increase in flood levels during the occurrence of the base flood discharge.

**Gravel is extracted from the floodway and stockpiled primarily outside of the floodway. The net is a decrease in material within the floodway and no increase in flood levels are modeled during the base flood discharge.**

(3) The fill is necessary for an approved use on the property.

**Yes, the fill is gravel (round rock aggregate) extraction to be used to create concrete**

(4) The fill is the minimum amount necessary to achieve the approved use.

**Yes, the USACE permit details a maximum removal is 10,000 to 15,000 cubic yards- minimum would be 3,000 to 5,000 cubic yards-average would be 8,000 cubic yards. Looking back last decade the average gravel extraction is right around 5,000 cubic yards looking at pre and post survey data completed each year.**

(5) No feasible alternative upland locations exist on the property.

**There is no feasible alternative. USACE has worked with Mohler S & G to develop an alternative analysis document to investigate this. It was concluded that no feasible alternative upland location exists on the property or within a local area.**

(6) The fill does not impede or alter drainage or the flow of floodwaters.

**No**

(7) If the proposal is for a new critical facility, no feasible alternative site is available.

**This is not a new facility. This facility has been in operation for over 50 years. No new sites or methods are being proposed for gravel extraction.**

(8) For creation of new, and modification of, Flood Refuge Platforms, the following apply, in addition to (14)(a)(1-4) and (b)(1-5):

i. The fill is not within a floodway, wetland, riparian area or other sensitive area regulated by the Tillamook County Land Use Ordinance.

ii. The property is actively used for livestock and/or farm purposes,

iii. Maximum platform size = 10 sq ft of platform surface per acre of pasture in use, or 30 sq ft per animal, with a 10-ft wide buffer around the outside of the platform,

iv. Platform surface shall be at least 1 ft above base flood elevation,

v. Slope of fill shall be no steeper than 1.5 horizontal to 1 vertical,



vi. Slope shall be constructed and/or fenced in a manner so as to prevent and avoid erosion.

Conditions of approval may require that if the fill is found to not meet criterion (5), the fill shall be removed or, where reasonable and practical, appropriate mitigation measures shall be required of the property owner. Such measures shall be verified by a certified engineer or hydrologist that the mitigation measures will not result in a net rise in floodwaters and be in coordination with applicable state, federal and local agencies, including the Oregon Department of Fish and Wildlife.

# Mohler Sand and Gravel Company

## Gravel Removal Site Plan

2019

### Site Description

The Nehalem River is the longest coastal river in Oregon with a mainstem length of 126 miles. The site used for gravel extraction is located approximately ½ mile above the head of tide water. Gravel extraction activities have been conducted at this location by Mohler Sand and Gravel Company for over four decades. The site's valley and channel geomorphology located 5 river miles below a major reach change is a major reason why it's been so successful in being a renewable resource for so long. This location is where the Nehalem River transitions from a narrow steep valley with a constrained channel to a broad valley that is unconstrained and floods over its banks during high water flood events usually every 10 years or so. This significant change in river habitat characteristics can also be observed by a decrease in the river's gradient. By the reduction in stream gradient the substrate changes from being dominated by bedrock in the steep valley (upstream of the Foss road bridge (MP 7.5)) to a gravel dominated reach in the broad valley, which continues to the Hwy 53 bridge (Approx. 10 river miles in length).

The extraction site for Mohler Sand and Gravel is approximately 500 yards in total length and is located within the last two river miles of this broad valley reach. The site selection for gravel removal is an ideal location to take advantage of gravel deposition just before the river becomes tidal. In the winter during high flow events the river at this location flows back over this gravel bar and stays underwater for months at a time, which enables it to deposit a significant amount of gravel to be harvested annually. Historically, since operations have begun if precipitation is abnormally low or below average then less or no gravel is extracted that year. Below the extraction site the river continues to have a gravel dominated substrate for another 1.5 miles until the river gradient reduces further. As this occurs the substrate then changes to be dominated by Silt/Organics common in lowland river and estuary ecosystems. Another important characteristic to be highlighted is the lack of historical Salmon spawning observed surrounding this area of the river. This is based on ODFW Spawner Survey data (ODFW Corvallis research lab) within this stream reach for Chinook, Coho, steelhead, and Chum. Three factors that attribute to historical lack of spawning here are: 1) River reach is very low in the system 2) River Velocities are too strong for successful spawning and redd survival 3) This river reach is considered more of a migration corridor for adult salmon traveling further up river to get to major tributaries for spawning.

## Extraction Plan and Need

Every year the site of gravel removal is graded back to the level from the last years dry season after operations are complete. Mohler Sand and Gravel Company hires a qualified/licensed survey team to survey the bar before removal and again afterwards to ensure consistent levels are guaranteed year after year. These survey results are submitted to DSL for review. This process of collecting pre and post data points of contour and elevation allows for consistent and limited activities so it is sustainable for future decades to come.

Activities for gravel removal is done with dump trucks and excavators during the lowest flows of the year, which is typically in the mid to late summer season. Working during this time frame allows the operators to not go near the low flow wetted width and disturb water quality while operations are under way. Obviously by removing gravel and sand the bar on site will be disturbed. However, grading and buffer strips performed the day of completion or the day after to lessen disturbance impacts when water flows rise again in the fall season. It is also important to note that the bar is completely high and dry during operations. No damming occurs on the river as the river is free flowing above and below the site.

The access for industrial equipment (dump trucks and other vehicles) to the site follows one access point, so to not disturb the river banks natural vegetation of trees and shrubs. All fueling of trucks and equipment is done off bar above the high-water mark where the Mohler Sand and Gravel Company Headquarters is located (less than 1 mile away). Spill kits are readily available for anything which may occur. The extensive experience the Mohler Sand and Gravel team has had at this location allows them to use proven methods that have been refined and acceptable by USACE and DSL to conduct the most efficient extraction methods with minimal disturbance for this site.

River Rock and Sand are a very much needed commodity in the landscape, construction trades, and road/bridge building projects. This type of rock is a very hard source and the operators need to have access to this site to extract this valuable resource and provide it to the state, county, and public as needs arise. Everything removed is processed for sale and there is no waste. Continued gravel extraction in a responsible way allows this resource to be readily available for projects throughout Tillamook County. Without this operation to obtain this valuable resource there would be a huge negative impact on the feasibility to conduct basic infrastructure jobs throughout Tillamook county.

\*Two maps are included to illustrate site location and removal plan.

# Map of Lower Nehalem

## Basin Overview with Gravel Extraction Site

### &

## Changes in Channel and Valley Geomorphology



Scale =====500m

**Below Reach 1**-Tidally influence lowland river ecosystem in a single channel with a wide active floodplain. Minor flooding can occur frequently during moderate rainfalls if there are high tides occurring. The lowland river transitions into the Nehalem Bay just past the Town of Nehalem near the Hwy 101 bridge. The substrate is Fines/Silt Organics typical of estuaries in the PNW.

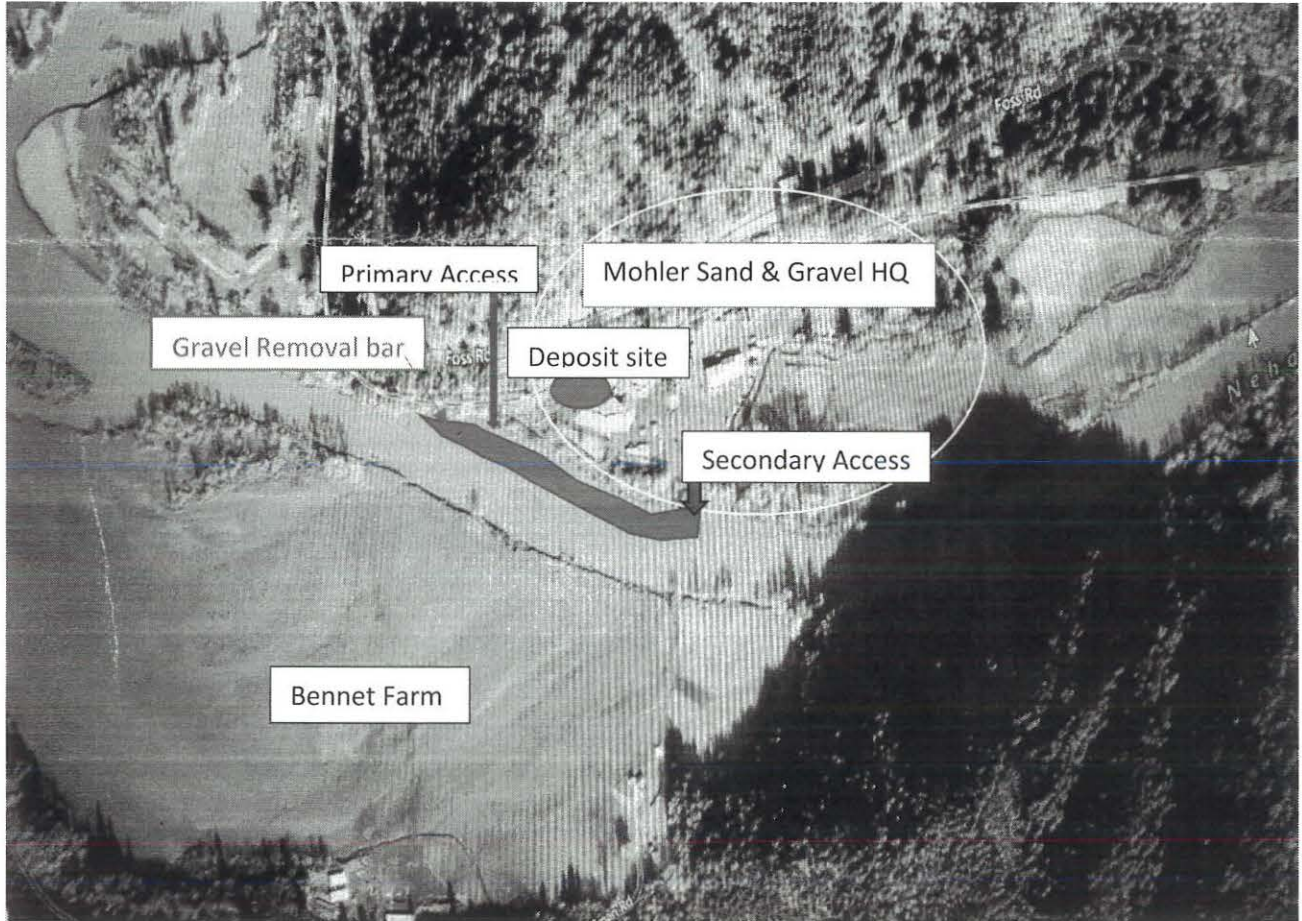
**Reach 1** – Broad Valley with a single channel constrained by high terraces. This reach has a wide active floodplain during extreme high-water events. Begins at the confluence with Foley Creek and is also close to the head of tidewater. Substrate is dominated by gravel

**Reach 2** – Narrow Valley with channel constrained by hillslopes. There is no floodplain in this reach due to the steep hillslopes on both sides of the river. Begins at the Foss road bridge just below Nehalem falls. The stream gradient increases in this reach and is dominated by bedrock substrate.

# Map of Nehalem River

## Surrounding the Mohler Sand and Gravel Company Property

### Details of Gravel Removal Operations



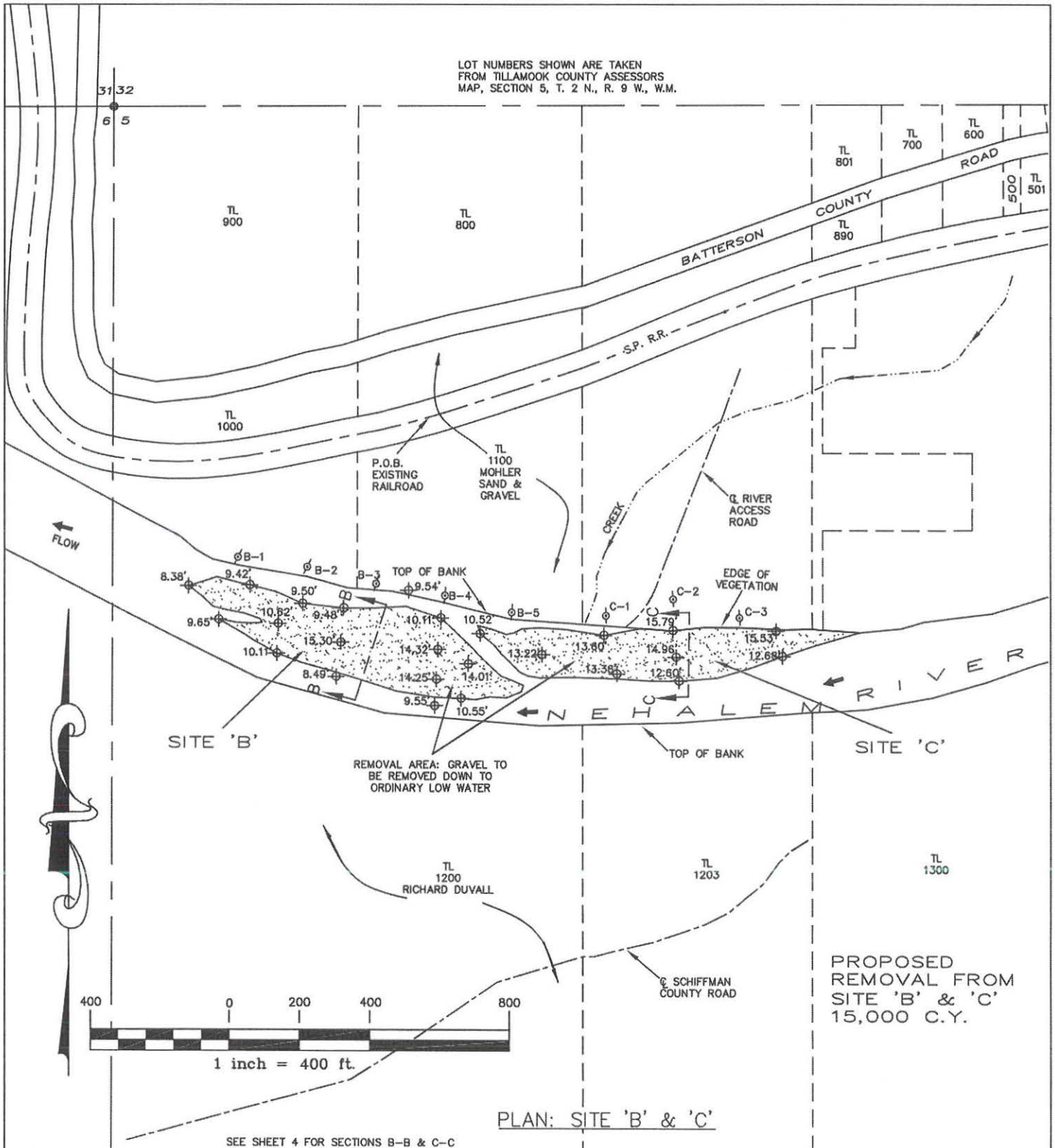
Scale =====

500m

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- One single access point to the gravel bar for excavators, dump trucks, and vehicles.
- None of the operations from access to bar sculping require contact with the water
- All activities for gravel removal are conducted during the lowest flows of the year when the bar is high and dry
- Buffer strips are located on both side of the removal area to protect the river water on one side and the stream bank on the other
- During low flows the Nehalem river is a narrow single channel and runs along the terrace next to the Bennet farm

LOT NUMBERS SHOWN ARE TAKEN FROM TILLAMOOK COUNTY ASSESSORS MAP, SECTION 5, T. 2 N., R. 9 W., W.M.



SURVEY FOR:

MOHLER SAND & GRAVEL  
 PROPOSED GRAVEL REMOVAL  
 NEHALEM RIVER  
 SITE 'B' & 'C' PLAN

"S-BAR4"

0367-1181-02.DWG

SECTION 5, T2N, R9W, W.M.  
 TILLAMOOK COUNTY OREGON

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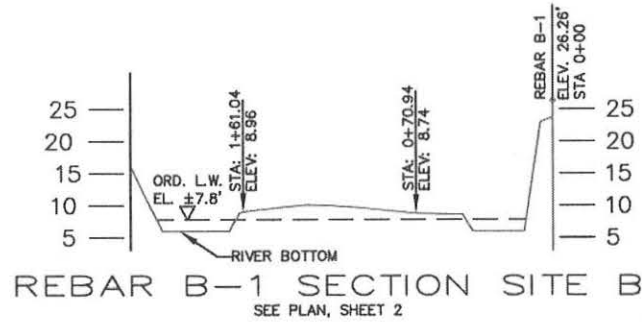
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SHEET

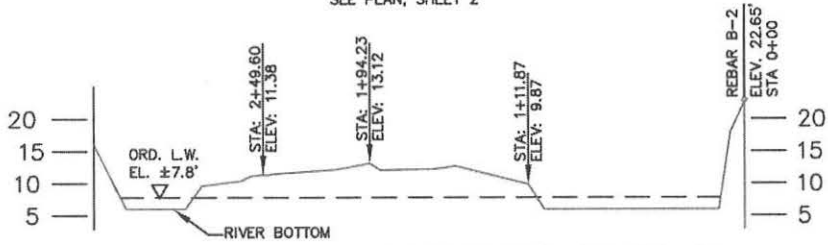
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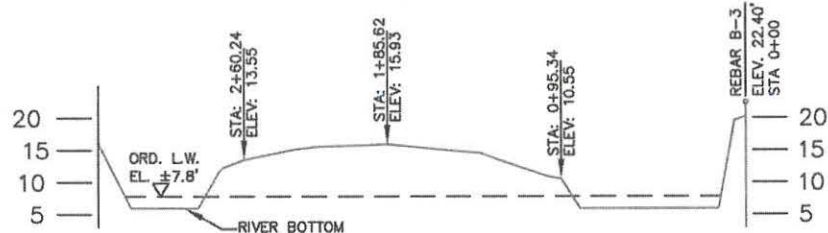
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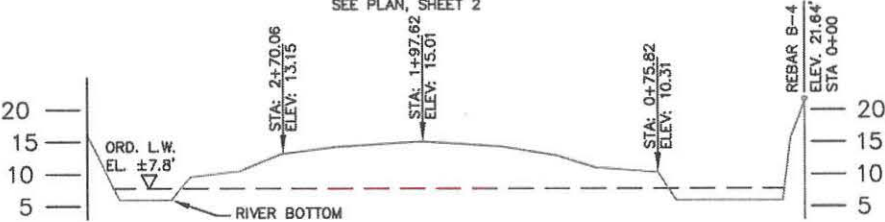
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SEE PLAN, SHEET 2



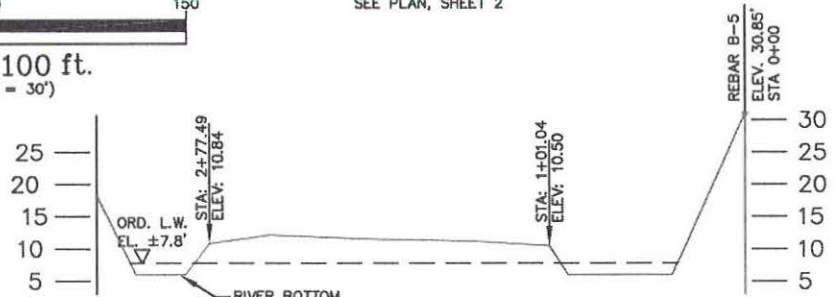
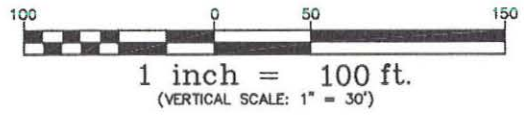
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SEE PLAN, SHEET 2



REBAR B-3 SECTION SITE B  
SEE PLAN, SHEET 2



REBAR B-4 SECTION SITE B  
SEE PLAN, SHEET 2



REBAR B-5 SECTION SITE B  
SEE PLAN, SHEET 2

SURVEY FOR:  
**MOHLER SAND & GRAVEL**  
 PROPOSED GRAVEL REMOVAL  
 NEHALEM RIVER  
 SITE 'B' & 'C' PLAN  
 SECTION 5, T2N, R9W, W.M.  
 TILLAMOOK COUNTY OREGON

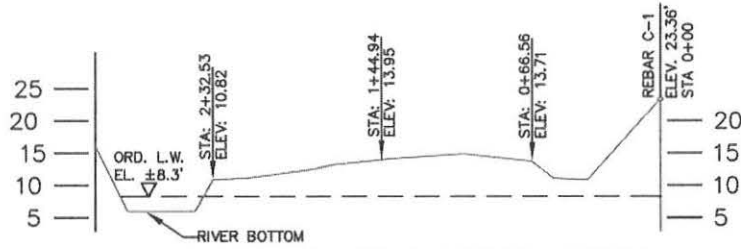
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SHEET  
**2**  
 OF 5

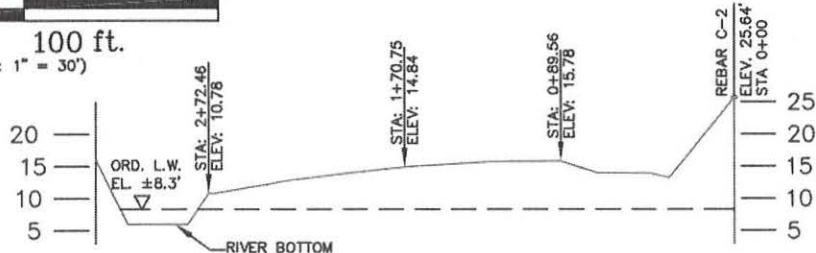


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SEE PLAN, SHEET 2

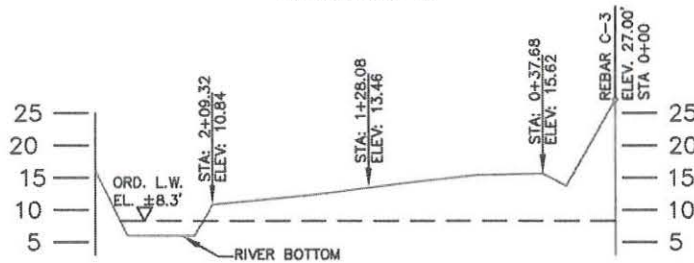


1 inch = 100 ft.  
(VERTICAL SCALE: 1" = 30')



REBAR C-2 SECTION SITE C

SEE PLAN, SHEET 2



REBAR C-3 SECTION SITE C

SEE PLAN, SHEET 2

SUPPLEMENTAL INFORMATION

TO ACCOMPANY JOINT APPLICATION FOR GRAVEL REMOVAL AT RIVER MILE 9.3 (SITE 'A'), AND RIVER MILE 9.8 (SITE 'B' & 'C') ON THE NEHALEM RIVER  
MOHLER SAND & GRAVEL, APPLICANT.

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SURVEY FOR:

MOHLER SAND & GRAVEL  
PROPOSED GRAVEL REMOVAL  
NEHALEM RIVER  
SITE 'B' & 'C' PLAN

SECTION 5, T2N, R9W, W.M.  
TILLAMOOK COUNTY OREGON

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0367-1181-2002-02.DWG

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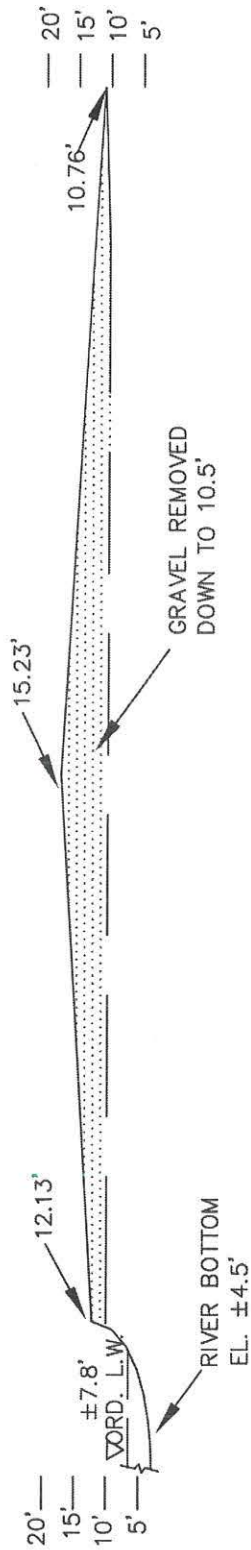
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OF 5

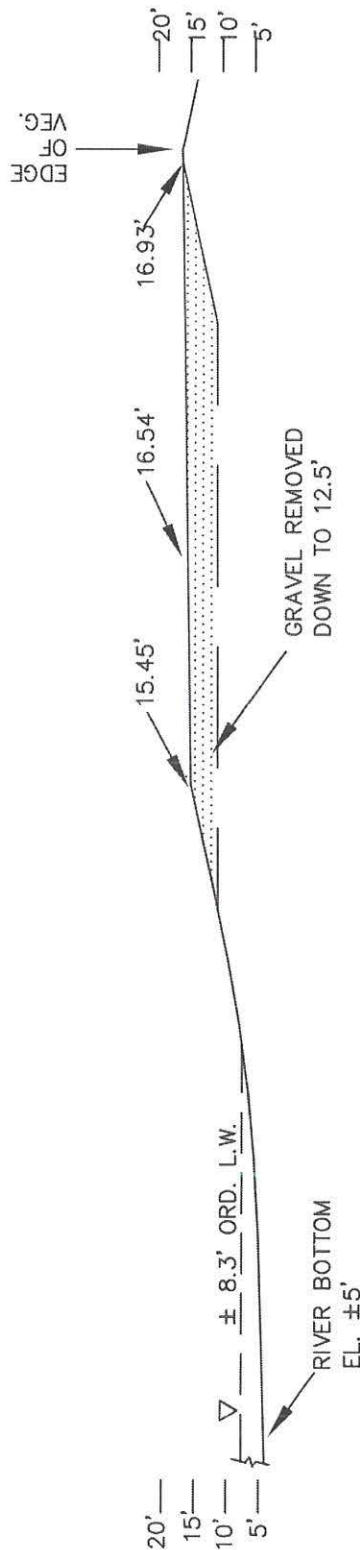
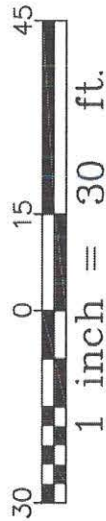
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SECTION B — SITE B

SEE PLAN,  
SHEET 1



SECTION C — SITE C

SEE PLAN,  
SHEET 1



SURVEY FOR:

**MOHLER SAND & GRAVEL**

PROPOSED GRAVEL REMOVAL  
NEHALEM RIVER  
SITE 'B' & 'C' PLAN

SECTION 5, T2N, R9W, W.M.  
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SHEET

**4**

OF 5

DATE	JOB NO.	FIELD	DRAWN	CHECKED
AUGUST 28, 2002	0367-11814	JPR/PJG	KKA	RGL

**SURVEY FOR:**

**MOHLER SAND & GRAVEL**

PROPOSED GRAVEL REMOVAL  
NEHALEM RIVER  
SITE 'B' & 'C' PLAN

"S-BAR4"

SECTION 5, T2N, R9W, W.M.  
TILLAMOOK COUNTY OREGON

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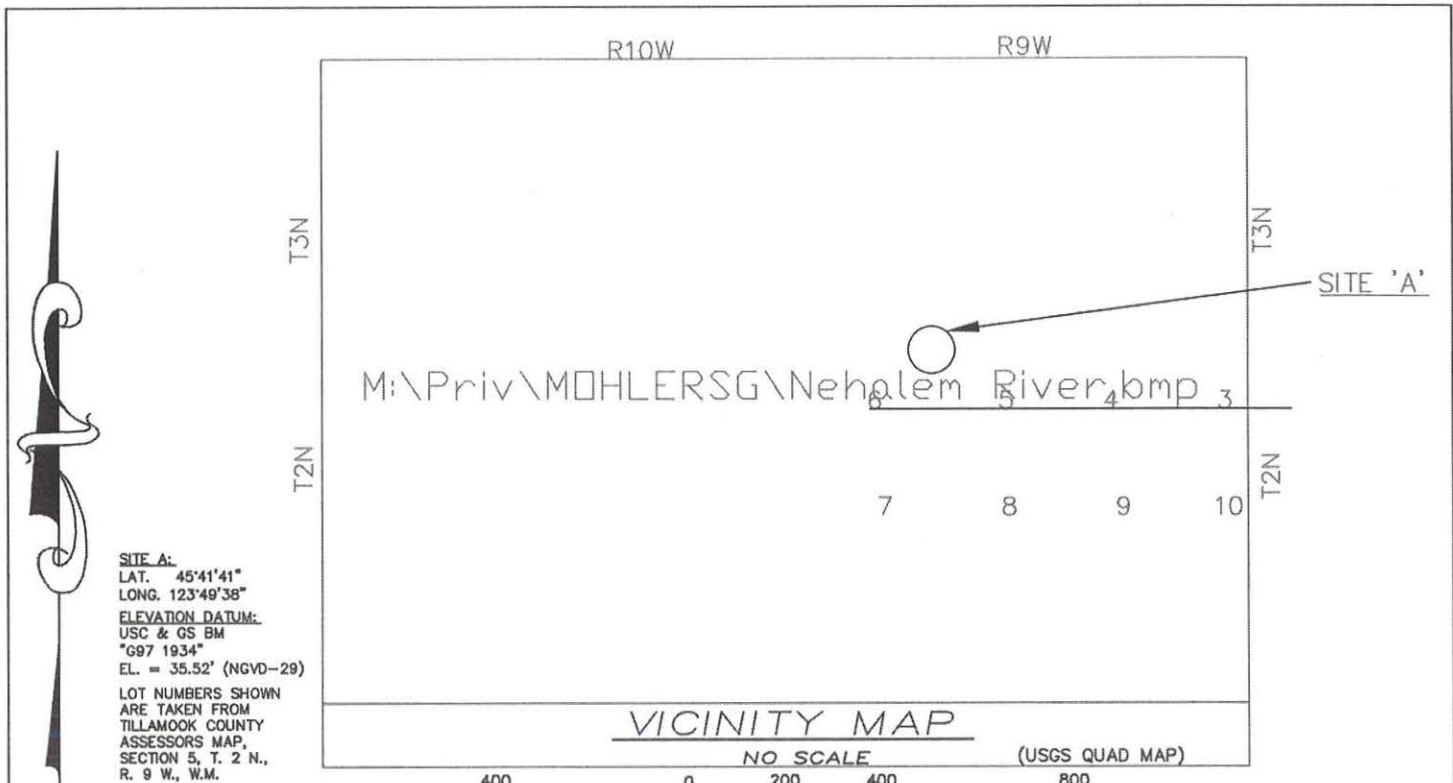
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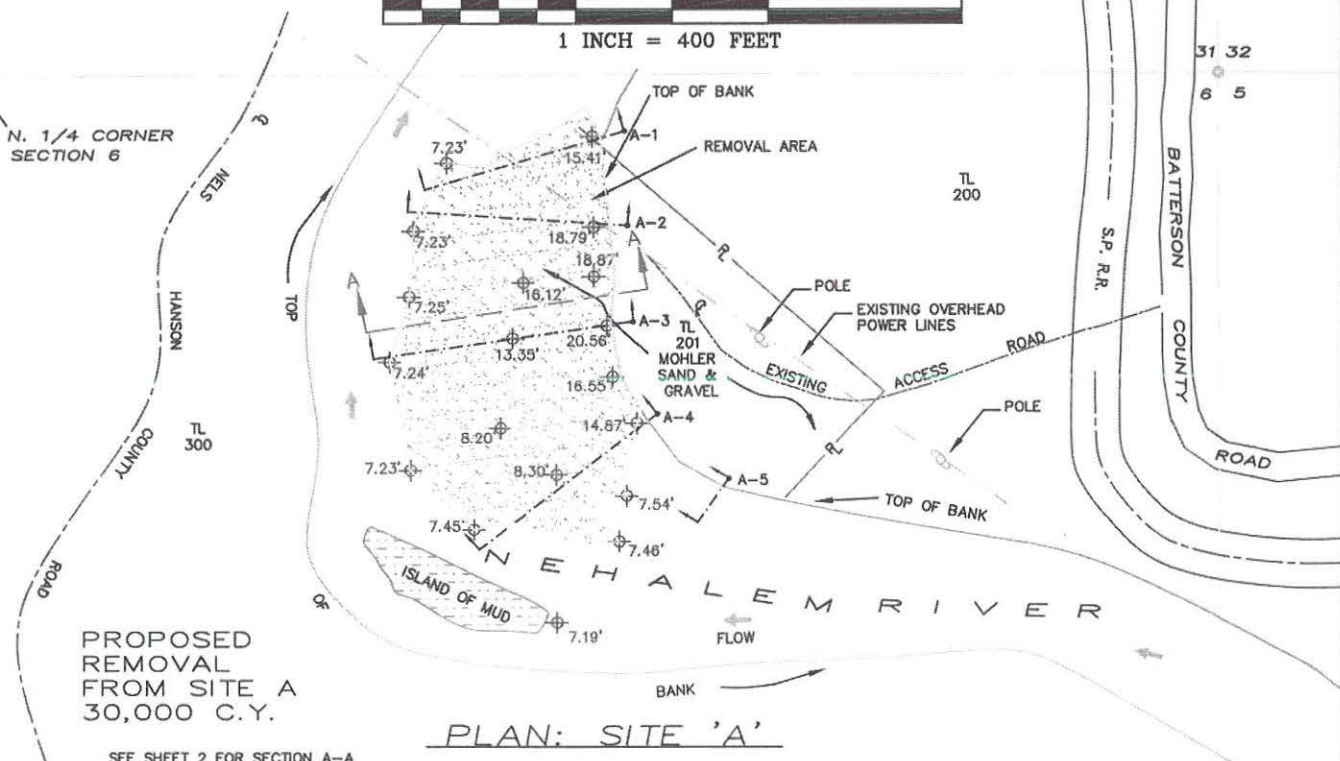
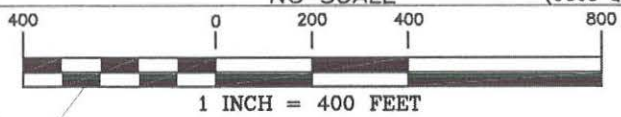
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OF **5**

DATE	JOB NO.	FIELD	DRAWN	CHECKED
AUGUST 28, 2002	0367-11814	JPR/PJG	KKA	RGL



**SITE A:**  
 LAT. 45°41'41"  
 LONG. 123°49'38"  
**ELEVATION DATUM:**  
 USC & GS BM  
 "G97 1934"  
 EL. = 35.52' (NGVD-29)  
 LOT NUMBERS SHOWN  
 ARE TAKEN FROM  
 TILLAMOOK COUNTY  
 ASSESSORS MAP,  
 SECTION 5, T. 2 N.,  
 R. 9 W., W.M.



**SURVEY FOR:**  
**MOHLER SAND & GRAVEL**  
 PROPOSED GRAVEL REMOVAL  
 NEHALEM RIVER  
 SITE "A" PLAN  
 SECTION 6, T2N, R9W, W.M.  
 TILLAMOOK COUNTY OREGON

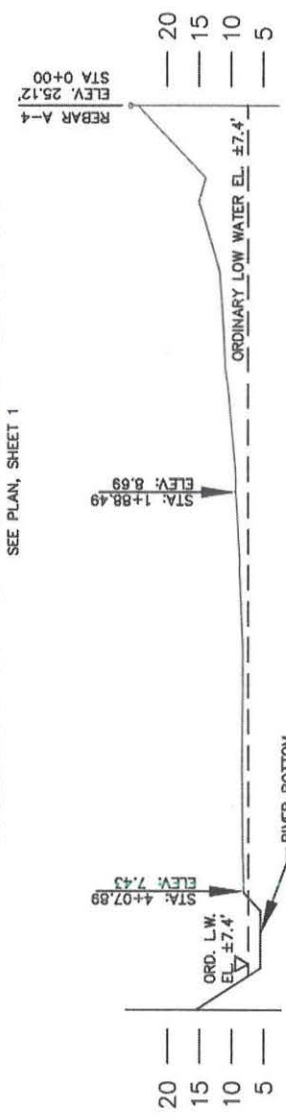
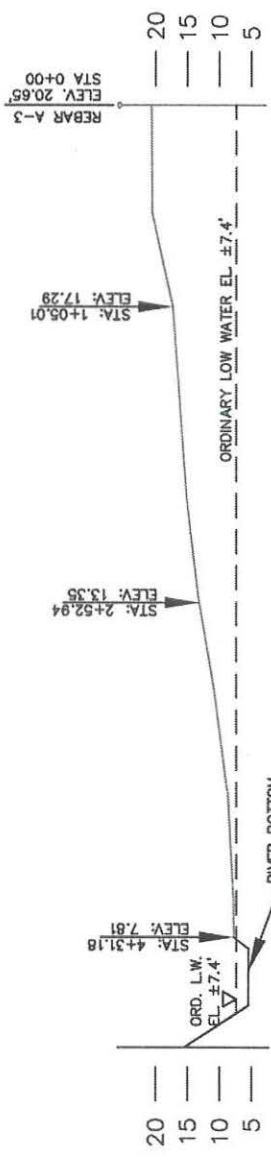
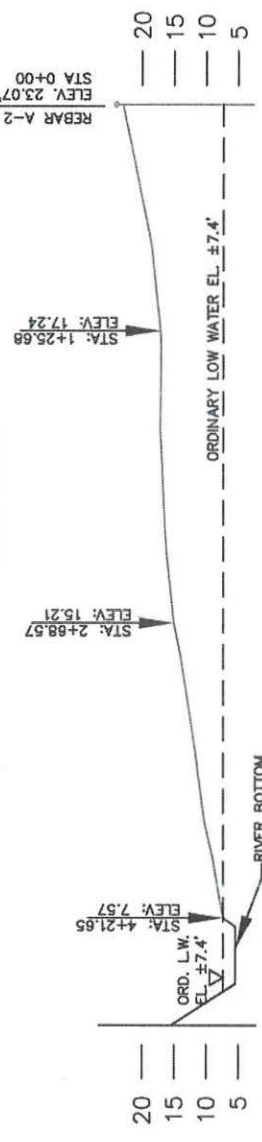
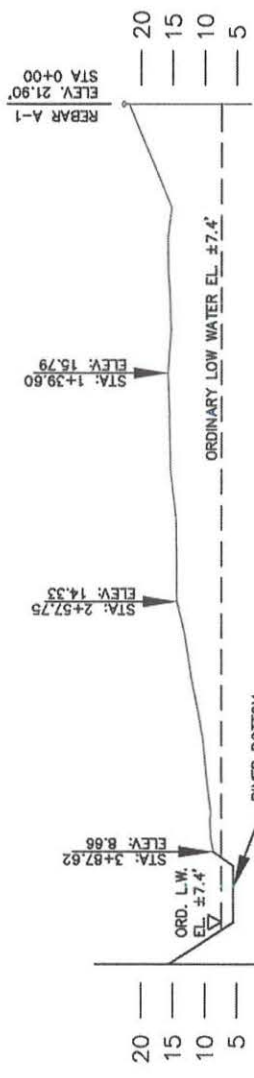
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SHEET  
**1**  
 OF 4



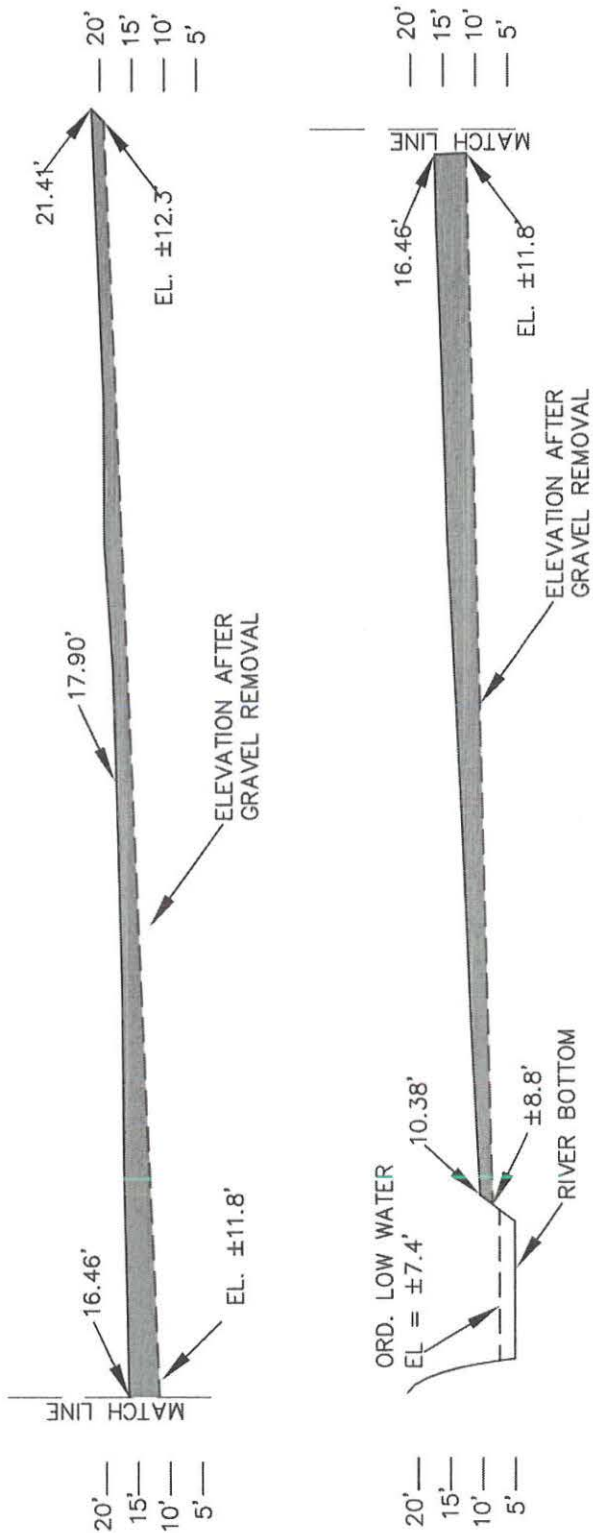
SURVEY FOR:  
**MOHLER SAND & GRAVEL**  
 PROPOSED GRAVEL REMOVAL  
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 SITE "A" PLAN  
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 TILLAMOOK COUNTY OREGON

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SHEET  
**2**

DATE AUGUST 06, 2002	JOB NO. 0367-11814	FIELD JPR/PJG	DRAWN KKA	CHECKED RGL
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OF 4



**SUPPLEMENTAL INFORMATION**

TO ACCOMPANY JOINT APPLICATION FOR GRAVEL REMOVAL AT RIVER MILE 9.3 (SITE 'A'), AND RIVER MILE 9.8 (SITE 'B') ON THE NEHALEM RIVER MOHLER SAND & GRAVEL, APPLICANT.

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**SURVEY FOR:**  
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 PROPOSED GRAVEL REMOVAL  
 NEHALEM RIVER  
 SITE "A" PLAN  
 SECTION 6, T2N, R9W, W.M.  
 TILLAMOOK COUNTY OREGON

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SHEET

**3**

OF 4

DATE AUGUST 06, 2002	JOB NO. 0367-11814	FIELD JPR/PJG	DRAWN KKA	CHECKED RGL
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SURVEY FOR:

**MOHLER SAND & GRAVEL**

PROPOSED GRAVEL REMOVAL  
NEHALEM RIVER  
SITE "A" PLAN

"G-BAR4"

SECTION 6, T2N, R9W, W.M.  
TILLAMOOK COUNTY OREGON

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SHEET

**4**

OF **4**

DATE	JOB NO.	FIELD	DRAWN	CHECKED
AUGUST 06, 2002	0367-11814	JPR/PJG	KKA	RGL

# **Mohler Sand and Gravel Hydrologic and Hydraulic Analysis**

## **Prepared for**

Mohler Sand & Gravel, LLC

PO Box 399

Nehalem, OR 97131

## **Prepared by**

Ed Salminen

Niklas Christensen, P.E.

Watershed Professionals Network

PO Box 8, Mount Hood Parkdale, OR 97041

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

**September 21, 2020**

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# Overview

## Purpose and Scope

Mohler Sand and Gravel LLC has extracted gravel from gravel bars within the active channel of the Nehalem River for over four decades. The operation occurs on and adjacent to company-owned property on the north (right) bank of the Nehalem River from approximately river mile (RM) 9 - 10 (Figure 1). The operation is located at a natural geomorphic break between the relatively steep and confined upstream transport reach, and the lower gradient unconfined downstream reach, at or close to the head of tide. Gravel is extracted from gravel bars during the summer months and stockpiled outside of the mapped floodway, with year around transport offsite. In-channel gravel deposits are replenished by winter and spring storm events. No change is planned in ongoing operations. The purpose of this analysis is to evaluate likely changes in base flood (100-year recurrence interval flood) elevations associated with ongoing annual operations.

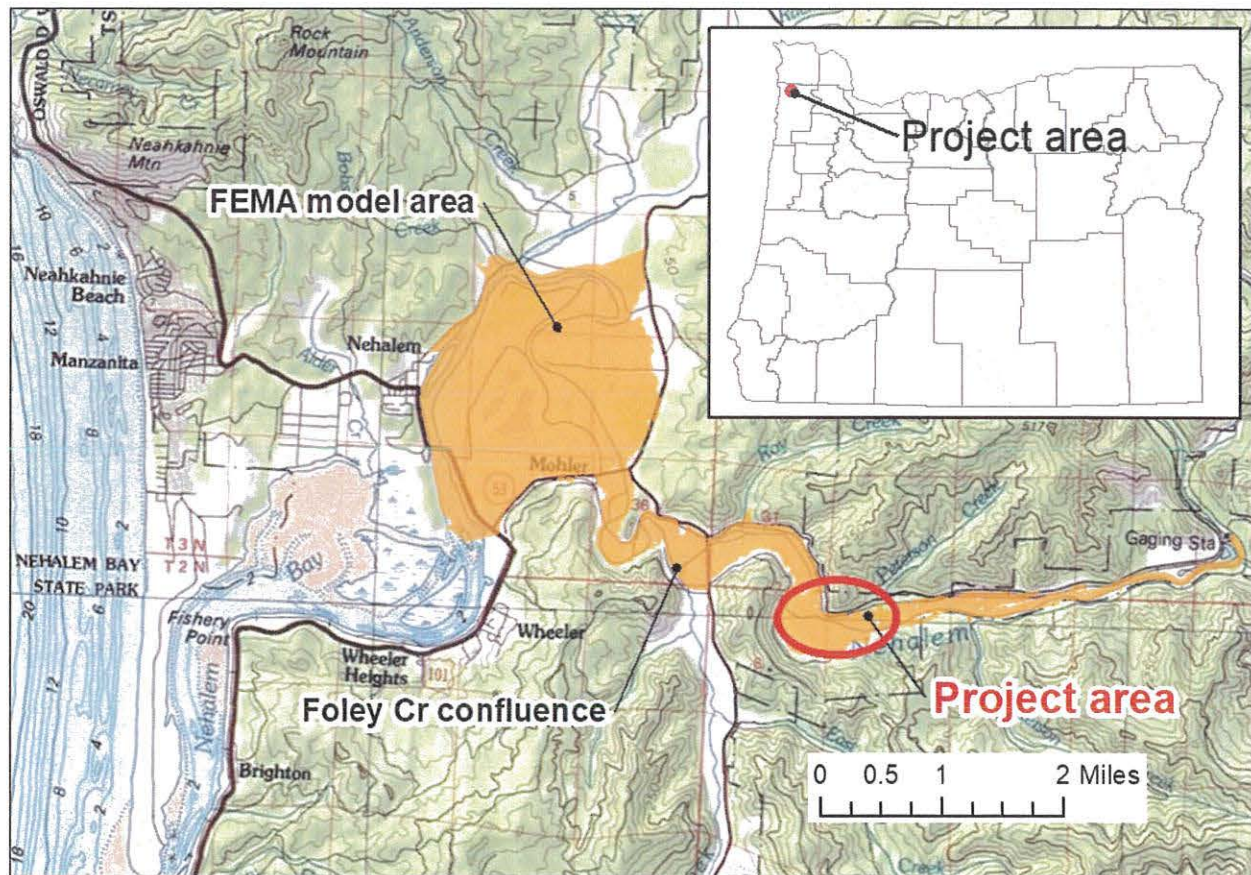


Figure 1. Project location map showing project area and extent of FEMA models.

## Approach

---

The Federal Emergency Management Agency (FEMA) has developed hydraulic models of the Nehalem River, including the project area, for the purpose of mapping flood elevations and extent. The FEMA mapping was based on the US Army Corps of Engineers (USACE) Hydrologic Engineering Center River Analysis System (HEC-RAS)<sup>1</sup>. Our approach was as follows:

1. The original hydraulic model files were acquired from FEMA in scanned digital (i.e., PDF) format. The original model was reconstructed in HEC-RAS and verified against reported results from the original model,
2. The verified original model was modified by adding additional cross-sections in the vicinity of Mohler Sand and Gravel operations. This was done to improve the model resolution for evaluation of gravel impacts,
3. The modified model was adjusted to represent post-gravel extraction conditions, rerun, and compared against pre-extraction conditions to evaluate any changes in flood elevations associated with operations.

## Original Model Reconstruction

The original models, archived in FEMA's Mapping Information Platform (MIP), were provided in Adobe Portable Document Format (PDF) by Atkins Global<sup>2</sup>. The original model was dated 1978 and covered the Nehalem River mainstem from approximately RM 0.5 to RM 14 (Figure 1). The portion of the model near the Highway 101 bridge was revised in 1982. We used the portion of the 1978 model from immediately upstream of the Foley Creek confluence (RM 8 to the upstream end at RM 14) (Figure 1). The original models are provided as Appendix 1 to this report.

The portion of the original 1978 model from RM 8 to RM 14 was reconstructed in HEC-RAS. This consisted of 20 cross sections with associated model parameter values. Four flood profiles corresponding to the 10-, 50-, 100-, and 500-year flood events were included in the reconstructed model, however only the 100-year flood elevations are discussed here. The reconstructed original model is provided in Appendix 2 to this report.

Table 1 provides a crosswalk between the lettered cross-sections shown on FEMA Flood Insurance Rate Map (FIRM) for the Nehalem River (FEMA, 2018), river stations (in miles) from the original HEC-RAS model, and river station (in feet) for the reconstructed and modified HEC-RAS models. Figure 2 displays the model reach showing cross sections from

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<sup>1</sup> <https://www.hec.usace.army.mil/software/hec-ras/> Note that the original models were developed using the HEC-2 model which was the precursor to the current HEC-RAS model.

<sup>2</sup> Josha Crowley, personal communication, 8/5/2020. [Josha.Crowley@atkinglobal.com](mailto:Josha.Crowley@atkinglobal.com)

original and reconstructed models (red), and add-in cross-sections (yellow) used in the modified model. Four cross-sections not shown on the FIRM maps occur at the Miami-Foley Bridge crossing located between FIRM cross-sections T and U.

**Table 1. Crosswalk between FIRM lettered cross-sections, river stations from original and modified HEC-RAS models.**

FIRM cross-section letter	Original HEC-RAS model river station (miles)	Reconstructed HEC-RAS model station (feet)	Modified HEC-RAS model station (feet)	Notes
S	8.000	0	0	Approximately 400' upstream of Foley Cr confluence
T	8.187	989	989	
-	8.225	1189	1189	Immediately downstream of Miami-Foley Rd. bridge
-	8.226	1190	1190	Downstream edge of Miami-Foley Rd. bridge
-	8.232	1219	1219	Upstream edge of Miami-Foley Rd. bridge
-	8.233	1220	1220	Immediately upstream of Miami-Foley Rd. bridge
U	8.260	1320	1320	
V	8.750	3940	3940	
W	9.000	5440	5440	
X	9.340	7080	7080	
Y	9.680	8880	8880	Location of gravel removal (section "A-A", HLB, 2002a)
Z	10.120	11180	11180	
-	-	-	11890	New cross-section at gravel removal site (section "B-B", HLB, 2002a)
-	-	-	12814	New cross-section at gravel removal site (section "C-C", HLB, 2002a)
AA	10.620	13780	13780	
AB	11.260	17080	17080	
AC	11.830	20060	20060	
AD	12.270	22360	22360	
AE	12.740	24840	24840	
AF	13.190	27240	27240	
AG	13.780	30280	30280	
AH	13.970	31280	31280	

Modeled water surface elevation<sup>3</sup> (W.S.El.) associated with the 100-year recurrence interval flood event ( $Q_{100}$ ) at each cross-section from the original model are given in column 2 of Table 2. Flood elevations from the original model were reported using the National Geodetic Vertical Datum of 1929 (NGVD29). Values from the original model were converted to the North American Vertical Datum of 1988 (NAVD88) using the local conversion factor of 3.54 feet (FEMA, 2018) and are shown in Table 2, column 3. All subsequent elevation values are given in NAVD88.

<sup>3</sup> All results presented in this report are for the "without floodway" condition as described in the FIRM report.

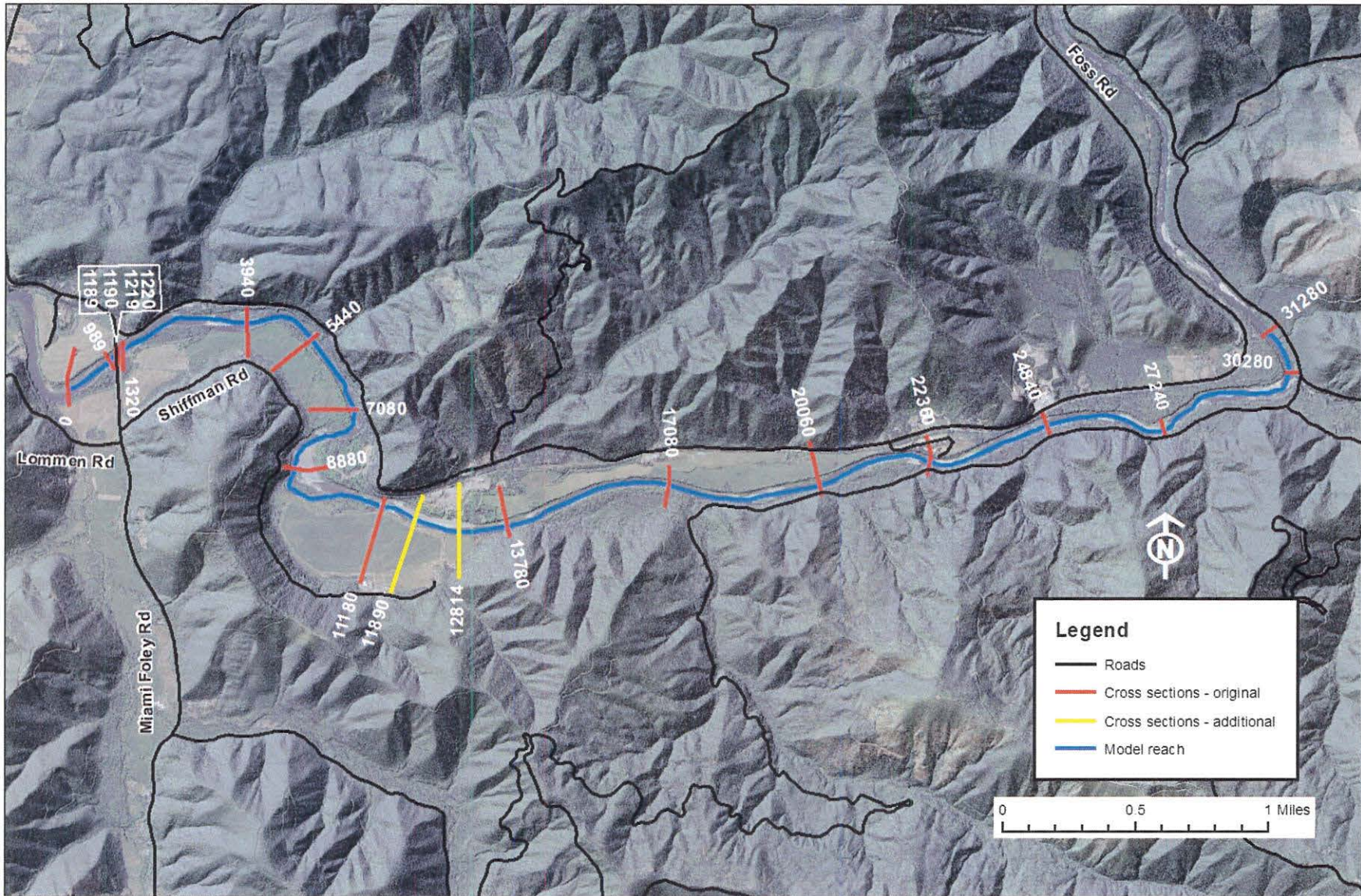


Figure 2. Model reach showing cross sections from original model (red), and add-in cross-sections (yellow).

Table 2. Cross-section water surface elevations (W.S.El.) and differences for the original, reconstructed, and modified models.

[1] River Sta	[2] Original model (NGVD29) Q <sub>100</sub> W.S. El. (ft)	[3] Original model (NAVD88) Q <sub>100</sub> W.S. El. (ft)	[4] Recon- structed original model Q <sub>100</sub> W.S. El. (ft)	[5] Delta: Recon- structed minus original model (ft)	[6] Modified model - pre gravel extraction Q <sub>100</sub> W.S. El. (ft)	[7] Delta: Modified model - pre gravel extraction model minus recon- structed model (ft)	[8] Modified model - post gravel extraction Q <sub>100</sub> W.S. El. (ft)	[9] Delta: Modified model - post gravel extraction minus pre gravel extraction (ft)
0	25.47	29.01	29.17	0.16	29.17	0.00	29.17	0.00
989	26.03	29.57	29.71	0.14	29.71	0.00	29.71	0.00
1189	26.23	29.77	29.90	0.13	29.90	0.00	29.90	0.00
1190	26.21	29.75	29.88	0.13	29.88	0.00	29.88	0.00
1219	26.30	29.84	29.97	0.13	29.97	0.00	29.97	0.00
1220	26.53	30.07	30.18	0.11	30.18	0.00	30.18	0.00
1320	27.16	30.70	30.79	0.09	30.79	0.00	30.79	0.00
3940	28.94	32.48	32.51	0.03	32.51	0.00	32.51	0.00
5440	29.43	32.97	32.99	0.02	32.99	0.00	32.99	0.00
7080	30.23	33.77	33.80	0.03	33.80	0.00	33.80	0.00
8880	30.31	33.85	33.88	0.03	34.11	0.23	34.11	0.00
11180	31.49	35.03	35.02	-0.01	34.71	-0.31	34.38	-0.33
11890	n/a	n/a	n/a	n/a	35.19	n/a	34.92	-0.27
12814	n/a	n/a	n/a	n/a	35.30	n/a	35.01	-0.29
13780	32.55	36.09	36.08	-0.01	35.68	-0.40	35.24	-0.44
17080	35.50	39.04	39.06	0.02	38.87	-0.19	38.71	-0.16
20060	39.34	42.88	42.89	0.01	42.81	-0.08	42.75	-0.06
22360	42.09	45.63	45.65	0.02	45.61	-0.04	45.57	-0.04
24840	45.76	49.30	49.32	0.02	49.30	-0.02	49.29	-0.01
27240	48.54	52.08	52.08	0.00	52.07	-0.01	52.07	0.00
30280	53.81	57.35	57.35	0.00	57.35	0.00	57.34	-0.01
31280	56.63	60.17	60.17	0.00	60.16	-0.01	60.16	0.00
			minimum	-0.01		-0.40		-0.44
			mean	0.05		-0.04		-0.07
			maximum	0.16		0.23		0.00

Modeled W.S.El. for the reconstructed original model are given in Table 2, column 4, and the delta between W.S.El. for the reconstructed model minus the original model results are given in column 5. The reconstructed original model reproduces the original model results well, with delta values ranging from -0.01 to 0.16 feet, with a mean value of 0.05 feet.

## Modified Model

Mohler Sand and gravel operations occur at cross section 8880, and between cross-section 11180 and 13780 (Figure 2). In order to evaluate impacts associate with gravel excavation two additional cross sections were added to the model, at stations 11890 and 12814 (Figure 2, yellow lines).

### Pre gravel extraction

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Pre-gravel extraction conditions at cross section 8880 was represented using the FEMA cross section data from the original model. Pre-gravel extraction conditions at cross sections 11890 and 12814 were represented as follows:

- Upland elevations for the two new cross-sections were taken from bare earth 2009 LiDAR elevation data for the North Coast area (Watershed Sciences, 2009). LiDAR data were acquired within the April 16 – June 15, 2009 time-period, prior to the gravel extraction season, and as such were assumed to be representative of pre-gravel harvest conditions.
- In-channel bottom elevations were taken from site surveys conducted in 2002 by HLB and Associates, Inc. (HLB, 2002b). Section B-B corresponds to cross section 11890, and Section C-C to cross section 12814.

Modeled W.S.El. for the pre-gravel extraction model are given in Table 2, column 6, and the delta between W.S.El. for the pre-gravel extraction model minus the reconstructed model are given in column 7. The pre-gravel extraction model is similar to the reconstructed original model, with delta values ranging from -0.40 to 0.23 feet, with a mean value of -0.04 feet. The pre gravel-extraction model is provided in Appendix 3 to this report.

### Post gravel extraction

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Data on gravel extraction at cross sections A-A (HLB, 2002a), B-B, and C-C (HLB, 2002b) were used to modify the pre-gravel cross-sections at cross section 8880, 11890, and 12814 respectively (Figure 3). Post-extraction bar elevations were adjusted such that the cross-sectional area removed as part of the extraction process was equivalent to the area reported in HLB 2002a, an HLB 2002b.

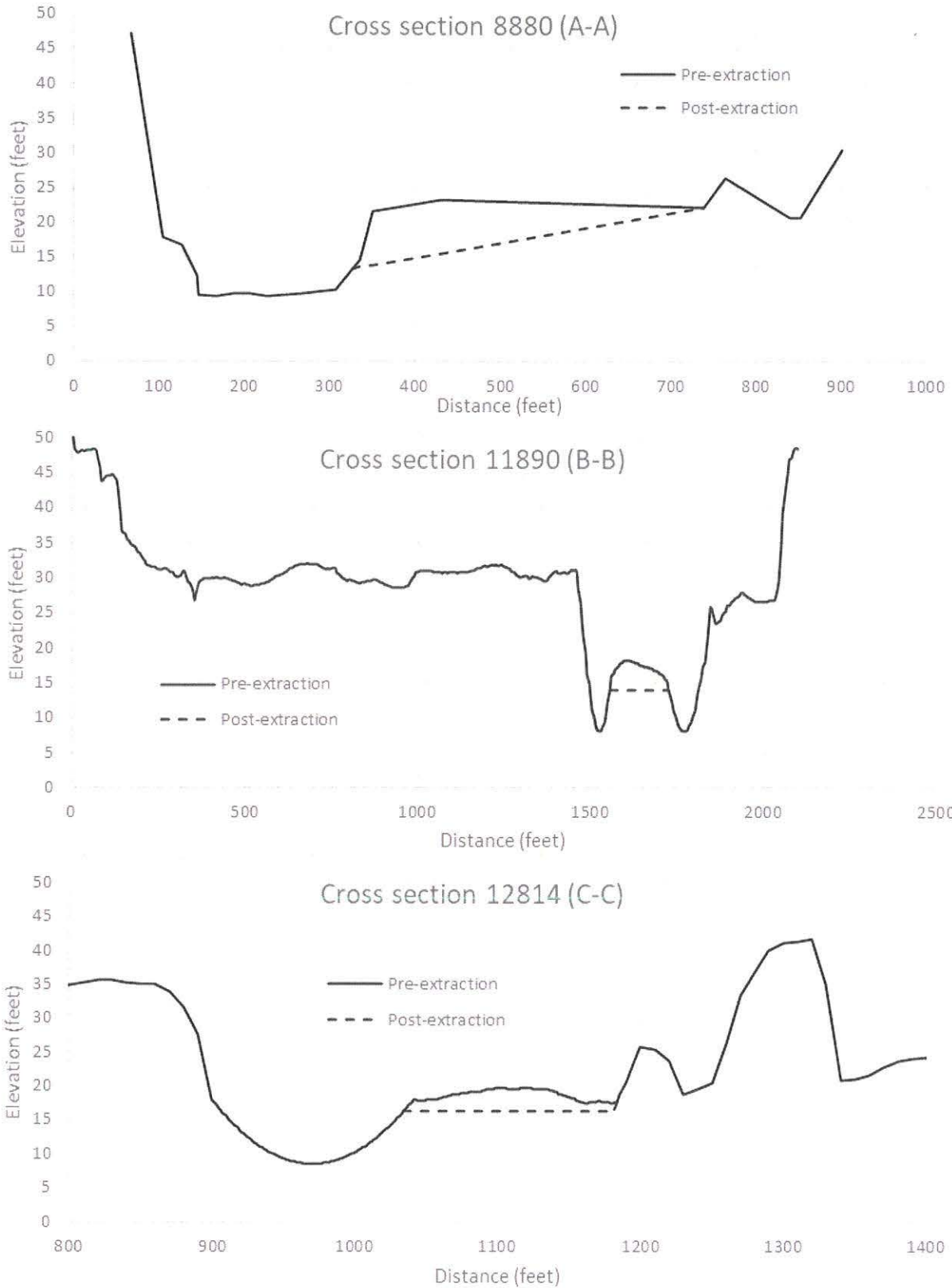


Figure 3. Pre- and post-gravel extraction cross-sections used to represent gravel extraction activities.



Modeled W.S.El. for the post-gravel extraction model are given in Table 2, column 8, and the delta between W.S.El. for the post-gravel extraction model minus the pre-gravel extraction model are given in column 9. The pre-gravel extraction model is similar to the reconstructed original model, with delta values ranging from -0.44 to 0.00 feet, with a mean value of -0.07 feet, indicating that gravel extraction operations result in no increase in modeled 100-year flood elevations. The post gravel-extraction model is provided in Appendix 4 to this report.

## Summary

We evaluated the potential impacts of gravel extraction in the Nehalem River by Mohler Sand and Gravel using FEMA-developed HEC-RAS hydraulic modeling.

We first reconstructed the original model and showed that the reconstructed model produced the same results as the original model.

We next modified the reconstructed model by adding two additional cross-sections at one of the Mohler extraction sites. We showed that the modified model produced the same results as the reconstructed model for the pre-gravel extraction condition.

We then modified the pre-gravel model by adjusting three cross-sections to represent post gravel-extraction conditions. The post gravel-extraction model showed that the likely impacts of gravel extraction are to reduce or have no impact on the 100-year flood elevations.

## References

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## **Appendices**

### Appendix 1 – Original FEMA models

PDF documents (electronic attachment).

### Appendix 2 – Reconstructed Original FEMA model

USACOE HEC-RAS model (electronic attachment).

### Appendix 3 – Modified FEMA model – pre gravel extraction

USACOE HEC-RAS model (electronic attachment).

### Appendix 4 – Modified FEMA model – post gravel extraction

USACOE HEC-RAS model (electronic attachment).