Development Services

From Concept to Construction



Phone: 503-823-7300 Email: bds@portlandoregon.gov 1900 SW 4th Ave, Portland, OR 97201 More Contact Info (http://www.portlandoregon.gov//bds/article/519984)

Status: Decision Rend	lered - Held over from ID 26554 (3/2/2	22) for additional information
Appeal ID: 27593		Project Address: 9420 NW St Helens Rd
Hearing Date: 3/16/22		Appellant Name: AARON MUTH
Case No.: B-012		Appellant Phone: 406-396-4756
Appeal Type: Building		Plans Examiner/Inspector: Kevin Wells, Lisa Buellesbach, Corey Stanley
Project Type: commerce	cial	Stories: NA Occupancy: U Construction Type: IIB
Building/Business Na Energy LP	me: Shore Terminals LLC / NuStar	Fire Sprinklers: Yes - Dock
Appeal Involves: Reco	onsideration of appeal	LUR or Permit Application No.: 21-035156-CO
Plan Submitted Optio	n: pdf [File 1] [File 2] [File 3] [File	e Proposed use: piping support and containment
APPEAL INFORMA	TION SHEET	
Code Section	1613 and ASCE 7-16 12.13.9	
Requires	ASCE 7-16 15.4.10.1 Nonbuilding s foundations at liquefiable sites	structures shall not be permitted to be supported on shallow
Code Modification or Alternate Requested	This request is to appeal the enforce 7 in 1613.1 Scope. Specifically, the foundations and lateral spreading m will be met.	ement of 2019 OSSC SECTION 1613 in it's reference to ASC sections in Chp. 15 and 12 mentioned above regarding deep nitigation. Note that all other requirements for seismic design
Proposed Design	Based on mitigating circumstances specific attributes of the proposed s reasonable degree of safety under l complete description. RECONSIDERATION TEXT:	provided by existing product flow control procedures and tructures and support soils, the proposed design provides for liquefaction conditions. See attached memo for a more
	Since piping may rupture, an autom of this system will be addressed exp measures are as follows. As require operations are manned. During tran charge can stop the flow of hazardou or an electronic voice communication who can stop the flow of hazardous docks operated prior to October 4, or operations of the facility provides m	hated shut-off mechanism will be provided. The specific design bediently. For informational purposes, the existing flow control and by Coast Guard regulations, 33 CFR 154, all transfer insfer operations, in the event of an emergency, the operator in bus materials by an electrical, pneumatic, or mechanical linkag ons system continuously operated by a person on the facility material immediately. For hazardous materials transfers at 1990, this is within 60 seconds. The current design and events or exceeds these requirements. Each product line has a

valve inside the secondary containment wall. When a product line is not transferring product at the P2 dock, these valves are closed. Four product lines are being relocated as part of this project, the location of the valve for each line is shown on the included drawing, PORT-24-015 EXHIBIT, 1st page of mechanical drawing set other clarifying markups.

We were not able to obtain Fire Plan requirements from Corey Stanley (out of office). The requirements of ASCE 7-16, 12.13.9 have not been considered and the design assumes the piping system will fail under conditions where the soil experiences liquefaction. This note will be included on the plans as part of the design criteria submitted at time of plan review. As noted above under CODE MODIFICATION, documentation and calculations submitted as part of the permit submittal will demonstrate that the proposed design will meet all other appropriate requirements of the 2019 OSSC.

 Reason for alternative
 The primary purpose of this project is to enhance the environmental safety at the site by relocating underground and under dock product lines above ground and to above-deck level on the dock to facilitate inspection and maintenance. The scope of the project is very limited and mitigation for liquefaction, lateral spread, and flow failure using the typical tools of deep foundations and ground improvement is not practically scalable to this project.

APPEAL DECISION

Use of shallow foundations at a site subject to liquefaction: Granted provided the shut-off mechanisms limiting release of hazardous materials are provided to the satisfaction of the Fire Bureau and BDS Structural.

Appellant may contact John Butler (503 865-6427) or e-mail at John.Butler@portlandoregon.gov with questions.

The Administrative Appeal Board finds with the conditions noted, that the information submitted by the appellant demonstrates that the approved modifications or alternate methods are consistent with the intent of the code; do not lessen health, safety, accessibility, life, fire safety or structural requirements; and that special conditions unique to this project make strict application of those code sections impractical.

Pursuant to City Code Chapter 24.10, you may appeal this decision to the Building Code Board of Appeal within 90 calendar days of the date this decision is published. For information on the appeals process, go to www.portlandoregon.gov/bds/appealsinfo, call (503) 823-7300 or come in to the Development Services Center.



FRUCTION	SLC	09/13/21	SLC	вск
RUCTION	AB	03/10/21	SLC	BCK
REVISION	BY	DATE	A	PR

TO 6/7 PORT-12-002 12" REGULAR		
PORT-10"-UL-330-A		
CENTER MANIFOLD PORT-12-012 8" REGULAR		
RIVERSIDE		
PORT-12-222 <u>8" REGULAR</u>		
	PT PI XXX XXX	
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GASOLINE FROM OLY		
PORT-12-XXX PORT-14"-XX-XXX-A]	
	•~ ~ 14"	<u>300# 150# 3/4" 1"x3/4"</u>
	UG AG 14"x12"	B V−0001
DIESEL FROM OLY PORT-12-XXX PORT-14"-XX-XXX-A		
0TES.	DEFEDENCE DRAWINGS.	1 1
1. UNDERGROUND LINES SHOWN HAVE NOT BEEN FIELD-VERIFIED.	WELEVENCE DEAMINGS:	
		0 AS-BUILT

REVISION

NO.

1)	CONTRACTOR	OT 9	FIELD	VERIFY	ALL	DIME	VSIONS	AND
•	ELEVATIONS	PRIO	R TO	FABRICA	TION	AND	INSTAL	_ATION

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RUCTION	SLC	09/13/21	SLC	BCK
RUCTION	AB	03/10/21	SLC	BCK
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Energy L.P.

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	PROJECT LO	CATION: 9420 NW S	ST. HELENS RD., PORTLAN	ND, OR 97231	PORTLAND TERMINAL	
	DRAWN BY:	SLC	DATE: 07/	22/20	PIPING PLAN	
57	CHECKED.	51.0		(20. (20.	– P2 DOCK PIPING REROU	TE
-	CHECKED:	SLC	DATE: 07/	29/20	ORIGINAL PROJECT NO.	
	APPROVED:	BCK	DATE: 07/	′29/20		
	SCALE:	3/8"=1'-0"	I		DRAWING NO. PORT-24-018	REV. 0

NOTES:

1. FOR KEY PLAN, SEE DWG PORT-24-015.

AB

BY

03/10/2

DATE

SLC

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Energy L.P.

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REVISION

NOTES: 1) CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO FABRICATION AND INSTALLATION. 0

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_	(2)	10"	¢	EL.	

1'–	0" 1' 0'	1'2'3'4'	5' 6' 7'		NORWEST ENGINEERING, INC. CONSULTING ENGINEERS PORTLAND, OREGON 503-254-0110 IRVINE, CALIFORNIA www.NorwestEngineering.com	N.E. RV11	# 154
	PROJECT LO	CATION: 9420 NW ST.	HELENS RD., PORTLAND, C	R 97231	PORTLAND TERMINAL		
	DRAWN BY:	WN BY: SLC DATE: 07/22/		' 20	PIPING SECTIONS		
7	CHECKED	SLC		(20	PZ DUCK PIPING RERUUIE		
	CHECKED.	320	DAIL: 07/207	20	ORIGINAL PROJECT NO.		
	APPROVED:	BAK	DATE: 07/29/	′20			
	SCALE:	3/8"=1'-0"			DRAWING NO. PORT-25-014	REV.	0

NOTES:

1. FOR KEY PLAN, SEE DWG PORT-24-015.

RUCTION	SLC	09/13/21	SLC	BCK
RUCTION	AB	03/10/21	SLC	BCK
REVISION	BY	DATE	A	PR

NOTES:

- 1. FOR KEY PLAN, SEE DWG PORT-24-015.
- EXISTING "OUT OF SERVICE" PIPING TO BE DEMOLISHED ABOVE THE DOCK AS REQUIRED BY NUSTAR MANAGEMENT.

(VS-2 AND 3) VAULT SUPPORT- ELEVATION N.T.S.

	1 1/2"=1	·-0"	0'	1'			
	3/8"=1'-	0" 1' 0'	1'2'3'4'5	6' 7'		NORWEST ENGINEERING, INC. CONSULTING ENGINEERS PORTLAND, OREGON 503-254-0110 IRVINE, CALIFORN www.NorwestEngineering.co	N.E. #
	19003 IH-10 WEST	PROJECT LO DRAWN BY:	OCATION: 9420 NW ST. HEL	ENS RD., PORTLAND, (DATE: 07/22/	DR 97231 /20	PORTLAND TERMINAL PIPING SECTIONS P2 DOCK PIPING REROUT	E
Energy L.P.	San Antonio, Texas 78257 \sim Tel: (210) 918–2000 1-800-866-9060	CHECKED: APPROVED:	SLC BCK	DATE: 07/29/ DATE: 07/29/	/20 /20	ORIGINAL PROJECT NO. DRAWING NO. PORT-25-020	

ISSUED FOR CONSTRUCTION	AB	03/10/21	SLC	BC
REVISION	BY	DATE	A	PR

0 NO.

2'-1½"

1"

NOTES:

1. FOR KEY PLAN, SEE DWG PORT-24-015.

EXPIRATION DATE: 6/30/23

March 13, 2022

City of Portland, Oregon – Bureau of Development Services Administrative Board of Appeal 1900 SW Fourth Avenue Portland, Oregon 97201

> Building Code Appeal Shore Terminals LLC / NuStar Energy Portland, Oregon Application # 21-035156-000-00-CO SITE DEVELOPMENT CHECKSHEET Review Date February 4, 2022. Item #5

The NuStar Energy Terminal is located at 9420 NW St. Helens Road in Portland, Oregon. The site is used to store and transfer petroleum products. NuStar is proposing to relocate some of the existing underground product lines. The primary purpose of this project is to enhance the environmental safety at the site by relocating underground and under dock product lines above ground and to above-deck level on the dock to facilitate inspection and maintenance. These lines run from the Tank farm to the P2 Dock on the Willamette River; an above ground vault or pipe chase allowing for inspection and maintenance of the piping and the safe passage of terminal traffic over this piping is the principal structure in this project; there are other minor structures included. A permit application has been submitted by NuStar and a Checksheet has been generated by BDS, Site Development.

Re:

The primary purpose of this correspondence is to appeal the enforcement of 2019 OSSC SECTION 1613 EARTHQUAKE LOADS, specifically the requirement in the ASCE 7 Reference Standard not permitting support of nonbuilding structures on shallow foundations at sites on liquefiable soils (ASCE 7-16 15.4.10.1). Mitigation for liquefaction and related lateral soil displacement is always a consideration for Norwest Engineering in the Portland Critical Energy Infrastructure hub; our preliminary work on this project was an attempt to design mitigation for a conventional overhead pipe bridge but piling socketed into bedrock proved cost-prohibitive. It was our view that the typical mitigation tools are not scalable to a project of this limited scope. The proposed at-grade configuration was chosen to satisfy Life Safety concerns related to the overhead structure and it is our belief that this configuration combined with certain aspects of the soils, proposed structure, and piping that provide a reasonable level of safety against collapse and removes the need for deep foundations and other mitigation procedures. Existing Product Flow Control measures mandated by the US Coast Guard and the owner limit exposure to uncontrolled release of product. See the following Appeal Narrative for a more detailed discussion.

SHORE TERMINALS LLC City of Portland—Bureau of Development Services Code Exemption Request; 1154_MEM101 March 13, 2022

APPEAL NARRATIVE

This appeal for exemption of enforcement of 2019 OSSC 1613 applies <u>only to liquefaction and lateral</u> <u>spreading mitigation</u> in the project, seismic design for other hazards will be done as specified in the code. Please refer to the sketches and calculations on proceeding pages, the cross-sectional sketch shows the Tank Farm containment wall, existing paved roadway, seawall and revetment and the dock in relative scale. This area is subject to "several inches of seismically induced soil liquefaction and several feet of lateral spreading" as stated in the Geotechnical Engineering documents submitted with the permit application. A conceptual Flow Failure Zone behind the seawall is show with hatching on the sketch.

- Existing product flow control. See below for discussion by a Subject Matter Expert, Brian Kaiser, PE (Mechanical) Director of Engineering for Norwest.
- Site Soils: Ref.: LAI Geotechnical Engineering Report submitted with the permit application. Surface deformations toward the river are significant as described above. While the upper site soils are unclassified fill and not considered to be the quality of an engineered fill, they are not subject to liquefaction and provide a viable surface crust. This crust will support the distributed piping and vault loads, approx. 300 psf applied bearing pressure. The liquefiable layers are relatively thin and below the crust; existing bearing piles supporting the dock are likely to retain the limited capacity required to prevent collapse even though settlement will occur.
- Vault Structure: Attached calculations show that the vault in its current dimensions can be reinforced to bridge the Flow Failure Zone near the seawall this is an overhanging condition with the onshore or Tank Farm side supported by the non-liquefied upper soils. Additionally, the continuous Vault will perform the Foundation Ties Function per ASCE 7-16 12.13.9.2.1.1 for shallow foundations in liquefiable soils.
- Piping Configuration: Results from an ASME B31 Pipe stress analysis for seismic loading is attached. Additionally, it can be shown that 7" of differential lateral displacement parallel to the piping can safely be carried without piping overstress.

Existing Hazardous Material Release and River and Groundwater Protection: As required by Coast Guard regulations, 33 CFR 154, all transfer operations are manned. During transfer operations, in the event of an emergency, the operator in charge can stop the flow of hazardous materials by an electrical, pneumatic, or mechanical linkage or an electronic voice communications system continuously operated by a person on the facility who can stop the flow of hazardous material immediately. For hazardous materials transfers at docks operated prior to October 4, 1990, this is within 60 seconds. The current design and operations of the facility provides meets or exceeds these requirements. Each product line has a valve inside the secondary containment wall. When a product line is not transferring product at the P2 dock, these valves are closed. Four product lines are being relocated as part of this project, the location of the valve for each line is shown on the included drawing, PORT-24-015 EXHIBIT. SHORE TERMINALS LLC City of Portland—Bureau of Development Services Code Exemption Request; 1154_MEM101 March 13, 2022

<u>Life Safety</u>: Worker presence in the tank farm and on the dock is incidental. Site specific safety training covers incidents where immediate egress to safe muster points occurs.

SUMMARY

This is a limited scope project intended to enhance maintenance and environmental safety, typical construction procedures to mitigate the seismic hazards of liquefaction and lateral spreading cannot be practically applied to this project. We have shown that there is a reasonable amount of seismic safety in this system at this site, based on this, we respectfully request an exemption to Section 1613.1 of the OSSC where it applies to the mitigation for liquefaction and lateral spreading.

Thank you for considering our request. We look forward to discussing any aspect of the appeal with you.

Sincerely, Norwest Engineering, Inc.

Aaron R. Muth, PE, SE Lead Civil / Structural Engineer

Cc: Laurie Parry | Stewardship Solutions Inc. (Permit Applicant)

Atts: Mechanical Drawing set with valve locations highlighted Vault Calculations

VAULT DESIGN

Extraordinary Load Case - xx ft. of vault near seawall is not supported due to Flow Failure

By T&E $L_{liq} := 25$ ft. – Check Stability in Final Design NOTE: This is NOT a geotechnical parameter or calculation

Piping Dead Load:	$40.5 + \frac{\pi \cdot 10.0^2}{4 \cdot 144} \cdot 62.4 \cdot 0.9 = 71.13$	lbs / ft 10" Sch 40
	$28.6 + \frac{\pi \cdot 7.98^2}{4 \cdot 144} \cdot 62.4 \cdot 0.9 = 48.11$	lbs / ft 8" Sch 40
	North Cell	South Cell – Future
	$71.13 \cdot 2 + 48.11 \cdot 2 = 238$ lbs/ft	$71.13 \cdot 2 + 48.11 \cdot 1 = 190$ lbs / ft
	Tributary Dock piping at end of vault	
	$\frac{(238+190)\cdot 20}{2} = 4280 \text{ lbs}$	
Vault Dead Load	(1.0.1.33.3 + 0.5.0.33.2 + 13.67.1.0	$0) \cdot \gamma_{conc} = 2699 \qquad \text{lbs / ft}$
	Grating at 52.7 psf	
	$52.7 \cdot 10.67 \cdot 1.05 = 590$ lbs / ft	

NORWEST ENGINEERING

Consulting Engineers TBPELS Firm No. 15564

VAULT DESIGN

Check shear in the 3 stems, 50% on middle stem

$$\begin{split} b_{w} &:= 12.0 \quad \text{in.} \\ \varphi v_{c} &:= \varphi_{v} \cdot 2 \cdot \sqrt{f_{c}} \cdot b_{w} \cdot d = 22768 \quad \text{lbs} \\ 50\% \cdot V_{uliq} &= 58323 \quad \text{lbs} \\ v_{c} &:= 2 \cdot \sqrt{f_{c}} \cdot b_{w} \cdot d = 30358 \quad \text{lbs} \\ \frac{50\% \cdot V_{uliq}}{\varphi_{v}} - v_{c} &= 47406 \quad \text{lbs} \\ v_{s} &:= \frac{0.20 \cdot 2 \cdot f_{y} \cdot d}{10} &= 48000 \quad \text{lbs} \quad \text{#4 ties at 10} \end{split}$$

NORWEST ENGINEERING

Consulting Engineers TBPELS Firm No. 15564

VAULT DESIGN

Design Unit Strip transversely Design for single cell ... 12" walls ok by inspection $\frac{IM \cdot 48 \cdot \frac{1}{2}}{6.0 + 4.0} = 3.12$ kips / ft on wall LL+I Dead Load on wall use 60 psf for grating $1.67 \cdot 1.0 \cdot \gamma_{conc} + 60 \cdot 5.2 = 563$ lbs / ft $1.67 \cdot 1.0 \cdot \gamma_{conc} + \frac{60 \cdot 5.2}{2} = 407$ lbs / ft $w_{u} := \frac{\left(1.2 \cdot \frac{407}{1000} + 1.6 \cdot 3.12\right) \cdot 2}{6.83 \cdot 1.0} = 1.60 \quad \text{kips / ft}$ $M_u := \frac{w_u \cdot 5.83^2}{8} = 6.82$ ft-kips / ft b := 12 in. d := $8.0 - 1.5 - \frac{5}{8.2} = 6.19$ in. $R_u := \frac{M_u \cdot 12 \cdot 1000}{\varphi_b \cdot b \cdot d^2} = 197.88 \quad \text{ psi-looks low enough}$ $\rho_{\text{req}} := \frac{1}{m} \cdot \left(1 - \sqrt{1 - \frac{2 \cdot m \cdot R_u}{f_v}} \right) = 0.0034$ $A_{s} := \rho_{req} \cdot b \cdot d = 0.25 \quad \text{in2 / ft} - \quad \frac{12 \cdot 0.31}{A_{s}} = 14.7 \quad \text{in., use \#5 at 14}$

NORWEST ENGINEERING

Consulting Engineers TBPELS Firm No. 15564

VAULT DESIGN

Check single mat at mid depth:

$$\begin{split} & d := 4.0 \quad \text{ in.} \\ & R_u := \frac{M_u \cdot 12 \cdot 1000}{\varphi_b \cdot b \cdot d^2} = 473.48 \quad \text{ psi-low enough} \\ & \rho_{req} := \frac{1}{m} \cdot \left(1 - \sqrt{1 - \frac{2 \cdot m \cdot R_u}{f_y}} \right) = 0.0085 \\ & A_s := \rho_{req} \cdot b \cdot d = 0.41 \quad \text{in2 / ft} - \frac{12 \cdot 0.31}{A_s} = 9.1 \quad \text{ in., use #5 at } 9 \end{split}$$

Use the double mat config. with thicken bottom at middle cell for 'Negative' moment

 $0.0020 \cdot 8 \cdot 12 = 0.19$ in 2 / ft – use #4 at 12 longit.

