

# Beneficial Use of Solid Waste Determination Evaluation Form



State of Oregon  
Department of  
Environmental  
Quality

**Applicant: Port of Portland**

**BUD No.: BUD-20130318**

**Solid Waste: Terminal 4 (T-4) Dredged Sediments**

**Summary of Proposed Beneficial Use:**

The Port of Portland is planning to dredge from 3,000 to 5,100 cubic yards of clayey, silty sand from the Port's T-4 (Middle and West Areas of Berth 410), on the Willamette River. Actual volumes will be determined by pre-dredge bathymetric surveys. The Port plans to use this sediment as fill material for future marine commercial and industrial development at the established West Hayden Island Placement site.

**Reviewers: Bruce Lumper and Bill Mason**

**Date: June 24, 2013 and updated July 17, 2013**

**Tier:**  One  Two  Three

## Beneficial Use of Solid Waste

Beneficial use of solid waste is a sustainability practice that may involve using an industrial waste in a manufacturing process to make another product or using a waste as a substitute for construction materials.

The environmental benefits of substituting industrial waste materials for virgin materials includes conserving energy, reducing the need to extract natural resources and reducing demand for disposal facilities.

Oregon Administrative Rules (OAR) 340-093-0260 to 0290 establish standing beneficial uses and a process for DEQ review of case-specific beneficial use proposals. Under these rules, DEQ may issue a beneficial use determination as an alternative to a disposal permit for proposals that meet the rule criteria. Once a beneficial use determination is issued, DEQ no longer regulates the waste as a solid waste, as long as the material is used in accordance with the approved beneficial use determination.

## Beneficial Use Determination Evaluation Summary

**Yes, the Beneficial Use of this solid waste meets all the case-specific performance criteria listed below and is approved.**

No, the Beneficial Use of this solid waste does not meet all the case-specific performance criteria listed below and is not approved.

**Notes: The Port of Portland submitted the information necessary for DEQ to make a beneficial use determination. DEQ evaluated this information against acceptable risk criteria, and surface and groundwater interactions.**

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**Case-Specific Beneficial Use Performance Criteria:**

DEQ may approve an application for a case-specific beneficial use of solid waste only if all the following performance criteria are addressed: 1) Characterization of the solid waste; 2) Productive beneficial use of the solid waste; and, 3) The affect of the proposed beneficial use on public health, safety, and welfare or on the environment.

**1) Characterization of the Solid Waste**

Did the applicant characterize the solid waste and proposed beneficial use sufficiently to demonstrate compliance with the rules for case-specific beneficial use determinations (OAR 340-093-0280) by submitting required information for the appropriate tier? (See tier sections below for detailed characterization information.)

Yes  No

**Notes: The Port of Portland provided the necessary description of the material and how it is proposed to be used.**

Was the following information submitted for DEQ review and how adequate was it?

**Tier 1**  Applicable  Not applicable

- Did the applicant provide an adequate description of the material proposed for beneficial use, the manner of generation and the estimated quantity to be used beneficially each year?  
 Yes  No

**Notes: The material is fine-grained sediment (mix of clayey, silty sand) from T-4, Berth 410, Middle and West Areas, in the Willamette River. The sediments will be generated by maintenance dredging. Sediments in the Western area are suitable for unconfined in-water aquatic disposal. Approximately 5,000 – 7,000 cubic yards of sediment will be dredged from Berth 410 of which approximately 3,000 to 5,100 cubic yards will be placed at the West Hayden Island facility. Remaining sediments will be disposed of at a DEQ permitted solid waste disposal site. Dredging will occur between July 1 and October 31, 2013, during the in-water work window for the Willamette River. Dredging will occur in accordance with a U.S. Army Corps of Engineers (Corps) permit that has not yet been issued, a State of Oregon Department of State Lands permit that has been issued, a national Marine Fisheries Service Biological Opinion and the Oregon DEQ Water Quality Certification issued on February 5, 2013.**

- Did the applicant provide an adequate description of the proposed beneficial use and justify how the proposed use is beneficial?  
 Yes  No

**Notes: The Port of Portland proposes to use the sediments as fill material to increase site grade prior to future development at West Hayden Island (see section 2 notes below).**

- Did the applicant provide a sufficient comparison of the chemical and physical characteristics of the material proposed for beneficial use with the material it will replace?

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Yes  No

**Notes: Dredge sediments have similar characteristics to soil fill. In DEQ's experience, dredged sediments are commonly used as fill material.**

- Did the applicant successfully demonstrate compliance of the proposed beneficial use with the performance criteria in OAR 340-093-0280 based on knowledge of the process that generated the material, properties of the finished product, or testing?  
 Yes  No

**Notes: See notes for Tier 2 below, and Sections 2 and 3.**

- If required, did the applicant provide any other DEQ required information to evaluate the proposal?  
 Yes  No

**Notes: In addition to the beneficial use application, the applicant provided the analytical report on sediment quality, a land use compatibility statement signed by Kim Freeman from the City of Portland on April 19, 2012 confirming that disposal of the sediment from maintenance dredging at T-4, Berth 410, at the West Hayden Island sediment facility is an existing non-conforming use, and information about outreach efforts that the Port has taken to provide information to West Hayden Island residents about this proposed project.**

**Tier 2**     Applicable     Not applicable

- Did the applicant submit all the information required for a Tier 1 application?  
 Yes  No

**Notes: See notes for Tier 1.**

- Did the applicant submit adequate sampling and analysis to make a determination of suitability for beneficial use? (Note: The analysis must provide chemical, physical, and biological characterization of the material proposed for beneficial use and identify potential contaminants in the material or the end product, as applicable.)  
 Yes  No

**Notes: The Port provided analytical information for three samples (410A/DP, 410B/DP and 410B/NSM) which meets the sampling protocol agreed to by the multi-agency Regional Sediment Evaluation Team for a dredging project of this size. The samples showed concentrations of ammonia up to 105 mg-N/kg. The lab reports did not specify subtypes of ammonia. "Ammonia" in upland soil (or sediments dredged and disposed of in an upland area) is typically present in the form of ammonium, NH4+. Ammonium (and ammonia) is metabolized by organisms, assimilated by plants, adsorbed by clay minerals or organic matter, and oxidized to nitrate over time as oxygenated rainfall infiltrates through the ammonium-containing sediments.**

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Because it's present in the ionic or "charged" form, ammonium tends not to transport very far in groundwater. After the ammonium converts to nitrate, the nitrate will travel freely in groundwater. DEQ evaluated the ammonia to determine threats to groundwater and surface water. DEQ assumed a worst case scenario that all the ammonium would go into the groundwater and eventually into the river. Based on a low flow volume recorded on 9/9/2001 of 63,600 cubic feet per second, DEQ calculated a dilution ratio of 6 million to one. At these flow rates, the sampled amount of 105 ppm of ammonium would dilute to 0.00007 ppm if every molecule reached the river without being taken up by organisms or mineral materials. The chronic ambient water quality criterion is roughly 1 ppm. Ammonia criteria for acute water quality criterion for freshwater may depend on pH, temperature, and the presence of salmonids or other fish with ammonia-sensitivity in early life stages. Values for freshwater criteria (of total ammonia nitrogen in mg N/L) can be calculated using the formulae specified in the 1999 Update of Ambient Water Quality Criteria for Ammonia (EPA-822-R-99-014) at:

<http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/pollutants/ammonia/upload/99update.pdf> ). A 2009 draft update is available at [http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/pollutants/ammonia/upload/2009\\_12\\_23\\_criteria\\_ammonia\\_2009update.pdf](http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/pollutants/ammonia/upload/2009_12_23_criteria_ammonia_2009update.pdf)

DEQ considers it unlikely that ammonia in any form will reach the river. DEQ estimates that the ammonia would either be taken up by clay minerals or be converted to nitrate in the two years it would take for groundwater to reach the river from the placement area. DEQ has not identified any drinking water wells down gradient of the sediment placement area. DEQ has therefore determined that the ammonia identified in the sediment to be placed at the West Hayden Island facility will not negatively impact the groundwater beneficial use (drinking water wells) or the Columbia River.

- When applicable, did the applicant provide a risk screening comparing the concentration of hazardous substances in the material to existing DEQ approved, risk-based screening level values, and demonstrate compliance with acceptable risk levels?  
 Yes  No

Notes: The Port of Portland provided a comparison of chemicals detected to screening levels (Tables 2 and 3 of the application) for upland ecological and human receptors. The applicant's screening against DEQ risk screening levels identified one compound of potential concern, benzo(a)pyrene, that exceeded the DEQ occupational human risk based concentration, for one sample. Sample 410B/NSM showed a maximum concentration of 400 µg/kg which exceeds the occupational human health risk based concentration of 270 µg/kg. The other two samples contained benzo(a)pyrene at concentrations of 83 and 86 µg/kg, respectively. Accordingly, the applicant performed a risk screening for benzo(a)pyrene by calculating weighted concentrations possible depending on the low, mid and high average amounts of material to be dredged. DEQ has evaluated the Port's risk screening and agrees with the methodology used and the results showing that the weighted concentration of benzo(a)pyrene in the volumes to be dredged are below occupational human risk based concentrations.

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DEQ also concurs with the Port's conclusions that benzo(a)pyrene values fall below ecological screening values for invertebrates and mammals. DEQ has concluded that ecological receptors are not at risk due to the concentrations of benzo(a)pyrene in the sediment to be placed at West Hayden Island from maintenance dredging of T- 4, Berth 410's Middle and West areas. Sample results show no other contaminants at concentrations that might pose a risk to humans or the environment from placement of the sediments at the West Hayden Island facility.

- When applicable, did the applicant supply the location or type of land use where the material will be applied, consistent with the risk scenarios used to evaluate risk?  
 Yes  No

Notes: The Port of Portland is the site owner. The current zoning is Multiple Use Forest 19 Acre Minimum (MUF 19) with a Significant Environmental Concern overlay. Kim Freeman of the City of Portland signed a Land Use Compatibility Statement on April 19, 2012 stating that disposal of dredged sediments on West Hayden Island is currently allowed as an existing nonconforming use. The City of Portland confirmed in a June 20, 2013, email that the land use regulations have not changed with respect to dredging or the placement of dredged material at the facility on West Hayden Island. The West Hayden Island Placement Site is used for placement of dredged material. The Port is engaged in a land use proceeding to annex the property to fulfill long-term plans for marine terminal development. Risk screening assumed marine terminal development and the possibility of other types of uses including recreation and open space.

The primary human health risk scenario used in the Port's BUD application is occupational. This protective level is adequate for commercial/industrial, recreational and other uses. Protection would not be adequate for residential use of the property, so the siting of homes there would not be acceptable. Terrestrial and bird species occupying the upland portions of the island consist of non-threatened and non-endangered (non-T&E) species. Ecological risk was evaluated for these non-T&E species for birds and mammals.

- When applicable, did the applicant supply contact information of property owner(s) if this is a site-specific land application proposal, including name, address, phone number, e-mail, site address and site coordinates (latitude and longitude)?  Yes  No

Notes: The Port of Portland is the applicant and property owner. Approximate site coordinates were provided in the application.

- Did the applicant supply an adequate description of how the material will be managed to minimize potential adverse impacts to public health, safety, welfare, or the environment?  
 Yes  No

Notes: The West Hayden Island Placement Facility is an existing dredge material facility. The Port of Portland prepared the facility by constructing a berm around the entire 102-

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acre site. The lowest elevation of the berm is more than 5 feet higher than the 100-year flood plain. Upland placement involves pumping dredge material directly from the transport barge to a diked area. The T-4 dredge material would be placed within the bermed area. Return water would be held in settling ponds and no surface water would be released back into the river. After dewatering, the dredged sediment may be graded. Contaminant concentrations in the sediments do not pose an unacceptable risk to people and wildlife.

The Port will utilize dredging and GPS software to model the dredge prism and track areas dredged to ensure that only areas represented by samples for 410A/DP, 410B/DP and 410B/NSM will be placed at the West Hayden Island Dredged Material Placement Site. Areas represented by 410A/DP, 410B/DP and 410B/NSM will be dredged and handled separate from the landfill bound material. The Port will conduct daily inspections of the project and work progress.

In addition, the Port will report to DEQ after dredging is complete and include in the report the volume of material placed at the West Hayden Island facility and any location or characterization information if changed from that in the application. The report must include disposal receipts and amounts taken from Terminal 4, Berth 410 to a DEQ permitted solid waste landfill and verification that the operational and engineering procedures listed above were followed to ensure that only approved sediments were placed at the upland placement facility.

Tier 3     Applicable     Not applicable

- Did the applicant submit all the information required for a Tier 1 & Tier 2 application?  
 Yes     No
- Did the applicant provide an adequate discussion of the justification for the proposal?  
 Yes     No
- Is there an estimated length of time that would be required to complete the project, if it is a demonstration?  
 Yes     No
- If it is a demonstration project, are their methods proposed to ensure safe and proper management of the material?  
 Yes     No

2) Productive Beneficial Use of the Solid Waste

Has the applicant demonstrated that the proposed beneficial use is a productive use of the material by providing information substantiating the criteria listed below?

Yes     No

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**Notes: See notes below.**

- Did the applicant successfully identify or demonstrate a reasonably likely proposed beneficial use for the material that is not speculative?  Yes  No

This criterion consists of three parts.

**1. Identified Use:**

Has the applicant clearly stated what the waste is going to be used for, that the waste is compatible with that use and the proposed quantity is necessary?

Yes  No

**2. Reasonably Likely Use:**

Has the applicant identified, with supporting documentation, the timeframe within which this use is likely to occur (e.g., zoning info, master plan for development, letters from local jurisdictions, etc)?

Yes  No

**3. Not Speculative:**

For Land application - has this material been used at other sites for the same purpose, is the material feasible for use at this site for this purpose, or has the applicant identified a known potential for this use at this site?

Yes  No  N/A

For uses other than land application - has the material been used in a product before, is the material feasible for use in a product, or has the applicant identified a known potential for use in this product?

Yes  No  N/A

**Notes: The Port of Portland has identified the intended use as fill material at West Hayden Island. The Port requires a large volume of material (well over the 3,000 to 5,100 cubic yards proposed for placement with the proposed project) for development.**

**While the City of Portland has not made a final decision, the City is midway through a planning process for West Hayden Island's future development. In 2004, Metro identified West Hayden Island as a "Regionally Significant Industrial Area." In 2010 Metro completed a draft Urban Growth Report that assumes approximately 380 acres on West Hayden Island is available for large lot future industrial development. Metro further determined that West Hayden Island contained both high development value and high riparian value. In July 2010 the Portland City Council adopted Resolution No. 36805 that directs the Bureau of Planning and Sustainability to develop a legislative proposal for annexation of West Hayden Island and to identify no more than 300 acres for future marine terminal development. The City of Portland continues to develop a legislative proposal for city council approval. If approved the Port of Portland would then take further**

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steps towards development with an expectation that the complete planning and initial development process will take a minimum of five to ten years.

The value of sediments as fill material is not speculative. Sediments are commonly used for fill material. DEQ's determination that the proposed use is beneficial relied on the following factors: 1) The history of dredged sediment placement at the site; 2) current land use that allows sediment placement; 3) dredged sediment's common use as fill material; 4) the Port of Portland's need for fill material to develop the property for future marine commercial or industrial use; 5) sediment contaminant concentrations that are below screening levels for current uses by people and wildlife; and 6) the City's engagement in a planning process to evaluate area uses that include marine development.

- Is the use a valuable part of a manufacturing process, an effective substitute for a valuable raw material or commercial product, or otherwise authorized by the Department and does not constitute disposal?  Yes  No

Notes: Sediments are an effective substitute for soil fill material. The Port of Portland has identified a need for fill material at the West Hayden Island location. Placement at this location for this purpose would not constitute disposal under the beneficial use rules.

Current land use would allow the placement of dredged sediments at this location as either a beneficial use approved through the beneficial use process or as a disposal activity through a DEQ issued solid waste permit. A DEQ solid waste permit is an alternative to meeting the requirements of a beneficial use determination.

- Is the use in accordance with applicable engineering standards, commercial standards, and agricultural or horticultural practices?  Yes  No

Notes: Sediments are an effective substitute for fill. Structural, landscaping, and hardscape materials will likely be required on top of the fill to prepare the finished surface as part of development.

### 3) Effect of Proposed Beneficial Use on Public Health, Safety, Welfare and/or the Environment

Has the applicant demonstrated the proposed beneficial use will **not** create an adverse impact to public health, safety, welfare, or the environment, by providing information substantiating compliance with the criteria listed in the bullet list below?

Yes  No

Notes: See notes below.

- Has the applicant demonstrated that the material is not a hazardous waste under ORS 466.00?  Yes  No

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Notes: Contaminant concentrations in the sediment are well below hazardous waste criteria.

- Has the applicant demonstrated that until the time this material is used according to a beneficial use determination, the material will be managed, including any storage, transportation, or processing, to prevent releases to the environment or nuisance conditions?  
 Yes  No

Notes: The Port of Portland prepared the West Hayden Island Placement Facility by constructing a berm around the entire 102-acre site. The lowest elevation of the berm is more than 5 feet higher than the 100-year flood plain. The T-4, Berth 410 Middle and West areas dredge material would be placed within this bermed area. For a previous beneficial use determination, the Post Office Bar dredge sediment placement project, DEQ evaluated the likelihood that flooding could result in environmental contamination. The same scenario applies to the T-4 sediment. Assuming a conservative scenario that all the T-4 sediments were released back into the Columbia River from a flood event, about 125 million cubic feet of water would pass by the island within an hour, and 3 billion cubic feet (125,000,000 x 24 = 3,000,000,000) within a day. Because the dredged material is fine to medium grained, it would be dispersed widely during such an event and undergo so much dilution that any identified contaminant concentrations would be further reduced below levels of concern for any aquatic life or people.

DEQ's analysis of the Port of Portland beneficial use application for placement of sediments from dredging at T-4 Berth 410 Middle and West areas comes to the same conclusion as the DEQ analysis of the Port of Portland beneficial use applications for the Post Office Bar Sediment project and T-6 and T-2 projects. DEQ concludes that seepage to the Columbia River or wetlands via groundwater would have virtually no impact from chemicals contained in the T-4 sediment that is placed in the West Hayden Island placement facility. The pertinent findings include:

- The dredged sediments consist of sandy, clayey silt.
- The material underlying the disposal cell is sand, but also contains significant quantities of silts.
- It is more likely that silty material will adsorb benzo(a)pyrene, hindering this chemical from migrating to groundwater or the Columbia River.
- Using conservative estimates and calculations, DEQ estimates that the time needed for groundwater to flow from the placement cell to the Columbia River is greater than two years, during which time silty material would absorb any potential contaminants that moved along the groundwater flow path.
- Groundwater moves very slowly, and the volume of groundwater moving from the fill area and discharging to the river would be no more than 0.03 cubic feet per second.
- Using the lowest flow in the Columbia River on record (63,600 cubic feet per second on 9/9/2001 at a nearby gauging station), the dilution ratio of Columbia River water to discharging groundwater is over 6 million to 1.
- Geotechnical and monitoring wells indicate the depth to groundwater is about 10 to 15 feet below ground surface, implying that rainfall, not groundwater discharge, forms the wetlands. This means that any chemicals in the groundwater would not reach the nearby wetlands.

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- **Contaminant levels in the T-4 Berth 410 Middle and West area sediments are very low to begin with. Benzo(a)pyrene has a very low mobility in soil and therefore, does not pose a significant risk to groundwater quality.**
- Has the applicant demonstrated that hazardous substances in the material, if any, meet one of the criteria in the bulleted list below?  Yes  No
  - Hazardous substances do not significantly exceed the concentration in a comparable raw material or commercial product;
  - Hazardous substances do not exceed naturally occurring background concentrations; or
  - Hazardous substances will not exceed acceptable risk levels, including persistence and potential bioaccumulation, when the material is managed according to a beneficial use determination.

**Notes: DEQ's evaluation concludes that sediment contaminant concentrations do not pose an unacceptable risk to human or ecological receptors.**

- Has the applicant demonstrated that the proposed beneficial use will not result in the increase of a hazardous substance in a sensitive environment, such as a park, wildlife refuge or wetland?  Yes  No

**Notes: The T-4 Berth 410 Middle and West area sediments are currently in a sensitive environment, the Willamette River. West Hayden Island has not been sampled to determine existing concentrations of hazardous substances, but low concentrations are often detected in soil and sediment in the Portland metropolitan area and are considered to be urban anthropogenic baseline or background. The concentrations of hazardous substances in the T-4 Berth 410 Middle and West area material are similar to concentrations detected in other dredge sediment placed at West Hayden Island, including sediments from T-2, T-6 and Post Office Bar dredging projects. The low concentrations of hazardous substances in the T-4 Berth 410 Middle and West area sediments will not adversely impact people or the environment at West Hayden Island.**

- Has the applicant demonstrated that the proposed beneficial use will not create objectionable odors, dust, unsightliness, fire, or other nuisance conditions?  Yes  No

**Notes: Dredged sediments will be pumped as a slurry from a barge into a bermed cell. The Port of Portland manages the West Hayden Island Placement Facility to address potential nuisance conditions.**

- Has the applicant indicated that the proposed beneficial use will comply with any other applicable federal, state, and local regulations?  Yes  No

**Notes: The dredging project will be managed by the Port of Portland. Dredging will occur in accordance with a U.S. Army Corps of Engineers permit to be issued in the future, a State of Oregon Department of State Lands permit, a National Marine fisheries Service**

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Biological Opinion and an Oregon DEQ Water Quality Certification issued on February 5, 2013.

The Portland Sediment Evaluation Team, consisting of the U.S. Army Corps of Engineers, Environmental Protection Agency, National Marine Fisheries Service, Washington Department of Ecology and DEQ, evaluated the T-4 sediments to be dredged and determined that the sediments associated with the Middle and West areas of Berth 410 are suitable for unconfined aquatic placement and noted that the Port plans to place the T-4 sediments from the Middle and West areas of Berth 410 at an upland site. The Port is not planning to dispose of the sediments dredged from the inner (Eastern) area of Berth 410 at its West Hayden Island placement site.

The Port has provided a copy of the City of Portland Land Use Compatibility Statement (April 19, 2012) that the placement of dredged sediments is currently allowed on West Hayden Island. DEQ also confirmed that land use has not changed through a June 20, 2013 email exchange with Susan E van Staveren of the City of Portland.

4) Public Involvement Evaluation (Note: this is not a Beneficial Use evaluation criterion)  
Determine a public involvement recommendation using the current, *Guidance to DEQ Solid Waste Program Staff and Managers on Public Notice & Participation*.

- Is public notice and participation being recommended for this application?  
 Yes  No

Notes: DEQ issued a public notice and held an information meeting on July 10, 2013. Two people attended the meeting to discuss protection of the wildlife habitat at the Port's sediment disposal site, the beneficial use process, the City of Portland's annexation process and the Port of Portland's proposed commercial development.

