Oregon
Kate Brown, Governor

Department of Transportation
123 NW Flanders St.
Portland, Oregon 97209
Phone (503) 731-8200
Fax (503) 731-8259

DATE: November 1st, 2021

TO: Wesley Thomas, P.E., DEQ Project Manager
Anna Coates, R.G., DEQ Project Manager

FROM: Paul Wirfs, P.E., State Hydraulic Engineer
Sam Haffner, Portland Harbor Coordinator
Jonathan Horowitz, P.E., Resident Engineer – Consultant Projects

SUBJECT: Advanced Investigation Report
N02000 – Portland Harbor

The Advanced Investigation (AI) Team has completed the assessment of the structural Source Control Measures (SCMs) proposed in the *Portland Harbor Source Control Preliminary Feasibility Study* (Preliminary FS) (*ODOT, 2021*) to facilitate a Source Control Determination from the Oregon Department of Environmental Quality (DEQ).

BACKGROUND

The Preliminary FS evaluated an extensive list of potential SCMs which would provide ODOT with the needed stormwater treatment, at outfalls located within the Portland Harbor Superfund Site, They are to meet the goals of the Record of Decision (ROD) established by the United States Environmental Protection Agency (USEPA) for the Portland Harbor Superfund Site. The outfalls examined included 4 bridge outfalls (St. Johns Bridge east/west, Fremont Bridge Center span east/west), 2 interstate highway outfalls (I-5/Fremont Bridge east and I-405/Fremont Bridge west) and multiple outfalls along an approximate 7.4 mile stretch of Highway 30.

The SCMs for these outfalls were screened against five Balancing Factors:

- **Effectiveness:** Assess alternative's ability to achieve the desired level of protectiveness.
- **Long-Term Reliability:** Assess alternative's ability to maintain the required level of protectiveness over the long term after it has been implemented.
- **Implementability:** Determine whether, or with how much difficulty, the alternative can be implemented.
- **Implementability Risk:** Address the effects/risks of an alternative on human health (including safety) and the environment during implementation.
- **Cost Reasonableness:** Select lowest cost alternative that is effective and reliable and determine the degree to which the costs are proportionate to the benefits (cost/benefits analysis).

The Balancing Factor screening process eliminated a significant number of potential SCMs, resulting in a "short list" of remaining options for potential implementation. The "short list" of SCMs was passed to the multi-disciplinary AI Team for further evaluation/development, scoping, risk identification, and cost estimating.

ADVANCED INVESTIGATION – PROCESS

Advanced Investigation is a relatively new process, implemented by ODOT to reduce the risk of costly and untimely project changes that ultimately minimize unforeseen extra costs. AIs are intended to provide more precise data on projects with limited or not fully define scopes due to the cost and time-consuming nature of detailed investigations. In addition to completing tasks typically included in an AI, the AI Team concurrently completed a more traditional (although modified) Scoping process intended to gather discipline-specific general information regarding the various technical aspects of the engineering design and construction of the proposed "short list" of SCMs.

The AI was assembled and a kick-off meeting was held in May 2021. The AI team was led by Atousa Gorg, Jonathan Horowitz, Alex Granados, and Sam Haffner and was comprised of a representative from each technical discipline, including: Hydraulics, Geotechnical, Bridge, Right-of-Way (ROW), Railroad, Maintenance, Construction, Community Affairs, Utilities, Survey, Roadway, Hazmat, Environmental, Traffic, Active Transportation, and Mobility. In addition, the AI team included Tech Center Discipline Managers, Doug Stanley and Raymond Chong (Roadway) and Stephen Hay (Geotechnical). As the AI work advanced, regular check-in meetings with ODOT management, including Eduardo Miranda (Region 1 Tech Center Manager), Tova Peltz (Region 1 Project Delivery Manager), and Paul Wirfs (State Hydraulic Engineer) were held to facilitate review, guidance, and oversight.

In an effort to keep DEQ apprised of the AI team's progress, bi-weekly meeting were held to provide an overview of the work completed and the upcoming tasks. This provided the AI team leads with insight which was utilized to direct the work of the AI Team.

Documents

For each outfall (or subsequently group of outfalls) the deliverables for the AI Team included the following documents:

- Scoping Notes Document;
- Work Zone Decision Tree;
- ROW Footprint;
- Initial Business Case; and
- Cost Estimating Template (which includes a Risk Register).

Scoping notes documents were completed for each outfall location. The remaining AI documents generated were completed for each bridge and interstate highway outfall and Highway 30 outfalls combined. All of the documents generated as part of the AI are included in Attachment A. Figures illustrating the initial proposed SCMs provided to the AI Team by the FS Team are included as Attachment B.

Assumptions

During the AI/Scoping process, several assumptions were required in order for the AI Team to advance their work. These assumptions are detailed in multiple documents, including the Scoping notes and CET documents. For example, although the specific dimensions of the proposed Modified Bioslope, recommended by the FS for outfalls along Highway 30, would be determined during the design phase, it was assumed the Modified Bioslopes would be 4 feet wide. As Highway 30 is a designated Bicycle Facility, requiring a minimum 6 foot bike lane and one foot buffer, locations where Modified Bioslopes were proposed in the FS were screened for a minimum of 11 feet of shoulder space which would accommodate both the Modified Bioslope and a bicycle lane. Locations where this minimum was not met were eliminated from further consideration due to Implementability/Implementabilty Risk.

Another example concerns Outfall WR-307 (I-405/Fremont Bridge west). The AI Team identified two possible areas where the proposed treatment system for this outfall could be located: beneath a west footing of the Fremont Bridge (identified as Alternative A) or a block of property currently owned by ODOT (bound by NW 15th Avenue, NW 16th Avenue, NW Raleigh Street, and NW Savier Street, identified as Alternative B). Based on anticipated ROW acquisition costs of property located beneath the Fremont Bridge (multiple millions of dollars), the AI Team completed the scoping, cost estimating, etc. under the assumption that the treatment system will be located on the ODOT owned property although doing so would result in treating approximately 90% of the stormwater (as opposed to 100% had the treatment system be located beneath the Fremont Bridge). As a result, Alternative A was eliminated from further consideration due to Cost Reasonableness and Implementability Risk.

Quality Assurance/Quality Control

The AI was effectively completed in two phases: Scoping Notes (Phase I) and Cost Estimating/Risk Register (Phase II). After each phase of the AI was completed an internal QA/QC process conducted where the details provided in the phase-related documents were independently reviewed.

Region 1 Management Review

In addition, at the completion of each phase, the AI Team's work of was reviewed ODOT Management Team, including the State Hydraulic Engineer, Region 1 Project Delivery Manager, Region 1 Tech Center Manager, and select Region 1 Technical Discipline Managers. The results of the AI Team's work was checked for completeness and weighed against the Five Balancing Factors utilized by the FS Team. The ODOT Management Team provided input and comments which were incorporated before moving on to Phase II. After the completion of Phase II, the ODOT Management Team again provided input and comments which were incorporated prior to the completion of the AI Team's work.

ADVANCED INVESTIGATION – SCOPING RESULTS

After the completion of Phase II of the AI, the AI Team Leads and the ODOT AI Management Team met to discuss the findings. The results of the AI Team's efforts, were again weighted against the Five Balancing Factors used by the FS Team to select feasible SCMs to meet the stormwater quality objectives.

The full results of the AI Team's efforts are summarized in Table 1, included as Attachment C. The abbreviated summary tables are included below.

Table A below summarizes the conclusions of the AI Team's work. After discussion with the ODOT AI Management Team. Total cost is $130,568,395.

Table A – Preliminary AI Team Results

Location/Outfall	Evaluated SCM Treatment Type	Area Treated (acres) / Percent of Total Area Treated	AI Cost Estimate (For Design and Construction)	Cost per acre Treated
I-5/Fremont Bridge E (WR-306)	TMF* or CFU**	34.1 / 100%	$6,490,937	*$190,350*
I-405/Fremont Bridge W (WR-307)	TMF* or CFU**	36.5 / 90%	$6,645,928	*$182,080*
Fremont Br Ctr Span (E) (FB-E)	TMF* or CFU**	1.1 / 100%	$1,463,446	*$1,330,405*
Fremont Br Ctr Span (W) (FB-W)	TMF* or CFU**	1.1 / 100%	$3,090,000	*$2,809,091*

St Johns Bridge W (WR-510)	TMF* or CFU**	1.4 / 100%	$1,154,640	*$824,743*
St Johns Bridge E (OF-52)	TMF* or CFU**	1.9 / 100%	$1,226,218	*$645,378*
Highway 30 (multiple outfalls)	Modified Bioslopes	13.5 / 20.6%	$110,515,226	*$8,186,313*
TOTAL COST		**61.8%**	**$130,586,395**	

Notes:
Green: Cost below Cost Reasonableness factor
Yellow: Cost within Cost Reasonableness factor
Red: Cost above Cost Reasonableness factor
**TMF: Tank Media Filter*
***CFU: Cartridge Filter Unit*

Table B summarizes ODOT's proposed structural SCM improvements at this time. Total cost is $13,580,232.

Table B – ODOT SCM Recommendations

Location/Outfall	SCM Treatment Type	Area Treated (acres) / Percent of Total Area Treated	AI Cost Estimate (For Design and Construction)	Cost per acre Treated
I-5/Fremont Bridge E (WR-306)	Bioswale/ Modular Wetland	21.9-30.0 / 64-88%	*NA: scoping and cost estimates conducted as part of Rose Quarter project*	
I-405/Fremont Bridge W (WR-307)	TMF or CFU	36.5 / 90%	$6,645,928	*$182,080*
Fremont Br Ctr Span (E) (FB-E)	TMF or CFU	1.1 / 100%	$1,463,446	*$1,330,405*
Fremont Br Ctr Span (W) (FB-W)	TMF or CFU	1.1 / 100%	$3,090,000	*$2,809,091*
St Johns Bridge W (WR-510)	TMF or CFU	1.4 / 100%	$1,154,640	*$824,743*
St Johns Bridge E (OF-52)	TMF or CFU	1.9 / 100%	$1,226,218	*$645,378*
TOTAL COST		**84.7%**	**$13,580,232**	

Notes:
Green: Cost below Cost Reasonableness factor
Yellow: Cost within Cost Reasonableness factor
Red: Cost above Cost Reasonableness factor

CONCLUSIONS AND NEXT STEPS

As detailed above in Table A, the proposed SCMs for Highway 30 (Modified Bioslopes) were eliminated primarily due to Cost Reasonableness (at approximately $8 million/acre treated). The AI Team also determined that this SCM would have significant constructability and maintainability challenges, impacting the DEQ balancing factors of "Implementability" and "Long-term Reliability".

Although recommendations for structural SCMs for Highway 30 are not included as part of this AI, work on a Supplemental FS has begun that will re-evaluate SCM options along the Highway 30 corridor. The Supplemental FS for Highway 30 will include the same examination of potential SCMs and also include the work completed by the AI Team for the original FS. ODOT anticipates delivery of the Supplemental FS early in the first quarter of 2022.

Additionally, while the AI Team scoped and evaluated installing either a Tank Media Filter or Cartridge Filter Unit in the WR-306 location, the AI Team recommends that a bioswale/modular wetland (scoped separately as part of an early work package for the Rose Quarter Project) be selected as the recommended SCM at this location.

In addition, as part of the design of the included SCMs, it is ODOT's intent to include both and Operations & Maintenance (O&M) Plan for the proposed SCMs and a Sampling and Monitoring Program which will include Highway 30 (once structural SCMs are identified). With additional information, based on sampling data, ODOT can readdress treatment needs along Highway 30 with a significantly more targeted approach.

CLOSING

If you have any further questions or require any additional information please contact Sam Haffner (Samuel.K.HAFFNER@odot.state.or.us) or Jonathan Horowitz (Jonathan.P.HOROWITZ@odot.state.or.us).

Attachments:

Attachment A – AI/Scoping Background Information
Scoping Notes Documents
Cost Estimating Templates
Attachment B – Figures
Attachment C – Table 1 – Portland Harbor Advanced Investigation/Scoping Executive Summary

cc: Tova Peltz, P.E., G.E., C.E.G., Region1 Project Delivery Manager
Eduardo Miranda, P.E., Region 1 Technical Center Manager
Raymond Chong, P.E., Region 1 Senior Roadway Unit Manager
Douglas Stanley, P.E., Region 1 Roadway Unit Manager,
Stephen Hay, C.E.G., Region 1 Geo-Hydro and Hazmat Unit Manager