DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, PORTLAND DISTRICT
PO BOX 2946
PORTLAND OR 97208-2946

REPLY TO
ATTENTION OF:

5 February 2014

Operations Division
Regulatory Branch
Corps No. NWP-2009-19

City of Milwaukie
ATTN: Stephen Butler
6101 Johnson Creek Boulevard
Milwaukie, OR 97206

Dear Mr. Butler:

Enclosed is your fully executed Department of the Army Permit.

Please carefully read the permit and its conditions. In addition, if you have a contractor and/or agent, please review these conditions with them to ensure that the work is performed in accordance with the permit terms.

Also be aware that other authorizations from Federal, state, or local governments may be required by law. If the work is not completed prior to the permit expiration date, you may apply for a time extension. We recommend you apply for a time extension at least 90 days before the expiration date of the permit.

If you have any questions, please contact me at the letterhead address, by telephone at (503) 808-4963, or email james.a.holm@usace.army.mil.

Sincerely,

Michael R. Turaski
Section Chief
Regulatory Branch

Enclosures

DEPARTMENT OF THE ARMY PERMIT

Permittee: City of Milwaukie

Permit No: NWP-2009-19

Issuing Office: U.S. Army Corps of Engineers

NOTE: The term "you" and its derivatives as used in this permit means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the U.S. Army Corps of Engineers (Corps) having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: The 6.5-acre park redevelopment project involves a total excavation of approximately 10,900 cubic yards (CY) of material, including uplands. For work below the ordinary high water mark (OHWM) of the Willamette River and Kellogg Creek, the project involves the removal of approximately 5,000 CY of materials, affecting 1.6 acres of Waters of the U.S., and the discharge of approximately 4,800 CY of fill materials, affecting 0.9 acres of Waters of the U.S.

The Riverfront Park project is composed of the following in-water components:

- stream and streambank habitat enhancements (removal of 79 piles, concrete, rebar, asphalt),
- bio-engineered bank stabilization (large wood, crib walls, soft gabions, crib walls),
- removal of an existing, two-lane boat ramp,
- installation of new, one-lane boat ramp, pilings, and boarding float,
- installation of stone steps for shore access, and
- nearshore re-contouring (graded river cobbles and gravels).

The 79 piles to be removed, with 75 from Kellogg Creek and 4 upstream of Johnson Creek, will be extracted by a vibratory hammer or cut at the mudline if they break off, and disposed of at an approved facility with all floating piling debris. Approximately 35 CY of deleterious shoreline debris (concrete culvert sections, asphalt, rebar, concrete and wood rubble, trash, fencing) below the OHWM will be removed from the banks of the Willamette River and Kellogg Creek inside the project limits. Approximately 30,000 sq. ft. of the bank and shore below the OHWM will be altered by bio-engineered bank protections, re-contouring, and habitat enhancements (large wood [24" diameter, 20-feet long] with root wads, natural cobbles and gravels [2-6" diameter, ~100 CY, ~16,300 sq. ft.], soil lifts, soft gabions, crib walls). The removal of the old boat ramp will restore 2,700 sq. ft. below the OHWM. This area will be recontoured to match the adjacent bank, with the upper portion re-planted with native vegetation.

The new single-lane boat ramp will be 160-feet long by 20-feet wide and constructed of pre-cast concrete planks below the OHMW. The earthwork for new ramp will require a cut of 4,667 CY, a fill of 4,154 CY, for a total net cut of 523 CY. The new ramp area will be graded to a level slope, with a 1.5-inch gravel base and steel support rails. Class 700 riprap (~102 CY) will be placed 4 feet wide and 4 feet deep on the sides and toe of the new ramp to prevent scour. The 8-foot wide by 300-fot long,

plastic "wood" boarding float will be located on the upstream side of the new ramp and secured with nine 16- to 18-inch diameter, steel pilings. The pilings will be installed with a vibratory hammer, but an impact hammer may be required if subsurface obstructions are encountered. The boarding float and access ramp will incorporate light-transmitting materials (metal grating). Each piling will have a conical cap.

The approximately 1,170-sq. ft. stone step area below the OHWM will provide controlled public access to the shore areas to protect the riparian plantings and bio-engineered banks. The stone step will total 175 CY and will be less than 40 feet wide below the OHWM. The steps will be interspersed with large rock to stabilize the bank. The work below the OHWM is described in detail in the National Marine Fisheries Service's (NMFS) Biological Opinion.

A new over-water pedestrian walkway may be constructed over the mouth of Kellogg Creek. Upland elements of the proposed project include a dense, native riparian re-vegetation plan, pedestrian and bike trails offset from the top of bank, public recreational facilities and open spaces, parking, boat trailer parking, overlooks, and stormwater treatment swales and gardens. No treated wood will be used for in- or over-water structures.

Construction activities below the OHWM, over Kellogg Creek, and all in-water work will occur during the July 1 to October 31 in-water work window. Erosion and turbidity controls include the use of sediment curtains (with floating booms), sediment fencing, inlet protection, bio filter bags, and use of coir fabrics. Land-based equipment will not be used in water and all staging and storage areas will be above the OHWM.

Purpose: The project purpose is to provide regional riverfront recreational opportunities for the City of Milwaukie and the restoration of aquatic and upland habitats. The City's comprehensive Downtown and Riverfront Framework Plan is to redevelop the riverfront park, increase recreational opportunities, improve and create natural habitats, protect and improve water quality, and promote the downtown area.

Project Location: The project is located in the Milwaukie Riverfront Park along the Willamette River (river mile 18.5) from Kellogg Creek downstream to Johnson Creek. The project site is in Section 35, Township 1 South, Range 1 East, within the City of Milwaukie, Clackamas County, Oregon

Drawings: 40 pages (Enclosure 1)

General Conditions:

1. The time limit for completing the work authorized ends on October 31, 2020. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. Permittee must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition No. 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions (Enclosure 2).

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. Permittee shall notify the Regulatory Branch with the date the activities authorized in waters of the United States are scheduled to begin. Notification shall be sent by email to cenwp.notify@usace.army.mil or mailed to the following address at least 30 days prior to beginning work below the ordinary high water mark:

   U.S. Army Corps of Engineers
   Permit Compliance, Clackamas County
   Post Office Box 2946
   Portland, Oregon 97208-2946

   The subject line of the message shall contain the name of the county (Clackamas) in which the project is located followed by the U.S. Army Corps of Engineers permit number (NWP-2009-19).

2. Permittee shall submit a signed certification regarding the completed work and the required archeological monitoring. A "Compliance Certification" is provided (Enclosure 3).

3. The following special condition is a part of all Department of the Army permits that provide authorization under Section 10 of the Rivers and Harbors Act, regardless whether the permit provides such authorization under Section 10 alone or in combination with authorization under other laws:

   The permittee understands and agrees that if future operations by the United States require the removal, relocation, or other alteration of the structure or work herein authorized, or if in the opinion of the Secretary of the Army or their authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required upon due notice from the U.S Army Corps of Engineers to remove, relocate, or alter the structural work or obstructions caused thereby without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

4. The National Marine Fisheries Service (NMFS) issued biological opinion (BO) No. 2010/563 on May 10, 2013 since the project will adversely affect Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), Upper Willamette River (UWR) Chinook salmon, LCR steelhead (*O. mykiss*), UWR steelhead, LCR coho (*O. kisutch,*) and their designated critical habitats. To minimize adverse effects to listed species and their habitat, you shall fully implement the terms and conditions from the NMFS BO (Enclosure 4). All terms and conditions of the BO are terms and conditions of this authorization.

5. To minimize impacts to listed salmon species, all work below the OHWM (elev. 18.4' NGVD 29) shall be conducted during the in-water work window from July 1 to October 31. Any deviation from this window requires prior written approval of the Corps, in consultation with ODFW and NMFS.

6. The permittee shall maintain unobstructed passage through Kellogg Creek for all life stages of fish and aquatic life (amphibians, reptiles, mammals) during the construction project.

7. The permittee shall follow these measures to avoid and minimize adverse effects during removal of the 79 derelict pilings:

    A. A floating curtain shall be placed around the piling field prior to attempting piling removal.
    B. Pilings shall be first removed with a barge-mounted vibratory hammer.
    C. Pilings shall be gripped above the waterline.
    D. Intentional twisting or bending of the piling is prohibited.
    E. If a piling breaks during removal, a second attempt to remove the piling shall be made.
    F. If the piling is not retrievable, it shall be cut at the mudline.
    G. The removed pilings shall be placed in a temporary containment area on the barge or in uplands to prevent the return of sediments and debris to the waterway.
    H. The removed pilings, sunken debris, and floating debris shall be removed from the waterway and placed in a vehicle for disposal.
    I. Removed debris and pilings disposal shall be taken to an appropriate upland landfill.

8. To prevent piscivorous bird perching, the permittee shall install conical piling caps on each piling.

9. The permittee shall incorporate light transmitting materials into boarding float and floating portion of the access ramp for at least 50 percent of its overwater surface area.

10. The permittee is responsible for obtaining any "take" permits required under the U.S. Fish and Wildlife Service's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the Oregon Office (503-231-6179) of the U.S. Fish and Wildlife Service to determine if such "take" permits are required for a particular activity.

11. To minimize temporal loss and riparian effects, prior to grading the site and removing existing riparian vegetation, the permittee shall complete a tree preservation inventory below the OHWM of the park with the North Clackamas Parks and arborist to determine which existing native trees and snags may be safely left in place. The inventory shall be submitted to the Corps with the as-built report detailed in condition 16.

12. The permittee shall install vegetation below the OHWM in the following manner and method to

maximize survival of individual plants that will develop into a properly functioning riparian zone:

A. At least 0.55 acres of woody shrubs and trees shall be planted below the OHWM. The 0.55 acre of plantings shall include at least 0.40 acre of emergent shrubs, 0.10 acre of ash/willow plantings, and 0.05 acre of fir/maple plantings. If monitoring, outlined in Condition 13 below, determines the failure to achieve these acreages after 10 years, additional plantings or other measures to achieve the expected environmental lift may be required. To accommodate beaver issues, the permittee may install additional vegetation (native willows or dogwoods) within the project limits by 10% (~0.05 acre) beyond the required 0.55 acre to ensure at least 0.55 acre of plantings survive to the end of the 10-year monitoring period.
B. Only native plants shall be used.
C. Only live plants shall be installed. Damaged, infected, or broken plants are prohibited. Plants brought to site and not immediately installed shall be watered and placed in the shade until installed.
D. Species planted below the OHWM shall be tolerant of seasonal inundation.
E. Woody plants shall be installed in a higher density that will create a dense riparian zone after 10 years of growth.
F. Tree saplings shall be at least 2-gallon in size. Bare rootstock for trees is prohibited.
G. The soil around each installed tree sapling shall be amended.
H. A temporary watering plan and system for woody vegetation shall be developed and implemented for at least the first two growing seasons. The plan shall provide deep watering at least every two weeks during the dry-weather, growing season from July through October. The water system may be used for three seasons as an adaptive management is required.
I. The temporary water system shall be removed in its entirety by the end of third growing season.

13. The permittee shall submit an as-built "Year 0" report of the installed vegetation below the OHWM, detailing the following information:

A. Source(s) of installed plants.
B. Species installed.
C. Number and size of species installed.
D. Acres of installation for each community.
E. At least 5 photographs of installation activities for each planting community below the OHWM.
F. Location map of the planted communities with photographic monitoring sites.
G. Established at least 5 photographic monitoring sites.
H. Diagram of the watering system installed.
I. Written two-year watering plan.
J. Contingency plan to replace and protect lost plants during the 10-year monitoring period. The use of herbicides overwater or within 50 feet of the water's edge are prohibited, unless separately approved in writing by the Corps and NMFS.
K. The as-built vegetation plan shall be submitted within 60 days of completing installation of the vegetation and watering system.

14. The permittee shall annually monitor during the growing season and adaptively manage the installed vegetation below the OHWM for 10 years. Status reports of the installed vegetation and annual monitoring shall be submitted by December 31 of years 1, 3, 5, 7, and 10. The succinct

report shall briefly discuss the following long-term success criteria for each year monitored:

A. A minimum of 50% areal coverage of all vegetation by year 5 and 80% by year 10.
B. A maximum of 10% non-native vegetation in years 3, 5, 7, and 10.
C. A discussion of actions taken to meet the success criteria.
D. A discussion of plants lost, causes, and actions taken, with dates of actions, to replace lost plants.
E. A discussion of other factors that adversely or beneficially affecting achievement of the success criteria.
F. Photograph log of annual monitoring effort(s) and 5 photographic monitoring sites for each year.

15. The permittee shall remove and control all invasive or noxious plants below the OHWM in project limits for the 10-year monitoring period. Invasive and noxious plant species include, but are not limited to:
    http://www.oregon.gov/ODA/PLANT/index.shtml
    http://www.portlandoregon.gov/bes/article/98648
    http://www.oregon.gov/ODA/PLANT/WEEDS/Pages/lists.aspx

16. The permittee shall submit an as-built report and final drawings of the redeveloped park by December 31 of the year in which in-water construction is completed. The as-built report shall detail the project's construction milestones and provide a photographic log of all work. The as-built project report shall detail the quantities of removal and fill activities in waters of the U.S., the types and source location(s) of fill materials, areas of temporary and permanent aquatic impacts, and any deviations from the authorized project description.

17. The permittee shall have a Professional Archeologist monitor the initial excavation and grading of the new boat ramp area. The archeologist shall sign the compliance certificate form (Enclosure 3).

18. Permittee shall immediately notify the Corps at the letterhead address if at any time during the authorized work, human remains and/or cultural resources are discovered within the permit area.

19. In the event cultural resources and/or historic properties are discovered during the any phase of the authorized work, the Permittee shall fully implement the recommendations outlined in the Inadvertent Discovery Plan (Enclosure 4).

20. To minimize adverse environmental effects, no activity may use unsuitable fill materials (e.g., trash, debris, car bodies, asphalt, contaminated fill, etc.). Material used for construction or discharge must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

21. Land-based equipment and heavy machinery is prohibited from working in the water. Heavy equipment working on mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance or compaction.

22. To protect water quality, the use of treated wood in over-water and in-water structures is prohibited.

23. To protect water quality prior to, during, and immediately after construction, the permittee shall

implement best management practices for erosion and sediment controls. You shall remove all temporary fill and isolation measures from waters of the U.S. within 30 days of completing in-water work. You shall utilize native, non-invasive plant species when re-vegetating disturbed areas.

24. To protect water quality during in-water work, turbidity controls and work area isolation measures shall be implemented. The use of sediment curtains shall follow the deployment and retrieval methods as detailed in the NMFS Biological Opinion.

25. The use of in-water explosives is prohibited.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this Authorization:

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability: In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions: General Condition No. 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below as permittee indicates that you accept and agree to comply with the terms and conditions of this permit.

Stephan C. Butler — 2/5/14

(PERMITTEE SIGNATURE) **(DATE)**

Stephan C. Butler — Community Development Director

(PRINTED NAME) **(TITLE)**

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

FOR THE COMMANDER, GLENN O. PRATT, LIEUTENANT COLONEL, CORPS OF ENGINEERS, DISTRICT COMMANDER:

MIKE TURSKI — 5 FEB 2014

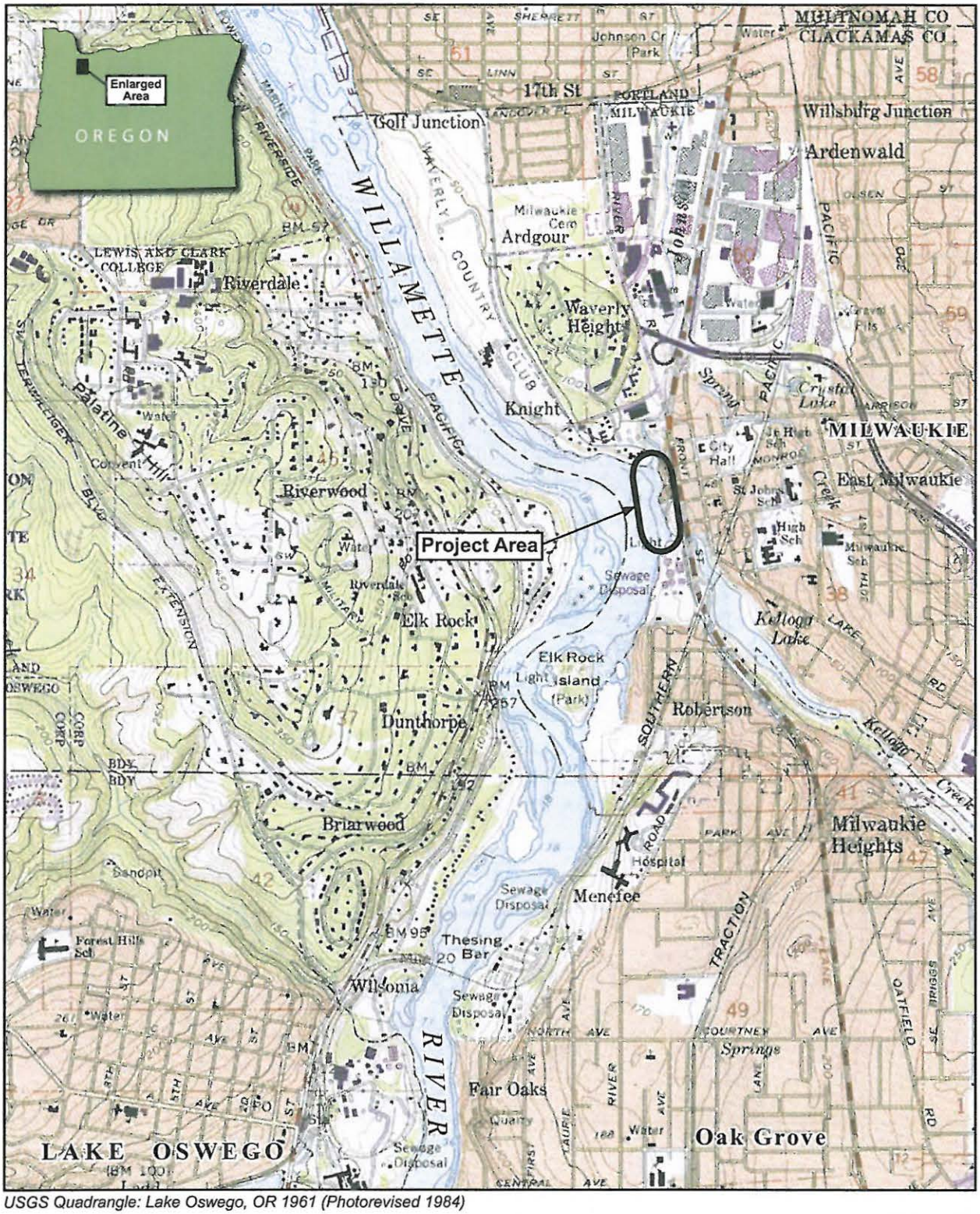
(DISTRICT COMMANDER) **(DATE)**

For Shawn H. Zinszer
Chief, Regulatory Branch

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ _____

(TRANSFEREE) **(DATE)**



USGS Quadrangle: Lake Oswego, OR 1961 (Photorevised 1984)

Figure 1
Vicinity

Scale - 1 : 24,000

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

SCALE IN FEET
0 20 40 60

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Existing Site Plan		
	Reach 1		4A
DWG. REF. C-1	PROJECT MAEX0018	SCALE 1" = 60'	AMENDMENT NO. 0.0
DRAWN BY BAR	DESIGN BY CRM, RGWI	APPROVED BY	DATE 05-15-09

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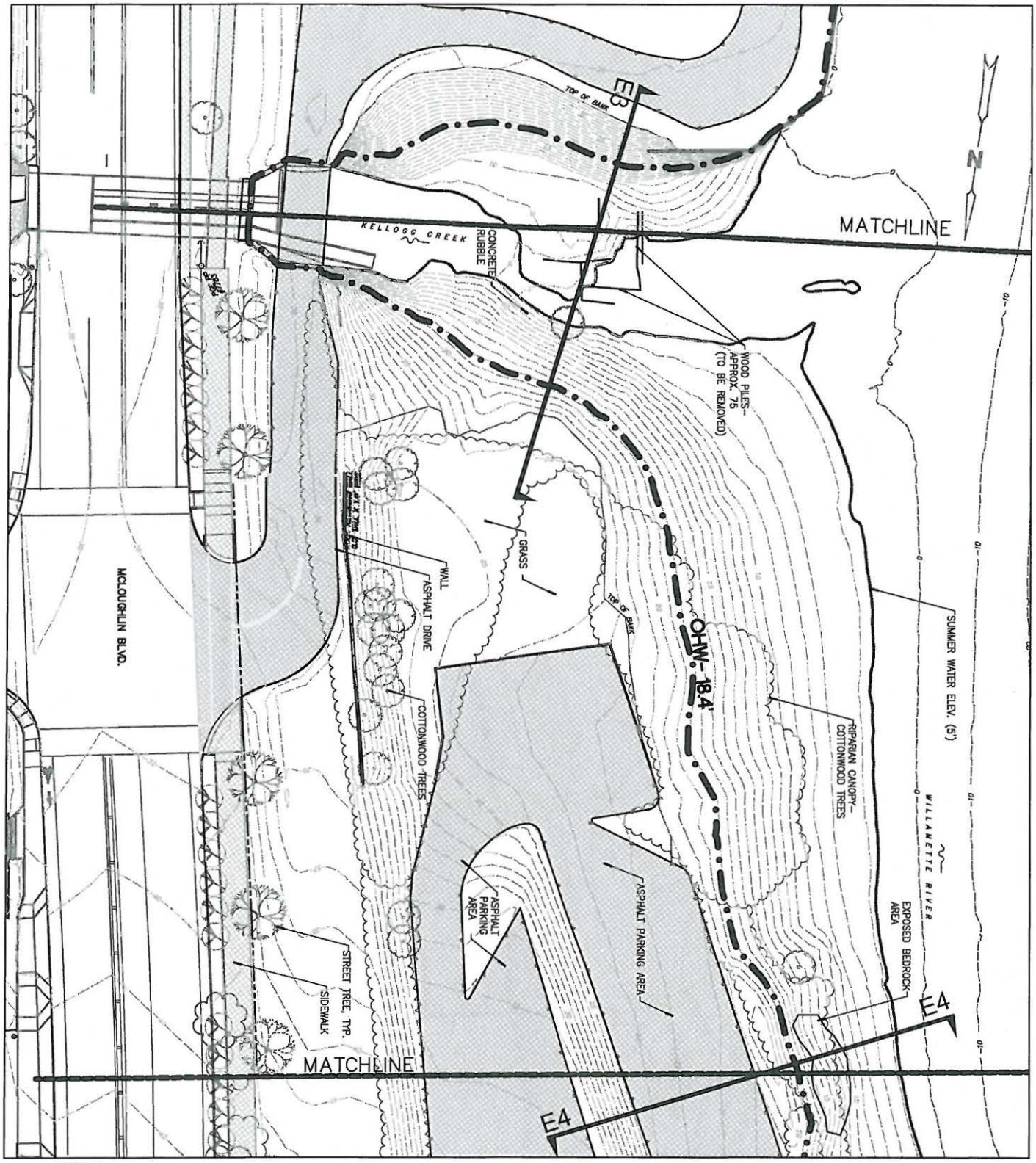

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SCALE IN FEET
0 20 40 60

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Existing Site Plan		
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BAR	CRM, RGWI		05-15-09

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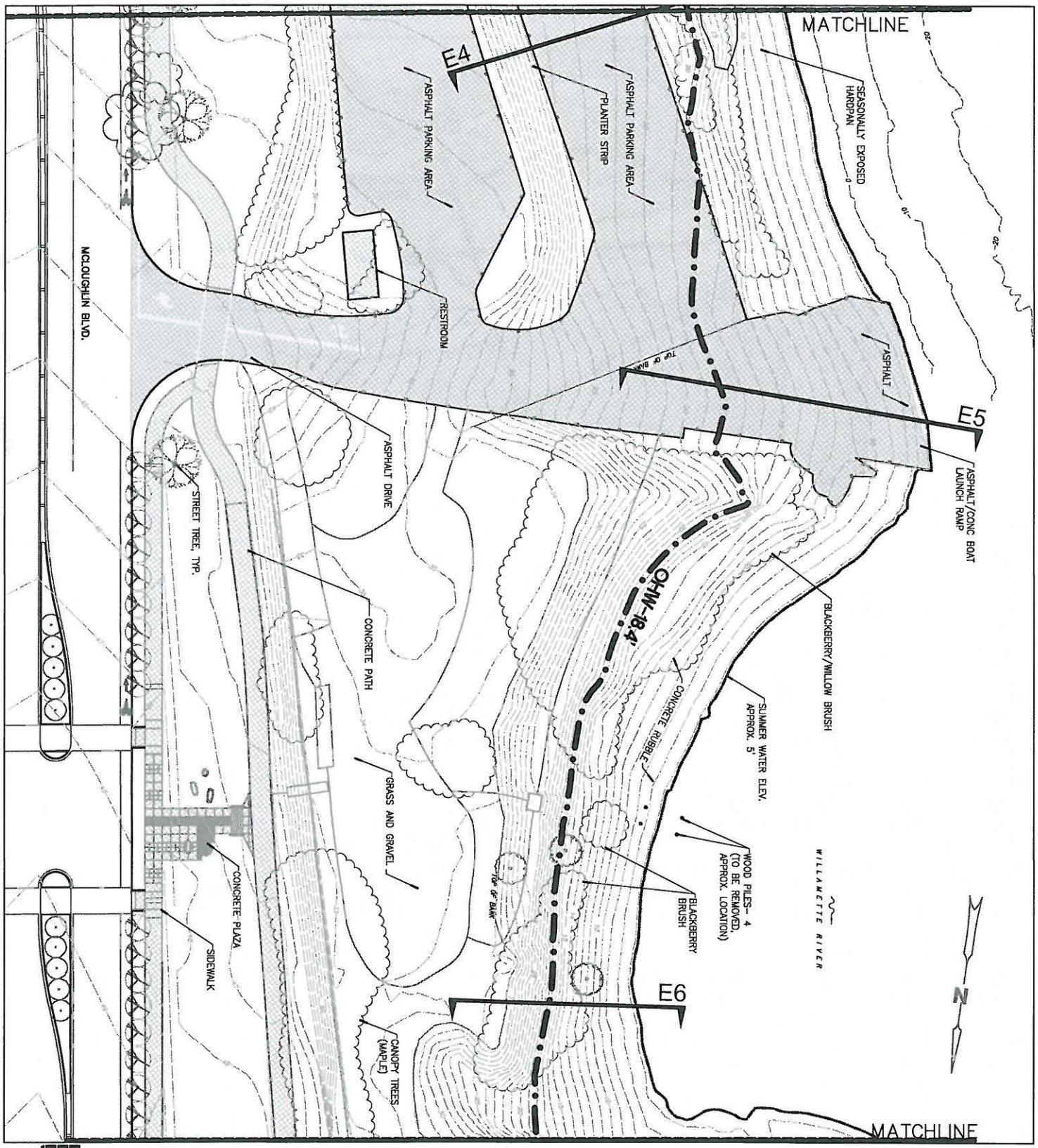

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland, Oregon 97201
Phone: 503.223.6663

SCALE IN FEET 0 20 40 60

PROJECT: Milwaukie Riverfront Park

TITLE: Existing Site Plan

Reach 3

SHEET: 4C

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BAR	CRM, RGWI		05-15-09

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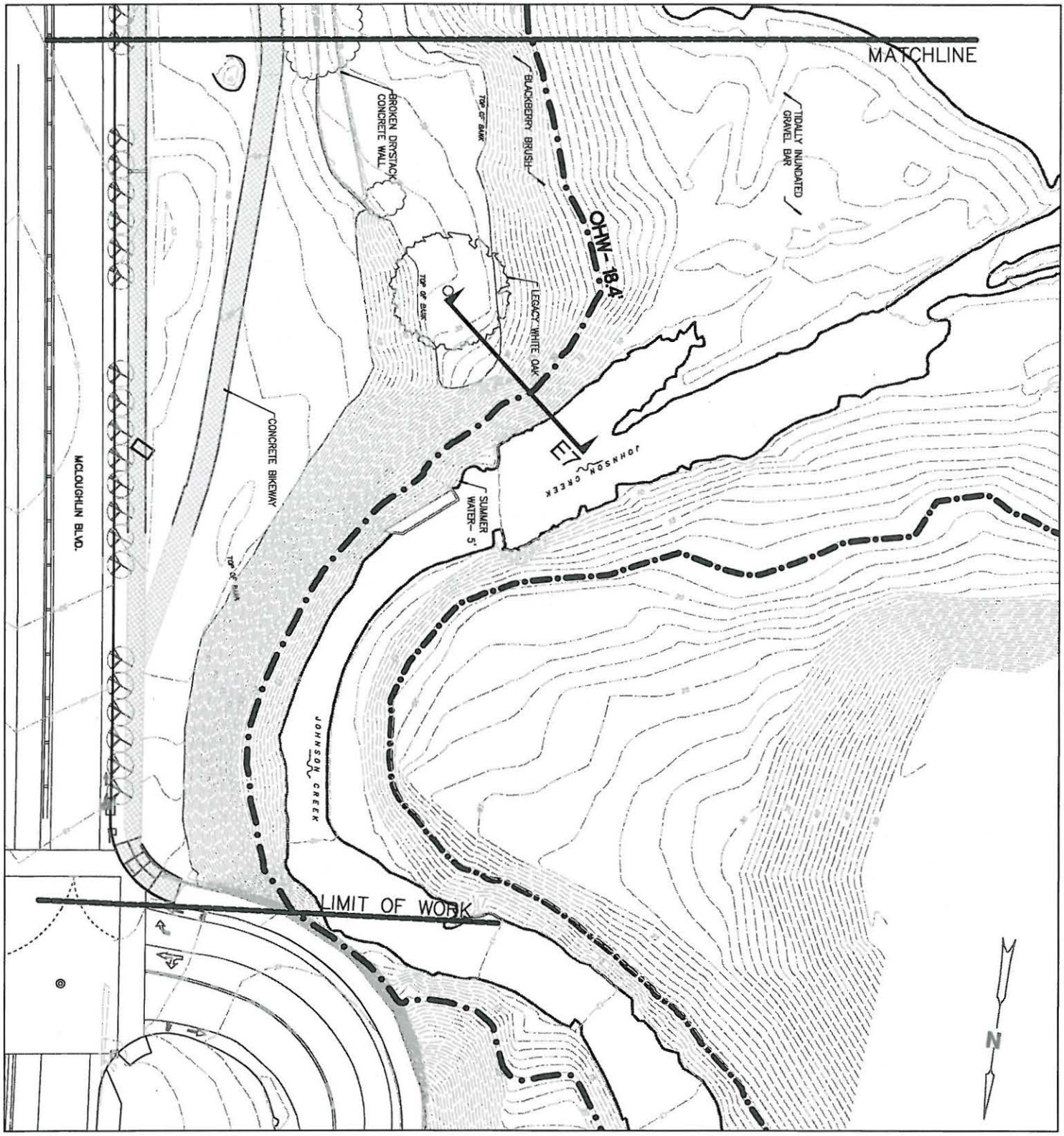

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2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

SCALE IN FEET 0 20 40 60

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Existing Site Plan		
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DRAWN BY BAR	DESIGN BY CRM, RGWI	APPROVED BY	DATE 05-15-09

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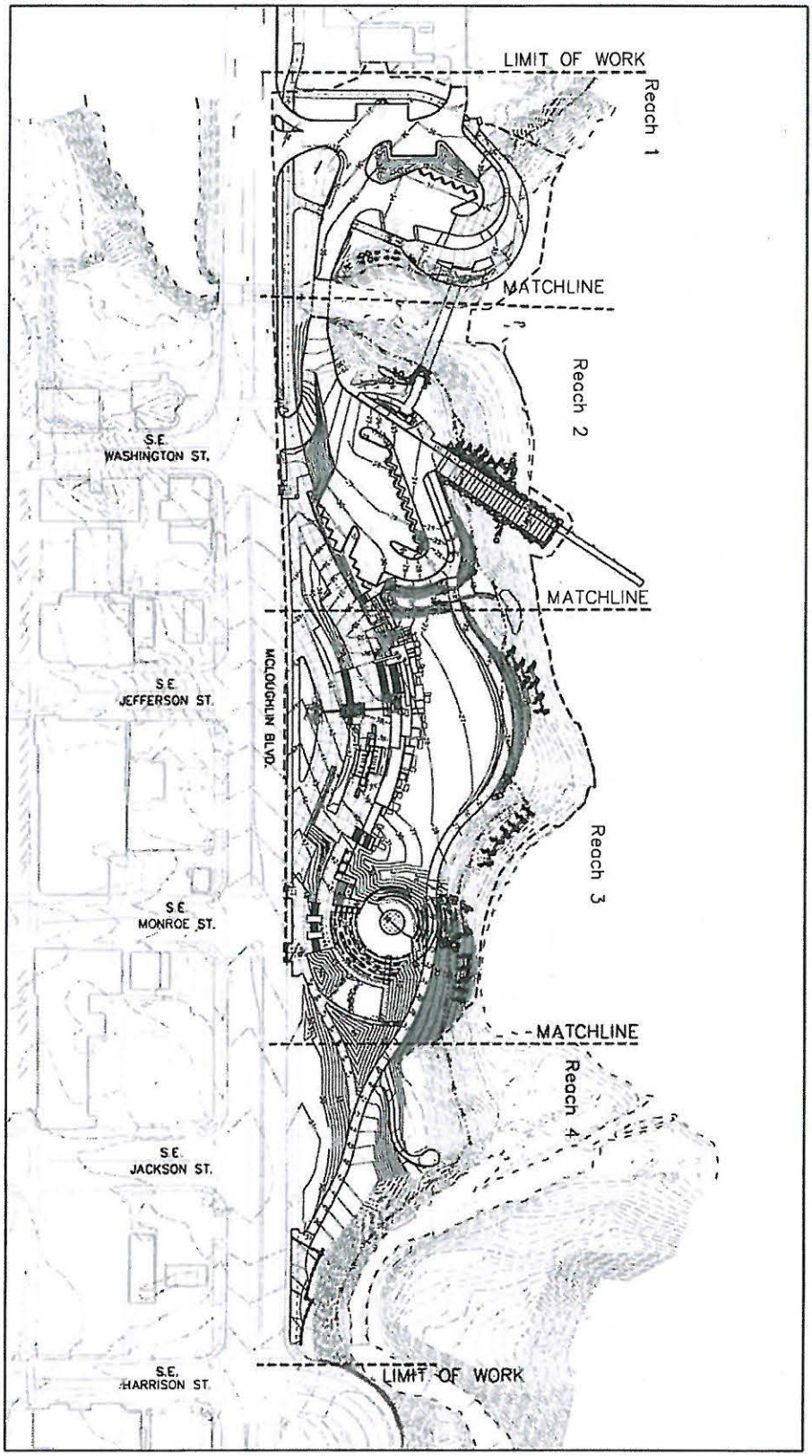

0 50 100 200

PROJECT: Milwaukie Riverfront Park

TITLE: Proposed Site Plan

SHEET: 6

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
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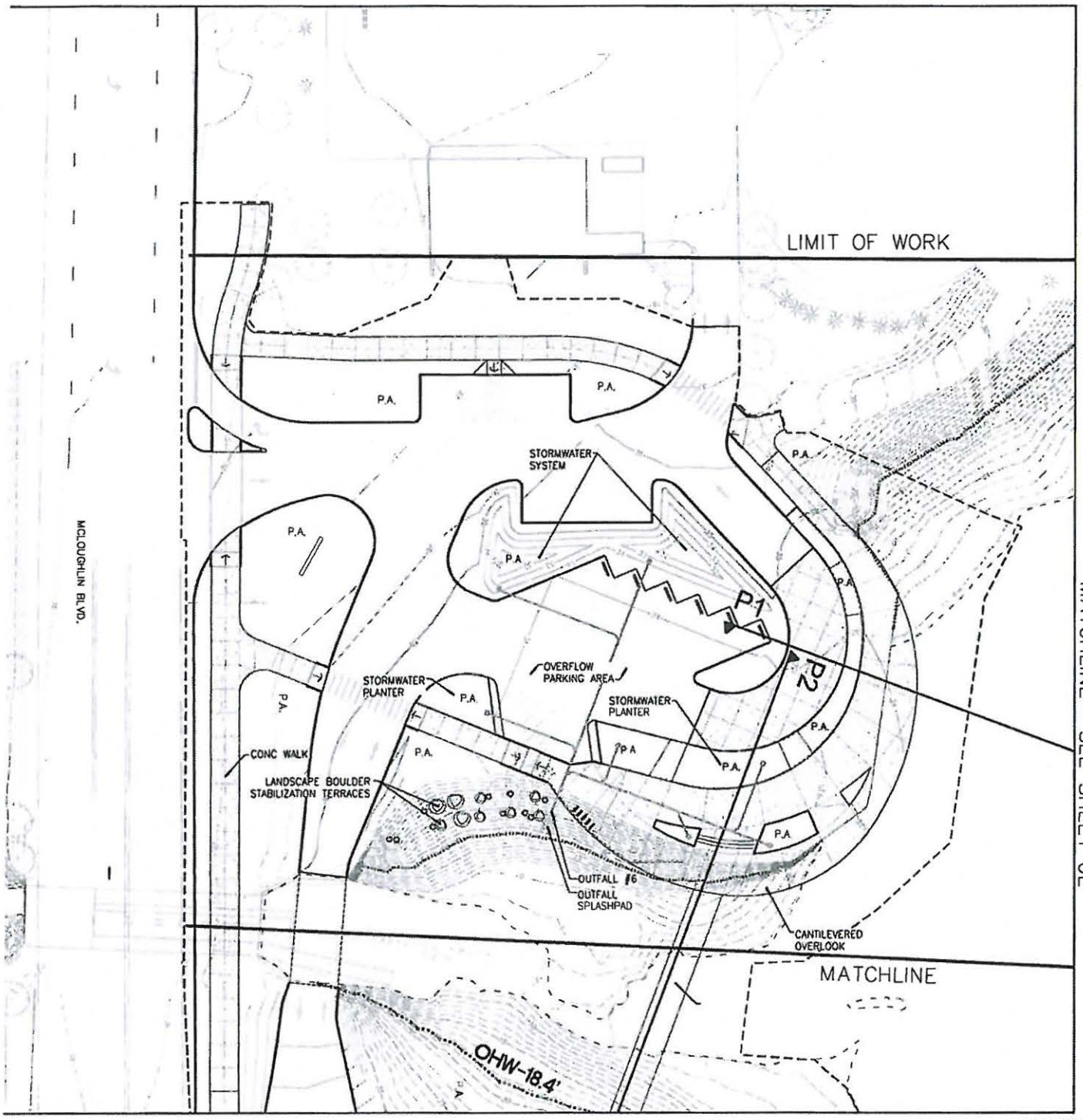

NOTE: SEE SHT. 101 FOR STORM OUTFALL SECTION

0 15 30 60

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park
TITLE	Proposed Site Plan
	Reach 1
SHEET	6A

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
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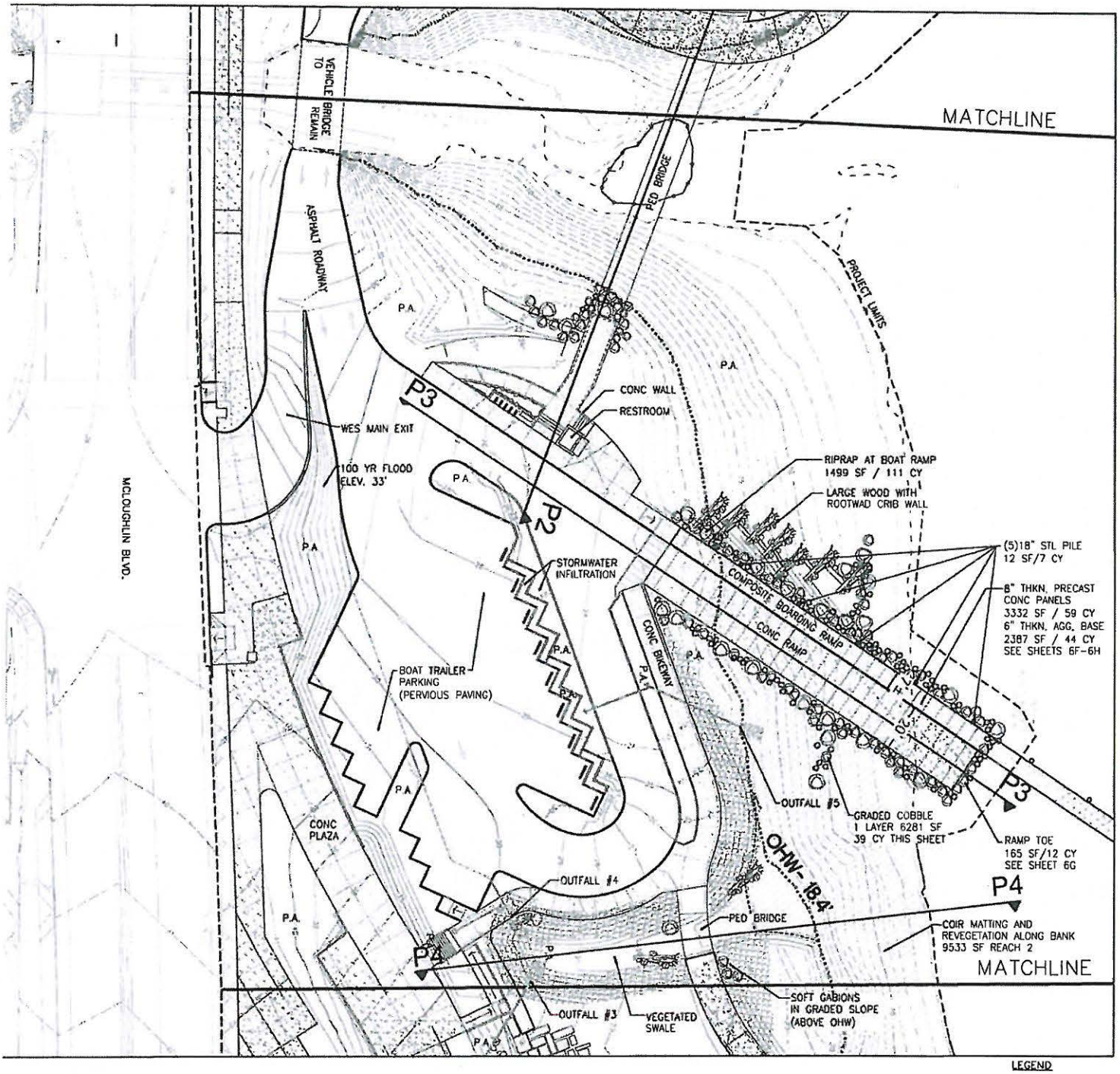

LEGEND

- COIR MATTING
- SOFT GABION (ON GRADED SLOPES)
- GRADED COBBLE

NOTE: SEE SHT. 10I FOR STORM OUTFALL SECTION

0 15 30 60

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

PROJECT: Milwaukie Riverfront Park

TITLE: Proposed Site Plan

Reach 2

SHEET: 6B

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BAR	CRM, RGWI		ENCLOSURE 1 05-15-09

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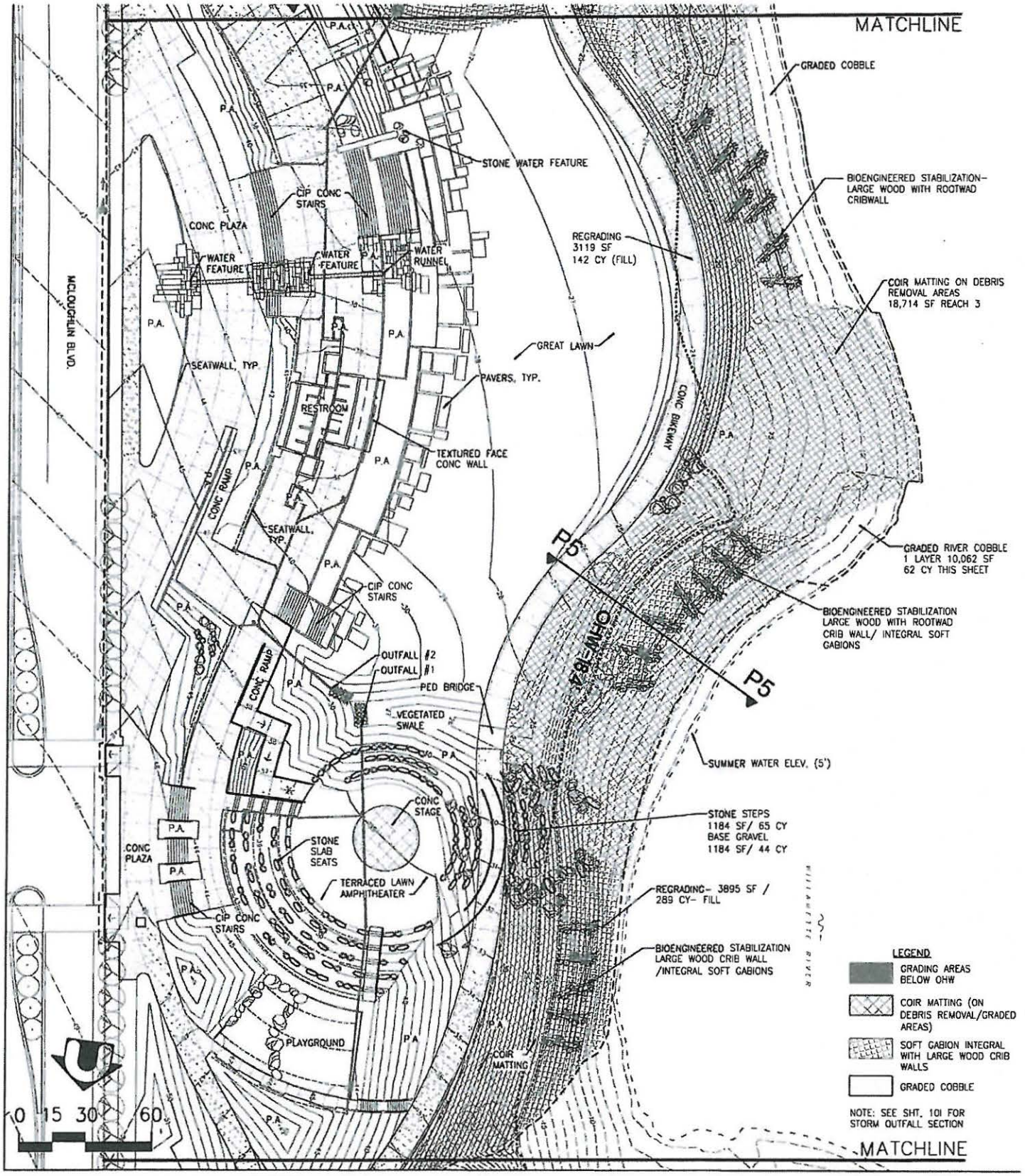

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park
TITLE	Proposed Site Plan
	Reach 3

SHEET 6C

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0
DRAWN BY	**DESIGN BY**	**APPROVED BY**	**DATE**
BAR	CRM, RGWI	ENCLOSURE I	05-15-09

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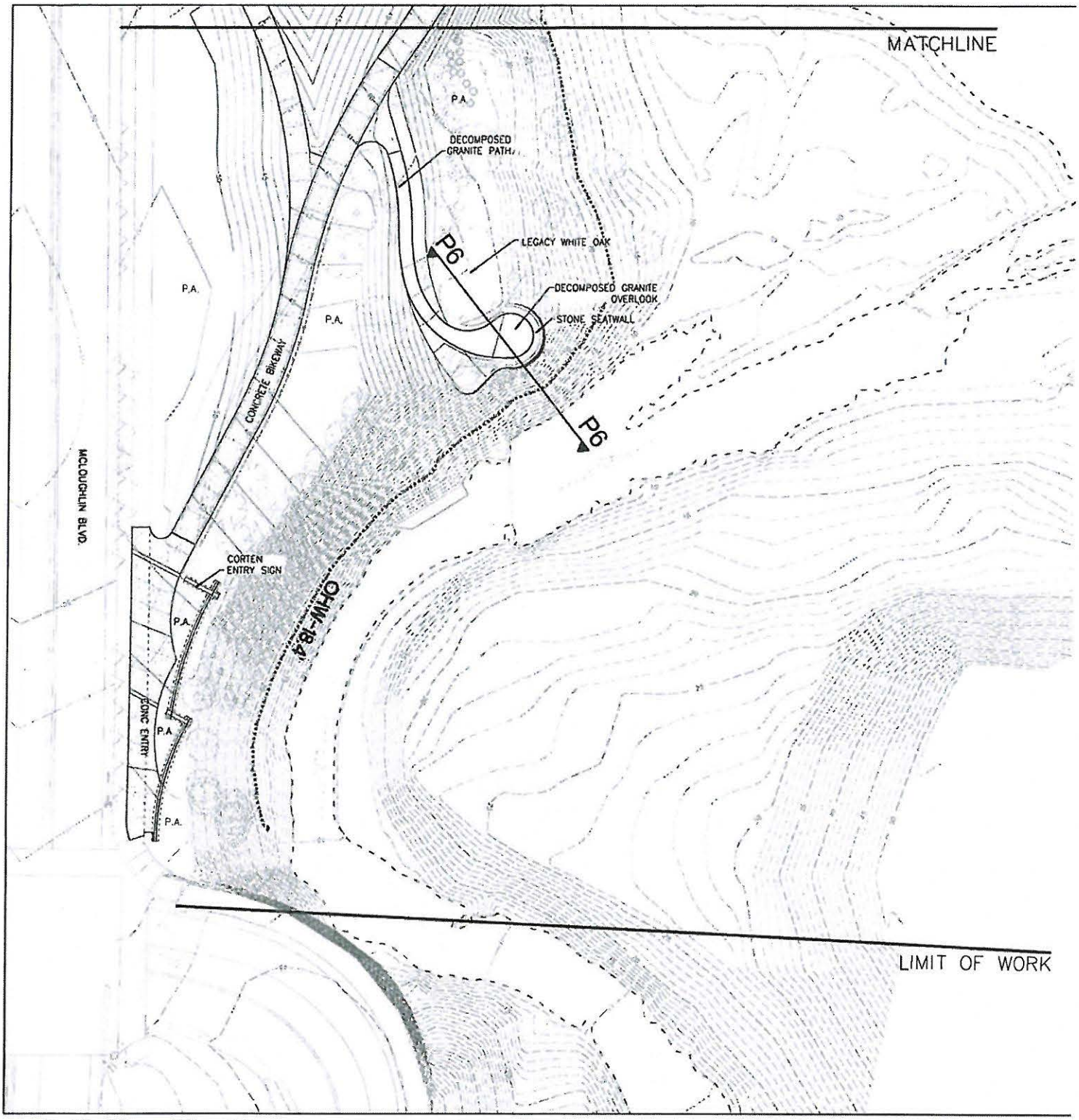

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DAVID EVANS AND ASSOCIATES INC.
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Portland Oregon 97201
Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park
TITLE	Proposed Site Plan
	Reach 4

SHEET 6D

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0
DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR	CRM. RGWI	ENCLOSURE 1	05-15-09

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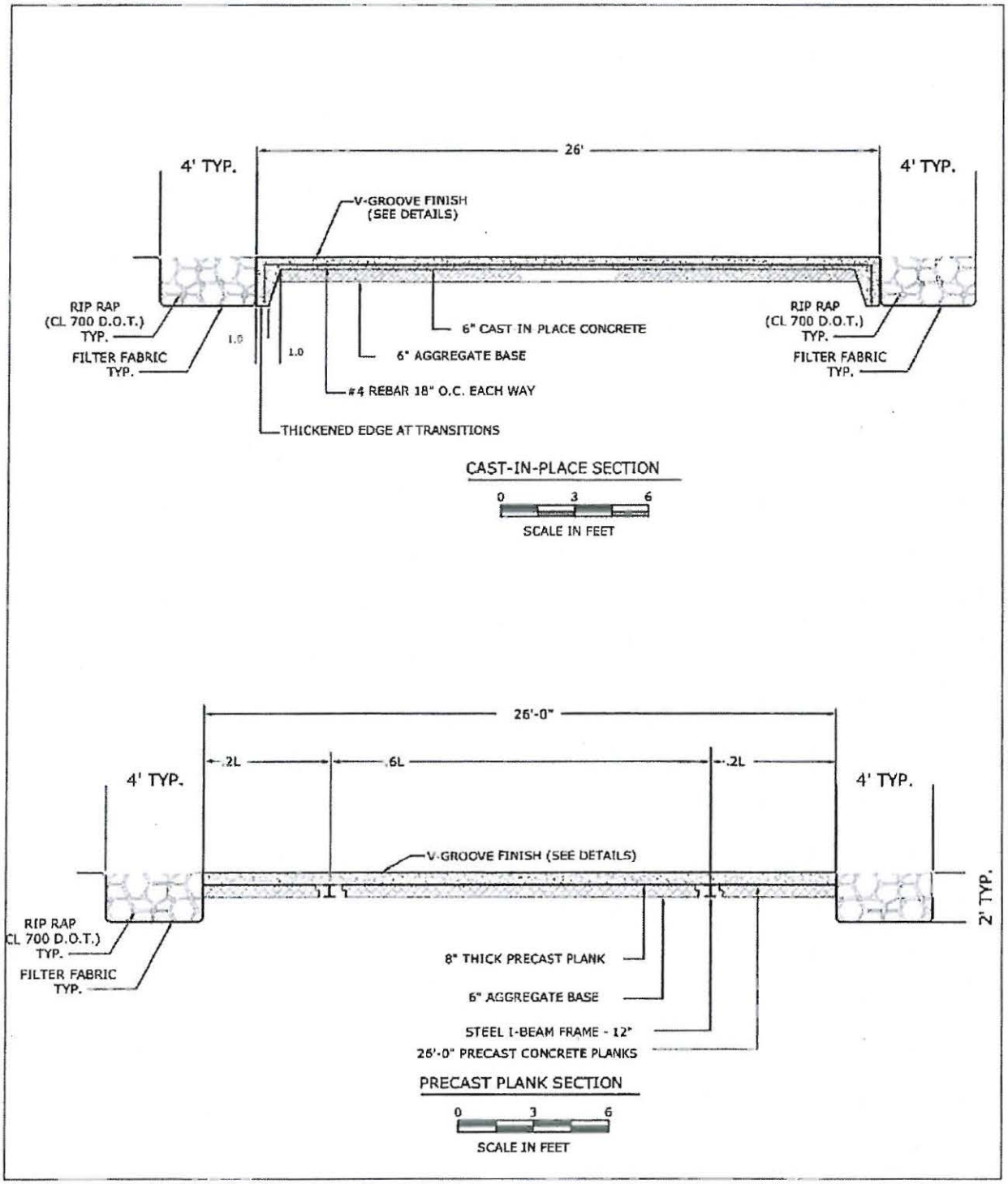

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
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Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Boat Ramp		
	Details		6F

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
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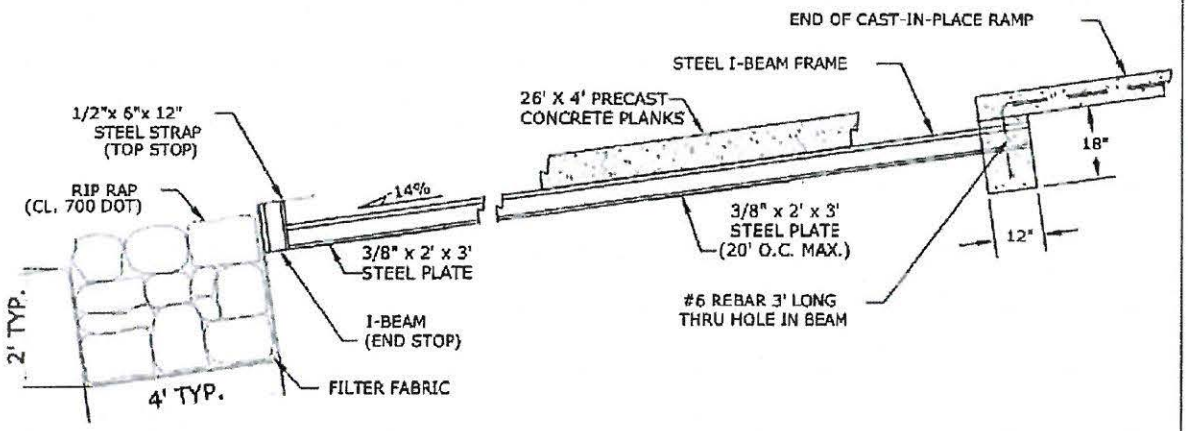
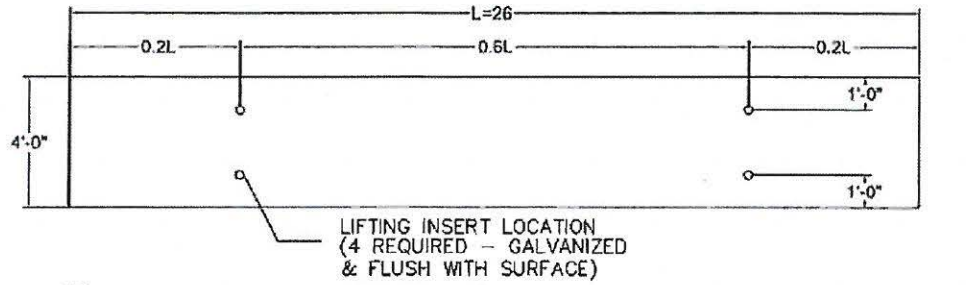
DRAWN BY	**DESIGN BY**	**APPROVED BY**	**DATE**
BAR	CRM. RGWI	ENCLOSURE I	05-15-09



PRECAST PLANK/RAIL PROFILE

4 2 0

SCALE IN FEET



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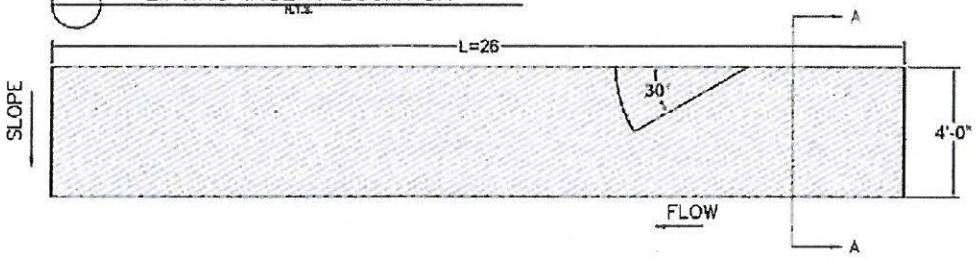

2 PLAN N.T.S.

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2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park			SHEET
TITLE	Boat Ramp Details			6G
	Longitudinal Section			
DWG. REF.	PROJECT	SCALE	AMENDMENT NO.	
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DRAWN BY	DESIGN BY	APPROVED BY	DATE	
BAR	CRM. RGWI	ENCLOSURE 1	05-15-09	

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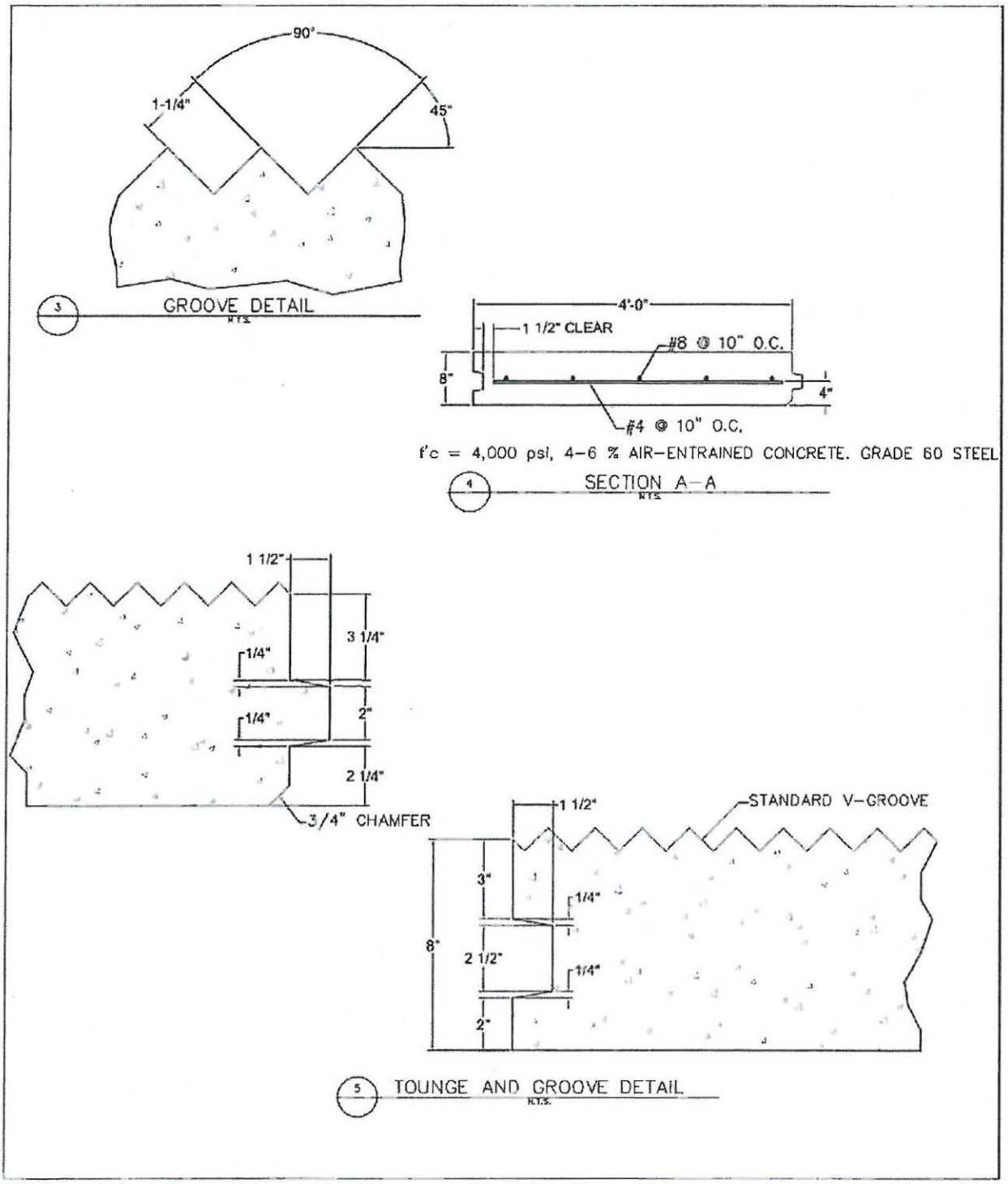

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Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Boat Ramp Details		
	Groove Details		6H
DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
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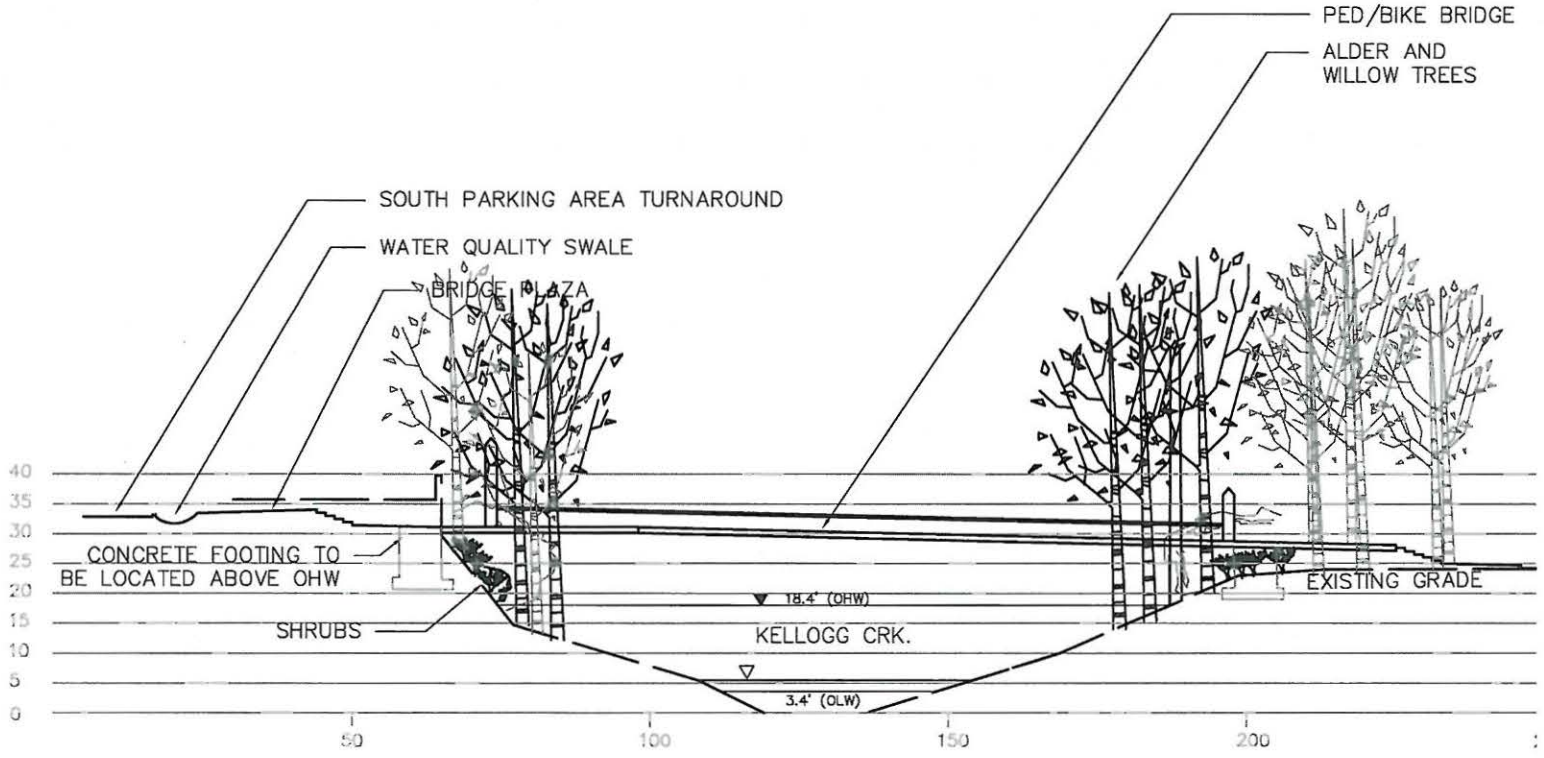
DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR	CRM. RGWI	ENCLOSURE 1	05-15-09



SECTION P2– KELLOG CREEK
(REFER TO FIGURE 6A)

PROPOSED CONDITIONS

TYPICAL FOR KELLOGG CRK
NOTE: NO CUT/FILL
ACTIVITY IN THIS AREA

PROJECT: Milwaukie Riverfront Park

TITLE: Proposed Site Plan

Cross Section P2

SHEET: 7B

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1"=30'	0.0
DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR	CRM, RGWI	ENCLOSURE 1	05-15-09

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Phone: 503.223.6663

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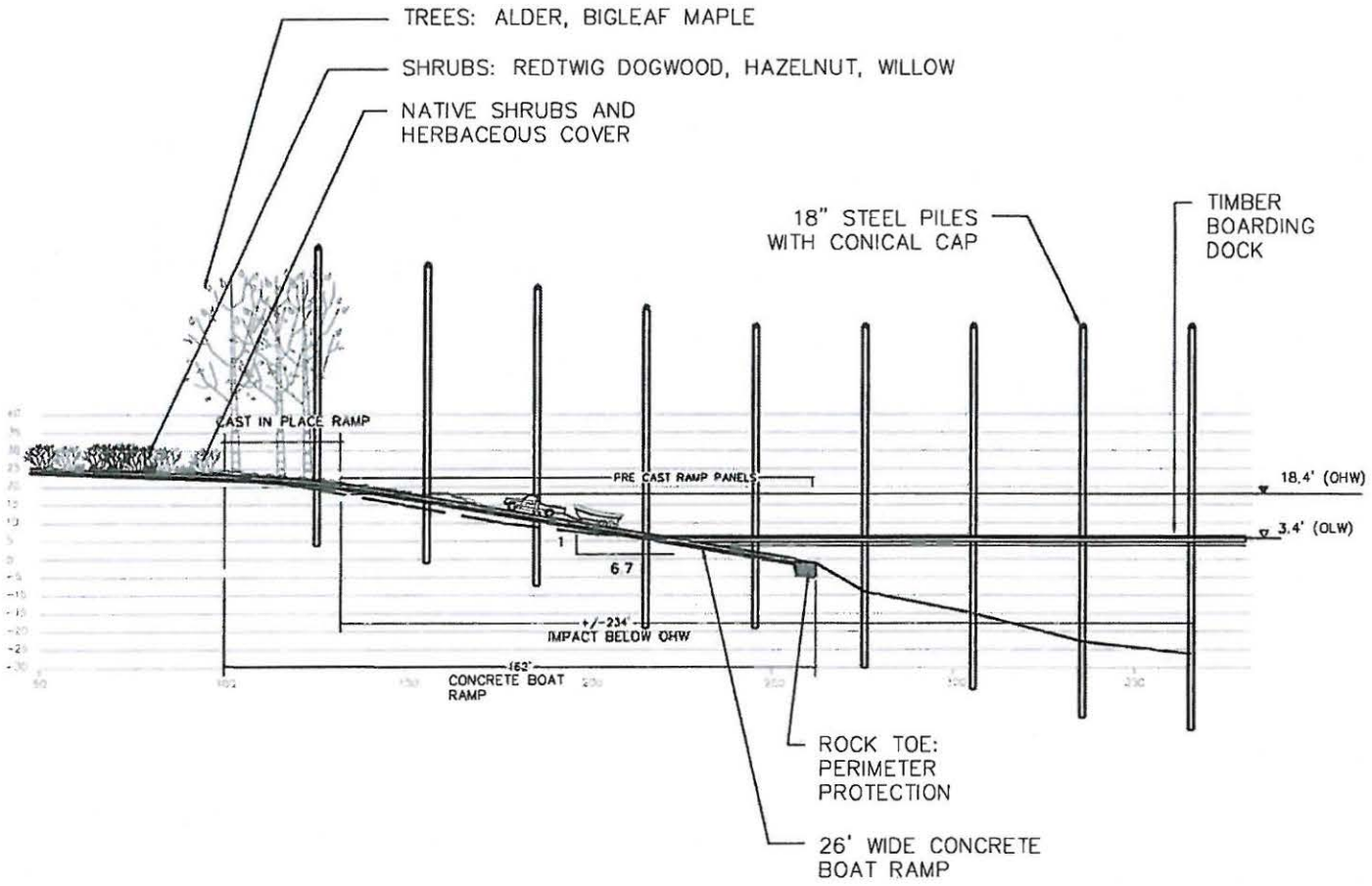

SECTION P3– BOAT RAMP
(REFER TO FIGURE 6B)

0 25 50

PROPOSED CONDITIONS

TYPICAL OF BOAT RAMP

ENCLOSURE 1

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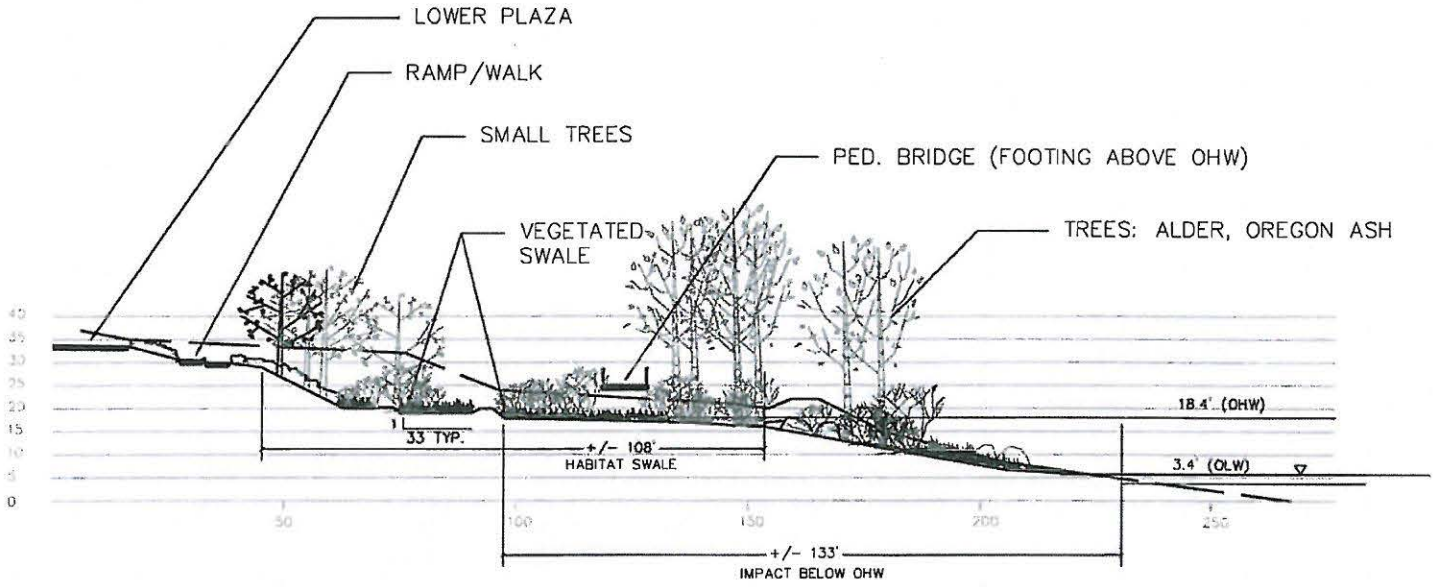
PROJECT	Milwaukie Riverfront Park
TITLE	Proposed Site Plan
	Cross Section P3

SHEET 7C

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1"= 50'	0.0
DRAWN BY	**DESIGN BY**	**APPROVED BY**	**DATE**
BAR	FLOWING SOLUTIONS		05-15-09



SECTION P4– VEGETATED SWALE
(REFER TO FIGURE 6B)

PROPOSED CONDITIONS

TYPICAL OF VEGETATED SWALES

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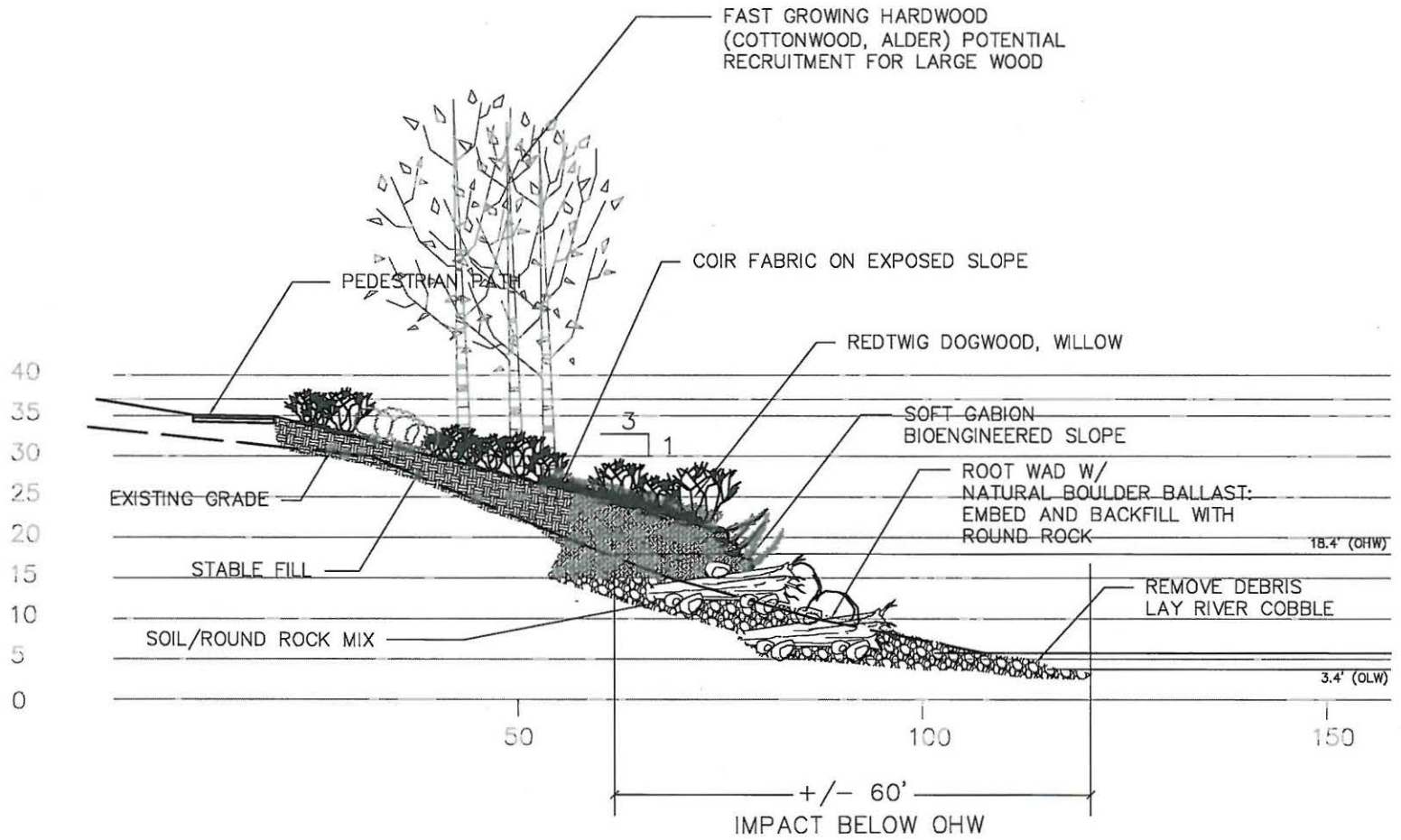
PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Proposed Site Plan		
	Cross Section P4		7D
DWG. REF. C-1	PROJECT MAEX0018	SCALE 1"= 40'	AMENDMENT NO. 0.0
DRAWN BY BAR	DESIGN BY BXM, RGWI	APPROVED BY	DATE 05-15-09



PROPOSED CONDITIONS

TYPICAL OF BANK RESTORATION
NORTH OF GREAT LAWN

SECTION P5– BANK RESTORATION WITH CRIB WALL
(REFER TO FIGURE 6C)

PROJECT: Milwaukie Riverfront Park

TITLE: Proposed Site Plan

Cross Section P5

SHEET: 7E

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1"=20'	0.0

DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR	FLOWING SOLUTIONS	ENCLOSURE 1	05-15-09

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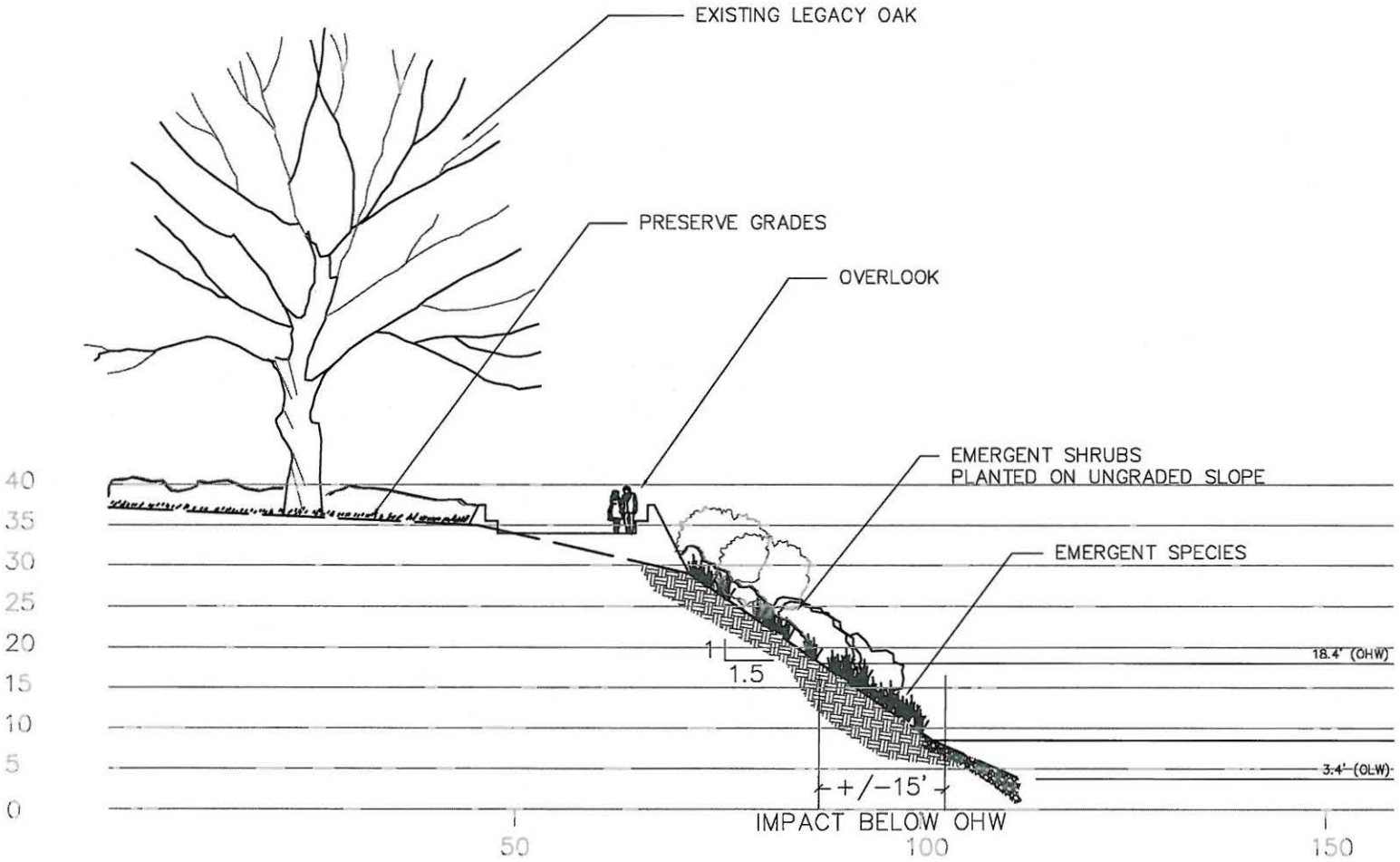

SECTION P6– BANK AT OVERLOOK
(REFER TO FIGURE 6D)

PROPOSED CONDITIONS

TYPICAL OF NORTHERN LIMITS
OF PROJECT GRADING

PROJECT: Milwaukie Riverfront Park

TITLE: Proposed Site Plan

Cross Section P6

SHEET: 7F

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1"= 20'	0.0

DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR	CRM, RGWI	ENCLOSURE 1	05-15-09

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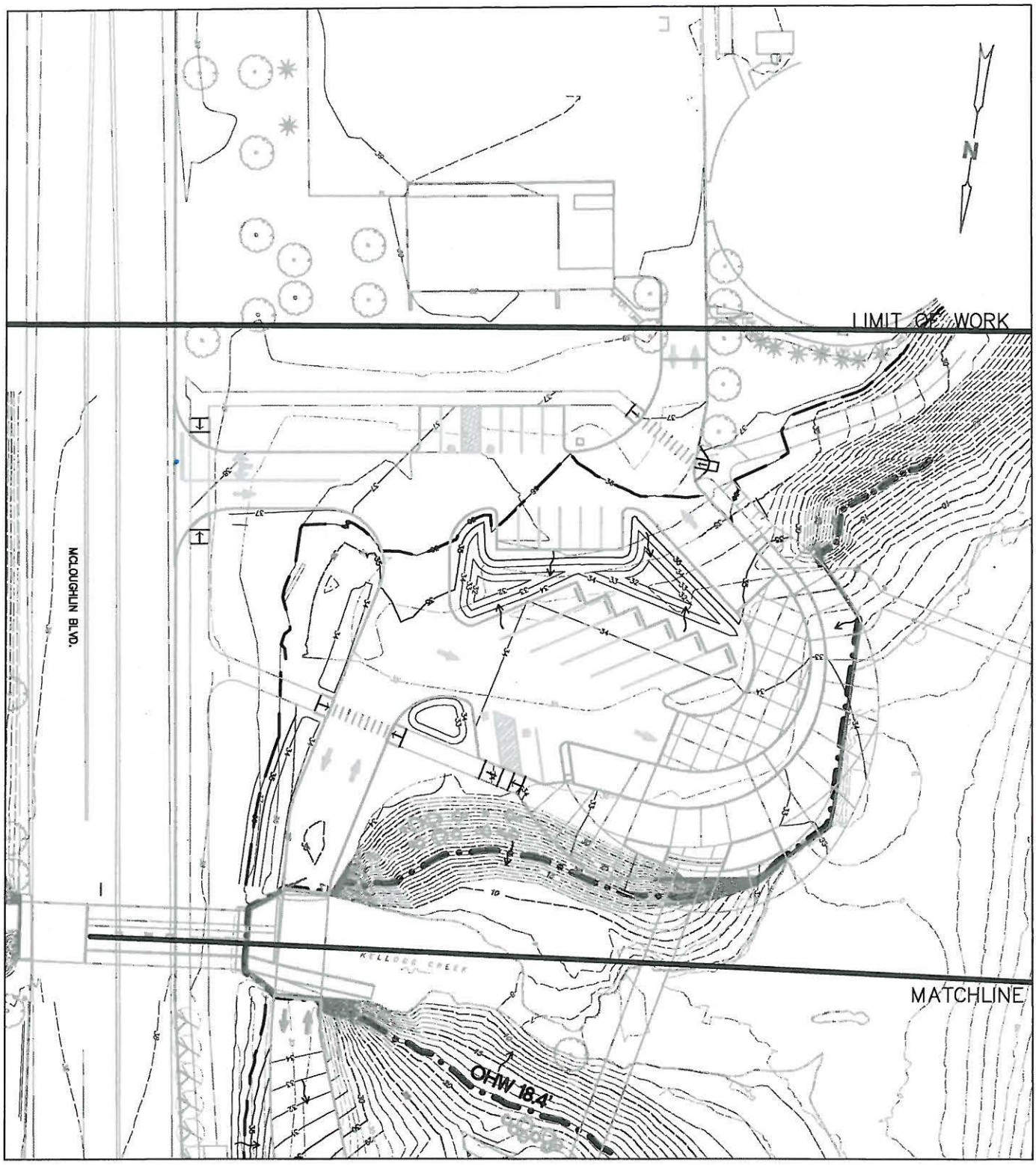

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Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Proposed Earthwork Grading Plan		
	Reach 1		8A
DWG. REF. C-1	PROJECT MAEX0018	SCALE 1" = 60'	AMENDMENT NO. 0.0
DRAWN BY BAR, RFH	DESIGN BY BXM, RGWI	APPROVED BY ENCLOSURE 1	DATE 05-15-09

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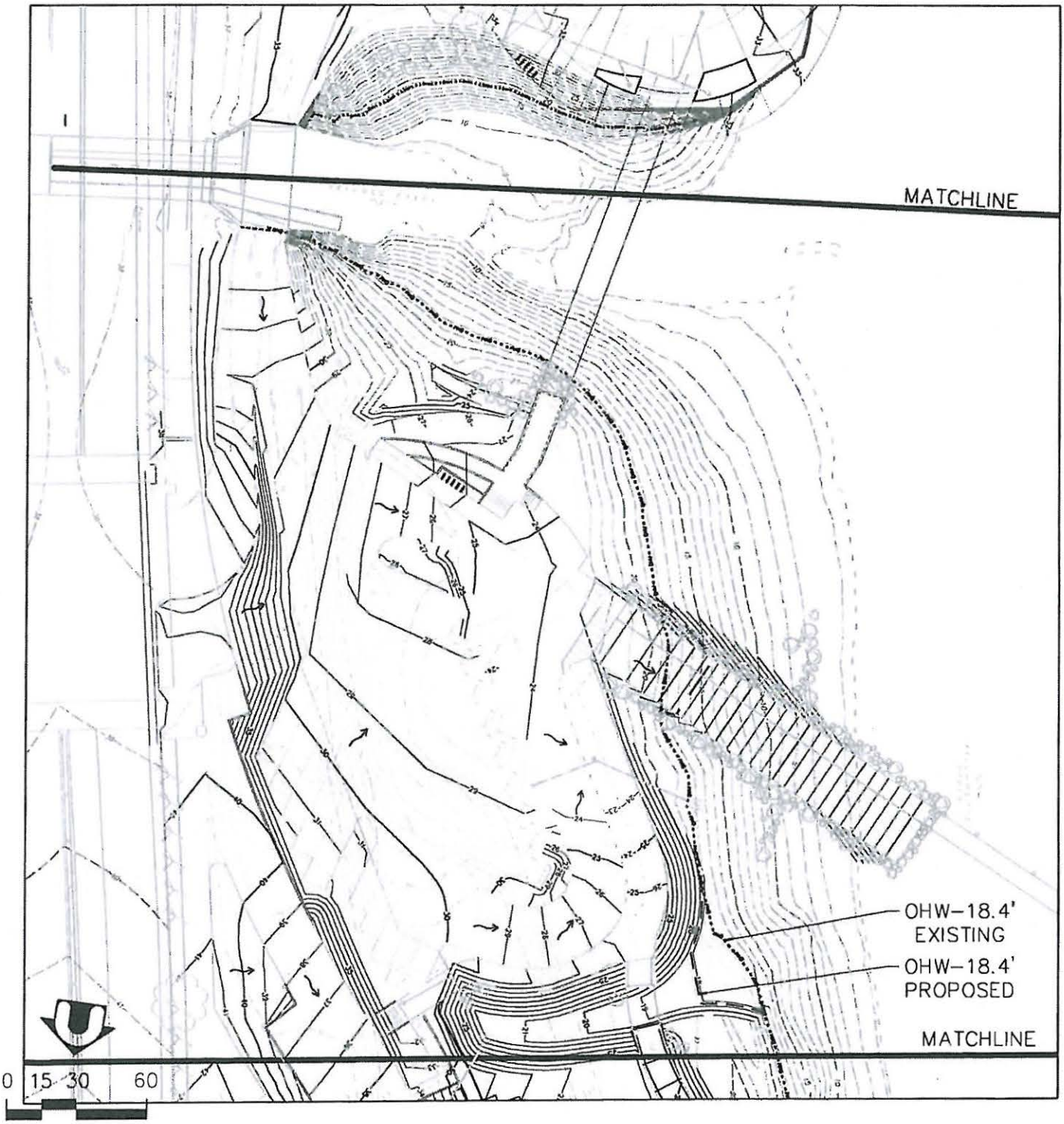


DAVID EVANS
AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

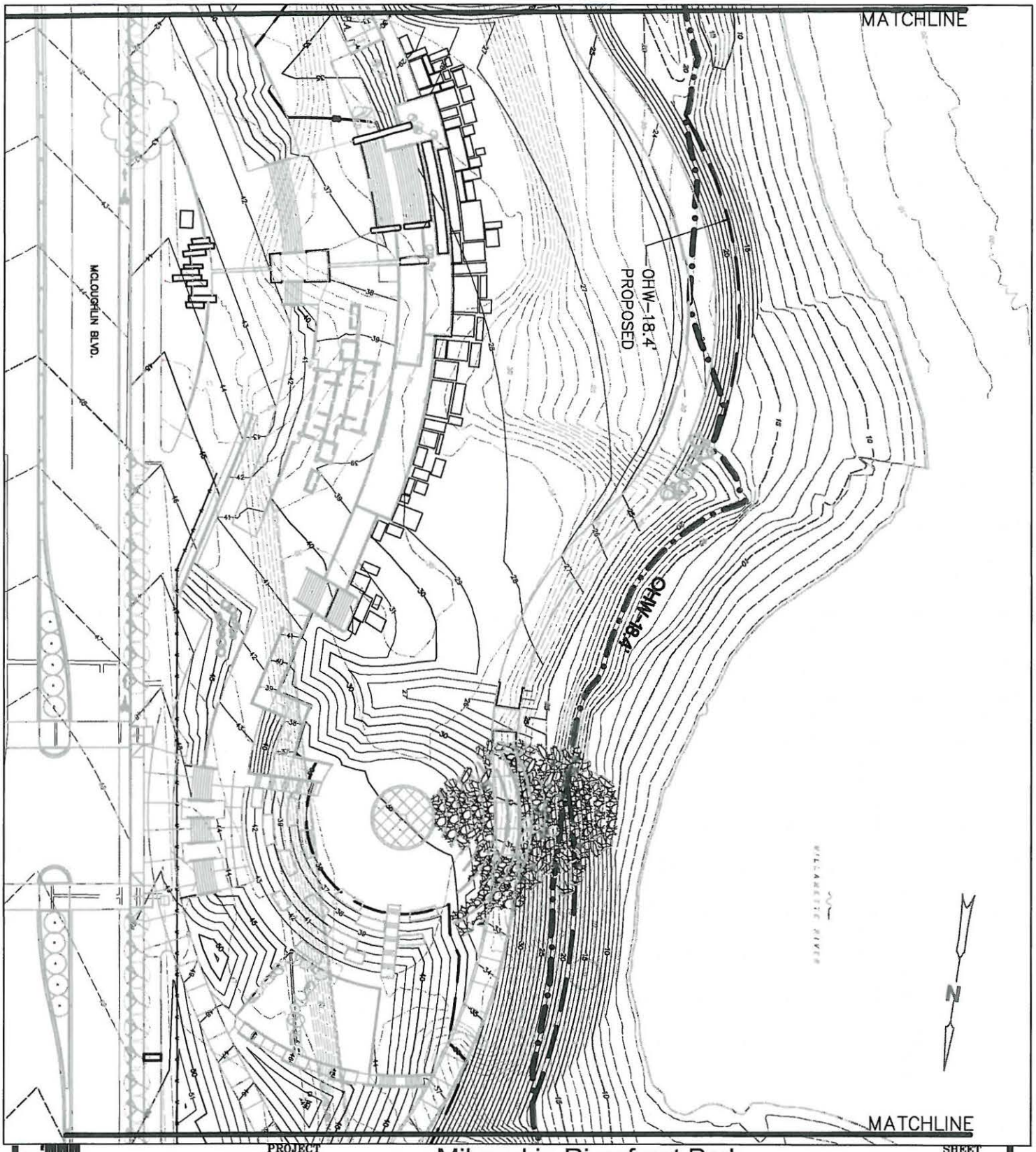
PROJECT: Milwaukie Riverfront Park

TITLE: Proposed Earthwork Grading Plan

Reach 2

SHEET: 8B

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0
DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR, RFH	BXM, RGWI		ENCLOSURE 1 05-15-09



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2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

SCALE IN FEET 0 20 40 60

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Proposed Earthwork Grading Plan		
	Reach 3		8C
DWG. REF. C-1	PROJECT MAEX0018	SCALE 1" = 60'	AMENDMENT NO. 0.0
DRAWN BY BAR, RFH	DESIGN BY BXM, RGWI	APPROVED BY ENCLOSURE 1	DATE 05-15-09

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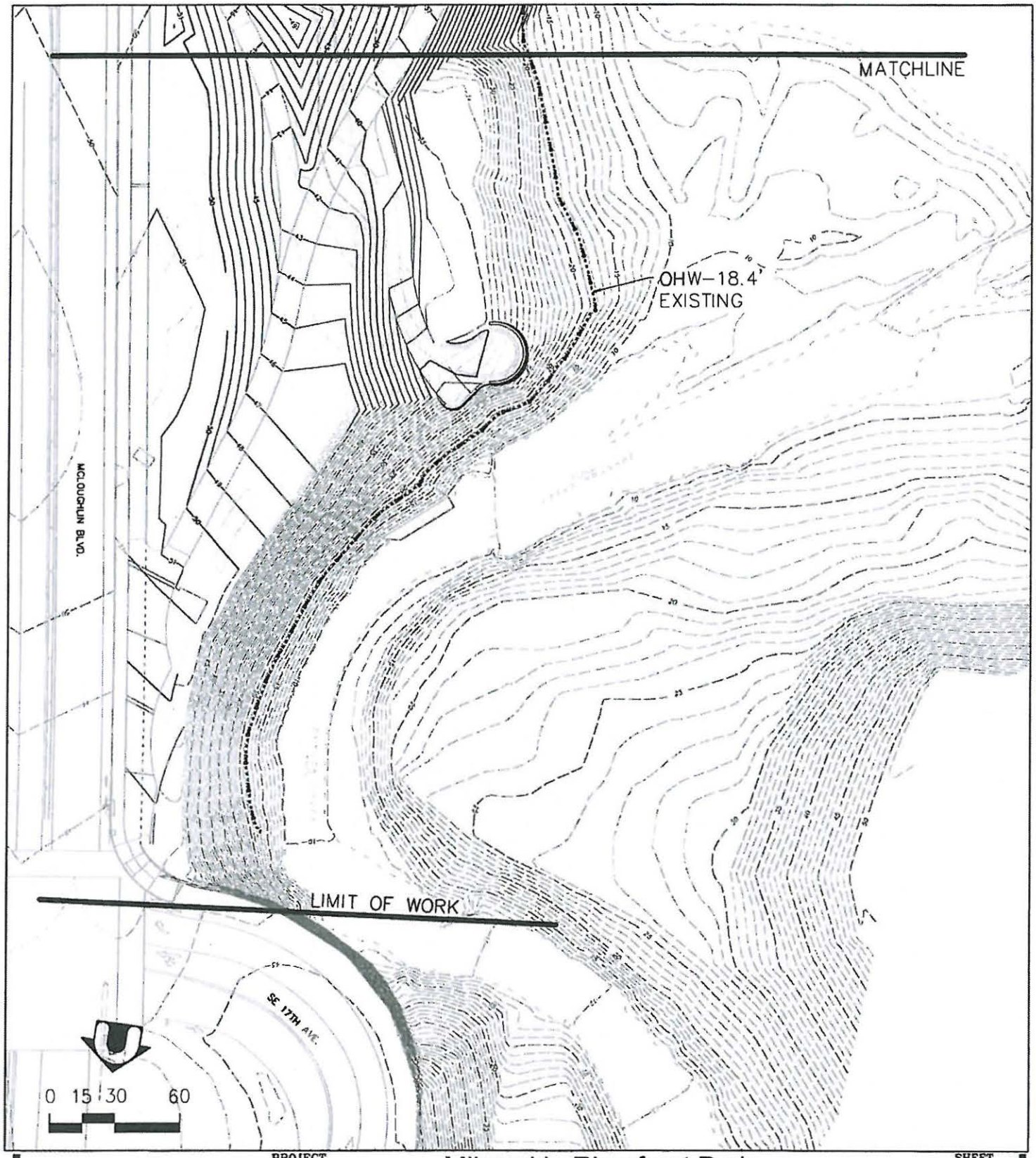

PROJECT: Milwaukie Riverfront Park

TITLE: Proposed Earthwork Grading Plan

Reach 4

SHEET: 8D

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0
DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR, RFH	BXM, RGWI	ENCLOSURE 1	05-15-09

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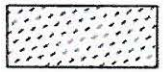
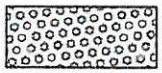
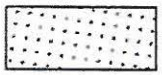
PLANTING COMMUNITIES LEGEND



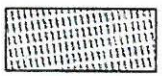
EM- Emergent Shrub
10% Tree Cover
60% Shrub Cover
90% Herbaceous Cover



UP- Upland Shrub and Herbaceous
20% Tree Coverage
60% Shrub Coverage
20% Herbaceous Coverage

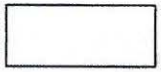


MD- Native meadow
100% Herbaceous Coverage



OS- White Oak and Shrub Mix
30% Tree Coverage
20% Shrub Coverage
90% Herbaceous Coverage

FM- Doug Fir and Bigleaf maple
60% Tree Coverage
40% Shrub Coverage
60% Herbaceous Coverage



LW- Lawn
100% Herbaceous Coverage

AW- Ash and Willow
60% Tree Coverage
40% Shrub Coverage
60% Herbaceous Coverage

SW- Stormwater planting
20% Tree Coverage
40% Shrub Coverage
40% Herbaceous Coverage

SHEET 9A

PROJECT Milwaukie Riverfront Park

TITLE Proposed Planting Plan

Plant Community Key

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0
DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR	BXM, BAR	ENCLOSURE 1	05-15-09

NWP-2009-19 Page 23 of 40

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2100 Southwest River Parkway
Portland Oregon 97201
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Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Proposed Planting Plan		
	Reach 1		9B
DWG. REF. C-1	PROJECT MAEX0018	SCALE 1" = 60'	AMENDMENT NO. 0.0
DRAWN BY BAR	DESIGN BY BXM, BAR	APPROVED BY ENCLOSURE 1	DATE 05-15-09

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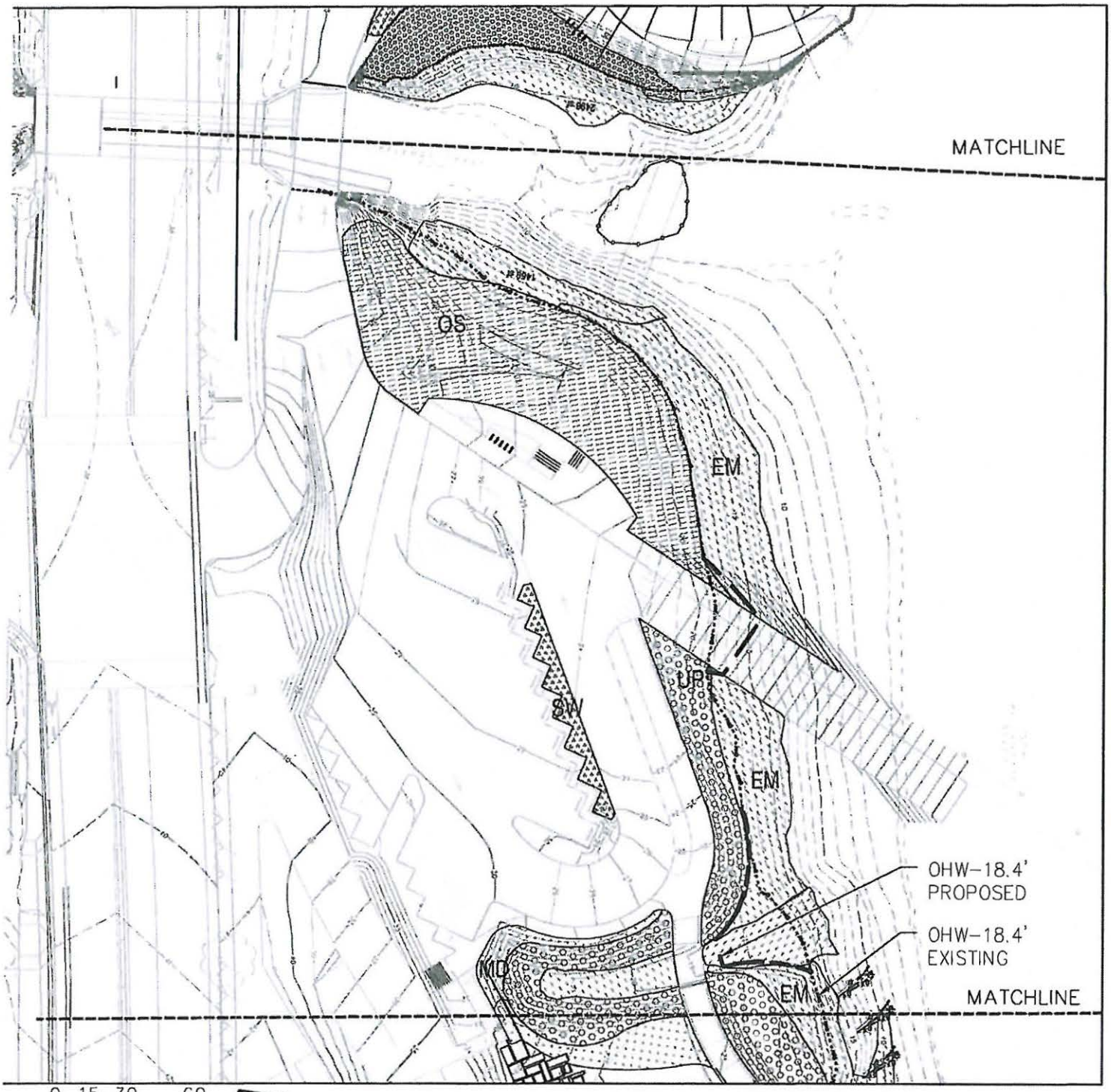

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Portland Oregon 97201
Phone: 503.223.6663

PROJECT: Milwaukie Riverfront Park

TITLE: Proposed Planting Plan

Reach 2

SHEET: 9C

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0
DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR	BXM, BAR	ENCLOSURE 1	05-15-09

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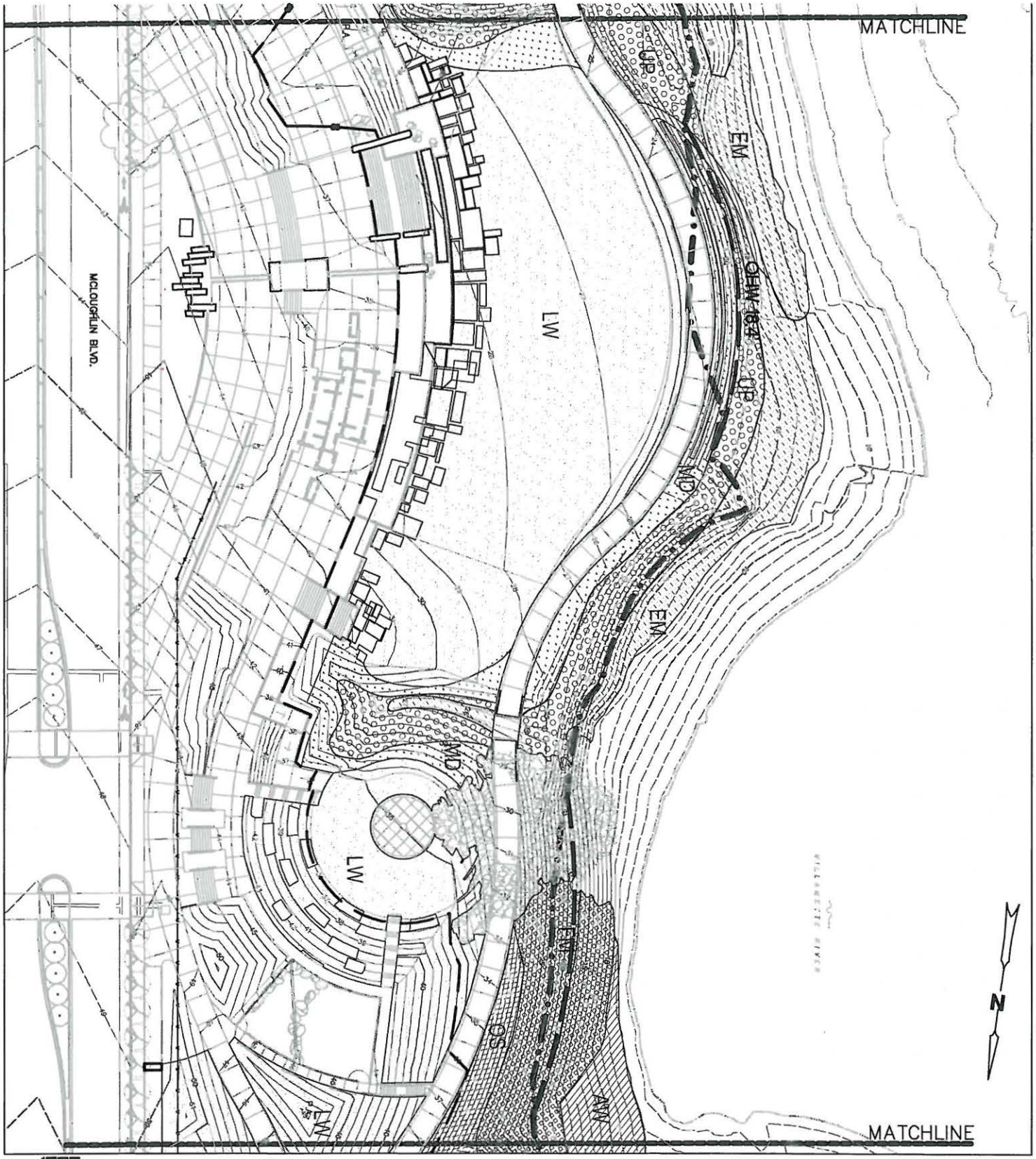

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Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Proposed Planting Plan		
	Reach 3		9D
DWG. REF. C-1	PROJECT MAEX0018	SCALE 1" = 60'	AMENDMENT NO. 0.0
DRAWN BY BAR	DESIGN BY BXM, BAR	APPROVED BY ENCLOSURE 1	DATE 05-15-09

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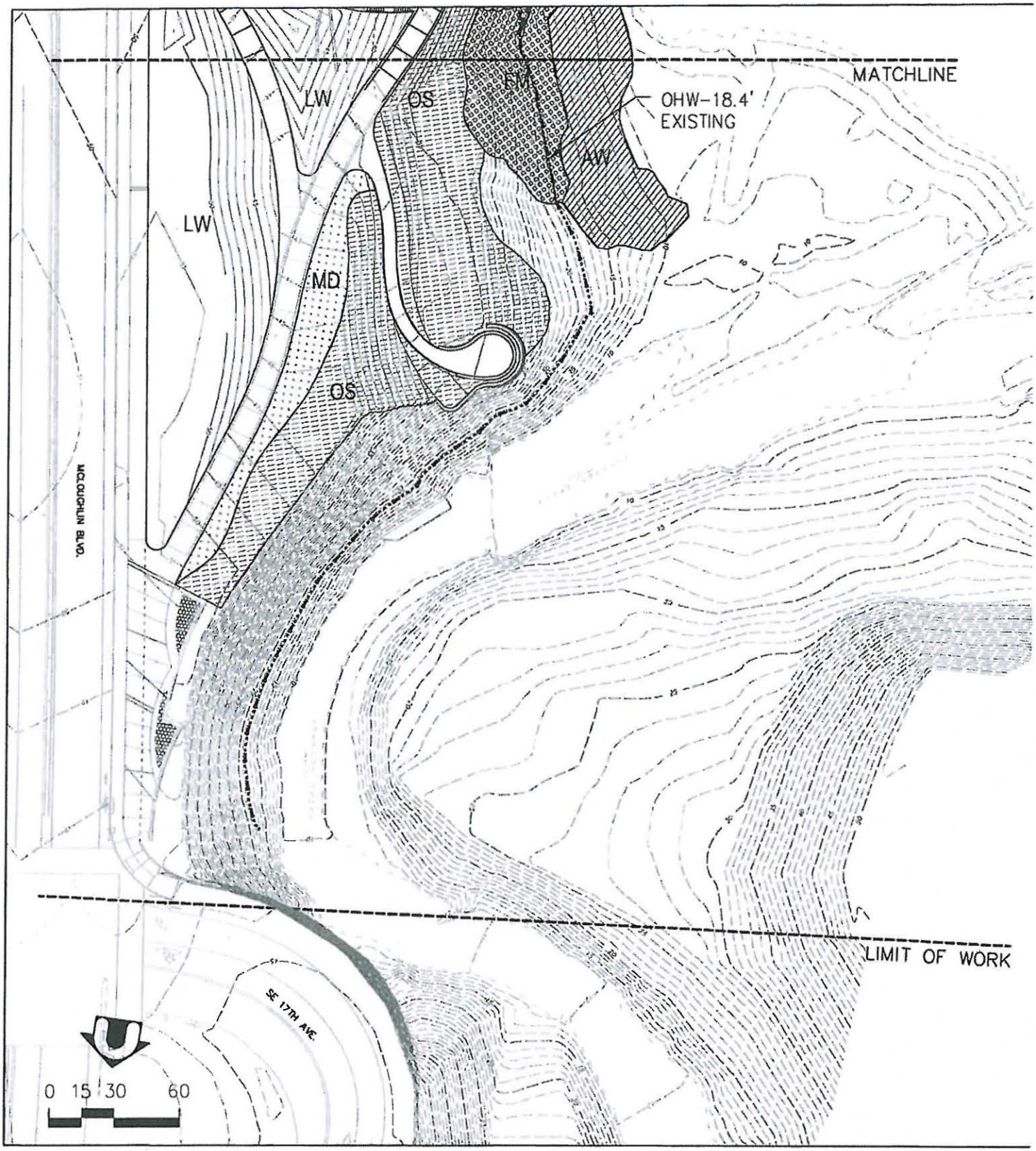

DAVID EVANS AND ASSOCIATES INC.
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Portland Oregon 97201
Phone: 503.223.6663

PROJECT: Milwaukie Riverfront Park

TITLE: Proposed Planting Plan

Reach 4

SHEET: 9E

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0
DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR	BXM, BAR	ENCLOSURE 1	05-15-09

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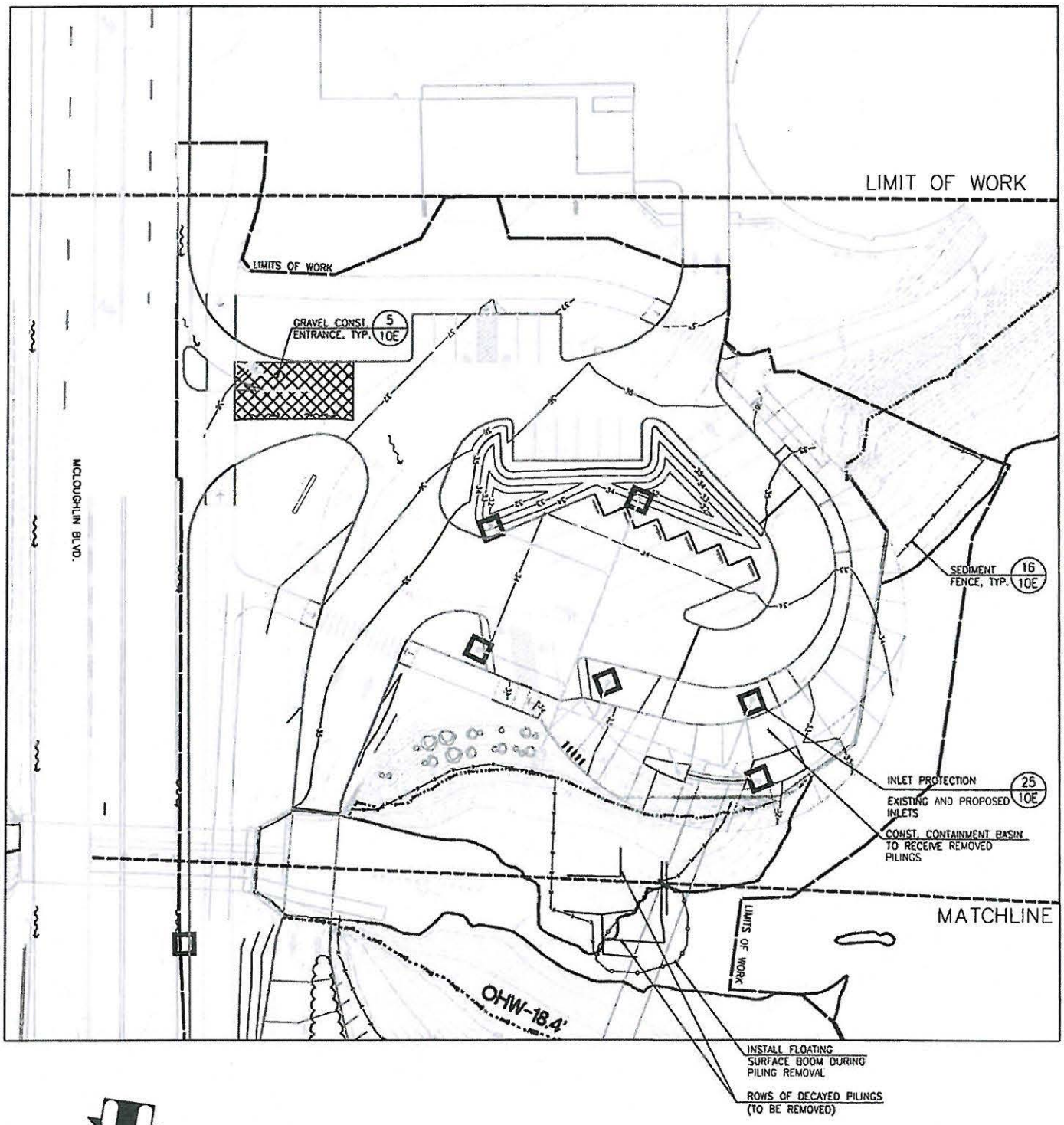

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DAVID EVANS AND ASSOCIATES INC.
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Portland Oregon 97201
Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Erosion Control Plans		
	Reach 1		10A
DWG. REF. C-1	PROJECT MAEX0018	SCALE 1" = 60'	AMENDMENT NO. 0.0
DRAWN BY RFH, BAR	DESIGN BY RFH	APPROVED BY ENCLOSURE 1	DATE 05-15-09

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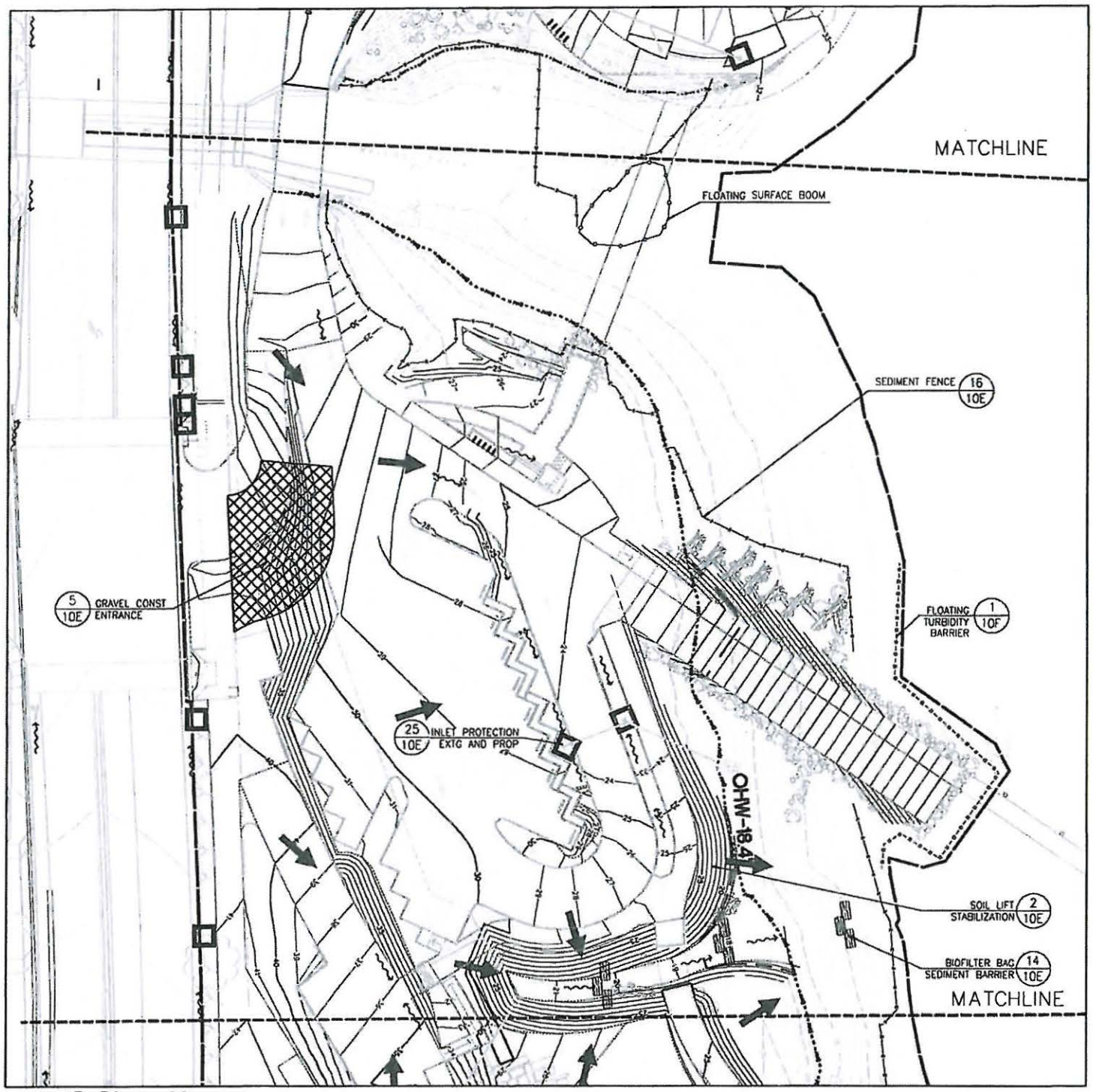

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Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Erosion Control Plans		
	Reach 2		10B
DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0
DRAWN BY	DESIGN BY	APPROVED BY	DATE
RFH, BAR	RFH	ENCLOSURE 1	05-15-09

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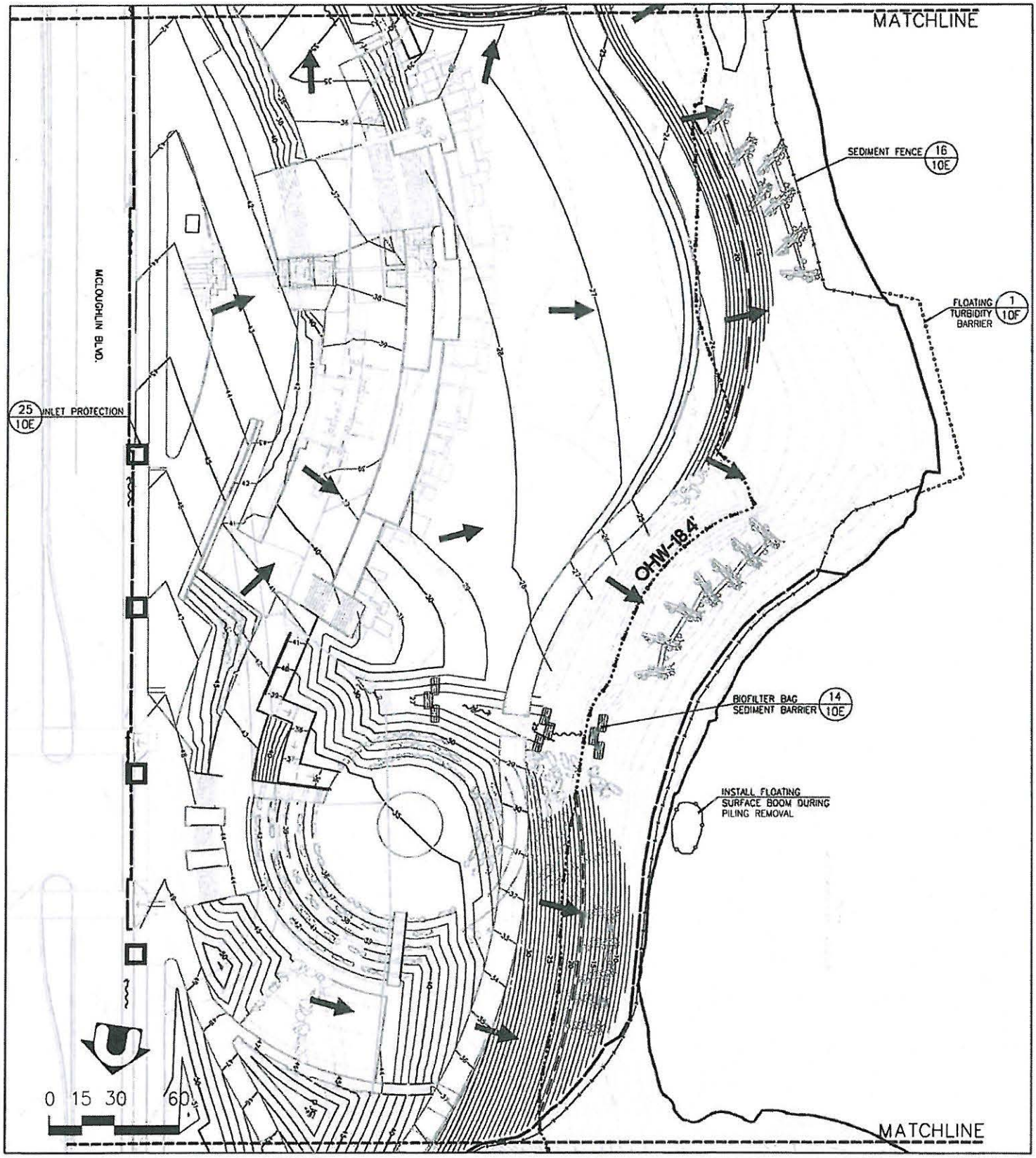

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Portland Oregon 97201
Phone: 503.223.6663

PROJECT: Milwaukie Riverfront Park

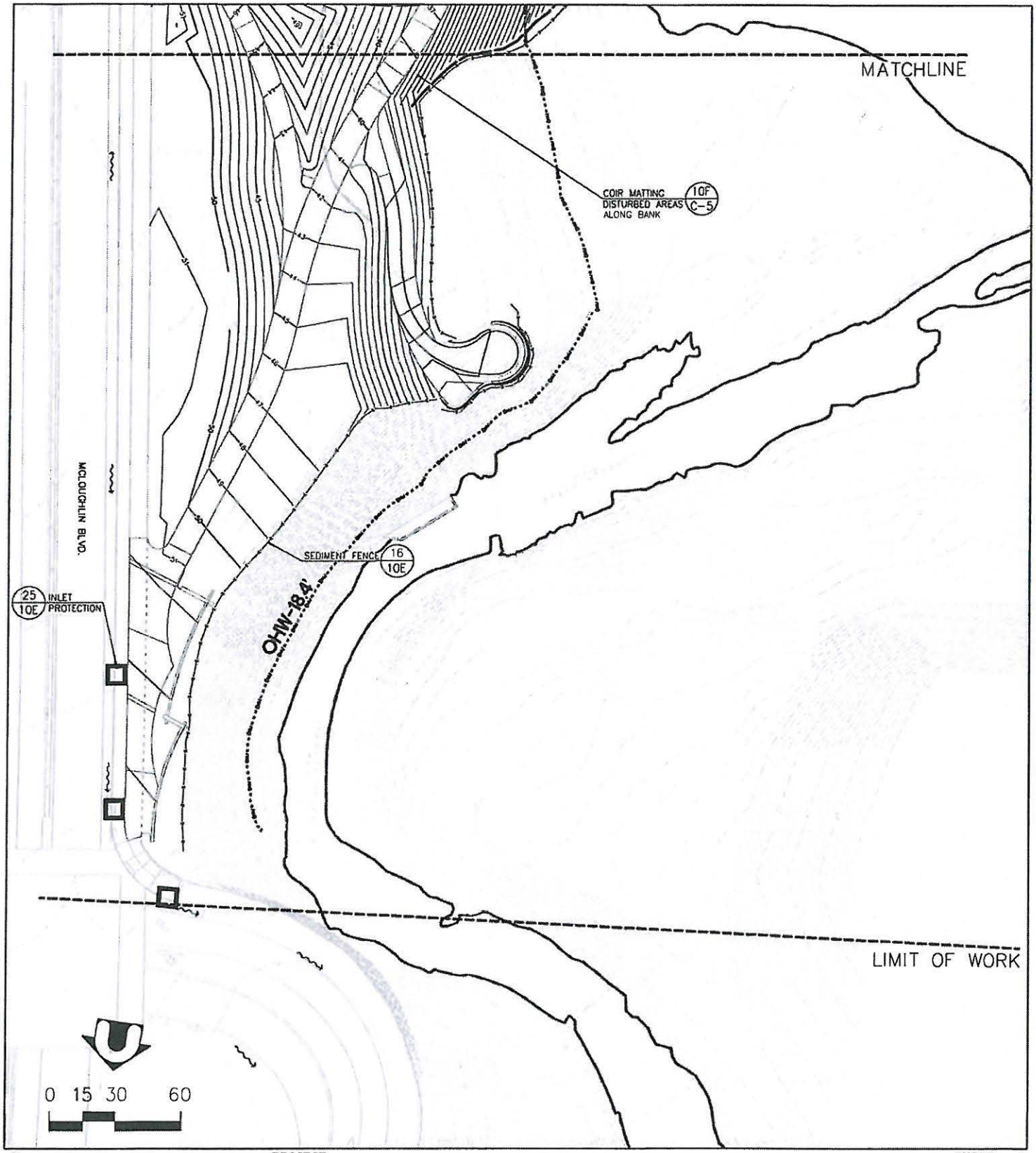
TITLE: Erosion Control Plans
Reach 3

SHEET: 10C

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0

DRAWN BY	DESIGN BY	APPROVED BY	DATE
RFH, BAR	RFH	ENCLOSURE 1	05-15-09

M:\MAEX00000021\04000AD\EXHIBITS\PERMIT DRAWINGS\SiteMap-ErosCntr-JPA.dwg Nov 25, 2013 - 2:42pm



PROJECT: Milwaukie Riverfront Park

TITLE: Erosion Control Plans

Reach 4

SHEET: 10D

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0

DRAWN BY	DESIGN BY	APPROVED BY	DATE
RFH, BAR	RFH		ENCLOSURE 1 05-15-09

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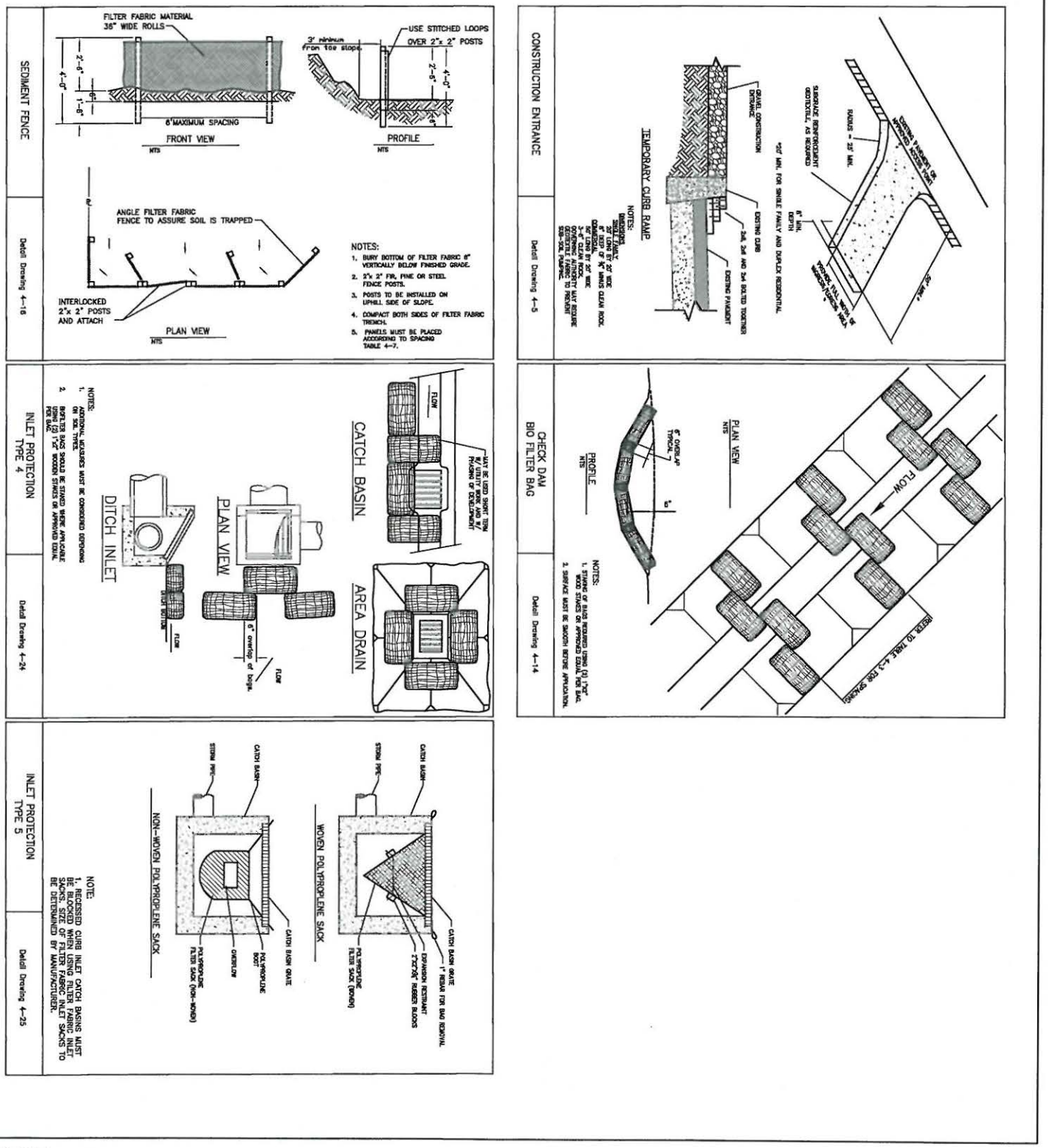

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Erosion Control Details		
	Sheet 1		10E
DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	NTS	0.0
DRAWN BY	DESIGN BY	APPROVED BY	DATE
RFH, BAR	RFH	ENCLOSURE 1	05-15-09

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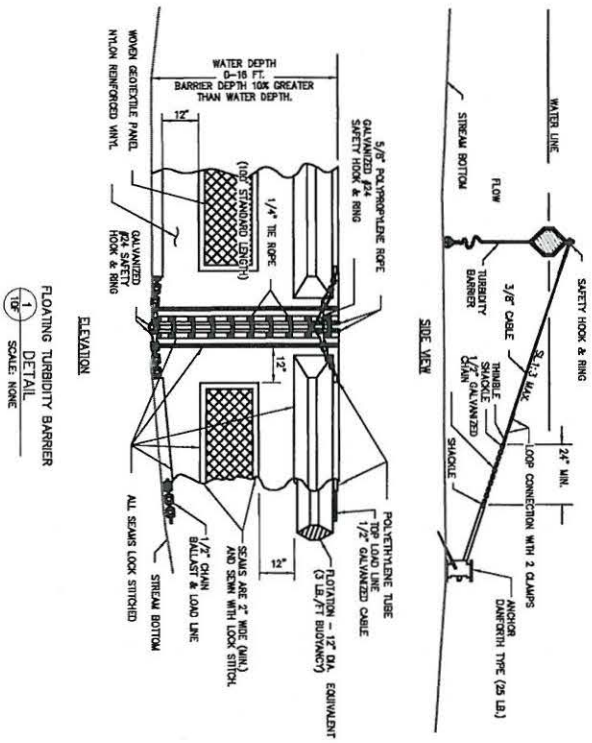

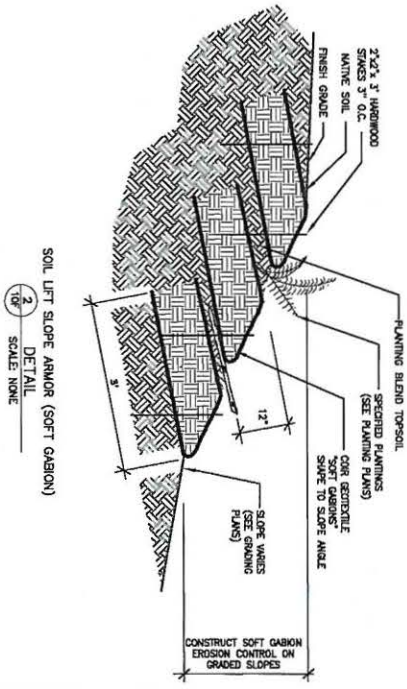

SOIL LIFT SLOPE ARMOR (SOFT GABION)
2
10F
DETAIL
SCALE: NONE

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Erosion Control Details		
	Sheet 2		10F
DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	NTS	0.0
DRAWN BY	DESIGN BY	APPROVED BY	DATE
RFH, BAR	RFH	ENCLOSURE 1	05-15-09

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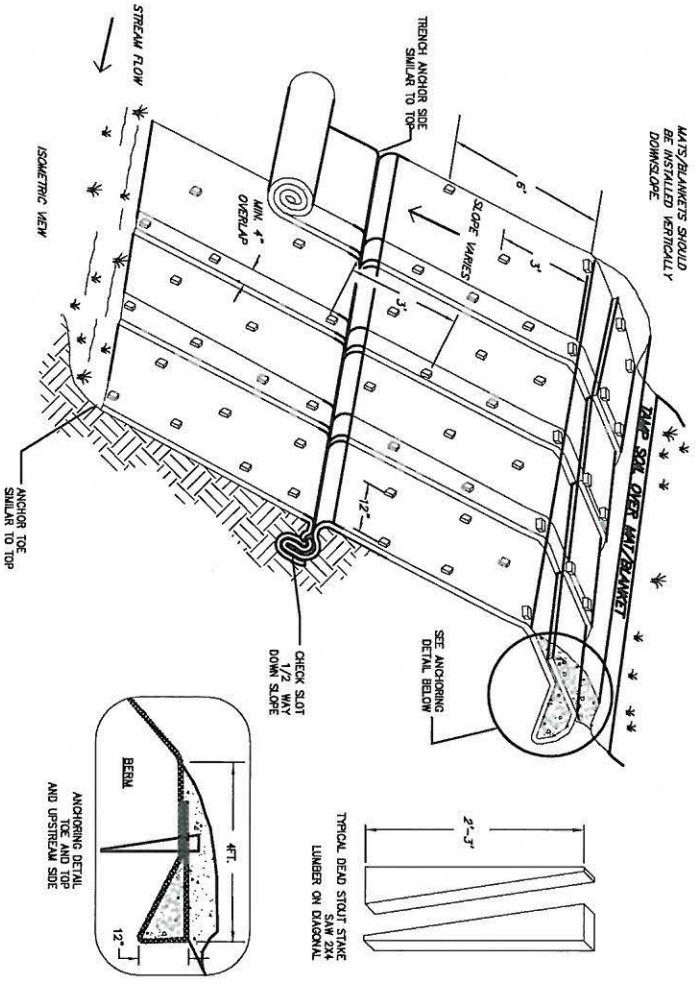

1 / 10G

COIR EROSION CONTROL FABRIC

NOT TO SCALE

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Bank Treatment Details		10G
DWG. REF. C-1	PROJECT MAEX0018	SCALE 1" = 60'	AMENDMENT NO. 0.0
DRAWN BY BAR	DESIGN BY CRM, RGWI	APPROVED BY ENCLOSURE 1	DATE 05-15-09

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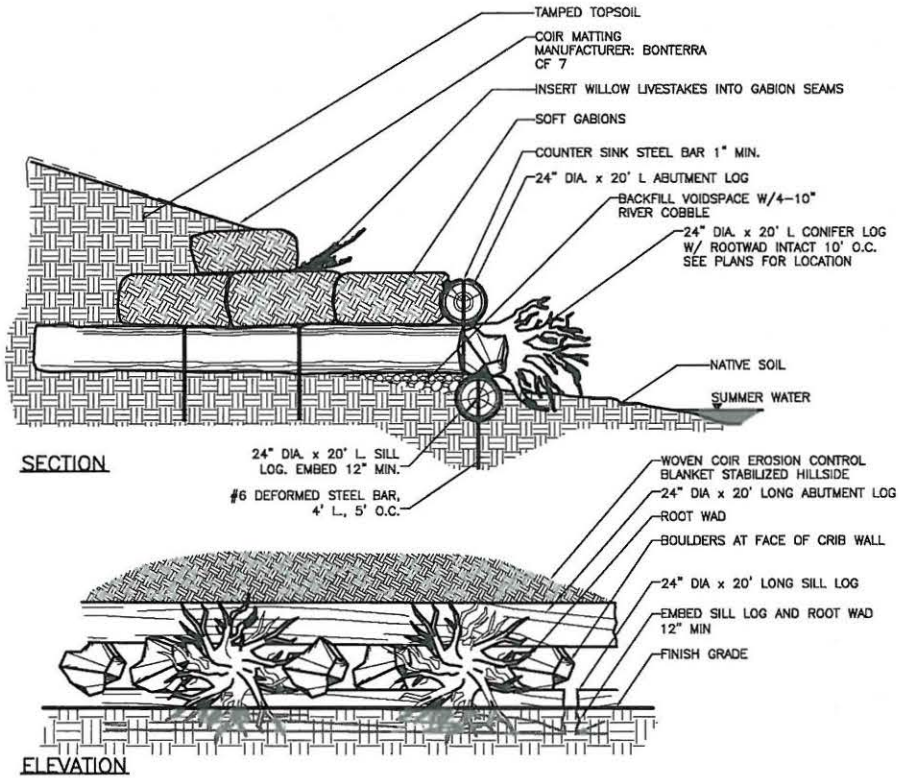
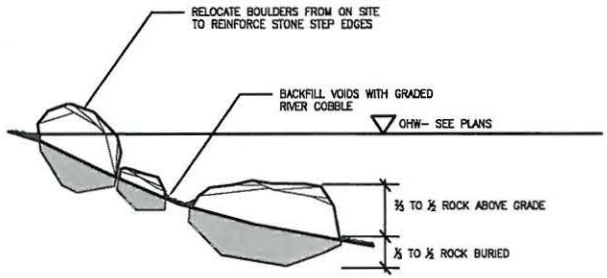
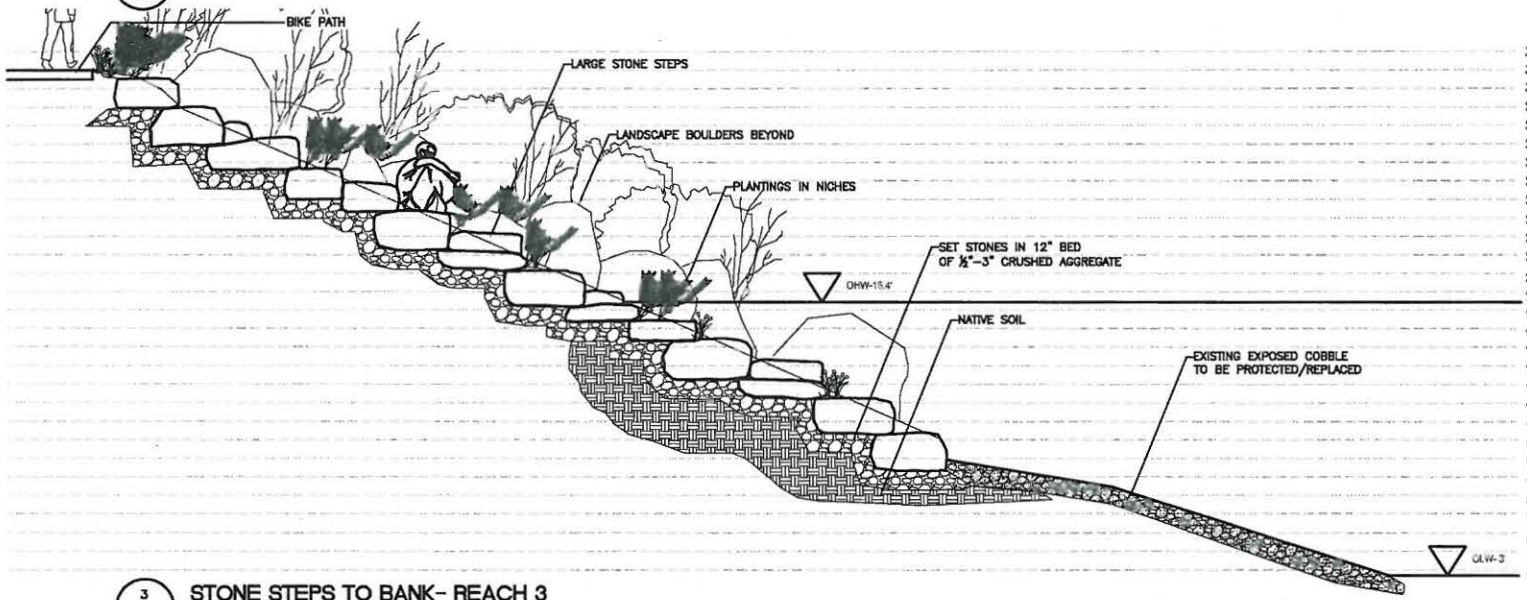


1/10H LARGE WOOD CRIB WALL
NOT TO SCALE



2/10H BANK STABILIZATION BOULDERS AT STONE STEPS
NOT TO SCALE



3/10H STONE STEPS TO BANK- REACH 3
NOT TO SCALE

PROJECT Milwaukie Riverfront Park

TITLE Bank Treatment Details

Reach 2

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0

DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR	CRM, RGWI	ENCLOSURE 1	05-15-09

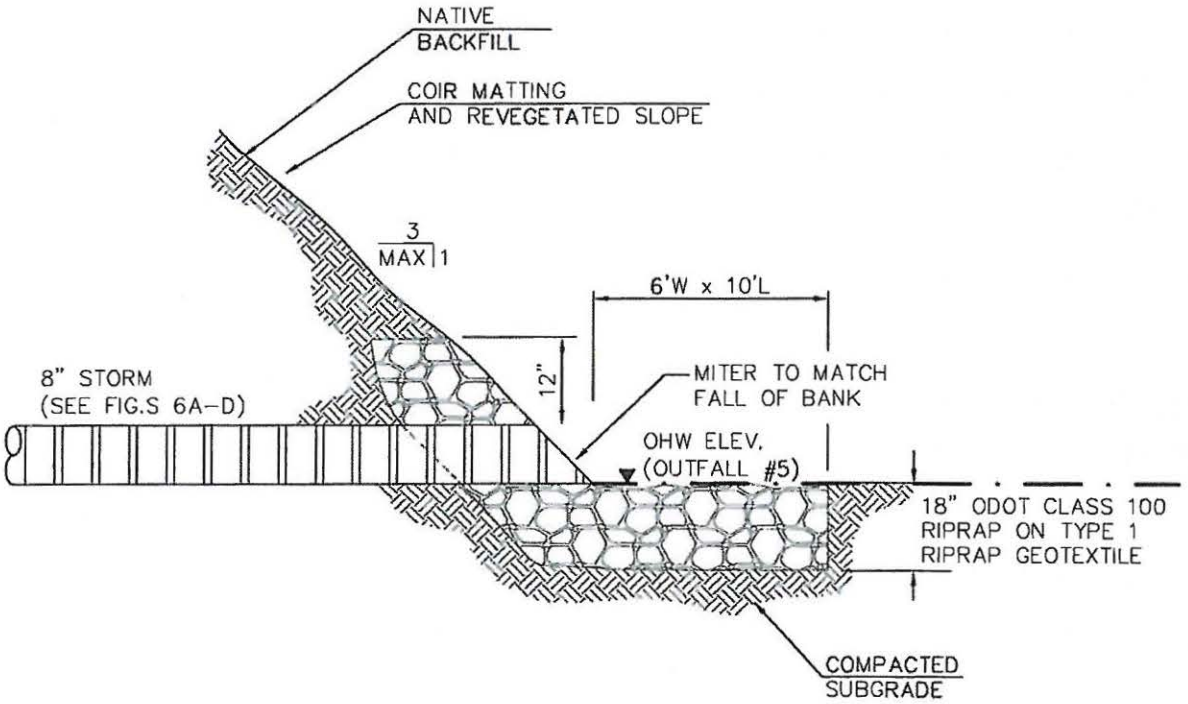
SHEET 10H

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

OUTFALL ELEVATION TABLE

NUMBER	SIZE	INVERT ELEVATION
#1	8"	28.00
#2	8"	29.00
#3	8"	26.00
#4	8"	27.00
#5	8"	18.40
#6	8"	26.58

REFER TO FIGURES 6A–D
FOR OUTFALL LOCATIONS



1/101 **STORM DRAIN OUTFALL**
NOT TO SCALE

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	Stormwater Outfall		101
	Reaches 1, 2, 3		
DWG. REF. C-1	PROJECT MAEX0018	SCALE NTS	AMENDMENT NO. 0.0
DRAWN BY BAR	DESIGN BY SDH	APPROVED BY ENCLOSURE 1	DATE 05-15-09

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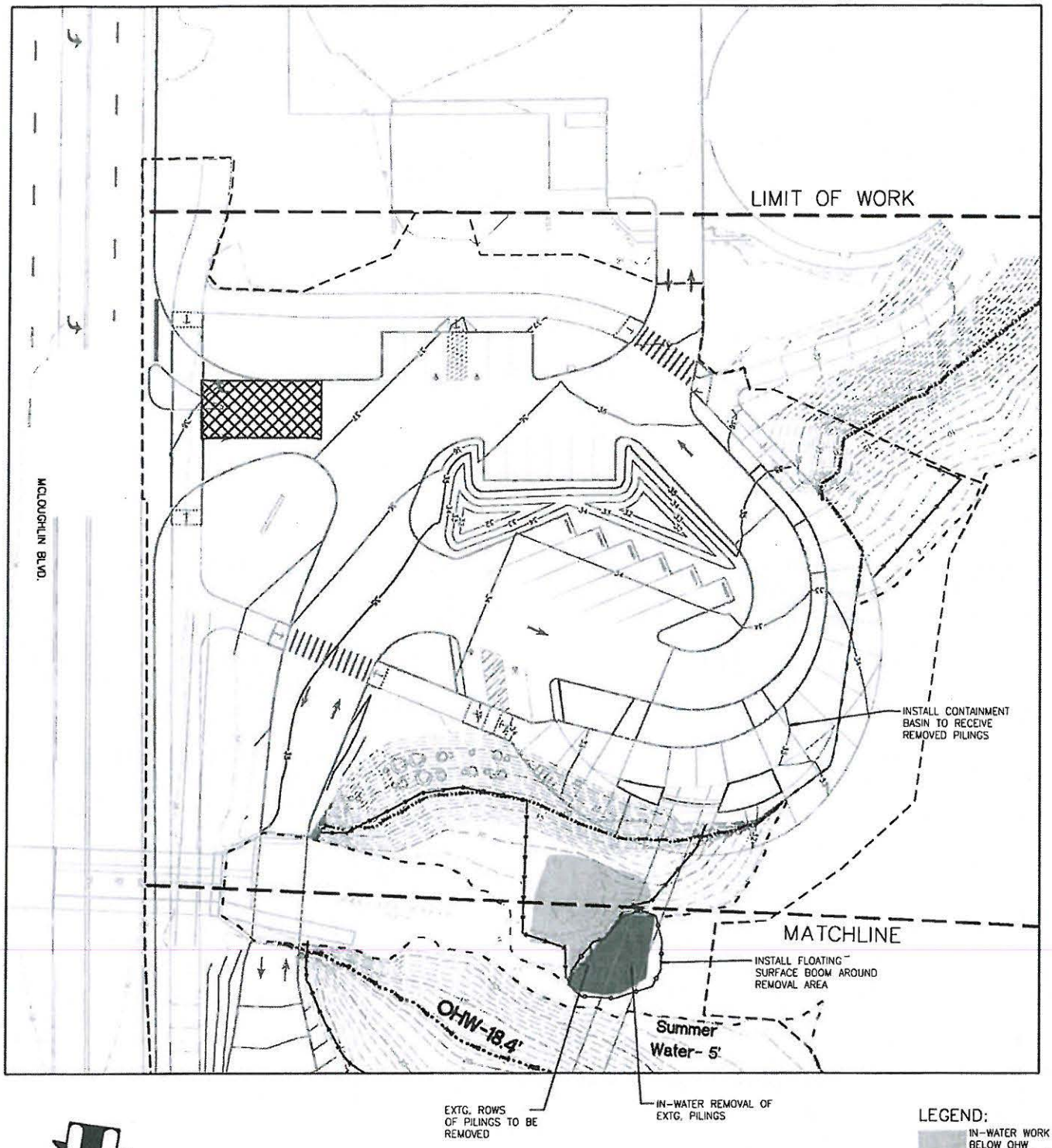

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park
TITLE	In-Water Work Isolation
	Reach 1

SHEET 11A

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0
DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR	CRM, RGWI	ENCLOSURE 1	05-15-09

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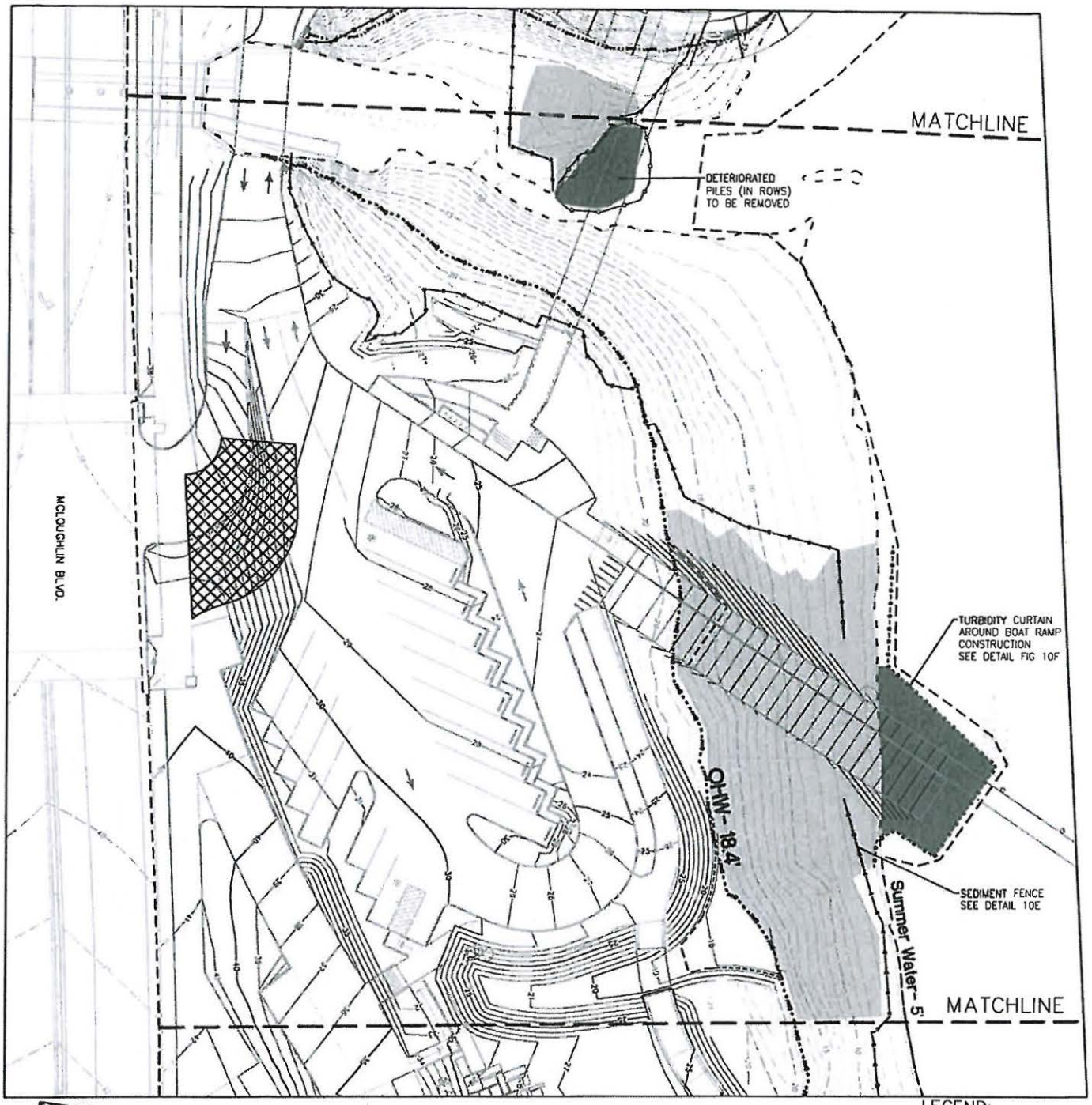

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

PROJECT: Milwaukie Riverfront Park

TITLE: In-Water Work Isolation

Reach 2

SHEET: 11B

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0

DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR	CRM, RGWI	ENCLOSURE 1	05-15-09

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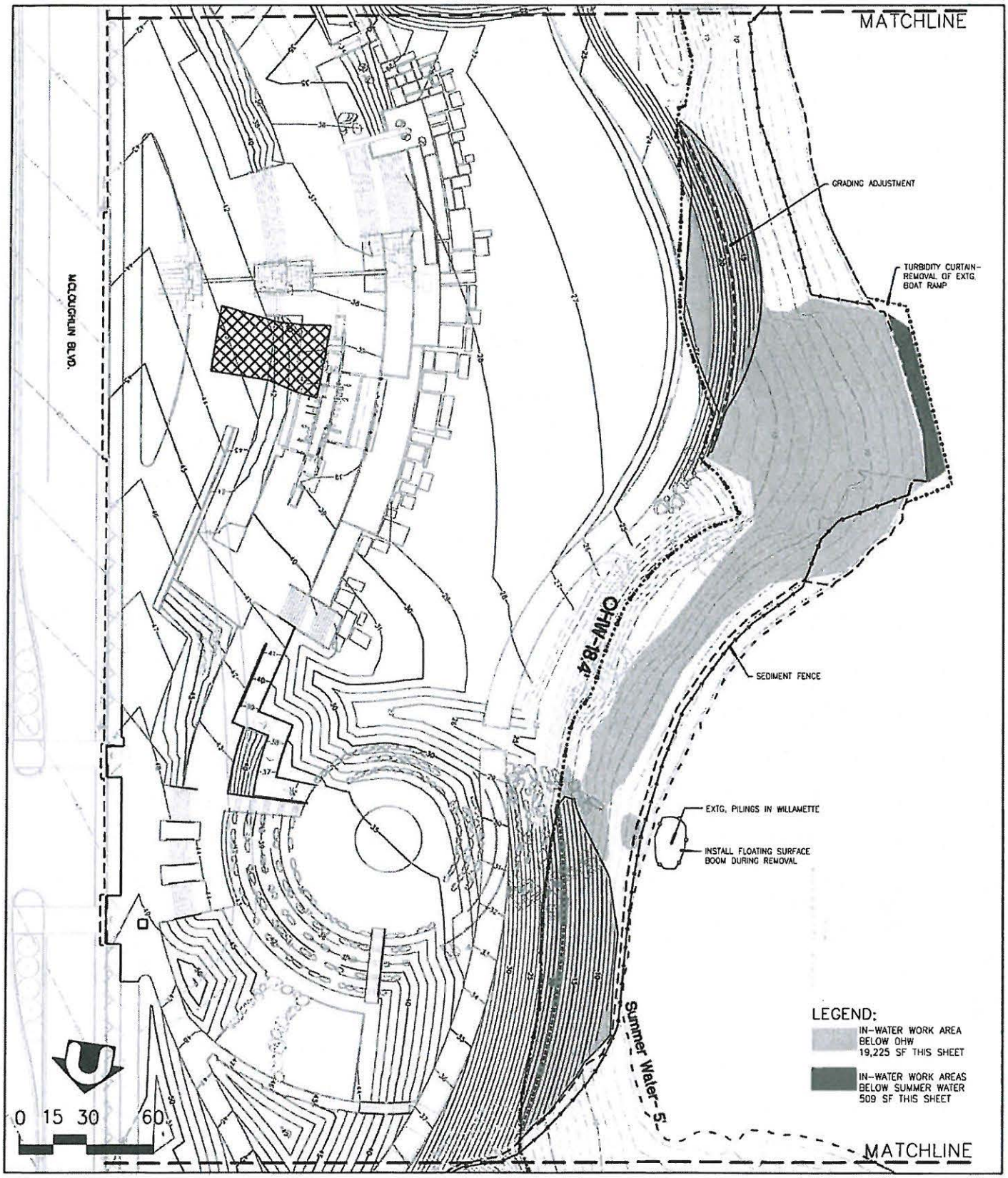

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

PROJECT: Milwaukie Riverfront Park

TITLE: In-Water Work Isolation

Reach 3

SHEET: 11C

DWG. REF.	PROJECT	SCALE	AMENDMENT NO.
C-1	MAEX0018	1" = 60'	0.0
DRAWN BY	DESIGN BY	APPROVED BY	DATE
BAR	CRM, RGWI	ENCLOSURE 1	05-15-09

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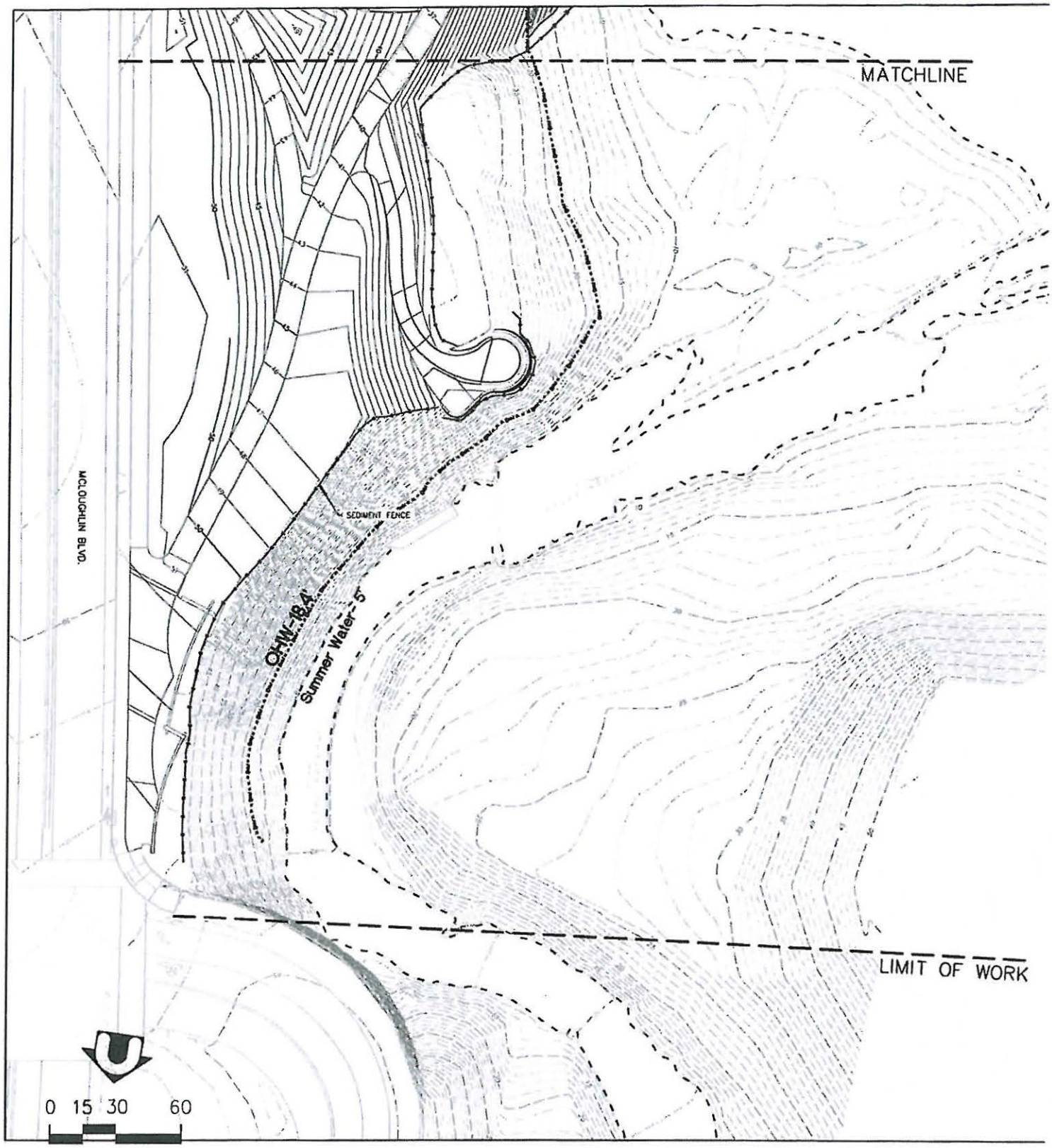

DAVID EVANS AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

PROJECT	Milwaukie Riverfront Park		SHEET
TITLE	In-Water Work Isolation		
	Reach 4		11D
DWG. REF. C-1	PROJECT MAEX0018	SCALE 1" = 60'	AMENDMENT NO. 0.0
DRAWN BY BAR	DESIGN BY CRM. RGWI	APPROVED BY ENCLOSURE 1	DATE 05-15-09

M:\MAEX0000021\0400CAD\EXHIBITS\PERMIT DRAWINGS\In-WaterWork-IPA.dwg Nov 26, 2013 - 11:29am

Oregon
John A. Kitzhaber, MD, Governor

Department of Environmental Quality
Northwest Region Portland Office
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987
(503) 229-5263
Fax: (503) 229-6945
TTY: 711

September 13, 2013

James Holm
U.S. Army Corps of Engineers
ATTN: CENWP-OP-GP
PO BOX 2946
Portland, OR 97208-2946

RE: 401 Water Quality Certification for City of Milwaukie

Dear Mr. Holm:

The Department of Environmental Quality (DEQ) has reviewed the U.S. Army Corps of Engineers Permit Application #2009-00019 (Department of State Lands Permit # 41713-RF), received by DEQ on December 15, 2009. DEQ's 401 Water Quality Certification public comment opportunity was circulated with the U.S. Army Corps of Engineers public notice, and DEQ received no public comments.

The applicant, the City of Milwaukie, proposes to impact waters of the state to develop a waterfront park and boat ramp. The project is located in waters of the Willamette River at river mile 18.5, in the city of Milwaukie, in Clackamas County, Oregon (Section 35, T1S/R1E).

Project Description: The City will redevelop the Milwaukie Riverfront Park along McLoughlin Boulevard between Kellogg Creek and Johnson Creek.

Proposed components of the project include working in water and during low water conditions, as follows:

- Removal of the existing deteriorated boat ramp and deleterious materials (concrete, rebar, fencing and debris) along riverbanks;
- Removal of up to 79 pilings near Kellogg Creek using a barge-mounted crane to vibrate out to prevent breakage;
- Construction of a new single lane boat ramp south of the existing ramp that will measure approximately 160 feet long by 20 feet wide and will be framed with riprap;
- Placement of up to 9 piles to secure the installation of a wood boarding float that will measure approximately 300 feet long by 8 feet wide;
- Installation of stone steps on the north side of the park that will extend into the ordinary high water line and measure approximately 35-40 feet wide
- Stabilization of riverbanks that will include; cribwalls, soft gabion soil lifts, large wood, coir mats, native vegetation and cobbles.

Additional project components that will complete the park development include:

- New parking facilities with stormwater treatment facilities;
- A pedestrian bridge over Kellogg Creek;
- Trials and scenic overlooks; and,
- A Public plaza and grass amphitheater for community access.

Status of Affected Waters of the State: The proposed impacts are in the Willamette River, which is classified as water quality limited under the federal Clean Water Act, and has an Environmental Protection Agency approved Total Maximum Daily Load (TMDL) that has been developed for the parameters of: Dioxin, Mercury, Temperature, and *E. coli*. The Willamette River is on the Section 303(d) List of impaired waterbodies for the parameters of: Aldrin, Dichlorodiphenyltrichloroethane (DDT), Dichlorodiphenyldichloroethylene (DDE), Dieldrin, Iron, polychlorinated biphenyl (PCB), and Dissolved Oxygen. Parameters listed with potential concern include: Chromium, Copper, Manganese, Nickel, Zinc, Alkalinity, and Phosphate.

Beneficial uses impaired by the above listed parameters in the Willamette River include: water contact recreation, salmonid fish spawning and rearing, anadromous fish passage, resident fish and aquatic life, fishing/fish consumption, and drinking water.

Based on the application materials and sediment characterization analysis, DEQ is reasonably assured that implementation of the Project will be consistent with applicable provisions of Sections 301, 302, 303, 306, and 307 of the federal Clean Water Act, state water quality standards set forth in OAR Chapter 340 Division 41, and other appropriate requirements of state law, provided the following conditions are incorporated into the USACE permit and strictly adhered to by the applicant.

401 CERTIFICATION CONDITIONS

1) **Duration of Certification:** This 401 WQC is valid until closure of the in-water timing window (see Condition 2) of the fifth year after issuance of the USACE permit. A new 401 WQC must be obtained prior to any substantial modification of the U.S. Army Corps of Engineers permit.

2) **Stormwater Management Plan**: A post-construction stormwater management plan has been developed and submitted on behalf of the applicant. The plan describes the Best Management Practices (BMPs) that will be implemented to prevent or treat pollution in stormwater generated by the proposed project in order to comply with state water quality standards, Total Maximum Daily Load (TMDL) Load Allocations (LAs), Groundwater Management Area concerns, or National Pollutant Discharge Elimination System (NPDES) permit requirements.

   The system components include: stormwater will sheetflow into either: vegetated swales, infiltration planters; filter strips and an infiltration pond. The site will be designed to detain up to 100-year flow events and will infiltrate stormwater up to a 10-year design storm. The applicant, the City of Milwaukie, will provide long term operation and maintenance of the stormwater system components as outlined in the plan submitted on behalf of the applicant.

3) **Fish protection/Oregon Department of Fish and Wildlife timing:** In-water work is allowed only within the Oregon Department of Fish and Wildlife preferred time window as specified in Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources, June 2008, or most current version. Exceptions to the timing

window must be reviewed and approved in writing in advance by Oregon Department of Fish and Wildlife and the National Marine Fisheries Service.

4) **Aquatic life movements:** Any activity that may substantially disrupt the movement of those species of aquatic life indigenous to the water body, including those species that normally migrate through the area, is prohibited. Unobstructed fish passage must be provided at all times during any authorized activity. Exceptions must be reviewed and approved in writing in advance by Oregon Department of Fish and Wildlife and the National Marine Fisheries Service.

5) **Isolation of in-water work areas:** Isolation of in-water work areas from the active flowing stream must be accomplished to the maximum extent practicable. Methods of isolation include, but are not limited to: timing work at low water so as to effectively work in the dry; using silt curtains; cofferdams; inflatable bags; geo blocks; sandbags; sheet pilings; or similar materials. The applicant is referred to Appendix D of DEQ's *Oregon Sediment and Erosion Control Manual*, April 2005, for isolation techniques. http://www.deq.state.or.us/wq/stormwater/docs/escmanual/appxd.pdf

6) **Cessation of Work:** Cease project operations under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize turbidity or other resource damage as a result of the exposed project area.

7) **Turbidity**: All practical Best Management Practices (BMPs) on disturbed banks and within the stream must be implemented to minimize turbidity during in-water work. Any activity that causes turbidity to exceed 10% above natural stream turbidities is prohibited except as specifically provided below.

   a. **Monitoring**: Turbidity monitoring must be conducted and recorded as described below. Monitoring must occur each day during daylight hours when in-water work is being conducted. Visual gauging is acceptable, however, *turbidity that is visible over background is considered an exceedance of the standard.*

      i. Representative Background Point: a sample or observation must be taken every two hours at a relatively undisturbed area approximately 100 feet upcurrent from in-water disturbance to establish background turbidity levels for each monitoring cycle. Background turbidity, location, date, and time must be recorded prior to monitoring downcurrent.
      ii. Compliance Point: Monitoring must occur every two hours, approximately 100 feet downcurrent from the disturbance, at approximately mid-depth and within any visible plume, and be compared against the background measurement or observation. The turbidity, location, date, and time must be recorded for each sample or observation.

   b. **Compliance**: Results from the compliance points must be compared to the background levels taken during each monitoring interval. Exceedances are allowed as follows:

MONITORING WITH A TURBIDIMETER		
ALLOWABLE EXCEEDANCE TURBIDITY LEVEL	ACTION REQUIRED AT 1ST MONITORING INTERVAL	ACTION REQUIRED AT 2ND MONITORING INTERVAL
0 to 5 NTU above background	Continue to monitor every 2 hours	Continue to monitor every 2 hours
5 to 29 NTU above background	Modify BMPs & continue to monitor every 2 hours	Stop work after 4 hours at 5-29 NTU above background
30 to 49 NTU above background	Modify BMPs & continue to monitor every 2 hours	Stop work after 2 confirmed hours at 30-49 NTU above background
50 NTU or more above background	Stop work	Stop work
VISUAL MONITORING		
No plume observed	Continue to monitor every 2 hours	Continue to monitor every 2 hours
Plume observed	Modify BMPs & continue to monitor every 4 hours	Stop work after 4 hours with an observed plume

If an exceedance over the background level occurs, the applicant must modify the activity and continue to monitor every two hours. **If an exceedance over the background level continues after the second monitoring interval, the activity must stop.** If, however, turbidity levels return to background at or after second monitoring level due to implementation of BMPs or natural attenuation, work may continue with appropriate monitoring as above.

If an exceedance occurs at: 50 NTU or more over background; 30 NTU over background for 2 hours; or 5-29 NTU over background for 8 hours, the activity must stop immediately for the remainder of that 24-hour period.

c. **Reporting**: The applicant must make available copies of daily logs for turbidity monitoring to DEQ, USACE, NMFS, USFWS, and ODFW upon request. The log must include: calibration documentation (if using an instrument); background NTUs or observation; compliance point NTUs or observation; comparison of the points in NTUs or narrative; and location; date; time; and tidal stage (if applicable) for each reading. Additionally, a narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions.

d. **BMPs to Minimize In-stream Turbidity:**
   i. Sequence/Phasing of work – The applicant must schedule work activities so as to minimize in-water disturbance and duration of in-water disturbances;
   ii. Bucket control - All in-stream digging passes by excavation machinery and placement of fill in-stream using a bucket must be completed so as to minimize turbidity. All practicable techniques such as employing an experienced equipment operator, not dumping partial or full buckets of material back into the wetted stream, adjusting the volume, speed, or both of the load, or by using a closed-lipped environmental bucket must be implemented;
   iii. Machinery may not be driven into the flowing channel;

iv. Excavated material must be placed so that it is isolated from the water edge or wetlands and not placed where it could re-enter waters of the state uncontrolled; and,
v. Containment measures such as silt curtains, geotextile fabric, and silt fence must be implemented and properly maintained in order to minimize in-stream sediment suspension and resulting turbidity.

8) **Deleterious waste materials**: Biologically harmful materials and construction debris including, but not limited to: petroleum products, chemicals, cement cured less than 24 hours, welding slag and grindings, concrete saw cutting by-products, sandblasted materials, chipped paint, tires, wire, steel posts, asphalt and waste concrete may not be placed in or where they could enter waterways or wetlands.

a. Concrete, cement, or grout must be cured for at least 24 hours prior to any contact with flowing waters;
b. Only clean fill, free of waste and polluted substances, may be used;
c. Best Management Practices must be employed to prevent discharges of spills of deleterious materials to surface or ground water;
d. An adequate supply of materials needed to contain deleterious materials during a weather event must be maintained at the project construction site and deployed as necessary; and
e. All foreign materials, refuse, and waste must be removed from the area.

9) **Spill Prevention:** Vehicles must be fueled, operated, maintained, and stored and construction materials must be stored in areas that minimize disturbance to habitat and prevent adverse effects from potential discharges. In addition, the following specific requirements apply:

a. Vehicle staging, cleaning, maintenance, refueling, and fuel storage must take place in a vehicle staging area placed 150 feet or more from any waters of the state.
b. All vehicles operated within 150 feet of any waters of the state must be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected must be repaired before the vehicle resumes operation;
c. Before operations begin and as often as necessary during operation, equipment must be steam cleaned (or undergo an approved equivalent cleaning) until all visible external oil, grease, mud, and other visible contaminates are removed if the equipment will be used below the bank of the water body; and,
d. An adequate supply of materials (such as straw matting/bales, geotextiles, booms, diapers, and other absorbent materials) needed to contain spills must be maintained at the project construction site and deployed as necessary.

10) **Spill & Incident Reporting:**

a. In the event that petroleum products, chemicals, or any other deleterious materials are discharged into state waters, or onto land with a potential to enter state waters, the discharge must be promptly reported to the Oregon Emergency

Response Service (OERS, 1-800-452-0311). Containment and cleanup must begin immediately and be completed as soon as possible.

b. If the project operations cause a water quality problem that results in distressed or dying fish, the operator must immediately: cease operations; take appropriate corrective measures to prevent further environmental damage; collect fish specimens and water samples; and notify DEQ, Oregon Department of Fish and Wildlife and other appropriate regulatory agencies.

11) **Vegetation Protection and Restoration:**

a. Riparian, wetland, and shoreline vegetation in the authorized project area must be protected from disturbance to the maximum extent practicable through one or more of the following:
   i. Minimization of project and impact footprint;
   ii. Designation of staging areas and access points in open, upland areas;
   iii. Fencing and other barriers demarking construction areas; and,
   iv. Use of alternative equipment (e.g., spider hoe or crane).

b. If authorized work results in unavoidable vegetative disturbance and the disturbance has not been accounted for in planned mitigation actions, riparian, wetland and shoreline vegetation must be successfully reestablished to a degree that it functions (for water quality purposes) at least as well as it did before the disturbance. The vegetation must be reestablished by the completion of authorized work.

12) The applicant must notify DEQ of any change in ownership and obtain DEQ review and approval before undertaking any change to the project that might significantly affect water quality.

13) DEQ may modify or revoke this 401 WQC, in accordance with OAR 340-048-0050, in the event of project changes or new information indicating that the project activities are having a significant adverse impact on state water quality or beneficial uses.

14) A copy of this 401 WQC letter shall be kept on site and readily available for reference by the applicant and its contractors, U.S. Army Corps of Engineers, DEQ and other appropriate state and local government inspectors.

15) This 401 WQC is invalid if the project is operated in a manner not consistent with the project description contained in the permit application materials.

16) The applicant and its contractors must allow DEQ site access at reasonable times as necessary to monitor compliance with these 401 WQC conditions.

If the applicant is dissatisfied with the conditions contained in this certification, a contested case hearing may be requested in accordance with OAR 340-048-0045. Such request must be made in writing to the DEQ Office of Compliance and Enforcement at 811 SW 6th Avenue, Portland Oregon 97204 within 20 days of the mailing of this certification.

The DEQ hereby certifies this project in accordance with the Clean Water Act and state rules, with the above conditions. If you have any questions, please contact Corey Saxon at saxon.corey @deq.state.or.us, by phone at 503 229-5051 or at the address on this letterhead.

Sincerely,

Steve Mrazik
Water Quality Manager
Northwest Region

X: 2009-00019cert City Milwaukie.doc

cc: Applicant
Mischa Connine - NMFS
Anita Huffman, DSL

COMPLIANCE CERTIFICATION

U.S. Army Corps of Engineers, Portland District
CENWP-OD-G
P.O. Box 2946
Portland, Oregon 97208-2946

1. Permittee Name: City of Milwaukee

2. County: Clackamas County

3. Corps Permit No: NWP-2009-19

4. Corps Contact: Compliance Project Manager for Clackamas County

5. Type of Activity: **Individual Permit, Riverfront Park re-development**

Please sign and return form to the address above:

I hereby certify that the work authorized the above referenced permit has been completed in accordance with the terms and conditions of said permit and that required mitigation is completed in accordance with the permit conditions, except as described below.

_____

Signature of Permittee **Date**

.....

Professional Archaeologist Signature:

I hereby certify that the work authorized by the above referenced permit has been monitored for cultural resources and/or human remains during all ground disturbance activities in accordance with the terms and conditions of said permit. In the event cultural resources and/or human remains were discovered, all appropriate Federal, State, and local authorities have been notified.

_____

Signature of Archaeologist **Date**

_____

Organization/Affiliation

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to NMFS No:
NWR-2010-563

May 10, 2013

Shawn H. Zinszer
Chief, Regulatory Branch
U.S. Army Corps of Engineers
P.O. Box 2946
Portland, Oregon 97208-2946

Re: Endangered Species Act Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for Milwaukie Riverfront Park, Willamette River (HUCs 170900120104 and 170900120103), Multnomah County, Oregon (Corps No.: NWP-2009-00019)

Dear Mr. Zinszer:

The enclosed document contains a biological opinion (opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to section 7(a)(2) of the Endangered Species Act (ESA) on the effects of the proposal by the U.S. Army Corps of Engineers (Corps) to authorize the City of Milwaukie's proposal for the Milwaukie Riverfront Park using the Corps' regulatory authority under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act.

In this opinion, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), Upper Willamette River (UWR) spring-run Chinook salmon, LCR coho salmon (*O. kisutch*), LCR steelhead (*O. mykiss*), UWR steelhead, or result in the destruction or adverse modification of critical habitat designated or proposed for these species.

As required by section 7 of the ESA, NMFS is providing an incidental take statement with the opinion. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize the impact of incidental take associated with this action. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the Federal action agency must comply with to carry out the reasonable and prudent measures. Incidental take from actions that meet these terms and conditions will be exempt from the ESA's prohibition against the take of listed species.

This document also includes the results of our analysis of the action's likely effects on essential fish habitat (EFH) pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes two conservation recommendations to avoid, minimize, or otherwise offset potential adverse effects on EFH. One of these conservation recommendations is identical to the ESA take statement's terms and conditions. Section 305(b) (4) (B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations.

Enclosure

If the response is inconsistent with the EFH conservation recommendations, the Federal action agency must explain why the recommendations will not be followed, including the scientific justification for any disagreements over the effects of the action and the recommendations. In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we request that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

Please direct questions regarding this opinion to Mischa Connine, in the Oregon State Habitat Office, at 503.230.5401.

Sincerely,

for William W. Stelle, Jr.
Regional Administrator

cc: JoAnn Herrigel, City of Milwaukie

Endangered Species Act (ESA) Section 7(a)(2) Biological and Conference Opinion
and
Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation

Milwaukie Riverfront Park
Willamette River (HUCs 170900120104 and 170900120103)
Multnomah County, Oregon
(Corps No.: NWP-2009-00019)

NMFS Consultation Number: NWR-2010-563

Action Agency: U.S. Army Corps of Engineers

Affected Species and Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely To Jeopardize the Species?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Lower Columbia River Chinook salmon (*Oncorhynchus tshawytscha*)	Threatened	No	No	No
Upper Willamette River Chinook salmon	Threatened	No	No	No
Lower Columbia River coho salmon (*O. kisutch*)	Threatened	No	No	No*
Lower Columbia River steelhead (*O. mykiss)*	Threatened	No	No	No
Upper Willamette River steelhead	Threatened	No	No	No

*Critical Habitat has been proposed for Lower Columbia River coho salmon

Fishery Management Plan That Describes EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon	Yes	Yes

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Issued By:

for William W. Stelle, Jr.
Regional Administrator

Date: May 10, 2013

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LIST OF ACRONYMS

BA	Biological Assessment
BMP	Best Management Practice
CFR	Code of Federal Regulations
CHART	Critical Habitat Analytical Review Team
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FR	Federal Register
HUC	Hydraulic Unit Code
LCR	Lower Columbia River
MSA	Magnuson Stevens Act
NMFS	National Marine Fisheries Service
OHW	Ordinary High Water
PCE	Primary constituent element
RM	River Mile
RMS	Root Mean Squared
RPM	Reasonable and prudent measure
TRT	Technical Review Team
U.S.C.	United States Code
UWR	Upper Willamette River
VSP	Viable Salmonid Population
WLC	Willamette/Lower Columbia

1. INTRODUCTION

This Introduction Section provides information relevant to the other sections of this document and is incorporated by reference into Sections 2 and 3 below.

1.1 Background

The National Marine Fisheries Service (NMFS) prepared the biological opinion (opinion) and incidental take statement portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531, *et seq.*), and implementing regulations at 50 CFR 402.

We also completed an essential fish habitat (EFH) consultation on the proposed action, in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801, *et seq.*) and implementing regulations at 50 CFR 600.

The opinion, incidental take statement, and EFH conservation recommendations are each in compliance with the Data Quality Act (44 U.S.C. 3504(d)(1) *et seq.*) and they underwent pre-dissemination review.

1.2 Consultation History

Early coordination and pre-consultation with NMFS, U.S. Fish and Wildlife Service, Corps, Oregon Department of Fish and Wildlife (ODFW), Oregon Department of State Lands (DSL), and Oregon Department of Environmental Quality (DEQ) was conducted during a series of site visits, meetings, and phone conversations. A pre-application meeting was held at the project site on July 16, 2008. A follow-up meeting was held with NMFS on April 14, 2010, to discuss the additional information requested from NMFS.

On February 28, 2010, NMFS received a request for ESA section 7 and MSA section 305(b) consultation from the U.S. Army Corps of Engineers (Corps) to authorize the City of Milkwaukie's (City) Milwaukie Riverfront Park Project under section 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act. NMFS sent a request to the Corps for additional information on March 19, 2010, and received the additional information on May 17, 2010. Several meetings took place with the Corps, ODFW, and the City to explore alternatives to the project that would minimize effects to ESA-listed fish and critical habitat. On October 11, 2012, NMFS sent a letter to the Corps, requesting the alternatives analysis within 30 days, and if we did not receive the information, we assumed the project was withdrawn. On January 14, 2013, NMFS received an alternatives analysis and final proposal from the Corps. NMFS requested additional information from the Corps and the City on January 18, 2013. NMFS received the additional information on January 24, 2013 and formal consultation was initiated.

In the request for consultation, the Corps concluded that the proposed action is "likely to adversely affect" Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), Upper Willamette River (UWR) Chinook salmon, LCR coho salmon (*O. kisutch*), LCR steelhead (*O. mykiss*), and UWR steelhead, as well as designated critical habitat for LCR Chinook salmon,

UWR Chinook salmon, LCR steelhead, UWR steelhead, and LCR coho salmon (proposed). The Corps further concluded that the proposed action "would adversely affect" essential fish habitat (EFH) designated by NMFS under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801, *et seq.*).

This opinion is based on information provided in the December 2009 biological assessment, meeting discussions, field investigations, and the additional information provided by the Corps. A complete record of this consultation is on file at the Oregon State Habitat Office in Portland, Oregon.

1.3 Proposed Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

The Corps proposes to authorize the redevelopment of Milwaukie Riverfront Park. The City plans to redevelop the park located along McLoughlin Boulevard between Kellogg Creek and Johnson Creek. The purpose of the proposed project is to improve recreational opportunities, increase structural and vegetative diversity along the waterway, create and enhance habitats that support native species while minimizing non-native species, protect and improve water quality in the Willamette River. Where needed, the project is also expected to provide stable riverbanks, protect existing and future urban development, infrastructure, significant natural resources, and public safety; provide safe, limited public access to the river in appropriate locations; and enhance the aesthetic qualities of the river's edge.

The redeveloped park will include large grassy areas, a children's play area, picnic facilities, restrooms, benches for viewing the river, natural vegetative areas with trails, stone steps leading to the river, a boat ramp with attached boat dock, and parking. (Figures 1 and 2). A description of each project element is described below.

Existing Boat Ramp Removal

A two-lane boat ramp is currently located in the middle of the park. The ramp has been undermined and is not safe to use during low water conditions. The existing ramp will be removed during the in-water work window at low water conditions to minimize the need for construction equipment to enter the river. The in-water work area for demolition of the old boat ramp will occupy about 2,700 square feet, of which about 2,000 square feet will be above the actual summer water level during construction. Demolition of this structure involves lifting out about ten large slabs of concrete using a trackhoe. The work will be performed during low tide during low-water season, and the inundated portion of the demolition work area will be isolated from the active flowing channel using a floating turbidity curtain as described below for new ramp construction. If any concrete is beyond reach of the trackhoe, a diver will attach chains to allow removal. The ramp will be isolated from the active flowing channel with a turbidity curtain or other engineer-approved measures to prevent debris and sediment from leaving the project

site. Construction equipment will be operated below OHW elevation but will not enter the water. The bank will be re-contoured to match upstream and downstream grades.

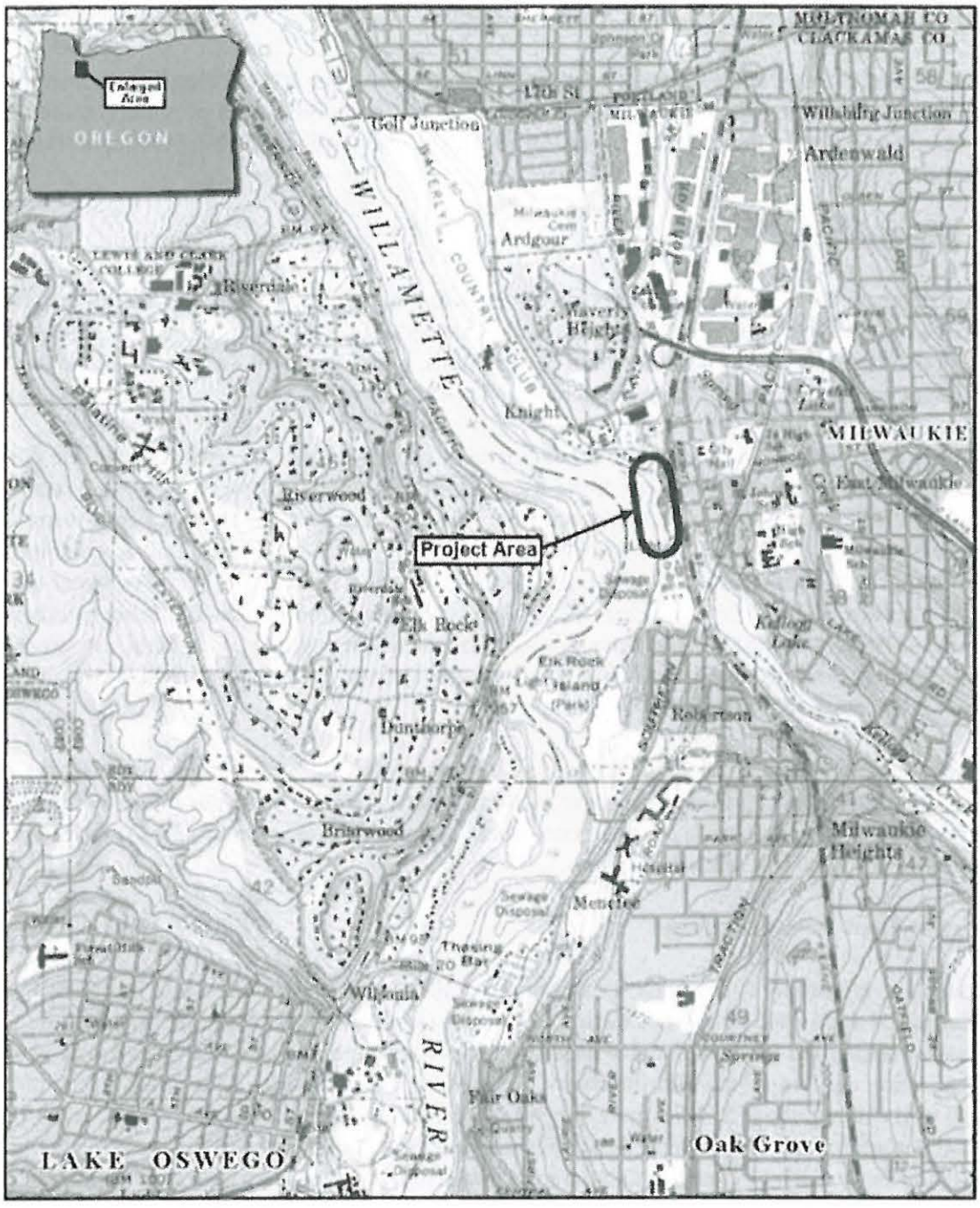

Figure 1. Location Map of the Milwaukie Riverfront Park Project

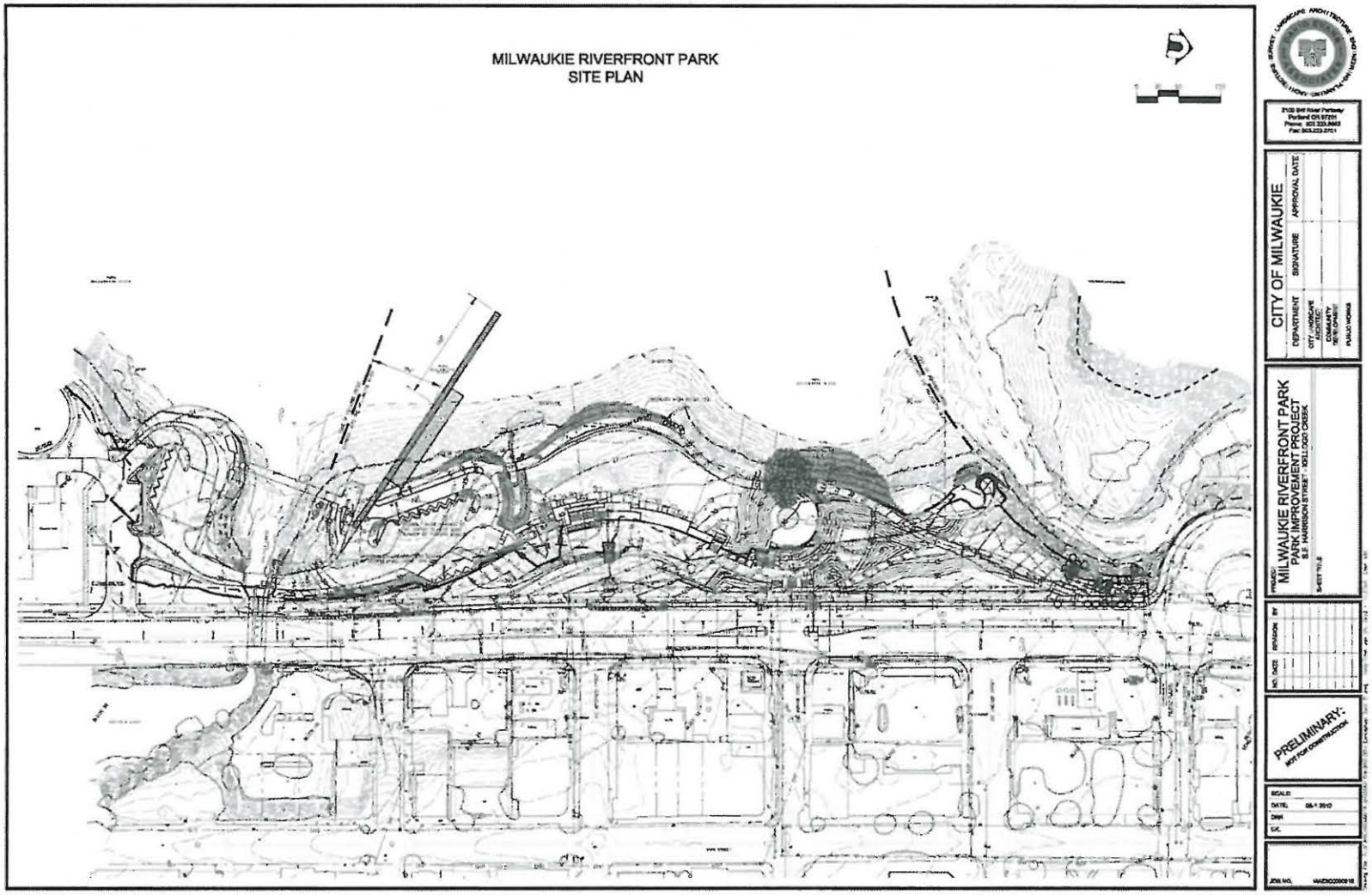

Figure 2. Plan view of the proposed Milwaukie Riverfront Park project.

New Boat Ramp and Boarding Float

The City proposes to construct a boat ramp south of the existing ramp (Figure 2, above). The boat ramp will be approximately 160 feet long by 20 feet wide and 8 inches thick. The boat ramp design is based on a single lane ramp and meets current Oregon State Marine Board standards. The section of the ramp below OHW elevation will be constructed with pre-cast concrete planks for the driving surface. The section of the ramp above OHW elevation will be poured-in-place concrete. Construction below OHW will include slope grading, with 1-1/2 inch gravel base and steel rails placed on grade to support planks. Grading will be limited to slope modifications necessary to establish a flush and level ramp. The pre-cast concrete planks will be placed on the rails and will interlock with each other. A perimeter of riprap will be placed around the ramp to prevent scour and undercutting of ramp surface. This rock will be approximately 4 feet wide and 4 feet deep and flush with the ramp surface.

Most of the construction will be accomplished using excavators and other shore-mounted equipment, but riprap will be placed using a barge mounted crane. The inundated portion of the boat ramp work area will be isolated using a floating turbidity curtain. The curtain will be pulled out from shore so as to exclude any fish that may be present at the time.

An 8-foot by 300-foot plastic 'wood' boarding float will be placed next to the ramp and secured with piling. The boarding float will be constructed of wood surrounding and encapsulating foam. The float will be secured with nine 16- to 18-inch steel piles driven into the ground. Each pile will have a conical pile cap to prevent birds from perching on top.

Stone Steps

The City proposes to construct stone steps to concentrate river access in one location which may help to protect the remainder of the bank and riparian vegetation. The stone steps will be located on the north side of the park in the upland and extend down below OHW elevation. The stone steps will be 35-40 feet wide. The steps will occupy 1,169 square feet and displace 65 cubic yards below OHW elevation. Large rock will be placed along the stone steps, where it is necessary to prevent undercutting and scouring.

Existing Pile and Deleterious Material Removal

A total of 79 pilings will be removed from the Willamette River including 75 at the mouth of Kellogg Creek and four downstream of Kellogg Creek. The old wooden pilings at the mouth of Kellogg Creek are tightly clustered together in several L-shaped rows. About half of them lie at an elevation that will be dry during the in-water work window, and half are likely to be inundated in water up to 6 feet deep. Of the four pilings that lie in the Willamette River, two will be inundated during the in-water work window. Containment for inundated pilings will consist of a floating boom placed around the inundated pilings before removal begins. The floating booms will encompass approximately 770 square feet at the Kellogg Creek location, and 500 square feet at the Willamette River location.

The pilings will be vibrated out using a barge-mounted crane, and the objective will be to vibrate out each entire piling without breakage. However, if a piling accidentally breaks, it will be cut off at the sediment mudline. The removed pilings will be stockpiled in a containment area to prevent discharge back into the River. The pilings will be discarded at the approved METRO facility off-site. Piling removal is expected to take about one week. After mobilization, it is estimated that extracting each piling would take about half an hour, and should a piling break, cutting it off at the mudline would take another half an hour.

Any debris will be pulled to shore when removing the boom after construction, and will be collected and disposed at the off-site approved METRO disposal facility along with the pilings. For pilings removed in areas below the OHW but above the actual water level, any debris will be collected and disposed of with the pilings.

Currently, concrete, rebar, chain link fencing, wood piles, and other debris are found along the banks of the Willamette River and Kellogg Creek. This material will be removed as part of this project. It is anticipated that approximately 35 cubic yards (611 cubic feet of material and 318 cubic feet of piles) will be removed below OHW.

Channel and Slope Stabilization

The shoreline is presently characterized by piles of concrete rubble waste overgrown with thickets of non-native blackberry, other non-native vegetation, and native overstory trees (black cottonwood, red alder, bigleaf maple, and red oak). Much of the immediate shoreline is relatively barren of vegetation. There would be a net increase in permanent fill volume but a net decrease in permanent fill area associated with the removal of the existing boat ramp and deleterious material and construction of the new boat ramp, boat dock and stone steps (Table 1). In most locations, the slope stabilization measures overlap the areas where material is being removed.

Table 1. Summary of fill volume within OHW associated with the Milwaukie Riverfront Park project.

Project Component	Area of Impact Below OHW
Removal of existing boat ramp	-8,990 ft^2
Construction of new boat ramp and dock	6,752 ft^2
Construction of new stone steps	1,169 ft^2
Recontouring bank	7,014 ft^2
Bio-engineered bank protection (cribwalls, soil lifts, large woody debris, cobble)	23,097 ft^2
Removal of deleterious material and existing piles	-18,771 ft^2
Total	**10,271 ft^2**

Proposed bank stabilization measures will include cribwalls and soft gabion soil lifts planted with native shrubs, large wood, coir mats, shoreline cobbles, and large boulders at key scour edges at the new boat ramp and stone steps. Soil engineering will include installation of coir matting in concert with re-vegetation to protect the engineered soil from erosion while planting

becomes established and a matrix of roots binds the slope. The riverbank will then rely on the plantings for stability. To control further retreat of the bank, larger boulders will be placed behind the bioengineering and combined with the root-wads. This system will establish a limit of erosion if the bio-engineering experiences a major flow/flood event before root systems are firmly established.

The following provides a more detailed description of the proposed slope stabilization measures:

Cribwalls and Soft Gabion Soil Lifts. The City proposes crib walls that will be composed of anchored logs and rootwads, and "soft gabion walls" that will be composed of geotextile-wrapped soil lifts with native shrub plantings between levels. Below the OHW elevation, the crib walls will be topped with soft gabion soil lifts. Cribwalls and soft gabions are proposed upstream of the proposed boat ramp and in other locations where the shore is steep enough to require a stabilized terrace following removal of existing concrete rubble armoring.

Large Wood. All large wood below the OHW elevation will be incorporated into the log crib structures described above. The large wood will be approximately 24-inch diameter, 20 foot-long trunks attached to intact rootwads. The rootwads will face the river at about 10 feet on center spacing, in a stabilizing structure with sill logs below and abutment logs above. Several free-standing large wood structures are specified above OHW and are thus not described further here.

Coir Mats. Coir fabric will be used to stabilize the entire disturbed portion of the project shoreline. This includes the regraded area and the shoreline areas in which the only activity will be pulling out old concrete debris and clearing blackberry thickets. The total area to be protected with coir outside of soft gabion walls is 28,247 square feet.

Shoreline Cobbles. A layer of native material will be deposited throughout much of the shoreline below OHW and above the typical summer water elevation. This layer of material will occupy about 16,343 square feet below the OHW and displace 101 cubic yards. The proposed removal of 816 cubic yards of old concrete rubble and debris below OHW is expected to leave a rough, uneven surface that degrades the view from the park areas. The material will partially fill in the low spots and will provide a more uniform surface.

Trails and Scenic Overlook

The north end of the park adjacent to Johnson Creek will feature trails and scenic overlook connections to the Willamette River and to an informal amphitheater. Trail connections on the north end and south end of the park will allow access to regional recreational facilities by bikers and pedestrians. The trail will be located along the top of bank which is between 15-40 feet from OHW.

Pedestrian Bridge

A pedestrian bridge at the mouth of Kellogg Creek is proposed to connect parking on the north side of Kellogg Creek with Milwaukie Riverfront Park. The proposed pedestrian bridge will span

Kellogg Creek and will not be below OHW. The vertical profile will be slightly higher than the 100-year flood elevation to minimize flooding and to ensure a "no rise" in the 100-year floodplain (Figure 2, above). The bridge material will not be made of treated wood.[1]

Park Entrance, Boat Trailer Parking, and Automobile Parking

The park's main entry will be on the portion of the site south of Kellogg Creek. The two existing entryways will be removed. Access and parking will be provided adjacent to the boat ramp (Figure 2, above).

Upland Facilities

Upland facilities will include a Southern plaza, public plaza, amphitheater, and restroom.

The Southern plaza will be south of Kellogg Creek and will provide a gathering place to overlook the Willamette River. It will be at the top of a 30-foot high sheet pile wall formerly used as a log dump. Portions of the plaza will cantilever up to 10 feet over the river at the top of the sheet pile wall. A new parking area will be constructed adjacent to the plaza, where an informal parking area is currently.

The public plaza will include a water feature, children's play area, and an outdoor theatre space.

The grass amphitheater will hold approximately 150 people for community events.

The restroom building in the large public (pedestrian) plaza will be constructed.

Illumination

Illumination is proposed for this project. All park and path lighting will be of a pedestrian scale and directed downward toward paths and will include hoods or shades to prevent light pollution on the river. Lighting associated with the dock float and walkway will be housed near, and obtusely directed at, the walking surface.

Utility Relocation

Portland General Electric power lines and a water line are currently in the northern half of the project area. The PGE poles and waterline would be moved closer to McLoughlin Blvd. behind the sidewalk. Both of these utility relocates are within existing developed park land and away from the top of bank. None of these utilities require work below OHW and would not result in the loss of riparian vegetation.

[1] Email to Mischa Connine, NMFS from JoAnn Herrigel, City of Milwaukie, stating that they will not use treated wood for the proposed pedestrian bridge, April 18, 2013.

Access/Staging

If possible, areas for non-workshift storage of equipment and vehicles, other than track-mounted vehicles and cranes, will be at least 150 feet away from the regulated work area. Areas for storing fuels and other potentially hazardous materials and areas for refueling and servicing construction equipment and vehicles will also be at least 150 feet from the regulated work area, if feasible. Due to the location of the Willamette River, Kellogg Creek and Johnson Creek, as well as the need to maintain access to sections of the park, sufficient space may not be available to establish a staging area for storing hazardous materials and non-work shift vehicles 150 feet away from OHW. If this is the case, full containment of potential contaminants will be provided to prevent soil and water contamination, as appropriate. Hazardous material containment booms and spill containment booms will be provided on site to facilitate the cleanup of hazardous material spills. After the project is completed, staging areas will be returned to pre-project grade and seeded, if the ground is disturbed.

Stormwater Collection and Treatment

The following provides a more detailed description of the stormwater treatment plan:

Water Quality Treatment. The majority of the existing impervious areas in the project area will be removed for the new layout of parking and sidewalks. The total pre-development site impervious area is approximately 103,960 square feet (2.4 acres). An impervious area of 95,756 square-feet (2.2 acres) will be removed. An impervious area of 8,204 square feet (0.2 acre) of sidewalk will remain.

Stormwater from the existing impervious surfaces presently flows down the river bank to the Willamette River. The existing stormwater system consists of two catch basins that collect part of the driveway stormwater runoff. These catch basins will be removed during construction since the driveway will be moved.

The City will add 122,821 square feet (2.8 acres) of impervious area to the existing 8,204 square-feet (0.2 acre) that will remain. The parking area near Kellogg Creek, which is approximately 56,292 square feet (1.3 acres), will be constructed using pervious pavement technology. Although this technology will allow some infiltration to occur, the water quality treatment facilities have been designed as if this area were impervious. Based on this approach, the total impervious area for the site post-development will be 131,025 square-feet (3.0 acres). The project will create a net increase of 27,065 square-feet (0.6 acre) of impervious area.

For discussion of stormwater, the site has been divided into three key areas. These areas are the north and south parking (intersected by Kellogg Creek connected by an existing vehicle bridge and the proposed pedestrian bridge) and the north pedestrian plaza.

The proposed water quality facilities meet the design standards of the current City of Portland, Stormwater Management Manual (SWMM)(City of Portland 2004). SWMM specifies that pollution reduction is required for all impervious areas created by development projects with the exception of roof areas. SWMM regulations require water quality facilities to treat stormwater

runoff generated by 0.83 inches of rainfall over a 24-hour period when using the Santa Barbara Urban Hydrograph hydrograph-based analysis method.

Stormwater runoff in the south parking area is collected, treated and detained from four basins in four separate facilities; one vegetated swale/planter, two infiltration planters, and one pond. The swale is connected to an adjacent planter. This planter collects and treats runoff through infiltration. The pond collects and treats runoff from the south parking area. All four facilities provide treatment for the water quality event and, furthermore, infiltrates the 10-year event without releasing any water. Larger storm events will release storm water to the Willamette River.

Stormwater runoff in the north parking area is treated and detained in three separate facilities: one flat planter and two sloped planters. All three facilities provide sufficient storage for the water quality storm event, and fully infiltrate runoff from the 10-year storm event.

The public plaza area, also referred to as the pedestrian plaza, includes the restrooms, water features, planters, and amphitheater. These areas also have two stormwater quality treatment features. A swale is proposed on the south side of the plaza and a filter strip is proposed on the far north side of the plaza. A large percentage of the plaza is graded to sheet flow stormwater runoff into adjacent planters or grassy areas. These areas were not modeled for water quality purposes.

Water Quantity Treatment. Since infiltration rates in this area are not high enough to infiltrate the 2-, 5-, 10-, and 25-year storm event, it is necessary to provide a detention system in order to meet the predevelopment discharge rate requirements. The proposed pond and planter facilities provide detention for both the north and south parking area runoff. These facilities are designed to provide detention during the 100-year storm event.

Stormwater Conveyance. All stormwater from vehicular impervious surfaces on the site will be collected and all storm water up to the 10-year event will be treated and infiltrated on the site. Overflow from larger storms, and runoff from some non-vehicular surfaces will be discharged at six pipe outfalls into the Willamette River.

Best Management Practices (BMPs)

The City proposes to minimize impacts to ESA-listed species by implementing an erosion control plan, suspended sediment control plan, and an in-water work isolation plan. The city proposes the following additional BMPs to avoid and minimize impacts to ESA-listed species and associated habitat:

Project Design Measures.

- Riparian shoreline native plantings.
- Removal of existing debris and pilings.
- The boat Ramp float will be placed 100 feet offshore to avoid shoreline smolt migration corridors.

- Float will incorporate light-transmitting materials.
- Stormwater-treatment design storm will be infiltrated to avoid pollutant discharges.
- Project will incorporate permeable pavement, reducing stormwater effects.

Erosion and Pollution Control Measures.

- The contractor will adhere to permit conditions of NPDES 1200-C permit for the discharge of stormwater from construction sites. This permit is issued by DEQ under the authority delegated by the U.S. Environmental Protection Agency.
- An erosion and sediment control plan (ESCP) will be developed and implemented, in accordance with the conditions of the NPDES 1200-C permit. The ESCP may include, but is not limited to, the use of turbidity curtains, silt fences, temporary and permanent ground covers, and siltation ponds to protect water quality, with particular attention to safeguarding adjacent waterways.
- Erosion and sediment control measures will be implemented prior to ground disturbing activities, and shall remain in place until the project area is stabilized.
- Turbidity curtains will be installed for removal of the existing boat ramp and construction of the new boat ramp.
- A floating surface boom will be installed during piling removal.
- A sediment fence will be installed for riprap removal and installation of bank treatment.
- Coir matting and bio filter bags will be installed along disturbed areas of the bank.
- Turbidity increases will be limited to 10% above background reading, as measured 100 feet downstream from the project.
- A pollution control plan will be developed and implemented, which includes limitations on chemical and fuel storage areas, as well as spill containment plans. Spill containment equipment must be stored on site, and the contractor must have the crew trained in its proper use. This plan shall satisfy all pertinent requirements of Federal, State, and Local laws and regulations.
- Construction equipment operating within 30 feet of any stream will contain appropriate spill containment measures, such as diapers.
- All construction equipment will be inspected and cleaned prior to operating within 150 feet of any stream. All construction equipment will be checked for fluid leaks and external oil, grease, dirt and caked mud will be removed. Untreated wash and rinse water will not be discharged into any stream. Temporary impoundments will be established to catch water from equipment cleansing, at least 150 feet from any stream and in a location that does not contribute untreated wastewater to any flowing stream.
- Non-work shift storage of equipment and vehicles, other than track-mounted vehicles and cranes, will occur at least 150 feet away from any stream, or within a fully contained area to prevent any contaminated runoff.
- If feasible, storage areas for fuels and other potentially hazardous materials and areas for refueling and servicing construction equipment and vehicles will be at least 150 feet from any stream. If staging areas are within 150 feet of any stream, full containment of potential contaminants will be provided to prevent soil and water contamination, as appropriate.
- Adequate containment measures will be implemented to prevent pollutants or construction and demolition materials from entering any stream.

- Hazardous material containment booms and spill containment booms will be maintained on site to facilitate the cleanup of hazardous material spills.
- If flooding of the work area is expected to occur within 24 hours, areas used for staging, access roads, or storage and remove materials, equipment, and fuel will be evacuated.

Habitat and Fish Impact Avoidance and Minimization Measures.

- For the purpose of this project, the OHW is defined as the area at or below the elevation of 18.4 feet.
- Construction below OHW will occur during the ODFW in-water work period, which extends from July 1 to October 31 in the Willamette River. The in-water work period for Kellogg Creek is July 1 to September 30. There is no in-water work proposed in Johnson Creek. An extension of the in-water work period requires approval by the engineer, ODFW, NMFS, DSL, and the Corps. Passage for adult and juvenile fish will be maintained for the duration of the project.
- Impacts will be minimized through the use of appropriate construction techniques including work area isolation, turbidity monitoring, and other environmental protection controls. Where feasible, work will be conducted from upland areas to limit temporary impacts to waterways.
- Isolation barriers or other engineer-approved containment method will be installed to isolate in-water work areas from the aquatic environment. Installation and removal will be restricted to the ODFW in-water work window.
- The engineer will be notified at least ten working days prior to completion of containment/isolation device construction. A qualified biologist will be provided access to the containment/isolation devices to remove fish trapped within the devices before beginning work within the containment/isolation devices. Entrapped fish will be removed in accordance with NMFS guidelines (NMFS 2011).
- Contaminated or sediment-laden water from the project or water contained within a containment/isolation device will not be discharged directly into any waterway until satisfactorily treated (*e.g.*, by bioswale, filter, settlement pond, pumping to a vegetated upland location, bio-bag or dirt-bag).
- Turbidity during construction will be monitored per DEQ section 401 permit requirements.
- Water pump intakes will be screened according to the NMFS Juvenile Fish Screen Criteria for Pump Intakes (NMFS 2008a).
- Alteration or disturbance of stream banks and existing riparian vegetation will be minimized. All areas temporarily disturbed by construction activities will be replanted.
- The following conservation measures where steel piles are driven (for construction of the boat ramp) within the wetted channel will be implemented:
    - o When using impact drivers to install a piling, use the smallest driver and the minimum force necessary. Use a drop hammer or hydraulic impact hammer when feasible and set the drop height to the minimum necessary to drive the piling.
    - o If currents are 1.7 miles per hour or less, surround the piling being driven with an unconfined bubble curtain for the full depth of the water column.

- If currents are greater than 1.7 miles per hour, surround the piling being driven with a confined bubble curtain (*e.g.*, a bubble ring surrounded by a fabric or metal sleeve) for the full depth of the water column.
- An additional bubble ring will be added for each 35 feet of water depth.

- The following conservation measures will be implemented when removing existing timber piles:
  - All timber piles to be removed in inundated areas will first be surrounded by a floating surface boom to prevent discharge of debris.
  - All pile removal equipment will be kept out of the water, and work will be performed during the July to October in-water work window.
  - Existing piles will be extracted whenever possible, rather than broken or excavated.
  - If a pile breaks during removal, cut it off flush with the river bottom.
  - Removed piles will be placed in a containment basin on a barge to prevent discharge of debris or adhering sediment.
  - All existing timber piles and adhering sediment will be disposed of at the approved METRO disposal facility.

Mitigation

The City states that the extensive shoreline treatment and planting is considered to be "self-mitigating" and will provide a significant net benefit of riparian and aquatic habitat by providing stabilization as well as shading, cover, and increased nutrient and insect prey input for smolts as well as resident fish. No additional mitigation is being proposed for this project. No wetland impacts are proposed. Aquatic habitat improvement has been incorporated into the project as part of the park redevelopment, and thus no separate compensatory mitigation plan has been proposed for waterway impacts.

1.4 Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02).

For this consultation, the action area includes a portion of Willamette River at river mile (RM) 18.4 known as Milwaukie Bay, and its banks between Johnson and Kellogg creeks, and a small parcel south of Kellogg Creek (Figures 1-2, above). The site consists of several parcels totaling approximately 6.5 acres that form the Milwaukie Riverfront Park owned by the City. The project site is in Milwaukie, Oregon (T01S, R01E, Sec 38, W.M.). The project is in the Lower Willamette River sub-basin and included the mouths of Johnson and Kelly creeks (HUCs 170900120104 and 17090012010) (Figures 1-2, above). The action area includes:

- The streambeds, streambanks, riparian areas, and associated wetlands and upland areas within the proposed project area.
- All such habitat 1,000 feet downstream from the project area (or to the limit of visible turbidity increases resulting from the construction activities).

The action area for this consultation also extends to areas where listed species may encounter impacts from pile driving (*i.e.*, sound pressure waves). Salmon and steelhead are relatively sensitive to sound generated by pile driving. NMFS defined the action area based on effects to salmon and steelhead from pile driving-generated sound. NMFS determined the extent of the action area, by using the NMFS Pile Driving Calculation spreadsheet. NMFS has calculated the distance of onset of injury within 338 feet for salmon and steelhead smolts and 368 feet for salmon and steelhead adults of pile driving activity. Behavioral effects, such as foraging disruption and delayed migration, could occur within 7,067 feet of the pile driving activity. However, the river bends at the project area, thus limiting sound transmission from reaching this distance and is likely closer to 2,970 feet upstream and 4,780 feet downstream from the proposed boat dock.

Thus, the total action area for all effects extends from 2,980 feet upstream and 4,780 feet downstream of the project area (Figure 3). The action area is occupied by LCR Chinook salmon, UWR spring-run Chinook salmon, LCR coho salmon, LCR steelhead, and UWR steelhead and is designated as critical habitat for these species. The action area is EFH for Chinook and coho salmon.

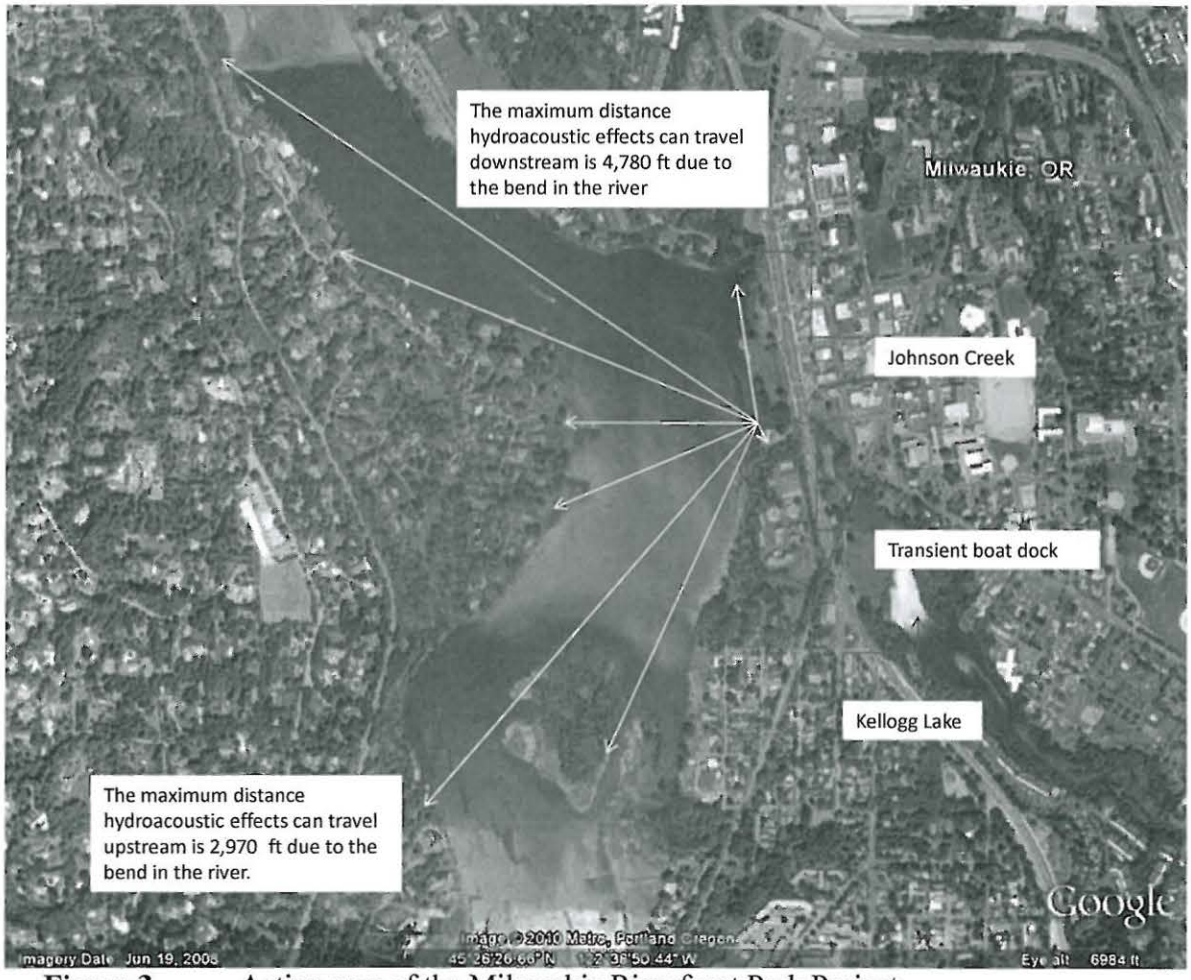

Figure 3. Action area of the Milwaukie Riverfront Park Project.

2. ENDANGERED SPECIES ACT: BIOLOGICAL AND CONFERENCE OPINION AND INCIDENTAL TAKE STATEMENT

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with the United States Fish and Wildlife Service, NMFS, or both, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitat. Section 7(b)(3) requires that at the conclusion of consultation, the Service provide an opinion stating how the agencies' actions will affect listed species and their critical habitat. If incidental take is expected, section 7(b)(4) requires the consulting agency to provide an incidental take statement (ITS) that specifies the impact of any incidental taking and includes reasonable and prudent measures to minimize such impacts.

2.1 Approach to the Analysis

Section 7(a)(2) of the ESA requires Federal agencies, in consultation with NMFS, to insure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. The jeopardy analysis considers both survival and recovery of the species. The adverse modification analysis considers the impacts on the conservation value of designated critical habitat.

"To jeopardize the continued existence of a listed species" means to engage in an action that would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02).

This opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat.[2]

We will use the following approach to determine whether the proposed action is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- Identify the rangewide status of the species and critical habitat likely to be adversely affected by the proposed action.
- Describe the environmental baseline in the action area.
- Analyze the effects of the proposed action on both species and their habitat.
- Describe any cumulative effects in the action area.
- Integrate and synthesize the above factors to assess the risk that the proposed action poses to species and critical habitat.
- Reach jeopardy and adverse modification conclusions.
- If necessary, define a reasonable and prudent alternative to the proposed action.

[2] Memorandum from William T. Hogarth to Regional Administrators, Office of Protected Resources, NMFS (Application of the "Destruction or Adverse Modification" Standard Under Section 7(a)(2) of the Endangered Species Act) (November 7, 2005).

2.2 Rangewide Status of the Species and Critical Habitat

One factor affecting the status of salmonid fishes and aquatic habitat at large is climate change. Climate change is likely to play an increasingly important role in determining the abundance of ESA-listed species, and the conservation value of designated critical habitats, in the Pacific Northwest. These changes will not be spatially homogeneous across the Pacific Northwest. Areas with elevations high enough to maintain temperatures well below freezing for most of the winter and early-spring will be less affected. Low-elevation areas are likely to be more affected. During the last century, average regional air temperatures increased by 1.5°F, and increased up to 4°F in some areas. Warming is likely to continue during the next century as average temperatures increase another 3 to 10°F. Overall, about one-third of the current cold-water fish habitat in the Pacific Northwest is likely to exceed key water temperature thresholds by the end of this century (USGCRP 2009).

Precipitation trends during the next century are less certain than for temperature but more precipitation is likely to occur during October through March and less during summer months, and more of the winter precipitation is likely to fall as rain rather than snow (ISAB 2007; USGCRP 2009). Where snow occurs, a warmer climate will cause earlier runoff so stream flows in late spring, summer, and fall will be lower and water temperatures will be warmer (ISAB 2007; USGCRP 2009).

Higher winter stream flows increase the risk that winter floods in sensitive watersheds will damage spawning redds and wash away incubating eggs. Earlier peak stream flows will also flush some young salmon and steelhead from rivers to estuaries before they are physically mature, increasing stress and the risk of predation. Lower stream flows and warmer water temperatures during summer will degrade summer rearing conditions, in part by increasing the prevalence and virulence of fish diseases and parasites (USGCRP 2009). Other adverse effects are likely to include altered migration patterns, accelerated embryo development, premature emergence of fry, variation in quality and quantity of tributary rearing habitat, and increased competition and predation risk from warm-water, non-native species (ISAB 2007).

The earth's oceans are also warming, with considerable interannual and inter-decadal variability superimposed on the longer-term trend (Bindoff *et al.* 2007). Historically, warm periods in the coastal Pacific Ocean have coincided with relatively low abundances of salmon and steelhead, while cooler ocean periods have coincided with relatively high abundances (Scheuerell and Williams 2005; USGCRP 2009; Zabel *et al.* 2006). Ocean conditions adverse to salmon and steelhead may be more likely under a warming climate (Zabel *et al.* 2006).

2.2.1 Status of Listed Species

For Pacific salmon, steelhead, and other relevant species NMFS commonly uses four parameters to assess the viability of the populations that, together, constitute the species: spatial structure, diversity, abundance, and productivity (McElhany *et al.* 2000). These "viable salmonid population" (VSP) criteria therefore encompass the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. When these parameters are collectively at appropriate levels, they maintain a population's capacity to adapt to various environmental

conditions and allow it to sustain itself in the natural environment. These attributes are influenced by survival, behavior, and experiences throughout a species' entire life cycle, and these characteristics, in turn, are influenced by habitat and other environmental conditions.

"Spatial structure" refers both to the spatial distributions of individuals in the population and the processes that generate that distribution. A population's spatial structure depends fundamentally on habitat quality and spatial configuration and the dynamics and dispersal characteristics of individuals in the population.

"Diversity" refers to the distribution of traits within and among populations. These range in scale from DNA sequence variation at single genes to complex life history traits (McElhany *et al.* 2000).

"Abundance" generally refers to the number of naturally-produced adults (*i.e.*, the progeny of naturally-spawning parents) in the natural environment (*e.g.*, on spawning grounds).

"Productivity," as applied to viability factors, refers to the entire life cycle; *i.e.*, the number of naturally-spawning adults produced per parent. When progeny replace or exceed the number of parents, a population is stable or increasing. When progeny fail to replace the number of parents, the population is declining. McElhany *et al.* (2000) use the terms "population growth rate" and "productivity" interchangeably when referring to production over the entire life cycle. They also refer to "trend in abundance," which is the manifestation of long-term population growth rate.

For species with multiple populations, once the biological status of a species' populations has been determined, NMFS assesses the status of the entire species using criteria for groups of populations, as described in recovery plans and guidance documents from technical recovery teams. Considerations for species viability include having multiple populations that are viable, ensuring that populations with unique life histories and phenotypes are viable, and that some viable populations are both widespread to avoid concurrent extinctions from mass catastrophes and spatially close to allow functioning as metapopulations (McElhany *et al.* 2000).

The summaries that follow describe the status of the ESA-listed species, and their designated critical habitats, that occur within the geographic area of this proposed action and are considered in this opinion. More detailed information on the status and trends of these listed resources, and their biology and ecology, are in the listing regulations and critical habitat designations published in the Federal Register (Table 2).

Table 2. Listing status, status of critical habitat designations and protective regulations, and relevant Federal Register (FR) decision notices for ESA-listed species considered in this opinion. Listing status: 'T' means listed as threatened under the ESA; 'E' means listed as endangered.

Species	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon *(Oncorhynchus tshawytscha)*			
Lower Columbia River	T 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Willamette River spring-run	T 6/28/05; 70 FR 37160	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Coho salmon *(O. kisutch)*			
Lower Columbia River	T 6/28/05; 70 FR 37160	P 1/14/13; 78 FR 2726	6/28/05; 70 FR 37160
Steelhead *(O. mykiss)*			
Lower Columbia River	T 1/5/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160
Upper Willamette River	T 1/5/06; 71 FR 834	9/02/05; 70 FR 52630	6/28/05; 70 FR 37160

Table 3. Recovery planning domains identified by NMFS and their ESA-listed salmon and steelhead species.

Recovery Domain	Species
Willamette-Lower Columbia (WLC)	LCR Chinook salmon UWR Chinook salmon CR chum salmon LCR coho salmon LCR steelhead UWR steelhead

For each recovery domain, a technical review team (TRT) appointed by NMFS has developed, or is developing, criteria necessary to identify independent populations within each species, recommended viability criteria for those species, and descriptions of factors that limit species survival. Viability criteria are prescriptions of the biological conditions for populations, biogeographic strata, and evolutionarily significant units (ESU) that, if met, would indicate that an ESU will have a negligible risk of extinction over a 100-year time frame.[3]

Although the TRTs operated from the common set of biological principals described in McElhany *et al.* (2000), they worked semi-independently from each other and developed criteria suitable to the species and conditions found in their specific recovery domains. All of the criteria have qualitative as well as quantitative aspects. The diversity of salmonid species and

[3] For Pacific salmon, NMFS uses its 1991 ESU policy, that states that a population or group of populations will be considered a Distinct Population Segment if it is an Evolutionarily Significant Unit. An ESU represents a distinct population segment of Pacific salmon under the Endangered Species Act that 1) is substantially reproductively isolated from conspecific populations and 2) represents an important component of the evolutionary legacy of the species. The species *O. mykiss* is under the joint jurisdiction of NMFS and the Fish and Wildlife Service, so in making its listing January, 2006 determinations NMFS elected to use the 1996 joint FWS-NMFS DPS policy for this species.

populations makes it impossible to set narrow quantitative guidelines that will fit all populations in all situations. For this and other reasons, viability criteria vary among species, mainly in the number and type of metrics and the scales at which the metrics apply (*i.e.*, population, major population group (MPG), or ESU) (Busch *et al.* 2008).

The A&P score considers the TRT's estimate of a populations' minimum threshold population, natural spawning abundance and the productivity of the population. Productivity over the entire life cycle and factors that affect population growth rate provide information on how well a population is "performing" in the habitats it occupies during the life cycle. Estimates of population growth rate that indicate a population is consistently failing to replace itself are an indicator of increased extinction risk. The four metrics (abundance, productivity, spatial structure, and diversity) are not independent of one another and their relationship to sustainability depends on a variety of interdependent ecological processes (Wainwright *et al.* 2008).

Integrated SS/D risk combines risk for likely, future environmental conditions, and diversity (Ford 2011; McElhany *et al.* 2007; McElhany *et al.* 2000). Diversity factors include:

- Life history traits: Distribution of major life history strategies within a population, variability of traits, mean value of traits, and loss of traits.
- Effective population size: One of the indirect measures of diversity is effective population size. A population at chronic low abundance or experiencing even a single episode of low abundance is at a higher extinction risk because of loss of genetic variability, inbreeding and the expression of inbreeding depression, or the effects of mutation accumulation.
- Impact of hatchery fish: Interbreeding of wild populations and hatchery origin fish are a significant risk factor to the diversity of wild populations if the proportion of hatchery fish in the spawning population is high and their genetic similarity to the wild population is low.
- Anthropogenic mortality: The susceptibility to mortality from harvest or habitat alterations will differ depending on size, age, run timing, disease resistance or other traits.
- Habitat diversity: Habitat characteristics have clear selective effects on populations, and changes in habitat characteristics are likely to eventually lead to genetic changes through selection for locally adapted traits. In assessing risk associated with altered habitat diversity, historical diversity is used as a reference point.

Overall viability risk scores (high to low) and population persistence scores are based on combined ratings for the abundance and productivity (A&P) and spatial structure and diversity[4] (SS/D) metrics (Table 4) (McElhany *et al.* 2006). Persistence probabilities, which are provided here for Lower Columbia River salmon and steelhead, are the complement of a population's extinction risk (*i.e.*, persistence probability = 1 – extinction risk)(NMFS 2012b). The IC-TRT has provided viability criteria that are based on McElhany (2000) and McElhany *et al.* (2006), as well as the results of previous applications in other TRTs and a review of specific information available relative to listed IC ESU populations (Ford 2011; IC-TRT 2007).

[4] The WLC-TRT provided ratings for diversity and spatial structure risks. The IC-TRT provided spatial structure and diversity ratings combined as an integrated SS/D risk.

Table 4. Population persistence categories from McElhany *et al.* (2006). A low or negligible risk of extinction is considered "viable" (Ford 2011). Population persistence categories correspond to: 4 = very low (VL), 3 = low (L), 2 = moderate (M), 1 = high (H), and 0 = very high (VH) in Oregon populations, which corresponds to "extirpated or nearly so" (E) in Washington populations (Ford 2011).

Population Persistence Category	Probability of population persistence in 100 years	Probability of population extinction in 100 years	Description
0	0-40%	60-100%	Either extinct or "high" risk of extinction
1	40-75%	25-60%	Relatively "high" risk of extinction in 100 years
2	75-95%	5-25%	"Moderate" risk of extinction in 100 years
3	95-99%	1-5%	"Low" (negligible) risk of extinction in 100 years
4	>99%	<1%	"Very low" risk of extinction in 100 years

The boundaries of each population were defined using a combination of genetic information, geography, life-history traits, morphological traits, and population dynamics that indicate the extent of reproductive isolation among spawning groups. To date, the TRTs have divided the 19 species of salmon and steelhead considered in this opinion into a total of 304 populations, although the population structure of PS steelhead has yet to be resolved. The overall viability of a species is a function of the VSP attributes of its constituent populations. Until a viability analysis of a species is completed, the VSP guidelines recommend that all populations should be managed to retain the potential to achieve viable status to ensure a rapid start along the road to recovery, and that no significant parts of the species are lost before a full recovery plan is implemented (McElhany *et al.* 2000).

The size and distribution of the populations considered in this opinion generally have declined over the last few decades due to natural phenomena and human activity, including climate change (as described in Section 2.2), the operation of hydropower systems, over-harvest, effects of hatcheries, and habitat degradation. Enlarged populations of terns, seals, California sea lions, and other aquatic predators in the Pacific Northwest may be limiting the productivity of some Pacific salmon and steelhead populations (Ford 2011).

Viability status or probability or population persistence is described below for each of the populations considered in this opinion.

Willamette-Lower Columbia Recovery Domain. Species in the Willamette-Lower Columbia (WLC) recovery domain include LCR Chinook salmon, UWR Chinook salmon, CR chum salmon, LCR coho salmon, LCR steelhead, UWR steelhead, southern DPS green sturgeon, and eulachon. The WLC-TRT has identified 107 demographically independent populations of Pacific salmon and steelhead (Table 5). These populations were further aggregated into strata, groupings above the population level that are connected by some degree of migration, based on

ecological subregions. All 107 populations use parts of the mainstem of the Columbia River and the Columbia River estuary for migration, rearing, and smoltification.

Table 5. Populations in the WLC recovery domain. Combined extinction risks for salmon and steelhead based on an analysis of Oregon populations.

Species	Populations
LCR Chinook salmon	32
UWR Chinook salmon	7
CR chum salmon	17
LCR coho salmon	24
LCR steelhead	23
UWR steelhead	4

Status of LCR Chinook Salmon

Spatial Structure and Diversity. This species includes all naturally-spawned populations of Chinook salmon in the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River; the Willamette River to Willamette Falls, Oregon, exclusive of spring-run Chinook salmon in the Clackamas River; and progeny of seventeen artificial propagation programs.[5] LCR Chinook populations exhibit three different life history types base on return timing and other features: fall-run (a.k.a. "tules"), late-fall-run (a.k.a. "brights"), and spring-run. The WLC-TRT identified 32 historical populations of LCR Chinook salmon— seven in the coastal subregion, six in the Columbia Gorge, and 19 in the Cascade Range (Table 6). Spatial structure has been substantially reduced in several populations. Low abundance, past broodstock transfers and other legacy hatchery effects, and ongoing hatchery straying may have reduced genetic diversity within and among LCR Chinook salmon populations. Hatchery-origin fish spawning naturally may also have reduced population productivity (Lower Columbia Fish Recovery Board 2010; ODFW 2010). Out of the 32 populations that make up this ESU, only the two late-fall runs—the North Fork Lewis and Sandy—are considered viable. Most populations (26 out of 32) have a very low probability of persistence over the next 100 years (and some are extirpated or nearly so) (Ford 2011; Lower Columbia Fish Recovery Board 2010; ODFW 2010). Five of the six strata fall significantly short of the WLC-TRT criteria for viability; one stratum, Cascade late-fall, meets the WLC TRT criteria (NMFS 2012b).

[5] In 2009, the Elochoman tule fall Chinook salmon program was discontinued and four new fall Chinook salmon programs have been initiated. In 2011, NMFS recommended removing the Elochoman program from the ESU and adding the new programs to the ESU (NMFS 2011a).

Table 6. LCR Chinook salmon strata, ecological subregions, run timing, populations, and scores for the key elements (A&P, spatial structure, and diversity) used to determine overall net persistence probability of the population (NMFS 2012b). Persistence probability ratings range from very low (VL), low (L), moderate (M), high (H), to very high (VH).

Stratum		Spawning Population (Watershed)	A&P	Spatial Structure	Diversity	Overall Persistence Probability
Ecological Subregion	Run Timing					
Cascade Range	Spring	Upper Cowlitz River (WA)	VL	L	M	VL
		Cispus River (WA)	VL	L	M	VL
		Tilton River (WA)	VL	VL	VL	VL
		Toutle River (WA)	VL	H	L	VL
		Kalama River (WA)	VL	H	L	VL
		North Fork Lewis (WA)	VL	L	M	VL
		Sandy River (OR)	M	M	M	M
	Fall	Lower Cowlitz River (WA)	VL	H	M	VL
		Upper Cowlitz River (WA)	VL	VL	M	VL
		Toutle River (WA)	VL	H	M	VL
		Coweeman River (WA)	L	H	H	L
		Kalama River (WA)	VL	H	M	VL
		Lewis River (WA)	VL	H	H	VL
		Salmon Creek (WA)	VL	H	M	VL
		Clackamas River (OR)	VL	VH	L	VL
		Sandy River (OR)	VL	M	L	VL
		Washougal River (WA)	VL	H	M	VL
	Late Fall	North Fork Lewis (WA)	VH	H	H	VH
		Sandy River (OR)	VH	M	M	VH
Columbia Gorge	Spring	White Salmon River (WA)	VL	VL	VL	VL
		Hood River (OR)	VL	VH	VL	VL
	Fall	Lower Gorge (WA & OR)	VL	M	L	VL
		Upper Gorge (WA & OR)	VL	M	L	VL
		White Salmon River (WA)	VL	L	L	VL
		Hood River (OR)	VL	VH	L	VL
Coast Range	Fall	Young Bay (OR)	L	VH	L	L
		Grays/Chinook rivers (WA)	VL	H	VL	VL
		Big Creek (OR)	VL	H	L	VL
		Elochoman/Skamokawa creeks (WA)	VL	H	L	VL
		Clatskanie River (OR)	VL	VH	L	VL
		Mill, Germany, and Abernathy creeks (WA)	VL	H	L	VL
		Scappoose River (OR)	L	H	L	L

Abundance and Productivity. A&P ratings for LCR Chinook salmon populations are currently "low" to "very low" for most populations, except for spring Chinook salmon in the Sandy River, which are "moderate" and late-fall Chinook salmon in North Fork Lewis River and Sandy River, which are "very high" (NMFS 2012b). Low abundance of natural-origin spawners (100 fish or fewer) has increased genetic and demographic risks. Other LCR Chinook salmon populations have higher total abundance, but several of these also have high proportions of

hatchery-origin spawners. Particularly for tule fall Chinook salmon populations, poor data quality prevents precise quantification of population abundance and productivity; data quality has been poor because of inadequate spawning surveys and the presence of unmarked hatchery-origin spawners (Ford 2011).

Limiting Factors include (NMFS 2012b; NOAA Fisheries 2011):

- Degraded estuarine and near-shore marine habitat resulting from cumulative impacts of land use and flow management by the Columbia River hydropower system Degraded freshwater habitat: Floodplain connectivity and function, channel structure and complexity, riparian areas, stream substrate, stream flow, and water quality have been degraded as a result of cumulative impacts of agriculture, forestry, and development.
- Reduced access to spawning and rearing habitat mainly as a result of tributary hydropower projects
- Hatchery-related effects
- Harvest-related effects on fall Chinook salmon
- An altered flow regime and Columbia River plume has altered the temperature regime and estuarine food web, and has reduced ocean productivity
- Reduced access to off-channel rearing habitat in the lower Columbia River
- Reduced productivity resulting from sediment and nutrient-related changes in the estuary
- Juvenile fish strandings that result from ship wakes
- Contaminants affecting fish health and reproduction

Status of UWR Chinook Salmon

Spatial Structure and Diversity. This species includes all naturally spawned populations of spring-run Chinook salmon in the Clackamas River; in the Willamette River and its tributaries above Willamette Falls, Oregon; and progeny of seven artificial propagation programs. All seven historical populations of UWR Chinook salmon identified by the WLC-TRT occur within the action area and are contained within a single ecological subregion, the western Cascade Range (Table 7). The McKenzie River population currently characterized as at a "low" risk of extinction and the Clackamas population has a "moderate" risk. (Ford 2011). Consideration of data collected since the last status review in 2005 has confirmed the high fraction of hatchery origin fish in all of the populations of this species (even the Clackamas and McKenzie rivers have hatchery fractions above WLC-TRT viability thresholds). All of the UWR Chinook salmon populations have "moderate" or "high" risk ratings for diversity. Clackamas River Chinook salmon have a "low" risk rating for spatial structure (Ford 2011).

Table 7. Scores for the key elements (A&P, diversity, and spatial structure) used to determine current overall viability risk for UWR Chinook salmon (ODFW and NMFS 2011). All populations are in the Western Cascade Range ecological subregion. Risk ratings range from very low (VL), low (L), moderate (M), high (H), to very high (VH).

Population (Watershed)	A&P	Diversity	Spatial Structure	Overall Extinction Risk
Clackamas River	M	M	L	M
Molalla River	VH	H	H	VH
North Santiam River	VH	H	H	VH
South Santiam River	VH	M	M	VH
Calapooia River	VH	H	VH	VH
McKenzie River	VL	M	M	L
Middle Fork Willamette River	VH	H	H	VH

Abundance and Productivity. The Clackamas and McKenzie river populations currently have the best risk ratings for A&P, spatial structure, and diversity. Data collected since the BRT status update in 2005 highlighted the substantial risks associated with pre-spawning mortality. Although recovery plans are targeting key limiting factors for future actions, there have been no significant on-the-ground-actions since the last status review to resolve the lack of access to historical habitat above dams nor have there been substantial actions removing hatchery fish from the spawning grounds. Overall, the new information does not indicate a change in the biological risk category since the last status review (Ford 2011).

Limiting Factors include (NOAA Fisheries 2011; ODFW and NMFS 2011):

- Significantly reduced access to spawning and rearing habitat because of tributary dams
- Degraded freshwater habitat, especially floodplain connectivity and function, channel structure and complexity, and riparian areas and large wood recruitment as a result of cumulative impacts of agriculture, forestry, and development
- Degraded water quality and altered temperature as a result of both tributary dams and the cumulative impacts of agriculture, forestry, and urban development
- Hatchery-related effects
- Anthropogenic introductions of non-native species and out-of-ESU races of salmon or steelhead have increased predation on, and competition with, native UWR Chinook salmon
- Ocean harvest rates of approximately 30%

Status of LCR Coho Salmon

Spatial Structure and Diversity. This species includes all naturally-spawned populations of coho salmon in the Columbia River and its tributaries in Washington and Oregon, from the mouth of the Columbia up to and including the Big White Salmon and Hood rivers; in the Willamette River to Willamette Falls, Oregon; and progeny of 25 artificial propagation

programs.[6] Spatial diversity is rated "moderate" to "very high" for all the populations, except the North Fork Lewis River, which has a "low" rating for spatial structure.

Three status evaluations of LCR coho salmon status, all based on WLC-TRT criteria, have been conducted since the last NMFS status review in 2005 (McElhany *et al.* 2007; NMFS 2012b). Out of the 24 populations that make up this ESU (Table 8), 21 are considered to have a very low probability of persisting for the next 100 years, and none is considered viable (Ford 2011; Lower Columbia Fish Recovery Board 2010; NMFS 2012b; ODFW 2010).

Table 8. LCR coho salmon strata, ecological subregions, run timing, populations, and scores for the key elements (A&P, spatial structure, and diversity) used to determine current overall net persistence probability of the population (NMFS 2012b). Persistence probability ratings range from very low (VL), low (L), moderate (M), high (H), to very high (VH).

Ecological Subregions	Population (Watershed)	A&P	Spatial Structure	Diversity	Overall Persistence Probability
Coast Range	Young's Bay (OR)	VL	VH	VL	VL
	Grays/Chinook rivers (WA)	VL	H	VL	VL
	Big Creek (OR)	VL	H	L	VL
	Elochoman/Skamokawa creeks (WA)	VL	H	VL	VL
	Clatskanie River (OR)	L	VH	M	L
	Mill, Germany, and Abernathy creeks (WA)	VL	H	L	VL
	Scappoose River (OR)	M	H	M	M
Cascade Range	Lower Cowlitz River (WA)	VL	M	M	VL
	Upper Cowlitz River (WA)	VL	M	L	VL
	Cispus River (WA)	VL	M	L	VL
	Tilton River (WA)	VL	M	L	VL
	South Fork Toutle River (WA)	VL	H	M	VL
	North Fork Toutle River (WA)	VL	M	L	VL
	Coweeman River (WA)	VL	H	M	VL
	Kalama River (WA)	VL	H	L	VL
	North Fork Lewis River (WA)	VL	L	L	VL
	East Fork Lewis River (WA)	VL	H	M	VL
	Salmon Creek (WA)	VL	M	VL	VL
	Clackamas River (OR)	M	VH	H	M
	Sandy River (OR)	VL	H	M	VL
	Washougal River (WA)	VL	H	L	VL
Columbia Gorge	Lower Gorge Tributaries (WA & OR)	VL	M	VL	VL
	Upper Gorge/White Salmon (WA)	VL	M	VL	VL
	Upper Gorge Tributaries/Hood (OR)	VL	VH	L	VL

[6] The Elochoman Hatchery Type-S and Type-N coho salmon programs were eliminated in 2008. The last adults from these two programs returned to the Elochoman in 2010. NMFS has recommended that these two programs be removed from the ESU (NMFS 2011a).

Abundance and Productivity. In Oregon, the Clatskanie Creek and Clackamas River populations have "low" and "moderate" persistence probability ratings for A&P, while the rest are rated "very low." All of the Washington populations have "very low" A&P ratings. The persistence probability for diversity is "high" in the Clackamas population, "moderate" in the Clatskanie, Scappoose, Lower Cowlitz, South Fork Toutle, Coweeman, East Fork Lewis, and Sandy populations, and "low" to "very low" in the rest (NMFS 2012b). Uncertainty is high because of a lack of adult spawner surveys. Smolt traps indicate some natural production in Washington populations, though given the high fraction of hatchery origin spawners suspected to occur in these populations it is not clear that any are self-sustaining. Overall, the new information considered does not indicate a change in the biological risk category since the last status review (Ford 2011; NMFS 2011a; NMFS 2012b).

Limiting Factors include (NMFS 2012b; NOAA Fisheries 2011):

- Degraded estuarine and near-shore marine habitat resulting from cumulative impacts of land use and flow management by the Columbia River hydropower system
- Fish passage barriers that limit access to spawning and rearing habitats
- Degraded freshwater habitat: Floodplain connectivity and function, channel structure and complexity, riparian areas and large wood supply, stream substrate, stream flow, and water quality have been degraded as a result of cumulative impacts of agriculture, forestry, and development
- Hatchery-related effects
- Harvest-related effects
- An altered flow regime and Columbia River plume has altered the temperature regime and estuarine food web, and has reduced ocean productivity
- Reduced access to off-channel rearing habitat in the lower Columbia River
- Reduced productivity resulting from sediment and nutrient-related changes in the estuary
- Juvenile fish strandings that result from ship wakes
- Contaminants affecting fish health and reproduction

Status of LCR Steelhead

Spatial Structure and Diversity. Four strata and 23 historical populations of LCR steelhead occur within the DPS: 17 winter-run populations and six summer-run populations, within the Cascade and Gorge ecological subregions (Table 9).[7] The DPS also includes the progeny of ten artificial propagation programs.[8] Summer steelhead return to freshwater long before spawning. Winter steelhead, in contrast, return from the ocean much closer to maturity and spawn within a few weeks. Summer steelhead spawning areas in the Lower Columbia River

[7] The White Salmon and Little White Salmon steelhead populations are part of the Middle Columbia steelhead DPS and are addressed in a separate species-level recovery plan, the Middle Columbia River Steelhead Distinct Population Segment ESA Recovery Plan (NMFS 2009).

[8] In 2007, the release of Cowlitz Hatchery winter steelhead into the Tilton River was discontinued; in 2009, the Hood River winter steelhead program was discontinued; and in 2010, the release of hatchery winter steelhead into the Upper Cowlitz and Cispus rivers was discontinued. In 2011, NMFS recommended removing these programs from the DPS. A Lewis River winter steelhead program was initiated in 2009, and in 2011, NMFS proposed that it be included in the DPS (NMFS 2011a).

are found above waterfalls and other features that create seasonal barriers to migration. Where no temporal barriers exist, the winter-run life history dominates.

Table 9. LCR steelhead strata, ecological subregions, run timing, populations, and scores for the key elements (A&P, spatial structure, and diversity) used to determine current overall net persistence probability of the population (NMFS 2012b). Persistence probability ratings range from very low (VL), low (L), moderate (M), high (H), to very high (VH).

Stratum		Population (Watershed)	A&P	Spatial Structure	Diversity	Overall Persistence Probability
Ecological Subregion	Run Timing					
Cascade Range	Summer	Kalama River (WA)	H	VH	M	M
		North Fork Lewis River (WA)	VL	VL	VL	VL
		East Fork Lewis River (WA)	VL	VH	M	VL
		Washougal River (WA)	M	VH	M	M
	Winter	Lower Cowlitz River (WA)	L	M	M	L
		Upper Cowlitz River (WA)	VL	M	M	VL
		Cispus River (WA)	VL	M	M	VL
		Tilton river (WA)	VL	M	M	VL
		South Fork Toutle River (WA)	M	VH	H	M
		North Fork Toutle River (WA)	VL	H	H	VL
		Coweeman River (WA)	L	VH	VH	L
		Kalama River (WA)	L	VH	H	L
		North Fork Lewis River (WA)	VL	M	M	VL
		East Fork Lewis River (WA)	M	VH	M	M
		Salmon Creek (WA)	VL	H	M	VL
		Clackamas River (OR)	M	VH	M	M
		Sandy River (OR)	L	M	M	L
		Washougal River (WA)	L	VH	M	L
Columbia Gorge	Summer	Wind River (WA)	VH	VH	H	H
		Hood River (OR)	VL	VH	L	VL
	Winter	Lower Gorge (WA & OR)	L	VH	M	L
		Upper Gorge (OR & WA)	L	M	M	L
		Hood River (OR)	M	VH	M	M

It is likely that genetic and life history diversity has been reduced as a result of pervasive hatchery effects and population bottlenecks. Spatial structure remains relatively high for most populations Out of the 23 populations, 16 are considered to have a "low" or "very low" probability of persisting over the next 100 years, and six populations have a "moderate" probability of persistence (Ford 2011; Lower Columbia Fish Recovery Board 2010; NMFS 2012b; ODFW 2010). All four strata in the DPS fall short of the WLC-TRT criteria for viability (NMFS 2012b).

Baseline persistence probabilities were estimated to be "low" or "very low" for three out of the six summer steelhead populations that are part of the LCR DPS, moderate for two, and high for one—the Wind, which is considered viable (Lower Columbia Fish Recovery Board 2010; NMFS 2012b; ODFW 2010). Thirteen of the 17 LCR winter steelhead populations have "low" or "very low" baseline probabilities of persistence, and the remaining four are at "moderate" probability

of persistence (Table 8, above) (Lower Columbia Fish Recovery Board 2010; NMFS 2012b; ODFW 2010).

Abundance and Productivity. The "low" to "very low" baseline persistence probabilities of most Lower Columbia River steelhead populations reflects low abundance and productivity (NMFS 2012b). All of the populations increased in abundance during the early 2000s, generally peaking in 2004. Most populations have since declined back to levels within one standard deviation of the long term mean. Exceptions are the Washougal summer-run and North Fork Toutle winter-run, which are still higher than the long term average, and the Sandy, which is lower. In general, the populations do not show any sustained dramatic changes in abundance or fraction of hatchery origin spawners since the 2005 status review (Ford 2011). Although current LCR steelhead populations are depressed compared to historical levels and long-term trends show declines, many populations are substantially healthier than their salmon counterparts, typically because of better habitat conditions in core steelhead production areas (Lower Columbia Fish Recovery Board 2010; NMFS 2012b).

Limiting Factors include (NMFS 2012b; NOAA Fisheries 2011):

- Degraded estuarine and nearshore marine habitat resulting from cumulative impacts of land use and flow management by the Columbia River hydropower system
- Degraded freshwater habitat: Floodplain connectivity and function, channel structure and complexity, riparian areas and recruitment of large wood, stream substrate, stream flow, and water quality have been degraded as a result of cumulative impacts of agriculture, forestry, and development
- Reduced access to spawning and rearing habitat mainly as a result of tributary hydropower projects and lowland development
- Avian and marine mammal predation in the lower mainstem Columbia River and estuary.
- Hatchery-related effects
- An altered flow regime and Columbia River plume has altered the temperature regime and estuarine food web, and has reduced ocean productivity
- Reduced access to off-channel rearing habitat in the lower Columbia River
- Reduced productivity resulting from sediment and nutrient-related changes in the estuary
- Juvenile fish strandings that result from ship wakes
- Contaminants affecting fish health and reproduction

Status of UWR Steelhead

Spatial Structure and Diversity. This species includes all naturally-spawned steelhead populations below natural and manmade impassable barriers in the Willamette River, Oregon, and its tributaries upstream from Willamette Falls to the Calapooia River. One stratum and four extant populations of UWR steelhead occur within the DPS (Table 10). Historical observations, hatchery records, and genetics suggest that the presence of UWR steelhead in many tributaries on the west side of the upper basin is the result of recent introductions. Nevertheless, the WLC-TRT recognized that although west side UWR steelhead does not represent a historical population, those tributaries may provide juvenile rearing habitat or may be temporarily (for one or more generations) colonized during periods of high abundance. Hatchery summer-run steelhead that are released in the subbasins are from an out-of-basin stock, not part of the DPS.

Additionally, stocked summer steelhead that have become established in the McKenzie River were not considered in the identification of historical populations (ODFW and NMFS 2011).

Table 10. Scores for the key elements (A&P, diversity, and spatial structure) used to determine current overall viability risk for UWR steelhead (ODFW and NMFS 2011). All populations are in the Western Cascade Range ecological subregion. Risk ratings range from very low (VL), low (L), moderate (M), high (H), to very high (VH).

Population (Watershed)	A&P	Diversity	Spatial Structure	Overall Extinction Risk
Molalla River	VL	M	M	L
North Santiam River	VL	M	H	L
South Santiam River	VL	M	M	L
Calapooia River	M	M	VH	M

Abundance and Productivity. Since the last status review in 2005, UWR steelhead initially increased in abundance but subsequently declines and current abundance is at the levels observed in the mid-1990s when the DPS was first listed. The DPS appears to be at lower risk than the UWR Chinook salmon ESU, but continues to demonstrate the overall low abundance pattern that was of concern during the last status review. The elimination of winter-run hatchery release in the basin reduces hatchery threats, but non-native summer steelhead hatchery releases are still a concern for species diversity. Overall, the new information considered does not indicate a change in the biological risk category since the last status review (Ford 2011).

Limiting Factors include (NOAA Fisheries 2011; ODFW and NMFS 2011):

- Degraded freshwater habitat: Floodplain connectivity and function, channel structure and complexity, riparian areas and large wood recruitment, and stream flow have been degraded as a result of cumulative impacts of agriculture, forestry, and development
- Degraded water quality and altered temperature as a result of both tributary dams and the cumulative impacts of agriculture, forestry, and urban development
- Reduced access to spawning and rearing habitats mainly as a result of artificial barriers in spawning tributaries
- Hatchery-related effects: impacts from the non-native summer steelhead hatchery program
- Anthropogenic introductions of non-native species and out-of-ESU races of salmon or steelhead have increased predation and competition on native UWR steelhead.

2.2.2 Status of Critical Habitat

We review the status of designated critical habitat affected by the proposed action by examining the condition and trends of essential physical and biological features throughout the designated area. These features are essential to the conservation of the listed species because they support one or more of the species' life stages (*e.g.*, sites with conditions that support spawning, rearing, migration and foraging).

For salmon and steelhead, NMFS ranked watersheds within designated critical habitat at the scale of the fifth-field hydrologic unit code (HUC5) in terms of the conservation value they provide to each listed species they support;[9] the conservation rankings are high, medium, or low. To determine the conservation value of each watershed to species viability, NMFS' critical habitat analytical review teams (CHARTs; NOAA Fisheries 2005) evaluated the quantity and quality of habitat features (for example, spawning gravels, wood and water condition, side channels), the relationship of the area compared to other areas within the species' range, and the significance to the species of the population occupying that area. Thus, even a location that has poor quality of habitat could be ranked with a high conservation value if it were essential due to factors such as limited availability (*e.g.*, one of a very few spawning areas), a unique contribution of the population it served (*e.g.*, a population at the extreme end of geographic distribution), or the fact that it serves another important role (*e.g.*, obligate area for migration to upstream spawning areas).

The physical or biological features of freshwater spawning and incubation sites include water flow, quality and temperature conditions and suitable substrate for spawning and incubation, as well as migratory access for adults and juveniles (Table 11). These features are essential to conservation because without them the species cannot successfully spawn and produce offspring. The physical or biological features of freshwater migration corridors associated with spawning and incubation sites include water flow, quality and temperature conditions supporting larval and adult mobility, abundant prey items supporting larval feeding after yolk sac depletion, and free passage (no obstructions) for adults and juveniles. These features are essential to conservation because they allow adult fish to swim upstream to reach spawning areas and they allow larval fish to proceed downstream and reach the ocean.

[9] The conservation value of a site depends upon "(1) the importance of the populations associated with a site to the ESU [or DPS] conservation, and (2) the contribution of that site to the conservation of the population through demonstrated or potential productivity of the area" (NOAA Fisheries 2005).

Table 11. PCEs of critical habitats designated or proposed for ESA-listed salmon and steelhead species considered in the opinion and corresponding species life history events.

Primary Constituent Elements		Species Life History Event
Site Type	**Site Attribute**	
Freshwater spawning	Substrate Water quality Water quantity	Adult spawning Embryo incubation Alevin growth and development
Freshwater rearing	Floodplain connectivity Forage Natural cover Water quality Water quantity	Fry emergence from gravel Fry/parr/smolt growth and development
Freshwater migration	Free of artificial obstruction Natural cover Water quality Water quantity	Adult sexual maturation Adult upstream migration and holding Kelt (steelhead) seaward migration Fry/parr/smolt growth, development, and seaward migration

CHART Salmon and Steelhead Critical Habitat Assessments. The CHART for each recovery domain assessed biological information pertaining to areas under consideration for designation as critical habitat to identify the areas occupied by listed salmon and steelhead, determine whether those areas contained PCEs essential for the conservation of those species and whether unoccupied areas existed within the historical range of the listed salmon and steelhead that are also essential for conservation. The CHARTs assigned a 0 to 3 point score for the PCEs in each HUC_5 watershed for:

Factor 1. Quantity,
Factor 2. Quality – Current Condition,
Factor 3. Quality – Potential Condition,
Factor 4. Support of Rarity Importance,
Factor 5. Support of Abundant Populations, and
Factor 6. Support of Spawning/Rearing.

Thus, the quality of habitat in a given watershed was characterized by the scores for Factor 2 (quality – current condition), which considers the existing condition of the quality of PCEs in the HUC_5 watershed; and Factor 3 (quality – potential condition), which considers the likelihood of achieving PCE potential in the HUC_5 watershed, either naturally or through active conservation/restoration, given known limiting factors, likely biophysical responses, and feasibility.

Willamette-Lower Columbia Recovery Domain. Critical habitat was designated in the WLC recovery domain for UWR spring-run Chinook salmon, LCR Chinook salmon, LCR steelhead, UWR steelhead, CR chum salmon, southern green sturgeon, and eulachon, and proposed for LCR coho salmon. In addition to the Willamette and Columbia River mainstems,

important tributaries on the Oregon side of the WLC include Youngs Bay, Big Creek, Clatskanie River, and Scappoose River in the Oregon Coast subbasin; Hood River in the Gorge; and the Sandy, Clackamas, Molalla, North and South Santiam, Calapooia, McKenzie, and Middle Fork Willamette rivers in the West Cascades subbasin.

Land management activities have severely degraded stream habitat conditions in the Willamette River mainstem above Willamette Falls and associated subbasins. In the Willamette River mainstem and lower sub-basin mainstem reaches, high density urban development and widespread agricultural effects have reduced aquatic and riparian habitat quality and complexity, and altered sediment and water quality and quantity, and watershed processes. The Willamette River, once a highly braided river system, has been dramatically simplified through channelization, dredging, and other activities that have reduced rearing habitat by as much as 75%. In addition, the construction of 37 dams in the basin blocked access to more than 435 miles of stream and river spawning habitat. The dams alter the temperature regime of the Willamette River and its tributaries, affecting the timing and development of naturally-spawned eggs and fry. Logging in the Cascade and Coast Ranges, and agriculture, urbanization, and gravel mining on valley floors have contributed to increased erosion and sediment loads throughout the WLC domain.

The mainstem Willamette River has been channelized and stripped of large wood. Development began to encroach on the riparian forest beginning in the 1870s (Sedell and Froggatt 1984). Gregory (2002a) calculated that the total mainstem Willamette River channel area decreased from 41,000 to 23,000 acres between 1895 and 1995. They noted that the lower reach, from the mouth of the river to Newberg (RM 50), is confined within a basaltic trench, and that due to this geomorphic constraint, less channel area has been lost than in upstream areas. The middle reach from Newberg to Albany (RM 50 to 120) incurred losses of 12% primary channel area, 16% side channels, 33% alcoves, and 9% islands. Even greater changes occurred in the upper reach, from Albany to Eugene (RM 187). There, approximately 40% of both channel length and channel area were lost, along with 21% of the primary channel, 41% of side channels, 74% of alcoves, and 80% of island areas.

The banks of the Willamette River have more than 96 miles of revetments; approximately half were constructed by the ACOE. Generally, the revetments were placed in the vicinity of roads or on the outside bank of river bends, so that while only 26% of the total length is revetted, 65% of the meander bends are revetted (Gregory *et al.* 2002b). The majority of dynamic sections have been armored, reducing adjustments in channel bed and sediment storage by the river, and thereby diminishing both the complexity and productivity of aquatic habitats (Gregory *et al.* 2002b).

Riparian forests have diminished considerably in the lower reaches of the Willamette River (Gregory *et al.* 2002c). Sedell and Froggatt (1984) noted that agriculture and cutting of streamside trees were major agents of change for riparian vegetation, along with snagging of large wood in the channel. The reduced shoreline, fewer and smaller snags, and reduced riparian forest comprise large functional losses to the river, reducing structural features, organic inputs from litter fall, entrained allochthonous materials, and flood flow filtering capacity. Extensive changes began before the major dams were built, with navigational and agricultural demands dominating the early use of the river. The once expansive forests of the Willamette River

floodplain provided valuable nutrients and organic matter during flood pulses, food sources for macroinvertebrates, and slow-water refugia for fish during flood events. These forests also cooled river temperatures as the river flowed through its many channels.

Gregory *et al.* (2002c) described the changes in riparian vegetation in river reaches from the mouth to Newberg, from Newberg to Albany, and from Albany to Eugene. They noted that the riparian forests were formerly a mosaic of brush, marsh, and ash tree openings maintained by annual flood inundation. Below the City of Newberg, the most noticeable change was that conifers were almost eliminated. Above Newberg, the formerly hardwood-dominated riparian forests along with mixed forest made up less than half of the riparian vegetation by 1990, while agriculture dominated. This conversion has reduced river shading and the potential for recruitment of wood to the river, reducing channel complexity and the quality of rearing, migration and spawning habitats.

Hyporheic flow in the Willamette River has been examined through discharge measurements and found to be significant in some areas, particularly those with gravel deposits (Fernald *et al.* 2001; Wentz *et al.* 1998). The loss of channel complexity and meandering that fosters creations of gravel deposits decreases the potential for hyporheic flows, as does gravel mining. Hyporheic flow processes water and affects its quality on reemerging into the main channel, stabilizing variations in physical and chemical water characteristics. Hyporheic flow is important for ecological functions, some aspects of water quality (such as temperature and dissolved oxygen), and some benthic invertebrate life stages. Alcove habitat, which has been limited by channelization, combines low hydraulic stress and high food availability with the potential for hyporheic flows across the steep hydraulic gradients in the gravel separating them from the main channel (Fernald *et al.* 2001).

On the mainstem of the Columbia River, hydropower projects, including the Federal Columbia River Hydropower System (FCRPS), have significantly degraded salmon and steelhead habitats (Bottom *et al.* 2005; Fresh *et al.* 2005; NMFS 2011b; NMFS 2012b). The series of dams and reservoirs that make up the FCRPS block an estimated 12 million cubic yards of debris and sediment that would otherwise naturally flow down the Columbia River and replenish shorelines along the Washington and Oregon coasts.

Industrial harbor and port development are also significant influences on the Lower Willamette and Lower Columbia rivers (Bottom *et al.* 2005; Fresh *et al.* 2005; NMFS 2011b; NMFS 2012b). Since 1878, 100 miles of river channel within the mainstem Columbia River, its estuary, and Oregon's Willamette River have been dredged as a navigation channel by the ACOE. Originally dredged to a 20-foot minimum depth, the Federal navigation channel of the Lower Columbia River is now maintained at a depth of 43 feet and a width of 600 feet. The Lower Columbia River supports five ports on the Washington State side: Kalama, Longview, Skamania County, Woodland, and Vancouver. In addition to loss of riparian habitat, and disruption of benthic habitat due to dredging, high levels of several sediment chemicals, such as arsenic and polycyclic aromatic hydrocarbons (PAHs), have been identified in Lower Columbia River watersheds in the vicinity of the ports and associated industrial facilities.

The most extensive urban development in the Lower Columbia River subbasin has occurred in the Portland/Vancouver area. Outside of this major urban area, the majority of residences and

businesses rely on septic systems. Common water quality issues with urban development and residential septic systems include higher water temperatures, lowered dissolved oxygen, increased fecal coliform bacteria, and increased chemicals associated with pesticides and urban runoff.

The Columbia River estuary has lost a significant amount of the tidal marsh and tidal swamp habitats that are critical to juvenile salmon and steelhead, particularly small or ocean-type species (Bottom *et al.* 2005; Fresh *et al.* 2005; NMFS 2011b; NMFS 2012b). Edges of marsh areas provide sheltered habitats for juvenile salmon and steelhead where food, in the form of amphipods or other small invertebrates which feed on marsh detritus, is plentiful, and larger predatory fish can be avoided. Historically, floodwaters of the Columbia River inundated the margins and floodplains along the estuary, allowing juvenile salmon and steelhead access to a wide expanse of low-velocity marshland and tidal channel habitats. In general, the riverbanks were gently sloping, with riparian and wetland vegetation at the higher elevations of the river floodplain becoming habitat for salmon and steelhead during flooding river discharges or flood tides. Sherwood *et al.* (1990) estimated that the Columbia River estuary lost 20,000 acres of tidal swamps, 10,000 acres of tidal marshes, and 3,000 acres of tidal flats between 1870 and 1970. This study further estimated an 80% reduction in emergent vegetation production and a 15% decline in benthic algal production.

Habitat and food-web changes within the estuary, and other factors affecting salmon population structure and life histories, have altered the estuary's capacity to support juvenile salmon (Bottom *et al.* 2005; Fresh *et al.* 2005; NMFS 2011b; NMFS 2012b). Diking and filling activities have reduced the tidal prism and eliminate emergent and forested wetlands and floodplain habitats. These changes have likely reduced the estuary's salmon-rearing capacity. Moreover, water and sediment in the Lower Columbia River and its tributaries have toxic contaminants that are harmful to aquatic resources (LCREP 2007). Contaminants of concern include dioxins and furans, heavy metals, polychlorinated biphenyls (PCBs) and organochlorine pesticides such as DDT. Simplification of the population structure and life-history diversity of salmon possibly is yet another important factor affecting juvenile salmon viability. Restoration of estuarine habitats, particularly diked emergent and forested wetlands, reduction of avian predation by terns, and flow manipulations to restore historical flow patterns have likely begun to enhance the estuary's productive capacity for salmon, although historical changes in population structure and salmon life histories may prevent salmon from making full use of the productive capacity of estuarine habitats.

The WLC recovery domain CHART determined that most HUC_5 watersheds with PCEs for salmon or steelhead are in fair-to-poor or fair-to-good condition. However, most of these watersheds have some or a high potential for improvement. Only watersheds in the upper McKenzie River and its tributaries are in good to excellent condition with no potential for improvement (Table 12).

Table 12. **Willamette-Lower Columbia Recovery Domain:** Current and potential quality of HUC_5 watersheds identified as supporting historically independent populations of ESA-listed Chinook salmon (CK), chum salmon (CM), and steelhead (ST) (NOAA Fisheries 2005).[10] Watersheds are ranked primarily by "current quality" and secondly by their "potential for restoration."

Current PCE Condition	Potential PCE Condition
3 = good to excellent	3 = highly functioning, at historical potential
2 = fair to good	2 = high potential for improvement
1 = fair to poor	1 = some potential for improvement
0 = poor	0 = little or no potential for improvement

Watershed Name(s) and HUC_5 Code(s)	Listed Species	Current Quality	Restoration Potential
Lower Willamette #1709001xxx			
Collawash (101), Upper Clackamas (102), & Oak Grove Fork (103) Clackamas rivers	CK/ST	2/2	3/2
Middle Clackamas River (104)	CK/ST	2/1	3/2
Eagle Creek (105)	CK/ST	2/2	1/2
Gales Creek (002)	ST	2	1
Lower Clackamas River (106) & Scappoose Creek (202)	CK/ST	1	2
Dairy (001) & Scoggins (003) creeks; Rock Creek/Tualatin River (004); & Tualatin River (005)	ST	1	1
Johnson Creek (201)	CK/ST	0/1	2/2
Lower Willamette/Columbia Slough (203)	CK/ST	0	2

2.3 Environmental Baseline

The "environmental baseline" includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

The BA provided an evaluation of environmental baseline conditions in the action area using procedures in NMFS (1996), as amended.[11] Fourteen out of 17 habitat indicators in the action area were characterized as "not properly functioning" (Table 13).

[10] On January 14, 2013, NMFS published a proposed rule for the designation of critical habitat for LCR coho salmon and Puget Sound steelhead (USDC 2013). A draft biological report, which includes a CHART assessment for PS steelhead, was also completed (NMFS 2012a). Habitat quality assessments for LCR coho salmon are out for review; therefore, they are not included on this table.

[11] As amended by *Analytical Process for Developing Biological Assessments for Federal Actions Affecting Fish within the Northwest Forest Plan Area* (November 2004).

Table 13. Summary of baseline conditions in the action area.

Pathway	Indicator	Baseline Condition
Water Quality	Temperature	NPF
	Sediment	NPF
	Chemical Contamination & Nutrients	NPF
Habitat Access	Physical Barriers	PF
Habitat Elements	Substrate	NPF
	Large Woody Debris	NPF
	Pool Frequency and Pool Quality/Size	NPF
	Off-Channel Habitat	NPF
	Refugia	NPF
Channel Conditions & Dynamics	Width/Depth Ratio	PF
	Streambank Condition	PF
	Floodplain Connectivity	NPF
Flow/Hydrology	Change in Peak/Base Flows	NPF
	Increase in Drainage Network	NPF
Watershed Conditions	Road Density and Location	NPF
	Disturbance History	NPF
	Riparian Reserve/Conservation Areas	NPF

* PF=Properly Functioning, FAC=Functioning at Risk, and NPF=Not Properly Functioning

Since 1850, both primary channel and side channels have been lost in the Lower Willamette River (Hulse *et al.* 2002). Much of the off-channel and beach type habitat has been lost over the years due to development and channelization. The development of the Lower Willamette River has transformed much of the natural bank habitat into riprap and seawalls to stabilize banks and control flooding. In addition, commercial shipping has altered the natural landscape and river bottom of the lower reach through construction of docks and channel dredging. Gravel continues to be extracted from the river and floodplain and much of the sediment trying to move downstream in the Willamette River is blocked by dams. These river changes contribute to the limiting factors identified for ESA-listed species using the action area.
ODFW conducted a study and categorized the habitat types along the Lower Willamette River (mouth to Willamette Falls). Habitats were separated into six categories (beach, alcove, riprap, seawall, rock outcrop, and mixed). The majority (59.2%) of river bank habitat in the study area (mouth to Willamette Falls) was undeveloped ("natural"), with no obvious modifications such as seawalls, riprap, or piers. Beaches were the most prevalent habitat type in the upper (above Ross Island Bridge; 38.8%) and lower (29.1%) sections of the study area, but the distribution of other types was considerably different. Undeveloped habitats composed 81.1% of the habitat in the upper section, but only 32.8% in the lower section. Nearshore structures (*e.g.*, piers, docks, pilings) were associated with 18.7% of the total shoreline area (Friesen 2005).

Water quality in the project-area reach of the Willamette River reflects its urban location and disturbance history. The Lower Willamette River is currently listed on the DEQ 303(d) List of Water Quality Limited Water Bodies. DEQ listed water quality problems identified in the project area include toxics (mercury levels), biological criteria (fish skeletal deformities), bacteria (fecal coliform) and temperature (DEQ 2006).

The project lies between the mouths of Kellogg Creek and Johnson Creek. Johnson Creek flows about 25 miles from the Cascade foothills, through agricultural areas and the City of Gresham and finally through southeast Portland and the City of Milwaukie to discharge to the Willamette River at the north end of the site. Milwaukie Riverfront Park consists of a dilapidated boat ramp and upland parking lot. The runoff from the parking lot is not treated and runs directly into the Willamette River. The bank of the Willamette River adjacent to the park is steep and lacks an understory and overstory of native riparian vegetation (although there are some native, mature trees that exist). The shoreline and other areas below OHW contain debris consisting of large blocks of concrete.

The lower portion of Johnson Creek flows primarily through urbanized land with industrial, commercial, and residential areas. This is in contrast to the eastern portion of the creek which flows through undeveloped open space, rural/residential areas, and agricultural land. Overall, 54% of the watershed is residential, 33% is rural, 8% is commercial/industrial, and 5% is parks and open space (JCWC 2008). About 39% of the lower portion of Johnson Creek is covered by impervious surface, which is associated with road-building and development. Extensive restoration projects have been done by various public agencies and private groups. Restoration projects including native plant installation and wetland enhancement have been completed at locations near the project, including at the mouth of the creek, at Millport Road in Milwaukie, and at South East 23rd Street in Portland.

Kellogg Creek drains urban and suburban areas to the south and east of Milwaukie before discharging at the site. Just upstream of the project area, Kellogg Creek exists as an artificially impounded reservoir; therefore, its substrate is likely dominated by fines and its habitat is a fairly uniformly shaped pool. Although there is a fish ladder, it functions only at a narrow range of water levels. Very little instream habitat diversity exists in this location, limiting refugia and spawning opportunities that might otherwise be present at the site. The stream supports native fishes including coho salmon and steelhead. Friesen and Zimmerman (1999) note that because Kellogg Creek contains ESA-listed salmonids, it is one of the best candidates for habitat enhancement and restoration.

2.3.1 Species within the Action Area

The action area in the Willamette River is downstream from the Clackamas River watershed and within the Johnson Creek and Kellogg Creek watersheds. LCR Chinook salmon, LCR coho salmon, and LCR steelhead in the action area are likely part of the Clackamas River population. Many LCR species found in the action area are likely to have been produced in the Lower Willamette River tributaries. All populations of UWR Chinook salmon and UWR steelhead migrate through and rear in the action area. Spawning habitat for the UWR species is upstream from Willamette Falls (with the exception of UWR spring Chinook salmon that also spawn in the Clackamas River).

Willamette River. According to the 2005 Friesen study, juvenile and adult Chinook salmon, coho salmon, and steelhead use the action area as a migratory corridor and as rearing habitat for juveniles. The results of the study demonstrate that juvenile salmon and steelhead are present in the Lower Willamette River nearly year-round. Of the more than 5,000 juvenile

salmonids collected during the study, over 87% were Chinook salmon, 9% were coho salmon, and 3% were steelhead. Friesen (2005) concluded that the Chinook salmon juveniles were largely spring-run stocks that rear in fresh water for a year or more before migrating to the ocean. Chinook salmon juveniles caught exhibited a bimodal distribution in length, indicating the presence of both subyearlings and yearlings. Although at lower abundance, coho salmon juveniles also exhibited this bimodal distribution of yearlings and subyearlings.

The abundance of all juvenile salmon and steelhead increased beginning in November, peaked in April, and declined to near zero by July. Some of the larger juveniles may spend extended periods of time in off-channel habitat. Mean migration rates of juvenile salmon and steelhead ranged from 1.68 miles/day for steelhead to 5.34 miles/day for sub-yearling Chinook salmon. Residence time in the Lower Willamette River ranged from 4.9 days for Chinook to 15.8 days for steelhead. Catch rates of juvenile salmon were significantly higher at sites composed of natural habitat (*e.g.*, beaches and alcoves).

Steelhead are not known to spawn in the mainstem of the Willamette River in the vicinity of the action area but do use the action area as an upstream and downstream migration corridor. Chinook salmon may spawn not far upstream from the action area in the lower end of the Clackamas River or in the Willamette River just below Willamette Falls, where suitable gravel-type substrate for spawning may occur, and in Johnson Creek. Recent observations of coho salmon juveniles in Miller Creek (tributary at RM 3 on the Willamette River) and in Johnson Creek by City of Portland biologists suggest that coho spawning may occur in small tributaries in the Lower Willamette River.

Adult Chinook and steelhead have been documented holding in the lower Willamette River for a period of time before moving upriver. Adults migrate upstream to spawn during early spring (spring Chinook), early fall (coho), and late fall through winter (steelhead), and spawn in early to mid-fall (Chinook and coho) and spring (steelhead). Adult steelhead have been documented entering the mouth of the Clackamas River with a darkened coloration, indicating that they have been in freshwater for some time.

The 2005 Friesen study's key finding is that the Lower Willamette River is no longer appropriately considered simply a migration corridor. The presence of naturally-spawned Chinook salmon from November through July, as well as significant evidence of fish growth, contradicts a longstanding assumption that spring Chinook salmon primarily reared in their natal streams over the winter and migrated out of the Willamette River during the spring. In this study, juvenile Chinook salmon were present in the Lower Willamette River in every month sampled from May, 2000 through July, 2003. Juvenile salmon were captured more frequently during winter and spring than during other seasons. Coho salmon and steelhead were generally present only during winter and spring. Therefore, juvenile Chinook salmon will be present during the summer in-water work window, and there will likely be a few coho salmon and steelhead juveniles present as well.

As in the Columbia River, yearling and older juvenile salmon and steelhead in the Willamette River tend to be found in mid-channel areas, whereas subyearling fish tend to be most abundant at nearshore sites (Dawley *et al.* 1986, Dauble *et al.*1989, Friesen 2005). Off-channel habitats

such as alcoves, lagoons, backwater areas, and secondary channels are more important areas for juvenile refuge and rearing than mid-channel areas for subyearling fish (Vile *et al.* 2004, Friesen 2005). Friesen (2005) found significantly higher stomach fullness for juvenile Chinook salmon captured in off-channel sites in the Lower Willamette River than at sites in the main river channels. This suggests that some of the larger juveniles may spend extended periods of time in off-channel habitat.

Johnson Creek. Johnson Creek historically had large salmon populations. Numbers declined dramatically once urbanization began and particularly after the channelization work was completed (McConnaha 2002). Historically, coho salmon were observed in the lower reaches of Johnson Creek and Crystal Springs Creek from late September through early November (JCWC 2003).

ODFW conducted fish and habitat surveys in the Johnson Creek watershed from March 2008 to June 2009 (Van Dyke and Storch 2009). Streams surveyed in the Johnson Creek watershed were Johnson, Crystal Springs, Kelley, and Mitchell creeks. Crystal Springs and Kelley creeks are tributaries of Johnson Creek and Mitchell Creek is a tributary of Kelley Creek. The results of the fish surveys in the 2009 report are summarized below (Table 14).

Table 14. Estimated number of fish for each stream sampled in Johnson, Crystal Springs, Kelley, and Mitchell creeks during spring, summer, fall, and winter 2008-2009.

	Johnson Creek	Crystal Springs Creek	Kelley Creek	Mitchell Creek	Total in Johnson Creek Watershed
Chinook salmon	19	8	0	0	**27**
Coho salmon	37	1	55	0	**93**
Steelhead	236	13	14	0	**263**
Cutthroat trout	132	1	530	649	**1,312**
Unidentified salmonid	7	0	1	9	**17**

Van Dyke and Storch (2009) found that Johnson Creek is being used by rearing juvenile Chinook salmon, coho salmon, and steelhead. Since no adult anadromous salmonids were observed in Johnson Creek, ODFW concluded that it remains unclear if spawning is occurring in the creek. However, there have been anecdotal observations of larger steelhead in Johnson Creek watershed and confirmed sightings of adult coho salmon in Crystal Springs by City of Portland staff.

Kellogg Creek. Historically, steelhead and coho salmon spawned and reared in Kellogg Creek and Mt. Scott Creek (tributary of Kellogg Creek) (State of Oregon Fish Commission, 1951, Willis *et al.*, 1960). Juvenile Chinook salmon may have used the lower reaches for rearing but the streams are considered to be too small to have supported Chinook salmon spawning (Neerman and Vogt, 2008). Estimates of historic (pre-1950) run sizes for steelhead and coho salmon are not available for either Kellogg or Mt. Scott Creeks. Oregon Fish Commission records (1951) grouped Abernathy, Kellogg, and Johnson Creeks together. They estimated that combined spawning escapements to these streams averaged about 700 coho salmon and 500 steelhead. Kellogg Creek was reported as supplying a sizeable run of coho salmon and

a few steelhead. Willis *et al.* (1960) reported that Mt. Scott Creek supplied a small run of coho salmon and also that a few steelhead spawned annually. Between 1950 and 1966, spotty spawning ground surveys were conducted by Oregon Fish Commission (unpublished data) on 0.5 to 1.0 mile of Mt. Scott Creek, just upstream of Southeast 82nd Avenue. Numbers of redds counted ranged from 0 to 13. The limited historic data were collected after both watersheds had been impacted by agriculture, logging, and some residential development (WES 2009).

ODFW conducted fish and habitat surveys in the spring/summer of 2008 in streams within the Kellogg Creek watershed (Neerman and Vogt 2009). Streams surveyed in the Kellogg Creek watershed were Kellogg, Mt. Scott, and Phillips creeks. Mt. Scott Creek is a tributary to Kellogg Creek and Phillips Creek is a tributary to Mt. Scott Creek. The results of the fish surveys in the 2009 report are summarized below (Table 15). It is important to note that the Kellogg Creek survey results are actual numbers of fish captured and the Johnson Creek survey results are estimated numbers of fish based on capture numbers.

Table 15. Number of fish collected during presence/absence sampling, March-May 2008, in Kellogg, Mt. Scott, and Phillips creeks.

	Kellogg Creek	Mt. Scott Creek	Phillips Creek	Total in Kellogg Creek Watershed
Coho salmon	0	6	0	**6**
Steelhead	1	6	0	**7**
Chinook salmon	0	1	0	**1**
Rainbow trout	0	28	0	**28**
Cutthroat trout	2	123	0	**125**
Unidentified salmonid	4	143	0	**147**
Unidentified salmonid fry	0	2	0	**2**

Neerman and Vogt (2009) concluded that although there were no adult salmonids found, the presence of coho salmon fry in Mt. Scott Creek indicates that coho salmon may be using the creek for spawning. ODFW biologists also observed a smolting steelhead in Mt. Scott Creek and concluded that steelhead could also be using Mt. Scott Creek for spawning. The origin of the juvenile Chinook salmon observed in Mt. Scott Creek is unknown since Chinook salmon are not known to naturally spawn in Mt. Scott or Kellogg creeks. Juvenile Chinook salmon are known to migrate several miles out of the mainstem Willamette River to rear in tributaries with little or no Chinook spawning habitat and it is possible that the juvenile Chinook salmon found was looking for habitat more suitable than Portland Harbor for late spring/early summer rearing.

Presently, Kellogg Creek has a dam close to the mouth. The dam has limited fish passage as evidenced by the few numbers of fish found during the 2008 survey.

As nearly all LCR and UWR species of juvenile and adult Chinook salmon, coho salmon, and steelhead use the action area, the degraded conditions (lack of habitat complexity, limited access to off-channel habitat, poor water quality) has reduced growth and survival for juveniles. Although adults are also affected by the poor water quality, juveniles are likely more susceptible to the degraded conditions as they spend a several months rearing in these nearshore areas as they migrate downstream.

2.3.2 Critical Habitat within the Action Area

The NMFS' UWR Critical Habitat Analytical Review Team (CHART) designated the Willamette River a "high" conservation value to the watershed and described the Willamette corridor as highly essential (NOAA Fisheries 2005). This reach connects nearly all populations and HUC5s in this ESU with downstream reaches and the ocean. Agricultural, channel modifications/diking, road building/maintenance, urbanization, and wetland loss/removal in the watershed were identified by the CHART as needing special management considerations or protection (NOAA Fisheries 2005).

The action area supports two PCEs; freshwater rearing and migration corridor. Water quality is poor and does not meet water quality standards for *Escherichia coli*, fecal coliform, iron, mercury, dissolved oxygen, and temperature (DEQ 2009). There are no passage barriers identified within the action area. Cover/shelter and riparian vegetation are in poor condition with impacts occurring from urban development. Floodplain connectivity has been reduced due to urban development.

2.4 Effects of the Action on Species and Proposed and Designated Critical Habitat

"Effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

Effects on Species. The following outlines effects to the environment and species.

Over- and In-Water Structures. The size of the proposed dock float would be approximately 2,400 square feet. The dock will create shadows that could allow predators to remain in darkened areas (barely visible to prey) and watch for prey to swim by against a bright background (high visibility). Prey species moving around structure(s) are unable to see the predators in the dark areas under or beside structure(s) and are therefore more susceptible to predation. Predator species, such as, bluegill (*Lepomis macrochirus*), smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), and pikeminnow (*Ptychocheilus oregonensis*) are associated with fresh water. All predator species listed above are present in the action area[12].

Placement of structures, including the boat dock, boat ramp, and stone steps, in shallow water may also disrupt migration of smaller juvenile salmonids that use nearshore areas. The presence of the artificial structures may result in juvenile salmonid delaying passage or forcing them into deeper water areas in an attempt to go around the structures. Juvenile Chinook and coho salmon use backwater areas during their outmigration (Parente and Smith 1981). Littoral areas are important for juvenile salmonid migration (Ward *et al.* 1994). McCabe *et al.* (1986) using a 50 m (164 feet) beach seine found extensive usage of nearshore areas in the Columbia River estuary

[12] Email to Mischa Connine, NMFS, from Tom Murtagh, ODFW, confirming the predator species present in the action area.

by subyearling Chinook salmon. Ledgerwood *et al.*(1990) using a 95 m (312 feet) beach seine fishing in depths to 6 m (20 feet) found extensive use of nearshore habitat in the Lower Columbia River by subyearling Chinook salmon. Dawley *et al.* (1986) using a 95 m beach seine fishing in depths to 3 m (10 feet) found extensive use of nearshore habitat in the Lower Columbia River by subyearling Chinook salmon. Sampling by them in 1968 found nearshore usage by subyearling Chinook salmon to be 15 times greater than in the adjacent channel area and that yearling Chinook salmon, coho salmon and steelhead were more often caught in deeper waters (Dawley *et al.* 1986). The results of these studies suggest that the construction and presence of artificial structures may force juvenile salmonids into deeper water.

Shading from docks, piers, boat houses, moored boats, and marinas may also reduce juvenile salmonid prey organism abundance and the complexity of the habitat by reducing aquatic vegetation and phytoplankton abundance (Kahler *et al.* 2000). In-water structures (tops of pilings) also provide perching platforms for avian predators such as double-crested cormorants (*Phalacrocorax auritis*) (Kahler *et al.* 2000), from which they can launch feeding forays.

In sum, the proposed action will create predator habitat and structures that delay salmon and steelhead migration. The presence of the boat dock will create 1,280 square feet of predator habitat. There will likely only be a few individual predatory fish that will utilize the dock and this will result in a small amount of additional predation on juvenile salmonids. The presence of the boat dock, boat ramp, and stone steps will alter migration and feeding patterns. These behavioral changes will result in death and injury to a small number of fish that are forced out of ideal feeding and migration habitat and are preyed upon by other fish or birds. The effects will be year-round for as long as the structures are present (decades). All populations of juvenile UWR Chinook salmon and UWR steelhead; the Clackamas River population of LCR Chinook salmon, LCR coho salmon, and LCR steelhead will be affected from increased predation. The death of a few juvenile salmonids in each population is not likely to result in a measurable decrease in population abundance trends over time.

Boating Activity. The proposed relocation and upgrade of the boat ramp and the addition of the boat dock shifts these impacts from an area that currently has little to no boating activity to an area that would have a substantial amount of boating activity. This is because the existing boat ramp is non-functional and the addition of the boat dock would allow for transient boat use. The proposed boat dock would provide for additional boat moorage and usage. The purpose of the new boat ramp is to provide for adequate boating access, since the existing ramp is inadequate to serve the current demand. Consequently, the creation of the new boat ramp and boat dock would result in an increase in boating traffic in the action area. This is an indirect effect of the proposed action.

Boating activity affects ESA-listed fish in a number of ways. The physical presence of boat hulls may disturb or displace nearby fishes (Mueller 1980). Graham and Cooke (2008) studied the effects of three boat noise disturbances (canoe paddling, trolling motor, and combustion engine (9.9 hp)) on the cardiac physiology of largemouth bass (*Micropterus salmoides*). They found that exposure to each of the treatments resulted in an increase in cardiac output in all fish, associated with a dramatic increase in heart rate and a slight decrease in stroke volume, with the most extreme response being to that of the combustion engine treatment. Recovery times were the

least with canoe paddling (15 minutes) and the longest with the power engine (40 minutes). They postulate that this demonstrates that fish experienced sublethal physiological disturbances in response to the noise propagated from recreational boating activities. Directly, engine noise, prop movement, and the physical presence of a boat hull will likely disrupt or displace nearby fishes (Mueller 1980). Boats beaching along the river may also disrupt juveniles utilizing the nearshore area for feeding and rearing.

Wakes derived from boat traffic may also increase turbidity in shallow waters, uproot aquatic macrophytes in shallow waters, or cause pollution through exhaust, fuel spills, or release of petroleum lubricants (Warrington 1999, McConchie and Tolman 2003). Hilton and Phillips (1982) in their studies on boat traffic and increased turbidity in the River Ant determined that boat traffic definitely had a large effect on turbidity levels in the river. Nordstrom (1989) says that boat wakes may also play a significant role in creating erosion in narrow creeks entering an estuary (areas extensively used by rearing juvenile salmonids). Kahler *et al.* (2000) indicates that wake erosion results in continuous low level sediment input with episodic large inputs from bank failure.

These boating impacts directly or indirectly affect listed fish in many ways. Turbidity may injure or stress affected fishes (see above). The loss of aquatic macrophytes may decrease littoral productivity, or alter local species assemblages and trophic interactions. The continual loss of bankline results in requests for bank stabilization measures that further disrupt natural stream processes. Despite a general lack of data specifically for salmonids, pollution from boats may cause short-term injury, physiological stress, decreased reproductive success, cancer, or death for fishes (Neff 1985). Further, pollution may also affect fishes by affecting likely prey species or aquatic vegetation. Boating activity will also result in delayed upstream and downstream migration of juvenile and adult salmonids along the Willamette River, and in particular to those out-migrating from and returning to Kellogg Creek and to a lesser degree, Johnson Creek. Delayed adult migration could result in pre-spawning mortality, thus reducing the abundance of Chinook salmon, coho salmon, and steelhead. However, with the presence of Kellogg Dam, there are very few numbers of adult salmonids that use Kellogg Creek as spawning habitat. Johnson Creek is used as spawning habitat for ESA-listed salmonids, however the majority of the boating activity will be concentrated closer to Kellogg Creek, thus minimizing the effect of boating activity on upstream adult migration. All populations of juvenile UWR Chinook salmon and UWR steelhead; the Clackamas River population of LCR Chinook salmon, LCR coho salmon, and LCR steelhead will be affected by increased boating activity. The death of a few juvenile salmonids in each population is not likely to result in a measurable decrease in population abundance trends over time Adult LCR Chinook salmon, LCR coho salmon, and LCR steelhead of the Clackamas River population will be affected by increased boating activity as some individuals of this population will spawn in Kellogg Creek. Only a few individuals may be affected and will not likely result in a measurable decrease in population abundance trends over time.

Pile Driving and Acoustic Disturbance. Pile driving often generates intense sound pressure waves that can injure or kill fish (Reyff 2003, Abbott and Bing-Sawyer 2002, Caltrans 2001, Longmuir and Lively 2001, Stotz and Colby 2001). The type and size of the pile, the firmness of the substrate into which the pile is being driven, the depth of water, and the type and

size of the pile-driving hammer all influence the sounds produced during pile driving. Fishes with swimbladders (including salmon and steelhead) are sensitive to underwater impulsive sounds, i.e., sounds with a sharp sound pressure peak occurring in a short interval of time, (Caltrans 2001). As the pressure wave passes through a fish, the swimbladder is rapidly squeezed due to the high pressure, and then rapidly expanded as the under pressure component of the wave passes through the fish. The pneumatic pounding may rupture capillaries in the internal organs as indicated by observed blood in the abdominal cavity, and maceration of the kidney tissues (Caltrans 2001). The injuries caused by such pressure waves are known as barotraumas, and include hemorrhage and rupture of internal organs, as described above, and damage to the auditory system. Death can be instantaneous, can occur within minutes after exposure, or can occur several days later.

Vibratory or impact hammers are commonly used to drive piles into the substrate. Sounds produced by impact hammers and those produced by vibratory hammers evoke different responses in fishes due to the differences in the duration and frequency of the sound pressure waves. A vibratory hammer uses a combination of a stationary, heavy weight, and vibration in the plane perpendicular to the long axis of the pile. Vibratory hammers produce sounds of lower intensity, with a rapid repetition rate. When exposed to sounds which are similar to those of a vibratory hammer, fishes consistently displayed an avoidance response (Dolat 1997; Enger et al. 1993; Knudsen et al. 1997; Sand et al. 2000), and did not habituate to the sound, even after repeated exposure.

Acoustic disturbances associated with pile driving can disrupt the foraging behavior of juvenile salmonids, causing them to move away from the shoreline, or to delay their migratory progress. This effect can be especially detrimental in the spring, when salmonid densities are high, and predation can have a significant effect on their survival (Anderson 1990). The sound may mask the sound of an approaching predator, and salmonids may become habituated to the sound and fail to respond to predators.

Peak sound pressure level (SPL) and sound exposure level (SEL) are metrics used to correlate physical injury to fish from underwater sound pressure. "SPL" is defined as the maximum absolute value of the instantaneous pressure and "SEL" is a measurement of the accumulated noise energy from a single event, such as pile driving. According to Popper (2005), the use of the SEL metric is a more appropriate metric to use to correlate physical injury to fish from underwater sound pressure produced during installation of piles than SPL. Sound pressure levels (SPLs) greater than 150 decibels (dB) root mean square (RMS) produced when using an impact hammer to drive a pile are thought to affect fish behavior. A multi-agency work group determined that to protect listed species, sound pressure waves should be within a single strike threshold of 206 decibels (dB), and for cumulative strikes either 187 dB sound exposure level (SEL) where fish are larger than 2 grams or 183 dB SEL where fish are smaller than 2 grams (NMFS 2008).

Air bubble systems reduce the adverse effects of underwater sound pressure levels on fish. Whether confined inside a sleeve made of metal or fabric or unconfined, these systems have been shown to reduce underwater sound pressure (Christopherson and Wilson 2002; Longmuir and Lively 2001; Reyff 2003; Reyff and Donovan 2003; Würsig et al. 2000). Unconfined bubble

curtains lower sound pressure by as much as 17 dB (85%) (Würsig et al. 2000; Longmuir and Lively 2001), while bubble curtains contained between two layers of fabric reduce sound pressure up to 22 dB (93%) (Christopherson and Wilson 2002). However, an unconfined bubble curtain can be disrupted and rendered ineffective by currents greater than 1.15 miles per hour (Christopherson and Wilson 2002). When using an unconfined air bubble system in areas of strong currents, it is essential that the pile be fully contained within the bubble curtain, and that the curtain have adequate air flow, and horizontal and vertical ring spacing around the pile. NMFS assumes a 10 dB attenuation with the use of a confined or unconfined bubble curtain when the bubble curtain is set up and operated according to the criteria identified in the terms and conditions section of this opinion.

The City proposes to install nine 16-18-inch piles over a 2 week period. An impact hammer may be necessary to drive piles if installation activities encounter objects that cannot be vibrated aside. If an impact hammer is necessary, the applicant proposes to use either a confined or unconfined bubble curtain. Installing steel piles with impact hammers and vibratory hammers will cause interruption of essential behaviors for 2 weeks, and could potentially injure or kill a few individuals. All populations of juvenile UWR Chinook salmon and UWR steelhead; the Clackamas River population of LCR Chinook salmon, LCR coho salmon, and LCR steelhead will be affected by hydroacoustic disturbance. The death of a few juvenile salmonids in each population is not likely to result in a measurable decrease in population abundance trends over time. Adult LCR and UWR Chinook salmon, and LCR coho salmon of the Clackamas River population will be affected by hydroacoustic disturbance as the pile driving will overlap with the upstream migration of these adults. UWR Chinook will likely either avoid the area during upstream migration or delay upstream migration during active pile driving. LCR Chinook and coho salmon will likely be exposed to hydroacoustic effects as some individuals of these fish will spawn in Johnson Creek and Kellogg Creek. Fish holding in the vicinity of pile driving could be injured or killed. Other fish may avoid the area or delay upstream migration during active pile driving. Although the effects of pile installation could injure or kill a few individuals, the loss of individuals is not likely to result in a measurable decrease in population abundance trends over time.

In-Water Work. Construction activities are likely to temporarily increase suspended sediment levels through the re-suspension of sediments from pile installation and grading of the stream bank.

Potential effects from project-related increases in suspended sediment on ESA-listed species include, but are not limited to: (1) Reduction in feeding rates and growth, (2) physical injury, (3) physiological stress, (4) behavioral avoidance, and (5) reduction in macroinvertebrate populations.

An increase in turbidity from suspension of fine sediments can adversely affect fish and filter-feeding macro-invertebrates downstream from the work site. At moderate levels, turbidity has the potential to reduce primary and secondary productivity; at higher levels, turbidity may interfere with feeding and may injure and even kill both juvenile and adult fish (Berg and Northcote 1985; Spence *et al.* 1996). However, Bjornn and Reiser (1991) found that adult and

larger juvenile salmonids appear to be little affected by the high concentrations of suspended sediments that may be experienced during storm and snowmelt runoff episodes.

Exposure duration is a critical determinant of the occurrence and magnitude of turbidity caused by physical or behavioral turbidity effects (Newcombe and Jensen 1996). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such seasonal high pulse exposures. However, research indicates that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Servizi and Martens 1991). In a review of 80 published reports of fish responses to suspended sediment in streams and estuaries, Newcombe and Jensen (1996) documented increasing severity of ill effects with increases in dose (concentration multiplied by exposure duration).

Behavioral avoidance of turbid waters by juvenile salmonids may be one of the most important effects of suspended sediments (Birtwell *et al.* 1984; DeVore *et al.* 1980; Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (Lloyd *et al.* 1987; McLeay *et al.* 1984; McLeay *et al.* 1987; Scannell 1988; Servizi and Martens 1991). If the turbidity is severe enough to affect a significant cross-section of the river, the behavioral avoidance of turbid waters may impede or delay downstream or upstream migrations of adult and juvenile ESA-listed salmonids. Salmon and steelhead rearing in the action area during construction may also be exposed to other stress factors which may impose a cumulative burden in combination with increases in turbidity.

The construction activities that will most likely result in elevated suspended sediment are the installation of new piles and grading of the stream bank. All populations of juvenile UWR Chinook salmon and UWR steelhead; the Clackamas River population of LCR Chinook salmon, LCR coho salmon, and LCR steelhead will be affected by increased suspended sediment. Adult LCR and UWR Chinook salmon, and LCR coho salmon of the Clackamas River population will be affected by hydroacoustic disturbance as the in-water work will overlap with the upstream migration of these adults. The project-related suspended sediment increases will be localized and take part in a small portion of the lateral extent of the Willamette River, however, rearing and foraging behavior of juvenile salmonids will be altered during increased turbidity plumes for a duration of the four months of construction. Although turbidity created by the project will cause interruption of essential behaviors, it will not reach levels sufficient to kill or permanently injure juvenile and adult salmonids. Additionally, the total area affected by increased turbidity is relatively small when compared to the total size of the Willamette River in the project. Rearing juvenile salmonids and migrating adults can relocate to other nearby areas to escape the turbidity plumes.

Removal of Riparian Vegetation. The City proposes to remove 54 trees within 50 feet from the top of the bank of the Willamette River for the construction of the boat dock, boat ramp, pedestrian bridge, trail, scenic overlook, public plaza, and amphitheater. Trees range in size from 3-40 inches diameter at breast height. Tree species include big-leaf maple, red alder, willow, black cottonwood, black walnut, red oak, European hornbeam, flowering plum, and flowering cherry. The City proposes to plant a mix of herbaceous vegetation, shrubs, and trees along a narrow band (0-60 feet wide) in the riparian area. There will be a temporal loss of habitat

function (reduced shade, reduced inputs of woody material) from the removal of trees, especially large, mature trees until the newly planted trees establish and mature.

The removal of trees within the riparian area for stabilizing the bank and trail construction will result in a temporal loss of habitat function (reduced shade and reduced inputs of woody material). Reduced inputs of woody material could result in reduced cover, thus reducing refugia for adults and juveniles. The loss of standing trees will reduce the amount of organic litter in the stream which could lead to a small decreased abundance and diversity of prey for forage for juvenile salmonids inhabiting the area. A small percentage of the juveniles in the affected area will suffer a reduction in size upon outmigration and fitness, which makes fish more vulnerable to predation, or a reduction in fitness, which reduces the likelihood of long-term survival of individual fish.

Development within the 100 Year Floodplain. The Milwaukie Riverfront Park is located within the 100 year floodplain and consequently, all proposed upland development will be within the 100 year floodplain. Floodplain connectivity is very poor in the action area because of the existing steep banks along the Willamette River. In addition, the Willamette River is regulated by dams and flood events would likely be minimized or ameliorated by the regulation of flood waters upstream. However, during a 100 year flood event, the Willamette River could inundate the park. If the Willamette River inundated the park, juvenile salmonids would be exposed to structures and contaminants from the parking lot. However, the condition of the un-built floodplain will be improved due to stormwater treatment (where none exists currently), replacing impervious surfaces with pervious pavement, and planting native vegetation. Although there is a possibility that juvenile salmonids could be exposed to structures and increased contaminants during a flood event, the effects would likely be small due to the improved conditions.
A few juveniles from all populations of juvenile UWR Chinook salmon and UWR steelhead; the Clackamas River population of LCR Chinook salmon, LCR coho salmon, and LCR steelhead could be injured or killed, however, the loss of individuals is not likely to result in a measurable decrease in population abundance trends over time.

Stormwater Management. Stormwater runoff from impervious surfaces delivers a wide variety of pollutants to aquatic ecosystems, such as nutrients, metals, petroleum-related compounds, sediment washed off the road surface, and agricultural chemicals used in highway maintenance (Driscoll *et al.* 1990; Buckler and Granato 1999, Kayhanian *et al.* 2003). These ubiquitous pollutants are a source of potent adverse effects to ESA-listed salmon and steelhead, even at ambient levels (Hecht *et al.* 2007, Johnson *et al.* 2007, Sandahl *et al.* 2007, Spromberg and Meador 2006).

Increased impervious surface and resulting stormwater management will result in discharged stormwater to the Willamette River. The proposed project will add approximately 27,065 square feet of new impervious surface. Stormwater from the existing impervious surfaces presently flows down the river bank to the Willamette River. The proposed water quality facilities will meet the design stands of the current City of Portland, Stormwater Management Manual and will include vegetated bio-swales, infiltration planters, sloped planters, and a detention pond. Stormwater will infiltrate at or near the point at which rainfall occurs using bio-infiltration swales. Bio-infiltration swales have been identified as excellent treatments to reduce or eliminate

contaminants for highway runoff (Barrett *et al.* 1995, CWP and MDE 2000, NCHRP 2006, WSDOT 2006, Hirshman *et al.* 2008). With the addition of a bio-swale and a bio-slope in this project, treatment for dissolved metals will occur, where it was non-existent prior to the project.

Aquatic contaminants from stormwater runoff often travel long distances in solution or attached to suspended sediments, or gather in sediments until they are mobilized and transported by next high flow (Anderson *et al.* 1996, Alpers *et al.* 2000a, 2000b). These contaminants also accumulate in the prey and tissues of juvenile salmon where, depending on the level of exposure, they cause a variety of lethal and sublethal effects on salmon and steelhead, including disrupted behavior, reduced olfactory function, immune suppression, reduced growth, disrupted smoltification, hormone disruption, disrupted reproduction, cellular damage, and physical and developmental abnormalities (Fresh *et al.* 2005, Hecht *et al.* 2007, LCREP 2007).

Stormwater treatment, currently proposed for an area where there is no treatment of stormwater, will lead to decreased pollutant and metals loading and will be a benefit in the long term in the Willamette River and reduce the exposure of contaminants to salmon and steelhead in the action area.

Release of Contaminants. The use of heavy equipment during the proposed construction activities creates the opportunity for accidental spills of fuel, lubricants, hydraulic fluid, and other petroleum products, which, if spilled in the vicinity of the action area, could injure or kill aquatic organisms. Petroleum-based contaminants contain polycyclic aromatic hydrocarbons (PAHs), which can cause lethal as well as sublethal effects to fish and other aquatic organisms (Neff 1985). The proposed conservation measures, such as fueling equipment 150 feet from streams and implementing a spill and containment plan, will minimize the risk of contamination during in-water work. Based on the conservation measures, it is highly unlikely that there will be adverse effects from contaminants during the in-water work.

Summary of Effects on Listed Species. The City proposes to construct the boat dock, boat ramp, and stone steps during the ODFW in-water work window (July 1 to October 31). According to ODFW (2003), juvenile Chinook salmon, coho salmon, and steelhead will be present in the action area year-round. ODFW (2003) indicates that adult Chinook salmon holding and migration begins mid-January through September, adult coho salmon holding migration begins August through December, and adult steelhead holding and migration begins mid-November through May. Adverse effects from the construction of the boat dock, boat ramp, and stone steps will affect juvenile LCR and UWR Chinook salmon; LCR coho salmon; and LCR and UWR steelhead. Adverse effects from construction will affect adult LCR and UWR Chinook salmon and LCR and UWR steelhead. Lethal and sublethal effects are likely to occur as a result of the proposed project. Effects include death, physical injury, physiological stress, behavioral avoidance, delayed migration and decreased feeding and growth rates of juveniles. The effects to the species will vary based on the timing of the adverse effects and whether the species are present, as described above.

Lethal and sublethal effects are likely to occur as a result of the presence of the boat dock and the associate boating activity. Effects include death from increased predation, physiological stress, behavioral avoidance, and delayed migration of adults. Adverse effects for adults migrating

upstream will occur seasonally: Chinook salmon (mid-January through September), coho salmon (August through December), and steelhead (mid-November through May). Juvenile Chinook salmon, coho salmon, and steelhead will use the action area as rearing and foraging habitat year round. ODFW (2003) indicates that rearing and foraging juvenile steelhead and spring Chinook salmon are present in the action area mid-October to June. These effects will have no long-term impact on the abundance trends of any of the affected populations.

Some of the project elements will improve habitat conditions. The treatment of stormwater where there is no currently no treatment, the replacement of impervious pavement with pervious pavement, and planting native, riparian vegetation will improve some habitat conditions in the floodplain and reduce contaminant effects on fish from stormwater. These project elements will provide a long-term benefit to fish.

Effects on Critical Habitat. The following outlines effects to critical habitat in the Willamette River, Kellogg Creek, and Johnson Creek. All of these water bodies are designated as critical habitat.

Willamette River. The following outlines effects to critical habitat in the Willamette River.

Freshwater spawning.
There is no known spawning habitat within the project area in the Willamette River.

Freshwater rearing.
Floodplain connectivity – The Milwaukie Riverfront Park is located within the 100 year floodplain. Although structures will be placed within the floodplain, the connectivity will not be affected. Fish that access the floodplain during high water events will be exposed to improved habitat conditions from the treatment of stormwater where there is none currently, the replacement of impervious pavement with pervious pavement, and the planting of native, riparian vegetation.
Water quality – Turbidity and contaminant concentrations will increase during project activities (weeks). Over the long term, there will be small increased potential for toxic contamination (*i.e.* fuel, oil, lubricants) of the aquatic and substrate environments and turbidity from increased boating activity and recreational use for the life of the boat ramp and boat dock. Contaminants from stormwater will be minimized due the proposed treatment of stormwater where there is none currently, and the replacement of impervious pavement with pervious pavement.
Water quantity – Water quantity will not be affected by the proposed action.
Forage – Temporary decreased forage quantity and quality due to increased suspended sediment and removal of riparian vegetation. Small, but long-term reduction of forage due to contaminants from increased boating activity.
Natural cover – Natural cover for juveniles and adults will be impacted from reduced recruitment of large wood in the stream from the removal of trees within the riparian area due to the bank stabilization and trail. Although a portion of the riparian area will be replanted, there will be a temporal loss (approximately 75 years) of riparian function until the vegetation matures.

Freshwater migration corridors.

Free passage – Migration of juvenile salmonids will be disrupted and delayed due to the presence of the boat ramp and boat dock, and the increased boating activity. Disruption and delay of downstream migration of juvenile salmonids.

Water quality – Turbidity and contaminant concentrations will increase during project activities (weeks). Over the long term, there will be increased potential for toxic contamination (*i.e.* fuel, oil, lubricants) of the aquatic and substrate environments and turbidity from increased boating activity and recreational use for the life of the boat ramp and boat dock. Contaminants from stormwater will be minimized due the proposed treatment of stormwater where there is none currently, and the replacement of impervious pavement with pervious pavement.

Water quantity – Water quantity will not be affected by the proposed action.

Natural cover - Natural cover for juveniles and adults will be impacted from reduced recruitment of large wood in the stream from the removal of trees within the riparian area due to the bank stabilization and trail. Although a portion of the riparian area will be replanted, there will be a temporal loss (approximately 75 years) of riparian function until the vegetation matures.

Kellogg Creek. The following outlines effects to critical habitat in Kellogg Creek.

Freshwater spawning.

Spawning habitat is present in Kellogg Creek, however it located above the dam. The proposed project will therefore not have an effect on spawning habitat in Kellogg Creek.

Freshwater rearing.

Floodplain connectivity – The proposed project will not affect the floodplain connectivity with Kellogg Creek.

Water quality – Turbidity and contaminant concentrations will increase during project activities (weeks). Over the long term, there will be increased potential for toxic contamination (*i.e.* fuel, oil, lubricants) of the aquatic and substrate environments and turbidity from increased boating activity and recreational use for the life of the boat ramp and boat dock. The effects to water quality will be limited to the mouth and lower reach of Kellogg Creek to the extent of tidal influence. Contaminants from stormwater will be minimized due the proposed treatment of stormwater where there is none currently, and the replacement of impervious pavement with pervious pavement.

Water quantity – Water quantity will not be affected by the proposed action.

Forage – Decreased forage quantity and quality due to the removal of riparian vegetation. The effects of decreased forage will last for decades until riparian vegetation is established.

Natural cover – Natural cover for juveniles and adults will be impacted from reduced recruitment of large wood in the stream from the removal of trees within the riparian area due to the bank stabilization and trail. Although a portion of the riparian area will be replanted, there will be a temporal loss (approximately 75 years) of riparian function until the vegetation matures.

Freshwater migration corridors.

Free passage – Upstream migration of juvenile and adult salmonids will be disrupted and delayed due to the presence and use of the boat ramp and the boat dock, and the increased boating activity. Disruption and delay of upstream migration will limit the number of juvenile

and adult salmonids reaching rearing and spawning habitat in the upper reaches of the creek. Downstream migration of juvenile salmonids will be disrupted and delayed due to the presence of the boat ramp and the boat dock, and the increased boating activity. Disruption and delay of downstream migration of juvenile salmonids will limit the number and success of juvenile salmonids reaching the ocean.
Water quality – Turbidity and contaminant concentrations will increase during project activities (weeks). Over the long term, there will be increased potential for toxic contamination (*i.e.* fuel, oil, lubricants) of the aquatic and substrate environments and turbidity from increased boating activity and recreational use for the life of the boat ramp and boat dock. Contaminants from stormwater will be minimized due the proposed treatment of stormwater where there is none currently, and the replacement of impervious pavement with pervious pavement.
Water quantity – Water quantity will not be affected by the proposed action.
Natural cover - Natural cover for juveniles and adults will be impacted from reduced recruitment of large wood in the stream from the removal of trees within the riparian area due to the bank stabilization and trail. Although a portion of the riparian area will be replanted, there will be a temporal loss (approximately 75 years) of riparian function until the vegetation matures.

Johnson Creek. The following outlines effects to critical habitat in Johnson Creek.

Freshwater spawning.
There is no known spawning habitat within the project area in Johnson Creek. Spawning habitat is present in the upper portions of the creek, therefore the proposed project will not have an effect on spawning habitat.

Freshwater rearing.
Floodplain connectivity – The proposed project will not affect the floodplain connectivity with Johnson Creek.
Water quality – Turbidity and contaminant concentrations will increase during project activities (weeks). Over the long term, there will be increased potential for toxic contamination (*i.e.* fuel, oil, lubricants) of the aquatic and substrate environments and turbidity from increased boating activity and recreational use for the life of the boat ramp and boat dock. The effects to water quality will be limited to the mouth and lower reach of Johnson Creek to the extent of tidal influence. Contaminants from stormwater will be minimized due the proposed treatment of stormwater where there is none currently, and the replacement of impervious pavement with pervious pavement.
Water quantity – Water quantity will not be affected by the proposed action.
Forage – Decreased forage quantity and quality due to the removal of riparian vegetation. The effects of decreased forage will last for decades until riparian vegetation is established.
Natural cover – Natural cover for juveniles and adults will be impacted from reduced recruitment of large wood in the stream from the removal of trees within the riparian area due to the bank stabilization and trail. Although a portion of the riparian area will be replanted, there will be a temporal loss (approximately 75 years) of riparian function until the vegetation matures.

Freshwater migration corridors.

Free passage – Upstream migration of juvenile and adult salmonids will be disrupted and delayed due to the presence of the boat ramp and boat dock, and the increased boating activity. Disruption and delay of upstream migration will limit the number of juvenile and adult salmonids reaching rearing and spawning habitat in the upper reaches of the creek. Downstream migration of juvenile salmonids will be disrupted and delayed due to the presence of the boat ramp and boat dock, and the increased boating activity. Disruption and delay of downstream migration of juvenile salmonids will limit the number and success of juvenile salmonids reaching the ocean.

Water quality – Turbidity and contaminant concentrations will increase during project activities (weeks). Over the long term, there will be increased potential for toxic contamination (*i.e.* fuel, oil, lubricants) of the aquatic and substrate environments and turbidity from increased boating activity and recreational use for the life of the boat ramp and boat dock. Contaminants from stormwater will be minimized due the proposed treatment of stormwater where there is none currently, and the replacement of impervious pavement with pervious pavement.

Water quantity – Water quantity will not be affected by the proposed action.

Natural cover - Natural cover for juveniles and adults will be impacted from reduced recruitment of large wood in the stream from the removal of trees within the riparian area due to the bank stabilization and trail. Although a portion of the riparian area will be replanted, there will be a temporal loss (approximately 75 years) of riparian function until the vegetation matures.

Designated critical habitat within the action area for LCR Chinook salmon, LCR steelhead, UWR Chinook salmon, and UWR steelhead consists of a freshwater rearing sites and freshwater migration corridors and their PCEs as listed above. The effects of the proposed action on these features are summarized above as a subset of the habitat-related effects of the action that were discussed more fully in the Effects on Listed Species section . Some of the noise, habitat and water quality effects of in-water construction will be short-term (weeks) during and immediately following construction of the proposed action. Long-term effects to the habitat and water quality will result from changes to riparian habitat, increased shading, and increased boating activity. Within this reach of the Willamette River, the proposed project is located between Johnson Creek and slightly upstream of Kellogg Creek. These impacts will continue to affect the quality and function of PCEs at the project scale. Because the action area for this project is small and takes place in a small portion of the Willamette River, the intensity and severity of the effects described is relatively low at the watershed scale.

2.5 Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

The contribution of non-Federal activities to the current condition of ESA-listed species and designated critical habitats within the action area was described in the Status of the Species and Critical Habitats and Environmental Baseline sections, above. Among those activities were

urbanization, recreational activities, and habitat restoration. Those actions were driven by a combination of economic conditions that characterized these activities.

The most common activities reasonably certain to occur in the action areas addressed by this consultation are urbanization and recreational activities. These activities occur at the project site and upstream. Many of these activities are not subject to ESA consultation and will result in some adverse effects to LCR and UWR Chinook salmon; LCR coho salmon; and LCR and UWR steelhead, and their habitat. Some of the activities are subject to other non-federal regulations, and the effects to LCR and UWR Chinook salmon; LCR coho salmon; and LCR and UWR steelhead, and their habitat will be reduced to varying degrees under these regulations.

When considered together, these cumulative effects could have a small negative effect on the abundance and productivity of LCR and UWR Chinook salmon; LCR coho salmon; and LCR and UWR steelhead. Similarly, the conditions of the critical habitat PCEs could be slightly degraded by cumulative effects.

2.6 Integration and Synthesis

The Integration and Synthesis Section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we will add the effects of the action (Section 2.4) to the environmental baseline (Section 2.3) and the cumulative effects (Section 2.5) to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) Reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat (Section 2.2).

The Lower Willamette River has lost both primary channels and side channels (Hulse *et al.* 2002). Much of the off-channel and beach type habitat has been lost over the years due to development and channelization. The development of the Lower Willamette River has transformed much of the natural bank habitat into riprap and seawalls to stabilize banks and control flooding. In addition, commercial shipping has altered the natural landscape and river bottom of the lower reach through construction of docks and channel dredging. Gravel continues to be extracted from the river and floodplain and much of the sediment trying to move downstream in the Willamette River is blocked by dams. These river changes contribute to the limiting factors identified for ESA-listed species using the action area. Water quality in the project-area reach of the Willamette River reflects its urban location and disturbance history. The Lower Willamette River is currently listed on the DEQ 303(d) List of Water Quality Limited Water Bodies. DEQ listed water quality problems identified in the project area include toxics (mercury levels), biological criteria (fish skeletal deformities), bacteria (fecal coliform) and temperature (DEQ 2006). Milwaukie Riverfront Park currently consists of a dilapidated boat ramp and upland parking lot. The runoff from the parking lot is not treated and runs directly into the Willamette River. The bank of the Willamette River adjacent to the park is steep and lacks an understory and overstory of native riparian vegetation (although there are some native, mature

trees that exist). The shoreline and other areas below OHW contain debris consisting of large blocks of concrete.

The current extinction risk of LCR Chinook salmon is very high. To meet the recovery goals of LCR Chinook salmon, the extinction risk for the Clackamas population will need to be reduced from very high to moderate risk. In terms of numbers of individual fish, the Clackamas population will need to increase numbers from 670 (currently) to 1,211. The current extinction risk of LCR steelhead is moderate. To meet the recovery goals of LCR steelhead, the extinction risk for the Clackamas population will need to be reduced from moderate to low risk. In terms of numbers of individual fish, the Clackamas population will need to increase numbers from 4,676 (currently) to 10,655. The current extinction risk of LCR coho salmon is high. To meet the recovery goals of LCR coho salmon, the extinction risk for the Clackamas population will need to be reduced from high to very low risk. In terms of numbers of individual fish, the Clackamas population will need to increase numbers from 7,858 (currently) to 10,138.

The current extinction risk for UWR Chinook salmon is very high. To meet the recovery goal of UWR Chinook salmon, the extinction risk will need to be reduced from very high to very low risk. In terms of numbers of individual fish, numbers will need to increase from 6,256 (currently) to 26,299. The current extinction risk for UWR steelhead is moderate. To meet recovery goals for UWR steelhead, the extinction risk for will need to decrease from moderate to very low risk. In terms of numbers of individual fish, number will need to 9,230 (currently) to 15,769.
All populations of juvenile UWR Chinook salmon and juvenile UWR steelhead migrate through the action area from the Upper Willamette River basin to the ocean. The effects of the proposed action are likely to cause behavioral modifications, injury, or death to a few individuals. This will likely occur from pile driving and increased boating activity. The death of a few individuals from each population is not likely to decrease population abundance and productivity as the action area represents a small area for rearing and migration compared to available habitat.

The in-water work is scheduled to occur when LCR and UWR Chinook salmon; LCR coho salmon; and LCR and UWR steelhead juveniles are present. Adult LCR and UWR Chinook salmon; and LCR coho salmon will also be present in the action area during the in-water work.

During construction, individual fish in the action area are likely to be disturbed by construction activities and are likely to change migration and feeding behavior. Stress experienced by these individuals is likely to be brief and limited to four months for construction related activities. These fish are likely to respond by changing migration and feeding behavior, and leaving the action area, although some will be injured or killed directly by the effects of pile driving during construction. A very few other fish may be injured or killed indirectly due to the culmination of joint causes, such as stress due to the action, a previous wound inflicted by the environmental baseline, and genetic weakness. Although the in-water work is scheduled to occur during days of the year when juvenile and adult salmonids are present, the overall percentage of individuals in these species compared to the run size is small. This very small proportion of the number of individuals in each population will be directly or indirectly exposed to harmful sounds, turbidity, over-water structures, and chemical contamination. As noted in our effects analysis, these effects will have no long-term impact on the abundance trends of any of the affected populations.

Stress experienced by individual fish caused from the presence of the dock and boating activity will continue as long as the dock is present. The majority of the boating activity will likely occur May-September. All populations of juvenile UWR Chinook salmon and UWR steelhead; the Clackamas River population of LCR Chinook salmon, LCR coho salmon, and LCR steelhead will be affected by increased boating activity. The death of a few juvenile salmonids in each population is not likely to impact population abundance trends over time.

Adverse effects to the quality and function of critical habitat PCEs and biological and physical features influenced by this project will be minor and of a low intensity. The effects on water quality from increased turbidity will be at the highest intensity during the in-water work window (four months). Long-term increases in turbidity and contaminants will last for as long as the boat ramp and boat dock are in place. The treatment of stormwater will improve the water quality in the action area by treating runoff that is not currently being treated. The disturbance of benthic substrates will result in a short-term decrease in forage available to juvenile salmonids. Migration will be disturbed for juvenile and adult salmonids for as long as the boat ramp and boat dock are in place. These small adverse effects to the quality and function of PCEs and physical and biological features will be insignificant at the 5th-level HUC and designation scales.

2.7 Conclusion

After reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, any effects of interrelated and interdependent actions, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of LCR Chinook salmon, UWR Chinook salmon, LCR coho salmon, LCR steelhead, UWR steelhead,] or to destroy or adversely modify its designated or proposed (LCR coho) critical habitat.

2.8 Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by regulation to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. For this consultation, we interpret "harass" to mean an intentional or negligent action that has the potential to injure an animal or disrupt its normal behaviors to a point where such behaviors are abandoned or significantly altered.[13] Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be

[13] NMFS has not adopted a regulatory definition of harassment under the ESA. The World English Dictionary defines harass as "to trouble, torment, or confuse by continual persistent attacks, questions, etc." The U.S. Fish and Wildlife Service defines "harass" in its regulations as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3). The interpretation we adopt in this consultation is consistent with our understanding of the dictionary definition of harass and is consistent with the Service's interpretation of the term.

prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this incidental take statement.

2.8.1 Amount or Extent of Take

The distribution and abundance of fish that occur within an action area are affected by habitat quality, competition, predation, and the interaction of processes that influence genetic, population, and environmental characteristics. Additionally, there is no way to count or observe the number of fish exposed to the effects of the proposed action over the relatively long period of time during which these effects will occur (decades). In such circumstances, NMFS cannot provide an amount of take that would be caused by the proposed action and instead uses an indicator of the extent of take.

Activities necessary to construct and operate the boat ramp and boat dock will occur within the active channel of the Willamette River when juvenile Chinook salmon, coho salmon, and steelhead; and adult Chinook salmon and coho salmon are present. Incidental take caused by the adverse effects of the proposed action will include the following: (1) Sound pressure waves from pile driving will cause physical injury or death to ESA-listed fish in the vicinity of the action; (2) increased risk of injury or death due to increases in suspended sediment and pollutants during construction; and (3) increased risk of harassment, injury, or death from increased boating activity.

Take of ESA-listed fish as a result of pile driving will be difficult to detect. However, pile driving and associated sound pressure waves from this activity are expected to cause injury to ESA-listed salmonids in the Willamette River that are present within 328 feet of the pile driving activity and behavior effects are expected within 2,970 feet upstream and 4,708 feet downstream of pile driving activity. The distance of 328 feet for injury and 7,067 feet for behavioral effects is based on a number of factors including the estimated number of pile strikes, the time between pile strikes, and the time between piling installation. Incidental take of juvenile and adult ESA-listed fish is expected from the installation of nine 16-18 inch steel piles. Although mortality from physical injuries may not occur immediately, and some fish may recover depending on the severity of injuries, a certain degree of take is expected, albeit delayed. The extent of take for hydroacoustic effects is a maximum of 600 consecutive strikes with a 15 minute delay between each the next 600 consecutive strikes. Exceeding any of these limits will trigger the reinitiation provisions of this opinion.

The best available indicator for the extent of take caused by in-water construction is the extent of suspended sediment plumes. This feature best integrates the likely take pathway associated with in and near water construction, is proportional to the anticipated amount of take, and is the most practical and feasible indicator to measure. Thus, the extent of take indicator that will be used as a reinitiation trigger for this consultation is increased suspended sediment from construction activities with suspended sediment plumes 1,000 feet from the boundary of construction activities at 10% over the background level.

The best available indicator for the extent of take for the operation of the boat ramp and boat dock is the size of the parking facility for boat trailers and the size of the boat dock. This feature

best integrates the likely take pathway associated with this action, is proportional to the anticipated amount of take caused by the dock and boating activity, and is the most practical and feasible indicator to measure. Although this indicator is partially co-extensive with the proposed action, under the terms and conditions, there is a requirement to monitor and report with respect to this extent of take surrogate. If this indicator is exceeded, the Corps has authority to conduct compliance inspections and to take actions to address non-compliance, including post-construction (33 CFR 326.4). Thus, the extent of take indicator that will be used as a reinitiation trigger for this consultation is the size of the parking facility (12,800 square feet), the size of the boat dock (2,400 square feet), as well as the 600 consecutive strikes with a 15 minute delay associated with pile driving.

2.8.2 Effect of the Take

In Section 2.7, NMFS determined that the level of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

2.8.3 Reasonable and Prudent Measures

"Reasonable and prudent measures" are nondiscretionary measures to minimize the amount or extent of incidental take (50 CFR 402.02).

The following measures are necessary and appropriate to minimize the impact of incidental take of listed species from the proposed action:

The Corps shall:

1. Minimize incidental take from project-related activities by applying conditions to the proposed action that avoid or minimize adverse effects to water quality and the ecology of aquatic systems.
2. Avoid or minimize the amount and extent of take resulting from pile driving.
3. Ensure completion of a monitoring and reporting program to confirm that the take exemption for the proposed action is not exceeded, and that the terms and conditions in this incidental take statement are effective in minimizing incidental take.

2.8.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and the Corps or any applicant must comply with them in order to implement the reasonable and prudent measures (50 CFR 402.14). The Corps or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this incidental take statement (50 CFR 402.14). If the following terms and conditions are not complied with, the protective coverage of section 7(o)(2) will likely lapse.

1. To implement reasonable and prudent measure #1, the Corps shall ensure that:

   a. Work Window. To minimize effects to juvenile salmonids, construction shall be limited to the in-water work window of July 1-October 31.
   b. Notice to Contractors. Before beginning work, all contractors working on site shall be provided with a complete list of Corps permit special conditions, reasonable and prudent measures, and terms and conditions intended to minimize the amount and extent of take resulting from in-water work.
   c. Minimize Impact Area. The applicant will confine construction impacts to the minimum area necessary to complete the project.

2. To implement reasonable and prudent measure #2 (pile driving), the Corps shall ensure that:

   a. Pile Driving. Pilings may be installed with steel round pile 18 inches in diameter or smaller, and shall occur only during daylight hours with the sun above the horizon. This is to ensure that pile driving does not occur at dawn or dusk, which can be peak movement time for juvenile and adult salmonids.
      i. When possible, use a vibratory hammer for piling installation.
      ii. When using an impact hammer to drive or proof steel piles, use one of the following sound attenuation methods:
         (1) If water velocity is 1.6 feet per second (1.1 miles per hour) or less for the entire installation period, surround the piling being driven by a confined or unconfined bubble curtain that will distribute small air bubbles around 100% of the piling perimeter for the full depth of the water column.
            (a) General - An unconfined bubble curtain is composed of an air compressor(s), supply lines to deliver the air, distribution manifolds or headers, perforated aeration pipe, and a frame. The frame facilitates transport and placement of the system, keeps the aeration pipes stable, and provides ballast to counteract the buoyancy of the aeration pipes in operation.
            (b) The aeration pipe system shall consist of multiple layers of perforated pipe rings, stacked vertically in accordance with the following:

Water Depth (m)	No. of Layers
0 to less than 5	2
5 to less than 10	4
10 to less than 15	7
15 to less than 20	10
20 to less than 25	13

            (c) The pipes in all layers shall be arranged in a geometric pattern which shall allow for the pile being driven to be completely enclosed by bubbles for the full depth of the water column and with a radial dimension such that the

rings are no more than 0.5 m from the outside surface of the pile.

(d) The lowest layer of perforated aeration pipe shall be designed to ensure contact with the substrate without burial and shall accommodate sloped conditions.

(e) Air holes shall be 1.6 mm (1/16-in) in diameter and shall be spaced approximately 20 mm (3/4 in) apart. Air holes with this size and spacing shall be placed in four adjacent rows along the pipe to provide uniform bubble flux.

(f) The system shall provide a bubble flux 3.0 cubic meters per minute per linear meter of pipe in each layer (32.91 cubic ft per minute per linear foot of pipe in each layer). The total volume of air per layer is the product of the bubble flux and the circumference of the ring:

$V_t = 3.0\ m^3/min/m$ * Circum of the aeration ring in m

or

$V_t = 32.91\ ft^3/min/ft$ * Circum of the aeration ring in ft

(g) Meters shall be provided as follows:

(i) Pressure meters shall be installed at all inlets to aeration pipelines and at points of lowest pressure in each branch of the aeration pipeline.

(ii) Flow meters shall be installed in the main line at each compressor and at each branch of the aeration pipelines at each inlet. In applications where the feed line from the compressor is continuous from the compressor to the aeration pipe inlet the flow meter at the compressor can be eliminated.

(iii) Flow meters shall be installed according to the manufactures recommendation based on either laminar flow or non-laminar flow.

(2) If water velocity is greater than 1.6 feet per second (1.1 miles per hour) at any point during installation, surround the piling being driven by a confined bubble curtain (*e.g.*, a bubble ring surrounded by a fabric or non-metallic sleeve) that will distribute air bubbles around 100% of the piling perimeter for the full depth of the water column.

(a) General - A confined bubble curtain is composed of an air compressor(s), supply lines to deliver the air, distribution manifolds or headers, perforated aeration pipe(s), and a means of confining the bubbles.

(b) The confinement shall extend from the substrate to a sufficient elevation above the maximum water level expected during pile installation such that when the air

delivery system is adjusted properly, the bubble curtain does not act as a water pump (*i.e.*, little or no water should be pumped out of the top of the confinement system).

(c) The confinement shall contain resilient pile guides that prevent the pile and the confinement from coming into contact with each other and do not transmit vibrations to the confinement sleeve and into the water column (*e.g.* rubber spacers, air filled cushions).

(d) In water less than 15 meters deep, the system shall have a single aeration ring at the substrate level. In waters greater than 15 m deep, the system shall have at least two rings, one at the substrate level and the other at mid-depth.

(e) The lowest layer of perforated aeration pipe shall be designed to ensure contact with the substrate without sinking into the substrate and shall accommodate for sloped conditions.

(f) Air holes shall be 1.6 mm (1/16-inch) in diameter and shall be spaced approximately 20 mm (3/4 inch) apart. Air holes with this size and spacing shall be placed in four adjacent rows along the pipe to provide uniform bubble flux.

(g) The system shall provide a bubble flux of 2.0 cubic meters per minute per linear meter of pipe in each layer (21.53 cubic feet per minute per linear foot of pipe in each layer). The total volume of air per layer is the product of the bubble flux and the circumference of the ring:

Vt = 2.0 m3/min/m * Circ of the aeration ring in m or
Vt = 21.53 ft3/min/ft * Circ of the aeration ring in feet

(h) Flow meters shall be provided as follows:

(i) Pressure meters shall be installed at all inlets to aeration pipelines and at points of lowest pressure in each branch of the aeration pipeline.

(ii) Flow meters shall be installed in the main line at each compressor and at each branch of the aeration pipelines at each inlet. In applications where the feed line from the compressor is continuous from the compressor to the aeration pipe inlet the flow meter at the compressor can be eliminated.

(iii) Flow meters shall be installed according to the manufacturer's recommendation based on either laminar flow or non-laminar flow.

3. To implement reasonable and prudent measure #3, the Corps shall ensure that:

   a. Pile Driving Monitoring. During construction, if an impact hammer is used and hammer strikes exceed 600 consecutive strikes or if pile installation commences 15 minutes prior to the completion of 600 strikes, contact NMFS immediately at 503-230-5401 or Mischa.Connine@noaa.gov.

   b. Turbidity Monitoring. Visual turbidity monitoring shall be conducted and recorded as described below. Monitoring shall occur each day during daylight hours when in-water work is being conducted.

      i. Representative background point. A sample must be taken every 2 hours at a relatively undisturbed area at least 600 feet upcurrent from in-water disturbance to establish background turbidity levels for each monitoring cycle. Background turbidity, location, time, and tidal stage must be recorded prior to monitoring downcurrent.

      ii. Compliance point. Monitoring shall occur every 2 hours approximately 1,000 feet downcurrent from the point of disturbance and be compared against the background measurement. The turbidity, location, time, and tidal stage must be recorded for each sample.

      iii. Compliance. Results from the compliance points should be compared to the background levels at the corresponding depth taken during that monitoring interval. Turbidity may not exceed an increase of 10 percent above background during the summer in-water work window.

      iv. Exceedance. If an exceedance over the background level occurs, the applicant must modify the activity and continue to monitor every 2 hours. If an exceedance over the background level continues after the second monitoring interval, the activity must stop until the turbidity levels return to background. If the exceedances continue, then work must be stopped and NMFS notified so that revisions to the BMPs can be evaluated.

      v. Reporting. Copies of daily logs for turbidity monitoring shall be available to NMFS upon request.

   c. Size of Facilities Monitoring. Measure the size of the square footage of the boat ramp, boat dock, and parking area.

   d. Reporting. The applicant shall report all monitoring items, to include, at a minimum, the following:

      i. Piling installation. Report the number of strikes per pile, the number of pile installed, the type of piles installed, the time between pile installation, and type of hammer used.

      ii. Turbidity monitoring. Report the results from the turbidity monitoring, including location and time.

      iii. Facility size. Report the size of the square footage of the boat ramp, boat dock, and parking area.

e. The applicant will submit monitoring reports to:

National Marine Fisheries Service
Oregon State Habitat Office
Attn: NWR-2010-563
1201 NE Lloyd Boulevard, Suite 1100
Portland, OR 97232-2778

2.9 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

Identify and implement habitat enhancement or restoration activities in the Willamette River that:

- Restore or create off-channel habitat or access to off-channel habitat, side channels, alcoves, wetlands, and floodplains
- Remove old docks and pilings that are no longer in use
- Protect and restore riparian areas to improve water quality, provide long-term supply of large wood to streams, and reduce impacts that alter other natural processes
- Improve or regrade/revegetate streambanks
- Restore instream habitat complexity, including large wood placement
- Remove invasive plants and plant native species

Please notify NMFS if the Corps carries out this recommendation so that we will be kept informed of actions that are intended to improve the conservation of listed species or their designated critical habitats.

2.10 Reinitiation of Consultation

As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) The amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT CONSULTATION

The consultation requirement of section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. The MSA (section 3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Adverse effects occur when EFH quality or quantity is reduced by a direct or indirect physical, chemical, or biological alteration of the waters or substrate, or by the loss of (or injury to) benthic organisms, prey species and their habitat, or other ecosystem components. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH.

This analysis is based, in part, on the EFH assessment provided by the Corps and descriptions of EFH for Pacific coast salmon (PFMC 1999) contained in the fishery management plans developed by the Pacific Fishery Management Council (PFMC) and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

The proposed action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life-history stages of Chinook and coho salmon as identified in the Fishery Management Plan for Pacific coast salmon (PFMC 1999).

3.2 Adverse Effects on Essential Fish Habitat

Based on information provided by the action agency and the analysis of effects presented in the ESA portion of this document, NMFS concludes that proposed action will have adverse effects on EFH designated for Chinook and coho salmon. Adverse effects of the proposed action will include death, injury, and harassment from pile driving and from increased suspended sediment during construction on juvenile Chinook and coho. Adverse effects from the operation of the boat ramp and boat dock will include predation on juvenile Chinook and coho salmon from the presence of the boat dock; delayed upstream migration of adult Chinook and coho salmon from the boat ramp, boat dock, and boating activity; and delayed migration and feeding behavior on juvenile and adult Chinook and coho salmon.

3.3 Essential Fish Habitat Conservation Recommendations

NMFS expects that fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in Section 3.2 above, approximately 1.5 acres of designated EFH for Pacific coast salmon.

1. Follow term and condition 1 and 2 as presented in the ESA portion of this document to minimize adverse effects to water quality and the ecology of aquatic systems from project-related activities (implementation).
2. Implement the six conservations presented as part of the ESA portion of this document.

3.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, the Corps must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation Recommendations unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)).

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

3.5 Supplemental Consultation

The Corps must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR 600.920(l)).

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The DQA specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

4.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are the Corps. Other interested users could include The City. Individual copies of this opinion were

provided to the Corps. This opinion will be posted on the NMFS Northwest Region web site (http://www.nwr.noaa.gov). The format and naming adheres to conventional standards for style.

4.2 Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

4.3 Objectivity

Information Product Category: Natural Resource Plan

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01, et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References Section. The analyses in this opinion/EFH consultation contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

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DEPARTMENT OF THE ARMY
Corps of Engineers, Portland District
Regulatory Branch

Inadvertent Discovery Plan (IDP)

Background

Traditionally, tribes have managed the lands in Oregon for thousands of years. Although these lands are now broken up into segments of various ownerships and managing agencies, Native Americans still retain a strong connection to their ancestral lands. For Oregon tribes, archaeological/burial sites are not simply artifacts of the tribe's cultural past, but are considered sacred and represent a continuing connection with their ancestors. Native American ancestral remains, funerary objects, sacred objects and objects of cultural patrimony associated with Oregon Tribes are protected under state and federal law. These laws recognize and codify the tribes' rights in the decision-making process regarding ancestral remains and associated objects. Therefore, both the discovered ancestral remains and/or archaeological objects should be treated in a sensitive and respectful manner by all parties involved.

It is the policy of the Corps Regulatory program to work effectively with Native American Tribes, landowners, resource agencies, historic preservation organizations, stakeholders, applicants and the public to comply with the National Historic Preservation Act and other applicable laws and regulations, Executive Orders, Presidential Memoranda, and policy guidance documents, and to efficiently process permit applications so that development projects can proceed for the good of the Nation's economic health and national security. Respectful and meaningful coordination and consultations between the Corps, Native American Tribes, and the State Historic Preservation Office are conducted as we strive to balance economic needs with historic preservation concerns.

This IDP ensures all parties involved, during inadvertent discovery of cultural materials, are contacted and fulfill their obligation under state and federal laws, including but not limited to:

National Historic Preservation Act (NHPA) – **[16 USC 470] [36 CFR 60]**
Native American Graves Protection and Repatriation Act – **[25 USC 3001] [43 CFR 10]**
Indian Graves and Protection Objects – **ORS 97.740-S 97.760**
Archaeological Objects and Sites – **ORS 358.905 – 358.955**
Procedures for the Protection of Historic Properties – **[33 CFR 325 – Appendix C]**
Consultation and Coordination with Indian Tribal Governments – **[Executive Order – 13175]**

Suspend Work

Cultural Resources and Human Burials: In the event evidence of human burials, human remains, cultural items, suspected cultural items, or historic properties, as identified by the National Historic Preservation Act, are discovered and/or may be affected during the course of the work authorized, the Permittee shall **Immediately Cease All Ground Disturbing Activities**.

Failure to stop work immediately and until such time as the Corps has coordinated with all appropriate agencies and complied with the provisions of 33 CFR 325, Appendix C, the National Historic Preservation Act and other pertinent regulations, could result in violation of state and federal laws. Violators are subject to civil and criminal penalties.

Notification Process for Permittee and/or Archaeological Monitor

The person(s) making the discovery shall immediately notify the permittee(s), the Corps of Engineers, and other appropriate agencies as necessary.

- Notification to the Portland District Regulatory Branch shall be made by fax (503-808-4375) as soon as possible following discovery but in no case later than 24 hours. The fax shall clearly specify the purpose is to report a cultural resource discovery, provide the Permittee's name, Corps Permit No., and the archaeological monitor's contact information for follow-up purposes.
- Follow up the fax notification with an email and phone call to the Corps of Engineers Project Manager identified in the permit letter.

Notification Process for Corps Project Manager

The Project Manager or person(s) designated to manage the inadvertent discovery shall immediately notify the following agencies:

- Oregon State Historic Preservation Office, Dennis Griffin, office phone (503) 986-0674.
- Washington Department of Archaeology and Historic Preservation, Greg Griffith, office phone (360) 586-3073.
- Oregon State Police **[if human remains are found]**, Sgt. Chris Allori, office phone (503) 731-3020, cell (503) 708-6461.
- Commission on Indian Services (CIS) [provide the list of appropriate Native American Tribes], Karen Quigley, Director, office phone (503) 986-1067.

Tribes:

- Confederated Tribes of the Grand Ronde Community of Oregon, Eirik Thorsgard (503) 879-1630; Don Day (503) 879-2185.
- Confederated Tribes of the Warm Springs Reservation of Oregon, Sally Bird (541) 553-3555.
- Confederated Tribes of the Siletz Reservation, Oregon, Robert Kentta (541) 351-0148.
- Confederated Tribes of the Umatilla Reservation, Oregon, Carey Miller (541) 276-3629; Teara Farrow (541) 276-3629; Eric Quaempts (541) 276-3447.
- Cow Creek Band of Umpqua Tribe of Indians, Jessie Plueard (541) 677-5575 ext. 5577.
- Coquille Tribe of Oregon, Nicole Norris (541) 756-0904.
- Klamath Tribes, Oregon, Lillian Watah (541) 783-2219 ext. 159; Perry Chocktoot (541) 783-2210 ext. 178.
- Confederated Tribes of Coos Lower Umpqua and Siuslaw Indians of Oregon, Agness Castronuevo (541) 888-7513.
- Fort Bidwell Indians Community of the Fort Bidwell Reservation of California, John Vass (530) 279-6310.
- Smith River Rancheria, California, Suntayea Steinruck (707) 487-9255 ext. 3180.
- Burns Paiute Tribe of the Burns Paiute Indian Colony of Oregon, Theresa Peck (541) 573-1375.
- Nez Perce Tribe of Idaho, Vera Sonneck (208) 843-7313.
- Yakama Indian Nation, Thalia Sachtleben, (509) 865-5121 ext. 6074.
- Cowlitz Indian Tribe, Washington, Dave Burlingame, (360) 577-6962.

The Corps will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Registry of Historic Places. In addition, the Corps will coordinate a Site Avoidance Plan (SAP) and/or a Scope of Work (SOW) with the SHPO/DAHP, the tribe(s) and the permittee to avoid or excavate the archaeological/burial site. In the event the Corps decides to delegate their cultural resource protection responsibilities to another federal or state agency, the Corps shall contact the interested parties and provide those parties with the appropriate new contact person(s).

Plan of Action (POA)

In the event human burials, human remains, cultural items, suspected cultural items, or historic properties, as identified by the National Historic Preservation Act, are discovered and/or may be affected during the course of the work authorized, the archaeological monitor, and/or designee, has the authority to temporarily stop all ground disturbance activities to further inspect the material(s). If an isolated artifact

(defined as fewer then 10 artifacts by the Oregon SHPO) is identified, the monitor shall determine whether sufficient quantities and/or evidence of artifacts warrant presence to define a site. If upon closer examination the materials discovered are not consistent with human burials, human remains, cultural items, suspected cultural items, or historic properties, as identified by the National Historic Preservation Act, the monitor will allow work to proceed but with caution and at a slower rate until the monitor is confident no sites are represented.

Upon positive identification of human burials, human remains, cultural items, suspected cultural items, or historic properties, as identified by the National Historic Preservation Act, the monitor will maintain the cease work order, make efforts to secure the discovery location, and immediately notify the permittee and/or designee of the positive discovery as defined in the notification process above.

Human Remains POA

If human burials and/or human remains are discovered, the monitor will treat the remains with sensitivity and respect, ensure all unauthorized personnel have vacated the site location in a safe manner, make reasonable efforts to secure the location, and stabilize the remains if necessary, e.g. they are endangered of falling out a trench wall. Every reasonable effort will be made by the monitor(s) to ensure the remains are not physically handled or examined by unauthorized personnel until the proper notifications have been made. Reference is made to the Tribal Position Paper on Human Remains found on SHPO's website at:
http://www.oregon.gov/OPRD/HCD/ARCH/docs/Tribal_position_paper_on_Human_Remains.pdf.

Treatment Plan (TP)

A treatment plan (TP) will be developed between the Corps, SHPO/DAHP, Tribe(s) and the Permittee during consultation to ensure the proper handling and curation of human remains and/or cultural items is clearly outlined and agreed upon. The TP will define the items found; develop a strategy for handling/moving human remains and/or cultural items; develop a strategy for determining whether additional human remains and/or cultural items are endangered; determine if additional testing is necessary to identify site boundaries; and, determine the disposition of the human remains and/or cultural items. The TP will be agreed upon by all parties involved before any future ground disturbance activities resume.

Construction related activities and/or ground disturbance activities shall not resume until authorization from the Corps has been given.

This plan was developed to ensure the safeguarding of our Nation's heritage through inadvertent discovery, and to ensure the Corps' Tribal-Trust responsibilities are met with Diligence, Responsiveness, Reliability, Accuracy, and Respect to our fellow government agencies.