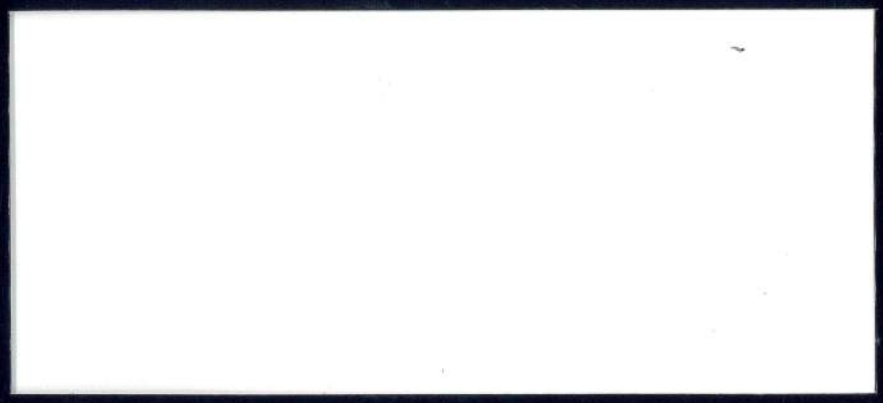

Wetland Mitigation Plan
Dunes Estates

Prepared for

Dunes Estates, Inc.
c/o Jon Schneidler.
1310 Fifth Avenue, Suite 2600
Seattle, WA 98101

Prepared by

AMEC Earth & Environmental, Inc.
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034

"February 17, 2006"
Reviewed/Revised August 23, 2006

AMEC Project Number: 5-91M-15325-0

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EXECUTIVE SUMMARY

Dunes Estates, Inc., (DEI) is proposing mitigation for past and proposed future impacts on wetlands on a portion of Dunes Estates, a 27-lot subdivision in Grays Harbor County, Washington. The Dunes Estates subdivision was approved by Grays Harbor County in 1990, when it was determined there were no wetlands within the areas proposed for home construction. The U.S. Environmental Protection Agency (EPA) has alleged that filling of 1.7 acres of wetlands occurred in the area of the home sites and that 2.73 acres of wetlands were disturbed by excavation in approximately 1999. The alleged fill occurred on most of the lots. Eighteen of the 27 lots within the subdivision have been purchased, representing 14 property owners. Four homes have been constructed and four additional lots graded for home construction. Seven of the remaining lots will require a total of approximately 21,800 square feet of additional wetland fill to provide the minimum buildable area for each owner to construct one home.

In spring 2004, Shapiro and Associates, Inc., (Shapiro and Associates) (acquired by AMEC Earth & Environmental, Inc., in June 2005) was retained to evaluate wetlands at Dunes Estates through aerial photograph interpretation and on-site investigations. In March 2004, Shapiro and Associates performed presence-or-absence fish surveys and collected water-quality data from the area of excavation (Shapiro and Associates 2004b). In addition, a wetland delineation was conducted on a portion of Dunes Estates in the vicinity of the proposed construction areas. The delineation used the 1987 *Corps of Engineers Wetlands Delineation Manual* (Corps 1987) and the 1997 *Washington State Wetland Identification and Delineation Manual* (Washington Department of Ecology 1997). Ten wetlands were identified within the study area located in the interdune area east of the second set of dunes and west of Dunes Lane. A second delineation was conducted in February 2005 in the northeast portion of the project site for a proposed parking lot for use by residents. One wetland was identified in that vicinity (Shapiro and Associates 2005).

As part of a settlement with the EPA, three types of wetland mitigation are proposed: enhancement, creation, and preservation. Enhancement would primarily occur in 2.96 acres of predominantly open water wetlands (Cowardin, Carter , et al. 1979) that were disturbed through excavation. Creation of 3.4 acres of wetland would mitigate impacts resulting from existing and proposed wetland fill and would occur in areas presently classified as upland dominated primarily by non-native species. In addition, 114 acres would be set aside for preservation in perpetuity through a conservation easement or similar mechanism. Mitigation would involve several plant communities consisting of forested, scrub-shrub, emergent meadow, and open-water habitats. Specific mitigation measures are proposed for improvement of habitat for sensitive species, including coho salmon *(Oncorhynchus kisutch),* Olympic mudminnow *(Novumbra hubbsi),* and native amphibian species, which have been documented in the excavated areas.

Following construction, mitigation sites would be maintained and monitored for success. Contingency plans would be implemented if performance standards were not met. All mitigation areas would be protected from further development by covenant or restrictive easement.

1.0 PROJECT DESCRIPTION

This report documents the mitigation measures proposed to respond to EPA's compliance order. Such measures include wetland creation to compensate for past and future wetland fill associated with establishment of a developable area on each lot; wetland enhancement as mitigation for excavation of ponds east of Ocean Lane; and preservation of the remaining wetlands east of Dunes Lane.

Proposed plant communities would consist of forested, scrub-shrub, emergent, and aquatic habitats. Communities would occur in several locations on either side of Ocean Lane in the approximate center of the lots between the eastern and western boundaries of the subdivision (State Route 109 to the east and the line of vegetation to the west).

Mitigation construction is proposed to occur in summer and fall of 2007 depending on receipt of all necessary permits. Following construction, the mitigation sites would be maintained and monitored for 10 years. Contingency measures would be implemented following monitoring if performance standards were not being met.

1.1 Project Location

Dunes Estates is a 27-lot subdivision approved by Grays Harbor County in 1990. Dunes Estates was developed by Dunes Estates Inc., (DEI). Since its development, most of the lots within this subdivision have been sold. The subdivision is located west of State Route 109 just north of the intersection of State Route 115 and State Route 109, about two miles south of the town of Ocean City in Grays Harbor County, Washington (Section 15, Township 18N, Range 12W, WM), within Lower Chehalis Water Resource Inventory Area (WRIA) 22 (Figure 1).

As originally platted, most of the 27 lots in Dunes Estates are approximately six acres in size. Each lot is long and narrow, generally 100 feet wide (Figure 2).The only area on each lot available for home construction extends approximately 100–150 feet west of Dunes Lane.

An initial wetland delineation (Shapiro and Associates 2004b) was conducted on a portion of Dunes Estates where fill is either existing or proposed. That wetland study area is west of Dunes Lane for approximately 120 feet. Wetlands within the study area were either partially or completely delineated depending on whether the wetland extended outside or was contained within the study area. The wetland study area is predominantly dune habitat consisting of grass-covered dunes and an interdune wetland area. West of Dunes Lane, some areas have been filled for septic systems and single-family home construction.

A second wetland delineation was conducted in the northeast portion of the subdivision where a parking lot is being proposed for use by Dunes Estates lot owners. No wetland fill is proposed for the parking area. The results of that delineation were incorporated into Shapiro's 2004 delineation report and republished by Shapiro in 2005 (Shapiro and Associates 2005).

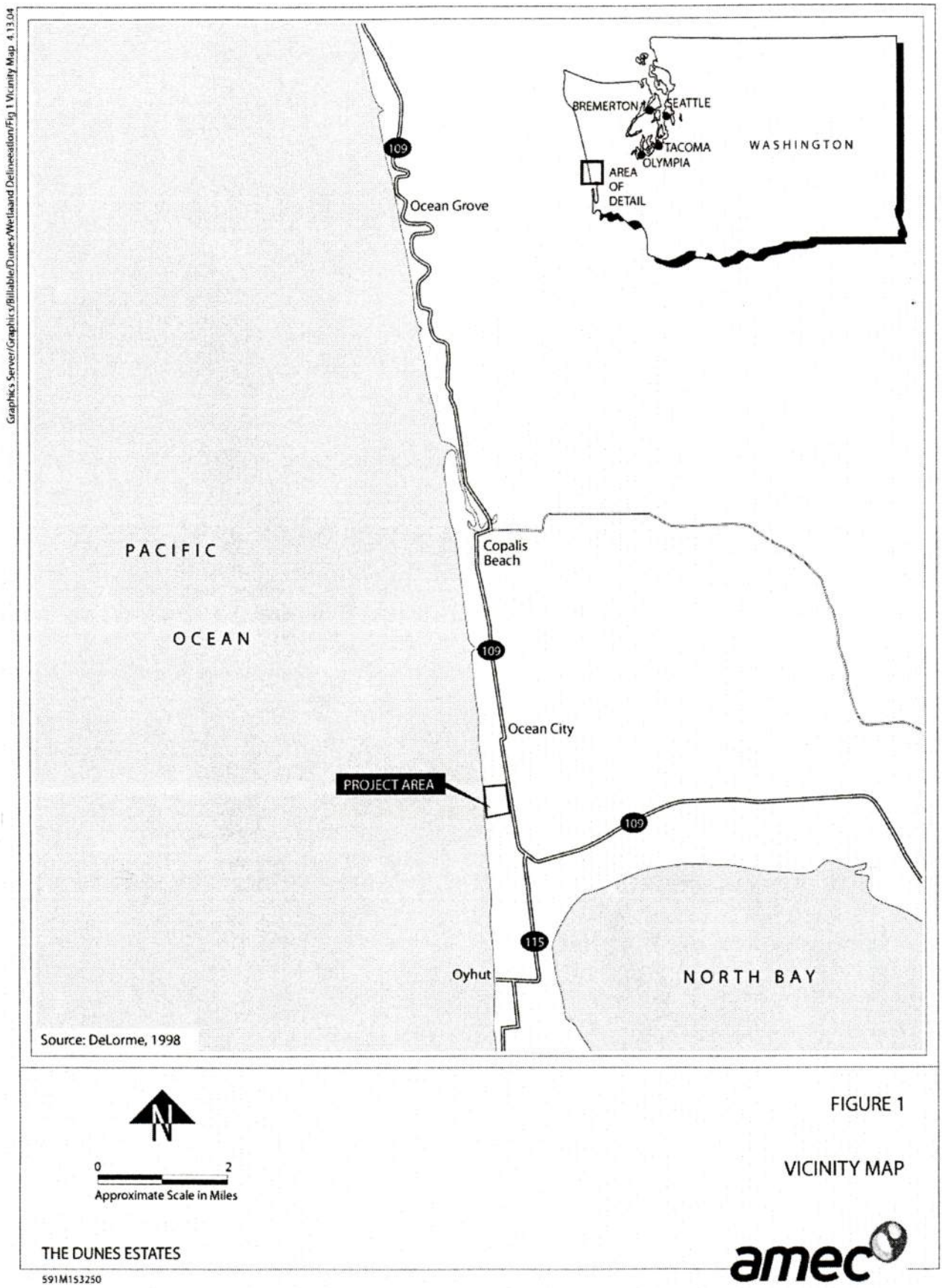


FIGURE 1

VICINITY MAP

THE DUNES ESTATES

591M153250

Graphics Server/Graphics/Billable/Dunes/Wetland Delineation/Fig 1 Vicinity Map 4.13.04

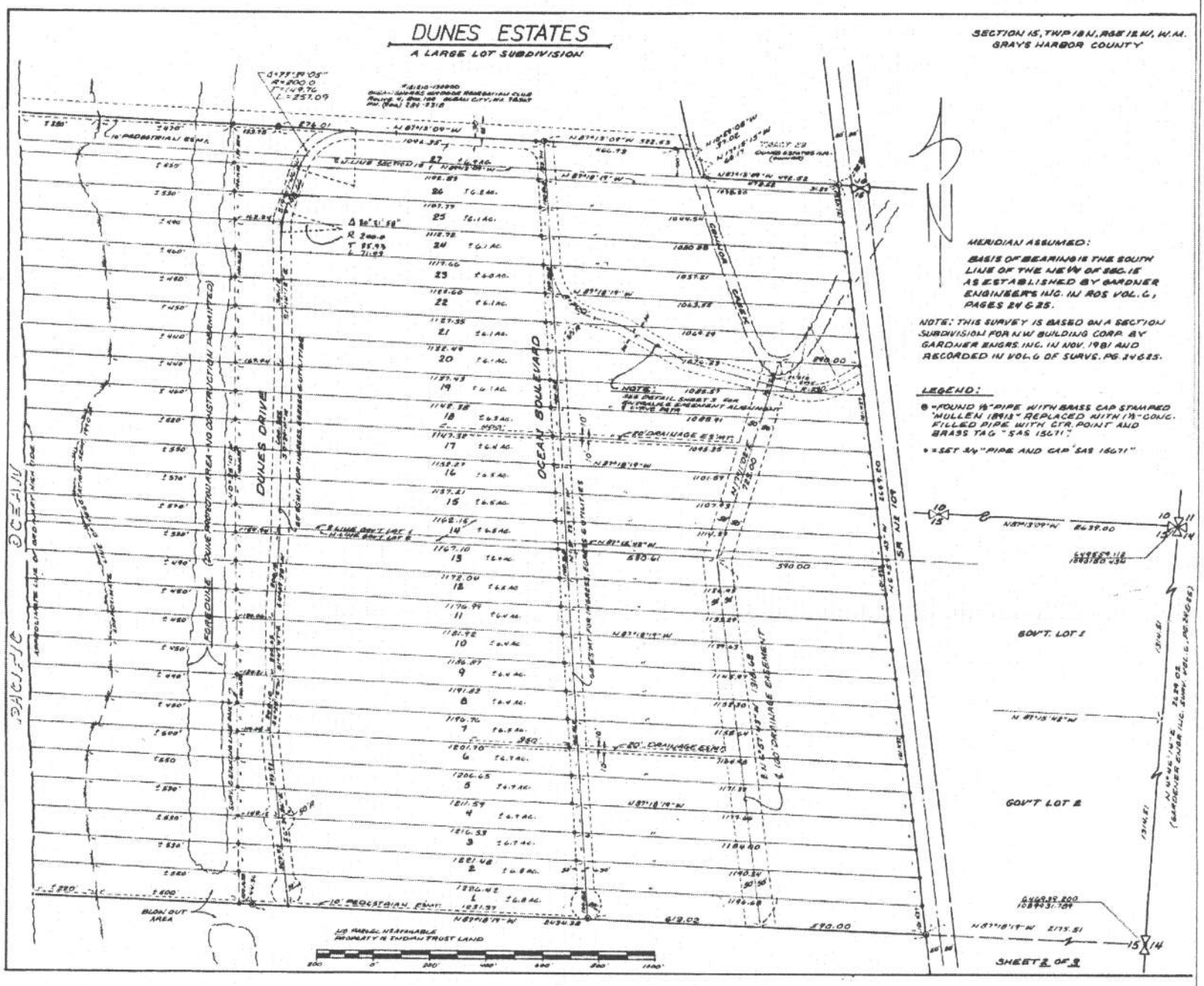


FIGURE 2

PLAT MAP

THE DUNES ESTATES

951M153250

amec

1.2 Responsible Parties

The responsible party and contact person for the proposed project is

Dunes Estates, Inc.
c/o Jon Schneidler
1301 Fifth Avenue, Suite 2600
Seattle, WA 98101

The wetland delineation report was initially prepared by

Shapiro and Associates, Inc.
101 Yesler Way, Suite 400
Seattle, Washington 98104
206-624-9190

The wetland mitigation plan was initially prepared by

Shapiro and Associates, Inc.
101 Yesler Way, Suite 400
Seattle, Washington 98104
206-624-9190

Since the initiation of this work, Shapiro and Associates, Inc. has been acquired by

AMEC Earth & Environmental, Inc.
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034
425-820-4669

Survey information was provided by

Mike Schmidt
Bergland, Schmidt & Associates, Inc.
216 East First Street
Aberdeen, Washington 98520
360-532-7630

1.3 Project History

A comparison of the approved plat with historic maps and aerial photographs shows that, at the time of subdivision approval in 1990, Dunes Lane was to be constructed on the crest of the foredune with development pads to the west. At that time, the area to the west of Dunes Lane consisted of an irregular incipient dune field with no consolidation. Ocean Boulevard (later Ocean

Lane) was located on an old roadbed that appears to have been the original road linking Ocean Shores to the south with Ocean City to the north. The area between Dunes Lane and Ocean Lane was to remain undisturbed except for construction of a water line from the community well in the northeast corner of the subdivision to each of the development sites. That area appears to have consisted of older dunes and interdunal wetlands. The approved plat map is presented in Figure 2.

Dunes Lane was constructed soon after approval of the plat, and the well and water lines were installed. Little improvement appears to have been made to Ocean Lane. Of the 27 lots, 18 have been sold by DEI to 14 different owners. The first house was constructed in 1995, and at present four homes have been constructed. As each home was constructed, septic systems were installed, and home site areas were filled with material taken by excavating areas east of Ocean Lane.[1] In 1999, septic systems were installed on all undeveloped lots, and fill material was placed on four lots in preparation for home construction. The material used for fill was excavated from areas east of Ocean Lane.

An EPA compliance order was issued in 2004 alleging disturbance of wetlands through both excavation and fill. The alleged wetland impacts are depicted in Figure 3. The compliance order was based on aerial photograph interpretation and a site visit by U.S. Army Corps of Engineers (Corps) personnel. Appendix A includes a copy of the Corps maps included in the compliance order. In response to the alleged impacts, EPA required mitigation, which could be in the form of wetland creation, enhancement, or preservation.

1.4 Project Summary

The EPA issued an administrative compliance order (Compliance Order) to DEI for disturbance of wetlands without permits at the Dunes Estates subdivision. In particular, the Compliance Order alleged DEI had disturbed 2.73 acres of wetland through excavation in the area east of Ocean Lane and filled approximately 1.7 acres west of Dunes Lane. The excavated material was used as fill material. Although DEI has denied these allegations, it has agreed to an administrative order on consent to mitigate for the impacts identified by EPA.

Through county approvals, property owners were limited to home site development in an area west of Dunes Lane. The four lots on which homes have been built and the four filled in 1999 have established that area of home-site development to be about 130–40 feet west of Dunes Lane. Based on a recent wetland delineation (Shapiro and Associates 2005), however, seven lot owners who acquired property from DEI do not have enough land, without some additional wetland disturbance, for construction of one single-family home on the property they own. The owners of each of those lots are proposing additional fill in order to construct one home. As part

[1] These homes and their associated excavations occurred independent and separate from the disturbances DEI is alleged to have created.

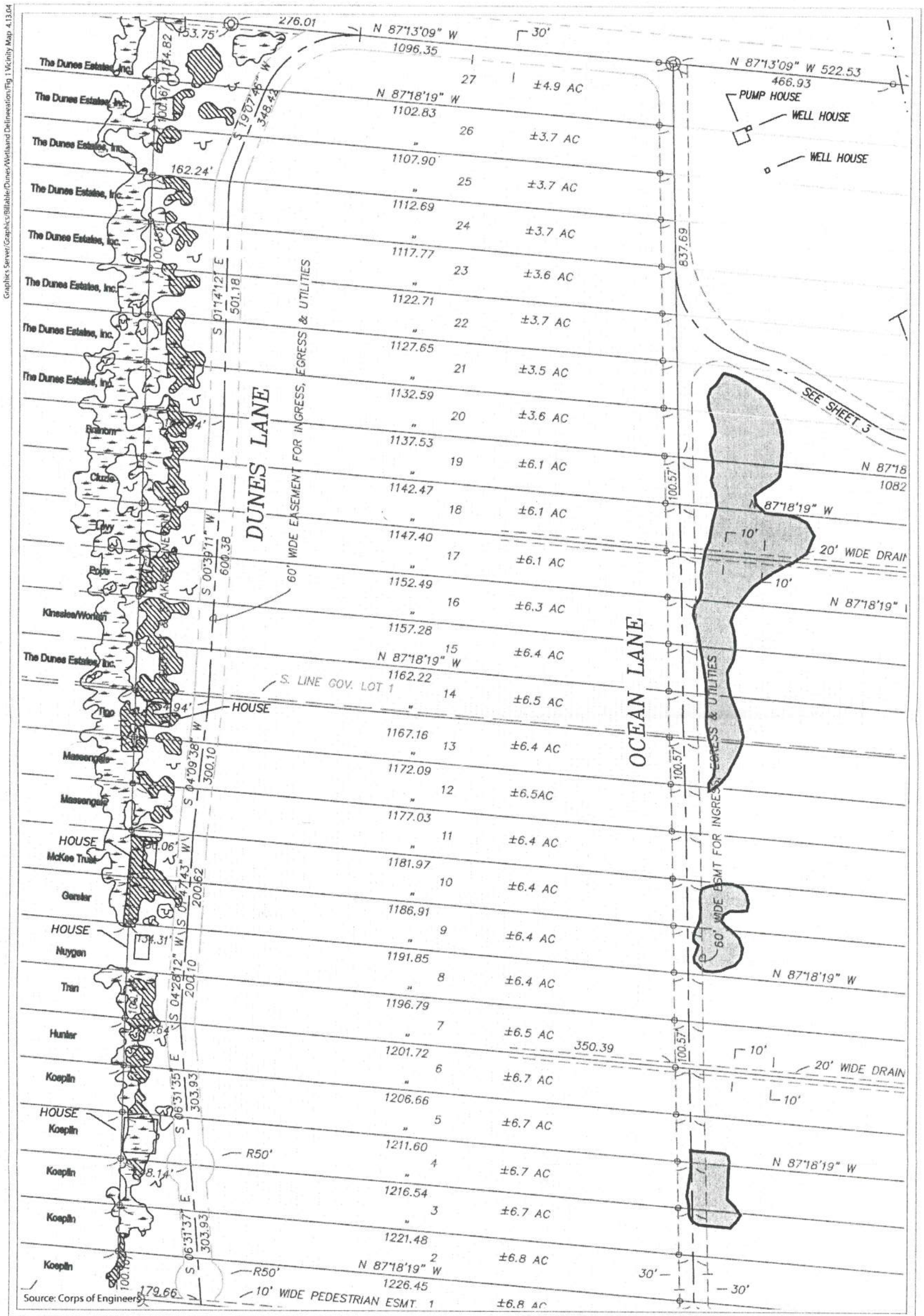


FIGURE 3

Alleged Areas of Wetland Impact

of the analysis for this mitigation plan, development constraints for each of these lots were identified and then an assessment was completed on avoiding and minimizing disturbance to wetlands while establishing a reasonable development pad upon which to build a home. The mitigation plan presented here is intended to compensate for both the existing and proposed impacts.

Finally, DEI proposes to construct a parking area in the northeast corner of the site just north and east of the eastern leg of Dunes Lane. This parking area, which would not be located within any wetland area, is intended to provide some additional area for owners, given the small home sites now proposed and the preservation of all other lot areas as part of the mitigation plan. That parking area is identified on Figure 4a.

2.0 ECOLOGICAL ASSESSMENT OF AFFECTED WETLANDS

2.1 Wetlands West of Dunes Lane

On March 23, 2004, Shapiro and Associates, Inc., staff performed a wetland delineation on a portion of Dunes Estates (Shapiro and Associates 2004b)Shapiro and Associates. The delineation used the 1987 *Corps of Engineers Wetlands Delineation Manual* (Corps 1987) and the 1997 *Washington State Wetland Identification and Delineation Manual* (Washington Department of Ecology 1997).

Ten wetlands were originally identified within the study area, subsequently called Wetlands A, B, C, D, E, V, W, X, Y, and Z. All wetlands are located in the interdune area east of the second set of dunes and west of Dunes Lane. Wetlands C, D, and Z are one- to two-acre depressional systems. Wetlands A, B, E, V, W, X, and Y are small depressional systems less than one acre in size. All wetlands are palustrine emergent (PEM) systems. No surface water flow is discernable within these wetlands. All of the delineated wetlands, and those that presumably have been filled, meet the Washington State Wetlands Rating System for Western Washington (Ecology Rating System) (Washington Department of Ecology 2004) criteria for Category II wetlands because they are interdunal wetlands that are either greater than one acre or are part of a wetland mosaic greater than one acre in size (Hruby 2004).

2.2 Wetlands Northeast of Dunes Lane

The wetland boundary along Conner Creek where the parking area is proposed was subsequently delineated on February 22, 2005, and designated "wetland P." Wetlands in this area are primarily palustrine forested (PFO) and palustrine scrub-shrub (PSS) systems adjacent to Conner Creek. This wetland would be considered a Category 1.

2.3 Wetlands East of Ocean Lane

Based on aerial photographs and the presence of spruce in scattered slash piles, PFO existed east of Ocean Lane prior to excavation of the ponds. Following excavation, these wetlands became largely palustrine open-water systems (POW) with limited areas of aquatic bed. The excavated wetlands also meet the Ecology criteria for Class II because they are located in an interdunal setting.

2.4 Wetlands between Dunes Lane and Ocean Lane

Based on interpretation of aerial photographs and several site visits, the wetlands between Dunes Lane and Ocean Lane are a combination of palustrine scrub-shrub and forested ecosystems located in interdunal swales. The scrub-shrub is generally in the western portion of the area, while the forested wetlands are found to the east. Similarly, the upland communities immediately east of Dunes Lane are dominated by grasses and forbs, while upland shrubs are on the middle dune, and forest dominates much of the upland to the east. No wetland disturbance is proposed in this area, so no delineation was performed.

2.5 Fish Surveys

As noted earlier in this report, DEI was issued a Compliance Order, which included among its terms the direction to perform presence/absence fish surveys in pond/wetland habitat on the east area of the site.

Shapiro and Associates performed presence-or-absence fish surveys in March 2004 using the following four techniques: electrofishing, minnow traps, beach seining, and observation stations (Appendix B of (Shapiro and Associates 2004a)SHAPIRO. Key McMurrey of the Washington Department of Fish and Wildlife (WDFW) issued a Hydraulic Project Approval scientific collection permit (#ST-G0917-01). Shapiro and Associates also collected water-quality data during the surveys.

Pond habitat conditions at the site currently resemble bowl shapes with sloping sides to the deepest area in the middle. During the March 2004 electrofishing survey, wading depth (about three feet or less) in the main pond was limited to about three or four feet from the shoreline because of the sloping nature and depth of the pond. Electrofishing surveys were not performed in the small pond because steep slopes prohibited wading; traps and observation stations were used, however. In January 2005, additional information on pond depths was collected. Use of a boat allowed a stadia rod to be extended to the bottom of the ponds, and depths were recorded at points along transects.

In the main pond, aquatic vegetation (primarily *Potamogeton* sp.) was common in the shallow or nearshore areas of the pond while vegetation was generally absent in the deeper water away from the nearshore areas. Aquatic vegetation in the small pond was generally confined to within one or two feet of the shoreline.

Seven aquatic species—four fish and three amphibians—were captured during the surveys. Captured fish species were coho salmon, Olympic mudminnow, three-spine stickleback *(Gasterosteus aculeatus),* and sculpin *(Cottus sp.).* Captured amphibian species were northwestern salamander (*Ambystoma gracile*), red-legged frog *(Rana aurora),* and rough-skinned newt *(Taricha granulosa).*

The survey area is located within the geographic area for the Southwest Washington evolutionarily significant unit (ESU) for coho salmon. The area for this ESU includes all naturally spawned populations of coho salmon from coastal drainages in southwest Washington between the Columbia River and Point Grenville. Originally, this ESU was part of a larger Lower Columbia River/Southwest Washington ESU for which listing was determined not warranted. Lower Columbia coho were identified as a separate ESU and listed as threatened on June 28, 2005. The Southwest Washington coho ESU status is currently undetermined (NOAA Fisheries 2006).

None of the other captured aquatic species are identified by federal or state agencies as protected or sensitive species. The fish species three-spine stickleback and sculpin are common and widespread in western Washington (Wydoski, and Whitney 1979). Amphibian

species northwestern salamander, red-legged frog, and rough-skinned newt are common and widespread in western Washington (Leonard, Brown , et al. 1993). Wetlands, which are a critical breeding and foraging habitat component for amphibians, are protected under a variety of federal, state, and local regulations.

Emergent and aquatic vegetation typically associated with wetland habitat in western Washington generally does not grow in water depths greater than three feet. At the time of the March 2004 Shapiro and Associates fish surveys, the majority of the ponds were open water habitat with approximately 10 percent to 20 percent aquatic vegetation coverage. Establishing a uniform pond depth in the range of 0 to 3 feet would maximize potential mudminnow habitat by replacing the deeper areas of the pond with shallow conditions that would allow native aquatic and emergent vegetation to colonize. Providing a soft mud bottom substrate preferred by mudminnows would also be an important feature in creating shallow pond conditions at the site. Because Olympic mudminnows already occupy the pond habitat, increasing optimal habitat characteristics throughout the pond, as opposed to just the nearshore areas, would likely result in a local increase in mudminnow population levels.

2.6 Mudminnow

The current distribution of the Olympic mudminnow includes the southern and western lowlands of the Olympic Peninsula, the Chehalis River and lower Deschutes River drainages, and south Puget Sound west of the Nisqually River. Olympic mudminnows are usually found in slow-moving streams, wetlands, and ponds. The WDFW status report for Olympic mudminnow identifies three habitat characteristics that appear to be required by the species: several inches of soft mud bottom substrate, little to no water flow, and abundant aquatic vegetation. Mudminnows have not been found in habitats that do not include all three of these characteristics (Washington Department of Fish and Wildlife 1999).

Eight mudminnows were documented during the March 2004 fish surveys performed by Shapiro and Associates: two in the main pond and six in the small pond. Three other fish species documented during the surveys—sculpin, three-spine stickleback, and coho salmon—have been identified by WDFW as fish species most frequently associated with Olympic mudminnow populations. Reticulate sculpin and three-spine stickleback were the two most common fishes, both occurring with more than 70 percent of sampled Olympic mudminnow populations. Coho salmon was the third most common species (50 percent) (Mongillo, and Hallock. M. 1999).

Mudminnow spawning takes place over an extended period. It begins in late November, subsides during the winter months, picks up again in March, and ends by mid-June. The spawning peak takes place in April and May (Meldrim 1968; Hagen, Moodie, et al. 1972). Water temperature during the breeding season ranges from 50 to 64 degrees Fahrenheit (F). Water-quality data collected during the March 2004 fish surveys documented a pond temperature range of 46.6 to 54.3 F (Shapiro and Associates 2004b; Shapiro and Associates 2005)Shapiro and Associates. Male Olympic mudminnows establish breeding territories approximately 44 inches long by 17 inches wide around clumps of vegetation. Territories are aggressively defended against intruders such as three-spine stickleback, salmon fry, or other male Olympic

mudminnows. Spawning and egg deposition occur within the vegetation (Hagen, Moodie, et al. 1972).

WDFW research indicates that Olympic mudminnow can occupy areas if suitable habitat conditions are established. A site near Lake Ozette with documented mudminnow use was cleared of vegetation in 1995 during dredging activity. No mudminnows were present during surveys in 1996 while the site was still lacking vegetation. As vegetation returned over the years, the number of mudminnows increased to predredging levels (Washington Department of Fish and Wildlife 1999).

3.0 MITIGATION APPROACH

3.1 Mitigation Sequencing

This mitigation plan describes measures to mitigate for previous impacts on wetlands within the project area and for additional impacts involved with establishing developable sites on each parcel. The original alleged impacts occurred in areas that were not known to contain wetlands. The original plat was approved with the homesites in uplands west of Dunes Lane, and the wetland area between Dunes Lane and Ocean Drive was avoided and protected by restrictive covenants. Impacts to the areas proposed for additional wetland fill have been avoided and minimized as described subsequently in this report. This plan has been developed through coordination with the Corps, EPA, Ecology, WDFW, and Grays Harbor County. Several avoidance, minimization, reduction, rectification, and mitigation measures have been incorporated into the design of the proposed fill portion of the project and are described in tables and figures of this report.

3.1.1 Avoidance, Minimization, and Reduction Measures

As noted earlier in this report, the original covenants permitted development in an area immediately west of Dunes Lane. At the time, there were no wetlands in that area. Subsequently, wetlands have formed, and areas on eight lots were filled and graded. The grading on those lots extended as much as 150 feet from Dunes Lane without regard to wetland avoidance. To evaluate the extent of wetland fill that would be needed to establish a reasonable development pad on each lot not yet filled, or alleged to have been partially filled, various building constraints were identified. The constraints included front yard, side yard, and septic system setbacks as well as a driveway of at least one automobile length. Several different grading scenarios were evaluated; each involved a 3000-square-foot development area. Table 1 compares the wetland impacts for each of these grading scenarios.

Typical Grading

With standard grading techniques, the disturbed area would be continuous and contiguous with existing fills. It would not extend out the entire 100 feet, but would probably extend a minimum of 150 feet from Dunes Lane, with 3:1 side slopes to the west.

Minimize Wetland Impacts

Under this alternative, each lot would be configured to minimize the wetland fill. Fill would be contoured around building pads. Some building pads would change shape or orientation (see Figures 4 a, b, c, and d). This lot layout also recognizes that when fill of two adjoining lots would result in a long wetland finger only a few feet wide, it would only be a matter of time before that wetland filled in naturally. Furthermore, a wetland finger of that configuration would have very limited function. Therefore, the loss of those wetland finger areas was included in the overall impact calculations.

Save Wetland Fingers

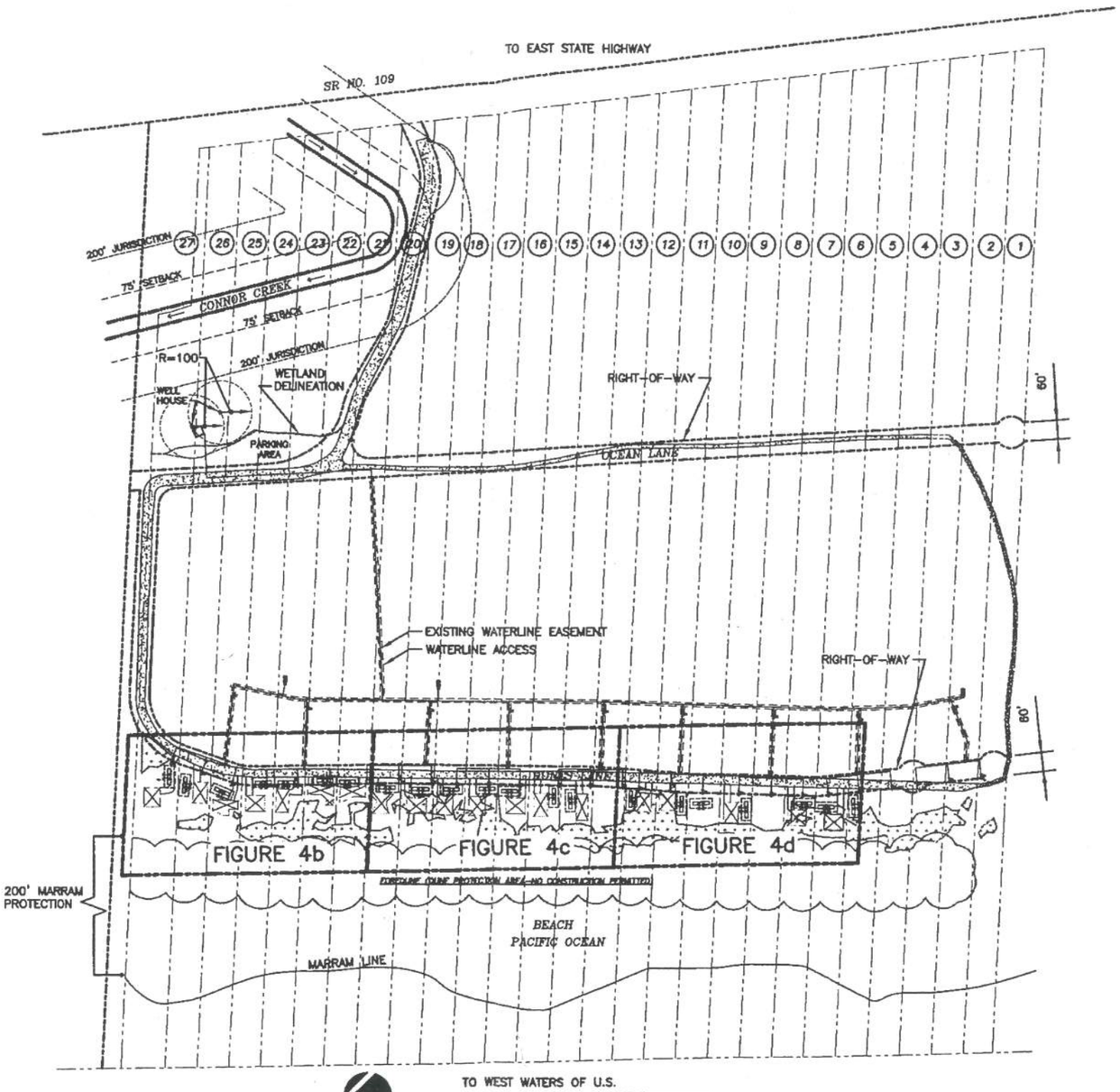
Same as previous, plus narrow wetland fingers between lots would be saved.

Create a Vertical Fill Slope with Retaining Walls

Retaining walls could be constructed to limit the development area to exactly 3,000 square feet.

Based on the results depicted in Table 1, the proponents compared the costs and effectiveness of each of the grading scenarios for establishing a 3,000-square-foot building area. The typical grading approach would be the most cost effective. The minimize-wetland-impacts alternative would be less cost-effective but would reduce wetland fill by about 1,465 square feet, as compared to the typical-grading alternative. As noted previously, saving the slivers of wetlands between various lots would be much more costly because of the delicacy of grading needed. It would also leave artificial features that would have limited wetland function and most probably would soon fill in with blowing sand. Constructing retaining walls would be extremely expensive and time consuming. As a result of these considerations, the proponents are proposing the minimize-wetland-impacts alternative. This is depicted in Figures 4a, b, c, and d.

Table 1 Comparison of Wetland Impacts for Alternative Grading Plans				WETLAND IMPACTS			
LOT INFORMATION				PROPOSED IMPACTS (SQ. FT.)			
LOT NO.	TAX LOT NO.	SITE ADDRESS (Dunes Lane)	CURRENT OWNER (as of 8/1/06)	3,000 SQ. FT. PAD TYPICAL GRADING	3,000 SQ. FT. PAD MINIMIZE WETLAND IMPACTS	3,000 SQ. FT. PAD MINIMIZE WETLAND IMPACTS SAVE FINGERS	3,000 SQ. FT. PAD WITH RETAINING WALLS
27	18121033-0030	60	Dunes Estates, Inc.	0	0	0	0
26	18121521-0010	62		0	0	0	0
25	18121521-0020	64		0	0	0	0
24	18121521-0030	66		0	0	0	0
23	18121521-0040	68		0	0	0	0
22	18121521-0050	70		0	0	0	0
21	18121521-0060	72		0	0	0	0
20	18121521-0070	74		0	0	0	0
19	18121521-0080	76	Robert & Nancy Branom	2,821	2,821	2,769	1,728
18	18121521-0090	78	Martin Levy and Sara Ciuzio	1,530	1,530	1,041	506
17	18121521-0100	84	Jerrold and Romina Levy	3,858	3,583	3,583	621
16	18121521-0110	90	Glenn and Julie Pope	0	0	0	0
15	18121521-0120	96	Richard E Kinssies	0	0	0	0
14	18121521-0130	102	Dunes Estates, Inc.	0	0	0	0
13	18121524-0010	108	Jeffrey W and Sheila Miller	EX. HOUSE	EX. HOUSE	EX. HOUSE	EX. HOUSE
12	18121524-0020	114	Alexandra Jean Massengale	4,445	4,364	4,364	2,732
11	18121524-0030	120	Randy and Kathryn L Massengale	2,414	2,072	2,072	1,572
10	18121524-0040	126	Timothy and Christine McKee Trust	EX. HOUSE	EX. HOUSE	EX. HOUSE	EX. HOUSE
9	18121524-0050	132	Gregory G and Mary M Kozlowski	0	0	0	0
8	18121524-0060	138	Kent D and Susan D Nugen	EX. HOUSE	EX. HOUSE	EX. HOUSE	EX. HOUSE
7	18121524-0070	144	John T H Tran and CJ Wareing Tran	3,708	3,325	3,288	413
6	18121524-0080	150	John R and Ellen Hunter; Brian and Katherine McIntosh	4,484	4,100	4,070	1,743
5	18121524-0090	156	Patrick and Carmela Koeplin	0	0	0	0
4	18121524-0100	162		EX. HOUSE	EX. HOUSE	EX. HOUSE	EX. HOUSE
3	18121524-0110	166		0	0	0	0
2	18121524-0120	172		0	0	0	0
1	18121521-0030	178		0	0	0	0
Totals				23,260	21,795	21,187	9,315



NOT FOR CONSTRUCTION
August - 2006

LEGEND:

EXISTING WETLAND

(27) LOT NUMBERS

SOURCE:
ARMY CORPS OF ENGINEERS PHOTO NO. 501005-108-19

SURVEY:
BERGLUND, SCHMIDT & ASSOCIATES - JUNE 29TH, 2005

0 400 800
SCALE IN FEET

amec
AMEC EARTH & ENVIRONMENTAL, INC.
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

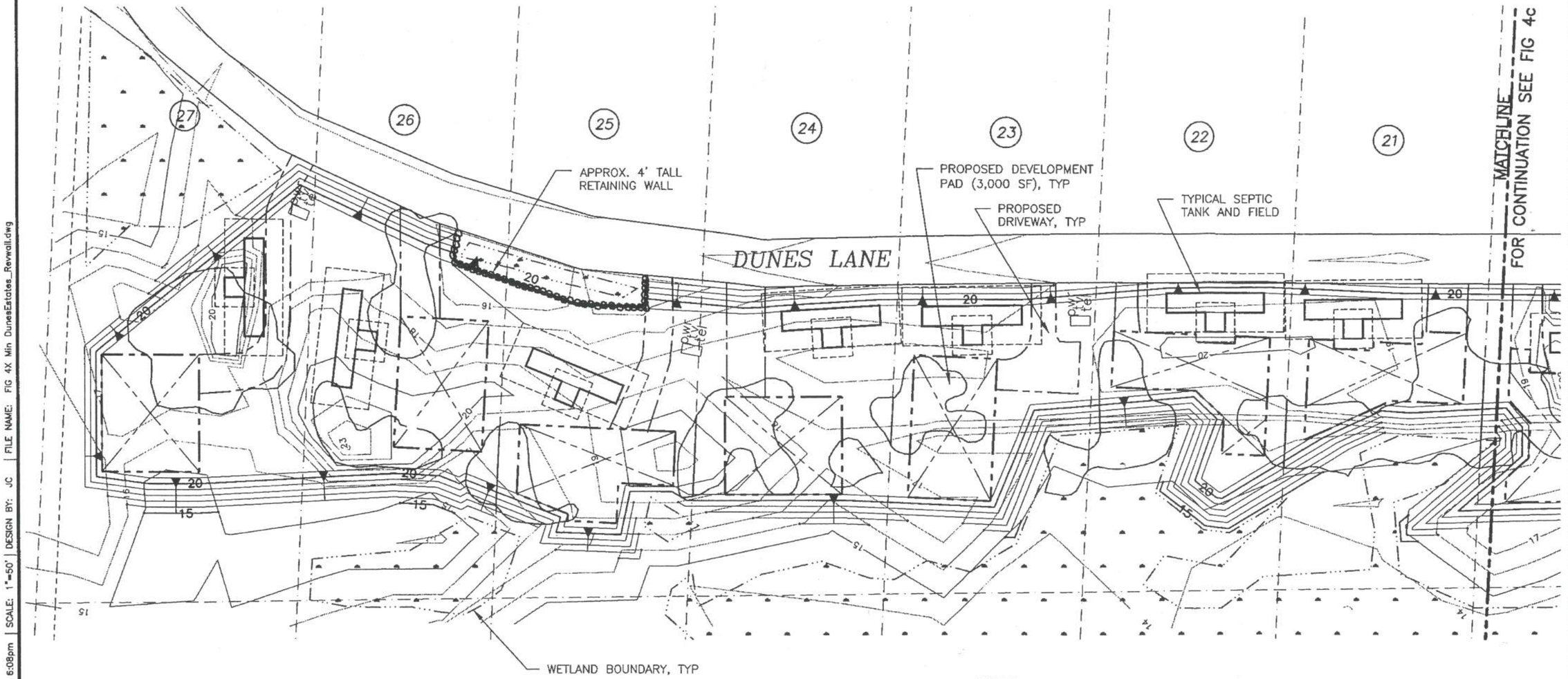
SITE PLAN

DUNES ESTATES
POTENTIAL FILL AREA PLAN

OCEAN SHORES, WASHINGTON

FIGURE
4a

JOB NO.: 05-91M-15325-0 | DWG DATE: 8-22-2006 10:32am | SCALE: 1"=50' | DESIGN BY: JC | FILE NAME: FIG 4a PLAN.dwg



LEGEND:

- EXISTING WETLAND
- WETLAND IMPACT AREAS – CORPS 1999
- —20— EXISTING CONTOURS (1 FOOT INTERVAL)
- —20— PROPOSED CONTOURS (1 FOOT INTERVAL)

SOURCE:
ARMY CORPS OF ENGINEERS PHOTO NO. 501005-108-19

SURVEY:
BERGLUND, SCHMIDT & ASSOCIATES – JUNE 29TH, 2005

NOT FOR CONSTRUCTION
AUGUST - 2006

0 50 100
SCALE IN FEET

NOTES:

1. EXISTING SEPTIC TANKS AND FIELD LOCATIONS HAVE BEEN APPROXIMATED. (TANK = 10'X10' W/ 5' OFFSET) (DRAIN FIELD = 10'X50' W/ 10' OFFSET)

2. FINISHED GRADE ELEVATIONS HAVE BEEN ASSUMED AT 21'. THE FINAL ELEVATION MAY VARY AND THE FINISH GRADE ELEVATIONS NEED FIELD VERIFICATION BY THE CONTRACTOR AT A MINIMUM HEIGHT OF 1 FOOT ABOVE THE TOP OF EXISTING SEPTIC TANKS.

amec
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Kirkland, WA, U.S.A. 98034-6918

SITE AND EXPLORATION PLAN

DUNES ESTATES
POTENTIAL FILL AREAS

OCEAN SHORES, WASHINGTON

FIGURE 4b

JOB NO.: 05-91M-15325-0 | DWG DATE: 8-22-2006 6:08pm | SCALE: 1"=50' | DESIGN BY: JC | FILE NAME: FIG 4X Min DunesEstates_Revwall.dwg

NOTE: GRADING WAS COMPLETED PRIOR TO THIS SURVEY AND PLACEMENT OF DEVELOPMENT PAD ON LOTS 9, 14–16.

MATCHLINE FOR CONTINUATION SEE FIG 4b

PROPOSED DEVELOPMENT PAD (3,000 SF), TYP

PROPOSED DRIVEWAY, TYP

TYPICAL SEPTIC TANK AND FIELD

DUNES LANE

EXISTING HOUSE #108

MATCHLINE FOR CONTINUATION SEE FIG 4d

WETLAND BOUNDARY, TYP

LEGEND:

- EXISTING WETLAND
- WETLAND IMPACT AREAS – CORPS 1999
- —20— EXISTING CONTOURS (1 FOOT INTERVAL)
- —20— PROPOSED CONTOURS (1 FOOT INTERVAL)

SOURCE:
ARMY CORPS OF ENGINEERS PHOTO NO. 501005–108–19

SURVEY:
BERGLUND, SCHMIDT & ASSOCIATES – JUNE 29TH, 2005

NOT FOR CONSTRUCTION
AUGUST - 2006

0 50 100
SCALE IN FEET

NOTES:

1. EXISTING SEPTIC TANKS AND FIELD LOCATIONS HAVE BEEN APPROXIMATED. (TANK = 10'X10' W/ 5' OFFSET) (DRAIN FIELD = 10'X50' W/ 10' OFFSET)

2. FINISHED GRADE ELEVATIONS HAVE BEEN ASSUMED AT 21'. THE FINAL ELEVATION MAY VARY AND THE FINISH GRADE ELEVATIONS NEED FIELD VERIFICATION BY THE CONTRACTOR AT A MINIMUM HEIGHT OF 1 FOOT ABOVE THE TOP OF EXISTING SEPTIC TANKS.

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Kirkland, WA, U.S.A. 98034-6918

SITE AND EXPLORATION PLAN

DUNES ESTATES
POTENTIAL FILL AREAS
OCEAN SHORES, WASHINGTON

FIGURE 4c

JOB NO.: 05-91N-15325-0 | DWG DATE: 8-22-2006 10:28am | SCALE: 1"=50' | DESIGN BY: JC | FILE NAME: FIG 4X Mln DuneeEstates_Revwall.dwg

NOTE: GRADING WAS COMPLETED PRIOR TO THIS SURVEY AND PLACEMENT OF DEVELOPMENT PAD ON LOTS 9, 14–16.

MATCHLINE FOR CONTINUATION SEE FIG 4c

PROPOSED DEVELOPMENT PAD (3,000 SF), TYP

PROPOSED DRIVEWAY, TYP

DUNES LANE

TYPICAL SEPTIC TANK AND FIELD

U.S. SR NO. 109

PROPOSED DRIVEWAY, TYP

EXISTING SEPTIC TANK AND FIELD, TYP.

EXISTING HOUSE #126

EXISTING HOUSE

PROPOSED DEVELOPMENT PAD (3,000 SF)

WETLAND BOUNDARY, TYP

LEGEND:

EXISTING WETLAND

WETLAND IMPACT AREAS – CORPS 1999

—20— EXISTING CONTOURS (1 FOOT INTERVAL)

—20— PROPOSED CONTOURS (1 FOOT INTERVAL)

SOURCE:
ARMY CORPS OF ENGINEERS PHOTO NO. 501005–108–19

SURVEY:
BERGLUND, SCHMIDT & ASSOCIATES – JUNE 29TH, 2005

NOT FOR CONSTRUCTION
AUGUST - 2006

0 50 100
SCALE IN FEET

NOTES:

1. EXISTING SEPTIC TANKS AND FIELD LOCATIONS HAVE BEEN APPROXIMATED. (TANK = 10'X10' W/ 5' OFFSET) (DRAIN FIELD = 10'X50' W/ 10' OFFSET)

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SITE AND EXPLORATION PLAN

DUNES ESTATES
POTENTIAL FILL AREAS

OCEAN SHORES, WASHINGTON

FIGURE 4d

JOB NO.: 05-91M-15325-0 | DWG DATE: 8-22-2006 10:28am | SCALE: 1"=50' | DESIGN BY: JC | FILE NAME: FIG 4X Min DunesEstates_Revwall.dwg

During construction of mitigation areas, a number of measures would be used to avoid and limit impacts to nearby sensitive areas. An erosion and sedimentation control plan would be prepared and implemented before any construction activity began. This plan would contain best management practices (BMPs) consistent with requirements of the *2001 Stormwater Management Manual for Western Washington* (Washington Department of Ecology 2001).

Temporarily inactive construction areas would be covered or mulched as required. All disturbed areas not planned for creation or enhancement would be seeded for revegetation.

3.1.2 Rectification Measures

Wetlands temporarily affected as a result of construction would be restored to original condition.

3.1.3 Mitigation Measures

Permanent impacts to wetlands as a result of development would be mitigated onsite. Mitigation would consist of wetland creation, enhancement, and preservation.

3.2 Goals and Objectives

Goals define the intent of the mitigation project. The objectives specify the direct actions that are necessary to achieve the goals, and the performance standards provide the specific measurements used to evaluate whether the goals and objectives are being met.

The overall goals of mitigation efforts are to (1) offset unavoidable impacts of the existing and proposed project; (2) achieve no net loss of wetland functions; and (3) improve existing habitat. Specific goals and objectives for wetland creation and wetland enhancement are described in following text.

Creation Goals
The goals of wetland creation are to compensate for past and future impacts from wetland fill by providing additional wetlands in several areas of the subdivision. Creation of wetlands would result in a corresponding replacement of lost functions and maintain or improve the existing wetland functions and values.

Creation Objectives and Performance Standards
The following objectives and performance standards establish specific criteria that would be used to measure the success of the wetland creation.

Objectives
A total of approximately 148,000 square feet (3.4 acres) of wetland would be created.

Conditions for colonization of a forested–scrub-shrub–emergent meadow mosaic of vegetation would be established in many areas. Portions of the creation areas containing herbaceous and grass species would be maintained without the use of mowers or line trimmers to encourage

colonization by native pioneer and climax community species (Table 2). Through succession, many of the pioneers eventually would be replaced by additional climax species, including overstory shrubs and trees, understory shrubs, and an understory herbaceous community.

Performance Standards

Vegetation

Colonization during the first year would be minimal as pioneer plants are becoming established from seed, live remnants of roots and rhizomes, and other propagules where salvaged topsoil is used and from vegetation existing adjacent to the mitigation site. During the following years, however, growth would be measured in cover percentages as plants become larger and more abundant.

Evaluation of the success of the mitigation project would be based on whether wetland hydrologic conditions are established and colonization by native species is occurring. Associated with colonization would be an increase in habitat with the creation of more diverse wetland plant communities. Created and enhanced wetlands would provide feeding, nesting, and protective cover for a variety of birds, small mammals, and large mammals such as deer.

Enhancement Goals

The goal of wetland enhancement is to improve areas previously affected by construction activities and to increase fish and wildlife habitat in the central portion of the site. Fish and wildlife mitigation measures were developed through coordination with the WDFW (Bell, pers. comm. 2004).

Enhancement Objectives and Performance Standards

The following objectives and performance standards establish specific criteria that would be used to measure the success of the wetland enhancement.

Objectives

A total of approximately 129,000 square feet (2.96 acres) of ponds and adjacent uplands would be enhanced.

Uniform pond depths in the range of 0 to 3 feet would be established to maximize habitat features associated with Olympic mudminnow and coho salmon (Figure 6). Conditions for colonization by aquatic plants in the ponds and by native trees, shrubs, and herbaceous vegetation would be created in disturbed wetland buffer areas.

A minimum of 24 pieces of large woody debris and five brush piles containing small woody debris would be placed within the ponds and in the disturbed pond or wetland (Figure 5). Fill material associated with disturbed pond or wetland buffer areas would be removed.

Figure 5 Proposed Location of LWD and Brush Piles

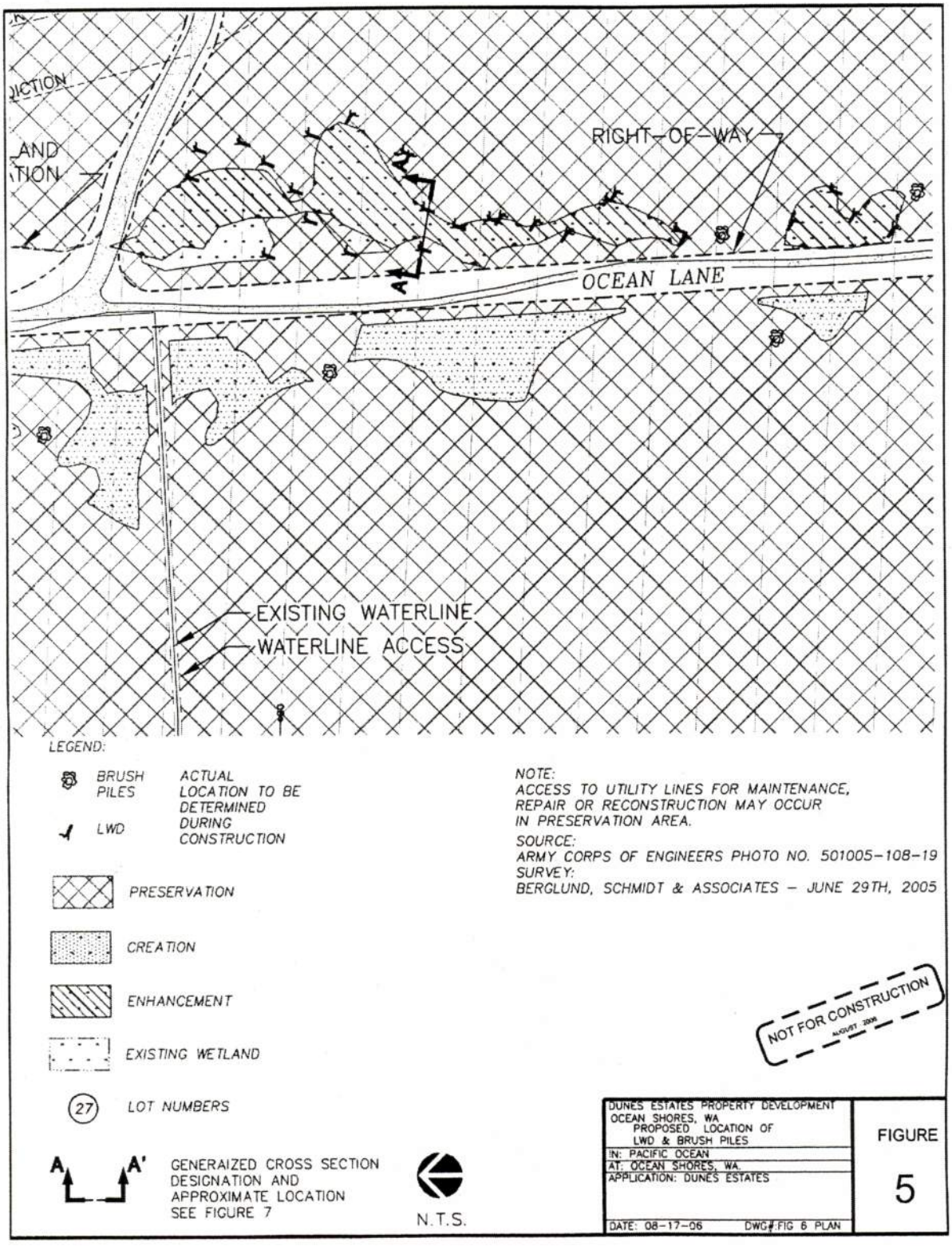
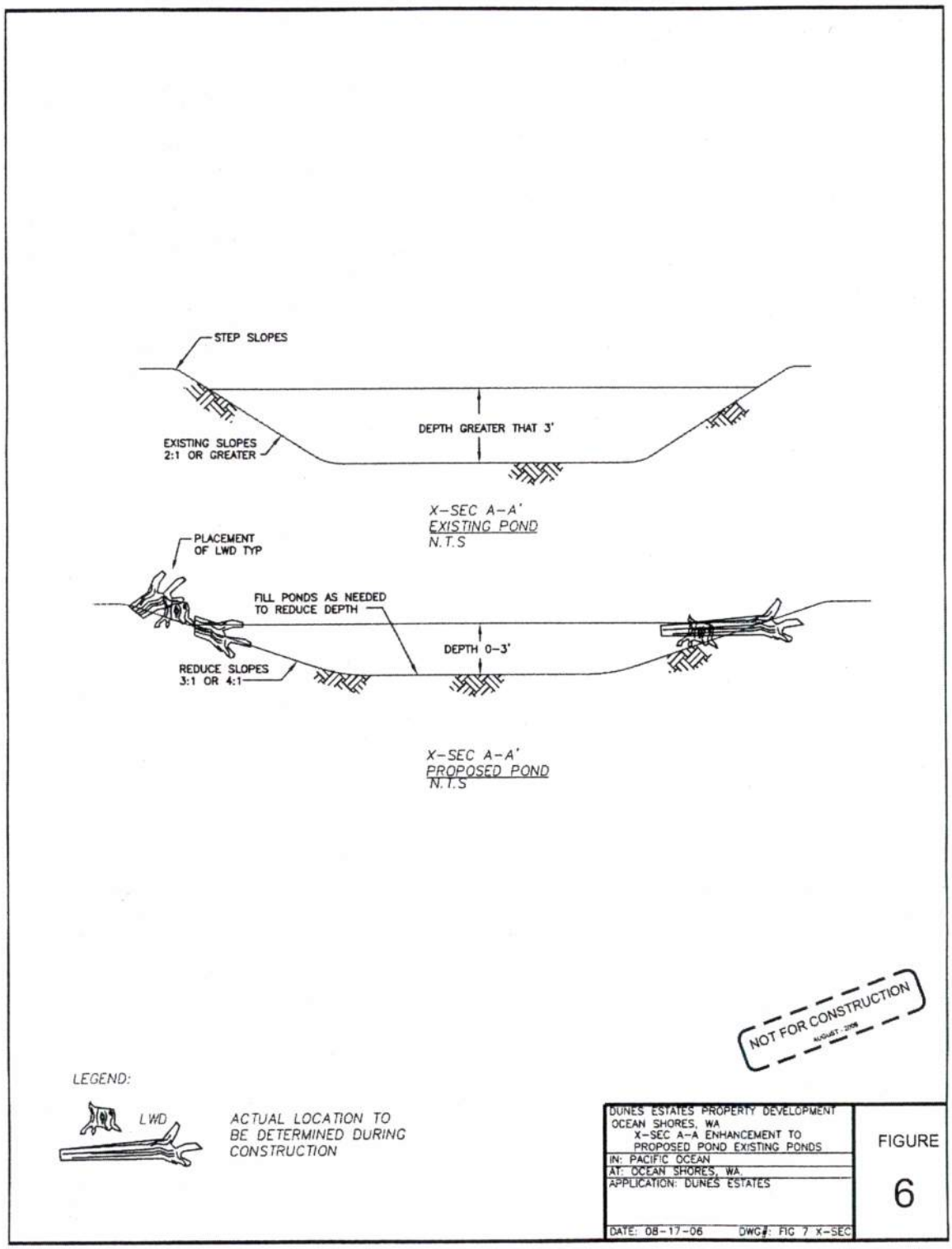


Figure 6 Cross-section A-A Enhancement to Proposed and Existing Ponds



In those areas where enhancement is to occur and colonizers are already present, continued colonization would be encouraged. As in the creation areas, the use of mowers or line trimmers during maintenance activities would be discouraged to allow colonization by native pioneer and climax community species (Table 2). Through succession, many of the pioneers eventually would be replaced by additional climax species, including overstory shrubs and trees, understory shrubs, and an understory herbaceous community.

Performance Standards

Vegetation:

Coverage would be achieved naturally by colonizing species.

a. Year 1-3: Vegetation will be reviewed during the site visit, but will not be required to meet a performance standard

b. Year 4: 10% coverage of vegetation from the list of species on Table 2

c. Year 8: 40% coverage of vegetation from the list of species on Table 2

d. Year 10: 80% coverage of vegetation from the list of species on Table 2

No more than 10% of aerial coverage by invasive species shall be allowed in the mitigation site

Hydrology:

The minimum hydrology performance standard shall be that the mitigation wetland shall have saturation to the soil surface or inundation for at least 12.5% of the growing season measured consecutively. This is approximately 30 days between March 1 and October 31 in western Washington.

Mudminnow habitat:
During monitoring year one numbers of mudminnows readily observable without trapping will be identified and recorded in each pond. This information will be used as the baseline for the following monitoring years 1, 2, 4, 6, 8, and 10.

Wildlife and Bird habitat:

Wildlife use of the mitigation areas will be monitored. Birds, mammals, reptiles, amphibians, and invertebrates readily observable without trapping will be identified and recorded. Where possible, notation will be made of the kinds and locations of the habitats with greatest use by each species. Notation also will be made of breeding or nesting activity, particularly of bird species, in the mitigation areas. During monitoring year one baseline information for wildlife and birds will be gathered. This information will be used to measure against the following monitoring years 1, 2, 4, 6, 8, and 10.

Success of the enhancement would be indicated by an increase in mudminnow habitat within the pond areas. Additional measures of success would consist of colonization by native plant species and the creation of 129,000 square feet (2.96 acres) of habitat, including feeding, nesting, and protective cover for a variety of amphibians, birds, small mammals, and large mammals such as deer.

Preservation Goals

All areas of Dunes Estates east of Dunes Lane—not including roads, wells, utility lines, and parking area—would be protected in perpetuity under a conservation easement or similar covenant. This would protect approximately 4,982,000 square feet (114 acres) of dune and wetland system from any future disturbance. This very large block would provide a habitat connection for Conner Creek to the north and east. It would also provide significant water-quality, recharge, and flood-storage functions. Table 3 compares areas of wetland impacts to the areas of proposed wetland enhancement, creation, and preservation. Figure 7 shows the alleged areas of wetland impact.

Table 2 List of Expected Colonizing Plant Species[1]

Common Name (Scientific Name)	Indicator Status[2]	Successional Status	Plant Community[3]
Trees			
red alder (*Alnus rubra*)	FAC	Mid	PFO / UPL
cascara (Rhamnus purshiana)	FAC–	Mid / Late	PFO / UPL
Sitka spruce (Picea sitchensis)	FAC	Mid / Late	PFO
shore pine (Pinus contorta)	FAC	Mid / Late	PFO / UPL
Pacific willow (Salix lucida var. lasiandra)	FACW+	Early / Mid	PSS / PFO
western red cedar (*Thuja plicata*)	FAC	Late	PFO / UPL
western hemlock (*Tsuga heterophylla*)	FACU–	Late	UPL
Shrubs			
vine maple (Acer circinatum)	FAC-	Mid / Late	PFO / PSS / UPL
western crabapple (*Malus fusca*)	FACW	Early / Mid	PSS
California wax-myrtle (*Myrica californica*)	FACW	Early / Mid	PSS
salal (Gaultheria shallon)	FACU	Mid / Late	UPL
Pacific blackberry (*Rubus ursinus*)	FACU	Early / Mid	UPL
Hooker willow (*Salix hookeriana*)	FACW-	Early / Mid	PSS
Douglas spirea (*Spiraea douglasii*)	FACW	Early / Mid	PSS
evergreen huckleberry (*Vaccinium ovatum*)	UPL	Early / Mid	UPL
Herbs			
coastal strawberry (*Fragaria chiloensis*)	UPL	Early	UPL
lupine (*Lupinus* sp.)	NI	Early	UPL
Pacific silverweed (Potentilla anserina ssp. Pacifica)	OBL	Early	PEM
clover (Trifolium sp.)	NI	Early	PEM / UPL
Rushes			
jointed rush (Juncus articulatus)	OBL	Early	PEM
Baltic rush (Juncus balticus)	FACW+	Early	PEM
mud rush (Juncus gerardii)	FACW+	Early	PEM
Sedges			
Cusick's sedge (*Carex cusickii*)	OBL	Early	PFO / PSS / PEM
slough sedge (*Carex obnupta*)	OBL	Early	PFO / PSS / PEM
sand dune sedge (*Carex pansa*)	OBL	Early	PFO / PSS / PEM
inflated sedge (*Carex vesicaria*)	OBL	Early	PFO / PSS / PEM
common spikerush (Eleocharis macrostachya)	OBL	Early	PFO / PSS / PEM
swamp horsetail (Equisetum fluviatale)	OBL	Early	PFO / PSS / PEM
slough sedge (*Carex obnupta*)	OBL	Early	PFO / PSS / PEM
Grasses			
American dunegrass (*Elymus mollis*)	*FACU*	*Early*	*UPL*
Grass spp.	*Varies*	*Early*	*PEM / UPL*
Ferns			
sword fern (Polystichum munitum)	FACU	Early	UPL
Shoreline Species			
Cusick's sedge (*Carex cusickii*)	OBL	Early	PEM
slough sedge (*Carex obnupta*)	OBL	Early	PEM
sand dune sedge (*Carex pansa*)	FAC	Early	PEM

Common Name (Scientific Name)	Indicator Status[2]	Successional Status	Plant Community[3]
inflated sedge (*Carex vesicaria*)	OBL	Early	PEM
common spikerush (Eleocharis macrostachya)	OBL	Early	PEM
swamp horsetail (Equisetum fluviatile)	OBL	Early	PEM
mare's tail (Hippuris vulgaris)	OBL	Early	PEM
Baltic rush (Juncus balticus)	FACW+	Early	PEM
tufted loosestrife (Lysimachia thrysiflora)	OBL	Early	PEM
buckbean (Menyanthes trifoliata)	OBL	Early	PEM
small-flowered forget-me-not *(Myosotis laxa)*	OBL	Early	PEM
marsh cinquefoil (Potentilla palustris)	OBL	Early	PEM
hard-stem bulrush (*Scirpus acutus*)	OBL	Early	PEM
soft-stem bulrush (*Scirpus validus*)	OBL	Early	PEM
floating bur-reed (Sparganium angustifolium)	OBL	Early	PEM
Floating Mat Species			
marsh pennywort (Hydrocotyle ranunculoides)	*OBL*	*Early*	*PAB*
false loosestrife (*Ludwigia palustris*)	*OBL*	*Early*	*PAB*
Floating-Leaved Rooted Species			
pond lily (Nuphar polysepalum)	OBL	Early	*PAB*
large-flowered pondweed (*Potamogeton amplifolius*)	OBL	Early	*PAB*
Nuttal pondweed (Potamogeton epihydrus)	OBL	Early	*PAB*
Free-Floating Species	OBL	Early	PAB
water lentil (Lemna minor)	OBL	Early	PAB
Submerged Species			
fennel-leaf pondweed (*Potamogeton pectinatus*)	OBL	Early	*PAB*
small pondweed (Potamogeton pusillus)	OBL	Early	*PAB*
Richardson's pondweed (Potamogeton richardsonii)	OBL	Early	*PAB*
water buttercup (Ranunculus aquatilis)	OBL	Early	*PAB*
ditchgrass (Ruppia maritima)	OBL	Early	*PAB*
water clubrush (Scirpus subterminalis)	OBL	Early	*PAB*

1 Does not include invasive species.

2 Reed (Reed Jr. 1988; Reed Jr., Peters , et al. 1993)

3 Adapted from (Cowardin, Carter, et al. 1979); OBL = obligative; FAC = facultative; FACW = facultative wet; PAB = palustrine aquatic bed; PEM = palustrine emergent wetland; PSS = palustrine scrub-shrub wetland; PFO = palustrine forested wetland; UPL = upland

Table 3 Wetland Impacts, Mitigation, and Additional Fill Needed (February 2006)

LOT INFORMATION		WETLAND IMPACTS			WETLAND MITIGATION				
					Wetland Creation	Wetland Enhancement	Habitat Preservation	Mitigation Credit[1]	Balance (Wetland Impacts)
LOT NO.	CURRENT OWNER (as of 8/1/06)	Corps Est. of Existing Wetlands Impacts SQ. FT.	3,000 SQ. FT. PAD MINIMIZE WETLAND IMPACTS	Total Corps Plus Minimized Grading	SQ. FT.	SQ. FT.	SQ. FT.	SQ. FT.	SQ. FT.
27	Dunes Estates, Inc.	2,000	0	2,000	6,355	0	136,321	6,662	4,662
26		3,200	0	3,200	9,691	0	164,634	8,718	5,518
25		1,200	0	1,200	4,038	0	168,069	6,948	5,748
24		1,600	0	1,600	14,310	0	160,620	10,124	8,524
23		800	0	800	4,510	0	172,782	7,263	6,463
22		800	0	800	14,457	0	149,226	9,793	8,993
21		4,400	0	4,400	13,449	8,250	139,580	9,136	4,736
20		2,800	0	2,800	16,522	14,962	118,855	9,469	6,669
19	Robert & Nancy Branom	5,200	2,821	8,021	9,238	12,288	159,347	8,391	370
18	Martin Levy and Sara Ciuzio	6,400	1,530	7,930	2,442	19,387	165,682	6,337	-1,593
17	Jerrold and Romina Levy	3,600	3,583	7,183	7,163	15,290	173,649	8,176	993
16	Glenn and Julie Pope	2,800	0	2,800	11,317	8,552	177,856	9,701	6,901
15	Richard E Kinssies	2,000	0	2,000	13,056	6,522	177,972	10,284	8,284
14	Dunes Estates, Inc.	4,400	0	4,400	5,377	6,254	179,492	7,775	3,375
13	Jeffery W and Sheila K Miller	6,400	EX. HOUSE	6,400	677	5,632	192,843	6,654	254
12	Alexandra Jean Massengale	2,400	4,364	6,764	0	848	200,936	6,698	-66
11	Randy and Kathryn L Massengale	3,200	2,072	5,272	330	0	205,097	6,947	1,675
10	Timothy and Christine McKee Trust	4,400	EX. HOUSE	4,400	4,544	5,317	197,687	8,104	3,704
9	Gregory G and Mary M Kozlowski	2,000	0	2,000	2,703	7,849	199,175	7,540	5,540
8	Kent D and Susan D Nugen	0	EX. HOUSE	0	0	2,964	214,664	7,155	7,155
7	John T H Tran and CJ Wareing Tran	3,600	3,325	6,925	0	0	216,957	7,232	307
6	John R and Ellen Hunter; Brian and Katherine McIntosh	3,200	4,100	7,300	5,048	0	209,770	8,675	1,375
5	Patrick and Carmela Koeplin	3,600	0	3,600	2,778	0	212,989	8,026	4,426
4		0	EX. HOUSE	0	0	5,281	218,869	7,296	7,296
3		2,800	0	2,800	0	9,511	216,586	7,220	4,420
2		400	0	400	0	0	228,980	7,633	7,233
1		800	0	800	0	0	223,442	7,448	6,648
Total Area (square feet)		74,000	21,795	95,795	148,005	128,907	4,982,080	215,404	119,609
Total Area (acres)		1.7	0.5	2.2	3.4	2.96	114	4.94	2.75

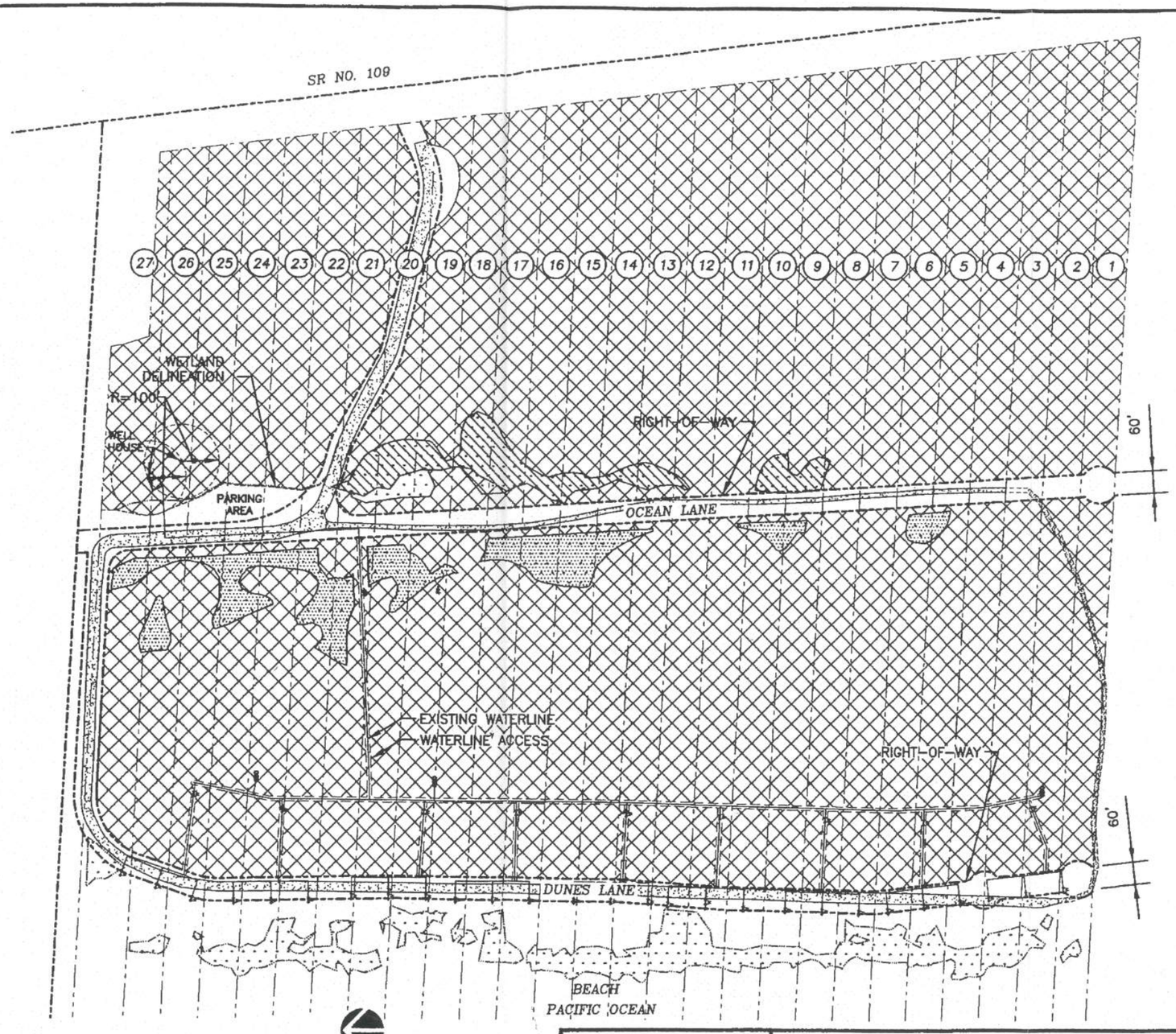
1 = Mitigation Ratios include 3:1 for Wetland Creation and 30:1 for Habitat Preservation.

4.0 PROPOSED MITIGATION SITES

The creation and enhancement mitigation areas are located along Ocean Lane in the central portion of the lots, approximately halfway between the western segment of Dunes Lane and the eastern boundary of the lots formed by State Route 109. These are shown on Figure 7. These locations offer opportunities for wetland creation and enhancement. The mitigation sites also would be connected to larger wetlands, riparian areas, and surrounding open spaces.

Wetland creation would occur on the east and west sides of Ocean Lane in a mosaic of clearings and vegetated areas. To the east of the road, creation would be accomplished in unvegetated areas. On both sides of the road, Scot's broom would be removed and the areas excavated to depths suitable to reach shallow groundwater and allow wetland hydrologic conditions to become established.

The enhancement area is a wetland system with pond (open water) habitat and is located on the east side of Ocean Lane. The main pond is approximately 800 feet long and ranges from about 50 to 100 feet wide. Ocean Lane is an unpaved, single-lane road that runs about 100 feet west and parallel to the pond. East of the pond is a large wetland system that includes emergent, scrub-shrub, and forested wetland communities. A variety of channels convey water throughout the wetland system; several channels, ranging from a few inches to two feet wide, were observed flowing into and out of the main pond during the March 2004 wildlife surveys (Shapiro and Associates 2004a; Shapiro and Associates 2005)Shapiro and Associates. A small pond about 50 feet wide and 100 feet long is located about 400 feet south of the main pond. The east side of the small pond is also adjacent to the large wetland system. Connor Creek is north of the wetland on the other side of a two-lane road. Culverts beneath the two-lane road appear to intermittently convey water from the wetland system to the creek. Conner Creek flows into the Pacific Ocean north of Ocean City about a half mile from the Dunes Estates property.



NOT FOR CONSTRUCTION
DECEMBER - 2006

LEGEND:

- PRESERVATION
- CREATION
- ENHANCEMENT
- EXISTING WETLAND
- (27) LOT NUMBERS

NOTE:
ACCESS TO UTILITY LINES FOR MAINTENANCE, REPAIR OR RECONSTRUCTION MAY OCCUR IN PRESERVATION AREA.

SOURCE:
ARMY CORPS OF ENGINEERS PHOTO NO. 501005-108-19

SURVEY:
BERGLUND, SCHMIDT & ASSOCIATES – JUNE 29TH, 2005

0 300 600
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WETLAND MITIGATION PLAN

DUNES ESTATES
WETLAND MITIGATION PLAN

OCEAN SHORES, WASHINGTON

FIGURE 7

JOB NO.: 05-91M-15325-0 | DWG DATE: 2-16-2006 2:54pm | SCALE: 1"=50' | DESIGN BY: JC | FILE NAME: FIG 5 PLAN.dwg

5.0 PRELIMINARY MITIGATION PLAN

Wetland mitigation would be accomplished in accordance with project goals and objectives.

5.1 Design Concept

Based on discussions between EPA, the Corps, and AMEC, much of the mitigation would consist of creating conditions for colonization by native species rather than by planting nursery stock. According to the EPA, this approach has been successful on similar coastal sites (Clark, pers. comm., 2004). In the pond areas, however, enhancement would occur through colonization, placement of fill to decrease the depth of the ponds, and installation of large woody debris (LWD) for additional habitat.

5.2 Site Analysis

This phase of the project involved gathering detailed information about site characteristics such as topography and depth to groundwater. Specific activities included surveying the bottom of the ponds to determine how much material needs to be placed; using augers to create holes to find groundwater elevations in the areas to be excavated for wetland creation; surveying the relative elevations of wetlands in adjoining areas; and determining how much material will be removed from the creation areas.

5.3 Construction

Creation

Wetlands would be created in selected areas on both sides of Ocean Lane. Creation would consist of excavation in areas of upland with little native vegetation and populations of nonnative invasive species. Excavation depths would vary based on the depth to the water table. Site-analysis investigations indicate excavation could be to depths of five feet. Following excavation, these areas would be left to revegetate through natural colonization. In general, a pioneer community of herbs and grasses is expected to become established, followed by shrub communities and a climax forested community (Wiedemann, Dennis , et al. 1974). This process of succession can be observed on the Dunes Estates site in the plant communities between the foredune west of Dunes Lane and the forest east of Ocean Lane.

Where creation is to occur, this process of succession would exist in both upland and wetland communities. Following excavation to the depth of the water table, development of wetland plant communities would progress from wet sand to marshes and rush meadows, which would then become colonized with wetland shrubs, followed by pine-spruce forest, and ending in a climax forest of spruce (Franklin, and Dyrness 1988). Similarly, dry sand would become a meadow of grasses and herbs, which then develops into a dense shrub layer and gradually into a pine or pine-fir forest with a dense understory. Further succession in dry areas would lead to a climax fir and hemlock forest.

Enhancement

Areas designated on the plan for enhancement include the ponds and adjacent cleared riparian areas east of Ocean Lane. These locations offer the opportunities for improvement of fish habitat in the ponds and wildlife habitat in surrounding riparian areas.

Ponds

Emergent and aquatic vegetation typically associated with wetland habitat in western Washington generally does not grow in water depths greater than three feet. At the time of the March 2004 Shapiro and Associates fish surveys, the majority of the ponds were open-water habitat with approximately 10 percent to 20 percent aquatic vegetation coverage. Establishing a uniform pond depth in the range of 0 to 3 feet will maximize potential mudminnow habitat by replacing the deeper areas of the pond with shallow conditions that would allow native aquatic and emergent vegetation to colonize. Providing a soft, mud-bottom substrate preferred by mudminnows will also be an important feature in creating shallow pond conditions at the site. Because Olympic mudminnow already occupy the pond habitat, increasing optimal habitat characteristics throughout the pond, as opposed to just the nearshore areas, would likely result in a local increase in mudminnow population levels. During construction, seine nets will be used to move resident fish to the shallow portions of the pond where no construction will occur. The exit channel will be assessed for appropriate width and depth, and any necessary changes will be made.

Riparian Zones

Riparian zones are the terrestrial component of aquatic ecosystems. Riparian habitat performs many functions that are essential to fish survival and productivity. They provide a recruitment source of woody debris, organic matter (fine litter), and invertebrates. Riparian vegetation provides shade and overhanging cover, thus maintaining cool temperatures needed by most fish. Riparian habitat contributes leaves, twigs, and insects to aquatic ecosystems, thereby providing basic food and nutrients that support fish and aquatic wildlife. Riparian vegetation, litter layers, and soils filter incoming sediments and pollutants, assisting in the maintenance of high water quality needed for healthy fish populations (Washington Department of Ecology 1997).

Proposed riparian buffer enhancement would occur on the currently disturbed areas along the west side of the pond habitat. The proposed buffer enhancement would consist of (1) removal of invasive species; (2) grading, where possible, to reduce slopes; (3) colonization by native trees, shrubs, and herbaceous plants native to western Washington; and (4) salvage of plants from the parking areas to jump-start colonization.

Wildlife habitat would be increased with the removal of nonnative vegetation and with the colonization of a variety of native plants. This would result in improved vegetative structure and diversity. Establishment of an herbaceous layer would provide cover, food, and nesting habitat for a greater number of animal species than presently exist in the area. Through the process of succession, a layered community would develop as the vegetation matures. This community

would consist of shrubs and forbs at the ground level and a mature tree overstory. A layered community would provide habitat for a variety of birds, small mammals, insects, invertebrates, reptiles, and amphibians typically observed in native riparian habitats (Washington Department of Ecology 1997).

Successful establishment of colonizing vegetation would require removal of weeds and invasive species on an ongoing basis. Such invasive species include Himalayan blackberry *(Rubus procerus)* and Scot's broom *(Cytisus scoparius)*.

Large and Small Woody Debris

Large woody debris in the form of downed trees, root wads, and large branches is an integral part of aquatic ecosystems. This material is important as refuge for fish, as food sources for aquatic invertebrates, and as storage area for sediments and food sources. Small woody debris provides these functions to a lesser degree because of its relatively rapid decomposition. Generally, the source of large and small woody debris is the riparian zone. Various size criteria have been established in the literature to define large woody debris. WDFW defines large woody debris as greater than 20 inches diameter at breast height (dbh). WDFW's definition for large woody debris does not identify a minimum length (Washington Department of Ecology 1997). The U.S. Fish and Wildlife Service (USFWS) and NOAA Fisheries definitions for large woody debris are greater than 24 inches dbh and longer than 50 feet (NMFS 1996; USFWS 1998). According to USFWS and NOAA Fisheries, properly functioning habitat for salmon and other fish includes more than 80 pieces of large woody debris per mile.

Large woody debris would be placed in the pond, along the shoreline of the pond, and in the pond-wetland buffer to provide cover, nutritional sources, and aquatic habitat diversity. At least 24 pieces of large woody debris would be placed in the area of the main pond and at least four pieces would be placed in the area of the small pond (NMFS 1996; USFWS 1998). This would provide at least double the amount of large woody debris recommended by NOAA Fisheries and USFWS for properly functioning salmon and fish habitat. Placement of large woody debris, and small woody debris in the form of brush piles, would also provide feeding, nesting, and protective cover for a variety of birds, amphibians, reptiles, and small mammals.

In addition to enhancing habitat for Olympic mudminnow, planting native vegetation in the pond-wetland buffer and adding large woody debris habitat features would also improve habitat conditions for coho salmon.

Removal of Fill Material

Disturbed areas west of the pond-wetland habitat include an unpaved single-lane road and several areas of cleared or bare ground between the unpaved road and the ponds. Following grading to reduce slopes, fill material and/or compacted soils that currently exist in the disturbed areas adjacent to the road would be replaced with native soils. These areas would then be revegetated through natural processes with native plants as described previously. Removal of

fill material in the pond-wetland buffer area would help restore the site to predisturbed conditions.

Mitigation Construction Sequence

Construction of the mitigation areas would be completed in several phases depending on whether the specific site was designated for creation or enhancement. Following construction, a locked gate will be installed at the north end of Ocean Lane.

The following is in response to questions raised by the U.S. Environmental Protection Agency (EPA) regarding specific details associated with the proposed wetland mitigation plan for the subdivision at Dunes Estates, near Ocean Shores in Grays Harbor County, Washington. The topics of concern include the following:

1. Construction window and scheduling
2. Locked gate
3. Fish passage
4. Vegetation around ponds
5. Vegetation salvage

1. Construction window and scheduling
   Species of concern within the project area are primarily the Olympic mud minnow and coho salmon. In addition, a bald eagle nest is located more than 0.75 miles from the project site.

   The Olympic mud minnow is a state-listed species of concern whose principal habitat area appears to be in and around Conner Creek in the vicinity of the Dunes Estates Project site. Fish sampling in 2005 within ponds constructed on the project site showed evidence of mud minnows (Shapiro and Associates Inc. 2004). Mud minnows generally begin spawning in late November.

   While coho salmon are not listed under the Endangered Species Act (ESA), they are identified under the Magnuson-Stevens Fisheries Act as species for which critical habitat must be addressed. According to WDFW (Bell 2006), the window for nontidal salmonid waters on the coast is June 15 through February 28.

   The only recognized bald-eagle nest in the vicinity is outside the 0.5-mile area of concern. The dense vegetation around much of the pond area that would reduce its value for waterfowl habitat would also reduce its value as a bald-eagle feeding area.

   Given the above, it would appear that any substantive work window would be based on the breeding characteristics of Olympic mud minnow and coho salmon. Thus, construction would begin sometime after June 15 and should be completed by September 15.

2. Locked gate
   EPA has requested that a locked gate be installed at the north end of Ocean Lane where it intersects with Dunes Lane. The proponent is willing to install such a gate. Access through the locked gate will be provided to owners of lots in Dunes Estates and to appropriate government agencies.

3. Fish passage
   Washington Department of Fish and Wildlife (WDFW) has requested improvement of fish passage from the wetland area south of Dunes Lane and east of Ocean Lane to Conner Creek. This would entail replacing the two existing 24-inch culverts with a larger bottomless box or similar culvert acceptable to the Washington Department of Fish and Wildlife or retaining the existing culverts but installing a new, acceptable fish-passage culvert. Culvert modifications and additions would be according to WDFW standards. (Design of Road Culverts for Fish Passage 2003)

4. Vegetation around ponds
   EPA has inquired about plantings along the west side of the existing ponds up to Ocean Lane. The existing mitigation plan calls for shallowing the grade of that area up to the east side of Ocean Lane and then vegetating the upland portion of the area. To the extent practicable, vegetation removed from the parking area would be replanted in that area.

   All of the area east of Dunes Lane—with the exception of the existing roads, water system, and proposed parking area—would be set aside in a conservation easement. This will protect the vegetated area.

5. Vegetation salvage
   See previous text.

Creation

Creation areas would be constructed in two phases. The first phase would include clearing and grubbing and salvage of topsoil, if any, from designated areas prior to excavations. Rough grading also would be completed during this phase and would consist of establishing subgrade elevations for the wetland creation areas. The second phase would include placement of salvaged topsoil and establishment of finish grade to create conditions for colonization.

Enhancement

Enhancement areas would be constructed in four phases: (1) clearing and grubbing to remove invasive species; (2) removal of fill in riparian zones and placement of material in ponds to reduce depth; (3) rough grading and placement of large and small woody debris; and (4) final grading.

No planting would be conducted at either the creation or enhancement sites because native trees, shrubs, and herbaceous species (Table 2) are expected to colonize these areas.

Construction Observation

A mitigation specialist or biologist familiar with the project should be present during implementation of the mitigation plan. The phases appropriate for field visits are (1) onsite preconstruction meeting; (2) confirmation of mitigation areas; (3) inspection of subgrade and spreading of topsoil, if any; and (4) final inspection.

Maintenance

Maintenance would include removal of invasive species. The use of line trimmers should be limited to areas without woody vegetation.

Conservation Easement

The conservation easement would apply in perpetuity to all mitigation and enhancement areas as well as to the undisturbed dune systems proposed to be preserved. The mitigation area may not be the subject of any future Department of the Army permit applications for fill or other development, except as may be required for maintenance, repair, or replacement of the existing water line, and the mitigation areas must be identified on the property deed.

6.0 MONITORING PLAN

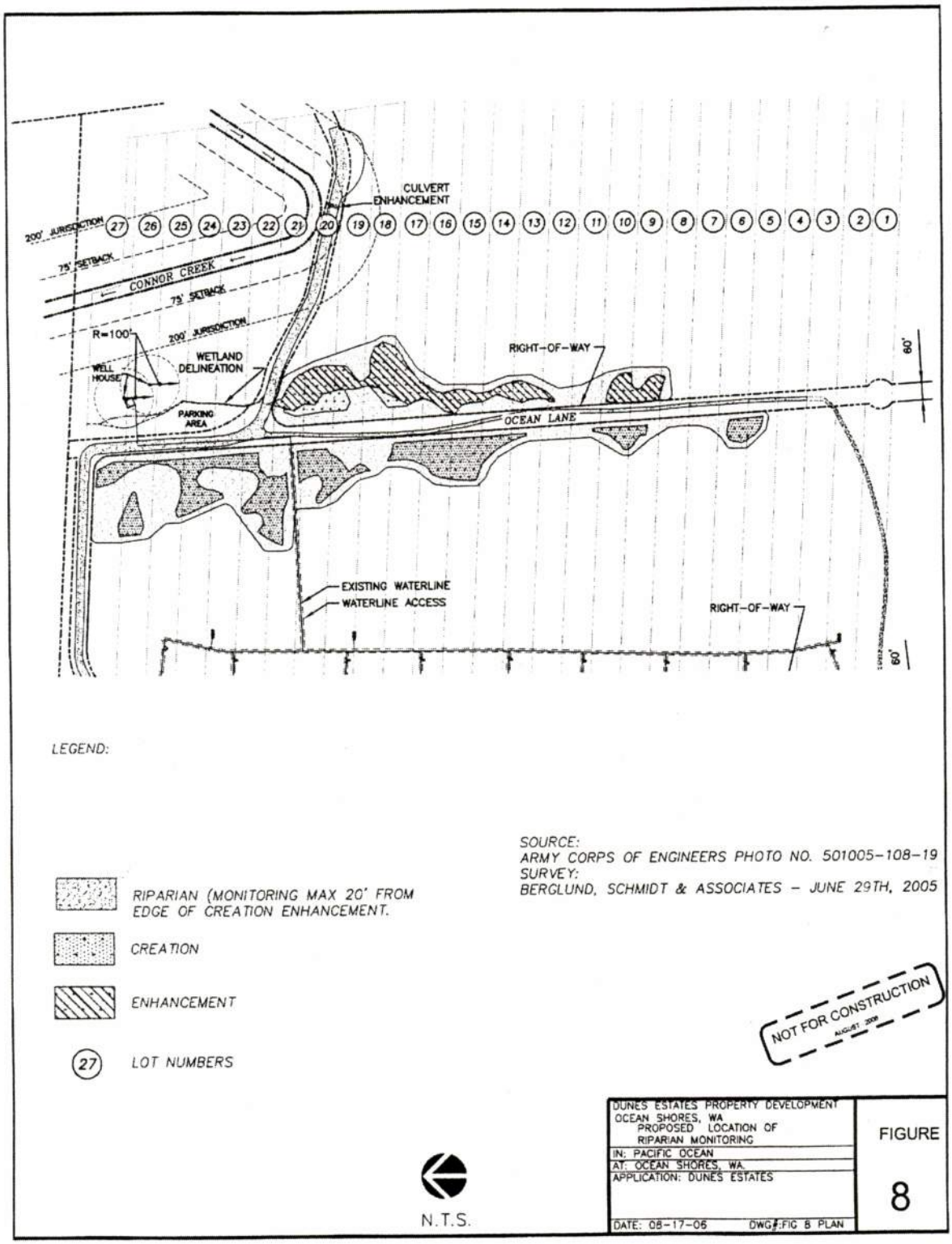
A 10-year monitoring program would be conducted to assess the performance of the mitigation wetlands following construction. Monitoring would begin following completion of construction, and standardized procedures described subsequently would be used to measure the progress of colonization of the sites by native species and as a result of distributing soils gathered from the site that contain existing vegetation root mass and seed stock. Because the proposal is for natural revegetation, the monitoring only needs to run long enough to make sure native species dominate and are not overtaken by nonnative species. The monitoring strategy would consider plant species composition and cover values. Monitoring protocols are as follows:

- **Duration**: Vegetation shall be monitored during the growing season of Years 0 (baseline, post-construction), 1, 2, 4, 6, 8, and 10.

- **As-Built Plans**: As-built plans consisting of markups to the wetland mitigation plan shall be prepared by the contractor following construction and shall be included in the reports for each year of monitoring.

- **Sample Plots**: Vegetation data shall be collected at a minimum of 10 sample plots 10 meters in diameter. Within the plot, shrubs and trees shall be sampled, and herbaceous material sampled within a one-meter-square area. Each vegetation sample plot shall be marked with rebar and PVC pipe at the center of the plot. This will allow location of sample plots during subsequent monitoring. Location of plots shall be determined by the monitoring biologist during Year 0 of the monitoring period. See Figure 8 for areas to establish sample plots.

Figure 8 Proposed Location of Riparian Monitoring



Photopoints: Photopoints shall be established in conjunction with the sample plots and be used to obtain representative photographs of the project. Photographs shall include panoramic photos of the mitigation site. Photopoints shall be established in the middle of each plot to provide a point for long-term photographic record of planting establishment. Sample plot markers shall serve as the photopoints.

- **Vegetation**: Shrubs and trees within each plot shall be identified and counted. Percentage areal coverage of each species shall be estimated, and tree and shrub heights shall be measured and averaged for each plot. Herbaceous vegetation within the one-meter-square plots shall be identified and the percentage areal coverage of each species estimated. The overall condition of the enhancement site and the health of existing vegetation, if any, present before enhancement shall be noted.

- **Soils**: Soils in the created wetlands will be sampled to an 18-inch depth using a probe. Records would be of evidence or presence of groundwater or soil saturation; and depth of root penetration. It is important to note that no performance standards for hydric soils are provided for this project because sandy soils generally lack field indicators (Washington Department of Ecology 1997). Therefore, evaluation of the success of the created wetlands cannot be based on development of hydric soil characteristics.

- **Hydrologic Conditions**: The locations of proposed mitigation are based on anticipated surface and groundwater levels. The success of the mitigation will depend on maintenance of these anticipated water levels. Monitoring of hydrologic conditions in the created wetlands shall be conducted in early summer and will consist of observing ponding or evidence of seasonal inundation of the wetland plantings. Monitoring the hydrologic conditions in the wetlands in relationship to observed survival, growth, and reproduction of specific species will help ascertain the effects of water table fluctuations on the survival of the planted vegetation and the potential need to implement a contingency plan.

- **Wildlife**: Wildlife use of the mitigation areas will be monitored. Birds, mammals, reptiles, amphibians, and invertebrates readily observable without trapping will be identified and recorded. Where possible, notation will be made of the kinds and locations of the habitats with greatest use by each species. Notation also will be made of breeding or nesting activity, particularly of bird species, in the mitigation areas.

- **Evaluation**: Monitoring results will be compared to the established performance standards for the project to judge the success of the enhancement effort. Evaluation of the success of the enhancement project will be based on whether the project performance standards are met. An annual report describing the level of success of the plan will be written and submitted for review and approval to the Corps within the time that is mandated by the permit for completion of each year's monitoring.

7.0 CONTINGENCY PLAN

Depending on the data collected during monitoring of the completed project, it may be necessary to implement contingency measures (Table 4) to ensure the original goals of the project are met. Several factors, both human-made and natural, could have a detrimental effect on the success of the mitigation wetlands. The following table lists the components of wetland creation, those related factors that may have an adverse effect on the created wetlands, and contingencies to ensure success of the project. No contingency plan can foresee all problems and their solutions; in all cases, if a more effective remedy is identified, it would be considered.

Table 4 Contingency Plan

Mitigation Component	Potential Factors	Contingency
Hydrologic conditions	Insufficient	Drought, lack of runoff from adjacent uplands and wetlands, and incorrect depth of excavation could result in insufficient hydrologic support. Excavations could be made deeper if necessary for contact with groundwater.
Hydrologic conditions	Excessive	After identification of the cause, soil elevations would be modified or excess water would be directed away from the mitigation area.
Hydrologic conditions	Pollution	The type and source of the pollutants would be determined and proper corrective measures established. These measures would include cleanup, biofiltration, or placement of filter fabric fencing.
Soils	Erosion	Causes of erosion would be identified; remedies could include use of erosion-control fabric and seeding of plant species with dense, strong root systems conducive to erosion control.
Vegetation	Competition from invasive species	Invasive species would be identified and eradicated or controlled during the monitoring period. If herbicides were determined to be necessary, a detailed application plan would be developed in coordination with Ecology and other resource agencies.
Disturbances	Wildlife	Excessive predation and/or grazing by wildlife could have an adverse effect on the success of plant species. Depending on the disturbance, fencing could be installed or wire mesh cylinders would be placed around individual plants.
Disturbances	Human	Human intrusion could be controlled by fencing the mitigation sites and installing gates on Ocean Lane.
Vegetation	Natural vegetation and succession does not occur	The enhancement and creation areas would need to be planted

8.0 LIMITATIONS OF THIS REPORT

This report has been prepared for the use by DEI. In preparing this report, AMEC used information contained in site development plans and other documents that were current at the time of report preparation. Recommendations made herein are based on information gathered in the field, information presented in previously prepared reports, and meetings and personal communications between DEI, EPA, the Corps, and AMEC.

Any proposed modification to site development plans that affects the proposed mitigation plan should be reviewed by AMEC and the Corps for necessary adjustments to the mitigation plan. Before construction and implementation of the proposed mitigation plan, all appropriate regulatory agencies should be contacted to obtain the required permits.

Within the limitations of schedules and scope of work, work performed herein conforms to accepted standards in the field. It is AMEC's professional opinion that, if the designs, recommendations, and implementation procedures described herein are followed, the result would be mitigation of project wetland impacts in accordance with stated goals, objectives, and performance standards.

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APPENDIX A

CORPS MAPS

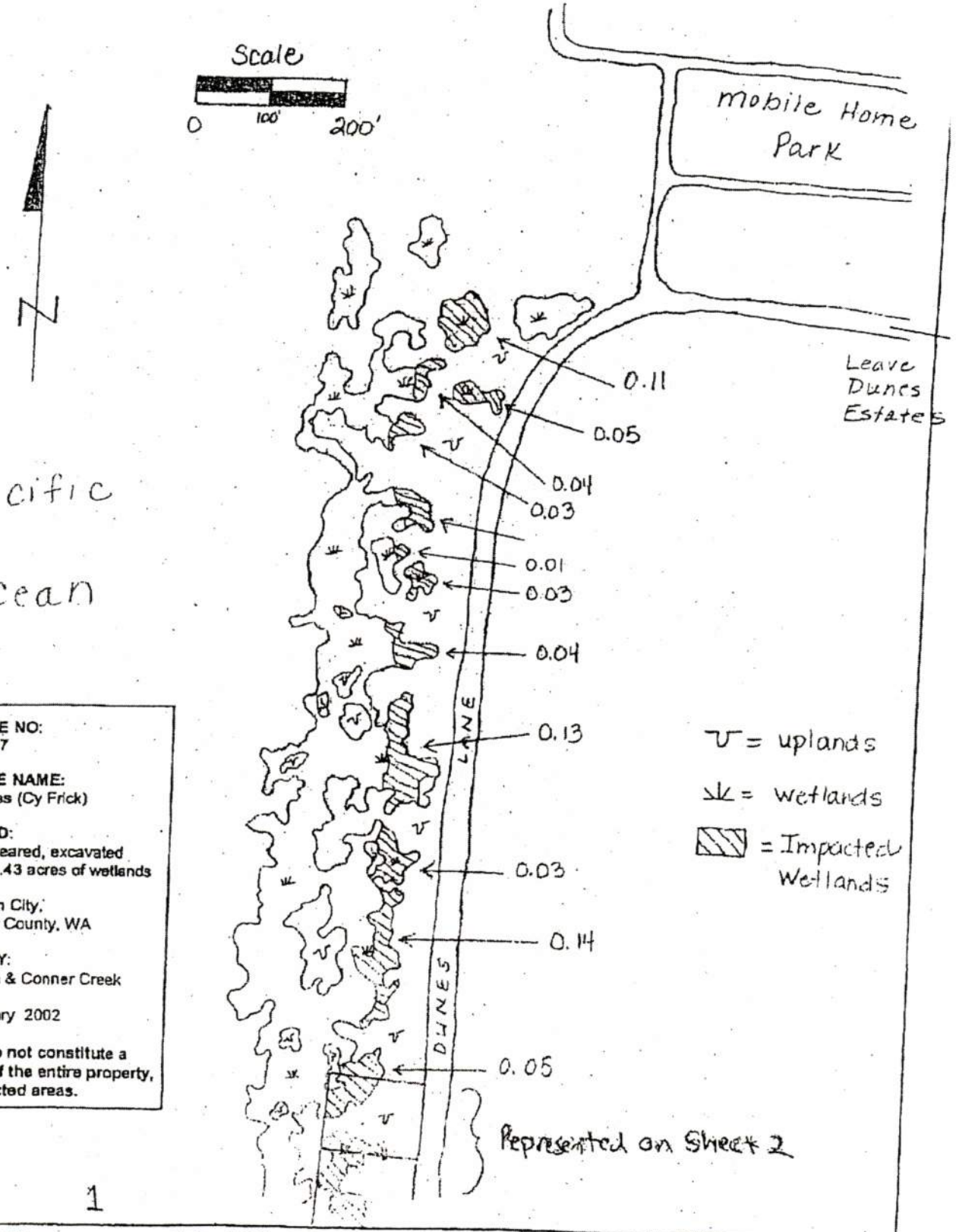
REFERENCE NUMBER: 1999-4-00487

REFERENCE NAME: Dunes Estates
Cy Frick

INSPECTOR(S): See attached

DATE OF INSPECTION: 3-24-99, 8-29-00, 10-3-01

TIME OF INSPECTION: Various



REFERENCE NO:
1999-4-00487

REFERENCE NAME:
Dunes Estates (Cy Frick)

PERFORMED:
Filled, land cleared, excavated and graded 4.43 acres of wetlands

NEAR: Ocean City,
Grays Harbor County, WA

WATERBODY:
Pacific Ocean & Conner Creek

DATE: January 2002

*Drawings do not constitute a delineation of the entire property, only the affected areas.

MVS Form 1145-1I, Mar 98

Replaces NPD Form 7-10 gld which is no longer usable

☆ U.S. GPO: 2001-789-793

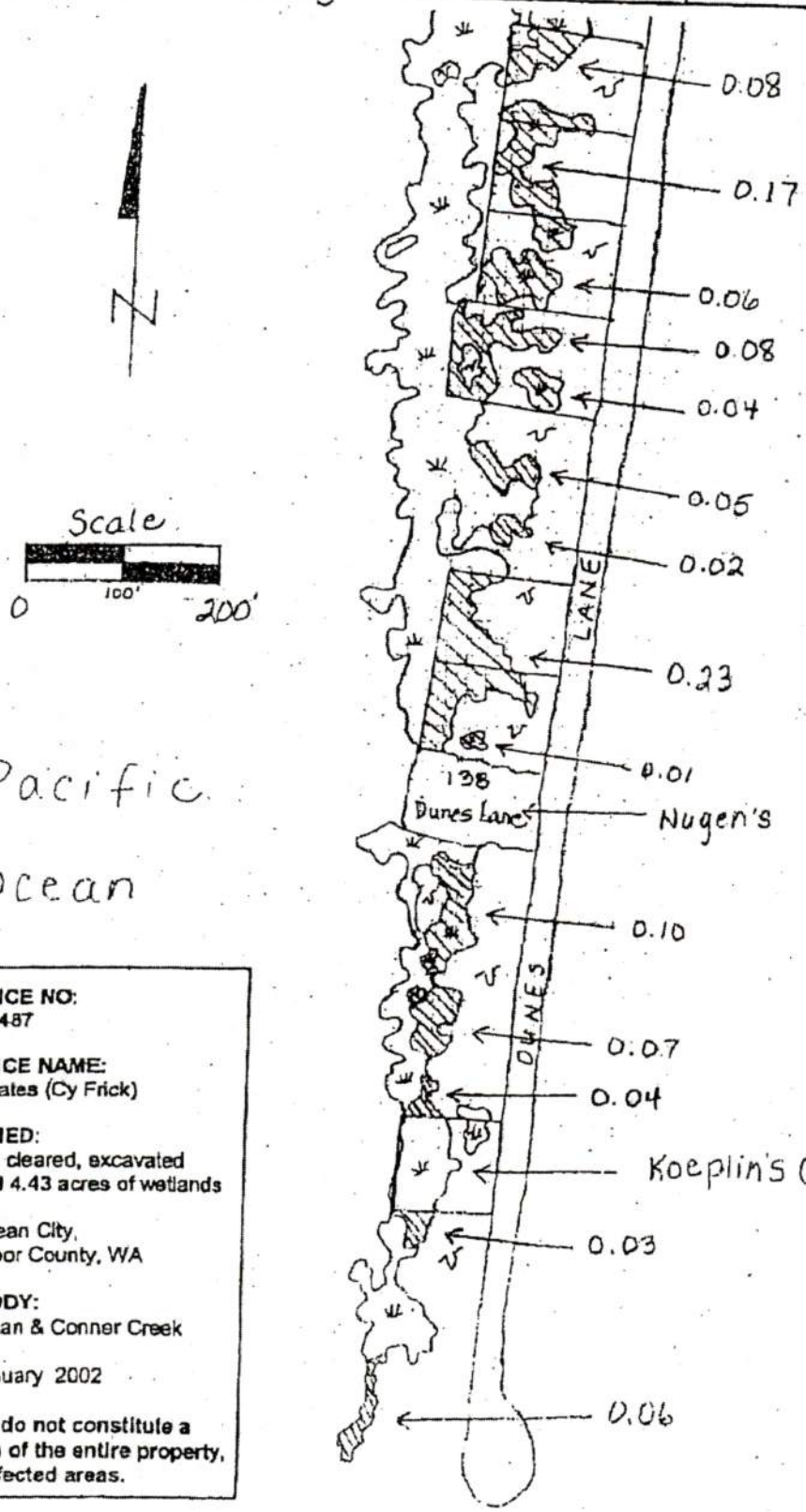
REFERENCE NUMBER: 1999-4-00487

REFERENCE NAME: Dunes Estates
Cy Frick

INSPECTOR(S): See attached

DATE OF INSPECTION: 3-24-99, 8-29-00, 10-3-01

TIME OF INSPECTION: Various



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NEAR: Ocean City, Grays Harbor County, WA

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Pacific Ocean & Conner Creek

DATE: January 2002

*Drawings do not constitute a delineation of the entire property, only the affected areas.

Sheet 2

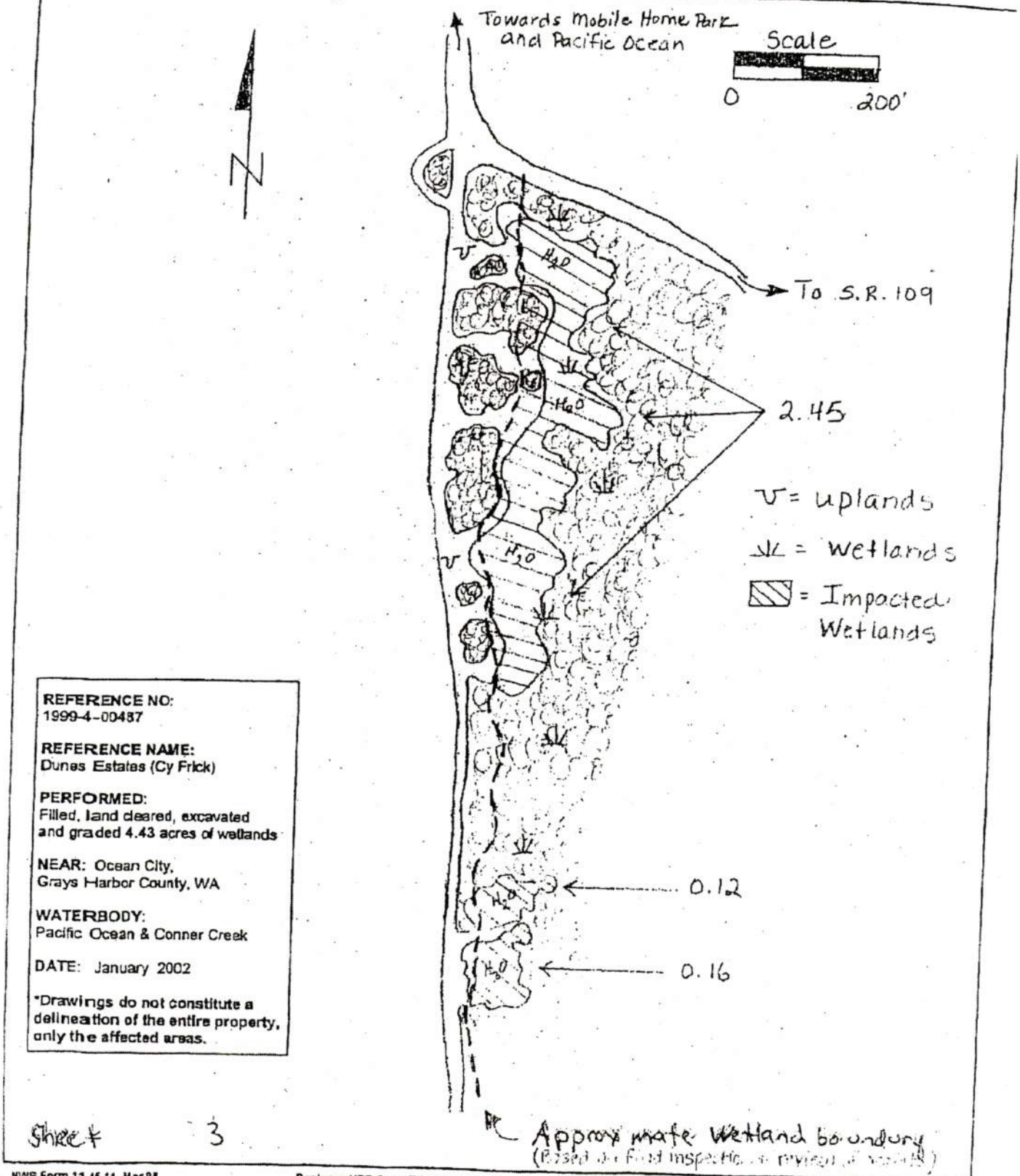
1999-4-00487

REFERENCE NAME: Dunes Estates
Cy Frick

INSPECTOR(S):
Dori Tigny - COE
Clark - EPA
Schneranne/Lund - Ecology

DATE OF INSPECTION: 10-3-01

TIME OF INSPECTION: ~ 9:00-11:30a



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Sheet 3