TABLE OF CONTENTS

Public Comments regarding the
Bandon Beach Hotel Zoning Code Text Amendment

18-003

Open Record

Documents received April 27th, 2018 to 3:00pm on May 4th, 2018

Megan Lawrence <mlawrence@ci.bandon.or.us>

Geology Testimony For April 26 Bandon Beach Hotel Zone Text Amendment Hearing Record

Vickie Crowley <vec@ti.org>
To: Bandon Planning Department <planning@cityofbandon.org>
Cc: Chris Keiser <ckkeiser@gmail.com>

Fri, May 4, 2018 at 10:20 AM

To: Bandon Planning Commission
For the April 26 Bandon Beach Hotel Zone Text Amendment Hearing Record — Geology Section
From: Vickie Crowley, 1425 Beach Loop, Bandon, Oregon

Please accept my testimony below in addition to my previous submittal of attachments for the April 26 hearing and today's height testimony sent separately.

The comprehensive plan and zoning ordinances that govern land use review in the Coquille Point area prioritize protection of ecological and conservation values. "Special consideration" means that only after considering these things do they provide for the next steps.

Coquille Point is a headland and shoreline, the geology is dynamic, the bluffs are shifting. There is a slump within about 30 feet of the proposal properties. Goal 17 and Bandon's Shoreland Overlay Zone require that upland alternatives be considered, and for a good reason.

The applicant's geotechnical report has failed to note the head of a slump on the bluff is just 30 feet from the existing structure and is actively moving as shown by the cracks in the asphalt path and needs to assess how construction at this site can be done without risking an acceleration of that slumping and, in turn, damage to the wildlife refuge. Changing the zone text to allow bigger and higher does not make sense at this site and should be rejected.

Page 9 of the geotechnical report accompanying the application states,

"A beach profile (Bandon09, Figure 4) taken 180 feet southwest of the site during various times during the summer and winter beginning in 2002, and most recently surveyed in February 2009, indicates that 18 feet of erosion has occurred along the base of the sea cliff beginning in September 2002 until February 2009. This indicates a rate of over two (2) feet of beach erosion per year."

What the geotechnical report fails to mention is that the base of the cliff southwest of the motel represents a toe of a slump. The Fish & Wildlife Service staircase is built on the south side of that slump, where movement would be the slowest. Yet that staircase has seen considerable movement to the point that the F&WS closed it in 2014 to assess whether it was safe to use. The assessment concluded that it is safe at the moment but must be monitored closely.

As shown in photo one below, this slump is essentially aimed at the the Bandon Beach Motel. The topography of the slump is highly variable, indicating numerous small slumps in the greater slump and showing that this slump is very active.

Photo Two below shows that the hummocky topography continues up the slope almost to the motel itself.

Photo three below shows that that head of the slump is undermining the asphalt path that is located between the motel and the bluff. For clarity, photo four is the same picture with lines approximating the existing head of the bluff.

At its closest point, the head of the slump is 30 feet away from the motel. At this point, the head is on the west side of the asphalt path near the top of the photo. The head then crosses the asphalt path as shown by the red lines. Because the path moves at a diagonal away from the hotel, the point where the head reaches the east side of the path is about 35 feet away from the motel.

If the toe of the slump is eroding at more than two feet per year, then the head of the slump will eventually erode that fast as well. At thirty feet away from the motel, the motel site may start slumping into the ocean in less than 15 years.

Page 9 of the geotechnical report states,

"It is our opinion that bluff retreat does not pose a threat to this property over the anticipated life of the proposed structure. We base our opinion on the hard, resistant bedrock encountered in Borings B-2 and B-3 and exposed at the base of the bluff."

But the boring logs for the cores taken on the east side of the motel (borings 1 and 2) revealed that the "resistant bedrock" is covered by 15 to 21 feet of sand and fill dirt (attachment 2, hand-numbered pages 80 and 81). All of this is subject to slumping. Even the first couple of feet of bedrock is likely to be weathered and somewhat broken up and subject to slumping itself.

Page 15 of the geotechnical report notes,

"The subject property and surrounding area will be inundated by a tsunami wave generated by a CSZ Moment Magnitude (Mm) Earthquake of 9.0 or greater."

While a 9.0 magnitude earthquake and follow-up tsunami could be catastrophic for any structure built on this site, a smaller earthquake and tsunami could be just as deadly. Tsunami inundation maps prepared by the Oregon Department of Geology and Mineral Industries show that a smaller earthquake could generate a tsunami that is 20 feet high. Such a tsunami could completely liquify the toe of the slump that heads southwest from the motel. That liquification could cause the entire slump to move down to the beach, and the head of the slump could easily move 30 or more feet to the east, thus threatening the structure.

The construction of a structure on this site can take one of several approaches. First, it could be build directly on the surface sand and fill dirt. This is the method used for the existing Bandon Beach Motel. It leaves the structure extremely vulnerable to slumping.

Second, the structure could be built on piles driven into the sand down to bedrock with a pile driver. This could safely anchor the structure to the bedrock, but the vibration from the pile driver could accelerate the movement of the slump, thus threatening the wildlife refuge.

Third, the structure could be built on piles bored into the sand by an auger. This causes less vibration and might be less likely to threaten the refuge. But it is difficult to be certain that an auger has reached firm bedrock. If the piles are placed on loose rocks on top of solid bedrock, the structure might be only a little safer than building it on the surface.

In sum, the geotechnical report has failed to note that the head of the slump is just 30 feet from the existing structure and that the slump is actively moving as shown by the cracks in the asphalt path. The report has failed to show that a new, larger structure can be built on this site that will be safe from future slumping or that such construction can be done without risking an acceleration of that slumping and damage to the wildlife refuge, an unacceptable risk at any size. These cannot be left unaddressed and deferred to another time. The zone code text amendment should be rejected.

Thank you for your careful consideration.

US Fish & Wildlife Stairs Report —
Coquille Point, South Stairway Schematic Design Services, US FWS Final Report April 24, 2015

Motel is located on a slope close to the stairway and the bluff and the slump:

Section of topo map contained in Figure 6, US Fish & Wildlife Stairs Report —
Coquille Point, South Stairway Schematic Design Services, US FWS Final Report April 24, 2015

---

6 attachments

PhotoOne.jpg
627K

PhotoTwo.jpg
935K

PhotoThree.JPG
1384K

PhotoFour.jpg
1379K

Topo Lines.jpeg
74K

StairsReport.pdf
12013K


10

Coquille Point
South Stairway Schematic Design Services
US Fish and Wildlife Service
Contract No. F14PC00037/F15PD00406

FINAL REPORT

April 24, 2015

Prepared by
KPFF Consulting Engineers
111 SW Fifth Avenue, Suite 2500
Portland, Oregon 97204-3628

Coquille Point
South Stairway Schematic Design Services
US Fish and Wildlife Service
Contract No. F14PC00037/F15PD00406

TABLE OF CONTENTS

BACKGROUND

The South Stairs at Coquille Point Unit in Bandon, Oregon, were initially constructed in 1998 as a replacement to stairs located approximately 50 yards south of the present location. The current stairs allow Coquille Point Unit visitors to view Elephant Rock and to explore the tide pools and shoreline along the beach. The stairs are constructed with pressure treated timber supporting concrete treads, with level, timber framed rest areas and an observation platform. The stair treads were replaced in 2013, following a 2012 recommendation which showed that the stair treads were wearing thin. Concrete spalling and exposed reinforcement were observed at that time.

It was also noted at that time, that the stairs were shifting downhill. Refuge staff members have also noted that one of the stair stringers has displaced laterally at the landing and that gaps up to 2 inches exist at several locations.

The stair was closed by the U.S. Fish and Wildlife Service (USFWS) on July 23, 2014, pending a structural and geotechnical assessment.

KPFF and Hart Crowser performed a visual assessment of the stair on July 31, 2014. Based on the age of the structure, the lack of visible distress in the wood framing, estimated rate of movement, remaining bearing seat dimensions and the limited risk of significant slope failure through the mostly dry weather of Summer and early Fall, KPFF recommended re-opening the stair to public use until October 31, 2014.

The stair was closed to public access on October 31, 2014 pending further structural and geotechnical evaluation.

KPFF and Hart Crowser have been retained by the USFWS to develop a schematic design report investigating the following four alternates:

1. Continued inspection and maintenance of the structure, based on the expectation that the stair will continue to displace and will require frequent, ongoing maintenance.
2. Complete replacement of the stair structure in its current location.
3. A new on-grade trail.
4. Rehabilitation of the existing stair and foundations.

In the process of evaluating the four alternatives listed above, several alternatives were considered which would partially replace the portion of the existing stair that has exhibited the most significant downhill shifting, including:

- Preservation of the most stable portion of the existing stair, combined with a new on-grade trail to replace the portion of the existing stair that has exhibited the most significant downhill shifting.

- Preservation of the most stable portion of the existing stair, combined with a new stair structure to replace the portion of the existing stair that has exhibited the most significant downhill shifting.

Hart Crowser performed a detailed geotechnical investigation on February 18 and 19, 2015. KPFF performed a visual assessment of the existing structure and a field investigation of potential on grade trail alignments on February 23, 2015.

EXISTING STRUCTURE

The existing stair connects an asphalt parking lot at approximately elevation 75 feet to the beach below at approximately elevation 5 feet. The stair is approximately 265 feet long in plan, with approximately 130 steps, as well as nine landings and two overlook structures.

The structure consists of pressure treated wood framed stringers and posts supporting precast concrete treads at the stairs and pressure treated wood 3x decking at the landings and overlooks. The bottom run of stair treads are metal grating instead of precast concrete.

The structure is supported on 18 inch diameter concrete footings. The existing drawings indicate a footing depth of either 4'–0" or as underlying rock depth permits. Actual footing depth could not be determined during the site visit.

As-constructed plans are included in Appendix A. Site Photographs are included in Appendix B.

OBSERVATIONS

STRUCTURE CONDITION

The existing wood framing was visually inspected and a limited hammer sounding was performed. The stringers, posts, cross braces and decking are weathered, however no signs of significant decay were observed. Areas of moss/algae were noted on the underside of the structure in several locations.

Metal fasteners are in good condition and observed corrosion appeared to be superficial.

No visible changes to the condition of the existing structure – from the original July 2014 evaluation to the February 2015 evaluation - were noted.

FOUNDATIONS AND SUBGRADE

Hart Crowser performed a site reconnaissance in July of 2014, followed by a more detailed geotechnical study in February 2015. The February 2015 study included:

- Limited shallow subsurface boring and drive probes
- Limited laboratory testing on select soil samples
- Site reconnaissance to visually observe slope stability issues and the condition of the stairway
- Engineering analysis to develop preliminary design recommendations for stabilization of the staircase
- Preparation of a report summarizing findings and preliminary recommendations.

Based on this research, investigation, and observations, Hart Crowser noted that the stairway and surrounding area are being affected by creep of the adjacent slopes, which is accelerated where active landslide deposits are present. Slope movement is exacerbated by wave action along the toe of the slope and associated loss of soil. Extended periods of rainfall are also a likely source of slope movement.

Since the 2014 site reconnaissance, additional erosion along the base of the slope appears evident. Soil loss along the toe of the slope is attributed to wave and tidal action. Some soil loss is also likely attributable to surface seepage and spring activity along the face of slopes. Loss of soils along the base\toe of the slope contributes to continued creep in the ground located on either side of the staircase. Soil cracks and secondary scarps were noted within the landslide area to the south. Numerous seeps and springs were observed adjacent to the stairway and at the base of the slope on either side of the stairway. Heavy seepage and soil sloughing was also observed in the vicinity of the large viewing platform.

Evidence of imminent large-scale slope instability that would cause sudden failure of the stairway was not observed. However, it is anticipated that the slopes and staircase will be subject to slow, long-term creep and shifting. The portions of the staircase that extend off of the ridgeline and into the landslide zones noted in the Geotechnical Report in Appendix D will have the greatest potential for creep. Current shifting of the staircase has been limited in magnitude over the past ±15 years, and rapid changes to that condition are not expected.

ALTERNATE EVALUATIONS

ALTERNATE NO.1 – CONTINUED INSPECTION AND MAINTENANCE PLAN

The existing structure is constructed on a coastal bluff that is experiencing a continual and gradual movement of the subgrade. Based on the findings of Hart Croswer's geotechnical investigation, this landsliding will continue for the foreseeable future. However, there is low risk of a sudden, catastrophic failure of the slope.

This alternate involves a program of periodic inspection and maintenance of the existing structure, implemented by USFWS staff supported by engineering consultants where needed. The recommended inspection program would consist of the following steps:

- All stringer to landing connections are to be monitored for movement. We recommend installing a visible, weatherproof movement indicator - such as a vertical scribed line - across all joints where sloped stringers meet flat landing support beams, prior to re-opening of the stair. See Figure 1 below for an example.

Figure 1 – Scribe Line for Movement Indicator

- Monitor all movement indicators described above on a monthly basis and after any rain event measuring 2.25 inches in 24 hours.
- If movement of more than 1/4" (from the initially marked position) is observed at any one of the movement indicators, the stair shall be immediately closed to public use, pending evaluation by a structural engineer and a geotechnical engineer.
- Perform a survey at the top surface of all concrete foundations every three months.

A schematic level cost estimate has been included in Appendix C of the report. This cost estimate assumes that USFWS would perform 10 inspections per year over an assumed remaining lifespan of 20 years and that an engineering consultant and contractor would be retained to design and construct repairs of the structure an average of once per year for 20 years.

The estimated cost of this alternate is $520,000.

ALTERNATE NO.2 – COMPLETE REPLACEMENT OF THE STAIR STRUCTURE

This alternate involves the complete replacement of the existing structure.

As described above, the slope on which the new structure would be constructed is subject to gradual and ongoing landsliding. Any new structure placed in this location will need to be designed to accommodate this landsliding, without negatively affecting the structural integrity or life span of the new structure.

Foundations

As described in Hart Crowser's Geotechnical Report, a stable layer of sandstone exists below the sliding soil layer. The replacement structure would be supported on new drilled concrete shafts (or other similar deep foundation system, though for purposes of estimating, drilled shafts have been assumed), anchored into the stable sandstone and extending through the sliding soil layer to form supports for the new walkway structure. The new concrete shafts would need to be designed to resist the lateral forces applied to them by the sliding soils, requiring the new reinforced concrete shafts to be approximately 30 inches in diameter. It is assumed that drilled shafts would be installed from the existing parking lot at the top of the stair and from the beach at the base of the stair. Beach access for construction equipment appears to exist to the north of the existing structure.

The layer of landsliding soil is estimated to be between 5 to 9 feet in depth. The lateral forces that this layer would apply to the new foundations would be considerable. In order to reduce these forces and reduce the size and cost of the foundation system, we recommend that approximately 5 feet of the existing soils be removed in the form of a trench underneath the alignment of the replacement structure, as illustrated in the section below. The sides of this trench would be sloped and strengthened to minimize long term erosion.

The potential for soil improvement at the base of the stair and on the existing slope was evaluated. However, this would not significantly improve the stability of the existing slope and was not evaluated in detail.

Supporting the new structure on the existing rock outcropping to the north of the existing walkway is feasible.

Elevated Walkway

The existing structure is framed using pressure treated wood members and exhibits no signs of significant decay. A wood framed replacement structure is proposed for the following reasons:

- The existing wood framed structure has not been adversely affected by the coastal environment.
- A concrete structure – while more durable - would be substantially more costly than wood framing.
- A steel structure is not recommended due to the corrosive coastal environment.

A schematic section through the new structure is shown below:

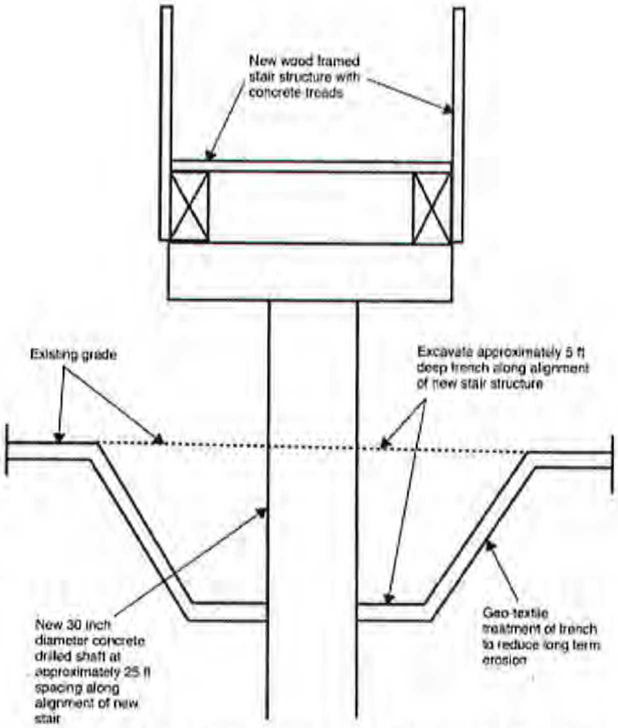


Figure 2 – New Stair Structure – Schematic Section

A schematic level cost estimate has been included in Appendix C of the report. This estimate assumes that the new structure would require approximately (24) 30-inch diameter drilled shafts, approximately 30 foot long, spaced uniformly along the length of the new stair. The new walkway would be a 4 foot wide, wood framed walkway with concrete treads – similar to the existing structure.

The estimated cost of this alternate is $773,000.

ALTERNATE NO.3 – NEW ON-GRADE TRAIL

As an alternate option, USFWS directed KPFF to develop a conceptual design for an on-grade trail. The most feasible location for an on-grade trail would be in the location of the existing trail to the north of the staircase. The start of the north trail is approximately 920 feet north of the start of the staircase. The existing trail consists of paved surfaces, wooden staircases, paths, and hand rails, and steel staircase leading down to the beach.

Constructing the on-grade trail in the current location of staircase is not pratical due to the slope stability being minimal near and around the stairs, as well as continuous drainage through the hillside. Furthermore, to the north of the stair case, the hillside appears to be mostly comprised of bedrock jutting out of the hillside limiting the areas where a trail can be placed unless the rocks are removed.

KPFF investigated moving the trail further south however that proved impractical due to slope stability, as well. It was brought to KPFF's attention that at one time, an on-grade trail existed south of the staircase and after a storm event it collapsed in on itself, further justifying that an on-grade trail near the staircase is not appropriate. KPFF also considered proposing the on-grade trail to be placed on the north side of the point, however that would make the on-grade trail approximately 400 feet within the existing trail. Placing the new on-grade trail within close proximity of the existing trail limits the appeal for pedestrians being able to complete a walking loop around the point. KPFF has determined the optimal location for an on-grade trail is at the current location of the existing trail. The existing trail will be modified to meet the requirements set forth by *United States Access Board in the Outdoor Developed Areas*, May 2014 document.

Reference Figures 6 and 7, located at the end of this report, for the proposed location and layout of the new on-grade trail. The proposed layout ensures the slopes will be no more than 8.33 percent allowing for resting intervals, 60 inches long and 36 inches wide, only being necessary every 200 feet. The proposed on-grade trail will be approximately 915 feet in length and a minimum of 36 inches wide. The cross slope of the trail will be no more than 2 percent and will slope to the west, minimizing the possibility of ponding on the trail. The trail will be comprised of a six inch section of Americans with Disabilities Act (ADA) trail mix aggregate, see the table below for gradation.

Table 1 – ADA Trail Mix Gradation

Size	Percentage Passing By Weight
3/8"	100
#4	76-100
#10	30-60
#200	0-10
Pan	

An ADA trail geotextile fabric will separate the existing soil from the proposed ADA trail mix section. Trail edging will be used to contain the ADA trail mix along the entire trail length. In locations were the hillside will be cut into, a retaining wall will be used to hold back the hillside. It is not anticipated that the wall will be taller than three feet. At the location where the trail meets the beach, a landing pad of approximately five feet by five feet will be enclosed with edging to prevent the ADA trail mix from scattering into the beach. KPFF recommends maintenance on the landing pad to ensure that the edging encasing the ADA trail mix doesn't become a tripping hazard. The edging shall not be exposed more than two inches per United States Access Board's Outdoor Developed Areas document.

The estimated cost of this alternate is $141,000.

Alternate No.4 – Rehabilitation of the Existing Stair

This alternate involves the strengthening of the existing structure and improving drainage of the adjacent slope. The movement of the underlying soils will continue to laterally and vertically displace the existing structure. The displacement is unlikely to be uniform along the length of the stair, resulting in differential vertical and lateral displacements. This movement is expected to be gradual, with the risk of sudden, catastrophic failure of the slope being low.

This expected soil movement means that there is no cost-effective method of strengthening the structure to a point where subsequent monitoring is not required. The scheme described below will extend the life of the structure by reducing the rate of slope movement increasing the amount of lateral movement that the structure can accommodate.

The rehabilitation scheme would involve the following elements:

Drainage Improvements

The rate of displacement of the soils would be reduced with the installation of drainage improvements along each side of the existing structure. These drainage improvements would consist of installing a matrix of horizontal drains into the face of the slope could help stabilize the drainage system. Horizontal drains are often used to lower water table elevations and reduce pore pressures, which increases shear strength of the soil and improves slope stability. A drainage system in this case could entail installations of 50 to 150 feet in length and may require anywhere from 20 to 100 drains to achieve the desired effect on slope stability.

Structural Connections

Continued lateral and vertical movement of the foundations could result in loss of bearing at the connection point between the foundations and wood posts. A steel bracket would be installed around the base of the post and would be bolted to the existing concrete foundation, maintaining a positive connection between the two elements.

Structural Bearing Seat Extensions

The typical bearing seat conditions for the existing stair stringers are shown below:

Figure 3 – Typical Bearing Seat Connection

Figure 4 – Typical Bearing Seat Connection

Figure 5 – Typical Bearing Seat Connection

The continued displacement of the structure could result in loss of bearing at any one of the typical conditions pictured above. The proposed solution is to extend the length of the existing bearing seats with new wood framing members supported from the existing framing.

Continued Monitoring

The extended bearing seats and improved base connections do not eliminate the risk of failure due to large movement of the underlying soil. Continued monitoring of the structure for significant movement would still be required.

A schematic level cost estimate has been included in Appendix Cof the report. This estimate assumes that all post connections to the foundations would be strengthened and that all bearing seats would be extended. It also assumes that USFWS staff would inspect the structure three times per year and that one minor, engineered repair would be required every two years. The estimate assumes a 20 year life span.

The estimated cost of this alternate is $456,000.

ALTERNATE NO.5 – PARTIAL REPLACEMENT OF THE STAIR STRUCTURE

This alternate would include retaining the upper portion of the existing stair structure where evidence of downhill shifting is limited or non-existent; and removal and replacement of the portion of the existing stair that has exhibited the most significant downhill shifting, which is the generally the lower half of the structure. Replacement options considered for the lower portion of the stair include an on-grade trail and a new stair structure to replace the portion of the existing stair that has exhibited the most significant downhill shifting.

Partial Replacement with On-Grade Trail

Evaluation of potential replacement of the lower portion of the stair with an on-grade identified several drawbacks to this alternate, including:

- The route for a trail beginning at approximately the midpoint of the existing stair and continuing downhill would require routing the trail to the north or south of the rock outcrop into areas of the slope where previous landslides have occurred.

- The predominant grade down the lower half of the slope is approximately 40%, a trail in this portion of the slope would require numerous switchbacks and landings to provide the necessary length and slope to maximize accessibility, while simultaneously minimizing the construction that would occur within areas of past landslides.

- The lower 50% to 65% of the slope is where the majority of seepage and spring activity has been observed. Extensive use of shallow riprap lined ditches or gravel subdrains would be required to minimize or prevent erosion or sliding of the trail on the slope.

Based on these drawbacks, we do not consider replacement of the lower portion of the existing stair with an on-grade trail to be a feasible long term solution to provide access to the beach.

Partial Replacement with New Stair Structure

As described above, the slope on which the new structure would be constructed is subject to gradual and ongoing landsliding. Any new structure placed in this location will need to be designed to accommodate this landsliding, without negatively affecting the structural integrity or life span of the new structure.

As described above in the description for Alternate No. 2:

- The replacement structure would be supported on new drilled concrete shafts (or other similar deep foundation system, though for the purposes of estimating, drilled shaft have been assumed), anchored into the stable sandstone and extending through the sliding soil layer to form supports for the new walkway structure.

- The new concrete shafts would need to be designed to resist the lateral forces applied to them by the sliding soils, requiring the new reinforced concrete shafts to be approximately 30 inches in diameter.

- It is assumed that drilled shafts would be installed primarily from the beach at the base of the stair. Beach access for construction equipment appears to exist to the north of the existing structure.
- In order to reduce these forces and reduce the size and cost of the foundation system, we recommend that approximately 5 feet of the existing soils be removed in the form of a trench underneath the alignment of the replacement structure.
- An elevated walkway framed using pressure treated wood members, similar to the existing stair structure would provide adequate decay resistance for a reasonable cost.

Configuring the new structure to pass over the top of the existing rock outcropping to the north of the existing walkway is also feasible. Routing the new stair structure over the rock would require installation of rock anchors, and the overall length of the structure would be 10 to 20 feet longer than a route along the edge of the rock outcrop. An advantage of constructing the stair over the top of the rock outcrop is that the rock and the ridge uphill from the rock is the most stable portion of the slope in the area, and that stability will enhance the longevity of the structure. Constructing a staircase over the top of the rock outcrop should include slip joints between the sections of staircase supported by different materials to accommodate potential differential movements between the outcrop/boulder and the soils on the ridge above the outcrop.

Conceptual plan and profile views for the two potential new stair structure routes (Alternate 5A and Alternate 5B) considered for partial replacement of the stair structure are included as Figures 8 through 11 located at the end of this report. It is important to note that the concept layouts developed for the new stair structure are based on available LIDAR survey data and design drawings depicting the construction of the original stair. Topographic survey and additional geotechnical investigations to determine the limits of below grade rock are required before detailed engineering of the structure can occur.

A schematic level cost estimate has been included in Appendix C of the report. This estimate assumes that the new structure would require approximately twelve 3 foot diameter drilled shafts, approximately 30 foot long, spaced along the length of the new stair. The new walkway would be a 4 foot wide, wood framed walkway with concrete treads – similar to the existing structure.

The estimated cost of alternate 5A, constructing a new stair structure around the edge of the rock outcrop, is $381,000.

The estimated cost of alternate 5B, constructing a new stair structure over the top of the rock outcrop, is expected to be similar to the cost for alternate 5A. The structure in Alternate 5B is slightly longer, however the lower cost of rock anchors which can be used in lieu of drilled footings for the portion of the structure over the rock, will offset a portion of the cost for additional structure.

CONCLUSIONS

Based on our site evaluations and studies, the existing stair structure will continue to slowly displace laterally and vertically – due to the underlying and slow moving landslide – requiring continued inspection and maintenance. However, due to the low risk of sudden failure of the slope, this remains a viable alternate.

Rehabilitation to reduce inspection and maintenance costs is comparable in cost to simply inspecting and maintaining the existing stair as-is. However, it is likely that the useable life of the rehabilitated structure will be increased under this scenario.

Complete replacement of the existing structure in its current location – while slightly more costly than rehabilitation, inspection and maintenance – will provide a substantially more durable structure with a significantly increased design life. However, this alternate would result in significant environmental and aesthetic impacts to the slope in the vicinity of the new structure.

A new on-grade trail to the north of the existing stair is significantly less costly than the three other alternates. However, this trail would be constructed several hundred feet to the north of the existing parking lot, increasing the distance to the beach and limiting access to the beach south of Coquille Point during high tidal ranges.

Partial replacement of the existing structure in its current location will provide a substantially more durable access with a significantly increased design life in comparison to the stair rehabilitation or new trail alternatives. This alternate would provide slightly lower durability and design life than a complete replacement structure, but at a cost that is less than 50% of a complete replacement structure.

We recommend pursuing a partial replacement of the stair structure, using a structure layout similar to what is shown in Figures 8 and 10 for Alternates 5A and 5B.

FIGURE 6 - New Trail Location

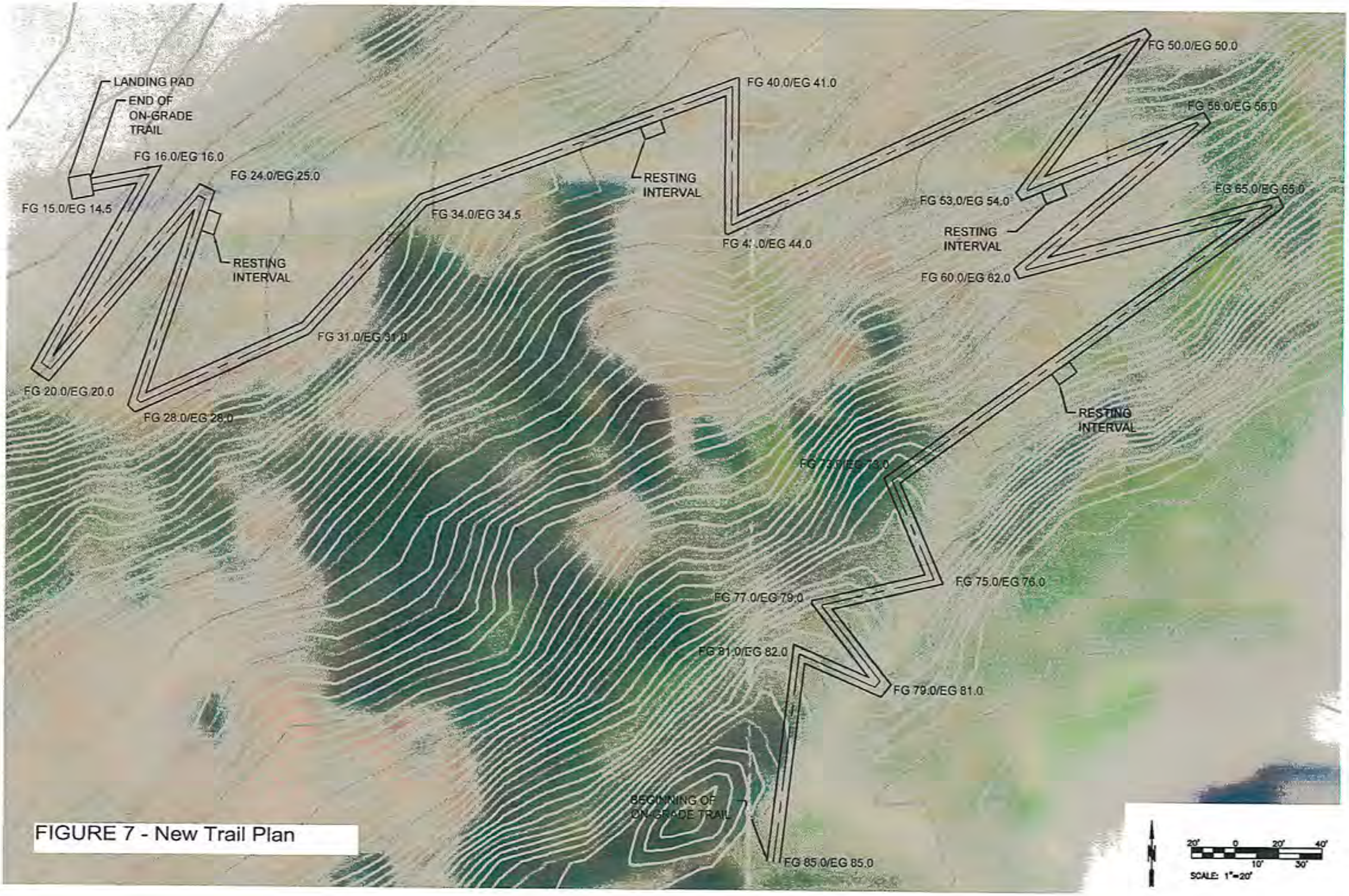
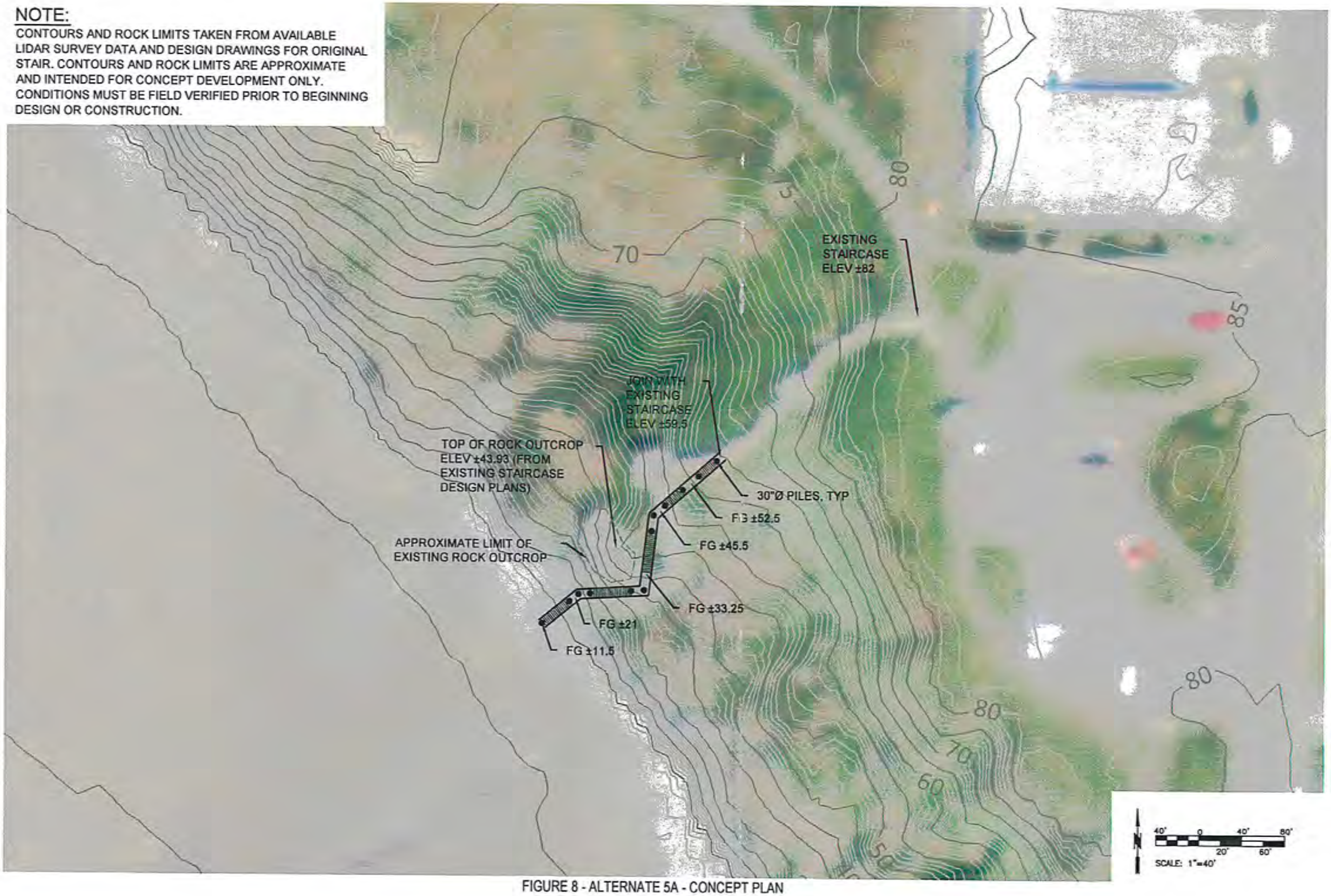


FIGURE 7 - New Trail Plan



NOTE:
CONTOURS AND ROCK LIMITS TAKEN FROM AVAILABLE LIDAR SURVEY DATA AND DESIGN DRAWINGS FOR ORIGINAL STAIR. CONTOURS AND ROCK LIMITS ARE APPROXIMATE AND INTENDED FOR CONCEPT DEVELOPMENT ONLY. CONDITIONS MUST BE FIELD VERIFIED PRIOR TO BEGINNING DESIGN OR CONSTRUCTION.

FIGURE 8 - ALTERNATE 5A - CONCEPT PLAN

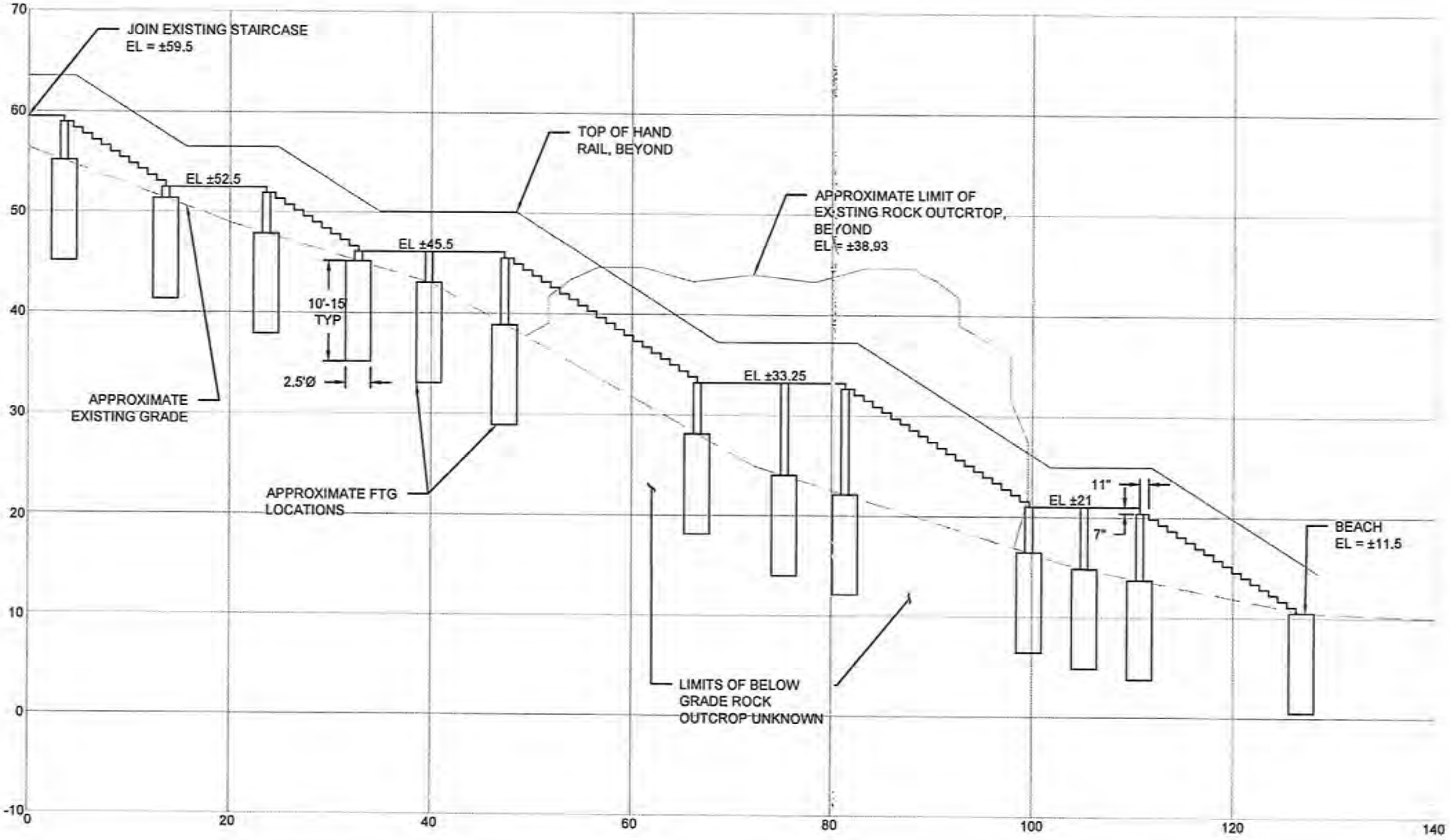
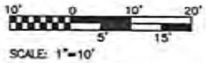
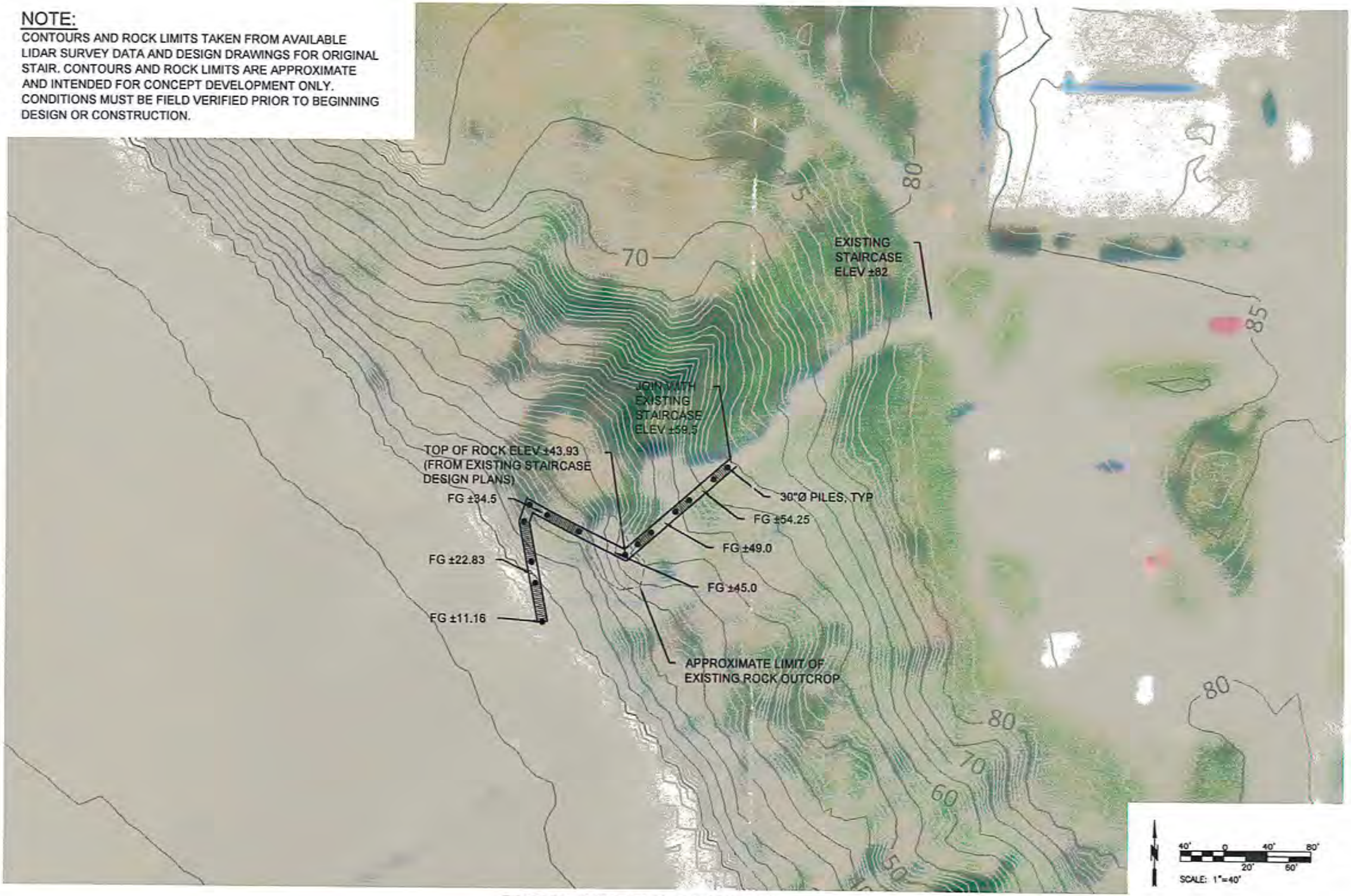


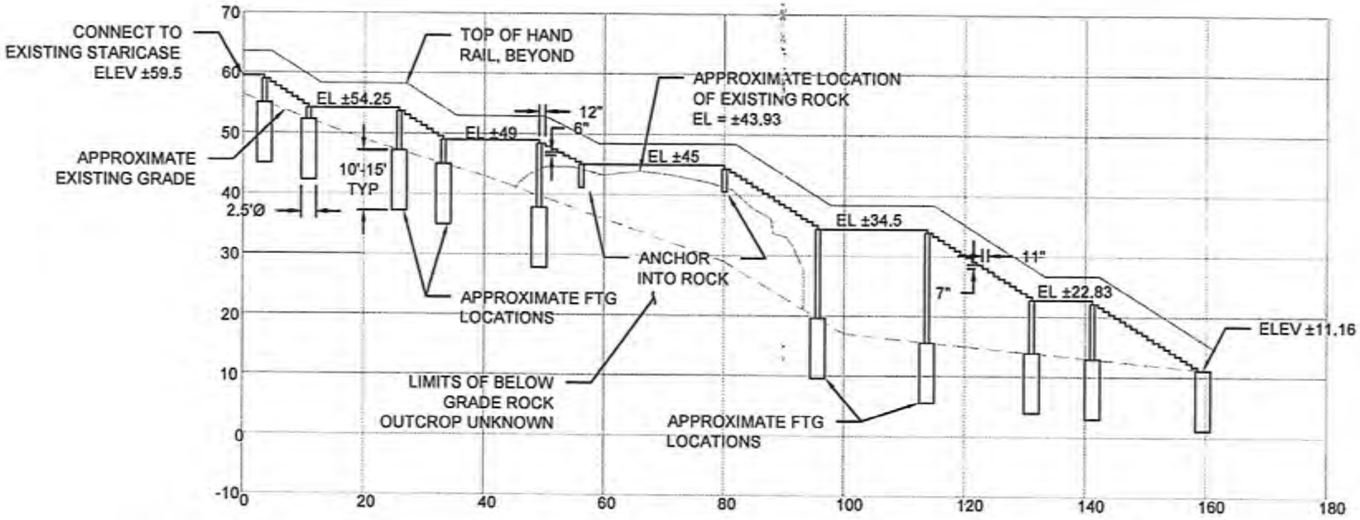
FIGURE 9 - ALTERNATE 5A - CONCEPT PROFILE





NOTE:
CONTOURS AND ROCK LIMITS TAKEN FROM AVAILABLE LIDAR SURVEY DATA AND DESIGN DRAWINGS FOR ORIGINAL STAIR. CONTOURS AND ROCK LIMITS ARE APPROXIMATE AND INTENDED FOR CONCEPT DEVELOPMENT ONLY. CONDITIONS MUST BE FIELD VERIFIED PRIOR TO BEGINNING DESIGN OR CONSTRUCTION.

FIGURE 10 - ALTERNATE 5B - CONCEPT PLAN



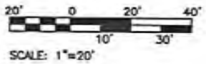


FIGURE 11 - ALTERNATE 5B - CONCEPT PROFILE

Appendix A

Existing Drawings

COQUILLE POINT STAIR

OREGON ISLANDS NATIONAL WILDLIFE REFUGE
DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
BANDON, OREGON

DRAWING INDEX:

A0.0	TITLE SHEET	1R-OR-178-3-1.0

ARCHITECTURAL – SOUTH BEACH ACCESS

A1.1	STAIR PLANS	1R-OR-178-3-2.0
A2.1	STAIR SECTIONS AND DETAILS	1R-OR-178-3-3.0
A3.1	STAIR FRAMING AND DETAILS	1R-OR-178-3-4.0
A4.1	STAIR FRAMING AND DETAILS	1R-OR-178-3-5.0

ARCHITECTURAL – NORTH BEACH ACCESS

A1.2	ACCESSABLE PATH SITE PLAN	1R-OR-178-3-6.0
A2.2	ACCESSABLE PATH ELEVATIONS AND SECTIONS	1R-OR-178-3-7.0

PROJECT TEAM:

ARCHITECT/PROJECT COORDINATOR

RAR ARCHITECTS INCORPORATED
34 NW FIRST AVENUE, SUITE 206
PORTLAND, OREGON 97209
(503) 225-9085

CIVIL ENGINEERING

DAVID EVANS AND ASSOCIATES, INC
2828 SW CORBETT AVENUE
PORTLAND, OREGON 97201
(503) 223-6663

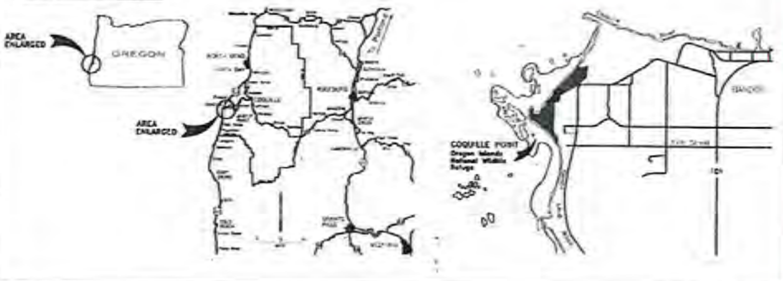
GEOTECHNICAL ENGINEERING

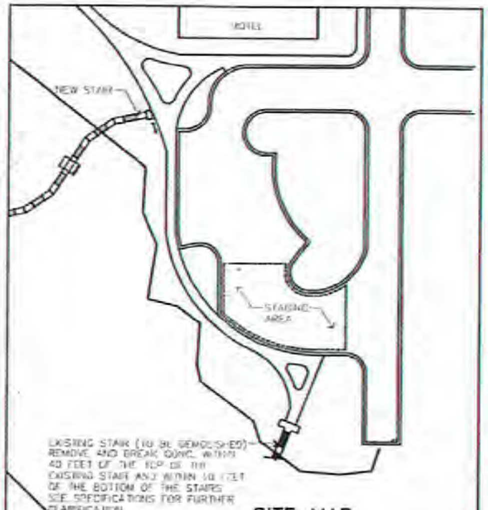
ALDER GEOTECHNICAL SERVICES
3910 NE 40TH AVENUE
PORTLAND, OREGON 97212
(503) 282-7482

STRUCTURAL ENGINEERING

CONLEE ENGINEERS, INC
1308 S.E. BERTHA BLVD.
PORTLAND, OREGON 97219
(503) 244-0549

VICINITY MAP





EXISTING STAIR (TO BE DEMOLISHED)
REMOVE AND BREAK CONC. WITHIN 40 FEET OF THE TOP OF THE EXISTING STAIR AND WITHIN 10 FEET OF THE BOTTOM OF THE STAIRS. SEE SPECIFICATIONS FOR FURTHER CLARIFICATION.

SITE MAP

RAR ARCHITECTS INCORPORATED
34 N.W. FIRST AVENUE
Portland, Oregon 97209
(503) 225-9085

REGISTERED ARCHITECT · STATE OF OREGON
GEORGE T. ROBSON

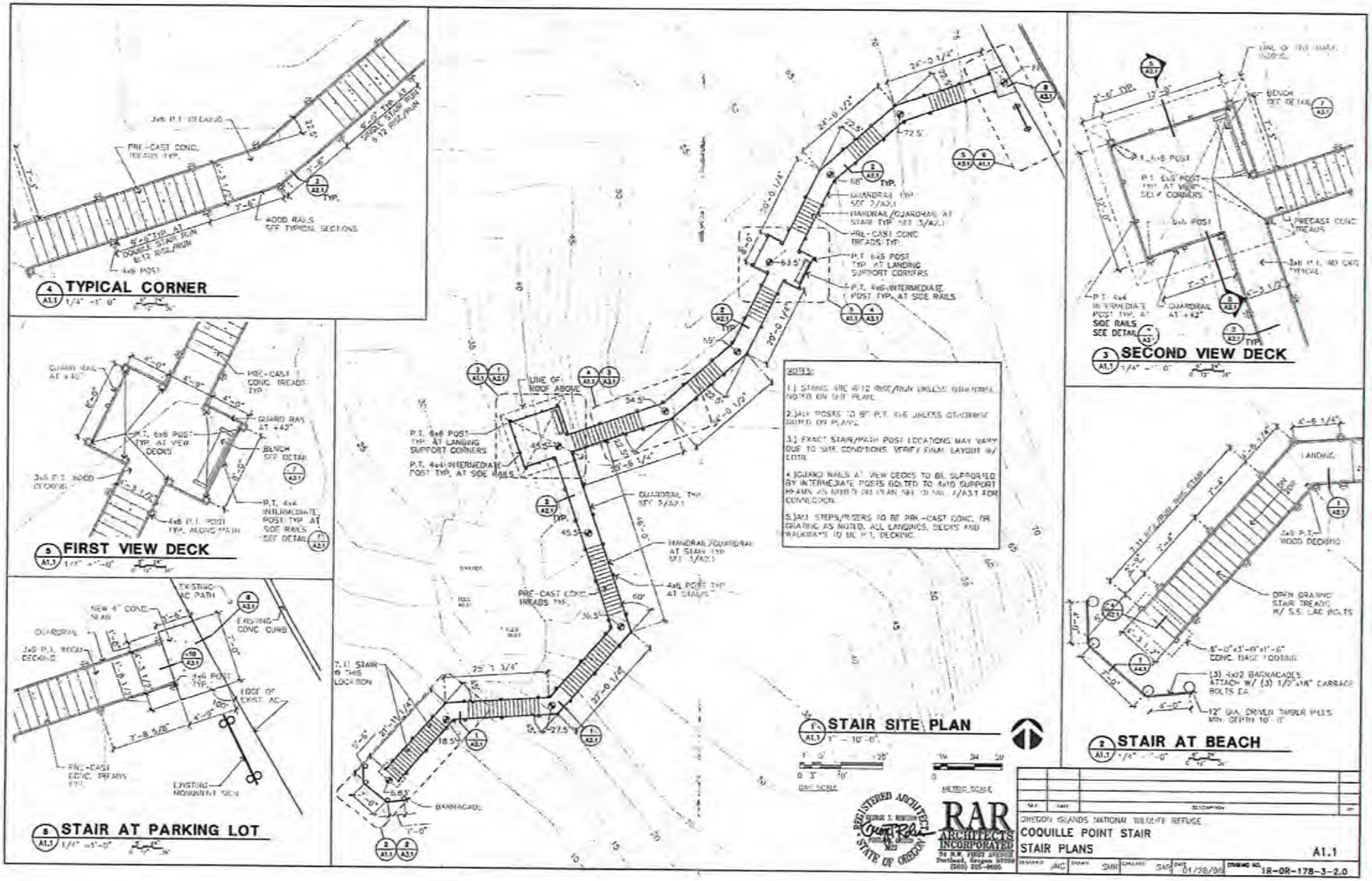
REV.	DATE	DESCRIPTION	BY

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
REGION 1, OFFICE OF ENGINEERING
PORTLAND, OREGON

OREGON ISLANDS
NATIONAL WILDLIFE REFUGE
COQUILLE POINT STAIR
TITLE SHEET
A0.0

DESIGNED	JRC	DRAWN	SMR	CHECKED	SAR
DATE	01/28/98	DRAWING NO.	1R-OR-178-3-1.0		

SHEET 1 OF 7



NOTES:

1.) STAIRS ARE 8/12 RISE/RUN UNLESS OTHERWISE NOTED ON SITE PLAN.

2.) ALL POSTS TO BE P.T. 4x6 UNLESS OTHERWISE NOTED ON PLANS.

3.) EXACT STAIR/PATH POST LOCATIONS MAY VARY DUE TO SITE CONDITIONS. VERIFY FINAL LAYOUT W/ COTR.

4.) GUARD RAILS AT VIEW DECKS TO BE SUPPORTED BY INTERMEDIATE POSTS BOLTED TO 4x10 SUPPORT BEAMS AS NOTED ON PLAN. SEE DETAIL 7/A3.1 FOR CONNECTION.

5.) ALL STEPS/RISERS TO BE PRE-CAST CONC. OR GRATING AS NOTED. ALL LANDINGS, DECKS AND WALKWAYS TO BE P.T. DECKING.

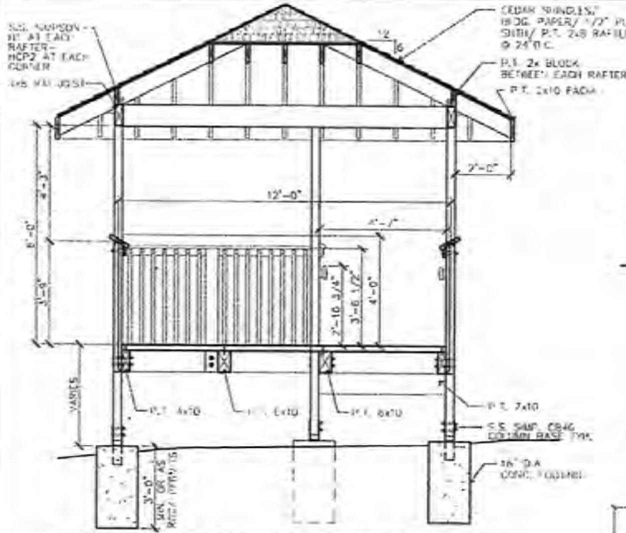
REGISTERED ARCHITECT
GEORGE T. ROBISON
PORTLAND, OREGON
STATE OF OREGON

RAR
ARCHITECTS
INCORPORATED
26 N.W. FIRST AVENUE
Portland, Oregon 97209
(503) 225-9695

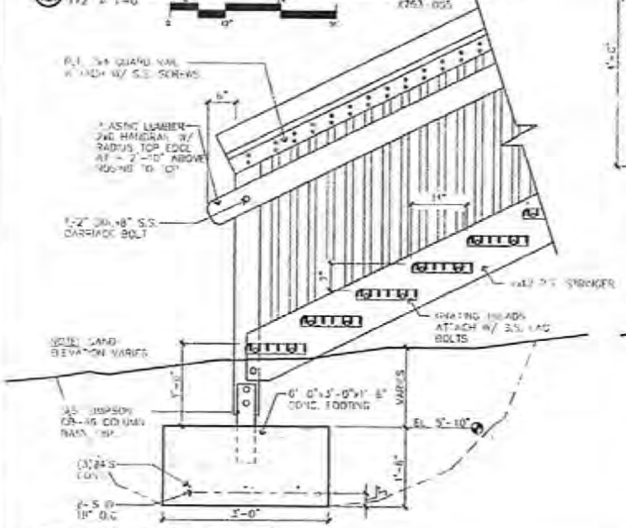
OREGON ISLANDS NATIONAL WILDLIFE REFUGE
COQUILLE POINT STAIR
STAIR PLANS
A1.1

DESIGNED JAC DRAWN SMR CHECKED SAS DATE 01/28/98 DRAWING NO. 1R-OR-178-3-2.0

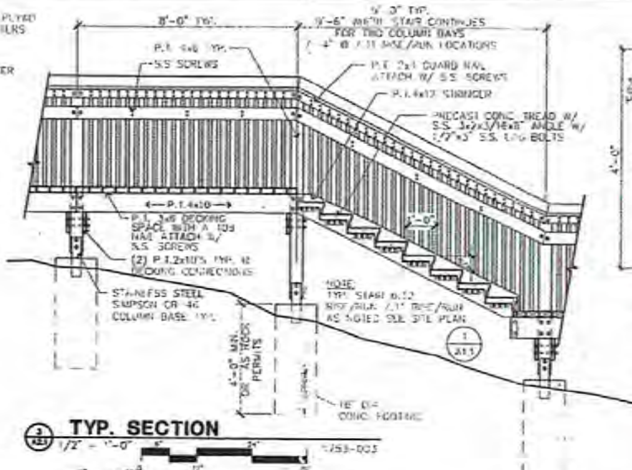
SHEET 2 of 7



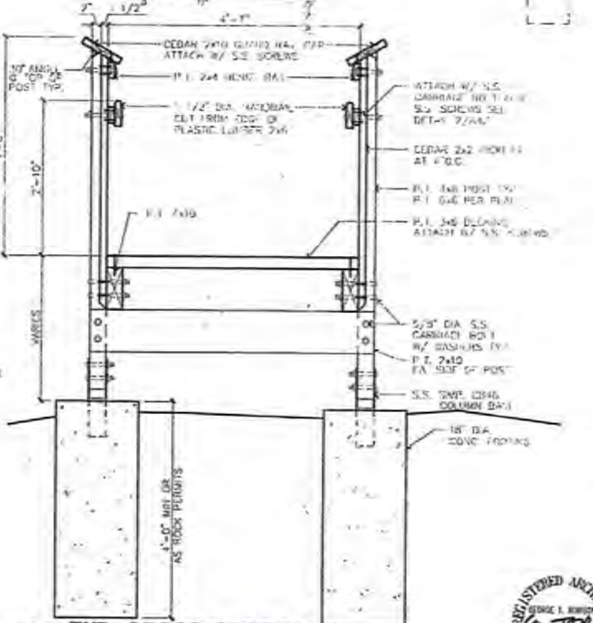
5
A2.1
SECTION TROUGH COVERED LANDING
1/2" = 1'-0"
X753-005



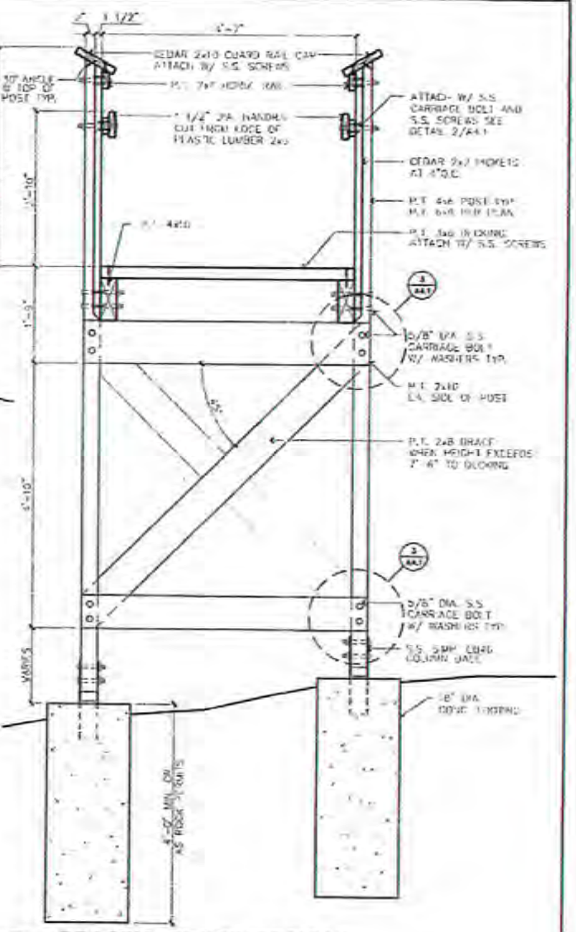
4
A2.1
STAIR AT BEACH
" = 1'-0"
X753-004



3
A2.1
TYP. SECTION
1/2" = 1'-0"
X753-003



2
A2.1
TYP. CROSS SECTION
" = 1'-0"
X 53-002



1
A2.1
BRACING CROSS SECTION
" = 1'-0"
X753-001

REGISTERED ARCHITECT
GEORGE T. ROBSON
STATE OF OREGON

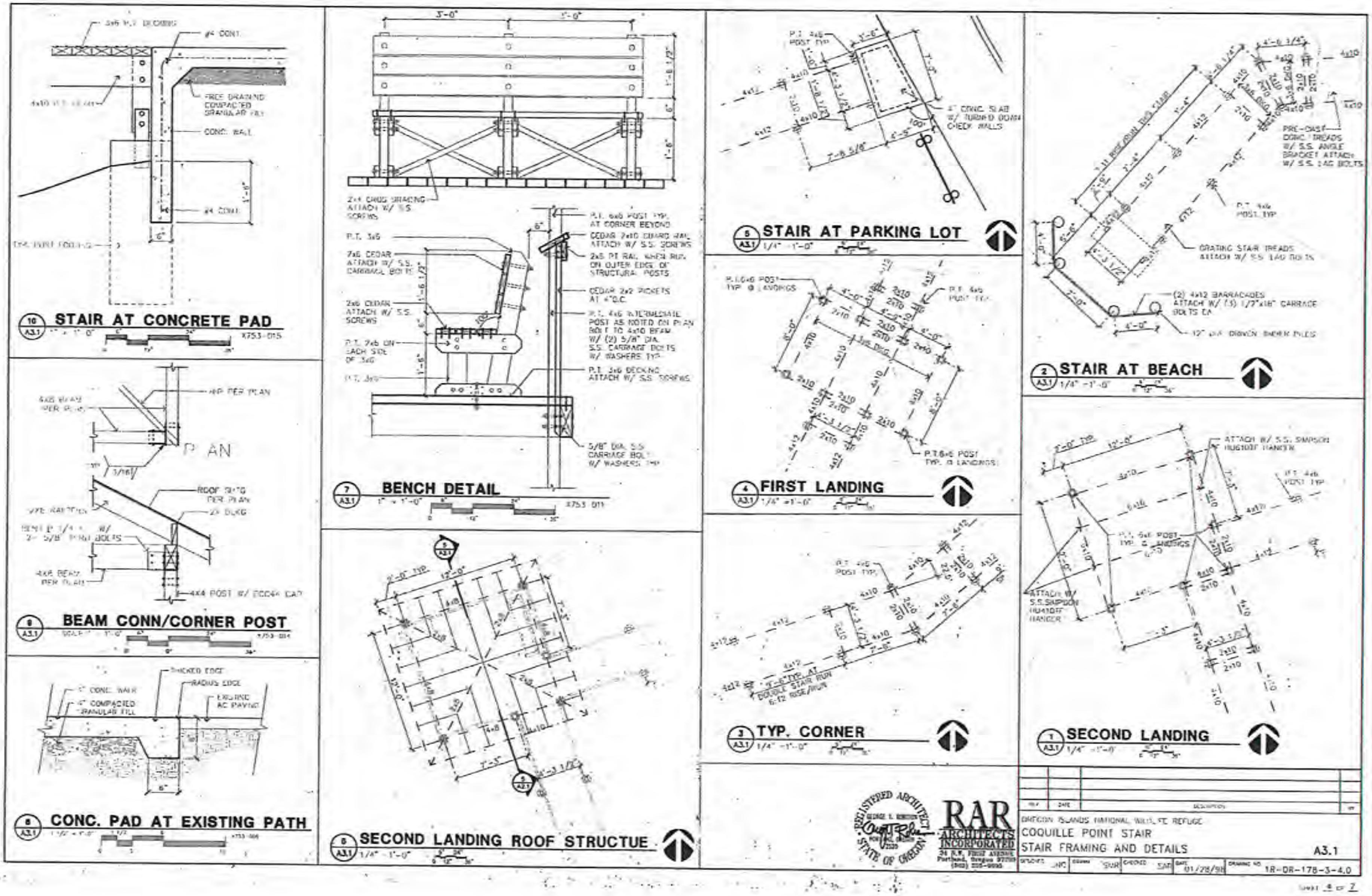
RAR
ARCHITECTS INCORPORATED
34 N.W. FIRST AVENUE
Portland, Oregon 97209
(503) 225-9990

REV	DATE	DESCRIPTION	BY

OREGON ISLANDS NATIONAL WILDLIFE REFUGE
COQUILLE POINT STAIR
STAIR SECTIONS AND DETAILS
A2.1

DESIGNED	DRAWN	CHECKED	DATE	DRAWING NO.
JNC	SMR	SAR	01/28/98	1R-0R-178-3-3.0

SHEET 3 OF 7



GEORGE T. ROBINSON
REGISTERED ARCHITECT
PORTLAND, OREGON
2320
STATE OF OREGON

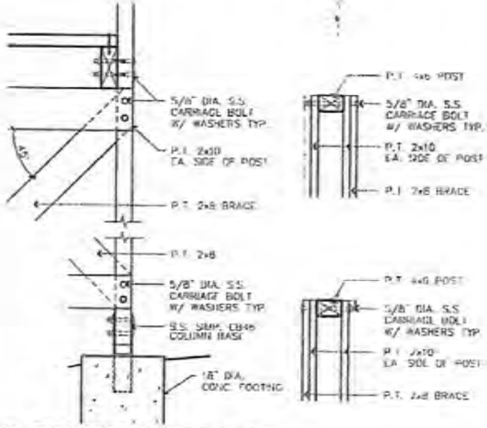
RAR ARCHITECTS INCORPORATED
34 N.W. FIRST AVENUE
Portland, Oregon 97209
(503) 225-9890

REV	DATE	DESCRIPTION	BY

OREGON ISLANDS NATIONAL WILDLIFE REFUGE
COQUILLE POINT STAIR
STAIR FRAMING AND DETAILS
A3.1

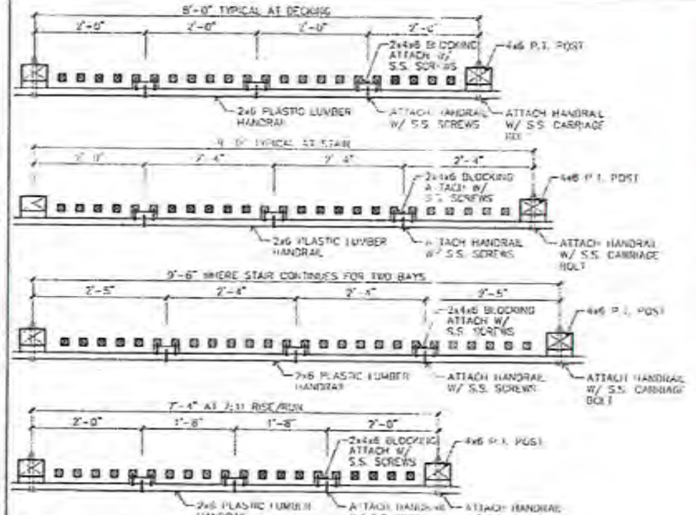
DESIGNED	DRAWN	CHECKED	DATE	DRAWING NO.
JMC	SUR	SAT	01/28/98	1R-DR-178-3-4.0

SHEET 4 OF 7



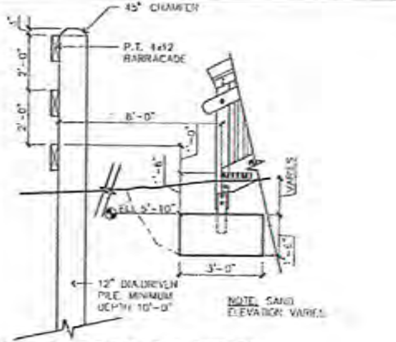
3 A4.1 BRACING CONNECTION

1" = 1'-0" X153-010



2 A4.1 HANDRAIL CONNECTION

1" = 1'-0" X153-001



1 A4.1 BARRACADE DETAIL

1" = 1'-0" X153-016

REGISTERED ARCHITECT
GEORGE L. ROBSON
STATE OF OREGON

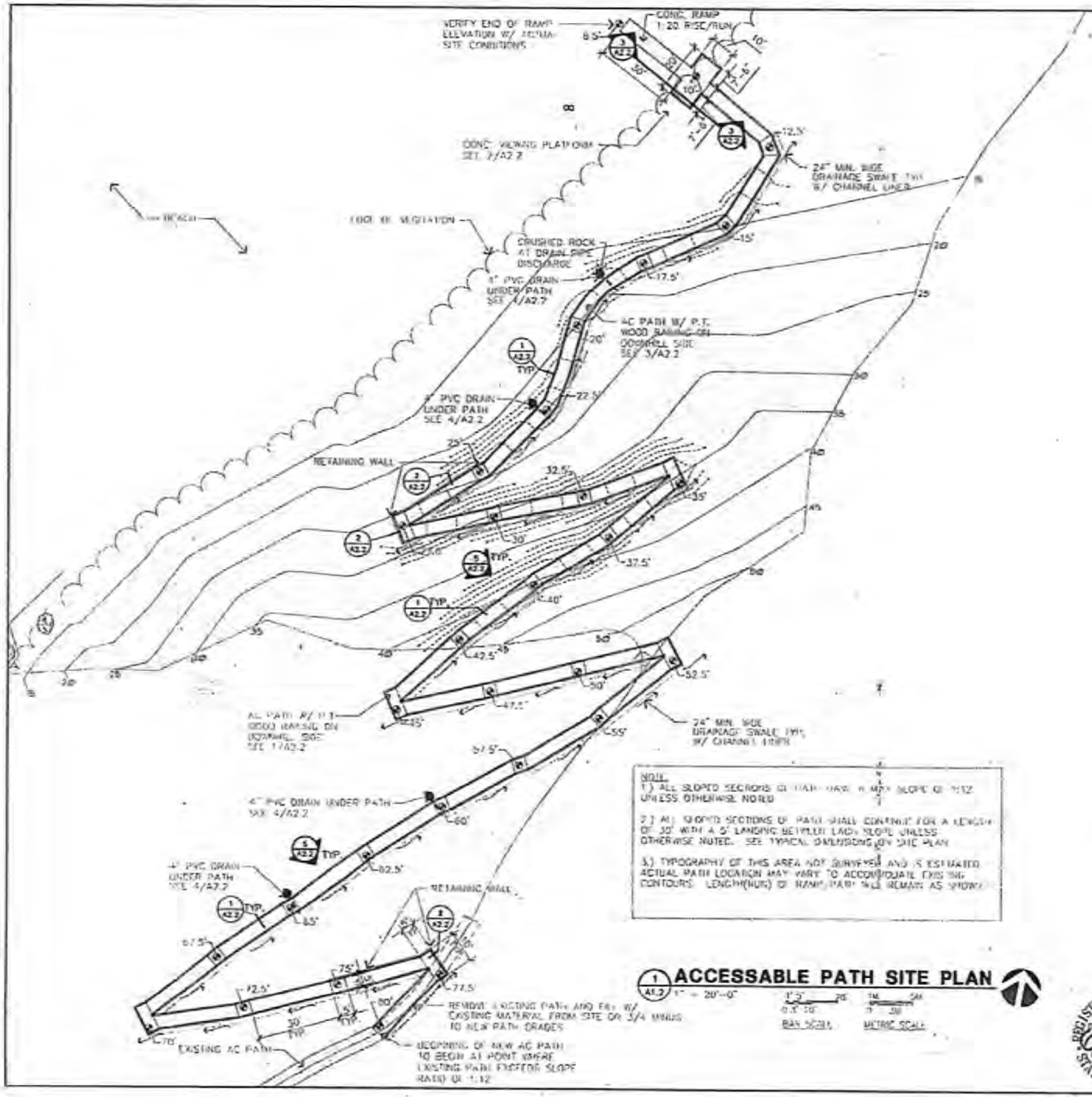
RAR
ARCHITECTS INCORPORATED
24 N.W. FIRST AVENUE
Portland, Oregon 97209
(503) 385-9999

REV	DATE	DESCRIPTION	BY

OREGON ISLANDS NATIONAL WILDLIFE REFUGE
COQUILLE POINT STAIR
STAIR DETAILS
A4.1

DESIGNER JHC DRAWN SAR CHECKED SAR DATE 01/28/98 DRAWING NO. 1R-OR-178-3-4.0

SHEET 5 of 7



ACCESSABLE PATH SITE PLAN

1/A1.2 1" = 20'-0"

BAR SCALE

METRIC SCALE

NOTE:
1.) ALL SLOPED SECTIONS OF PATH HAVE A MAX SLOPE OF 1:12 UNLESS OTHERWISE NOTED

2.) ALL SLOPED SECTIONS OF PATH SHALL CONTINUE FOR A LENGTH OF 30' WITH A 5' LANDING BETWEEN EACH SLOPE UNLESS OTHERWISE NOTED. SEE TYPICAL DIMENSIONS ON SITE PLAN

3.) TYPOGRAPHY OF THIS AREA NOT SURVEYED AND IS ESTIMATED ACTUAL PATH LOCATION MAY VARY TO ACCOMMODATE EXISTING CONTOURS. LENGTH(RUN) OF RAMP/PATH WILL REMAIN AS SHOWN

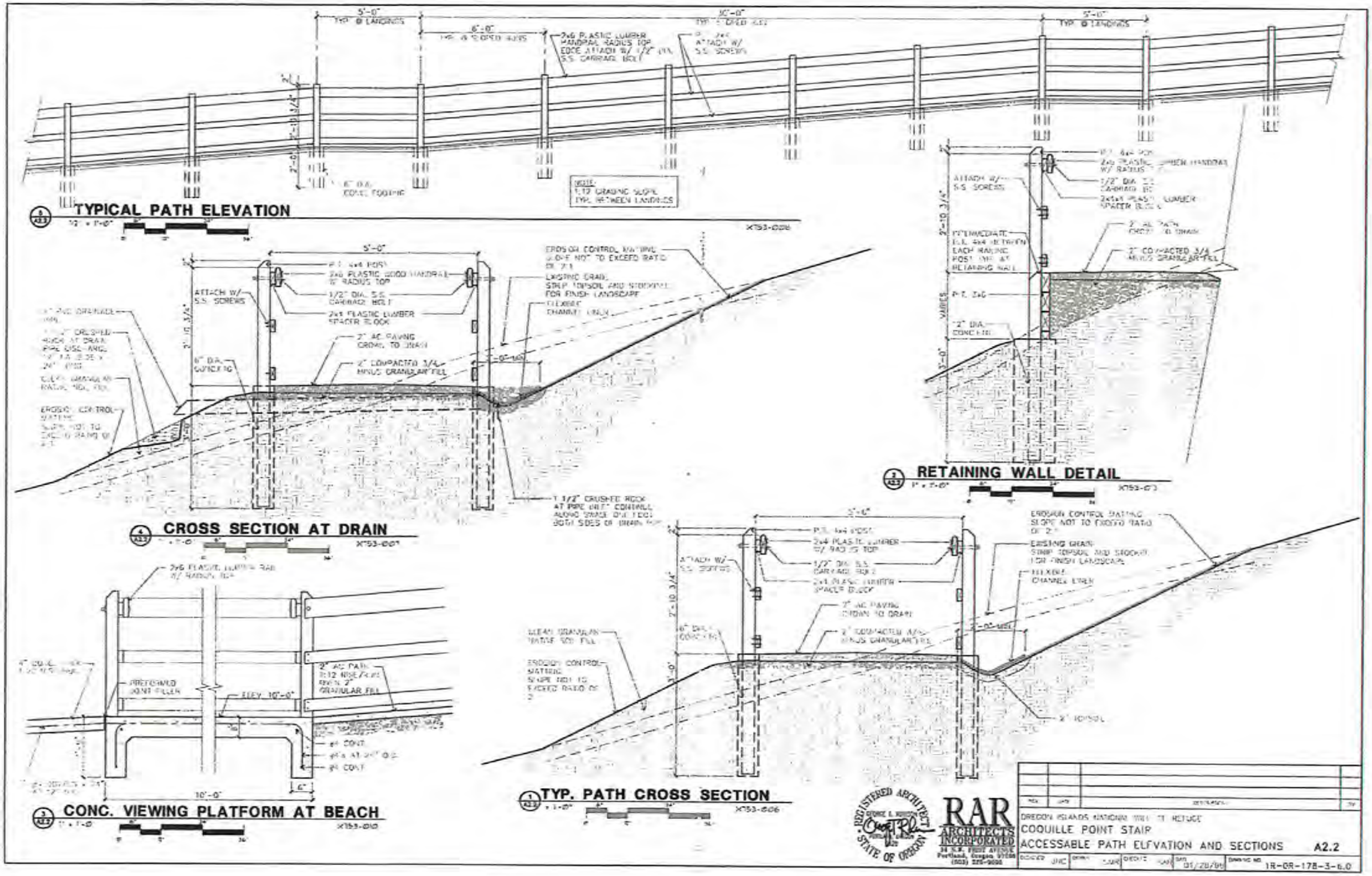
RAR ARCHITECTS INCORPORATED

REV	DATE	DESCRIPTION	BY

OREGON ISLANDS NATIONAL WILDLIFE REFUGE
COQUILLE POINT STAIR
ACCESSABLE PATH SITE PLAN
A1.2

DESIGNED	DRAWN	CHECKED	DATE	DRAWING NO.
JWC		SAR	01/28/98	1R-OR-178-3-5.0

SHEET 6 OF 7


5'-0"
TYP. @ LANDINGS
6'-0"
10'-0"
2x6 PLASTIC LUMBER HANDRAIL RADIUS TOP EDGE ATTACH W/ 1/2" DIA. S.S. CARRIAGE BOLT
ATTACH W/ S.S. SCREWS
6" DIA. CONC. FOOTING
NOTE:
1:12 GRADING SLOPE TYP. BETWEEN LANDINGS
TYPICAL PATH ELEVATION
X753-006
5'-0"
P.T. 4x4 POST
2x6 PLASTIC WOOD HANDRAIL W/ RADIUS TOP
ATTACH W/ S.S. SCREWS
1/2" DIA. S.S. CARRIAGE BOLT
2x4 PLASTIC LUMBER SPACER BLOCK
2" AC PAVING CROWN TO DRAIN
2" COMPACTED 3/4 MINUS GRANULAR FILL
6" DIA. CONCRETE
2'-10 3/4"
3'-0"
EROSION CONTROL MATTING SLOPE NOT TO EXCEED RATIO OF 2:1
EXISTING GRADE STRIP TOPSOIL AND STOCKPILE FOR FINISH LANDSCAPE
FLEXIBLE CHANNEL LINER
CLEAN GRANULAR NATIVE SOIL FILL
EROSION CONTROL MATTING SLOPE NOT TO EXCEED RATIO OF 2:1
1 1/2" CRUSHED ROCK AT PIPE INLET CONTINUE ALONG SWALE ONE FOOT BOTH SIDES OF DRAIN PIPE
CROSS SECTION AT DRAIN
X753-007
P.T. 4x4 POST
ATTACH W/ S.S. SCREWS
1/2" DIA. S.S. CARRIAGE BOLT
2x4x4 PLASTIC LUMBER SPACER BLOCK
INTERMEDIATE P.T. 4x4 BETWEEN EACH RAILING POST TYP. AT RETAINING WALL
2" AC PATH CROWN TO DRAIN
2" COMPACTED 3/4 MINUS GRANULAR FILL
P.T. 2x6
VARIES
3'-0"
RETAINING WALL DETAIL
X753-013
2x6 PLASTIC LUMBER RAIL W/ RADIUS TOP
PREFORMED JOINT FILLER
ELEV. 10'-0"
2" AC PATH 1:12 RISE/RUN OVER 2" GRANULAR FILL
#4 CONT.
#4's AT 24" O.C.
#4 CONT.
6"
10'-0"
CONC. VIEWING PLATFORM AT BEACH
X753-010
5'-6"
P.T. 4x4 POST
2x4 PLASTIC LUMBER W/ RADIUS TOP
1/2" DIA. S.S. CARRIAGE BOLT
2x4 PLASTIC LUMBER SPACER BLOCK
2" AC PAVING CROWN TO DRAIN
2" COMPACTED 3/4 MINUS GRANULAR FILL
CLEAN GRANULAR NATIVE SOIL FILL
EROSION CONTROL MATTING SLOPE NOT TO EXCEED RATIO OF 2:1
EXISTING GRADE STRIP TOPSOIL AND STOCKPILE FOR FINISH LANDSCAPE
FLEXIBLE CHANNEL LINER
2" TOPSOIL
TYP. PATH CROSS SECTION
X753-006
REGISTERED ARCHITECT
STATE OF OREGON
RAR
ARCHITECTS INCORPORATED
34 N.W. FIRST AVENUE
Portland, Oregon 97209
(503) 225-9696
OREGON ISLANDS NATIONAL WILDLIFE REFUGE
COQUILLE POINT STAIR
ACCESSABLE PATH ELFVATION AND SECTIONS
A2.2
JHC
01/28/99
1R-OR-178-3-6.0

Appendix B

Site Photographs

Photo 1 - View from Base of Structure

Photo 2 – Typical Framing

Photo 3 – Typical Movement at Stair Stringer to Landing Connection

Photo 4 – Movement at Stair Stringer to Landing Connection

Photo 5 – Open Gap at Displaced Stair Stringer

Photo 6 – Lateral Displacement at Stair to Landing Connection

Photo 7 – Bowed Rail Picket

Photo 8 – Moss/Algae Growth Ender Wood Decking

Photo 9 – Typical Concrete Footing

Appendix C

Cost Estimates

kpff

Schematic Cost Estimates
Coquille Point Stair, Bandon, OR
USFWS

Submitted
04-24-15

No.	Item Description	Quantity		Unit Price		Item Cost
	Alternate 1 - Continued Inspection and Maintenance					
1.01	Periodic Inspection	200 EA	$	1,000	$	200,000
1.02	Design Engineering for Repair	20 EA	$	5,000	$	100,000
1.03	Construction for Repair	20 EA	$	5,000	$	100,000
				Subtotal	$	400,000
				Contingency 30%	$	120,000
				Total Estimated Construction Costs	$	520,000
	Alternate 2 - Complete Replacement Strutcure					
2.01	Mobilization (10%)	1 LS	$	45,020	$	45,020
2.02	Demo Existing Structure	1,200 SF	$	10	$	12,000
2.03	Drilled Shaft Foundations	24 EA	$	15,000	$	360,000
2.04	Soil Trench	555 CY	$	40	$	22,200
2.05	New Elevated Structure	1,400 SF	$	40	$	56,000
				Subtotal	$	495,220
				Contingency 30%	$	148,566
				Preliminary and Construction Engineering 20%	$	128,757
				Total Estimated Construction Costs	$	772,543
	Alternate 3 - New on Grade Trail					
3.01	Mobilization (10%)	1 LS	$	8,220	$	8,220
3.02	Site Preparation	1 LS	$	15,300	$	15,300
3.03	New Trail	2,800 SF	$	18	$	50,400
3.04	Demo Existing Stair and Restore Grade	1,100 SF	$	15	$	16,500
				Subtotal	$	90,420
				Contingency 30%	$	27,126
				Preliminary and Construction Engineering 20%	$	23,509
				Total Estimated Construction Costs	$	141,055
	Alternate 4 - Rehabilitation of the Existing Structure					
4.01	Mobilization (10%)	1 LS	$	26,600	$	26,600
4.02	Drainage Improvements	1 LS	$	25,000	$	25,000
4.03	Post Base Anchorages	82 EA	$	500	$	41,000
4.04	Seat Extensions	20 EA	$	2,000	$	40,000
4.05	Periodic Inspection	60 EA	$	1,000	$	60,000
4.06	Design Engineering for Repair	10 EA	$	5,000	$	50,000
4.07	Construction for Repair	10 EA	$	5,000	$	50,000
				Subtotal	$	292,600
				Contingency 30%	$	87,780
				Preliminary and Construction Engineering 20%	$	76,076
				Total Estimated Construction Costs	$	456,456
	Alternate 5 - Partial Replacement Strutcure					
2.01	Mobilization (10%)	1 LS	$	22,178	$	22,178
2.02	Demo Existing Structure	658 SF	$	10	$	6,580
2.03	Drilled Shaft Foundations	12 EA	$	15,000	$	180,000
2.04	Soil Trench	240 CY	$	40	$	9,600
2.05	New Elevated Structure	640 SF	$	40	$	25,600
				Subtotal	$	243,958
				Contingency 30%	$	73,187
				Preliminary and Construction Engineering 20%	$	63,429
				Total Estimated Construction Costs	$	380,574
	Summary					
	Alternate 1				$	520,000
	Alternate 2				$	773,000
	Alternate 3				$	141,000
	Alternate 4				$	456,000
	Alternate 5				$	381,000

Appendix D

Geotechnical Report by Hart Crowser

celebrating 40 YEARS
HARTCROWSER
www.hartcrowser.com

April 23, 2015

U.S. Fish and Wildlife Service
Attention: Jeff Rose
Division of Engineering, R-1 and R-8
911 NE 11th Avenue
Portland, OR 97232-4181

Re: **Report of Geotechnical Engineering Services**
Coquille Point Stairway
Bandon, Oregon
15999-01 / Task 02

Dear Mr. Rose:

Introduction

Project Understanding

Hart Crowser is pleased to provide this report summarizing the findings of our preliminary subsurface investigation of slope instability issues at the Coquille Point Stairway site located at the end of 11th Street NW in Bandon, Oregon.

Hart Crowser had previously completed a limited evaluation of the site detailed in our report titled *Site Reconnaissance Field Report, Coquille Point Stairway Evaluation, Bandon, Oregon*, and dated August 2014. This current report should be considered supplemental to that prior report.

The general location of the project is shown on the Vicinity Map (Figure 1), and the relevant limits of our work area are shown on the Site Features drawing (Figure 2). Attachment A presents logs of hand-augured borings completed during this study. Attachment B present the results of laboratory testing on select soil samples.

Purpose and Scope of Work

The purpose of our current work is to provide the U.S. Fish and Wildlife Services (USFWS) and KPFF Consulting Engineers (KPFF), the project lead engineer, with preliminary design recommendations for various stabilization options for the staircase.

Our scope of work is outlined in the Agreement for Subconsultant Services (dated February 12, 2015) between Hart Crowser and KPFF. KPFF's work is being completed under their Contract No. F14PC00037 with USFWS. The KPFF job number is 113184.25. The scope generally included the following tasks:

300 West 15th Street
Vancouver, Washington 98660-2927
Tel 360.448.4189
Fax 503.620.6918

- Limited shallow subsurface boring and drive probes;
- Limited laboratory testing on select soil samples;
- Site reconnaissance to visually observe slope stability issues and the condition of the stairway;
- Engineering analysis to develop preliminary design recommendations for stabilization of the staircase; and
- This report summarizing our findings and preliminary recommendations.

Our current scope did not include mechanically advanced, deep explorations (e.g., mud rotary borings or test pits).

Use of this Report

This report is for the exclusive use of the KPFF and USFWS for specific application to the subject project and site. We completed this work in accordance with generally accepted geotechnical engineering practices for the nature and conditions of the work completed in the same or similar localities at the time the work was performed. We make no other warranty, express or implied.

Site Description

Surface Conditions

As detailed in our August, 2014 report, the project area includes the Coquille Point staircase and immediate vicinity. The stairway generally runs northeast to southwest across a slope ranging from 30 to 50 percent, with elevations ranging from 0 to 77 feet mean sea level (MSL). The stairway is constructed above and adjacent to a resistant bedrock knob or boulder along a narrow ridge. Landslide areas with hummocky topography and springs are located to the north and south of the stairs.

The landslide areas are vegetated with low-lying coastal grasses, invasive blackberries, and wetland plants. Further to the north, slopes generally consist of exposed bedrock faces consistent with erosive wave action. These bedrock faces are topped with terrace deposits. Slopes to the south of the project area generally exhibit bowl-shaped depressions, concave slope features, and hummocky topography consistent with landslides and areas of unstable slopes.

Since our 2014 site reconnaissance, additional erosion along the base of the slope appears evident. Soil loss along the toe of the slope is attributed to wave and tidal action. Some soil loss is also likely attributable to surface seepage and spring activity along the face of slopes. Loss of soils along the base\toe of the slope contributes to continued creep in the ground located on either side of the staircase. Soil cracks and secondary scarps were noted within the landslide area to the south. Numerous seeps and springs were observed adjacent to the stairway and at the base of the slope on either side of the stairway. Heavy seepage and soil sloughing was also observed in the vicinity of the large viewing platform. Some of the visible springs and secondary scarps were mapped during our February 2015 site reconnaissance, and their approximate locations are indicated on Figure 2.

Geology

A detailed geologic overview of the project site, including a review of U.S. Department of Agriculture (USDA) soil mapping, is detailed in our August 2015 report. In general, the geology of the site is mapped by Wiley and others (2014) as part of the Jurassic/Cretaceous, Mélange of Sixes River Terrain, overlain by Pleistocene, Whiskey Run terrace sediments. The southwestern end of the staircase terminates in beach sand. Landslides have been mapped directly adjacent to the staircase (AGS 1997) and along the coastline, in the same geologic unit, to the south of the project site (Wiley and others 2014).

The near ground surface soils have been mapped by USDA as consisting predominantly of "Bullards" sandy loam, with 30 to 50 percent slopes.

Subsurface Conditions

General

Our understanding of the subsurface conditions is based on our research and information collected from our field explorations, conducted February 18 and 19, 2015. We completed 10 hand-augured borings, to maximum depths of approximately 9.5 feet below ground surface (bgs). In addition, drive probes were advanced next to hand auger borings HA-1, HA-2, HA-3, HA-4, HA-6, HA-8, and HA-10. Due to the presence of shallow groundwater and loose sands, we used hand-driven casing in several borings to try to prevent and reduce caving.

The locations of the explorations are shown on Figure 2, and the exploration logs are included in Attachment A. Attachment B summarizes the results of laboratory testing on select soil samples.

A summary of subsurface conditions observed within our hand augured explorations is provided below.

- **Topsoil** was encountered in all borings with the exception of HA-04, HA-06, and HA-09 and generally consisted of 6 inches of low plasticity sand with silt and numerous grass rootlets.

- **Mixed Aeolian and Terrace Deposits** were encountered below the topsoil in borings HA-01 through HA-03, HA-05, and HA-10. These deposits ranged in thickness from 2.0 feet to 5.5 feet and generally consisted of moist, brown silty sand or sand with silt and trace gravel.

- **Terrace Deposits** were encountered below the mixed Aeolian and Terrace Deposits and generally consisted of sand with silt to gravelly sand with trace silt. Borings HA-01, HA-03, and HA-10 terminated in this unit. Water seepage, sloughing and caving was also problematic in this unit.

- **Landslide Deposits** were encountered in borings HA-04, HA-06, and HA-07, which were advanced within the previously mapped landslide areas. These deposits generally consist of soft to very soft, moist to wet, sand with trace silt and occasional rootlets and fine organic debris. Very soft organic soil was encountered in the landslide deposits in HA-06.

- **Residual Soil (Clay)** was encountered in borings HA-02 and HA-05 through HA-07. These deposits generally consist of gray sandy clay of medium plasticity with scattered organic debris. In explorations where the residual soil underlies the landslide deposits, the upper portion of this clay likely forms the failure plane for the observed landslide activity. This unit may also facilitate soil creep in other areas outside of previously identified landslide zones.

- **Residual Soil/Bedrock (Sandy Gravel/Sandstone)** was encountered in borings HA-02 and HA-05 and interpreted from drive probe action in borings HA-01, HA-03, HA-04, HA-06, and HA-10. This unit generally consisted of medium dense to dense, sandy gravel with trace clay and is interpreted to be weathered sandstone of the Mélange of Sixes River Terrain.

- **Beach Sand and Cobbles** were encountered in borings HA-08 and HA-09. Both of these explorations were terminated in this unit.

Groundwater

Groundwater was encountered in some of the borings, as noted on the logs, and was observed in the form of numerous seeps and springs in the hillside. These features appeared most prominently at the slope breaks and at the base of the slope. The slope break represents the contact between the marine terrace deposits and the Mélange of Sixes River deposits. Wet soil or groundwater was also noted in a number of our hand auger explorations, as perched water atop the clayey residual soils. Wet sandy soils and soils below groundwater were subject to severe caving and sloughing.

Conclusions

Based on our research, investigation, and observations, it is our opinion the stairway and surrounding area are being affected by creep of the adjacent slopes, which is accelerated where active landslide deposits are present. Slope movement is exacerbated by wave action along the toe of the slope and associated loss of soil. Extended periods of rainfall are also a likely source of slope movement.

As with our earlier site evaluation, we did not observe evidence of imminent large-scale slope instability that would cause sudden failure of the stairway. However, we do anticipate that the slopes and staircase will be subject to slow, long-term creep and shifting. The portions of the staircase that extend off of the ridgeline and into the landslide zones will have the greatest potential for creep. Current shifting of the staircase has been limited in magnitude over the past ±15 years, and we do not expect rapid changes to that condition.

We understand that the project team is tasked with evaluating four alternative courses of action regarding the staircase, including:

1. Develop an inspection and maintenance plan;
2. Construct a replacement staircase in or near its current alignment;

3. Construct an at-grade trail to replace the staircase; and
4. Rehabilitate and strengthen the existing staircase.

Our preliminary recommendations associated with each of these alternatives is outlined below:

Alternate 1 – Inspection and Maintenance

Because movement of the slopes and staircase appears to be occurring slowly; the current distress to the staircase appears to be limited; and the risk of sudden catastrophic failure of the stair appears to be low, we consider it an appropriate option to institute a formalized program of monitoring of the staircase so that future movements can be measured. With a monitoring program in place, staircase movement can be better delineated and quantified, then the data can be evaluated and a targeted program of maintenance, strengthening, and/or rehabilitation can be developed.

From a geotechnical perspective, we recommend that the following measures be incorporated into an inspection/monitoring plan.

- Install "tell-tale" crack monitoring strips, surveyor marking nails, and/or scribed marks on sides of key structural joints, connections, posts, etc. The installation of such features will allow quantification of the rate and magnitude of movement of various parts of the staircase. These monitoring devices could be installed at locations selected by KPFF and Hart Crowser, but subsequently monitored by USFWS personnel.

- Install survey hubs or stakes on slopes adjacent to the staircase to measure the rate and magnitude of slope movement. Again, these devices could be installed at locations selected by KPFF and Hart Crowser, but subsequently monitored by USFWS personnel.

- Measurement of these monitoring devices should be taken approximately once every month during the wet season (November to April) and once every other month during the dry season (May to October).

- Additional readings of these monitoring devices should be taken during intense or prolonged, heavy rainfall events. The Oregon Department of Geology and Mineral Industries (DOGAMI) defines "intense" rainfall as 4 percent of the average annual rainfall in a 12-hour period. The average annual rainfall for the Bandon area is approximately 56 inches, indicating that an intense rainfall corresponds to approximately 2.25 inches of rain in 12 hours. To help cover both intense and heavy, prolonged rainfalls, we recommend that "event-based" readings occur when over 2.25 inches of rain falls in a 24-hour period.

We anticipate that in a 1- to 3-year period of monitoring, a pattern of staircase and/or slope movement will be identified. Based on magnitude and rate of movement of various features, the project team will be more readily able to identify the most cost-effective and appropriate stabilization, strengthening, or rehabilitation measures for the structure.

Alternate 2 – Replace Existing Staircase

One option being considered is complete replacement of the staircase with a new structure founded on a stable foundation system. Due to the presence of creeping soils and active landsliding along the staircase alignment, a new foundation system would need to resist lateral forces imparted by the moving soils. Therefore, the use of a foundation system that extends into the deeper, more stable weathered sandstone bedrock would be required.

KPFF and Hart Crowser discussed the use of various "deep" foundation systems, such as drilled shafts/piers, driven piles, helical anchors, and micropiles. Any of these foundation system would be anchored into the weathered sandstone below the creeping/sliding sand and clay soil layers. For slender foundation elements, such as helical augers or micropiles, the use of tie-backs would likely be required to resist lateral movements. For larger diameter foundation elements, such as driven piles or drilled shafts, the lateral resistance would be developed by the stiffness of the foundation element and its embedment into the sandstone.

Based on various site conditions, such as caving sands, dense bedrock materials, steep slopes, environmentally sensitive areas, etc., we concluded that all of these systems had limitations. However, we chose drilled shafts as the system to recommend for this preliminary evaluation. The key constraint/difficulty with drilled shafts is the presence of caving sands that will necessitate the use of casing during installation. Other systems can be considered, if desired.

Preliminary Design Parameters

Typically, lateral soil pressures due to landslide movement around the shafts are determined based on desired factory of safety of the slope following shaft installation (if trying to stabilize the slide), depth of the slide plane below the ground surface, depth of embedment of the shaft, shaft diameter, horizontal distance between shafts, horizontal distance from the toe of the slope and centroid of the shaft, and soil material properties. The magnitude of lateral force acting on piers due to landslide forces is typically large and often requires large diameter shafts to resist slope movements. There are numerous methodologies for determining lateral landslide pressures acting on shafts, and for this preliminary analysis, we have chosen the use of full passive pressures acting on the shafts within the creep/landslide zone.

The lateral landslide pressure acting on shafts is modeled within software such as L-Pile, so that the required structural design and embedment of the shaft can be determined. The landslide pressure acting on the shafts should be represented as a triangular load distribution—starting at zero at the ground surface. This is an approximation of the actual loading condition but can be used to develop a realistic calculation of distributed shear, moment, and displacement in the drilled shaft.

For the current staircase alignment, we recommend that two different soil profiles be considered for modelling of average conditions at the site, one for the generally more stable ridgeline above the overlook and the other for the "near-landslide" areas at the overlook and below. These groupings conservatively pair a section of trail below the overlook, which abuts the stable boulder, with the less stable overlook and the lowest portion of the trail, which are both in landslide areas, but for this preliminary analysis this appears to be an appropriate delineation.

- Along Ridgeline (above overlook):
  - 0 to 5 feet – loose sand
  - 5 to 6 feet – clay (residual soil)
  - Greater than 6 feet – sand/sandstone (residual soil/weathered bedrock)
- Overlook and Below:
  - 0 to 6 feet – loose sand
  - 6 to 9 feet – clay (residual soil)
  - Greater than 9 feet – sand/sandstone (residual soil/weathered bedrock)

The creep/landsliding force on the pile should be modeled as a passive equivalent fluid weight equal to 700 pounds per cubic foot (pcf) acting over 3 projected pile diameters. This creep force should be applied within the loose sand and clay zones (e.g., to a depth of 6 feet along the ridgeline and 9 feet at the overlook and below).

Lateral resistance to the creep/landsliding force will be derived from the dense sand (residual sandstone) below the clay. Table 1 provides L-Pile parameters for all soil types; however, we recommend that lateral resistance in the loose sand and clay be ignored for long-term creep. (Theoretically, they could be relied on for short-term lateral loads.)

Table 1: L-Pile Soil Parameters

Soil	Unit Weight (lbs/ft^3)	Friction Angle (degrees)	Soil Modulus Constant, k (lbs/in^3)	Cohesion (lbs/ft^2)	Strain Factor, E_{50}
Loose Sand (above water)	105	30	25	n/a	n/a
Loose Sand (submerged)	43	30	15	n/a	n/a
Clay (submerged)	53	n/a	n/a	350	0.02
Dense Sand (submerged)	83	42	150	n/a	n/a

If the initial assessment of new drilled shafts indicates that staircase replacement is viable, than we recommend deeper soil explorations via track-mounted drill rigs be conducted to verify depths to sandstone.

As part of our evaluation of replacement or stabilization of the staircase, we discussed the potential use of buttresses near the toe of the existing slope. Due to the localized nature of some of the creep/landslide movements within the slope, we did not judge the use of buttresses to be an effective stabilization alternative.

Partial Replacement of the Structure

Another alternative might include partial removal and replacement of the existing staircase. Currently the lower half of the staircase meanders on either side of the large resistant rock outcrop/boulder near the toe of the slope. This section of staircase, in addition to the main viewing platform, extend off of the more stable ridgeline onto less stable sideslopes or landslide areas. One option would entail taking greater advantage of the stabilizing effect of the large outcrop/boulder by removing the staircase at and below the overlook and realigning the new stair case such that it no longer meanders to either side of the boulder. Instead a more straight line approach toward the large boulder could be used that includes aligning the staircase over the top of the outcrop/boulder. This could either be via a bridge over the boulder, or using the boulder as the foundation for staircase sections over the top of the boulder. Rock anchors could be used for both bearing and uplift capacity of any staircase features established over the top of the rock.

For preliminary rock anchor sizing for tension/uplift, we recommend the use of an ultimate ground/bond stress of 150 pounds per square inch (psi). For preliminary bearing estimates an allowable capacity of 5 kips in compression is possible for an anchor with a diameter of at least 6 inches installed a minimum of 5 feet into the outcrop/boulder.

Due to the potential for differential movements between the boulder and soils on the ridgeline, we recommend the inclusion of slip joints between sections of the staircase supported by the different materials.

Alternate 3 – Construct At-Grade Trail

Removal of the existing staircase and construction of an "at-grade" pathway is also being considered. The terrain on either side of the existing staircase alignment presents numerous challenges for an at-grade pathway, including scattered landslide scarps, hummocky ground from landsliding and slope creep, highly compressible organic soils along the lower portion of the slope, and large numbers of springs and seeps.

The advantages of an at-grade trail include alleviation of any danger associated with a structural staircase section collapsing. In addition, while routine maintenance associated with long-term slope creep and surface water will still be required with an at-grade trail, maintenance should be relatively low-tech relative to structural issues associated with a staircase.

Trail Considerations

We recommend the use of a gravel trail rather than asphalt-paved trail. Slope creep and water seepage will quickly result in cracking, settlement, and even uplifting of pavements. A gravel trail would be somewhat more "flexible" and more easily maintained/repaired.

The following considerations should be evaluated as part of the design and construction of an at-grade pathway.

- The ridgeline on the upper half of the current staircase alignment is relatively stable; whereas, the adjacent ground to the north and south include two landslides. To the greatest extent possible, any new trail should be aligned along the ridgeline.
- Due to the presence of loose sands, organic soils, and shallow groundwater seepage, we anticipate that paths will require a substantial gravel section to provide a relatively stable base. We recommend a minimum 18-inch section of clean, angular base rock underlain by a geotextile separation fabric be assumed for preliminary design.
- Site grading associated with an at-grade trail should be minimized to the extent possible. Any cuts and fills, particularly off the ridgeline, will be relatively unstable due to loose sands and shallow groundwater.
    - Unsupported cuts will be subject to severe running, sloughing, and caving. In order to reduce such conditions, all cuts should be protected by rockery or gabion-style walls. The height of these features should be restricted to less than approximately 4 feet. Such walls should be constructed with as much batter as possible, typically 1/2 horizontal to 1 vertical (1/2H:1V) or flatter. Taller walls will likely be unstable due to slope movements.
    - Similar to cuts into the existing slopes, fills on the slope should be minimized. It will be difficult to create a stable base for new structural fills; therefore, they should also be limited to 3 to 4 feet in thickness with maximum inclinations of 3H:1V. Additionally, imported granular material should be specified for all fill, or all fill should be encased in gabions.
- Hand railings and associated posts constructed on surface trails will likely experience long term vertical, horizontal, and angular (become out of plumb) displacement as a result of slope creep.
- Significant seepage and spring activity is present in the lower half of the slope. Extensive use of shallow riprap lined ditches or gravel subdrains will be required. Water collected in ditches or subdrains should not be allowed to discharge freely over slopes but should be routed from collection points via tight-lining with discharge points at beach level.

Relocated At-Grade Trail

A steep, though seemingly uniform and stable slope, is present approximately 150 to 200 feet northwest of the staircase (beyond the northern landslide). This area might be considered as an alternative trail location. The ground is relatively steep; however, the outcrop grades downward toward the south and parallel to the beach. A combined pathway and staircase that hugs the southern edge of this outcrop might be a viable alternative to the current location. The majority of a staircase trail placed in this area would be outside of the mapped landslide features and would not experience the various issues associated with the current staircase location. If chosen, this area will need to be further evaluated in order to develop appropriate design recommendations and construction guidelines.

Alternate 4 –Rehabilitate and Strengthen the Existing Staircase

Rehabilitation/strengthening measures can be implemented as part of a proactive stabilization program or a part of targeted measures planned based on the results of an inspection and maintenance program (Alternate 1). We anticipate that such measures may include the following tasks.

- Installing slip joints that will allow sections of the staircase to move independently from one another. The slip joints can be designed to reduce trip hazards within the staircase.
- Installing lateral bracing to reduce differential movements between unstable areas and to stiffen the staircase for structural redundancy.
- Replacing localized underpinning/foundation in areas where ground/foundation movement is evident. Underpinned/replaced foundations would be preliminarily evaluated in conformance with the parameters provided in Alternate 2.
- Installing subsurface drainage improvements that intercept and collect the perched water atop the clayey residual soil layer. This will help to reduce, though not eliminate, creep and landslide movements. However, to be effective the drainage system would need to be extensive.
- Installing a matrix of horizontal drains into the face of the slope could help stabilize the drainage system. Horizontal drains are often used to lower water table elevations and reduce pore pressures, which increases shear strength of the soil and improves slope stability. A drainage system in this case could entail installations of 50 to 150 feet in length and may require anywhere from 20 to 100 drains to achieve the desired effect on slope stability.

Closing

We appreciate the opportunity to assist you with this project, should you have any questions regarding the information contained in this report, please feel free to contact us.

Sincerely,

HART CROWSER, INC.

REGISTERED PROFESSIONAL ENGINEER
69386
OREGON
MARCH 12, 2002
DANIEL J. TRISLER

RENEWAL DATE: 6/30/16

DANIEL J. TRISLER, PE
Senior Associate, Geotechnical Engineer

GARRY HORVITZ, PE
Senior Principal, Geotechnical Engineer

Attachments:
Figure 1 – Vicinity Map
Figure 2 – Site Features
Attachment A – Field Explorations
Attachment B – Laboratory Test Results

References

Adams, W.C., R.W. Prellwitz, and T.E. Koler 2007. *Low-Technology Approach to Evaluating Slope Stability in Forested Uplands*, in First North American Landslide Conference, Vail, CO, pp. 569 – 577.

Alder Geotechnical Services (AGS) 1997. *Geotechnical Investigation for Proposed North and South Beach Accesses Oregon Islands National Wildlife Refuge Bandon, Oregon,* October 28, 1997.

Hart Crowser 2014. *Site Reconnaissance Field Report, Coquille Point Stairway Evaluation, Bandon, Oregon,* August 7, 2014.

KPFF 2014. *Coquille Point South Stairway Structural Evaluation,* August 6, 2014.

United States Department of Agriculture (USDA) 2014. Web Soil Survey Viewer: *Custom Soil Resource Report for Coos County, Oregon: Coquille Point Stairs*: http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

Wiley, T.J., J.D. McClaughry, L. Ma, K.A. Mickelson, C.A. Niewendorp, L.L. Stimely, H.H. Herinckx, and J. Rivas 2014. *Geologic Map of the Southern Oregon Coast between Port Orford and Bandon, Curry and Coos Counties, Oregon*: Oregon Department of Geology and Mineral Industries, Open-File Report O-14-01.

Williamson, D.A. 1994. *Geotechnical Exploration – Drive Probe Method,* in D.E. Hall, M.T. Long, and M.D. Rembolt, ed., Slope Stability Guide for National Forests in the United States, U.S. Department of Agriculture Forest Service Washington Office Engineering Staff Publication EM 7170-13, pp. 317-321.

F:\Notebooks\1599901_Coquille Pt Stairway Evaluation\Deliverables\Report-FINAL 04-23-15\Coquille Point Stairway-Geoletter.docx

Document Path: F:\Notebooks\1599901_Coquille Pt Stairway Evaluation\GIS\15999-01_Vmap.mxd Date: 3/10/2015 User Name: melissaschweitzer

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Coquille Point Stairway
Bandon, Oregon

Vicinity Map

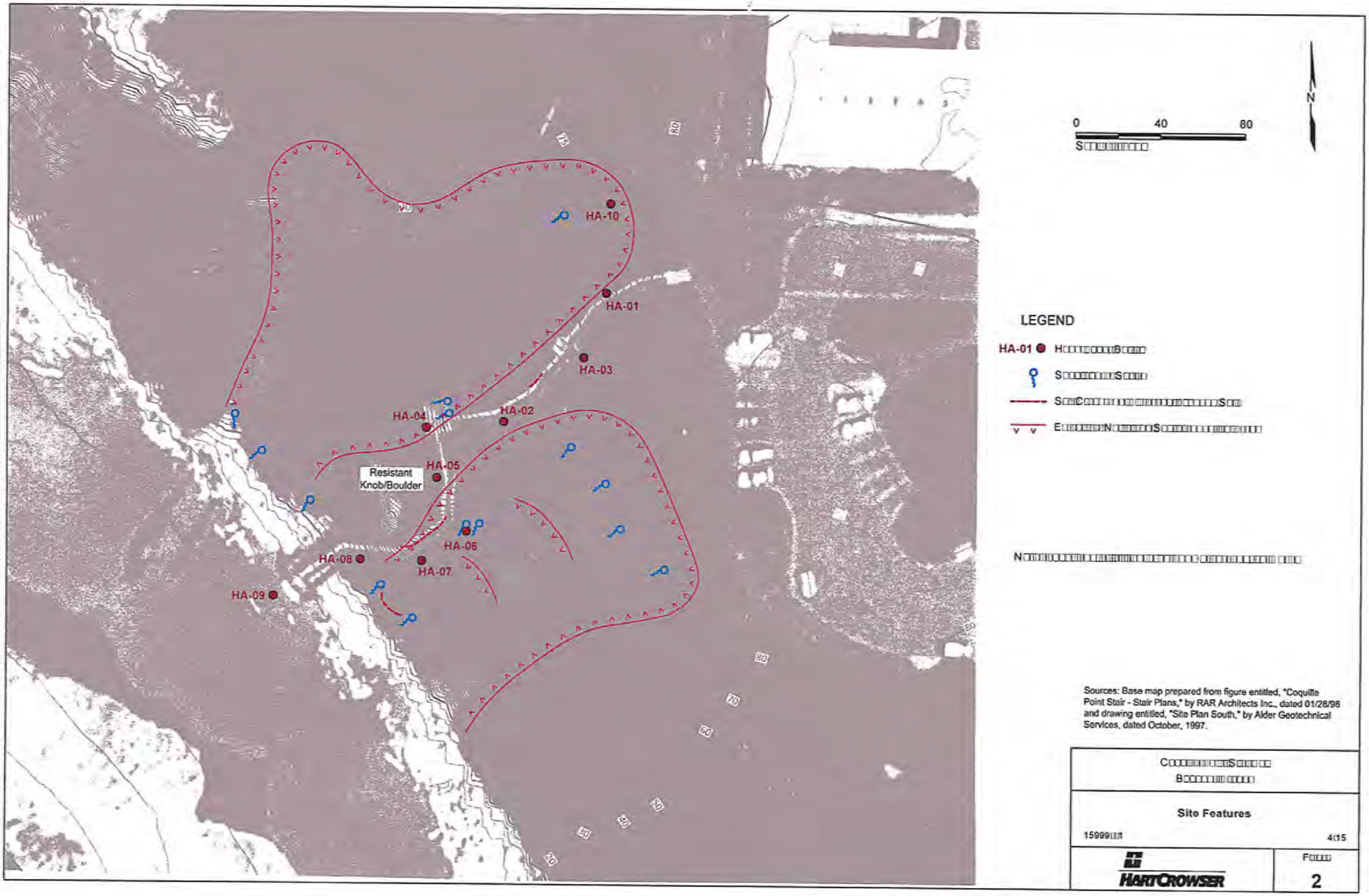
15999-01

4/15

HARTCROWSER

Figure

1



Sources: Base map prepared from figure entitled, "Coquille Point Stair - Stair Plans," by RAR Architects Inc., dated 01/28/98 and drawing entitled, "Site Plan South," by Alder Geotechnical Services, dated October, 1997.

Site Features

15999 4/15

HARTCROWSER

2

ATTACHMENT A
Field Explorations

ATTACHMENT A

Field Explorations

This attachment documents the processes Hart Crowser used to determine the nature (and quality) of the soil and groundwater underlying the project site addressed by this report. The discussion includes information on the following subjects:

- Explorations and their Locations,
- Hand Auger Borings, and
- Drive Probe (DP) Soundings.

Explorations and their Locations

Subsurface explorations for this project include 10 hand auger borings and 7 drive probe soundings. Materials encountered in the explorations were classified in the field in general accordance with ASTM International (ASTM) Standard Practice D 2488 "Standard Practice for the Classification of Soils (Visual-Manual Procedure)."

The exploration logs in this attachment show our interpretation of the drilling, sampling, and testing data. The logs indicate the depth where the soils change. Note that the change may be gradual. In the field, we classified the samples taken from the explorations according to the methods presented on the Key to Exploration Logs. This key also provides a legend explaining the symbols and abbreviations used in the logs.

Figure 2 shows the location of explorations, located using a pace count and steel tape measuring from existing physical features. The method used determines the accuracy of the location and elevation of the explorations.

Hand Auger Borings

Disturbed ("grab") samples were collected from drill spoils during hand auger explorations. Sampling intervals are shown in the exploration logs included in this attachment. Soil samples were field classified, and placed into watertight bags. They were then taken to an outside laboratory for further testing.

Drive Probe (DP) Soundings

DP soundings, which provide information about soil density, were performed in general accordance with the guidelines of Williamson (1994). The DP employs driving a 0.5-inch outer diameter pipe with a flat end drive plug using a 12-pound slide hammer. The "blows" required to advance 6 inches are recorded and can later be correlated to a Standard Penetration Test (SPT) blow count (N value) using correlations by Adams, Prellwitz, and Koler (2007).

KEY TO EXPLORATION LOGS

HARTCROWSER

SOIL CLASSIFICATION CHART

MATERIAL TYPES	MAJOR DIVISIONS		GROUP SYMBOL	SOIL GROUP NAMES & LEGEND	
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	GW	WELL-GRADED GRAVEL	●
			GP	POORLY-GRADED GRAVEL	○
		GRAVELS WITH FINES, >12% FINES	GM	SILTY GRAVEL	○
			GC	CLAYEY GRAVEL	▨
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	SW	WELL-GRADED SAND	░
			SP	POORLY-GRADED SAND	░
		SANDS AND FINES >12% FINES	SM	SILTY SAND	▥
			SC	CLAYEY SAND	▨
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	CL	LEAN CLAY	▨
			ML	SILT	▥
		ORGANIC	OL	ORGANIC CLAY OR SILT	☰
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	CH	FAT CLAY	▨
			MH	ELASTIC SILT	▥
		ORGANIC	OH	ORGANIC CLAY OR SILT	≋
HIGHLY ORGANIC SOILS			PT	PEAT	ψ

Note: Multiple symbols are used to indicate borderline or dual classifications

OTHER MATERIAL SYMBOLS

░	Concrete
■	Asphalt
ψ	Topsoil

MOISTURE MODIFIERS

Dry -	Absence of moisture, dusty, dry to the touch
Moist -	Damp, but no visible water
Wet -	Visible free water or saturated, usually soil is obtained from below the water table

SEEPAGE MODIFIERS

None -	
Slow -	< 1 gpm
Moderate -	1-3 gpm
Heavy -	> 3 gpm

CAVING MODIFIERS

None -	
Minor -	isolated
Moderate -	frequent
Severe -	general

MINOR CONSTITUENTS

Trace -	< 5% (silt/clay)
Occasional -	< 15% (sand/gravel)
With -	5-15% (silt/clay) in sand or gravel 15-30% (sand/gravel) in silt or clay

SAMPLE TYPES

⧗	Dames & Moore
☒	Standard Penetration Test (SPT)
■	Shelby Tube
▩	Bulk or Grab

LABORATORY/ FIELD TESTS

ATT -	Atterberg Limits
CP -	Laboratory Compaction Test
CA -	Chemical Analysis (Corrosivity)
CN -	Consolidation
DD -	Dry Density
DS -	Direct Shear
HA -	Hydrometer Analysis
OC -	Organic Content
PP -	Pocket Penetrometer (TSF)
P200 -	Percent Passing No. 200 Sieve
SA -	Sieve Analysis
SW -	Swell Test
TV -	Torvane Shear
UC -	Unconfined Compression

GROUNDWATER SYMBOLS

▽	Water Level (at time of drilling)
▼	Water Level (at end of drilling)
▽	Water Level (after drilling)

STRATIGRAPHIC CONTACT

———	Distinct contact between soil strata or geologic units
— — —	Gradual or approximate change between soil strata or geologic units

Notes:

Blowcount (N) is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted) per ASTM D-1586. See exploration log for hammer weight and drop.

When the Dames & Moore (D&M) sampler was driven with a 140-pound hammer (denoted on logs as D+M 140), the field blow counts (N-value) shown on the logs have been reduced by 50% to approximate SPT N-values.

Refer to the report text and exploration logs for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the exploration locations at the time the explorations were made. The logs are not warranted to be representative of the subsurface conditoins at other locations or times.

HARTCROWSER

BORING HA-01

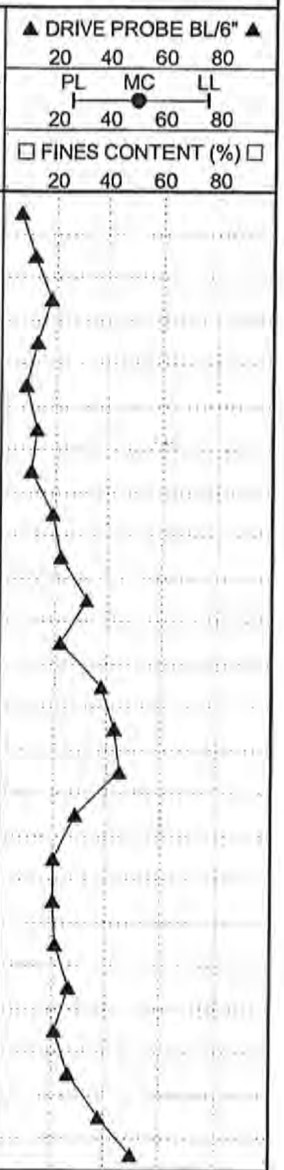
PAGE 1 OF 1

CLIENT KPFF / USFWS
PROJECT NUMBER 15999-01
DATE STARTED 2/18/2015 **COMPLETED** 2/18/2015
DRILLING CONTRACTOR Hart Crowser Staff
DRILLING METHOD Hand Auger
LOGGED BY R. Pirot **CHECKED BY** D. Trisler
NOTE:

PROJECT NAME Coquille Point Stairway
PROJECT LOCATION Bandon, Oregon
GROUND ELEVATION **SIZE**
GROUND WATER LEVELS:
AT TIME OF DRILLING —
AT END OF DRILLING —
AFTER DRILLING —

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		(SM) Moist, brown, SAND with silt, low plasticity fines, numerous grass rootlets (4-inch-thick) (Topsoil) (SM) (Medium dense), moist, brown, SAND with silt to silty SAND, fine subangular sand, low plasticity fines (mixed Aeolian and Terrace Deposits)			7		
					12		
					18		
					13		
					9		
2.5			GRAB S-1		13		
					11		
					19		
					22		
		(SP) (Medium dense), light brown, SAND with silt, medium to coarse subangular sand, nonplastic fines (Terrace Deposits)			32		
5.0					22		
			GRAB S-2		38		
					43		
					45		
		(SP) (Medium dense), light brown, gravelly SAND, trace silt, medium to coarse subangular sand, fine subrounded gravel, nonplastic fines (Terrace Deposits)			28		
7.5			GRAB S-3		20		
					20		
					21		
					26		
		Boring terminated at 9.5' due to caving Interpretation of subsurface conditions from this point and below are based off of Drive Probe results			21		
10.0					26		
		(Residual Soil/Bedrock)			38		
					50/5"		

Drive Probe completed at 11.375' due to refusal



GEOTECH BH PLOTS DRIVE PROBE - F:\DATA\GINT\OREGON_LIBRARY.GLB - 3/6/15 10:37 - F:\NOTEBOOKS\15999\01_COQUILLE PT STAIRWAY EVALUATION\FIELD DATA\PERM_GINT\1599901-HA1-10.GPJ

HARTCROWSER

BORING HA-02

PAGE 1 OF 1

CLIENT KPFF / USFWS

PROJECT NAME Coquille Point Stairway

PROJECT NUMBER 15999-01

PROJECT LOCATION Bandon, Oregon

DATE STARTED 2/18/2015 **COMPLETED** 2/18/2015

GROUND ELEVATION **SIZE**

DRILLING CONTRACTOR Hart Crowser Staff

GROUND WATER LEVELS:

DRILLING METHOD Hand Auger

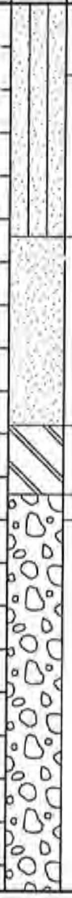
AT TIME OF DRILLING ---

LOGGED BY R. Pirot **CHECKED BY** D. Trisler

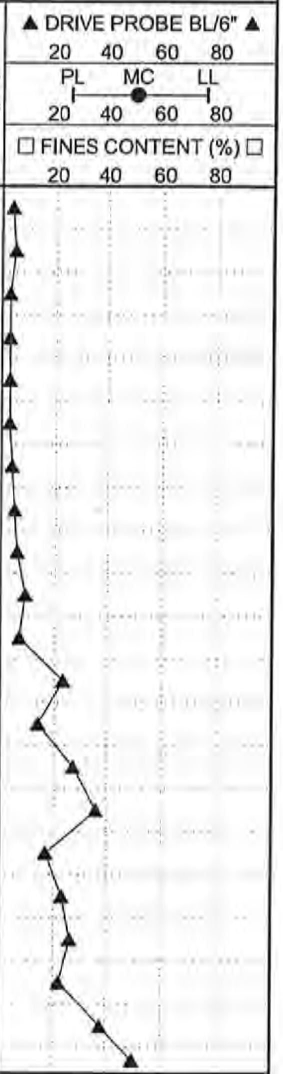
AT END OF DRILLING ---

NOTE:

AFTER DRILLING ---



DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0	(SM) Moist, brown, SAND with silt, low plasticity fines, numerous grass rootlets (4-inch-thick) (Topsoil)			4		
	(SM) (Medium dense), moist to wet, brown, silty SAND, trace gravel, fine subangular sand, low plasticity fines, scattered roots and organic debris (mixed Aeolian and Terrace Deposits)			5		
				3		
		GRAB S-1		3		
2.5				3		
	(SP) (Medium dense), wet, yellow-brown, SAND, trace silt, fine subangular sand, nonplastic fines (Terrace Deposits)			3		
				4		
		GRAB S-2		5		
				6		
5.0				9		
	(CL/CH) (Stiff), gray, moist, sandy CLAY, trace gravel, fine to medium subangular to angular sand, fine to medium subangular to angular gravel (Residual Soil)	GRAB S-3		7		
	(GP-SP) (Medium dense to dense), damp, gray, sandy GRAVEL, trace clay, fine to coarse subangular to angular sand, fine to coarse subangular to angular gravel, sandstone fragments (Residual Soil/Bedrock)	GRAB S-4		23		
	Boring terminated at 6' due to refusal			14		
				27		
7.5	Interpretation of subsurface conditions from this point and below are based off of Drive Probe results			36		
				17		
				23		
				26		
				22		
10.0				38		
				50/4"		



Drive Probe completed at 10.3' due to refusal

HARTCROWSER

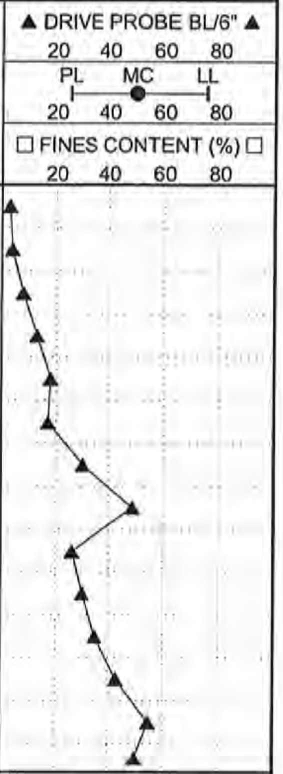
BORING HA-03

PAGE 1 OF 1

CLIENT KPFF / USFWS
PROJECT NUMBER 15999-01
DATE STARTED 2/18/2015 **COMPLETED** 2/18/2015
DRILLING CONTRACTOR Hart Crowser Staff
DRILLING METHOD Hand Auger
LOGGED BY R. Pirot **CHECKED BY** D. Trisler
NOTE:

PROJECT NAME Coquille Point Stairway
PROJECT LOCATION Bandon, Oregon
GROUND ELEVATION **SIZE**
GROUND WATER LEVELS:
AT TIME OF DRILLING ---
▼ **AT END OF DRILLING** 4.50 ft
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		(SP) (Loose), damp, brown, SAND with silt, low plasticity fines, numerous grass rootlets and organics (4-inch-thick) (Topsoil)			3		
		(SM) (Loose to medium dense), moist, brown, SAND with silt, trace gravel, fine subangular sand, fine subrounded to subangular gravel, low plasticity fines, scattered rootlets (mixed Aeolian and Terrace Deposits)			4		
			GRAB S-1		8		
					13		
					18		
2.5		(SP) (Medium dense), moist, yellow-brown, SAND, trace silt and gravel, medium subangular sand, fine to coarse subrounded gravel, nonplastic fines (Terrace Deposits)	GRAB S-2		17		
					30		
					49		
	▼	(SP) (Medium dense to dense), moist, yellow-brown, gravelly SAND, trace silt, fine subrounded to subangular gravel, medium to coarse subrounded to subangular sand, nonplastic fines (Terrace Deposits)	GRAB S-3		26		
					30		
5.0		Boring terminated at 4.6' due to refusal Interpretation of subsurface conditions from this point and below are based off of Drive Probe results (Residual Soil)			35		
					43		
					55		
					50/4"		



Drive Probe completed at 6.8' due to refusal

HARTCROWSER

BORING HA-04

PAGE 1 OF 1

CLIENT KPFF / USFWS

PROJECT NAME Coquille Point Stairway

PROJECT NUMBER 15999-01

PROJECT LOCATION Bandon, Oregon

DATE STARTED 2/18/2015 **COMPLETED** 2/18/2015

GROUND ELEVATION **SIZE**

DRILLING CONTRACTOR Hart Crowser Staff

GROUND WATER LEVELS:

DRILLING METHOD Hand Auger

∇ **AT TIME OF DRILLING** 3.00 ft

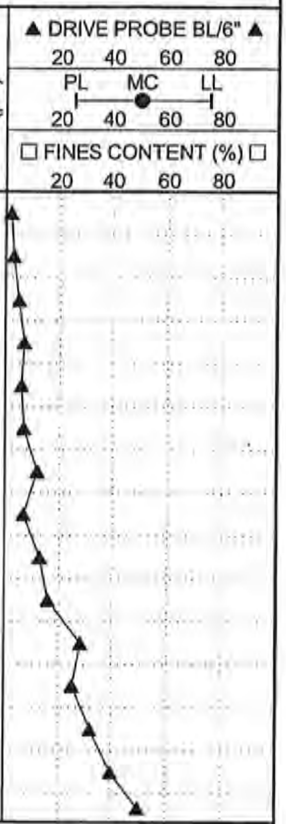
LOGGED BY R. Pirot **CHECKED BY** D. Trisler

AT END OF DRILLING —

NOTE:

AFTER DRILLING —

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		(SM) (Loose), moist, dark brown, silty SAND, fine subangular sand, low plasticity fines, scattered grass rootlets and fine organic debris (Landslide Deposits)			2		
					3		
			☒ GRAB S-1		5		
		(SP) (Medium dense), moist to wet, dark brown, SAND, trace silt, fine to medium subangular to angular sand, nonplastic fines, occasional rootlets and fine organic debris (Landslide Deposits)			7		
2.5					6		
		∇	☒ GRAB S-2		7		
		seepage			12		
		grades to gravelly Boring terminated at 3.6' due to refusal Interpretation of subsurface conditions from this point and below are based off of Drive Probe results (Landslide Deposits or Residual Soil)			7		
					13		
5.0					16		
					28		
					25		
		(Residual Soil/Bedrock)			32		
					40		
					50/4"		



Drive Probe completed at 7.3' due to refusal

HARTCROWSER

BORING HA-05

PAGE 1 OF 1

CLIENT KPFF / USFWS

PROJECT NAME Coquille Point Stairway

PROJECT NUMBER 15999-01

PROJECT LOCATION Bandon, Oregon

DATE STARTED 2/18/2015 **COMPLETED** 2/18/2015

GROUND ELEVATION **SIZE**

DRILLING CONTRACTOR Hart Crowser Staff

GROUND WATER LEVELS:

DRILLING METHOD Hand Auger

AT TIME OF DRILLING ---

LOGGED BY R. Pirot **CHECKED BY** D. Trisler

AT END OF DRILLING ---

NOTE:

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ DRIVE PROBE BL/6" ▲ 20 40 60 80 PL MC LL 20 40 60 80 ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		(SM) (Loose), damp, brown, SAND with silt, low plasticity fines, numerous grass rootlets and organic debris (4-inch-thick) (Topsoil)						
		(SP-SM) (Medium dense), moist, brown, SAND with silt, fine subangular sand; low plasticity fines (mixed Aeolian and Terrace Deposits)						
2.5								
		(SP) (medium dense), moist, yellow-brown, SAND, trace silt and gravel; fine to medium subangular sand; fine to coarse subrounded gravel, nonplastic fines (Terrace Deposits)						
5.0								
		(CL/CH) (Medium stiff to stiff), moist, gray, sandy CLAY, fine subangular sand, medium to high plasticity, disturbed texture, scattered small twigs, plants and organic debris (Residual Soil)	GRAB S-1					
		(GP) (Medium dense to dense), moist, dark gray, sandy GRAVEL, trace clay, medium to coarse angular sand, fine to coarse subangular to angular gravel, low plasticity fines (Residual Soil/Bedrock)	GRAB S-2					

Boring terminated at 6.4' due to refusal

GEOTECH BH PLOTS DRIVE PROBE - F:\DATA\GINT\OREGON_LIBRARY.GLB - 3/6/15 10:37 - F:\NOTEBOOKS\1599901 COQUILLE PT STAIRWAY EVALUATION\FIELD DATA\PERM GINT\1599901-HA1-10.GPJ

HARTCROWSER

BORING HA-06

PAGE 1 OF 1

CLIENT KPFF / USFWS

PROJECT NUMBER 15999-01

DATE STARTED 2/19/2015 **COMPLETED** 2/19/2015

DRILLING CONTRACTOR Hart Crowser Staff

DRILLING METHOD Hand Auger with Casing

LOGGED BY R. Pirot **CHECKED BY** D. Trisler

NOTE:

PROJECT NAME Coquille Point Stairway

PROJECT LOCATION Bandon, Oregon

GROUND ELEVATION **SIZE**

GROUND WATER LEVELS:

∇ **AT TIME OF DRILLING** 1.10 ft

AT END OF DRILLING —

▼ **AFTER DRILLING** 0.00 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		▼ (OL) (Very soft), wet, dark brown, ORGANIC SOIL with sand, fine subangular sand, low to medium plasticity, mostly fine organic material and rootlets, strong organic odor (Landslide Deposits)			1		
			GRAB S-1		1		
		∇ (SP) (Loose to medium dense), wet, brown, SAND, trace silt, fine subangular sand, nonplastic to low plasticity fines (Landslide Deposits)			1		
					2		
2.5					2		
			GRAB S-2		2		
		(CL/CH) (Medium stiff), moist to wet, gray, sandy CLAY, trace gravel, medium to coarse subangular to angular sand, fine subangular to angular gravel, medium to high plasticity, scattered decomposed organic debris (Landslide Failure Plane/Residual Soil)			1		
					2		
					4		
5.0					9		
					9		
					13		
					23		
		Boring terminated at 6.6' due to refusal Interpretation of subsurface conditions from this point and below are based off of Drive Probe results			21		
7.5		(Residual Soil/Bedrock)			37		
					48		

Drive Probe completed at 8' due to refusal

GEOTECH BH PLOTS DRIVE PROBE - F:\DATA\GINT\OREGON_LIBRARY.GLB - 3/6/15 10:37 - F:\NOTEBOOKS\1599901_COQUILLE PT STAIRWAY EVALUATION\FIELD DATA\PERM_GINT\1599901-HA1-10.GPJ

BORING HA-07

PAGE 1 OF 1

HARTCROWSER

CLIENT KPFF / USFWS

PROJECT NUMBER 15999-01

DATE STARTED 2/19/2015 **COMPLETED** 2/19/2015

DRILLING CONTRACTOR Hart Crowser Staff

DRILLING METHOD Hand Auger

LOGGED BY R. Pirot **CHECKED BY** D. Trisler

NOTE:

PROJECT NAME Coquille Point Stairway

PROJECT LOCATION Bandon, Oregon

GROUND ELEVATION **SIZE**

GROUND WATER LEVELS:

∇ **AT TIME OF DRILLING** 1.70 ft

AT END OF DRILLING —

$\blacktriangledown$ **AFTER DRILLING** 1.50 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ DRIVE PROBE BL/6" ▲ 20 40 60 80 PL MC LL 20 40 60 80 ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0	▥	(ML) (Soft), damp, dark brown, sandy SILT, fine sand, low plasticity fines, contains rootlets (Topsoil)						
	░	$\blacktriangledown$ ∇ (SP) (Loose), moist to wet, gray-brown, SAND, trace silt, fine to medium sand, low plasticity fines (Landslide Deposits) heavy seepage						
2.5	░	(SP) (Medium dense), wet, yellow-brown, SAND with silt, fine to medium subangular sand; low plasticity fines (Landslide Deposits)						
5.0								
7.5	▨	(CL/CH) (Stiff), moist to wet, gray, sandy CLAY, trace gravel, medium to coarse subangular to angular sand, fine to coarse subangular to angular gravel, medium plasticity fines, occasional organic debris, disturbed texture (Residual Soil)	☒ GRAB S-1					

Boring terminated at 8.6' due to refusal

HARTCROWSER

BORING HA-08

PAGE 1 OF 1

CLIENT KPFF / USFWS

PROJECT NUMBER 15999-01

DATE STARTED 2/19/2015 **COMPLETED** 2/19/2015

DRILLING CONTRACTOR Hart Crowser Staff

DRILLING METHOD Hand Auger

LOGGED BY R. Pirot **CHECKED BY** D. Trisler

NOTE:

PROJECT NAME Coquille Point Stairway

PROJECT LOCATION Bandon, Oregon

GROUND ELEVATION **SIZE**

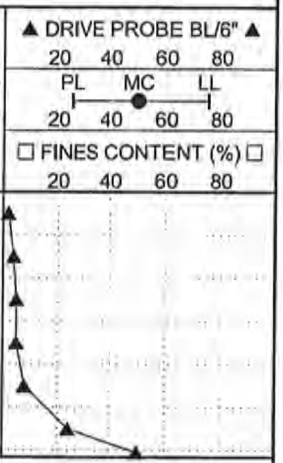
GROUND WATER LEVELS:

AT TIME OF DRILLING ---

AT END OF DRILLING ---

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		(SM) (Loose), damp, brown, SAND with silt, low plasticity fines, numerous grass rootlets, contains rotted driftwood and beach trash (Topsoil)			2		
					4		
		(SM-SP) (Loose), wet, brown, SAND with silt, fine to medium subangular sand, low plasticity fines, scattered organics (Beach Sand/Colluvium)			5		
		\ dense cobbles			5		
2.5		Boring completed at 1.75' Interpretation of subsurface conditions from this point and below are based off of Drive Probe results			8		
					24		
		Drive Probe completed at 3.08' due to refusal			50/1"		



BORING HA-09

PAGE 1 OF 1

HARTCROWSER

CLIENT KPFF / USFWS

PROJECT NUMBER 15999-01

DATE STARTED 2/19/2015 **COMPLETED** 2/19/2015

DRILLING CONTRACTOR Hart Crowser Staff

DRILLING METHOD Hand Auger

LOGGED BY R. Pirot **CHECKED BY** D. Trisler

NOTE:

PROJECT NAME Coquille Point Stairway

PROJECT LOCATION Bandon, Oregon

GROUND ELEVATION **SIZE**

GROUND WATER LEVELS:

AT TIME OF DRILLING —

AT END OF DRILLING —

AFTER DRILLING —

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ DRIVE PROBE BL/6" ▲ 20 40 60 80 PL MC LL 20 40 60 80 ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		(SP) (Loose), wet, brown, SAND, trace silt, fine subangular sand (Beach Sand)						
		dense cobbles Boring completed at 1.75'						

HARTCROWSER

BORING HA-10

PAGE 1 OF 1

CLIENT KPFF / USFWS

PROJECT NUMBER 15999-01

DATE STARTED 2/19/2015 **COMPLETED** 2/19/2015

DRILLING CONTRACTOR Hart Crowser Staff

DRILLING METHOD Hand Auger

LOGGED BY R. Pirot **CHECKED BY** D. Trisler

NOTE:

PROJECT NAME Coquille Point Stairway

PROJECT LOCATION Bandon, Oregon

GROUND ELEVATION **SIZE**

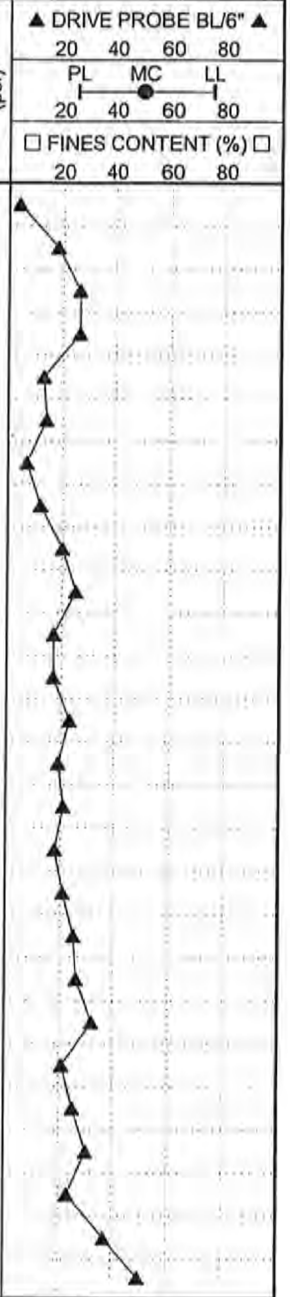
GROUND WATER LEVELS:

AT TIME OF DRILLING ---

AT END OF DRILLING ---

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		(SM) (Loose), damp, brown, SAND with silt, numerous grass rootlets and organic debris (Topsoil) (SP) (Medium dense), brown, SAND with silt and gravel, fine to medium subrounded to subangular sand, fine to coarse, rounded to subrounded gravel, low plasticity fines (mixed Aeolian and Terrace Deposits)			4		
					18		
					26		
					26		
					13		
2.5		(SM) (Medium dense), brown, SAND with silt and gravel, fine to medium subrounded to subangular sand, fine subrounded gravel, low plasticity fines, contains silty/clayey gravel-sized clasts (mixed Aeolian and Terrace Deposits)	GRAB S-1		14		
					7		
		grades to gravelly sand	GRAB S-2		12		
					20		
					25		
5.0					17		
					17		
		(SP-SM) (Medium dense), moist to wet, yellow-brown, SAND with silt, fine to medium subangular sand, nonplastic to low plasticity fines (Terrace Deposits)			23		
			GRAB S-3		19		
		grades to gravelly sand			21		
7.5					18		
					21		
					25		
					26		
					32		
10.0		Boring terminated at 9.9' due to caving Interpretation of subsurface conditions from this point and below are based off of Drive Probe results			21		
					25		
					30		
					23		
		(Residual Soil/Bedrock)			37		
12.5					50/5"		



Drive Probe completed at 12.9' due to refusal

GEOTECH BH PLOTS DRIVE PROBE - F:\DATA\GINT\OREGON_LIBRARY.GLB - 3/6/15 10:37 - F:\NOTEBOOKS\1599901_COQUILLE PT STAIRWAY EVALUATION\FIELD DATA\PERM_GINT\1599901-HA1-10.GPJ

ATTACHMENT B
Laboratory Test Results

ATTACHMENT B

Laboratory Test Results

Select soil samples were delivered to ACS Testing for testing of various soil properties. The results of the testing are included in this attachment.

7409 SW Tech Center Dr, #145
Tigard, OR 97223
phn: 503-443-3799
fax: 503-620-2748

HART CROWSER, INC
8910 SW GEMINI DR
BEAVERTON, OR 97008-7123

PROJECT:	HART CROWSER 2015 LAB SERVICES	**JOB NO:**	15-5475
LOCATION:	COQUILLE POINT STAIRWAY	**WORK ORDER NO:**	N/A
MATERIAL:	NATIVE SOILS	**LAB NO:**	8011-1
SAMPLE SOURCE:	SEE BELOW	**DATE SAMPLED:**	3/6/15

MOISTURE CONTENT OF SOIL (ASTM D2216)

LAB #	BORING	DEPTH	WET WT. (gram)	DRY WT. (gram)	MOISTURE CONTENT
8011-1	HA1	2.5'-3.0'	849.0	734.8	15.5%
8011-1	HA1	5.5'-6.0'	1109.7	1050.2	5.7%
8011-1	HA1	7.5'-8.0'	1164.9	1026.4	13.5%
8011-1	HA2	1.5'-2.0'	856.6	700.5	22.3%
8011-1	HA2	3.5'	885.4	666.9	32.8%
8011-1	HA2	4.9'-5.3'	536.1	448.0	19.7%
8011-1	HA3	1.0'-1.5'	1007.0	849.6	18.5%
8011-1	HA3	2.5'-3.0'	1067.6	981.0	8.8%
8011-1	HA3	4.0'-4.5'	748.8	692.0	8.2%
8011-1	HA4	1.0'-1.5'	194.2	133.5	45.5%
8011-1	HA4	2.3'-3.0'	513.6	396.8	29.4%
8011-1	HA4	3.0'-7.2'	249.4	214.6	16.2%
8011-1	HA5	5.2'-5.9'	525.1	425.3	23.5%
8011-1	HA6	0.5'-1.0'	693.9	502.2	38.2%
8011-1	HA6	2.5'-2.8'	378.7	298.9	26.7%
8011-1	HA6	N/A	505.4	434.8	16.2%
8011-1	HA7	7.5'-8.0'	588.0	518.5	13.4%
8011-1	HA10	1.0'-2.5'	613.2	528.8	16.0%
8011-1	HA10	3.8'-4.6'	739.1	683.2	8.2%
8011-1	HA10	6.3'-6.5'	125.4	107.5	16.7%

REVIEWED BY 5-13-15

ASPHALT
CONCRETE
SOILS
TESTING, INC
503.443.3799

7409 SW Tech Center Dr, #145
Tigard, OR 97223
phn: 503-443-3799
fax: 503-620-2748

HART CROWSER, INC
8910 SW GEMINI DR
BEAVERTON, OR 97008-7123

PROJECT: HART CROWSER 2015 LAB SERVICES
LOCATION: COQUILLE POINT STAIRWAY
SAMPLE SOURCE: SEE BELOW

JOB NO: 15-5475
WORK ORDER NO: N/A
DATE SAMPLED: 3/6/15

MECHANICAL SIEVE ANALYSIS
GROUP SYMBOL, USCS (ASTM D-2487)

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	#200	#100	#50	#40	#30	#16	#10	#8	#4	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	3"	6"	Lab #
HA2 @ 4.9'-5.3'		30	15																				8011-1
HA5 @ 5.2'-5.9'		37	21																				8011-1
HA7 @ 7.5'-8.0'		21	8																				8011-1

PERCENT PASSING BY WEIGHT

BORING	DEPTH	MC%

3-13-15

503.443.3799

7409 SW Tech Center Dr, #145
Tigard, OR 97223
phn: 503-443-3799
fax: 503-620-2748

HART CROWSER, INC
8910 SW GEMINI DR
BEAVERTON, OR 97008-7123

PROJECT: HART CROWSER 2015 LAB SERVICES
LOCATION: COQUILL POINT STAIRWAY
SAMPLE SOURCE: SEE BELOW

JOB NO: 15-5475
WORK ORDER NO: N/A
DATE SAMPLED: 3/6/15

MECHANICAL SIEVE ANALYSIS
GROUP SYMBOL, USCS (ASTM D-2487)

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	#200	#100	#50	#40	#30	#16	#10	#8	#4	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	3"	6"	Lab #

PERCENT PASSING BY WEIGHT

HA1 @ 2.5'-3.0'				21.8																			8011-1
HA1 @ 5.5'-6'				2.8																			8011-1
HA1 @7.5'-8.0'				3.2																			8011-1
HA2 @ 1.5'-2.0'				6.2																			8011-1
HA6 @ 2.5'-2.8'				1.7																			8011-1

BORING	DEPTH	MC%

3-13-15

Appendix E

Original Geotechnical Report

Alder Geotechnical Services

3910 NE 10th Avenue
Portland, Oregon 97212
503.282.7482 Fax: 282.7402

October 28, 1997
Project No. 161-3

FILE
COPY

Mr. Scott Reiter
RAR Architects
34 NW First Avenue, Suite 206
Portland, Oregon 97209

GEOTECHNICAL INVESTIGATION FOR
PROPOSED NORTH AND SOUTH BEACH ACCESSES
OREGON ISLANDS NATIONAL WILDLIFE REFUGE
BANDON, OREGON

Dear Mr. Reiter:

Alder Geotechnical Services (AGS) is pleased to present the results of our geotechnical study for the subject project. The approximate location of the project is shown on the attached Vicinity Map (Figure 1).

PURPOSE AND SCOPE OF INVESTIGATION

The U.S. Fish and Wildlife Service plans to develop two access routes down to the beach at their Oregon Islands Wildlife Refuge in Bandon. The south access will be an elevated wooden stairway located west of 11th Street SW. The north access with be a wheelchair accessible, asphalt-paved path located west of 10th Street SW. Our study was performed to evaluate subsurface soil and groundwater conditions and to provided an opinion regarding preferred access routes and design recommendations for stairway support, site grading and erosion protection.

This report has been prepared for RAR Architects and their consultants and presents conclusions and recommendations regarding:

- General subsurface conditions;
- Preferred access route locations;
- Groundwater conditions encountered in our explorations;
- Site preparation and engineered fill recommendations;
- Types and depths of stairway foundations; and
- Erosion protection for new fills and path drainage channels.

DESCRIPTION OF THE PROJECT

The current plans for the south beach access consists of constructing an elevated wooden stairway down to the beach from the refuge parking lot at the west end of 11th Street SW. The stairway will be approximately 260 feet long and will drop some 65 feet in elevation. Support for the stairway will be provided by wooden posts attached to shallow concrete piers. Topography of the south beach access area is shown on Figure 2.

The north beach access will be along a new 5-foot wide pathway. The approximately 1,060-foot long pathway will be asphalt paved and sloped no steeper than about 8 percent. Topography for the north access area is shown on Figure 3.

FIELD INVESTIGATION

Our field investigation included making a visual reconnaissance of the existing surface conditions and drilling 9 soil borings on September 17 and 18, 1997. The hand auger borings were drilled to depths ranging from 2 to 7 feet in the south beach access area. The approximate locations of the borings are shown on Figure 2.

Final logs of the explorations are presented in Appendix A. The descriptions on the logs are based on field logs and sample inspection.

SITE CONDITIONS

Geologic Setting

The coastal bluff on the refuge is composed of Tertiary age sandstone of the Roseburg Formation. Tectonic uplift has exposed a thin cap of Quaternary age marine terrace deposits on top of the sandstone. Landsliding in the form of slumping and earthflows dominate on the bluff face in the decomposed sandstone. Undercutting and oversteepening of the bluff by wave action is the primary driving mechanism of this mass movement. Slide debris at the base of the bluff are removed quickly during large storm events.

Surface Conditions

The top of the coastal bluff is at approximately elevation 75 to 80 feet above mean sea level.

In the area of the south beach access the bluff is moderately sloping, with an average inclination to the beach of about 2.3 horizontal to 1 vertical. The local topography includes erosion resistant ridges, erosional channels, and hummocks from earthflows and slumping.

The north beach access has moderate sloping topography as a result of mass movement of the decomposed sandstone exposed in the bluff face. The average inclination of the slope down to the beach is about 3 horizontal to 1 vertical. Several large and recent rotational slumps are present in the area (Figure 3). An erosional gully up to 4 feet deep and 10 feet wide is located along the lower portion of the existing uncontrolled pathway to the beach (Figure 3).

Both access areas are generally heavily vegetated with salal, gorse and native grasses and flowers. Bare soil is present in erosional gullies and on uncontrolled pathways.

Subsurface Conditions

The results of our explorations indicate that both beach access routes are underlain Quaternary marine terrace sands and gravels and by Tertiary sandstone. The upper portion of the sandstone has decomposed to fat clay.

Marine Terrace Deposits

Based on our explorations and visual reconnaissance, it appears that the upper 10 to 15 feet of bluff is composed of sandy and gravelly marine terrace deposits. These coarse grained materials were deposited below sea level but have been raised to their current level by tectonic uplift. The deposits generally consist of clean, well rounded sands and gravels. The upper 1 to 2 feet of the terrace deposits are often silty fine to medium sands. Undisturbed marine terrace deposits were encountered in Boring 6 at the top of the bluff.

Erosion and mass movement of the marine terrace materials has deposited a loose layer of silty sands down the bluff face. These very loose deposits were encountered in Borings 1, 2, 3, 7, 8 and 9 and ranged from 2 feet thick to over 5½ feet thick. Severe caving and flowing occurs in these loose, saturated sands.

Roseburg Sandstone Formation

The predominate geologic unit forming the coastal bluff is the Roseburg Sandstone Formation. The consistency and composition of this variably weathered bedrock ranges from soft fat clay to hard, fresh sandstone. At shallow depths along the bluff face, the sandstone has completely weathered to a dark gray, firm to stiff fat clay. At resistant outcrops and with increasing depth below the ground surface, the sandstone becomes hard, gray, thinly bedded with interbeds of siltstone. The sandstone is typically highly deformed, folded and fractured.

Concrete pier foundations and pathway excavations will primarily encountered soft to stiff fat clay. Little hard rock is anticipated along the proposed access routes. Caving of drilled pier holes in the clay will not be a construction issue. Drilling will be difficult, however, due to the plasticity (stickiness) of the clay.

Groundwater

Groundwater primarily seeps out of the top 15 feet of the bluff at the contact between the Roseburg Formation and the marine terrace deposits. The seepage water then flows down the bluff face and saturates the surface soils. Groundwater is generally present within 2 feet of the ground surface where shallow sandy soils are present on top of the weathered sandstone. Ground water flows within inches of the ground surface in the bottom of the deeper erosional gullies.

CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations presented in this report are based on the information provided to us, results of the field studies, engineering analyses, and professional judgment. Only small portions of the pertinent soil, bedrock, and groundwater conditions have been observed. The recommendations made in this report are based on the assumption that soil conditions do not deviate appreciably from those found during the field investigation. If the plans for site development are changed, or if variations or undesirable geotechnical conditions are encountered during construction, AGS should be consulted for further recommendations.

Site Characteristics and Route Selection

The proposed beach access routes traverse down a coastal bluff composed of deeply weathered sandstone. The top of the bluff is mantled with silt, sand, and gravel marine terrace deposits. The moderately sloping bluff face is actively undergoing mass movement as a result of wave cutting at the toe of the bluff, deep weathering of the sandstone into clay soils, and the presence of groundwater seepage. There is no economical way to prevent this active process of "landsliding". Constructing the south and north beach access routes will require that the U.S. Fish and Wildlife Services accept the typical risks associated with building on unstable ground. These risks include lateral movement and settlement of structures and paths, continual maintenance of facilities, and possibly future rerouting of the access routes.

Earthflows are the primary mechanism of mass movement occurring on the bluff face in the area of the south beach access. This type of ground failure involves the slow, viscous flow of soil and rock material. It is occurring north and south of the large rock outcrop shown southwest of Boring 9 on Figure 2. The hard rock "boulder" forms a protective barrier and buttress for a ridge of stable ground located immediately uphill. This ridge is relatively stable. It is recommended that the raised stairway access the beach by following the south side of the protected soil ridge down to the rock "boulder". The stairway should then make its final descent to the beach along the south side of the "boulder." Caving sandy soils, high groundwater and stiff "sticky" clays should be anticipated with installing the stairway foundations.

Earthflows, slumps, and erosion are the primarily mechanisms of mass movement occurring on the bluff face in the area of the north beach access. Slumps are classical landslides involving the rotational movement of soil or rock material down slide surfaces. Movement is moderately rapid and is preceded by the development of cracks in the ground where the slip plane intersects the ground surface. Erosion occurs slowly where vegetation has been removed by pedestrian traffic or by mass movement of the slope face. It is recommended that the new north beach access path avoid the active slumps shown on Figure 3. Where possible the new path should use existing portions of the undeveloped path, especially where the switchbacks turn and change direction.

South Beach Access Recommendations

The proposed wooden stairway may be supported on drilled pier foundations. The concrete foundations should be at least 12 inches in diameter and founded at least 3 feet below the ground surface. Foundations of this size may used to support a maximum allowable vertical load of 1,000 pounds. Vertical settlements of about 1 inch or less are anticipated. Foundations of this size may also be used to support maximum horizontal loads of 300 pounds under a lateral displacement of about ½ inch. The load has been assumed to be applied 3 feet above the ground surface.

Caving soils should be anticipated during excavation of the foundations. All water should be bailed or pumped from the foundation excavations prior to pouring concrete. As an alternative, concrete may be pumped through a tremie pipe to the bottom of the excavations if the groundwater cannot be controlled.

North Beach Access Recommendations

Grading and Soil Compaction

All organic topsoils should be stripped from the proposed pathway and stockpiled for landscaping uses after grading. The depth of stripping is anticipated to vary from 0 to 6 inches deep.

Structural fills should be composed of brown sandy marine terrace deposits. The gray clay soils on the bluff are unsuitable for use as fill and should be hauled off the pathway and properly disposed of as directed by construction manager.

Structural fills and granular base rock should be compacted to at least 95 percent of the maximum dry density determined in accordance with ASTM Test Method D 698-91 (standard proctor). Fill slopes should be constructed no steeper than 2 horizontal to 1 vertical unless they are reinforced.

Fill slopes may be inclined as steep as 1 horizontal to 1 vertical if they are reinforced with coconut fiber erosion control blankets. Reinforced slopes should be no higher than 5 feet. The reinforcement should consist of coconut fiber erosion control blankets placed every 1 foot vertically. The blankets should extent 4 feet horizontally behind the slope face. The coconut fiber blankets should weigh at least 29 ounces per yard. A locally available product meeting this specification is *BioD-Mat 90* by RoLanka International Inc.

Erosion Control

After grading is completed a disturbed areas should be covered with topsoil per a landscape architects recommendations and then protected with erosion control blankets and native vegetation. The following erosion control blankets are recommended:

Drainage channel adjacent to pathway	*C125* Channel liner by North American Green
Disturbed slopes	*BioD-Mat 70* coconut fiber erosion control blanket by RoLanka International, Inc.

The blankets should be lapped and securely anchored to the slopes per the manufacturer's recommendations. The drainage channel liner should extend at least 1 foot outside of the drainage channel.

CLOSURE

Geotechnical review is of paramount importance in engineering practice. The poor performance of many foundations and floor slabs has been attributed to inadequate design construction review. A geotechnical engineer should review the grading and foundation plans and specifications before final design. On-site grading and earthwork should be observed and, where necessary, tested by a qualified geotechnical engineering firm to verify compliance with the recommendations contained in this report. Foundation excavations should also be observed to compare the generalized site conditions assumed in this report with those found on the site at the time of construction. If the plans for site development are changed, or if variations or undesirable geotechnical conditions are encountered during construction, the geotechnical engineer should be consulted for further recommendations.

Geotechnical engineering and the geologic sciences are characterized by uncertainty. Professional judgments presented are based partly on an understanding of the proposed construction, and partly on general experience. The engineering work performed and judgments rendered for this study meet current professional standards; no other warranties, either expressed or implied, are made.

Sincerely,

ALDER GEOTECHNICAL SERVICES

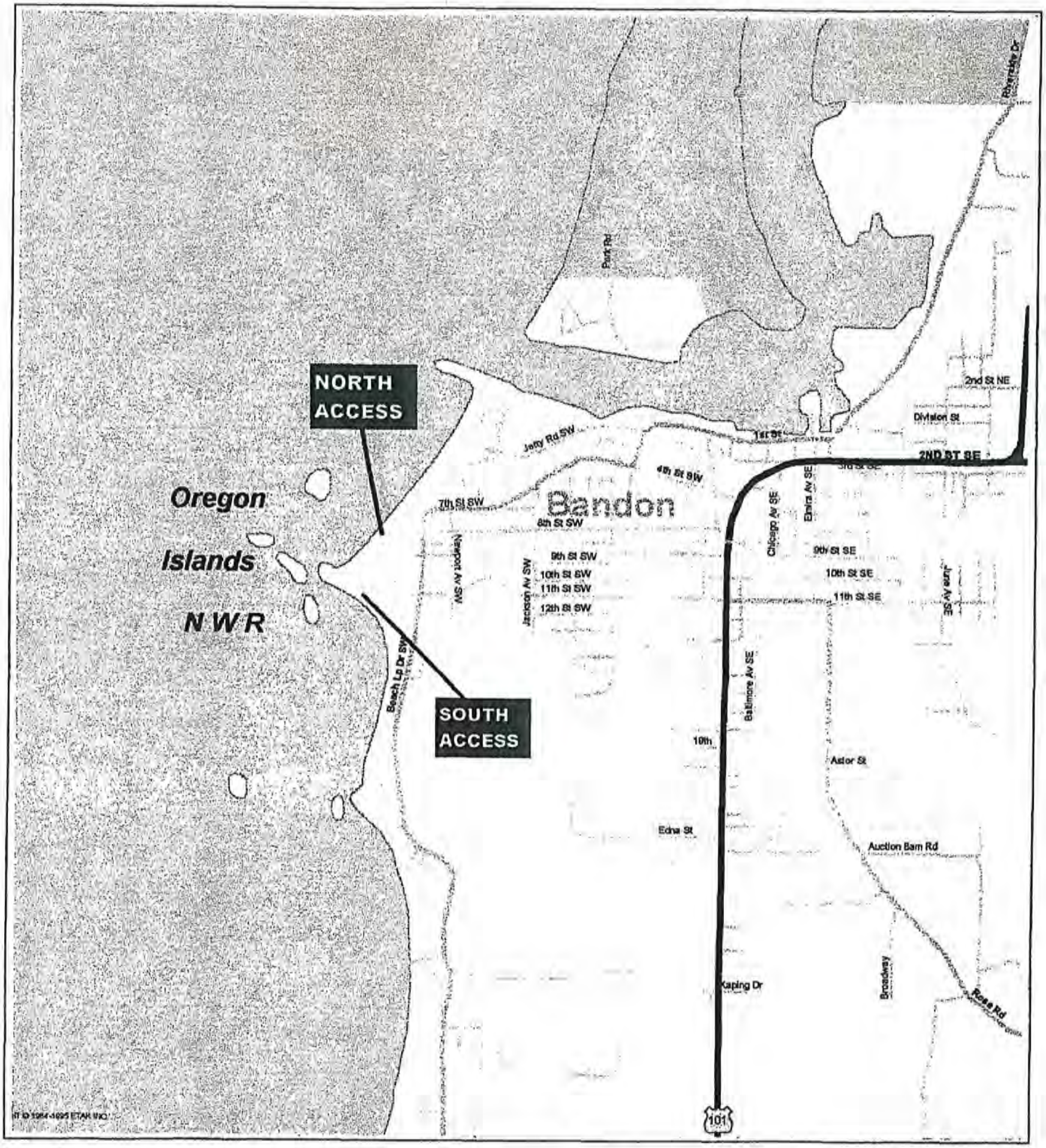
John N. Cunni

REGISTERED PROFESSIONAL ENGINEER
13507
OREGON
MARCH 19, 1987
JOHN N. CUNNINGHAM

John N. Cunningham, P.E.
Geotechnical Engineer

Attachments

(4) Addressee



ETAK Base Map

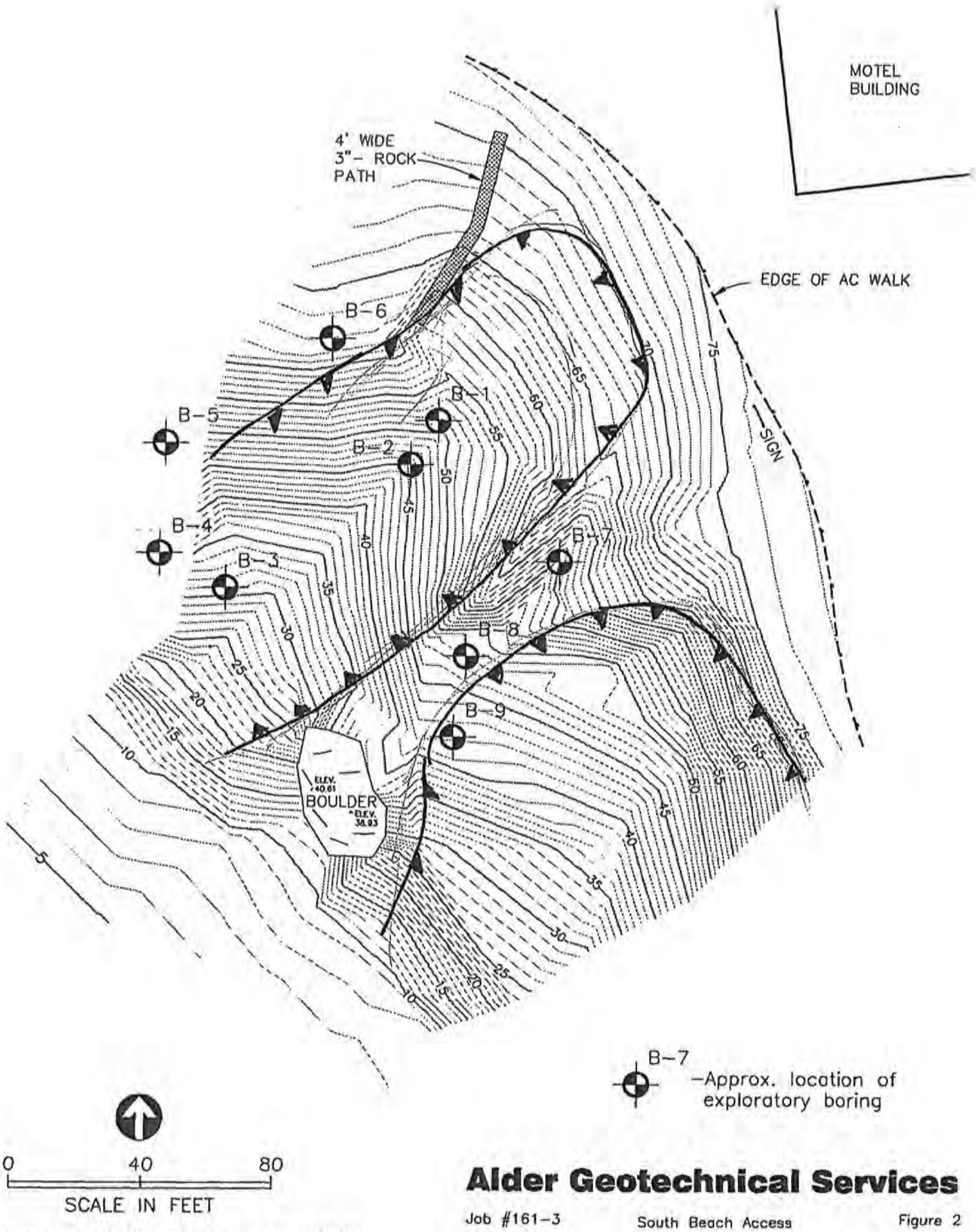
0 1/2 1
APPROX. SCALE IN MILES

Alder Geotechnical Services

Job #161-3
October, 1997

Beach Access
Oregon Islands NWR

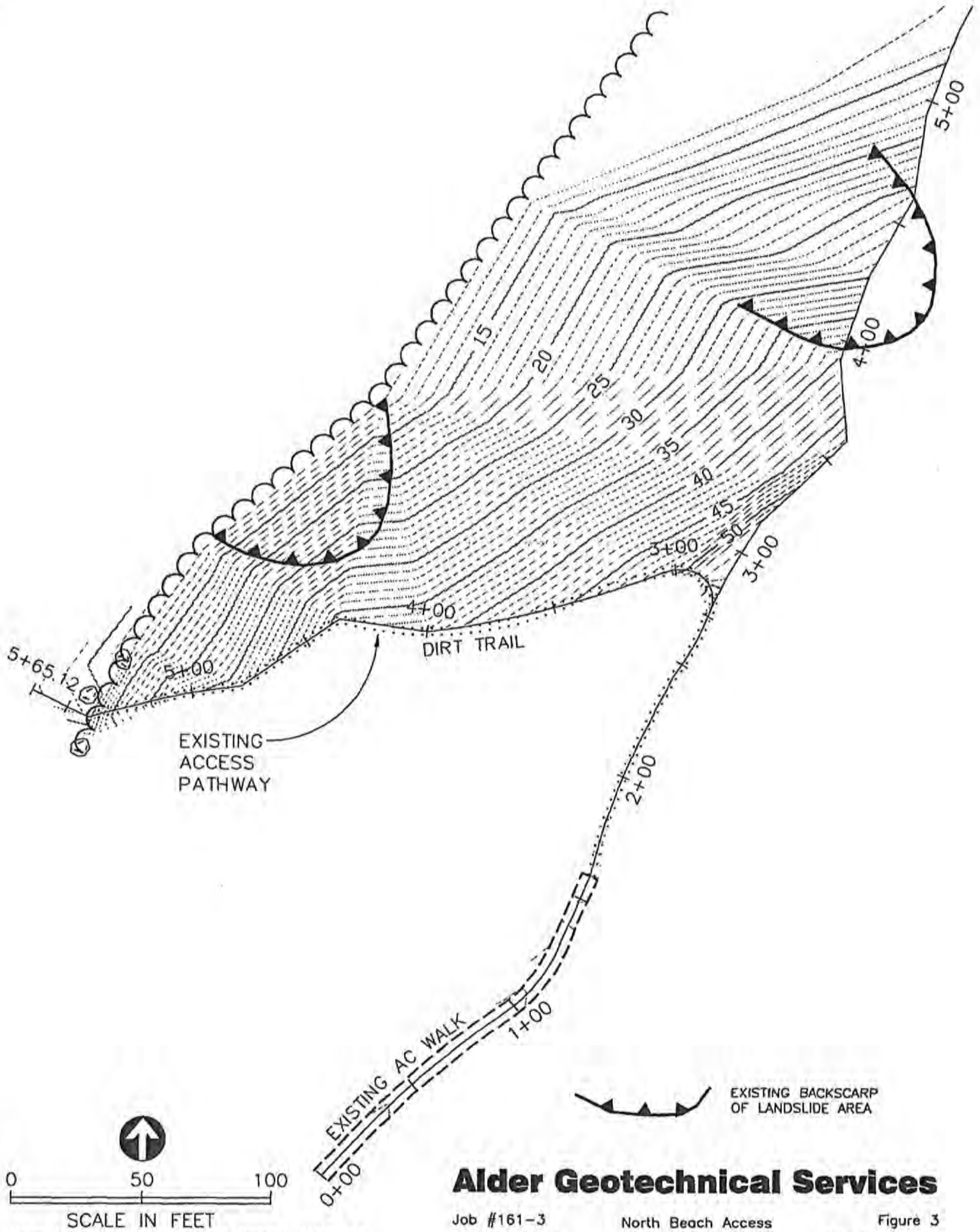
Figure 1
Vicinity Map



Base Map from DEA Revised Survey, 10/6/97.

Alder Geotechnical Services

Job #161-3	South Beach Access	Figure 2
October, 1997	Oregon Islands NWR	Site Plan South



Base Map from DEA Revised Survey, 10/6/97.

Alder Geotechnical Services

Job #161-3	North Beach Access	Figure 3
October, 1997	Oregon Islands NWR	Site Plan North

APPENDIX A

FIELD EXPLORATIONS

Nine exploratory hand auger boring were advanced on September 17 and 18, 1997 at the approximate locations shown on the Site Plan (Figure 2). The borings were drilled using a 3-inch diameter hand auger. A geotechnical engineer logged the explorations.

Disturbed grab samples of the subsurface materials were obtained from each exploration, sealed in plastic bags, and brought to our office for examination and testing.

The locations of the explorations are approximate and were estimated by measuring with a cloth tape from know locations.

The soils encountered in the explorations were generally described using the Unified Soil Classification System. The soil logs are attached.

FIELD EXPLORATION LOG

Exploration No. 1

Date 9-17-97

Project Name Oregon Islands NWR Coastal Stairway

Location See Plan

Job No. 161-3

Elev. +51

Exploration Method 3" dia. hand auger

Logger JNC

Datum DEA topo plan

Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
1	SILTY TO CLAYEY SAND (SM/SC), wet, brown, very loose, fine to medium grained, occasional pebbles Coluvium/Marine Terrace Deposits			▽	groundwater at 1'
2					
3	@ 3' severe caving				
4	FAT CLAY (CH), wet, dark gray, firm, slighty cemented, highly decomposed sandstone Roseburg Sandstone Formation				
5	Bottom of Boring @ 4' due to caving of upper sand				
6					
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-1

FIELD EXPLORATION LOG

Exploration No. 2

Date 9-17-97

Project Name Oregon Islands NWR Coastal Stairway

Location See Plan

Job No. 161-3

Elev. +45

Exploration Method 3" dia. hand auger

Logger JNC

Datum DEA topo plan

Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
1	SILTY TO CLAYEY SAND (SM/SC), wet, yellow brown, very loose, fine to medium grained, occasional pebbles Colluvium/Marine Terrace Deposits			▽	groundwater at 1'
2					
3	@ 3' severe caving				
4	FAT CLAY (CH), wet, dark gray with rust mottling, firm to stiff, slighty cemented, highly decomposed sandstone *Roseburg Sandstone Formation*				
5	Bottom of Boring @ 4' due to caving of upper sand				
6					
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-2

FIELD EXPLORATION LOG

Exploration No. 3

Date 9-17-97

Project Name Oregon Islands NWR Coastal Stairway

Location See Plan

Job No. 161-3

Elev. +31'

Exploration Method 3" dia. hand auger

Logger JNC

Datum DEA topo plan

Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	SILTY TO CLAYEY SAND(SM/SC), wet, dark brown, very loose, with organics, trace pebbles			∇	groundwater at groundsurface
1					
	@ 1½ ' becomes CLAYEY SAND (SC), gray				
2	Colluvium /Marine Terrace Depoists				
	SANDSTONE, hard, highly fractured				
	Refusal to drilling @ 2' on Roseburg Sandstone Formation				
3					
4					
5					
6					
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-3

FIELD EXPLORATION LOG

Exploration No. 4

Date 9-17-97

Project Name Oregon Islands NWR Coastal Stairway

Location See Plan

Job No. 161-3

Elev. +33

Exploration Method 3" dia. hand auger

Logger JNC

Datum DEA topo plan

Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	FAT CLAY (CH), wet, dark gray, soft				
1	FAT CLAY (CH), moist, dark gray, mottled olive and white, very stiff, cuttings are crumbly, decomposed sandstone with occasional fine gravel-size cemented clasts of hard sandstone				
2	*below 2' trace amounts of brown fir needles in clay*	4-1 baggie			
3					
4					
5	Roseburg Sandstone Formation	4-2 baggie			
	Bottom of boring @ 5½' No groundwater encountered				
6					
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-4

FIELD EXPLORATION LOG

Exploration No. 5
Date 9-17-97
Project Name Oregon Islands NWR Coastal Stairway
Location See Plan
Job No. 161-3
Elev. +44'
Exploration Method 3" dia. hand auger
Logger JNC
Datum DEA topo plan
Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	FAT CLAY (CH), wet, very soft, dark brown, with organics			▽	groundwater at ground surface
1					
2	FAT CLAY (CH), wet, soft to firm, dark gray, , decomposed sandstone with occasional fine gravel-size cemented clasts of hard sandstone				
3					
4					
5	Roseburg Sandstone Formation Bottom of boring @ 5'				
6					
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-5

FIELD EXPLORATION LOG

Exploration No. 6

Date 9-17-97

Project Name Oregon Islands NWR Coastal Stairway

Location See Plan

Job No. 161-3

Elev. +63'

Exploration Method 3" dia. hand auger

Logger JNC

Datum DEA topo plan

Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	SILTY SAND (SM), damp, brown, loose, with organics				
1	Topsoil				
2	POORLY GRADED SAND WITH GRAVEL (SP), moist, yellow-brown, loose, coarse to fine grained, with occasional 2" to 4" layers of fine pebbles and trace rounded medium gravels				
3		6-1 baggie			
4					
5					
6	Marine Terrace Deposits				
7	Bottom of Boring @ 7' Refusal on gravel layer No groundwater encountered				
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-6

FIELD EXPLORATION LOG

Exploration No. 7
Date 9-18-97
Project Name Oregon Islands NWR Coastal Stairway
Location See Plan
Job No. 161-3
Elev. +55'
Exploration Method 3" dia. hand auger
Logger JNC
Datum DEA topo plan
Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	SILTY SAND (SM), moist, dark brown, very loose, medium to fine grained, angular gravels at 1½'				
1					
	becomes yellow-brown, loose				
2					
3					
4	becomes red-brown			▽	Groundwater @ 4'
5	Colluvium /Marine Terrace Deposits				
	Bottom of boring @ 5½' due to caving of sand				
6					
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-7

FIELD EXPLORATION LOG

Exploration No. 8
Date 9-18-97
Project Name Oregon Islands NWR Coastal Stairway
Location See Plan
Job No. 161-3
Elev. +48
Exploration Method 3" dia. hand auger
Logger JNC
Datum DEA topo plan
Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	SILTY SAND (SM), moist, dark brown, very loose, medium to fine grained				
1	becomes yellow-brown, loose				
2				▽	Groundwater @ 2'
3					
4	Colluvium /Marine Terrace Deposits				
	FAT CLAY (CH), wet, dark gray with rust mottling, firm to stiff, slighty cemented, highly decomposed sandstone				
5	Roseburg Sandstone Formation				
	Bottom of boring @ 4½' due to caving of sand				
6					
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-8

FIELD EXPLORATION LOG

Exploration No. 9

Date 9-18-97

Project Name Oregon Islands NWR Coastal Stairway

Location See Plan

Job No. 161-3

Elev. +39

Exploration Method 3" dia. hand auger

Logger JNC

Datum DEA topo plan

Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	SILTY SAND (SM), moist, dark brown, very loose, medium to fine grained				
1					
2					
	becomes yellow-brown, loose				
	Colluvium /Marine Terrace Deposits				
3					
	FAT CLAY (CH), wet, dark gray with rust mottling, firm to very stiff, slightly cemented, cuttings are crumbly, decomposed sandstone with occasional fine gravel-size cemented clasts of hard sandstone				
4					
	Roseburg Sandstone Formation				
	Bottom of boring @ 3½' No groundwater encountered				
5					
6					
7					
8					
9					
10					

Alder Geotechnical Services

3910 NE 10th Avenue, Portland, OR 97212

503.282.7482 FAX: 282.7402

Figure No. A-9

Megan Lawrence <mlawrence@ci.bandon.or.us>

Height Testimony For the April 26 Bandon Beach Hotel Zone Text Amendment Hearing Record

Vickie Crowley <vec@ti.org>
To: Bandon Planning Department <Planning@cityofbandon.org>

Fri, May 4, 2018 at 10:34 AM

To: Bandon Planning Commission
For the April 26 Bandon Beach Hotel Zone Text Amendment Hearing Record
From: Vickie Crowley, 1425 Beach Loop, Bandon, Oregon

Please accept my testimony below in addition to my previous submittal of attachments for the April 26 hearing and today's geology testimony sent separately.

Height Measurement

Rather than use long settled rules, the staff report recommends an entirely new way to measure building height. BMC 16.42.010 states, "'Height of building or structure' means the vertical distance from the native grade to the highest point of the roof. On slopes, the height of the structure shall be determined by taking the height of each side of the building measured from grade at the center of the wall to the highest point of the roof and dividing by the number of measured sides."

Rather than use this method, required by BMC 17.20.090 (A), the staff report proposes to measure the height from the crown of Portland Avenue on the east side of the building. Because the building is on a slope, and because the building lines on several feet of fill above the native grade of the land, this effectively adds several feet to the allowable height.

The land on the west side of the current structure is approximately four feet below Portland Avenue, so Portland Avenue is roughly two feet higher than the average height as specified in BMC 16.42.010. In addition, the geotechnical report prepared for the applicant reported that the current structure is built on 2-1/2 to 5 feet of fill dirt, so "native grade" is that many feet down. This means that Portland Avenue is up to seven feet higher than the reference elevation under BMC 16.42.010.

In other words, when the applicant requests a 45-foot-tall building as measured from Portland Avenue, this is really a 52-foot tall building as measured under BMC 16-42.010. When the staff report recommends 40 feet as measured from Portland Avenue, this really represents 47 feet as measured under BMC 16.42.010. Note that 47 feet is nearly twice as tall as the current legal height limit for the property.

"Special consideration" doesn't mean allowing applicants to double the height limit that applies to everyone else. Staff report recommendation and applicant's request to change the way of measuring height for the hotel proposal, is contrary to Title 16. BMC 16.42.010 "Height of building or structure," and should be rejected.

Corner Lot Side Yards & Setbacks

The USF&W BOUNDARY MAP, below, clearly shows the existing motel is located on the corner lot at 11th and Portland Ave. Testimony from others has explained that the Planning Commission should reject any proposal to decrease corner lot side yards and setbacks so close to the refuge boundary.

The Planning Commission should reject changes to height, height measurement, and to corner lot set backs and side yards. Thank you for your careful consideration.

Megan Lawrence <mlawrence@ci.bandon.or.us>

For April 26 Bandon Beach Hotel Zone Text Amendment Hearing Record

---

Vickie Crowley <vec@ti.org>
To: Bandon Planning Department <Planning@cityofbandon.org>
Cc: Dave Perry DLCD <dave.perry@state.or.us>

Fri, May 4, 2018 at 11:00 AM

Dear Planning Commissioners,

Thank you for welcoming comments on the text amendment hearing and recognizing the importance of citizen involvement in Bandon.

This correspondence below may have been inadvertently left out of the March 7 Planning Commission Work Session, please include for the Bandon Beach Hotel Zone Text Amendment Hearing Record.

I spoke with John McLaughlin the afternoon of the Work Session on March 7 to find out what the CCI was doing for public involvement on this very important issue and was surprised to learn that, contrary to the requirements of Goal One and our Comp Plan and code, the answer was nothing.

If the Commission recommends referral to the Council of the Zone Code Text Amendment I ask that you also request any hearing on the Amendment be *a de novo hearing and that procedural issues be corrected and followed.*

Sincerely,
Vickie Crowley
1425 Beach Loop, Bandon

Vickie Crowley March 7, 2018 at 2:19 PM
To: jmclaughlin@cityofbandon.org
Bandon Citizens Involvement Committee

Dear Mr. McLaughlin,

Thank you for taking the time today to explain that:

1. "We don't actually have a Citizens Involvement Committee anymore"
2. There hasn't been a Citizens Involvement committee for at least 2 years
3. There is no annual review available
4. The Planning Commission "functions as" the citizens involvement committee
5. There is no documentation on how this change occurred
6. The Planning Commission does not "change hats" and hold any citizens involvement meetings
7. That BMC 2.18 - Administration and Personnel, contains the specs on the Citizens Involvement Committee

Now I understand why when I called City Hall this morning asking how to find info on your website about the Citizens Involvement Committee and their meeting minutes Linda had to refer me to Beth and Beth had to refer me to you, the planning director, as neither knew anything about any citizens involvement committee in Bandon.

Your reference to BMC 2.18 was helpful. Section 050 explains that implementation is "detailed in the Comprehensive Plan of the City of Bandon, Chapter 1" which was written in light of Statewide Planning Goal One. The Comprehensive Plan is, of course, available on your website along with the Bandon Municipal Code (BMC) in the "Documents" section under the "Public Resources" section.

Please enter this info into the record for tonight's Planning Commission Work Session as it may be helpful for people to know where to find this info.
Thank you!

Megan Lawrence <mlawrence@ci.bandon.or .us>

Fwd:

Greg Patrick <crawlindirt@gmail.com> Fri, May 4, 2018 at 2:51 PM
To: planning@cityofbandon.org

Submitting public comment re: code text amendment for Bandon Beach Motel

Greg Combs
Bandon

Letter to Bandon Planning Commission.pdf
39K

May 2, 2018

TO: Bandon Planning Commission

RE: Public Comment for the record, submitted via email;
Opposition to proposed zoning code text amendment to modify Bandon Municipal Code Section 17.20, as requested by Steere Bandon Associates, LLC

The proponent has requested, and your staff are supporting, a proposal to nearly double the maximum height, reduce setbacks, and allow 75% impervious surface for a hotel at Coquille Point.

The proposed amendment is in direct conflict with Bandon's Comprehensive Plan and will have an adverse impact to the adjacent National Wildlife Refuge, as well as to those of us who cherish Bandon's scenic qualities.

I'm opposed to this proposal for several reasons.

1. To be fair, if this is allowed for one, it must be allowed for all. Approval would set a disastrous precedent.
2. It would negatively impact residents and visitors who are drawn to the area for its beautiful coast and vibrant, varied birdlife.
3. It would be out of character in a community that supposedly prides itself as a livable coastal village.
4. It is contrary to the purpose of the CD-1 zone: to recognize and maintain the scenic and unique qualities of Bandon's oceanfront by controlling the scale of development.
5. It is contrary to codes for height limits, setbacks, building footprint, and impervious surface limits.

Municipal code 17.116 requires zoning code text amendments be consistent with the Comp Plan and should only be allowed if the proposal is suitable in regards to natural resource consideration. The Comp Plan repeatedly includes citations to protect the city's scenic resources. The applicant has not met the burden of proof required. If the Commission approves this application, I can only conclude it is because you either want to pander to a specific developer or you see this as an opening to modify height limits throughout the CD-1 zone.

I find no solace in planning staff's recommendation for a sunset clause. The staff report states the unique site deserves a structure to reflect it's iconic nature. Agreed! How about an interpretive center? Think of the Whale Watch Center in Depot Bay; it's a huge draw. Bandon would more likely increase its status as a tourist destination with an interpretive center at Coquille Point, focused on nature, history and culture, rather than a four-story hotel and cafe. Something within current height limits that blends in with the environment and is designed to minimize impacts to birds, views, neighbors, etc. The proposed hotel may in fact have an opposite effect on tourism. Hiking and wildlife viewing are the top outdoor recreation activities in Oregon. Tourists who have read about Coquille Point views and bird watching, will be dumbstruck by a building out of character with the surroundings and degrading to the adjacent refuge. They will question the City's judgment, and perhaps conclude Bandon is forsaking its identity and seeking to convert to something like Lincoln City where the buildings become the view.

This zoning amendment must be rejected. If you want to allow this 45-foot-tall building west of the road, then you need to engage the community in a Comp Plan amendment to allow a 45 foot limit for all buildings west of Beach Loop in the CD-1 zone, rather than approach this as a one-off. As was noted in the staff report, many lots west of Beach Loop are narrow, and I'm sure there are owners who would love to add a third or fourth floor to enhance views and maximize square footage. An argument can be made this would increase City coffers through property tax and increased lodging tax from vacation rentals. Forget about controlling the "slipperiness of the slope." That is a dangerous path full of subjective judgment that will lead to ongoing conflict that further bogs down the Commission and Council and gives every landowner an opening to challenge your decision-making and find it unfair if they don't get what they want.

This should be straightforward. The Planning Commission must reject this proposal on the basis the applicant has not met the burden of proof to demonstrate it is consistent with the Comp Plan. It is also inconsistent with state planning, favors a single property developer, and would degrade what is the City's most iconic scenic viewpoint and sensitive wildlife resource.

Coquille Point is invaluable to the community for views and wildlife watching. Denial of this proposal is not unfair to the landowner; they would have been aware of codes prior to buying the property. If they want a taller hotel they can build it on the east side of Beach Loop Road or outside City limits.

Respectfully,

Greg Combs
Bandon

May 2, 2018

To: City of Bandon Planning Department

Re: Application 18-003 Zone Code Text Amendment – Bandon Beach Hotel

The design for the Bandon Beach Hotel replacement would look great in the Pearl District in Portland, or another urban situation. But at Coquille Point, it's not so good.

Mr. Keiser has been highly praised for his concern for the environment and the principles he followed in the design and construction of Bandon Dunes. The buildings at the Dunes are classy and understated. They are designed to blend in with the surroundings. They don't draw attention to themselves or overpower the landscape.

Unfortunately, this approach was not followed in the design for the new Bandon Beach Hotel. This shiny, bright, oversized, glitzy structure will overwhelm the natural beauty of Coquille Point. Coquille Point is a National Wildlife Refuge, it's not a casino or shopping mall. The original design was way out of character with the neighboring buildings and the whole point of the Refuge. The latest and newest proposal is even worse, it's completely over the top and unacceptable. The design needs to be overhauled to make it smaller, less shiny, less intrusive. You really don't need glitz and glamour at Coquille Point. As the ad says, it's all about the view.

The original plans for the new hotel were smaller than the currently proposed building, but even the original plans did not conform to the zoning requirements. These latest plans are totally over the moon. They are not acceptable. The zoning limits and requirements were put into place to prevent Bandon and Coquille Point from becoming a southern version of Seaside and Lincoln City. We must not let that happen. The zoning codes have served Bandon well. They must be enforced. Zoning codes should not be adjusted to satisfy the needs of one influential individual.

By setting a precedent for this situation, City Council and the Planning Department will have no ability or justification to enforce the zoning codes for the next person who wants to build a massive, intrusive out of character structure anywhere in Bandon.

On sunny days during the summer, the Coquille Point parking lot is frequently full. What will prevent hotel and restaurant patrons from taking up slots in the Coquille Point parking lot and thus make it impossible for non-patrons to have good access to the beach and the Wildlife Refuge? How will this be monitored and controlled?

In designing Bandon Dunes, Mr. Keiser has shown his ability to create structures that blend in well with the landscape and the environment. Hopefully he can be persuaded to change the design of his new hotel to show as much respect for the natural environment at Coquille Point as he has demonstrated with his property at the Dunes.

David Hellmann

761 12th St SW

Bandon, Oregon

513-683-7248

Megan Lawrence <mlawrence@ci.bandon.or.us>

ORCA Testimony re Zone Code Text Amendment (Bandon Hotel, 18-003)

Sean Malone <seanmalone8@hotmail.com> Fri, May 4, 2018 at 2:49 PM
To: "mlawrence@cityofbandon.org" <mlawrence@cityofbandon.org>, Cameron La Follette <cameron@oregoncoastalliance.org>

Please find attached testimony and exhibits on behalf of for the Zone Code Text Amendment for the Bandon Hotel (18-003). I will be submitting the documents over the course of several emails. In all, there will be a letter and exhibits C through H.

Attached hereto is the testimony and exhibits C and G. Other exhibits to follow.

Please add to the record.

Thank you,

Sean Malone

Sent from Mail for Windows 10

---

3 attachments

Exhibit C - About the Refuge - Oregon Islands - U.S.pdf
945K

Exhibit G - Comprehensive Conservation Plan - 4_ORG_TAR_CPM_Final_CCP.pdf
2482K

Malone to Bandon obo ORCA 5.4.18 final.pdf
113K

Sean T. Malone

Attorney at Law

259 E. Fifth Ave.,
Suite 200-C
Eugene, OR 97401

Tel. (303) 859-0403
Fax (650) 471-7366
seanmalone8@hotmail.com

May 4, 2018

Via Email

Planning Commission, City of Bandon
c/o John McLaughlin, Planning Director
555 Highway 101
Bandon OR 97411
(541) 347-2437
planning@cityofbandon.org
jmclaughlin@cityofbandon.org

Re: ORCA Testimony on Zone Code Text Amendment, Bandon Beach Hotel, 1090 Portland Ave (18-003)

Dear Members of the Planning Commission,

On behalf of Oregon Coast Alliance, please accept this supplemental testimony on application file no. 18-003, a proposed site-specific zone code text amendment for a single property to enlarge a hotel immediately adjacent to valued National Wildlife Refuge.

As noted in prior testimony, the proposal is so fundamentally flawed that it would be best for the applicant and City to go back to the drawing board. According to the US Fish and Wildlife Service, the Coquille Point Unit of the Oregon Islands NWR "contains rare plants, unique geological formations, and one mile of pristine beach with interspersed rocky intertidal areas. It's also a buffer, protecting seabird colonies from encroaching development." Exhibit C. This proposal is just that – encroaching development. It will have negative effects on the wildlife and natural resources by increasing the size of the hotel and increasing the number of visitors.

I. The proposed amendment is not suitable given the slope, geologic stability, flood hazard, wetlands, and other relevant hazard or resource considerations.

Attached as Exhibit D is Coquille Point South Stairway Schematic Design Services, USFWS, Final Report, which shows that Coquille is subject to geologic movement, and the "[s]lope movement is exacerbated by wave action along the toe of the slope and associated loss of soil. Extended periods of rainfall are also a likely source of slope movement." Exhibit D at 41. The report "anticipate[s] that the slopes and staircase will be subject to slow, long-term creep and shifting." *Id.* The movement is also evidenced by cracks in the asphalt path and there is a rate of beach erosion at 2 feet per year. Simply put, the geologic instability of the site and rapid rate of erosion makes this site unsuitable.

II. The proposed amendment is not consistent with the comprehensive plan

In prior testimony, ORCA pointed to numerous comprehensive plan policies and goals that have not been addressed by the City or the applicant. Most important is the goal 5 ESEE analysis required for increasing the size of the building that will obstruct views.

III. The Amendment is inconsistent with Ordinance No. 1335 and Bandon Municipal Code Section 17.68

The proposal will increase the size of the hotel, resulting in greater numbers of visitors and the accompanying negative impacts. The Comprehensive Conservation Plan for Coquille Point acknowledges that it has "been negatively affected by graffiti, vandalism, waste dumping, and overnight camping. Illegal uses persist partly due to limited law enforcement capability and lack of public awareness of the sensitivity of the wildlife to human disturbance." Exhibit H at 9. It is also beyond dispute that more people will bring more invasive species, an existing issue at Coquille Point: "The most aggressive and prolific species on the Coquille Point Unit is gorse…. The species is extremely competitive, displaces native plants, and impoverishes the soil. In addition, it creates an extreme fire hazard due to oily, highly flammable foliage and seeds, and abundant woody material in the plant's center. The city of Bandon in southwestern Oregon was almost completely destroyed by a fire fueled in part by gorse." Exhibit G at 5. Pest animals are another problem that accompanies increased human presence. *See* Exhibit G at 5-8 (identifying red foxes, feral cats, rats, and raccoons as having the greatest potential to negatively impact Oregon's seabird colonies." Increasing the number of pest animals along with human presence does not enhance the refuge[1], as required by Ordinance No. 1335.

VI. The proposal is not consistent with Statewide Planning Goals

As noted in prior testimony, the applicant must account for the adverse impacts referred to herein and in prior testimony in preparing their ESEE analysis.

---

[1] Indeed, Comprehensive Conservation Plan for Coquille Point acknowledges the "desired condition" is for a "[m]inimal human impacts at Coquille Point Unit." Exhibit G at 21.

IX. Conclusion

For the reasons set forth here and in prior testimony, I respectfully request that the Planning Commission table this proposal until significant changes to the application have been made or recommend denying the legislative proposal.

Sincerely,

Sean T. Malone
Attorney for ORCA

Cc:
Client

Enclosure:

Exhibit C – USFWS Oregon Islands

Exhibit D – USFWS Report on Coquille Point Stairway

Exhibit E – Chapter 1, Comprehensive Conservation Plan

Exhibit F – Chapter 3, Comprehensive Conservation Plan

Exhibit G – Chapter 4, Comprehensive Conservation Plan

Exhibit H – Chapter 5, Comprehensive Conservation Plan

Exhibit C

Search

(https://www.fws.gov/)

☐ All Refuges

U.S. Fish & Wildlife Service

≡

Oregon Islands (/refuge/Oregon_Islands/)

National Wildlife Refuge | Oregon

About the Refuge

ABOUT THE REFUGE (/REFUGE/OREGON_ISLANDS/ABOUT.HTML)

Whale Cove (/refuge/Oregon_Islands/wildlife_and_habitat/whale_cove.html)

About the Complex (/refuge/Oregon_Islands/about/about_the_complex.html)

Creature Features (/refuge/Oregon_Islands/about/creature_features.html)

Exhibit C

About the Refuge

Spanning the Oregon coast, the wilderness islands and windswept headlands of Oregon Islands National Wildlife Refuge are celebrated for their abundant wildlife and rugged grandeur. Rocky islands and sheer cliffs provide isolated breeding and resting habitat for diverse communities of birds, marine mammals, and plants along the wave-battered coastline.

From nearly every viewpoint on the Oregon coast, colossal rocks can be seen jutting out of the Pacific Ocean, stark monoliths amidst a pounding surf. Established on May 6, 1935, as a refuge and breeding ground for seabirds and marine mammals, the scenic and rugged Oregon Islands Refuge includes 1,853 rocks, reefs, and islands and stretches from Tillamook Head near Seaside south to the California border. All of the rocks and islands of the refuge are designated National Wilderness Areas, with the exception of 1-acre Tillamook Rock. Most of Oregon’s estimated 1.2 million nesting seabirds use Oregon Islands Refuge as a place to raise their young, and Oregon’s seals and sea lions use the islands as a place to haul out and rest or to give birth to their pups.

Exhibit C

The refuge also protects two headlands: Coquille Point and Crook Point. The 19-acre **Coquille Point**, acquired in 1991, is located on the western edge of the city of Bandon. The headland provides a buffer zone between mainland development and the islands. It is a spectacular place to watch seabirds and harbor seals and serves as a gateway to Bandon's beach. A paved trail winds over the headland and features interpretive panels that share stories about the area's wildlife.

The 134-acre **Crook Point Unit** was acquired in 2000 and is located along the southern Oregon coast just south of Gold Beach. It contains rare plants, unique geological formations, and one mile of pristine beach with interspersed rocky intertidal areas. It's also a buffer, protecting seabird colonies from encroaching development. It is next to the Mack Reef archipelago home to the second-largest concentration of nesting seabirds in Oregon. This headland is closed to public use.

The 14-acre **Whale Cove Unit** on the central Oregon Coast is the most recent addition to Oregon Islands National Wildlife Refuge. Acquired in December 2014, the property is two miles south of Depoe Bay in Lincoln County. It surrounds the oldest marine reserve in Oregon, where all marine life is protected. The site will be managed for its natural resource values and to protect Whale Cove's ecology. The cove provides scenic views from nearby Rocky Creek State Park and US Highway 101. Learn more about Whale Cove here (/refuge/Oregon_Islands/wildlife_and_habitat/whale_cove.html).

Refuge Headquarters:
Oregon Coast National Wildlife Refuge Complex
2127 SE Marine Science Drive
Newport, OR 97365
541-867-4550
oregoncoast@fws.gov

FOLLOW US ONLINE

MAPS (/REFUGE/OREGON_ISLANDS/MAP.HTML)

MULTIMEDIA (/REFUGE/OREGON_ISLANDS/MULTIMEDIA/)

WHAT WE DO

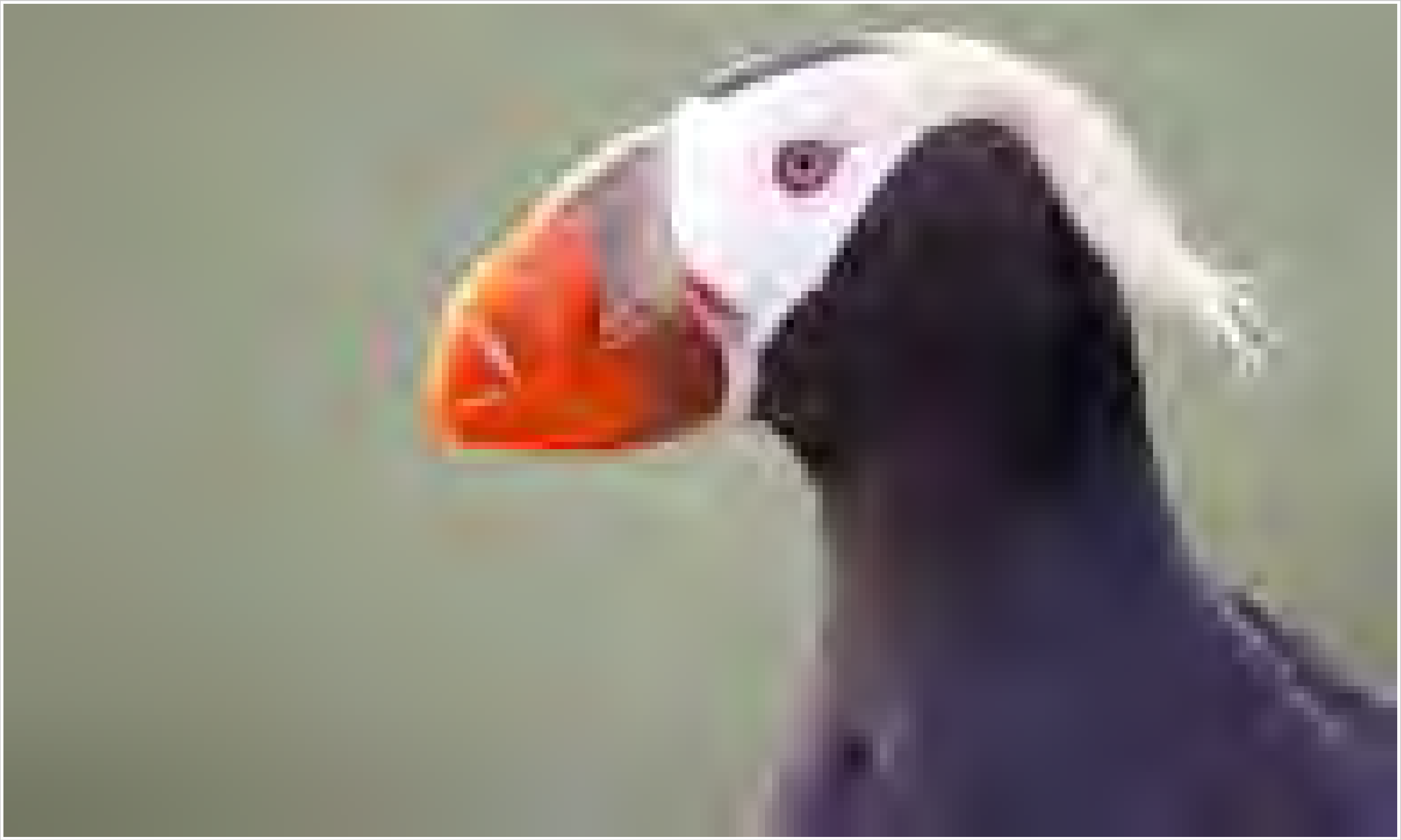
Resource Management (/refuge/Oregon_Islands/what_we_do/resource_management.html)
Conservation (/refuge/Oregon_Islands/what_we_do/conservation.html)

Exhibit C

Get Involved (/refuge/Oregon_Islands/what_we_do/get_involved.html)

Partnerships (/refuge/Oregon_Islands/what_we_do/partnerships.html)

Science (/refuge/Oregon_Islands/what_we_do/science.html)



Tufted Puffins

Exhibit C

If you want to see one of the these comical-looking seabirds, check out their nesting islands from May-August: Haystack Rock at Cannon Beach and Face Rock in Bandon.

Learn More (/refuge/Oregon_Islands/wildlife_and_habitat/tufted_puffin.html)

Print | *Share (http://www.addthis.com/bookmark.php?v=250&pubid=ra-4df0de8a2cdd523d)*

Page Photo Credits – Haystack Rock at Cannon Beach, a part of Oregon Islands National Wildlife Refuge - Roy Lowe/USFWS

Last Updated: Aug 19, 2015

Oregon Islands Home (/refuge/Oregon_Islands/) | *Regional Office (https://www.fws.gov/pacific/)* | *Refuges/Districts Nearby (https://www.fws.gov/refuges/zipCodeLocator/index.cfm)* | *Contact Us (/refuge/Oregon_Islands/about.html)*

U.S. Fish & Wildlife Service (https://www.fws.gov/) National Wildlife Refuge System (https://www.fws.gov/refuges/)

Notices (https://www.fws.gov/help/notices.html) Accessibility (https://www.fws.gov/help/accessibility.html)

Disclaimer (https://www.fws.gov/help/disclaimer.html) Privacy (https://www.fws.gov/help/policies.html) FOIA (http://www.doi.gov/foia/)

Department of the Interior (http://www.doi.gov/)

USA.gov (http://www.usa.gov/)

Exhibit D

Coquille Point
South Stairway Schematic Design Services
US Fish and Wildlife Service
Contract No. F14PC00037/F15PD00406

FINAL REPORT

April 24, 2015

Prepared by
KPFF Consulting Engineers
111 SW Fifth Avenue, Suite 2500
Portland, Oregon 97204-3628

Exhibit D

Coquille Point
South Stairway Schematic Design Services
US Fish and Wildlife Service
Contract No. F14PC00037/F15PD00406

TABLE OF CONTENTS

Exhibit D

BACKGROUND

The South Stairs at Coquille Point Unit in Bandon, Oregon, were initially constructed in 1998 as a replacement to stairs located approximately 50 yards south of the present location. The current stairs allow Coquille Point Unit visitors to view Elephant Rock and to explore the tide pools and shoreline along the beach. The stairs are constructed with pressure treated timber supporting concrete treads, with level, timber framed rest areas and an observation platform. The stair treads were replaced in 2013, following a 2012 recommendation which showed that the stair treads were wearing thin. Concrete spalling and exposed reinforcement were observed at that time.

It was also noted at that time, that the stairs were shifting downhill. Refuge staff members have also noted that one of the stair stringers has displaced laterally at the landing and that gaps up to 2 inches exist at several locations.

The stair was closed by the U.S. Fish and Wildlife Service (USFWS) on July 23, 2014, pending a structural and geotechnical assessment.

KPFF and Hart Crowser performed a visual assessment of the stair on July 31, 2014. Based on the age of the structure, the lack of visible distress in the wood framing, estimated rate of movement, remaining bearing seat dimensions and the limited risk of significant slope failure through the mostly dry weather of Summer and early Fall, KPFF recommended re-opening the stair to public use until October 31, 2014.

The stair was closed to public access on October 31, 2014 pending further structural and geotechnical evaluation.

KPFF and Hart Crowser have been retained by the USFWS to develop a schematic design report investigating the following four alternates:

1. Continued inspection and maintenance of the structure, based on the expectation that the stair will continue to displace and will require frequent, ongoing maintenance.
2. Complete replacement of the stair structure in its current location.
3. A new on-grade trail.
4. Rehabilitation of the existing stair and foundations.

In the process of evaluating the four alternatives listed above, several alternatives were considered which would partially replace the portion of the existing stair that has exhibited the most significant downhill shifting, including:

- Preservation of the most stable portion of the existing stair, combined with a new on-grade trail to replace the portion of the existing stair that has exhibited the most significant downhill shifting.

- Preservation of the most stable portion of the existing stair, combined with a new stair structure to replace the portion of the existing stair that has exhibited the most significant downhill shifting.

Hart Crowser performed a detailed geotechnical investigation on February 18 and 19, 2015. KPFF performed a visual assessment of the existing structure and a field investigation of potential on grade trail alignments on February 23, 2015.

EXISTING STRUCTURE

The existing stair connects an asphalt parking lot at approximately elevation 75 feet to the beach below at approximately elevation 5 feet. The stair is approximately 265 feet long in plan, with approximately 130 steps, as well as nine landings and two overlook structures.

The structure consists of pressure treated wood framed stringers and posts supporting precast concrete treads at the stairs and pressure treated wood 3x decking at the landings and overlooks. The bottom run of stair treads are metal grating instead of precast concrete.

The structure is supported on 18 inch diameter concrete footings. The existing drawings indicate a footing depth of either 4'–0" or as underlying rock depth permits. Actual footing depth could not be determined during the site visit.

As-constructed plans are included in Appendix A. Site Photographs are included in Appendix B.

OBSERVATIONS

STRUCTURE CONDITION

The existing wood framing was visually inspected and a limited hammer sounding was performed. The stringers, posts, cross braces and decking are weathered, however no signs of significant decay were observed. Areas of moss/algae were noted on the underside of the structure in several locations.

Metal fasteners are in good condition and observed corrosion appeared to be superficial.

No visible changes to the condition of the existing structure – from the original July 2014 evaluation to the February 2015 evaluation - were noted.

FOUNDATIONS AND SUBGRADE

Hart Crowser performed a site reconnaissance in July of 2014, followed by a more detailed geotechnical study in February 2015. The February 2015 study included:

- Limited shallow subsurface boring and drive probes
- Limited laboratory testing on select soil samples
- Site reconnaissance to visually observe slope stability issues and the condition of the stairway
- Engineering analysis to develop preliminary design recommendations for stabilization of the staircase
- Preparation of a report summarizing findings and preliminary recommendations.

Based on this research, investigation, and observations, Hart Crowser noted that the stairway and surrounding area are being affected by creep of the adjacent slopes, which is accelerated where active landslide deposits are present. Slope movement is exacerbated by wave action along the toe of the slope and associated loss of soil. Extended periods of rainfall are also a likely source of slope movement.

Since the 2014 site reconnaissance, additional erosion along the base of the slope appears evident. Soil loss along the toe of the slope is attributed to wave and tidal action. Some soil loss is also likely attributable to surface seepage and spring activity along the face of slopes. Loss of soils along the base\toe of the slope contributes to continued creep in the ground located on either side of the staircase. Soil cracks and secondary scarps were noted within the landslide area to the south. Numerous seeps and springs were observed adjacent to the stairway and at the base of the slope on either side of the stairway. Heavy seepage and soil sloughing was also observed in the vicinity of the large viewing platform.

Evidence of imminent large-scale slope instability that would cause sudden failure of the stairway was not observed. However, it is anticipated that the slopes and staircase will be subject to slow, long-term creep and shifting. The portions of the staircase that extend off of the ridgeline and into the landslide zones noted in the Geotechnical Report in Appendix D will have the greatest potential for creep. Current shifting of the staircase has been limited in magnitude over the past ±15 years, and rapid changes to that condition are not expected.

ALTERNATE EVALUATIONS

ALTERNATE NO.1 – CONTINUED INSPECTION AND MAINTENANCE PLAN

The existing structure is constructed on a coastal bluff that is experiencing a continual and gradual movement of the subgrade. Based on the findings of Hart Croswer's geotechnical investigation, this landsliding will continue for the foreseeable future. However, there is low risk of a sudden, catastrophic failure of the slope.

This alternate involves a program of periodic inspection and maintenance of the existing structure, implemented by USFWS staff supported by engineering consultants where needed. The recommended inspection program would consist of the following steps:

- All stringer to landing connections are to be monitored for movement. We recommend installing a visible, weatherproof movement indicator - such as a vertical scribed line - across all joints where sloped stringers meet flat landing support beams, prior to re-opening of the stair. See Figure 1 below for an example.

Figure 1 – Scribe Line for Movement Indicator

- Monitor all movement indicators described above on a monthly basis and after any rain event measuring 2.25 inches in 24 hours.
- If movement of more than 1/4" (from the initially marked position) is observed at any one of the movement indicators, the stair shall be immediately closed to public use, pending evaluation by a structural engineer and a geotechnical engineer.
- Perform a survey at the top surface of all concrete foundations every three months.

A schematic level cost estimate has been included in Appendix C of the report. This cost estimate assumes that USFWS would perform 10 inspections per year over an assumed remaining lifespan of 20 years and that an engineering consultant and contractor would be retained to design and construct repairs of the structure an average of once per year for 20 years.

The estimated cost of this alternate is $520,000.

ALTERNATE NO.2 – COMPLETE REPLACEMENT OF THE STAIR STRUCTURE

This alternate involves the complete replacement of the existing structure.

As described above, the slope on which the new structure would be constructed is subject to gradual and ongoing landsliding. Any new structure placed in this location will need to be designed to accommodate this landsliding, without negatively affecting the structural integrity or life span of the new structure.

Foundations

As described in Hart Crowser's Geotechnical Report, a stable layer of sandstone exists below the sliding soil layer. The replacement structure would be supported on new drilled concrete shafts (or other similar deep foundation system, though for purposes of estimating, drilled shafts have been assumed), anchored into the stable sandstone and extending through the sliding soil layer to form supports for the new walkway structure. The new concrete shafts would need to be designed to resist the lateral forces applied to them by the sliding soils, requiring the new reinforced concrete shafts to be approximately 30 inches in diameter. It is assumed that drilled shafts would be installed from the existing parking lot at the top of the stair and from the beach at the base of the stair. Beach access for construction equipment appears to exist to the north of the existing structure.

The layer of landsliding soil is estimated to be between 5 to 9 feet in depth. The lateral forces that this layer would apply to the new foundations would be considerable. In order to reduce these forces and reduce the size and cost of the foundation system, we recommend that approximately 5 feet of the existing soils be removed in the form of a trench underneath the alignment of the replacement structure, as illustrated in the section below. The sides of this trench would be sloped and strengthened to minimize long term erosion.

The potential for soil improvement at the base of the stair and on the existing slope was evaluated. However, this would not significantly improve the stability of the existing slope and was not evaluated in detail.

Supporting the new structure on the existing rock outcropping to the north of the existing walkway is feasible.

Elevated Walkway

The existing structure is framed using pressure treated wood members and exhibits no signs of significant decay. A wood framed replacement structure is proposed for the following reasons:

- The existing wood framed structure has not been adversely affected by the coastal environment.
- A concrete structure – while more durable - would be substantially more costly than wood framing.
- A steel structure is not recommended due to the corrosive coastal environment.

A schematic section through the new structure is shown below:

Exhibit D

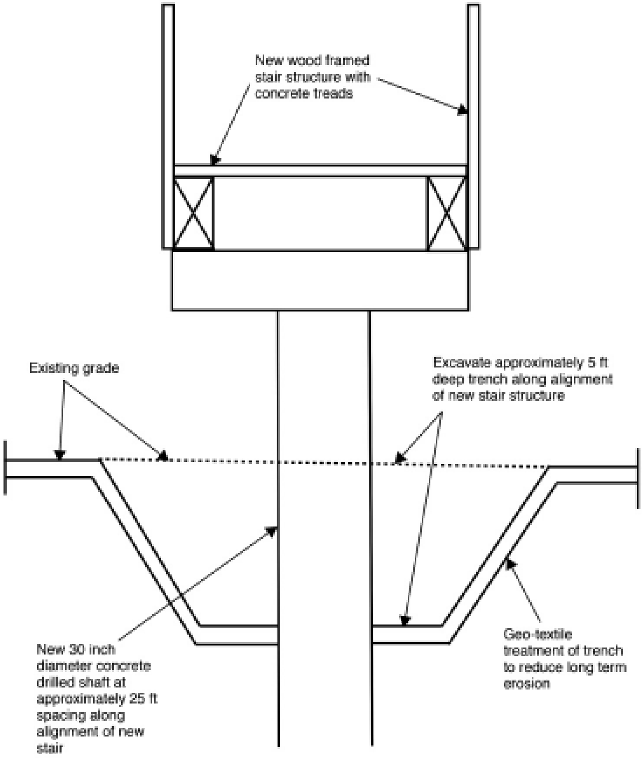


Figure 2 – New Stair Structure – Schematic Section

A schematic level cost estimate has been included in Appendix C of the report. This estimate assumes that the new structure would require approximately (24) 30-inch diameter drilled shafts, approximately 30 foot long, spaced uniformly along the length of the new stair. The new walkway would be a 4 foot wide, wood framed walkway with concrete treads – similar to the existing structure.

The estimated cost of this alternate is $773,000.

ALTERNATE NO.3 – NEW ON-GRADE TRAIL

As an alternate option, USFWS directed KPFF to develop a conceptual design for an on-grade trail. The most feasible location for an on-grade trail would be in the location of the existing trail to the north of the staircase. The start of the north trail is approximately 920 feet north of the start of the staircase. The existing trail consists of paved surfaces, wooden staircases, paths, and hand rails, and steel staircase leading down to the beach.

Constructing the on-grade trail in the current location of staircase is not pratical due to the slope stability being minimal near and around the stairs, as well as continuous drainage through the hillside. Furthermore, to the north of the stair case, the hillside appears to be mostly comprised of bedrock jutting out of the hillside limiting the areas where a trail can be placed unless the rocks are removed.

KPFF investigated moving the trail further south however that proved impractical due to slope stability, as well. It was brought to KPFF's attention that at one time, an on-grade trail existed south of the staircase and after a storm event it collapsed in on itself, further justifying that an on-grade trail near the staircase is not appropriate. KPFF also considered proposing the on-grade trail to be placed on the north side of the point, however that would make the on-grade trail approximately 400 feet within the existing trail. Placing the new on-grade trail within close proximity of the existing trail limits the appeal for pedestrians being able to complete a walking loop around the point. KPFF has determined the optimal location for an on-grade trail is at the current location of the existing trail. The existing trail will be modified to meet the requirements set forth by *United States Access Board in the Outdoor Developed Areas*, May 2014 document.

Reference Figures 6 and 7, located at the end of this report, for the proposed location and layout of the new on-grade trail. The proposed layout ensures the slopes will be no more than 8.33 percent allowing for resting intervals, 60 inches long and 36 inches wide, only being necessary every 200 feet. The proposed on-grade trail will be approximately 915 feet in length and a minimum of 36 inches wide. The cross slope of the trail will be no more than 2 percent and will slope to the west, minimizing the possibility of ponding on the trail. The trail will be comprised of a six inch section of Americans with Disabilities Act (ADA) trail mix aggregate, see the table below for gradation.

Table 1 – ADA Trail Mix Gradation

Size	Percentage Passing By Weight
3/8”	100
#4	76-100
#10	30-60
#200	0-10
Pan	

An ADA trail geotextile fabric will separate the existing soil from the proposed ADA trail mix section. Trail edging will be used to contain the ADA trail mix along the entire trail length. In locations were the hillside will be cut into, a retaining wall will be used to hold back the hillside. It is not anticipated that the wall will be taller than three feet. At the location where the trail meets the beach, a landing pad of approximately five feet by five feet will be enclosed with edging to prevent the ADA trail mix from scattering into the beach. KPFF recommends maintenance on the landing pad to ensure that the edging encasing the ADA trail mix doesn’t become a tripping hazard. The edging shall not be exposed more than two inches per United States Access Board’s Outdoor Developed Areas document.

The estimated cost of this alternate is $141,000.

ALTERNATE NO.4 – REHABILITATION OF THE EXISTING STAIR

This alternate involves the strengthening of the existing structure and improving drainage of the adjacent slope. The movement of the underlying soils will continue to laterally and vertically displace the existing structure. The displacement is unlikely to be uniform along the length of the stair, resulting in differential vertical and lateral displacements. This movement is expected to be gradual, with the risk of sudden, catastrophic failure of the slope being low.

This expected soil movement means that there is no cost-effective method of strengthening the structure to a point where subsequent monitoring is not required. The scheme described below will extend the life of the structure by reducing the rate of slope movement increasing the amount of lateral movement that the structure can accommodate.

The rehabilitation scheme would involve the following elements:

Drainage Improvements

The rate of displacement of the soils would be reduced with the installation of drainage improvements along each side of the existing structure. These drainage improvements would consist of installing a matrix of horizontal drains into the face of the slope could help stabilize the drainage system. Horizontal drains are often used to lower water table elevations and reduce pore pressures, which increases shear strength of the soil and improves slope stability. A drainage system in this case could entail installations of 50 to 150 feet in length and may require anywhere from 20 to 100 drains to achieve the desired effect on slope stability.

Structural Connections

Continued lateral and vertical movement of the foundations could result in loss of bearing at the connection point between the foundations and wood posts. A steel bracket would be installed around the base of the post and would be bolted to the existing concrete foundation, maintaining a positive connection between the two elements.

Structural Bearing Seat Extensions

The typical bearing seat conditions for the existing stair stringers are shown below:

Figure 3 – Typical Bearing Seat Connection

Figure 4 – Typical Bearing Seat Connection

Figure 5 – Typical Bearing Seat Connection

The continued displacement of the structure could result in loss of bearing at any one of the typical conditions pictured above. The proposed solution is to extend the length of the existing bearing seats with new wood framing members supported from the existing framing.

Continued Monitoring

The extended bearing seats and improved base connections do not eliminate the risk of failure due to large movement of the underlying soil. Continued monitoring of the structure for significant movement would still be required.

A schematic level cost estimate has been included in Appendix Cof the report. This estimate assumes that all post connections to the foundations would be strengthened and that all bearing seats would be extended. It also assumes that USFWS staff would inspect the structure three times per year and that one minor, engineered repair would be required every two years. The estimate assumes a 20 year life span.

The estimated cost of this alternate is $456,000.

ALTERNATE NO.5 – PARTIAL REPLACEMENT OF THE STAIR STRUCTURE

This alternate would include retaining the upper portion of the existing stair structure where evidence of downhill shifting is limited or non-existent; and removal and replacement of the portion of the existing stair that has exhibited the most significant downhill shifting, which is the generally the lower half of the structure. Replacement options considered for the lower portion of the stair include an on-grade trail and a new stair structure to replace the portion of the existing stair that has exhibited the most significant downhill shifting.

Partial Replacement with On-Grade Trail

Evaluation of potential replacement of the lower portion of the stair with an on-grade identified several drawbacks to this alternate, including:

- The route for a trail beginning at approximately the midpoint of the existing stair and continuing downhill would require routing the trail to the north or south of the rock outcrop into areas of the slope where previous landslides have occurred.

- The predominant grade down the lower half of the slope is approximately 40%, a trail in this portion of the slope would require numerous switchbacks and landings to provide the necessary length and slope to maximize accessibility, while simultaneously minimizing the construction that would occur within areas of past landslides.

- The lower 50% to 65% of the slope is where the majority of seepage and spring activity has been observed. Extensive use of shallow riprap lined ditches or gravel subdrains would be required to minimize or prevent erosion or sliding of the trail on the slope.

Based on these drawbacks, we do not consider replacement of the lower portion of the existing stair with an on-grade trail to be a feasible long term solution to provide access to the beach.

Partial Replacement with New Stair Structure

As described above, the slope on which the new structure would be constructed is subject to gradual and ongoing landsliding. Any new structure placed in this location will need to be designed to accommodate this landsliding, without negatively affecting the structural integrity or life span of the new structure.

As described above in the description for Alternate No. 2:

- The replacement structure would be supported on new drilled concrete shafts (or other similar deep foundation system, though for the purposes of estimating, drilled shaft have been assumed), anchored into the stable sandstone and extending through the sliding soil layer to form supports for the new walkway structure.

- The new concrete shafts would need to be designed to resist the lateral forces applied to them by the sliding soils, requiring the new reinforced concrete shafts to be approximately 30 inches in diameter.

Exhibit D

- It is assumed that drilled shafts would be installed primarily from the beach at the base of the stair. Beach access for construction equipment appears to exist to the north of the existing structure.

- In order to reduce these forces and reduce the size and cost of the foundation system, we recommend that approximately 5 feet of the existing soils be removed in the form of a trench underneath the alignment of the replacement structure.

- An elevated walkway framed using pressure treated wood members, similar to the existing stair structure would provide adequate decay resistance for a reasonable cost.

Configuring the new structure to pass over the top of the existing rock outcropping to the north of the existing walkway is also feasible. Routing the new stair structure over the rock would require installation of rock anchors, and the overall length of the structure would be 10 to 20 feet longer than a route along the edge of the rock outcrop. An advantage of constructing the stair over the top of the rock outcrop is that the rock and the ridge uphill from the rock is the most stable portion of the slope in the area, and that stability will enhance the longevity of the structure. Constructing a staircase over the top of the rock outcrop should include slip joints between the sections of staircase supported by different materials to accommodate potential differential movements between the outcrop/boulder and the soils on the ridge above the outcrop.

Conceptual plan and profile views for the two potential new stair structure routes (Alternate 5A and Alternate 5B) considered for partial replacement of the stair structure are included as Figures 8 through 11 located at the end of this report. It is important to note that the concept layouts developed for the new stair structure are based on available LIDAR survey data and design drawings depicting the construction of the original stair. Topographic survey and additional geotechnical investigations to determine the limits of below grade rock are required before detailed engineering of the structure can occur.

A schematic level cost estimate has been included in Appendix C of the report. This estimate assumes that the new structure would require approximately twelve 3 foot diameter drilled shafts, approximately 30 foot long, spaced along the length of the new stair. The new walkway would be a 4 foot wide, wood framed walkway with concrete treads – similar to the existing structure.

The estimated cost of alternate 5A, constructing a new stair structure around the edge of the rock outcrop, is $381,000.

The estimated cost of alternate 5B, constructing a new stair structure over the top of the rock outcrop, is expected to be similar to the cost for alternate 5A. The structure in Alternate 5B is slightly longer, however the lower cost of rock anchors which can be used in lieu of drilled footings for the portion of the structure over the rock, will offset a portion of the cost for additional structure.

CONCLUSIONS

Based on our site evaluations and studies, the existing stair structure will continue to slowly displace laterally and vertically – due to the underlying and slow moving landslide – requiring continued inspection and maintenance. However, due to the low risk of sudden failure of the slope, this remains a viable alternate.

Rehabilitation to reduce inspection and maintenance costs is comparable in cost to simply inspecting and maintaining the existing stair as-is. However, it is likely that the useable life of the rehabilitated structure will be increased under this scenario.

Exhibit D

Complete replacement of the existing structure in its current location – while slightly more costly than rehabilitation, inspection and maintenance – will provide a substantially more durable structure with a significantly increased design life. However, this alternate would result in significant environmental and aesthetic impacts to the slope in the vicinity of the new structure.

A new on-grade trail to the north of the existing stair is significantly less costly than the three other alternates. However, this trail would be constructed several hundred feet to the north of the existing parking lot, increasing the distance to the beach and limiting access to the beach south of Coquille Point during high tidal ranges.

Partial replacement of the existing structure in its current location will provide a substantially more durable access with a significantly increased design life in comparison to the stair rehabilitation or new trail alternatives. This alternate would provide slightly lower durability and design life than a complete replacement structure, but at a cost that is less than 50% of a complete replacement structure.

We recommend pursuing a partial replacement of the stair structure, using a structure layout similar to what is shown in Figures 8 and 10 for Alternates 5A and 5B.

Exhibit D

FIGURE 6 - New Trail Location

Exhibit D

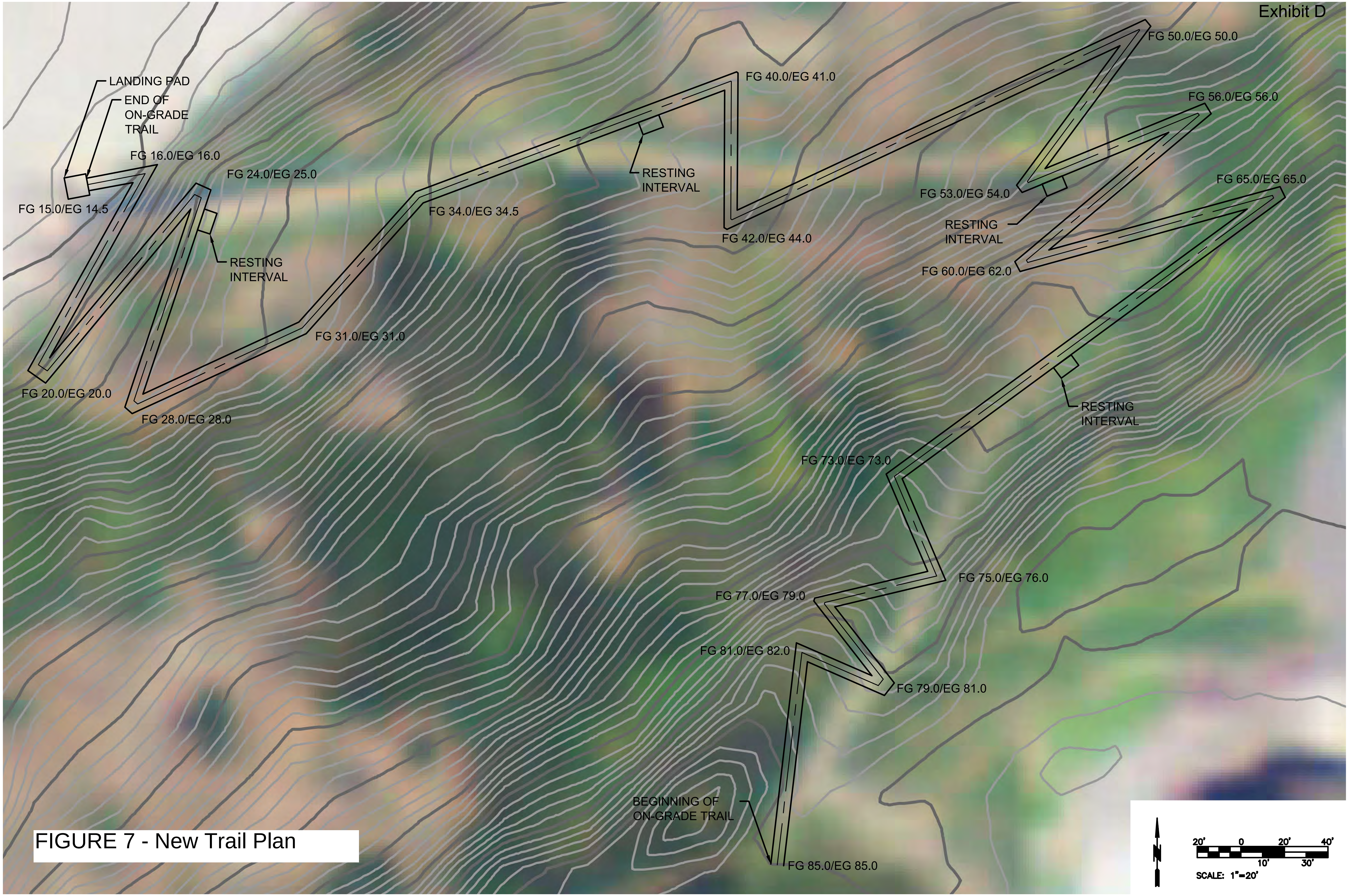


FIGURE 7 - New Trail Plan

Exhibit D

NOTE:

CONTOURS AND ROCK LIMITS TAKEN FROM AVAILABLE LIDAR SURVEY DATA AND DESIGN DRAWINGS FOR ORIGINAL STAIR. CONTOURS AND ROCK LIMITS ARE APPROXIMATE AND INTENDED FOR CONCEPT DEVELOPMENT ONLY. CONDITIONS MUST BE FIELD VERIFIED PRIOR TO BEGINNING DESIGN OR CONSTRUCTION.

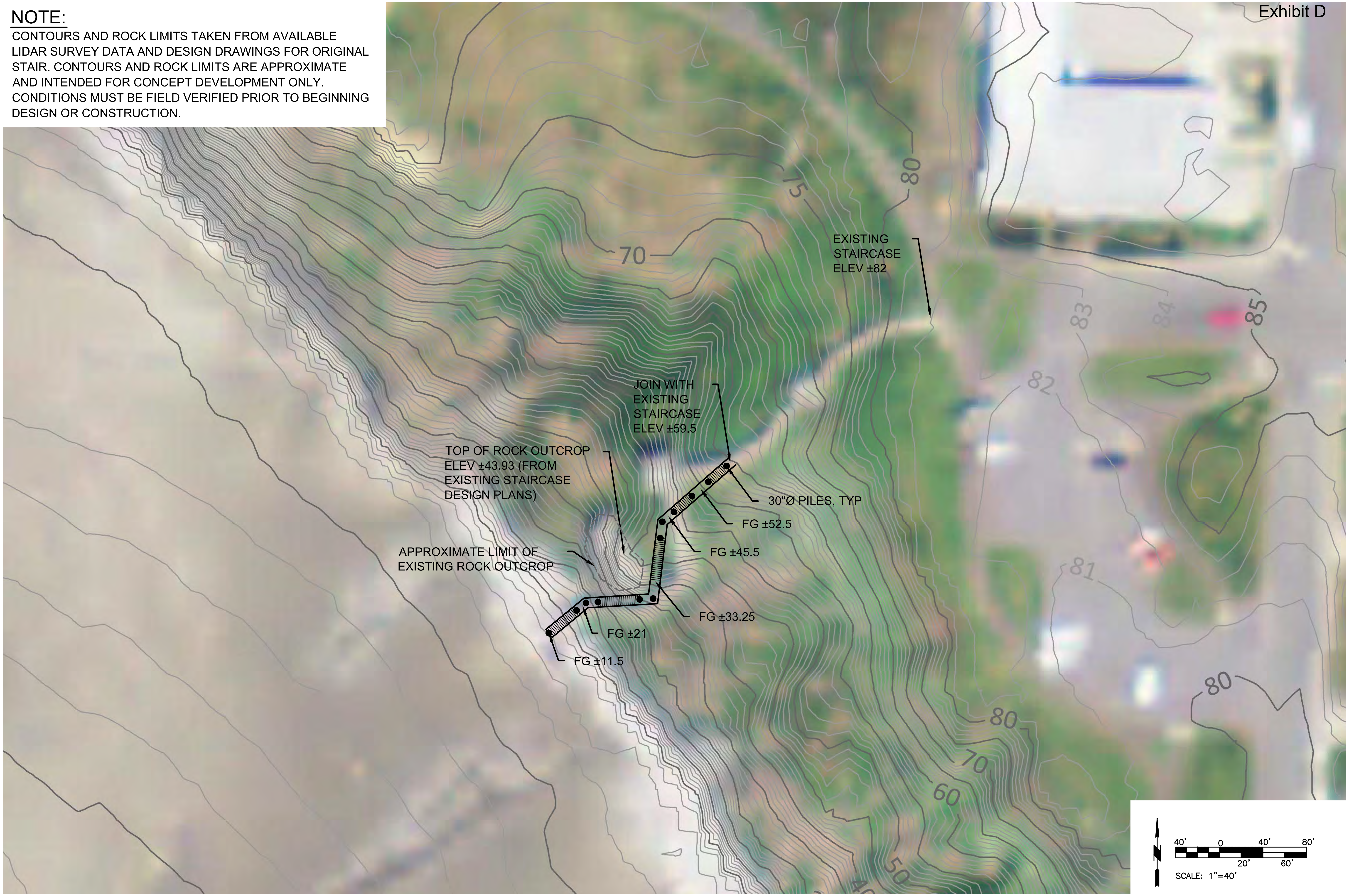


FIGURE 8 - ALTERNATE 5A - CONCEPT PLAN

Exhibit D

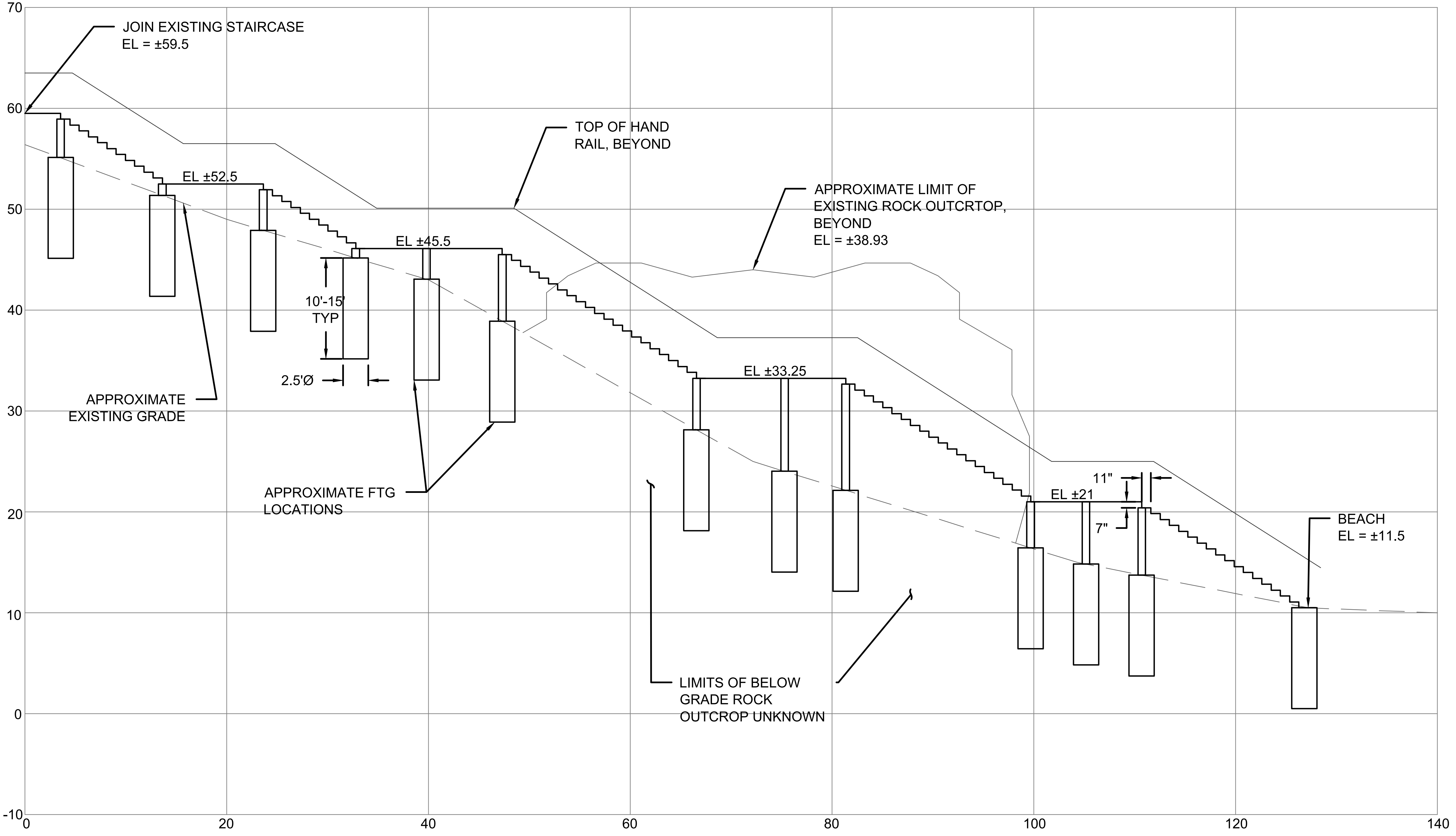


FIGURE 9 - ALTERNATE 5A - CONCEPT PROFILE

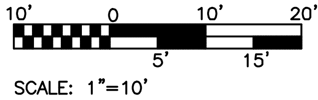


Exhibit D

NOTE:

CONTOURS AND ROCK LIMITS TAKEN FROM AVAILABLE LIDAR SURVEY DATA AND DESIGN DRAWINGS FOR ORIGINAL STAIR. CONTOURS AND ROCK LIMITS ARE APPROXIMATE AND INTENDED FOR CONCEPT DEVELOPMENT ONLY. CONDITIONS MUST BE FIELD VERIFIED PRIOR TO BEGINNING DESIGN OR CONSTRUCTION.

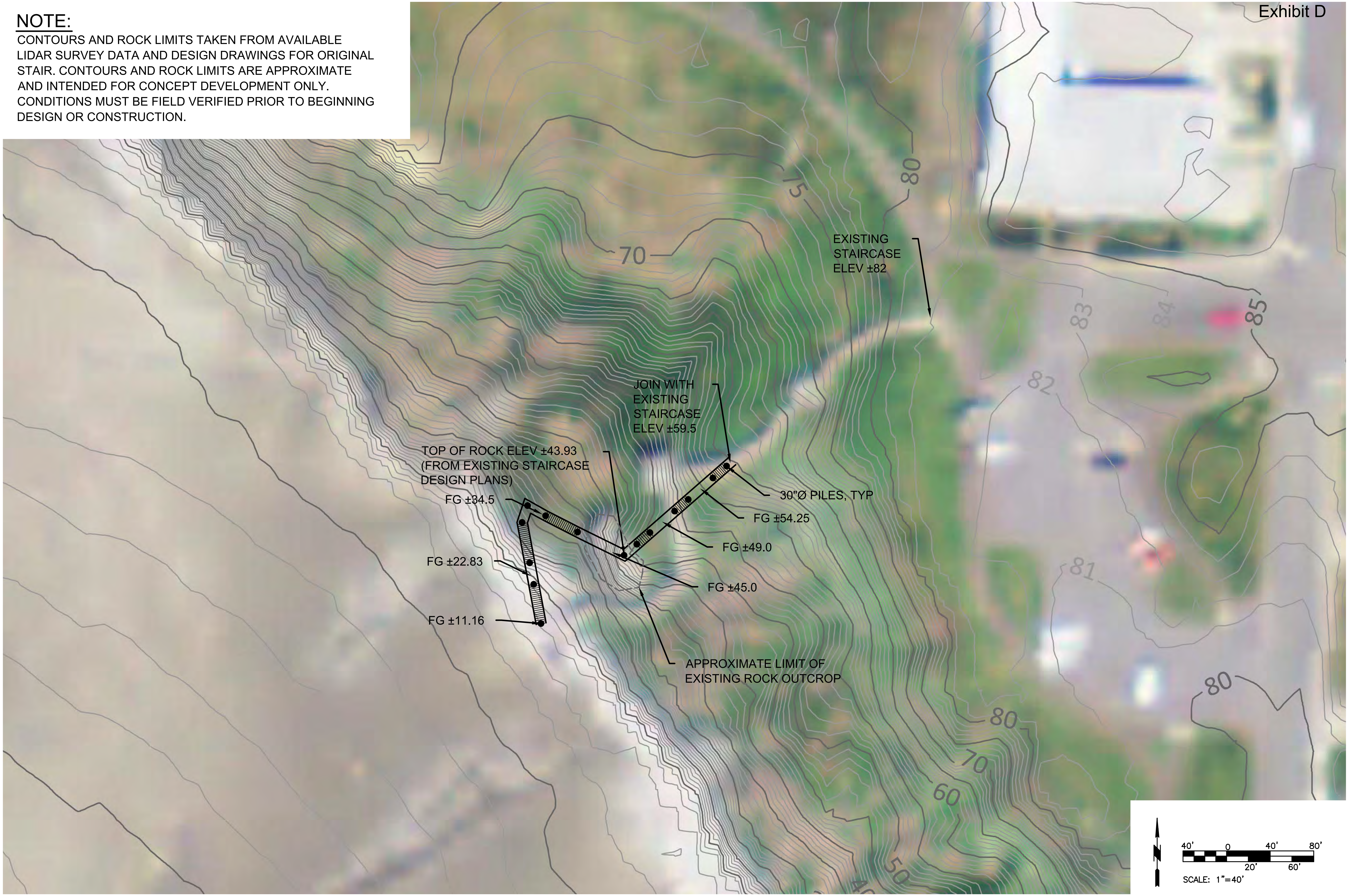
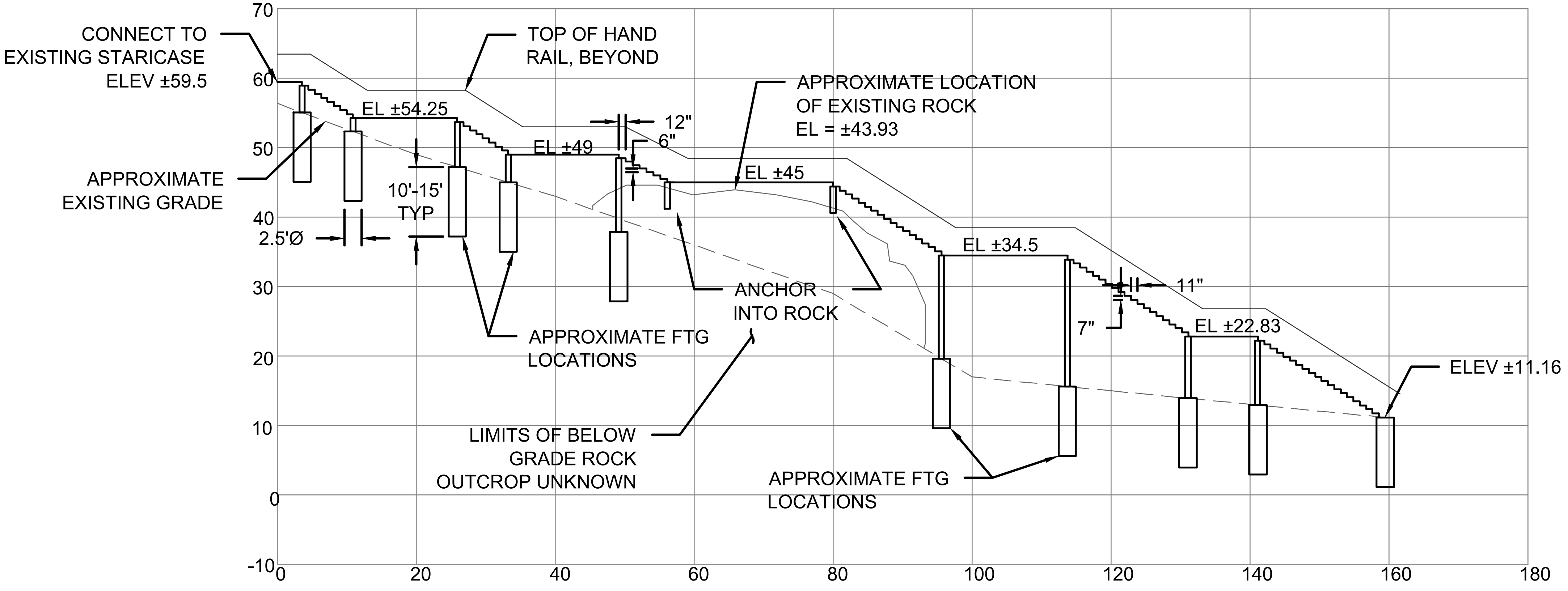


FIGURE 10 - ALTERNATE 5B - CONCEPT PLAN



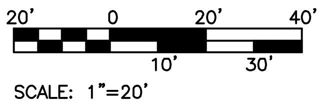


FIGURE 11 - ALTERNATE 5B - CONCEPT PROFILE

Exhibit D

Appendix A

Existing Drawings

Exhibit D

COQUILLE POINT STAIR

OREGON ISLANDS NATIONAL WILDLIFE REFUGE
DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
BANDON, OREGON

DRAWING INDEX:

A0.0	TITLE SHEET	1R-OR-178-3-1.0
ARCHITECTURAL – SOUTH BEACH ACCESS		
A1.1	STAIR PLANS	1R-OR-178-3-2.0
A2.1	STAIR SECTIONS AND DETAILS	1R-OR-178-3-3.0
A3.1	STAIR FRAMING AND DETAILS	1R-OR-178-3-4.0
A4.1	STAIR FRAMING AND DETAILS	1R-OR-178-3-5.0
ARCHITECTURAL – NORTH BEACH ACCESS		
A1.2	ACCESSABLE PATH SITE PLAN	1R-OR-178-3-6.0
A2.2	ACCESSABLE PATH ELEVATIONS AND SECTIONS	1R-OR-178-3-7.0

PROJECT TEAM:

ARCHITECT/PROJECT COORDINATOR

RAR ARCHITECTS INCORPORATED
34 NW FIRST AVENUE, SUITE 206
PORTLAND, OREGON 97209
(503) 225-9095

CIVIL ENGINEERING

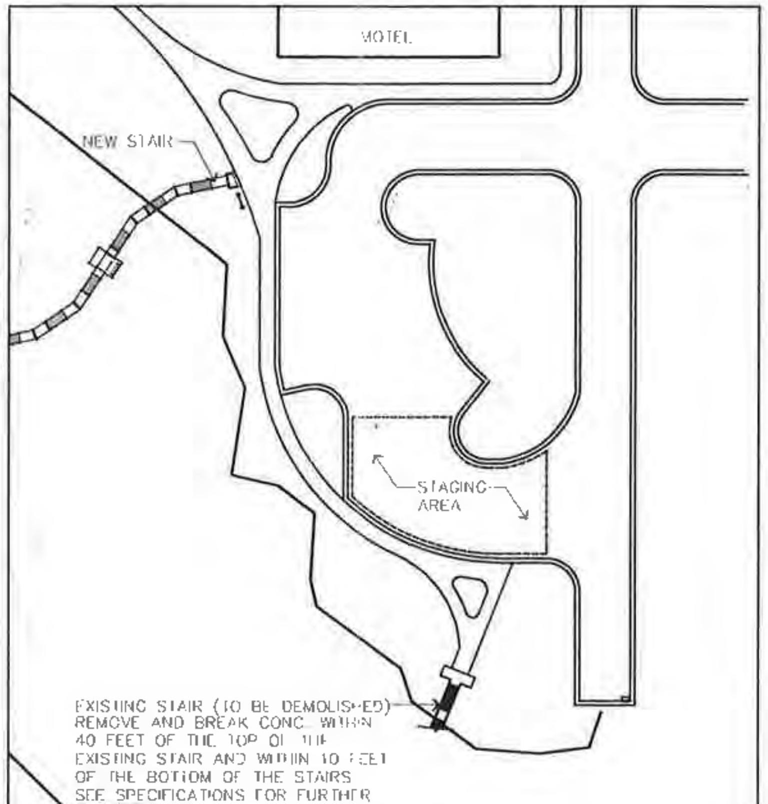
DAVID EVANS AND ASSOCIATES, INC
2828 SW CORBETT AVENUE
PORTLAND, OREGON 97201
(503) 223-6663

GEOTECHNICAL ENGINEERING

ALDER GEOTECHNICAL SERVICES
3910 NE 10TH AVENUE
PORTLAND, OREGON 97212
(503) 282-7487

STRUCTURAL ENGINEERING

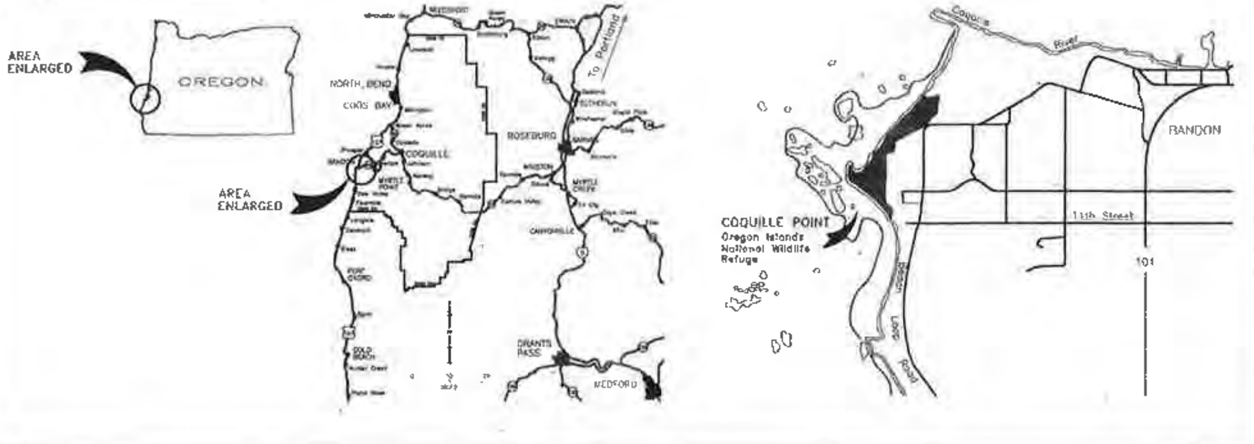
CONLEE ENGINEERS, INC.
1308 S.W. BERTHA BLVD.
PORTLAND, OREGON 97219
(503) 244-0579



EXISTING STAIR (TO BE DEMOLISHED) REMOVE AND BREAK CONC. WITHIN 40 FEET OF THE TOP OF THE EXISTING STAIR AND WITHIN 10 FEET OF THE BOTTOM OF THE STAIRS SEE SPECIFICATIONS FOR FURTHER CLARIFICATION.

SITE MAP

VICINITY MAP



GEORGE T. ROBISON

RAR ARCHITECTS INCORPORATED
34 N.W. FIRST AVENUE
Portland, Oregon 97209
(503) 225-9095

REV	DATE	DESCRIPTION	BY

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
REGION 1, OFFICE OF ENGINEERING
PORTLAND, OREGON

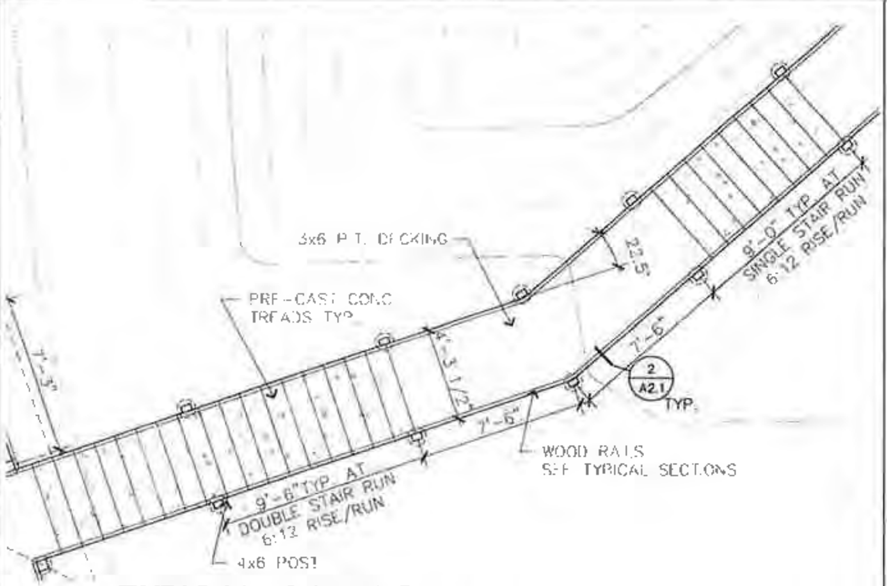
SUBMITTED
REGIONAL ENGINEER
REVIEWED
RECOMMENDED
CERTIFIED 10 CFR 435 COMPLIANCE

OREGON ISLANDS
NATIONAL WILDLIFE REFUGE

COQUILLE POINT STAIR
TITLE SHEET
A0.0

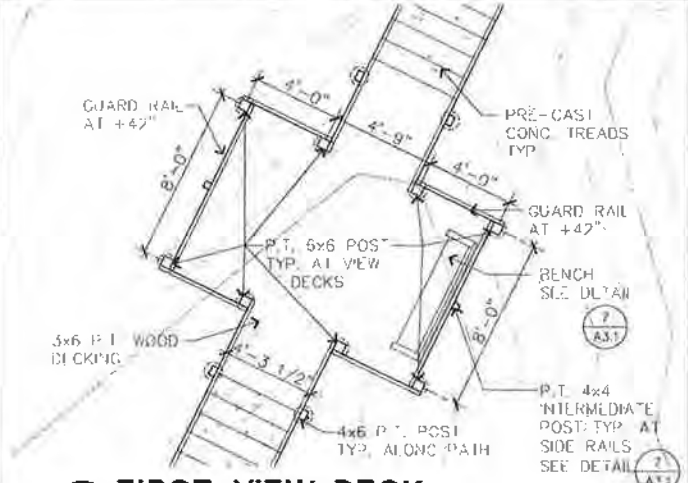
SURVEYED
DESIGNED JNC
DRAWN SMR
CHECKED SAR
DATE 01/28/98
DRAWING NO. 1R-OR-178-3-1.0

Exhibit D



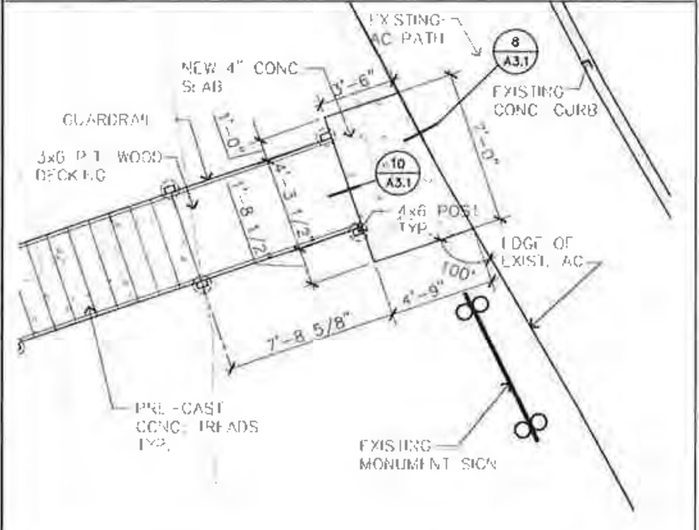
4/A1.1 TYPICAL CORNER

1/4" = 1'-0"



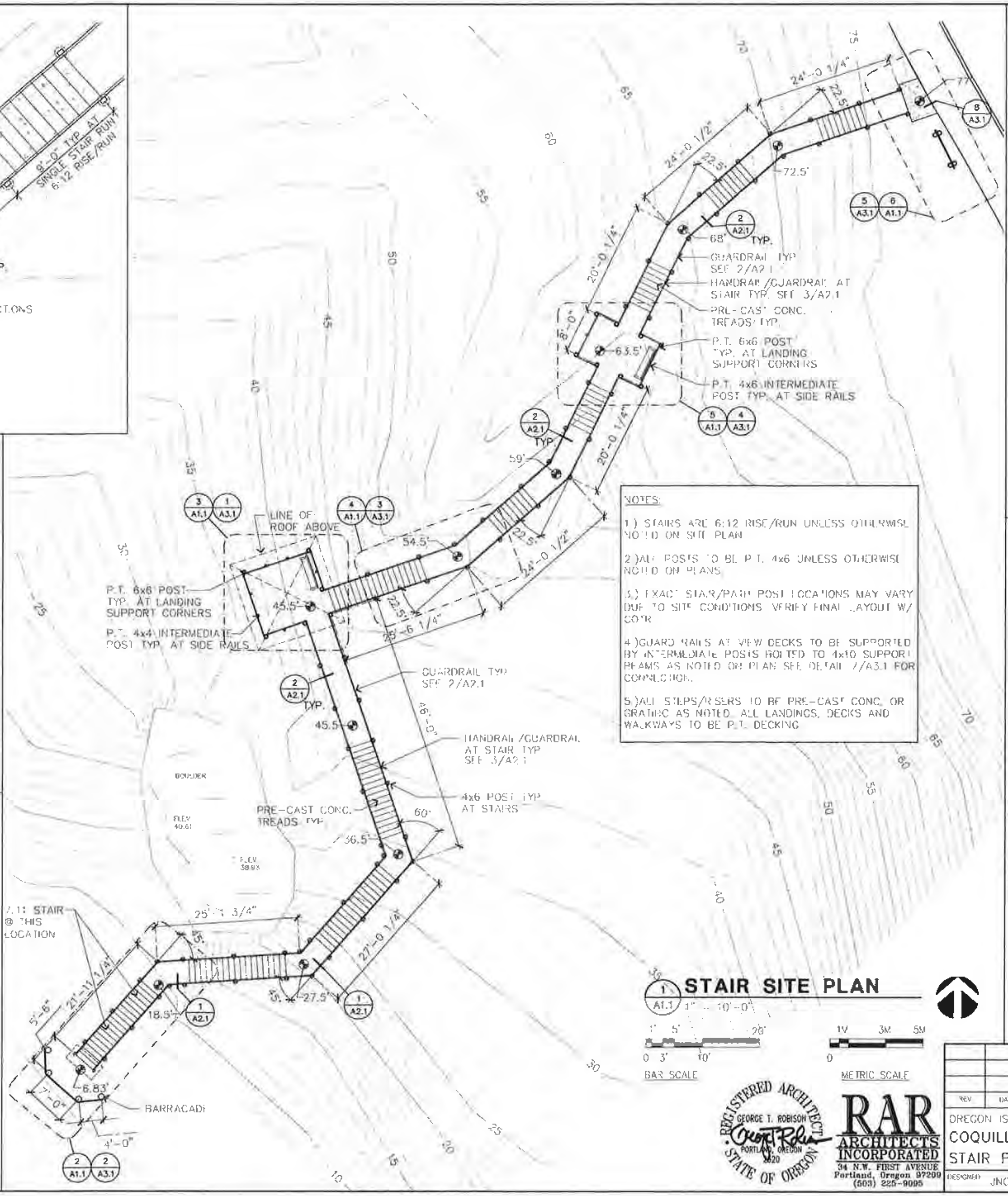
5/A1.1 FIRST VIEW DECK

1/4" = 1'-0"



8/A1.1 STAIR AT PARKING LOT

1/4" = 1'-0"



NOTES:

1) STAIRS ARE 6:12 RISE/RUN UNLESS OTHERWISE NOTED ON SITE PLAN

2) ALL POSTS TO BE P.T. 4x6 UNLESS OTHERWISE NOTED ON PLANS

3) EXACT STAIR/PATH POST LOCATIONS MAY VARY DUE TO SITE CONDITIONS. VERIFY FINAL LAYOUT W/ COTR

4) GUARD RAILS AT VIEW DECKS TO BE SUPPORTED BY INTERMEDIATE POSTS BOLTED TO 4x10 SUPPORT BEAMS AS NOTED ON PLAN SEE DETAIL 7/A3.1 FOR CONNECTION.

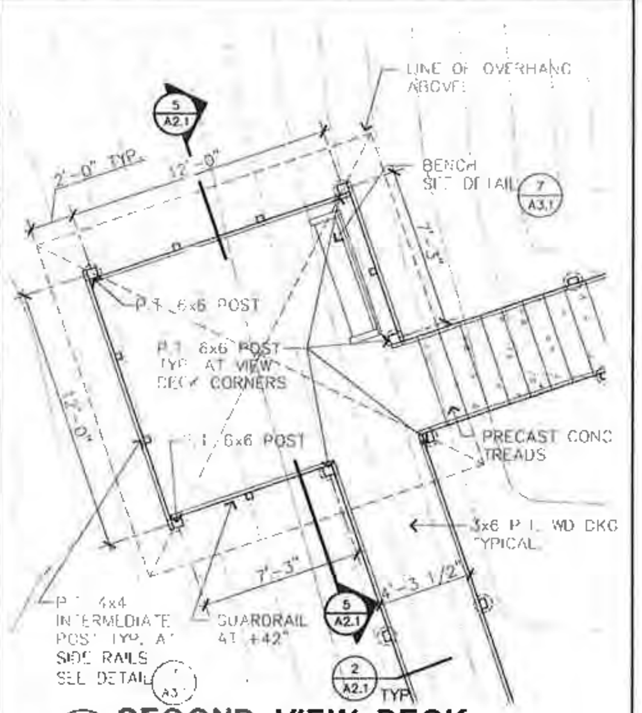
5) ALL STEPS/RISERS TO BE PRE-CAST CONC. OR GRATING AS NOTED. ALL LANDINGS, DECKS AND WALKWAYS TO BE P.T. DECKING

1/A1.1 STAIR SITE PLAN

1" = 10'-0"

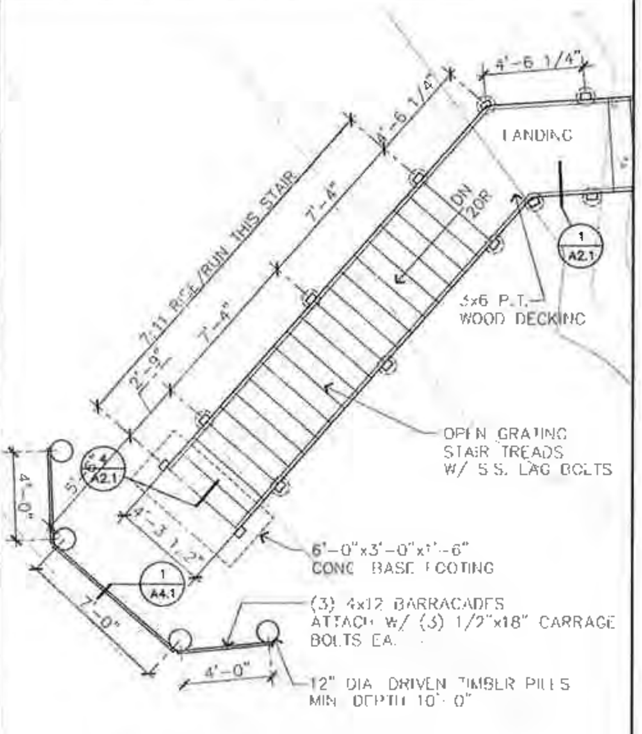
BAR SCALE 0 3' 5' 10' 20'

METRIC SCALE 0 1M 3M 5M



3/A1.1 SECOND VIEW DECK

1/4" = 1'-0"



2/A1.1 STAIR AT BEACH

1/4" = 1'-0"

REGISTERED ARCHITECT
GEORGE T. ROBISON
George T. Robison
PORTLAND, OREGON
3620
STATE OF OREGON

RAR ARCHITECTS INCORPORATED
34 N.W. FIRST AVENUE
Portland, Oregon 97209
(503) 225-9095

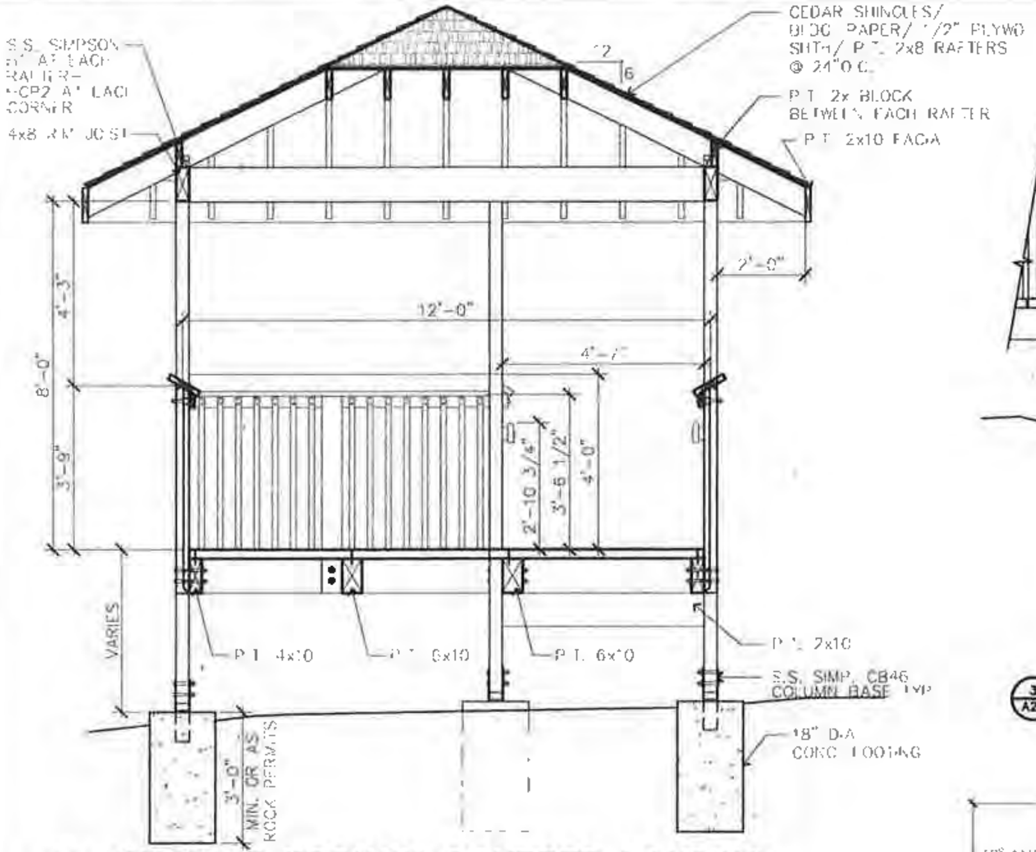
REV	DATE	DESCRIPTION	BY

OREGON ISLANDS NATIONAL WILDLIFE REFUGE
COQUILLE POINT STAIR
STAIR PLANS
A1.1

DESIGNED JNC
DRAWN SMR
CHECKED SAR
DATE 01/28/99
DRAWING NO. 1R-OR-178-3-2.0

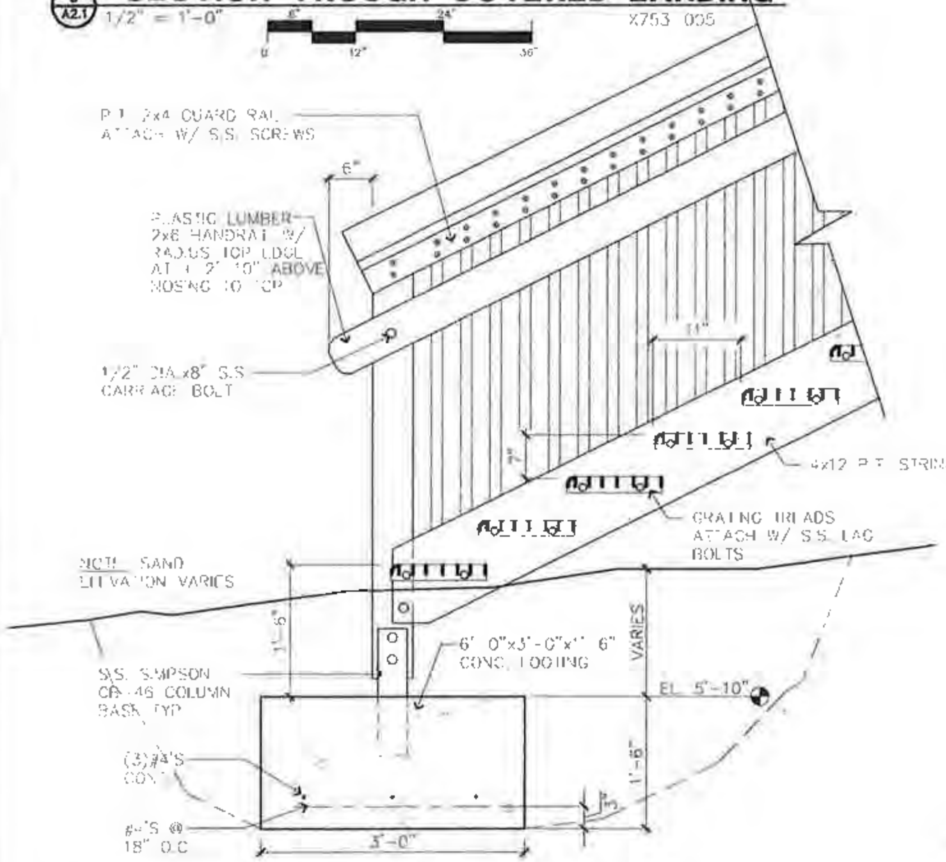
SHEET 2 OF 7

Exhibit D



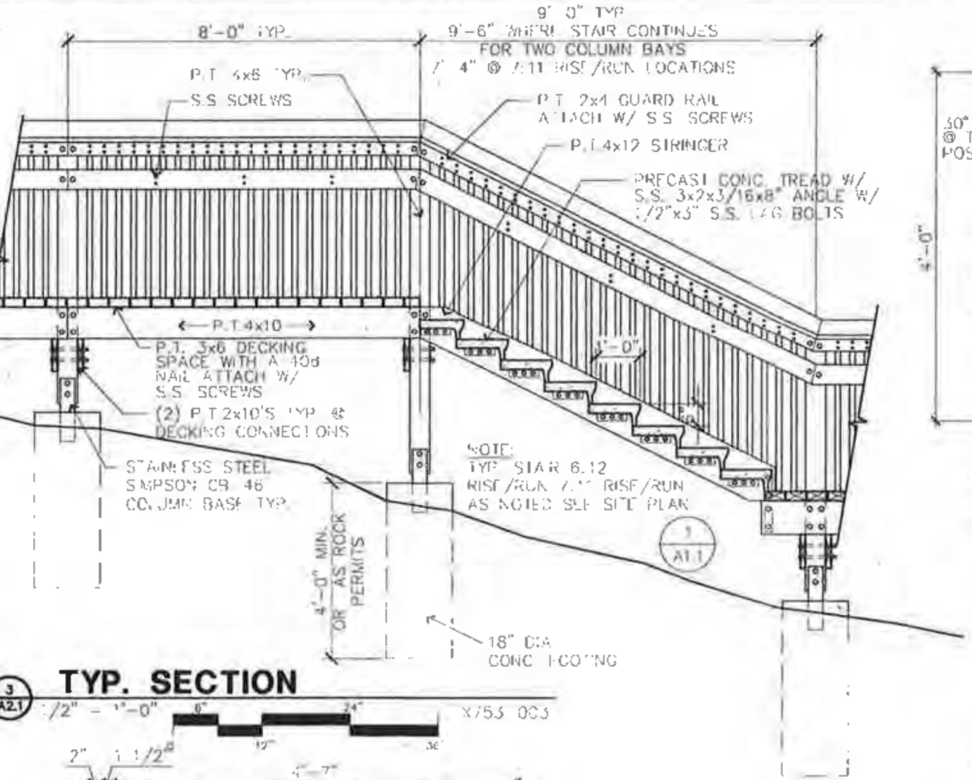
5 / A2.1 **SECTION TROUGH COVERED LANDING**

1/2" = 1'-0"   X753 005



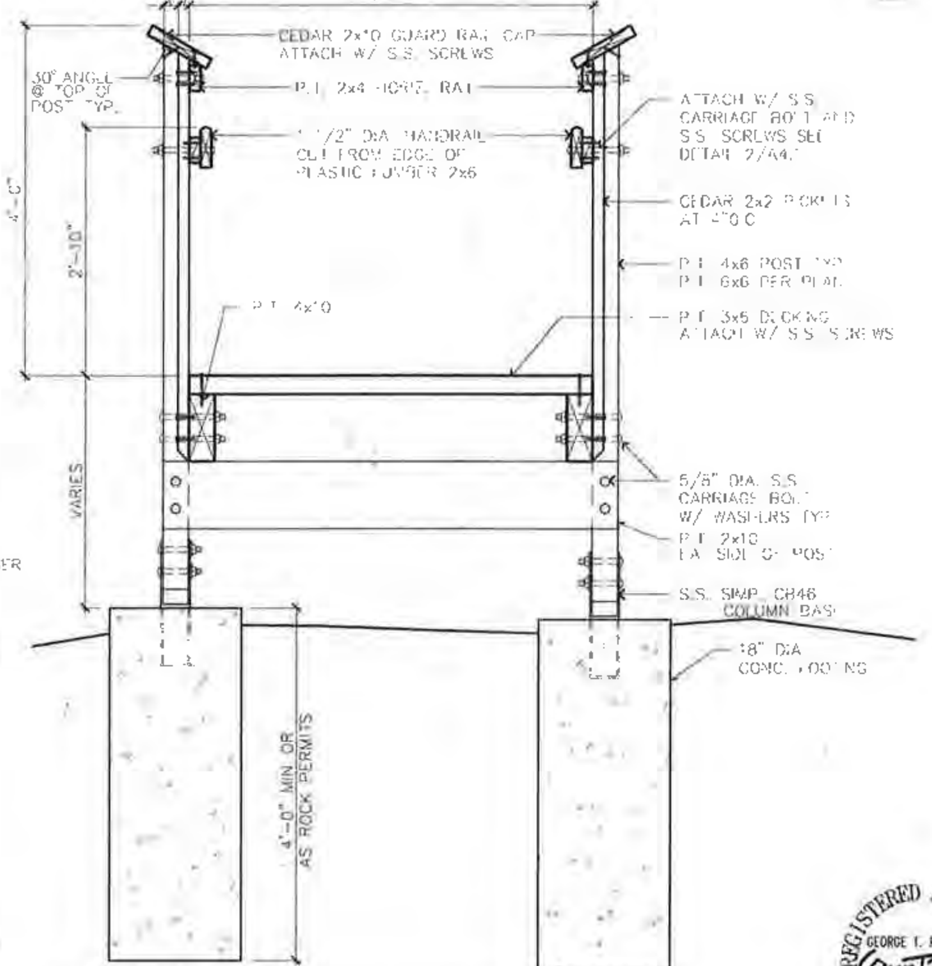
4 / A2.1 **STAIR AT BEACH**

1" = 1'-0"   X753-004



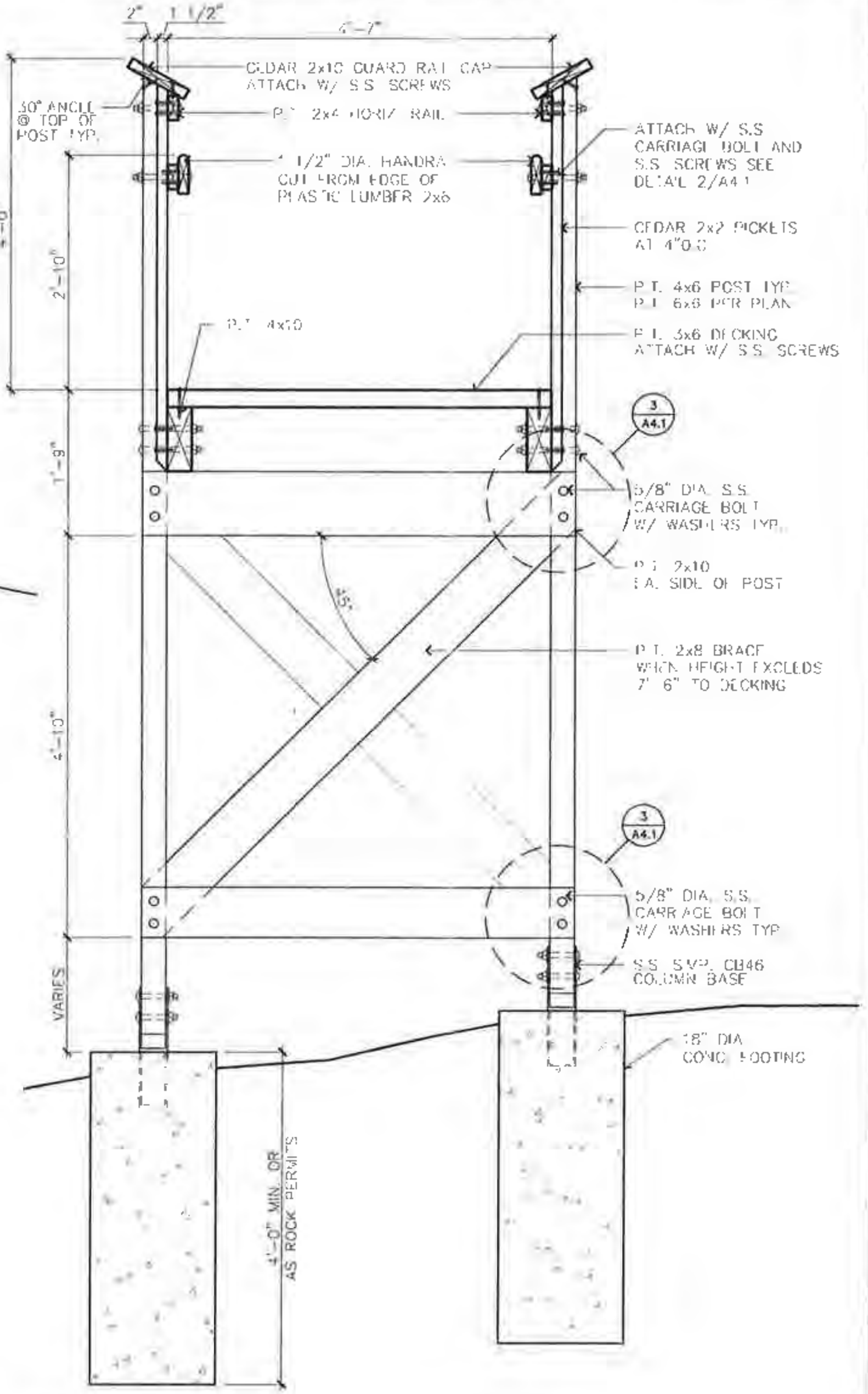
3 / A2.1 **TYP. SECTION**

1/2" = 1'-0"   X753 003



2 / A2.1 **TYP. CROSS SECTION**

1" = 1'-0"   X753-001



1 / A2.1 **BRACING CROSS SECTION**

1" = 1'-0"   X753-002

REGISTERED ARCHITECT GEORGE T. ROBISON PORTLAND, OREGON 2520 STATE OF OREGON

RAR ARCHITECTS INCORPORATED
34 N.W. FIRST AVENUE
Portland, Oregon 97209
(503) 225-9095

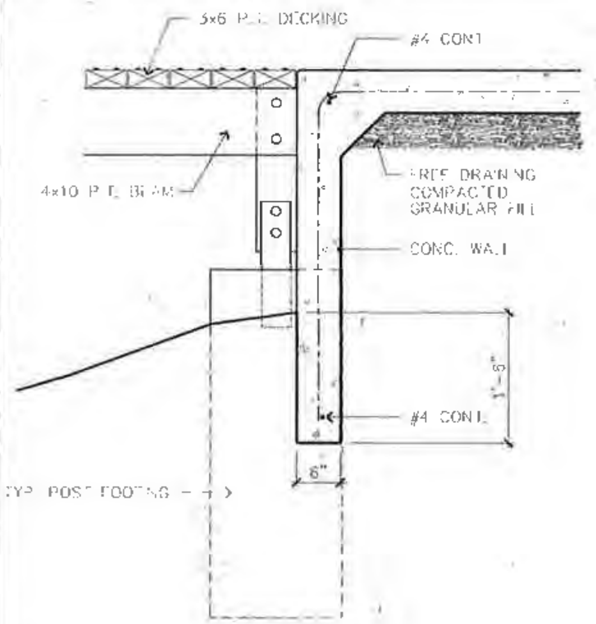
REV	DATE	DESCRIPTION	BY

OREGON ISLANDS NATIONAL WILDLIFE REFUGE
COQUILLE POINT STAIR
STAIR SECTIONS AND DETAILS
A2.1

DESIGNED	DRAWN	CHECKED	DATE	DRAWING NO
JNC	SMR	SAR	01/28/98	1R-OR-178-3-3.0

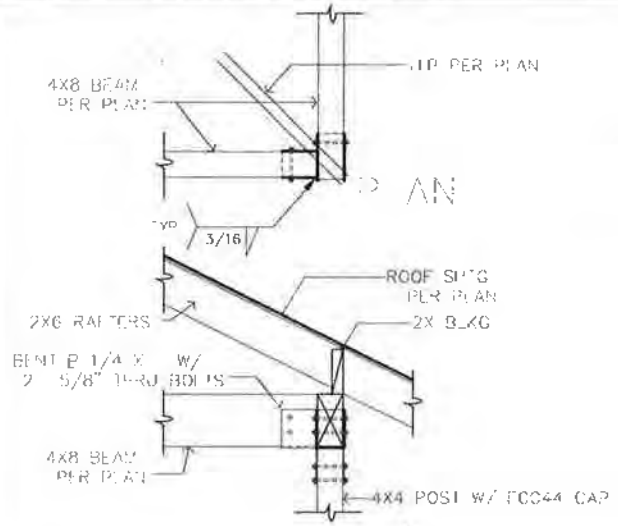
SHEET 3 OF 7

Exhibit D



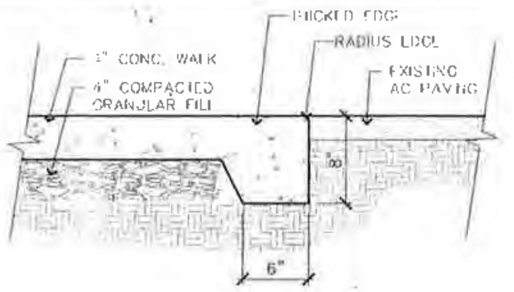
10 A3.1 STAIR AT CONCRETE PAD

1" = 1'-0" 6" 24" 0 12" 36" X753 015



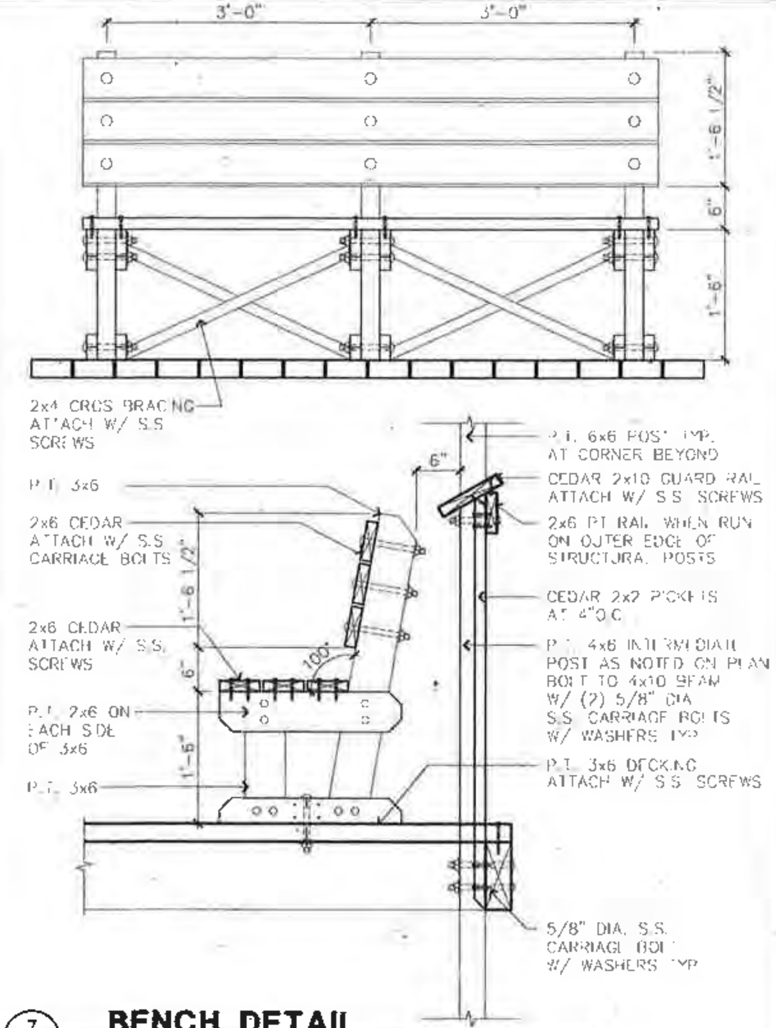
9 A3.1 BEAM CONN/CORNER POST

SCALE 1" = 1'-0" 6" 24" 0 12" 36" X753-014



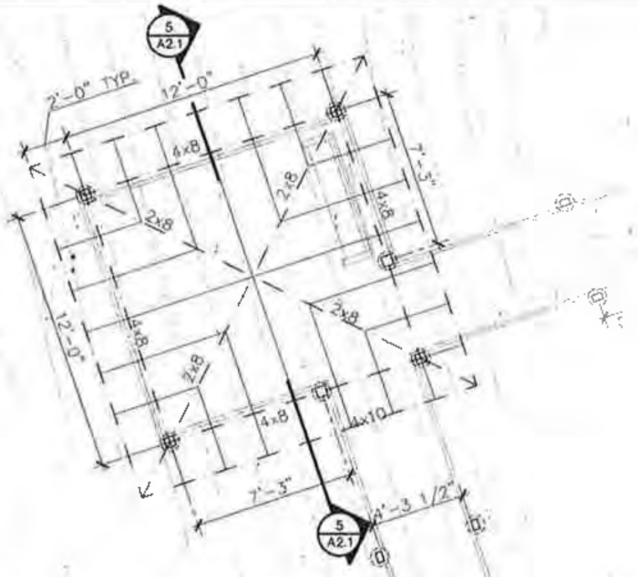
8 A3.1 CONC. PAD AT EXISTING PATH

1 1/2" = 1'-0" 1 1/2 6 0 3 12 X753-009



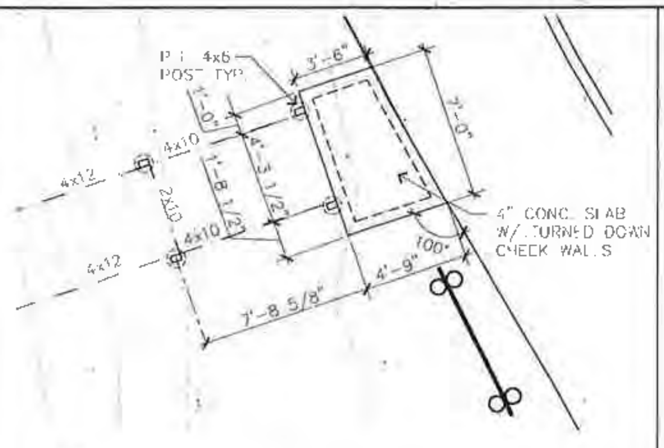
7 A3.1 BENCH DETAIL

1" = 1'-0" 6" 24" 0 12" 36" X753 011



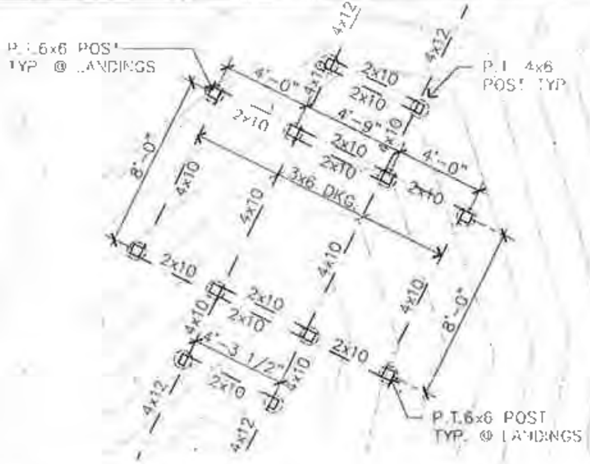
6 A3.1 SECOND LANDING ROOF STRUCTUE

1/4" = 1'-0" 6" 24" 0 12" 36"



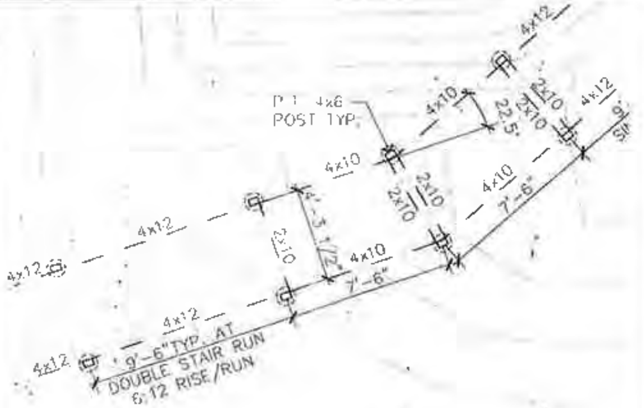
5 A3.1 STAIR AT PARKING LOT

1/4" = 1'-0" 6" 24" 0 12" 36"



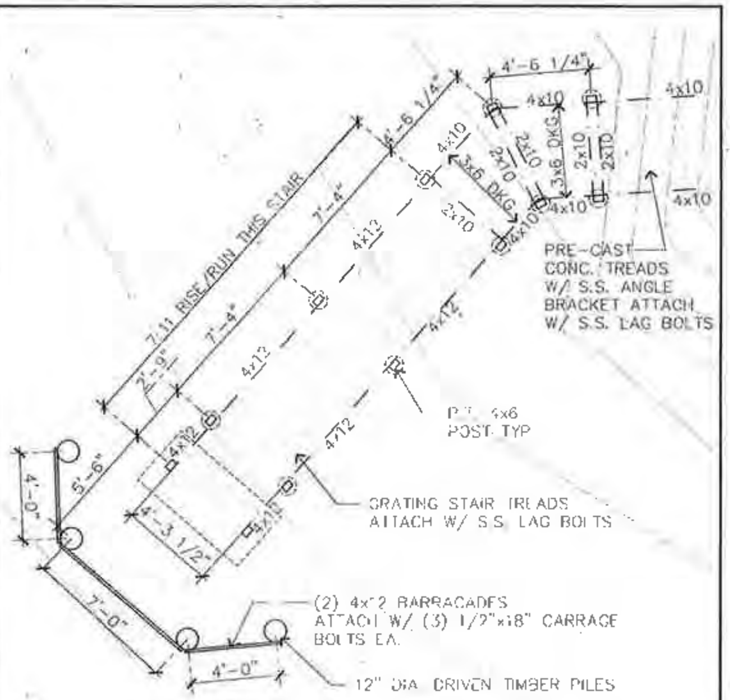
4 A3.1 FIRST LANDING

1/4" =1'-0" 6" 24" 0 12" 36"



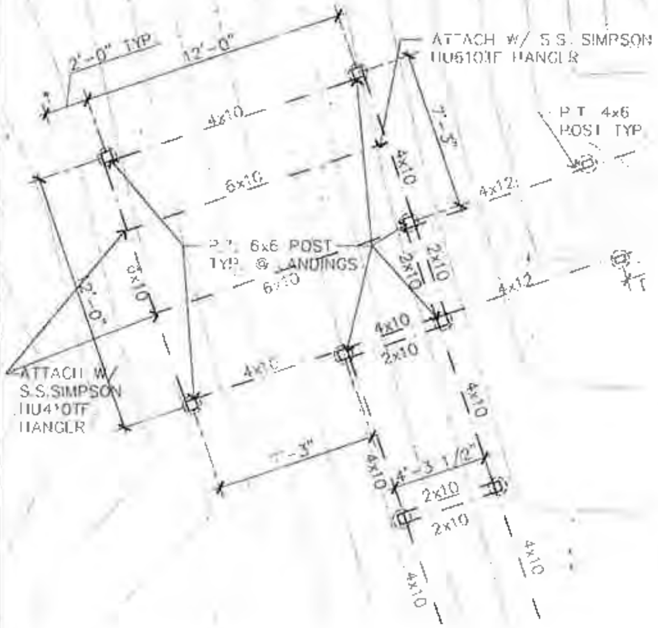
3 A3.1 TYP. CORNER

1/4" = 1'-0" 6" 24" 0 12" 36"



2 A3.1 STAIR AT BEACH

1/4" =1'-0" 6" 24" 0 12" 36"



1 A3.1 SECOND LANDING

1/4" = 1'-0" 6" 24" 0 12" 36"

REGISTERED ARCHITECT
GEORGE T. ROBISON
PORTLAND, OREGON
2520
STATE OF OREGON

RAR
ARCHITECTS
INCORPORATED
34 N.W. FIRST AVENUE
Portland, Oregon 97209
(503) 225-9095

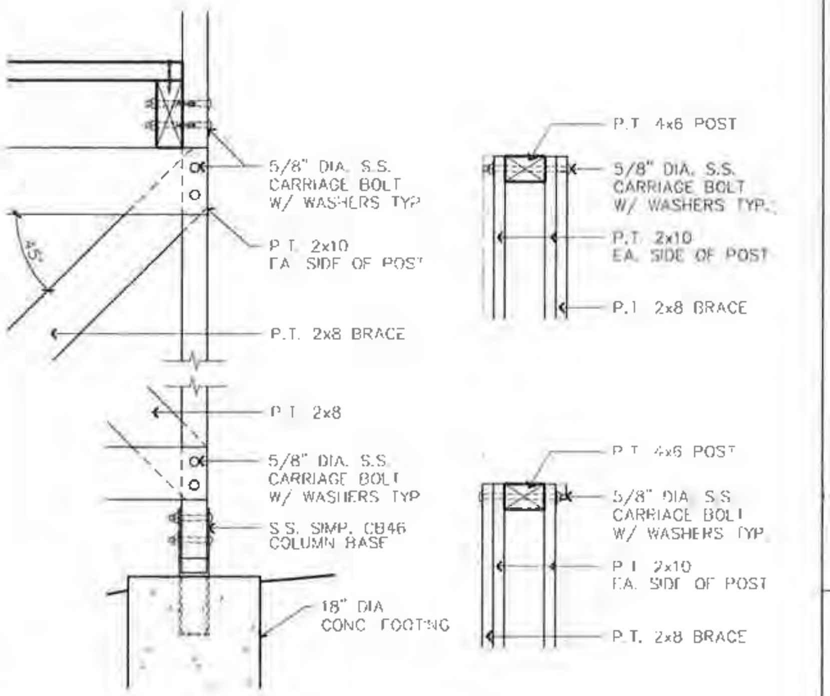
REV	DATE	DESCRIPTION	BY

OREGON ISLANDS NATIONAL WILDLIFE REFUGE
COQUILLE POINT STAIR
STAIR FRAMING AND DETAILS
A3.1

DESIGNED	DRAWN	CHECKED	DATE	DRAWING NO
JNC	SMR	SAR	01/28/98	1R-OR-178-3-4.0

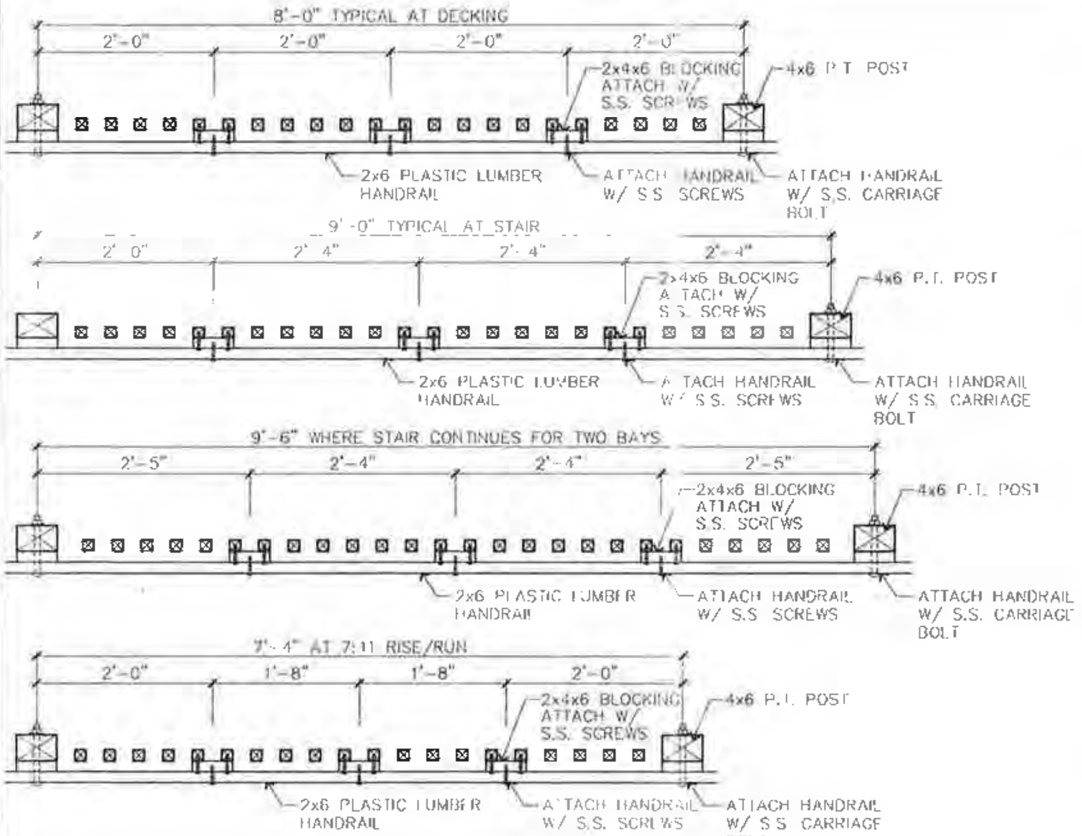
SHEET 4 OF 7

Exhibit D



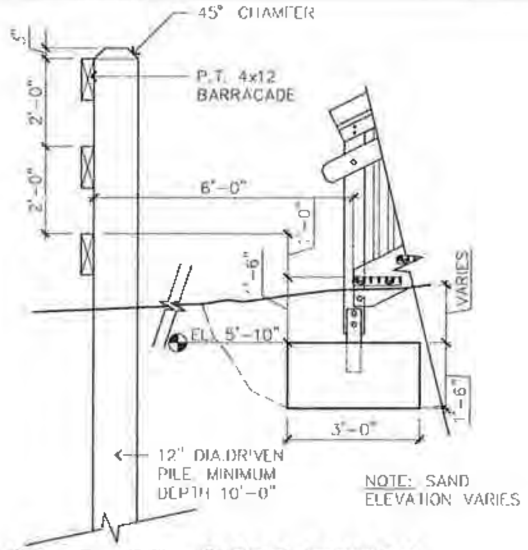
3 A4.1 BRACING CONNECTION

1" = 1'-0" 0 6" 12" 24" 36" X753-018



2 A4.1 HANDRAIL CONNECTION

1" = 1'-0" 0 6" 12" 24" 36" X753-001



NOTE: SAND ELEVATION VARIES

1 A4.1 BARRACADE DETAIL

1" = 1'-0" 0 6" 12" 24" 36" X753-016

REGISTERED ARCHITECT
GEORGE T. ROBISON
PORTLAND, OREGON
2520
STATE OF OREGON

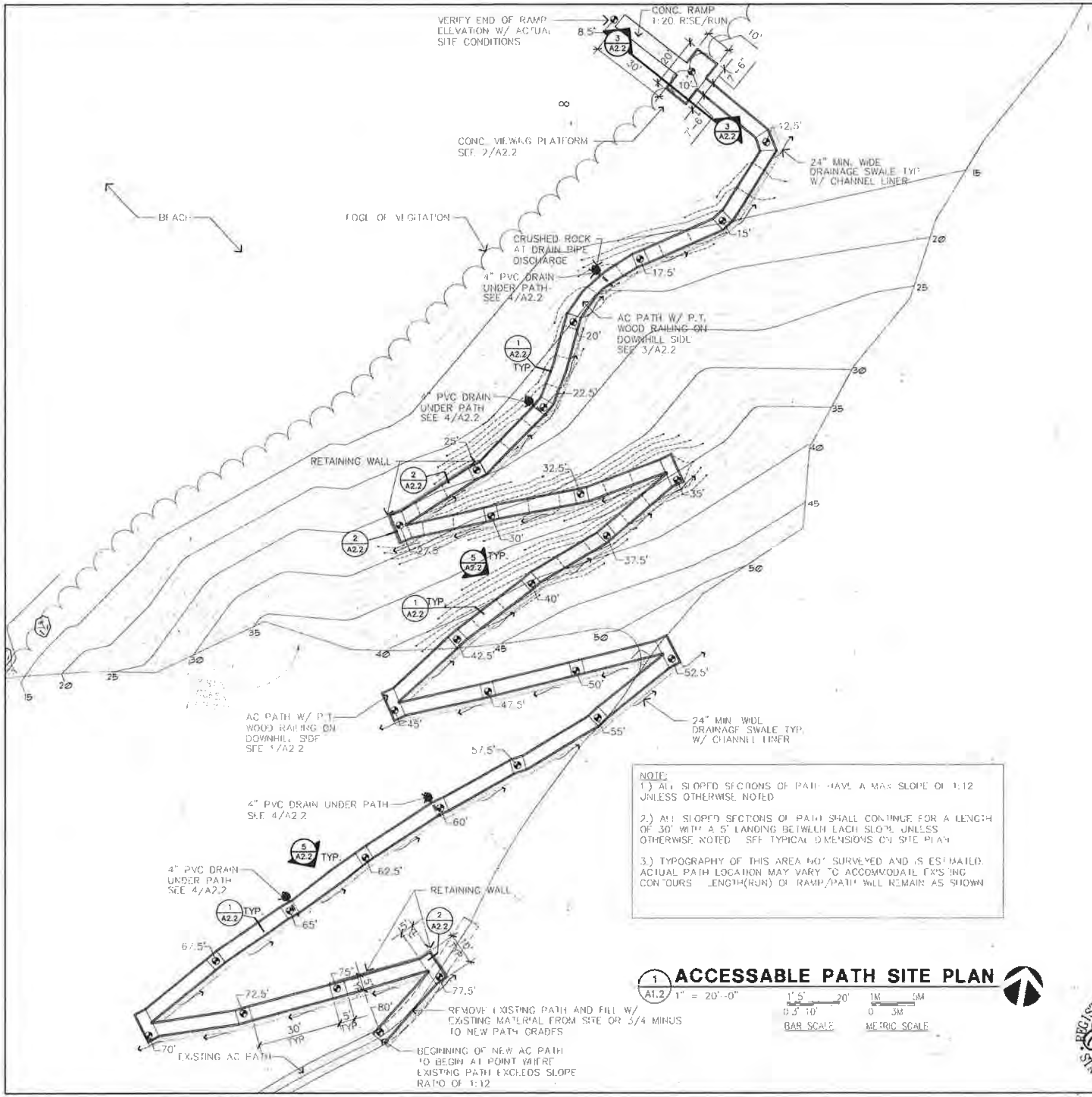
RAR
ARCHITECTS
INCORPORATED
34 N.W. FIRST AVENUE
Portland, Oregon 97209
(503) 225-9095

REV.	DATE	DESCRIPTION	BY

OREGON ISLANDS NATIONAL WILDLIFE REFUGE
COQUILLE POINT STAIR
STAIR DETAILS
A4.1

DESIGNED JNC
DRAWN SMR
CHECKED SAR
DATE 01/28/98
DRAWING NO 1R-OR-178-3-4.0

SHEET 5 OF 7



NOTE:
1.) ALL SLOPED SECTIONS OF PATH HAVE A MAX SLOPE OF 1:12 UNLESS OTHERWISE NOTED

2.) ALL SLOPED SECTIONS OF PATH SHALL CONTINUE FOR A LENGTH OF 30' WITH A 5' LANDING BETWEEN EACH SLOPE UNLESS OTHERWISE NOTED. SEE TYPICAL DIMENSIONS ON SITE PLAN

3.) TYPOGRAPHY OF THIS AREA NOT SURVEYED AND IS ESTIMATED. ACTUAL PATH LOCATION MAY VARY TO ACCOMMODATE EXISTING CONTOURS. LENGTH(RUN) OF RAMP/PATH WILL REMAIN AS SHOWN

1 A1.2 ACCESSABLE PATH SITE PLAN

1" = 20'-0"

BAR SCALE 0 5' 10' 20'

METRIC SCALE 0 1M 3M 5M

REGISTERED ARCHITECT GEORGE T. ROBISON PORTLAND, OREGON 2520 STATE OF OREGON

George T Robison

RAR ARCHITECTS INCORPORATED
34 N.W. FIRST AVENUE
Portland, Oregon 97209
(503) 226-9095

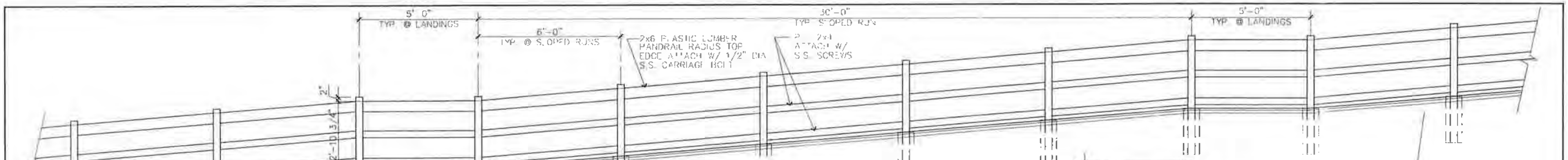
REV	DATE	DESCRIPTION	BY

OREGON ISLANDS NATIONAL WILDLIFE REFUGE
COQUILLE POINT STAIR
ACCESSABLE PATH SITE PLAN
A1.2

DESIGNED	DRAWN	CHECKED	DATE	DRAWING NO.
JNC	SMR	SAR	01/28/98	1R-0R-178-3-5.0

SHEET 6 OF 7

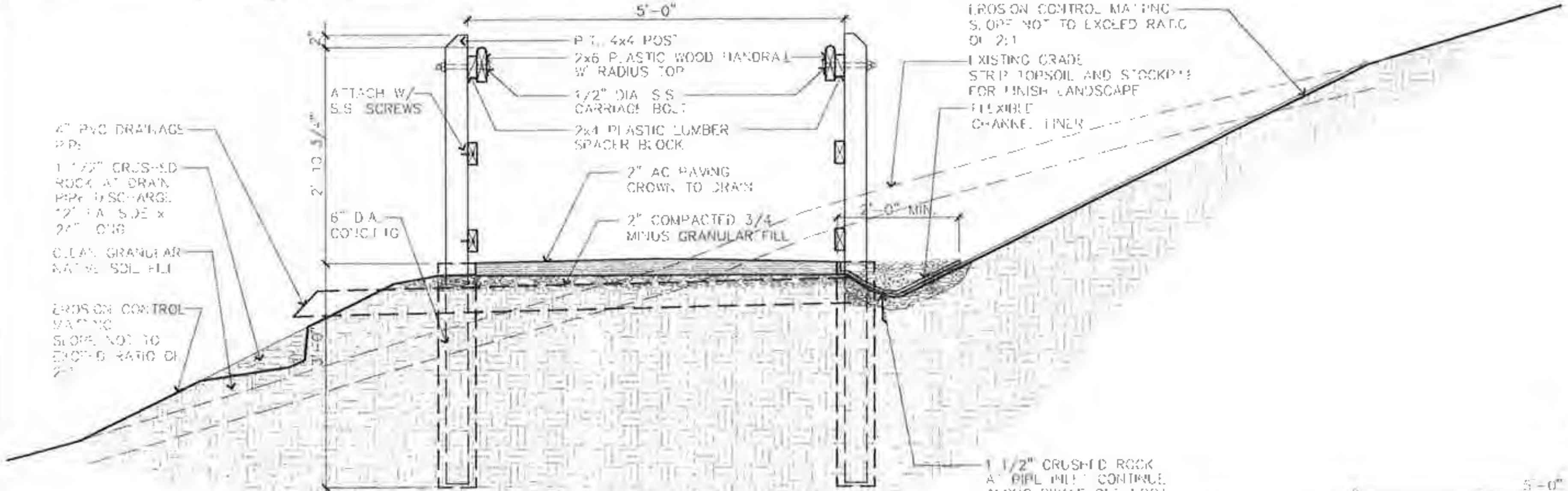
Exhibit D



5 A2.2 **TYPICAL PATH ELEVATION**

1/2" = 1'-0"

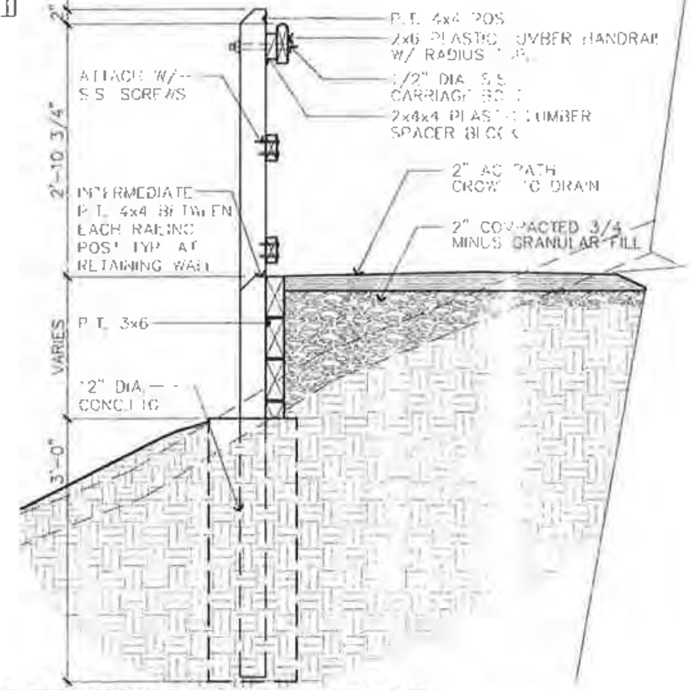
X753-008



4 A2.2 **CROSS SECTION AT DRAIN**

1" = 1'-0"

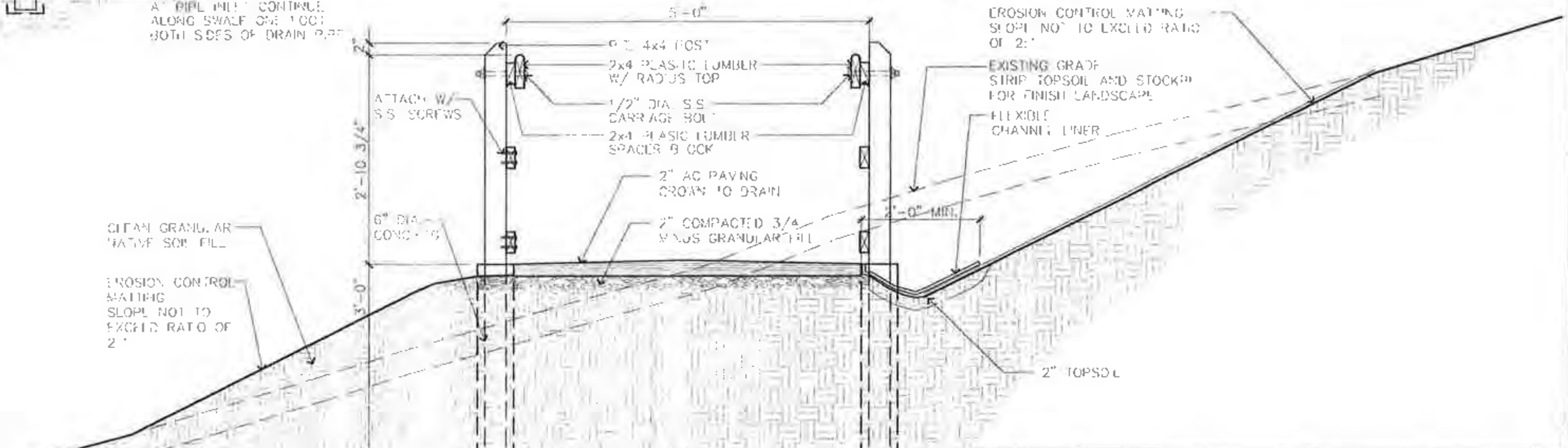
X753-007



2 A2.2 **RETAINING WALL DETAIL**

1" = 1'-0"

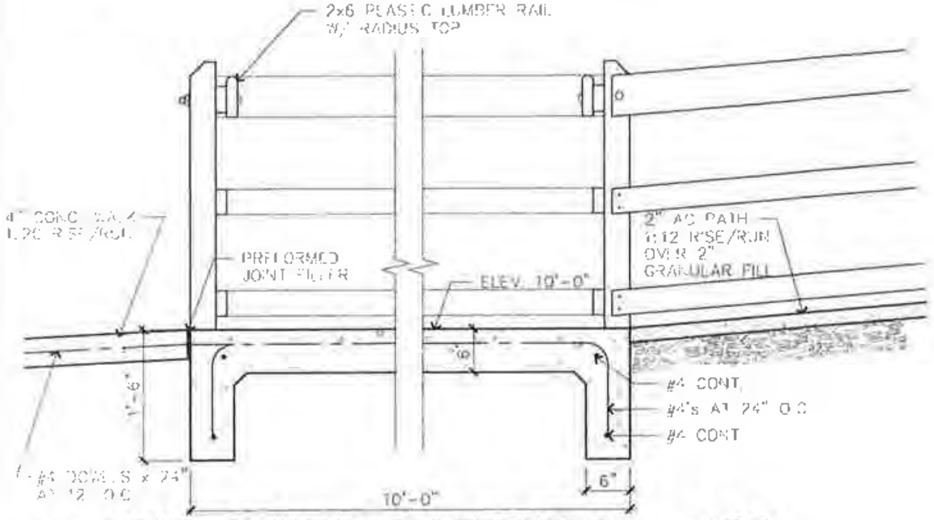
X753-003



1 A2.2 **TYP. PATH CROSS SECTION**

1" = 1'-0"

X753-006



3 A2.2 **CONC. VIEWING PLATFORM AT BEACH**

1" = 1'-0"

X753-010

REGISTERED ARCHITECT
GEORGE T. ROBISON
PORTLAND, OREGON
STATE OF OREGON

RAR
ARCHITECTS INCORPORATED
34 N.W. FIRST AVENUE
Portland, Oregon 97209
(503) 225-9095

REV	DATE	DESCRIPTION	BY

OREGON ISLANDS NATIONAL WILDLIFE REFUGE
COQUILLE POINT STAIR
ACCESSABLE PATH ELEVATION AND SECTIONS A2.2

DESIGNED JNC | DRAWN SMR | CHECKED SAR | DATE 01/28/98 | DRAWING NO. 1R-OR-178-3-6.0

SHEET 7 OF 7

Exhibit D

Appendix B

Site Photographs

Exhibit D

Photo 1 - View from Base of Structure

Photo 2 – Typical Framing

Exhibit D

Photo 3 – Typical Movement at Stair Stringer to Landing Connection

Photo 4 – Movement at Stair Stringer to Landing Connection

Exhibit D

Photo 5 – Open Gap at Displaced Stair Stringer

Photo 6 – Lateral Displacement at Stair to Landing Connection

Exhibit D

Photo 7 – Bowed Rail Picket

Photo 8 – Moss/Algae Growth Ender Wood Decking

Exhibit D

Photo 9 – Typical Concrete Footing

Exhibit D

Appendix C

Cost Estimates

Exhibit D

Submitted
04-24-15

Schematic Cost Estimates
Coquille Point Stair, Bandon, OR
USFWS

No.	Item Description	Quantity	Unit Price	Item Cost
	Alternate 1 - Continued Inspection and Maintenance			
1.01	Periodic Inspection	200 EA	$ 1,000	$ 200,000
1.02	Design Engineering for Repair	20 EA	$ 5,000	$ 100,000
1.03	Construction for Repair	20 EA	$ 5,000	$ 100,000
			Subtotal	$ 400,000
			Contingency 30%	$ 120,000
			Total Estimated Construction Costs	$ 520,000
	Alternate 2 - Complete Replacement Strutcure			
2.01	Mobilization (10%)	1 LS	$ 45,020	$ 45,020
2.02	Demo Existing Structure	1,200 SF	$ 10	$ 12,000
2.03	Drilled Shaft Foundations	24 EA	$ 15,000	$ 360,000
2.04	Soil Trench	555 CY	$ 40	$ 22,200
2.05	New Elevated Structure	1,400 SF	$ 40	$ 56,000
			Subtotal	$ 495,220
			Contingency 30%	$ 148,566
			Preliminary and Construction Engineering 20%	$ 128,757
			Total Estimated Construction Costs	$ 772,543
	Alternate 3 - New on Grade Trail			
3.01	Mobilization (10%)	1 LS	$ 8,220	$ 8,220
3.02	Site Preparation	1 LS	$ 15,300	$ 15,300
3.03	New Trail	2,800 SF	$ 18	$ 50,400
3.04	Demo Existing Stair and Restore Grade	1,100 SF	$ 15	$ 16,500
			Subtotal	$ 90,420
			Contingency 30%	$ 27,126
			Preliminary and Construction Engineering 20%	$ 23,509
			Total Estimated Construction Costs	$ 141,055
	Alternate 4 - Rehabilitation of the Existing Structure			
4.01	Mobilization (10%)	1 LS	$ 26,600	$ 26,600
4.02	Drainage Improvements	1 LS	$ 25,000	$ 25,000
4.03	Post Base Anchorages	82 EA	$ 500	$ 41,000
4.04	Seat Extensions	20 EA	$ 2,000	$ 40,000
4.05	Periodic Inspection	60 EA	$ 1,000	$ 60,000
4.06	Design Engineering for Repair	10 EA	$ 5,000	$ 50,000
4.07	Construction for Repair	10 EA	$ 5,000	$ 50,000
			Subtotal	$ 292,600
			Contingency 30%	$ 87,780
			Preliminary and Construction Engineering 20%	$ 76,076
			Total Estimated Construction Costs	$ 456,456
	Alternate 5 - Partial Replacement Strutcure			
2.01	Mobilization (10%)	1 LS	$ 22,178	$ 22,178
2.02	Demo Existing Structure	658 SF	$ 10	$ 6,580
2.03	Drilled Shaft Foundations	12 EA	$ 15,000	$ 180,000
2.04	Soil Trench	240 CY	$ 40	$ 9,600
2.05	New Elevated Structure	640 SF	$ 40	$ 25,600
			Subtotal	$ 243,958
			Contingency 30%	$ 73,187
			Preliminary and Construction Engineering 20%	$ 63,429
			Total Estimated Construction Costs	$ 380,574
	Summary			
	Alternate 1			$ 520,000
	Alternate 2			$ 773,000
	Alternate 3			$ 141,000
	Alternate 4			$ 456,000
	Alternate 5			$ 381,000

Appendix D

Geotechnical Report by Hart Crowser

Exhibit D

celebrating 40 YEARS
HARTCROWSER
www.hartcrowser.com

April 23, 2015

U.S. Fish and Wildlife Service
Attention: Jeff Rose
Division of Engineering, R-1 and R-8
911 NE 11th Avenue
Portland, OR 97232-4181

Re: Report of Geotechnical Engineering Services
Coquille Point Stairway
Bandon, Oregon
15999-01 / Task 02

Dear Mr. Rose:

Introduction

Project Understanding

Hart Crowser is pleased to provide this report summarizing the findings of our preliminary subsurface investigation of slope instability issues at the Coquille Point Stairway site located at the end of 11th Street NW in Bandon, Oregon.

Hart Crowser had previously completed a limited evaluation of the site detailed in our report titled *Site Reconnaissance Field Report, Coquille Point Stairway Evaluation, Bandon, Oregon*, and dated August 2014. This current report should be considered supplemental to that prior report.

The general location of the project is shown on the Vicinity Map (Figure 1), and the relevant limits of our work area are shown on the Site Features drawing (Figure 2). Attachment A presents logs of hand-augured borings completed during this study. Attachment B present the results of laboratory testing on select soil samples.

Purpose and Scope of Work

The purpose of our current work is to provide the U.S. Fish and Wildlife Services (USFWS) and KPFF Consulting Engineers (KPFF), the project lead engineer, with preliminary design recommendations for various stabilization options for the staircase.

Our scope of work is outlined in the Agreement for Subconsultant Services (dated February 12, 2015) between Hart Crowser and KPFF. KPFF's work is being completed under their Contract No. F14PC00037 with USFWS. The KPFF job number is 113184.25. The scope generally included the following tasks:

Exhibit D

- Limited shallow subsurface boring and drive probes;
- Limited laboratory testing on select soil samples;
- Site reconnaissance to visually observe slope stability issues and the condition of the stairway;
- Engineering analysis to develop preliminary design recommendations for stabilization of the staircase; and
- This report summarizing our findings and preliminary recommendations.

Our current scope did not include mechanically advanced, deep explorations (e.g., mud rotary borings or test pits).

Use of this Report

This report is for the exclusive use of the KPFF and USFWS for specific application to the subject project and site. We completed this work in accordance with generally accepted geotechnical engineering practices for the nature and conditions of the work completed in the same or similar localities at the time the work was performed. We make no other warranty, express or implied.

Site Description

Surface Conditions

As detailed in our August, 2014 report, the project area includes the Coquille Point staircase and immediate vicinity. The stairway generally runs northeast to southwest across a slope ranging from 30 to 50 percent, with elevations ranging from 0 to 77 feet mean sea level (MSL). The stairway is constructed above and adjacent to a resistant bedrock knob or boulder along a narrow ridge. Landslide areas with hummocky topography and springs are located to the north and south of the stairs.

The landslide areas are vegetated with low-lying coastal grasses, invasive blackberries, and wetland plants. Further to the north, slopes generally consist of exposed bedrock faces consistent with erosive wave action. These bedrock faces are topped with terrace deposits. Slopes to the south of the project area generally exhibit bowl-shaped depressions, concave slope features, and hummocky topography consistent with landslides and areas of unstable slopes.

Since our 2014 site reconnaissance, additional erosion along the base of the slope appears evident. Soil loss along the toe of the slope is attributed to wave and tidal action. Some soil loss is also likely attributable to surface seepage and spring activity along the face of slopes. Loss of soils along the base\toe of the slope contributes to continued creep in the ground located on either side of the staircase. Soil cracks and secondary scarps were noted within the landslide area to the south. Numerous seeps and springs were observed adjacent to the stairway and at the base of the slope on either side of the stairway. Heavy seepage and soil sloughing was also observed in the vicinity of the large viewing platform. Some of the visible springs and secondary scarps were mapped during our February 2015 site reconnaissance, and their approximate locations are indicated on Figure 2.

Geology

A detailed geologic overview of the project site, including a review of U.S. Department of Agriculture (USDA) soil mapping, is detailed in our August 2015 report. In general, the geology of the site is mapped by Wiley and others (2014) as part of the Jurassic/Cretaceous, Mélange of Sixes River Terrain, overlain by Pleistocene, Whiskey Run terrace sediments. The southwestern end of the staircase terminates in beach sand. Landslides have been mapped directly adjacent to the staircase (AGS 1997) and along the coastline, in the same geologic unit, to the south of the project site (Wiley and others 2014).

The near ground surface soils have been mapped by USDA as consisting predominantly of “Bullards” sandy loam, with 30 to 50 percent slopes.

Subsurface Conditions

General

Our understanding of the subsurface conditions is based on our research and information collected from our field explorations, conducted February 18 and 19, 2015. We completed 10 hand-augured borings, to maximum depths of approximately 9.5 feet below ground surface (bgs). In addition, drive probes were advanced next to hand auger borings HA-1, HA-2, HA-3, HA-4, HA-6, HA-8, and HA-10. Due to the presence of shallow groundwater and loose sands, we used hand-driven casing in several borings to try to prevent and reduce caving.

The locations of the explorations are shown on Figure 2, and the exploration logs are included in Attachment A. Attachment B summarizes the results of laboratory testing on select soil samples.

A summary of subsurface conditions observed within our hand augured explorations is provided below.

- **Topsoil** was encountered in all borings with the exception of HA-04, HA-06, and HA-09 and generally consisted of 6 inches of low plasticity sand with silt and numerous grass rootlets.
- **Mixed Aeolian and Terrace Deposits** were encountered below the topsoil in borings HA-01 through HA-03, HA-05, and HA-10. These deposits ranged in thickness from 2.0 feet to 5.5 feet and generally consisted of moist, brown silty sand or sand with silt and trace gravel.
- **Terrace Deposits** were encountered below the mixed Aeolian and Terrace Deposits and generally consisted of sand with silt to gravelly sand with trace silt. Borings HA-01, HA-03, and HA-10 terminated in this unit. Water seepage, sloughing and caving was also problematic in this unit.
- **Landslide Deposits** were encountered in borings HA-04, HA-06, and HA-07, which were advanced within the previously mapped landslide areas. These deposits generally consist of soft to very soft, moist to wet, sand with trace silt and occasional rootlets and fine organic debris. Very soft organic soil was encountered in the landslide deposits in HA-06.

- **Residual Soil (Clay)** was encountered in borings HA-02 and HA-05 through HA-07. These deposits generally consist of gray sandy clay of medium plasticity with scattered organic debris. In explorations where the residual soil underlies the landslide deposits, the upper portion of this clay likely forms the failure plane for the observed landslide activity. This unit may also facilitate soil creep in other areas outside of previously identified landslide zones.

- **Residual Soil/Bedrock (Sandy Gravel/Sandstone)** was encountered in borings HA-02 and HA-05 and interpreted from drive probe action in borings HA-01, HA-03, HA-04, HA-06, and HA-10. This unit generally consisted of medium dense to dense, sandy gravel with trace clay and is interpreted to be weathered sandstone of the Mélange of Sixes River Terrain.

- **Beach Sand and Cobbles** were encountered in borings HA-08 and HA-09. Both of these explorations were terminated in this unit.

Groundwater

Groundwater was encountered in some of the borings, as noted on the logs, and was observed in the form of numerous seeps and springs in the hillside. These features appeared most prominently at the slope breaks and at the base of the slope. The slope break represents the contact between the marine terrace deposits and the Mélange of Sixes River deposits. Wet soil or groundwater was also noted in a number of our hand auger explorations, as perched water atop the clayey residual soils. Wet sandy soils and soils below groundwater were subject to severe caving and sloughing.

Conclusions

Based on our research, investigation, and observations, it is our opinion the stairway and surrounding area are being affected by creep of the adjacent slopes, which is accelerated where active landslide deposits are present. Slope movement is exacerbated by wave action along the toe of the slope and associated loss of soil. Extended periods of rainfall are also a likely source of slope movement.

As with our earlier site evaluation, we did not observe evidence of imminent large-scale slope instability that would cause sudden failure of the stairway. However, we do anticipate that the slopes and staircase will be subject to slow, long-term creep and shifting. The portions of the staircase that extend off of the ridgeline and into the landslide zones will have the greatest potential for creep. Current shifting of the staircase has been limited in magnitude over the past ±15 years, and we do not expect rapid changes to that condition.

We understand that the project team is tasked with evaluating four alternative courses of action regarding the staircase, including:

1. Develop an inspection and maintenance plan;
2. Construct a replacement staircase in or near its current alignment;

Exhibit D

3. Construct an at-grade trail to replace the staircase; and

4. Rehabilitate and strengthen the existing staircase.

Our preliminary recommendations associated with each of these alternatives is outlined below:

Alternate 1 – Inspection and Maintenance

Because movement of the slopes and staircase appears to be occurring slowly; the current distress to the staircase appears to be limited; and the risk of sudden catastrophic failure of the stair appears to be low, we consider it an appropriate option to institute a formalized program of monitoring of the staircase so that future movements can be measured. With a monitoring program in place, staircase movement can be better delineated and quantified, then the data can be evaluated and a targeted program of maintenance, strengthening, and/or rehabilitation can be developed.

From a geotechnical perspective, we recommend that the following measures be incorporated into an inspection/monitoring plan.

- Install "tell-tale" crack monitoring strips, surveyor marking nails, and/or scribed marks on sides of key structural joints, connections, posts, etc. The installation of such features will allow quantification of the rate and magnitude of movement of various parts of the staircase. These monitoring devices could be installed at locations selected by KPFF and Hart Crowser, but subsequently monitored by USFWS personnel.

- Install survey hubs or stakes on slopes adjacent to the staircase to measure the rate and magnitude of slope movement. Again, these devices could be installed at locations selected by KPFF and Hart Crowser, but subsequently monitored by USFWS personnel.

- Measurement of these monitoring devices should be taken approximately once every month during the wet season (November to April) and once every other month during the dry season (May to October).

- Additional readings of these monitoring devices should be taken during intense or prolonged, heavy rainfall events. The Oregon Department of Geology and Mineral Industries (DOGAMI) defines "intense" rainfall as 4 percent of the average annual rainfall in a 12-hour period. The average annual rainfall for the Bandon area is approximately 56 inches, indicating that an intense rainfall corresponds to approximately 2.25 inches of rain in 12 hours. To help cover both intense and heavy, prolonged rainfalls, we recommend that "event-based" readings occur when over 2.25 inches of rain falls in a 24-hour period.

We anticipate that in a 1- to 3-year period of monitoring, a pattern of staircase and/or slope movement will be identified. Based on magnitude and rate of movement of various features, the project team will be more readily able to identify the most cost-effective and appropriate stabilization, strengthening, or rehabilitation measures for the structure.

Alternate 2 – Replace Existing Staircase

One option being considered is complete replacement of the staircase with a new structure founded on a stable foundation system. Due to the presence of creeping soils and active landsliding along the staircase alignment, a new foundation system would need to resist lateral forces imparted by the moving soils. Therefore, the use of a foundation system that extends into the deeper, more stable weathered sandstone bedrock would be required.

KPFF and Hart Crowser discussed the use of various “deep” foundation systems, such as drilled shafts/piers, driven piles, helical anchors, and micropiles. Any of these foundation system would be anchored into the weathered sandstone below the creeping/sliding sand and clay soil layers. For slender foundation elements, such as helical augers or micropiles, the use of tie-backs would likely be required to resist lateral movements. For larger diameter foundation elements, such as driven piles or drilled shafts, the lateral resistance would be developed by the stiffness of the foundation element and its embedment into the sandstone.

Based on various site conditions, such as caving sands, dense bedrock materials, steep slopes, environmentally sensitive areas, etc., we concluded that all of these systems had limitations. However, we chose drilled shafts as the system to recommend for this preliminary evaluation. The key constraint/difficulty with drilled shafts is the presence of caving sands that will necessitate the use of casing during installation. Other systems can be considered, if desired.

Preliminary Design Parameters

Typically, lateral soil pressures due to landslide movement around the shafts are determined based on desired factory of safety of the slope following shaft installation (if trying to stabilize the slide), depth of the slide plane below the ground surface, depth of embedment of the shaft, shaft diameter, horizontal distance between shafts, horizontal distance from the toe of the slope and centroid of the shaft, and soil material properties. The magnitude of lateral force acting on piers due to landslide forces is typically large and often requires large diameter shafts to resist slope movements. There are numerous methodologies for determining lateral landslide pressures acting on shafts, and for this preliminary analysis, we have chosen the use of full passive pressures acting on the shafts within the creep/landslide zone.

The lateral landslide pressure acting on shafts is modeled within software such as L-Pile, so that the required structural design and embedment of the shaft can be determined. The landslide pressure acting on the shafts should be represented as a triangular load distribution—starting at zero at the ground surface. This is an approximation of the actual loading condition but can be used to develop a realistic calculation of distributed shear, moment, and displacement in the drilled shaft.

For the current staircase alignment, we recommend that two different soil profiles be considered for modelling of average conditions at the site, one for the generally more stable ridgeline above the overlook and the other for the "near-landslide" areas at the overlook and below. These groupings conservatively pair a section of trail below the overlook, which abuts the stable boulder, with the less stable overlook and the lowest portion of the trail, which are both in landslide areas, but for this preliminary analysis this appears to be an appropriate delineation.

- Along Ridgeline (above overlook):
  - 0 to 5 feet – loose sand
  - 5 to 6 feet – clay (residual soil)
  - Greater than 6 feet – sand/sandstone (residual soil/weathered bedrock)

- Overlook and Below:
  - 0 to 6 feet – loose sand
  - 6 to 9 feet – clay (residual soil)
  - Greater than 9 feet – sand/sandstone (residual soil/weathered bedrock)

The creep/landsliding force on the pile should be modeled as a passive equivalent fluid weight equal to 700 pounds per cubic foot (pcf) acting over 3 projected pile diameters. This creep force should be applied within the loose sand and clay zones (e.g., to a depth of 6 feet along the ridgeline and 9 feet at the overlook and below).

Lateral resistance to the creep/landsliding force will be derived from the dense sand (residual sandstone) below the clay. Table 1 provides L-Pile parameters for all soil types; however, we recommend that lateral resistance in the loose sand and clay be ignored for long-term creep. (Theoretically, they could be relied on for short-term lateral loads.)

Table 1: L-Pile Soil Parameters

Soil	Unit Weight (lbs/ft^3)	Friction Angle (degrees)	Soil Modulus Constant, k (lbs/in^3)	Cohesion (lbs/ft^2)	Strain Factor, E_{50}
Loose Sand (above water)	105	30	25	n/a	n/a
Loose Sand (submerged)	43	30	15	n/a	n/a
Clay (submerged)	53	n/a	n/a	350	0.02
Dense Sand (submerged)	83	42	150	n/a	n/a

Exhibit D

If the initial assessment of new drilled shafts indicates that staircase replacement is viable, than we recommend deeper soil explorations via track-mounted drill rigs be conducted to verify depths to sandstone.

As part of our evaluation of replacement or stabilization of the staircase, we discussed the potential use of buttresses near the toe of the existing slope. Due to the localized nature of some of the creep/landslide movements within the slope, we did not judge the use of buttresses to be an effective stabilization alternative.

Partial Replacement of the Structure

Another alternative might include partial removal and replacement of the existing staircase. Currently the lower half of the staircase meanders on either side of the large resistant rock outcrop/boulder near the toe of the slope. This section of staircase, in addition to the main viewing platform, extend off of the more stable ridgeline onto less stable sideslopes or landslide areas. One option would entail taking greater advantage of the stabilizing effect of the large outcrop/boulder by removing the staircase at and below the overlook and realigning the new stair case such that it no longer meanders to either side of the boulder. Instead a more straight line approach toward the large boulder could be used that includes aligning the staircase over the top of the outcrop/boulder. This could either be via a bridge over the boulder, or using the boulder as the foundation for staircase sections over the top of the boulder. Rock anchors could be used for both bearing and uplift capacity of any staircase features established over the top of the rock.

For preliminary rock anchor sizing for tension/uplift, we recommend the use of an ultimate ground/bond stress of 150 pounds per square inch (psi). For preliminary bearing estimates an allowable capacity of 5 kips in compression is possible for an anchor with a diameter of at least 6 inches installed a minimum of 5 feet into the outcrop/boulder.

Due to the potential for differential movements between the boulder and soils on the ridgeline, we recommend the inclusion of slip joints between sections of the staircase supported by the different materials.

Alternate 3 – Construct At-Grade Trail

Removal of the existing staircase and construction of an "at-grade" pathway is also being considered. The terrain on either side of the existing staircase alignment presents numerous challenges for an at-grade pathway, including scattered landslide scarps, hummocky ground from landsliding and slope creep, highly compressible organic soils along the lower portion of the slope, and large numbers of springs and seeps.

The advantages of an at-grade trail include alleviation of any danger associated with a structural staircase section collapsing. In addition, while routine maintenance associated with long-term slope creep and surface water will still be required with an at-grade trail, maintenance should be relatively low-tech relative to structural issues associated with a staircase.

Trail Considerations

We recommend the use of a gravel trail rather than asphalt-paved trail. Slope creep and water seepage will quickly result in cracking, settlement, and even uplifting of pavements. A gravel trail would be somewhat more "flexible" and more easily maintained/repaired.

The following considerations should be evaluated as part of the design and construction of an at-grade pathway.

- The ridgeline on the upper half of the current staircase alignment is relatively stable; whereas, the adjacent ground to the north and south include two landslides. To the greatest extent possible, any new trail should be aligned along the ridgeline.

- Due to the presence of loose sands, organic soils, and shallow groundwater seepage, we anticipate that paths will require a substantial gravel section to provide a relatively stable base. We recommend a minimum 18-inch section of clean, angular base rock underlain by a geotextile separation fabric be assumed for preliminary design.

- Site grading associated with an at-grade trail should be minimized to the extent possible. Any cuts and fills, particularly off the ridgeline, will be relatively unstable due to loose sands and shallow groundwater.

  - Unsupported cuts will be subject to severe running, sloughing, and caving. In order to reduce such conditions, all cuts should be protected by rockery or gabion-style walls. The height of these features should be restricted to less than approximately 4 feet. Such walls should be constructed with as much batter as possible, typically 1/2 horizontal to 1 vertical (1/2H:1V) or flatter. Taller walls will likely be unstable due to slope movements.

  - Similar to cuts into the existing slopes, fills on the slope should be minimized. It will be difficult to create a stable base for new structural fills; therefore, they should also be limited to 3 to 4 feet in thickness with maximum inclinations of 3H:1V. Additionally, imported granular material should be specified for all fill, or all fill should be encased in gabions.

- Hand railings and associated posts constructed on surface trails will likely experience long term vertical, horizontal, and angular (become out of plumb) displacement as a result of slope creep.

- Significant seepage and spring activity is present in the lower half of the slope. Extensive use of shallow riprap lined ditches or gravel subdrains will be required. Water collected in ditches or subdrains should not be allowed to discharge freely over slopes but should be routed from collection points via tight-lining with discharge points at beach level.

Exhibit D

Relocated At-Grade Trail

A steep, though seemingly uniform and stable slope, is present approximately 150 to 200 feet northwest of the staircase (beyond the northern landslide). This area might be considered as an alternative trail location. The ground is relatively steep; however, the outcrop grades downward toward the south and parallel to the beach. A combined pathway and staircase that hugs the southern edge of this outcrop might be a viable alternative to the current location. The majority of a staircase trail placed in this area would be outside of the mapped landslide features and would not experience the various issues associated with the current staircase location. If chosen, this area will need to be further evaluated in order to develop appropriate design recommendations and construction guidelines.

Alternate 4 –Rehabilitate and Strengthen the Existing Staircase

Rehabilitation/strengthening measures can be implemented as part of a proactive stabilization program or a part of targeted measures planned based on the results of an inspection and maintenance program (Alternate 1). We anticipate that such measures may include the following tasks.

- Installing slip joints that will allow sections of the staircase to move independently from one another. The slip joints can be designed to reduce trip hazards within the staircase.

- Installing lateral bracing to reduce differential movements between unstable areas and to stiffen the staircase for structural redundancy.

- Replacing localized underpinning/foundation in areas where ground/foundation movement is evident. Underpinned/replaced foundations would be preliminarily evaluated in conformance with the parameters provided in Alternate 2.

- Installing subsurface drainage improvements that intercept and collect the perched water atop the clayey residual soil layer. This will help to reduce, though not eliminate, creep and landslide movements. However, to be effective the drainage system would need to be extensive.

- Installing a matrix of horizontal drains into the face of the slope could help stabilize the drainage system. Horizontal drains are often used to lower water table elevations and reduce pore pressures, which increases shear strength of the soil and improves slope stability. A drainage system in this case could entail installations of 50 to 150 feet in length and may require anywhere from 20 to 100 drains to achieve the desired effect on slope stability.

Exhibit D

Closing

We appreciate the opportunity to assist you with this project, should you have any questions regarding the information contained in this report, please feel free to contact us.

Sincerely,

HART CROWSER, INC.

REGISTERED PROFESSIONAL ENGINEER
69386
OREGON
MARCH 12, 2002
DANIEL J. TRISLER
RENEWAL DATE: 6/30/16

DANIEL J. TRISLER, PE
Senior Associate, Geotechnical Engineer

GARRY HORVITZ, PE
Senior Principal, Geotechnical Engineer

Attachments:
Figure 1 – Vicinity Map
Figure 2 – Site Features
Attachment A – Field Explorations
Attachment B – Laboratory Test Results

References

Adams, W.C., R.W. Prellwitz, and T.E. Koler 2007. *Low-Technology Approach to Evaluating Slope Stability in Forested Uplands*, in First North American Landslide Conference, Vail, CO, pp. 569 – 577.

Alder Geotechnical Services (AGS) 1997. *Geotechnical Investigation for Proposed North and South Beach Accesses Oregon Islands National Wildlife Refuge Bandon, Oregon,* October 28, 1997.

Hart Crowser 2014. *Site Reconnaissance Field Report, Coquille Point Stairway Evaluation, Bandon, Oregon,* August 7, 2014.

KPFF 2014. *Coquille Point South Stairway Structural Evaluation,* August 6, 2014.

United States Department of Agriculture (USDA) 2014. Web Soil Survey Viewer: *Custom Soil Resource Report for Coos County, Oregon: Coquille Point Stairs*: http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

Wiley, T.J., J.D. McClaughry, L. Ma, K.A. Mickelson, C.A. Niewendorp, L.L. Stimely, H.H. Herinckx, and J. Rivas 2014. *Geologic Map of the Southern Oregon Coast between Port Orford and Bandon, Curry and Coos Counties, Oregon*: Oregon Department of Geology and Mineral Industries, Open-File Report O-14-01.

Williamson, D.A. 1994. *Geotechnical Exploration – Drive Probe Method*, in D.E. Hall, M.T. Long, and M.D. Rembolt, ed., Slope Stability Guide for National Forests in the United States, U.S. Department of Agriculture Forest Service Washington Office Engineering Staff Publication EM 7170-13, pp. 317-321.

F:\Notebooks\1599901_Coquille Pt Stairway Evaluation\Deliverables\Report-FINAL 04-23-15\Coquille Point Stairway-Geoletter.docx

Exhibit D

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Coquille Point Stairway
Bandon, Oregon

Vicinity Map

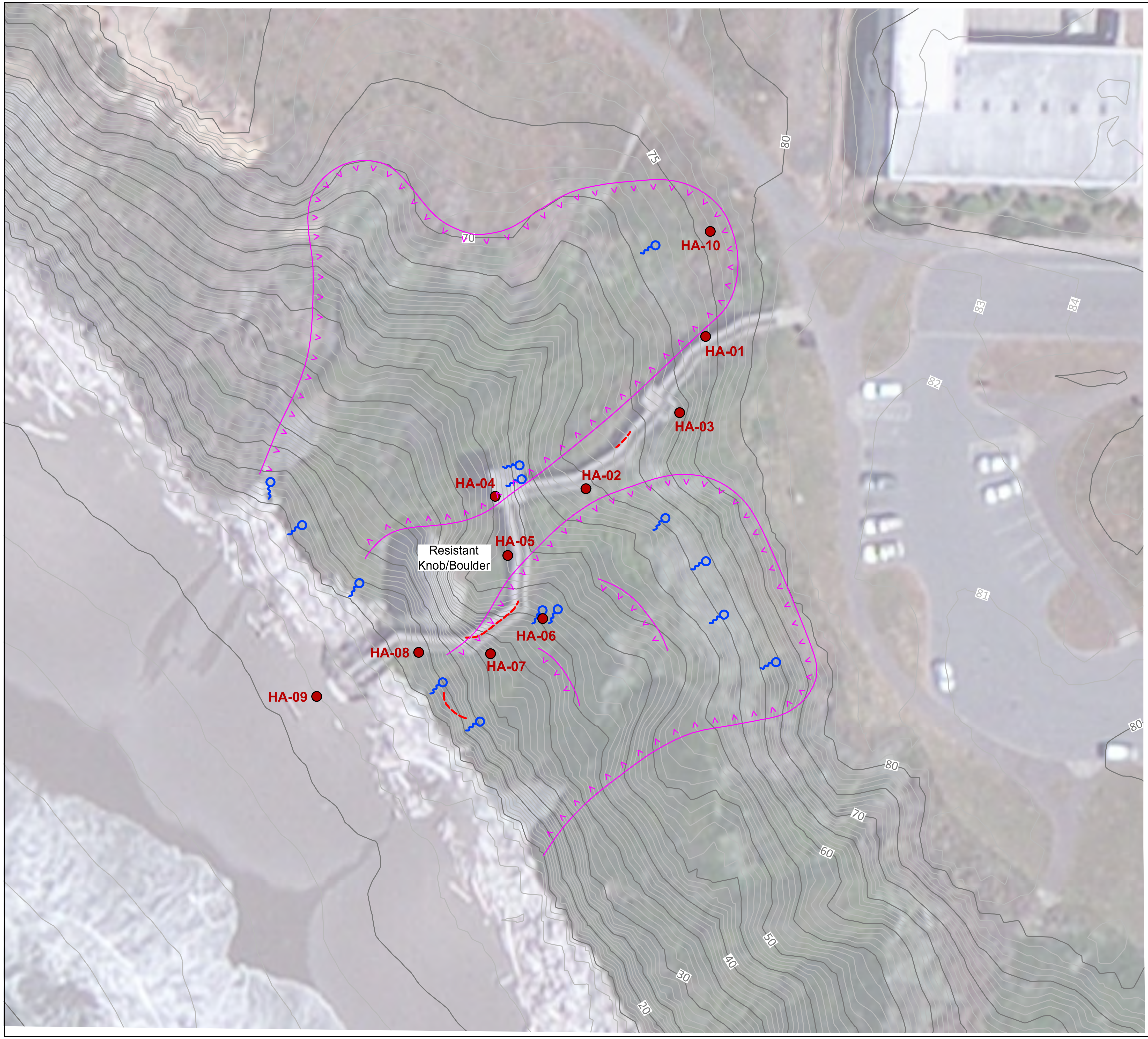
15999-01 4/15

HARTCROWSER

Figure
1

Document Path: F:\Notebooks\1599901_Coquille Pt Stairway Evaluation\GIS\15999-01_Vmap.mxd Date: 3/10/2015 User Name: melissaschweitzer

Exhibit D



0 40 80
Scale in Feet

LEGEND

HA-01 ● Hand Auger Boring
Seep and/or Spring
Soil Crack and Disturbed/Exposed Soil
Extents of North and South Landslide Areas

Note: Locations of all features shown are approximate.

Sources: Base map prepared from figure entitled, "Coquille Point Stair - Stair Plans," by RAR Architects Inc., dated 01/28/98 and drawing entitled, "Site Plan South," by Alder Geotechnical Services, dated October, 1997.

Coquille Point Stairway
Bandon, Oregon

Site Features

15999-01 4/15

HARTCROWSER

Figure
2

File: F:\Notebooks\1599901_Coquille Pt Stairway Evaluation\CAD\15999-01_SP2.dwg Layout:11x17 - H Date: 03-11-2015 Author: melissaschweitzer

Exhibit D

ATTACHMENT A
Field Explorations

ATTACHMENT A

Field Explorations

This attachment documents the processes Hart Crowser used to determine the nature (and quality) of the soil and groundwater underlying the project site addressed by this report. The discussion includes information on the following subjects:

- Explorations and their Locations,
- Hand Auger Borings, and
- Drive Probe (DP) Soundings.

Explorations and their Locations

Subsurface explorations for this project include 10 hand auger borings and 7 drive probe soundings. Materials encountered in the explorations were classified in the field in general accordance with ASTM International (ASTM) Standard Practice D 2488 “Standard Practice for the Classification of Soils (Visual-Manual Procedure).”

The exploration logs in this attachment show our interpretation of the drilling, sampling, and testing data. The logs indicate the depth where the soils change. Note that the change may be gradual. In the field, we classified the samples taken from the explorations according to the methods presented on the Key to Exploration Logs. This key also provides a legend explaining the symbols and abbreviations used in the logs.

Figure 2 shows the location of explorations, located using a pace count and steel tape measuring from existing physical features. The method used determines the accuracy of the location and elevation of the explorations.

Hand Auger Borings

Disturbed (“grab”) samples were collected from drill spoils during hand auger explorations. Sampling intervals are shown in the exploration logs included in this attachment. Soil samples were field classified, and placed into watertight bags. They were then taken to an outside laboratory for further testing.

Drive Probe (DP) Soundings

DP soundings, which provide information about soil density, were performed in general accordance with the guidelines of Williamson (1994). The DP employs driving a 0.5-inch outer diameter pipe with a flat end drive plug using a 12-pound slide hammer. The “blows” required to advance 6 inches are recorded and can later be correlated to a Standard Penetration Test (SPT) blow count (N value) using correlations by Adams, Prellwitz, and Koler (2007).

Exhibit D

KEY TO EXPLORATION LOGS

HARTCROWSER

SOIL CLASSIFICATION CHART

MATERIAL TYPES	MAJOR DIVISIONS		GROUP SYMBOL	SOIL GROUP NAMES & LEGEND	
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	GW	WELL-GRADED GRAVEL	●
			GP	POORLY-GRADED GRAVEL	○
		GRAVELS WITH FINES, >12% FINES	GM	SILTY GRAVEL	○
			GC	CLAYEY GRAVEL	▨
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	SW	WELL-GRADED SAND	⁘
			SP	POORLY-GRADED SAND	⋯
		SANDS AND FINES >12% FINES	SM	SILTY SAND	▥
			SC	CLAYEY SAND	▨
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	CL	LEAN CLAY	▨
			ML	SILT	▥
		ORGANIC	OL	ORGANIC CLAY OR SILT	☰
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	CH	FAT CLAY	▨
			MH	ELASTIC SILT	▥
		ORGANIC	OH	ORGANIC CLAY OR SILT	≈
HIGHLY ORGANIC SOILS			PT	PEAT	⩛

Note: Multiple symbols are used to indicate borderline or dual classifications

OTHER MATERIAL SYMBOLS	
△	Concrete
■	Asphalt
⩛	Topsoil

MOISTURE MODIFIERS

Dry - Absence of moisture, dusty, dry to the touch
Moist - Damp, but no visible water
Wet - Visible free water or saturated, usually soil is obtained from below the water table

SEEPAGE MODIFIERS

None -
Slow - < 1 gpm
Moderate - 1-3 gpm
Heavy - > 3 gpm

CAVING MODIFIERS

None -
Minor - isolated
Moderate - frequent
Severe - general

MINOR CONSTITUENTS

Trace - < 5% (silt/clay)
Occasional - < 15% (sand/gravel)
With - 5-15% (silt/clay) in sand or gravel
15-30% (sand/gravel) in silt or clay

SAMPLE TYPES

⧗	Dames & Moore
☒	Standard Penetration Test (SPT)
■	Shelby Tube
▩	Bulk or Grab

LABORATORY/ FIELD TESTS

ATT - Atterberg Limits
CP - Laboratory Compaction Test
CA - Chemical Analysis (Corrosivity)
CN - Consolidation
DD - Dry Density
DS - Direct Shear
HA - Hydrometer Analysis
OC - Organic Content
PP - Pocket Penetrometer (TSF)
P200 - Percent Passing No. 200 Sieve
SA - Sieve Analysis
SW - Swell Test
TV - Torvane Shear
UC - Unconfined Compression

GROUNDWATER SYMBOLS

▽	Water Level (at time of drilling)
▼	Water Level (at end of drilling)
▽	Water Level (after drilling)

STRATIGRAPHIC CONTACT

———	Distinct contact between soil strata or geologic units
— — —	Gradual or approximate change between soil strata or geologic units

Notes:

Blowcount (N) is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted) per ASTM D-1586. See exploration log for hammer weight and drop.

When the Dames & Moore (D&M) sampler was driven with a 140-pound hammer (denoted on logs as D+M 140), the field blow counts (N-value) shown on the logs have been reduced by 50% to approximate SPT N-values.

Refer to the report text and exploration logs for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the exploration locations at the time the explorations were made. The logs are not warranted to be representative of the subsurface conditoins at other locations or times.

KEY TO EXPLORATION LOGS - F:\DATA\GINT\OREGON_LIBRARY.GLB - 3/3/15 13:16 - F:\NOTEBOOKS\1599901_COQUILLE PT STAIRWAY EVALUATION\FIELD DATA\PERM_GINT\1599901-HA1-10.GPJ

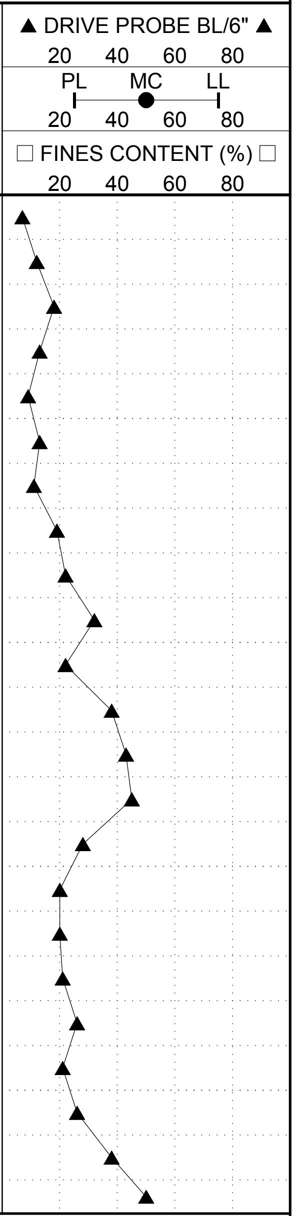
BORING HA-01

PAGE 1 OF 1

HARTCROWSER

CLIENT KPFF / USFWS
PROJECT NAME Coquille Point Stairway
PROJECT NUMBER 15999-01
PROJECT LOCATION Bandon, Oregon
DATE STARTED 2/18/2015 **COMPLETED** 2/18/2015
GROUND ELEVATION **SIZE**
DRILLING CONTRACTOR Hart Crowser Staff
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY R. Pirot **CHECKED BY** D. Trisler
AT END OF DRILLING ---
NOTE:
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		(SM) Moist, brown, SAND with silt, low plasticity fines, numerous grass rootlets (4-inch-thick) (Topsoil)			7		
		(SM) (Medium dense), moist, brown, SAND with silt to silty SAND, fine subangular sand, low plasticity fines (mixed Aeolian and Terrace Deposits)			12		
					18		
					13		
					9		
2.5			GRAB S-1		13		
					11		
					19		
					22		
		(SP) (Medium dense), light brown, SAND with silt, medium to coarse subangular sand, nonplastic fines (Terrace Deposits)			32		
5.0					22		
			GRAB S-2		38		
					43		
					45		
		(SP) (Medium dense), light brown, gravelly SAND, trace silt, medium to coarse subangular sand, fine subrounded gravel, nonplastic fines (Terrace Deposits)			28		
7.5			GRAB S-3		20		
					20		
					21		
					26		
		Boring terminated at 9.5' due to caving Interpretation of subsurface conditions from this point and below are based off of Drive Probe results			21		
10.0					26		
		(Residual Soil/Bedrock)			38		
					50/5"		



Drive Probe completed at 11.375' due to refusal

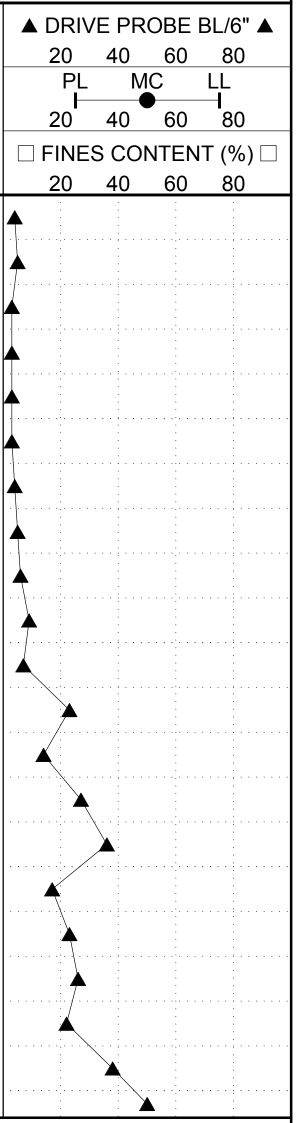
HARTCROWSER

BORING HA-02

PAGE 1 OF 1

CLIENT KPFF / USFWS
PROJECT NAME Coquille Point Stairway
PROJECT NUMBER 15999-01
PROJECT LOCATION Bandon, Oregon
DATE STARTED 2/18/2015 **COMPLETED** 2/18/2015
GROUND ELEVATION **SIZE**
DRILLING CONTRACTOR Hart Crowser Staff
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY R. Pirot **CHECKED BY** D. Trisler
AT END OF DRILLING ---
NOTE:
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0	(SM) Moist, brown, SAND with silt, low plasticity fines, numerous grass rootlets (4-inch-thick) (Topsoil)			4		
	(SM) (Medium dense), moist to wet, brown, silty SAND, trace gravel, fine subangular sand, low plasticity fines, scattered roots and organic debris (mixed Aeolian and Terrace Deposits)			5		
				3		
		GRAB S-1		3		
				3		
2.5	(SP) (Medium dense), wet, yellow-brown, SAND, trace silt, fine subangular sand, nonplastic fines (Terrace Deposits)			3		
				4		
		GRAB S-2		5		
				6		
				9		
5.0	(CL/CH) (Stiff), gray, moist, sandy CLAY, trace gravel, fine to medium subangular to angular sand, fine to medium subangular to angular gravel (Residual Soil)	GRAB S-3		7		
	(GP-SP) (Medium dense to dense), damp, gray, sandy GRAVEL, trace clay, fine to coarse subangular to angular sand, fine to coarse subangular to angular gravel, sandstone fragments (Residual Soil/Bedrock)	GRAB S-4		23		
				14		
	Boring terminated at 6' due to refusal			27		
	Interpretation of subsurface conditions from this point and below are based off of Drive Probe results			36		
7.5				17		
				23		
				26		
				22		
				38		
10.0				50/4"		



Drive Probe completed at 10.3' due to refusal

Exhibit D

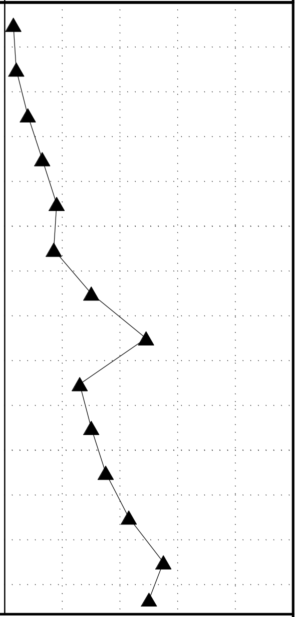
BORING HA-03

PAGE 1 OF 1

HARTCROWSER

CLIENT KPFF / USFWS
PROJECT NAME Coquille Point Stairway
PROJECT NUMBER 15999-01
PROJECT LOCATION Bandon, Oregon
DATE STARTED 2/18/2015 **COMPLETED** 2/18/2015
GROUND ELEVATION **SIZE**
DRILLING CONTRACTOR Hart Crowser Staff
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY R. Pirot **CHECKED BY** D. Trisler
▼ **AT END OF DRILLING** 4.50 ft
NOTE:
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ DRIVE PROBE BL/6" ▲ 20 40 60 80 PL MC LL 20 40 60 80 ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		(SP) (Loose), damp, brown, SAND with silt, low plasticity fines, numerous grass rootlets and organics (4-inch-thick) (Topsoil)			3			
		(SM) (Loose to medium dense), moist, brown, SAND with silt, trace gravel, fine subangular sand, fine subrounded to subangular gravel, low plasticity fines, scattered rootlets (mixed Aeolian and Terrace Deposits)			4			
			GRAB S-1		8			
					13			
					18			
2.5		(SP) (Medium dense), moist, yellow-brown, SAND, trace silt and gravel, medium subangular sand, fine to coarse subrounded gravel, nonplastic fines (Terrace Deposits)	GRAB S-2		17			
					30			
					49			
	▼	(SP) (Medium dense to dense), moist, yellow-brown, gravelly SAND, trace silt, fine subrounded to subangular gravel, medium to coarse subrounded to subangular sand, nonplastic fines (Terrace Deposits)	GRAB S-3		26			
					30			
5.0		Boring terminated at 4.6' due to refusal Interpretation of subsurface conditions from this point and below are based off of Drive Probe results			35			
					43			
		(Residual Soil)			55			
					50/4"			



Drive Probe completed at 6.8' due to refusal

GEOTECH BH PLOTS DRIVE PROBE - F:\DATA\GINT\OREGON_LIBRARY.GLB - 3/6/15 10:37 - F:\NOTEBOOKS\1599901_COQUILLE PT STAIRWAY EVALUATION\FIELD DATA\PERM_GINT\1599901-HA1-10.GPJ

Exhibit D

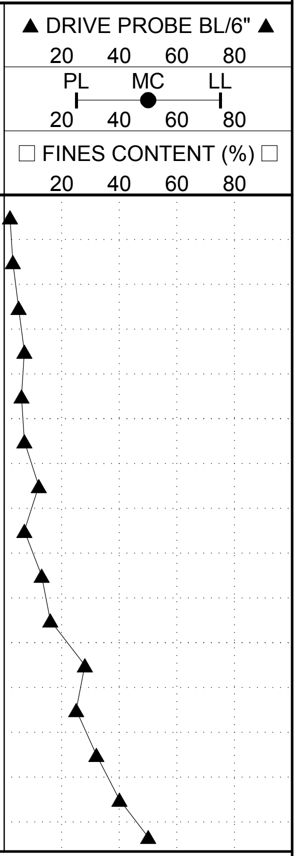
BORING HA-04

PAGE 1 OF 1

HARTCROWSER

CLIENT KPFF / USFWS
PROJECT NAME Coquille Point Stairway
PROJECT NUMBER 15999-01
PROJECT LOCATION Bandon, Oregon
DATE STARTED 2/18/2015 **COMPLETED** 2/18/2015
GROUND ELEVATION **SIZE**
DRILLING CONTRACTOR Hart Crowser Staff
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
∇ **AT TIME OF DRILLING** 3.00 ft
LOGGED BY R. Pirot **CHECKED BY** D. Trisler
AT END OF DRILLING ---
NOTE:
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		(SM) (Loose), moist, dark brown, silty SAND, fine subangular sand, low plasticity fines, scattered grass rootlets and fine organic debris (Landslide Deposits)			2		
					3		
			GRAB S-1		5		
		(SP) (Medium dense), moist to wet, dark brown, SAND, trace silt, fine to medium subangular to angular sand, nonplastic fines, occasional rootlets and fine organic debris (Landslide Deposits)			7		
			GRAB S-2		6		
2.5					7		
		∇ seepage			12		
		grades to gravelly Boring terminated at 3.6' due to refusal Interpretation of subsurface conditions from this point and below are based off of Drive Probe results (Landslide Deposits or Residual Soil)			7		
					13		
					16		
5.0					28		
					25		
		(Residual Soil/Bedrock)			32		
					40		
					50/4"		



Drive Probe completed at 7.3' due to refusal

GEOTECH BH PLOTS DRIVE PROBE - F:\DATA\GINT\OREGON_LIBRARY.GLB - 3/6/15 10:37 - F:\NOTEBOOKS\1599901_COQUILLE PT STAIRWAY EVALUATION\FIELD DATA\PERM_GINT\1599901-HA1-10.GPJ

Exhibit D

BORING HA-05

PAGE 1 OF 1

HARTCROWSER

CLIENT KPFF / USFWS

PROJECT NAME Coquille Point Stairway

PROJECT NUMBER 15999-01

PROJECT LOCATION Bandon, Oregon

DATE STARTED 2/18/2015 **COMPLETED** 2/18/2015

GROUND ELEVATION **SIZE**

DRILLING CONTRACTOR Hart Crowser Staff

GROUND WATER LEVELS:

DRILLING METHOD Hand Auger

AT TIME OF DRILLING ---

LOGGED BY R. Pirot **CHECKED BY** D. Trisler

AT END OF DRILLING ---

NOTE:

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ DRIVE PROBE BL/6" ▲ 20 40 60 80 PL MC LL 20 40 60 80 ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		(SM) (Loose), damp, brown, SAND with silt, low plasticity fines, numerous grass rootlets and organic debris (4-inch-thick) (Topsoil)						
2.5		(SP-SM) (Medium dense), moist, brown, SAND with silt, fine subangular sand; low plasticity fines (mixed Aeolian and Terrace Deposits)						
5.0		(SP) (medium dense), moist, yellow-brown, SAND, trace silt and gravel; fine to medium subangular sand; fine to coarse subrounded gravel, nonplastic fines (Terrace Deposits)						
		(CL/CH) (Medium stiff to stiff), moist, gray, sandy CLAY, fine subangular sand, medium to high plasticity, disturbed texture, scattered small twigs, plants and organic debris (Residual Soil)	GRAB S-1					
		(GP) (Medium dense to dense), moist, dark gray, sandy GRAVEL, trace clay, medium to coarse angular sand, fine to coarse subangular to angular gravel, low plasticity fines (Residual Soil/Bedrock)	GRAB S-2					

Boring terminated at 6.4' due to refusal

GEOTECH BH PLOTS DRIVE PROBE - F:\DATA\GINT\OREGON_LIBRARY.GLB - 3/6/15 10:37 - F:\NOTEBOOKS\1599901_COQUILLE PT STAIRWAY EVALUATION\FIELD DATA\PERM_GINT\1599901-HA1-10.GPJ

BORING HA-06

PAGE 1 OF 1

HARTCROWSER

CLIENT KPFF / USFWS
PROJECT NAME Coquille Point Stairway
PROJECT NUMBER 15999-01
PROJECT LOCATION Bandon, Oregon
DATE STARTED 2/19/2015 **COMPLETED** 2/19/2015
GROUND ELEVATION **SIZE**
DRILLING CONTRACTOR Hart Crowser Staff
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger with Casing
▽ **AT TIME OF DRILLING** 1.10 ft
LOGGED BY R. Pirot **CHECKED BY** D. Trisler
AT END OF DRILLING ---
NOTE:
▼ **AFTER DRILLING** 0.00 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		(OL) (Very soft), wet, dark brown, ORGANIC SOIL with sand, fine subangular sand, low to medium plasticity, mostly fine organic material and rootlets, strong organic odor (Landslide Deposits)			1		
			GRAB S-1		1		
		(SP) (Loose to medium dense), wet, brown, SAND, trace silt, fine subangular sand, nonplastic to low plasticity fines (Landslide Deposits)			1		
					2		
					2		
2.5			GRAB S-2		2		
		(CL/CH) (Medium stiff), moist to wet, gray, sandy CLAY, trace gravel, medium to coarse subangular to angular sand, fine subangular to angular gravel, medium to high plasticity, scattered decomposed organic debris (Landslide Failure Plane/Residual Soil)			1		
					2		
					4		
					9		
5.0					9		
					13		
					23		
		Boring terminated at 6.6' due to refusal			21		
		Interpretation of subsurface conditions from this point and below are based off of Drive Probe results			37		
7.5		(Residual Soil/Bedrock)			48		

Drive Probe completed at 8' due to refusal

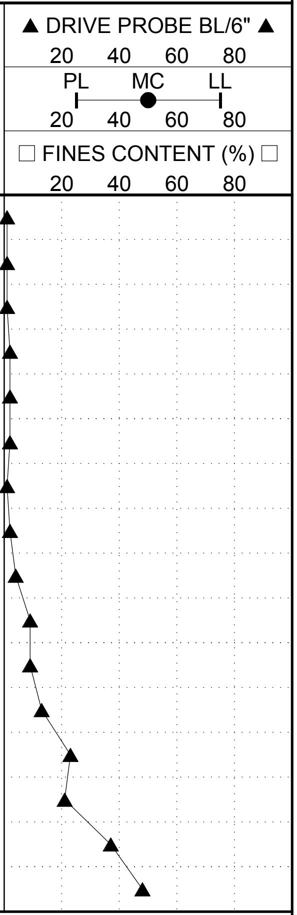


Exhibit D

BORING HA-07

PAGE 1 OF 1

HARTCROWSER

CLIENT KPFF / USFWS
PROJECT NAME Coquille Point Stairway
PROJECT NUMBER 15999-01
PROJECT LOCATION Bandon, Oregon
DATE STARTED 2/19/2015 **COMPLETED** 2/19/2015
GROUND ELEVATION **SIZE**
DRILLING CONTRACTOR Hart Crowser Staff
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
▽ **AT TIME OF DRILLING** 1.70 ft
LOGGED BY R. Pirot **CHECKED BY** D. Trisler
AT END OF DRILLING ---
NOTE:
▼ **AFTER DRILLING** 1.50 ft

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ DRIVE PROBE BL/6" ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0		(ML) (Soft), damp, dark brown, sandy SILT, fine sand, low plasticity fines, contains rootlets (Topsoil)						
		▼ ▽ (SP) (Loose), moist to wet, gray-brown, SAND, trace silt, fine to medium sand, low plasticity fines (Landslide Deposits) heavy seepage						
2.5		(SP) (Medium dense), wet, yellow-brown, SAND with silt, fine to medium subangular sand; low plasticity fines (Landslide Deposits)						
5.0								
7.5		(CL/CH) (Stiff), moist to wet, gray, sandy CLAY, trace gravel, medium to coarse subangular to angular sand, fine to coarse subangular to angular gravel, medium plasticity fines, occasional organic debris, disturbed texture (Residual Soil)	☒ GRAB S-1					

Boring terminated at 8.6' due to refusal

GEOTECH BH PLOTS DRIVE PROBE - F:\DATA\GINT\OREGON_LIBRARY.GLB - 3/6/15 10:37 - F:\NOTEBOOKS\1599901_COQUILLE PT STAIRWAY EVALUATION\FIELD DATA\PERM_GINT\1599901-HA1-10.GPJ

Exhibit D

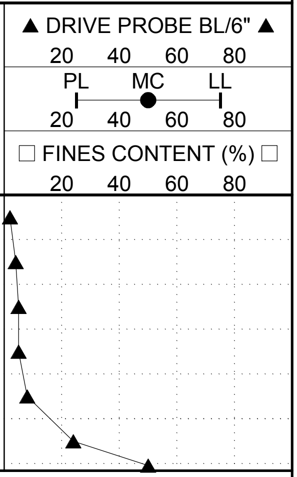
BORING HA-08

PAGE 1 OF 1

HARTCROWSER

CLIENT KPFF / USFWS
PROJECT NAME Coquille Point Stairway
PROJECT NUMBER 15999-01
PROJECT LOCATION Bandon, Oregon
DATE STARTED 2/19/2015 **COMPLETED** 2/19/2015
GROUND ELEVATION **SIZE**
DRILLING CONTRACTOR Hart Crowser Staff
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY R. Pirot **CHECKED BY** D. Trisler
AT END OF DRILLING ---
NOTE:
AFTER DRILLING ---

DEPTH (ft) 0.0	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
		(SM) (Loose), damp, brown, SAND with silt, low plasticity fines, numerous grass rootlets, contains rotted driftwood and beach trash (Topsoil)			2		
					4		
		(SM-SP) (Loose), wet, brown, SAND with silt, fine to medium subangular sand, low plasticity fines, scattered organics (Beach Sand/Colluvium)			5		
		dense cobbles			5		
2.5		Boring completed at 1.75' Interpretation of subsurface conditions from this point and below are based off of Drive Probe results			8		
					24		
		Drive Probe completed at 3.08' due to refusal			50/1"		



GEOTECH BH PLOTS DRIVE PROBE - F:\DATA\GINT\OREGON_LIBRARY.GLB - 3/6/15 10:37 - F:\NOTEBOOKS\1599901_COQUILLE PT STAIRWAY EVALUATION\FIELD DATA\PERM_GINT\1599901-HA1-10.GPJ

Exhibit D

BORING HA-09

PAGE 1 OF 1

HARTCROWSER

CLIENT KPFF / USFWS

PROJECT NAME Coquille Point Stairway

PROJECT NUMBER 15999-01

PROJECT LOCATION Bandon, Oregon

DATE STARTED 2/19/2015 **COMPLETED** 2/19/2015

GROUND ELEVATION **SIZE**

DRILLING CONTRACTOR Hart Crowser Staff

GROUND WATER LEVELS:

DRILLING METHOD Hand Auger

AT TIME OF DRILLING ---

LOGGED BY R. Pirot **CHECKED BY** D. Trisler

AT END OF DRILLING ---

NOTE:

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	▲ DRIVE PROBE BL/6" ▲ 20 40 60 80 PL MC LL 20 40 60 80 ☐ FINES CONTENT (%) ☐ 20 40 60 80
0.0								
		(SP) (Loose), wet, brown, SAND, trace silt, fine subangular sand (Beach Sand)						

dense cobbles

Boring completed at 1.75'

GEOTECH BH PLOTS DRIVE PROBE - F:\DATA\GINT\OREGON_LIBRARY.GLB - 3/6/15 10:37 - F:\NOTEBOOKS\1599901_COQUILLE PT STAIRWAY EVALUATION\FIELD DATA\PERM_GINT\1599901-HA1-10.GPJ

Exhibit D

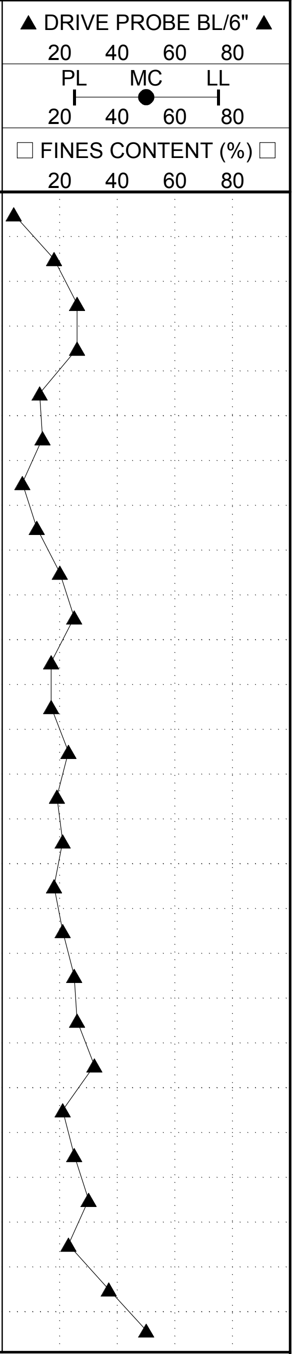
BORING HA-10

PAGE 1 OF 1

HARTCROWSER

CLIENT KPFF / USFWS
PROJECT NAME Coquille Point Stairway
PROJECT NUMBER 15999-01
PROJECT LOCATION Bandon, Oregon
DATE STARTED 2/19/2015 **COMPLETED** 2/19/2015
GROUND ELEVATION **SIZE**
DRILLING CONTRACTOR Hart Crowser Staff
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY R. Pirot **CHECKED BY** D. Trisler
AT END OF DRILLING ---
NOTE:
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	DRIVE PROBE BLOWS/6"	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)
0.0		(SM) (Loose), damp, brown, SAND with silt, numerous grass rootlets and organic debris (Topsoil)			4		
		(SP) (Medium dense), brown, SAND with silt and gravel, fine to medium subrounded to subangular sand, fine to coarse, rounded to subrounded gravel, low plasticity fines (mixed Aeolian and Terrace Deposits)			18		
					26		
					26		
2.5					13		
		(SM) (Medium dense), brown, SAND with silt and gravel, fine to medium subrounded to subangular sand, fine subrounded gravel, low plasticity fines, contains silty/clayey gravel-sized clasts (mixed Aeolian and Terrace Deposits)	GRAB S-1		14		
					7		
		grades to gravelly sand	GRAB S-2		12		
					20		
5.0					25		
					17		
					17		
		(SP-SM) (Medium dense), moist to wet, yellow-brown, SAND with silt, fine to medium subangular sand, nonplastic to low plasticity fines (Terrace Deposits)	GRAB S-3		23		
					19		
7.5		grades to gravelly sand			21		
					18		
					21		
					25		
					26		
10.0					32		
		Boring terminated at 9.9' due to caving Interpretation of subsurface conditions from this point and below are based off of Drive Probe results			21		
					25		
					30		
					23		
12.5		(Residual Soil/Bedrock)			37		
					50/5"		



Drive Probe completed at 12.9' due to refusal

GEOTECH BH PLOTS DRIVE PROBE - F:\DATA\GINT\OREGON_LIBRARY.GLB - 3/6/15 10:37 - F:\NOTEBOOKS\1599901\1599901_COQUILLE PT STAIRWAY EVALUATION\FIELD DATA\PERM_GINT\1599901-HA1-10.GPJ

Exhibit D

ATTACHMENT B
Laboratory Test Results

ATTACHMENT B

Laboratory Test Results

Select soil samples were delivered to ACS Testing for testing of various soil properties. The results of the testing are included in this attachment.

Exhibit D

ASPHALT
CONCRETE
SOILS
Testing, Inc.

7409 SW Tech Center Dr, #145
Tigard, OR 97223
phn: 503-443-3799
fax: 503-620-2748

HART CROWSER, INC
8910 SW GEMINI DR
BEAVERTON, OR 97008-7123

PROJECT:	HART CROWSER 2015 LAB SERVICES	**JOB NO:**	15-5475
LOCATION:	COQUILLE POINT STAIRWAY	**WORK ORDER NO:**	N/A
MATERIAL:	NATIVE SOILS	**LAB NO:**	8011-1
SAMPLE SOURCE:	SEE BELOW	**DATE SAMPLED:**	3/6/15

MOISTURE CONTENT OF SOIL (ASTM D2216)

LAB #	BORING	DEPTH	WET WT. (gram)	DRY WT. (gram)	MOISTURE CONTENT
8011-1	HA1	2.5'-3.0'	849.0	734.8	15.5%
8011-1	HA1	5.5'-6.0'	1109.7	1050.2	5.7%
8011-1	HA1	7.5'-8.0'	1164.9	1026.4	13.5%
8011-1	HA2	1.5'-2.0'	856.6	700.5	22.3%
8011-1	HA2	3.5'	885.4	666.9	32.8%
8011-1	HA2	4.9'-5.3'	536.1	448.0	19.7%
8011-1	HA3	1.0'-1.5'	1007.0	849.6	18.5%
8011-1	HA3	2.5'-3.0'	1067.6	981.0	8.8%
8011-1	HA3	4.0'-4.5'	748.8	692.0	8.2%
8011-1	HA4	1.0'-1.5'	194.2	133.5	45.5%
8011-1	HA4	2.3'-3.0'	513.6	396.8	29.4%
8011-1	HA4	3.0'-7.2'	249.4	214.6	16.2%
8011-1	HA5	5.2'-5.9'	525.1	425.3	23.5%
8011-1	HA6	0.5'-1.0'	693.9	502.2	38.2%
8011-1	HA6	2.5'-2.8'	378.7	298.9	26.7%
8011-1	HA6	N/A	505.4	434.8	16.2%
8011-1	HA7	7.5'-8.0'	588.0	518.5	13.4%
8011-1	HA10	1.0'-2.5'	613.2	528.8	16.0%
8011-1	HA10	3.8'-4.6'	739.1	683.2	8.2%
8011-1	HA10	6.3'-6.5'	125.4	107.5	16.7%

REVIEWED BY 5-13-15

ASPHALT CONCRETE SOILS TESTING, INC
503.443.3799

7409 SW Tech Center Dr, #145
Tigard, OR 97223
phn: 503-443-3799
fax: 503-620-2748

Exhibit D

HART CROWSER, INC
8910 SW GEMINI DR
BEAVERTON, OR 97008-7123

PROJECT: HART CROWSER 2015 LAB SERVICES
LOCATION: COQUILLE POINT STAIRWAY
SAMPLE SOURCE: SEE BELOW

JOB NO: 15-5475
WORK ORDER NO: N/A
DATE SAMPLED: 3/6/15

MECHANICAL SIEVE ANALYSIS
GROUP SYMBOL, USCS (ASTM D-2487)

				Silt or Clay	SAND								GRAVEL									COBBLES	
					Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	**USCS**	**LL**	**PI**	**#200**	**#100**	**#50**	**#40**	**#30**	**#16**	**#10**	**#8**	**#4**	**1/4"**	**3/8"**	**1/2"**	**3/4"**	**1"**	**1 1/4"**	**1 1/2"**	**2"**	**3"**	**6"**	**Lab #**

PERCENT PASSING BY WEIGHT

HA2 @ 4.9'-5.3'		30	15																				8011-1
HA5 @ 5.2'-5.9'		37	21																				8011-1
HA7 @ 7.5'-8.0'		21	8																				8011-1

BORING	DEPTH	MC%

3-13-15

ASPHALT
CONCRETE
SOILS
TESTING, INC
503.443.3799

7409 SW Tech Center Dr, #145
Tigard, OR 97223
phn: 503-443-3799
fax: 503-620-2748

Exhibit D

HART CROWSER, INC
8910 SW GEMINI DR
BEAVERTON, OR 97008-7123

PROJECT: HART CROWSER 2015 LAB SERVICES
LOCATION: COQUILL POINT STAIRWAY
SAMPLE SOURCE: SEE BELOW

JOB NO: 15-5475
WORK ORDER NO: N/A
DATE SAMPLED: 3/6/15

MECHANICAL SIEVE ANALYSIS
GROUP SYMBOL, USCS (ASTM D-2487)

PERCENT PASSING BY WEIGHT

				Silt or Clay	SAND								GRAVEL									COBBLES	
					Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	**USCS**	**LL**	**PI**	**#200**	**#100**	**#50**	**#40**	**#30**	**#16**	**#10**	**#8**	**#4**	**1/4"**	**3/8"**	**1/2"**	**3/4"**	**1"**	**1 1/4"**	**1 1/2"**	**2"**	**3"**	**6"**	**Lab #**
HA1 @ 2.5'-3.0'				21.8																			8011-1
HA1 @ 5.5'-6'				2.8																			8011-1
HA1 @7.5'-8.0'				3.2																			8011-1
HA2 @ 1.5'-2.0'				6.2																			8011-1
HA6 @ 2.5'-2.8'				1.7																			8011-1

BORING	DEPTH	MC%

3-13-15

Appendix E

Original Geotechnical Report

Exhibit D

Alder Geotechnical Services

3910 NE 10th Avenue
Portland, Oregon 97212
503.282.7482 Fax: 282.7402

FILE COPY

October 28, 1997
Project No. 161-3

Mr. Scott Reiter
RAR Architects
34 NW First Avenue, Suite 206
Portland, Oregon 97209

GEOTECHNICAL INVESTIGATION FOR PROPOSED NORTH AND SOUTH BEACH ACCESSES OREGON ISLANDS NATIONAL WILDLIFE REFUGE BANDON, OREGON

Dear Mr. Reiter:

Alder Geotechnical Services (AGS) is pleased to present the results of our geotechnical study for the subject project. The approximate location of the project is shown on the attached Vicinity Map (Figure 1).

PURPOSE AND SCOPE OF INVESTIGATION

The U.S. Fish and Wildlife Service plans to develop two access routes down to the beach at their Oregon Islands Wildlife Refuge in Bandon. The south access will be an elevated wooden stairway located west of 11th Street SW. The north access with be a wheelchair accessible, asphalt-paved path located west of 10th Street SW. Our study was performed to evaluate subsurface soil and groundwater conditions and to provided an opinion regarding preferred access routes and design recommendations for stairway support, site grading and erosion protection.

This report has been prepared for RAR Architects and their consultants and presents conclusions and recommendations regarding:

- General subsurface conditions;
- Preferred access route locations;
- Groundwater conditions encountered in our explorations;
- Site preparation and engineered fill recommendations;
- Types and depths of stairway foundations; and
- Erosion protection for new fills and path drainage channels.

Exhibit D

DESCRIPTION OF THE PROJECT

The current plans for the south beach access consists of constructing an elevated wooden stairway down to the beach from the refuge parking lot at the west end of 11th Street SW. The stairway will be approximately 260 feet long and will drop some 65 feet in elevation. Support for the stairway will be provided by wooden posts attached to shallow concrete piers. Topography of the south beach access area is shown on Figure 2.

The north beach access will be along a new 5-foot wide pathway. The approximately 1,060-foot long pathway will be asphalt paved and sloped no steeper than about 8 percent. Topography for the north access area is shown on Figure 3.

FIELD INVESTIGATION

Our field investigation included making a visual reconnaissance of the existing surface conditions and drilling 9 soil borings on September 17 and 18, 1997. The hand auger borings were drilled to depths ranging from 2 to 7 feet in the south beach access area. The approximate locations of the borings are shown on Figure 2.

Final logs of the explorations are presented in Appendix A. The descriptions on the logs are based on field logs and sample inspection.

SITE CONDITIONS

Geologic Setting

The coastal bluff on the refuge is composed of Tertiary age sandstone of the Roseburg Formation. Tectonic uplift has exposed a thin cap of Quaternary age marine terrace deposits on top of the sandstone. Landsliding in the form of slumping and earthflows dominate on the bluff face in the decomposed sandstone. Undercutting and oversteepening of the bluff by wave action is the primary driving mechanism of this mass movement. Slide debris at the base of the bluff are removed quickly during large storm events.

Surface Conditions

The top of the coastal bluff is at approximately elevation 75 to 80 feet above mean sea level.

In the area of the south beach access the bluff is moderately sloping, with an average inclination to the beach of about 2.3 horizontal to 1 vertical. The local topography includes erosion resistant ridges, erosional channels, and hummocks from earthflows and slumping.

The north beach access has moderate sloping topography as a result of mass movement of the decomposed sandstone exposed in the bluff face. The average inclination of the slope down to the beach is about 3 horizontal to 1 vertical. Several large and recent rotational slumps are present in the area (Figure 3). An erosional gully up to 4 feet deep and 10 feet wide is located along the lower portion of the existing uncontrolled pathway to the beach (Figure 3).

Both access areas are generally heavily vegetated with salal, gorse and native grasses and flowers. Bare soil is present in erosional gullies and on uncontrolled pathways.

Subsurface Conditions

The results of our explorations indicate that both beach access routes are underlain Quaternary marine terrace sands and gravels and by Tertiary sandstone. The upper portion of the sandstone has decomposed to fat clay.

Marine Terrace Deposits

Based on our explorations and visual reconnaissance, it appears that the upper 10 to 15 feet of bluff is composed of sandy and gravelly marine terrace deposits. These coarse grained materials were deposited below sea level but have been raised to their current level by tectonic uplift. The deposits generally consist of clean, well rounded sands and gravels. The upper 1 to 2 feet of the terrace deposits are often silty fine to medium sands. Undisturbed marine terrace deposits were encountered in Boring 6 at the top of the bluff.

Erosion and mass movement of the marine terrace materials has deposited a loose layer of silty sands down the bluff face. These very loose deposits were encountered in Borings 1, 2, 3, 7, 8 and 9 and ranged from 2 feet thick to over 5½ feet thick. Severe caving and flowing occurs in these loose, saturated sands.

Roseburg Sandstone Formation

The predominate geologic unit forming the coastal bluff is the Roseburg Sandstone Formation. The consistency and composition of this variably weathered bedrock ranges from soft fat clay to hard, fresh sandstone. At shallow depths along the bluff face, the sandstone has completely weathered to a dark gray, firm to stiff fat clay. At resistant outcrops and with increasing depth below the ground surface, the sandstone becomes hard, gray, thinly bedded with interbeds of siltstone. The sandstone is typically highly deformed, folded and fractured.

Concrete pier foundations and pathway excavations will primarily encountered soft to stiff fat clay. Little hard rock is anticipated along the proposed access routes. Caving of drilled pier holes in the clay will not be a construction issue. Drilling will be difficult, however, due to the plasticity (stickiness) of the clay.

Groundwater

Groundwater primarily seeps out of the top 15 feet of the bluff at the contact between the Roseburg Formation and the marine terrace deposits. The seepage water then flows down the bluff face and saturates the surface soils. Groundwater is generally present within 2 feet of the ground surface where shallow sandy soils are present on top of the weathered sandstone. Ground water flows within inches of the ground surface in the bottom of the deeper erosional gullies.

CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations presented in this report are based on the information provided to us, results of the field studies, engineering analyses, and professional judgment. Only small portions of the pertinent soil, bedrock, and groundwater conditions have been observed. The recommendations made in this report are based on the assumption that soil conditions do not deviate appreciably from those found during the field investigation. If the plans for site development are changed, or if variations or undesirable geotechnical conditions are encountered during construction, AGS should be consulted for further recommendations.

Site Characteristics and Route Selection

The proposed beach access routes traverse down a coastal bluff composed of deeply weathered sandstone. The top of the bluff is mantled with silt, sand, and gravel marine terrace deposits. The moderately sloping bluff face is actively undergoing mass movement as a result of wave cutting at the toe of the bluff, deep weathering of the sandstone into clay soils, and the presence of groundwater seepage. There is no economical way to prevent this active process of "landsliding". Constructing the south and north beach access routes will require that the U.S. Fish and Wildlife Services accept the typical risks associated with building on unstable ground. These risks include lateral movemeut and settlement of structures and paths, continual maintenance of facilities, and possibly future rerouting of the access routes.

Earthflows are the primary mechanism of mass movement occurring on the bluff face in the area of the south beach access. This type of ground failure involves the slow, viscous flow of soil and rock material. It is occurring north and south of the large rock outcrop shown southwest of Boring 9 on Figure 2. The hard rock "boulder" forms a protective barrier and buttress for a ridge of stable ground located immediately uphill. This ridge is relatively stable. It is recommended that the raised stairway access the beach by following the south side of the protected soil ridge down to the rock "boulder". The stairway should then make its final descent to the beach along the south side of the "boulder." Caving sandy soils, high groundwater and stiff "sticky" clays should be anticipated with installing the stairway foundations.

Earthflows, slumps, and erosion are the primarily mechanisms of mass movement occurring on the bluff face in the area of the north beach access. Slumps are classical landslides involving the rotational movement of soil or rock material down slide surfaces. Movement is moderately rapid and is preceded by the development of cracks in the ground where the slip plane intersects the ground surface. Erosion occurs slowly where vegetation has been removed by pedestrian traffic or by mass movement of the slope face. It is recommended that the new north beach access path avoid the active slumps shown on Figure 3. Where possible the new path should use existing portions of the undeveloped path, especially where the switchbacks turn and change direction.

South Beach Access Recommendations

The proposed wooden stairway may be supported on drilled pier foundations. The concrete foundations should be at least 12 inches in diameter and founded at least 3 feet below the ground surface. Foundations of this size may used to support a maximum allowable vertical load of 1,000 pounds. Vertical settlements of about 1 inch or less are anticipated. Foundations of this size may also be used to support maximum horizontal loads of 300 pounds under a lateral displacement of about ½ inch. The load has been assumed to be applied 3 feet above the ground surface.

Caving soils should be anticipated during excavation of the foundations. All water should be bailed or pumped from the foundation excavations prior to pouring concrete. As an alternative, concrete may be pumped through a tremie pipe to the bottom of the excavations if the groundwater cannot be controlled.

North Beach Access Recommendations

Grading and Soil Compaction

All organic topsoils should be stripped from the proposed pathway and stockpiled for landscaping uses after grading. The depth of stripping is anticipated to vary from 0 to 6 inches deep.

Structural fills should be composed of brown sandy marine terrace deposits. The gray clay soils on the bluff are unsuitable for use as fill and should be hauled off the pathway and properly disposed of as directed by construction manager.

Structural fills and granular base rock should be compacted to at least 95 percent of the maximum dry density determined in accordance with ASTM Test Method D 698-91 (standard proctor). Fill slopes should be constructed no steeper than 2 horizontal to 1 vertical unless they are reinforced.

Exhibit D

Fill slopes may be inclined as steep as 1 horizontal to 1 vertical if they are reinforced with coconut fiber erosion control blankets. Reinforced slopes should be no higher than 5 feet. The reinforcement should consist of coconut fiber erosion control blankets placed every 1 foot vertically. The blankets should extent 4 feet horizontally behind the slope face. The coconut fiber blankets should weigh at least 29 ounces per yard. A locally available product meeting this specification is *BioD-Mat 90* by RoLanka International Inc.

Erosion Control

After grading is completed a disturbed areas should be covered with topsoil per a landscape architects recommendations and then protected with erosion control blankets and native vegetation. The following erosion control blankets are recommended:

Drainage channel adjacent to pathway	*C125* Channel liner by North American Green
Disturbed slopes	*BioD-Mat 70* coconut fiber erosion control blanket by RoLanka International, Inc.

The blankets should be lapped and securely anchored to the slopes per the manufacturer's recommendations. The drainage channel liner should extend at least 1 foot outside of the drainage channel.

CLOSURE

Geotechnical review is of paramount importance in engineering practice. The poor performance of many foundations and floor slabs has been attributed to inadequate design construction review. A geotechnical engineer should review the grading and foundation plans and specifications before final design. On-site grading and earthwork should be observed and, where necessary, tested by a qualified geotechnical engineering firm to verify compliance with the recommendations contained in this report. Foundation excavations should also be observed to compare the generalized site conditions assumed in this report with those found on the site at the time of construction. If the plans for site development are changed, or if variations or undesirable geotechnical conditions are encountered during construction, the geotechnical engineer should be consulted for further recommendations.

Exhibit D

Project No. 161-3

Geotechnical engineering and the geologic sciences are characterized by uncertainty. Professional judgments presented are based partly on an understanding of the proposed construction, and partly on general experience. The engineering work performed and judgments rendered for this study meet current professional standards; no other warranties, either expressed or implied, are made.

Sincerely,

ALDER GEOTECHNICAL SERVICES

John N. Cunningham

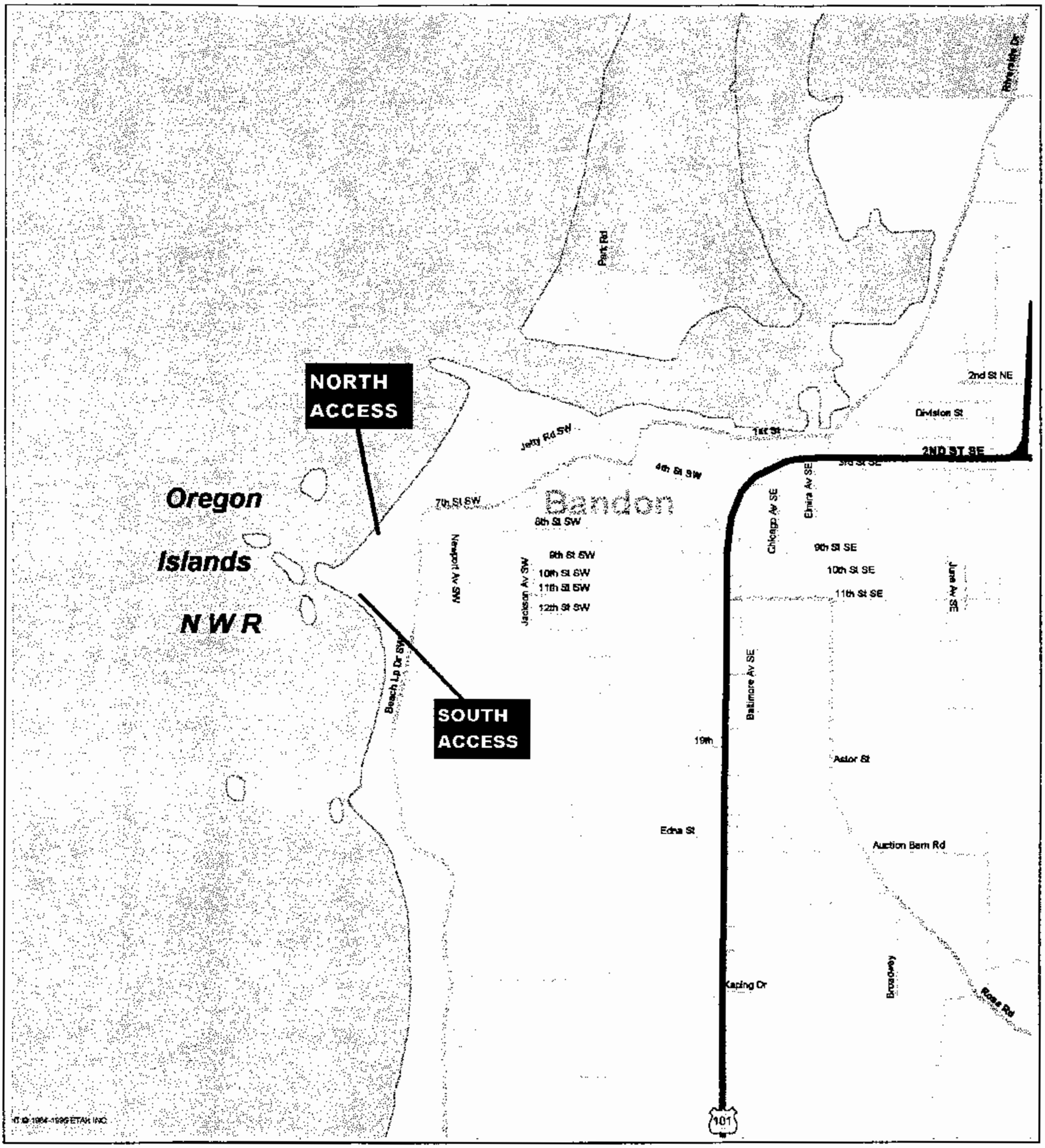
REGISTERED PROFESSIONAL
ENGINEER
13507
OREGON
MARCH 19, 1987
JOHN N. CUNNINGHAM

John N. Cunningham, P.E.
Geotechnical Engineer

Attachments

(4) Addressee

Exhibit D



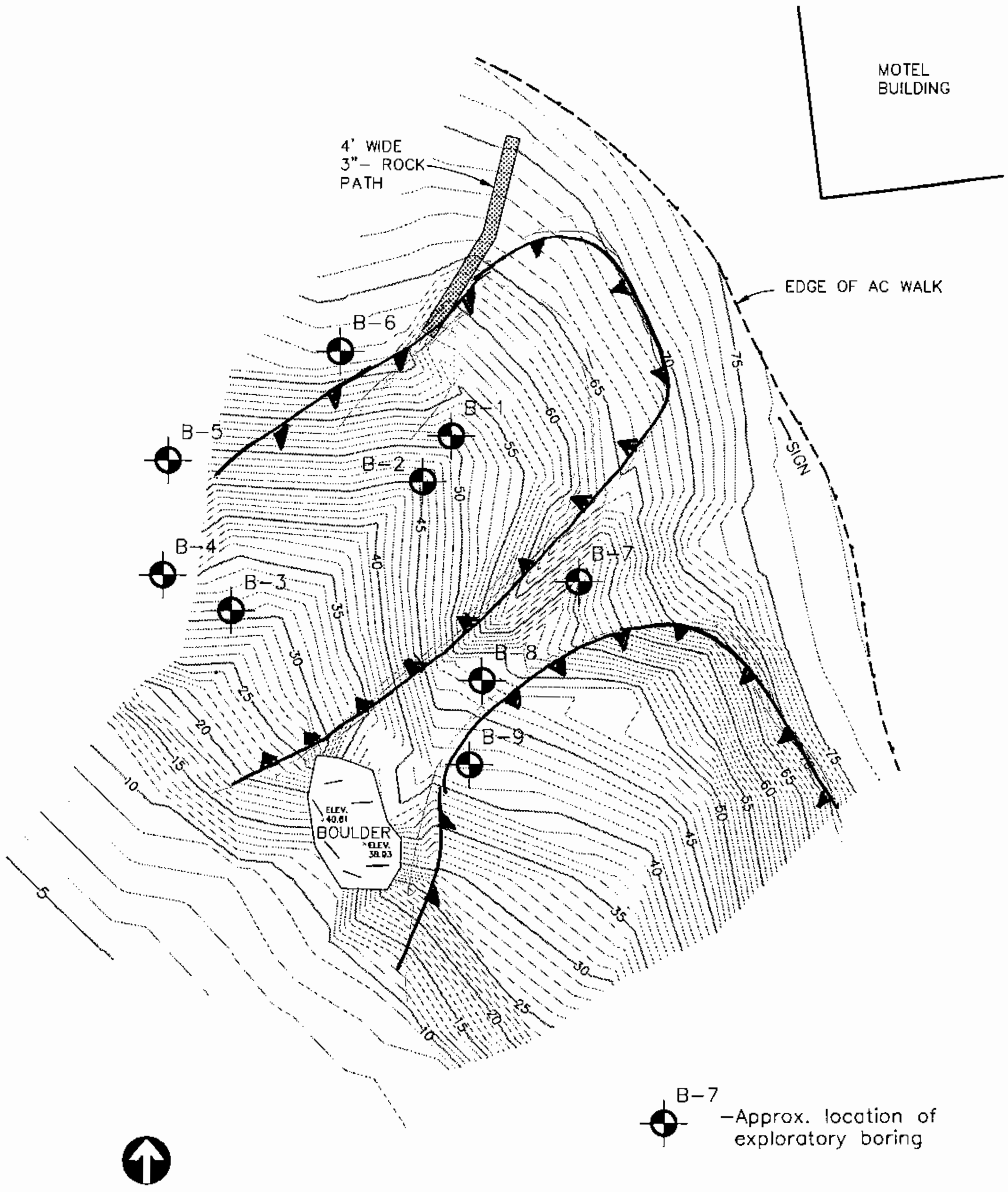
ETAK Base Map

0 1/2 1
APPROX. SCALE IN MILES

Alder Geotechnical Services

Job #161-3	Beach Access	Figure 1
October, 1997	Oregon Islands NWR	Vicinity Map

Exhibit D



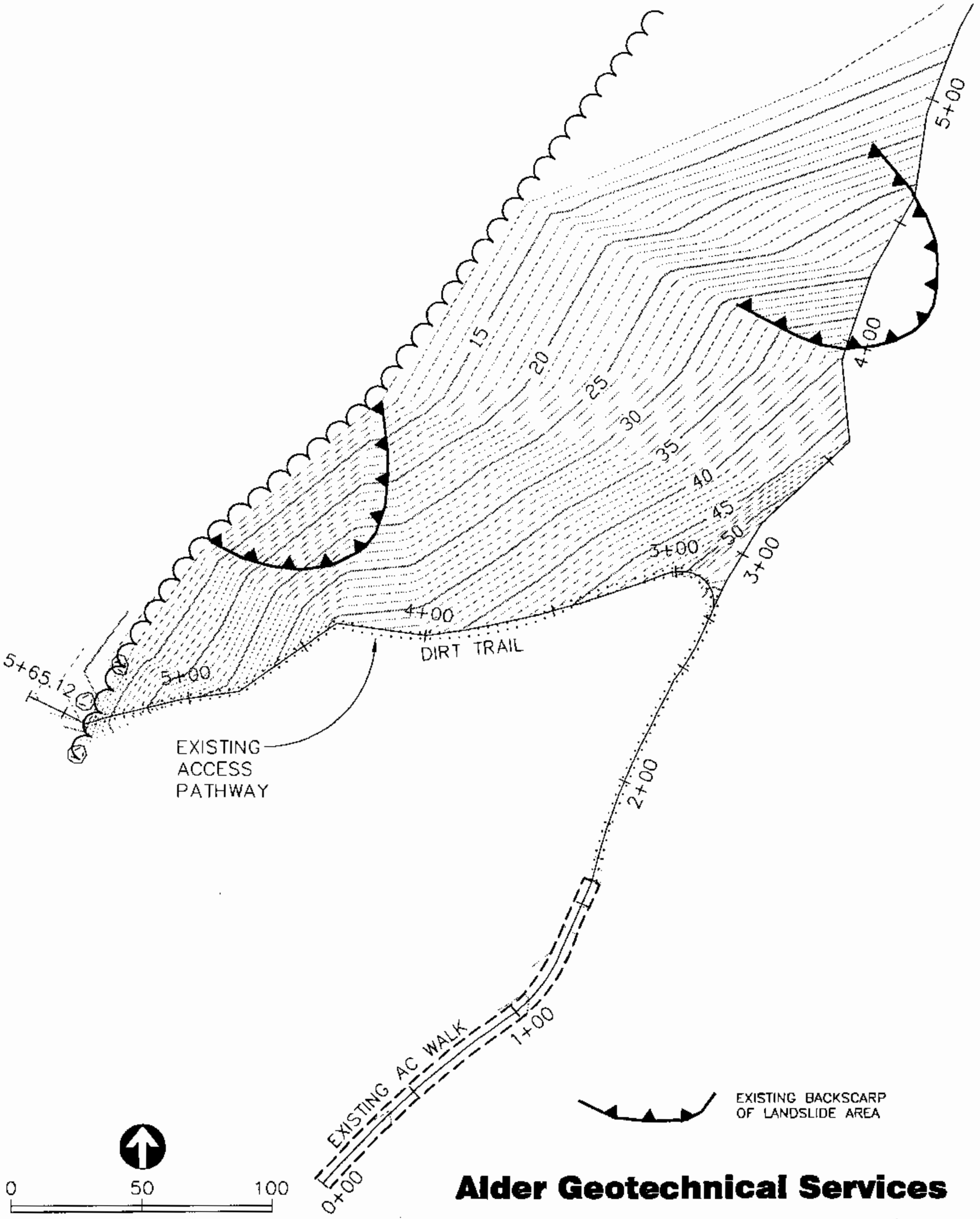
0 40 80
SCALE IN FEET

Base Map from DEA Revised Survey, 10/6/97.

Alder Geotechnical Services

Job #161-3	South Beach Access	Figure 2
October, 1997	Oregon Islands NWR	Site Plan South

Exhibit D



Base Map from DEA Revised Survey, 10/6/97.

Alder Geotechnical Services

Job #161–3
October, 1997

North Beach Access
Oregon Islands NWR

Figure 3
Site Plan North

Exhibit D

APPENDIX A

FIELD EXPLORATIONS

Nine exploratory hand auger boring were advanced on September 17 and 18, 1997 at the approximate locations shown on the Site Plan (Figure 2). The borings were drilled using a 3-inch diameter hand auger. A geotechnical engineer logged the explorations.

Disturbed grab samples of the subsurface materials were obtained from each exploration, sealed in plastic bags, and brought to our office for examination and testing.

The locations of the explorations are approximate and were estimated by measuring with a cloth tape from know locations.

The soils encountered in the explorations were generally described using the Unified Soil Classification System. The soil logs are attached.

Exhibit D

FIELD EXPLORATION LOG

Exploration No. 1
Date 9-17-97
Project Name Oregon Islands NWR Coastal Stairway
Location See Plan
Job No. 161-3
Elev. +51
Exploration Method 3" dia. hand auger
Logger JNC
Datum DEA topo plan
Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	SILTY TO CLAYEY SAND (SM/SC), wet, brown, very loose, fine to medium grained, occasional pebbles				
1	Coluvium/Marine Terrace Deposits			▽	groundwater at 1'
2					
3	@ 3' severe caving				
4	FAT CLAY (CH), wet, dark gray, firm, slighty cemented, highly decomposed sandstone Roseburg Sandstone Formation				
5	Bottom of Boring @ 4' due to caving of upper sand				
6					
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-1

Exhibit D

FIELD EXPLORATION LOG

Exploration No. 2
Date 9-17-97
Project Name Oregon Islands NWR Coastal Stairway
Location See Plan
Job No. 161-3
Elev. +45
Exploration Method 3" dia. hand auger
Logger JNC
Datum DEA topo plan
Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	SILTY TO CLAYEY SAND (SM/SC), wet, yellow brown, very loose, fine to medium grained, occasional pebbles Colluvium/Marine Terrace Deposits				
1				▽	groundwater at 1'
2					
3	@ 3' severe caving				
4	FAT CLAY (CH), wet, dark gray with rust mottling, firm to stiff, slighty cemented, highly decomposed sandstone Roseburg Sandstone Formation				
5	Bottom of Boring @ 4' due to caving of upper sand				
6					
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-2

Exhibit D

FIELD EXPLORATION LOG

Exploration No. 3
Date 9-17-97
Project Name Oregon Islands NWR Coastal Stairway
Location See Plan
Job No. 161-3
Elev. +31'
Exploration Method 3" dia. hand auger
Logger JNC
Datum DEA topo plan
Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	SILTY TO CLAYEY SAND(SM/SC), wet, dark brown, very loose, with organics, trace pebbles			▽	groundwater at groundsurface
1					
	@ 1½ ' becomes CLAYEY SAND (SC), gray				
2	Colluvium /Marine Terrace Depoists				
	SANDSTONE, hard, highly fractured				
	Refusal to drilling @ 2' on Roseburg Sandstone Formation				
3					
4					
5					
6					
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-3

Exhibit D

FIELD EXPLORATION LOG

Exploration No. 4
Date 9-17-97
Project Name Oregon Islands NWR Coastal Stairway
Location See Plan
Job No. 161-3
Elev. +33
Exploration Method 3" dia. hand auger
Logger JNC
Datum DEA topo plan
Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	FAT CLAY (CH), wet, dark gray, soft				
1	FAT CLAY (CH), moist, dark gray, mottled olive and white, very stiff, cuttings are crumbly, decomposed sandstone with occasional fine gravel-size cemented clasts of hard sandstone				
2	below 2' trace amounts of brown fir needles in clay	4-1 baggie			
3					
4					
5	Roseburg Sandstone Formation	4-2 baggie			
6	Bottom of boring @ 5½' No groundwater encountered				
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-4

Exhibit D

FIELD EXPLORATION LOG

Exploration No. 5
Date 9-17-97
Project Name Oregon Islands NWR Coastal Stairway
Location See Plan
Job No. 161-3
Elev. +44'
Exploration Method 3" dia. hand auger
Logger JNC
Datum DEA topo plan
Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	FAT CLAY (CH), wet, very soft, dark brown, with organics			▽	groundwater at ground surface
1					
	FAT CLAY (CH), wet, soft to firm, dark gray, , decomposed sandstone with occasional fine gravel-size cemented clasts of hard sandstone				
2					
3					
4					
	Roseburg Sandstone Formation				
5	Bottom of boring @ 5'				
6					
7					
8					
9					
10					

Figure No. A-5

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Exhibit D

FIELD EXPLORATION LOG

Exploration No. 6
Date 9-17-97
Project Name Oregon Islands NWR Coastal Stairway
Location See Plan
Job No. 161-3
Elev. +63'
Exploration Method 3" dia. hand auger
Logger JNC
Datum DEA topo plan
Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
1	SILTY SAND (SM), damp, brown, loose, with organics Topsoil				
2 3 4 5 6	POORLY GRADED SAND WITH GRAVEL (SP), moist, yellow-brown, loose, coarse to fine grained, with occasional 2" to 4" layers of fine pebbles and trace rounded medium gravels Marine Terrace Deposits	6-1 baggie			
7 8 9 10	Bottom of Boring @ 7' Refusal on gravel layer No groundwater encountered				

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-6

Exhibit D

FIELD EXPLORATION LOG

Exploration No. 7
Date 9-18-97
Project Name Oregon Islands NWR Coastal Stairway
Location See Plan
Job No. 161-3
Elev. +55'
Exploration Method 3" dia. hand auger
Logger JNC
Datum DEA topo plan
Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	SILTY SAND (SM), moist, dark brown, very loose, medium to fine grained, angular gravels at 1½'				
1					
	becomes yellow-brown, loose				
2					
3					
4				▽	Groundwater @ 4'
	becomes red-brown				
5	Colluvium /Marine Terrace Deposits				
	Bottom of boring @ 5½' due to caving of sand				
6					
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-7

Exhibit D

FIELD EXPLORATION LOG

Exploration No. 8
Date 9-18-97
Project Name Oregon Islands NWR Coastal Stairway
Location See Plan
Job No. 161-3
Elev. +48
Exploration Method 3" dia. hand auger
Logger JNC
Datum DEA topo plan
Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	SILTY SAND (SM), moist, dark brown, very loose, medium to fine grained				
1	becomes yellow-brown, loose				
2				▽	Groundwater @ 2'
3					
	Colluvium /Marine Terrace Deposits				
4	FAT CLAY (CH), wet, dark gray with rust mottling, firm to stiff, slighty cemented, highly decomposed sandstone Roseburg Sandstone Formation				
5	Bottom of boring @ 4½' due to caving of sand				
6					
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-8

Exhibit D

FIELD EXPLORATION LOG

Exploration No. 9
Date 9-18-97
Project Name Oregon Islands NWR Coastal Stairway
Location See Plan
Job No. 161-3
Elev. +39
Exploration Method 3" dia. hand auger
Logger JNC
Datum DEA topo plan
Equipment

Depth (feet)	Soil Description	Sample No. & type	Blow Count	Water Level	Lab Data/ Comments
	SILTY SAND (SM), moist, dark brown, very loose, medium to fine grained				
1					
2					
	becomes yellow-brown, loose Colluvium /Marine Terrace Deposits				
3					
	FAT CLAY (CH), wet, dark gray with rust mottling, firm to very stiff, slightly cemented, cuttings are crumbly, decomposed sandstone with occasional fine gravel-size cemented clasts of hard sandstone				
4	Roseburg Sandstone Formation				
	Bottom of boring @ 3½' No groundwater encountered				
5					
6					
7					
8					
9					
10					

Alder Geotechnical Services
3910 NE 10th Avenue, Portland, OR 97212
503.282.7482 FAX: 282.7402

Figure No. A-9

Exhibit E
Page 1

Chapter 1. Introduction and Background

1.1 Introduction

The Oregon Coast National Wildlife Refuge Complex (Complex) comprises six individual National Wildlife Refuges (NWRs or Refuges) that span the coast of Oregon and support a rich diversity of wildlife habitats including coastal rocks, reefs, and islands; forested and grass-covered headlands; estuaries; and freshwater marshes. The six National Wildlife Refuges include Cape Meares, Oregon Islands, Three Arch Rocks, Bandon Marsh, Nestucca Bay, and Siletz Bay. This Comprehensive Conservation Plan (CCP) applies only to Oregon Islands, Three Arch Rocks, and Cape Meares NWRs. A Wilderness Stewardship Plan (WSP) is also part of this document; it applies to Oregon Islands and Three Arch Rocks Wilderness Areas only. We may refer to this document as the CCP/WSP. The CCPs for the Complex's other three NWRs will be developed under a separate planning effort.

1.1.1 Oregon Islands NWR

The scenic and rugged Oregon Islands NWR includes 1,854 rocks, reefs, and islands, and two headland units, and spans 320 miles of the Oregon Coast, from Tillamook Head near Seaside south to the California border (Figures 1-1 North Coast Overview, 1-2 Central Coast Overview, and 1-3 South Coast Overview). With the exception of Tillamook Rock, all of the rocks, reefs, and islands within the Refuge are included in the Oregon Islands Wilderness. The two headlands are not designated wilderness areas. Most of Oregon's estimated 1.2 million nesting seabirds are found on this Refuge. A large percentage of Oregon's pinniped population use the Refuge for haul-out and/or pupping, including more than 5,000 harbor seals (*Phoca vitulina*), 4,000 California sea lions (*Zalophus californianus*), 4,000 threatened Steller sea lions (*Eumetopias jubatus*) and 100 northern elephant seals (*Mirounga angustirostris*).

1.1.1.1 Islands Unit

Each of the 1,854 Refuge islands that make up the Islands Unit can be categorized as a reef, rock, or island. Reefs are defined as low-elevation, essentially bare rocks that are awash during storms at higher tides. Rocks are taller, essentially bare rocks that may or may not be inundated. These usually have rather precipitous sides and are used by wildlife in the same way as reefs. Grassy islands are generally the highest islands. They usually have precipitous sides and are extensively used for nesting by seabirds. Some pinniped use occurs on the lower portions of islands. These reefs, rocks, and islands are used as breeding habitat for 13 species of seabirds and as haul-out and pupping sites by four species of pinnipeds.

1.1.1.2 Coquille Point Unit

Nineteen-acre Coquille Point (see Figure 1-3), the first mainland addition to Oregon Islands NWR, was acquired from 1991 to 1992 and is located on the western edge of the City of Bandon. The intent of this mainland unit is to protect seabird nesting colonies on the adjacent rocks, restore native habitat, and provide a highly visible public use area for environmental education and interpretation. Coquille Point is the only unit of Oregon Islands NWR that is open to the public. Although Coquille Point has limited wildlife use, its primary values are providing a buffer zone between mainland development and the islands, and serving as an important interpretive site

Exhibit E
Page 2

for Oregon Islands NWR. The adjacent rocks contain substantial and observable populations of seabirds that are easily viewable from the headland.

Coquille Point Unit consists of a headland jutting toward the ocean and overlooking part of the Islands Unit of Oregon Islands NWR. A beach stretches to the north and another to the south from the point. The bluff portion of the headland is covered with native and non-native plants. The northern portion of the property is a low-lying stabilized dune with invasive European beachgrass (*Ammophila arenaria*) and a mixture of native plants. A 1-acre emergent wetland, formed from groundwater seepage from the base of the bluff, exists between the bluff and the beach at the north end of the Coquille Point Unit.

1.1.1.3 Crook Point Unit

The 134-acre Crook Point Unit (see Figure 1-3), a second mainland addition, was acquired in 2000 and is located along the southern Oregon coast approximately 12 miles south of Gold Beach. Crook Point contains rare plant species, undisturbed cultural resource sites, unique geological formations, and 1 mile of pristine beach with interspersed rocky intertidal habitat, and it serves to protect major seabird colonies. It is immediately adjacent to the Mack Reef archipelago, which supports the second-largest concentration of nesting seabirds in Oregon.

Crook Point consists of a mosaic of habitats including grassland, meadows, coniferous forest, rock formations, and barren ground; it is also one of the windiest locations on the Pacific Coast. Geologic formations and the presence of numerous landslides indicate that the area is highly unstable, and much of the area is naturally unvegetated. The extreme western tip of Crook Point consists of a rock outcrop that forms a large rock pinnacle. Numerous seeps and springs can be found throughout.

1.1.2 Three Arch Rocks NWR

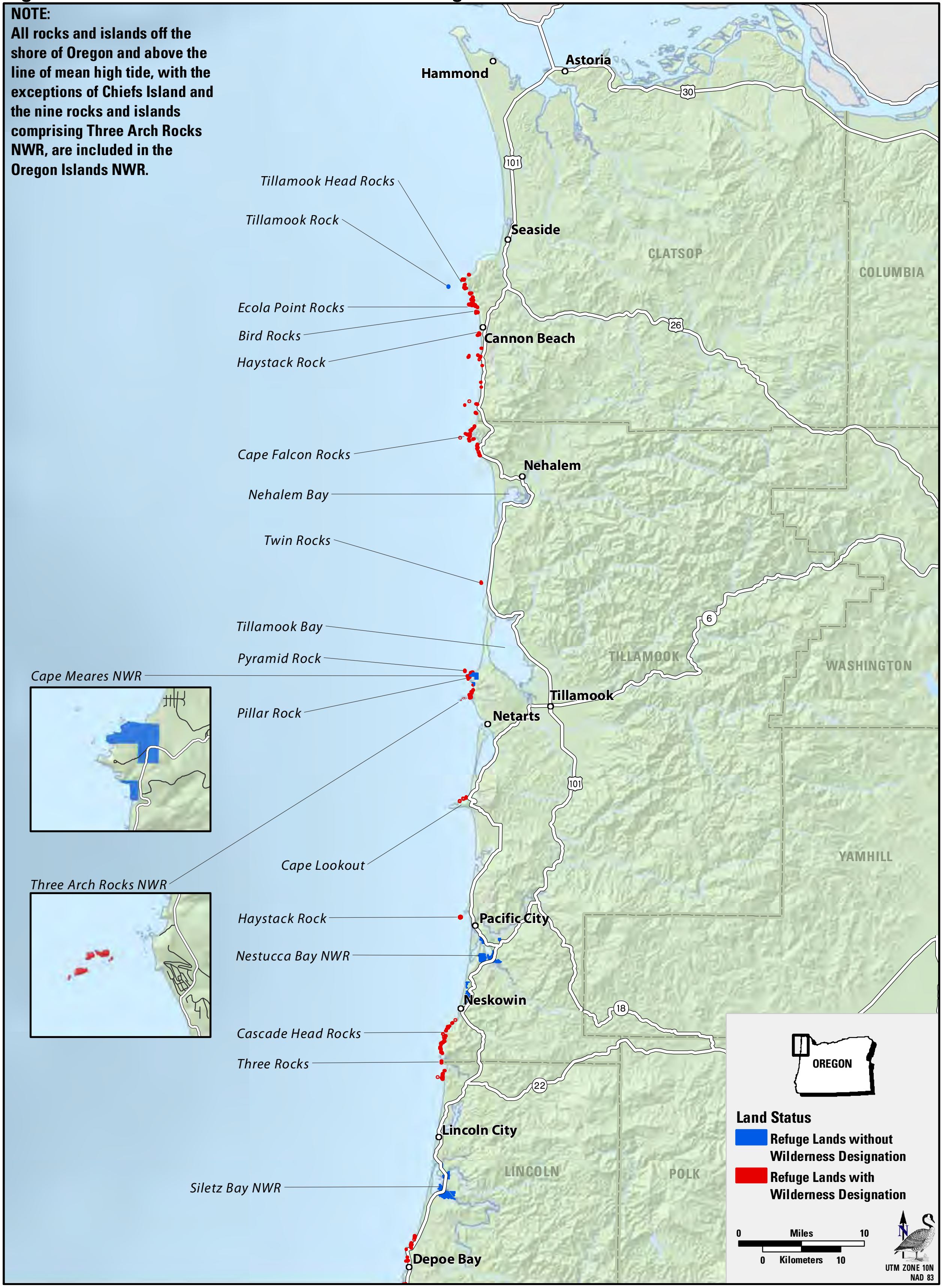
Three Arch Rocks NWR is located in the Pacific Ocean one-half mile west of the town of Oceanside in Tillamook County, Oregon (see Figure 1-1). The Refuge comprises nine rocks and islands with a total land area of 15 acres and supports one of the largest colonies of breeding seabirds—mainly tufted puffins (*Fratercula cirrhata*) and common murre (*Uria aalge*)—in Oregon. The Refuge is also a designated wilderness area known as Three Arch Rocks Wilderness. The three largest rocks have various amounts of soil accumulation, and vegetative growth is limited due to extreme rockiness, steep cliffs, and harsh weather. The six smaller rocks are devoid of soil and vegetation, and some are awash when high tides and large swells coincide. This is the only breeding site for the threatened Steller sea lion on the north coast of Oregon.

1.1.3 Cape Meares NWR

Cape Meares is located on Oregon's Pacific Coast between Tillamook Bay and Netarts Bay, approximately 1.75 miles north of Oceanside and 6 miles west of Tillamook. The Refuge comprises two units separated by Cape Meares State Scenic Viewpoint (see Figure 1-1). Cape Meares NWR consists of vertical coastal cliffs, rock outcroppings, and rolling headlands with old-growth forest dominated by Sitka spruce (*Picea sitchensis*) and western hemlock (*Tsuga heterophylla*). A 20-acre section east of the Three Capes Scenic Route consists of early seral-stage forest adjacent to a clearcut. This section is undergoing natural regeneration following a complete blowdown of the old-growth. This small Refuge protects one of the last stands of old-

Exhibit E
Page 3

Figure 1-1. North Coast National Wildlife Refuges and Wilderness Areas



NOTE:
All rocks and islands off the shore of Oregon and above the line of mean high tide, with the exceptions of Chiefs Island and the nine rocks and islands comprising Three Arch Rocks NWR, are included in the Oregon Islands NWR.

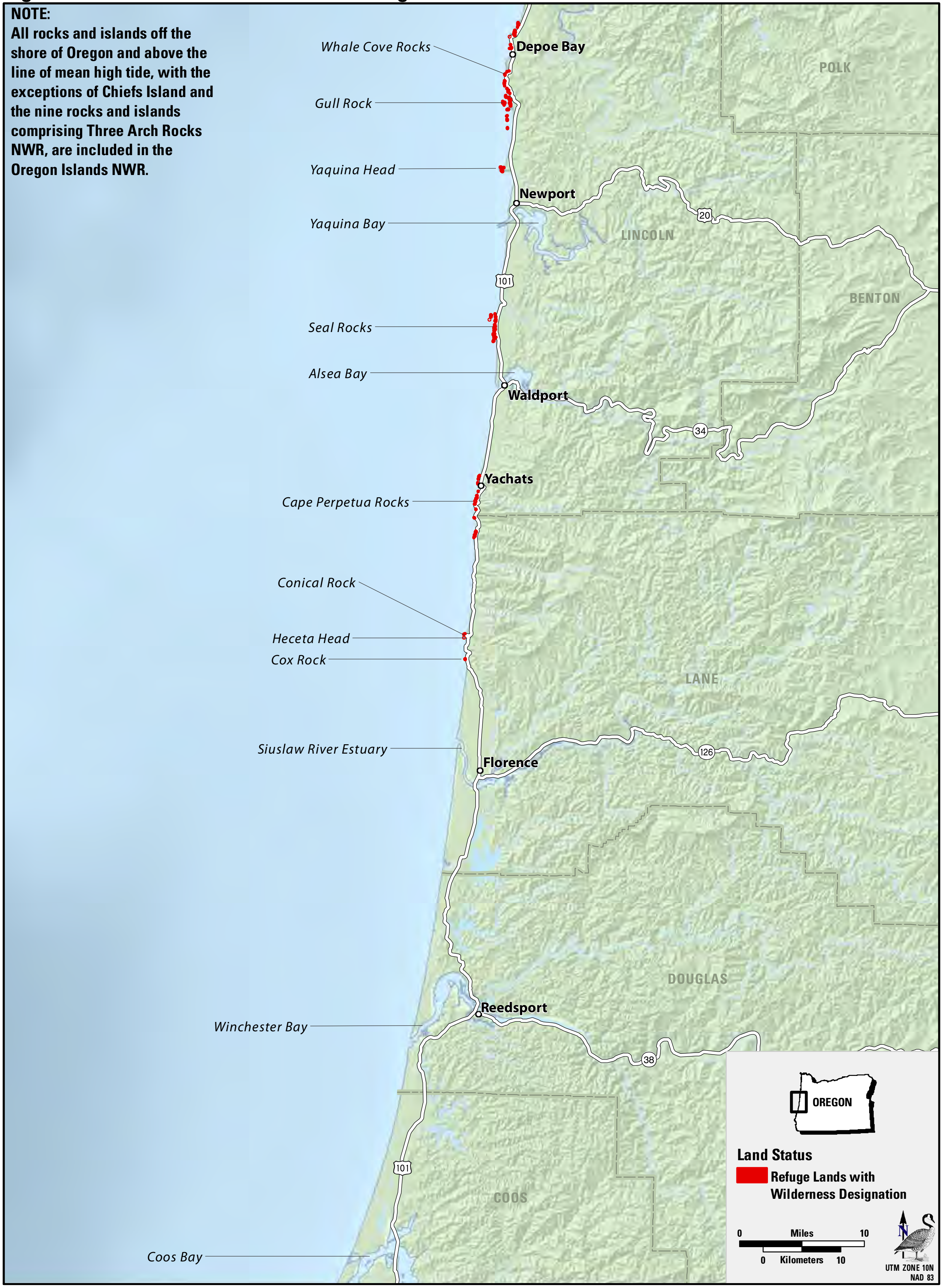
Data Sources: Refuge Boundaries from USFWS/R1; Roads from ESRI; County Boundaries from BLM; Hydrology from NOAA and USGS; Elevation from USGS

Exhibit E
Page 4

The back sides of maps are blank to improve readability.

Exhibit E
Page 5

Figure 1-2. Central Coast Overview - Oregon Islands NWR and Wilderness Area



NOTE:
All rocks and islands off the shore of Oregon and above the line of mean high tide, with the exceptions of Chiefs Island and the nine rocks and islands comprising Three Arch Rocks NWR, are included in the Oregon Islands NWR.

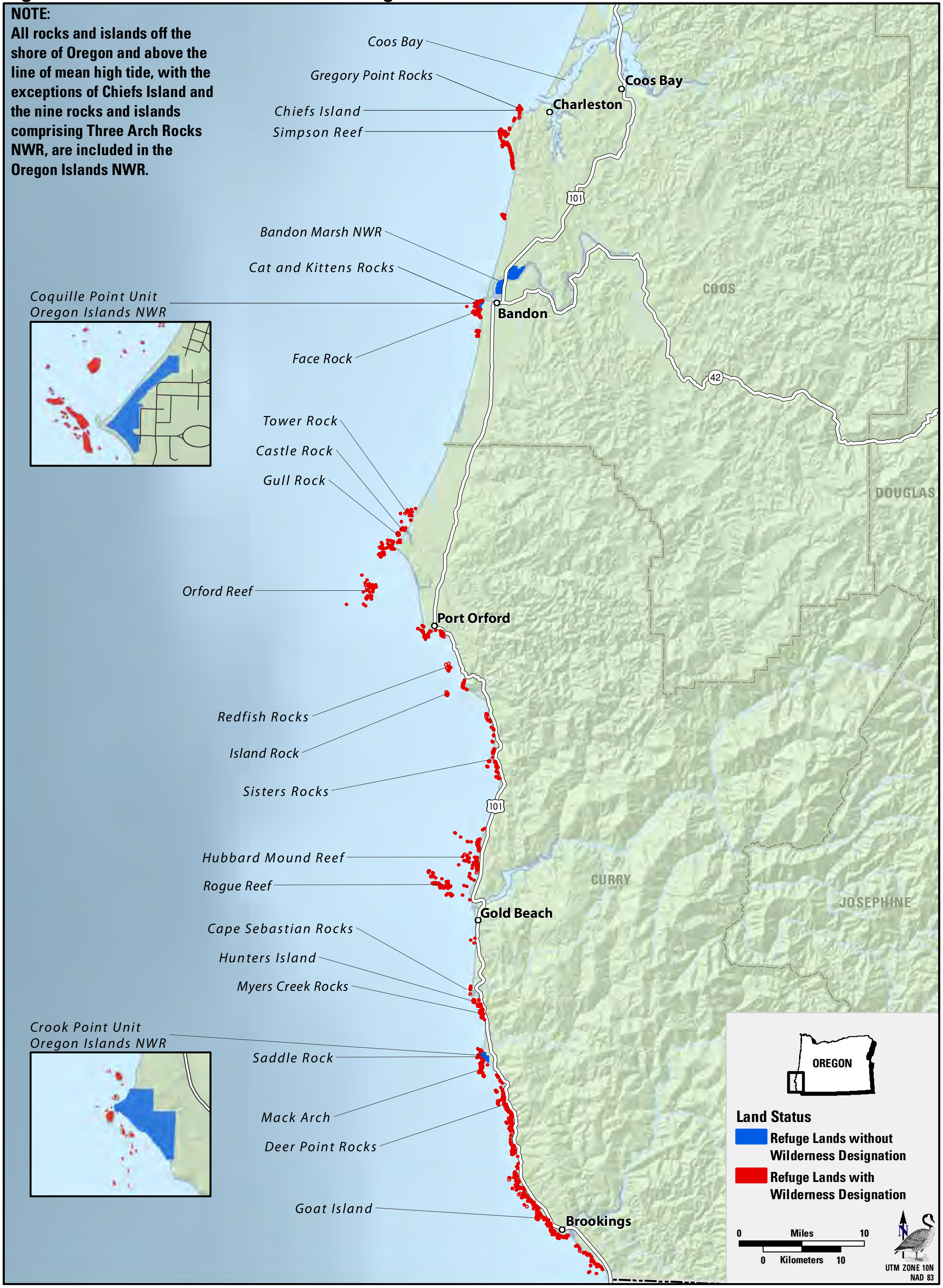
Data Sources: Refuge Boundaries from USFWS/R1; Roads from ESRI; County Boundaries from BLM; Hydrology from NOAA and USGS; Elevation from USGS

Exhibit E
Page 6

The back sides of maps are blank to improve readability.

Exhibit E
Page 7

Figure 1-3. South Coast Overview - Oregon Islands NWR and Wilderness Area



NOTE:
All rocks and islands off the shore of Oregon and above the line of mean high tide, with the exceptions of Chiefs Island and the nine rocks and islands comprising Three Arch Rocks NWR, are included in the Oregon Islands NWR.

Data Sources: Refuge Boundaries from USFWS/R1; Roads from ESRI; County Boundaries from BLM; Hydrology from NOAA and USGS; Elevation from USGS

Exhibit E
Page 8

The back sides of maps are blank to improve readability.

growth coastal forest in Oregon and serves, in effect, as an "island" ecosystem. The vertical seacliffs around this headland support nesting seabird populations including tufted puffins, common murres, pigeon guillemots (*Cepphus columba*), pelagic cormorants (*Phalacrocorax pelagicus*), and others. Peregrine falcons (*Falco peregrinus*) nest on the cliffs, and the recently delisted bald eagle (*Haliaeetus leucocephalus*) forages on the headland.

1.2 Purpose and Need for the CCP

The purpose of the CCP is to provide the Complex, the National Wildlife Refuge System (NWRS or System), partners, and citizens with a management plan for improving fish and wildlife habitat conditions and refuge infrastructure, for wildlife and public use on Cape Meares, Oregon Islands, and Three Arch Rocks NWRs over the next 15 years. An approved CCP will ensure that the Complex manages these Refuges to achieve the individual Refuge purposes, vision, goals, and objectives, to help fulfill the mission of the NWRS. The CCP updates management direction so that it is consistent with the Improvement Act of 1997 (Improvement Act or NWRSIA) and with the Oregon Islands and Three Arch Rocks Wilderness designations.

The CCP will provide reasonable, scientifically grounded guidance for managing and improving the Refuges' coastal rocks, reefs, islands, cliffs, and forested and grass-covered headlands, for the long-term conservation of native plants and animals and migratory birds. Appropriate actions will be identified for protecting and sustaining the cultural, biological, and wilderness features of the coastal rocks, reefs, and islands; protecting major nearshore seabird breeding colonies and pinniped pupping and haul-out sites; and preserving the existing cliff and old-growth forest habitat in an unaltered, natural condition. The CCP will also evaluate the priority public use activities on the Refuges, including wildlife observation, photography, environmental education, and interpretation.

The CCP is needed for a variety of reasons. Primary among these is the need to reduce disturbance to wildlife using the Refuges. Equally as important is the need to determine biological data gaps for the Refuges, methods for acquiring this data, and strategies for incorporating findings into refuge management. The CCP also recognizes and identifies threats to coastal wildlife and habitats due to rapid development along the Oregon coast, invasive species, global climate change, and catastrophic human-induced events such as oil spills.

In an effort to improve refuge law enforcement, citizen involvement, and coordination with other agencies, and to better accomplish the Refuges' and the Service's goals and objectives, there is a need to identify future actions and partnerships. There is also a need to analyze public use programs for wildlife-dependent priority public uses and to determine what improvements or alterations should be made in the pursuit of higher quality programs and opportunities. Finally, there is a need to describe the steps that should be taken to better protect the habitats and wildlife through strategies to accomplish our goals.

1.3 Content and Scope of the CCP

This CCP provides guidance for management of the Refuges' habitats and wildlife, and administration of public uses on refuge lands. Information in the CCP includes but is not limited to:

Exhibit E
Page 10

- An overall vision for the Refuges, their establishment history and purposes, and their role in the local ecosystem (Chapter 1).
- Goals and objectives for specific conservation targets and public use programs, as well as strategies for achieving the objectives (Chapter 2).
- A description of the physical environment of the Refuges (Chapter 3).
- A description of the conservation targets, their condition, and trends on the Refuges and within the local ecosystem; a presentation of the key desired ecological conditions for sustaining the targets; and a short analysis of the threats to each conservation target (Chapter 4).
- An overview of the Refuges' public use programs and facilities, a list of desired future conditions for each program, and other management considerations (Chapter 5).
- A comprehensive list of species known to occur on the Refuges and mentioned within the CCP (Appendix B).
- Evaluations of existing and proposed appropriate public and economic uses for compatibility with each Refuge's purposes (Appendix E).
- An outline of the updated WSP detailing where the plan components can be found within the CCP (Appendix F).
- An outline of the projects, staff, and facilities needed to support the CCP (Appendix G).

1.4 Planning and Management Guidance

The U.S. Fish and Wildlife Service (Service), an agency within the Department of the Interior, is the principal Federal agency responsible for conserving, protecting and enhancing fish, wildlife and plants and their habitats for the continuing benefit of the American people. The Service manages the 96-million acre National Wildlife Refuge System, which encompasses 548 NWRs, thousands of small wetlands, and other special management areas.

Refuges are guided by various federal laws and executive orders, Service policies, and international treaties. Fundamental are the mission and goals of the NWRS and the designated purposes of the Refuge unit as described in establishing legislation, executive orders, or other documents establishing, authorizing, or expanding a Refuge.

Key concepts and guidance of the Refuge System derive from the National Wildlife Refuge System Act of 1966 as amended (16 U.S.C. 668dd-668ee), the Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4), as amended, Title 50 of the Code of Federal Regulations (CFR), and the Fish and Wildlife Service Manual. The NWRS Administration Act is implemented through regulations covering the NWRS, published in Title 50, subchapter C of the CFR. These regulations govern general administration of units of the Refuge System. This CCP is intended to comply with the Refuge Administration Act.

1.4.1 U.S. Fish and Wildlife Service mission

The mission of the Service is *"working with others, to conserve, protect and enhance fish and wildlife and their habitats for the continuing benefit of the American people."* National natural resources entrusted to the Service for conservation and protection include migratory birds, endangered and threatened species, inter-jurisdictional fish, wetlands, and certain marine mammals. The Service also manages national fish hatcheries, enforces federal wildlife laws and international treaties governing importing and exporting wildlife, assists with state fish and wildlife programs, and helps other countries develop wildlife conservation programs.

1.4.2 National Wildlife Refuge System

The NWRS is the world's largest network of public lands and waters set aside specifically for conserving wildlife and protecting ecosystems. From its inception in 1903, the NWRS has grown to encompass 548 national wildlife refuges and 10 waterfowl production areas located across the nation in all 50 states, covering more than 96 million acres of public lands. More than 36 million visitors annually fish, hunt, observe and photograph wildlife, or participate in environmental education and interpretive activities on these National Wildlife Refuges.

1.4.2.1 National Wildlife Refuge System mission and goals

The mission of the Refuge System is:

"to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended)(16 U.S.C. 668dd).

Wildlife conservation is the fundamental mission of the Refuge System. The goals of the National Wildlife Refuge System, as articulated in the Mission Goals and Purposes Policy (601 FW1) are:

- Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered.
- Develop and maintain a network of habitats for migratory birds, anadromous and inter-jurisdictional fish, and pinniped populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges.
- Conserve those ecosystems, plant communities, wetlands of national or international significance, and landscapes and seascapes that are unique, rare, declining, or underrepresented in existing protection efforts.
- Provide and enhance opportunities to participate in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation and photography, and environmental education and interpretation).
- Foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

1.4.3 National Wildlife Refuge System Administration Act

Of all the laws governing activities on National Wildlife Refuges, the Refuge Administration Act undoubtedly exerts the greatest influence. The Improvement Act amended the Refuge System Administration Act in 1997 by including a unifying mission for all National Wildlife Refuges to be managed as a System, a new process for determining compatible uses on refuges, and a requirement that each refuge will be managed under a Comprehensive Conservation Plan, developed in an open public process.

Exhibit E
Page 12

The Refuge Administration Act states that the Secretary shall provide for the conservation of fish, wildlife, plants, and their habitats within the System, and ensure that the biological integrity, diversity, and environmental health of the System are maintained. House Report 105–106 accompanying the Improvement Act states "...the fundamental mission of our System is wildlife conservation: wildlife and wildlife conservation must come first." Biological integrity, diversity, and environmental health are critical components of wildlife conservation. As later made clear in the Biological Integrity, Diversity and Environmental Health Policy, "the highest measure of biological integrity, diversity, and environmental health is viewed as those intact and self-sustaining habitats and wildlife populations that existed during historic conditions."

Under the Refuge Administration Act, each refuge must be managed to fulfill the Refuge System mission and the specific purposes for which it was established. The Refuge Administration Act requires the Service to monitor the status and trends of fish, wildlife, and plants on each refuge.

Additionally, the Refuge Administration Act identifies six priority wildlife-dependent recreational uses—hunting, fishing, wildlife observation and photography, and environmental education and interpretation. Under the Refuge Administration Act, the Service is to grant these six wildlife-dependent public uses special consideration in planning, managing, establishing, and expanding units of the NWRS. The overarching goal is to enhance wildlife-dependent recreation opportunities and access to quality visitor experiences on refuges while managing refuges to conserve fish, wildlife, plants, and their habitats. New and ongoing recreational uses should help visitors focus on wildlife and other natural resources. These uses should provide an opportunity to make visitors aware of resource issues, management plans, and how the refuge contributes to the Refuge System and Service mission. When determined compatible on a refuge-specific basis, these six uses assume priority status among all uses of the refuge in question. The Service is directed to make extra efforts to facilitate priority wildlife-dependent public use opportunities.

When preparing a CCP, refuge managers must re-evaluate all general public, recreational, and economic uses (even those occurring to further refuge habitat management goals) proposed or occurring on a refuge for appropriateness and compatibility. No refuge use may be allowed or continued unless it is determined to be appropriate and compatible. Generally, an appropriate use is one that contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan. A compatible use is a use that, in the sound professional judgment of the refuge manager, will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge. Updated Appropriateness Findings and Compatibility Determinations for existing and proposed uses for Oregon Islands, Three Arch Rocks, and Cape Meares NWRs are in Appendices D and E.

The Refuge Administration Act also requires that, in addition to formally established guidance, the CCP must be developed with the participation of the public. Issues and concerns articulated by the public played a role in guiding the development of the CCP, and together with the formal guidance, played a role in the final CCP. It is Service policy to invite public participation in CCP development, to carry out an open public CCP process, and secure public input throughout the process.

1.5 Relationship to Previous and Future Refuge Plans

Planning has been part of refuge operations since the Refuges were established. A number of plans have been completed over the years to guide managers. In recent history, additional smaller step-down plans and or management agreements (plans addressing one program or resource) have been developed for Oregon Islands, Three Arch Rocks and Cape Meares NWRs individually or as a group. Current (completed since 2000) management plans include:

- Oregon Coast National Wildlife Refuge Complex HPAI (Highly Pathogenic Avian Influenza) and Wildlife Disease Contingency Plan (2006)
- Fire Management Plans (2003; 2004)
- Station Safety Plan (2002, revised 2008)
- Mammalian Predator Damage Management to Protect Seabird Colonies on Oregon Islands National Wildlife Refuge, Three Arch Rocks National Wildlife Refuge, and Adjacent Mainland Areas (2005a)
- Fire Dispatch Plans (updated annually)
- Oregon Coast NWRC IPM Plan (2009)

A Wilderness Management Plan was completed in 1980 (USFWS 1980). This CCP addresses all the current required elements of a Wilderness Stewardship Plan (610 FW 3) and serves as an updated Wilderness Plan for Oregon Islands and Three Arch Rocks designated wilderness areas.

1.6 Future Planning

The CCP will be revised every 15 years or sooner if monitoring and evaluation determine that changes are needed to achieve the Refuge's purposes, vision, goals, or objectives. The CCP provides guidance in the form of goals, objectives, and strategies for refuge program areas but may lack some of the specifics needed for implementation. Step-down management plans may be developed for individual program areas, as needed, following completion and approval of the CCP. Step-down plans may require additional National Environmental Policy Act (NEPA) and other compliance.

1.7 Refuge Establishment and Refuge Purposes

The purpose for which a refuge was established or acquired is of key importance in refuge planning. Purposes must form the foundation for planning and management decisions. The purposes of a refuge are specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge subunit.

Unless the establishing law, order, or document indicates otherwise, purposes dealing with the conservation, management, and restoration of fish, wildlife, plants, and the habitats on which they depend take precedence over other purposes in the management and administration of any unit. Where a refuge has multiple purposes related to fish, wildlife, and plant conservation, the more specific purpose will take precedence in instances of conflict. When an additional unit is acquired under an authority different from the authority used to establish the original unit, the addition takes on the purpose(s) of the original unit, but the original unit does not take on the purpose(s) of the newer addition.

By law, refuges are to be managed to achieve their purposes. When a conflict exists between the Refuge System mission and the purpose of an individual refuge, the refuge purpose may supersede the Refuge System mission. Refuge purposes are also the driving force in the development of the refuge vision statements, goals, objectives, and strategies in the CCP and are critical to determining the compatibility of all existing and proposed refuge uses. The purposes for the Oregon Islands, Three Arch Rocks, and Cape Meares NWRs follow.

1.7.1 Oregon Islands National Wildlife Refuge purposes

(purposes are bold and italicized)

1.7.1.1 Rocks, reefs, and islands

Oregon Islands National Wildlife Refuge was established by Executive Order (E.O.) 7035, dated May 6, 1935, with the designation of Goat Island Migratory Bird Refuge ***"…as a refuge and breeding ground for wild birds and animals."*** This original purpose applies to all lands and waters within this Refuge. Additional islands were added to the Refuge from 1968 to 1996 through various Executive Orders, Public Laws and Public Land Orders ***"…for use as an inviolate sanctuary, or for any other management purpose, for migratory birds."*** The rocks constituting Port Orford, Blanco, and Rogue River Reefs, when added to the existing Oregon Islands NWR, maintained an additional purpose as a ***"refuge for the protection of sea lions…"*** The Tillamook Rock Lighthouse Unit was added to the Refuge in 1992 through a Grant of Easement, which states that this addition is ***"…suitable for seabird nesting and habitat, and the recognized theme and spirit of this Indenture is to offer nesting protection for these seabirds that annually nest here while not affecting the sensitivity of the current and projected ongoing usage as a non-visiting columbarium cemetery and historic lighthouse, which must remain the primary purpose of the land for which this Indenture is granted."***

Scenic and rugged rocks, reefs, and islands. (Dave Ledig/USFWS)

1.7.1.2 Mainland units

The Coquille Point Unit was purchased in 1991 to ***"provide a buffer zone between mainland development and the coastal rocks and islands; protect the bluff zone for wildlife species; and provide one of the best opportunities along the Oregon coast for wildlife observation and environmental education."*** The Crook Point Unit was added in 1999 to ***"provide permanent protection to one of the few remaining undisturbed headlands on the Oregon coast, resulting in increased protection to major nearshore seabird breeding colonies and pinniped pupping and haul-out sites within***

Steller sea lions on Rogue Reef. (Roy W. Lowe/USFWS)

Exhibit E
Page 15

the Oregon Islands Refuge, unique geological formations, rare plants and cultural resource sites on the mainland, and a relatively undisturbed intertidal zone."

Oregon Islands NWR and Wilderness is located along 320 miles of the coast of Oregon and includes 1,854 rocks, reefs, and islands and two headlands. The original purpose for federal withdrawal of certain rocks, reefs, and islands along the Oregon coast was to protect them from "settlement, location, sale or entry, for classification and in aid of proposed legislation." Goat Island was the first unit of Oregon Islands NWR designated as a refuge, and all of the administratively withdrawn rocks, reefs, and islands were eventually added. Wilderness designation was conferred on this Refuge in 1970, 1978, and 1996 and applies to all rocks, reefs, and islands within Oregon Islands NWR, with the exception of Tillamook Rock. With the exception of Coquille Point Unit's recreation purpose, Oregon Islands NWR lands were acquired to serve as a refuge and breeding ground for seabirds and pinnipeds, and wilderness designation was intended to complement and strengthen existing protections for wildlife.

Goat Island Migratory Bird Refuge was established by E.O. 7035 on November 26, 1934. The establishment was intended to effectuate further the purposes of the Migratory Bird Conservation Act (ch. 257, 45 Stat. 1222). Goat Island was withdrawn from settlement, location, sale, entry, or other form of appropriation under the public-land laws and reserved and set apart for the use of the Department of Agriculture as a refuge and breeding ground for wild birds and animals. It was declared unlawful within this reservation to "take or disturb any wild animal or bird, or their nests or eggs; to destroy any natural growth; or to burn it." The Refuge was also closed to all public entry. In 1940, Presidential Proclamation 2416 changed the name from Goat Island Migratory Bird Refuge to Oregon Islands NWR. At that time Goat Island was still the only land within the Refuge.

Beginning in 1968, a series of Public Land Orders, Public Laws, and Acts largely revoking earlier pre-Goat Island withdrawals, added numerous rocks, reefs, and islands to Oregon Islands NWR. Prior to Goat Island/Oregon Islands NWR establishment, numerous rocks and islands were withdrawn from settlement but not placed into any system. The Executive Order that withdrew Proposal Rock (E.O. 4082, 1924) and "all unreserved rocks and pinnacles situated in the Pacific Ocean off the coast of Oregon" (E.O. 4774, 1927) did not state a wildlife purpose.

Executive Order 4364 (1926) withdrew numerous named and unnamed islands and rocks "pending the passage of legislation to provide for the permanent reservation of the islands and rocks, in whole or in part, for recreational purposes or for the creation of permanent reservations of such rocks or islands as have long been occupied by breeding waterfowl and other native birds." Port Orford, Blanco, and Rogue River Reefs were withdrawn in 1931 (E.O. 5702) specifically as a refuge for the protection of sea lions. In 1968 Public Land Order (P.L.O.) 4395 added a total of 346.06 acres of rocks, reefs and islands to Oregon Islands NWR. A 1976 amendment to P.L.O. 4395 revoked or partially revoked the earlier withdrawals, and all the islands that had not been already made a part of the Refuge were added through the P.L.O. amendment.

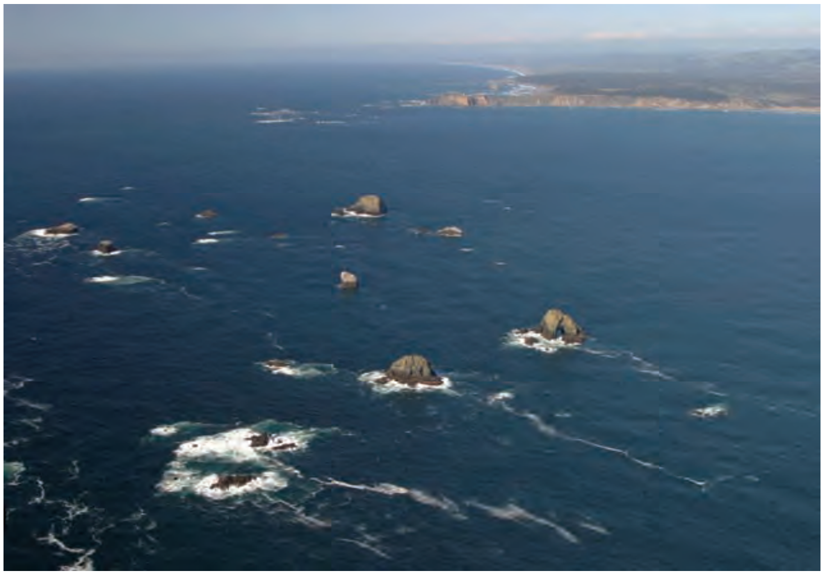
On October 23, 1970, certain lands within Oregon Islands NWR were accorded wilderness status through Public Law (P.L.) 91-504. The Wilderness Act of 1964 had directed the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 acres or more and every roadless island (regardless of size), and recommend to the President the suitability of each such area or island for inclusion in the National Wilderness Preservation System. Twenty-one acres within Oregon Islands NWR were found to be suitable and were accorded Wilderness designation through P.L. 91-504. The purposes of Oregon Islands NWR were not altered with this designation, as recorded in the public hearing records on the wilderness proposal: "the Wilderness Act provides that the establishment of a refuge wilderness area is 'supplemental' to the purpose for which a unit of the wildlife refuge system was established in the first place, so that protection of wildlife would only be strengthened."

The Wilderness Management Plan completed in 1980 (USWFS 1980) includes this statement regarding the relationship of wilderness to refuge objectives: "The Wilderness Act of 1964 (P.L. 88-577) defines a wilderness as '. . .an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area. . .without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions. . .' This definition of wilderness is compatible with refuge objectives. It has little, if any, effect on refuge programs since the original intent was to preserve these islands in a near-natural state with only minimal human intrusions. Authorized entry under specific conditions is detailed in the Wilderness Management Plan. Public use is not allowed as it is incompatible with the primary objectives." Wilderness designation provides an additional level of protection for the wilderness portions of this Refuge, but does not open the area to public access or use, nor does it change or supersede the original purposes for establishing the Refuge.


Common murre colony. (Roy W. Lowe/USFWS)

Public Land Orders and Public Laws from 1978 through 1996 completed the Oregon Islands NWR and Wilderness. On October 11, 1978, P.L. 95-450 added additional islands to the Refuge, and 459 acres already within Oregon Islands NWR were added to the Oregon Islands Wilderness. Public Land Order 6287 of June 16, 1982, withdrew additional "rocks, reefs, islets and islands lying within three geographical miles off the coast of Oregon and above mean high tide," and designated these as Oregon Islands NWR. On November 12, 1996, P.L. 104-333 transferred additional islands under Bureau of Land Management (BLM) jurisdiction, to Oregon Islands NWR, and designated all "federally owned named, unnamed, surveyed and unsurveyed rocks, reefs, islets and islands lying within three geographic miles of the coast of Oregon and above mean high tide" as Oregon Islands NWR and Wilderness.

The 1991 Environmental Assessment for a Proposed Addition to Oregon Islands NWR, Coos County, Oregon covered the acquisition of the Coquille Point Unit (USFWS 1991a). The purposes of this acquisition were to provide a buffer zone between mainland development and Oregon Islands NWR's offshore islands, protect the bluff zone for wildlife species dependent on it, and provide one of the best opportunities along the Oregon coast for wildlife observation. Authority for this acquisition was through the Fish and Wildlife Act of 1956 (16 U.S.C. 742f-a-5), using funds



String of islands accorded wilderness status. (Roy W. Lowe/USFWS)

made available through the Land and Water Conservation Fund Act of 1965, and through the Recreational Use of Conservation Areas Act of 1962, as amended (16 U.S.C. 460k-1). The Coquille Point Unit is the only unit of Oregon Islands NWR with a specific on-site public recreation purpose and is not included in the Oregon Islands Wilderness.

On July 7, 1992, a Grant of Easement was signed which granted an easement and right of use to the Service of privately owned Tillamook Rock to be maintained as a seabird nesting and habitat area in perpetuity as part of Oregon Islands NWR. The Grant states that “the land. . .is wholly suitable for seabird nesting and habitat and the recognized theme and spirit of this Indenture is to offer nesting protection for these seabirds that annually nest here while not affecting the sensitivity of the current and projected ongoing usage as a non-visiting columbarium/cemetery and historic lighthouse, which must remain the primary purpose of the land for which this Indenture is granted.” The grantors of this easement are permitted to utilize Tillamook Rock as a columbarium between September 1 and March 15, while “maintaining the spirit and theme of this Indenture.” Tillamook Rock does not qualify for Wilderness designation due to the human alterations of the rock, which includes the presence of buildings.

The Crook Point Unit of Oregon Islands NWR was acquired in 2000 with Land and Water Conservation Fund monies to protect sensitive seabird nesting colonies and pinniped haul-out sites located within Oregon Islands NWR from human disturbance and trespass. The purposes of acquisition were to provide permanent protection to one of the few remaining undisturbed headlands on the Oregon coast, resulting in increased protection to major nearshore seabird breeding colonies and pinniped pupping and haul-out sites within the Oregon Islands NWR, and to protect a relatively undisturbed intertidal zone, unique geological formations, rare plants and cultural resource sites. This acquisition was accomplished through a Categorical Exclusion because it involved a willing seller and there were no proposed changes to the existing uses of Oregon Islands NWR. Wildlife observation and photography, environmental education and interpretation were determined compatible uses for this unit during the interim period between acquisition and CCP development, but only in the form of extremely limited, guided tours by refuge staff, and dependent on available funding. Crook Point did not contain the necessary wilderness features to qualify for wilderness study after acquisition.

A statement of overall goals for the Oregon Coast NWR Complex Refuges was drafted in 1997. These broad goals will continue to be used as general guidance for the Complex’s biological and public use programs; however, the goals articulated within the CCP will supersede the 1997 goals. The 1997 goals are as follows: (1) Protect, restore, and develop habitats for and otherwise support recovery of federally listed endangered and threatened species and help prevent the listing of candidate species and species of management concern; (2) Provide a diversity of habitats and maintain sanctuary status on coastal rocks, islands, and reefs along the Oregon coast sufficient to support nesting seabird populations and breeding and loafing pinniped populations; (3) Protect, restore, and develop a diversity of habitats for migratory birds such as shorebirds, wading birds, and neotropical songbirds, with special emphasis on waterfowl; (4) Protect, restore, and develop a diversity of native habitats for indigenous fish, wildlife, invertebrate, and plant species of the Oregon coastal ecosystem; and (5) Provide high quality opportunities for wildlife-dependent recreation to enhance public appreciation, understanding, and enjoyment of fish, wildlife, habitat, and cultural resources. Figures 1-1, 1-2 and 1-3 show the existing Refuge boundaries.

1.7.2 Three Arch Rocks National Wildlife Refuge purposes

(purposes are bold and italicized)

Three Arch Rocks was established in 1907 ***“. . .as a preserve and breeding ground for native birds and animals.”*** On October 14, 1907, President T. Roosevelt signed E.O. 699 establishing the Three Arch Rocks Reservation to protect existing habitat for colonial nesting seabirds. The name and land status, but not the purpose, were changed to the Three Arch Rocks NWR by E.O. 2416 signed July 25, 1940.

Three Arch Rocks NWR. (Betsy Rosenbaum/USFWS)

On October 23, 1970, Three Arch Rocks NWR was accorded wilderness status through P.L. 91-504. At 15 acres, Three Arch Rocks Wilderness is one of the smallest designated wilderness areas in the country. The Wilderness Act of 1964 had directed the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 acres or more and every roadless island (regardless of size) and to recommend to the President the suitability of each such area or island for inclusion in the National Wilderness Preservation System. All rocks and islands within Three Arch Rocks NWR were found to be suitable and were accorded Wilderness designation through P.L. 91-504. The purposes of Three Arch Rocks NWR were not altered with this designation, as recorded in the public hearing records on the wilderness proposal: “the Wilderness Act provides that the establishment of a refuge wilderness area is ‘supplemental’ to the purpose for which a unit of the wildlife refuge system was established in the first place, so that protection of wildlife would only be strengthened.” Figure 1-1 shows the existing Refuge boundary.

1.7.3 Cape Meares National Wildlife Refuge purposes

(purposes are bold and italicized)

Originally named Cape Meares Migratory Bird Refuge, Cape Meares NWR was established in 1938 ***“as a refuge and breeding ground for migratory birds and other wildlife”*** by E.O. 7957, dated August 19, 1938, and signed by President F. Roosevelt. The name and land status, but not the purpose, were changed to Cape Meares National Wildlife Refuge by E.O. 2416, signed July 25, 1940. Cape Meares NWR has been managed in cooperation with Oregon Parks and Recreation

Exhibit E
Page 19

Department (OPRD) since its establishment. A Special Use Permit dated November 9, 1938, granted permission to the Oregon State Parks Commission to "use Cape Meares Migratory Bird Refuge for the purpose of cooperating with the Bureau of Biological Survey in administering the area as a joint National Wildlife Refuge and State Park Project," subject to supervision and "dominant use" by the Bureau of Biological Survey. This agreement was superseded by a memorandum of agreement (MOA) dated February 21, 1986, through which Cape Meares NWR is managed cooperatively with OPRD as a joint NWR and State Scenic Viewpoint. Specifically, the MOA is for "the Use of Cape Meares National Wildlife Refuge for State Park Purposes." Forest resource management is administered by the Service, except that State Parks pays the annual fire patrol assessment to Oregon Department of Forestry.

Spruce on Cape Meares NWR. (Robert Reed/USFWS)

On June 11, 1987, the Service designated the NWR (excluding the hiking trail) a Research Natural Area (RNA) to further protect its unique vegetation, geology, and wildlife habitat in a naturally functioning ecosystem. Authority to designate RNAs on NWRs is delegated to the Service director by the National Wildlife Refuge Administration Act of 1966. RNAs are areas where natural processes are allowed to predominate without human intervention. Activities on RNAs are limited to research, study, observation, monitoring, and educational activities that are non-destructive, non-manipulative, and maintain unmodified conditions. The RNA designation for Cape Meares NWR was supported as an example of Sitka spruce forest communities and coastal headland shrublands on the north Oregon coast, and was considered an important site for inclusion into the RNA program as it is one of the few remaining stands of old-growth Sitka spruce along the northern Oregon coast.

A Refuge Management Plan was completed for Cape Meares in 1987 (USFWS 1987). In this plan, overall refuge goals and objectives for Cape Meares NWR were articulated as (1) to protect and preserve the existing cliff habitat and the Cape Meares old-growth forest in an unaltered, natural condition to support migratory bird and other wildlife populations; (2) to maintain the integrity of the Refuge as a Research Natural Area, allowing natural processes to continue without interference from humans; (3) to provide monitoring and to cooperate with other agencies, institutions of higher education, private organizations, and individuals in providing research opportunities; and (4) to provide, in cooperation with Oregon State Parks and Recreation, opportunities for quality wildlife-dependent recreation, interpretation, and outreach to enhance public appreciation, understanding, and enjoyment of refuge resources. These broad goals will continue to be used as general guidance for Cape Meares biological and public use programs; however, the goals articulated within the CCP will supersede the 1987 Management Plan goals.

The goals and objectives for Cape Meares NWR as a Research Natural Area are in addition to the 1987 Refuge Management Plan goals and objectives and are as follows: (1) to preserve an example of a significant natural ecosystem for comparison with those influenced by humans; (2) to provide an educational and research area for ecological and environmental studies; and (3) to preserve gene pools of typical and endangered plants and animals. RNA goals have been incorporated into the CCP goals. Figure 1-1 shows the existing Refuge boundary.

1.8 Relationship to Ecosystem Management Goals or Plans

One of the major purposes of this CCP is to ensure that refuge management is focused on achieving not only the refuge purposes, but also national, regional, and state goals for the preservation and enhancement of wildlife and habitats. These goals are stated in various plans that pertain to the Pacific Northwest and especially the Oregon coast and the California Current System. The following is a list of the major plans that were considered in the development of the CCP goals and objective.

1.8.1 Habitat

- Oregon Natural Heritage Plan (ONHP 2003). The Oregon Natural Heritage Plan is a product of the Oregon Natural Heritage Program, whose mission is to conserve the full range of Oregon's native plants, animals and ecosystems through voluntary and cooperative action. The Program uses science to identify high quality and representative examples of native Oregon habitats and species and works to protect these natural treasures through voluntary and cooperative habitat conservation agreements. The Oregon Natural Heritage Plan has three roles: (1) Describe the components of Oregon's natural heritage; (2) Identify natural areas of exceptional value for conservation; and (3) Provide opportunities for voluntary conservation on both public and private lands.

- Pacific Northwest Coast Ecoregion Assessment (Vander Schaaf et al. 2006). This Assessment is a resource to help conservation agencies, planners, and organizations direct their resources to the most important places for supporting the ecoregion's biodiversity. It describes a portfolio of priority conservation areas that are of exceptional biological value and are the most likely places for conservation to succeed based on their current condition, land use, and other factors.

- Oregon Nearshore Strategy (ODFW 2005a). The Nearshore Strategy, prepared by the Oregon Department of Fish and Wildlife (ODFW) Marine Resources Program, complements the statewide Comprehensive Wildlife Conservation Strategy (ODFW 2005b) by providing additional information on nearshore marine fish and wildlife, and their habitats. The Nearshore Strategy identifies a broad spectrum of resource management concerns and issues in order to ensure all issues that may affect fish and wildlife have been considered. Many of these issues cut across the jurisdiction of multiple agencies; however, this Strategy is focused on providing recommendations for action within ODFW's jurisdiction. The mission of Oregon's Nearshore Strategy is to promote actions that will conserve ecological functions and nearshore marine resources to provide long-term ecological, economic, and social benefits for current and future generations of Oregonians.

- Oregon Territorial Sea Plan (LCDC 1994). This Plan was developed by the Ocean Policy Advisory Council (OPAC). During development of the Plan OPAC held statewide public input meetings, worked with federal partners, and used the earlier Ocean Plan as a framework. This Plan focuses on state waters out to three nautical miles. It established policies and procedures, coordination between state agencies, and provided a strategy for protecting rocky shores. The Plan was approved as part of Oregon's Coastal Management Plan in 1994 and was amended in May 2001.

- Oregon's Comprehensive Wildlife Conservation Strategy (ODFW 2005b). The Oregon Department of Fish and Wildlife prepared a Comprehensive Wildlife Conservation Strategy (CWCS) in response to two federal programs—the Wildlife Conservation and Restoration Program and the State Wildlife Grant Program. The CWCS includes information on the distribution and abundance of priority wildlife and habitats; provides strategies for conserving and monitoring wildlife and habitat; and provides for coordination with federal, state, tribal, and local agencies and the public. The CWCS emphasizes proactive measures to conserve declining species and habitats, and to "keep common species common."

1.8.2 Birds

- Birds of Conservation Concern 2002 (USFWS 2002). Based on the efforts and assessment scores of three major bird conservation efforts (Partners in Flight, the U.S. Shorebird Conservation Plan, and the North American Waterbird Conservation Plan), this report identifies, by Service Region and by Bird Conservation Region (BCR), the bird species most in need of conservation attention. The Refuges of the Complex are located within BCR Region 5.

- Recovery Plan for the Threatened Marbled Murrelet (*Brachyramphus marmoratus*) in Washington, Oregon, and California (USFWS 1997). The interim objective of the Recovery Plan is to set strategies for stabilizing population size at or near current levels by maintaining and/or increasing productivity and removing and/or minimizing threats to the species survival.

- A Conservation Strategy for the Northern Spotted Owl (Interagency Scientific Committee 1990). The Conservation Strategy for the northern spotted owl (*Strix occidentalis caurina*) proposes a two-part conservation strategy. The first stage prescribes and implements the steps needed to protect habitat in amounts and distribution that will adequately ensure the owl's long-term survival. The second stage calls for research and monitoring to test the adequacy of the strategy and to seek ways to produce and sustain suitable owl habitat in managed forests.

- California Brown Pelican Recovery Plan (USFWS 1983). This Recovery Plan describes the biology of the California brown pelican (*Pelecanus occidentalis californicus*), the reasons for its decline, and the actions needed to recover and delist the species.

- Pacific Bald Eagle Recovery Plan (USFWS 1986). This recovery plan, one of five such plans, outlines the steps needed for recovery and maintenance of bald eagle populations in the seven-state Pacific recovery area.

- Aleutian Canada Goose Recovery Plan – Second Revision (USFWS 1991b). This Recovery Plan, prepared in 1979 with a first revision in 1982, described the biology of the Aleutian Canada goose (*Branta hutchinsii leucopareia*) (now Aleutian cackling goose, delisted in 2001) and the habitat requirements and limiting factors, and the actions needed to recover and delist the species.

- Regional Seabird Conservation Plan (USFWS 2005b). This Plan identifies the Service's priorities for seabird management, monitoring, research, outreach, planning, and

Exhibit E
Page 22

coordination. It serves as a guide to coordinate Service activities for seabird conservation at the Regional scale. The Plan includes a review of seabird resources and habitats, a description of issues and threats, and a summary of current management, monitoring, and outreach efforts. All species are prioritized by conservation concern at the regional scale and recommendations for conservation actions are identified and prioritized. Brief profiles for each breeding species provide a summary of current information on population size, status, ecology, distribution, habitats, threats, and recommended conservation actions.

- U.S. Shorebird Conservation Plan: Northern Pacific Coast Regional Shorebird Management Plan (Drut and Buchanan 2000). The national Shorebird Plan, which provides a scientific framework to determine species, sites, and habitats that most urgently need conservation action, includes 11 regional plans reflecting major shorebird flyways and habitats within the United States. This regional plan addresses shorebird management needs on a regional basis while considering Pacific Flyway and National levels of need.

- Waterbird Conservation for the Americas: North American Waterbird Conservation Plan, Version 1 (Kushlan et al. 2002). The North America Waterbird Conservation Plan provides a continental-scale framework for the conservation and management of 210 species of waterbirds, including seabirds, coastal waterbirds, wading birds and marshbirds utilizing aquatic habitats in 29 areas throughout North America, Central America, the islands and pelagic waters of the Caribbean Sea, western Atlantic and U.S.-associated Pacific Islands, and pelagic waters of the Pacific Ocean.

- Partners in Flight North American Landbird Conservation Plan. (Rich et al. 2004). Partners in Flight (PIF) is an international coalition of government agencies, conservation groups, academic institutions, private organizations, and citizens dedicated to the long-term maintenance of healthy populations of native landbirds. PIF's goal is to focus resources on the improvement of monitoring and inventory, research, management, and education programs involving birds and their habitats. The PIF strategy is to stimulate cooperative public and private sector efforts in North America and the neotropics to meet these goals. Specific strategies for accomplishing the goals are contained in regional landbird conservation plans. These plans describe priority habitats and species, and provide recommended management actions to conserve those habitats and species.

- Partners in Flight Continental Priorities and Objectives defined at the State and Bird Conservation Regional Levels; Oregon (Rosenberg 2004). The Oregon regional and state PIF plans identify priority species and habitats, set goals and objectives, discuss local issues and opportunities, and outline strategies for local or regional partners to implement bird conservation objectives.

- The California Current Marine Bird Conservation Plan version 1 (Mills et al. 2005). This Plan addresses seabird conservation from an ecosystem perspective, synthesizing information on multiple species, multiple habitats, ecological interactions, and the issues and threats that affect the health of seabirds, their prey and their environments.

1.8.3 Mammals

- Recovery Plan for the Steller Sea Lion (*Eumetopias jubatus*) (NMFS 2008). The Recovery Plan serves as the blueprint for recovery and eventual de-listing of the Steller sea lion from the list of threatened and endangered species under the Federal Endangered Species Act.

1.8.4 Global climate change

- Strategic Habitat Conservation (USFWS and USGS 2006). Strategic Habitat Conservation will involve working collaboratively with partners to develop and implement a landscape approach to habitat conservation. The program employs strategic habitat conservation principles to provide landscape-level conservation and planning assistance to abate the impacts of growth and development related to climate change and/or sea-level rise. Activities focus on ensuring habitat connectivity; mitigating the effects of climate change, such as flooding or storm surge; and coastal land protection and conservation.

1.9 Planning and Issue Identification

The public scoping period for preparation of the Draft CCP for Oregon Islands, Three Arch Rocks, and Cape Meares NWRs opened in October 2006 when the Complex mailed approximately 300 copies of Planning Update #1 to local conservation and interest groups, conservation and research organizations, government agencies, Tribes, and others who expressed an interest in the planning process. The planning update was posted on the Complex website. Planning Update #1 described the CCP process, explained refuge purposes, identified preliminary issues, and helped us expand our mailing list.

Five public meetings were held in coastal Oregon communities during November 2006 where Complex staff explained the CCP process; refuge purposes, vision, and management; and preliminary management issues, concerns and opportunities that had been identified early in the planning process. Public comments were documented during these meetings. Issues and concerns articulated by the public were considered while we formulated the CCP, and together with the formal guidance, played a role in the final CCP.

The second planning update was mailed on April 18, 2007. This update summarized the issues, concerns, and opportunities identified by the Service, its partners, and the public during initial public scoping. A summary of public involvement is in Appendix I.

1.9.1 Issues to be addressed in the CCP

The core planning team evaluated the issues and topics documented during the scoping process. Issues are defined as matters of controversy, dispute, or general concern over resource management activities, the environment, land uses, or public use activities. Issues are important to the planning process because they identify topics to be addressed in the CCP, pinpoint the types of information to gather, and help define CCP alternatives. Numerous issues, concerns, and opportunities were raised, and all are addressed in some manner in the CCP. It is the Service's responsibility to focus CCP planning on the major issues. Major issues typically suggest different actions or alternative solutions and are those within the Complex's jurisdiction that have a positive or negative effect on the resource. The major issues, concerns, and opportunities identified by the CCP planning team and the public are presented in the sections that follow.

1.9.1.1 Issue 1. Disturbance of wildlife

- *What actions should the Service take to reduce low-flying aircraft disturbance events impacting highly vulnerable seabirds and marine mammals?*

Reports of low-flying aircraft disturbing seabird colonies and pinniped haul-outs continue along locations on the coast, and at Oregon Islands and Three Arch Rocks NWRs. The Complex is actively managing low-level aircraft disturbance through guidelines published on Federal Aviation Administration (FAA) pilot maps, educational posters, and material distributed to airports and pilots associations, and through educational pilot training opportunities. The CCP outlines strategies and levels of effort to reduce wildlife disturbance by aircraft.

- *What actions should the Service take to reduce boating disturbance events impacting seabirds and marine mammals? Is the existing seasonal buffer zone closure around Three Arch Rocks NWR effective in protecting breeding seabirds and marine mammals and if so, could and should the buffer zone be replicated around other rocks and islands to protect valuable habitat?*

Boats, both motorized and non-motorized, are reported regularly disturbing wildlife on rocks and islands along the coast. To reduce or eliminate watercraft disturbance events to wildlife, the Refuge manages watercraft at Three Arch Rocks NWR with a seasonal buffer zone closure. For Oregon Islands NWR the Refuge posts public boat ramps at coastal locations with informational and warning placards. The CCP outlines strategies and levels of effort, including replication of buffer zones, to reduce disturbance to wildlife by motorized and non-motorized watercraft.

1.9.1.2 Issue 2. Law enforcement

- *What actions and partnerships can the Service pursue to improve law enforcement on the Refuges?*

Local citizens often notify the Refuge of trespass and wildlife disturbance. Due to limited staff, past and current enforcement coverage has by necessity relied on informal arrangements and coordination with other law enforcement agencies. The CCP outlines strategies and levels of effort for pursuing law enforcement capabilities and partnerships with other agencies.

1.9.1.3 Issue 3. Management of public access and use

- *What types and level of recreational opportunities should be provided? Are existing public use opportunities adequate and appropriate?*

Interest in public recreation on the Refuges is increasing. This interest involves priority wildlife-dependent public uses (hunting, fishing, wildlife observation, photography, environmental education and interpretation) that have priority over other public uses as mandated by the National Wildlife Refuge System Administration Act of 1966, as amended. Specifically, the CCP considers how to best meet those priority public use needs while also protecting the habitat/wildlife the Service is mandated to protect.

1.9.1.4 Issue 4. Research and monitoring

- *Based on Refuge System, ecosystem, and refuge goals, what management-oriented research is needed and what partnerships and methods for accomplishing high-priority research are feasible?*

Existing baseline data and inventory of plant and animal species found on Oregon Islands, Three Arch Rocks, and Cape Meares NWR's habitats are currently inadequate for monitoring trends in these communities. Emphasis of research should focus on understanding the cause of reduced or declining wildlife populations and development of tools and techniques to aid recovery of threatened or endangered species. The CCP proposes various strategies and levels of effort for identifying and fulfilling inventory, monitoring, and research needs as well as research partnership opportunities, and considers how this information can be incorporated into management of the Refuges.

1.9.1.5 Issue 5. Climate change

- *What is known about global climate change and how it affects the species and ecosystems that depend on the Refuges? Which of these issues can be further studied at the Refuge and ecosystem level, and how can this information be incorporated into wildlife management on the Refuges?*

Over the coming years, effects of climate change, such as flooding, storm surge, and coastal erosion due to sea-level rise will impact the Refuges. Through the CCP process we assessed what is known about global climate change and how it affects the species and ecosystems that depend on the Refuge; this information was used to determine which issues can be further studied at the refuge and ecosystem level, and identify how this information can be incorporated into refuge management.

1.9.1.6 Issue 6. Invasive species

- *What invasive plant and animal species are present on the Refuges, how are they impacting seabird and other important wildlife habitats, and how can the Refuges deal with them?*

Negative impacts of invasive species on wildlife populations and habitat continue to be a major factor in the management of the Refuges. The CCP considers different strategies and levels of effort to determine the presence of invasive plant and animal species, and establish management strategies to reduce or eliminate them.

1.9.1.7 Issue 7. Human-caused catastrophic events

- *What actions can the Complex take to initiate or improve contingency planning for catastrophic events such as shipwrecks, oil spills, and rat spills; concentrations of marine debris; diseases such as West Nile virus and avian flu; and wildfire?*

Public concerns over the impacts of wildland fires, wildlife diseases, and oil spills and other human-induced wildlife catastrophic events have increased in recent years. The CCP incorporates existing Contingency Plans and addresses contingency planning for other potential disasters.

1.9.1.8 Issue 8. Cooperative efforts

- *What jurisdictions and management responsibilities overlap within the Refuges' administrative boundaries and in Marine Protected Areas and how can the Complex's resources and management benefit from multiple-agency involvement in resource protection?*

There are many community groups, federal and state agencies, and other entities that assist the Refuges in accomplishing their mission. The CCP proposes strategies for improving the Refuges' resource management capabilities through partnerships with other agencies, organizations, groups, and media.

1.9.2 Issues outside the scope of the CCP

The CCP is not an appropriate forum for discussion of all issues. The following issues are not analyzed in this CCP because they are not under the jurisdiction of these Refuges.

- Regarding future specific plans for Oil Spill Mitigation funds, refuge staff will engage in Natural Resource Damage Assessment (NRDA) programs when applicable and will provide input, including strategies and priorities for restoration projects.
- The issue of land acquisition, such as the establishment of new refuges to offset impacts of coastal development or the acquisition of forest habitat for marbled murrelets, is not feasible at this time.
- Snowy plover management on beaches, the potential for sea otter reintroduction along the Oregon coast, and management of other listed species not occurring on refuge lands are not within the scope of this CCP/WSP because they fall under the jurisdiction of other Service programs.
- Wildlife disturbance on lands and waters not included within the Refuges' boundaries will be part of cooperative management discussions with other resource agencies but are not a target for analysis within the CCP/WSP.

1.10 Refuge Vision Statements

1.10.1 Oregon Islands National Wildlife Refuge

Spanning the Oregon coast, the wilderness islands and windswept headlands of Oregon Islands National Wildlife Refuge are celebrated for their wildlife and rugged grandeur. Rocky islands and sheer cliffs provide critical breeding and resting habitat for diverse communities of birds, mammals, and plants along the wave-battered coastline. The isolated Crook Point headland continues to be reshaped by the geologic forces that fashioned it, while visitors are drawn to the Coquille Point headland by the exceptional opportunities to observe and learn about coastal wildlife and the National Wildlife Refuge System.

With our friends and partners, we will apply sound scientific principles for monitoring, managing, and protecting the biological integrity of Pacific coastal wildlife and habitats. We envision the continued development and enhancement of inspiring viewing opportunities for hundreds of thousands of visitors, providing them with a window into this living heritage, while the island breeding grounds and Crook Point will continue to provide a secluded wildland haven for wildlife and plants, in sight of and just out of reach of human influence.

1.10.2 Three Arch Rocks National Wildlife Refuge

A testament to seabird conservation, Three Arch Rocks National Wildlife Refuge sustains the largest and most diverse seabird colony in Oregon and is an important breeding site for Steller sea lions. Early protection of the nine offshore rocks that define this remote wilderness habitat set a precedent for conservation along the resource-exploited Pacific coastline, symbolizing a change in the way the American public protects and views these marine species. Formed by pre-historic lava flows and shaped by continuous oceanic forces, this Wildlife Refuge will be managed as wilderness in perpetuity, for the benefit of wildlife and the American people.

1.10.3 Cape Meares National Wildlife Refuge

A remnant of once vast old-growth Pacific temperate rainforest, the fog-shrouded Sitka spruce and western hemlock forests of Cape Meares National Wildlife Refuge loom over precipitous coastal cliffs providing seabirds, falcons, and a wealth of endemic coastal wildlife with protected sanctuary. In cooperation with OPRD, we envision natural processes continuing to unfold in the most remote sections of the Refuge while visitors are welcomed to the viewing decks and trails and invited to observe and learn about this rare, intact functioning coastal ecosystem.

1.11 Refuge Goals

Goal 1: Preserve and protect all rocks, reefs, and islands within Oregon Islands and Three Arch Rocks NWRs for the benefit of seabirds, shorebirds, waterfowl, other migratory birds, pinnipeds, and native plants.

Goal 2: Maintain and protect native coastal habitats within the Crook Point Unit of Oregon Islands NWR for the benefit of rare plants, migratory birds, and other native wildlife.

Goal 3: Protect rocks and islands within Oregon Islands NWR by maintaining a mainland buffer zone at Coquille Point Unit for the benefit of seabirds, shorebirds, waterfowl, other migratory birds, pinnipeds, and native plants.

Goal 4: Collect scientific information (inventories, monitoring, feasibility studies, assessments, and research) to support adaptive management decisions (Goals 1–3) on Oregon Islands and Three Arch Rocks NWRs.

Goal 5: Oregon Islands NWR: Promote protection, stewardship and enjoyment of Oregon’s seabirds and pinnipeds and their wilderness habitats by providing opportunities for wildlife observation, photography, interpretation, and environmental education on appropriate mainland areas.

Goal 6: Three Arch Rocks NWR: Promote protection, stewardship and enjoyment of Oregon’s seabirds and pinnipeds and their wilderness habitats, and the historical significance of the Refuge to marine wildlife conservation.

Goal 7: Preserve and protect the wilderness character of Oregon Islands Wilderness and Three Arch Rocks Wilderness including their untrammeled nature, naturalness, and undeveloped condition.

Goal 8: At Cape Meares NWR, protect and maintain coastal habitats characteristic of Pacific Northwest old-growth Sitka spruce forest to allow natural succession to occur consistent with Research Natural Area designation, for the benefit of these habitat types and the plant and animal species associated with them.

Goal 9: Collect scientific information (inventories, monitoring, feasibility studies, assessments, and research) to support adaptive management decisions (Goal 8) on Cape Meares NWR and RNA.

Goal 10: In cooperation with OPRD, provide on- and off-site opportunities for visitors to enjoy wildlife observation, photography, and environmental education and interpretation while limiting disturbance to wildlife. Visitors will be able to gain an understanding of the basic ecological concepts of the coastal cliffs and old-growth Sitka spruce and western hemlock forests of Cape Meares and appreciate wildlife and wildlands that are being protected.

Goal 11: Promote conservation of cultural resources on refuge lands through effective coordination and cooperation with Tribes having adjoining ownership or management responsibilities.

1.12 References

Drut, M.S. and J.B. Buchanan. 2000. Northern Pacific coast regional shorebird management plan. U.S. shorebird conservation plan. U.S. Fish and Wildlife Service. Office of Migratory Bird Management. Portland, OR. 32 pp.

Interagency Scientific Committee. 1990. A conservation strategy for the northern spotted owl. Portland, OR. 427 pp.

Kushlan, J.A., M.J. Steinkamp, K.C. Parsons, J. Capp, M.A. Cruz, M. Coulter, I. Davidson, L. Dickson, N. Edelson, R. Elliot, R.M. Erwin, S. Hatch, S. Kress, R. Milko, S. Miller, K. Mills, R. Paul, R. Phillips, J.E. Saliva, B. Sydeman, J. Trapp, J. Wheeler, and K. Wohl. 2002. Waterbird conservation for the Americas: North American waterbird conservation plan, version 1. Washington, D.C. 78 pp.

LCDC (Land Conservation and Development Commission). 1994. Oregon territorial sea plan. Salem, OR. 250 pp.

Mills, K.L., W.J. Sydeman, and P.J. Hodum, eds. 2005. The California Current marine bird conservation plan, vol. 1. PRBO Conservation Science. Stinson Beach, CA.

NMFS (National Marine Fisheries Service). 2008. Recovery plan for the Steller sea lion (*Eumetopias jubatus*). Revision. National Marine Fisheries Service. Silver Spring, MD. 325 pp.

ODFW (Oregon Department of Fish and Wildlife). 2005a. Oregon nearshore strategy. Oregon Department of Fish and Wildlife. Newport, OR.

ODFW. 2005b. Oregon's comprehensive wildlife conservation strategy. Oregon Department of

Fish and Wildlife. Salem, OR.

ONHP (Oregon Natural Heritage Program). 2003. Oregon natural heritage plan. Department of State Lands. Salem, OR. 167 pp.

Rich, T.D., C.J. Beardmore, H. Berlanga, P.J. Blancher, M.S.W. Bradstreet, G.S. Butcher, D.W. Demarest, E.H. Dunn, W.C. Hunter, E.E. Iñigo-Elias, J.A. Kennedy, A.M. Martell, A.O. Panjabi, D.N. Pashley, K.V. Rosenberg, C.M. Rustay, J.S. Wendt, and T.C. Will. 2004. Partners in Flight North American landbird conservation plan. Cornell Lab of Ornithology. Ithaca, NY.

Rosenberg, K.V. 2004. Partners in Flight continental priorities and objectives defined at the state and bird conservation regional levels; Oregon. Cornell Lab of Ornithology. Ithaca, NY.

USFWS (U.S. Fish and Wildlife Service). 1980. Oregon Islands and Three Arch Rocks wilderness management plan. Western Oregon National Wildlife Refuge Complex. Corvallis, OR.

USFWS . 1983. California brown pelican recovery plan. U.S. Fish and Wildlife Service. Portland, OR. 179 pp.

USFWS. 1986. Pacific bald eagle recovery plan. Region 1. U.S. Fish and Wildlife Service. Portland, OR. 160 pp.

USFWS. 1987. Oregon Islands, Cape Meares, Three Arch Rocks, and Bandon Marsh NWRs refuge management plan. Western Oregon National Wildlife Refuge Complex. Corvallis, OR.

USFWS. 1991a. Environmental assessment; proposed additions to Oregon Islands National Wildlife Refuge, Coos County, Oregon. Portland, OR. 18 pp.

USFWS. 1991b. Aleutian Canada goose recovery plan. U.S. Fish and Wildlife Service, Anchorage, AK. 55 pp.

USFWS. 1997. Recovery plan for the threatened marbled murrelet (*Brachyramphus marmoratus*) in Washington, Oregon and California. Portland, OR. 203 pp.

USFWS. 2002. Birds of conservation concern 2002. Division of Migratory Bird Management. Arlington, VA. 99 pp.

USFWS. 2003. Wildland fire management plan; Cape Meares NWR. Newport, OR

USFWS. 2004. Wildland fire management plan; Oregon Islands NWR. Newport, OR.

USFWS. 2005a. Environmental assessment: mammalian predator damage management to protect seabird colonies on Oregon Islands NWR, Three Arch Rocks NWR, and adjacent mainland areas. Oregon Coast National Wildlife Refuge Complex. Newport, OR. 130 pp.

USFWS. 2005b. Regional seabird conservation plan. U.S. Fish and Wildlife Service. Migratory Birds and Habitat Programs. Pacific Region. Portland, OR. 261 pp.

USFWS. 2006. Highly pathogenic avian influenza and wildlife disease contingency plan. Oregon Coast National Wildlife Refuge Complex. Newport, OR.

USFWS. 2009. Integrated pest management plan. Oregon Coast National Wildlife Refuge Complex. Newport, OR.

USFWS and USGS (U.S. Geological Survey). 2006. Strategic habitat conservation. Final report of the National Ecological Assessment Team. 45 pp.

Vander Schaaf, D., G. Wilhere, Z. Ferdaña, K. Popper, M. Schindel, P. Skidmore, D. Rolph, P. Iachetti, G. Kittel, R. Crawford, D. Pickering, and J. Christy. 2006. Pacific Northwest coast ecoregion assessment. Prepared by The Nature Conservancy, The Nature Conservancy of Canada, and the Washington Department of Fish and Wildlife. The Nature Conservancy, Portland, OR.

Exhibit F
Page 1

Chapter 3. Physical Environment

3.1 Climate

The Oregon Coast National Wildlife Refuge Complex comprises six National Wildlife Refuges that span nearly 320 miles along the rugged Oregon coastline. We discuss three of the six NWRs associated with the Complex: Oregon Islands, Three Arch Rocks, and Cape Meares. Oregon Islands NWR spans nearly the entire length of the Oregon coastline and consists of two headlands and all coastal rocks, reefs, and islands that are exposed at mean high tide and not connected to the mainland, except Chief's Island. Three Arch Rocks NWR includes three large rocks and six smaller rocks located one-half mile offshore from the town of Oceanside on Oregon's north coast. Cape Meares NWR is a coastal headland also located on the north coast approximately 12 miles southwest of Tillamook.

The region's climate is greatly influenced by the Pacific Ocean on the west and the Coast Range to the east. The Coast Range rises between 2,000 and 3,000 feet (610–914 m) above sea level in the north and between 3,000 and 4,000 feet (914–1,219 m) in the southwestern portion of the state with occasional mountain peaks rising an additional 1,000 to 1,500 feet (305–457 m). The coastal zone is characterized by wet winters, relatively dry summers, and mild temperatures throughout the year. Because of the moderating influence of the Pacific Ocean, extremely high or low temperatures are rare and annual temperature range is lower than any other Oregon climate zone. The area's heavy precipitation during winter results from moist air masses moving from the Pacific Ocean onto land. The lower elevations along the coast receive annual precipitation of 65 to 90 inches (165–229 cm), which can cause flood events if abundant rainfall is consistent for several days. The west slope of the Coast Range can receive 200 inches (508 cm) of annual precipitation, some of that in the form of snow. Occasional strong winds occur along the coast, usually in advance of winter storms. Wind speeds can exceed hurricane force and have caused substantial damage to structures and vegetation in exposed coastal locations. Skies are usually cloudy in the winter and partly cloudy during summer due to localized fog. As a result of persistent cloudiness, total solar radiation is lower along the north and central coast than in any other part of the state.

The Oregon coast in general has a temperate marine climate but is subject to strong winds and tides especially during the winter. Temperatures occasionally fall to freezing and rarely exceed 75°F (24°C) although temperatures exceeding 90–100°F (32–38°C) have been recorded. Precipitation is heavier and more persistent during the winter but regular moisture occurs from rain and fog throughout the year.

The National Climatic Data Center (NCDC) established the Oregon coast, from Astoria to Brookings, as Climate Division 1. Meteorological measurements have been taken at 22 NOAA Climate Stations throughout Climate Division 1 (NCDC 2008) and are representative of the general climatic conditions of the Refuge Complex. This CCP uses NOAA's weather data to discuss weather patterns on the Refuges.

3.1.1 Temperature

Based on data collected from 1948 through 2008 at Climate Division 1, the average monthly temperatures for the coast range from a low of 43.2°F (6.2°C) in January to a high of 61.2°F (16.2°C) in August. The highest winter monthly average temperature recorded was 51.4°F (10.8°C) in February 1963, and the lowest average monthly temperature was 33.9°F (1.1°C) in

Exhibit F
Page 2

January 1949. The highest summer monthly average temperature recorded was 64.1°F (17.8°C) in August 2004, and the lowest monthly average temperature was 54.9°F (12.7°C) in June 1954 (NCDC 2008).

Based on data collected from 1971 to 2000, daily maximum temperatures at Newport, Oregon, located near the center of the Oregon coast, vary from an average of 51.2°F (10.7°C) in January to 65.7°F (18.7°C) in August. There are, on average, 0.5 days annually with maximum temperatures exceeding 90°F (32.2°C). The record maximum daily temperature was 100°F (37.8°C), recorded on July 11, 1961. The average daily minimum temperature at Newport is 38.6°F (3.7°C) during January and 50.7°F (10.4°C) during August. On average, the daily minimum temperature drops to or below 32°F (0°C) 20.3 days per year. The record minimum temperature of 1°F (−17.2°C) was recorded December 8, 1972 (NOAA 2008). The all-time maximum high temperature recorded on the Oregon coast is 108°F (42°C) and occurred in Brookings on July 8, 2008.

3.1.2 Precipitation

Average annual precipitation for the Oregon coast is 77.0 inches (195.6 cm). In 1996, the wettest year on record the precipitation measured was 108.4 inches (375.3 cm); in 1976, the driest year, only 49.0 inches (124.5 cm) were measured. The wettest season on record was the winter of 1956–1957, with 18.8 inches (47.8 cm) of precipitation; the driest season was the summer of 2003, with only 0.2 inches (0.5 cm) of precipitation (NCDC 2008). Winter is defined as December, January, and February and summer as June, July, and August. More than half of the total annual amount of precipitation occurs from November through February.

Average snowfall in Newport ranges from a maximum of 0.6 inch (1.5 cm) in January, to 0.1 inch (0.2 cm) in February, to 0.3 inch (0.8 cm) in December. The record monthly snowfall of 11.0 inches (27.9 cm) occurred in January 1943 and December 1972. The annual record snowfall of 15.5 inches (39.4 cm) occurred in 1972. Snowfall accounts for less than 1% of all precipitation from December through February (NOAA 2008).

Fog (water vapor condensing into tiny liquid water droplets in the air) is a common phenomenon along the Oregon coast because of contrasting differences between air, land, and ocean temperatures and humidity. The average number of days per year with dense fog (visibility of 0.25 mile or less) in Astoria is 41. Fog records for central and south coastal locations were unavailable. June averaged the fewest days (one) with dense fog and October with the most days (seven) (NOAA 2008).

3.1.3 Wind

Average wind speeds have been calculated on hourly data collected from 1996 to 2006 from automated stations at reporting airports in Oregon. The average annual wind speed for Newport is 8.8 miles per hour (mph [14.2 km/h]). The highest average wind speed occurred during December and January at 11.2 (18) and 11.0 mph (17.7 km/h) respectively. The calmest month, September, recorded an average wind speed of 6.5 mph (10.5 km/h). Astoria Airport recorded an average annual wind speed of 7.7 mph (12.4 km/h) with highest speeds during December at 8.7 mph (14 km/h) and lowest during September and October at 6.7 mph (10.8 km/h) (NOAA 2008).

Prevailing wind direction, defined as the direction with the highest percent of frequency, was calculated from hourly data during 1992 to 2002. The average annual prevailing wind direction in

Newport (on the central coast) blows from the east and south respectively. In Newport, winds from the east occur in December through February, from the south during fall and spring, and north-northwest during the summer months (NOAA 2008).

As a rule, Oregon does not experience hurricanes, and tornadoes are infrequent and generally small in the northwestern part of the United States. However, the National Weather Service issued a hurricane warning for the first time for the Oregon coast during an extremely powerful storm that slammed into the Pacific Northwest during December 2–4, 2007, during which winds topped out at 130 mph (209 km/h) along coastal Oregon (NOAA 2008). The NCDC maintains a database that provides information on the incidence of tornadoes reported in each county in the United States. This database reports that 94 tornadoes were reported in Oregon since 1950. In the seven counties closest to the Refuges (Clatsop, Tillamook, Lincoln, Lane, Douglas, Coos, and Curry), only 19 tornadoes have been recorded since 1950. Of these, 11 tornadoes had maximum wind speeds estimated in the range of 40 to 72 mph (64–116 km/h, or F0), and eight had maximum wind speeds in the range of 73 to 112 mph (117–180 km/h, or F1).

3.2 Hydrology

A description of a hydrological system usually includes parameters such as stream/river flow, runoff, ground water, and snow pack. However, the hydrology of the Oregon Islands and Three Arch Rocks NWR would be better described by Pacific Ocean processes. This immense water body surrounds, impacts, and influences the refuge headlands, rocks, islands, and reef habitats continually.

The Pacific Ocean processes can be explained by investigating features and dynamics of the California Current, also known as the Eastern Boundary Current. The California Current System extends up to 621 miles (1,000 km) offshore from southern British Columbia to Baja California and encompasses a southward meandering surface current, a poleward undercurrent, and surface countercurrents. This system exhibits high biological productivity, diverse regional characteristics, and intricate eddy motions. The California Current System is driven by prevailing northerly winds and is associated with upwelling areas off Oregon and California (Miller et al. 1999). Wind-induced upwelling is the dominant mechanism for bringing nutrients to the surface.

The Oregon coast experiences large seasonal changes in the strength of upwelling, clearly related to seasonal differences in wind strength and direction. There are four or five periods of strong upwelling separated by periods of little or no upwelling (Mann and Lazier 2006). Each of these events precipitates a burst of productivity equivalent to a spring bloom (Barber and Smith 1981). In addition, coastal upwellings tend to be centered on topographical features such as capes and canyons. The bathymetric features along the Oregon coast are very irregular, which is indicative of fracture zones, basins, ridges, and canyons. Seabirds, pinnipeds, and marine fish benefit from the high productivity associated with coastal upwelling. In fall and winter a weaker countercurrent, known as the Davidson Current, flows north occasionally moving somewhat warmer water northward along the California and Oregon coast.

The stream and riparian habitat within Cape Meares NWR and RNA is located in the northeast corner of the northern unit, in an active glacial slide area. Several spring-fed and surface runoff streams with medium to steep gradient, step-pool morphologies, and basalt parent geology flow across this area from the top of the adjacent privately owned headland. The streams cross under an early-successional red alder canopy and end in a 12-foot drop to the beach on a continually

Exhibit F
Page 4

eroding bank. A fork of the Oregon Coast Trail passes through this portion of the Refuge and parallels the main stream before dropping to the beach at the extreme northeast corner of the cape while the main trail continues north across county lands to the community of Cape Meares.

3.3 Topography and Bathymetry

To be within Oregon Islands and Three Arch Rocks NWRs, a rock, reef, or island must be separated from the mainland and above the surface of the sea at mean high tide. Reefs are low elevation, essentially bare rocks that are awash during storms at higher tides. Rocks are taller, essentially bare rocks that may or may not be inundated and usually have rather precipitous sides. Grassy islands are generally the highest land mass. They usually have precipitous sides, vegetated tops with varying amounts of soil, and are never immersed in water. Many rocks and islands are close to shore and accessible by foot at low tides.

In areas along the southern Oregon coast, headlands often show varying stages of deposition, deflation, and extended periods of surficial stability. The Crook Point and Coquille Point headlands, consisting of Holocene dunes and floodplains, are subjected to high-energy geomorphic processes that contribute to their alteration or destruction. These processes are marine transgression and erosion by tides, winds and storm waters, as well as past human alteration (Davis 2006). The Crook Point headland is dominated by a generally barren, windblown landscape of flat to gentle slopes approximately 100 to 200 feet above sea level. The Coquille Point headland is relatively flat, and the bluffs below the headland are classified as steep coastal erosion bluff habitat.

Cape Meares NWR consists of vertical coastal cliffs, rock outcroppings and rolling headlands with old-growth forest dominated by Sitka spruce and western hemlock. Cape Meares is located on a prominent coastal headland that rises more than 640 feet above sea level. The western border of the headland ends dramatically at sheer cliffs above the Pacific Ocean, while north aspects of the headland descend gradually to sandy beaches that occur beyond the refuge boundaries. Topography is generally steep with a prominent gully formed from landslides of unstable soils being a landmark in the southern end of the Refuge. The central portion of the Cape Meares headland, largely on OPRD lands, is less steep than the north or south portions and is bisected by the roadway to the State Scenic Viewpoint and lighthouse. Two small drainages contain the spring-fed and surface run-off streams mentioned previously.

Ocean bathymetry along the Oregon coast features a series of seamounts, small valleys, channels, and ridges on a multilevel plain. Bathymetric characteristics can be an important indicator of marine bird-habitat associations because they are fixed in space and can produce hydrological processes (Yen et al. 2005). Seamounts are known for their productivity and concentrations of birds (Yen et al. 2004) possibly because of upwellings that can concentrate prey. Upwelling often occurs at sills and ocean-floor ridges, which can increase prey abundance and availability for seabirds (Hunt and Schneider 1987). Results of another study conducted in Prince William Sound, Alaska, concluded marbled and Kittlitz's murrelets (*Brachyramphus brevirostris*) were clearly associated with bathymetric features that promote upwelling and currents (Kuletz 2005; Stephensen in review). These hydrographic features may create accessible concentrations of invertebrates and fish that are lifted into the upper water column (Coyle et al. 1992; Hunt et al. 1990, 1999) and produce "hot spots" where birds aggregate.

Exhibit F
Page 5

3.4 Geology

The refuge landscape has been shaped by water, wind, plate tectonics, and millions of years of volcanic activity. A volcanic island chain collided with North America about 50 million years ago and formed many of the scenic headlands, rocks, reefs, and islands along the coast. The Cape Meares headland is composed of solid basalt, which was uplifted in the Tertiary period approximately 65 to 1.8 million years ago. In addition, sediments that have accumulated in the coastal zone contain marine fossils that help explain the formation and origin of the unique geology of the area.

Approximately 66 million years ago, during the Cretaceous period, volcanic (Roseburg Volcanics) activity created offshore islands in the southern portion of the current Coast Range. The northern portion of the range was created by Siletz River Volcanics. Lastly, a series of basalt flows from the Columbia River basalts also added to these formations with some smaller flows in between. Pillow basalt formations were created when a hot basalt flow rapidly cooled upon meeting the salt water of the ocean. These offshore deposits were then pushed into the continental plate as a forearc basin rotating slowly over millions of years. This tectonic collision forced the basalt and newer sedimentary rock formations (including marine terrace deposits) upward and created the coastal range. Additional basalt flows originated from eastern Oregon and added to the layers that were uplifted, as the newer Cascade Mountains had not yet been formed. By the early Oligocene epoch 36 million years ago, the current coastline was in place and erosion has continued to shape the range primarily through rivers cutting deep valleys through the igneous and sedimentary rocks (Orr et al. 1992).

The geologic boundaries of the coast range formation extend from southwest Washington to the Coquille River, where the older and taller Klamath Mountains begin. In the east, the mountains begin as foothills forming the western edge of the Willamette Valley and continue west to the coastline and beyond where the basalt formation tapers off into the continental shelf and ends at the continental slope with several banks and basins offshore (Orr et al. 1992). Physiographically they are a section of the larger Pacific Border province, which in turn are part of the larger Pacific Mountain System physiographic division.

3.5 Soils

Cape Meares and the coastal headland soils range from shallow to moderate in depth, are well drained, and are derived from sedimentary sandstones and or siltstones. The majority of the rocks and reefs are generally devoid of soil and vegetation. The islands have varying accumulations of soils on top which often support permanent coverings of low-growing coastal-type vegetation, ranging from extremely sparse to quite dense. Soil data are limited since reconnaissance studies have not been conducted on the Refuge to determine soil type and distribution. The Crook Point headland is dominated by a generally barren, windblown landscape of flat to gentle slopes approximately 100 to 200 feet above sea level. The Coquille Point headland is relatively flat and when acquired by the Service this headland was devoid of topsoil due to past construction disturbance. It has since been restored with imported topsoil and some native plantings. The bluffs below the headland are classified as steep coastal erosion bluff habitat.

Exhibit F
Page 6

3.6 Environmental Contaminants

Few contaminant studies have been conducted on the Refuges and the majority of collected data were obtained during the 1970s and 1980s. Pollutants in Oregon seabirds have not been systematically studied; however, one study was conducted in 1979 (Henny et al. 1982). The purposes of this study were to determine organochlorine burdens in seabird eggs, measure eggshell thickness, evaluate the importance of the residues and eggshell thickness detected, and compare results to the same species at other locations. A single egg was collected at 62 nests of 10 seabird species and analyzed for organochlorine contaminants (PCB and DDE). Eggshell thickness was measured for each egg. Six of the ten seabird species had less than 1 ppm (part per million) geometric mean concentration of DDE and seven species showed geometric means of PCBs less than 1 ppm. One shorebird (snowy plover, C*haradrius alexandrinus*) also had a geometric mean of less than 1 ppm concentration of DDE and PCBs. Double-crested cormorant (*Phalacrocorax auritus*), Leach's storm-petrel, and fork-tailed storm-petrel were the most contaminated, with concentrations greater than 1 ppm. The fork-tailed storm-petrel samples had the largest residue concentrations of 12 ppm DDE and 5.1 ppm PCBs. In all species except the fork-tailed storm-petrel, the residues were generally low, and concentrations are below estimated thresholds that may affect the species examined. The single fork-tailed storm-petrel egg was in the critical range and indicates further research is needed for that species. Eggshell thickness data can provide important supplementary information when DDE is of concern. Keith and Gruchy (1972) and Lincer (1975) reported that 18–20% shell thinning may result in reduced reproductive success. Eggshell thinning of the 1979 samples did not approach the 18–20% range and all samples had greater thickness compared to data collected in the 1950s (Henny et al. 1982).

Seabirds along the Pacific coast have great potential to be exposed to contaminants from oil spills, chemical releases, pesticide use, and other general sources. Oregon has experienced large die-offs of pre- and post-fledging juvenile common murres occurring from July to October. These die-offs of juvenile common murres occur almost annually and infrequently die-offs of adult murres have occurred during the summer months, the causes of the mortality events are unknown. Several beach transects near Newport, ranging from 4.4 to 7.5 km in length, were monitored for many years to document mortality events and one beach transect has been monitored continuously year-round from 1978 to present. Observations found that murre carcasses can exceed 1,000 individuals on a 7.5-km stretch of beach per year (Bayer et al. 1991). Numerous carcasses of juvenile and adult common murres have been sent to the USGS National Wildlife Health Center in Madison, Wisconsin, for analysis. The cause of these mortality events remain unknown; however, necropsies results indicate poor body condition, emaciation, no fat and no food items in the digestive system, suggesting starvation (USFWS unpublished data). The highest mortality occurs prior to fledging of juvenile murres when they are still dependent on the adult male parent at sea. Forage fish populations sustaining these birds may disappear locally and neither the juvenile murre nor the attending adult male can fly to seek forage elsewhere. The lack of forage fish and the stress of swimming long distances to seek prey can result in starvation and death. In 1995, Service personnel collected common murre father/chick pairs at sea near Newport to determine if contaminants and biotoxins played a role in the annual common murre mortality events. Results of this study indicated that there did not appear to be any immediate life-threatening abnormalities in inorganic and organic concentrations measured. However, the condition of the birds and the concentrations of various potentially harmful chemicals detected in tissues indicate that the birds were experiencing cumulative stressors, which ultimately contribute to their poor health and increase susceptibility to pathogens and mortality. A 1969 study found body weights of dead common murres were significantly lower than healthy birds collected during

Exhibit F
Page 7

a die-off period. Necropsy of the emaciated dead birds suggested drowning was the proximate cause of death and all DDE and PCB levels were considerably less than reported lethal concentrations in other bird species; however, environmental stress may have been sufficient to contribute to mortality (Scott et al. 1975).

Double-crested cormorants were collected on Hunters Island in 1992 (Kiff 1994) and 1993 (Buck and Sproul 1999). Eggs were collected at Hunters Island to serve as a reference site for studies being conducted in the Channel Islands in California (Kiff 1994) and the lower Columbia River (Buck and Sproul 1999) where contaminant levels in double-crested cormorants were known or suspected to be elevated. Eggs were analyzed for the presence of DDT and transformation products, PCBs, dioxins, and furans. Concentrations of DDT and DDE were present in Hunters Island eggs but at significantly lower concentrations than in eggs from the lower Columbia River cormorants (Buck and Sproul 1999). Eggshells measured from Hunters Island by Kiff (1994) were thicker compared to eggshells from the lower Columbia River, indicating these birds experience little or no effects from DDE exposure. Few PCB congeners were above detection limits in Hunters Island eggs. Likewise, all dioxin and furan congeners tested were below detection limits, whereas these compounds were elevated above effects-thresholds in eggs of lower Columbia River cormorants (Buck and Sproul 1999). Overall, organochlorine contaminants in eggs from Hunters Island cormorants were insufficient to impair reproduction or cause mortality.

3.7 Surrounding Land Uses

There are no large cities on the Oregon coast, mainly due to the lack of deep commercial harbors with access to the inland agricultural and metropolitan areas. The largest population area on the south coast consists of the bordering cities of Coos Bay and North Bend, with a population of approximately 25,000 people. On the north coast the population centers are the cities of Newport and Astoria (approximately 10,000 each). The relative isolation of the coast from nearby large population centers of Portland, Salem, and Eugene has given the coast a reputation for being somewhat rustic, being a mixture of old logging towns, fishing villages, seasonal resorts, and artists' colonies. Tourism, commercial fishing, and logging are the major industries on the coast.

3.7.1 Land development

The Oregon coast offers breathtaking scenery, mild temperatures and climate, wide open spaces, outdoor recreational activities, and many other desirable features that attract people from all over the world. Oregon coast real estate has become a popular commodity and many coastal lands are being or have already been developed into vacation resorts, commercial property, and residential communities. New residential subdivisions and other developments have emerged along the coast at a rapid rate in the last 20 years. Many new residential communities are in close proximity to the ocean and structures are being built near water's edge. Building structures and development continue to encroach upon the remaining undeveloped lands and threaten biological resources.

3.7.2 Logging

The logging industry began in the Pacific Northwest at the beginning of the twentieth century and has been a dominant industry in Oregon's economy. Many old-growth forests have disappeared and the resources associated with the habitat have frequently declined as a result. Refuge lands are protected; however, forested areas surrounding Cape Meares NWR have undergone extensive logging and development during the past century.

Exhibit F
Page 8

From 2002 through 2007, Oregon's timber harvest averaged 4 billion board feet per year (ODF 2008). Over the last two decades timber production has declined by 30 to 50% in all coastal counties, with the sole exception of Clatsop, where timber production has increased. Yet the coast remains one of the largest producers of timber in Oregon; in 2002, the coast accounted for more than a quarter of all timber production in the state.

3.7.3 Agriculture

Agriculture is important along the Oregon coast and thousands of acres of farmland are in close proximity to the Refuges. In 2001, gross farm sales on the Oregon coast totaled more than $175 million (OAIN 2001). Dairy products brought in nearly $95 million in sales, which is more than one third of the state's dairy production. Tillamook County alone produces $85 million in dairy products annually (OAIN 2002). Farms on the south coast, in Curry County, account for 90% of the Easter lily bulbs (Curry County 2008) and in Coos County, 35 million pounds of cranberries are produced near the city of Bandon (Nakano 2002).

3.7.4 Recreation

Millions of people annually visit Cape Meares NWR, the Coquille Point Unit of Oregon Islands NWR, Yaquina Head, Cape Arago, and other viewing areas or parks along the Oregon coast. Along the entire Oregon coast, outstanding natural, scenic, cultural, historical, and recreational sites for education and enjoyment are available to the public. All land within 16 vertical feet of the average low tide mark belongs to the people of Oregon and guarantees the public has free and uninterrupted use of the beaches along Oregon's 363 miles of coastline (OSCC 2008). Locals and visitors can find a large number of private and state owned campsites with access to Oregon's beaches. The OPRD administers 19 parks on the north coast, 37 on the central coast, and 28 on the south coast (OPRD 2008). The Refuge works cooperatively with OPRD to maintain wildlife viewing structures, interpretive facilities, and lands for the benefit of present and future generations.

3.8 Global Climate Change

A continuously growing body of scientific evidence supports the theory of global climate change. During the twentieth century, the global environment experienced variations in average worldwide temperatures, sea levels, and chemical concentrations. Global air temperatures on the earth's surface have increased by 1.3°F since the mid nineteenth century (Solomon et al. 2007). Eleven of the 12 years from 1995 to 2006 are the warmest on record since 1850 (IPCC 2007).

During the next 20 to 40 years, the climate of the Pacific Northwest is projected to change significantly. Global climate models project mid twenty-first century temperatures in the Pacific Northwest that are well outside the natural range of temperature observed in the twentieth century. They also suggest important changes in future precipitation: nearly all the climate models project wetter winters and drier summers in the 2020s through the 2040s (Mote et al. 2003).

3.8.1 Sea level rise

The National Wildlife Federation engaged sea-level rise modeling expert Jonathan Clough, of Warren Pinnacle Consulting, Inc., to simulate how sea-level rise during this century would affect coastal habitats in 10 areas in Puget Sound as well as the Pacific Coast from northwestern Oregon

Exhibit F
Page 9

to southwestern Washington. One of the sites included in this report was the mouth of the Columbia River. While there have been several past studies of sea-level rise in the Pacific Northwest, this study provides the most comprehensive and detailed analysis to date of the potential impacts of sea-level rise on the region's coastal habitats.

The model used for this analysis is called Sea Level Affecting Marshes Model, Version 5.0 (SLAMM 5.0), which was designed to simulate the dominant processes involved in wetland conversion and shoreline modification under long-term sea-level rise. The model integrates information about projected global sea-level rise with area-specific NOAA tidal data, detailed wetland information from the Service's National Wetlands Inventory, regional light-imaging detection and ranging (LiDAR) data, and USGS Digital Elevation Maps to project habitat changes associated with sea-level rise. The study maintains that global average sea level increases could increase by an average of 0.28 m (11.2 inches) by 2050 and by 0.69 m (27.3 inches) for the study locations in the Willapa Bay, Columbia River, and Tillamook Estuary (Glick et al. 2007). The impacts of these changes to Oregon's coastal ecosystem include a projected increase in ambient temperature, more frequent and intense wildfires, changes in stream flow and freshwater systems, and rising sea levels that will inundate coastal areas (Solomon et al. 2007; Westerling et al. 2006).

The potential large-scale impacts of global warming on the Pacific Ocean and nearshore environment include increase in sea-level and sea-surface temperatures; changes in salinity, alkalinity, wave and ocean circulation patterns and upwelling; and loss of coastal marshes, estuaries and ocean beaches (Glick et al. 2007). The consequences of these changes to Oregon's marine environment include direct loss of habitat through coastal inundation and flooding, changes in species biogeography, including species of marine wildlife (e.g., phytoplankton, krill, forage fish, seabirds, pinnipeds) and invasive species (e.g., animals, plants, microbes, pathogens).

Radically different weather patterns influence wind and ocean currents that precipitate seasonal upwellings. The upwellings bring nutrients into the photic zone, stimulating plankton blooms close to the surface. These upwellings have been inconsistent over the last 10 years (Defenders of Wildlife 2006). During this time, large numbers of seabirds, including species not typically part of the standard annual die-off, have washed up on the Oregon beaches, apparently casualties of shifts in the California Current's primary productivity (Johnson 2007). The system is primed to be warm and somewhat unproductive, which translates in less food for piscivorous (fish-eating) and planktivorous bird species (Lawler et al. 2008). In extreme events of change in upwelling, there is the potential of increased dead zones where low oxygen levels in ocean waters will inhibit most forms of marine life (Barth et al. 2007).

3.8.2 Potential changes to refuge habitats

There have been no specific studies documenting potential affects to refuge habitats from future climate change. However, based on the various climate modeling scenarios for the Pacific Northwest, there are several potential problems that are envisioned by the refuge planning team. One of the main concerns is potential loss of available nesting and roosting areas for pinnipeds and seabirds. Large concentrations of harbor seals, California sea lions, Steller sea lions, and northern elephant seals use refuge lands to rest and breed, and an estimated 1.2 million seabirds breed on the Oregon Islands and Three Arch Rocks NWR (Naughton et al. 2007). Under the modeling done by the National Wildlife Federation study, the sea level could rise almost a foot by 2050. This could cause significant loss of surface area on rocks and islands, and subsequent competition for available areas would cause wildlife displacement, abandonment, reduced breeding success, and increased bodily stress. Another potential loss of habitat would occur from the increased intensity of storm/wave events resulting from higher sea levels as well as precipitation, both of which could erode soil and vegetation and eliminate burrow-nesting habitat.

Numerous other changes to the Refuges' habitats and wildlife would likely result from increases in ambient temperature and precipitation over the next 50 to 100 years. However, until a more detailed analysis of the effects of global climate change can be completed on specific refuge units, more generalized modeling will continue to be used to assess how and what the Complex should do to prepare for upcoming changes to the natural environment. While this management plan is intended to cover a 15-year time span, it is clear that for the Complex to adequately plan for climate change, it will have to look further into the future. During the 15-year time span of this management plan, the Complex will be monitoring changes in conditions and using adaptive management to properly manage, conserve, and perpetuate the unique wildlife and habitat with which it was entrusted.

3.9 References

Barber, R.T. and R.L. Smith. 1981. Coastal upwelling ecosystems. Pages 31-68 in: A.R. Longhurst, ed. Analysis of marine ecosystems. New York: Academic Press.

Barth, J.A., B.A. Menge, J. Lubchenco, F. Chan, J.M. Bane, A.R. Kirincich, M.A. McManus, K.J. Nielsen, S.D. Pierce, and L. Washburn. 2007. Delayed upwelling alters nearshore coastal ocean ecosystems in the northern California current. Proceedings of the National Academy of Sciences of the United States of America 104:3719-3724.

Bayer, R.D., R.W. Lowe, and R.E. Loeffel. 1991. Persistent summer mortalities of common murre along the Oregon central coast. Condor 93:516-525.

Buck, J. and E. Sproul. 1999. Organochlorine contaminants in double-crested cormorants from Lewis and Clark National Wildlife Refuge in the Columbia River estuary, final report. Unpublished report. U.S. Fish and Wildlife Service. Portland, OR. 41 pp.

Coyle, K.O., J.L. Hunt Jr., M.B. Decker, and T.J. Weingartner. 1992. Murre foraging, epibenthic sound scattering and tidal advection over a shoal near St. George Island, Bering Sea. Marine Ecology Progress Series 83:1-14.

Curry County. 2008. Curry County-Oregon. Available at: http://www.co.curry.or.us/.

Davis, L.G. 2006. Geoarchaeological insights from Indian Sands, a late Pleistocene site on the southern northwest coast, USA. Geoarchaeology: An International Journal 21(4):351-361.

Defenders of Wildlife. 2006. Refuges at risk, the threat of global warming; America's 10 most endangered national wildlife refuges. Washington, D.C. 23 pp.

Glick, P., J. Clough, and B. Nunley. 2007. Sea-level rise and coastal habitats in the Pacific Northwest. An analysis for Puget Sound, southwestern Washington, and northwestern Oregon. National Wildlife Federation. Seattle, WA. 94 pp.

Henny, C.J., L.J. Blus, and R.M. Prouty. 1982. Organochlorine residues and shell thinning in Oregon seabird eggs. The Murrelet 63:15-21.

Hunt, G.L., Jr. and D.C. Schneider. 1987. Scale dependent processes in the physical and biological environment of marine birds. Pages 7-41 in: J.P. Croxall, ed. Seabirds: feeding ecology and role in marine ecosystems. Cambridge University Press.

Hunt, G.L., Jr., N.M. Harrison, and R.T. Cooney. 1990. The influence of hydrographic structure and prey abundance on foraging of least auklets. Studies in Avian Biology 14:7-22.

Hunt, G.L., Jr., F. Mehlum, R.W. Russell, D.B. Irons, M.B. Decker, and P.H. Becker. 1999. Physical processes, prey abundance, and the foraging of seabirds. Pages 2040-2056 in: N. Adams and R. Slotow, eds. Proceedings of 22nd International Ornithological Congress.

IPCC (Intergovernmental Panel on Climate Change). 2007. Climate change 2007: the physical science basis, summary for policy makers. Intergovernmental Panel on Climate Change, Paris.

Johnson, C.S. 2007. Climate change may be cause of seabird deaths. News release, California Sea Grant, La Jolla, CA.

Keith, J.A. and I.M. Gruchy. 1972. Residue levels of chemical pollutants in North American birdlife. Proceedings of the International Ornithological Congress 15:437-454.

Kiff, L. 1994. Eggshell thinning in birds of the California Channel Islands. Unpublished report. U.S. Fish and Wildlife Service. Sacramento, CA. 24 pp.

Kuletz, K.J. 2005. Foraging behavior and productivity of a non-colonial seabird, the marbled murrelet (*Brachyramphus marmoratus*), relative to prey and habitat. PhD. dissertation. University of Victoria, Victoria, BC.

Lawler, J.J., M Mathias, A.E. Yanke, and E.H. Girvetz. 2008. Oregon's biodiversity in a changing climate. Report prepared for the Climate Leadership Initiative, University of Oregon.

Lincer, J.L. 1975. DDE-induced eggshell-thinning in the American kestrel: a comparison of the field situation and laboratory results. Journal of Applied Ecology 12:781-793.

Mann, K.H. and J.R.N. Lazier. 2006. Dynamics of marine ecosystems: biological-physical interactions in the oceans. 3rd edition. Malden, MA: Blackwell Publishing.

Miller, A.J., J.C. McWilliams, N. Schneider, J.S. Allen, J.A. Barth, R.C. Beardsley, F.P. Chavez, T.K. Chereskin, C.A. Edwards, R.L. Haney, K.A. Kelly, J.C. Kindle, L.N. Ly, J.R. Moisan, M.A. Noble, P.P. Niiler, L.Y. Oey, F.B. Schwing, R.K. Shearman, and M.S. Swenson. 1999. Observing and modeling the California Current system. Eos, Transactions, American Geophysical Union, 80: 533-539.

Mote, P.W., E.A. Parson, A.F. Hamlet, K.N. Ideker, W.S. Keeton, D.P. Lettenmaier, N.J. Mantua, E.L. Miles, D.W. Peterson, R. Slaughter, and A.K. Snover. 2003. Preparing for climatic change: the water, salmon, and forests of the Pacific Northwest. Climate Change 61:45-88.

Nakano, C. At play on Oregon's coast. Available at: http://www.latimes.com/la-tr-coosbay11aug11.story.

Naughton, M.B., D.S. Pitkin, R.W. Lowe, K.J. So, and C.S. Strong. 2007. Biological technical publication Region 1, catalog of Oregon seabird colonies. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. In Press.

NCDC (National Climatic Data Center). 2008. Climate division website. Available at: http://www.cdc.noaa.gov.

NOAA (National Oceanic Atmospheric Administration). 2008. Western Regional Climate Center. Available at: http://www.wrcc.dri.edu/index.html.

OAIN (Oregon Agricultural Information Network). 2001. Gross farm sales report. Availalble at: http://ludwig.arec.orst.edu/oain/SignIn.asp.

OAIN. 2002. Dairy products commodity report. Available at: http://ludwig.arec.orst.edu/oain/SignIn.asp.

ODF (Oregon Department of Forestry). 2008. Oregon annual timber harvest reports. Available at: http://www.odf.state.or.us/DIVISIONS/resource_policy/resource_planning/Annual_Reports/Default.asp.

OPRD (Oregon Parks and Recreation Department). 2008. Available at: http://www.oregonstateparks.org.

Orr, E., W. Orr, and E. Baldwin. 1992. Geology of Oregon. 4th ed. Dubuque, IA: Kendall/Hunt Publishing.

OSCC (Oregon Shores Conservation Coalition). 2008. Oregon Shores Conservation Coalition website. Available at: http://oregonshores.org.

Scott, J.M., J.A. Wiens, and R.R. Claeys. 1975. Organochlorine levels associated with common murre die-off in Oregon. Journal of Wildlife Management 39(2):310-320.

Solomon, S., D. Qin, M. Manning, Z. Chen, et al., eds. 2007. Climate change 2007: the physical science basis. Contribution of working group I to the fourth assessment report of the Intergovernmental Panel on Climate. Cambridge University Press, Cambridge.

Stephensen, S.W. In Review. A comparison of preferred habitats of Kittlitz's and marbled murrelets in Harriman Fiord Prince William Sound, Alaska. M.S. thesis. University of Alaska Anchorage.

Westerling, A.L., H.G. Hidalgo, D.R. Cayan, and T.W. Swetnam. 2006. Warming and earlier spring increase western U.S. forest wildfire activity. Science 313:940-943.

Yen, P.P.W., W.J., Sydeman, and K.D. Hyrenbach. 2004. Marine bird and cetacean associations with bathymetric habitats and shallow-water topographies: implications for trophic transfer and conservation. Journal of Marine Systems 50:79-99.

Yen, P.P.W., W.J. Sydeman, K.H. Morgan, and F.A. Whitney. 2005. Top predator distribution and abundance across the eastern Gulf of Alaska: temporal variability and ocean habitat associations. Deep-Sea Research II 52:799-822.

Exhibit G
Page 1

Chapter 4. Refuge Biology and Habitat

This chapter addresses the biological environment of the Oregon Islands, Three Arch Rocks, and Cape Meares NWRs; however, it is not an exhaustive overview of all species and habitats. The chapter begins with a discussion of biological integrity; we then focus on the presentation of pertinent background information for the conservation targets designated under the CCP. Background information includes a description, location, condition, and the trends associated with wildlife or habitats, key ecological attributes, and stresses and sources of stress (collectively, "threats") to the target. The information presented was used when the CCP team developed goals and objectives for each of the conservation targets. The biological integrity (601 FW3) analysis section introduces the biological environment by describing the native wildlife and vegetation that occur on the three Refuges in comparison to the surrounding landscape. The conservation target identification and analysis section identifies species, species groups, and features the Refuge Complex personnel will actively manage to accomplish biological conservation and restoration. The biological research and monitoring programs section describes techniques and studies and their relationship to conservation targets.

4.1 Biological Integrity Analysis

The National Wildlife Refuge System Improvement Act of 1997 directs the FWS to ensure that the biological integrity, diversity, and environmental health (BIDEH) of the Refuge System are maintained for the benefit of present and future generations of Americans. In simplistic terms, elements of BIDEH are represented by native fish, wildlife, plants, and their habitats as well as those ecological processes that support them. The Service's policy on BIDEH (601 FW 3) also provides guidance on consideration and protection of the broad spectrum of fish, wildlife, and habitat resources found on refuges, and associated ecosystems that represent BIDEH on each refuge.

The Oregon Islands and Three Arch Rocks NWRs include rocks, reefs and islands in an isolated and protected marine environment. In addition, Oregon Islands NWR includes two coastal headlands with native grasslands, second-growth forests, rocky cliffs, and human-impacted dunes and bluffs. Cape Meares NWR encompasses one of the few remaining stands of old-growth forest on the Oregon coast. The marine waters adjacent to or surrounding these three NWRs are not under the jurisdiction or management of the Service.

Human impacts on refuge lands have been limited since refuges are protected from exploitation and development. However, the ecosystem surrounding the Refuges has undergone dramatic alteration since pre-settlement times. The most discernible change is the conversion of large portions of coastal areas into residential and commercial lands. Also, the marine ecosystem experiences impacts due to human presence, resource exploitation, and climate change. This summary is not a complete analysis of all factors related to changes in native vegetation, fish, and wildlife. Much of the information presented here is based upon the CCP team's knowledge and existing scientific understanding of the area.

Exhibit G
Page 2

Aerial view of development along the coast. (Roy W. Lowe/USFWS)

4.1.1 Coastal lands conversion and development

4.1.1.1 Human population growth

The effects of human-induced stresses on habitat and species of the coastal lands and estuarine systems of the Pacific Northwest have increased due to population growth. As of 2005, Oregon has an estimated population of 3,641,056, which is an increase of 49,693 (1.4%) from the prior year and an increase of 219,620 (6.4%) since the year 2000. The cities of the central Oregon coast have experienced moderate (24–49% increase) to rapid (greater than 50% increase) human population growth rate over a 20-year period from 1980 to 2000 (Achterman et al. 2005). As a result of the population growth, activities such as boating, personal aircraft, surfing, and other recreational activities have increased along the coast. These activities often cause stress, reduced productivity, and increased predation rate to seabirds and pinnipeds associated with the Refuge (LCDC 1994; Rodgers and Smith 1997; Rojek et al. 2007). Please refer to section 4.2 for further discussion and detailed descriptions of habitat, associated wildlife, and disturbance factors.

4.1.1.2 Land development

The beautiful Oregon coast offers breathtaking scenery, mild temperatures and climate, wide open spaces, recreational activities, and many other desirable features that attract people from all over the world. Oregon coast real estate has become a popular commodity and many coastal lands are being or have already been developed into vacation resorts, commercial property, and residential communities. New residential subdivisions and other developments have emerged along the coast at an increasing rate in the last 20 years. Many new residential communities are in

Exhibit G
Page 3

close proximity to the ocean and structures are being built near water's edge. Building structures and development continually encroach upon wildlife habitat and in some cases cause increased stress on biological resources (SCBC 2003).

4.1.1.3 Logging

The logging industry began in the Pacific Northwest at the beginning of the twentieth century and has been one of the dominant natural resource extraction industries in Oregon's economy. Many old-growth forests have been logged and the wildlife resources associated with the habitat altered (Maas-Hebner and Schrader 2001). The public now realizes the importance of the old-growth ecosystem and actions have been initiated to preserve these fragile wildlife areas. The establishment of Cape Meares NWR in 1938 ensured that these refuge lands are protected; however, forested areas surrounding Cape Meares NWR have undergone extensive clearcut logging and replanting during the past century.

4.1.2 Marine ecosystem changes

4.1.2.1 Contaminant load

Shipping lanes for cargo ships and large oil transport vessels that carry crude oil to refineries are located along the Oregon coast. These shipping lanes are designated marine highway channels or routes that vessels use near the coastline to avoid marine hazards and are part of the Great Circle Route that ships transit between the west coast and Asia. More than 7,000 ships per year travel the route, almost 20 per day, and the number is growing. With increased vessel presence, the risk of oil spills that can cause devastation to the marine ecosystem increases as well. Large-scale marine oil spills that have occurred in Oregon or influenced Oregon resources include the New Carissa in 1999, the Tenyo Maru in 1991, the Nestucca in 1988, and the Blue Magpie in 1983. The fuel or oil is persistent and remains in the environment for years and causes long-term environmental damage as well as acute and chronic effects to wildlife. In addition, ballast water and other waste dumping from ocean vessels increase contaminant load in the Pacific Ocean (Flagella et al. 2007). Pollution, caused by the transfer and introduction of exotic or foreign aquatic species through the ballast water of ships, threatens the conservation and sustainable use of biological diversity (Bax et al. 2003).

4.1.2.2 Changes to colonial nesting birds

Approximately 1.3 million seabirds, representing 13 species, breed at 393 colonies along the Oregon coast. Current seabird breeding populations for the entire coast of Oregon can be found in Naughton et al. (2007) or are available by contacting the refuge headquarters in Newport, Oregon. The most common seabird species that breeds in Oregon is the common murre with 685,000 individuals or 53% of total breeding population (Naughton et al. 2007). Murres are difficult to census, as numbers on the colony at any one time depend on a host of variables including ocean productivity, nesting chronology, time of day, weather conditions, disturbance events, and tidal conditions (Birkhead 1978; Rodway 1990; Slater 1980). However, the overall health and status of the marine ecosystem can be determined by observing population trends of the common murre since populations are indicative of prey availability, suitable nesting habitat, and overall ocean productivity (Carter et al. 2001). Murres have been termed marine condition "indicator species", a biological species that defines a trait or characteristic of the environment. Indicator species can be among the most sensitive species in the region, acting as an early warning of changing environmental conditions. Population surveys have been conducted at the Yaquina

Exhibit G
Page 4

Head common murre colony at Newport, Oregon, from 1988 to 2007 and indicate an upward population trend (Figure 4-1). The population increase at this colony is probably a result of bird immigration from other colony sites that are impacted by bald eagle disturbance (USFWS unpublished data). The murre population at Yaquina Head is increasing; however, the total population in Oregon remains stable and fluctuates annually in correlation with marine ecosystem changes and other factors.

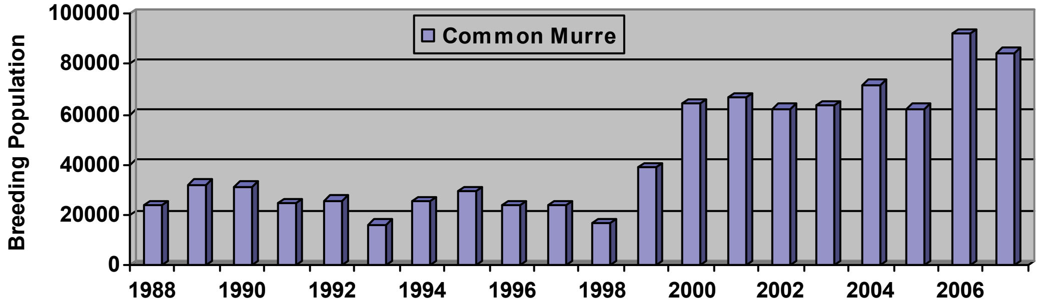


Figure 4-1. Breeding population of common murre at Yaquina Head (1988–2007; USFWS unpublished data).

4.1.2.3 Coastal biodiversity changes

Currently, we are in a state of climate change and global warming that will increase the earth's surface temperature, cause ocean levels to rise due to polar ice melt, change precipitation patterns, cause glacial retreat, and influence ocean productivity and food availability (Defenders of Wildlife 2006; Irons et al. 2008; Kuletz et al. 2003). The climate change effects for Oregon's coastal ecosystem likely include a projected increase in ambient temperature, more frequent and intense wildlife fires, changes in stream flow and freshwater systems, and rising sea levels that will inundate coastal areas (Defenders of Wildlife 2006). Climate-induced changes in the California Current, driven by wind and climate effects off the Oregon coast, may delay upwelling of nutrient rich waters that will result in a reduction of prey for seabirds and pinnipeds (Irons et al. 2008; Lawler et al. 2008). In extreme events of change in upwelling, there is the potential of increased dead zones where low oxygen levels in ocean waters inhibit most forms of marine life (Barth et al. 2007).

4.1.3 Influx of exotic and invasive species

One of the largest threats to wildlife and habitat of the Refuges is invasive plants and pest animals. Invasive plant species displace native vegetation, altering the composition and structure of vegetation communities, affecting food webs, and modifying ecosystem processes (Olson 1999). Introduced native and non-native animal species are usually in direct competition with native wildlife species for food, shelter, and breeding areas and often cause existing native species populations to decline or become extirpated. Ultimately, both plant and animal invasive species can result in considerable impact to native wildlife and the habitat they are dependant upon. For example, introductions of Arctic (*Alopex lagopus*) and red (*Vulpes vulpes*) foxes for fur farming purposes resulted in widespread extirpation of breeding Aleutian cackling geese in the Aleutian Islands, Alaska, due to predation (Bailey and Trapp 1984; USFWS 1993). The fox decimated goose populations by preying upon vulnerable nesting adults, chicks, and eggs. The Aleutian

Exhibit G
Page 5

cackling geese inhabit refuge lands in Alaska during the summer and Oregon during the winter. Because of cooperative recovery efforts, the Service officially delisted this species from threatened status in 2001 (USFWS 2001). Another example is ice plant. Native to South Africa, it was brought into the country for bank stabilization and landscaping. This species excludes native dunemat vegetation, stabilizes sand, and displaces native dune plant species such as beach layia (*Layia camosa*), Wolf's evening primrose (*Oenothera wolfii*), and pink sand verbena (NPS 2001).

4.1.3.1 Invasive plants

Non-native invasive plants on the Refuges include gorse, European beachgrass, tansy ragwort, Canada thistle, and ice plant (Kagan 2002; USFWS unpublished data). This list is not all inclusive and includes only the most problematic species; many other exotic plants have also been introduced.

The most aggressive and prolific species on the Coquille Point Unit is gorse. Gorse is native to western and central Europe where it was cultivated as hedgerows and reserves for livestock forage. In southern coastal Oregon, gorse was introduced by early European emigrants and planted as an ornamental shrub. This invasive non-native plant grew in monotypic stands and became an established exotic shrub in most coastal habitats. This species is extremely competitive, displaces native plants, and impoverishes the soil. In addition, it creates an extreme fire hazard due to oily, highly flammable foliage and seeds, and abundant woody material in the plant's center. The city of Bandon in southwestern Oregon was almost completely destroyed by a fire fueled in part by gorse in 1936. All but 16 buildings out of 500 were completely burned to the ground.

Widespread infestations of ice plant occur throughout the southern portion of Oregon Islands NWR and along public mainland beach areas. This species stabilizes sand and prevents its natural movement, which most native dune species need to survive. Ice plant is usually associated with disturbed areas and is capable of growing over entire beaches (NPS 2001).

Tansy ragwort, a common wildflower introduced by early pioneers, is native to the Eurasian continent. This species contains many different alkaloids, making it poisonous to animals, and can have a cumulative effect (Sharrow et al. 1988). A substantial infestation of tansy ragwort exists on the north side of the riparian area at Cape Meares NWR, predominantly on adjacent county lands. This species also occurs at Crook Point and many islands along the coast.

4.1.3.2 Pest animals

Native and non-native mammals that have the potential to negatively affect seabird populations and their habitat on the Refuges include raccoon (*Procyon lotor*), river otter (*Lutra canadensis*), short and long-tailed weasels (*Mustela* spp.), mink (*Mustela vison*), striped and spotted skunks (*Spilogale putorius, Mephitis mephitis*), feral cats, dogs (*Canis familiaris*), rats and small rodents (*Rattus* spp.), gray and red fox (*Urocyon cinereoargenteus*, *Vulpes vulpes*), and feral livestock (e.g., sheep, goats). Based on observations at the Coquille Point Unit, knowledge of local wildlife and feral animal populations, and a review of scientific literature, the Service and cooperating agencies have identified red foxes, feral cats, rats, and raccoons as having the greatest potential to negatively impact Oregon's seabird colonies (USFWS 2005a). Predation, particularly by non-native predatory mammal species, has been documented to have devastating effects on nesting seabird populations throughout the world (Ashmole et al. 1994; Atkinson 1985; Gaston 1994; Jehl 1984; Kadlec 1971; USFWS 1993). Predator impacts on seabirds may include

Exhibit G
Page 6

direct predation on eggs, young and adults; reproductive failure due to disturbance during nesting season; and detrimental alteration of habitat including destruction of nesting burrows. These impacts can result in complete abandonment of nesting colonies.

Raccoons are opportunistic omnivorous predators that have adapted well to human-altered urban and rural landscapes. An increasing population of coastal raccoons can be attributed to easily accessible human supplied or available food sources (garbage cans, compost bins, gardens, outdoor pet food bowls). When available, raccoons naturally feed upon avian and mammalian food resources including seabirds (eggs, young, and adults). In 2006 and 2007, signs of mammalian predation were documented on Saddle Rock of Oregon Islands NWR. Through direct observations and the use of infra-red photographic techniques, refuge biologists were able to determine that western gulls, great horned owls (*Bubo virginianus*), and barn owls (*Tyto alba*), with river otter and raccoon, impact the seabird colony. Biologists concluded raccoons were the primary predator preying upon nesting Leach's storm-petrels, and eradication efforts were initiated (USFWS 2005a).

A feral cat is a domestic cat that is free-roaming, untamed, and un-owned. These cats live and breed entirely in the wild and depend on native wildlife as prey items. Feral cats are often apex predators in local ecosystems feeding on local birds and small mammals. Feral cat predation has been documented to be particularly devastating to colonies of island-breeding seabirds. Keitt et al. (2002) documented annual growth rates of black-vented shearwaters (*Puffinus opisthomelas*) and manx shearwater (*Puffinus puffinus*) to decline approximately 5% for every 20 cats in a population of 150,000 birds on Natividad Island, Baja California Sur, Mexico. Jehl (1984) summarized conservation problems associated with seabirds in Baja California, Mexico, and the Pacific Coast of North America and concluded that feral cats are an important predator of island seabirds, specifically storm-petrels and alcids, including Craveri's murrelet (*Synthlibocamphus craveri*). Feral cats were documented by Moors and Atkinson (1984) to be responsible for killing 1.2 million birds each year on Kerguelen Island in the southern Indian Ocean (USFWS 1993). Ashmole et al. (1994) attribute the decline of shearwaters on Ascension Island in the South Atlantic to the introduction of feral cats and rats. Seabirds nesting on the mainland at Yaquina Head, Oregon, have experienced feral cat predation in the past (USFWS unpublished data).

Feral and trespass cats and dogs can also be a source of disturbance of native wildlife on the Refuges. The Coquille Point Unit and Cape Meares receive heavy visitor use annually and it continues to grow. Current wildlife-dependent public uses on these refuges include wildlife observation, photography, interpretation, and environmental education. Dog walking, with animals on leash, is a non-wildlife dependent use that currently occurs on the refuge trail at Coquille Point. An Appropriateness Finding and a Compatibility Determination (CD) have been completed for this use on the Coquille Point Unit, and these documents are appended to this CCP (Appendices D and E).

Rats and small rodents of different species are found along the Oregon mainland and likely occur on some rocks and offshore islands. Rats are considered to be a threat to seabirds during all life stages, but especially to eggs and chicks prior to fledging. The potential introduction of rats to the islands and rocks from shipwrecks is of particular concern. The sailing ships of European explorers provided a mechanism for roof rats (*Rattus rattus*), also known as black rats, to spread rapidly to six continents and thousands of islands (Clark 1981). Roof rats can occupy available vegetated habitats from desert scrub to lush montane forests (Clark 1981). They commonly live in trees and can potentially prey upon almost any bird nest (Atkinson 1985). Roof rats are

Exhibit G
Page 7

omnivorous with plant foods comprising an average of 80% of sampled stomach contents. However, animal food also occurred in at least 81% of the rats examined on the Galapagos Islands (Clark 1981).

The Norway rat, also called the house rat, sewer rat, wharf rat, brown rat and gray rat, was also introduced into North America by sailing ships from Europe (Timm 1994). The predominantly nocturnal habits of these rats make both their identification and observation of their predatory behavior difficult. Consequently, the incidence of rat predation is probably higher than realized (Atkinson 1985). Even a low frequency of rat predation can have a severe effect if, for other reasons, there are few birds (Bourne 1981; Moors and Atkinson 1984). According to Gaston (1994), introduced raccoons and rats are believed to be responsible for the decline of the formerly very large colony of ancient murrelets (*Synthliboramphus antiquus*) at Langara Island, British Columbia. This population has decreased by about 90% over recent decades. Additionally, raccoons and rats are believed to be responsible for population declines of ancient murrelets occupying colonies on Lyell Island, the Limestone islands, and islands of Englefield Bay in British Columbia. In all cases, these declines seem to be related to the presence of introduced rats or raccoons. Unless rats and raccoons can be eliminated, or the spread of raccoons can be halted, a high proportion of the population of ancient murrelets may be extirpated within a few decades (Gaston 1994). Atkinson (1985) documented that within a few years of the introduction of rats on Lord Howe Island, Australia; more than 40% of the indigenous bird species became extinct.

Historically, feral sheep and goats have been observed on the mainland adjacent to refuge lands and on islands on the Oregon south coast. Goat Island, on the Oregon south coast, received its name because goats were placed on the island to graze by a Scottish pioneer named George Harris in the late 1880s. In 2006, feral goats were observed at Boardman State Park during a seabird survey and again in 2008 (USFWS unpublished data). Prior to acquisition in 2000, feral goats were observed grazing at Crook Point (USFWS unpublished data). Feral goats and sheep could cause damage to wildlife and associated habitat if they were immigrated to or were released on refuge lands. During the colonization period, many islands off the East Coast were cleared of predators and set aside for sheep: Nantucket, Long Island, and Martha's Vineyard were notable examples. Placing semi-feral sheep and goats on islands was common practice in colonization during this period (Anderson 2006).

Red foxes are notorious seabird predators and have caused many population declines, and in some cases total eradication, of a prey species from an area. The Service (1993) conducted a comparative study of bird populations on islands in Alaska with and without foxes, and documented that fork-tailed storm-petrels, Leach's storm-petrels, Aleutian terns (*Sterna aleutica*), arctic terns (*Sterna paradisaea*), ancient murrelets, Cassin's auklets, and tufted puffins were not present in substantial numbers on islands with foxes. During 2001 and 2002, red foxes caused the failure of seabird nesting on Middle Coquille and Elephant Rocks within Oregon Islands NWR (USFWS unpublished data). Red foxes were observed loafing near the entrances to the nesting burrows of tufted puffins and pigeon guillemots and in the area of ground nesting western gulls, Brandt's cormorants and double-crested cormorants (USFWS unpublished data). Red foxes were also observed eating and burying western gull eggs. During the 2003 through 2008 nesting seasons, no red foxes were observed in the area and nesting western gulls, pigeon guillemots, and black oystercatchers successfully bred on the rocks. A number of seabird species, including tufted puffin and Brandt's cormorant, which historically bred on Middle Coquille and Elephant Rocks, were observed in the area, but continued to restrict their breeding efforts to islands not accessible to red foxes (USFWS unpublished data). In addition to the loss of valuable

Exhibit G
Page 8

seabird breeding habitat, opportunities to observe seabirds like tufted puffins have been greatly reduced due to the presence of red fox.

4.1.3.3 Integrated Pest Management (IPM)

Mechanical, physical, biological, and chemical means have been utilized to combat invasive plants throughout the Refuges in accordance with 7 RM 14 (Pest Control policy). Plans to remove, control, and prevent establishment of non-native plant species and treat infestations with IPM techniques are implemented on an as-needed basis. Control efforts are planned annually, as staff and funding are available. An insect introduced for biological control for non-native gorse includes the gorse spider mite (*Tetranychus lintearius*) that was only marginally effective because of predation by other arthropods at Coquille Point Unit. Considerable progress has been made in some areas with infestations of invasive plants being reduced or eliminated by volunteers and refuge staff (USFWS unpublished data).

Control of pest mammals negatively effecting seabird colonies have been implemented at the Crook Point Unit where raccoons have impacted nesting Leach's storm-petrels (A. Pollard unpublished data). Efforts for the predation management program are guided by the tools and techniques detailed in the Environmental Assessment for Mammalian Predator Damage Management to Protect Seabird Colonies on Oregon Islands National Wildlife Refuge, Three Arch Rocks National Wildlife Refuge, and Adjacent Mainland Areas (USFWS 2005a).

4.2 Conservation Target Selection and Analysis

4.2.1 Conservation target selection

In preparing this plan, the Service reviewed other local, regional, and national plans that pertain to the wildlife and habitats of the Oregon Coast. The Service also sought input from Oregon State conservation agencies, non-governmental organizations, and the general public. The refuge purposes, as stated in the enabling legislation for each refuge (see Chapter 1) were carefully reviewed as was the Refuges contribution to maintenance of BIDEH (Appendix J) on the Oregon Coast. As a result of this information gathering and review process, certain species and habitats were identified as resources of concern. From this list of resources of concern, those species and habitats that are most representative of refuge purposes and habitats, BIDEH (Appendix J), as well as other Service and ecosystem priorities, were chosen as priority resources of concern. Examples include the common murre (refuge purposes) for Oregon Islands Refuge, the Vaux's swift (represents species that utilize old-growth Sitka spruce) for Cape Meares, and the Brandt's cormorant (species that nests on the rocks) for Three Arch Rocks. The complete list of priority resources of concern, i.e., focal species and habitat types, for each refuge is also contained within Appendix J. These priority resources of concern are the species and habitats whose conservation and enhancement will guide refuge management into the future. Potential management actions will be evaluated on their effectiveness in achieving refuge goals and objectives for the priority resources of concern.

Management of refuge focal species and habitats that support them will benefit many of the other native species that are present on the Refuges and the Oregon Coast. Many of the species that will benefit from management of the refuge focal species are identified in the "Other Benefiting Species" column in Appendix J. Through the consideration of BIDEH, the Refuges will provide for or maintain all appropriate native habitats and species. Refuge management priorities may

Exhibit G
Page 9

change over time and since the CCP is designed to be a living flexible document, changes will be made as needed and at appropriate times as identified by refuge personnel.

Note that although migratory birds comprise a major focus of the purpose on the Refuges, migratory birds were not designated as a conservation target separately, mainly because migratory birds occupy such a variety of habitat niches. Also, Complex staff members do not attempt to monitor and document the status of many migratory bird species, such as passerines, due to time constraints and work load. Instead, most migratory bird species were grouped or categorized into groups as seabirds and endangered, threatened, or sensitive species (Table 4-1).

Table 4-1. Key habitats or species groups identified during the conservation target identification analysis

System Targets	Nested or Benefiting Resources
Old-growth and late-successional Sitka spruce/ salal forest habitats	All vegetation and wildlife species associated with old-growth forest and late-successional Sitka spruce/salal forest habitats as detailed in Appendix J.
Steep rock cliff and coastal erosion bluff habitats	All vegetation and wildlife species associated with steep rock cliff and steep coastal erosion bluff habitats as detailed in Appendix B but not including seabirds and endangered, threatened, or sensitive species.
Stream and riparian habitat	All stream and riparian habitat associated species as detailed in Appendix B but not including seabirds and endangered, threatened, or sensitive species.
Headland riparian shrublands	All vegetation and wildlife species associated with headland riparian shrubland habitat associated species as detailed in Appendix B but not including seabirds and endangered, threatened, or sensitive species.
South coast headland erosion forblands and dunes	All vegetation and wildlife species associated with south coast headland erosion forbland and dune habitat associated species as detailed in Appendix B but not including seabirds and endangered, threatened, or sensitive species.
Rare early successional south coast headland prairie-grassland habitats	All early successional south coast headland prairie-grassland habitat associated species and habitat.
Rocks, reefs, and islands	All vegetation and wildlife species associated with coastal rocks, reefs, and islands that extend above the surface of the ocean and are surrounded by water at mean high tide, including nesting and roosting seabirds, wintering waterfowl, and other migratory birds as detailed in Appendix B.
Seabirds	All birds that frequent coastal waters and nest and/or loaf on refuge rocks, reefs, islands, and cliffs.
Endangered, threatened, or sensitive species	Species currently present or suspected historically to have inhabited the Refuges that are listed as endangered, threatened, candidate, or proposed under the Federal Endangered Species Act, as well as Federal Species of Concern. Target also includes Oregon State-listed threatened, endangered, or candidate species but does not include State-listed sensitive species; these are included as nested species under the appropriate habitat targets.
Pinnipeds	All pinnipeds that frequent coastal waters, haul-out, and or breed on refuge rocks, reefs, and islands.

4.2.2 Conservation target analysis

4.2.2.1 Old-growth and late-successional Sitka spruce/salal forest

4.2.2.1.1 Description and location

Cape Meares NWR provides permanent protection to one of the few remaining old-growth Sitka spruce and late-successional forest habitats on the Oregon coast. The Refuge is located along the Three Capes Scenic Route, approximately 10 miles west of Tillamook, Oregon. The 138-acre forested headland consists of Sitka spruce and western hemlock with intermittent open areas of forest wind-throw and an understory dominated by salal. The overstory Sitka spruce and western hemlock are very large and some individual trees approach 800 and 195 years in age respectively (USFWS 2004). Oregon's state champion Sitka spruce, the largest known representative of its species in Oregon, is located on Cape Meares NWR. This individual tree stands 144 feet tall, measures 576 inches in circumference and 15.5 feet in diameter. The crown averages 93 feet across (crown spread 90 by 88 feet), and it is estimated at 750 to 800 years old (French 2008).

Forested communities present at Cape Meares NWR include both Sitka spruce/salal and Sitka spruce-western hemlock/swordfern (*Polystichum munitum*). Neither community is represented in a pure stand, which is typical for coastal Sitka spruce forests. There is a tendency for the salal understory to predominate toward the windward or coastal edge of the site and for the swordfern understory to dominate on steep northerly slopes and to the interior of the site. The understory in the community is dominated by swordfern with salal, salmonberry, leatherleaf licorice fern (*Polypodium scouleri*), wood sorrel (*Oxalis oregana*), evergreen huckleberry, and vine maple (*Acer circinatum*) also occurring in lesser amounts (USFWS 2004).

The Sitka spruce-western hemlock/swordfern vegetation type, once common to the central and northern Oregon coast, remains uncut in only a few isolated areas, including Cape Meares NWR. This community is found on the upper reaches of the cape, usually on more gentle topography on all aspects. The canopy has a more closed appearance than that of the Sitka spruce/salal community. The western hemlock dominates the overstory in actual numbers of trees, but Sitka spruce trees are much larger in diameter. Pockets of extensive blowdown are found in this community, especially on the north slope of the cape. The Sitka spruce/salal community is found primarily as a narrow band atop the ocean cliffs. The key natural process that influences the unique habitat characteristics for this community appears to be intense exposure to salt spray and high winds coming from the ocean. The spruce trees are widely spaced in this community and the understory is dominated by salal (30–80% cover), and salmonberry (15–30% cover; USFWS 2004).

4.2.2.1.2 Condition and trends

The forest community within the Cape Meares NWR represents old-growth or late-successional forest conditions with representative large downed wood, standing snags, and a variety of age class trees present. The forest on surrounding refuge lands has been harvested by clearcutting, the majority of which took place 25 to 30 years ago. Because of adjacent clearcut logging practices, Cape Meares is more exposed to high southerly winds and forest blowdown has increased.

In 1987, the entire refuge, with the exception of the Oregon Coast Trail, was designated an RNA by the Oregon Natural Heritage Program (2003). Within designated RNAs, natural processes are allowed to predominate without human intervention and drive successional vegetative changes. An example of this management at Cape Meares NWR is the 20-acre unit east of the Three Capes

Exhibit G
Page 11

Scenic Route that is an early seral stage forest resulting from an almost complete wind-throw of the old-growth forest during a 1981 high-wind storm event. This stand appears to have been largely a Sitka spruce-western hemlock/swordfern stand. This site is one of the very few coastal locations in the Pacific Northwest where timber salvaging of downed old-growth was not conducted following a blowdown event and natural forest regeneration was allowed to occur. However, under certain circumstances such as invasion by non-native plant species (e.g., tansy ragwort), deliberate manipulation may be used to maintain the unique features for which the RNA was established. Because of the Refuge's purpose and the RNA restrictions, management of Cape Meares NWR and RNA will focus on protection, preservation, inventory, monitoring, and research.

In order to assist settlement after the Civil War, the U.S. Congress began offering land grants from federally owned land to assist rail and wagon road construction. In 1866, the state of Oregon received a grant that included every other square mile (section) in a 40-mile swath of land stretching from Portland to the California border. Oregon then awarded a private railroad company the land, to sell to settlers, and clearcutting practices began. The BLM acquired almost 2.4 million acres and the U.S. Forest Service administered several hundred thousand acres. The federal timber sale program began with the post–World War II housing boom and within 50 years over 80% of old-growth forest was lost. Logging reached its peak in the 1980s and only several hundred thousand acres remain protected in old-growth preserves. Because land was granted as every other section, it formed a checkerboard ownership pattern. Several areas have been consolidated over the years as a result of land exchanges, and some large blocks of old-growth forest still persist in Oregon, on BLM land.

Old-growth forests in California, Washington, and Oregon cover about 10.3 million acres. Oregon has almost half of the old-growth acres with about five million acres in seven different ownerships. More than 80% of the old-growth is on federal land, primarily National Forests. Old-growth occupied about half of the forest area when the first comprehensive forest surveys were made in the 1930s and 1940s. Less than 20% of the forest is now old-growth (Bolsinger and Waddell 1993). Future trends of old-growth in the state may change, by proposals developed by federal land management agencies to alter protection for the remaining old-growth forests.

4.2.2.1.3 Associated wildlife

4.2.2.1.3.1 Migratory birds

Species known to generally occur in old-growth forests within coastal Oregon that have been observed at Cape Meares NWR include marbled murrelet and Vaux's swift. In addition, northern spotted owl may occur; however, there have been no observations or reports in the past two decades. The late-successional Sitka spruce species include brown creeper, red crossbill, pileated woodpecker, and varied thrush. Other species common to the area are bald eagle, peregrine falcon, and numerous migratory songbirds (Cornell and AOU 2008; USFWS unpublished data). Inventories and monitoring of avian species within this habitat community of the Refuge have not been initiated and are needed.

4.2.2.1.3.2 Terrestrial mammals

Observations of mammals on the Refuge have revealed the presence of a diversity of large vertebrate species including Roosevelt elk, black-tailed deer (*Odocoileus hemionus*), and black bear (USFWS unpublished data; USFWS 2004). Carnivores such as coyote (*Canis latrans*), raccoon, and striped skunk are frequently observed and an occasional mountain lion (*Felis* *concolor*) may also forage or range through the Refuge (USFWS unpublished data). Seven species of rodents were documented in the old-growth forest habitat during a 1996 study, where Townsend's chipmunk (*Tamias townsendi*) and deer mouse (*Peromyscus maniculatus*) accounted for over 70% of the captured animals, along with Oregon meadow mouse (*Microtus oregoni*), California red-backed vole (*Clethrionomys californicus*), red tree mouse (*Phenacomys longicaudus*), northern flying squirrel (*Glyucomys sabrinus*), and bushy-tailed wood rat (*Neotoma cinerea*; Gomez et al. 1997). Surveys to determine current population estimates for all mammal species within this refuge habitat community have not been attempted, and estimates do not exist and are needed.

4.2.2.1.3.3 Herptiles (reptiles and amphibians)

During the 1996 study of small mammal and amphibian abundance at Cape Meares NWR conducted under contract by the Oregon Cooperative Wildlife Research Unit at OSU, five amphibian species were captured in old-growth forest habitat. These species include roughskin newt (*Taricha granulose*), western red-backed salamander (*Plethodon vehiculum*), ensatina salamander, torrent salamander (*Rhyacotriton* spp.), and long-toed salamander (*Ambystoma macrodactylum*; Gomez et al. 1997). Further inventory is needed in this habitat community to develop baseline population estimates and trends.

4.2.2.1.4 Key ecological attributes

Table 4-2 describes key ecological attributes of a functioning old-growth forest and associated indicators. For each indicator, the conditions that would represent "good" or better are shown. Desired conditions stated in the tables are descriptions and information of the listed ecosystem type as outlined by Oregon Natural Heritage Program and Information Center, OSU Institute for Natural Resources (ONHIC 2008).

Table 4-2. Old-growth and late-successional Sitka spruce/salal forest ecological attributes, indicators, and condition parameters*

Key Ecological Attributes	Indicators	Desired Conditions
Late seral-stage Sitka spruce	• Various stages of decay • Large hollow snags • Some trees 300 years old or older • Multiple tree layers	• Decomposing woody material • Snags 25 meters tall • Tree/snag densities >18/hectares • 60% canopy cover
Salal dominated understory	• High stem density • Multiple floor vegetation layers • Soft loose floor debris	• Relatively low open understory and forest floor • 2 feet • Decomposing woody and plant material
Salmonberry forest	• Berry-producing shrubs	• 3–5 feet tall
Native plant species	• Total native plant cover • Understory native plant richness	• >70% • Natural succession
Stream and riparian zone habitat	• Streams with medium to steep gradient • Basalt parent geology • Canopy dominated by early successional red alder	• Step-pool morphology • High percent basalt base • Non-native invasive plants absent

*Not all key ecological attributes or indicators were deemed ultimately feasible or necessary to design an objective around. In addition, while the key ecological attribute identifies a desired condition for most indicators, other factors, such as feasibility and the ability to reasonably influence certain indicators played a role in determining the ultimate

Exhibit G
Page 13

parameters and condition levels chosen for each conservation target. Thus the key ecological attributes should be viewed as a step in the planning process, but the ultimate objective design was subject to further discussion and consideration.

4.2.2.1.5 Threats

A threat or stress is something that destroys, degrades, or impairs a conservation target by impacting a key ecological attribute of that target. In addition, different stresses place varying degrees of pressure on the environmental system, and sources (the proximate cause of a stress) can contribute to more than one stress. Sources contributing to multiple stresses and having high contribution and irreversibility are of major concern and must be addressed.

4.2.2.1.5.1 Human activities

Human-induced wildfire is a potential catastrophic threat to old-growth forest habitat. The Fire Management Plan (USFWS 2004) needs to be reviewed annually or as needed to ensure that contact information is up-to-date and the responding agencies are familiar with allowable suppression techniques and sensitive areas within the Refuge/RNA.

At Cape Meares NWR, illegal activities such as rock climbing, mushroom collection, and general trespass have the potential to cause tremendous disturbance to wildlife and also have the potential for introduction of invasive plant species into closed areas of the Refuge. Boundary survey and posting are necessary to delineate where certain public use activities are permitted and to reduce or eliminate illegal logging or other trespass on refuge lands, and are most critical along the boundary of the Refuge/RNA tract on the east side of Three Capes Scenic Route and on the northeastern portion of the Refuge adjacent to private and county forest lands.

There are potentially direct impacts from nonfederal forest management practices on species that move between federal and nonfederal forest habitats during the year or during their life cycle. A review of the cumulative effects analysis of spotted owl habitat management alternatives, highlighting the role of nonfederal lands in maintenance of old-growth-dependent amphibian and bird species and their habitats, emphasizes the desirability of partnering with adjacent landowners to maintain and enhance habitat quality on adjacent privately owned forest lands (USFS and BLM 1994). Maintenance and improvement of habitat on adjacent forest land would also provide a protective buffer from high winds and secondary effects of logging.

4.2.2.1.5.2 Edge effects

A specialized range of plant and wildlife species exists and is dependent upon old-growth forest habitat. Some of these species depend on the more stable climatic environment of the forested interior, whereas others require snags and decaying woody debris often found there. Many species require large unbroken tracts to survive; however, the amount and quality of this habitat has gradually decreased due to logging. As forests are harvested, edges are created. The environmental conditions produced along these edges may modify habitat values that are important to interior old-growth forest dwellers. Habitat disruption and potential loss of landscape-level biodiversity may ensue if interior habitat ecosystems and processes are not sustained. Therefore, preserving sufficient interior habitat is important to protect these species and maintain biodiversity (BCMF and BCMELP 1995).

Plants and animals adapted to the moderate climatic conditions of interior habitat often cannot survive the effects of drying winds and temperature changes that penetrate from edge environments. The depth of influence for air temperature and humidity extended 120 to 140 meters from a clear-cut edge into an old-growth Douglas-fir (*Pseudotsuga menziesii*) forest in southern Washington State. For soil temperature and moisture the range of edge influence was 60 to 120 meters (Chen et al. 1990).

Edge effects can be positive or negative because some species thrive in the edge habitat while others perish. For example, species such as elk and deer tend to flourish in edge environments because the habitat contains a wide variety of cover and food resources (Nyberg and Janz 1990). Many amphibians require the cool moist conditions of forest floor microhabitats, and they may be vulnerable to the drier, warmer, exposed edges between forests and clearcuts (Davis 1996). Breeding populations of marbled murrelets decline as areas of old-growth forest decrease since this species largely relies on heavily forested areas with large trees having high epiphyte cover (Piatt et al. 2007).

4.2.2.1.5.3 Pest species

Urbanization often causes changes in hydrology, increased disturbance, pollution, and the introduction of plants and animals (USFS 2006). All of these changes can lead to an increase in biological invasions and unwanted infestations of introduced plants (Reichard 2004). A substantial infestation of non-native invasive tansy ragwort is spreading and threatening native plants and wildlife habitat on the north side of the riparian area predominantly on adjacent county lands near Cape Meares NWR. In addition, urbanization causes introductions of non-native animal species. Populations of raccoon, feral cat, feral livestock, and rats may increase and cause predation and competition of native wildlife species. See section 4.1, Biological Integrity Analysis, for detailed description of invasive plants and animal species associated with the Refuge.

4.2.2.2 Steep rock cliffs and coastal erosion bluffs

4.2.2.2.1 Description and location

Areas of steep basalt cliffs and coastal bluffs can be found throughout the Cape Meares NWR and the two headland units of Oregon Islands NWR, Coquille Point and Crook Point. The forested headland of Cape Meares NWR consists of a mosaic of habitats including old-growth forest, headland riparian shrublands, stream mouth coastal riparian, steep rock cliffs and steep coastal erosion bluffs and cliffs. The area occupied by these habitats at Cape Meares has not been surveyed and is hard to quantify, but it is estimated that cliffs and bluffs occupy approximately 28.5 acres (USFWS 2004).

The Coquille Point Unit, located within the city limits of Bandon, Oregon, also has sections of steep coastal erosion bluffs. One of the primary purposes for establishing the Coquille Point Unit was to protect and restore the steep coastal erosion bluff habitat for wildlife species dependent upon it (USFWS 1991). Total acreage of bluff areas for the Coquille Point Unit has not been surveyed and is needed.

The Crook Point Unit is located approximately 12 miles south of the town of Gold Beach and is an example of southern Oregon's diverse habitat types including steep rock cliffs and coastal erosion bluffs. The steep rock cliffs and coastal erosion bluffs at this unit have not been surveyed; surveys are needed before pursuing specific management actions.

The rock cliff and coastal erosion bluff vegetative characteristics are similar for the Coquille Point and Crook Point Units. The steep rock cliff face areas are generally devoid of vegetation with occasional wind sweep shrubs, succulents and grasses growing from rock fissures. Plant species present on the cliff sides and nearby surrounding headlands and bluffs at Coquille Point include gorse, kinnikinnick (*Arctostaphylos uva-ursi*), shore pine, plantain (*Plantago lanceolata*), dock (*Rumex* spp.), and rushes (*Juncus* spp.; USFWS 2004). Vegetation inventories and surveys have not been completed at refuge rock cliffs and coastal erosion bluffs and are needed.

4.2.2.2.2 Condition and trends

Cape Meares NWR and RNA is managed to maintain and protect the existing steep rock cliff habitat and the old-growth Sitka spruce/salal forest in an "unaltered, natural condition" to support migratory bird and other wildlife populations. In addition to the requirements of management as an RNA, the inaccessibility of the steep cliff habitat at Cape Meares and at Crook Point together with the susceptibility of nesting seabirds to disturbance, make it necessary to implement a hands-off management approach to this habitat type. The condition trend of the steep cliff habitat habitats is generally stable and not impacted by human disturbance.

Other than the limited habitat and wildlife data or observations used to nominate and approve the RNA designation of Cape Meares NWR, existing baseline data and inventory of plants and wildlife species found within Cape Meares NWR and the two mainland units' steep cliff and coastal erosional bluff habitats are currently nonexistent or inadequate for monitoring trends in these communities.

At Coquille Point Unit, prior to the acquisition of lands by the Refuge from 1991 to 1994, invasive gorse and European beachgrass dominated Coquille Point Unit's erosional bluffs and headland habitats. Refuge management efforts in 1994 and 1995 involved mechanical re-grading of the headland to create a natural vegetated open space buffer and to establish an interpretive trail. Efforts also included importation of topsoil and restoring vegetation with native plant species. Habitat management efforts from 1996 to present have involved mowing, fertilizing, and controlling invasive plants. In addition to establishment of headland native plant and soil restoration, Complex staff members initiated invasive gorse control measures along the erosional bluffs and headland habitats using an IPM program of mechanical, biological, and chemical treatments. From 2004 to 2007, extensive infestations (approximately 5–10 acres) of gorse have been removed mechanically and treated with herbicides through a Wildland Urban Interface Grant to reduce the threat of wildland fire and to re-establish displaced coastal erosional bluff and headland native plant diversity (USFWS unpublished data). Continued efforts will be required to reduce the potential of wildland fire associated with highly flammable gorse and to re-establish low-fuel-load native vegetation in the bluff habitat for the benefit of wildlife species.

4.2.2.2.3 Associated wildlife

These steep rock cliffs and coastal erosional bluffs provide nesting habitat for cliff-dwelling seabirds and raptors, as well as foraging and shelter habitat for various small mammals and herptiles. Inventory and baseline surveys of many species including mammals, reptiles, amphibians, and invertebrates are lacking due to insufficient staffing and funding. The only wildlife inventory that has been conducted is in the rock cliffs of Cape Meares NWR, that provide nesting habitat for peregrine falcon, pelagic cormorant, Brandt's cormorant, common murre, tufted puffin, rhinoceros auklet, pigeon guillemot, and western gull. Current seabird breeding populations for the entire coast of Oregon can be found in Naughton et al. (2007).

4.2.2.2.4 Key ecological attributes

The CCP team members identified the following as key ecological attributes for a healthy and functioning cliff and bluff system.

Table 4-3. Steep rock cliff and coastal erosion bluff ecological attributes, indicators, and condition parameters*

Key Ecological Attributes	Indicators	Desired Conditions
Very steep or vertical basalt rock faces	• Elevation, mean high tide to higher than 200 feet above sea level • Basalt rock	• Stable cliff material • Nesting birds • Invasive plants not present
Vegetated and unvegetated ledges	• Pockets of vegetated soil • Native vegetation present	• Ledges for nesting birds • Invasive plants not present
Steep rock cliffs	• Very steep, largely unvegetated cliffs of mostly serpentine rock or sandstone with patches of seaside daisy, Pacific sedum, and coast eriogonum	• Nesting birds • Invasive plants not present
Steep coastal erosion bluffs	• Steep, largely vegetated cliffs/bluffs above the ocean with a mixture of grasses and forbs	• Large concentrations of native coastal grasses and forbs • >75% native plant species
High levels of disturbance by past human activities	• Grading, top soil removal, building construction	• No or minimal human disturbance
Non-native invasive plants actively managed	• Reduced gorse, European beachgrass	• Non-native or introduced plant species absent

*Not all key ecological attributes or indicators were deemed ultimately feasible or necessary to design an objective around. In addition, while the key ecological attribute identifies a desired condition for most indicators, other factors, such as feasibility and the ability to reasonably influence certain indicators, played a role in determining the ultimate parameters and condition levels chosen for each conservation target. Thus the key ecological attributes should be viewed as a step in the planning process but the ultimate objective design was subject to further discussion and consideration.

4.2.2.2.5 Threats

Introduced invasive plants (e.g., gorse, European beachgrass, tansy ragwort, ice plant) are a constant issue along the Oregon coast and within the habitats of steep rock cliffs and erosional bluffs. Refuge management will prevent the establishment of invasive plant species and treat existing or new infestations with IPM techniques using mechanical, physical, biological, and chemical means.

Human-induced wildfire is a potential catastrophic threat at Coquille Point Unit due in large part from invasive nonnative gorse. The Fire Management Plan (USFWS 2004) needs to be reviewed annually or as needed to ensure that contact information is up-to-date and the responding agencies are familiar with allowable suppression techniques and sensitive areas within the Refuge/RNA.

At the Coquille Point and Crook Point Units, where steep rocky cliffs and erosional bluffs occur, illegal activities such as rock climbing and general trespass have the potential to cause tremendous disturbance to wildlife and introduce invasive plant species into closed areas of the Refuge units. Boundary survey and posting are necessary to delineate where certain public use activities are permitted and to reduce or eliminate trespass on refuge lands.

4.2.2.3 Stream and riparian habitat

4.2.2.3.1 Description and location

Cape Meares' forested headland consists of a mosaic of habitats including headland riparian shrublands, stream mouth coastal riparian, steep rock cliffs, and steep coastal erosion bluffs and cliffs. The stream and riparian habitat within Cape Meares NWR and RNA is located in the northeast corner of the northern unit, in an active glacial slide area. Several spring-fed and surface runoff streams flow across this area from the top of the adjacent privately owned headland, crossing under an early successional red alder canopy and ending in a 12-foot drop to the beach on a continually eroding bank.

4.2.2.3.2 Condition and trends

The condition and trend of the Cape Meares NWR's stream and riparian area remains stable. Because Cape Meares NWR is classified as an RNA, and the riparian habitat is closed to the general public, the human influences are minimal and land management practices are not implemented. Natural processes are allowed to predominate without human intervention and successional vegetative changes occur naturally. However, at Cape Meares, a substantial infestation of tansy ragwort exists on the north side of the riparian area predominantly on adjacent county lands.

4.2.2.3.3 Associated wildlife

The large mammal and bird species listed for the old-growth habitat also frequent riparian areas. The 1996 small mammal and amphibian survey at Cape Meares NWR indicated the total capture rate of rodents was highest in the riparian area (Gomez et al. 1997). Townsend's chipmunk, deer mouse, Oregon vole (*Microtis oregoni*), Pacific jumping mouse (*Zapus trinotatus*), and long-tailed vole (*Microtis longicaudus*) were captured in the riparian habitat. Insectivore captures included Trowbridge's shrew (*Sorex trowbridgii*), Pacific shrew (*Sorex pacificus*), marsh shrew (*Sorex bendirii*), and shrew-mole (*Neurotrichus gibbsii*).

Amphibian species richness was greatest in the old-growth and riparian habitat with five species, but total capture rate was highest in the riparian zone at Cape Meares. The species documented include roughskin newt, western red-backed salamander, torrent salamander, Pacific giant salamander (*Dicamptodon tenebrosus*), and Pacific tree frog (*Pseudacris regilla*; Gomez et al. 1997).

4.2.2.3.4 Key ecological attributes

The CCP team members identified the following as key ecological attributes for a healthy and functioning riparian system.

Table 4-4. Riparian ecological attributes, indicators, and condition parameters*

Key Ecological Attributes	Indicators	Desired Conditions
Streams with medium to steep gradient	• Good drainage • Seasonal runoff	• Step-pool morphology • Natural flood regime
Native species representation	• Native plant species cover • Early successional red alder	• Greater than 75% native plant species cover • Non-native or introduced plant species absent

*Not all key ecological attributes or indicators were deemed ultimately feasible or necessary to design an objective around. In addition, while the key ecological attribute identifies a desired condition for most indicators, other factors,

Exhibit G
Page 18

such as feasibility and the ability to reasonably influence certain indicators, played a role in determining the ultimate parameters and condition levels chosen for each conservation target. Thus the key ecological attributes should be viewed as a step in the planning process but the ultimate objective design was subject to further discussion and consideration.

4.2.2.3.5 Threats

The area of riparian habitat at Cape Meares NWR is in the remote portion of the Refuge and is closed to public access. More than 20 million visitors travel the Oregon coast immediately adjacent to and through Cape Meares NWR on an annual basis. Visitation of Cape Meares NWR will probably increase due to the new state champion Sitka spruce tree and upgrades at the lighthouse and State Scenic Viewpoint. The increase in visitation to the champion tree may bring issues of trespass into closed areas and an increase in the potential of non-native plant invasion.

4.2.2.4 Headland riparian shrublands

4.2.2.4.1 Description and location

The Crook Point Unit is an example of southern Oregon's diverse habitat types that are associated with a windswept marine terrace headland bordered by relatively undisturbed beaches, small coastal streams, and Sitka spruce forests. The headland riparian shrublands located at the Crook Point Unit are in the northeastern portion of the unit. Plant species associated with the riparian habitat include a mixture of native rushes, Sitka spruce, red alder, willow, and a variety of grasses and forbs.

4.2.2.4.2 Condition and trends

The Crook Point Unit is designated as a Natural Heritage Conservation Area (ORS 273-586) by the Oregon Department of State Lands, Oregon Natural Heritage Program. To be designated as a Natural Heritage Conservation Area it was determined that the Refuge unit has substantially retained its natural character, or, if altered in character, shall in addition to its natural heritage resource values, be valuable as habitat for plant and animal species or for the study and appreciation of the natural features. Since Crook Point Unit is classified as a Natural Heritage Conservation Area and the riparian habitat is closed to the general public, human influences have been and are expected to be minimal. Natural processes are allowed to predominate without human intervention and successional vegetative changes occur naturally.

4.2.2.4.3 Associated wildlife

Wildlife inventories and monitoring surveys have not occurred at the Crook Point Unit and are needed to understand the significance of the headland shrubland riparian habitat. Due to the undeveloped nature of Crook Point Unit, wildlife is abundant and uses the unit's habitats. Migrant songbird species that may breed or roost in this riparian habitat include red crossbills, hermit warblers, and Swainson's thrush (*Catharus ustulatus*; USFWS unpublished data).

Common mammalian species such as black bear, black-tailed deer, mink, river otter, and bobcat (*Lynx rufus*) have been observed using the headland and undisturbed portions of the headland shrubland riparian habitat. Found in the Refuge's waters of Sand Creek, coastal cutthroat trout, which have been considered a sensitive species by the Service and the State of Oregon, are associated with the unit's lush riparian corridor that is a mixture of native rushes, Sitka spruce, red alder, willow, and a variety of grasses and forbs (USFWS unpublished data).

4.2.2.4.4 Key ecological attributes

Table 4-5. Headland riparian shrubland ecological attributes, indicators, and condition parameters*

Key Ecological Attributes	Indicators	Desired Conditions
Headland riparian shrublands	• Stream channel associated riparian corridor with patches of Sitka spruce, red alder, and hooker willow	• 60–70% native plant cover in riparian area
Native species representation	• Native plant species cover • Early successional red alder	• >75% native plant species cover • Non-native or introduced plant species absent
Minimal human disturbance	• Human presence	• No human impacts

*Not all key ecological attributes or indicators were deemed ultimately feasible or necessary to design an objective around. In addition, while the key ecological attribute identifies a desired condition for most indicators, other factors, such as feasibility and the ability to reasonably influence certain indicators, played a role in determining the ultimate parameters and condition levels chosen for each conservation target. Thus the key ecological attributes should be viewed as a step in the planning process but the ultimate objective design was subject to further discussion and consideration.

4.2.2.4.5 Threats

The Crook Point Unit of Oregon Islands NWR offers spectacular coastal views and if opened to the public would be difficult to control due to its remote and rugged location, limited access road, and lack of public use facilities and staff to ensure the safety of visitors. Many of the habitats found on the headland are occupied by rare and fragile plants, making them susceptible to erosion and impacts from public-use foot traffic (Kagan 2002). Current management tools necessary for the long-term survival of these fragile plants and habitats, exposed cultural resources, and adjacent sensitive seabird breeding sites include management of the area as a closed biological reserve with no general public use, limited staff guided tours, and well-posted access points to control unauthorized entry. The Refuge promotes an undisturbed natural environment by excluding public access. Lack of funding and maintenance staff is curtailing habitat management efforts, additional boundary posting, and maintenance of access roads and facilities.

Adjacent to the Crook Point Unit, private lands are currently managed as large forested parcels and grazed grasslands with residential homes interspersed along the scenic bluffs overlooking the majestic Mack Reef archipelago. Cooperative working relationships with adjacent landowners and managers is essential to curbing the threats of wildland fire, non-native invasive plants, feral and domestic animals (e.g., sheep, goats, cows, horses, dogs, and cats) and trespass on refuge lands and resources. Cooperative efforts through programs such as the Service's Partners for Wildlife Program and forest management initiatives would assist adjacent private and public landowners in the management of threats to the unit's biodiversity and rare habitat types.

The presence and extent of invasive plant infestations in this habitat are unknown due to lack of plant inventories and surveys, which are needed. Invasive plant and animal species cause competition and degradation of native species. Efforts to remove, control, and prevent establishment of invasive woody and non-native plant species will be accomplished with IPM techniques using mechanical, physical, biological, and/or chemical means.

4.2.2.5 South coast headland erosion forblands and dunes

4.2.2.5.1 Description and location

Coquille Point Unit consists of a headland jutting toward the ocean and overlooking rocks and islands within Oregon Islands NWR. From the point, a beach stretches to the north and another to the south. At the time of acquisition, the bluff portion of the headland was covered with large areas of eroded hardpan soil interspersed with gorse, Scotch broom, and other invasive plants. The northern portion of the property is low-lying stabilized dunes with invasive European beachgrass (USFWS 2004). A small one-acre emergent wetland, formed from ground water seepage from the bluff's base, exists between the bluff and dunes at the unit's north end.

The Crook Point Unit is an example of southern Oregon's diverse habitat types that are associated with a windswept marine terrace headland bordered by relatively undisturbed beaches, small coastal streams, and Sitka spruce forests. Uplifted serpentine and sedimentary layers dominate the soils and geology of the headland with plant communities that have developed on partially stabilized sand dunes or on marine terraces. Within the Refuge unit, examples of rare and exceptional habitat types of great conservation concern occur, including coastal headland forblands and dunes. Many of the more common habitats found at Crook Point are not late-successional or unusual, but they are one of the largest remnants of undeveloped areas in southern Oregon (Kagan 2002).

4.2.2.5.2 Condition and trends

The Crook Point Unit is designated a Natural Heritage Conservation Area (ORS 273-586) by the Oregon Department of State Land's Oregon Natural Heritage Program. To be designated as a Natural Heritage Conservation Area it was determined that the Refuge unit has substantially retained its natural character, or, if altered in character, is in addition to its natural heritage resource values, valuable as habitat for plant and animal species or for the study and appreciation of the natural features. The coastal headland forblands and dunes at Crook Point are managed to retain their current state by controlling non-native invasive plants.

The coastal dune habitat at Coquille Point Unit is dominated by non-native European beachgrass. This species displaces native dune species significantly altering the morphology of dune systems (Barbour and Johnson 1977). In 2006, the Refuge started a test beachgrass control effort on the northern boundary of the unit to investigate the potential of native plant re-establishment. This habitat is of importance to a suite of dune community plants including pink sand verbena. This extirpated species is listed as endangered by the Oregon Department of Agriculture and is considered a Species of Concern by the Service. Restoration of this habitat and re-establishment of native species at Coquille Point will provide habitat for wildlife and will provide an opportunity for the public to understand the ecology of coastal dunes and restoration techniques.

4.2.2.5.3 Associated wildlife

No wildlife inventories or monitoring surveys have occurred at the Crook Point Unit, and they are needed to understand the wildlife significance of the headland forblands and dune habitat. Due to the undeveloped nature of Crook Point Unit, wildlife is abundant and using habitats lost in other areas due to encroaching human presence. Common mammalian species such as black bear, black-tailed deer, mink, river otter, and bobcat have been observed using the headland forblands and dune habitat for foraging and as travel corridors.

Wildlife inventories and monitoring surveys have not occurred at Coquille Point Unit and are needed to understand the wildlife significance of the headland forblands and dune habitat. In contrast to undeveloped Crook Point Unit, there is minimal wildlife use of Coquille Point's habitats due to limited natural habitat onsite, its small size, and encroaching human presence. Common mammalian species such as black-tailed deer, long-tailed weasel (*Mustela frenata*), and brush rabbit (*Sylvilagus bachmani*) are rarely observed in headland forblands and dune habitat. These habitats are extremely important as open space for migrant birds and travel corridors for breeding seabirds (USFWS unpublished data).

4.2.2.5.4 Key ecological attributes

Table 4-6. South coast headland erosion forblands and dunes ecological attributes, indicators, and condition parameters*

Key Ecological Attributes	Indicators	Desired Conditions
South coast headland erosion forblands and dunes	• Exposed, windswept marine terrace and partially stabilized sandstone, forbs, and low isolated dunes	• Stable or increasing
Minimal non-native invasive plants	• Tansy ragwort, Canada thistle, ice plant, European beachgrass	• Less than 10% invasive species
Native forbs	• Beach strawberry, field horsetail, common yarrow, selfheal, western brackenfern, broadleaf lupine, seaside daisy, coastal sagewort	• 60–70% native plant cover
Minimal human disturbance	• Human presence	• No human impacts at Crook Point Unit • Minimal human impacts at Coquille Point Unit

*Not all key ecological attributes or indicators were deemed ultimately feasible or necessary to design an objective around. In addition, while the key ecological attribute identifies a desired condition for most indicators, other factors, such as feasibility and the ability to reasonably influence certain indicators, played a role in determining the ultimate parameters and condition levels chosen for each conservation target. Thus, the key ecological attributes should be viewed as a step in the planning process but the ultimate objective design was subject to further discussion and consideration.

4.2.2.5.5 Threats

The lands at Crook Point Unit are in a remote location and closed to public access, while lands at Coquille Point Unit are within an urban environment and are designed to manage high levels of human-caused disturbance and trespass. The Coquille Point Unit is bordered to the east, north and south by residential development within the City of Bandon. The west boundary of the unit is ocean shoreline managed by ORPD, which abuts the unit's coastal forblands and dunes. The shoreline has heavy public use for recreation and wildlife viewing. Immediately adjacent to the Refuge, illegal driftwood fires occur year-round and the use of illegal fireworks occurs during the Fourth of July holiday, both of which have a high potential for igniting vegetation on the Refuge and spreading rapidly into adjacent residential and commercial properties. To reduce the threat of wildland fire, cooperative efforts by the Bandon Rural Fire Protection District and OPRD result in seasonally posting "No Driftwood Fires" and "Fireworks Prohibited on all Beaches" signs in the area, in addition the Refuge's "Fireworks and Campfires Prohibited" signage at all beach access points.

Exhibit G
Page 22

Invasive plants dominate the coastal forblands and dunes at Coquille Point and are minimally present at the Crook Point Unit. Invasive plants cause competition and degradation of native species, and in the high levels at Coquille Point Unit they constitute a wildland fire threat. Efforts to remove, control, and prevent re-establishment of invasive non-native plant species could be accomplished with IPM techniques using mechanical, physical, biological, and/or chemical means.

Many of the habitats found on the Crook Point Unit headland are occupied by rare and fragile plants, making them susceptible to erosion and impacts from public-use foot traffic (Kagan 2002). The unit is closed to public access; however, lack of funding and maintenance staff is limiting habitat management efforts, additional boundary posting, and maintenance of access roads and facilities.

4.2.2.6 Rare early successional south coast headland prairie-grasslands

4.2.2.6.1 Description and location

The 134-acre Crook Point Unit, the second mainland addition within Oregon Islands NWR, was acquired in 2000 and is located along Oregon's south coast approximately 12 miles south of Gold Beach. It is bordered on the west by a coastal beach administered by the State of Oregon, on the south and east by private property, and on the north by Pistol River State Park. Crook Point contains numerous rare plant species, undisturbed cultural resource sites, unique geological formations, and 1 mile of pristine beach with interspersed rocky intertidal habitat, and serves to protect major seabird colonies.

The Crook Point Unit consists of grassland, meadows, Sitka spruce forest, unvegetated headland, and coastal beach. The top of the headland slopes off to the north into a small watershed and to the west down to the beach. These vegetated grassland slopes are dominated by native red fescue as well as other unique plant species including San Francisco bluegrass and Roemer's fescue. The red fescue grassland on Crook Point is among the largest and best in Oregon. This area is managed as a biological reserve under the State of Oregon Natural Heritage Conservation Area designation. The Oregon Natural Heritage Program has identified 19 "special-status" plant species that may occur on Crook Point. Two rare plants, large-flowered goldfield and beach wormwood (*Artemisia pycnocephala*), have been observed on Crook Point.

An objective of the Refuge is to preserve and maintain the native coastal habitats within the Crook Point Unit, for the benefit of rare plants, migratory birds, and other native wildlife. The Crook Point Unit has some small but exceptional examples of coastal grasslands, representing rare and endemic vegetation types that have almost entirely vanished from the Oregon coast. South coast headland prairie-grassland is unnamed in the National Vegetation Classification System (Grossman et al. 1998) and the Oregon Classification of Native Vegetation (Kagan et al. 2000). The closest existing alliance is *Festuca rubra* coastal headland vegetation that is classified by the State of Oregon as critically imperiled because of extreme rarity, with five or fewer occurrences or very few remaining acres in the state, and is globally imperiled because of rarity, with six to 20 occurrences or few remaining acres worldwide. Roemer's fescue is found in the south coast headland prairie-grassland habitat in Crook Point. In addition, this rare early successional south coast headland prairie-grassland at Crook Point is one of four large populations of large-flowered goldfields, endemic to Curry County, which is known to occur at only 16 locations along the coast from Brookings to Cape Blanco. This member of the Asteraceae family is listed as a Candidate Species by the State of Oregon and is imperiled because of its rarity, with 6 to 20 occurrences or few remaining acres.

Exhibit G
Page 23

4.2.2.6.2 Condition and trends

Crook Point is the narrow headland between the dunes created by the mouth of the Pistol River to the north and the sedimentary terraces to the south. The point itself is of serpentine origin. The Crook Point headland consists of a mosaic of habitats including grassland, meadows, coniferous forest, rock formations, and barren ground. The western portion of Crook Point is dominated by a barren, windblown, highly eroded landscape of flat to gentle slopes approximately 100 feet above sea level. The history and reason for the barrenness of the area is unclear, but human activities (e.g., human-induced fires, forest management practices, grazing), weather and local geomorphology have likely played a major role. Crook Point is located in one of the windiest locations on the Pacific Coast. During the spring and summer, strong persistent northwest winds sweep the area with gusts sometimes exceeding 50 miles per hour. During the fall and winter, powerful Pacific storms pound the area with wind gusts commonly exceeding 100 miles per hour in the bigger storms. Annual precipitation ranges from 60 to 100 inches. If this barren area was once vegetated it would have taken little disturbance or vegetation removal to initiate serious top soil erosion. Geologic formations and the presence of numerous landslides and slips indicate that the area is highly unstable, and much of the area may be naturally unvegetated. The extreme western tip of Crook Point consists of a rock outcrop that forms a large pinnacle. Numerous seeps and springs can be found throughout Crook Point (USFWS 2004).

At Crook Point the south coast headland prairie-grasslands are found in areas where harsh coastal weather conditions slow forest invasion, but they will not persist over time, as secondary succession will eventually lead to forest dominating the entire site unless management action is taken to prevent this succession (Kagan 2002). During the period of 2005 through 2008, limited habitat management efforts using volunteer labor have been initiated to control woody vegetation encroachment on grasslands. These efforts have included mechanical and manual removal of encroaching Sitka spruce, shore pine, evergreen huckleberry, coyote bush, and wax myrtle.

4.2.2.6.3 Associated wildlife

No wildlife inventories or monitoring surveys have occurred at the Crook Point Unit, and they are needed to understand the wildlife significance of the South Coast Headland Prairie-Grassland habitat. Due to the undeveloped nature of Crook Point Unit, wildlife is abundant and using habitats lost in other areas due to encroaching human presence. Common mammalian species such as black bear, black-tailed deer, mink, river otter, and bobcat have been observed using the south coast headland prairie-grassland habitat for foraging and as travel corridors.

There has been one survey to document the presence of the Oregon silverspot butterfly's (*Speyeria zerene hyppolyta*) obligate host plant, the western blue violet (*Viola adunca*), at Crook Point. The Oregon silverspot butterfly is federally listed as a threatened species. In the spring of 2008, it was determined that there are a minimum of 12 discrete violet locations within the south coast headland prairie-grassland at Crook Point. Three of these plant locations are in areas managed for woody vegetation control. No larvae of Oregon silverspot were observed in this initial survey, but six of the larger concentrations of *Viola adunca* could possibly support the species or would potentially be suitable habitat for reintroduction of this butterfly (D. and D. Bilderback unpublished data). It remains to be determined if the Crook Point Unit has sufficient plant resources to support this threatened invertebrate species. “Hundreds” of silverspots were observed during a field visit in August 2008 at Cape Blanco, north of Crook Point (USFWS unpublished data).

4.2.2.6.4 Key ecological attributes

Table 4-7. Rare early successional south coast headland prairie-grassland ecological attributes, indicators, and condition parameters*

Key Ecological Attributes	Indicators	Desired Conditions
Early successional south coast headland grassland	• Windswept, gently to moderately sloping with 60–70% cover of native grasses and forbs (e.g., native grasses, beach strawberry, western blue violet, field horsetail, common yarrow, selfheal, western brackenfern, broadleaf lupine, seaside daisy)	• Stable or increasing • 60–70% native plant cover
Minimal non-native invasive plants	• Tansy ragwort, Canada thistle, ice plant, European beachgrass	• Less than 10% invasive species
Minimal intrusion of woody species	• Sitka spruce, shore pine, evergreen huckleberry, coyote bush	• Less than 30% woody species cover
Minimal human disturbance	• Human presence	• No human impacts

*Not all key ecological attributes or indicators were deemed ultimately feasible or necessary to design an objective around. In addition, while the key ecological attribute identifies a desired condition for most indicators, other factors, such as feasibility and the ability to reasonably influence certain indicators, played a role in determining the ultimate parameters and condition levels chosen for each conservation target. Thus the key ecological attributes should be viewed as a step in the planning process but the ultimate objective design was subject to further discussion and consideration.

4.2.2.6.5 Threats

The Crook Point Unit offers spectacular coastal views and would likely be a popular location for wildlife-dependent activities if opened to the public. However, due to its remote and rugged location, limited access, and lack of public-use facilities and staff to ensure the safety of visitors, allowing public use at Crook Point Unit could result in adverse effects to wildlife and habitat. This is because many of the habitats found on the unit, including south coast headland prairie grassland, are occupied by rare and fragile plants, making them particularly susceptible to erosion and impacts from foot traffic (Kagan 2002). Thus, the current management approach used for the long-term survival of these fragile plants and habitats is to manage the area as a closed biological reserve with no general public use, allow limited staff guided tours, and post access points to control unauthorized entry.

A minimal amount of invasive non-native plants (e.g., tansy ragwort, Canada thistle, ice plant, European beachgrass) and a suite of encroaching native woody species (e.g., Sitka spruce, shore pine, evergreen huckleberry, coyote bush) are present at Crook Point Unit, which cause competition and degradation of rare native species found in early successional south coast headland prairie-grassland. Efforts to remove, control, and prevent establishment of invasive woody and non-native plant species could be accomplished with IPM techniques using mechanical, physical, biological, and/or chemical means.

4.2.2.7 Rocks, reefs, and islands

4.2.2.7.1 Description and location

Oregon Islands and Three Arch Rocks NWRs include all land masses that extend above the ocean surface and are surrounded by water at mean high tide with the exception of Chief's Island at Gregory Point. Oregon Islands NWR is also a designated Wilderness (Oregon Islands Wilderness) that spans six counties and 320 miles of the Oregon coastline from Tillamook Head

Exhibit G
Page 25

south to the California border and includes 1,854 rocks, reefs, and islands. Three Arch Rocks NWR comprises three large and six smaller rocks totaling 15 acres and lies one-half mile offshore from the community of Oceanside, and is also a designated Wilderness (Three Arch Rocks Wilderness). The total area of all rocks, reefs, and islands of Oregon Islands and Three Arch Rocks NWRs is estimated at 373 acres. These two Refuges have highly vulnerable wildlife habitats including major seabird nesting colonies, pinniped rookeries, and threatened and endangered species use areas.

4.2.2.7.2 Condition and trends

Seabirds and pinnipeds spend the majority of their life at sea foraging on marine fishes and invertebrates, and return to land for breeding, loafing, and roosting. The rocks, reefs, and islands associated with Oregon Islands and Three Arch Rocks NWRs provide wildlife habitat that is important for vulnerable adults, young, and, in the case of seabirds, eggs and young. Nearly 1.3 million seabirds, representing 13 different species (Naughton et al. 2007), and four species of pinnipeds, including threatened Steller sea lions, depend on these habitats. Protective measures for pinnipeds include the designation of critical habitat under the Endangered Species Act for threatened Steller sea lions at the two major rookeries in Oregon (i.e., Rogue and Orford Reefs). All rocks, reefs, and islands within Oregon Islands and Three Arch Rocks Refuges are closed to public entry to reduce disturbance to wildlife. Management of seabird resources is facilitated by implementation of the Service’s Regional Seabird Conservation Plan (2005b). Pinniped resources are managed and protected by the Marine Mammal Protection Act of 1972 by providing undisturbed breeding and haul-out habitat for pinnipeds.

The Steller sea lion was listed as a threatened species in Oregon, and in 1990 critical habitat was designated around the major breeding rookeries including Pyramid Rock on the Rogue Reef Unit and Large Brown Rock on the Orford Reef Unit of Oregon Islands NWR. Critical habitat includes an aquatic zone that extends 3,000 feet out from the shoreline of these rocks into the State Territorial Sea and a 3,000-foot air zone that extends over these rocks (CFR 50, Part 226.202b). Listing as a threatened species and classification of critical habitat extended additional legal protection to Steller sea lions and provided awareness of the status and management concern for these species to ocean users and the general public.

The goal of protecting an undisturbed natural environment on all refuge rocks, reefs, and islands is being accomplished by prohibiting public access. Refuge personnel enforce and document trespass violations according to federal regulations (CFR 50, Part 26.21). Cooperative law enforcement efforts with state and federal agencies, with limited Service law enforcement efforts for the protection of seabirds, pinnipeds, and refuge habitats, have been initiated. In addition, signs and other deterrents to keep the public off rocks, reefs, and islands that are accessible at low tide have been developed (see Chapter 5).

The Coquille Point Unit of Oregon Islands NWR has limited wildlife use, and its primary value is providing a buffer zone between residential development within the City of Bandon and the nearshore rocks and islands that provide habitat to sensitive breeding and loafing wildlife (USFWS 1991). These rocks and islands provide habitat to hundreds of loafing harbor seals (Brown et al. 2005) and breeding habitat for thousands of migrating and nesting birds (Naughton et al. 2007). The adjacent islands of Elephant, Middle Coquille Point, North Coquille Point, and Haystack Rocks are close to shore and accessible to the public at low tides. These easily climbed islands provide cliff and island top habitat for black oystercatchers, Aleutian cackling geese, peregrine falcons, and a suite of seabirds including tufted puffin and brown pelican. As the human population in Bandon and on the Oregon south coast increases, the pressure on refuge resources grows with additional recreational beach use, trespass on refuge islands, illegal driftwood beach fires and fireworks, and development of adjacent lands for residential homes and hotels with exterior lighting, non-native landscaping, domestic and feral animals, and human-related refuse.

4.2.2.7.3 Associated wildlife

4.2.2.7.3.1 Colonial seabirds

Nesting seabird colonies are the most distinctive biological feature of the rocks, reefs, and islands. Oregon Islands and Three Arch Rocks provide nesting habitat for 1.3 million seabirds of 13 species including fork-tailed storm-petrel, Leach's storm-petrel, Brandt's cormorant, double-crested cormorant, pelagic cormorant, black oystercatcher, western gull, glaucous-winged gull (*Larus glaucescens*), common murre, pigeon guillemot, Cassin's auklet, rhinoceros auklet, and tufted puffin. The seabird nesting season on the islands generally extends from March through August. Another seabird bird that frequents the Refuges is the endangered brown pelican.

4.2.2.7.3.2 Pinnipeds

The Steller sea lion, California sea lion, northern elephant seal, and harbor seal use the rocks, reefs, and islands as haul-outs throughout the year.

4.2.2.7.3.3 Reptiles and amphibians

No reptile and amphibian inventories or monitoring surveys have occurred on the rocks, reefs and islands associated with Oregon Islands and Three Arch Rocks NWRs. Anecdotal observations of clouded and ensatina salamanders have been documented on larger islands (Goat and Hunter islands and Saddle Rock) in the southern portion of the Oregon Islands NWR (USFWS unpublished data).

4.2.2.7.4 Key ecological attributes

Table 4-8. Rocks, reefs, and islands ecological attributes, indicators, and condition parameters*

Key Ecological Attributes	Indicators	Desired Conditions
Steep, rocky, and precipitous edges	• Basalt, metasedimentary, and sandstone	• Stable rock fissures and ledges with a variety of aspects
Non-vegetated without soil or vegetated with soil	• Native coastal plants	• Non-native invasive plants not present
Native species representation	• Native species percent cover	• 100% native plants
Coastal rocks and islands	• Water depth around islands	• Land mass exposed at mean high tide
Sanctuary	• Secure roosting and nesting habitats for seabirds • Secure haul-out and pupping habitat for pinnipeds • Predation • Impacts from diseases	• Wildlife areas protected from disturbance • Rocks and islands with soil covered by native plant communities • No invasive mammals present and avian predation limited to natural events • Limited or no disease

*Not all key ecological attributes or indicators were deemed ultimately feasible or necessary to design an objective around. In addition, while the key ecological attribute identifies a desired condition for most indicators, other factors, such as feasibility and the ability to reasonably influence certain indicators, played a role in determining the ultimate

Exhibit G
Page 27

parameters and condition levels chosen for each conservation target. Thus, key ecological attributes should be viewed as a step in the planning process but the ultimate objective design was subject to further discussion and consideration.

4.2.2.7.5 Threats

Some of the onsite threats to the wildlife associated with rocks, reefs, and islands include human-induced disturbance events, invasive species competition with native plants and animals, and predation that causes direct mortality of native wildlife species. A single aircraft or watercraft disturbance event at a common murre colony can cause reduced reproductive output, breeding failure, and abandonment of the colony (Rojek et al. 2007). The presence of an individual mammalian (e.g., climbing human, red fox) or avian (e.g., bald eagle) predator can have serious negative effects on seabird nesting success (Rojek et al. 2007; USFWS 1993). Human disturbance to pinnipeds using the Refuge can cause direct mortality of pups, loss of energy resources to resting animals, and disruption of normal loafing activities (Riemer and Brown 1997). The invasion of seabird breeding habitat by non-native plants, such as ice plant and tansy ragwort, may restrict or eliminate burrow-nesting species (e.g., Leach's storm-petrels) from the capability to access or dig nesting burrows (A. Pollard unpublished data). Oil spills in the California Current System have caused significant seabird and shorebird mortality and are the greatest threat to refuge resources (USFWS 2005b, 2007a).

Many of Oregon's seabird colonies are physically isolated from the shoreline, providing a measure of protection from humans and mammalian predators. However, many other colonies are close enough to shore to be accessible to human intrusion during periods of low tides. Predation of seabirds, particularly by non-native red fox and raccoon, has been documented to have negative effects on nesting seabirds on Oregon's south coast (A. Pollard unpublished report; USFWS 2005a). The Oregon coast is experiencing rapid growth in residential, resort and recreational development. As the human population increases and lands are developed there will likely be accompanying increased range expansion and population sizes of predators such as red foxes, raccoons, feral cats, and rats. To reduce predation at seabird colonies where mammalian predators have been determined to be a threat, the Refuge Complex would manage the predation problem using procedures approved in the Mammalian Predator Damage Management Environmental Assessment (USFWS 2005a). In addition, it is expected that with increased illegal activities (e.g., trespass) caused by rapid human population growth on the coast there would be an increased risk of invasive non-native plant species introduction on coastal rocks and islands, thereby altering seabird nesting habitats.

Watercraft approaching too close to the rocks, reefs, and islands within Oregon Islands and Three Arch Rocks NWRs can cause serious disturbance to seabirds and pinnipeds and can result in the loss of reproduction, and in some cases, colony or rookery abandonment (USFWS unpublished data). Legal watercraft activities occurring in the marine environment near these islands, such as scuba diving, sport and commercial fishing, bait and shellfish collection, kayaking, and canoeing have a high potential for disturbing wildlife. The need to establish buffer zones to minimize disturbance around waterbird colonies and pinniped rookeries is well documented (LCDC 1994; Rodgers and Smith 1997). The NOAA guidelines request the public and watercraft to remain a minimum of 100 yards from pinnipeds when they are hauled out on shore. All NWRs that support seabird colonies or pinniped haul-out areas strictly regulate or close the area to human entry (CFR 50, Part 26.21). Three Arch Rocks NWR has an enforceable 500-foot watercraft buffer (closure) zone annually from May 1 to September 15 to minimize wildlife disturbance by boaters (OSMB 1994; OAR 250-20-309). The Refuge Complex continues to deploy buoys annually to

Exhibit G
Page 28

delineate the Three Arch Rocks closure. This is currently the only watercraft closure zone in Oregon marine waters.

Aircraft overflights lower than 2,000 feet AGL or closer than a quarter- or half-mile have a high potential for disrupting seabirds and pinnipeds. The FAA's aeronautical charts currently request a 2,000-foot AGL vertical clearance over all NWRs; however, this is only a request, not a regulation and is regularly ignored by many pilots. The Service does not have jurisdiction over air space above the rocks, reefs, and islands of Oregon Islands and Three Arch Rocks NWRs.

Populations of colonial nesting seabirds and pinniped rookeries are extremely vulnerable to the effects of oil or hazardous material spills. To minimize the potential effects of a catastrophic spill in Oregon, the main transportation corridor for crude-laden tankers in the Trans-Alaskan Pipeline Petroleum Trade occurs 30 to 60 nautical miles offshore. In contrast, numerous small oil tankers, cargo vessels, bulk carriers and barges use the waters near the coast as a transportation route. Any spill from these routes could potentially be devastating to populations of marine wildlife and habitat. In addition, nonpoint source oil tarballs, or slicks, periodically wash up on Oregon's beaches and impact wildlife. Nonpoint chronic sources may be products of vessels illegally pumping bilges, recreational outboard motors, and improper use of petroleum products in marinas (USFWS 2005b).

4.2.2.8 Seabirds

4.2.2.8.1 Description and location

There are an estimated 1.3 million breeding seabirds of 13 species nesting on the Refuge's 1,854 rocks, reefs, and islands. The Oregon Islands and Three Arch Rocks NWRs primary purposes are the protection and conservation of sea lions and colonial nesting seabirds (E.O. No. 4364 and 699). Seabird conservation and management at the Refuge Complex has been extensive over the past three decades despite limited staff and funding. Future efforts will be based upon statistically viable scientific research, combined with long-term monitoring of key species, provided funding is available for these important tasks. Seabirds using Oregon Islands and Three Arch Rocks NWRs represent a group of species that use different foraging guilds in the marine food web (R. Suryan unpublished data). Long-term small-scale or localized research using this suite of species as indicators of ocean conditions can be used to document change in the larger marine environment. The need to change or regulate human induced threats to refuge resources will be driven by an understanding of marine ecological parameters that is directly influenced by anthropogenic actions. The Refuges' role in increasing this knowledge is key to making informed management decisions with the best scientific information possible. Emphasis of research should focus on understanding the cause of reduced or declining seabird populations and development of tools and techniques to aid recovery of threatened or endangered species (USFWS 2005b).

4.2.2.8.2 Condition and trends

The Service has conducted seabird surveys along the coast of Oregon from 1966 to present (Naughton et al. 2007). Aerial and boat surveys have been standardized, both in technique and timing (Carter et al. 2001; Takekawa et al. 1990) since 1988 to more accurately census and monitor breeding seabirds. Pelagic and Brandt's cormorants have been monitored to determine population trends, and since 1988, have shown interannual variation in numbers, but overall remain stable over the study period (USFWS unpublished data). Common murre population levels have shown during this time period to be influenced by natural (e.g., levels of upwelling, prey availability, bald eagle predation and presence) and human-induced (e.g., oil spills, aircraft and boating disturbance) factors and maybe on the verge of population decline (Naughton et al. 2007; R. Lowe pers. com.) Limited data and qualitative observations indicate that tufted puffin have been in decline in Oregon for more than a decade (Piatt and Kitaysky 2002) and may now represent less that 50% of the population present in 1988 (R. Lowe pers. com.) Common murres, Brandt's cormorants, and pelagic cormorants have been and will continue to be focal species for these surveys due to the ability of staff to conduct distant aerial or boat observations and/or photography of surface nesters with little or no disturbance. The knowledge is limited concerning the majority of seabirds that nest on the Refuges and is needed to determine the status of population levels and trends.

Pigeon guillemot. (Roy W. Lowe/USFWS)

The black oystercatcher is a Service Focal Species for priority conservation efforts due to its restricted population size and range, susceptibility to human-caused disturbances, and lack of baseline natural history and ecological data to assess management actions and conservation status (Tessler et al. 2007). The black oystercatcher is also listed as a species of high concern within national, state, and regional shorebird conservation plans. As an obligate rocky shore species and good keystone species, it has been monitored along the central Oregon coast since 1997 by the Service. Reproductive output during this period has shown a stable population with interannual variability and no significant trend over the study period (USFWS unpublished data). Population declines from increased disturbance and associated nest abandonment may lead to local extirpation on the Oregon coast. To assess the importance of demographic parameters, USGS with the Service's Ecological Services Division and a suite of other public agencies have developed a research assessment study to understand the ecology of the species in the southern portion of its range and to determine if increased management (e.g., public education, regulations, predator control) is needed for its conservation (Tessler et al. 2007). Because of this species' status as a species of concern, refuge staff will continue to assist the Service's Ecological Services Division and USGS with monitoring population trends.

The ODFW's management responsibilities along the coast including lands and waters, fish and wildlife, threatened and endangered species, and other programs that frequently overlap with Service resources and responsibilities. Increased cooperation between ODFW and the Refuge Complex will assist both agencies in meeting their missions and mandates and provide a more systematic and accessible process for sharing information and expertise, and funding as contained in the Oregon Conservation Strategy (ODFW 2006). Since refuge boundaries stop at the mean high tide line, ODFW and other state agencies are in a unique position to greatly assist the Refuge Complex in protecting sensitive seabirds and pinnipeds from human disturbance in close proximity to the Refuges though management actions as described in the Rocky Shores Management Strategy of the Territorial Sea Plan (LCDC 1994). The ODFW and the Refuge Complex share mutual interests in wildlife surveys, documenting and responding to seabird mortality events, developing joint research projects, education and outreach programs, species management, and dissemination of data, results, and information to a wider audience. Working in concert with ODFW is consistent with the policies of Oregon Statewide Planning Goal 19 - Ocean Resources and the Territorial Sea Plan. The Territorial Sea Plan specifies that Oregon should seek co-management arrangements with federal agencies when appropriate to ensure that ocean resources are managed and protected and to cooperate with other states and governmental entities directly and through regional mechanisms to manage and protect ocean resources and uses (LCDC 1994). The potential establishment of Marine Reserves in waters surrounding refuge rocks, reefs, and islands by the State of Oregon could add additional protection to refuge wildlife and habitats.

The Refuge Complex and the BLM have been working cooperatively since the early 1980s to protect the wildlife resources of YHONA and the adjacent rocks within Oregon Islands NWR. Working in close cooperation with BLM over the past two decades has resulted in the protection of existing seabird colonies and the pinniped haul-out site and provided for dramatic population increases in nesting seabirds and the colonization of new sites on the mainland and refuge rocks (R. Lowe pers. com.) Public use of YHONA is extremely high, exceeding 350,000 visitors annually. This site is now one of the premier seabird viewing locations in the country; it provides tremendous opportunities for wildlife resource interpretation and environmental education. There is a need for continued close coordination between the Refuge Complex and BLM to share data and ensure that adaptive management of public use and wildlife protection continues to prevent impacts to wildlife using refuge rocks directly adjacent to YHONA.

4.2.2.8.3 Key ecological attributes

Table 4-9. Key ecological attributes for seabirds*

Key Ecological Attributes	Indicators	Desired Conditions
Species abundance and diversity	• Population levels • Population available for viewing	• Stable or increasing • Large concentrations
Sanctuary	• Secure roosting and nesting habitats • Native plants • Predation • Impact from diseases	• Roosting and nesting areas protected from disturbance • Rocks and islands with soil covered by native plant communities • No invasive mammals present and avian predation limited to natural events • Minimal avian and mammalian predators • Limited or no disease

*Not all key ecological attributes or indicators were deemed ultimately feasible or necessary to design an objective around. In addition, while the key ecological attribute identifies a desired condition for most indicators, other factors, such as feasibility and the ability to reasonably influence certain indicators, played a role in determining the ultimate parameters and condition levels chosen for each conservation target. Thus the key ecological attributes should be viewed as a step in the planning process but the ultimate objective design was subject to further discussion and consideration.

4.2.2.8.4 Threats

One of the greatest challenges currently facing the National Wildlife Refuge System and fish and wildlife populations in the twenty-first century is rapid climate change brought about by global warming (Defenders of Wildlife 2006). Oregon's climate is warmer than it was 20 years ago and this trend is likely to continue into the next century. Climate change is a large-scale issue that has and will continue to affect refuge resources in the future. The potential large-scale impacts of global warming on the Pacific Ocean and nearshore environment include increase in sea-level and sea-surface temperatures, changes in salinity, alkalinity, wave and ocean circulation patterns and upwelling, and loss of coastal marshes, estuaries, and ocean beaches (Glick et al. 2007). The consequence of these changes and losses in Oregon's marine environment include direct loss of habitat through coastal inundation and flooding, changes in species biogeography, including marine wildlife species (e.g., phytoplankton, krill, forage fish, seabirds, pinnipeds) and invasive species (e.g., animals, plants, microbes, pathogens). Although there is no certainty regarding the precise nature and rate of changes to Oregon's marine environment, it is clear that changes in the environment have the potential for serious social, economic, and environmental impacts. The monitoring and research of potential climate change impacts on refuge species and habitats is complex and difficult and will require cooperation from numerous public and private organizations to analyze all the factors that could affect the region's wildlife and habitat.

Many seabird colonies are located immediately adjacent to the coastline and some are connected to the beach at low tides. Human disturbance impacts to nesting seabirds at these sites are of great concern. The Refuge Complex has initiated and maintained a number of extensive outreach and educational efforts designed to prevent or lessen human disturbance impacts at seabird colonies (see Chapter 5). At some locations such as Yaquina Head, Seal Rock, and Heceta Head, seabird nesting populations have shown significant growth following outreach and education efforts designed to lessen human impacts. Efforts to continue to protect seabirds and pinnipeds

Exhibit G
Page 32

on the Refuges from human disturbance will need to continue and expand as land development continues to increase and more tourists visit the Oregon coast.

Predation of seabirds, particularly by non-native and native mammalian predators, has been documented to have negative effects on nesting seabirds on the Oregon coast (USFWS 2005a; A. Pollard unpublished data). Many of the rocks and islands impacted by these mammals are connected or within swimming distance during low tides and are easily accessible to predators. The Oregon coast is experiencing rapid human growth in residential, commercial and recreational development. As the human population increases and lands are developed there will likely be accompanying increased range expansion and population sizes of predators, such as red foxes, raccoons, feral cats, and rats, that find beneficial aspects of human refuse as a food resource and infrastructure that can be used as shelter or breeding sites. In recent years, a reduction in the number of seabirds nesting at some mainland sites has been noted and may be due, in part, to predation by red foxes, feral cats, and raccoons, which are often attracted to areas of public use such as Harris State Beach Park and Bandon's waterfront on the south coast and YHONA to the north.

Bald eagles nesting near seabird colonies prey predominantly on seabirds for food (DeGange and Nelson 1982; Sherrod et al. 1976). Bald eagles in Oregon have been increasing steadily since the 1970s. The net increase in the Oregon population was 8.9% in 2007, with an average annual increase of 6.9% from 1995 through 2004. Along the Oregon coast, the nesting bald eagle population increased 17% from 2003 through 2007 (Isaacs and Anthony 2008). Since 1994, disturbance at common murre and Brandt's cormorant colonies from increasing numbers of bald eagles on Oregon's north and central coast has resulted in colony abandonment, population declines, and redistribution (R. Lowe pers. com.; Naughton et al. 2007). This successfully recovered eagle population is expected to continue a positive growth trend in Oregon, and it is unknown what level of influence this increasing population of predators will have on seabird populations and demography. Cooperative research efforts with the Refuges, OSU, and Oregon Sea Grant, to quantify the effects of bald eagles on common murre reproductive output at Yaquina Head were started in 2007. Preliminary results indicate that eagle foraging disturbance was high prior to incubation initiation by the murres (OSU unpublished data). Continuation of this research and expansion to the entire Oregon coast is needed to determine if changes in seabird populations are affected by direct mortality and disturbance, secondary predators (e.g., gulls, ravens) during eagle disturbance events, or immature eagle foraging and loafing patterns. In addition, research should also focus on developing long-term population and range trends for seabird species, such as the common murre, facing impacts from the expanding bald eagle population.

4.2.2.9 Endangered, threatened, and sensitive species

4.2.2.9.1 State or federally listed species known to occur on refuges

One goal of the Refuge System is "to conserve, restore where appropriate, and enhance all species of fish, wildlife, and plants that are endangered or threatened with becoming endangered." In the policy clarifying the mission of the Refuge System, it is stated "We protect and manage candidate and proposed species to enhance their status and help preclude the need for listing."

In accordance with the above, the CCP team considered any species with federal or state status in the planning process. Table 4-10 lists the species that are state or federally listed that are known to occur on the Refuges. Other state-listed species may occur but have not been documented.

Listed species that are suspected to have occupied refuge lands historically are also part of this target. Discussion on the listed species follows Table 4-10.

Table 4-10. Federal and State listed species known to occur or very likely to occur on Oregon Islands, Three Arch Rocks, and Cape Meares National Wildlife Refuges.

Species	Federal*	Oregon*	Current Occurrence on Refuges
California brown pelican	Endangered	Endangered	Common visitor; roosting on rocks and islands
Black oystercatcher	Species of Concern	Sensitive-Vulnerable	Resident; breeds on rocks and islands
Marbled murrelet	Threatened	Threatened	Possible breeder in old-growth forest at Cape Meares NWR
Bald eagle	Species of Concern	Threatened	Common year-round; forages on seabirds. Nests at Cape Meares NWR
American peregrine falcon	Species of Concern	Species of Concern	Common year-round; nests on all three NWRs
Aleutian cackling goose	Species of Concern	Species of Concern	Migrant during spring and fall; winters on Haystack Rock at Pacific City
Northern spotted owl	Threatened	Threatened	Formerly occurred on Cape Meares NWR; no reliable observations in decades
Steller sea lion	Threatened	Unknown	Common throughout year; breeds on Oregon Islands and Three Arch Rocks NWRs

* Federal status of species located at http://ecos.fws/Endangered/wildlife.html

* Oregon status of species located at http://www.dfw.state.or.us/

4.2.2.9.2 Condition and trends of federally listed species and habitats utilized on refuges

The California brown pelican breeds in southern California and Mexico during the winter and early spring and migrates north to Oregon and Washington where it is common from late spring through fall. In Oregon brown pelicans use refuge rocks and islands as secure roosting sites. It is rarely seen inland or far out at sea as the species forages for small fish in the nearshore coastal waters. The primary reason for severe declines in the U.S. population, and for designating the species as endangered, was DDT contamination in the 1960s and early 1970s. The pesticide DDT and its principal metabolite DDE are not easily broken down and accumulate in the tissues of species at the top of the food chain (USFWS 1983). Since banning of these organochlorine pesticides, brown pelican abundance has shown a dramatic recovery, and although annual reproductive success varies widely, populations have remained generally stable for at least 20 years (USFWS 2007b). Therefore, the Service proposed to remove the brown pelican from the List of Endangered and Threatened Wildlife because it no longer meets the definition of endangered or threatened (USFWS 2008a, 2008b).

The black oystercatcher is a Service Focal Species for priority conservation efforts due to its restricted population size and range, susceptibility to human-caused disturbances, and lack of baseline natural history and ecological data to assess management actions and conservation status (Tessler et al. 2007). The black oystercatcher is also listed as a species of high concern within the national, state, and regional shorebird conservation plans (USFWS 2000). As an obligate rocky shore species and good keystone species it has been monitored along the central Oregon coast, including below Cape Meares, since 1997 by the Service. Statewide monitoring for this species has occurred since 2005, determining that the south coast has the largest portion of the breeding

Exhibit G
Page 34

Peregrine falcon perched on a cliff. (Dave Ledig/USFWS)

population (Elliott-Smith et al. 2007). Reproductive output during this period has shown a stable population with interannual variability and no significant trend over the study period (USFWS unpublished data). Because of this species' status as a species of concern, refuge staff will continue to assist the Service's Ecological Services Division and USGS with monitoring of population trends.

The marbled murrelet, a small oceanic seabird that nests in the coastal, old-growth forests of the Pacific Northwest, is listed as a threatened species under the Endangered Species Act (ESA) for the lower 48 states (USFWS 1997). The birds were disappearing rapidly from California, Oregon, and Washington as its coastal habitat came under pressure from logging and human development. The three northwestern states marbled murrelet population is estimated at 17,000 to 27,000 and has continued to decline (4–7% per year) and fragment over the last 10 years (McShane et al. 2004). The Canada population is estimated to be between 54,000 to 92,000, and Alaska has approximately 270,000 individuals and has experienced a 70% decline during the past 25 years (Piatt et al. 2007). The Service identified 3.6 million acres in California, Oregon, and Washington as critical habitat to aid in the recovery process (USFWS 2006). Marbled murrelet surveys in 1989 and 1990 detected this species at Cape Meares NWR and adjacent state park (USFWS unpublished data). The old-growth habitat at Cape Meares is considered potential breeding habitat, but breeding surveys have not occured.

Exhibit G
Page 35

Bald eagles are year-round residents of the Refuges. They forage over or perch on rocks and islands were they actively pursue and capture seabirds. This activity is most common during spring and summer seabird breeding season. An active bald eagle nest has been present at Cape Meares since 1985 (Isaacs and Anthony 2008). In 1973, the bald eagle was listed as threatened in Oregon (43 Federal Register [FR] 6230–6233) and in June 2007 it was delisted in the lower 48 states (72 FR 37345–37372). There are almost 10,000 breeding pairs in the lower 48 states, and more than 40,000 individuals reside in Alaska (USFWS 2007c).

The American peregrine falcon was removed from the federal endangered species list in August 1999 (64 FR 46541–46558), and from the state of Oregon list in 2007. The peregrine falcon breeds, loafs, and forages on the coastal habitat found on the three refuges. The Refuge Complex initiated reproductive success monitoring efforts in 1993 at peregrine eyries at Three Arch Rocks and Cape Meares NWRs. In 2004, the monitoring effort was expanded with the inclusion of 15 newly re-occupied south and north coast eyries (USFWS unpublished data). This coastwide nesting success data are combined with state and nationwide efforts to monitor population trends in a national post-delisting monitoring program that was initiated in 2002 (Isaacs 2007; USFWS 2003). Monitoring surveys will be conducted on the Refuges every three years and will be added to the national effort that will review the status of the species in 2015.

The Aleutian cackling goose was delisted 2001 and currently uses Three Arch Rocks and Oregon Islands NWRs as foraging and nocturnal roosting habitat. The rocks and islands are important for staging Aleutian cackling geese as they prepare for migration to breeding grounds. Geese occupy the refuge islands mainly from January through April, with peak numbers in March in California and in early April for Oregon (USFWS unpublished data). The unique Semidi Islands subpopulation of Aleutian cackling geese, numbering approximately 140 birds, winters at Nestucca Bay from October-April and uses Haystack Rock at Pacific City as their nocturnal roosting site. The overall population of Aleutian cackling geese has recovered from a low of 790 in 1973 to the current estimated population of 114,000 (USFWS unpublished data).

The northern spotted owl primarily inhabits old-growth forests in the northern portion of the Pacific coast from southern British Columbia to northern California. Historically, the greatest threat to this species is the loss of old-growth and mature late-seral forests that contain large dead trees for nesting and prey habitat. In 1989 and 1990, the Service reviewed its status and proposed listing the species as threatened throughout its range in northern California, Oregon, and Washington (55 FR 26114–26194). Protection of the owl under the Endangered Species Act has led to significant changes to forest practices and land management in the northwest and has curtailed logging in old-growth forest. Currently, there are 3,000 to 5,000 pairs remaining in the states of Washington, Oregon, and California, and the population continues to decline 3.7% per year (Nickerbocker 2007). This species has not been observed or reported at Cape Meares NWR for more than several decades; however, the old-growth habitat has suitable characteristics for nesting but likely represents too small of an area.

The Steller sea lion is divided into the western (Gulf of Alaska, Bering Sea, Russia, and Japan) and eastern (California, Oregon, British Columbia, and southeast Alaska) stocks based on genetic evidence and population trends (Bickham et al. 1996; Loughlin 1997). The western stock has declined 70 to 80% since the 1970s and was listed as endangered in 1990 (62 FR 24345–24355). The eastern stock, which occurs in Oregon, was listed as threatened in 1990 (55 FR 49204). Suspected causes of the precipitous decline include over-fishing of prey stocks, orca predation, disease, climate change, and human interactions (NOAA 2007a, 2007b). The eastern stock's total

Exhibit G
Page 36

population size was 46,000 to 58,000 and increasing at 3% per year (NOAA 2007c; Pitcher et al. 2007). The Steller sea lion use refuge rocks, reefs, and islands within Oregon Islands and Three Arch Rocks NWRs, as haul-out areas year round (R. Lowe pers. com.) The Rogue Reef Unit and Orford Reef Unit of Oregon Islands NWR support breeding rookeries of Steller sea lions and 1,128 pups were produced in 2002 (Pitcher et al. 2007). In addition, small numbers of pups (fewer than 10) are born annually on Seal Rock at Three Arch Rocks NWR (R. Brown pers. com.)

4.2.2.9.3 Key ecological attributes and threats

Key ecological attributes and threats differ for each listed species and are not described here in the interest of space. Recovery plans and other species-specific documents are the best source for in depth information on these species.

4.2.2.10 Pinnipeds

4.2.2.10.1 Description and location

The Oregon Islands and Three Arch Rocks NWRs' primary purposes are the protection and conservation of pinnipeds and colonial nesting seabirds (E.O. No. 4364 and 699). Steller and California sea lions and harbor seals haul out on many rocks, reefs and islands associated with Oregon Islands and Three Arch Rocks NWRs. Steller sea lions breed and pup at Rogue and Orford Reefs. Harbor seals breed and pup at many refuge rocks, reefs, and islands along the Oregon coast. Northern elephant seals haul out and pup (fewer than 15 individuals) on Shell Island within the Simpson Reef Unit of Oregon Islands NWR near Cape Arago.

4.2.2.10.2 Condition and trends

Results from ODFW and NOAA Fisheries Service studies indicate the Steller sea lions in Oregon are year-round residents and have breeding rookeries at several sites on the Refuges. At least 10 haul-out sites are used on a regular basis, with reproductive activities occurring primarily at Orford and Rogue Reefs. An additional small number of pups (fewer than 10) are born each year on Seal Rock at Three Arch Rocks NWR on the north coast (R. Brown pers. com.) Recent counts of Steller sea lions (4,000–5,000) in Oregon have increased from counts made in the late 1970s (2,000–2,500). Annual peak counts occur during the June and July reproductive season. Winter counts range from 1,000 to 1,500 statewide. In 1994, 2,696 adults and juveniles and 423 pups were counted at the two major south coast rookeries (Rogue Reef and Orford Reef). Population estimates using aerial photography in 2002 determined Oregon's Steller sea lion population at 4,169 nonpups and 1,136 pups (Pitcher et al. 2007). Steller sea lions marked as newborn pups on Rogue Reef have been resighted at various ages (6 months–5 years) at haul-out areas from northern California through Washington, British Columbia, southeast Alaska, and the eastern and central Gulf of Alaska (NMFS 2008).

Peak counts of California sea lions in Oregon have increased from 1,000 to 2,000 in the late 1970s to 5,000 to 7,000 into 2000 (ODFW unpublished data). California sea lions are found in greatest abundance on the south coast of Oregon at Rogue Reef and Orford Reef (500–1,000), at Cape Arago and Sea Lion Caves on the central coast (2,000–3,000), and at Cascade Head and the south jetty of the Columbia River on the north coast (2,000–3,000). Peak number estimates can vary between annual surveys from 100 to 1,000 individuals due to seasonal migration (S. Riemer pers. com.) California sea lion numbers fluctuate seasonally, with peaks occurring in fall and spring as males move north from California breeding sites in the fall and then back south in the spring. Recently, researchers have observed more females than in the past, and in general, the sea lions appear to return earlier compared to historical accounts (ODFW unpublished data). Continuous counts occur at the East Mooring Basin in Astoria, Oregon, where branding work occurs.

Historic population levels of harbor seals in Oregon are unknown. The distribution and abundance of harbor seals in Oregon were monitored from 1977 to 2003 by ODFW through aerial photographic surveys. Harbor seals on shore were counted each year during the reproductive period. Mean annual counts of nonpups (adults and subadults) were used as an index of population size and the trend in the counts was modeled using exponential (density-independent) and generalized logistic (density-dependent) growth models. The population grew following protection under the Marine Mammal Protection Act of 1972, until stabilizing in the early 1990s. The estimated absolute abundance of harbor seals (all age classes) during the 2002 reproductive period was 10,087. The current predicted population size for harbor seals in Oregon is above its estimated maximum net productivity level and hence within its optimum sustainable population range. The ODFW speculates that recent increases in ocean productivity in the eastern Pacific Ocean may lead to an increase in carrying capacity and renewed growth in Oregon's harbor seal population (Brown et al. 2005).

Elephant seals are found occasionally in Oregon either resting or molting on refuge rocks, reefs, and islands and adjacent sandy beaches. Elephant seals do not generally breed in Oregon; however, there is one pupping site in Oregon at Shell Island near Cape Arago State Park where elephant seals haul out year-round and pup. The majority of the elephant seals in Oregon observed at locations other than Cape Arago are subadult animals that come to shore to molt.

4.2.2.10.3 Key ecological attributes and threats

Key ecological attributes and threats, most of which occur off of the Refuges, differ for each listed species and are not described here in the interest of space. Recovery plans and other species specific documents are the best source for in depth information on these species.

4.3 Current Wildlife and Habitat Research and Monitoring Efforts

The National Wildlife Refuge System Administration Act (16 U.S.C. 668dd–688ee), as amended, requires the Service to monitor the status and trends of fish, wildlife, and plants on each refuge in the Refuge System. The Oregon Coast Refuge Complex has relatively limited staff but extensive responsibilities managing six NWRs, resulting in insufficient capacity to carry out well-designed population inventories and assessments and report impacts of management actions. For many species and habitats, baseline inventories have not yet been conducted. The Service needs to provide additional staff to address the biological complexity of the Complex's six refuges. The 2008 Staffing Plan Model for the Refuge Complex identifies the need for an additional 21 employees, not including additional law enforcement personnel needs, to effectively manage the six Refuges within the Complex. The 2008 Staffing Plan calls for an additional six biologists for the Refuge Complex; however, due to budget constraints a single permanent full-time biologist continues to coordinate the biological program for the Complex. The CCP Implementation Plan (Appendix G) identifies staffing proposals over the 15-year life of this CCP, for administration of the Complex's various management programs.

The Refuge Complex is continuing to conduct boat, ground, and aerial seabird surveys (e.g., cormorants, common murre, pigeon guillemot, tufted puffin, western and glaucous-winged gulls/hybrids, black oystercatcher, small nocturnal burrow-nesting species) along the coast of Oregon (Naughton et al. 2007; USFWS unpublished data). In addition, the Refuge Complex assists other agencies (NOAA, USGS) in surveying listed or delisted threatened/endangered species (e.g., Steller sea lion, brown pelican, peregrine falcon, Aleutian cackling goose).

Over the past 40 years the Refuge Complex has conducted seabird surveys and continues to standardize the effort, both in technique and timing (Takekawa et al. 1990) to more accurately census and monitor breeding seabirds. Survey methods vary by species, location, size of colony, logistics, and personnel/organization conducting the surveys. Surveys are conducted from boats, aircraft, and land. Land or ground surveys are conducted from remote vantage points or from within the colony. In general, four techniques are used: (1) counts of nests, either directly or from aerial photographs; (2) counts of adult birds on or around the colony, either directly or from aerial photographs; (3) sampling to estimate burrow density and occupancy rates, combined with estimates of colony area; and (4) crude estimates of nests, birds, or burrows.

Seabird colony estimates are based on actual nest counts that provide the most accurate information, and this method is currently used on all counts of pelagic cormorants, Brandt's cormorants, double-crested cormorants, and western/glaucous-winged gulls. Direct nest or burrow counts are also employed whenever possible to estimate tufted puffin populations, but their burrow-nesting habits make the results less reliable.

Estimates based on the total number of adults present on the colony are used for those species whose nests are difficult to find and for species that nest in dense colonies, where it is difficult, or impossible, to distinguish breeding from nonbreeding individuals. Pigeon guillemots and black oystercatchers are often quite conspicuous around nesting colonies, but their actual nest sites are difficult to locate. Common murres nest in large, dense colonies, and estimates of colony size for this species are based on counts of adult birds on the colony (from aerial photographs), adjusted by a correction factor, to account for breeding birds away from the colony and nonbreeding birds in attendance.

Burrow-nesting species are the most difficult to survey, and colonies are directly sampled to estimate burrow density and occupancy rates. The area of the colony is estimated in the field or from aerial photographs. Density of active burrows is combined with estimates of colony area to generate colony estimates. Protocols and procedures have not been standardized for burrow-nesting species even though they comprise 38% of the 1.3 million seabirds that nest along the Oregon coast (Naughton et al. 2007). The Refuge Complex has begun investigations to determine methods for monitoring small nocturnal burrow nesting species (e.g., Leach's and fork-tailed storm-petrels, rhinoceros and Cassin's auklets), but much work remains to be done.

Major roosts of federally listed threatened brown pelican are found on Oregon Islands and Three Arch Rocks NWRs and other estuaries managed by the Refuge Complex. At Oregon Islands and Three Arch Rocks NWRs, monitoring efforts to assist in the recovery of this species started in 1987 (R. Lowe pers. com.) Annual aerial counts during the fall at coastal rocks, reefs, islands, and estuaries have documented a positive population trend of roosting pelicans from 4,622 in 1988 to 18,589 during the 2007 survey (USFWS unpublished data). Continuation of these annual aerial surveys will assist the Service in determining if the California brown pelican population is recovered to the level of delisting under the ESA (USFWS 1983). If this species is delisted, section 4(g)(1) of the ESA requires the Service to implement a plan to effectively monitor the status of all species that have been recovered and delisted. To assist in these recovery efforts, the continuation of annual monitoring efforts will document the population numbers of pelicans along the coast of Oregon during the tenure of this CCP.

The recently delisted peregrine falcon breeds, loafs, and forages on the coastal habitat found on all three coastal Refuges. The Refuge Complex initiated reproductive success monitoring efforts in 1993 at peregrine eyries at Three Arch Rocks and Cape Meares NWRs. In 2004, the monitoring effort was expanded with the inclusion of 15 newly re-occupied south and north coast eyries (USFWS unpublished data). This coast wide nesting success data is combined with state and nationwide efforts to monitor population trends in a national post-delisting monitoring program that was initiated in 2002 (Isaacs 2007; USFWS 2003). Monitoring surveys will be conducted on the Refuges every three years and will be added to the national effort that will review the status of the species in 2015.

The Aleutian cackling goose was recently delisted and currently uses the vegetated islands associated with the Oregon Islands NWR, along with private and public coastal short-grass pasturelands along the coast of northern California and Oregon (e.g., Nestucca Bay NWR). The ESA requires that the Service monitor population levels of formerly listed species for five years after delisting (USFWS 2001). Post-delisting monitoring efforts by the Refuge involve assisting the Service's monitoring plan in surveying the spring migration population by conducting direct counts of geese as they leave their roosts and through indirect population estimations based on the marked to unmarked ratio of neck-collared birds (Ross et al. 2007). Current annual monitoring of this subspecies is conducted as part of the Aleutian Cackling Goose Monitoring Program that is funded and managed by the Service's Division of Migratory Bird Management to assess management actions (e.g., hunting, land acquisition) that may affect population levels.

The ODFW and NOAA Fisheries Service are continuing to conduct surveys of pinniped populations that use the Refuges and adjacent mainland areas. The Refuge Complex supports this work by issuing Special Use Permits and reporting marked animals. The Refuge works closely with ODFW and NOAA Fisheries Service personnel on research associated with Steller sea lions within Oregon Islands NWR. The research is investigating population dynamics, recruitment, survivorship, and dispersal of young of this threatened species.

4.4 References

Achterman, G.L., R. Davis-Born, I. Rolston, and L. Gaines. 2005. Oregon coastal community water supply assessment. Institute for Natural Resources, Oregon State University. 43 pp.

Anderson, V.D. 2006. Creatures of empire: how domestic animals transformed America. Oxford University Press. pp. 147-148.

Ashmole, N.P., M.J. Ashmole, and K.E.L. Simmons. 1994. Seabird conservation and feral cats on Ascension Island, South Atlantic. Pages 94-121 in: D.N. Nettleship, J. Burger, and M. Gochfeld, eds. Seabirds on islands: threats, case studies and action plans. BirdLife Conservation Series no. 1.

Atkinson, I.A.E. 1985. The spread of commensal species of Rattus to oceanic islands and their effects on island avifaunas. Pages 35-81 iIn: P.J. Moors, ed. Conservation of Island birds: case studies for the management of threatened island species. International Council on Bird Preservation Technical Publication No. 3.

Bailey, E.P. and J.L. Trapp. 1984. A second wild breeding population of the Aleutian Canada goose. American Birds 38(3):284-286.

Exhibit G
Page 40

Barbour, M. and A.F. Johnson. 1977. Beach and dune. Pages 223-270 in: M. Barbour and J. Major, eds. Terrestrial vegetation of California. New York: John Wiley & Sons.

Barth, J.A., B.A. Menge, J. Lubchenco, F. Chan, J.M. Bane, A.R. Kirincich, M.A. McManus, K.J. Nielsen, S.D. Pierce, and L. Washburn. 2007. Delayed upwelling alters nearshore coastal ocean ecosystems in the northern California current. Proceedings of the National Academy of Sciences of the United States of America 104:3719-3724.

Bax, N., A. Williamson, M. Aguero, E. Gonzalez, and W. Geeves. 2003. Marine invasive alien species: a threat to global biodiversity. Marine Policy 27(4):313-323.

BCMF (British Columbia Ministry of Forests) and BCMELP (British Columbia Ministry of Environment, Lands, and Parks). 1995. Biodiversity guidebook. B.C. Forest Practices Code. Victoria, B.C.

Bickham, J.W., J.C. Patton, and T.R. Loughlin. 1996. High variability for control-region sequences in an marine mammal: Implications for conservation and biogeography of Steller sea lions (*Eumetopias jubatus*). Journal of Mammalogy 77(1):95-108.

Birkhead, T.R. 1978. Attendance patterns of guillemots (*Uria aalge*) at breeding colonies at Skomer Island. Ibis 120:219-229.

Bolsinger, C.L. and K.L. Waddell. 1993. Area of old-growth forests in California, Oregon, and Washington. U.S. Forest Service Research Bulletin PNW-RB-197. 32 pp.

Bourne, W.R.P. 1981. Rats as avian predators: discussion. Atoll Resources Bulletin 255:69-72.

Brown R.F., B.E. Wright, S.D. Riemer, and J. Laake. 2005. Trends in abundance and current status of harbor seals in Oregon: 1977-2003. Marine Mammal Science 21(4):657-670.

Carter, H.R., U.W. Wilson, R.W. Lowe, M.S. Rodway, D.A. Manuwal, J.E. Tekekawa, and J.L. Yee. 2001. Population trends of the common murre (*Uria aalge californica*). In: D. A. Manuwal, H. R. Carter, T. S. Zimmerman, and D. L. Orthmeyer, eds. Biology and conservation of the common murre in California, Oregon, Washington, and British Columbia. Volume 1: Natural history and population trends. Information and Technology Report USGS/BRD/ITR-2000-0012. U.S. Geological Survey. Washington, D.C.

Chen, J., J.F. Franklin, and T.A. Spies. 1990. Microclimatic pattern and basic biological responses to the clearcut edges of old-growth Douglas-fir stands. Northwest Environment 6(2):424-425.

Clark, D.A. 1981. Foraging patterns of black rats across a desert-montane forest gradient in the Galapagos Islands. Biotropica 13:182-194.

Cornell University and AOU (American Ornithologists' Union). 2008. The Birds of North America online. Species accounts. Available at: http://bna.birds.cornell.edu/bna.

Davis, T. 1996. Distribution, abundance, microhabitat use, and interspecific relationships amoung terrestrial salamanders on Vancouver Island, British Columbia. Ph.D. dissertation. University of Victoria, Victoria, BC.

Exhibit G
Page 41

Defenders of Wildlife. 2006. Refuges at risk; the threat of global warming. Washington, D.C. 20 pp.

DeGange, A.R. and J.W. Nelson. 1982. Bald eagle predation on nocturnal seabirds. Journal of Field Ornithology 53(4):407-409.

Elliott-Smith, E., S.M. Haig, and N. Holcomb. 2007. Black oystercatcher reproductive success on the Oregon coast final report. U.S. Geological Survey. Corvallis, OR. 17 pp.

Flagella, M.M., M. Verlaque, A. Soria, and M.C. Buia. 2007. Macroalgal survival in ballast water tanks. Marine Pollution Bulletin 54(9):1395-1401.

French, B. 2008. Report for special use permit. Ascending the giants, report to USFWS. 2 pp.

Gaston, A.J. 1994. Status of the ancient murrelet (*Synthliboramphus antiquus*) in Canada and the effects of introduced predators. Canadian Field-Naturalist 108:211-222.

Glick, P., J. Clough, and B. Nunley. 2007. Sea-level rise and coastal habitats in the Pacific Northwest. An analysis for Puget Sound, southwestern Washington, and northwestern Oregon. National Wildlife Federation. Seattle, WA. 94 pp.

Gomez, D.M., R.G. Anthony, and R.W. Lowe. 1997. Small mammal and amphibian abundance at Cape Meares National Wildlife Refuge – final report. U.S. Fish and Wildlife Service Report. Newport, OR. 34 pp.

Grossman, D.H., D. Faber-Langendoen, A.S. Weakley, M. Anderson, P. Bourgeron, R. Crawford, K. Goodin, S. Landaal, K. Metzler, K. Patterson, M. Pyne, M. Reid, and L. Sneddon. 1998. International classification of ecological communities: terrestrial vegetation of the United States. Volume 1. The National Vegetation Classification System: development, status, and applications. The Nature Conservancy, Arlington, VA.

Irons, D.B., T. Anker-Nilssen, A.J. Gaston, G.V. Byrd, K. Falk, G. Gilchrist, M. Hario, M. Hjernquist, Y.V. Krasnov, A. Mosbech, B. Olsen, A. Petersen, J.B. Reid, G.J. Robertson, H. Strom, and K.D. Wohl. 2008. Fluctuations in circumpolar seabird populations linked to climate oscillations. Global Change Biology 14(7):1455-1463.

Isaacs, F.B. 2007. Results of peregrine falcon breeding area monitoring in Oregon, 2003-2006: final report. 5 Feb 2007, Oregon Cooperative Fish and Wildlife Research Unit. Department of Fisheries and Wildlife, Oregon State University, Corvallis, OR.

Isaacs, F.B. and R.G. Anthony. 2008. Bald eagle nest locations and history of use in Oregon and the Washington portion of the Columbia River recovery zone, 1971 through 2007. Oregon Cooperative Fish and Wildlife Research Unit, Oregon State University. Corvallis, OR.

Jehl, J.R., Jr. 1984. Conservation problems of seabirds in Baja California and the Pacific Northwest. Pages 41-48 in: J.P. Croxall, P.G.H. Evans, and R.W. Schreiber, eds. Status and conservation of the world's seabirds. International Council of Bird Preservation technical publication no. 2.

Kadlec, J.A. 1971. Effects of introducing foxes and raccoons on herring gull colonies. Journal of Wildlife Management 35:625-636.

Exhibit G
Page 42

Kagan, J.S. 2002. Vegetation of Crook Point Unit of Oregon Islands National Wildlife Refuge, Curry County, Oregon. Final report. U.S. Fish and Wildlife Service. Newport, OR. 15 pp.

Kagan, J.S., J.A. Christy, M.P. Murray, and J.A. Titus. 2000. Classification of native vegetation of Oregon. Oregon Natural Heritage Program, Portland, OR. 56 pp.

Keitt, B.S., C. Wilcox, B.R. Tershy, D.A. Corll, and C.J. Donlan. 2002. The effects of feral cats on the population viability of black-vented shearwaters (*Puffinus opisthomelas*) on Natividad Island, Mexico. Animal Conservation 5:217-223.

Kuletz, K.J., S.W. Stephensen, and D.B. Irons. 2003. Changes in distribution and abundance of Kittlitz's murrelets *Branchyramphus brevirostris* relative to glacial recession in Prince William Sound, Alaska. Marine Ornithology 31:133-140.

Lawler, J.J., M. Mathias, A.E. Yahnke, and E.H. Girvetz. 2008. Oregon's biodiversity in a changing climate. Report prepared for the Climate Leadership Initiative, University of Oregon.

LCDC (Land Conservation and Development Commission). 1994. Oregon territorial sea plan. Salem, OR. 250 pp.

Loughlin, T.R. 1997. Using the phylogeographic method to identify Steller sea lion stocks. Pages 159-171 in: A.E. Dizon, S.J. Chivers, and W.F. Perrin, eds. Molecular genetics of marine mammals. Society for Marine Mammals Special Publication no. 3.

Maas-Hebner, K.G. and B.A. Schrader. 2001. The effects of silviculture activities on wildlife and fish populations in Oregon and the Pacific Northwest: an annotated bibliography from 1960 to 1999. Oregon State University, College of Forestry, Forest Research Laboratory, Research Contribution 32. 124 pp.

McShane, C., T. Hamer, H. Carter, G. Swartzman, V. Friesen, D. Ainley, R. Tressler, K. Nelson, A. Burger, L. Spear, T. Mohagen, R. Martin, L. Henkel, K. Prindle, C. Strong, and J. Keany. 2004. Evaluation report for the 5-year status review of the marbled murrelet in Washington, Oregon, and California. Unpublished report, EDAW, Inc., Seattle, Washington. Prepared for the U.S. Fish and Wildlife Service, Region 1. Portland, OR.

Moors, P.J. and I.A.E. Atkinson. 1984. Predation on seabirds by introduced animals and factors affecting its severity. International Council on Bird Preservation Technical Publication No. 2.

Naughton, M.B., D.S. Pitkin, R.W. Lowe, K.J. So, and C.S. Strong. 2007. Catalog of Oregon seabird colonies. Biological Technical Publication Region 1, BTP-R1009-2007. U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C.

Nickerbocker, B. 2007. Northern spotted owl's decline revives old concerns. Christian Science Monitor. June 27, 2007. 3 pp.

NMFS (National Marine Fisheries Service). 2008. Recovery plan for the Steller sea lion (*Eumetopias jubatus*). Revision. National Marine Fisheries Service. Silver Spring, MD. 325 pp.

NOAA (National Oceanic and Atmospheric Administration). 2007a. Draft revised Steller sea lion recovery plan (*Eumetopias jubatus*). National Marine Fisheries Service. Silver Spring, MD. 305 pp.

Exhibit G
Page 43

NOAA. 2007b. National Marine Mammal Laboratory California Current ecosystems program; Steller sea lion demography. California/Oregon. Available at: http://www.atsc.noaa.gov/nmml/california/research/demographyca.php.

NOAA. 2007c. Draft Pacific marine mammal stock assessment report. Available at: http://www.nmfs.noaa.gov/pr/sars/draft.htm.

NPS (National Park Service). 2001. Ice plant, sea fig (*Carpobrotus chilensis*). Available at: http://www.nps.gov/archive/redw/iceplant.htm.

Nyberg, J.B. and D.W. Janz, eds. 1990. Deer and elk habitats in coastal forests of southern British Columbia. Special Report Series No. 5. British Columbia Ministry of Forestry Research Branch, Victoria, BC.

ODFW (Oregon Department of Fish and Wildlife). 2006. The Oregon conservation strategy. Salem, OR. 372 pp.

Olson, B.E. 1999. Impacts of noxious weeds on ecologic and economic systems. Pages 4-18 in: R.L. Sheley and J.K. Petroff, eds. Biology and management of noxious rangeland weeds. Oregon State University Press, Corvallis, OR.

ONHIC (Oregon Natural Heritage Information Center). 2008. Oregon State University, Institute for Natural Resources. Available at: http://oregonstate.edu/ornhic/data.html.

ONHP (Oregon Natural Heritage Program). 2003. Oregon natural heritage plan. Department of State Lands. Salem, OR. 167 pp.

OSMB (Oregon State Marine Board). 1994. Proposed and adopted regulations. Salem, OR.

Piatt, J.F. and A.S. Kitaysky. 2002. Tufted puffin (*Fratercula cirrhata*). Available at: http://bna.birds.cornell.edu/bna/species/708.

Piatt, J.F., K.J. Kuletz, A.E. Burger, S.A. Hatch, V.L. Friesen, T.P. Birt, M.L. Arimitsu, G.S. Drew, A.M.A. Harding, and K.S. Bixler. 2007. Status review of the marbled murrelet (*Brachyramphus marmoratus*) in Alaska and British Columbia. U.S. Geological Survey Open-File Report 2006-1387. 258 pp.

Pitcher R.W., P.F. Olesiuk, R.F. Brown, M.S. Lowry, S.J. Jeffries, J.L. Sease, W.L. Perryman, C.E. Stinchcomb, and L.F. Lowry. 2007. Abundance and distribution of the eastern north Pacific Steller sea lion (*Eumetopias jubatus*) population. Fishery Bulletin 107:102-115.

Reichard, S. 2004. Invasive plants in the wildland-urban interface. Pages 235-244 in: S.W. Vince, M.L. Duryea, E.A. Macie, and A. Hermansen, eds. Forests at the wildland-urban interface: conservation and management. Boca Raton, FL: CRC Press.

Riemer, S.D. and R.F. Brown. 1997. Monitoring human-wildlife interactions and disturbance of seabirds and pinnipeds at Three Arch Rocks National Wildlife Refuge, 1993-1994. Wildlife Diversity Program Technical Report #97-6-01. Oregon Department of Fish and Wildlife. 27 pp.

Rodgers, J.A., Jr. and H.T. Smith. 1997. Buffer zone distances to protect foraging and loafing waterbirds from human disturbance in Florida. Wildlife Society Bulletin 25(1):139-145.

Exhibit G
Page 44

Rodway, M.S. 1990. Attendance patterns, hatching chronology, and breeding population of common murres on Triangle Island, British Columbia following the Nestucca oil spill. Canadian Wildlife Service Technical Report Series 87.

Rojek, N.A., M.W.Parker, A.R. Carter, and G.J McClesney. 2007. Aircraft and vessel disturbances to common murres *Uria aalge* at breeding colonies in central California, 1997-1999. Marine Ornithology 35:67-75.

Ross, K.G., D.C. Bachman, and E.T. Nelson. 2007. Aleutian cackling goose monitoring program, 2005-2006. Progress report for the north coast of California and Southern Oregon. Humboldt Bay NWR. Unpublished report. 25 pp.

SCBC (Stewardship Centre for British Columbia). 2003. Coastal shore stewardship: a guide for planners, builders, and developers on Canada's Pacific coast. 94 pp.

Sharrow, S.H., D.N. Uekert, and A.E. Johnson. 1988. Ecology and toxicology of *Senecio* species with special reference to *Senecio jacobaea* and *Senecio longilobus*. Pages 181-197 in: L.F. James, M.H. Ralphs, and D.B. Nielsen, eds. The ecology and economic impact of poisonous plants on livestock production. Boulder, CO: Westview Press.

Sherrod, S.H., C.M. White, and F.S.L. Williamson. 1976. Biology of the bald eagle on Amchitka Island, Alaska. Living Bird 15:143-182.

Slater, P.J.B. 1980. Factors affecting the number of guillemots (*Uria aalge*) on cliffs. Ornis Scandinavica 11:155-163.

Takekawa, J.E., H.R. Carter, and T.E. Harney. 1990. Decline of the common murre in central California. Pages 149-163 in: S. G. Sealy, ed. Auks at sea. Studies in Avian Biology 14.

Tessler, D.F., J.A. Johnson, B.A. Andres, S. Thomas, and R.B. Lanctot. 2007. Black oystercatcher (*Haematopus bachmani*) conservation action plan. International Black Oystercatcher Working Group; Alaska Department of Fish and Game, Anchorage, AK; U.S. Fish and Wildlife Service, Anchorage, AK; and Manomet Center for Conservation Sciences, Manomet, MA. 115 pp.

Timm, R.M. 1994. Norway rats. Pages B105-B120 in: S.E. Hygnstrom, R.M. Timm, and G.E. Larson, eds. Prevention and control of wildlife damage, vol. I. University of Nebraska, Lincoln.

USFS (U.S. Forest Service). 2006. Cooperating across boundaries: partnerships to conserve open space in rural America. FS-861. 49 pp.

USFS and BLM (Bureau of Land Management). 1994. Final supplemental environmental impact statement on management of habitat for late-successional and old-growth forest related species within the range of the northern spotted owl, volume I. Portland, OR.

USFWS (U.S. Fish and Wildlife Service). 1983. The California brown pelican recovery plan. U.S. Fish and Wildlife Service. Portland, OR. 179 pp.

USFWS. 1991. Proposed addition to Oregon Islands National Wildlife Refuge, Coos County, Oregon; environmental assessment. Portland, OR. 25 pp.

Exhibit G
Page 45

USFWS. 1993. Introduction of foxes to Alaskan islands-history, effects on avifauna, and eradication. Resource Publication 193. USFWS. Washington, D.C.

USFWS. 1997. Recovery plan for the threatened marbled murrelet (*Brachyramphus marmoratus*) in Washington, Oregon, and California. Portland, OR. 203 pp.

USFWS. 2000. U.S. shorebird conservation plan. U.S. Fish and Wildlife Service, Division of Migratory Birds. Arlington, VA.

USFWS. 2001. Endangered and threatened wildlife and plants; final rule to remove the Aleutian Canada goose from the federal list of endangered and threatened wildlife. Federal Register 66(54): 15643-15656. Washington, D.C.

USFWS. 2003. American peregrine falcon (*Falco peregrinus anatum*) proposed monitoring plan. U.S. Fish and Wildlife Service. Arlington, VA.

USFWS. 2004. Wildland fire management plan; Oregon Islands NWR. Newport, OR.

USFWS. 2005a. Environmental assessment: mammalian predator damage management to protect seabird colonies on Oregon Islands National Wildlife Refuge, Three Arch Rocks National Wildlife Refuge and adjacent mainland areas. Oregon Coast National Wildlife Refuge Complex. Newport, OR. 130 pp.

USFWS. 2005b. Regional seabird conservation plan, Pacific Region. U.S. Fish and Wildlife Service, Migratory Bird and Habitat Programs. Pacific Region. Portland, OR. 261 pp.

USFWS. 2006. Endangered and threatened wildlife and plants: designation of critical habitat for the marbled murrelet; proposed rule. Federal Register 71(176): 53838-53951, 50 CFR Part 17. Washington, D.C.,

USFWS. 2007a. Washington Islands National Wildlife Refuges: comprehensive conservation plan and environmental assessment. Port Angeles, WA.

USFWS. 2007b. Brown pelican fact sheet. Unpublished report.

USFWS. 2007c. Draft post-delisting monitoring plan for the bald eagle (*Haliaeetus leucocephalus*). U.S. Fish and Wildlife Service. Arlington, VA.

USFWS. 2008a. Secretary Kempthorne announces proposal to remove the brown pelican from the endangered species list, February 8, 2008. U.S. Fish and Wildlife Service news release.

USFWS. 2008b. Brown pelican (*Pelecanus occidentalis*). U.S. Fish and Wildlife Service Endangered Species Program. Arlington, VA. 2 pp.

Exhibit G
Page 46

Exhibit H
Page 1

Chapter 5. Public Uses, Cultural Resources, Social and Economic Environment

5.1 Public Infrastructure and Administrative Facilities

The infrastructure and facilities discussed in this section include boundary signs, public entrances, roads, trails, and administrative buildings. Facilities associated with specific public use programs are discussed in section 5.2. All public and administrative facilities, with the exception of boundary signs, are depicted on the maps located in Chapter 2: Figures 2-1 (North Coast); 2-2 (Central Coast); 2-3 (South Coast); 2-4 (Cape Meares detail); 2-5 (Three Arch Rocks detail); and 2-6 (Oregon Islands Coquille Point Unit detail).

5.1.1 Boundary and markers

5.1.1.1 Oregon Islands NWR

All refuge rocks, reefs, and islands are closed to public use. The Service requests all aircraft to maintain a 2,000-foot minimum AGL altitude over all NWRs including the rocks, reefs, and islands along the Oregon coast in order to minimize disturbance to seabirds, pinnipeds, and other wildlife. The minimum altitude request, notice to pilots, and the majority of the refuge rocks, reefs and islands are printed on the two FAA Sectional Aeronautical Charts that cover the Oregon coast. The 18.52-acre Coquille Point Unit is not posted with standard boundary signs. The boundary of the 133.71-acre Crook Point Unit is approximately 50% posted.

5.1.1.2 Three Arch Rocks NWR

The Refuge is closed to public use. To protect wildlife during the breeding season, waters within 500 feet of the Refuge are closed to all watercraft from May 1 through September 15 by an OSMB closure (ORS 830.110 and 830.175). Buoys are deployed annually to mark the seasonal water closure. The requested 2,000-foot minimum AGL altitude over Three Arch Rocks is also printed on all FAA sectional aeronautical charts that cover the Oregon coast.

5.1.1.3 Cape Meares NWR

This Refuge and RNA has a total size of 138.5 acres. Approximately 5% of this boundary is posted. Boundary signs are located primarily where refuge lands are adjacent to roads and OPRD lands.

5.1.2 Entrances, access points, roads and parking

5.1.2.1 Oregon Islands NWR

There are no entrances, roads, or vehicle parking areas on any of the rocks, reefs, and islands. There are four entrances to the Coquille Point Unit of the Refuge. Two of the entrances permit vehicular access and parking. The unit's primary entrance is located at the western end of NE 11th Street in the city of Bandon. The Complex maintains a parking lot for visitors at the main entrance and a second, unofficial entrance (dirt path) is located at the western end of NE 8th Street and is managed by the City of Bandon. Two staircases located on the unit's primary entrance provide pedestrian access to the adjacent OPRD managed ocean shore.

Exhibit H
Page 2

The Crook Point Unit is closed to all public entry. There is one entrance road that permits vehicular access to the unit. This road is privately owned up to the Crook Point Unit boundary, and the Service has a road easement through private property to maintain this access route. The unit can also be accessed from the public beach to the west. Pistol River State Park is adjacent to the north boundary of the Crook Point Unit, and there is an abandoned horse trail leading from the state park that is used on occasion to trespass on this unit.

5.1.2.2 Three Arch Rocks NWR

There are no entrances, roads, or vehicle parking areas on this refuge as it lies one-half mile offshore, west of the town of Oceanside.

5.1.2.3 Cape Meares NWR

There are three entrances to the Refuge. One permits vehicular access and two are accessible to pedestrians. The vehicular access road (Lighthouse Drive) is located just off and to the west of the Three Capes Scenic Loop. The road is maintained by OPRD and provides access to both the Refuge and the Cape Meares State Scenic Viewpoint. The road ends in a parking lot recently expanded and upgraded by the Refuge Complex, but maintained by OPRD and includes 36 spaces for cars and three designated spaces for RVs and tour buses. One of the pedestrian access points is located at the entrance to Cape Meares; the other is to the north of the Refuge through county lands, accessed from the town of Cape Meares.

5.1.3 Trails

5.1.3.1 Three Arch Rocks NWR

There are no trails because the Refuge is closed to public entry.

5.1.3.2 Oregon Islands NWR

The Coquille Point Unit has a half-mile, self-guided, paved interpretive trail that is accessible to people with disabilities.

5.1.3.3 Cape Meares NWR

There are two hiking trails within Cape Meares NWR. Both are one-way, unpaved trails and they are not accessible to people with disabilities. One of the trails is a quarter-mile long and ends at a giant old-growth Sitka spruce. A longer trail approximately 2 miles in length is part of the Oregon Coast Trail. From the trailhead it winds in a northerly direction through an old-growth Sitka spruce and western hemlock forest and a red alder meadow, and ends on a county road south of the community of Cape Meares. The trail through Cape Meares NWR was once much longer than the present configuration. The trail once extended from the town of Cape Meares south to Lighthouse Road as it currently does, then continued around the east, north, and west sides of the north unit of the Refuge, terminating in the parking lot of the Cape Meares Scenic Viewpoint. From January 5 to 9, 1990, Cape Meares was pounded by a series of powerful Pacific storms resulting in a catastrophic blowdown of trees and landslides. Approximately 200 feet of the trail on the north slide was lost in a slide. Prior to rebuilding or relocating the trail, it was discovered that a pair of bald eagle (a threatened species at the time) had relocated their nest within 15 feet of the trail with the tree canopy extending over the trail. In addition, detections of federally

Exhibit H
Page 3

threatened marbled murrelets occurred in this same area the previous two breeding seasons. Out of concern that public disturbance could impact the nesting bald eagles, marbled murrelets, and other listed species, the trail was temporarily closed in 1990. In January 1991, the Refuge Complex consulted with wildlife experts from OSU, ODFW, and USFS and subsequently prepared an intra-service Section 7 evaluation (dated March 14, 1991). The conclusion of the Section 7 evaluation was to permanently close this section of the trail to provide maximum protection to threatened and endangered species.

5.1.4 Administrative facilities

The Oregon Coastal Field Office is located within the Hatfield Marine Science Center and houses the Refuge Complex headquarters and the Service's Newport Ecological Services Field Office. The administrative facilities consist of a small interpretive display, two labs, a large meeting room, office space for 12 permanent employees and two to four temporary employees, and a maintenance shop/garage. The Oregon Coastal Field Office provides three enclosed vehicle/boat bays.

A south coast administrative facility is located in Bandon, Oregon, on Bandon Marsh NWR. The facility complex consists of an office building for the South Coast Refuge Manager, with office space for the Friends of Southern Oregon Coastal Refuges, a detached garage with three bays, and a nearby maintenance shop with four bays. There is a five-bedroom bunkhouse with a detached garage located adjacent to the refuge office. In addition, the facilities complex contains a two-bedroom doublewide manufactured home, an adjacent three-bay shop building, and two RV sites on lands within the Smith Tract of Bandon Marsh NWR. The bunkhouse, manufactured home, and RV sites serves as housing for refuge volunteers, visiting staff, and researchers.

5.1.5 Easements and rights-of-way

5.1.5.1 Oregon Islands NWR

At the Crook Point Unit, the Service has an easement from U.S. Highway 101, west to the entrance of the unit across private property for egress and ingress purposes. The southern 10 acres of the unit is under a 75-year lease (initiated in 2000) to the former owners where a residence and associated storage building is located.

5.1.5.2 Cape Meares NWR

In June 1971 the Service granted a road right-of-way easement to the Oregon State Highways Division for a 50-year period. The easement covers all of the Three Capes Scenic Route that bisects refuge land.

Exhibit H
Page 4

Observation deck with visitors. (Roy W. Lowe/USFWS)

5.2 Public Use Overview

The Oregon Coast is one of the most popular tourist destinations in the state with over 25 million visitor-use days each year. Wildlife observation is an activity that many visitors engage in during their visit. The Pacific Coast Scenic Byway (U.S. Highway 101) runs the length of the Oregon Coast, providing dramatic views of the rocky coastline, pastoral scenes through verdant farmland, and educational excursions at nature-based interpretive centers. The Complex provides funding for and manages a variety of both on-site and off-site facilities for hundreds of thousands of visitors to view wildlife. The Refuge Complex has one full-time staff member dedicated to the public use program and uses volunteers on both a seasonal and year-round basis to assist with site-specific interpretation programs and environmental education for targeted audiences.

5.2.1 Current public uses and wildlife-dependent public uses

5.2.1.1 Oregon Islands NWR

The coastal rocks, reefs, and islands are closed to public use to protect wildlife, which is sensitive to human disturbance, and to protect fragile habitats. Wildlife photography, observation, and interpretation are existing public uses of Oregon Islands that occur at many off-site mainland areas owned and managed by city, county, state, and federal agencies, as well as on-site at the Coquille Point Unit. To facilitate off-site public use, the Complex has enhanced wildlife viewing opportunities on several mainland areas that overlook refuge rocks and islands at sites managed by OPRD. To facilitate interpretation, volunteer wildlife interpreters are stationed at several key

Exhibit H
Page 5

viewing locations on the coast. They orient visitors, help them to become aware of the wildlife resources using the rocks and islands, and educate them as to how they can reduce negative wildlife/human interactions. Oregon Islands NWR overlook sites with volunteer interpreters include Haystack Rock at Cannon Beach, Yaquina Head Outstanding Natural Area, Heceta Head State Scenic Viewpoint, Coquille Point Unit of Oregon Islands NWR, Simpson Reef Overlook at Shore Acres State Park, and Harris Beach State Park. From mid April through August, refuge volunteers interpret at least four days per week and in some cases provide full coverage seven days a week.

When volunteers are not available or locations are not appropriate for volunteers, a series of interpretive panels, located on private, city, county, state, and federal lands, offer self-guided interpretation about Oregon Islands NWR. Excellent refuge wildlife observation and photography opportunities are available to visitors from an untold number of off-site viewing decks, highway pullouts, and beach locations along the entire Oregon coast.

The Service and the BLM have been working cooperatively since the early 1980s to protect the wildlife resources of YHONA and the adjacent rocks within Oregon Islands NWR. The existing MOU for YHONA signed in 1985, is a three-party agreement among the Service, BLM, and USCG. When the MOU was established, USCG managed the lighthouse and 10 acres of the site. With the exception of a dilapidated stairway to Cobble Beach, BLM did not have any structures or facilities on the headland and only one seasonal employee was present during the spring and summer months. At this time the public was accessing many of the cliff edges and rocks within the Refuge, frequently disturbing harbor seals and preventing seabirds from nesting in these areas.

Since establishment of the MOU, BLM has developed the headland for wildlife viewing, photography, interpretation, and environmental education. In addition, BLM has added permanent staff on site as well as seasonal employees and volunteers. Complex staff members have worked with BLM's employees and volunteers to identify life history information on seabirds and harbor seals to share with the visiting public, and also to identify and prevent human disturbance to wildlife. In recent years, the Refuge Complex has begun stationing refuge volunteers at YHONA in spring and summer to assist BLM in interpreting the natural resources of the headland and adjacent refuge rocks. Working in concert with Complex staff members, BLM has restricted and enforced where the public is allowed to go on the headland to protect wildlife and visitors.

Working in close cooperation with BLM over the past two decades has resulted in the protection of existing seabird colonies and a harbor seal haul-out site and has provided for dramatic population increases in nesting seabirds and the colonization of new sites on the mainland and refuge rocks. Public use of YHONA is high, exceeding 350,000 visitors annually, and this site is now one of the premier seabird viewing locations in the country, providing the public opportunities for wildlife resource interpretation and environmental education.

The Coquille Point Unit is open to public use. One of the purposes for acquisition of Coquille Point was to provide opportunities for public use, and the site is popular with both local wildlife enthusiasts and out-of-town visitors. Existing wildlife-dependent public uses include wildlife observation, photography, interpretation, and environmental education. On-site facilities managed by the Complex include an orientation kiosk; a self-guided, accessible, paved hiking trail; two sets of stairs that provide beach access from the headland; a parking lot and interpretive

Yaquina Head Outstanding Natural Area (YHONA). (Roy W. Lowe/USFWS)

panels. Coquille Point receives over 300,000 visitors annually, and this number is growing. In 2007, refuge volunteers, whose task was to provide interpretation to the visitors on off-site locations, devoted 6,422 hours and personally spoke to more than 122,000 people about refuge resources. Wildlife observation and photography opportunities are available to visitors from the self-guided trail, the parking lot, and the south coast stairs. Complex staff members, the Friends of the Southern Oregon Coast Refuges, and refuge volunteers also provide environmental education programs to local schools that request the programs.

The Crook Point Unit is closed to public use to prevent disturbance to nearby off-shore wildlife habitat that harbors tens of thousands of colonial burrow-nesting seabirds and a number of loafing pinnipeds, and to protect sensitive cultural resources and rare native plants.

5.2.1.2 Three Arch Rocks NWR

The Refuge is closed to public use to protect seabirds, pinnipeds, and their habitat from human disturbance. However, wildlife observation, photography, and interpretation are existing public uses of the Refuge that occur off-site at Cape Meares State Scenic Viewpoint and Oceanside Beach State Recreation Area. Interpretation of the Refuge is conducted through two interpretive panels, one located at each of the two sites identified above. In 2007, more than 300,000 people participated in at least one of the three public-use opportunities offered off-site.

Exhibit H
Page 7

5.2.1.3 Cape Meares NWR

The Cape Meares Refuge partially surrounds Cape Meares Lighthouse and State Scenic Viewpoint, which offers almost 500,000 yearly visitors a variety of activities. The Refuge itself is mainly closed to public use except for two hiking trails that traverse through a section of the Refuge. Existing wildlife-dependent public uses on the Refuge's hiking trails include wildlife observation and photography. In turn, wildlife photography, observation, and interpretation are existing public uses that occur off-site on Cape Meares State Scenic Viewpoint. The Complex has improved the public use facilities at the State Scenic Viewpoint to facilitate off-site, wildlife-dependent public use with the goal of minimizing wildlife disturbance on refuge lands and enhancing the public's understanding of the sensitivity of coastal wildlife to human disturbance. Off-refuge facilities include a parking lot, two accessible viewing decks, interpretive panels, and a welcoming kiosk. To offer personalized interpretation, volunteer wildlife interpreters are stationed on the north viewing deck annually from May through August. The volunteers orient visitors, help them to become aware of the wildlife resources using the rocks and islands, and educate them as to how they can reduce negative wildlife/human interactions. In the past five years, volunteers have annually dedicated more than 400 hours to speaking with more than 10,000 visitors about the Refuge's wildlife.

5.2.2 Annual refuge visitation

Visitation numbers for the Refuges gathered from the 2007 Refuge Annual Performance Plan are discussed in the following paragraphs. It is notable that the majority of public use on the Refuges occurs between May and September.

5.2.2.1 Oregon Islands NWR

Of the three marine Refuges, Oregon Islands NWR receives the most visitation. Most of the public use occurs off-site on the mainland. Annual visitation increases by a minimum of 5% annually. In 2007, more than two million people participated in at least one of the four public use opportunities offered off-site. The Coquille Point Unit received over 300,000 visitors. Coastwide refuge volunteers, whose task it is to provide interpretation to the visitors at off-site locations, devoted 6,422 hours and personally spoke to more than 122,000 people about refuge resources.

5.2.2.2 Three Arch Rocks NWR

All public use occurs at two off-site locations: Cape Meares State Scenic Viewpoint and Oceanside Beach State Recreation Area. Approximately 300,000 people participated in at least one of the three public use activities offered off-site.

5.2.2.3 Cape Meares NWR

Visitation to Cape Meares NWR and State Scenic Viewpoint continues to increase by 10% annually. Visitation was at 490,000 in 2007 with most of the visitors participating in wildlife observation and interpretation. Approximately 5% of those visitors engaged in wildlife photography. All of these public uses occur off-site on the adjacent OPRD lands within Cape Meares State Scenic Viewpoint. In 2007, two volunteers dedicated 438 hours to speaking one-on-one with over 10,500 visitors about the Refuge's wildlife.

Exhibit H
Page 8

5.2.3 Open and closed areas

5.2.3.1 Three Arch Rocks NWR

The Refuge is closed to public use.

5.2.3.2 Oregon Islands NWR

All refuge rocks, reefs, and islands are closed to public use. The Coquille Point Unit is open to public use year-round, daylight hours only. The Crook Point Unit is closed to all public use.

5.2.3.3 Cape Meares NWR

The Refuge is closed to public use except for the trail system (see section 5.1.3), which traverses a section of the Refuge.

5.2.4 Accessibility of recreation sites and programs for people with mobility limitations

5.2.4.1 Oregon Islands NWR

The Coquille Point Unit provides a half-mile, self-guided interpretive trail that is accessible for people with disabilities. In 2003 the Refuge Complex provided the funding for a much-needed upgrade to the visitor use facilities at Simpson Reef Overlook, located within Shore Acres State Park. The upgrade, which included a redesign of the parking lot and the viewing deck, made the facilities accessible for people with disabilities.

5.2.4.2 Cape Meares NWR

The Refuge Complex provided the funding to improve the parking lot and construct two viewing decks at Cape Meares State Scenic Viewpoint. These upgrades and new construction increased the amount of parking and made these facilities accessible.

5.2.5 Public use opportunities and recreation trends on the Oregon Coast

Oregon’s abundant outdoor recreation opportunities contribute both to the state’s quality of life by providing accessible outdoor experiences and to the economy by stimulating demand for local services, thereby creating jobs and income. Hiking, fishing, whale watching, tidepool exploring, photography, storm-watching, birding, cycling, kite flying, scuba diving, clamming, crabbing, camping, surfing, and beachcombing are among some of the outdoor activities that draw people to the Oregon coast. Residents and non-residents engage in these outdoor recreation opportunities, which form the basis for a growing tourist industry, especially in rural areas.

Comparing the 1986–1987 Pacific Northwest Outdoor Recreation Study to the 2003–2007 Oregon State Comprehensive Outdoor Recreation Plan (SCORP) shows that the most significant participation growth activities in the state of Oregon include nature/wildlife observation (over 170% growth), golf, RV/trailer camping, and sightseeing/driving for pleasure.

In terms of tourism on the coast, the north and central coast of Oregon receives the most visitors. Easy accessibility from larger urban areas along the I-5 corridor makes these two regions very popular with sightseers. The Oregon south coast is associated with more active pursuits of fishing

Exhibit H
Page 9

and motorized off-road sports. Two of the state's best fishing destinations, the Umpqua and Rogue rivers, are located in this region. Scenic areas also make the south coast a sightseeing destination, but the area is relatively distant from urban areas and Interstate 5, resulting in fewer sightseers visiting these areas as compared to the north and central coast.

National Wildlife Refuges in Oregon provide the public with opportunities to view and photograph wildlife in their natural habitats in a variety of ecosystems. In 2007, over two million people visited National Wildlife Refuges in Oregon. The majority of those viewed the seals, sea lions, and seabirds of the Oregon Islands NWR (OPRD 2003). A study issued by the Service reported that traveling visitors seek new outdoor recreational opportunities and opportunities for solitude. Visitors felt that many of the popular federal land management agencies' facilities were too crowded and regulated. The Refuges in Oregon and other states are starting to attract visitors seeking solitude and new outdoor recreational opportunities. This follows a trend discovered during data collection for the 2003–2007 SCORP where the public is asking land managers to place an increasing emphasis on protecting streams, fish, wildlife habitat, and threatened and endangered species. They are also asking land managers to manage for amenities including quiet, natural places, natural appearing settings, and information and education.

5.2.6 Impact of illegal uses

5.2.6.1 Oregon Islands

Aerial disturbance to seabird and pinniped colonies on rocks, reefs, islands, and headlands is of concern all along the Oregon coast. Disturbance events can be caused by a wide range of powered and non-powered aircraft. Seabirds and pinnipeds are highly vulnerable to aerial disturbance and large numbers of eggs and young can be destroyed during a single disturbance event. Although not allowed as a public use and considered trespass on the Refuge, rock climbers, anglers, and sightseers illegally access certain rocks and islands, which are easily accessible at low tides. It is likely that this type of trespass will increase over the next decade-and-a-half as the Oregon coast's population increases. Individuals accessing the near shore by boat, swimming, or surfboards may be interested in approaching the rocks and islands to get good views of the Refuge's wildlife. Legal activities occurring on land and in the air and waters surrounding Oregon Islands NWR which have the potential to impact nesting wildlife include surfing, tide pool exploration, beachcombing, recreational diving, commercial filming, commercial and sport fishing, and aircraft flying at low altitudes over the ocean.

The Coquille Point Unit has been negatively affected by graffiti, vandalism, waste dumping, and overnight camping. Illegal uses persist partly due to limited law enforcement capability and lack of public awareness of the sensitivity of the wildlife to human disturbance. Activities occurring on beaches surrounding Coquille Point and adjacent to the nearby coastal rocks and islands that can impact refuge wildlife include surfing, kayaking, fishing, bait collection, skimboarding, jogging, kite flying, driftwood fires, and uncontrolled dogs. These lands are managed by OPRD; therefore, the Complex works cooperatively with OPRD to minimize the negative impacts from these uses on refuge resources.

5.2.6.2 Three Arch Rocks NWR

The wildlife using the Three Arch Rocks Refuge experience disturbance by boaters and pilots; seabirds and pinnipeds are highly vulnerable to disturbance, and large numbers of eggs and young can be lost during a single event. Thus, activities occurring in the waters within 500 feet of

Exhibit H
Page 10

these islands have a high potential for disturbing wildlife. Disturbance by boaters has decreased since the 1994 ruling by the OSMB that established a 500-foot seasonal closure (buffer zone) of the waters surrounding the Refuge to reduce breeding season impacts from disturbance events caused by boats.

5.2.6.3 Cape Meares NWR

Due to high public use and the almost daily presence of refuge and OPRD volunteers, illegal activity at Cape Meares is minimal. Off-site public use facilities, provided with Service funds, have been vandalized and stolen on only two occasions in the past 14 years. It is anticipated that an increase in law enforcement presence would further reduce the incidence of illegal activity.

5.3 Historic Properties and Cultural History

5.3.1 Oregon Coast human history

Prior to the arrival of Euro-Americans, Native American Tribes occupied many locations along the Oregon coast. It is estimated that Native Americans first came to the Oregon Coast 12,000 years ago to hunt, fish, and gather food in the coast's bountiful forests and waters. It was largely subsistence-based living and the archaeological evidence left behind is limited due to the fact that 12,000 years ago the shoreline was 20 miles west of its current location thus inundating use sites of the time. Several researchers (Berreman 1944; Chase 1873; Ross 1977; Schumacher 1877a, 1877b) noted the association of offshore rocks with large mainland village sites in Oregon. Fish and wildlife populations on or associated with the rocks and islands were of great economic importance to Native American Indians. Some of the rocks and islands in Oregon were occupied by native people at least seasonally. Archaeological sampling of a large midden in 1989 found shellfish remains to be the most common items along with some pinniped, fish and seabird bones (Gard 1990, 1992). Cultural material found on several offshore rocks suggests that these rocks were occupied at least seasonally. At YHONA, archaeological investigations of midden sites on the mainland, revealed the presence of seabird bones including cormorants, gulls, albatross, and loons.

The evidence from these midden sites indicates a healthy human population utilizing a myriad of natural resources. Perhaps as early as the sixteenth century the native populations began to decline precipitously, largely from diseases that arrived with European explorers. By the late nineteenth century the remaining populations were forcibly relocated to centralized reservations (Gard 1990). Descendants of the original coastal inhabitants are found in the current major tribes of the Oregon coast: the Confederated Tribes of Grand Ronde; the Confederated Tribes of Siletz Indians; Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians; Coquille Indian Tribe; and the Clatsop-Nehalem Confederated Tribes.

European exploration of the Oregon Coast began in the eighteenth century with Spanish explorers, and the British soon followed, both laying claim to the Northwest Coast. The American Robert Gray visited the Oregon Coast via the sea in 1788 and 1792 and came back with furs (Center for the Study of the Pacific Northwest 2008). After the Louisiana Purchase, Lewis and Clark reached the Oregon Coast in 1804 and staked the United States' claim to the territory. They returned east with furs, and this led John Jacob Astor to set up the first permanent white settlement in Oregon. The post, called Astoria, was at the mouth of the Columbia River.

Oregon achieved statehood in 1859, and the completion of railroads through the Coast Range Mountains encouraged land development along the ocean shore. In 1874, the Oregon State Land

Exhibit H
Page 11

Board began selling public tidelands to private landowners. Resorts grew up around the beaches at Seaside, Newport, and Rockaway, and the newly completed railroads brought tourists from the population centers of the Willamette Valley for weekend vacations. In 1911, Governor Oswald West was elected on the promise to reclaim Oregon's beaches as public land (OPB 2008). The legislature favored the privatization of these lands, but West was able to make an argument for public ownership based on the need for transportation. The 1913 legislature declared the entire length of the ocean shore from Washington to California as a state highway. Legislators also created the State Highway Commission, which began the construction of Highway 101 (OPB 2008). The OPRD bought land for 36 state parks along the coastal highway, an average of one every 10 miles. With the completion of the highway and parks system, coastal tourism came of age (NOAA 1998).

5.3.1.1 Oregon Islands NWR

The offshore rocks and islands of the Oregon Islands NWR have known cultural resources of significance to Native American Tribes whose ancestors used the islands and harvested wildlife for thousands of years. The rocks and islands were also targeted by Euro-Americans as early as 1892. They exploited common murre colonies along the southern Oregon coast for food. An article in the Port Orford Tribune newspaper on May 17, 1892, states that Asa Carey and Charles Anderson, two local men, were starting a business to harvest murre eggs from rocks off of Humbug Mountain. The article also stated “The murre, which a few years ago was not known to exist north of Cape Mendocino are now to be found off Humbug by thousands.” Apparently, murre colonies on Island Rock and Redfish Rocks west of Humbug Mountain were the targets of this harvest, with the eggs being sent to San Francisco by ship. Articles in the Port Orford Tribune on June 11, 1901 talk of simultaneous harvest of murre eggs on Island Rock and Blanco Reef (probably Orford Reef off Cape Blanco). Charles and Will Strahan were the owners of the company. This apparently did not end murre egging in this area as the Port Orford Tribune reported on June 9, 1909, that the crew of the boat Ranger had gathered 170 dozen eggs in one forenoon’s work. An article in the Centennial Edition of the Coos Bay Times on May 3, 1947, indicated that in the early days, an average of 700 dozen murre eggs was gathered each year at Island Rock and Redfish Rocks. It appears that by the turn of the century, thousands of murres nested on the rocks and islands near Port Orford and supported commercial harvesting of eggs for at least a decade (Manuwal et al. 2001). Both the Coquille Point and Crook Point Units contain Native American cultural resources and sites of significance to the Coquille Indian Tribe and the Confederated Tribes of the Siletz Indians.

On July 7, 1992, a perpetual easement with Eternity at Sea was established for privately owned Tillamook Rock. The easement states the rock is to be known as the Tillamook Rock Lighthouse Unit of the Oregon Islands National Wildlife Refuge and is to be managed as a seabird nesting and habitat area in perpetuity and as a non-visiting columbarium/cemetery and historic lighthouse. The lighthouse is listed in the National Registry of Historic Places.

5.3.1.2 Three Arch Rocks NWR

There are no historic properties associated with the Three Arch Rocks Refuge. This refuge has the distinction of being the first National Wildlife Refuge established west of the Mississippi River. The need to designate the Refuge as a protected wildlife area was brought to the attention of President Theodore Roosevelt by two pioneer naturalists and conservationists from Oregon, William L. Finley and Herman Bohlman. Finley and Bohlman visited the wind- and sea-swept

Exhibit H
Page 12

rocks in June of 1901 and 1903 to photograph the unique wildlife. To reach the rocks, they loaded up a dory with food, a tent, water, clothing, and photographic equipment and rowed toward the rocks. Shag Rock, the westernmost large rock, was the only rock with a landing spot, and the men unloaded their equipment. They camped on Shag Rock for two weeks during which time they took some of the first photographs of nesting seabirds, collected eggs and specimens for study, and documented some of the life history of the birds. During the first expedition they witnessed a tugboat filled with target shooters circling the rocks blasting seabirds for sport every Sunday. Throughout the week they further witnessed other boats carrying gunners who were shooting Steller sea lions for their skins and oil. They knew they had to put a stop to this slaughter as the seabird and sea lion colonies could not survive much longer. After the expedition, Finley traveled across the country to Washington, D.C., for a personal audience with the President. After four additional years of lobbying, the President designated Three Arch Rocks as the first National Wildlife Refuge west of the Mississippi River on October 14, 1907 (Sharp 1926).

5.3.1.3 Cape Meares NWR

There are no historic properties or known cultural resources associated with this refuge. Cape Meares Lighthouse is listed in the National Register of Historic Places; however, it is located on the adjacent State Scenic Viewpoint and is not included in the MOU for management of the Refuge and State Park.

5.3.2 Special designation areas

5.3.2.1 Oregon Islands NWR

Bird Rocks, Blanco Reef, Coquille Point Rocks, Goat Island, Mack Reef, Orford Reef, Redfish Rocks, Table Rocks, Two Arches Rock, Whaleshead Island, and the islands surrounding YHONA are all designated as Important Bird Areas (IBAs). A portion of the refuge rocks and islands were designated as a National Wilderness Area in 1970 and the remaining rocks and islands, except Tillamook Rock, were designated in 1978 and 1996. The wilderness is named Oregon Islands Wilderness. The Crook Point Unit is designated by the Oregon Natural Heritage Advisory Council and registered as a Natural Heritage Conservation Area by the State Land Board because of its significant species and natural resource values.

5.3.2.2 Three Arch Rocks NWR

The Refuge is designated as an IBA. Oregon's Important Bird Area program recognizes sites of outstanding importance to birds in the state. Sites with IBA designation are extremely important to Oregon's birds, though the IBA program by itself does not ensure the continued productivity of selected sites and certainly cannot guarantee continued avian diversity throughout the state. Most species of birds within IBAs are at least partially migratory, and most of the waterfowl, shorebirds, and seabirds of Oregon's IBAs are highly migratory or at least make extensive flights between the recognized IBAs and other areas. The Refuge was designated as a National Wilderness Area on October 11, 1978, and is known as Three Arch Rocks Wilderness.

5.3.2.3 Cape Meares NWR

The Refuge (except for the hiking trail) was designated an RNA on June 11, 1987. RNAs are part of a nationwide network of ecological areas set aside for both research and education. Cape Meares Refuge was designated an RNA to further protect its unique vegetation, geology, and

Exhibit H
Page 13

wildlife habitat in a naturally functioning ecosystem. The goals and objectives for Cape Meares NWR as an RNA are to (1) Preserve an example of a significant natural ecosystem for comparison with those influenced by humans; (2) Provide an educational and research area for ecological and environmental studies; and (3) Preserve gene pools of typical and endangered plants and animals.

5.4 Social and Economic Conditions

The Oregon coast stretches 362 miles and includes seven counties: Clatsop, Tillamook, Lincoln, Lane, Douglas, Coos, and Curry. Measured from the crest of the Coast Range Mountains, the coastal area of Oregon encompasses 7,800 square miles. One in three acres along the Oregon coast is federally owned (1000 Friends 2008).

5.4.1 Population demographics

The Oregon coast is home to one in every 15 Oregonians or roughly 6.5% of the state's population (DLCD 2008). These 225,000 residents are scattered along the coast, with 60% living in the coast's 32 incorporated communities and 40% living in unincorporated communities or in rural parts of the seven counties. The five largest cities are Coos Bay, North Bend, Newport, Lincoln City, and Astoria. The Oregon coast gained 20,000 new residents in the 1990s (USCB 2000).

The coast's population is older than the state average and includes many retirees. According to the 2000 Census, one-third of all coastal residents are over the age of 55, and the median age on the coast is 40, compared with the state's median age of 36. The coast is ethnically homogenous with 91% of coastal residents listed as Caucasian (USCB 2000).

5.4.2 Economy and employment

Over 100,000 people work on the coast, 80% of whom work for private businesses. Tourism is the leading employer on the entire coast, employing 23,000 people. In 2002, tourism spending on the Oregon coast exceeded $1.3 billion, an 80% increase over the previous 10 years. Spending by visitors generates sales in lodging, food services, recreation, transportation, and retail businesses. These sales support jobs for Oregon residents and contribute tax revenue to local and state governments.

The growth in tourism has partially offset a decline in the coastal timber and fishing industries. Yet the coast remains one of the largest producers of timber in Oregon and in 2002 the coast accounted for more than a quarter of all timber production in the state. Agriculture is important in many parts of the Oregon coast. In 2001, gross farm sales on the Oregon coast totaled more than $175 million. Dairy products brought in nearly $95 million in sales during that same year. Tillamook County produces $85 million in dairy products annually. Some regions produce specific agriculture products including farms in Curry County that account for 90 percent of the nation's Easter lily bulbs, and 35 million pounds of cranberries grown on acidic soils in and around Bandon (1000 Friends 2008).

Despite growth in some areas, the coast's economy lags behind the rest of the state. While statewide employment grew by 23% from 1990 to 2000, coastal jobs increased by only 13%. Unemployment has also been higher on the coast (Cowden 2003). From 1996 to 2001 the average unemployment rate on the coast was more than 7%, compared with 5.7% for the state. Using an index based on employment and income figures, the Oregon Economic and Community Development Department considers four coastal counties (Coos, Douglas, Lane—outside of Dunes

City—and Lincoln) to be economically distressed, along with seven communities outside of the economically distressed coastal counties of Astoria, Brookings, Garibaldi, Gold Beach, Nehalem, Port Orford, and Tillamook (OECDD 2008).

Income on the Oregon coast has also lagged behind other parts of Oregon, and poverty has been higher. Coastal per capita income is $24,000 a year, 15% below the state average. And the 2000 Census found 13% of coastal residents live in poverty, compared with 10.6% statewide. Children First for Oregon reports nearly half of all children on the coast (46%) live in or near poverty levels, compared with 37% statewide (USBEA 2001).

5.4.3 Transportation

Highway 101 is a designated National Scenic Byway and All American Road that runs the length of the coast, acting both as a highway and a main street through many coastal communities. With a growth in population, traffic has become more congested on Highway 101, and Oregon Department of Transportation data show the average daily flow of traffic increased by 10% from 1993 to 2003. The influence of seasonal tourism on Highway 101 is also evident, as traffic volumes in August are an average of 59% higher than traffic volumes in January (ODOT 2008).

5.4.4 The beach

In 1967, the Oregon Legislature passed the Beach Bill, which guaranteed public access to all Oregon beaches. Today, 90% of Oregon's beaches are accessible to the public via 1,150 beach access points, an average of three access points per mile of coastline (1000 Friends 2008).

5.4.5 Diversity

According to the 2005 OPRD SCORP, in Oregon, as in the United States as a whole, minority populations are increasing at a rate well above total population growth. As a result, recreation providers in the state of Oregon must consider the needs of an ethnically mixed population when planning for outdoor recreation opportunities. Resource management agencies under the Department of the Interior and the Department of Agriculture including the U.S. Forest Service, the Bureau of Land Management, and the National Park Service are responding to some demographic changes by initiating recreation research to learn more about ethnic recreation behavior. For example, studies have established that African Americans are less likely than European Americans to pursue recreation in dispersed settings or to travel to regional recreation areas. Also, Hispanic visitors tend to be more family- and group-oriented when visiting outdoor recreation areas. The Service will be consulting this growing literature base to assist in satisfying the recreation needs of an increasingly diverse population.

5.5 References

1000 Friends of Oregon. 2008. Oregon coastal future project. Available at: http://www.coastalfutures.org/aboutcoast.html.

Berreman, J.V. 1944. Chetco archaeology. General Series in Anthropology, no. 11.

Center for the Study of the Pacific Northwest. 2009. European and American exploration of the Pacific Northwest. Available at: http://www.washington.edu/uwired/outreach/cspn/Website/index.html.

Exhibit H
Page 15

Chase, H.A. 1873. Indian mounds on the Oregon coast. American Journal of Science and Arts, 3rd series 6(31):26-32.

Cowden, S. 2003. How the states stack up. In: J. Mapes, A. Pulaski, and G. Kinsey Hill. The nine states of Oregon. Special series in the Oregonian. Portland, OR.

DLCD (Oregon Department of Land Conservation and Development). Visiting the coast: population and demographics. Available at: http://www.lcd.state.or.us/coast/visiting/popul_demig.html.

Gard, H.A. 1990. The role of southern Oregon's islands in prehistoric subsistence. M.A. thesis. Oregon State University, Corvallis.

Gard, H.A. 1992. Resource distribution and prehistoric utilization of southern Oregon coastal islands. Northwest Science 66(4):207-217.

Manuwal, D.A., H.R. Carter, T.S. Zimmerman, and D.L. Orthmeyer, eds. 2001. Biology and conservation of the common murre in California, Oregon, Washington, and British Columbia. Volume 1: natural history and population trends. Information and Technology Report. USGS/BRD/ITR-200-0012. U.S. Geological Survey, Biological Resources Division. Washington, D.C. 132 pp.

NOAA (National Oceanic and Atmospheric Administration). 1998. Which way to the beach: Oregon's beaches belong to the public. Available at: http://www.csc.noaa.gov/magazine/back_issues/apr98/sec4c.html.

ODOT (Oregon Department of Transportation). Automatic traffic recorder stations. Available at: http://www.odot.state.or.us/tdb/traffic_monitoring/tvtable.htm.

OECDD (Oregon Economic and Community Development Department). 2008. Distressed areas in Oregon. Available at: http://www.econ.state.or.us/distarea.htm.

OPRD (Oregon Parks and Recreation Department). 2003. The 2003-2007 Oregon statewide comprehensive outdoor recreation plan. Salem, OR.

OPRD. 2008. The 2008-2012 Oregon statewide comprehensive outdoor recreation plan. Salem, OR.

OPB (Oregon Public Broadcasting). 2008. Oregon experience: the beach bill. Available at: http://www.opb.org/programs/oregonexperience/beachbill/timeline.php.

Ross, R.E. 1977. Preliminary archaeological investigations at 35 CU (, Port Orford, Oregon. Department of Anthropology, Oregon State University. Submitted to the Oregon State Parks and Recreation Department.

Sharp, D.L. 1926. Sanctuary! Sanctuary! Freeport, NY: Books for Libraries Press.

Schumacher, P. 1877a. Aboriginal settlements of the Pacific Coast. Popular Science Monthly (10):353-356.

Schumacher, P. 1877b. Researches in the kjokkenmoddings and graves of a former population of the coast of Oregon. Bulletin of the U.S. Geological and Geographical Survey of the Territories 3:27-35.

USBEA (U.S. Bureau of Economic Analysis). 2001. U.S. Bureau of Economic Analysis website. Available at: http://www.bea.gov/bea/regional/data.htm.

USCB (U.S. Census Bureau). 2000. Census data. Available at: http://www.census.gov/.

USFWS (U.S. Fish and Wildlife Service). 2007. Public use. Refuge annual performance plan.

Enclosed, "Bandon Beach Hotel" Record Additions: Aerial Photos; USF+W Parking Concepts

Robert S. "Robin" Miller III <rsmiii@aol.com> Fri, May 4, 2018 at 2:38 PM
To: Megan Lawrence <mlawrence@ci.bandon.or.us>
Cc: McLaughlin John <jmclaughlin@ci.bandon.or.us>, Dana Nichols <dnichols@ci.bandon.or.us>

Megan Lawrence,

Please accept the enclosed three documents as additions to the record for the “Bandon Beach Hotel” zone text amendment application.
I am submitting this on Friday, May 4, 2018, at approximately 2:40pm PST.

(1) Pre-2008 aerial photograph of Coquille Point, from South looking North, showing the legacy Beach Loop Gorman Motel + Three Gables Restaurant + Bandon Beach Motel structures;

(2) Pre-2008 aerial photograph of Coquille Point, from Southwest looking Northeast, showing the legacy Beach Loop Gorman Motel + Three Gables + Bandon Beach Motel structures; and

(3) 2011 USF+W conceptual plans for parking lot and landscaping changes at the “Masonic Viewpoint” and 8th Street entrances.

Robin

Robert S. Miller III, Attorney at Law
Admitted in Oregon and Federal Court
OSB No. 943874
BANDON PROFESSIONAL CENTER
1010 First Street S.E., Suite 210
Bandon, Oregon 97411
Tel: USA (541) 347 - 6075
Fax: USA (541) 639 - 4002

3 attachments

CoquillePoint-LookingNorth- pre2008.jpg
4748K

CoquillePoint- LookingNorthEast-pre2008.jpg
4343K

CoquillePoint-Parking- USFWConceptualPlans.pdf
2048K

SIMPLE

This design provides a practical upgrade to the site without modifying the major existing organizing elements and use.

The main auto circulation route through the visitor area is two way, providing access from both sides of the visitor area. Two bus pull-out areas have bee provided.

A main gathering plaza has been located near the stairs, but a secondary viewing plaza has bee located at the center axis of the parking area. This will provide visitors who just want a quick photo to have a backdrop of a low stone wall and possible interpretive signage at this area. Headlights are blocked by low raised planters that can also act as a seatwall for visitors.

The parking area and pedestrian pathways will use similar colored paving materials to blur the lines between auto and pedestrian zones. The drive aisle will be done in a contrasting color to accent the space and provide a visual queue for visitors.

INFO:

Parking Stalls : 20
Bus Parking : 2
Auto Circulation : Two Way
Requires Street Vacation: No

Coquille Point Parking - Oregon Islands NWR

Parking Lot Options

GREENWORKS

June 17, 2011

FLOW

The flowing lines of the ocean provide the foundations for this design. Sinuous lines criss-cross the visitor area and begin to define planting beds, travel lanes, and gathering spaces. The pedestrian, bike, and auto circulation routes have been subtly separated by planting beds and boulders in order to surround the visitor with natural elements.

Autos can park in stalls angled to the east to avoid the potential for headlight intrusion into the refuge. Two areas have been provided for RV or School Bus parking.

It is assumed that the western portion of 11th street would be vacated to provide area for the entrance drive and bike / pedestrian path into the site. Both the drive and path have been located on the southern half of the street section to accomodate the possible property line adjustments as necessary.

FACTS:

Parking Stalls : 12
Bus Parking : 2
Auto Circulation : One Way
Requires Street Vacation: Yes

Coquille Point Parking - Oregon Islands NWR

Parking Lot Options

GREENWORKS

June 17, 2011

SURF

This design fully embraces the forms of the ocean. As the visitor passes through the site, it changes from denser plant material and rocks near the eastern portion of the parking lot, to crashing waves of the corten steel, to the viewing plaza designed after patterns found as waves flow onto the beach.

This transect of the site is intended to surround visitors with the forms and textures of the preserve to enhance their experience and embedd the character of the preserve within their memory, even if their stay is brief.

Cars and their headlights have been screened from view by the limited use of corten steel "waves". The corten will protect plant material from the high winds during the winter months.

The short section of 11th Ave. has been assumed to be vacated in this option. The pedestrian path and auto entrance drive have been placed on the southern half of the roadway.

FACTS:
Parking Stalls : 18
Bus Parking : 1
Auto Circulation : One Way
Requires Street Vacation: Yes

Coquille Point Parking - Oregon Islands NWR

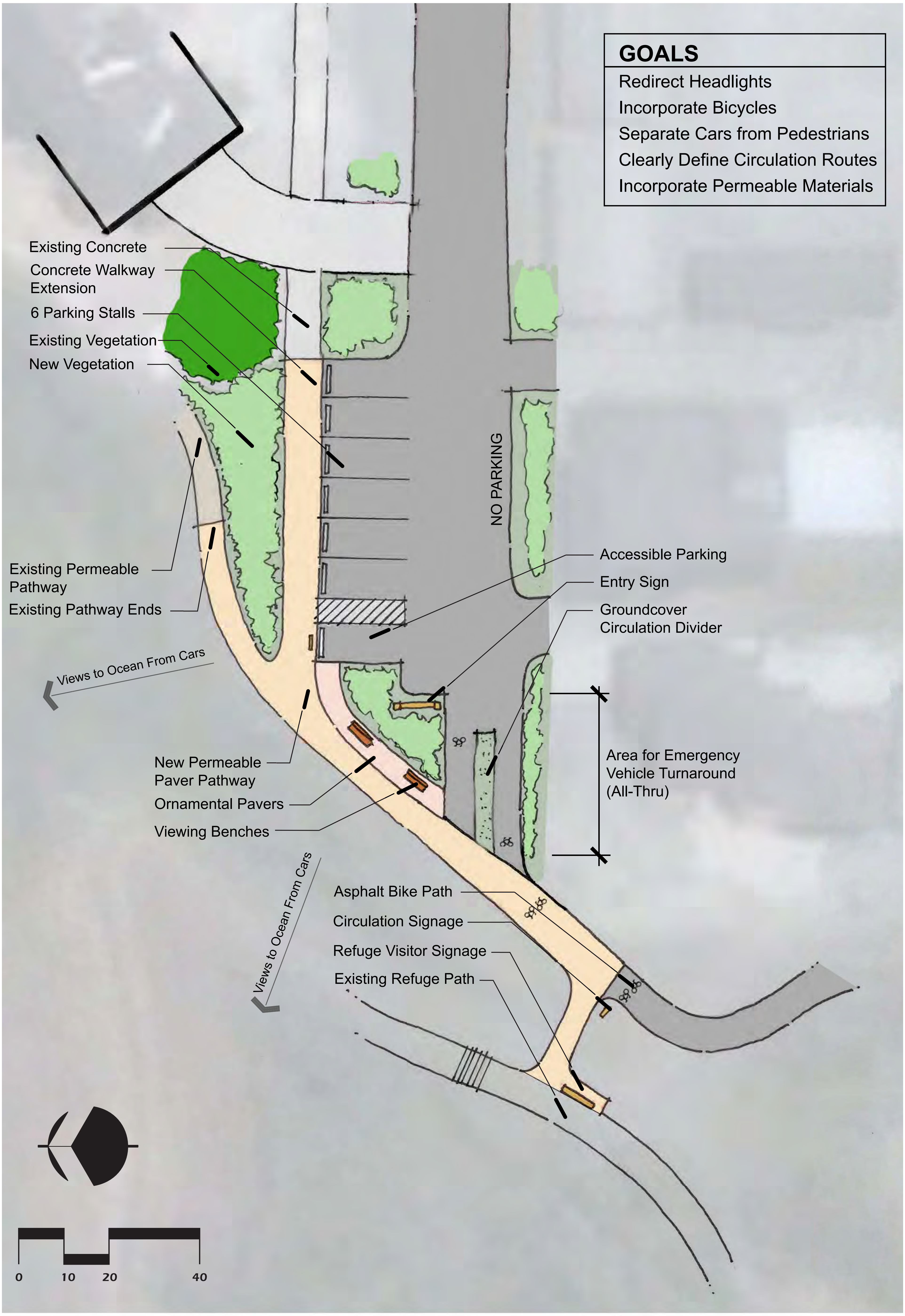
Parking Lot Options

GREENWORKS

June 17, 2011

GOALS

- Redirect Headlights
- Incorporate Bicycles
- Separate Cars from Pedestrians
- Clearly Define Circulation Routes
- Incorporate Permeable Materials

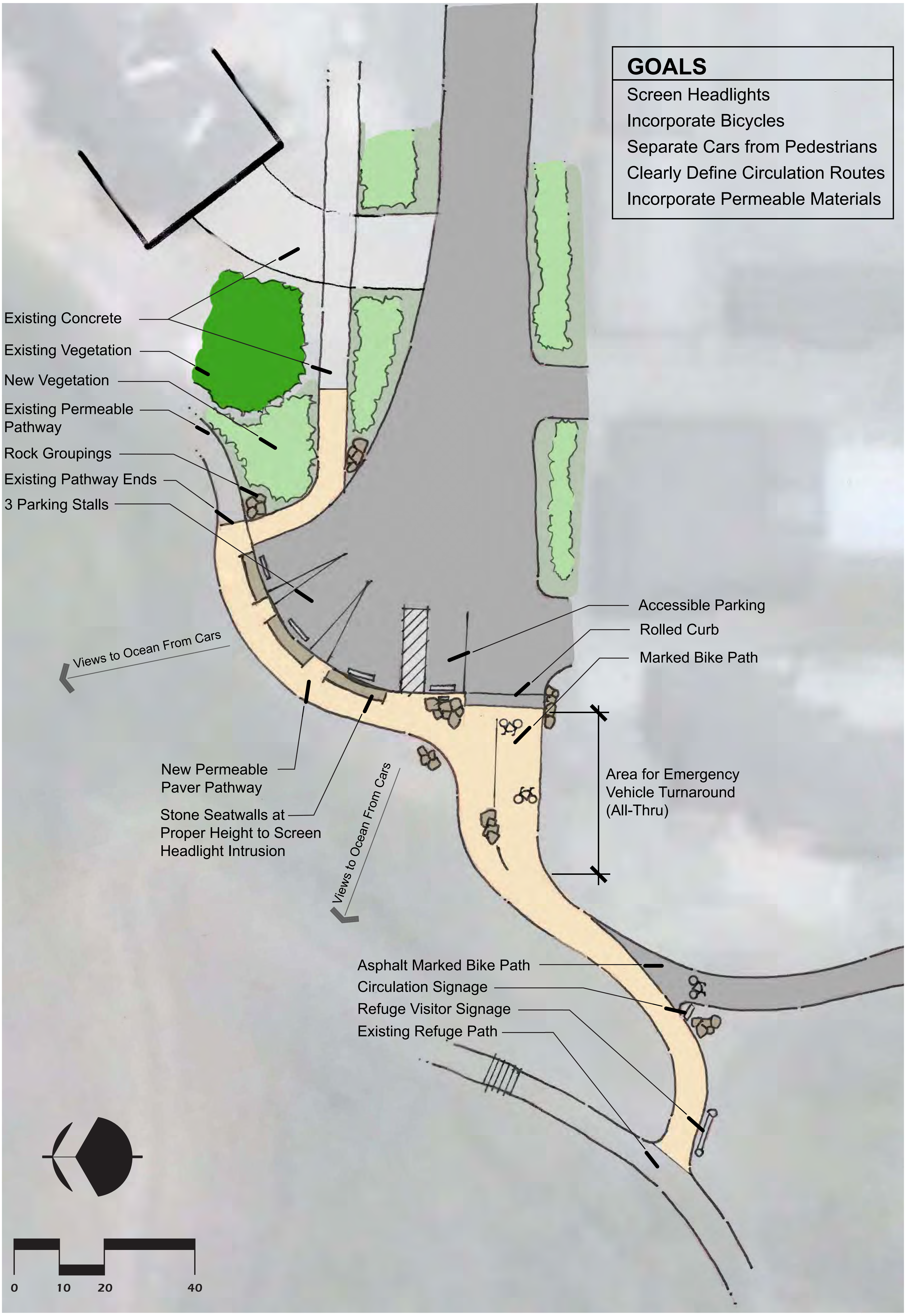


Coquille Point Parking - Oregon Islands NWR

June 17, 2011

8th Street Redesign - Option 1

GREENWORKS



GOALS

- Screen Headlights
- Incorporate Bicycles
- Separate Cars from Pedestrians
- Clearly Define Circulation Routes
- Incorporate Permeable Materials

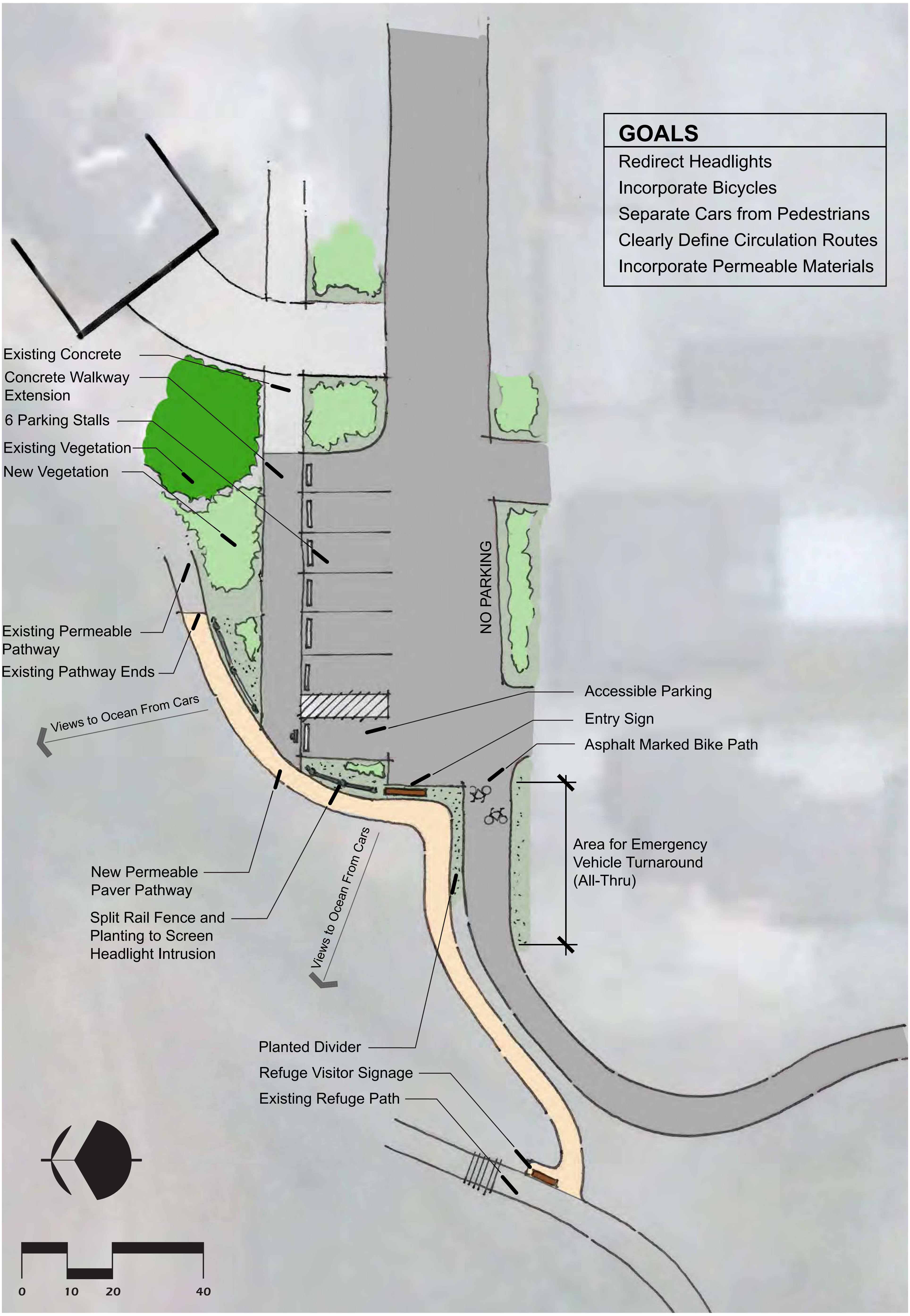
Coquille Point Parking - Oregon Islands NWR

June 17, 2011

8th Street Redesign - Option 3

GOALS

- Redirect Headlights
- Incorporate Bicycles
- Separate Cars from Pedestrians
- Clearly Define Circulation Routes
- Incorporate Permeable Materials



Coquille Point Parking - Oregon Islands NWR

8th Street Redesign - Option 2

June 17, 2011

GREENWORKS

To whom it may concern,

We are writing you to address the proposed CD-1 zone changes for the hotel at Coquille Point. We are in favor of the zone change, but with a slight reservation.

Our concern is with enforcement of the proposed code 17.20.030 K. Coquille Point Hotel, specifically section (e); also, the enforcement of other "agreements," such as providing parking at the corner of 11th and Beach Loop. The many benefits as outlined in the applicant's project proposal (public restrooms, additional parking, beautification, etc.) are enticing and provide great incentive but we did not see (or understand) the enforcement if such requirements are not met. Is there language in the City Code to protect the City's interests if some of these "public benefits" are not provided? (For example, say a new owner in twenty years decides they don't like people coming up from the beach to use their restrooms and stop providing public access.)

We have no problem with the proposed forty-five foot height or any of the other factors, as the public benefit and increased capital will be beneficial to the community at large. As things currently stand, the Federal agencies in charge of the public land have not provided adequate trash and recycling receptacles nor restrooms at this location. We also appreciate the Planning Department's efforts to create a defined scope for this code change so as to not allow for unanticipated future buildings of forty-five feet. We have on numerous recent occasions visited the location of this building to observe the surroundings and the impediment a forty-five foot building would impose on other property owners. As far as we can see, an increase in building height will have little impact on adjacent property views, and if anything will increase property values.

We would also like to reiterate our support of granting the applicant the forty-five foot height instead of the Planning Department's forty foot proposal. We feel the community is fortunate to have the interest of such a fine establishment with such overwhelming public benefits and the Department should take care to not make the project unattractive to the applicant (We harken back to the now-dead New River golf course proposal that would have created many jobs and public benefits). If anything, prudent negotiating with the applicant over the proposed forty foot limit and the requested forty-five foot limit may enable the Planning Department to come away with an additional public benefits such as improved public walkways to Face Rock and Old Town (like the footpath lighting shown in the applicants promotional materials).

We thank you for your service and consideration.

Isaac Taylor
Property owner
920 1st St NE

Rod Taylor
Property owner
1320 Strawberry Dr SW

CITY OF BANDON

555 HWY 101
P.O. BOX 67
BANDON, OREGON 97411

(541) 347-2437
www.cityofbandon.org

April 27th, 2017

Eric Mruz
South Coast Unit Refuge Manager
U.S. Fish and Wildlife Service
P.O. Box 99, Bandon, Oregon 97411

RE: 18-003, Proposed Bandon Beach Hotel at 1090 Portland Ave in Bandon, OR 97411

Dear Eric Mruz:

The City of Bandon has received an application for a Zone Code Text Amendment to modify the Bandon Municipal Code Section 17.20 Controlled Development 1 (CD-1) Zone, to allow for building height up to 45 feet, side yards of 5 feet, a rear yard of 5 feet, and a 55% lot coverage with up to 75% impervious surface on property located at 1090 Portland Ave, the current location of the Bandon Beach Motel.

This project is being heard as a legislative matter in front of our Planning Commission and the record has been left open following an April 26th, 2018 public hearing. The record will be open until May 4th, 2018 at 3:00 pm for comment. Considering the proximity of the Coquille Point Wildlife Refuge, the City of Bandon would like to offer U.S. Fish and Wildlife the opportunity to comment on the project. Please direct your response and any questions to myself at dnichols@cityofbandon.org, or by phone at 541-347-2437.

Sincerely,

Dana Ni

Dana Nichols
City Planner
City of Bandon

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Coast National Wildlife Refuge Complex
South Coast Refuge Office
P.O. Box 99, 83673 North Bank Lane
Bandon, Oregon 97411
Phone: (541) 347-1470 Fax: (541) 347-9376

May 3, 2018

Dana Nichols
City Planner
555 Hwy 101
Bandon, OR. 97411

Re: 18-003, Proposed Bandon Beach Hotel at 1090 Portland Ave in Bandon, OR 97411

Dear Ms. Nichols:

The nineteen-acre Coquille Point Unit, on the western edge of the City of Bandon, was acquired in 1991-92 as the first mainland addition to Oregon Islands NWR. The intent of this mainland unit is to protect seabird nesting colonies on the adjacent rocks, restore native habitat, and provide a highly visible public use area for environmental education and interpretation. Coquille Point is the only unit of Oregon Islands NWR that is open to the public. Although Coquille Point has limited wildlife use, its primary values are providing a buffer zone between mainland development and the islands, and serving as an important interpretive site for Oregon Islands NWR. The adjacent rocks contain substantial and observable populations of seabirds that are easily viewable from the headland.

There was substantial public support for this land to be incorporated into the Refuge and to protect the headland from development.

For the US Fish and Wildlife Service to have regulatory authority over a project on privately owned lands, the project would have to involve federal funding and/or a federal permit or approval, or be on refuge-owned lands. The proposed Hotel modifications and request for height text amendment of the city ordinance does not meet any of these criteria. USFWS often provides technical support for projects and proposed actions that could impact fish and wildlife resources under our management authority. The representatives of Steele Bandon Associates, LLC asked for the Service's recommendations to eliminate or minimize impacts to wildlife and the adjacent Refuge. We have provided recommendations and Steele Bandon Associates, LLC has been receptive to those recommendations, incorporating them into the design.

To minimize any negative effects to wildlife and the adjacent Refuge, USFWS recommends the following considerations for Steele Bandon Associates, LLC when designing the new hotel and associated development at Coquille Point. If adopted, these "best management practices" related to design of the lighting, windows, landscaping, and waste management will reduce the potential impacts to wildlife or habitat.

- Reduce bird strikes to windows and disruption of migratory bird orientation through window and lighting design Best Practices, such as integrating a variety of glass and window design options into building design, avoiding unnecessary perimeter lighting, and ensuring all exterior lights are fully shielded.
- Design all structures so they do not present inadvertent roosting and nesting opportunities to wildlife, especially pigeons, starlings, and house sparrows.

- Implement solid waste management according to an integrated pest management plan that assures trash and potential food for rodents, gulls, and other scavenging animals is contained and handled such that it is unavailable to them.
- Consult with local landscape professionals to select landscaping plant species that are known not to spread or naturalize into natural areas, unless they are locally native species not considered invasive, which would be preferred.
- Develop traffic and parking plan to mitigate potential changes to traffic and parking availability for refuge visitors.
- The Steele Bandon Associates, LLC. should address the geotechnical conditions of the site and potential impacts to the stairs and surrounding lands as part of their analysis. Due to concerns regarding the existing conditions and stairway in 2014, the Refuge completed a geotechnical investigation for the headland and the structural integrity of the stairs. The Refuge is willing to share this report.

Please let me know if you have further questions. I can be contacted by email at: Eric_Mruz@fws.gov, or office phone at 541 347-1470.

Sincerely,

Eric Mruz
South Coast Refuge Manager

Megan Lawrence <mlawrence@ci.bandon.or .us>

Application 18-003-Zone Code Text Amendment - Bandon Beach Hotel

Judy Smilan <jsmilan@yahoo.com> Thu, May 3, 2018 at 5:20 AM
To: "planning@cityofbandon.org" <planning@cityofbandon.org>

My letter to the Planning Department is attached.
Could you email me back letting me know that you received it?
Thanks,
Judy Smilan

Zoning Keiser hotel.docx
20K

May 2, 2018

TO: PLANNING Department, Bandon, Oregon 97411

RE: Application 18-003-Zone Code Text Amendment – Bandon Beach Hotel

I am totally opposed to any changes to our current CD-1 zoning.

"The purpose of the CD-1 zone is to recognize the scenic and unique qualities of Bandon's ocean front and nearby areas and to maintain these qualities as much as possible by carefully controlling the nature and scale of future development in this zone" per Bandon Municipal Code , 10-04-2009.

If the requested change/amendment is made to the CD-1 code, we would lose a big piece of our scenic view at Coquille point.

They say that the current Bandon Beach Hotel is unattractive and that this new building would look much better. I disagree. Even though the current Gorman Hotel/Bandon Beach Hotel is not all that attractive, it is not as offensive as the massive new structure would be. The current hotel fits in with the environment with its size, material and color.

The height limit is 24 feet under our current code. Last year Keiser was asking for 35 feet. This year they have upped it to 45 feet plus 5 more feet for chimneys. That is a 50 foot high building. It is not just the height that makes this new hotel so massive. You also must consider that they are not just increasing the height of the building but they are expanding the hotel to cover much more of the lot than the current hotel covers.

The comment put out by the Planning Commission said that the requested changes were only for Keiser, implying that they will not be for others.

This comment is not believable because once you set a new precedent, it is almost impossible to go back. IF you change the rules for this hotel, there will be other changes down the line. Since this hotel will lessen our scenic view at Coquille Point, why would you want to change the zoning for it?

WHY would we ever make a change for one person? That is totally inappropriate. Where are our ethics?

This new hotel would be massive and the picture looks like something that belongs in a big city, but not on Bandon beach. To me it looks totally inappropriate for the beautiful, natural place that is Coquille Point.

I am concerned about the increase in size of the hotel by letting them increase the footprint of the old hotel. There is parking on the current site but they plan on filling all that in with new hotel. **Was there/is there not a written rule about not increasing the size of the footprint of the existing structure?** The parking lot is not part of the structure/footprbint.

Another big concern is parking. They are adding new parking lots where the old Bandon Beach hotel and the Three Gables restaurant used to be, but there will be 48 rooms and up to 70 people in the restaurant/bar.

These new parking lots will not hold all those cars. What will stop the hotel and restaurant guests and employees from parking in the current Coquille Point parking lot?

Where will the locals and tourists, who come to enjoy Coquille Point, park? Where will you park to go down on the beach or to enjoy the view from your car? If one has to park farther away on residential streets, there will be no ocean view from your car.

Why can't Keiser build a hotel that fits the rules and guidelines of our current code?

He could build a two story hotel that does not go over the 24 foot height that is allowed for buildings on the west side of Beach Loop Drive. But even with two floors, instead of three (fewer rooms), and a restaurant that might hold 70 people, I don't see a solution for the parking problem which means locals and tourists who come to Coquille Point will not have the great view we have now.

The only solution to the parking problem is to not create the problem. Let them follow the rules that were put there for very good reasons.

If the new hotel is the same size (height and footprint) as the current hotel, then there would be no new parking problem created and Mr. Keiser would still make plenty of money from his hotel. He has no problem filling up his current Bandon

Beach Hotel, as ugly as they say it is. There is plenty of money for Keiser to make with a new hotel that would not change the zoning. He would still have a hotel there and we would still have our beautiful, scenic Coquille Point.

It is not an all or none proposition. It does not have to be a massive building that does not blend into its surroundings. There could be a very nice, understated hotel that would blend into the environment and leave our beautiful scenic view intact.

If this new massive building is built, the whole feeling of Coquille Point would change from beauty and nature to something much less. Coquille Point would be more commercial than natural. It would be the end of Coquille Point as we know and love it.

The most important part of our current zoning is that we keep our beautiful scenic views. If you let him build this new massive hotel, much of our scenic view will be gone and once it is gone. we can never get it back.

Please turn down Mr. Keiser's request for special treatment and have him follow our existing code. Why take part of this beautiful view away from the people so that one person can make more money? Also, Mr. Keiser does not live in Bandon and he won't have to look at this hotel everyday – but we will.

Judy Smilan

761 12th St SW

Bandon, Oregon

513-683-7248

BANDON BEACH HOTEL COMMENT

5/1/2018

Bandon City Planning Commission:

My husband and I moved to Bandon in 2016 after visiting here since 2002 when we lived in Roseburg. We have always loved this area and feel it is the most beautiful town on the Oregon Coast due to its quaint small town feel and very friendly people.

We attended the Planning meeting last night (April 26) to hear both sides; we both were neutral on the subject initially. We heard some good points on both sides, but at the end of the meeting, we found ourselves leaning more to the side of people who reject the zone change.

The people who stood up and commented who live next to the proposed development had some very valid points. The thought that went through my head was, why should they have to abide by the current ordinances and their next door neighbor doesn't? I know that if I had a home next door and this was being proposed, I would be very upset at the prospect of losing my beautiful ocean view, and I would think you would too if you put yourselves in their shoes.

I have nothing bad to say about the Kaisers, on the contrary, I feel they did a beautiful job at Bandon Dunes and have no doubt that they want to preserve the beauty of the area and I don't have a problem with a new hotel replacing the existing hotel, but feel they should stick with the 24 foot height. That area is predominately residential and would be very unfair to not only the residents close by, but for all Bandon residents who enjoy the beauty of Coquille Point. We don't want to see a big monstrosity overshadowing the point. With all the property they own around that site, maybe they should consider a couple "boutique" hotels to get to their 48 rooms that are low profile and aesthetically pleasing. I am very much in favor of the amenities they are planning and would love to see the point enhanced and improved upon for wildlife viewing, etc.

We hope you will do the right thing and vote against this zone change for the sake of the many residents who oppose this. This will create a (bad) precedent if approved. The last thing many of us want, is to see another Lincoln City or Newport..

Respectfully,
Nancy Bailey
Nancy Bailey
601 Seabird Drive SW
Bandon, OR

Megan Lawrence <mlawrence@ci.bandon.or .us>

Item 4.1 Zone Code T ext Amendment - Bandon Beach Hotel

Diane Follansbee <dianenighthawk@gmail.com> Tue, May 1, 2018 at 5:48 PM
To: Planning@cityofbandon.org

Attached please find comments and concerns from three of the board members of he Cape Arago Audubon Society.
Thank you.
Diane Follansbee, Treasurer

CAAS Letter to Bandon commissioners, May 1, 2018.pdf
117K

Cape Arago Audubon Society
P.O. Box 381
North Bend, OR 97459

May 1, 2018

City of Bandon Planning Commission
555 Highway 101
Bandon, OR 97411

Re: Item 4.1 Zone Code Text Amendment- Bandon Beach Hotel

Dear Planning Commissioners:

Please accept the following comments regarding item 4.1 Zone Code Text Amendment – Bandon Beach Hotel from leaders of Cape Arago Audubon Society, a Coos County chapter affiliated with the National Audubon Society. As officers of our chapter, we are concerned about natural resource conflicts associated with expansion of development adjacent to the National Wildlife Refuge at Coquille Point.

The open space on Coquille Point serves as a critical buffer from disturbance for seabird colonies on nearby offshore rocks that are part of the Oregon Island National Wildlife Refuge.

For this reason, we are concerned about the applicant’s request to amend Bandon’s code to raise the building height restrictions on this site from 24 feet to 45 feet and to reduce yard setbacks.

The headland buffer should not be considered a substitute for side and rear yard development setbacks on the proposed hotel property.

We are also concerned that the proposed development of a larger hotel with its expanse of reflective windows and use of artificial light at night will increase the potential risk to birds at nearby seabird colonies, which are vulnerable to disturbance.

We are also concerned about the cumulative environmental impacts of increased traffic, activity, and noise to these unique colonies.

According to the Bandon Comprehensive Plan, "When property within 100 feet of the Refuge boundary is proposed for development, the applicant shall demonstrate that the proposal will have no adverse impact on the function of the Refuge." We are concerned that the applicant has not met this requirement for no adverse impact.

Thank you for your consideration of these comments.

Respectfully,

/s/ Joe Metzler, Vice President

/s/ Bruce Follansbee, Secretary

/s/ Diane Follansbee, Treasurer

Megan Lawrence <mlawrence@ci.bandon.or .us>

Building at Coquille Point

andyandlynn@mycomspan.com <andyandlynn@mycomspan.com> Wed, May 2, 2018 at 12:44 PM
To: planning@cityofbandon.org

I'm very concerned about the motel/hotel, at Coquille Point, that is under discussion. Everyone knows that the present motel on the point is a disgrace and pretty much always has been. However, building a 45 ft high glass building practically on top of a bird sanctuary seems a bit rash.

One of the reasons for the sanctuary was to preserve open space, and a safe space for bird life to flourish. I hope that whoever is going to stay at this new motel/hotel, won't mind birds crashing into the windows and falling to the ground, because that will happen for about 18-24 months. It takes a while for the birds to get that their flight paths are obstructed, especially the young birds.

If they must build there, and I wish they wouldn't, they need to at least, keep to the present height and size restrictions. Going from 24 ft. to 45 ft. seems a HUGE variance request to me. Almost double the height restrictions. The parking for guests will have to be down the block on Beach Loop as the footprint of the building will be expanded as well. What they are asking for is NOT a variance, it's a total disregard for the town's codes and what is proper for the area. I'm assuming that the rules were made for a reason. This particular project isn't what the variance relief was meant for.

Everyone else in the area has had to comply with the codes. This motel/hotel should have to as well. Bigger is not better, it's just bigger. The catch phrase of "help the economy" is overly used. A smaller, two story building will also help the economy. Hiring will be about the same, tax revenue also. So, please don't use the economy to bring a building into the area that doesn't fit.

I personally think the building is ugly. It's a big, bulky, glass box. It isn't quaint, it isn't charming, it doesn't go with the area at all.

People come to this area for it's fabulous scenic and wildlife beauty, the charm of Old Town, the wonderful people. This building just detracts from the reason people come here.

Coquille Point is a hard won, special place and if this building is approved it will be very sad and wrong.

Lynn Christensen
1373 Strawberry Drive. SW
Bandon, Oregon 97411

Bob Fischer
1127 12th Street S.E.
Bandon, OR 97411
May 3, 2018

City of Bandon Planning Commission
Honored Commissioners,

Political favoritism violates the spirit of the law and undermines the trust that citizens place in their elected leaders.

Here is the spirit of a law called the Controlled Development-1 Zone. It's in the Bandon Municipal Code.

"The purpose of the CD-1 Zone is to recognize the scenic and unique qualities of Bandon's ocean front and nearby areas and to maintain these qualities as much as possible by carefully controlling the nature and scale of future development in this zone."

Bandon is a small town with two renown natural wonders. One of those is the Bandon Marsh National Wildlife Refuge. It is the largest remaining tidal saltmarsh in Oregon, and it is invaluable habitat for thousands of migratory shorebirds and waterfowl. The Bandon Marsh is known to ornithologists and bird-lovers around the world.

The other natural wonder is the Coquille Point Headland, the mainland unit of the Oregon Islands National Wildlife Refuge, a designated National Wilderness Area that contains more than 1,400 sea rocks, reefs and islands, and two headland parcels, along the entire Oregon coastline. Thirteen species of seabirds nest on the ocean rocks around Coquille Point. Seabirds spend their entire lives at sea except when they are nesting, and the Coquille Point Headland is the best place in world to see them.

Both of these national treasures are owned and protected by the United States Fish and Wildlife Service.

Mike Keiser, the developer and owner of the Bandon Dunes Golf Resort, is requesting that changes be made in the text of the CD-1 Zone, solely for his property on the Coquille Point Headland.

He wants the limit on building height to be raised from 24 feet to 45 feet plus 5-foot tall chimneys (7 of them) on the highest points of the roof, and he wants the standard city setbacks to be reduced to just 5 feet from his property lines, so that his proposed three-story, 48 room, luxury hotel can fill the entire lot, a lot that is on the west side, the wrong side, of the Portland Avenue boundary of the U.S. Fish and Wildlife Service's protected area on the Coquille Point Headland.

A hotel too tall for the seascape, too large for the lot, and too close to the rookeries, along with the increase in traffic, lights and noise that such a hotel would bring, would put this precious, sensitive wildlife area in great peril.

A decision must be made, and we have every right to expect that our elected leaders will resist the seductive power of political influence and favoritism, and uphold the spirit of the law expressed in the Bandon Municipal Code.

Megan Lawrence <mlawrence@ci.bandon.or .us>

Bandon beach hotel proposal

colette <colette@colettesweb.com> Wed, May 2, 2018 at 9:50 AM
To: planning@cityofbandon.org

To our Bandon Planning Committee:

I have no opposition to making improvements to the Bandon Beach motel, but any and all changes must remain within the limitations specified in the current zoning. The sketch of the proposed new higher, more luxurious hotel looks out of place to me. Of course, like many others, I love the area as it is currently. The home-owners in the area have a view they enjoy and they paid for that privilege. As proposed, the new hotel at 4 stories would block some of their views. That is disappointing and may well anger the homeowners in the area. Many have sacrificed greatly to live where they do and a large part of their quality of life is their ocean view.

I am not sure there are enough potential employees currently living in Bandon who will be available to fill the additional jobs offered due to the added rooms the hotel would offer. The current vacation establishments are having a difficult time finding staff to fill all their current openings. I don’t think Bandon is ready now, nor perhaps ever will be, for the larger number of rooms that the motel owners propose.

I wouldn't like to have my neighborhood zoned in a way that takes something away from residents as important and irreplaceable as a beautiful ocean view, for the potential benefits of this hotel to a single resident for profit.

Thanks for taking time to read and consider my thoughts.

Colette Fuchs

Megan Lawrence <mlawrence@ci.bandon.or.us>

Application 18-003-Zone Code Text Amendment - Bandon Beach Hotel

Francis Quinn <framarn@icloud.com> Wed, May 2, 2018 at 1:58 AM
To: planning@cityofbandon.org

[Pleas note: the text for this comment is also being sent to The Western World as a letter to the editor.]

Francis Quinn
425 Bandon Ave., SW
Bandon, OR 97411

Sent from my iPad

Blank 2.docx
9K

Special Zoning for a Building That Shouldn’t Be?

The April 26 Planning Commission hearing focussed on the request for CD-1 zone code changes that would be necessary for Mike Keiser to be able to construct his proposed new Bandon Beach Hotel to replace the current Gorman motel on Coquille Point.

As noted in a letter in last week’s news Western World, the Bandon Municipal Code states: “The purpose of the CD-1 zone is to recognize the scenic and unique qualities of Bandon’s ocean front and nearby areas and to maintain these qualities as much as possible by carefully controlling the nature and scale of future development in this zone.” Towards that goal, the current height limit for structures in the CD-1 zone is 24 feet, with up to five feet more for a chimney.

The new hotel would almost double that height to 45 feet, and would require other changes in the CD-1 code specs with respect to setbacks, lot coverage, and impermeable surface space allowable. While the request to allow these changes are specific for the Gorman motel site only, it is understandable that residents in the broader CD-1 zone who built their homes since Bandon adopted its Comprehensive Plan and zoning codes in 1990 might feel resentful.

They were constrained by the code in what they could build, but now a new person comes along and says, in effect, let’s change the rules — for my sake! Meanwhile, other citizens are fearful that granting the code changes for one party will only set a precedent for further requests for exceptions to the code in the future.

This touches on the very purpose of the CD-1 code as spelled out above. If the 24’ limit is deemed the maximum height permissible for structures in the zone, how could a 45’ tall building be justified as “maintaining” the scenic qualities of the ocean front and nearby areas? It would stick out like a sore thumb. The nearby area on three sides of the site is the Oregon Islands National Wildlife Refuge, just feet away. How will “the nature and scale” of this imposing three story structure with its extensive gleaming glass surfaces fit in that setting?

Megan Lawrence <mlawrence@ci.bandon.or .us>

Bandon Beach motel zoning code change additional comments

Robert Schroeter <schroetr345@gmail.com> Wed, May 2, 2018 at 10:40 AM
To: Planning@cityofbandon.org

Hi Megan,
See attached document below with my additional comments on the proposed Bandon Beach motel zoning code text change request.
Bob

Bandon Beach motel zoning code change additional comments reduced.pdf
2339K

Planning Commission
City of Bandon
May 2nd, 2018

Additional comments on code text change regarding property in Bandon at 1090 Portland Avenue.

I'm opposed to the zoning code change that the owners of the Bandon Beach motel are looking to have apply to the lot the own where the Bandon Beach motel is currently located.

As I mentioned before specifically I oppose the change in maximum building height from 24 feet to 45 feet (or 40 feet). A building of that size would be out of scale with all the surrounding buildings in the neighborhood which are all 24 feet or less in height.

Last week I had used a laser measuring device to measure the height of the Sprague Theater in Bandon. The measurements I obtained on the building are shown in the photos below. The tallest part of the Sprague Theater is 45 feet tall (which is the height that the Bandon Beach motel owners are asking for in their code text change request). The main part of the Sprague Theater roof is 30 feet tall. While the height of the gutters on the main part of the roof are 24 feet tall (which is the current height limit allowed on the lot where the current Bandon Beach motel is located and for everything west of Beach Loop Drive).

If you haven't recently stood next to the Sprague Theater, it would probably be good to take the time to do so to get a feel what standing next to a 45 foot building is like to realize how tall it is. Also realize that only part of the Sprague Theater is 45 feet tall while the proposed Bandon Beach motel would consist of a building that is 45 feet tall for the whole length of the building. Also the proposed Bandon Beach motel would have a larger total footprint than the Sprague Theater. Such a building would tower over the surrounding neighborhood and definitely stick out above everything else.

To realize how far away one could see such a building, it would also be good to take a walk out to Coquille Point on the paved trail in the Wildlife Refuge to its farther point west on the trail and then turn around and look back to the east. You'll notice that you can see the top third of the Sprague Theater towering above the trees in the area which is located over 4 blocks away from you at that point. A building 45 feet tall out at Coquille Point would be readily visible at a much greater distance around as there wouldn't be any tall vegetation to screen it from any direction.

As mentioned before the Bandon Beach motel owners also own 4 additional lots in the vicinity which are all located west of Beach Loop Drive. They are taxlots 2000 (NW corner of Beach Loop Drive and 11th Street); taxlots 4900 and 4800 (SW corner of Beach Loop Drive and 11th Street - where the old motel and swimming pool were located that were torn down in 2013);and taxlot 4100 (SE corner of Portland Avenue and 11th Street - where the old restaurant the 3 Gables was located).

All of the above 4 lots are located in the CD-1 zoning and being west of Beach Loop Drive have a building height maximum of 24 feet.

As I mentioned before all of these lots could easily provide for the lodging and restaurant facilities that the Bandon Beach motel owners wish to have and that they could be constructed within the current code requirements for the CD-1 zoning.

The current Bandon Beach motel has 20 units with parking on site at the units. Also all of the units have an ocean view (something that the proposed new Bandon Beach motel does not). A new motel on the site that incorporates similar design features seems like it would be desirable to have - all ocean view rooms and parking on site. Like the old motel, a new one could be designed to incorporate those features while staying within the current zone height restrictions while maintaining the scenic, natural and aesthetic beauty of Coquille Point.

In order to achieve additional lodging as the Bandon Beach motel owners desire they might be better served to construct it on their other lots to take advantage of the positive features that those lots have.

For example on taxlots 4900 and 4800 (SW corner of Beach Loop Drive and 11th Street) there is fantastic views of Face Rock and the ocean looking to the SW from the lot at street level (see photo above taken from Beach Loop Drive at corner of 11th Street looking SW across taxlots 4900 and 4800).

From my estimation one could design/build two story lodging along Beach Loop Drive on these two lots that would consist of at least 16 rooms that would all have views of Face Rock and the ocean from both the first and second stories. The second story building could easily be built within the current 24 foot height limitation. Also an additional 8 rooms could also be built in a two story structure that parallels 11th Street that would also provide the same views of Face Rock and ocean from both levels. Together they would provide a total of 24 rooms that would all have outstanding views of Face Rock and the ocean. There would still be sufficient space for parking within interior area of taxlots 4900 and 4800 that would be on site/next to the lodging on those lots. There also might be space for additional rooms or parking along the western portion of the taxlots if needed.   Access for the lodging could be located off of 11th Street with ingress/egress along the western edge of taxlot 4900.

Set backs along Beach Loop Drive are 20 feet so there would be plenty of room for landscaping to help screen and soften the effect of the motel buildings along Beach Loop Drive. The native tree Shore Pine would be an excellent choice to use for example as it grows well in the area, grows relatively quickly and provides for nice screening and habitat for songbirds and local Douglas squirrels. Currently many parts of the surrounding neighborhood already have mature Shore Pines along Beach Loop Drive and 11th Street (see photos of Beach Loop Drive to the north and 11th Street to the east with Shore Pines that help provide screening to the neighboring houses).

In the above photos you can see how the Shore Pines screen the 28 foot tall house to the right in the first photo and to the left in the second photo.

To the NW of the corner of Beach Loop Drive and 11th Street is taxlot 2000 which is also owned by the Bandon Beach motel owners. This lot also has views to the SW of Face Rock from the northern side of the lot and views of Cat and Kittens Rock from the eastern side of the lot.

Again these views are from the street level so the views could be obtained from both levels of a two story structure. From my estimation one could design/build two story lodging along Beach Loop Drive on this lot that would consist of at least 12 rooms that would all have views of Cat and Kittens Rock and the ocean from both the first and second stories. The second story building could easily be built within the current 24 foot height limitation. Also an additional 12 rooms could also be built in a two story structure along the northern edge of taxlot 2000 that would also provide the views of Face Rock and ocean from both levels. Together they would provide a total of 24 rooms that would all have outstanding views of Cat and Kittens Rock or Face Rock and the ocean. There would still be sufficient space for parking within interior area of taxlot 2000 that would be on site/next to the lodging on those lots.

Photo from Beach Loop Drive along east side of taxlot 2000 looking west/southwest.

Photo from Beach Loop Drive along east side of taxlot 2000 looking west/southwest.

Photo from north side of taxlot 2000 looking southwest.

Photo from north side of taxlot 2000 looking southwest.

Screenshot of Google Earth highlighting the taxlots owned by the Bandon Beach motel owners along with the line of views from the the lots along Beach Loop Drive they own (taxlots 2000, 4900 and 4800) where lodging could be built that would have great views of Face Rock and Cat and Kittens Rock from both the first and second story levels.

The last lot to mention is taxlot 4100 (located at the SE corner of Portland Avenue and 11th Street). This is where the previous restaurant had been located. This lot would also serve itself well for a restaurant location as it has a outstanding view to the west of Coquille Point and the ocean. A one story building would be sufficient here to take advantage of the views and not obstruct any potential views from the lodging built on taxlot 2000. There also would be sufficient restaurant parking on the east side of taxlot 4100 behind the restaurant. This location would also be centrally located to all the potential lodging that could be built on the other four taxlots.

In summary it seems to me that there is ample opportunities for the Bandon Beach motel owners to develop high quality lodging and restaurant facilities on all the properties they currently own near Coquille Point. They also would be able to do so within the current zoning codes without impacting the area and surrounding neighborhoods as what would happen with their zoning code text change request.

Also they could potentially have up to 68 rooms or more of lodging across four of their lots with a restaurant on their fifth lot which is more capacity and would be less visually impacting to the surrounding area than a 45 foot tall motel would be.

For the above reasons I think the Plannng Commision should reject the request for a zoning code text change.

Bob Schroeter
345 Laurelwood Drive
Jacksonville, OR 97530
(owner of house and property at the corner of 11th Street and Beach Loop Drive in Bandon, OR)

Megan Lawrence <mlawrence@ci.bandon.or.us>

Fw: Beach Loop Motel, Portland Ave.

William Turner <wdturner32@yahoo.com> Wed, May 2, 2018 at 6:26 AM
Reply-To: William Turner <wdturner32@yahoo.com>
To: Megan Lawrence <mlawrence@ci.bandon.or.us>

On Wednesday, May 2, 2018 6:22 AM, William Turner <wdturner32@yahoo.com> wrote:

Mary,

Just returned from my morning walk around Coquille Point. Bright moon, out going tide. Absolute natural beauty.

While walking, I am thinking about the "45 foot motel" zoning.

Mary, we the public, the people of Bandon need to start thinking way, way larger than we are. We are down in the pits slugging through issues with swimming pool people, motel people. We are thinking on way too narrow of a scale.

The swimming pool people are bold as brass. They are not afraid to step up and declare --- "We want a pool in city park!"

The Bandon Dunes people are bold as brass. They are not afraid to step up and declare-- "We want a 45 foot motel!"

Well, Mary, let's be bold as brass and step up with our own idea. Nothing ventured, nothing gained.

The concept of the operation. Are you sitting down?

We, the people of Bandon, "partner" with the Federal government (Fish and Game, who ever) and work to gain the deed to the Bandon Beach Motel on Portland.

Having the deed in hand the old motel is then demolished and the lot put back to nature, landscaped.

Surely, there are people in Bandon that can see several ways this land acquisition could be accomplished.

Here are my ideas:

1. First, we put the zoning vote for the "45 foot" motel on hold for one year.
2. Second, we go to our Federal Government man, Peter DeFazio. Selling him on the idea of Coquille Point being a "national treasure". The Beach Loop Motel property is bought by the Federal government, the motel demolished. Some where in there the Department of the Interior, Wild Life, Fish and Game come into play.
3. Third, we the people of Bandon go to the Bandon Dunes people with a 'bold -as-brass" idea. They want a "45 foot" motel. Fine. We approve the "45 foot" zoning with the stipulation the new motel is built on the site of the old demolished motel, the south west corner of Beach Loop and 11th St SW. The current Beach Loop Motel is deeded to the City of Bandon. We demolish the motel and land scape the property.

If ideas Two and Three don't pan out to our liking the Bandon Dunes people can forget their "45 foot" idea and build to current code.

Be bold as brass. They want something. We want something.

Think big!!

Will Turner
1040 Jackson
Bandon

Bandon City Planning Commission
Re: Comments on Bandon Beach Hotel Project
May 2, 2018

Dear Planning Commission Members:

On the evening of April 26, 2018, my wife and I attended the public hearing on the Zone Code Text Amendment for the Bandon Beach Hotel. I went to the hearing get a better understanding of the scope of the project and at that time had no opinion either way, pro or con. After listening to Chris Keiser, his attorney, and numerous Bandon residents share their thoughts, it became very apparent that legitimate issues were being raised regarding the project. While I have no doubt the Keiser family has the best intentions and I appreciate all that they do for Bandon and the area, and I understand there will be some benefits to the community, I have some serious concerns. First and foremost, I object to the proposed building height of 45 feet. It would look totally out of place, would dominate Coquille Point, and being as far out on the point as it is, it would be visible for miles. It would not be in compliance with the Bandon Comprehensive Plan, nor would it be in character with the quaint "look and feel" of Bandon, which is one of the reasons we chose Bandon as our new home in 2016 over all of the other towns on the southern Oregon coast we considered. We visited Bandon when we lived in Roseburg for nine years and it easily became our favorite beach town because of the way development was carefully controlled.

Putting myself in the shoes of the residents in the immediate neighborhood of the hotel, I would not want a larger building blocking my ocean view. And I don't believe the commission members would either if they were put in that situation. Not only is the view precious, it also has intrinsic value as any realtor will tell you. Homes with an ocean view always command a higher price. I'm surprised no one at the hearing mentioned how the loss of the view would devalue their property, as it most certainly will. Loss or reduction of an ocean view would be a significant impact on the neighbors.

I also have concerns about the up to 75% impervious surface and the proposed setbacks. Water must be directed into the city storm water system or dealt with in some other effective way in order not to cause erosion or drainage problems. The hotel should abide by the current setbacks.

Looking at an alternative approach to get the 48 rooms the Keisers would like to have to ensure the business is sufficiently profitable and still keep the building to two stories, perhaps they should consider a land exchange with the US Fish and Wildlife Service. In particular, perhaps the land just to the north of the current hotel's location might work. I understand the Keisers own other bluff-front properties adjoining the National Wildlife Refuge that might be suitable for an exchange.

In summary, I believe the ordinance limiting building height to 24 feet in the CD-1 Zone should be applied fairly and equitably to ALL property owners, and not be modified arbitrarily to suit the needs of only one. It's the right thing to do for your constituents and for the community as a whole. I honestly don't feel the majority of Bandon residents want the town to end up looking like Lincoln City or one of the other numerous highly developed beach towns. Please be aware I'm not anti-development, I'm simply asking the Planning Commission to ensure we have responsible development.

Respectfully,

Bruce E. Williams

Bruce Williams
601 Seabird Drive SW
Bandon, OR 97411

APRIL 30, 2018

TO: PLANNING COMMISSION
RE: PROPOSED HOTEL

I WAS **NOT** ABLE TO ATTEND THE MEETING ON APRIL 26TH DUE TO MY DAUGHTERS ILLNES.

I DO WANT TO LET THE CITY KNOW THAT RECENTLY THE VACATION RENTAL SOUTHWEST OF ME AND JUST ACROS THE STREET (EAST) OF THE PROPOSED HOTEL HAD OVER 20 CARS PARKED ALL OVER THE STREET (11TH) AND SOUTH ON PROPERTY FORMERLY THE GORMAN MOTEL — PLUS A LARGE VAN FILLED WITH CHAIRS AND SOME HUGE YELLOW BALLOON DUCKS — IT WAS DIFFICULT TO EVEN SEE 11TH STREET. NOISE, TRAFFIC! IF THE HOTEL IS ALLOWED , WILL BE SO MUCH WORSE!

IT USED TO BE THAT CHILDREN WERE BUSSED TO COQUILLE POINT!

NOT ANY MORE!!

SEA USED COQUILLE POINT TO WATCH THE WHALES.

LABYRINTHS IN THE SAND ON THE BEACH FOR THEIR DRAWINGS – NOW THEY USE FACE ROCK!

STAIRS ARE NOT SAFE! SUMMER WILL BRING LOTS OF TRANSIENTS !!

THIS WILL CAUSE LOTS OF PROBLEMS TO RESIDENTS AND THE CITY.

PLEASE SAY NO!!!

ANN O'SULLIVAN
P.O. BOX 7437 (1030 BEACH LOOP)
BANDON, OR 97411 — SINCE 1927!

Coquille Point

joybautz <joy_bautz@comcast.net> Mon, Apr 30, 2018 at 8:58 PM
Reply-To: joybautz <joy_bautz@comcast.net>
To: planning@cityofbandon.org

To whom it may concern,

I am pleading with you to stop this developer. This developer has already broken FEDERAL law by encroaching on a Wildlife Refuge. If you allow them to make an exception, they will come back again and again needing just one more exception for this and just another for that. Do not allow them to chop away your city to the point that this community loses its identity. Do not sacrifice this coastal community. Preserve the sanctity that defines The Oregon Coast. A purpose that is much bigger than commercial development. The beauty that is Bandon Oregon must be held to the highest standard.

Joy E Bautz

Standing up for the conservation of the Oregon Coast

Megan Lawrence <mlawrence@ci.bandon.or .us>

Bandon Beach Hotel

Steve Buck <steve@stevebuck.net> Tue, May 1, 2018 at 5:40 AM
To: planning@cityofbandon.org

To Planning Dept, City of Bandon.
I own a house and a duplex in the Bandon city limits. Although I welcome the thought of the Bandon Beach Motel being replaced with something new, the zoning rules should not be changed for one project in one location by a special interest group. A few feet higher might be okay, but the 45 foot height limit is too much.

Sincerely,
Steve Buck
777 Beach Loop Drive

Larry E. & JC Cagle
3870 Grant Pl
Bandon, OR 97411

RECEIVED
APR 30 2018
BY

April 30, 2018

Bandon, OR Planning Commission
Re: Application 18-003-Zone Code Text Amendment-Brandon Beach Hotel

Dear Honorable Commission Members,

Thank you for the opportunity to attend the recent meeting and public comments. We are the ones you requested to speak last. Those who began the meeting with a neutral mind set. We did not raise our hands because we didn't feel ready to comment at that time. But, having heard both sides and giving this matter serious consideration we are absolutely opposed to the "Zone Code Text Amendment" for the Bandon Beach Hotel. There are many reasons for this and I am sure you are aware of them all. We will highlight a couple that we feel are paramount.

1. There is no compelling reason to change, amend, or give variance to the established zoning codes for this property, nor have we heard any valid reason to do so.
2. To change the zoning regulations would be effectively nullifying the code regardless of statements to the effect of "Only this one". Also, it is simply unjust, "unfair", to other landowners who have complied and will comply with the codes in the future.
3. The proposed type of structure can be built within the existing codes on the property owned by the requester.
4. Bandon is a unique place and does not need to aspire to attract a "higher level of visitors", or to be like other overdeveloped cities. The existing code is a good compromise for maintaining the livability and unique character of this city. The proposed structure would be nothing more than, for lack of a better word, an atrocious eyesore on the shoreline bluff.
5. While we do not fault the developer for trying to advance their ideal business model, if they really cared about the welfare of this city they would not request this change and would simply build within the existing code.

As you know, there are other objections to this change as well. We appreciate your accepting our input and respectfully request that you forward a negative recommendation concerning this proposal to the City Council.

Respectfully,

Larry E Cagle
JC Cagle

BANNER
BANK

To Bandon City Council Members and Fellow Bandon Citizens,

My name is David Hisel and I am the local Branch Manager for Banner Bank. I have lived in Coos County for nearly two decades now, and most recently in Bandon for the last 6 years. I am fully committed to this community and serve it with all of my heart, and most of my free time. I currently am a member of the Bandon Economic Development Committee, a sub committee of the Greater Bandon Association. I serve in youth sports and community programs all throughout the year. I am active on the Board (s) for Bandon Youth Baseball, Bandon Youth Soccer, Bandon Kiwanis, Chairman for Bandon YoungLife, as well as a Bandon Rotary member. I support this community with my time and financial resources in many other ways as well.

I say all of this in hopes to have a "vested" community member such as myself have their voice heard and stance considered sincerely.

I am in full support of the proposed Bandon Beach Hotel project and am in support of making the necessary zoning adjustments to accommodate them.

When you drive or walk to the end of 11th ST, which I often do several times a week, you tend to just feel like you're hitting a dead end, and an eye sore at the very least. No doubt the Pacific Ocean is one of the most beautiful things to see, but the Coquille Point area looks sad and lacking. There is a very small parking lot, which often times is full of tourists and has no spots available. There are no bathrooms, which makes it difficult for families with children to visit long. There is no beautiful landscaping to match the beautiful ocean, and lastly you have to look at one of the ugliest motels in the area sitting right on the purposed site for what could be a top notch hotel.

I have listened to people on both sides of the argument, and quite frankly there is no good reason that I have heard to slow down or stop this project. There has been careful planning to address all of the valid concerns from local citizens and not to mention the great value added to the USFW and the general public. Bandon needs projects like this that will make our city more attractive and give us access to better and more abundant facilities and accommodations.

Let's make Bandon a better place to live and a better place to visit! Please pass the zoning request and help move this project forward!

Sincerely,

David Hisel

Megan Lawrence <mlawrence@ci.bandon.or .us>

Fwd: Additional Comments to Zone Amendment

John McLaughlin <jmclaughlin@ci.bandon.or.us> Mon, Apr 30, 2018 at 3:47 PM
To: Megan Lawrence <mlawrence@cityofbandon.org>

---------- Forwarded message ---------
From: Ben Fisher <ben@toadly.com>
Date: Mon, Apr 30, 2018 at 1:28 PM
Subject: Additional Comments to Zone Amendment
To: John McLaughlin <jmclaughlin@ci.bandon.or.us>
CC: Mary Schamehorn <marys@coosnet.com>

John, please share these comments as part of the Commission hearing on the Bandon Hotel zone amendment.

Ben Fisher

April 30 Panning Commission.docx
13K

April 30, 2018

To: Bandon Planning Commission

From: Ben Fisher, 550 11th St SW, Bandon

Subject: Zone Text Amendment - Bandon Beach Hotel

Commissioners:

I take issue with several assertions made in the staff report and urge a NO vote on the proposed amendment.

The report touts that the unique combination of the natural beauty of the site and “a known developer in the region of means and quality” make for a project that the community will be proud of for many years to come. This sounds a bit like favoritism directed to a developer with significant history and holdings in the area. The City should be mindful that playing favorites or cozying up to wealthy developers is not always in the best interest of the community, even if repairs to the federally owned stairways and new sidewalks are promised.

I disagree that the proposed amendment does not set a precedent for other developers. Similar properties along Beach Loop, Queen Anne Court, for instance, are off of Beach Loop Road enough that a 45 foot tall building could be erected using the same principles as noted in the staff report. Don’t open a door you can’t close.

In regards to parking, it seems to me that putting in a parking lot well east of the proposed hotel would in no way guarantee that guests will use it. Most people will use the existing parking at Coquille Point; it is a shorter walk to the hotel and will give guests that “Aha” moment as they drive in. People that are visiting the refuge and beach will be forced to park in the new east lot and walk to the beach. That’s not the intended use of the existing parking lot. The applicant needs to come up with a better plan.

The staff report contends that there won’t be any significant impact to traffic, as in the mid-late 20th century the Three Gables restaurant and a second motel were on properties owned by the applicant. While it’s true that these business existed, they did not have the occupancy rates that would be expected from a new hotel/dining area in 2018 and beyond. I grew up here, and trust me, the old motel was rarely busy and the restaurant had been mostly vacant since the 1970’s. It’s obvious that there would be traffic issues along 11th Street through the city park and school athletic fields as well as the 11th Street/Beach Loop intersection. The City, and perhaps the applicant, need to find an alternative connector access to highway 101.

In regards to the restroom: If you simply MUST approve this amendment, and I hope you do not, please specify a minimum of a two room restroom unit with two stalls on either side built to ADA standards and access to the public available from 7 AM to 10 PM.

Megan Lawrence <mlawrence@ci.bandon.or .us>

Fwd: The New Hotel @ Coquille Point

John McLaughlin <jmclaughlin@ci.bandon.or.us> Mon, Apr 30, 2018 at 3:43 PM
To: Megan Lawrence <mlawrence@cityofbandon.org>

---------- Forwarded message ---------
From: G Zuk <gzuk@outlook.com>
Date: Sat, Apr 28, 2018 at 3:25 PM
Subject: The New Hotel @ Coquille Point
To: jmclaughlin@cityofbandon.org <jmclaughlin@cityofbandon.org>

I am very much in favor of the new hotel being built by the Kaiser's on the site presently located by the old hotel at Coquille Point. However, the height ordinance of 24 feet is going to be increased to 45 feet just for this hotel, as iunderstand it.

I feel that you MUST either give everyone who constructs a new building the exact same height variance or do it for no one!

By giving this height variance to a hotel builder when other private home builders have been made to follow the 24 foot rule smacks of unfairness and favoritism. I do not care how beautiful the new hotel might be, how influential and wealthy the Kaiser's are, or how much money they have given to the Bandon area, they should not be given this height variance unless the City Planners are going to grant it to every citizen.

Linda K. Frick
1140 6TH ST NE, #A
Bandon, Oregon

Re: Addition to New Bandon Beach Hotel - zone code text amendment testimony

1 message

Pam Jenson <pjenson@hotmail.com> Mon, Apr 30, 2018 at 5:26 PM
To: Dana Nichols <dnichols@ci.bandon.or.us>

Please consider the following comments before the planning commission makes a decision.
#1 The project will not necessarily bring more long term jobs to the area. During the past three weeks in the Coffee Break, nearly half the motels in town have advertised for openings in the lodging industry. In the April 26th issue, most of those motels are still looking to fill those positions. Last year, many of those job openings were still unfulfilled in September (according to the Coffee Break). These are entry level jobs and Bandon already has a definite shortage of affordable housing. So unless, the developer plans on providing housing or a starting wage of $15 per hour, more than doubling the number of rooms would only seem to complicate and compound an already existing problem.
#2 My husband has a viable solution that would protect the views of the property owners, locals, and tourists alike. Use the footprint of the present property to build a two story, 24' height hotel that conforms to the limitations of CD-1 zoning. If the open area on the bottom floor that now exists, were built as rooms and rooms built on the area of the existing parking spaces, perhaps that could add an additional 10-15 rooms. Granted, the developer's vision might have to be scaled back and the financial rewards would not be nearly as great. Please remember the property owners were in that area long before the developer purchased the Gorman Motel. Their rights to the ocean views that were more costly should be carefully considered and protected. Please stand FIRM and do NOT recommend a zoning change text amendment.
Sincerely,
Mike and Pam Jenson
Property owners since 2002, Residents since 2013
Dana, please let me know that you have received this email. Thanks
On Apr 19, 2018, at 9:35 AM, Dana Nichols <dnichols@ci.bandon.or.us> wrote:

Hi Pam,

April 27, 2018

Planning Department

RE: Comments relating to Application 18-003 Zone Code Text Amendment

VOTE – YES – to change the Zone Code

Rationale:

- Bandon Dunes is a class act and would construct a nice facility versus the run down look of the present hotel and many properties on Beach Loop.
- Bandon needs a nicer hotel on Beach Loop for our seasonal guests. Many of the current Bandon hotels are old with antiquated plumbing and dark interiors. The exception is The Bandon Inn.
- Bandon Dunes has voluntarily increased their Lodging tax to benefit the City Of Bandon and promote our tourism industry. Other hotels have not.
- The facility would generate increased income and local jobs, including construction and additional staff jobs.
- A nice restaurant on Beach Loop with reliable hours is needed. Bandon Bills restaurant closed years ago. Lord Bennett's closes in the off-season and is not open for breakfast or lunch. Tourists driving and renting houses on Beach Loop would also benefit from a nice restaurant on Beach Loop.
- Real estate on the coast is very expensive; modifying the City's height restriction for this commercial property is a progressive change.
- Make the height variance language very specific to this property. If there is "added value" to the City, the height restriction may apply to other properties.
- Opponent's don't like the modern glass look and want "woodsy" and "quaint". We have Lloyds and the Toy Room façade for that.
- Guests stay along the coast for the view. The modern glass look will maximize the views, much more than the current hotel views.
- A new construction of steel and modern materials will be more earthquake, fire resistant and energy efficient.
- Opponents complain that the view will be compromised. The removal of the old hotel on 11th and Beach Loop and the old closed restaurant has already improved the view.
- Many of the trees along Beach Loop impede the view more so than the building height.
- It is inevitable Dunes will be expanding the Resort – new course, tournaments, etc. Bandon will need additional new lodging for fans, press, and golfers. Sending tourists down the road to Coos or elsewhere is not a very smart business decision.
- Dunes will be adding additional features such as more Coquille Point parking and a public access bathroom that currently are not there. These are not necessarily warranted, but are a positive factor.

Thank you for considering these comments.

Steve and Rita Kuehn
1417 Pelican Place
Bandon, OR 97411

Megan Lawrence <mlawrence@ci.bandon.or .us>

Bandon Beach Hotel

Mike Mueller <mulegrow@yahoo.com> Sat, Apr 28, 2018 at 9:17 AM
Reply-To: Mike Mueller <mulegrow@yahoo.com>
To: "planning@cityofbandon.org" <planning@cityofbandon.org>

Planning Department

As an active bird watcher in Coos County. One of my favorite place to observe birds is Coquille Point located at the end of 11th street in Bandon. I have observed nesting birds around the stairs leading down to the beach and also between all of the paths located on Coquille Point overlook where all the information kiosk's are located. The nesting begins in the spring and lasts through the summer. More noise created by more people with more cars equals too more disturbance to these nesting birds that are only trying to live in the present safe & peaceful environment created for them at Coquille Point. My suggestion to the Bandon Beach Hotel developers is to demolish the present motel and make that spot a nice parking lot with restrooms. And then move the two story hotel east on 11th street and build on the empty lots located there where they are planned for hotel parking. Having that hotel move back would created the most awesome open space in Bandon forever.

Thanks for listening!

Mike
mulegrow@yahoo.com

Megan Lawrence <mlawrence@ci.bandon.or.us>

Public Comment: Zone Code Text Amendment - Bandon Beach Hotel

Richard Poecker <rpoecker@icloud.com> Mon, Apr 30, 2018 at 10:57 AM
To: planning@cityofbandon.org

To the City of Bandon Planning Department,

We own and occupy residential property full time in Bandon, and appreciate the natural beauty combined with mostly sensible attractive development found in Bandon.

We do not support the zone code text amendment regarding application 18-003 to modify the CD-1 zoning text to allow for increasing a building height to 45 feet, side and rear yards of 5 feet, 55% lot coverage with up to 75% impervious surface. This change is to accommodate the development proposed for the property where the current Bandon Beach Motel is located.

But wait: This is a zoning change, and not just a one time zoning variance. A zoning change done for exclusively one property will not stay that way. Changing the zone code in the CD-1 zoning will surely open up the “pandora’s box”, as the other property owners, particularly along Beach Loop, will then also want to develop their properties with similar building heights. If the city just tries to hold this zoning change to one property with CD-1 zoning, it would likely lose this case, when challenged in court by other landowners.

Bandon is not, nor do we want it to become, another Lincoln City….that is all too common in other coastal areas in the United States. There are attractive and responsible ways of having both residential and commercial development, and we wish for Bandon to continue to pursue that direction through wise choices in accommodating future development. Starting down a path to develop Beach Loop Drive with buildings up to 45 feet in height creates a whole different vision for Bandon, for both its residents and the people who choose to vacation here that prefer having a beach not lined with high rise motels and condos.

Please vote “NO” on the zone code changes.

Thank you,
Richard and Elizabeth Poecker
Natalie Way, Bandon

Written statement for my stance on the proposed Bandon Hotel

5 messages

Sally Jurkowski <sallyjurkowski@gmail.com> Thu, Apr 26, 2018 at 10:29 PM
To: dnichols@cityofbandon.org

Dear Planning Department and Planning Committee:

I spoke simply at the planning meeting tonight. I decided at the last minute to actually address you and I wasn't as prepared as I should have been, therefore I wasn't particularly persuasive, or detailed in my presentation.

I am still of the opinion that the Planning Department, and the Kaiser Organization have been following a process to elicit public input in this process. I am extremely pleased to have the chance to hear the proposal for the new Bandon Hotel, and respond with my input, as well. I did not attend the July 2017 meeting, however, I was present in March of 2018, and April 26th, 2018. Both times I have been impressed with the willingness of all parties to present information, evaluate public input and then revise the plan.

As I stated at the meeting, I started coming to Bandon in 2007. My oldest daughter, and her then husband lived here. In fact, we stayed with them on Beach Loop in their rental house across from the now razed Gorman Motel. It was an eyesore and I am so glad that the right decision was made to eliminate it. Now I believe it is time to replace the current Bandon Hotel, too. This time, however, I believe the change in height of the building is justified. The larger size hotel will allow for more guests, the beverage restaurant, and much needed public restrooms.

I do understand that change is hard for the neighbors, however, the greater good needs to be considered. I visit the ocean frequently with my grandchildren.(My grandson wanted to accompany me to the meeting, therefore, he was with me.) There are no public bathrooms at that location. It would benefit families to have them available. The proposed educational information would also be beneficial as it would assist in reaching more visitors with important facts that could help protect our shores and wildlife.

When I visit the beach, I have left the 3rd Street, S.E. location, where there is less wind. I know that I may encounter more brisk winds at the beach, however some days, the difference is more noticeable. I believe it would be helpful to be able to buy a hot beverage right onsite. I know that I am not the only person that would benefit from that chance.

The positive impact on the area in regards to economics is important, too. I am not one to want a huge increase in the number of hotels in Bandon, however, a new hotel would be a welcomed addition. Tourism is important to our retailers, as I know from the occasional work that I do at Winter River Books. Personally, I find the tourists delightful and interesting. It broadens my mind when I talk to visitors from other locations. I always learn something from them, too.

I was at the meeting long enough to hear some of those opposed to the project argue that no compelling reason was given to allow for the additional height for the proposed hotel. I know that Kaiser, and the Planning Department, have been listening to citizens and working on a compromise from the original plan. I also heard Kaiser speak in regards to needing the larger hotel to sustain it economically, if the public features were to be added. I believe that was discussed in the March meeting. That makes sense to me. It is my opinion that the positives outweigh the negatives in allowing for the additional height.

I regret that I left during the public input from those who oppose the height increase, however my five year old grandson was getting restless. I plan on attending the next meeting without him so that I may hear the entire meeting.

Respectfully,

Sally Jurkowski
1094 3rd. St. S.E.
Bandon, OR 97411

Dana Nichols <dnichols@ci.bandon.or.us> Fri, Apr 27, 2018 at 10:24 AM
To: Sally Jurkowski <sallyjurkowski@gmail.com>

Thanks, Sally! I will pass this on to Megan to add to the record. Good to see you last night! Oh, and adorable grandson you have :)

[Quoted text hidden]

--

Dana Nichols | City Planner
City of Bandon
541.347.2437
www.cityofbandon.org

Megan Lawrence <mlawrence@ci.bandon.or .us>

Bandon Beach Hotel

William T urner <wdturner32@yahoo.com> Mon, Apr 30, 2018 at 8:26 AM
Reply-To: William Turner <wdturner32@yahoo.com>
To: "planning@cityofbandon.org" <planning@cityofbandon.org>

Hello,

I am strongly opposed to changing the building code to accommodate a 45 feet tall building on west 11th street. There are none, not one, huge, over riding benefit to the people of Bandon to approve this request for a code change.

These people (I'll call them Bandon Dunes) knew, were aware, of the building code standards when they started planning this project. Yet they continued pouring dollars into the project on the hope Bandon City would cave in and change the rules. For example: The city building codes at Hilton Head Island, SC and Edgartown, MA (Martha's Vineyard) are written in stone! Absolute and forever! Do not ask those two cities for a "code change".

There is a solid reason Hilton Head and Edgartown have the most stick building codes in the nation -- TRADITION !! "the transmission of customs or beliefs from generation to generation". National treasure!! Bandon Beach Hotel is located exactly on the edge of National Wild Life Refuse land. Coquille Point is a treasure every bit as valued as Hilton Head or Martha's Vineyard. Even more so, in my opinion. The view of the Pacific from Coquille Point is every bit as spectacular as any view in the world. My point? Once Bandon Dunes builds a 45 foot tall motel, the appearance of west 11th St and Coquille Point is altered, irrevocably, FOREVER!! The homey folksy charm and beauty are gone FOREVER. A 45 foot tall motel will transform Coquille Point into the appearance of a WalMart parking lot. An elephant in the room.

West 11th St will turn into a Lincoln City, Newport or Seaside. And this is just the first 45 foot tall request. The second? The third?

If Bandon Dunes wants to build a 45 foot tall motel, why not build it on their property north of Bandon. Their golf course complex has TWO driving ranges. Use one of the driving ranges to build the 45 foot tall motel. Bandon Dunes has a 3 acre putting practice course, put the 45 foot tall motel on the west half. We could drive around Bandon Dunes golf complex and find three or four suitable building locations. Bandon Dunes has half a dozen options without changing Bandon City building codes. Bandon Dunes could always ask the city planning board at Martha's Vineyard for a 45 foot tall motel.

NO over riding benefit to the people of Bandon.

A national treasure marred FOREVER.

Bandon is charming for a reason ---- Bandon looks like Bandon!!! Keep it that way!

William Turner
1040 Jackson St
Bandon, OR

Megan Lawrence <mlawrence@ci.bandon.or.us>

45 feet tall motel

William Turner <wdturner32@yahoo.com> Mon, Apr 30, 2018 at 12:19 PM
Reply-To: William Turner <wdturner32@yahoo.com>
To: Megan Lawrence <mlawrence@ci.bandon.or.us>

Megan,

Just to share a tad more info. on the Bandon Beach Motel zoning.

Mayor Mary and I have exchanged ideas on this issues and we find some common ground.

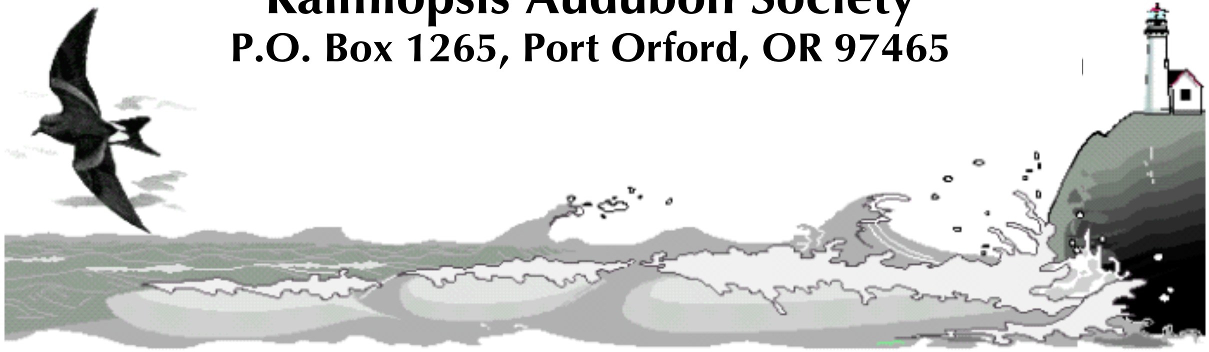
Mary and I agree that, as it stands the Beach Motel lacks "curb appeal". That is the modern phrase that replaces "the place is an eye sore" or "ratty dump".

I am all for Bandon Dunes remodeling/replacing the current Bandon Beach Motel with an attractive, modern motel that could show case the west end of 11th St.

To be clear, I oppose the "45 feet high" idea. To be clear, I am all for a modern attractive motel build to current zoning rules.

Will Turner
1040 Jackson St
Bandon, OR

Kalmiopsis Audubon Society
P.O. Box 1265, Port Orford, OR 97465



April 30, 2018

City of Bandon Planning Commission
555 Highway 101
Bandon, OR 97411

Re: Item 4.1 Zone Code Text Amendment- Bandon Beach Hotel

Dear Bandon Planning Commission members:

I am writing on behalf of the Kalmiopsis Audubon Society. Our group has more than 350 members, mostly in Curry County but also some in Bandon, who are concerned about habitat for birds, and so we are concerned about the proposal before you for a variance that will ultimately allow for construction of a larger hotel proposed within the footprint of the Coquille Point National Wildlife Refuge —an area protected for the express purpose of safeguarding nationally-significant offshore seabird colonies.

Although we recognize that approval of the actual hotel plan is not under consideration at this time, approval of the variance will open the way for future approval of the hotel, and so it makes sense to consider the potential ramifications from the outset.

Unique seabird colonies

The large rocks offshore from Coquille Point are not only stunningly scenic but they also provide critical resting and breeding habitat for a large number of seabirds, including Pelagic and Brandt's Cormorants, Common Murres, Pigeon Guillemots, Cassin's Auklets, Black Oystercatchers, and perhaps most significant, Leach's Storm Petrels and Tufted Puffins. The Petrels and Puffins are especially unique because they create burrows for their nests. There are only a limited number of offshore sea stacks that provide conditions suitable for these burrowing breeders so they can't simply move somewhere else. The offshore rocks at Coquille Point have been recognized as an "Important Bird Area."

The location of these remarkable colonies close to Coquille Point has provided a rare opportunity for people to view these otherwise difficult to observe seabirds. The point is noted on the Oregon Coast Birding Trail. Indeed, seabirds and migratory birds related to the National Wildlife Refuges in the Bandon area have become important and popular attractions. The Tufted Puffin is even a mascot for Bandon Dunes.

Impacts to seabirds already facing stresses

We are particularly concerned about impacts to Tufted Puffins, the most charismatic seabirds of our region, which are already experiencing declines likely owing to reductions in the abundance of the small fish and invertebrates they eat, a trend related to the Oregon "blob" and warming sea water temperatures. We are concerned that adding extra stress from disturbances on the mainland, such as extra noise and lights, during breeding season could affect the likelihood of these birds to persist at this site into the future.

In addition, we are concerned about impacts to Storm Petrels, which fly in and out of their burrows under cover of darkness and are known for their propensity to become drawn to and confused by artificial lights at night, in some instances leading to mortality, especially of young birds after they fledge.

Thus far the seabird colonies at Coquille Point have managed to thrive despite their nearness to the city of Bandon owing in large part to the dark and protected buffer that has kept the Bandon headlands undeveloped. It's important to not take the value of this open space for granted.

Likely disturbances to result from variance

Based on the preliminary sketch provided by the applicant, the primary potential disturbances from the proposed 3-4 story hotel will be:

- strikes related to the glare and reflectivity of the hotel's expansive bank of oceanfront windows;
- artificial night-time lighting;
- the greater presence and activity of vehicles (with disruptive car alarms and bright headlights) and people; and
- proximity of trash and the predators it can attract, to the refuge site.

The variance for increased height allowance and reduced side yard area will amplify all these impacts.

The bank of reflective windows will be much larger with the variance that allows a 45-foot structure than would otherwise be allowed. The 45-foot height will also create a need for taller lighting fixtures that will be more likely to be disruptive. The larger building size and hotel capacity will mean more visitors and more cars than would otherwise be allowed with the established lower height limit, and more trash, too. The reduced side yard areas mean that visitors will use the public lands of the National Wildlife Refuge as the side yard for their incidental outdoor use, which will likely increase use and activity at night.

Some of these impacts have the potential to be mitigated, and if the Planning Commission does choose to permit this variance, we request that the applicant take seriously the need to mitigate in order to protect our seabirds into the future. Keep in mind, a smaller sized facility (within current zoning) would have fewer impacts, and a facility on the east side of the road would have fewer impacts.

Applicable criteria

The *Bandon Comprehensive Plan* wisely recognized the important value of this open space to the National Wildlife Refuge when it established the following requirement: "When property within 100 feet of the Refuge boundary is proposed for development, the applicant shall demonstrate that the proposal will have no adverse impact on the function of the Refuge." For reasons listed above, we are concerned that the applicant will not be able to meet this criterion.

Conclusion

In weighing this variance, we urge the Bandon Planning Commission to consider the potential direct and cumulative impacts to sensitive seabirds into the future.

In this age when wildlife faces more and more stress, and incrementally increasing harms by "a thousand cuts," we need to pause and thoughtfully consider each cut. Is there another location across the road that can provide similar visitor amenities and economic benefit to the applicant with less impact to the one-of-a-kind seabird colonies at Coquille Point?

If the Commission does allow this variance that will open the way for a future hotel proposal, please know we will urge the Commission to require that any development at this site meet the highest standards for bird safe building strategies with regards to windows; the highest lighting standards that minimize skyglow and light trespass into habitat areas; and specialized conditions for managing traffic lights and trash disposal. We hope that the applicant will be receptive to making design adjustments in order to mitigate adverse impacts to the important nearby seabird colonies.

We request to be put on a mailing list for future proposals at this site.

Thank you for considering our perspective.

Sincerely,

Ann Vileisis

Ann Vileisis
President

Bandon Beach Hotel--zone code amendment

1 message

Ann Vileisis <annvil@earthlink.net> Mon, Apr 30, 2018 at 8:51 PM
To: dnichols@ci.bandon.or.us

Greetings,

Some of our Audubon members in Bandon have alerted me to the proposal before your planning commission for a variance to allow for a larger hotel at Coquille Point. I am aware that the record was left open, and so I have attached a letter from our organization that I would like to submit to the record for this decision.

Please let me know that you have received this (and that I am sending it to the correct place).

Much thanks

Sincerely,

Ann

Ann Vileisis
President
Kalmiopsis Audubon Society
P.O. Box 1265
Port Orford, OR 97465

541-332-0261
www.kalmiopsisaudubon.org

KAS to City of Bandon Planning Commissioners,4.30.2018.pdf
140K