



# San Juan County Community Development & Planning

135 Rhone Street P.O. Box 947 Friday Harbor, WA 98250  
(360) 378-2354 (360) 378-2116 Fax (360) 378-3922  
www.sanjuanco.com

## Shoreline Permit Application

<b>PROPERTY INFORMATION</b>		
Tax Parcel Number: <u>1 5 1 0 2 4 0 0 2 + 003</u>	Shoreline Designation: <u>Rural Residential</u>	
Island: <u>Blakely</u>	Subdivision: <u>Syre Exception</u>	Lot Number: <u>Parcel A</u>
Property Size: <u>10.9(acres/square feet)</u>	Existing Use of Property: <u>Residential</u>	
Water Body: <u>Thatcher Pass</u>		
Directions to Property: <u>South Blakely Island, adj Thatcher Pass</u>		

<b>APPLICANT INFORMATION</b>		
Name of Applicant: <u>Jon Runstad</u>	Telephone: <u>206-447-6407</u>	
	Email: <u>brogj@foster.com</u>	
Address: <u>1201 Third Avenue, Suite 2700</u>		
City: <u>Seattle</u>	State: <u>WA</u>	Zip Code: <u>98101</u>
Name of Agent (if applicable): <u>Joseph A. Brogan</u>	Telephone: <u>206-447-6407</u>	
	Email: <u>brogj@foster.com</u>	
Address: <u>1111 Third Avenue, Suite 3400</u>		
City: <u>Seattle</u>	State: <u>WA</u>	Zip Code: <u>98101</u>

S.J.C. COMMUNITY

<b>DESCRIPTION OF PROPOSED USE</b> (Include separate sheets as necessary)
<u>Runstad Property Bank Stabilization - Bulkhead</u>

NOV 29 2012

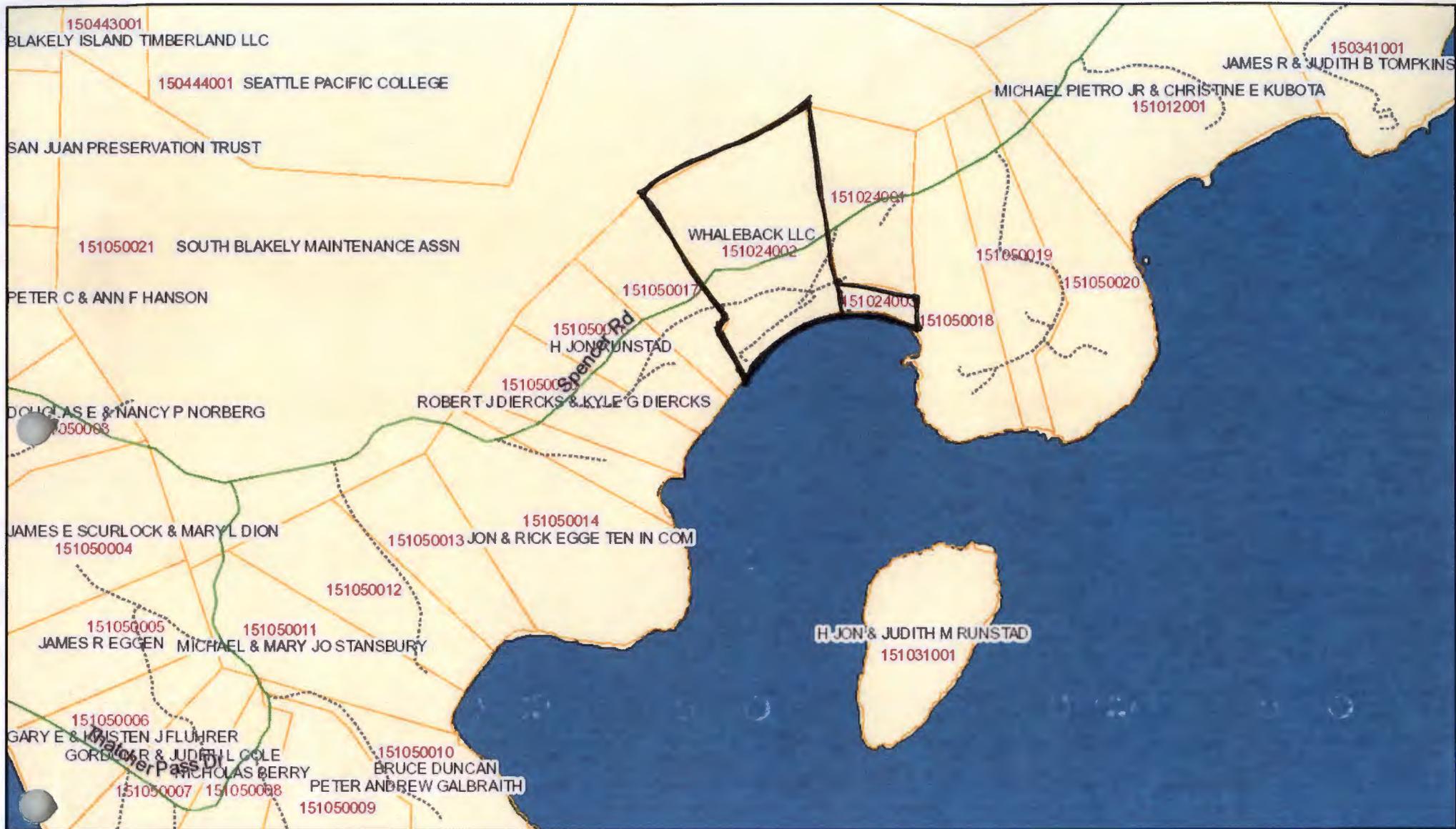
DEVELOPMENT & PLANNING

<b>PERMIT CERTIFICATION</b>	
I have examined this application and attachments and know the same to be true and correct, and certify that this application is being made with the full knowledge and consent of all owners of the affected property.	
<u>[Signature]</u>	<u>11/28/12</u>
Signature of Property Owner or Authorized Agent	Date
<b>Note: If applicant is not the owner a notarized statement is required stating that the application is submitted with the consent of all owners of the property &amp; identifying the owners authorized agent or representative.</b>	

<b>For Community Development &amp; Planning Use Only</b>		
<input checked="" type="checkbox"/> Substantial Development Permit	<input type="checkbox"/> Conditional Use Permit	<input type="checkbox"/> Variance
Date Received: <u>11-29-12</u>	Complete Application: <u>11-30-12</u>	Receipt Number: <u>#</u>

00005460

ST



*This map is a graphic representation derived from San Juan County's Geographic Information System. It is designed and intended for reference only, and is not guaranteed to survey accuracy. Information represented in this map is subject to change without notice.*

## RUNSTAD BANK STABILIZATION

### NARRATIVE ADDRESSING COMPLIANCE WITH COUNTY REGULATIONS

Reference SJCC 18.80.110(H):

***1. The Proposal is consistent with the policies of the Shoreline Management Act and its implementing regulations, Chapter 90.58 RCW and Chapter 173-27 WAC, as amended.***

The State Shoreline Management Act (Chapter 90.58 RCW) provides that it is the policy of the state to provide for the management of the shorelines of the state by planning for and fostering all reasonable and appropriate uses. RCW 90.58.020. Alterations of the natural conditions of the shorelines of the state, in those limited circumstances where authorized, shall be given priority for single family residences and their appurtenant structures. RCW 90.58.020. The Act goes as far as exempting construction of normal protective bulkheads common to single-family residences.

SJCC acknowledges that the provisions of the SJC Shoreline Master Program are adopted pursuant to RCW 90.58.200, which specifies that local governments are authorized to adopt such rules as are necessary and appropriate to carry out the provisions of Chapter 90.58 RCW. As provided in RCW 90.58.900 and SJCC 18.50.010(C)(2), both the Act and the County's SMP shall be liberally construed to give the full effect to the purposes, goals, objectives and policies for which the Act and the County's SMA were enacted and adopted, respectively. See SJCC 18.50.010(C)(2). The County's SMP is adopted pursuant to Chapter 173-27 WAC. See SJCC 18.50.010(C)(1).

The Runstad Bank Stabilization Project ("Project") is a reasonable and appropriate permitted use under the County's SMP. SJCC 18.50.210 (Bulkheads); RCW 90.58.200. Thus, the Project may be permitted under the policies and regulations of the Act and the County SMP. The purpose of the Project is to stabilize an oversteepened and eroding bank that is adjacent to a single-family home and its appurtenant structures, specifically a primary access road, stormwater systems and utilities.<sup>1</sup> Serious erosion is threatening an established use and the bulkhead is the most reasonable method of stabilizing the existing beach and slope condition.

***2. The Proposal is consistent with the policies and regulations of the Shoreline Master Program in Chapter 18.50 SJCC.***

The County SMP specifically regulates Bulkheads. SJCC 18.50.210. SJCC 18.50.210(A)(2) provides that [n]onexempt bulkheads shall be permitted only when nonstructural shoreline protection, restoration, or modification techniques have been shown to be ineffective and it can be shown that one or more of the following conditions exists:

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<sup>1</sup> The Applicant reserves all rights and is submitting this application under protest whereas despite the language of WAC 173-27-040 mandating that an after-the-fact substantial development permit be obtained, no such language appears in RCW 90.58.030(3)(e)(iii). See Also, *AWB, et al. v. Department of Ecology*, Order Granting and Denying Appeal at pp. 13-14 (2001)(Shoreline Guidelines improperly regulate exempt uses under the SMA).

- a. *Serious erosion is threatening an established use on the adjacent uplands;*

The technical memorandum and modeling results submitted by the Applicant and prepared by Vladimir Shepsis, Principal Coastal Engineer, Coast and Harbor Engineering, demonstrates that use of non-structural stabilization methods would be ineffective based on site conditions, including wave energy impacting the toe of the oversteepened slope. *See Coastal Technical Memorandum, Runstad Property – Shoreline Erosion Protection, November 26, 2012.*

The technical memorandum submitted by the Applicant's geotechnical engineer, Garry Horvitz, Hart Crowser, documents that serious erosion is threatening the existing oversteepened slope and the established use and appurtenant structures directly uphill from the bulkhead. Both Horvitz and Shepsis conclude that it is their shared professional opinion that the erosion is caused by a combination of wave runup and overland stormwater flow. *See Coastal Technical Memorandum, Runstad Property – Shoreline Erosion Protection, November 26, 2012 at pp 1-4; Hart Crowser Memorandum RE: Summary of Site Reconnaissance, Runstad Residence, Blakely Island, November 26, 2012 at pp.1-2.*

- b. *A bulkhead is needed and is the most reasonable method of stabilizing an existing beach condition;*

Coastal Engineering constructed two numerical modeling grids to model and document the significant amount of wave energy impacting the bulkhead location. Photos are included in their report documenting erosion scarps and bank failures at the site prior to installation of the bulkhead.

Both experts' technical memoranda directly address why a bulkhead is the most reasonable method of stabilizing the existing beach condition. *See Coastal Technical Memorandum at pp. 4-6; Hart Crowser Memorandum at p. 2.*

- c. *There is a demonstrated need for a bulkhead in connection with water dependent or water-related commerce or industry in an appropriate environment; or*

(Not Applicable)

- d. *A bulkhead is the most desirable method of stabilizing a landfill permitted under this Master program.*

(Not Applicable)

Consistent with the plain language of SJCC 18.50210(A)(2), the Applicant need only show that *one or more* of the foregoing conditions exists. The Applicant has met this burden.

3. *Bulkheads shall not be permitted in conjunction with new projects or development where practical alternatives are available.*

A building permit for the new construction was granted in 2010 and completed in 2011. (Source San Juan County Community Development (2012)). The Proposal was not contemplated as part of the new development, but was implemented in response to an emergency condition brought about by storm conditions during the period December 2010 – January 2011. Nevertheless, the technical memoranda noted above document that no practicable alternatives existed to stabilize the beach condition and slope.

4. *Bulkheads shall be permitted on feeder bluffs only where a (a) a clear and significant danger to established development exists and (b) there is reasonable cause to believe that the bulkhead will in fact arrest the bluff recession and will not seriously disrupt the feeder action or driftway.*

This is not a marine feeder bluff (Source: San Juan County Community Development (2012)).

5. *Bulkheads constructed on Class 1 marine beaches shall be located behind the berm.*

This is not a Class 1 Marine beach. (Source: San Juan County Community Development (2012)).

6. *All bulkheads shall conform to the design requirements of the Washington Department of fish and Wildlife, except where such design would be incompatible with protection of the shore process corridor and operating systems.*

The Washington Department of Fish and Wildlife has submitted recommendations to the County Prosecutor that permit the existing bulkhead to remain “as constructed,” conditioned upon obtaining a Hydraulic Project Approval and completing certain beach nourishment and vegetation mitigation, spawning surveys and monitoring measures. Brian Williams, WDFW, Communication to San Juan County (undated).

7. *Applications for bulkhead permits shall include the following:*
  - a. *Purpose of bulkhead; (See Coastal Memorandum at 6; SEPA Checklist).*
  - b. *Low, normal and high elevations, when appropriate (See Site Plan).*
  - c. *Direction of net longshore drift (See Coastal Memorandum at 6).*
  - d. *Type of construction proposed (See SEPA Checklist; Site Plan).*
  - e. *Elevation of the toe and crest of bulkhead with respect to water levels (See Site Plan).*
8. *Bulkheads shall be prohibited for any purposes if it will cause significant erosion or beach starvation.*

(See Coastal Memorandum at 7).

Consistency with Policies in Chapter 18.50 SJCC:

- *18.50.040(D) The policies listed in Element 3 of the Comprehensive Plan provide guidance and direction and will be used by the County in applying the regulations.*

Element 3 - Applicable Polices:

3.2. Shoreline Goals And Policies

Policy 3.2.A The Proposal is consistent with the Policy Goal of supporting single-family residential uses.

3.3C. Rural Residential Environment

Management Policies include protection and enhancement of the residential character of shoreline development. The Proposal is designed to protect residential development.

3.4B. Clearing and Grading

*3.4B(1) Limit clearing and grading to the minimum necessary to accommodate shoreline development and minimize adverse impacts to water quality and wildlife habitat by means which include but are not limited to site planning, bank stabilization and erosion, sedimentation and drainage control.*

The Proposal is consistent with this policy as it employs bank stabilization and erosion control to address a dynamic slope and beach condition which threatens shoreline development.

3.6B Bulkheads

3.6B(1) Response: The Proposal is “located designed, and constructed with an understanding of how they affect and are affected by wave action.” See Coastal Technical Memorandum.

3.6B(2) Response: The Proposal will have minimal impact on fish and shellfish habitats. Mitigation measures will include the following: beach nourishment (importing gravels); spawning surveys (although WDFW confirms no beach spawning is documented at the site) (Source: WDFW April 11, 2011); shoreline native plantings; and monitoring of the offshore eelgrass bed.

3.6B(3) Response: The bulkhead follows only the contours necessary to provide slope stabilization and thus, minimizes any impacts on scenic quality.

3.6B(4) Response: This is not a publicly owned shoreline property.

3.6B(5) Response: The Applicant has submitted an application that is consistent with the policies and regulations of the Shoreline Master Program (See This Narrative).

### 3.6D Shoreline Stabilization

3.6(D)(1) Response: The single-family home was permitted in 2010 without shoreline stabilization measures. The conditions warranting emergency bank stabilization occurred to the east and below the primary access road beginning in early January 2011.

3.6(D)(2) Response: The Proposal is designed to protect a slope that supports primary access, drainage systems and utilities to a single-family home.

3.6(D)(3) Response: The Coastal and Hart Crowser technical memoranda respond to the issue of the ineffectiveness of soft stabilization methods at the site.

3.6(D)(4) Response: See Above.

3.6(D)(5) Response: The Coastal and Hart Crowser technical memoranda respond to the issue of the appropriateness of the bulkhead's design. Sloping revetments would damage sensitive shoreline vegetation and occur on unstable colluvium.

3.6(D)(6) Response: This is not a publicly financed project.

3.6(D)(7) Response: The Proposal did not involve removal of trees, snags or stumps. The Proposal is designed to stabilize these desirable features on the adjoining slope.

3.6(D)(8) Response: The Proposal includes mitigation measures to address any impacts to aquatic habitat.

3.6(D)(9) Response: The Coastal and Hart Crowser memoranda address why a naturally regenerating enhancement system would not be effective at this location.

3.6(D)(10) Response: Supplementary beach nourishment is proposed as a mitigation measure.

3.6(D)(11) Response: The Proposal is not anticipated to result in beach or bank erosion along nearby shorelines. Several other bulkheads are known to exist off-site on Blakely Island. This proposal mitigates any contribution to any cumulative impacts through provision of beach nourishment and restoration of the nearshore area with native vegetation. In 2011, WDFW did not document surf smelt or sand lance spawning at the site, but such activity will be monitored by the Applicant. The Applicant is also committed to monitoring the offshore eelgrass bed.

### **3. *Consistent with this Chapter (SJCC 18.80.110(H))***

SJCC 18.80.110(h) governs procedures for processing this application.

### **4. *Consistent with applicable sections of this Code (e.g., Chapter 18.60 SJCC)***

Chapter 18.60 (Development Standards) – Clearing and Grading (SJCC 18.60.060)

This provision addresses clearing and grading standards in environmentally sensitive areas. Subsection 18.60.060D(5) provides standards for development activities in these areas are found in SJCC 18.30.160. (See Below)

**Compliance with Critical Areas Standards for Fish and Wildlife Habitat Conservation Areas- SJC 18.30.160.**

(1)a. Mitigation: The Proposal includes implementation of mitigation recommendations of the WDFW, as noted in the Brian Williams communication (2012). These are described in the SEPA Checklist and include beach nourishment, shoreline plantings, spawning surveys, and monitoring of offshore eelgrass beds.

(1)a. Preferred Sequence. Because this is an after-the-fact permit, avoidance of taking any action whatsoever is inapplicable. The Project employed the minimum technical solution based on conditions at the site. The emphasis is on rectifying any impacts, repairing, rehabilitating, and restoring the effected environment, as is permitted under SJCC 18.30.160(B)(1)(a)(iii).

(1)b. As noted above, the Applicant is committed to implement “other appropriate mitigation actions in compliance with the intent, standards, and criteria of this section.”

(1)c. Erosion control methods were employed on the slope above the bulkhead.

(1)d. No further grading is planned associated with the bulkhead. Any grading associated with beach nourishment will be as directed by WDFW.

(1)e. No hazardous substances were or will be introduced into the area. BMPs will be employed during mitigation actions.

**5. *Consistent with Policies of the Comprehensive Plan***

See coverage of applicable Comp Plan provisions in Section 2 (above).

PARCEL B  
TAX PARCEL 151024001

PARCEL A  
TAX PARCEL 151024002

LOT 19  
SOUTH BLAKELY ADDITION  
TAX PARCEL 151050019

LOT 18  
SOUTH BLAKELY ADDITION  
TAX PARCEL 151050018

LOT 17  
SOUTH BLAKELY ADDITION  
TAX PARCEL 151050017

M A I N R O A D (E)

REALIGNED &  
IMPROVED DRIVEWAY

GRASS PATH (E)

GRASS PATH (E)

(E) POND

(E) HOUSE

(E) TENNIS  
COURT

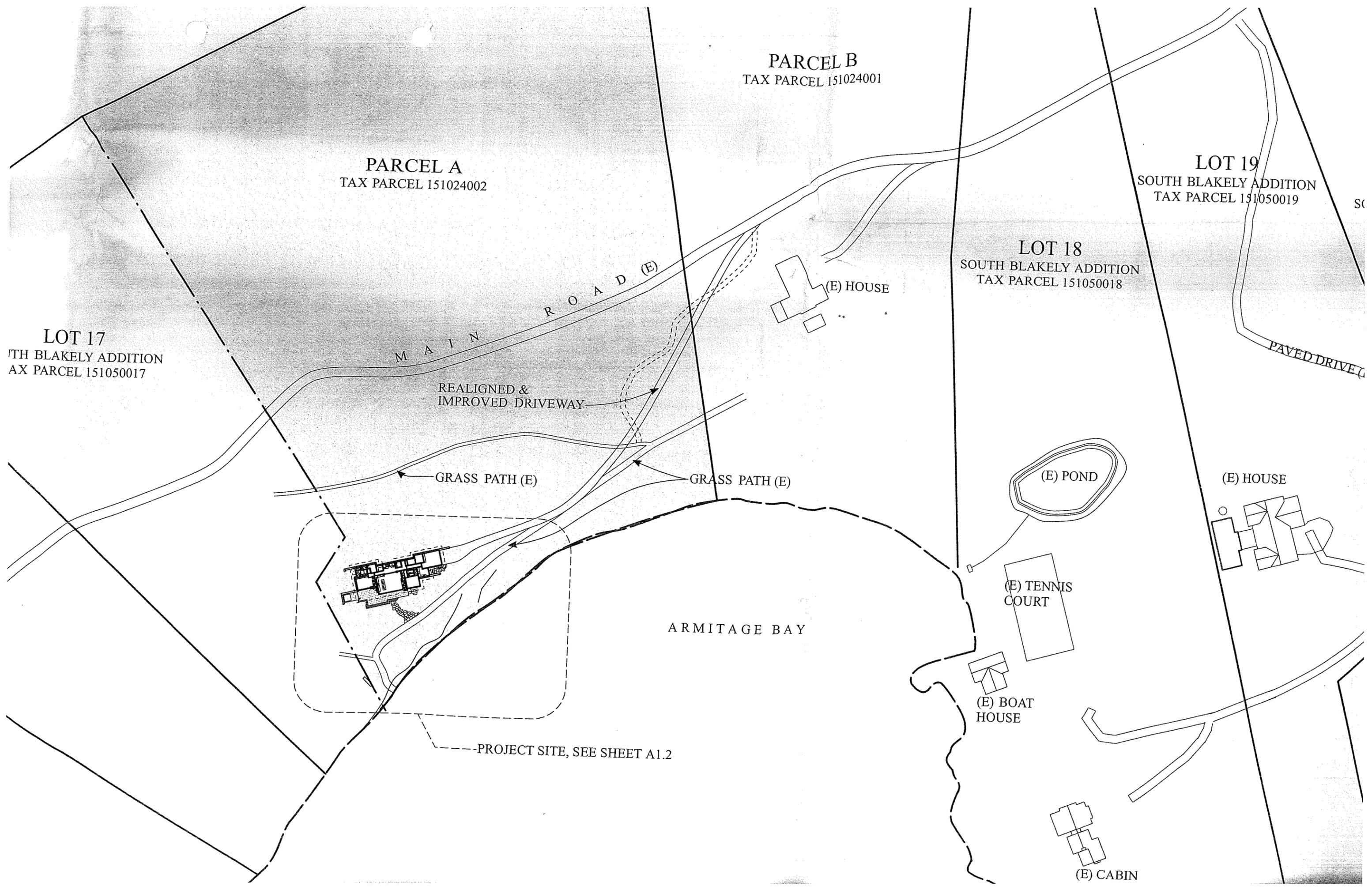
ARMITAGE BAY

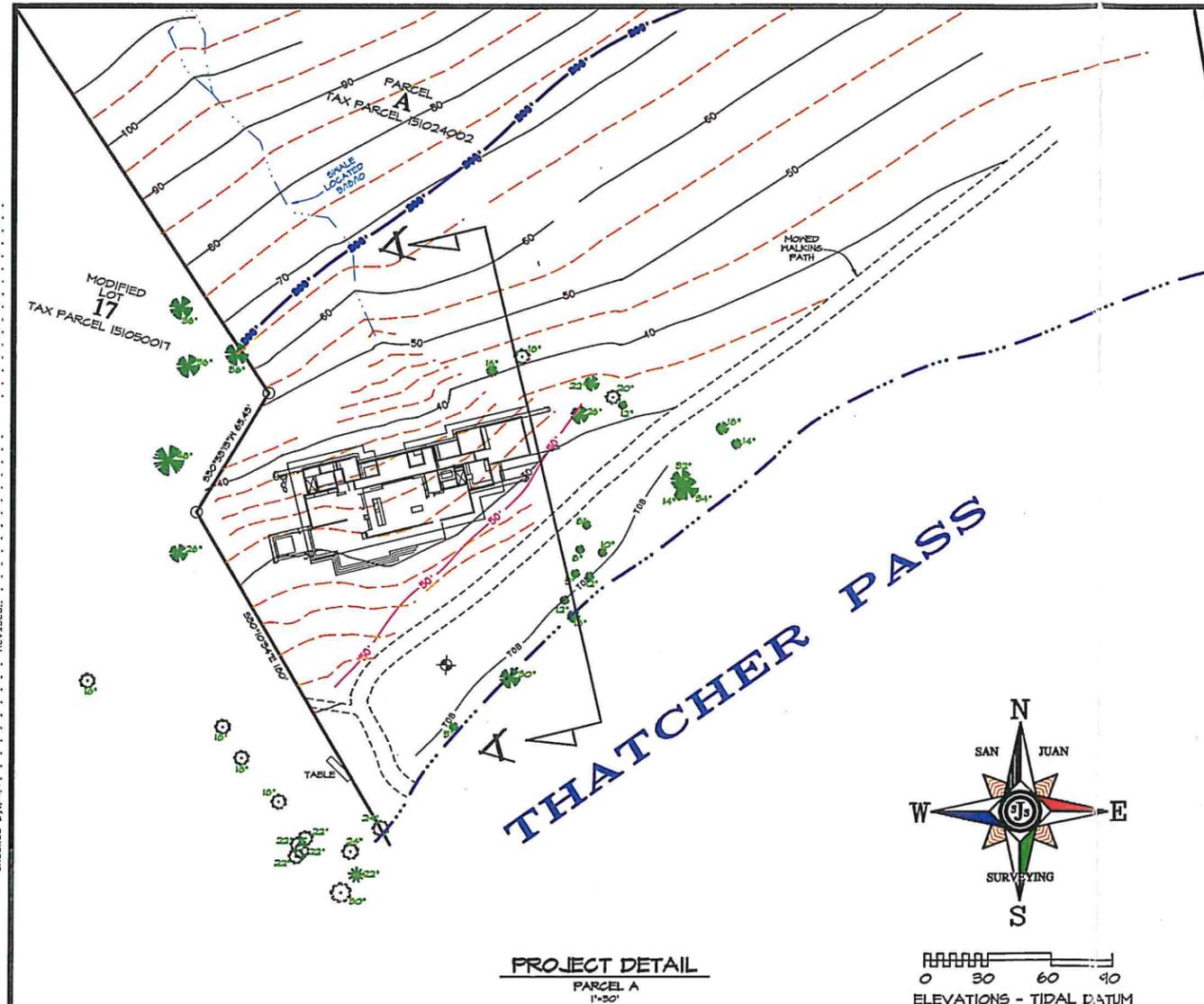
(E) BOAT  
HOUSE

PROJECT SITE, SEE SHEET A1.2

(E) CABIN

PAVED DRIVE





**LEGEND**

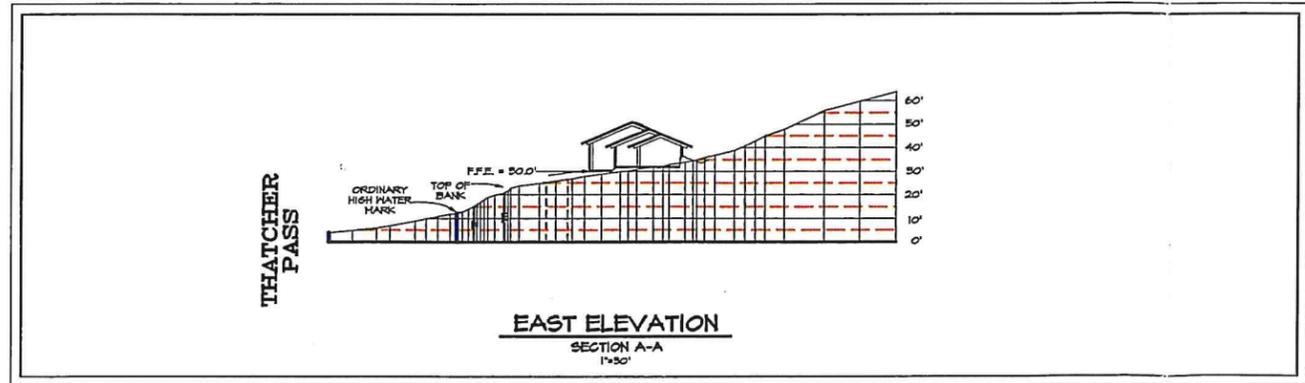
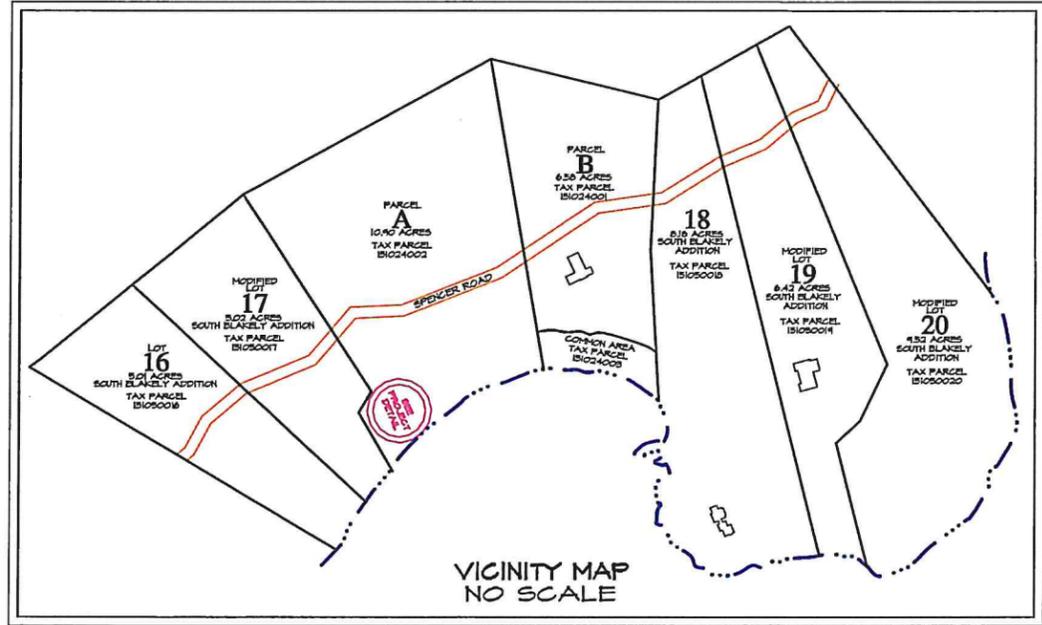
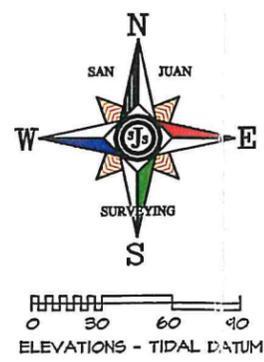
- ⊕ 5/8" DIA. REBAR / ALUM. CAP SET
- ⊗ 5/8" DIA. REBAR / ORANGE CAP SET
- ⊙ FOUND FLAT MONUMENT LS 11693
- ANGLE POINT-BOUNDARY
- 200' — 200' — UPLAND BOUNDARY OF SHORELINE MASTER PLAN DESIGNATION AREA
- — — — — ORDINARY HIGH WATER MARK
- 50' — 50' — 50' OFFSET FROM TOP OF BANK
- TB — TB — TOP OF BANK
- PINE WITH NOTED DIAMETER
- FIR WITH NOTED DIAMETER
- ALDER WITH NOTED DIAMETER

**SURVEYOR'S NOTES**

1. THIS MAP REPRESENTS A TOPOGRAPHIC SURVEY WHICH LOCATED EXISTING MONUMENTS, STAKES AND PHYSICAL FEATURES. NO BOUNDARY MARKERS OR STAKES WERE SET. ALL PARTIES ARE HEREBY ADVISED THAT THIS MAP DOES NOT CONSTITUTE A BOUNDARY SURVEY, AND IS EXEMPT FROM THE REQUIREMENTS FOR FILING UNDER THE PROVISIONS OF THE WASHINGTON STATE SURVEY RECORDING ACT PER RCW 50.04.040(1)(D) AND MEETS THE CRITERIA OF WAC 163-24-110 (4.A).

2. THE CONTOURS SHOWN HEREON ARE FOR GRAPHIC PURPOSES, THE EXPECTED TOLERANCE BASED UPON DATA ACQUISITION AND CALCULATION PROCEDURES BEING 2 & 3 FOOT INTERVALS WITHIN 1/2 AN INTERVAL VERTICALLY AND HORIZONTALLY.

3. THE SHORELINE TRAVERSE AS SHOWN HEREON IS THE APPROXIMATE LINE OF ORDINARY HIGH TIDE. THE TIDAL PLANE LOCATIONS WERE DETERMINED BY LEVEL AND SOUNDING OBSERVATIONS IN DECEMBER OF 2004 AND ARE RELATIVE TO MEAN LOWER LOW WATER PER THE U.S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY DATA PUBLISHED FOR ARTHUR ISLAND, WASHINGTON TIDAL BENCH MARKS (NOAA WASHINGTON - 444 4432 - 4/2/2003).



**PRELIMINARY**  
PLAN AND PROFILE  
**RUNSTAD ESTATE**

PORTIONS OF THE NE/4, GL-2, AND GL-3, SECTION 10, TOWNSHIP 35 NORTH, RANGE 1 WEST, W.M. BLAKELY ISLAND

Job No. 2542  
Comp Ref. 2542/PCO  
Field Book (a) 216  
Reference: RUNSTAD  
Drawn by: R.M.  
Checked by: J.T.  
Revised: 01/02/2010 R.M.  
Misc: 5056 PIP PARCELA

### SURVEYOR'S NOTES

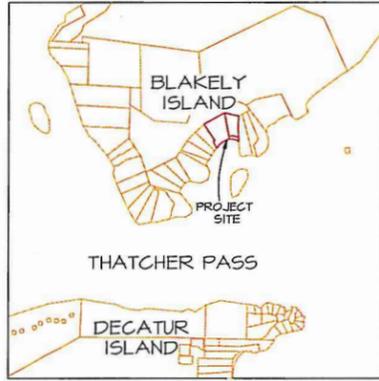
1. THIS TOPOGRAPHIC SURVEY MEETS OR EXCEEDS THE REQUIREMENTS OF WAC 332-130-040.
2. THIS MAP REPRESENTS A TOPOGRAPHIC SURVEY WHICH LOCATED EXISTING MONUMENTS, STAKES AND PHYSICAL FEATURES. NO BOUNDARY MARKERS OR STAKES WERE SET. ALL PARTIES ARE HEREBY ADVISED THAT THIS MAP DOES NOT CONSTITUTE A BOUNDARY SURVEY, AND IS EXEMPT FROM THE REQUIREMENTS FOR FILING UNDER THE PROVISIONS OF THE WASHINGTON STATE SURVEY RECORDING ACT PER RCW 50.04.040(WD).
3. FOR MORE BOUNDARY INFORMATION SEE THE SIMPLE LAND DIVISION RECORDED UNDER AUDITOR'S FILE NUMBER 2010-104014 AND VOLUME 5 OF LONG PLATS PAGES 13 AND 13A RECORDS OF SAN JUAN COUNTY.
4. MEAN LOWER LOW WATER PER ARMITAGE ISLAND TIDAL BENCHMARK STATION ID 9449932 IS 0.00 FEET. THE NAVD83 GEOD 03 ELEVATION FOR MEAN LOWER LOW WATER AT STATION ID 9449932 IS -0.50 FEET. MEAN HIGHER HIGH WATER PER ARMITAGE ISLAND TIDAL BENCHMARK STATION ID 9449932 IS 7.03 FEET. THE NAVD83 GEOD 03 ELEVATION FOR MEAN HIGHER HIGH WATER AT STATION ID 9449932 IS 7.33 FEET. BOTH LINES ARE DEPICTED HEREON FOR REFERENCE PURPOSES IN TIDAL DATUM MEAN LOWER LOW WATER = 0.00 FEET.
5. AN ATTEMPT WAS MADE ON 11/26/12 TO IDENTIFY THE ORDINARY HIGH WATER MARK PER THE WASHINGTON DEPARTMENT OF FISH AND WILDLIFE HYDRAULIC CODE RULES STATED IN WAC 220-110-020 (57). DUE TO THE HIGH ENERGY TIDAL NATURE AT THE PROJECT SITE AND THE LOCATION OF THE NEWLY CONSTRUCTED BULKHEAD IN RELATIONSHIP TO THE SHORELANDS WE WERE UNABLE TO DETERMINE THE ORDINARY HIGH WATER MARK BASED ON VEGETATION. PER WAC 220-110-020 (57) MEAN HIGHER HIGH WATER HAS UTILIZED FOR DELINEATING THE LINE OF ORDINARY HIGH WATER MARK.

### EQUIPMENT AND PROCEDURES

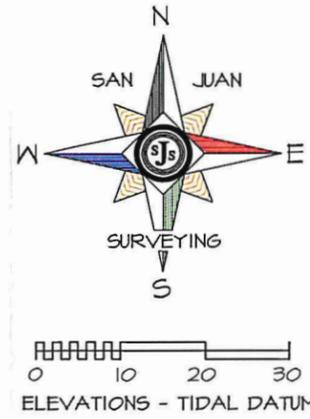
EQUIPMENT: LEICA 1201+ (ONE SECOND THEODOLITE)  
LEICA 1200 GPS  
PROCEDURE: FIELD TRAVERSE

### LEGEND

- FIR
- P/L — PROPERTY LINE
- MHHW — LINE OF MEAN HIGHER HIGH WATER
- MLLW — LINE OF MEAN LOWER LOW WATER
- TOP — TOP OF BULKHEAD
- TOE — TOE OF BULKHEAD
- NATURAL ROCK FORMATION
- SPOT ELEVATION
- NEWER BULKHEAD



VICINITY MAP  
NO SCALE



**RUNSTAD**  
PARCEL A  
PER SLD RECORDED  
UNDER APN 2010-104014

**RUNSTAD**  
PARCEL B  
PER SLD RECORDED  
UNDER APN 2010-104014

JON RUNSTAD  
1201 THIRD AVE. SUITE 2700  
SEATTLE, WA. 98101

FOR  
TOPOGRAPHIC SURVEY

FOR	JON RUNSTAD
ON	BLAKELY ISLAND
COMPL. REF.	11-020
DATE	11/26/12
DRAWN BY	RJM
CHECKED BY	RJM
SHEET	1 OF 1

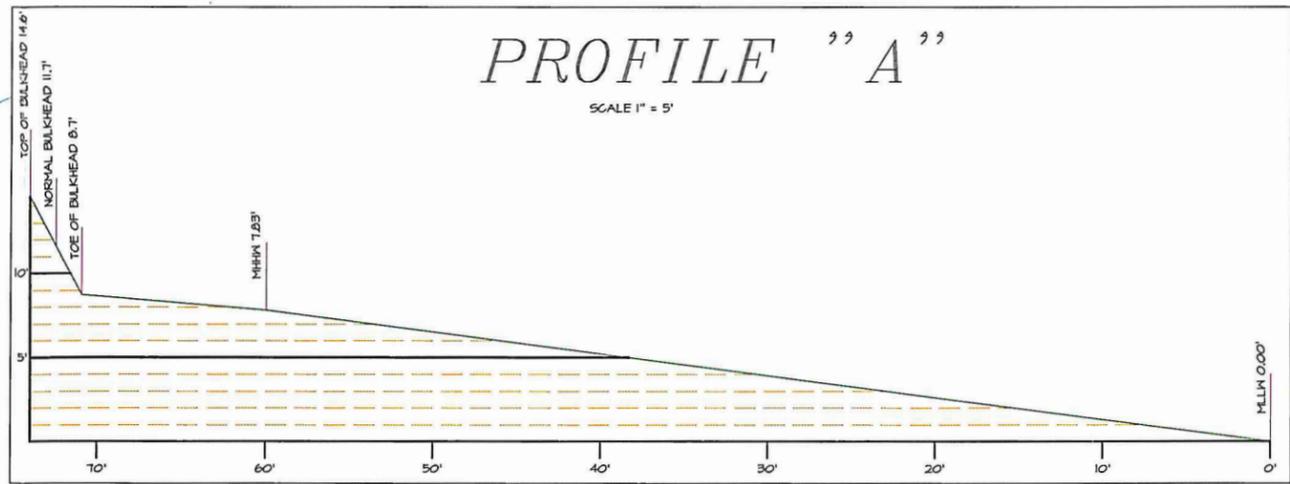
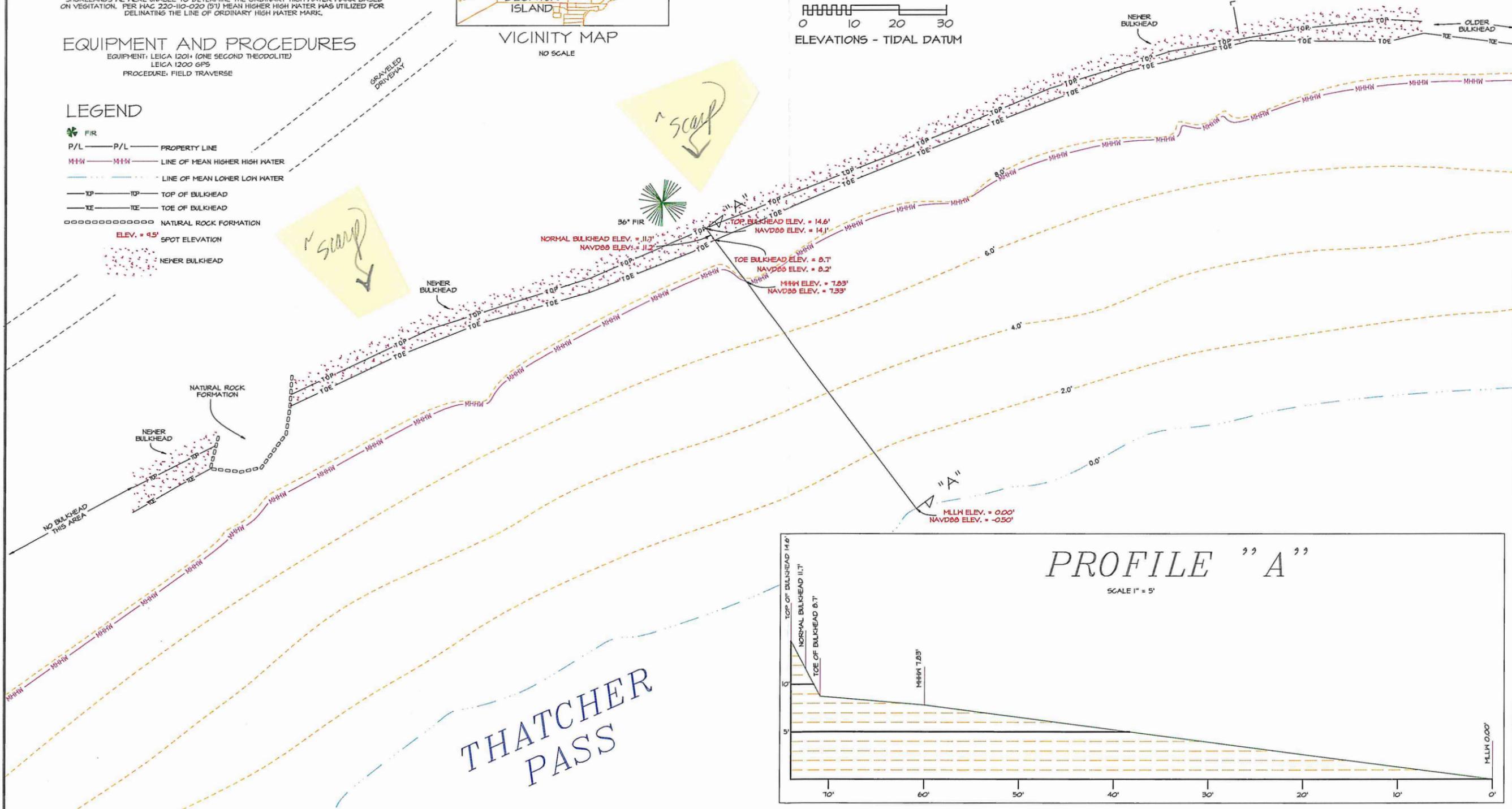
SAN JUAN SURVEYING

FOR	JON RUNSTAD
ON	BLAKELY ISLAND
COMPL. REF.	11-020
DATE	11/26/12
DRAWN BY	RJM
CHECKED BY	RJM
SHEET	1 OF 1



PROPERTY INFORMATION

SITE ADDRESS:	SPENCER ROAD
TAX PARCEL NUMBER:	191024002-151024003
DESCRIPTION:	TOPOGRAPHIC SURVEY
MISC:	





## MEMORANDUM

**DATE:** November 26, 2012

**TO:** Joe Brogan, Foster Pepper

**FROM:** Garry Horvitz, PE, Hart Crowser

**RE:** **Summary of Site Reconnaissance**  
**Runstad Residence, Blakeley Island**  
13-3-1100-011

**CC:**

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Joe:

This memo summarizes our observations made during a recent site visit to the Runstad property on Blakeley Island and presents our conclusions and recommendations with respect to the current stability of the exposed bank and shoreline and general recommendations for stabilization of the area.

We visited the site with you on November 20, 2012 to observe conditions along the shoreline. We understand that emergency repairs had been made to the shoreline shortly after a severe storm event in 2011. Apparently, overland stormwater flow had eroded portions of the bank which resulted in an oversteepening of portions of the slope. Wave runup at high tide is also a likely cause for the distress to the slope. Repairs consisted of placement of riprap and other rock to stabilize the toe of the failed slopes just above the beach.

Based on our observations of soil conditions and public geologic mapping sources the site soils along this edge of Blakeley island consist of dense glacial till soils. The site slopes steeply from the beach upward toward the interior of the Island. We observed weathered till soils exposed in areas and it is likely that much of this material is slope debris which has washed down from higher elevation over the years. There are numerous signs of instability along the slope between the gravel road and the water's edge. This is evidenced by oversteepened scarps as well as leaning trees and "pistol-butted" trees which is a sign of long term instability.

It appeared that portions of the area that were washed away have now left an oversteepened condition which we feel needs to be stabilized. The stability of these soils is largely a function of



Runstad  
November 26, 2012

13-3-1100-011  
Page 2

the slope angle. Although the major cause of the oversteepening is likely the storm event of early 2011 the resultant steep slopes have been reduced in their stability and it is our opinion that remedial measures are warranted at this time.

We understand that it would be most desirable to use “softer” measures to stabilize the otherwise unstable bank. However we do not feel that this will be appropriate. A significant amount of weight and strength has been removed from the toe of the oversteepened slopes and the contribution of this lost material needs to be replaced in order to maintain the long term stability of the slopes. In our opinion the use of heavy riprap at the base of the upland slope is the most appropriate way to accomplish this short of construction of a concrete seawall. The use of rip rap provides the necessary weight to “buttress” the toe of the slope and at the same time protects the exposed oversteepened slope from continued erosion. The use of a high strength material such as angular rock also adds passive resistance to the toe which enhances stability in the long term.

We trust that this memo provides you with the necessary preliminary information. Please call with any questions.



SAN JUAN COUNTY

**COMMUNITY DEVELOPMENT AND PLANNING**

135 Rhone Street • P.O. Box 947 • Friday Harbor, Washington 98250  
360/378-2354 • 360/378-2116 • Fax 360/378-3922  
[permits@co.san-juan.wa.us](mailto:permits@co.san-juan.wa.us) [www.co.san-juan.wa.us/permitcenter](http://www.co.san-juan.wa.us/permitcenter)

**DETERMINATION OF NONSIGNIFICANCE**

**Proposal:** After-the-fact construction of a rock bulkhead

**Applicant:** Jon Runstad

**Location:** parcels 151024002 and 151024003, Blakely Island

San Juan County, the lead agency for this proposal, has determined that this proposal will not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) will not be required under RCW 43.21C.030(2)(c). This determination was made after review of a completed environmental checklist and other information on file at San Juan County Community Development & Planning. The lead agency has determined that the requirements for environmental analysis, protection, and mitigation measures have been adequately addressed in the development regulations and Comprehensive Plan adopted under Chapter 36.70A RCW, and in other applicable local, state, or federal laws or rules, as provided by RCW 43.21C.240 and WAC 197-11-158. Our agency will not require any additional mitigation measures under SEPA. This information is available upon request.

This determination is issued pursuant to WAC 197-11-340(2). San Juan County will not act on this proposal for 14 days from the date of publication and mailing to agencies with jurisdiction (5/22/2013). Comments must be submitted in writing to Community Development & Planning no later than 14 days from the date of publication (5/22/2013). Appeals must be submitted in writing to Community Development & Planning no later than 21 days from the end of the comment period (6/12/2013).

This determination may be appealed by submitting a written request for review to the Director of Community Development & Planning at the above address. The appellant(s) must be prepared to make specific factual objections. Contact the above address to ask about procedures for SEPA appeals.

**Responsible Official:**

Rene Beliveau, Director  
Community Development & Planning  
(360) 378-2354

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

5/8/2013

**Date of publication:** 5/8/2013

**Permit #:** PSJ000-12-0019

N:\STAFF FOLDERS\Lee\SEPA\runstadDNS.doc

**WAC 197-11-960 Environmental checklist.**

ENVIRONMENTAL CHECKLIST

*Purpose of checklist:*

The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

*Instructions for applicants:*

This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply." Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

*Use of checklist for nonproject proposals:*

Complete this checklist for nonproject proposals, even though questions may be answered "does not apply." IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D).

For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectively.

A. BACKGROUND

1. Name of proposed project, if applicable:

Runstad Property Bank Stabilization

2. Name of applicant:

Jon Runstad

3. Address and phone number of applicant and contact person:

Joseph A. Brogan, Agent for Applicant  
1111 Third Avenue, Suite 3400  
Seattle, Washington 98101  
(206) 447-6407

4. Date checklist prepared:

November 25, 2012

5. Agency requesting checklist: San Juan County Community Development and Planning

6. Proposed timing or schedule (including phasing, if applicable):

Bank Stabilization structures are existing. This is an after-the-fact permit, as ordered by San Juan County. Proposed restoration actions will occur in 2013 and be governed by applicable agency work windows.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Technical Memo, Hart Crowser, November 2012  
Technical Memo, Coast & Harbor Engineering, November 2012  
Biological Evaluation, Runstad Bank Stabilization, Pentec Environmental, (Required by WDFW for HPA) est. December-January 2012

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

No

10. List any government approvals or permits that will be needed for your proposal, if known.

Shoreline Substantial Development Permit  
Hydraulic Project Approval  
SEPA Compliance  
U.S. Army Corps

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

Construction of 413' foot bank stabilization structure composed of 18" – 30" rock and gabion rock (cobble-gravel) along shoreline of Blakely Island. Existing stabilization measures involved placement of approximately 283.5 cubic yards of 18" – 30" rock and 256.76 cubic yards of cobble-gravel particles. Restoration measures will include shoreline plantings and beach nourishment (import of sand/gravels) in quantities to be determined by permitting agencies, but not expected to exceed 5,000 cubic yards over the 25-year life of the project and 7,500 cubic yards over the 50-year life of the project.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

Tax Parcel ~~3151014002~~, Blakely Island, San Juan County, WA

1510 24002  
1510 24003

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous,

Steep Shoreline Bluff

b. What is the steepest slope on the site (approximate percent slope)?

77%

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

Colluvium, derived from parent rock formations above the site.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Yes. The soils at the site consist of colluvium which is derived from the parent rock formations at the site. These soils are in an oversteepened condition within the project area as a result of historic sloughing and landsliding and as a result of over-land stormwater flow. Localized areas of sloughing were noted during site reconnaissance as was other evidence of past instability in the form of deformed ("pistol butt") trees and leaning trees.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

Construction of 413' foot bank stabilization structure composed of 18" – 30" rock and gabion rock (cobble-gravel) along shoreline of Blakely Island. Existing stabilization measures involved placement of approximately 283.5 cubic yards of 18" – 30" rock and 256.76 cubic yards of cobble-gravel particles. Restoration measures will include shoreline plantings and beach nourishment (import of sand/gravels) in quantities to be determined by permitting agencies, but not expected to exceed 5,000 cubic yards over the 25-year life of the project and 7,500 cubic yards over the 50-year life of the project.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

The project is designed to prevent existing erosion caused by wave/tidal action and drainage from upland areas. No new erosion is anticipated.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

None

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Construction Best Management Practices will be implemented associated with planting and beach nourishment mitigation measures.

## 2. Air

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

Minor emissions from construction vehicles and those vehicles delivering materials for mitigation actions.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

No

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Construction vehicles will be maintained and not permitted to leak fluids on or near the site.

## 3. Water

a. Surface:

- 1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Yes. The site is along the shoreline of Thatcher Pass in the San Juan Islands.

- 2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Yes. See the project description in Section A 11.

- 3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

See the project description in Section A 11.

- 4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No.

- 5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No

- 6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No

b. Ground:

- 1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.

No

- 2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

None

c. Water runoff (including stormwater):

- 1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Rain will fall on rock bulkhead and is expected to infiltrate.

- 2) Could waste materials enter ground or surface waters? If so, generally describe.

No.

- d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

No additional measures are necessary associated with maintenance of the existing structure.

#### 4. Plants

- a. Check or circle types of vegetation found on the site:

deciduous tree: alder, maple, aspen, other (willow)

evergreen tree: Douglas fir, cedar, pine, other

shrubs (ocean spray, red elderberry)

grass

pasture

crop or grain

wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other (skunk cabbage in one small riparian swale)

water plants: water lily, eelgrass, milfoil, other: Dune grass is preset among drift logs and lower portions of the rock embankment, especially on the western portion of the site. Eelgrass is reported to be present in the lower intertidal and shallow subtidal zone along the entire site.

other types of vegetation: marine algae are likely present attached to hard substrates below about mean sea level.

- b. What kind and amount of vegetation will be removed or altered?

Some riparian grasses were removed during the shoreline work.

- c. List threatened or endangered species known to be on or near the site.

No threatened or endangered plants are known from the site.

- d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Shoreline riparian vegetation will be restored on the site through a combination of planting and control of herbivory by local deer populations. A vegetation restoration and monitoring plan will be prepared for approval by the County and WDFW. An eelgrass monitoring plan will also be prepared for approval by the County and WDFW. In this plan, the Applicant will commit to monitor the distribution of eelgrass along the low tide line of the site for a period of 5 years, or as required by the agencies.

#### 5. Animals

- a. Underline any birds and animals which have been observed on or near the site or are known to be on or near the site:

birds: hawk, heron, eagle, songbirds, other: osprey, kingfisher, gull

mammals: deer, bear, elk, beaver, other: harbor seal,

fish: bass, salmon, trout, herring, shellfish, other: many marine fish and invertebrate species are present along the shoreline of the site during higher tides.

- b. List any threatened or endangered species known to be on or near the site.

According to NOAA Fisheries and USFWS threatened or endangered species that may occur near the site include Chinook salmon, steelhead trout, and bull trout, in marine waters adjacent to the site.

Marbled murrelet, Steller sea lion, humpback whale, and four species of sea turtles may occur in Puget Sound, but are not expected to be found in marine waters adjacent to the site. The southern resident orca whale has been listed under the ESA. This species occurs at times in bay and passes in the San Juan Islands and may occasionally move past the site in deeper waters.

- c. Is the site part of a migration route? If so, explain.

Yes, juveniles and adults of several species of anadromous salmonids likely migrate past this site during their marine migrations. Several passerine and marine bird species may also migrate through the area.

- d. Proposed measures to preserve or enhance wildlife, if any:

The vegetation restoration and monitoring plan discussed above will enhance conditions for riparian birds and wildlife, although during the early stages of revegetation, plantings will likely be fenced to minimize deer grazing. The Applicant will also analyze the potential benefits of beach restoration through nourishment with native sands and gravels. If nourishment is undertaken, the result will be monitored for 5 years. The Applicant also will monitor the site monthly for a period of one year for the presence of forage fish (sand lance or surf smelt) spawning.

## 6. Energy and natural resources

- a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

None

- b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No

- c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

None

## 7. Environmental health

- a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

No

- 1) Describe special emergency services that might be required.

None

- 2) Proposed measures to reduce or control environmental health hazards, if any:

None

- b. Noise

- 1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

None

- 2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Construction vehicle idling and dumping of bulk materials will cause low-level, short-term noise during daytime work hours, Sunday-Monday.

- 3) Proposed measures to reduce or control noise impacts, if any:

Construction equipment will maintained, as provided by the manufacturer.

**8. Land and shoreline use**

- a. What is the current use of the site and adjacent properties?

Residential

- b. Has the site been used for agriculture? If so, describe.

No

- c. Describe any structures on the site.

A single-family residence (and sole access road) is located approximately 75 feet landward from the bulkhead.

- d. Will any structures be demolished? If so, what?

No

- e. What is the current zoning classification of the site?

Rural Residential

- f. What is the current comprehensive plan designation of the site?

Rural Residential

- g. If applicable, what is the current shoreline master program designation of the site?

Rural Residential/Rural Farm Forest

- h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

Yes. Fish and Wildlife Habitat Conservation Area

- i. Approximately how many people would reside or work in the completed project?

None

- j. Approximately how many people would the completed project displace?

None

k. Proposed measures to avoid or reduce displacement impacts, if any:

None

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

Compliance with applicable State Regulations, e.g., Shoreline Management Act, and Chapter 173-27 WAC; compliance with San Juan County Code, including the policies and regulations in the Shoreline Master Program (Chapter 18.50 SJCC), compliance with the County Comprehensive Plan and compliance with conditions specified by the Hearing Examiner.

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

None

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

N/A

c. Proposed measures to reduce or control housing impacts, if any:

N/A

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

The tallest point of the bulkhead is approximately 6 feet.

b. What views in the immediate vicinity would be altered or obstructed?

None

c. Proposed measures to reduce or control aesthetic impacts, if any:

N/A

11. **Light and glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

None

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No

c. What existing off-site sources of light or glare may affect your proposal?

None.

d. Proposed measures to reduce or control light and glare impacts, if any:

None. N/A

## 12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

Boating; Fishing

b. Would the proposed project displace any existing recreational uses? If so, describe.

No

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

The proposal includes mitigation measures to enhance wildlife and beach habitat, including shoreline plantings and beach nourishment, i.e, importation of sand/gravel for any affected areas.

## 13. Historic and cultural preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

No

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

None known

c. Proposed measures to reduce or control impacts, if any:

None proposed

## 14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

None

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

No

c. How many parking spaces would the completed project have? How many would the project eliminate?

None

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

No

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

Construction materials for mitigation measures will be delivered by barge to approved barge landing sites located elsewhere on the island.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

None

g. Proposed measures to reduce or control transportation impacts, if any:

Deliveries to the site will employ Best Management Practices

15. Public services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

No

b. Proposed measures to reduce or control direct impacts on public services, if any.

None

16. Utilities

a. Underline utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

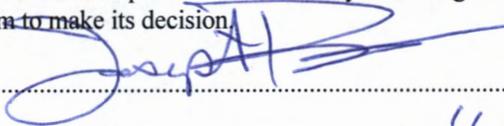
Private sewerage and water systems

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Orcas Power & Light; Century Tel

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature:  .....

Date Submitted: 11/28/12 .....



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## Technical Memorandum Runstad Property – Shoreline Erosion Protection

This technical memorandum is prepared to assist with preparation of a Shoreline Substantial Development Permit application for a shoreline erosion protection project at the Runstad property located at Blakely Island. Specifically, this technical memorandum provides technical information confirming that the shoreline erosion protection at the Runstad property meets the criteria of San Juan County Code 18.80.110(H) and standards specified in SJCC 18.50.210, Bulkheads. This technical memorandum is structured to address appropriate coastal engineering standards implicated in the County's regulations at SJCC 18.50.210(A)(2)(a), (b), A(3), A7(a), A7(c), and A(8).

*A.2. "...nonstructural shoreline protection, restoration, or modification techniques have been shown to be ineffective and it can be shown that one or more of the following exists:"*

*a) Serious erosion is threatening an established use of the adjacent uplands*

The shoreline along the Runstad property and Blakely Island has been subjected to long-term erosion related to multiple factors, including waves, tidal currents, sea level rise, sediment deficit, and other factors, including upland runoff. The evidence of shoreline erosion can be observed on multiple photographs that were taken during or prior to construction of the recent shoreline erosion protection project. For example, Figure 1 shows the shoreline at Runstad property prior to construction of shoreline erosion protection measure.

The figure shows the scarp at the toe of shoreline bluff that is clear evidence of shoreline erosion. Formation of the scarp here is most likely attributed to wave impact during high tide and instability of slope conditions. During high tide, when water depth at the shoreline is 2 to 4 feet or deeper, a significant amount of wave energy that enters the bay is delivered to the bank. This phenomenon was demonstrated by computer simulation of wave refraction/diffraction in the bay. Simulation (numerical modeling) of wave generation and transformation was conducted using the two-dimensional model SWAN (a standard tool produced by the Danish Hydraulic Institute). Two numerical modeling grids were constructed and used for simulation: Large Domain Grid and Nested Domain Grid. Numerical modeling grids were constructed using available bathymetric survey data from the Puget Sound Digital Elevation Model (Finlayson 2005) and NOAA surveys. Figure 2 shows the numerical modeling domains (nested and large) with depth shown in color format. For example a deep blue color indicates that water depth of 40 meters and deeper (130 feet and deeper) is located inside the bay in relatively close proximity to the shoreline.



**Figure 1. Shoreline along Runstad property prior to construction of shoreline erosion protection measure**

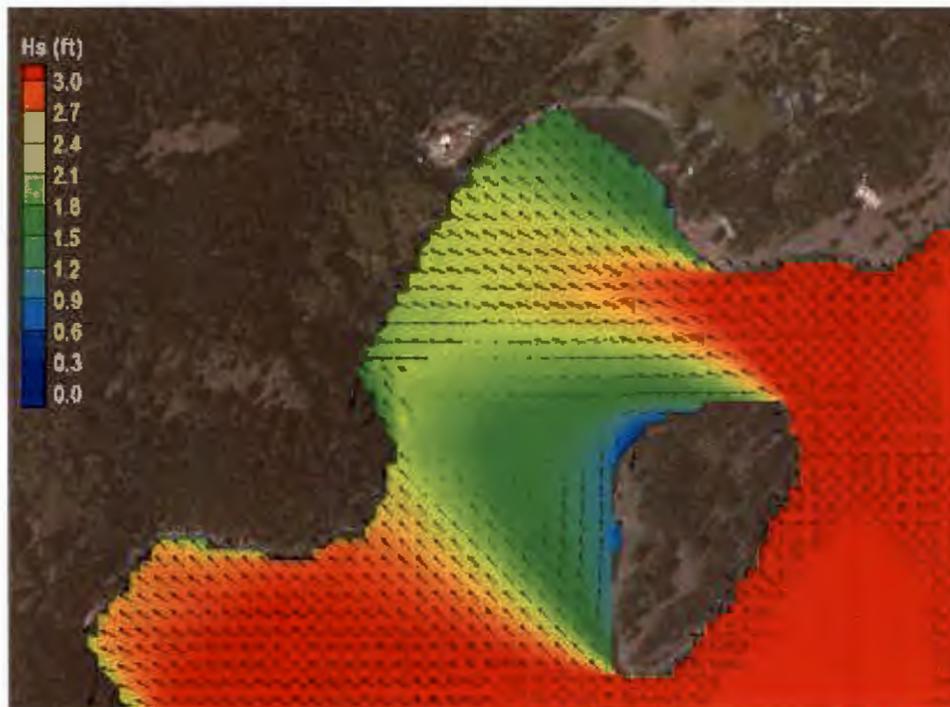


**Figure 2. Numerical modeling domains (nested high resolution, and large-scale (inset)) in color format, based on DEM and NOAA data**

Wave modeling requires depth data throughout the domain. Where depth data are lacking in the nearshore area (not colored in the figure) depth values were generated by interpolation between the NOAA bathymetric data and recent topographic survey data. Wind data that was used to drive the numerical wave model was developed from processing of measured long-term (total 60 years) wind data from Whidbey Island meteorological station at Ault Field. Extreme value analysis of these long-term measured data was performed. The design wind storm parameters

was determined as follows: Direction- 140 deg, Return period- 25 year, Speed-47 m.p.h. (41 knots).

Results of numerical modeling are shown in Figure 3 in color format. The figure shows spatial distribution (plan view) of significant wave height over the nested modeling domain. Reddish color indicates larger waves (higher wave height) and blueish color shows smaller wave heights or no waves. The figure shows that during this design storm a significant amount of wave energy penetrates into the bay and propagates to the shoreline<sup>1</sup>. Wave gauges were deployed in the model along the shoreline to extract energy spectra characteristics of waves directly at the Runstad property. Extracted output at the location of the revetted shoreline at the Runstad property during the design storm event is significant wave height of 2.2 ft with peak period of 3.7. We emphasize that this modeling is preliminary; with more detailed bathymetry and model refinement it is likely the wave energy shown to reach the bank could be greater than stated here.



**Figure 3. Model results of wave height in vicinity of Runstad property shoreline**

The wave energy from these waves dissipates through exerting pressure, stresses, and generating wave runup velocities and other hydrodynamic factors that interact with the bank. Because a large part of the Runstad property shoreline is formed with poorly consolidated material, this material is mobilized by these hydrodynamic factors resulting in formation of the erosion scarp shown on Figure 1 and other possible scarps at this shoreline.

<sup>1</sup> The float at the Runstad property was destroyed during a wave storm on December 2009. It is one indicator of strong wave energy impact on the shoreline at this location.

What was demonstrated by this numerical model case is only one fragment of long-term, multiple, and random wave impacts on the Runstad property shoreline. These impacts have occurred and will occur in the future, and, if no action was taken the formation and growth of erosion scarps would have continued. The increase in extent of erosional scarps at the toe of the bluff was threatening an established use of the Runstad property and the bulkhead is required along the full length of damaged area to control bluff erosion. Therefore, the rock bulkhead meets this SMP requirement for shoreline erosion protection action.

***b) The bulkhead is needed and is the most reasonable method of stabilizing an existing beach condition***

As discussed above, the erosion problem at this property is due to a combination of various wave, currents and tidal hydrodynamic effects, including runup damage at the upper elevation of the profile and upland runoff. As shown below, wave parameters at the project site for the design storm event are very energetic and only a structural solution can protect against shoreline erosion. From the possible structural solutions, such as sheet-pile wall, revetment, breakwater, or other, a rock bulkhead appears to be the most reasonable method for stabilization of existing uplands at the Runstad property.

Our previous experience with similar projects indicates that use of non-structural measures would not be a reasonable solution for shoreline erosion protection at the Runstad Property. To demonstrate this statement let's consider two possible non-structural solutions: Large Woody Debris<sup>2</sup> (LWD) and open beach. LWD that are placed in a wave environment that exists at the Runstad property (significant wave height = 2.2 ft and peak period = 3.7 sec) will be impacted by frequent, dynamic wave forces that may exceed several thousand pounds. Unchained or unanchored LWD subjected to these forces would, at first, create certain damage to the shoreline bluff (due to LWD motions caused by waves and resulting pounding of the bluff) and, then migrate away by wave and tidal currents.

Even worse damage would occur if LWD is rod anchored or chained into the bluff. In this case, LWD would perform similar to a poorly-designed bulkhead structure (without toe protection and proper transition). Erosion would occur underneath and on the leeward side of the LWD, undermining the bluff and LWD itself. For example, the Indian Island shoreline is subjected to similar (or even smaller) wave conditions. The Indian Island shoreline was originally protected by LWD that were placed on the beach in an area of wave impacts. These LWD performed similar to a poorly designed bulkhead structure. Erosion had occurred underneath and on the back side of the LWD. It undermined the beach, exacerbated shoreline erosion, and eventually resulted in damage to the LWD anchoring system. Figure 4 shows the shoreline at Indian Island upon installation of LWD.

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<sup>2</sup> Please note that LWD should be considered as a structural solution once LWD is anchored or chained.



**Figure 4. Indian Island shoreline upon installation of LWD**

Similar effects occurred at many other locations where LWD were placed on erodible material in an energetic wave environment. For example, Figure 5 below shows the results of installing LWD at the shoreline along the Tacoma Narrows.



**Figure 5. Installation of LWD along Tacoma Narrows shoreline**

Another example of a non-structural solution would be an open beach. For this purpose, the imported material (sand, gravel, cobbles, or mixture) would be brought on site and placed on the existing bottom slope starting from an elevation of at least 3 ft MLLW to ordinary high water. As shown below, the sediment transport (littoral drift) direction along the Runstad property shoreline is strictly from east to west. This implies that sediment from the soft solution - open beach - would migrate to the west under any type of wave conditions capable of moving beach particles. An open beach, if constructed at this location, should be expected to be replaced quite frequently, approximately every 5-10 years.

In addition, the close proximity of deep water (as shown in Figure 2 the depth of 100 ft would be just offshore of the beach) would result in additional losses of sediment. Finer sediment from the open beach would move across the slope and slide into the deep water, thus contributing to sediment loss and frequency of beach replacements.

Summarizing the above and based on previous experience and knowledge of coastal processes, it is our opinion that the rock bulkhead is the most reasonable method of stabilizing the beach condition at the Runstad property.

***A.3 “Bulkheads shall not be permitted in conjunction with new projects or development when practical alternatives are available”***

New construction was completed in 2011. At that time no bulkhead was part of the construction because the need for erosion protection was not recognized. Wave storms that occurred after construction eroded the back shore and upland so severely that the need for erosion protection was evident, to prevent more loss and more expensive repairs in the future. As discussed above, the most practical means of shore protection available is the rock bulkhead.

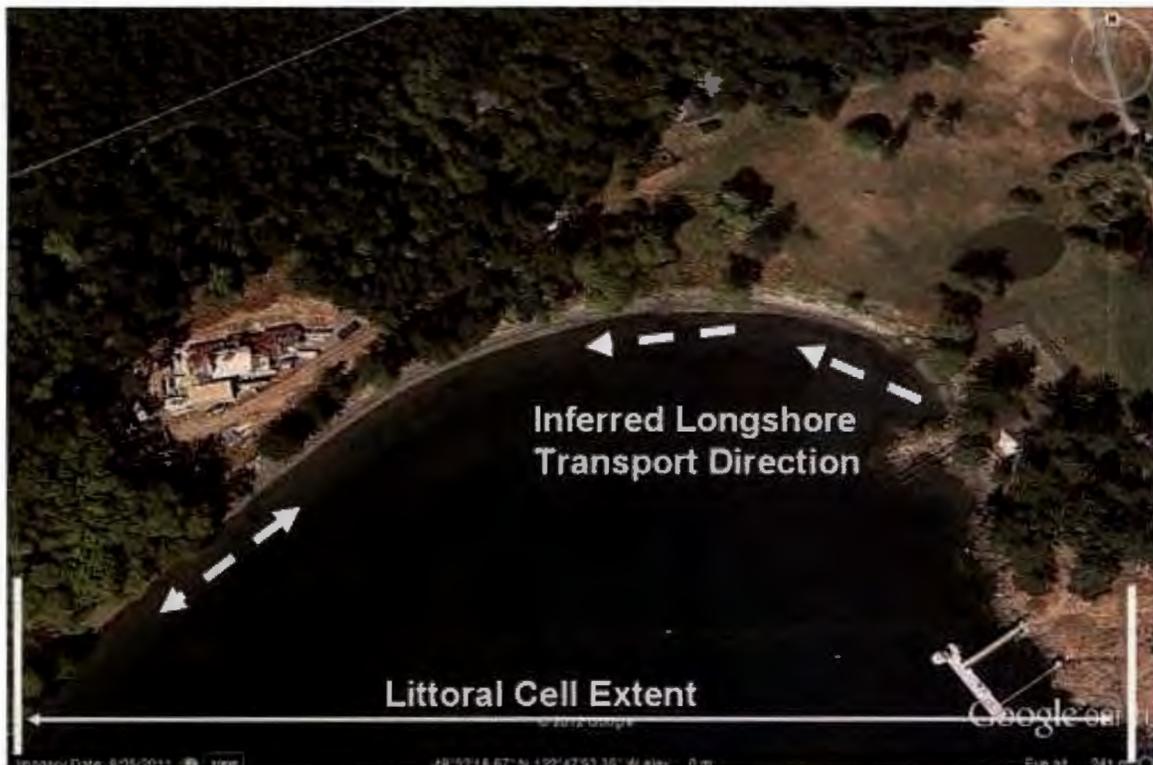
***A.7 “...include at least the following information:”***

***a) Purpose of the proposed bulkhead***

The purpose of the bulkhead is to protect the slope at the back of the beach and the edge of the uplands from erosion by wave runup and currents and forces caused by wave storms.

***b) Direction of longshore transport***

Sediment transport along the project shoreline is generated and controlled mostly by wave hydrodynamics. This means the direction of wave propagation coincides with the direction of longshore sediment transport. Major storms in the project area are due to southeast winds, similar to that analyzed with numerical modeling. Waves propagating from the southeast transport the available sediment from east to west along the shoreline. At the western end the transport direction may alternate westward and eastward, depending on the initial wave direction and the frequency-dependent refraction and diffraction process which determines the wave approach angle at the shore. The interpretation of sediment transport in the project area is shown in the figure below.



**Figure 6. Interpreted directions of longshore transport at project site**

***A.8 “...prohibited for any purpose if it will cause significant erosion or beach starvation.”***

The shoreline in the project area is bounded by rocky headlands at the east and the west. My interpretation is that beach material located between the headlands remains in that reach, but might move eastward or westward in response to incident wave direction. Very little material currently making up the beach escapes the bounds of this pocket beach. The bulkhead is constructed high in the profile, not in response to retreat of the intertidal beach, but to protect the slope at the back of the beach from episodic erosion due to high storm waves combined with high water level. My opinion is that nature does not need to erode the upland to provide sediment to the beach so that it is not in a starved state. Therefore, the bulkhead neither interferes with predominant longshore processes nor causes erosion due to sediment starvation in the littoral cell defined by the two headlands.

**References**

Finlayson D.P. 2005. Combined bathymetry and topography of the Puget Lowland, Washington State. University of Washington, (<http://www.ocean.washington.edu/data/pugetsound/>).