

**PROJECT EXECUTIVE SUMMARY
REHABILITATION OF FLOOD CONTROL WORKS
DUN-2-04**

PROJECT NAME: Dungeness Meadows Levee

PROJECT FUNDING CLASS: 320

PROJECT CWIS NUMBER: ????

NON-FEDERAL SPONSOR: Dungeness Meadows Homeowners Association

LOCATION AND DESCRIPTION: The levee is located along the right bank of the Dungeness River extending from about river mile 7.98 to 8.6, near the town of Dungeness, in Clallam County, Washington. The levee is an earthen material levee with riprap used for erosion control on the riverward side. The levee has a crest width of 12 to eighteen feet to facilitate maintenance and has side slopes of 2H:1V on the riverward side and on the landward side. The levee provides flood protection for residential property and public infrastructure (see section 12-1 for more detail). In the undamaged condition, the levee would prevent damages from a flood with a 100-year recurrence interval with a high degree of certainty.

DESCRIPTION OF DAMAGE: The damage occurred to a 500 linear foot section of toe. Armor rock has been lost and slopes have been damaged over the entire length of this section. Reference Appendix C, which includes a hydrology and hydraulics report, dated 26 January, 2004.

PROPOSED REPAIR: The recommended plan consists of repairing damaged slopes and replacing the levee armor and toe rock in kind, per the original construction dimensions of the project.

SUMMARIZED FINANCIAL AND ECONOMIC DATA:

Total Construction Cost	\$130,329
Engineering and Design (Federal Cost)	\$ 20,000
Total Federal Cost	\$108,263
Total non-Federal Cost	\$ 22,066
Benefit Cost Ratio	28.4 to 1

ADDITIONAL INFORMATION: The non-federal cost share will be provided by the local sponsor, the Dungeness Meadows Homeowners Association.

POINT OF CONTACT: Doug Weber, CENWS-OD-EM, (206) 764-6959.

**PROJECT INFORMATION REPORT
REHABILITATION OF FLOOD CONTROL WORKS
DUN-2-04**

1. Project Identification

- a. Project Name: Dungeness Meadows Levee
- b. Project Funding Class: 320
- c. Project CWIS Number: ????

2. Project Authority

- a. Classification: non-Federal
- b. Authority: The project was originally constructed by local interests to protect the Dungeness Meadows residents.
- c. Estimated original cost of project: unknown
- d. Construction completion date of the original project: 1964
- e. Previous Rehabilitations: Rebuilt in 1980, repaired 1981, 1986.

3. Public Sponsor

- a. Sponsor Identification:
Dungeness Homeowners Association
Steven E. Funk – Chairman, Dike Committee
370 Dungeness Meadows
Sequim, WA 98382
360-683-9716

b. Application for Assistance:

- (1) Date of Issuance of District's public Notice: None issued for this event
- (2) Date of public sponsor's written request: November 11, 2003 (See Appendix A)

4. Project Location

The levee is located along the right bank of the Dungeness River extending from about river mile 7.98 to 8.6, near the town of Dungeness, in Clallam County, Washington. See Appendix C for map.

5. Project Design

The levee is an earthen material levee with riprap used for erosion control on the riverward side. The levee is approximately 3,270 feet in length. It ties to high ground at both ends and is immediately adjacent to the river over its entire length. The levee has a

crest width of 12 to eighteen feet to facilitate maintenance and has side slopes of 2H:1V on the riverward side and on the landward side. There is a concrete water control structure with a sixty-inch culvert at the upstream end of the project. The purpose of this structure is to divert flow from the river to a ditch behind the levee for irrigation and recreational activities. The levee provides protection against the 100-year flood event, with 3 feet of freeboard. The project provides protection for 117 acres of residential property and public infrastructure, such as roads.

6. Disaster Incident: The levee was damaged during widespread western Washington flooding during October and November 2003. The flood event was calculated to be a 14-year event.

7. Project Damages: The damage occurred to a 500 linear foot section of toe. Armor rock has been lost and slopes have been damaged over the entire length of this section. This erosion will continue during the next high water event, potentially causing levee failure. In its damaged state, the levee provides protection up to a 15-year event.

8. Project Performance Data

a. Inspection Results.

(1) Date of Last Inspection: 22 March 2002

(2) Type of Last Inspection: Periodic Inspection of non-federal Flood Control Work

(3) Project Condition Code of Last Inspection: Active

b. Sponsor's Annual O&M Costs: **\$5,000** for the entire length of the levee segment.

c. The levee has been properly maintained and was in good condition prior to the flood damage.

9. Project Alternatives Considered

Multiple alternatives were considered including, the No-Action Alternative, the Non-Structural Alternative, the Realignment Alternative, and the Repair Alternative.

The No-Action alternative would leave the damage in place jeopardizing the flood protection provided by the levee. If not repaired, there would be an imminent threat to loss of life and property.

The Non-Structural alternative would buy-out the facilities and properties adjacent to and downstream of the damages with a cost far exceeding the estimated cost of the repair.

The Realignment alternative would set the levee back from the damaged area. This alternative is not viable due to the very close proximity of residential structures.

The Repair Alternative is to repair the levee in place, reconstructing the levee to match its original configuration.

10. Recommended Alternative

a. Description of Recommended Alternative

Drawings, maps, and other pertinent design information are located in Appendix C. The recommended plan will consist of replacing the levee armor in kind, per the original construction dimensions of the project. The damaged slopes will be repaired and regraded as needed.

11. Real Estate

Since the proposed repair is part of an existing flood control project, the DMHA already owns the necessary real estate interests. However, before advertising for construction, the DMHA will need to certify all the lands within the levee reach as available, and provide supporting real estate documentation showing their ownership interest and limits. Access to the levee is available from private roads in the Dungeness Meadows complex. All staging will take place within the existing project footprint.

12. Economics

Benefits attributable to the proposed levee repair are calculated based on the difference in probabilities associated with the levels of protection provided by the levee in the pre-flood condition compared to the post flood condition. Prior to the flood, the levee would prevent damages from a flood with a 100-year recurrence interval. Flood damages to the levee have reduced the conditional non-exceedence performance to a 15-year recurrence interval. With repair, the levee will again prevent damages from a flood with a 100-year recurrence interval. Benefits resulting from the proposed project consist of the following:

(1) Repair of levee will eliminate property damage (up to a 100-year event) to approximately 126 residential structures, 3 public structures, approximately 13,000 feet of roads and streets, public swimming pool, and golf course. If the levee is not repaired and flooding occurs, the total value of future damageable property, including contents, is estimated to be at least \$23,000,000. In accordance with ER 500-1-1, the economic life is equal to the degree of protection or 50 years whichever is less. Therefore, the economic analysis is based on an economic life of 50 years and the FY2004 discount rate of 5 5/8 percent. The expected annual benefits associated with repairing the levee to its pre-flood condition are conservatively estimated (residential buildings and contents only) to be at least \$364,240.

Average Annual Benefits (Jan 2004 prices)

Average Annual Damages Prevented:

Residential Buildings and Contents	\$364,240
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Value of Residential Buildings:

\$4,592,000

Estimated construction costs required to repair the levee are estimated at \$130,329. Following are the average annual costs of repair.

Interest and Amortization (50 years @ 5 5/8%)	\$ 7,839
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Operation and Maintenance	<u>\$ 5,000</u>
Total Annual Costs	\$12,839

Benefits-Cost Ratio @ 5 5/8%: 28.4 to 1

13. Environmental

a. **Water Quality.** There will be short-term impacts from the construction of repairs to the levee. An impact will be a temporary increase in turbidity due to fill placement. Construction noise may temporarily disturb any wildlife in the area. Turbidity will be monitored during construction, and should turbidity standards be exceeded, construction will cease until turbidity returns to acceptable levels. This will be addressed in the construction management plan.

b. **Fish and Wildlife.** Because the work will be accomplished inside the established work window (July 15 – August 15), effects to salmonids will be limited, such as a temporary disruption of salmonid movement and rearing in the bank area. Adults are not anticipated to be present during construction. Visual monitoring and turbidity sampling will be conducted to minimize the impact on salmonids. The following ESA-listed species are the only listed species expected to be in the project vicinity, and are not anticipated to be adversely affected by construction:

- Puget Sound Chinook Salmon
- Hood Canal Summer-run Chum Salmon
- Coastal/Puget Sound Bull Trout
- Bald Eagle
- Marbled Murrelet

c. **Wetlands.** There are no wetlands in the project footprint.

d. **Cultural Resources.** A preliminary site assessment has been conducted. No significant cultural resources are anticipated in the project area due to disturbed nature of the project area (existing levee).

e. **Recreation.** This section of levee is used by local residents as a recreation area, although recreation is not the levee's official purpose.

f. **Coordination.** The proposed work is coordinated throughout the planning, design, and construction phases with the following agencies:

- (1) U.S. Fish and Wildlife Service
- (2) Clallam County
- (3) Washington Department of Fish and Wildlife
- (4) Washington Department of Ecology
- (5) Jamestown S'Klallam Tribe
- (6) NOAA Fisheries
- (7) Environmental Protection Agency
- (8) State Historic Preservation Office

Their recommendations will be considered and implemented as appropriate. The design will be coordinated with and reviewed by the above listed agencies. An Environmental Assessment (EA) will be completed to satisfy NEPA requirements. In addition, the requirements for compliance with the Endangered Species Act will also be completed through a facilitated process, with the intention of completing the Section 7 process prior to construction. The local sponsor will be required to obtain all applicable local and state permits. According to the Code of Federal Regulations, Title 33, Section 323.4 (a) (2), levee repair is an activity that does not require a Section 404 permit; therefore, a water quality certification from the Dept of Ecology is not required either.

g. Environmental enhancement features. Project construction may include environmental enhancement features to offset temporary construction impacts. These features will be fully engineered during E&D. Per guidance from Corps Headquarters, environmental features should not constitute more than 5% of construction costs.

14. Interagency Levee Task Force (ILTF)

HQUSACE has not directed activation of an ILTF for the flood event associated with the October 2003 floods in Western Washington. However, informal coordination with FEMA is ongoing.

15. Project Management

a. Funding Authority

- (1) Program and Appropriation: FCCE, 96x3125
- (2) Project Funding Class: 320
- (3) Project CWIS Number:

b. Project Funds - Project Cost Estimate at January 2004 Price Level

- (1) Construction Cost: (500 feet)

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Item	Quantity	Unit of Measure	Unit Cost	Amount
Equipment mob and demob (no survey)	1	Job	\$ 5,000.00	\$ 5,000
Reshape 500 feet of levee with excavator and dozer	30	hours	\$ 220.00	\$ 6,600
Crushed rock for surfacing (delivered and placed)	300	cy	\$30	\$ 9,000
Class IV riprap (delivered and placed)	1250	cy	\$ 49.00	\$ 61,250
Environmental Features (5%)	1	Job	\$4,413	\$ 4,413
Hydroseeding	1	Job	\$2,000	\$ 2,000
Subtotal				\$ 88,263
Supervision and Inspection	10%			\$ 8,826
Contingency	15%			\$ 13,239
TOTAL CONSTRUCTION COST				\$ 110,329
Engineering and Design				\$ 10,000
Plans and Specifications				\$ 10,000
TOTAL FEDERAL PROJECT COST (80% Construction + E&D)				\$ 108,263
TOTAL LOCAL PROJECT COST (20% Construction)				\$ 22,066
TOTAL COST				\$ 130,329

c. Project Repair Schedule

(1) Expected Approval Date	2 April 2004
(2) Completed P&S	16 April 2004
(4) Cooperation Agreement Signed	16 April 2004
(5) Real Estate Certified	30 April 2004
(6) Real Estate Review	10 May 2004
(6) Contract Advertisement	11 May 2004
(7) Contract Bid Opening	25 May 2004
(8) Contract Award	8 June 2004
(9) Notice to Proceed Issuance	10 June 2004
(10) Construction Start	15 July 2004
(11) Construction Complete	22 July 2004
(12) Construction Final Inspection	15 September 2004
(13) Project Closeout	30 September 2004

d. Project Authentication

Prepared by: Chris Pollock, (206) 764-6947

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Emergency Management approval by: Paul Komoroske, (206) 764-3406

District-level approval by: Diane Parks, (206) 764-3432

e. Technical Points of Contact

Emergency Management: Doug Weber, (206) 764-3406

Program/project management: Chris Pollock, (206) 764-6947

Economics: Don Bisbee, (206) 764-3713

Environmental: Rustin Director, (206) 764-3636

Engineering and Design: Monte Kaiser, (206) 764-6194

Real Estate: Bradford Schultz, (206) 764-3668

Hydraulics and Hydrology: Doug Knapp, (206) 764-3542

Cost Engineering: Tim Sullivan, (206) 764-6759

APPENDIX A

Project Sponsor's request for Rehabilitation Assistance

Dungeness Meadows Homeowners Association, Inc.



November 11, 2003

U.S. Army Corps of Engineers
P.O. Box 3755
4735 East Marginal Way South
Seattle, Wa. 98124-3755

Attn: Van R. Niemi
Subject: Dungeness Meadows Dike

During your recent visit to view the dike we observed a number of large pieces of rip-rap, several the size of toe rock, in the river channel.

We are technically and physically incapable of determining the location of possible damage that occurred during the last high water event of several weeks ago.

We respectfully request the assistance of one of your engineers to identify and assess the severity of the problem and to make recommendations regarding repairs that would be required.

The processing of a hydraulic permit through the various state and county agencies can be very time consuming. If repairs are required we would like to start the permit process with out delay.

Very respectfully yours

A handwritten signature in blue ink that reads "Steven E. Funk". The signature is written in a cursive style.

Steven E. Funk
Chairman, Dike Committee
370 Dungeness Meadows
Sequim, Wa. 98382

APPENDIX B

Project Photos

Figure J – Photos Taken During the December 17, 2003, Site Visit.



Dungeness River Federal Levee debris jam looking downstream.

Dungeness River Federal Levee turnaround looking downstream.





Sharp bend in Dungeness River looking u/s from Dungeness Meadows levee near Station 10+00.



Dungeness Meadows Levee lost toe and vertical banks looking upstream near Station 10+00.

APPENDIX C

Project Maps and Drawings

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CENWS-EC-TB-HH

26 January 2004

MEMORANDUM FOR: CENWS/PM/PL Chris Pollock

SUBJECT: Hydrology and Hydraulics Report PL 84-99 Dungeness River

REFERENCES:

- 1) Project Management Plan, December 2003.
- 2) MFR: Dungeness Levee Site Visits, December 2003.
- 3) MFR: Hydrology and Hydraulics Report, April 2002.
- 4) Project Information Report (PIR), Rehabilitation of Flood Control Works, Dungeness River, 2002.
- 5) Dungeness Meadows Levee Inspection Report, March 2002
- 6) Dungeness Meadows Levee Inspection Report, December 1989
- 7) USGS gage 12048000 (Dungeness River near Sequim).
- 8) Aerial photograph and Topo Map from <http://terraserver.microsoft.com>.

1. **Weather:** Two consecutive storms occurred in 2003 on October 16th and October 20th which led to flooding on the Dungeness River. Although the first flood event did not cause the Dungeness River to surpass flood stages, it provided a saturated condition that easily allowed the second event to exceed flood conditions. The severe rains were the result of a high velocity jet stream from the southwest that brought warm pockets of moisture to the Pacific Northwest. This common weather pattern is often referred to as the Pineapple Express.
2. **Flooding:** Stage measurements were recorded every 15 minutes on the Dungeness River near Sequim (USGS 12048000). The stream gage records surface water flow in the Dungeness River for a drainage area of 156 square miles at river mile 11.8. The location of the gage is shown in *Figure A*. The National Weather Service zero damage flood stage for this gage is 7.0 ft (~4,500 cfs). The zero flood damage was exceeded on October 20 at 1745 hours and crested at 7.67 feet (5,900 cfs) on October 20 at 2000 hours, correlating to a 14-year event. Water dropped below flood stage on October 21 at 0215 hours. It should be noted that another flood event took place due to precipitation beginning on 18 November 2003 prior to investigation of the levee. The Dungeness River near Sequim crested at 7.12 feet (4,740 cfs) on November 19 at 0245 hours, correlating to an 8-year flood event.
3. **Frequency:** A discharge-frequency curve for the Dungeness River was used to determine the frequency of flood events (*Figure B*). The frequency curve was developed on 24 May 1984 using the standard Log Pearson Type III method. The period of record for the gage is from June of 1937 to present. The flood of record for the Dungeness River occurred on 07 January 2002, at a stage of 8.37 feet (7,610 cfs), correlating to a 33-year event.
4. **Original Construction / Repairs:** Two levees on the Dungeness River (shown in *Figure A*) were investigated. Details are as follows:
 - A) Dungeness Meadows Levee – The Dungeness Meadows levee spans from River Mile 8.6 (Levee Station 0+00) to River Mile 7.98 (Levee Station 32+70) and is maintained by the Dungeness Meadows Homeowners Association (DMHA). The levee failed in the late 1970's and was rebuilt in 1980 and rehabilitated in 1981 and 1986. Using survey data from 1990, and modeling in HEC-RAS version 3.1, the levee was found to provide protection against the 100-yr flood with three feet of freeboard. The performance of the 1990 levee is shown in *Figure C*. The most recent levee inspection prior to 2003 occurred on 22 March 2002, a few months after the flood of record. The levee appeared to have held up against the flood, but the DMHA was recommended to closely monitor the levee at station 7+00, where the river makes a sharp bend (*Figure D*).
 - B) Federally Authorized Levee – The Dungeness River levee project was constructed in 1961 under the authority of Section 205. The project provided a three-foot freeboard above the computed water surface profile of a 200-yr event (14,200 cfs at the time). The levee is located on the Lower Dungeness River downstream of Sequim from River Mile 2.4 to River Mile 0, and is maintained by Clallam County.

5. Damage:

A) Dungeness Meadows Levee – A sharp bend in the river exists at the upper end of the levee (Sta. 7+00). High stream velocities have caused scour along the toe of the levee. The toe of the levee has been eroded or has fallen into the developed scour hole. The damage to the levee extends approximately 500 feet downstream of Sta. 7+00. Toe loss is the primary damage resulting in nearly vertical slopes in some areas.

B) Federally Authorized Levee – Damage occurred to the levee approximately 100 to 200 feet downstream of a levee construction project that took place in 2002. A woody debris jam formed at an existing turnaround in the levee resulting in toe scour for approximately 50 feet. The damage does not appear to be critical, since the top width of the levee at the turnaround is wider than the 12-foot top width of the rest of the levee.

6. Current Protection:

A) Dungeness Meadows Levee – Toe loss at levee station 7+00 has resulted in vertical slopes approximately five feet high. It was assumed that the levee would continue to erode at a 3:1 horizontal to vertical stable slope. The resulting reduction in levee height is considered to be the current protection level. The procedure is shown in *Figure E*. The toe loss present in December of 2003 reduces the current level of protection to a 15-yr flood event with zero freeboard. Predicted inundation levels of the Dungeness Meadows residential area for various flood events occurring after a possible failure of the levee are shown in *Figure F*.

B) Federally Authorized Levee – There is minor damage to the Federally Authorized Levee. The damage is toe loss and is primarily seen at the turnaround. *Figure G* shows that the toe loss at the turnaround threatens the turnaround itself, but does not necessarily decrease the level of protection.

7. Proposed Correction:

A) Dungeness Meadows Levee – To repair the levee to its pre-flood condition, the toe and launchable toe must be replaced. The launchable toe provides a volume of material that will fall into a developing scour hole. The function of the launchable toe is to prevent the loss of riprap into the scoured region and to provide protection for the increased surface area due to scour. Up to 25 ft³/ft of riprap has been eroded along the damaged area, and 50 ft³/ft of additional riprap is needed to line the developing scour hole. This results in 2.5 cubic yards of riprap per linear foot, or a total of 1250 cubic yards for the 500 foot damaged section. *Figure H* shows the hydraulic characteristics along the levee. The channel is relatively steep producing near critical flows with average velocities ranging from 8 to 10 cfs at a 10-year event. Actual velocities at a sharp bend in the river can often be double the average computed velocities. Thus, class III riprap (30" material) should be used for this reach of the river.

B) Federally Authorized Levee – There is a minor reduction in the level of protection due to the toe loss. Thus, no immediate action is recommended. The toe loss and debris jam should be closely monitored, especially after future flood events.

8. Figures:

Figure A – Location of USGS Stream Gage and Investigated Levees.

Figure B – Discharge Frequency Curve for the Dungeness River near Sequim (USGS 12048000).

Figure C – Dungeness Meadows Levee Performance using 1990 Survey Data and HEC-RAS.

Figure D – Aerial Photo of the Dungeness Meadows Levee, 1985.

Figure E – Dungeness Meadows Levee Current Level of Protection.

Figure F – Inundation Levels for Post-Levee Failure Flood Events.

Figure G – Dungeness River Federal Levee Current Level of Protection.

Figure H – HEC-RAS Hydraulic Characteristics Output for the Dungeness Meadows Levee.

Figure I – Proposed Rehabilitation for the Dungeness Meadows Levee.

Figure J – Photos Taken During the December 17, 2003, Site Visit.

Doug Knapp

Hydraulic Engineer

Figure A – Location of USGS Stream Gage and Investigated Levees.

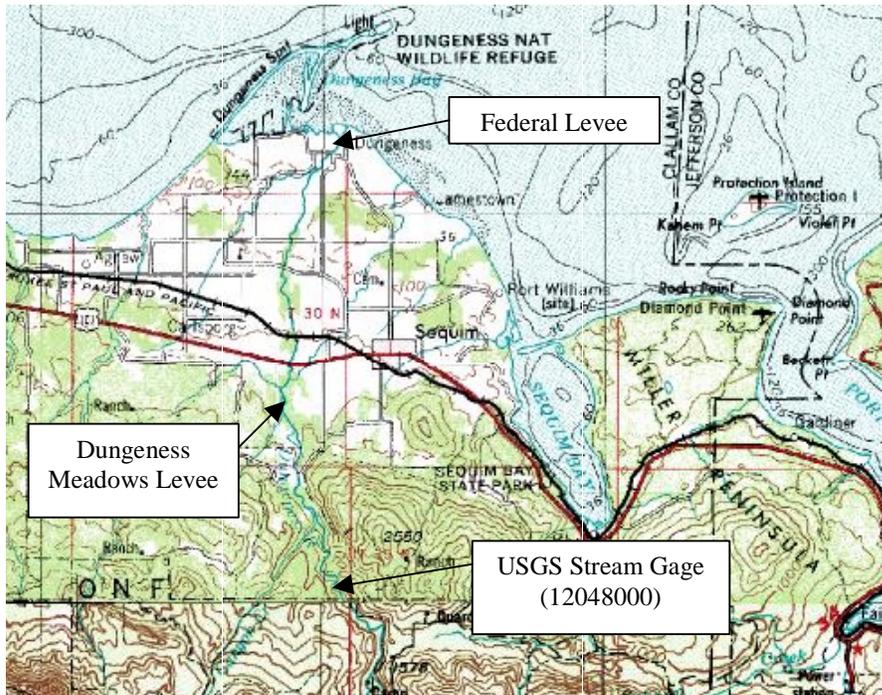


Figure B – Discharge Frequency Curve for the Dungeness River near Sequim (USGS 12048000).

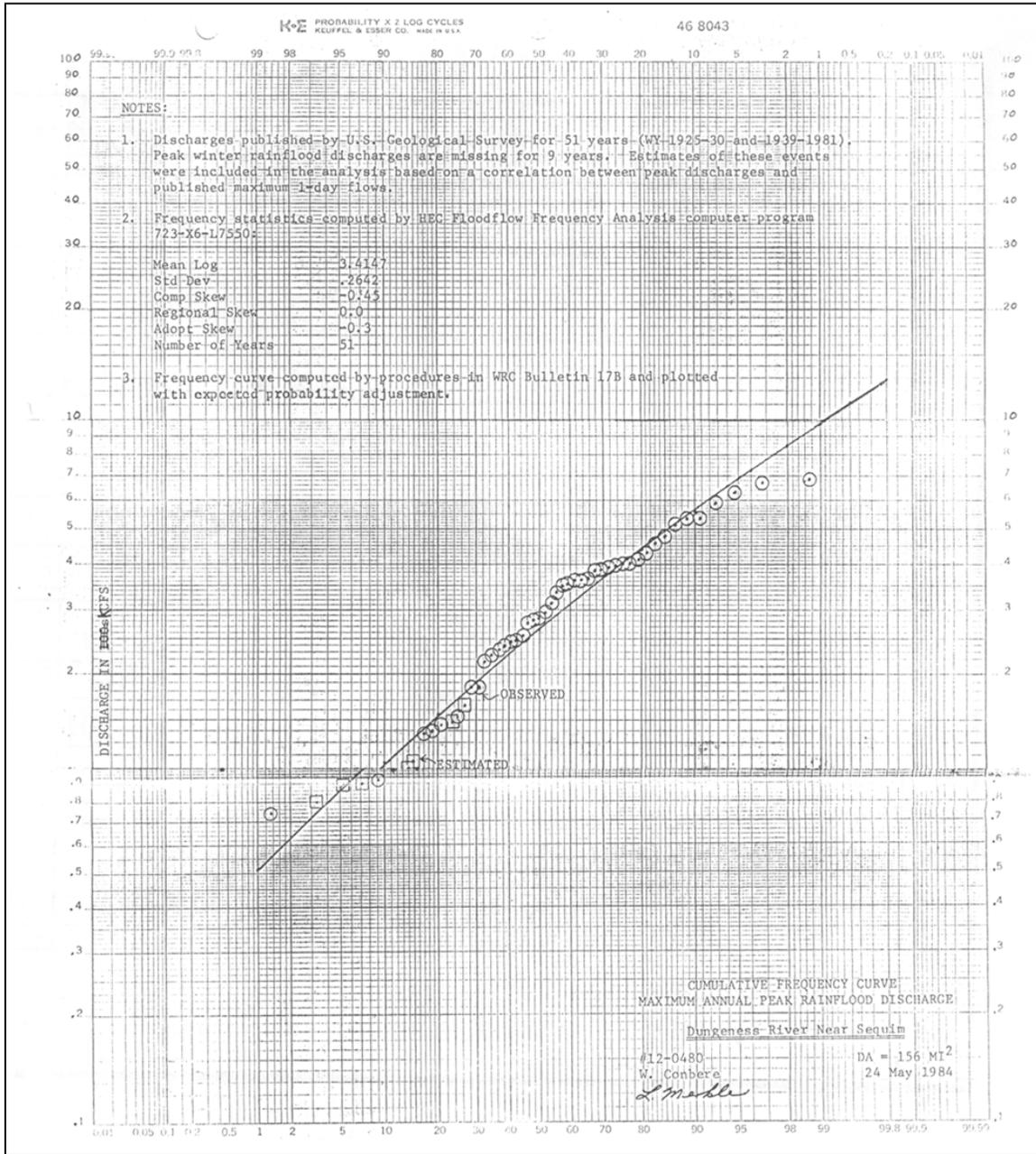


Figure C – Dungeness Meadows Levee Performance using 1990 Survey Data and HEC-RAS.

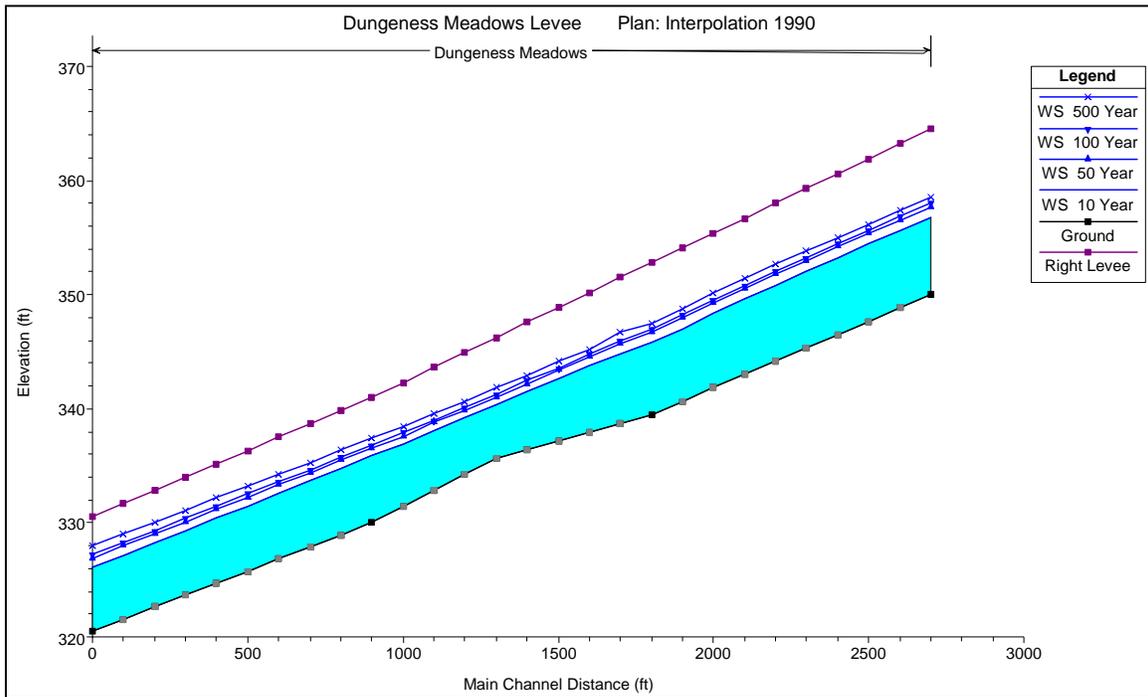


Figure D – Aerial Photo of the Dungeness Meadows Levee, 1985.

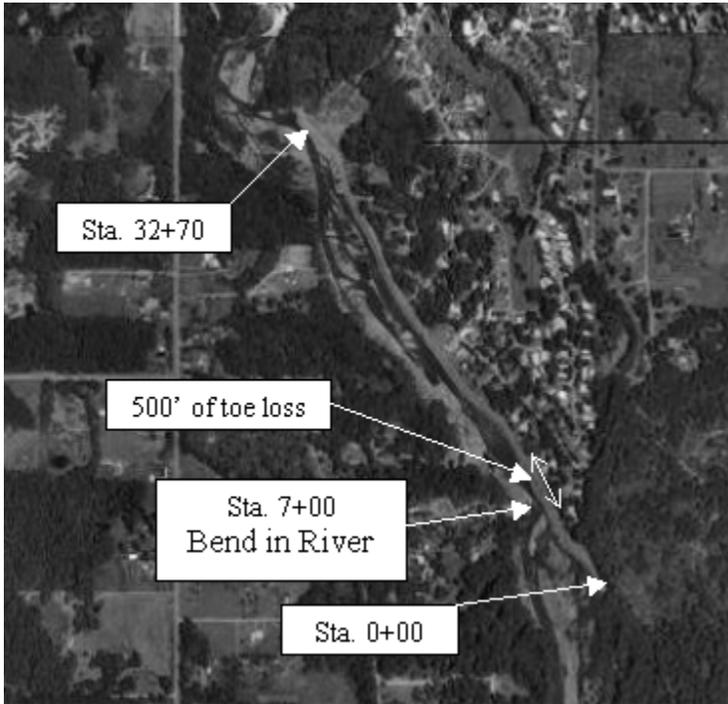


Figure E – Dungeness Meadows Levee Current Level of Protection.

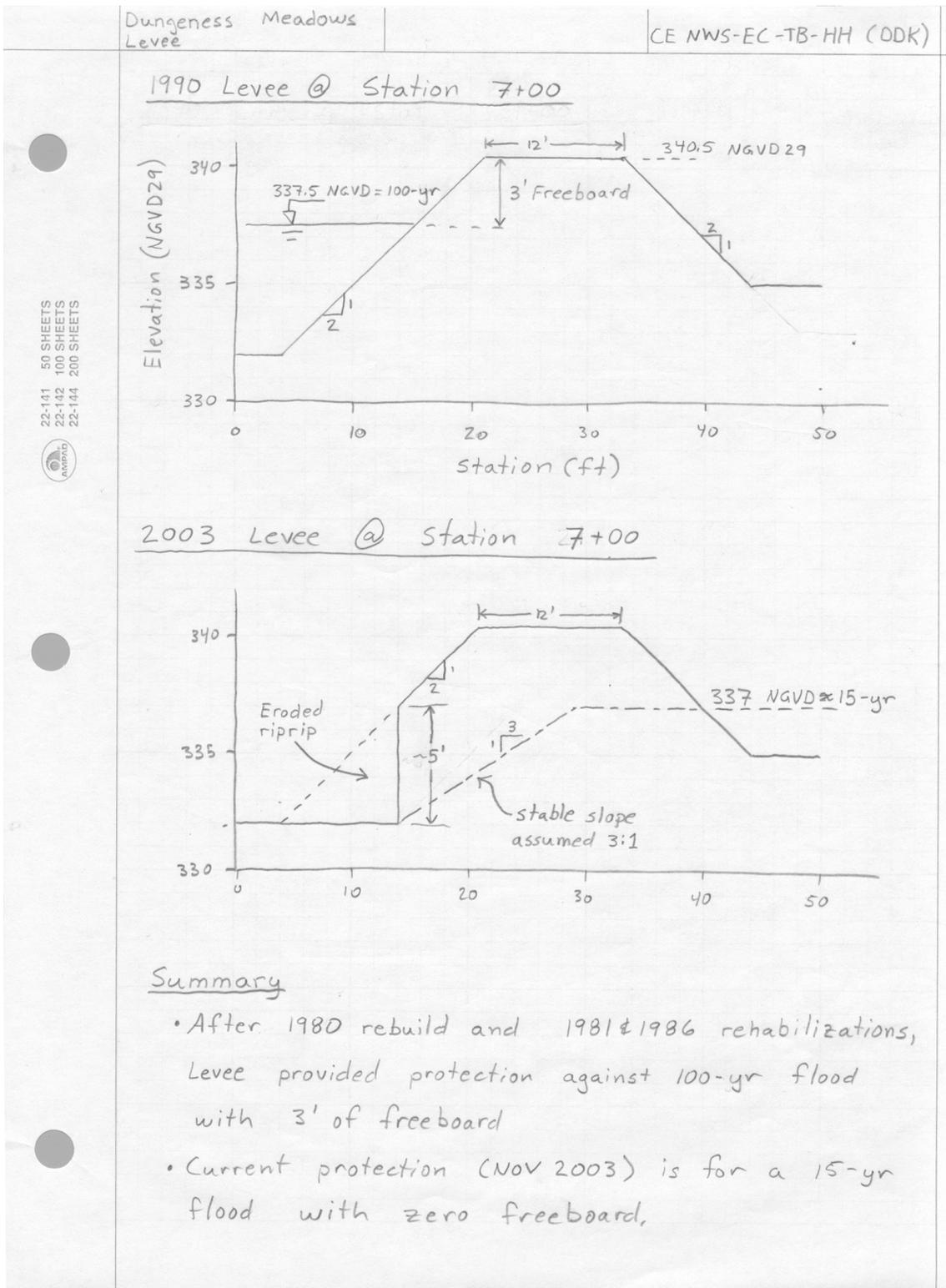


Figure F – Inundation Levels for Post-Levee Failure Flood Events.

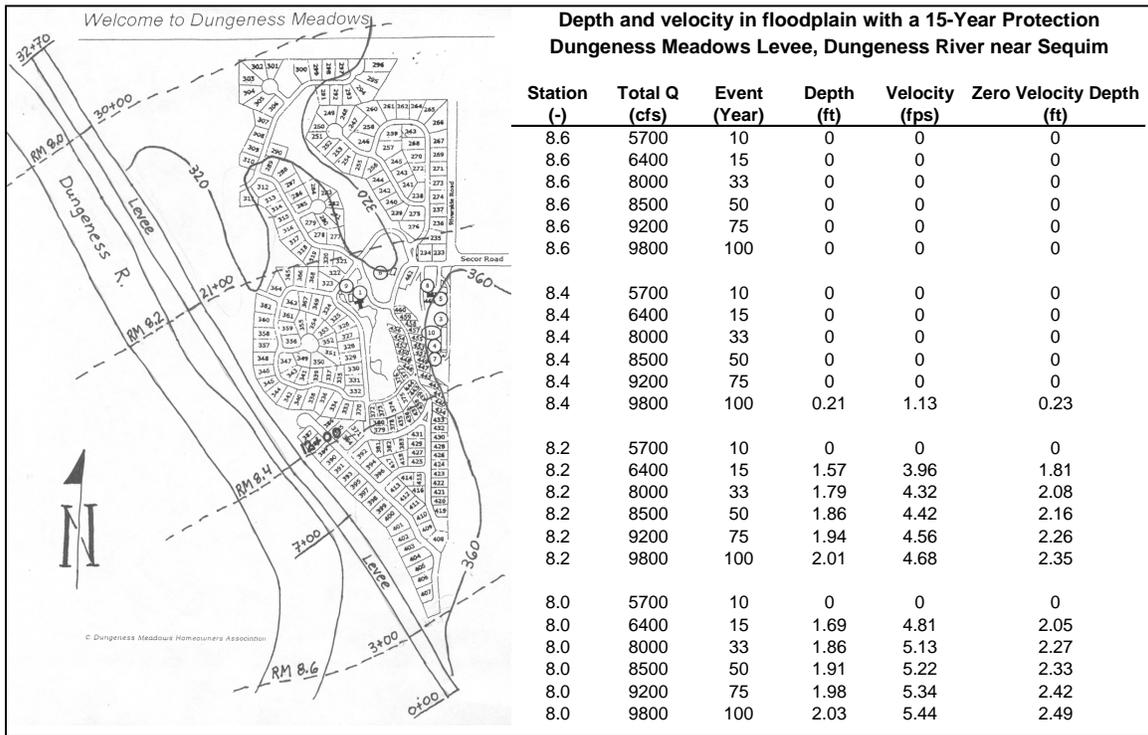
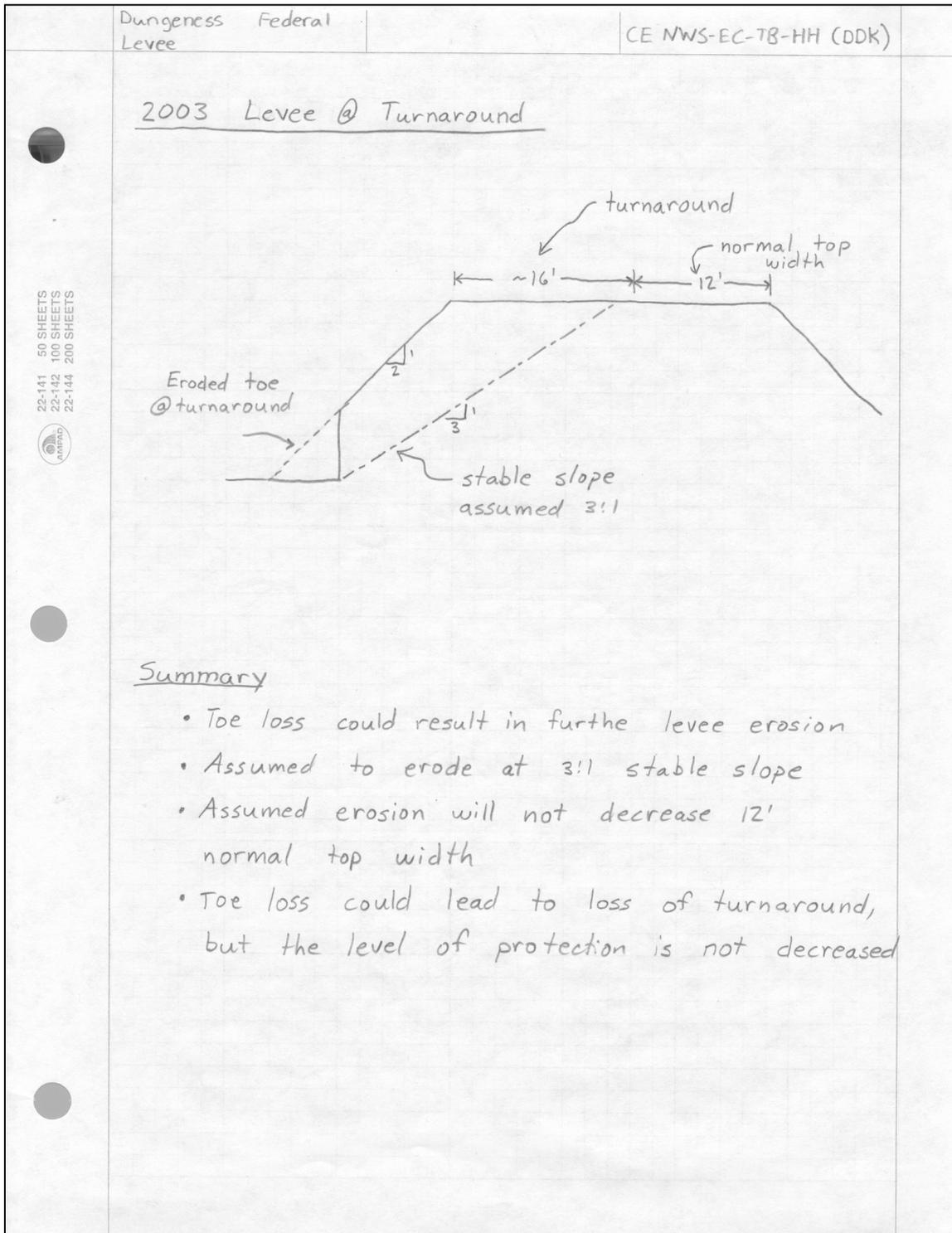


Figure G – Dungeness River Federal Levee Current Level of Protection.

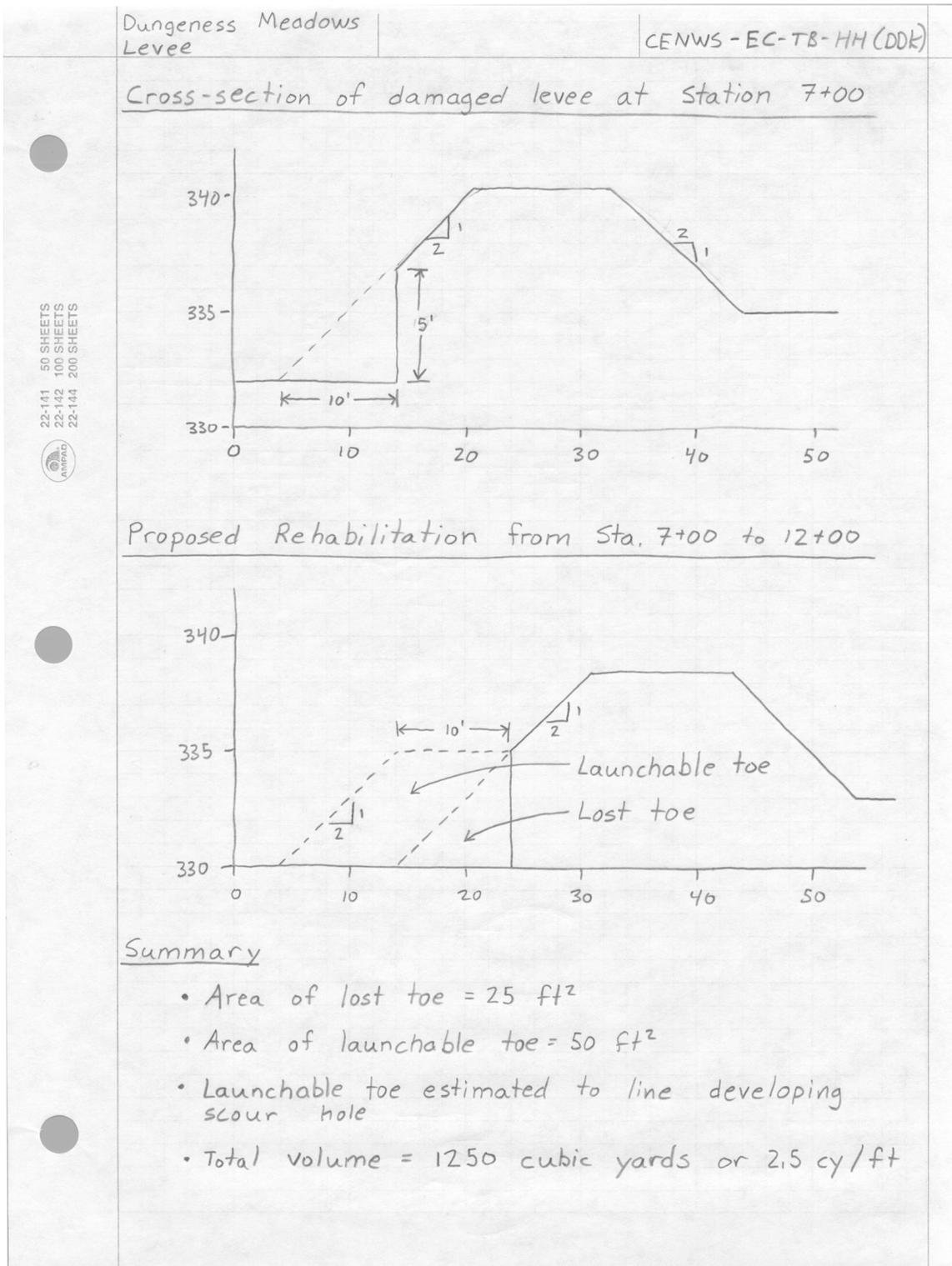


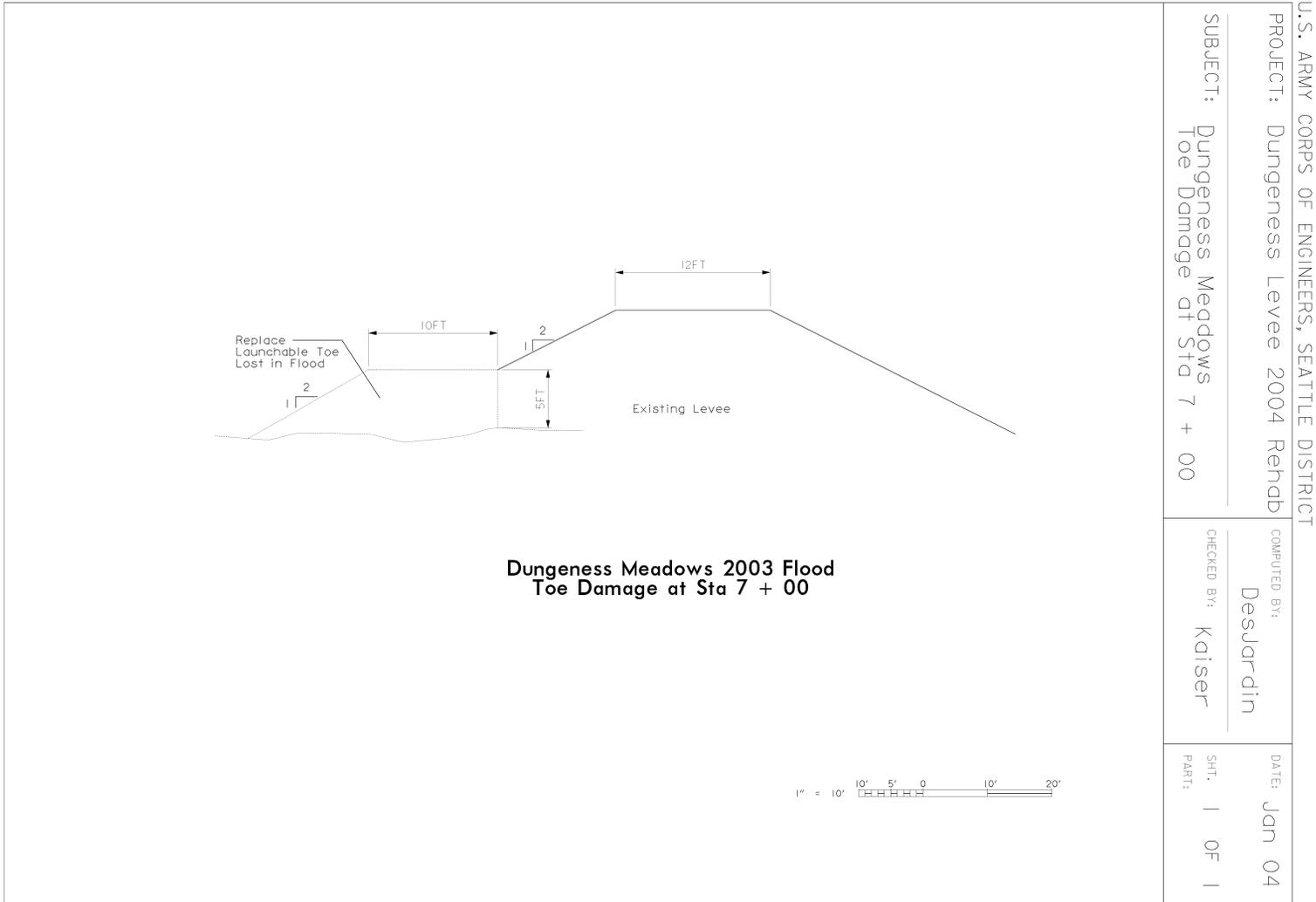
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Figure H – HEC-RAS Hydraulic Characteristics Output for the Dungeness Meadows Levee.

Reach	River Sta	Profile	Q Total (cfs)	Min.Ch El (ft)	W.S. Elev (ft)	Ch.W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Shear Chan (lb/sq ft)	Shear Total (lb/sq ft)
Meadows	8.6	10 Year	5700.00	350.00	356.76	356.59	357.81	0.011267	8.23	692.56	277.49	0.92	1.74	1.74
Meadows	8.6	50 Year	8500.00	350.00	357.69	357.56	358.80	0.011337	8.47	1003.56	387.53	0.93	1.82	1.82
Meadows	8.6	100 Year	9800.00	350.00	358.01	357.81	359.18	0.011889	8.69	1128.25	435.00	0.95	1.91	1.91
Meadows	8.6	200 Year	11000.00	350.00	358.21	358.12	359.48	0.011761	9.06	1214.13	435.78	0.96	2.03	2.03
Meadows	8.6	500 Year	13000.00	350.00	358.52	358.45	359.96	0.011489	9.61	1353.35	437.04	0.96	2.20	2.20
Meadows	8.4	10 Year	5700.00	339.50	345.88	345.67	346.98	0.010288	8.52	678.77	248.77	0.90	1.79	1.74
Meadows	8.4	50 Year	8500.00	339.50	346.73	346.61	348.06	0.011060	9.29	921.44	308.17	0.94	2.07	2.05
Meadows	8.4	100 Year	9800.00	339.50	347.01	346.89	348.48	0.010988	9.80	1007.95	311.65	0.95	2.24	2.20
Meadows	8.4	200 Year	11000.00	339.50	347.33	347.17	348.87	0.010136	10.01	1114.81	354.76	0.93	2.27	1.97
Meadows	8.4	500 Year	13000.00	339.50	347.43	347.66	349.45	0.012937	11.51	1149.85	367.79	1.05	2.97	2.50
Meadows	8.2	10 Year	5700.00	330.00	336.92	336.67	336.85	0.009396	7.92	747.32	300.48	0.85	1.57	1.44
Meadows	8.2	50 Year	8500.00	330.00	336.53	336.49	337.86	0.010514	9.60	946.40	334.14	0.93	2.15	1.83
Meadows	8.2	100 Year	9800.00	330.00	336.81	336.77	338.26	0.010340	10.05	1040.85	335.52	0.94	2.29	1.97
Meadows	8.2	200 Year	11000.00	330.00	337.05	337.00	338.62	0.010301	10.47	1120.62	336.68	0.94	2.44	2.10
Meadows	8.2	500 Year	13000.00	330.00	337.43	337.39	339.19	0.010144	11.08	1250.39	338.56	0.95	2.64	2.30
Meadows	8.0	10 Year	5700.00	320.50	326.06	326.17	327.50	0.010144	9.97	630.34	241.48	0.93	2.26	1.64
Meadows	8.0	50 Year	8500.00	320.50	326.90	327.01	328.68	0.009833	11.30	834.67	245.17	0.95	2.70	2.08
Meadows	8.0	100 Year	9800.00	320.50	327.25	327.35	329.19	0.009706	11.81	920.54	246.71	0.95	2.87	2.24
Meadows	8.0	200 Year	11000.00	320.50	327.58	327.65	329.63	0.009473	12.19	1000.48	248.13	0.95	3.00	2.37
Meadows	8.0	500 Year	13000.00	320.50	328.05	328.13	330.32	0.009385	12.87	1118.17	250.21	0.96	3.24	2.60

Figure I – Proposed Rehabilitation for the Dungeness Meadows Levee.





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APPENDIX D

PIR Review Checklist

DRAFT - March 3, 2004

YES NO N/A

1. ____ ____ ____ The project is active in the RIP. [ER, 5-2.a.]
2. ____ ____ ____ The project was damaged by flood(s) or coastal storm(s). [ER, 5-2.]
3. ____ ____ ____ The Public Sponsor has requested Rehabilitation Assistance in writing. [EP, 5-10.b.]
4. ____ ____ ____ The Public Sponsor has agreed to sign the Cooperation Agreement, which will occur before USACE begins rehabilitation work. [ER, 5-10.]
5. ____ ____ ____ The estimated construction cost of the rehabilitation is greater than \$15,000, and is not considered sponsor maintenance. [ER, 5-2.q.]
6. ____ ____ ____ The repair option selected is the option that is the least cost to the Federal government, or, the sponsor's preferred alternative is selected with all increases in cost paid by the public sponsor. PIR includes justification for non-select of the least cost alternative. [ER, 5-2.h. and 5-11.e.(3)]
7. ____ ____ ____ The public sponsor is aware of the opportunity to seek a nonstructural alternative project, and has decided to proceed with a structural rehabilitation. [ER, 5-16]
8. ____ ____ ____ The cost estimate in the PIR itemized the work to identify the Public Sponsor's cost share. [ER, 5-11]
9. ____ ____ ____ The rehabilitation project has a favorable benefit cost ratio of greater than 1.0:1. [ER, 5-2.r.]
10. ____ ____ ____ The proposed work will not modify the FCW to increase the degree of protection or capacity, or to provide protection to a larger area. [ER, 5-2.n.]
11. ____ ____ ____ Betterments are paid 100 percent by the Public Sponsor. [5-2.o.]
12. ____ ____ ____ The CA contains a provision for 80% Federal and 20% local cost share for non-Federal projects. [ER, 5-11.a.]
13. ____ ____ ____ Cost for any betterments are identified separately in the cost estimate. [ER, 5-2.o.]

DRAFT - March 3, 2004

14. _____ Repair of deliberate levee cuts is the responsibility of the public sponsor, except as provided for in ER 500-1-1, paragraphs 5-2.j. and 4-3.h. [ER, 5-2.j. and 4-3.h.]
15. _____ All deficient and deferred maintenance will be paid for or accomplished by the Public Sponsor, without receiving credit toward any sponsor's cost share. [ER, 5-2.g.]
16. _____ Any relocation of levees is adequately justified. [ER, 5-2.h.]
17. _____ USACE assistance does not correct design or construction deficiencies. [ER, 5-12.a.]
18. _____ An assessment of environmental requirements was completed. [ER, 5-13., and EP, Figure 5-3, paragraph 12.]
19. _____ The project complies with NEPA, and required documentation was completed and placed in Appendix **G** of the PIR. [ER, 2-3.k.; ER, 5-13.; and EP, Figure 5-3, paragraph 12.]
20. _____ The Endangered Species Act was appropriately considered. [ER, 5-13.g., and EP, Figure 5-3., paragraph 12.]
21. _____ EO 11988 requirements were considered in the process of evaluating the proposed project for rehabilitation. [ER, 5-13.f., and EP, Figure 5-3, paragraph 12.]
22. _____ The completed PIR has been reviewed and the PIR Checklist has been reviewed and signed by the Emergency Management Office. [EP, 5-11.a.(3)(a)]
23. _____ The completed PIR meets all policy, procedural, content, and formatting requirements of ER 500-1-1 and EP 500-1-1. [ER, 2-3.b.]

Prepared By:

Reviewed By:

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APPENDIX E

Certification of Independent Technical Review

STATEMENT OF TECHNICAL REVIEW

**COMPLETION OF INDEPENDENT TECHNICAL REVIEW
PROJECT INFORMATION REPORT
2004 DUNGENESS RIVER LEVEE REHABILITATION PROJECT
Dungeness Meadows**

The Seattle District Corps of Engineers (Corps) has completed its study on the Levee Rehabilitation at the Dungeness Meadows Levee near Sequim, and produced a Project Information Report (PIR). Notice is hereby given that an independent technical review (ITR) has been conducted that is appropriate to the level of risk and complexity inherent in the project, as identified in the Quality Control Plan. The levee rehabilitation study included coordination with agencies at the Federal, state, local, and tribal levels. Those agencies involved included U.S. Fish and Wildlife Service (USFWS), NOAA Fisheries, Washington State Department of Fish and Wildlife (WDFW), Clallam County, and the Jamestown S'klallam Tribe.

All of the technical review comments were resolved, none significantly effected the final project design. However, coordination with resource agencies will continue through construction to identify suitable habitat features that can be incorporated into the design.

During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions were verified. This included review of assumptions, methods, procedures, and materials used in analyses; alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results; including whether the product meets the customer's needs consistent with the law and existing Corps policy.

Paul Komoroske
Chief, Emergency Management

Date

Lester E. Soule
Chief, Civil Projects

Date

Greg Segal
Design Branch

Date

DRAFT - March 3, 2004

Karl Eriksen
Hydrology and Hydraulics Section

Date

Ken Brunner
Environmental Resources Section

Date

Tim Sullivan
Cost Engineering

Date

A.E. Hamilton
Chief, Real Estate

Date