Pierce County
Public Works and Utilities


Courtesy of Gary Marston

Public Works & Utilities Bridge Engineering

Fox Island Bridge

Fox Island Community Presentation

History

- **Built by the Washington Toll Bridge Authority in 1954**
- **Construction Bid $1,051,476**
- **Originally Toll Bridge**
- **Tolls lifted May 14, 1965**


(Courtesy of Fox Island Museum)

Vital Statistics

- **Longest bridge on the Pierce County Inventory (1,950 feet)**
- **Deck width 22’ curb to curb**
- **ADT (Average Daily Traffic) 6,150 in 2013**

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Is the Bridge safe?

YES!

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Sufficiency Rating 7.33

- **What a Sufficiency Rating is: The sufficiency rating is the basis for establishing eligibility and priority for replacement or rehabilitation of bridges with the Federal Highway Bridge Replacement and Rehabilitation Program funds.**

- **What the Sufficiency Rating is NOT: A measure of bridge safety.**

- **In general, the lower the sufficiency rating, the better a project competes for Federal funds.**

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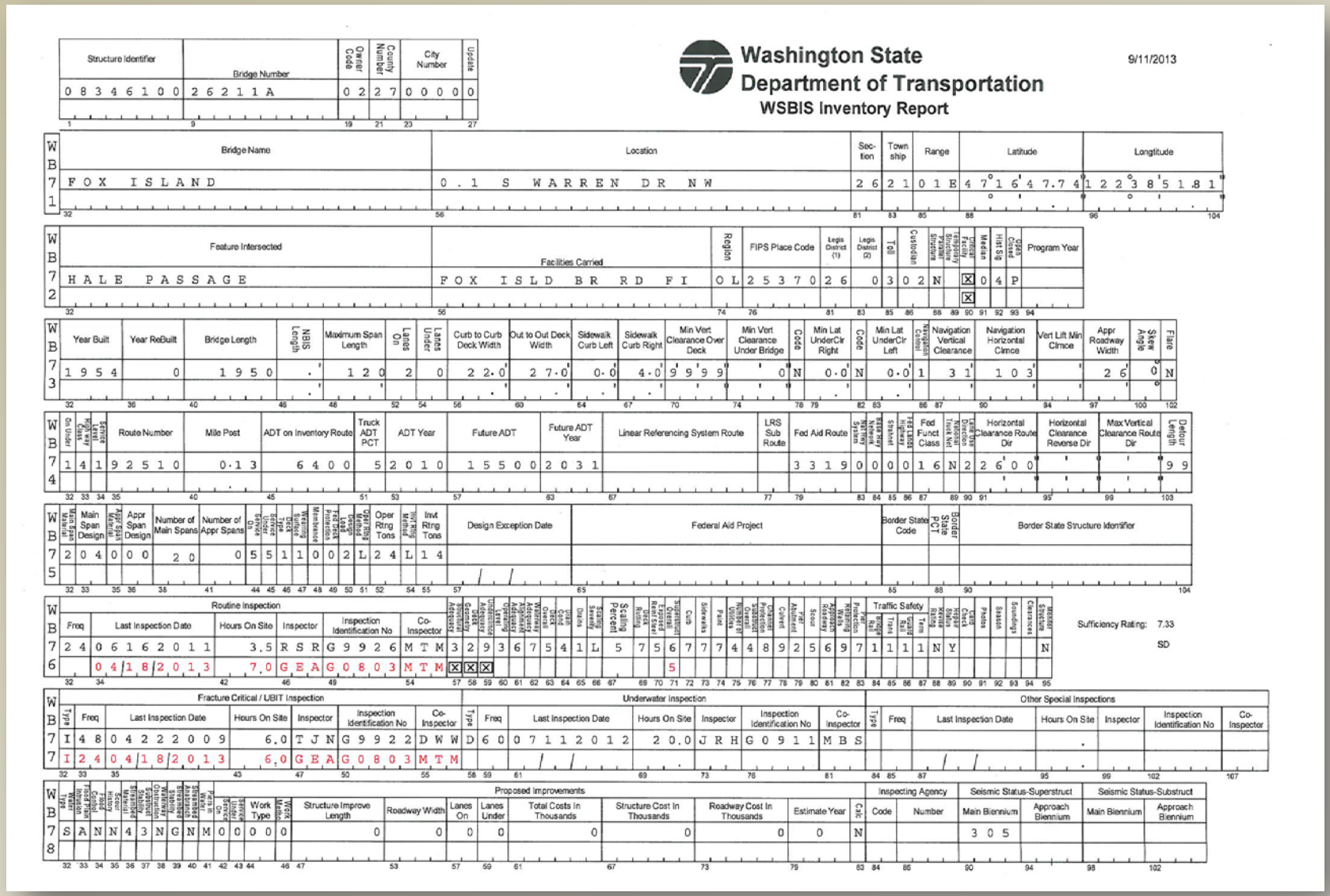
Where does the Sufficiency Rating come from?



Washington State Department of Transportation
WSBIS Inventory Report
9/11/2013

Structure Identifier	Bridge Number	Owner Code	County Number	City Number	Update
0834610026211A		02	27	00000	0

Bridge Name	Location	Section	Township	Range	Latitude	Longitude
FOX ISLAND	0.1 S WARREN DR NW	26	21	01E	47°16'47.74	122°38'51.81

Feature Intersected	Facilities Carried	Region	FIPS Place Code	Legis District (1)	Legis District (2)	Toll	Curbside/Median	Structure Parallel	Temporary Structure	Critical Facility	Median	Hist Sig	Open/Closed	Program Year
HALE PASSAGE	FOX ISLD BR RD FI	OL	25370	26	0	3	02	N		X	04	P		
										X				

Year Built	Year ReBuilt	Bridge Length	NBIS Length	Maximum Span Length	Lanes On	Lanes Under	Curb to Curb Deck Width	Out to Out Deck Width	Sidewalk Curb Left	Sidewalk Curb Right	Min Vert Clearance Over Deck	Min Vert Clearance Under Bridge	Code	Min Lat UnderClr Right	Code	Min Lat UnderClr Left	Navigation Control	Navigation Vertical Clearance	Navigation Horizontal Clrnce	Vert Lift Min Clrnce	Appr Roadway Width	Skew Angle	Flare
1954	0	1950	.	120	2	0	22.0	27.0	0.0	4.0	9999	0	N	0.0	N	0.0	1	31	103		26	0	N

On Under	Highway Class	Level	Route Number	Mile Post	ADT on Inventory Route	Truck ADT PCT	ADT Year	Future ADT	Future ADT Year	Linear Referencing System Route	LRS Sub Route	Fed Aid Route	Highway System	National Network	Strahnet	Federal Lands Highway	Fed Funct Class	Toll	Truck Net	Direction	Horizontal Clearance Route Dir	Horizontal Clearance Reverse Dir	Max Vertical Clearance Route Dir	Detour Length
1	4	1	92510	0.13	6400	5	2010	15500	2031			3319	0	0	0	0	16	N	2		2600			99

Main Span Material	Main Span Design	Appr Span Material	Appr Span Design	Number of Main Spans	Number of Appr Spans	Structure Flared	Wearing Surface	Deck Membrane	Deck Protection	Deck Rebar Coated	Oper Rtng Method	Oper Rtng Tons	Inv Rtng Method	Inv Rtng Tons	Design Exception Date	Federal Aid Project	Border State Code	Border State PCT	Border State Structure Identifier
2	04	0	00	20	0	55	11	0	0	2	L	24	L	14					

Routine Inspection

Freq	Last Inspection Date	Hours On Site	Inspector	Inspection Identification No	Co-Inspector
24	06162011	3.5	RSR	G9926	MTM
	04/18/2013	7.0	GEA	G0803	MTM

Sufficiency Rating: 7.33
SD

Fracture Critical / UBIT Inspection

Type	Freq	Last Inspection Date	Hours On Site	Inspector	Inspection Identification No	Co-Inspector
I	48	04222009	6.0	TJN	G9922	DWW
I	24	04/18/2013	6.0	GEA	G0803	MTM

Underwater Inspection

Type	Freq	Last Inspection Date	Hours On Site	Inspector	Inspection Identification No	Co-Inspector
D	60	07112012	2.0	JRH	G0911	MBS

Other Special Inspections

Type	Freq	Last Inspection Date	Hours On Site	Inspector	Inspection Identification No	Co-Inspector

Proposed Improvements

Type	Work Type	Work Mailed	Structure Improve Length	Roadway Width	Lanes On	Lanes Under	Total Costs In Thousands	Structure Cost In Thousands	Roadway Cost In Thousands	Estimate Year	Calc
SA	NN	43	NG	NM	00	000	0	0	0	0	0	N

Inspecting Agency Code	Inspecting Agency Number	Seismic Status-Superstruct Main Biennium	Seismic Status-Superstruct Approach Biennium	Seismic Status-Substruct Main Biennium	Seismic Status-Substruct Approach Biennium
		305			

Sufficiency Rating details

Summation of four calculated values:

- Structural Adequacy and Safety (55%)
- Serviceability and Functional Obsolescence (30%)
- Essentiality for Public Use (15%)
- Special reductions (variable)

Structural Adequacy and Safety

- **Superstructure overall**
- **Inventory rating**
- **Substructure overall**
- **Culverts**

3		Structural Adqcy	(657)	2		Pier/Abut/Protect	(679)	1954	Year Built	(332)	
2		Deck Geometry	(658)	5		Scour	(680)	0	Year Rebuilt	(336)	
9		Underclearance	(659)	9		Retaining Walls	(682)	24	Oper Rating	(551)	
3		Operating Level	(660)	7		Pier Protection	(683)	14	Inv Rating	(554)	
6		Alignment Adqcy	(661)	1		Bridge Rails	(684)	P	Open Close	(293)	
7		WaterwayAdqcy	(662)	1		Transition	(685)	9999	Vert Over Deck	(360)	
5		Deck Overall	(663)	1		Guardrails	(686)	0000	Vert Under	(374)	
4		Drains Condition	(664)	1		Terminals	(687)	N	Vert Und Code	(378)	
6	5	Superstructure	(671)	N		Revise Rating	(688)	0.00	Asphalt Depth		
4		Number Utilities	(675)			Photos Flag	(691)	35	Speed Limit		
4		Substructure	(676)			Soundings Flag	(693)				
8		Chan/Protection	(677)			Measure Clearance	(694)				
9		Culvert	(678)								

Inspections Performed

IT	NT	HRS	Date	Rep Type
Y	24	7.0	04/18/2013	Routine
				Fract Crit
D	60	20.0	07/11/2012	Underwater
				Special
				Interim
				Equipment
				Damage
				Safety
				Short Span

Total: 13.0

Suff Rating: 7.33 SD 7.33 SD

Serviceability and Functional Obsolescence

- Main span design
- Curb-to-Curb width
- Approach roadway
- ADT
- Structural adequacy
- Deck geometry
- Under clearance adequacy
- Alignment adequacy
- Waterway adequacy
- Deck overall
- Lanes on bridge

- Minimum Vertical clearance over deck
- STRAHNET (Strategic Highway Network)

Essentiality for Public Use

- **ADT**
- **STRAHNET**
- **Detour length**

Special Reductions

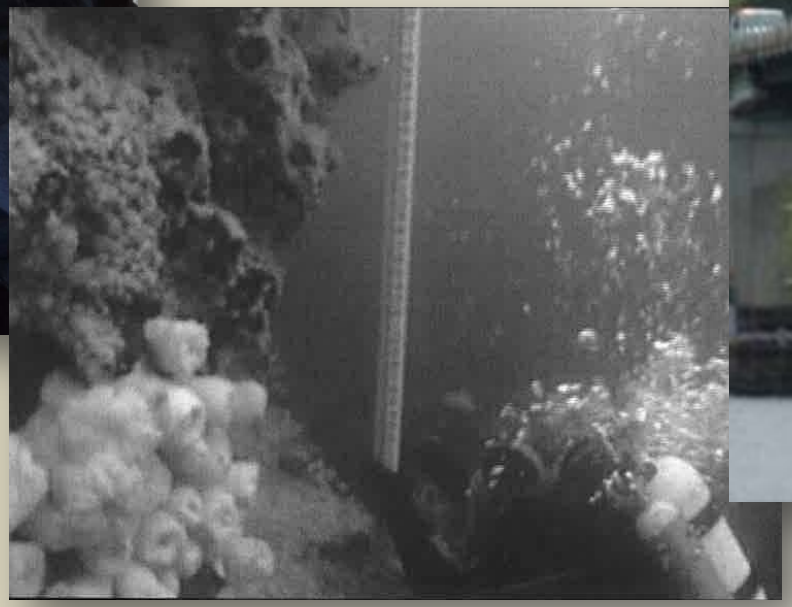
- **Detour Length**
- **Main span design**
- **Bridge rail**
- **Transition**
- **Guardrail**
- **Terminal**

Functionally Obsolete / Structurally Deficient

- **Functionally obsolete**
  - **Federal definition –** a bridge that has deck geometry, load carrying capacity, clearance or approach roadway alignment that no longer meets the criteria for the system of which the bridge is a part.

- **Structurally deficient**
  - **Federal definition –** bridges where:
    1) Significant load carrying elements are found to be in poor or worse condition due to deterioration and/or damage or,
    2) The adequacy of the waterway opening provided by the bridge is determined to be extremely insufficient to the point of causing intolerable traffic interruptions.

How does the County monitor/maintain bridge structural condition?

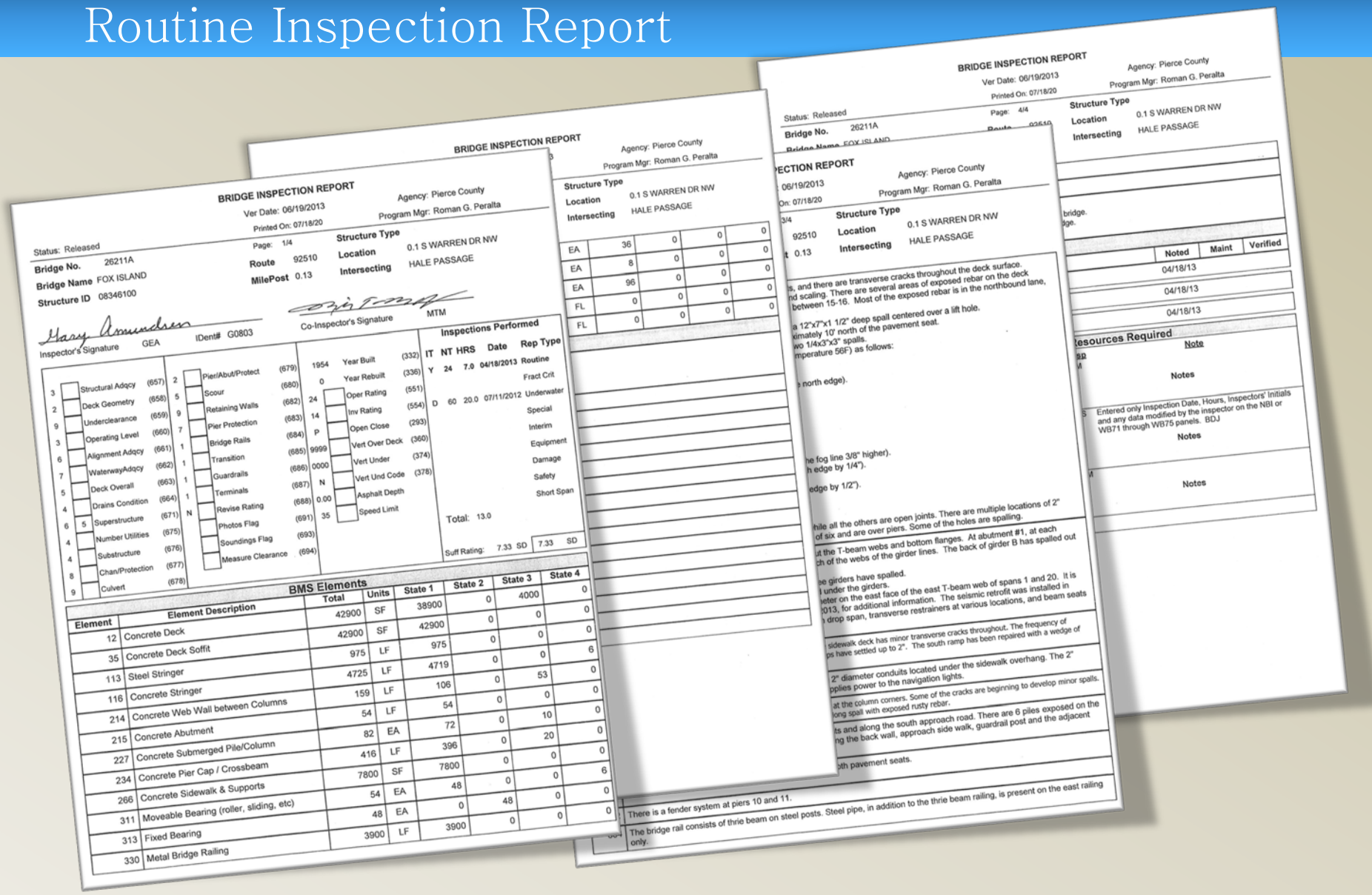


Inspections:

- Routine – 24 months
- Underwater – 60 months
- UBIT (Under Bridge Inspection Truck) – 24 months [in 2009, the frequency was 48 months]

Pierce County
Public Works and Utilities

Routine Inspection Report



BRIDGE INSPECTION REPORT

Status: Released
Ver Date: 06/19/2013
Printed On: 07/18/20
Page: 1/4
Agency: Pierce County
Program Mgr: Roman G. Peralta

Bridge No. 26211A
Bridge Name FOX ISLAND
Structure ID 08346100
Route 92510
MilePost 0.13
Structure Type
Location 0.1 S WARREN DR NW
Intersecting HALE PASSAGE

Inspector's Signature GEA IDent# G0803
Co-Inspector's Signature MTM

3		Structural Adqcy	(657)	2		Pier/Abut/Protect	(679)	1954	Year Built	(332)
2		Deck Geometry	(658)	5		Scour	(680)	0	Year Rebuilt	(336)
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6	5	Superstructure	(671)	N		Revise Rating	(688)	0.00	Asphalt Depth	
4		Number Utilities	(675)			Photos Flag	(691)	35	Speed Limit	
4		Substructure	(676)			Soundings Flag	(693)			
8		Chan/Protection	(677)			Measure Clearance	(694)			
9		Culvert	(678)							

Inspections Performed

IT	NT	HRS	Date	Rep Type
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				Fract Crit
D	60	20.0	07/11/2012	Underwater
				Special
				Interim
				Equipment
				Damage
				Safety
				Short Span

Total: 13.0

Suff Rating: 7.33 SD 7.33 SD

BMS Elements

Element	Element Description	Total	Units	State 1	State 2	State 3	State 4
12	Concrete Deck	42900	SF	38900	0	4000	0
35	Concrete Deck Soffit	42900	SF	42900	0	0	0
113	Steel Stringer	975	LF	975	0	0	0
116	Concrete Stringer	4725	LF	4719	0	0	6
214	Concrete Web Wall between Columns	159	LF	106	0	53	0
215	Concrete Abutment	54	LF	54	0	0	0
227	Concrete Submerged Pile/Column	82	EA	72	0	10	0
234	Concrete Pier Cap / Crossbeam	416	LF	396	0	20	0
266	Concrete Sidewalk & Supports	7800	SF	7800	0	0	0
311	Moveable Bearing (roller, sliding, etc)	54	EA	48	0	0	6
313	Fixed Bearing	48	EA	0	48	0	0
330	Metal Bridge Railing	3900	LF	3900	0	0	0

EA	36	0	0	0
EA	8	0	0	0
EA	96	0	0	0
FL	0	0	0	0
FL	0	0	0	0

There is a fender system at piers 10 and 11.

The bridge rail consists of thrie beam on steel posts. Steel pipe, in addition to the thrie beam railing, is present on the east railing only.

	Noted	Maint	Verified
	04/18/13		
	04/18/13		
	04/18/13		

Resources Required

Note

Notes

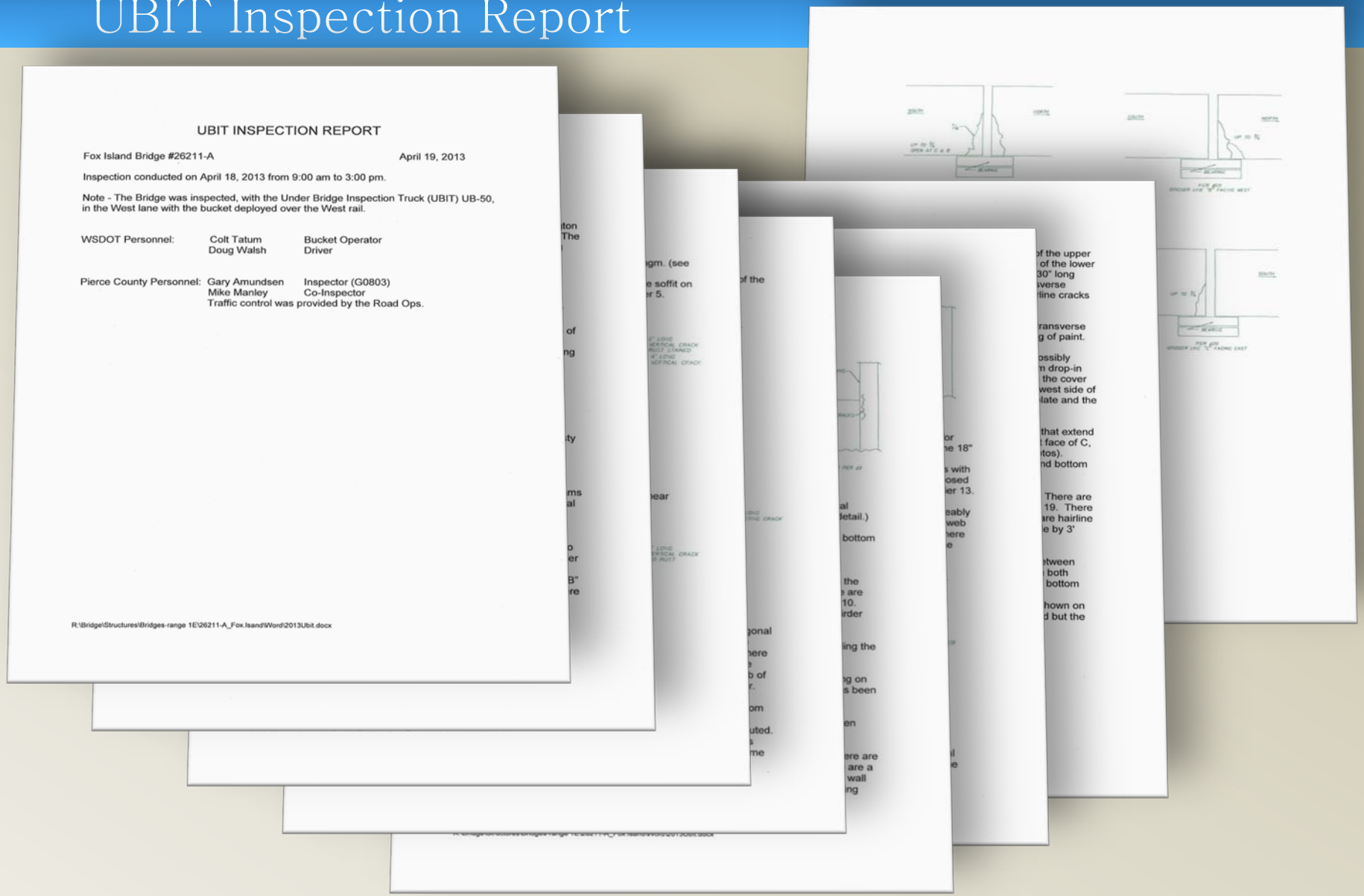
Entered only Inspection Date, Hours, Inspectors' Initials and any data modified by the inspector on the NBI or WB71 through WB75 panels. BDJ

Notes

Notes

Pierce County
Public Works and Utilities

UBIT Inspection Report



UBIT INSPECTION REPORT

Fox Island Bridge #26211-A April 19, 2013

Inspection conducted on April 18, 2013 from 9:00 am to 3:00 pm.

Note - The Bridge was inspected, with the Under Bridge Inspection Truck (UBIT) UB-50, in the West lane with the bucket deployed over the West rail.

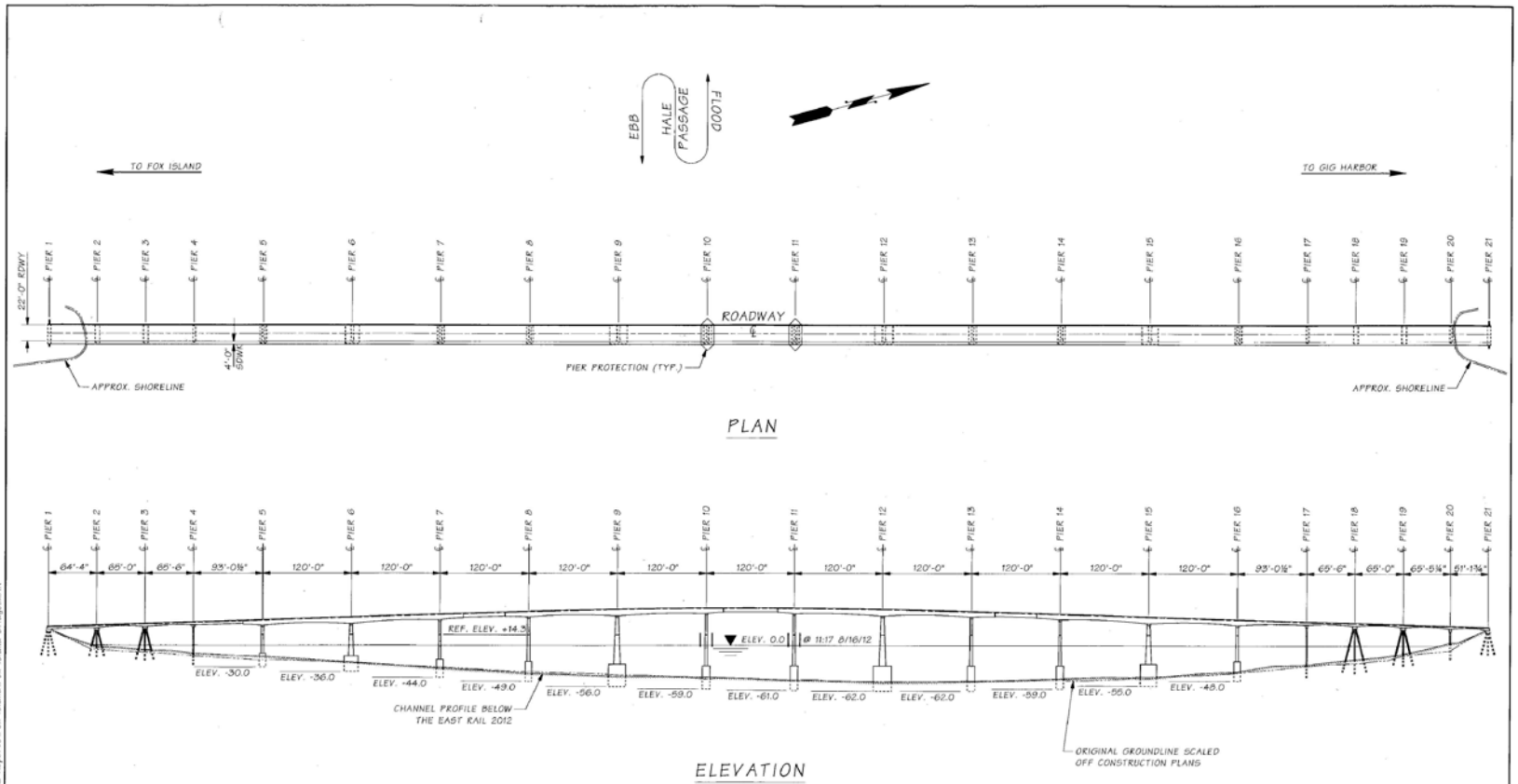
WSDOT Personnel:	Colt Tatum	Bucket Operator
	Doug Walsh	Driver
Pierce County Personnel:	Gary Amundsen	Inspector (G0803)
	Mike Manley	Co-Inspector

Traffic control was provided by the Road Ops.

R:\Bridge\Structures\Bridges-range 1E\26211-A_Fox Island\Word\2013Ubit.docx

Pierce County
Public Works and Utilities

Underwater Inspection Report – Layout



NOTES:

1. BRIDGE LAYOUT PER ORIGINAL CONSTRUCTION PLANS, WASHINGTON TOLL BRIDGE AUTHORITY, DATED NOVEMBER 12, 1952
2. REFERENCE ELEVATION, TOP OF PIER 7 PIER WALL ELEV. +14.3

Date:	JULY 11, 2012
Scale:	MGDS SCALE: 1:775
Drawn By:	JRH
Reviewed By:	MBS

WSDOT Dive Team

Washington State Department of Transportation
Bridge and Structures Office

BR. NO. 26211A FOX ISLAND BRIDGE
PIERCE COUNTY STR. ID. 08346100
UNDERWATER INSPECTION

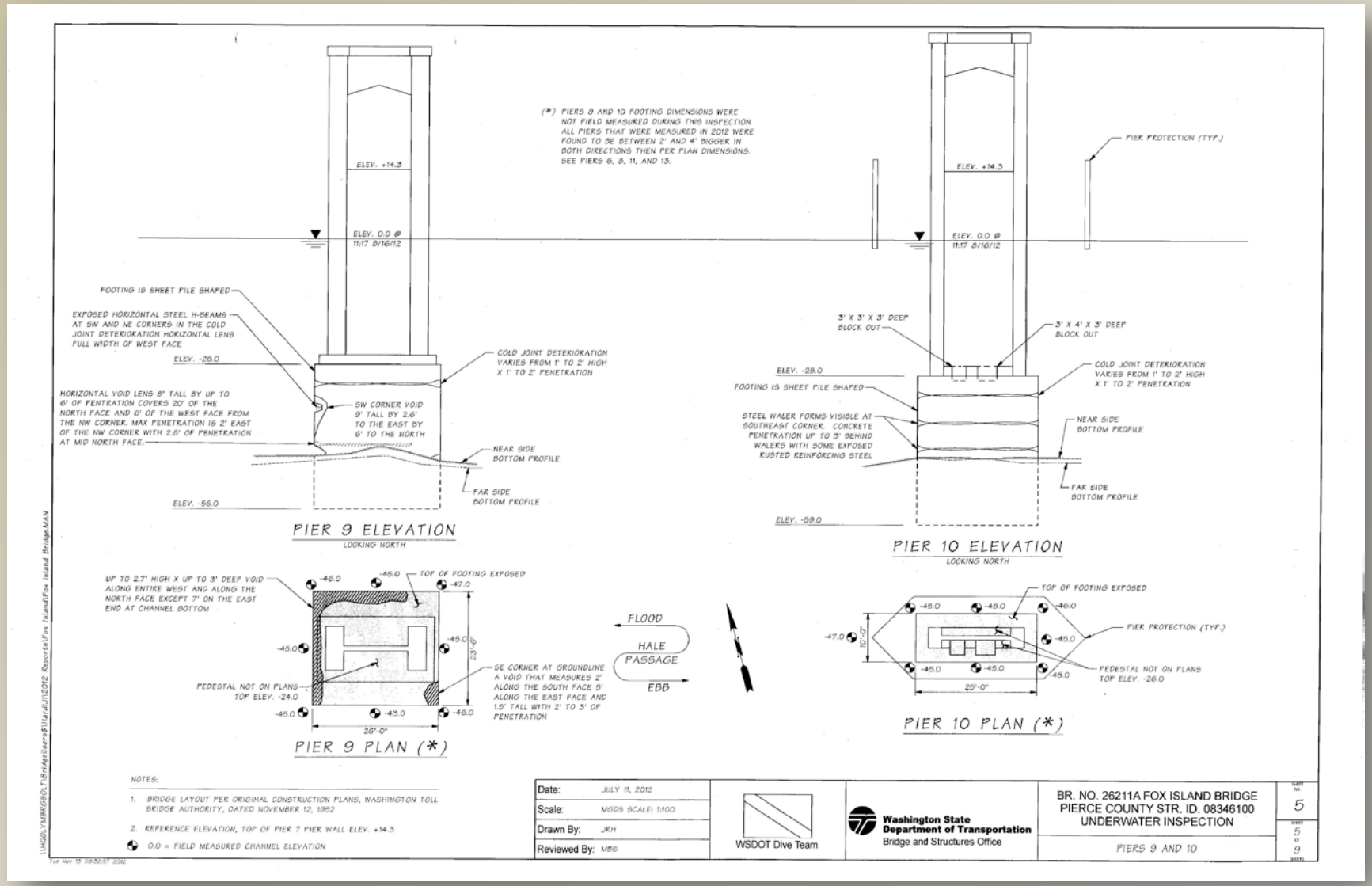
LAYOUT

SHEET NO. 1
SHEET 1 OF 9 SHEETS

76047

Pierce County
Public Works and Utilities

Underwater Inspection Report – Piers 9 & 10



Pierce County
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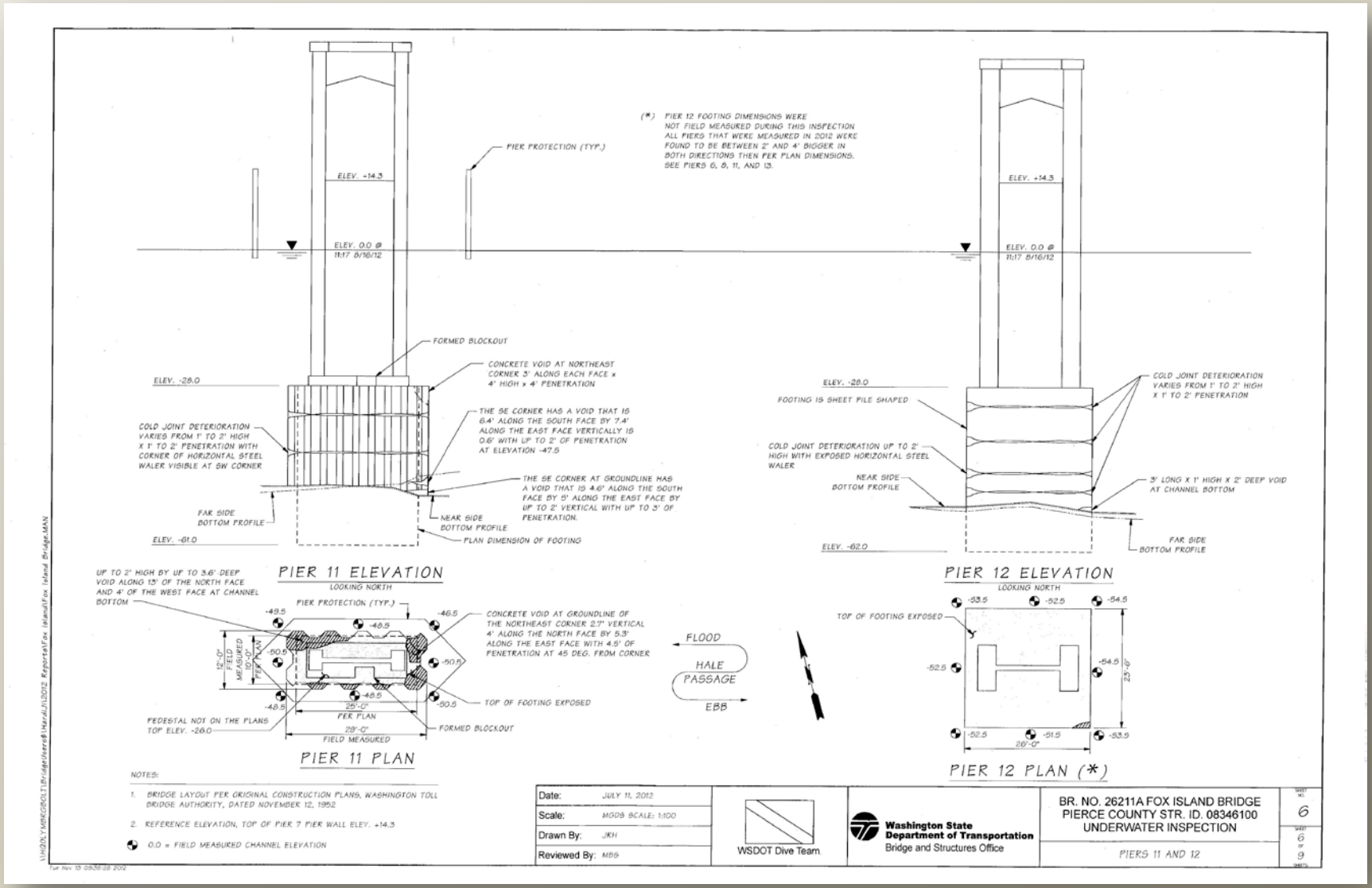
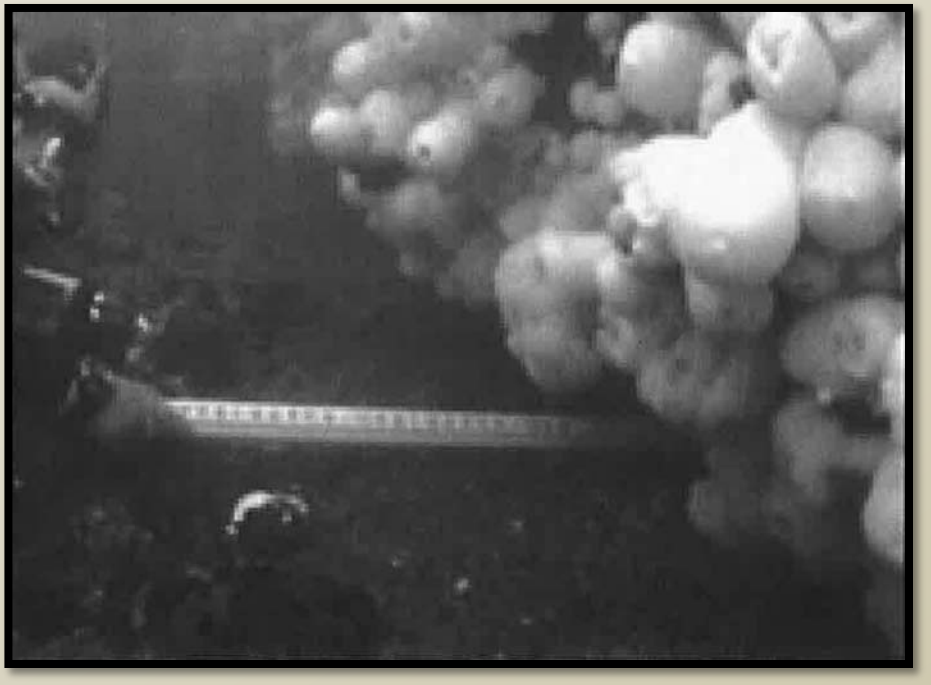
Underwater Inspection Report – Piers 11 & 12



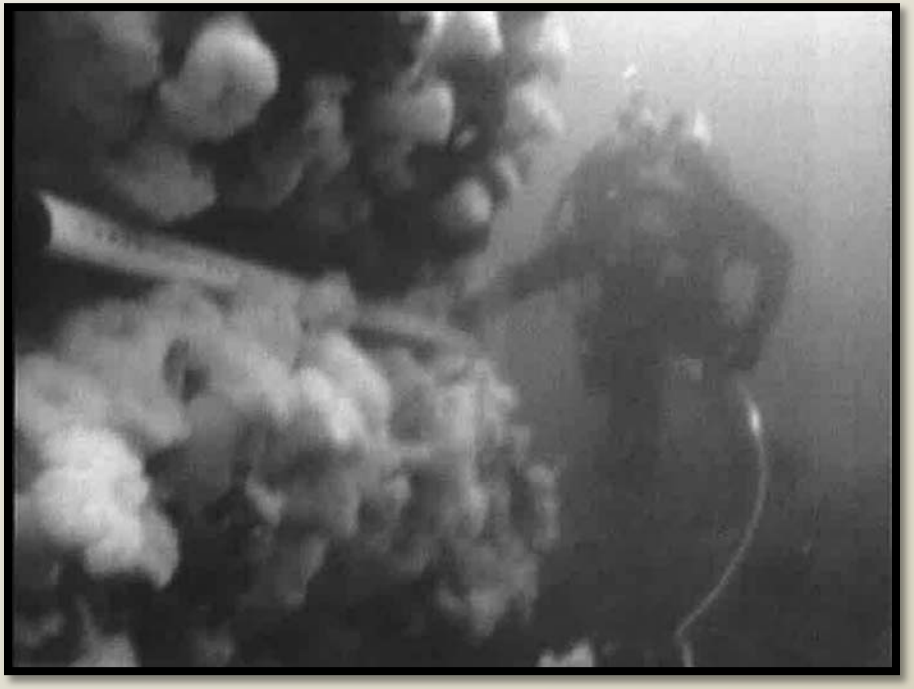
Underwater Inspection Report – Photos

SW corner of Pier 6 lens of poor consolidation measuring up to 2' vertical with up to 3.2' of penetration along the entire west face.

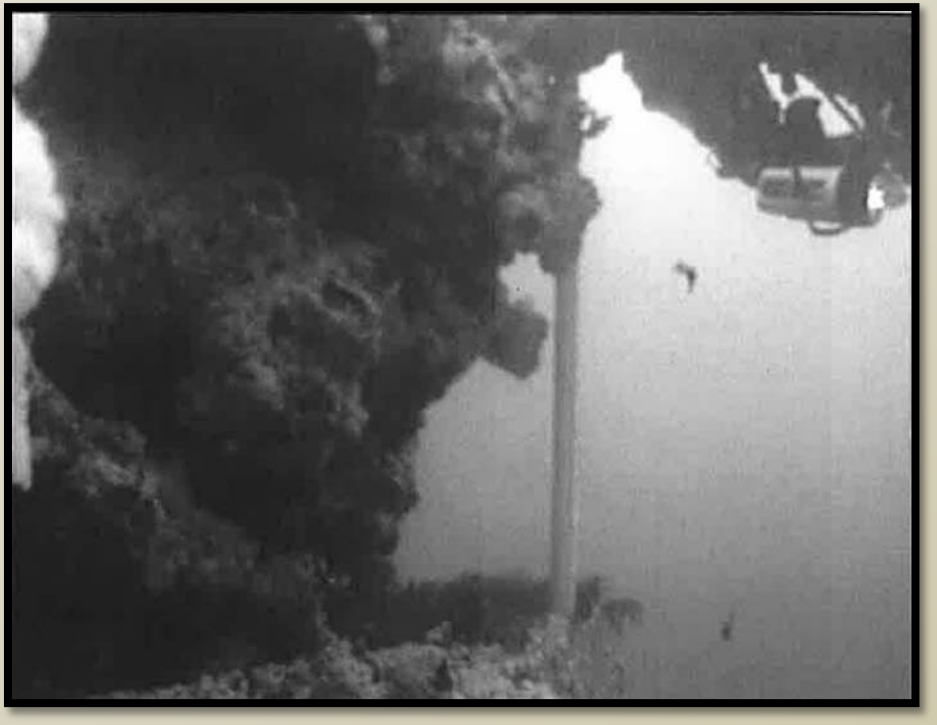


Middle of Pier 6 lens of poor consolidation measuring up to 2' vertical with up to 3.2' of penetration along entire west face.

Underwater Inspection Report – Photos



Horizontal lens at NW corner of Pier 9 measured 8” tall with 6’ of penetration. Looking west.



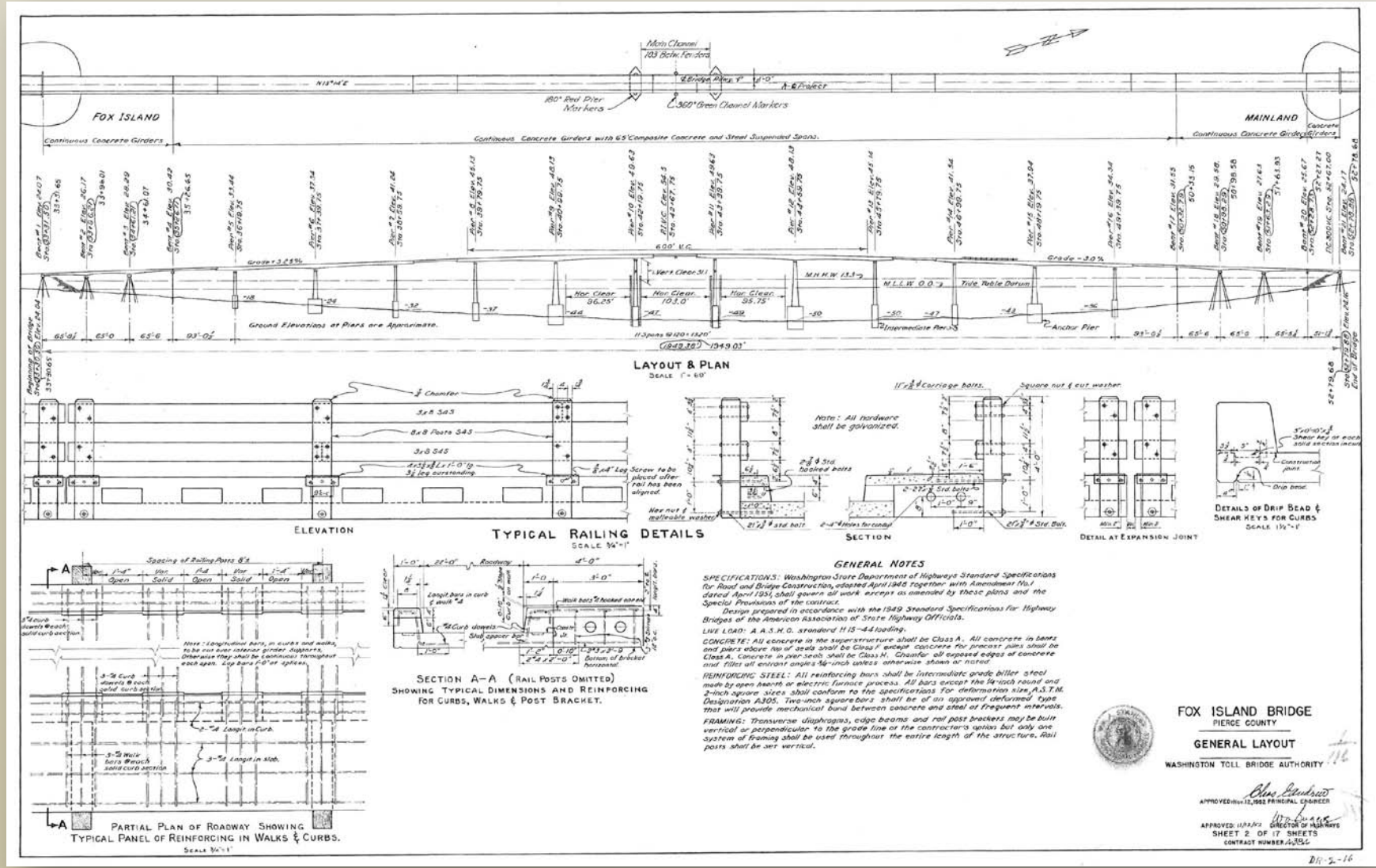
Horizontal lens at NW corner of Pier 9 measured 8” tall with 6’ of penetration. Looking west. Note the rod reading.

Seismic Evaluations

- **Seismic evaluation completed 1994**
- **Superstructure seismic retrofit completed 2003**
- **Substructure Retrofit?**

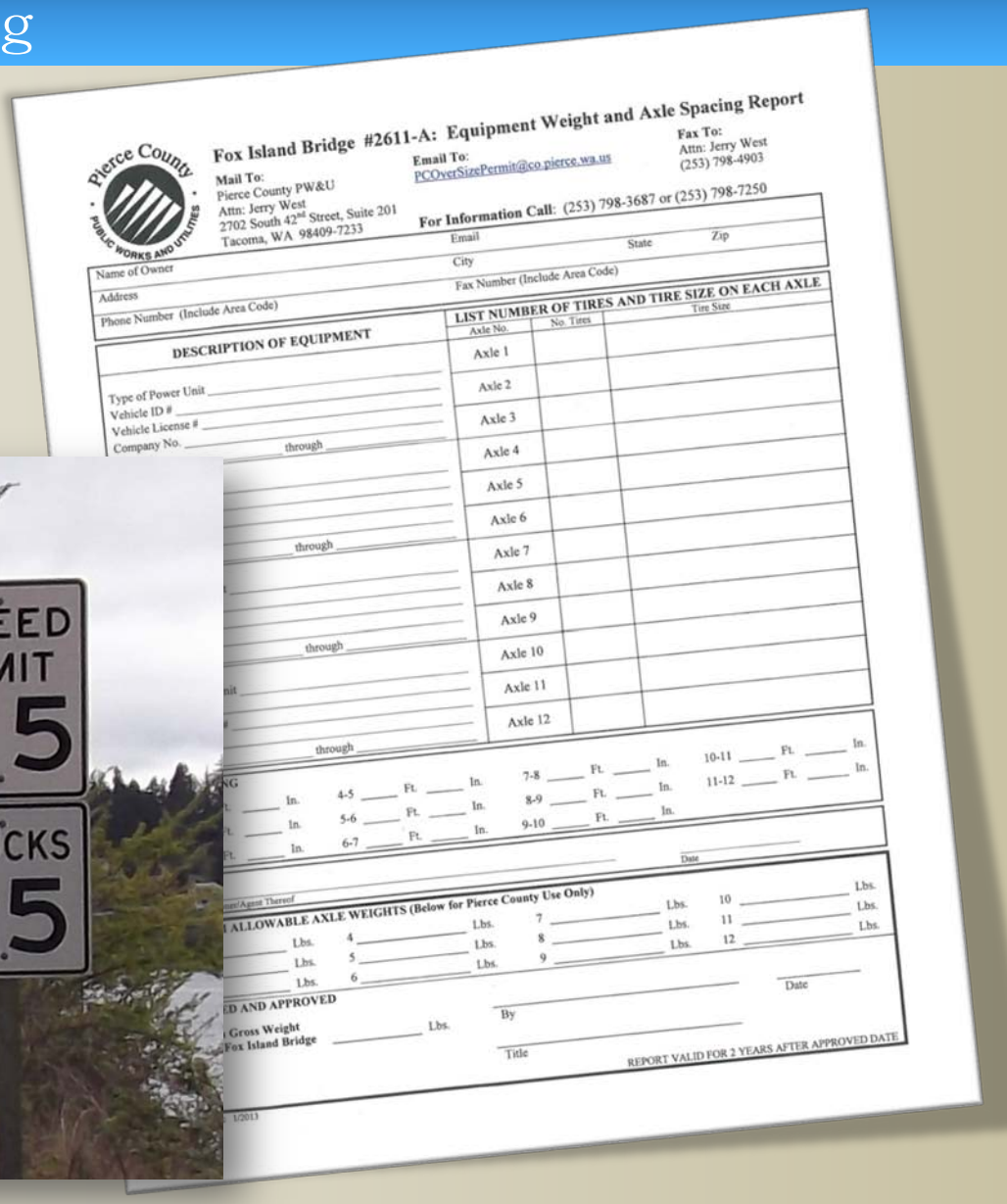
Pierce County
Public Works and Utilities

Bridge Layout



Load Rating and Posting

- **Load rating completed in 1994**
- **Load limit posting ordinance passed in 1995**



Pierce County
PUBLIC WORKS AND UTILITIES

Fox Island Bridge #2611-A: Equipment Weight and Axle Spacing Report

Mail To:
Pierce County PW&U
Attn: Jerry West
2702 South 42nd Street, Suite 201
Tacoma, WA 98409-7233

Email To:
PCOverSizePermit@co.pierce.wa.us

Fax To:
Attn: Jerry West
(253) 798-4903

For Information Call: (253) 798-3687 or (253) 798-7250

Name of Owner | Email | State | Zip
Address | City
Phone Number (Include Area Code) | Fax Number (Include Area Code)

DESCRIPTION OF EQUIPMENT

Type of Power Unit
Vehicle ID #
Vehicle License #
Company No.

LIST NUMBER OF TIRES AND TIRE SIZE ON EACH AXLE

Axle No.	No. Tires	Tire Size
Axle 1		
Axle 2		
Axle 3		
Axle 4		
Axle 5		
Axle 6		
Axle 7		
Axle 8		
Axle 9		
Axle 10		
Axle 11		
Axle 12		

through

4-5 ___ Ft. ___ In. 7-8 ___ Ft. ___ In. 10-11 ___ Ft. ___ In.
5-6 ___ Ft. ___ In. 8-9 ___ Ft. ___ In. 11-12 ___ Ft. ___ In.
6-7 ___ Ft. ___ In. 9-10 ___ Ft. ___ In.

Date

ALLOWABLE AXLE WEIGHTS (Below for Pierce County Use Only)

4 ___ Lbs. 7 ___ Lbs. 10 ___ Lbs.
5 ___ Lbs. 8 ___ Lbs. 11 ___ Lbs.
6 ___ Lbs. 9 ___ Lbs. 12 ___ Lbs.

ED AND APPROVED

Gross Weight
Fox Island Bridge ___ Lbs.

By

Date

Title

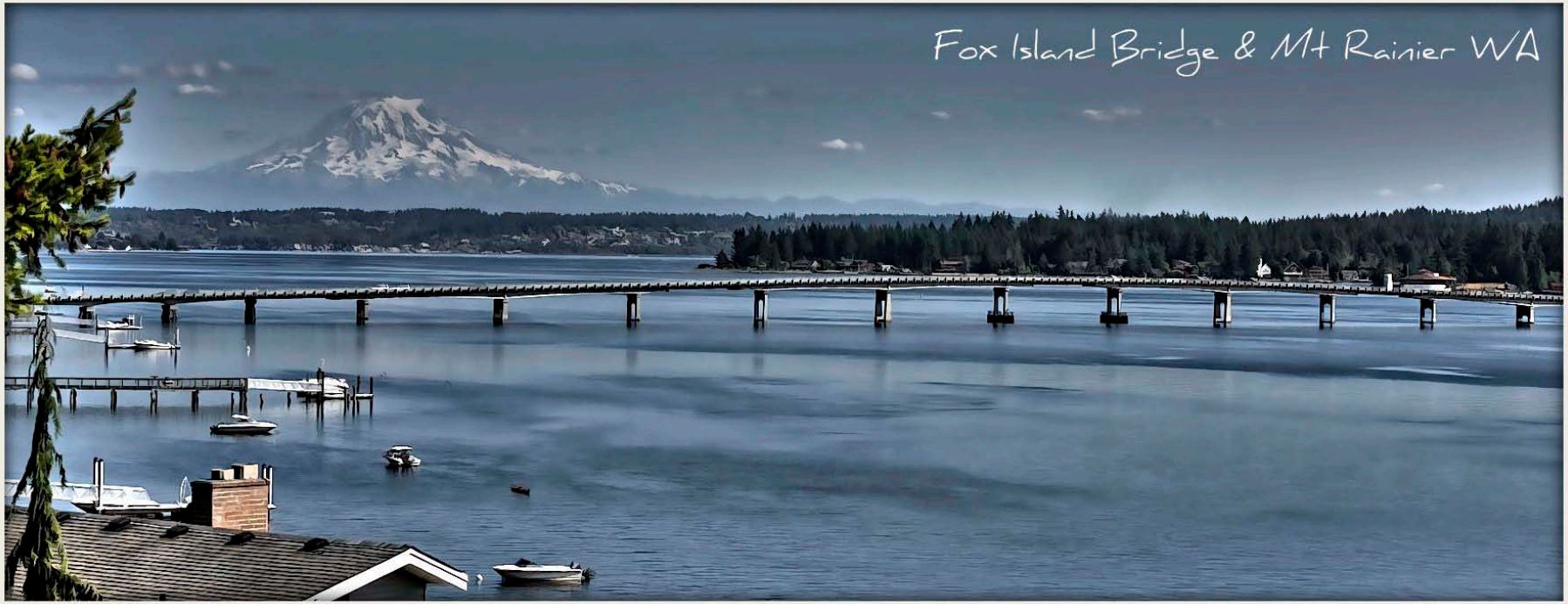
REPORT VALID FOR 2 YEARS AFTER APPROVED DATE

1/2013

Common Questions

- **Joint noise on the bridge deck, is this a result of foundation issues?**
- **Should residents accelerate our emergency preparedness efforts in light of the bridge condition?**
- **Does the existing bridge meet current design standards for roadway width, pedestrian facilities, seismic design, structural design, marine vessel vertical clearance, etc.?**

Questions?



Courtesy of Michael D. Martin

Kraig Shaner, P.E. (Presentation)
Gael Serviss, P.E. (Graphics)
Pierce County Public Works & Utilities
Bridge Engineering