

CONFIDENTIAL

August 6, 2014

Our Reference: 31256

Sunshine Coast Regional District

1975 Field Road
Sechelt, BC. V0N 3A1

Attention: Sam Adams, Parks Planning Coordinator

Dear Sir:

Reference: Sir Thomas Lipton Park Bridge Inspection Program

We are pleased to submit our draft letter for the Sir Thomas Lipton Park Bridge Inspection Program. This program includes the inspection of three timber pedestrian bridges located in Sir Thomas Lipton Park on Gambier Island: East Creek Bridge, MacDonald Creek Bridge and West Creek Bridge.

Provided in this submission are the Field Bridge Inspection Forms and Photo Sheets for each of the structures inspected, outlining the various components inspected and their condition rating. We have included the Field Bridge Inspections Forms and Photo Sheets for each of these bridges outlining their deficiencies in Appendix A for your review, and Appendix B provides a description of the Field Bridge Inspection Forms. Bridge design drawings have been included in Appendix C for reference.

According to the design drawings, these bridges were designed for pedestrian traffic only (5.0 kPa). At this time, approximately 75% of the lots on the island have been developed, including water and BC Hydro lines. The outcome of this development is that it has brought on vehicular traffic onto these bridges, including septic tank trucks, 15-ton excavators, tandem trucks fully loaded with aggregate, and BC Hydro and Telus trucks; these vehicular loads are substantially larger than the designed pedestrian loads.

As such, the vehicular traffic has caused some damage to the East Creek Bridge, MacDonald Creek Bridge and West Creek Bridge, with collision damage and deterioration to the deck, curbs and handrails, and vehicle tread marks on the timber planks. These damages are not serious structural defects, and although replacement of the deck components would likely extend the lifespan of the bridges, the structures themselves appear to be structurally sound for their intended usage as pedestrian bridges.

At the present time the three bridges do not meet current standards and code for vehicular loading. Vehicular traffic should not continue to be allowed on these structures until a load evaluation and assessment has been performed on each of the structures. Further use of these bridges by vehicular loading may result in liabilities and risk to the SCR D. In addition, the utilities present under the bridges are in jeopardy in the case of an incident on the bridge due to vehicular loading.

Should the SCR D prefer to not impose vehicular restrictions to meet the demands for future development on the island, the bridges should be load-rated and strengthened to take on such loads, and designed to meet the standards for vehicular traffic. However, at this time, it is imperative that the use of this bridge by vehicular traffic be terminated.

For these reasons, we would recommend that restrictive measures be installed at this time to prevent vehicles from travelling on these structures until assessments of the structures have been performed. We would also recommend posting a weight restriction sign limiting passage over the bridges to pedestrian loads only.

As pedestrian bridges, the structures appear to be structurally sound and in fair condition. Vehicular traffic appears to have mainly caused aesthetic damages to the bridges' deck components, with a few areas requiring immediate repair. We have outlined specific areas on the bridges recommended for replacement or repair in the Field Bridge Inspection Forms. In terms of maintenance, we would recommend annual maintenance of the structures, including regular power-washing to prevent debris accumulation on the deck and between the planking, and ensuring the sturdiness of the handrails.

We thank you for the opportunity for this assignment. Please do not hesitate to contact the undersigned should you have any questions.

Yours truly,

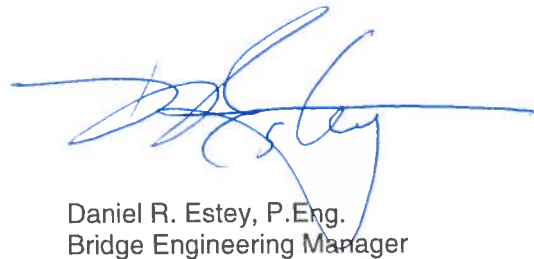
ISL Engineering and Land Services Ltd.



Karine Poliquin, E.I.T.
Project Engineer

Attachments

KP/DRE



Daniel R. Estey, P.Eng.
Bridge Engineering Manager

Appendix A
Field Bridge Inspection Forms & Photo Sheets



Structural Material: Timber Deck with Steel Girders & Cross Bracing

Structure Name: East Creek Bridge

Inspection Date: July 29th, 2014

Location: Crossing East Creek, Gambier Island, BC

Inspection Type: L1 L2 **Time:** 9:45-11:20 am

Weather: Sunny **Temperature:** 25°C

PERCENT CONDITION RATING

Enter % in each condition.

INSPECTION EXPLANATION OR DESCRIPTION

All poor or very poor conditions must be explained.

A. CHANNEL:

1. Debris Risk (A)
2. Bank/Bed Scour/Buildup (P,S)
3. Dolphins/Fenders (A)

E	G	F	P	V	N/X
		100			
		100			
					N

B. SUBSTRUCTURE:

1. Foundation Movement (P)
2. Abutments (P)
3. Wing/Retaining Walls (S)
4. Footings/Piling (P)
5. Pier Columns/Walls/Cribs
6. Bearings (S)
7. Caps (S)
8. Corbels / Bridge Seats (S)

100					
50	50				West end: Lock Block. East End: Anchor Bolt in bedrock, rotting wood sills.
					N
					N
					N
					X
					N
					N

C. SUPERSTRUCTURE:

1. Floor Beams/Transoms (P)
2. Stringers (P)
3. Girders (P)
4. Portals (P)
5. Bracing/Diaphragms (S)
6. Truss Chords/Arch Ribs (P)
7. Arch Ties (P)
8. Truss Diagonals (P)
9. Truss Rods/ Verticals (P)
10. Cables (P)
11. Panels (S)
12. Pins/Bolts/Rivets (P)
13. Camber/Sag (S)
14. Live Load Vibration (S)
15. Coating (structure) (P,S)

					N
					N
100					Discoloration and some organics, but appear functional and in good shape.
					N
100					
					N
					N
					N
					N
					N
					N
	100				Some rusting.
					X
					X
		100			

D. DECK:

1. Sub Deck/Cross Ties (P)
2. Wearing Surface/Planking (P)
3. Deck Joints (S)
4. Curbs/Wheelguards (P,S)
5. Sidewalk(s) (P,S)
6. Railings/Parapets (S)
7. Median Barrier (S)
8. Drains/Pipes (A)
9. Coating (Railings) (S)

	100				Steel grating treated as sub deck.
		50	50		Damaged planks (tread marks on timber), especially at corners.
					N
		50	45	5	Significant collision damage at NE & NW corner. Local. rot and checks. Waness.
					N
	40	55		5	Missing railing. Collision damage.
					N
	100				5 service ducts. Some organics growing, but appear in good shape.
		100			Coating loss. Organics growing.

E. APPROACHES:

1. Signing/Lighting (A)
2. Roadway Approaches (S)
3. Roadway Flares (S)
4. Approach Drainage
5. Utility Concerns? (A)

Yes No

					N
			100		
					N
					N
			100		
If yes contact utility company					

Condition Codes

E – Excellent	(7)	
G – Good	(6)	N – Not Applicable
F – Fair	(5)	X – Cannot Inspect
P – Poor	(3)	
V – Very Poor	(1)	

URG

5.6

Karine Poliquin, EIT

Inspector (s) (please type or print)

Daniel R. Estey, P.Eng.

Professional Engineer (EoR) (please type or print)

K. Poliquin

Signature (s)

Signature

General Inspection Notes:

Planks: 100x300mm. Nailer: 300mm deep.

Deck length: 42' 12", approx. 12.850m o/o. Railing length: 35' 2", approx.. 10.720m o/o.

B.2 – Timber sills at East end appeared lightly rotted.

C.3 – Stiffeners appear to be an afterthought.

D.1 – Plywood appears to have been placed underneath the planking, on top of steel grating. Debris appears to be washing down from steep grades at approaches.

D.2.a – Superficial damage to timber planking. Apparent vehicular tread marks along entire bridge length, but especially apparent at corners of the bridge at approach. Wheel paths are obvious: several meters long, approx. 800mm wide.

D.2.b – 1 Drill test: superficial shavings were damp, but mostly dry. Good.

D.4.a – Curbs were sound-tested along entire length. Approx. 50% sounded more rotted than other.

D.4.b – Drill-tested at 4 locations; Drill hole #1 at NE corner yielded with no resistance, wet and dark wood chips, completely rotted. Drill holes #2,3,4 shavings from were generally dry, with superficial rot (damp wood top half inch or so).

D.4.c – Collision damage at NW end: ~1.080m. Collision damage at NE end: ~0.800m long. Wanes and occasional checks along curb.

D.4.d – Rot at boltholes in curbs.

E.2.a – Sharp turns at both approaches. Problematic for oversized vehicles for proper alignment onto bridge; cause of collision damage of curb and railing.

E.2.b – Steep grades both ends. Problematic at East end: soil and gravel washing down and accumulating onto the bridge deck and between planking.

Posted Weight Restriction (print actual message on sign(s)):

Imperative that the bridge be posted for design loads only (Pedestrian – 5.0 kPa). Vehicular traffic should not be allowed on this bridge. Restrictive measures for vehicles should be installed.

Other Posted Hazard Warning Signs:

"Use at Own Risk".

Drainage Area Description (water level fluctuation, logging debris, etc.):

Repair and Replacement Work Notes:

- Would recommend replacement of damaged curbs and missing railing.

Maintenance Work Notes:

- Would recommend regular power-washing and annual maintenance for the structure to avoid accumulation of debris between planks.

- Would recommend checking sturdiness of railings as part of annual maintenance.

- Would recommend monitoring bank erosion at road approaches.

Utility Concern Notes:

- Five service ducts run underneath the bridge and BC Hydro lines run along the road. Failure of this bridge would cause these utilities to be out of commission.

Residual Life Expectancy Notes:

- Steel girders and cross-bracing appear to be in good shape.

- Damaged timber planking and curbs due to vehicular loads has reduced the life expectancy of the structure, however these are not serious structural defects.



001 – Lock Block Foundation at West end of Bridge (B.1)



002 – Foundation at East End of Bridge (B.1)



003 – Close-up of Foundation at East End of Bridge, Damp and Rotting Timber Sill (B.1)



004 – Anchor Bolts at SW Corner of Bridge (B.6)



005 – E-W spanning Girder at North Side of Bridge (C.3)



006 – Girder spanning E-W along South side of Bridge (C.3)

PROJECT : 31256 NAME: East Creek Bridge

LOCATION: East Creek, Gambier Island

CLIENT: Sunshine Coast Regional District BY: KP

DATE: July29th, 2014 PAGE: 1 OF 3



007 – View of Bridge Deck, View from West End of Bridge (D)



008 – Plywood between Steel Grating and Timber Planking (D.1)



009 – Shake at Planking (D.2)



010 – Damaged Plank at NW Corner of Bridge (D.2)



011 – Tread marks and Collision Damage at Bull Rail, NW corner of Bridge (D.2, D.4)



012 – Rotted Wood from Bolt Holes in Bull Rail (D.4)

PROJECT : 31256 NAME: East Creek Bridge

LOCATION: East Creek, Gambier Island

CLIENT: Sunshine Coast Regional District BY: KP

DATE: July29th, 2014 PAGE: 2 OF 3



013 – Check along Bull Rail (D.4)



014 - Close-Up of Collision Damage at Bull Rail, NW Corner of Bridge (D.4)



015 – Missing Railing - Appeared to be Torn off (D.6)



016 – Deck and Approach at East end of Bridge (D.2, E.2)



017 – Road Approach at East End of Bridge (E.2)



018 – Steep Grade and Curve at Roadway Approach at West end of Bridge (E.2)

PROJECT : 31256 NAME: East Creek Bridge

LOCATION: East Creek, Gambier Island

CLIENT: Sunshine Coast Regional District BY: KP

DATE: July29th, 2014 PAGE: 3 OF 3

Structural Material: Timber Deck with Steel Girders & Cross Bracing Structure Name: MacDonald Creek Bridge
 Inspection Date: July 29th, 2014 Location: Crossing MacDonald Creek, Gambier Island, BC
 Inspection Type: L1 L2 Time: 11:25-12:30 Weather: Sunny Temperature: 25°C

PERCENT CONDITION RATING

Enter % in each condition.

INSPECTION EXPLANATION OR DESCRIPTION

All poor or very poor conditions must be explained.

A. CHANNEL:

	E	G	F	P	V	N/X	
1. Debris Risk (A)			100				
2. Bank/Bed Scour/Buildup (P,S)		75		25			Erosion at NE corner of Bridge
3. Dolphins/Fenders (A)						N	

B. SUBSTRUCTURE:

	E	G	F	P	V	N/X	
1. Foundation Movement (P)		75		25			NE Corner: Geotextile exposed and appeared shifted at Lock Block.
2. Abutments (P)	50	50					East End: Lock Block. West End: anchors bolted in bedrock.
3. Wing/Retaining Walls (S)						N	
4. Footings/Piling (P)						N	
5. Pier Columns/Walls/Cribs						N	
6. Bearings (S)						X	
7. Caps (S)						N	
8. Corbels / Bridge Seats (S)						N	

C. SUPERSTRUCTURE:

	E	G	F	P	V	N/X	
1. Floor Beams/Transoms (P)						N	
2. Stringers (P)						N	
3. Girders (P)	100						Discoloration, but appear functional and in good shape. Localized flaking.
4. Portals (P)						N	
5. Bracing/Diaphragms (S)		100					
6. Truss Chords/Arch Ribs (P)						N	
7. Arch Ties (P)						N	
8. Truss Diagonals (P)						N	
9. Truss Rods/ Verticals (P)						N	
10. Cables (P)						N	
11. Panels (S)						N	
12. Pins/Bolts/Rivets (P)		100					Some rusting.
13. Camber/Sag (S)						X	
14. Live Load Vibration (S)						X	
15. Coating (structure) (P,S)			100				

D. DECK:

	E	G	F	P	V	N/X	
1. Sub Deck/Cross Ties (P)		100					Steel grating treated as sub deck.
2. Wearing Surface/Planking (P)		50		50			Damaged planks (tread marks on timber). Section of plank missing at SE corner.
3. Deck Joints (S)						N	
4. Curbs/Wheelguards (P,S)			60	35	5		Significant collision damage at SE corner. Localized rot.
5. Sidewalk(s) (P,S)						N	
6. Railings/Parapets (S)			90	10			Collision damage at mid-length of North rail.
7. Median Barrier (S)						N	
8. Drains/Pipes (A)	100						5 service ducts. Some organics growing, but appear in good shape.
9. Coating (Railings) (S)			100				Coating loss. Organics growing.

E. APPROACHES:

	E	G	F	P	V	N/X	
1. Signing/Lighting (A)						N	
2. Roadway Approaches (S)				100			
3. Roadway Flares (S)						N	
4. Approach Drainage						N	
5. Utility Concerns? (A)				100			
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If yes contact utility company							

Condition Codes	
E – Excellent	(7)
G – Good	(6)
F – Fair	(5)
P – Poor	(3)
V – Very Poor	(1)
N – Not Applicable	
X – Cannot Inspect	

URG
5.4

Karine Poliquin, EIT

Inspector (s) (please type or print)

Daniel R. Estey, P.Eng.

Professional Engineer (EoR) (please type or print)

K. Poliquin

Signature (s)

D. Estey

Signature

General Inspection Notes:

Planks: 100x300mm. Nailer: 300mm deep.

Deck length: 74' 7", approx. 22.730m o/o. Railing length: 71' 9", approx. 21.870m o/o.

D.1 – Plywood appears to have been placed underneath the planking, on top of steel grating. Debris appears to be washing down from steep grades at approaches.

D.2.a – Superficial damage to timber planking. Apparent vehicular tread marks along entire bridge length, but especially apparent at corners of the bridge at approach. Section of deck planking missing at SE corner, approx. 0.75m long x 0.3m wide section missing.

D.2.b – 1 Drill test: superficial shavings were damp, but mostly dry. Good.

D.4.a – Curbs were sound-tested along entire length. Most sounded good, 10% sounded rotten.

D.4.b – Drill-hole near NE corner: rot at center of curb. Remainder of curb appears OK; other drill holes were generally dry, with some superficial dampness (approx. within top half inch).

D.4.c – Bull rail collision damage at SW end: ~1.000m. Wanes along bull rail.

D.5 – Rot at some boltholes in curb.

E.2.a – Sharp turns at both approaches. Problematic for oversized vehicles for proper alignment onto bridge; cause of collision damage of curb and railing.

E.2.b – Steep grades both ends. Problematic at West end: soil and gravel washing down and accumulating onto the bridge deck and between planking.

Posted Weight Restriction (print actual message on sign(s)):

Imperative that the bridge be posted for design loads only (Pedestrian – 5.0 kPa). Vehicular traffic should not be allowed on this bridge. Restrictive measures for vehicles should be installed.

Other Posted Hazard Warning Signs:

“Use at Own Risk”.

Drainage Area Description (water level fluctuation, logging debris, etc.):

Repair and Replacement Work Notes:

- The missing section of the timber planks at the SE corner of the bridge and the eroded bank at the NE corner of the bridge could be a tripping or falling hazard; these should be repaired immediately.

- Would recommend replacement of damaged curbs and missing railing.

Maintenance Work Notes:

- Would recommend regular power-washing and annual maintenance for the structure to avoid accumulation of debris between planks.

- Would recommend checking sturdiness of railings as part of annual maintenance.

- Would recommend monitoring bank erosion at road approaches.

Utility Concern Notes:

- Five service ducts run underneath the bridge and BC Hydro lines run along the road. Failure of this bridge would cause these utilities to be out of commission.

Residual Life Expectancy Notes:

- Steel girders and cross-bracing appear to be in good shape.

- Damaged timber planking and curbs due to vehicular loads has reduced the life expectancy of the structure, however these are not serious structural defects.



001 – Erosion at NE Corner of Bridge (A.2)



002 – View Underneath Deck and Foundation at East End of Bridge (B.1)



003 – Exposed Geotextile at Lock Block, West End of Bridge (B.1)



004 – View Underneath Deck at West End of Bridge (B.1)



005 – View of Steel Girder along South side of Bridge (C.3)



006 – View of Steel Girder along North side of Bridge (C.3)

PROJECT : 31256 NAME: **MacDonald Creek Bridge**

LOCATION: MacDonald Creek, Gambier Island

CLIENT: **Sunshine Coast Regional District** BY: KP

DATE: July 29th, 2014 PAGE: 1 OF 3



007 – Localized Scaling at Steel Girder, at East end of North side of Bridge (C.3)



008 – Plywood, Steel Grating and Steel Floor beam, Typical (C.1)



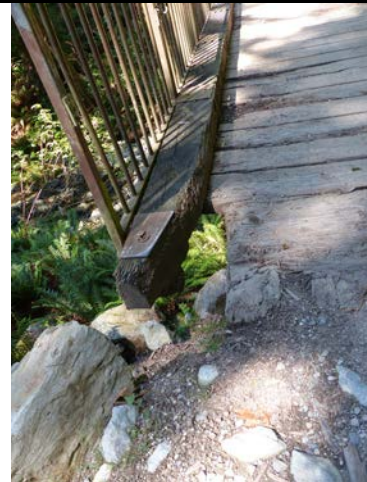
009 – View of Bridge Deck, View from East End of Bridge (D.2)



010 – Deterioration of Entire Timber Plank, View Looking East (D.1)



011 – Tread marks on Planking, NW corner of Bridge (D.2)



012 – Damaged/Missing Plank at SE Corner of Bridge (D.2)

PROJECT : 31256 NAME: **MacDonald Creek Bridge**

LOCATION: MacDonal Creek, Gambier Island

CLIENT: **Sunshine Coast Regional District** BY: KP

DATE: July29th, 2014 PAGE: 2 OF 3



013 – Collision Damage at Bolt Holes in Bull Rail (D.4)



014 – Drill Hole at Rotting Bull Rail and Typical Timber Condition (D.4)



015 - Close-Up of Collision Damage at Bull Rail, SW Corner of Bridge (D.4)



016 – Damaged Guardrail (D.6)



017 – Downhill Road Approach at East End of Bridge (E.2)



018 – Steep Uphill Grade and Curve at Roadway Approach at West end of Bridge (E.2)

PROJECT : 31256 NAME: **MacDonald Creek Bridge**

LOCATION: MacDonald Creek, Gambier Island

CLIENT: **Sunshine Coast Regional District** BY: KP

DATE: July 29th, 2014 PAGE: 3 OF 3

Structural Material: Timber Deck with Steel Girders & Cross Bracing

Structure Name: West Creek Bridge

Inspection Date: July 29th, 2014

Location: Crossing West Creek, Gambier Island, BC

Inspection Type: L1 L2 **Time:** 12:35-13:25

Weather: Sunny **Temperature:** 25°C

PERCENT CONDITION RATING

Enter % in each condition.

INSPECTION EXPLANATION OR DESCRIPTION

All poor or very poor conditions must be explained.

A. CHANNEL:

1. Debris Risk (A)
2. Bank/Bed Scour/Buildup (P,S)
3. Dolphins/Fenders (A)

E	G	F	P	V	N/X	
			100			Accumulation of debris and branches.
	75	25				Minor erosion at NW corner.
					N	

B. SUBSTRUCTURE:

1. Foundation Movement (P)
2. Abutments (P)
3. Wing/Retaining Walls (S)
4. Footings/Piling (P)
5. Pier Columns/Walls/Cribs
6. Bearings (S)
7. Caps (S)
8. Corbels / Bridge Seats (S)

E	G	F	P	V	N/X	
	100					
100						East & West end: Lock Block.
					N	
					N	
					N	
					X	
					N	
					N	

C. SUPERSTRUCTURE:

1. Floor Beams/Transoms (P)
2. Stringers (P)
3. Girders (P)
4. Portals (P)
5. Bracing/Diaphragms (S)
6. Truss Chords/Arch Ribs (P)
7. Arch Ties (P)
8. Truss Diagonals (P)
9. Truss Rods/ Verticals (P)
10. Cables (P)
11. Panels (S)
12. Pins/Bolts/Rivets (P)
13. Camber/Sag (S)
14. Live Load Vibration (S)
15. Coating (structure) (P,S)

E	G	F	P	V	N/X	
					N	
					N	
	100					Rusting and flaking, but appear functional and in good shape. Rust on stiffeners.
					N	
	100					
					N	
					N	
					N	
					N	
					N	
					N	
	100					Some rusting.
					X	
					X	
		100				

D. DECK:

1. Sub Deck/Cross Ties (P)
2. Wearing Surface/Planking (P)
3. Deck Joints (S)
4. Curbs/Wheelguards (P,S)
5. Sidewalk(s) (P,S)
6. Railings/Parapets (S)
7. Median Barrier (S)
8. Drains/Pipes (A)
9. Coating (Railings) (S)

E	G	F	P	V	N/X	
	100					Debris accumulating.
	85	15				Light damage on planks (tread marks on timbers).
					N	
		75	25			Dirty bull rails. Minor superficial rot.
					N	
		100				A few scrapes, but intact.
					N	
100						5 service ducts. Some organics growing, but appear in good shape.
	100					Minor coating loss. Some organics growing.

E. APPROACHES:

1. Signing/Lighting (A)
2. Roadway Approaches (S)
3. Roadway Flares (S)
4. Approach Drainage
5. Utility Concerns? (A)

Yes No

E	G	F	P	V	N/X	
					N	
		100				
					N	
					N	
			100			
If yes contact utility company						

Condition Codes	
E – Excellent	(7)
G – Good	(6) N – Not Applicable
F – Fair	(5) X – Cannot Inspect
P – Poor	(3)
V – Very Poor	(1)

URG
5.8

Karine Poliquin, EIT

Inspector (s) (please type or print)

Daniel R. Estey, P.Eng.

Professional Engineer (EoR) (please type or print)

K. Poliquin

Signature (s)

D. Estey

Signature

General Inspection Notes:

Planks: 100x300mm. Nailer: 300mm deep.

Deck length: 47' 0", approx. 14.325m o/o. Railing length: 42' 0", approx. 12.800m o/o.

Overall, bridge appears to be in good condition. Bridge was power-washed prior to inspection.

D.1 – Plywood appears to have been placed underneath the planking, on top of steel grating. Debris appears to be washing down from steep grades at approaches.

D.2.a – Minor superficial damage to timber planking particularly at corners of bridge. Localized section loss at top of planks.

D.2.b – 1 Drill test: superficial shavings were damp, but mostly dry. Good.

D.4.a – Curbs were sound-tested along entire length. Sounded good.

D.4.b – A few scrapes from collisions on curbs. Dirt appears to be accumulating on sides of curbs

E.2.a – Roadway slightly skewed at both approaches; does not appear to be problematic.

E.2.b – Minor grades both ends. Possible source of soil and gravel washing down and accumulating onto the bridge deck and between planking.

Posted Weight Restriction (print actual message on sign(s)):

Imperative that the bridge be posted for design loads only (Pedestrian – 5.0 kPa). Vehicular traffic should not be allowed on this bridge. Restrictive measures for vehicles should be installed.

Other Posted Hazard Warning Signs:

"Use at Own Risk".

Drainage Area Description (water level fluctuation, logging debris, etc.):

Repair and Replacement Work Notes:

Maintenance Work Notes:

- Would recommend regular power-washing and annual maintenance for the structure to avoid accumulation of debris between planks.
- Would recommend checking sturdiness of railings as part of annual maintenance.
- Would recommend monitoring bank erosion at road approaches.

Utility Concern Notes:

- Five service ducts run underneath the bridge and BC Hydro lines run along the road. Failure of this bridge would cause these utilities to be out of commission.
- Five service ducts run underneath the bridge and BC Hydro lines run along the road. Failure of this bridge would cause these utilities to be out of

Residual Life Expectancy Notes:

- Aside from minor rusting, steel girders and cross-bracing appear to be in good shape.
- Damaged timber planking and curbs due to vehicular loads has reduced the life expectancy of the structure, however these are not serious structural defects.



001 – View Upstream, looking North (A.1)



002 – View Downstream, looking South (A.1)



003 – Minor Erosion at NW Corner of Bridge (A.2)



004 – View Underneath Deck and Foundation, East End of Bridge (B.1)



005 – Lock Block Foundation at West End of Bridge (B.1)



006 – Typical Condition of Bridge, View of North Side of Bridge (C.3)

PROJECT : 31256 NAME: **West Creek Bridge**

LOCATION: West Creek, Gambier Island

CLIENT: **Sunshine Coast Regional District** BY: KP

DATE: July 29th, 2014 PAGE: 1 OF 3



007 – Close-Up of Rusting Steel Girder, South side of Bridge (C.3)



008 – Close-Up of Rusting Stiffeners, SW End of Bridge (C.3)



010 – View of Bridge Deck, View from East End of Bridge (D)



010 – Accumulation of Soil and Gravel between Planks and Wanes at Bull Rail (D.2, D.4)



011 – Tread marks on Planking, SW corner of Bridge (D.2)



012 – Damaged Planking and Collision Damage on Bull Rail (D.2, D.4)

PROJECT : 31256 NAME: West Creek Bridge

LOCATION: West Creek, Gambier Island

CLIENT: Sunshine Coast Regional District BY: KP

DATE: July 29th, 2014 PAGE: 2 OF 3



013 – Plank Deterioration and Isolated Rot in Bull Rail, Near SE corner of Bridge (D.2, D.4)



014 –Typical Timber Condition (D.4)



015 – Roadway Approach at East End of Bridge (E.2)



016 –Roadway Approach at West end of Bridge (E.2)

PROJECT : 31256 NAME: West Creek Bridge

LOCATION: West Creek, Gambier Island

CLIENT: Sunshine Coast Regional District BY: KP

DATE: July29th, 2014 PAGE: 3 OF 3

Appendix B

Description of Field Bridge Inspection Forms



Field Bridge Inspection Form

The Field Bridge Inspection Form used in this inspection program is similar to the standard BCMoT Form used to document and report the results of a condition inspection of a structure. The headings on the Form identify the main structural components of the bridges, and are grouped as follows:

- Channel or stream
- Substructure
- Superstructure
- Deck
- Approaches

Each of the above structural components is further divided into subcomponents. In order to recognize the importance of the subcomponents, all subcomponents were categorized as either Primary (P), Secondary (S) or Auxiliary (A), “Primary” subcomponents being the most critical. Each was assigned a condition rating based on observations from the inspections, and recorded as a percentage on the Form.

The Form also contains space to include the following additional information:

- Structure Identification - the bridge name
- Structural Material(s)
- Information pertinent to the date and time of the inspection - includes the inspection time-frame, temperature and weather conditions
- Inspector(s) - names of all inspection personnel
- Inspection Explanation or Description - comments explaining any subcomponent rating of Poor or Very Poor. Included in this section are any special access equipment or non-destructive testing equipment used during the inspection
- Posted weight restrictions (if applicable)
- Posted hazard warning signs
- A description of the drainage area - water level fluctuation, logging debris, etc.
- Rehabilitation and maintenance work notes - comments describing existing conditions that require maintenance or repair (either immediate or scheduled)
- Utility concern notes
- Residual life expectancy notes

The inspector should also note on the Form whether the inspection type is a Level 1 (L1) routine inspection type – performed every one or two years – or a detailed Level 2 (L2) five-year inspection.

Percentage Condition Rating

Each structural component must be assessed to determine what percentage of the component is in which condition state, to total 100%. The condition states are defined as follows:

- **Excellent Condition (E)** - as new condition
- **Good Condition (G)** - normal wear and deterioration not requiring maintenance or repair
- **Fair Condition (F)** - minor defects, deterioration or collision damage; generally requires maintenance or repair



- **Poor Condition (P)** - advanced deterioration, significant defects or collision damage; repair required
- **Very Poor Condition (V)** - serious defects, deterioration or collision damage; imminent failure of component requiring immediate repair or replacement and/or load restrictions
- **Not Applicable (N)**
- **Cannot Inspect (X)**

The percentage of a component in a specified condition (e.g. Fair) will be the actual quantity of the component divided by the total quantity, then multiplied by 100 to give the percentage.

When the deterioration of a component is of the nature that the problem cannot be repaired without replacing the entire unit, the entire unit of that component can be given one rating. Most bridges have built-in redundancies which allows some re-distribution of stresses or weakness to various surrounding members. One failing member of a pack does not necessarily mean replacement of the entire unit.

Urgency Rating

The Urgency rating (URG), found at the lower right-hand corner of the Field Bridge Inspection Form, is accorded by the most critical condition state rating assigned to a component. Each of the condition ratings – described in the section above – are correlated to a numerical value:

Component Condition Rating	Correlated Numerical Value
Excellent Condition (E)	7
Good Condition (G)	6
Fair Condition (F)	5
Poor Condition (P)	3
Very Poor Condition (V)	1

The URG is a numerical rating out of 7, and reflects the numerical values of the components' condition ratings. This indicates whether or not the bridge has an important deficiency that needs to be addressed immediately, or if it has only suffered normal wear and tear.

The purpose of the URG is to optimize decision-making related to the expenditure of the limited funds on bridge maintenance, repairs, rehabilitation, and replacement.

Material and Performance Defects

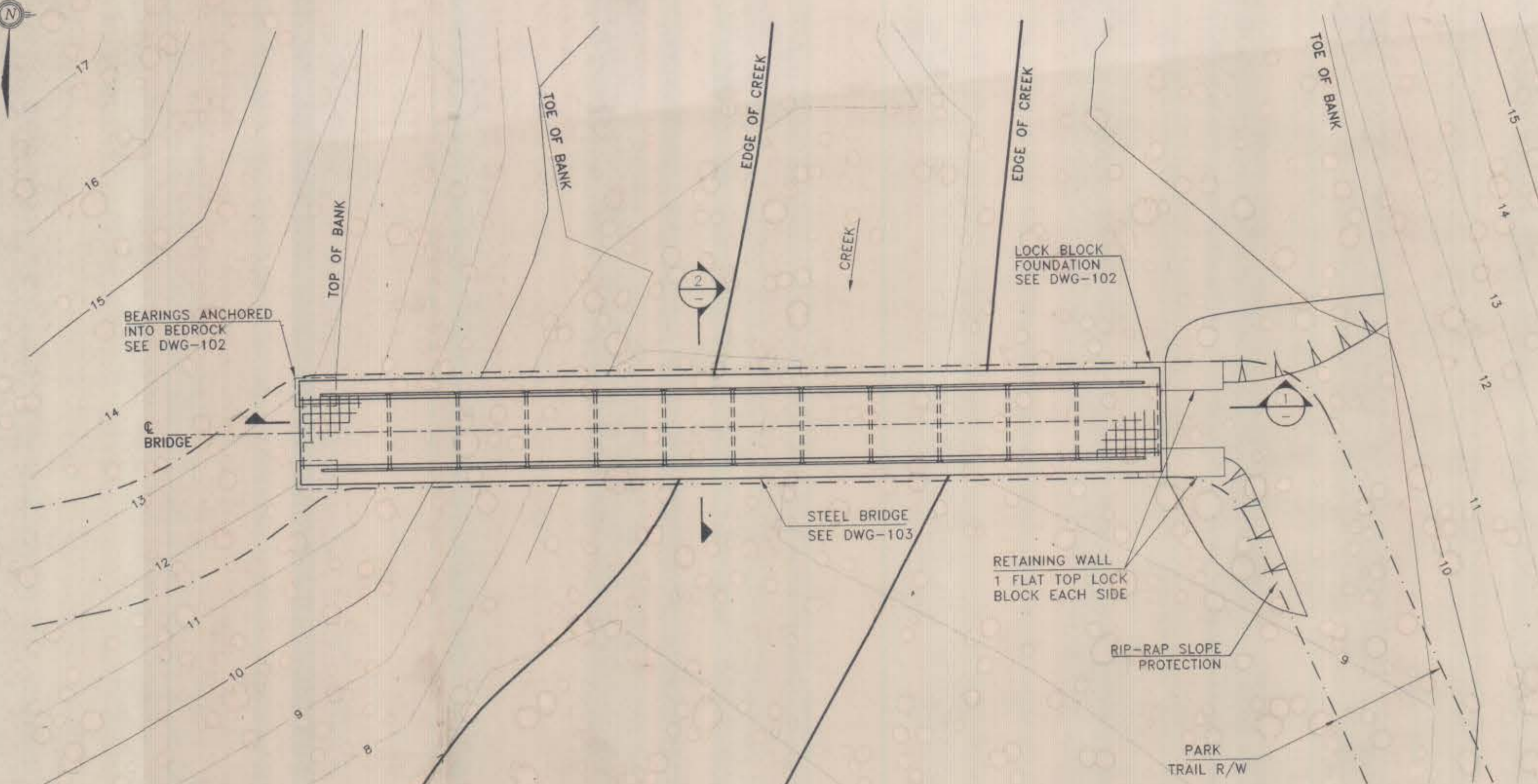
Both material and performance defects shall be considered for all components. The performance defects for components of a structure describes the condition of the component based upon its ability to perform its intended function in the structure as specified in the original design.

In some cases, performance defects exist due to defects in design or construction, unexpected behavior of the structure, or due to performance defects in other components of the structure. The inspector shall record the observed reduction in performance and the causes producing those effects wherever possible.

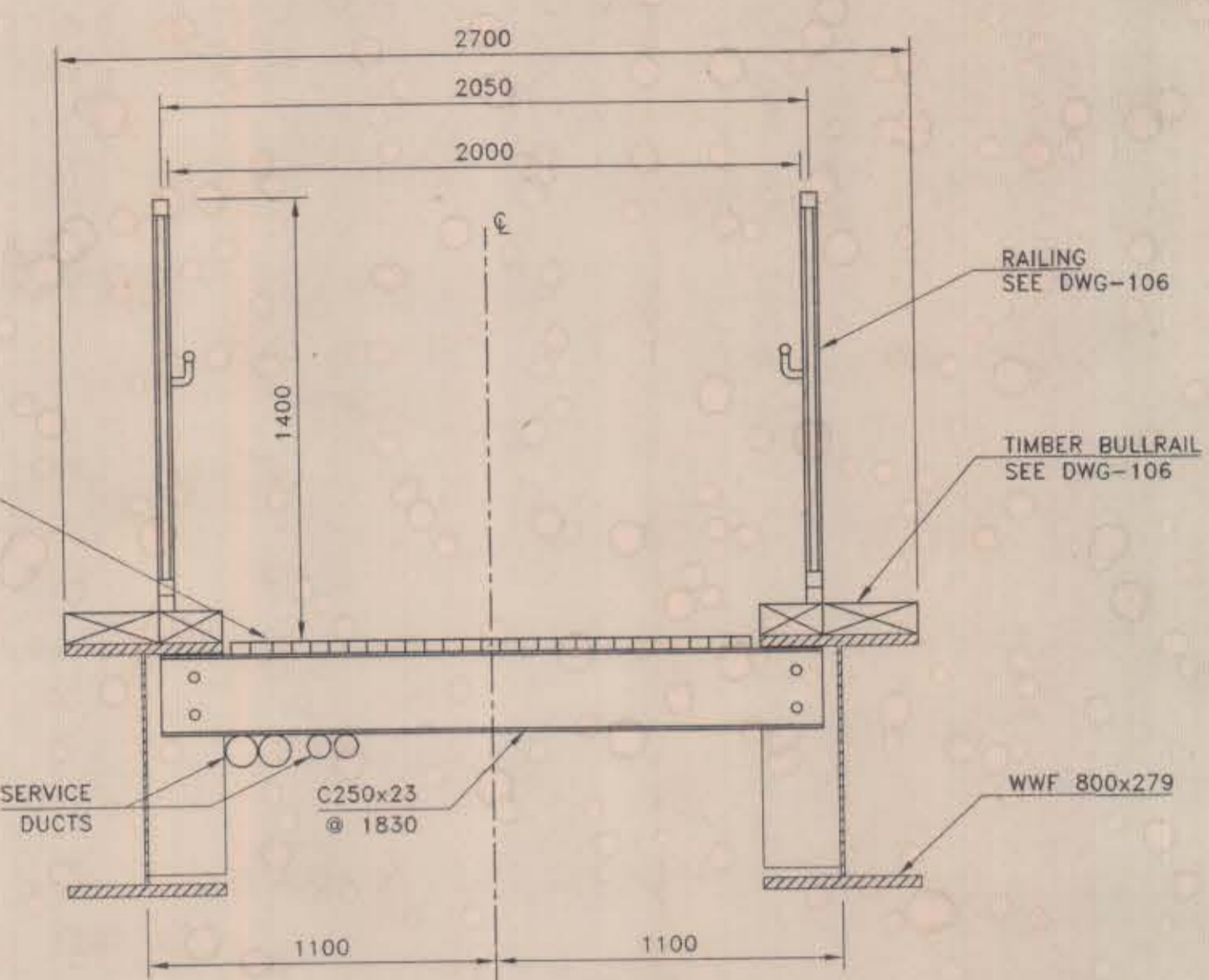
Additional Notes

The Field Bridge Inspection Form also includes General Inspection Notes, which further elaborate on the Percent Condition Ratings assigned to the components. Rehab Notes, Maintenance Work Notes, and Residual Life Expectancy Notes have also been included to provide our recommendations for maintenance, repair and/or replacement.

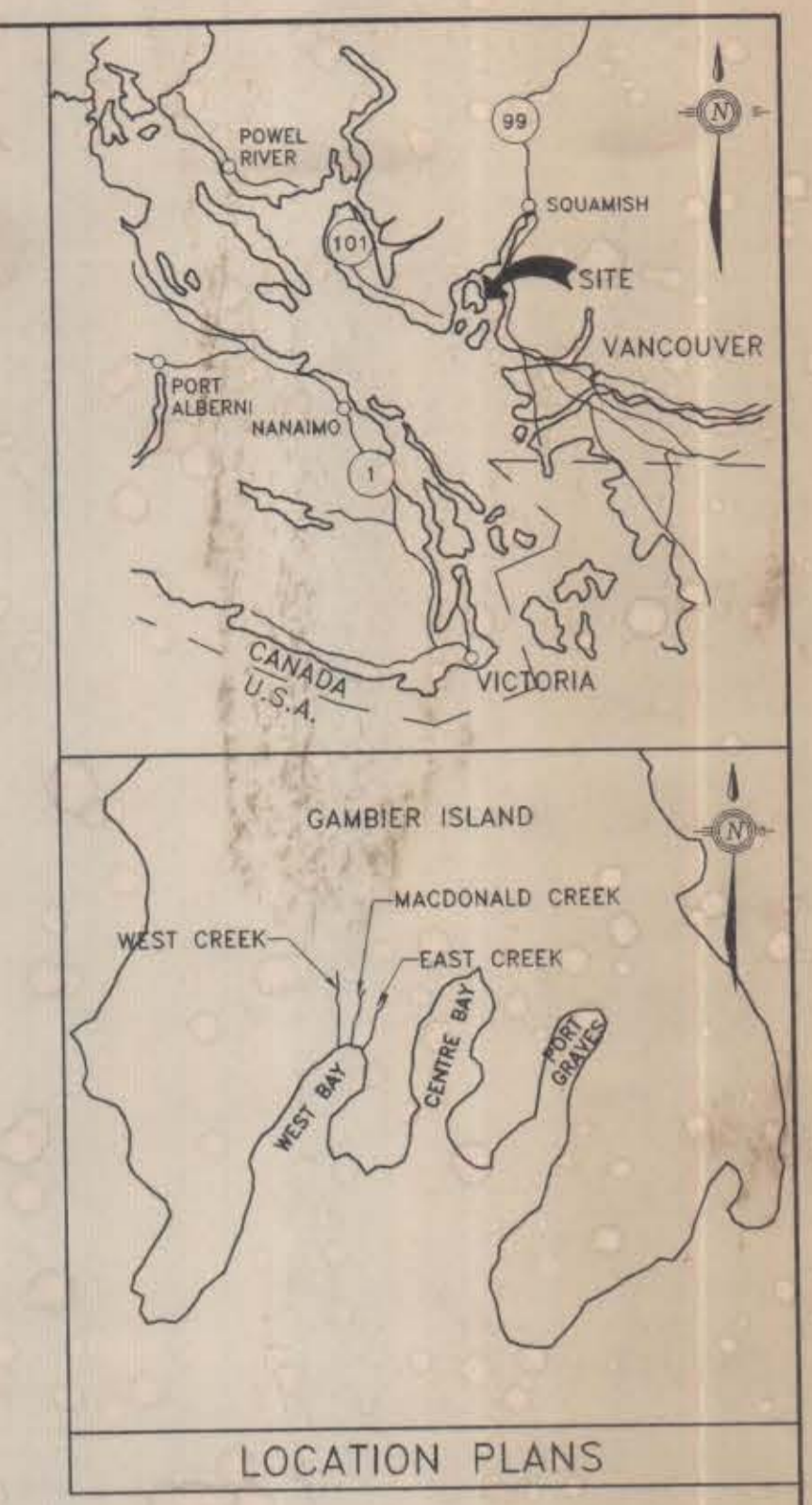
Appendix C
Bridge Design Drawings



MacDONALD CREEK - PLAN
1:100



SECTION 2
1:20



DESIGN CRITERIA

- A. CODES
1. N.B.C.C.
2. CAN/CSA - 56-88
- B. LIVE LOADS
1. PEDESTRIAN LOAD = 5.0 kPa
- C. SEISMIC CONDITIONS
ZONAL VELOCITY RATIO $v = 0.20$
SEISMIC ZONE $Z_a = Z_v = 4$
- D. CREEK FLOOD LEVEL
200 YEAR RETURN PERIOD

GENERAL NOTES

- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
- ALL ELEVATIONS ARE IN METRES AND ARE TO GEODETIC DATUM.
- ALL WORK TO BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION 1996 BY B.C. MINISTRY OF TRANSPORTATION AND HIGHWAYS, UNLESS NOTED OTHERWISE.
- TOPOGRAPHY BASED ON DWG. RIV 94199-TRAIL BY LANDPLAN, FEB. 3, 1997.

CONCRETE

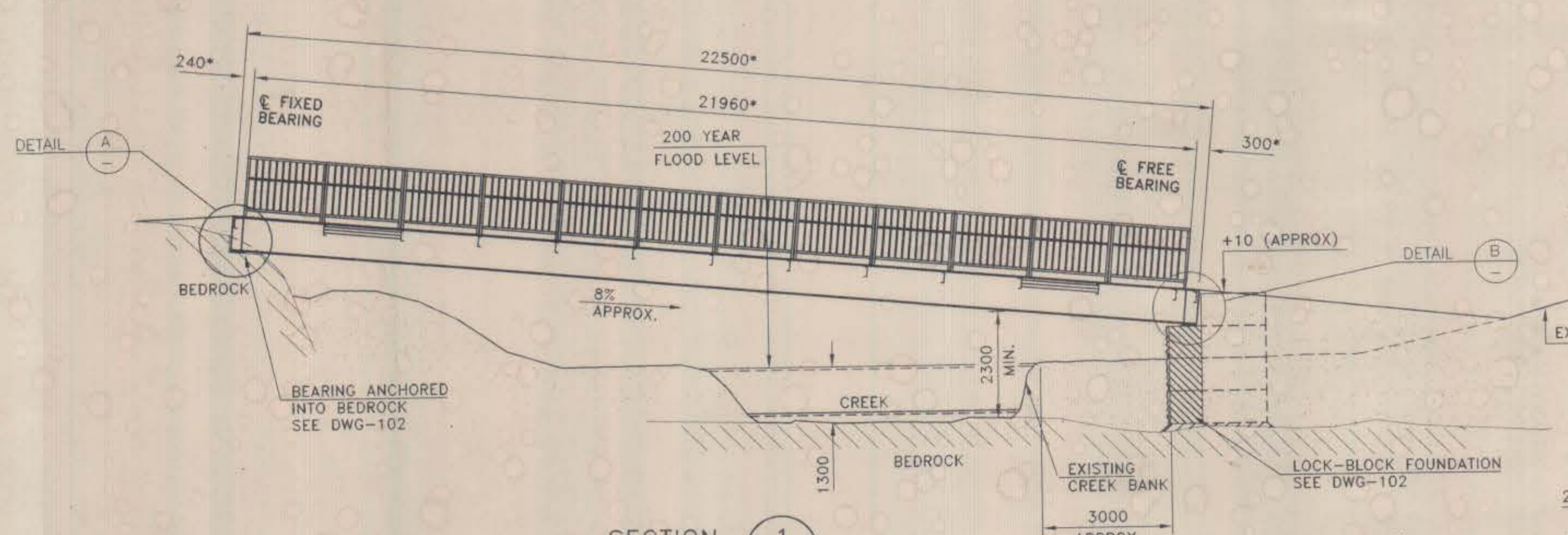
- CONCRETE CONSTRUCTION AND MATERIALS TO CONFORM TO CAN/CSA-A23.1, A23.2 AND A23.4 STANDARDS. USE NORMAL DENSITY, CLASS C-1 EXPOSURE CONCRETE FOR ALL WORK, CEMENT TO BE TYPE 10/20. CONCRETE TO HAVE A 28 DAY CYLINDER COMPRESSIVE STRENGTH OF 30 MPa.
- DOWEL BARS TO BE DEFORMED REINFORCING BARS CONFORMING TO CSA G30.18M, GRADE 400.

STRUCTURAL AND MISCELLANEOUS STEEL

- ALL ROLLED SECTIONS & MISCELLANEOUS PLATES TO BE GRADE 300W CONFORMING TO CSA STD. G40.21 UNLESS NOTED OTHERWISE.
- HOLLOW STRUCTURAL SECTIONS TO BE GRADE 350W, CLASS H CONFORMING TO STD. G40.21 UNLESS NOTED OTHERWISE.
- ALL BOLTS SHALL BE ASTM A325 UNLESS NOTED OTHERWISE.
- ALL WELDING TO CONFORM TO CSA STD. W47, W48 & W59. MINIMUM WELD SIZE TO BE 6mm.
- ALL DYWIDAG RODS TO BE THREAD BARS WITH STEEL GRADE 413 MPa
- ALL BOLTS, DYWIDAG RODS, THREADED RODS, GRATING AND STRUCTURAL STEEL EXCEPT THE MAIN GIRDERS TO BE HOT DIP GALVANISED IN ACCORDANCE WITH CAN/CSA G164-M STANDARD.
- MAIN STEEL GIRDERS TO BE PAINTED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION 1996 BY B.C. MINISTRY OF TRANSPORTATION AND HIGHWAYS
PRIMER : CARBOLINE 858 MIN. 3 mil
MIDCOAT : CARBOLINE 890 MIN. 4 mil
FINISH : CARBOLINE 890 MIN. 4 mil

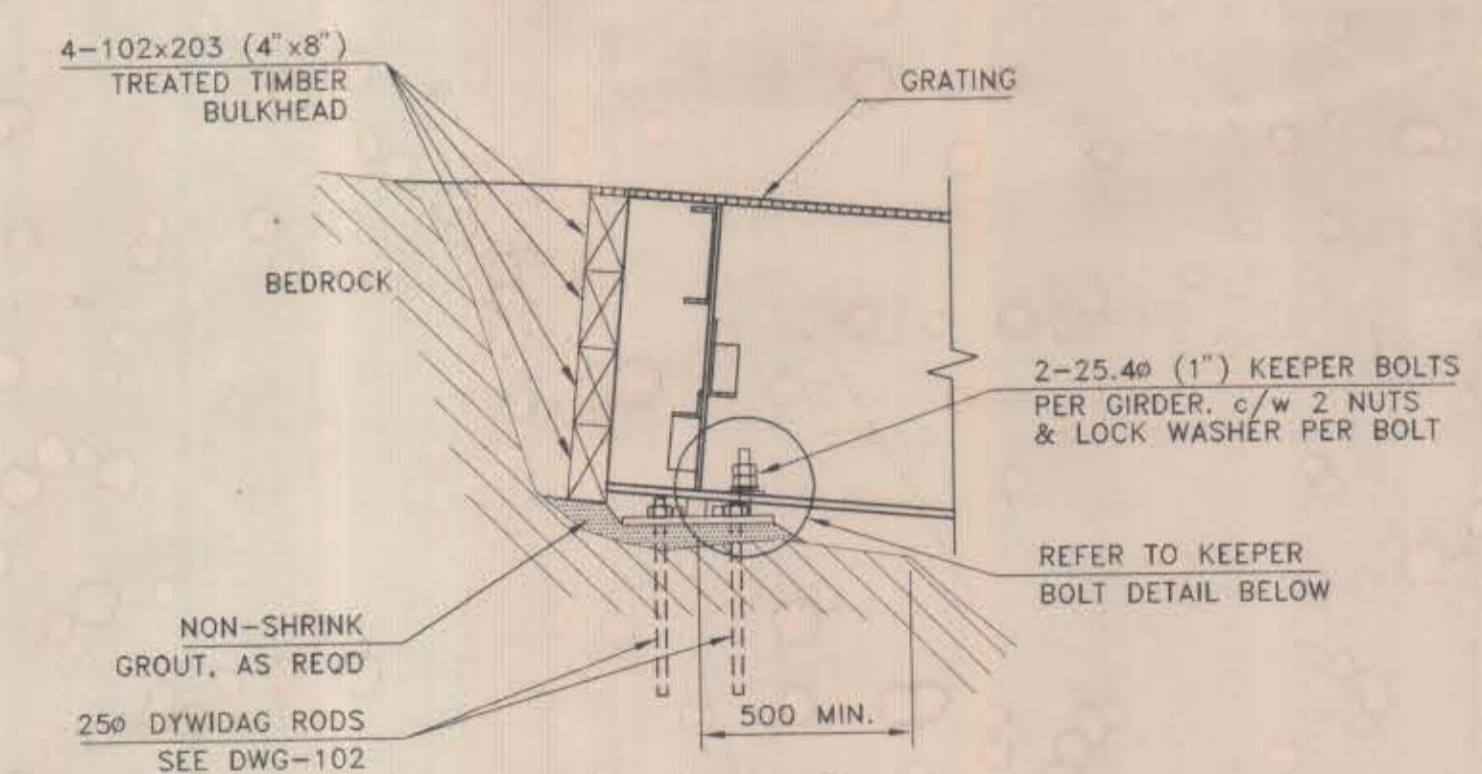
DIMENSIONED LUMBER & SAWN TIMBER

- BULLRAIL AND BULKHEAD:
HEM-FIR, No.2 STRUCTURAL GRADE OR BETTER.
- ALL SAWN TIMBER TO BE GIVEN A SALT PRESERVATIVE TREATMENT CONFORMING TO CAN/CSA STD. 080.

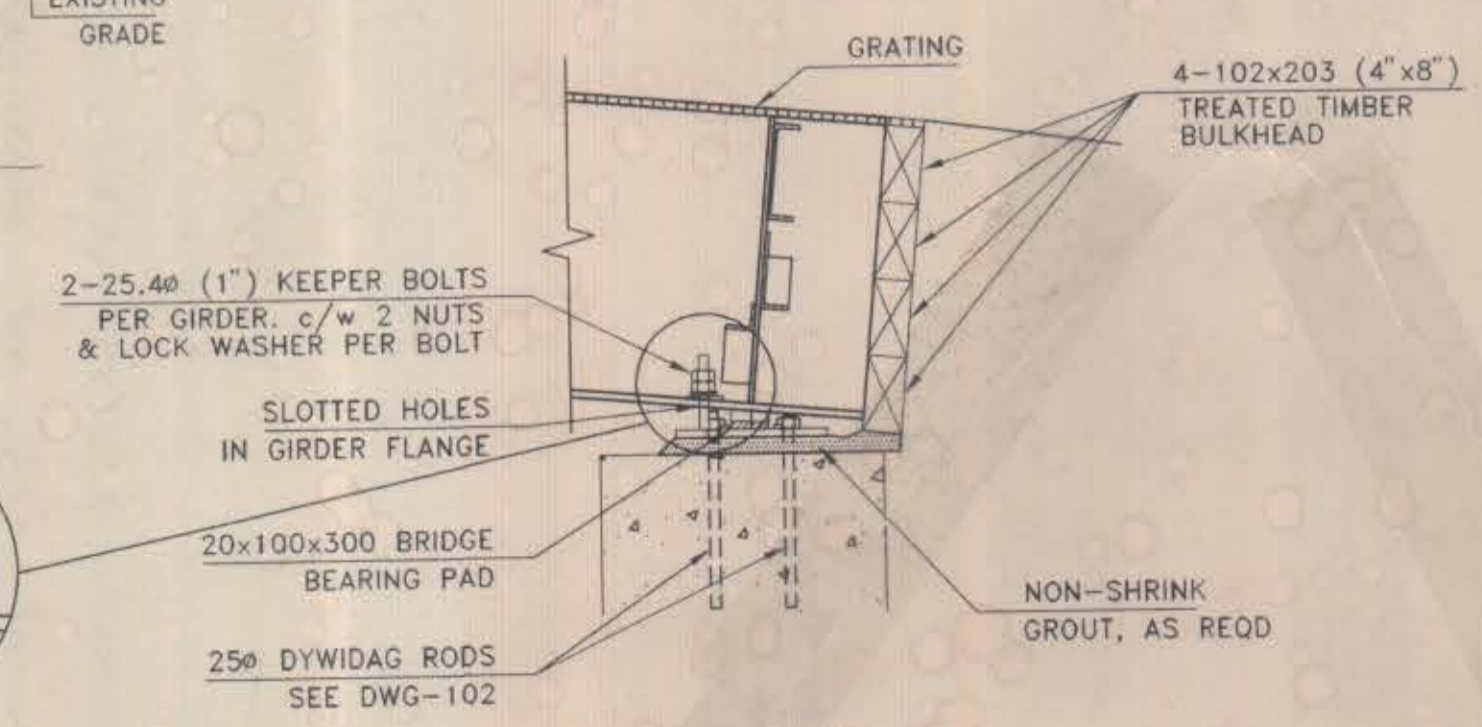


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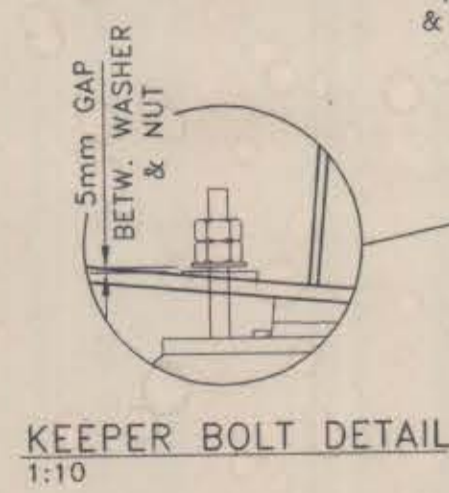
** DIMENSIONS TO BE VERIFIED ON SITE



DETAIL A
1:20



DETAIL B
1:20



KEEPER BOLT DETAIL
1:10

REVISION	REVISION	REFERENCE DRAWINGS
E		
D		
C		
B	NOTES REVISED	
A	ISSUED FOR REVIEW	

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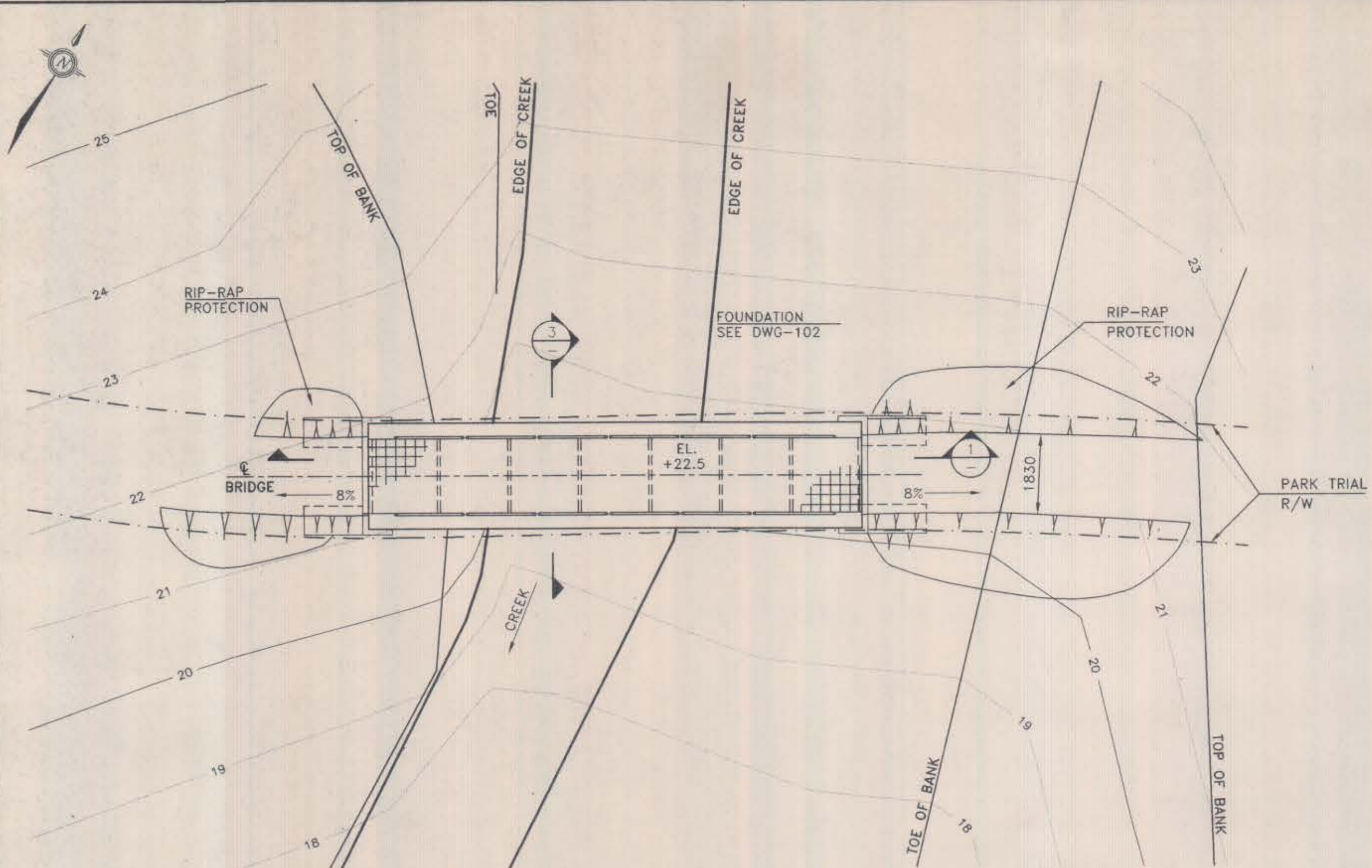
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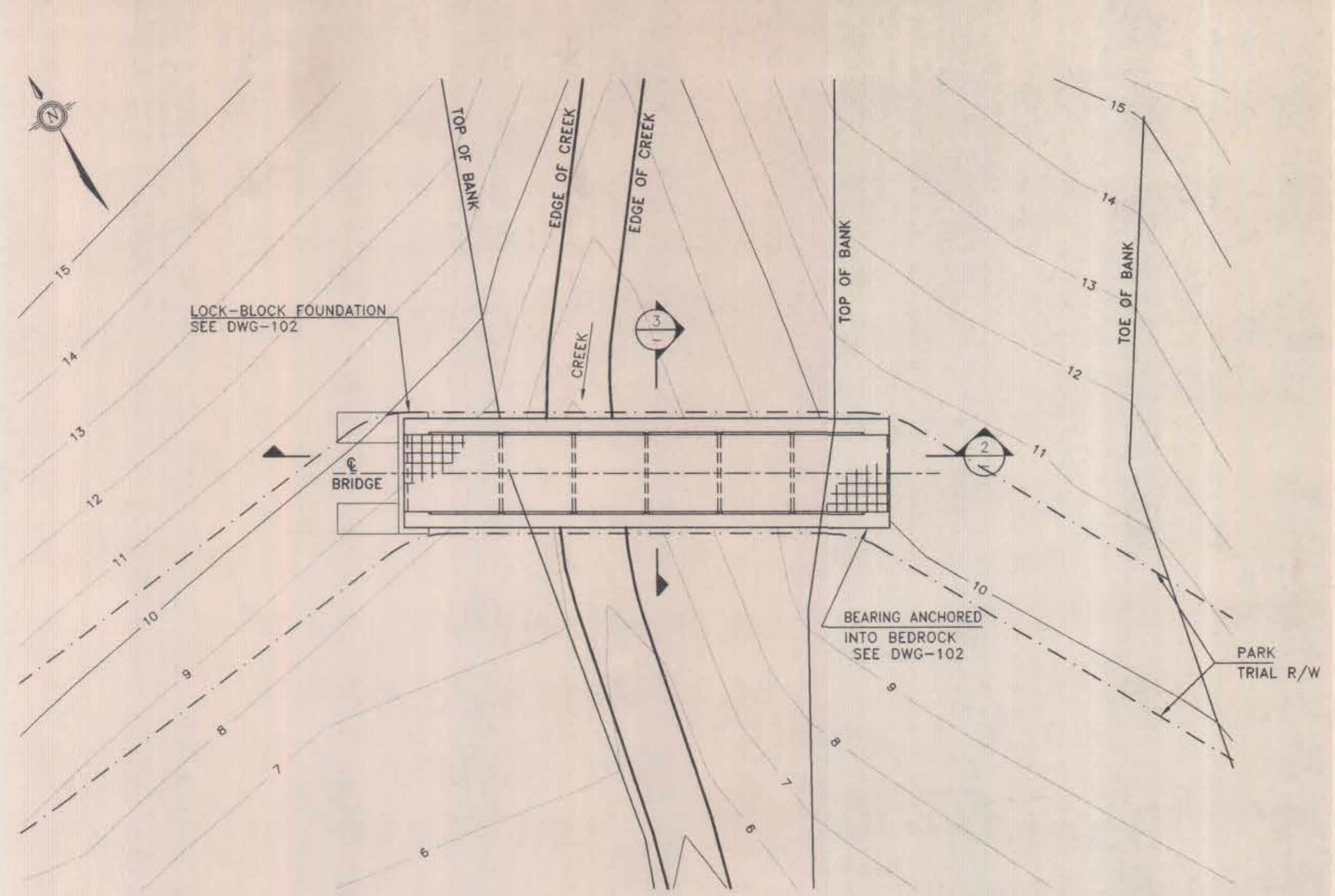
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WEST BAY DEVELOPMENT	
PARK TRAIL CREEK BRIDGES	DRAWING No.
GENERAL LAYOUT (1 of 2)	96113-100
	REV. B

9/25

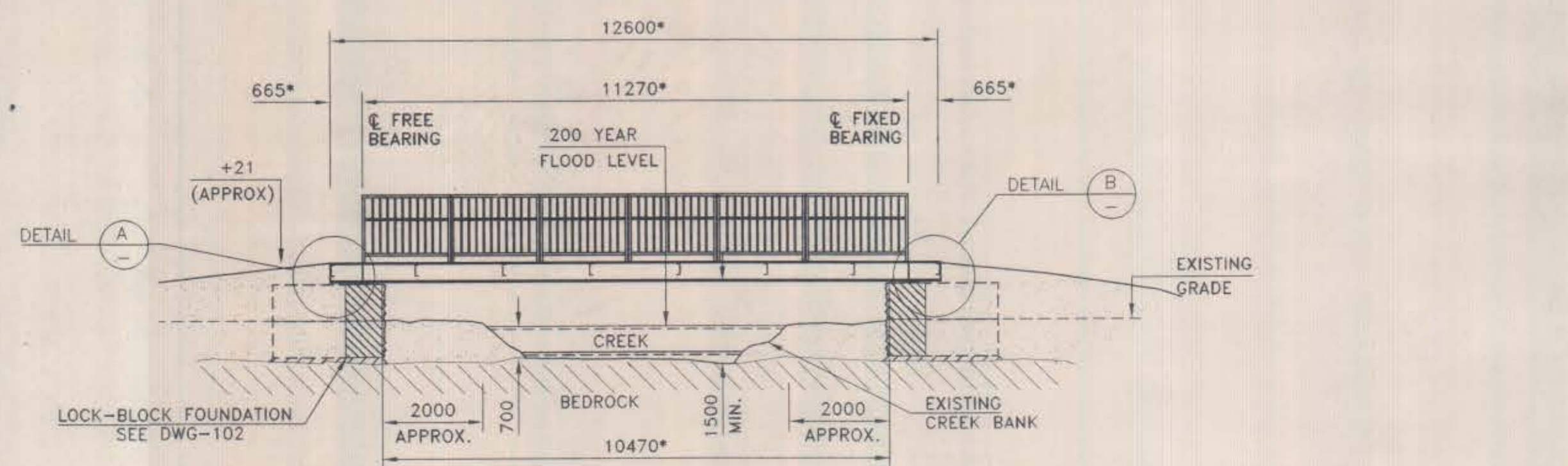
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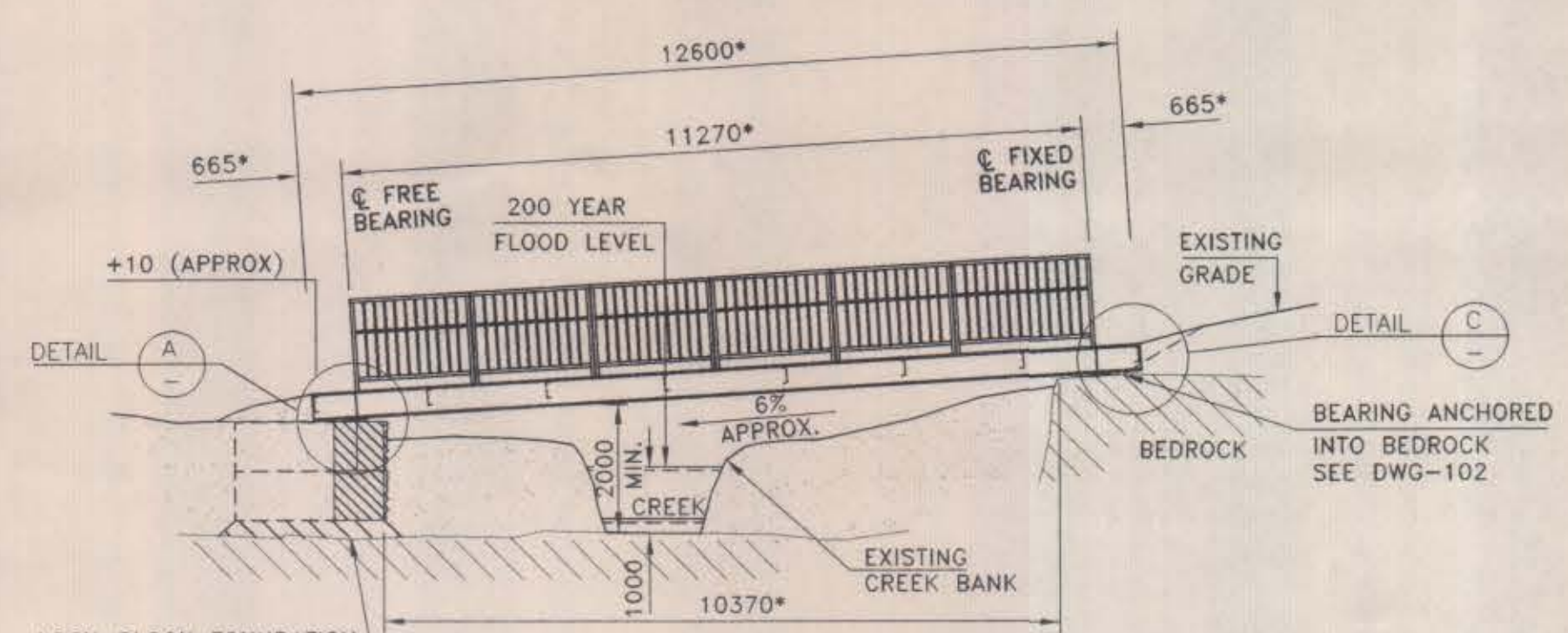


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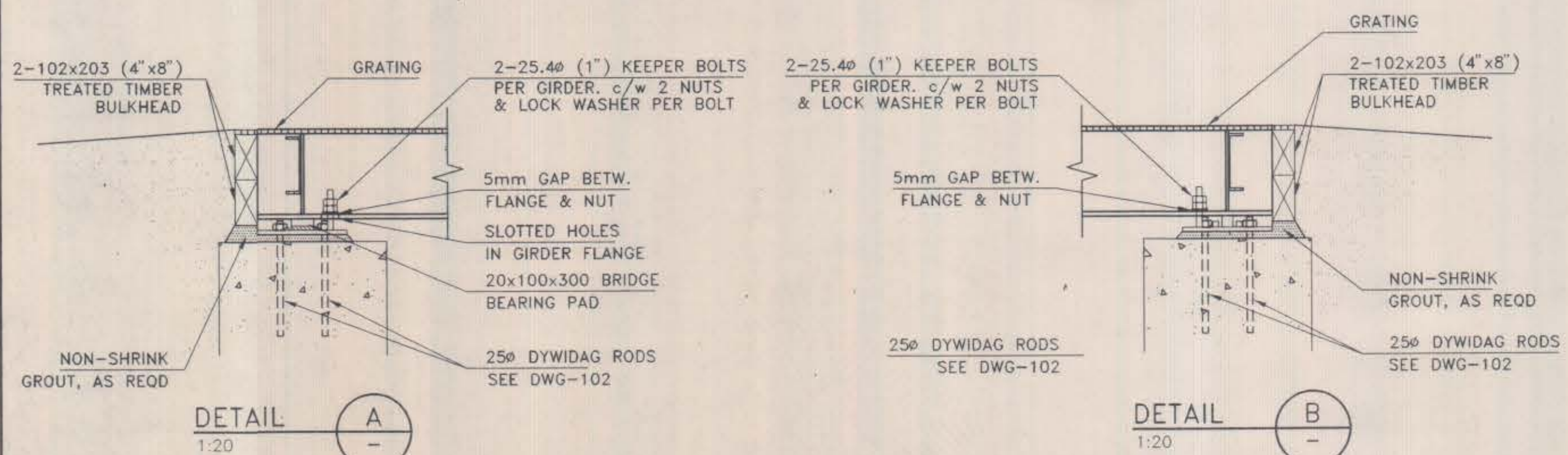
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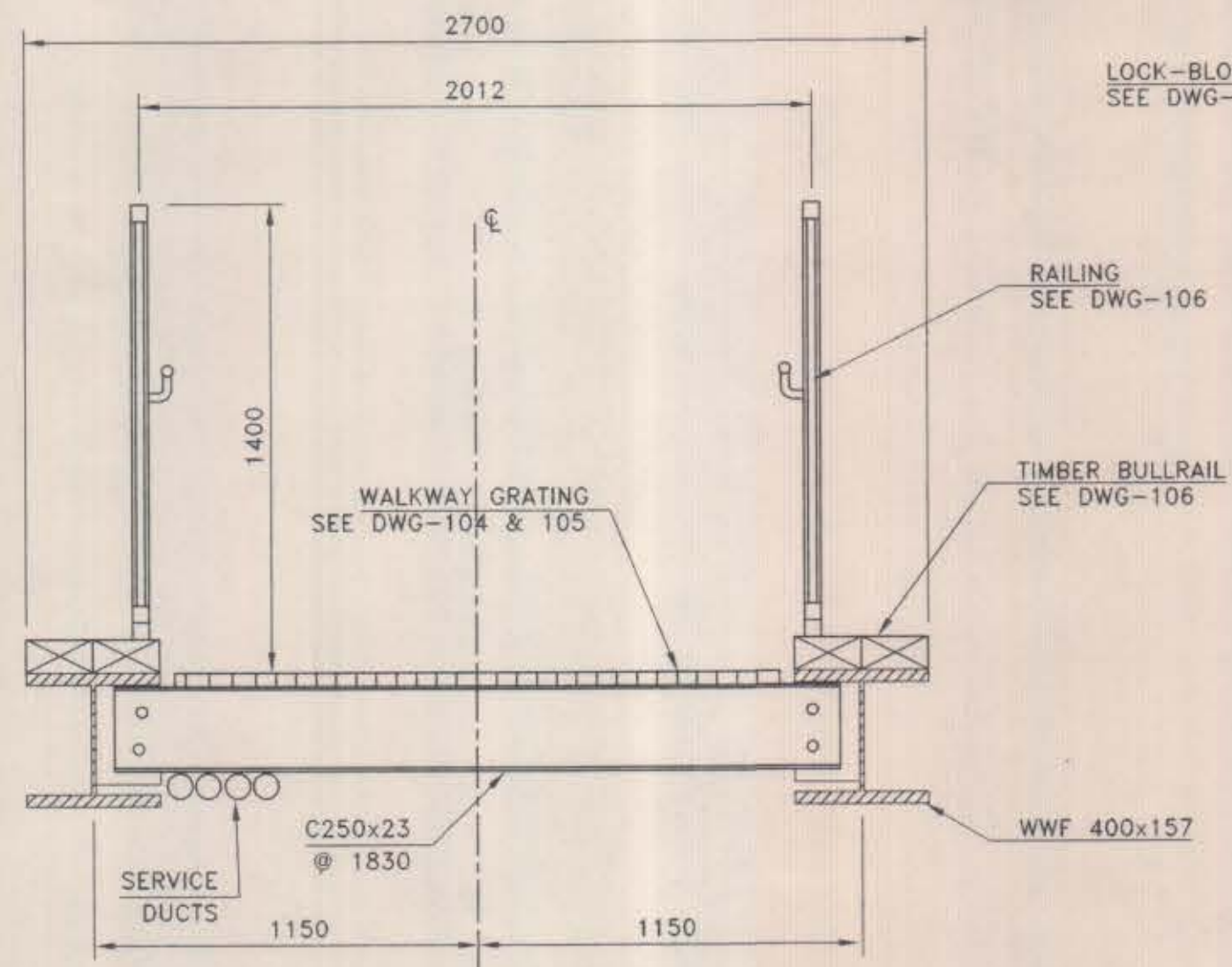
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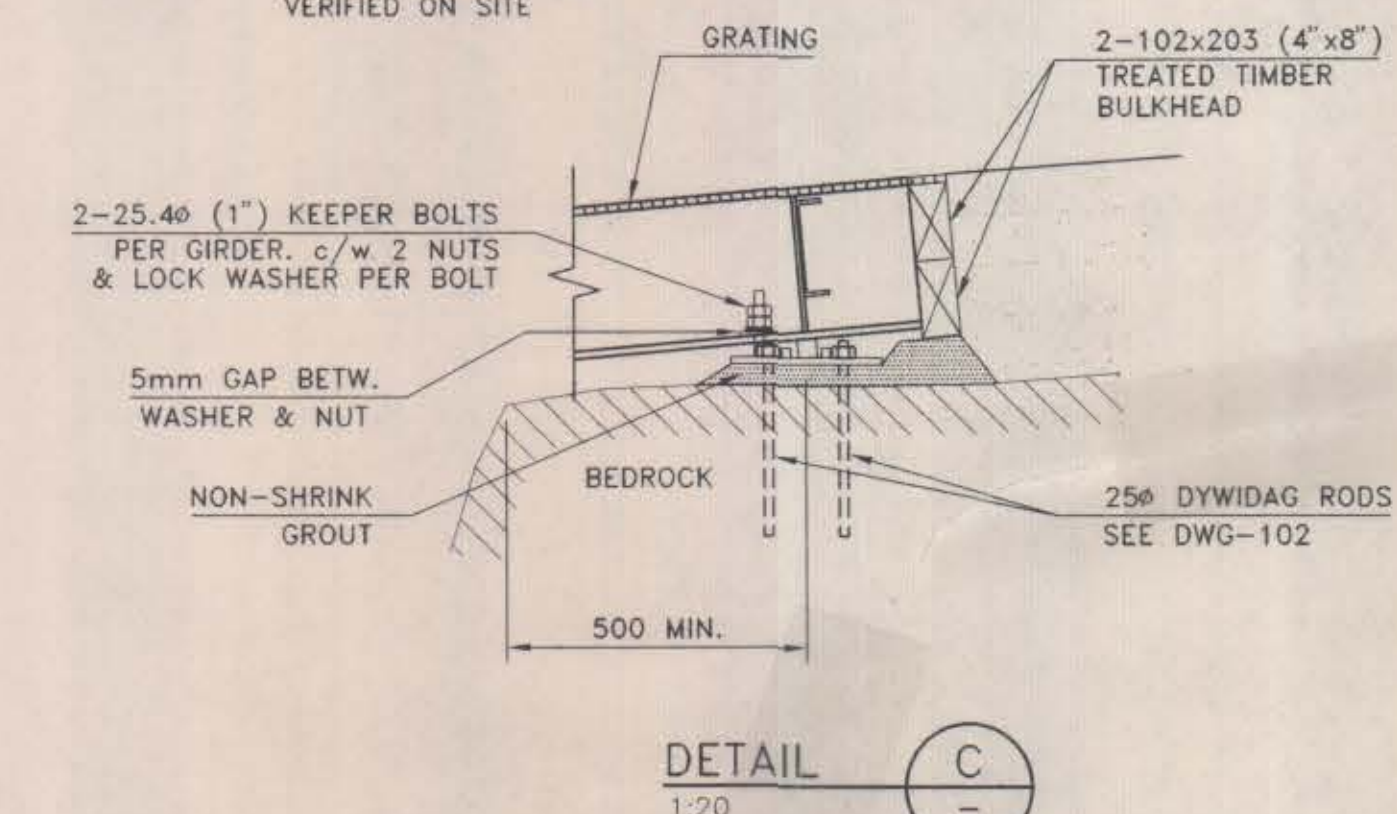


DETAIL A
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DETAIL B
1:20



SECTION 3
1:20



DETAIL C
1:20

NOTE:
1. FOR GENERAL NOTES SEE DWG-100

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D			I		
C			H		
B	ANCHOR NOTES REVISED	29MAY/97	AP	G	
A	ISSUED FOR REVIEW	30APR/97	AP	F	
	REVISION			REVISION	REFERENCE DRAWINGS

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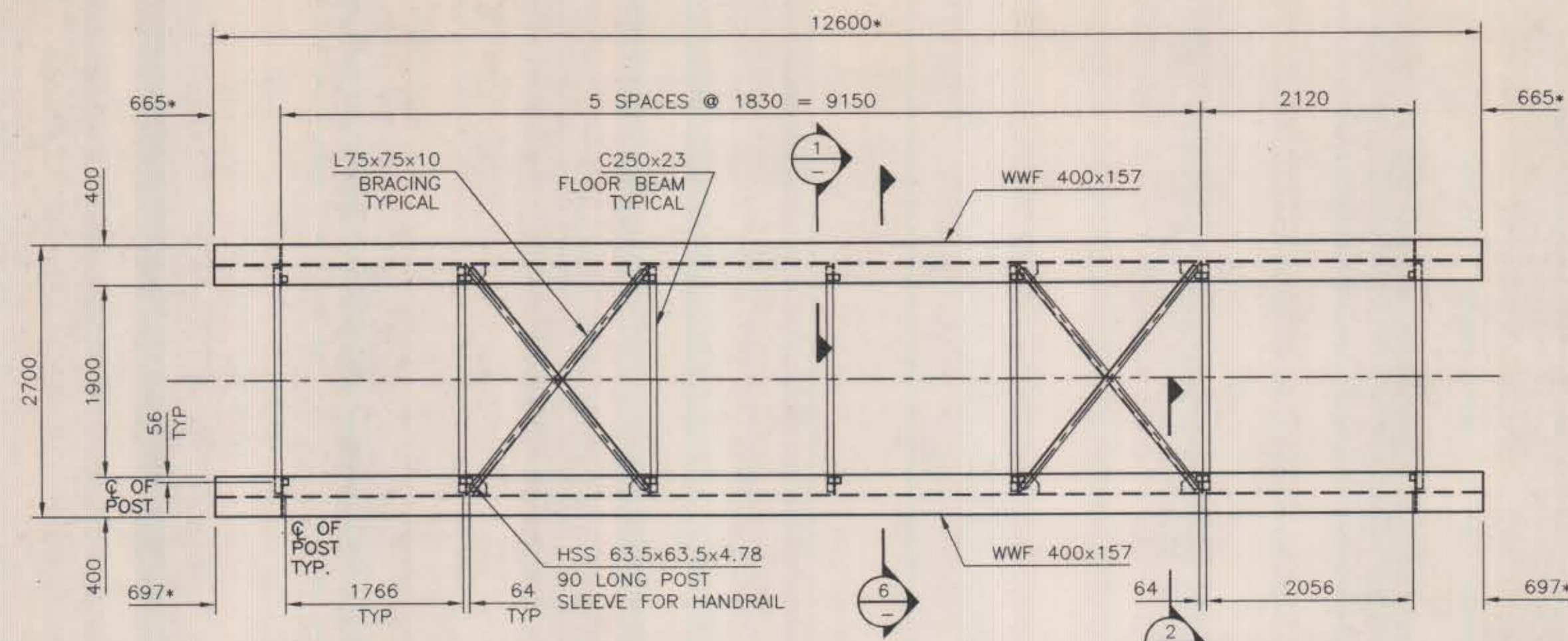
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APPROVED:	

SCALE:	AS SHOWN
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PROJECT No.	96113

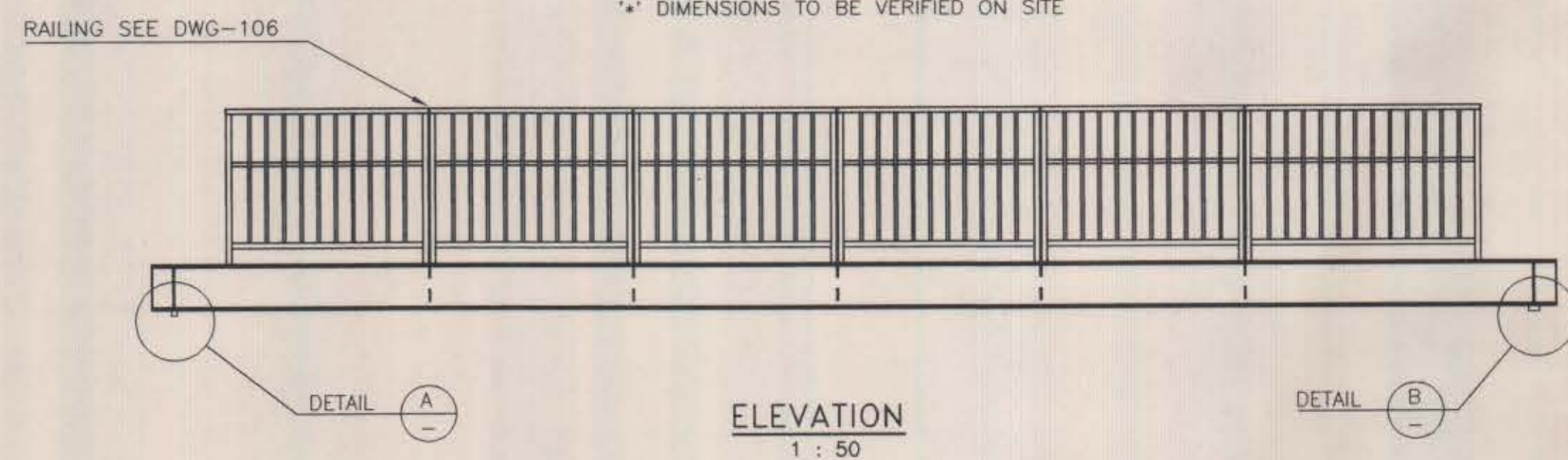
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PARK TRAIL CREEK BRIDGES	
GENERAL LAYOUT (2 of 2)	
DRAWING No.	96113-101
REV.	B

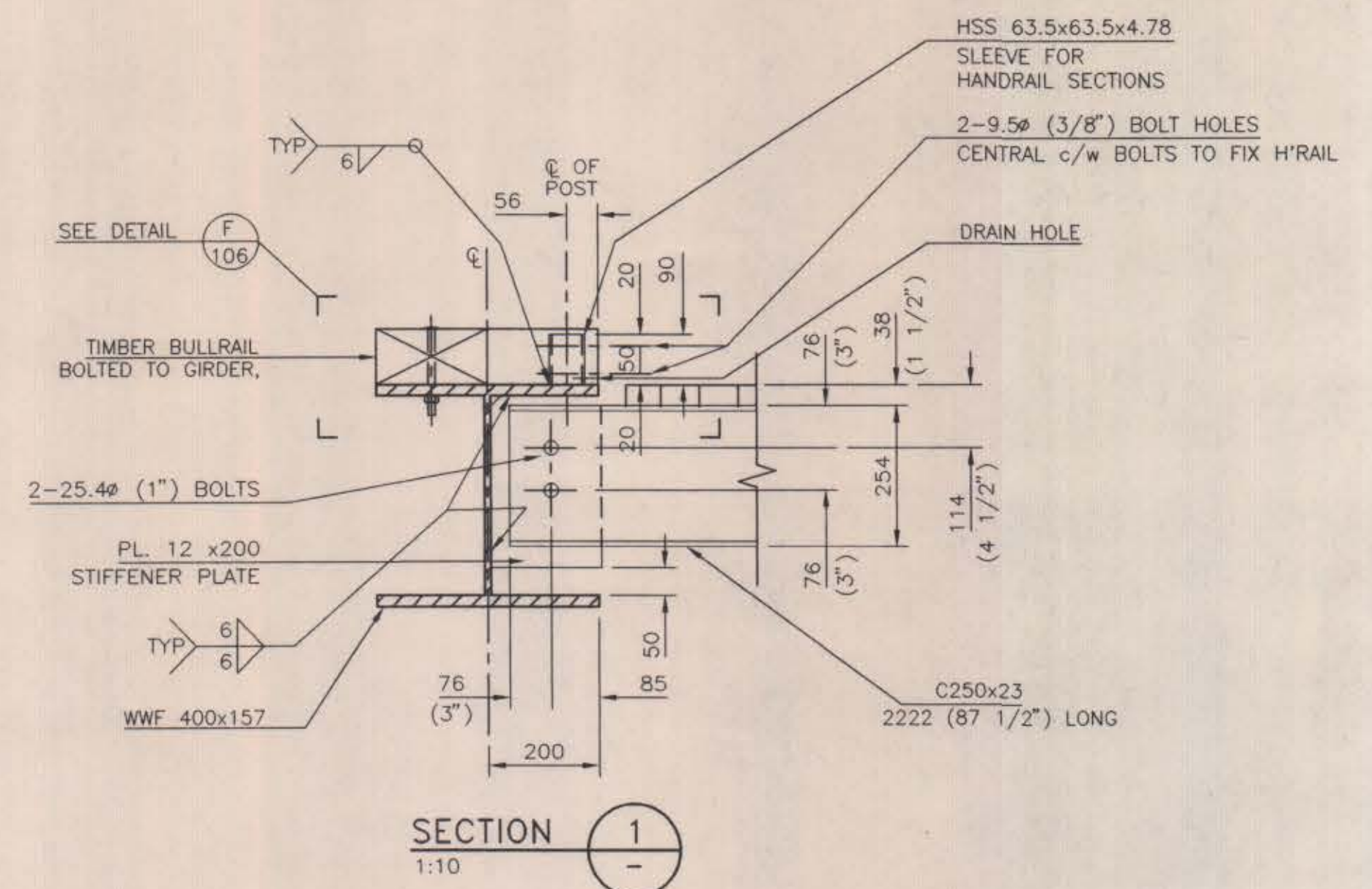
MAY 9, 1997 4:00 PM



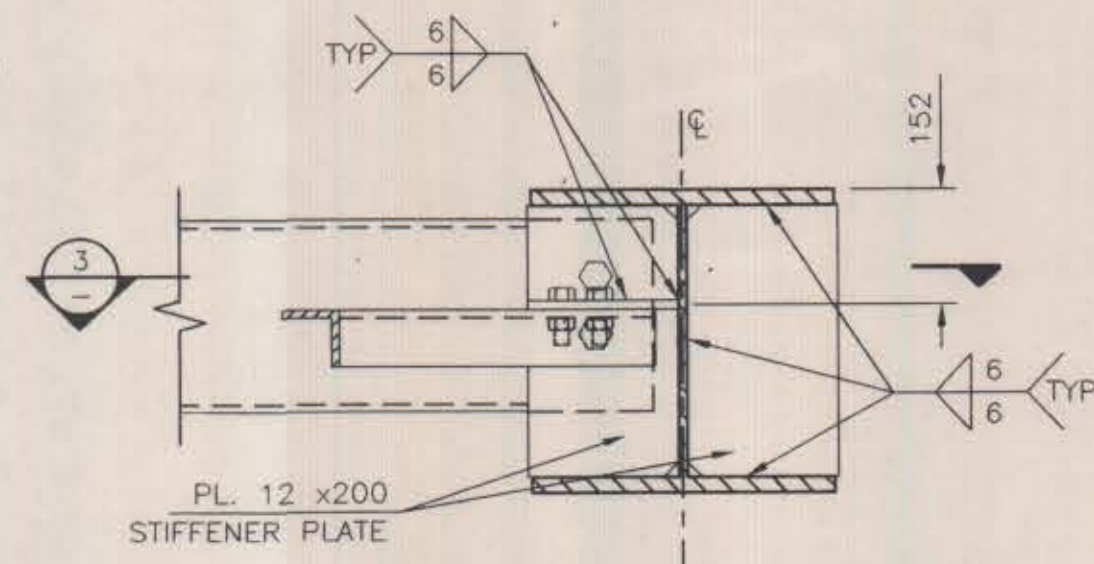
WEST CREEK BRIDGE - PLAN
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(GRATING & BULLRAIL NOT SHOWN FOR CLARITY)
* DIMENSIONS TO BE VERIFIED ON SITE



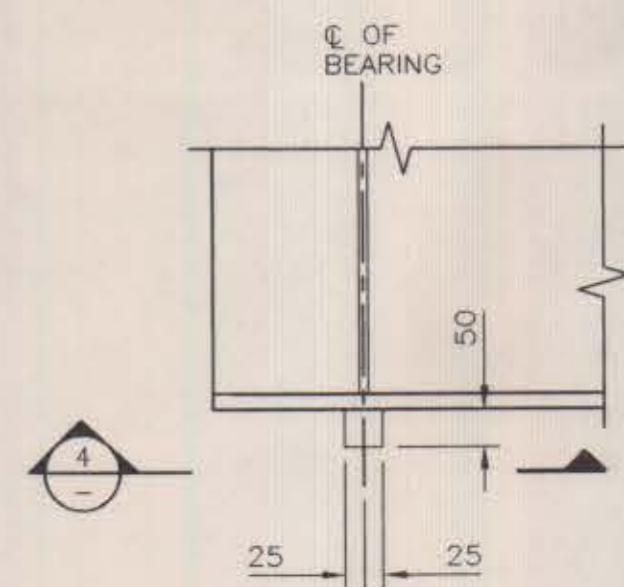
ELEVATION
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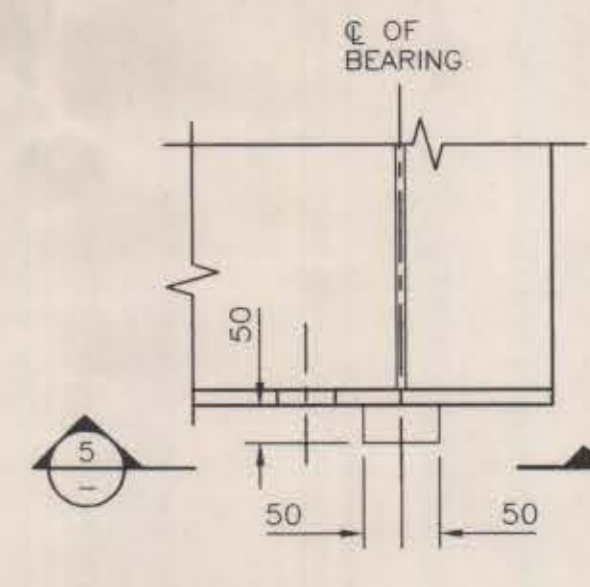
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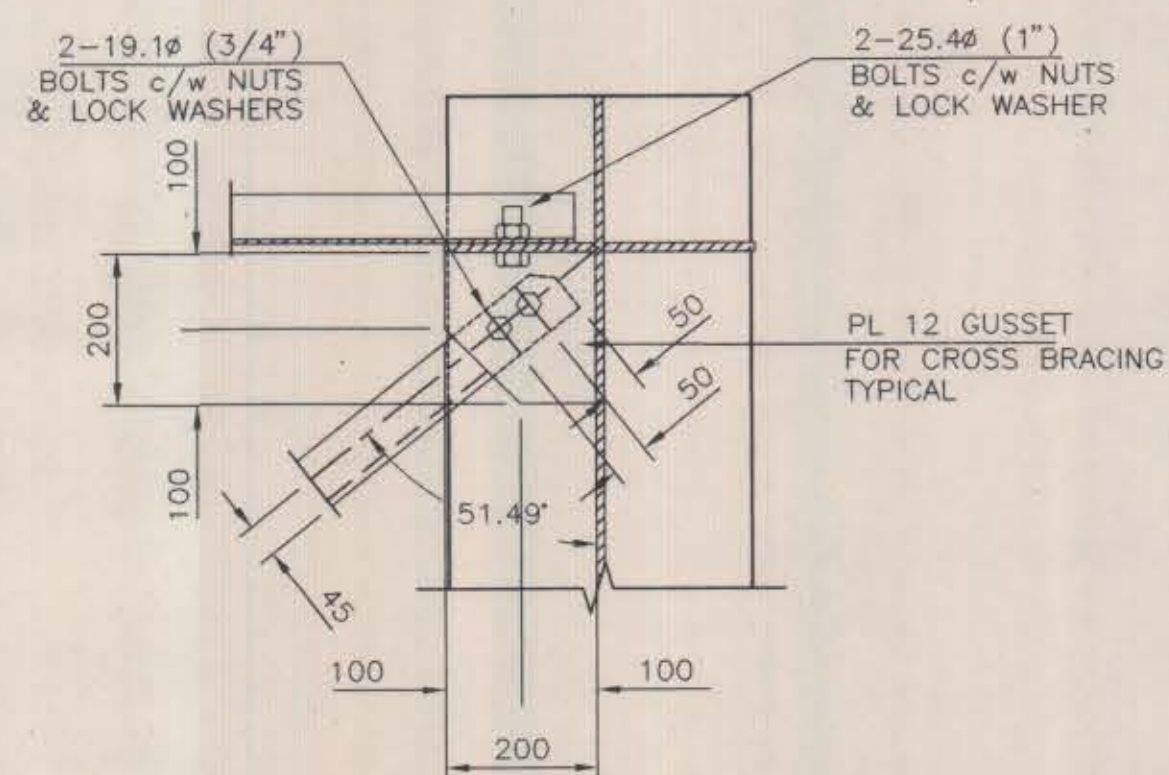
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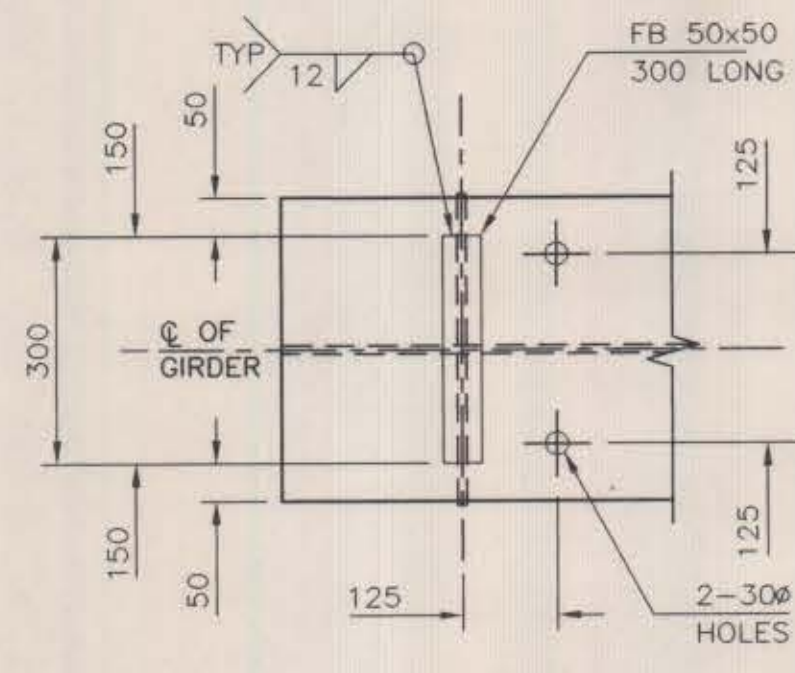
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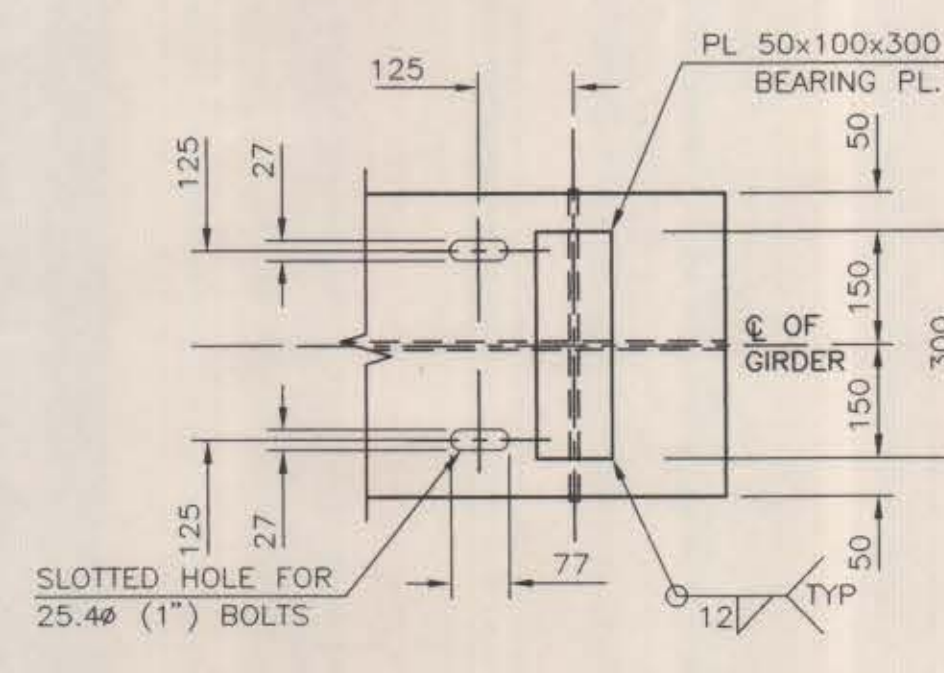
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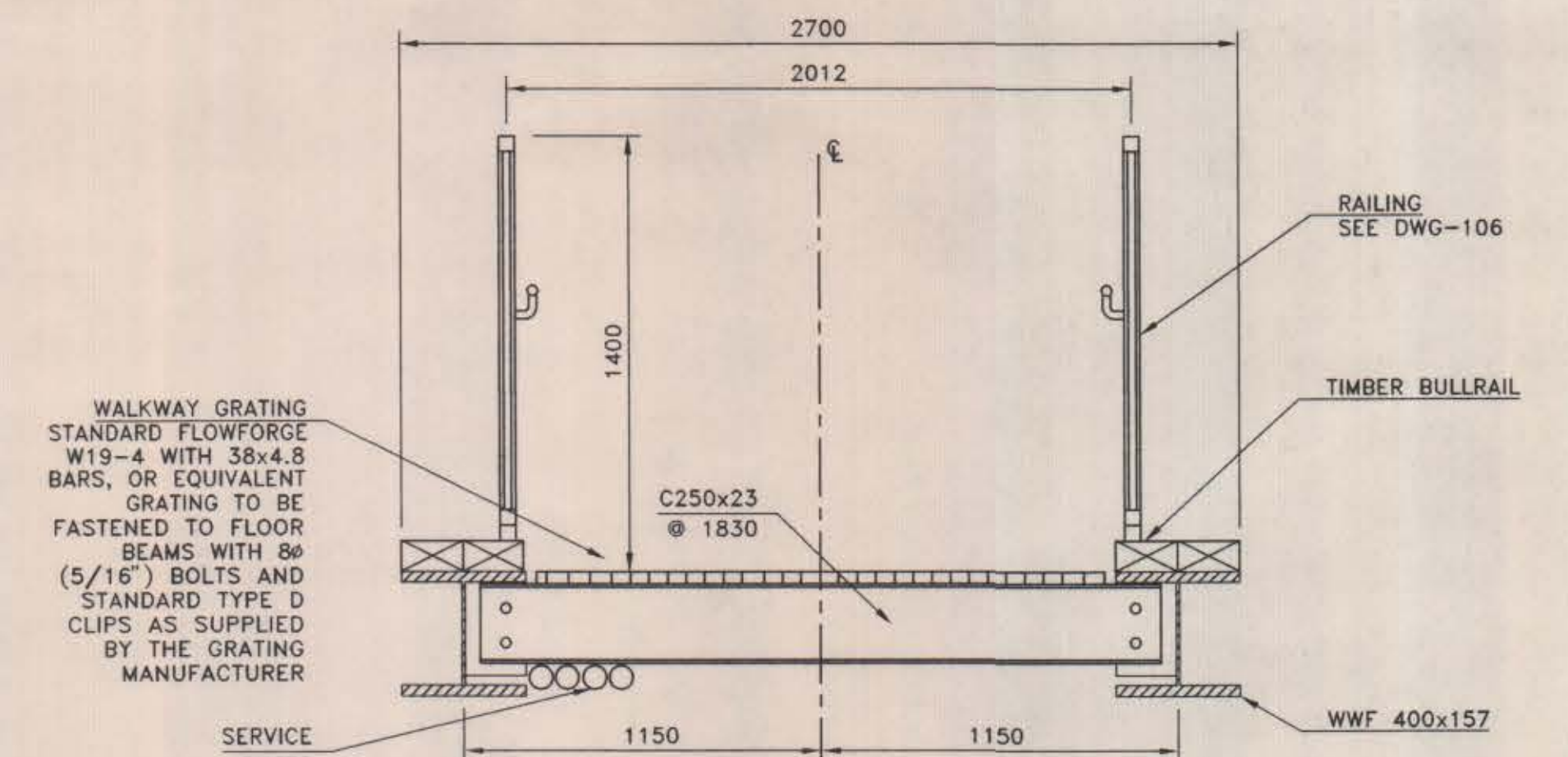
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SECTION 4
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SECTION 5
1:10



SECTION 6
1:20

NOTES:
1. FOR GENERAL NOTES SEE DWG-100

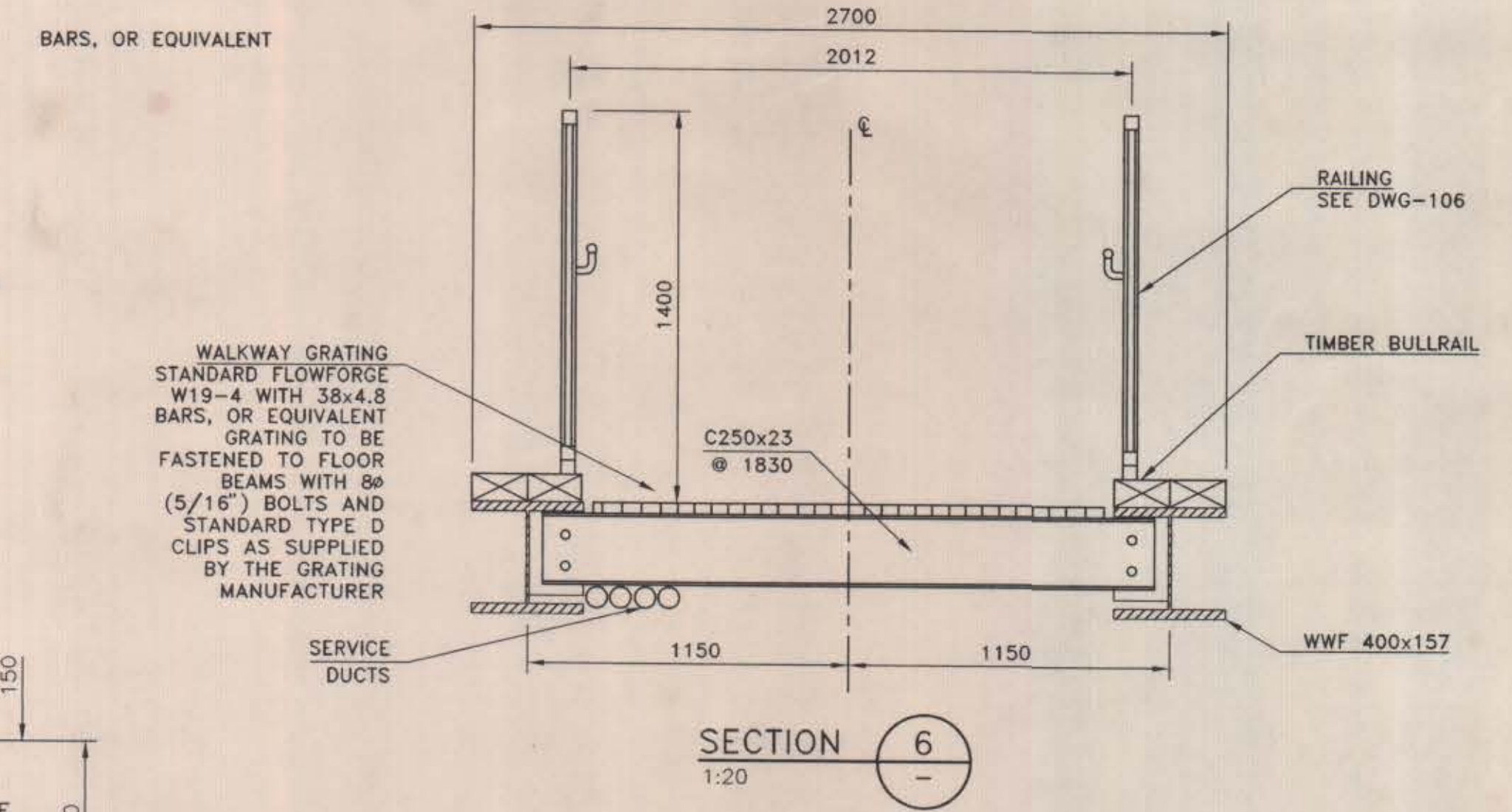
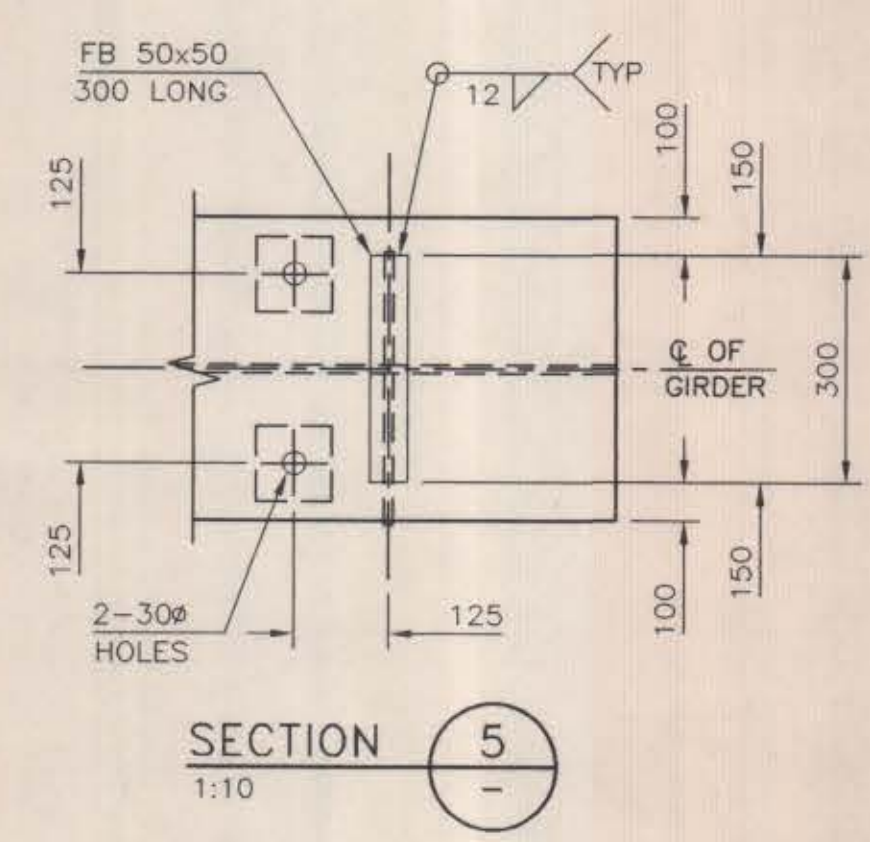
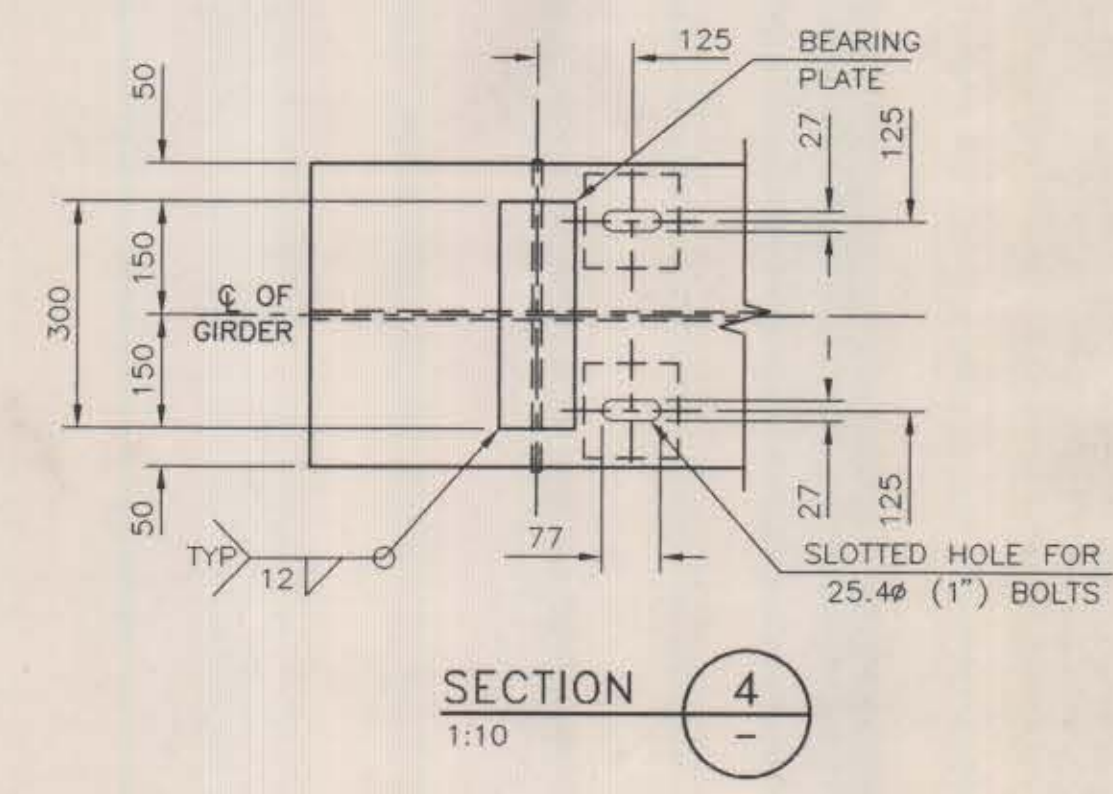
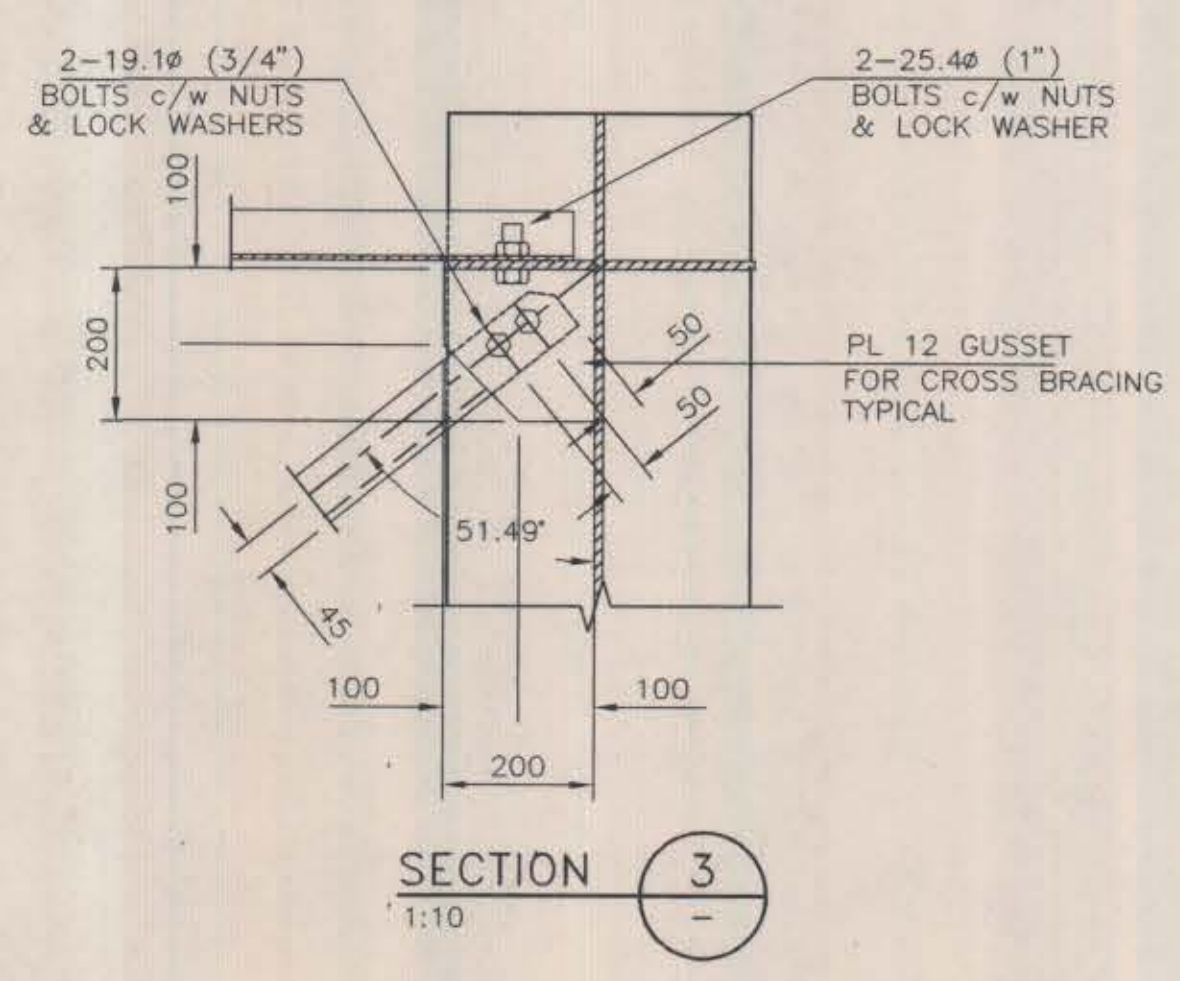
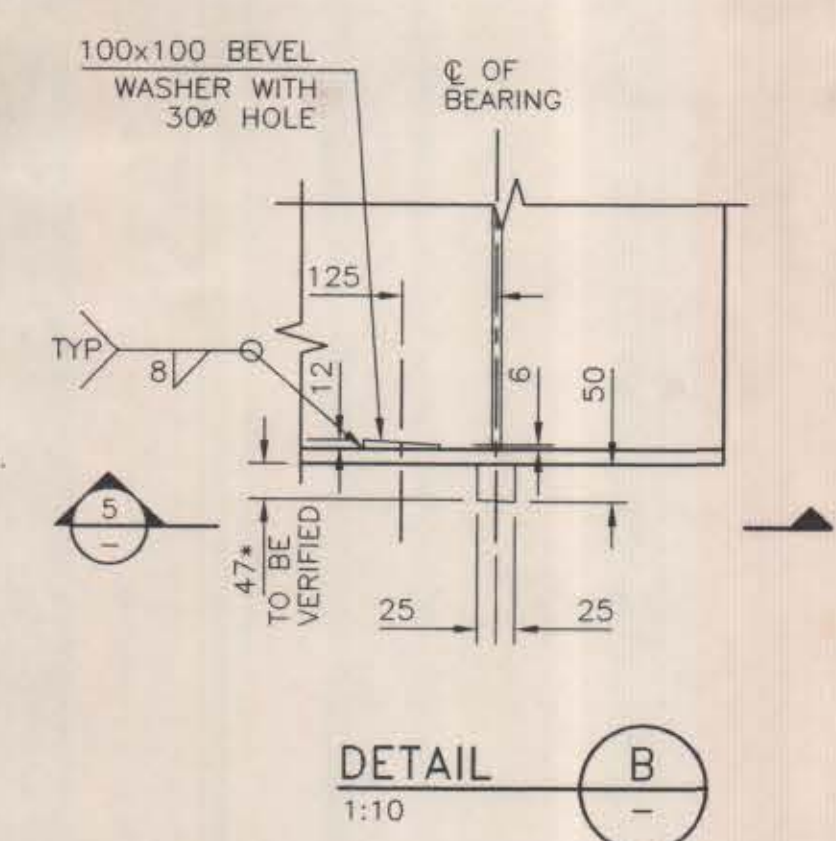
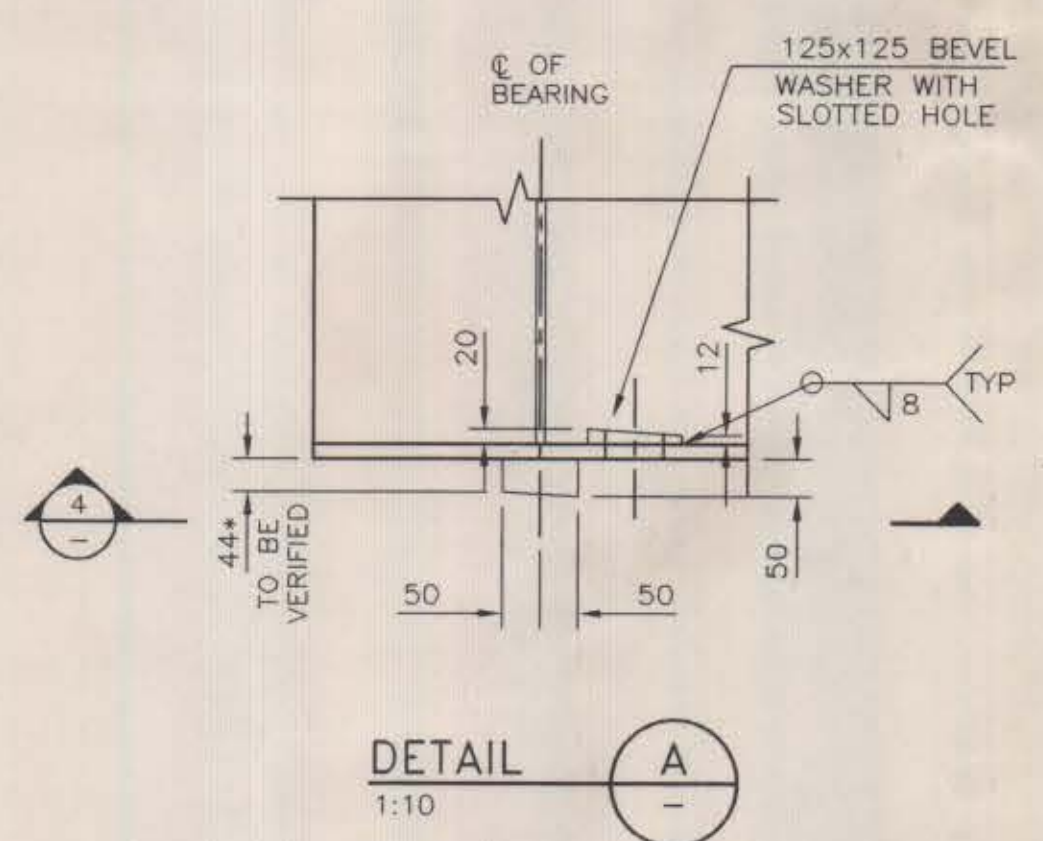
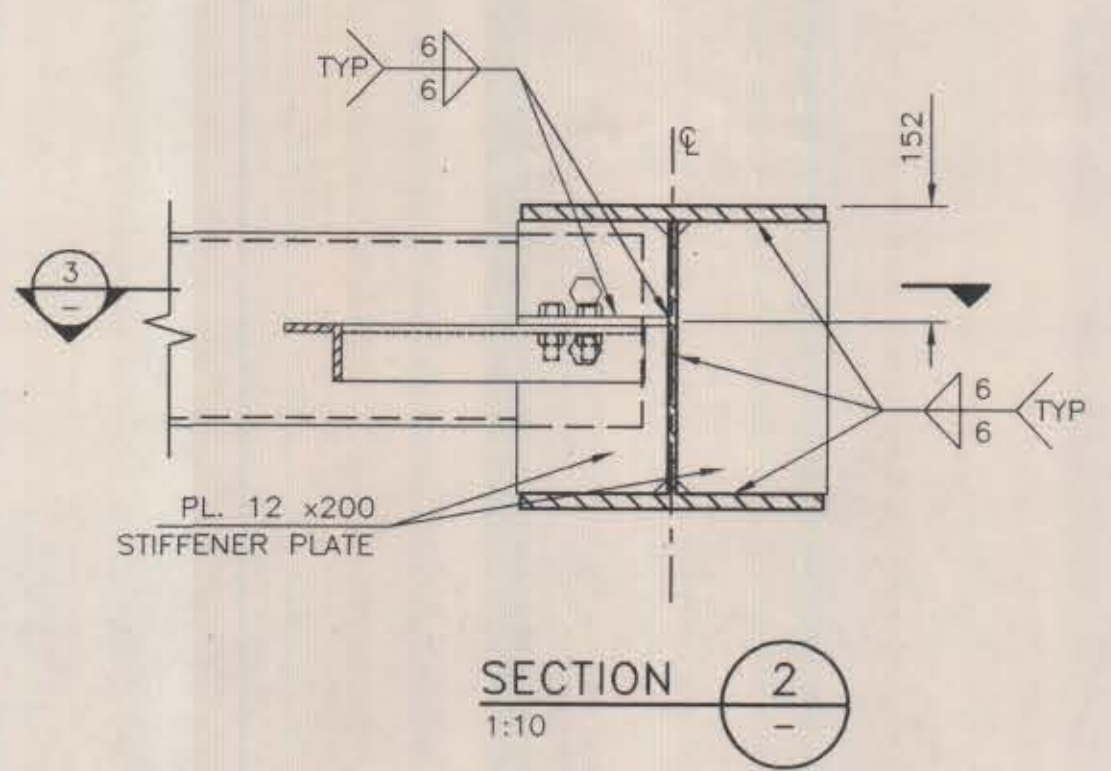
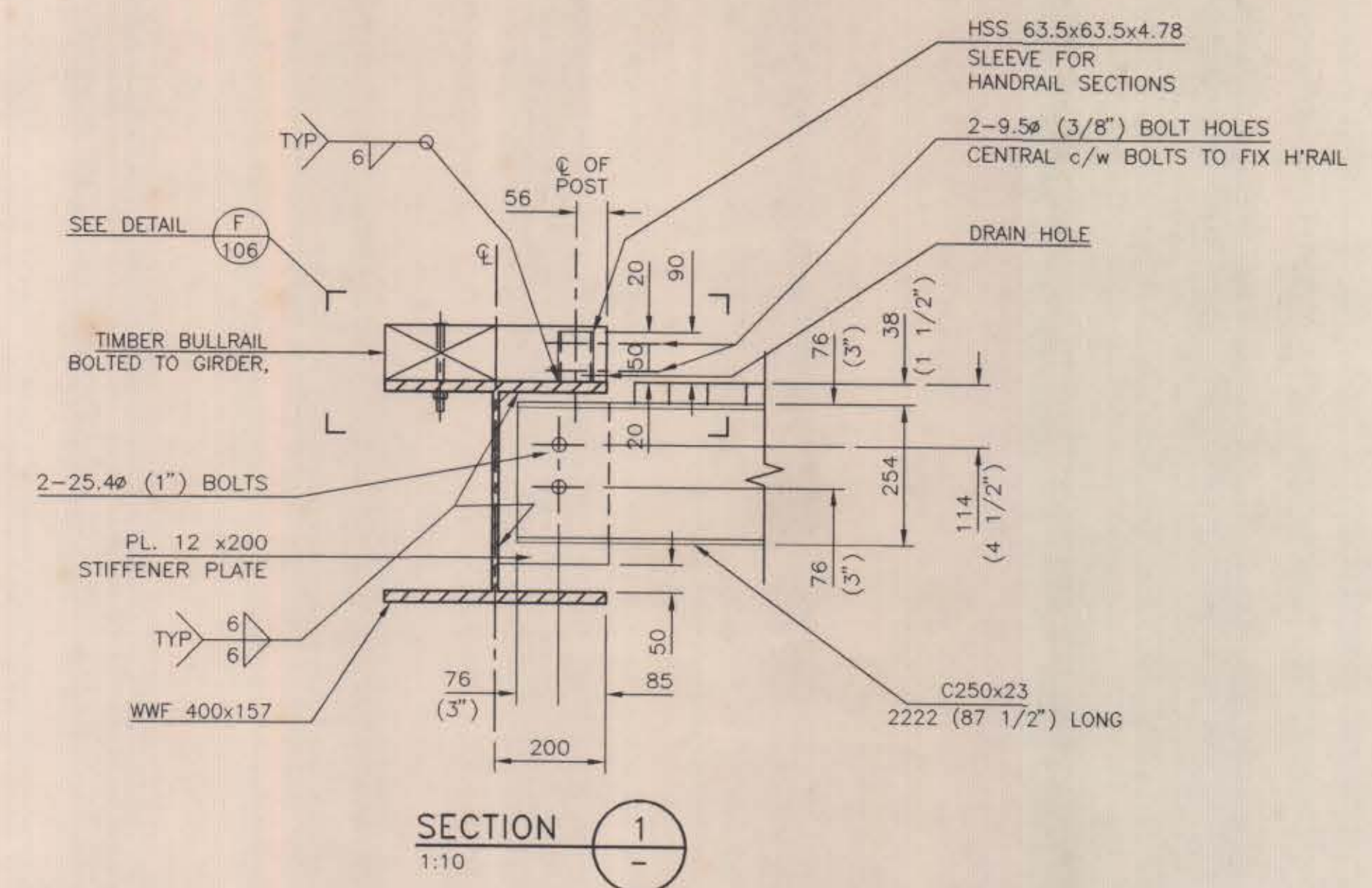
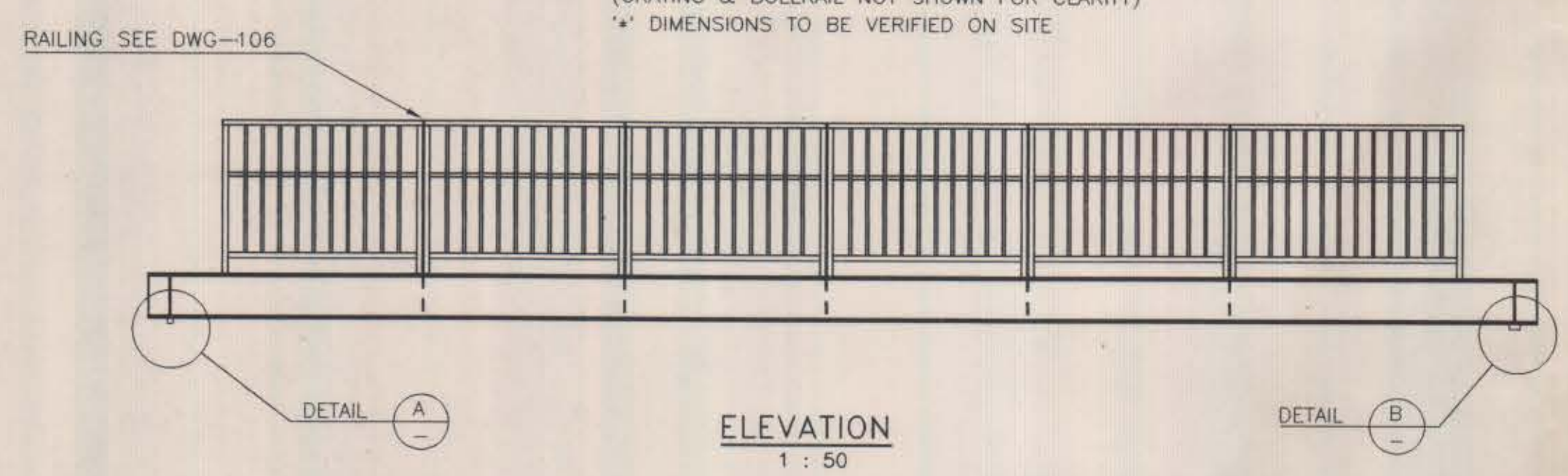
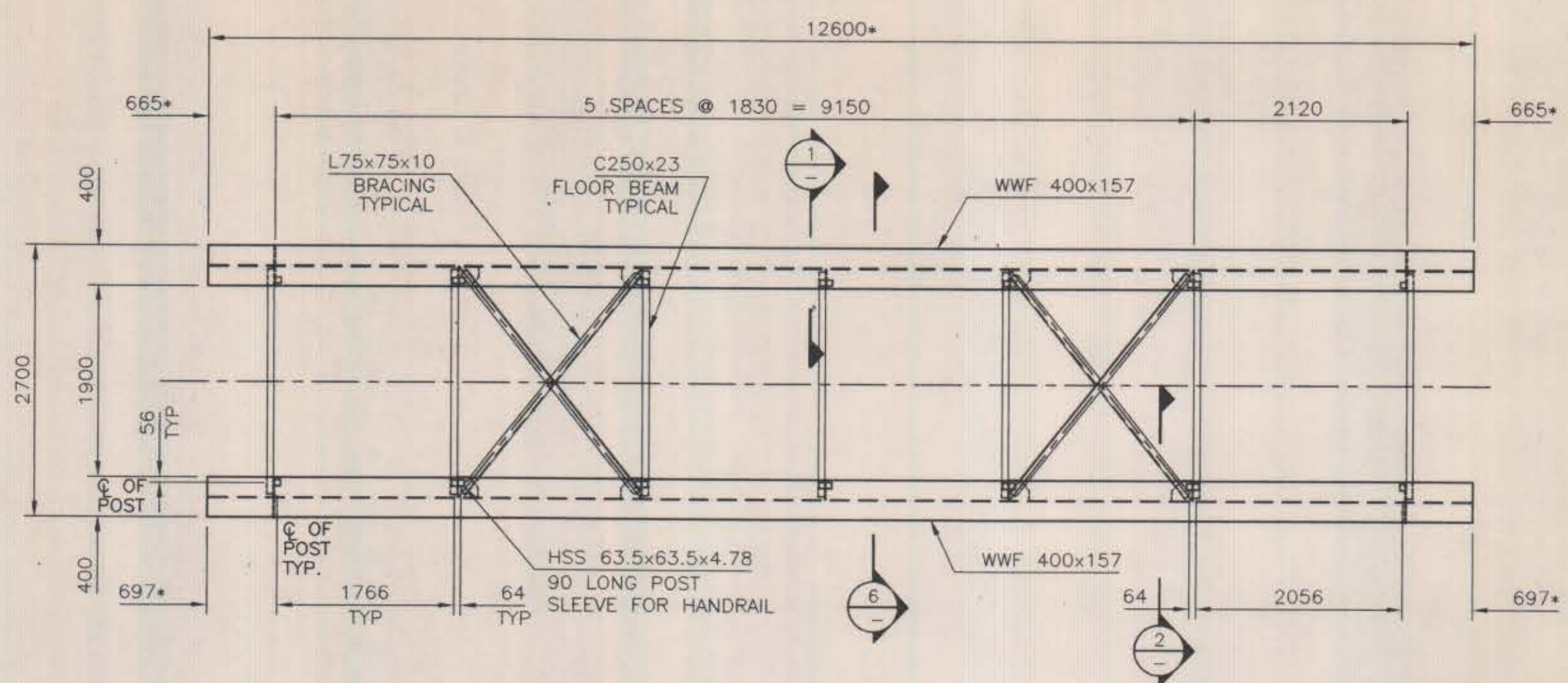
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D			I				
C			H				
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A	ISSUED FOR REVIEW	30APR/97	AP	F			
REVISION				REVISION		REFERENCE DRAWINGS	

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WEST BAY DEVELOPMENT		96113-104	B
PARK TRAIL CREEK BRIDGES		STEEL DETAILS (2 of 3)	



NOTES:
 1. FOR GENERAL NOTES SEE DWG-100

E			J				
D			I				
C			H				
B	GRATING NOTE MODIFIED	9MAY/97	AP	G			
A	ISSUED FOR REVIEW	30APR/97	AP	F			
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 CAD FILE NAME: 96113105
 PROJECT No. 96113

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RIVTOW MARINE LTD.
 WEST BAY DEVELOPMENT
 PARK TRAIL CREEK BRIDGES
 STEEL DETAILS (3 of 3)
 DRAWING No. 96113-105
 REV. B

9/25

MAY 9, 1997 4:00 PM

