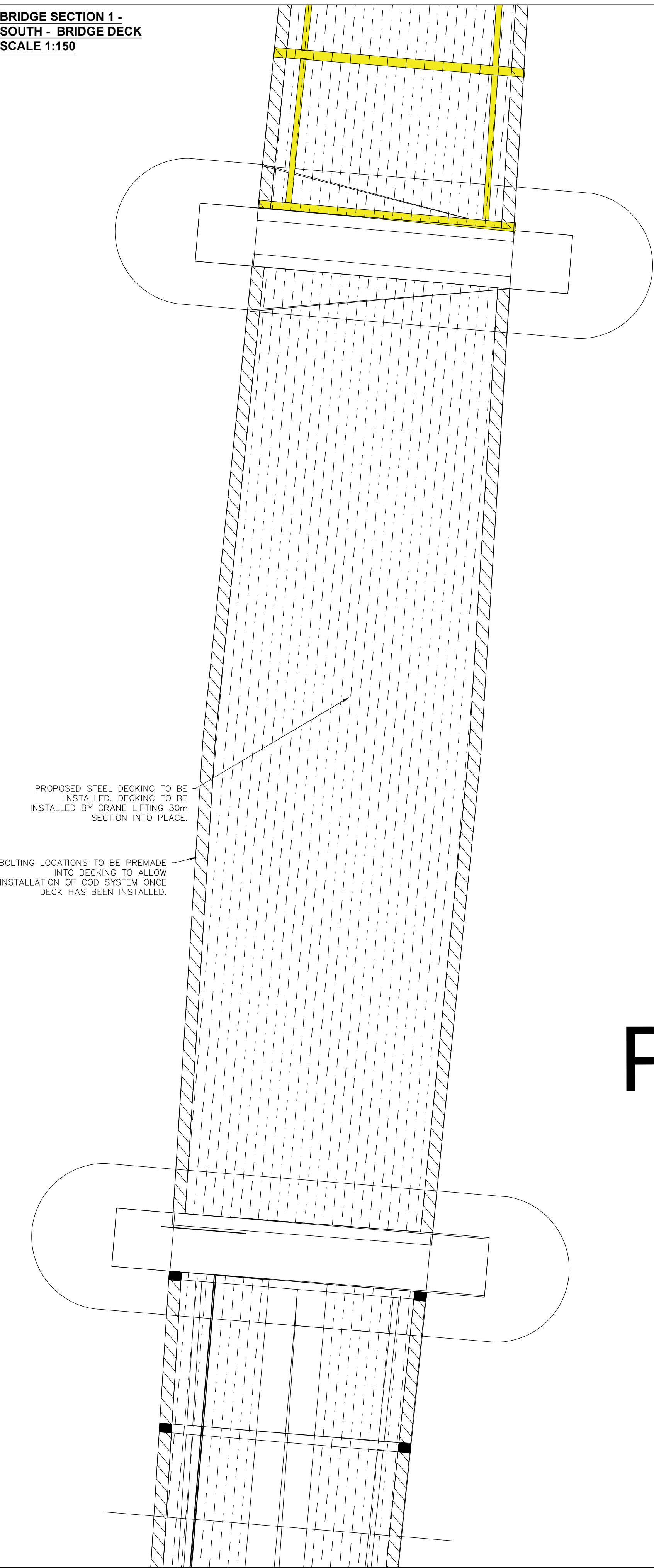
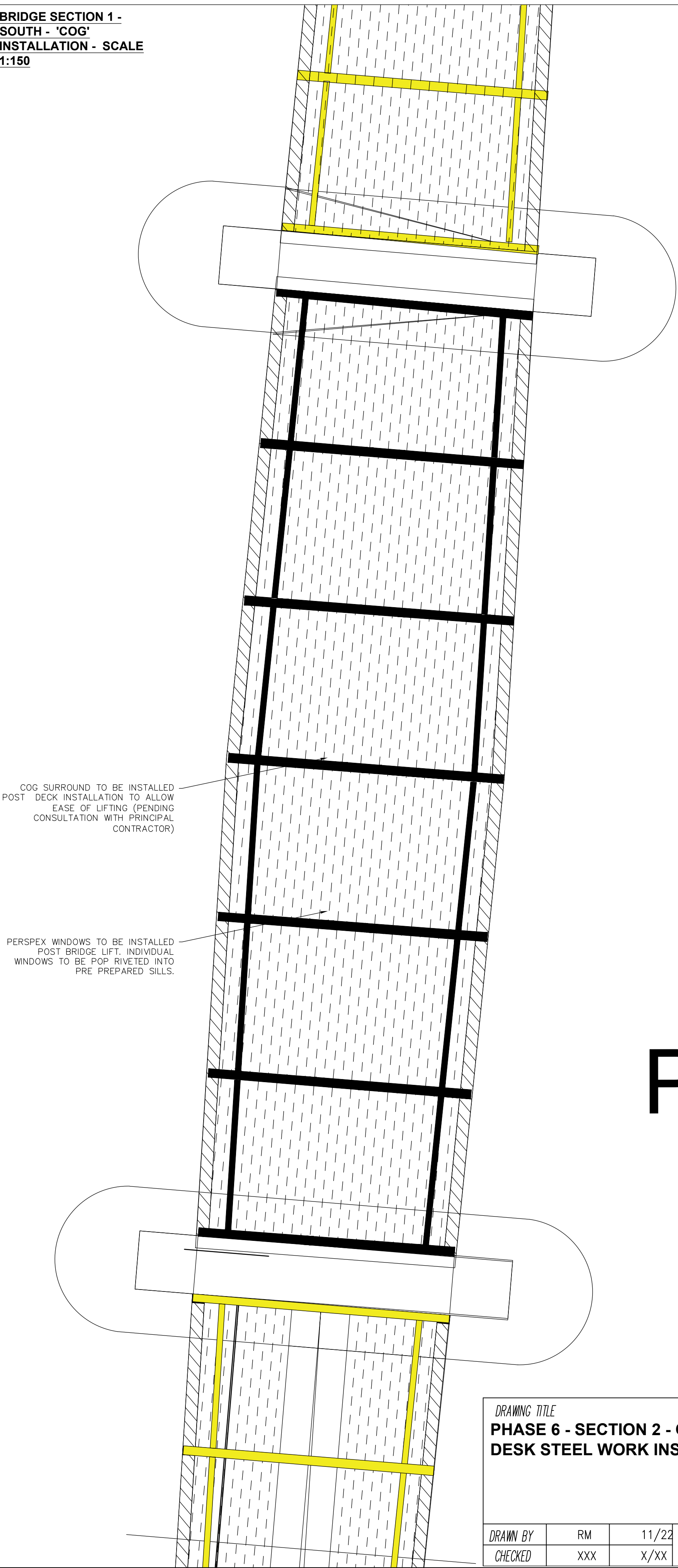


SPRINGFIELD DESIGNS Ltd

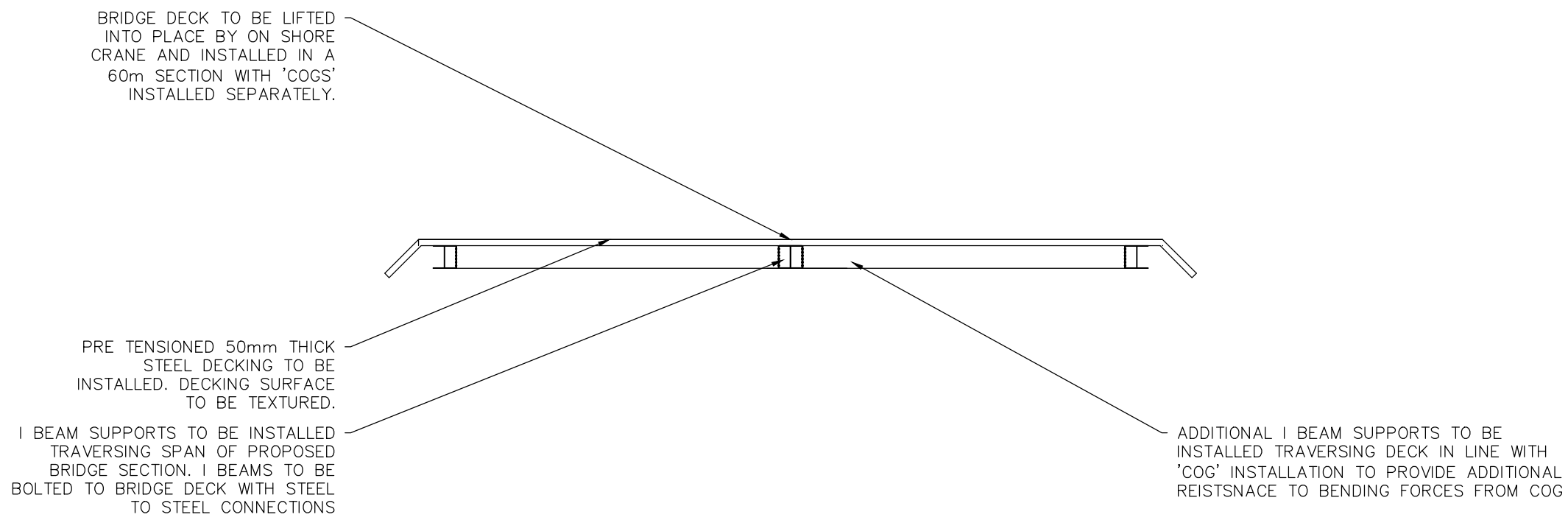
BRIDGE SECTION 1 -
SOUTH - BRIDGE DECK
SCALE 1:150



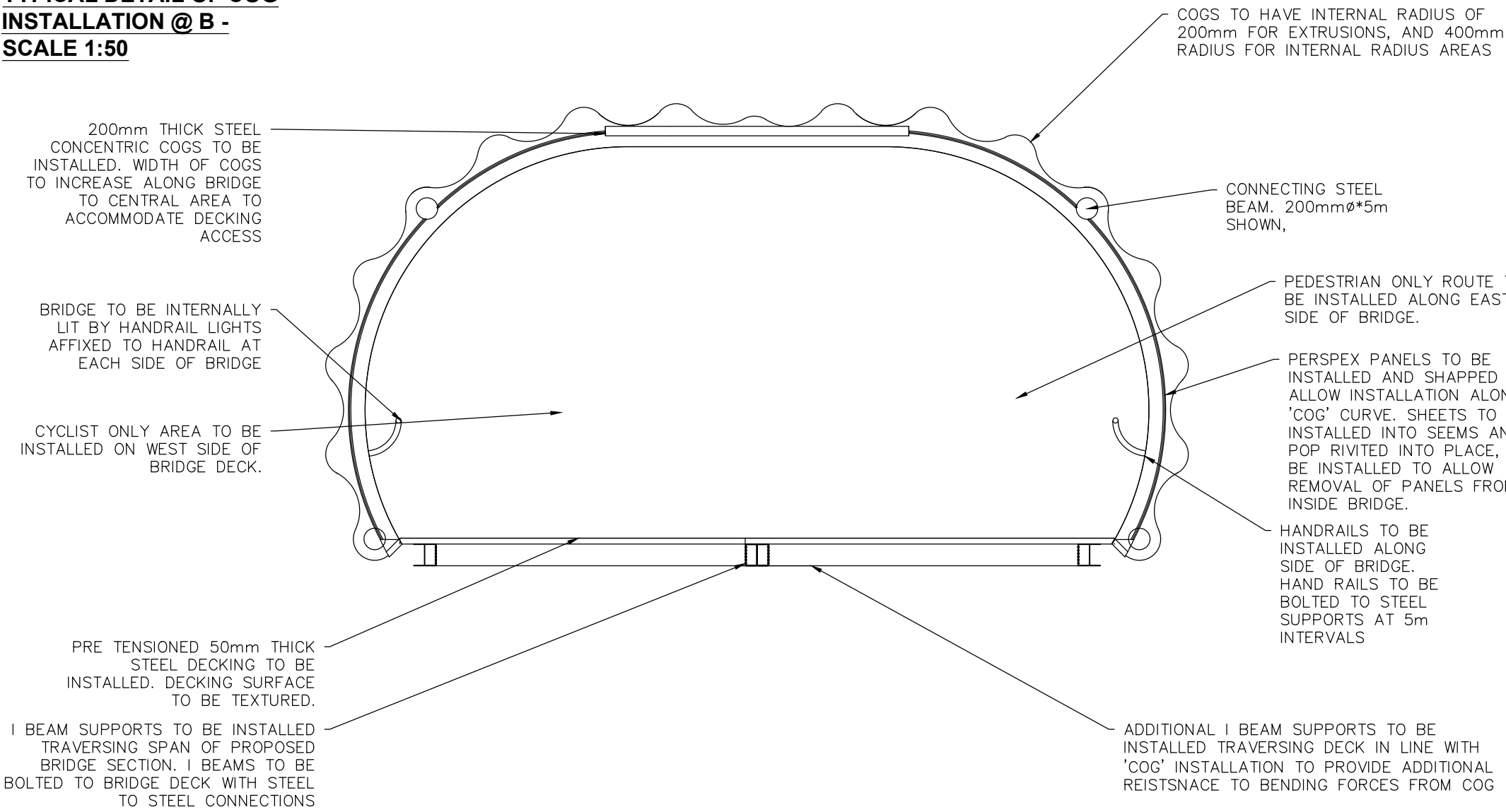
BRIDGE SECTION 1 -
SOUTH - 'COG'
INSTALLATION - SCALE
1:150



TYPICAL DETAIL OF
BRIDGE DECK @ B -
SCALE 1:50



TYPICAL DETAIL OF COG
INSTALLATION @ B -
SCALE 1:50



Prin

Pri

DRAWING TITLE
PHASE 6 - SECTION 2 - CENTRAL- BRIDGE
DESK STEEL WORK INSTALLATION

DRAWN BY	RM	11/22	SCALE	SHOWN
CHECKED	xxx	x/xx		

PROJECT TITLE
ACBA6003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE

CAD REF.	CAD	
PROJECT PHASE	PHASE	REV.

DRAWING No.
PED1-SPR-DR-C-0014-S1

REV.	DESCRIPTION	BY	DATE

SPRINGFIELD DESIGNS Ltd

BRIDGE ELEVATION -
A1-A1 - NTS

Sub Sta

Hotel

Car Park

Sand Quay

Prince of Wales Dock

Bollards

Car Park

Face of Dock Wall

Face of Dock Wall

MOORINGS TO BE
PROVIDED TO ALLOW
DOCKING OF 32 QTY
BOATS ON NORTHERN
SIDE

PEDESTRIAN ACCESS TO
MOORINGS TO BE
PROVIDED VIA SECURITY
KEY VIA RAMPED
ACCESS FROM CENTRE
OF BRIDGE DECK

MOORINGS TO BE
PROVIDED TO ALLOW
DOCKING OF 32 QTY
BOATS ON SOUTHERN
SIDE

ILLUMINATION TO BE PROVIDED BY INSTALLATION OF
ACROSPIRE DEFENDER LANTERNS AFIXED TO BRIDGE
DECKING VIA 76.1mm COLUMNS. SHORT COLUMN
AFIXED TO BRIDGE DECK VIA BOLT DOWN SYSTEM.
SOLAR LIGHTING TO BE INSTALLED AT 15M C/C
INTERVALS

ILLUMINATION TO BE PROVIDED BY INSTALLATION OF
ACROSPIRE DEFENDER LANTERNS AFIXED TO BRIDGE
DECKING VIA 76.1mm COLUMNS. SHORT COLUMN
AFIXED TO BRIDGE DECK VIA BOLT DOWN SYSTEM.
SOLAR LIGHTING TO BE INSTALLED AT 15M C/C
INTERVALS

DRAWING TITLE

PHASE 7 - BRIDGE MOORINGS AND
LIGHTING SYSTEM.

PROJECT TITLE

ACBA6003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE

DRAWING No.

PED1-SPR-DR-C-0016-S1

CAD REF.

CAD

DRAWN BY

RM

11/22

SCALE

SHOWN

CHECKED

XXX

X/XX

PROJECT

PHASE

REV.

REV.

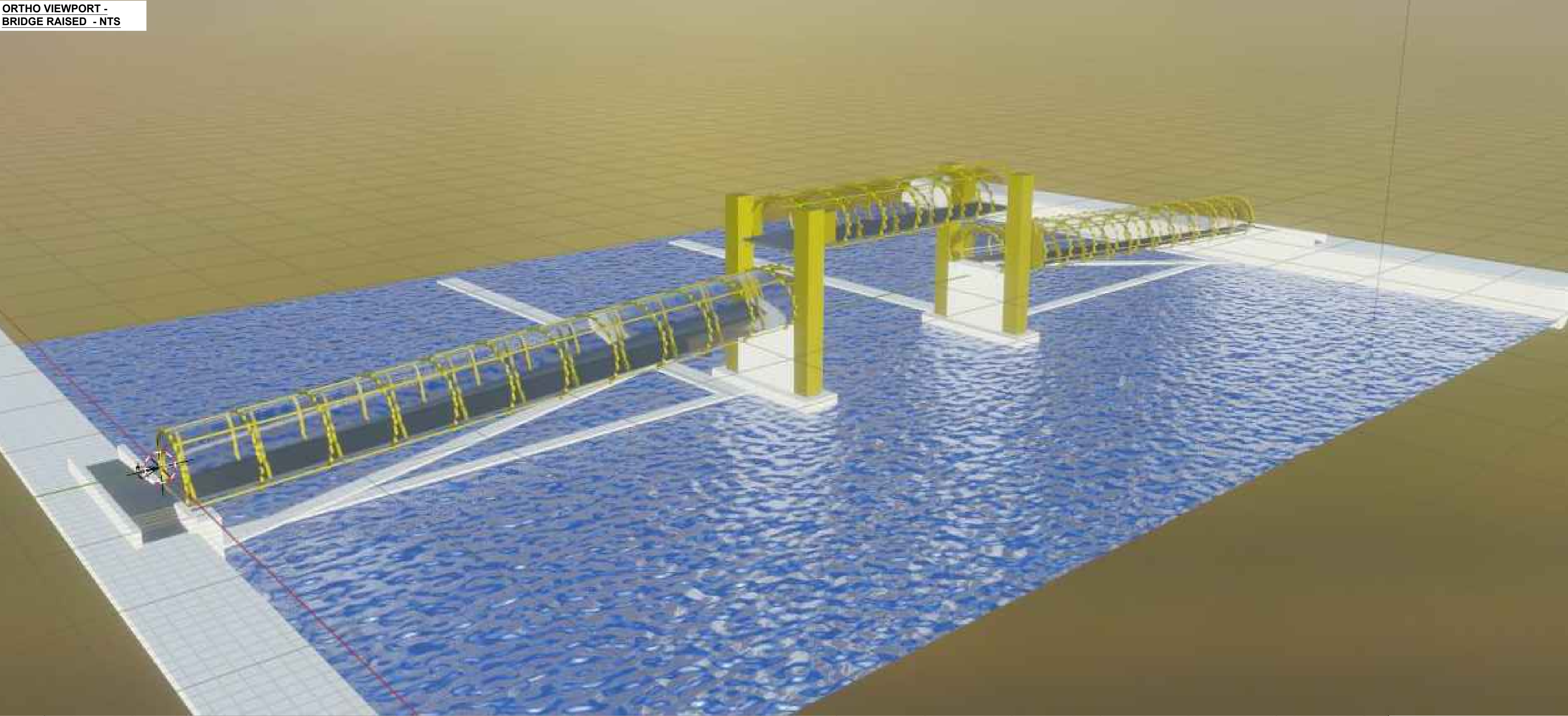
DESCRIPTION

BY

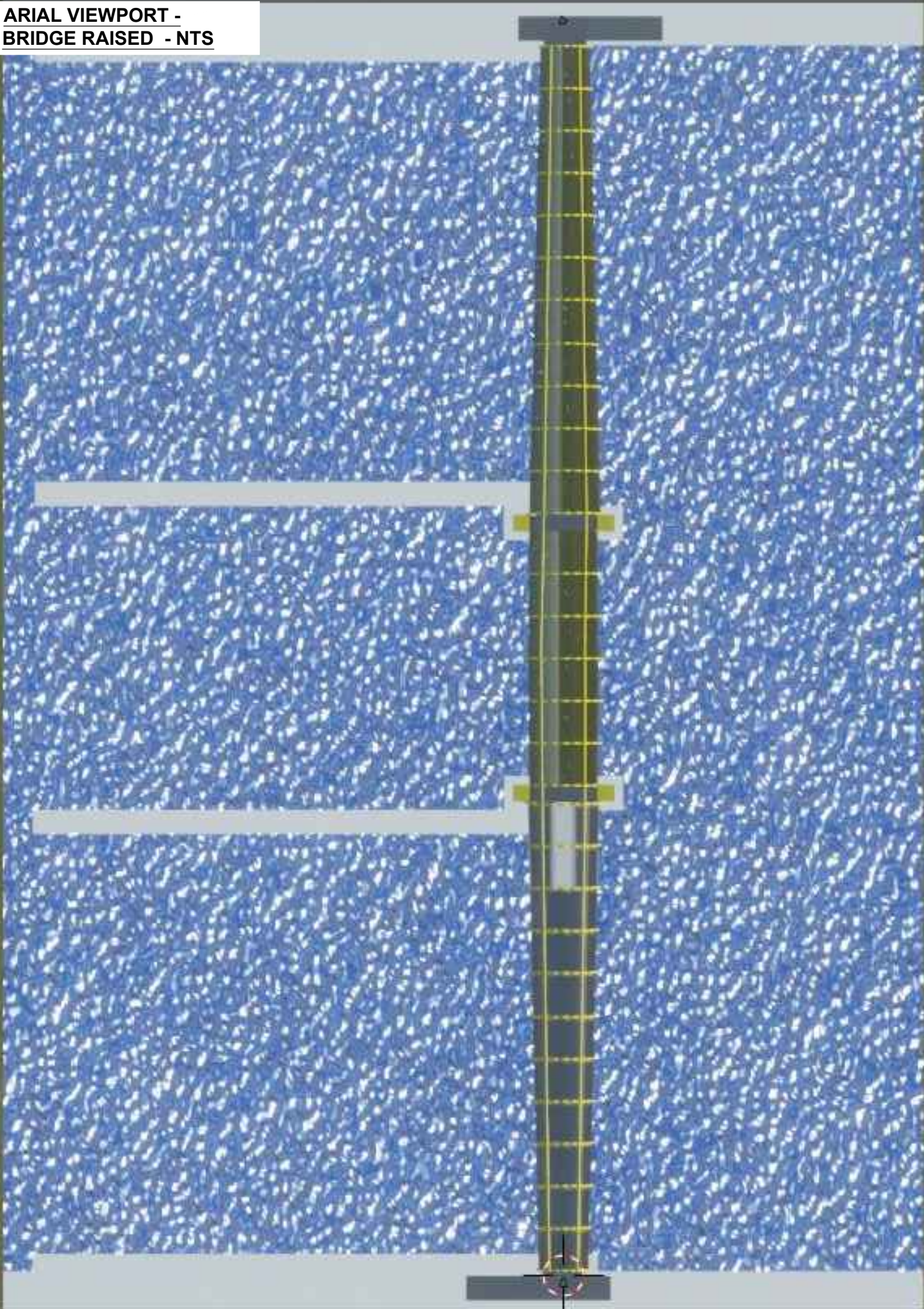
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SPRINGFIELD DESIGNS Ltd

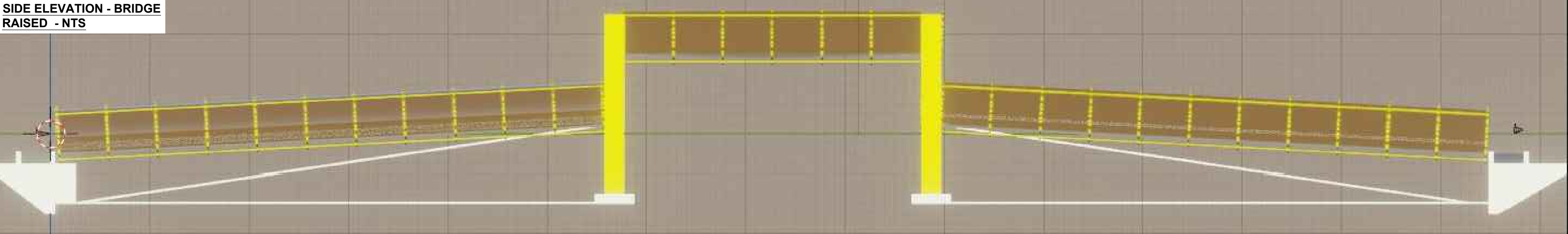
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BRIDGE RAISED - NTS



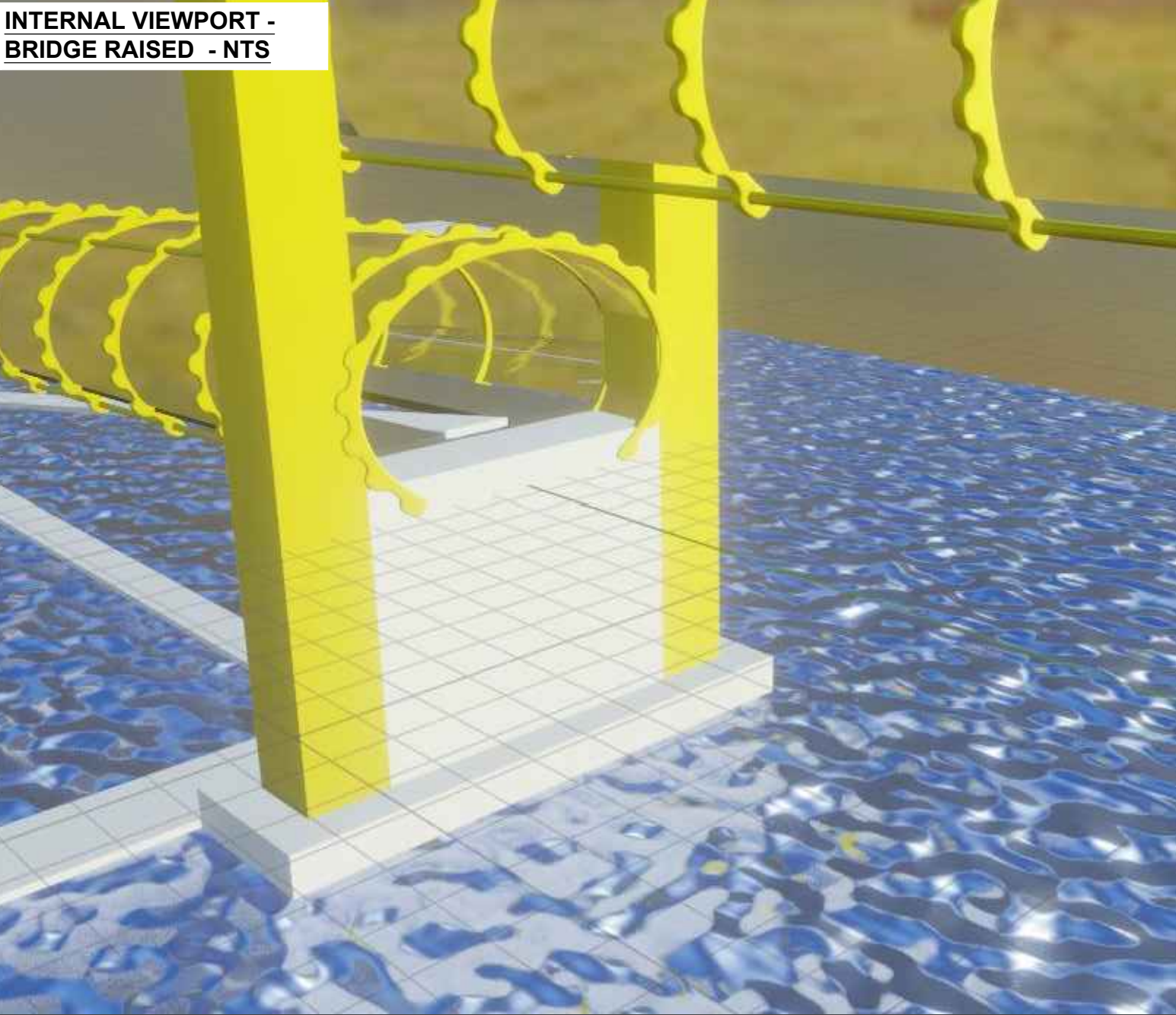
ARIAL VIEWPORT -
BRIDGE RAISED - NTS



SIDE ELEVATION - BRIDGE
RAISED - NTS



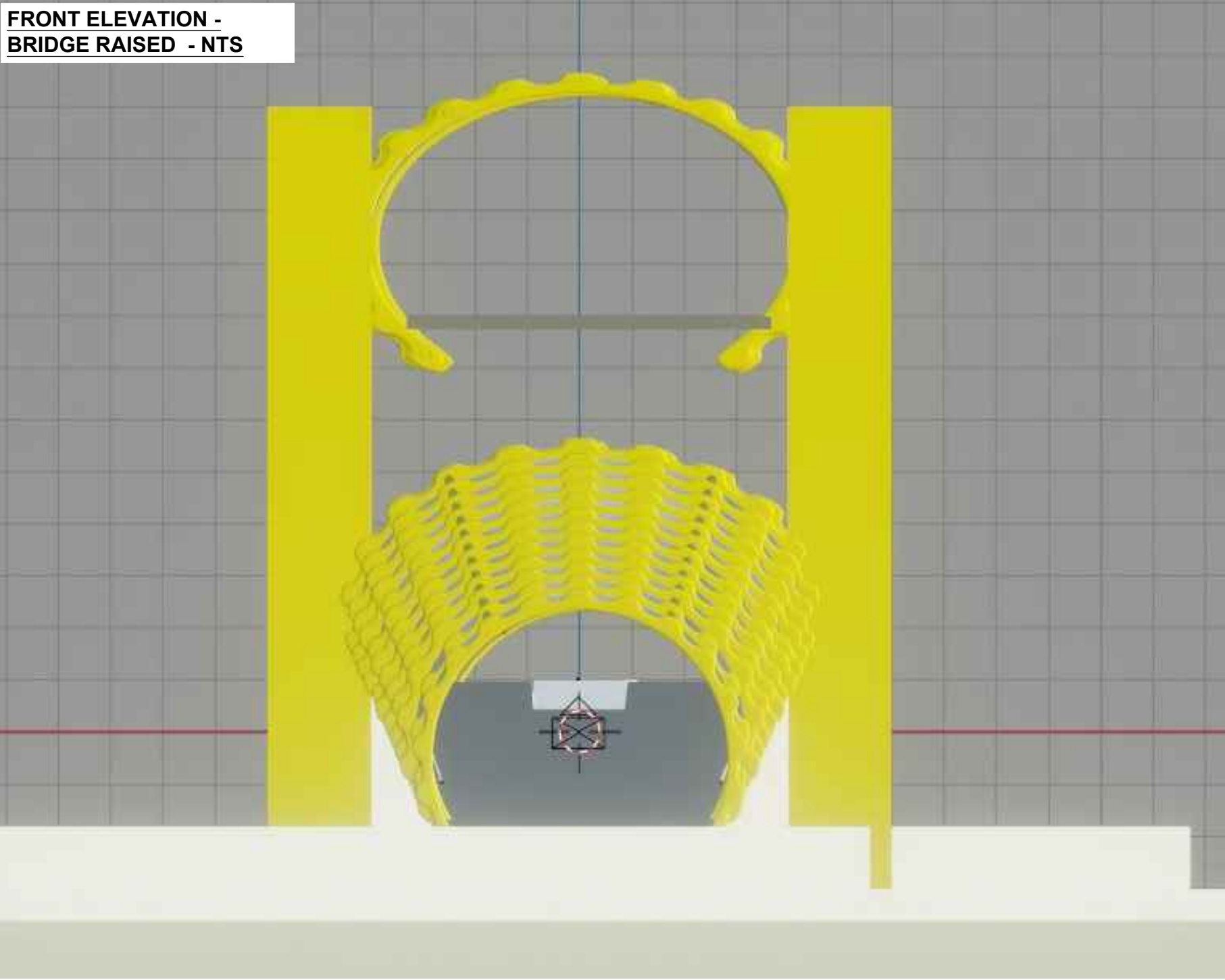
INTERNAL VIEWPORT -
BRIDGE RAISED - NTS



USER VIEWPORT - BRIDGE
RAISED - NTS



FRONT ELEVATION -
BRIDGE RAISED - NTS



DRAWING TITLE
**BRIDGE ELEVATIONS AND VISUALIZATIONS
(RAISED - BLENDER FILE)**

DRAWN BY	RM	5/23	SCALE	SHOWN
CHECKED	xxx	x/xx		

PROJECT TITLE
**ACBA6003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE**

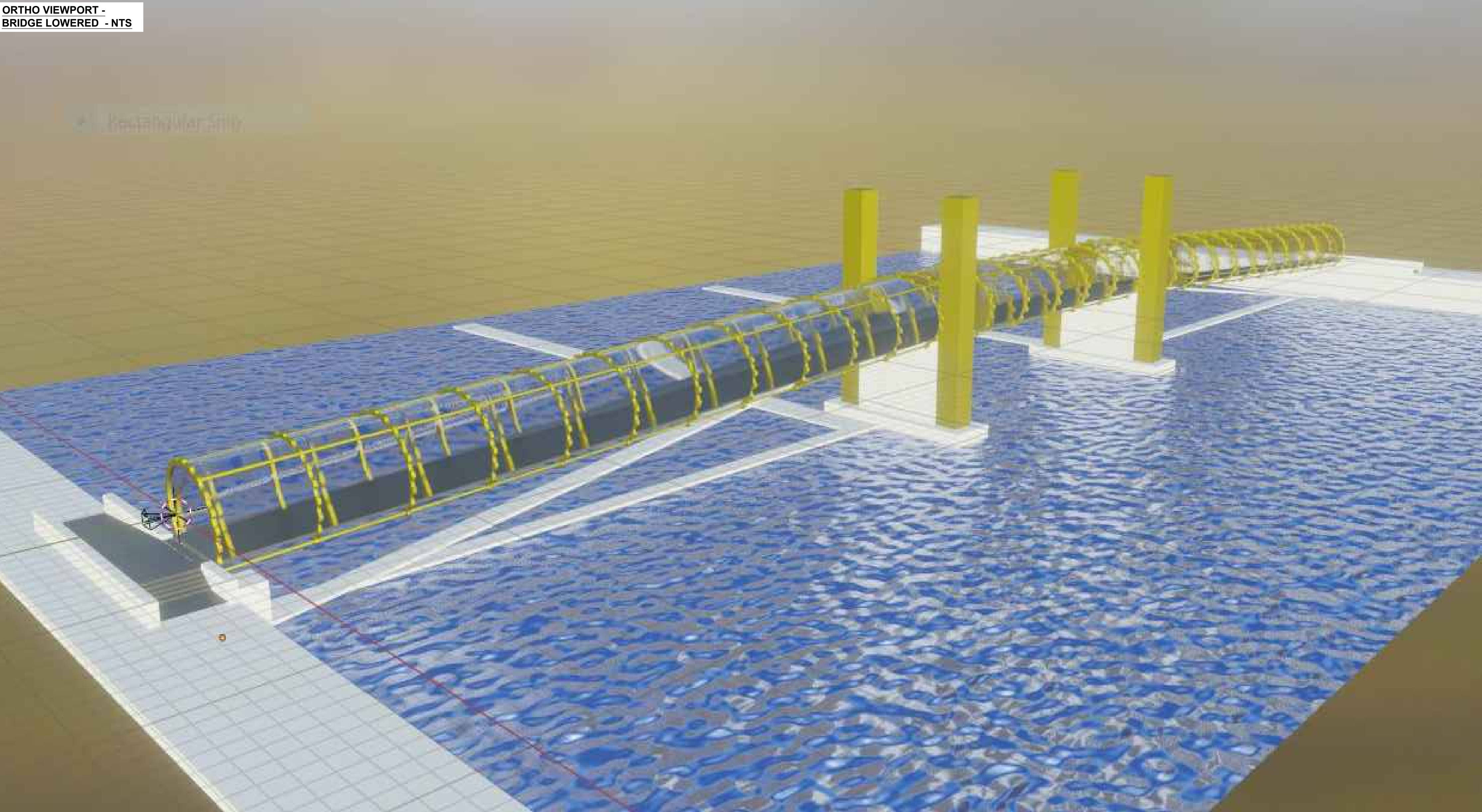
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PROJECT PHASE	PHASE	REV.

DRAWING No.
PED1-SPR-DR-C-0017-S1

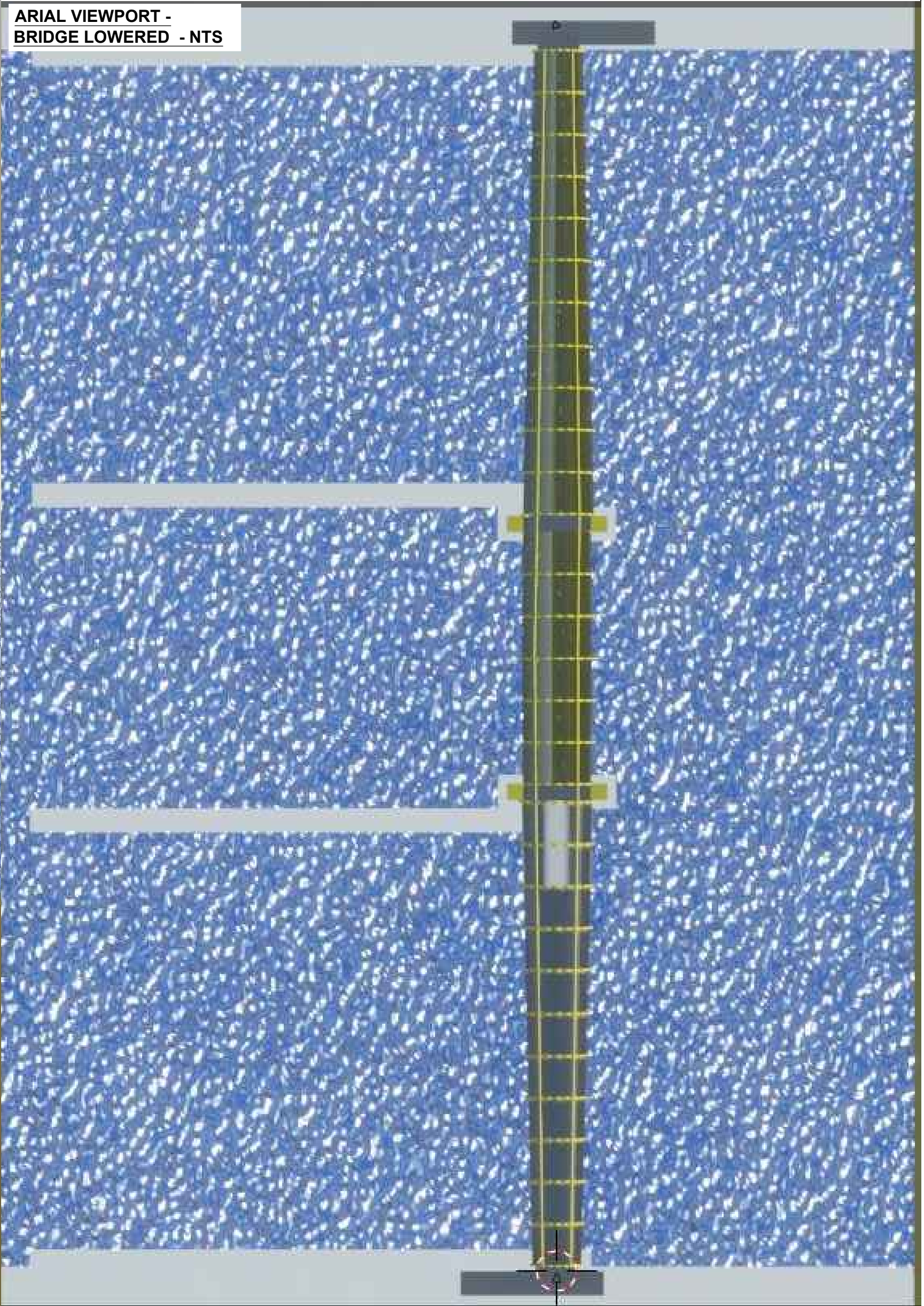
REV.	DESCRIPTION	BY	DATE

SPRINGFIELD DESIGNS Ltd

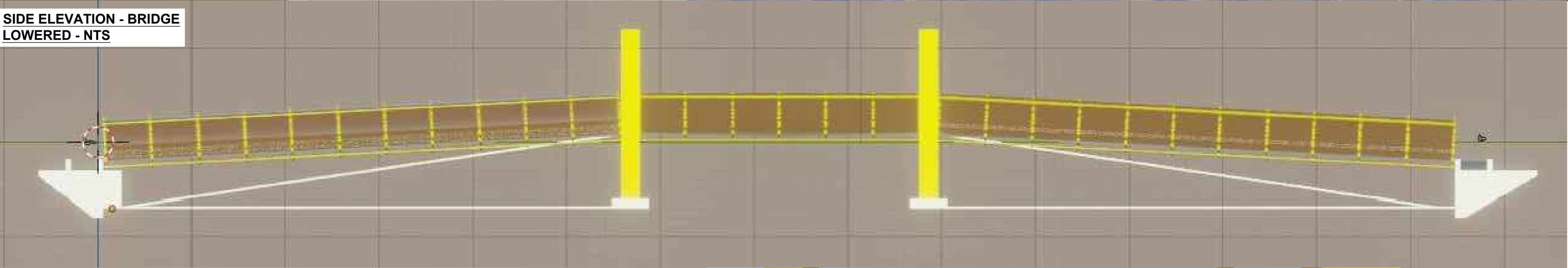
ORTHO VIEWPORT -
BRIDGE LOWERED - NTS



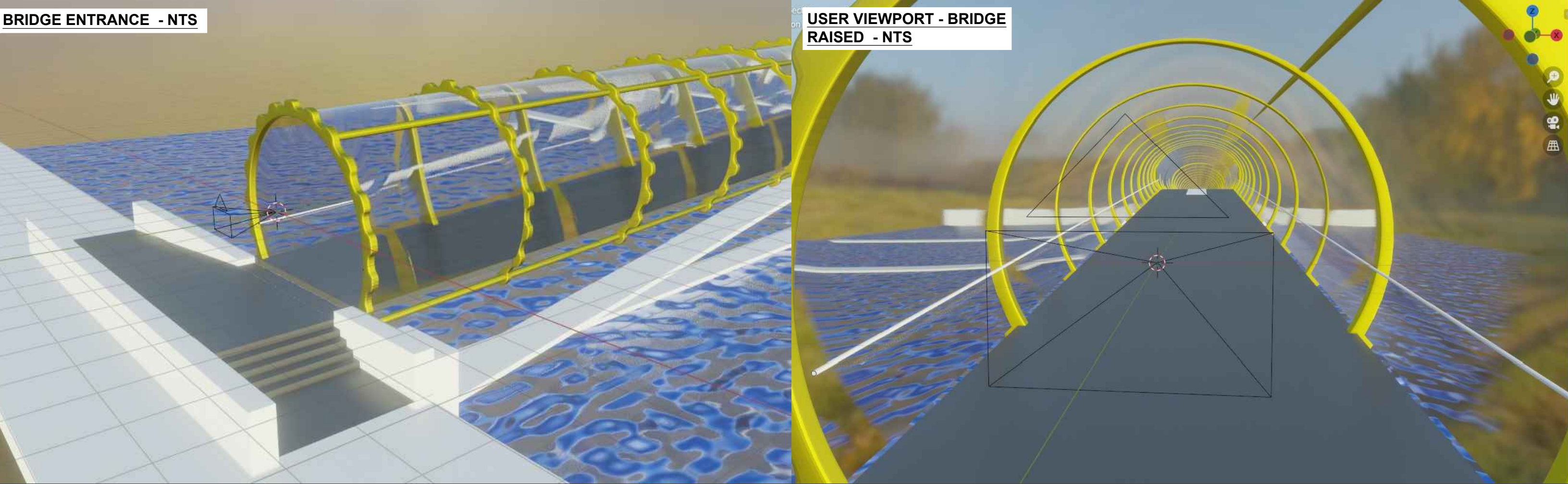
ARIAL VIEWPORT -
BRIDGE LOWERED - NTS



SIDE ELEVATION - BRIDGE
LOWERED - NTS

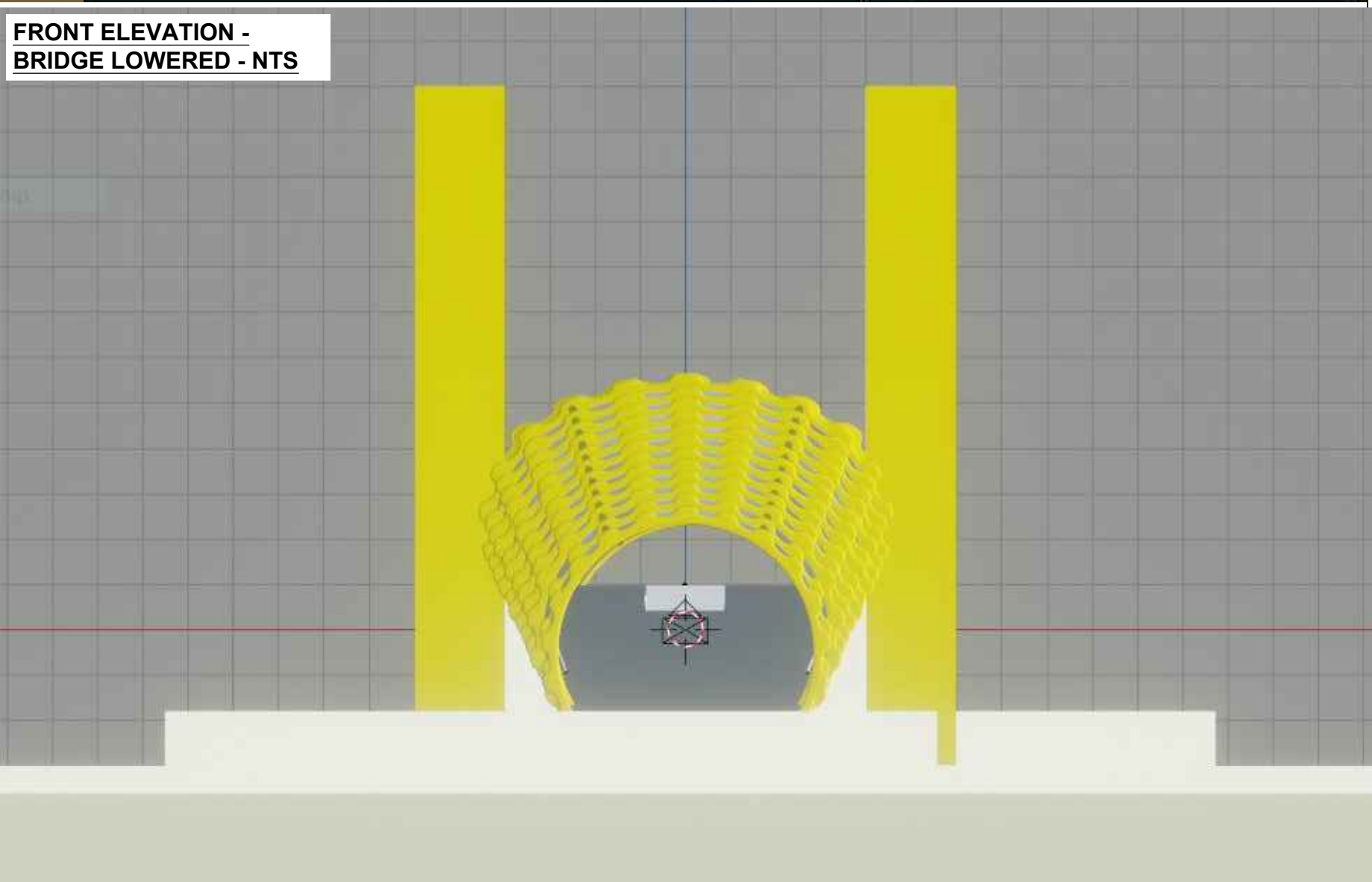


BRIDGE ENTRANCE - NTS



USER VIEWPORT - BRIDGE
RAISED - NTS

FRONT ELEVATION -
BRIDGE LOWERED - NTS



DRAWING TITLE
**BRIDGE ELEVATIONS AND VISUALIZATIONS
(RAISED - BLENDER FILE)**

DRAWN BY	RM	5/23	SCALE
CHECKED	xxx	x/xx	SHOWN

PROJECT TITLE
**ACBA6003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE**

CAD REF.	CAD
PROJECT PHASE	PHASE
REV.	

DRAWING No.
PED1-SPR-DR-C-0018-S1

REV.	DESCRIPTION	BY	DATE

Asset Type	Asset No.	Asset Name	Asset Description	Asset Location	Asset Manufacturer	Date Obtained	Date Installed	Maintenance Period	Finish	Price
Bridge Deck	BR-Deck-001	Bridge Decking 1	Bridge Decking running from South Pier Wall to Vertical Lift System - Span 70m	South Pier Wall to Vertical Lift System - Span 70m	Central Span				Powder Coated Exposed Steel with Bitmac Bridge Surface	
Bridge Deck	BR-Deck-002	Bridge Decking 2	Bridge Decking within Vertical Section						Powder Coated Exposed Steel with Bitmac Bridge Surface	
Bridge Deck	BR-Deck-003	Bridge Decking 3	Bridge Decking running from North Pier Wall to Vertical Lift System - Span 70m	North Pier Wall to Vertical Lift System - Span 70m					Powder Coated Exposed Steel with Bitmac Bridge Surface	
Bridge Deck	BR-Deck-004	Bridge Deck to Moorings	Bridge Decking on South Side running to Moorings							
Bridge Deck	BR-Deck-005	Bridge Deck to Moorings	Bridge Decking on North Side Running to Moorings							
Moorings Deck	Moorings Deck 001	Moorings Deck 001	Moorings Deck	Section 1						
Moorings Deck	Moorings Deck 002	Moorings Deck 002	Moorings Deck	Section 1						
Moorings Deck	Moorings Deck 003	Moorings Deck 003	Moorings Deck	Section 1						
Moorings Deck	Moorings Deck 004	Moorings Deck 004	Moorings Deck	Section 2						
Moorings Deck	Moorings Deck 005	Moorings Deck 005	Moorings Deck	Section 2						
Moorings Deck	Moorings Deck 006	Moorings Deck 006	Moorings Deck	Section 2						
Bollard	B-001	Bollard 001	Mini-Ensign™ Bollard with sign reference 956	South Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-002	Bollard 002	Mini-Ensign™ Bollard with sign reference 956	South Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-003	Bollard 003	Mini-Ensign™ Bollard with sign reference 956	South Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-004	Bollard 004	Mini-Ensign™ Bollard with sign reference 956	South Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-005	Bollard 005	Mini-Ensign™ Bollard with sign reference 956	South Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-006	Bollard 006	Mini-Ensign™ Bollard with sign reference 956	South Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-007	Bollard 007	Mini-Ensign™ Bollard with sign reference 956	South Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-008	Bollard 008	Mini-Ensign™ Bollard with sign reference 956	South Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-009	Bollard 009	Mini-Ensign™ Bollard with sign reference 956	South Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-010	Bollard 010	Mini-Ensign™ Bollard with sign reference 956	North Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-011	Bollard 011	Mini-Ensign™ Bollard with sign reference 956	North Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-012	Bollard 012	Mini-Ensign™ Bollard with sign reference 956	North Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-013	Bollard 013	Mini-Ensign™ Bollard with sign reference 956	North Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-014	Bollard 014	Mini-Ensign™ Bollard with sign reference 956	North Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-015	Bollard 015	Mini-Ensign™ Bollard with sign reference 956	North Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-016	Bollard 016	Mini-Ensign™ Bollard with sign reference 956	North Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-017	Bollard 017	Mini-Ensign™ Bollard with sign reference 956	North Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Bollard	B-018	Bollard 018	Mini-Ensign™ Bollard with sign reference 956	North Side Section		https://uk.glasdon.com/road-safety/bollards/ensign-tm-bollard			Black	£667.06
Energy Chain	Energy Chain 001	Ready Chain Energy Chain 001	Ready Chain Energy Chain Standard Lifting System	South Side - Eastern Lifting System		https://www.igus.eu/info/harnessed-energy-chain-systems-readychain#section_9				
Energy Chain	Energy Chain 002	Ready Chain Energy Chain 002	Ready Chain Energy Chain Standard Lifting System	South Side Western Lifting System		https://www.igus.eu/info/harnessed-energy-chain-systems-readychain#section_9				
Energy Chain	Energy Chain 003	Ready Chain Energy Chain 003	Ready Chain Energy Chain Standard Lifting System	North Side - Eastern Lifting System		https://www.igus.eu/info/harnessed-energy-chain-systems-readychain#section_9				
Energy Chain	Energy Chain 004	Ready Chain Energy Chain 004	Ready Chain Energy Chain Standard Lifting System	North Side Western Lifting System		https://www.igus.eu/info/harnessed-energy-chain-systems-readychain#section_9				
Steel Cog Surround	ST-C-001	Steel Cog Ring-001	Steel Cog Intersection Ring - Internal Width = 5695mm	Section 1 (South Wall to Central Span) - 1st Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-002	Steel Cog Ring-002	Steel Cog Intersection Ring - Internal Width = 5884mm	Section 1 (South Wall to Central Span) - 2nd Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-003	Steel Cog Ring-003	Steel Cog Intersection Ring - Internal Width = 6095mm	Section 1 (South Wall to Central Span) - 3rd Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-004	Steel Cog Ring-004	Steel Cog Intersection Ring - Internal Width = 6308mm	Section 1 (South Wall to Central Span) - 4th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-005	Steel Cog Ring-005	Steel Cog Intersection Ring - Internal Width = 6520mm	Section 1 (South Wall to Central Span) - 5th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-006	Steel Cog Ring-006	Steel Cog Intersection Ring - Internal Width = 6732mm	Section 1 (South Wall to Central Span) - 6th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-007	Steel Cog Ring-007	Steel Cog Intersection Ring - Internal Width = 6945mm	Section 1 (South Wall to Central Span) - 7th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-008	Steel Cog Ring-008	Steel Cog Intersection Ring - Internal Width = 7157mm	Section 1 (South Wall to Central Span) - 8th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-009	Steel Cog Ring-009	Steel Cog Intersection Ring - Internal Width = 7330mm	Section 1 (South Wall to Central Span) - 9th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-010	Steel Cog Ring-010	Steel Cog Intersection Ring - Internal Width = 7582mm	Section 1 (South Wall to Central Span) - 10th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-011	Steel Cog Ring-011	Steel Cog Intersection Ring - Internal Width = 7795mm	Section 1 (South Wall to Central Span) - 11th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-012	Steel Cog Ring-012	Steel Cog Intersection Ring - Internal Width = 8007mm	Section 1 (South Wall to Central Span) - 12th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-013	Steel Cog Ring-013	Steel Cog Intersection Ring - Internal Width = 8007mm	Section 2 (Central Span) -South-1st Cog from Lifting Mechanism					Copper Nickel Alloy	
Steel Cog Surround	ST-C-014	Steel Cog Ring-014	Steel Cog Intersection Ring - Internal Width = 8230mm	Section 2 (Central Span) -South-2nd Cog from Lifting Mechanism					Copper Nickel Alloy	
Steel Cog Surround	ST-C-015	Steel Cog Ring-015	Steel Cog Intersection Ring - Internal Width = 8447mm	Section 2 (Central Span) -South-3rd Cog from Lifting Mechanism					Copper Nickel Alloy	
Steel Cog Surround	ST-C-016	Steel Cog Ring-016	Steel Cog Intersection Ring - Internal Width = 8653mm	Section 2 (Central Span) -Mid Point- Cog from Lifting Mechanism					Copper Nickel Alloy	
Steel Cog Surround	ST-C-017	Steel Cog Ring-017	Steel Cog Intersection Ring - Internal Width = 8847mm	Section 2 (Central Span) -North-3rd Cog from Lifting Mechanism					Copper Nickel Alloy	
Steel Cog Surround	ST-C-018	Steel Cog Ring-018	Steel Cog Intersection Ring - Internal Width = 8230mm	Section 2 (Central Span) -North-2nd Cog from Lifting Mechanism					Copper Nickel Alloy	
Steel Cog Surround	ST-C-019	Steel Cog Ring-019	Steel Cog Intersection Ring - Internal Width = 8007mm	Section 2 (Central Span) -North-1st Cog from Lifting Mechanism					Copper Nickel Alloy	
Steel Cog Surround	ST-C-020	Steel Cog Ring-020	Steel Cog Intersection Ring - Internal Width = 8007mm	Section 3 North Wall to Central Span) - 12th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-021	Steel Cog Ring-021	Steel Cog Intersection Ring - Internal Width = 7795mm	Section 3 North Wall to Central Span) - 11th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-022	Steel Cog Ring-022	Steel Cog Intersection Ring - Internal Width = 7582mm	Section 3 North Wall to Central Span) - 10th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-023	Steel Cog Ring-023	Steel Cog Intersection Ring - Internal Width = 7330mm	Section 3 North Wall to Central Span) -9th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-024	Steel Cog Ring-024	Steel Cog Intersection Ring - Internal Width = 7157mm	Section 3 North Wall to Central Span) - 8th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-025	Steel Cog Ring-025	Steel Cog Intersection Ring - Internal Width = 6945mm	Section 3 North Wall to Central Span) - 7th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-026	Steel Cog Ring-026	Steel Cog Intersection Ring - Internal Width = 6732mm	Section 3 North Wall to Central Span) - 6th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-027	Steel Cog Ring-027	Steel Cog Intersection Ring - Internal Width = 6520mm	Section 3 North Wall to Central Span) - 5th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-028	Steel Cog Ring-028	Steel Cog Intersection Ring - Internal Width = 6308mm	Section 3 North Wall to Central Span) - 4th Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-029	Steel Cog Ring-029	Steel Cog Intersection Ring - Internal Width = 6095mm	Section 3 North Wall to Central Span) - 3rd Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-030	Steel Cog Ring-030	Steel Cog Intersection Ring - Internal Width = 5884mm	Section 3 North Wall to Central Span) - 2nd Cog from Wall					Copper Nickel Alloy	
Steel Cog Surround	ST-C-031	Steel Cog Ring-031	Steel Cog Intersection Ring - Internal Width = 5695mm	Section 3 North Wall to Central Span) - 1st Cog from Wall					Copper Nickel Alloy	
Steel Beam Support	ST-B-001	Steel Beam Connection - 001	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 1st Intersection - Bottom Left					Copper Nickel Alloy	
Steel Beam Support	ST-B-002	Steel Beam Connection - 002	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 1st Intersection - Top Left					Copper Nickel Alloy	
Steel Beam Support	ST-B-003	Steel Beam Connection - 003	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 1st Intersection - Top Right					Copper Nickel Alloy	
Steel Beam Support	ST-B-004	Steel Beam Connection - 004	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 1st Intersection - Bottom Right					Copper Nickel Alloy	
Steel Beam Support	ST-B-005	Steel Beam Connection - 005	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 2nd Intersection - Bottom Left						
Steel Beam Support	ST-B-006	Steel Beam Connection - 006	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 2nd Intersection - Top Left						
Steel Beam Support	ST-B-007	Steel Beam Connection - 007	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 2nd Intersection - Top Right						
Steel Beam Support	ST-B-008	Steel Beam Connection - 008	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 2nd Intersection - Bottom Right						
Steel Beam Support	ST-B-009	Steel Beam Connection - 009	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 3rd Intersection - Bottom Left						
Steel Beam Support	ST-B-010	Steel Beam Connection - 010	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 3rd Intersection - Top Left						
Steel Beam Support	ST-B-011	Steel Beam Connection - 011	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 3rd Intersection - Top Right						
Steel Beam Support	ST-B-012	Steel Beam Connection - 012	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 3rd Intersection - Bottom Right						
Steel Beam Support	ST-B-013	Steel Beam Connection - 013	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 4th Intersection - Bottom Left						
Steel Beam Support	ST-B-014	Steel Beam Connection - 014	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 4th Intersection - Top Left						
Steel Beam Support	ST-B-015	Steel Beam Connection - 015	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 4th Intersection - Top Right						
Steel Beam Support	ST-B-016	Steel Beam Connection - 016	Steel Beam Diameter = 200mm * 5m	Section 1 (South Wall to Central Span) - 4th Intersection - Bottom Right						

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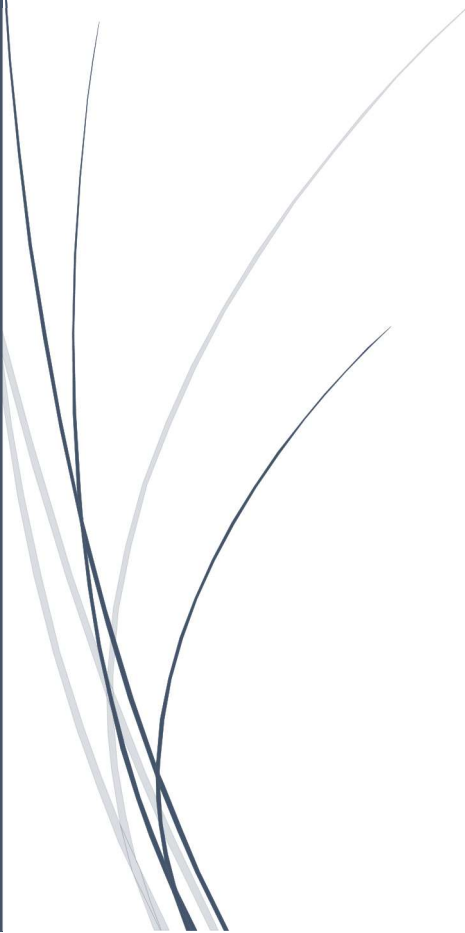
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A dark blue vertical bar runs down the left side of the page. A blue arrow points to the right from this bar, containing the date 4/28/2023.

4/28/2023

Springfield Designs Ltd – Prince of Wales Dock Pedestrian Bridge

Structural Calculations

Several thin, curved lines in shades of blue and grey sweep upwards from the bottom left corner of the page.

Document Control

Richard Murray – Page 1-18

(Name – P.x-x)

Work Completed by Richard Murray
Highlighted **Yellow**

The density of the materials will be taken from Obinna.U (2020)

Bridge Component	Calculations (Dead load = Self Weight of Materials)	Result
Bridge Deck		
Section 1 – South Side	Bridge Deck construction is specified to be steel at 60m span. Width of bridge increases from 5.5m to 8.5m at widest point. Assumed width of 8m for calculation proves a factor of safety.	
	Width = 8m Span = 60m Thickness = 5cm Volume Calculation = $(8 \times 60) \times 0.05 = 24 \text{m}^3$	
	Density of Steel is 78.50kn/m^3	
	Weight of Steel Deck = $78.50 \times 24 = 1884 \text{kn/m}^3$	1884kn/m^3
	Proposed additional reinforcement along length of bridge in I beam * 3	
	Assumed dimensions of I Beam are; Area = 0.0244 60m Length Volume = $0.0244 \times 60 = 1.4654 \times 3 = 4.392 \text{m}^3$	
	Density of Steel is 78.50kn/m^3	
	Weight of Steel I beam = $78.50 \times 4.392 = 344.772 \text{kn/m}^3$	344.772kn/m^3
	Assumed Traverse I beam at each 'Cog'	

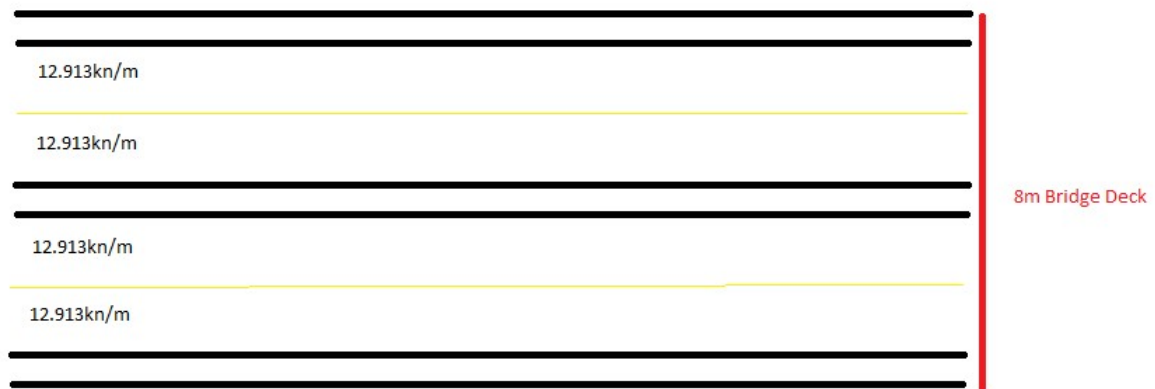
	Assumed dimensions of I Beam are; Area = 0.0244 8m Length Volume = $0.0244 \times 8 = 0.1952 \times 7 = 1.3664 \text{m}^3$	
	Density of Steel is 78.50kn/m^3	
	Weight of Steel I beam = $78.50 \times 1.3664 = 107.2624 \text{kn/m}^3$	107.2624kn/m^3
	Steel Poles/Beams will be located at each 4 points of cogs	
	0.031 Cross Sectional Area 60m length 4 Quantity	
	$(0.031 \times 60) \times 4 = 7.44 \text{m}^3$	
	Density of Steel is 78.50kn/m^3	
	Weight of Steel beam = $78.50 \times 7.44 = 584.04 \text{n/m}^3$	584.04n/m^3
	Perspex Windows	
	Circumference Area is assumed to be 26.763m as taken from plan at widest point	
	5m lengths	
	Total Number of windows = 11	
	Window Thickness 8mm	
	$((26.763 \times 5) \times 0.008) \times 11 = 11.7752 \text{m}^3$	
	Density of Perspex is 12kn/m^3	
	Weight of Perspex Windows = $12 \times 11.7752 =$ 141.30864kn/m^3	141.30864kn/m^3

	Steel Cog	
	Volume = 2.04 at widest point	
	12 Cogs	
	=12*2.04=24.48m ³	
	Density of Steel is 78.50kn/m ³	
	Weight of Steel I beam = 78.50*24.48=1921.68kn/m ³	1921.68kn/m ³
Total Weight of Section 1	Deck = 1884kn/m ³	
	Span Traversing I Beam = 344.772kn/m ³	
	Transverse I Beam = 107.2624kn/m ³	
	Steel Pole = 584.04n/m ³	
	Perspex Window = 141.30864kn/m ³	
	Steel Cog = 1921.68kn/m ³	
	Total Weight = 3,099.06304kn/m ³	3,099.06304kn/m ³
	Length of Bridge= 60m	
	UDL Calculation = 3,099.6304/60=51.651kn/ m ³	51.651kn/ m ³

Estimated Load Transitions would be as below;

$$51.651/8=6.456\text{kn/m}$$

2m of load would be experienced by the Spanning Beam due to 3 beams as shown in the below diagram.



As such the UDL for the central Beam would be $(12.913 \times 2) = 25.826 \text{ kn/m}$, the UDL for the 2 beams on the outside edge would be 12.913 kn/m

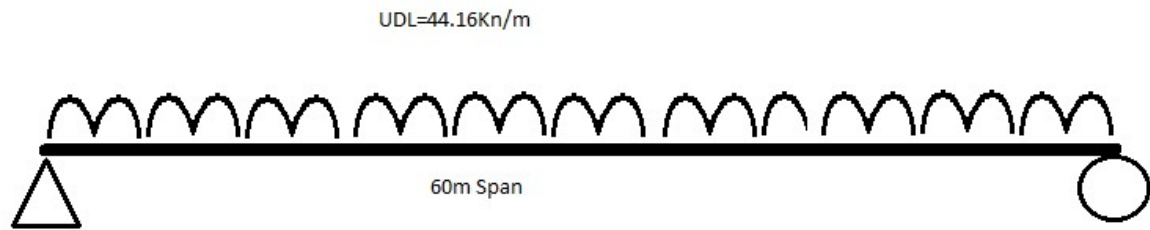
The live load as indicated by Concrete Development Group (No date) is 5 kn/m

As such from the above 2 sets of calculations will be required, 1 set for the central beam and another for the outside beam.

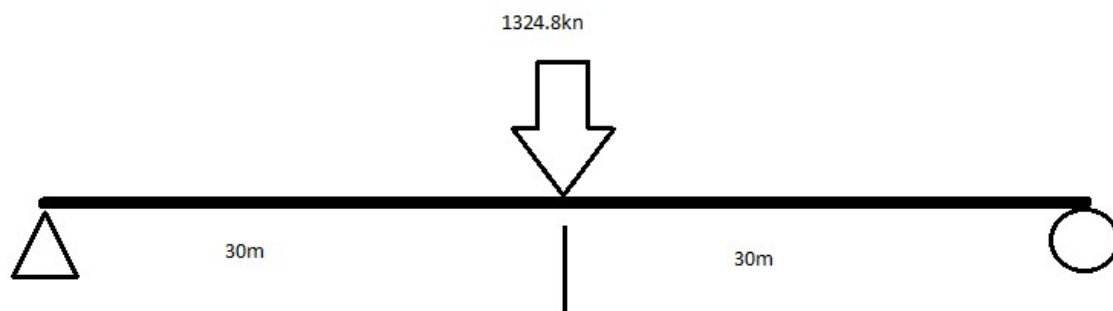
Central Beam Ultimate Limit Load

$$(1.4gk) + (1.6qk) = (1.4 \times 25.826) + (1.6 \times 5) = (36.1564) + (8) = 44.1564 = 44.16 \text{ kn/m}$$

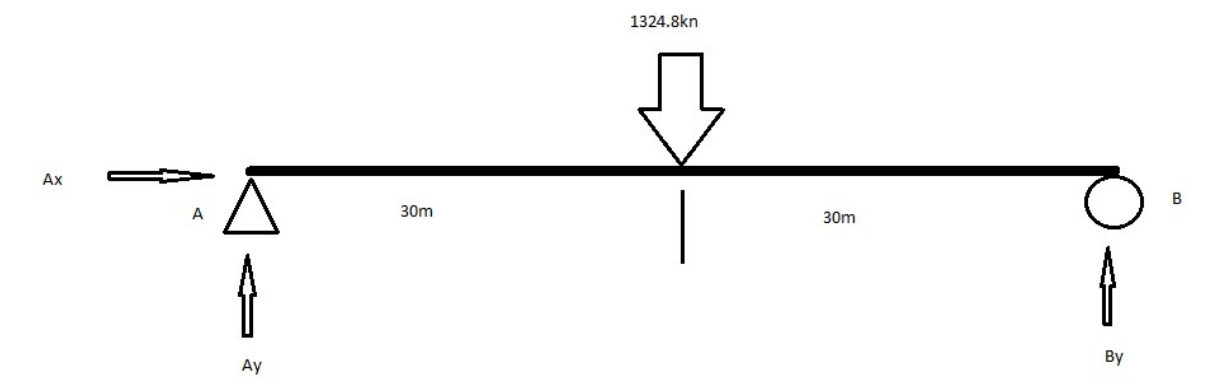
From the above the free body diagram will be as below



Converting the above into a point load;



As the beam is supported by each side the beam is Simply Supported. As such the resultant reactions can be calculated utilising the Equilibrium Equation



$$\sum f_x = 0 \quad a_x = 0$$

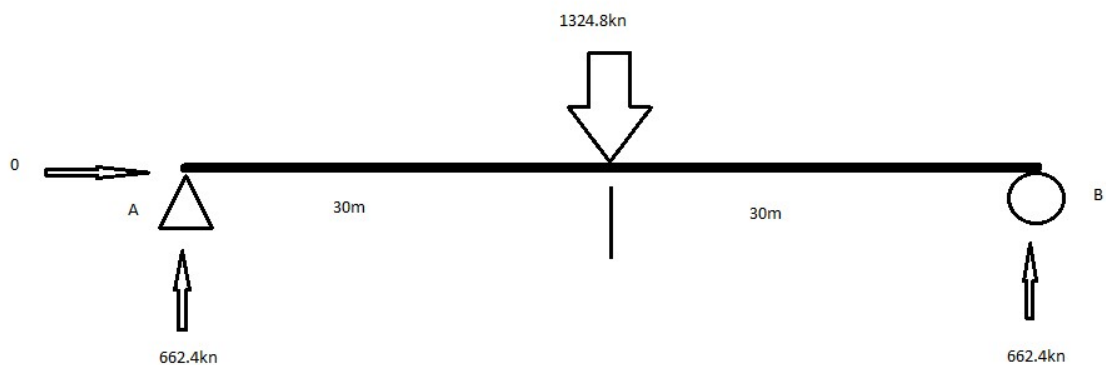
$$\sum f_y = 0 \quad A_y + B_y - 1324.8kn = 0 \quad A_y + B_y = 1324.4$$

$$\sum_{@A} M = 0 \quad B_y(60) - (1324.4 * 30) = 0 \quad B_y = \frac{-39732}{60} \quad B_y = -662.2 \quad B_y = 662.2$$

$$\sum f_y = 0 \quad A_y + B_y = 1324.8 \quad A_y + 662.2 = 1324.8 \text{ kn} \quad A_y = 662.6$$

Note – Due to the load being directly in the middle, the above difference is due to a rounding error within the equation.

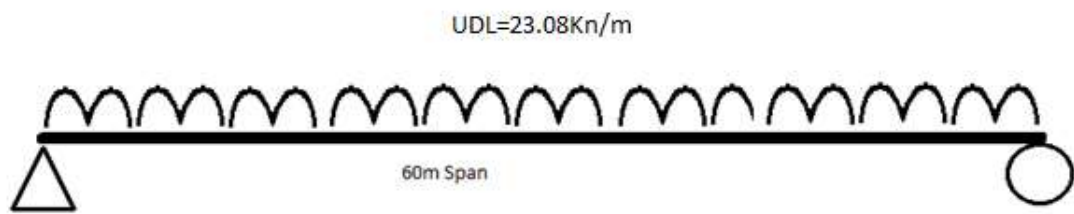
As such the loads will be taken as directly equal = 662.4kn



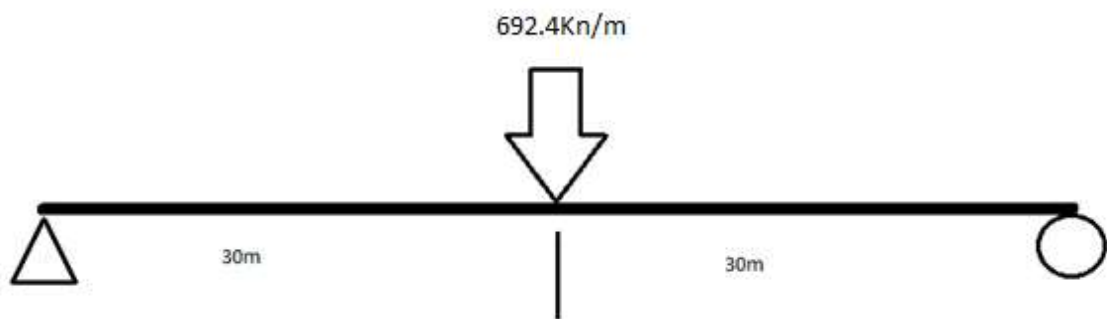
Side Beam Load

$$(1.4gk) + (1.6qk) = (1.4 * 12.913) + (1.6 * 5) = (18.0782) + (8) = 23.0782 = 23.08 \text{ kn/m}$$

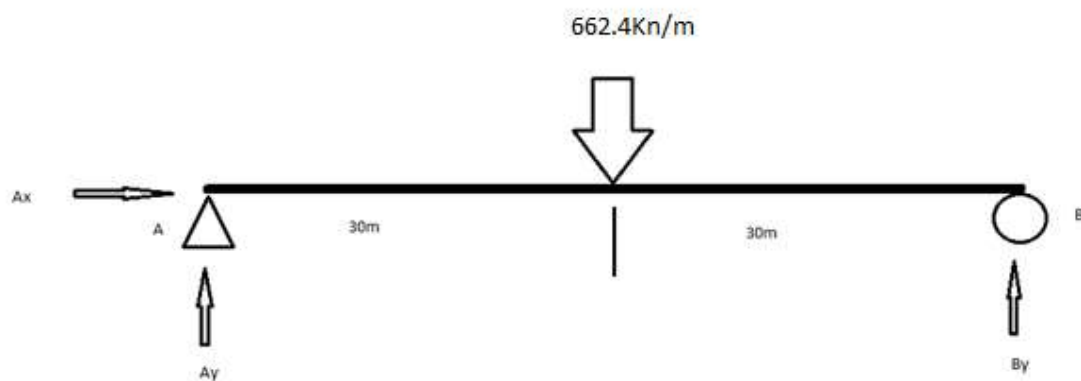
From the above the free body diagram will be as below



Converting the above into a point load;



As the beam is supported by each side the beam is Simply Supported. As such the resultant reactions can be calculated utilising the Equilibrium Equation

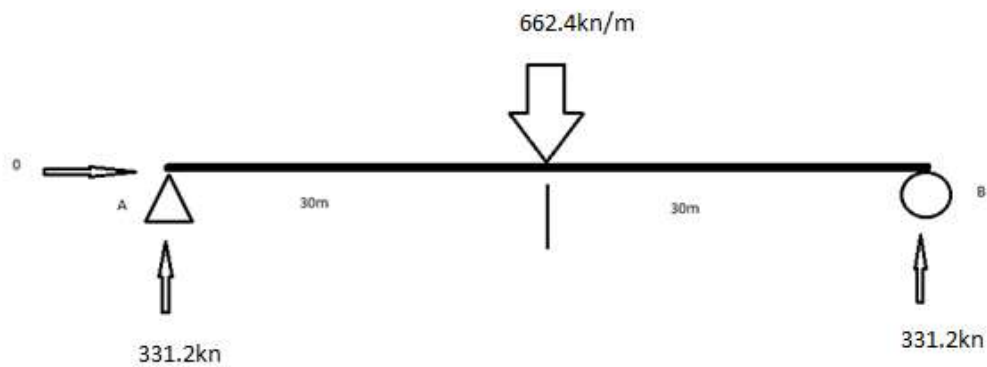


$$\sum f_x = 0 \quad a_x = 0$$

$$\sum f_y = 0 \quad Ay + By - 624.4kn = 0 \quad Ay + By = 662.4kn$$

$$\sum_{@A} M = 0 \quad B_y(60) - (662.4 * 30) = 0 \quad B_y = \frac{-19872}{60} \quad B_y - 331.2 \quad B_y = 331.2$$

$$\sum f_y = 0 \quad A_y + B_y = 662.4 \quad A_y + 331.2 = 662.4 \text{ kn} \quad A_y = 331.2 \text{ kn}$$



Note – As Section 3 is identical to Section 1. The above equations can also be taken for Section 3 of the bridge.

Central Span

The density of the materials will be taken from Obinna.U (2020)

Bridge Component	Calculations (Dead load = Self Weight of Materials)	Result
Bridge Deck		
Central Section	Bridge Deck construction is specified to be steel at 30m span. Width of bridge is 8m at widest point. This will be utilised in below calculations	
	Width = 8m Span = 30m Thickness = 5cm Volume Calculation = $(8 \times 30) \times 0.05 = 12\text{m}^3$	
	Density of Steel is 78.50kn/m^3	
	Weight of Steel Deck = $78.50 \times 24 = 942\text{kn/m}^3$	942kn/m^3
	Proposed additional reinforcement along length of bridge in I beam * 3	
	Assumed dimensions of I Beam are; Area = 0.0244 60m Length Volume = $0.0244 \times 30 = 0.732 \times 3 = 2.196\text{m}^3$	
	Density of Steel is 78.50kn/m^3	
	Weight of Steel I beam = $78.50 \times 2.196 = 172.386\text{kn/m}^3$	172.386kn/m^3
	Assumed Traverse I beam at each 'Cog'	

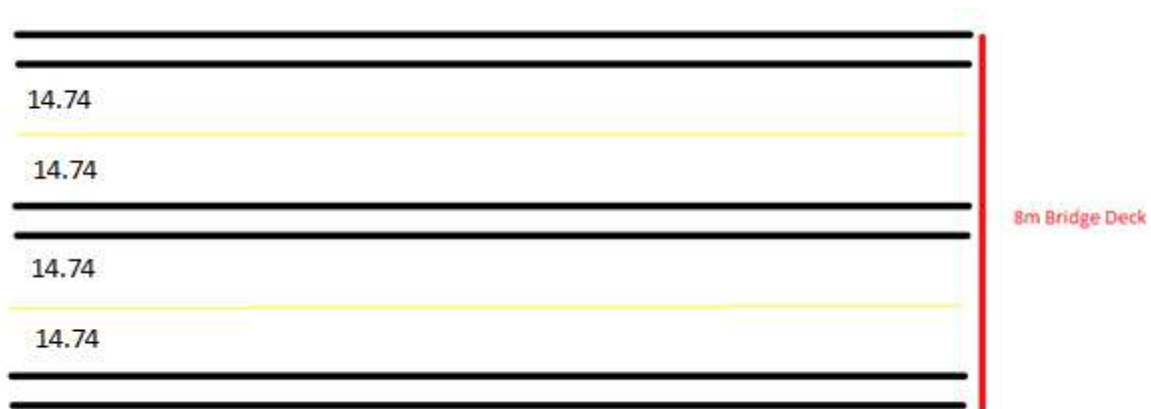
	Assumed dimensions of I Beam are; Area = 0.0244 8m Length Volume = $0.0244 \times 8 = 0.1952 \times 7 = 1.3664 \text{m}^3$	
	Density of Steel is 78.50kn/m^3	
	Weight of Steel I beam = $78.50 \times 1.3664 = 107.2624 \text{kn/m}^3$	107.2624kn/m^3
	Steel Poles/Beams will be located at each 4 points of cogs	
	0.031 Cross Sectional Area 30m length 4 Quantity	
	$(0.031 \times 30) \times 4 = 3.72 \text{m}^3$	
	Density of Steel is 78.50kn/m^3	
	Weight of Steel beam = $78.50 \times 3.72 = 292.02 \text{kn/m}^3$	292.02kn/m^3
	Perspex Windows	
	Circumference Area is assumed to be 26.763m as taken from plan at widest point	
	5m lengths	
	Total Number of windows = 6	
	Window Thickness 8mm	
	$((26.763 \times 5) \times 0.008) \times 6 = 6.42312 \text{m}^3$	
	Density of Perspex is 12kn/m^3	
	Weight of Perspex Windows = $12 \times 6.42312 =$ $77.07744 \text{kn/m}^3 = 77.077 \text{Kn/ m}^3$	77.077Kn/ m^3

	Steel Cog	
	Volume = 2.04 at widest point	
	7 Cogs	
	$= 7 * 2.04 = 14.28 \text{m}^3$	
	Density of Steel is 78.50kn/m^3	
	Weight of Steel I beam = $78.50 * 14.28 = 1120.98 \text{kn/m}^3$	1120.98kn/m^3
Total Weight of Central Section	Deck = 942kn/m^3	
	Span Traversing I Beam = 172.386kn/m^3	
	Transverse I Beam = 107.2624kn/m^3	
	Steel Pole = 292.02n/m^3	
	Perspex Window = 77.077kn/m^3	
	Steel Cog = 1120.98kn/m^3	
	Total Weight = 1769.7254kn/m^3	1769.73kn/m^3
	Length of Bridge = 30m	
	UDL Calculation = $1769.73 / 30 = 58.991 \text{kn/m}^3$	58.991kn/m^3

Estimated Load Transitions would be as below;

$$58.991 / 8 = 7.373875 = 7.37 \text{kn/m}$$

2m of load would be experienced by the Spanning Beam due to 3 beams as shown in the below diagram.



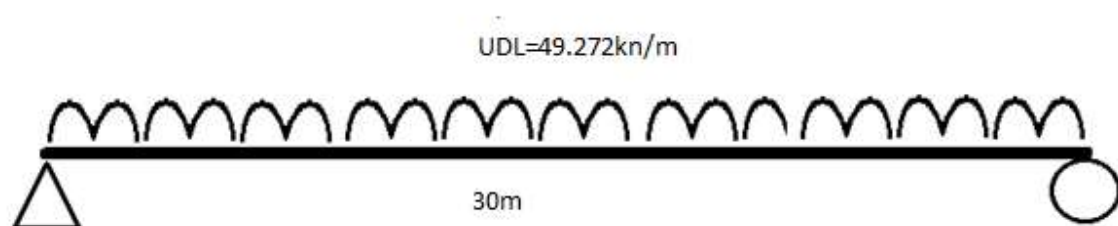
As such the UDL for the central Beam would be $(14.74 \times 2) = 29.48 \text{ kn/m}$, the UDL for the 2 beams on the outside edge would be 14.74 kn/m

The live load as indicated by Concrete Development Group (No date) Is 5 kn/m

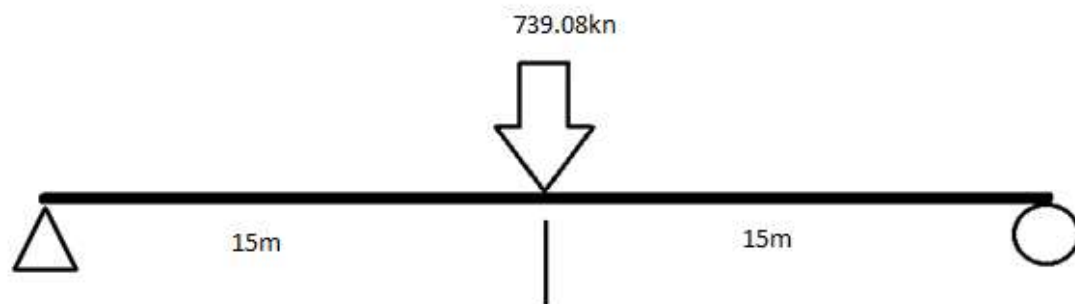
Central Beam Ultimate Limit Load

$$(1.4gk) + (1.6qk) = (1.4 \times 29.48) + (1.6 \times 5) = (41.272) + (8) = 49.272 = 49.272 \text{ kn/m}$$

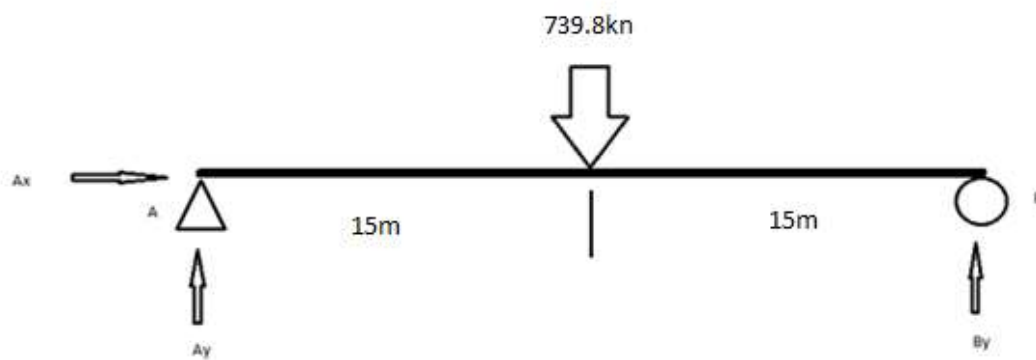
From the above the free body diagram will be as below



Converting the above into a point load;



As the beam is supported by each side the beam is Simply Supported. As such the resultant reactions can be calculated utilising the Equilibrium Equation

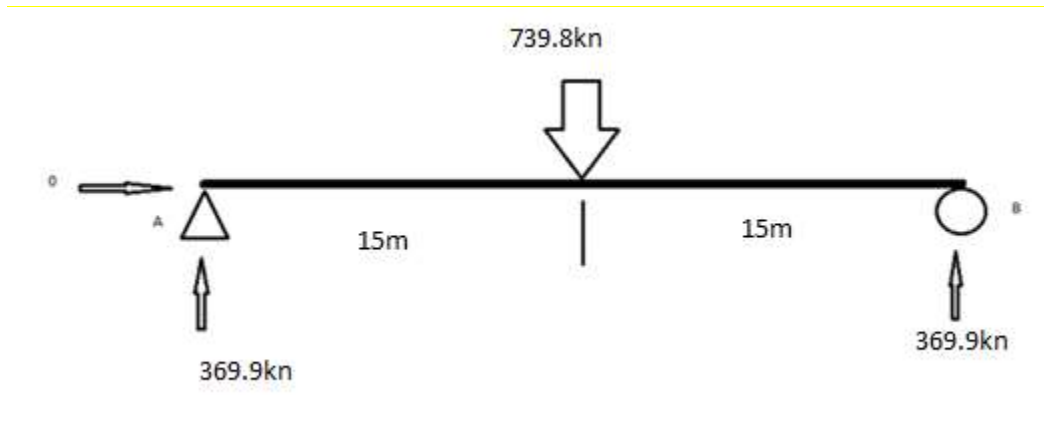


$$\sum f_x = 0 \quad A_x = 0$$

$$\sum f_y = 0 \quad A_y + B_y - 739.8kn = 0 \quad A_y + B_y = 739.8kn$$

$$\sum_{@A} M = 0 \quad B_y(30) - (739.8 * 15) = 0 \quad B_y = \frac{-11097}{30} \quad B_y - 369.9 \quad B_y = 369.9$$

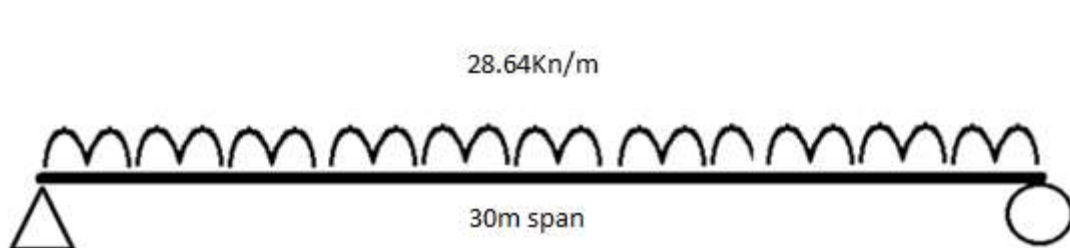
$$\sum f_y = 0 \quad A_y + B_y = 739.8 \quad A_y + 369.9 = 662.4kn \quad A_y = 369.9kn$$



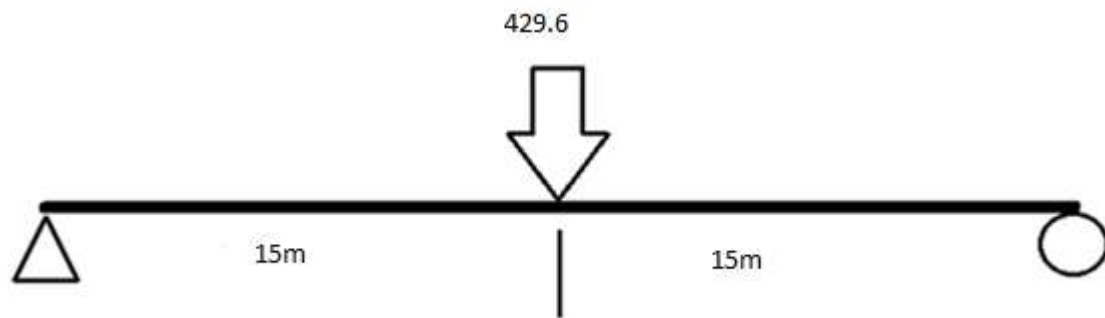
Side Beam Load

$$(1.4gk) + (1.6qk) = (1.4 * 14.74) + (1.6 * 5) = (20.636) + (8) = 28.636 = 28.64kn/m$$

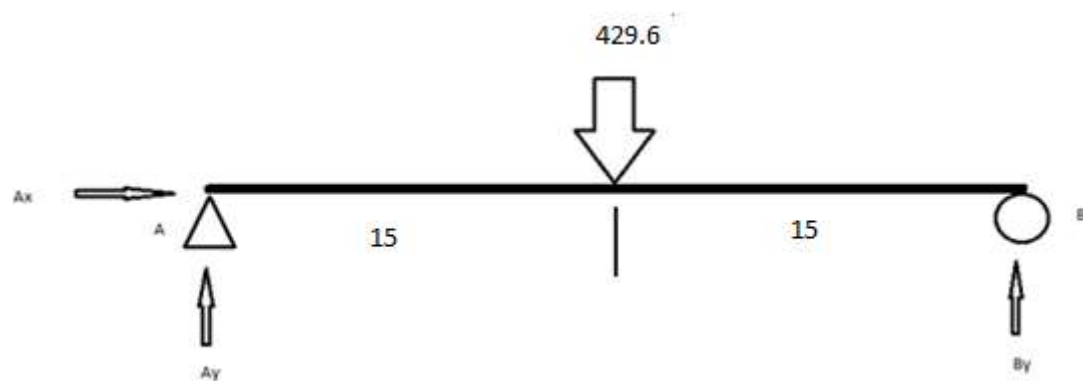
From the above the free body diagram will be as below



Converting the above into a point load;



As the beam is supported by each side the beam is Simply Supported. As such the resultant reactions can be calculated utilising the Equilibrium Equation

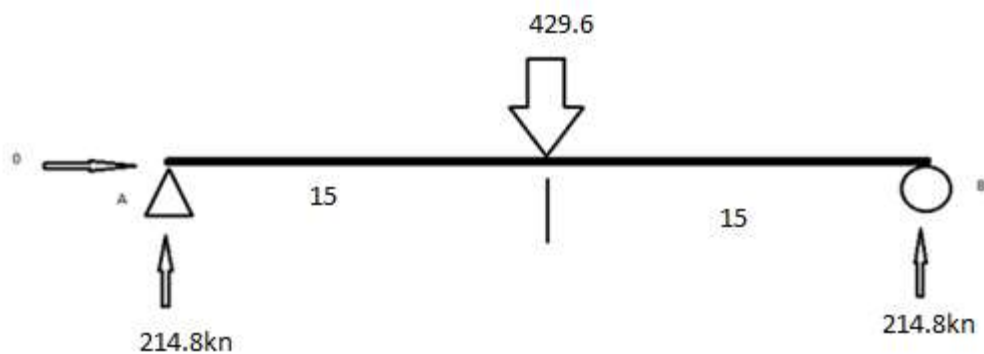


$$\sum f_x = 0 \quad A_x = 0$$

$$\sum f_y = 0 \quad A_y + B_y - 429.6 \text{ kn} = 0 \quad A_y + B_y = 429.6 \text{ kn}$$

$$\sum_{@A} M = 0 \quad By(30) - (429.6 * 15) = 0 \quad By = \frac{-6444}{30} \quad By - 214.8 \quad By = 214.8$$

$$\sum f_y = 0 \quad Ay + By = 429.6 \quad Ay + 214.8 = 429.6kn \quad Ay = 214.8kn$$



In conclusion each of the dock walls will need to be able to support 1324.6kn of weight, while the central ports will need to take 2064.4Kn. The vertical Lifting device will need to be rated to be able to support a total weight of 739.8kn each side.

Reference List

Obinna.U (2020) *Unit Weight of Construction Materials*. (Available at;

<https://structville.com/2020/12/unit-weight-of-construction-materials.html>) (Accessed 28/4/2023)

Concrete Development Group (No date) *Footbridges*. (Available at;

<https://www.cbdg.org.uk/footbridges.asp#:~:text=Design%20loading%20and%20vibration,is%20typically%205kN%2Fm2>) (Accessed 28/4/2023)

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PROPOSED BRIDGE IMPROVEMENT -
OVERVIEW - SCALE 1:500

SEE PHASE 2 FOR CONSTRUCTION OF CIVIL
ENGINEERING LANGDON ROAD HIGHWAY
ACCESS (VIEWPORT A).

SEE PHASE 3 FOR CONSTRUCTION OF RAMP
AND RETAINING WALL STRUCTURE. VIEWPORT
B

SEE PHASE 5 FOR BRIDGE CONSTRUCTION
SOUTH SIDE. VIEWPORT D

SEE PHASE 1 FOR CONSTRUCTION OF PIER
SUPPORTS.

SEE PHASE 6 FOR BRIDGE CONSTRUCTION
CENTRAL SECTION. VIEWPORT E

SEE PHASE 1 FOR CONSTRUCTION OF PIER
SUPPORTS.

SEE PHASE 4 FOR BRIDGE CONSTRUCTION
SOUTH SIDE. VIEWPORT F

SEE PHASE 3 FOR CONSTRUCTION OF RAMP
AND RETAINING WALL STRUCTURE. VIEWPORT
C

LOCATION PLAN - SCALE 1:2500

VIEWPORT A - HIGHWAY
IMPROVEMENT - SCALE 1:200

UNCONTROLLED CROSSING
POINTS INSTALLED ON
PEDESTRIAN DESIRE LINE.

VEHICLE PICK UP AND
DROP OFF LOCATIONS
INSTALLED. TEMPORARY
WAITING TIMES TO BE
ENFORCED UNDER TRO.

UNCONTROLLED CROSSING POINTS
CONSTRUCTED.

EXISTING ACCESS MAINTAINED.

VIEWPORT B - BRIDGE ACCESS
RAMP - NORTH - SCALE 1:200

RAMP ACCESS WITH STEPS
CONSTRUCTED AT REAR OF
FOOTWAY ADJACENT TO DOCK
WALL.

VIEWPORT C - BRIDGE ACCESS
RAMP SOUTH - SCALE 1:200

RAMP ACCESS WITH STEPS
CONSTRUCTED AT REAR OF
FOOTWAY ADJACENT TO DOCK
WALL.

VIEWPORT D - BRIDGE SECTION 3 -
NORTHERN SPAN - SCALE 1:200

BRIDGE DECK TO BE FITTED.
SEE PHASE 5 FOR DETAILS.

VIEWPORT E - BRIDGE SECTION 2
CENTRAL SPAN - SCALE 1:200

BRIDGE DECK TO BE FITTED.
SEE PHASE 6 FOR DETAILS.

VIEWPORT F - BRIDGE SECTION 1
SOUTH SPAN - SCALE 1:200

BRIDGE DECK TO BE FITTED.
SEE PHASE 4 FOR DETAILS.

DRAWING TITLE

PHASE 1 - 7 OVERVIEW
PROPOSED BRIDGE DESIGN OVERVIEW
WITH ACCESS AND PARKING PROVISION
ON LANGDON ROAD

DRAWN BY RM 11/22 SCALE SHOWN
CHECKED XXX X/XX

PROJECT TITLE

ACBA6003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE

CAD REF.

CAD

PROJECT PHASE PHASE

REV.

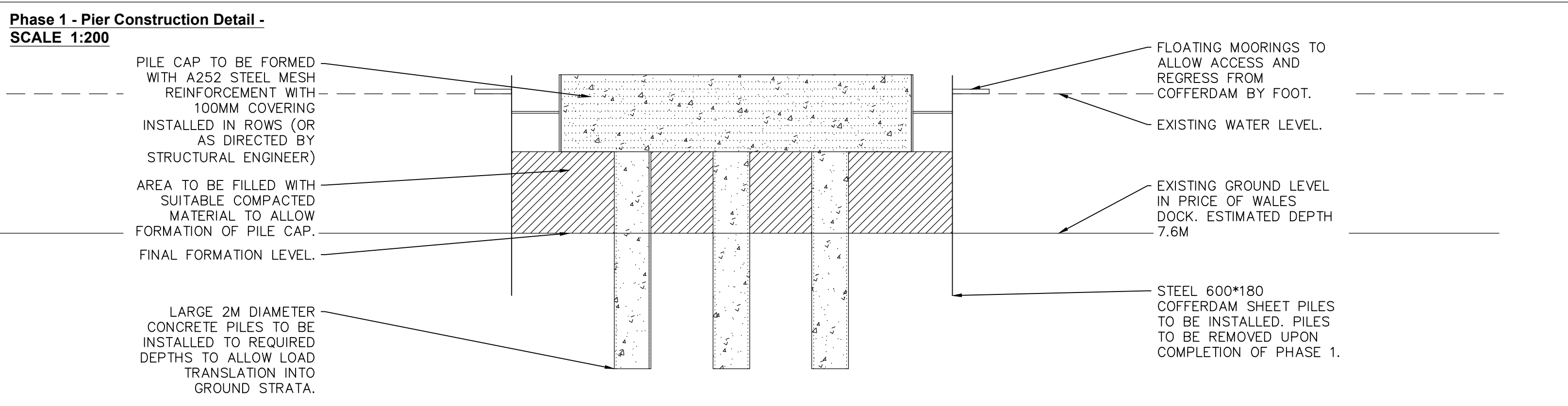
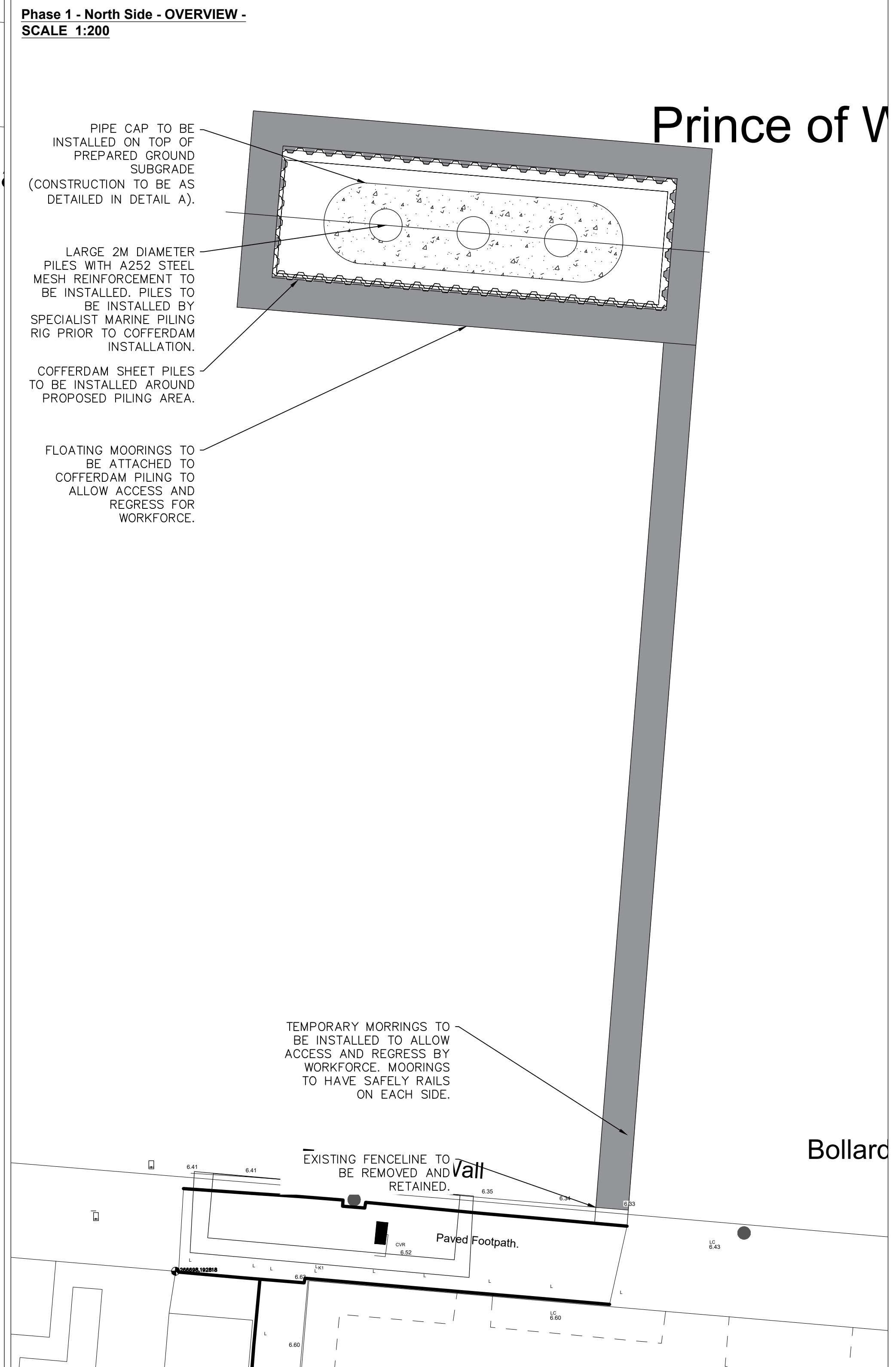
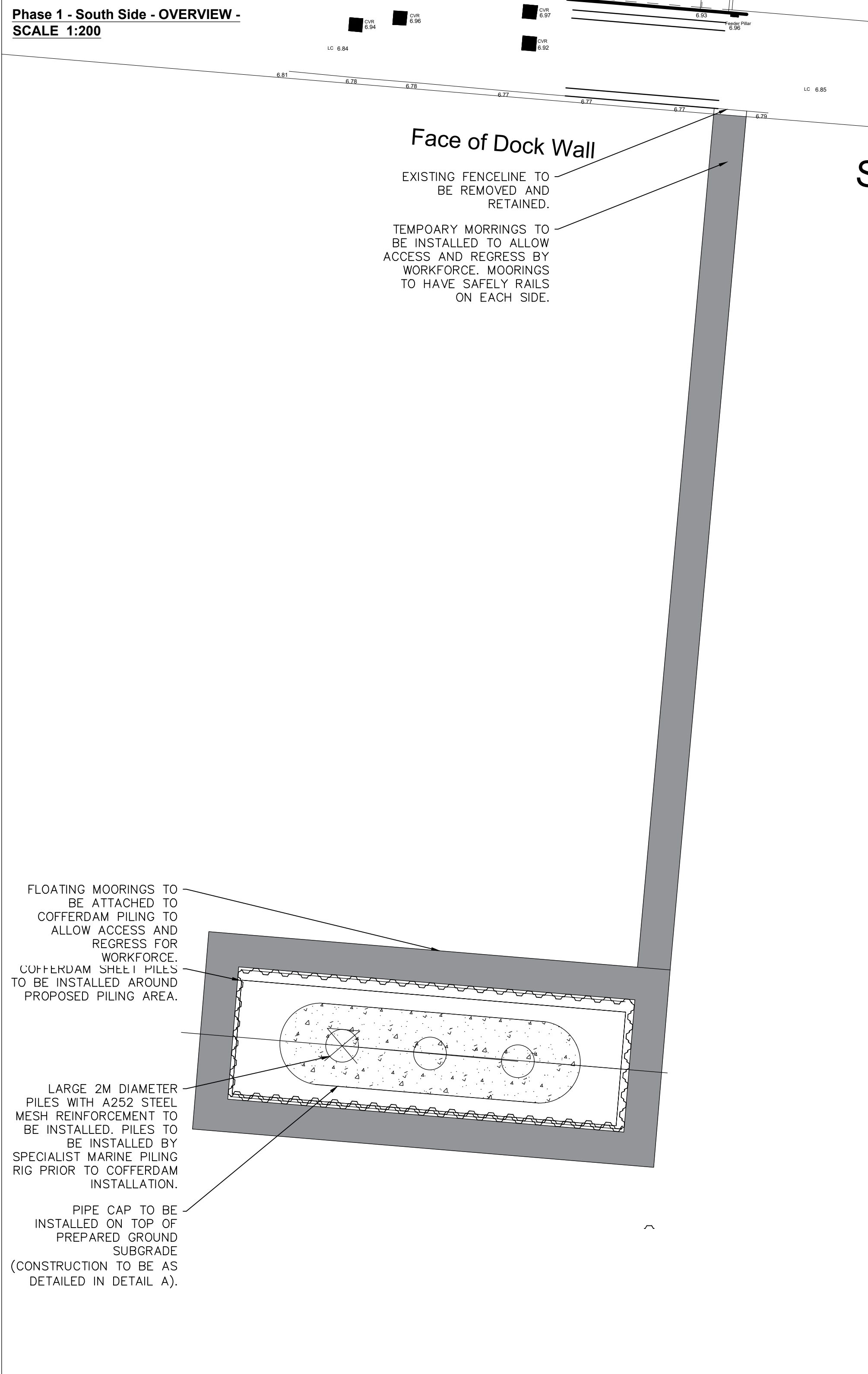
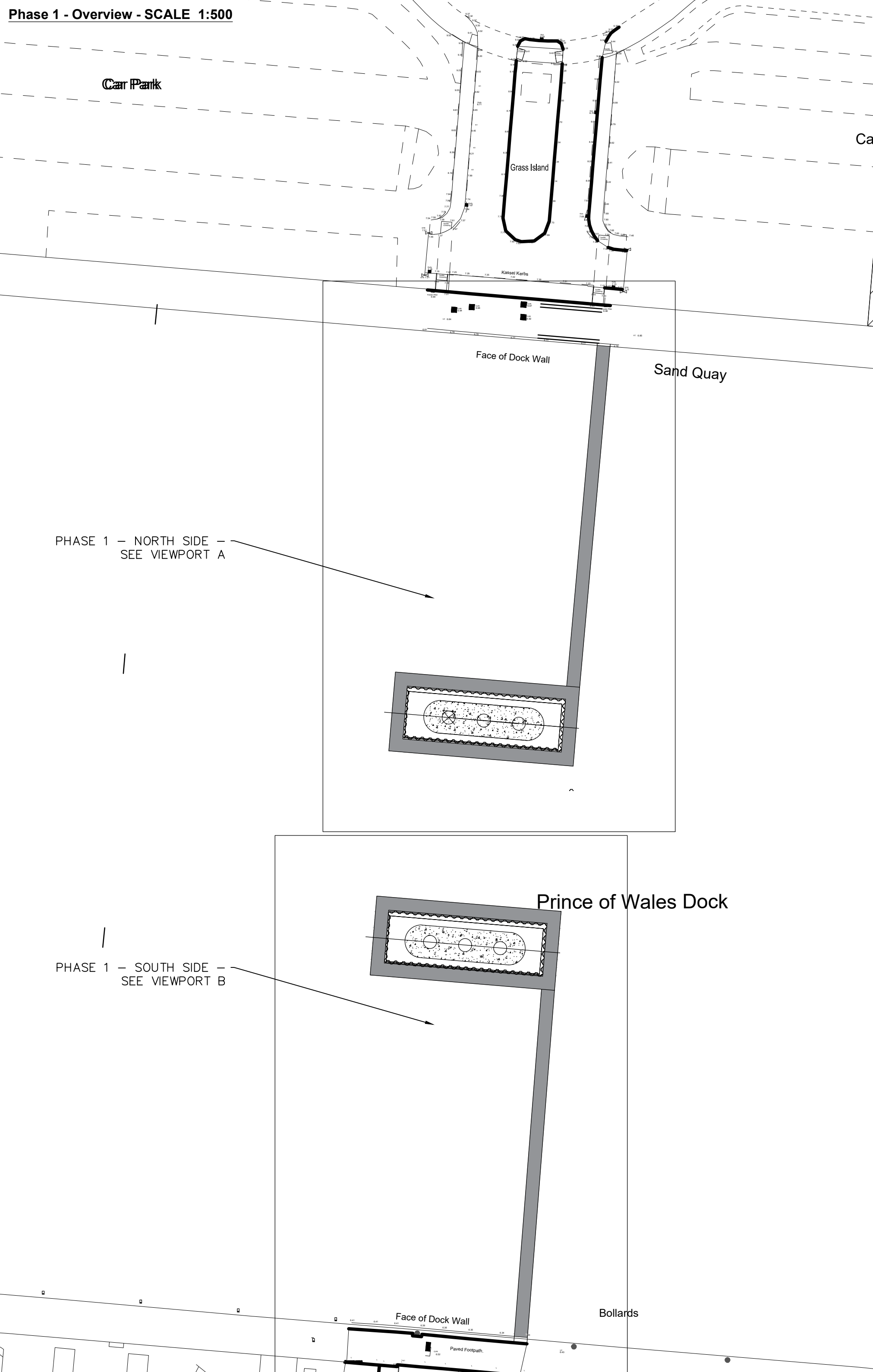
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PED1-SPR-DR-C-0002-S1

REV. DESCRIPTION

BY DATE

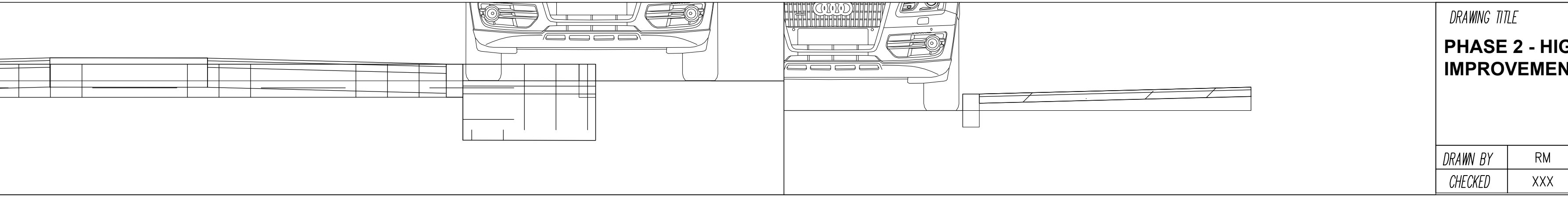
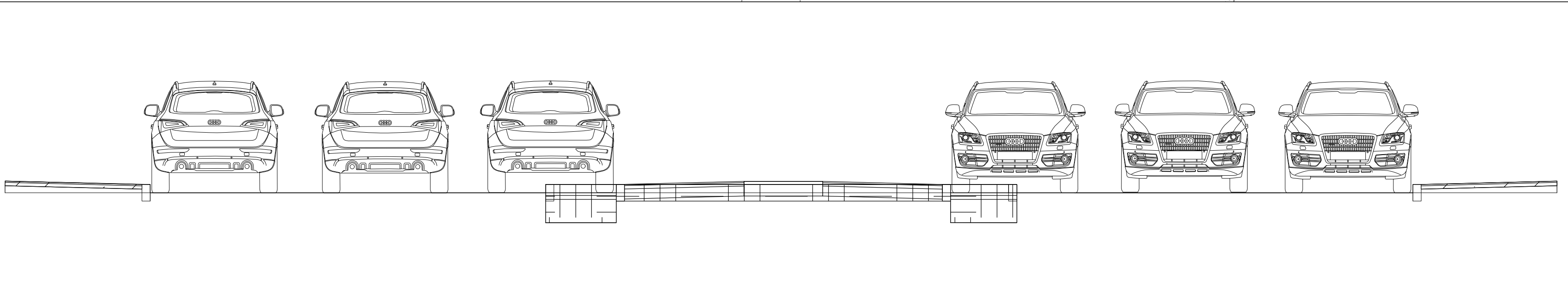
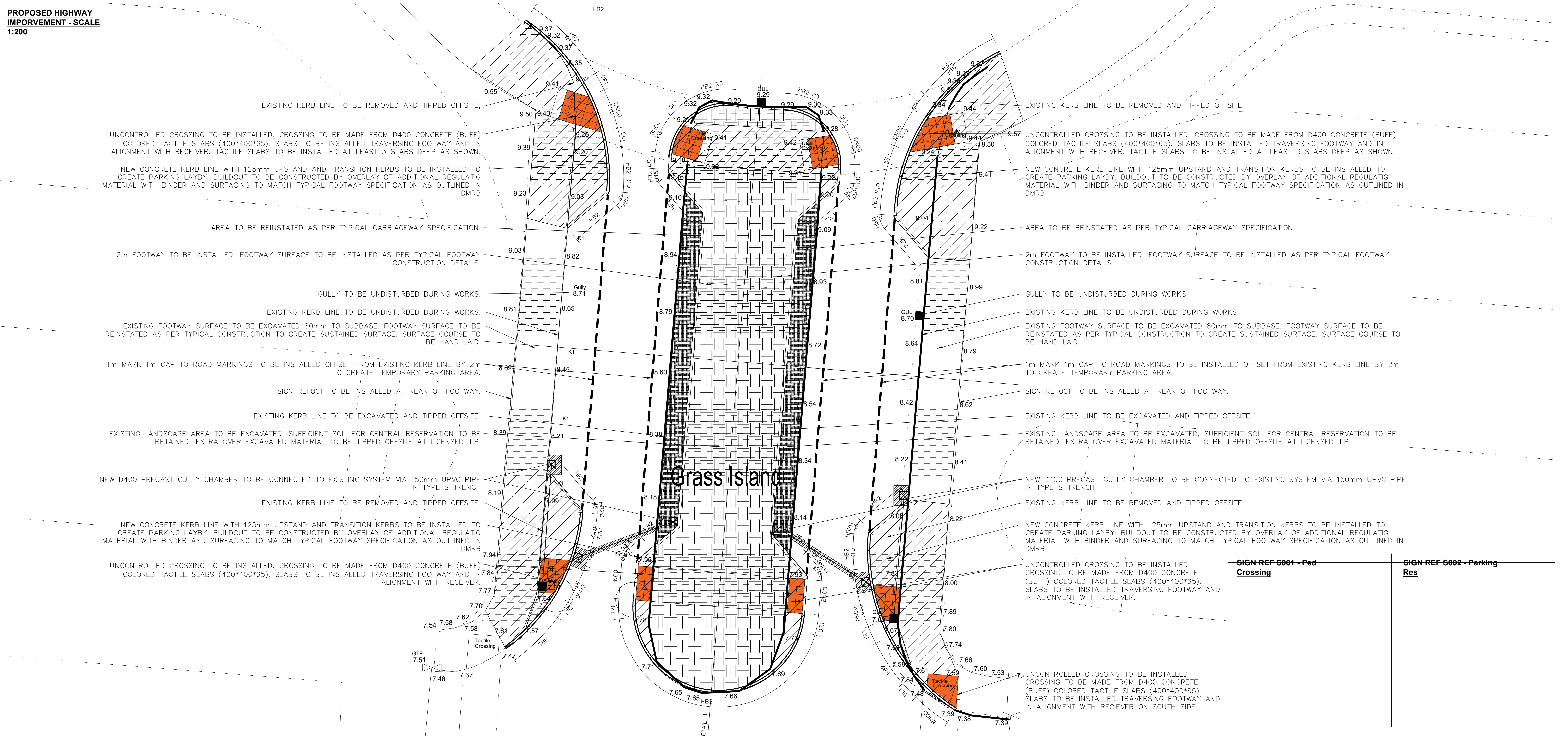
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DRAWING TITLE PHASE 1 - OVERVIEW CONSTRUCTION					PROJECT TITLE ACBA6003 - SPRINGFIELD DESIGNS - PEDESTRIAN BRIDGE													DRAWING No. PED1-SPR-DR-C-0003-S1			
DRAWN BY RM 5/23 SCALE SHOWN					CAD REF. CAD																
PROJECT PHASE					REV.																
REV.					DESCRIPTION													BY	DATE		

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PROPOSED HIGHWAY IMPORVEMENT - SCALE 1:200



DRAWING TITLE
PHASE 2 - HIGHWAY ACCESS IMPROVEMENT - OVERVIEW

DRAWN BY RM 11/22 SCALE SHOWN
CHECKED XXX X/XX

PROJECT TITLE
ACBA6003 - SPRINGFIELD DESIGNS - PEDESTRIAN BRIDGE

CAD REF. CAD
PROJECT PHASE PHASE REV.

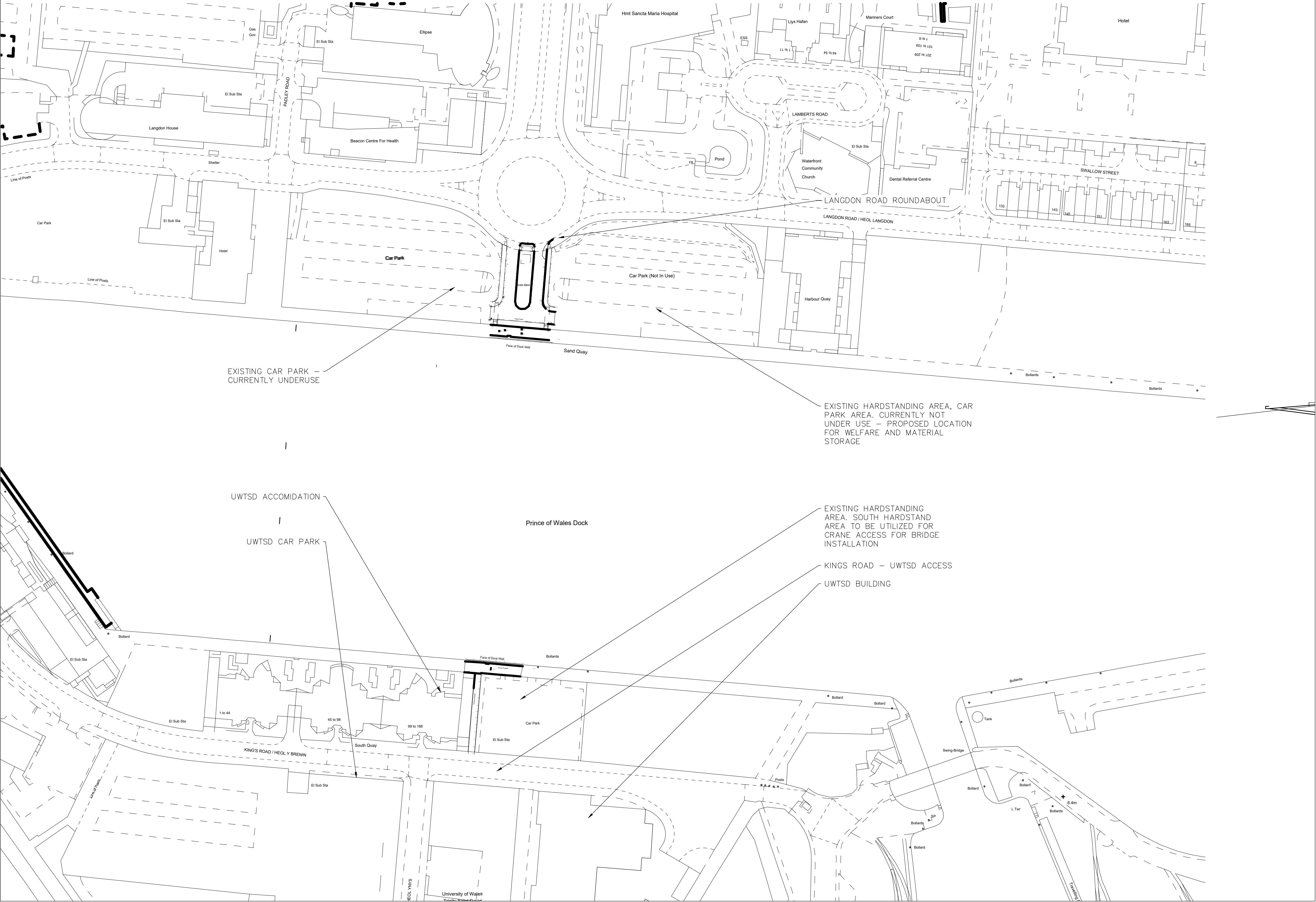
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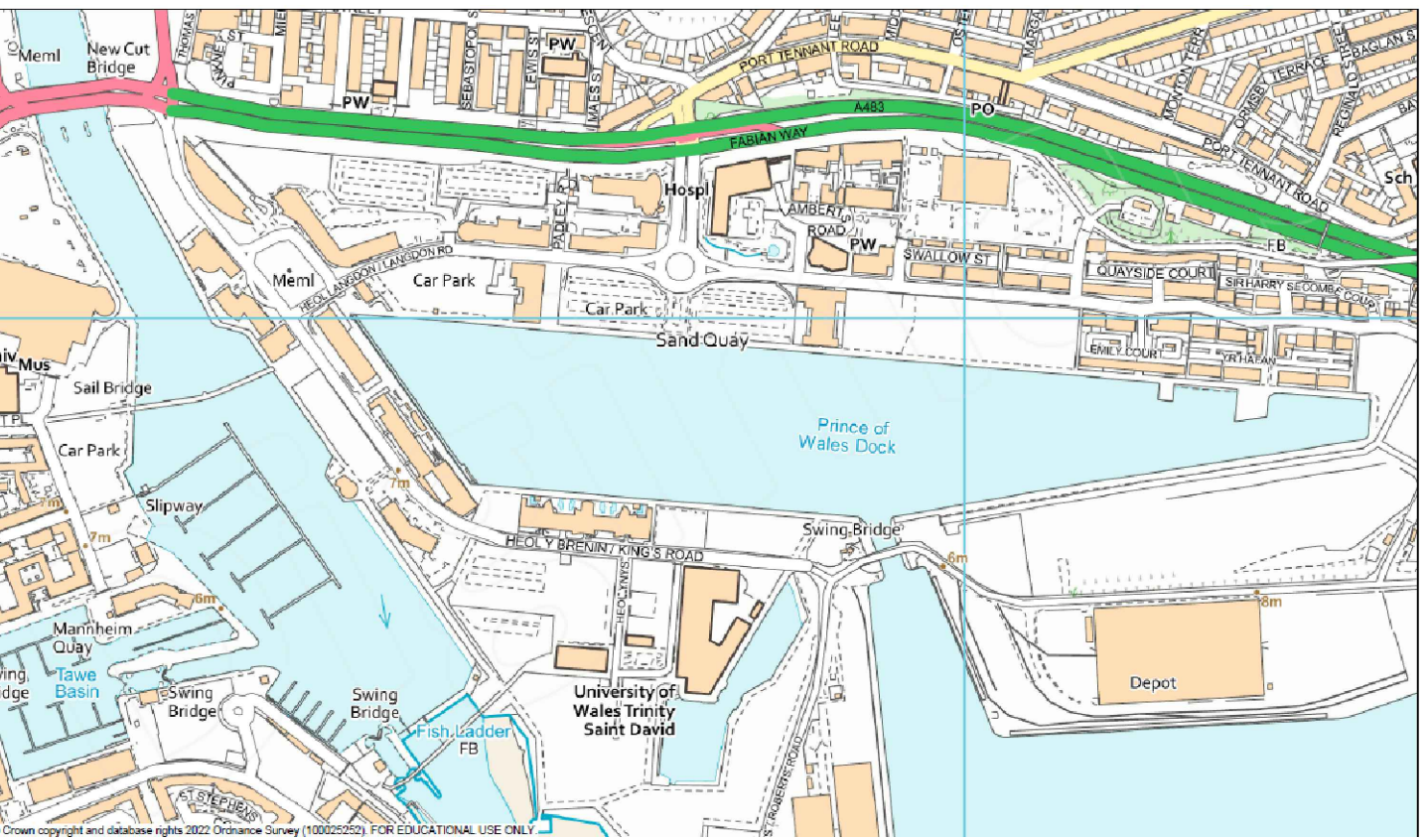
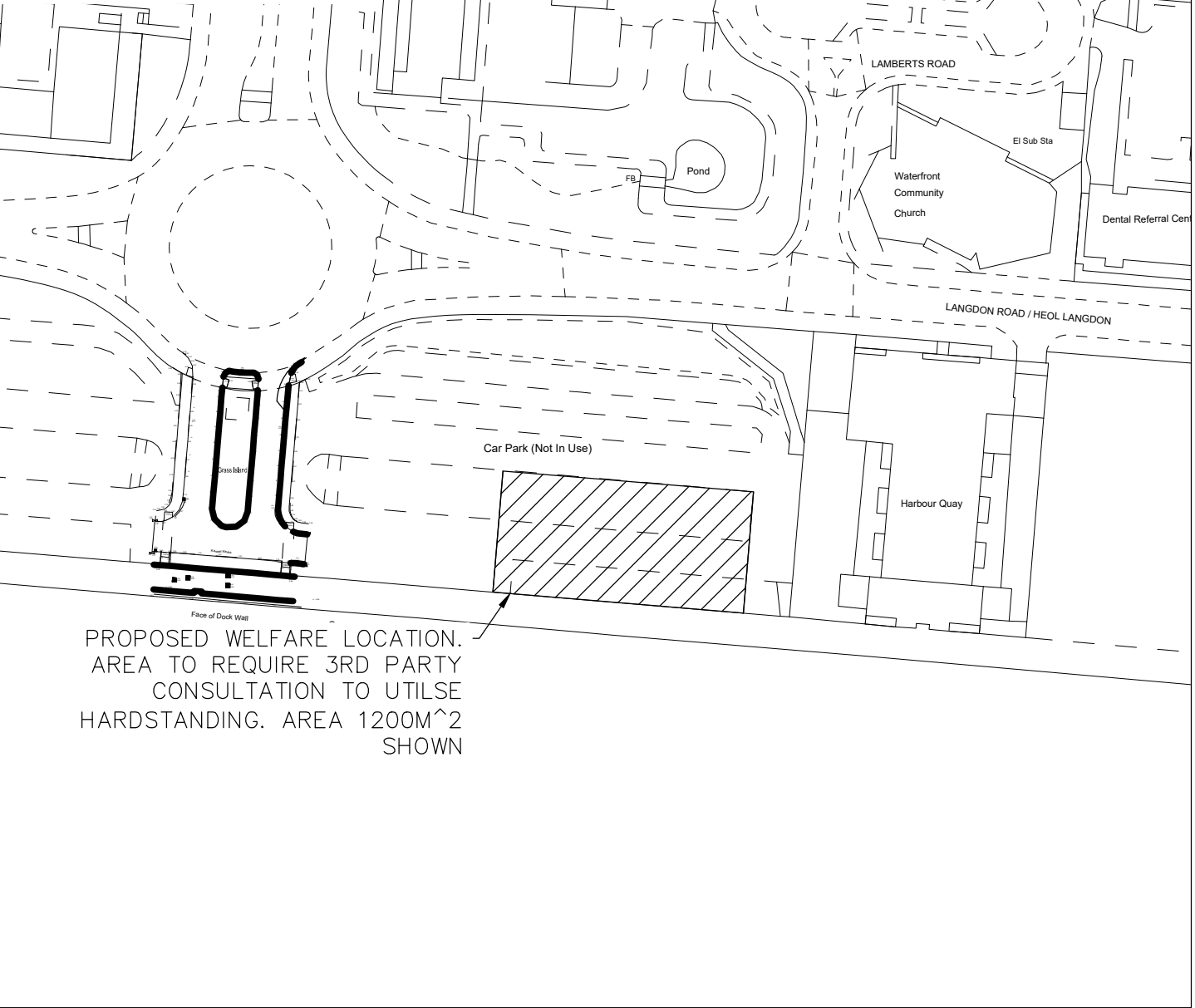
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LOCATION PLAN - SCALE 1:1000
aaa

LOCATION PLAN - SCALE 1:1000



PROPOSED WELARE
LOCATION - SCALE 1:1250



DRAWING TITLE
LOCATION PLAN AND PROPOSED
WELFARE LOCATION

DRAWN BY RM 05/23 SCALE SHOWN
CHECKED XXX X/XX

PROJECT TITLE
ACBA6003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE

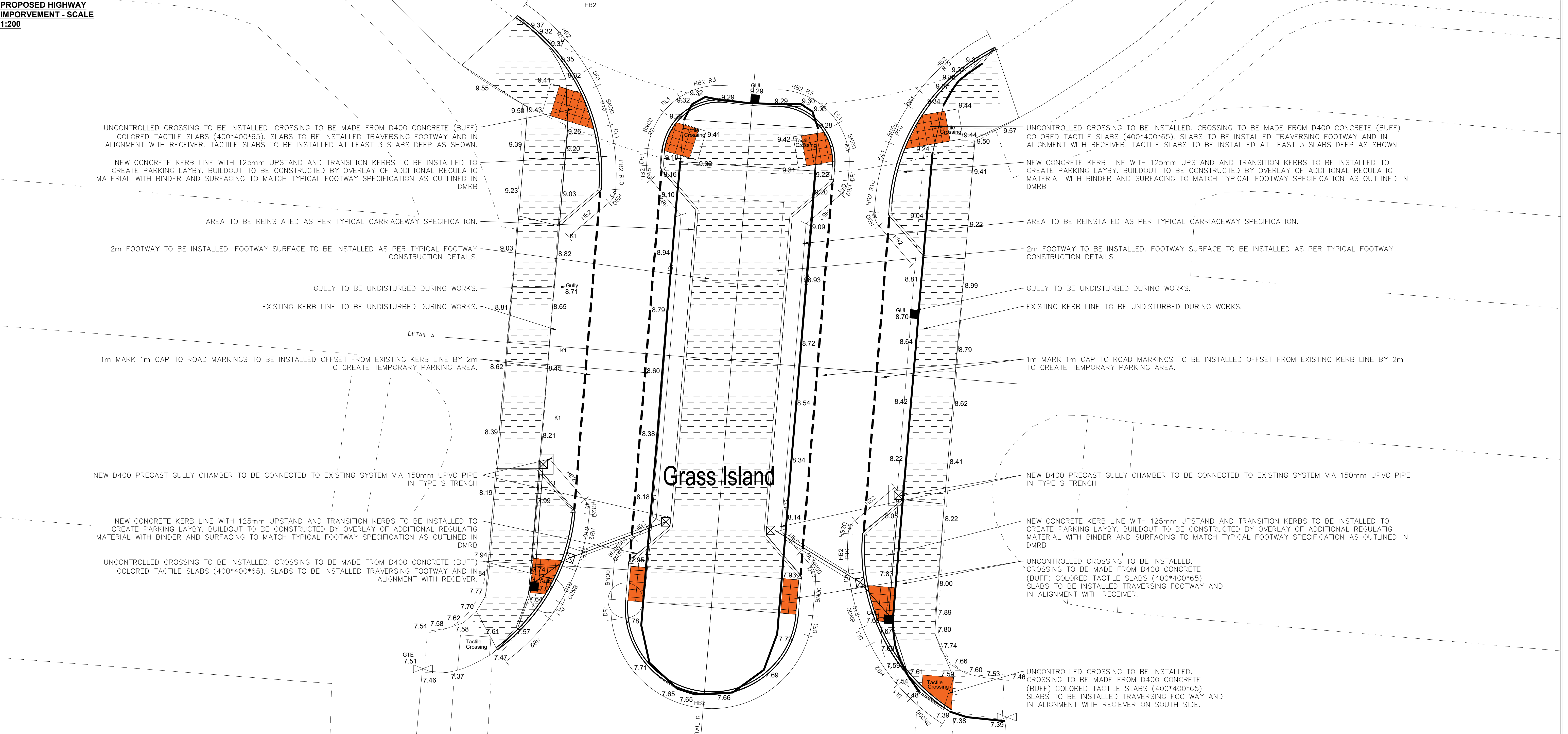
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PROJECT PHASE PHASE

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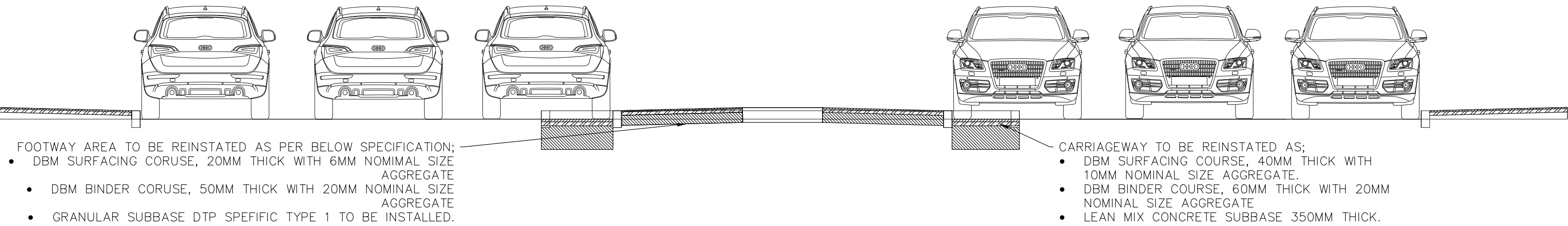
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SPRINGFIELD DESIGNS Ltd

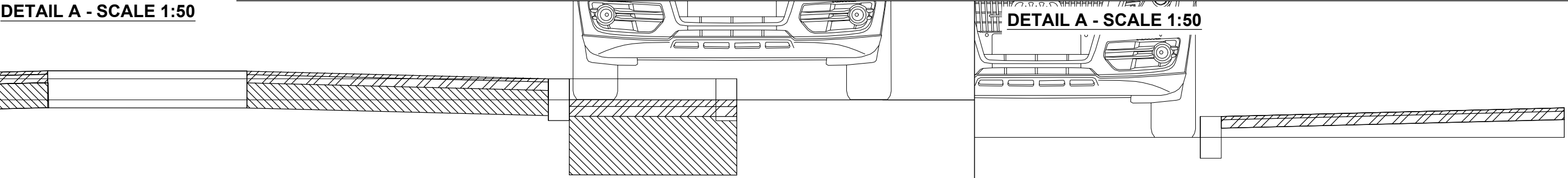
PROPOSED HIGHWAY
IMPROVEMENT - SCALE
1:200



DETAIL A - SCALE 1:50



DETAIL A - SCALE 1:50



DRAWING TITLE
**PHASE 2 - HIGHWAY ACCESS
IMPROVEMENT - REINSTATEMENT PLAN**

DRAWN BY RM 11/22 SCALE SHOWN
CHECKED xxx x/xx

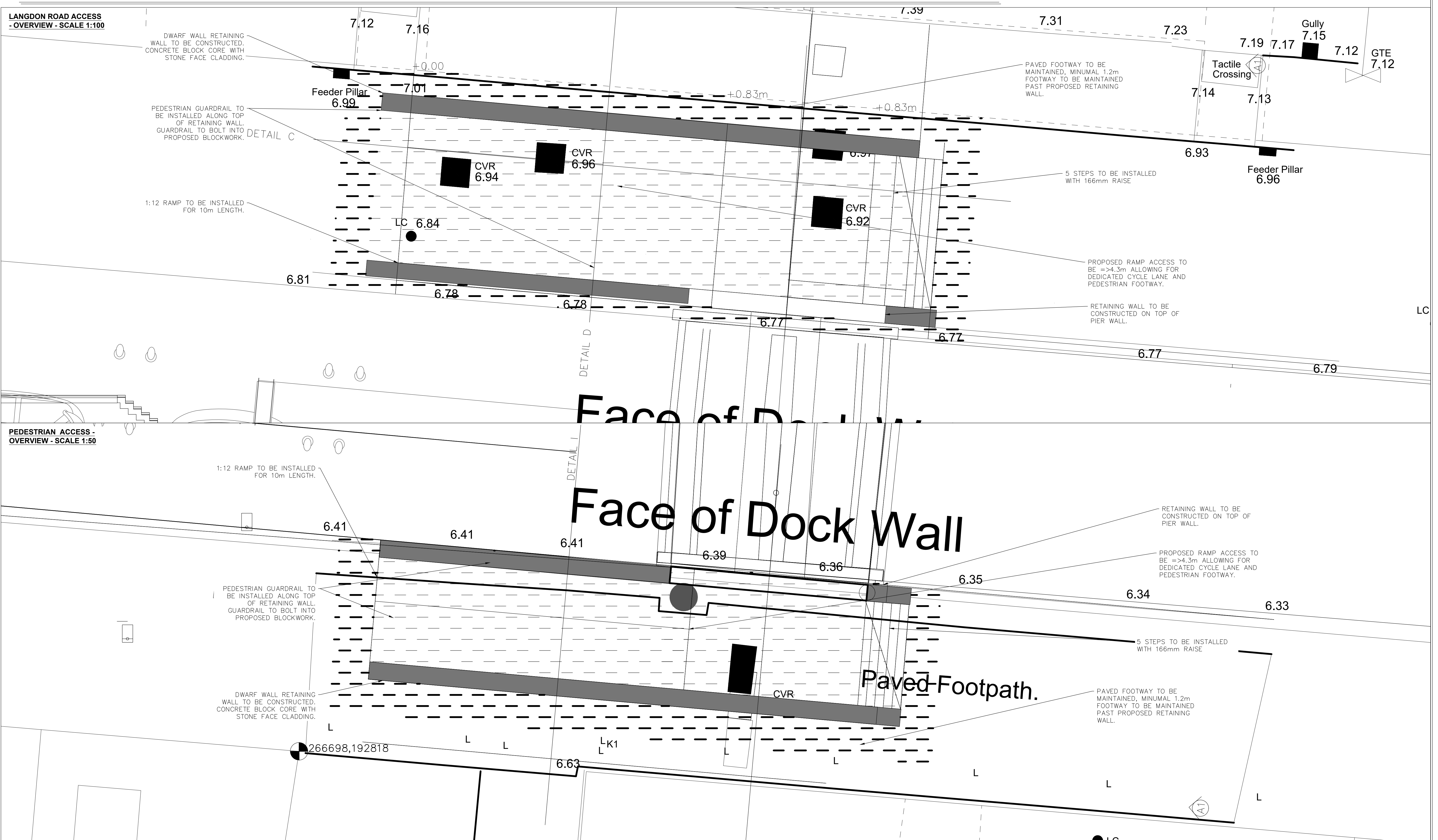
PROJECT TITLE
**ACBA6003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE**

CAD REF. CAD
PROJECT PHASE PHASE REV.

DRAWING No.
PED1-SPR-DR-C-0006-S1

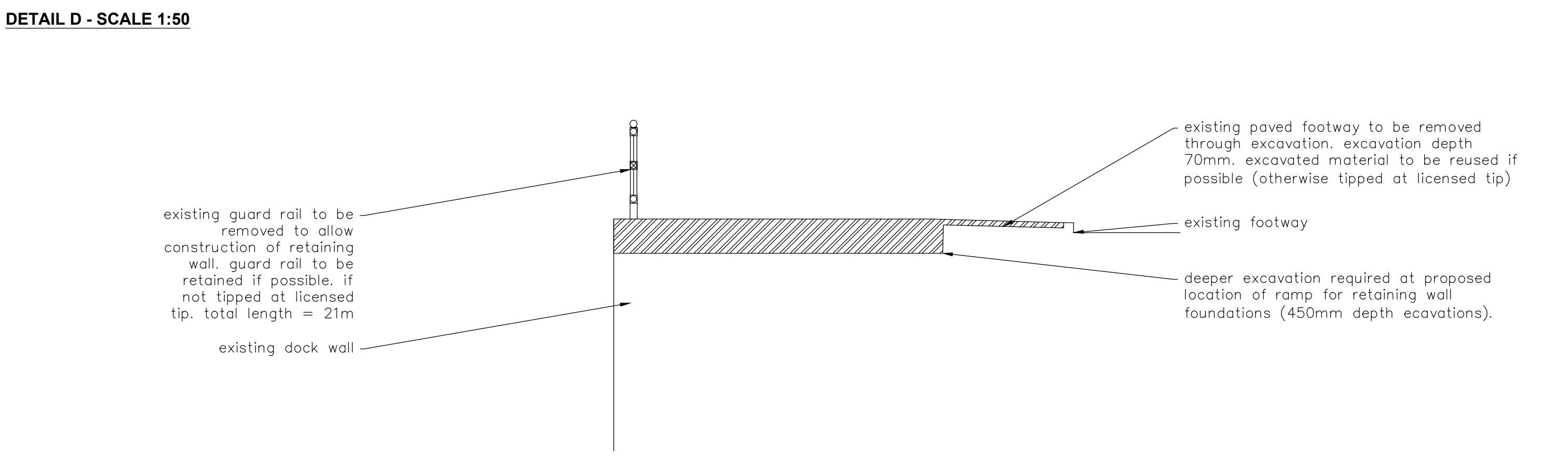
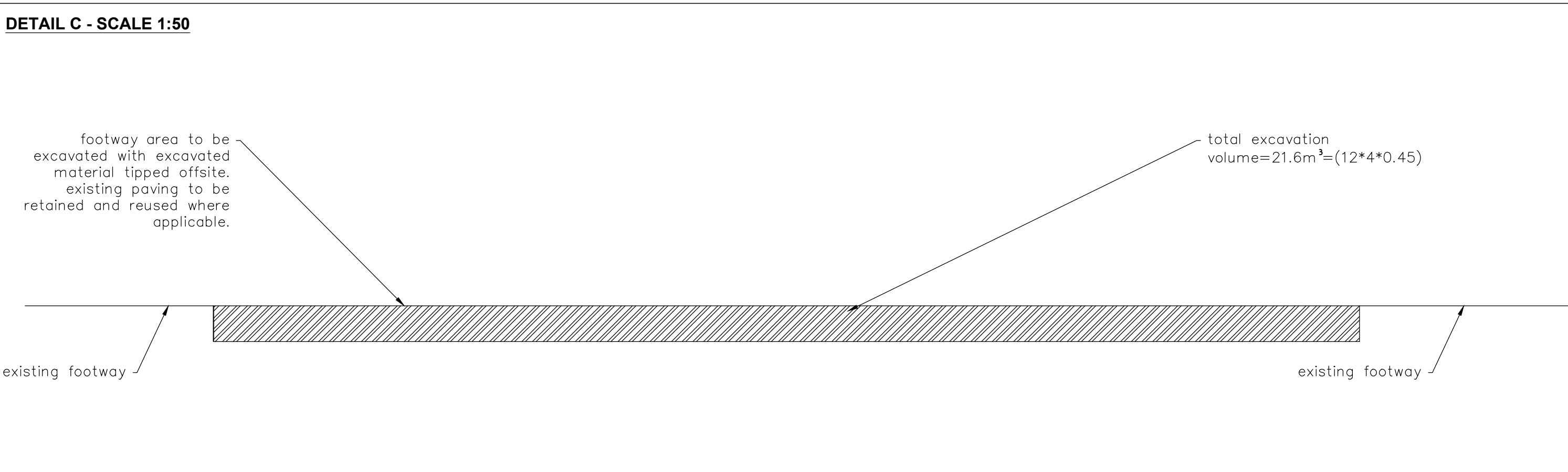
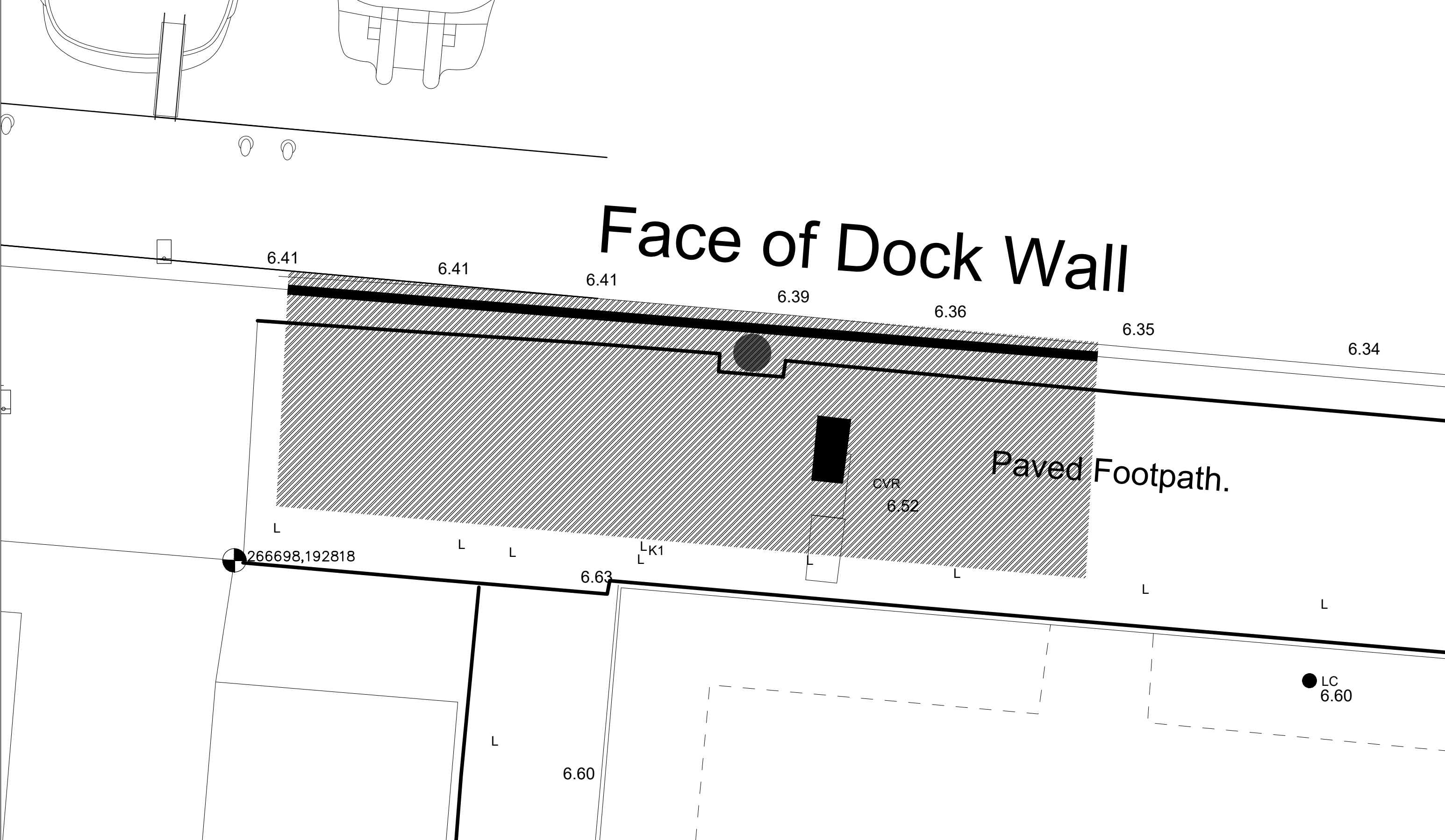
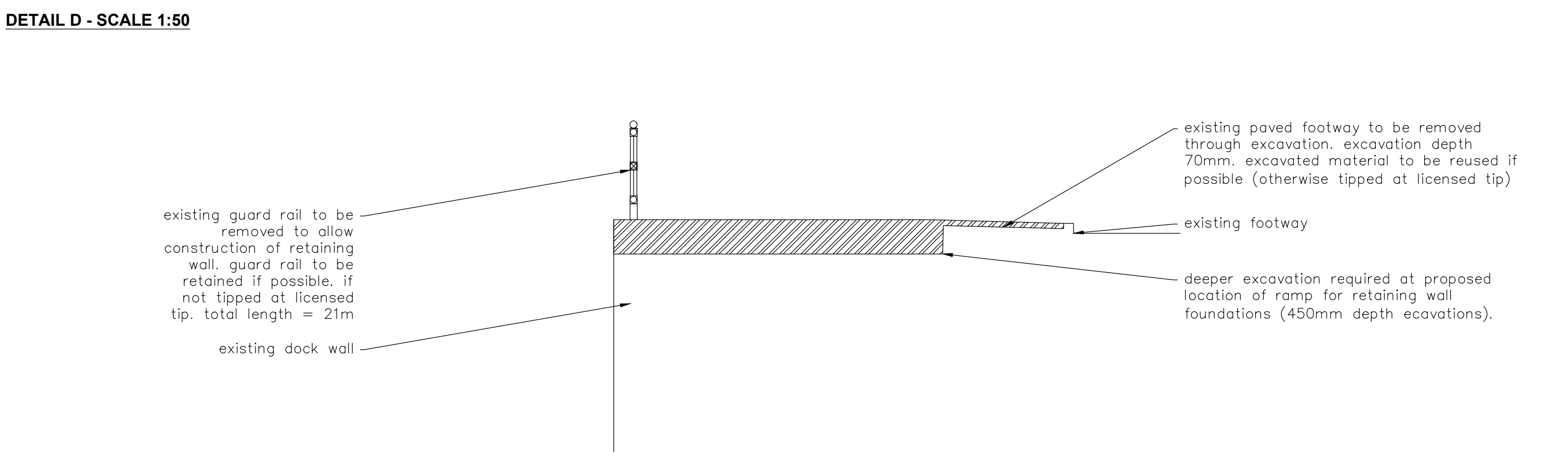
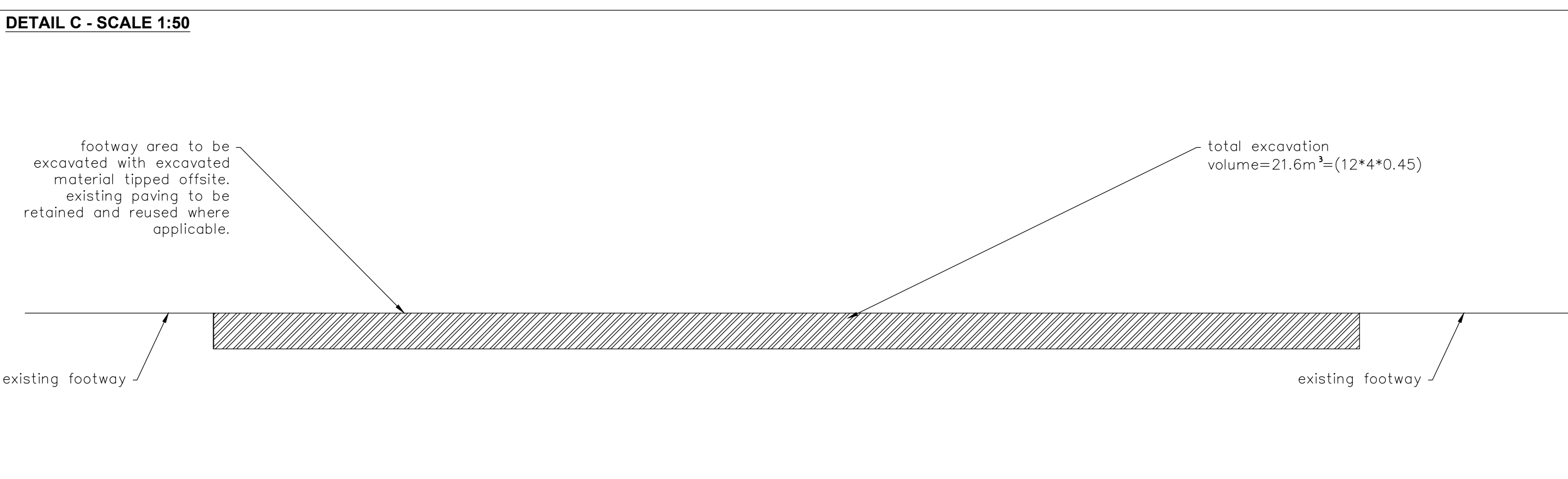
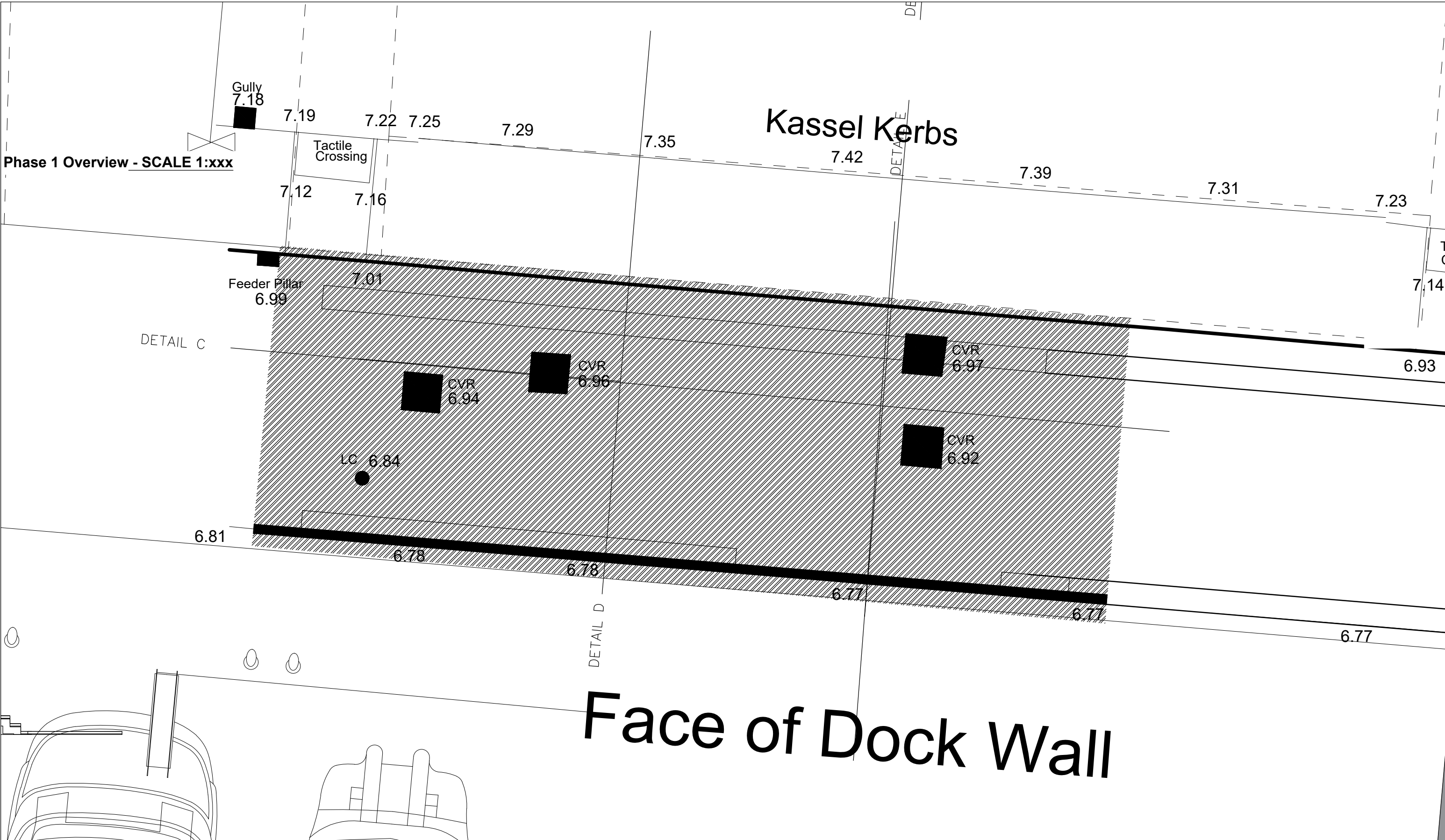
REV. DESCRIPTION BY DATE

SPRINGFIELD DESIGNS Ltd



DRAWING TITLE PHASE 3 - PROPOSED RAMP ACCESS TO BRIDGE - OVERVIEW					PROJECT TITLE ACBA6003 - SPRINGFIELD DESIGNS - PEDESTRIAN BRIDGE													DRAWING No. PED1-SPR-DR-C-0007-S1																
					CAD REF.																													
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CHECKED					xxx		x/xx		SHOWN		PROJECT PHASE				PHASE		REV.									REV.		DESCRIPTION			BY		DATE	

SPRINGFIELD DESIGNS Ltd



DRAWING TITLE

PHASE 3 - RAMP ACCESS FOR PROPOSED BRIDGE - EXCAVATION PLAN

PROJECT TITLE

ACBA6003 - SPRINGFIELD DESIGNS - PEDESTRIAN BRIDGE

DRAWING No.

PED1-SPR-DR-C-0008-S1

DRAWN BY RM 5/23 SCALE SHOWN

CHECKED xxx x/xx

CAD REF. CAD

PROJECT PHASE PHASE

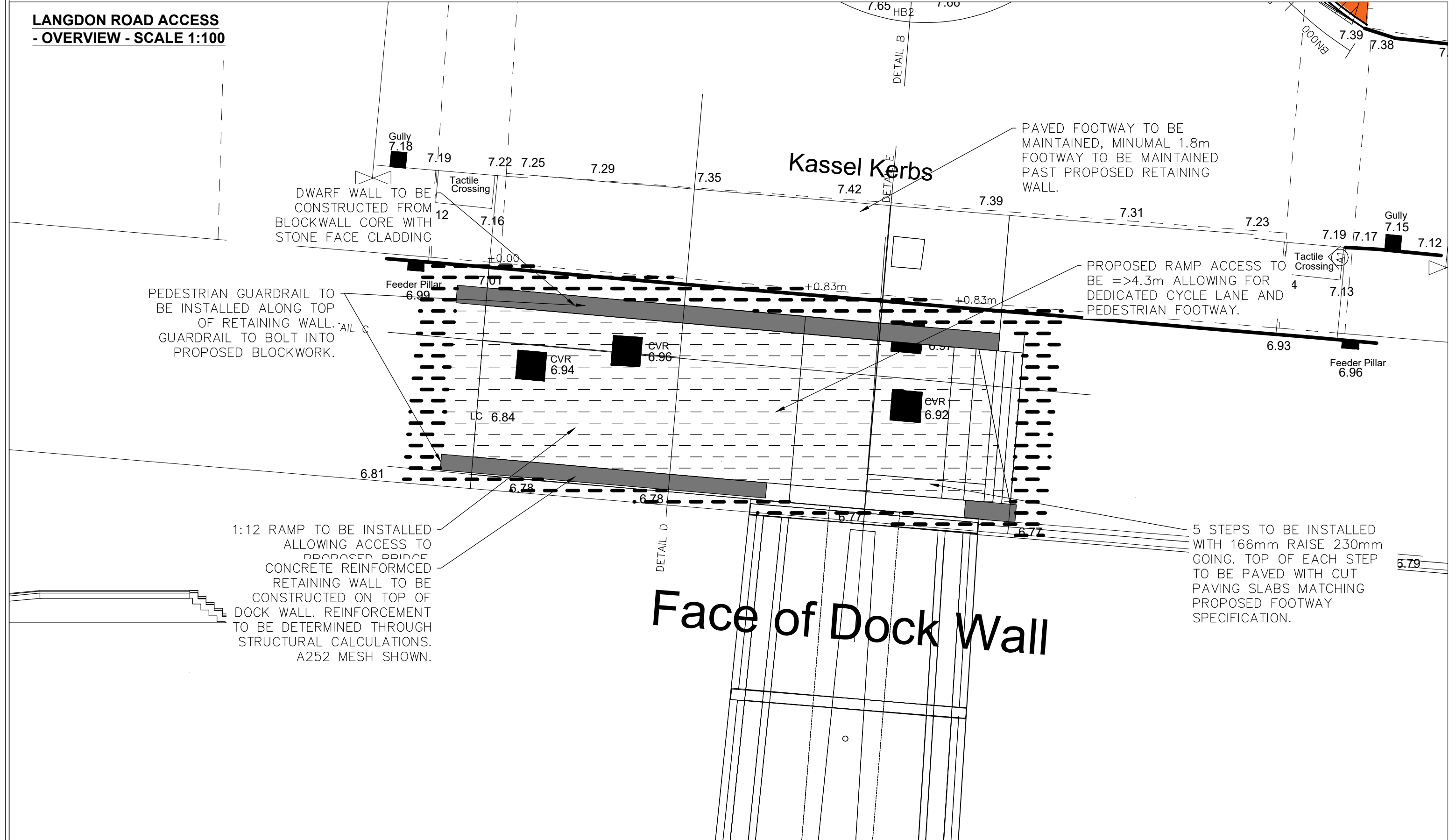
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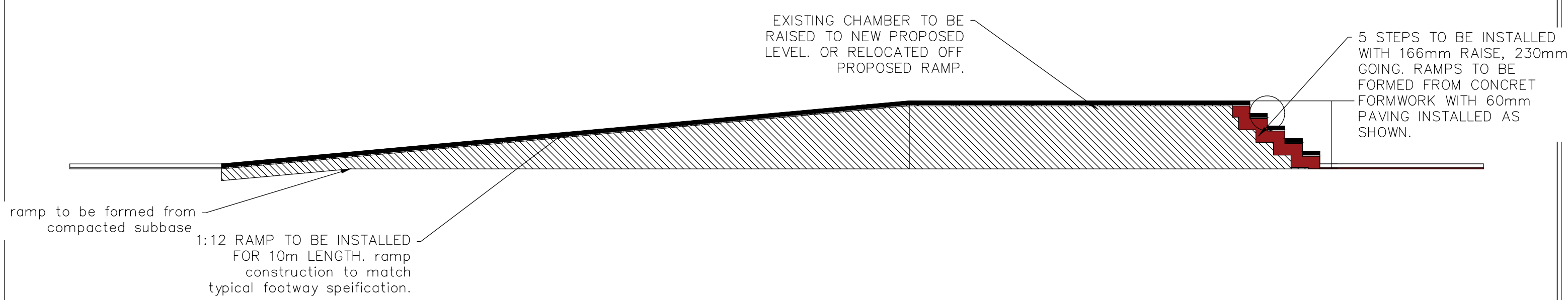
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SPRINGFIELD DESIGNS Ltd

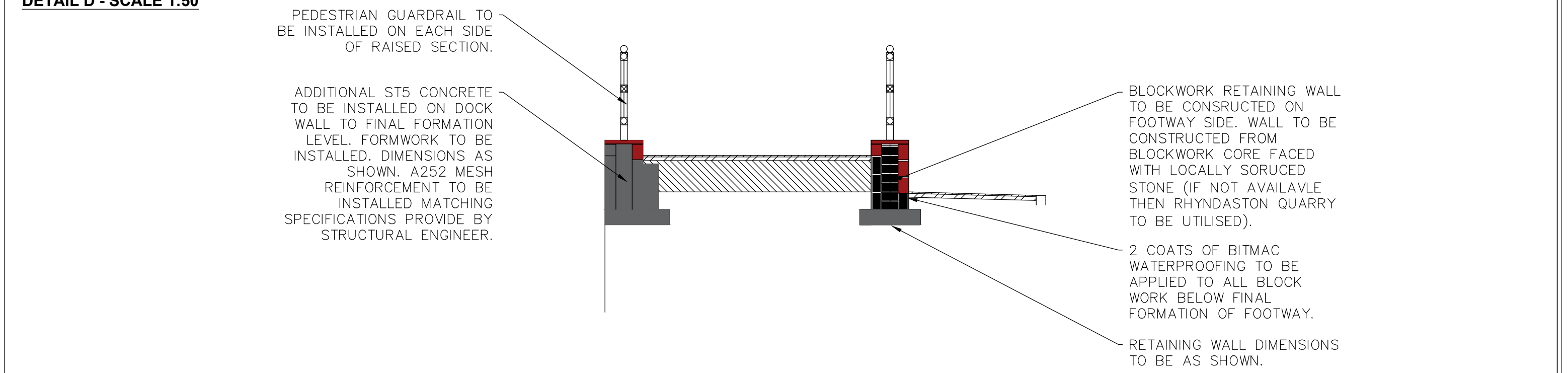
LANGDON ROAD ACCESS
- OVERVIEW - SCALE 1:100



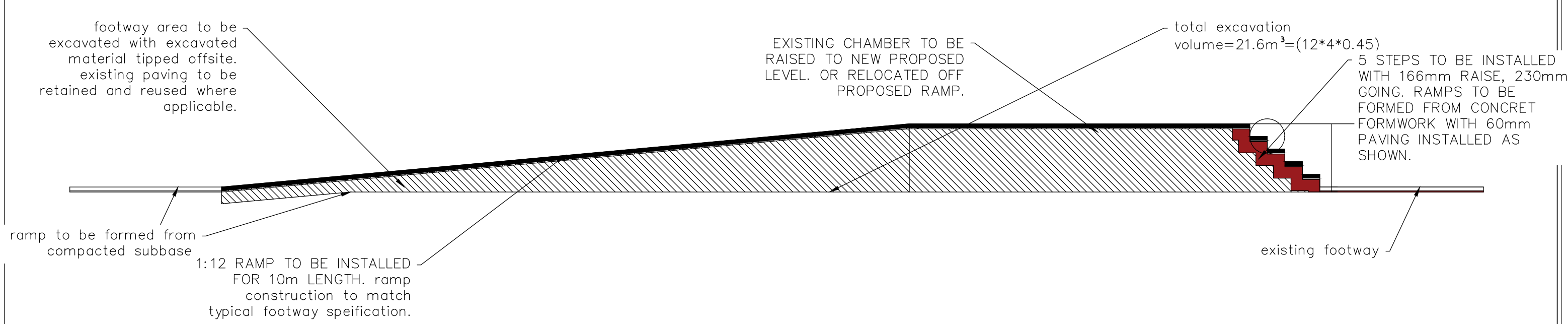
DETAIL C - SCALE 1:50



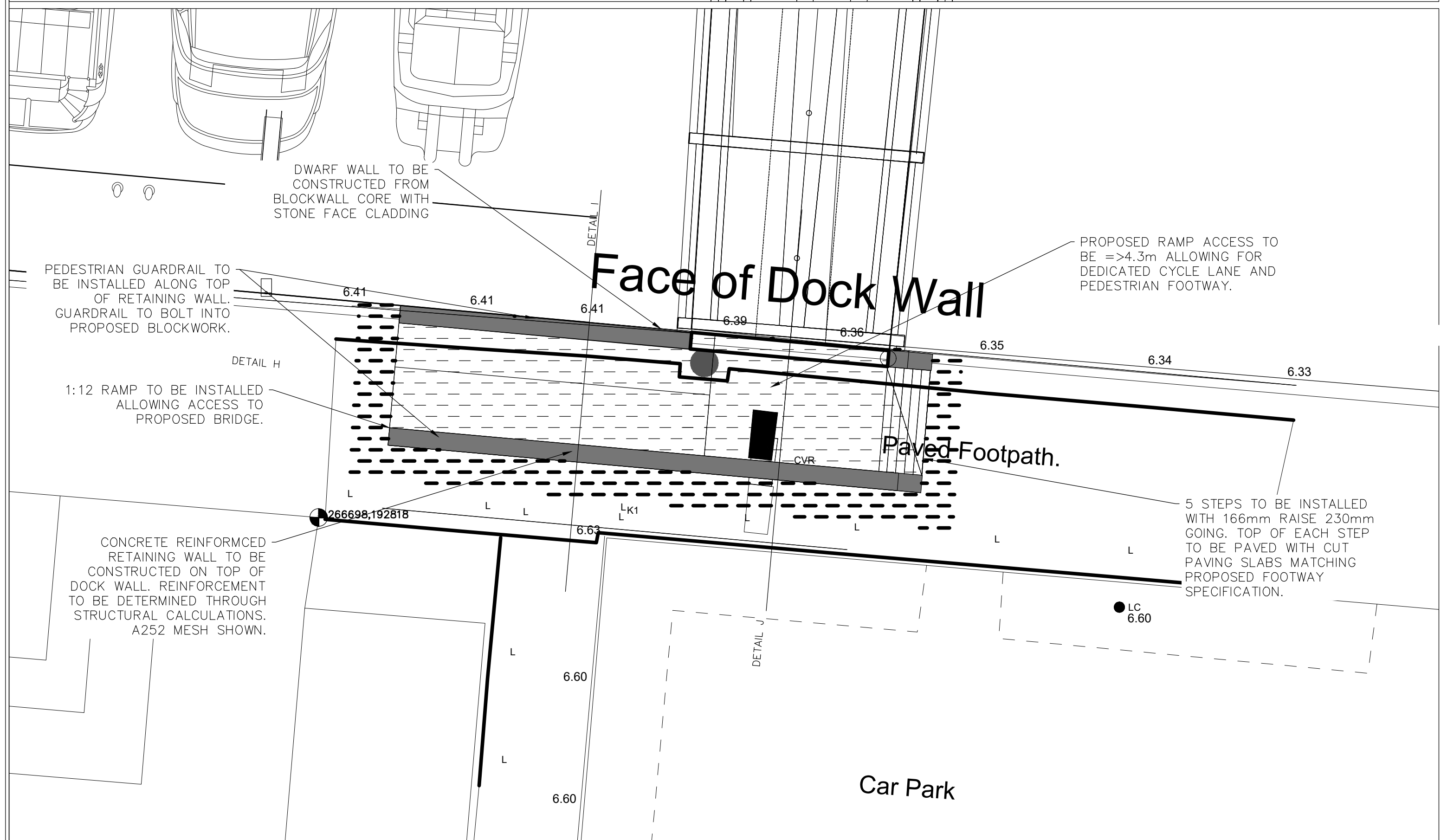
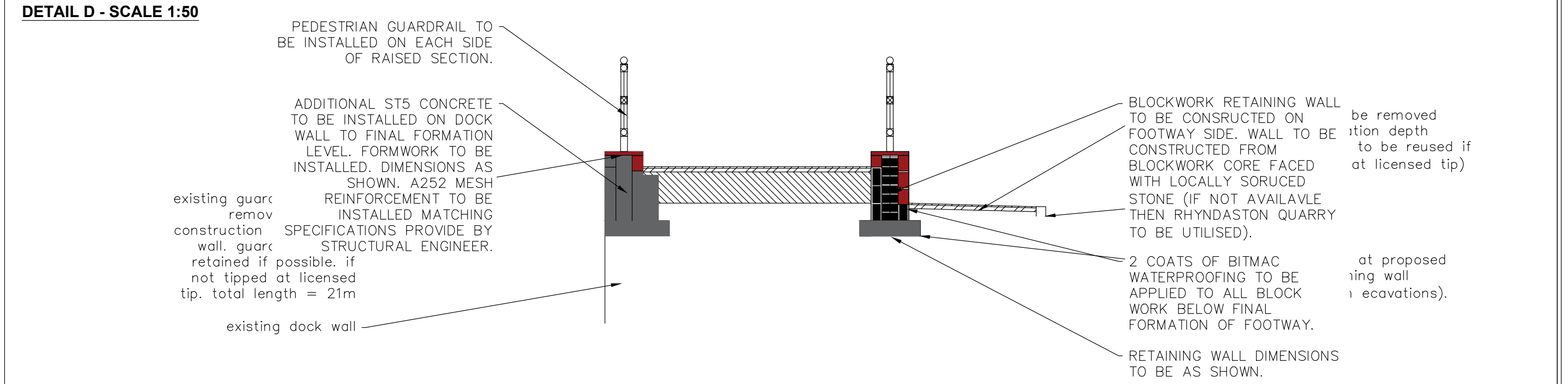
DETAIL D - SCALE 1:50



DETAIL C - SCALE 1:50



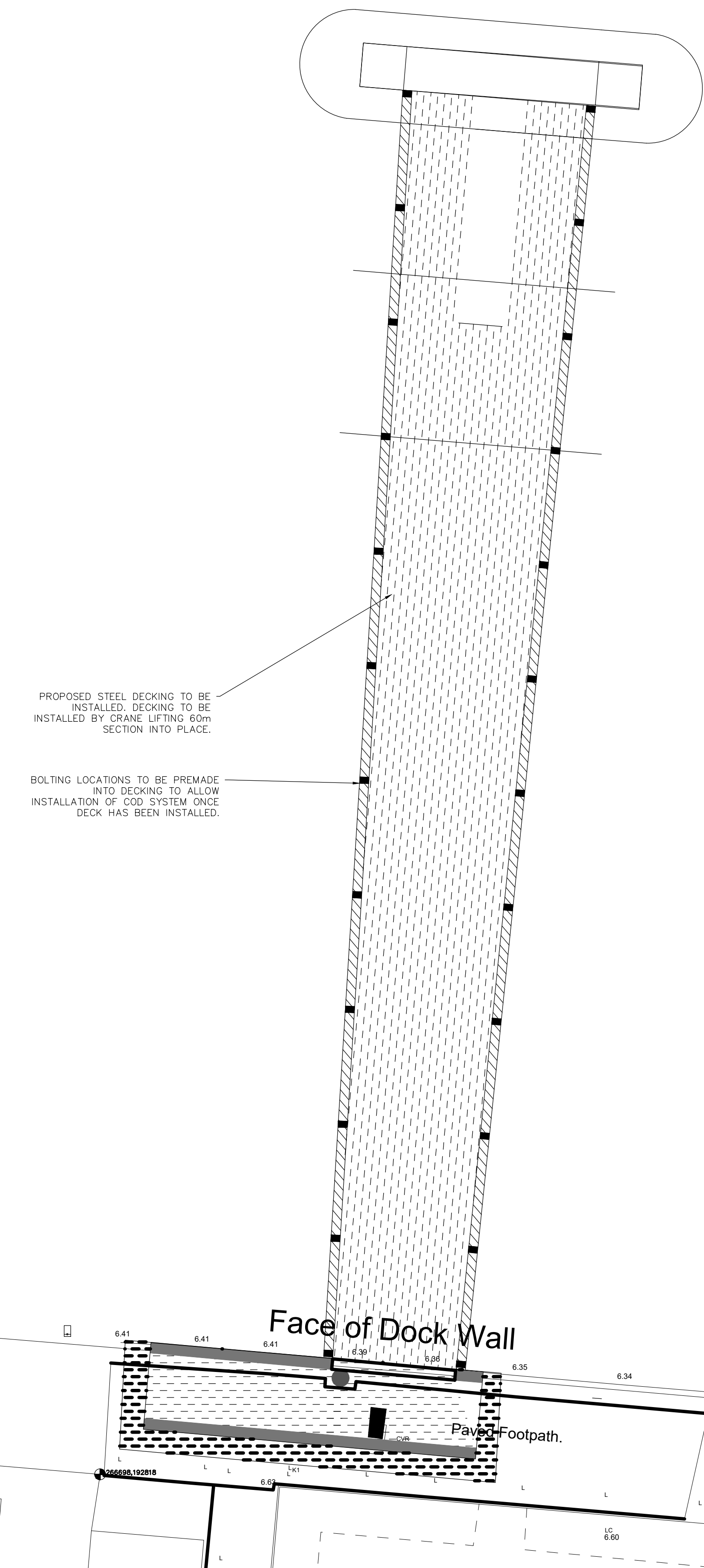
DETAIL D - SCALE 1:50



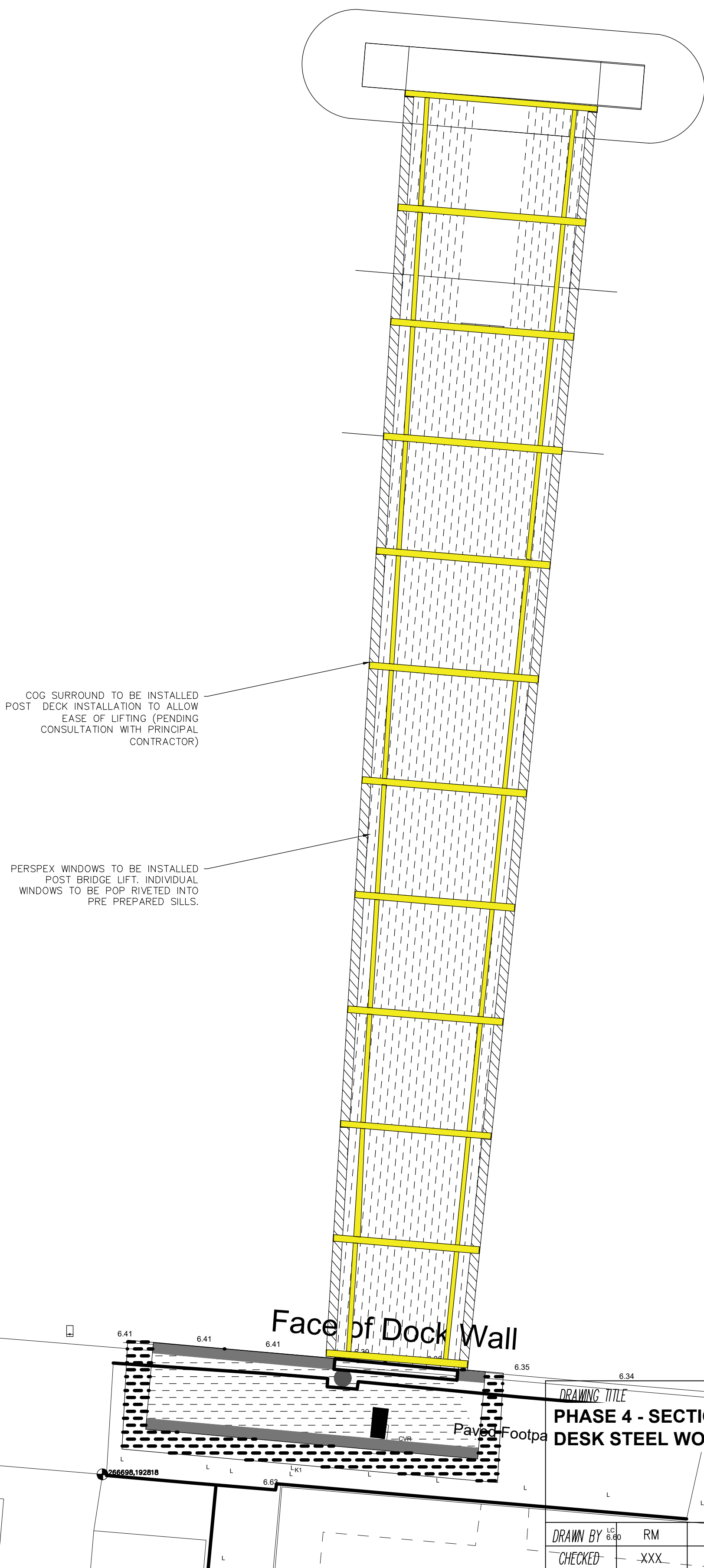
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PHASE 2 - PROPOSED RAMP ACCESS FOR PEDESTRIAN BRIDGE - REINSTATEMENT PLAN					ACBA6003 - SPRINGFIELD DESIGNS - PEDESTRIAN BRIDGE													PED1-SPR-DR-C-0009-S1										
					CAD REF.																							
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DRAWN BY		RM	5/23		SCALE	SHOWN	PROJECT PHASE				REV.										REV.		DESCRIPTION			BY	DATE	
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SPRINGFIELD DESIGNS Ltd

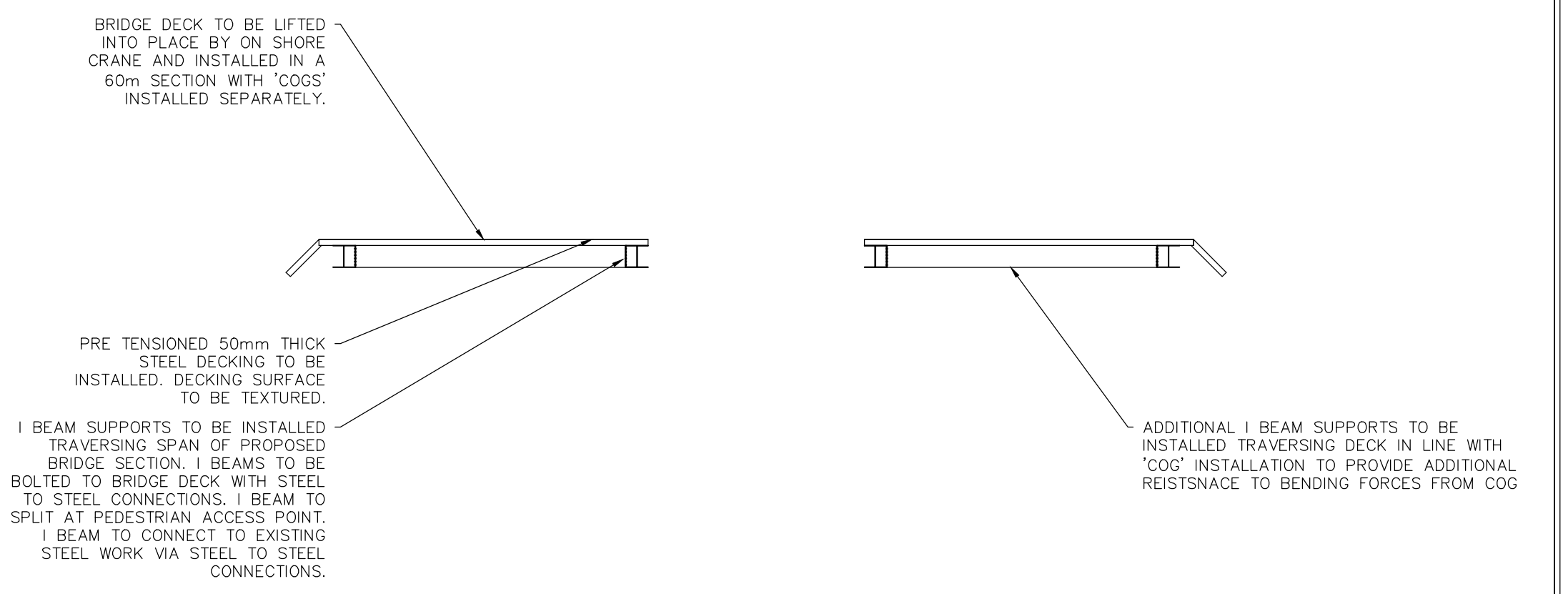
BRIDGE SECTION 1 -
SOUTH - BRIDGE DECK
SCALE 1:150



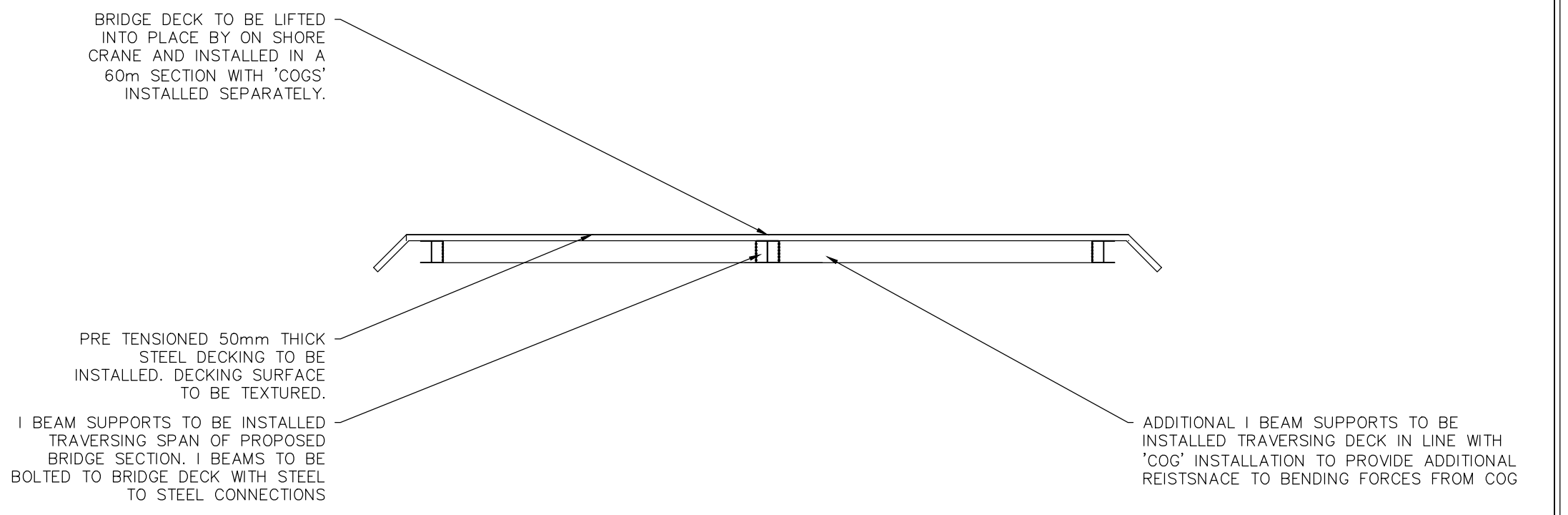
BRIDGE SECTION 1 -
SOUTH - 'COG'
INSTALLATION - SCALE
1:150



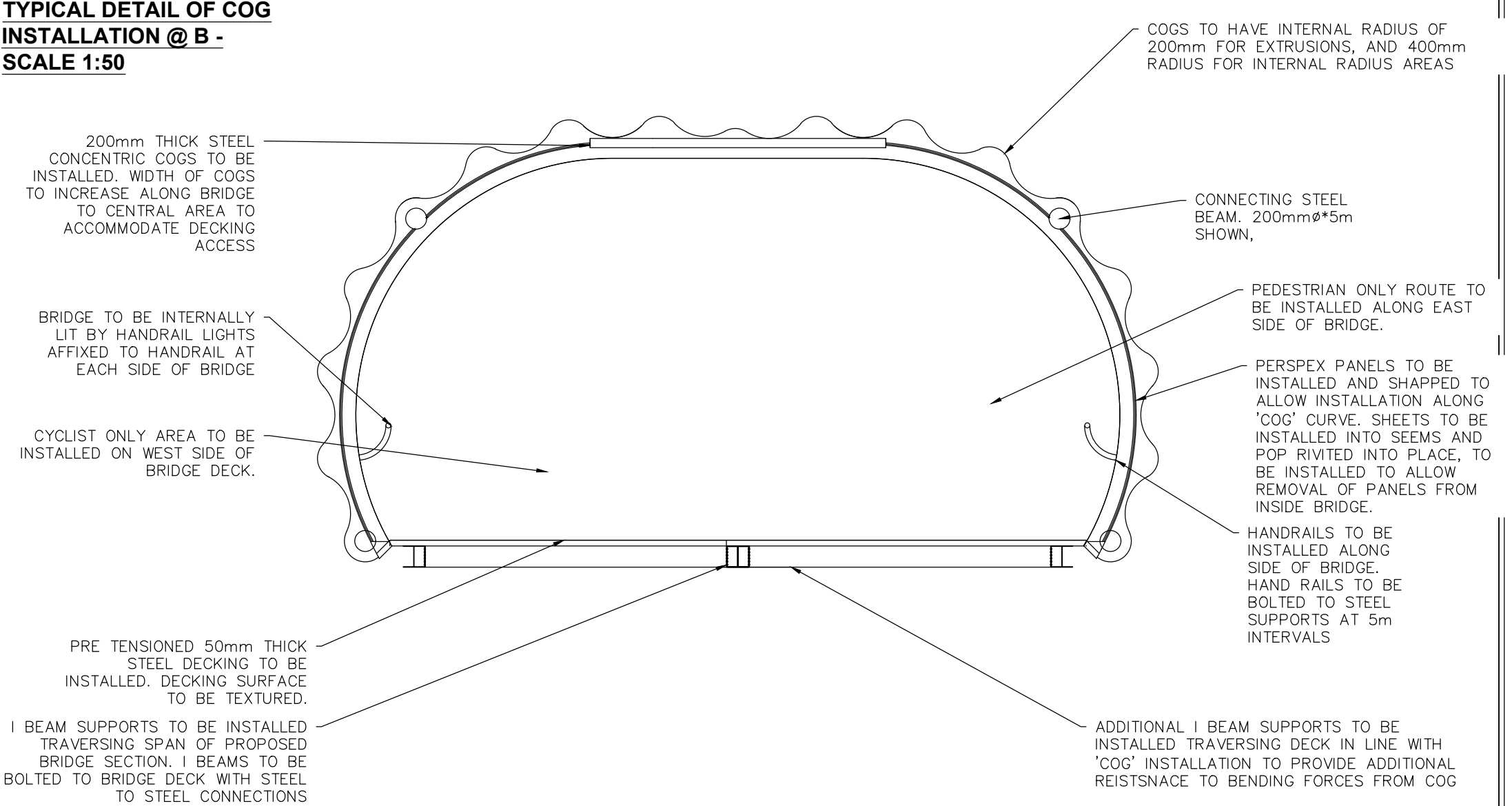
TYPICAL DETAIL OF
BRIDGE DECK - @ A -
SCALE 1:50



TYPICAL DETAIL OF
BRIDGE DECK @ B -
SCALE 1:50



TYPICAL DETAIL OF COG
INSTALLATION @ B -
SCALE 1:50



DRAWING TITLE
PHASE 4 - SECTION 1 - SOUTH- BRIDGE
DESK STEEL WORK INSTALLATION

PROJECT TITLE
ACBA6003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE

DRAWING No.
PED1-SPR-DR-C-0010-S1

DRAWN BY: RM 5/23
CHECKED: XXX X/XX
SCALE: SHOWN

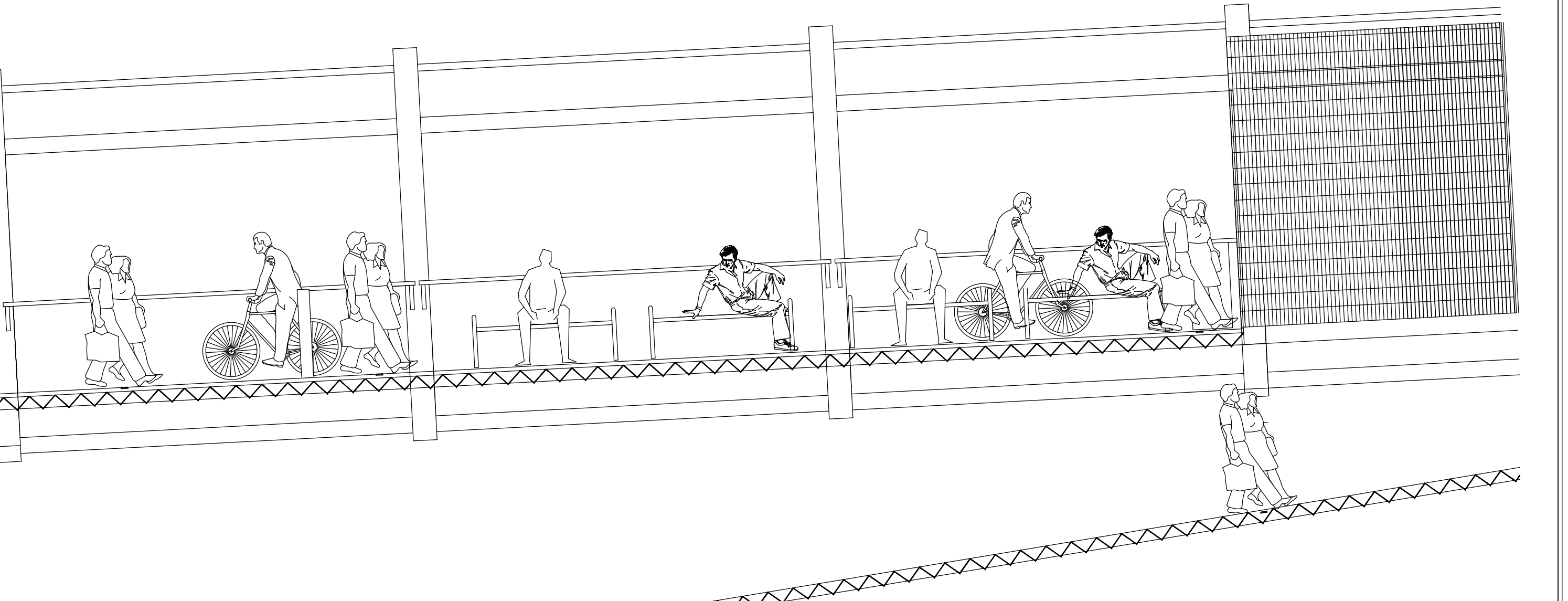
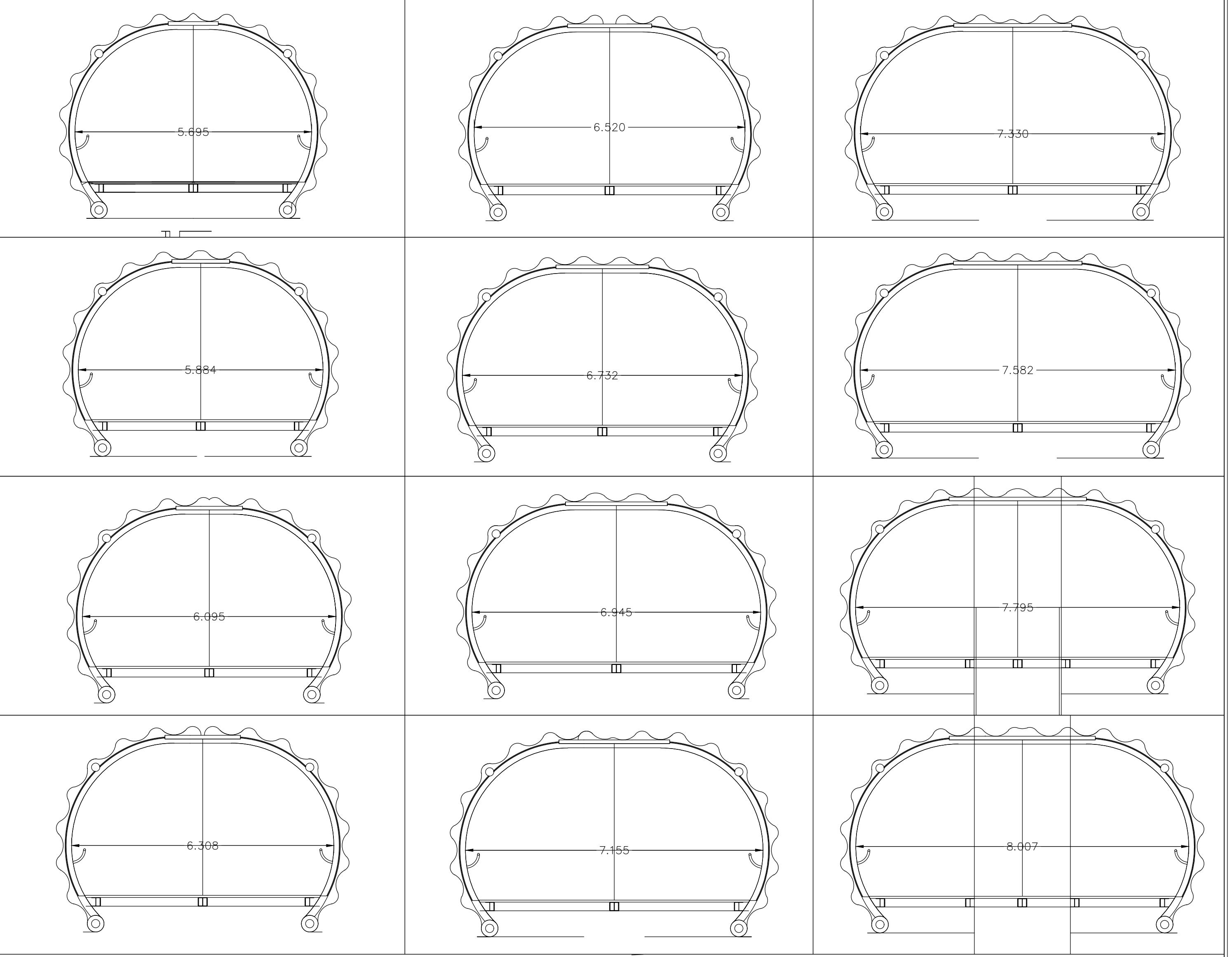
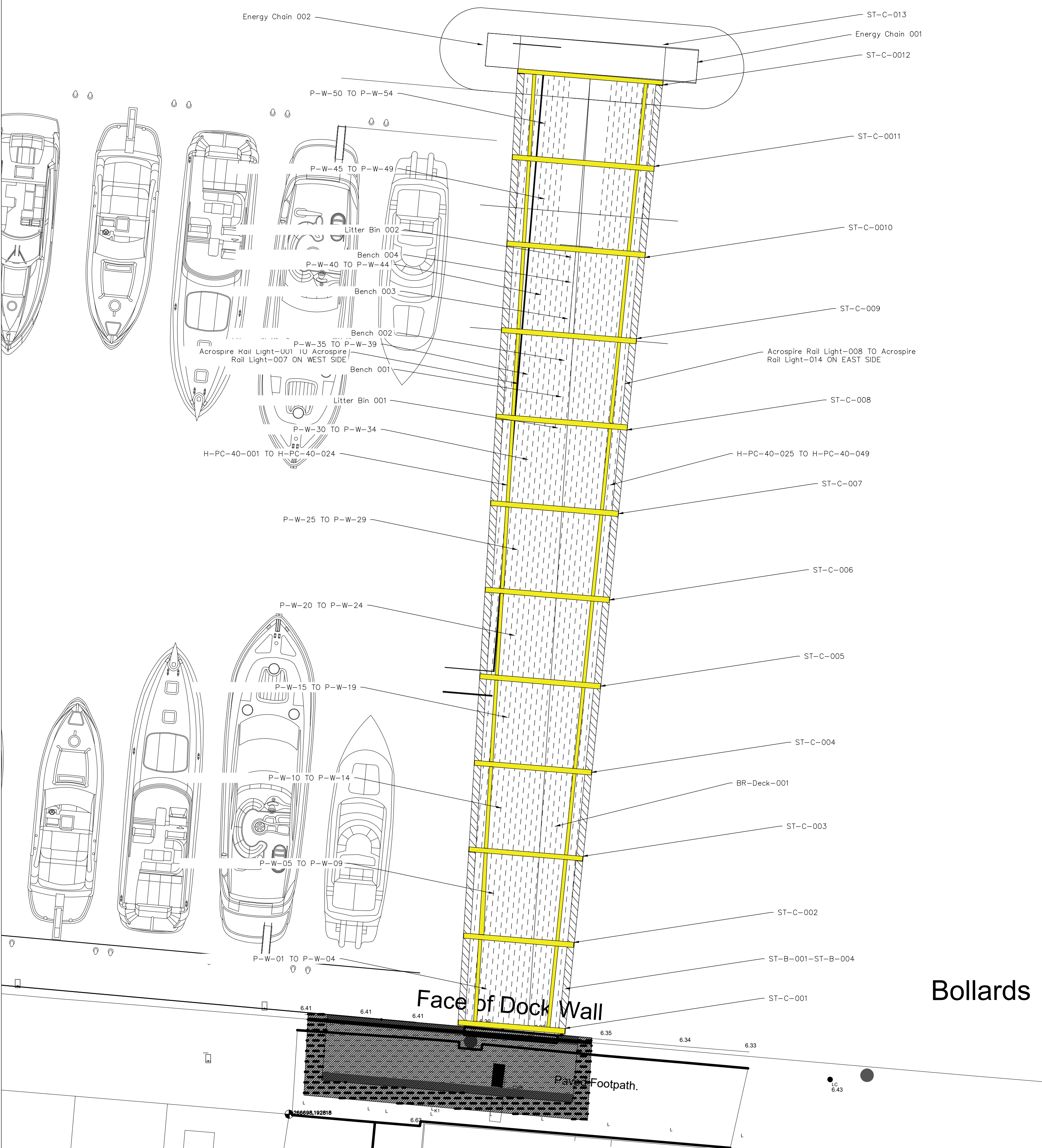
CAD REF.	CAD
PROJECT PHASE	PHASE
REV.	

REV.	DESCRIPTION	BY	DATE

SPRINGFIELD DESIGNS Ltd

BRIDGE INSERT A - SCALE
1:250

Prince of Wales



DRAWING TITLE
**PHASE 4 - PROPOSED BRIDGE LAYOUT,
COG DETAIL AND ASSET LOCATION PLAN**

PROJECT TITLE
**ACBA6003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE**

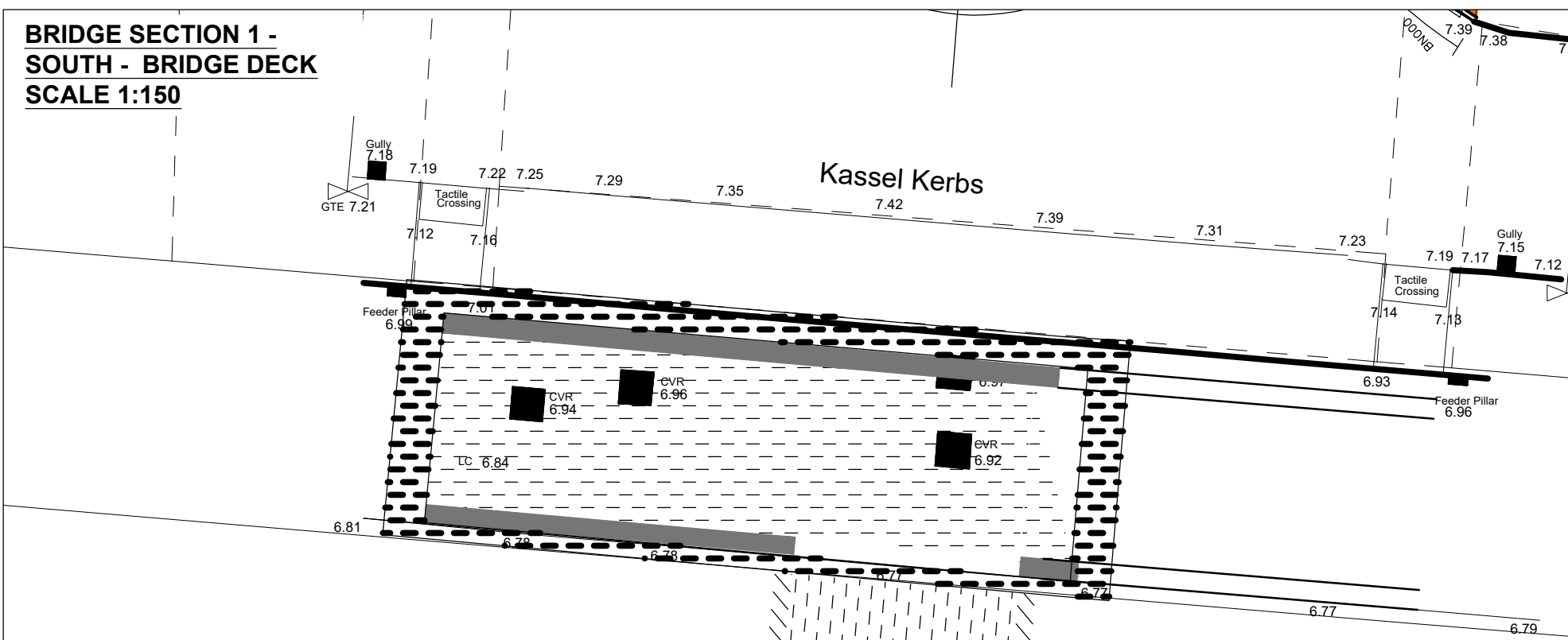
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PED1-SPR-DR-C-0011-S1

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PROJECT PHASE	PHASE
REV.	

REV.	DESCRIPTION	BY	DATE

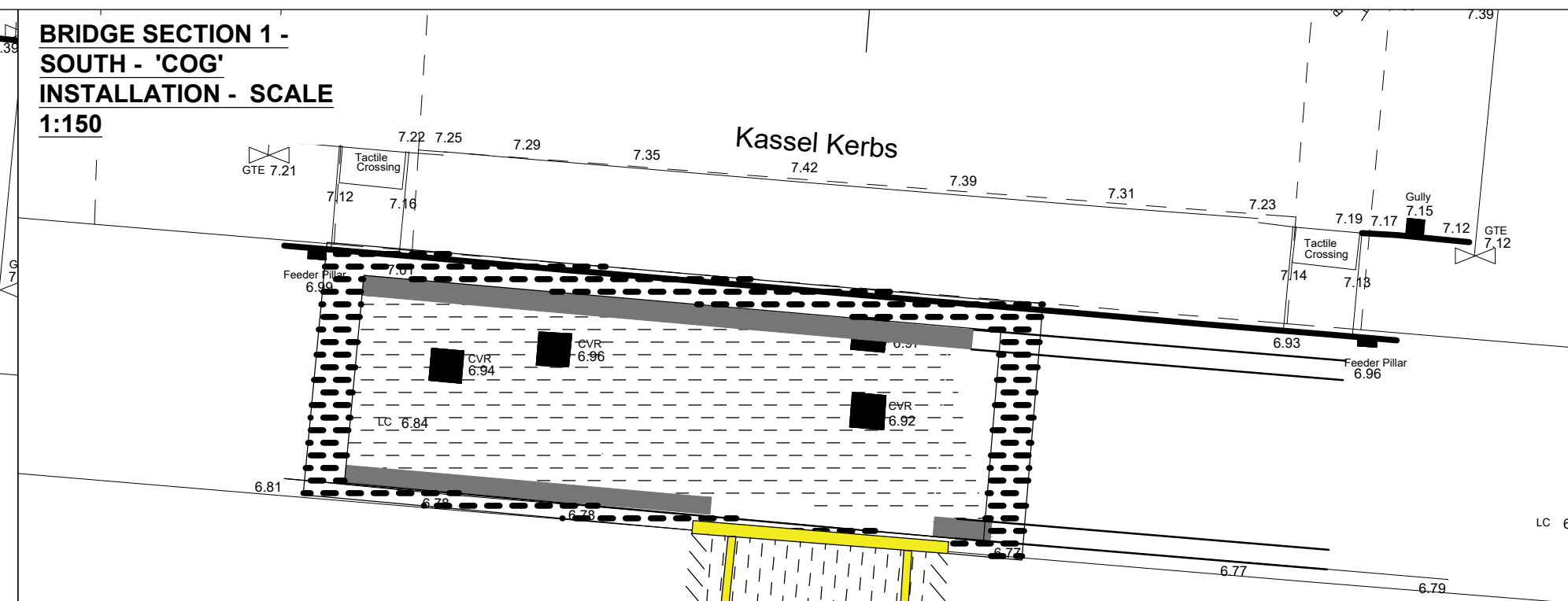
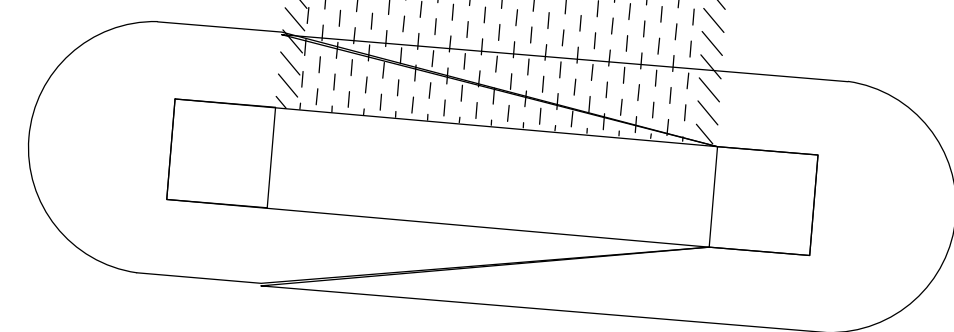
SPRINGFIELD DESIGNS Ltd



Face of Dock Wall

PROPOSED STEEL DECKING TO BE
INSTALLED. DECKING TO BE
INSTALLED BY CRANE LIFTING 60m
SECTION INTO PLACE.

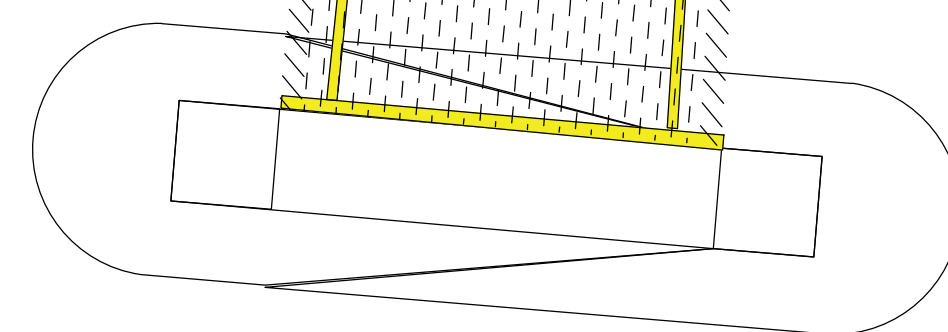
BOLTING LOCATIONS TO BE PREMADE
INTO DECKING TO ALLOW
INSTALLATION OF COD SYSTEM ONCE
DECK HAS BEEN INSTALLED.



Face of Dock Wall

COG SURROUND TO BE INSTALLED
POST DECK INSTALLATION TO ALLOW
EASE OF LIFTING (PENDING
CONSULTATION WITH PRINCIPAL
CONTRACTOR)

PERSPEX WINDOWS TO BE INSTALLED
POST BRIDGE LIFT. INDIVIDUAL
WINDOWS TO BE POP RIVETED INTO
PRE PREPARED SILLS.



DRAWING TITLE

PHASE 4 - SECTION 3 - NORTH- BRIDGE DECK STEEL WORK INSTALLATION

DRAWN BY	RM	11/22	SCALE
CHECKED	xxx	x/xx	SHOWN

PROJECT TITLE

**ACBA6003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE**

CAD REF.

CAD

	PROJECT PHASE
1	Project Initiation
2	Project Planning
3	Project Execution
4	Project Monitoring & Control
5	Project Closure

PH

RE

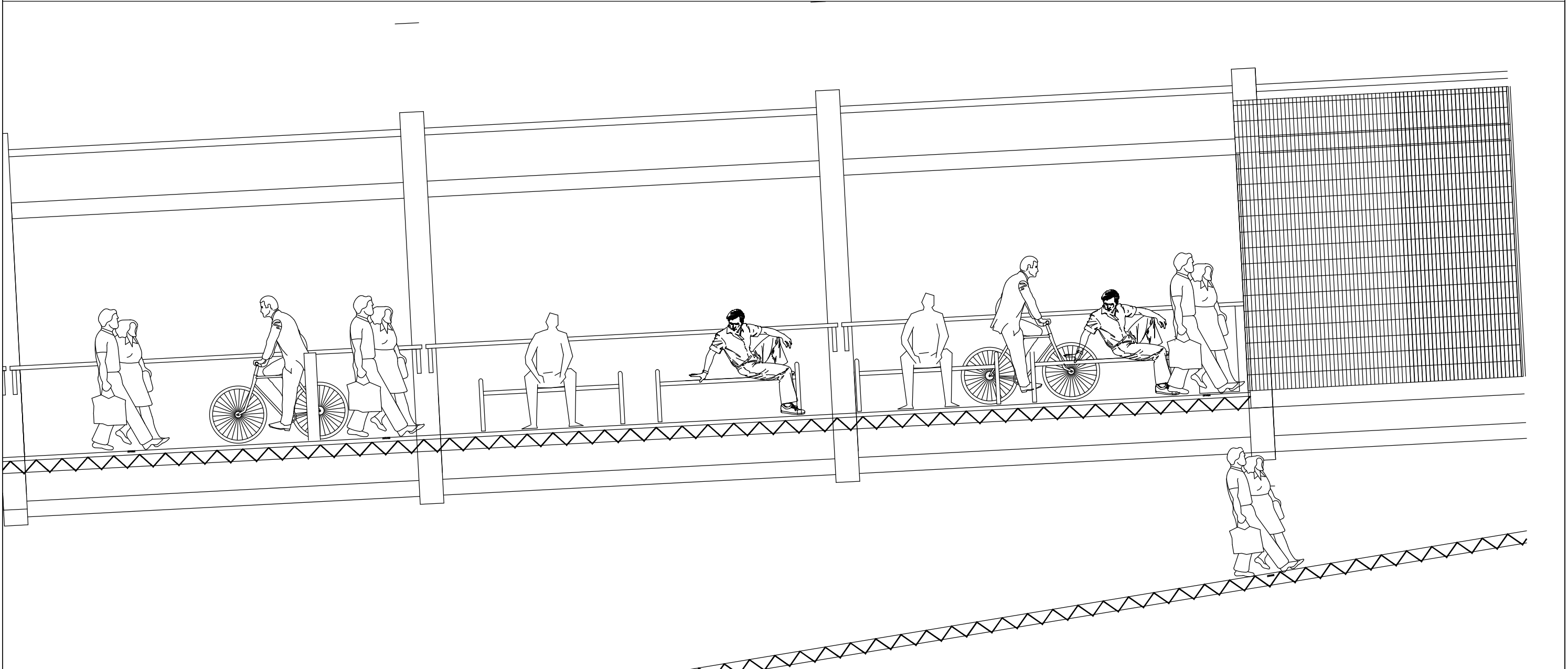
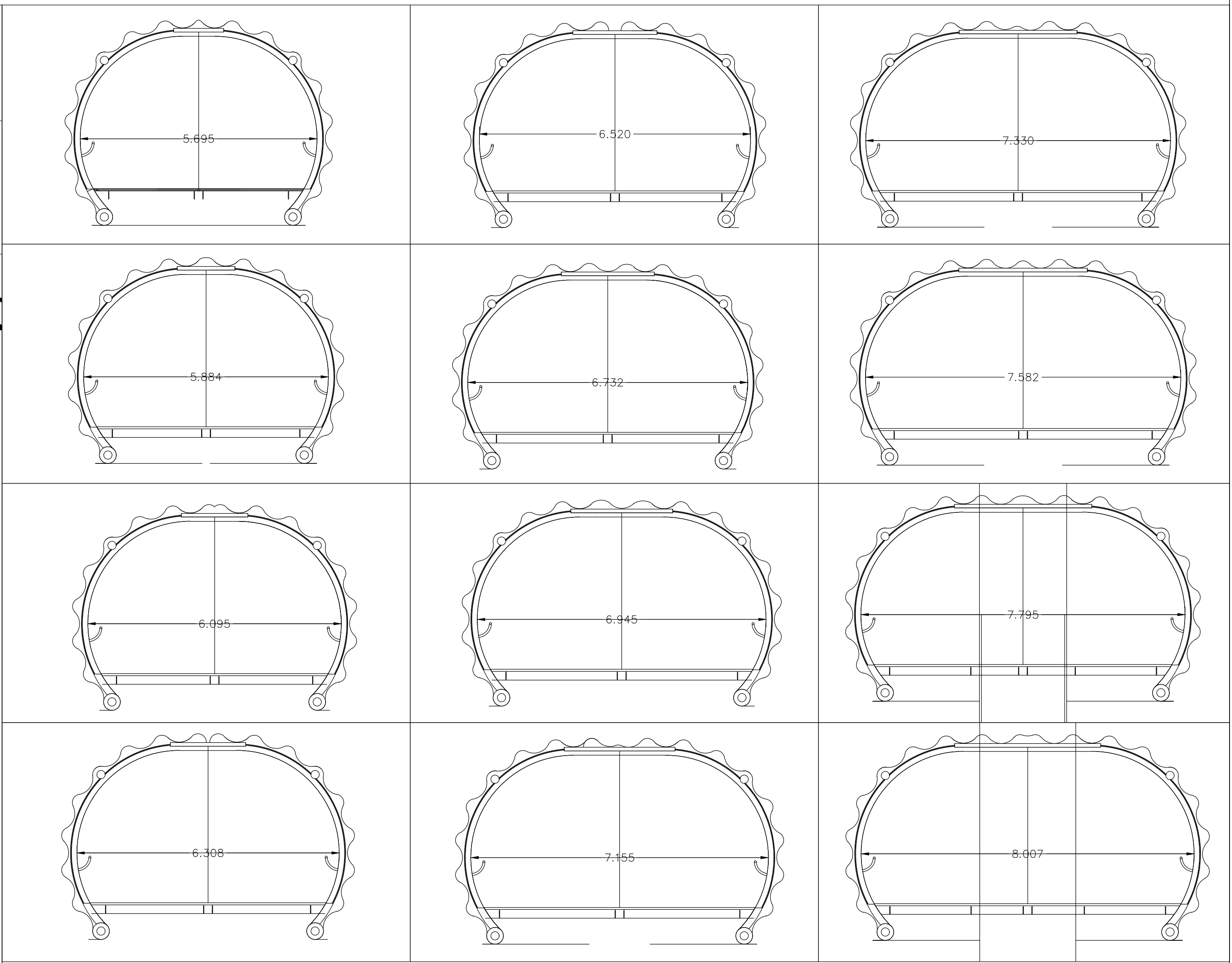
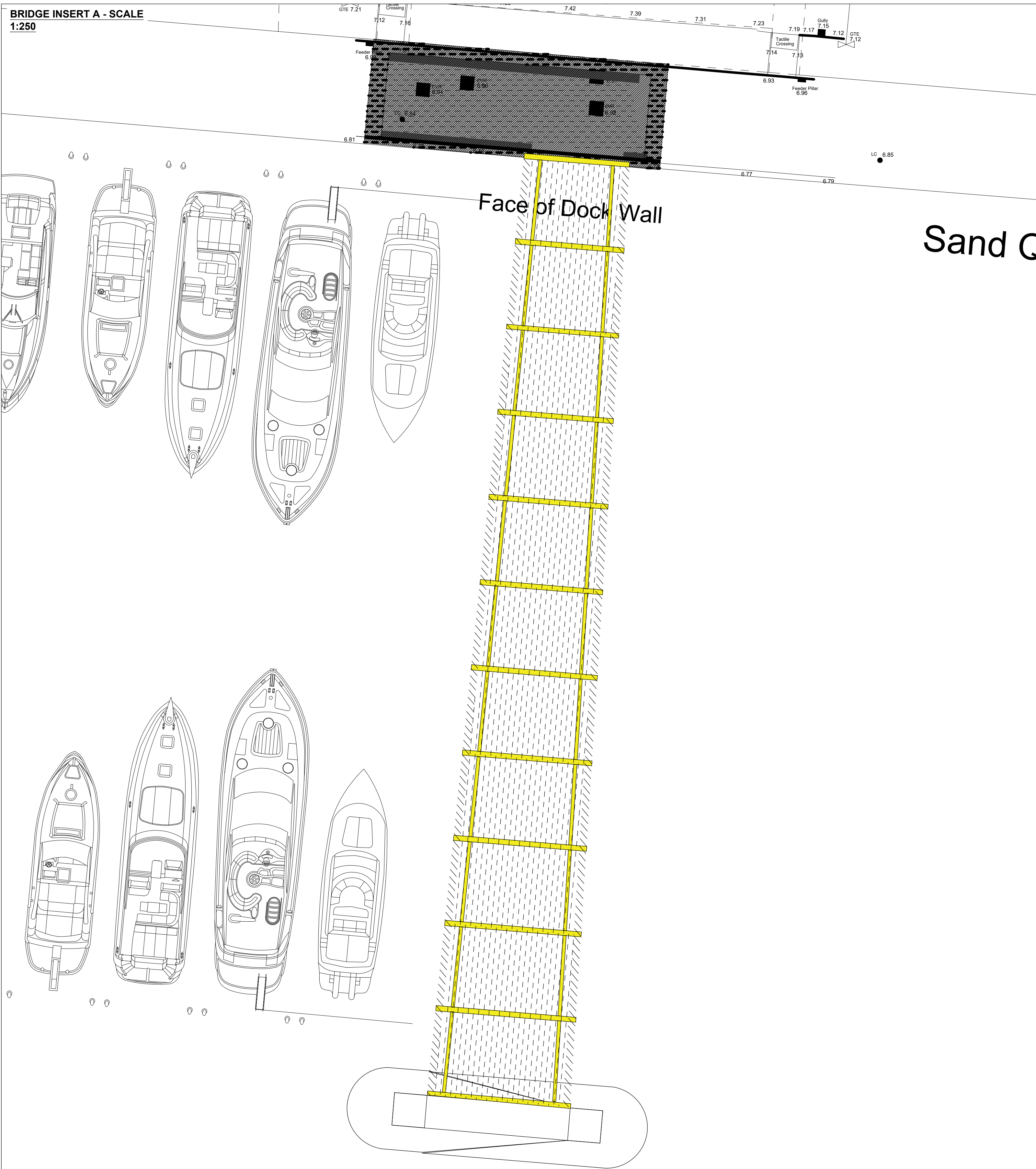
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PED1-SPR-DR-C-0012-S1

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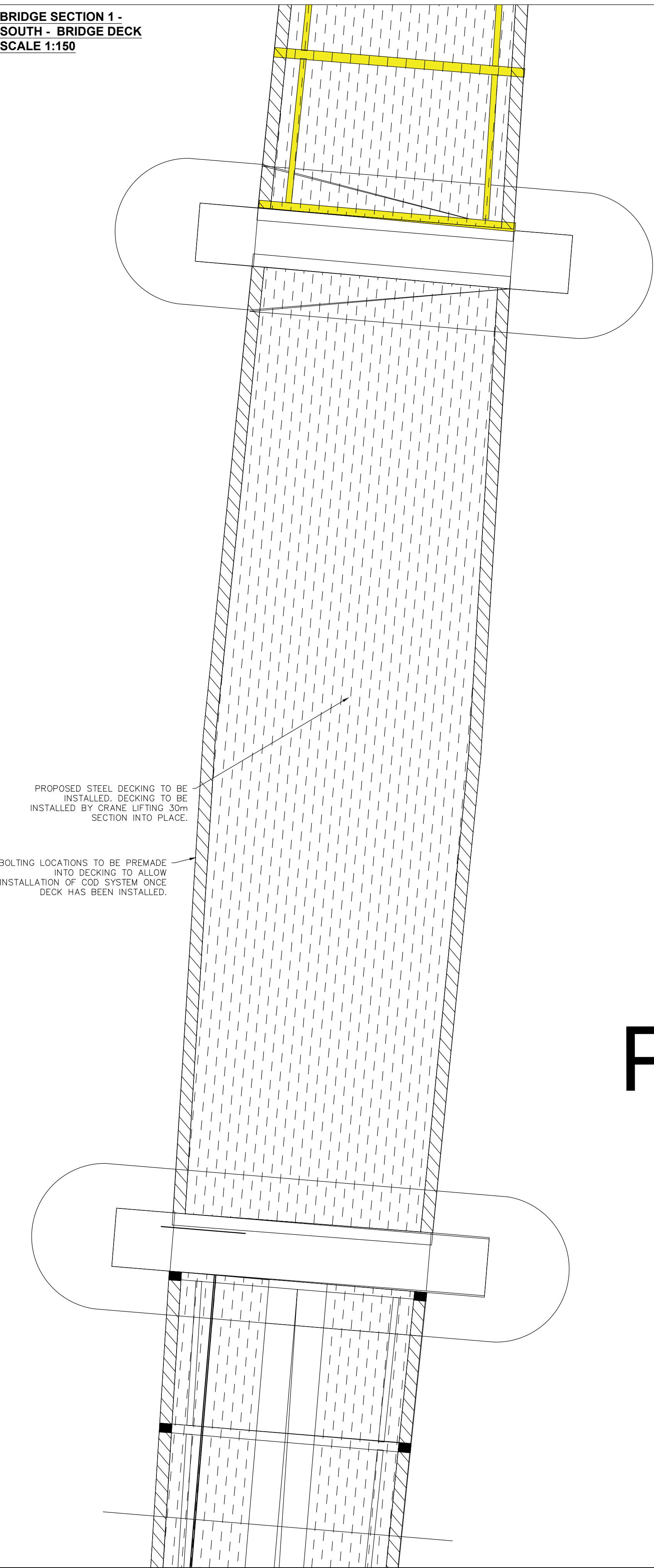
SPRINGFIELD DESIGNS Ltd



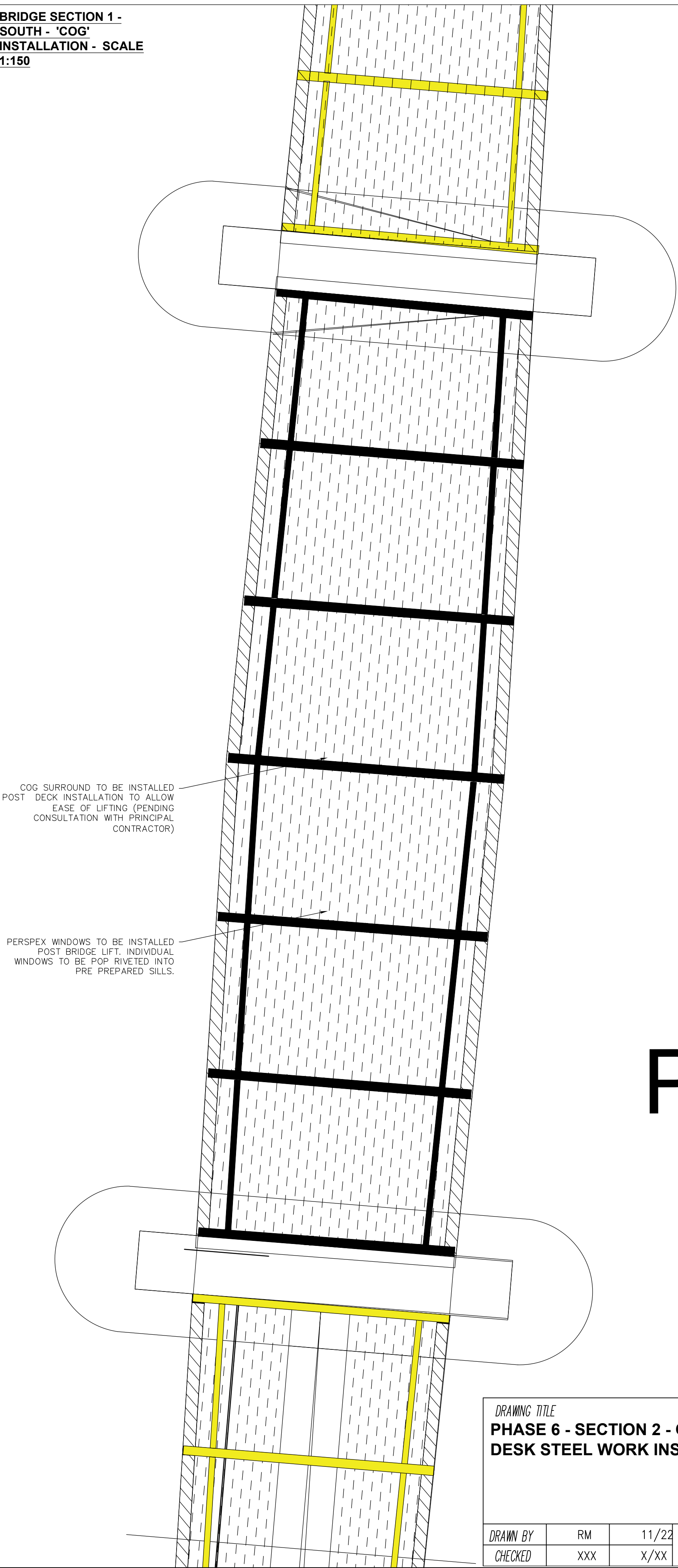
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DRAWN BY		RM	11/22	SCALE		PROJECT		REV.		DESCRIPTION	
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										DATE	

SPRINGFIELD DESIGNS Ltd

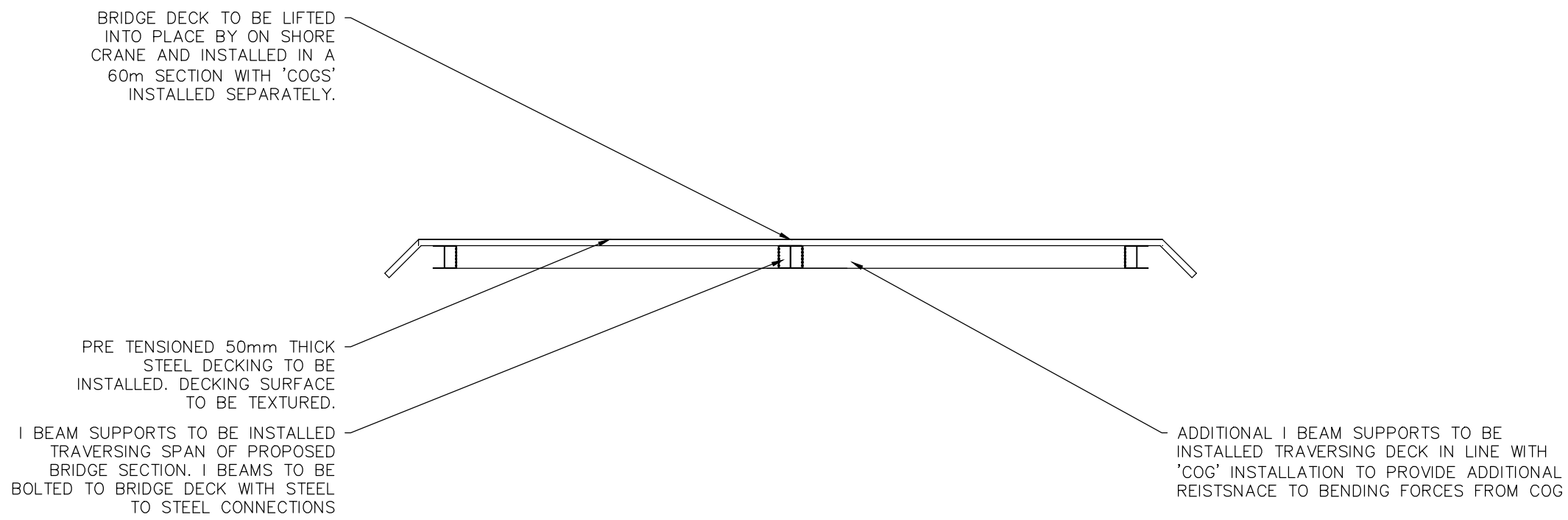
BRIDGE SECTION 1 -
SOUTH - BRIDGE DECK
SCALE 1:150



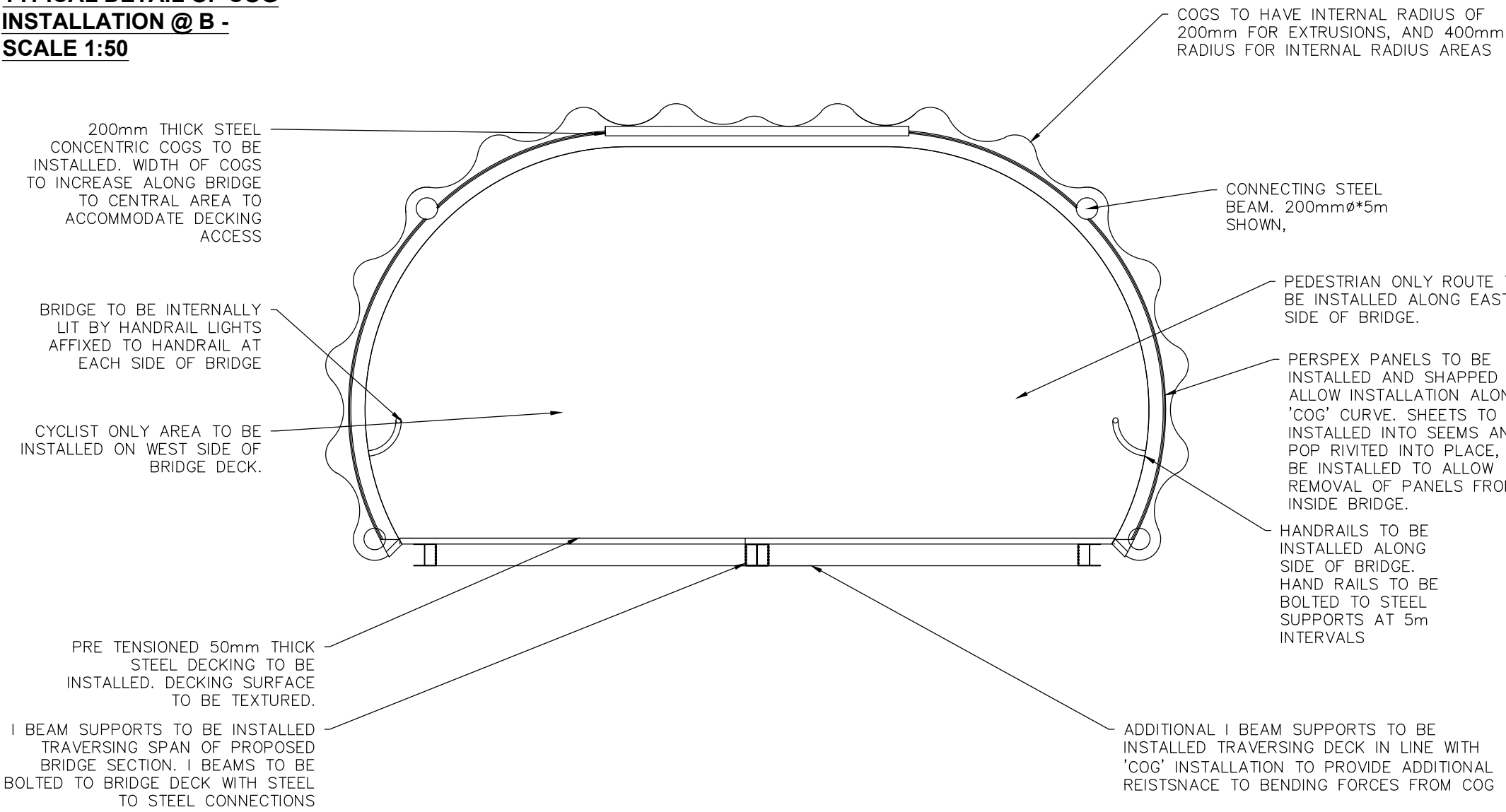
BRIDGE SECTION 1 -
SOUTH - 'COG'
INSTALLATION - SCALE
1:150



TYPICAL DETAIL OF
BRIDGE DECK @ B -
SCALE 1:50



TYPICAL DETAIL OF COG
INSTALLATION @ B -
SCALE 1:50



Prin

Pri

DRAWING TITLE
PHASE 6 - SECTION 2 - CENTRAL- BRIDGE
DESK STEEL WORK INSTALLATION

DRAWN BY	RM	11/22	SCALE	SHOWN
CHECKED	xxx	x/xx		

PROJECT TITLE
ACBA6003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE

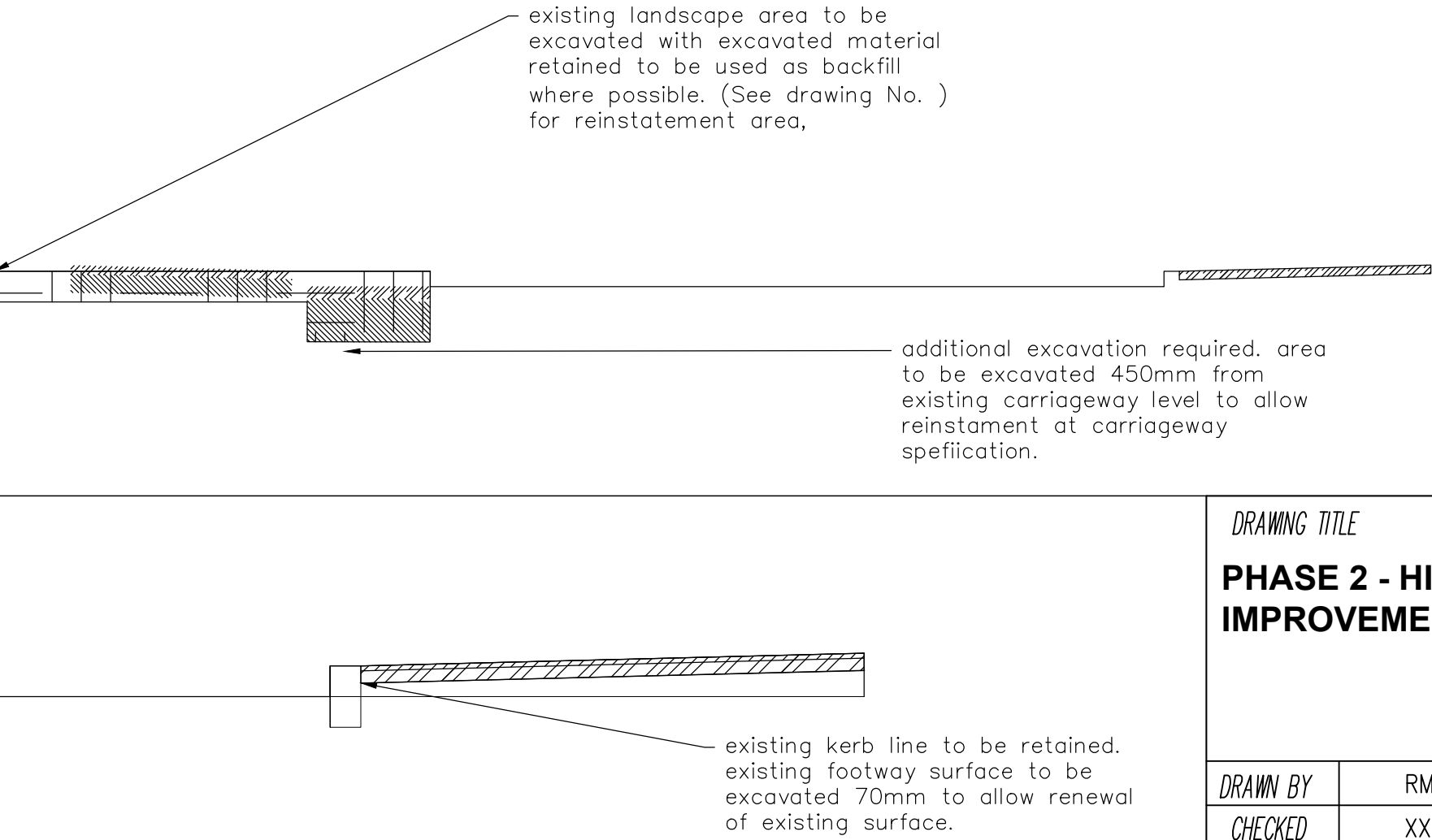
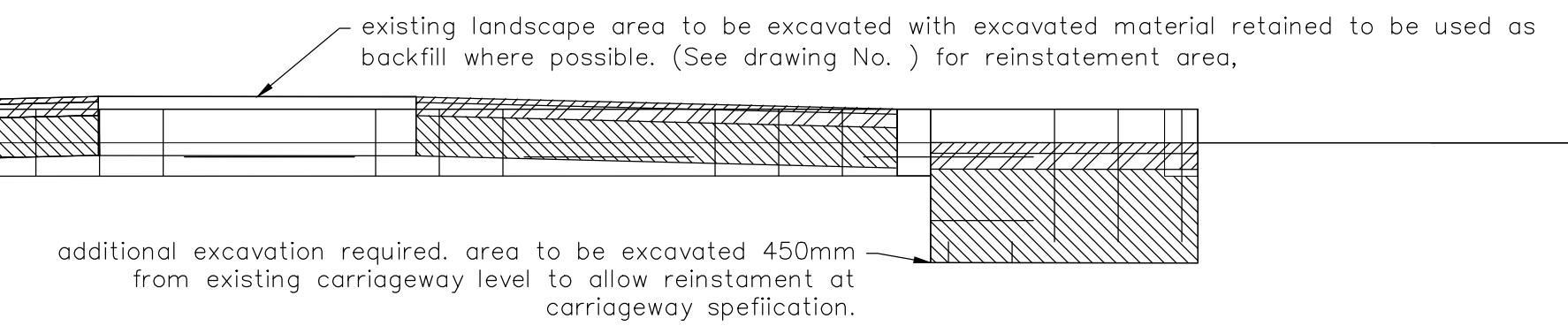
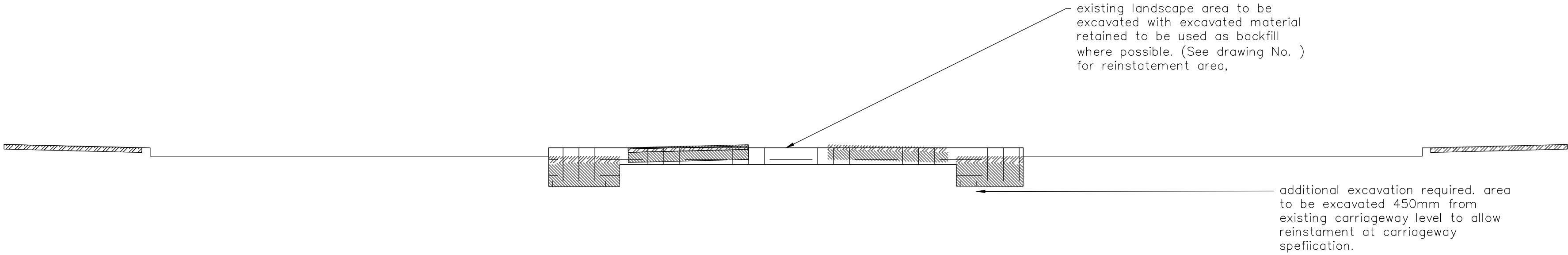
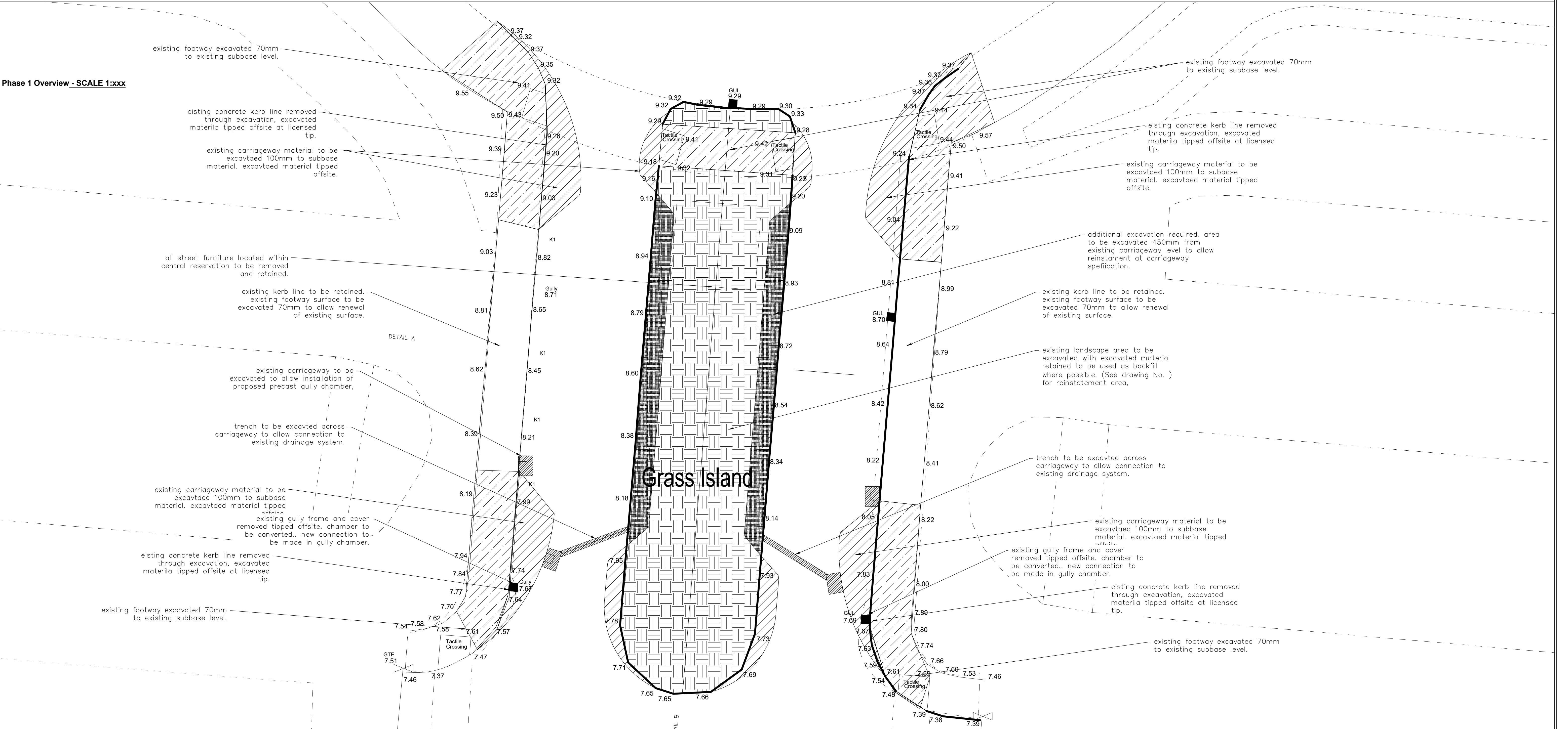
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DRAWING No.
PED1-SPR-DR-C-0014-S1

REV.	DESCRIPTION	BY	DATE

SPRINGFIELD DESIGNS Ltd

Phase 1 Overview - SCALE 1:xxx



DRAWING TITLE
PHASE 2 - HIGHWAY ACCESS
IMPROVEMENT - EXCAVATION PLAN

DRAWN BY	RM	11/22	SCALE	SHOWN
CHECKED	XXX	X/XX		

PROJECT TITLE
ACBA6003 - SPRINGFIELD DESIGNS -
PEDESTRIAN BRIDGE

CAD REF.	CAD	
PROJECT PHASE	PHASE	REV.

DRAWING No.
PED1-SPR-DR-C-0005-S1

REV.	DESCRIPTION	BY	DATE
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