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COCKLE BAY PARK REDEVELOPMENT

APPENDIX DD – LANDBRIDGE STRUCTURAL REPORT

State Significant Development,
Development Application (SSD DA)

Prepared for DPT Operator Pty Ltd and DPPT Operator Pty Ltd

23 September 2021

Revision [C]

ISSUE AUTHORISATION

Rev	Date	Purpose of Issue / Nature of Revision	Prepared by	Reviewed by	Issue Authorised by
A	03/09/21	Issued for SSD DA	JGR	TBB	TBB
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1. Introduction

This report has been prepared to accompany a detailed State Significant Development (SSD) Development Application (DA) (Stage 2) for a commercial mixed use development, Cockle Bay Park, which is submitted to the Minister for Planning and Public Spaces pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The development is being conducted in stages comprising the following planning applications:

- Stage 1 – Concept Proposal setting the overall 'vision' for the redevelopment of the site including the building envelope and land uses, as well as development consent for the carrying out of early works including demolition of the existing buildings and structures. This stage was determined on 13 May 2019, and is proposed to be modified to align with the Stage 2 SSD DA.
- Stage 2 – detailed design, construction, and operation of Cockle Bay Park pursuant to the Concept Proposal.

The Site

The site is located at 241-249 Wheat Road, Sydney to the immediate south of Pyrmont Bridge, within the Sydney CBD, on the eastern side of the Darling Harbour precinct. The site encompasses the Cockle Bay Wharf development, parts of the Western Distributor and Wheat Road, Darling Park and Pyrmont Bridge.

The Darling Harbour Precinct is undergoing significant redevelopment as part of the Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP) including Darling Square and the W Hotel projects. More broadly, the western edge of the Sydney CBD has been subject to significant change following the development of the Barangaroo precinct.

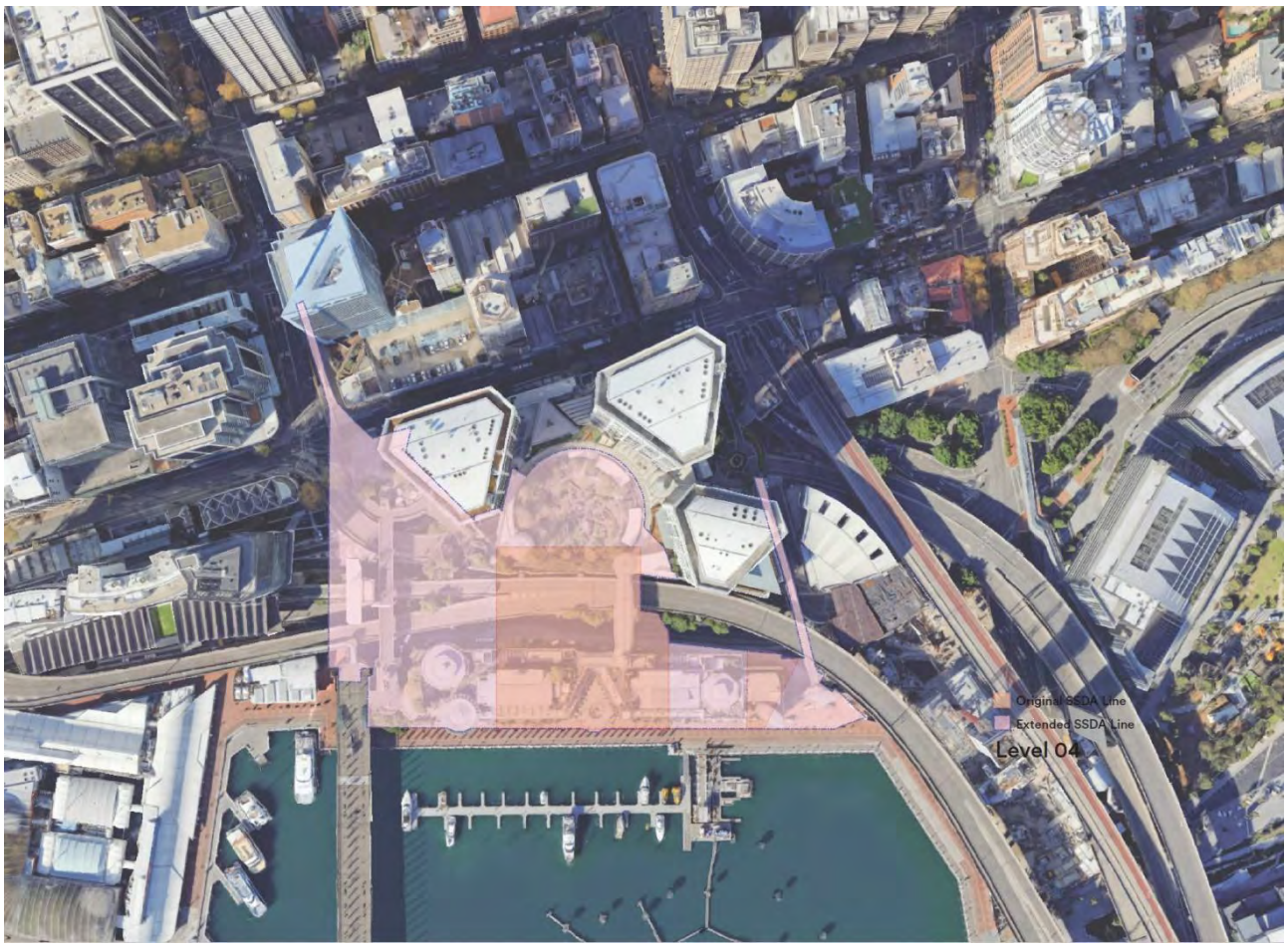


Figure 1 – Location Plan

This report has been prepared in response to the Secretary's Environmental Assessment Requirements (SEARS) dated 12 November 2020 for SSD-9978934. Specifically, this report has been prepared to respond to those SEARS summarised in Table 1.

TABLE 1 - SEARs requirements		
Item	**Description of Requirement**	**Section Reference (this report)**
C24	Western Distributor Future Development Application(s) shall demonstrate compliance with RMS Technical Direction (GTD 2012/001) - Excavation Adjacent to Roads and Maritime Infrastructure.	Section 8
C25	Western Distributor Future Development Application(s) shall include a Geotechnical and Structural Investigation Report considering design and construction methodology	All Sections
C31	CBD Rail Link Future Development Application(s) shall consider the impact of the design and construction of the development on the CBD Rail Link (CBDRL), in consultation with TfNSW and Sydney Trains, and shall address the following matters: a) all buildings and structures and any basement levels, foundations and ground anchors for the development which have a potential impact on the CBDRL, must be designed in accordance with design criteria specified by TfNSW b) allowances for the future construction of railway tunnels in the vicinity of the development c) allowances for future operation of railway tunnels in the in the vicinity of the development especially in relation to noise, vibration, stray currents, electromagnetic fields and fire safety d) consultation with TfNSW and provision to TfNSW of drawings, reports and other information related to the design development e) such other matters which TfNSW consider appropriate or as the Applicant and TfNSW may agree.	Section 9

Landbridge

A significant feature of the Cockle Bay Park redevelopment is the planned landbridge connecting the city on the East to the Harbour on the West. The landbridge will restore a direct link between Pyrmont Bridge and Market St across the Western Distributor and Harbour Street, providing large public plaza and park spaces.

Constructability of the landbridge structure is a key element for design consideration to ensure an efficient and buildable arrangement is provided. The structural system developed for the landbridge predominantly utilises precast concrete elements to minimise onsite construction time and allow the structure to be built through night possessions of the Western Distributor. The precast structure

also has the benefit of good inherent fire resistance and durability requiring minimal maintenance over the design life of the structure.

Due to the structure being constructed over the road corridor, the landbridge structure is to be designed and constructed in accordance with Transport for NSW (TfNSW) requirements. Regular consultation with TfNSW has occurred throughout the EIS process to progress the approval of the landbridge design. The consultation process with TfNSW has been positive and collaborative and is working towards execution of a Works Authorisation Deed (WAD) with TfNSW.

The Landbridge structure abuts the existing Darling Park development which will require integration of vertical structure to support the landbridge. Construction of new structure supported off the existing structure at Crescent Garden will facilitate connection to the Landbridge and provide a single contiguous space.

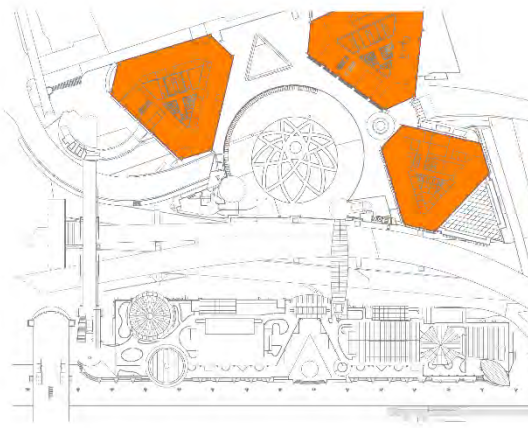
Figure 2 – Existing Site Context

Figure 3 – Proposed Landbridge Footprint with Beam Outlines

2. Landbridge Context

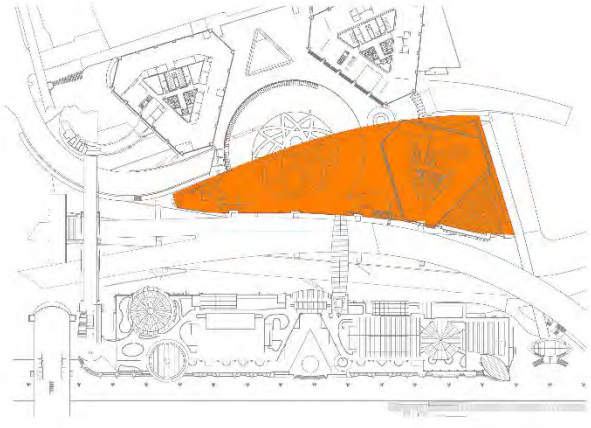
Darling Park Towers

Commercial towers DP1, DP2 & DP3 situated to the East



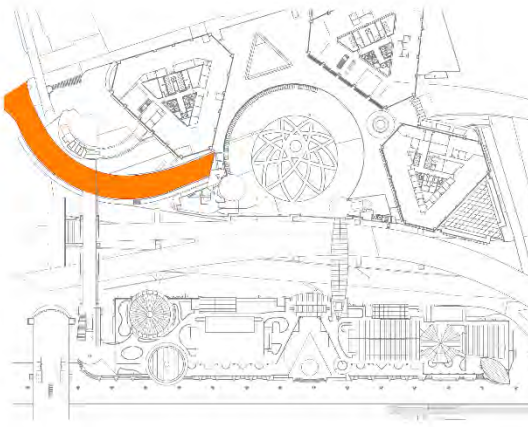
Darling Park Car Park

Existing three level carpark. New landbridge columns placed to minimise impact to operation.



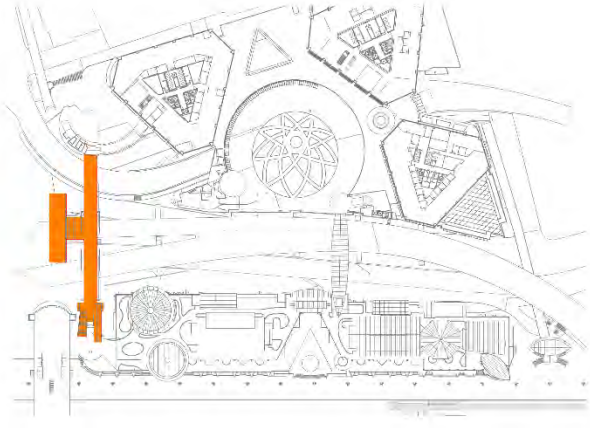
Market St Ramp

Vehicle clearance heights above ramp influence landbridge SSL



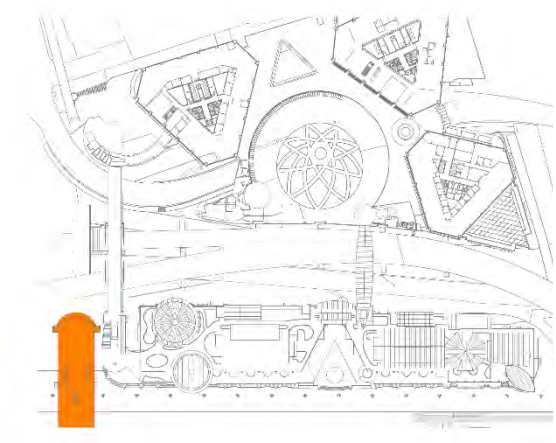
Monorail Station & Pedestrian Bridge

To be demolished. Existing foundation beams and pads to be demolished. Landbridge foundations placed to avoid existing piles.



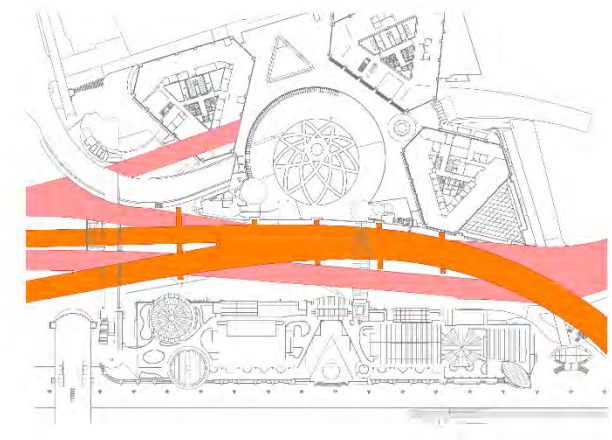
Pyrmont Bridge

Heritage structure situated to the Northwest. New stairs and escalator support structure to be integrated with existing structure.



Western Distributor Network

Elevated viaduct (WD) and on grade road (Harbour St) network



In-Ground Services

Detailed survey of existing in ground services on-going. All proposed structure and foundations located to minimise excavation and relocation works.

3. Structural Design Criteria

Standards

Design standards applicable to the proposed structure are outlined below.

Structures within TfNSW Portion:

- AS/NZS 3845.1:2015 - Road Safety Barrier Systems and Devices - Road safety barrier systems
- AS 5100.1:2017 - Bridge design - Scope and general principles
- AS 5100.2:2017 - Bridge design - Design loads
- AS 5100.3:2017 - Bridge design - Foundation and soil-supporting structures
- AS 5100.4:2017 - Bridge design - Bearings and deck joints
- AS 5100.5:2017 - Bridge design – Concrete
- AS 5100.6:2017 - Bridge design – Steel and composite construction
- BTD 2008/07 – Design of bridge supports for collision load from road traffic
- GTD 2020/001 - Excavation adjacent to Transport for NSW Infrastructure

Structures outside of TfNSW Portion:

- AS/NZS 1170.0:2002 - Structural design actions - General principles
- AS/NZS 1170.1:2002 (R2016) - Structural design actions - Permanent, imposed and other actions
- AS/NZS 1170.2:2021 - Structural design actions - Wind actions
- AS 1170.4:2007 (R2018) - Structural design actions - Earthquake actions in Australia
- AS 2159:2009 - Piling - Design and installation
- AS 3600:2018 - Concrete structures
- AS 3700: 2018 - Masonry Structure
- AS 4100:2020 – Steel structure
- AS 4678:2002 - Earth Retaining Structures

Design Life

- 100-year design life for landbridge superstructure, substructure and foundations immediately adjacent over the Western Distributor (AS5100:2017)
- 50-year design life for all other structures (AS 3600:2018, AS 3700:2018, AS 4100:1998 (R2016))

Importance Level

- All structural elements to be designed for Importance Level 3 (NCC Volume 1 Table B1.2a)

Durability

- All structural elements to be designed for the following exposure conditions for the appropriate design life nominated above:
    - External areas – B1
    - In Ground – B2

Fire

The fire engineering requirement for protection of the landbridge structure was informed by a risk assessment process which addressed the transport of dangerous goods on the Western Distributer roadway underneath.

The landbridge structure must achieve a minimum Fire Resistance Level of 4 hours to the ISO fire curve or 2 hours to the Modified Hydrocarbon curve (HCinc), whichever is the worst.

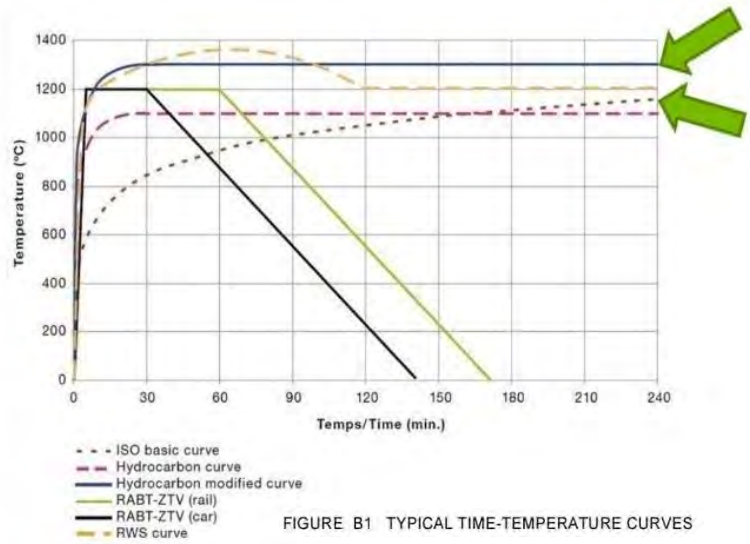


Figure 4 – Time Temperature Curves for Fire Analysis

Earthquake

The analysis and design of all structural elements will be in accordance with AS/NZS 1170.0 (2002) – General Principles, AS 1170.4 (2007) – Earthquake Actions in Australia, AS5100 (2017) – Bridge Design, and AS3600 (2018) – Concrete Structures.

Design Life [AS5100]	100-years[1]
Importance Level [BCA Table B1.2a]	3
Probability Factor (kp) [AS1170.4]	1.3
Hazard Factor (Z) [AS1170.4]	0.08
Site sub-soil Class [AS1170.4]	De[2]
Earthquake Design Category (EDC) [AS1170.4]	h_n < 50m: EDC II h_n > 50m: EDC III

Note:

1) Applies to landbridge superstructure, substructure and foundations immediately adjacent and over the Western Distributor only.
2) Geotechnical advice on site sub-soil classification is from a partially completed geotechnical investigation and is subject to further refinement with a detailed site investigation for the project, and may be improved based on findings of these investigations.

Impact

All columns and supporting elements for the Landbridge designed in accordance with AS 5100 – Bridge Design and BTD2008/07 – Design of bridge supports for collision load from road traffic. Design considers vehicular collision requirements for those columns within the road corridor.

General Loading

OCCUPANCY	OCCUPANCY TYPE TO AS1170.1	DEAD LOAD (kPa / kN)	LIVE LOAD (kPa / kN)
Lobby	C3	3.5 / -	4.0 / 4.5
Paving	C3	5.0 / -	5.0 / 4.5
Light Planting (300mm Soil)	C3	8.0 / -	5.0 / 4.5
Medium Planting (600mm Soil)	C3	15.0 / -	5.0 / 4.5
Heavy Planting (1200mm Soil)	C3	27.0 / -	5.0 / 4.5
Trees	-	- / 40	-
Podium Transfer Columns	-	VARIES	VARIES

The landscape design loading applied to the landbridge structure is shown below.

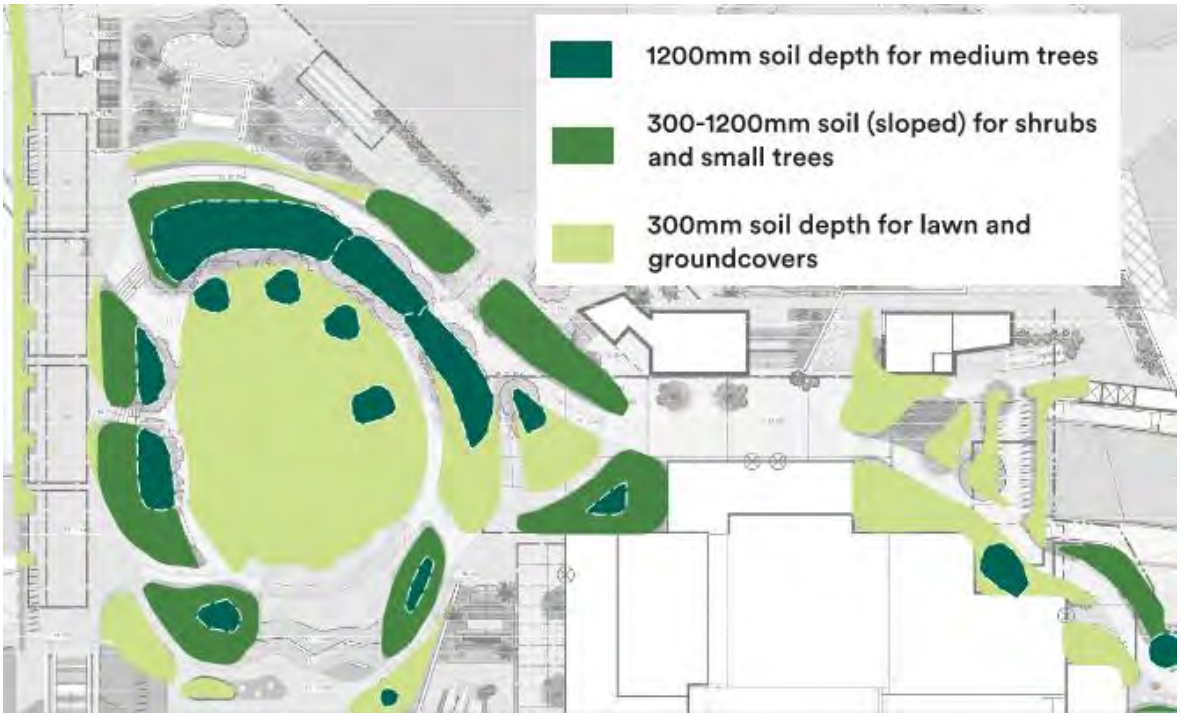


Figure 5 – Landscape Loading Diagram

Deflection Criteria

Element	DEAD	LIVE	INCREMENTAL	TOTAL
Precast Floors over Western Distributor	Span/360	Span/500		Span/300
Transfer Beams over Western Distributor			Span/1000	Span/500

4. Structural Surface

The direct load carrying structure consists of precast beams with a modified Super-T shape which span the roadway onto headstock supports. An in-situ topping slab is proposed to be cast over the precast beam elements, creating a continuous structural surface onto which waterproofing and finishes can be applied.

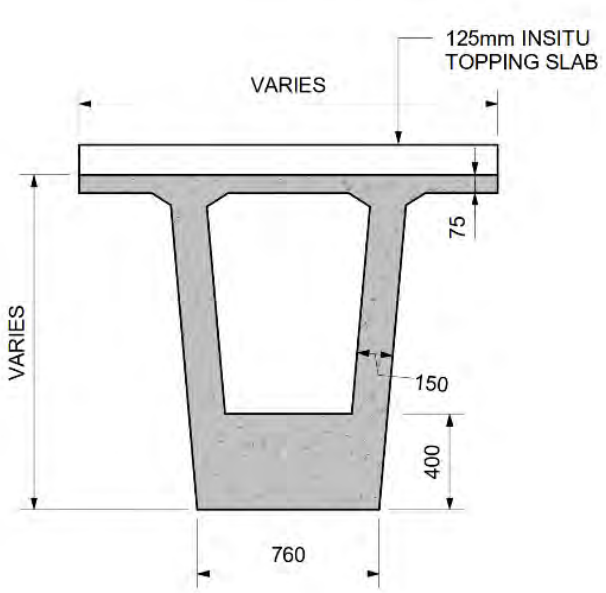


Figure 6 – Precast Beam Section

Precast Beams

Beams spanning the roadway have spans ranging from 5m to 40m with the majority spanning 35m whilst maintaining a minimum clearance to the road below. Off-site fabrication of the beam elements within the road corridor is a hard design constraint since formwork cannot be installed off the road surfaces under, which must remain operational during construction.

The proposed beam type is a modified closed Super-T profile precast with prestressing in the bottom flange and a flat top surface. The sections typically have a constant cross section with a central void and solid shear blocks at each end.

- Typical beams have a large bottom flange to fit the required number of pre-stressing strands and a 75mm thickness top surface.
- High road levels to the South require a zone of tapered beams, with the beam bottom surface inclined to provide the required clearance at critical pinch points.
- A cantilevered zone at the South-West requires beams with an enhanced top flange to accommodate large amounts of top stressing

The void in the middle of the beam has an inherent efficiency in reducing the overall concrete volume in the non-critical region of the cross-section, therefore reducing mass requiring support and enabling installation using fixed cranes. The flat top surface will provide a working surface immediately after beam installation, increasing site safety and productivity.

The beam depths and spacing have been optimised for the load applied to each one, since there is no load path for sharing to adjacent planks. The typical arrangement of beams is 1.75m centre-to-centre spacing using a 1400mm deep precast section.

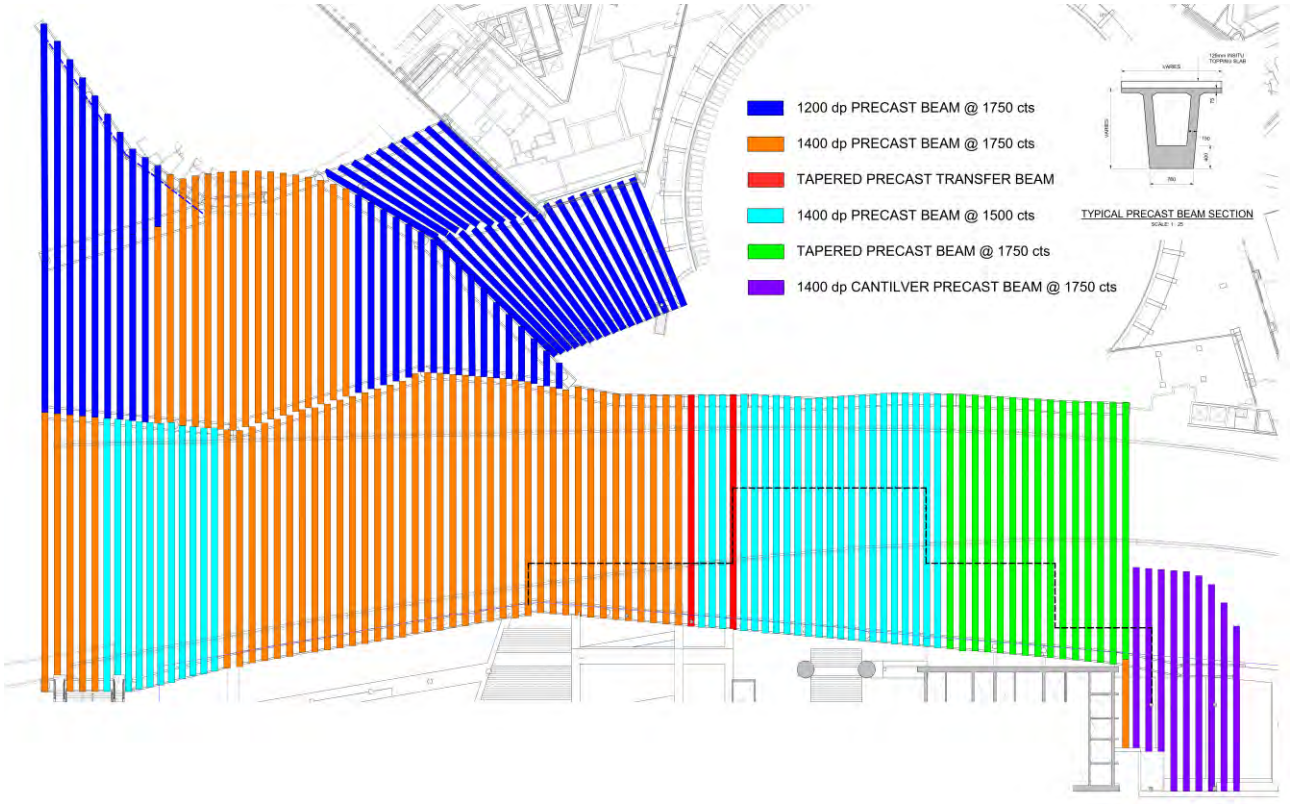


Figure 7 – Precast Beam Plan

Topping Slab

A 125mm thick cast in-situ topping slab is proposed over the entire top surface of the beams, creating a continuous structural surface. The beams themselves will be laid to falls, with a minimum 1% to suit the drainage design and ensure the topping slab can remain a constant thickness.

The combined topping slab and precast beam top surface will form an essential part of the diaphragm system which distributes horizontal loading to the lateral support walls.

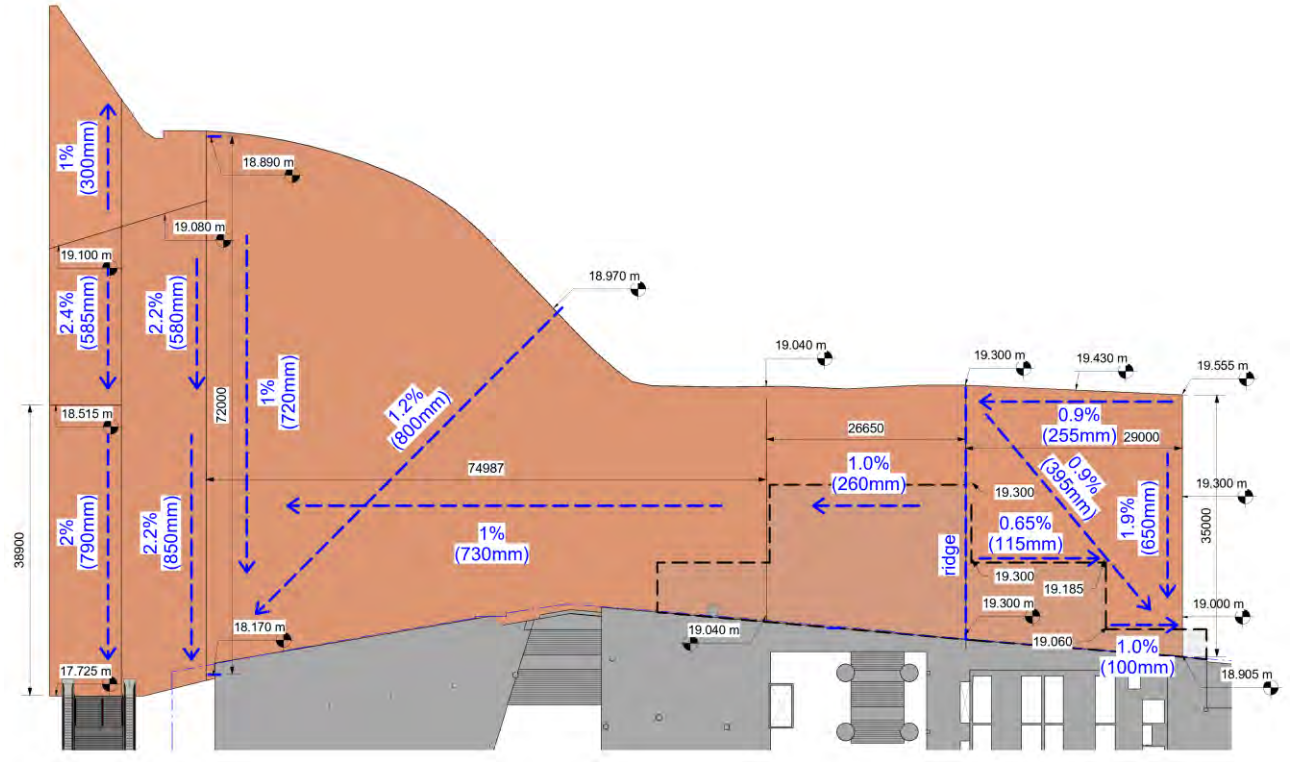


Figure 8 – Indicative Surface Falls for Drainage

Fire treatment

Requirements for protection of concrete with respect to the ISO fire curve are included in AS3600, with an appropriate level of cover to reinforcement provided in design calculations and additional heat analysis of the structure not required.

Assessment methods for concrete with respect to the HCinc curve are as outlined in AS5100. A time temperature analysis of the unprotected beam cross section was carried out and highlighted the need for additional mitigation of heat effects, with the proposed solution being application of a cementitious protection layer, such as CAFCO Fendolite, or similar. Adopting a fire protection solution will also limit damage to the structure during a fire and is recommended over increased cover, which will require significant structural remediation post-fire.

Noting these fire events are ultimate design criteria, it is expected that the concrete immediately exposed to the fire will undergo significant damage if unprotected and require structural remediation to remove and re-instate the damaged concrete.

Movement Joints and Bearings

The structural system has been planned to allow movement of the existing Darling Park Buildings supporting the landbridge to occur independently of each other, with no lateral load path created by tying adjacent buildings together.

Movement joints are located on the Eastern edge of the Northern Park and Park Plaza, on the Darling Park interface. Columns and headstocks will be cast into the existing structure and will gain restraint from these. Bearings will be installed under the precast beams on the support headstocks and will be designed as free-floating bearings to allow movement in both directions.

Due to the size of the landbridge in the North-South direction a permanent movement joint has been introduced and carried through the podium structure. Completely independent vertical and lateral support structure has been planned for the two halves.

TfNSW have nominated that access to all elements associated with the Landbridge which require maintenance should be designed to allow this maintenance to be undertaken from outside of the road corridor wherever possible. For this reason, the location of all bearings supporting the Landbridge along its eastern edge will allow access to be obtained from within the existing Darling Park structure.

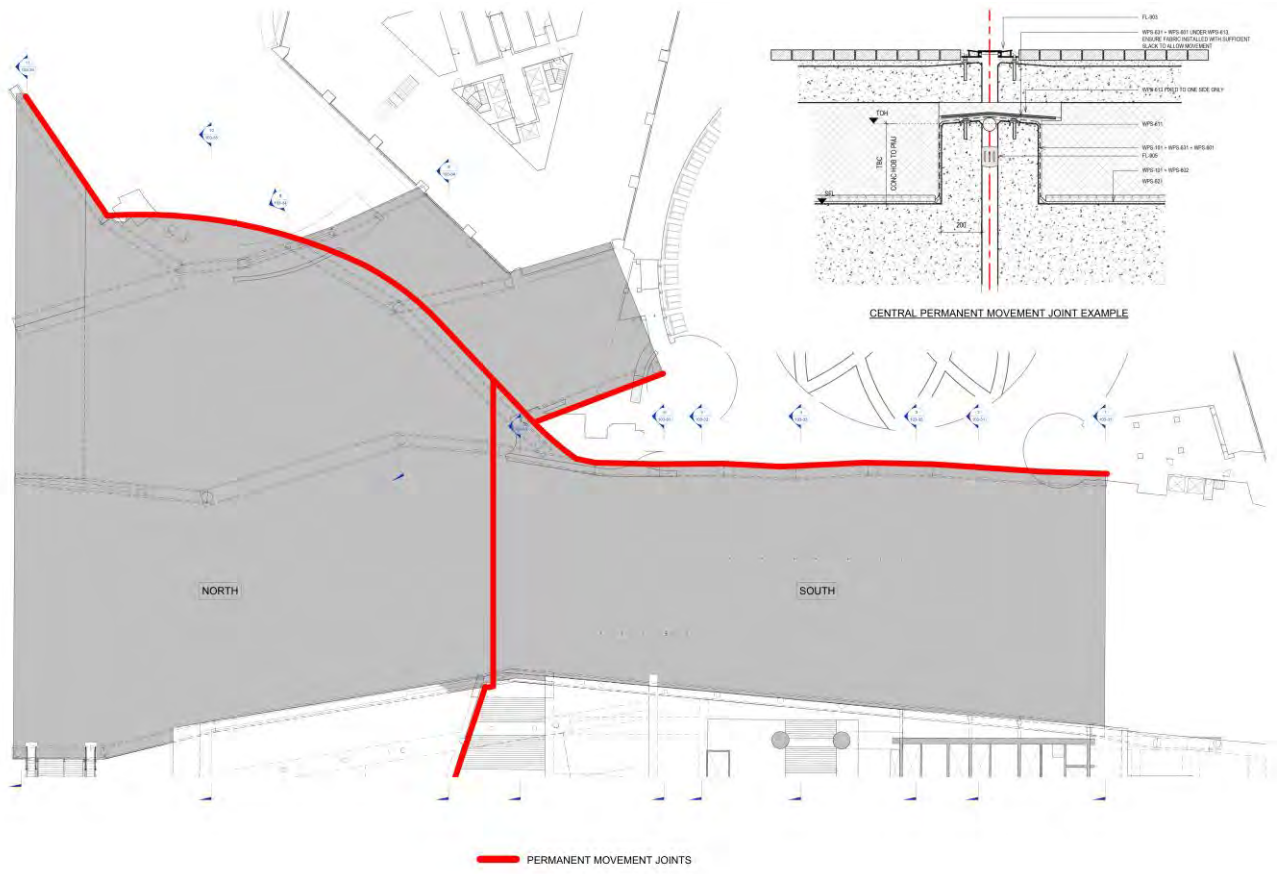


Figure 9 – Movement Joint Plan

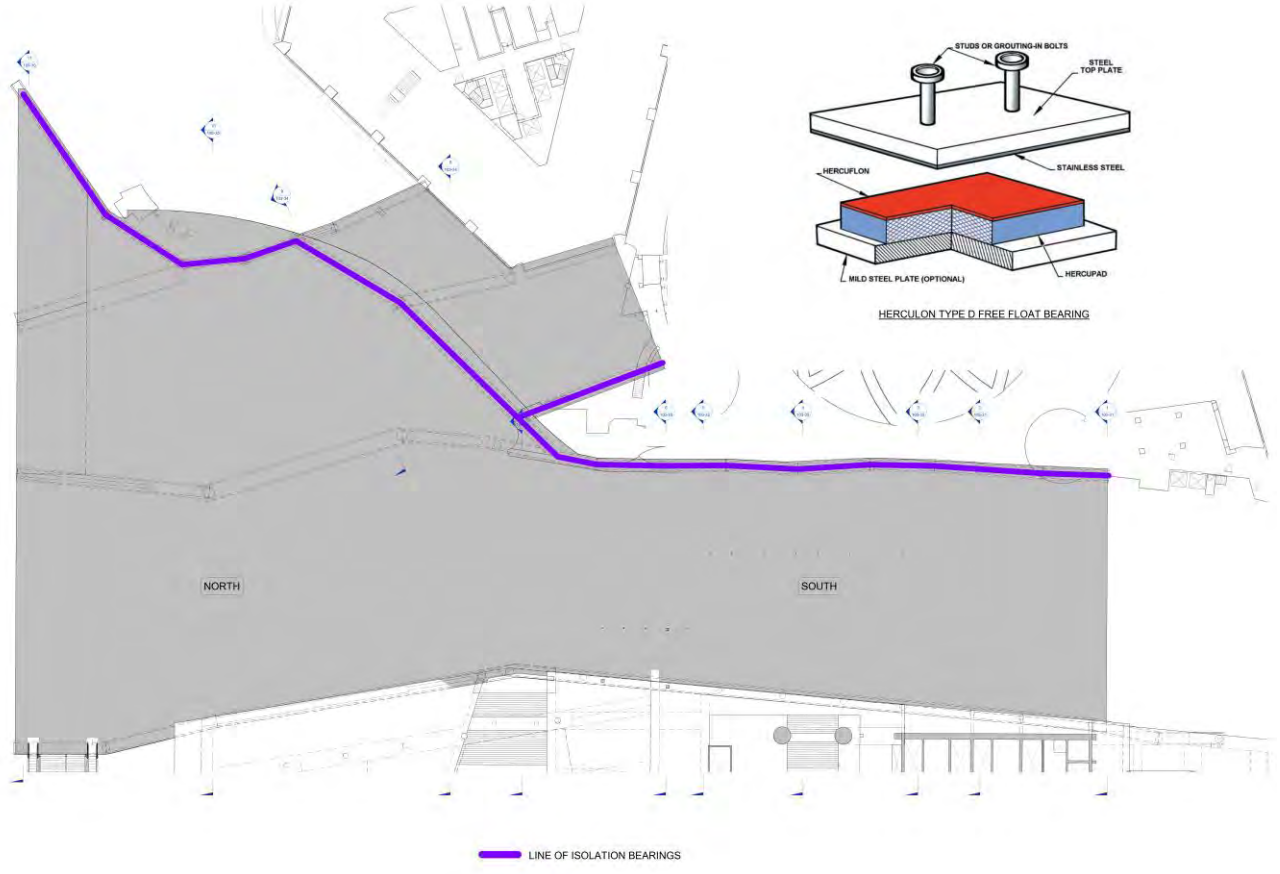


Figure 10 – Bearing Plan

5. Headstock Beams

The precast beams/planks for the Landbridge are detailed with support at either end provided by post-tensioned headstock beams spanning onto columns and walls. Many of the headstocks also span the roads below and will require precast formwork shells to support the cast in-situ concrete within. Where headstocks are located over the existing Darling Park or proposed podium structure, formwork can be provided for cast in-situ construction.

Precast Shells

The magnitude of load carried by the headstock beams is very large and the required cross-sections are too heavy to pre-cast and transported or lift on site. Therefore, a formwork solution using precast concrete U-beam shells that are filled with concrete in-situ and post-tensioned has been developed.

The shells are designed to carry their own weight and the wet weight of concrete inside. On completion of curing and post-tensioning, this combined section is designed to carry the precast beams and topping slab weight. Many of the beams then gain additional stiffness after pouring the topping due to an increase in cross-sectional depth between the precast beams, which are intentionally installed with a gap for this purpose. A staged stress analysis has been carried out to consider the stress state of the concrete and prestressing given the changing cross-section and loading.

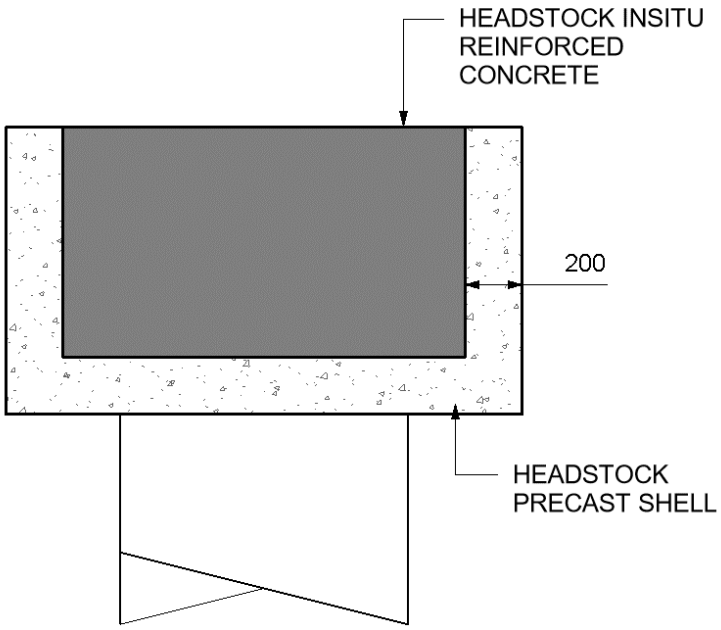


Figure 11 – Precast Shell Headstock Section

Column Corbels

Support for the precast headstock shells will be provided by corbels at the column head with sufficient width to pick up the shear force in each of the vertical legs. Openings in the shell base will enable a direct connection of the cast in-situ headstock to the column.

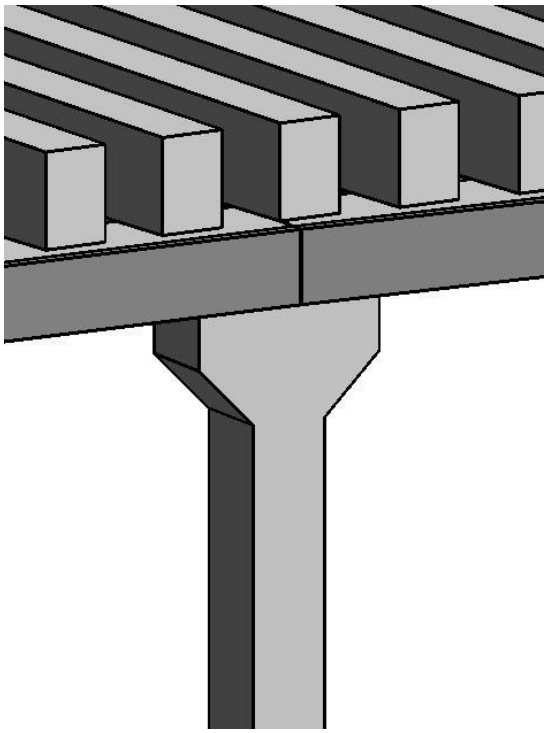


Figure 12 – Column Corbel and Headstock Isometric

6. Columns and Transfers

Columns/vertical structure to support the Landbridge can be split into three groups:

1) Structure within the Cockle Bay Park podium:
    - Podium columns, walls and tower core are used to provide vertical support to the Landbridge along its western edge
2) Structure within the existing Darling Park buildings:
    - New columns will be constructed within the existing Darling Park structure to provide vertical support to the Landbridge along its eastern edge
3) Structure within the road corridor:
    - New columns will be constructed within the road corridor to provide intermediate support to the Landbridge structure to limit the span lengths for the precast planks used for the Landbridge deck structure

1) Cockle Bay Park Podium

Vertical support within the Cockle Bay Park development has been incorporated into the podium structure with support along the western edge of the Landbridge provided by:

- Columns and shear wall at the northern end of the Landbridge
- Columns and transfer structure through the central zone
- Tower core at the southern end of the Landbridge

The columns directly below the headstock beams have been sized to minimise the impacts spatially throughout the podium floorplates. These columns are supported either by shear walls located throughout the Eastern edge of the podium or wing walls cantilevering off the East side of the core. Landbridge column sizes vary from 750mm to 1050mm in diameter and will extend to the underside of the head stock beams. These columns can be formed and constructed using standard formwork and general construction principles.

Transfer Structure

The support provided by the podium and tower columns and core along the central and southern zone are offset from the western edge of the Landbridge to provide a new slip lane off Harbour Street and into Wheat Road. In these areas cantilevering concrete structure is provided to extend the support line to the western edge of the Landbridge. In this zone there are significant spans between support elements. To provide the continuous vertical support required by the Landbridge a full storey high reinforced concrete wall is provided in these zones to span between the available points of support, see image below.

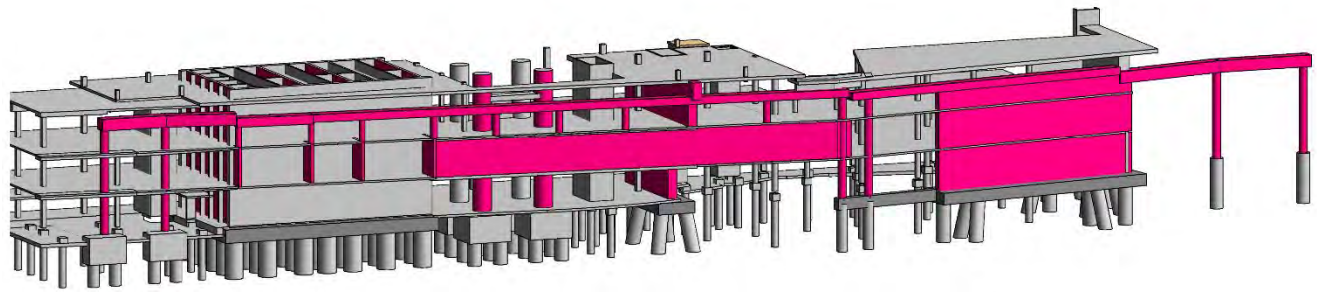


Figure 13 – Western Landbridge Support at Podium

2) Existing Darling Park Car Park

Along the Western edge of the existing darling park structure, landbridge columns have been strategically spaced at approximately 7 to 9m centres to suit existing car park layouts. Consideration has been made to isolate the existing structure from the new landbridge plank structure by providing a movement joint that transfers the vertical load imposed by the planks to the headstock beams while allowing for horizontal movement. This ensures the existing structural design conditions of the Darling Park structure remains as close as possible to the original design intent.

Columns supporting the headstock beams will be designed as cantilevers above the crescent garden level utilising a 50MPa concrete mix to allow for an appropriate transition and minimise bearing stresses on existing floorplates further down the structure. The intent is to limit the amount of strengthening required to the existing structure by providing a transition detail that will comprise of doweled reinforcement bars through the existing floor plates. This will enable standard formwork practices to be utilised in combination with letterbox pouring or pumping from a main point and providing weep holes as required at the top of the column to ensure correct concrete placement has been achieved.

Throughout, column sizes vary above the crescent garden level due the columns height and load imposed by the landbridge planks, however as the columns transition through the existing carpark structure one size has been typically maintained throughout.

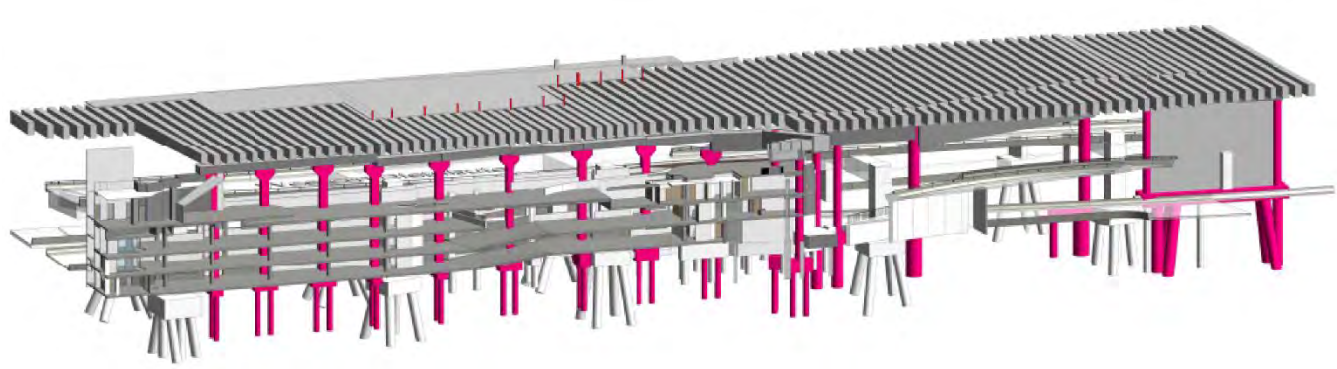


Figure 14 – Eastern Landbridge Support through Darling Park

3) Columns in the road corridor

Columns and walls within the proposed Cockle Bay Park podium have been located to meet planning requirements of the proposed development. The dense network of existing infrastructure within the road corridor has undergone a detailed assessment by the project team and TfNSW to reconcile support locations with existing infrastructure, planned infrastructure expansion and clearances required, with the column locations on plan representing a resolution of these requirements.

These supports are designed as reinforced concrete columns with sufficient capacity to support the proposed landbridge and also resist code impact loading from the adjacent roads.

Due to the nature of the build being over a roadway, precast headstock beams will need to be temporarily supported by way of a corbel. This will be installed at the top level of the column to provide temporary support of the headstock beam prior to it being fully poured tying the two elements together.

Further, construction of the columns was considered with respect to impacts to the road network and a formwork arrangement was proven which utilises shutters braced to supports adjacent the road to minimise impacts on the network.

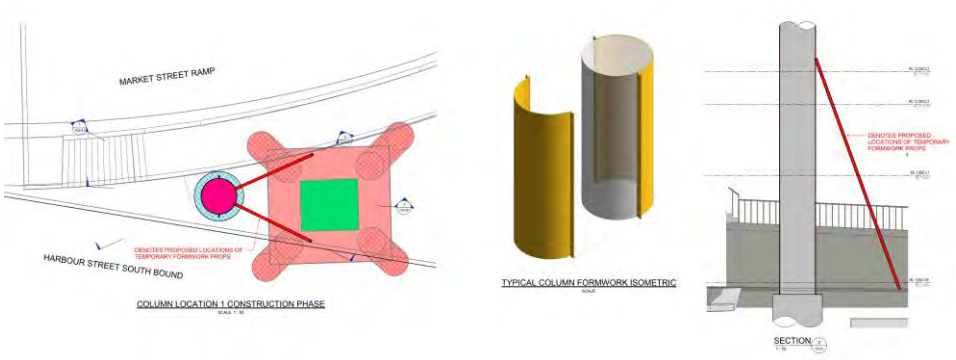


Figure 15 – Typical Column Within Road Network Formwork Concept

7. Lateral Support

The Landbridge deck has been provided with an east/west running movement joint due to the length of the deck in the north south direction. To accommodate this the lateral structure for the Landbridge is split into northern and southern zones to keep either half of the deck independent of the other.

The lateral systems for both zones are incorporated into the podium and tower planning, with dedicated lateral walls or enhanced core capacity providing the required support.

Northern Zone

The lateral structure for the northern zone of the Landbridge consists of the following elements:

- North/south shear wall along the eastern edge of the Landbridge within the existing Darling Park structure. Further investigation of this shear wall is required once detailed in-ground services survey is completed to determine the arrangement of the foundations required for a shear wall at this position to confirm it can be achieved given the existing electrical cables and conduits that are known to be within this area. If it is found that the required foundations cannot be achieved this shear wall will be deleted and replaced with columns and the remaining lateral elements in the northern zone strengthened to allow for this removal.
- North/south shear wall within the road corridor. This shear wall will be located between the northern and southern lanes of the Western Distributor within the support zones approved in-principle by TfNSW.
- North/south shear wall at the western edge of the Landbridge along the edge of the podium structure.
- East/west shear wall within the podium structure.

The lateral elements for the northern zone have been arranged so that there is only a single lateral element in the east/west direction located close to the centre of mass in the north/south direction so that creep, shrinkage and thermal movements of the deck in both directions are centred on this wall. The multiple north/south lateral elements have been located close to the centre of mass in the east/west direction also.

As the north/south shear walls are uncoupled elements they allow the creep, shrinkage and thermal movements of the deck in the east/west direction to be accommodated by rotation of these walls about their weak axis. The lateral system will be integrated into deck/podium structure with isolation of the deck from the Darling Park structure occurring along the eastern edge of the deck where bearings are provided.

Southern Zone

The lateral structure for the southern zone of the Landbridge consists of the following elements:

- Tower structure lateral core system.
- East/west shear wall within the podium structure to the north of the core.

The lateral elements for the southern zone have been arranged so that there is only a single lateral element in the north/south direction which is the tower core so that creep, shrinkage and thermal movements of the deck in both directions are centred on core. The east/west shear wall has been located close to the east/west centre of stiffness of the tower core ensuring that creep, shrinkage and thermal movements of the deck in the north/south direction can be accommodated by rotation of this shear wall about its weak axis. The lateral system will be integrated into deck/podium structure with isolation of the deck from the Darling Park structure occurring along the eastern edge of the deck where bearings are provided.

8. Foundations

Site Geotechnical Investigation

An interim geotechnical investigation report has been produced by Douglas Partners (R.001.DftA, dated 6/08/21) to assess and understand the subsurface soil and groundwater conditions across the site, with advice provided on the following:

- Excavation conditions
- Temporary excavation support
- Foundation design and suitable construction methodologies
- Earthworks and groundwater
- Other geotechnical construction related issues considered relevant to the proposed development

To date, the drilling of 11 boreholes has been carried out with three of these being converted into groundwater monitoring wells. Borehole locations have been noted across the extent of the site below.

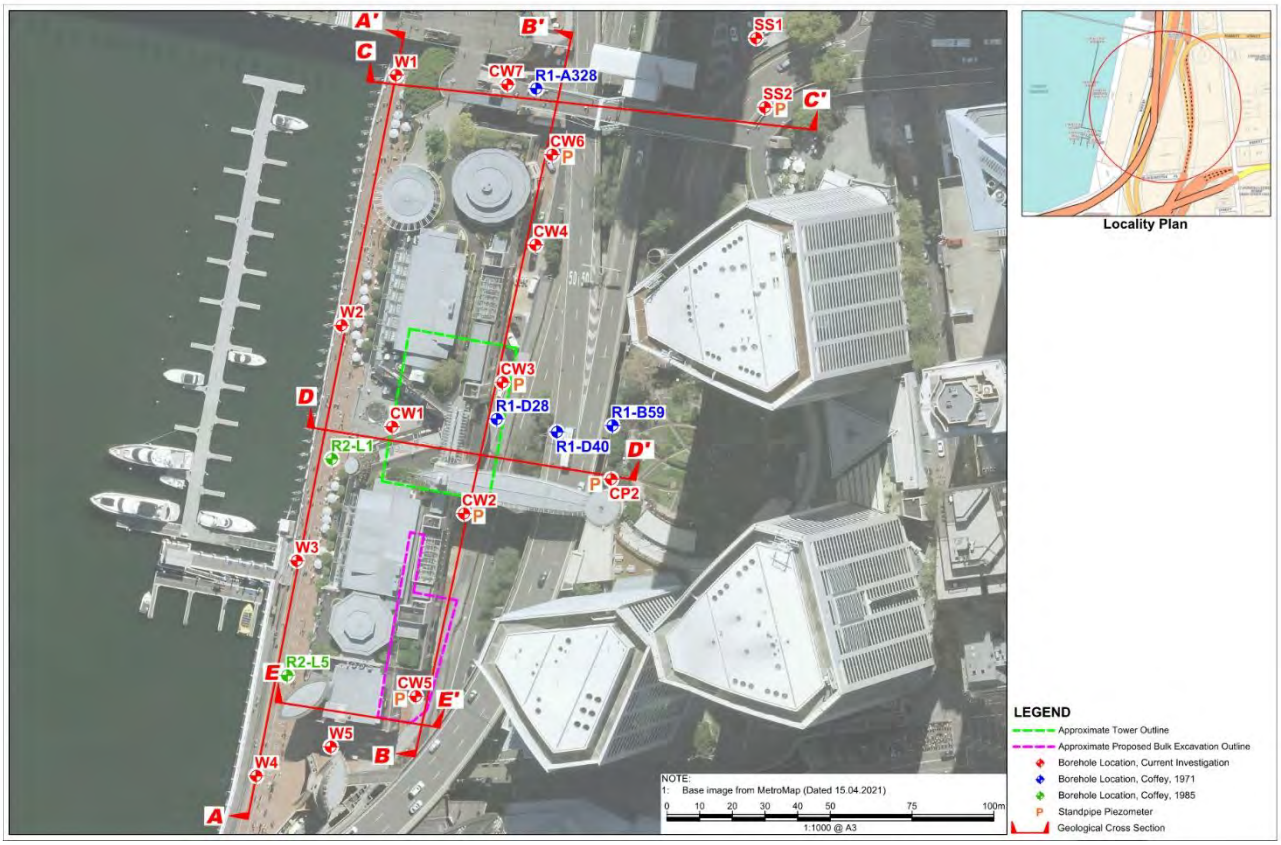


Figure 16 – Geotechnical Borehole Location Plan

The ground conditions across the site typically comprises of uncontrolled fill (encountered at depths between RL 1.3 and -7.2m) overlying marine deposits (encountered at depths between RL -6.5 and -18.2m) overlying sandstone bedrock (encountered at depths between RL 1.3 and -20.9m). The top of the sandstone bedrock differs quite significantly across the site, noting that near borehole SS1 and SS2 the depth to the sandstone is as high as RL 1.3 and as low as RL -18.2 across the harbour. This bedrock comprises of 3 different unit strengths at varying depths (very low to low, low to medium and medium to high strength) and will provide incrementally better founding parameters for the structure.

Groundwater was encountered between RL 0.0 and RL -0.1, with water being observed in all boreholes drilled through the suspended deck over the harbour. Temporary batters may be feasible where groundwater is not encountered, however temporary shoring such as trench boxes, sheet piling and pile walls will be required to enable excavation below the groundwater level.

Within the report it has been recommended that all column foundations will require one of the following pile types:

- Continuous flight augured piles
- Steel encased concrete bored piles
- Steel tube piles

These foundation supports have been adopted for all columns across the site, with the extent and size varying column to column as it is strictly dependent on location, load and sub-surface material depths.

Road Corridor

All columns and shear walls within the road corridor will be supported on piled foundations outside the zone of influence for the existing TfNSW foundations or placed to not adversely affect the structural integrity of the existing structure. Assessment and confirmation of avoidance of geotechnical impact to the existing TfNSW foundations will be undertaken by Douglas Partners during further development of the design.

The design and construction of all foundations within and adjacent to the road corridor will be undertaken in accordance with the requirements of GTD 2020/001 - Excavation adjacent to Transport for NSW Infrastructure.

Darling Park Car Park

New columns throughout Darling Park are proposed to be constructed within the existing structure. Existing foundations are bored reinforced concrete piles and the geotechnical engineering report has identified rock at some distance below the existing slab level. The proposed foundations are bored cast in-situ piles, however a low-height drilling rig will be required to install these below the existing suspended car park slab.

Podium

A piled foundation system will be provided throughout the podium, consisting of a number of different pile types which is dependent on the ground conditions across the site at which each pile is located.

Typically, the following types will provide support to the corresponding structural elements.

- Structural Element: Tower columns and core/shear walls:
  Foundation Type: Steel encased reinforced concrete bored pile.
- Structural Element: Podium columns east of boardwalk including landbridge columns
  Foundation Type: Reinforced concrete contiguous flight auger piles with no steel sleeve/tubing.
- Structural Element: Columns West of boardwalk
  Foundation Type: Driven steel tubes with reinforced concrete plug and localised external corrosion protection at the head.

9. Market St Ramp

An existing pedestrian footbridge springing from Market St and traversing Sussex St currently provides pedestrian access to the existing Darling Park towers, the decommissioned Monorail station and through to Pyrmont Bridge and Darling Harbour.

The current alignment lands on the Darling Park side at approximately RL13, which will require modification to achieve connection with the higher design landbridge finished level. The existing supports on either side of Sussex St have been surveyed and modelled to compare with the CBDRL exclusion zones, which were also surveyed. The existing supports and foundations are located in Zone 4, which permits vertical downward loads that are limited in magnitude, as agreed with TfNSW.

A new proposed pedestrian bridge will be located at the existing support locations with new foundation structure with loads of a similar magnitude to the existing condition. This design has been presented to TfNSW with a view to understanding any additional requirements to be satisfied. This consultation is currently being finalised with no adverse commentary received at the time of writing.

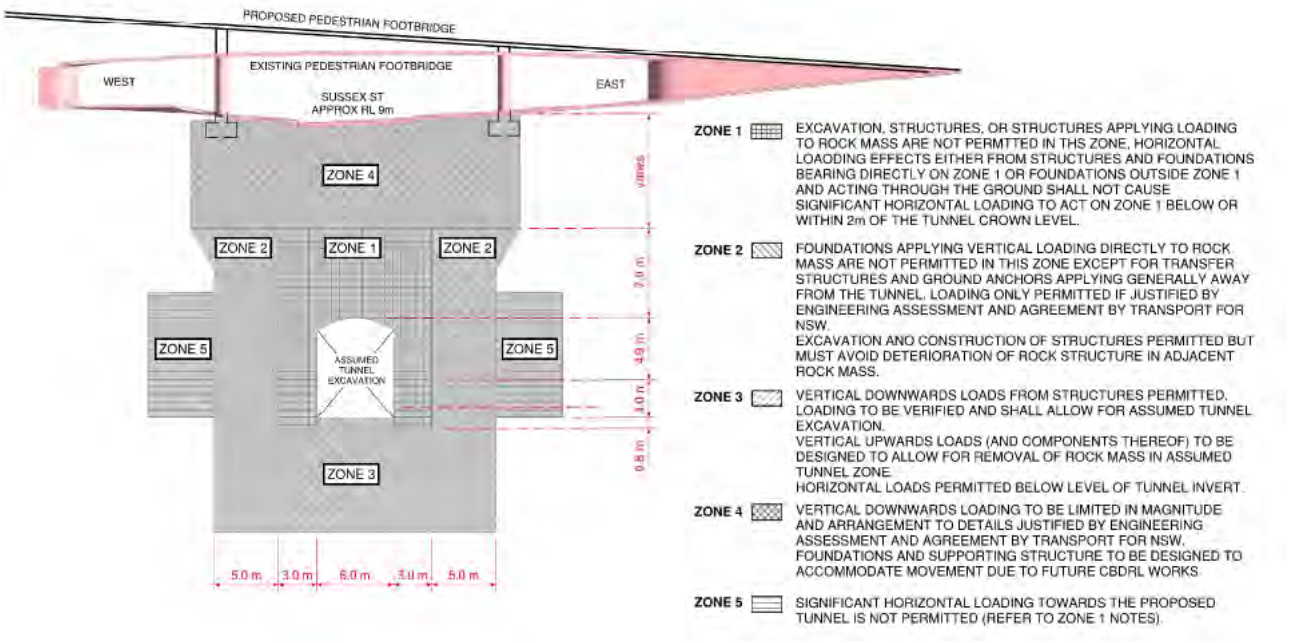


Figure 17 – Pedestrian Footbridge over CBDRL Sussex Street corridor

10. Stormwater Diversion

Existing stormwater drainage is generally located to the east of the Cockle Bay Park site and includes assets owned and maintained by the City of Sydney Council (CoS) and Sydney Water Corporation (SWC). Two main underground drainage lines convey flows through the Cockle Bay Park site including a 1500 mm diameter line in the central part of the site and an 1800 mm diameter line in the southern part of the site.

Due to the location of the proposed Cockle Bay Park building, the 1500 mm diameter line requires relocation as it clashes with the buildings proposed core. This line is registered as S.W.C No 30L by Sydney Water and was amplified in 1974. The line is currently located under the existing Cockle Bay Wharf podium building on the site and is independent of the existing building.

Existing major street drainage lines will remain undisturbed in their current locations, aside from some proposed inlet modifications at the eastern edge of the property to improve drainage during extreme floods in Harbour Street.

To accommodate the proposed Cockle Bay Park development S.W.C No 30L is proposed to be relocated. This relocation commences on the eastern side of Harbour St across the Cockle Bay Park site to the harbour.

To facilitate construction via either trenching or boring the section of the stormwater diversion crossing Harbour St has been sized as a precast circular pipe. Allowing the contractor to select the preferred construction methodology to minimise impact to Harbour St during construction.

The stormwater diversion crossing the Cockle Bay Park site has been sized as a rectangular culvert integral with the building structure.

The alignment selected for the stormwater diversion has ensured all existing Western Distributor in-ground structure is avoided as well as all proposed structure for the Cockle Bay Park development.

The diversion of the stormwater line has been approved in principle by Sydney Water.

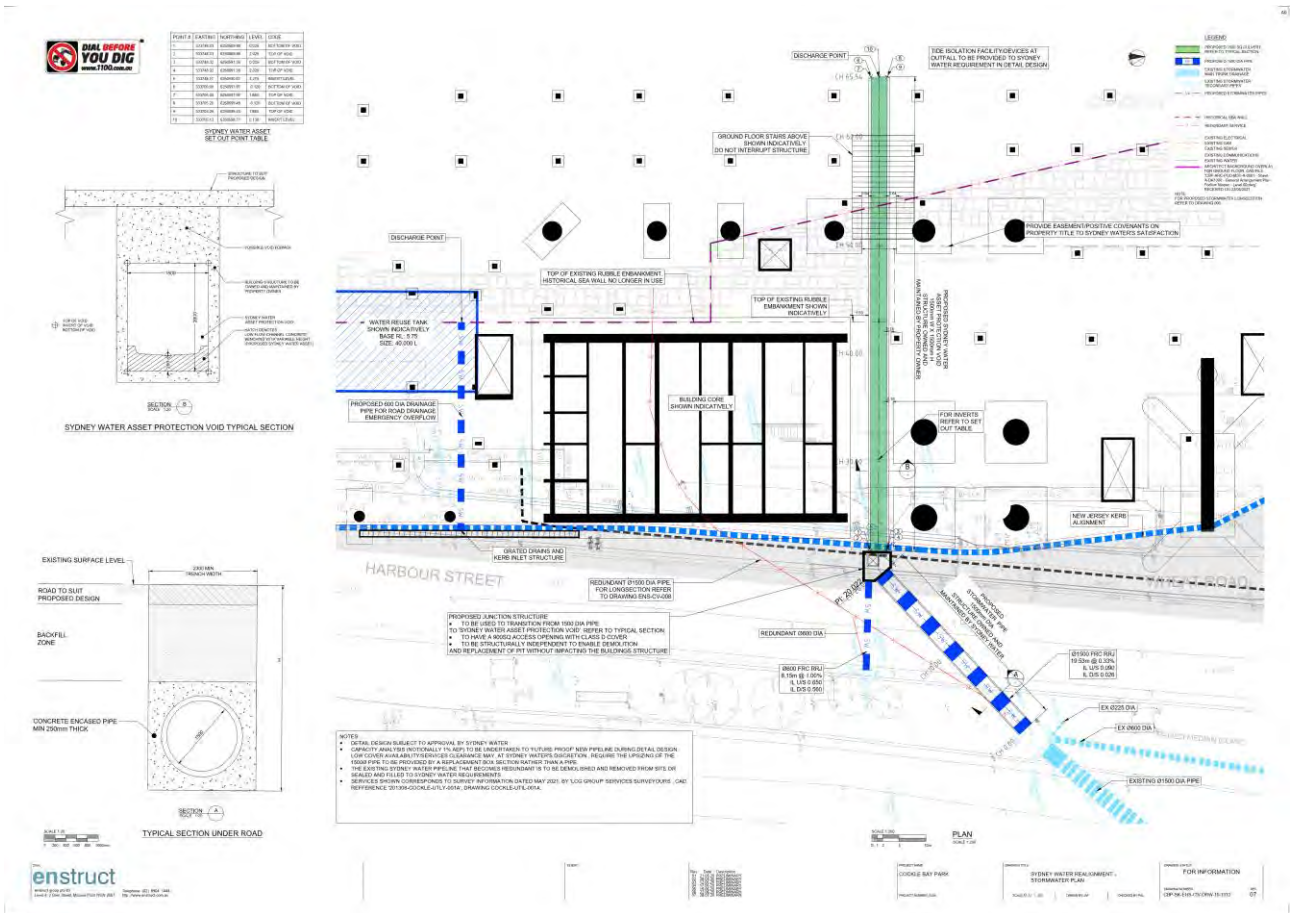


Figure 18 – Stormwater Diversion Plan

11. Clearances

Road Clearances

A critical planning constraint incorporated into the design is maintaining minimum vertical clearance between the proposed landbridge structure and the existing Western Distributor roadway. A minimum clearance of 5.4m has been adopted everywhere with an additional 0.4m services zone added and achieved at all locations. It has been identified that the services clearance zones could be reduced in some areas which will be investigated as the design progresses and if possible utilised to minimise the elevation of the Landbridge in these areas.

An additional horizontal clearance between the road edge and any vertical structure has been incorporated into the design at all new column locations.

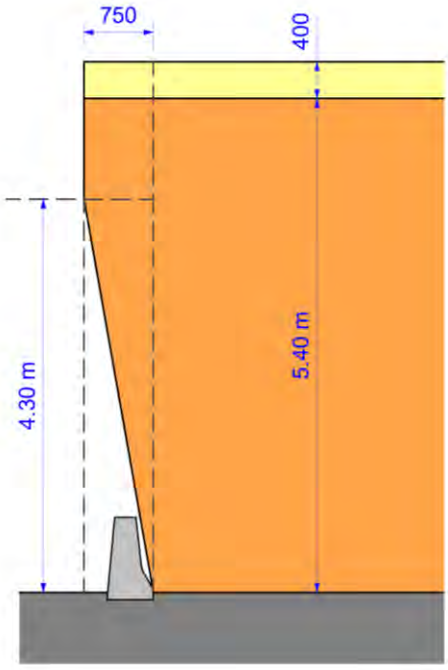


Figure 19 – Road Clearance Requirements

enstruct has incorporated 2D and 3D point cloud survey of the existing road infrastructure into the project structural BIM model. All elements of the existing road infrastructure have been assessed relative to the planned landbridge structure. The required clearances have been demonstrated at all critical cross sections.

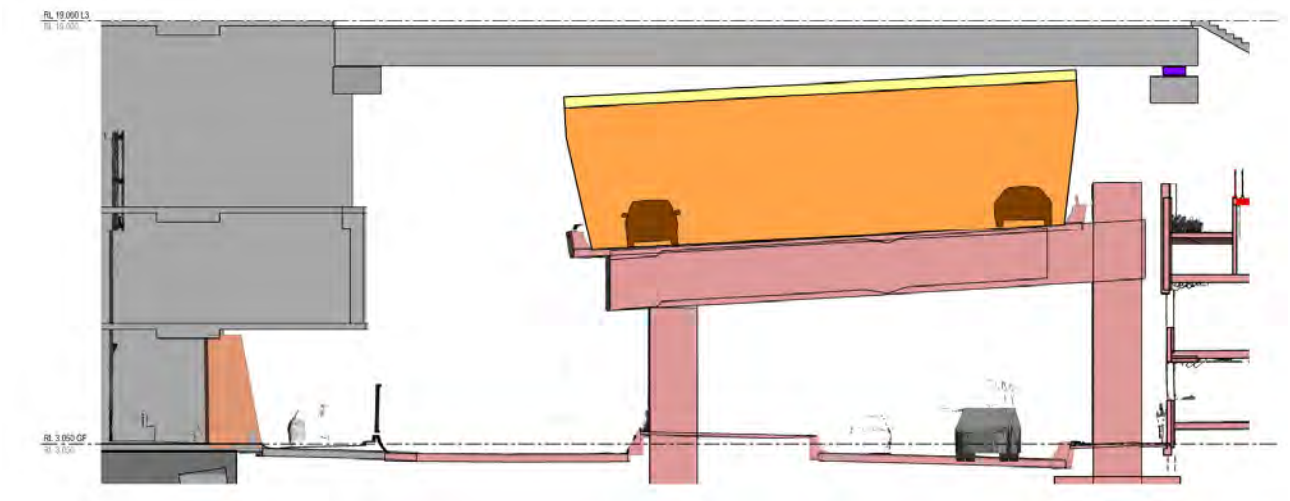


Figure 20 – Typical Road Clearance Section

Horizontal Clearances to the Western Distributor

Adequate clearance has been identified as a key planning consideration to ensure the proposed vertical elements do not compromise TfNSW's ability to maintain the existing road infrastructure. To this end, a detailed co-ordination process was undertaken to identify any locations where clearance was less than 2m, a threshold identified by TfNSW as needing further consideration. At each of the four relevant locations, it was demonstrated that less than 2m clearance to the proposed landbridge would not compromise TfNSW's ability to maintain the existing infrastructure.

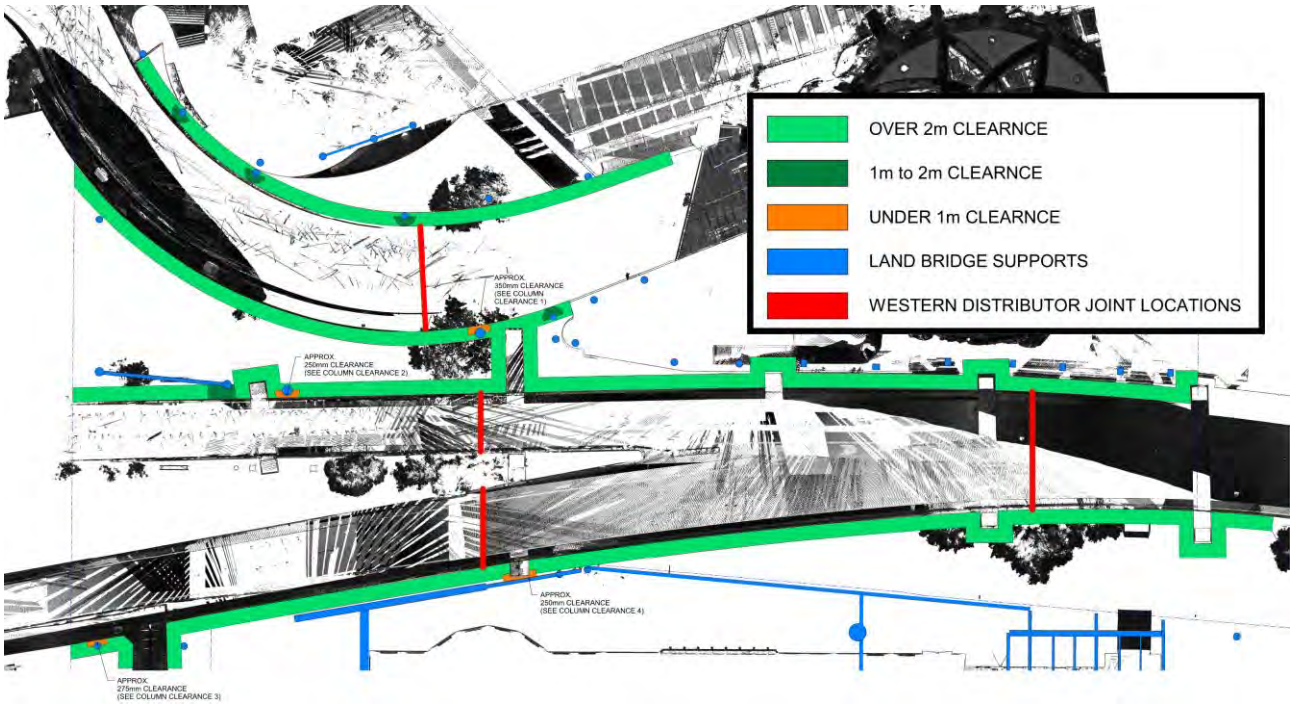


Figure 21 – Clearance Diagram between Western Distributor and New Structure

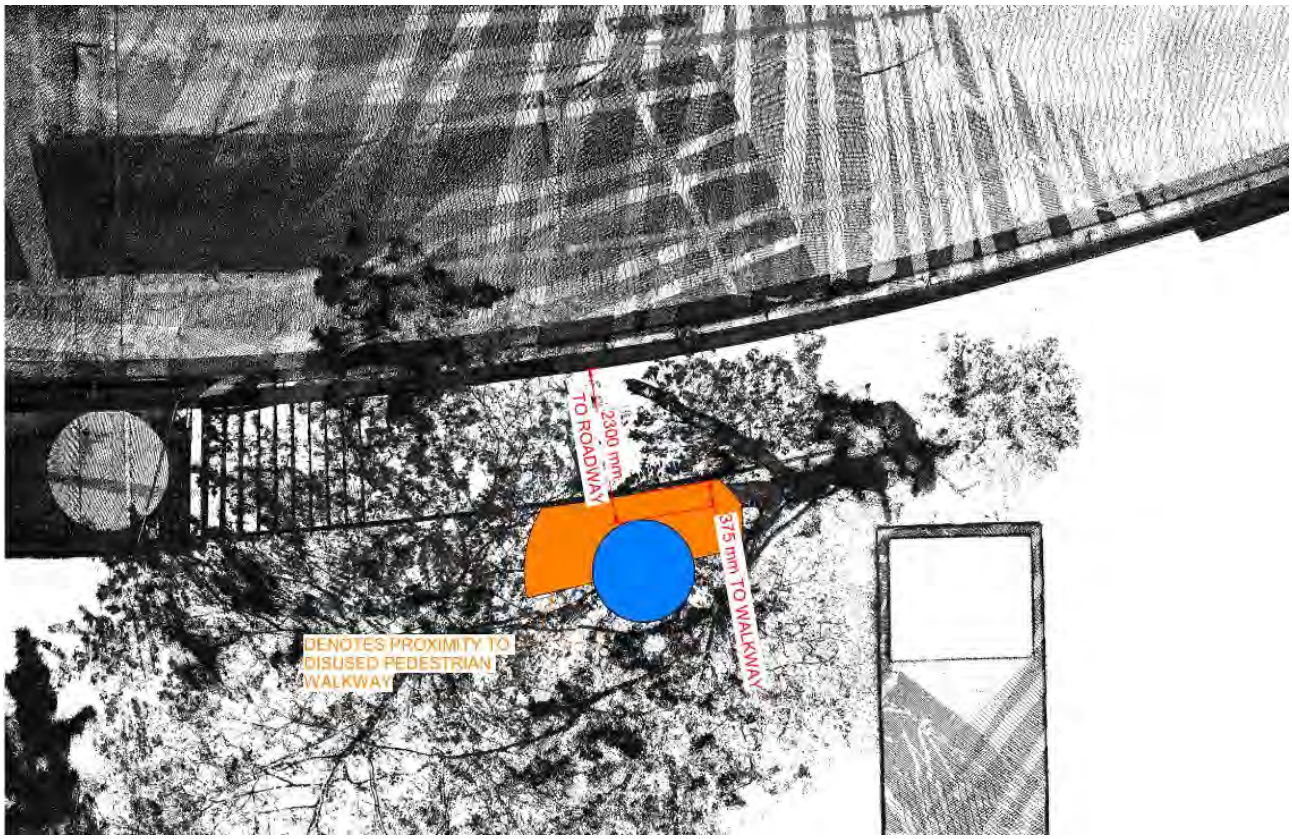


Figure 22 – Typical Detailed Clearance Investigation Plan

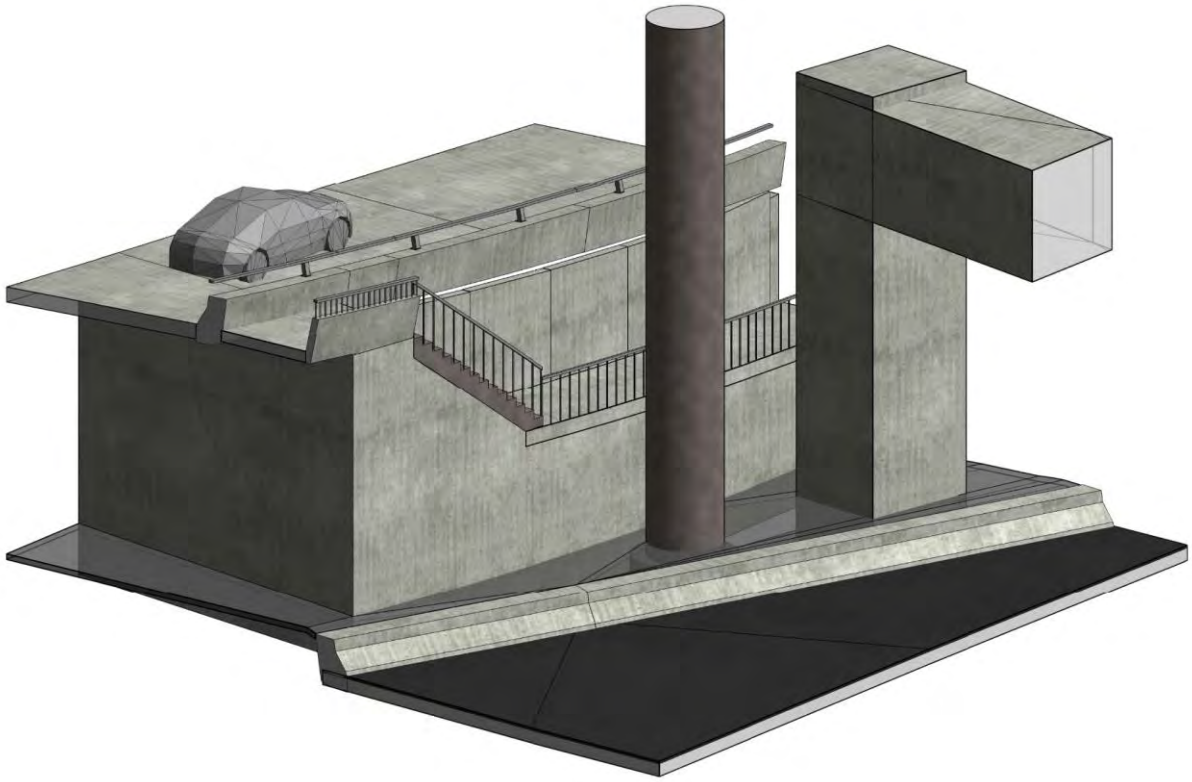


Figure 23 – Typical Detailed Clearance Investigation ISO

12. Conclusion

This report has been prepared to address planning conditions relating to the structural design of a proposed landbridge spanning the Western Distributor.

Outlined are the relevant structural systems, clearances, and construction requirements to build the proposed landbridge, demonstrating compliance with condition C25.

The structural planning has incorporated requirements of GTD 2012/001 and progression of the design will maintain compliance with these requirements in accordance with condition C24.

The proposed new pedestrian bridge over Sussex St is consistent in scale and support to the existing bridge and does not meaningfully worsen the current loads imposed on the proposed CBDRL, demonstrating compliance with condition C31.

APPENDIX A

Landbridge Structural Drawings

COCKLE BAY REDEVELOPMENT
LAND BRIDGE GENERAL ARRANGEMENT

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LAND BRIDGE STRUCTURAL DRAWING LIST	
SHEET NUMBER	SHEET NAME
103-20	LAND BRIDGE - GENERAL ARRANGEMENT
103-21	LAND BRIDGE - DEMOLITION PLAN
103-22	LAND BRIDGE - SUPPORTS
103-23	LAND BRIDGE - HEADSTOCKS
103-24	LAND BRIDGE - PRECAST BEAMS
103-25	LAND BRIDGE - CONCRETE PROFILE
103-26	LAND BRIDGE - JOINTS
103-27	LAND BRIDGE - BEARINGS
103-28	LAND BRIDGE - LATERAL SUPPORTS
103-29	LAND BRIDGE - EXISTING SITE
103-31	LAND BRIDGE - SECTIONS SHEET 1
103-32	LAND BRIDGE - SECTIONS SHEET 2
103-33	LAND BRIDGE - SECTIONS SHEET 3
103-34	LAND BRIDGE - SECTIONS SHEET 4
103-35	LAND BRIDGE - SECTIONS SHEET 5
103-36	LAND BRIDGE - SECTIONS SHEET 6

LAND BRIDGE STRUCTURAL DRAWING LIST	
SHEET NUMBER	SHEET NAME
103-70	LAND BRIDGE - LOADING DIAGRAM
103-80	LAND BRIDGE - CLEARANCES TO ELEVATED WESTERN DISTRIBUTOR
103-81	LAND BRIDGE - COLUMN CLEARANCE 1
103-82	LAND BRIDGE - COLUMN CLEARANCE 2
103-83	LAND BRIDGE - COLUMN CLEARANCE 3
103-84	LAND BRIDGE - COLUMN CLEARANCE 4
103-85	LAND BRIDGE - LONG SECTION
103-86	LAND BRIDGE - WESTERN DISTRIBUTOR FOUNDATION OVERLAY
103-87	LANDBRIDGE - SUPPORT COLUMNS
103-90	LAND BRIDGE - COLUMN CONSTRUCTION OVERALL
103-91	LAND BRIDGE - COLUMN CONSTRUCTION LOCATION 1
103-92	LAND BRIDGE - COLUMN CONSTRUCTION LOCATION 2
103-93	LAND BRIDGE - COLUMN CONSTRUCTION LOCATION 3
103-94	LAND BRIDGE - COLUMN CONSTRUCTION LOCATION 4
103-95	LAND BRIDGE - COLUMN CONSTRUCTION FORMWORK AND SCAFFOLD

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PROJECT NAME
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DRAWING TITLE
LAND BRIDGE - GENERAL ARRANGEMENT

SCALE AT B1:
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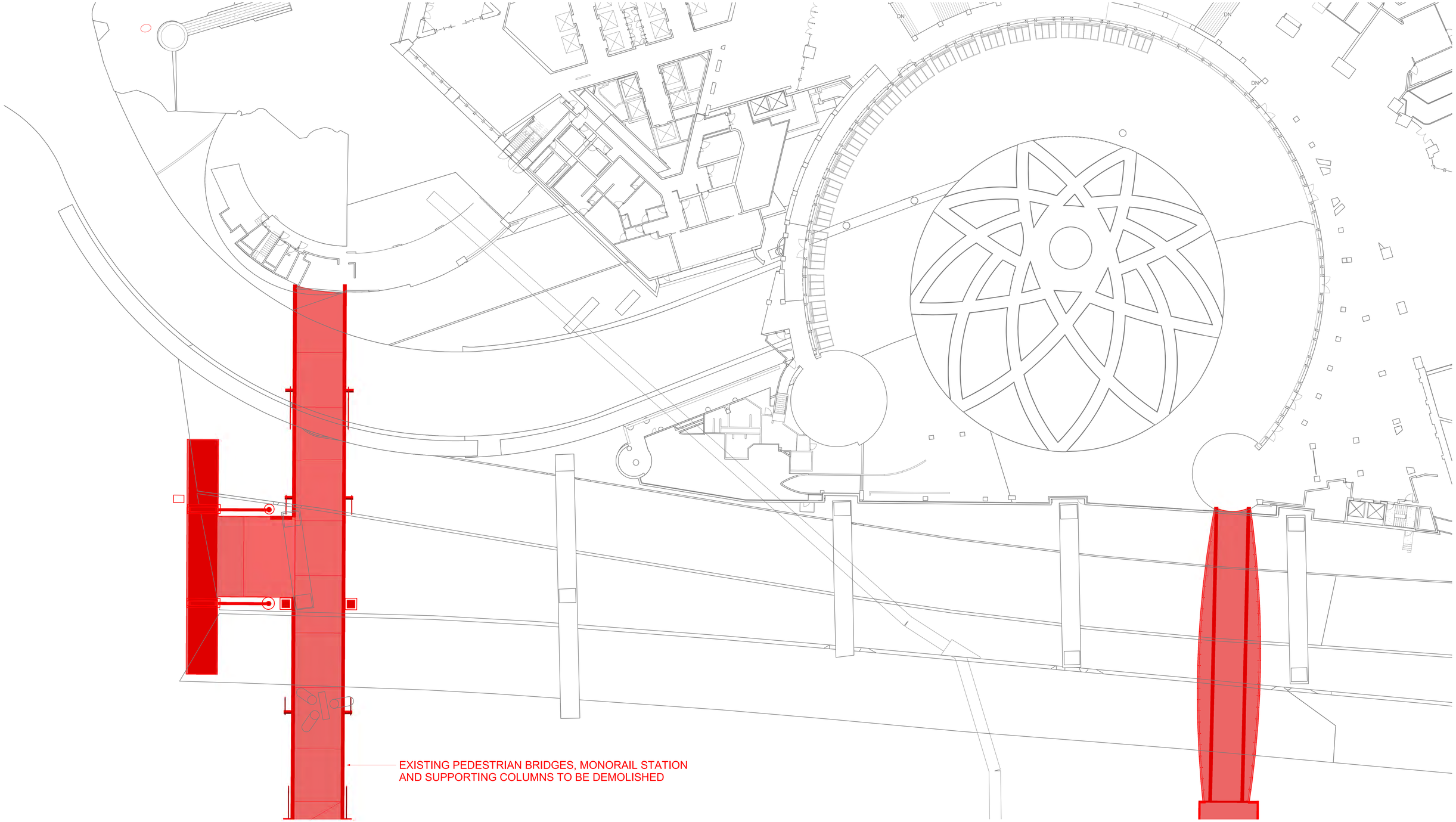

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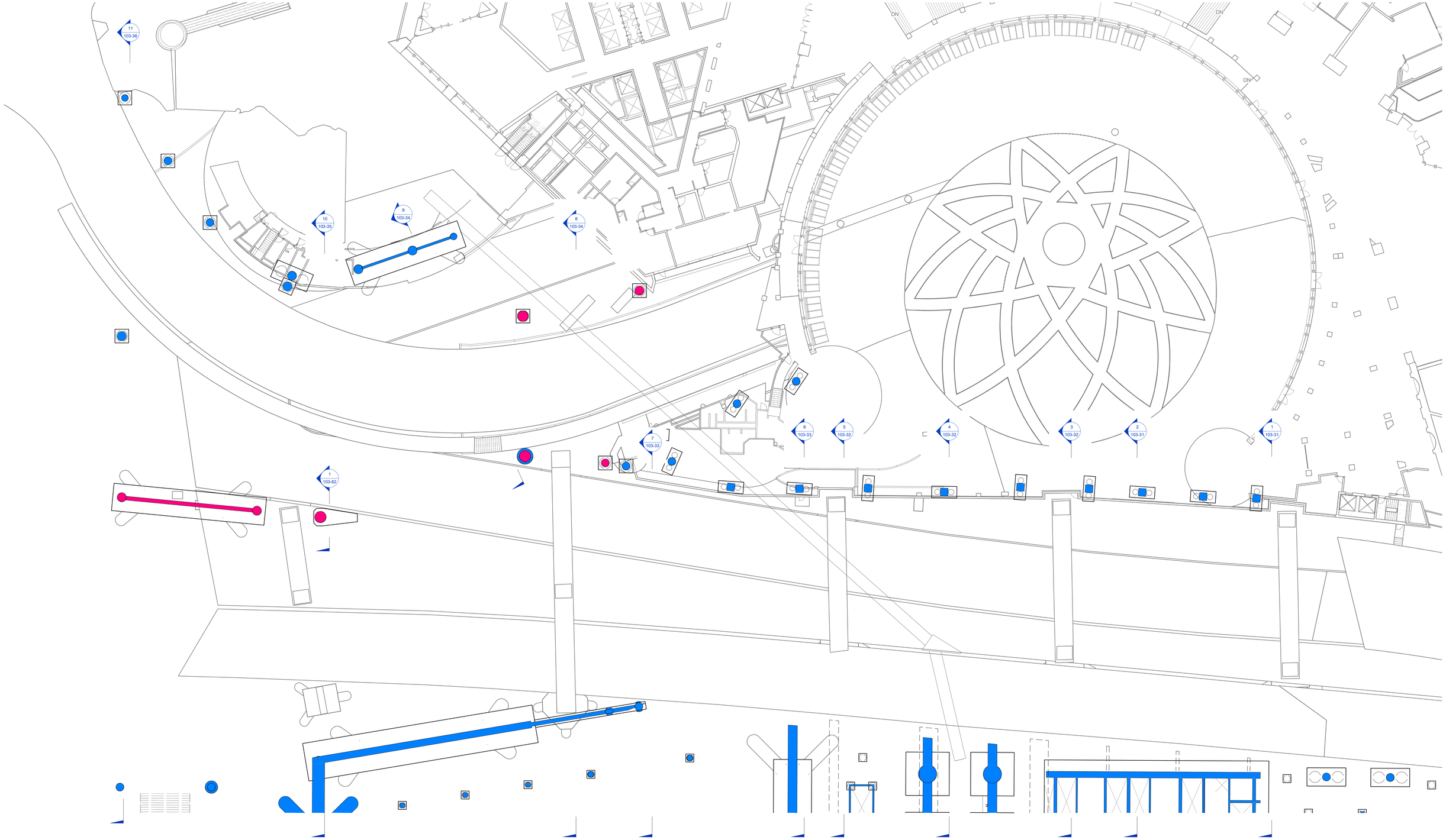

Supports within owner site boundary

Supports behind barriers within road network

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1
103-31

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1500 dp x 1500 wd Headstock

2050 dp x 2800 wd Headstock

2500 dp x 1800 wd Headstock

2500 dp x 1800 wd Headstock

2500 dp x 1800 wd Headstock

1500 dp x 1800 wd Headstock

2500 dp x 1800 wd Headstock

3500 dp x 2400 wd Headstock

2500 dp x 1800 wd Headstock

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1500 dp x 1800 wd Headstock

1500 dp x 1800 wd Headstock

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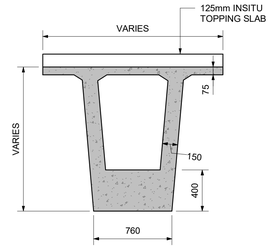
TAPERED PRECAST TRANSFER BEAM

1400 dp PRECAST BEAM @ 1500 cts

TAPERED PRECAST BEAM @ 1750 cts

1400 dp CANTILVER PRECAST BEAM @ 1750 cts



TYPICAL PRECAST BEAM SECTION

SCALE: 1 : 25

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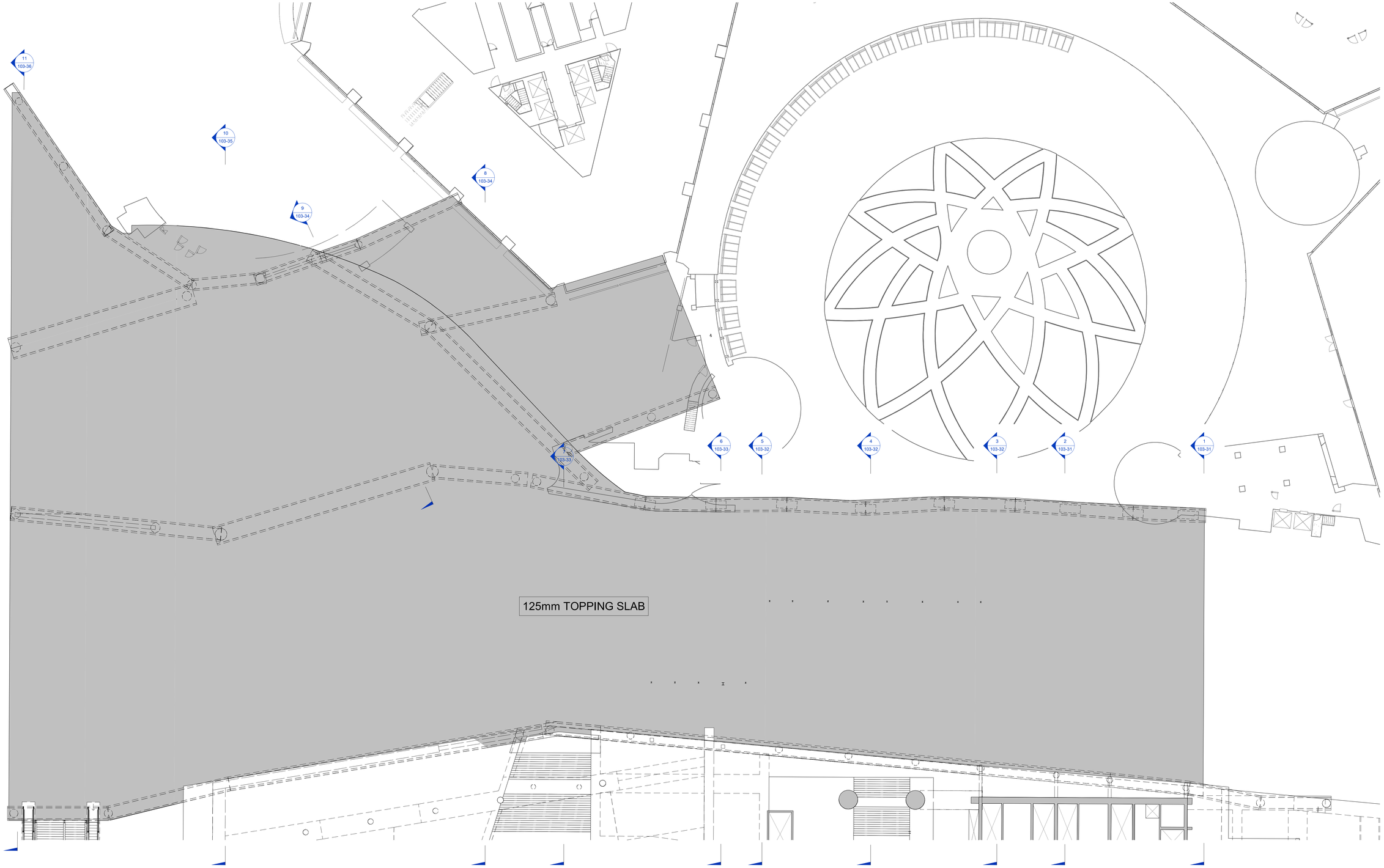

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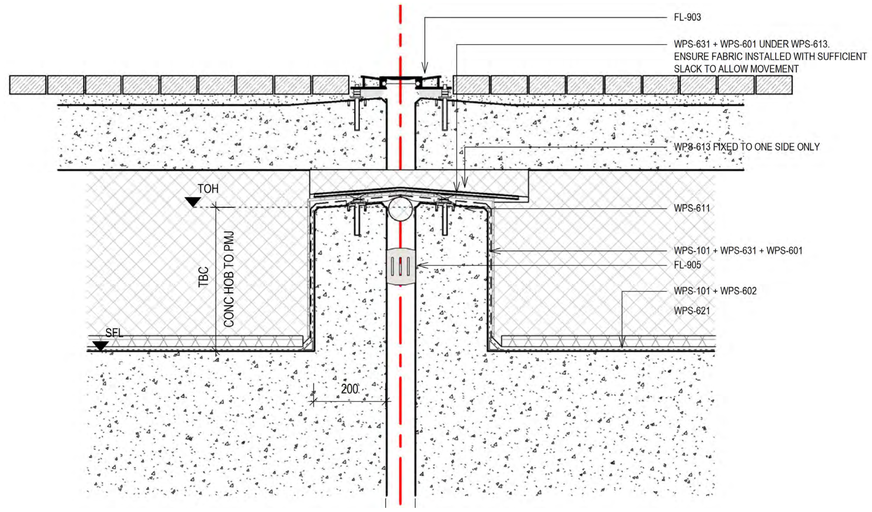

CENTRAL PERMANENT MOVEMENT JOINT EXAMPLE

PERMANENT MOVEMENT JOINTS

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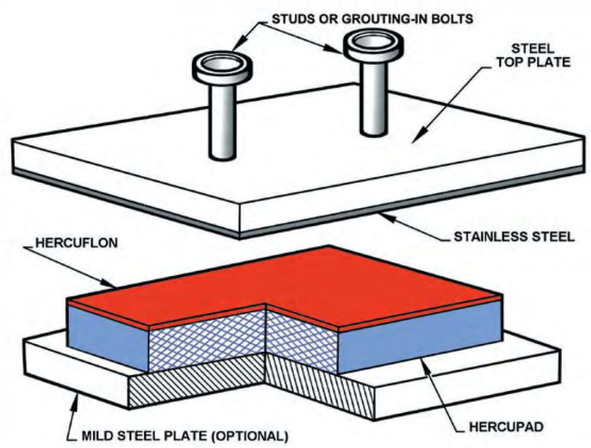

HERCULON TYPE D FREE FLOAT BEARING

LINE OF ISOLATION BEARINGS

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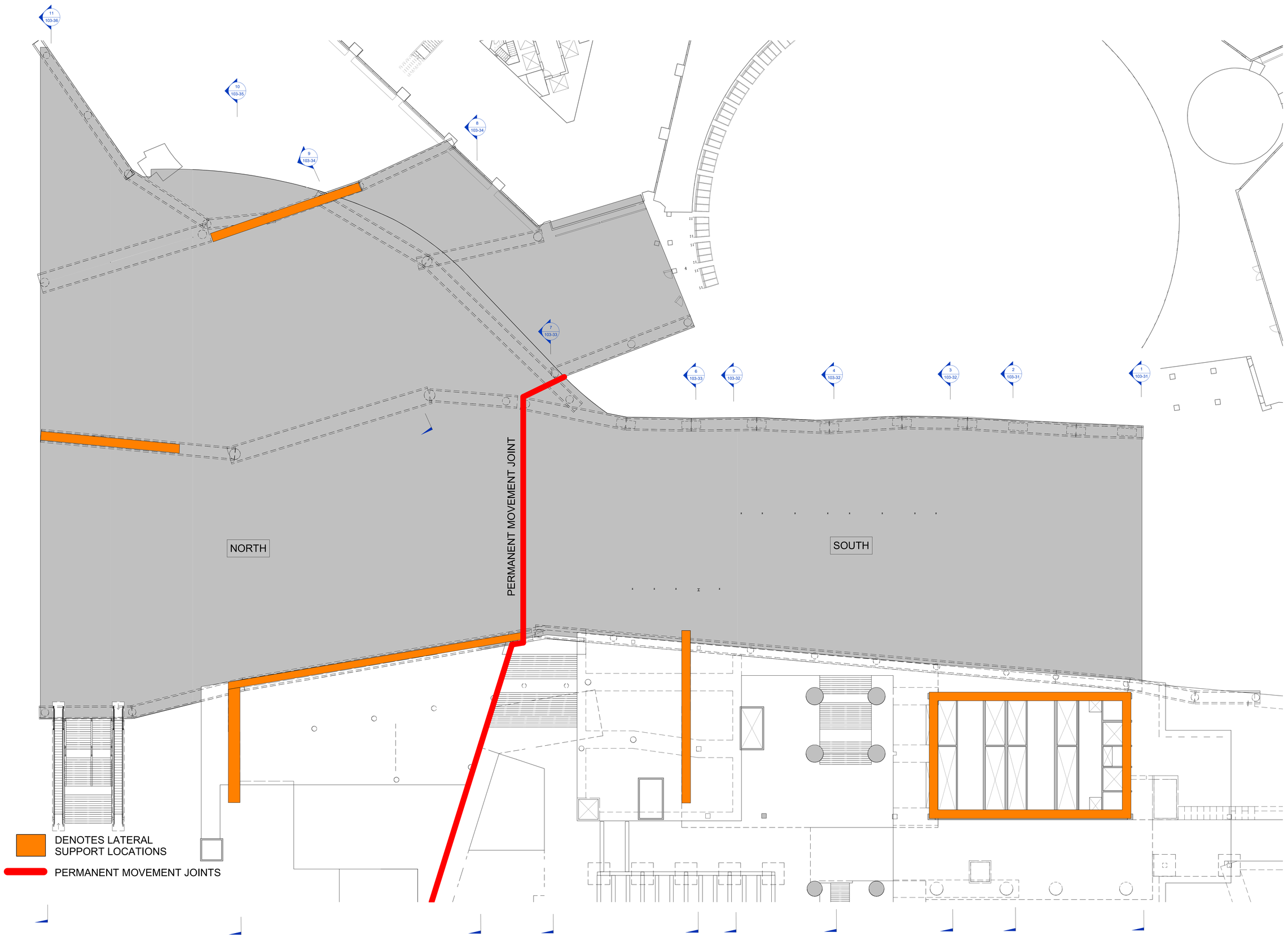

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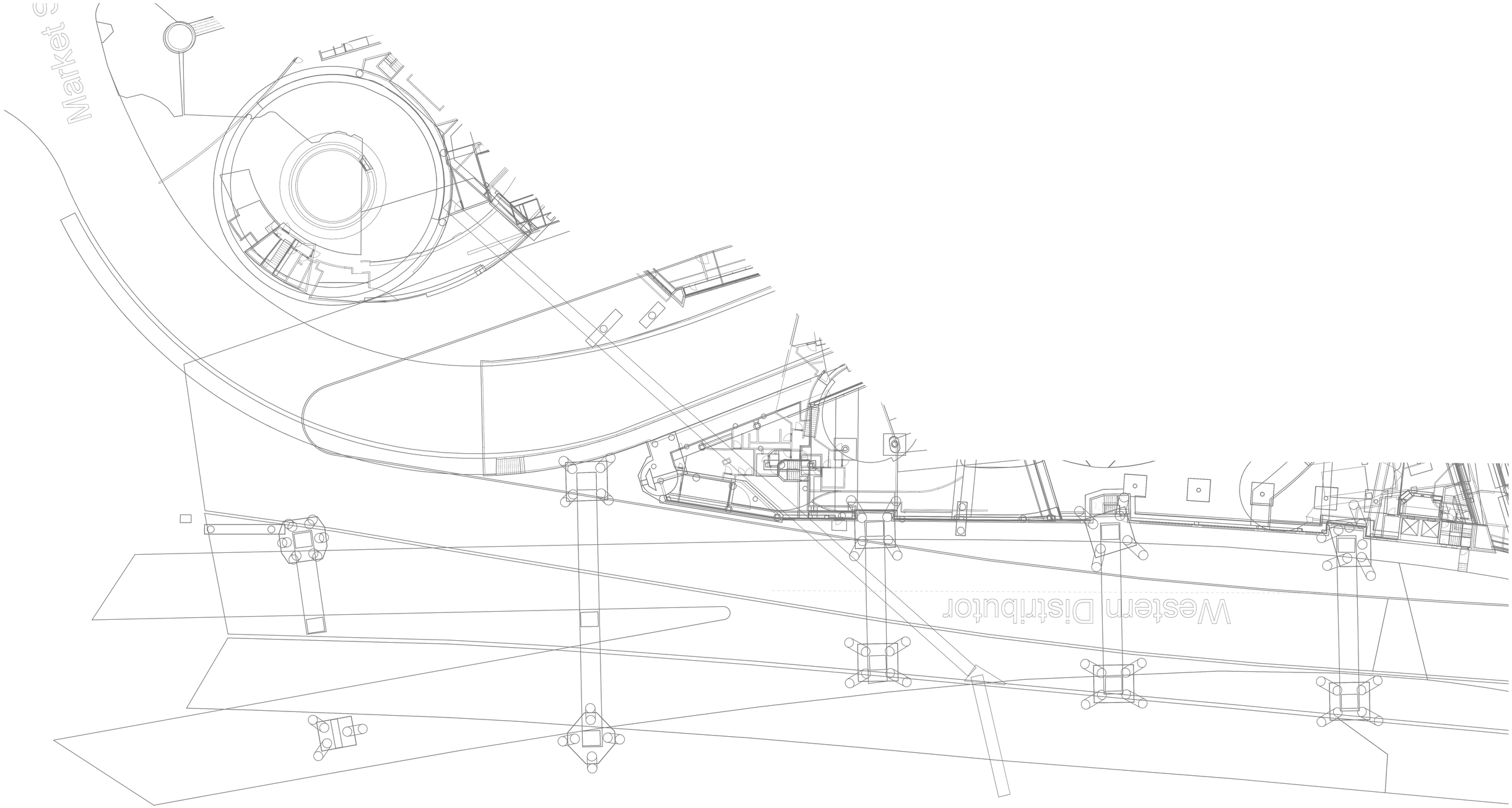

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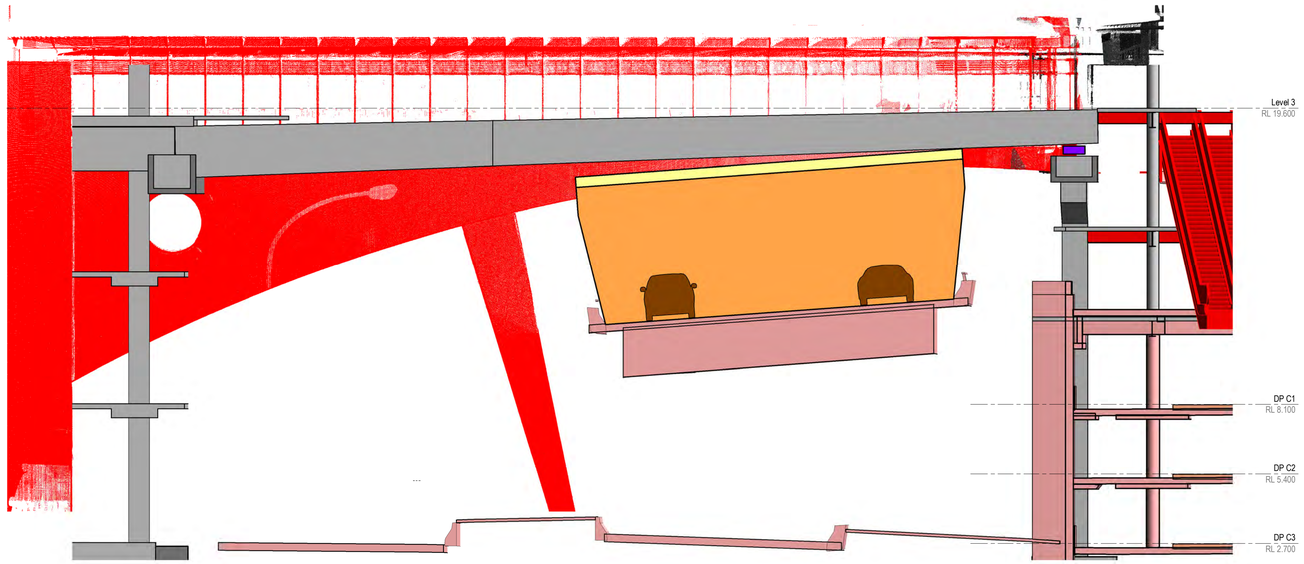
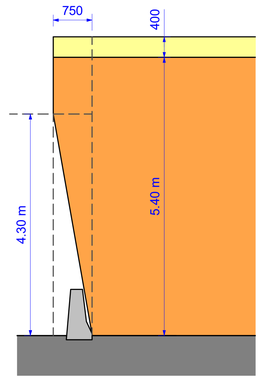
REV.
A



SECTION 1 / 103-22
1 : 100

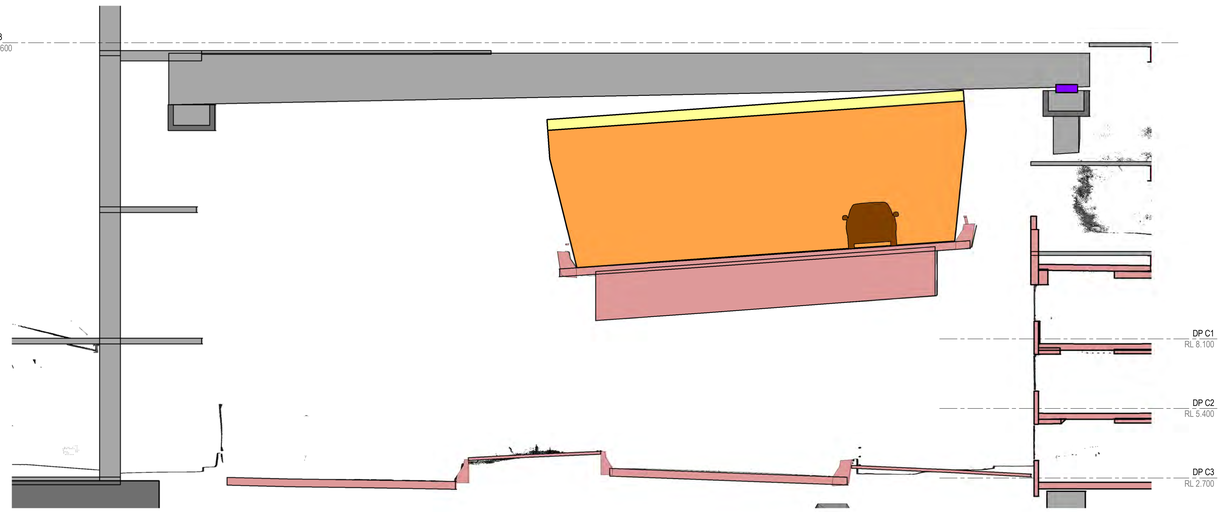


ROLL OVER CLEARANCES

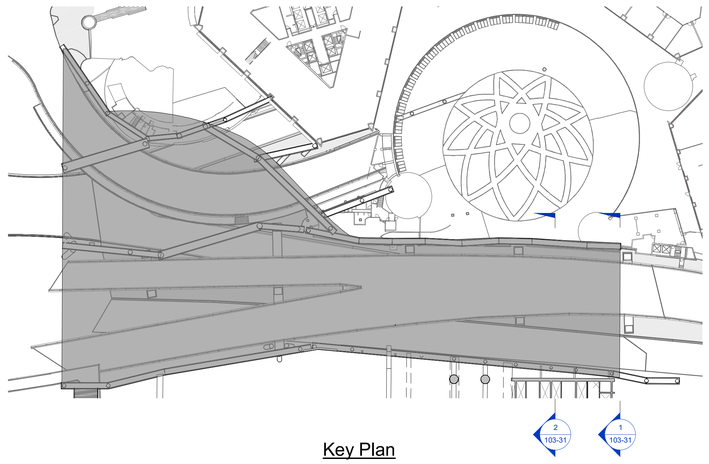
Denotes Existing Structure

Denotes Proposed Land Bridge Structure

Denotes Demolished Structure



SECTION 2 / 103-22
1 : 100



Key Plan
SCALE:1 : 700

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C	05.08.20	ISSUED FOR INFORMATION
D	12.05.21	ISSUED FOR INFORMATION
E	03.09.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

DRAWING TITLE
LAND BRIDGE - SECTIONS SHEET 1

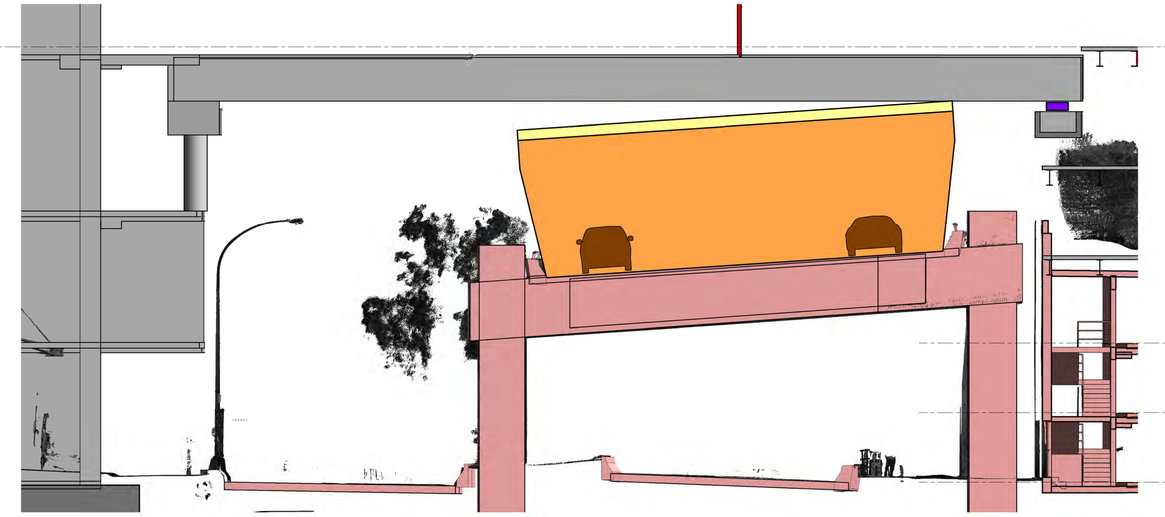
SCALE AT B1: As indicated
DRAWN BY: MTL
CHECKED BY: TBB

DRAWING STATUS
FOR INFORMATION

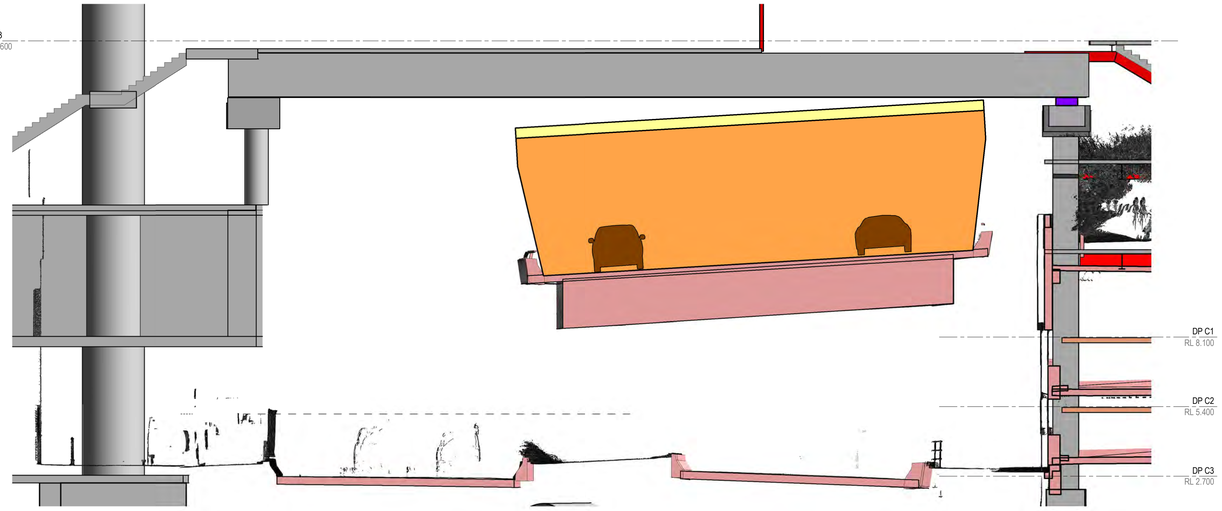
DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-31

REV.
E

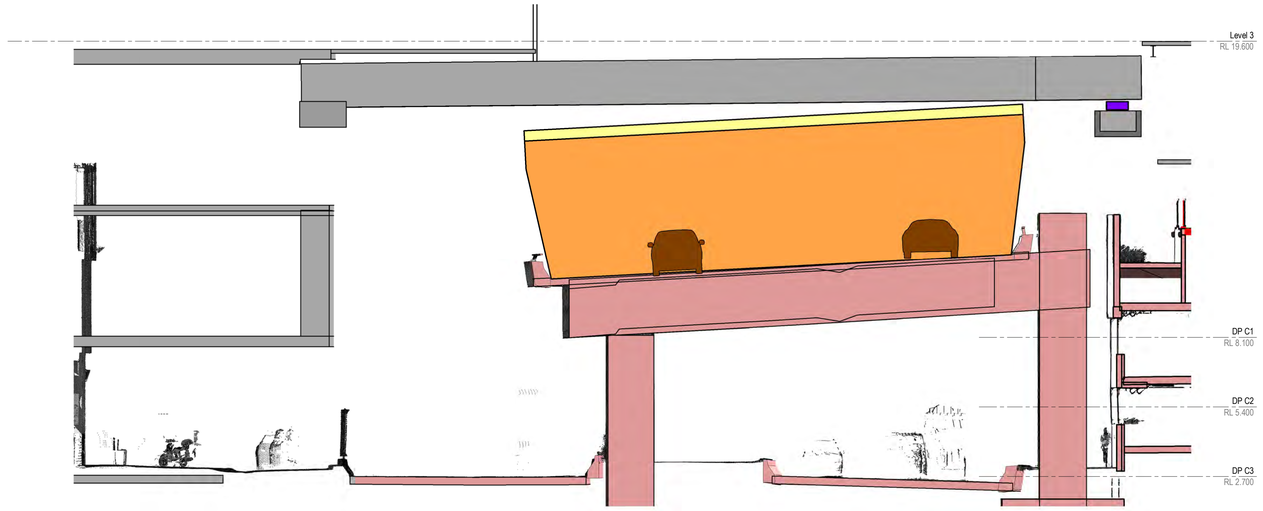
B1



SECTION 3
1 : 100
103-22



SECTION 4
1 : 100
103-22

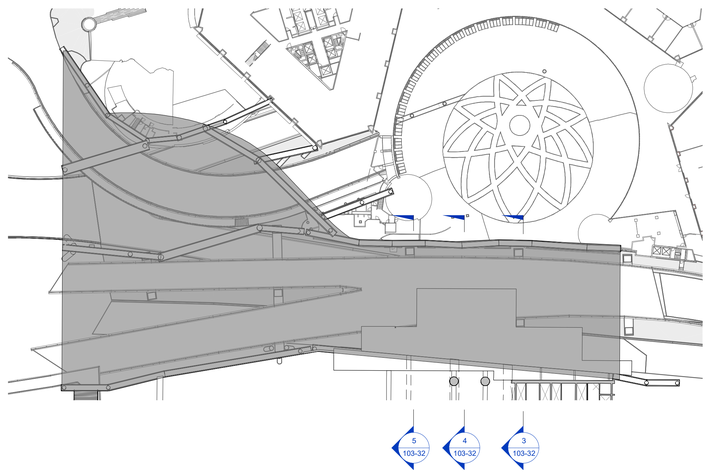


SECTION 5
1 : 100
103-22

Denotes Existing Structure

Denotes Proposed Land Bridge Structure

Denotes Demolished Structure



Key Plan
SCALE:1 : 700

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D	12.05.21	ISSUED FOR INFORMATION
E	03.09.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

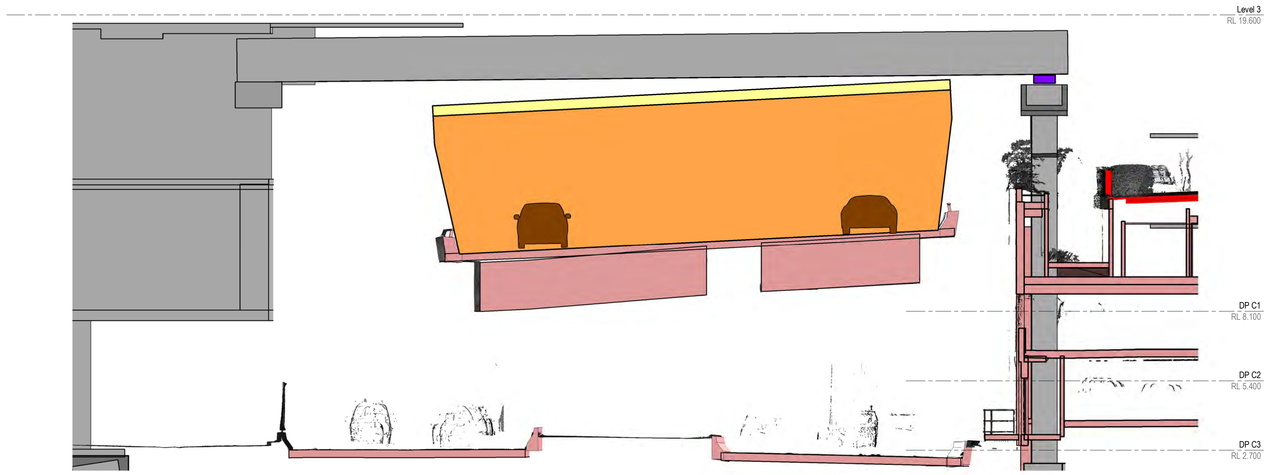
DRAWING TITLE
LAND BRIDGE - SECTIONS SHEET 2

SCALE AT B1: As indicated
DRAWN BY: MTL
CHECKED BY: TBB

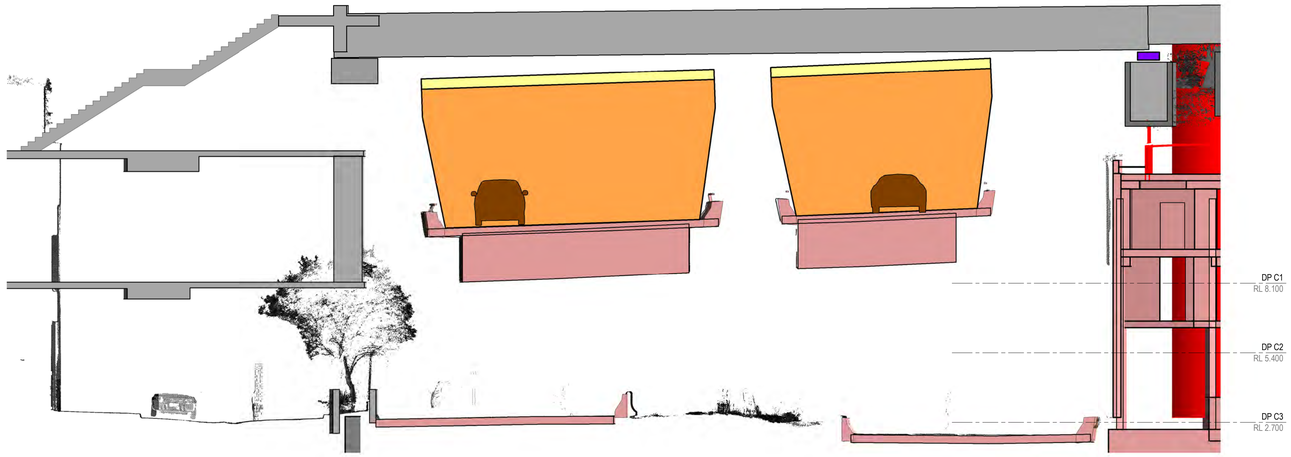
DRAWING STATUS
FOR INFORMATION

DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-32

REV.
E



SECTION 6
1 : 100
103-22

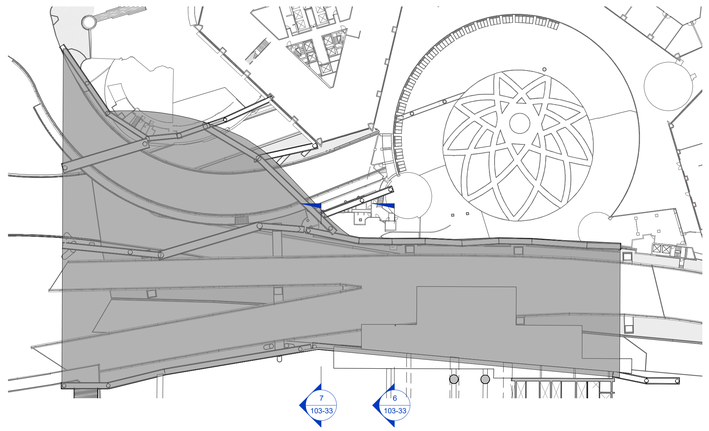


SECTION 7
1 : 100
103-22

Denotes Existing Structure

Denotes Proposed Land Bridge Structure

Denotes Demolished Structure



Key Plan
SCALE:1 : 700

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D	12.05.21	ISSUED FOR INFORMATION
E	03.09.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

DRAWING TITLE
LAND BRIDGE - SECTIONS SHEET 3

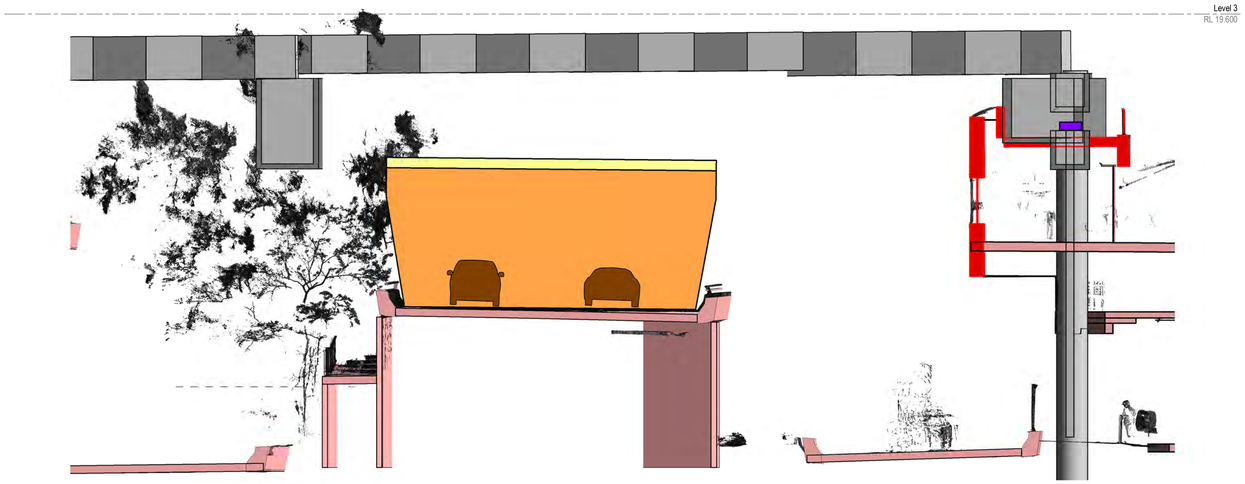
SCALE AT B1: As indicated
DRAWN BY: MTL
CHECKED BY: TBB

DRAWING STATUS
FOR INFORMATION

DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-33

REV.
E

SECTION 8
1 : 100
103-22

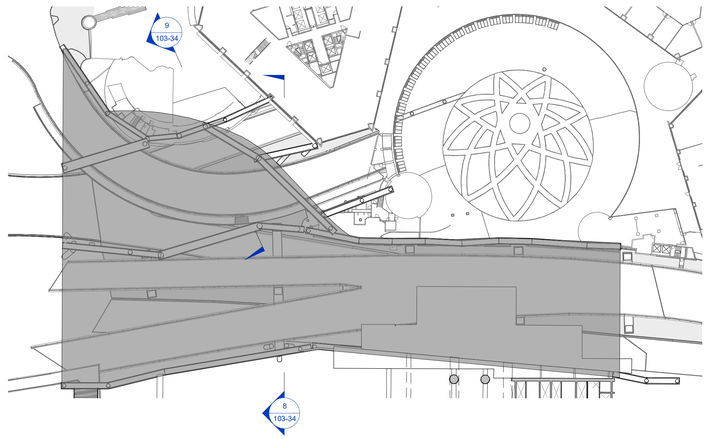


SECTION 9
1 : 100
103-22

Denotes Existing Structure

Denotes Proposed Land Bridge Structure

Denotes Demolished Structure



Key Plan
SCALE:1 : 700

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D	12.05.21	ISSUED FOR INFORMATION
E	03.09.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

DRAWING TITLE
LAND BRIDGE - SECTIONS SHEET 4

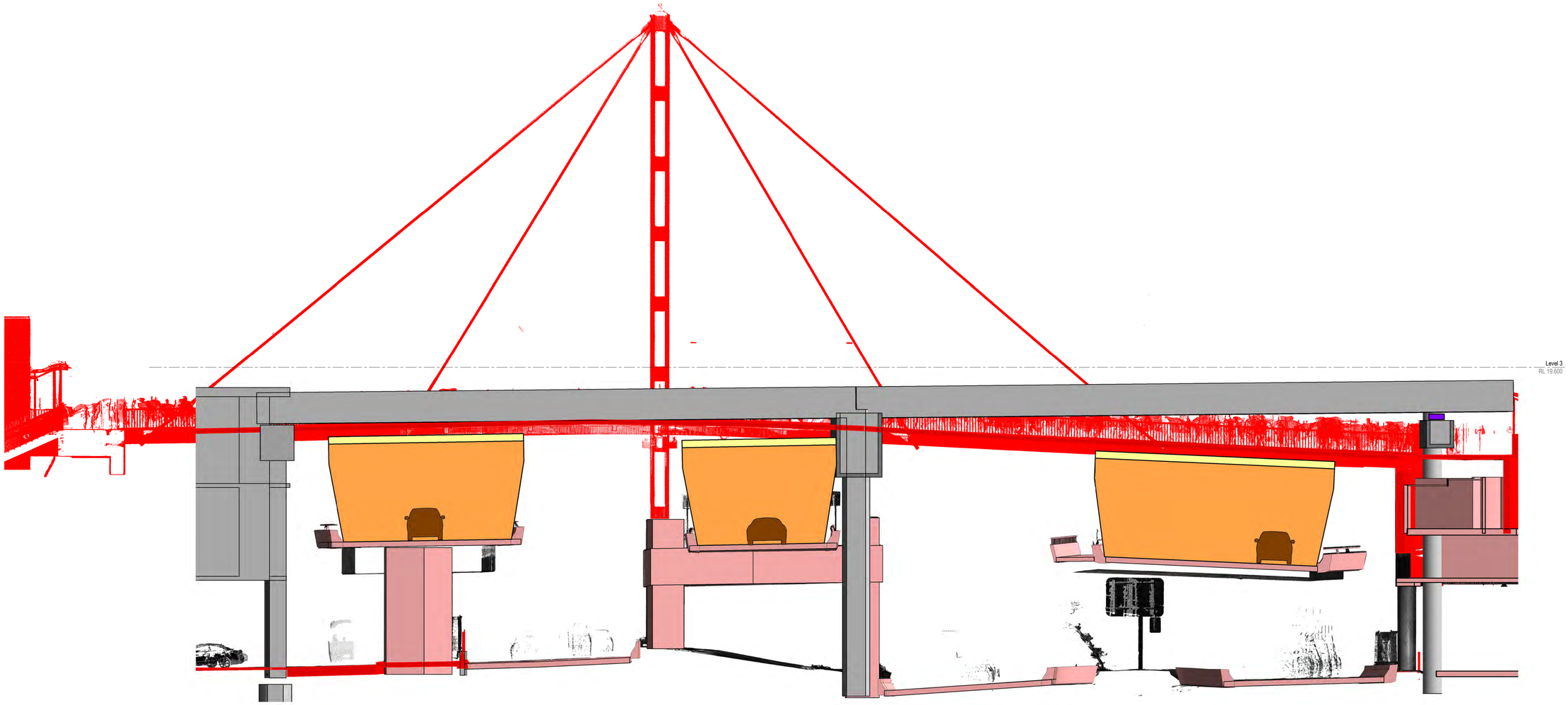
SCALE AT B1: As indicated
DRAWN BY: MTL
CHECKED BY: TBB

DRAWING STATUS
FOR INFORMATION

DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-34

REV.
E

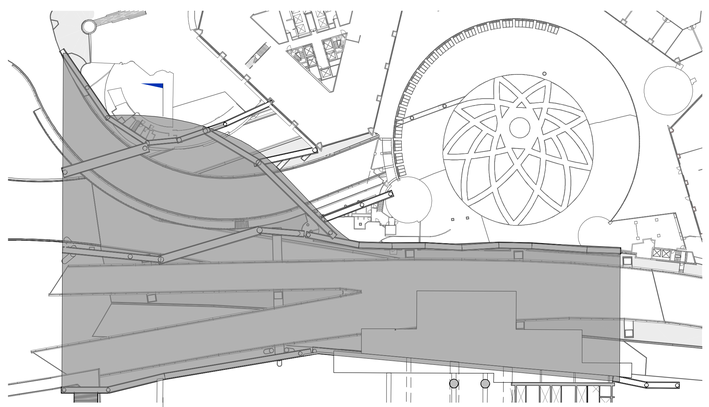
B1



Denotes Existing Structure

Denotes Proposed Land Bridge Structure

Denotes Demolished Structure



10
103-35

Key Plan
SCALE:1 : 700

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D	12.05.21	ISSUED FOR INFORMATION
E	03.09.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK
PROJECT NUMBER: 6054

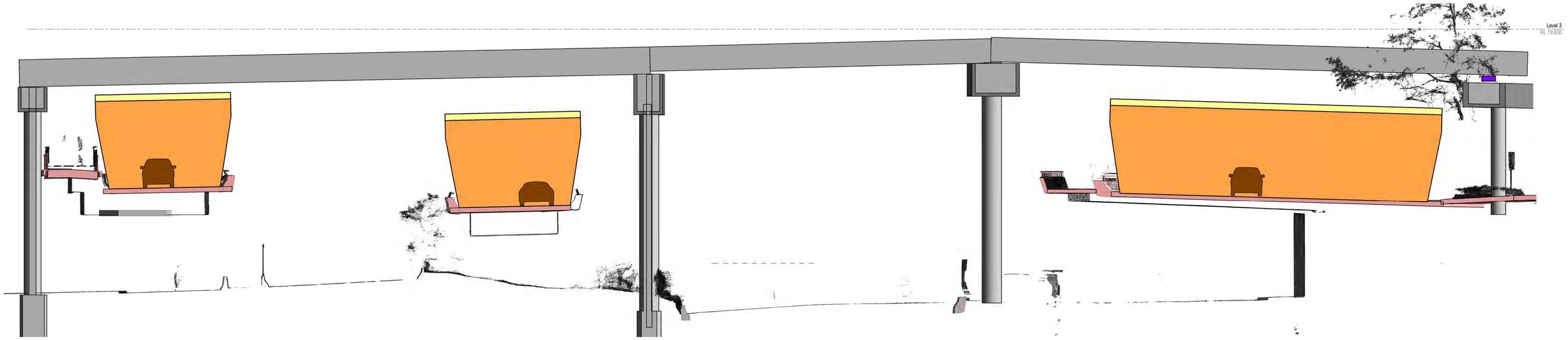
DRAWING TITLE
LAND BRIDGE - SECTIONS SHEET 5
SCALE AT B1: As indicated
DRAWN BY: MTL
CHECKED BY: TBB

DRAWING STATUS
FOR INFORMATION

DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-35

REV.
E

B1

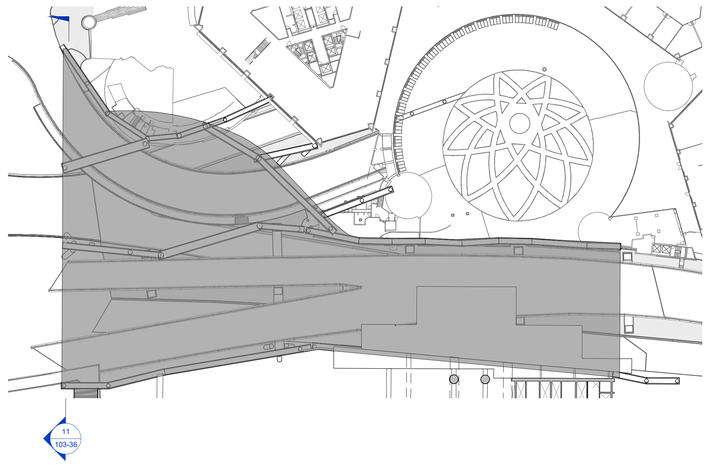


SECTION 11 103-22
1 : 100

Denotes Existing Structure

Denotes Proposed Land Bridge Structure

Denotes Demolished Structure



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C	05.08.20	ISSUED FOR INFORMATION
D	12.05.21	ISSUED FOR INFORMATION
E	03.09.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

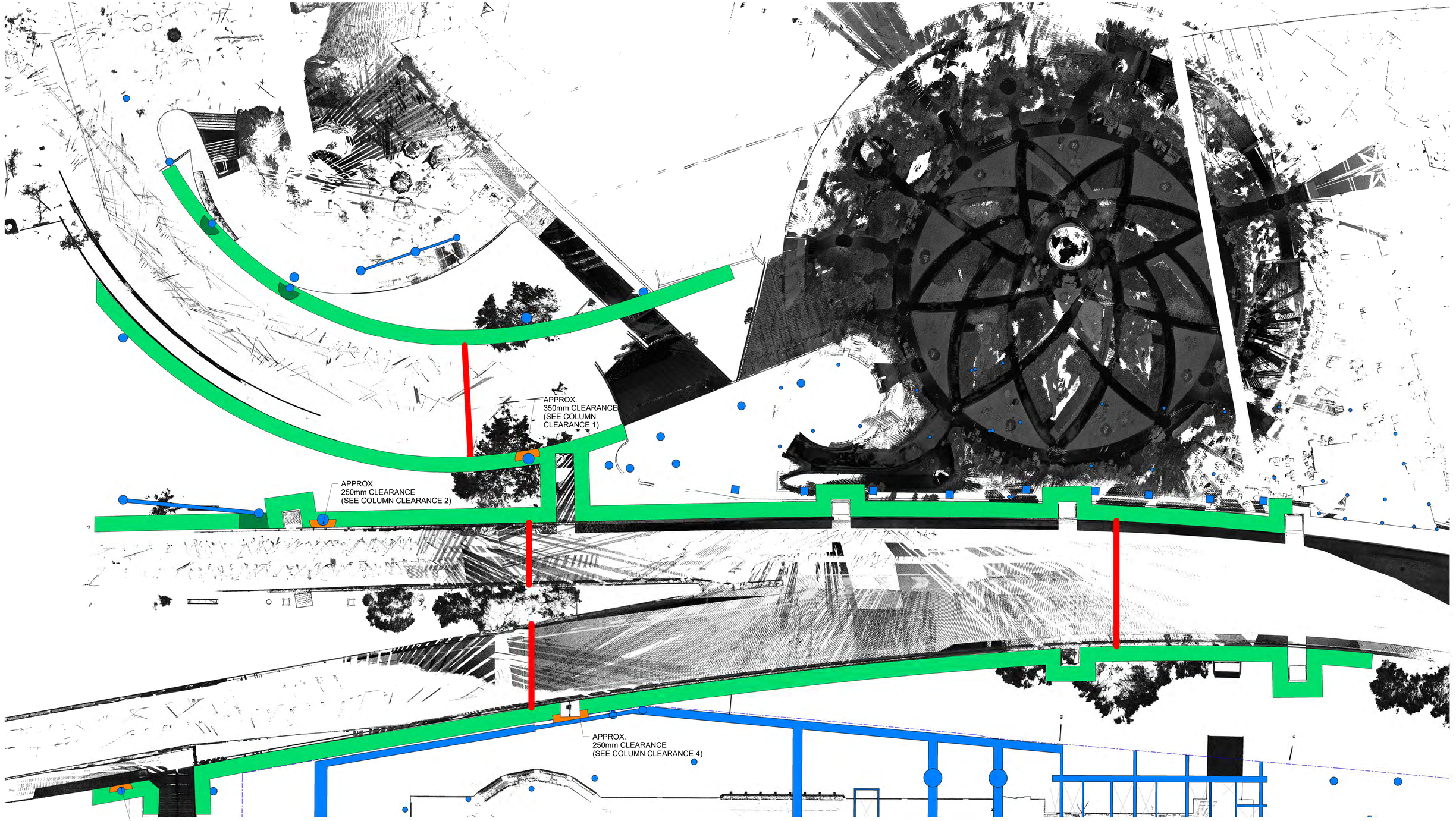
DRAWING TITLE
LAND BRIDGE - SECTIONS SHEET 6

SCALE AT B1: As indicated
DRAWN BY: MTL
CHECKED BY: TBB

DRAWING STATUS
FOR INFORMATION

DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-36

REV.
E



- OVER 2m CLEARNCE
- 1m to 2m CLEARNCE
- UNDER 1m CLEARNCE
- LAND BRIDGE SUPPORTS
- WESTERN DISTRIBUTOR JOINT LOCATIONS

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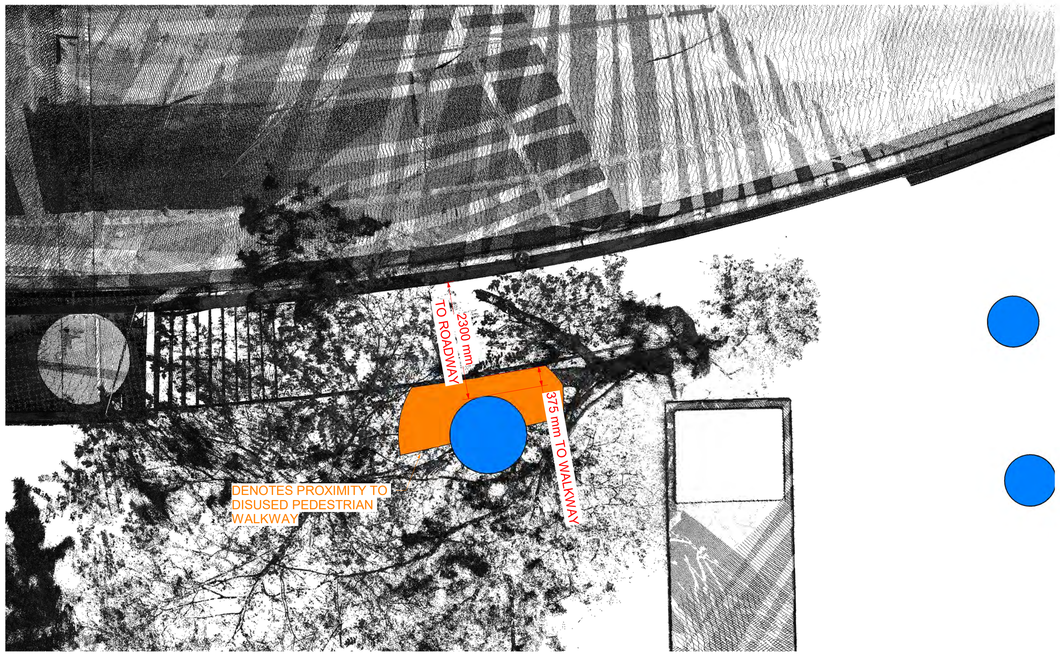
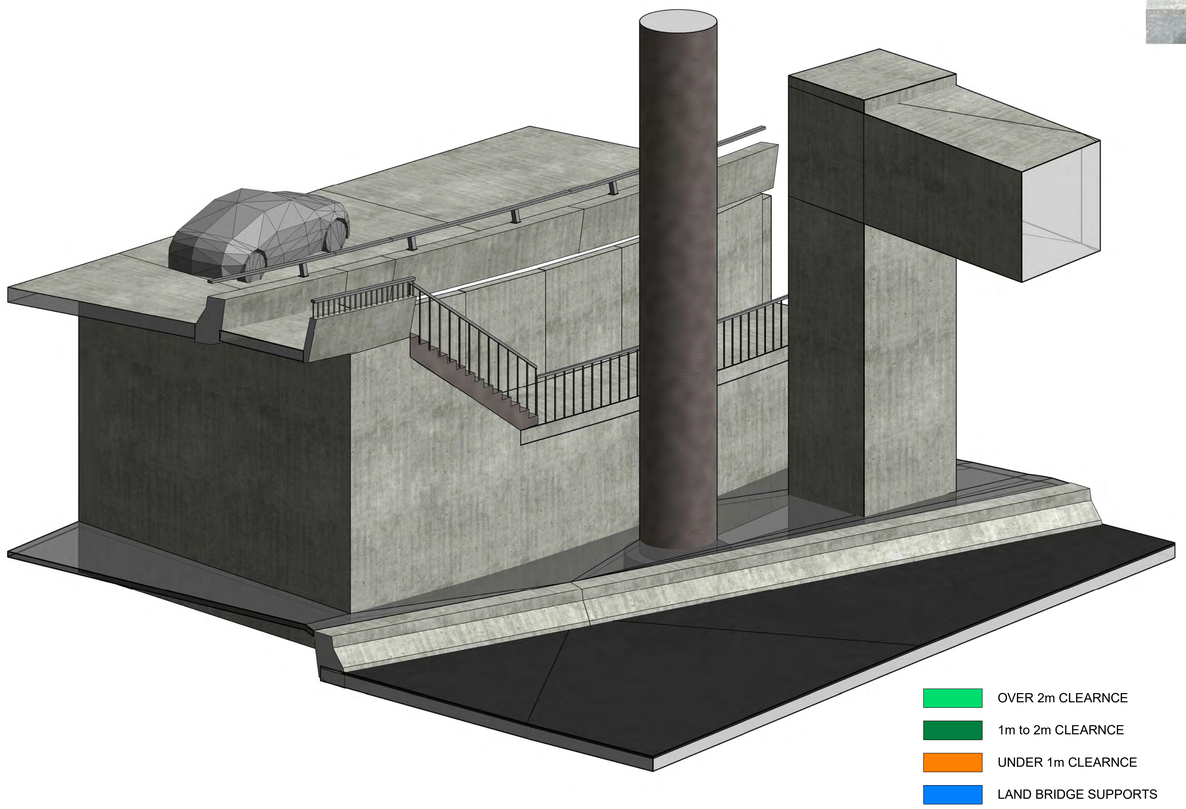
C	03.03.21	ISSUED FOR INFORMATION
D	12.05.21	ISSUED FOR INFORMATION
E	03.09.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK
PROJECT NUMBER: 6054

DRAWING TITLE
LAND BRIDGE - CLEARANCES TO ELEVATED WESTERN DISTRIBUTOR
SCALE AT B1: 1 : 200
DRAWN BY: ML
CHECKED BY: TBB

DRAWING STATUS
FOR INFORMATION
DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-80
REV.
E





OVER 2m CLEARNCE

1m to 2m CLEARNCE

UNDER 1m CLEARNCE

LAND BRIDGE SUPPORTS

WESTERN DISTRIBUTOR JOINT LOCATIONS

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C	25.02.21	ISSUED FOR INFORMATION
D	03.03.21	ISSUED FOR INFORMATION
E	12.05.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

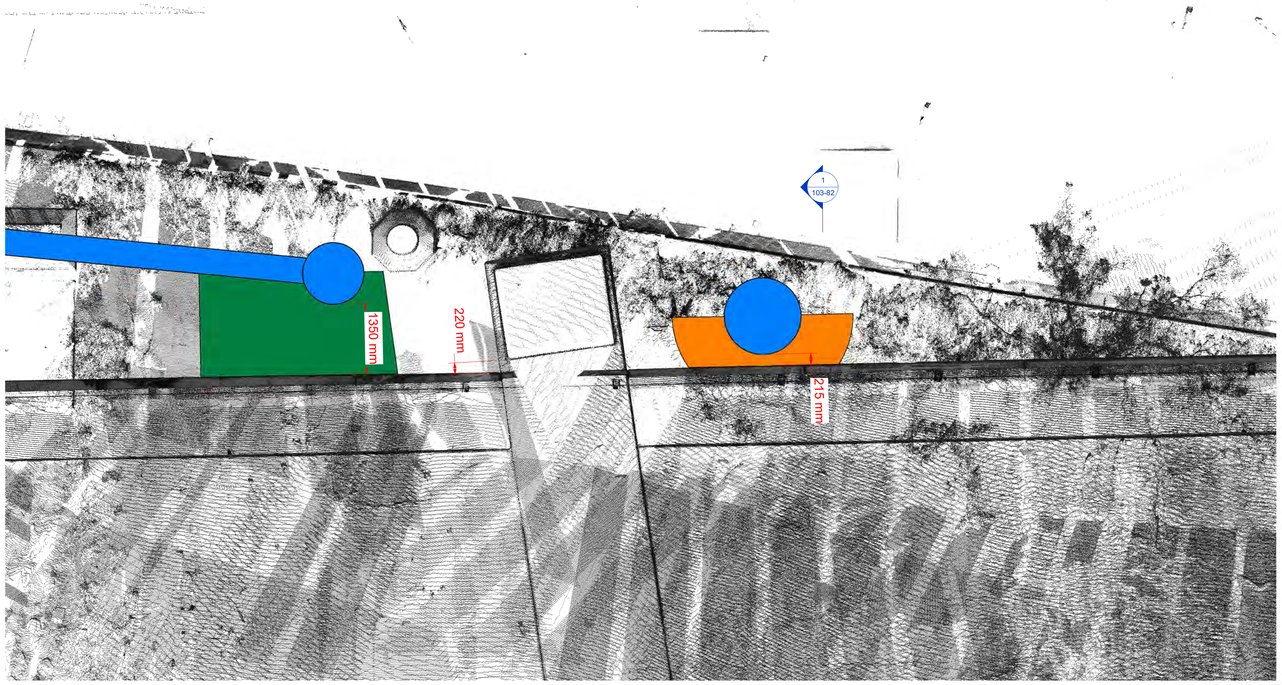
DRAWING TITLE
LAND BRIDGE - COLUMN CLEARANCE 1

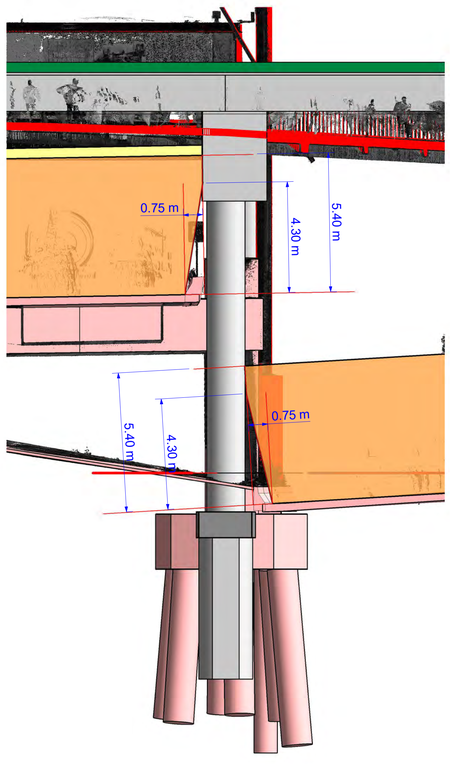
SCALE AT B1: 1 : 50 | DRAWN BY: Author | CHECKED BY: Checker

DRAWING STATUS
FOR INFORMATION

DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-81

REV.
E





SECTION 1 (103-22)
1 : 100

Denotes Existing Structure

Denotes Proposed Land Bridge Structure

Denotes Demolished Structure

OVER 2m CLEARNCE

1m to 2m CLEARNCE

UNDER 1m CLEARNCE

LAND BRIDGE SUPPORTS

WESTERN DISTRIBUTOR JOINT LOCATIONS

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D	12.05.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

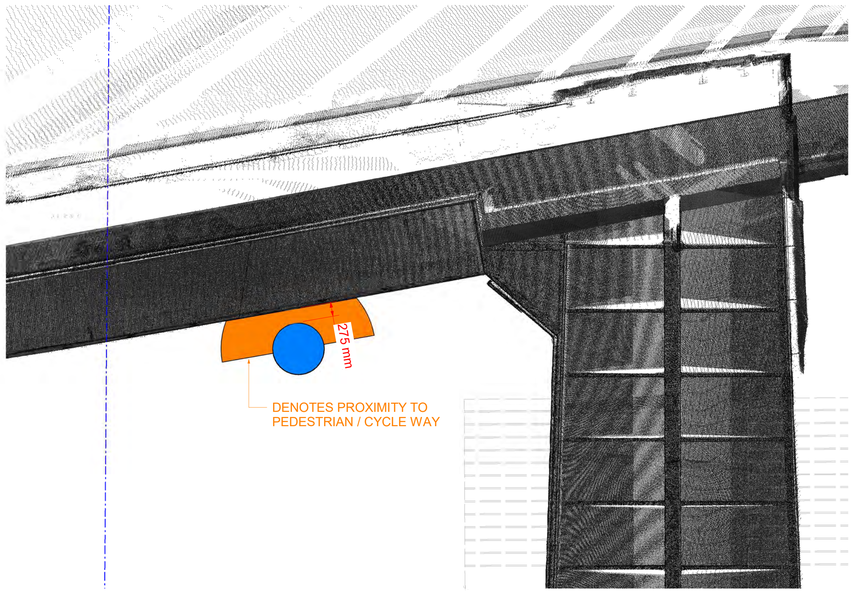
DRAWING TITLE
LAND BRIDGE - COLUMN CLEARANCE 2

SCALE AT B1: As indicated
DRAWN BY: Author
CHECKED BY: Checker

DRAWING STATUS
FOR INFORMATION

DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-82

REV.
D



OVER 2m CLEARNCE

1m to 2m CLEARNCE

UNDER 1m CLEARNCE

LAND BRIDGE SUPPORTS

WESTERN DISTRIBUTOR JOINT LOCATIONS

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D	03.03.21	ISSUED FOR INFORMATION
E	12.05.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

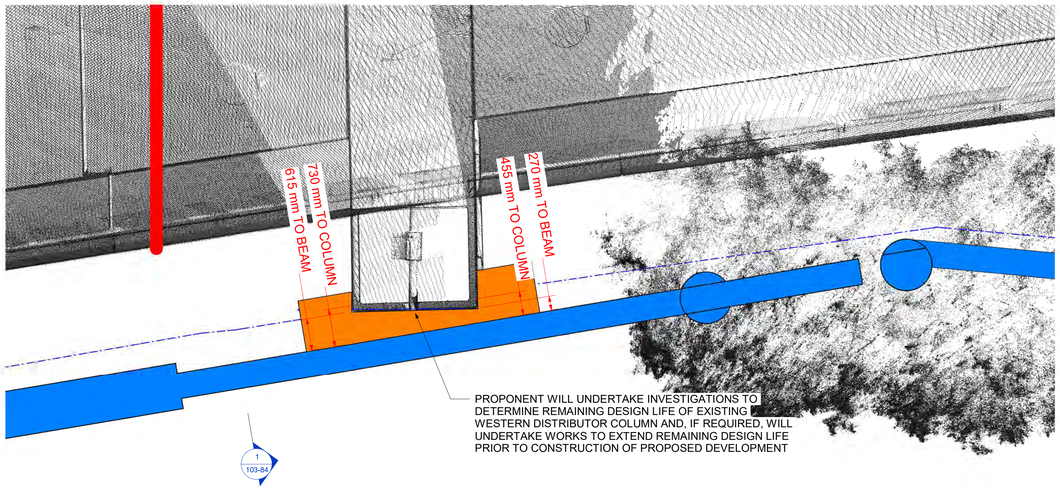
DRAWING TITLE
LAND BRIDGE - COLUMN CLEARANCE 3

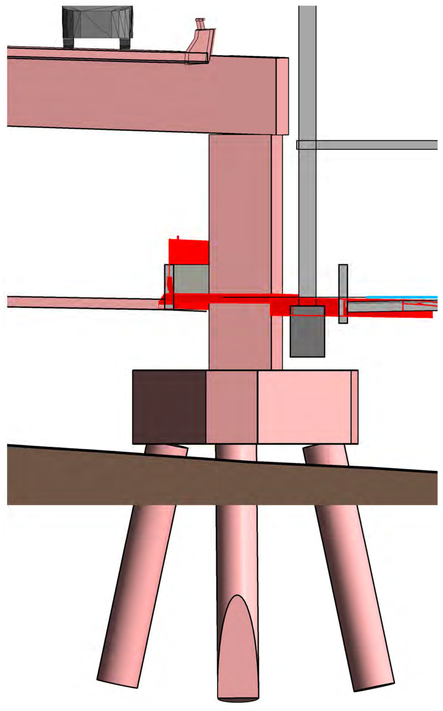
SCALE AT B1: 1 : 50 | DRAWN BY: Author | CHECKED BY: Checker

DRAWING STATUS
FOR INFORMATION

DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-83

REV.
E





Denotes Existing Structure

Denotes Proposed Land Bridge Structure

Denotes Demolished Structure

OVER 2m CLEARNCE

1m to 2m CLEARNCE

UNDER 1m CLEARNCE

LAND BRIDGE SUPPORTS

WESTERN DISTRIBUTOR JOINT LOCATIONS

SECTION 1 : 75
1
103-22

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PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

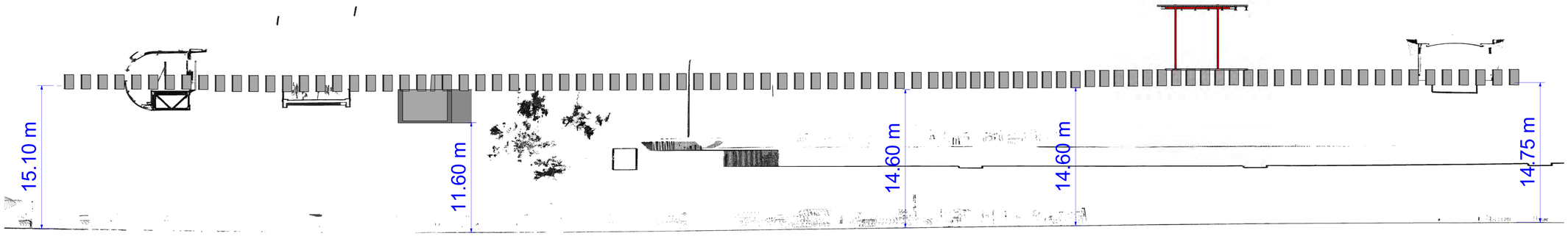
DRAWING TITLE
LAND BRIDGE - COLUMN CLEARANCE 4

SCALE AT B1: As indicated
DRAWN BY: Author
CHECKED BY: Checker

DRAWING STATUS
FOR INFORMATION

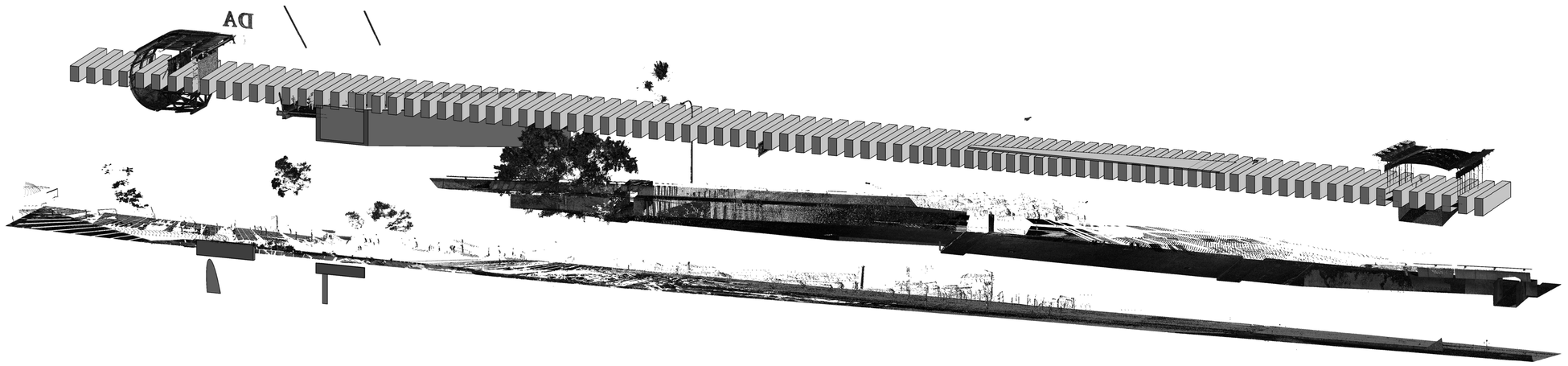
DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-84

REV.
E



Landbridge Long Section

SCALE: 1 : 200



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D	03.09.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

DRAWING TITLE
LAND BRIDGE - LONG SECTION

SCALE AT B1: 1 : 200 | DRAWN BY: Author | CHECKED BY: Checker

DRAWING STATUS
FOR INFORMATION

DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-85

REV.
D

B1

Supports within owner site boundary

Supports behind barriers within road network

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C	12.05.21	ISSUED FOR INFORMATION
D	03.09.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

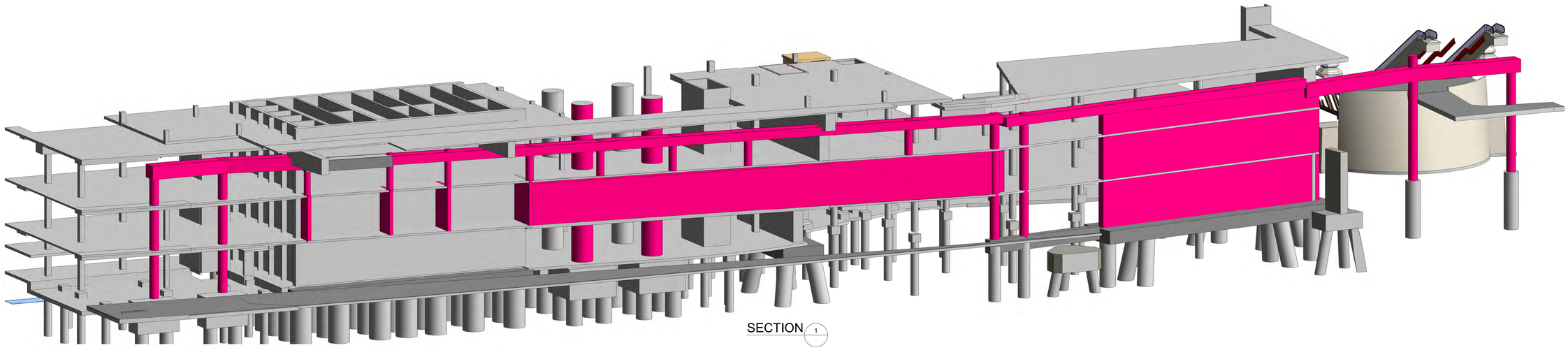
DRAWING TITLE
LAND BRIDGE - WESTERN DISTRIBUTOR
FOUNDATION OVERLAY

SCALE AT B1: 1 : 200 | DRAWN BY: MTL | CHECKED BY: TBB

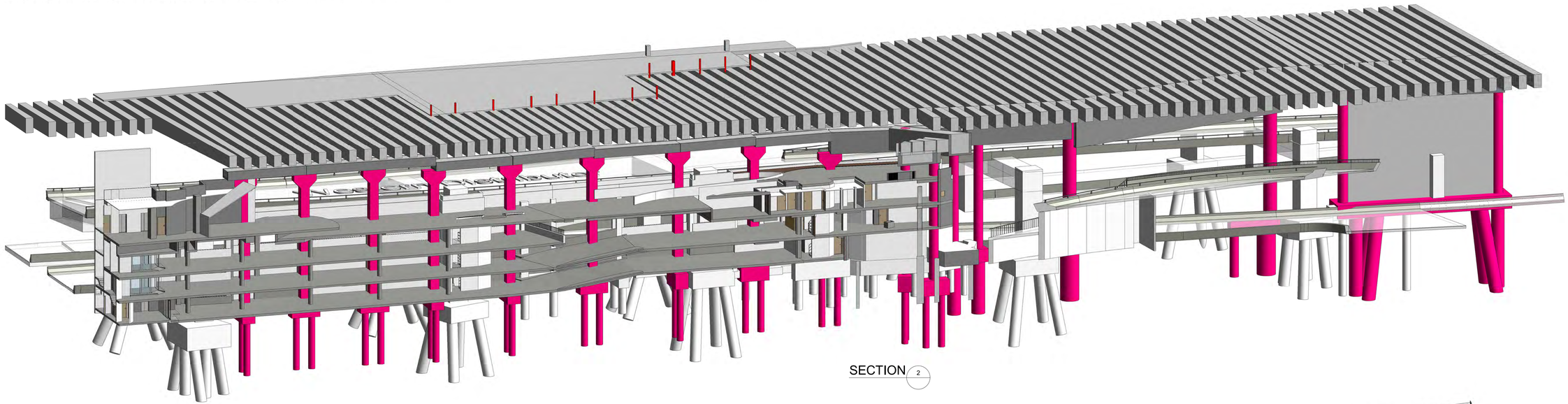
DRAWING STATUS
FOR INFORMATION

DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-86

REV.
D



SECTION 1



SECTION 2

Denotes Landbridge support Structure

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FOR GENERAL NOTES REFER TO DRAWING ST-001-00

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B	03.09.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

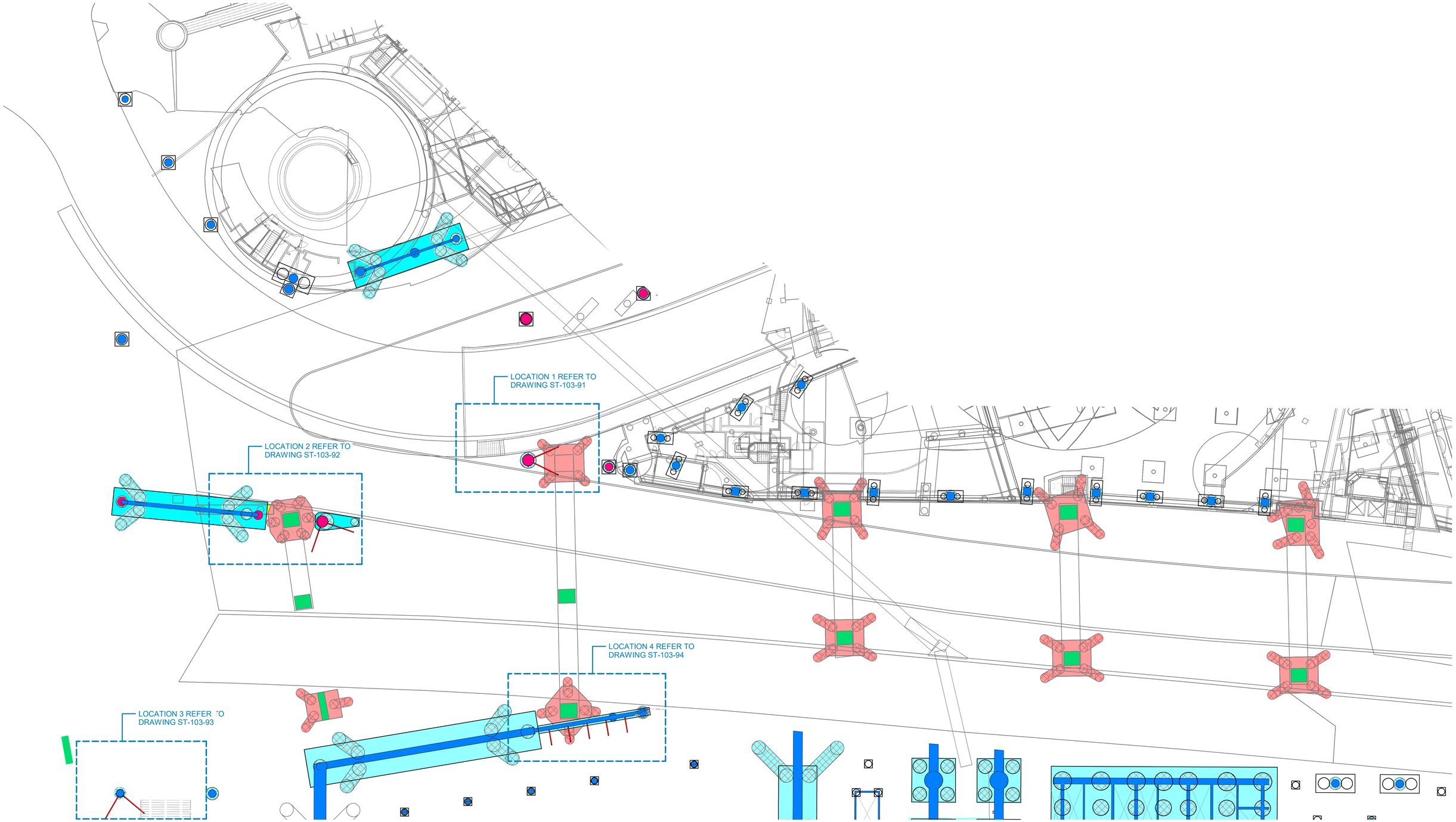
DRAWING TITLE
LANDBRIDGE - SUPPORT COLUMNS

SCALE AT B1:
DRAWN BY: ML
CHECKED BY: TBB

DRAWING STATUS
FOR INFORMATION

DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-87

REV.
B



TEMPORARY FORMWORK PROPS

EXISTING STRUCTURE TO BE DEMOLISHED

EXISTING FOUNDATIONS

EXISTING PILES

EXISTING COLUMNS

NEW FOUNDATIONS

NEW PILES

NEW COLUMNS/WALLS (ON SITE)

NEW COLUMNS (WITHIN WESTERN DISTRIBUTOR CORRIDOR SITE)

ELEMENT LEGEND

STRUCTURAL
enstruct
enstruct group pty ltd
Level 4, 2 Glen Street, Milsons Point NSW 2061
Telephone (02) 8904 1444
http: //www.enstruct.com.au

CLIENT
The GPT Group
AMP CAPITAL

Rev.	Date	Description
A	03.03.21	ISSUED FOR INFORMATION
B	12.05.21	ISSUED FOR INFORMATION
C	03.09.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

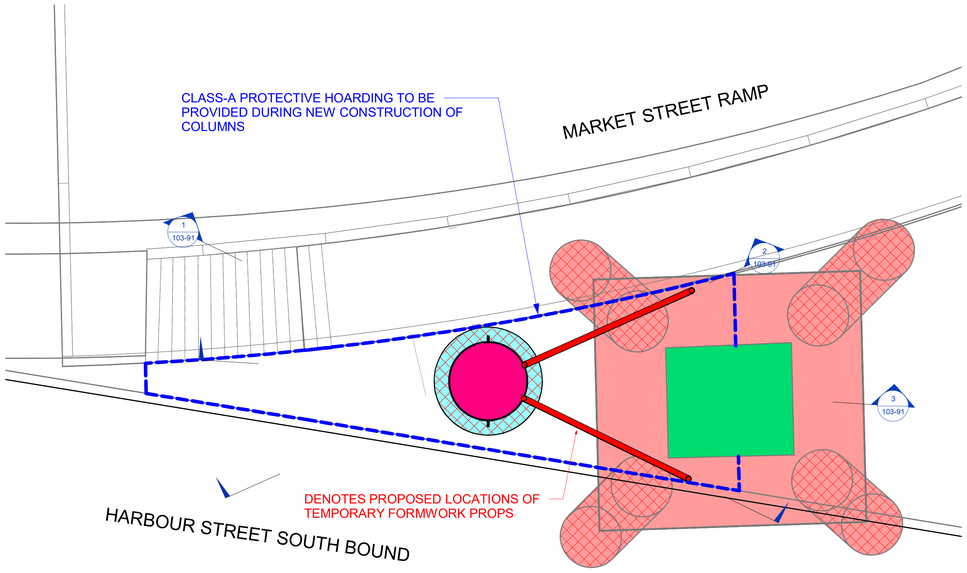
DRAWING TITLE
LAND BRIDGE - COLUMN CONSTRUCTION OVERALL

SCALE AT B1: 1 : 200 | DRAWN BY: Author | CHECKED BY: Checker

DRAWING STATUS
FOR INFORMATION

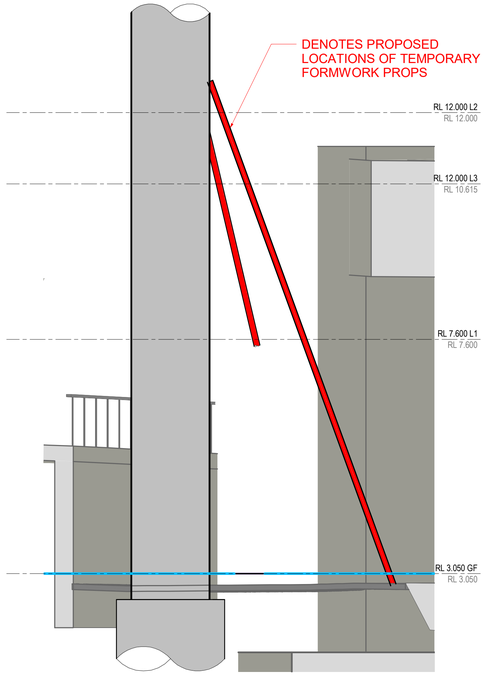
DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-90

REV.
C



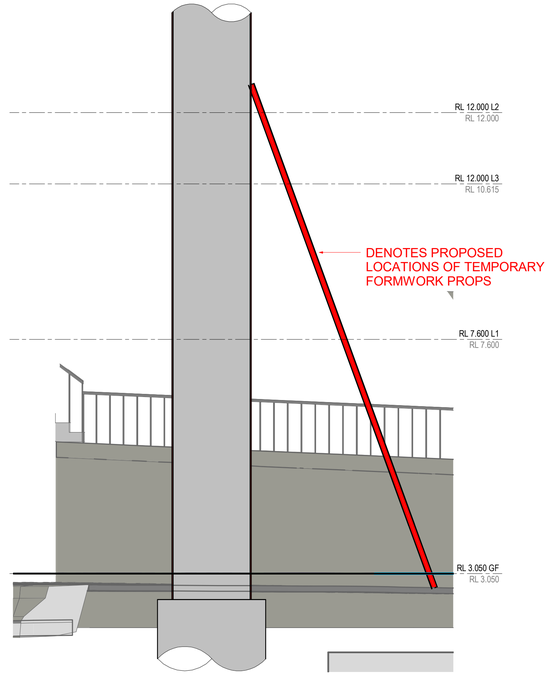
COLUMN LOCATION 1 LB CONSTRUCTION PHASE

SCALE: 1 : 50



SECTION 1 / 103-91

1 : 50



SECTION 2 / 103-91

1 : 50

TEMPORARY FORMWORK PROPS

EXISTING STRUCTURE TO BE DEMOLISHED

EXISTING FOUNDATIONS

EXISTING PILES

EXISTING COLUMNS

NEW FOUNDATIONS

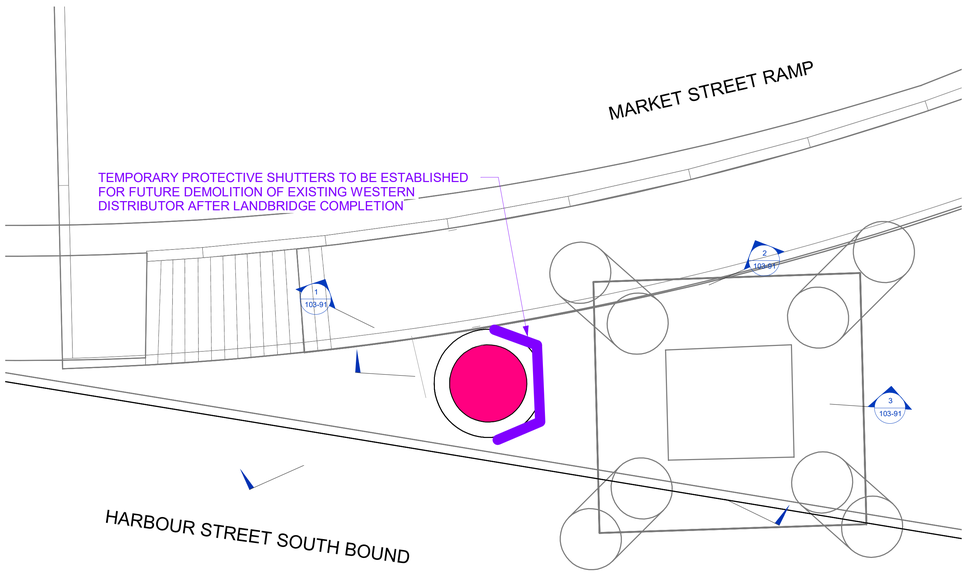
NEW PILES

NEW COLUMNS/WALLS (ON SITE)

NEW COLUMNS (WITHIN WESTERN DISTRIBUTOR CORRIDOR SITE)

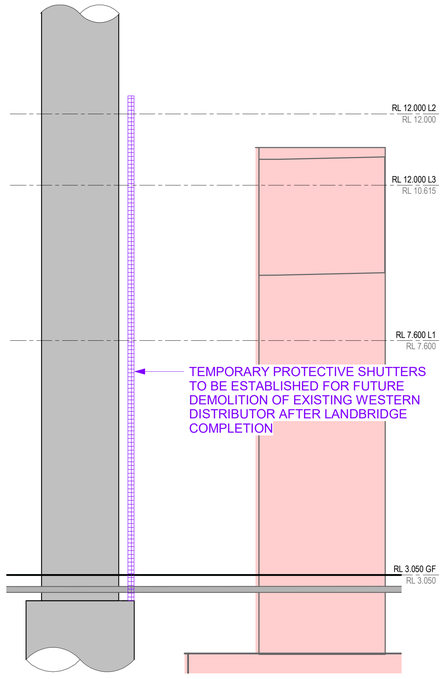
ELEMENT LEGEND

SCALE: 1 : 200



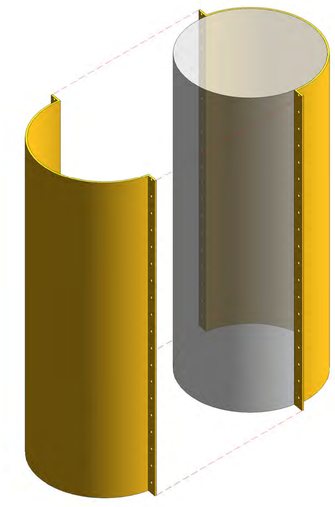
COLUMN LOCATION 1 WD DEMOLITION PHASE

SCALE: 1 : 50



SECTION 3 / 103-91

1 : 50



TYPICAL COLUMN FORMWORK ISOMETRIC

SCALE:

STRUCTURAL
enstruct
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Telephone (02) 8904 1444
http: //www.enstruct.com.au

CLIENT
The GPT Group
AMP CAPITAL

Rev.	Date	Description
A	03.03.21	ISSUED FOR INFORMATION
B	08.03.21	ISSUED FOR INFORMATION
C	12.05.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

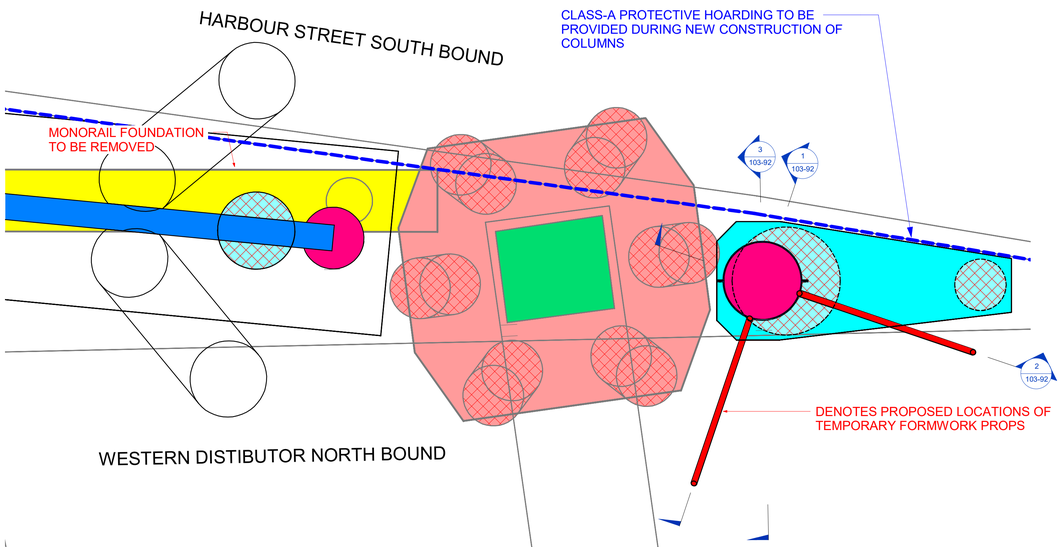
DRAWING TITLE
LAND BRIDGE - COLUMN CONSTRUCTION LOCATION 1

SCALE AT B1: As indicated
DRAWN BY: Author
CHECKED BY: Checker

DRAWING STATUS
FOR INFORMATION

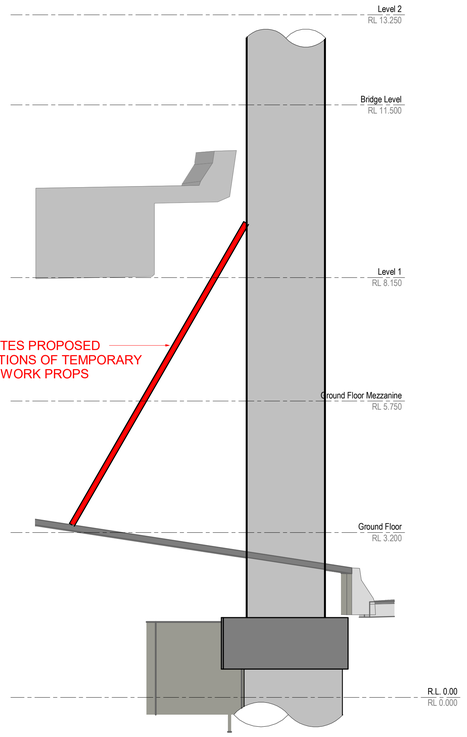
DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-91

REV.
C



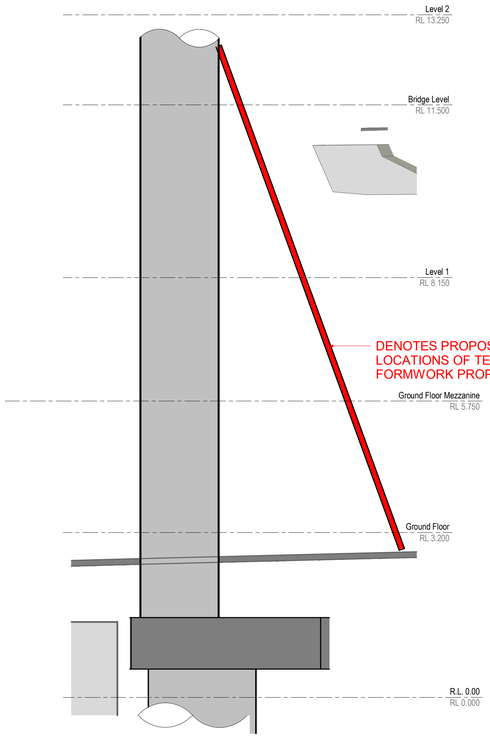
COLUMN LOCATION 2 LB CONSTRUCTION PHASE

SCALE: 1 : 50



SECTION 1 103-92

1 : 50



SECTION 2 103-92

1 : 50

TEMPORARY FORMWORK PROPS

EXISTING STRUCTURE TO BE DEMOLISHED

EXISTING FOUNDATIONS

EXISTING PILES

EXISTING COLUMNS

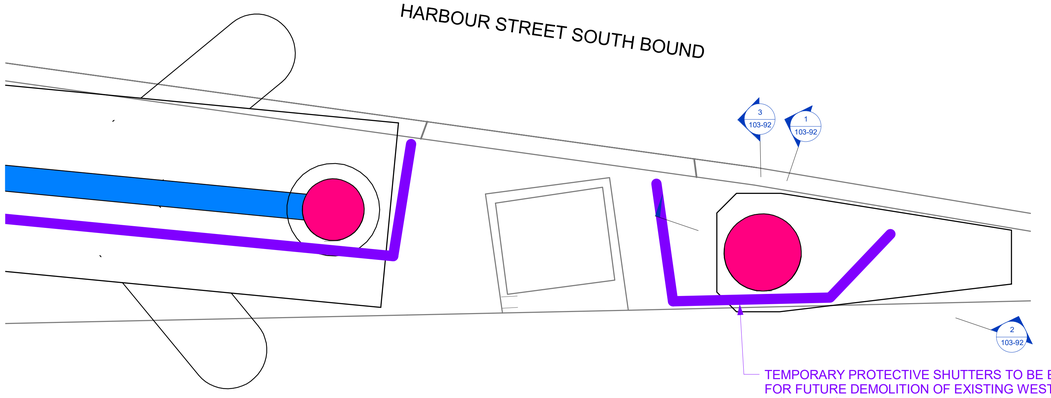
NEW FOUNDATIONS

NEW PILES

NEW COLUMNS/WALLS (ON SITE)

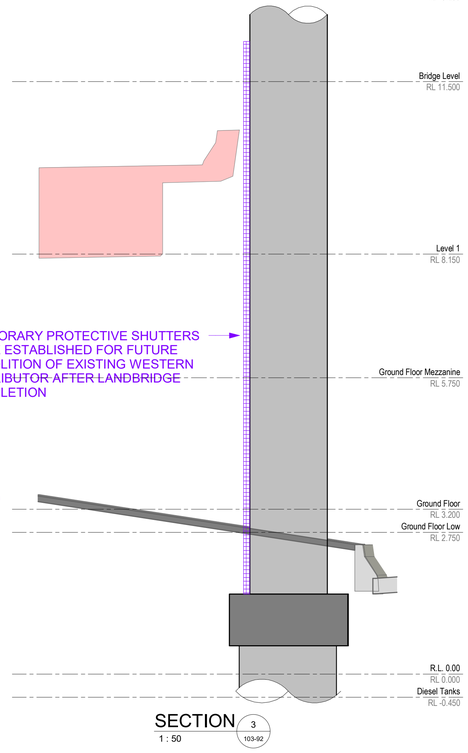
NEW COLUMNS (WITHIN WESTERN DISTRIBUTOR CORRIDOR SITE)

ELEMENT LEGEND



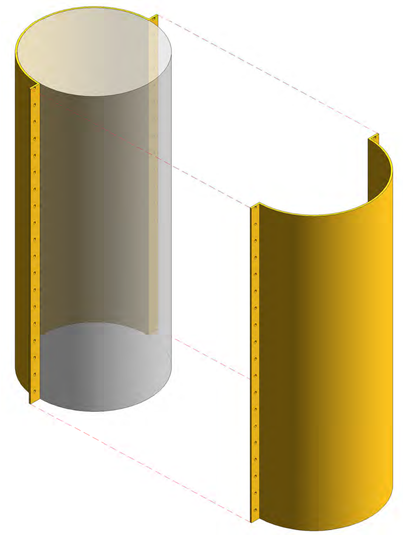
COLUMN LOCATION 2 WD DEMOLITION PHASE

SCALE: 1 : 50



SECTION 3 103-92

1 : 50



TYPICAL COLUMN FORMWORK ISOMETRIC

SCALE:

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http: //www.enstruct.com.au

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AMP CAPITAL

Rev.	Date	Description
A	03.03.21	ISSUED FOR INFORMATION
B	08.03.21	ISSUED FOR INFORMATION
C	12.05.21	ISSUED FOR INFORMATION
D	03.09.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

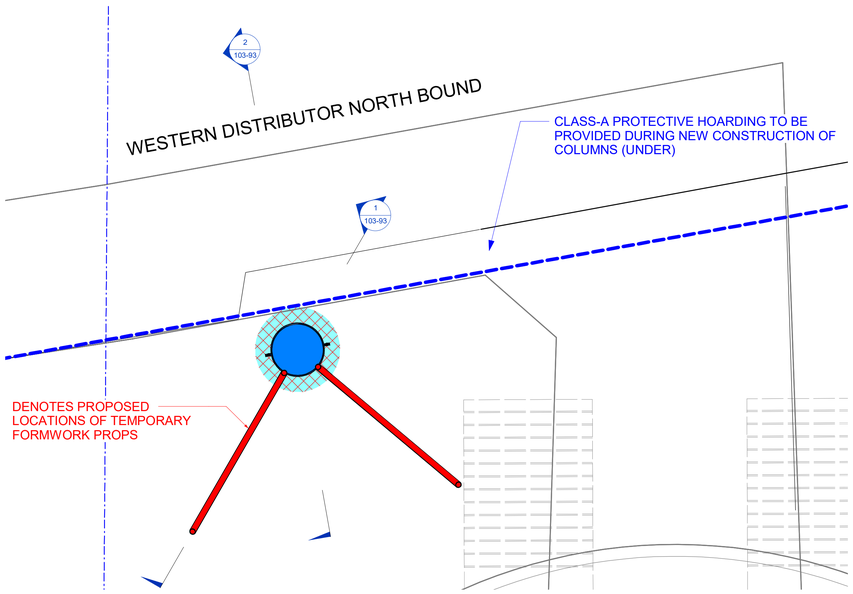
DRAWING TITLE
LAND BRIDGE - COLUMN CONSTRUCTION LOCATION 2

SCALE AT B1: As indicated | DRAWN BY: Author | CHECKED BY: Checker

DRAWING STATUS
FOR INFORMATION

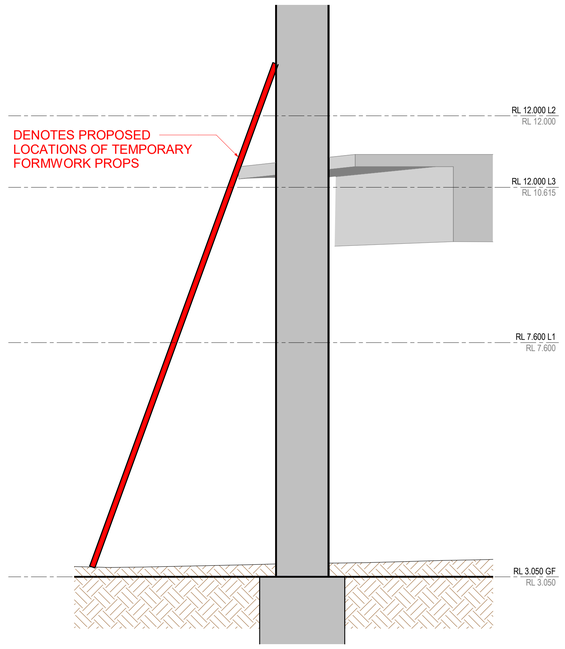
DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-92

REV.
D



COLUMN LOCATION 3 CONSTRUCTION PHASE

SCALE: 1 : 50

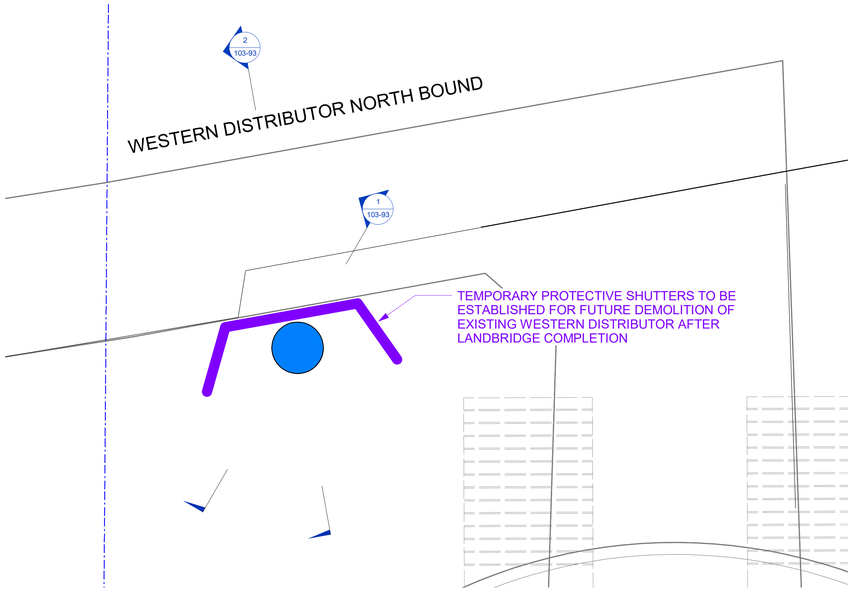


SECTION 1/103-93

1 : 50

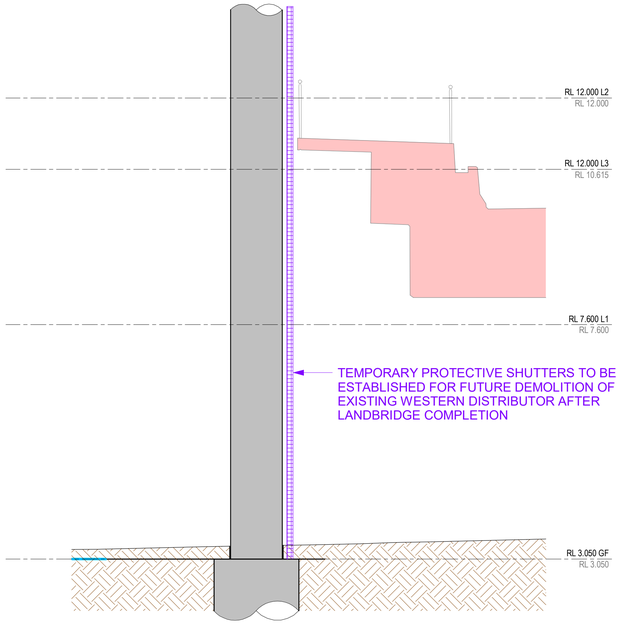
- TEMPORARY FORMWORK PROPS
- EXISTING STRUCTURE TO BE DEMOLISHED
- EXISTING FOUNDATIONS
- EXISTING PILES
- EXISTING COLUMNS
- NEW FOUNDATIONS
- NEW PILES
- NEW COLUMNS/WALLS (ON SITE)
- NEW COLUMNS (WITHIN WESTERN DISTRIBUTOR CORRIDOR SITE)

ELEMENT LEGEND



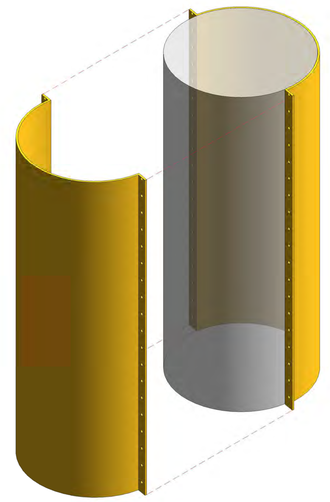
COLUMN LOCATION 3 - WD DEMOLITION PHASE

SCALE: 1 : 50



SECTION 2/103-93

1 : 50



TYPICAL COLUMN FORMWORK ISOMETRIC

SCALE:

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AMP CAPITAL

Rev.	Date	Description
A	03.03.21	ISSUED FOR INFORMATION
B	08.03.21	ISSUED FOR INFORMATION
C	12.05.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

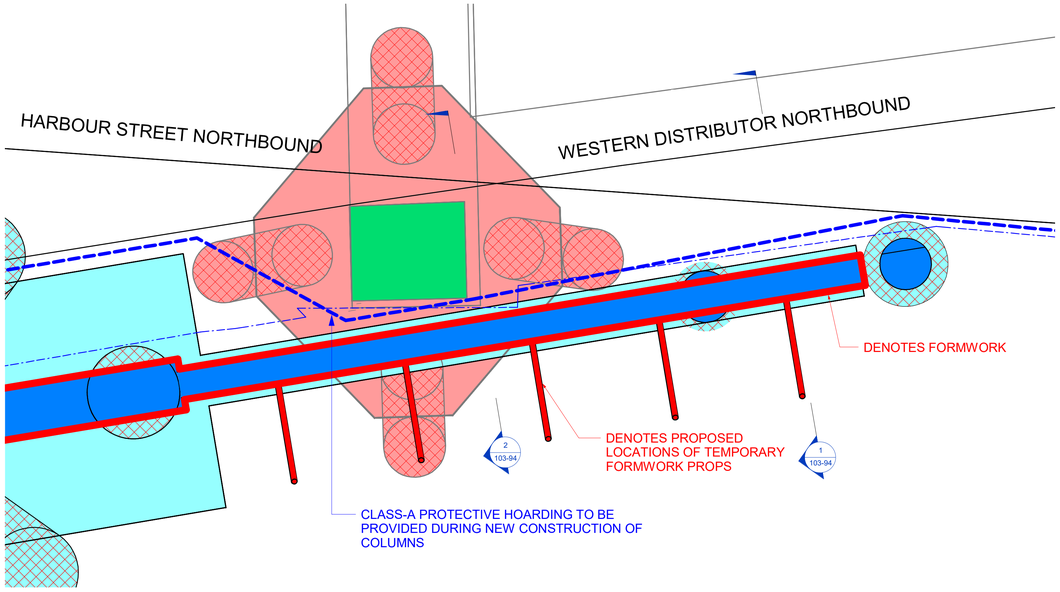
DRAWING TITLE
LAND BRIDGE - COLUMN CONSTRUCTION LOCATION 3

SCALE AT B1: As indicated
DRAWN BY: Author
CHECKED BY: Checker

DRAWING STATUS
FOR INFORMATION

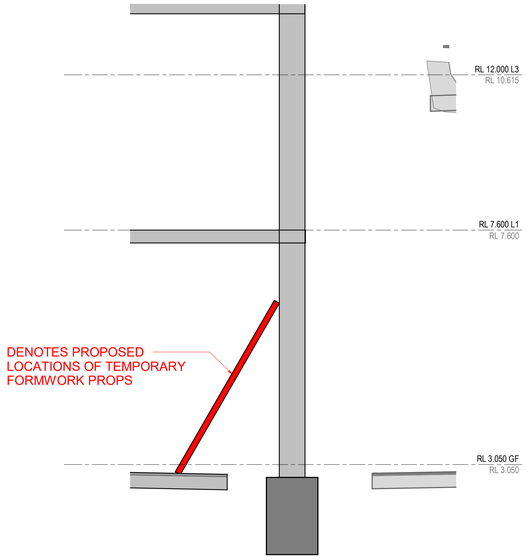
DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-93

REV.
C



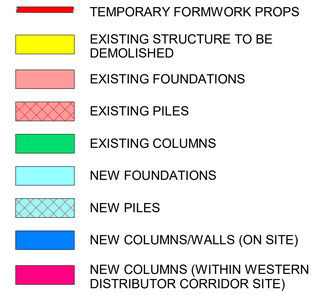
COLUMN LOCATION 4 LB CONSTRUCTION PHASE

SCALE: 1 : 50

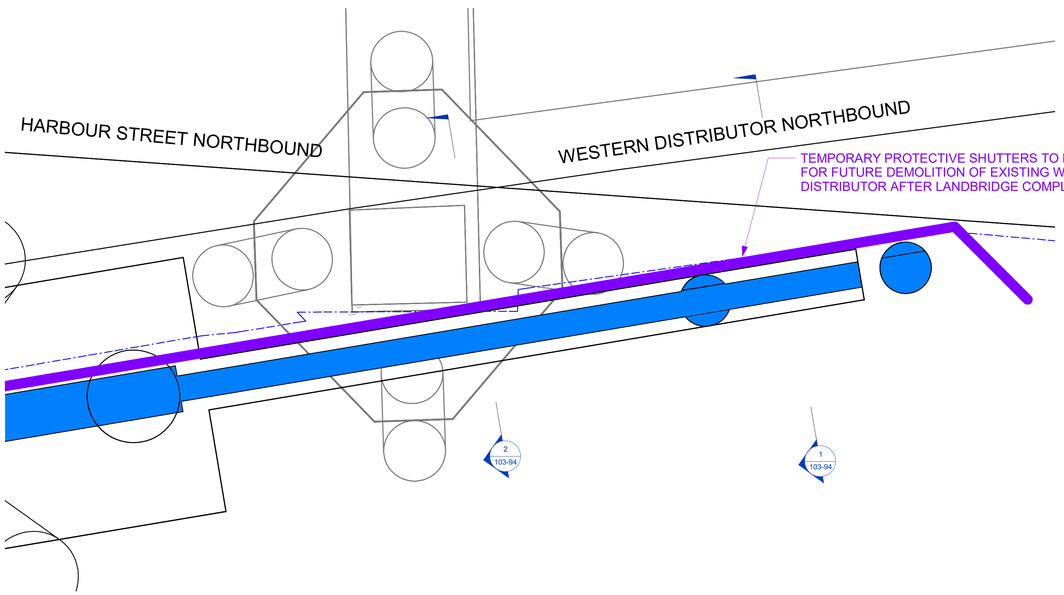


SECTION 1 / 103-94

1 : 50

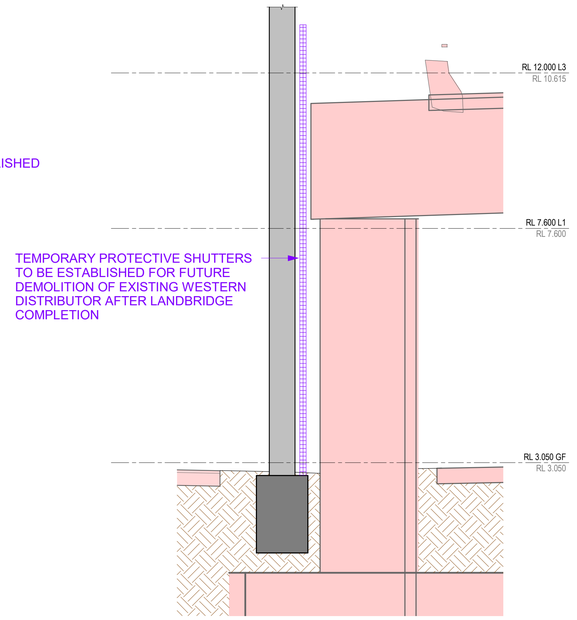


ELEMENT LEGEND



COLUMN LOCATION 4 WD DEMOLITION PHASE

SCALE: 1 : 50



SECTION 2 / 103-94

1 : 50

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AMP CAPITAL

Rev.	Date	Description
A	03.03.21	ISSUED FOR INFORMATION
B	08.03.21	ISSUED FOR INFORMATION
C	12.05.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

DRAWING TITLE
LAND BRIDGE - COLUMN CONSTRUCTION LOCATION 4

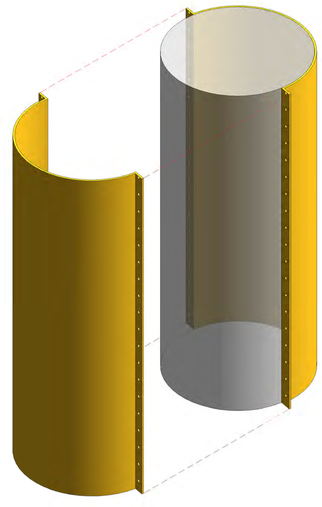
SCALE AT B1: As indicated
DRAWN BY: Author
CHECKED BY: Checker

DRAWING STATUS
FOR INFORMATION

DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-94

REV.
C

TYPICAL COLUMN FORMWORK SCAFFOLD



TYPICAL COLUMN FORMWORK ISOMETRIC

STRUCTURAL
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enstruct group pty ltd
Level 4, 2 Glen Street, Milsons Point NSW 2061
Telephone (02) 8904 1444
http: //www.enstruct.com.au

CLIENT
The GPT Group
AMP CAPITAL

Rev.	Date	Description
A	03.03.21	ISSUED FOR INFORMATION
B	12.05.21	ISSUED FOR INFORMATION

PROJECT NAME
COCKLE BAY PARK

PROJECT NUMBER: 6054

DRAWING TITLE
LAND BRIDGE - COLUMN CONSTRUCTION FORMWORK AND SCAFFOLD

SCALE AT B1:
DRAWN BY: Author
CHECKED BY: Checker

DRAWING STATUS
FOR INFORMATION

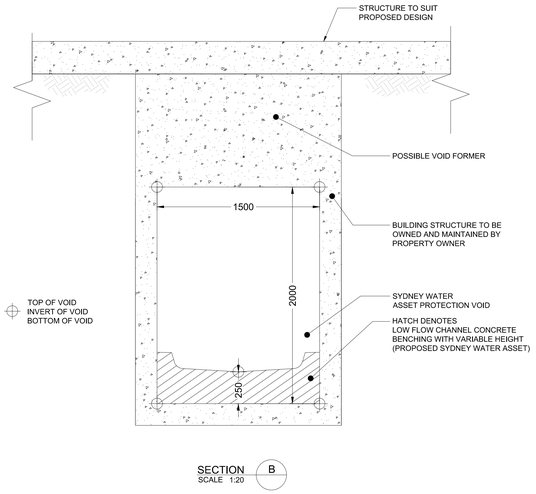
DRAWING NUMBER
CBP-SK-ENS-STR-DRW-103-95

REV.
B

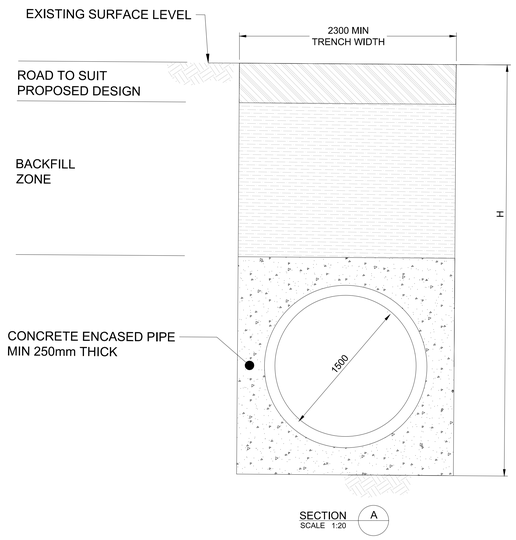
DIAL BEFORE YOU DIG
www.1100.com.au

POINT #	EASTING	NORTHING	LEVEL	CODE
1	333748.03	6250589.88	0.025	BOTTOM OF VOID
2	333748.03	6250589.88	2.025	TOP OF VOID
3	333748.32	6250591.35	0.025	BOTTOM OF VOID
4	333748.32	6250591.35	2.025	TOP OF VOID
5	333748.17	6250590.61	2.275	INVERT LEVEL
6	333705.00	6250597.97	-0.120	BOTTOM OF VOID
7	333705.00	6250597.97	1.880	TOP OF VOID
8	333705.25	6250599.45	-0.120	BOTTOM OF VOID
9	333705.25	6250599.45	1.880	TOP OF VOID
10	333705.13	6250598.71	0.130	INVERT LEVEL

SYDNEY WATER ASSET
SET OUT POINT TABLE



SYDNEY WATER ASSET PROTECTION VOID TYPICAL SECTION



SCALE 1:20
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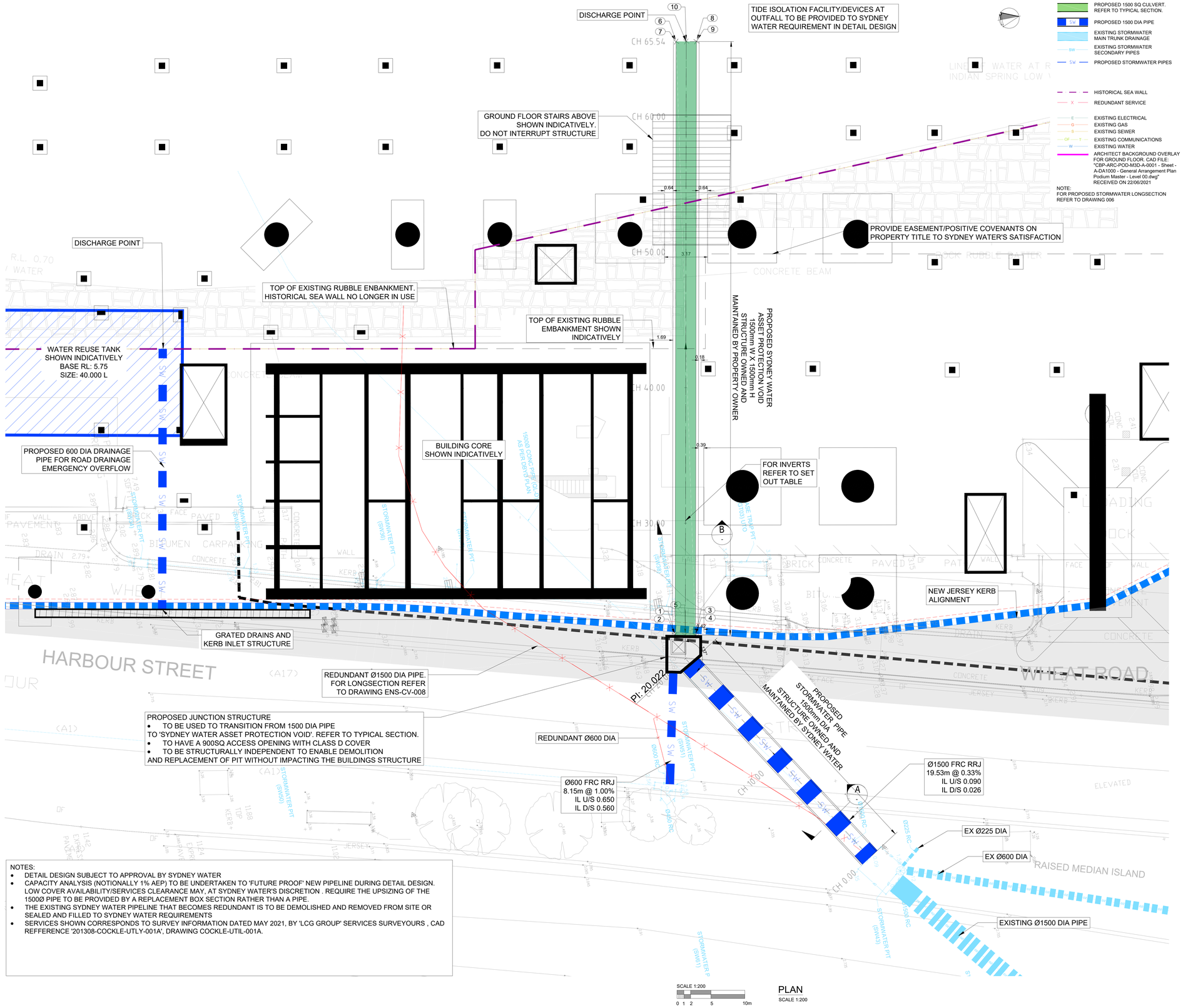
TYPICAL SECTION UNDER ROAD



NOTES:
- DETAIL DESIGN SUBJECT TO APPROVAL BY SYDNEY WATER
- CAPACITY ANALYSIS (NOTIONALLY 1% AEP) TO BE UNDERTAKEN TO 'FUTURE PROOF' NEW PIPELINE DURING DETAIL DESIGN. LOW COVER AVAILABILITY/SERVICES CLEARANCE MAY, AT SYDNEY WATER'S DISCRETION . REQUIRE THE UPSIZING OF THE 1500Ø PIPE TO BE PROVIDED BY A REPLACEMENT BOX SECTION RATHER THAN A PIPE.
- THE EXISTING SYDNEY WATER PIPELINE THAT BECOMES REDUNDANT IS TO BE DEMOLISHED AND REMOVED FROM SITE OR SEALED AND FILLED TO SYDNEY WATER REQUIREMENTS
- SERVICES SHOWN CORRESPONDS TO SURVEY INFORMATION DATED MAY 2021, BY 'LCG GROUP' SERVICES SURVEYOURS , CAD REFFERENCE '201308-COCKLE-UTLY-001A', DRAWING COCKLE-UTIL-001A.

SCALE 1:200
0 1 2 5 10m

PLAN
SCALE 1:200

CIVIL
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enstruct group pty ltd
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Telephone (02) 8904 1444
http: //www.enstruct.com.au

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Rev.	Date	Description
01	21.05.20	PRELIMINARY
02	28.05.20	PRELIMINARY
03	12.06.20	PRELIMINARY
04	17.06.20	PRELIMINARY
05	19.06.20	PRELIMINARY
06	22.06.20	PRELIMINARY
07	28.07.20	PRELIMINARY

PROJECT NAME
COCKLE BAY PARK
PROJECT NUMBER: 6054

DRAWING TITLE
SYDNEY WATER REALIGNMENT - STORMWATER PLAN
SCALE AT A1: 1 : 200 | DRAWN BY:JAF | CHECKED BY:PAL

DRAWING STATUS
FOR INFORMATION

DRAWING NUMBER
CBP-SK-ENS-CIV-DRW-10-1012

REV.
07