Roof Safety & Access Specification

Sandstone Precinct – Department of Education Building 35-39

Bridge St, Sydney, NSW, 2000

Site Reference Number: N1476

Specification Date: 01/03/19

Sky5

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Document Version Control	Date	Change	By
1.0	01/03/19	Issued to Client (Preliminary)	JP
2.0	05/06/20	Rev for Change of Bldg Design	JP
3.0	30/07/20	Revised Design	JP
4.0	18/12/20	Design Change to Zone C & J	JP
5.0	08/02/21	Builder Amendments	JP

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Introduction

Description:

Sky 5 Pty Ltd has been engaged by Built to undertake the design of a suitable roof safety & façade access system for the Department of Education New Construction Works.

General Information

Standards:

Installation of proprietary Fall Protection & Rope Access equipment must comply with the following:

AS/NZS5532:2013 Manufacturing requirements for single point anchor point used for harness based work at height

AS/NZS1891.1:2009 Industrial fall arrest systems and devices/harnesses and ancillary equipment

AS/NZS1891.2:2001 Industrial fall arrest systems and devices/horizontal lifeline and rail systems

AS/NZS1891.3:1997 Industrial fall arrest systems and devices/fall arrest devices

AS/NZS1891.4:2009 Industrial fall arrest systems and devices/selection, use and maintenance

AS1657:2013 Fixed platforms, walkways, stairways and ladders/design, construction, installation

AS/NZS 4488.1 1997 Industrial Rope Access System – Specifications

AS/NZS 4488.2 1997 Industrial Rope Access System – Selection use and maintenance

Proposed System Information:

System Information:

The overall roof safety & façade access system will utilise multiple types that are suitable for the relevant applications. These are not limited to:

- Rigid Rail Systems for dual purpose fall arrest and rope access.
- Anchor Points via a custom bollard cast-in to concrete slab
- Davit Arms
- Rope Diversion Devices
- Fixed Ladders
- Guardrail

Water Supply:

For the process of window cleaning we will require that there is water supply to various areas via taps.

We believe that a cleaning method of Pure Water Cleaning will be required in areas.

Installation, Certification & Maintenance Information:

Installation Information:

General Information:

- Installation of equipment defined in this proposal must be provided by Accredited Installer of the relevant systems.
- Installation of Roof Access, Fall Protection and Abseil Systems must be carried out by an Accredited Installer who is competent and conversant with the relevant Australian Standards and Compliance Codes.
- Exact component locations, support structure integrity, suitability for use and the fixing method must be assessed and approved by a competent person prior to commencement of installation.
- The installer is to provide all necessary WHS documentation to carry out installation. This would include Safe Work Method Statements, completion of all relevant Permits, and providing evidence of competencies to carry out the specific tasks.
- This design will need to be verified by the installer prior commencement of onsite works.

Certification Information:

On completion of installation, certification must be carried out by an Accredited Installer in accordance with Manufacturer's installation guidelines.

A System Handover Manual must be provided on completion of installation of Roof Access, Fall Protection and Abseil Systems. This manual will include the following:

- Product Specifications
- As-built layout plans
- Installation Certifications
- System Operating Instructions
- Annual Recertification Schedule
- Product Warranties
- Product Certificates

Maintenance Information:

Fall Arrest & Rope Access systems and equipment must only be operated by competent persons trained to use and maintain fall arrest equipment.

All Fall Arrest and Rope Access equipment requires periodical maintenance by a competent person in accordance with Manufacturer's specifications and the requirement of Australian Standard AS/NZS1891.4.2009 (Section 9), and AS/NZS4488.

Any attempt to change the design during installation renders both our compliance and responsibility null and void. The person who authorises any changes holds himself responsible for all actions and decisions made.

Zone Specific Specification:

A general arrangement drawing dividing the building into zones is included in Appendix 1. This should be referenced in conjunction with the following information.

Zone A:

This zone is not required to have any rope access system as the glazing below this area can be accessed via level 9. The proposed guardrail has now been removed, however we insist on at least 2m of Guardrail to extend onto this roof to ensure the user is in a safe zone of the roof when they exit from a gate in the guardrail.

Given the type of roof cladding being used we envisage that it may need to be cleaned or repaired over time so if any maintenance required in this area can be safely accessed by an anchor point system.

Proposed Products:

- Anchor Point System – Purlin Anchor or Structural anchor or equivalent to suit the substructure. (Access to underside of structure may be required for installation)

Edge Protection:

Work in this area should practice Restraint Techniques to prevent a fall over the edge. If a fall did occur there would be localised damage to the building edges.

References:

- Appendix 2 – Indicative Layouts only
- Appendix 2 – Product Information
- Drawing – 13745-SD-01-E LEVEL 09 (ROOF)

Notes:

- All layouts and products need to be verified by installer to ensure compliance to the application and substructure
- All dimensions need to be checked on site by the installer.

Zone B:

This zone is on level 9 and will be the main rigging point for a large portion of the new and existing facades.

Access doors will be required this area via the plantrooms (East & West). Due to this area being the main rigging point we are specifying a continuous rigid rail system to allow multiple users on the systems at the same time on different facades.

We have also included some anchor bollards to access the corner areas of the building to prevent swing falls.

Landscaping has to be minimal to allow the ropes to pass through for façade maintenance.

The layout shows indicative locations to mount the rail system so this will need to be coordinated with architect/builder. We may require an extra parapet on the inside of the walkway area to mount the rail as under the glazing may be too small an area. The proposed gravel shown should be minimal to allow enough space for the rail to the mounted. If the location is decided on the inside parapet, this would need to be formed as part of the slab pour for strength requirements. The brand of rigid rail system would be chosen based on the available mounting option.

Proposed Products:

- Rigid Rail System – Raptor Rail (Sayfa), Unirail (3M), XRail (Safetylink) or equivalent.
- Custom Cast-In Anchor Bollard (Engineered) or Tuff Post (Safetylink)

Edge Protection:

At any point where the ropes come in contact with the building edge will need to support the rope access loads. The technicians must use edge rollers and/or rope protectors on their ropes where they contact the building. **It was advised that this capping area would need to be reinforced**.

References:

- Appendix 3 – Indicative Layouts only
- Appendix 3 – Product Information
- Drawing – 13745-SD-02-D LEVEL 08

Notes:

- All layouts and products need to be verified by installer to ensure compliance to the application and substructure
- All dimensions need to be checked on site by the installer.

Zone C:

To access this roof we have proposed a small fixed ladder as a permanent access solution. We have allowed for Custom Cast-In Rope Access Bollards or Cast-In High Top Anchor Point to be installed to allow access to the external façade in this area. Casting into the concrete slab is preferred so that you do not have to remove pavers to test anchor points.

The layout shows indicative mounting locations and would need to be confirmed to ensure they are in the right place for structural and any service requirements.

Proposed Products:

- LD21 Mini Ladder with Grabrails. Ladder to be custom made to suit correct height.
- Custom Cast-In Anchor Bollard (Engineered), High Top Anchor Point (Sayfa) or Tuff Post (Safetylink). Installer to ensure correct height anchor is used.

Edge Protection:

At any point where the ropes come in contact with the building edge will need to support the rope access loads. The technicians must use edge rollers and/or rope protectors on their ropes where they contact the building.

References:

- Appendix 4 – Indicative Layouts only
- Appendix 4 – Product Information
- Drawing – 13745-SD-01-E LEVEL 09 (ROOF)

Notes:

- All layouts and products need to be verified by installer to ensure compliance to the application and substructure
- All dimensions need to be checked on site by the installer.

Zone D:

To access this roof we have proposed fixed ladders at either end of the roof as a permanent access solution.

Given the glazing is only 3 levels then we are recommending that the glass be cleaned via water fed extension poles from Level 6. If hands on work to the façade is required we have proposed anchor points on the roof above rather than a rail system due to the frequency of access. The anchor points will need to be mounted to suitable structure and be rated for 15kN.

The location of the anchor system on the plan is indicative only and will be based on what structure is available and whether the louvres are classed as trafficable. If possible, we would like to increase the metal clad area to be 2m as a minimum to provide a safe access zone and give technicians space to rig their ropes.

The anchor point system will need to be used in conjunction with a rope diversion system such as a vortex or similar so no pressure is applied directly to the roof edge.

The use of the system can be set up so they drop their ropes over the edge and ascend up their ropes by manual or powered options. This enables no user to put load on the edge while trying to access from roof level.

The construction of this roof is metal clad with louvres over the cooling tower. The type of anchor would be chosen based on the available structure & mounting options.

Proposed Products:

- Anchor Point System – TBC. Will depend on structure
- Rope Diversion Device – Vortex or equivalent.

Edge Protection:

At any point where the ropes come in contact with the building edge will need to support the rope access loads. The technicians must use edge rollers and/or rope protectors on their ropes where they contact the building.

References:

- Appendix 5 – Indicative Layouts only
- Appendix 5 – Product Information
- Drawing – 13745-SD-01-E LEVEL 09 (ROOF)

Notes:

- All layouts and products need to be verified by installer to ensure compliance to the application and substructure
- All dimensions need to be checked on site by the installer.

Zone E:

To access this roof we have proposed a fixed ladder as a permanent access solution. We have allowed for Custom Cast In Rope Access Bollards to be installed to allow access to the external façade in this area. If the structure ends up being precast panels the anchors will need to be post fixed and the precast needs to be fixed suitably for the safe installation.

The layout shows indicative mounting locations and would need to be confirmed to ensure they are in the right place for structural and any service requirements.

Proposed Products:

- LD21 Mini Ladder with Grabrails & Landing
- Custom Cast-In Anchor Bollard (Engineered), High Top Anchor Point (Sayfa) or Tuff Post (Safetylink)

Edge Protection:

At any point where the ropes come in contact with the building edge will need to support the rope access loads. The technicians must use edge rollers and/or rope protectors on their ropes where they contact the building.

References:

- Appendix 6 – Indicative Layouts only
- Appendix 6 – Product Information
- Drawing – 13745-SD-01-E LEVEL 09 (ROOF)

Notes:

- All layouts and products need to be verified by installer to ensure compliance to the application and substructure
- All dimensions need to be checked on site by the installer.

Zone F:

Access to this roof area via door within the internal corridor. Guardrail has been proposed as edge protection for simple maintenance of the roof area.

The best solution to bypass any rope loads on the edges is to use a davit arm system. The davit arm system allows for it to be set up behind the guardrail and provides an anchorage point that allows the user to descend into the atrium area without ropes contacting roof edges.

There must be suitable substructure to attach the davit base to at roof level. This needs to be designed and installed by others. Coordination between Installer and Builder to ensure correct design for the product used. The preference would be cast in the davit socket into the concrete with a small plinth. Access to the socket for use with the davit arm would require a access hatch in the cladding.

Proposed Products:

- Davit Base & Arm System (Engineered)

Edge Protection:

The davit arm prevents any requirement for edge protection

References:

- Appendix 7 – Indicative Layouts only
- Appendix 7 – Product Information
- Drawing – 13745-SD-02-D LEVEL 08

Notes:

- All layouts and products need to be verified by installer to ensure compliance to the application and substructure
- All dimensions need to be checked on site by the installer.

Zone G:

This zone has been classified as the areas for the internal void that are not covered by the systems located on Zone E, F & H. Guardrail has been proposed as edge protection for simple maintenance of the roof area.

The best solution to bypass any rope loads on the edges is to use a davit arm system. The davit arm system allows for it to be set up behind the guardrail and provides an anchorage point that allows the user to descend into the atrium area without ropes contacting roof edges.

There must be suitable substructure to attach the davit base to at roof level. This needs to be designed and installed by others. Coordination between Installer and Builder to ensure correct design for the product used. The preference would be cast in the davit socket into the concrete with a small plinth. Access to the socket for use with the davit arm would require a access hatch in the cladding.

We believe the best methodology for cleaning these windows are via Pure Water.

Exit Doors will be required on Level 2 for the technicians to exit the atrium roof. It is preferred that there is a minimum of 2 exit points. We also suggest using Pure Water to clean the top side of the atrium roof.

This final area in the internal atrium to consider is the underside of the atrium roof. It was discussed that a 'Spider Lift' may be required to access this area and further dimensions of the access doors and lifts are required to determine whether this machine will work in this area. The machine needs to be of a certain size to fit in the lifts.

Proposed Products:

- Davit Base & Arm System (Engineered)

Edge Protection:

The davit arm prevents any requirement for edge protection

References:

- Appendix 8 – Indicative Layouts only
- Appendix 8 – Product Information
- Drawing – 13745-SD-01-E LEVEL 09 (ROOF) & 13745-SD-04-A LEVEL 2

Notes:

- All layouts and products need to be verified by installer to ensure compliance to the application and substructure
- All dimensions need to be checked on site by the installer.

Zone H:

This zone contains the main access to the roof via access hatch and ladder from level below. Preference is for a fixed ladder however this depends on the use of the space below. A fold down or scissor stair can be used, however enough space must be available at the base. At the hatch location it is recommended to have grabrails on the top side to assist with exiting the hatch. The hatch can be a sliding hatch or hinged hatch depending on cladding. Hatch to be undertaken by cladding installer.

Guardrail has been proposed as edge protection for simple maintenance of the roof area.

There must be suitable substructure to attach the davit base to at roof level. This needs to be designed and installed by others. Coordination between Installer and Builder to ensure correct design for the product used. The substructure must be designed to suit and will be required to be undertaken by others. Preference would be to have a adaptor off structure that protrudes through cladding that can be waterproofed and then the socket attached to the adaptor.

Proposed Products:

- Davit Base & Arm System (Engineered)

Edge Protection:

The davit arm prevents any requirement for edge protection

References:

- Appendix 9 – Indicative Layouts only
- Appendix 9 – Product Information
- Drawing – 13745-SD-01-E LEVEL 09 (ROOF)

Notes:

- All layouts and products need to be verified by installer to ensure compliance to the application and substructure
- All dimensions need to be checked on site by the installer.

Zone J:

To access this roof we have proposed a small fixed ladder as a permanent access solution. We have allowed for Custom Cast-In Rope Access Bollards or Cast-In High Top Anchor Point to be installed to allow access to the external façade in this area. Casting into the concrete slab is preferred so that you do not have to remove pavers to test anchor points.

The layout shows indicative mounting locations and would need to be confirmed to ensure they are in the right place for structural and any service requirements.

Proposed Products:

- LD21 Mini Ladder with Grabrails. Ladder to be custom made to suit correct height.
- Custom Cast-In Anchor Bollard (Engineered), High Top Anchor Point (Sayfa) or Tuff Post (Safetylink). Installer to ensure correct height anchor is used.

Edge Protection:

At any point where the ropes come in contact with the building edge will need to support the rope access loads. The technicians must use edge rollers and/or rope protectors on their ropes where they contact the building.

References:

- Appendix 10 – Indicative Layouts only
- Appendix 10 – Product Information
- Drawing – 13745-SD-01-E LEVEL 09 (ROOF)

Notes:

- All layouts and products need to be verified by installer to ensure compliance to the application and substructure
- All dimensions need to be checked on site by the installer.

Zone K:

To access this roof a permanent access door is required from the internal corridor to roof.

We will be required to use this roof as a rigging point to access the glazing below on the existing facade. For consistency we have recommend the use of a continuous rigid rail that can be used for rope access. We have proposed a rail system in the corridor between the pop up roofs and the sandstone parapets.

With the roof area being raised it needs to be confirmed whether this reduces the parapet height to less than 900mm. If the parapet height is reduced then the parapet no longer acts as passive system for general roof maintenance.

The location of the rail system on the plan is the preferred location as it will give clear access to all areas. Since this area is being raised the best mounting option is to pour a plinth connected into the roof slab that raises the system above the topping height. It will need to be able to support a 15kN load. The use of a plinth will serve two purposes. It allows for ease of inspection in the future post installation and also helps for waterproofing. The spacing of plinths would be every 2m for mounting of a rigid rail system.

Alternatively we can use the XRail System and mount it to Tuff Post Bollards every 1m.

The brand of rigid rail system would be chosen based on the available mounting options.

Proposed Products:

- Rigid Rail System – Raptor Rail (Sayfa), Unirail (3M), XRail (Safetylink) or equivalent.

Edge Protection:

At any point where the ropes come in contact with the building edge will need to support the rope access loads. The technicians must use edge rollers and/or rope protectors on their ropes where they contact the building.

References:

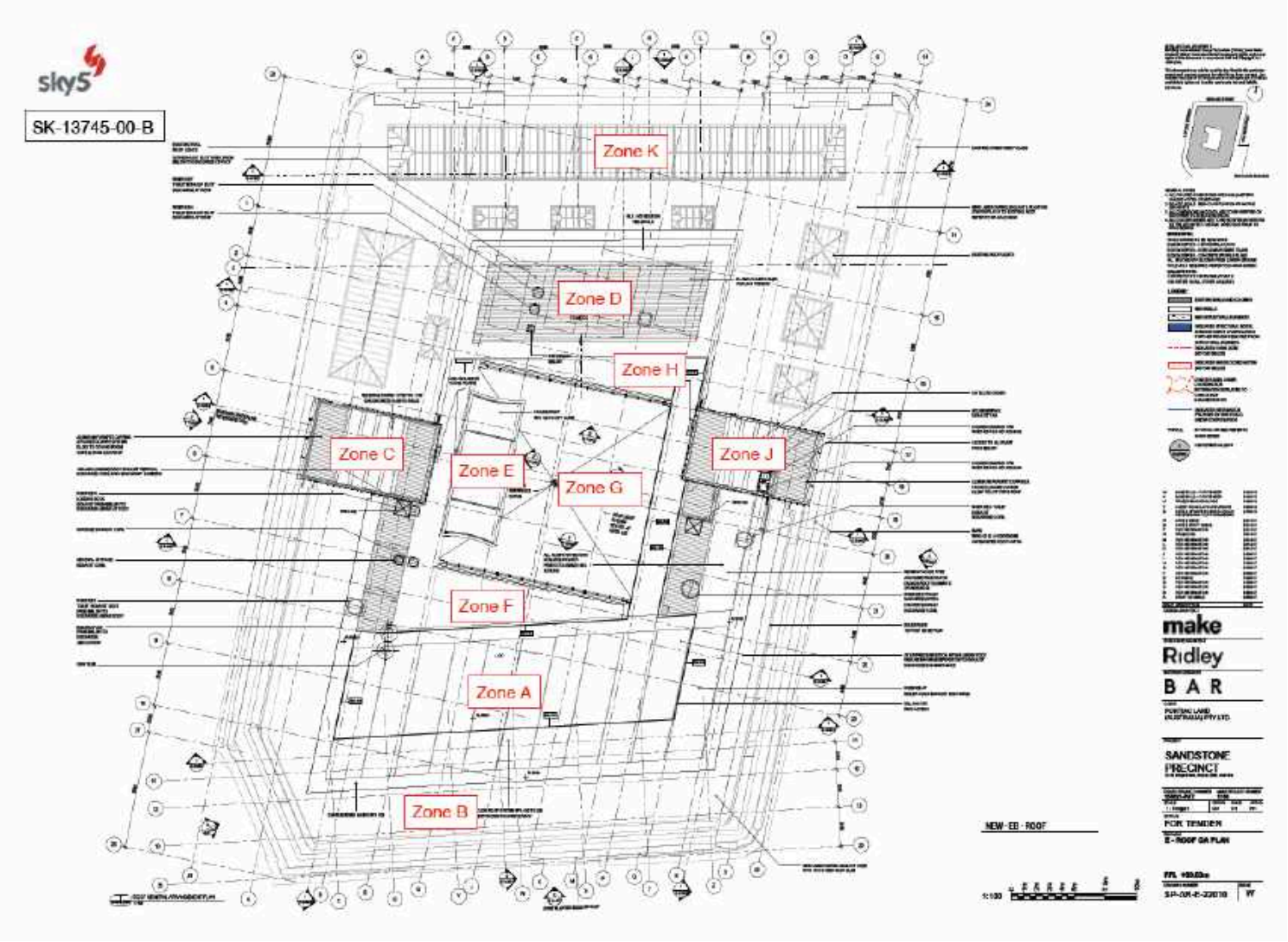
- Appendix 11 – Indicative Layouts only
- Appendix 11 – Product Information
- Drawing – 13745-SD-03-C LEVEL 06

Notes:

- All layouts and products need to be verified by installer to ensure compliance to the application and substructure
- All dimensions need to be checked on site by the installer.

Appendices:

Appendix 1: Zone Layout Plan



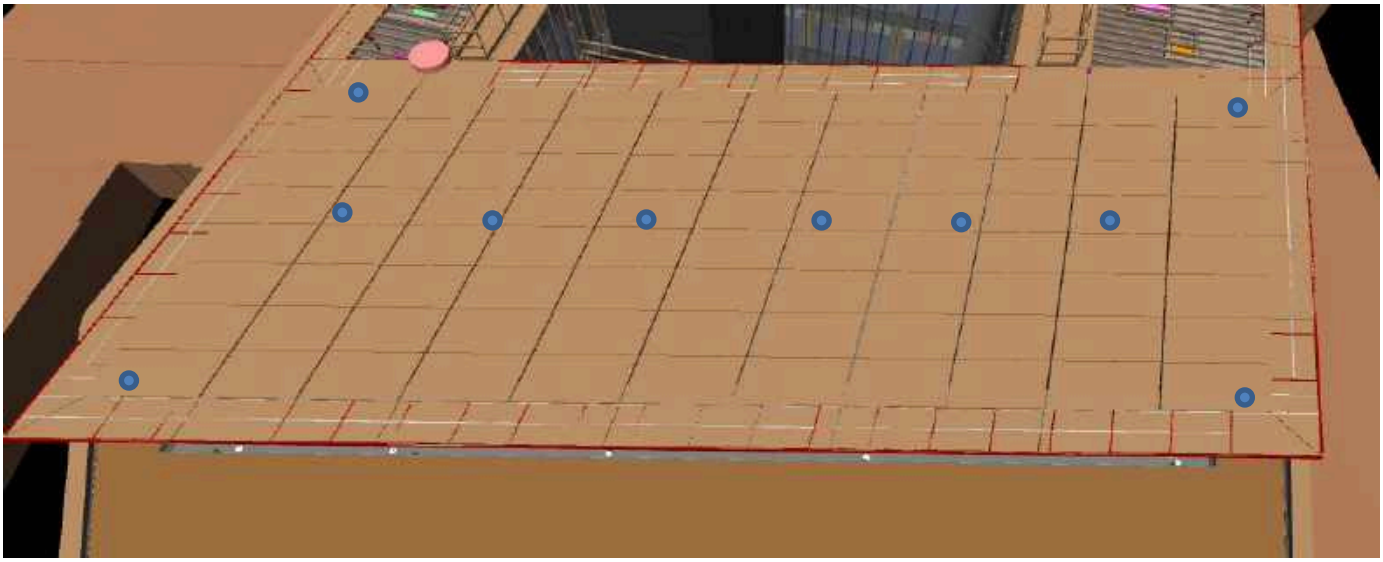
Appendix 2: Zone A Layout Plan & General Information

Guardrail Gate Anchor Point

SD-13745-01-D

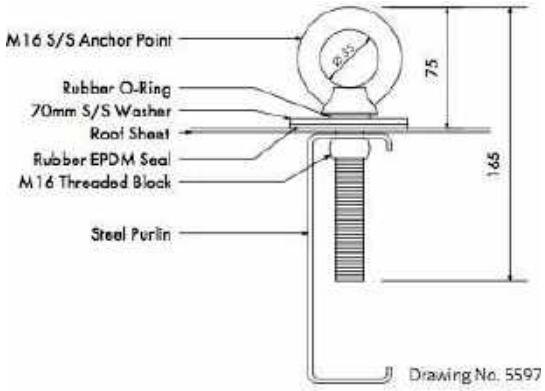
Indicative Only

Zone A



Product Information (TBC – based on substructure

Flush



150mm High

300mm High

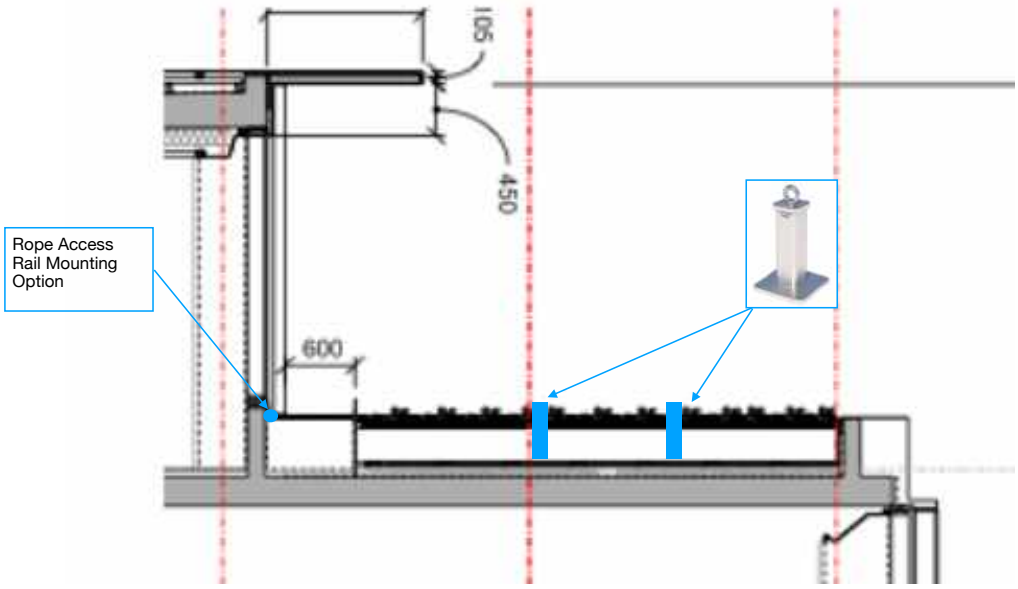
Appendix 3: Zone B Layout Plan & General Information

Rope Access Rail Rope Access Bollard

Zone B

SD-13745-02-D

Indicative Only

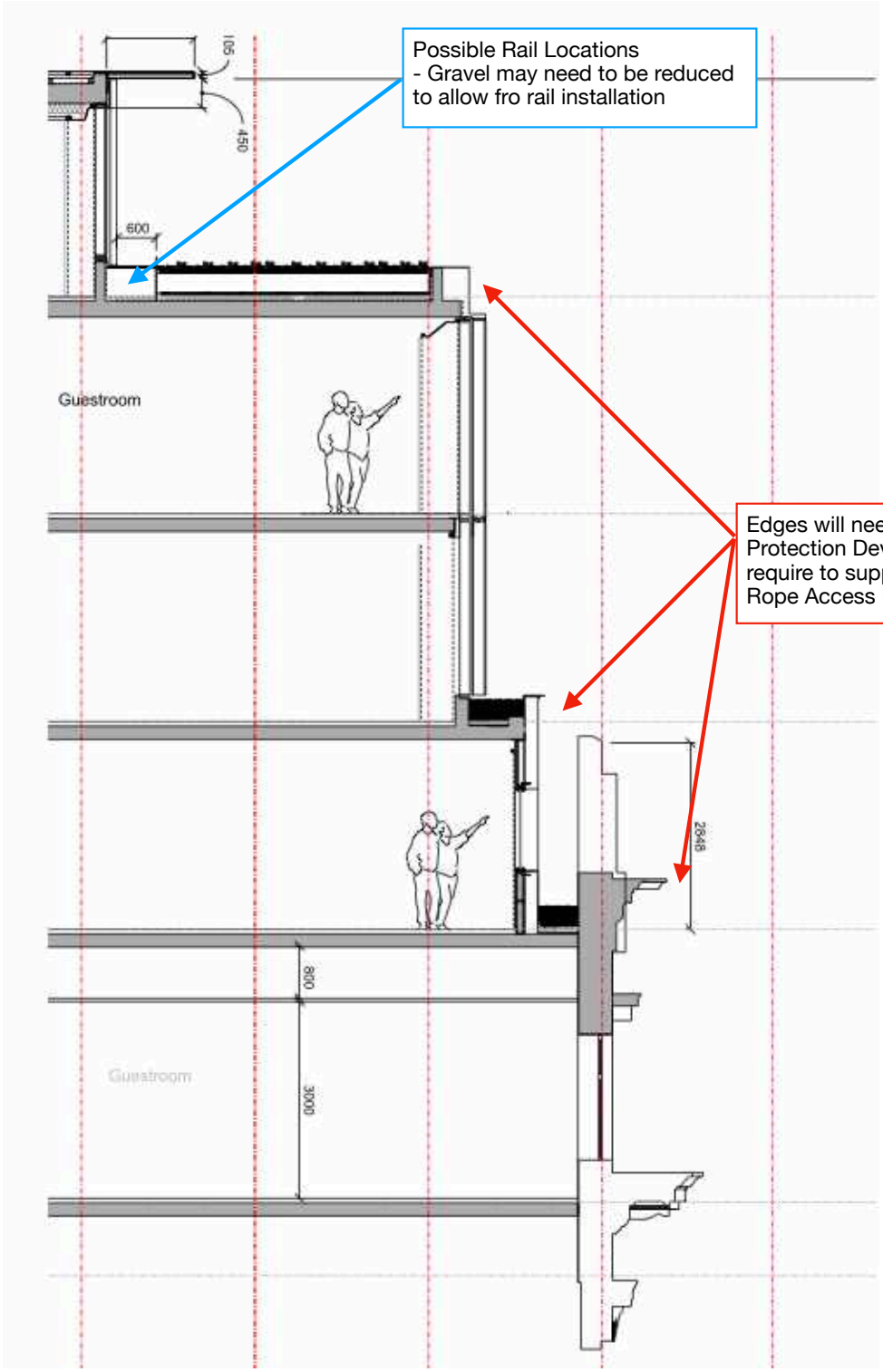


Rope Access Rail Rope Access Bollard

Zone B

SD-13745-04-C

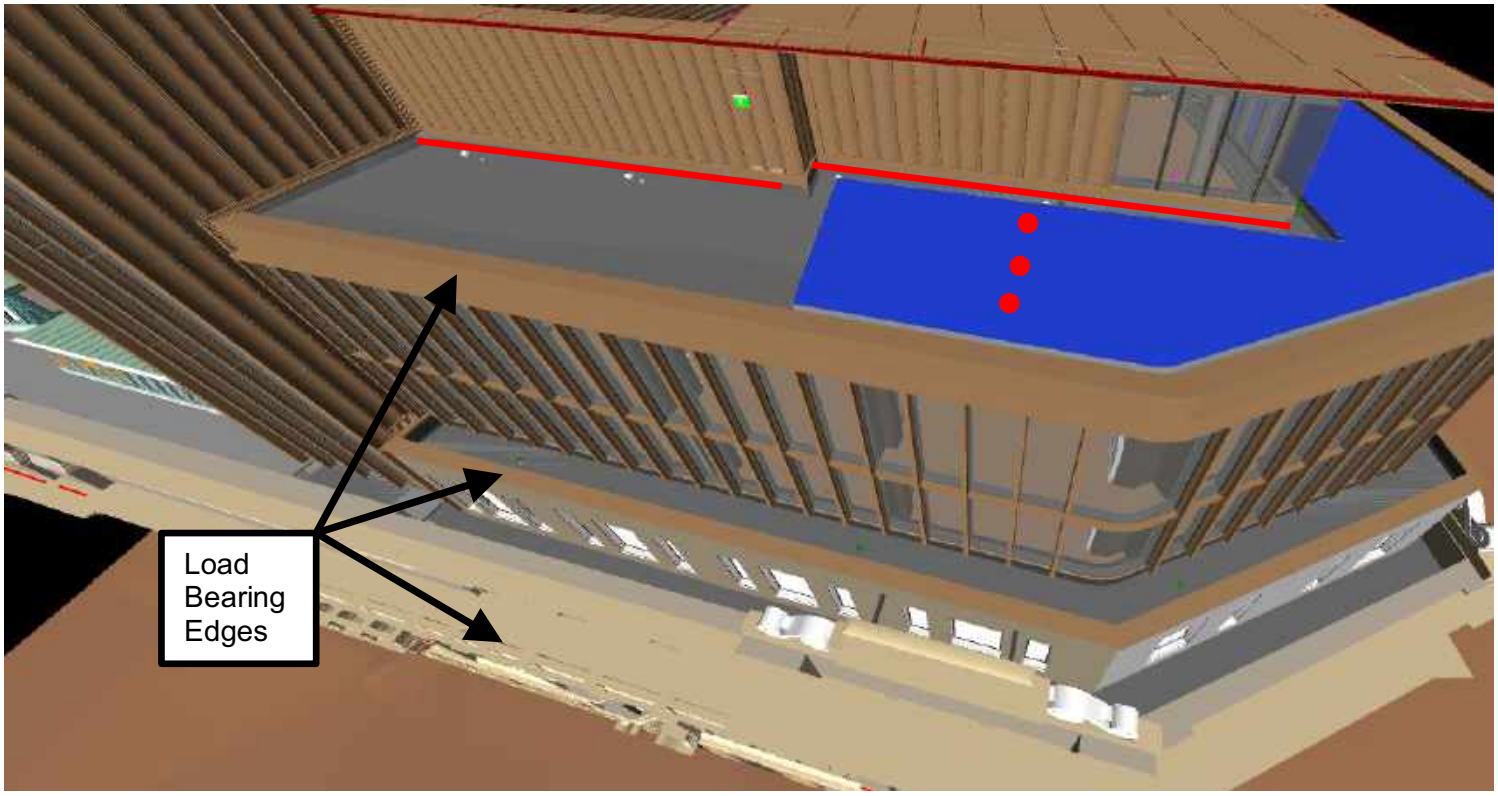
Indicative Only

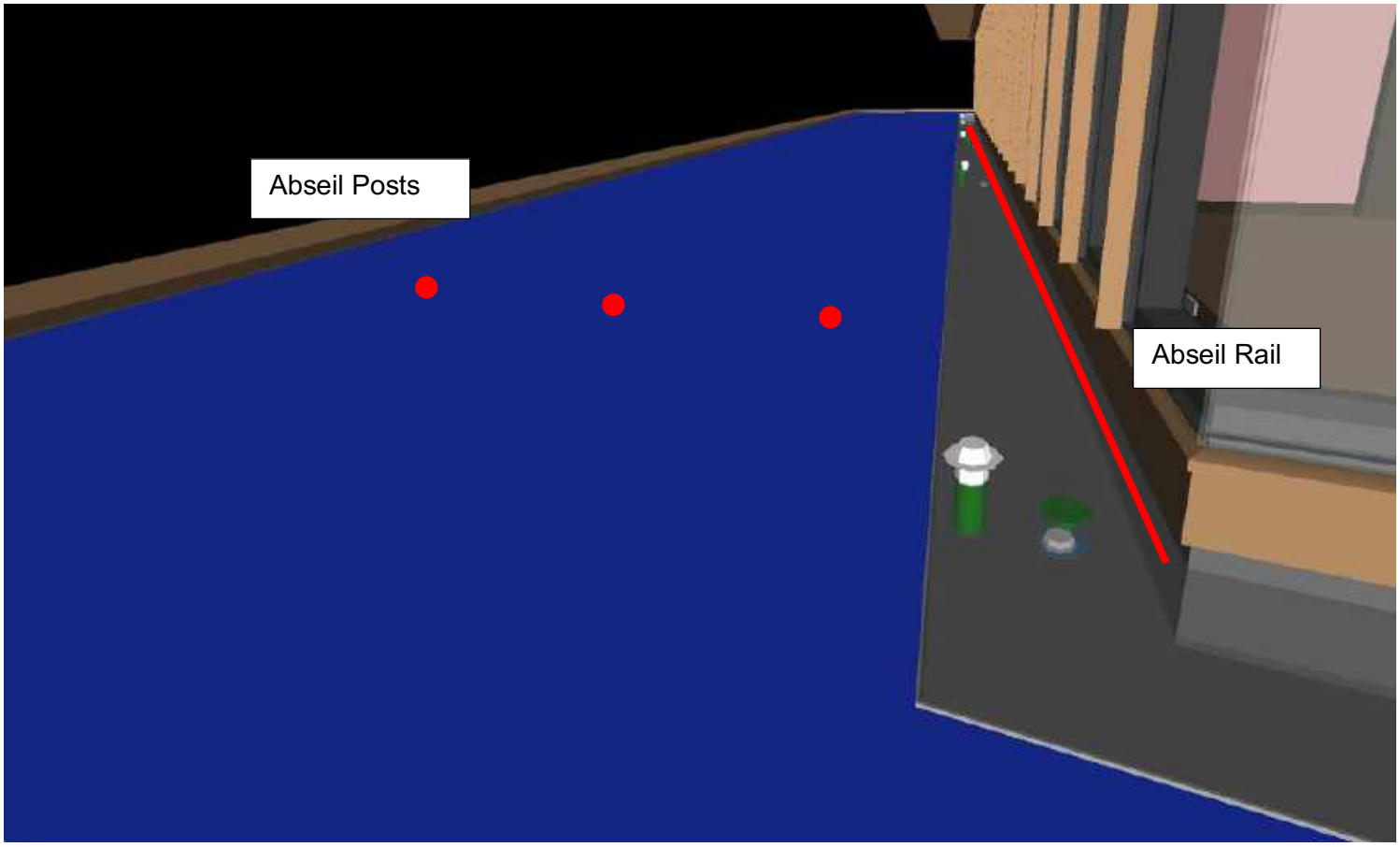


Zone B

SD-13745-03-C

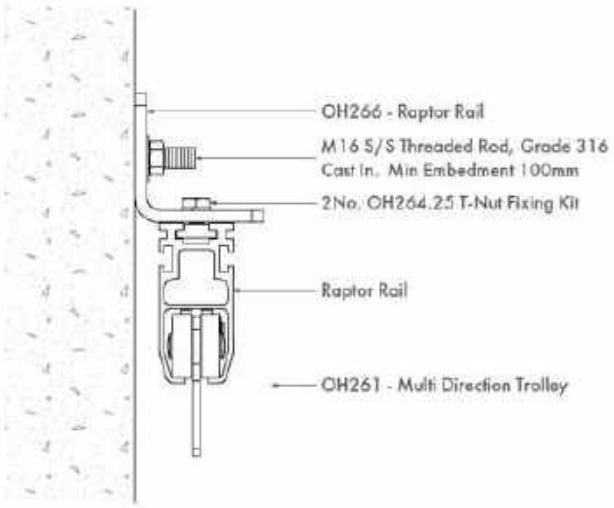
Indicative Only

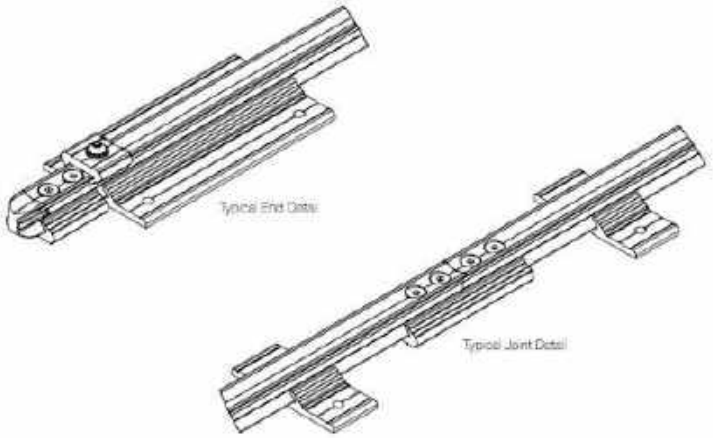

Load
Bearing
Edges


Abseil Posts
Abseil Rail

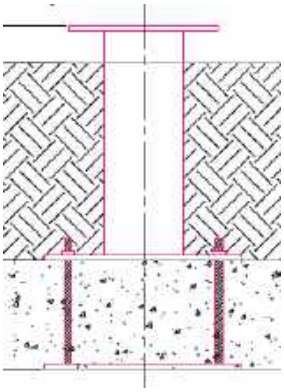
Product Information

Rigid Rail Systems

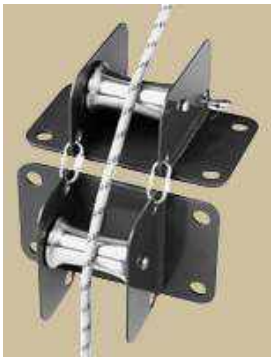




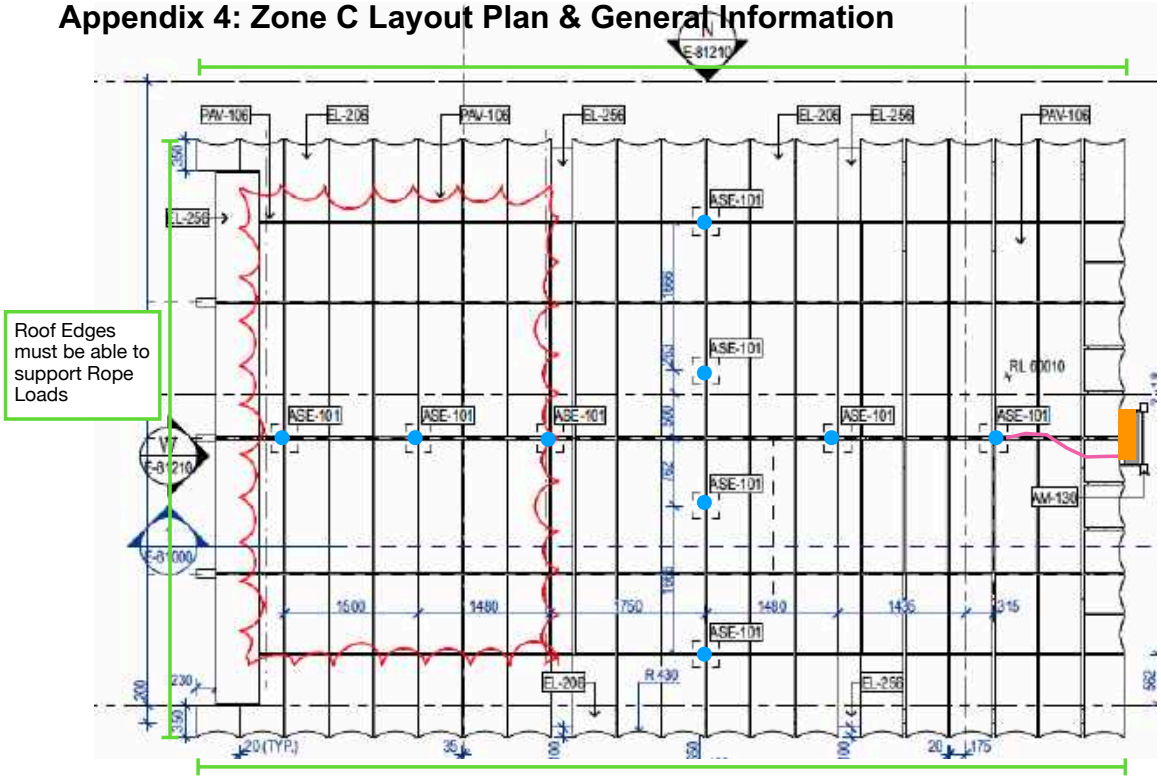
Anchor Points



Edge Protection



Appendix 4: Zone C Layout Plan & General Information

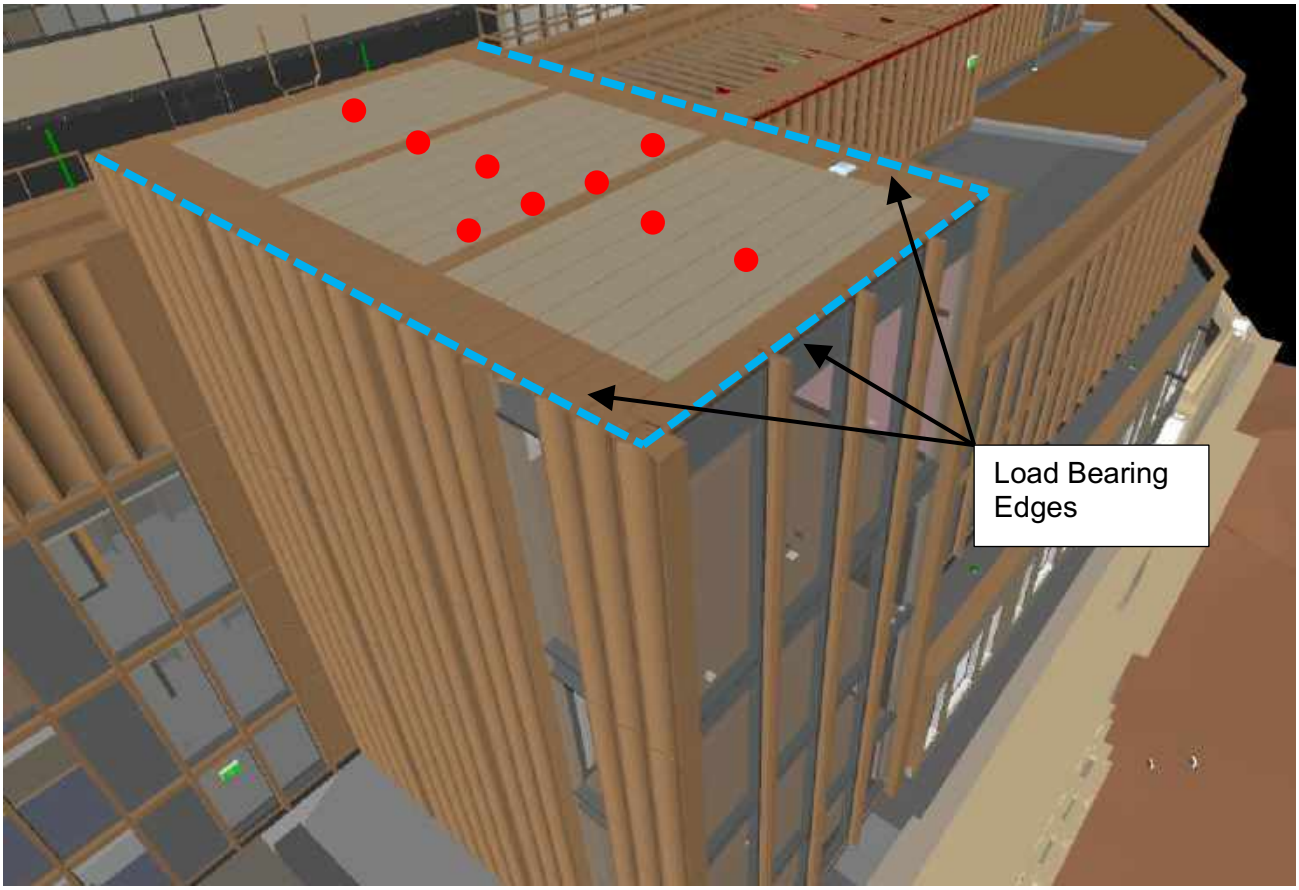


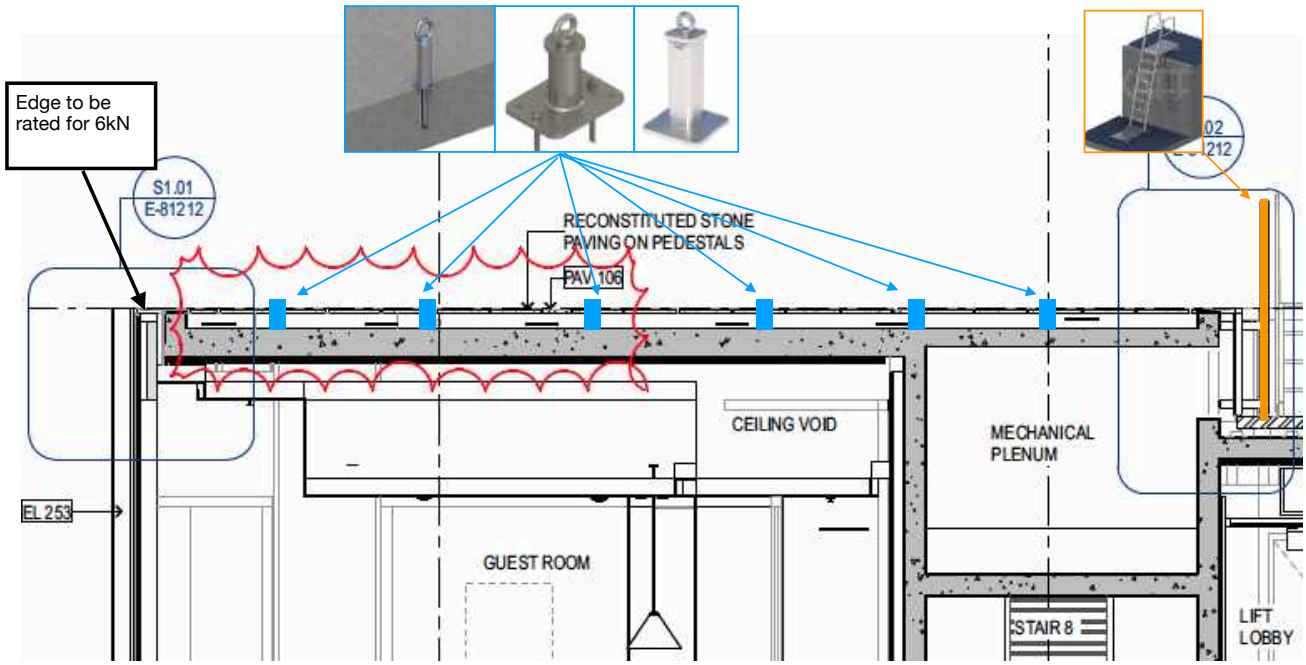
Rope Access Bollard Strop Fixed Ladder

Zone C

SD-13745-05-D

Indicative Only





Rope Access Bollard

Strop

Fixed Ladder

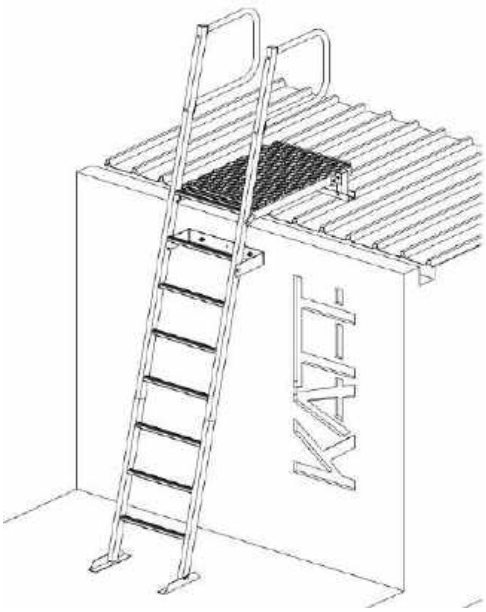
Zone C

SD-13745-05-D

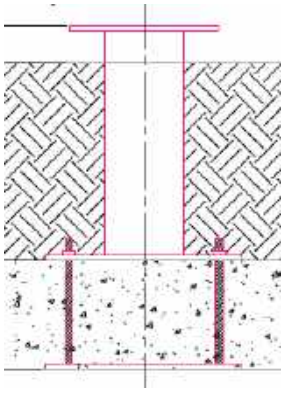
Indicative Only

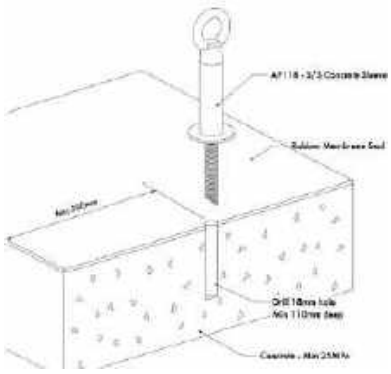
Product Information

Ladders

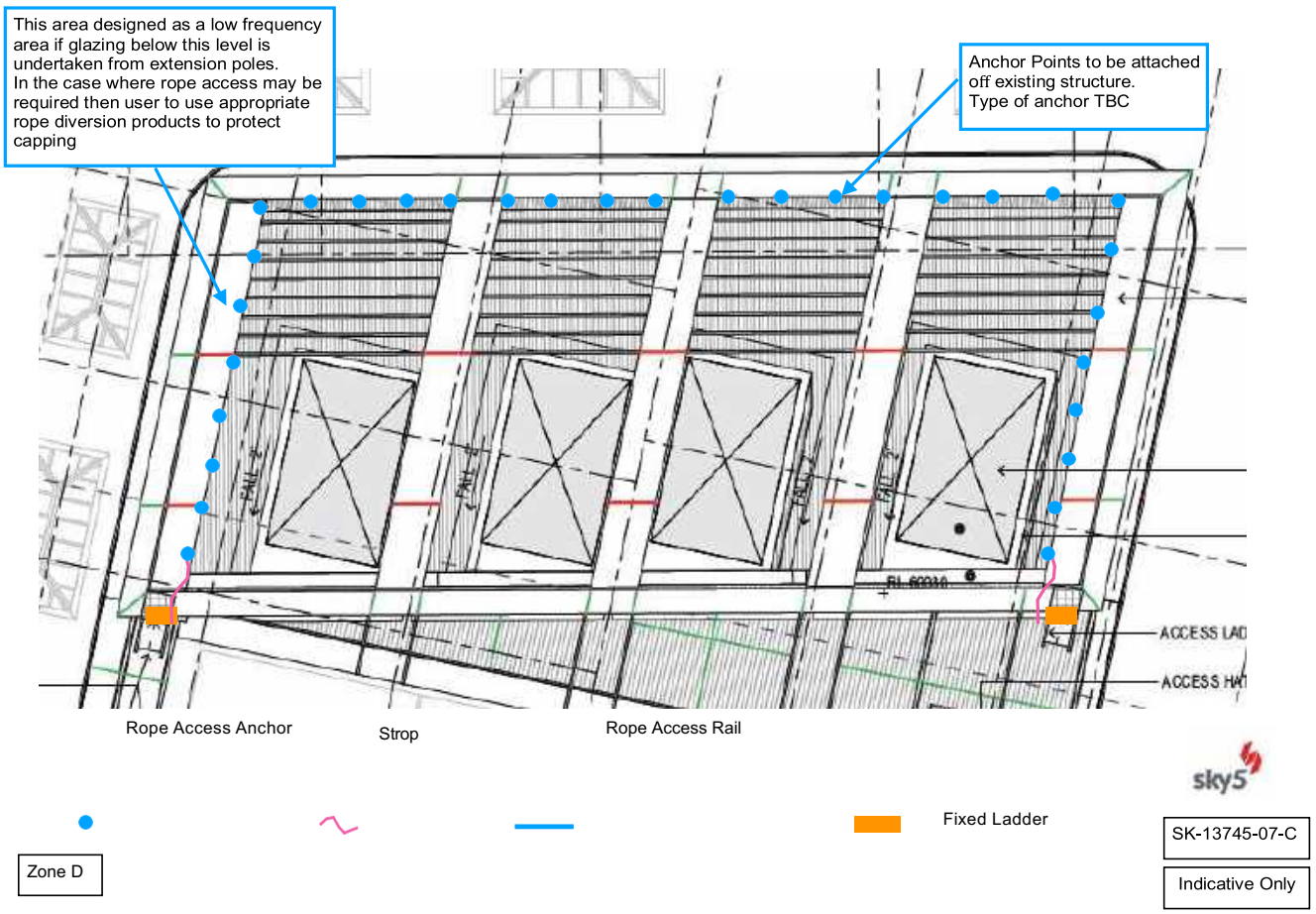


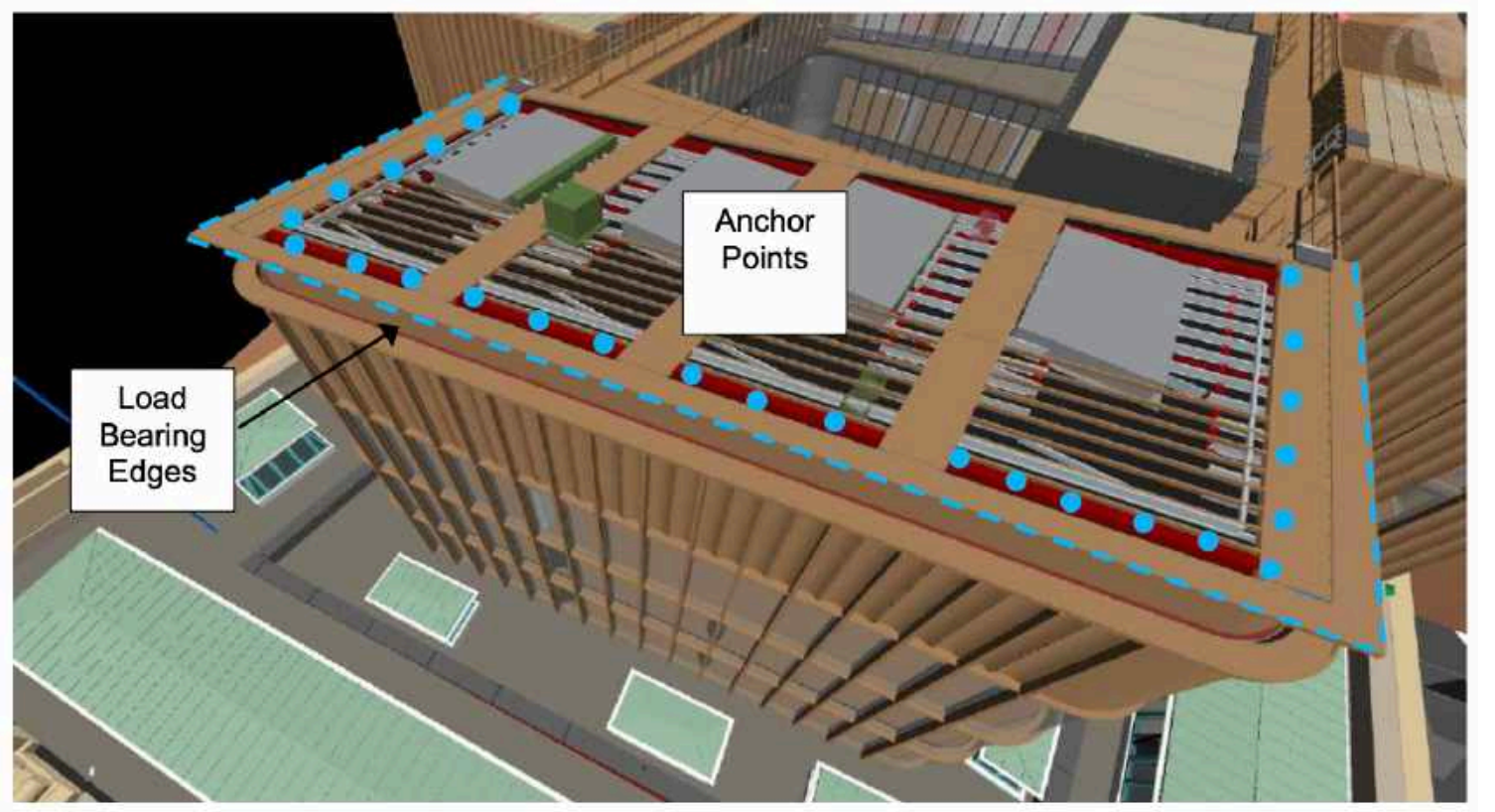
Anchor Points

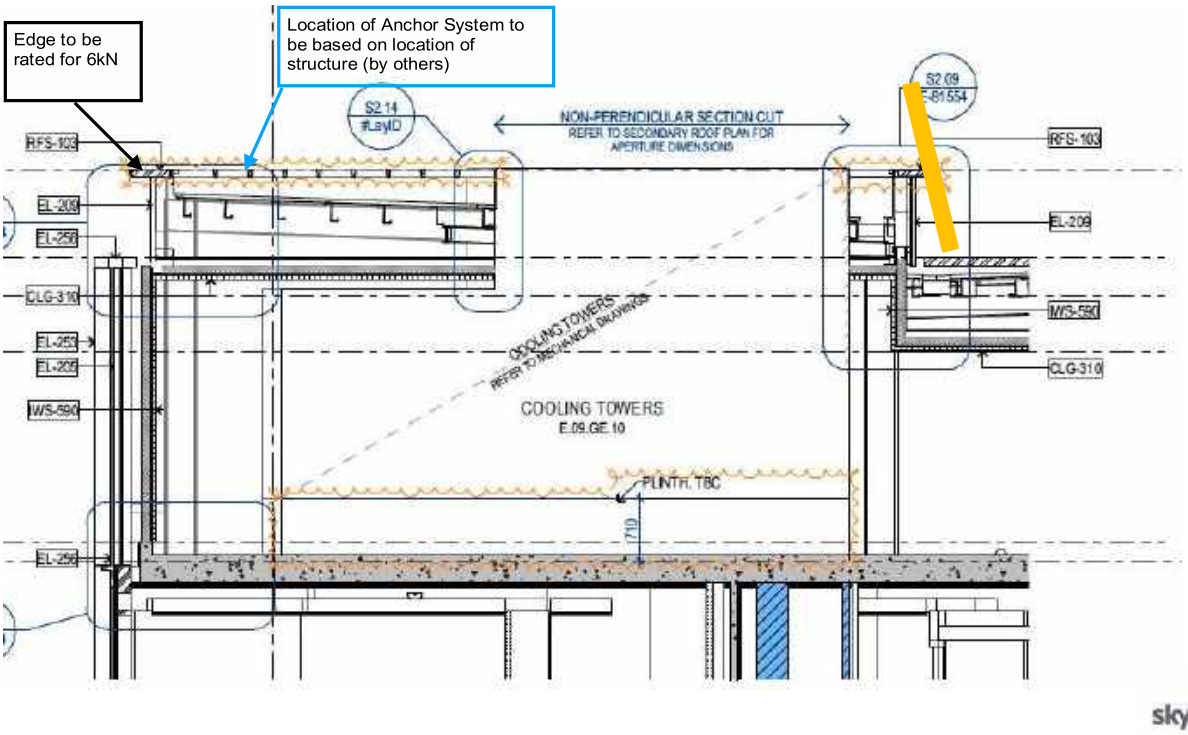




Appendix 5: Zone D Layout Plan & General Information

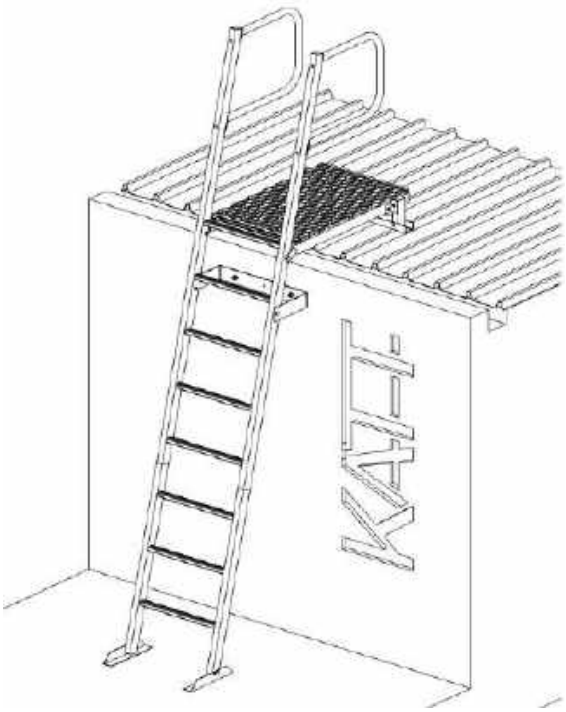






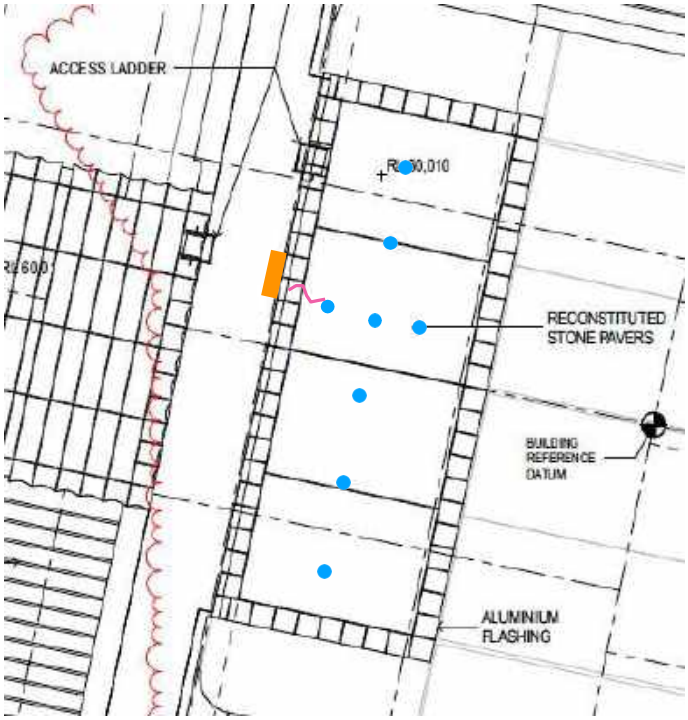
Product Information

Ladders



Note: Point will depend on available structure

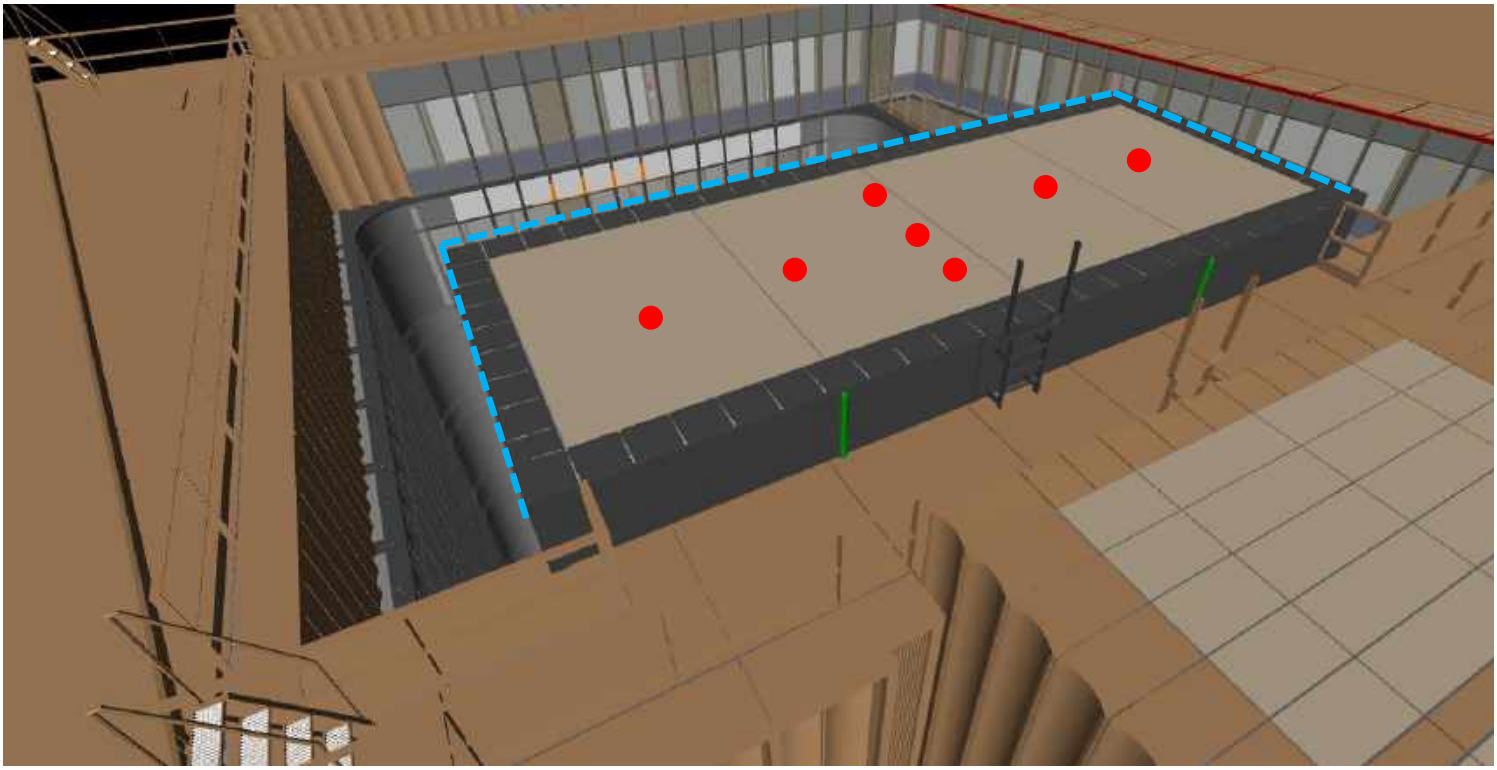
Appendix 6: Zone E Layout Plan & General Information

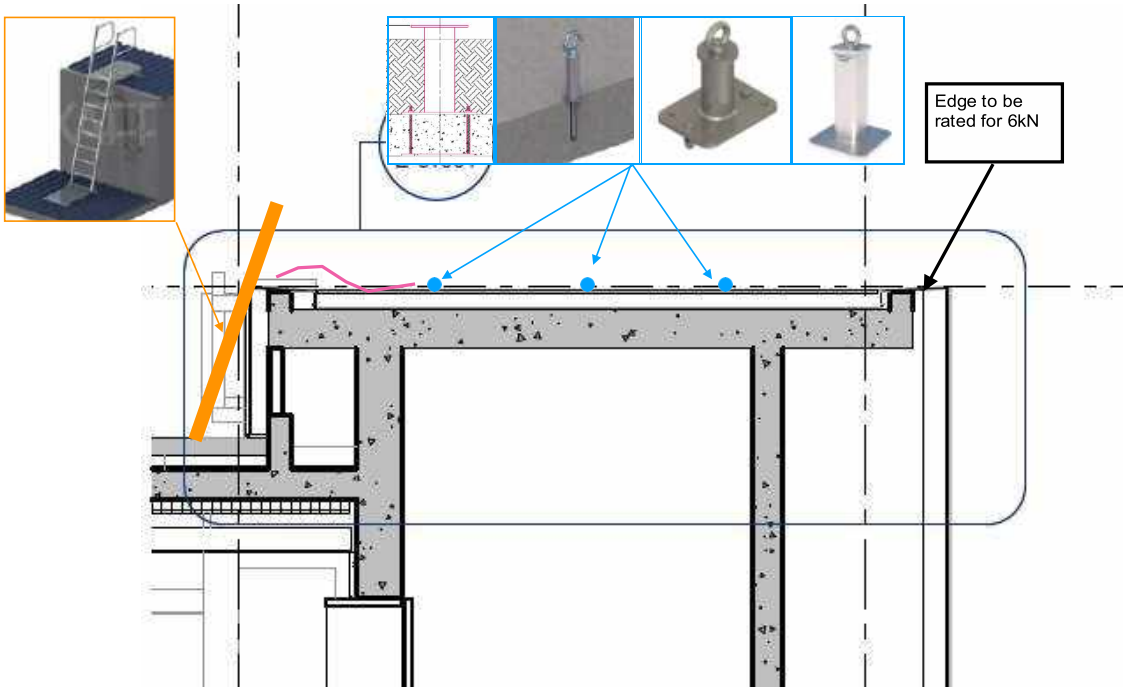


Rope Access Bollard Strop Fixed Ladder

Zone E

SK-13745-09-B





SK-13745-17-C

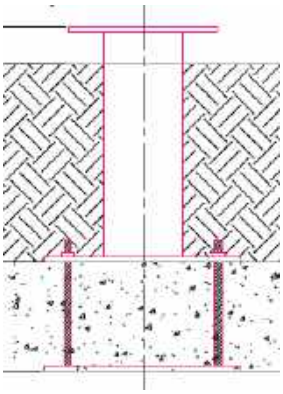
Indicative Only

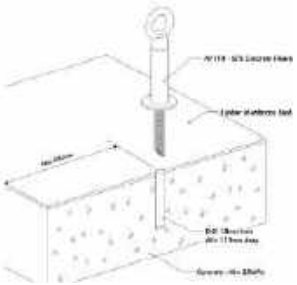
Zone E

Product Information

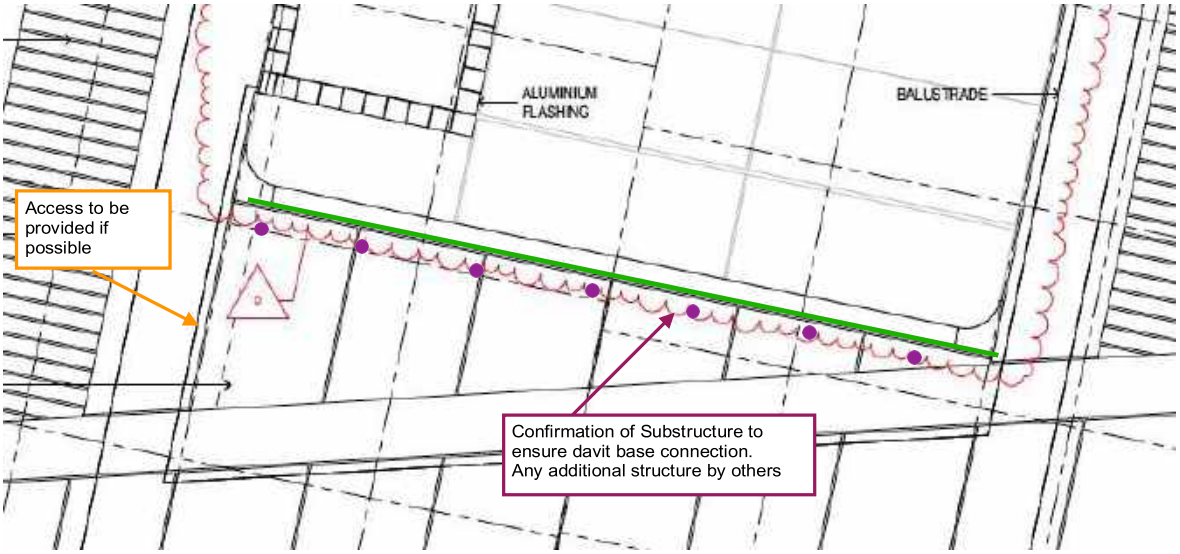
Ladders

Anchor Points





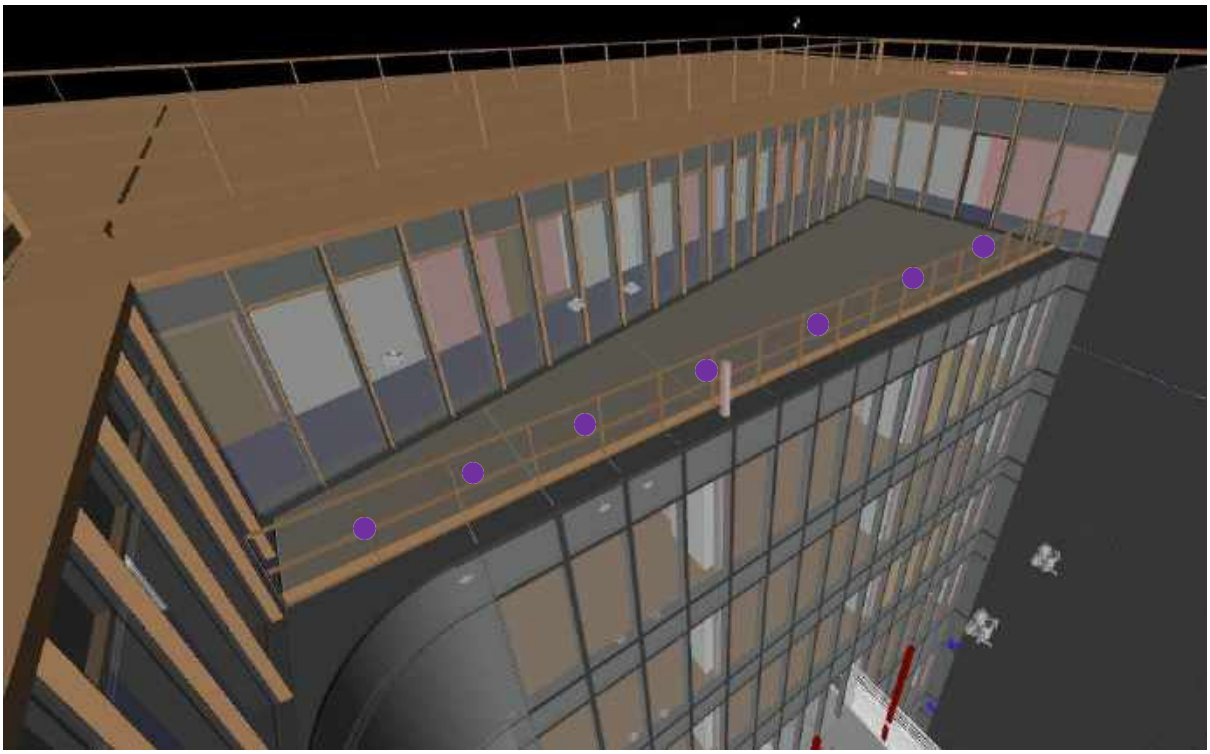
Appendix 7: Zone F Layout Plan & General Information

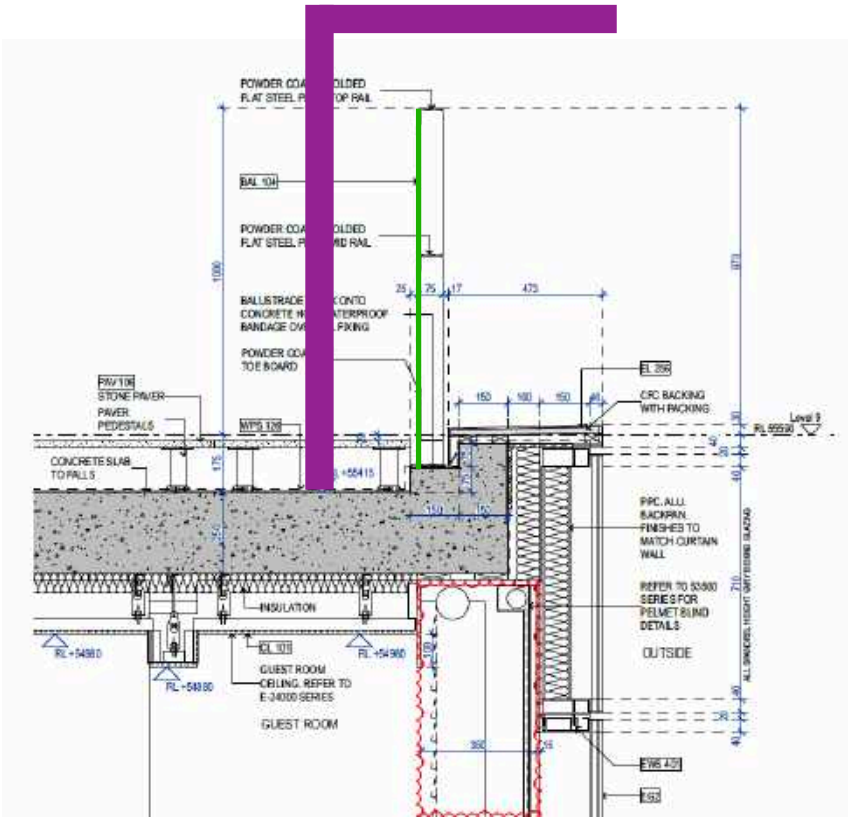


Guardrail Rope Access Davit Arm

Zone F

SK-13745-11-B



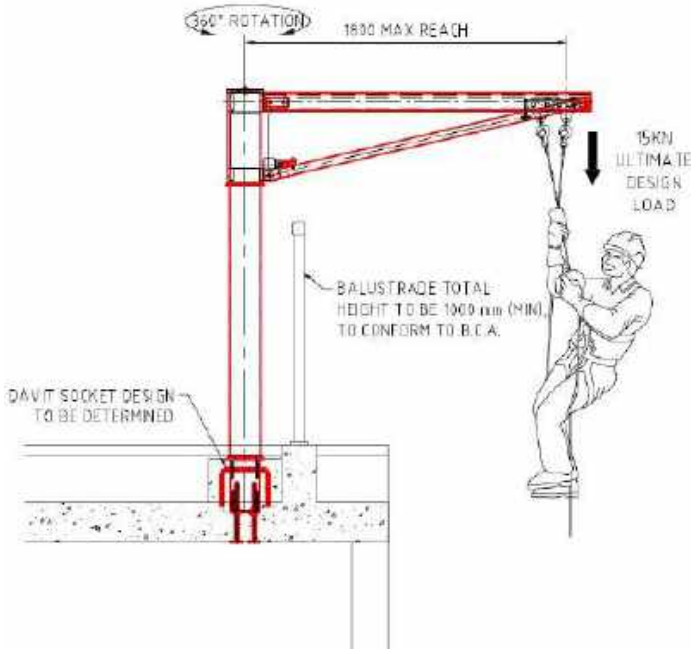


Rope Access Davit Guardrail

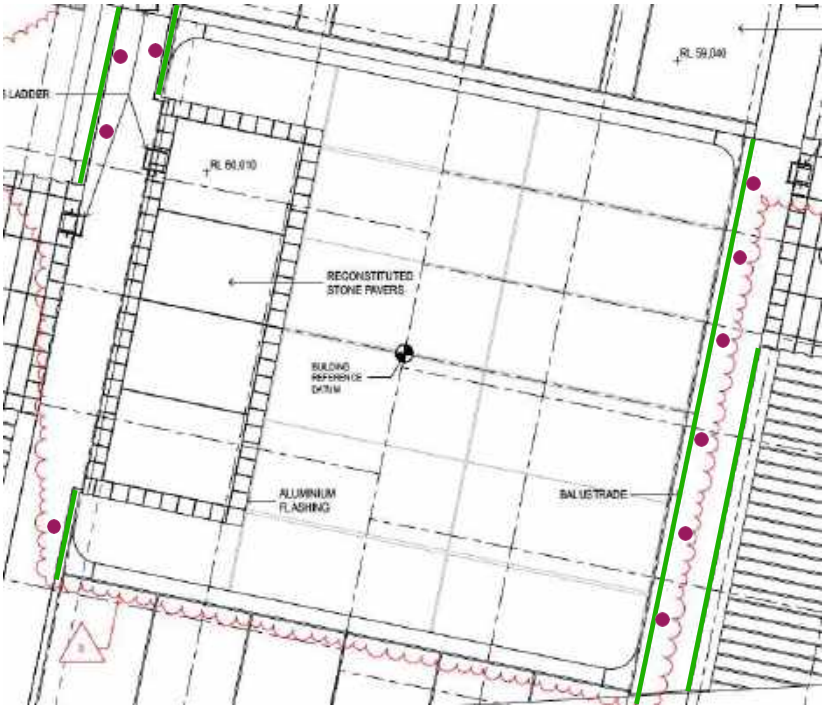
Zone F

SD-13745-12-C

Indicative Only



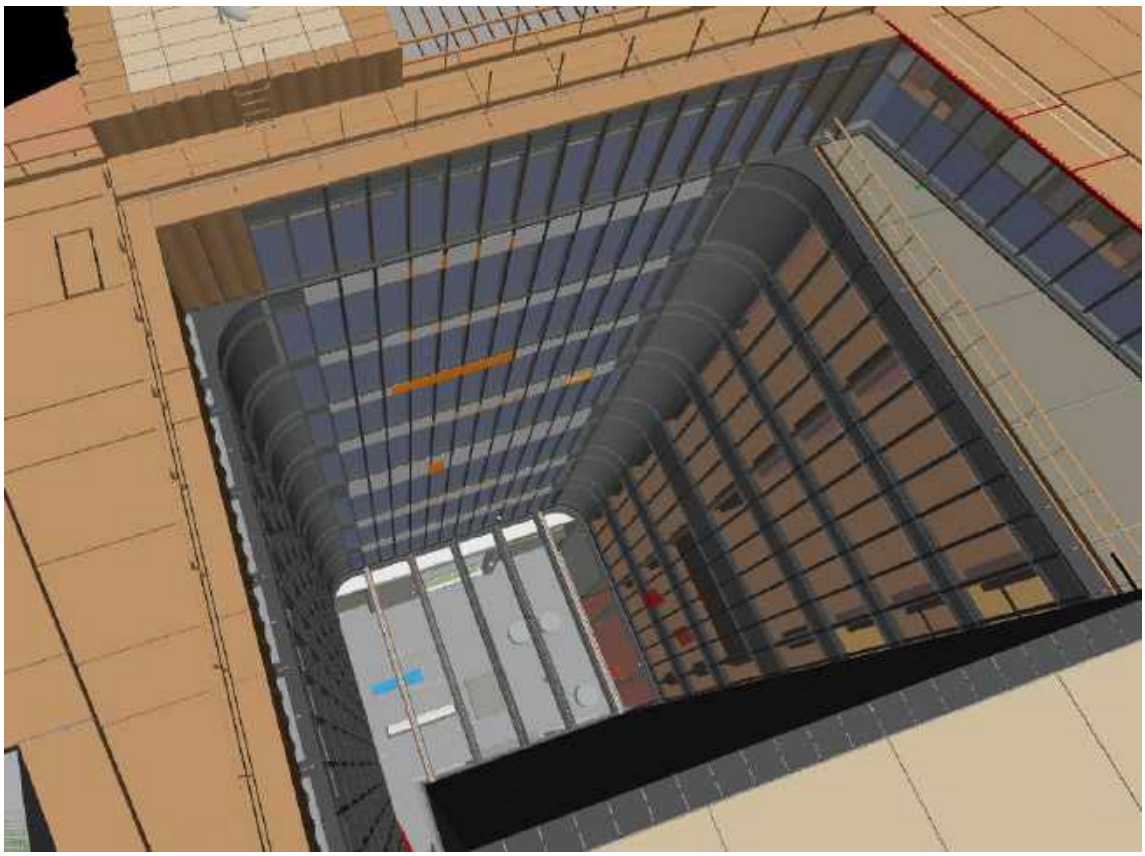
Appendix 8: Zone G Layout Plan & General Information



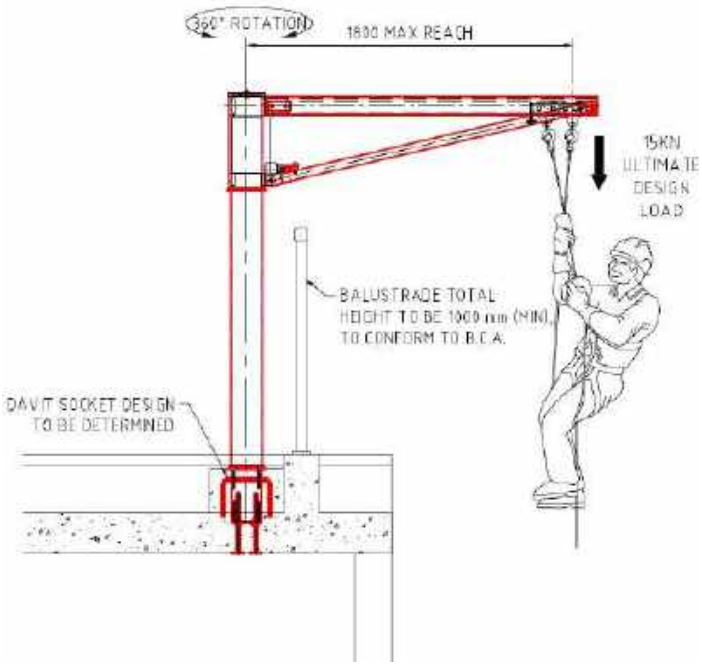
Rope Access Bollard Guardrail

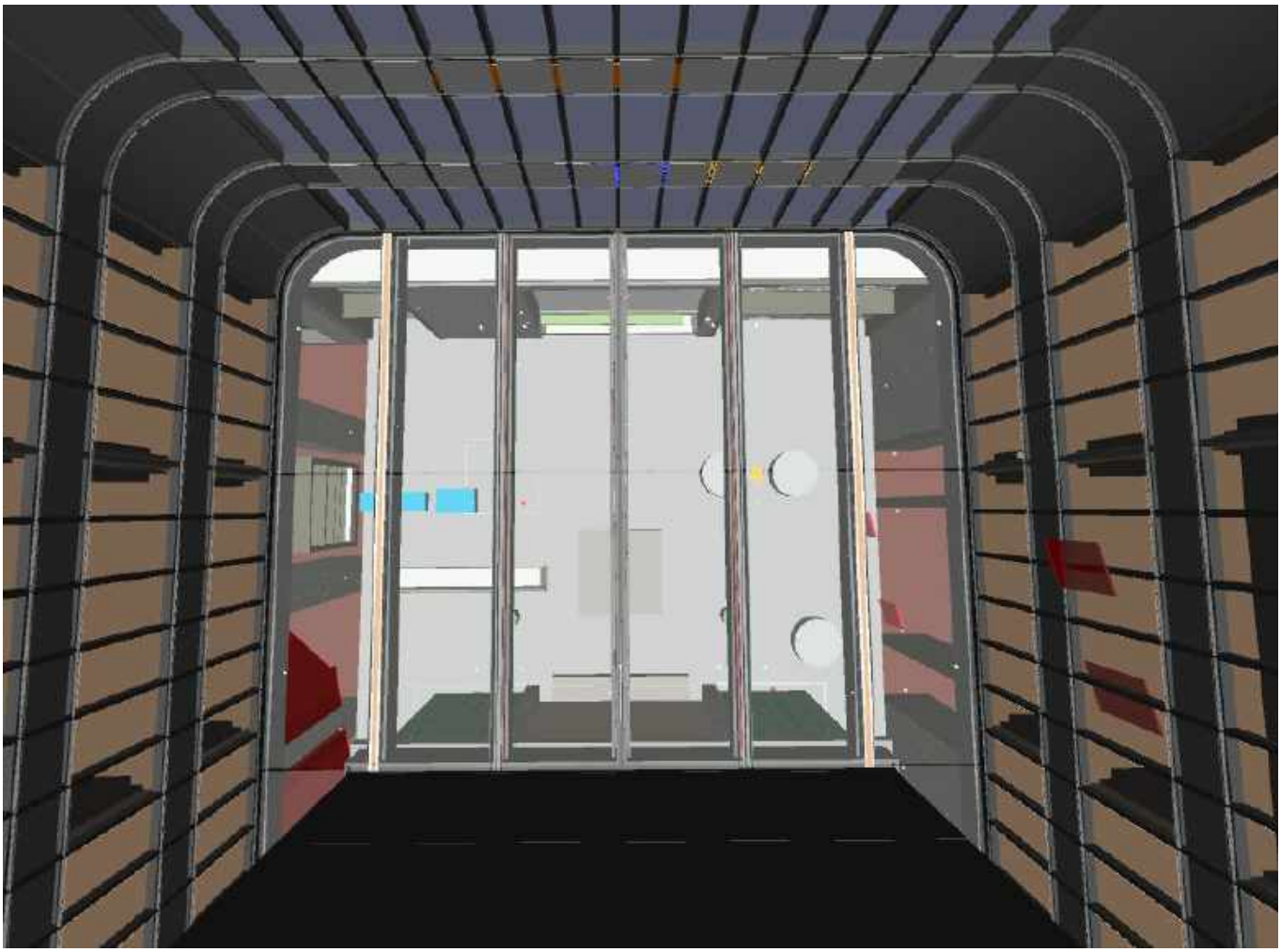
Zone G

SK-13745-13-B

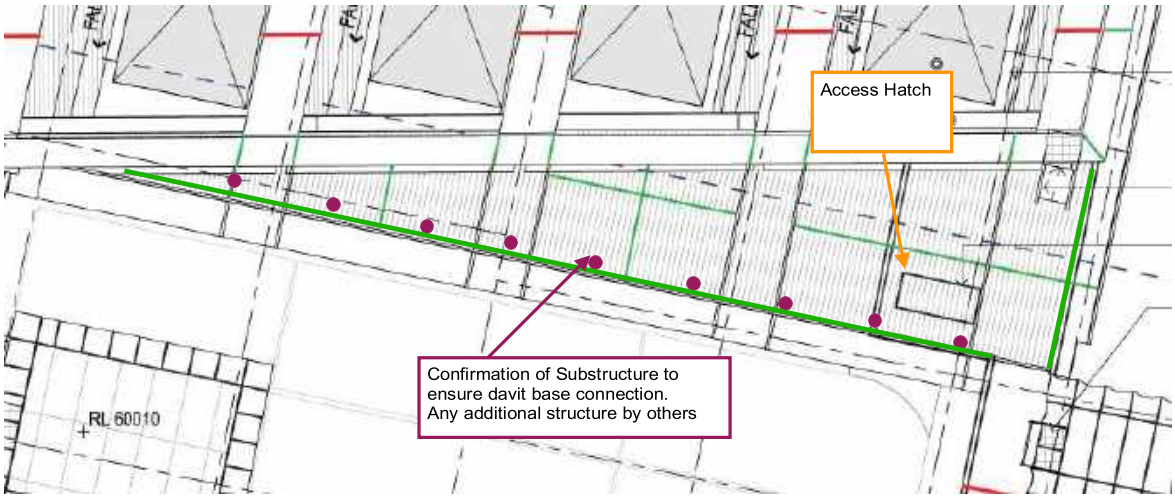


Product Information





Appendix 9: Zone H Layout Plan & General Information



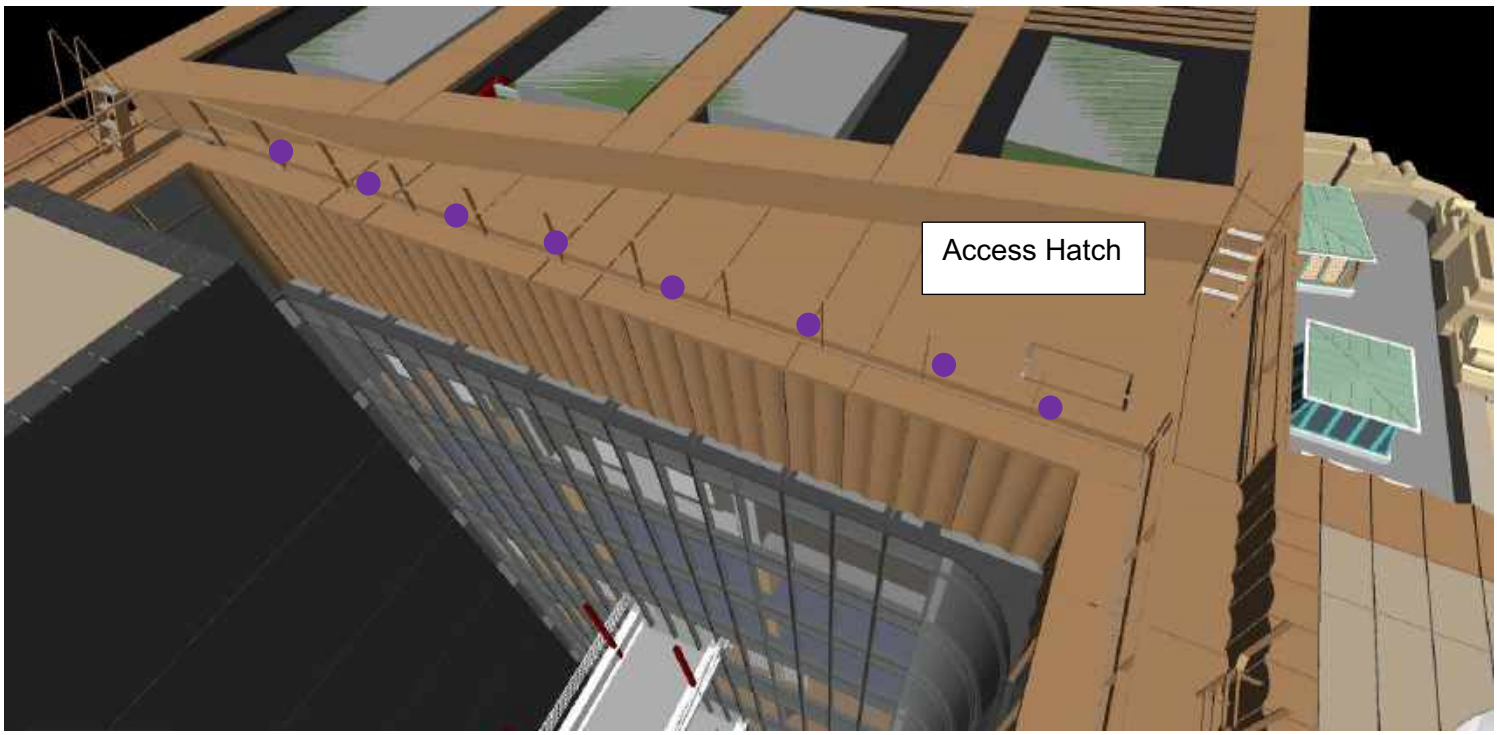
Guardrail

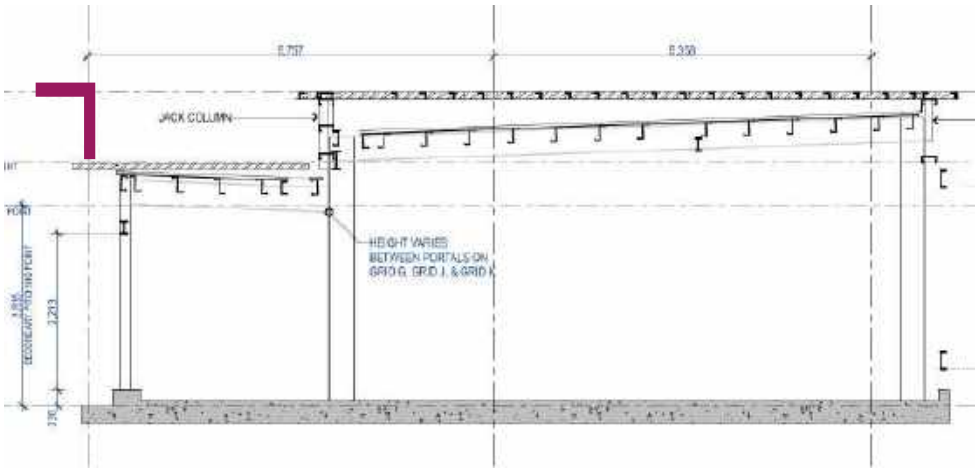
Rope Access Davit Arm

SK-13745-10-C

Indicative Only

Zone H





Davit Arm

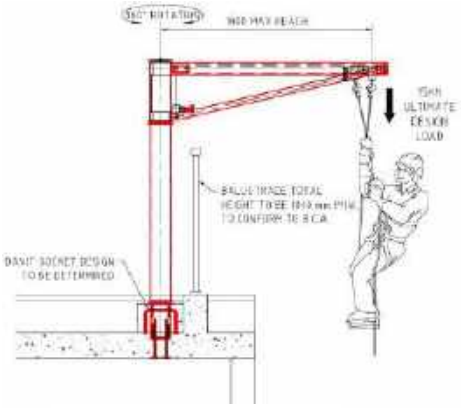
Guardrail

SK-13745-18-C

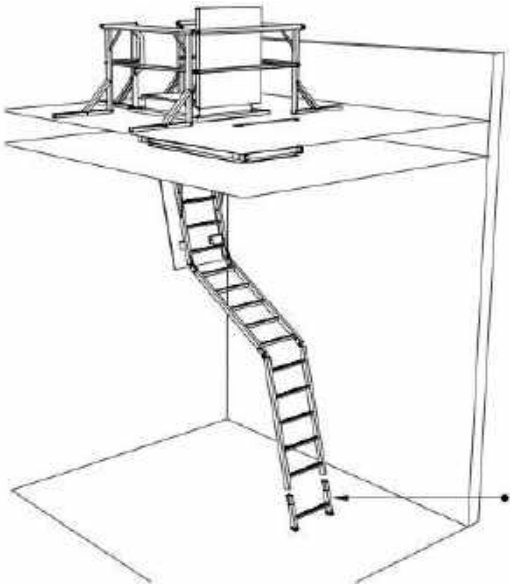
Indicative Only

Zone H

Product Information

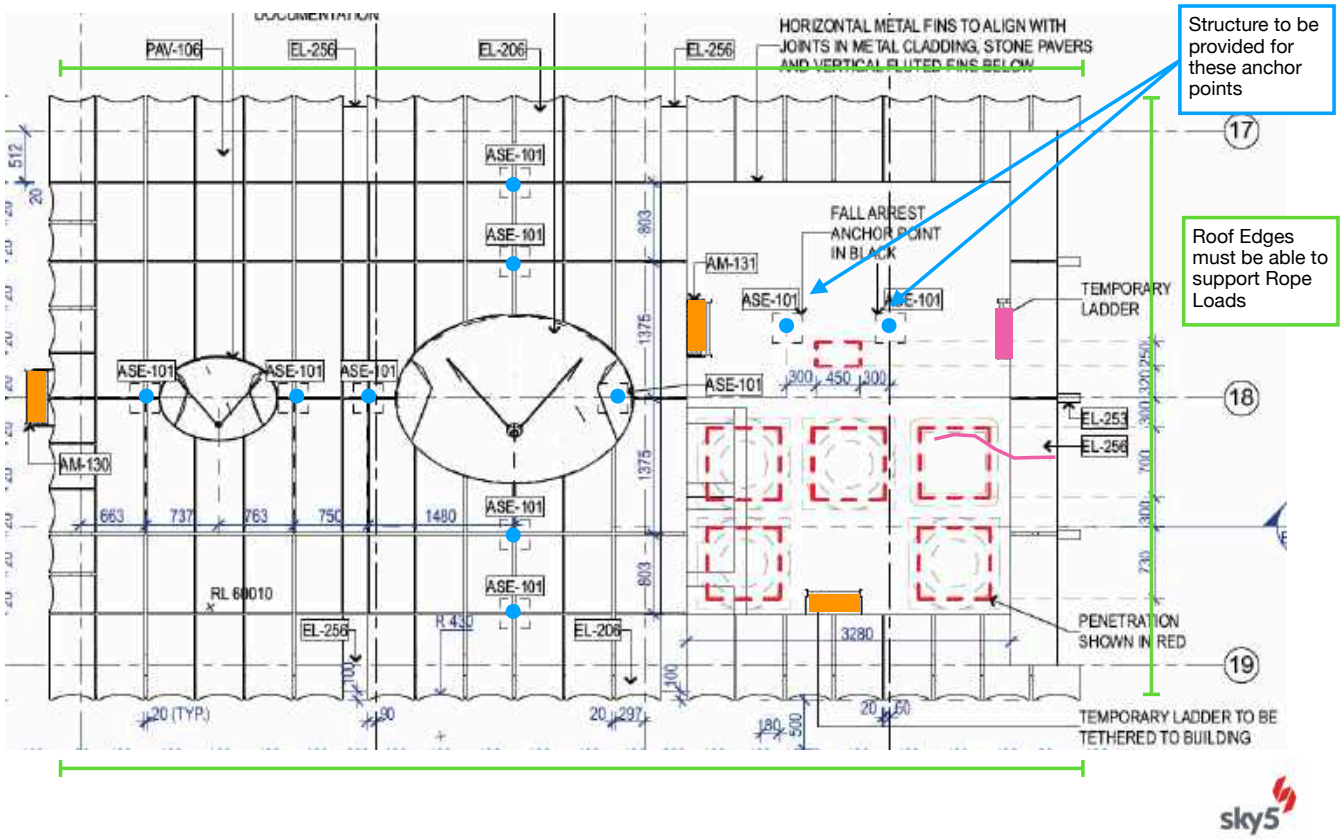


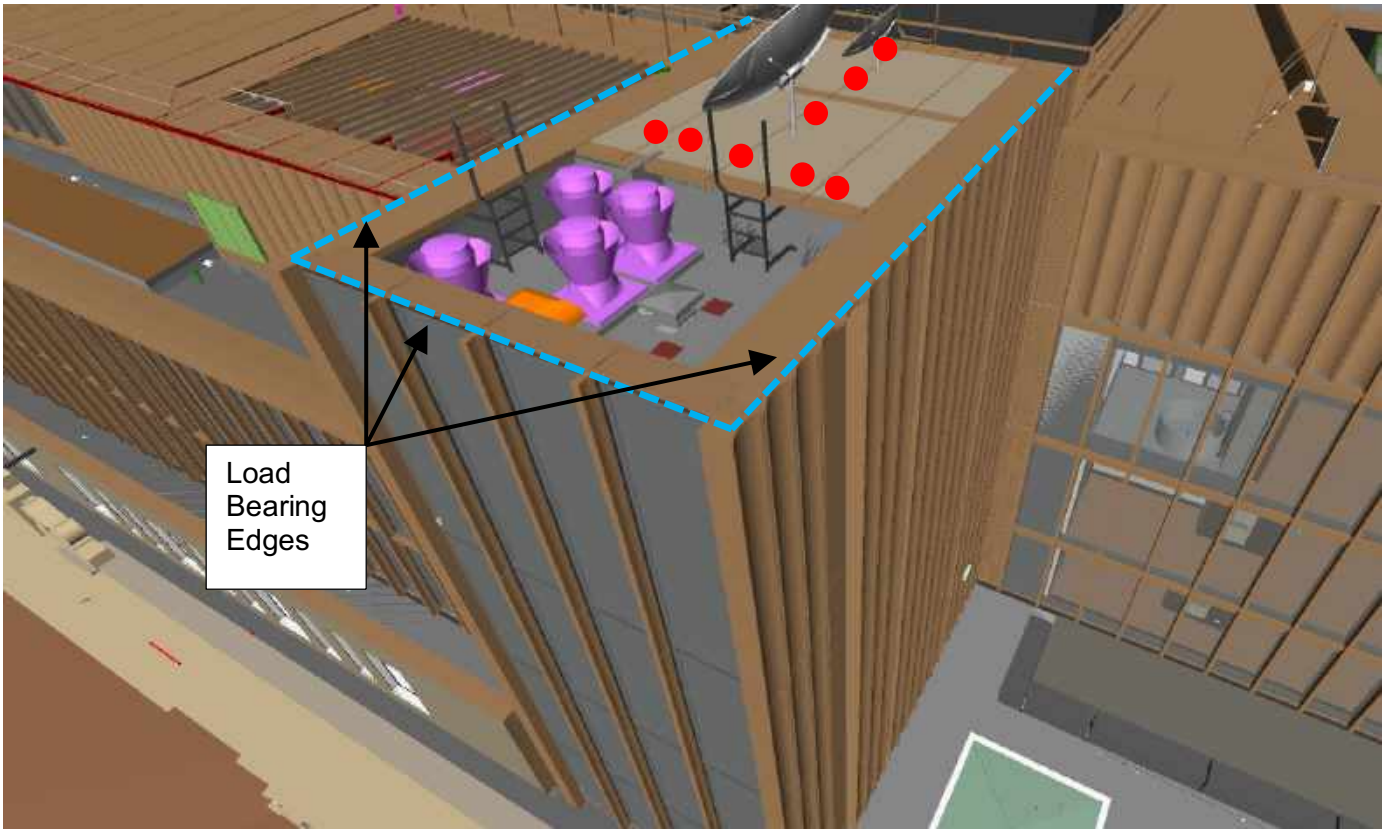
Davit Arm

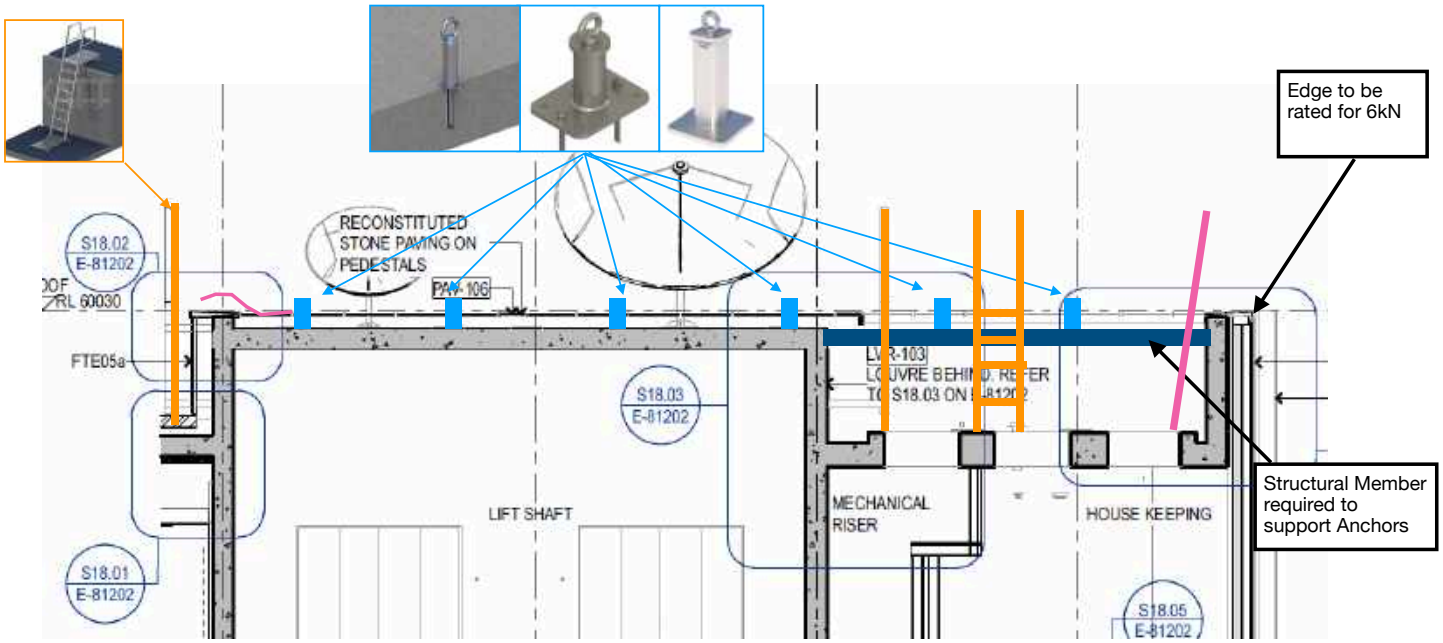


Fold Down Ladder, Hatch & Hatch Guardrail

Appendix 10: Zone J Layout Plan & General Information







Rope Access Bollard Strop Fixed Ladder Temp Ladder

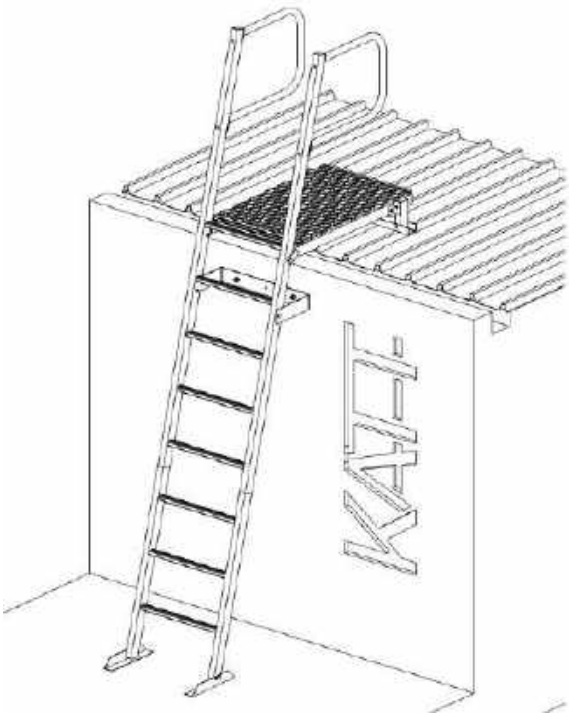
SD-13745-15-D

Zone J

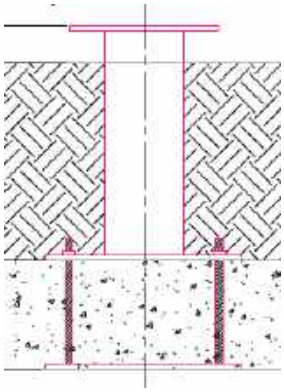
Indicative Only

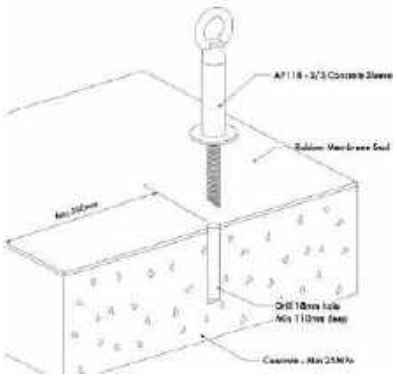
Product Information

Ladders



Anchor Points





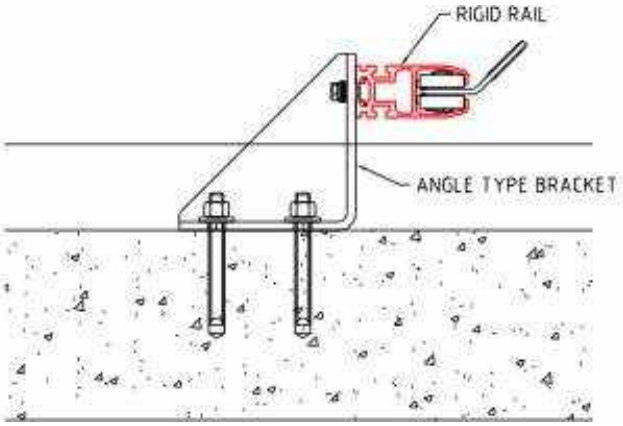
Appendix 11: Zone K Layout Plan & General Information

Rope Access Rail on structural support beam

Zone K

SK-13745-15-B

Rigid Rail System



Edge Protection