

Check all dimensions and site conditions prior to commencement of any work, the purchase or ordering of any materials, fittings, plant, services or equipment and the preparation of shop drawings and or the fabrication of any components.

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**Notes - Construction General (BASIX)**

**Glazing**  
**Doors / windows:**  
 - Aluminium framed **single clear** glazing to internal windows that open to wintergardens  
 U-Value: 6.6 (equal to or lower than)  
 SHGC: 0.69 (+ or - 10%)

- Aluminium framed **double clear** glazing to curtain walls & glazing to balcony edge.  
 U-Value: 4.4 (equal to or lower than)  
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Given values are NFRC, total window values

**Roof / ceiling insulation**

**Roof:**  
 Concrete roof - No insulation

Default Colour modelled

**Ceiling:**  
 Plasterboard ceiling - R3.0 bulk insulation to selected units (34.01 and 34.07) with balconies above.

Plasterboard ceiling - R2.0 bulk insulation to all units to top floor, balconies above & slot areas above to all other units.

Note: It has been assumed at DA stage that the area of all ceiling penetrations is less than 0.5% of the total ceiling area. If down lights are proposed at a later stage, BCA loss of insulation calculations will be required.

**Wall / floor insulation**

**External Wall:**  
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 No colour nominated

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**Inter-tenancy walls / corridor:**  
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**Floors:**  
 Concrete - R2.1 insulation to all units in level 7 with car park below  
 Concrete - no insulation required between units

**Floor coverings:**  
 1 & 2 bed apartments - tiles to wets areas, carpet to bedrooms and living areas as per plans  
 All 3 & 4 bed apartments tiled throughout

**Central hot water system**  
 Central gas-fired boiler with R1.0 (~38mm) insulation to ringmain and supply risers.

**HARON ROBSON**  
 lightmatters wattmatters avmatters  
 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP

Client: Ecove  


**Site 9, Sydney Olympic Park**  
 3 Olympic Boulevard  
 General Arrangement Plan  
 Level 20, 22, 24, 26

Status	Development Application
Scale	1 : 100 @ A1
Drawn	Author Checked Checker
Project No.	S11890
Plot Date	7/3/2016 2:51:43 PM
Plot File	

Drawing no. **DA02.020** Revision **A**

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**BATESSMART**



Electrical riser cupboard.  
 Refer to typical layout  
 arrangements on drawing  
 DA02.010.

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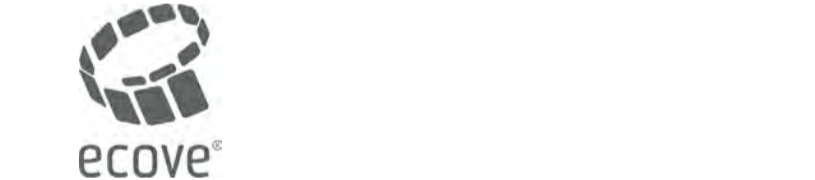
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**HARON ROBSON**  
 lightmatters wattmatters avmatters  
 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP

Client: Ecove



Site 9, Sydney Olympic Park  
 3 Olympic Boulevard

General Arrangement Plan  
 Level 21, 23, 25

Status	Development Application
Scale	1 : 100 @ A1
Drawn	Author Checked Checker
Project No.	S11890
Plot Date	7/3/2016 2:52:01 PM
Plot File	

Drawing no.	Revision
DA02.021	A

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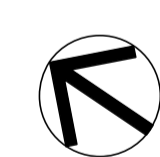
**HARON ROBSON**  
 lightmatters wattmatters avmatters  
 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP

Client: Ecove  


**Site 9, Sydney Olympic Park**  
**3 Olympic Boulevard**

General Arrangement Plan  
 Level 27, 29, 31, 33, 35



Status	Development Application		
Scale	1 : 100	@	A1
Drawn	Author	Checked	Checker
Project No.	S11890		
Plot Date	7/3/2016 2:57:37 PM		
Plot File			

Drawing no.	Revision
DA02.027	A

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**BATESSMART**



Electrical riser cupboard.  
 Refer to typical layout  
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C:\Temp\59\_BS\_ARCH\_SHH\vt

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**HARON ROBSON**  
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 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP



Site 9, Sydney Olympic Park  
 3 Olympic Boulevard

General Arrangement Plan  
 Level 28, 30, 32, 34

Status	Development Application		
Scale	1 : 100	@	A1
Drawn	Author	Checked	Checker
Project No.	S11890		
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Drawing no.	Revision
DA02.028	A

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1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP



**Site 9, Sydney Olympic Park**  
**3 Olympic Boulevard**

**General Arrangement Plan**  
**Level 36-37**

Status	Development Application		
Scale	1 : 100	@	A1
Drawn	Author	Checked	Checker
Project No.	S11890		
Plot Date	7/3/2016 2:52:48 PM		
Plot File			

Drawing no.	Revision
DA02.036	A

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 lightmatters wattmatters avmatters  
 1 April 2016

Revision	Date	Description	Initial	Checked
A	01.03.16	Development Application	JS	CP



Site 9, Sydney Olympic Park  
 3 Olympic Boulevard

General Arrangement Plan  
 Level 38

Status	Development Application
Scale	1 : 100 @ A1
Drawn	Author Checked Checker
Project No.	S11890
Plot Date	7/3/2016 2:53:03 PM
Plot File	

Drawing no. **DA02.038** Revision **A**

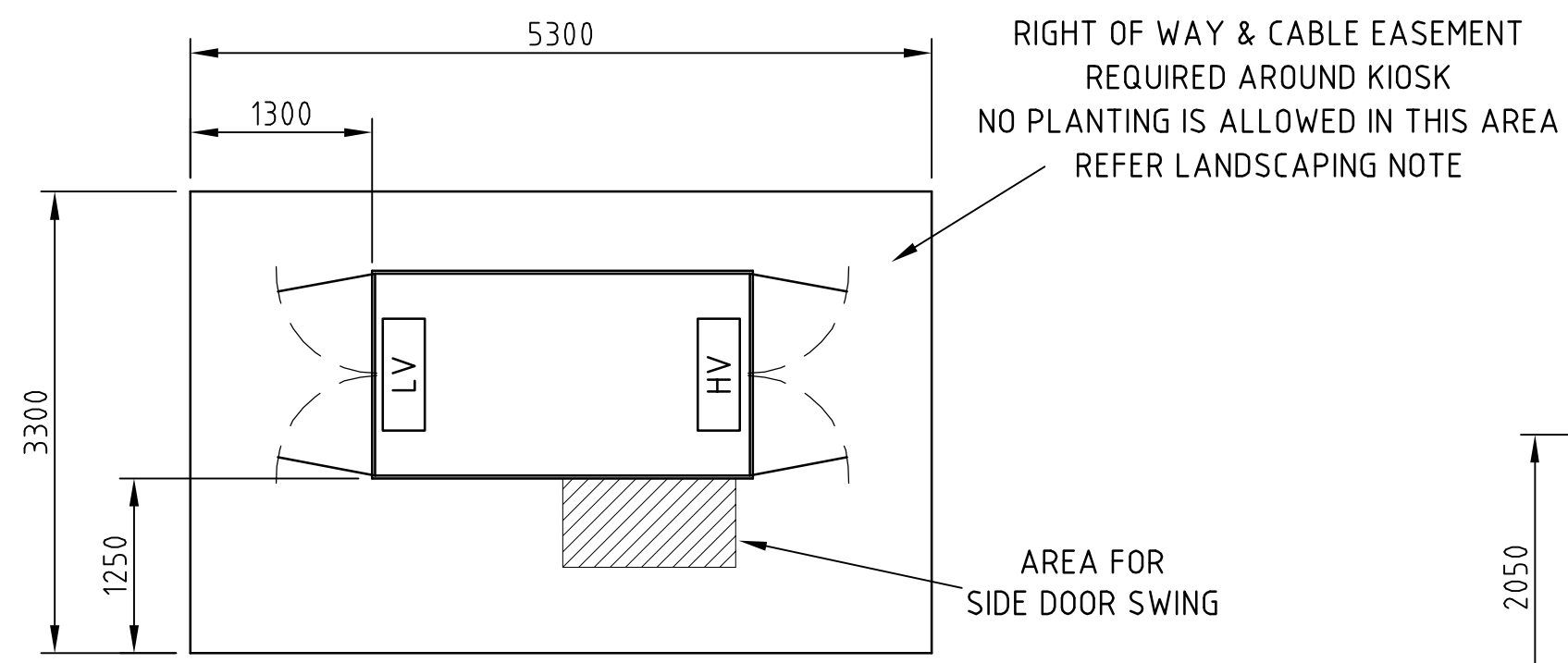
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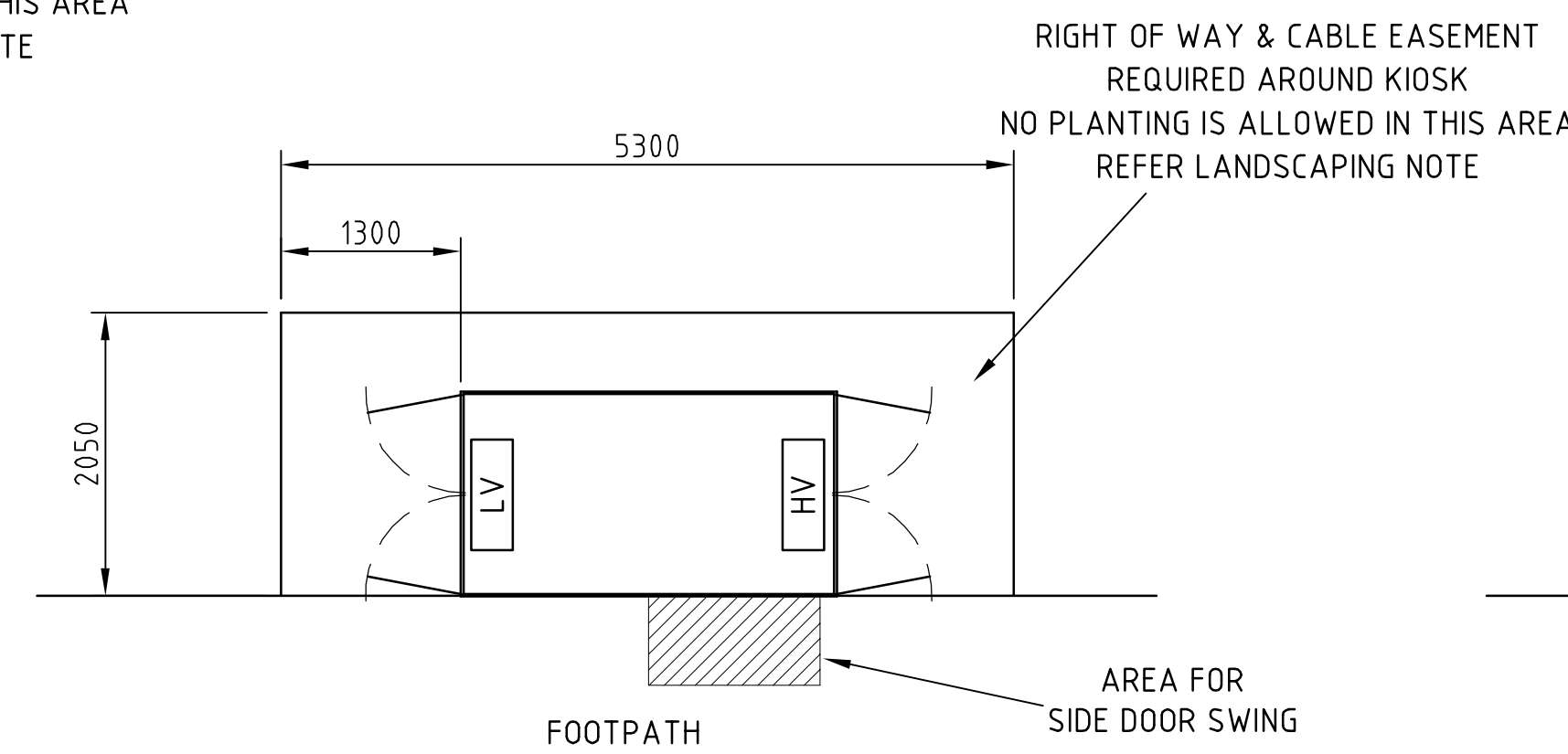
Bates Smart Pty Ltd ABN 70 004 999 400



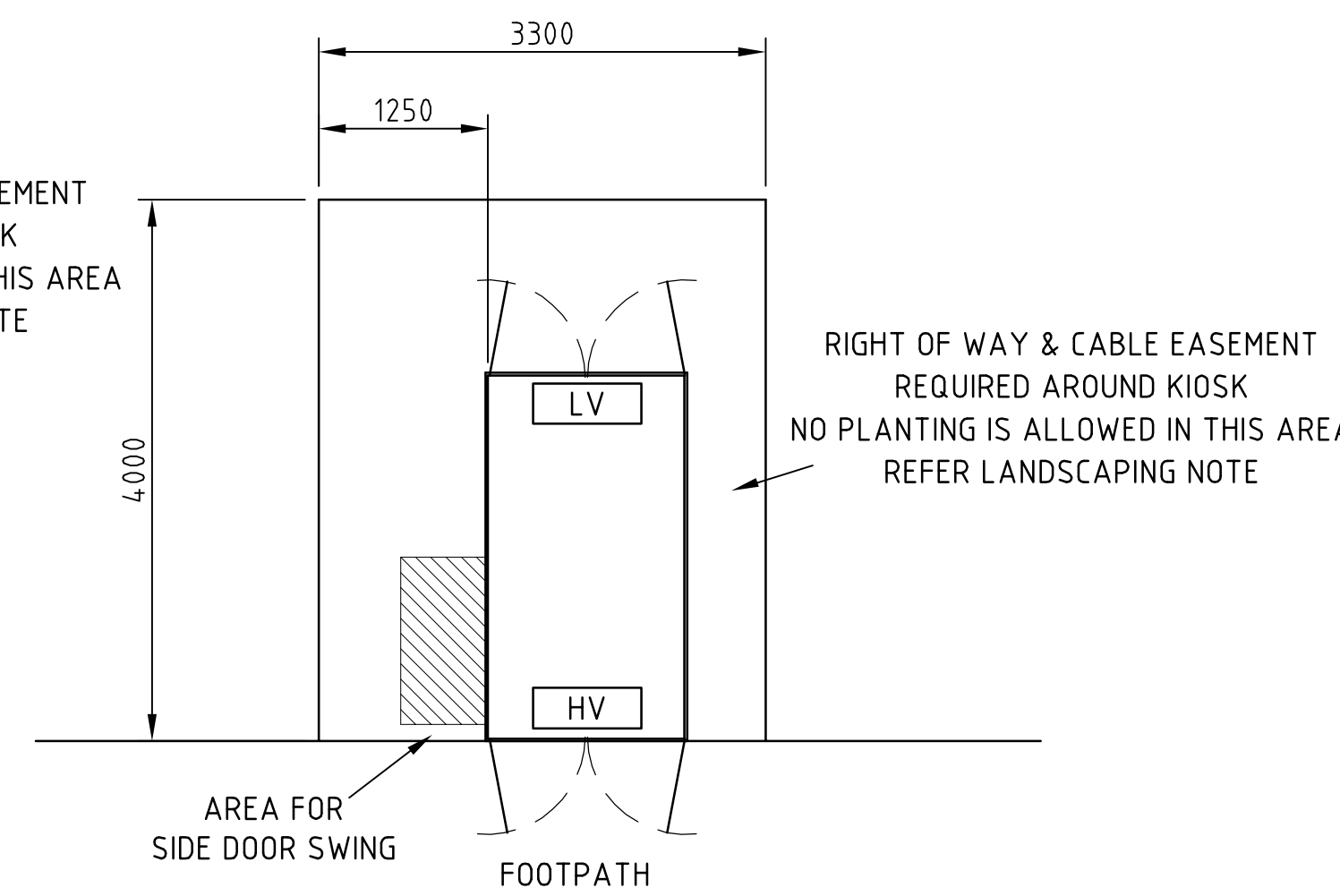
**ALTERNATE SITE PLANS**



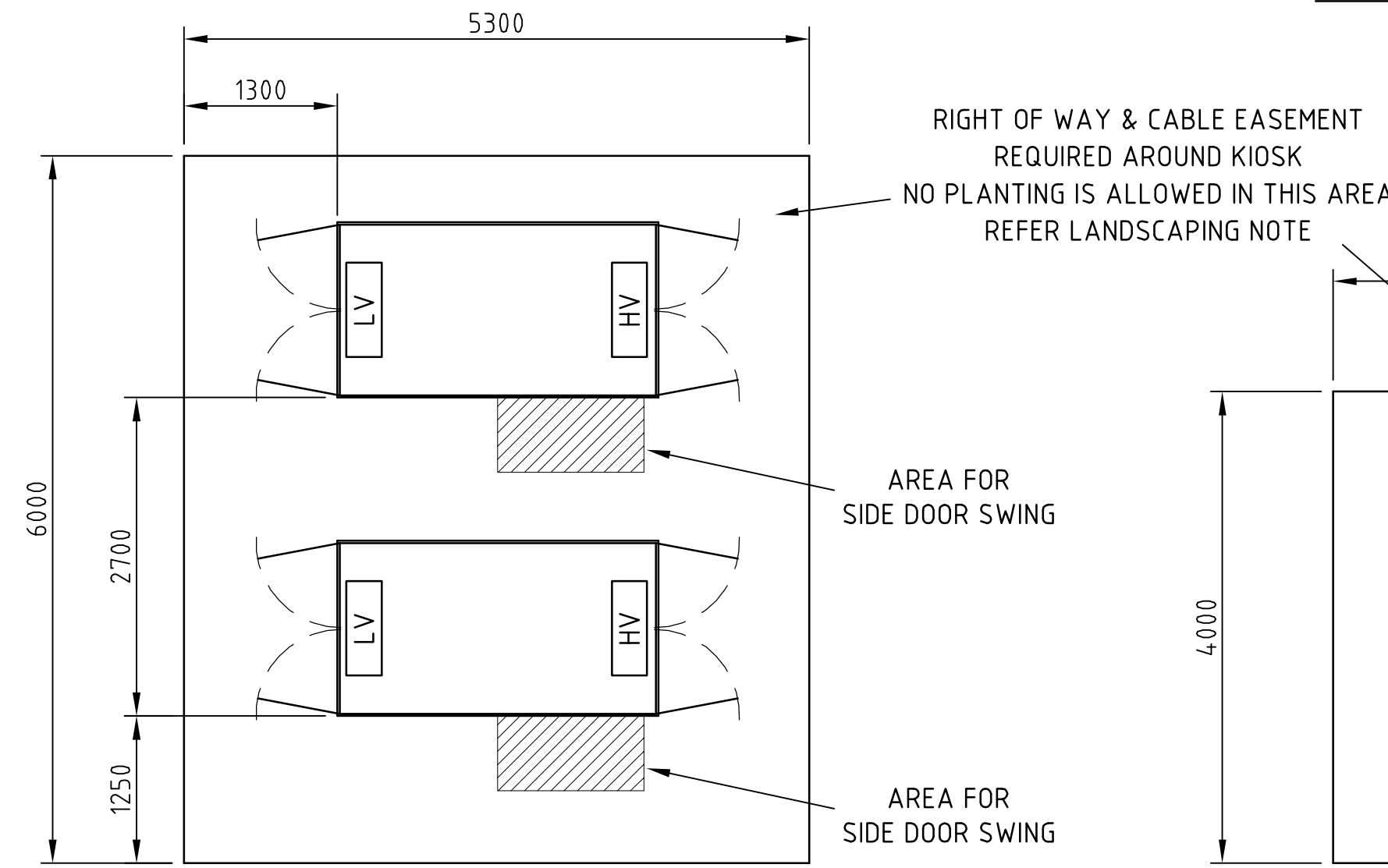
**SITE PLAN A**  
Scale 1:50



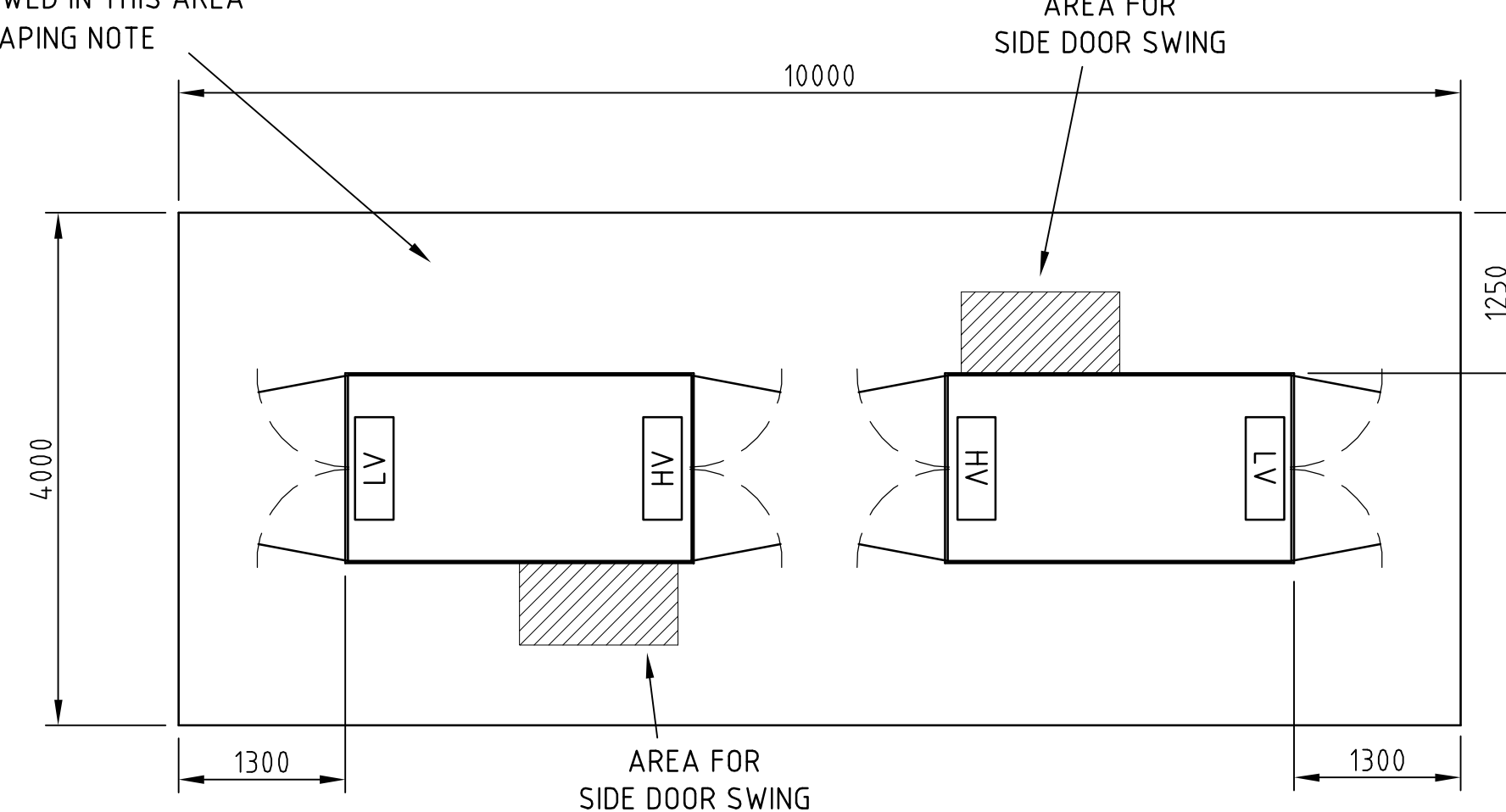
**SITE PLAN B**  
USED IN URD AREAS ONLY  
Scale 1:50



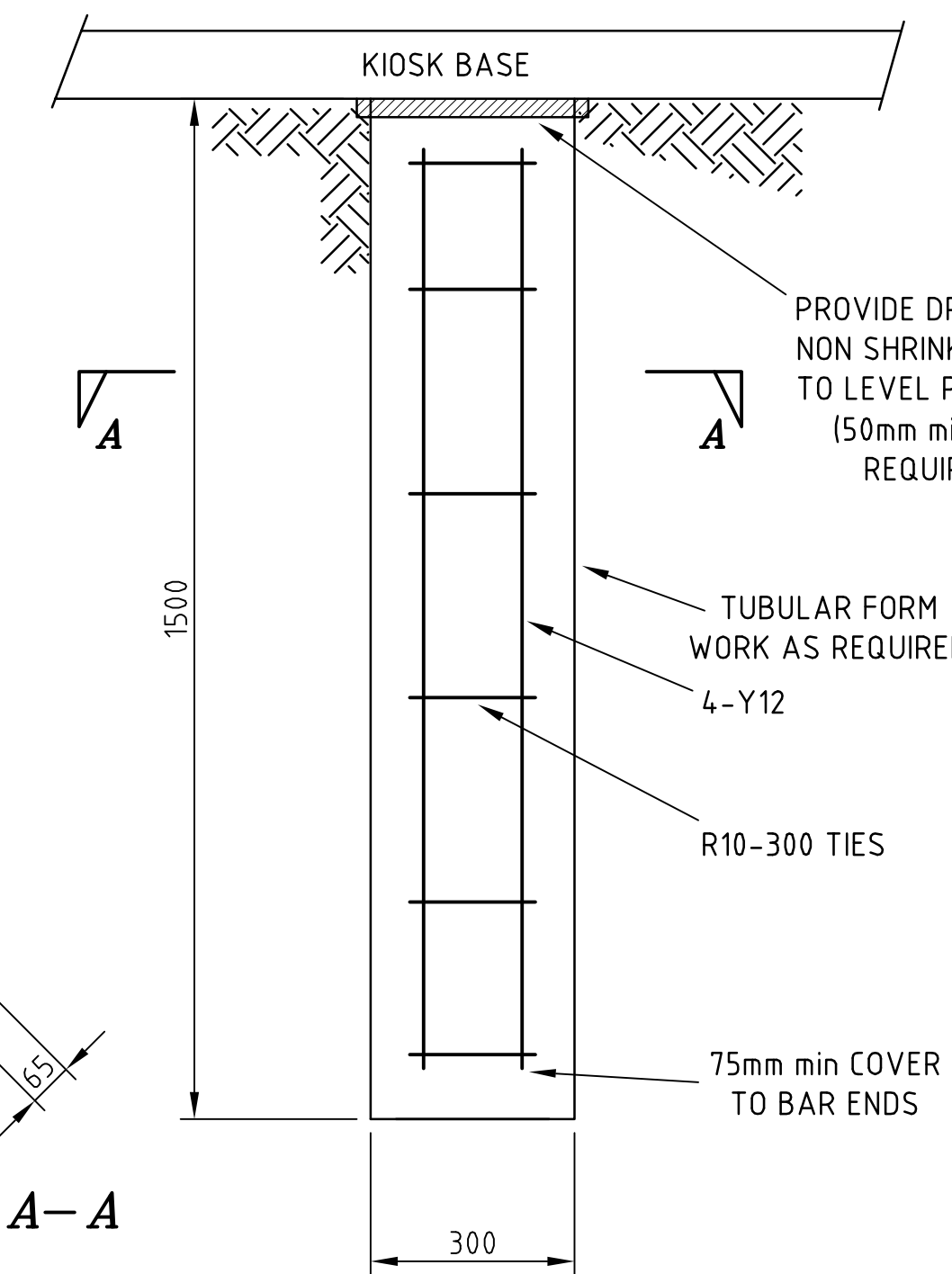
**SITE PLAN C**  
USED IN URD AREAS ONLY  
Scale 1:50



**SITE PLAN D**  
Scale 1:50

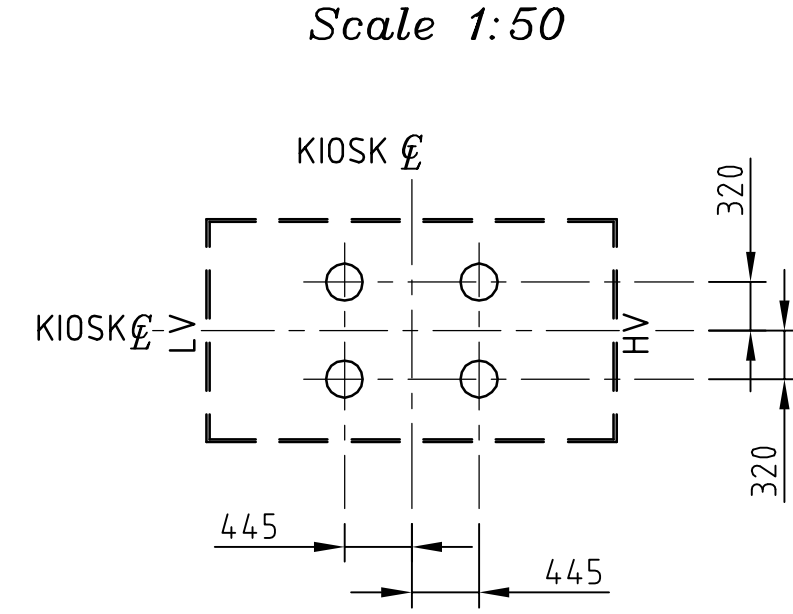


**SITE PLAN E**  
Scale 1:50



**TYPICAL REINFORCED PIER**  
Scale 1:10

THE PIER SHOWN ABOVE IS TYPICAL ONLY AND MAY NOT BE SUITABLE FOR THE KIOSK INSTALLATION BEING PROPOSED. REFER TO PIERS NOTE FOR FURTHER INFORMATION



**PIER LAYOUT**  
Scale 1:50

**SECTION A-A**

**NOTES**

**SITE**  
ALL DIMENSIONS SHOWN ARE MINIMUM REQUIREMENTS. THE SITE MUST BE LEVEL AND CLEAR OF ALL CONSTRUCTION AND ACCESSIBLE FOR EQUIPMENT INSTALLATION AND MAINTENANCE. NO SERVICES SUCH AS DRAINS, HIGH OR LOW PRESSURE PIPES, ELECTRICAL OR COMMUNICATION CABLES, WATER PIPES etc ARE TO BE LOCATED WITHIN THE AREA SHOWN ON THE SITE PLAN. ANY FILL USED WITHIN THE AREA SHOWN ON THE SITE PLAN IS TO BE CLEAN COMPACTED SAND.

**ACCESS**  
PROVISION MUST BE MADE FOR ALL WEATHER ACCESS TO THE KIOSK SITE BY HEAVY MOBILE CRANE AND TRUCK. WHERE STEPS ARE REQUIRED FOR PERSONNEL ACCESS, THEY MUST BE PROVIDED EXTERNAL TO THE KIOSK SITE.

**PIERS**  
PIERS ARE TO BE CONSTRUCTED IN THE LOCATIONS SHOWN FOR ALL KIOSK SITES. THE PIERS SHOWN ON THIS DRAWING WILL BE SUITABLE. FOR USE AT MOST SITES, HOWEVER AT SOME SITES WHERE THE GROUND IS FOUND TO BE FILLED OR UNSTABLE, PIERS ARE TO BE DESIGNED BY A QUALIFIED AND PRACTISING STRUCTURAL ENGINEER TO CARRY A TOTAL LOAD OF 7350kg. VERIFICATION IS ALSO REQUIRED THAT THE BEARING OF ANY PIER USED ON THE KIOSK SITE AT ITS FOUNDATION DEPTH HAS A CAPACITY OF 300kPa. DRAWINGS OF THE KIOSK SITE AND PIERS ARE TO BE SUBMITTED BEFORE CONSTRUCTION COMMENCES.

**EARTHING**  
EARTHING IS TO BE INSTALLED AFTER THE SITE IS CLEARED AND PIER CONSTRUCTION COMPLETED. TYPICAL EARTHING DETAILS FOR KIOSK SUBSTATIONS ARE SHOWN ON DRAWINGS 167433, 167434 AND 173990. HOWEVER INFORMATION SHOWN ON THESE DRAWINGS IS INDICATIVE ONLY AS EACH KIOSK SITE REQUIRES A SPECIFIC EARTHING DESIGN TO BE UNDERTAKEN AS INDICATED IN NETWORK STANDARD NS116. EARTHING FOR SITES USING OPTIONS 2a AND 2b IS TO BE UNDERTAKEN USING THE METHODS SHOWN ON DRAWING 25121 FOR EARTHING CONDUITS AND EARTH ROD INSTALLATION UNDER ANY CONCRETE FLOOR.

**CABLE AND CONDUIT INSTALLATION**  
CABLES AND CONDUITS ARE TO BE INSTALLED TO NETWORK STANDARD NS130. WHERE THE COVER CANNOT BE ACHIEVED OR THE CABLES PASS UNDER AN AREA WHICH CANNOT BE READILY EXCAVATED IN THE FUTURE, A BANK OF Ø125mm ORANGE LD RIGID UPVC PIPE CONFORMING TO AS 2053 PART 2, MAY BE REQUIRED TO BE INSTALLED TO A 1500mm<sup>2</sup> EXCAVABLE AREA SUITABLE FOR LOCATING CABLE JOINTS. THIS AREA IS TO BE IN A POSITION AGREED BY THE BOTH THE BUILDER AND AUSGRID. WHERE CONDUITS SUPPLYING THE KIOSK SUBSTATION PASS UNDER A ROADWAY OR A BUILDING THEY ARE TO BE CONCRETE ENCASED.

**PROTECTION OF KIOSK FROM VEHICLE DAMAGE**  
IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE ADEQUATE PERMANENT PROTECTION IF KIOSKS ARE LOCATED IN THE VICINITY OF AREAS USED BY VEHICLES. ANY FORM OF PROTECTION USED SHOULD MEET THE REQUIREMENTS STATED IN AS/NZ 1170.1 AND CAN TAKE THE FORM OF BOLLARDS OR CRASH BARRIERS. VEHICLE PROTECTION SHOULD BE PLACED ON THE OUTSIDE OF THE KIOSK SITE.

**REINSTATEMENT OF VEHICULAR ROADWAY OR CABLE EASEMENT**  
THE CUSTOMER IS RESPONSIBLE FOR ALL REINSTATEMENT.

**LANDSCAPING THE SITE**  
AFTER THE EQUIPPING CONTRACTOR HAS INSTALLED THE KIOSK AND THE CUSTOMER'S CABLES HAVE BEEN INSTALLED, THE BUILDER MAY COVER THE KIOSK SITE WITH EITHER MEDIUM TO LARGE PINE BARK CHIPS, BLUE METAL, LAWN, WOODCHIPS, REMOVABLE PAVERS OR DECORATIVE GRAVEL, TO A DEPTH OF 120mm. PLASTIC SHEETING IS NOT TO BE USED UNDER THE COVER AND NO PLANTING IS ALLOWED IN AREA SHOWN ON THE SITE PLAN.

**REFERENCES**

AUSGRID'S NETWORK STANDARDS	NS 0141 NS 0117 NS 0130 NS 0116
SINGLE KIOSK SUBSTATIONS TYPICAL COMBINED EARTHING DETAILS	167433
DOUBLE KIOSK SUBSTATIONS TYPICAL COMBINED EARTHING DETAILS	167434
SINGLE KIOSK SUBSTATIONS TYPICAL SEGREGATED EARTHING DETAILS	173990

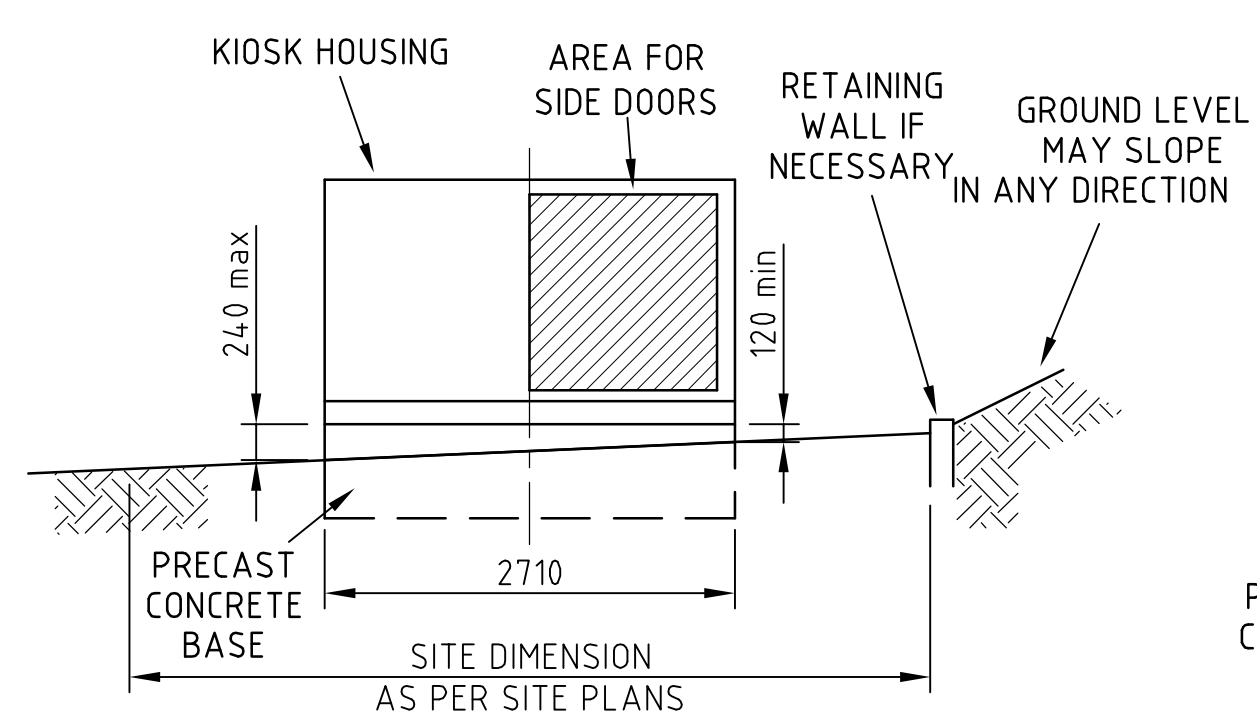
**CABLE ENTRY TO KIOSK BASE**  
Scale 1:50

RANGE OF ACCEPTABLE ENTRY ANGLES FOR CONSUMER'S MAINS AT KIOSK. RANGE EXTENDS TO KIOSK EASEMENT BOUNDARY

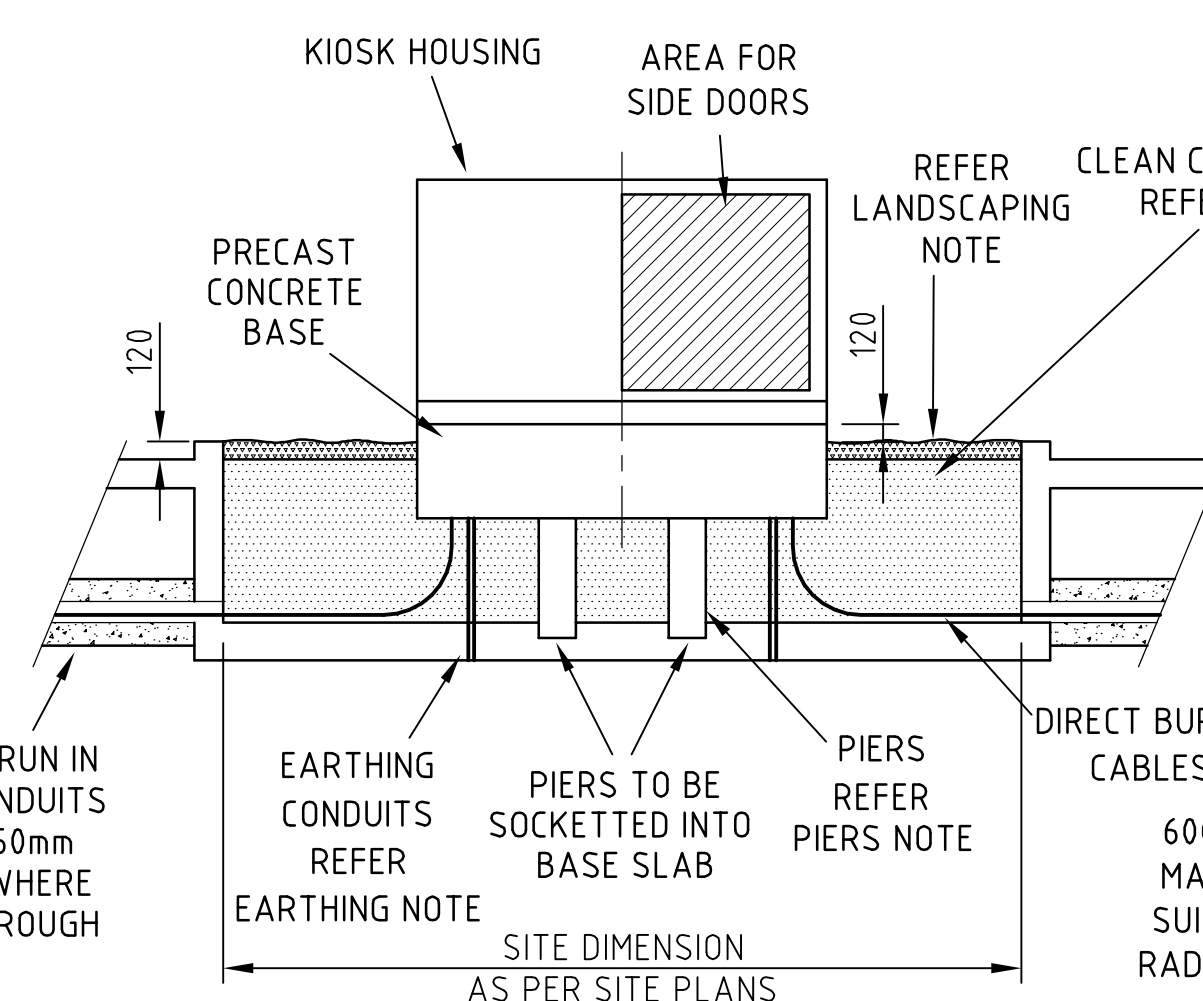
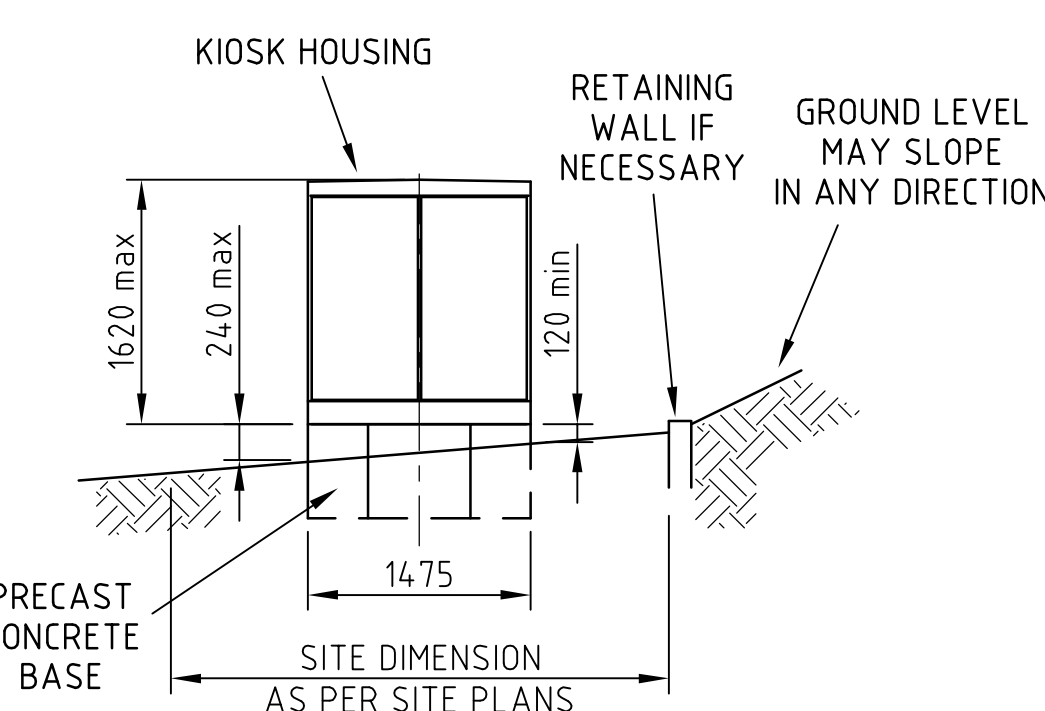
**CABLE ENTRY TO KIOSK BASE**  
Scale 1:50

**NOTE**  
BOTH ENDS OF THE KIOSK BASE HAVE REMOVABLE PANELS TO ALLOW CABLES TO BE "LAID IN"

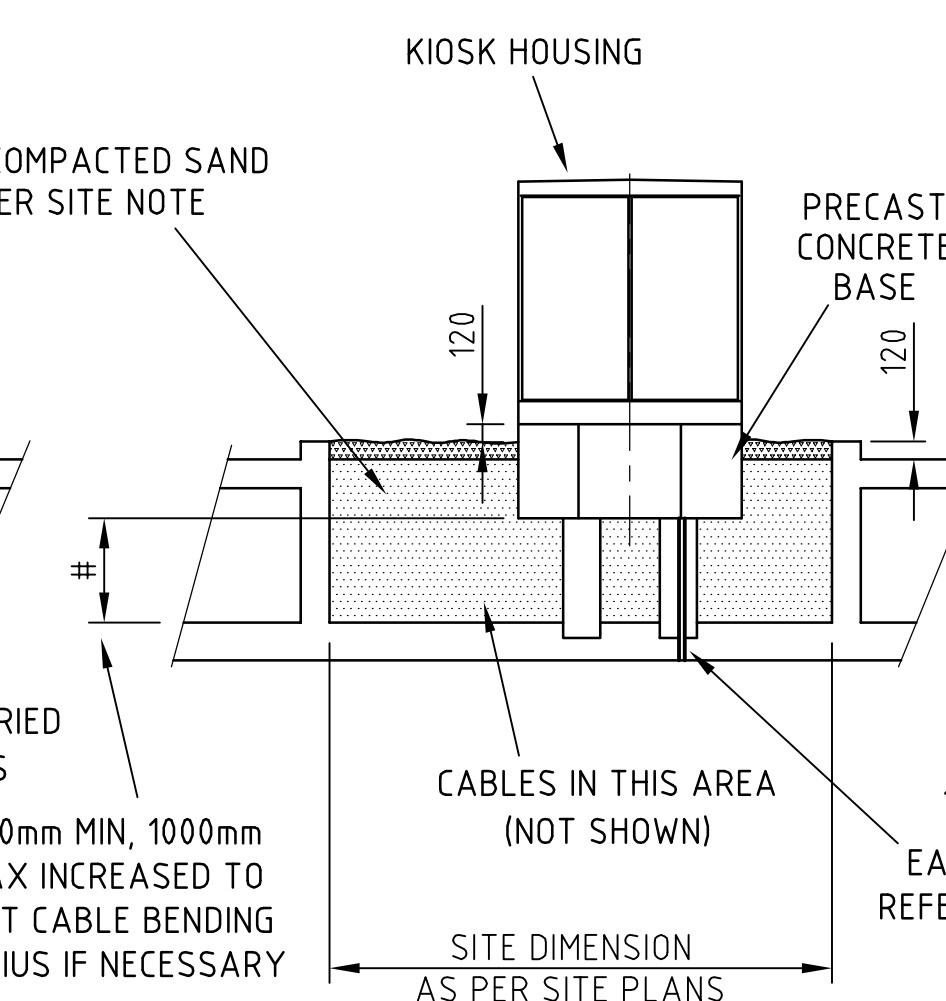
**ALTERNATE INSTALLATION METHODS**



**OPTION 1**  
**INSTALLATION DIRECT ON GROUND**  
Scale 1:50

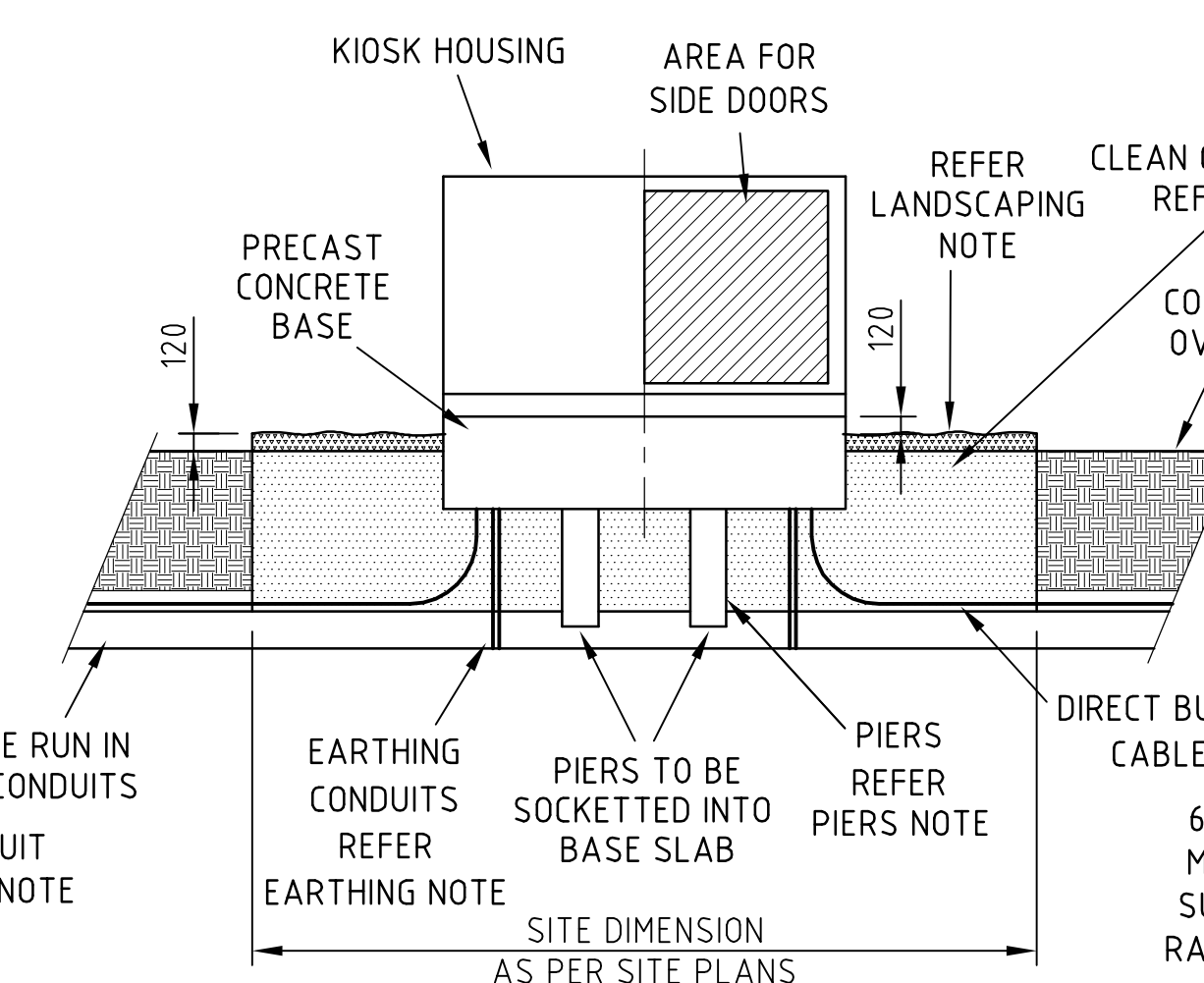


**OPTION 2a**

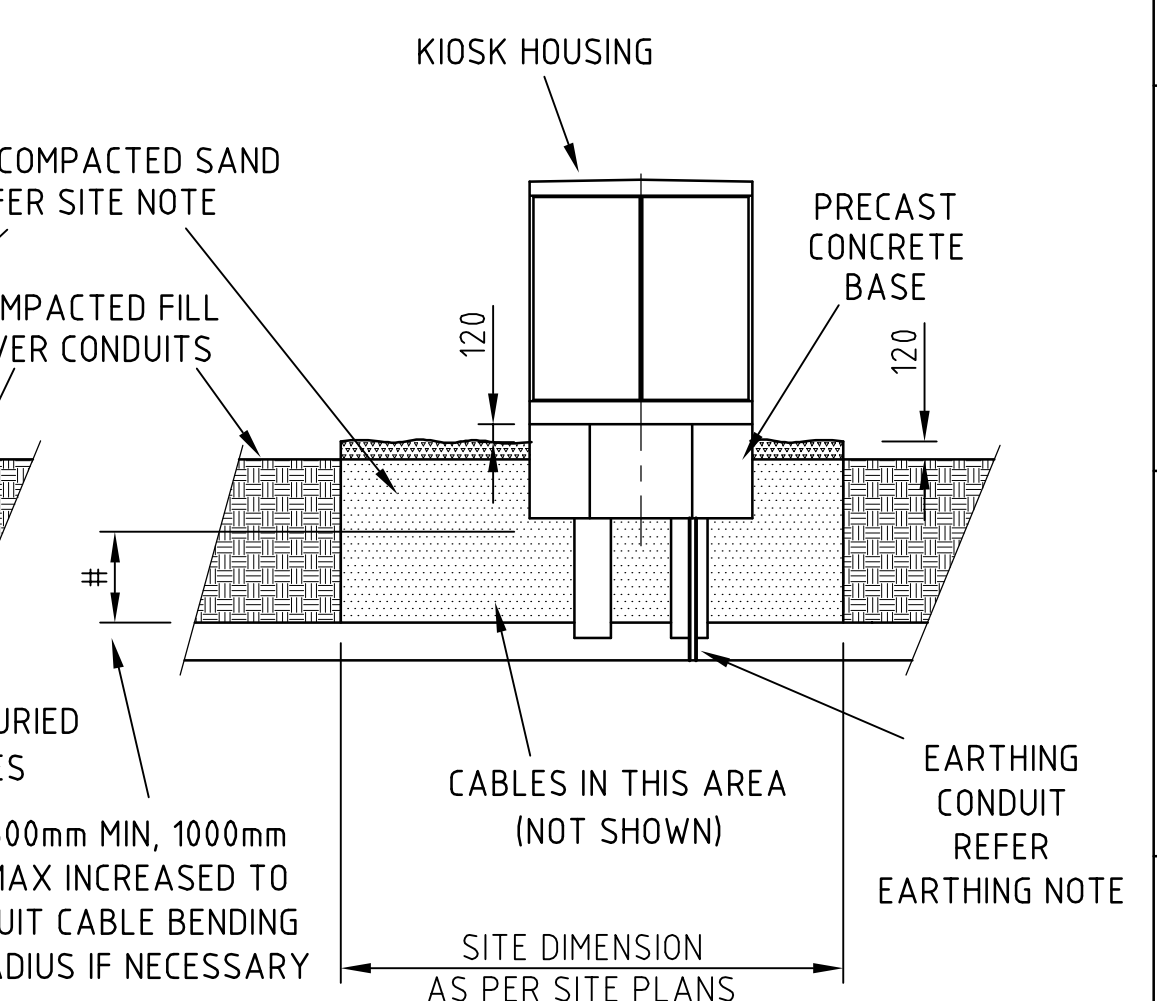


**INSTALLATION OVER A SUPPORTING STRUCTURE**

Scale 1:50

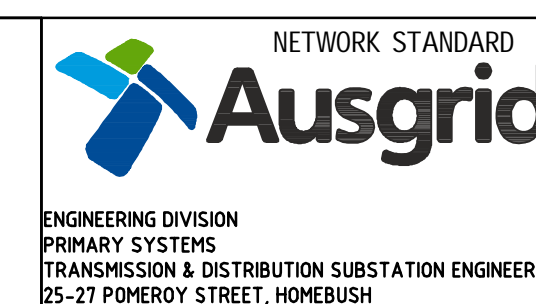


**OPTION 2b**



CAD DRAWING  
BY: P. JARVIS  
DATE: 2013-08-14  
13. NETWORK STANDARD  
SITE PLANS FOR URD  
DESIGNATED FOR URD  
AREAS.  
KIOSK HOUSING  
MANUFACTURER'S  
DETAILS.  
KIOSK IN OPTIONS 2a&2b  
LANDSCAPING ABOVE  
NOTES UPDATED.  
TITLE MODIFIED.  
P. JARVIS 2013-08-14  
CHECKED: P. TURRIN  
APPROVED: P. TURRIN  
14. SITE PLANS D & E  
FOR DOUBLE KIOSKS  
REFERENCE TABLE  
UPDATED.  
EARTHING & VEHICLE  
PROTECTION NOTES  
P. JARVIS 2013-08-2012  
CHECKED: P. TURRIN  
APPROVED: P. TURRIN

**CONSTRUCTION**



SCALE: AS SHOWN  
DESIGNED: [ ]  
DRAWN: [ ]  
CHECKED: [ ]  
APPROVED: [ ]  
DATE: [ ]  
PROJECT NUMBER: [ ]  
PROJTRAK NUMBER: [ ]  
SIGNED BY: ORIGINAL

TYPE "L" KIOSK  
LAYOUT OPTION PLAN

DRAWING No: B1  
151572  
SHEET 1  
14

## 5.0 INTRODUCTION

This Network Standard sets out the requirements for site selection and site preparation for kiosk distribution substations for reticulation of electricity to all types of premises, including underground residential distribution (URD), commercial/industrial and multiple dwelling housing developments, in all areas supplied by Ausgrid. It applies to footpath sites and off-street locations.

This Standard specifies the requirements for siting of the following types of kiosk distribution substations, designed to provide three-phase four-wire nominal 415/240 volt AC supply:

- Type J, nominal ratings up to and including 400 kVA,
- Type L, nominal ratings up to and including 1000 kVA, and
- Type K, nominal rating 1500 kVA.

Requirements for siting of type K kiosks (nominal 1500 kVA rating), although included in this standard, must be confirmed by Ausgrid's Regional Planning Office.

This Standard does not cover the design of electrical systems, the installation of high and low voltage mains, or the installation of substation equipment. These topics are specified in other network standards.

This Standard is to be read in conjunction with NS117 Design and Construction Standards for Kiosk Type Substations and the other standards listed in NS117. Refer also to NS117 for definitions of terms used in this Standard.

All site preparation work must be carried out in accordance with the relevant safety requirements indicated in NS117.

## 6.0 GENERAL ARRANGEMENTS

### 6.1 Kiosk types

This Network Standard refers to kiosk types J, L and K. These kiosks are for installation throughout Ausgrid's area, subject to the limitations indicated in Clause 6.2.

Refer to NS117, for details of the equipment installed in these kiosks, including transformers, high voltage switchgear, distributors and electrical protection equipment.

These kiosks are completely assembled and delivered by the manufacturer to a previously prepared site. The manufacturer's representative will contact the Service Provider regarding access to the site and provision of a crane, if required.

### 6.2 Limitations on usage, siting and installation of kiosk types

The following kiosk usage, siting and installation limitations apply:

- (a) J type kiosks must be installed as specified in Drawing 151573.
- (b) L type kiosks must be installed as specified in Drawing 151572.
- (c) K type kiosks must be installed as specified in Drawing 151190.
- (d) K type kiosks are not permitted on footpath sites.
- (e) Various other usage and siting limitations apply, as specified in Sections 7, 8, 9, 10 and Annexure A.

In addition, NS109 limitations and limitations on usage of the various kiosk types.

## 6.3 Multiple kiosks

In some cases, Ausgrid may approve installation of more than one kiosk at a premises. Where approval is given, each installation must comply with the requirements of this Network Standard. Each individual kiosk site must also comply with the site dimensions required in Annexure A and each kiosk must be positioned within its individual site so as to achieve the specified minimum clearances to its site boundary. Unless agreed otherwise by Ausgrid, the HV ends shall be located facing each other (where kiosks are positioned end-to-end), or at the same end (where kiosks are positioned side-by-side).

Where blast resisting barriers are necessary in accordance with the requirements of Section 10, or where the customer requires blast resisting barriers between or beside kiosks, the blast resisting barriers must be constructed in accordance with Section 10 of this Network Standard and must not encroach into the clearance space required around each kiosk.

## 7.0 SUBSTATION SITE

### 7.1 General

Kiosk substations must be located with due regard to safety of the public and safety of personnel working in and around the substation.

It is essential to locate kiosk substations in areas that are well drained and are clear of underground or overhead obstructions. Sites should preferably also be level or near level, to minimise soil erosion effects and long term movement of the kiosk assembly. Kiosk sites must be able to withstand a bearing pressure of 55 kilopascals without movement.

Kiosk substation sites must also comply with the environmental requirements specified in Section 9 and the fire segregation requirements specified in Section 10.

Kiosk substations should not be installed in the following areas, unless Ausgrid determines that there is no reasonable alternative:

- areas prone to stormwater run-off,
- areas subject to declared 1in100 year (or less) floods,
- areas less than one metre above the highest tidal surge inundation limit,
- unstable areas,
- ocean-front areas where storm wave erosion could affect the site, or where storm wave conditions could cause access difficulties, and
- roadway areas including kerb blisters or similar traffic control narrowings,
- exposed ocean-front locations subject to salt laden winds or coastal environments which demonstrate accelerated corrosion to existing infrastructure.

Kiosk substations and/or associated cables must not be installed on contaminated sites, or on landfill sites where gas emanating from the landfill may cause construction problems or safety problems. Any proposals associated with landfill sites must be discussed at the initial stages of the project with Ausgrid's Regional Planning Officer, before any design work is commenced. (Note: This does not preclude the building-up of a kiosk site for levelling purposes on a non-landfill site, provided the site complies with all other Ausgrid requirements.)

Kiosk substations are not to be installed within buildings, on building roofs, in chambers, or in covered parking areas or garages.

Kiosk substations are not normally permitted in building alcoves or under roofed or partly roofed areas unless the surroundings and installation satisfy specific Ausgrid requirements. All proposals must be approved by Ausgrid before planning proceeds.

The level at the top of the kiosk base must be not more than two metres above or below the access roadway level or street footpath level adjacent to the kiosk site. The difference in levels is to be measured from where the usual point of personnel access adjacent to the kiosk site leaves the access roadway level or street footpath level. Safety railing must be installed where there is a reasonable likelihood that a person could fall from the site or the access path or steps.

The siting of kiosk substations in the vicinity of public swimming pools, service stations, flammable gas or liquid storage tanks should be avoided. The Service Provider is responsible for the control of any potentially hazardous situation that may arise from substations located near these structures. Refer also to:

- AS/NZS 1596 - The Storage and Handling of LP Gas
- AS 1940 – The Storage and Handling of Flammable and Combustible Liquids
- AS/NZS 2229.2 – Fuel Dispensing Equipment for Explosive Atmospheres.
- AS/NZS 2430 – Classification of Hazardous Areas.

Refer to Section 10 regarding fire segregation requirements including requirements relating to locations near gas meters/regulators.

It should be noted that in accordance with AS 2419.1:2005 – Fire Hydrant Installations – Part 1 System Design, Installation and Commissioning – external fire hydrants are required to be located in a position not less than 10m from any high voltage electrical distribution equipment such as transformers (kiosks) and distribution boards to avoid potential electrical hazards.”

Kiosk substations must not be sited under overhead high voltage power lines of nominal voltage 22 kV or above. Kiosk substations should not be sited under overhead 11 kV power lines, unless there is no reasonable alternative. Kiosk substations must not be sited closer than 20 metres to a structure carrying 132 kV overhead power lines and where 132 kV overhead power lines are constructed along a public roadway, kiosk substations should not be located on the footpath on the same side.

Kiosk substations must not be sited on land owned or controlled by a rail authority, excepting where the kiosk site is approved by the rail authority and is required to provide supply for that authority or for installations approved by that authority. A kiosk substation sited on land owned or controlled by a rail authority must not be used for supply to an installation external to that land without Ausgrid’s special approval and conditions, including special earthing arrangements.

For URD areas in particular, during the initial selection of kiosk sites at the subdivision stage, the likely future locations for swimming pools should be considered. For off-footpath sites, locations adjoining residential backyards or at corner allotments should be avoided.

All kiosk substation sites must comply with relevant Australian Standards and Standards Australia Handbooks including:

- SAA HB 100 – 2000 (CJC 4) Co-ordination of Power and Telecommunications: Manual for the establishment of safe work practices and the minimisation of operational interference between power systems and paired cable telecommunications systems.

Refer also to NS116 Design Standards for Distribution Earthing for further information on clearance requirements from telecommunications pits and pillars.

## 7.2 Site selection

Kiosk substation sites must also comply with the relevant requirements in the following sub-sections for off-street locations or footpath sites.

Refer also to NS104 Specification for Electrical Network Project Design Plans and in particular to the section on Responsibility for Obtaining Consent from Other Parties.

K type kiosks are not permitted on footpath sites.

## 7.3 Site plans and site preparation

### 7.3.1 General

In addition to the requirements of this Network Standard, kiosk substations must be installed in accordance with the relevant drawing:

- for J kiosk – drawing 151573
- for L kiosk – drawing 151572
- for K kiosk – drawing 151190.

For contestable work, the developer/customer is responsible for all substation site preparation to the satisfaction of Ausgrid and for all associated costs, including piers, retaining walls and excavation of rock for the kiosk base and cable entries.

Site plans or sketches of each individual substation site must be submitted for approval by Ausgrid, as part of the Design Certification process and before construction proceeds.

Site plans must show existing or proposed structures for a radius of 10 m from the kiosk, the street location name and the name of nearest cross street, the north point and the scale of the plan.

For J and L type kiosks, site contours must be such that the top of the kiosk base is not lower than 120 mm and not more than 240 mm above finished ground level. Refer to the relevant drawings indicated above for details and requirements for K type kiosks.

The kiosk site should not retain surface water and should not be in a location where sub-surface drainage will collect. If this is likely, it will be necessary for a sub-surface drainage system to be installed to the satisfaction of Ausgrid.

Unless specified otherwise by Ausgrid, kiosks installed on footpath sites should be oriented with the high voltage end facing the oncoming traffic i.e. such that the side door (HV connection / tap changer access) is on the property side of the kiosk - not on the road side.

### 7.3.2 Retaining walls and batter

Sites where retaining walls and/or batter would be required should be avoided unless there are no reasonable alternatives.

Where retaining walls and/or batter are necessary, they must comply with the following requirements:

- Retaining walls, including foundations and batter must be external to the minimum overall dimensions of the substation site.
- They must be constructed to the engineering requirements of the local council and the relevant Australian Standards (including AS 3798 and AS 4678). An Engineer's Certificate is to be supplied by the Service Provider on request.
- They must be suitably drained away from the site.
- They must be constructed of non-perishable material such as concrete or brick.
- Backfill must be compacted and be of suitable clean material free from large solid material over 50 mm in diameter.
- If a retaining wall is used, a handrail may also be required.

The minimum depth for kiosk piers is the greater of:

- 1000 mm below the underside of the kiosk base level,
- 500 mm below the level of the ground that will be disturbed during excavation for installation of the cables,
- 500 mm below the bottom of any other service line (eg water, sewer, gas, telecommunications, stormwater) within 2000 mm of any one of the piers.

The maximum \*length for kiosk piers complying with the design specifications in the above drawings shall not exceed 1500 mm. If it is necessary for piers to exceed 1500 mm in length to satisfy particular site conditions, as indicated below, a site specific design by a qualified structural engineer will be required.

(\*length = depth of pier from underside of kiosk base)

Some kiosk site conditions may require pier design to exceed the minimum specifications indicated in the drawings and pier length to exceed 1500 mm. Examples include terraced sites or sites cut into sloping ground, or sites near other large services, such as large water, stormwater or sewer mains. The Service Provider is responsible for ensuring that pier foundations are stable and adequate and for engaging a qualified structural engineer to design pier foundations where necessary. A structural engineer's report may be required in such cases.

Where pier foundations are installed for J, L and K type kiosks, the area around the piers must be backfilled after installation of the piers with sand and compacted to remove voids under the area where the kiosk base will be installed. Excavations under and around the kiosk base for cable installations must also be backfilled with sand and compacted to remove voids.

The kiosk piers must be allowed at least seven days for the concrete to cure before the kiosk base is installed on the piers and before cables are installed in the kiosk base footprint area.

After completion of the installation, the area around the kiosk must be backfilled, compacted and restored to the finished surrounding site level.

## 7.5 Avoiding services and encroachments

For off-street locations, **services such as drains, sewers, pipes and wiring, must not pass through or under the kiosk substation overall site area.** For exact dimensions, refer to minimum site requirements in Annexure A and the drawings indicated in Clause 7.3.1. Refer also to the above drawings for the range of acceptable entry angles for consumers' mains at the kiosk.

For footpath sites it is generally not possible to have a site, the size of a standard kiosk easement, which is clear of other services. Therefore, instead of the arrangements discussed above, the following requirements shall apply which are in addition to the requirements outlined in Clause 7.2.2:

- there should be no other services directly beneath the footprint of the kiosk,
- there should be sufficient space around the kiosk to allow cables to be connected to the kiosk without encroaching on minimum separations to other services. Minimum separations are generally as follows, however in each case these should be confirmed with the other Utility/Service Providers in accordance with the NSW Streets Opening Conference Guide to Codes and Practices for Streets Opening:
  - Gas pipes  $\leq$  75mm: 150mm minimum to LV cables, 300mm minimum to HV cables
  - Gas pipes  $>$  75mm: 300mm minimum to LV or HV cables
  - Telstra/Optus cables & conduits: 100mm minimum to LV cables, 300mm minimum to HV cables

- Water Mains  $\leq$  DN 375mm: 1000mm minimum horizontal clearance, 225mm vertical clearance
- Water Mains  $>$  DN 375mm: advice on clearances is to be sought from relevant water supply organisation.
- Sewer Mains  $<$  DN 200mm: 500mm minimum horizontal clearance
- Sewer Mains  $>$  DN 200mm: 1000mm minimum horizontal clearance
- Sewer Mains  $\leq$  DN 300mm: 225mm minimum vertical clearance
- Sewer Mains  $>$  DN 300mm: 300mm minimum vertical clearance
- Earthing should be in accordance with Clause 7.5 of NS116 i.e. the electrodes may be installed either in the footpath cable allocation in accordance with drawing 167433, or in the pole line allocation as per drawing 36377 for pole mounted substations. The pole line allocation is preferred.

## 7.6 Protection from vehicles in off-street locations

Kiosks must be protected from damage by vehicles in areas classified as high risk for vehicle impact, such as adjacent to driveways, etc.

## 7.7 Landscaping for off-street locations

For J, L and K type kiosks, the finished surface of the substation site may be blue metal, lawn grass, pine bark woodchips, pavers or mowing strips.

When selecting the landscaping surface, the customer is responsible to consider the impact the finished surface may have on the adjacent footways either by direct interference or the landscaping material spilling onto it.

Other surface finishes may be permitted, at the discretion of Ausgrid's Regional Planning Officer, provided the customer agrees in writing to bear all costs resulting from any future need to excavate and reinstate around the substation, irrespective of whether or not the excavation is associated with supply to the customer.

Ausgrid cannot accept responsibility for damage to landscaping where excavation for cable works or equipment replacement occurs in the future.

Screening vegetation must not interfere with access to the substation for both personnel and equipment.

Trees, shrubs, or plants, other than lawn grass, are not permitted on the substation site.

Watering systems must not be installed within the substation site or designated personnel access routes.

## 7.8 Fencing around off-street locations

Where it is intended to fence around off-street locations, attention must be given to the following issues:

- potential rise, under fault conditions, which may be transferred along a metallic fence. This may require wood fence posts in the vicinity of the kiosk, or in some cases the whole section of fence may need to be non-metallic. Each substation should be treated on its own merits with advice sought early in the project design from Ausgrid as required. The major factors which will affect this are: the local soil resistivity; whether the 11kV feeder is underground all the way back to the Zone Substation (i.e. providing a return path by cable sheath continuity), and is the kiosk connected to an adequate interconnected MEN system.

- kiosks should be “fenced out” of the property not “fenced in”. Also refer to Section 8 regarding access requirements.
- attention needs to be given to the distance between fence and kiosk to prevent people jumping from the top of one to the other.

## 7.9 Substation tenure for off-street locations

In all off-footpath kiosk site locations an easement shall be provided at the development stage, to minimise ongoing title problems. The following site criteria shall also apply:

- for URD areas preference should be given to siting of kiosk substations on park boundaries, access lanes and public land where available,
- for industrial, commercial or high/medium density domestic developments, the preferred siting for kiosk substations is for one edge of the overall substation site boundary to be at the front road boundary of the development,
- where the kiosk site is not located adjacent to a public roadway, an easement will be required for the kiosk site and an easement and right-of-way for cable and personnel access.

For further details of land tenure requirements and requirements for easements and rights-of-way refer to NS109 Design Standards for Overhead Developments and NS143 Easements.

## 8.0 ACCESS REQUIREMENTS

Kiosk sites must have unimpeded access for Ausgrid personnel and vehicles, directly from a public street, for 24 hours per day, 7 days per week.

A heavy truck with a vehicle-mounted crane is needed to install or remove the kiosk and equipment. Access routes, where required, must be suitable under all weather conditions and constructed to withstand the loading. The access route should be a minimum of 4 metres wide, have a minimum of 4 metres headroom and be continuous from the property boundary to the kiosk site.

For kiosk sites other than footpath, reserve or URD sites, the site owner/customer is responsible for providing and maintaining access routes and surface finishes, to the satisfaction of Ausgrid, as specified in the easement document.

Access from the street to the kiosk site must not be fenced or enclosed, unless approval is given in writing by Ausgrid and the conditions listed in the approval are complied with on an ongoing basis by the site owner/customer.

## 10.0 FIRE SEGREGATION REQUIREMENTS

The siting of kiosk substations must comply with the requirements of all relevant authorities (including fire control authorities) in relation to segregation from buildings, structures, etc. Kiosk substations must also be separated from building air intake and exhaust openings and natural ventilation openings by separation distances that meet the requirements of all relevant authorities and Australian Standards.

Apart from any requirements to satisfy other authorities; Ausgrid has a general requirement for kiosk substations to be effectively segregated from neighbouring areas and buildings which are subject to fire risk. Pathways and or fire escape routes shall not encroach upon the kiosk easement and may require greater separation to ensure the route is not impacted in the event of a fire. The following specific additional requirements must also be satisfied.

Ausgrid requires kiosk substation housings to be separated from building ventilation system air intake and exhaust duct openings, by not less than \*6 metres. This applies irrespective of whether the building ducted ventilation system is mechanical or natural and irrespective of whether or not fire dampers are installed in the ducts.

(\* Measured by shortest string line between housing and duct.)

**Note:** For the purposes of this Section Ausgrid does not regard openable windows, that provide natural ventilation to one building compartment only, as a building ventilation system opening.

Any portion of a building other than a BCA class 10a structure constructed from non combustible materials, which is not sheltered by a non-ignitable blast-resisting barrier and is within 3 metres in any direction from the housing of a kiosk substation, is required to have a Fire Resistance Level (FRL) of not less than 120/120/120. Openable or fixed windows or glass blockwork or similar, irrespective of their fire rating, are not permitted within 3 metres in any direction from the housing of a kiosk substation, unless they are sheltered by a non-ignitable blast resisting barrier.

Any meter, regulator or exposed pipe work associated with the reticulation of gas which is within 3 metres in any direction from the housing of a kiosk substation and which does not have a Fire Resistance Level of 120/120/120 must be sheltered by a non-ignitable blast-resisting barrier.

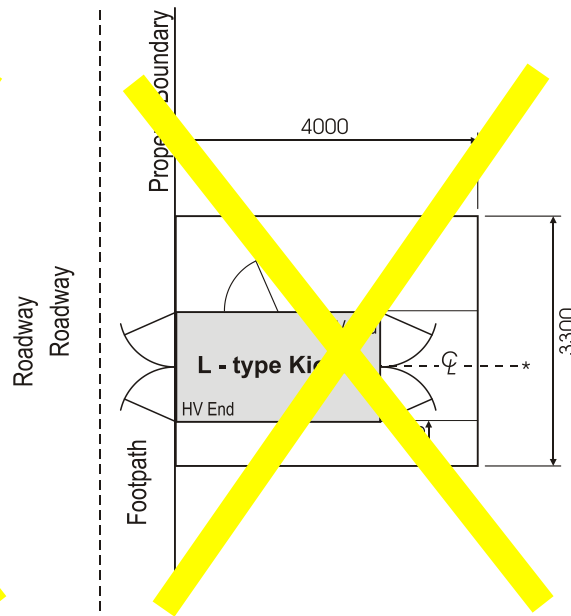
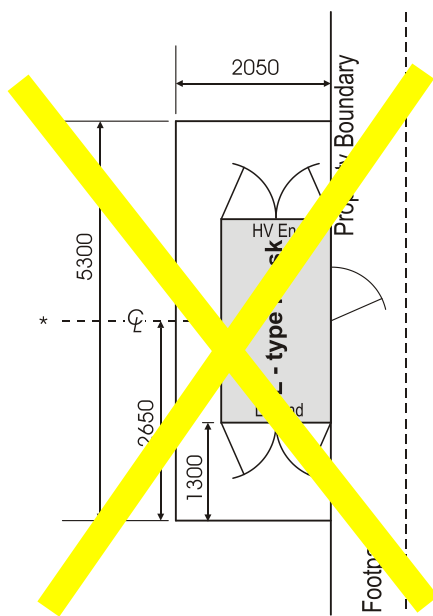
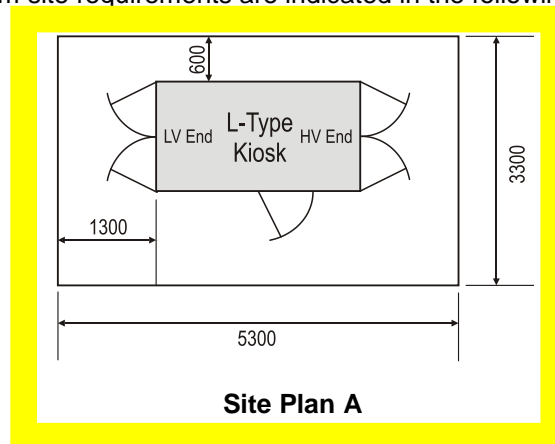
Any portion of an area which may be used for storage of combustible material, which is within 3 metres in any direction from the housing of a kiosk substation, must be sheltered by a non-ignitable blast-resisting barrier.

Blast resisting barriers and their foundations must be external to the overall area required for the substation site and must also comply with the following requirements:

- they must not interfere with personnel or equipment access to the substation or with cabling,
- they must be constructed of non-perishable material such as concrete or brick,
- they must not contain apertures or openings such as doorways or vents even if these have a Fire Resistance Level rating,
- they must provide for concrete encased conduits where required for cable entry to the substation,
- they must not interfere with the kiosk ventilation and the escape of heat from the kiosk,
- they must be constructed to comply with any relevant Australian Standards and the engineering requirements and the satisfaction of the local council,
- an Engineer's Certificate must be supplied by the Service Provider (Designer) if requested, and

## A2 L type kiosk

L type kiosk minimum site requirements are indicated in the following site plans and notes:



(\* Property boundary between lots, if kiosk site is located across adjacent residential lots.)

### L Type Kiosk Notes

1. The L kiosk site plans shown with one edge of the kiosk structure on the street frontage property boundary (Site Plans B and C) are restricted options generally only available for underground residential distribution (URD) sites. Approval for these options in areas other than URD will be at the discretion of Ausgrid, after consideration of all relevant factors.
2. Where the 5300 mm x 3300 mm L kiosk site is set back from the street frontage property boundary (ie Site Plan A with additional set back), it will be necessary for an associated cable easement and a right-of-way for access to be established. (Refer to Clause 7.9.)

## Annexure B – Weight of Kiosk Assemblies

Typical weights of Kiosk Types J, L and K, complete with transformer, switchgear, bases and sundry equipment.

**Table B1**

J Type Kiosk		L Type Kiosk		K Type Kiosk	
Item	Weight	Item	Weight	Item	Weight
Kiosk with 160 kVA transformer	3215 kg	Kiosk with 400 kVA transformer	5275 kg	Kiosk with 1500 kVA transformer	6560 kg
Kiosk with 315 kVA transformer	3845 kg	Kiosk with 600 kVA transformer	5875 kg		
Kiosk with 400 kVA transformer	4005 kg	Kiosk with 800 kVA transformer	6475 kg		
		Kiosk with 1000 kVA transformer	7075 kg		
J Type - Maximum Weight (see Note)	4005 kg	L Type - Maximum Weight (see Note)	7075 kg	K Type – Maximum Weight (see Note)	6560 kg

**Note:** Supporting structures and piers must be suitable for the maximum weight applicable for the kiosk type.

Bentonite expands as it absorbs and retains water. This ensures good contact between the installed earthing electrode and the surrounding soil, and lowers the electrode's resistance. The compound should be installed as follows and in keeping with any instructions from the manufacturer:

- The earthing compound slurry shall be mixed in compliance with the manufacturer's recommendations and poured into the drilled hole around the installed electrode. The electrode shall be agitated to eliminate voids remaining in the slurry.
- The compound shall not be installed dry.
- Neither salt enriched earthing compounds nor 'rock salt' treatment of the electrode installation shall be used as a method of (temporarily) lowering the electrode's resistance.

#### 9.4.5 Prevention of contact

The following requirements should help to prevent contact:

- On wood poles, UV stabilised black plastic cover strip shall be utilised to prevent contact with above-ground earthing conductors within 2.4m of ground level.
- Below ground, PVC cover strip or conduit shall be used to protect and identify earthing conductors that are not installed within Ausgrid's distribution substation easements or beneath other cables in Ausgrid's cable allocations.
- Additional requirements to prevent theft of earthing conductor may be specified in standard construction drawings.

## 9.5 Installation methods

### 9.5.1 Earthing arrangements

Local earthing for distribution equipment is generally one or more vertically driven or drilled electrodes interconnected with earthing cable.

- **Driven rod electrodes** – shall be 15mm diameter copper coated (clad or electroplated) steel rods. The first rod of each electrode shall be fitted with a hardened steel driving point. Rods must be joined with the approved friction joint couplings. The minimum electrode length is 5 metres (e.g. three 1800mm rods produce a 5.4m electrode).
- **Drilled electrodes** – shall be bare 70mm<sup>2</sup> stranded copper cables. They are installed by boring a clearance hole to a suitable depth. Minimum hole diameters are 35 mm in solid rock, and 50mm in loose rock or clay. Crimping an earth rod or a short length of copper tube to the end of the electrode cable allows easier installation of the electrode to the bottom of the hole. Slurry made from an approved earthing compound is then poured into the hole. During the pour, the electrode should be agitated and/or the slurry tamped to expel any trapped air pockets. Once the slurry has set it may be necessary to top up the hole. The minimum electrode length is 5 metres.

**Note:** In some areas greater electrode depths or additional electrodes will be required to achieve the required earthing system resistance. In some locations with high resistivity soils, it may be necessary to drill to depths exceeding 10 metres to obtain a suitable resistance value.

- **Electrode Groups** – shall be arranged as shown on the appropriate approved drawings.

### 9.5.2 Electrodes not to be driven after crimping

Compression crimp connections to driven electrodes shall not be made before the electrode is driven to its final depth as this may result in a substandard connection and is not permitted. The crimp connections to the electrode shall be made within the excavated trench with the top of the electrode 500mm below finished ground level.