



ZERO CIVIL

TECHNOLOGY THAT TRANSFORMS

IMPACT RESISTANT

Bollards secured using the Impact Recovery System are resistant to impact- self recovering from low speed impact. Removable and reusable following severe impact.



FOOTINGS REUSABLE

When secured on Impact Recovery System the concrete footings can be protected from damage for the entire lifespan of a development!



UV RESISTANT

Made with unique blend of Supa UV our Advanced Polymer Bollards offer 4.5 times the UV protection required by Australian Standard (AS/NZ 4766:2006) with design life up to 50 years



BOLLARDS REUSABLE

When secured on Impact Recovery System bollards self-recover from low-speed impact and are removable and reusable following severe impact



SPECIFICATIONS IRS 2026

Photo Dept Transport Safety Yellow Advanced Polymer XHD Impact Recovery Bollards

Impact Recovery Bollards

02 Specifications



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Should you require any further information
please contact us or visit the website for
installation details and videos.

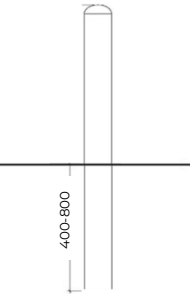
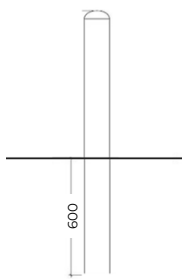
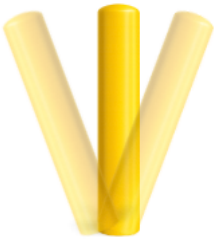
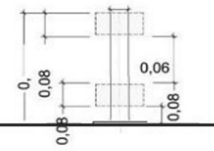
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hello@zerocivil.com

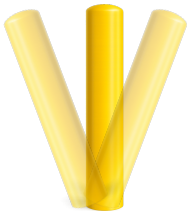
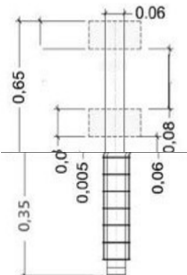
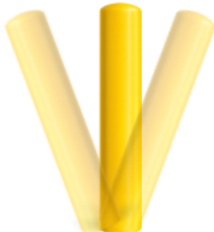
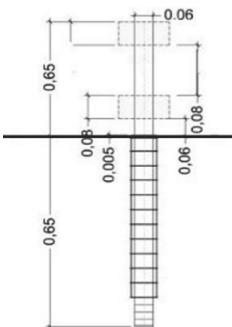
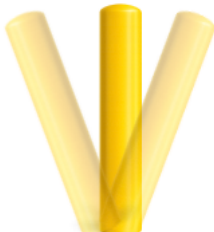
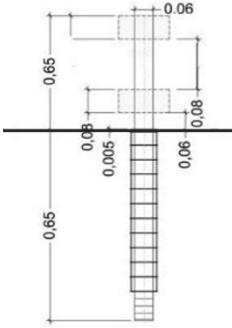
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Impact

Rating charts

INSTALLATION METHOD	MAX IMPACT	OUTCOME FOLLOWING IMPACT
In-ground – Concrete Filled	≈ 8 km/h	Concrete filling increases stiffness but offers little practical improvement in impact tolerance. Because the bollard becomes less able to flex, higher loads are transferred into the footing, which may increase the risk of footing damage or dislodgement.
In-ground – Hollow	≈ 10 km/h	The hollow bollard can flex and recover from light impacts. Under more severe impact, permanent deformation may occur, and the bollard may not fully recover. Footing damage remains possible because there is no impact recovery mechanism below ground.
Impact Recovery – Surface Mount	≈ 13 km/h	Bollard deflects and self-recovers under low-speed impact and side glances. Under higher-speed impact, the resistance core can bend and require replacement. Surrounding footing is not damaged.
Impact Recovery – In-ground 350	≈ 16 km/h	Improved stability over surface mount. Bollard deflects and self-recovers under low-speed impact and side glances. Under higher-speed impact, the resistance core can bend and require replacement. Surrounding footing is not damaged.
Impact Recovery – In-ground 650	≈ 19 km/h	Greater embedment improves resistance to more serious low-speed impacts. Bollard deflects and self-recovers under low-speed impact and side glances. Under higher-speed impact, the resistance core can bend and require replacement. Surrounding footing is not damaged.
XHD Impact Recovery – In-ground 650 (Extra Heavy Duty)	≈ 21 km/h	Highest-duty option for severe low-speed impacts, including impacts from utility vehicles or trucks. Bollard deflects and self-recovers under low-speed impact and side glances. Under higher-speed impact, the resistance core can bend and require replacement. Surrounding footing is not damaged.

BOLLARD		INSTALLATION	BOLLARD REUSABLE	FOOTINGS REUSABLE
		INGROUND CONCRETE FILLED - LOWEST RESISTANCE Advanced Polymer 150 Ø 1800 L. Installed directly inground (suggest min 600 mm Depth in solid concrete 30MPa) and concrete filled. High force transfer to bollard and footing under impact. May survive light impact (with possible damage to concrete at base and inside bollard) but with multiple impacts (or impact at medium speed) both the bollard and footings will need replacing		
		INGROUND HOLLOW IMPACT TOLERANT Advanced Polymer 150 Ø 1800 L. Installed directly inground and left hollow, or concrete filled (to ground level providing reinforcement where needed). Flexible material- Bollard will withstand light impacts (such as carpark bumps and recover without need for maintenance. Upon medium to high impact, the bollard may bend but remain secured in concrete footing (providing a safety cushion between the vehicle and the electrical asset). Bollard and footings may need replacing.		
		SURFACE MOUNT IMPACT RECOVERY LOW-MEDIUM RESISTANCE Advanced Polymer 150 Ø 1200L. Suitable for low speed zones such as car parks. Existing footing must be solid concrete or asphalt. Rather than “flexing” the bollard has a shock absorbing core that allows the bollard to deflect up to 20 degrees and slowly recover from low speed impacts and glances (no maintenance). Footings and bollard are also reusable following even severe impact.		

BOLLARD		INSTALLATION	BOLLARD REUSABLE	FOOTINGS REUSABLE
		INGROUND 350 MM IMPACT RECOVERY MEDIUM RESISTANCE Advanced Polymer 150 Ø 1200L (350 mm depth) Suitable for low speed zones such as carparks. 350 mm footing suitable for areas with existing concrete footings to provide stability to concrete base and protect against dislodgement. Rather than “flexing” the bollard has a shock absorbing core that allows bollard to deflect up to 20 degrees and slowly recover from low to medium speed impacts and glances (no maintenance). Footings and bollard are reusable following even severe impact.		
		INGROUND 650 MM IMPACT RECOVERY HIGH RESISTANCE Advanced Polymer 150 Ø 1200L (650 mm depth) Suitable for low to medium speed zones such as carparks. 650 mm footing suitable for areas with no existing concrete footings (free standing footing). Rather than “flexing” the bollard has a shock absorbing core that allows bollard to deflect up to 20 degrees and slowly recover from low to medium speed impacts and glances (no maintenance). Footings, and bollard are reusable following more severe impacts and glances (such as utility vehicles)		
		INGROUND 650 MM XHD IMPACT RECOVERY MOST RESISTANT Advanced Polymer 150 Ø 1200L (650 mm depth Extra Heavy Duty Resistance Core provides 150% greater resistance to bending upon impact from a vehicle) Suitable for medium to high impact from large passenger vehicles and utility vehicles. Rather than “flexing” the bollard has a shock absorbing core that allows bollard to deflect up to 20 degrees and slowly recover from low to medium speed impacts and glances (no maintenance). Footings and bollard are reusable following severe impacts (such as utility vehicles).		

Steel

Bollard casing

Lifespan
10-15 years

- Australian Steel AS 4100
- 165mm Ø Galvanised Steel Pipe
- Cleaned
- Quality Polyester
- Knock-on Cap
- Hole drilled and tapped to accept securing stud

NOTE: 10-year corrosion warranty and 20-year chalk/colour fade warranty

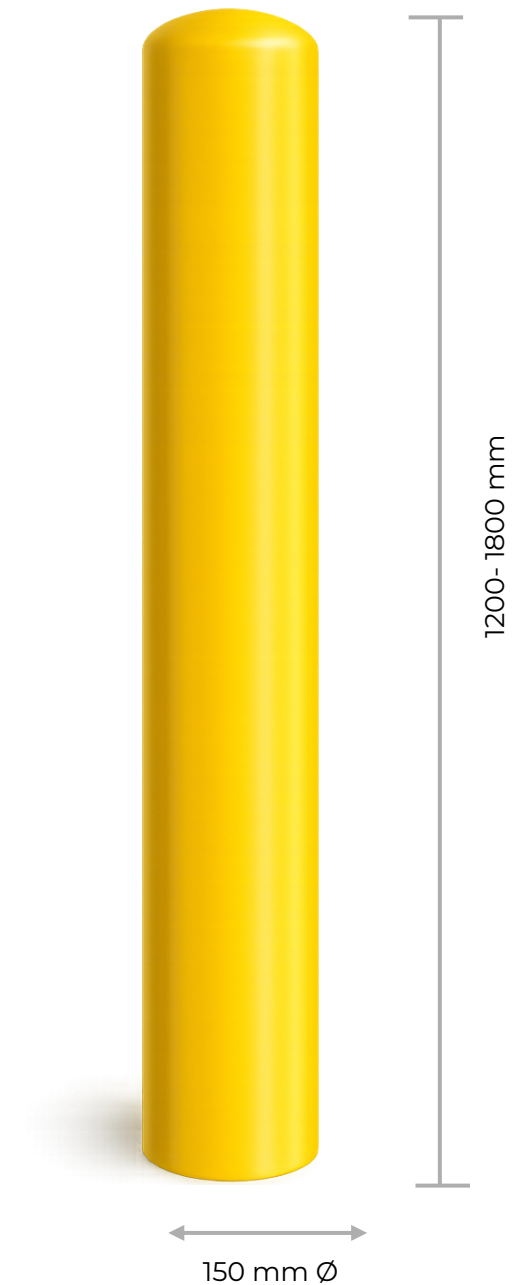
Cheap powder coating can reduce lifespan to as little as 1-2 years before fading



Advanced Polymer Bollard casing

Long life
25-50 years

- Australian Made
- Advanced Polymer Casing
- UV Stabilised (good in harsh sun)
- Long life 25 in direct sunlight- 50 years
- Heavy Duty 7mm walls
- Allows for a little "flex"
- Won't rust or chip like steel powder coated bollards
- Excellent outdoor functional lifespan
- Dents and scratches don't show
- Can be wiped clean tyre marks using Car polish
- Hole drilled to accept securing stud
- Reduces risk of damage to vehicles
- Non-Conductive



Stainless Steel Bollard casing

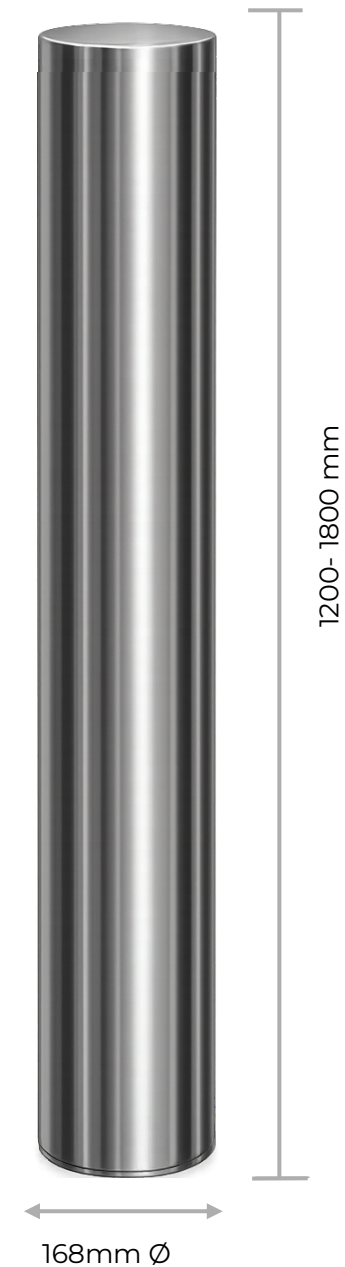
Long life
50 years

- Australian Stainless steel 304
(316 available for coastal regions)
- 168mm Ø Stainless Steel Heavy Duty Pipe
- Cleaned & Polished to a Satin Finish
(most durable finish)
- Seamless flat cap (slightly domed)
- Manufactured to secured height
- Hole drilled and tapped to accept
securing stud

Compliance:

NOTE: ASSDA warns about imported 200-series stainless being sold as 304, which has caused corrosion failures

- Manufactured to ASTM A240/A480
- Mill Test Certificate available
- Welding compliant to AS/NZS 1554.6





Bollards Impact Resistant

ZERO CIVIL Bollards are made from Australian heavy-duty materials designed to withstand impact, remaining in good condition



Bollards self-recover

Upon low-speed impact bollards absorb the impact force, slowly self-recovering and are removable and reusable following severe impact



No damage to footings

ZERO WASTE Foundations remain in good working condition following multiple low and high speed impacts. Base plates are reusable following impact



Superior protection

Unlike flexible bollards that can over-flex, the strong resistance core provides superior protection against errant vehicles, greatly improving safety



Bollard re-usable

Both surface mount and Inground bollards are removable and reusable following severe impact, saving thousands over the life of a development



Footings reusable

ZERO WASTE foundations remain in pristine condition and surface mount base plates are reusable following severe impact, saving thousands



Simple replacements

Bollards are low cost to maintain. If damaged, they are removed and replaced in less than 5 minutes without the need for digging or heavy labour.



Impact resistant base plate

With square base plates the impact force is concentrated on one anchor- with heavy duty round base plates the impact force is evenly distributed, reducing the risk of damage

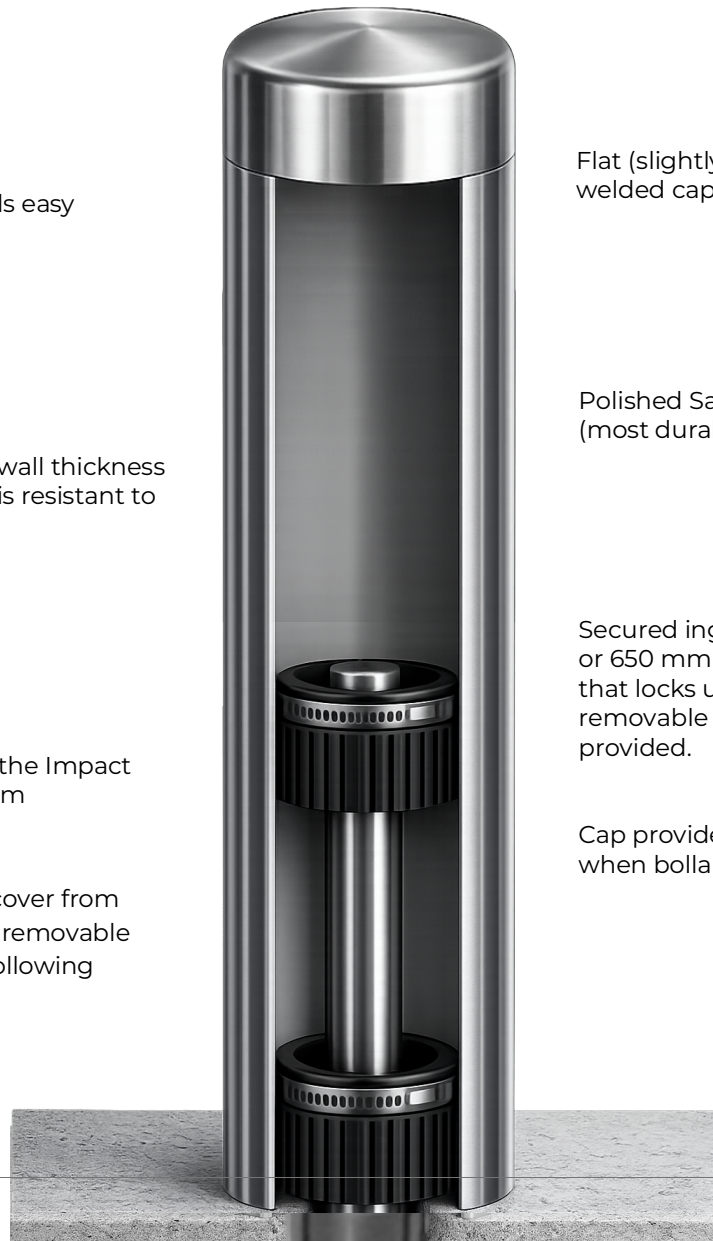
In-ground Impact Recovery Bollard

Quality Bollards easy
to install and
maintain

Heavy 3.6 mm wall thickness
Bollard casing is resistant to
impact

Secured using the Impact
Recovery System

Bollards self-recover from
low impact, are removable
and re-usable following
severe impact



Flat (slightly domed)
welded cap

Polished Satin finish
(most durable finish)

Secured inground using 350
or 650 mm ground socket
that locks units in- only
removable using tools
provided.

Cap provided to cover socket
when bollard is removed.

unit includes

- 2 x Impact Recovery Rings
- 2 x Stainless steel Securing Clamps
(to secure rings)
- Heavy Duty Resistance Core with self-
locking taper attached
(60 Ø x 300 mmx 3.5 wall thickness)
- Securing stud
(10 mm x 40 mm stainless steel)
- 350 mm Ground socket (two sockets
required for 650 mm Depth footing)
- Cap for ground socket

TOOLS REQUIRED

Installation tool for socket
Removal tool to remove Resistance core
Screwdriver to remove clamps
Allen key to remove securing stud

Surface Mount

Impact Recovery Bollard

Quality Bollards easy to install and maintain

Heavy 3.6 mm wall thickness Bollard casing is resistant to impact

Secured using the Impact Recovery System

Bollards self-recover from low impact, are removable and re-usable following severe impact

Flat (slightly domed) welded cap

Polished Satin finish (most durable finish)

Secured on Re-usable Heavy Duty 10 mm thick x 300 mm diameter Stainless steel Base Plate

5 evenly spaced recessed High quality concrete anchors to evenly distribute energy reducing risk of damage



unit includes

- 2 x Impact Recovery Rings
- 2 x Clamps (to secure rings)
- Resistance Core
(60 Ø 300 mm Heavy Duty Pipe)
- Securing stud
(10 mm x 40 mm stainless steel)

TOOLS REQUIRED

Allen key
Screwdriver

Heavy Duty Base Plate

- 10 mm thick
- 200 mm diameter
- Upright spigot 100 mm High made from hollow bar.

Resistance Core

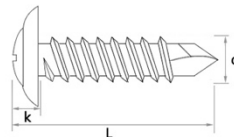
Resistance Core is a Heavy Duty CHS steel pipe secured to base plate using an embedded grub screw.

Evenly spaced Concrete anchors

Surface Mount Base Plate is bolted down using 6 evenly spaced recessed concrete anchors to evenly distribute impact force and prevent damage to the base plate

In-ground Footings 02-01

- 350 mm Depth (suitable for most locations as the Impact Recovery System absorbs the energy, thus reducing the need for large footings)
- 650 mm units (using 2 ground sockets) are advised for industrial locations where bollard may be subject to more intense impact forces. Or where there are no existing foundations to help secure the footing (i.e. free standing footing installed in soil or paving)
- If using the Extra Heavy Duty core, you need 650 mm depth sockets and can add a reinforcement reo cage to protect the footing



Stainless Steel Self Drilling Screws come with a sharp, piercing tip or a flat, blunt tip. The sharp tipped screws are designed for drilling their own hole into softer materials such as wood and plastic so unlike self-tapping screws, they don't need a pilot hole. DK 5 K 1 L 9.5 D 5

Surface Mount

Base Plate 02-02

Heavy Duty Base Plate

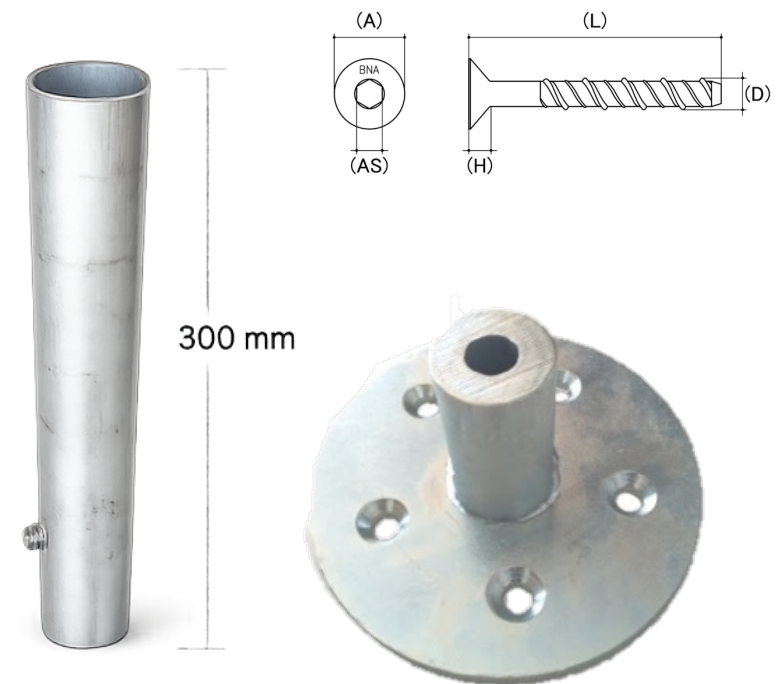
- 10 mm thick
- 200 mm diameter
- Upright spigot 100 mm High made from hollow bar.

Resistance Core

Resistance Core is a Heavy Duty CHS Steel pipe secured to base plate using an embedded grub screw.

Evenly spaced Concrete anchors

Surface Mount Base Plate is bolted down using 6 evenly spaced countersunk M10 x 100 mm concrete anchors (D=10 L=100) to evenly distribute impact force and prevent damage to the base plate



Impact Recovery

Rings 02-03

Available in 3 dimensions to secure

- Advanced Polymer bollards 150 mm Ø
7 mm wall thickness
- Steel Bollards 150NB (165 mm Ø)
5 mm wall thickness
- Stainless Steel Bollards (168 mm Ø)
3.6 mm wall thickness



CODE	IMPACT RECOVERY RINGS	WEIGHT
IRR-150	Ring to fit 150 Advanced Polymer Bollard	1 kg
IRR-165	Ring to fit 165 mm Steel Bollard	1.25 kg
IRR-168	Ring to fit 168 mm Stainless Steel Bollard	1.56 kg

Resistance

Core 02-04



Heavy Duty Galvanised Steel. 300 mm Length with securing stud to secure core to base

Heavy Duty Galvanised Steel. 350 mm Depth (650 mm Length) with self-locking Taper attached

Heavy Duty Galvanised Steel. 650 mm Depth (950 mm Length) with self-locking Taper attached

Extra Heavy Duty Galv. Steel 650 mm Depth (950 mm Length) with self-locking Taper attached

RINGS ATTACHED

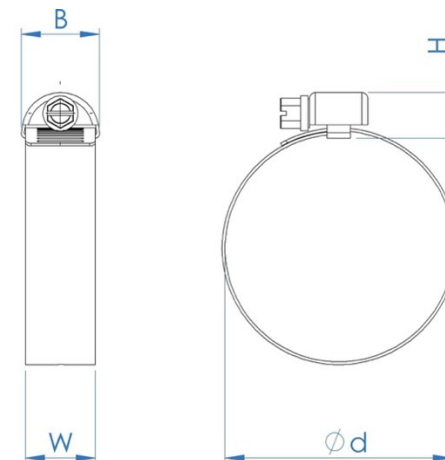
Resistance Core shown here
with two Impact Recovery
Rings attached. Please Note:
*Images show original rings
without ribs.*



Securing Clamp 02-05

Used to secure Impact Recovery Rings to Resistance Core

- Stainless Steel Clamps
- 78-102 mm Ø
- 304 Stainless Steel
- 15 mm width
- Supplied with Rings
- Tightened using screwdriver



Bollard casing weights and dimensions

Our bollards are made from heavy duty materials- quality steel Australian made, and UV stabilised Advanced Polymer compound (Non-conductive

CODE	DETAILS	WEIGHT
GALV STEEL	165 mm Ø x 5 mm wall thickness x 1650 L	34 kg
GALV STEEL	165 mm Ø x 5 mm wall thickness x 1200 L	25 kg
STAINLESS STEEL	168 mm Ø x 3.6 mm wall thickness x 1200 L	1 8.8 kg
ADVANCED POLYMER	150 mm Ø x 7 mm wall thickness x 1800 L	5.2 kg
	150 mm Ø x 7 mm wall thickness x 1200 L	3.5 kg

Components weights and dimensions

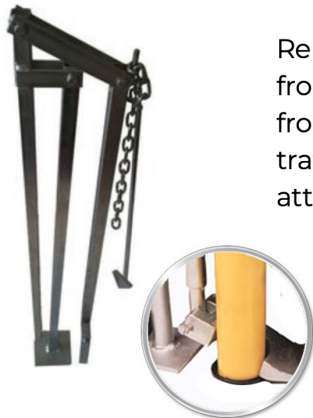
Only replaceable component is the resistance Core. * NB can be made under license, but distributors and clients are NOT authorised to make these control.

CODE	DETAILS	WEIGHT
IRR-150	Ring to fit 150 mm Poly Bollard	1 kg
IRR-165	Ring to fit 165 mm Galvanised Steel Bollard	1.25 kg
IRR-168	Ring to fit 168 mm Stainless steel Bollard	1.3 kg
RCORE-SM	Galvanised Resistance Core x 300 mm	1 kg
RCORE-350	3.6 Galvanised Resistance Core x 650 mm	2 kg
RCORE-650	3.6 Galvanised Resistance Core x 950 mm	3 kg
RCORE-XHD	5.5 Galvanised Resistance Core x 950 mm	7.5 kg
TOOLPACK	Pack of tools Install & removal	12 kg
CON-ANCH	Concrete anchors	

Required Tools



Installation tool used to correctly align socket, enables installation of ground socket from standing position



Removal tool used to lever items from ground socket, operated from standing position, facing traffic, (sheared post removal attachment included)

Scan for more info



Advanced Polymer

Non-conductive bollards

Advanced Polymer Bollards offer:

- high impact resistance
- excellent toughness
- flexibility under load
- reliable performance across a wide range of temperatures
- reduced risk of brittle failure over time

Under lighter impact, the material can flex and recover. Scuff marks from tyres can typically be cleaned away without affecting the structural performance of the bollard.

Long life

Many plastic products exposed to sunlight will eventually fade, chalk, crack, and become brittle as ultraviolet radiation breaks down the polymer structure over time. This often leads people to assume that polymer bollards will not last in the sun. That is not the case with our Advanced Polymer Bollards.

Our Advanced Polymer material is specifically formulated for demanding outdoor environments, helping the bollard maintain its strength, flexibility, appearance, and structural integrity over the long term.

UV Resistance

Australia experiences some of the highest UV radiation levels in the world, so ultraviolet protection is critical for any polymer used outdoors. Our UV stabilisation package provides a much higher level of protection than the Australian industry standard (AS/NZ 4766:2006).

Through careful selection of a high-quality Polyethylene base polymer specifically designed for outdoor use, advanced additives such as UV

stabilisers and antioxidants, pigmented “SUPA UV” provides a UV36 level of stabilisation to protect against the harmful effects of prolonged sun exposure. This helps prevent:

- brittleness
- chalking
- cracking
- warping
- premature material breakdown

Impact Resistance

Unlike rigid materials that may dent, deform, or permanently distort under impact, Advanced Polymer is able to absorb and disperse impact energy. This gives the bollard cover excellent toughness and helps reduce the risk of cracking or permanent visual damage from everyday contact.

Heavy Duty Construction

Advanced Polymer Bollards and Bollard Covers are rotomoulded as a solid one-piece unit with heavy-duty 7 mm wall thickness.

This robust construction provides:

- increased durability
- improved shape retention
- strong resistance to distortion
- long-term structural stability
- dependable performance in hot outdoor environments

The one-piece moulded design also removes weak joins and helps ensure consistent wall strength throughout the cover.

Appearance Retention

Durability is not only about impact performance — it is also about how well the product continues to look over time.

Because Advanced Polymer is **colour-fast** and coloured throughout the material, scratches and minor surface scuffs are far less noticeable than with painted finishes. Unlike powder-coated steel, the colour is not just on the surface.

This provides several practical benefits:

Recovery Performance

Advanced Polymer Bollard Covers are designed to flex under load and recover from light impact.

When combined with the **ZERO WASTE Impact Recovery System**, the bollard system provides even greater resilience, allowing bollards and footings to remain reusable following even severe impact

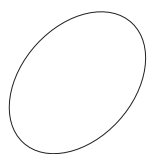
Technical Properties

- **Material:** Advanced Polymer
- **Base Description:** UV-stabilised material
- **Wall Thickness:** 7 mm
- **Manufacturing Method:** One-piece rotomoulded construction
- **Tensile Strength at 72°F:** 1,400 psi
- **Tensile Modulus:** 57,000 psi
- **Tensile Elongation at Break:** 100%
- **Flexural Modulus:** 29,000 psi

- improved appearance retention
- reduced visibility of scratches and marks
- no paint chipping
- easy cleaning after tyre scuffs or contact marks



Colour Chart: Advanced Polymer Non-conductive bollards & Bollard Covers



05 WHITE



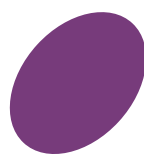
551 BLOOD RED



61 ORANGE



526 MAGENTA



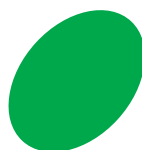
539 PURPLE



18 YELLOW



257 LIME GREEN



209 LIGHT GREEN



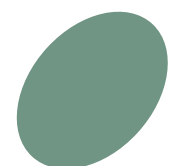
329 TEAL



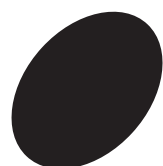
326 DARK BLUE



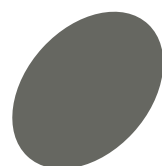
35 LIGHT BLUE



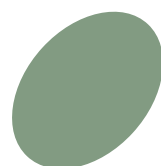
234 RIVER GUM



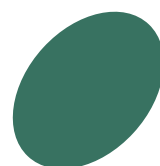
70 BLACK



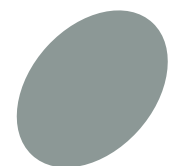
89 SLATE GREY



206 MIST GREEN



2081 HERITAGE GREEN



890 ARMOUR GREY



930 WHEAT



392 MOUNTAIN BLUE



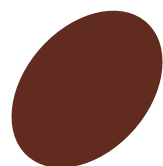
918 MERINO



916 BEIGE

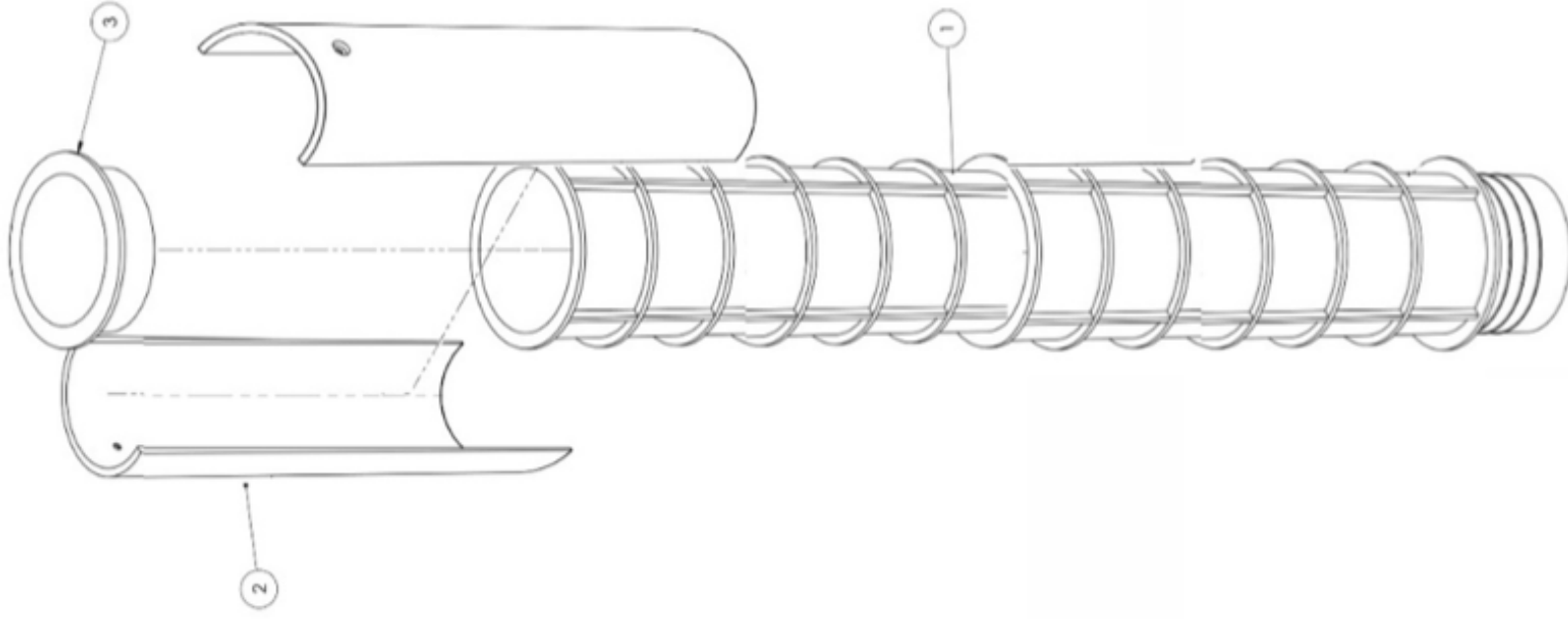


947 SMOOTH CREAM

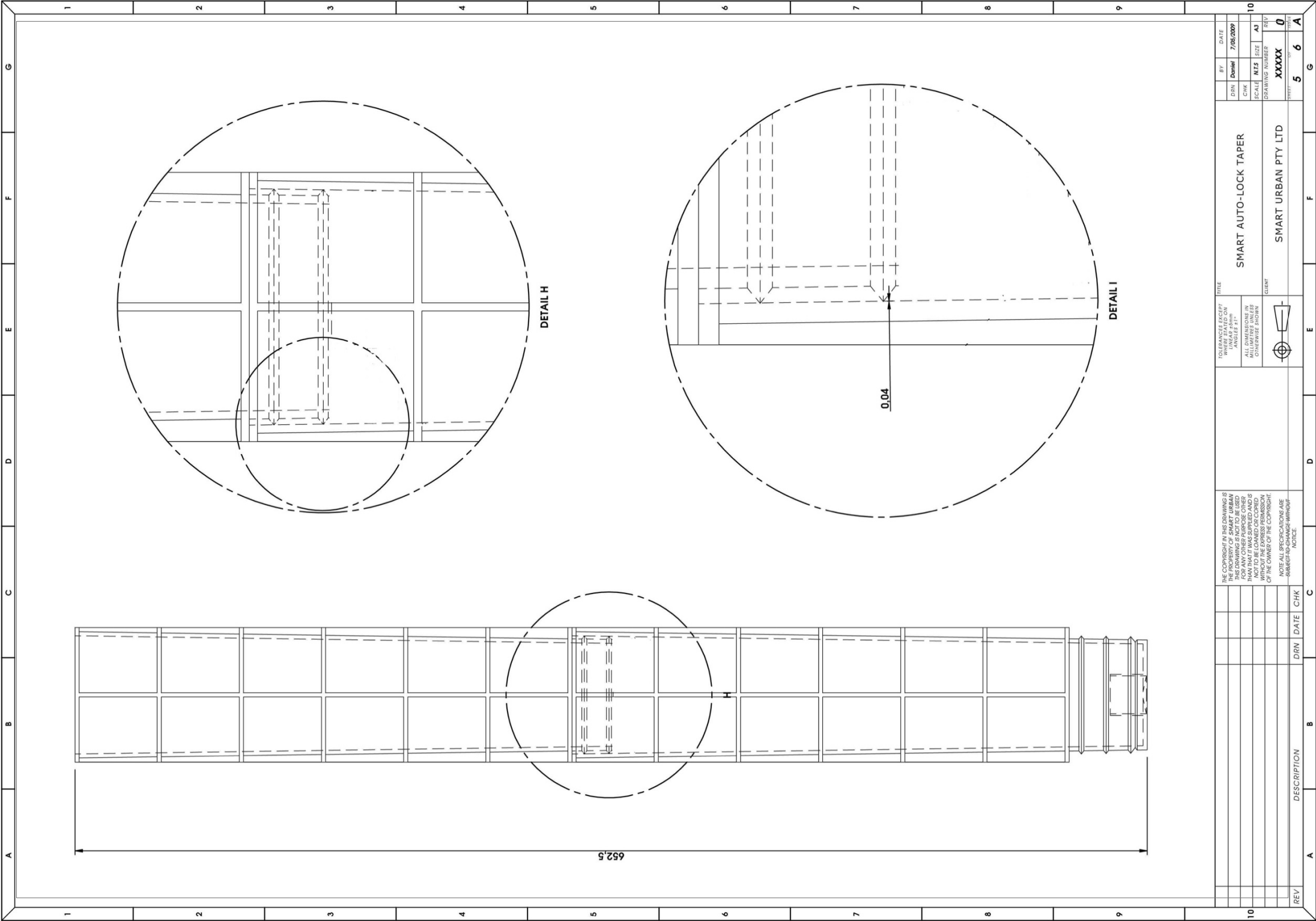


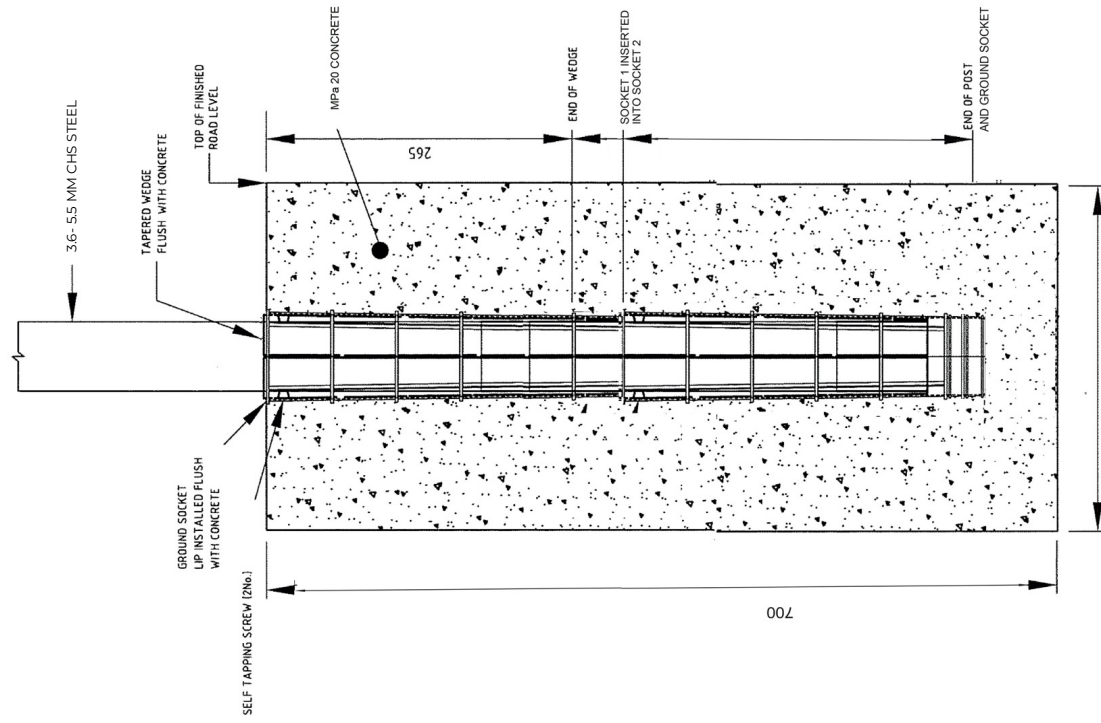
45 HERITAGE RED



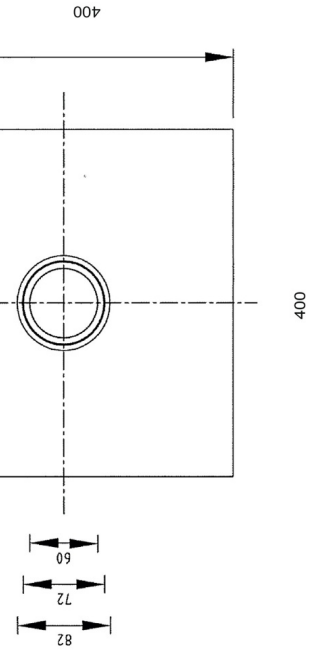


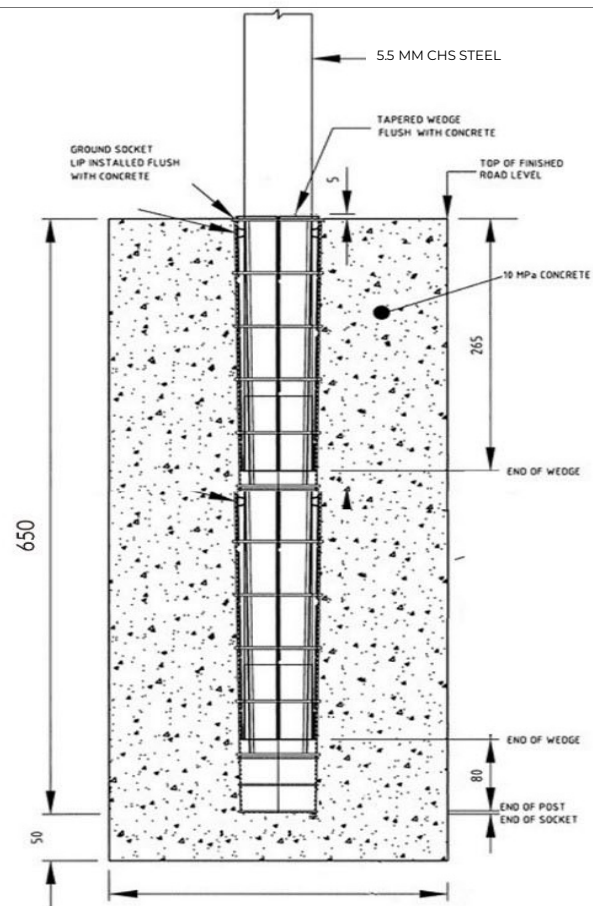
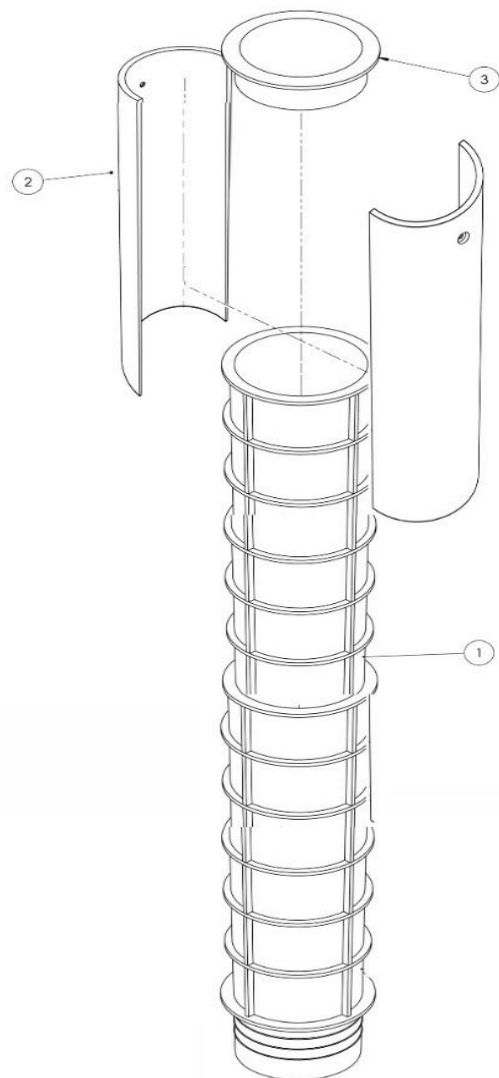
- 1.** GROUND SOCKET
- 2.** TAPER
- 3.** CAP
- 4.** GROUND SOCKET



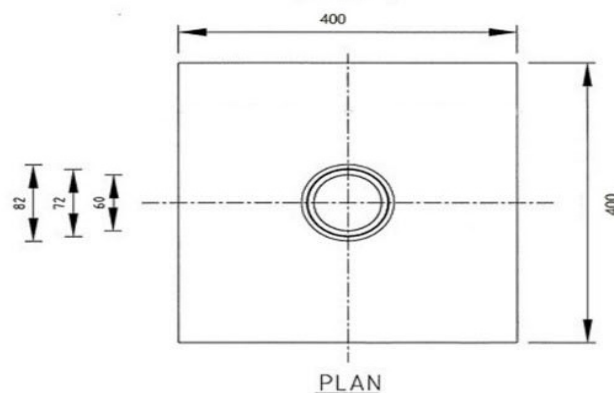


SECTIONAL ELEVATION
FOOTING

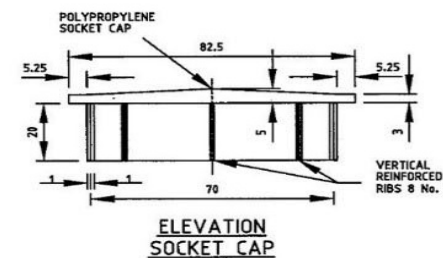




**SECTIONAL ELEVATION
FOOTING**



PLAN



**ELEVATION
SOCKET CAP**

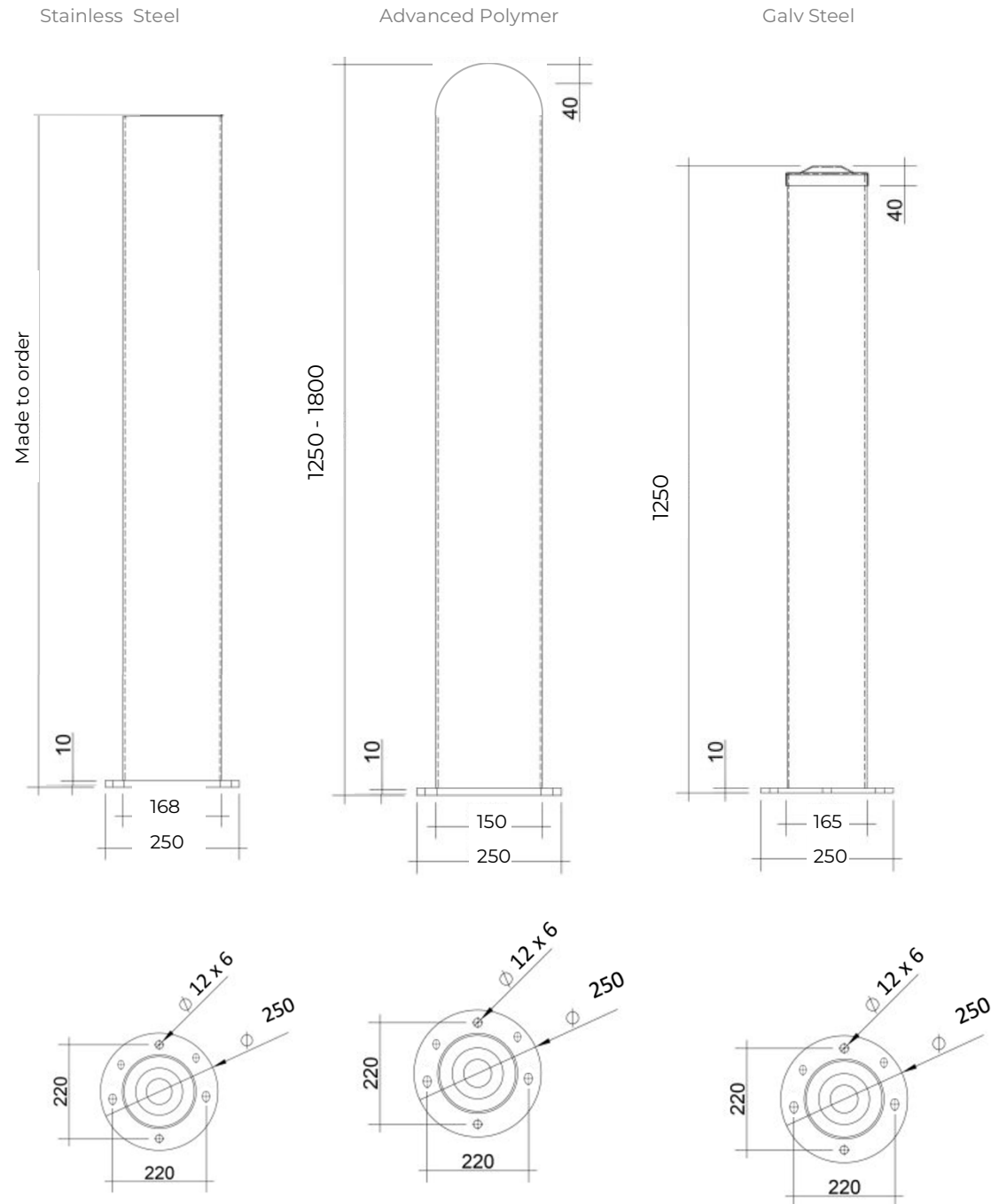
NOTES

To secure the Extra Heavy Duty Resistance Core you need a 650 mm Depth 30MPa concrete footing

If installing footing in sand, we suggest using a reo cage to reinforce the concrete footing.

NOTES

To secure the Extra Heavy Duty Resistance Core you need a 650 mm Depth 30MPa concrete

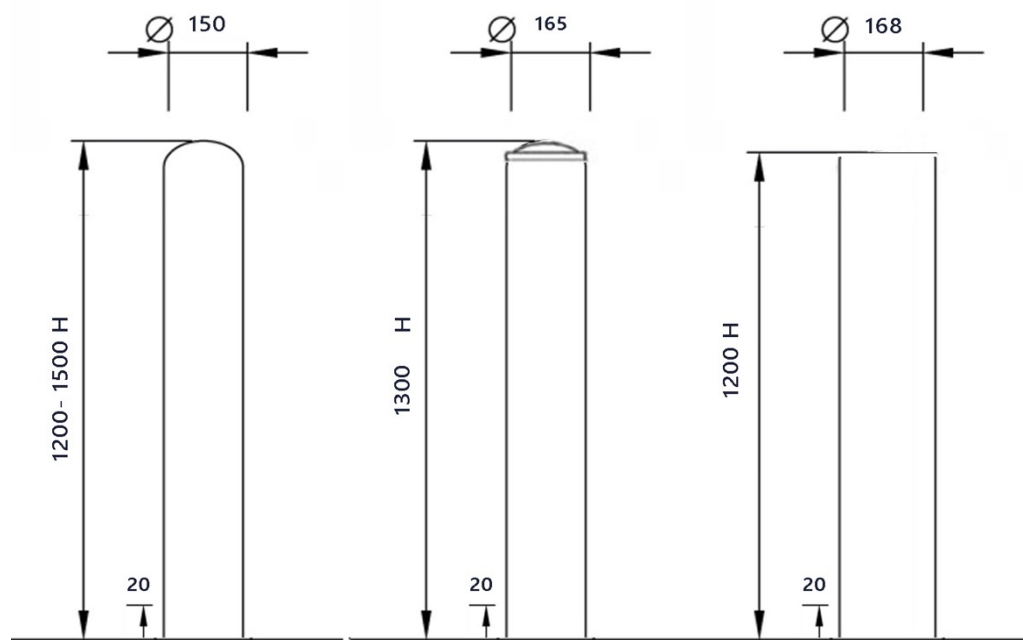


SURFACE MOUNT IRS

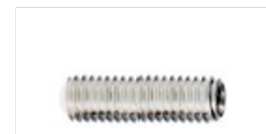
Solid 10 mm Base plate with evenly spaced anchors evenly distributes impact force to reduce damage.

SURFACE MOUNT IRS

Solid 10 mm Base plate with evenly spaced anchors evenly distributes impact force to reduce damage.



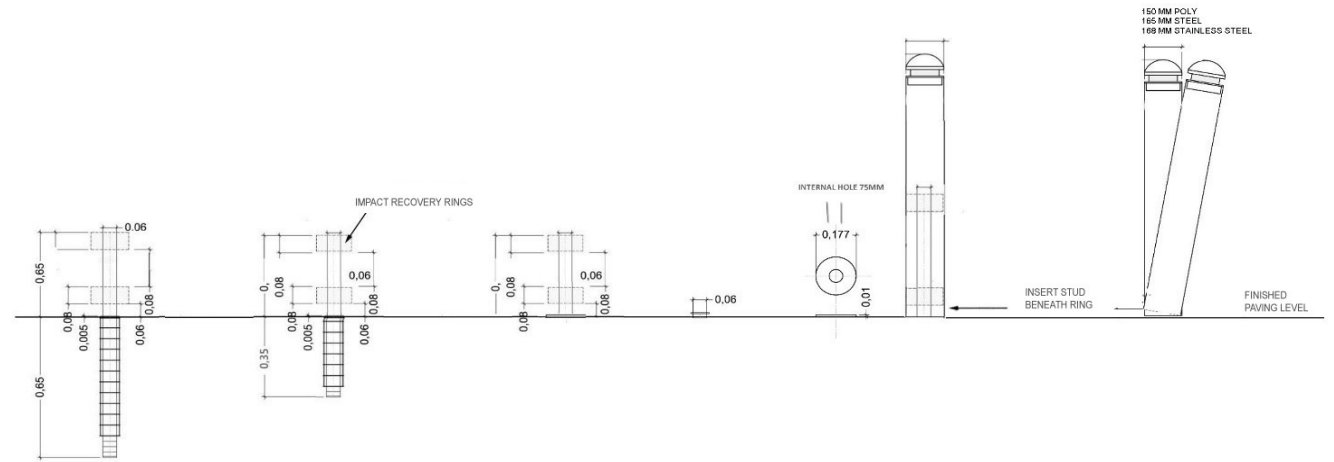
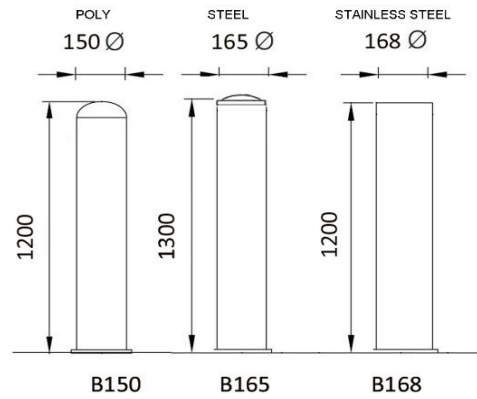
HOLE TO ACCEPT 10 MM STUD



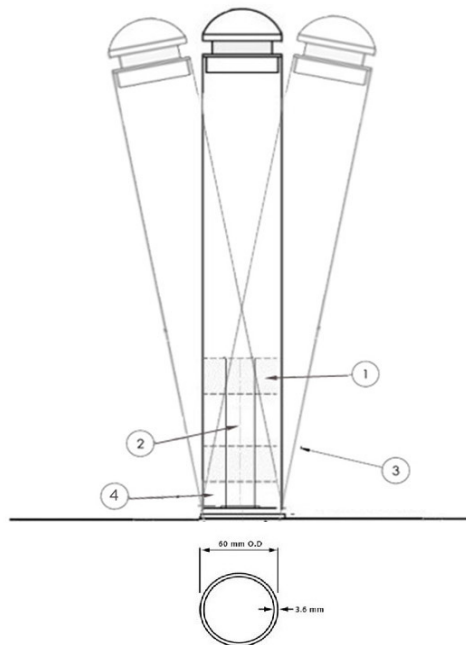
* Hole must be drilled (and tapped) approx. 20 mm from base of bollard to accept 10 mm stud. Advanced Polymer do not need tapping - suggest using 8.5 mm drill bit.

Stud must sit "below" bottom ring- should not bite into ring.

HOLE TO ACCEPT 10 MM STUD



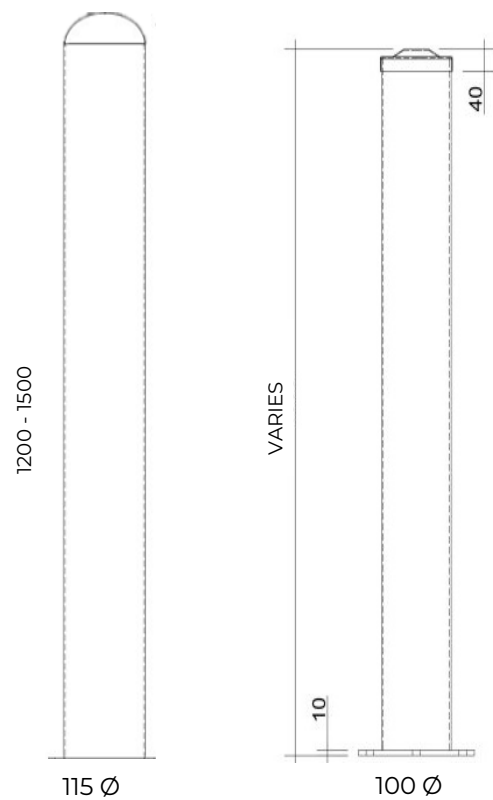
650 MM DEPTH 350 MM DEPTH SURFACE MOUNT CAP PROTECTIVE BASE PLATE BOLLARD



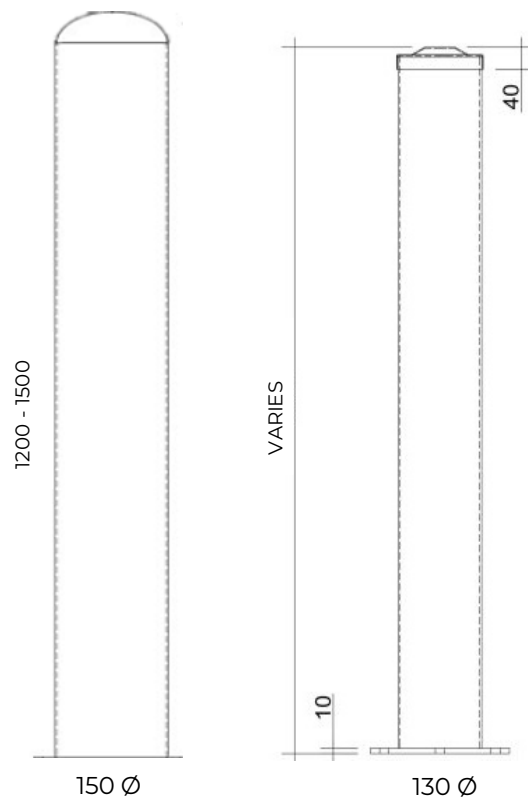
COMPONENTS

1. IMPACT RECOVERY RINGS
2. INTERNAL CORE 300 MM HIGH 3.6 WALL THICKNESS
3. BOLLARD CASING - POLY/ STEEL OR STAINLESS
4. SECURING STUD (SECURITY STUD AVAILABLE)

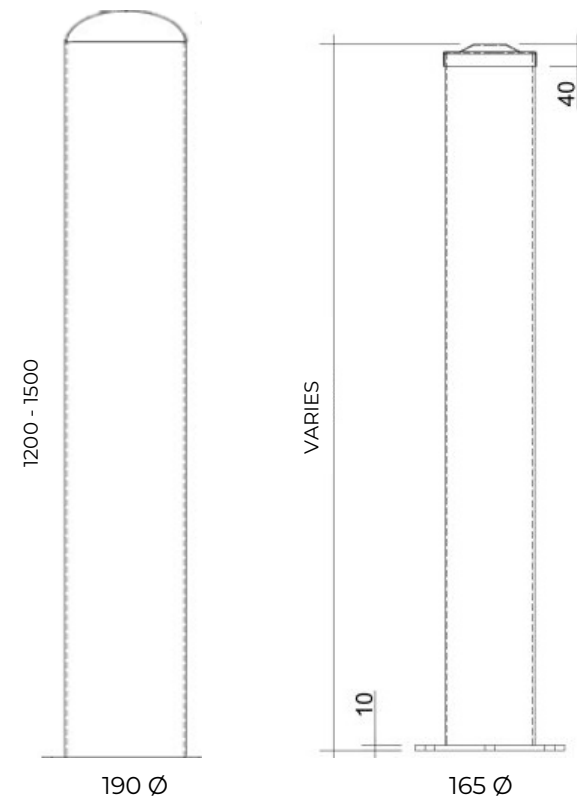
Stud is inserted in hole at base of bollard
and sits below the bottom Impact Recovery Ring



Fits 100 mm Ø or less



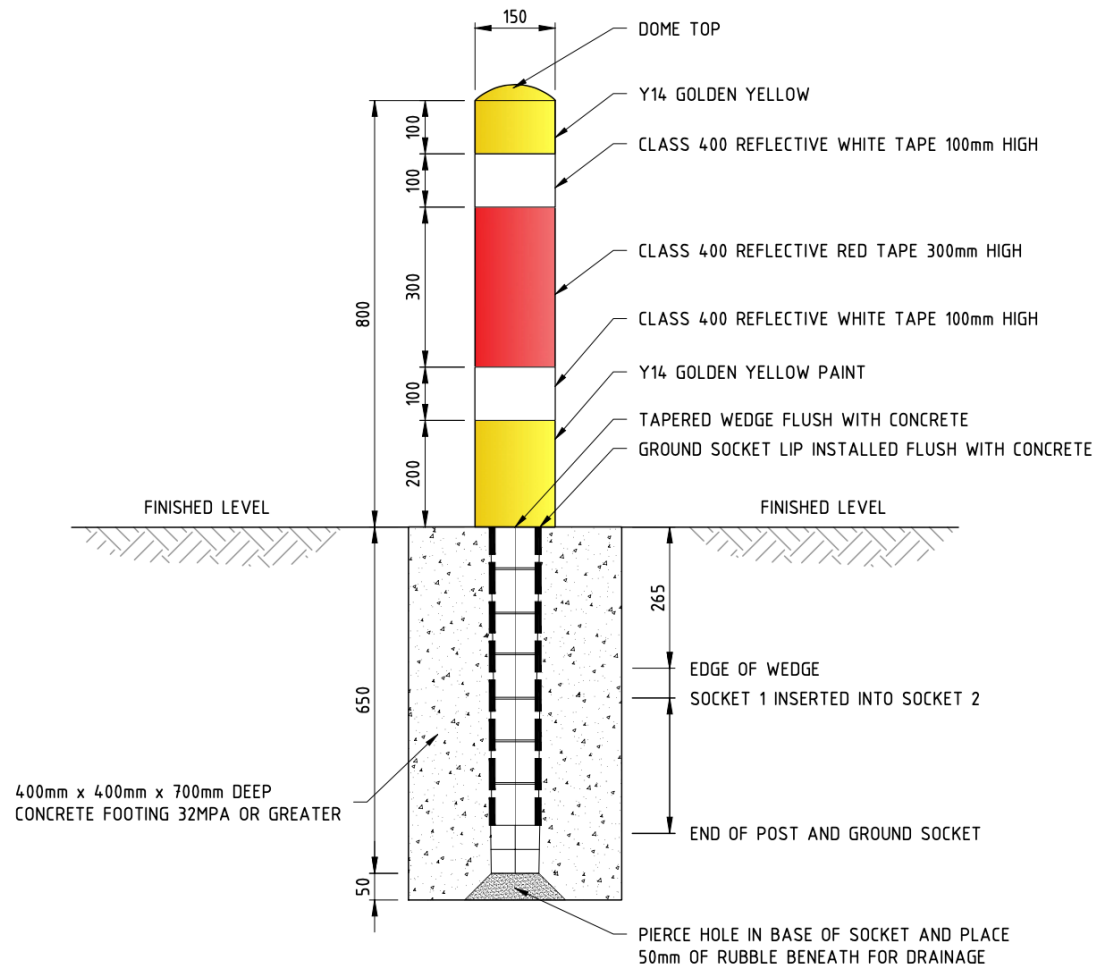
Fits 130 mm Ø or less



Fits Galv Steel Bollard 165 mm Ø

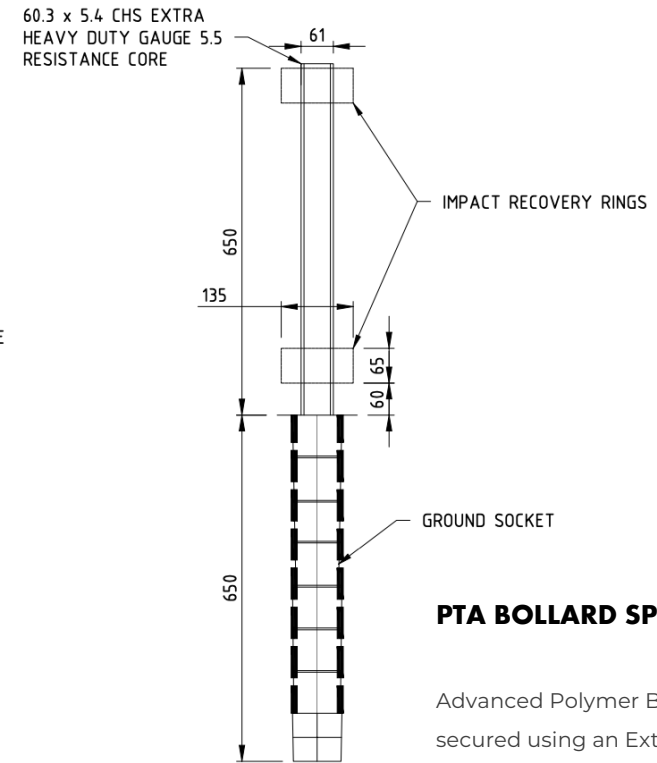
BOLLARD COVER DIMENSIONS

Available in a large range of colours- ask for colour chart



BOLLARD DETAIL
SCALE 1:10

GAS	LOCAL GOVERNMENT REQUIREMENTS; FOR EXAM (GAS DISTRIBUTION NETWORK)
SEWER + WATER	AS/NZS 3500.1



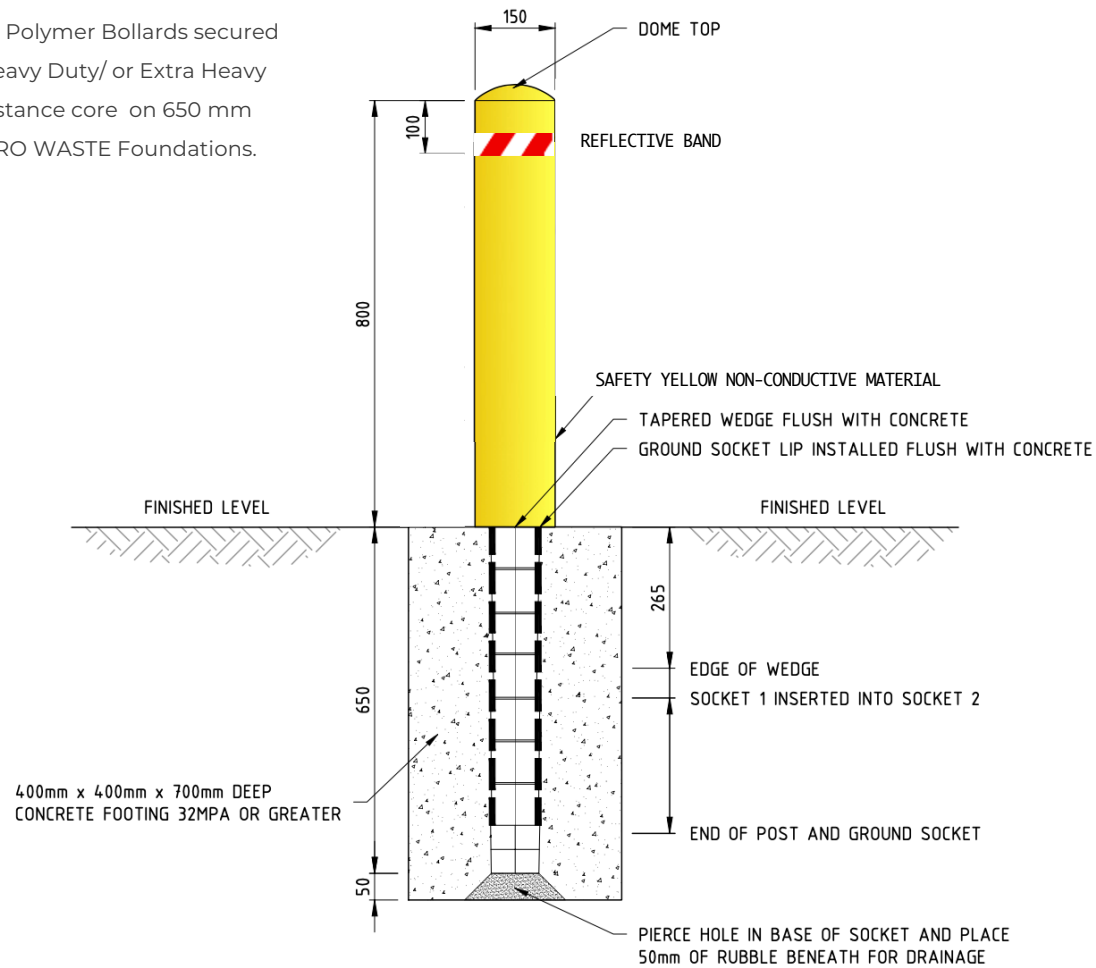
BOLLARD INTERNAL COMPONENT DETAIL
SCALE 1:10

PTA BOLLARD SPECS

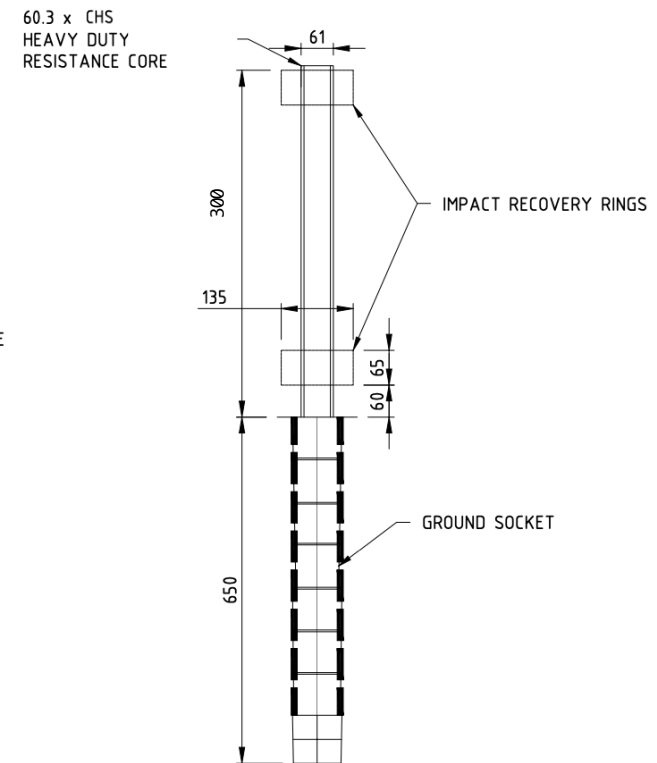
Advanced Polymer Bollards
secured using an Extra Heavy Duty
Resistance core on 650 mm Depth
ZERO WASTE Foundations.

IMPACT RECOVERY INGROUND

Advanced Polymer Bollards secured using a Heavy Duty/ or Extra Heavy Duty Resistance core on 650 mm Depth ZERO WASTE Foundations.



BOLLARD DETAIL
SCALE 1:10

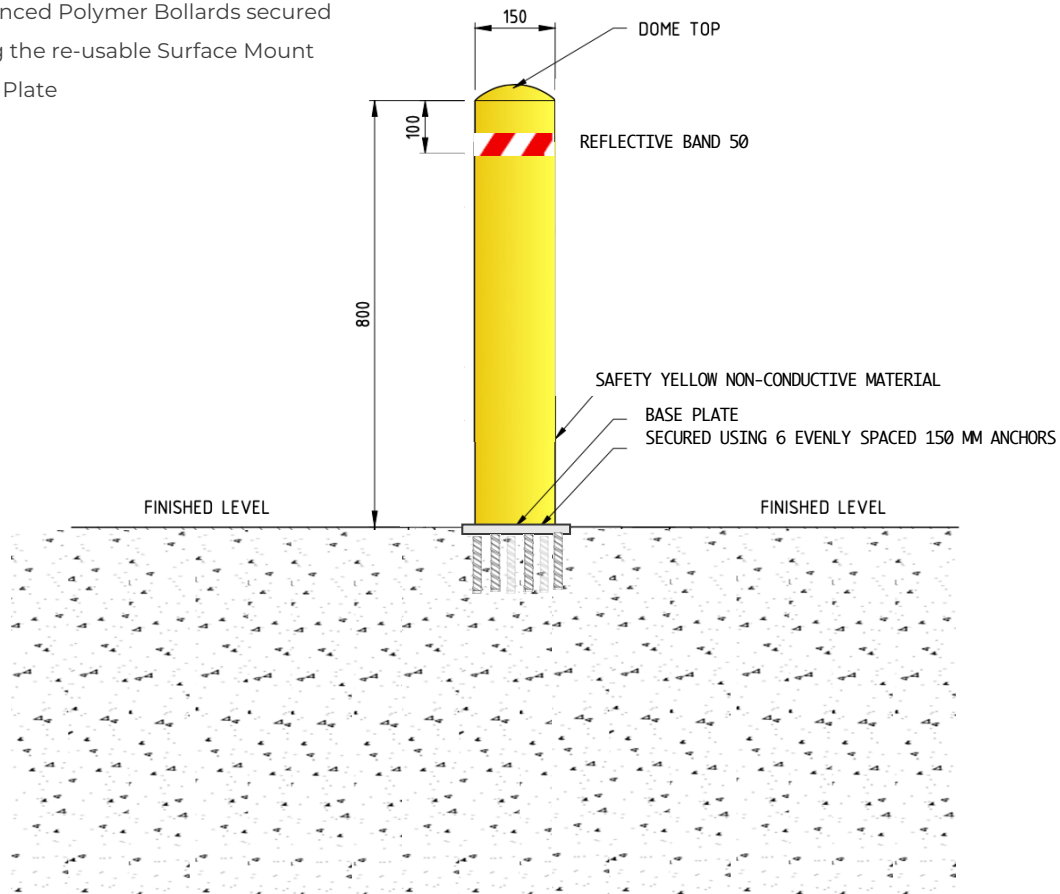


BOLLARD INTERNAL COMPONENT DETAIL

SCALE 1:10

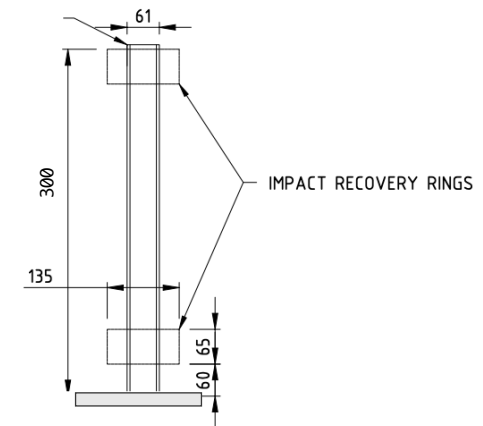
IMPACT RECOVERY SURFACE MOUNT

Advanced Polymer Bollards secured
using the re-usable Surface Mount
Base Plate



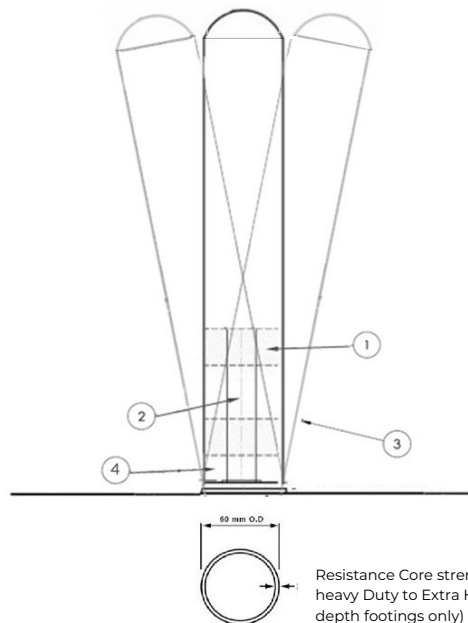
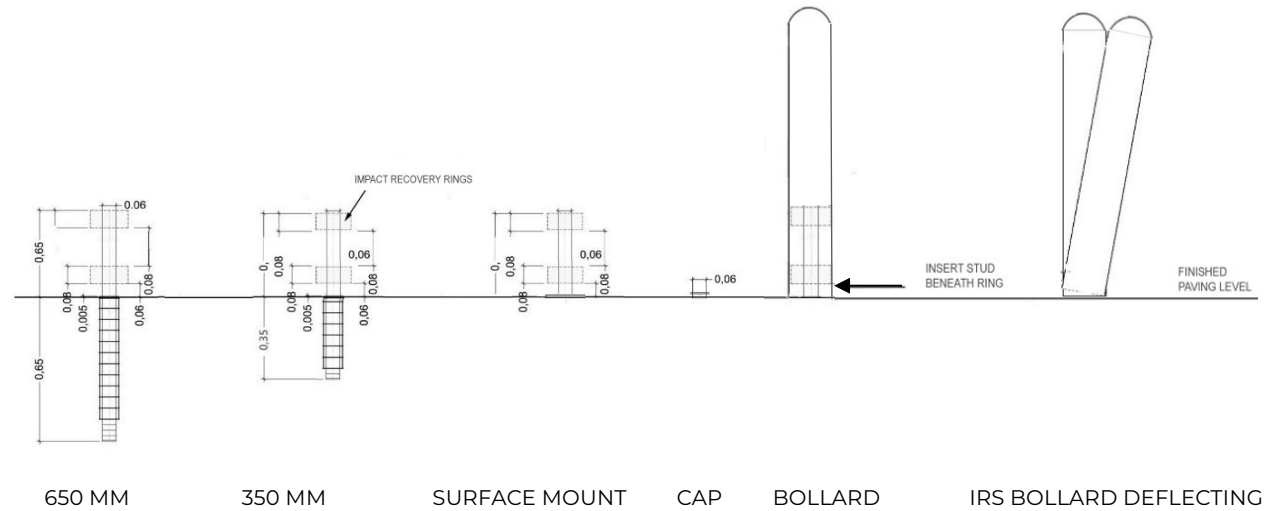
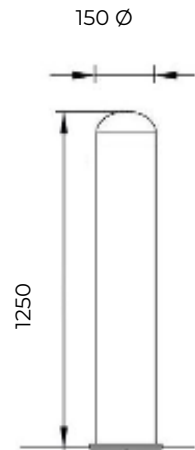
BOLLARD DETAIL
SCALE 1:10

60.3 x CHS
HEAVY DUTY
RESISTANCE CORE



BOLLARD INTERNAL COMPONENT DETAIL
SCALE 1:10

IMPACT RECOVERY BOLLARDS



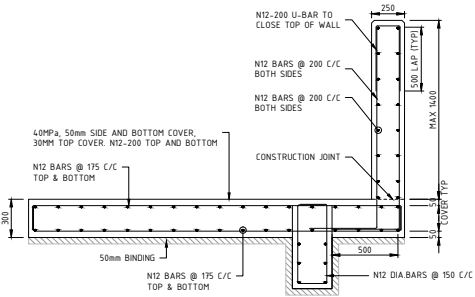
COMPONENTS

1. IMPACT RECOVERY RINGS
2. INTERNAL CORE 300 MM HIGH 3.6 WALL THICKNESS
3. BOLLARD CASING - POLY/ STEEL OR STAINLESS
4. SECURING STUD (SECURITY STUD AVAILABLE)

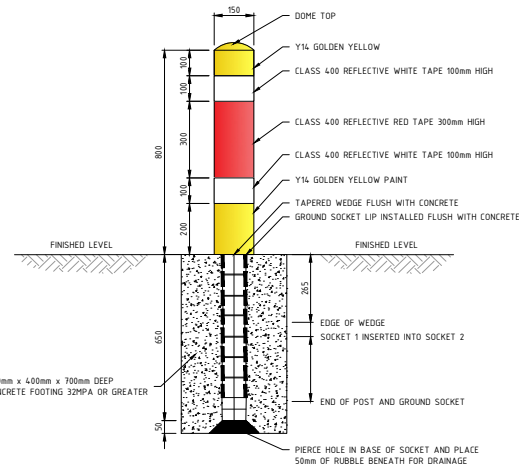
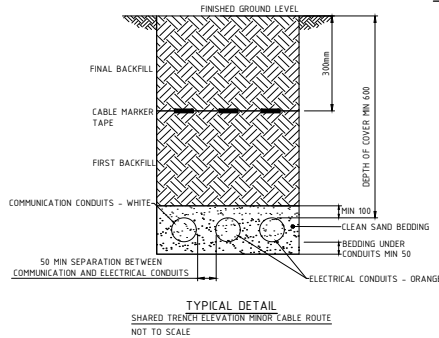
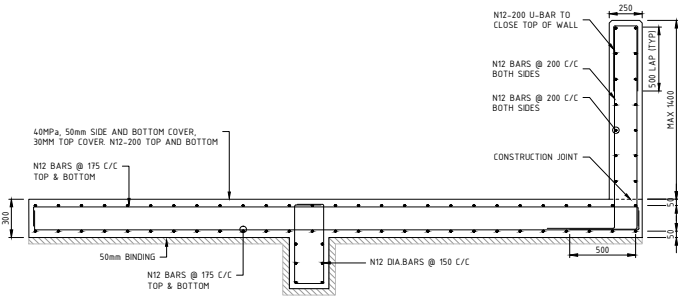
Securing stud is inserted in hole at base of bollard and sits below the bottom Impact Recovery Ring

Best option to be determined based upon existing foundations and expected severity of potential impact

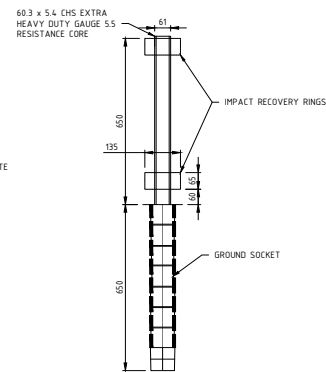
- Surface Mount
- 350 mm Footing
- 650 mm Footing
- XHD 650 mm footing



RETAINING WALL R.C. DETAILS
SCALE 1:20



BOLLARD DETAIL
SCALE 1:10



BOLLARD INTERNAL COMPONENT DETAIL
SCALE 1:10

GENERAL NOTES

A. GENERAL

- ALL WORK SHALL BE CONDUCTED IN ACCORDANCE WITH PTA DESIGN GUIDELINES AND SPECIFICATIONS AND/OR AS DIRECTED BY THE PRINCIPAL.
- ALL LEVELS ARE EXPRESSED IN METRES ABOVE AUSTRALIAN HEIGHT DATUM (AHD).
- EXISTING SERVICE INFORMATION SHOWN IN THE DRAWINGS IS INDICATIVE ONLY, THE CONTRACTOR SHALL VERIFY DEPTH AND ALIGNMENT OF ALL EXISTING SERVICES PRIOR TO UNDERTAKING THE WORKS.
- THE CONTRACTOR SHALL VERIFY THE CONSISTENCY AND CONDITIONS OF THE EXISTING INFORMATION SHOWN ON THE DRAWING BEFORE CONSTRUCTION.
- CARE SHALL BE TAKEN WHEN EXCAVATING IN THE VICINITY OF SERVICES.
- THE CONTRACTOR SHALL NOT ENTER OR WORK ON ADJOINING PROPERTIES WITHOUT THE WRITTEN CONSENT OF THE OWNERS OR THE RELEVANT AUTHORITIES.
- THE CONTRACTOR IS TO ENSURE THAT MINIMAL DISTURBANCE IS MADE TO AREAS OUTSIDE THE CONSTRUCTION WORKS.
- PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE, THE CONTRACTOR SHALL CONTACT THE RELEVANT AUTHORITIES TO ASCERTAIN THE POSSIBLE LOCATION OF FURTHER SERVICES AND DETAILED LOCATION AND DEPTH OF ALL SERVICES AND ARRANGE FOR THEIR RELOCATION WHERE NECESSARY.
- DURING EXCAVATION WORKS ALL STRUCTURES SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART OF THE STRUCTURE TO BE OVERSTRESSED. ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL CONDITION, INCLUDING FOOTPATHS, GRAVEL, AND GRASSED AREAS UNLESS DIRECTED OTHERWISE.
- THE CONTRACTOR SHALL ERECT AND MAINTAIN ALL BARRICADES, SIGNS, LIGHTS, ETC. NECESSARY TO KEEP WORKERS IN A SAFE AND STABLE CONDITION AND FOR PROTECTION OF THE PUBLIC.
- THE CONTRACTOR SHALL ENSURE THE PRECAUTIONS ARE TAKEN TO PREVENT EMISSION OF DUST, WHETHER FROM THE OPERATION OF CONSTRUCTION EQUIPMENT OR OTHERWISE.
- THE CONTRACTOR SHALL TAKE EXTREME CAUTION WHEN EXCAVATING NEAR EXISTING STRUCTURES AND FOUNDATIONS.
- ALL EXCESS EXCAVATED MATERIAL AND DEMOLISHED MATERIAL SHALL BE DISPOSED OF OFFSITE AT AN APPROVED DISPOSAL FACILITY AT THE CONTRACTOR'S EXPENSE.
- THE LOCATIONS OF ALL EXISTING SURFACE PITS, VALVE COVERS, ETC. SHOWN ON DRAWINGS ARE INDICATIVE ONLY. ALL EXISTING SERVICES SHALL BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE COMMENCING WORK.
- THE CONTRACTOR SHALL MAINTAIN PROPER SITE DRAINAGE TO ALL AREAS THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL BE RESPONSIBLE FOR MAINTAINING EXCAVATIONS IN A SAFE AND STABLE CONDITION AT ALL TIMES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR LIAISON WITH SERVICE AUTHORITIES REGARDING CONNECTION OF SERVICES, PERMIT FEES, PERMIT LEVELS, AND AUTHORITY INSPECTION FEES ASSOCIATED WITH SERVICE CONNECTION APPROVALS AND CERTIFICATION.

B. EARTHWORKS AND TRENCHING FOR SERVICES

- EARTHWORKS TO BE CARRIED OUT IN ACCORDANCE WITH PTA SPECIFICATION 8880-450-074. FOR MINIMUM COMPACTION REQUIREMENTS FOR EARTHWORKS ACTIVITIES REFER TABLE 7 OF THAT STANDARD.
- CONSTRUCTION AREAS TO BE STRIPPED OF ALL UNCONTROLLED FILL, TOPSOIL, ROOTZONE, VEGETATION AND OTHER DELETERIOUS MATERIALS TO EXPOSE NATURAL RESIDUAL SOILS, FREE OF LOOSE, COMPRESSIBLE OR DEFORMING MATERIAL.
- TRENCHING FOR PROPOSED UNDERGROUND SERVICES SHALL BE CONSTRUCTED AS INDICATED ON THE DRAWINGS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF TEMPORARY WORKS.
- NO FILLING SHALL TAKE PLACE TO THE EXPOSED SUBGRADE UNTIL THE AREA HAS BEEN PROOF ROLLED AND APPROVAL FROM THE PRINCIPAL THAT FILLING CAN PROCEED.
- DONOT USE COMPACTION METHODS THAT WILL CAUSE DAMAGE TO ADJACENT STRUCTURES. SELECTION OF METHODS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
- FILL SHALL BE PLACED AND COMPACTED IN LAYERS OF UNIFORM THICKNESS, DEPOSITED SYSTEMATICALLY ACROSS THE FILL AREA.
- TRENCHES SHALL BE BACKFILLED AND COMPACTED TO 95% MODIFIED RELATIVE COMPACTION AS SOON AS POSSIBLE UPON LAYING OF DRAIN.
- REFER TO PTA STANDARD DRAWINGS 00-T-16-0109 AND 010 FOR CONSTRUCTION DETAILS OF CABLE PIT.

C. EXISTING SERVICES

- CONTRACTORS ARE TO UNDERTAKE A FULL SERVICES SEARCH, PRIOR TO COMMENCEMENT OF WORKS ON SITE. SEARCH RESULTS ARE TO BE KEPT ON SITE AT ALL TIMES.
- CONTRACTORS ARE TO CONTACT ALL RELEVANT SERVICE AUTHORITY PRIOR TO COMMENCEMENT OF EXCAVATION WORKS INCLUDING THE LOCAL COUNCIL.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO UPDATE THE INFORMATION AND TO ADEQUATELY INFORM THEMSELVES OF THE LOCATION OF ALL SERVICES WHETHER SHOWN ON THE CONTRACT DOCUMENTS OR NOT.
- ANY ADJUSTMENT OR RELOCATION OF SERVICES THAT MAY BE REQUIRED SHALL BE CARRIED OUT BY THE CONTRACTOR WITH THE AGREEMENT OF THE SERVICE AUTHORITY CONCERNED.
- NEW SERVICES SHALL BE CONSTRUCTED AS INDICATED ON THE DRAWINGS.

D. NOTES FOR CONSTRUCTION OF SHALLOW FOUNDATION AND RETAINING WALL:

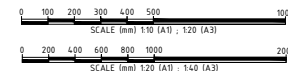
- RETAINING STRUCTURE AND FOUNDATION CONSTRUCTION SHALL COMPLY WITH PTA SPECIFICATION 8880-450-053.
- TOPSOIL AND VEGETATION OR ANY UNSUITABLE MATERIALS SHALL BE REMOVED FOR BASE FORMATION.
- GROUND SHALL BE LEVELED AND PROOF COMPACTED AT BASE FORMATION LEVEL TO ACHIEVE THE ALLOWABLE BEARING PRESSURE OF 100kPa.
- PROPERTIES OF FOUNDING SOIL SHALL ACHIEVE A MINIMUM OF EFFECTIVE INTERNAL FRICTION ANGLE 35 DEGREES.
- EARTHWORKS SHALL COMPLY WITH PTA SPECIFICATION 8880-450-074. IF BASE FRICTION ANGLE AND BEARING CAPACITY DO NOT ACHIEVE, OVER-EXCAVATE, PLACE COMPACTED A MINIMUM 0.5m THICK OF APPROVED ENGINEERING FILL.
- BURIED UTILITIES MUST BE IDENTIFIED AND APPROPRIATELY ADDRESSED PRIOR TO COMMENCING EXCAVATION.
- 50mm OF N20 GRADE CONCRETE BLINDING SHALL BE PROVIDED AT BASE OF FOUNDATION AND RETAINING STRUCTURE.
- ALL CONCRETE WORK SHALL COMPLY WITH PTA SPECIFICATION 8880-450-020. MIX DESIGN OF CONCRETE SHALL BE S40a TO APPENDIX A OF PTA SPECIFICATION 8880-450-020.
- REINFORCEMENT SHALL BE DESIGNATED GRADE N WITH MINIMUM YIELD STRENGTH OF 500MPa COMPLYING WITH AS 4671. MINIMUM COVER TO REINFORCEMENT SHALL BE 50mm.
- THE EXPOSED EDGES OF WALLS AND BASES SHALL BE FINISHED WITH CHAMFER 20mm x 20mm.
- BACKFILLING SHALL NOT COMMENCE UNTIL CONCRETE STRENGTH IN THE WALL STEM HAS BEEN DEVELOPED AND THE DESIGNED COMPRESSIVE STRENGTH IS ACHIEVED.

PIT SCHEDULE

PIT ID (REFER TO SITE LAYOUT 09-C-19-10001)	DESCRIPTION	PIT LABELLING	PIT DEPTH FROM FINISH LEVEL	PIT INTERNAL DIMENSIONS	EASTING	NORTHING	COVER TYPE	LID RATING PIT LID SIZE	COMMENTS
E1	LV POWER PIT	RE1-316U	1200mm	1200mm	53064.528	362770.212	TYPE 2	B	INTERMEDIATE PIT
E2	LV POWER PIT	RE1-324U	1200mm	1200mm	53070.741	362774.541	TYPE 2	B	INTERMEDIATE PIT
C1	COMMS PIT	RC1-327U	1200mm	1200mm	53069.066	362782.574	TYPE 2	B	INTERMEDIATE PIT

NOTES: REFER TO PTA STANDARD DRAWING 00-T-16-0110 FOR FURTHER PIT DETAILS.

COVER TYPE:
TYPE 1: USED FOR PAVED AREA OR COMPACTED SURFACE. THE COVER SHALL BE SAME LEVEL WITH THE FINISHED LEVEL.
TYPE 2: USED FOR NON-PAVED AREA, THE TOP COVER SHALL BE 150mm-200mm HIGHER THAN THE FINISHED LEVEL.



REV	DATE	DESCRIPTION	PL	HN	MB	CN
2	31/07/25	RE-ISSUED FOR CONSTRUCTION				
1	02/07/25	ISSUED FOR CONSTRUCTION	PL	HN	MB	CN
0	22/05/25	ISSUED FOR CONSTRUCTION	PL	HN	MB	CN
REV	DATE	DESCRIPTION	PL	HN	MB	CN
AMENDMENT			DSN	DRN	CHK	APP
ORIG. SIZE						
A1						

CAD-DRAWING-PATHNAME: C:\Users\thanh.chi@aurecon-group.com\Documents\250224 - LV-Major-Works - Design - Radio-Systems-Replacement - 5-Working-Files\5-03-Drawing\DRAWINGS\5-03-ESplanade-Foreshore_Elizabeth-Quay\09-C-19-10003.dwg



REFERENCES	SCALE	DESIGNED	P.LUI
AS SHOWN		DRAWN	H.NGUYEN
DATUM		CHECKED	M.BURLEY
HORIZONTAL: PCG2020		APPROVED	C.NGUYEN
VERTICAL: AHD71		DATE	23/07/2025

ISSUED FOR CONSTRUCTION

Government of Western Australia Public Transport Authority	LV MAJOR DESIGN WORK-RSR
ESPLANADE FORESHORE CIVIL	
TYPICAL DETAILS - SHEET 2	39
PTA Drawing No: 09-C-19-10003	Rev: 2

Mill certificate



UTKARSH INDIA LIMITED AN ISO 9001:2015 CERTIFIED COMPANY

Office
Regd. Office : Arrjavv Square ,4th Floor ,95A ,Elliot Road , Kolkata-700016
, Ph. No.: 91-33-2230-9124/25/9157, Fax: 91-33-2230-5384
Website: www.utkarshindia.in, email: info@utkarshindia.in



MANUFACTURER QUALITY CERTIFICATE

① QUALITY CERTIFICATE NO. : UIL/EXP/DITH/AUS/021/25-26, Date : 14.05.2025
② CLIENT NAME : DITH AUSTRALIA PTY LTD
LEVEL 30,31 MARKET STREET
SYDNEY, NSW 2000
AUSTRALIA
③ MANUFACTURER : UTKARSH INDIA LIMITED
④ CONTRACT NO. : 7503014428
PI/UIL/EXP/DB/24-25/1740, Dtd: 05.03.2025
⑤ LOT NO. : 4958-M4
⑥ SPECIFICATION : AS 1074
⑦ Description of Goods / Services : ERW WELDED GALVANIZED STEEL PIPES

Sl. No.	Size (mm)	Ends	Thickness (mm)	Length (mm)	Total Number of Bundles of Each Size	Pieces Per Bundle of Each Size	Total Length of Each Size in Meters	Theoretical Weight of Each Size (kg)	Pcs.	Heat Number	Chemical Properties						Mechanical Properties					Galvanizing
											C%	Mn%	P%	S%	B%	CE	TS Range (MPa)	Min Yst (Mpa)	Min EL%	Bend Test	Flattering Test	Mass of Zinc Coating g/m ² (Min-296)
1	NB 32	PE	3.20	6500	15	61	5947.5	18399	915	2550987	0.10	0.25	0.013	0.009	<0.0008	0.141	420	321	30	PASSED	NA	432/441
2	NB 50	PE	2.90	6500	5	37	1202.5	4936	185	2551014	0.08	0.28	0.016	0.011	<0.0008	0.126	417	318	31	PASSED	NA	428/432
3	NB 90	PE	4.00	6500	2	19	247	2378	38	2502028	0.06	0.36	0.016	0.008	<0.0008	0.120	418	320	31	NA	PASSED	430/439

Note:

1. TS = Tensile Strength, YS = Yield Strength, EL = Elongation (* S1 Inner Surface, * S2 Outer Surface)
 2. It is certify that each steel tubes is hydrostatically Tested to test pressure of 50 Bar - passed for 5 Second, Found to be satisfactory. No Leakage & Pressure Drop.
 3. All the Visual Finish & Dimensional characteristics like O.D., Thickness conform to the specified limit & tolerance.
 4. All pipes are marked as per PO.
- Country of origin for supplied goods- INDIA
 - Supplier of HR coils is STEEL AUTHORITY OF INDIA LIMITED which is used for manufacturing the HDG Pipes

AUTHORIZED SIGNATORY

SAFETY DATA SHEET

JE025QF 30-2168 INTERPON 600 SAFETY YELLOW

Section 1. Identification

GHS product identifier : JE025QF 30-2168 INTERPON 600 SAFETY YELLOW
SDS code : 8133005
JE025QF/25KG

Relevant identified uses of the substance or mixture and uses advised against

	Identified uses
Industrial use	
Consumer use	Uses advised against

Product use : Electrostatic coating for use in industrial plants

Supplier's details

Akzo Nobel Coatings Inc.
150 Columbia Street
Reading, PA 19601 USA

1-610-372-3600

Emergency telephone number (with hours of operation) : CHEMTREC +1 (800) 424-9300 (Inside the US)
CHEMTREC International +1 (703) 527-3887 (Outside the US, collect calls accepted)
Domestic Poison Control Center Customer Service +1 (800) 854-6813

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture

: ACUTE TOXICITY (oral) - Category 4
SERIOUS EYE DAMAGE - Category 1
SKIN SENSITIZATION - Category 1
GERM CELL MUTAGENICITY - Category 1
CARCINOGENICITY - Category 2
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) - Category 2

GHS label elements

Hazard pictograms



Signal word

: Danger

Date of issue/Date of revision

: 9/12/2025

Date of previous issue

: 5/31/2023

Version

: 2

1/13