

Drainage Technical Specification for Cadden Hill Sports Precinct

Place Design Group



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Project Name	Cadden Hill Sports Precinct Field Drainage and Storm Water use
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1 GENERAL

1.1 Tender to inform Themselves Fully

The Tenderer is required to become acquainted with all conditions relating to the Contract. If the Tenderer has any doubt as to the meaning of any portion of the Tender Documents, prior to submitting the tender, deliver to the Principal or representative a written statement of the interpretation upon which they rely, and request approval of such interpretation. Unless disagreement with such interpretation is provided by the Principal or representative within one week following said delivery, it will be understood that tendering statement is the basis on which the tender has been prepared and submitted.

This information is provided for the convenience of the Tenderer and is not part of the Contract unless otherwise specifically agreed. The information is not guaranteed as to accuracy, sufficiency or otherwise and the tender submitted by the Tenderer and subsequent entry into the Contract will be deemed for all purposes to have been based on the Tenderer's own investigations and determinations.

1.2 Alternative Tenders

Alternative tenders may be lodged provided they are accompanied by a conforming tender with completed schedules. If a tenderer wishes to offer alternative 'product packages', the lump sum difference can be listed without the accompanying schedules. After tender's close, the tenderer may be required to submit the completed schedules for one or more of the alternatives.

1.3 Site Location

The site is Caddens Hill Sports Precinct, Caddens Hill, New South Wales.

1.4 Geotechnical Data

1.4.1 Ground Encountered

The Contractor will be deemed to have satisfied themselves, including by site inspection, as to the different kinds of ground likely to be met during the progress of the work, including the extent and nature of wet or bad ground and the nature of any rock to be encountered.

1.5 Supplementary Conditions

1.5.1 Abbreviations and Irrigation Jargon

Where abbreviations and jargon are used in this specification, interpretations shall be in accordance with normal usage in the irrigation industry, or as ruled by the Superintendent.

Table 1: Abbreviations and Irrigation Jargon

PVC	Unplasticised Poly Vinyl Chloride
HDPE poly	High Density Polyethylene, AS4130/AS2033
QCV	Quick Coupling Valve
solenoid	solenoid valve (automatic control valves)
control valves	valves that connect mains to laterals or submains, on/off and pressure control.
common	common wire to valves, normally earthed
active	switching wire to each valve, normally 24V AC.

shift	group of valves that are operated together
station	output terminal of the automatic controller, valve or valve group
L/s, L/min, L/h	Litres per Second, -per Minute, -per Hour (flow rate)
m ³ /h, kL/h	Cubic Metres per Hour (flow rate), Kilolitres per Hour
kL, ML	Kilolitre (1,000 Litres), Mega litre (1,000,000 Litres)
MPR	Matched Precipitation Rate
CU	Christensen's Coefficient of Uniformity
DU	Coefficient of Distribution Uniformity
mainline	pipes that are constantly pressurised during irrigation pipes that feed water to control valves
lateral	intermittently pressurised pipe work with outlets attached, downstream from control valves
submain	manifold of controlled pressure to feed laterals
PRV,PSV	Pressure Reducing Valve, Pressure Sustaining Valve
pitot	pressure gauge attachment to measure velocity head at sprinkler nozzles
BPD	Backflow prevention device
OTR	Office of the Technical Regulator

2 SCOPE OF WORKS

2.1 Documents for the Drainage Works are, in order of precedence:

- The Drainage Specification which includes the Schedule of Rates which must be completed and included as part of the tender submission
- Drawing Sheets, 14304-001, 14304-003,14304-004

2.2 Work Included

The works included in this contract comprises the provision of all labour, plant, tools and materials and includes but is not limited by the following:

- Supply and install a drainage system to Caddens Hill Sports Field, as indicated on the drawing
- Cut and reinstate any asphalt surfaces and concrete kerbs as required, including all sand bedding, compacted road-base, asphalt and concrete to match existing
- All drainage pipes shall be installed with the correct fall. Please refer to drawing 14304-003 for slotted lateral and mainline collector pipe falls.
- All 150mm and 225mm Stormpro drainage main lines and 50mm slotted Ag pipe laterals will be installed below the irrigation system that is typically installed with a minimum of 350 mm cover. Please refer to detailed drawing 14304-004 for drainage pipe trench construction.
- All 50mm slotted Ag Pipe shall be backfilled as indicated on drawing.
- 150mm Stormpro mainline collector drains need to be installed below the level of the slotted Ag pipe laterals. Only approved fittings should be used to join slotted Ag pipe laterals to Stormpro mainlines. These connections need to be made at the top of the Stormpro mainline.
- Inspection points shall be installed at the locations shown on the drawings. Access boxes shall be installed with their lid 100 mm below finished grade. A metal plate (min 100 mm x 100 mm) shall be permanently attached to the underside of the valve box lid for future identification. Survey coordinates of inspection boxes must be indicated on the "as-constructed" drawings

- All pipes shall be set to the correct grade by using approved laser survey equipment and methods. The contractor will record start, mid and end invert levels and locations of each drain pipe over the entire oval

2.3 Variations to contract

The Superintendent may, at any time, direct the Contractor to carry out variations but variations do not invalidate the contract.

If a variation deleting part of the works is directed, the Contractor will not be entitled to claim or to be paid any compensation and the client may itself carry out any deleted work or engage others to do the work.

Within two (2) days of a request for a variation, the Contractor must notify the Superintendent in writing of the total cost to carry out the variation, including parts and labour.

If the Superintendent accepts the cost provided by the Contractor, the Superintendent will notify the Contractor to proceed with the variation in writing prior to work on the variation commencing, and the Contract Sum will be adjusted accordingly.

The Contractor shall not be entitled to claim or be paid any variation costs where the above pre-approval process has not been followed.

2.4 Work by Others

If work by others threatens to retard progress of the Contractor's works, the Contractor shall inform the Superintendent immediately.

2.5 Setting Out and Checking of Work

2.5.1 Setting out pipe positions

The Contractor shall clearly identify the location of each run of pipe and inspection points, using paint or pegs for approval by the Superintendent or their representative prior to trenching. It shall be the responsibility of the Contractor to report to the Superintendent any discrepancies between drawings, specification and site. Failure to do so prior to installation of equipment may result in replacement or removal of the equipment at the Contractor's expense.

2.5.2 Inspection

The Contractor shall give sufficient notice so that the Superintendent can make inspections at the following stages:

1. The growing media used to resurface the field needs to free draining, with acceptable hydraulic conductivity. A sample of this soil along with a soil analysis will need to be submitted for approval prior by consultant to construction. This will influence soil media depths in the Drainage Laterals.
2. Completed trench excavation, prior to pipe installation, with survey logs for review to confirm levels
3. Installation of slotted Ag Pipe Drainage pipe gravel and sand samples are to be provided to the Superintendent and checked for suitability, prior to this material being brought to site. The Superintendent is to be satisfied the material meets specification.
4. Installation of the Diversion Pit, and Sump Pump
5. Connection of the pump discharge to the Irrigation Tank.

6. Practical completion

3 INSTALLATION OF WORKS

3.1 Cleaning Up

3.1.1 Cleaning up - general

The Contractor shall progressively clean up and restore works during the progress of the Contract and shall continuously remove any accumulation of waste spoil rubbish and unused materials, whether supplied by himself or the Principal.

It is the responsibility of the contractor to remove all unwanted spoil from the site and pay any fees associated with the dumping of this spoil. Spoil will be removed from site prior to each weekend and cannot be left on site over weekends without written approval from the superintendent or council representative.

3.1.2 Refusal to set out until cleaning up complete

The Superintendent may refuse to set out or permit new work to proceed until clean up and restoration has been completed for works available for clean up more than 10 days previously.

3.1.3 Deposition of materials from clean up

All materials, spoil and rubbish removal from the site shall only be deposited where it is lawful to do so. Surplus spoil shall be disposed of as specified in herein under EXCAVATION - SURPLUS MATERIAL.

3.2 Maintenance (Defects Liability)

3.2.1 Period of maintenance (Defects Liability)

Maintenance or Defects Liability Period shall be 52 weeks from the date of issue of a Certificate of Practical Completion.

3.2.2 Rectification before final certificate

All work required during the defects liability period (including work of obtaining clearances and repair of damage to property) becoming evident during the defects liability period shall be carried out before final certification and the defects liability period shall be extended accordingly.

3.2.3 Time limits for maintenance by the Contractor

In the event of any required maintenance work not being carried out within two (2) working days (or shorter time if conditions are created that are hazardous to persons or the irrigated area) of the need arising, the Superintendent shall have the same carried out by others and the cost shall be deducted from any moneys due or to become due to the Contractor under the Contract.

3.3 Existing Services

3.3.1 Location of existing services

The Contractor shall by site investigation, “Dial B4U Dig” service, and by checking with the Principal and local authorities concerned, positively locate and expose all services at least 30 metres ahead of the point being excavated. Advice provided to the Contractor does not reduce the Contractor's responsibility to locate services.

3.3.2 Protection of or damage to existing services

The Contractor shall take every precaution necessary for the protection of private services during the course of the Contract and should any such service be damaged, the Contractor shall immediately:

1. notify the owner affected of the damage to the service,
2. contact the local authority concerned and advise of the damage and arrange for any turning off of the supply and
3. arrange repair of the service by properly qualified and licensed workers.

The Contractor shall make good any damage to any existing services previously identified at their own cost.

3.3.3 Protection of or damage to existing irrigation equipment

- The drainage system is to be installed beneath the existing irrigation system (as indicated on the drawing).
- The irrigation pipes shall be pot-holed, identified and shall remain intact during the drainage installation process.
- All drainage pipes (except the main discharge pipe) are inside the playing surface, the existing irrigation main and control cables.
- All existing sprinkler locations will be marked by council prior to commencing the installation phase.
- Damage to the existing irrigation system to be minimised; any damage made good and all sprinklers on damaged stations shall be removed and flushed until all debris is removed from pipes.
- The Contractor shall make good any damage caused to existing irrigation infrastructure at their own cost.

3.4 Rock Excavation and Refilling

3.4.1 Rock definition

Rock is defined as material that, in the opinion of the Superintendent, cannot be removed by manual tools and/or a standard back-hoe with appropriate attachments.

3.4.2 Payment for rock excavation

Payment for excavations defined as being rock shall be according to the rates tendered. In the absence of such rates, day labour rates will be applied by the Superintendent. Payment for rock excavation excludes costs incurred by the Contractor whilst determining the presence and extent of rock. The Contractor shall inform the Superintendent of the existence of rock and gain written approval before proceeding.

3.4.3 No payment for 'Hard-dig' excavation

All ground material encountered is defined as either normal ground conditions, or rock as defined above. The Contractor shall be deemed to have satisfied themselves as to both the nature and the extent of all digging to be met with during the progress of the work. The scheduled rates or prices for excavation and refilling shall be deemed to cover excavation and refilling in all kinds of normal ground conditions notwithstanding the actual nature and extent of the ground encountered. No claims for extras due to hard dig will be approved unless the conditions can be considered rock as defined above.

3.4.4 Refilling of rock excavations

With the exception of some trench refilling as specified therein, rock excavations shall not be used for refilling. The scheduled rate for rock excavation shall include the cost of loading, cartage and removal of the rock to the nearest tip as specified and the replacement of the rock removed with other refilling material. In general, this material shall be surplus material obtained from normal excavation on the job however, the Contractor shall allow to import suitable material for refilling if necessary the cost of which shall be included in the rate for excavation.

3.5 Excavation of Trenches - General

3.5.1 Dimensions of trenches

The Contractor shall refer to the drawing for trench details.

3.5.2 Cost of excavation

The cost of all excavation above, including drive, widening or deepening shall be deemed included in the tender sum for excavation, refilling and bedding type. For the purposes of payment according to a scheduled rate, depths of construction shall be measured to the invert of the pipes.

3.6 Excavation - excavated material

3.6.1 Obstruction by deposition of excavated material

Excavated material shall be deposited in such a manner as to not obstruct any drain, roadway, right of way or access to any building or premises. No public street, path or right of way, which is in normal everyday use shall be blocked by the Contractor's plant or excavated material unless written permission to do so has previously been obtained from the local council or other controlling authority. The Contractor shall seek and obtain such approval in ample time to prevent delays in construction while awaiting approval. The Contractor shall comply with all Occupational Health and Safety policies of local authorities.

3.6.2 Removal of material unsuitable for refilling

All excavated material must be removed at the Contractor's own expense.

3.6.3 Deposition against walls and fences

No excavated material shall be deposited against the wall of any building or fence unless the Contractor has first obtained the written permission of the owner and occupier of such property. Notwithstanding such permission obtained, the Contractor shall make good all damage immediately after the removal of material.

3.7 Excavation - surplus material

3.7.1 General

All surplus material from the excavation shall be removed from the site as soon as practical or within 48 hours of receiving instruction to do so from the Superintendent, at a designated site within the Council area. Removal/transportation cost shall be met by the contractor but disposal is free of charge.

3.7.2 Retention of surplus material by property owner

Where the Principal desires to retain surplus materials from the excavations for their own use the Contractor may leave such surplus materials deposited as requested in writing by the Principal. A copy of such request shall be lodged with the Superintendent.

3.7.3 Surplus material not removed by Contractor

Should the Contractor fail to effectively remove surplus material within 48 hours of having been directed in writing by the Superintendent to do so, the Superintendent may without further notice cause the material to be removed. The cost of such removal shall be deducted from any moneys due or to become due to the Contractor under the Contract.

3.8 Refilling materials and methods

3.8.1 Bedding sand and gravel

A sample of backfilling sand and gravel shall be supplied to the Superintendent prior to delivery to site. On approval of the correct type and grade, the Contractor may stockpile product on-site in a location to be approved by the Superintendent.

Stormwater pipe shall be backfilled using selected/clean excavated material.

3.8.2 Samples of refilling material

The Contractor shall provide sieve-passing data of various materials imported to site. The Contractor shall supply at no cost such samples as required by the Superintendent.

3.9 Top Finish

3.9.1 General surfaces

Unless specified otherwise, the Contractor shall level off the surface and remove stones, debris and other undesirable materials. The Contractor is responsible for the reinstatement of all trenches, holes and areas denuded of vegetation by the Contractor's operations.

3.9.2 Horticultural surfaces

Unless specified otherwise, the Contractor can trench on all surfaces. No sod cutting is required.

3.9.3 Trench topping and maintenance

Subsidence of trenches after completion of the works shall be the responsibility of the Contractor. The Contractor shall ensure trenches are kept "topped up" and re-compacted for the duration of the defects liability period.

3.10 Laying and Jointing of Pressure Pipes

3.10.1 General

Pipes shall be laid complete with all fittings required for completion of the functions described on the drawings and specification. The methods used for laying and jointing pipes and fittings shall be to the satisfaction of the Superintendent.

Manufacturer's markings and labels indicating pipe class and standard shall face upward after installation to allow inspection and verification.

3.10.2 Making joints and tolerances

Pipes shall be laid by inserting spigots into sockets. Manual jointing only will be permitted, and excavation plant shall not be used to push pipes into socket. Tolerances and deflections shall not exceed those defined by manufacturers and the appropriate Australian Standard. PVC and poly pipe shall be cut square with a fine tooth saw or tube cutter, and burrs shall be removed prior to making joints.

3.10.3 Prevent dirt from entering pipes

The Contractor shall ensure before laying pipes or fittings that they are free from dirt or foreign matter. All pipe ends left open overnight shall be taped or bagged off.

4 EQUIPMENT BRAND NAMES AND APPROVALS

4.1.1 Use of trade names

Where trade and brand names, catalogue or reference numbers are referred to, they shall indicate the product required. Alternatives may not be used without the written approval of the Superintendent.

4.1.2 Contractor to notify of reservations

The Contractor shall notify the Superintendent in writing, prior to installation, if they have any reservations whatsoever as to the suitability of specified product, or their ability to properly warrant the product.

4.2 Pipes and Fittings

4.2.1 Depth of cover to top of pipes

Refer to drawings.

5 PRACTICAL COMPLETION

5.1.1 Practical Completion

Practical completion includes commissioning, testing and site clean-up. Following a successful inspection and compliance with the specification, a Certificate of Practical Completion shall be issued by the Principal.

5.1.2 As constructed drawings

The Contractor may be required to supply 'as installed' drawings of the completed system. The "as-installed" information for the drawing shall be obtained using "Total Station" or GPS survey (to +/- 10 cm accuracy), and shall be professionally labelled and include all any variations from the original drawing.

The Contractor is to coordinate with HydroPlan for the purpose of conducting an "As Constructed" survey of all pipe ends and junctions. This survey is to record X, Y and Z coordinates of all points to confirm correct falls on all pipes. Z coordinates will be for trench bottom levels.

The Contractor will provide a drawing to HydroPlan as a hard copy of the system with all "as-installed" details clearly marked.

HydroPlan will collate the "as-installed" information and prepare final documentation and submit to the client for their records.

All drawings and associated documentation must be submitted to HydroPlan at least two (2) weeks prior to the Practical Completion inspection. The Contractor must allow for HydroPlan to complete this work (as shown in Schedule of Rates)

6 FINAL INSPECTION

If the system fails final inspection test more than once, the Principal may deduct inspection costs from the final payment.

Final inspection by the Superintendent shall include checks for compliance with the specification.

A Final Certificate can only be issued after the successful final inspection has been carried out and approved by the Superintendent and Council Officer.

7 SCHEDULE OF RATES

The following list of rates will be used for calculating variations. **This form must be completed and returned with the tender.**

Table 2: Schedule of Rates

ITEM	DESCRIPTION	RATE/ITEM
DRAINAGE PIPEWORK (rate to supply only)		
A1	50mm Ag Drain (No Sock)	/m
A2	225mm Stormpro Mainline Pipe	/m
A3	150mm Stormpro Mainline Pipe	/m
A4	5-7mm Gravel	/cubic metre
A5	Geotextile Material	/m
MISCELLANEOUS ITEMS		
F1	Foreman	/hr
F2	Labourer	/hr
F3	Trenching - Chain dig	/Lin. m
F4	Trenching - Backhoe	/Lin. m
F5	Excavation in Rock as defined in Item 8 (includes Refilling and Disposal)	/Lin. m

F6	HydroPlan fee for GPS surveys and preparation of as-constructed drawings. This must be included in the tender price.	\$1,800.00 plus GST
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