



THE CITY OF
CALGARY

PARKS

**DEVELOPMENT GUIDELINES
AND STANDARD SPECIFICATIONS**

LANDSCAPE CONSTRUCTION
2010

**Development Guidelines and Standard Specifications
Landscape Construction 2010
Cross Reference for Changes**

2010 Page #	2010 Item #	Revisions
76	III.7.f.ii Note	Revise the requirement for information to be included on the survey grade stakes.
97	1.2.j.ii	Clarify the lighting requirement for river valley pathways.
116	3.4.a	Revise the requirement for play structure equipment hardware.
117	3.4.e	Add new item for play structure equipment "Posts".
117	3.4.g	Add new item for play structure equipment "Bridges".
117	3.4.i	Add new item for play structure equipment "Coatings".
Detail	Sheet # 5	Revise the dimensions for the minor soccer goalposts
Detail	Sheet # 23	Revise the tree planting requirements.
Detail	Sheet # 26	Revise the tree bed planting requirements.
Detail	Sheet # 27a	New tree trench planting requirements.
Detail	Sheet # 74	Delete the last sentence under notes.

INTRODUCTION

The purpose of the Development Guidelines and Standard Specifications – Landscape Construction is to provide:

- A list of appropriate development activities for each park type;
- Concept Planning Requirements at the Land Use / Outline Plan stage;
- Construction approval requirements;
- Construction plan requirements;
- Requirements for inspections during construction;
- Construction Completion Certificate requirements;
- Final Acceptance Certificate requirements; and
- Detail specifications for landscape construction.

Concept plans and construction plans shall reflect the policies and conditions approved at the Community Planning and Land Use / Outline Planning stages. Community Plans and Land Use / Outline Plans shall conform to Council approved policies and Federal/Provincial legislation. The following table illustrates these relationships:

	Municipal Government Act & Other Provincial and Federal Legislation					
City wide / larger in scope; multiple functions; partnerships	Inter-municipal Development Plans		The Calgary Plan and other Council-approved policies (e.g. Go Plan)		Joint Use Agreement	
City wide; all open space	Open Space Plan					
City wide; specific to an issue or aspect of open space. Examples include:	Urban Park Master Plan River Valleys Plan	Natural Areas Mgmt Plan Wetland Conservation Plan	Storm-water Mgmt Plan Water Mgmt Strategic Plan	Bikeways/ Pathways Plan	Sports Fields Mgmt Plan	Urban Forestry Mgmt Plan
Policy for a broad geographic area	Area Redevelopment Plans		Community Plans Area Structure Plans		Special Studies (e.g. Bow Valley Centre, CFB)	
Plans for location / configuration of open space in a specific area (Implementation)	Land Use Amendments, Outline Plans and Tentative (Subdivision) Plans					
Implementation of policy through development of a specific site or project	Development Permits Review of Developer-built/Partnership projects Development agreements				Design Development Plans for City park projects Business Plans	

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ACKNOWLEDGMENTS

In September 1993, The City of Calgary Parks committed to a full-scale review of their Development Guidelines and Standard Specifications for Landscape Construction. The approved process for conducting the review was to facilitate a series of workshops that would include participants from:

- the Urban Development Institute - Calgary;
- the Alberta Association of Landscape Architects;
- the Landscape Alberta Nursery Trades Association;
- the Alberta Irrigation Association; and
- The City of Calgary Parks

The resulting workshop series involved six different workshop groups, with members from each of the above organizations that were assigned to review and update, by consensus, specific sections of the 1993 Guidelines and Specifications. The series ran over a total of 6.5 days in the month of January 1994. The City of Calgary Parks would like to take this opportunity to cordially thank those 65 individuals who donated their time and effort toward the workshop series.

A further full-scale review of the Development Guidelines and Standard Specifications for Landscape Construction was conducted during 2004. It involved a series of negotiations between representatives of the Urban Development Institute and The City of Calgary Parks to obtain a collaboratively developed set of guidelines and standards for the construction of the City's Open Space system. The dedication and effective communication skills of the members of the negotiation teams are what made this manual possible. Our sincere thanks go out to the following:

Urban Development Institute - Calgary's Urban Landscape Committee and The City of Calgary Parks' Negotiating Team

PREAMBLE

The Development Guidelines and Standard Specifications provided in the following sections are considered to be the normal practice for the construction of landscape elements. Their foundation is framed by the following policy documents: The Calgary Plan, Joint Use Agreement, Open Space Plan, Urban Parks Master Plan, Natural Areas Management Plan, Wetlands Conservation Plan, Storm-water Management Plan, Pathways/Bikeways Plan and Sports Fields Management Plan. The City of Calgary Parks, at their discretion, may consider alternatives to or relaxations of the Guidelines and Specifications when the Developer or their agent, or the Contractor or their agent, provides a written submission identifying the reasons for special considerations.

DEVELOPMENT ACTIVITIES

I. PARKS

1. Development Activities and Responsibilities

Table 1 illustrates responsibility for park development activities based on negotiations with the Urban Development Institute (UDI) and on The City of Calgary's Supply and Development Standards for parks and open space. The intent of the table is to provide the reader with a summary of the various types of parks and their appropriate level of development.

TABLE 1: Responsibility for Park Development Activities

*Current Development Responsibility							
Appropriate Development Activities	1	2	3		4		5
	Sub-Neighbourhood Parks MSR	Neighbourhood Parks MR	Community Parks MR	MSR	District Parks MR	MSR	Linear Parks
Grade	D	D	D	D	D	D	D
Loam	D	D	D	D	D	D	D
Seed to Grass	D	D	D	D	D	D	D
Fully-Automatic Irrigation (50mm P.W.S.)	D	N/A	N/A	N/A	N/A	N/A	D
Fully-Automatic Irrigation (150mm P.W.S.)	N/A	D	D	D	D	D	D
1.2m Chain Link Fence	D	D	D	D	D	D	D
Post and Cable Fence	D	D	D	D	D	D	D
Optional Amenities	NR	NR	NR	NR	NR	NR	NR
Local Pathway	D	D	D	D	D	D	D
Trees	D	D	D	D	D	D	D
Regional Pathway	NR	NR	NR	D	NR	D	D
Shrubs	D	D	D	D	D	D	D
Benches	D	D	D	D	D	D	D
Garbage Receptacles	D	D	D	D	D	D	D
Supply Dog By-law Signs	C	C	C	C	C	C	C
Install Dog By-law Signs	D	D	D	D	D	D	D
Play Equipment	NR	NR	NR	NR	NR	NR	NR
Exercise Equipment	NR	NR	NR	NR	NR	NR	NR
Game Tables	NR	NR	NR	N/A	NR	N/A	NR
Picnic Tables	NR	NR	NR	N/A	NR	N/A	NR
Basketball/Volleyball	NR	NR	NR	NR	NR	NR	NR
Ball Diamond	N/A	D	NR	D	NR	D	N/A
Soccer Field	N/A	D	D	D	D	D	N/A
Ice Rinks	N/A	N/A	C	C	NR	NR	N/A

*Current Development Responsibility							
Appropriate Development Activities	1 Sub-Neighbourhood Parks MSR	2 Neighbourhood Parks MR	3 Community Parks		4 District Parks		5 Linear Parks
			MR	MSR	MR	MSR	
Tennis Courts	N/A	NR	C	C	NR	NR	N/A
Bleachers	N/A	N/A	NR	C	NR	C	N/A
Portable Washrooms	N/A	N/A	NR	C	NR	C	N/A
Parking	N/A	N/A	NR	D	NR	D	N/A
Football field	N/A	N/A	N/A	N/A	N/A	C	N/A
400m Track	N/A	N/A	N/A	N/A	N/A	C	N/A
Lighting	NR	NR	NR	NR	NR	NR	D
2m Asphalt or Non-asphalt Pathway	NR	NR	NR	NR	NR	NR	NR

*** Current Development Responsibility**

D: Developer is responsible for appropriate development activity.

C: City/Community is responsible for appropriate development activity.

N/A: Development activity is not appropriate for the park type.

NR: Development activity is not required for the park type, however the Developer, City or community association may apply for its implementation.

Definitions of Park Types Noted in Table 1

.1 Sub-Neighbourhood Parks

Municipal Reserves (MR), i.e. Tot lots, decorative parks or ornamental parks that are +/- 0.2 hectares (+/- 0.5 acres). These parks are part of the 10% reserve dedication.

.2 Neighbourhood Parks

Municipal Reserves (MR), i.e. Tot lots, decorative parks or ornamental parks that are 0.4 to 3.6 hectares (1.0 to 8.9 acres). These parks are part of the 10% reserve dedication.

.3 Community Parks

MR and/or Municipal School Reserves (MSR), i.e. Tot lots, school grounds, recreation grounds or community lease sites that are 3.6 to 8.8 hectares (8.9 to 22 acres). These parks are part of the 10% reserve dedication. The following types of school sites, with or without a community lease site, are defined as community parks:

Public Elementary School (4 ha. / 10 acres)

Public Junior High School (4.9 ha. / 12 acres)

Public Elementary and Junior High Schools (6.9 ha. / 17 acres)

Separate Elementary School (3.6 ha. / 9 acres)

Separate Elementary and Junior High school (4.9 ha. / 12 acres)

.4 District Parks

MR and/or MSR, i.e. School grounds, recreation grounds or community lease sites that are greater than or equal to 9.2 hectares (23 acres). These parks are not part of the 10% reserve dedication. The following type of school site, with or without a community lease site, is defined as a district park:

Public/Separate High School (9.2 ha. / 23 acres)

.5 Linear Parks

MR that has a minimum width of ten (10) metres and a maximum width of twenty (20) metres, and that accommodates a regional pathway or performs a linear recreation function by providing local or regional pathway links to educational, recreational, and open space features (e.g. natural environment parks) within and between communities. These parks are part of the 10% reserve dedication.

2. Minimum and Maximum Landscape Development Activities

A Developer is responsible to construct in accordance with the minimum and maximum landscape development standards indicated in Tables 2.1 to 2.4 and to the satisfaction of the Manager of The City of Calgary Parks for all local parks. Local parks are defined to be sub-neighbourhood parks, neighbourhood parks, community parks and district parks.

If a Developer or homeowners'/residents'/community association wishes to develop parks beyond the "maximum" standards, they must follow the corporate policy and procedures as approved by Council for "Enhanced Landscape Maintenance & Infrastructure" (also see "Irrigation of Boulevard and Medians" page 11 and "Optional Amenities" page 129). Contact the Parks Maintenance Agreement Coordinator (268-4734) for further details.

.1 Sub-Neighbourhood Parks – MR

Item	Quantity		Type/Comment
	Minimum	Maximum	
Grading/Loaming	Entire site	Entire site	As per spec
Turf	Entire site	Entire site	As per spec
Trees	20 trees/.405 ha (1 acre)	40 trees/.405 ha (1 acre)	Approved species
Irrigation	Entire site	Entire site	Automatic as per spec
Benches	1 per site	5 per site	
Dog bylaw sign	1 per play equipment area	1 per play equipment area	As per spec
Walkways	As required	2.0m wide	Specifications as per approved policy
Fencing	As required	3 sides of site if requested	Only post and cable and chain link
Play equipment or other recreation equipment	If suited	If suited	To community needs or preference if desired
Game tables	0 per site	2 per site	
Picnic tables	0 per site	1 per site	
Sports fields/Parking	Not suitable	Not suitable	
Basketball/Volleyball	If suitable	If suitable	
Garbage Receptacles	1 per site	1 per site	Near walkways not benches
Shrubs	50 m ² /ha	150 m ² /ha	
Retaining Walls	As required	As required	1.5m height with mowing strip when abutting turf areas

.2 Neighbourhood Parks – MR

Item	Quantity		Type/Comment
	Minimum	Maximum	
Grading/Loaming	Entire site	Entire site	As per spec
Turf	Entire site	Entire site	As per spec
Trees	15 trees/.405 ha (1 acre)	30 trees/.405 ha (1 acre)	Approved species
Irrigation	Entire manicured area except for community centre site.	Entire site	Automatic as per spec
Benches	2 per site	5 per site	
Dog bylaw sign	1 per play equipment area	1 per play equipment area	As per spec
Walkways	As required	2.0m wide	As per spec
Fencing	As required	3 sides of site if requested	Only post and cable and chain link
Play equipment or other recreation equipment	If suited	1 per site	To community needs or preference if desired
Sport fields/Parking	Softball or soccer, as appropriate	-1-76m softball -1 major soccer (minor overlap)	-15 parking stalls/diamond -20 parking stalls/soccer fields
Game tables	0 per site	3 per site	
Picnic tables	0 per site	3 per site	
Basketball/Volleyball	0 per site	1 per site	
Garbage Receptacles	1 per site	As per Trash Receptacles, page 118	Near walkway
Shrubs	0	100 m ² /ha	
Retaining Walls	As required	As required	1.5m height with mowing strip when abutting turf areas

.3 Community Parks – MSR, SR and MR

Item	Quantity		Type/Comment
	Minimum	Maximum	
Grading/Loaming	Entire site	Entire site	As per spec
Turf	Entire site	Entire site	As per spec
Trees	10 trees/.405 ha (1 acre)	15 trees/.405 ha (1 acre)	Approved species
Irrigation	Entire manicured area except for SR & community centre site.	Entire manicured area except for SR site.	Automatic, as per spec
Dog bylaw sign	1 per play equipment area	1 per play equipment area as required by School	As per spec
Walkways	As required	Regional pathway 2.5m wide	As per spec
Fencing	As required	2 sides of site if requested	Only post and cable and chain link
Play equipment or other recreation equipment	The provision of space only as per Site Planning Team Guidelines (Page 53)	1 per School	To School needs or preference if desired
Ball Diamonds/Parking	As per Site Planning Team Guidelines (page 53)	As per Site Planning Team Guidelines (Page 53)	-15 stalls per 76m softball -As per spec
Benches	2/ball diamond	2/ball diamond	Players benches
Portable Washrooms	0/ball diamond	1/ball diamond	
Bleachers	0/ball diamond	2/ball diamond	
Soccer Fields/Parking	As per Site Planning Team Guidelines (Page 53)	As per Site Planning Team Guidelines (Page 53)	-20 stalls per Major/minor soccer -As per spec
Ice Rink	The provision of space only for one rink within community lease	1 per community lease site	
Tennis Courts	The provision of space only for two courts within community lease	4 per community lease site (boards, lights, hard surfaced, nets)	
Field Event Area	The provision of space only as per Site Planning Team Guidelines (Page 53)	The provision of space only as per Site Planning Team Guidelines (Page 53)	
Garbage Receptacles	1 per site	2 Haul All per site	Near walkway
Shrubs	50 m ² /ha	70 m ² /ha	
Retaining Walls	As required	As required	1.5m height with mowing strip when abutting turf areas

.4 District Parks – MSR, SR and MR

Item	Quantity		Type/Comment
	Minimum	Maximum	
Grading/Loaming	Entire site	Entire site	As per spec
Turf	Entire site	Entire site	As per spec
Trees	10 trees/.405 ha (1 acre)	15 trees/.405 ha (1 acre)	Approved species
Irrigation	Entire manicured area except for SR and community centre site.	Entire manicured area except for SR site.	Automatic, as per spec
Walkways	As required	Regional pathway 2.5m wide	As per spec
Fencing	As required	2 sides of site if requested	Only post and cable and chain link
Play equipment or other recreation equipment	The provision of space only as per Site Planning Team Guidelines (Page 53)	1 per site	To community needs or preference if desired
Dog Bylaw Sign	1 per play equipment area	1 per play equipment area as required	
Ball Diamonds/Parking	As per Site Planning Team Guidelines (Page 53)	As per Site Planning Team Guidelines (Page 53)	-15 stalls per 76m softball -As per spec
Benches	2/ball diamond	2/ball diamond	Players benches
Portable Washrooms	0/ ball diamond	1/ ball diamond	
Bleachers	0/ ball diamond	2/ ball diamond	
Soccer Fields/Parking	As per Site Planning Team Guidelines (Page 53)	As per Site Planning Team Guidelines (Page 53)	-20 stalls per Major/minor soccer -As per spec
Foot ball Field	As per Site Planning Team Guidelines (Page 53)	As per Site Planning Team Guidelines (Page 53)	
Ice Rink	The provision of space only for one rink within community lease	1 per community lease site	
Tennis Courts	The provision of space only for two courts within community lease	4 per community lease site (boards, lights, hard surfaced, nets)	
Field Event Area	The provision of space only as per Site Planning Team Guidelines (Page 53)	1, 400 metre track per athletic field.	
Garbage Receptacles	1 per site	2 Haul All per site	Near walkway
Shrubs	50 m ² /ha	70 m ² /ha	
Retaining Walls	As required	As required	1.5m height with mowing strip when abutting turf areas

3. Local Parks Development Charge

The Urban Development Institute and The City of Calgary agreed to the implementation of a development charge for local parks subject to the following conditions:

- .1** All sub-neighbourhood and neighbourhood parks will be dedicated and developed at the expense of the dedicating Developer with no recovery.
- .2** All pathways, whether regional, local or a connection to the carriageway of a major adjacent road, will be provided at the sole expense of the dedicating Developer with no recovery.
- .3** All community and district parks are to be dedicated and developed by the dedicating Developer and may be subject to cost recovery as provided for below.
 - a.** If one Developer owns the entire community and is also responsible for the dedication and development of the community and district parks, there will be no acreage assessment for community and district parks in the said community. The Developer will make arrangements, at the Outline Plan stage, for the dedication and development of the community and district park, according to the timing as determined by the Director of The City of Calgary Parks.
 - b.** If there is, however, more than one Developer within the community, then all lands within the community shall pay acreage assessments to The City. These community and district park development charges shall be recovered by the dedicating Developers of community and district parks in accordance with the ratio of the ownership of the joint use sites on a proportionate share basis.
 - c.** If there is more than one Developer within a community and all of the community and district parks are to be provided at the expense of a single Developer, then all lands within the community other than the lands Owned or controlled by the district and community park dedicating Developer shall pay development charges to The City.

II. BOULEVARDS, MEDIANS and TRAFFIC ISLANDS

1. Boulevard

Grade, loam and seed or sod to grass. All trees planted in a boulevard must be approved by The City of Calgary Parks and Transportation Roads.

2. Median

Grade, loam and seed or sod to grass. All trees planted in grassed median must be approved by The City of Calgary Parks and Transportation Roads.

3. Traffic Island

- .1** If less than five hundred (500) square metres in area:
 - a.** hard surface low maintenance material as approved by The City of Calgary Parks and Transportation Roads.
- .2** If greater than five hundred (500) square metres in area:
 - a.** grade, loam and seed or sod to grass;
 - b.** 50mm P.W.S. and automatic pop-up irrigation system;
- .3** All trees planted in a traffic island must be approved by The City of Calgary Parks and Transportation Roads.
- .4** All traffic islands will have a 0.50m concrete maintenance strip installed directly behind the curb.
- .5** Boulders, signs and other obstacles must be:
 - a.** at least 0.75m back from the curb;
 - b.** a minimum of 4.5m from the bullnose or back of walk extended through the island, which ever is greater, adjacent to the primary streets;
 - c.** a minimum of 4.5m from 'any' bullnose adjacent to primary streets on irregular shaped islands; and
 - d.** a minimum of 3.0m from the bullnose inside the cul-de-sac.
- .6** The minimum width of traffic islands containing coniferous trees shall be 7.0m.

4. Irrigation of Boulevards and Medians

The following is The City of Calgary's criteria for private irrigation systems proposed within boulevards and medians. Note that irrigating boulevards and medians is a non-standard practice; one **not** encouraged by The City of Calgary for safety and water conservation reasons.

- .1 If a Developer or homeowners'/residents/community association wishes to irrigate boulevards or medians within a community, they must receive approval from The City of Calgary Roads and enter into a **Landscape Maintenance Agreement** with The City as per the corporate policy and procedures as approved by Council for "Enhanced Landscape Maintenance & Infrastructure." Contact the Parks Maintenance Agreement Coordinator 403-268-5204 for further details.
***NOTE:** The intent to enter into a Landscape Maintenance Agreement must be identified at the Tentative Plan Stage via a letter of intent or other suitable mechanism.*
- .2 **Design and construction** of irrigation systems within boulevards and medians shall be in accordance with the current issues of the Development Guidelines and Standard Specifications – Landscape Construction, Standard Specifications – Roads Construction and the Land Use Bylaw.
- .3 **Private Water Service** – This service must be independent of any other park irrigation. It must be for irrigation in the road right-of-way only. Supply of double check valve and meter must be to City standards (Parks and Water Services).
- .4 **Irrigation Controller** must not be tied to The City's Centralized Irrigation Control System or that of any park.
- .5 **Sleeving** shall be either C900 PVC (bell and spigot) pipe bedded as per backfill material specification (Pg. 153, 6.12a and 6.12b), installed below the bed for a pathway, sidewalk, driveways or PVC SDR 35 (bell and spigot) pipe to City of Calgary Standard specifications for Sewer Construction Sec. 402.02.02 or approved equal.
***NOTE:** Sleeving to be bedded in accordance to The City of Calgary Standard Specifications for Sewer Construction.*
- .6 An **amenity removal and landscape rehabilitation fund**, in an amount determined by The City of Calgary Parks, shall be provided for the removal and landscape rehabilitation of any irrigation component visible at the surface of the landscape (e.g. valve boxes, irrigation heads, etc.), and for the killing of the Parks Water Service to the mainline.

III. PUBLIC UTILITY LOTS (PUL) and RIGHTS-of-WAY (RoW)

Grade, loam and seed or sod to grass; chain link, wood screen or other type of fencing as approved by The City of Calgary Parks on the flankage and rear of lots that abut RoW.; post and cable barrier where PUL or RoW. abuts lane.

IV. DRY PONDS

The dual use of MR and MSR lands for dry ponds should be supported, provided their location, size and recreation, education and/or conservation functions are not prejudiced in an effort to accommodate the ponds. The following are appropriate development guidelines and activities for MR and MSR sites containing dry ponds.

1. Development Guidelines

- .1** Dry ponds shall not be located within MR lands that are classified as environmentally significant, Special Protection Natural Environment Parks or Major Natural Environment Parks.
- .2** Storm-water dry pond facilities should be designed and operated so as to be fully integrated into the neighbourhood setting.
- .3** Storm-water dry pond facilities may receive 100 percent credit where located on reserve lands, provided that the reserve lands meet all City planning criteria for location, size and purpose and the reserve function is not prejudiced.
- .4** In the event that the location of a storm-water dry pond facility on reserve land results in an over-dedication of reserve, compensation for said over-dedication will be deemed to be one dollar. Storm-water dry ponds will be limited to 1/3 of approved reserve land.
- .5** In the event that a storm-water dry pond facility is located on a Public Utility Lot (PUL) and results in the 30 percent road/utility dedication being surpassed, compensation for the dry pond PUL will be deemed to be one dollar. Site development shall be similar to standards for reserve lands as noted herein.
- .6** All overland storm routes and dry pond areas shall be signed, at the Developer's expense, as dual function areas to the satisfaction of The City Engineer and the Director of The City of Calgary Parks.

- .7 Storm-water dry pond facilities and overland drainage routes to dry ponds are not to be located on school or community building envelopes. However, in retrofit situations, this restriction may be reviewed on a site-by-site basis.
- .8 Where dry ponds are included in MR or MSR sites, it is intended that these sites (including the school building envelope of the MSR site) shall be developed as a "turn key" operation and that all sodding, seeding, landscaping, and user amenities be installed as soon as possible.
- .9 The Developer, at his expense, will be required to excavate and grade the dry pond areas in accordance with The City of Calgary Water Services Storm-water Management & Design Manual. The area of inundation must be sodded to establish grass cover for erosion control and water quality. Areas above the level of inundation may be seeded. These seeded and sodded areas shall be maintained for three (3) years.
- .10 Notwithstanding Item .9, the Developer shall maintain MSR or MR sites less than four acres in area for three years. On sites larger than four acres, the limits of the three year maintenance period will be determined through negotiations between the Developer and the Director of The City of Calgary Parks. The maintenance cost during the negotiated maintenance period of the MSR or MR sites shall be at the sole expense of the Developer.
- .11 The Developer will be encouraged to develop the lots adjacent to the dry pond areas and to establish grass in the rear yards at the earliest possible date.

2. Development Activities

- .1 The Developer at his cost shall install **service connections** (sanitary, storm, water) from the mains to the property line of affected S.R. sites unless otherwise directed by the City Engineer.
- .2 The Developer at his expense shall install **pathways** as required in accordance with the Open Space Plan on all parks that have storm-water retention ponds.
- .3 **Irrigation** shall be provided as required under the terms of the Standard Development Agreement. In active sport areas irrigation is required.
- .4 **Benches** will be provided at the Developer's expense as follows:
 - a. four benches per kilometre of lineal pathway, and
 - b. two benches per play structure.

- .5 Trash receptacles** will be provided at the Developer's expense as follows:
- a. two per ball diamond or soccer pitch,
 - b. one per playground structure, and
 - c. two per kilometer of lineal pathway.
- .6 Playground equipment** – Dry ponds should not be located within areas designed to accommodate playground equipment.
- .7 Goal posts and backstops** shall be provided and installed at the Developer's expense where deemed appropriate by The City of Calgary Parks.
- .8 Shrubs** provided should be in accordance with the "Minimum and Maximum Landscape Development Activities" tables on pages 5 through 8.
- .9 Trees** shall be provided on public lands in accordance with the Urban Forest Management Policy as negotiated in the Standard Development Agreement.
- .10 Subsurface drainage systems** are required for all sports field areas within a dry pond.
- .11 A hard surface 3.0m ramp** to all levels of a dry pond is to be provided.
- .12 Soccer fields and ball diamonds** located within dry ponds shall meet the performance criteria specified in Item I.3.6b on page 55.
- .13 Hockey Rinks, Lacrosse Fields and Tennis Courts**, located within dry ponds, shall be placed above the 1:50 year flood level.
- .14 Dry Pond walls** should undulate in order to provide visual relief.

V. ENVIRONMENTAL RESERVES and ENVIRONMENTALLY SIGNIFICANT AREAS

The following zone system has been developed by The City of Calgary Parks with the intent of providing quantifiable rationale for the appropriate development or protection in Environmental Reserves (ER) or those Municipal Reserves (MR) that are allocated for the protection of Environmentally Significant Areas (ESA's).

1. Environmental Reserve Setback Guidelines

In accordance with section 664(1)(c) of the *Municipal Government Act*, Environmental Reserve setback zones will be determined with the following factors:

1. Water body Type

A site-specific variable setback width shall be applied to water bodies qualifying as Environmental Reserve based on the following water body types:

A. Stream Order

1st order: 6m setback

typically a vegetated 'draw' that conveys flow primarily during periods of moderate to heavy rainfall and may not convey flow during other periods.

2nd order: 30m setback

Formed when two first order streams meet, e.g. West Nose Creek

3rd order: 50m setback

tributary of two 2nd order streams (e.g. Nose Creek)

4th order: 50m setback

tributary of two 3rd order streams (e.g. Bow River, Elbow River)

B. Wetland Class

Stewart and Kantrud Class 3-6 wetlands, considered to be Environmental Reserve Wetlands under the *Wetland Conservation Plan* will have a 30m base setback applied to them.

Wetlands that are engineered to serve as storm-water management facilities ('storm-water wetlands'), may, at the discretion of the Administration have an ER setback width of less than 30m applied to them if the primary function of the wetland is for the provision of storm-water treatment rather than functioning as a natural wetland. Appropriate design elements (such as buffer strips, treatment swales or site grading) would be required to demonstrate that the water body would not be subject to surface or subsurface pollutant loading.

Setback widths should be determined as early as possible in the planning process. An initial review of waterbodies and recommended setback widths should be done by the Area Structure Plan stage of planning and confirmed later in the development approvals process.

2. Setback modifiers

The base setback width will be modified on a site-specific basis according to the following factors:

A. Slope

The setback distance will increase on sloped lands adjacent to a water body by a factor of one point five (1.5) metres for every percentage of slope increase above 5%. There will be no adjustment factor for slopes between 0 and 5%.

B. Cover type

Where the lands adjacent to the water body are disturbed, or have a non-native riparian zone that is determined to have lower ability to prevent non-point pollutants from entering the water body, the base setback width should be doubled, **or**, the base setback zone should be restored to a condition that will allow it to effectively buffer the water body from pollutants.

C. Hydraulic connectivity

Applies to areas of land adjacent to a water body with shallow groundwater deemed to be 'under the influence of a surface water', namely there is hydraulic connectivity between groundwater and surface water, such as the alluvial aquifer of streams. If it is demonstrated that pollution of shallow groundwater would reasonably lead to the pollution of a directly adjacent surface water body, then that land should be included within the ER setback zone.

Summary Table

Setback type	Base setback	Adjustment Factors		
		Slope adjustment	Hydraulic connectivity to groundwater*	Cover type
1 st order stream	6m	+1.5m/% slope over 5%	n/a	n/a
2 nd order stream	30m	“	Areas of land adjacent to water bodies that have shallow groundwater connectivity to surface water are taken as ER.	Double base setback width to provide for better buffering of water body or restoration of riparian lands to provide for proper riparian function
3 rd –4 th order stream	50m	“	“	“
Class 3-6 wetlands *	30m	“	“	“

*** This process is intended for use after the ER boundaries are identified and not as a method of determining ER definition. “See Glossary of Terms, page 17, item 3.1 for ER definition.**

2. Criteria for ER/Natural Environment Parks (MR)

Criteria	Preservation	Restoration	Disturbed
<i>Native Condition</i> (evaluated by % of expected native plant communities)	Near Native	Portion of Habitat Area that is disturbed in a natural area	Area that is in introduced condition and will likely harm nearby natural area
<i>Sensitivity</i> (Refers to the potential for unmitigated damage)	High Sensitivity	Moderate Sensitivity	Low Sensitivity
<i>Resource Significance</i> (Refers to the zone’s significance to the future park)	Resource significant to future park in existing condition	Resource significance to future park area to warrant enhancement	Will require improvement to not have a negative impact on future park area
<i>Habitat Type/Vegetation Community</i> (Viable condition)	Aspen Forest, Balsam Poplar, White Spruce, Upland Tall Shrub, Riverine Tall Shrub, Low Shrub, Native Grassland, Wetland	Non Native Grassland, Disturbed vegetation communities	Non Native Grassland, Disturbed vegetation communities
<i>Archaeological/ Historical</i>	Present/No Evidence	Present/No Evidence	No Evidence
<i>Natural System</i>	Part	Part	Not significantly

3. Development Activities for ER/Natural Environment Parks (MR)

Development Activities	Preservation	Restoration	Disturbed
<i>Development Encroachment</i>	None	Agreement between parties (site by site basis)	Agreement between parties (site by site basis)
<i>Utilities Encroachment</i>	None	Agreement between parties (site by site basis)	Where required
<i>Park Amenity Construction</i>	For preservation purposes only	Where required	Where required
<i>Fencing</i>	Always	Always	Optional
<i>Native Seed/Sod Planting</i> (Species to be submitted and approved)	N/A	Always	Optional (Type)
<i>Non-Native Seed/Sod Planting</i> (Species to be submitted and approved)	N/A	No	Optional (Type)
<i>Restoration/ Reclamation Signage</i>	N/A	Yes	Yes
<i>Irrigation</i>	N/A	Overland	Overland
<i>Maintenance Period</i>	None	until established to the satisfaction of The City of Calgary Parks	until established to the satisfaction of The City of Calgary Parks
<i>Restoration Plans</i> (see page 28)	N/A	Yes	Yes
<i>Weed/Pest Management/Control</i>	Yes for maintenance time period	Yes for Maintenance time period	Yes for maintenance time period
<i>Departmental Checks</i>	Regular	Yearly	Regular
<i>Native Tree/Shrub Planting</i> (Species to be submitted and approved)	N/A	As Required	Optional (Type)
<i>Non-Native Tree/Shrub Planting</i> (Species to be submitted and approved)	N/A	No	Optional (Type)

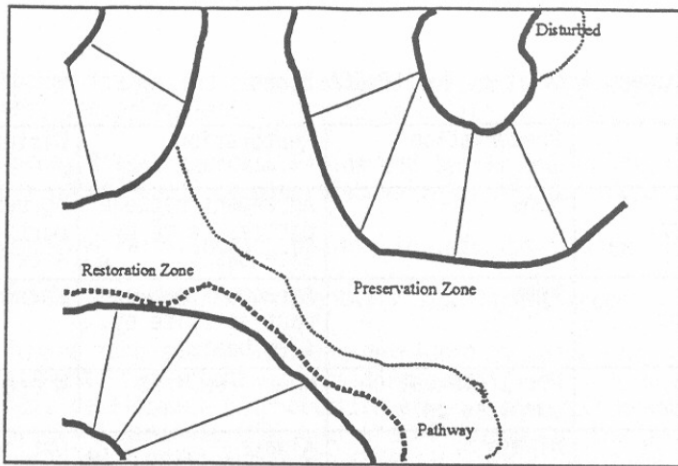


Figure 1

4. Glossary of Terms

.1 Environmental Reserve

See the **Municipal Government Amendment Act, 1995; Chapter 24; Part 17; page 37; section 616(e).**

.2 Municipal Reserve

See the **Municipal Government Amendment Act, 1995; Chapter 24; Part 17; page 37; section 616(o).**

.3 Environmentally Significant Area

A natural area site that has been inventoried prior to potential development and which because of its features or characteristics is significant from an environmental perspective to Calgary and has the potential to remain viable in an urban environment. A site is listed as an Environmentally Significant Area on the basis of meeting one or all of the criteria listed in Appendix C of The City of Calgary Parks Open Space Plan.

.4 Preservation Zone

Implies intent to maintain a natural environment in its present condition. See **The City of Calgary Parks Natural Area Management Plan (NAMP).**

.5 Restoration Zone

Implies intent to improve an area to near its natural and native condition. Such an area plays a role in the nearby natural system or vegetation community.

.6 Disturbed Zone

An ER or Natural Environment Park (MR) that is not substantially in its natural and native condition, and is cut off from the nearby natural system or vegetation community.

.7 Native

Species of animal or plant that have not been introduced by people or their direct activity.

.8 Near Native Condition

A vegetation community is not dominated by introduced species or seriously affected by damage.

.9 Sensitivity

Measures the amount of un-mitigable damage that a particular vegetation community or species can withstand.

.10 Resource Significance

Refers to the level of importance of the area in question to a future park area.

.11 Vegetation Community

A group of populations of plants in a given area.

.12 Historic/Archaeological

Refers to written/prewritten evidence/artifacts.

.13 Natural System

A group of areas that are ecologically dependent.

.14 Development Encroachment

A non-legal or non-judgmental term which refers to development activities in an ER.

.15 Utility Encroachment

Implies a non-legal or non-judgmental term which refers to utility development (i.e. natural gas, sewer, electrical, etc.) in an ER.

.16 Park Amenity

A park development project, such as pathway, trail, bench, or viewing platform.

.17 Non Native

Any introduced species of animal or plant.

.18 Restoration

The efforts to restore a site to near native condition.

.19 Reclamation

The efforts to improve a disturbed site's condition.

.20 Naturalization

The process of leaving a disturbed site to natural processes.

.21 Rehabilitation

The above three terms – i.e. The efforts to restore a site to near native condition, or the efforts to improve a disturbed site's condition, or the process of leaving a disturbed site to natural processes.

.22 Natural Environment Park

See The City of Calgary Parks Open Space Plan, page 103.

VI. DIRECT CONTROL SITES (DC)

As DC sites are not property under the ownership of The City of Calgary they should not share an irrigation water service with a park property. The City of Calgary Parks will not inspect, CCC or FAC DC sites as they are private property.

GENERAL GUIDELINES

I. CONCEPT PLAN REQUIREMENTS

Concurrent with the submission of the Outline Plan, the Developer is responsible for the submission and receipt of approval of Concept Plans prior to Outline Plan approval for all Municipal Park and Open Space areas.

A Concept Plan is intended to be a simple, written and drawn representation of the intended function of the MR and Open Space areas within an Outline Plan. Only freehand bubbles and other abstract symbols are expected within the representation, although computer generated drawings will also be accepted.

Since Concept Plans are precursors to the development of Layout Plans (page 27) and Grading Plans (page 29), detailed information will be presented as appropriate. Further, it is understood by both the Developer and The City of Calgary Parks that not all technical, grading and utility details, among others, are known at the time of submission of Concept Plan, but that best efforts will be made to represent the future intended use of the MR and Open Spaces by use of the Concept Plan.

The Concept Plan should:

- Locate and identify the major functions / spaces / constructed features with respect to the site;
- Show the relationship of the functions / spaces / constructed features with respect to each other;
- Show the relationship of the site to its surrounding land uses;
- Determine a preliminary resolution of technical requirements;
- Indicate the location of the utility rights-of-way within the Parks and Open Space areas; and
- Indicate existing grades, proposed direction of drainage, slope percentage and adjacent land use information if the data is available.

Each Concept Plan should contain the following information:

1. Theme and Function

Indicate the type of Municipal Park and Open Space area and its associated theme/function. The following are a few examples:

Park Type	Park Theme and Function
Sub-Neighbourhood Park	Child oriented, active recreation area
Linear Park	Pathway linkage within a natural area

Appropriate types of Municipal Park and Open Space areas are:

- .1 Sub-Neighbourhood Park
- .2 Neighbourhood Park
- .3 Community Park
- .4 District Park
- .5 Linear Park
- .6 Storm Water Pond
- .7 Storm Water Wetland
- .8 Storm Water Dry Pond
- .9 Environmental Reserve
- .10 Environmentally Significant Area

Notes:

- a. Definitions and/or appropriate levels of development for each of the above can be found in the "Open Space Development Activities" section (page 1).
- b. If Environmental Reserves and Environmentally Significant Areas are not developed or disturbed through the development of the subdivision a concept plan simply stating so will be acceptable.

II. CONSTRUCTION APPROVAL REQUIREMENTS

Prior to commencing landscape work on any park or public land within the city boundaries, the Contractor may confirm the appropriate approval process with the Parks Coordinator – Development for north areas tel. 403-268-1334 or central and south areas tel. 403-268-1376 (see Parks Inspection Boundaries map page 36). Parks will copy the Developer on all correspondence resulting from landscape construction drawing submissions. To facilitate this, all submissions for the approval by Parks of landscape construction drawings shall include the Developer's name, company and address, and the appropriate contact information for the Developer's Project Manager.

The following requirements generally apply to the various forms of development as undertaken:

Construction Type	Requirements for Approval	Time for Review and Comments
1. Utility and Roadwork	2 sets of drawings folded and collated into sets.	10 working days
2. Landscape Construction (Grading, loaming, seeding, irrigation, planting, hard surface treatments, play structures, site structures, etc.)	7 sets of drawings folded and collated into sets, to Parks for new subdivisions.	15 working days

Construction Type	Requirements for Approval	Time for Review and Comments
3. Landscape Construction on roadways, public utility lots and easements	7 sets of drawings folded and collated into sets, to Parks for new subdivisions.	15 working days
	7 sets of drawings folded and collated into sets to Land Information and Mapping, Access Solutions for non-standard tree planting proposals, existing areas, or where utility lines are involved.	15 working days

NOTE: Time for Review and Comment is assuming all submissions are complete.

Submit two (2) copies of reproducible Mylars® drawings for approval within 30 days of the review date on the construction drawings. One (1) Mylars® drawing set will be sent back to the Consultant for their records.

All construction plans should provide the development agreement phase boundary on the key plans. This will be used by the Parks Development Inspector to ensure that all components within the phase are complete as per the specific groupings identified in item .2; page 37.

NOTE: For information on Utility Line Assignment submissions contact The City business unit Land Information and Mapping, Access Solutions, tel. 403-268-5807.

III. CONSTRUCTION PLAN REQUIREMENTS

The following information will be provided with any drawings submitted to The City of Calgary Parks Planning and Development Services for construction approval. Landscape construction drawings are to be submitted only by Registered Landscape Architects.

NOTE: *The title block for landscape drawing layout, as made available by Parks, accommodates the Landscape Architect's stamp and a Parks approval stamp. All plans are to be prepared in ink using an accepted drafting standard.*

1. General Requirements

- .1 All landscape construction plans shall be sealed and signed by a Registered Landscape Architect with current membership in the Canadian Society of Landscape Architects.
- .2 All drawings are to be submitted on The City of Calgary Parks' title block. The title block template is available from The City of Calgary Parks Planning and Development Service, contact the Park Coordinator – Development, for north areas tel. 403-268-1334 or central and south areas tel. 403-268-1376 (see Parks Inspection Boundaries map page 36).
- .3 Scale in metric (preferred scales: 1:200, 1:250, 1:500).
- .4 North arrow.
- .5 Key plan oriented in same direction as site plan.
- .6 Legal description and zoning of site and property lines including bearings and dimensions. If the site has a municipal address, include it on the plan.
- .7 Land uses of surrounding parcels (i.e. residential, commercial industrial, etc.).
- .8 Utility locations and legal easements, right-of-way, etc.
- .9 Curb lines, sidewalk, utility poles, fences and any other boundary condition.

The following information shall apply to specific plans in conjunction with the information noted above.

2. Demolition Plan

- .1 Labeled as "Demolition."
- .2 Existing above & below grade features to be protected & to be removed.

.3 Existing vegetation.

.4 Existing irrigation.

3. Layout Plan

.1 Labeled as "Layout."

.2 Existing features to be saved.

.3 Location of proposed structures and features.

.4 Layout of playground as per CSA guidelines, including non-encroachment zones.

.5 Location of dog bylaw signs, restoration/reclamation signs, pathway signs (item n. 'Signage', page 98), and trail signs (item m. 'Signage' page 104).

.6 Identify and label the following park areas:

a. Preservation Zones

Preservation areas are portions of parks, which are to remain in their natural condition. The layout plan should identify the significance of the preservation areas, such as their habitat types and the grouping of vegetative communities that may support their ecological systems. The plan should also indicate how controlled human use is to be accommodated within the preservation areas.

b. Naturalized Zones

Naturalized areas are portions of parks, which are proposed for reclamation to as natural a state as possible. They include manicured areas and/or disturbed or partially disturbed natural areas. Vegetative cover shall include native grasses and/or trees and shrubs that may support the ecological system. Once established, maintenance is to be limited to fire and weed control as well as garbage removal. The plan should also indicate how controlled human use is to be accommodated within the naturalized area.

c. Manicured Zones

Manicured areas are portions of parks that have defined 'special use areas'. They imply some development as identified in the minimum standards and maintenance that is relatively intense compared to preservation and naturalized areas. Manicured areas include areas where larger numbers of park users are anticipated; i.e. sports fields, playgrounds, community uses.

4. Planting Plan

- .1 Labeled as "Planting."
- .2 Major items associated with "Layout" but not including dimensions, i.e. walkways, roads, curbs, hard surface areas, fountains, other structures, natural areas.
- .3 Plant material shown with crowns at 2/3 maximum size as noted in "Alberta Horticultural Guide" (Alberta Agriculture, AGDEX No. 200/01).
- .4 Outline of planting beds.
- .5 Proposed contours at half (½) metre intervals.
- .6 Utilities/ROW
- .7 Plant list identifying species (botanical and common name), quantities, sizes, habit, spacing and specific remarks as required.
- .8 Details as required but which are not included in Standard Specifications.

5. ER/Natural Environment Park (MR) Restoration Plan for Approved Encroachments

- .1 Labeled as "Restoration Plan."
- .2 Pre-development biophysical inventory of the site. At a minimum, the inventory will include:
 - An inventory of plant species composition and an assessment of relative abundance.
 - Soils described using the Canadian system of Soil Classification – classified to Soil Group. Provide texture and horizon depths.
 - Site description sufficient to establish the ecological characteristics of the site including:
 - Exposure (i.e. south facing, dry and exposed);
 - Slope position (i.e. mid-slope, slope crest, level); and
 - Topography (i.e. rolling with micro-topographic variation of approximately 5.0m – hummocky).
 - Sufficient detail must be provided so that the current condition of the site can be assessed and used to determine the desired objectives of the restoration.

- .3 Site preparation methods, i.e. a season of weed control prior to reseeding.
- .4 Seed mix(es) and application rate(s) specific to the site conditions.
- .5 Seeding method (hydroseeding, brillion, etc.)
- .6 Plant material shown with crowns at 2/3 maximum size as noted in "Alberta Horticultural Guide."
- .7 Proposed contours at half ($\frac{1}{2}$) metre intervals.
- .8 Utilities/ROW
- .9 Planting list identifying species (botanical and common name), quantities, sizes, habit, spacing densities and specific remarks as required.
***NOTE:** Plant cultivars are only acceptable if approved by Parks; and the spacing and densities of plantings are to replicate the biophysical inventory.*
- .10 An achievable set of criteria that constitutes a successful restoration of the site to be prepared in consultation with the Developer.
- .11 Depth of predevelopment topsoil and location of proposed stockpile.
- .12 Proposed maintenance schedule

6. Grading Plan

- .1 Labeled as "Grading."
- .2 Major items associated with layout but not including dimensions, i.e. walkways, play fields, roads, curbs, other structures, and natural areas.
- .3 Existing and proposed contours at half ($\frac{1}{2}$) metre contour intervals (existing to be done in a lighter pen width or pencil and solid; suggested pen widths: existing - 000, proposed – 0).
- .4 All grades shall be Geodetic measure and tied to the nearest A.S.C.M. benchmark; A.S.C.M. benchmark number to be indicated on plan.
- .5 Elevations to be shown at each break point (top and toe of slope).
- .6 Label property lines and show spot elevations.
- .7 Catch basin rim and invert elevations where required.
- .8 Manhole rim elevations.

- .9 Top of wall, top of curb, finished floor elevations as required.
- .10 Surrounding grade information affecting site development.
- .11 Label all concrete gutters.
***NOTE:** Where possible, concrete gutters are to be located on private property.*
- .12 Show all trap lows showing their 1:100 inundation area and emergency spill routes.

If site grades are significantly different from the approved grading plan and there appears to be a drainage problem as identified by the Park Development Inspector, as-built grading plans on an acceptable grid and tied to legal boundaries are to be provided and approved by The City of Calgary Parks prior to the signing of the CCC.

7. Grid Plan - For MSR Joint Use Sites Only

- .1 Labeled as "Grid."
- .2 Existing and proposed spot elevations on a fifteen (15) metre grid and tied to legal boundaries are required.
- .3 All grades shall be Geodetic measure and tied to the nearest A.S.C.M. benchmark; A.S.C.M. benchmark number to be indicated on plan.
- .4 Label property lines.
- .5 Catch basin rim and invert elevations where required.
- .6 Surrounding grade information affecting site development.
- .7 School building envelope to have same grade as sportsfield envelope (i.e. 2%).
- .8 School building envelopes and adjacent road grades must be at the same elevation.
- .9 For every one (1) metre in elevation in excess of 2% slope, a minimum increase of three (3) metres will be required on site.
- .10 Refer to page 54; section 3.4 for sports field grading specifications.

8. Irrigation Plan

- .1 Labeled as "Irrigation."
- .2 Major items associated with "Layout" but not including dimensions, i.e. walkways, structures, fences, play fields, roads, curbs, and natural areas.
- .3 Screened back major items of "Planting" and "Grading" plans.
- .4 Proposed contours at half ($\frac{1}{2}$) metre interval.
- .5 Locations of all lines, sprinkler heads, valves, drains, sleeves, electrical drop-offs, electrical controllers, dimensional from adjacent property lines.
***NOTE:** The irrigation system as shown on the plan is approximate and shall be adjusted to suit site conditions.*
- .6 Design the irrigation system so that sprinkler heads do not spray into playgrounds.
- .7 Indicate whether the system will be trenched or "plowed in" and whether the system will be gravity drained, blown out or a combination.
- .8 Set back park water services a minimum of 2.5m from pathways, hard surfaces and trees, and set back lateral irrigation lines a maximum of 0.5m from property lines.
- .9 Schedule of materials/products describing sizes, manufactures and model numbers, pipe fitting method, performance standards and sources of said materials/products. Approval of the list of materials/products is required prior to the placing of formal orders for them.
- .10 Water window is justified by vandalism problems and horticultural requirements. The park water service maximum site sizes are:

Park Water Service	Maximum Size of Site
50mm	0.83 ha
100mm	3.02 ha
150mm	6.79ha
200mm	11.17ha

- .11 All pertinent construction details not included in Standard Specifications.
- .12 Design the irrigation system to the minimum static water pressure of the applicable pressure zone. Contact the Development Section of Wastewater Division (268-2701) to obtain the Static Water Pressure, and indicate the pressure on the plan.

- .13** Where the design conflicts with the Development Guidelines and Standard Specifications, and the designer wishes approval for an override, identify conflicts and provide an explanation, i.e. "This design overrides specification item 7.4 of 'Layout' for the following reasons..."
- .14** In order to ensure that the irrigation design will function effectively within the practical water window, completion of the following scheduling chart is required. The following are the water requirements and limitation for Calgary as per current data. The maximum ET measured during the last couple of weeks in July and the first two in August is 0.183 inches per day or 1.281 inches per week (Based on Environment Canada 30-year data). The daily watering window is from 1:00 AM till 6:00 AM. For the health of the plants and to promote good root growth, each zone cannot operate more than once every second day.

Station / Zone	Head Type	Nozzle #	PSI	Flow (GPM)	Precipitation Rate	Slope	Aspect	Soil	Days of the week	No. of cycles	Cycle time	Soak Time
1	I-25	5@#13	56	58	1.575 in/hr	3:1	South	Clay loam	M-W-F	3	10min	45min
2	Toro 570											
3												
4												

IV. UTILITY and PIPELINE LOCATION CONTACT NUMBERS

Prior to the commencement of any work, the Contractor is responsible to contact the appropriate agencies as required including those not listed in the list below to locate existing underground utilities and pipelines in or adjacent to the construction work site. The utility or pipeline agencies must be contacted two (2) working days in advance of commencement of work.

1. Field Location Service Calls

ATCO	}	
ENMAX	}	
Telus	}	Alberta 1 Call 1-800-242-3447
Wastewater	}	
Wastewater	}	
Petrogas Processing Ltd.	}	
Rogers Cable TV/FM		(South) 261-7075
Calgary Cable TV/FM		(North) 250-5935
Gulf Canada Ltd.		
- Alberta Products Pipeline		259-9060
- Valley Pipeline		933-4711
Home Oil Company Ltd.		232-5054

2. Excavation Permits

Prior to any excavation in public rights-of-way, excavation permits must be obtained from The City of Calgary, Transportation (Roads), 2nd floor of the Roads Maintenance and Plants Building at 651 26 Avenue SE.

3. Emergency Service

If you accidentally damage the coating or scrape, sever or rupture any underground line, please call the appropriate service immediately.

Watch for aboveground structures such as utility pedestals, power lines and hydrants that are located in roadways, lanes and private property. If they are damaged please report the incident immediately.

Emergency Calls - 24 HR. Service

ATCO	245-7222
ENMAX	514-6100
Sewer, Wastewater, Roads	268-1155
Telus	611
Rogers Cable TV/FM (South)	261-7075
Calgary Cable TV/FM (North)	250-5935 (07:00 - 23:30 hrs.)
	250-8989 (23:30 - 07:00 hrs.)
Gulf Canada Ltd.	
- Alberta Products Pipeline Edmonton	1-800-661-5642
- Valley Pipeline Stettler	1-800-661-5642
Home Oil Co. Ltd.	232-5000
Petrogas Processing	226-0023

V. PERMISSION TO USE WATER FOR CONSTRUCTION

Refer to the current edition of Water Resources Standard Specifications Waterworks Construction, Section 504.13.00.

VI. INSPECTIONS

Inspections by The City of Calgary Parks are required at key times during project construction as outlined in each section of the Standard Specifications for Landscape Construction. In 1989 a centralized inspection service was instituted to respond to inspection requests. To determine which inspector to call, see enclosed map (page 36). These requests can now be met by calling the following telephone numbers for the **Parks Development Inspectors**:

Inspector	Cell. No.
North	804-9397
South	804-9417
Central	620-3216

Satisfactory construction inspections will be recorded on a "Construction Inspection Checklist". It is the applicant's responsibility to keep a copy of the "Construction Inspection Checklist" on site to verify previous site inspections. If a checklist is not available the Inspectors are not required to review site development.

The City of Calgary Parks shall be given a minimum of 24 hours notice when requesting an inspection.

As per the tables beginning on page 39, landscape and irrigation inspections for: interim development; Construction Completion Certificates; or Final Acceptance Certificates will only occur during regular business hours.

NOTE: *Parks Development Inspectors work a five-day week (Monday-Friday).*

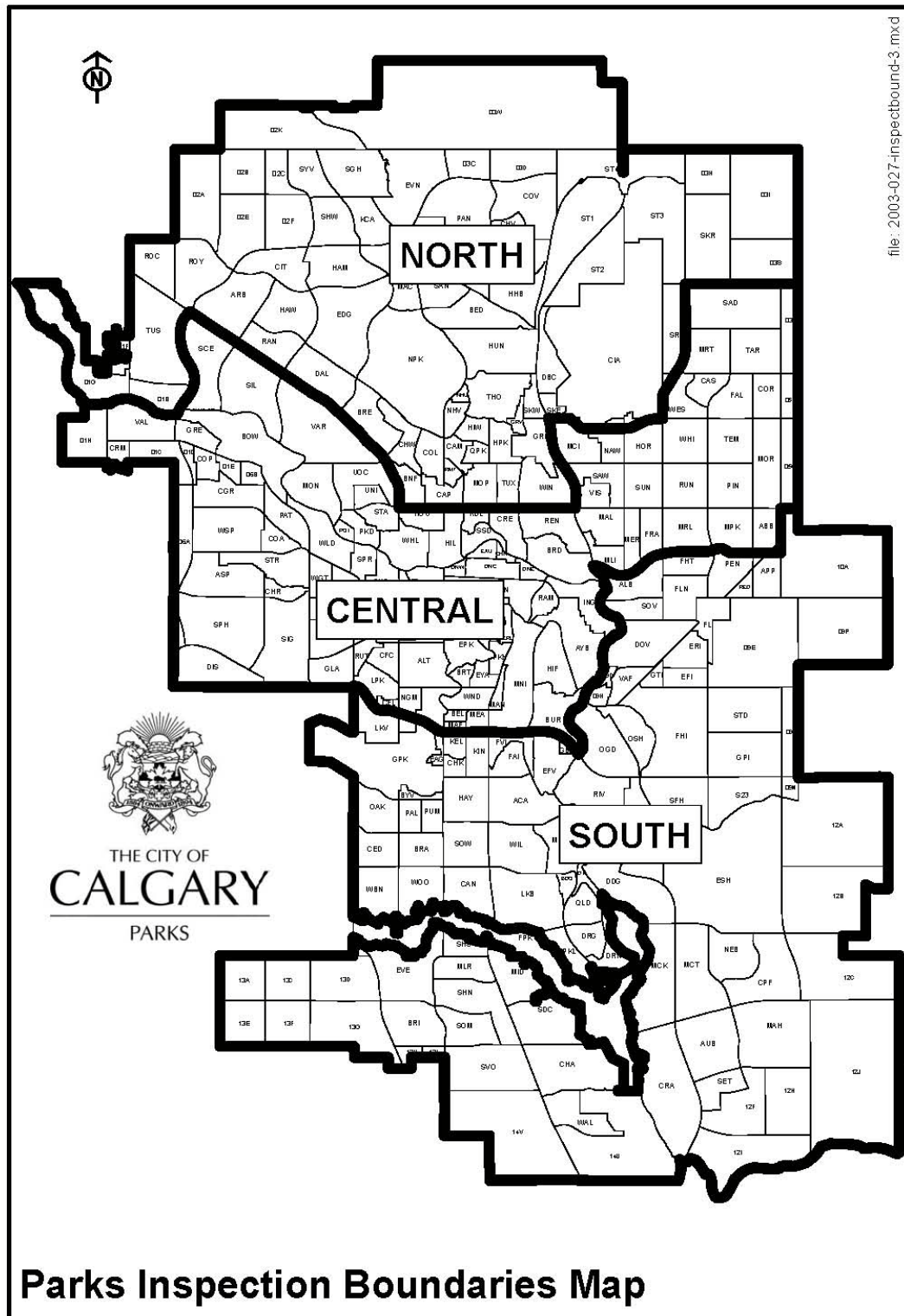
Final Acceptance Certificates submitted after September 30 for sites with an irrigation system will require the area irrigation foreman, or designate, present during the winterization procedure. The areas will ensure staff will be available with 48 hours notice. As an alternate, the area staff will not be required on site during the winterization procedure provided the Developer agrees, in writing, to start the system and perform any repairs that may be required the following spring.

Failure to notify the appropriate inspection service may require all work to be exposed for an inspection at the Contractor's expense.

NOTE: *Inspectors are not required to review site development unless stamped approved drawings are available on site.*

Natural Areas/ER's restoration sites may receive regular inspections during their maintenance period (see page 42) to ensure that site restorations are on track. The Consultant can contact Parks Planning and Development Services (311) between May and September to arrange for a yearly inspection during the maintenance period.

Parks Inspection Boundaries Map



VII. CONSTRUCTION COMPLETION CERTIFICATES (CCC)

1. Landscaping for Reserve Parcels (i.e. sub-neighbourhood parks, linear parks and those portions of neighbourhood, community and district parks designated as decorative parks, ornamental parks and tot lots), public utility lots, RoW, boulevards, medians, traffic islands and storm-water dry ponds shall be considered "complete" or "completed" when all underground irrigation and water services have been installed, tested and inspected and preliminary "as constructed" drawings have been submitted to The City of Calgary Parks and the Reserve Parcels, public utility lots, RoW., boulevards, medians, traffic islands and storm-water dry ponds have been graded, loamed, seeded or sodded, the trees have been planted and, if applicable, the paved or interlocking stone walkways, fencing, play equipment and amenities have been constructed in accordance with The City of Calgary Parks' Development Guidelines and Standard Specifications, Landscape Construction.
2. Park inspections will happen during the five critical stages (as per CCC Construction Inspection Schedules on pages 39 and 41).
 - a. Inspection 1 – Construction Start-up
 - b. Inspection 2 – Subgrade
 - c. Inspection 3 – Tree and Shrub Planting
 - d. Inspection 4 – Irrigation
 - e. Inspection 5 – Finish Grade
3. The Developer's Consultant, Contractor(s) and the Parks Development Inspector will be in attendance at each of the above critical stage inspections.

NOTE: *Each inspection will be initiated by the Developer's Consultant or Contractor. The scope of work to be inspected shall be complete prior to the inspection.*
4. Essential and non-essential deficiencies will be recorded during each inspection stage and both the Developer's Consultant and the Parks' Development Inspector will sign off on each inspection stage.
5. At the end of the five stages, if all essential work has been completed, the Developer will apply to Urban Development for CCC. Along with that application, the Developer will submit a copy of the signed-off Construction Inspection and CCC Report noting the expiry date to complete all non-essential work.

NOTE: *In order to effectively inventory sites once CCC is issued, Parks request that the Developer provide the following information on the CCC Application:*

 - Plan No. (registered or tentative), Block No., Lot No. and Type; and
 - Development Agreement No.
6. Landscape components submitted for construction completion should be submitted in specific groupings by development phase to reduce the frequency of inspections and the volume of documentation by The City of Calgary Parks, Urban Development and the Developer. Recommended groupings are:

- .1 all reserve parcels
 - .2 all boulevards, medians and traffic islands;
 - .3 all Environmental Reserves;
 - .4 all storm-water dry ponds
NOTE: *This CCC and FAC should be held at the same time of the CCC and FAC for Water Resources.*
 - .5 all Public Utility Lots
NOTE: *Where the PUL is dedicated for the purpose of a shallow utility cabinet or pedestal only, and embedded in a Municipal Reserve, the PUL may be included in the CCC application for the Municipal Reserve.*
- 7. The Developer, upon the completion of a reserve parcel, public utility lots, RoW, boulevards, medians, traffic islands or storm-water dry pond shall cause to be prepared and issued four (4) copies of a Construction Completion Certificate (CCC) that is duly signed, sealed and certified by the signing officer of the Consultant. The CCC shall also include the projected earliest maintenance expiry date.
NOTE: *An application form is available online at www.calgary.ca/parks (click on Parks Management, Planning and Development, Developers and Parks, and the form is available under downloads).*
 - 8. The Developer, within thirty (30) days of the issuance of the said CCC shall forward the four (4) copies of the said CCC to The City of Calgary Urban Development Division (268-5782) for acknowledgment of receipt of same.
 - 9. The City upon receipt of the said CCC shall within fourteen (14) days acknowledge the receipt of the said CCC.
 - 10. Urban Development will sign the CCC and send a copy to Calgary Parks.
 - 11. No other site inspection by the Parks' Development Inspector will occur. The Developer must complete the non-essential work items before the expiry date and submit a letter to Calgary Parks (cc. Urban Development) confirming that all deficiencies have been completed.
 - 12. As per the Residential Development Agreement, if the Developer does not complete the non-essential deficiencies within the expiry date period, the CCC will either be revoked or the maintenance period extended one year from the time the deficiencies are completed.
 - 13. This process applies to Development Agreements from 2002 onwards and is not retroactive.

CCC CONSTRUCTION INSPECTION SCHEDULE

Sub-neighbourhood, Neighbourhood, Community, and Linear Parks; Employment Centre Open Space; Community Squares; Commercial Plazas; Dry Ponds; RoW

NOTE: *Approved plans required prior to work.*

Work Inspected	Seasonal Limits	Timing	% Essential Prior to CCC
Site Layout, Grades, Topsoil and Turf			
Layout P.L. Stakes	6" frost and/or no snow	Inspection 1	100
Erosion/Sediment Controls	None	Inspection 1	100
Survey Stakes - Grades	6" frost and/or no snow	Inspection 2	100
Sub-grade Preparation	6" frost and/or no snow	Inspection 2	100
Site Layout (e.g. pathways, trees, amenities, sportsfields, playgrounds etc.)	6" frost and/or no snow	Inspection 2	100
Topsoil Test	None	Inspection 3	100
Finished Grade to Plan and Spec.	Frost Free	Inspection 5	100
Seeding	Frost Free	Inspection 5	100
Sodding	Frost Free	Inspection 5	100
Compaction Reports	None	Inspection 5	Within 60 days of inspection
Trees/Shrubs			
Line Assignment	None	Inspection 1	100
Tree/Shrubs Pits/Beds	None	Inspection 3	100
Correct Number and Species	None	Inspection 4	100
Rootball/Caliper Standards Met	Frost Free	Inspection 4	100
Trees Planted at Specified Grade	Frost Free	Inspection 4	100
CNLA Specifications Met	Frost Free	Inspection 4	100
Insect/Disease/Damage Free	Active Growth	Inspection 4	100
Set back Spacing	No Snow	Inspection 4	100
Burlap Strapping/Wires Removed or Rolled Back	Frost Free	Inspection 5	100
Irrigation			
Plumbing Permit	At irrigation layout	Inspection 2	100
Irrigation Layout	6" frost &/or no snow	Inspection 2	100
Meter Received by Contractor and Meter information sheet is submitted	Sept. 30 th or permission from Wastewater	Inspection 4	100
Open Trench Inspection	Frost Free	Inspection 4	100
Two Copies Irrigation As-Builts	None	Inspection 5	Within 60 days of inspection
Annual DCV Report	Within 30 days of start-up	Inspection 5	100

Work Inspected	Seasonal Limits	Timing	% Essential Prior to CCC
Pathways			
Pathway Alignment	6" frost and/or no snow	Inspection 2	100
To Approved Plan and Specification	No snow	Inspection 5	100
Playgrounds			
To Approved Plan and Specification	No snow	Inspection 5	100
Certificate of Compliance Letter	Prior to CCC	Inspection 5	100
Amenities			
To Approved Plan and Specification	No snow	Inspection 5	Prior to FAC
***Executed Maintenance Agree.	Prior to FAC	Inspection 5	Prior to FAC

CCC CONSTRUCTION INSPECTION SCHEDULE

Natural Environment Parks & Engineered Storm Water Wetlands

NOTE: Approved biophysical impact assessment, environmental significance assessment, wetland development assessment, and construction & restoration plans required prior to work.

Work Inspected	Seasonal Limits	Timing	% Essential Prior to CCC
Site Layout, Grades, Topsoil and Native Seed/Sod			
Layout P.L. and Approved Utility/ROW Encroachments	6" frost and/or no snow	Inspection 1	100
Erosion/Sediment Controls	None	Inspection 1	100
Survey Stakes - Grades	6" frost and/or no snow	Inspection 2	100
Sub-grade Preparation	6" frost and/or no snow	Inspection 2	100
Site Layout (e.g. trees, pathways, amenities, etc.)	6" frost and/or no snow	Inspection 2	100
Predevelopment Topsoil Stored	Frost Free	Inspection 2	100
Topsoil Depth & Finished Grade to Pre-existing Native Profile & Pre-Development Drainage Patterns & Rates	Frost Free	Inspection 5	100
Seeding	Frost Free	Inspection 5	100
Sodding	Frost Free	Inspection 5	100
Compaction Reports	None	Inspection 5	Within 60 days
Native Trees/Shrubs			
Tree/Shrubs Pits/Beds	None	Inspection 3	100
Correct Number and Species	None	Inspection 4	100
Rootball/Caliper Standards Met	Frost Free	Inspection 4	100
Trees Planted at Specified Grade	Frost Free	Inspection 4	100
CNLA Specifications Met	Frost Free	Inspection 4	100
Insect/Disease/Damage Free	Active Growth	Inspection 4	100
Set back Spacing	No Snow	Inspection 4	100
Burlap Strapping/Wires Removed or Rolled Back	Frost Free	Inspection 5	100
Pathways			
Pathway Alignment	6" frost and/or no snow	Inspection 2	100
To Approved Plan & Specification	No snow	Inspection 5	100
Amenities/Fencing			
Restoration/Reclamation Signage	No snow	Inspection 1	100
To Approved Plan & Specification	Prior to CCC	Inspection 5	Prior to FAC

VIII. MAINTENANCE PERIOD

1. The Developer, at no expense to The City, shall maintain over a continuous period: sub-neighbourhood parks; linear parks; those portions of neighbourhood, community and district parks designated as decorative parks, ornamental parks and tot lots; boulevards; medians; traffic islands and public utility lots, RoW for one (1) growing season. One (1) growing season shall be that period of time between the date that the Park Development Inspector signs the Construction Completion Certificate to June 30 of the following year, or on the date when, in the sole opinion of The City of Calgary Parks, the irrigation systems are operating and the vegetation is in full leaf, whichever event occurs last.

NOTE: Where Landscaping is to receive a Construction Completion Certificate (CCC) after September 30th, The City of Calgary Parks may extend the maintenance period to a maximum of September 30th in the following year from the CCC date. CCC inspections are subject to the seasonal limits identified in the CCC Construction Inspection Schedule on pages 39, 40 and 41.

2. The Developer, at no expense to The City, shall maintain storm-water dry ponds on SR, MSR, or MR sites less than four (4) acres in area for three years. On sites larger than four (4) acres, the limits of the three (3) year maintenance will be determined through negotiations between the Developer and The City of Calgary Parks.
3. The Developer, at no expense to The City, shall maintain engineered storm-water wetlands for three (3) years.

Construction Inspection Checklist

Construction Inspection Checklist

& C.C.C. Report

Community			Subdivision			Report #		
Description			Phase			Developer		
						Plan	Block	Lot
Legal/Municipal Address								
Consultant			Contact Person			Phone		
Contractor			Contact Person			Phone		
C.C.C. Application Received ___ Yes ___ No						Date YYYY MM DD 		
	Work Inspected	Approved		Date	Parks Ins.	Dev. Rep.	Def. Cor.	Comments & Notes
		Yes	No	/Y/MM/DD				
A.	Inspection # 1							
	Approved Plans, Letter							
	Line Assignment							
	Layout P.L. Stakes							
	Erosion/Sediment Controls							
B	Inspection # 2							
	Approved Plans & Letter							
	Survey Stakes - Grades							
	Subgrade Preparation							
	Irrigation Layout							
	Plumbing Permit							
	Layout, pathways, trees, furniture Sports Fields, Playgrounds etc.							
C	Inspection #3							
	Approved Plans & Letter							
	Topsoil Test as per specification							
	Tree/Shrub Pits							
D.	Inspection #4							
	Approved Plans & Letter							
	Trees & Shrubs as per Drawing							
	Meter Received By Contractor							
		Tag #			Serial #			
	Open Trench Inspection							
	Trees Planted at Specified Grade							
	Rootball, Caliper Standards Met							
	C.N.L.A. Specifications Met							
	Insect/Disease/Damage Free							
	Tree Setback Spacing							
E	Inspection #5							
	Approved Plans & Letter							
	Finish Grade to Plan & Spec.							
	Topsoil & Finished Grade to Pre-existing							
	Native Profile & Pre-Development							
	Drainage Patterns & Rates							
	Seeding/Sodding							
	Burlap Straps Wires Removed/Rolled Back							
	Amenities to Plan & Spec.							
	Playgrounds to Plan & Spec							
	Certificate of Compliance Letter							
	Asphalt Pathway to Plan & Spec							
	Asphalt Compaction/Density Reports							
	Two Copies Irrigation As Built							
	Annual DCV Report							
General Comments & Prior to F.A.C. Conditions								
Is there non-engineered fill on this site? Yes No If yes , see attached Non-Engineered Fill Drawing								
					Print Name		Signature	
<input type="checkbox"/>	No Deficiencies Noted		Developers Rep.		_____		_____	
	Report Distribution				_____		_____	
<input type="checkbox"/>	Developers Representative		Park Inspector		_____		_____	
			Inspection Date		_____		_____	
<input type="checkbox"/>	Design & Development File		Application Expiry Date		_____		_____	

CONSTRUCTION COMPLETION CERTIFICATE

Subdivision _____ Phase _____ Developer _____

Agreement No. _____ Description _____

Municipal Address _____ Plan/Block/Lot _____

Consultant _____ Contractor _____

BOUNDARY AREA: Map Attached.

Acting on behalf of the Developer, we wish to make application for a Construction Completion Certificate according to the terms outlined in the above noted The City of Calgary Residential Subdivision Agreement.

Attached are the appropriate Parks inspection report(s)/correspondence and a copy of the map showing the development boundary.

We hereby certify that the remaining landscaping noted within the area shown on the attached boundary map were constructed, installed, completed and inspected in conformance with all respects to The City of Calgary's specifications and approved designs, or as otherwise required by Parks, and that all defects and deficiencies in work and materials were reported to the Developer and were remedied by the Developer.

Date
.....

Signature of Applicant

Approved on _____
Date _____ Manager Urban Development

Projected Earliest Maintenance Period Expiry Date: _____
.....

Rejected on _____
Date _____ Manager Urban Development

Cause for Rejection: _____

IX. FINAL ACCEPTANCE CERTIFICATES

1. Not less than three (3) months prior to the maintenance period expiry date, or earlier if weather conditions permit, the Consultant and the Contractor shall inspect the Reserve Parcels (i.e. sub-neighbourhood parks; linear parks; and those portions of neighbourhood, community and district parks designated as decorative parks, ornamental parks and tot lots), public utility lots, RoW, boulevards, medians, traffic islands or storm-water dry ponds, and the Consultant shall ensure that the Contractor corrects all defects and deficiencies due to damage and other causes, except defects or deficiencies caused by the negligence of The City or its agents, employees or servants in the performance of their duties on behalf of The City. Subsequent to the correction of the said defects and deficiencies, the Consultant shall submit to The City of Calgary Urban Development Division (268-5782) four (4) copies of the Final Acceptance Certificate (FAC) duly signed and sealed by a signing officer of the Consultant.
NOTE: An application form is available online at www.calgary.ca/parks (click on Parks Management, Planning and Development, Developers and Parks, and the form is available under downloads).
2. Landscape components submitted for final acceptance should be submitted in specific groupings by development phase to reduce the frequency of inspections and the volume of documentation by The City of Calgary Parks, Urban Development and the Developer. Recommended groupings are:
 - .1 all reserve parcels;
 - .2 all boulevards, medians and traffic islands;
 - .3 all Environmental Reserves;
 - .4 all storm-water dry ponds.
NOTE: This CCC and FAC should be held at the same time of the CCC and FAC for Water Resources.
 - .5 All Public Utility Lots.
NOTE: Where the PUL is dedicated for the purpose of a shallow utility cabinet or pedestal only, and embedded in a Municipal Reserve, the PUL may be included in the FAC application for the Municipal Reserve.
3. The City of Calgary Parks shall make an on-site inspection with the Consultant within thirty (30) days of receipt of the FAC by The City, and if no advice of defects or deficiencies has been sent to the Developer within that time, the improvement shall be deemed by The City to be completed.
NOTE: Prior to inspection with the Consultant, the Parks Development Inspector will inspect the site with a representative of the Parks Division.
4. If the inspection shows to the satisfaction of The City of Calgary Parks that the improvement is completed and any third party damages are rectified the Area Parks Superintendent shall sign the FAC.

5. If, however, defects or deficiencies are apparent, the Parks Development Inspector will issue a "Final Acceptance Inspection Check List and Report" (page 48) detailing the defects or deficiencies that exist and the Inspector shall retain the FAC for one (1) month from the date of notification. Only one Inspection Check List and Report will be issued during the inspection process. The Inspector will record the last day of the one (1) month period on the Inspection Check List and Report under "Application Expiration Date." In the event that the defects or deficiencies are not corrected by the Developer within the one (1) month period, the FAC shall be returned unsigned and the Developer shall correct the defects and deficiencies and subsequently resubmit the FAC.
6. If weeds are identified in a Final Acceptance Inspection Check List and Report and a herbicide is applied to rectify the deficiency, a biocide application report must be submitted prior to the signing of the FAC.
7. Community and District parks containing MSR sites shall be fully developed and an application for Final Acceptance shall be submitted:
 - .1 no later than at least one full year prior to occupancy of a school;
 - .2 by the time thirty (30) percent of the lots or projected lots located within the catchment area, which is deemed to be all lands located within 1.2 kilometres from the property line of the said parcel of land, are occupied;
 - .3 no later than September 30th of the year of application. FAC application inspections may be performed after September 30th subject to weather and ground conditions that allow for an effective assessment of the property and at the discretion of the Manager Parks Planning and Development Services.

All development has to be checked and approved on site by Park Development Inspectors prior to signing of the FAC by the Manager Parks Operations Division. If defects or deficiencies are apparent, the process will be as per item 5 above.

8. **Criteria for Conditional FAC**

- .1 Prior to FAC inspection, the Consultant has reviewed the site; i.e., plant material and turf is healthy; irrigation system is complete, including required paperwork, and plans reflect final product. If this is not completed, no conditional FAC will be considered.
NOTE: *Date of inspection by the Consultant shall be added to the FAC document.*
- .2 FAC's are not to be submitted prior to site completion. Inspectors will not 'hold' document until site is ready.
- .3 Deficiencies indicated on the FAC inspection are to be carried out as soon as possible, not at the end of the 30 day expiration date.

- .4 Revised construction inspection form is attached to the FAC document when submitted.
- .5 Conditional FAC will be considered if site was complete and third party damage occurs where time restraints do not permit rehabilitation, or when there are exceptional circumstances (i.e., drought).
- .6 Marketing signs and flags will not interfere with the FAC process providing the Developer submits a letter acknowledging responsibility for continued maintenance and repairs to the parcel as well as a map outlining where the signs and marketing items are. The Developer shall provide to The City 30 days notice of their intent to turn the parcel(s) over to The City. Once the signs and/or marketing items have been removed the Developer shall initiate a re-inspection of the property as per the FAC procedure.

Final Acceptance Inspection Check List & Report



*FINAL ACCEPTANCE INSPECTION CHECK LIST & REPORT

COMMUNITY		SUBDIVISION	
DESCRIPTION	PHASE	DEVELOPER	
LEGAL/MUNICIPAL ADDRESS			
CONSULTANT	CONTACT PERSON		PHONE
CONTRACTOR	CONTACT PERSON		PHONE
F.A.C. APPLICATION RECEIVED: <input type="checkbox"/> YES <input type="checkbox"/> NO			DATE: YY MM DD
WORK INSPECTED	DEFICIENCY	INSPECTOR'S REPORT DETAIL	
A. SURFACE CONDITION:			
settlement			
ponding/drainage			
repair required			
B. TURF:			
turf quality acceptable			
bare spots requiring top dressing and overseeding			
weed problems			
others			
C. TREES:			
tree replacement			
pruning required			
strapping removed			
wires removed			
butlap removed			
guying removed			
tree well cultivated			
soil settlement is, tree too low			
others			
D. SHRUBS:			
shrubs replacement			
pruning required			
bed cultivated			
weed free bed			
mulch intact			
others			
E. FENCING			
F. PLAY EQUIPMENT:			
G. PATHWAYS/HARD SURFACE:			
H. AMENITIES:			
benches			
garbage receptacles			
others			
I. GENERAL COMMENTS:			
J. IRRIGATION SYSTEM:			
as-built drawings			
maintenance manuals received			
Annual D.C.V. report			
Irrigation information sheet			
Meter information sheet			
K. EXTENDED WARRANTY REQUIRED:			
L. MAINTENANCE LOG SUBMITTED:			
M. MYLARS RECEIVED (LANDSCAPE & IRRIGATION)			
*NOTE: Contract documents and the Development Guidelines and Standard Specification for Landscape Construction override the Inspection Check List and Report. <input type="checkbox"/> No deficiencies noted <input type="checkbox"/> Application Expiration Date: _____ Report Distribution <input type="checkbox"/> Industry Rep. <input type="checkbox"/> Area Superintendent <input type="checkbox"/> Design & Development File Parks Area Rep.: _____ Industry Rep.: _____ Park Inspector: _____ Inspection Date: _____			

FINAL ACCEPTANCE CERTIFICATE

Subdivision _____ Phase _____ Developer _____

Agreement No. _____ Description _____

Municipal Address _____ Plan/Block/Lot _____

Consultant _____ Contractor _____

BOUNDARY AREA: Map Attached.

Acting on behalf on the Developer, we wish to make application for a Final Acceptance Certificate according to the terms outlined in the above noted The City of Calgary Residential Subdivision Agreement.

Attached is a copy of the map showing the development boundary.

We hereby certify that the remaining landscaping noted within the area shown on the attached boundary map were constructed, installed, completed and inspected in conformance with all respects to The City of Calgary's specifications and approved designs, or as otherwise required by Parks, and that all defects and deficiencies in work and materials, including any prior to FAC conditions noted on the Construction Inspection Checklist were reported to the Developer and were remedied by the Developer.

Date Signature of Applicant

Approved on _____
Date Parks Representative

Approved on _____
Date Manager Urban Development

Rejected on _____
Date Parks Representative

Rejected on _____
Date Manager Urban Development

Cause for Rejection: _____

X. CCC and FAC APPEAL PROCESS

The intent is to provide a process by which an appeal can be initiated in the event the CCC or FAC applicant is refused a CCC or FAC. The process is intended to provide a review of the decision based on the contractual obligations associated with the development agreement, and Standard Landscape Development Guidelines and Specifications.

Step One: In the event of a refusal by the Parks Development Inspector, a review will be conducted with the Manager Parks Operations Division, the Developer or their representative, and the Parks Coordinator – Development. Where agreement or consensus is not achieved, the process will go to Step Two below.

Step Two: In the event consensus is not reached, the refusal will be considered by the Manager (North or South) Parks Planning and Development Services, and the Manager Urban Development or designate. The decision at Step Two will be final.

STANDARD SPECIFICATIONS FOR LANDSCAPE CONSTRUCTION

RECREATION FACILITIES

I. RECREATION FACILITIES

1. Site Planning Team's Joint Use Site Guidelines

Type of School	Joint Use Site Area	School Building Envelope	Sports field Envelope	Educational Sports field Requirements	Recreational Sports field Requirements
Public Elementary School	4 hectares (10 acres)	1.6 hectares (4 acres)	2.4 hectares (6 acres)	- 2 Minor/1 Major overlapping soccer fields - Creative Playground	- 1 x 76m ball diamond
Public Junior High School	4.9 hectares (12 acres)	1.6 hectares (4 acres)	3.2 hectares (8 acres)	- 2 Minor/1 Major overlapping soccer fields - Field event area	- 2 x 76m ball diamond
Public Elementary & Junior High Schools	6.9 hectares (17 acres)	3.2 hectares (8 acres)	3.6 hectares (9 acres)	- 2 Minor/1 Major overlapping soccer fields - Field event area - Creative Playground	- 2 x 76m ball diamond
Separate Elementary School	3.6 hectares (9 acres)	1.4 hectares (3.5 acres)	2.2 hectares (5.5 acres)	- 2 Minor/1 Major overlapping soccer fields - Creative Playground	- 1 x 76m ball diamond
Separate Elementary & Junior High School	4.9 hectares (12 acres)	1.9 hectares (4.75 acres)	2.9 hectares (7.25 acres)	- 2 Minor/1 Major overlapping soccer fields - Field event area - Creative Playground	- 1 x 76m ball diamond
Public/ Separate High School	9.2 hectares (23 acres)	4 hectares (10 acres)	5.3 hectares (13 acres)	- 2 Minor/1 Major overlapping soccer fields - 1 Football field - Track & field area	- 2 x 76m ball diamond
Community Association Facility	1.2 - 1.6 ha. (3 - 4 acres)				- 1 Outdoor Rink - 2 Tennis Courts

Notes:

- Public Elementary and Junior High School sites will accommodate 2 school buildings.
- All site sizes and building envelopes are minimum requirements. Additional land may be required where physical constraints exist.
- For joint use sites with Recreation Facilities within storm-water detention ponds see below: Hockey Rink and Lacrosse Field - Item 2.4; Soccer fields and Ball Diamonds - Item 3.6; and Tennis Courts - Item 4.2.g.

- d. Field Event areas include long jump, shot put, discus, etc.

2. Hockey Rink and Lacrosse Field

- .1 Refer to **Detail Sheet #1** for rink dimensions.
- .2 Rink surface must be graded flat for water retention.
- .3 Install a 50mm rink service when specified by The City of Calgary Parks as per **Detail Sheet #2**.
- .4 Hockey Rinks and Lacrosse Fields located within dry ponds shall be placed above the 1:50 year flood level.

3. Soccer Fields and Ball Diamonds

- .1 Refer to **Detail Sheets #3, 4 & 5** for soccer field and goalpost dimensions.
- .2 Subject to approval by The City, portable goalposts may be installed. If portable goalposts are to be installed they must be securely anchored to the ground.
- .3 Refer to **Detail Sheets #6 to 12** for ball diamond & backstop dimensions.
- .4 All sports fields, and a buffer zone of 3m, are to be graded to achieve a level, playable surface without ponding areas. The fields are to be graded to a maximum of 2% in all directions with a preference towards the "Optimal Drainage Patterns for Sports fields" as per Detail Sheet #2. The Parks Development Coordinators will consider solutions other than the preferred sports field grading options if site conditions do not permit their execution. Goal end to goal end grading will only be permitted subject to demonstration that no other alternate is available. Only the 3m adjacent to the sports field of the total 10m buffer is required to be graded level and free of obstacles. The 7m balance of the buffer may include plant material, amenities and back-sloping.
- .5 Ball diamonds and soccer fields shall be devoid of all obstacles including catch basins, and they shall be set back a minimum of:
 - 10m from all Property Lines;
 - Tree and shrub setbacks as per Table in item 1.2 on page 59;
 - 20m from playgrounds;
 - 10m behind soccer goal posts; and

- 3m around the perimeter of ball diamonds and along the sides of soccer fields.
- .6 Soccer fields and ball diamonds located within dry ponds shall meet the following performance criteria:
- a. Soccer fields, ball diamonds and their buffer zones are to be located outside of the 1:5 year inundation level.
 - b. Inundation of soccer fields, ball diamonds and their buffer zones must:
 - i. not be more than 48 hours in any month of the year;
 - ii. not exceed 6 times per month; and
 - iii. leave fields suitable for play within 48 hours after the flood event has receded.
- .7 Backstop canopies are required when the back of the backstop faces roadways; residences; other backstops; playgrounds; pathways; and other sports fields.

4. Tennis Courts

- .1 Tennis Courts will be permitted if developed minimally as double courts.
- .2 The following guidelines and specifications should be used in conjunction with **Detail Sheets #13 to 21**:
- a. A geotechnical analysis on a maximum ten (10) metre grid and to a two (2) metre depth shall be conducted.
 - b. Any organic or otherwise unsuitable material as determined by the geotechnical analysis, shall be removed to a minimum depth of one (1) metre below existing grade and replaced with 1000mm of base gravel conforming to the current Standard Specifications Roads Construction. If no organic or otherwise unsuitable material is present, then the subgrade shall be excavated to a minimum depth of 500mm and back filled with 500mm of base gravel conforming to the current Standard Specifications Roads Construction. The subgrade and base gravel shall be compacted to a minimum average of 98% with no single test showing less than 95% of standard Proctor.
 - c. 100mm of 40mm crushed gravel conforming to the current Standard Specifications Roads Construction shall be placed and compacted to a minimum average of 98% with no single test showing less than 95% of standard Proctor.

- d. A 60mm lift of Mix 'B' asphaltic concrete conforming to the current standard Specifications Roads Construction shall be placed and compacted to a minimum average of 98% with no single test showing less than 95% of standard Proctor.
- e. A 40mm lift of mix 'M' asphaltic concrete conforming to the current Standard Specifications Roads Construction shall be placed and compacted to a minimum average of 98% with no single test showing less than 95% of standard Proctor.
- f. A final asphalt emulsion should be applied. The application shall include a filling, sealing and texturing process. Then the colouring and lining of courts shall occur with an acrylic emulsion coating. This coating shall be highly pigmented with prime colour and reinforcing pigments that will provide a long and lasting finish for tennis courts. The colour green will be used for the actual courts and the colour red will be used for the back of courts, side of courts and in between courts. The shade of red or green is to be approved by The City of Calgary Parks.
- g. Tennis Courts located within dry ponds shall be placed above the 1:50 year flood level.
***NOTE:** The resulting surface shall be completely true (flat) with water ponding to a maximum depth of 1.25mm. Any deviation shall be corrected by the Contractor at no expense to The City of Calgary.*

FENCING: A 3.66m high chain link fence (38mm mesh - No. 9 gauge steel) is required and shall be constructed as per standard The City of Calgary Parks Standard Specifications - Landscape Construction.

5. Football Fields/Track & Field Areas

- .1 Football fields/track & field areas and their buffer zones must be graded to eliminate ponding areas and have an optimum gradient of 2% in all directions with a variance of plus or minus 0.5%.
- .2 Grading plans for football field/track & field areas shall illustrate drainage patterns in a minimum of three directions.
- .3 Football field/track & field areas are not to be located within dry ponds.
- .4 Football fields/track & field areas form part of a District Park and are not part of the 10% Municipal Reserve Dedication. The School Boards will be responsible for the development of these facilities.
- .5 Goal post and field dimensions are on **Detail Sheets 69 and 70.**

- .6 The layout for the field events may be varied to suit particular local requirements. Design specifications can be obtained by contacting the Park Development Coordinator.

6. Basketball Courts

- .1 **Detail Sheets 71, 72 and 73** are to be used in conjunction with the following specifications:
- a. Prior to construction of the surfacing a pavement design shall be submitted to Calgary Parks. The pavement design shall be prepared by a qualified geo-technical professional Engineer. The design should be gravel based and shall include a review of existing subsoils and subgrade drainage conditions. Subgrade preparation along with placing and compaction of gravel and asphaltic concrete is to be carried out in accordance with the current City of Calgary Roads specifications unless otherwise specified in the design.
 - b. A final asphalt emulsion of two coats should be applied. The application shall include a filling, sealing and texturing process. Then the colouring and lining of courts shall occur with an acrylic emulsion coating. This coating shall be highly pigmented with prime colour and reinforcing pigments that will provide a long and lasting finish for basketball courts.
 - c. Basketball Courts located within dry ponds shall be placed above the 1:50 year flood level.
NOTE: *The resulting surface shall be completely true (flat) with water ponding to a maximum depth of 2.50mm. Any deviation shall be corrected by the Contractor at no expense to The City of Calgary.*

TREES, SHRUBS and GROUNDCOVERS

II. TREES, SHRUBS and GROWDCOVERS

1. Development Guidelines

.1 Tree Planting Quantities

The Developer, at its sole cost and expense shall:

- a. plant all trees within the Development Area in conformity with the Tree Planting Guidelines and the Urban Forest Management Policy using the one tree per two lot formula and giving first priority to the planting of trees on public lands, and
- b. plant all trees on public land within the Development Area in conformity with Park Specifications, the Tree Planting Guidelines and the Urban Forest Management Policy.

.2 Setback/Spacing Guidelines

The following table shows the set back and spacing guidelines for all tree plantings in parks, public utility lots, RoW and storm-water dry ponds:

A. Setback Situation	Poplar and Willow Trees and Shrubs	Other Deciduous Trees	Coniferous Trees
Vertical Elements and Hard Surfaces	5m	2m	½ maximum spread
Private Property <ul style="list-style-type: none">• chain link fence• post & cable fence• wood screening fence	10m	2m	½ maximum spread
Sport Fields	10m	½ maximum spread from 3m buffer	½ maximum spread from 3m buffer
B. Tree Spacing	½ maximum spread or 5m (whichever is less)	½ maximum spread	

NOTES:

- a. *Poplar trees*
 - i. *all poplars except for trembling aspen and Swedish Columnar aspen.*
 - ii. *the minimum set backs for poplars may be reviewed upon request.*
- b. *If other deciduous trees and coniferous trees are less than 3.5m from vertical elements and hard surfaces or private property lines the trees must be placed in mulched beds.*
- c. *Maximum tree spread as per Alberta Horticultural Guide.*
- d. *No more than 50% of any one species planted in a park will be poplar as per the Poplar Tree Policy.*

NOTE: Deciduous trees exceeding 100mm caliper and coniferous trees taller than 4.0m will require a warranty and maintenance period of five (5) years.

.3 Line Assignment (i.e. Setback) Requirements

- a. For setback requirements of trees planted along roadways see “Design Guidelines for Subdivision Servicing” available from The City of Calgary Roads. “Regional Pathways on Residential Boulevards”. Also see Park’s Detail Sheet No.37b.
- b. The following table shows setback requirements for trees planted adjacent to utilities.

TREE SEPARATIONS TO UTILITIES						
UTILITIES	POPLAR		DECIDUOUS		CONIFEROUS	
DEEP	SERVICES	MAINS	SERVICES	MAINS	SERVICES	MAINS
		Parallel to tree line	Medians Blvds	Parallel to tree line	Median Blvds	Parallel to tree line
Sanitary	3.0m	4.0m	0m** 2.5m	3.0m	0m** 3.0m	4.0m
Storm (<4.5m deep)	3.0m	4.0m	0m** 2.5m	3.0m	0m** 3.0m	4.0m
Water	3.0m	4.0m	0m** 2.5m	3.0m	0m** 3.0m	4.0m
Hydrants	3.0m	4.0m	N/A 2.5m	2.5m	N/A 3.0m	4.0m
SHALLOW						
ATCO	2.0m*	2.0m*	2.0m	2.0m	2.0m*	2.0m*
TELUS	2.0m*	2.0m*	1.5m	1.5m	2.0m*	2.0m*
CTV	2.0m*	2.0m*	1.5m	1.5m	2.0m*	2.0m*
ENMAX	2.0m*	2.0m*	1.5m	1.5m	2.0m*	2.0m*
ENMAX						
Overhead (to outside conductor)	9.0m		7.0m - 9.0m		7.0m - 9.0m	
Transformers (within Utility Rights-of-Way)	N/A (Tree planting not permitted within Utility Rights-of-Way)		N/A (Tree planting not permitted within Utility Rights-of-Way)		N/A (Tree planting not permitted within Utility Rights-of-Way)	
Street Light Poles	5.0m		4.0m - 5.0m		Min. 4.0m	

NOTES:

* A 3.0m separation may be required at the discretion of the utilities.

** Pipe joints are not permitted on water or sewer services located under medians.

Trees on residential (15.0m RoW) boulevards, with no sidewalks, can be planted 1.0m from driveways.

The following are setback requirements for trees and shrubs planted on traffic islands:

- i. All trees and shrubs must be a minimum of 7.5m from the bullnose or back of walk extended through the island, whichever is greater, adjacent to primary streets.
- ii. All trees and shrubs must be a minimum of 4.5m from 'any' bullnose adjacent to primary streets on irregular shaped islands.
- iii. All trees and shrubs must be a minimum of 3.0m from the bullnose inside the cul-de-sac.
- iv. All shrubs and deciduous trees (excluding poplars) must be planted 1.5m from back of curb.
- v. All poplar trees, except for trembling aspen and Swedish Columnar aspen, must be planted 6.0m from back of curb.
- vi. All coniferous trees must be planted 3.0m from back of curb.

NOTE: *To obtain line assignment and construction approvals for plantings, please submit seven (7) sets of folded drawings to Parks Planning and Development Services for new subdivisions, or seven (7) sets of folded drawings to Land Information & Mapping, Access Solutions for non-standard tree planting proposals, existing areas and where utility lines are involved.*

.4 Play Structure Plantings

- a.** Shrub beds should be set back from areas designed for play structures as follows:
 - i.** 3.5m from the outside edge of the play area; or
 - ii.** The width of a local pathway where the pathway abuts a play area.
 - iii.** Type and spacing of plantings shall ensure clear sight-lines into the play structure area.

.5 Tree Protection Guidelines

The Street Bylaw (20M88) and the Tree Protection Bylaw (23M2002) contain clauses intended to protect trees growing on Public Land.

Permits issued by The City of Calgary Roads are required if construction activities use or cross any portion of the road right-of-way (including boulevards). Permits are obtained at Traffic Assessment 7th floor Municipal Building 800 Macleod Trail SE. For further permit information call 403-268-1586 or consult The City of Calgary Roads' web site at www.calgary.ca/roads, click on Permits.

A condition of the issuance of permits by The City of Calgary Roads may be the requirement for a Tree Protection Plan when construction activities are within six (6) metres of a tree on Public land. The intent of a Tree Protection Plan is to help ensure that The City's Urban Forestry assets remain long term assets to the community. Requirements and specifications for a Tree Protection Plan may be obtained by telephoning Urban Forestry at 311 or consult The City of Calgary Parks' web site at www.calgary.ca/parks, click on Parks Management, Trees.

- a.** Tree Protection Plan elements, measures and conditions are only required on The City of Calgary owned land. However, applicants are encouraged to apply tree protection measures on private land. Effective tree protection places limits on damage and disturbance to tree branches, trucks, and root systems.
- b.** A tree protection plan is a drawing and/or report, installation of physical barriers or other materials and specification of construction techniques. A Tree Protection Report is to:
 - Inventory and locate all trees and shrubs on The City of Calgary owned land within six (6) metres of all property lines of the site under redevelopment.
 - Identify species, diameter at 1.4m off the ground, height, condition and existing flaws or damage, significant pests and diseases.

- Identify whether tree(s) or shrubs are to be moved, removed or protected.
- Identify whether tree pruning is required to provide clearance.
- Identify a Tree Protection Zone in which activities are restricted. Minimally, this zone is limited to The City of Calgary owned land, four (4) metres distance from the trunk and to a depth of 1.2m. The canopy of the tree is protected to the dripline.
- Locate staging, hoarding, and storage areas of construction.
- Locate limits of land disturbance, excavation, trenching and grade changes, routing of utilities, and irrigation systems, sidewalks, driveways, construction access roads, changes to street lighting, fire hydrants, utilities boxes.
- Identify construction methods and equipment to be used on The City of Calgary owned lands.
- Identify measures to ensure tree branches, trunk and roots are protected during construction. Measures may include effective barrier fencing, branch and or root pruning, protective mulch, supplementary water, soil aeration, informational signage.
- Identify pre and post construction tree care measures.
- Provide contact information for a designated individual that will be responsible for ensuring all work adheres to the approved Tree Protection Plan.

c. The City of Calgary Parks prohibits:

- Work on The City of Calgary owned land within six (6) metres of a Public Tree without a Tree Protection Plan.
- Construction activities requiring use of or on the road right of way without a permit issued by Calgary Roads, Traffic Assessment.
- Unauthorized soil disturbance on The City of Calgary owned land within six (6) metres of a City Tree.
- Unauthorized deviation from a Tree Protection Plan approved by The City of Calgary Parks.
- Unauthorized entry into a Tree Protection Zone or interference with tree protection barriers.
- The attachment of objects to the trunk or branches.
- The use of equipment for which there is insufficient canopy clearance.

d. The City of Calgary Parks requires:

- Work on The City of Calgary owned lands to be performed by The City of Calgary forces or by Contractors that have entered into an indemnity agreement with The City of Calgary.

- Compensation for trees removed or damaged as per appraisal methodologies accepted by the International Society of Arboriculture and as determined to be fair and reasonable by The City of Calgary Parks, Urban Forestry Coordinator.
- e. Failure to comply with public tree protection measures may result in fines ranging from \$100 to \$10,000, in accordance with The City of Calgary's Tree Protection Bylaw 23M2002. Other compliance measures may be required by a duly appointed Enforcement Officer.
- f. The applicant will be required to provide compensation to The City of Calgary for any Public Trees that are removed or damaged. Individual Public Trees can have values ranging in the thousands of dollars depending on size and species. You may wish to consider this cost during the design and development phase of your project. Applicants that are unfamiliar with tree protection or tree appraisal are advised to consult an arborist. Arborists are found in the telephone directory under "Tree Service".
- g. The applicant shall provide compensation of The City for trees removed as per the approved **Tree Protection Plan**. Payment to be made to:

The City of Calgary Parks
c/o Urban Forestry Coordinator
Location #75, P.O. Box 2100 Station M
Calgary, AB T2P 2M5

All trees and landscaping on public land shall be established and receive construction inspections in accordance with the current edition of the Park Development & Operations 'Development Guidelines and Standard Specifications Landscape Construction'. Contact the Park Development Inspector at North 804-9397, South 804-9417, or Central 620-3216.

.6 Tree Replacement/Compensation Guidelines

- c. If anyone receives approval from The City of Calgary Parks to remove trees from public lands and they plant replacement trees, they may apply for a credit of \$380.00 per tree planted on public land. The replacement tree must be 60-85 mm and over and above any requirements under the Land Use Bylaw, or any other City requirement. Application for reimbursement may be made after the issuance of the FAC. Application for reimbursement should be directed to The City of Calgary Parks, Urban Forestry section at 311.

- d. If anyone receives approval from The City of Calgary Parks to remove trees from public lands and there are plans for replacement, they shall pay to The City the difference (if applicable) between the cost of the replacements and the value of the trees to be removed as determined by the Urban Forestry Specialist (311) using the International Society of Arboriculture's formula.
- e. If anyone, or other City business units, remove or damage trees on public lands, without approval of The City of Calgary Parks, while performing a City public works project, they shall replace the trees in accordance with the two trees for every one tree removed or destroyed formula.
- f. If anyone removes or damages **Native Vegetation** in any of the above three scenarios, the replacement of the vegetation will be evaluated on a site-by-site basis to ensure that the integrity of the site's vegetation is reasonably maintained.

.7 Shrub Planting Guidelines

a. Parks

Up to 1% of total area of park. Plantings to be approved on a site by site basis.

b. Boulevards

No shrub planting permitted except at interchanges where gradients exceed 3H: 1V.

NOTE: *Special projects to be looked upon on a site by site basis for larger boulevards as long as the shrubs:*

- i. are utilitarian;
- ii. do not cause excess maintenance requirements;
- iii. do not restrict the visibility between pedestrians and vehicles;
- iv. are not in conflict with utilities; and
- v. are of a suitable species and growth habit.

c. Medians/Traffic Islands

No shrub planting permitted.

NOTE: *Special projects to be looked upon on a site by site basis.*

d. Utility Easements RoW's

No shrub planting permitted unless otherwise approved by Land Information & Mapping.

2. Standard Specifications

.1 Description/Quality Assurance

- a.** This section specifies the supply and planting of trees, shrubs and ground covers.
- b.** Planting work is to be carried out by experienced personnel under the direction of a skilled horticultural foreman.

.2 Product Delivery, Storage and Handling

- a.** Supply manufactured items such as fertilizer, bone meal, mulch, etc. in standard containers, clearly indicating contents, weight, component analysis, and the name of the manufacturer. Include WHMIS codes as required.
- b.** Store manufactured materials, subject to deterioration, in a weatherproof place on site and in such a manner that their effectiveness is not impaired.
- c.** Provide root balls of the following minimum sizes to meet the corresponding tree size:

i. Hand Planting

Deciduous Trees

Caliper

#40mm (1.5")

Root Ball Diameter

600mm (2'0")

Coniferous Trees

Height

1.0m (3.28') -

1.5m (4.92')

Root Ball Diameter

600mm (2'0")

Root ball sizes for naturalized plantings will be approved by The City of Calgary Parks on a site-by-site basis.

Provide root ball depth as follows:

Root Ball Diameter

600mm (2'0") or less

Root Ball Depth

minimum 450mm

Wrap root balls according to the following schedule:
 Root Ball Diameter Wrapping Schedule
 up to 600mm (2'0") 142g (5oz.) hessian burlap,
 single wrap

Bare root stock to not exceed 40mm (1.5") caliper. Root Ball diameter will be 300mm (12") for every 25mm (1") caliper.

ii. For trees dug by tree spade (machine method):

Minimum Root Ball Size For Deciduous Trees (CNLA Standard)

Caliper	Ball Diameter	Ball Depth
40 mm	60 cm	40 cm
50-60 mm	70 cm	40 cm
70 mm	80 cm	50 cm
80 mm	90 cm	50 cm
90 mm	90 cm	50 cm
100 mm	100 cm	50 cm
125 mm	120 cm	80 cm
150 mm	150 cm	80 cm
175 mm	175 cm	80 cm
200 mm	200 cm	80 cm

- These root ball sizes are considered minimum and will only be used for trees grown under proper nursery conditions (i.e. transplanted or root pruned at least once within previous four years).
- Multi-stem trees will require a root ball at least one size larger.

Minimum Rootball Size For Coniferous Trees (CNLA Standard)

Height	Root Ball Size	Height	Root Ball Size
50 cm	30 cm	200 cm	80 cm
60 cm	35 cm	225 cm	90 cm
80 cm	40 cm	250 cm	90 cm
100 cm	45 cm	275 cm	100 cm
125 cm	50 cm	300 cm	122 cm
150 cm	60 cm	350 cm	127 cm
175 cm	70 cm		

- These root ball sizes are considered minimum and will only be used for trees grown under proper nursery conditions (i.e. transplanted or root pruned at least once within previous four years).

- Root ball shall be burlapped and wire basketed. Wire basket shall be laced at the top and of sufficient strength to withstand lifting the tree by the top loops of the basket at a minimum of two points.
- d. Cut all roots cleanly when digging plants. Roots should be cut even with the edges of the root ball.
- e. Protect all plant material from damage and breakage. Protect all parts of the plant material from drying out and maintain adequate moisture levels.
- f. Ensure that transported plant material is adequately protected from sun and wind. Trees that are moved by truck shall be covered with a tarp or windscreen.
- g. Carefully tie in all branches before transporting.
- h. Pad all points of contact between plant material, equipment and basket.
- i. Heel in with soil or other suitable material and water any plant material that cannot be planted during the current day's operations. All plant material should be planted within 24 hours of delivery to site. The City of Calgary Parks reserves the right to reject any material not installed within this timeframe, weather permitting.
- j. Keep all roots and root balls watered prior to planting.

.3 Job Conditions/Substitutions

- a. Proceed with planting operations during suitable weather conditions or at the discretion of The City of Calgary Parks.
- b. Supply and install plant material as specified on the plant list. Substitution with other plant material will be allowed only with the written approval of The City of Calgary Parks.

.4 Inspections

- a. The Contractor shall have an approved set of drawings and specifications and an approved line assignment available on site prior to calling The City of Calgary Parks for an inspection.
- b. Make plant material available for inspection at source by The City of Calgary Parks.

- c. Approval of plant material at source will not impair the right of The City of Calgary Parks to inspect plants upon arrival on the site or during the course of construction and to reject plants which have been damaged, or which in any way do not conform to the specifications.
- d. Give timely notice (see Inspections page 35) to The City of Calgary Parks when inspection and acceptance are required. Inspections shall be requested:
 - i. when holes or wells have been excavated;
 - ii. when all work is complete.
- e. Plant material at CCC and FAC: true to name and type; structurally sound; well branched; healthy and vigorous and free from disease, insect infestations, rodent damage, sun scald, frost cracks, and other untreated abrasions to the bark; and densely foliated with a healthy, well developed root system. Pruning wounds must show vigorous callus growth on all edges and all parts must show live and green cambium tissue when cut. Final inspection of all plant material will be made at the end of the specified guarantee period.

.5 Plant Material

- a. As a minimum, all plant material must be nursery grown and meet the specifications set out in the latest Guide Specifications for Nursery Stock prepared by the Canadian Nursery Trade Association (C.N.T.A.) and the International Society of Arboriculture (I.S.A.) for size, height, spread, grading, quality and method of cultivation.
- b. Nomenclature of specified plants shall conform to the International Code of Nomenclature for Cultivated Plants and the latest edition of Standardized Plant Names.
- c. Any plant material not conforming to Section .5a above will be designated as "Collected plants".
- d. "Collected plants" may only be used when approved in writing by The City of Calgary Parks.
- e. All material must conform to the sizes shown on the plant list. Larger material may be used only when approved by The City of Calgary Parks. Use of larger plants will not increase the contract price.

.6 Mulch

- a. Type: Any wood type except Fraxinus species (WABB). All non-wood types to receive approval of The City of Calgary Parks.

- b. Size: Even mix of sizes from 10mm x 10mm x 5mm to 40mm x 60mm x 35mm.
- c. Processing: chipper, hammer mill, grinder.
- d. Material should have no more than 5% by volume of soil, sawdust, peat moss, needles and twiggy material or longer strips.
- e. The best material is pulled out of piles that have composted for a year. However, this can provide an excess of mold and fungus spores which are a health hazard. If material is composted, it has to be turned during the year to prevent heating and potential spontaneous combustion. It would be best to use fresh material and add nitrogen fertilizer to compensate nitrogen tie up by bacteria.
- f. Application: 75mm deep. Keep material 50mm away from trunks and stems to prevent rotting of bark. Any time of year.

.7 Preparation

- a. Obtain the approval of The City of Calgary Parks for all planting excavations prior to commencing planting operations.
- b. Supply plant material as specified on the plant list or substitutions as approved by The City of Calgary Parks.
- c. Dig material, specified "B.R." (bare root) on the plant list, while in a dormant state and with the root system extending a minimum of 300mm (12") diameter per 25mm (1") of tree caliper. Immediately after digging, wrap the roots in wet burlap and keep burlap wet during transport and storage.
- d. Provide material, specified "W.B." (wire basketed and burlapped) to Canadian Nursery Landscape Association (CNLA) specifications.
NOTE: Section 2.2.c.ii (page 67) for root ball size.
- e. Do not use plant material on which the root ball has been cracked or broken preparatory to or during the planting process.
- f. Container stock to be Canadian Nursery Landscape Association (CNLA) specifications.

.8 Installation

The following specifications are to be referred to with **Detail Sheets #22 to 27a**.

- a. Dig out by tree spade, backhoe or hand shovel, the tree holes and shrub beds and remove excess soil off site.
- b. Ensure width of all planting excavations is 450mm greater on all sides than the width of the root ball or as per site conditions to maintain soil volume.

Scarify subgrade to a depth of 75mm under all tree pits and shrub beds.

- c. Depth of planting beds are as follows:
 - 450mm for flower beds
 - 600mm for shrub beds
- d. Place plant plumb in the centre of the planting pit with a firm base under the root ball. Face the plant to give the best appearance or relationship to adjacent structures.
- e. Place bare root plants so that the roots lie in a natural position.
- f. At the time of planting, cut away the strappings and remove the top 1/3 of the wire and burlap. Leave two wire handles intact during the maintenance period. Remove these wire handles to the first wire ring prior to final acceptance.
- g. Backfill with topsoil or other material as specified by The City of Calgary Parks and firmly compact the soil to ensure the plant retains its orientation. Ensure no air pockets remain around the roots.
- h. Thoroughly water within the same working day of planting trees. Water probing is not acceptable.
- i. Ensure that the trees remain at grade surrounded by a tree well to a depth of 100mm after planting and watering. All trees to be mulched starting 50mm from the root flare (trunk) and extending the length of the hole.

.9 Maintenance/Pruning/Clean-up

- a.** Maintain all plant material from the time of planting until the date of issue of Final Acceptance Certificate.
- b.** Maintenance shall include all measures necessary to establish and maintain all plants in a vigorous and healthy growing condition, as specified in Landscape Maintenance, page 165.
- c.** At the time of acceptance, all material must be in a healthy, vigorous growing condition. Unmulched beds and tree pits must be freshly cultivated and free of weeds, rubbish, and debris. Mulched beds should be free of weeds, rubbish and debris.
- d.** Remove all dead branches. If there is a double leader, shorten one by about $\frac{1}{2}$, back to a live branch that points away from the trees that is about $\frac{1}{3}$ the diameter of the leader cut. Prune broken portions of branches back to live lateral. Retain the rest of the spec.
- e.** Ensure that all damage to surrounding work is repaired before leaving site.
- f.** Each day ensure that all debris is cleaned up and disposed off site and that the project site is left in a tidy, organized condition.

.10 Transplanting Existing Trees

As per Sections .6, .7, .8 and .9 above.

SUBGRADE, TOPSOIL, SODDING, SEEDING

III. SUBGRADE, TOPSOIL, SODDING and SEEDING

1. Subgrade and Topsoil

.1 Design Guidelines

- a.** Provide a minimum 2% gradient across all reserve parcels, medians, traffic islands, boulevards, public utility lots/ROW's and storm-water dry ponds.
- b.** Excessive fill that compromises the site design will not be acceptable.
- c.** Geotechnical testing may be required where questionable subgrade exist.
- d.** Joint Use Site Guidelines:
 - School building envelope to have same grade as sports field envelope (i.e. 2%);
 - School building envelopes and adjacent road grades must be at the same elevation;
 - School building envelope is to have topsoil applied to a maximum depth of 150mm.
 - For every one (1) metre in elevation in excess of 2% slope, a minimum increase of three (3) metres will be required on site.
 - If non-engineered fill is to be incorporated in an MSR site, the non-engineered fill drawing (see detail Sheet No. 28a), documenting the limit and depth of the fill area and confirming the fill area is outside the building envelope, shall be provided at CCC.

.2 Drainage Guidelines

- a.** Where possible drainage is to be picked up within the reserve parcels, public utility lots/ROW's and storm-water dry ponds in grass swales.
- b.** Grass swales are to drain at a minimum 2% gradient.
- c.** Grass swales exceeding sixty (60) metre runs are to have a minimum gradient of 4.0%. If the swale is to drain at less than 4.0%, it shall have weeping tile along the entire length of the swale tied into a catch basin or water drainage along a concrete swale or an approved equal.
- d.** The City of Calgary Parks reserves the right to limit the amount of off-site drainage onto a reserve parcel and public utility lot/ROW when, in their opinion, such drainage will compromise the integrity of the site.
- e.** All trap lows must be approved by The City of Calgary Parks prior to construction. Trap lows must not compromise the use of the site and must be an integral part of the design.

- f. All drainage swales that empty onto reserve parcels, boulevards, public utility lots, RoW's, environmental reserves, and storm-water dry ponds shall have concrete splash pads (**Detail Sheet #46**). Concrete splash pads shall be installed at a 10% pitch or erosion fabric will be required at their end.

.3 Description and Quality Assurance

This section specifies the preparation of subgrade and supply and spreading of topsoil. The Contractor must have experience at performing this type and scale of work and be willing to provide proof of this experience.

.4 Submittals

Submit required sample of topsoil to the testing laboratory and indicate intended use, type of mulches to be applied, type of sub-soil and quality of drainage.

.5 Product Delivery, Storage and Handling

- a. Stockpile topsoil in locations designated by The City of Calgary Parks.
- b. Do not spread topsoil in a muddy condition.

.6 Job Conditions and Protection

- a. Report in writing to The City of Calgary Parks, prior to commencing work, any conditions or defects encountered on site upon which the work of this section depends, and which may adversely affect the performance of the work.
- b. Do not commence work until such conditions or defects have been investigated and corrected.
- c. Commencement of work implies acceptance of surface conditions and no claims for damages or extra work will be accepted, except where such conditions cannot be determined prior to construction.
- d. Protect all existing trees and planting areas in accordance to the Tree Protection Guidelines (see page 62).

.7 Inspections and Topsoil Test

- a. The Contractor shall have an approved set of drawings and specifications available prior to calling The City of Calgary Parks for inspection.

- b. Obtain approval of the topsoil in writing from The City of Calgary Parks. Topsoil testing shall be done on the source of topsoil. Four samples shall be taken (i.e., one within every 25% vertical increment of the stockpile) at a depth of one foot. The location of the samples within each vertical increment shall be determined by the Park Development Inspector.
- c. Submit for approval from The City of Calgary Parks the name of the testing company who will conduct the soil analysis.
- d. Submit two (2) copies of the soil analysis report, including the location of the topsoil stockpile or source and recommendations for correction to The City of Calgary Parks. Test the topsoil for NPK, a particle size analysis, soluble salt content, organic matter and pH. Recommendations should clearly state the type, quantity and application procedure for amendment.
- e. Should the source of topsoil be exhausted, test topsoil from new source, submit soil analysis report and recommendations for correction and obtain the approval of The City of Calgary Parks before using.
- f. The City of Calgary Parks shall approve both rough grade prior to placing of topsoil and finished grade at appropriate times before the Contractor proceeds with next phase of work. For all joint use sites and community parks, as well as dry ponds containing sports fields in MR and MSR sites, the Contractor shall:

i. At Subgrade Inspection:

- supply grade stakes at all corners of sports fields as well as along their centre line;
- supply grade stakes at the toe and heel of all slopes and swales. Spacing of the stakes is to be determined by The City of Calgary Parks prior to their installation;
- be available for a joint site inspection with The City of Calgary Parks and have on site a survey crew fully equipped to provide any additional elevations as may be requested.

ii. At Finished Grade Inspection:

- supply grade stakes at the corners, centre and quarter points of sports field, break of slopes and along drainage channels.

NOTE: The information to be provided by the Developer on the grade stakes, if so requested by The City of Calgary, shall include but not be limited to:

- Offset distance (if applicable)
- Grid Point (if applicable)
- Actual Elevations
- Cuts/Fills

The Developer of any adjacent undeveloped lands shall be responsible to match these final design elevations to the satisfaction of The City of Calgary.

.8 Materials (Detail Sheet #28)

- a. "Topsoil": A fertile, friable, natural loam, containing not less than 4% organic matter for clay loams and not less than 2% organic matter for sandy loams to a maximum of 15%; and capable of sustaining vigorous plant growth, free of rocks of 50mm in diameter and over, subsoil contamination, roots and weeds (as determined by The City of Calgary Parks) and having a pH ranging from 7.0 to 8.5.
- b. Volume of rock in topsoil not to exceed 20%.
- c. Native soils should be used where restoration is required of natural areas and environmental reserves. The organic layer (A horizon) should be stripped and stockpiled. Imported loam should only be used at the discretion of The City of Calgary Parks.

.9 Subgrade Preparation (Detail Sheet #28)

- a. Fine grade subgrade to even running and given levels with a tolerance of plus or minus 75mm. Remove all debris from the subgrade and ensure it is not contaminated and free of all deleterious materials.
- b. Compact finished subgrade and all fill material to 85% standard proctor Dry Density for areas under turf or planting.
- c. Scarify subgrade to a depth of 75mm in all areas except where considered impractical by The City. Whenever compaction is greater than or equal to 95% standard proctor dry density scarification will be required to 200mm.

.10 Spreading of Topsoil

- a. Spread dry topsoil during dry weather over approved subgrade.
- b. Apply topsoil to the following minimum depths measured at right angles to the subgrade after leveling with a tolerance of 25mm over a distance of 2.4m:
 - 150mm for seeded areas
 - 125mm for sodded areas
 - 450mm for flower beds
 - 600mm for shrub beds
- c. Fine grade topsoil eliminating rough and low areas and to ensure positive drainage.
- d. Ensure that finished grade meets flush at surface structures, project boundaries and property lines.

- e. Rake topsoil to obtain even running and given levels and remove surface rock. **(Detail Sheet #28).**
- f. Make good any damage caused by topsoil spreading activities.
- g. Control dust so as to have no impact on surrounding land uses.
- h. Clean all adjacent walks, streets and properties as a result of work done under this section at the end of each working day or as directed.

.11 Spreading of Topsoil – Natural Areas, ER's

- a. See above "Spreading of Topsoil," subsections a, d, f, g and h.
- b. In restoration the depth and finish grade of the topsoil should be tied to the depths and finish of the pre-existing native profile. This should be specified in the restoration plan and approved by The City of Calgary Parks.
- c. Rough grade topsoil to ensure positive drainage and to emulate the pre-development drainage patterns and rates.

2. Sodding

.1 Description and Quality Assurance

This section specifies the supply and placing of cultivated sod. The Contractor must have experience at performing this type and scale of work and be willing to provide proof of this experience.

.2 Product Delivery, Storage and Handling

- a. Cut sod by approved methods in accordance with recommendations of the Canadian Nursery Landscape Association (CNLA).
- b. Roll or fold sod prior to lifting, in such a manner as to prevent tearing or breaking.
- c. Protect sod during transportation to prevent drying out and ensure its arrival at the site in a fresh and healthy condition.
- d. Sod should be installed upon arrival. If there is a delay in installation due to weather, keep the sod moist and cool and protected from direct exposure to the sun until installation. The City of Calgary Parks will reject sod that has dried out.
- e. Provide fertilizer in standard manufacturer's containers, clearly marked with the name of the manufacturer, weight and analysis.

.3 Inspections

- a. The Contractor shall have an approved set of drawings and specifications available prior to calling The City of Calgary Parks for an inspection.
- b. Make all materials, including sod, available for inspection upon arrival on the site, or at source of supply when requested. Also, verify names of suppliers when requested.
- c. Give timely notice (see Inspections page 35) when materials are available for inspection.
- d. Obtain approval of finished topsoil surface by The City of Calgary Parks before proceeding with sodding.
- e. The City of Calgary Parks reserves the right to reject sod after it has been installed if: the sod does not conform to the specification and/or drawings; each grass species within the sod does not show signs of survival; the root system is not strong and fibrous; the sod is not free of stones; or if the sod shows signs of burned or bare spots.

- f. Remove all rejected materials immediately from the site.

.4 Materials

- a. **Number One Kentucky Bluegrass-Fescue Sod:** Good quality blue grass and fescue mix suitable for the Alberta climate.
- b. **Fertilizer:** Type and application rate to be determined by soil test.
- c. **Wooden pegs or approved equal:** ensure pegs are long enough to securely anchor sod.

.5 Preparation and Installation (Detail Sheet #29)

- a. Proceed with sodding operation only during favourable weather conditions and in accordance with good horticultural practice.
- b. Apply slow release fertilizer (NPK 2-4-1) i.e. 12-25-10 at a rate of 3.5lb of phosphorous per 1000 ft². Desired nitrogen makeup shall be 50% water-soluble and 50% polymer coated urea (slow release). This is subject to adjustment upon time of year and receipt of the topsoil analysis report and the Contractor's recommendation as outlined in Section III.1.7, Inspections/Topsoil Test (page 75).
- c. Provide a finished topsoil surface that is smooth and firm with a fine, loose texture, free of rocks, weeds and debris over 50mm in diameter, before sod is placed (**See Detail Sheet #28**).
- d. Lay sod with tight butt joints. Do not leave any open joints or overlap adjacent pieces of sod. Ensure that adjacent rows are laid in a staggered sequence.
- e. Ensure finished sod surface is flush with adjoining grass areas, pavement or top surface structures such as curbs, manholes, sidewalks, irrigation boxes, etc.
- f. On slopes steeper than 3H:1V lay sod across the face of the slope and peg each row at intervals of not more than 600mm. Secure in an approved fashion.
- g. Lay sod to a width of 3m in swales and place perpendicular to direction of swale, unless otherwise noted on drawings.
- h. Immediately after installation of sod, water area with sufficient amounts to saturate sod and underlying topsoil to a minimum depth of 100mm.

- i. After the sod and soil have dried sufficiently to prevent damage, roll the areas, if required, to ensure good bond between sod and soil and to remove minor irregularities. Clean up and remove off site all waste and extra sod at the end of each day or as directed.
- j. Protect all newly sodded areas as required.
- k. Remedy all damages, washouts and eroded areas resulting from weather, improper protection or other causes.

.6 Maintenance and Acceptance

- a. Maintain sodded areas according to the Landscape Maintenance Section (Page 165) from the time of installation until Final Acceptance Certificate is issued by The City of Calgary Parks.
- b. Prior to acceptance, sod and water all bare spots larger than 15cm². Acceptance will be given upon establishment of sodded area.

3. Seeding

.1 Description and Quality Assurance

This section specifies the supply and placing of grass seed. The Contractor must have experience at performing this type and scale of work and must be willing to provide proof of this experience.

.2 Product Delivery, Storage and Handling

Deliver grass seed, fertilizer, mulch and other materials in standard containers, clearly marked with contents, weight, analysis and name of supplier or manufacturer. Ensure that the quantities of each seed species within seed mixtures are clearly marked.

.3 Inspections

- a. The Contractor shall have an approved set of drawings and specifications available prior to calling The City of Calgary Parks for an inspection.
- b. Make all materials, including seed, available for inspection, upon arrival on the site, or at source of supply when requested. Also verify names of suppliers when requested.
- c. Give timely notice (see Inspections page 35) in writing, when materials are available for inspection.
- d. Obtain the approval of The City of Calgary Parks of the finished topsoil preparation before proceeding with seeding. **(Detail Sheet #28)**.
- e. Where a hydro-seeding method is used, notify The City of Calgary Parks 24 hours before loading seeder and allow for an inspection at location of loading operation. Also, provide all identification labels from materials placed in hydro-seeder. Failure to notify The City of Calgary Parks before loading occurs could result in rejection of the seeding operation.
- f. Installation of seed prior to inspection is the Contractor's responsibility. During an inspection, The City of Calgary Parks reserves the right to reject seed if seed does not conform to specifications.
- g. Remove all rejected materials from site immediately.

.4 Materials

- i. **Grass Seed:** certified Canada No. 1 seed, free of disease, weed seeds or other foreign materials, meeting the requirements of the Seeds Act. All cultivars listed below must be rated in the top 25th percentile of the National Turfgrass Evaluation Plots (NTEP) located in Alberta.

The following are grass seed mixes approved by The City of Calgary Parks and their appropriate application for use:

- i. **Urban A:** for slopes up to 3H:IV, highway boulevards, interface areas and other areas where irrigation is not available; a coarse grass mixture composed of:

Kentucky Blue Grass	20%
Creeping Red Fescue	35%
Annual Rye	30%
Perennial Rye Grass	15%

NOTE: The annual rye grass may be replaced with crested wheat when, in the opinion of Calgary Parks, the crested wheat grass will not be invasive to a natural area.

- ii. **Urban B:** for play fields, joint use sites, residential boulevards and other non-irrigated but high use areas; a medium grass mixture composed of:

Kentucky Blue Grass	40%
Creeping Red Fescue	45%
Perennial Rye Grass	15%

- iii. **Urban C:** for irrigated tot lots, decorative and athletic parks; a fine grass mixture composed of:

3 varieties of Kentucky Blue Grass	75%
Creeping Red Fescue	15%
Perennial Ryegrass	10%

Urban A, B and C grass mixtures are applied at a rate of not less than 30g/m² or 300kg/ha.

- iv. **Urban D:** a native grass seed for reclamation of Environmental Reserves and Natural Areas where maintenance and irrigation are not available. A proposed grass seed mix that makes every attempt to use seed that is native (locally indigenous) to the Calgary region must be submitted. The mix should be based primarily on wheat grasses and will be approved on a site-specific basis. Substituting due to lack of availability of native seed must be approved in advance by The City of Calgary Parks. Submissions must indicate seed suppliers for verification of source. Upon approval of the proposed grass seed mix, a

seed analysis certificate shall be submitted for approval by The City of Calgary Parks prior to application. Application rates to be determined on a site-specific basis.

- v. **Urban E:** a wildflower seed mixture for use as an option to Urban D in reclamation of Environmental Reserves and Natural Areas where irrigation and maintenance will not be available. It should be composed of a minimum of 10 perennial wildflower species applied at a rate of not less than 1gm/m² or 10kg/ha with an approved bunchgrass at 2.5gm/m² or 25kg/ha. A proposed wildflower mix must be submitted to The City of Calgary Parks for approval.

- vi. **Urban F:** a slow growing, low maintenance mix for medium use park areas where a more natural grassland appearance is desired on a non-irrigated site; a grass mixture composed of:

3 varieties of Kentucky Blue Grass	20%
Creeping Red Fescue	40%
Lowgrow Perennial Ryegrass	15%
Hard Fescue	25%

Urban F grass mixture is to be applied at a rate of not less than 20g/m² or 200kg/ha.

Where practical, Urban A, B, C and F grass mixtures can be used adjacent to natural areas only if a suitable barrier can be provided (such as a pathway) to prevent the Urban mix from encroaching into the native community.

- b. **Fertilizer:** type and application to be determined by soil test.

- c. **Hydromulching** (as per Public Works Canada specifications)

- i. **Mulch:** Approved wood fibre mulch manufactured from whole wood chips and containing no growth or germination inhibiting factors. The following specifications shall apply: Percent moisture content - 10%; percent organic matter - 99.2%; percent ash content - 8%; pH - 4.8%; water holding capacity - 1000gms/100gms of fibre. Percent moisture content is determined in accordance with the Canadian Pulp and Paper Association, Technical Section, Standard A.2.

The area of coverage for a hydroseeder is based on the water carrying capacity of a mulch and the volume of water that a seeder carries. The following is the water carrying capacity for various mulches. It is quoted as the number of kg's of mulch necessary to hold 1000 litres of water.

Manufacturer	Kg/1000 L
Fibramulch	46.84
Silva-Fiber	50.00
Verdyol Standard	37.9

The following is an **example for calculating the amount of mulch necessary per hydroseeder** if Fibramulch is being used:

- Hydroseeder volume is 3300 US gallons
- 3.785 is the conversion factor for US gallons to Liters
- 1000 is the water carrying capacity constant

$$\frac{\text{Hydroseeder Volume} \times 3.785}{1000} \times \text{Water Carrying Capacity}$$

$$\frac{3300 \times 3.785}{1000} \times 46.84 = 585 \text{ kg}$$

Therefore, each hydroseeder load requires 585 kg of mulch. Since Fibramulch comes in 50 lb. or 22.7 kg bags, each tank load would require 25.77 bags.

The following are the **rates for the application of mulch**:

Slope and/or Wind Conditions	Rate
<6:1 (H:V) Light Wind	1400 kg/ha
6:1 to 3:1 Medium Wind	1700 kg/ha
>3:1 High Wind	2000 kg/ha

The following is an **example of calculating the area of coverage per hydroseeder load on a >3:1 slope**:

- Application Rate is 2000 kg/ha (see above table)
- 10000 is the conversion factor from ha to m²
- Area covered is in m²
- Mulch per tank is 585 kg from previous calculation

$$\frac{\text{Mulch Per Tank} \times 10000}{\text{Application Rate}} = \text{Area Covered}$$

$$\frac{585 \times 10000}{2000} = 2925 \text{ m}^2$$

Therefore, the area of coverage per hydroseeder load is 2925 m² whether it is doing seeding, fertilizing or erosion control.

- ii. **Tackifier:** Acceptable colloidal polysaccharide tackifier, adhering to mulch during manufacturing, non-toxic and without growth or germination inhibiting factors. Apply as per labeled manufacturer's specifications for slopes 4:1 and greater.

The following are the **recommended rates for the application of TA200 tackifier:**

Slope and/or Wind Conditions		Rate
<6:1 (H:V)	Light Wind	50 lbs./acre
6:1 to 3:1	Medium Wind	75 lbs./acre
>3:1	High Wind	100 lbs./acre

The following is an example of **converting the application rate from lbs./acre to kg/ha:**

- 0.4047 is the conversion factor for acres to ha
- 0.4536 is the conversion factor for lbs. to kg
- Application rate is 100 lbs./acre(see above table)

$$\frac{\text{Application Rate} \times 0.4536}{0.4047} = \text{Metric Rate}$$

$$\frac{100 \times 0.4536}{0.4047} = 112$$

Therefore, the metric application rate is 112 kg/ha.

The quantity of tackifier per tank load is calculated as follows:

- Area of coverage (as previously calculated) = 2925 m²
- Application Rate (kg/ha) = 112
- Conversion factor from ha to m² = 10000

$$\frac{\text{Seeder Coverage} \times \text{Application Rate}}{10000}$$

$$\frac{2925 \times 112}{10000} = 33.6$$

Therefore 33.6 kg of tackifier is required per hydroseeder load.
The following is packaging information on TA200 Tackifier:

1 Pail = 50 lbs. = 22.68 kg ~ 20 litres

The following calculates the number of containers of Tackifier:

$$\frac{\text{Weight per Tank Load}}{\text{Weight per Container}} = \text{Number of Containers}$$

$$\frac{33.6}{22.68} = 1.48$$

Therefore, each hydroseeder load will have 1.48 pails of tackifier.

iii. Quantities of Seed in a Hydroseeder

The quantity of seed in a hydroseeder is calculated as follows:

$$\frac{\text{Seeder Coverage} \times \text{Seed Application Rate}}{10000}$$

The following are seed application rates as per the Development Guidelines and Standard Specifications:

Seed Mix	Application Rate
Urban A, B & C	300 kg/ha
Urban D	Site Specific
Urban E	25 kg/ha
Urban F	200 kg/ha

If the project calls for Urban F on the job site then the quantity of seed is calculated as follows:

$$\frac{2925 \times 200}{10000} = 58.5$$

Therefore, each hydroseeder tank load will require 58.5 kg of seed. Based on 25 kg per bag of seed, each hydroseeder load will require 2.34 bags.

iv. Quantity of Fertilizer in a Hydroseeder

Fertilizer rates are variable and they depend on the results of a soil analysis and the type of fertilizer applied. For this example it is assumed that 16-20-0 fertilizer is being applied at 400 kg/ha. The result would be the following calculation:

$$\frac{\text{Seeder Coverage} \times \text{Fertilizer Application Rate}}{10000}$$
$$\frac{2925 \times 400}{10000} = 117$$

Therefore, each tank load will require 117 kg of fertilizer. Based on 20 kg per bag of fertilizer, each hydroseeder load will require 5.85 bags.

.5 Preparation and Installation

- a. Provide a finished topsoil surface prior to seeding that is: conducive to seed growth; even running and to finish grades; free of rocks over 25mm in diameter; and free of weeds and debris (**Detail Sheet #28**).
- b. Ensure that finish grade meets flush and smooth with adjacent grades and surface structures such as curbs, manholes, sidewalks, irrigation boxes, etc.
- c. On slopes exceeding 3H:1V and where hydro-seeding is the application technique to be used, track packing is an acceptable form of preparation subject to meeting conditions in items a. and b. above. The long ridges of the tread are to run across the face of the slope.
- d. Apply 91kg/ha of 16-20-0 fertilizer at the time of seeding and then, two months into the growing season apply 32kg/ha of 32-4-8 fertilizer. This rate is subject to adjustment upon receipt of the topsoil analysis report and the Contractor's recommendation as outlined in Section III.1.7, Inspections/Topsoil Test (page 75).
- e. Do all seeding in accordance with good horticultural practice during the period from May 1 until September 30, or as weather permits and when wind speeds are minimal and site conditions are approved by The City of Calgary Parks.
- f. Two means of applying seed are acceptable to The City of Calgary Parks:
 - i. hydraulically-seeding, and
 - ii. mechanical or "Brillion" type seeding.

Hand broadcasting of seed is unacceptable under any conditions except for isolated repair work.

- g.** Protect all newly seeded areas as required.
- h.** Remedy all damaged areas and maintain until turf has properly established.

.6 Maintenance and Acceptance

- a.** Maintain seeded areas according to the Landscape Maintenance Section (page 165) from the time of installation until Final Acceptance Certificate is issued by The City of Calgary Parks.
- b.** Prior to acceptance, top dress, seed and water all bare spots larger than 15cm². Acceptance will be given upon germination of seeded areas.

PATHWAYS, TRAILS and PAVING STONES

IV. PATHWAYS, TRAILS and PAVING STONES

1. Pathways

.1 Planning Guidelines

The following list of guidelines is intended to assist in the development of a high-quality and fully integrated pathway system. It includes legal requirements, official policies, established standards and practices and desirable standards and is a local supplement to the existing standards in "Guidelines for Design of Bikeways" by the Roads and Transportation Association of Canada.

The objective of the planning guidelines is to lay out a pathway network which links together residential area parks, natural areas, riverbanks and public recreational facilities.

a. Pathway Classification

i. Regional Pathway System:

The regional pathway system is a city-wide linear network that facilitates non-motorized movements for recreation and transportation purposes. The regional pathway is hard-surfaced, typically asphalt and located off-street. It is a multi-use facility and no one user or type of user is to be given preference. The spine of the system parallels the major physical features of the river valleys park system, including waterways, escarpments and ravines. It should be designed as a continuous facility that connects individual communities to:

- City-wide and Regional Parks and recreation facilities;
- Natural features, including water courses, escarpments, ravines, river valley parks and associated open space;
- Regional joint use sites, commercial districts, employment centres, adjacent communities and key cultural attractions;
- Local pathways, bikeways and trail systems; and
- LRT stations and transit routes.

ii. Local Pathways:

A local pathway is a pathway that provides secondary routes within communities, linking residential areas to facilities such as neighbourhood parks, schools and other local community designations. Local pathways may also serve as links to the regional pathway system.

b. Alignments

Pathways shall be shown schematically in an Area Structure Plan; and have their alignment confirmed at the Outline Plan and Construction Plan stages in accordance to the Council approved Calgary Pathway & Bikeway Plan.

- i. Pathways, where desirable, should be routed along the edges of environmentally significant areas or into locations with less sensitivity in natural environment parks in order to minimize the impact on the park and reduce future damage and desire lines.

c. Linear Parks

- i. Linear parks provide open space connections within and between communities through a formal pathway network. They should accommodate a regional pathway or perform a linear recreation function for the community as a whole by providing local or regional pathway links to educational, recreational, and open space features (e.g. natural environment parks).
- ii. Overland drainage features should be contained in linear parks only when they do not diminish the primary recreational and aesthetic function of the park, and do not occupy more than one-quarter of the park's width. Otherwise, the overland drainage feature should be contained in a Public Utility Lot.
- iii. Utility rights-of-way should not interfere with the recreational, environmental and urban design functions of a linear park.
- iv. Linear parks should have a minimum width of ten (10) metres and a maximum width of twenty (20) metres.

d. Boulevards

- i. Avoid routing pathways along boulevards in front of residential properties.
- ii. Avoid routing pathways along boulevards where spacing of driveways and cross-streets is less than 200m.
- iii. Provide either an asphalt multi-use pathway or parallel asphalt bicycle pathway and concrete sidewalk.

e. Pathway Easement

Where an easement has been required for a pathway, ensure it is of an adequate width to facilitate the design and safe function of the pathway.

f. Street Crossings

- i. Route pathways to street intersections where possible.
- ii. Mid-block crossings are discouraged and permitted on local streets only. If mid-block crossings occur appropriate signage is to be installed by The City of Calgary.
- iii. Avoid necessity for building mid-block pedestrian overpasses on major streets.
- iv. Adjust subdivision layout to minimize quantity of crossings.
- v. Line up pathway entrances to ensure visual continuity.

g. Play Equipment Sites

- i. Regional pathways should not be within a minimum of 5.0m from play area surfaces.
- ii. Provide a minimum 2.0m wide asphalt link from the play equipment site to a local or regional pathway.

h. Parking Lots

- i. Route pathways around; avoid through.
- ii. Provide asphalt links from parking lots to pathways.
- iii. Locate pathway entrance at street.

i. Natural Areas

- i. Encourage back sloping gradient to 2:1 to minimize disturbance.

.2 Design Guidelines

The objective of the design guidelines is to produce a safe and enjoyable pathway incorporating the needs of multiple users (i.e. walkers, children's strollers, runners/joggers, people with disabilities, cyclists, in-line skaters and skateboarders), and therefore, stringent attention must be given to design details. Where location and design considerations prevent both transportation and recreation functions from being accommodated together, the recreation function should be given a higher priority. In addition to the following guidelines, section 2.7, Pathway Design Guidelines, of the Council approved Pathway & Bikeway Plan Report should be applied.

a. Surface Materials

- i. Regional pathways are hard-surfaced typically of asphalt pavement to accommodate multiple users.
- ii. Local pathways and pathways oriented to pedestrian traffic can be made up of a variety of materials depending on use.

b. Width

- i. 2.0m minimum for local pathways.
- ii. 2.5m minimum for regional pathways.
- iii. 3.5m minimum for river pathways.
- iv. 2.5m minimum pedestrian pathways and 2.5m minimum bicycle pathway for twinned pathways.

c. Safety Clearance and Setback requirements

- i. Provide 1.0m clear of all obstacles on both sides.
- ii. Provide 3.0m clear of all obstacles overhead.
- iii. Avoid locating pathways over manholes.
- iv. Ensure a 2.5m minimum clearance from park water services.
- v. Set back pathways a minimum of 1.0m from face of curb.

d. Safety Railings

- i. Safety railings shall be installed when a pathway is within two (2) metres of the top of a 2:1 slope or steeper, and the slope is greater than or equal to one (1) metre in depth.
- ii. Under exceptional circumstances and subject to approval by Parks after an appropriate risk assessment, a safety railing may not be required. If a risk assessment is required it shall be provided by The City at no cost to the Developer.
- iii. Minimum railing height and design to be as per **Detail Sheet #30** or to be an equivalent as approved by The City of Calgary Parks.
- iv. Chain-link fence is only acceptable when the fabric is attached to, but not protruding above, the top rail.
***NOTE:** Attachment will be with a knuckle finish.*
- v. Wooden fences are not desired.

e. Pathway Junctions

- i. Where possible, ensure pathways join at right angles.
- ii. Provide widening of pathways with radius of 4.0m where pathways join other pathways. **(Detail Sheets #32)**

f. Pathway Entrances/Wheel Chair Ramps

- i. Extend pathway to street curb in all cases.
- ii. Ensure pathway joins street at right angles.
- iii. Provide a standard steel bollard **(Detail Sheets #31 & 32)** where the entrance to a pathway is on a street.
- iv. Provide a **concrete wheelchair ramp (Detail Sheet #33)**, as required, where the entrance to a pathway is on a street and there is an existing concrete sidewalk.
- v. Provide an **asphalt wheelchair ramp complete with depressed concrete curb (Detail Sheet #34)** as required, where the entrance to a pathway is on a street and there is no existing concrete sidewalk.
- vi. Line up entrances for visual continuity where pathway route crosses street.
- vii. Ensure no catch basins are located at the entrance.

g. Sight-lines

Where possible, ensure no obstructions to visibility within 5.0m of junction with other pathways and streets (trees, shrubs, utility boxes, fences, etc.).

h. Criteria for Bicycles

- i. Maximum grades:
 - over 8%: re-route or provide stairs.
 - 5% to 8%: not longer than 50m (keep bicycles and pedestrians separate and avoid curves and constrictions).
 - 3% to 5%: not longer than 200m.
 - under 3%: acceptable.
- ii. Design Speed - flat terrain: do not exceed 35km/hr; downgrades: do not exceed 50km/hr.
- iii. Super-elevation - on curves: 2%; maximum 5%.

- iv. Stopping Sight Distances - stopping sight distance is described below:

$$\text{Minimum SSD} = v^2/[255 (f+g)] + 0.695v$$

Where: SSD = stopping sight distance

v = bicycle design speed (typically 30km/hr)

f = coefficient of friction = 0.25

g = grade m/m (rise or descent/run)

The following table may also be used to obtain appropriate stopping sight distances.

NOTE: A stopping site distance of 35.0m is considered a standard guideline:

	Level	Ascending		Descending	
Gradient	0%	2.5%	5%	2.5%	5%
SSD	35m	33.5m	32.5m	36.5m	38m

- v. Minimum Design Curve Radii - the minimum design curve radii is as follows:

$$\text{Minimum } r = v^2/[127 (e+f)]$$

Where: r = minimum radius

f = coefficient of friction = 0.25

e = super elevation

v = bicycle design speed (typically 30km/hr)

The following Table may also be used to obtain the appropriate minimum radius for asphalt pathways with 2% banking.

NOTE: A minimum design curve radii of 5.0m is considered a standard guideline:

Speed	10 km/hr	15 km/hr	20 km/hr
Radius	2m	5m	9.5m

i. Stairs

- i. Where possible, avoid use within a pathway network.
- ii. Install bicycle ramp along one side where stairs are unavoidable.

j. Lighting

- i. Provide on local and regional pathways as required by the Transportation Department and the Linear Park Policy.
- ii. Provide on river pathways in the downtown part of the city consistent with the boundaries defined in the Center city Plan.

k. Pedestrian Bridges and Overpasses

- i. Railing height as per building code.
- ii. Minimum deck width 3.0m (between railings).
- iii. Submit concept drawings to The City of Calgary Parks, however, final approval will come from the Bridges Section of the Roads Business Unit. Ensure all drawings are stamped by a professional Engineer.

l. Vehicular Bridges and Overpasses

- i. In general, ensure sidewalks for pedestrians and widened shoulder lanes for cyclists are provided along both sides of structure.
- ii. Where bridge is part of pathway system, ensure combined pathway and sidewalk is provided along both sides of structure.
- iii. Railing height as per building code.
- iv. Minimum pathway width to be 3.0m.
- v. Submit concept drawings to The City of Calgary Parks, however final approval will come from The City of Calgary Transportation Infrastructure Structural Design business unit. Ensure a Professional Engineer stamps all drawings. The Developer is to ensure that the proposed structure conforms to all applicable City Bylaws and provincial Building Code

m. Pedestrian Underpasses

- i. Minimum height 3.0m and minimum width 3.0m.
- ii. Ensure drainage is kept in concrete swale along one side.
- iii. Ensure well lighted.
- iv. Desirable maximum length 50m; provide break in underpass within median of divided roadways.

n. Signage

- i. Provide standard identification signs with pathway name (Traffic Operations #14-700 series) at pathway entrances.
- ii. Provide standard hazard warning signs (see Traffic Operations Sign Manual) where appropriate.
- iii. Provide centre line pavement marking on regional and river pathways and on separated bicycle pathways (75mm wide, yellow paint).
- iv. Provide double centre line pavement marking at hazardous locations (50+ 50mm wide, yellow paint).

o. Design Drawings References

- i. Submit to The City of Calgary Parks for approval for all local and regional paths as outlined in Construction Plan Requirements (page 26).
- ii. "Guidelines for Design of Bikeways," Roads and Transportation Association of Canada.
- iii. "Recreational Pathways," National Capital Commission, Ottawa.
- iv. "Technical Handbook of Bikeway Design," Velo, Quebec.
- v. "Planning & Design Criteria for Bikeways in California," California Department of Transportation.

p. Root Barriers

To protect pathway sections in the vicinity of aggressive rooting species, install root barriers (**Detail Sheet #37**) along sections of pathways that run through Environmental Reserves, Environmentally Significant Areas or Municipal Reserves where natural vegetation is being preserved and that have species of the Poplar family (except Aspen) or Willow family located within a five (5) metre set back of the edge of pathway. Root barriers will not necessarily run continuously through the Environmental Reserves, Environmentally Significant Areas or Municipal Reserves. They will only be installed where there are encroaching species as per **Detail Sheet #37a**.

.3 Standard Specifications

a. Description and Quality Assurance

This section specifies the construction of functional and cost effective pathways. The Contractor must have experience at performing this type and scale of work and be willing to provide proof of this experience.

b. Inspections

- i. The Contractor shall have an approved set of drawings and specifications available prior to calling The City of Calgary Parks for an inspection.
- ii. The Contractor shall obtain approval for the pathway alignment and sub-base (i.e. compaction and depth of gravel) prior to surfacing with asphalt.
- iii. Regional pathways within the Streets' right-of-way and **not** doubling as sidewalks shall be inspected and maintained by The City of Calgary Parks.
- iv. Regional pathways within the Streets right-of-way and doubling as sidewalks shall be inspected and maintained by the Roads Division.
- v. Regional pathways that are constructed in lieu of sidewalks and meander in and out of the Streets right-of-way shall be inspected and maintained by the Street Division.
- vi. All Regional pathways, except those noted in items b.iv. to b.v. above, shall be inspected and maintained by The City of Calgary Parks.

c. Materials

- i. **Sub-base:** 25mm crushed gravel.
- ii. **Surface:** City mix "B" hot mix asphalt.
- iii. **Bollard (Detail Sheets #31 & 32):** schedule 20 steel pipe minimum 140mm outside diameter; 1m height with 0.75m in ground in concrete; steel cap welded on. Bollard to be painted white with 2 strips of reflective tape. All paint is to be powder-coated polyester. The bollard will be permanent unless a service vehicle cannot maneuver around it. In this case, it shall be removable.

- iv. **Root Barriers:** 40mil.* thickness HDPE (high-density polyethylene) product or approved equal (**Detail Sheets #37 & 37a**). **NOTE:** * mil. Unit of measurement used for plastic thickness; 40mil. = 1mm.

d. Installation (Detail Sheets #35 & 36)

- i. Compact subgrade to 98% S.P.D.
- ii. Compact sub-base to 98% S.P.D. The sub-base shall be 100mm thick of 25mm crushed gravel.
- iii. Surface with 75mm thick asphalt to ensure:
 - Density values shall be established by Marshall Method – 50 blows with mechanical compaction. Minimum density of 96% of its maximum design density. Densities less than 96% shall be paid for as shown in the “Standard Specifications Streets Construction” item 308.05.02
 - central crown with 2% cross fall except where super elevation required on a curve; and
 - no trapped low areas on pathway surface.
- iv. Ensure pathways are not used as drainage swales. Use swales and culverts (**Detail Sheet #38**) to ensure there is positive drainage away from the pathway surface. Culverts are to be sized according to adequately handle the anticipated flow.
- v. Place good quality (raked and rolled) topsoil and sod, unless otherwise specified, on turf areas damaged by construction.
- vi. Ensure that the sod surface is flush with the pathway edge.

e. Maintenance

- i. Maintain pathways according to the Landscape Maintenance Section (page 165) from the time of installation until Final Acceptance Certificate is issued by The City of Calgary Parks.

2. Trails

Trails are constructed linear paths with a granular surface generally located in natural areas. As a management tool they identify intended public routing and can formalize desire lines to minimize impact on the natural environment.

.1 Planning Guidelines

a. Alignments

- i. Use trails to give low impact and low cost pedestrian access to parks, natural areas, riverbanks, and sensitive or steep areas where pathways are not appropriate.
- ii. Use trails as a secondary system to pathways.
- iii. Ensure trail alignments correspond to Natural Areas Management Policy, Area Structure Plans, Outline Plans and other Council-approved policy documents.
- iv. Locate crossings of major roads at overpasses or signalized intersections.
- v. Send proposed route plans for all natural areas and Environmental Reserve parcels to The City of Calgary Parks for approval.

.2 Design Guidelines

The objective of these design guidelines is to produce safe and enjoyable trails incorporating the needs of pedestrians, skiers and the disabled where possible, while respecting the surrounding environment.

a. Natural Areas

- i. Align trails around significant areas and sites; never through.
- ii. Avoid damage to natural features, vegetation and wildlife habitat.
- iii. Increase back sloping gradient to 2:1 to minimize fill coverage.
- iv. Send proposed design plans for all natural areas and Environmental Reserve parcels to The City of Calgary Parks for approval.

b. Surface Materials

- i. Dirt for informal trails.
- ii. Wooden chips, red shale, or crushed gravel (crusher fines) for formal, designed trails.

c. Width

- i. 0.3m to 0.5m for informal trails.
- ii. 0.5m to 1.5m for formal designed trails.

d. Slope Grades

- i. Less than 3% is required if to be wheelchair accessible.
- ii. Less than 5% is ideal.
- iii. 5% to 10% is acceptable.
- iv. More than 10%: provide switchbacks or stairs.

e. Safety Clearance

- i. Provide minimum 0.5m clear of all obstacles on both sides (i.e. trees, signs, light poles etc.).
- ii. Provide minimum 2.1m clear of all obstacles overhead (i.e. tree branches, bridges, etc.).

f. Safety Railings

- i. Minimum railing height and design to be as per **Detail Sheet #30** or to be an equivalent as approved by The City of Calgary Parks.
- ii. Usually of galvanized steel or wood.
- iii. Install where a trail is within 1m of the top of a 2:1 slope or steeper, and the slope is greater than or equal to 1m in depth.
- iv. Chain link fence is less desirable and is only acceptable when the fabric is attached to but not protruding above, the top rail.
NOTE: Attachment will be with a knuckle finish.

g. Stairs

- i. Avoid if the trail is to be accessible to skiers and wheelchairs.
- ii. 1m to 2m wide; of wood or rock; handrails as required for safety.

h. Amenities

- i. In general, provide one trail entrance every 150m or as needed.
- ii. One park bench every 250m; one picnic table every 500m. Environmentally sensitive areas should be assessed on a site by site basis.

i. Bridges

- i. Railing height as per building code.
- ii. Minimum deck width: 1.5m between railings.
- iii. Material examples: log stringers, laminated wooden beams, prefabricated steel and pre-cast concrete.
- iv. Submit concept drawings to The City of Calgary Parks, however, final approval will come from the Bridges Section of the Roads Business Unit. Ensure all drawings are stamped by a Professional Engineer.

j. Pedestrian Underpasses

- i. Minimum height 3.0m and minimum width 3.0m.
- ii. Ensure drainage is kept in a swale along one side.
- iii. Ensure the underpass is adequately lighted.
- iv. Desirable maximum length 50m; provide opening in underpass within median of divided roadways.

k. Accessible Use

- i. Primarily includes people in wheelchairs or without sight.
- ii. The needs of these users are more stringent than for other walkers.
- iii. To fully accommodate all users in trail design, consult Section "O" - "Recommended References," page 104.

I. Cross Country Skiing

- i. The needs of skiers are more stringent than for walkers.
- ii. To fully accommodate skiers in trail design, see Section "o" - "Recommended References," page 104.

m. Signage

- i. Provide standard signs with trail name (see Parks and Pathways Sign Manual) at trail entrances and important junctions to ensure continuity and legibility of trail routes where appropriate.
- ii. Provide standard hazard warning signs (see Parks and Pathways Sign Manual) where appropriate.

n. Design Drawings

- i. Submit design drawings to The City of Calgary Parks for approval for all trail proposals in Environmental Reserves and naturally vegetated areas.
- ii. Ensure plans are at minimum 1:500 scale and include proposed trail details, gradients, and signage, plus adjacent park and land uses and roadways.

o. Recommended References

- i. "Trail Manual" Parks Canada, 1978.
- ii. "Recreation Trails," Alberta Recreation and Parks, 1989.
- iii. "Trail Design, Construction and Maintenance Manual," Ontario
- iv. "Trail Building & Maintenance," Appalachian Mountain Club.
- v. "Sentiers Quebec," Comite Quebecois des Sentiers de Randonnee, 1979.
- vi. "Disabled Access Design Guidelines," The City of Calgary, 1988.
- vii. "Cross Country Ski Trail Development," Alberta Recreation and Parks, 1979.

.3 Standard Specifications

a. Description/Quality Assurance

This section specifies the construction of safe, functional and cost effective trails. The Contractor will have experience at performing this type and scale of work and be willing to provide proof of this experience.

b. Inspections

- i. The Contractor shall have an approved set of drawings and specifications available prior to calling The City of Calgary Parks for an inspection.
- ii. The Contractor shall obtain approval for the trail alignment prior to surfacing.

c. Materials

- i. Compacted dirt, wooden chips, granular trail mix, red shale, fine gravel-clay mix or crushed gravel depending on use and as approved by The City of Calgary Parks

- ii. **Parks Gravel Trail Mix**

This product has been customized for pedestrian and bicycle oriented trails; it is not suitable for extensive vehicle use. Moisture content and timely compaction are important when placing this material. Contractors can inquire to purchase directly from The City of Calgary Roads Materials Plant.

Contact:

City of Calgary Materials Plant Engineer, Ph: (403) 268-4928

Description: Gravelly sand, some silt, trace of clay

Optimum Moisture Content: 7.5%

Grain Size Distribution:

Gravel	—	21.8%
Sand	—	61.5%
Silt	—	12.8%
Clay	—	3.9%

The combined aggregates meet the following gradation:

Sieve Size (mm)	% Passing
16	100
12.5	98 – 100
10	80 – 98
5	55 – 80
2.5	40 – 60
1.25	35 – 50
0.63	28 – 43
0.315	23 – 36
0.160	15 – 25
0.80	8 - 18

Gravel Trail Mix:

The gravel trail mix must be laid upon a dry firm sub-grade, true to grade and cross-section and free from all screening or other loose or foreign material. No gravel trail mix to be installed when the sub-grade is wet or when other conditions prevent proper spreading, finishing or compaction of the gravel trail mix.

Trail mix stockpiles stored on site greater than 30 days will be subject to inspection to ensure mix has retained correct properties (i.e. proportion of fine materials). After 30 days, contractor may be required to re-mix trail mix to ensure correct distribution of materials.

All supply and installation of granular trails shall be as per Standard Specifications, Streets Construction and, Standard Specifications, Landscape Construction. Adherence to the desired mix will enhance life of the product reducing materials from being washed away, broken down and /or the creation of potholes.

- iii. Asphalt or other alternatives only in cases of heavy usage or extreme erosion problems.

d. Installation

- i. Strip existing surface material to allow for a 150mm compacted depth of approved material (see “Materials” section “c” above).

- ii. Haul and place trail mix to allow for crowning and compaction. Material to be placed and compacted on the same day.
- iii. Top of compacted trail mix should be 25 mm higher than adjacent vegetation and existing conditions.
- iv. Provide 3 - 5% cross-fall or central crown as determined by site conditions. Final surface to be level and true with minimal undulations. Ensure that there are no trapped low areas on trail surface. Provide positive drainage away from the surface with diagonal water bars, ditches, swales and culverts.
- v. Finished trail compacted to 95% maximum dry density. Multiple passes by a vibrating roller with the application of water may be required to achieve the specified level of compaction. Ensure no loose fine materials are left on the surface.
- vi. The finished gravel trail surface will be at the same elevation as any connecting existing trails or pathways. All grading will be free draining and is not to impede existing drainage.
- vii. Place topsoil (raked and rolled) and grass seed mix, as approved by The City of Calgary Parks, on areas damaged by construction.

e. Maintenance

Maintain trails according to the Landscape Maintenance Section (page 165) from the time of installation until Final Acceptance Certificate is issued by The City of Calgary Parks.

3. Concrete Paving Stones

.1 Description/Quality Assurance

This Specification shall indicate the manufacturer, delivering, and placing of concrete pavers of various types. The Contractor must have experience at performing this type and scale of work and must be willing to provide proof of this experience.

.2 Materials

a. **Cement** - Shall be Portland Cement conforming to the requirements of CAN3-A5-M77.

b. **Aggregates** - Shall conform to the requirements of CAB3-A23-M77.

c. **Admixtures** - Shall conform to the requirements of CAN-A23.1-M77.

d. **Concrete Compressive Strength** - Prior to delivery to site

Average Strength 55 MPa

Minimum Strength 50 MPa

e. **Absorption** - Maximum individual sample 5% ASTM C140.

f. **Resistance to Freezing and Thawing** - The manufacturer shall satisfy the purchaser either by proven field performance or a laboratory freezing-and-thawing test that the paving units have adequate resistance to freezing and thawing. If a laboratory test is used, when tested in accordance with Section 8 of Method C67, specimens shall have no breakage and not greater than 1.0 percent loss in dry weight, of any individual unit when subjected to 50 cycles of freezing and thawing. This test shall be conducted not more than 12 months prior to delivery.

g. **Abrasion Resistance** - When tested in accordance with Method C418, specimens shall not have a greater volume loss than 15cm³ per 50cm². The average thickness loss shall not exceed 3mm.

h. **Mix Design and Concrete Testing** - The supplier shall, immediately after award of Tender and prior to any casting of interlocking stone, submit to The City of Calgary Parks for approval, the proposed mix design including source of proposed aggregates.

The supplier shall notify The City of Calgary Parks of casting items in order that arrangements for concrete testing and/or inspection can be made as desired, at the expense of The City. The supplier shall allow the Engineer free access to those portions of his plant where the pavers are being produced and stored, for this purpose.

.3 Workmanship and Procedures

- a. Forms** - Shall be true to shape, lines and dimension called for on the drawings. They shall be substantial and tight to prevent leakage of moisture. Maximum tolerance for final dimensions shall be $\pm 2\text{mm}$.
- b. Concrete Compaction** - During casting, sufficient vibratory or other mechanical effort shall be applied to thoroughly compact the concrete.
- c. Moist Curing** - The surfaces of fresh concrete shall be kept continuously moist for a period of at least seven days and shall be protected against the harmful effects of sunshine, drying winds, cold running water, surface water, and mechanical shock. The temperature of the concrete shall be kept at 20° Celsius for not less than seven days.
- d. Steam Curing** - If steam curing is used to maintain a daily cycle of casting, the following criteria for curing shall be adhered to:
 - i.** There shall be a minimum of four hours delay after final placing of the concrete prior to the application of steam.
 - ii.** The maximum rate of temperature rise of the concrete shall be 20° Celsius per hour.
 - iii.** The maximum temperature to which the concrete shall be raised shall be 70° Celsius.
 - iv.** The maximum rate of cooling shall be 20° Celsius per hour.

Immediately after stripping of forms, the members shall be moist or steam cured for an additional five days at a temperature of not less than 65° Celsius.
- e. Handling, Storage and Delivery** - Care shall be taken in the handling, storage and delivery of completed interlocking stone to avoid damage. Damage to units prior to acceptance by The City at the point of delivery shall be rectified by the supplier at no extra cost to The City.

The concrete pavers shall be delivered to the site of work as directed by The City of Calgary Parks, and shall be unloaded and stacked at a specified location.

- f. Visual Inspection** - All units shall be sound and free of defects that would interfere with the proper placing of the unit or impair the strength of permanence of the construction. Minor cracks incidental to the usual methods of manufacture or minor chipping resulting from customary methods of handling in shipment and delivery shall not be deemed grounds for rejection.
- g. Sampling and Testing** - The purchaser, or his authorized representative, shall be accorded the proper facilities to inspect and sample the units at the place of manufacture from lots ready for delivery. Sample and test units in accordance with method C140.
- h. Rejection** - In case the shipment fails to conform to the specified requirements, the manufacturer may sort it, and new specimens shall be selected by the purchaser from the retained lot and tested at the expense of the manufacturer. In case the second set of specimens fail to conform to the test requirements, the entire lot shall be rejected.

.4 The Base (Detail Sheet #39)

Sieve mm	% Passing
9.50mm	100
4.75mm	95 to 100
2.36mm	80 to 100
1.18mm	50 to 85
600µm	25 to 60
300µm	10 to 30
150µm	2 to 10

This sand plus six (6) percent Bentonite shall be used for surface leveling and crack filling.

.5 Sand Bedding Course (Detail Sheet #39)

- a.** The sand-bedding course shall be spread evenly over the area to a level that will produce the required 50mm thickness when the paving stones have been placed and vibrated.
- b.** Once leveled, this sand-bedding course shall not be disturbed in any way.

.6 Installation (Detail Sheet #39)

- a.** Where service vehicles will be traveling on concrete paving stones, the pavers shall be set on a concrete base. The pavers shall be seated on a latex or polymer modified mortar. All joints shall be mortar filled.
- b.** Where service vehicles will not be traveling on concrete paving stones, a subgrade and gravel base each compacted to 95% S.P.D. will be

acceptable.

- c. Edge Restraint** - All edges of the pavers installation shall be restrained. There shall be positive edge restraint and the type of restraint used shall be subject to the approval of The City of Calgary Parks.

d. Laying of Concrete Pavers

- i.** The concrete pavers shall be laid in a pattern approved by The City of Calgary Parks.
- ii.** The concrete pavers shall be laid in such a manner that the desired pattern can be maintained and the joints between the stones do not exceed 3mm.
- iii.** The gaps at the edge of the paved surface shall be filled with standard edge pieces or with stones cut to fit. The stones shall be cut to a straight even surface without cracks or chips.
- iv.** The concrete pavers shall be vibrated to their final level.
- v.** After vibration, sand shall be brushed over the surface and vibrated to completely fill the joints. Sands worked between the paving stones shall be thoroughly mixed with six (6) percent by weight of bentonite clay.
- vi.** Surplus material shall then be swept from the surface and the entire site left clean.
- vii.** After final vibrating, the surface shall be true to line and grade and shall not vary by more than 8mm when tested with a 3m board at any location on the surface.

.7 Maintenance

Maintain concrete paving stones from the time of installation until Final Acceptance Certificate is issued by The City of Calgary Parks.

AMENITIES

V. AMENITIES

1. Development Guideline

The new Land Use Bylaw 1P2007 provides requirements for a Development Permit (DP). Under this bylaw certain amenity structures may require a Development Permit (DP) prior to construction. The Alberta Building Code as provincial legislation also requires the approval of a Building Permit (BP) for certain works. It is the Developer's responsibility to ensure that the proposed development complies with all applicable City Bylaws and provincial Building Codes. Parks approval of the landscape construction drawings does not supersede this requirement.

2. Material and Installation Standards

The following list is a list of all standards and regulations referred to within the Amenities Section of this manual.

All standard specifications are the latest issue, except when a year is mentioned.

A.S.T.M.

A-36-81a Specification for structural steel

A-325-71a Specification for high strength bolts for structural steel

D-693-70 Test for moisture-density relations of soils and soil aggregate mixtures

C.S.A.

0121 - M1978 Douglas Fir plywood

0141 - 1970 Softwood lumber

0151 - M1978 Canadian softwood plywood

G40.21 - 1976 & 2 Structural quality steels supplements

Can 3-G4021 MB1 Structural quality steels

G164 - M1981 Hot dip galvanizing for irregularly shaped articles

W47.1 - 1983 Certification of companies for fusion welding of steel structures

W59 - M1984 Welded steel construction (metal arc welding)

C.G.S.B.

1-GP-40C	Primer, structural steel OI, Alkyd type
CAN 2 - 138.1 - .4-M80	Chain link fence fabric, framework, installation and gates
85-GP-1M	Painting Exterior Wood Surfaces

NOTE: *The preceding standards can be obtained from the following:*

A.S.T.M. American Society for Testing and Materials
1916 Race St
Philadelphia, Pennsylvania 19103

C.S.A. Canadian Standards Association
5060 Spectrum way Suite 100
Mississauga, ON L4W 5N6
1-800-463-6727
www.csa.ca

C.G.S.B. Canadian Government Publishing Centre
Supply and Services Canada
Ottawa, ON K1A 0S9

3. Play Structures

.1 Description and Quality Assurance

This section specifies the supply and installation of Play Structures. The Contractor must have experience in performing this type and scale of work and must be willing to provide proof of their experience.

.2 Inspections

- a. The Contractor shall have an approved set of drawings and specifications available prior to calling The City of Calgary Parks for an inspection.
- b. The design and installation of playground structures must comply with C.S.A. guidelines on children's play spaces and equipment.
***NOTE:** A letter of compliance to C.S.A. guidelines will be required prior to signing a construction completion certificate.*

Canadian Standards Association
5060 Spectrum way Suite 100
Mississauga, ON L4W 5N6
1-800-463-6727
www.csa.ca

- c. Give timely notice (see Inspections page 35) to The City of Calgary Parks when Construction Completion Certificate for work is required.

.3 Materials

- a. Wooden playground structures and surrounding wooden borders shall not be used in construction.
- b. Use nylon locking nuts only.
- c. Playground Edge Restraints (**Detail Sheets #40, 40a & 41**) shall be constructed of plastic timbers or concrete.
***NOTE:** Plastic edge restraints will be of a minimum of 1.5m in length.*

Provide pea gravel or gyrostone base to the following depths:

Height of Platform	Depth
<2.1m	200mm
2.1 to 2.99m	225mm
3.0m or greater	300mm

.4 Equipment Design and Layout

a. Hardware

- i. All suspended elements, such as trapeze bars, rings, tight rope cables and swing seats, shall be fastened at top and bottom by means of a **positive locking system** such as hammer locks or clevis hooks (no quick links) These hooks should have lock tight attachments to prevent removal by equipment users.
- ii. All chains shall be at least ¼" or larger, zinc plated or galvanized.
- iii. Swing Seats and chains shall be connected by means of a **positive locking system** such as hammer locks or clevis hooks (no quick links).
- iv. Eye bolts must be forged or welded.
- v. Bearing hangers shall be complete with oil impregnated bronze bushing and shall be wrap free in design.

b. Slides

- i. The sitting section of all slides shall have protective side enclosures that diminish from guardrail height (i.e. 600mm) to side wall height (i.e. 100mm) in a smooth curve. They shall be designed so that the user's flow of hand movement is unhampered and smooth.
- ii. All sliding surfaces shall have sidewalls to control and guide descent and prevent the lateral discharge of the child during descent. A minimum height of 100mm of sidewall shall be provided and may be reduced to zero at the exiting section.
- iii. All slides shall be oriented north or east (i.e. not south or west).
- iv. Plastics are not to be used in the construction of slides. They shall be constructed out of metals that are not subject to structural degradation such as rust or corrosion.

c. Tube Structures

Tube structures and any other apparatus that restricts visibility into the structure will not be permitted.

d. Swings

The distance between individual swings and the distance between a swing and the swing structure shall be at least 750mm (30in.).

e. Posts

- i. All support post shall be a minimum of 3" square 11 – gauge galvanized tubing, or 3.5" round 11 – gauge galvanized tubing c/w polyester powder coat finish. For structures designed for 5-12 year old children, there is a preference for posts of at least 5" diameter or 5" square.
- ii. Post caps shall be secured by means of electronic weld, rivets or interference fit rib.
- iii. A settlement block, such as 2X6 pressure treated spf, larger than the footprint of the post must be placed at the bottom of the hole prior to installation of posts.

f. Teeter Totters

Teeter totters shall not have inclines more than 25° from the ground and the teeter totter beam shall be of such a length that children are no more than 1.524m (5 feet) from the ground.

g. Bridges

Suspended bridges must have **positive locking system** such as hammer locks.

h. Concrete Anchors

All concrete anchors shall be installed at a minimum depth of 300mm below the surface of the play area.

i. Coatings

All metal surfaces must be galvanized, plated, stainless steel, baked on paint etc. to resist corrosion. All paint must be lead free and conform to industry standard.

j. Signs

If a playground is in a park, the Developer will install "*No Dogs within 20 metres of Play Apparatus*" signs. Signs and posts to be provided by The City.

k. Benches

Subject to providing a universally accessible surface for access, benches may be installed inside the children's play space border. All related CSA Guidelines must be adhered to.

.5 Installation (Detail Sheets #40 to 43)

- a. In parks where play equipment is an appropriate development activity and a play structure is not to be installed by the Developer, a level turf area of 25m² must be made available by the Developer for future installation. Ensure that the future location is clearly labeled on the Layout Plan.
- b. Prior to installation, the Contractor shall submit to The City of Calgary Parks for approval the construction plans as well as the product name and model type or number of the play structure.

Ensure that the base of the play area is constructed to provide adequate surface drainage (**Detail Sheets #42 and 43**).

.6 Maintenance

Maintain play structures according to the Landscape Maintenance Section (page 165) from the time of installation until Final Acceptance Certificate is issued by The City of Calgary Parks.

4. Site Furnishings

.1 Description and Quality Assurance

This section specifies the supply and installation of site furnishings. The Contractor must have experience in performing this type and scale of work and must be willing to provide proof of this experience.

.2 Inspections

Give timely notice (see Inspections page 35) to The City of Calgary Parks when Construction Completion Certificate for work is required.

.3 Design, Materials and Installation

a. General Guidelines

- i. All site furnishings design and specifications must be reviewed and approved by The City of Calgary Parks prior to installation.
- ii. Site furnishings design and finishes should be consistent with site furnishings in adjacent parkland, if applicable.
- iii. All site furnishings should be of a consistent style and type within the community and or development phase.

b. Trash Receptacles

i. Design

- Haul-all containers or equivalent are encouraged but are not mandatory (see item 3.3a above).
- The following applies to non-bear proof containers:
 - metal cladding encouraged, however, if wood is used, it must be a minimum of 2"x4."
 - vandal resistant construction.
 - the container should accommodate a standard 75 litre receptacle that will hold a 66x91cm (26"x36") garbage bag.

ii. Materials

- **Timber Component**
 - kiln dried and nominal size.
 - fir/spruce/pine/cedar species.
 - chamfered on all sides and ends.
 - smooth finish.
- **Metal Component**
 - no special cast pieces.
 - welded joints ground smooth.
 - metal finish to be electrostatically applied or polyester powder coating.
 - vandal resistant zinc coated metal fasteners.
 - galvanized steel is an acceptable option.

iii. Installation

- Provide concrete, asphalt or compacted granular base.
- Ground model types must be bolted to a concrete pad using vandal resistant fasteners as per the manufacturer's requirements.
- Pedestal type must be set in concrete to a minimum depth of 300mm below finish grade.
- Set back trash receptacles at least ten (10) metres from all

park benches where possible.

c. Bench (Detail Sheet #44)

i. Design

- length about 1.8m with back.
- pedestals must be of a schedule 40 metal.
- metal mesh or wooden seat/back.

ii. Materials

- **Timber Component**

- kiln dried and nominal size.
- fir/spruce/pine/cedar species.
- smooth finish.

- **Metal Component**

- no special cast pieces.
- seats and backs to be fabricated from 5 gauge welded wire.
- cap ends appropriately with metal.
- welded joints ground smooth.
- metal finish to be: electrostatically applied; polyester powder coating; hot dip vinyl; or galvanized.
- field repair of metal finish will be accepted if performed in accordance with manufacture's specifications.

iii. Installation

- provide concrete, asphalt pad or compacted granular base.
- seating surface to be 410-440mm above finished grade.
- pedestals must be set in concrete to a minimum depth of 600mm below finished grade.
- ground model types must be bolted to a concrete pad using vandal resistant fasteners as per the manufacturer's requirements.

.4 Maintenance

Maintain site furnishings according to the Landscape Maintenance Section (page 165) from the time of installation until Final Acceptance Certificate is issued by The City of Calgary Parks.

5. Metal Work

.1 Description and Quality Assurance

- a. This section specifies the fabrication, supply and installation of miscellaneous metal items and fasteners.
- b. All work shall conform to The City of Calgary Roads Standard Specifications Roads Construction where applicable.
- c. The Contractor must have experience at performing this type and scale of work and be willing to provide proof of this experience.
- d. The Contractor, where applicable, must be fully approved by the Canadian Welding Bureau under the requirements of C.S.A. W.-47.1. Welding is to be done in accordance with C.S.A. W-59.

.2 Shop Drawings and Submittals

- a. Submit shop drawings for The City of Calgary Parks' review of items as noted.
- b. Show clearly materials, connections, attachments, anchorage and location.
- c. Submit samples of any or all specified materials if requested by The City of Calgary Parks.

.3 Product Delivery, Storage and Handling

- a. Store fabricated metal products and fasteners on racks or skids. Protect from the elements and damage by other materials. Maintain steel in its fabricated form.

.4 Job Conditions

- a. Report in writing to The City of Calgary Parks, prior to commencing work, of any conditions or defects encountered on the site upon which work of this section may depend, and which may adversely effect the performance of the work.
- b. Do not commence work until such conditions or defects have been investigated and corrected.

- c. Commencement of work implies acceptance of surface and conditions and no claim for damages or resulting extra work will be accepted, except where such conditions cannot be determined prior to construction.
- d. Protect all metal products from damage or harmful effects of weather, water, mechanical shock or trespassers until properly installed.

.5 Inspections

- a. The Contractor shall have an approved set of drawings and specifications available prior to calling The City of Calgary Parks for an inspection.
- b. Obtain The City of Calgary Parks approval of the layout before proceeding with subsequent work.
- c. Give timely notice (see Inspections page 35) to The City of Calgary Parks when Construction Completion Certificate for work is required.

.6 Materials

- | | |
|--------------------------|--|
| a. General Purpose Steel | C.S.A. G400-21 |
| b. Bolts and Nuts | A.S.T. A325-71A |
| c. Galvanizing | CGSB G164 650u zinc per m ² |
| d. Primer | CGSB 1-GP-40, oil alkyd type |
| e. Welding Materials | C.S.A. 516 |
| f. Structural Steel | C.S.A. G40-21 |
| g. Paint | Ready mixed non-metal products as detailed and applied according to manufacturer's recommendations |

.7 Fabrication

- a. Verify site dimensions before proceeding with shop fabrication and to suit field conditions.
- b. Fabricate all items in shop to approved Shop Drawings.
- c. Fabricate work complete with components for anchoring. After fabrication, radius all edges, welds and corners.
- d. Welds to be continuous fillet type, ground and filled in exposed locations.

- e. Drill all holes countersinking where required.
- f. Fill open joints, depressions and seams with metallic paste filler or by continuous brazing or welding and grind smooth to true form.
- g. After fabrication, de-scale steel, remove roughness and irregularities, clean oil and grease from surface and prepare for priming and galvanizing.
- h. Where galvanizing is called for, fabricate out of galvanized material and paint all welds with a silver zinc rich paint. Where galvanizing is not called for, the entire structure must be hot-dipped galvanized.
- i. Where priming is called for, apply one full coat of primer.
- j. Paint, where called for, with polyester coat finish or electrostatic. Obtain approval from The City of Calgary Parks on colour and type before proceeding.
- k. Bolts, nuts, washers, screws, nails and all fasteners shall be heavy duty galvanized or stainless steel. Supply all anchorages for attachment to structure as detailed.

.8 Installation

- a. Lay out all work according to drawings and obtain approval from The City of Calgary Parks before proceeding.
- b. Provide temporary supports and bracing as required to steady metal work until installation is complete.
- c. Protect metal work from damage during installation. Touch-up primer and/or paint chipped during installation.
- d. When excavating, ensure that all utility lines are properly staked. Hand excavation shall take place as per standard utility requirements.
- e. Make all pipe bends with approved bending tools. Bends are to be smooth transition, without kinks, crimps, bulges or other deformations.
- f. Where anchors, fastenings or sleeves have to be built-in by other trades, supply necessary templates, instructions and inspection to ensure satisfactory installation.
- g. All broken welds shall be completely separated, ground down, joints cleaned and re-welded as specified earlier. Re-galvanize, or prime and paint entire unit as required.
- h. Clean up and remove off site all debris at the end of each working day, or as required.

.9 Maintenance

Maintain all metal work from the time of installation until Final Acceptance Certificate is issued by The City of Calgary Parks.

6. Timber and Woodwork

.1 Description and Quality Assurance

- a. This section specifies the supply and installation of timber and wood elements.
- b. All work must be executed by skilled tradesmen having experience at performing this type and scale of work and willing to provide proof of this experience.
- c. All wood must comply with the grade specified.

.2 Shop Drawings

- a. Submit shop drawings for The City of Calgary Parks' review on items as noted.
- b. Clearly show materials, connections, attachments, reinforcements, anchorage and location.

.3 Product Delivery, Storage and Handling

- a. Protect all materials from harmful exposure during transportation to the site.
- b. On delivery, store all materials off the ground and protect from adverse conditions to prevent deterioration, damage, or impairment of structural or other essential properties.

.4 Job Conditions

- a. Prior to commencing work, report in writing to The City of Calgary Parks any conditions or defects encountered on the site which may adversely affect the performance of the work.
- b. Do not commence work until such conditions or defects have been investigated and corrected.
- c. Commencement of work implies acceptance of surfaces and conditions and no claim for damages or resulting extra work will be accepted, except where such conditions cannot be determined prior to construction.
- d. Protect all existing trees, structures and adjacent areas from damage

due to construction work. Make good all damage at no extra cost to the contract.

- e. Check and verify all site dimensions governing the fabrication of shop made items and report any discrepancies immediately to The City of Calgary Parks.

.5 Inspections

- a. The Contractor shall have an approved set of drawings and specifications available prior to contacting The City of Calgary Parks for an inspection.
- b. All materials are subject to inspection by The City of Calgary Parks on arrival on the site. Any materials not meeting the specifications will be rejected and must be removed from the site immediately.
- c. Give timely notice (see Inspections, page 35) to The City of Calgary Parks when Construction Completion Certificate is required.

.6 Materials

- a. **Timber and Lumber:** All lumber shall be #1 Construction Grade Spruce, Western Pine or Douglas Fir dressed, conforming to C.S.A. 0141 - 1970 for nominal size. All timber and lumber must be straight, sound and free of splits, warps, checks, large knots or other defects. Rough sawn lumber will be used only where detailed and shall be sawn straight, square and true.
- b. **Plywood:** Exterior type, free of all checks, splits, open joints, cracks, knot holes or loose knots and other defects, conforming to C.S.A. 0151-M1978 and 0121-M1978 for thickness and grade
- c. **Nails, Spikes, Bolts, Lagscrews etc.:** Hot dipped galvanized in accordance with C.S.A. G164-M1981 and of the size and/or weight specified.
- d. **Connecting Steel:** Medium structural steel, conforming to C.S.A. G40-4 latest edition and hot dipped galvanized as specified in section "d" above.
- e. **Steel Cable:** Multi-strand 10mm diameter galvanized with galvanized clamps as detailed and specified in section "d" above.

.7 Prefabricated Units

- a. Manufacture all prefabricated units in strict accordance with approved shop drawings.
- b. Items brought on to the site that do not conform to the shop drawings and specifications will be rejected.

- c. Apply shop coat of zinc primer conforming to C.G.S.B. 1-GP-40C to metal fasteners where specified.

.8 Installation

- a. Lay out all work true to line, level and spacing, plumb on true. Accurately place structural supports and members in position and brace securely to remain plumb and true until permanently fixed.
- b. Ensure structural supports and members are capable of safely supporting imposed loads. Report any discrepancies immediately to The City of Calgary Parks.
- c. Execute all fastening with nails, spikes, bolts or framing anchors as detailed. Counter sink all exposed bolts and nuts where required. Drill bolt hole 2mm larger than diameter of bolt, and after final installation, pean all bolts over to prevent removal of nuts.
- d. Ensure that all debris is cleaned up and removed off site at the end of each working day or as required.
- e. Ensure that all drilled, sawn or routed edges are free of splinters or burrs. Sand smooth if required.
- f. All woodwork is to be finished with an approved exterior paint or stain as detailed.

.9 Maintenance

Protect and maintain all timberwork, woodwork and finishes from the time of installation until Final Acceptance Certificate is issued by The City of Calgary Parks.

7. Fencing (Chain Link & Post and Cable)

.1 Description and Quality Assurance

This section specifies the supply and installation of chain link and post and cable fencing. The Contractor must have experience at performing this type and scale of work and be willing to provide proof of this experience.

.2 Job Conditions

- a. Verify all job conditions on site. Report any conditions at variance with the drawings and specifications in writing to The City of Calgary Parks before proceeding.
- b. Do not start work until any such conditions have been investigated and corrected.

- c. Commencement of work implies acceptance of conditions and no claims for extra work will be allowed except where such conditions cannot be determined prior to construction.
- d. Protect all plant material and structures from damage. Make good all damage at no extra cost (see Tree Replacement/Compensation Guidelines, page 64).
- e. The Contractor is responsible for contacting the appropriate Parks Operations Division office for irrigation locations:

Northwest Division	311
Northeast Division	311
West Division	311
Centre Division	311
South Division	311

.3 Inspections

- a. The Contractor shall have an approved set of drawings and specifications available prior to contacting The City of Calgary Parks for inspection.
- b. Prior to construction, the Park Development Inspector will verify the installation of fencing to protect Environmental Reserves and Natural Areas (see section 7.c, page 128).
- c. Give timely notice (see Inspections, page 35) to The City of Calgary Parks when Construction Completion Certificate for work is required.

.4 Materials (Chain Link)

See The City of Calgary Transportation's "Standard Specifications Roads Construction."

.5 Materials (Post and Cable) Detail Sheet #45

- a. **Lumber:** All lumber shall be rough-cut, No. 2 Construction Grade, and kiln dried.
- b. **Steel Cables and Clamps:** All steel cables and clamps shall be hot-dipped galvanized to C.S.A. G164 or as specified. The steel cables shall have a 10mm (3/8") diameter.

.6 Fabrication (Chain Link)

See The City of Calgary Roads' "Standard Specifications Roads Construction."

.7 Location and Type

- a. **Flankage and rear of lots adjacent to parks and utility lots/ROW:** Chain link, wood screen or other type of fencing as approved by The City of Calgary Parks is to be installed.
- b. **Where parks and utility lots/ROW's abut lanes:** Post and cable fencing is to be installed.
- c. **Environmental Reserves and Natural Areas:** Area to be fenced off with snow fencing or equivalent by the Developer prior to construction. The Developer will contact the Park Development Inspector and the Subdivision Inspector for a meeting to verify the location of this temporary fencing prior to installation.

.8 Installation (Chain Link)

See The City of Calgary Transportation's "Standard Specifications Roads Construction."

.9 Installation (Post and Cable) (Detail Sheet #45)

- a. Provide all new material unless directed otherwise.
- b. Post spacing to be as detailed or as specified by The City of Calgary Parks.
- c. Orient the face cuts of the posts as directed by the Park Development Inspector on a site-specific basis.
- d. Provide sufficient tension on steel cable to eliminate sag.
- e. Install the first cable clamp over-top the end of the cable to eliminate frayed ends.

.10 Maintenance

Maintain all fence installations from the time of installation until Final Acceptance Certificate is issued by The City of Calgary Parks.

8. Lighting

.1 Lighting will be permitted on park land provided:

- a. it is identified by The City as part of the transportation system; or
- b. it is used as security for structures; or
- c. in accordance with the "Linear Park Policy".

.2 Lighting standards shall be 6 Lux minimum.

9. Optional Amenities

- .1 **Optional amenities are** non-standard infrastructure development (i.e. ornamental fencing, water features, gazebos, sculptures, entrance features/signs, decorative fixtures, etc.) in a public park or road right-of-way.
- .2 If a Developer or homeowners'/residents/community association wishes to construct an optional amenity, they must **receive approval from** The City of Calgary Parks for optional amenities within a public park and from The City of Calgary Roads for optional amenities within a road right-of-way.
- .3 **The intent to construct** optional amenities must be identified at the Tentative Plan Stage via a letter of intent or other suitable mechanism.
- .4 If a Developer or homeowners'/residents/community association wishes to construct an optional amenity, they must either enter into an **Optional Amenities Agreement** and/or a **Landscape Maintenance Agreement** with The City, or they must provide an **Endowment Fund** as per the corporate policy and procedures as approved by Council for "Enhanced Landscape Maintenance & Infrastructure." Contact the Parks Maintenance Agreement Coordinator 403-268-5204 for further details.
- .5 A firm indication of whether an Optional Amenities Agreement, Landscape Maintenance Agreement or Endowment Fund will apply shall be given at the Construction Plan Approval Stage.
- .6 An Optional Amenity Agreement, Landscape Maintenance Agreement or payment of an Endowment Fund **must be executed prior to FAC approval**.
- .7 **Maintenance manuals** are to be submitted to The City prior to FAC approval for all optional amenities associated with irrigation and/or water systems (i.e. water features, fountains, spray pools etc.).
- .8 Under the Municipal Government Act, **Community Entrance Features** that contain the name, logo, address of the community, or the Developer's identification, cannot be placed on Municipal Reserves. Community Entrance Features with this type of information must be placed on private lands or within wider road right-of-ways upon approval of The City of Calgary Roads. All Community Entrance Features are to be in compliance with Land Use Bylaw 1P2007, Division 5, Signs.

If Community Entrance Features are placed on road right-of-ways, an Optional Amenities Agreement is required.

10. Landscape Boulders and Rocks

- .1 Landscape boulders/rocks placed in turf areas must have a 150 mm X 150

mm concrete mowing strip placed around their base and flush to final grade. All other landscape Boulders/Rocks must be placed in planting beds.

- .2 Landscape boulders/rocks near playgrounds must meet the safety setbacks as specified in the CSA guidelines.

NOTE: Landscape boulders and rocks are not allowed within a playground area.

11. Pedestrian Bridges

Submit concept drawings to The City of Calgary Parks, however final approval will come from The City of Calgary Transportation Infrastructure Structural Design business unit. Ensure a Professional Engineer stamps all drawings. The Developer is to ensure that the proposed structure conforms to all applicable City Bylaws and provincial Building Codes.

12. Retaining Walls

Submit concept drawings for approval to The City of Calgary Parks. If the retaining wall is to be made from Sandstone, it shall be constructed as per **Detail Sheet #74**. Ensure a Professional Engineer stamps all drawings of retaining walls that exceed one (1) metre in height. The Developer is to ensure that the proposed structure conforms to all applicable City Bylaws and provincial Building Codes.

IRRIGATION

VI. IRRIGATION

1. Description and Quality Assurance

This section specifies the supply and installation of irrigation systems. Installers must have experience at this type and scale of work and be willing to provide proof of experience.

2. As-Built Drawings (Detail Sheet #47)

- .1** Verify all conditions on the site and immediately report all discrepancies and variations from the drawings to The City of Calgary Parks.
- .2** Submit a reproducible Mylar® drawing which has been drafted in a professional manner and is to scale on legal base plan, which shows the exact "as-built" location of the system relative to property line, including the locations of all lines, sprinkler heads, valves (drain and zone control), boxes, double check valves, parks water service, curb stops, underground pipe fitting not adjacent to surface fixtures (tee, elbows, etc.) saddles for poly pigtails and other irrigation materials prior to the issuance of a Final Acceptance Certificate. All of the above items must be tied in at two points each from site property lines or other permanent on-site features.
- .3** Requirements for acceptable submission of 'as-built' drawings will include, but not be limited to, the following:
 - a.** sheet size to be 594mm x 841mm laid out on The City of Calgary Parks title block.
 - b.** labeled as "As-built Irrigation System".
 - c.** key plan showing location of site.
 - d.** labeling to be a minimum of a 12 pt. font.
 - e.** plan of site showing property lines, bearings, surrounding site uses, north location, on-site structures, utilities, fences, buildings, walkways, etc., all to a suitable metric scale.
 - f.** municipal address and legal description of said property including a registered plan number. If more than one address, refer to location of parks water service.
 - g.** largest scale (1:250) with a minimum letter size of 12 pt. font.

- h. Legend: Do not include Detail Sheets in as-built drawings. Instead, refer to the year of specification and the Detail

Sheet name and number (i.e. 1998, Drain Pit for PVC Pipe, Detail Sheet #68). Clarify type of irrigation system (gravity drain, blow out or main line gravity drain with lateral line that has to be blown out).

- i. Number all irrigation zones starting from DCVA and turning to the right at a mainline junction. Return to last turn and continue as before until all zones are numbered.
- j. Name, address and 24 hour phone number of installer as well as owner/Developer and Consultant, where applicable.
- k. Serial number, installation date and confirmation of up to date inspection of double check valve in accordance with The City of Calgary Water Resources business unit procedures.
- l. Provide zone flow rates and a precipitation table.

3. Product Delivery, Handling and Storage

- .1 Store all materials off the ground and under protection until ready to use. Support as required to prevent excessive strain on piping.
- .2 Remove off site all material that is damaged or rejected. No material that has been damaged shall be installed. The City of Calgary Parks reserves the right to reject any material that does not meet specifications.

4. Job Conditions

- .1 Proceed with irrigation installation only during suitable weather conditions.
- .2 Report to The City of Calgary Parks, prior to commencing work, of any conditions or defects encountered on the site upon which work of this section may depend and which may adversely affect the performance of the work.
- .3 Do not commence work until such conditions or defects have been investigated and corrected.
- .4 Protect the system from being contaminated during construction by blocking all open pipe ends.

5. Inspections and Testing

.1 Drawings

The Contractor shall have an approved set of drawings and specifications available prior to calling The City of Calgary Parks for an inspection. All installations require inspection acceptance from The City.

.2 Open Trench Inspections and Testing

- a.** The City of Calgary Parks shall be given a minimum of 24 hours notice when an open trench inspection is required.
- b.** Items which must be in place and complete for the open trench inspection include:
 - i.** trench depth and alignment.
 - ii.** bedding material.
 - iii.** pipe alignment joints and expansion couplers, valves.
 - iv.** drains with gravel sumps.
 - v.** swing joints and head locations.
 - vi.** thrust blocking and conduit under paving.
 - vii.** pressure test without heads (static water pressure).
 - viii.** electrical wiring.
 - ix.** meter as supplied by The City of Calgary.
 - x.** other items.
- c.** Items b.iii through b.x above shall be inspected in the event that the system is "plowed-in."
- d.** Receive in writing from The City of Calgary Parks acceptance and approval of the irrigation system as viewed during the open trench inspection before back filling.

.3 Construction Completion Inspection and Pressure Test

- a.** The City of Calgary Parks shall be given a minimum of 24 hours notice when a construction completion inspection and pressure test is required.
- b.** The inspection and pressure test shall not be done unless written proof of the open trench inspection is available.
- c.** Items which must be in place and complete for the inspection and pressure test include:
 - i.** back filling and landscaping.
 - ii.** drain and valve boxes installed as per specifications and clear of debris.
 - iii.** water pressure on and flowing freely through the system.
 - iv.** irrigation head adjustment and all heads activated and throwing water to provide adequate coverage as per manufacturer's recommendations and the plan.
- d.** At The City of Calgary Parks' discretion, a pressure gauge shall be placed on any point in the system and a reading shall be taken to confirm operating pressure in system. Pressure gauges shall be minimum 50mm face, 0-1000kPa, Peacock or equal, complete with pet cock.
- e.** Annually test the backflow prevention device in accordance with Wastewater By-law 22M82. A copy of the Testing and Inspection Report for Double Check Valve Assemblies shall be submitted to Parks Development Inspector for forwarding to the Wastewater Division. The municipal address of the site shall be indicated on the Testing and Inspection Report.
- f.** Submit a completed Parks Meter Record form (see page 161).
- g.** Supply a copy of the Plumbing Permit.
- h.** Submit two paper copies of preliminary as-built drawings for verification. These drawings will state the municipal address of the site. As-built drawings received at CCC will be verified by Parks prior to Fac. Discrepancies, if any, noted on the as-builts will be corrected on the Mylar® copy
- i.** Receive in writing from The City of Calgary Parks acceptance and approval of the construction completion inspection and pressure test.

.4 Final Acceptance Certificate Inspections

a. Irrigation items to be approved at a FAC inspection include:

- i. All valves, valve boxes, sprinkler heads or other irrigation sprinkler system components are undamaged and in good working condition;
- ii. All valve boxes are flush and set to the approved final grade;
- iii. All valve boxes are free of debris with the valve assemblies exposed as per specification;
- iv. Provide a copy of the double check valve assembly test, by a licensed tester, showing the assembly is operating properly, done yearly, or as required by The City of Calgary Water Resources business unit.
***NOTE:** The municipal address of the site shall be indicated on the testing and inspection report.*
- v. All zone control valves and drain valves are functioning properly with no leakage through the valve.
- vi. All heads are in a vertical position and installed at a depth recommended by the manufacturer.
- vii. All heads must be activated and operating to provide necessary coverage with the arc set as designed and with minimum overspray outside of the park property.
- viii. Maintenance manuals are to be submitted to The City prior to FAC approval for all optional amenities associated with irrigation and/or water systems (i.e. water features, fountains, spray pools, etc.).
- ix. Temporary irrigation systems shall be removed and their water services shall be "killed" (i.e. removed to the water main). Provide certification from Wastewater that this has been completed to their satisfaction.
- x. The Developer must submit a reproducible Mylar® drawing which shows the exact "as-built" location of the irrigation system prior to the issuance of a Final Acceptance Certificate (see As-Built Drawings page 132).
- xi. Submit a completed Parks Meter Record form (page 161), and Irrigation Information Sheet (page 161, 162).

***NOTE:** The irrigation information sheet must contain actual calculated values, not the standard numbers out of the catalogues.*

- b. FAC's submitted after September 30th for sites with an irrigation system will require the area irrigation foreman, or designate, present during the winterizing procedure. The areas will ensure staff will be available with 48 hours notice. As an alternative, the area staff will not be required on site during the winterization procedure provided the Developer agrees, in writing, to start the system and perform any repairs that may be required the following spring.
- i. Specify only pressure compensating spray heads.
- c. Pressure and Leak test for HDPE if required shall be performed consistent with the ASTM F2164-02(2007) Standard Practice for Field Leak Testing for Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure.

6. Materials

.1 Testing

Materials shall be new and without flaws or defects of any type. All irrigation items must meet current specification and go through a testing period of the duration and under conditions determined by the type of product, but not less than one year.

.2 Substitutions

For substitutions, supply material with descriptive literature and samples, at least three weeks before commencement of work. Any substitutions must meet or exceed specifications and performance standards of proposed system, and be approved by the Water Management Coordinator, without any additional cost to The City of Calgary Parks.

.3 Piping and Fittings

- a. All piping on downstream side of parks water service shall be: NSF or CSA B137.3 certified series 160 PVC with schedule 40 fittings and schedule 80 nipples; or Type 3 Series 160 high density polyethylene pipe using butt fusion according to manufacturer's recommendations and CGSB 41-GP-25 M. Medium density polyethylene pipe series 100 will be acceptable as laterals under extensive hard landscaping, shrub beds and as "pigtailed" (**Detail Sheets #48 to 54, and 56**).
- b. All fittings, valves and double check valve assemblies will be sized to fit the downstream pipe diameter as illustrated in the irrigation (**Detail Sheets #48 to 59 and 63 to 68**).

- c. For PVC pipe with a diameter greater than 38mm, bell and spigot type pipe and fittings with rubber gaskets shall be used. Solvent weld PVC joints will be permitted based on previous written approval from The City of Calgary Parks.
- d. For medium density installations, all fittings shall be double clamped with galvanized or plastic inserts as per section 4.a.i below.
- e. Expansion couplers of appropriate size shall be used at a minimum spacing of every thirty (30) metres or as required.
- f. Only CSA Series 100 medium-density poly pipe may be used as laterals in extensive shrub bed installations. 25mm poly pipe may be used in shrub beds if the approved drawing shows the changes in pipe size. Use 25mm, triple swing assemblies and reduce to the appropriate size at the last elbow. ½ inch triple swing assemblies are only acceptable on MDPE shrub bed laterals with spray heads using ½ inlets. Swing joints are to be installed to lateral using saddles or insert "T's" and elbows.

.4 Swing Joints and Risers/Sprinkler and Shrub Heads (Detail Sheet #54 to 57)

a. Swing Joints/Risers

- i. Swing joints shall be three 25 mm elbows using galvanized steel or PVC. elbows and nipples and brass saddles.
- ii. All risers for shrub beds shall be galvanized or Schedule 80 PVC and bushed down after the final elbow. A tee bar stake will be used and will be double clamped.

b. Spray Heads

- i. The following pressure compensating spray heads or an approved equal shall be used. Toro 570ZPRZ-4p; Toro 570Z PRZ-12p; Hunter Institutional 04, 06 & 12 heads; Rain Bird 1812 PRS & 1804 PRS.

NOTE: *TORO 570Z-PRX is not approved.*

- ii. The sprinkler heads shall be described on the drawings, and conform to manufacturer's performance standards for durability and operation, i.e. operating pressure, gallonage, nozzle size.
- iii. Where quick couple valve systems are used, supply one sprinkler head and one valve key for every four quick coupler valves installed.

- iv. The sprinkler shall be a fixed spray type, capable of covering a 2 to 5.5 metre radius at 30 psi with a full circle discharge rate of approximately 5gpm.
- v. The sprinkler shall have radius adjustment capabilities from top of the nozzle.
- vi. The sprinkler shall be available in 4", 6" and 12" pop up.
- vii. The sprinkler shall have heavy-duty riser seal to eliminate excess flow-by.
- viii. The sprinkler shall have optional drain check valve.
- ix. If the static water pressure in a lateral zone or the entire system exceeds the maximum listed operating pressure in an irrigation manufacturers performance chart (i.e. Hunter SRS = 40 psi), then a pressure reducing device must be installed in the head, on the lateral line or after the meter
- x. The sprinkler shall have ratcheting riser features on all bodies for easy adjustment.
- xi. The sprinkler shall have 1/2" NPT female thread.
- xii. The sprinkler shall have a five (5) year, over-the-counter warranty (not pro-rated).

c. Sprinkler (For Areas Less than 12m in Width)

- i. The following sprinklers or an approved equal shall be used: Hunter I-20 ADS; Hunter I-20 36S; Rain Bird 5004 Plus SS; Rain Bird 5006 Plus SS and MP Rotator Nozzles 1000, 2000, 3000, MPCorner, MPStrip. MP Rotator nozzles shall be installed on approved pressure compensating spray head bodies (Item 6.4.b.i)
- ii. The sprinkler shall be of the gear driven rotary type, capable of covering a 5-15 metres radius at 50psi. with a discharge rate of 3-10 gpm. The sprinkler shall be available with interchangeable nozzles. The sprinkler shall have radius adjustment capabilities by means of a stainless steel adjustment screw.
- iii. The sprinkler shall be commercial duty available in both full circle and adjustable part circle configurations. The adjustable unit shall have the capability of adjustment in all phases of installation, i.e. before installation and after installation static and while in operation. Pop-up versions of the sprinkler shall have a ratcheting type riser assembly for final arc orientation.

- iv. The sprinkler shall have a minimum of 3" pop up. The sprinkler shall have a rubber cover.
- v. The sprinkler shall be equipped with a drain check valve to prevent low head drainage and be capable of checking up to 8 feet (2.40m) in elevation changes. The sprinkler shall be equipped with a stainless steel set screw for locking the threaded cap to the body.
- vi. The sprinkler unit shall have a 3/4" NPT female thread inlet. The sprinkler shall be serviceable after installation in the field by unscrewing the body cap, removing the riser assembly and cleaning the inlet filter screen.
- vii. The body of the sprinkler shall be constructed of non-corrosive heavy duty ABS and the pop-up riser assembly shall be encased in stainless steel. The sprinklers carry a five-year over the counter exchange warranty (not pro-rated).
- viii. If the static water pressure in a lateral zone or the entire system exceeds the maximum listed operating pressure in an irrigation manufacturers performance chart (i.e. Hunter I-20 with #4 nozzle = 60 psi), then a pressure reducing device must be installed in the head on the lateral line or after the meter.
- ix. Sprinklers should be supplied by a local distributor to allow for product availability within 2-3 weeks.

d. Sprinkler (Standard for Public Landscape Areas)

- i. The following sprinklers or an approved equal shall be used; Hunter I-25 ADS; Hunter I-25 36S; Hunter I-60; Toro 640, Toro S2001; Nelson 7005, Rain Bird Falcon 6504 and Rain Bird 8005-SS.
- ii. The sprinkler shall be of the gear driven rotary type, capable of covering a 12-18 metre radius at 50psi with a discharge rate of 7-10gpm. The sprinkler shall be available with interchangeable nozzles. The sprinkler shall have radius adjustment capabilities by a stainless steel adjustment screw. Arc adjustment should be accessed at the top of the sprinkler without having to take the sprinkler apart.
- iii. If the static water pressure in a lateral zone or the entire system exceeds the maximum listed operating pressure in an irrigation manufacturers performance chart (i.e. Hunter I-25 with #7 nozzle = 70 psi), then a pressure reducing device must be installed in the head on the lateral line or after the meter.

- iv. See section c. "Sprinkler (for Areas Less than 12m in Width)", subsections iii. - viii. (page 139).

e. Flood Bubblers

- i. The following flood bubblers or an approved equal shall be used: Toro S00C; Rainbird I-300A-F; and Nelson 7300.
- ii. The flood bubblers will have an adjustment from 0gpm. to 3.5gpm.
- iii. The flood bubblers will have a screw adjustment.
- iv. The flood bubblers will have a serviceable filter screen.
- v. The flood bubblers will have a 1/2" NPT female thread inlet.

.5 Controllers (Detail Sheet #60, 60b, 60c, 60d) and Valves (Detail Sheets #48 to 53)

- a. All irrigation controllers/cabinets are to be set up as non-metered sites.

Exceptions where metering is required

- 1. Sites that involve heavy usage – storm ponds with pumps and/or valve operations
- 2. Sites where services have been added from the cabinet to operate lighting, etc.
- 3. If a third party is actually the major user of energy and The City of Calgary Parks is the site owner.

- b. Open Space areas must include controllers that are compatible to The City of Calgary Parks Centralized Irrigation System. To be compatible with The City's system, the following controllers should be installed:

- Motorola Irrinet XM 16, 32, 98, 64, 80, Irrinet XL
- Motorola Scorpio 8 or 16.

NOTE: The location and type of park site will dictate which of the Motorola controller products to use. The Developer or their agent should contact the Park Coordinator – Development for north areas tel. 403-268-1334 or central and south areas tel. 268-1376 (see Parks Inspection Boundaries map page 36) to determine the appropriate controller type.

- c. For outdoor installation the controller shall be mounted in an approved cabinet, fixed to a concrete base, as per Detail Sheet No. 60a-d.

- d. Zone control valves shall be CSA certified as Class II power limiting circuit low voltage (i.e. 24 volt) operated only. Closing time for valves shall not be less than 5 seconds.
- e. Zone control valves shall be electrically operated and self cleaning with a **bronze body** and of a make and model compatible with the designed system. Hand operated valves shall be installed on the upstream side of every electric valve.
- f. Wiring to and from the controller and valves shall conform to the Canadian Electric Code and any other regulatory conditions which govern this type of installation.
- g. All wire shall follow irrigation lines where appropriate.
- h. Where wiring leaves pipe alignment, place in conduit. Below ground - PVC is acceptable, above ground - galvanized conduit must be used.
- i. Splices shall be made waterproof with the use of an acceptable outdoor waterproof wire connector (refer to Pg. 148, 6.11.d.iii). Field splices will be identified, looped and located in a 250mm diameter lockable irrigation box.
- j. 110 volt wiring shall be colour coordinated to be different from 24 volt wire where used. Install all 110 volt wire in accordance with Canadian Electrical Code. Where satellite controllers are installed, colour code all wiring according to the satellite.

NOTE: Temporarily locate the 110 volt wire drop-off with a 4X4 stake until a controller is installed.

k. Valve Signal Wires and Common Wires

- Use continuous wire runs wherever manufacturers wire roll sizes allow.
- Calculate the voltage drop on zone signal wires and common based on the furthest distance run and the maximum number of valves that can simultaneously be activated on that leg. The value will be based on the abilities of the controller specified. Size wires accordingly and indicate calculations and designed wire sizes on design plans and as-built.
- When making field splices or valve wire connections, the length of wire for all signal wires or common wires is to extend at least 12" out of the box before making the watertight connector.
- Common to be sized one size larger than signal wire (i.e. If signal 14ga then common to be 12). One common wire per hectare of zone valves or one common wire per 10 signal wires.

I. Spare Wires

- Provide one (1) spare wire per wire run for each group of five (5) valves or less. The spare wire shall be looped in each valve box to extend 300mm above the valve box and be terminated in the fifth or last valve box.
- Provide one (1) spare 12 gauge common wire for each leg of the mainline, terminating at the end of the mainline.
- Use continuous wire runs wherever wire roll sizes allow.
- Have a loop of 0.5m of spare wire coiled into each valve box that the spare wires run through.
- Allowable voltage drop over distance (to be calculated and inserted).
- For redundancy, provide two spares per Ha or less of park size and a minimum of two spares per multiple of 5 valves per mainline run.
- For future expected expansion, there will be 10 additional wires per Ha of expansion, plus an over sized common.

.6 Wiring requirement Motorola Central Control DC Scorpio or DC IRRicom Controllers.

Motorola DC Scorpio controller:

- The total valve operating capacity of the controller ordered must include an extra valve circuit for the Master Valve.
- The controller circuits have one common wire connection for each group of four valve wires. The field wire gauges are as per other wire specification, i.e. 12 ga for common & 14 ga for valves. The valves grouped together on the one common connection should follow the valve box numbering order, i.e. follow the flow of water from the point of supply and follow any change of direction to the right. If the four valves in a group are in opposite directions at a tee in the main line, use a second common wire to the other valves but plan wiring so there are groups of four, e.g. for one four valve group: if one valve is to the right of the tee, this would have a combination of one common with one valve, leaving the three valves to the left to be connected to a second common.
- Follow the groupings of four, and when the total valve count is not a combination of four, have only the last grouping of valves wired at less than four valves.
- This standard must be followed to ensure that the Controller's valve operation potential is maximized.

Motorola DC IRRicom controller:

- The total valve operating capacity of the controller ordered must include an extra valve circuit for the Master Valve.
- The controller circuits have one common wire connection for each group of six valve wires. The field wire gauges are as per other wire specification, i.e. 12 ga for common & 14 ga for valves. The valves grouped together on the one common connection should follow the valve box numbering order, i.e. follow the flow of water from the point of supply and follow any change of direction to the right. If the six valves in a group are in opposite directions at a tee in the main line, use a second common wire to the other valves but plan wiring so there are groups of six, e.g. for one six valve group: if two valves are to the right of the tee, these would have a combination of one common with two valves, leaving the four valves to the left to be connected to a second common.
- Follow the groupings of six, and when the total valve count is not a combination of six, have only the last grouping of valves wired at less than six valves.
- This standard must be followed to ensure that the Controller's valve operation potential is maximized.

.7 Electric Valves (Detail Sheet #48 to 50)

- a. A Griswold GP or Rain Bird GB series electric valve or an approved equal shall be used.

b. Performance Features

- i. Continually cleans itself without screens or filter to clean or replace.
- ii. Works dependably in effluent or dirty water containing:
 - sand
 - silt
 - algae
- iii. Closes slowly without a hammer or chatter.
- iv. Works under extremely low flow and low pressure conditions.
- v. Has a flow control stem.
- vi. Has a manual open/close control.

c. Technical Features

- i. Available sizes – 3/4:" to 2."
- ii. Body configuration - globe.
- iii. Pressure rating - 200psi.
- iv. Flow range - 1.0 to 180gpm.
- v. Power requirements - 7.2 VA holding; 10.8 VA in rush
- vi. Operating voltage range 17-40.
- vii. Maximum wire run #14 wire - 1,460m.
- viii. Warranty - 5 years.

.8 Gate Valves (Detail Sheet #51)

- a. Gate valves for drainage and flow control shall be bronze body with solid wedge disk, non-rising stem, removable handle and a resilient rubber ring seal with a minimum pressure rating of 10kg/cm². All gate valves shall be installed in an upright position for accessibility.
- b. Valves – 1/4" to 3": A Red & White 280A must be used or an approved equivalent that meets the following criteria:
 - i. Materials

NAME OF PARTS		ASTM SPECIFICATIONS	
Body		Cast bronze	B62-C83600
Bonnet		Cast bronze	B62-C83600
Stem		Copper alloy rod or cast bronze	B21-C47940 or B505-C83600
Disc		Cast bronze	B62-C83600
Stuffing Box	1/4 - 2 1/2	Brass rod	B16-C36000
	3	Cast bronze	B62-C83600
NAME OF PARTS		ASTM SPECIFICATIONS	
Packing nut	1/4 2 1/2	Forged brass	B283-C37700
	3	Cast bronze	B62-C83600
Gland		Forged brass	B124-C37700
Gland packing		Non-asbestos packings	T#2996-NA
Hand-wheel	1/4 - 1/2	Zinc alloy die casting	B86-Z33520
	3/4 - 3	Aluminum alloy die casting	B85-A03840
Wheel nut		Steel (zinc plated)	A563-Gr.A
Name plate		Aluminum plate	B209-1100

ii. Dimensions

Mark	Size	1/4	3/8	1/2	3/4	1	1 ¼	1½	2	2½	3
L	in	1.69	1.77	1.97	2.20	2.56	2.83	3.11	3.35	4.21	4.57
	mm	43	45	50	56	65	72	79	85	107	116
H	in.	3.58	3.58	3.78	4.33	4.88	5.63	6.46	7.60	9.29	10.71
	mm	91	91	96	110	124	143	164	193	236	272
D	in.	1.89	1.89	2.17	2.48	2.76	3.15	3.54	3.94	4.33	4.92
	mm	48	48	55	63	70	80	90	100	110	125
Weight											
lb		0.71	0.66	0.88	1.17	1.76	2.45	3.53	5.36	8.36	11.91
kg		0.32	0.30	0.40	0.53	0.80	1.11	1.60	2.43	3.72	5.62

iii. Working Pressures

Working Pressure Non-Shock		Test Pressure	
Saturated Steam	Cold water, Oil, Gas	Shell (Water)	Seat (Air)
Psi 125	200	300	80
Bar 8.6	13.8	20.7	5.5

iv. **NOTE:**

- *End threads conform to the female international standard pipe threads.*
- *These valves conform to the requirements of MSS SP-80.*

- c. Valves 100 mm or larger to be resilient seat flanged valve, a Watts 405RW or approved equal with a 15 MM test cock.

.9 Double Check Valve Assembly (Detail Sheets #58, 59, 59a, 59b & 59c)

- a. The term "double check valve assembly" (DCVA) shall mean an assembly composed of two independently acting, approved check valves, including tightly closing shut-off valves with resilient seats located at each end of the assembly and fitted with properly located test cocks as per CSA B64 series-1976. All DCVA's must conform to The City of Calgary Water Resources Standard Specifications, latest edition, and capable of being installed in field locations with a drainage function.

In addition, the device must be drainable, in place, without any dismantling, adjustments or movement of the assembly, through the use of a test cock or drain valve, as approved and certified by CSA.

- b. The 150mm DCVA shall be a WATTS – 757N (drawings 59b & 59c) or approved device of equal dimension to allow the assembly to fit into a standard box.

.10 Brass Saddles, Tees or Crosses (Detail Sheet #50, 54 and 55)

- a. Cambridge 800 series hinged saddles, or AY MacDonald 3802 & 3892 service saddles, tees and crosses or approved equals must be used.

- b. 3/4" to 4" pipe size.

- c. 1/2" to 1" female threaded outlet (FIPT).

- d. Casting of saddle must be:

- 85% copper
- 5% zinc
- 5% tin
- 5% lead

- e. Bolts are of 18-8 non-corrosive stainless steel.

- f. To be used on series 160 PVC. or series 100 polyethylene pipe.

.11 Irrigation Boxes

- a. Where manufactured irrigation boxes are used, they shall be of heavy duty weight polyethylene and capable of being extended, withstanding the weight of a heavy tractor on their surface, and shall have a locking capability (clearances noted on details).

- b. Gravel beds in boxes shall consist of clean, washed 19mm gravel with an area marginally larger than box opening. See **Detail Sheets #48-53, 58, 59, and 66-68** for the depth of gravel and the distance the gravel shall be kept from the lowest point of the irrigation system.
- c. The double check valve assembly box and zone control valve boxes shall be designed into a location site where the final grade of the surrounding ground does not carry overland water drainage into the valve boxes.

d. Wire Splices Box

i. Body (Carson 910-10-4 or an approved equal)

- top inside diameter 9 1/4".
- top outside diameter 10".
- bottom inside diameter 11 3/4".
- bottom outside diameter 13".
- body of the box to be heavy duty polyethylene weighing 3 lbs.
- depth 10 1/4".
- colour green.

ii. Lid (Carson 910-4 or an approved equal)

- lid of the box to be heavy duty polyethylene weighing 1 1/2 lbs.
- twist lock lid.
- come with 3/8 x 1 3/4" lock bolt for slot screwdriver.
- marking on lid to be "Irrigation Wire Splice Box".
- must have cover lift holes.
- must be 2" in depth.
- colour green.

iii. Wire Splice Connectors: 3M DBY/DBR's or equivalent.

e. Drain Boxes

i. Box (Carson 1419 or an approved equal)

- body of the box to be heavy duty polyethylene weighing 7 lbs.
- depth 12".
- outside top width 11 3/4".
- outside top length 17".
- outside bottom width 15 7/8".
- outside bottom length 21 1/8".
- inside bottom width 14 1/8".
- inside bottom length 19 1/4".

ii. Lid (Carson 1419-4L or an approved equal)

- lid of the box to be heavy duty polyethylene weighing 3 1/2 lbs.
- lid must be over the rim cover or T-lid.
- must have locking 3/8" L-bolt with 9/16" head, non-corrosive, metal detector sensitive ball.
- marking on the lid to be "Irrigation Drain Box."
- lift slot.
- outside top width 12 1/2".
- outside top length 18".
- outside insert width 10 1/8".
- outside insert length 5 3/8".
- must be 2 1/8" in depth.
- lid must be interchangeable with box and extensions.
- colour green.

f. Drain Box Extensions

i. Boxes (Carson 1419-6X or an approved equal)

- body of box must be made of heavy duty polyethylene weighing 5 lbs.
- depth 6 3/4".
- outside top width 12".
- outside top length 17".
- outside bottom width 14".
- outside bottom length 19".
- inside bottom width 12 1/8".
- inside bottom length 17 1/4".
- colour green.

g. Control Valve Box, Isolation Valve Box, Meter Valve Box and Gate Valve Outlet Box

i. Boxes (For valves 50 mm or smaller Carson 1220-12 or an approved equal and for valves larger than 50 mm Carson 1324-12 or 1324-15 or an approved equal)

- body of the box must be made of heavy duty polyethylene weighing 8 lbs.
- depth 12".
- outside top width 14 3/4".
- outside top length 21 1/2".
- outside bottom width 19".
- outside bottom length 25 3/4".
- inside bottom width 17 1/4".
- inside bottom length 24".
- colour green.

- ii. **Lid** (Carson 1220-3L or 1220-5L or 1324-3L or an approved equal)
- lid of the box to be non-hinged made of heavy duty polyethylene weighing 5 lbs.
 - must have locking 3/8" L-bolt with 9/16" head, non-corrosive, metal detector sensitive bolt.
 - lift slot.
 - outside width 13 1/4".
 - outside length 19 3/4".
 - must be 1 3/4" in depth.
 - marking on the lid will change depending on the use of the lid; i.e.:
 - Irrigation Control Valve Box.
 - Irrigation Isolation Valve Box.
 - Irrigation Meter Valve.
 - lid must be inter-changeable with box and extensions.
 - colour green.

h. Control Valve Box, Isolation Valve Box, Meter Valve Box and Gate Valve Outlet Box Extensions

- i. **Box** (Carson 1220-6X or an approved equal)
- body of the box must be made of heavy duty polyethylene - weighing 4 lbs.
 - depth 6 3/4".
 - outside top width 14 3/4".
 - outside top length 21 1/2".
 - outside bottom width 17 5/8".
 - outside bottom length 24 3/8".

- inside bottom width 15 3/8".
- inside bottom length 22 1/8".
- colour green.

i. Double Check Valve Assembly Box

i. Box (Carson 1730-18-3L or an approved equal)

- body of the box must be made of heavy duty polyethylene weighing 25 lbs.
- depth 18."
- top outside width 19 1/2".
- top outside length 32 1/2".
- bottom outside width 27 1/4".
- bottom outside length 40 1/2".
- bottom inside width 24 1/4".
- bottom inside length 37 1/2".
- colour green.

ii. Lids (Carson 1730-3L or an approved equal)

- lid of the box to be non-hinged made of heavy duty polyethylene weighing 10 lbs.
- must have locking 3/8" L-bolt, with 9/16" head, non-corrosive, metal detector sensitive bolts.
- lift slot.
- outside width 17 1/2".
- outside length 30 1/2".
- must be 2" in depth.
- marking on the lid to be "Double Check Valve Assembly Box."
- colour green.

- iii. See **Detail Sheets #61, 62 and 62a** for 100mm DCV box and lid assembly complete with access door for meter reading.

.12 Backfill Material

- a. Backfill material for pipe trenches within 150mm of pipe shall be clean approved sand fill or gravel less than 12mm diameter in size, free of stones and sharp objects capable of damaging pipe.
- b. Excavated material may be used for backfilling only when approved by The City of Calgary Parks.

.13 Sleeving (Detail Sheet #63)

- a. Sleeving shall be PVC SDR 35 or PVC C-900 (bell and spigot) pipe to The City of Calgary Water Resources Standard specifications for Sewer Construction Sec. 402.02.02 or approved equal.

NOTE: *PVC SDR 35 shall be backfilled in accordance to The City of Calgary Standard Specifications for Sewer Construction. PVC C-900 may be backfilled with native material free of organics and shall be compacted to 98% SPD.*

- b. Diameter of conduit shall be twice the diameter of the irrigation pipe. The size of the conduit shall be measured in 50mm increments or as noted on the drawings.
- c. Extend sleeving a minimum of one (1) metre beyond edge of pavement of amenity area. Tape ends to prevent debris filling.
- d. All wire for automatic systems will not go in the same sleeve as the irrigation pipe; wire will have its own sleeving. Amount of wires will determine the size of the sleeve as follows:
 - i. 2 to 14, #14 gauge wires: 2 inch (50mm) sleeve;
 - ii. >14, #14 gauge wires; 2 inch (50mm) to 4 inch (100mm) sleeve.

Existing Irrigation Systems: DO NOT CUT wires or pipe. Use one sleeve as per above and cut sleeve down its length to create two half shells; excavate under pipe and wires; place one half of sleeve under wire and pipe, place other half above pipe and wire, then clamp two halves together with two broken pipe repair clamps.

.14 Miscellaneous Components

All miscellaneous components, such as air relief valves, concrete vaults or meter boxes, valve markers and caps, etc., shall be of the type and size as indicated on the drawings or details. Install according to approved manufacturer's directions or at the direction of The City of Calgary Parks.

.15 Thrust Blocks

- a. Local conditions will determine the type and extent of thrust blocking to be used. Obtain approval from The City of Calgary Parks on the base method (i.e. concrete, rock, rebar or a combination of the former) before proceeding.
- b. All lines 100mm and over will require concrete thrust blocks. Concrete will be Class B as per 310.00.00. Street Specifications.

.16 Irrigation Products Currently Being Tested

Manufacturer	Model No.	Description	Testing Period	
			From	To
Rain Bird	Rotary Nozzle	Spray Head Nozzle	2008	2012
Hunter	MPR40	Spray Head	2008	2012
Samson Riser	½" X 24"	Plastic Riser	2008	2012
Hunter	RZWS-36-50-CV-FILTER SOCK	Root Watering System	2008	2012
Rain Bird	RWS-M-B-1402-SOCK	Root Watering System	2008	2012
Environmental Sensors Inc.	Gro-Point Lite	Soil Moisture Sensor	2008	2010
Rain Bird	RWS-B-1402-SOCK	Root Watering System	2007	2011
Seacon International Inc.	WeatherCon	EvapoTranspiration-based weather reporting and automatic irrigation adjustment system	2008	2010
Rain Bird	VB-JMB	Valve Box	2008	2010
Rain Bird	VB-JMB6EXT	Valve Box Extension	2008	2010
Rain Bird	VB-STD	Drain Box	2008	2010
Rain Bird	VB-STD6EXT	Drain Box Extension	2008	2010
Manufacturer	Model No.	Description	Testing Period	

			From	To
CLA-VAL	690G-01YBKCX 150mm PRV	Pressure Reducing Valve	2007	2011
Carson Industries	H3660-36" Series	Valve Box	2007	2011
Custom Fabrication	36" X 60"	Valve Box Lid	2007	2011
Motorola	Piccolo XR	Controller	2005	2009

7. Layout

- .1 Stake out entire system, including locations of sprinkler heads and/or quick coupler valves, double check valve, zone control valves and tees and elbows for the pipe as well as the layout of all the piping, park water service, and the electrical drop. Confirm that layout is within project boundaries and property lines and ensure all surface hardware, excluding sprinklers, is installed outside of sports fields and the three meter buffer zones. Under exceptional circumstances and subject to the approval of Parks limited encroachment of surface hardware into the buffer zone may be acceptable. Heads shall be spaced to ensure head to head coverage. Where deviation from the design drawing is anticipated, submit in writing, as required, change requests to The City of Calgary Parks for approval.
- .2 Verify on site, the location of all sleeving under paving and adjust to suit.
- .3 Verify the location of all underground utilities and use standard precautions when working near such. Make good all damages at Contractor's cost.
- .4 Set back park water services (**Detail Sheets #64 and 65**) a minimum of 2.5m from pathways, hard surfaces and trees, and set back lateral irrigation lines a maximum of .50m from property lines.
- .5 Have layout inspected and approved by The City of Calgary Parks before commencement of work.
- .6 Due to changes in landscape elements, it may be necessary to adjust the spacing of the sprinklers in the field. Such changes that do not require extra materials or labour shall be done at no extra cost to The City of Calgary Parks. If such changes result in extra cost, all such changes shall be approved in writing by The City of Calgary Parks before proceeding with work.

8. Coordination

Fully coordinate work with other trades, so as not to delay work progress. If the water or electric service exists from a building, coordinate work with the building owner to ensure proper connections to services.

9. Trenching

- .1 Ensure that the grade has been set and approved by The City of Calgary Parks before commencing trench operations.
- .2 Width of trench shall be a minimum of three times the diameter of the pipe. Main line pipe depth shall be in accordance with the following table to ensure adequate coverage:

Main Line Pipe Depth			
Pipe Size	Min. Depth to Top of Pipe	Max. Depth of Bottom of Pipe	Imp. Depths
2" (50mm)	350mm	600mm	14" – 24"
4" (100mm)	350mm	650mm	14" – 26"
6" (150mm)	400mm	750mm	16" – 30"
8" (200mm)	400mm	800mm	16" – 32"
Lateral Zone Piping Depth			
Pipe Size	Min. Depth to Top of Pipe	Max. Depth to Centre Line of Pipe	Imp. Depths
2" (50mm) zone lines depth	300mm	450mm	14" – 16"

- .3 Bed with suitable material (See Backfill Material page 153) to the proper depth and compact to meet the approval of The City of Calgary Parks.
- .4 The Contractor shall repair any settlement of the trenches by bringing them to grade with topsoil and sodding.
- .5 Place sleeving as required to enclose piping under paved areas. Depth of sleeving shall match table for depth of pipe, 1000mm under roadways or as approved by Roads/Land Information & Mapping Services.

10. Installation

- .1 Submit a schedule as required for the proper installation of the system. Coordinate irrigation installation with other aspects of site development to ensure proper construction and reduce the possibility of damage to and by other trades. All work shall conform to approved design drawings.
- .2 Install all piping so it is not bent from a straight line in excess of the manufacturer's recommendation for local conditions and with a minimum fall of .5% to drain boxes.

- .3 Make all joints and connections tight and in accordance with manufacturer's recommendations.
- .4 Install risers with saddle tees (**Detail Sheet #54-57**) firmly connected and plumbed.
- .5 All sprinklers are to be adjusted and set flush with final grade using the three elbow swing joint (**Detail Sheet #54 and 55**). Ensure the horizontal nipple is no more than 45 degrees out of level when setting sprinklers. Where utility easements or property lines preclude the standard assembly, a "pig tail" swing joint shall be used (**Detail Sheet #56**).
***NOTE:** Pig tails shall be excluded in utility easements that contain concrete drainage swales. However, the Developer is responsible for repairs to the irrigation system during the maintenance period if remedial work is performed by The City within the drainage easement.*
- .6 All backflow prevention assemblies (**Detail Sheet #58 and 59**) must be installed in accordance with the Wastewater By-law 22M82 and the Alberta Plumbing and Drainage Act Regulations. Backflow prevention assemblies must be tested and tagged upon installation and annually thereafter prior to activating the system that year.
- .7 Ensure that such items as shrub heads are set at the proper height to obtain adequate coverage.
- .8 For automatic systems:
- a. Lay the wire in the trench with sufficient slack to accommodate backfilling and then backfill with suitable material (see Backfill Material page 153) prior to installation of the piping.
 - b. Ensure a 14 gauge tracer wire is installed for lateral lines.
 - c. Provide a minimum of 600mm coiled loops of wire at all control valves and changes in direction.
 - d. Wiring necessary to activate the controller and valves must be located in a conduit (see Sleeving page 153) when located in buildings or under all paving.
 - e. If a controller (**Detail Sheet #60**) is located in a building mount within approved cabinet (center cabinet 1650 mm above floor) capable of locking and securing controller and waterproof if necessary.

***NOTE:** The installation of a temporary controller will be acceptable at CCC, however a permanent automatic controller shall be installed by the Developer one month prior to application for FAC.*
 - f. IRRInet controller cabinet AC (**Detail Sheet #60a**).

- g. Scorpio and IRRlcom cabinet AC (**Detail Sheet #60b**).
- h. Scorpio and IRRlcom DC (**Detail Sheet #60c**).
- .9 Block all changes of direction and pipe endings (tee, elbows 45° and 90°, plugs). If concrete thrust blocks are used, protect pipe from spillover.
- .10 Ensure that the last sprinkler head tee is not set closer than 150mm from the pipe end.
- .11 Install drain valves and boxes (**Detail Sheet #67 and 68**) at appropriate locations to accommodate the slope of the land and the size of the irrigation system. Ensure that all heads, valves and drains are not set closer than one (1) metre from each other. If the mainline is less than ten (10) metres in length drain pits will not be required
- .12 Install one 25mm curb stop drain valve (**Detail Sheet #66**) at each end of a conduit under a roadway to ensure adequate drainage.
- .13 Install Park Water Services as per **Detail Sheet #64 and 65**.
- .14 Where provided for by The City of Calgary, install a combination 50mm Master Valve with a Water Meter as per **Detail Sheet #53**.

11. Backfilling

- .1 After an open trench inspection and receipt of written approval by The City of Calgary Parks, backfill with an approved fill (see Backfill Material page 153).
- .2 Place backfill in 150mm lifts, placing and compacting all lifts to 85% S.P.D. until 150mm below finished grade. Place topsoil, seed and/or sod as specified.
- .3 Adjust sprinkler heads to the correct spray angle to provide adequate coverage without excessive overspray.
- .4 All irrigation systems shall be flushed out in a satisfactory manner to remove accumulation of dirt and other deleterious matter. Flush all laterals in a manner approved by the manufacturer to prevent clogging of sprinkler screens or nozzles.
- .5 In the event that finished landscape grades are changed more than 150mm, either lower or higher, and thereby compromise the initial intent of the irrigation specifications, at the direction of The City of Calgary Parks, the irrigation piping and fixtures may have to be adjusted to meet the specifications. Drain valve assemblies may require a change to the standard 25mm curb stop size.

- .6 Repair as required upon final testing by The City of Calgary Parks.

12. Clean Up

Remove off site all debris and excess material left over from installation at the end of each working day or as required.

13. Maintenance

- .1 Protect and maintain the entire irrigation system from the time of installation until Final Acceptance Certificate is issued by The City of Calgary Parks.
- .2 Maintenance of the irrigation system shall include:

a. System Turn On

- i. operational by May 15.
- ii. includes: Spray painting water services and keeping them clear and exposed from overgrowth (locator markings).
- iii. follow all maintenance and repair procedures to ensure a completely functional system with head to head coverage according to original intent of design.
- iv. submit and implement a weekly watering schedule for the season, which shall provide moisture to the turf and plant material as site conditions dictate.
- v. double-check valve test: Complete and submit.
***NOTE:** The municipal address of the site shall be indicated on the Testing and Inspection Report.*

b. Monthly Checks

The following items will be checked on a monthly basis for proper operation:

- i. controller (clock).
- ii. automatic valves.
- iii. double-check valve.
- iv. water services.

- v. piping.
- vi. manual valves.
- vii. sprinkler heads (arcs).
- viii. boxes.
- ix. general settling and grading problems.

c. System Turn Off

- i. Turn off the water supply to the irrigation system. You will have two choices:
 - stop and drain (or seal), 1/4 turn clockwise to close.
 - Service valve and drain rod - service valve counter-clockwise to close and drain rod is 1/4 turn counter-clockwise to open.
- ii. Open all drain valves on main line of irrigation system and all test cocks and drains on double check valve assembly and allow sufficient time for the water to drain out.
- iii. Close all drain valves.
- iv. Connect an air compressor (600cfm) to a quick coupler using a 25mm hose (**Detail Sheet #54**) or to a 50mm gate valve outlet assembly using a 50 mm hose (**Detail Sheet #51**) downstream of the double check valve assembly or water meter.
- v. Activate all electric valves from the controller. Ensure that each zone blows "clean" of any water before proceeding to the next. After this procedure is completed, go to each electric valve and manually activate each zone to make sure you have not missed a zone. Repeat the procedure from controller to dispel any remaining water.
- vi. Turn the air compressor off and drain the main line of air, through the drain valve. Check all drain valves to make sure no water is coming out. Disconnect the air compressor. **DO NOT** leave drain valves and test cocks open for the winter.

Parks Irrigation Meter Sheet

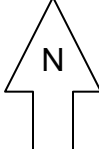
MFRM000	Quality Management Document Parks Irrigation Meter Report		ISO Elem: 4.0
Owner:	Approved by:	Issue Date:	Controlled Document

Irrigated Site Information		
Address:	Legal Description:	
Reference Address:	Community:	Phase:
Developer:	Steward:	MGMT_NUM:

Meter Information			
Meter Pit Location:	Meter Size:	50 mm	100 mm 150 mm
Tag #:	Serial #		
Install Date:	Install Reading:		
Power Source: SOLAR ELECTRIC	Computer Hook up:	NO	YES
Electric Meter: NO <input type="checkbox"/> YES NUMBER:	Outlet Tested:	NO	YES

Development Inspection Information	
Irrigation Contractor:	Development Inspector:
Phone :	As-Built: <input type="checkbox"/> NO <input type="checkbox"/> YES
Dev Agreement #:	Development Status: (CCC) (FAC): DATE:

Developer & Consultant Information	
Name of Developer:	Name Of Consultant:
Contact Person:	Phone:

Meter Location Diagram			
			
REF:	Revision Date:	Revision #:	Page:

Copy 1: Parks Inventory # 54

Copy 2: Waterworks: 334

Copy 3: Inspector

Copy 4: Consultant

Irrigation Information Sheet

Park Name					Page of	
Municipal Address					P.M.M.S. Number	
Service Address					PROSIS Number	
Park Hectares	Irrigated Hectares	Class	Community		Area	District
Systems <input type="checkbox"/> Automatic <input type="checkbox"/> Manual Pop Up <input type="checkbox"/> Manual						
Parks Water Service Type		Service Number		Corresponding Back Up Valve		
		# 1	#2	#1	#2	
Stop & Drain Service				<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Service Valve & Service Drain						
Other				Size (mm)	Size (mm)	
Water Service size in Millimeters						
Water Service depth in Metres						
Corresponding Backflow Unit			P.S.I. On Installation			
No.	Type	Make	Model	Size	Serial Number	Date Installed
1	DC <input type="checkbox"/> RP <input type="checkbox"/>					
2	DC <input type="checkbox"/> RP <input type="checkbox"/>					
Corresponding Water Meter						
No.	Make	Model	Serial Number	Size	W.W. Tag Number	Date Installed
1						
2						
Field Drains						
Total No.	Gate Valves	Drain Rod	Drains Located			
			<input type="checkbox"/> D.C.V. <input type="checkbox"/> Main Line <input type="checkbox"/> Laterals			
Components		Description (Make, Model, Etc.)		Arc Size, No. of Stations	Number, Length	Nozzle Size
Box						
Controller						
Pipe						
Sprinkler Head						
Valve						
<input type="checkbox"/> Washroom <input type="checkbox"/> Drinking Fountain <input type="checkbox"/> Display Fountain <input type="checkbox"/> Winter Service 163 <input type="checkbox"/> Fill Up Site <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____						

Key Plan	Water Services Location: Sketch / Written
<input type="checkbox"/> Additional Information on Back of Sheet	<div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> As Built <input type="checkbox"/> Written </div> <div> <input type="checkbox"/> Sketch <input type="checkbox"/> Other </div> <div> Records Last Updated </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 5px;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 5px;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 5px;"></div> </div> </div>
Winterizing Procedures : <input type="checkbox"/> Gravity Drain <input type="checkbox"/> Compression <input type="checkbox"/> Drain Main / Blow Laterals	<div style="border-bottom: 1px solid black; padding-bottom: 10px;"> Precipitation Rate per Zone (in/hr) </div> <div style="padding-top: 10px;"> Additional Comments </div>
163	
To Be Filled Out By Calgary Parks	

LANDSCAPE MAINTENANCE

VII. LANDSCAPE MAINTENANCE

1. Preamble

Parks Operations Divisions have developed these maintenance standards as a benchmark for minimum level of performance. The Development Industry at it's discretion may desire to perform an increased level of maintenance. Sections within these standards may be specific to Parks Operations and not apply to the Development Industry.

2. Mowing

Class A, B, C, R, N, Parks

Desired Results

All turf has been cut evenly at designated height, in a safe and efficient manner.

A – 5 – 7 cm

B – 5 – 10 cm

C – 5 – 15 cm

R – 5 – 15 cm

N – 10 – 20 cm (fire cut only)

- No excessive equipment “down time”.
- No damage to turf.
- No damage to trees, shrubs or other park features such as scraped bark on trees and shrubs, bent or scraped park furniture.
- No areas have been missed.
- Prior to and after mowing, no highly visible debris, paper, etc. have been left on turf.
- No more than 5% scalped turf
- Prior to and after mowing, no more than 1 piece of highly visible litter per 100 m² on turf.
- No lubricant or fuel spills on turf or non-turf areas.

3. Small Mowing / Power Trim

Class A, B, C, R, N, Parks

Desired Results

All turf has been cut evenly at designated heights and to standard.

A – 5 – 7 cm

B – 5 – 10 cm

C – 5 – 15 cm

R – 5 - 15 cm

N – 5 –20 cm (firecut)

- No areas have been missed
- No scalped turf
- Prior to and after mowing, no visible litter on “A” Class Parks and no more than:
 - 1 piece of litter per 100 m² – Class “B” Parks
 - 2 pieces of litter per 100 m² – Class “C” Parks
- No damage to trees, shrubs or other park features such as scraped bark on trees and shrubs, bent or scraped park furniture
- No highly visible grass clippings on class A or B turf areas. Clippings should not accumulate to the point of creating an appearance problem or inhibit lawn growth on class C or R turf areas.
- Grass clippings should not be present on sidewalks, pathways or any hard surfaces for any class of park
- No lubricant or fuel spills on turf or non turf areas.

4. Litter Control

Class A, B, C, R, N Parks

Desired Results

- Removal of all “Ad Hoc” structures in the park (tree forts, etc.)
- Fence lines cleaned of highly visible accumulated litter
- Lack of highly visible litter per 100 m² on turf

A – not to exceed 0 pieces per 100 m²

B – not to exceed 1 pieces per 100 m²

C – not to exceed 2 pieces per 100 m²

R – not to exceed 2 pieces per 100 m²

N – not to exceed 2 pieces per 100 m²

5. Garbage Receptacle Emptying

- All bags 75% full or over shall be replaced

Class A, B, C, R, N, Parks

Desired Results

- All garbage cans must have a plastic garbage bag inside
- All garbage containers shall remain free of crusted garbage build-up, objectionable odors, wasps or other insects from being attracted to the garbage can.
- Area around garbage container shall be litter free. All garbage bags, hazardous material, bio-hazardous waste is to be safely disposed of according to applicable safety procedures

6. Curb Sweeping, Spring and Fall Cleanup

Class A, B, C, R, Parks

Desired Results

- All possible areas within the site swept in a safe and efficient manner
- No litter or visible debris left on the turf
- Proper disposal of all hazardous material including bio-hazardous waste, in compliance to applicable policy
- All debris piles removed from the site in a safe and efficient manner without damage to trees, shrubs or other park features
- No damage to parks buildings or amenities
- No lubricant or fuel spills on turf or non-turf areas

7. Fertilize

Class A, B, C, Parks

- Public Notice prior to application.

Desired Results

- Application is even and uniform throughout
- No spillage of fertilizer
- No burning of turf grass
- No discolouring (streaking) of turf
- No damage to trees, shrubs or other features such as scraped bark or trees and shrubs, bent or scraped park furniture
- No lubricant or fuel spills on turf or non-turf areas

8. Aerate

Class A, B, C Parks

Desired Results

- Aerator holes / cores should be 3 inches deep, 3 inches or less apart and about ¾ inch in diameter
- No damage to trees, shrubs or other park features such as scraped bark on trees and bent or scraped park furniture, or damages to irrigation system.
- No ripping or tearing turf (caused by sharp turns)
- No missed areas
- No lubricant or fuel spills on turf or non-turf areas

9. Top Dressing

Class A, B, C, Parks

Desired Results

- Park site to be prepared for top dressing as required (ie. Removal of rocks and litter. Mowing, sweeping, aerating)
- No damage to trees, shrubs, turf or other park features such as scraped bark on trees, bent or scraped park furniture
- Accurate topsoil requirement calculations
- Appropriate soil mixture piling
- Loam spread and matted evenly throughout designated area
- No areas missed with top dressing material
- No remaining piles
- No damage to turf caused by loam piles
- No top dressing material on sidewalks or roadways
- No tools are to be left at the work site after completion of task
- No lubricant or fuel spills on turf or non-turf areas

10. Chemical Weed Control

Class A, B, C, R, Parks

- Public Notice prior to application.

Desired Results

- No lubricant, chemical or fuel spills on turfed or non-turfed areas
- Threshold of 5 weeds per m2 attained on all classes (spot spraying see biocide report)
- No damage to trees, shrubs or other park features as a result of spraying operations
- No spray (herbicide) damage to non targeted vegetation

- No spray (herbicide) damage within 10 meters of the edge of tot lots
- All signage removed

11. Renovation of Park Site

Class A, B, C, R, N Parks

As required based on condition of site and specifics of those conditions

- Could involve total renovation of park including but not limited to – reseeding, resodding, change of type of park from tot lot to leisure site or athletic site, upgrade of site from class C to class B or renovation of playground area to meet new standards or safety requirements (i.e. change of equipment from wooden structures to new metal/plastic structures, change of structure due to health and safety issue like lead paint situation)

12. Tree Well Maintenance

Class A, B, C, R

Desired Results

- Tree well to be either cultivated or mulched
- If well is cultivated, well should be free of weeds and of a standard size, approximately one (1) metre in diameter
- Tree well should be intact and able to hold water
- If well is mulched, mulch should be spread evenly to a depth of 4 inches and not piled against or touching trunk of tree as this can rot the wood causing decay or even death of the tree
- All visible litter shall be removed

13. Shrub Bed Maintenance

Class A, B, C, R, Parks

Desired Results

Cultivated Beds:

- No damage such as broken branches or scraped bark
- Shrub bed area is cultivated and free of weeds
- No more than 5% of shrubs dead, missing or diseased
- No more than 5% of broken, dead or diseased shrub branches remaining in bed
- Shrub bed 90% free of weeds
- All visible litter removed

Mulched Beds:

- Shrub bed to be weeded and cultivated before mulch is applied
- Mulch to be spread evenly to a depth of 4 inches
- Mulch should not be piled against the base of trees or shrubs as this can rot the wood, causing decay or even death of the plant
- No more than 5% of shrubs dead, missing or diseased
- No more than 5% of broken, dead or diseased shrub branches remaining in bed
- Shrub beds 90% free of weeds
- All visible litter removed

14. Flower Bed Fertilizing

Class A, B, Parks

Desired Results

- Fertilization of the flower displays in a safe and efficient manner, using the correct rates and frequencies as recommended by the manufacturer
- Healthy, vigorous and colourful flower displays in part as a result of an ongoing effective fertilizer program
- Even coverage of target plants, without significant spillage
- No symptoms of toxicity as a result of over fertilization
- No significant salt accumulations
- No fertilizer concentrate spilled on flower bed or surrounding area
- All immediate hazards removed
- All tools and equipment removed from site following completion of fertilizing activities

15. Irrigation Maintenance

Class A, B, Parks

Desired Results:

Successful completion of irrigation activities including:

- Service initiation
- DCV Testing
- System Turn-on
- All repairs required in order that system operate effectively
- All systems workable
- No water leaking from system
- No debris or parts left on site
- No irrigation boxes that have lids missing or in poor state of repair. Box lids are safe and locked
- Parks water value and drain rod are visible, to grade and painted red after FAC
- All sprinkler heads/turf valves are to grade so as not to be a tripping hazard

16. Street Sidewalks (Snow Removal)

Class A, B, C Parks

Snow and ice cleared in accordance with Bylaw 20M88.

Desired Results

- Free of hazards and obstructions
- 98% clear of snow
- Sand placed on 90% of slippery areas
- No damage to trees, fences, turf or other features such as scraped bark on trees, bent or scraped park furniture or fence
- No snow piled onto shrub/planting beds
- No lubricant or fuel spills on turf or non-turf areas
- No snow pushed onto private property
- No snow sprayed onto vehicles parked along pathway or sidewalk

17. Pathways, Roads and Parking Lot Maintenance

Class A, B, C, R, N Parks

Desired Results

- To be maintained in order that they can be used for their intended purpose
- To be inspected and repaired / renovated on a regular basis either as required or as scheduled
- To be maintained in a manner that meets all legislated requirement including safety requirements
- Free of hazards and obstructions
- No damage to trees, fences, turf or other park features such as scraped bark on trees, bent or scraped park furniture or fences
- No lubricant or fuel spills on turf or non-turf areas
- No piles of debris or excess material left on site as a result of maintenance completed

18. Park Features

Class A, B, C, R, N Parks

Parks Features: including but not limited to park furniture signs, sculptures, garbage receptacles, lights, bollards, stairway/platforms.

Desired Results:

- All parks features shall be fully functional, as designed, at all times
- All parks features shall be installed as to specifications and standards
- All parks features shall be maintained in safe operating condition
- All parks features shall meet or exceed all legislated requirements
- All park features shall be inspected and maintained on a regular basis as scheduled or as required

19. Building and Janitorial Maintenance

Class A, B, C, N Parks

Desired Results

Building Maintenance:

- All vandalism reported according to procedure
- All breaches of security reported according to procedure
- All buildings safe and secure
- All fans, pumps, filters, furnaces, valves must be checked on a regular scheduled basis and be in working order
- All lights and other electrical devices in working order

Building Janitorial:

- Accumulations of water, mud and dirt must not be present on more than 5% of the floor surface (after cleaning)
- Broken glass or obvious litter must not be present
- Adherence to spill cleanup procedures and WHMIS policy
- Smudges, spots, stains, watermarks etc must not be present on more than 5% of any wall surface or mirrors
- Waste and sanitary receptacles must not be more than 75% full. Overflowing conditions and piles of litter around receptacles are not acceptable
- All dispensers (toilet paper, paper towels, etc) shall not be less than 25% full
- All toilets and sinks shall be operable. No plugged, leaking or overflowing toilets or sinks

20. Playground Inspection and Maintenance

Class A, B, C, R, N Parks

Desired Results

- Inspections completed as per established inspection schedule
- All formal (inspection report) documentation completed
- All minor repairs completed
- Any major repairs scheduled as per inspection report
- Playground safe for public use

21. Tree Pruning

Class A, B, C, R Parks

Desired Results

- Tree is cleaned of all dead, diseased and broken branches
- All clearance, both vertical and visual (for safety reasons) are maintained
- No low hanging branches that will interfere with vehicles, equipment, pedestrians or signs.
- An obvious, prominent central leader is evident (if species and growth habit of tree allows)
- Structural defects are mitigated (e.g. Hazards, dead branches removed)
- The habit of growth for the species is maintained
- No stubs, flush cuts or stumps and tearing. Final cuts should result in a flat surface with adjacent bark firmly attached
- No more than 20% of the total live canopy and 20% of living wood on any branch removed in one season
- No debris from pruning operations on roadway sidewalk or private property

22. Water Features (Ponds and Lagoons)

Class A, B Parks

Desired Results

Summer Operation

- All areas/structures related to water feature shall be safe and secure
- All fans, pumps, filters, valves or other water volume regulatory devices must be checked on a regular scheduled basis and must be in proper working order
- All lights and/or other electrical devices must be in proper working order
- All vandalism and/or security breaches must be reported according to procedure

- All legislated requirements must be adhered to, such as WHMIS, ISO14001, OH&S, etc.

Winter Operation

- Snow cleared and piled safely in a non-obstructive manner
- No snow sprayed on parked vehicles
- All areas / structures related to water feature shall be safe secure and maintained as required
- All maintenance activities shall be carried out according to procedure in a safe manner (i.e. sweeping ice, flooding, heavy snow removal, litter control, etc)
- Adherence to all legislated requirements (i.e. WHMIS, OH and S, Working Alone Policy, etc)
- All areas must be free of obstacles and hazards
- All standard procedures shall be followed (i.e. use of fire hydrant for flooding etc)
- Ice groomed and fit for skating by Christmas (weather permitting)
- Smooth ice (weather permitting)
- No holes or cracks in ice that would constitute a hazard
- No buried rocks, pop cans, etc within the ice surface that would constitute a hazard
- No damage to trees, fences, turf or other park features
- No lubricant or fuel spills on turf or non-turf areas

23. Fence Maintenance

Class A, B, C, N Parks

Desired Results

- No damage to trees, shrubs or other park features such as scraped bark on trees and shrubs, bent or scraped park furniture
- No lubricant or fuel spills on turf or non-turf areas
- No fill piled up around posts
- No debris (i.e. rocks, pieces of wood, cable, pieces of fabric, tie wires, etc) left laying around repaired fence
- No broken or bent posts
- Cable and/or fabric must be tightened as required
- Fence must be straight and at same consistent height throughout
- All gates must be installed according to standard procedures and fully operational

24. Tennis Courts

Class A, B Parks

Desired Results

- Nets neat and straight and at the correct height
- No surface dirt, gravel or other debris on court
- No graffiti on practice board
- All fencing, furniture and signs are repaired

25. Playfields

Class A, B Parks

Desired Results

- Ensure that in all fields where shale is used, that all edges where shale meets the grass are straight
- Shale should be loosened regularly, to a depth of 1 inch
- Areas adjacent to the grass to be level
- Ball diamond infield and soccer fields should be weed free
- No holes in playing fields
- No glass or other hazardous materials on the playing surface
- Level, non-protruding surface
- Ensure that all fixtures and amenities on or around play fields are inspected regularly and maintained in order to provide a safe playfield area (i.e. goal posts, backstops, players benches, dugouts, bleachers, etc)
- Ensure that all irrigation sprinkler heads and/or box lids are set to grade, so as to not create a tripping hazard
- Ensure that all irrigation box lids fitted properly to boxes and locked
- Ensure that all lighting and electrical amenities are maintained properly and in good working condition

26. The City of Calgary Parks - Park Classifications

Class A Park:

These are highly decorative show piece parks usually with numerous horticultural and landscape features.

These parks will have a full or partial irrigation system capable of complete coverage of the turf area of park.

Class B Park:

These parks could be neighborhood, regional, community or major thoroughfare orientated. Horticultural and landscape features will be based on activities and usage.

Programs are generally limited to tennis, soccer, baseball, playgrounds and can include areas designated for picnics.

These parks will have a full or partial irrigation system capable of complete coverage of the turf area of park.

Class C Park

These parks are considerably different than a Class B park in that they may have limited or no horticultural features (i.e. flowers, trees, shrub beds).

Parks will be categorized as district, regional, community, citywide and major thoroughfare orientated and could have limited programs for major outings (i.e. picnicking, playgrounds, cycling). Turf is also generally of a more coarse texture. Growth and colour of turf is mainly determined by natural conditions. Limited weed infestation may be evident.

These parks are non-irrigated.

Class R Park

Parks in this category could be identified as major thoroughfares (i.e. boulevards and medians) and buffer zones.

The grass will be coarse and sparse with quality determined by natural conditions. Higher weed infestation usually present than in a Class C park.

Usually no irrigation system present.

Class N Park

These are natural areas and will include riverbanks, escarpments, gullies, coulees, natural parks and environmental reserves with plant material of native species only.

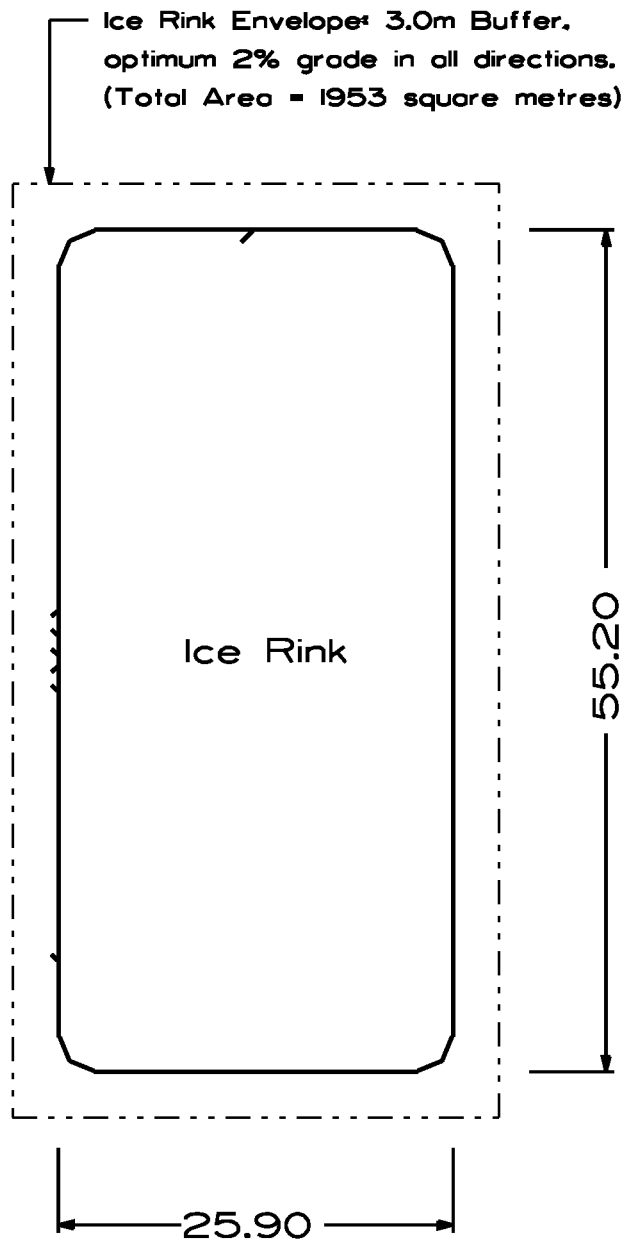
Irrigation systems not present.

DETAILS

DETAIL SHEETS

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NOTE: All dimensions are in metres unless otherwise noted.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**COMMUNITY
ICE HOCKEY RINK &
LACROSSE FIELD**

DRAWN BY

WB /MM

DATE **2006 02 03**

DESIGN BY

D.LaF.

DATE **1995 02 25**

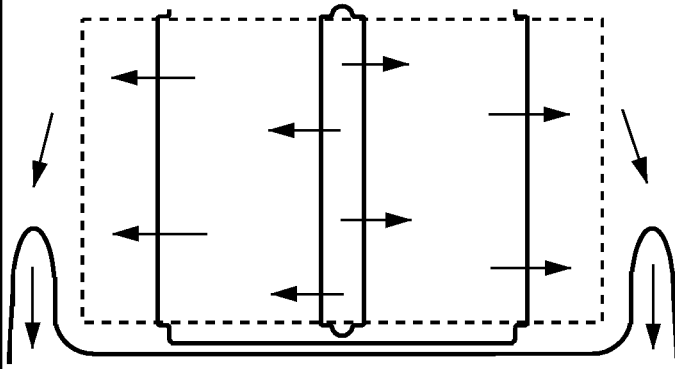
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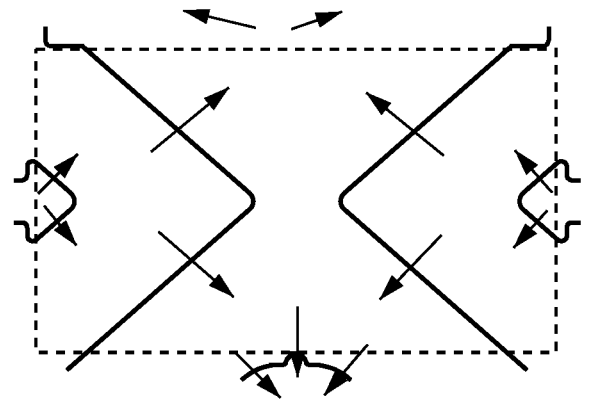
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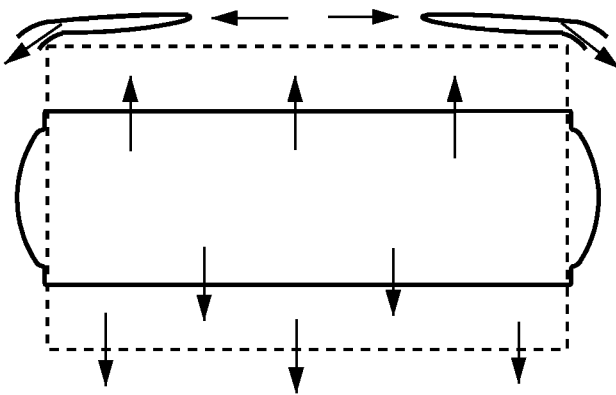
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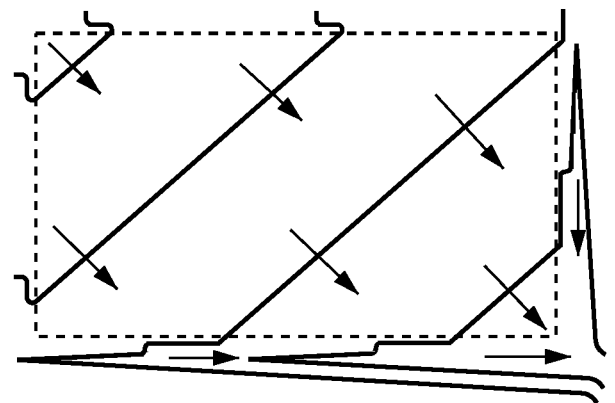
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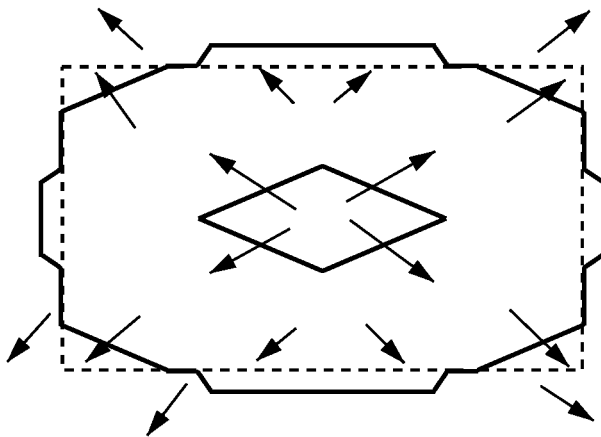
RIDGE



RIDGE



CORNER PITCH

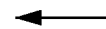


HIGH POINT

LEGEND



Sports Field



Direction of Surface Drainage



**Graphic Representation of
Contour Line - (no scale)**



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**OPTIMAL DRAINAGE
PATTERNS FOR SPORTS FIELDS**

DRAWN BY

MM

DATE 2005 01 25

DESIGN BY

DK

DATE

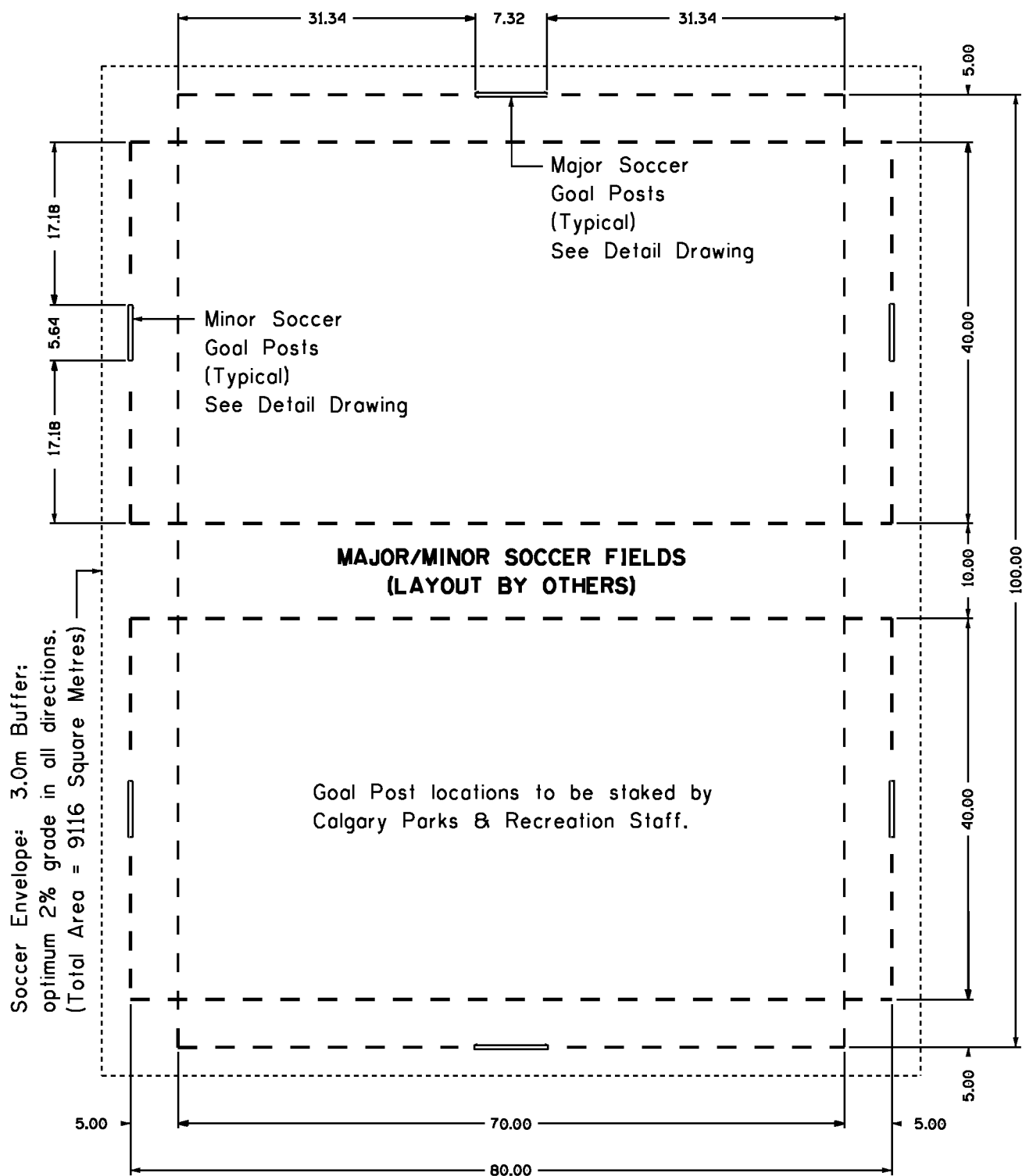
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N.T.S.

SHEET NO.

2

FILE NO.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**COMBINATION
MAJOR – MINOR
SOCCER FIELD**

DRAWN BY
WB /MM

DATE **2006 02 03**

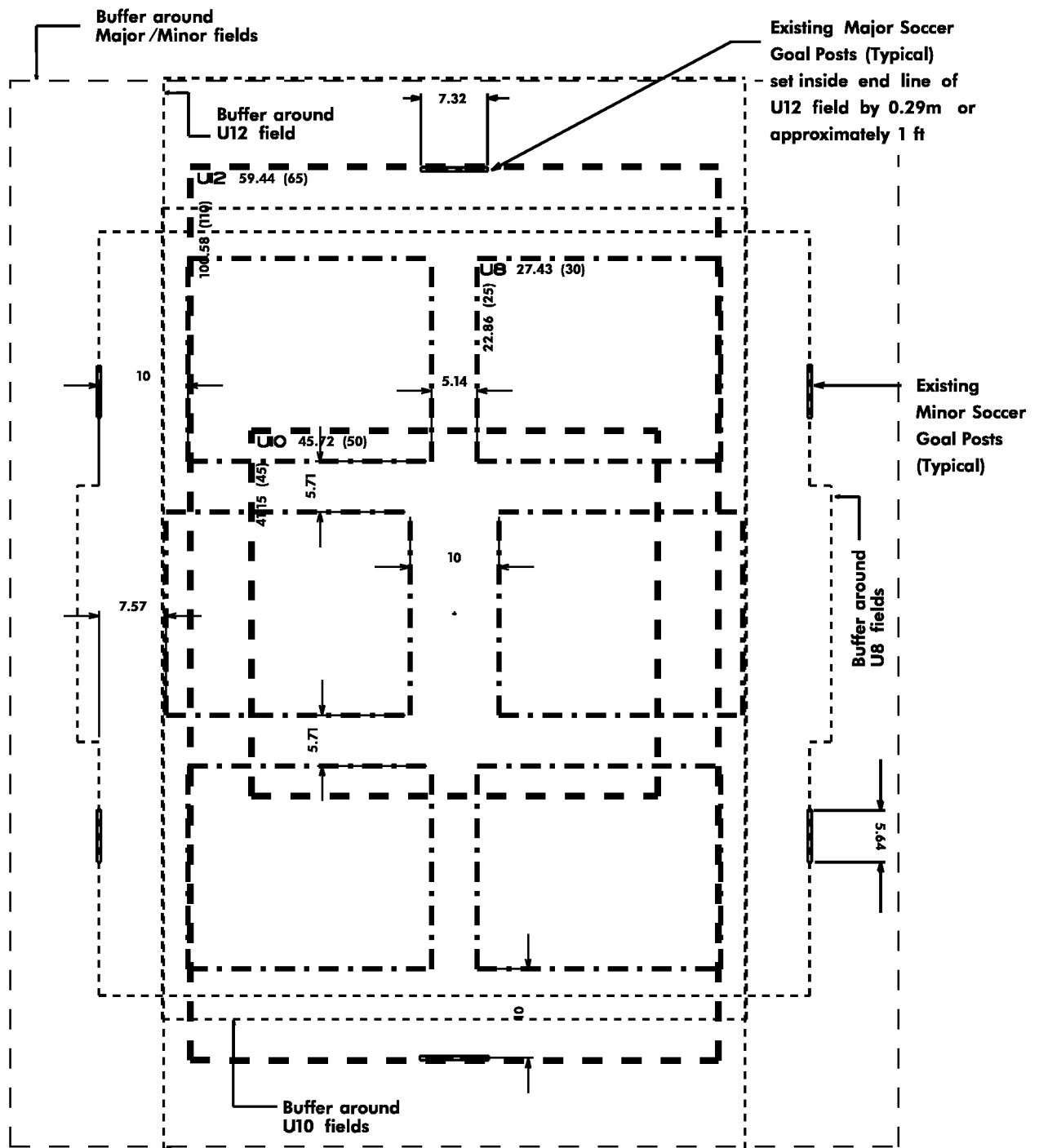
DESIGN BY
D. LaF.

DATE **1995 02 25**

SCALE
N.T.S.

SHEET NO.
3

FILE NO.



NOTE: All dimensions are in metres unless otherwise noted. Dimensions in yards are in brackets. Typical buffers around fields are 10m behind goal posts and 3m along sidelines. U6 fields are 27.43 x 18.29m (30 x 20yd) and lay out in the same locations as the U8 fields.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**U12-U6
SOCCER FIELD LAYOUT**

DRAWN BY
MM

DATE **2005 01 25**

DESIGN BY
DL

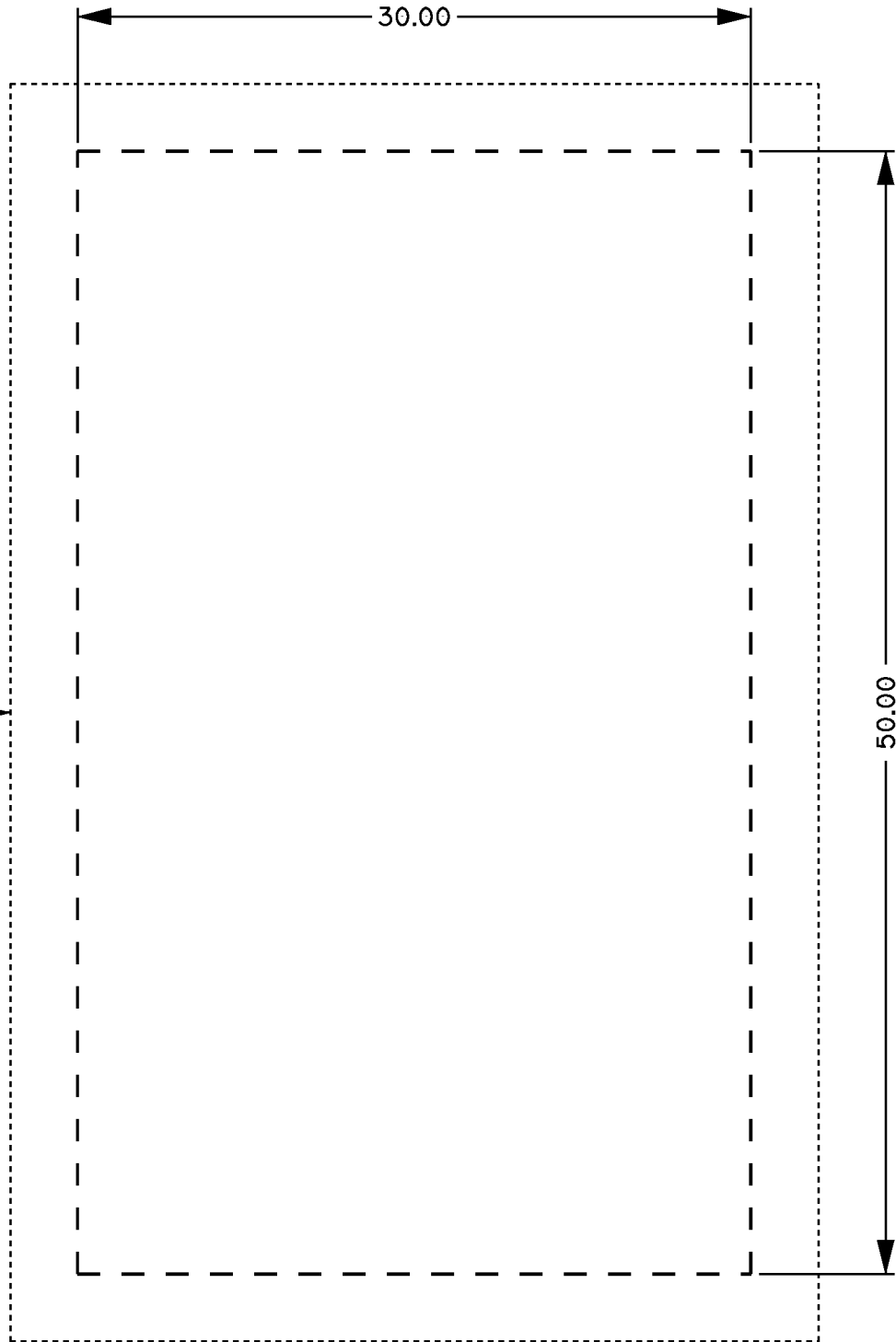
DATE

SCALE
N.T.S.

SHEET NO.
3a

FILE NO.

3.0m Buffer;
optimum 2% grade in all directions.
(Total Area = 8064 Square Metres)



NOTE: All dimensions are in metres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**ACTIVE OPEN
RECREATION SPACE**

DRAWN BY
WB

DATE **2009 03 26**

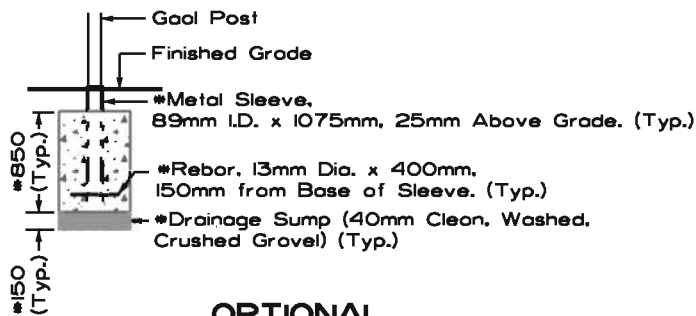
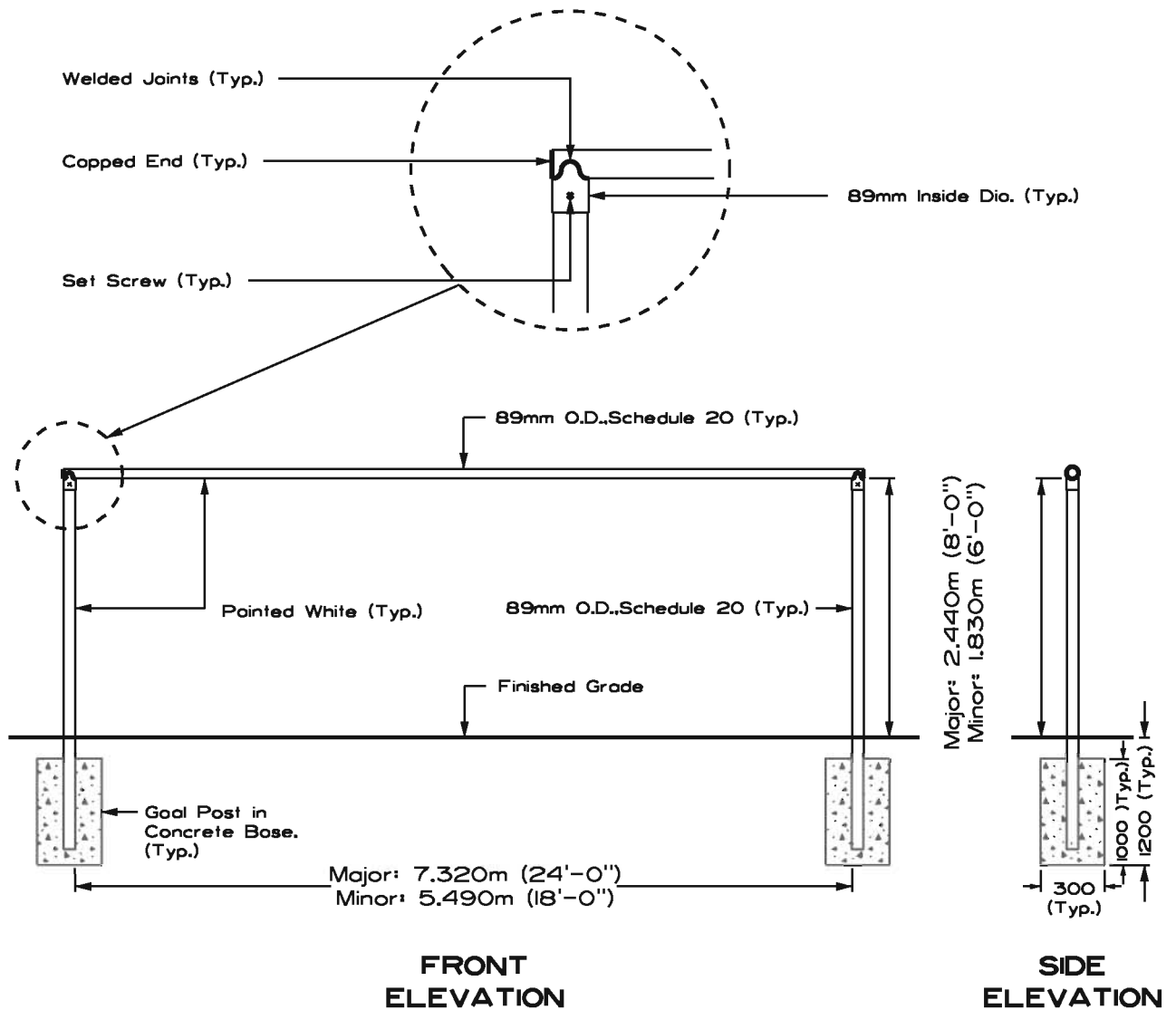
DESIGN BY

DATE **2009 03 26**

SCALE
N.T.S.

SHEET NO.
4

FILE NO.



OPTIONAL INSTALLATION *

* OPTIONAL - TO ALLOW REMOVAL
To be used when located near toboggan hills
or as required by Calgary Parks.

NOTES:

All dimensions are in millimetres unless otherwise noted.

Subject to approval by The City, portable goalposts may be installed.

If portable goalposts are to be installed they must be securely anchored to ground.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**MAJOR / MINOR
SOCCER GOAL POST DETAIL**

DRAWN BY
W.B.

DATE **2009-10-27**

DESIGN BY
D.LaF.

DATE **1997-07**

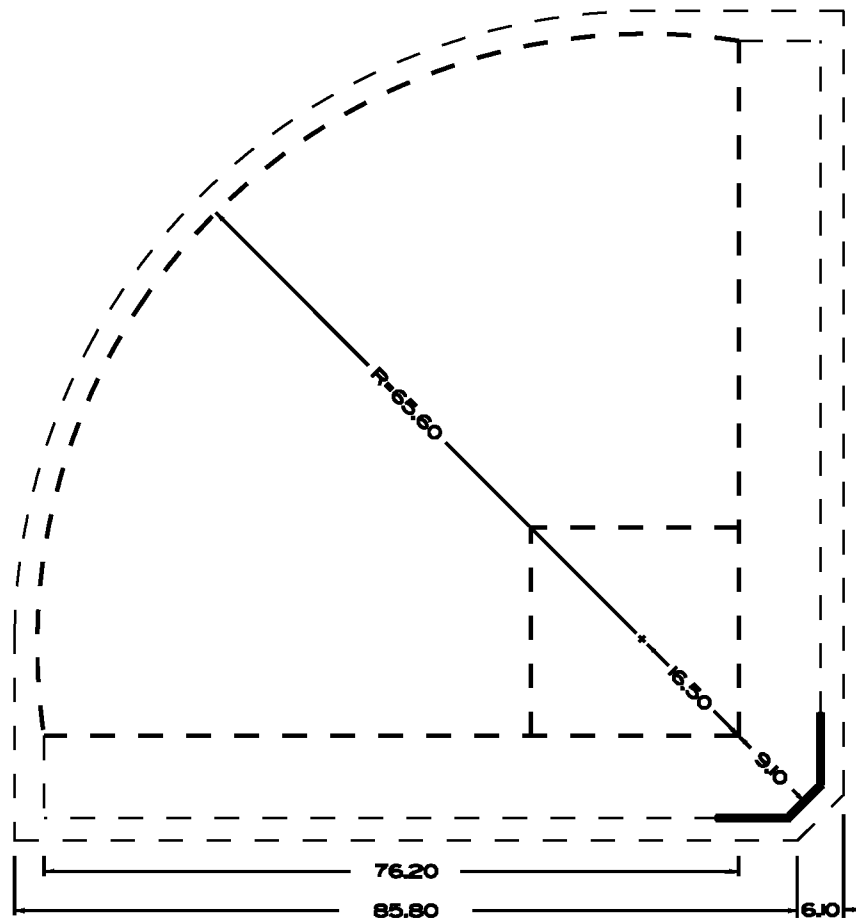
SCALE
N.T.S.

SHEET NO.
5

FILE NO.

Softball Envelope:

- 3.0m Buffer,
- optimum 2% grade in all directions.
- Total area including buffer equals 7406 square metres



NOTE: All dimensions are in metres unless otherwise noted



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**76.2m
SOFTBALL DIAMOND**

DRAWN BY
WB /MM

DATE **2006 02 03**

DESIGN BY

DATE

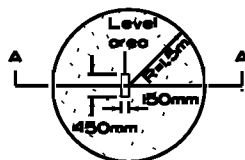
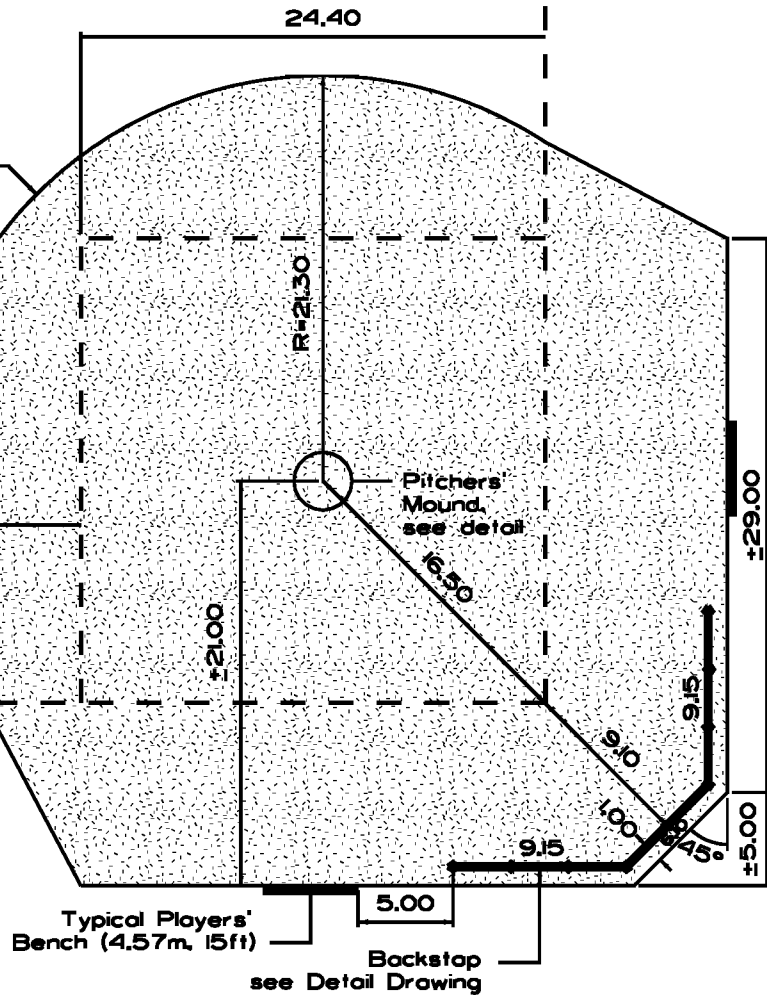
SCALE
N.T.S.

SHEET NO.
6

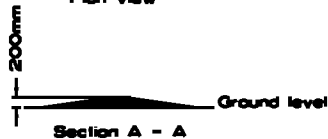
FILE NO.

Limit of
Red Shale Area
(1558 Sq. m.,
min. 150mm depth)

Baseline
Layout
by Others



Plan View



Pitchers' Mound
Detail
(N.T.S.)

NOTE: Backstop & Red Shale corner locations
to be staked by Calgary Parks.

All Dimensions are in metres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**76.2m LITTLE LEAGUE
BASEBALL DIAMOND
INFIELD**

DRAWN BY
W.B.

DATE 2005 01 25

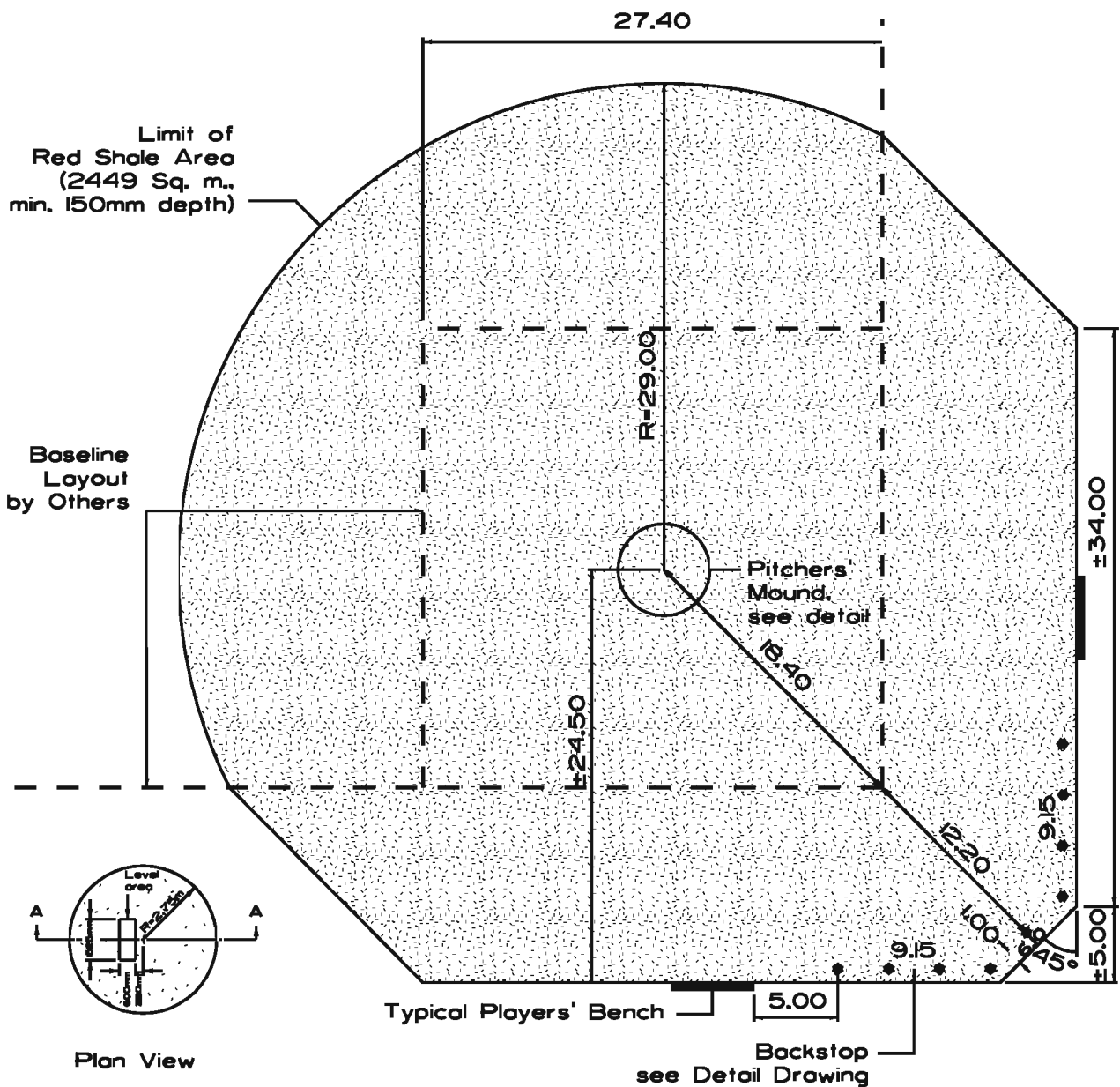
DESIGN BY
D.LaF.

DATE 1997-03-08

SCALE
1:400

SHEET NO.
7

FILE NO.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**91.4m LITTLE LEAGUE
BASEBALL DIAMOND
INFIELD**

DRAWN BY
W.B.

DATE 2002-03-05

DESIGN BY
D.LaF.

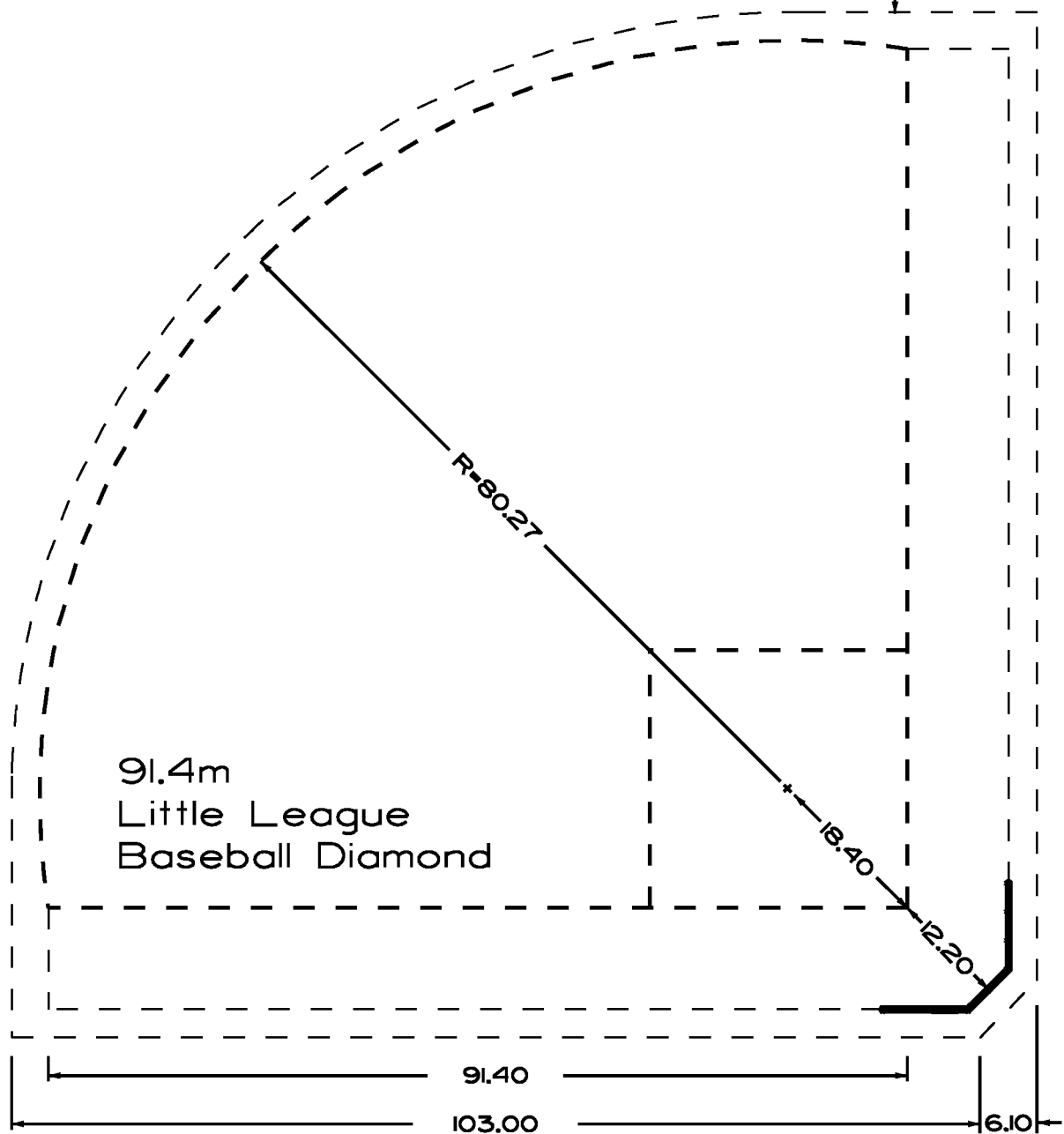
DATE 1997-03-08

SCALE
1:400

SHEET NO.
8

FILE NO.

Baseball Envelope: 3.0m Buffer,
optimum 2% grade in all directions.
(Total area = 10,394 square metres)



NOTE: All dimensions are in metres unless otherwise noted



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**91.4m LITTLE LEAGUE
BASEBALL DIAMOND**

DRAWN BY
WB /MM

DATE **2006 02 03**

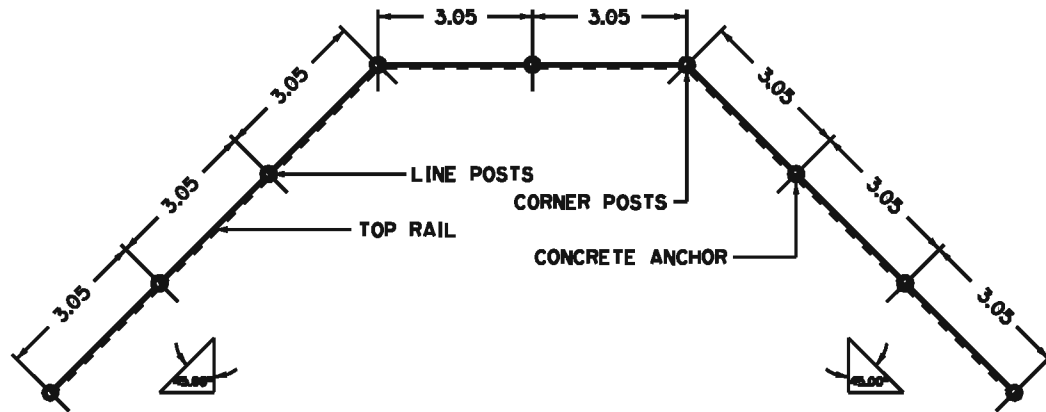
DESIGN BY
D. LaF.

DATE **1996 03 08**

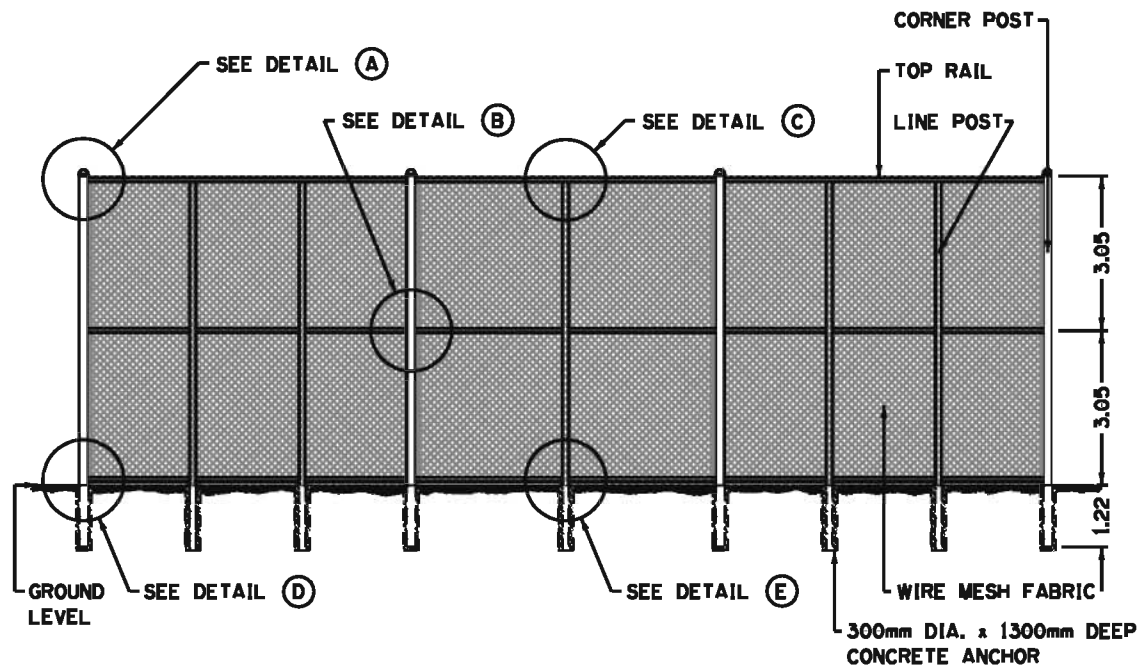
SCALE
N.T.S.

SHEET NO.
9

FILE NO.



BACKSTOP PLAN



BACKSTOP ELEVATION



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

BACKSTOP DETAIL

DRAWN BY

WB / MM

DATE **2006 02 04**

DESIGN BY

DATE

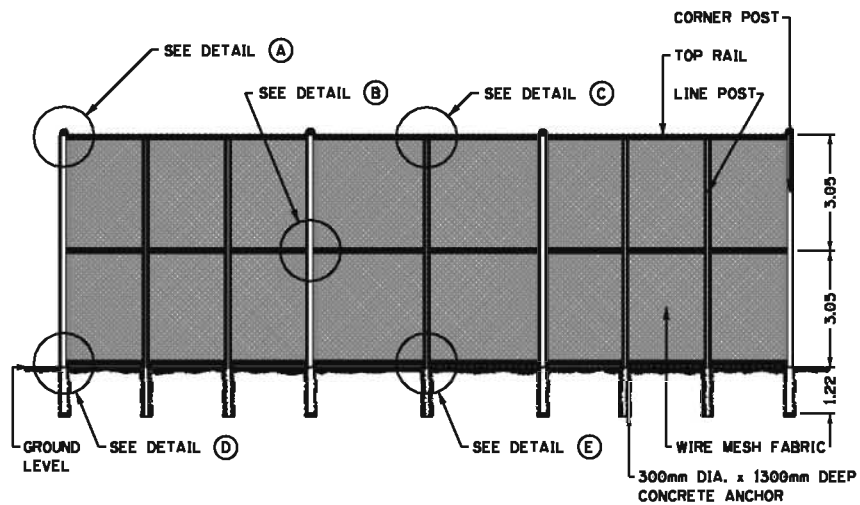
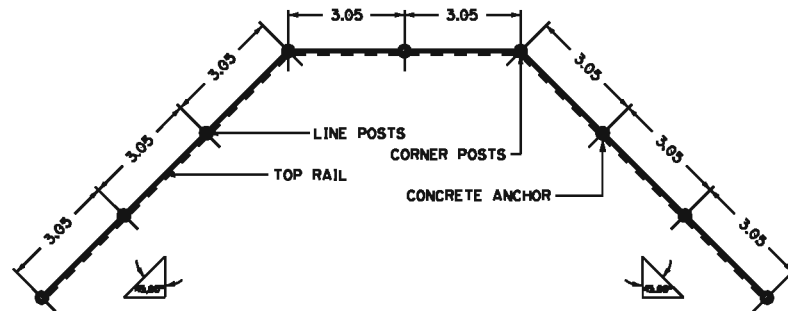
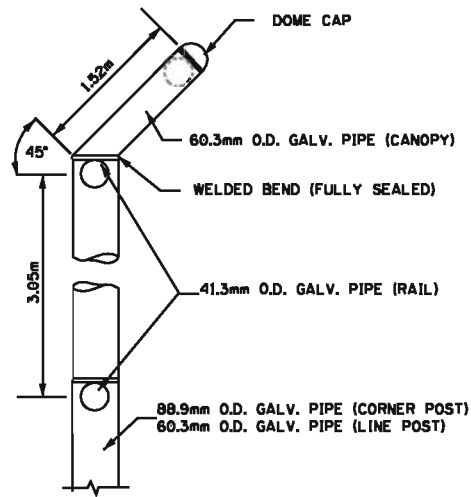
SCALE

N.T.S.

SHEET NO.

10

FILE NO.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

BACKSTOP DETAIL

DRAWN BY

MK

DATE **2006 05 25**

DESIGN BY

DATE

SCALE

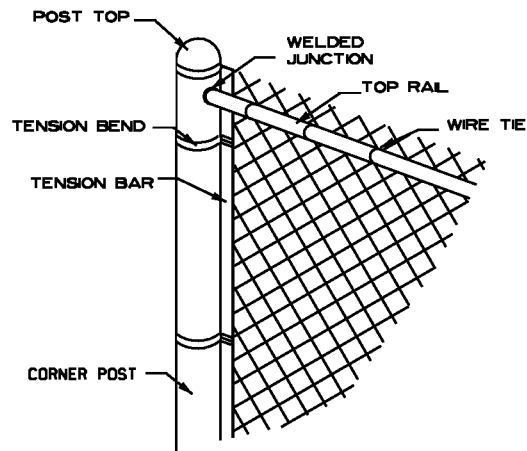
N.T.S.

SHEET NO.

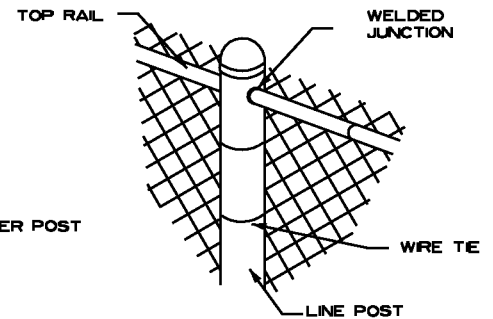
11

FILE NO.

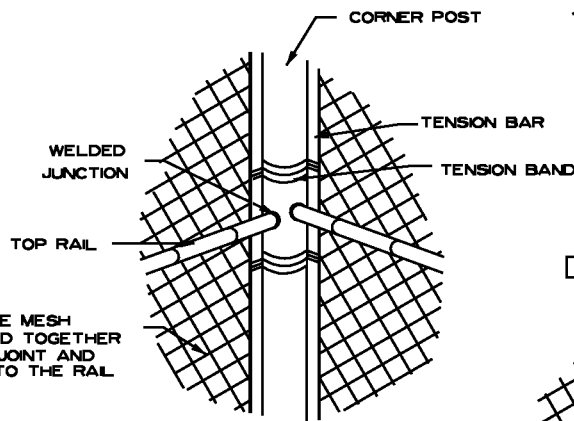
DETAIL A



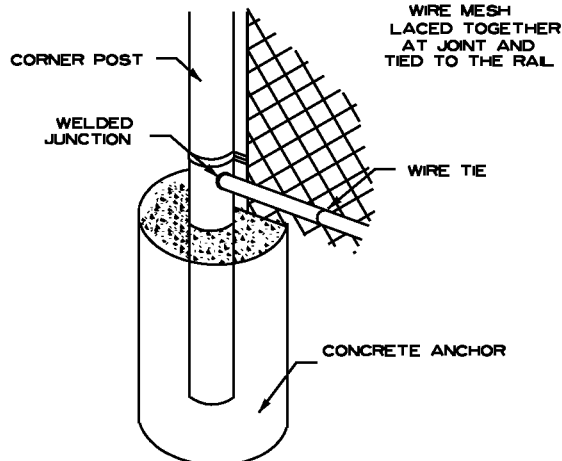
DETAIL C



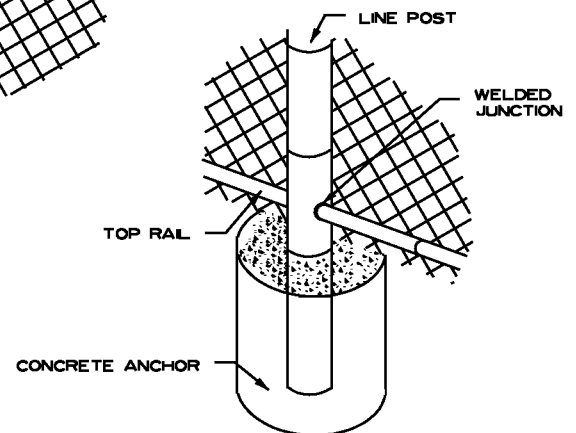
DETAIL B



DETAIL D



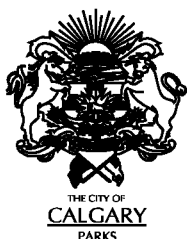
DETAIL E



MATERIAL LIST

QTY	SIZE	DESCRIPTION
49 m	3.05m x 50mm	No. 6 Gauge Wire Mesh
147m	41.3mm O.D.	Top Rail
4	88.9mm O.D. x 7.32m	Corner Post
5	60.3mm O.D. x 7.32m	Line Post
4	56.9mm I.D.	Post Tops
12	3.05m	Tension Bars
9.07kg	No.16 Gauge	Lacing Wire
72	38mm x 7.9m	Bolts c/w Locks & Nuts
72	88.9 I.D.	Tension (offset) Bands

BACKSTOP MATERIALS
(38 WELDED JUNCTIONS
CONOPY NOT INCLUDED)



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**BACKSTOP
DETAIL**

DRAWN BY
MK

DATE
2006 05 24

DESIGN BY

DATE

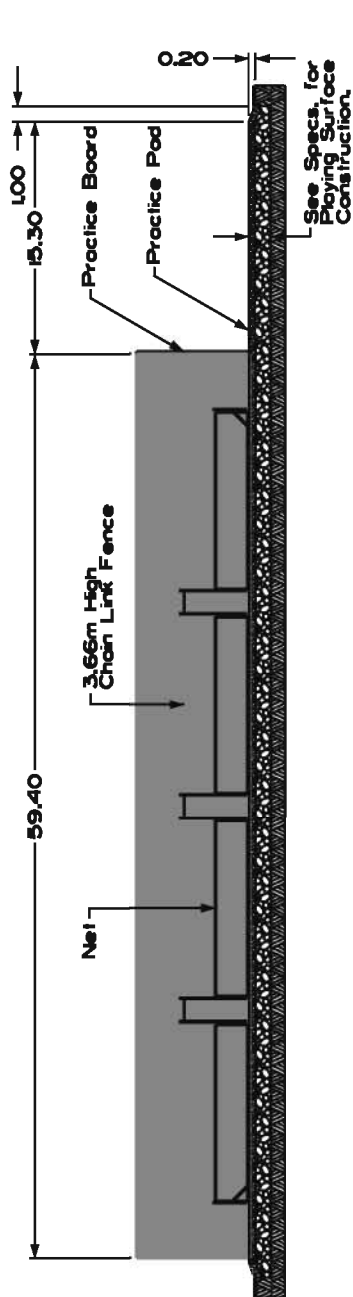
SCALE

N.T.S

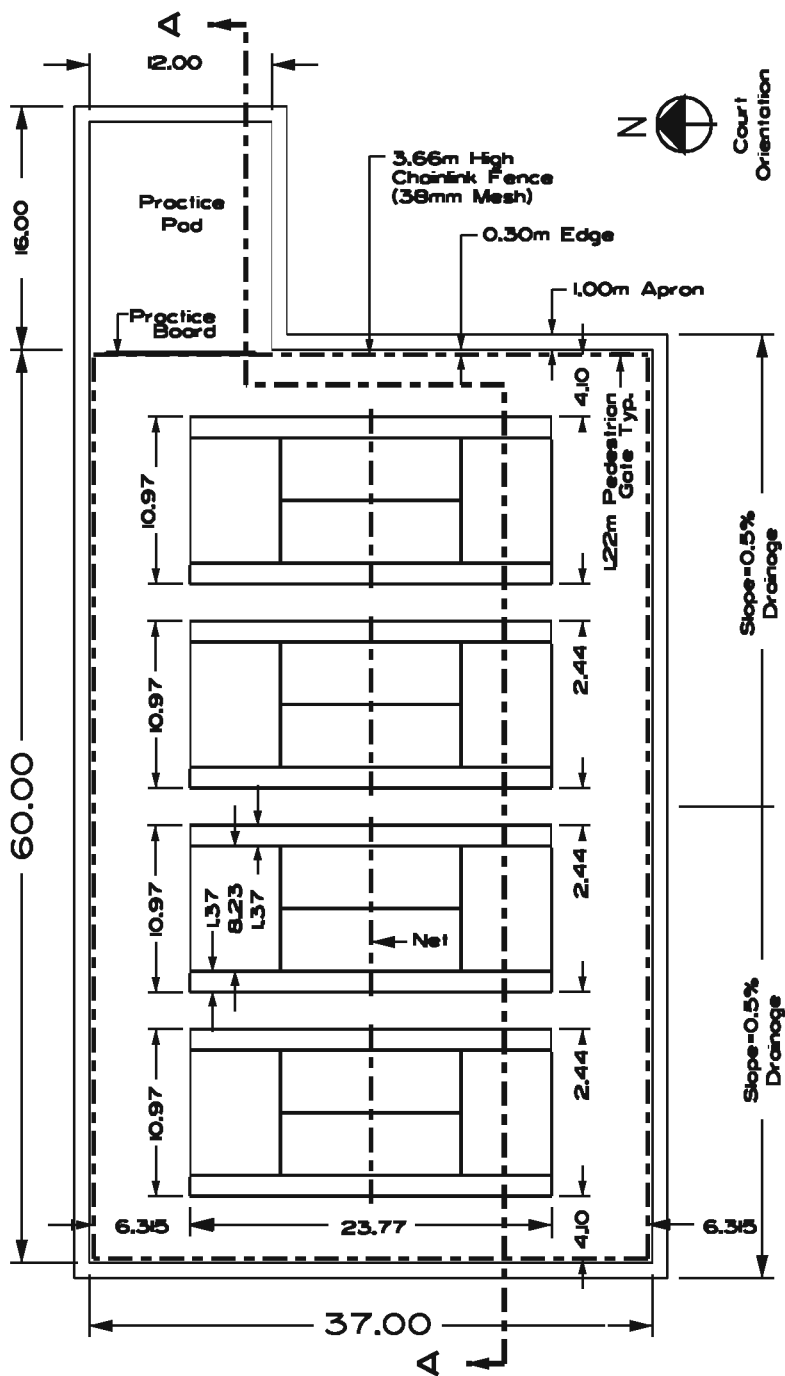
SHEET NO.

12

FILE NO.



SECTION A - A



NOTE: All dimensions are in metres unless otherwise noted.

PLAN VIEW



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
TENNIS COURT
CONSTRUCTION
(PLAN & SECTION VIEW)

DRAWN BY
WB

DATE 2006 02 03

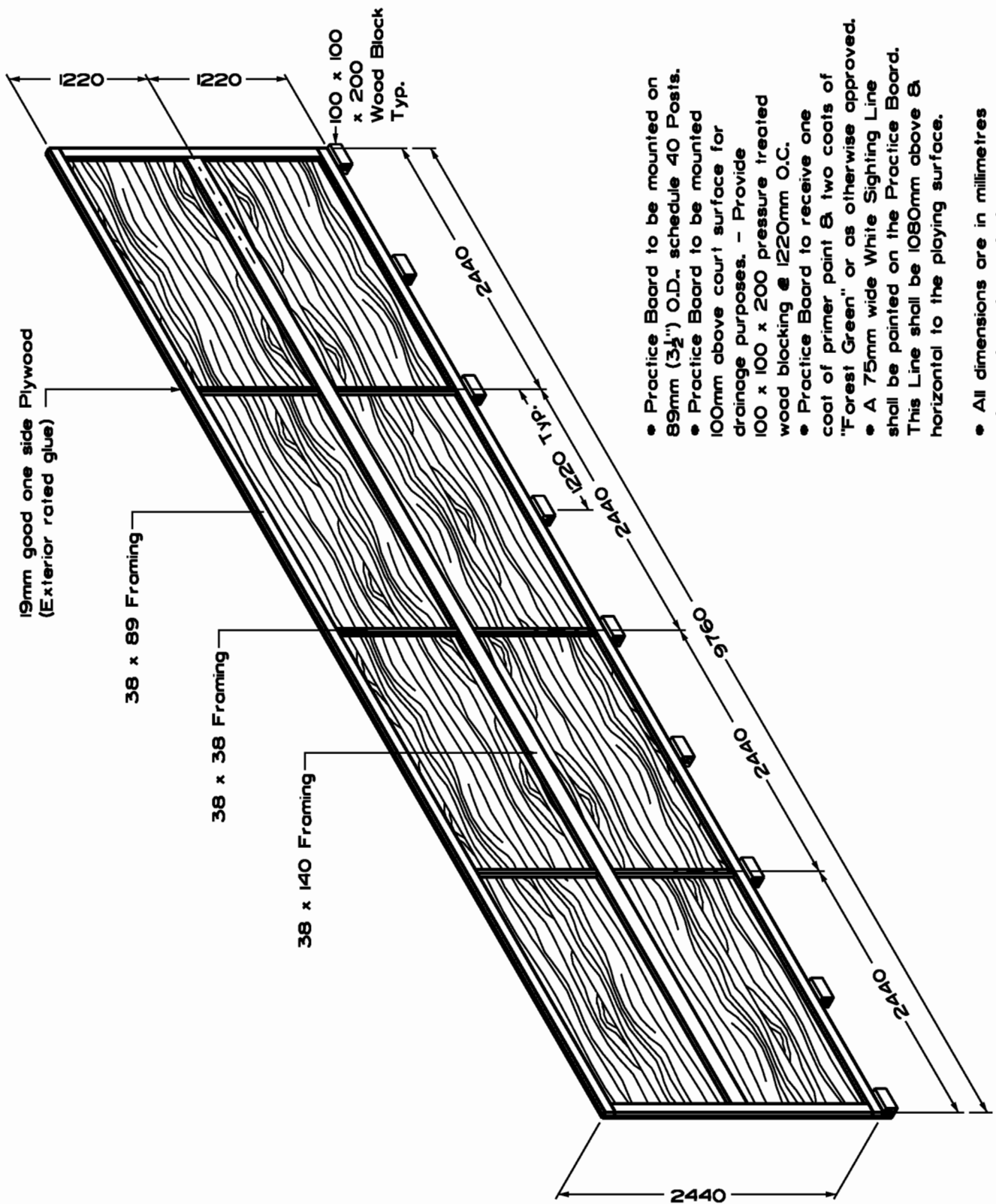
DESIGN BY

DATE

SCALE
N.T.S.

SHEET NO.
13

FILE NO.



- Practice Board to be mounted on 89mm (3½") O.D., schedule 40 Posts.
- Practice Board to be mounted 100mm above court surface for drainage purposes. - Provide 100 x 100 x 200 pressure treated wood blocking @ 1220mm O.C.
- Practice Board to receive one coat of primer paint & two coats of "Forest Green" or as otherwise approved.
- A 75mm wide White Sighting Line shall be painted on the Practice Board. This Line shall be 1080mm above & horizontal to the playing surface.
- All dimensions are in millimetres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**TENNIS COURT
CONSTRUCTION
(PRACTICE BOARD)**

DRAWN BY
WB

DATE **2006 02 04**

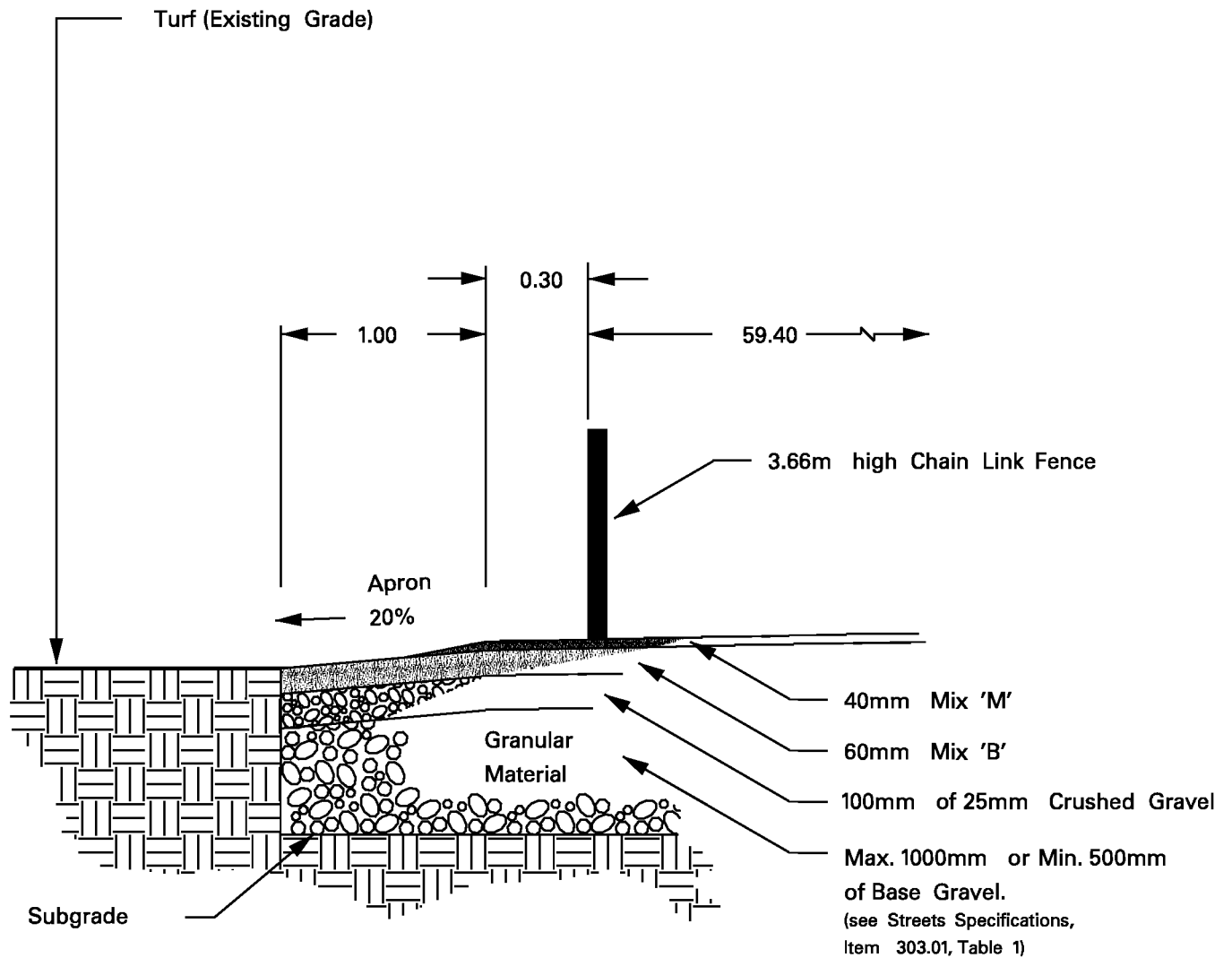
DESIGN BY

DATE

SCALE
N.T.S.

SHEET NO.
14

FILE NO.



NOTE: All dimensions are in metres unless otherwise noted.
See design information for Tennis Courts.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**TENNIS COURT
CONSTRUCTION
APRON DETAIL**

DRAWN BY
W.B./M.M.

DATE **2003 02 20**

DESIGN BY

DATE

SCALE
N.T.S.

SHEET NO.
15

FILE NO.

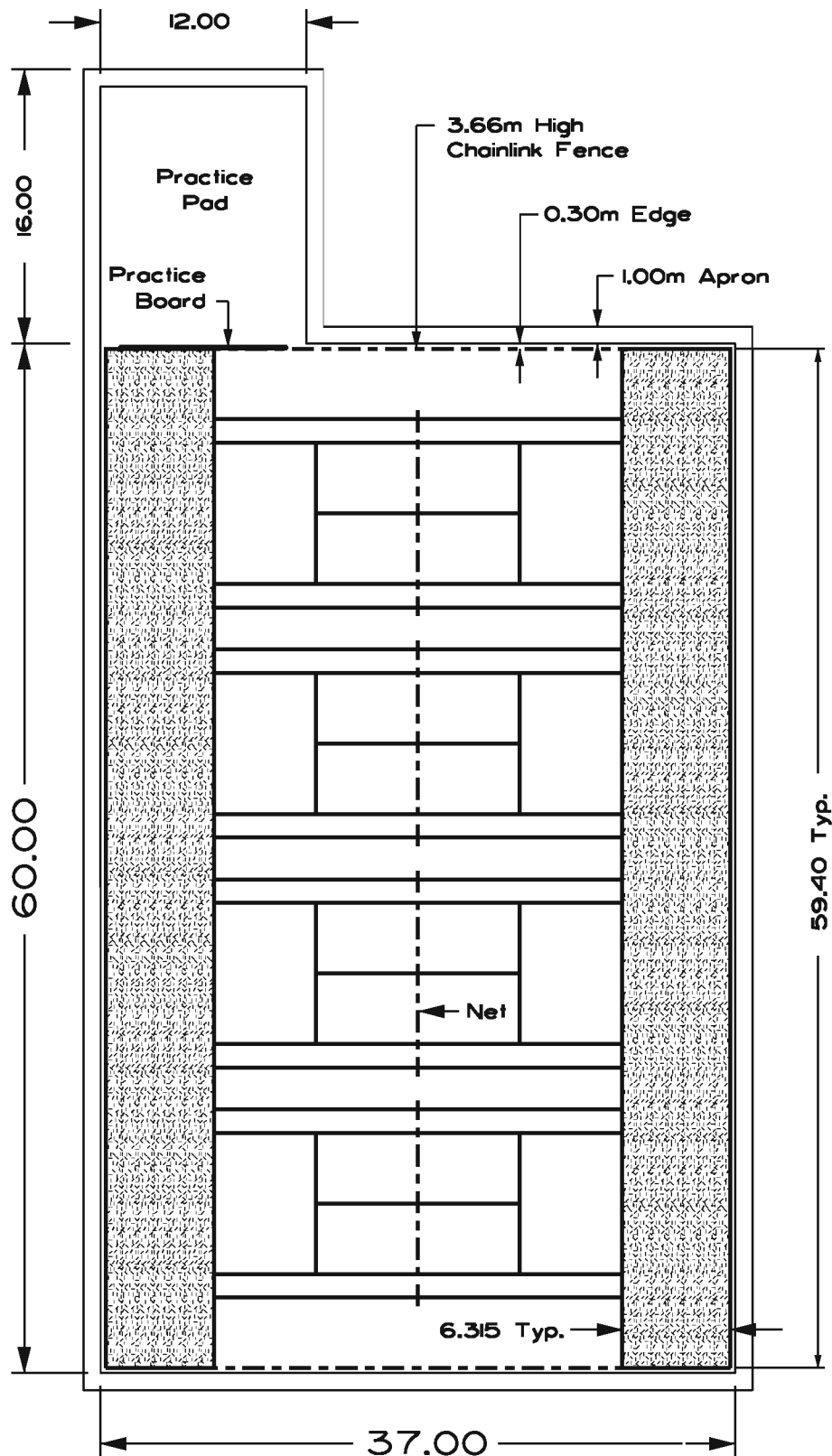




NOTE: All dimensions are in millimetres unless otherwise noted.

COLOUR FAILURE ANYWHERE ON BACK SPACE,
RECOLOUR THE ENTIRE AFFECTED AREA.

BACK SPACE SHOWN THUS - 



NOTE: All dimensions are in metres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**TENNIS COURT CONST.
SURFACE REPAIR
SCHEDULE #1**

DRAWN BY
WB

DATE **2006 02 06**

DESIGN BY
TDS

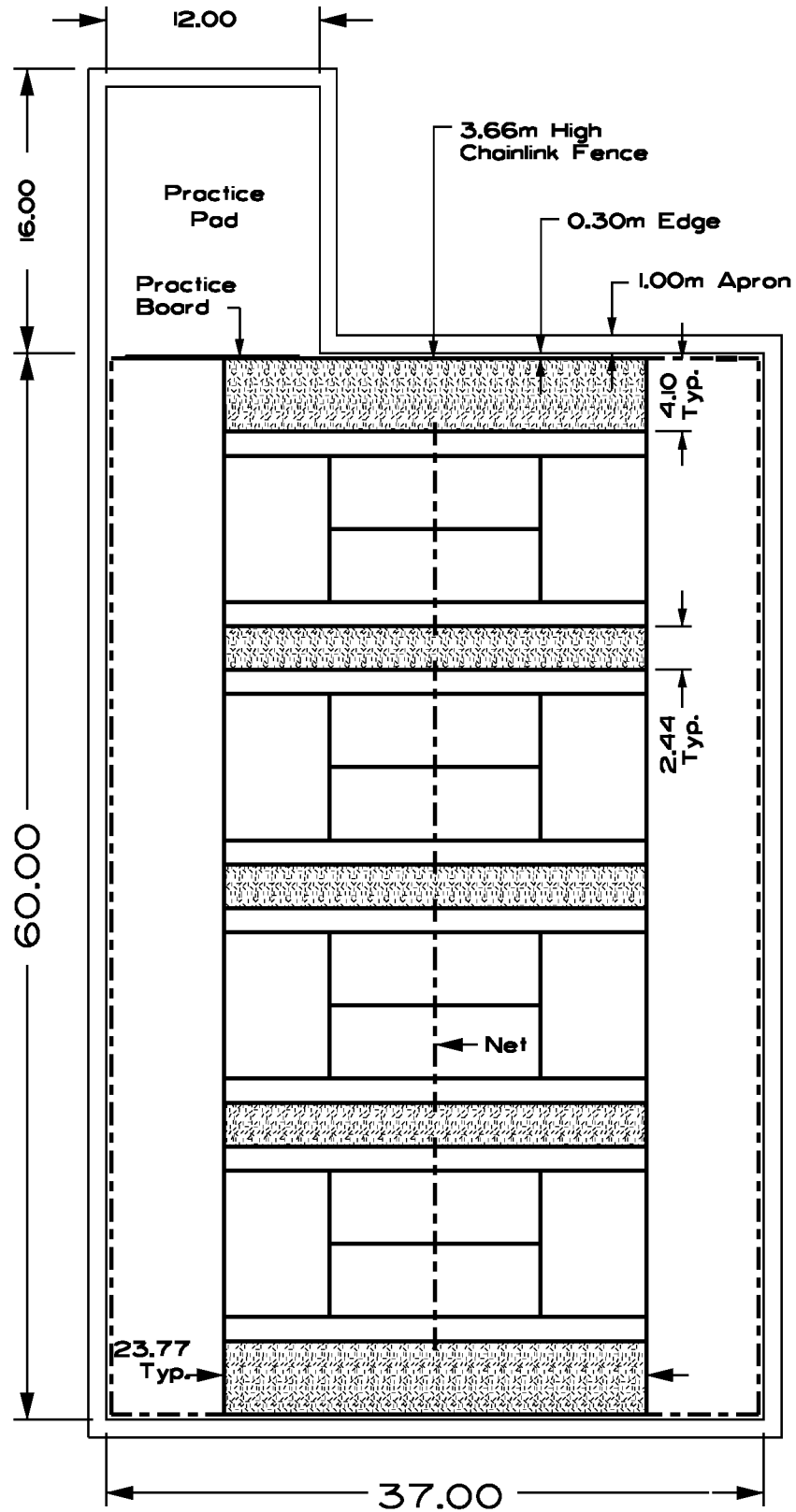
DATE **1994 01**

SCALE
N.T.S.

SHEET NO.
19

FILE NO.

COLOUR FAILURE ANYWHERE ON
SIDE COURT SPACE OR BETWEEN COURT SPACE.
RECOLOUR THE ENTIRE AFFECTED AREA.
SIDE COURT SPACE OR BETWEEN COURT SPACE SHOWN THUS - 



NOTE: All dimensions are in metres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**TENNIS COURT CONSTR.
SURFACE REPAIR
SCHEDULE #2**

DRAWN BY
WB

DATE **2006 02 06**

DESIGN BY
TDS


DATE **1994 01**

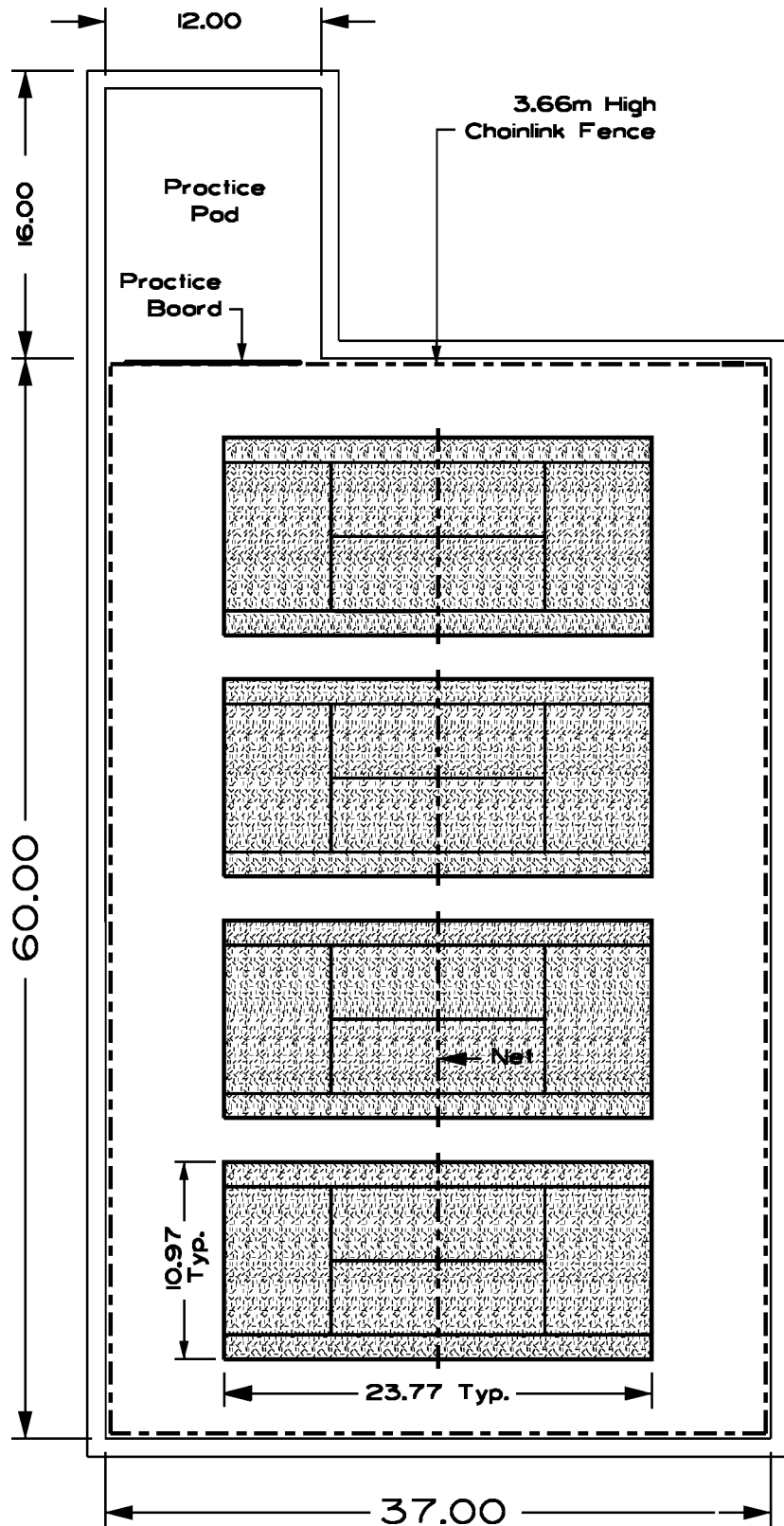
SCALE
N.T.S.

SHEET NO.
20

FILE NO.

COLOUR FAILURE ON ANY COURT.
RECOLOUR & RELINE THE ENTIRE AFFECTED COURT.

COURTS SHOWN THUS - 



NOTE: All dimensions are in metres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**TENNIS COURT CONSTR.
SURFACE REPAIR
SCHEDULE #3**

DRAWN BY
WB

DATE **2006 02 06**

DESIGN BY
TDS

DATE **1994 01**

SCALE
N.T.S.

SHEET NO.
21

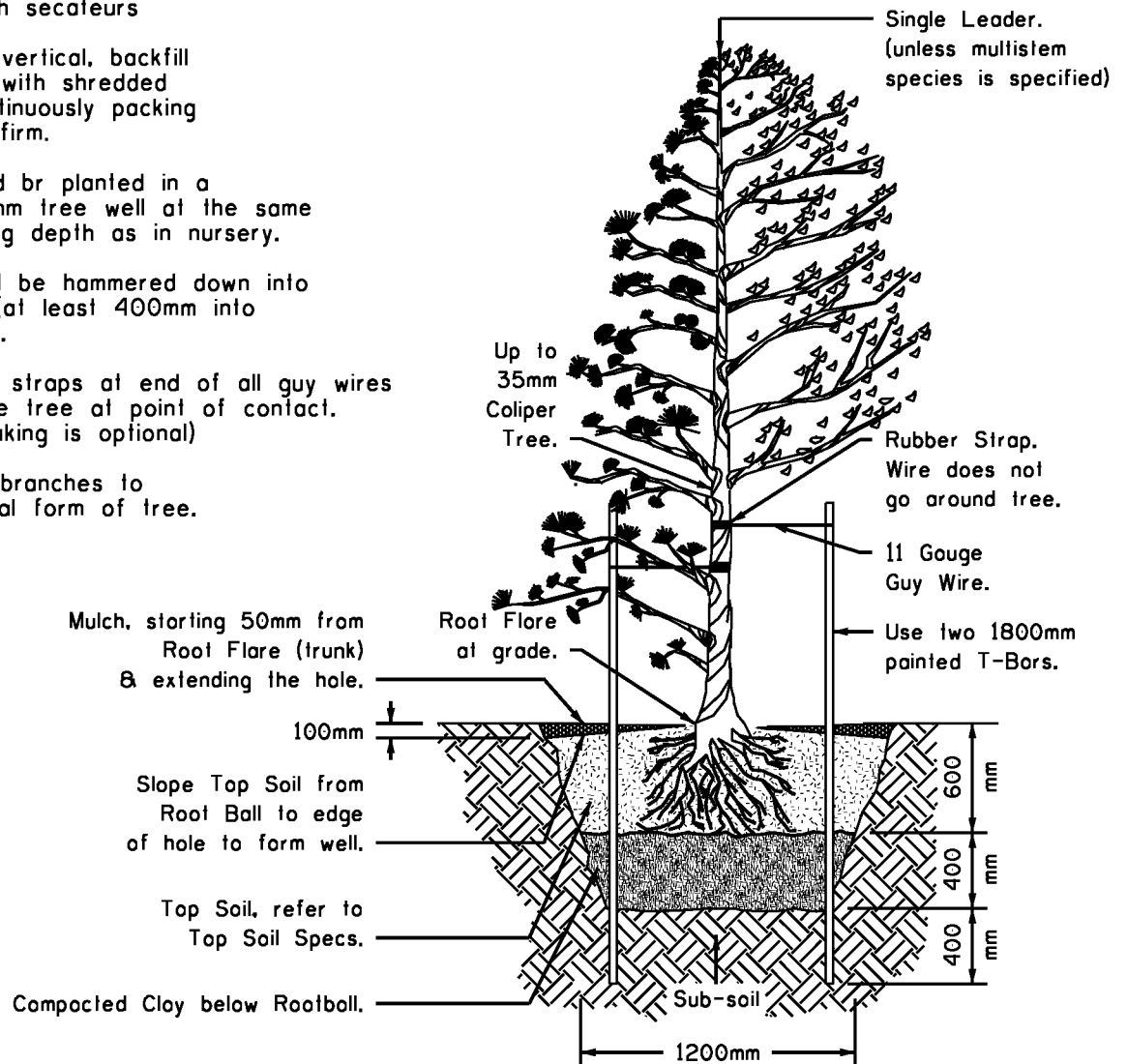
FILE NO.

TREE PLANTING DETAIL

The following Tree Planting Detail will be used for Bare Root Trees up to 35mm Caliper.

NOTES:

- Spread out roots in hole (hole shall be twice the diameter of the root spread).
- Flush out broken or frayed root ends with secateurs
- Hold trunk vertical, backfill around roots with shredded loam mix, continuously packing the soil until firm.
- Tree should be planted in a 75mm - 100mm tree well at the same original growing depth as in nursery.
- Bars should be hammered down into solid footing (at least 400mm into sub-soil base).
- Use rubber straps at end of all guy wires to protect the tree at point of contact. (Guying & Staking is optional)
- Prune dead branches to maintain natural form of tree.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
TREE PLANTING DETAIL
35mm CALIPER TREES & SMALLER
BARE ROOT

DRAWN BY
W.B.

DATE **2003-01-23**

DESIGN BY

DATE

SCALE
N.T.S.

SHEET NO.
22

FILE NO.

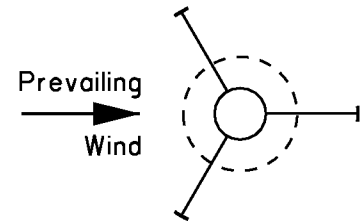
TREE PLANTING DETAIL

The following Tree Planting Detail will be used for Backhoe Dug, 40mm - 100mm caliper, either coniferous or deciduous, irrigated sites, basketed, or balled and burlap trees.

On non-irrigated sites an increase in topsoil depth to increase water holding capacity may be desired.

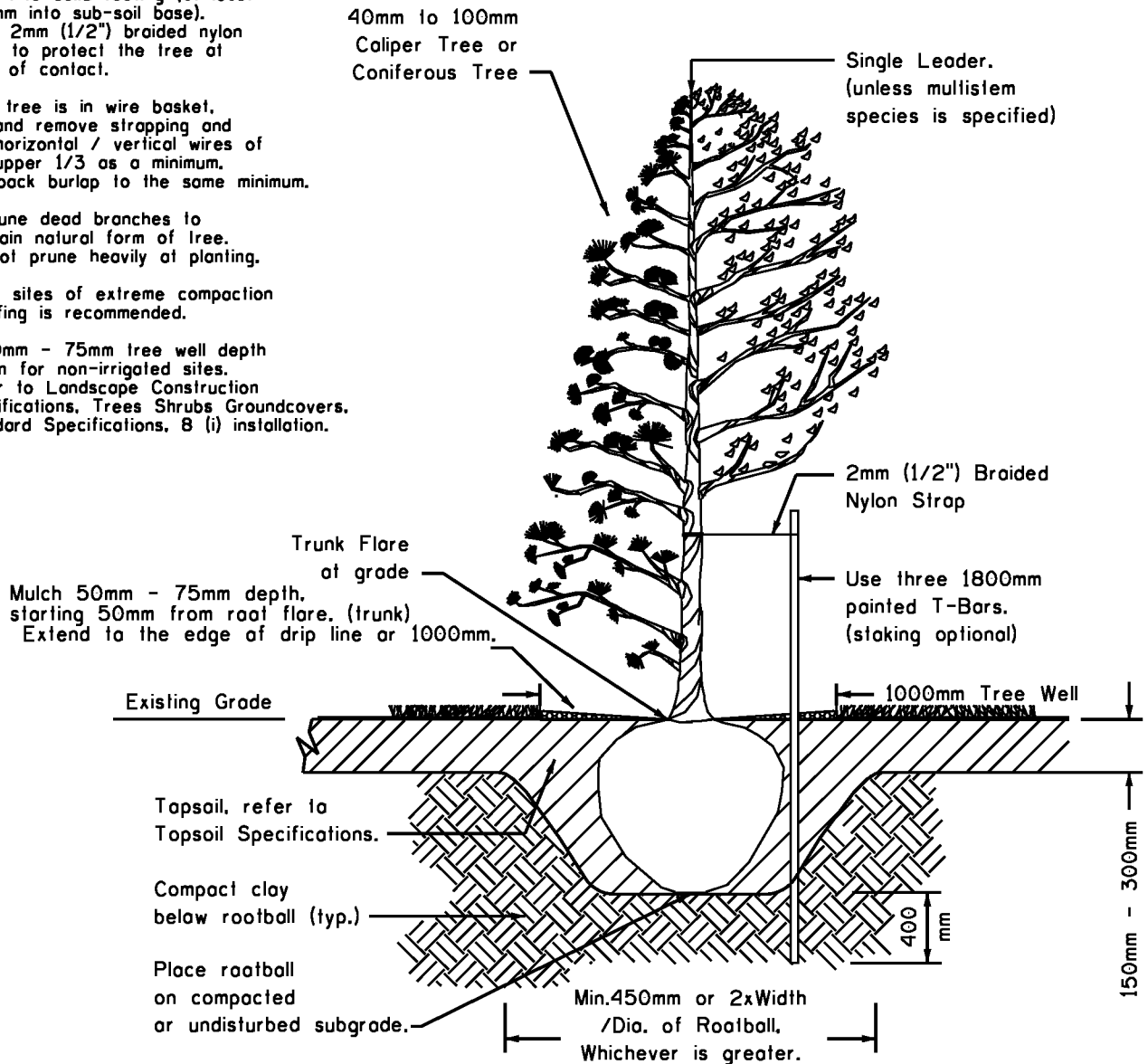
NOTES:

- Do not allow air pockets to form when back filling.
- Trees to be planted at grade with trunk flare visible - no more than 25mm above grade
- If staking, stake beyond edge of root ball. Bars should be hammered down into solid footing (at least 400mm into sub-soil base). Use 2mm (1/2") braided nylon strap to protect the tree at point of contact.
- If tree is in wire basket, cut and remove strapping and the horizontal / vertical wires of the upper 1/3 as a minimum. Pull back burlap to the same minimum.
- Prune dead branches to maintain natural form of tree. Do not prune heavily at planting.
- On sites of extreme compaction scarifying is recommended.
- 50mm - 75mm tree well depth option for non-irrigated sites. Refer to Landscape Construction Specifications, Trees Shrubs Groundcovers, Standard Specifications, 8 (i) installation.



PLAN FOR TREE STAKING

(optional)



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

TREE PLANTING DETAIL

40mm TO 100mm CALIPER TREES

DRAWN BY

W.B./M.M.

DATE

2009 10 27

DESIGN BY

DATE

SCALE

N.T.S.

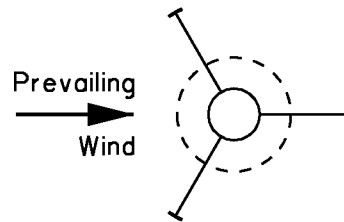
SHEET NO.

23

FILE NO.

TREE PLANTING DETAIL

The following Tree Planting Detail will be used for Spade Hole Preparation, 40mm - 100mm Caliper, either Coniferous or Deciduous, Basket or Ball & Burlap Trees

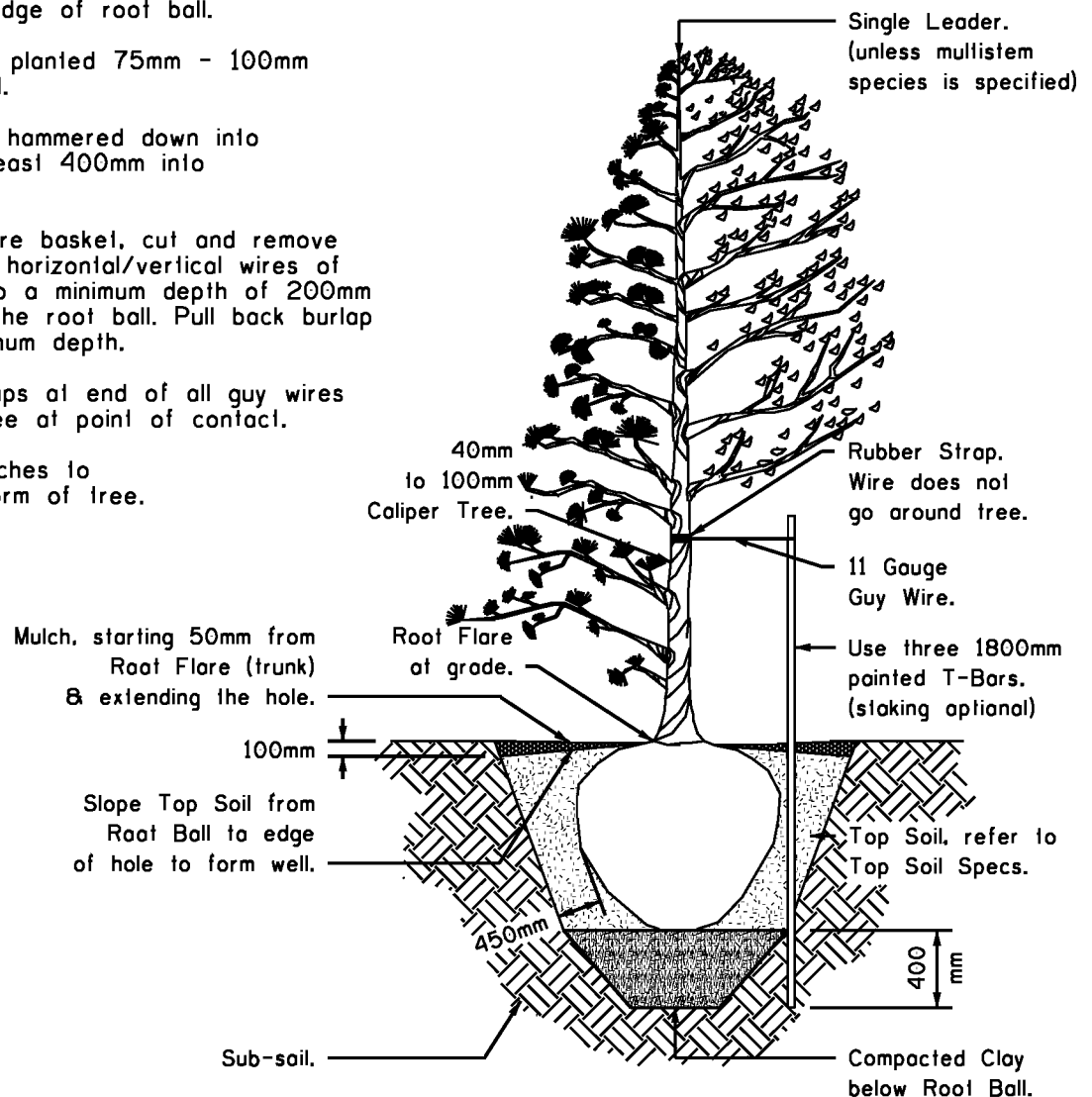


NOTES:

- Do not allow air pockets to form when back filling.
- Stake beyond edge of root ball.
- Tree should be planted 75mm - 100mm below ground level.
- Bars should be hammered down into solid footing (at least 400mm into sub-soil base).
- If tree is in wire basket, cut and remove strapping and the horizontal/vertical wires of the wire basket to a minimum depth of 200mm from the top of the root ball. Pull back burlap to this same minimum depth.
- Use rubber straps at end of all guy wires to protect the tree at point of contact.
- Prune dead branches to maintain natural form of tree.

PLAN FOR TREE STAKING

(optional)



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
TREE PLANTING DETAIL
40mm - 100mm CALIPER TREES
SPADE DUG

DRAWN BY
W.B.

DATE **2003-01-23**

DESIGN BY

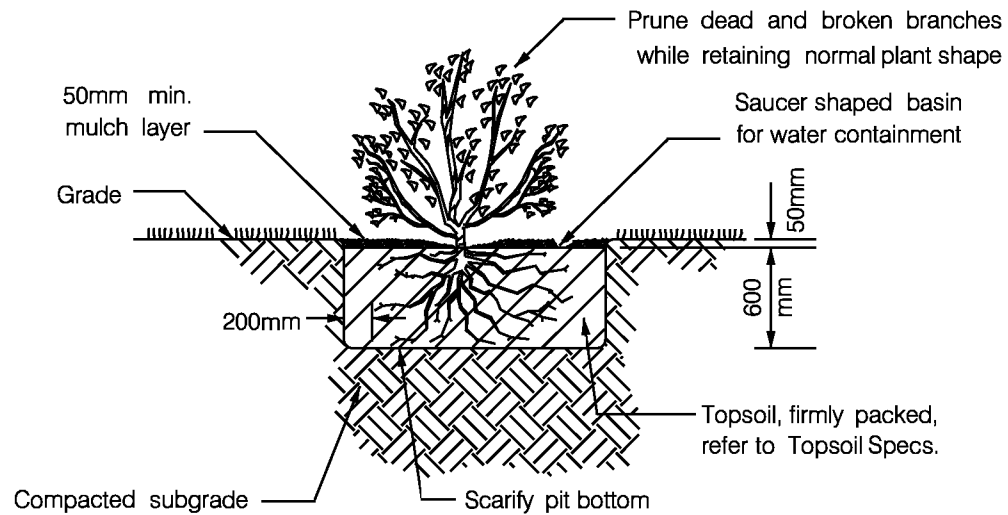
DATE

SCALE
N.T.S.

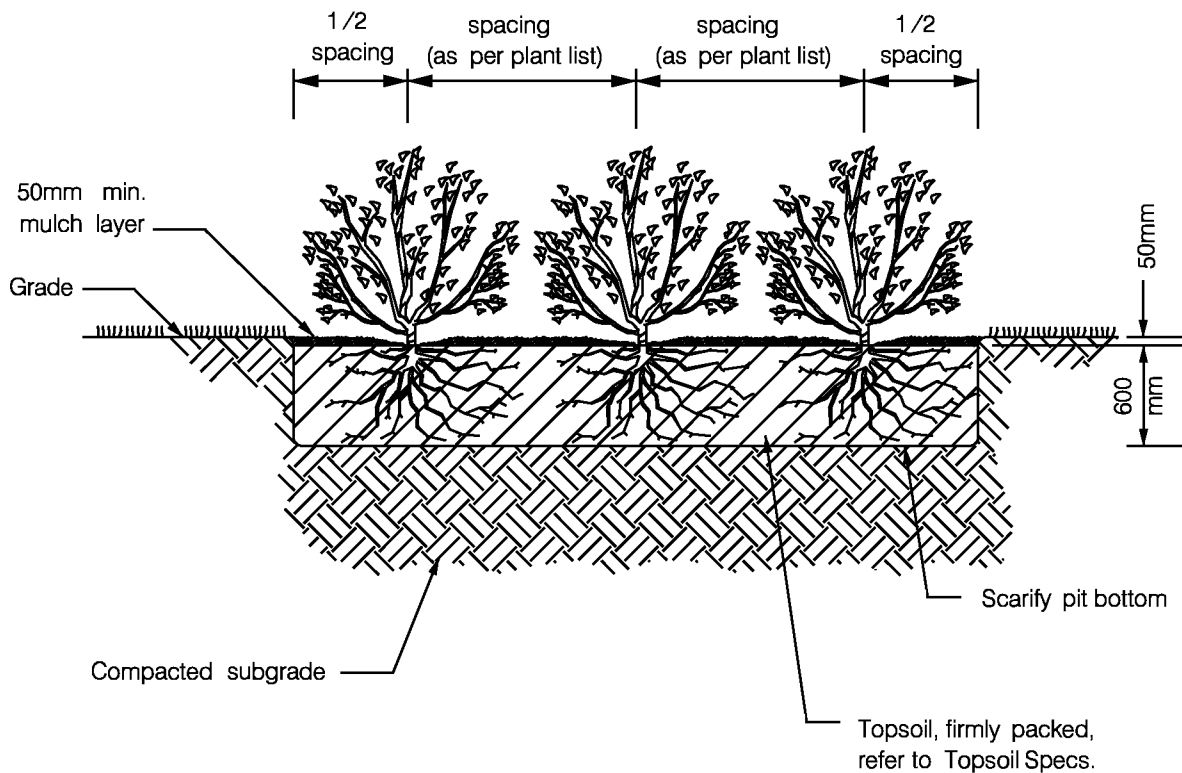
SHEET NO.
24

FILE NO.

The following shrub planting detail will be used for all potted deciduous or coniferous shrubs



Shrub Pit



Shrub Bed



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
SHRUB PLANTING DETAIL

DRAWN BY
W.B./M.M.

DATE **2006 02 06**

DESIGN BY

DATE

SCALE
N.T.S.

SHEET NO.
25

FILE NO.

TREE PLANTING DETAIL

This detail may be used for group tree planting on sites where drainage patterns allow a raised bed. Consider species selection & site selection for this detail.

NOTES:

- Edge of bed to be staked and approved by Landscape Architect.

- Do not allow air pockets to form when back filling.

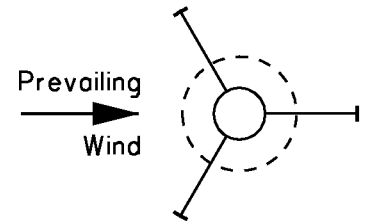
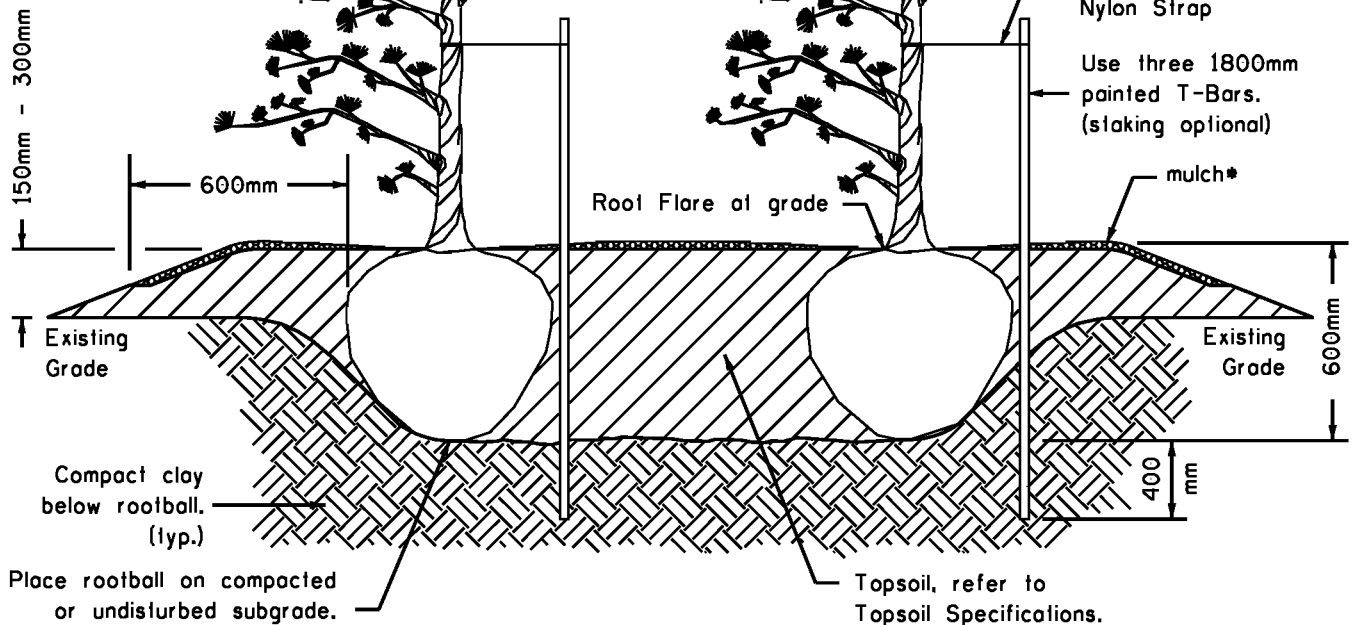
- If staking, stake beyond edge of root ball. Bars should be hammered down into solid footing (at least 400mm into sub-soil base). Use 2mm (1/2") braided nylon strap to protect the tree at point of contact.

- If tree is in wire basket, cut and remove strapping and the horizontal / vertical wires of the upper 1/3 as a minimum. Pull back burlap to the same minimum.

- Prune dead branches to maintain natural form of tree. Do not prune heavily at planting.

- Option to raise bed 150mm - 300mm

*50mm - 75mm depth, starting 50mm from root flare. (trunk)
Extend to the edge of drip line or 1000mm.



PLAN FOR TREE STAKING

(optional)



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

TREE BED DETAIL

DRAWN BY

W.B./M.M.

DATE

2009 10 27

DESIGN BY

DATE

SCALE

N.T.S.

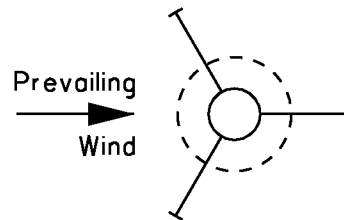
SHEET NO.

26

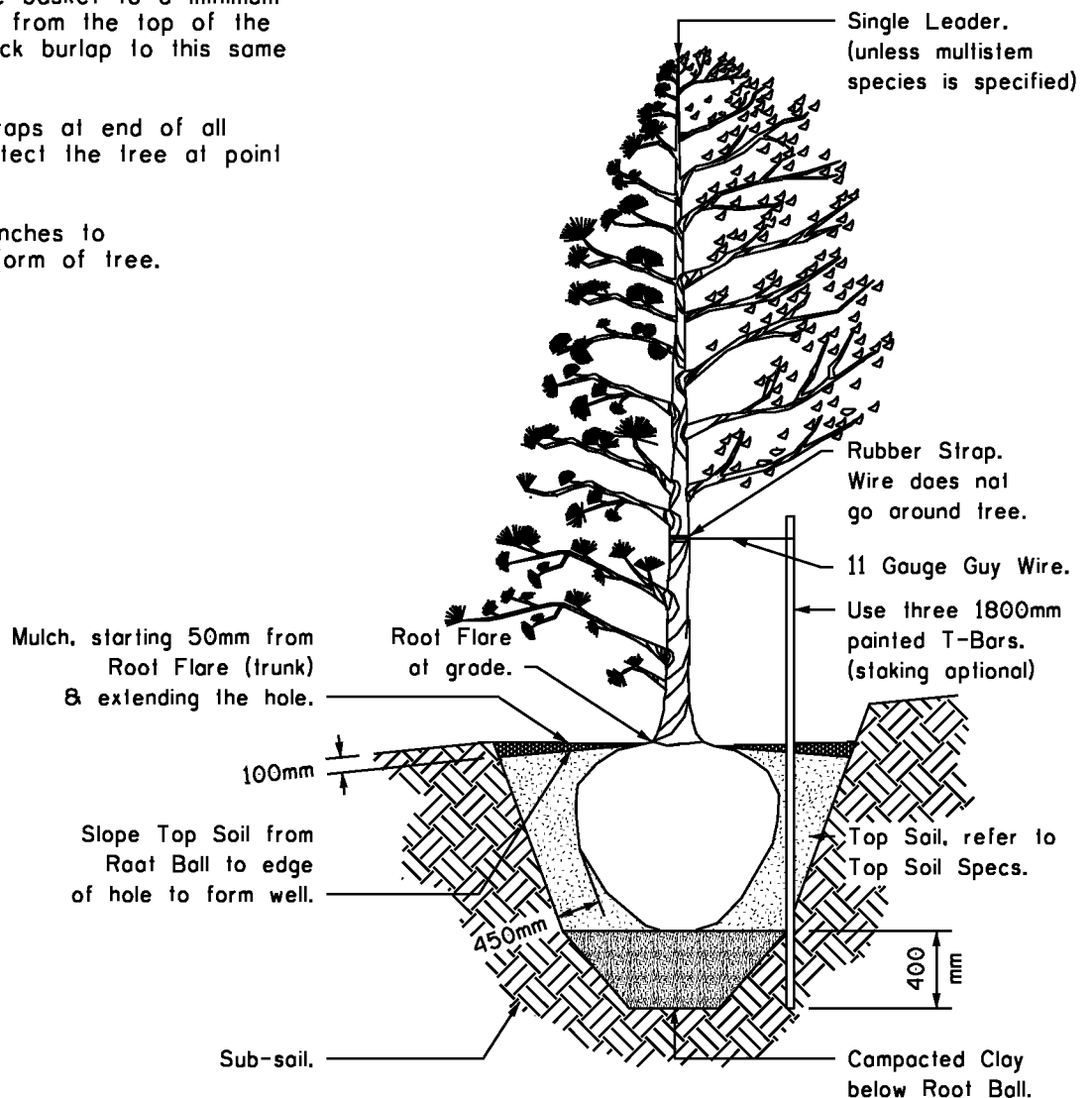
FILE NO.

NOTES:

- Do not allow air pockets to form when back filling.
- Stake beyond edge of root ball.
- Tree should be planted 75mm - 100mm below ground level.
- Bars should be hammered down into solid footing (at least 400mm into sub-soil base).
- If tree is in wire basket, cut and remove strapping and the horizontal/vertical wires of the wire basket to a minimum depth of 200mm from the top of the root ball. Pull back burlap to this same minimum depth.
- Use rubber straps at end of all guy wires to protect the tree at point of contact.
- Prune dead branches to maintain natural form of tree.



PLAN FOR TREE STAKING
(optional)



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**TREE PLANTING DETAIL
FOR SLOPES**

DRAWN BY
W.B.

DATE **2003-01-23**

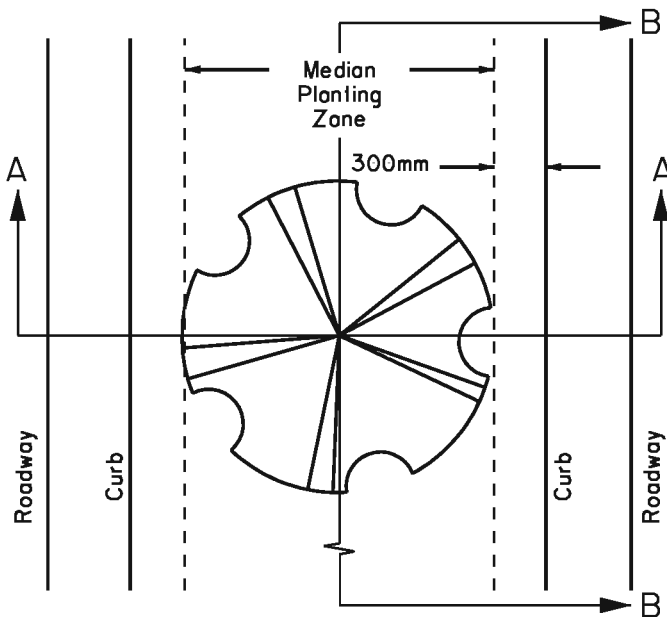
DESIGN BY

DATE

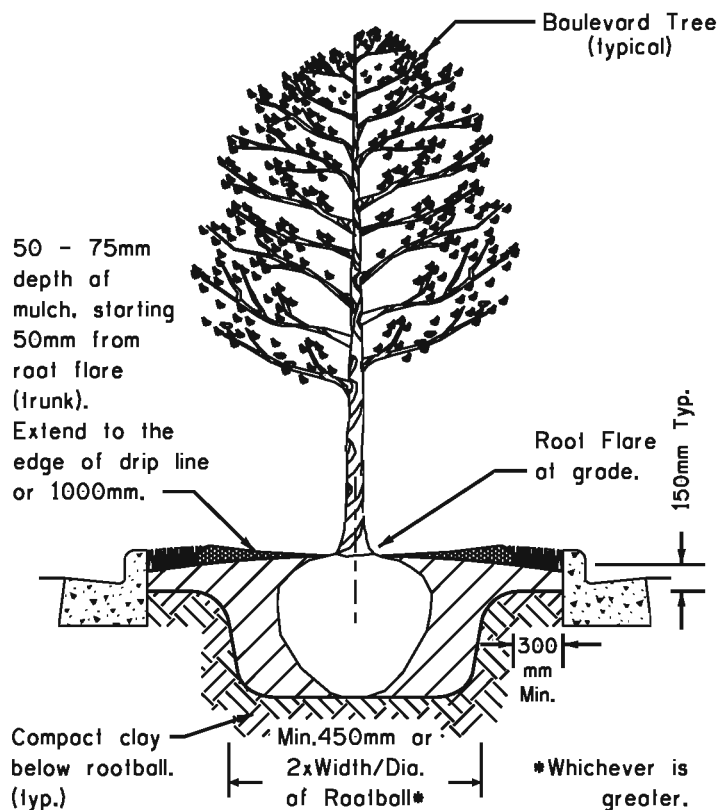
SCALE
N.T.S.

SHEET NO.
27

FILE NO.



PLAN VIEW



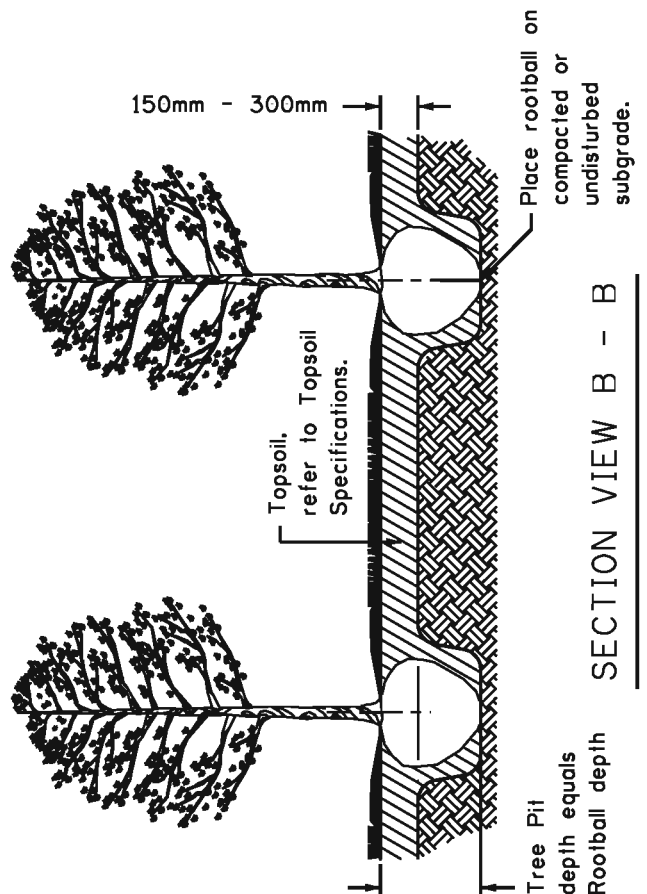
SECTION VIEW A - A

TREE PLANTING DETAIL

The following Tree Planting Detail will be used for all trees planted in the Boulevard and Median.

NOTES:

- Depth of loam min 150mm to optimum of 300mm. Tree spade option if depth is 300mm.
- Do not allow air pockets to form when back filling.
- Trees to be planted at grade with trunk flare visible - no more than 25mm above grade.
- Staking, if required - refer to Tree Planting Detail #23. remove staking one year after installation.
- If tree is in wire basket, cut and remove strapping and the horizontal / vertical wires of the upper 1/3 as a minimum. Pull back burlap to the same minimum.
- Prune dead branches to maintain natural form of tree. Do not prune heavily at planting.
- Crown median to ensure positive drainage.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**TREE PLANTING, TRENCH,
DETAIL
BOULEVARDS AND MEDIANS**

DRAWN BY

W.B./M.M.

DATE

2009 10 27

DESIGN BY

DATE

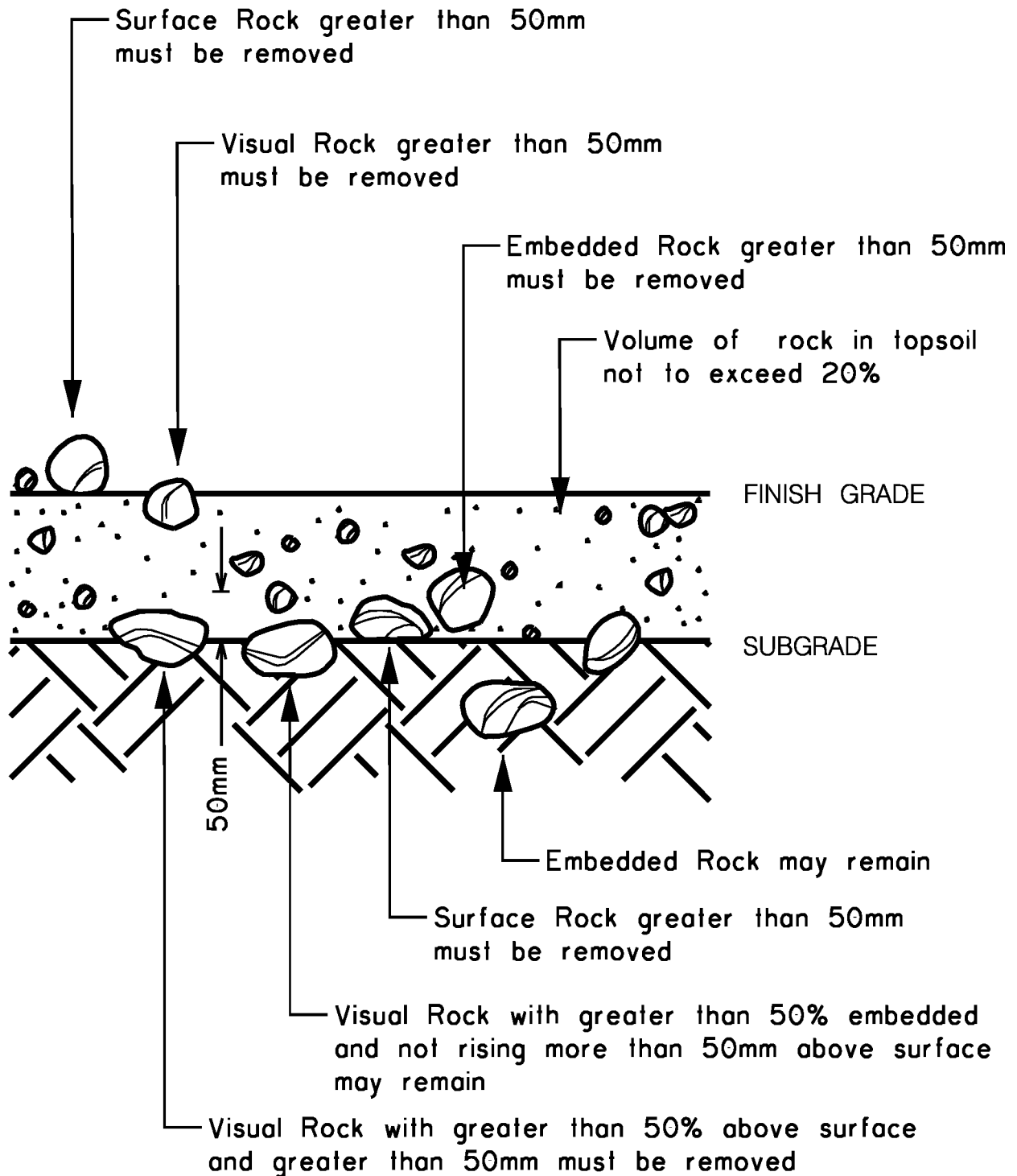
SCALE

N.T.S.

SHEET NO.

27a

FILE NO.



NOTE: Surface, visual or embedded rock that is greater than 25mm must be removed for all sportsfields.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**TOPSOIL /SUBGRADE
PREPARATION**

DRAWN BY
MM

DATE 2006 01 06

DESIGN BY

DATE

SCALE
N.T.S.

SHEET NO.
28

FILE NO.



THE CITY OF
CALGARY
PARKS

NON-ENGINEERED FILL DRAWING

Report #

Community

Subdivision

Plan Block Lot

Phase

Developer

Development Agreement #

Legal / Municipal address

Consultant

Contact Person

Phone

Contractor

Contact Person

Phone

G.C.C. Application Received: ☐ Yes ☐ No

Date yyyy

mm

dd

--- LIMIT OF BORROW AREA
DEPTH OF BORROW = ---



LIST OF POINTS

SCALE 1:1500

POINT	NORTHING	EASTING	POINT	NORTHING	EASTING
1	XXXX.XXX	XXXX.XXX	6	XXXX.XXX	XXXX.XXX
2	XXXX.XXX	XXXX.XXX	7	XXXX.XXX	XXXX.XXX
3	XXXX.XXX	XXXX.XXX	8	XXXX.XXX	XXXX.XXX
4	XXXX.XXX	XXXX.XXX	9	XXXX.XXX	XXXX.XXX
5	XXXX.XXX	XXXX.XXX	10	XXXX.XXX	XXXX.XXX
			11	XXXX.XXX	XXXX.XXX



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

NON-ENGINEERED
FILL DRAWING

DRAWN BY

WB

DATE 2007 06 28

DESIGN BY

DATE

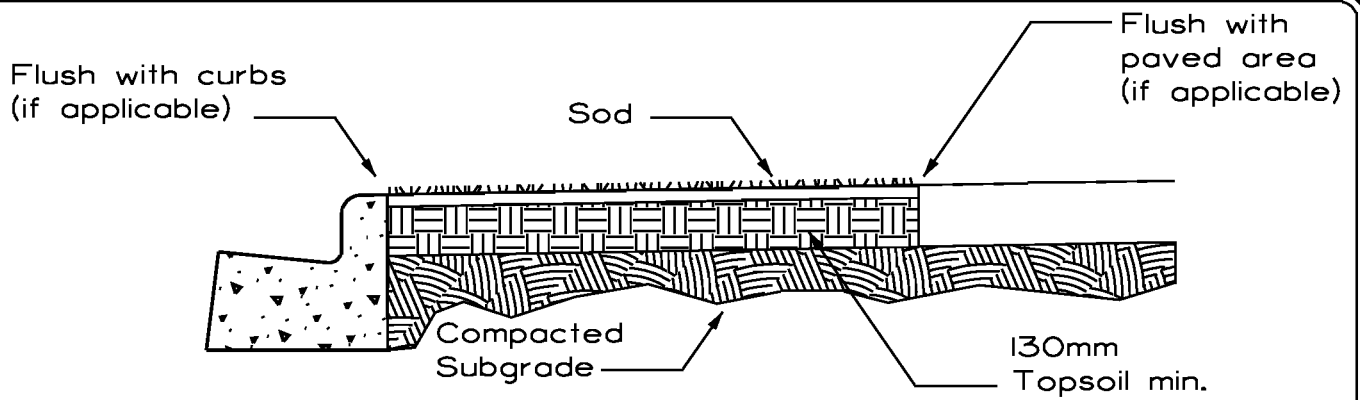
SCALE

N.T.S.

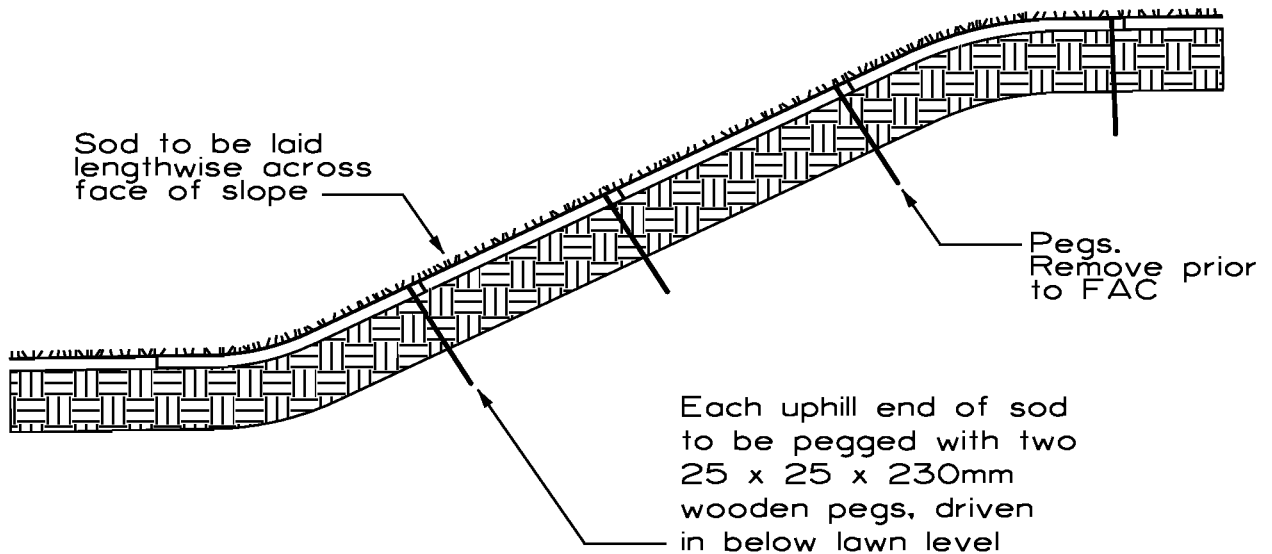
SHEET NO.

28a

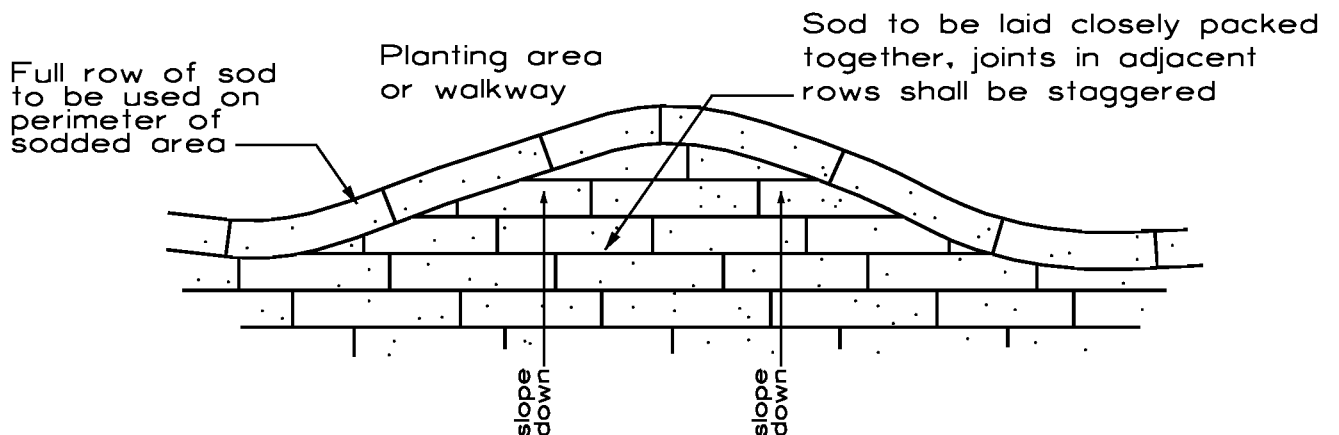
FILE NO.



SECTION THROUGH SOD



CROSS-SECTION OF 3H:1V SLOPE



PLAN VIEW OF SOD LAYOUT AND EDGING



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
SOD DETAIL

DRAWN BY
MM

DATE 2006 01 09

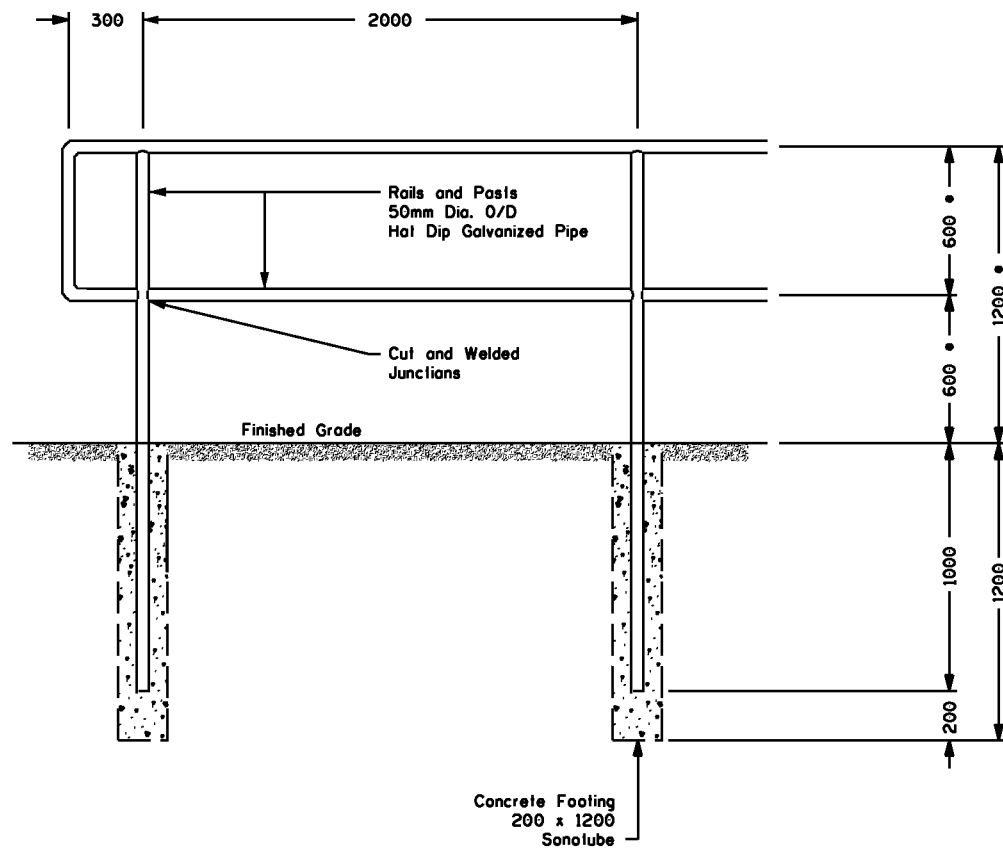
DESIGN BY

DATE

SCALE
N.T.S.

SHEET NO.
29

FILE NO.



Elevation

NOTE: - All dimensions are in millimetres unless otherwise noted.
- * Total railing height increases to 1400mm when required on a bridge.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
SAFETY RAILING

DRAWN BY
W.B./M.M.

DATE **2006 01 03**

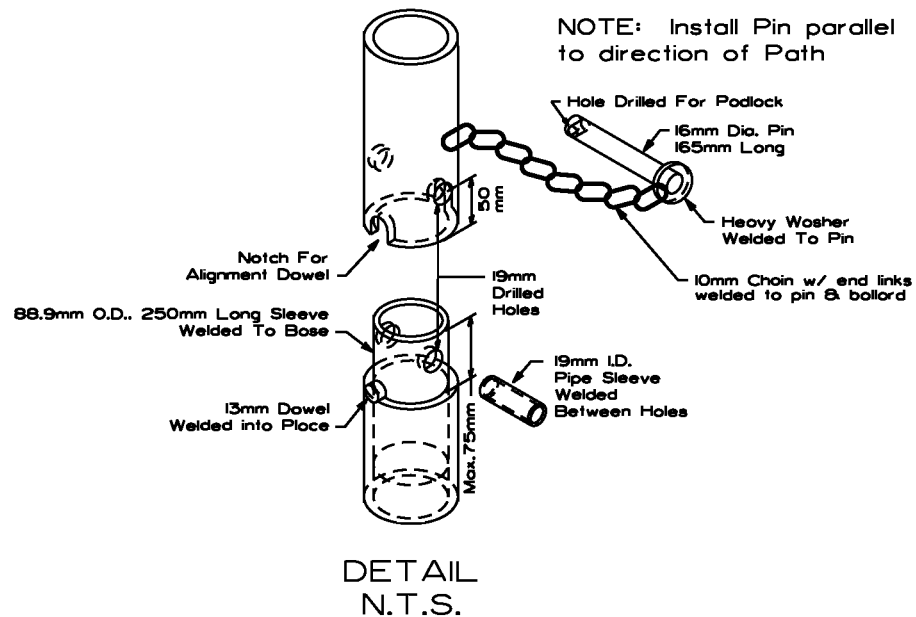
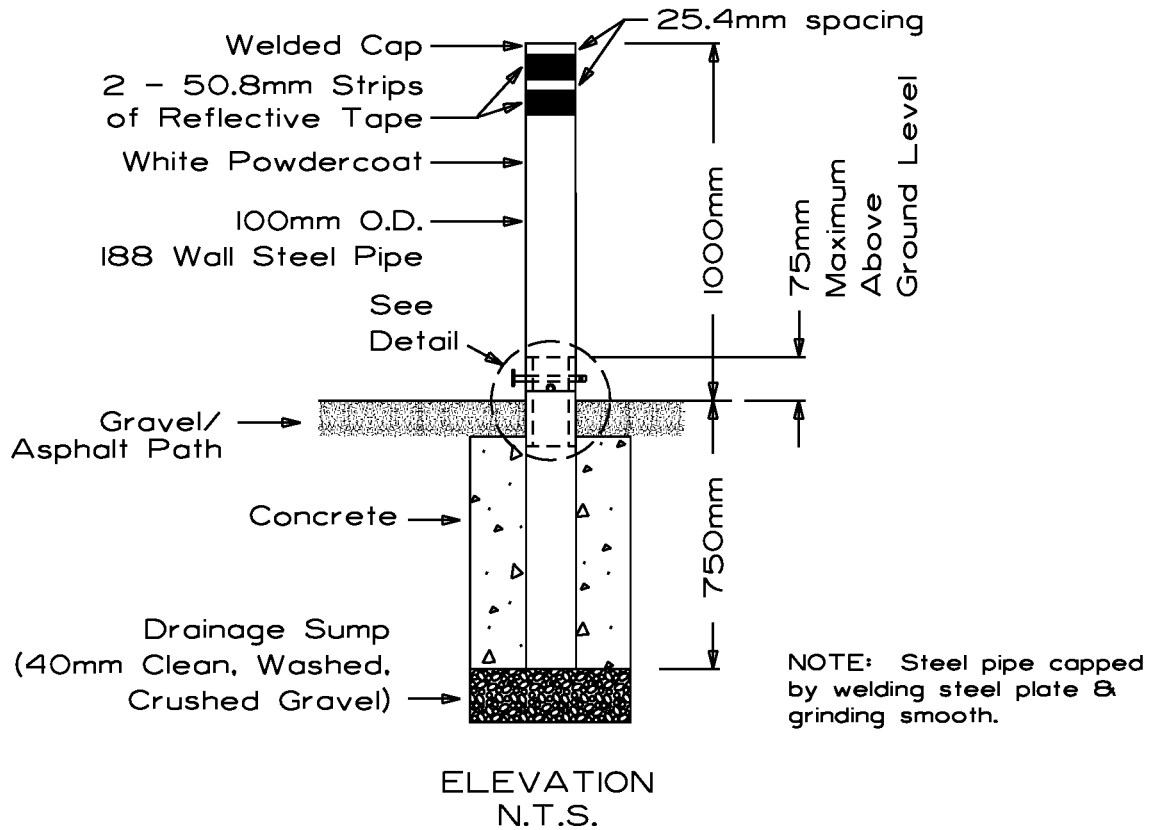
DESIGN BY
G.S.

DATE **1997 06**

SCALE
N.T.S.

SHEET NO.
30

FILE NO.



NOTE: See Bollard in Pathways, Trails & Paving Stones section. Pg.93 Sec. 1.2.F.iii
All dimensions are in millimetres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**REMOVABLE BOLLARD
DETAIL**

DRAWN BY
S.P. / W.B.

DATE 2006 06 07

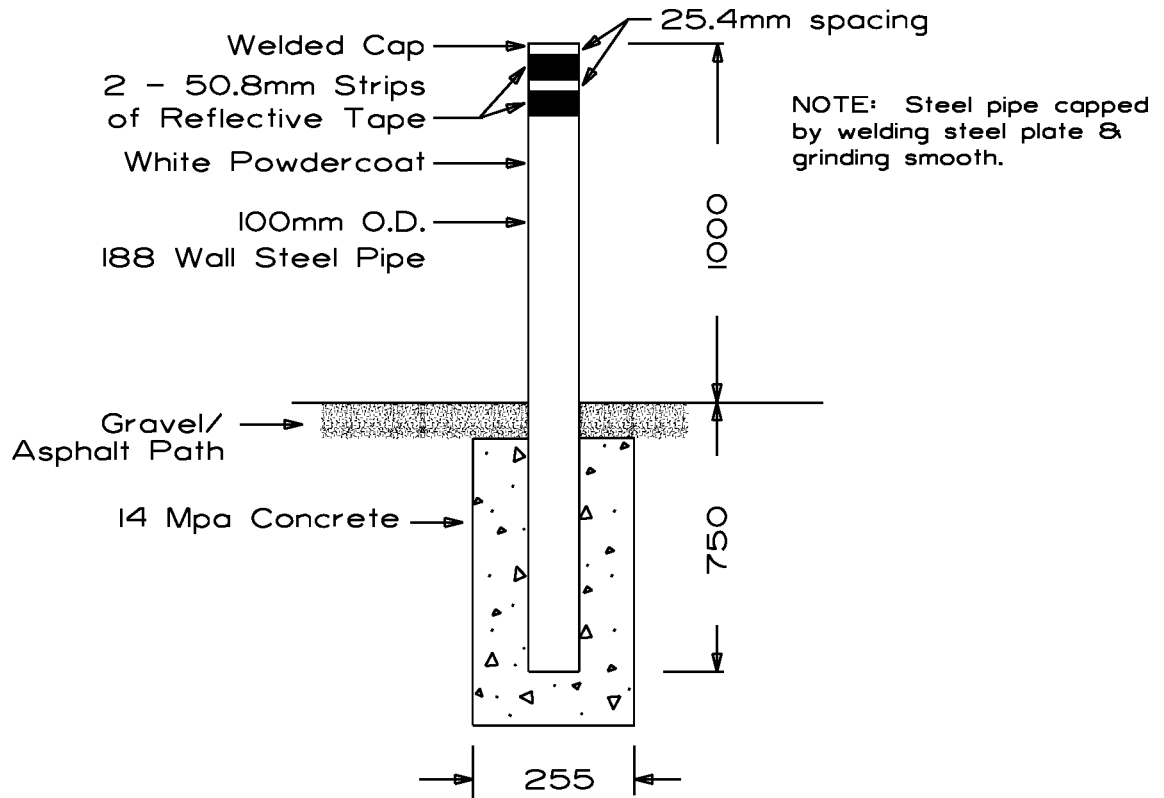
DESIGN BY
G.S.

DATE 1997-06

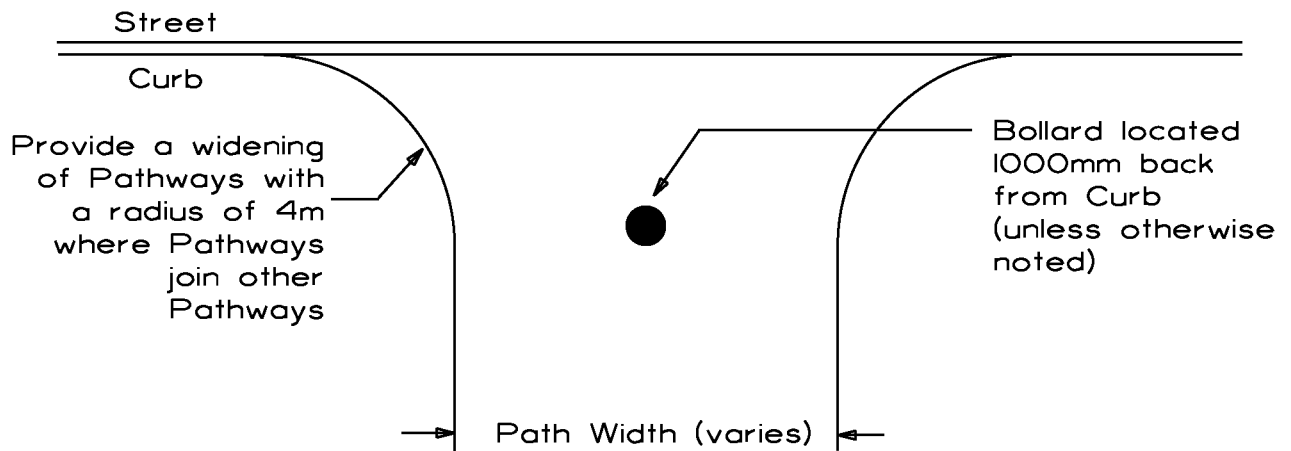
SCALE
N.T.S.

SHEET NO.
31

FILE NO.



ELEVATION /SECTION



PLAN VIEW OF FLARE

NOTE: See Bollard in Pathways, Trails & Paving Stones section. Pg.94 Sec. 1.2.F.iii
All dimensions are in millimetres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**PERMANENT BOLLARD
DETAIL**

DRAWN BY
SP /WB /MM

DATE **2006 06 07**

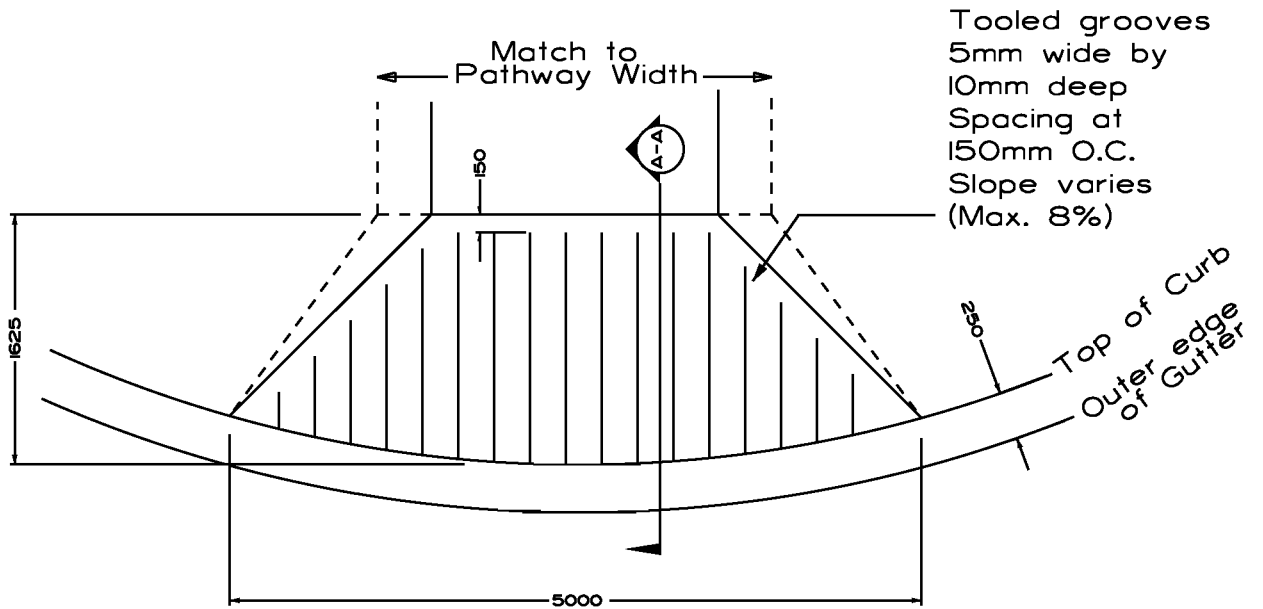
DESIGN BY

DATE

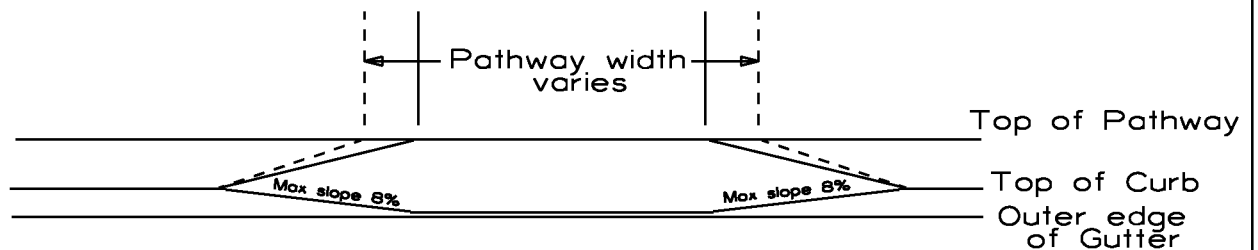
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N.T.S.

SHEET NO.
32

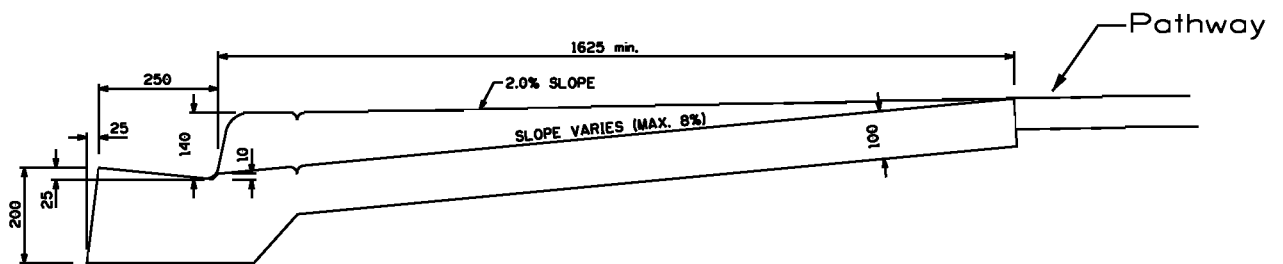
FILE NO.



PLAN VIEW



ELEVATION VIEW



SECTION VIEW A-A

NOTE: Maximum slope of ramp 8.0% (12.5:1)
Ramp surface to be textured concrete
All dimensions are in millimetres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**CONCRETE
WHEELCHAIR RAMP**

DRAWN BY
MM

DATE 2006 01 03

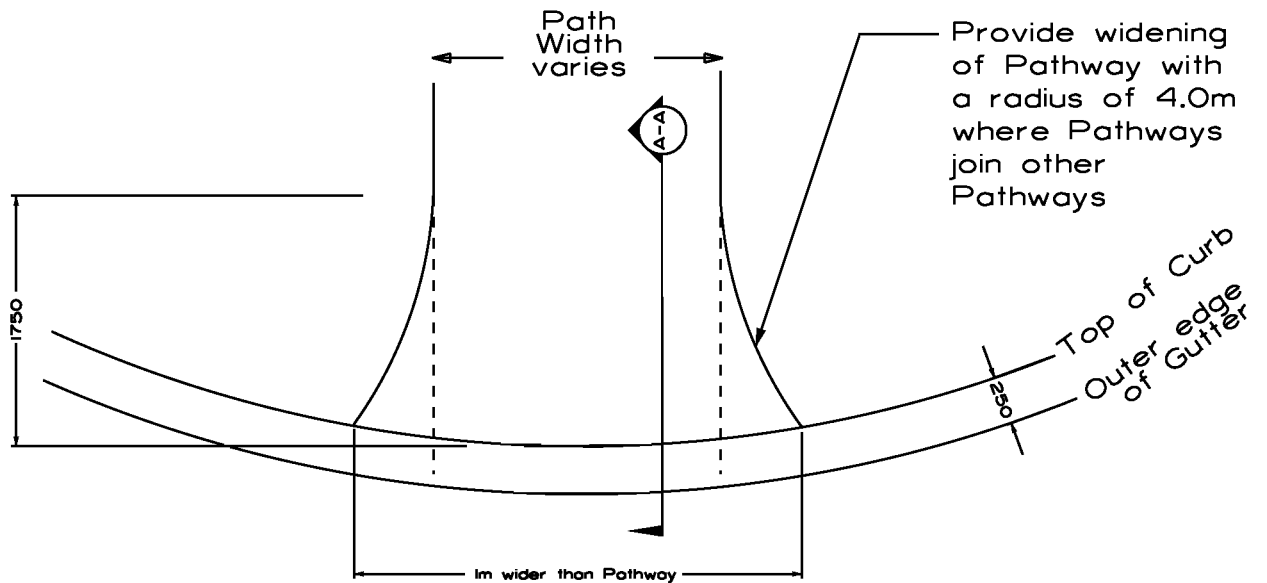
DESIGN BY
WF

DATE 1996 12 23

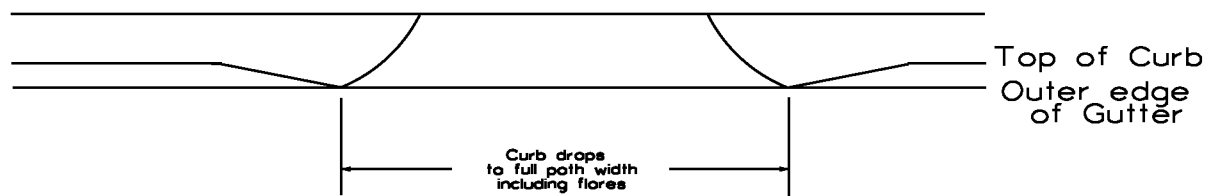
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N.T.S.

SHEET NO.
33

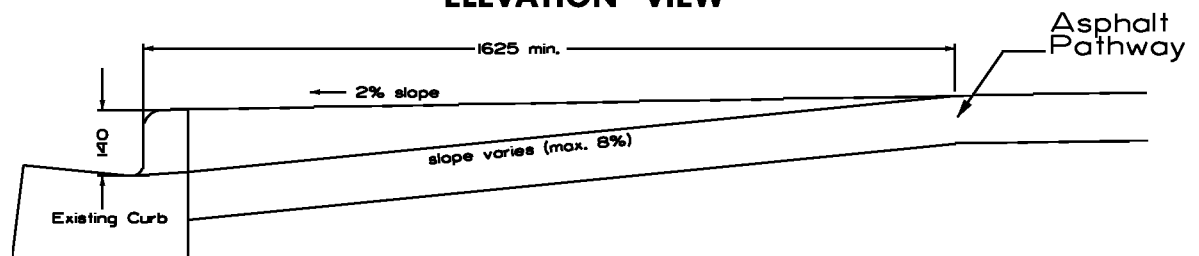
FILE NO.



PLAN VIEW



ELEVATION VIEW



SECTION VIEW A-A

NOTE: Maximum slope of ramp 8.0%
All dimensions are in millimetres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**ASPHALT
WHEELCHAIR RAMP**

DRAWN BY
MM

DATE 2006 06 07

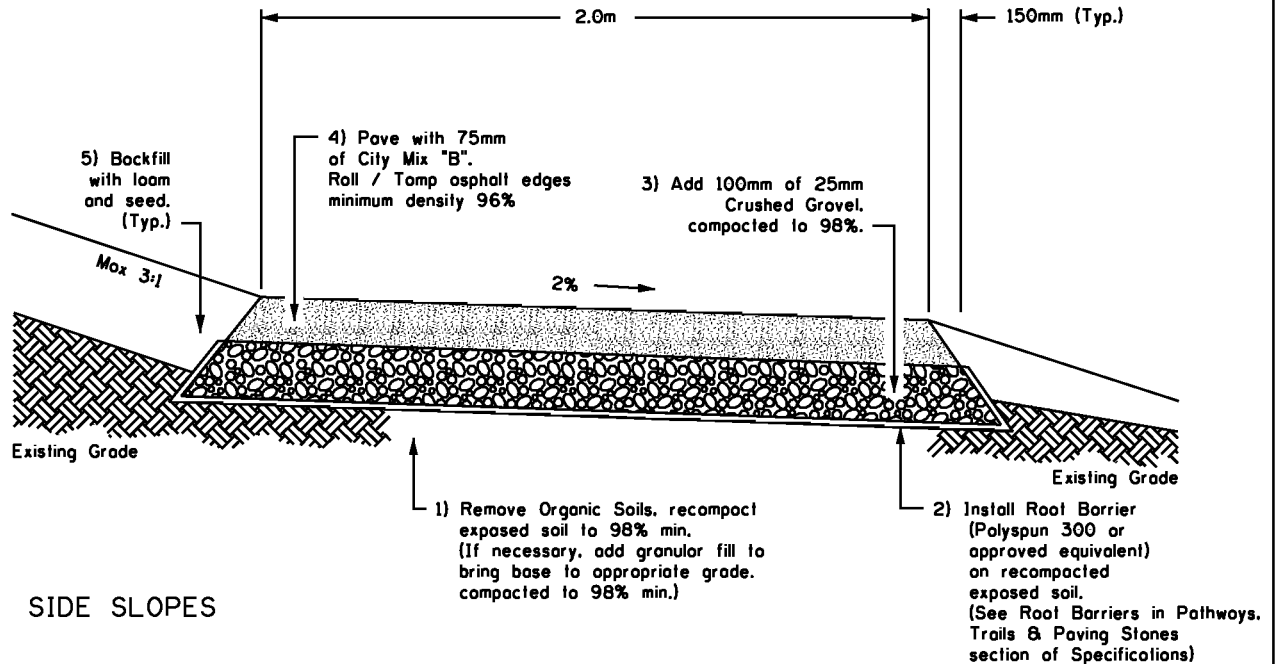
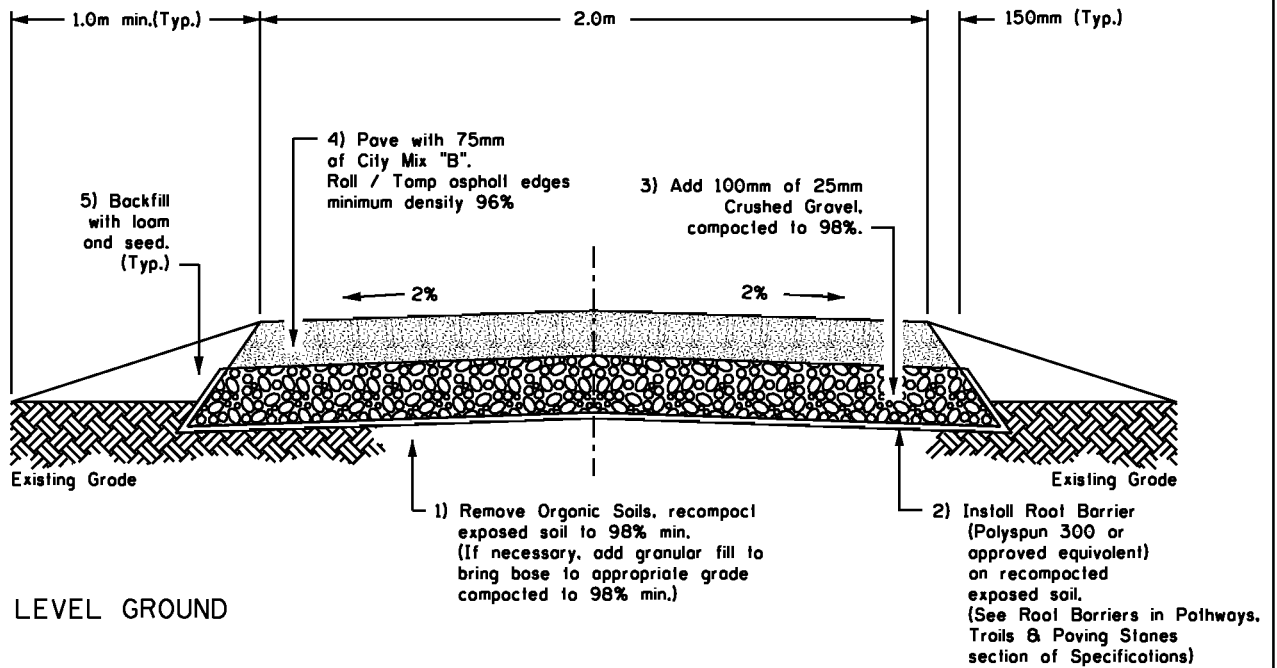
DESIGN BY
D.LaF.

DATE 2001 03 08

SCALE
N.T.S.

SHEET NO.
34

FILE NO.



NOTES:

Asphalt type "B" mix. Refer to the current edition City of Calgary Standard Specifications, Roads Construction.

All dimensions are in metres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**TYPICAL
LOCAL PATHWAY
CROSS SECTIONS**

DRAWN BY
W.B.

DATE **2006 05 17**

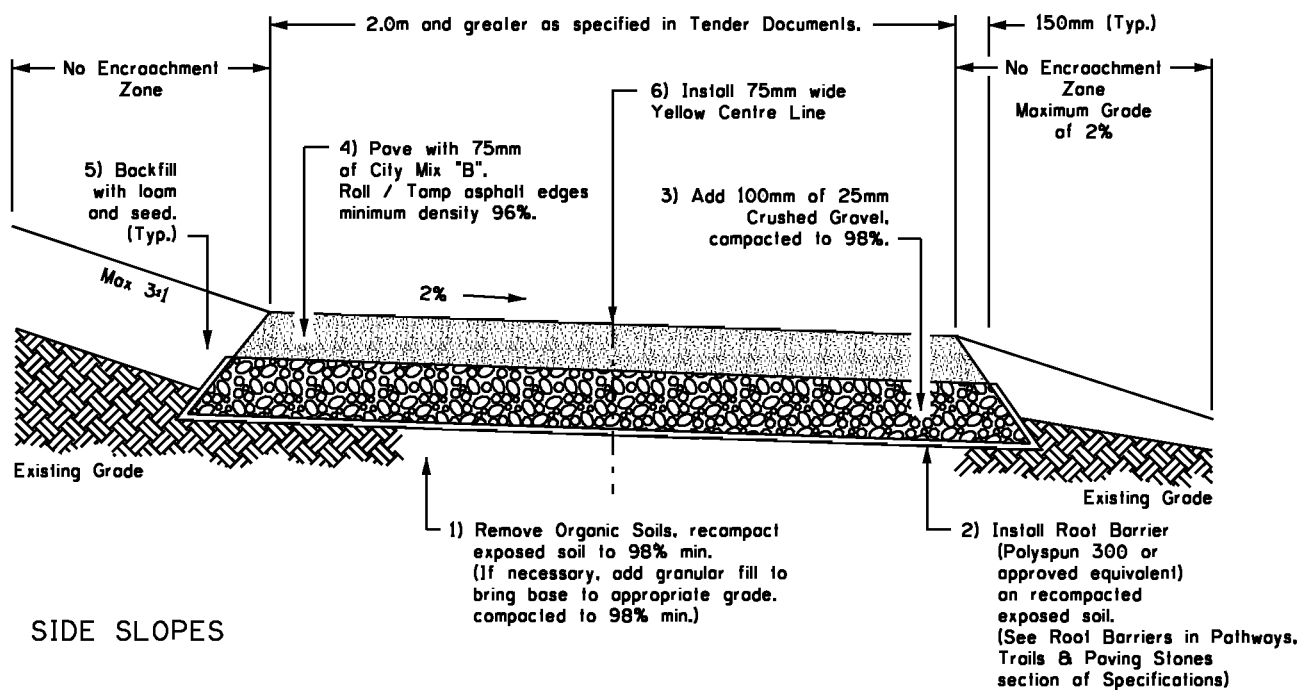
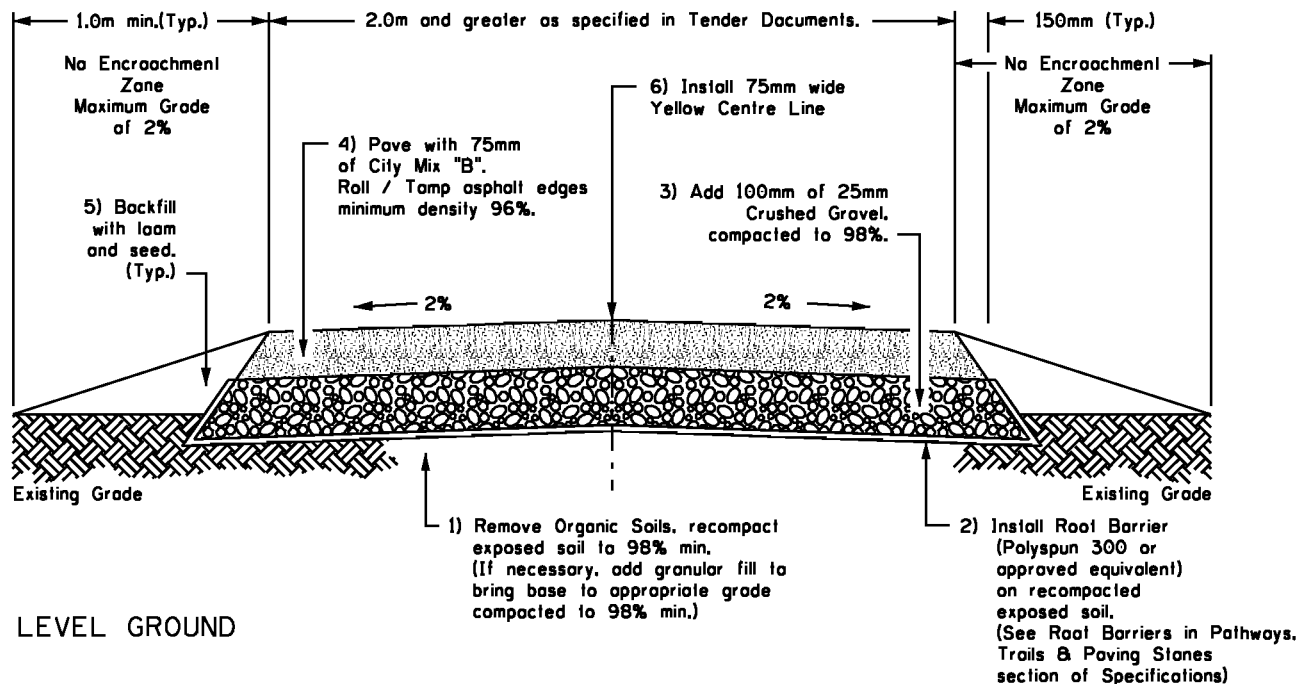
DESIGN BY
G.S.

DATE **2002-03-05**

SCALE
N.T.S.

SHEET NO.
35

FILE NO.



NOTES:

- Asphalt type "B" mix. Refer to the current edition City of Calgary Standard Specifications, Roads Construction.
- Where the Regional Pathway replaces a city sidewalk or is installed in a road right of way the No Encroachment Zones will Not apply.
- Safety railings, if required, may be installed within the No Encroachment Zones.
- All dimensions are in Metres unless otherwise noted.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**TYPICAL
REGIONAL PATHWAY
CROSS SECTIONS**

DRAWN BY

W.B.

DATE **2009 03 26**

DESIGN BY

DATE **2009 03 26**

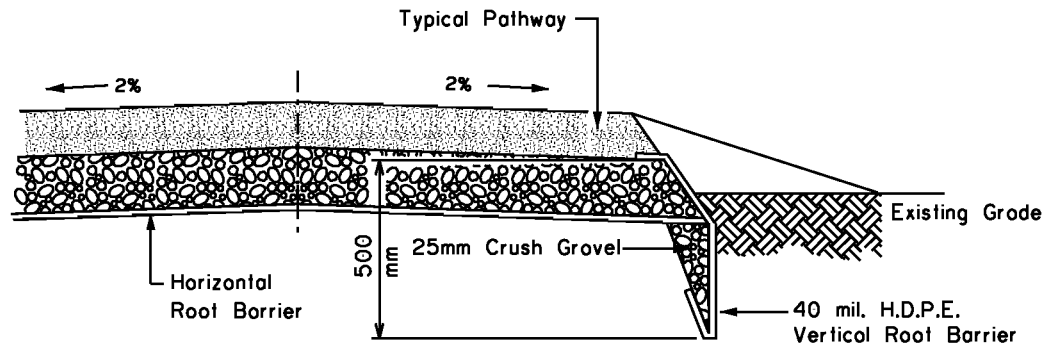
SCALE

N.T.S.

SHEET NO.

36

FILE NO.



NOTES:

Within Streets Right-of-way,
compaction of 100mm of 25mm Crushed Gravel
shall be 100% in accordance with Section 305.02.01 of the
City of Calgary Standard Specifications Roads Construction

All dimensions are in metres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
ROOT BARRIERS

DRAWN BY
MM

DATE **2006 01 06**

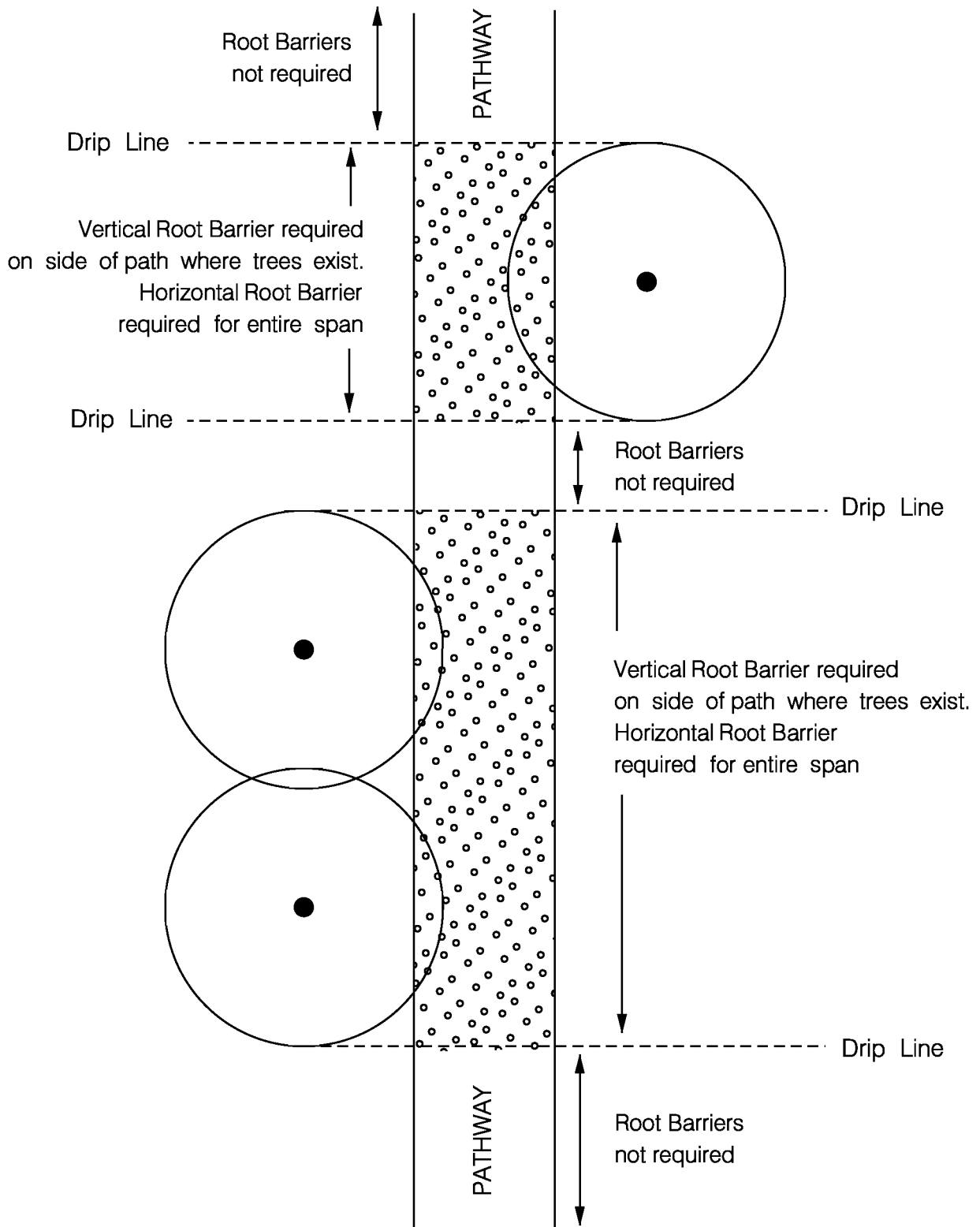
DESIGN BY
D.LaF.

DATE **1997 12 02**

SCALE
N.T.S.

SHEET NO.
37

FILE NO.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**LOCATION OF
ROOT BARRIERS**

DRAWN BY
MM

DATE **2006 02 09**

DESIGN BY
D.LaF.

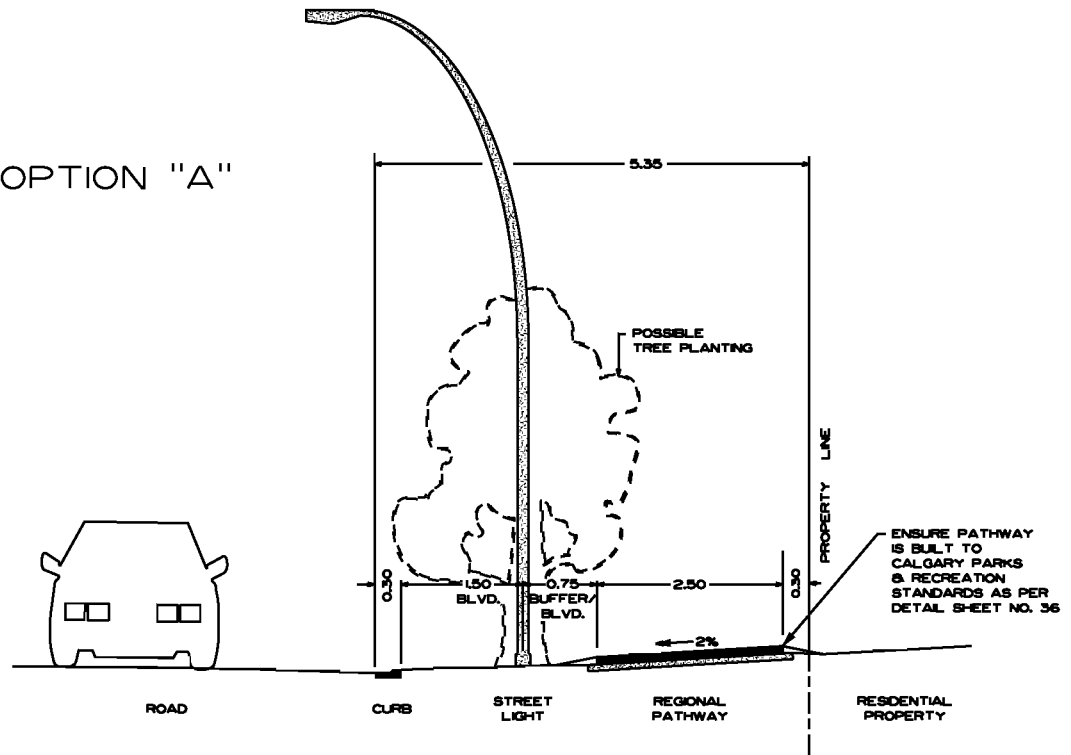
DATE **1998 04 16**

SCALE
N.T.S.

SHEET NO.
37a

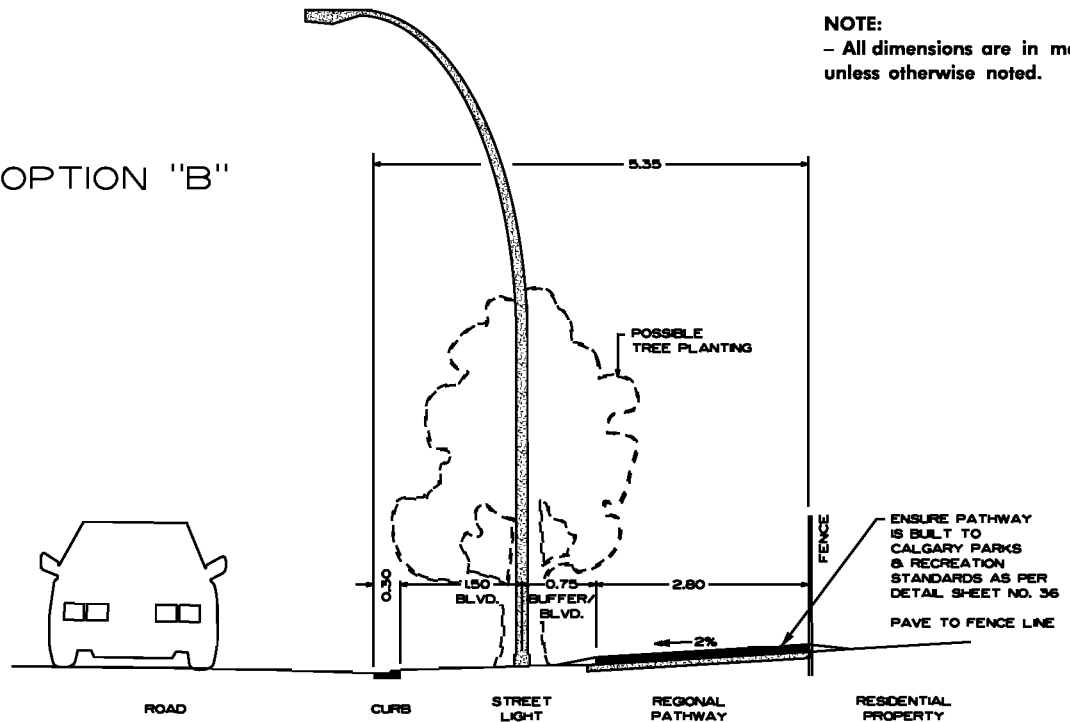
FILE NO.

OPTION "A"



NOTE:
- All dimensions are in meters unless otherwise noted.

OPTION "B"



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**REGIONAL PATHWAYS,
RESIDENTIAL BOULEVARDS**

DRAWN BY
W.B.

DATE **2006 05 19**

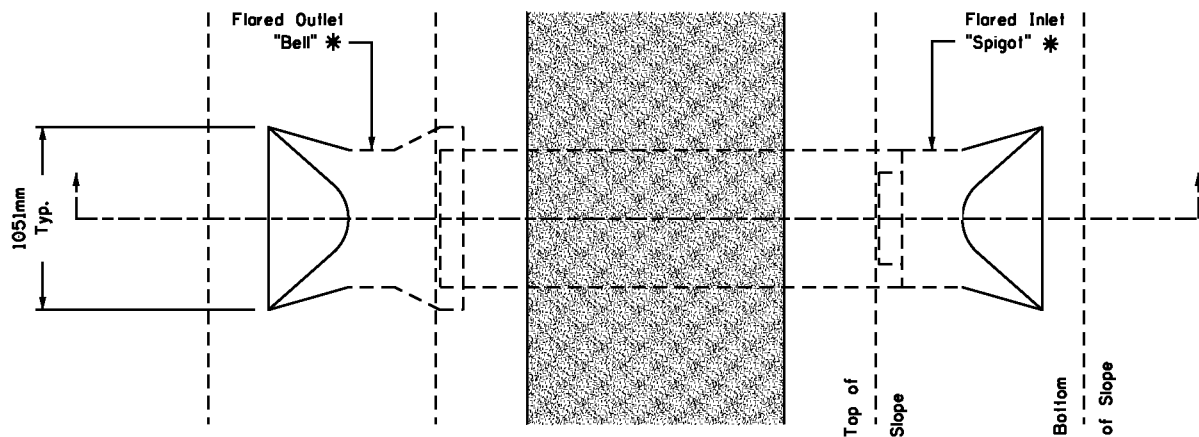
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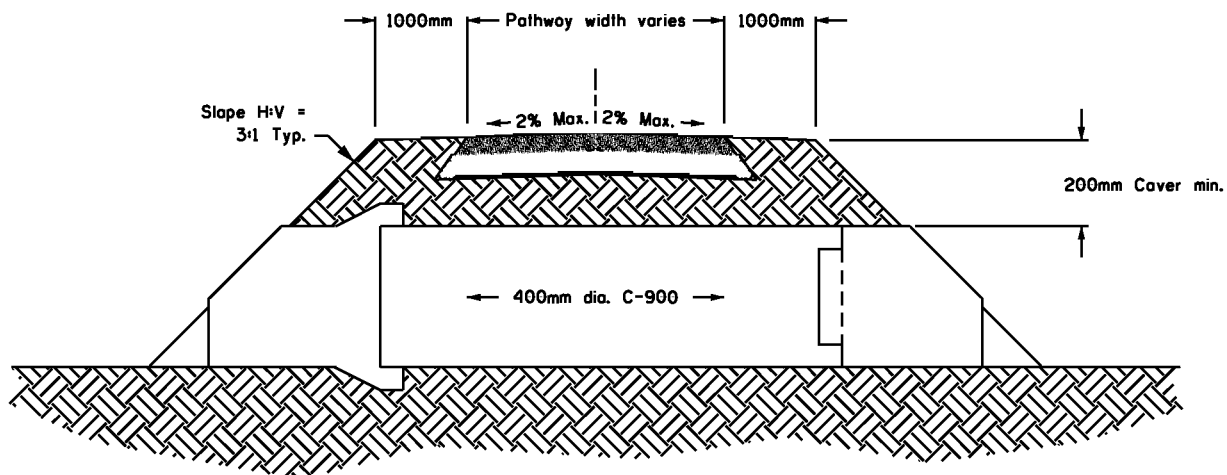
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N.T.S.

SHEET NO.
37b

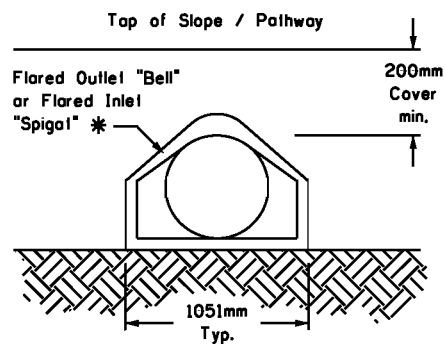
FILE NO.



PLAN VIEW



CROSS SECTION



END VIEW

* OR Approved Equivalent

NOTE: All dimensions are in millimetres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**PATHWAY CULVERT
AND EDGE DETAIL**

DRAWN BY
W.B.

DATE **2005-02-03**

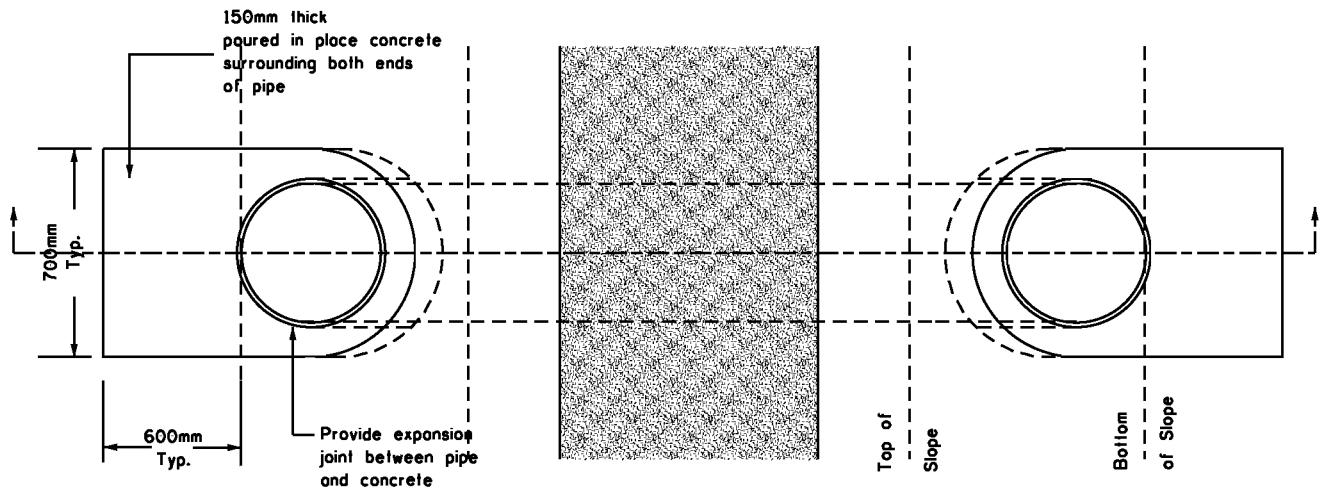
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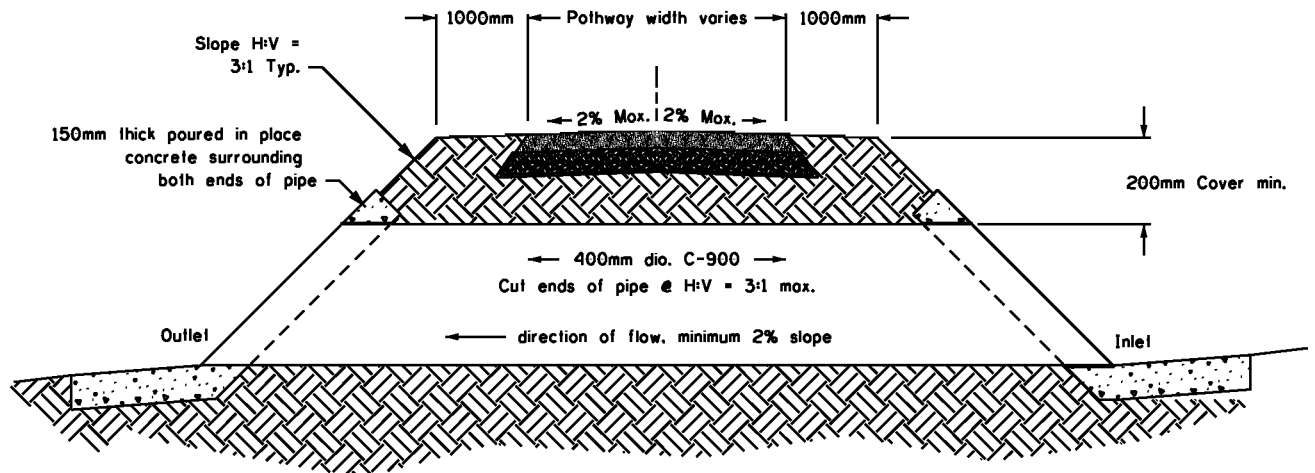
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N.T.S.

SHEET NO.
38

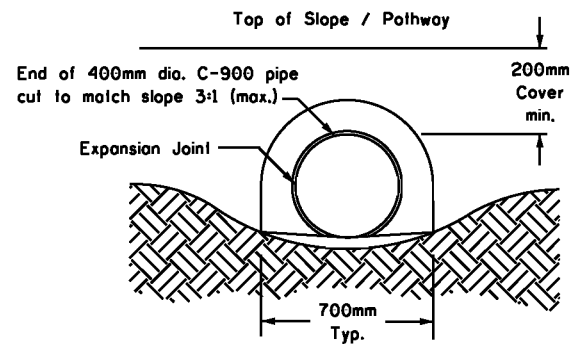
FILE NO.



PLAN VIEW



CROSS SECTION



OUTLET END VIEW

NOTE: All dimensions are in millimetres unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**CULVERT WITH P-I-P
CONCRETE AT ENDS**

DRAWN BY
W.B./M.M.

DATE **2008-01-18**

DESIGN BY

DATE

SCALE
N.T.S.

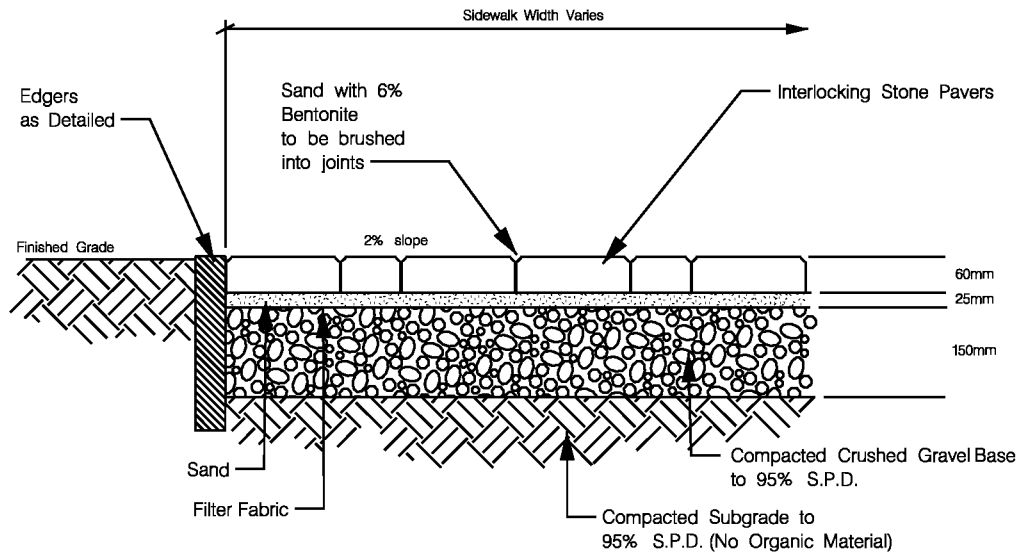
SHEET NO.
38a

FILE NO.

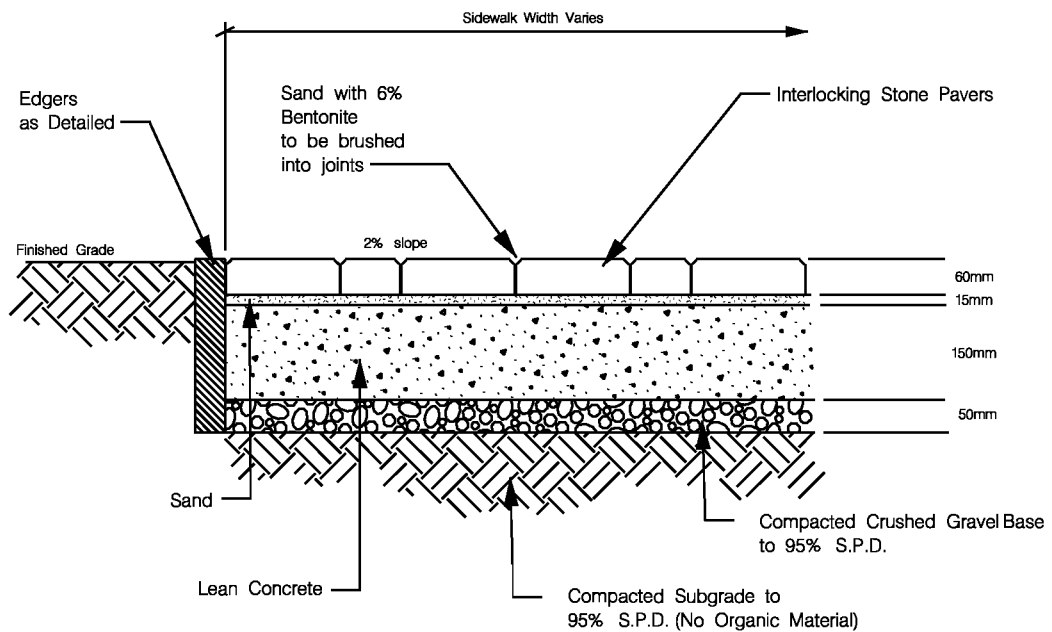


THE CITY OF
CALGARY
PARKS

FILE NO.



AREAS NOT SUBJECT TO VEHICLE TRAFFIC



AREAS SUBJECT TO VEHICLE TRAFFIC AND AREAS WITHIN THE STREETS RIGHT-OF-WAY



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

CONCRETE PAVING STONE

DRAWN BY

MM

DATE **2006 02 14**

DESIGN BY

DG

DATE **1997 03 15**

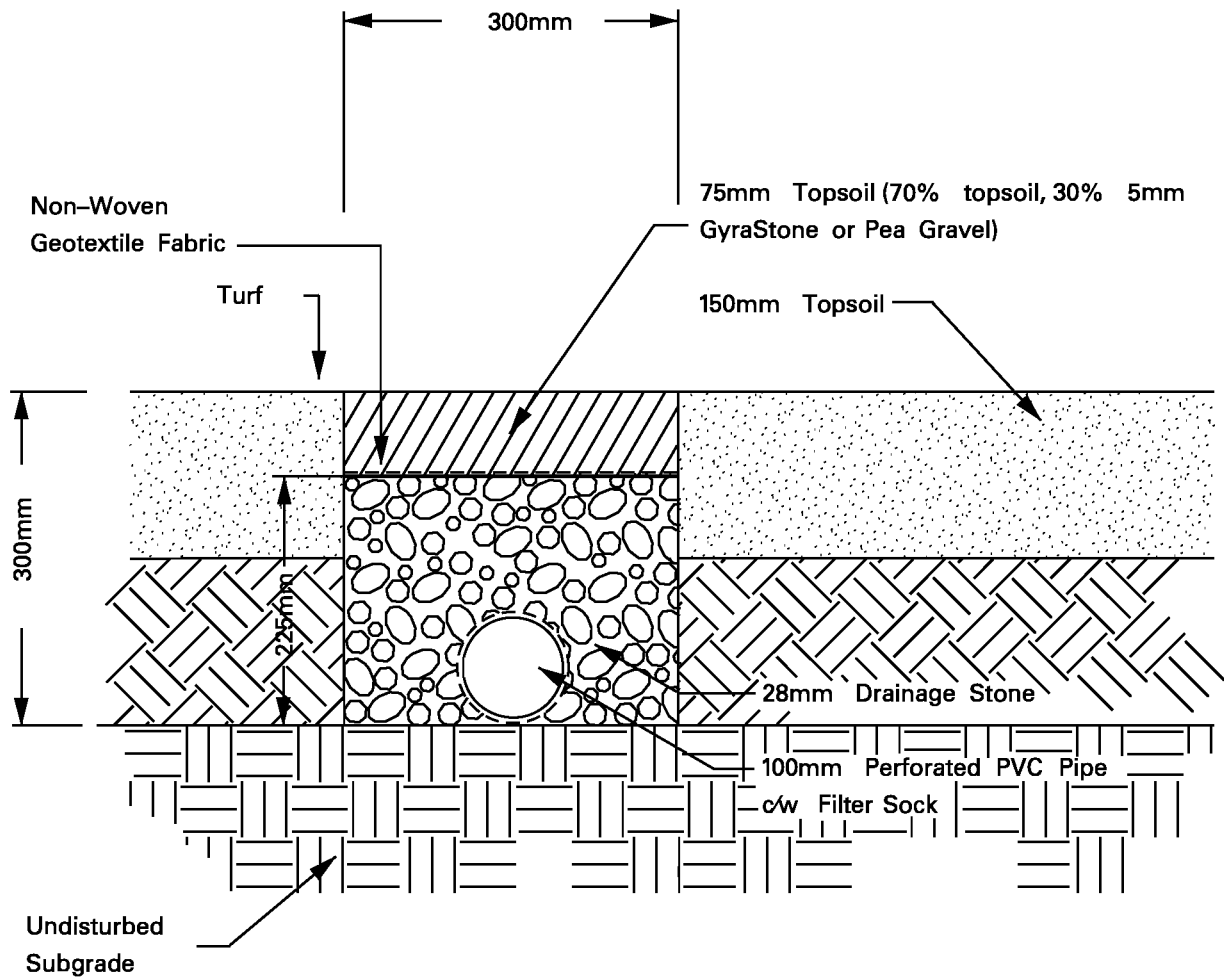
SCALE

N.T.S.

SHEET NO.

39

FILE NO.



Notes: Perforated PVC Weeping Tile to maintain a minimum 1% slope to catch basin barrel.
 Core hole in catch basin slightly larger than the weeping tile diameter.
 Insert perforated PVC into catch basin and caulk.
 Weeping tile to be installed along the entire length of the swale.
 Alternate design for a weeping tile system will be considered.
 The applicant shall cite the source for the manufacturer's performance specification.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**WEeping TILE IN <4%
 SWALES OVER 60m
 IN LENGTH**

DRAWN BY
W.B./M.M.

DATE **2005 01 25**

DESIGN BY

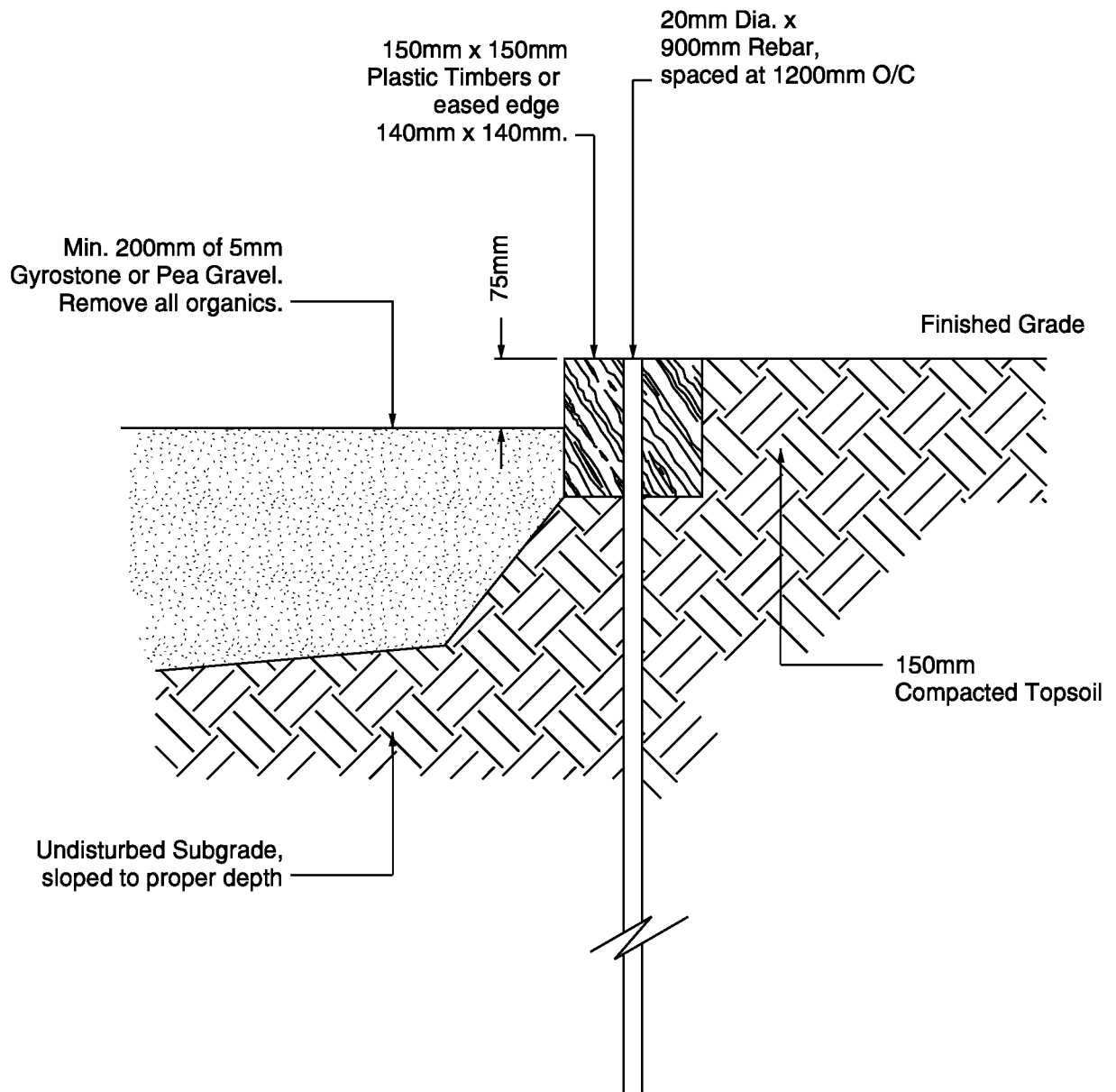
DATE

SCALE
N.T.S.

SHEET NO.

39a

FILE NO.



NOTES:

Rebar to be driven flush with the top of the plastic timber, 1500mm O.C. and 300mm from both sides of every joint.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**PLAYGROUND
EDGE RESTRAINT
(PLASTIC TIMBER)**

DRAWN BY
WB /MM

DATE **2003 02 20**

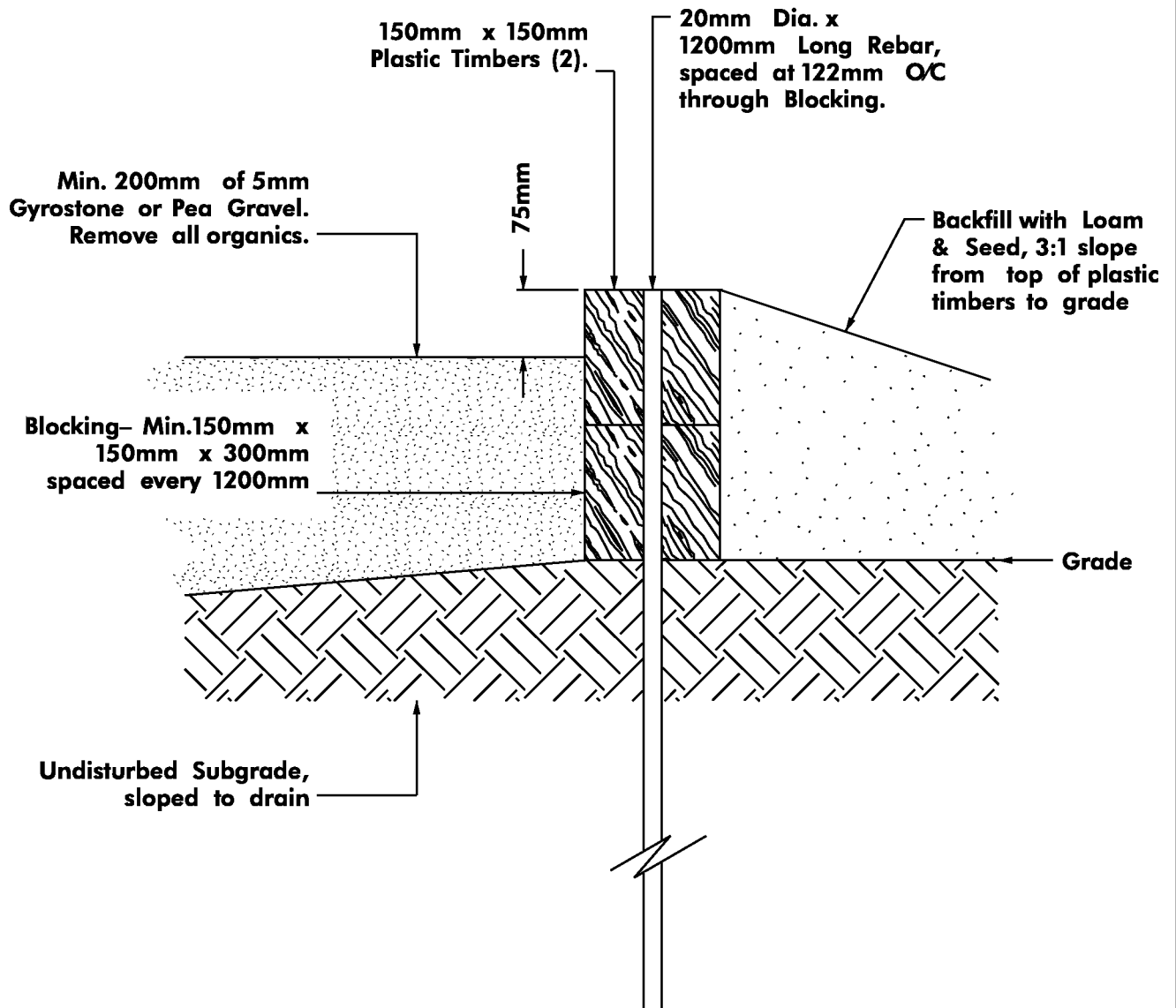
DESIGN BY
DG

DATE **1997 03 15**

SCALE
N.T.S.

SHEET NO.
40

FILE NO.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**PLAYGROUND EDGE
RESTRAINT (PLASTIC TIMBER)
ABOVE GROUND**

DRAWN BY
W.B.

DATE **2003 02 20**

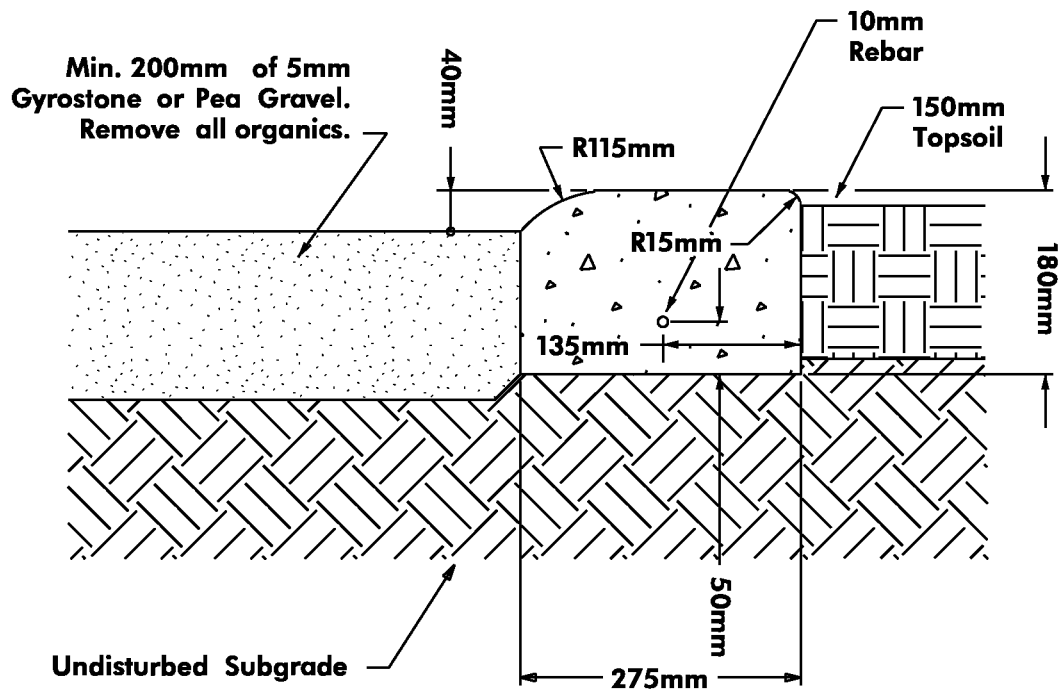
DESIGN BY

DATE

SCALE
N.T.S.

SHEET NO.
40a

FILE NO.



NOTES:

Contraction Joints shall be cut at every 1.5 metres by means of a marking tool or other approved method. Joints shall not be less than 30mm in depth and 6mm in width. The edges of the joint shall be rounded off with an edger having a radius of 6mm.

All dimensions are in millimeters unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**PLAYGROUND
EDGE RESTRAINT
(CONCRETE)**

DRAWN BY
W.B.

DATE **2002-08-28**

DESIGN BY

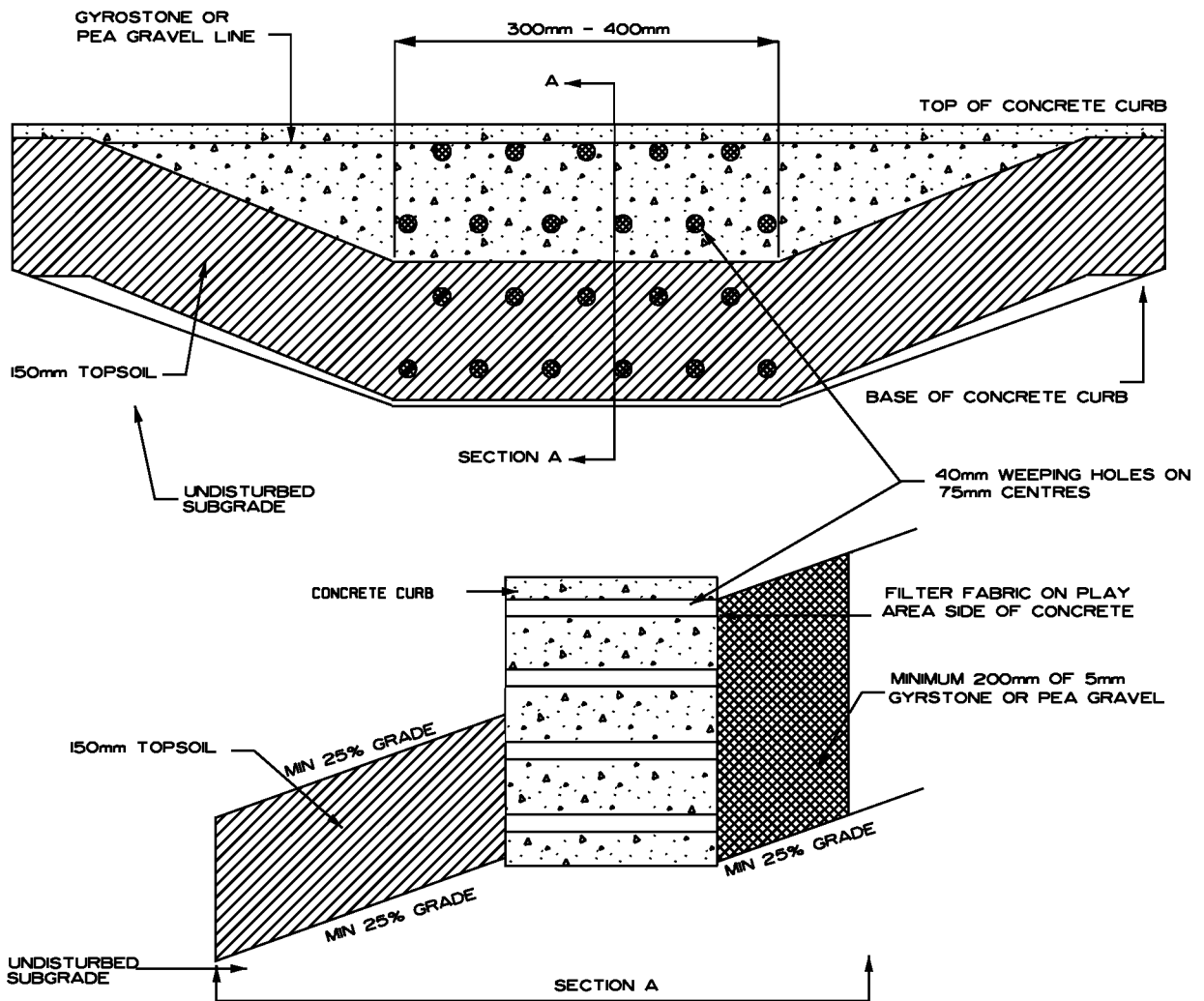
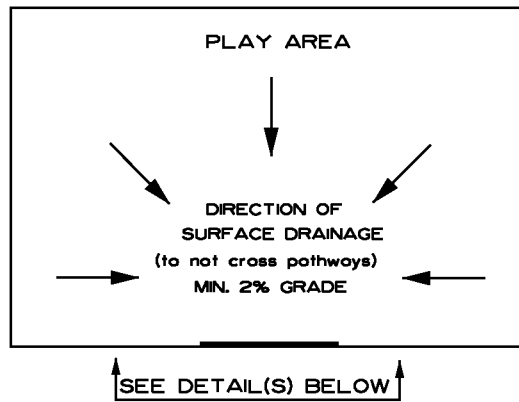
DATE

SCALE
N.T.S.

SHEET NO.
41

FILE NO.

CONCRETE CURB



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**PLAYGROUND DRAINAGE
CONCRETE EDGE DETAIL**

DRAWN BY
MK

DATE **2006 05 23**

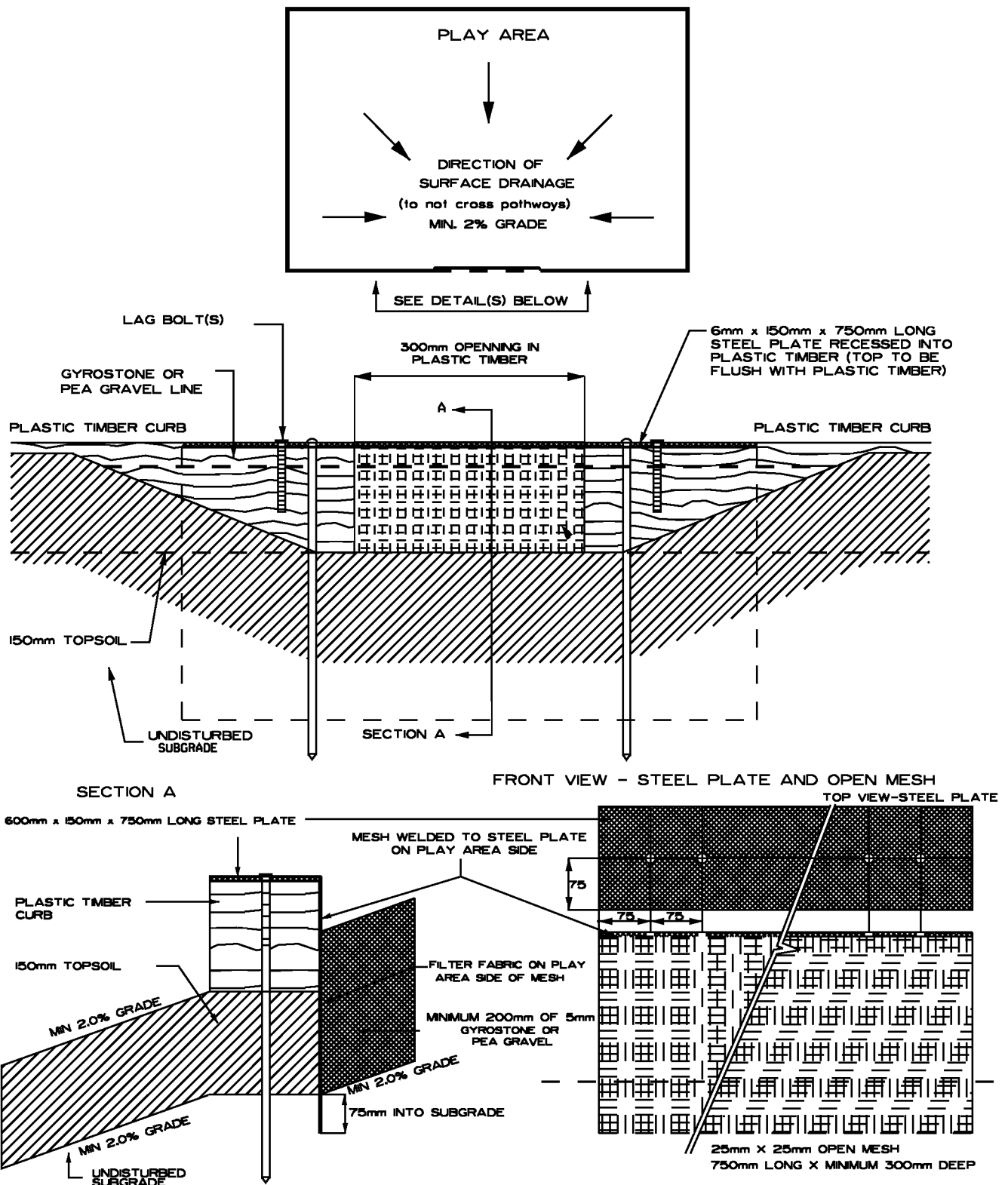
DESIGN BY
DATE

SCALE
N.T.S.

SHEET NO.
42

FILE NO.

PLASTIC TIMBER CURB



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**PLAYGROUND DRAINAGE
PLASTIC TIMBER EDGE DETAIL**

DRAWN BY
MK

DATE **2009 03 26**

DESIGN BY

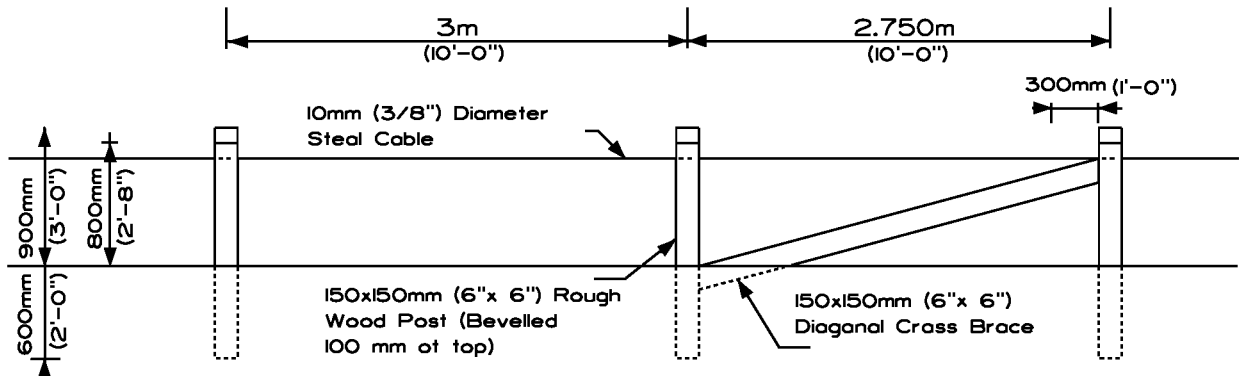
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SCALE
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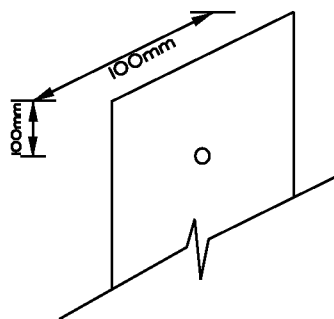
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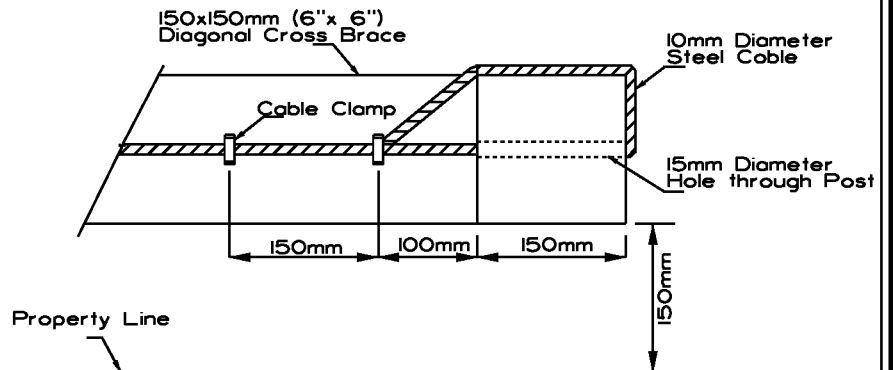
Elevation



Post Top Detail



Plan View (End Post)



NOTE:

- All lumber shall be rough cut, No.2 construction grade and kiln dried
- The direction of the face cut will be specified on site when the posts are installed.
- All steel cables and clamps shall be hot-dipped galvanized to C.S.A. G 164 or as specified. Provide sufficient tension on steel cable to eliminate sag.
- The first cable clamps will be located at the end of the cable to eliminate frayed ends.
- Alternate Material: Where specified in contract, Wood Posts may be substituted with Grey Recycled Plastic Posts. All dimensions to remain the same.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**POST &
CABLE BARRIER**

DRAWN BY
MK

DATE **2006 05 23**

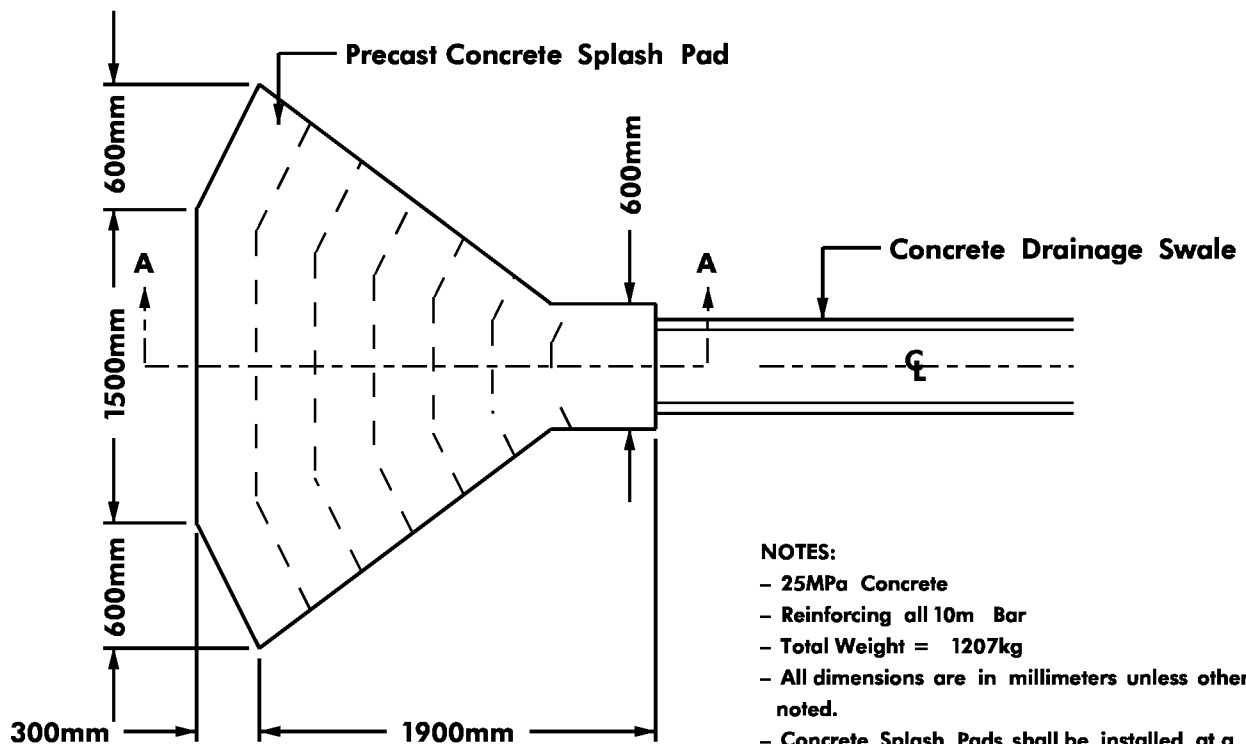
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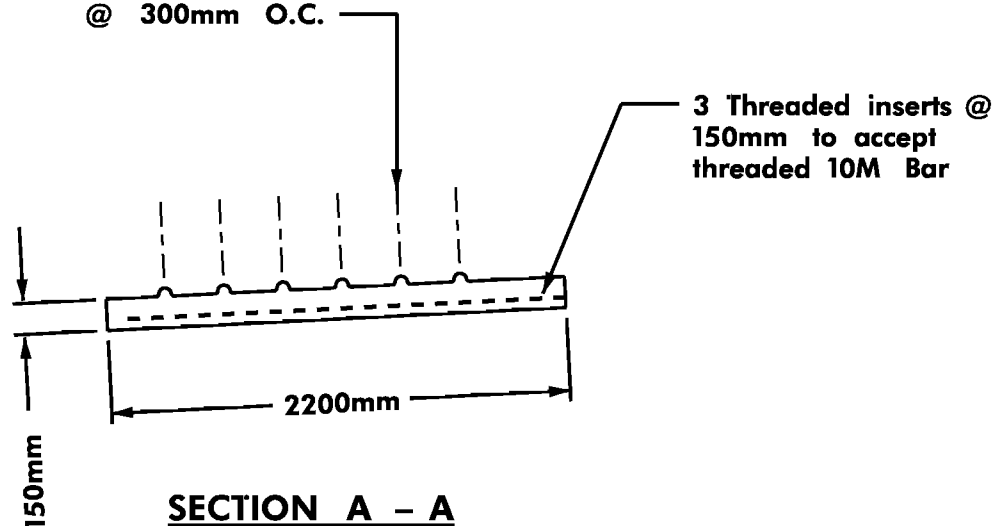
SHEET NO.
45

FILE NO.



PLAN VIEW

Centre Lines Of Energy
Dispersion Bumps
@ 300mm O.C.



NOTES:

- 25MPa Concrete
- Reinforcing all 10m Bar
- Total Weight = 1207kg
- All dimensions are in millimeters unless otherwise noted.
- Concrete Splash Pads shall be installed at a 10% pitch, or erosion control fabric will be required at their end.
- Industry may use variable concrete splash pad sizes subject to the velocity not exceeding 0.9m/sec.
- Subject to approval by Parks other ECP/energy dispersion products may be used.
- Rip Rap may be used in Natural Areas.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**CONCRETE SPLASH PAD
ON PUBLIC EASEMENTS**

DRAWN BY
W.B.

DATE **2009 03 26**

DESIGN BY

DATE

SCALE
N.T.S.

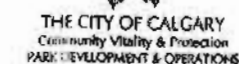
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46

FILE NO.



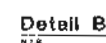
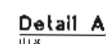
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IRRIGATION
AS-BUILT
DRAWING**

FILE NO.



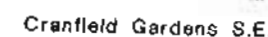
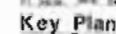
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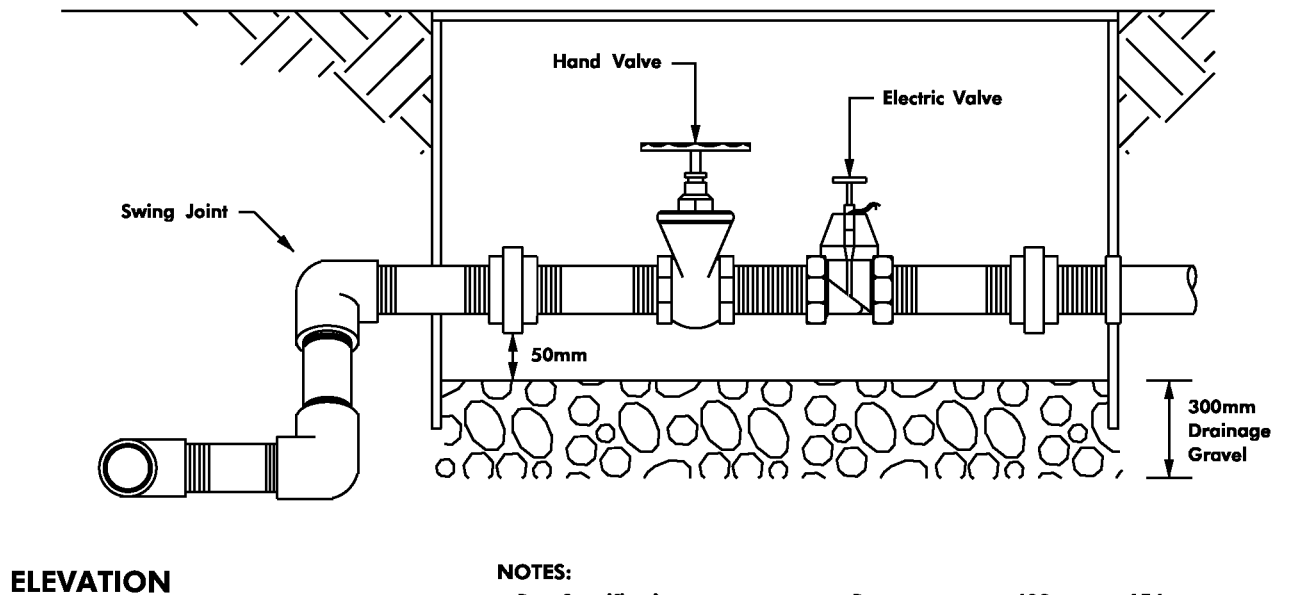
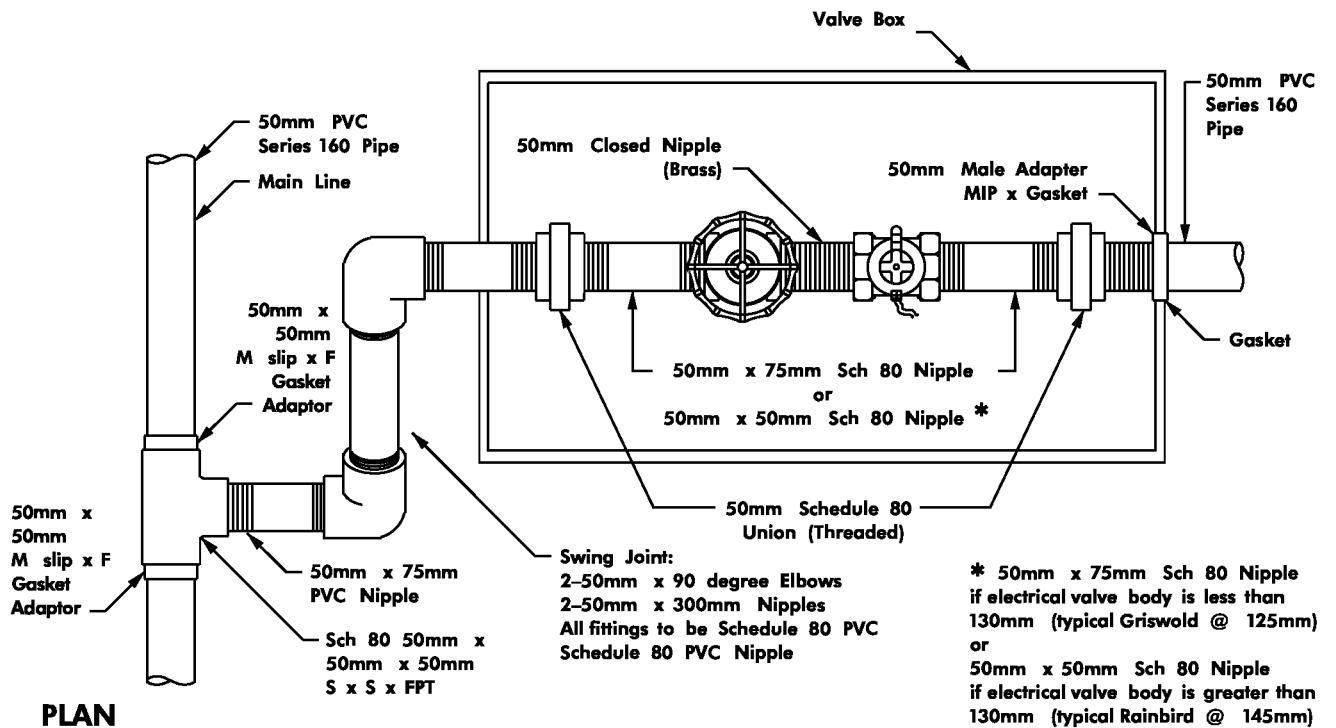
7171



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- 1910-1911: 10000, 10000, 10000
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- 1979-1980: 10000, 10000, 10000
- 1980-1981: 10000, 10000, 10000
- 1981-1982: 10000, 10000, 10000
- 1982-1983: 10000, 10

41570 | <https://doi.org/10.26434/chemrxiv-2024-cd>



NOTES:

- Box Specifications :

Bottom.....	482mm x 654mm
Top.....	374mm x 546mm
Height.....	304mm
- If Electric Valve not installed, centre Hand Valve in centre of box.
- Use premanufactured extensions when obtaining proper height of boxes.
- All threaded PVC fittings are to be Schedule 80
- All dimensions are in metres, unless otherwise noted.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**VALVE HOOK-UP (PVC)
50mm TO 50mm**

DRAWN BY

W.B.

DATE **2006 05 17**

DESIGN BY

DATE

SCALE

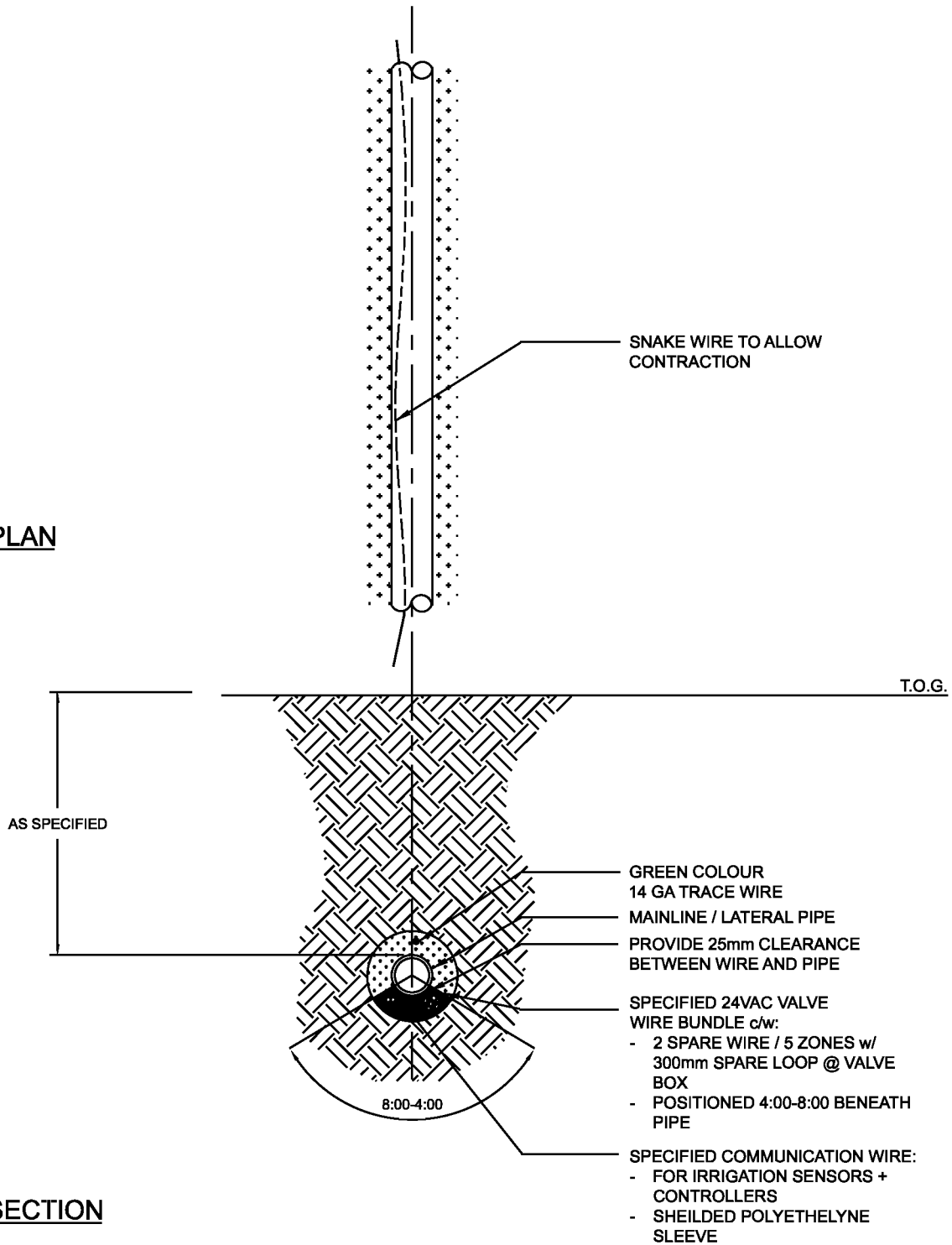
N.T.S.

SHEET NO.

48

FILE NO.

PLAN



SECTION

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**IRRIGATION FIELD WIRE
ALIGNMENT**

DRAWN BY

MRM

DATE **2006 05 24**

DESIGN BY

DATE

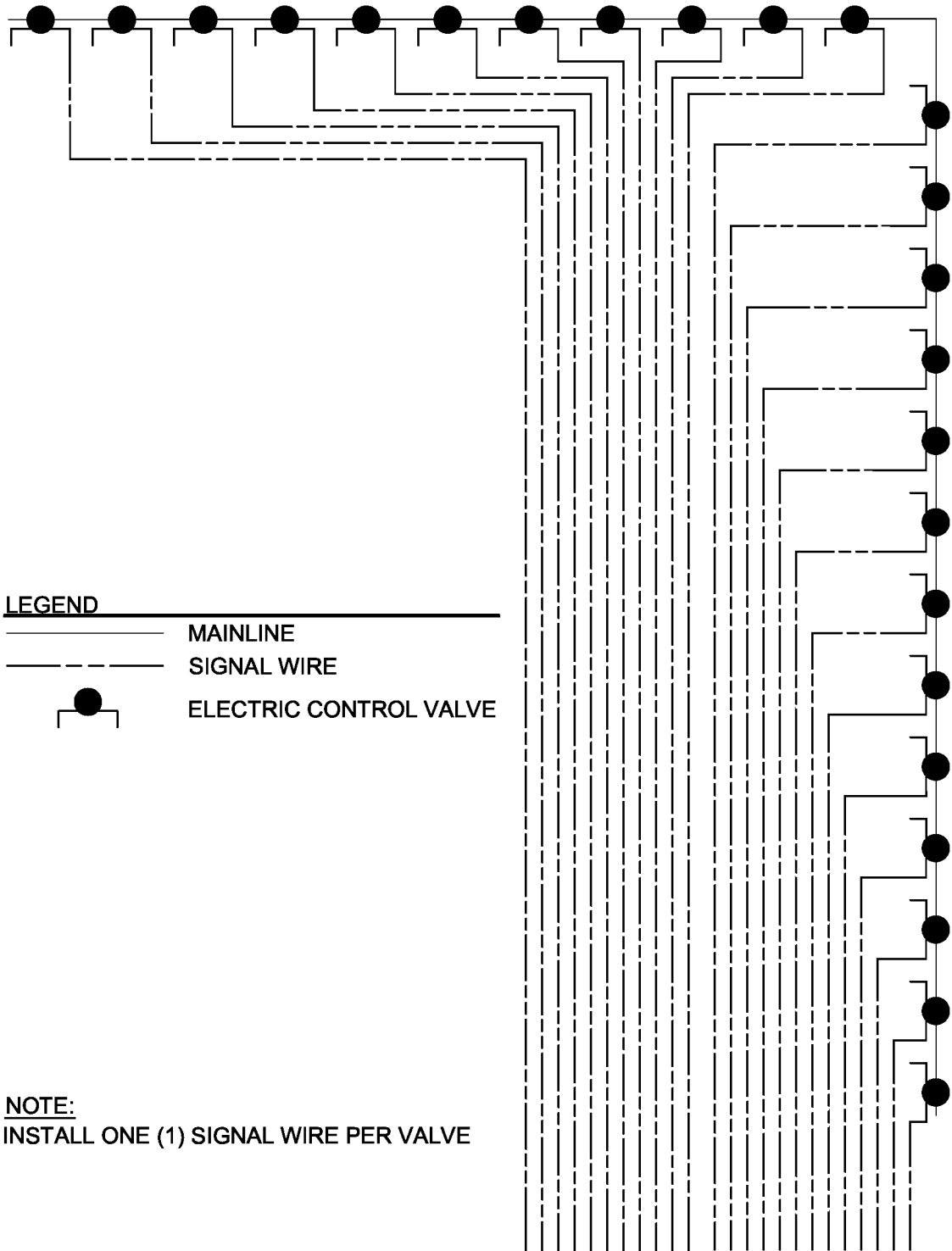
SCALE

N.T.S.

SHEET NO.

48a

FILE NO.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**ELECTRIC CONTROL VALVE
 SIGNAL WIRE SCHEMATIC**

DRAWN BY
MM

DATE **2009 01 16**

DESIGN BY
MM

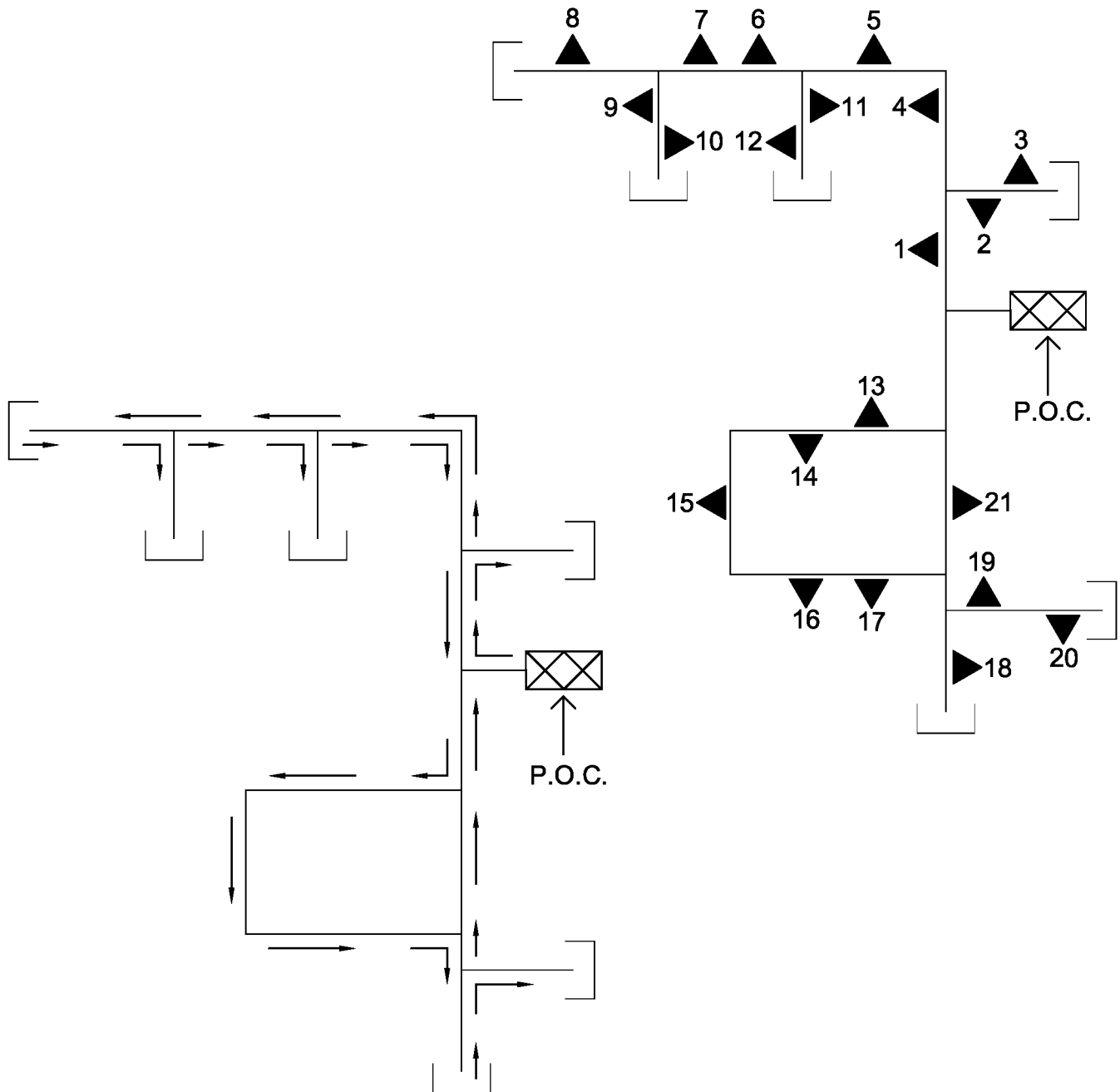
DATE **2009 01 16**

SCALE
N.T.S.

SHEET NO.
48b

FILE NO.

RIGHT HAND VALVE WIRING RULE



P.O.C: (POINT OF CONNECTION)



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**RIGHT HAND VALVE
WIRING RULE**

DRAWN BY
WYC

DATE **2009 02 25**

DESIGN BY
MM

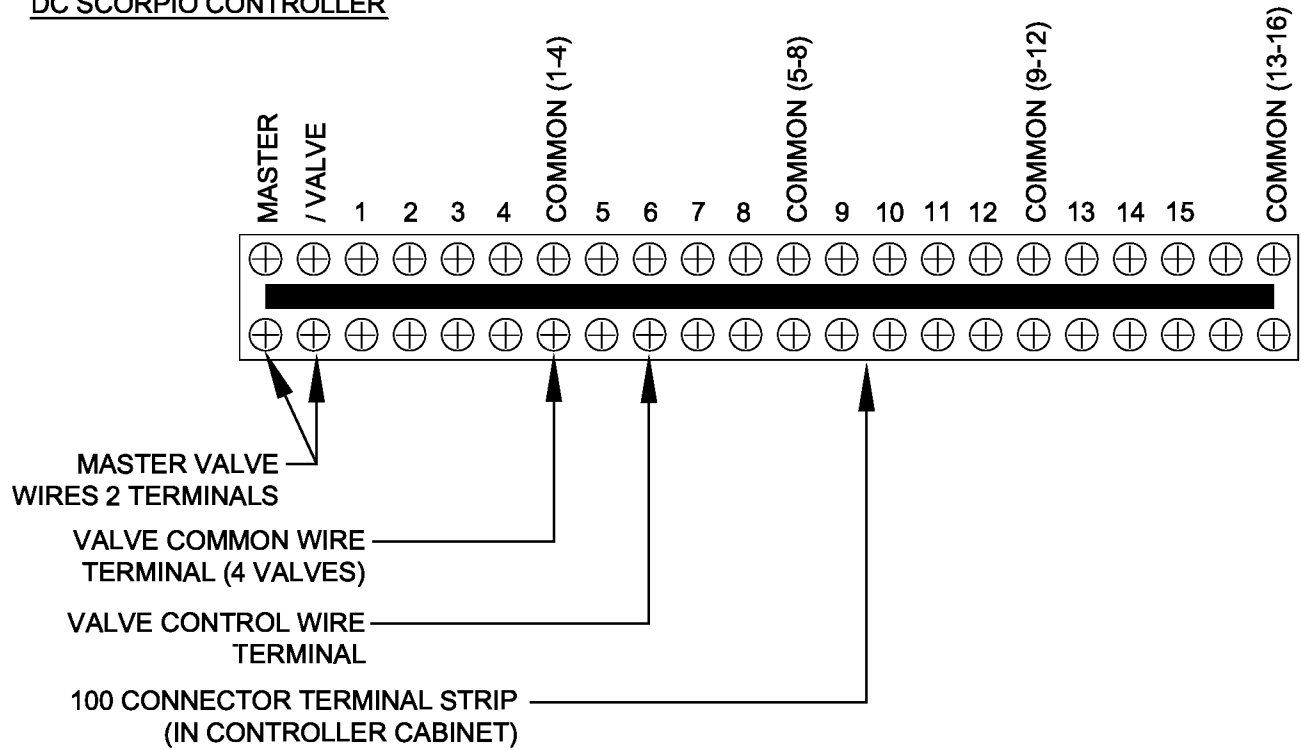
DATE **2009 02 25**

SCALE
N.T.S.

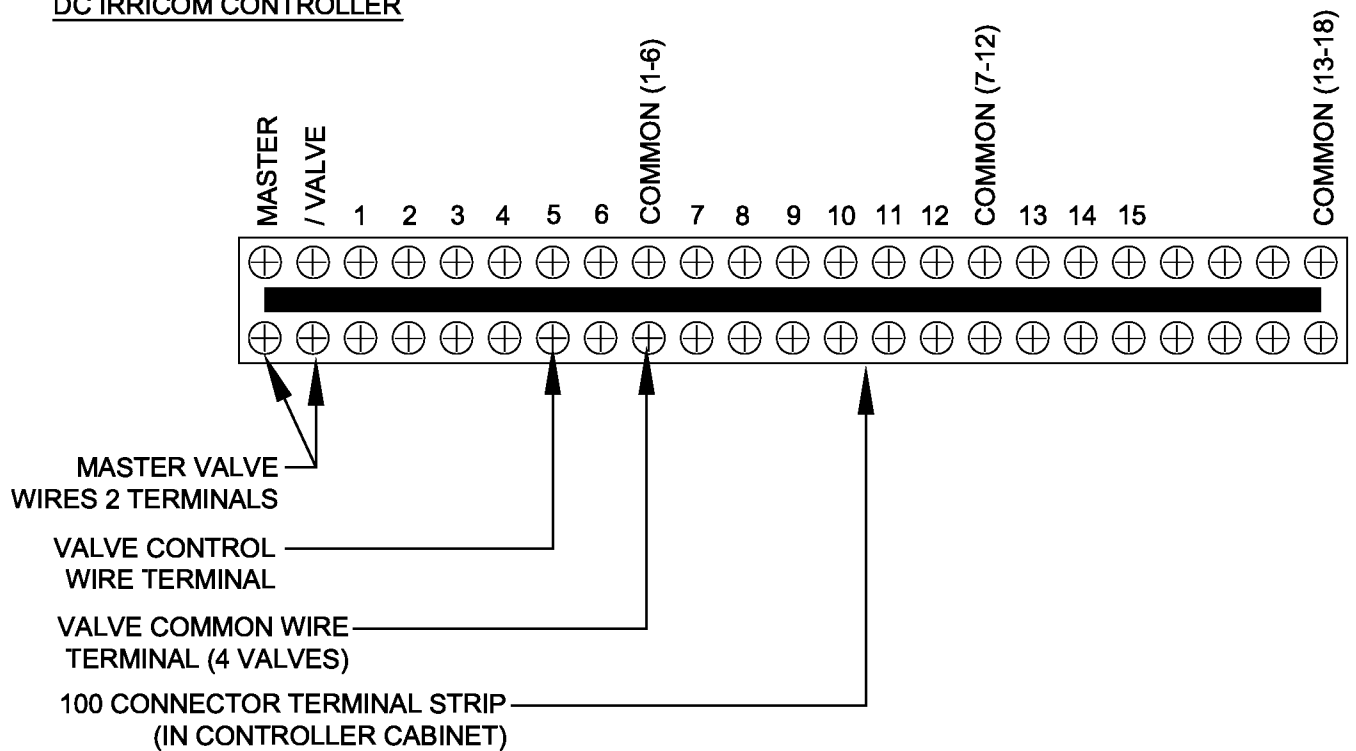
SHEET NO.
48c

FILE NO.

DC SCORPIO CONTROLLER



DC IRRICOM CONTROLLER



PROJECT TITLE
SPECIFICATIONS

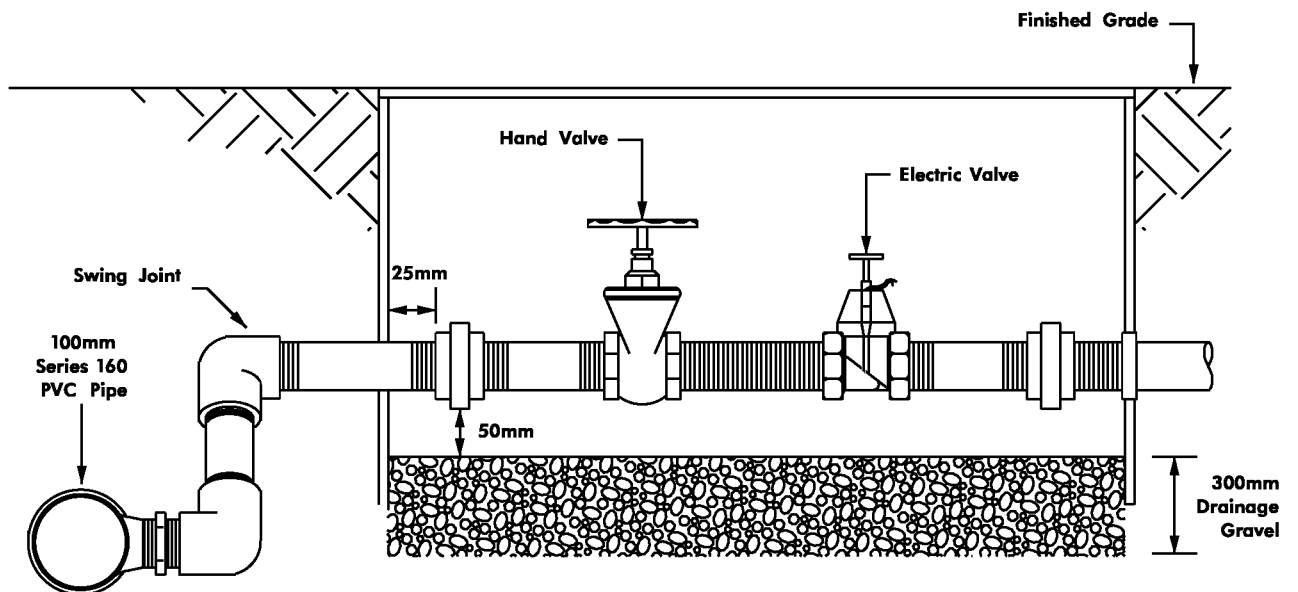
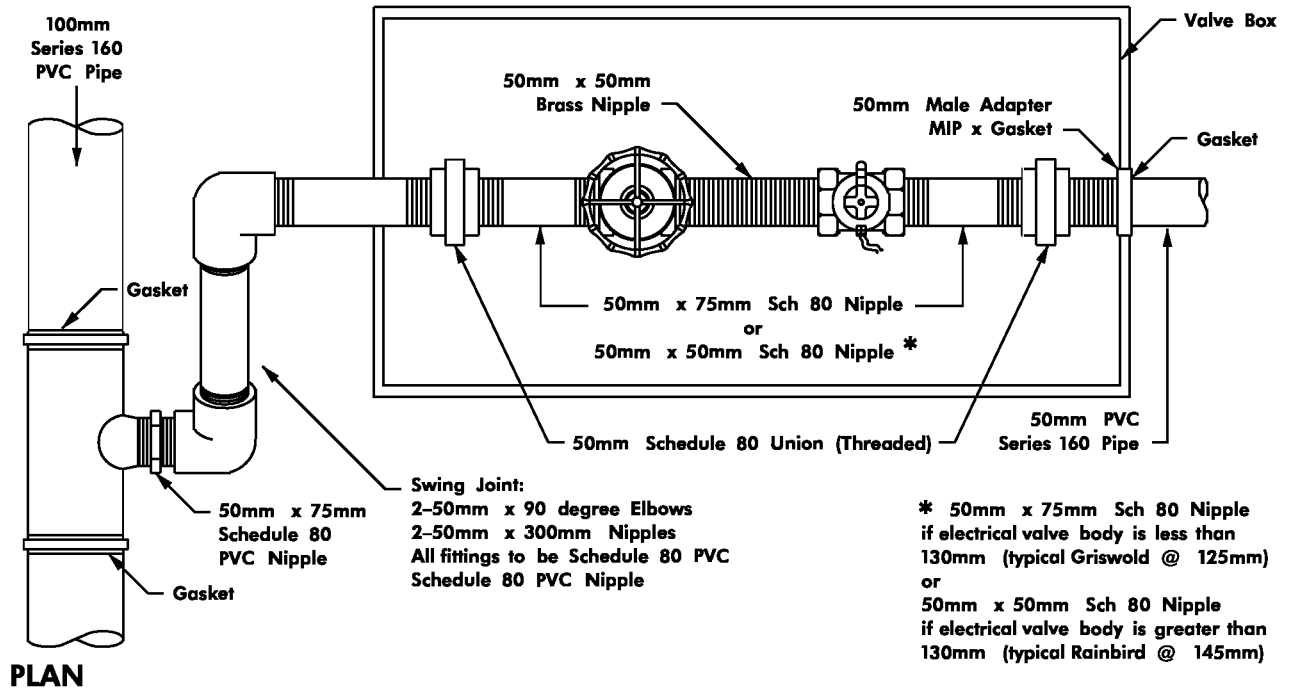
SHEET TITLE
**VALVE WIRING,
DC MOTOROLA CONTROLLERS**

DRAWN BY
MM
DATE
2008/12/05
DESIGN BY
MM
DATE
2008/12/05

SCALE
N.T.S.

SHEET NO.
48d

FILE NO.



NOTES:

- For Box Specifications refer to Detail Sheet #48.
- Use premanufactured extensions when obtaining proper height of boxes
- All threaded PVC fittings are to be Schedule 80.
- All dimensions are in metres, unless otherwise noted.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**VALVE HOOK-UP (PVC)
100mm TO 50mm**

DRAWN BY

W.B.

DATE **2006 05 17**

DESIGN BY

DATE

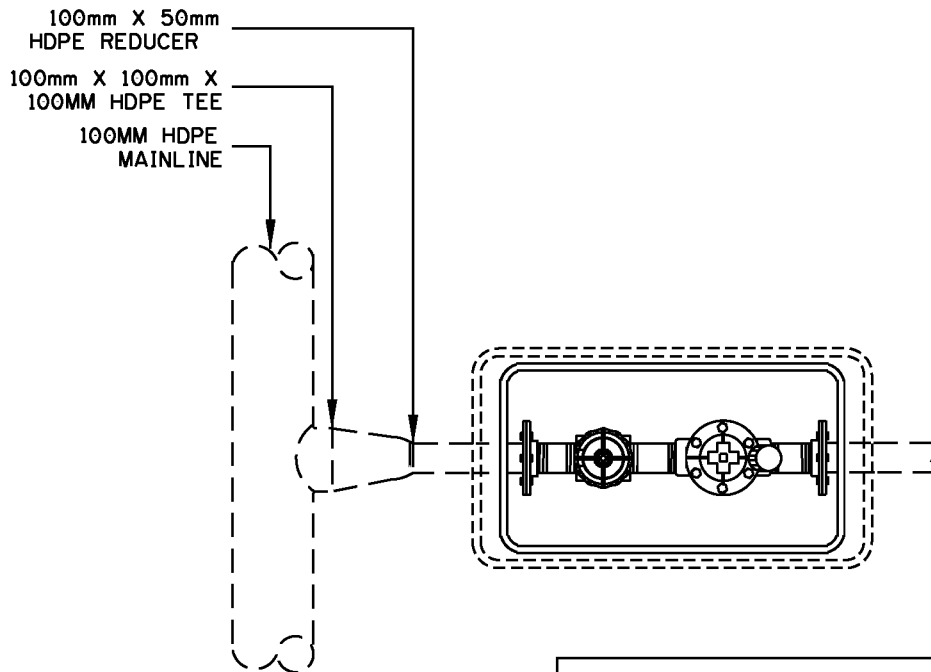
SCALE

N.T.S.

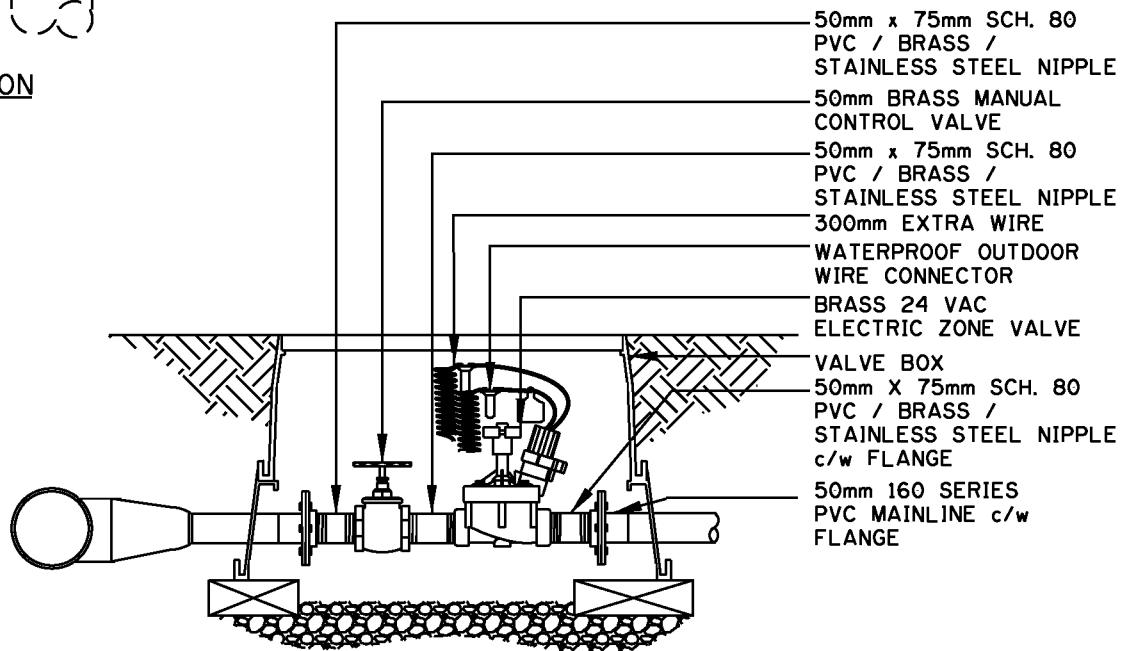
SHEET NO.

49

FILE NO.



ELEVATION



PLAN

NOTES:

- USE PREMANUFACTURED EXTENSIONS WHEN OBTAINING PROPER HEIGHT OF BOXES.
- ALL FITTINGS WHICH ARE HIGH DENSITY ARE TO BE BUTT FUSED.
- FLANGES ARE TO BE BOLTED TOGETHER USING STAINLESS STEEL BOLTS.
- IF ELECTRIC VALVE NOT INSTALLED, CENTRE HAND VALVE IN CENTRE OF BOX.
- FOR BOX SPECIFICATIONS REFER TO DETAIL SHEET *48.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

HPPE VALVE CONNECTION

100mm TO 50mm

DRAWN BY

W.B. MRM

DATE **2006 05 19**

DESIGN BY

DATE

SCALE

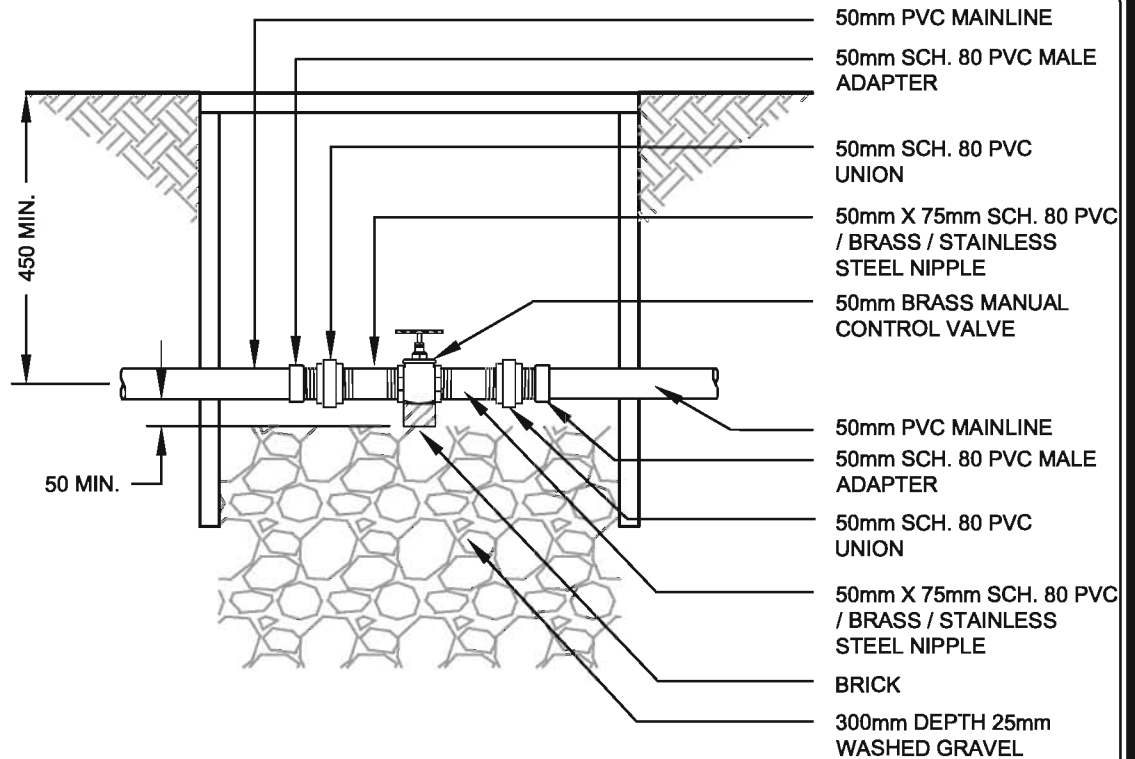
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SHEET NO.

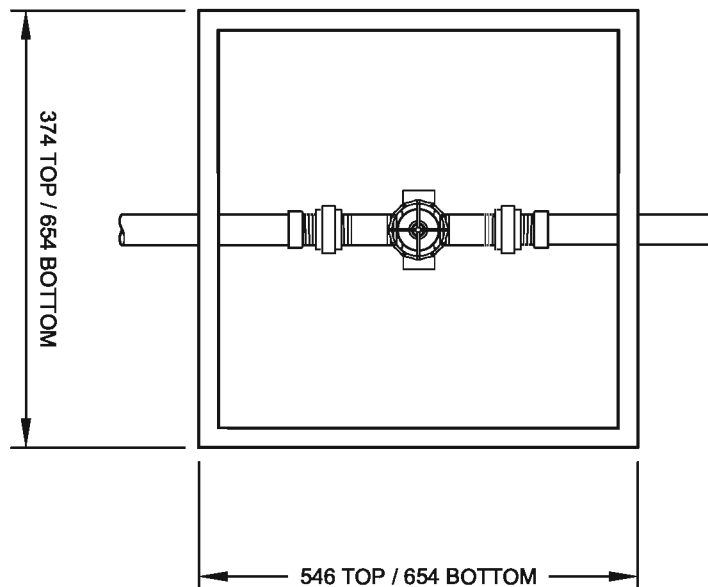
50

FILE NO.

ELEVATION



PLAN



NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- SCH. 80 PVC UNIONS SHALL HAVE UNION COLLARS INSTALLED TOWARDS VALVE.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**50mm ISOLATION VALVE
MAIN CONTROL VALVE (PVC)**

DRAWN BY
WYC

DATE **2008 12 05**

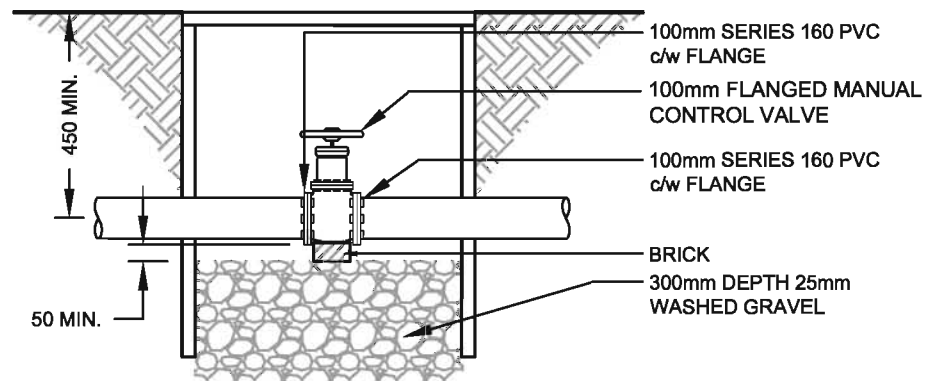
DESIGN BY

DATE

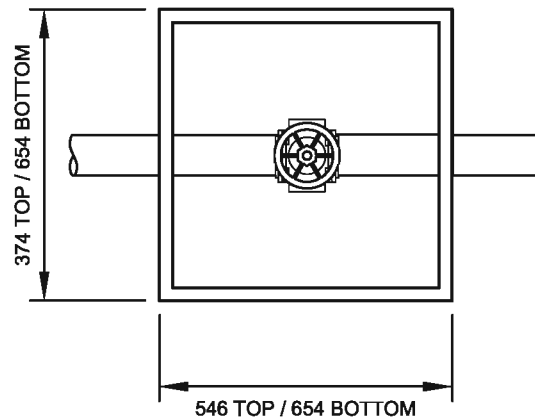
SCALE
N.T.S.

SHEET NO.
50a

FILE NO.



ELEVATION



PLAN

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- ALL BOLT HEADS ON FLANGES SHALL BE FACING AWAY FROM VALVE.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**100mm ISOLATION VALVE
MANUAL CONTROL VALVE
(PVC)**

DRAWN BY
WYC

DATE **2008 12 05**

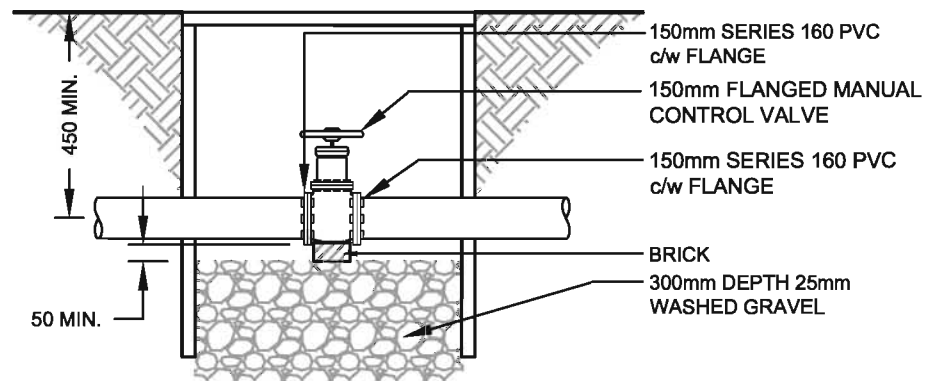
DESIGN BY

DATE

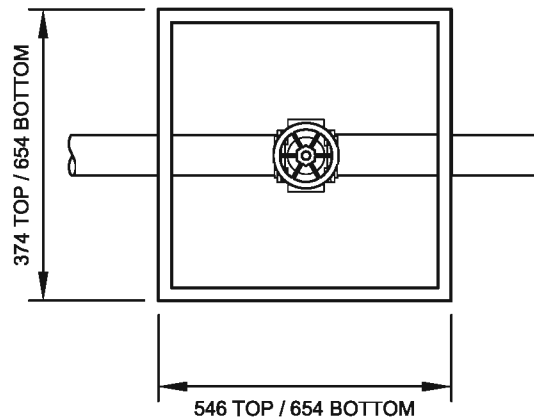
SCALE
N.T.S.

SHEET NO.
50b

FILE NO.



ELEVATION



PLAN

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- ALL BOLT HEADS ON FLANGES SHALL BE FACING AWAY FROM VALVE.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**150mm ISOLATION VALVE
MANUAL CONTROL VALVE
(PVC)**

DRAWN BY
WYC

DATE **2008 12 05**

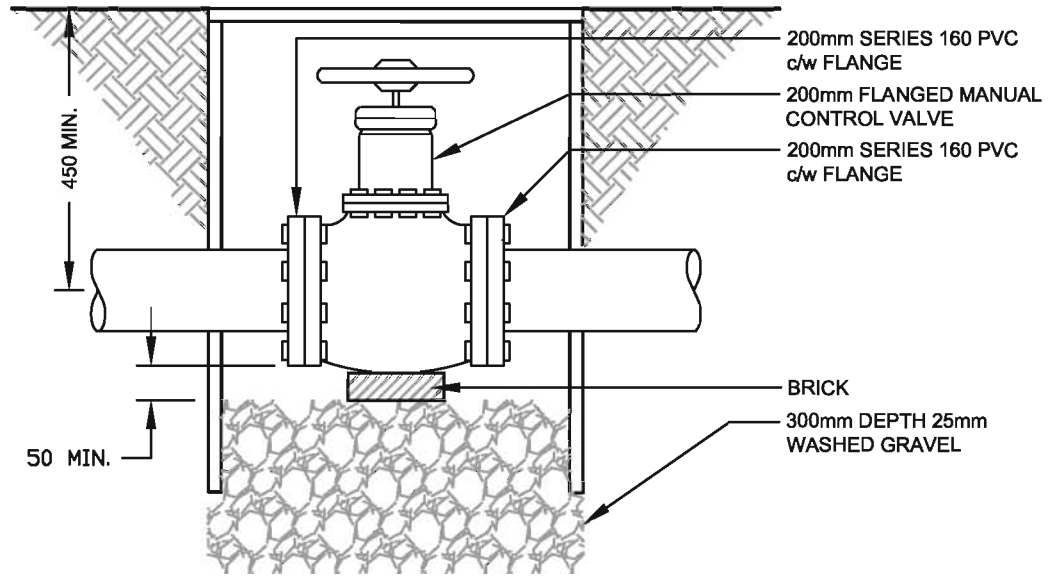
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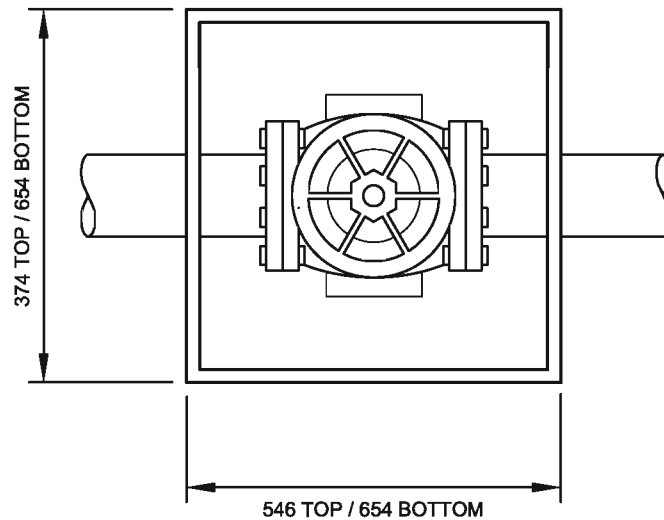
SCALE
N.T.S.

SHEET NO.
50c

FILE NO.



ELEVATION



PLAN

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- ALL BOLT HEADS ON FLANGES SHALL BE FACING AWAY FROM VALVE.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**200mm ISOLATION VALVE
MANUAL CONTROL VALVE
(PVC)**

DRAWN BY
WYC

DATE **2008 12 05**

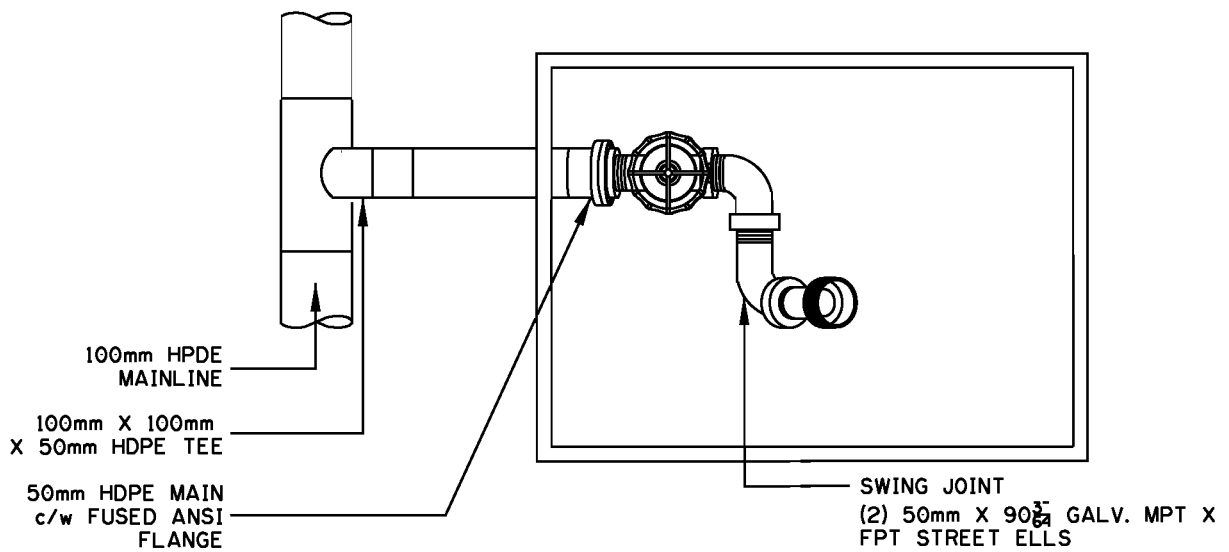
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DATE

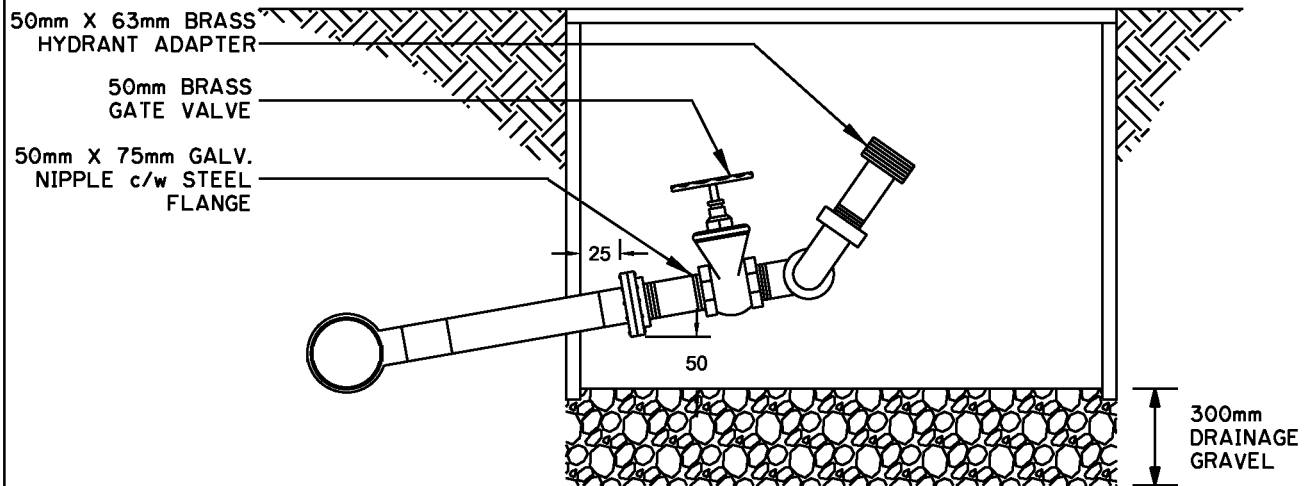
SCALE
N.T.S.

SHEET NO.
50d

FILE NO.



PLAN



ELEVATION

NOTES:

- INCREASE ANGLE AT ELBOW TO ALLOW FOR EASIER HOSE CONNECTION TO ADAPTER
- FOR BOX SPECIFICATIONS REFER TO DETAIL SHEET #48
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**50mm COMPRESSOR
CONNECTION & METER TEST
OUTLET ASSEMBLY**

DRAWN BY

W.B./M.M./RSP

DATE **2006 05 24**

DESIGN BY

DATE

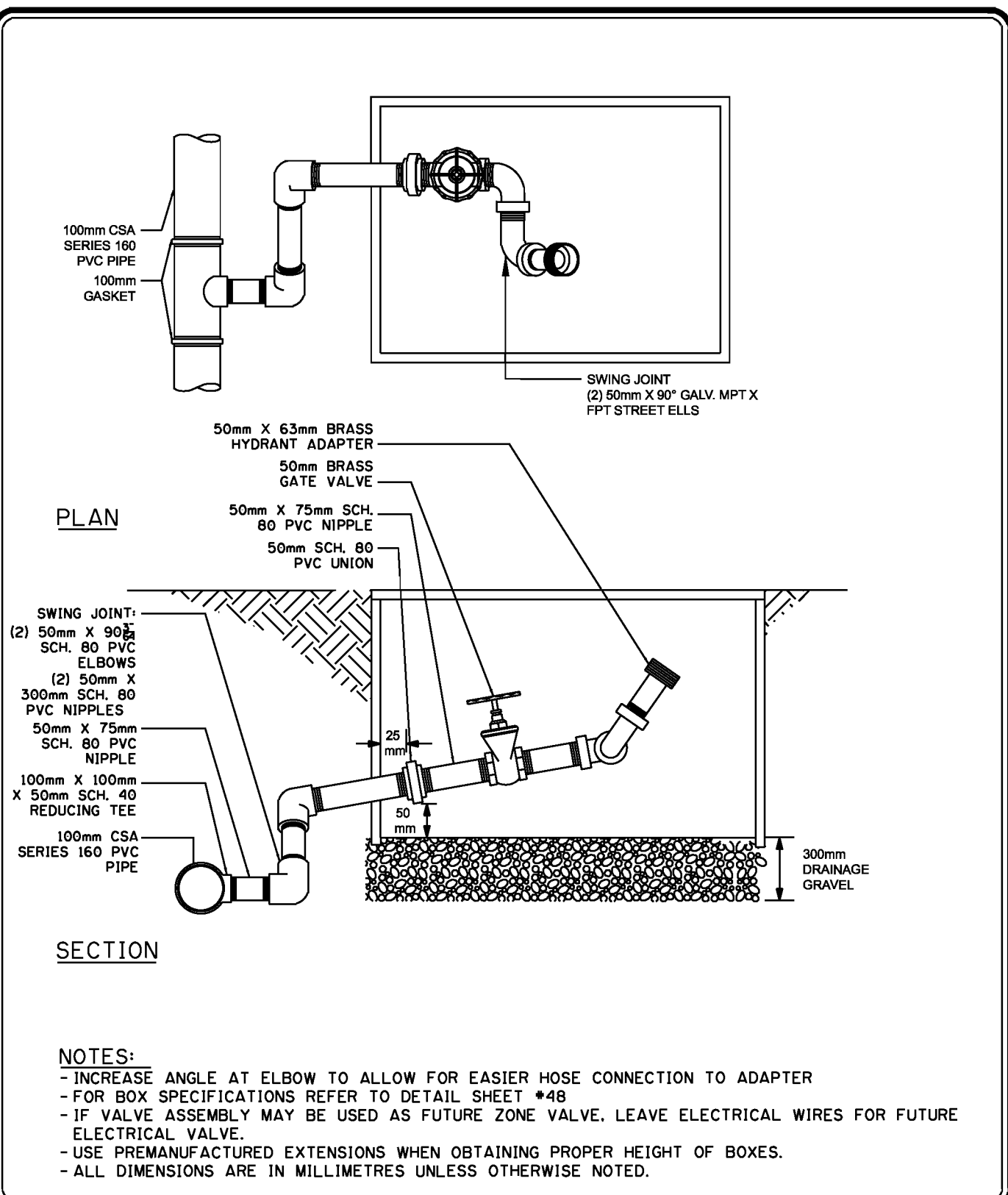
SCALE

N.T.S.

SHEET NO.

51

FILE NO.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
50mm FIELD GATE VALVE ASSEMBLY

DRAWN BY
W.B./M.M./MRM

DATE **2006 05 19**

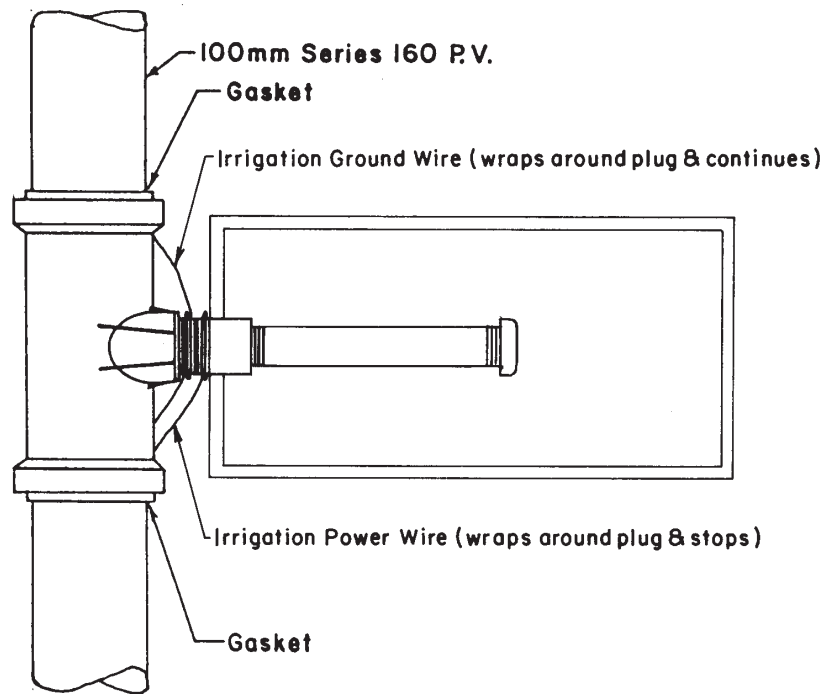
DESIGN BY

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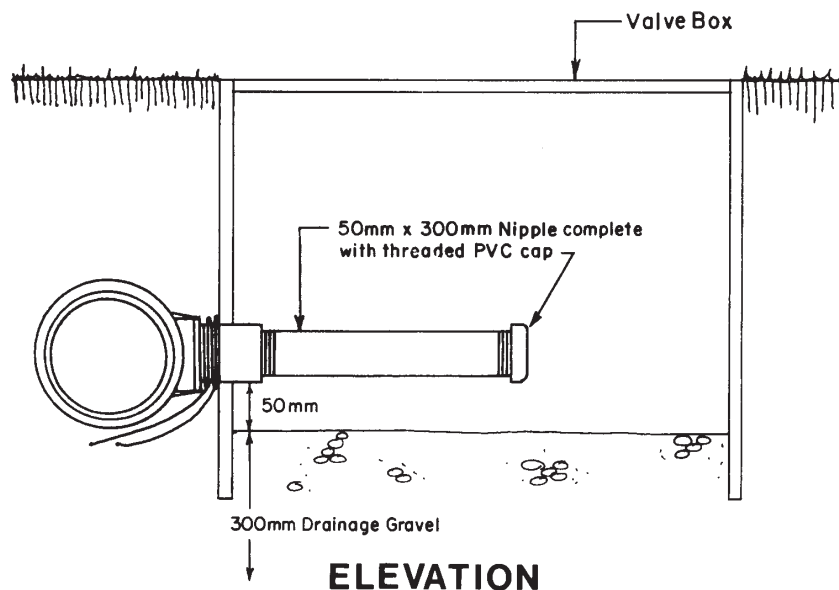
SCALE
N.T.S.

SHEET NO.
51a

FILE NO.



PLAN



ELEVATION

NOTE :

-Box Specifications: (all outside measurements)

Bottom..... 482mm x 654mm

Top..... 374mm x 546mm

Height..... 304mm

-All dimensions are in metres unless otherwise noted.

METRIC



THE CITY OF
CALGARY
PARKS

PROJECT TITLE SPECIFICATIONS

SHEET TITLE TEE HOOK-UP

DRAWN BY
W.B.

DATE 1997 03 08

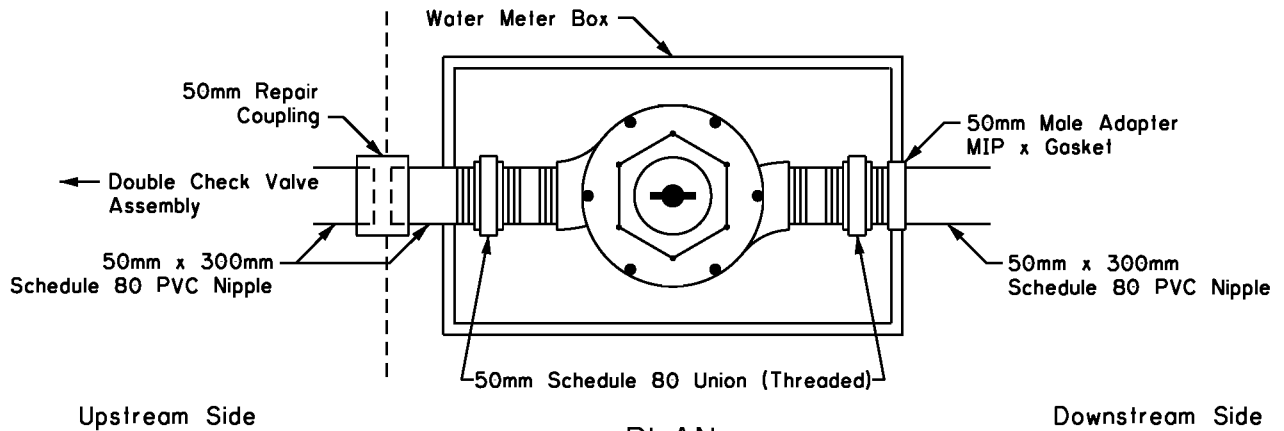
DESIGN BY
D.LaF.

DATE 1997 03 08

SCALE
N.T.S.

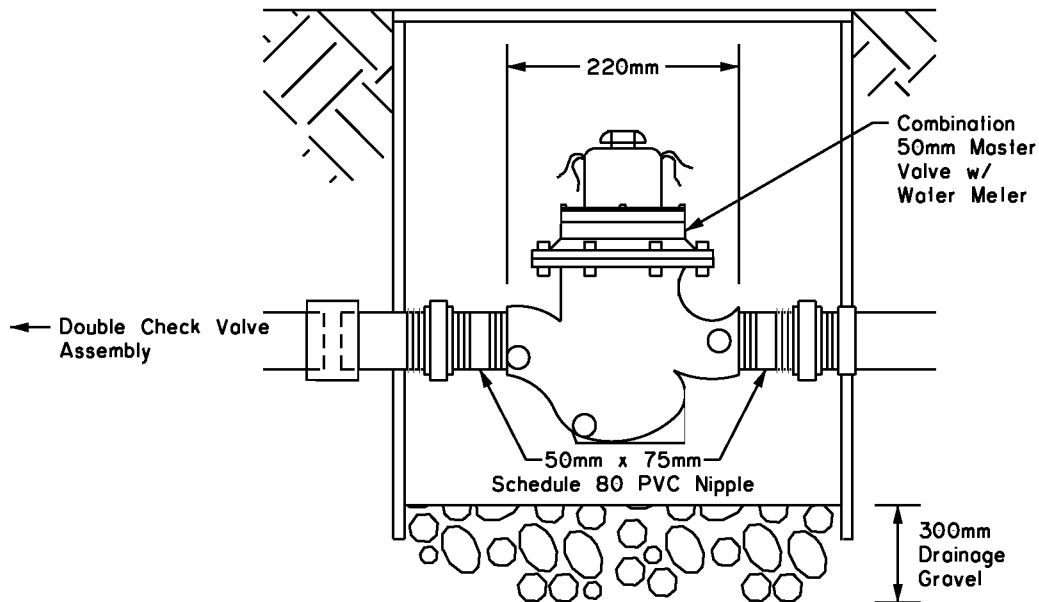
SHEET NO.
52

FILE NO.



PLAN

Use premanufactured extensions when obtaining proper height of boxes.



ELEVATION

NOTES:

- Eight, 14 gauge direct burial wires to run from Water Meter to Controller Box.
- Box Specifications :

Bottom.....	482mm x 654mm
Top.....	374mm x 546mm
Height.....	304mm
- Install "Quick Coupler Valve" (Detail Sheet #55) 0.5m downstream from the Water Meter Box.
- Install above Master Valve & Meter Assembly downstream of 50mm Double Check Valve Assembly. (Detail Sheet #58)
- Locate 1.5m (Center to Center) downstream of Double Check Valve Box.
- All dimensions are in metres, unless otherwise noted.
- All fittings on the pressure side are to be Schedule 80.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

VALVE HOOK-UP (PVC)

50mm TO 50mm

**COMBINATION 50m MASTER VALVE
WITH WATER METER**

DRAWN BY

W.B.

DATE **2006 05 19**

DESIGN BY

DATE

SCALE

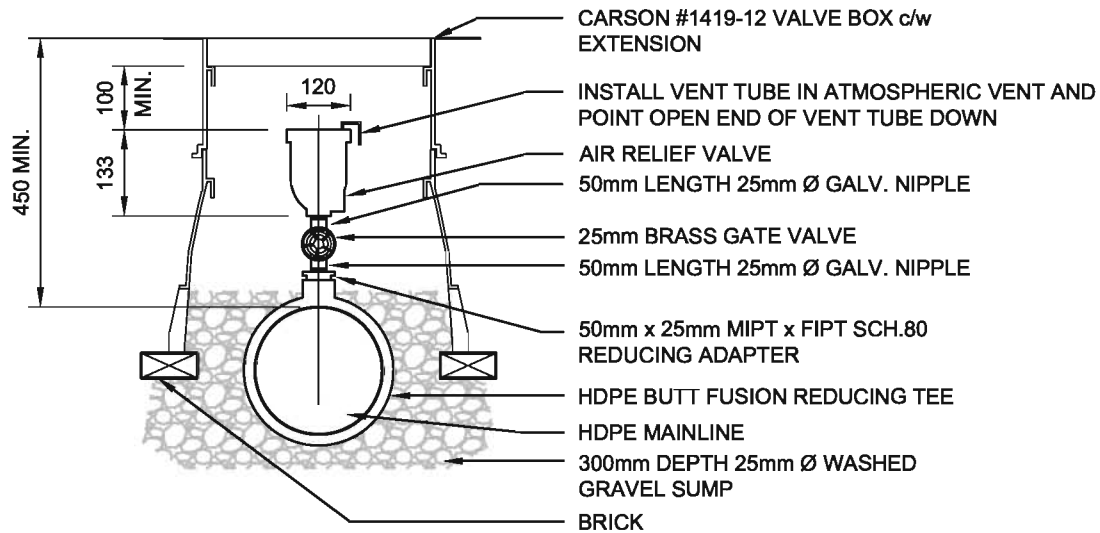
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SHEET NO.

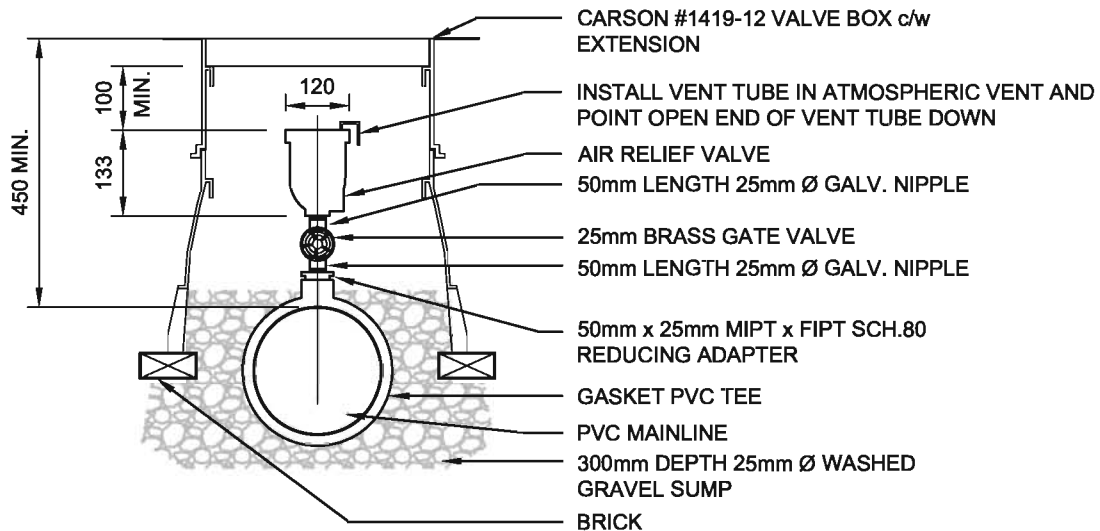
53

FILE NO.

AIR RELIEF VALVE (HDPE)



AIR RELIEF VALVE (PVC)



NOTE:

— ENSURE MAINLINE DEPTH FROM TOP OF PIPE TO FINISHED GRADE IS AT MINIMUM 450mm.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**AIR RELIEF VALVE
HDPE / PVC**

DRAWN BY
WYC

DATE **2008 12 05**

DESIGN BY
MM

DATE **2008 12 05**

SCALE
N.T.S.

SHEET NO.
53a

FILE NO.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**PRESSURE REDUCING
VALVE ASSEMBLY**

DRAWN BY
WYC

DATE **2008 12 05**

DESIGN BY

MS

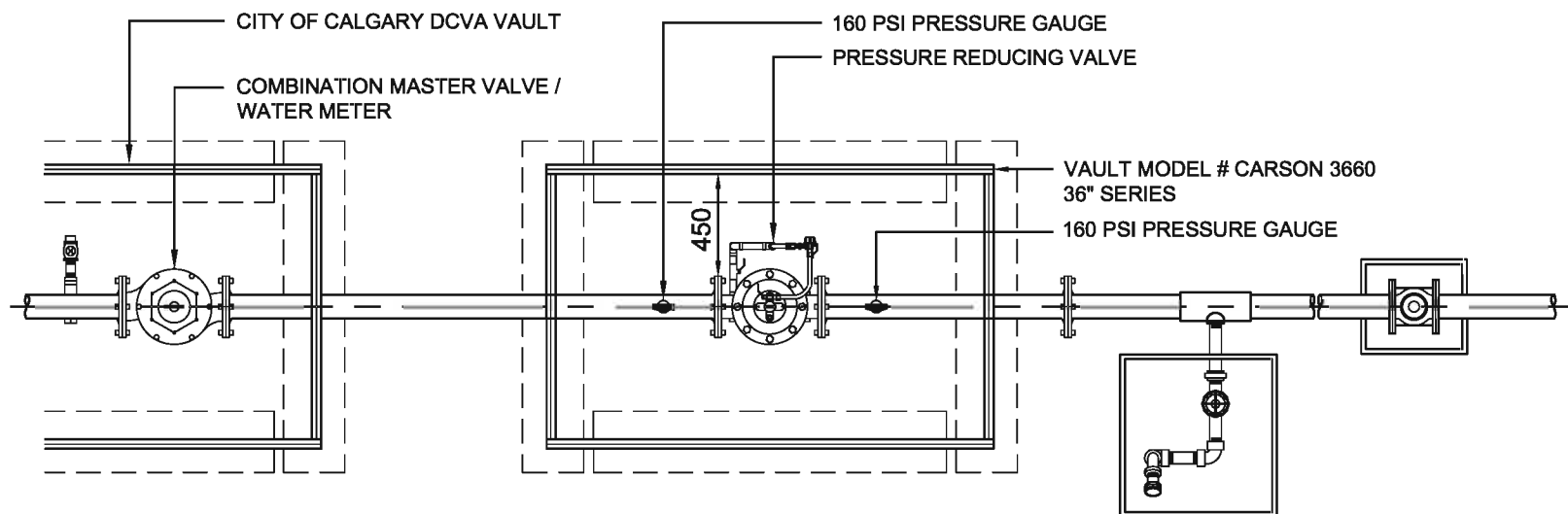
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SCALE
N.T.S.

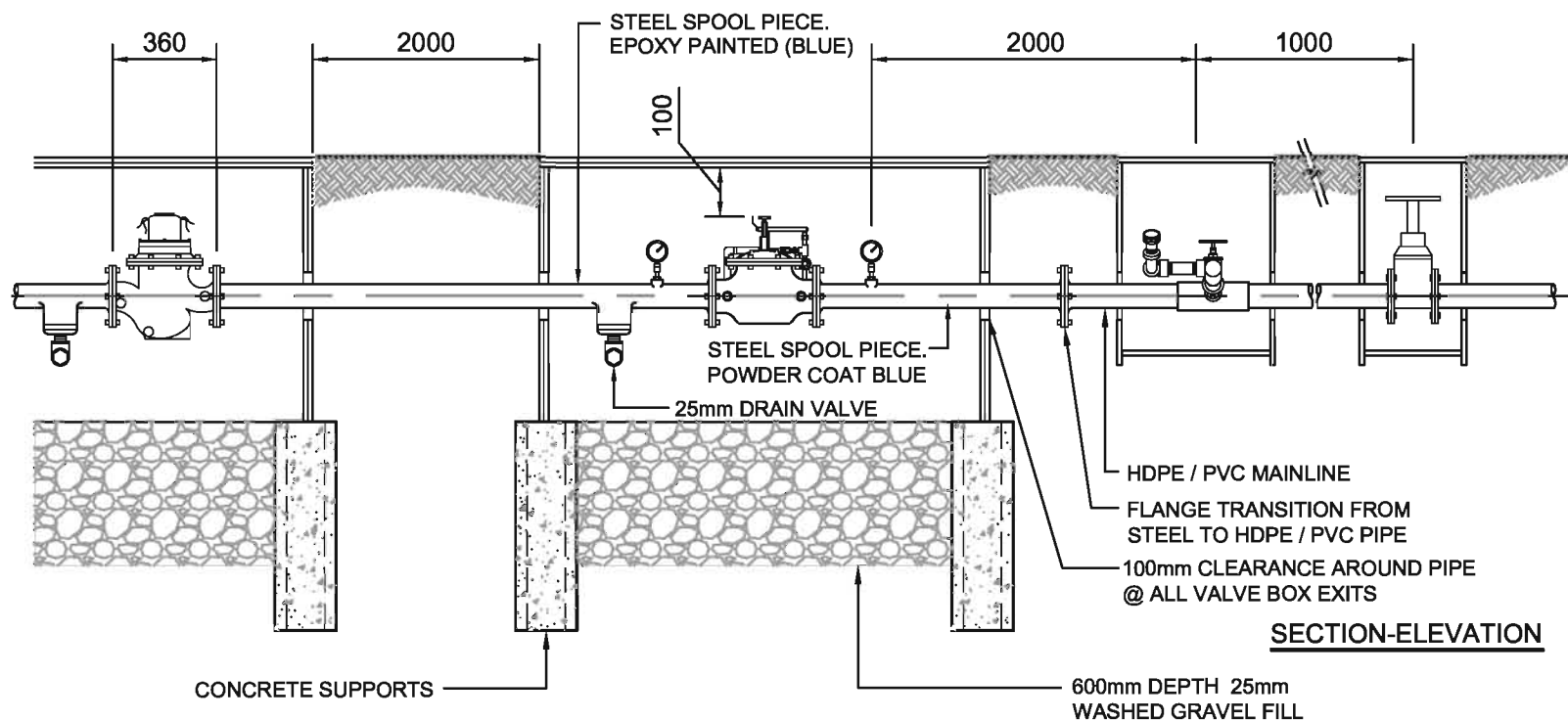
SHEET NO.

53b

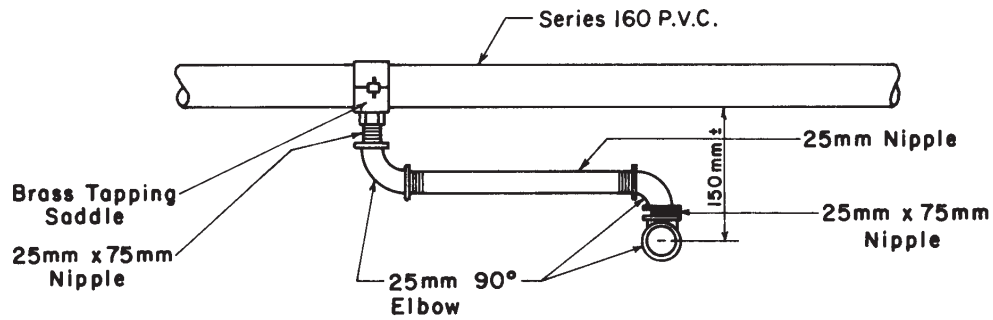
FILE NO.



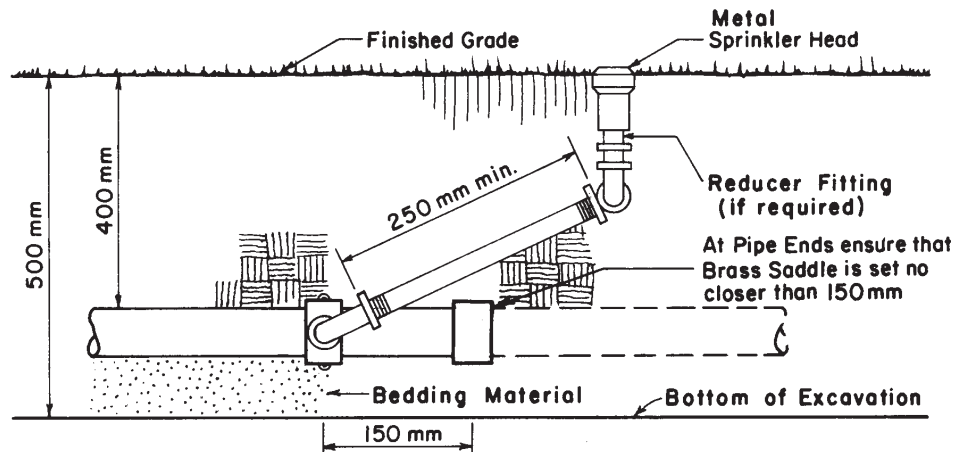
PLAN



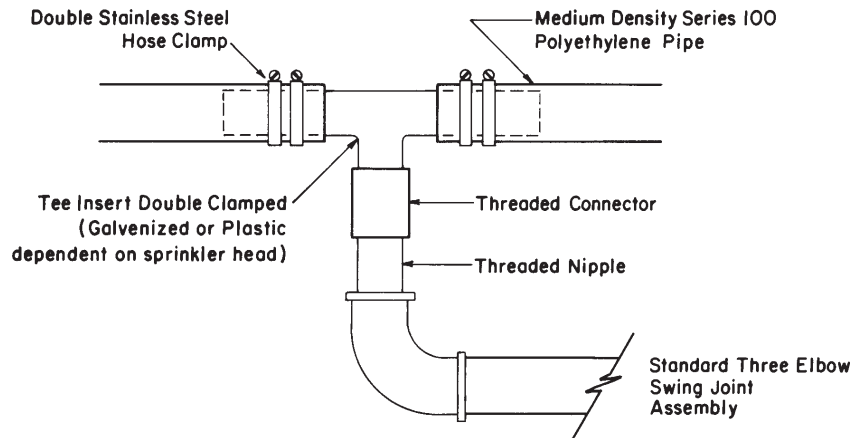
SECTION-ELEVATION



Plan View



Elevation



NOTE;

- Install Swing Joint so that all water drains back into pipe.
- Use galvanized fittings when installing Turf Valves or Metal Sprinkler Heads. Use Teflon Tape at all connections as per proper trade practice.
- Use Schedule 40 P.V.C. Fittings and Schedule 80 P.V.C. Nipples when installing Plastic Sprinkler Heads.
- All dimensions are in metres unless otherwise noted.



THE CITY OF
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PARKS

**PROJECT TITLE
SPECIFICATIONS**

**SHEET TITLE
THREE ELBOW
SWING JOINT FOR
METAL SPRINKLER HEAD**

**DRAWN BY
W.B.**

DATE 1997 03 08

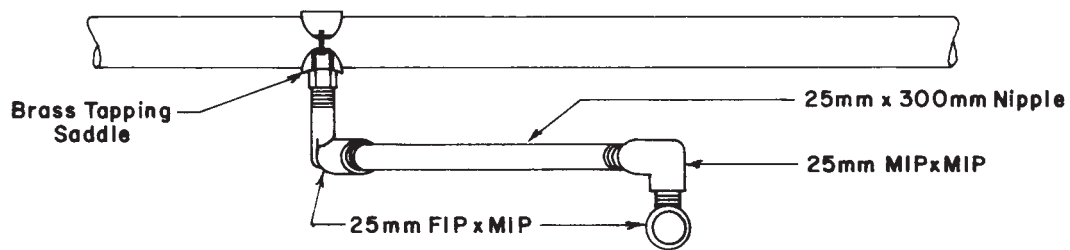
**DESIGN BY
D.LaF.**

DATE 1997 03 08

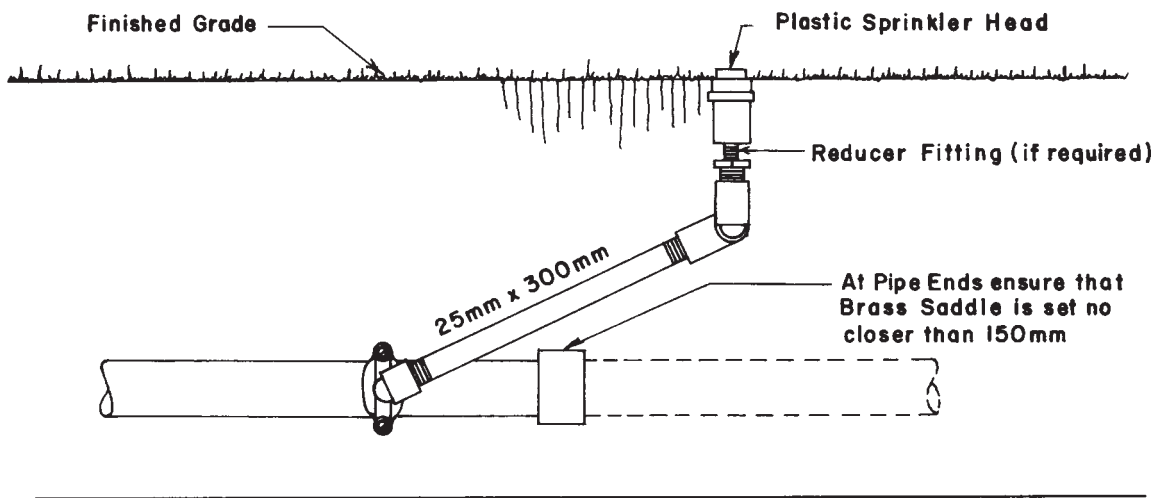
**SCALE
N.T.S.**

**SHEET NO.
54**

FILE NO.



Plan View



Elevation

NOTE:

- Install Swing Joint so that all water drains back into pipe.
- Use galvanized fittings when installing Turf Valves or Metal Sprinkler Heads. Use Teflon Tape at all connections as per proper trade practice.
- Use Schedule 40 P.V.C. Fittings and Schedule 80 P.V.C. Nipples when installing Plastic Sprinkler Heads.
- All dimensions are in metres unless otherwise noted.

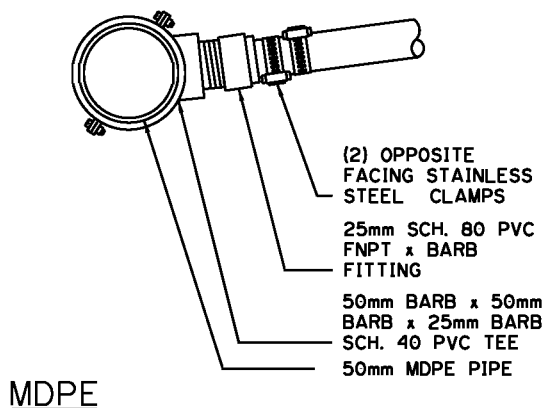
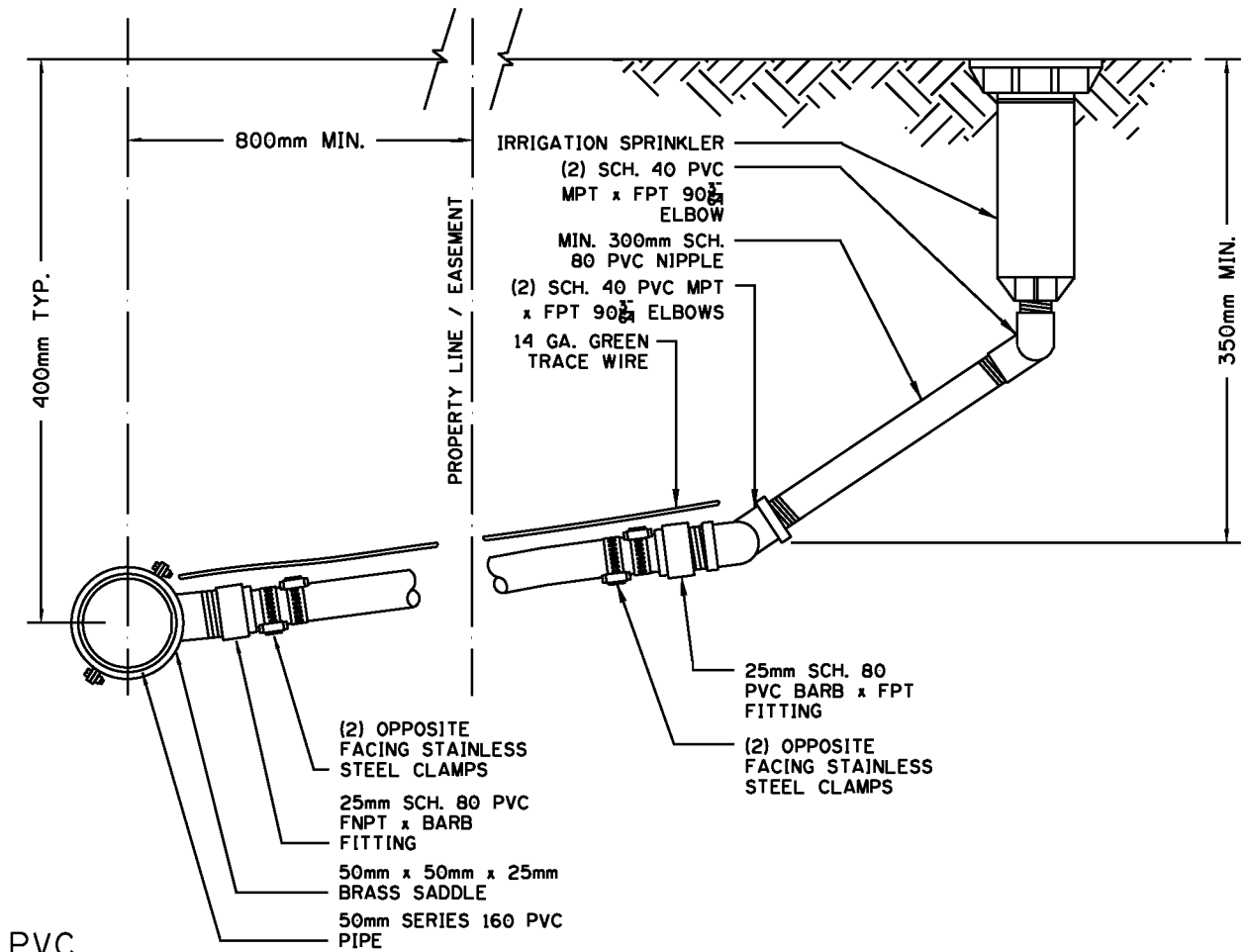


THE CITY OF
CALGARY
PARKS

PROJECT TITLE
SPECIFICATIONS
SHEET TITLE
THREE ELBOW
SWING JOINT FOR
PLASTIC SPRINKLER HEAD

DRAWN BY
W.B.
DATE 1997 03 08
DESIGN BY
D.LaF.
DATE 1997 03 08

SCALE
N.T.S.
SHEET NO.
55
FILE NO.



NOTE:

- 25mm X 900mm (TYP.) MDPE SHALL BE USED AS A PIGTAIL FOR OBSTRUCTIONS SUCH AS PROPERTY EASEMENTS, UTILITY RIGHT OF WAYS, TREE ROOTS, ETC.
- POLY 'PIGTAIL' SHALL BE CSA SERIES 100 MEDIUM DENSITY POLYETHYLENE
- DISTANCE FROM IRRIGATION PIPE TO SPRINKLER HEAD SHALL BE INDICATED ON AS BUILT DRAWINGS
- SWING JOINT AND POLY PIGTAIL SHALL BE MIN. 350mm DEPTH AND SHALL HAVE 14 GA. GREEN TRACE WIRE FROM PIPE CONNECTION TO BASE OF SWING JOINT



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**PIGTAIL SWING JOINT FOR
PVC + MDPE**

DRAWN BY
MRM

DATE **2005 05 24**

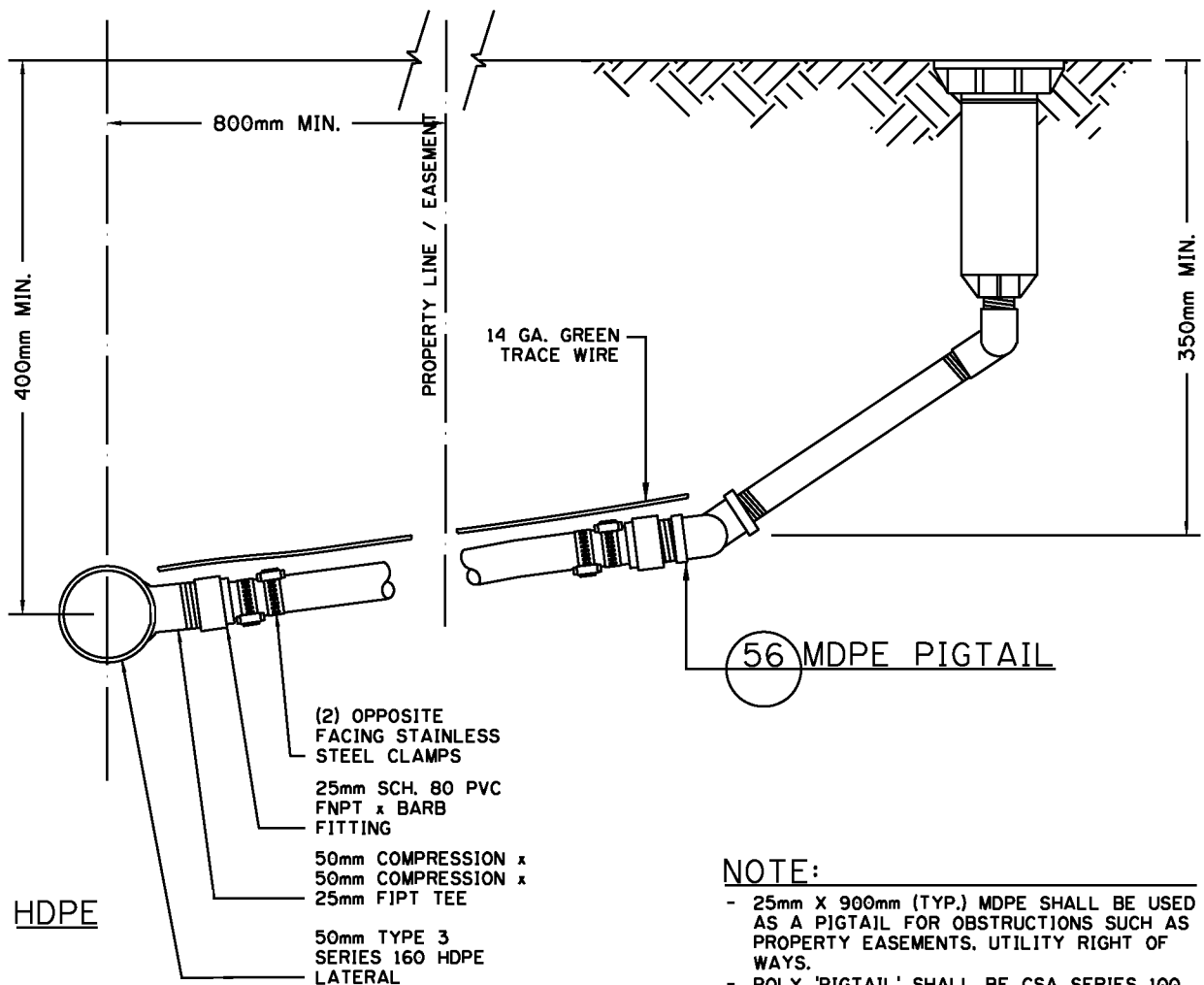
DESIGN BY
MRM

DATE **2005 05 24**

SCALE
N.T.S.

SHEET NO.
56

FILE NO.



NOTE:

- 25mm X 900mm (TYP.) MDPE SHALL BE USED AS A PIGTAIL FOR OBSTRUCTIONS SUCH AS PROPERTY EASEMENTS, UTILITY RIGHT OF WAYS.
- POLY 'PIGTAIL' SHALL BE CSA SERIES 100 MEDIUM DENSITY POLYETHYLENE
- DISTANCE FROM IRRIGATION PIPE TO SPRINKLER HEAD SHALL BE INDICATED ON AS BUILT DRAWINGS
- SWING JOINT AND POLY PIGTAIL SHALL BE MIN. 350mm DEPTH AND SHALL HAVE 14 GA. GREEN TRACE WIRE FROM PIPE CONNECTION TO BASE OF SWING JOINT



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**PIGTAIL SWING JOINT
FOR HDPE**

DRAWN BY

MRM

DATE **2006 05 24**

DESIGN BY

DATE

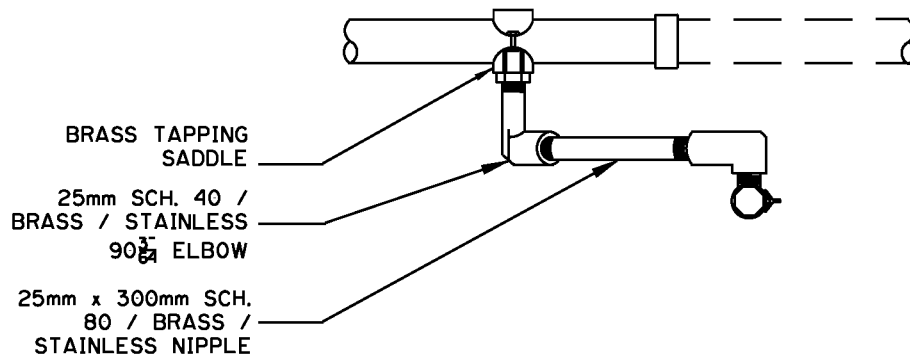
SCALE

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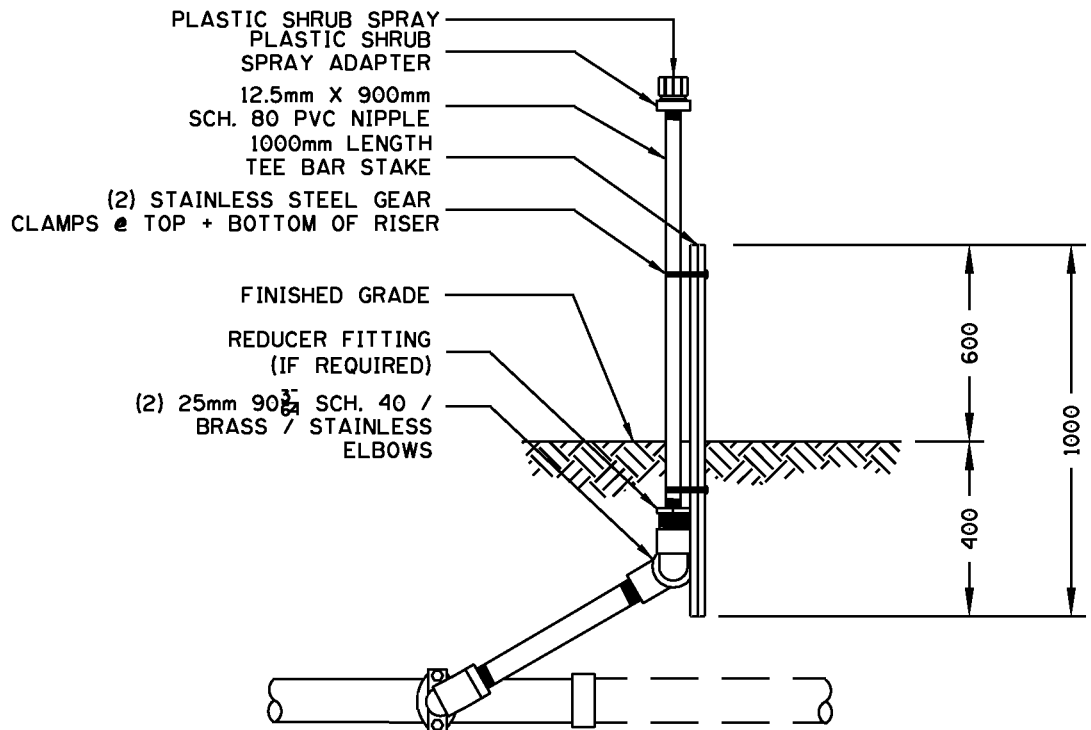
SHEET NO.

57

FILE NO.



PLAN



ELEVATION

NOTES:

- USE GALVANIZED FITTINGS WHEN INSTALLING TURF VALVES OR METAL SPRINKLERS HEADS.
- USE SCH. 40 PVC FITTINGS AND SCH. 80 PVC NIPPLES WHEN INSTALLING PLASTIC SPRINKLER HEADS.
- BRASS SADDLE SHALL NOT BE CLOSER THAN 150mm FROM PIPE END.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**THREE ELBOW SWING
JOINT FOR PLASTIC
RISER + SHRUB HEAD**

DRAWN BY

RSP

DATE **2006 05 24**

DESIGN BY

DATE

SCALE

N.T.S.

SHEET NO.

57a

FILE NO.



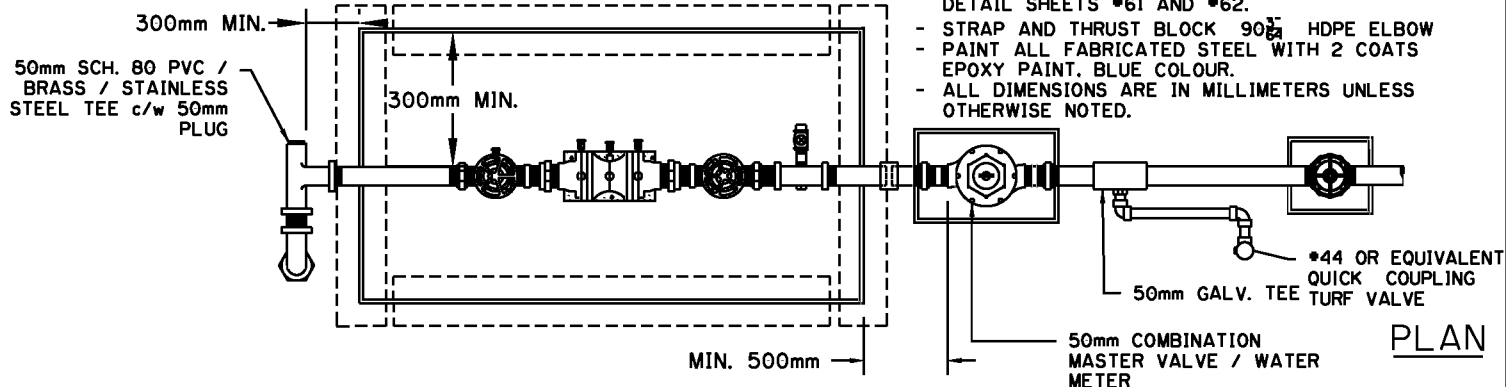
PROJECT TITLE
SPECIFICATIONS
SHEET TITLE
**50mm DOUBLE CHECK
VALVE ASSEMBLY**

DRAWN BY
W.B./MRM
DATE
2006 05 16
DESIGN BY
DATE

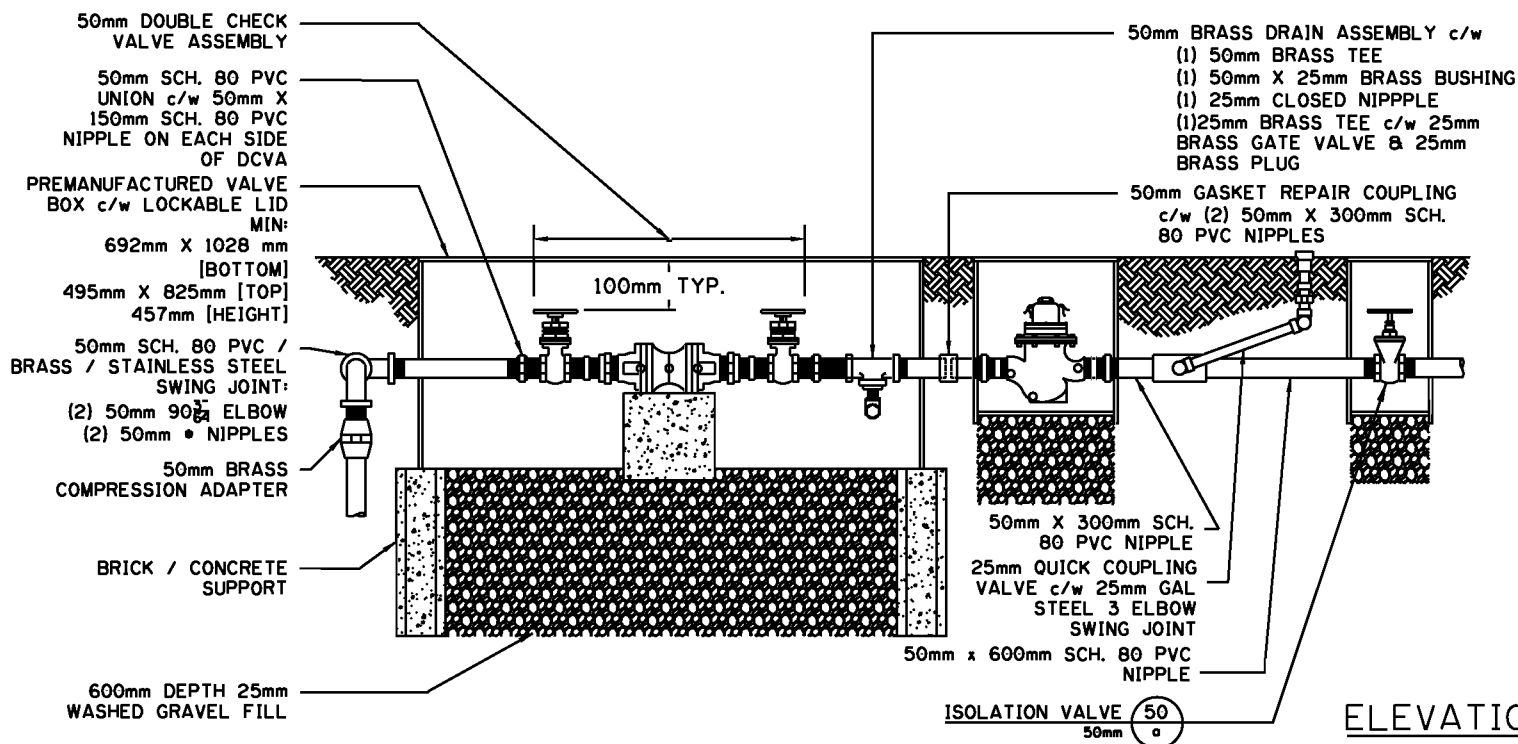
SCALE
N.T.S.
SHEET NO.
58
FILE NO.

NOTES:

- DOUBLE CHECK VALVE ASSEMBLY SHALL CONFORM TO CITY OF CALGARY WATERWORKS STANDARD SPECIFICATIONS, LATEST EDITION, AND BE CAPABLE OF BEING DRAINED OF WATER.
- EIGHT, 14 GAUGE, DIRECT BURIAL WIRES TO RUN FROM WATER METER TO CONTROLLER BOX.
- FOR BOX AND LID SPECIFICATIONS REFER TO DETAIL SHEETS *61 AND *62.
- STRAP AND THRUST BLOCK 90° HDPE ELBOW
- PAINT ALL FABRICATED STEEL WITH 2 COATS EPOXY PAINT, BLUE COLOUR.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.



PLAN



ELEVATION



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**100mm DOUBLE CHECK
VALVE ASSEMBLY**

DRAWN BY
W.B./MRM

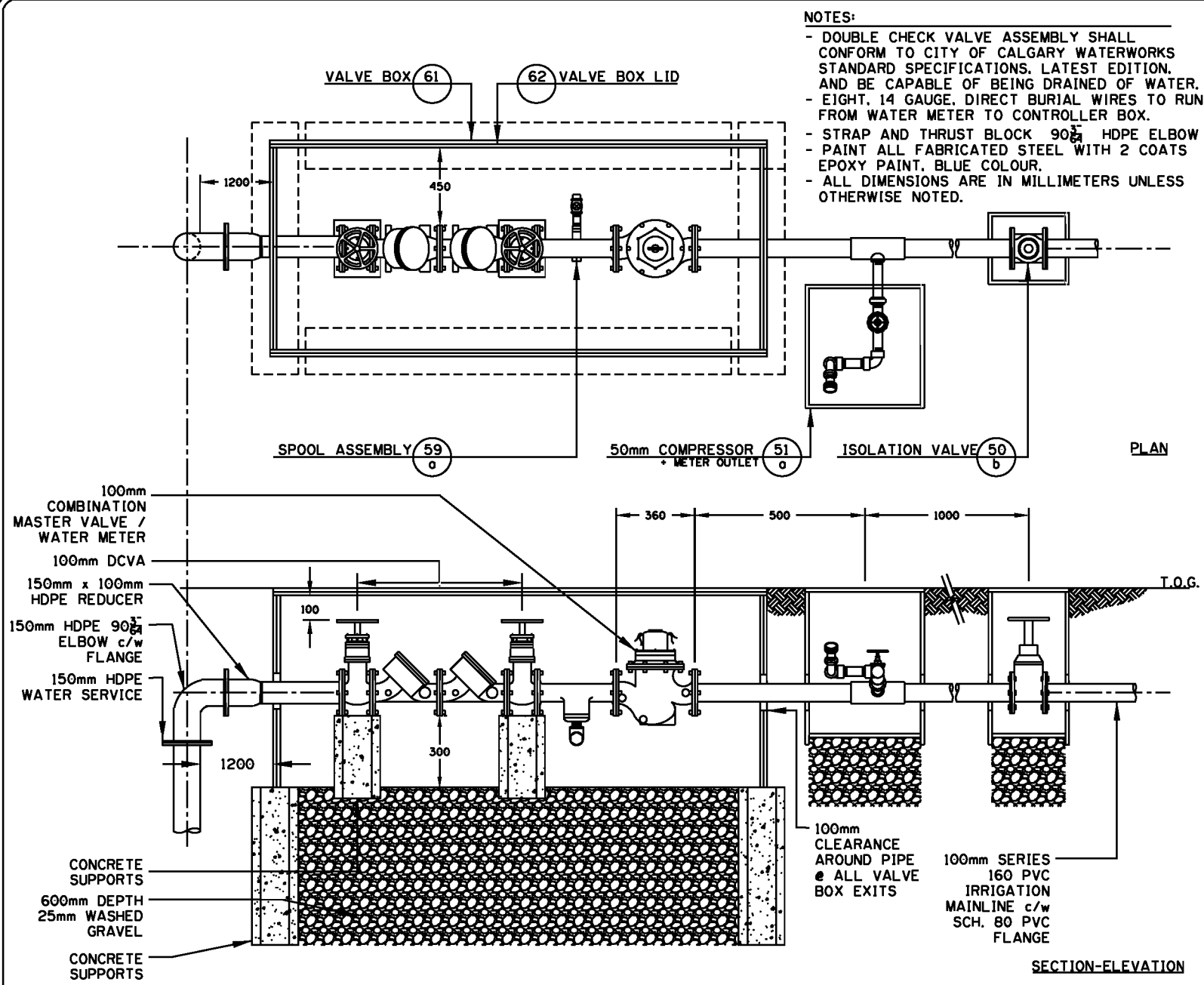
DATE
2006 05 23

DESIGN BY
DATE

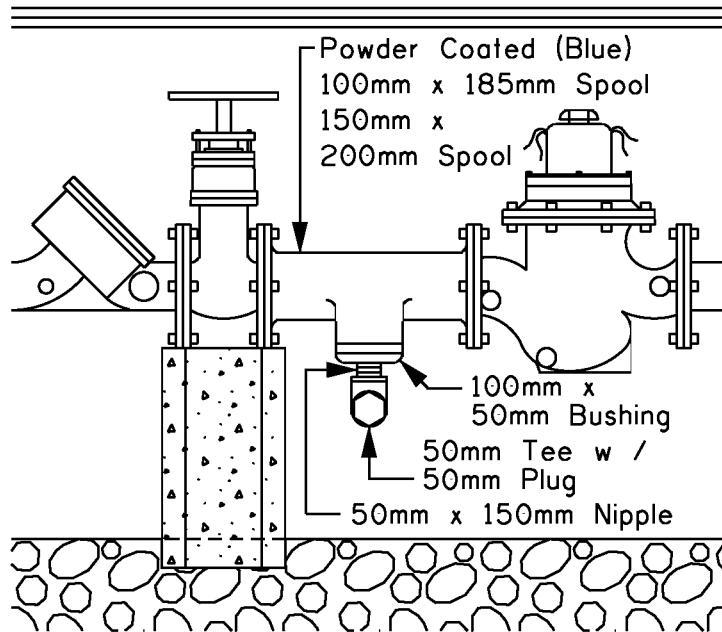
SCALE
N.T.S.

SHEET NO.
59

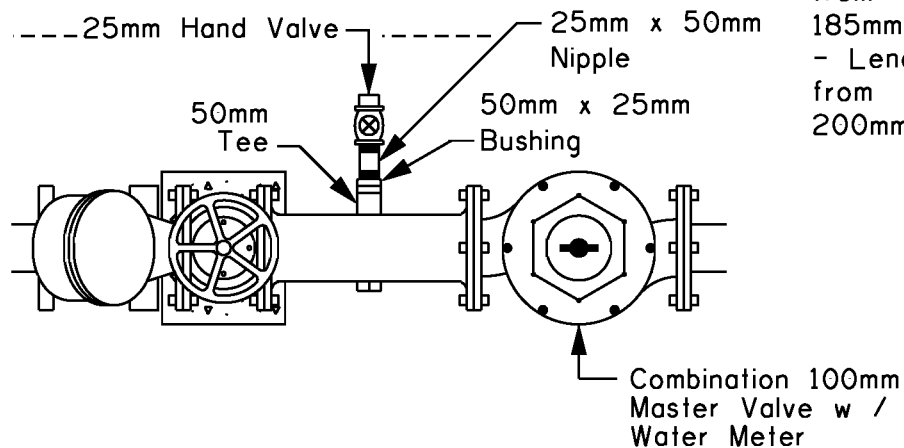
FILE NO.



- NOTES:**
- DOUBLE CHECK VALVE ASSEMBLY SHALL CONFORM TO CITY OF CALGARY WATERWORKS STANDARD SPECIFICATIONS, LATEST EDITION, AND BE CAPABLE OF BEING DRAINED OF WATER.
 - EIGHT, 14 GAUGE, DIRECT BURIAL WIRES TO RUN FROM WATER METER TO CONTROLLER BOX.
 - STRAP AND THRUST BLOCK 90° HDPE ELBOW
 - PAINT ALL FABRICATED STEEL WITH 2 COATS EPOXY PAINT, BLUE COLOUR.
 - ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.



ELEVATION



PLAN

NOTES:

- All dimensions are in millimetres unless otherwise noted.
- All 25mm Hand Valve Fittings are to be Sch 80 PVC, Brass or Stainless Steel
- Length of 100mm Spool from flange to flange is 185mm.
- Length of 150mm Spool from flange to flange is 200mm.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**100mm & 150mm DETAIL
OF SPOOL ASSEMBLY**

DRAWN BY

W.B.

DATE **2005 01 25**

DESIGN BY

DATE

SCALE

N.T.S.

SHEET NO.

59a

FILE NO.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**150mm DOUBLE CHECK
VALVE ASSEMBLY**

DRAWN BY
W.B./MRM

DATE
2006 05 23

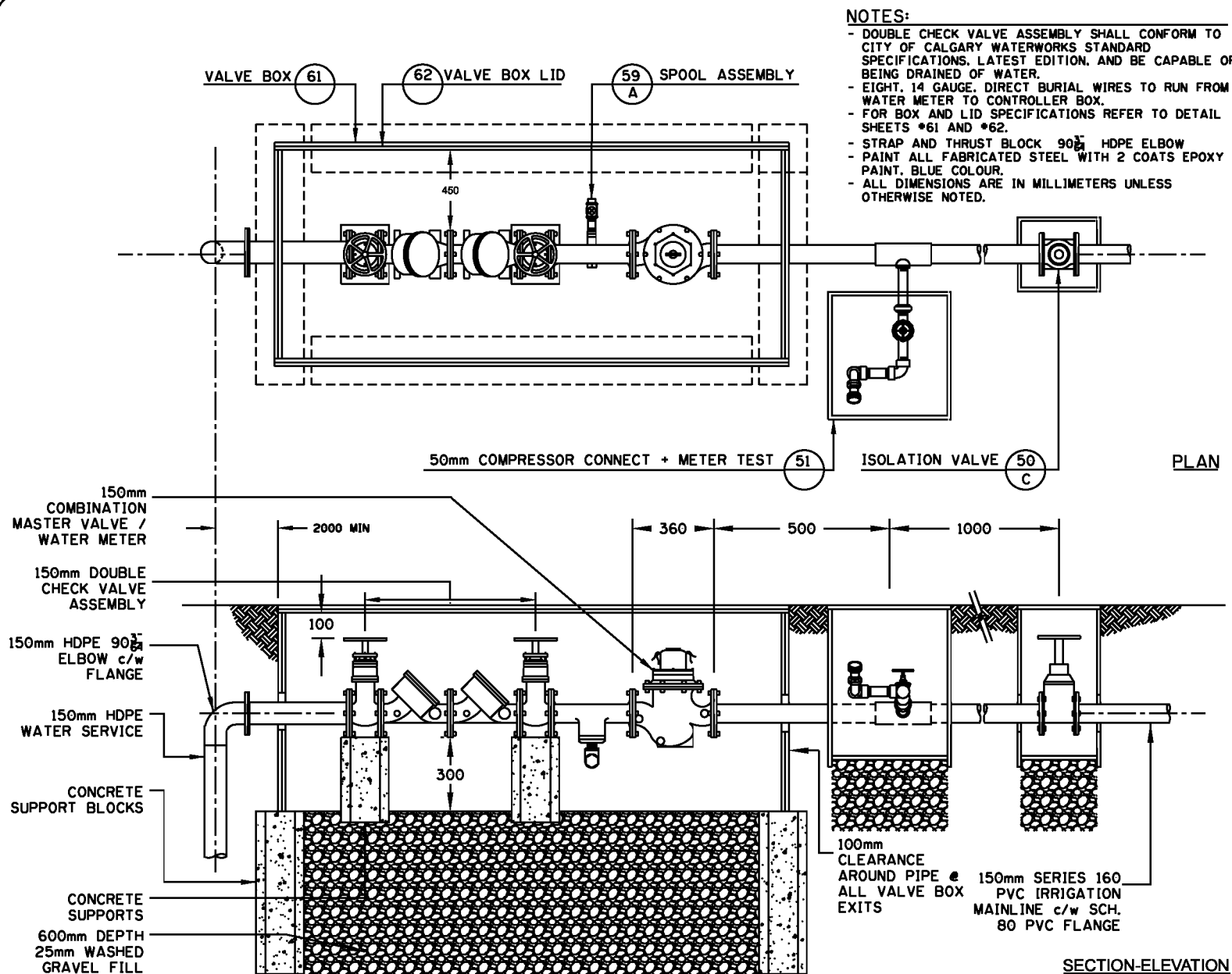
DESIGN BY

DATE

SCALE
N.T.S.

SHEET NO.
59b

FILE NO.





PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**200mm DOUBLE CHECK
VALVE ASSEMBLY**

DRAWN BY
W.B./MRM

DATE
2006 05 23

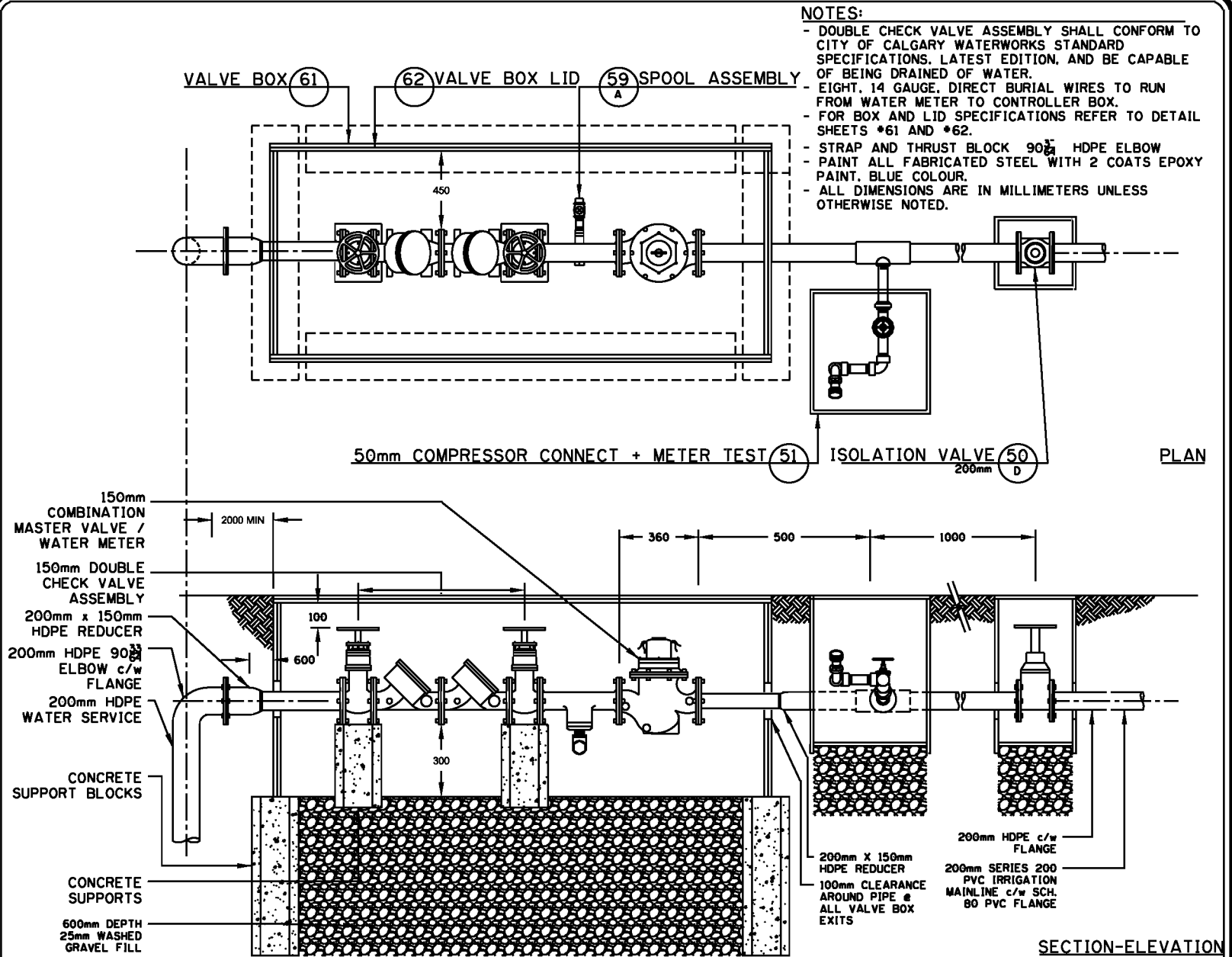
DESIGN BY

DATE

SCALE
N.T.S.

SHEET NO.
59c

FILE NO.



WEATHERPROOF METAL CONTROLLER
CABINET AS MANUFACTURED BY ACE
MFG. COMPANY LTD. NEMA 3 OR
EQUIVALENT. EUROPEC 1300MC CEMA
3R (DOUBLE DOOR)

LOCKABLE DOORS. HANDLES WITH
INTERNAL ROLLER MECHANISM.

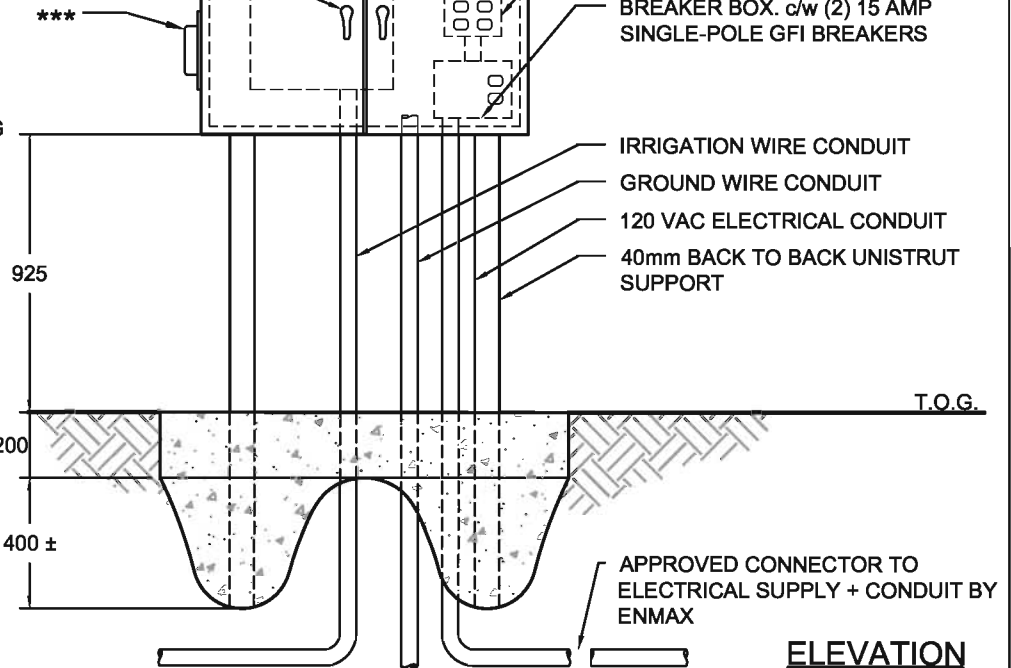
ELECTRICAL SURGE PROTECTOR BY
NORTHERN TECHNOLOGIES MODEL
TCS-HW

QUAD. RECEPTICAL c/w GFCI
PROTECTION

BREAKER BOX. c/w (2) 15 AMP
SINGLE-POLE GFI BREAKERS

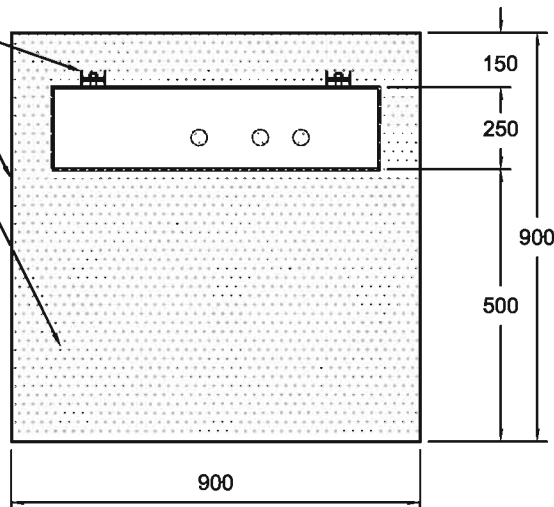
*** ALL IRRIGATION CONTROLLERS
/ CABINETS ARE TO BE SET UP
AS NON-METERED SITES.
EXCEPTIONS WHERE METERING
IS REQUIRED:

1. SITES THAT INVOLVE HEAVY
USAGE - STORM PONDS WITH
PUMPS AND / OR VALVE
OPERATIONS.
2. SITES WHERE SERVICES
HAVE BEEN ADDED FROM THE
CABINET TO OPERATE
LIGHTING ETC.
3. IF A THIRD PARTY IS
ACTUALLY THE MAJOR USER
OF ENERGY AND THE CITY OF
CALGARY IS THE SITE OWNER.



ELEVATION

UNISTRUT SUPPORTS BOLTED TO
OUTSIDE BACK OF CABINET
900 mm X 900 mm 20 M.Pa. CONCRETE
BASE
PROVIDE AMPLE CONCRETE SURFACE
FOR PERSONNEL OPERATING /
MAINTAINING CONTROLLER



PLAN

NOTE:

- CONTROLLER CABINET SHALL HAVE
ELECTRICAL SURGE PROTECTION AND
GROUNDED TO 5 ohms OR LESS
- CABINET SHALL BE:
< 15 ZONES 750mm X 750mm X 250mm
≥ 15 ZONES 900mm X 900mm X 300mm
- ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE NOTED.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**IRRIGATION CONTROLLER
CABINET**

DRAWN BY
CWM

DATE **2008 12 05**

DESIGN BY
JM

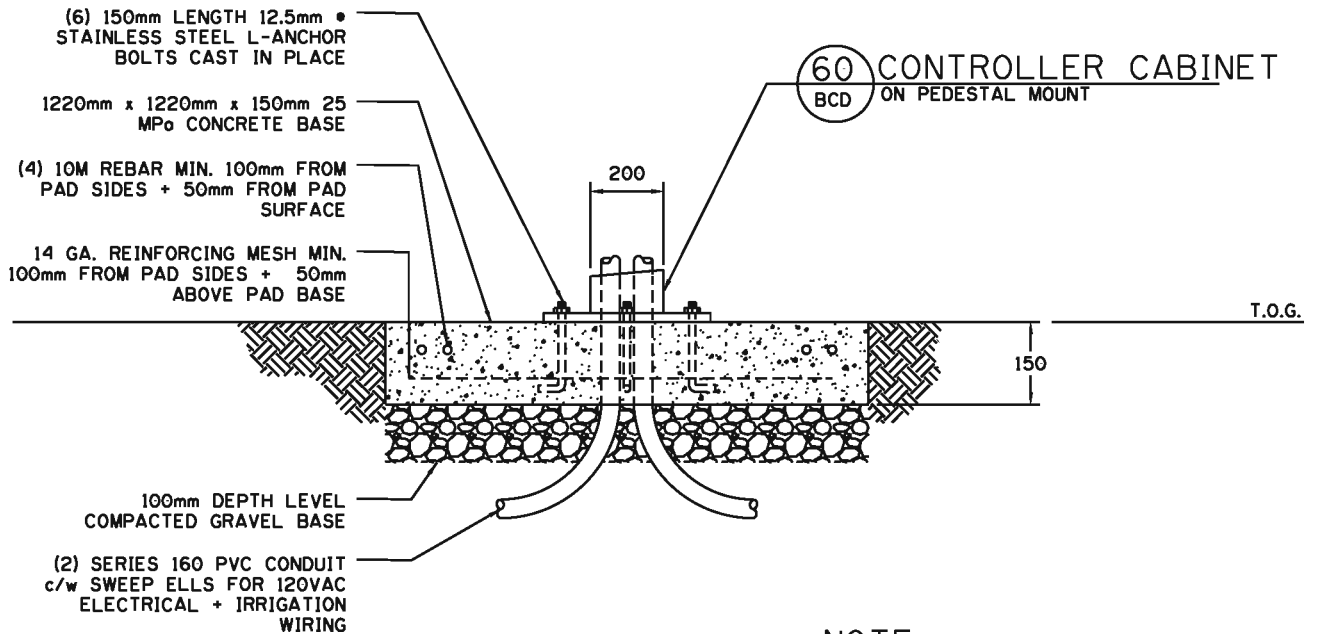
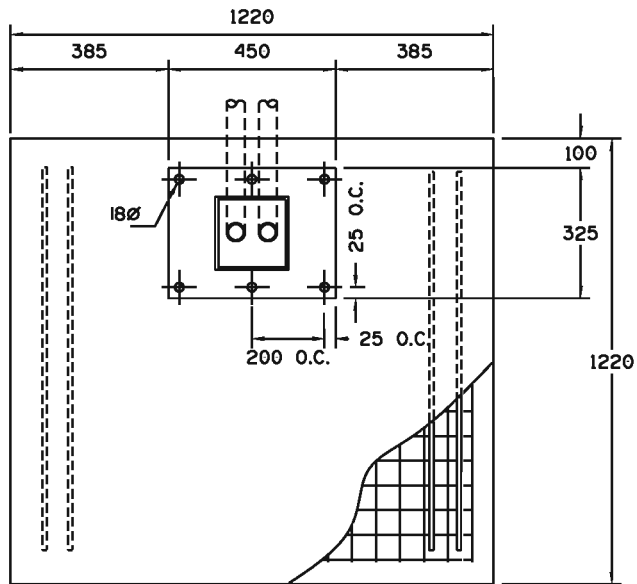
DATE

SCALE
N.T.S.

SHEET NO.
60

FILE NO.

PLAN



SECTION

NOTE:

- CONTRACTOR SHALL CONFIRM ALL BOLT TEMPLATES w/ CONTROL BOX MANUFACTURER PRIOR TO CONSTRUCTION OF CONCRETE PAD
- CONDUIT SHALL BE SIZED SO AS WIRES DO NOT EXCEED 40% ϕ OF PIPE DIAMETER
- VERIFY ANCHOR BOLT PLACEMENTS w/ BOLT TEMPLATE SUPPLIED BY PEDESTAL MANUFACTURER



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**CONCRETE PAD FOR
IRRINET /IRRICOM /SCORPIO
CONTROLLER CABINETS**

DRAWN BY
MRM

DATE **2006 05 24**

DESIGN BY

DATE

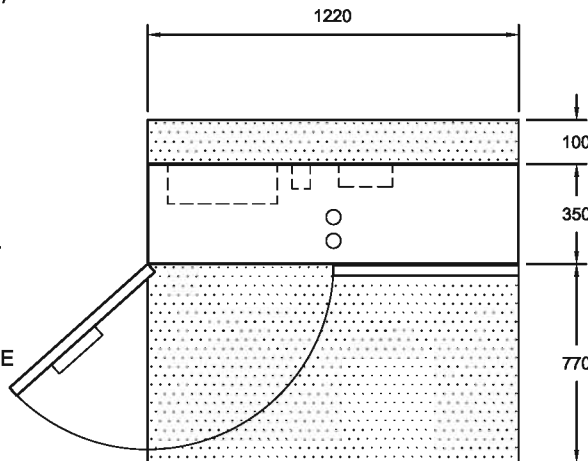
SCALE
N.T.S.

SHEET NO.
60a

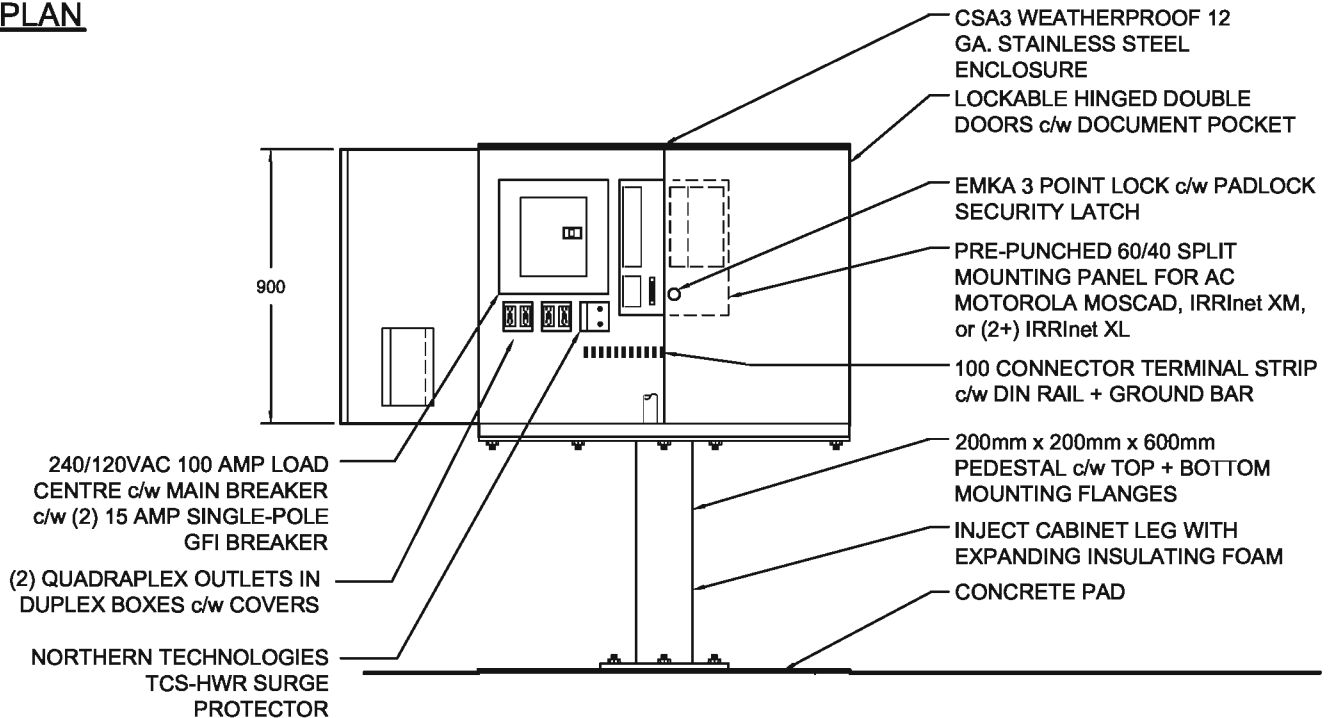
FILE NO.

ALL IRRIGATIONS CONTROLLERS / CABINETS ARE TO BE SET UP AS NON-METERED SITES.
EXCEPTION WHERE METERING IS REQUIRED:

1. SITES THAT INVOLVE HEAVY USAGE - STORM PONDS WITH PUMPS AND / OR VALVE OPERATIONS.
2. SITES WHERE SERVICES HAVE BEEN ADDED FROM THE CABINET TO OPERATE LIGHTING ETC.
3. IF A THIRD PARTY IS ACTUALLY THE MAJOR USER OF ENERGY AND THE CITY OF CALGARY IS THE SITE OWNER.



PLAN



ELEVATION

NOTE:

- CONTRACTOR SHALL CONFIRM ALL PEDESTAL BOLT TEMPLATES w/ CONTROL BOX MANUFACTURER PRIOR TO INSTALLATION
- ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED
- CABINET SHALL BE POWDER COATED w/ PFT-500-S8 ALMOND FINISH OR EQUIVALENT
- ALL COMPONENTS SHALL BE CSA APPROVED AND SUBJECT TO APPLICABLE NATIONAL, PROVINCIAL AND MUNICIPAL CODES / BYLAWS
- CONFORMS TO CARLYLE & CO. MODEL NO CCALMCD02



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE

**AC MOSCAD [AC IRRINET XM]
AC IRRInet XL CONTROL
CABINET AND PEDESTAL**

DRAWN BY
CWM

DATE **2008 12 05**

DESIGN BY
JM

DATE

SCALE
N.T.S.

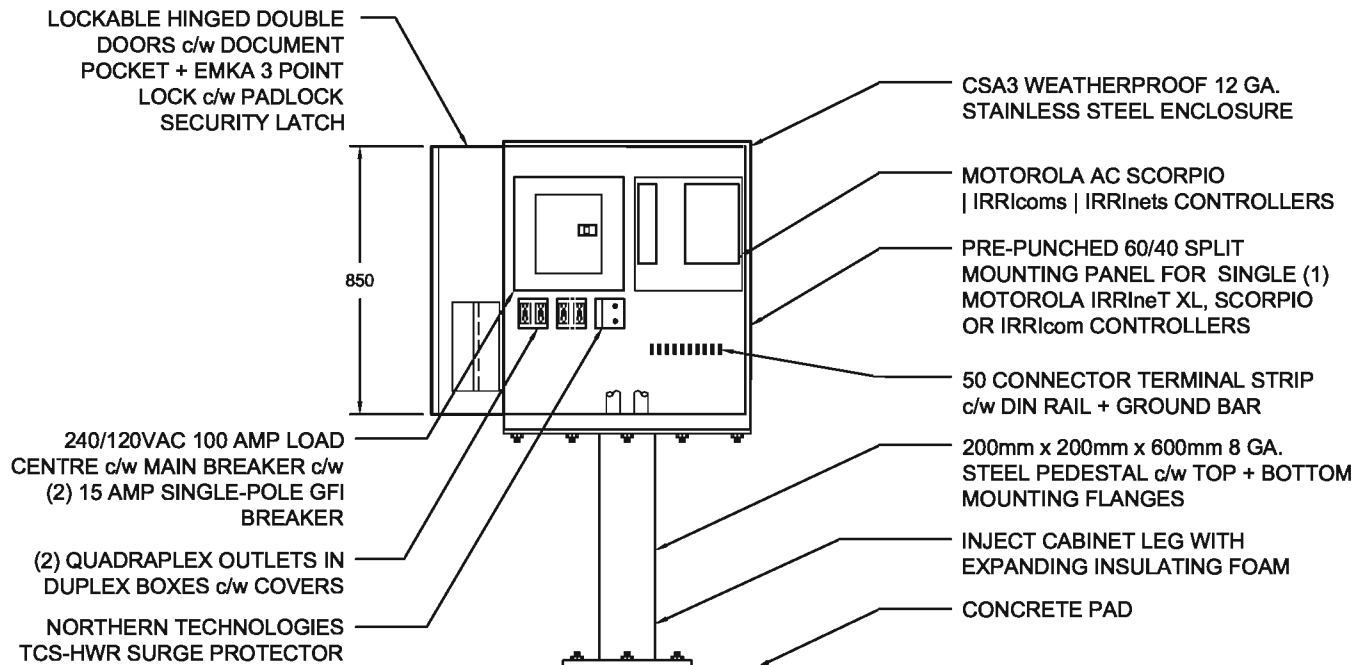
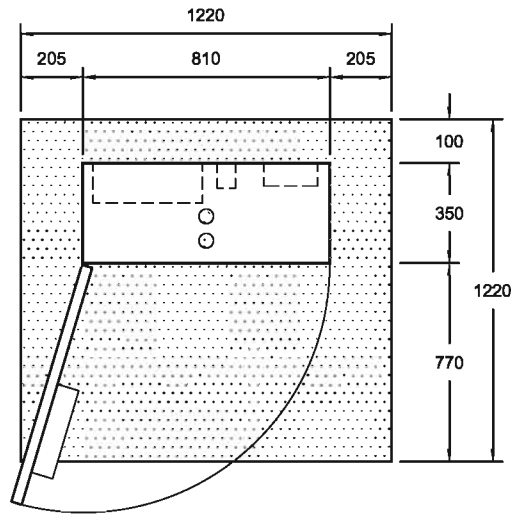
SHEET NO.
60b

FILE NO.

ALL IRRIGATIONS CONTROLLERS / CABINETS ARE TO BE SET UP AS NON-METERED SITES.
EXCEPTION WHERE METERING IS REQUIRED:

1. SITES THAT INVOLVE HEAVY USAGE - STORM PONDS WITH PUMPS AND / OR VALVE OPERATIONS.
2. SITES WHERE SERVICES HAVE BEEN ADDED FROM THE CABINET TO OPERATE LIGHTING ETC.
3. IF A THIRD PARTY IS ACTUALLY THE MAJOR USER OF ENERGY AND THE CITY OF CALGARY IS THE SITE OWNER.

PLAN



ELEVATION

NOTE:

- CONTRACTOR SHALL CONFIRM ALL PEDESTAL BOLT TEMPLATES w/ CONTROL BOX MANUFACTURER PRIOR TO INSTALLATION
- ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED
- CABINET SHALL BE POWDER COATED w/ PFT-500-S8 ALMOND FINISH OR EQUIVALENT
- ALL COMPONENTS SHALL BE CSA APPROVED AND SUBJECT TO APPLICABLE NATIONAL, PROVINCIAL AND MUNICIPAL CODES / BYLAWS
- CONFORMS TO CARLYLE & CO. MODEL NO CCALMCD03AC



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**AC SCORPIO [AC IRRicom]
AC IRRicom CONTROL
CABINET AND PEDESTAL**

DRAWN BY
CWM

DATE **2008 12 05**

DESIGN BY
DG
DATE

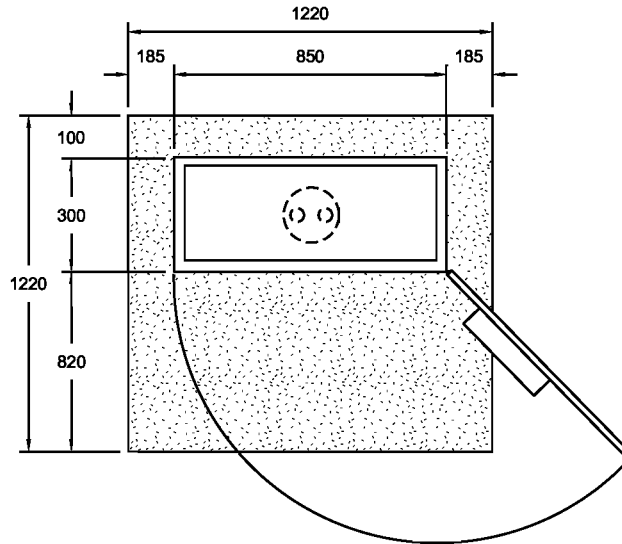
SCALE
N.T.S.

SHEET NO.
60c

FILE NO.

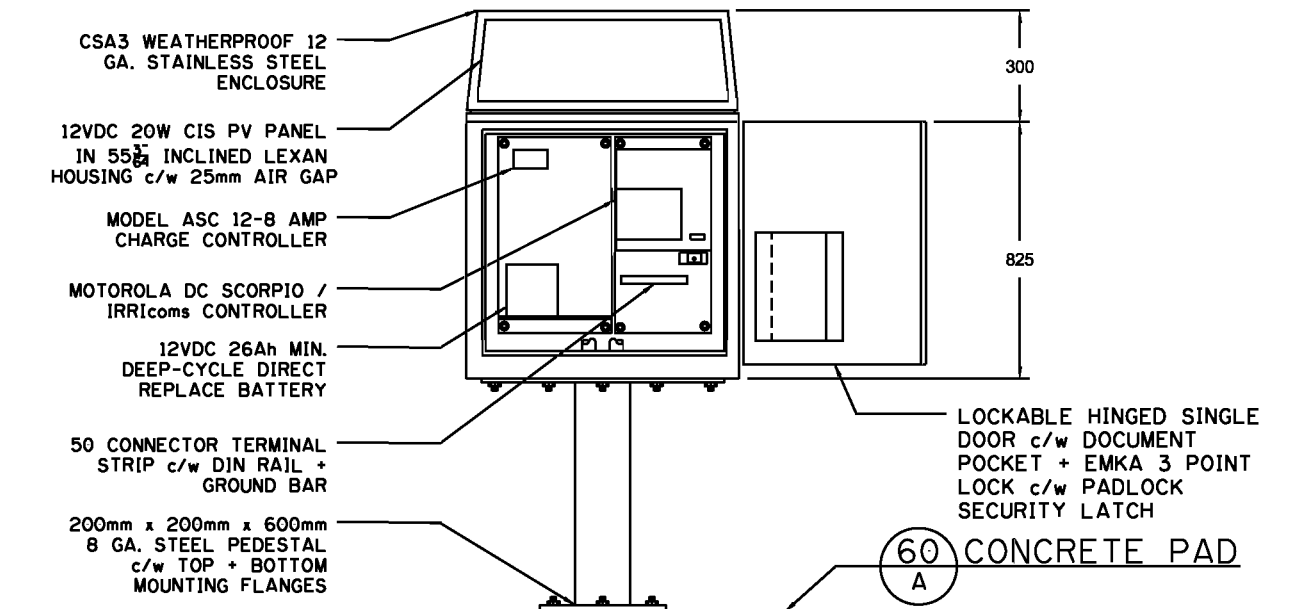


PLAN



ALL IRRIGATION CONTROLLERS / CABINETS ARE TO BE SET UP AS NON-METERED SITES. EXCEPTIONS WHERE METERING IS REQUIRED:

1. SITES THAT INVOLVE HEAVY USAGE - STORM PONDS WITH PUMPS AND / OR VALVE OPERATIONS.
2. SITES WHERE SERVICES HAVE BEEN ADDED FROM THE CABINET TO OPERATE LIGHTING, ETC.
3. IF A THIRD PARTY IS ACTUALLY THE MAJOR USER OF ENERGY AND THE CITY OF CALGARY IS THE SITE OWNER.



ELEVATION

NOTE:

- CONTRACTOR SHALL CONFIRM ALL PEDESTAL BOLT TEMPLATES w/ CONTROL BOX MANUFACTURER PRIOR TO INSTALLATION
- ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED
- CABINET SHALL BE POWDER COATED w/ PFT-500-S8 ALMOND FINISH OR EQUIVALENT
- ALL COMPONENTS SHALL BE CSA APPROVED AND SUBJECT TO APPLICABLE NATIONAL, PROVINCIAL AND MUNICIPAL CODES / BYLAWS
- CONFORMS TO CARLYLE & CO. MODEL NO CCALMCD03DC



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**DC IRRICOMS / DC SCORPIO
CONTROL CABINET +
PEDESTAL**

DRAWN BY
MRM

DATE **2008 01 29**

DESIGN BY

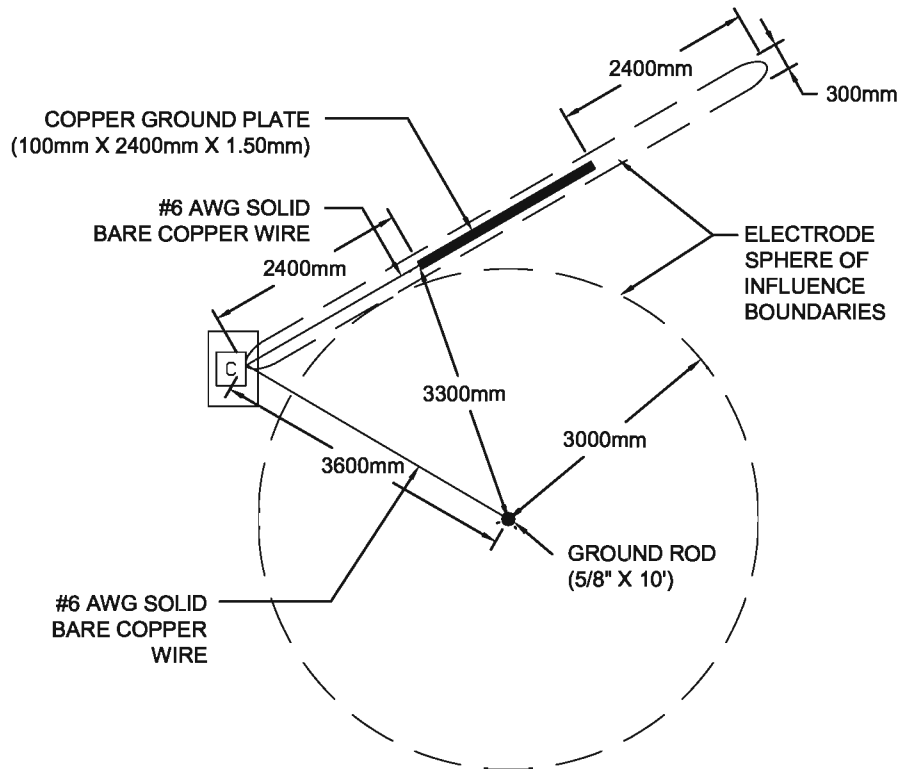
DATE

SCALE
N.T.S.

SHEET NO.
60d

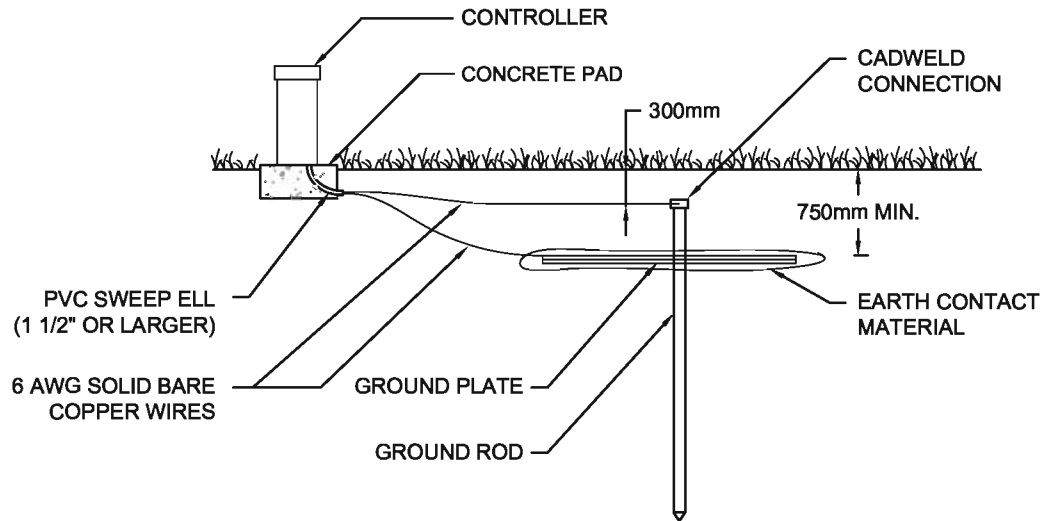
FILE NO.

TOP VIEW



DO NOT INSTALL ANY OTHER WIRES OR CABLE
WITHIN THE SPHERE OF INFLUENCE

SIDE VIEW



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**FIGURE 2-UP TO 64 STATIONS,
NON-ROCKY SOILS**

DRAWN BY
WYC

DATE **2008 12 05**

DESIGN BY
AS PER ASIC

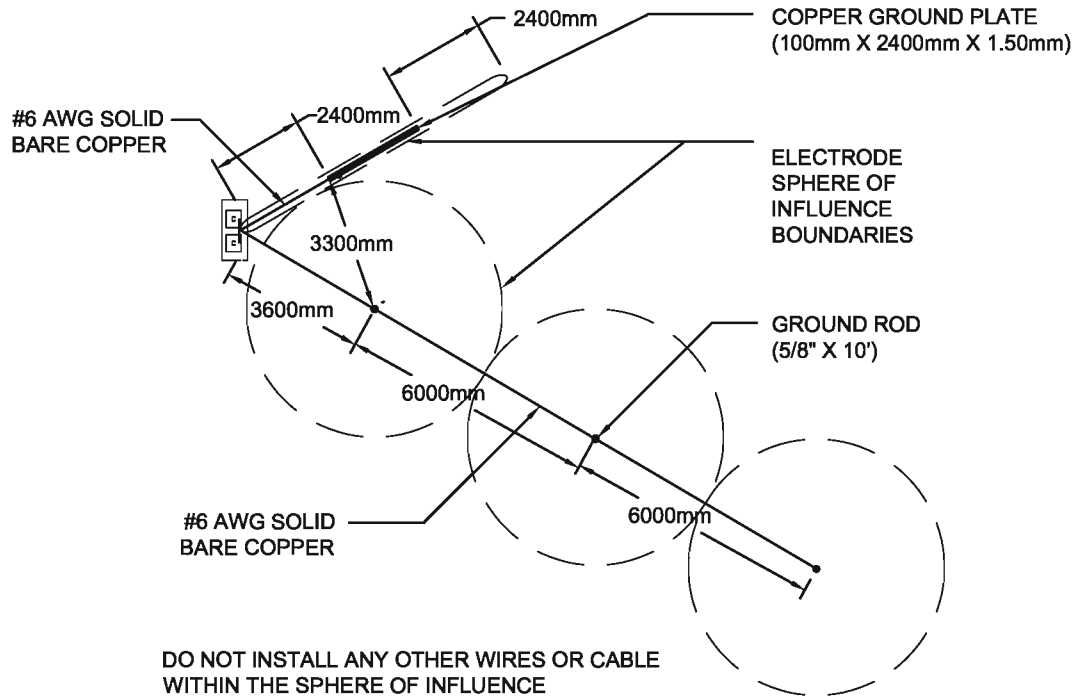
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SCALE
N.T.S.

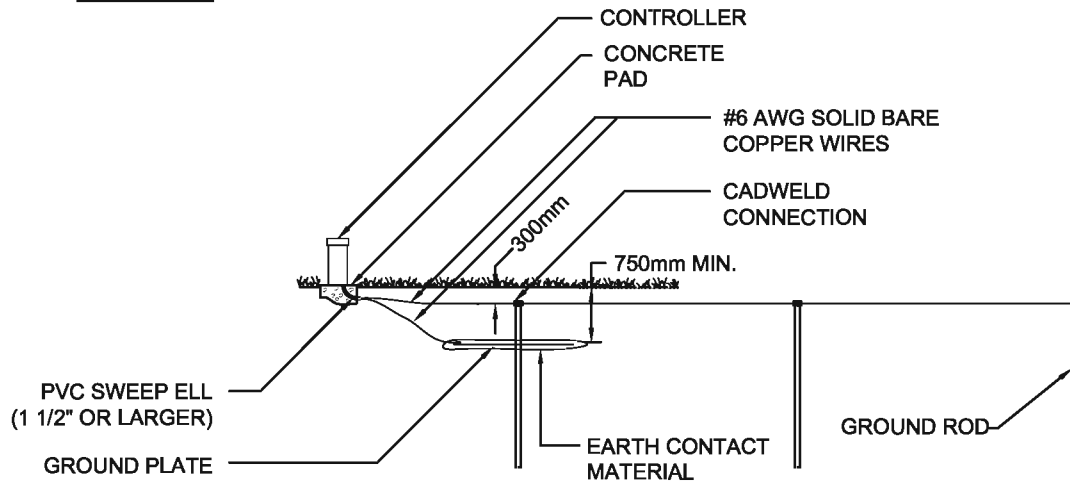
SHEET NO.
60e

FILE NO.

TOP VIEW



SIDE VIEW



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**FIGURE 4-UP TO 96 STATIONS,
NON-ROCKY SOILS**

DRAWN BY
WYC

DATE **2008 12 05**

DESIGN BY
AS PER ASIC

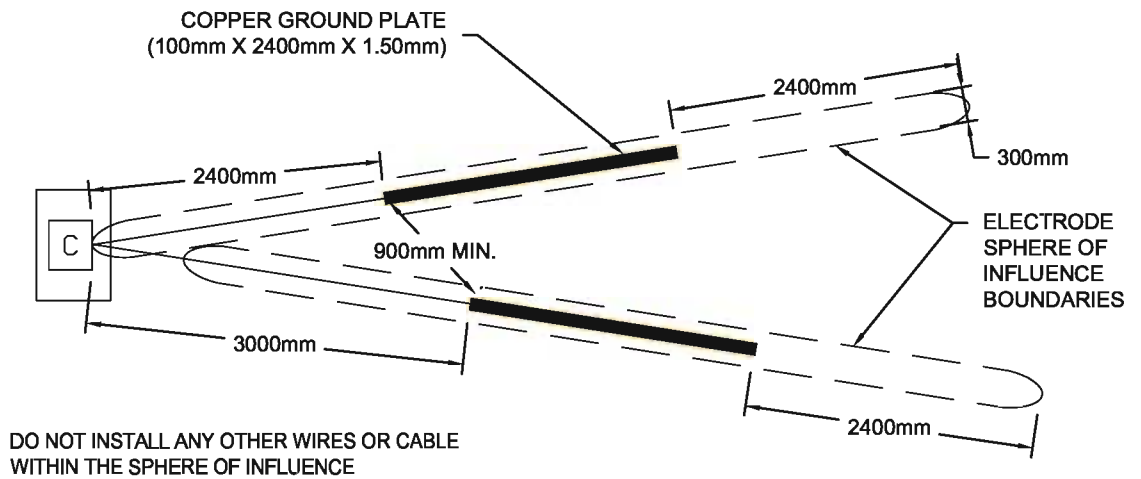
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N.T.S.

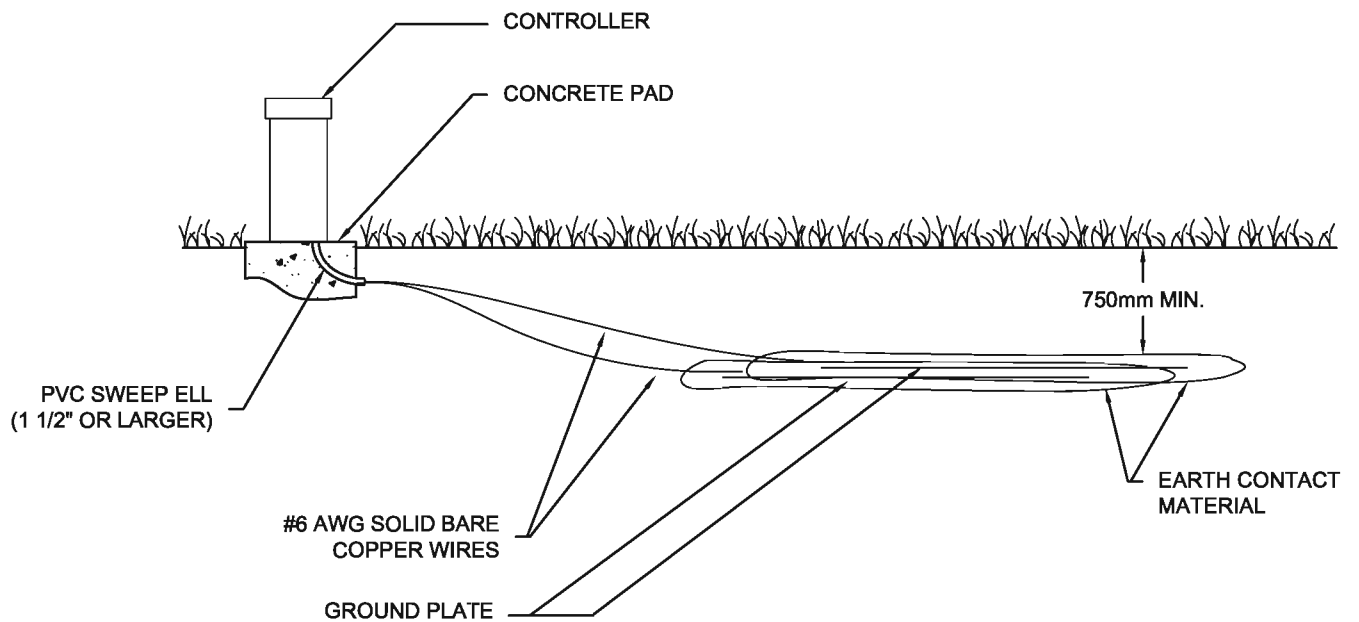
SHEET NO.
60f

FILE NO.

TOP VIEW



SIDE VIEW



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**FIGURE 3-UP TO 64 STATIONS,
ROCKY SOILS**

DRAWN BY
WYC

DATE **2008 12 05**

DESIGN BY
AS PER ASIC

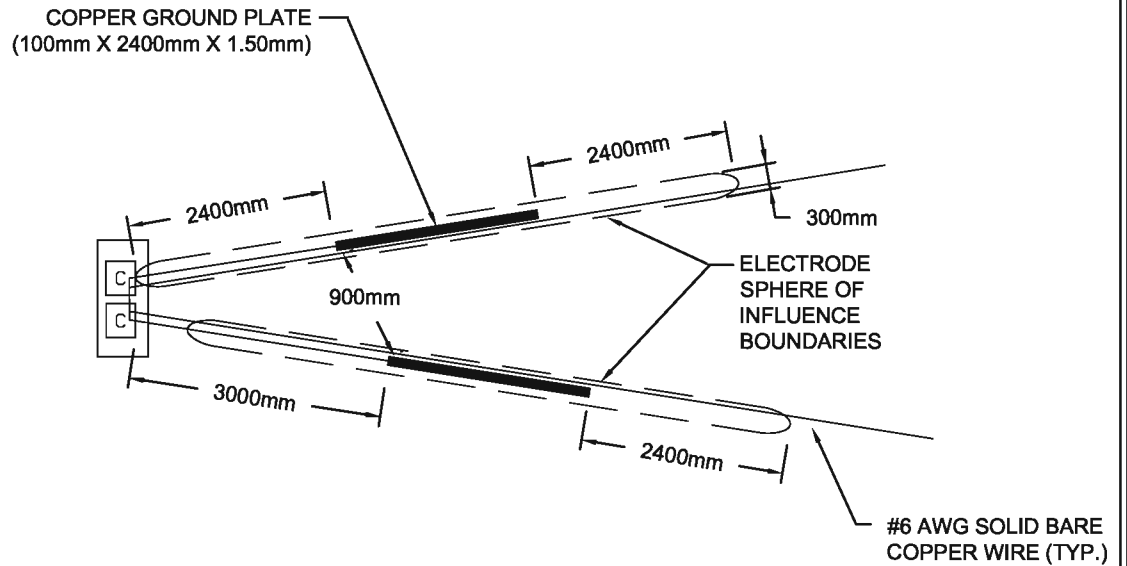
DATE

SCALE
N.T.S.

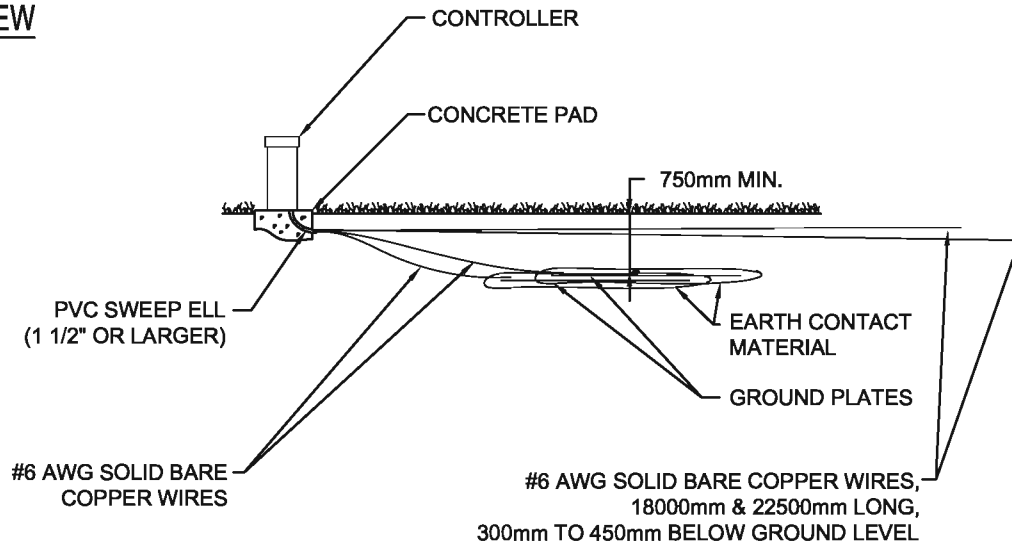
SHEET NO.
60g

FILE NO.

TOP VIEW



SIDE VIEW



* FOR SITES WITH MORE STATIONS CONTACT THE CITY OF CALGARY WATER MANAGEMENT COORDINATOR FOR DESIGN INFORMATION



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**UP TO 96 STATIONS,
ROCKY SOILS**

DRAWN BY
WYC

DATE **2008 12 05**

DESIGN BY
AS PER ASIC

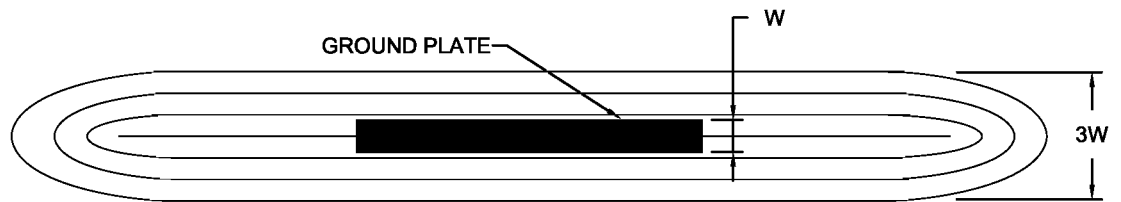
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SCALE
N.T.S.

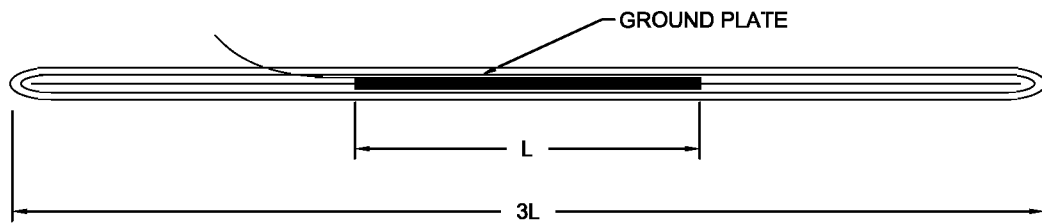
SHEET NO.
60h

FILE NO.

TOP VIEW



SIDE VIEW



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**GROUND PLATE
SPHERE OF INFLUENCE**

DRAWN BY
WYC

DATE **2008 12 05**

DESIGN BY
AS PER ASIC

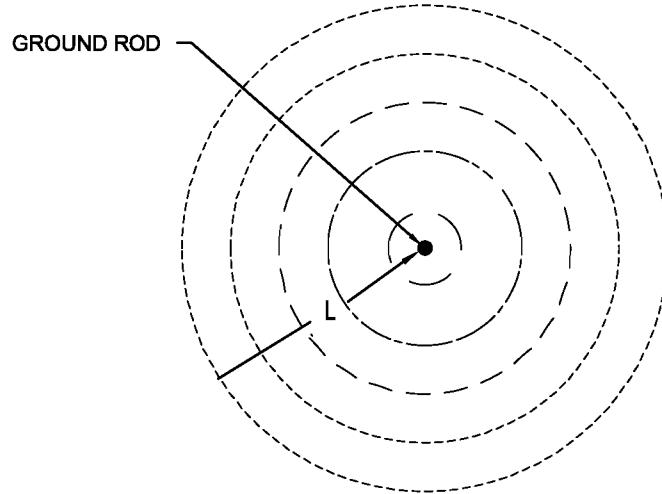
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SCALE
N.T.S.

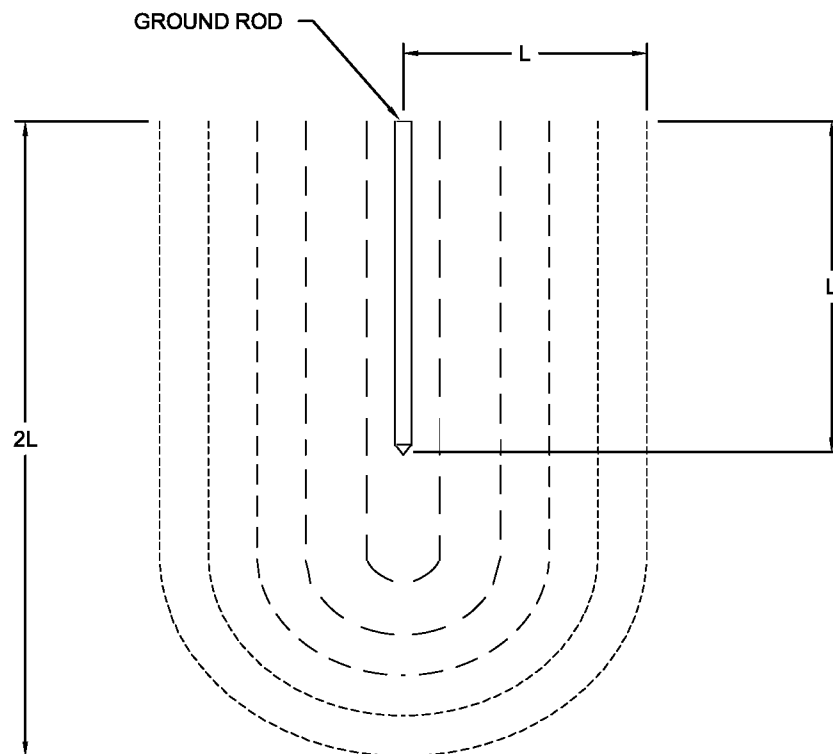
SHEET NO.
60i

FILE NO.

TOP VIEW



SIDE VIEW



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**GROUND ROD
SPHERE OF INFLUENCE**

DRAWN BY
WYC

DATE **2008 12 05**

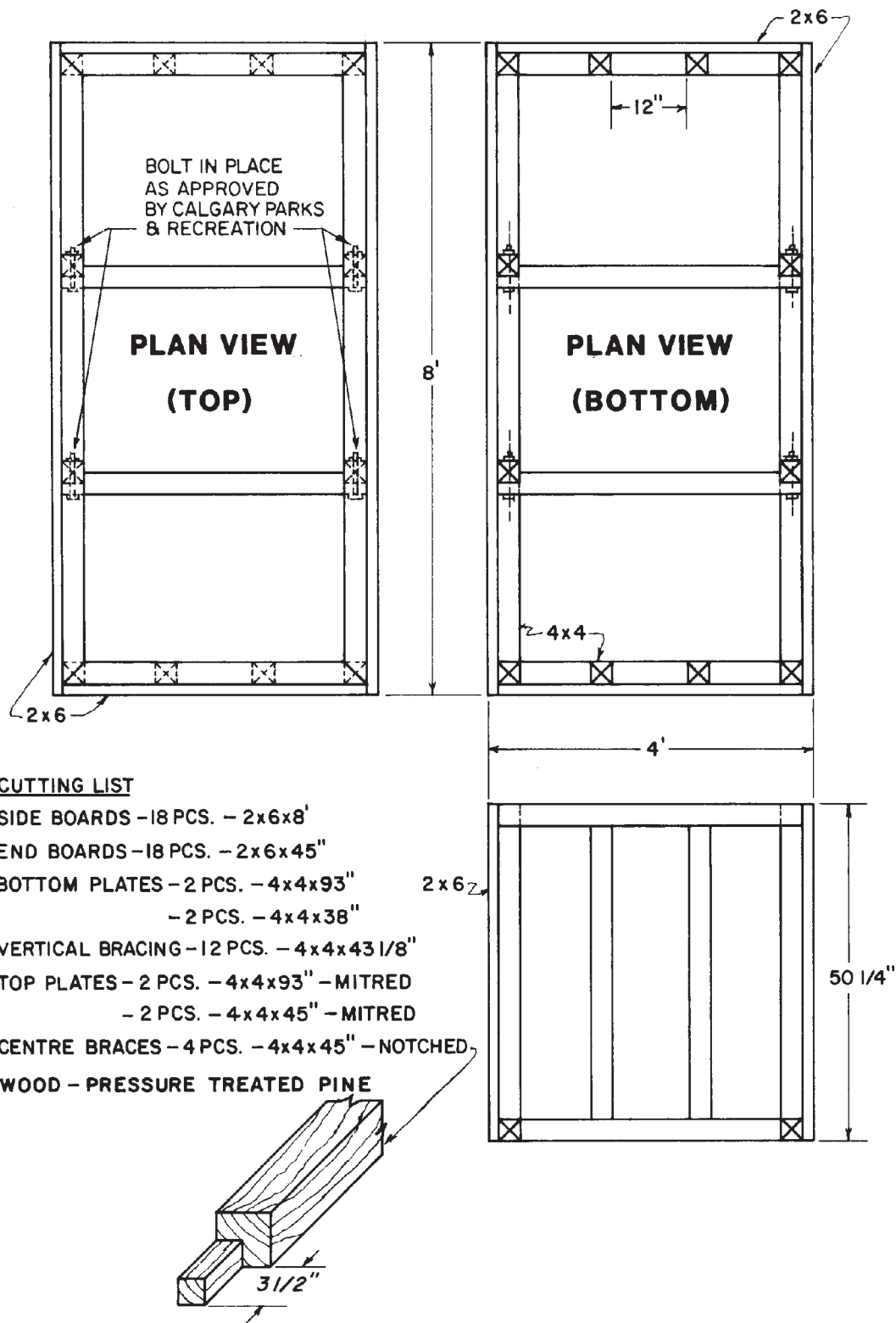
DESIGN BY
AS PER ASIC

DATE

SCALE
N.T.S.

SHEET NO.
60j

FILE NO.



METRIC



THE CITY OF
CALGARY
PARKS

PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
VALVE BOX DETAILS FOR
100mm DOUBLE CHECK
VALVE ASSEMBLY

DRAWN BY

DATE

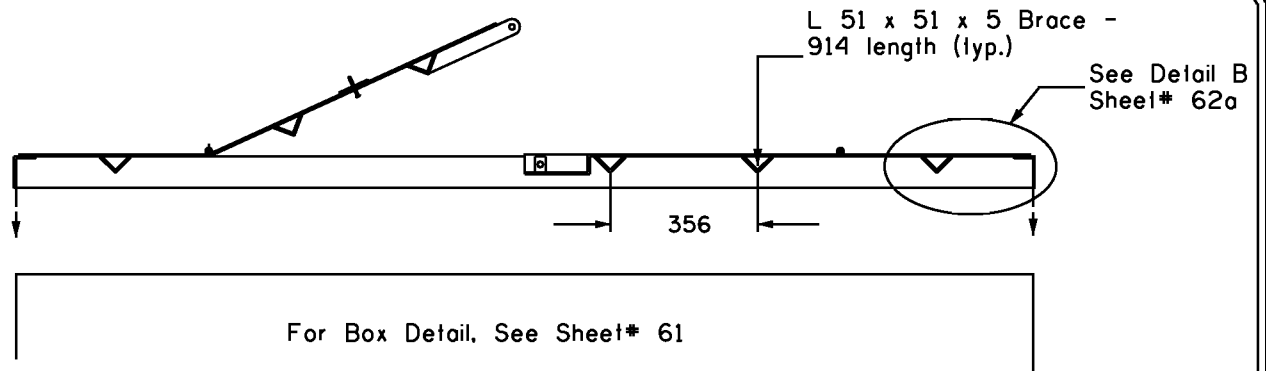
DESIGN BY

DATE

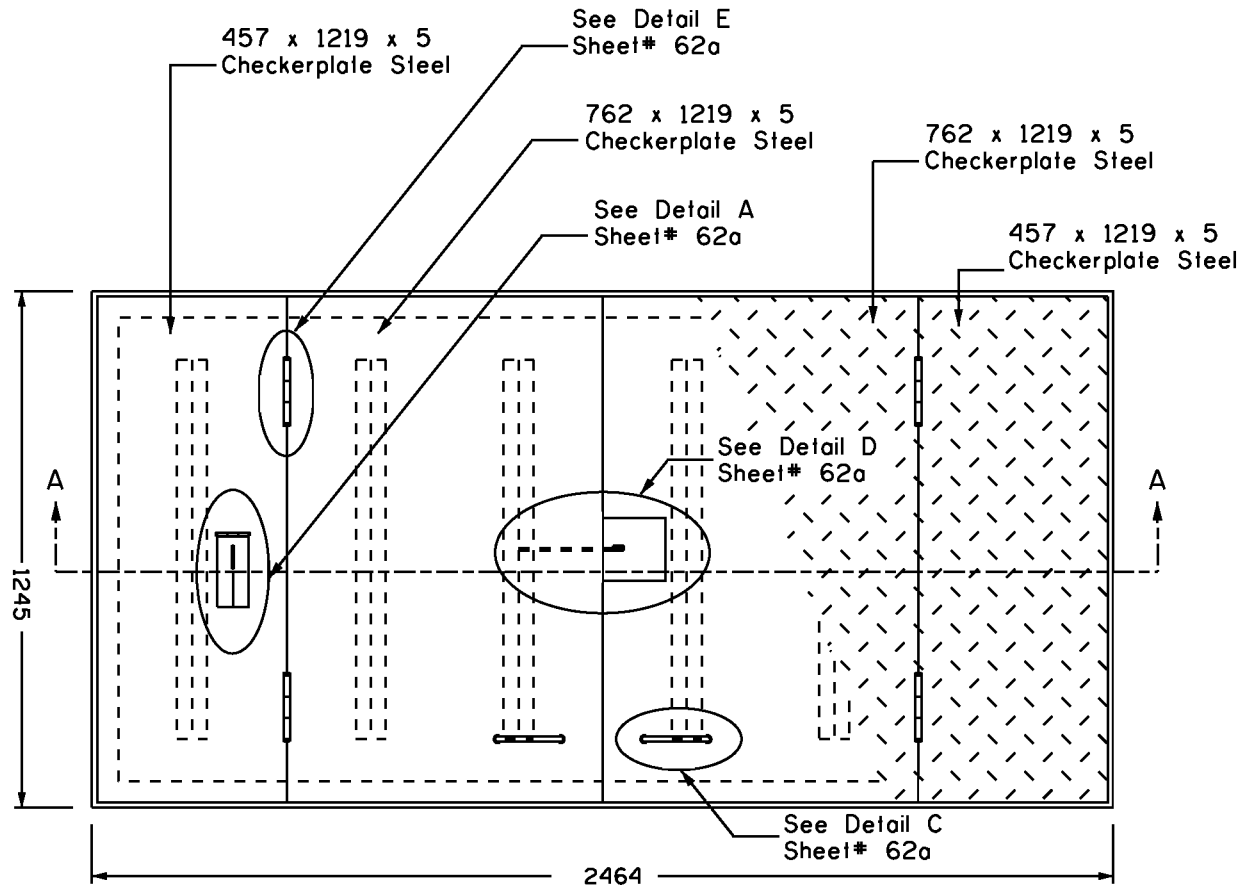
SCALE
N.T.S.

SHEET NO.
61

FILE NO.



SECTION A - A



PLAN VIEW

NOTES:

- Finish to be Red Oxide Primer
- Meter Viewing Port location is schematic and is anticipated to be above the meter.
- All dimensions are in millimetres unless otherwise noted.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**100mm DOUBLE CHECK
VALVE BOX LID
WITH METER VIEWING LID**

DRAWN BY

MM /WB

DATE **2006 05 19**

DESIGN BY

DATE

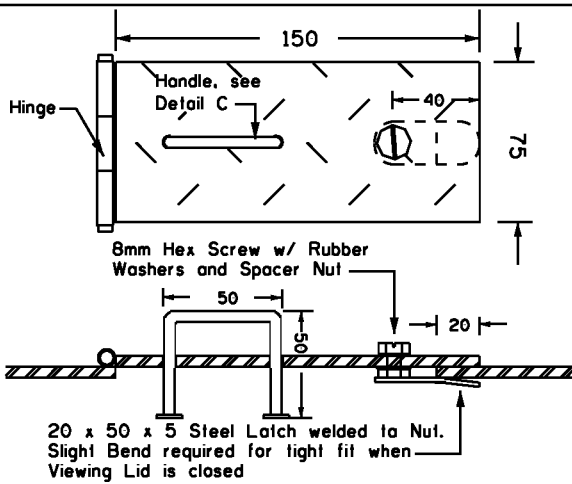
SCALE

N.T.S.

SHEET NO.

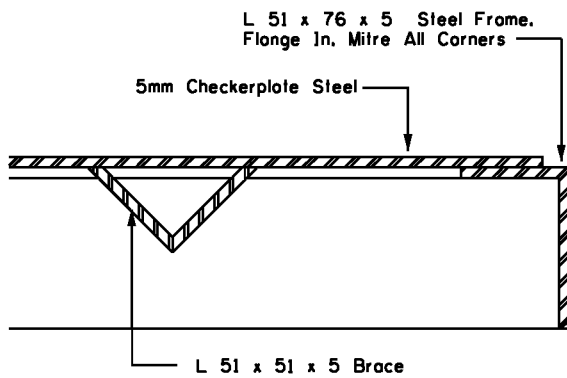
62

FILE NO.

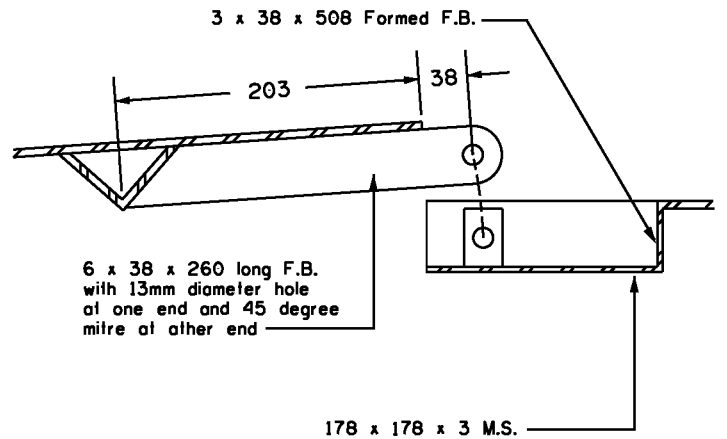
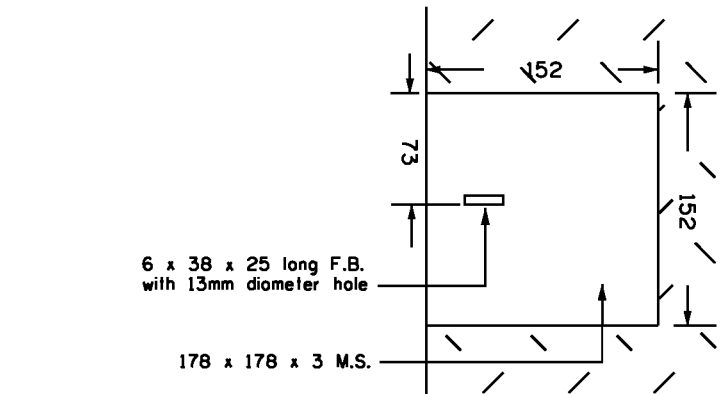


NOTE: Meter Viewing Lid to be located directly above anticipated location for meter.

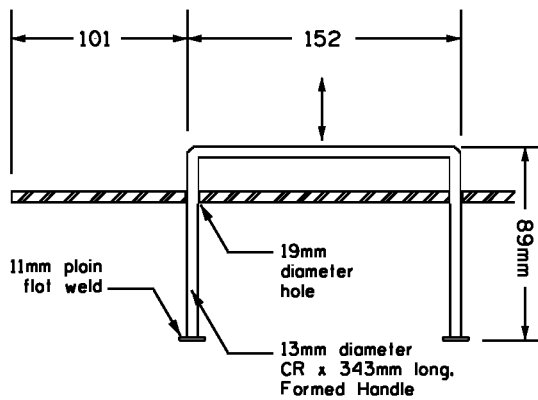
DETAIL A - METER VIEWING LID



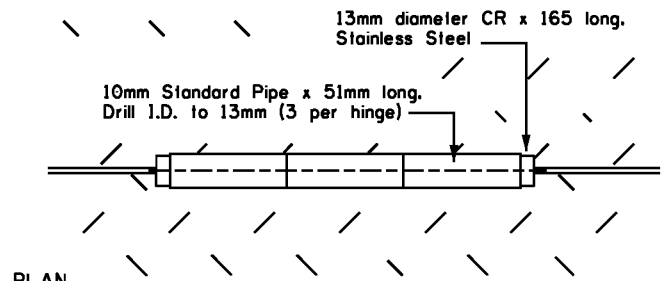
DETAIL B - FRAME



DETAIL D - DOOR LATCH



DETAIL C - DOOR HANDLE



PLAN

SECTION

DETAIL E - DOOR HINGE



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE

**DETAILS FOR 100mm DOUBLE
CHECK VALVE BOX LID WITH
METER VIEWING LID**

DRAWN BY
MM

DATE **2005 02 02**

DESIGN BY

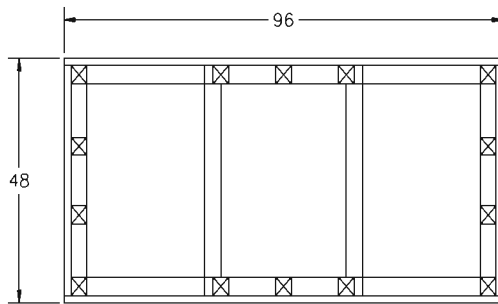
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SCALE
N.T.S.

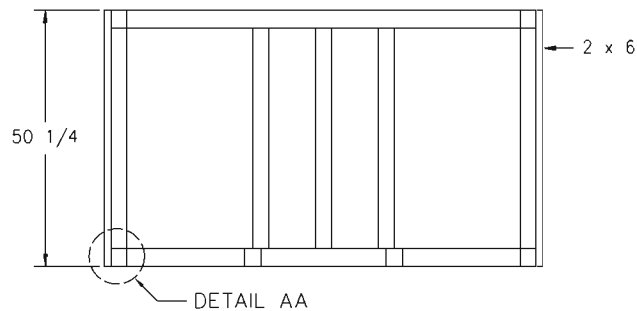
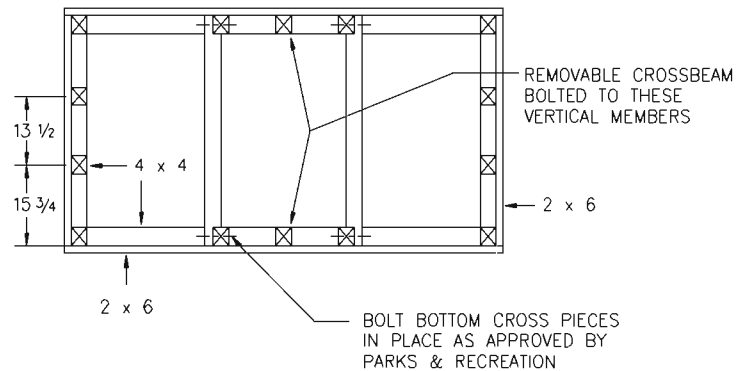
SHEET NO.
62a

FILE NO.

PLAN VIEW



PLAN VIEW BOTTOM

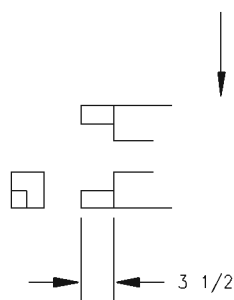


SIDE VIEW

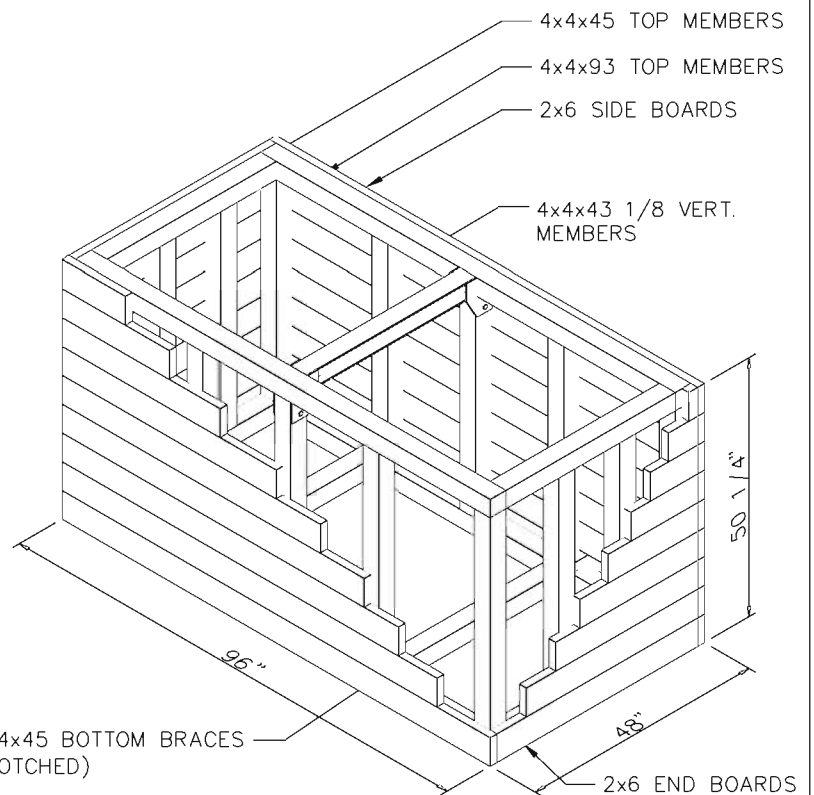
MATERIAL: WOOD - PRESSURE TREATED PINE

CUTTING LIST:

- SIDE BOARDS: (18) PCS - 2 x 6 x 96
- END BOARDS: (18) PCS - 2 x 6 x 45
- BOTTOM MEMBERS: (2) PCS - 4 x 4 x 93
- (2) PCS - 4 x 4 x 38
- VERTICAL MEMBERS: (14) PCS - 4 x 4 x 43 1/8
- TOP MEMBERS: (2) PCS - 4 x 4 x 93 MITRED
- (2) PCS - 4 x 4 x 45 MITRED
- BOTTOM BRACES: (2) PCS - 4 x 4 x 45 NOTCHED



DETAIL AA



3 DIMENSIONAL VIEW



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**VALVE BOX DETAILS FOR
100mm DOUBLE CHECK
VALVE ASSEMBLY**

DRAWN BY
WYC

DATE **2008 12 05**

DESIGN BY
JM

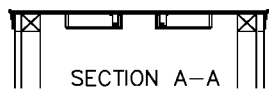
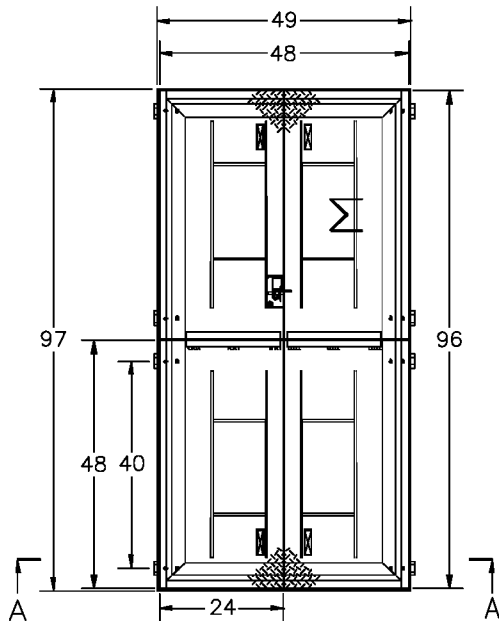
DATE **2008 12 05**

SCALE
N.T.S.

SHEET NO.
62b

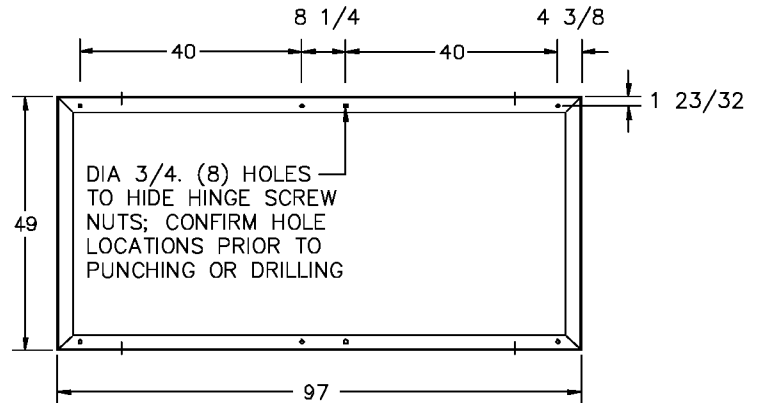
FILE NO.

GENERAL ARRANGEMENT

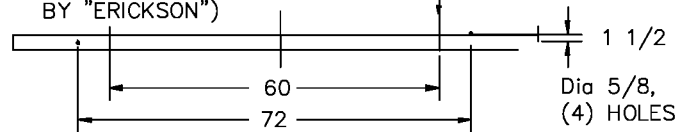


FOR MAIN WOODEN BOX c/w
CROSSBEAM. SEE SHEET #2

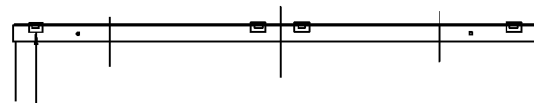
MAIN ANGULAR FRAME



WELD (4) O-RINGS
TO SIDES OF
FRAME SO IT
CAN BE LIFTED
(PART No. 09111
BY "ERICKSON")



304SS ANGLE FRAME 3 x 3 x 1/4



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**FRAME DETAIL FOR 100mm
DOUBLE CHECK VALVE BOX
ALUMINUM LID**

DRAWN BY
WYC

DATE **2008 12 05**

DESIGN BY
JM

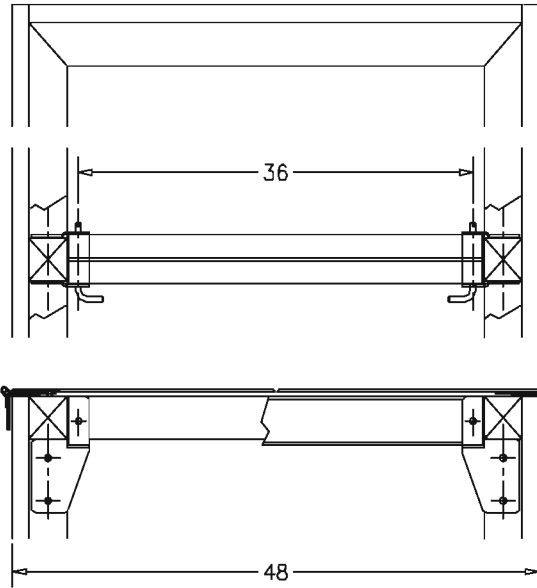
DATE **2008 12 05**

SCALE
N.T.S.

SHEET NO.
62c

FILE NO.

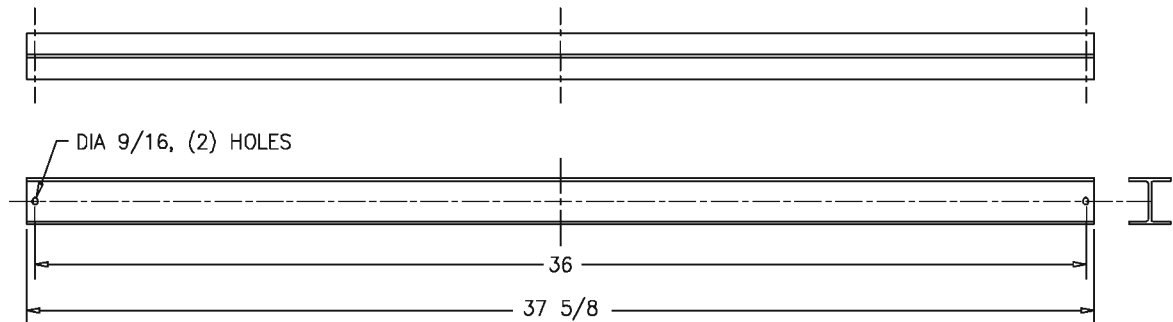
CROSSBEAM DETAIL



USE 1/2NC x 5 LG BOLTS C/W
HEX NUTS TO FASTEN CROSSBEAM
SUPPORT BRACKETS TO CENTER
VERTICAL MEMBERS OF THE WOODEN BOX
BOLTS & NUTS TO BE MIN GRADE 5, PLATED

CROSSBEAM

6061-T6 ALUMINUM H-BEAM 4 x 4 x 1/4



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**VALVE BOX CROSSBEAM
SUPPORT DETAILS FOR
100mm DOUBLE CHECK
VALVE ASSEMBLY**

DRAWN BY
WYC

DATE **2008 12 05**

DESIGN BY
JM

DATE **2008 12 05**

SCALE
N.T.S.

SHEET NO.
62d

FILE NO.

304SS PLATE 3/16

5 1/4

4 1/4

3 1/4

2 1/4

135°

1/4

9 1/2

7 1/2

6

3 1/2

5

1

1 1/2

3 1/4

RAD 3/8, TYPICAL

DIA 9/16, (3) HOLES

6 1/2

2 1/2

1/4

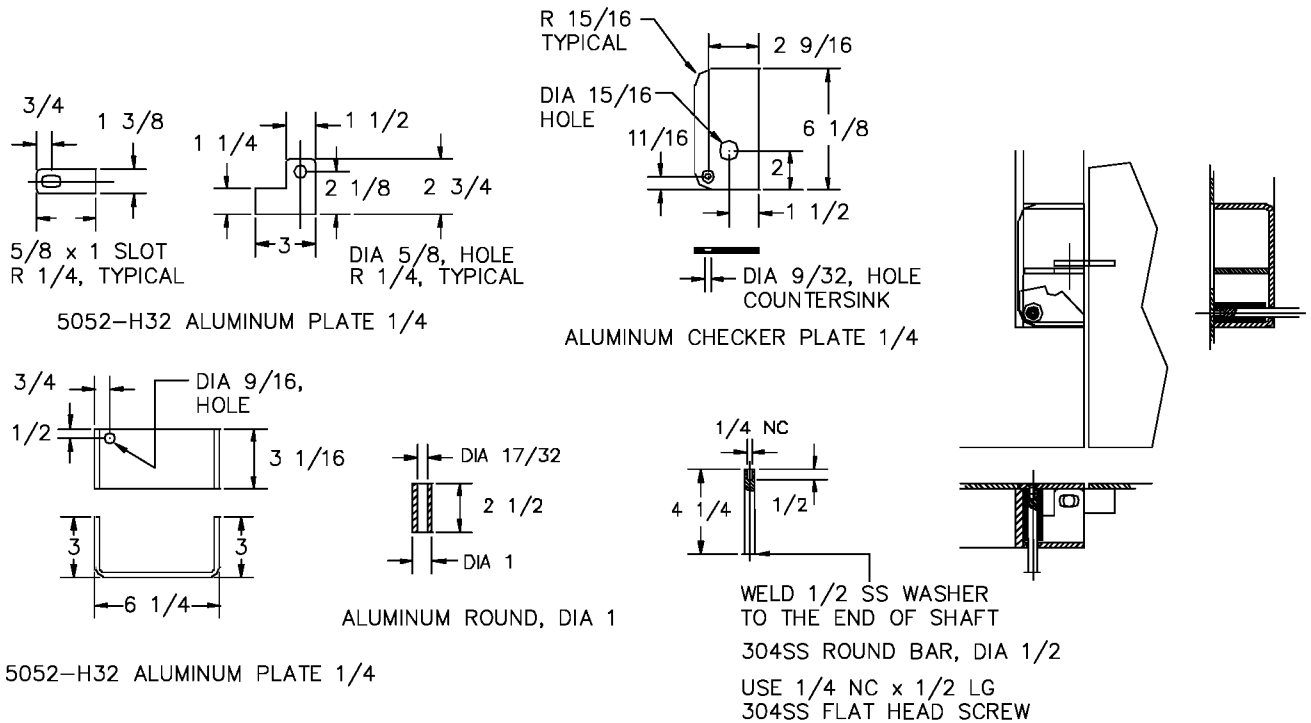
DIA 1/8, HOLE

Technical drawing of a rectangular block. The top horizontal edge is dimensioned as $4 \frac{1}{8}$. The right vertical edge is dimensioned as $1 \frac{7}{8}$. The drawing includes hidden lines to show the internal structure of the block.

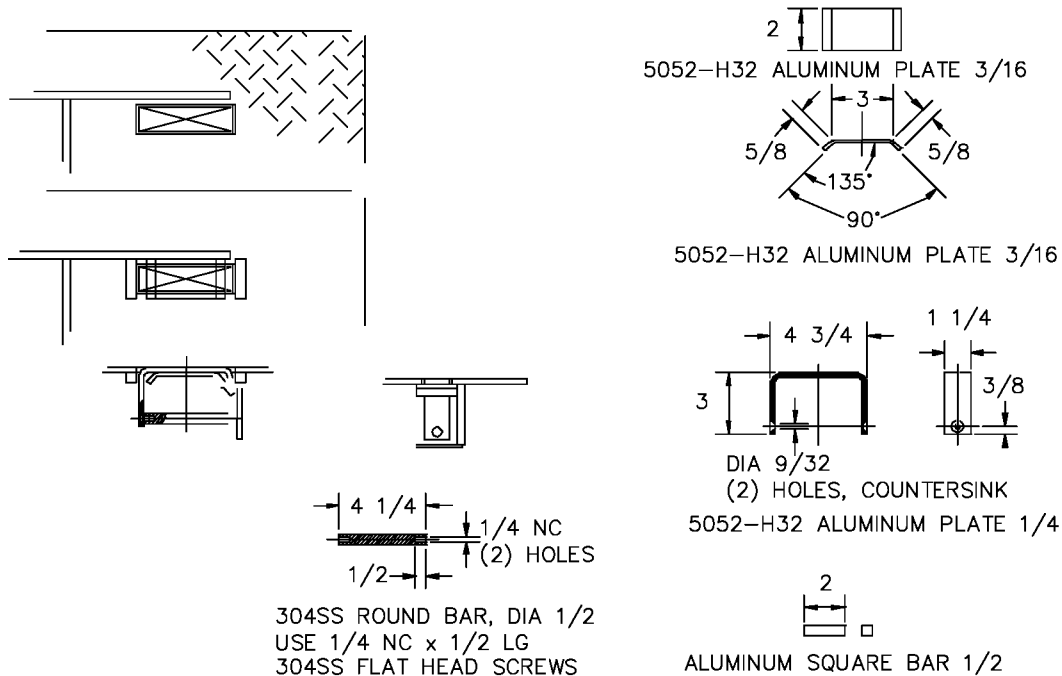
Technical drawing of a rectangular block. The top horizontal dimension is labeled $4 \frac{1}{8}$. The right vertical dimension is labeled 4.



PADLOCK BOX DETAIL



HANDLE DETAIL



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**DETAILS FOR 100mm DOUBLE
CHECK VALVE BOX
ALUMINUM LID**

DRAWN BY
WYC

DATE **2008 12 05**

DESIGN BY
JM

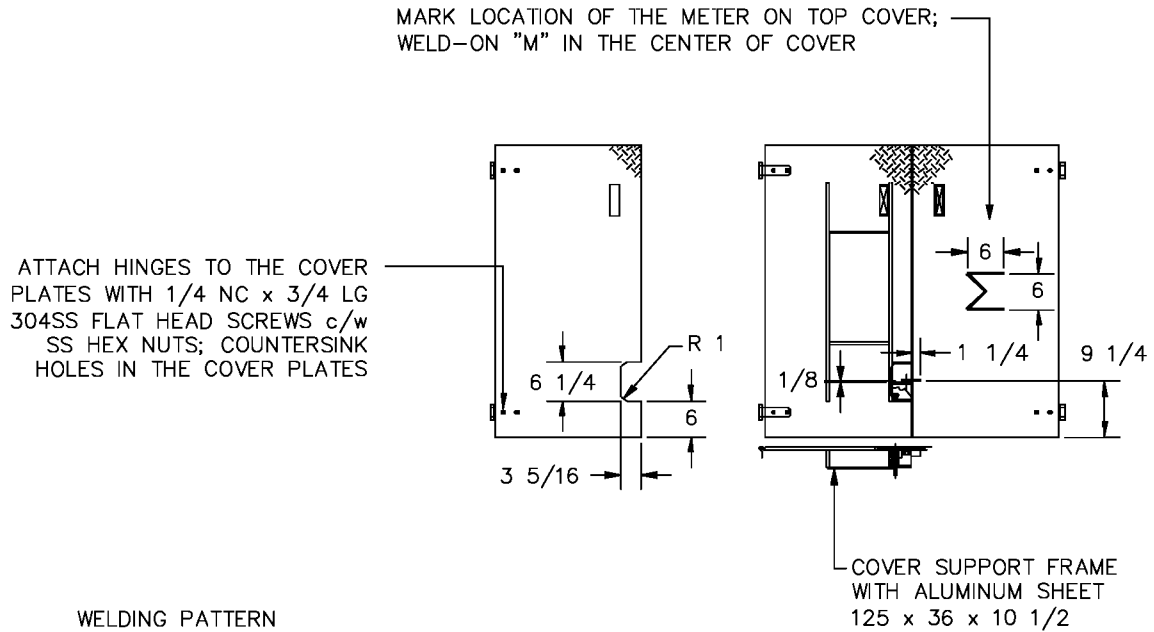
DATE **2008 12 05**

SCALE
N.T.S.

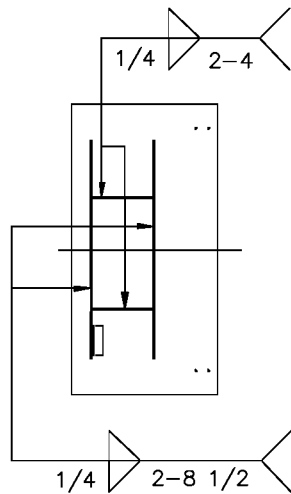
SHEET NO.
62f

FILE NO.

COVER PLATES DETAIL



WELDING PATTERN
BOTTOM VIEW OF COVER



BRAKE EDGES OF EACH COVER PLATE
1/4 ALUMINUM CHECKER PLATE



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
**DETAILS FOR 100mm DOUBLE
CHECK VALVE BOX
ALUMINUM LID**

DRAWN BY
WYC

DATE **2008 12 05**

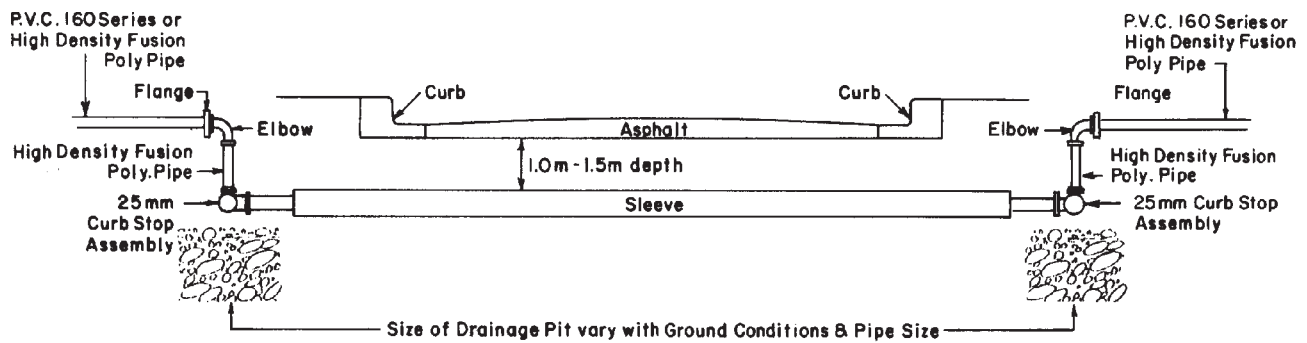
DESIGN BY
JM

DATE **2008 12 05**

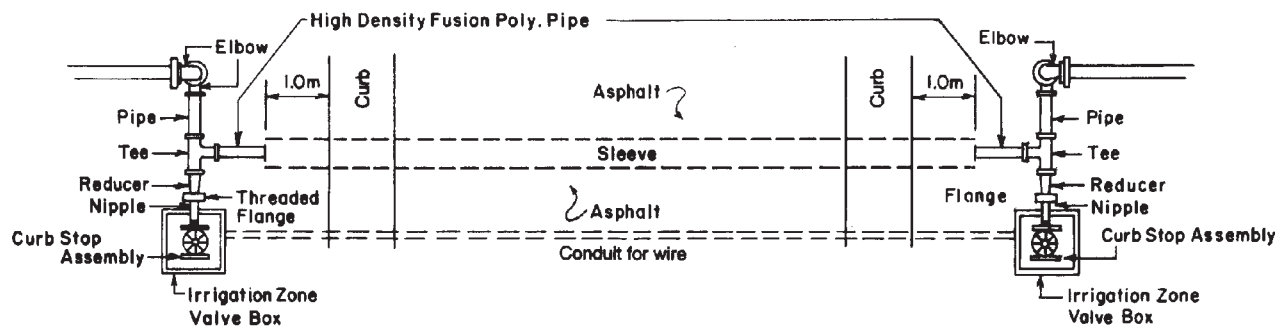
SCALE
N.T.S.

SHEET NO.
62g

FILE NO.



Elevation



Plan View

Note - All dimensions are in metres unless otherwise noted.



THE CITY OF
CALGARY
PARKS

PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
ROAD CROSSING
HIGH DENSITY POLY

DRAWN BY

W.B.

DATE 1997 03 08

DESIGN BY

D.LaF.

DATE 1997 03 08

SCALE

N.T.S.

SHEET NO.

63

FILE NO.

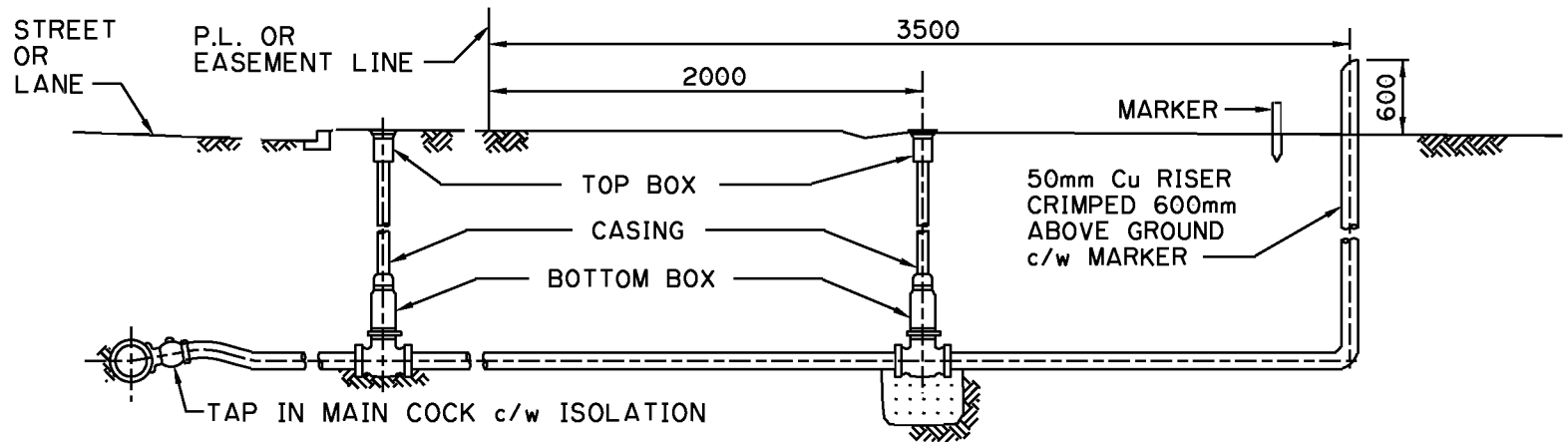


THE CITY OF
CALGARY
PARKS

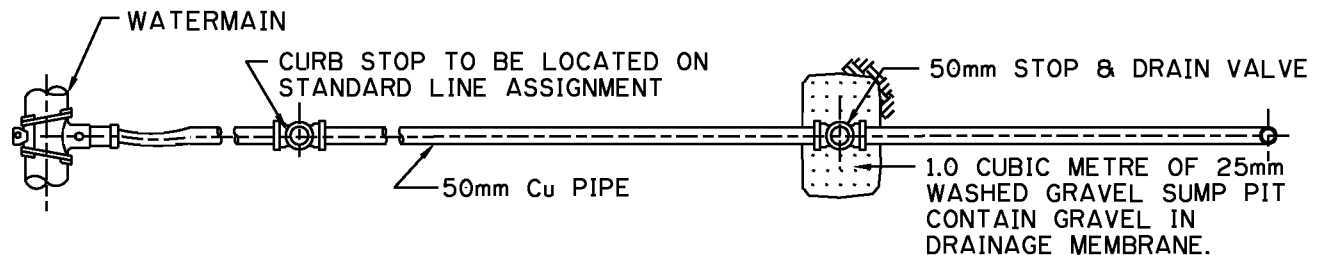
PROJECT TITLE
SPECIFICATIONS
SHEET TITLE
**TYPICAL 50mm
PARKS WATER SERVICE**

DRAWN BY
DATE **2004 03 11**
DESIGN BY
DATE

SCALE
N.T.S.
SHEET NO.
64
FILE NO.



CROSS-SECTION



PLAN VIEW

NOTES:

1. Parks Water Service shall be installed in accordance to the City Of Calgary Standard Specifications Waterworks Construction.
2. For irrigation system design, consult latest City Of Calgary, Park Development & Operations, Development Guidelines And Standard Specifications Landscape Construction
3. Call Park Development & Operations for inspection on Park Development & Operations Property.
4. Drainage Membrane, see Sec. 320 Standard Specification Streets Construction.
5. All dimensions are in millimeters unless otherwise noted.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
TYPICAL 150mm
PARKS WATER SERVICE

DRAWN BY

DATE 2002 03 05

DESIGN BY

DATE

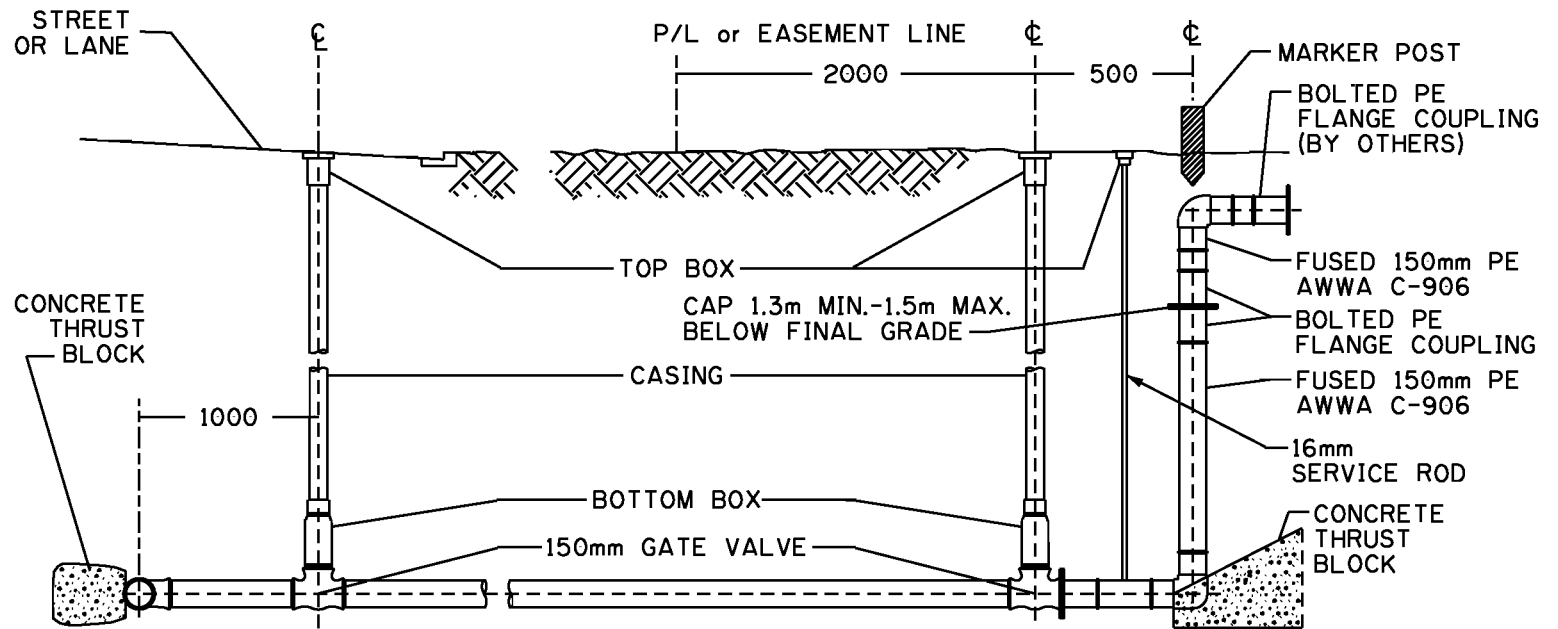
SCALE

N.T.S.

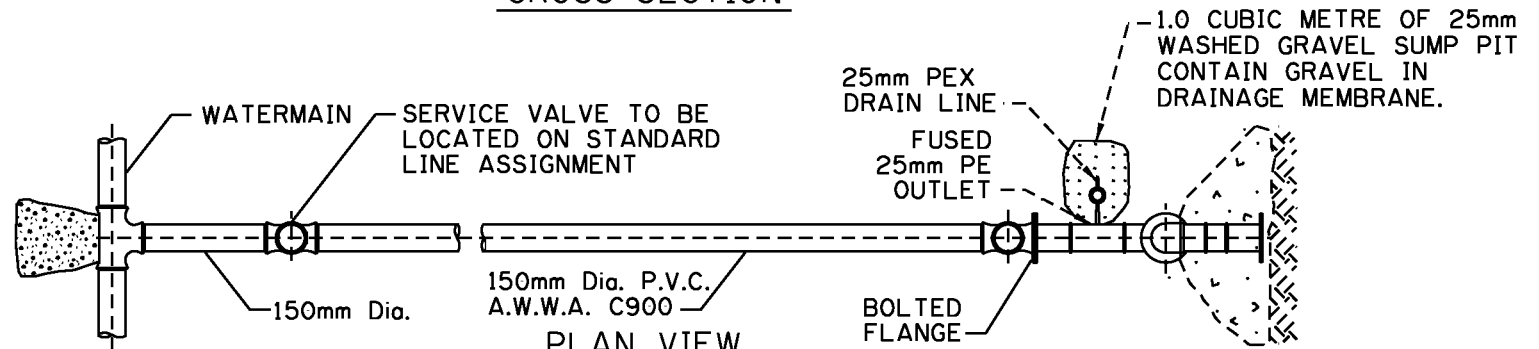
SHEET NO.

65

FILE NO.



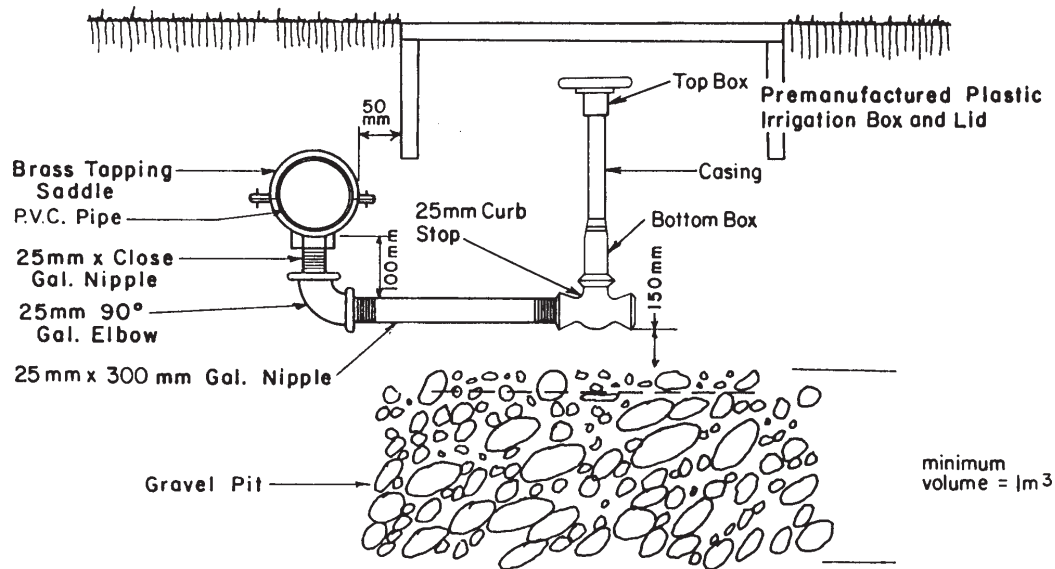
CROSS-SECTION



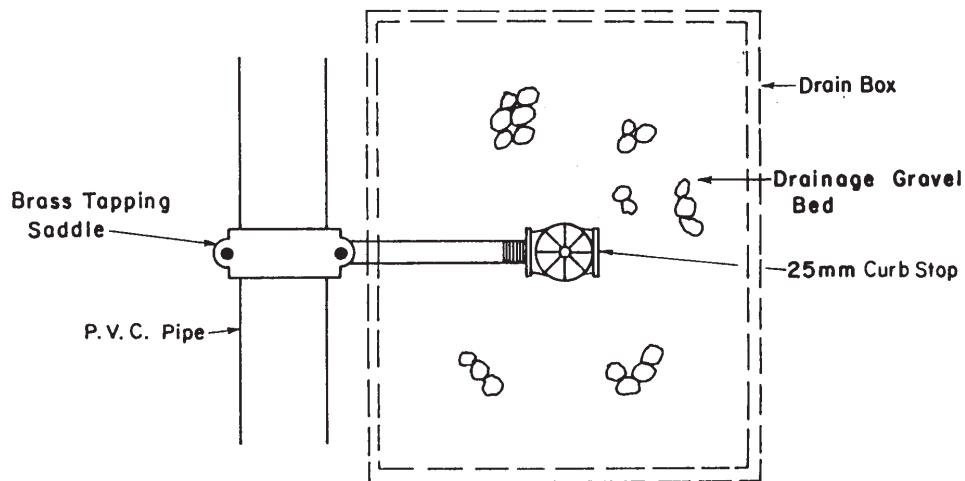
PLAN VIEW

NOTES:

1. Parks Water Service shall be installed in accordance to the City Of Calgary Standard Specifications Waterworks Construction.
2. For irrigation system design, consult latest City Of Calgary, Park Development & Operations, Development Guidelines And Standard Specifications Landscape Construction
3. Call Park Development & Operations for inspection on Park Development & Operations Property.
4. Drainage Membrane, see Sec. 320 Standard Specification Streets Construction.
5. All dimensions are in millimeters unless otherwise noted.



Elevation



Plan

NOTE;

1. Locate Drain Pits at lowest relative grade to ensure positive gravity drainage.
Number and location of Drain Pits will depend on topographic conditions and extent of system.
2. Size of Drainage Pit shall vary with pit conditions and pipe size
3. For Medium Density Polyethylene Pipe installation, use Double Clamped Insert Fittings in lieu of Brass Tapping Saddle.

-Box Measurements: (all outside measurements)

Bottom.....	391mm x 536mm
Top.....	298mm x 431mm
Height.....	304mm



THE CITY OF
CALGARY
PARKS

**PROJECT TITLE
SPECIFICATIONS**

**SHEET TITLE
25mm CURB STOP
ASSEMBLY**

**DRAWN BY
W.B.**

DATE 1997 03 08

DESIGN BY

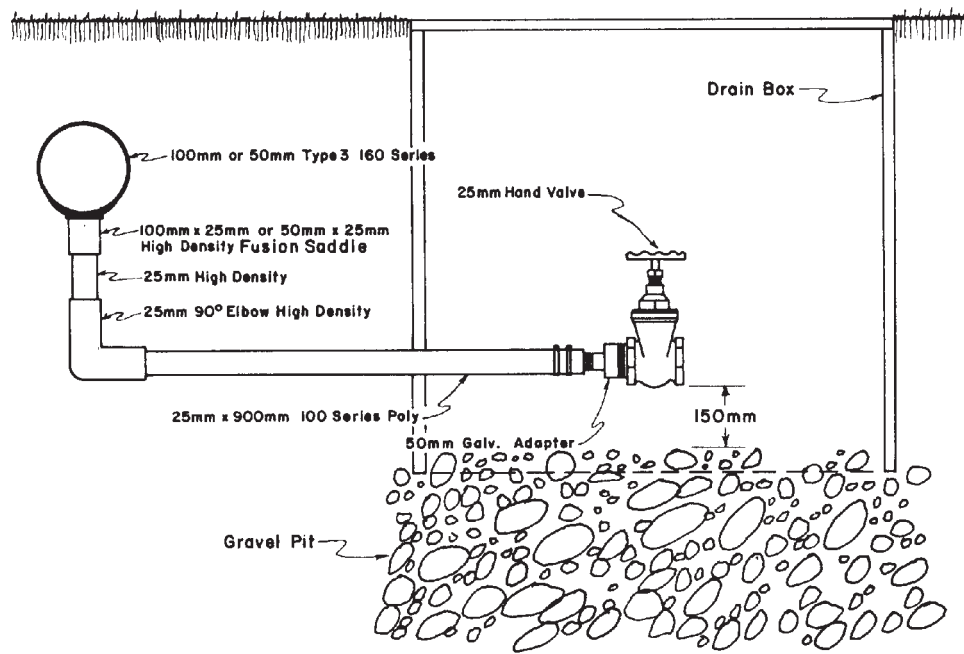
DATE

**SCALE
N.T.S.**

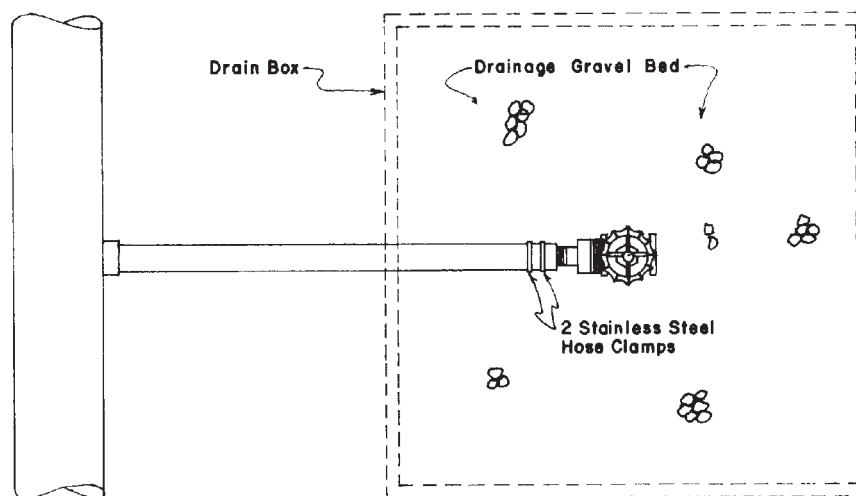
SHEET NO.

66

FILE NO.



ELEVATION



PLAN

NOTE;

1. Locate Drain Pits at lowest relative grade to ensure positive gravity drainage.
Number and location of Drain Pits will depend on topographic conditions and extent of system.
2. Size of Drainage Pit shall vary with pit conditions and pipe size
3. For Medium Density Polyethylene Pipe installation, use Double Clamped Insert Fittings in lieu of Brass Tapping Saddle.



THE CITY OF
CALGARY
PARKS

PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
DRAIN PIT FOR
HIGH DENSITY PIPE

DRAWN BY
W.B.

DATE 1997 03 08

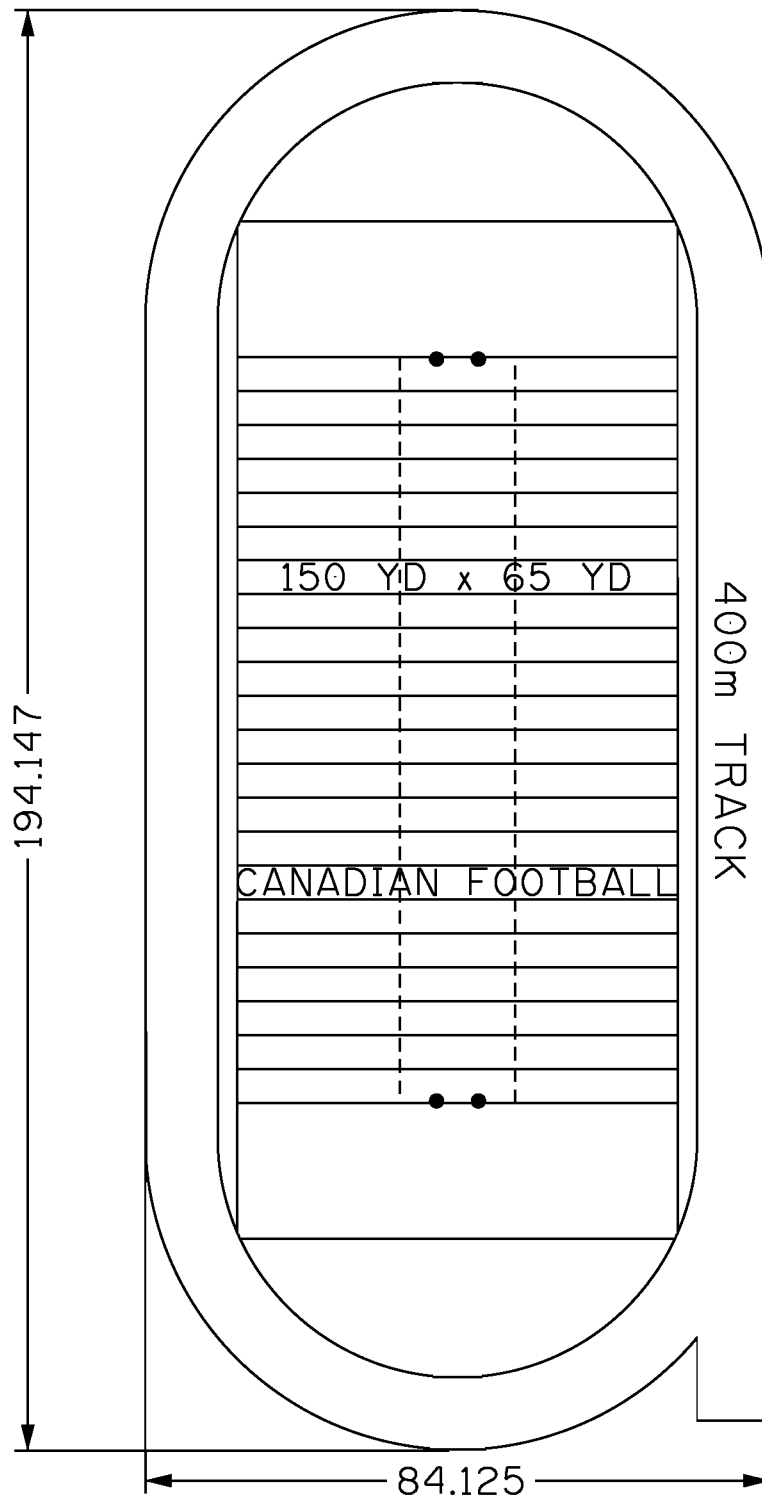
DESIGN BY

DATE

SCALE
N.T.S.

SHEET NO.
67

FILE NO.



PROJECT TITLE
SPECIFICATIONS

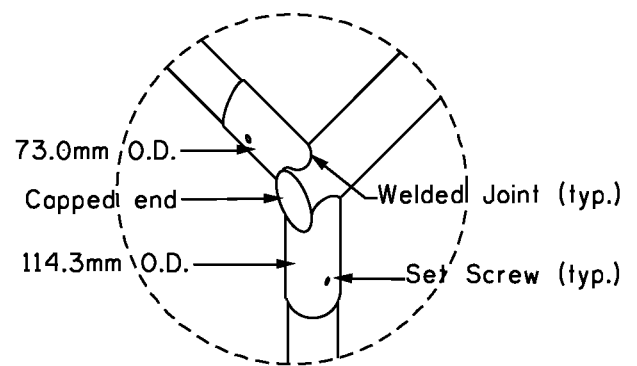
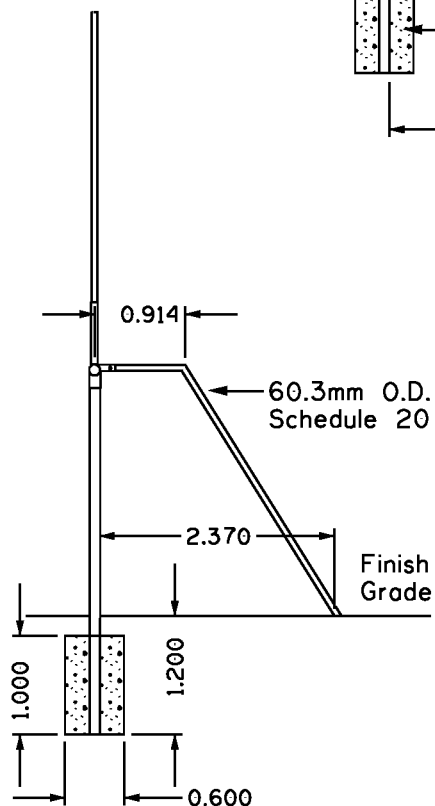
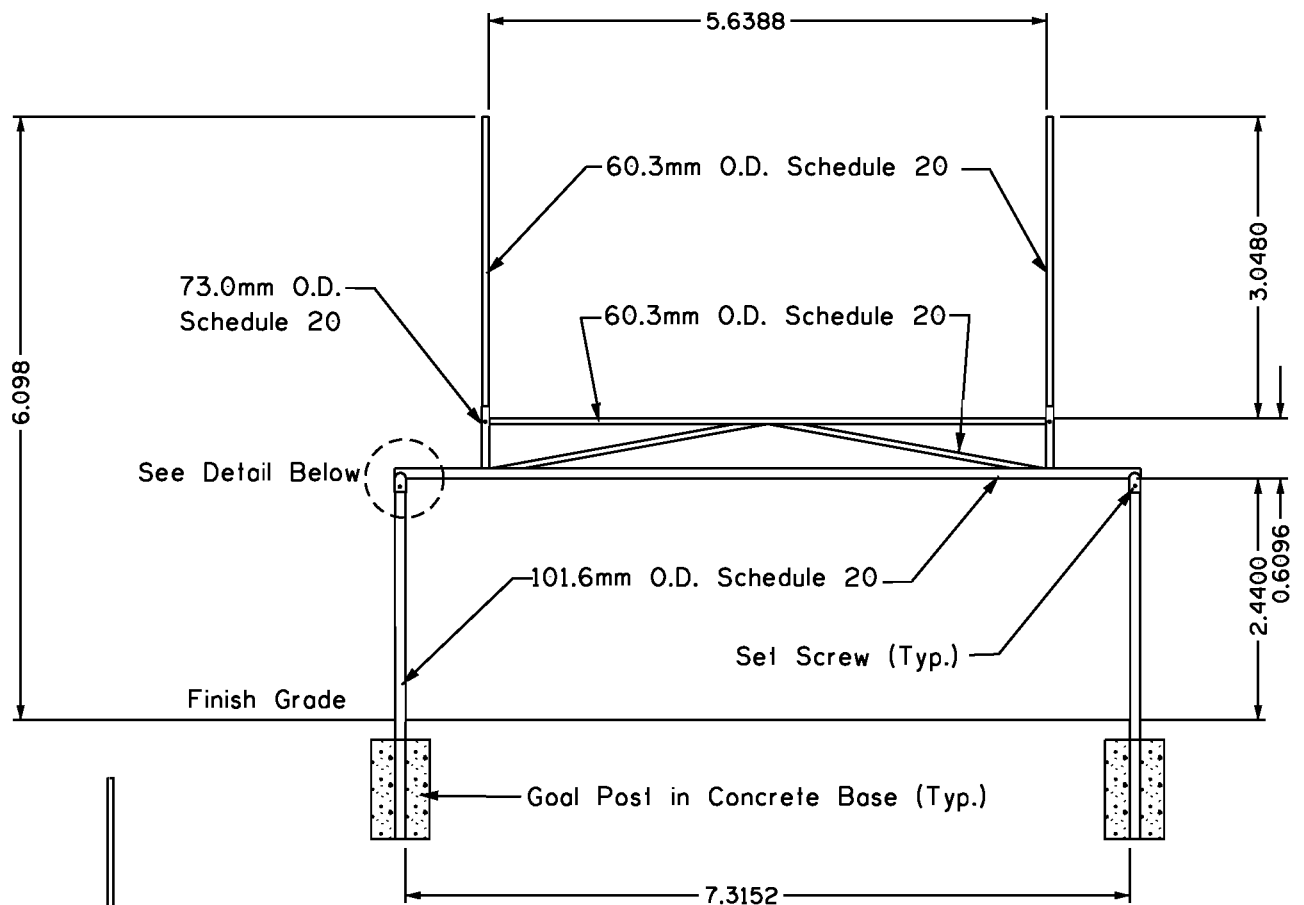
SHEET TITLE
**400m TRACK AND
FOOTBALL FIELD**

DRAWN BY
M.M.
DATE
DATE **2002 01 25**
DESIGN BY
DATE

SCALE
1:1000

SHEET NO.
69

FILE NO.



JOINT DETAIL (n.t.s.)

NOTE: All dimensions are in metres unless otherwise noted.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

FOOTBALL GOAL POSTS

DRAWN BY

M.M.

DATE **2002 02 20**

DESIGN BY

DATE

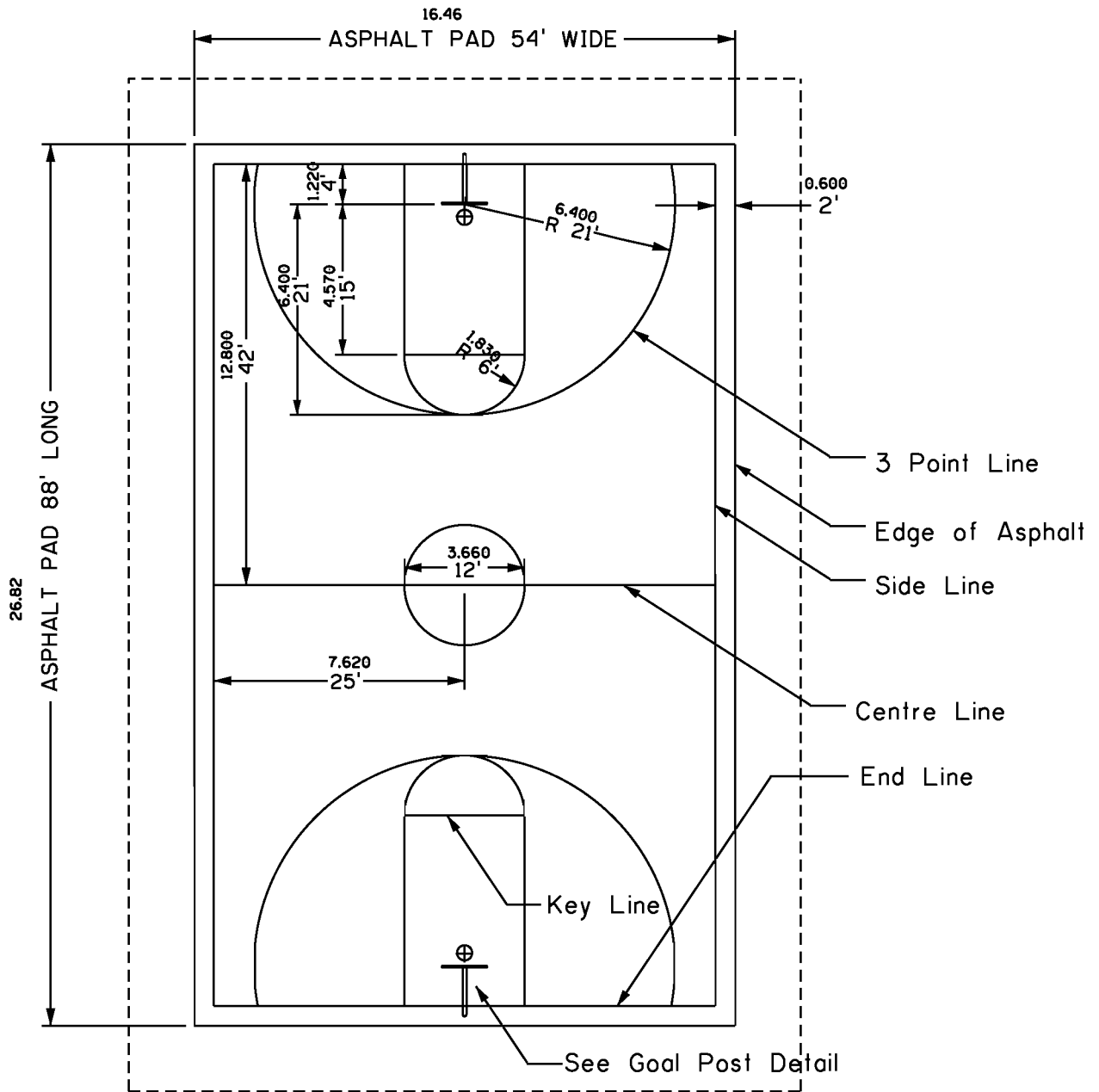
SCALE

N.T.S.

SHEET NO.

70

FILE NO.



Notes:

Dimensions are in metres unless otherwise noted.
 2m minimum buffer around asphalt edge.
 All lines to be masked and striped with
 100% acrylic latex paint only.



PROJECT TITLE
SPECIFICATIONS

SHEET TITLE
BASKETBALL COURT

DRAWN BY
M.M.

DATE **2003 01 23**

DESIGN BY
S.C.

DATE **2002 09 09**

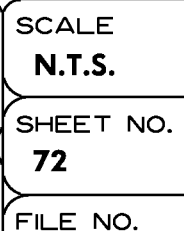
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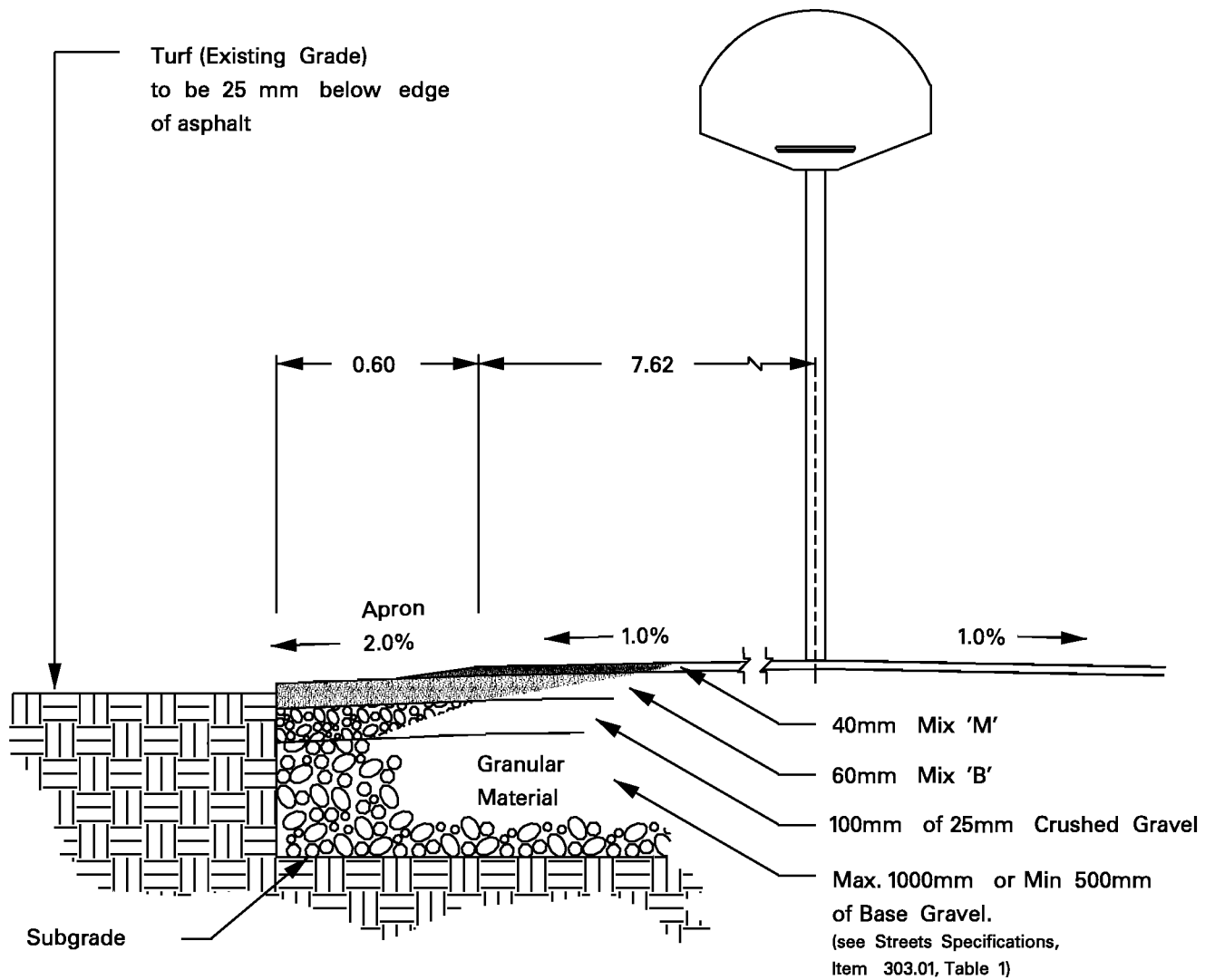
SHEET NO.
71

FILE NO.

Technical drawing of a manhole cover. The drawing shows a top-down view of a circular cover with a central square opening. Dimensions are provided: a width of 1.37, a height of 0.96, a radius of R 0.74 for the outer edge, and a depth of 3.05. A note indicates the 'top of rim to finish grade'.

Post, Goal and Backboard are all mounted together with the same hardware.





NOTE: All dimensions are in metres unless otherwise noted.



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**BASKETBALL COURT
SURFACE CONSTRUCTION**

DRAWN BY
W.B./M.M.

DATE **2003 01 23**

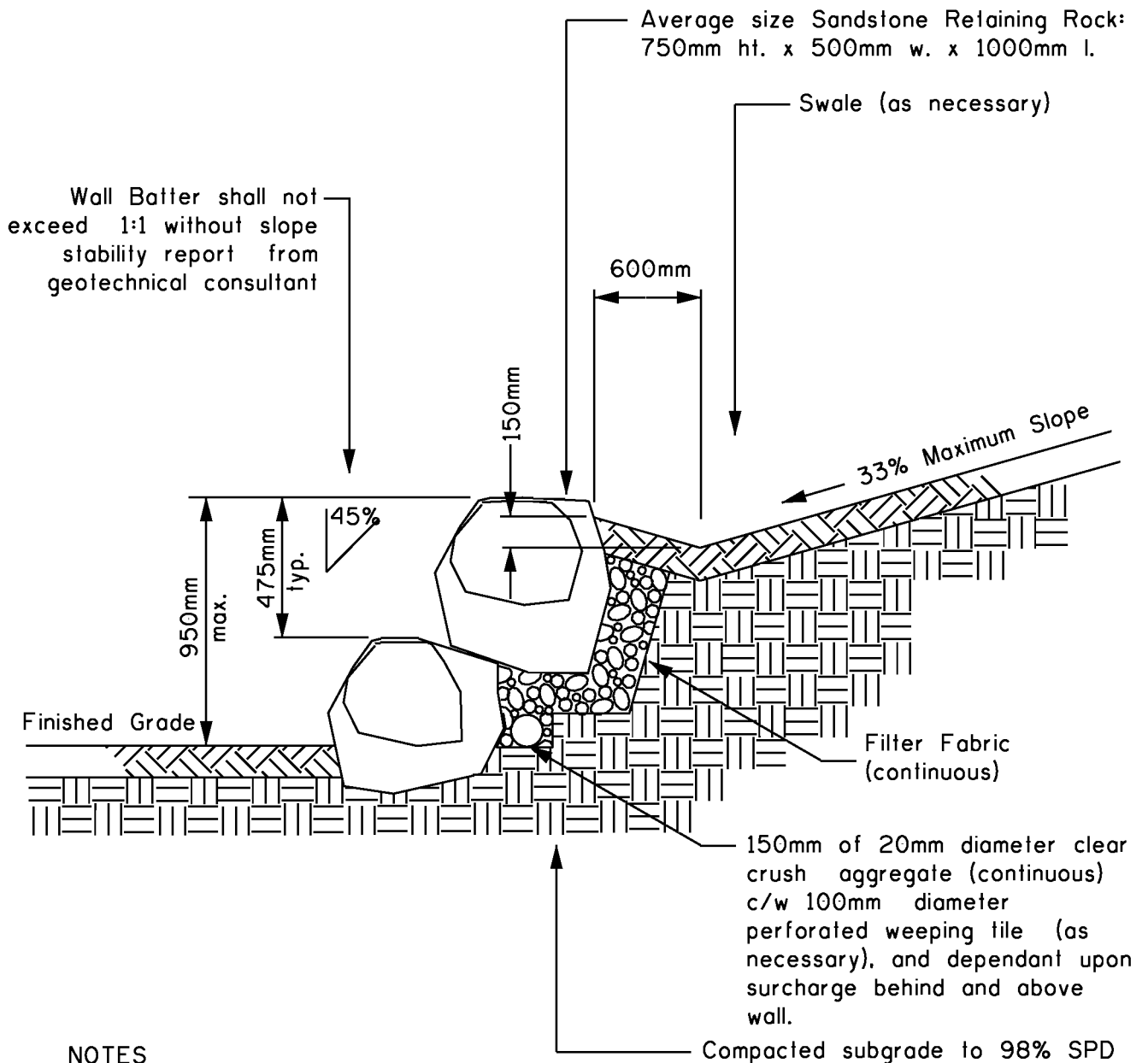
DESIGN BY
S.C.

DATE **2002 09 09**

SCALE
N.T.S.

SHEET NO.
73

FILE NO.



NOTES

All dimensions are in metres unless otherwise noted.

All void spaces to be filled with clear crushed aggregate and consolidated to prevent migration of fill materials.

All rocks to be structurally sound, free of any spalling, cracks, crevices or splinters. Mud stone is not acceptable.

All rocks to be buried 1/3 depth into ground. Place rocks to facilitate slope stability. Wall shall conform to all current applicable legislation.

Filter fabric to be Amoco 4535 non-woven or equivalent. (unit weight 139 g/m²)



PROJECT TITLE

SPECIFICATIONS

SHEET TITLE

**DRY PACK ROCK
RETAINING WALL**

DRAWN BY
W.B./M.M.

DATE **2003 12 31**

DESIGN BY

DATE

SCALE
N.T.S.

SHEET NO.
74

FILE NO.