SITE DEVELOPMENT ENGINEERING STANDARDS

TABLE OF CONTENTS

Section 1 GENERAL REQUIREMENTS

Introduction 3
1.1 Drawings and Reports 4
1.2 Plan Approvals 6
1.3 Other Site Plan Requirements 6

Section 2 GRADING AND DRAINAGE

2.1 Grading Plans 8
2.2 Grading Requirements 8
2.3 Erosion and Sediment Control 9
2.4 Standard Notes 9
2.5 Phasing 9

Section 3 STORMWATER MANAGEMENT

3.1 Design Criteria 10
3.2 Storm Water Modelling Parameters 11
3.3 Storm Water Management Report 12
3.4 Storm Water Management Certification 12
3.5 Maintenance Note 13
3.6 Reference Documents 13

Section 4 LANDSCAPING

4.1 Landscape Architect 14
4.2 Applicant / Owner Requirements 14
4.3 Landscape Plans 15
4.4 Landscape Standards 18
4.5 Site Layout Standards for Specific Land Uses 18
4.6 Planting Standards 19
4.7 Topsoil and Sod Standards 24
4.8 Property Demarcation Markers and Living Fences 26
4.9 Landscaping for Parking Lots 26

Section 5 SITE ACCESS, TRAFFIC CIRCULATION And OFF-STREET PARKING

5.1 Site Access 30
5.2 Emergency Vehicle Access Requirements 30
5.3 Public Transit Access 33
5.4 Access Design 33
5.5 Off-Street Parking 36
5.6 Traffic Circulation 40
5.7 Loading Space Requirements 40
5.8 Traffic Impact and Access Studies 41
5.9 Accessibility Requirements 43

Section 6 SITE SERVICING

6.1 On-Site Servicing Approvals 48
6.2 Off-Site Works by the City 49
6.3 Servicing Plan 50
6.4 Standard Notes 50
6.5 Design Criterion 50

Appendices

APPENDIX A	Sample Grading & Servicing Plan
APPENDIX B	Modified Rational Method Analysis
APPENDIX C	Owen Sound Area IDF Curves
APPENDIX D	Miscellaneous Drawings
APPENDIX E	Accessibility Figures
APPENDIX F	Checklists and Applications
APPENDIX G	Excerpts from Section 5 of Zoning By-law 2010-078
APPENDIX H	Scoped Traffic Impact Study – Terms of Reference

List of Figures

Figure 4.6a-d Tree and Shrub Planting Details ..... APPENDIX D

Figure 5.2a Emergency Vehicle Access Route General Dimensions 31

Figure 5.2b Emergency Vehicle Access Route General Dimensions (cont'd) 32

Figure 5.2c Emergency Vehicle Access Route General Dimensions (cont'd) 33

Figure 5.4 Access Illustrations 34

Figure 5.5.1 Typical Bicycle and Motorcycle Parking Layouts 39

List of Tables

Table 4.5 Landscape Site Standards 19

Table 4.6.2 Minimum Tree Spacing Requirements 20

Table 4.6.3a Native Species Tree Selection – Boulevard Trees 21

Table 4.6.3b Native Species Tree Selection – Green space Trees.....22

Table 4.6.4 Invasive Species List 23

Table 4.8 Property Demarcation Requirements 26

Table 4.9 Landscape Requirements for Parking Islands 29

Table 5.4a Access Layout 35

Table 5.4b Access Distances 35

Table 5.5 Parking Stall Dimensions 37

Table 5.5.1 Bicycle Parking Requirements 38

Table 5.6 Drive-Through Queuing Spaces 40

INTRODUCTION

This document contains engineering requirements of the City Engineering Services Division with respect to the site plan approval process administered by the Planning Services and Building Divisions of the Community Services Department.

These requirements are to be used by the developers and their consultant(s) for site layout, site grading, drainage, servicing and landscaping plans.

Although this document establishes certain engineering standards it is not intended to provide comprehensive details respecting all aspects of engineering requirements. Further information on details not covered in this document can be obtained by contacting the Planning Division.

Contact Information:

Community Services Department: (Planning & Building Divisions)	Phone: (519) 376-4440 eMail: osplanning@owensound.ca
Engineering Services Division:	Phone: (519) 376-4530 eMail: osengineering@owensound.ca

Section 1 – GENERAL REQUIREMENTS

1.1 DRAWINGS AND REPORTS

1.1.1 All site plans submitted to the City Engineering Department should be based on an accurate property survey prepared by an Ontario Land Surveyor or other qualified persons including a professional engineer with proper certification necessary to design and provide engineering services.

1.1.2 Property surveys containing topographic contours plotted in a metric scale are preferred. All elevations must be based on current Geodetic Survey of Canada Benchmarks. Local (assumed datum) benchmarks will not be accepted.

1.1.3 Site plan information may be provided on a single plan or on separate plans provided the information is clear and accurate. Where separate site plans are provided a consistent scale should be maintained throughout and the information described in Section 1.1.4 should be included on each separate plan.

1.1.4 The following base information must be provided on all site plans submitted to the City Engineering Department for approval:

a) Key plan, north arrow, appropriate scale, property address and registered owner;
b) Property lot lines (dimensioned), streets, road widenings, reserves, easements, rights of ways, sight triangles, etc;
c) Driveway entrance locations and separation distance from existing adjacent entrances and roadway intersection(s) in the vicinity of the property;
d) Existing electrical poles and fire hydrants within 90 metres of the subject property;
e) Abutting land uses, buildings, existing vegetation, trees and land features i.e. waterways;
f) Existing bus stops, pads and shelters;
g) Existing above ground services on the subject property and within adjacent right of way such as electrical transformers and poles, sidewalks, curb and gutter, light standards, traffic signs, telephone service boxes, and the like; and
h) Location and size of existing below ground services on the subject property and within adjacent right of way such as sanitary sewers, catch basins, storm sewers, water lines, gas lines, valve boxes, hydro lines, telephone lines, abandoned or existing septic tanks and tile beds, and the like.

1.1.5 General Requirements for Drawings

a) Site plan submissions are to be final design drawings.
b) Maximum sheet size is to be ISO A1 (594mm x 841mm). All plan submissions are to be FOLDED to letter or legal size.
c) Scale and dimensions are to be in METRIC UNITS. ***Site plan drawings submitted with Imperial dimensions will not be accepted.***
d) All piping with a diameter larger than 750mm is to be shown in the plan view with a double line at the correct scale.

1.1.6 Site plan(s) submitted for approval must provide information under the following main categories:

a) Grading and drainage (including storm water management, etc.);
b) Site development works (driveways, parking lot design, landscaping, lighting, curbs and sidewalks, etc.); and
c) Site servicing details (water, electrical, storm and sanitary sewer connections and requirements).

1.1.7 The following grading and drainage information must be supplied on the site plan:

a) Existing contours and existing/proposed ground elevations at the following locations:
   i) Outside all corners of building;
   ii) All property bars; and
   iii) Along property lines, ditches, and parking lots at 10 metre intervals;
b) All existing adjacent man made features such as retaining walls, swales, ditches, embankments and catch basins and natural features such as slopes, water courses and features that would have to be considered or affected by the proposed development;
c) On-site surface runoff features including flow direction and slope, swale inverts and top of bank elevations and SWM ponds, major storm flow routes.
d) All sewers and culverts labelled with information regarding invert elevation, length, diameter, type of material, thickness or class and grades;
e) Finished floor elevation and ground elevations immediately outside the building;
f) Existing ground elevations for 5 and 10 metres outside of property line at 20 metre intervals and the direction of drainage on adjacent lands;
g) Existing centre line road, top of curb elevations and ditch elevations must be shown along the entire frontage of the development; and
h) Grades with arrows and percent slope on driveways, parking, landscaped surfaces, and drainage swales.

NOTE: Refer to Appendix 'A' for City of Owen Sound Standard Drawings for industrial, commercial, institutional grading and servicing plans.

1.1.8 The following site development works must be shown on the submitted site plan:

a) All parking lot, walkways, driveway entrances, curbs, concrete pads and other hard surfaces to be constructed;
b) Areas to be covered with sod, seeded, areas to contain planting beds or other soft surface features, all tree and shrub locations including species, height, calliper and planting details on the property and adjacent road allowances in accordance with Section 4 of this document;
c) Proposed and existing fences with detail showing fence type and height etc;
d) Building location, garbage storage and recycling areas with details and loading areas
e) Lighting information including the location of all lampposts proposed; and
f) Traffic control devices including signs, line marking and signals if required.

1.1.9 The following site servicing details must be included on the submitted site plan:

a) Location and size of all lateral services and connections to municipal water, electrical, sanitary and storm sewer services;
b) Location and size of all proposed private services; and
c) Include invert elevations of all existing and proposed services.

1.1.10 Site plans are to show locations of fire routes, signage (fire route signs, pylon signs, ground and address signs) and any pavement markings (parking stalls, direction arrows, etc.).

1.1.11 All of the design drawings and reports are to be stamped and signed by an appropriate professional licensed in the Province of Ontario (Engineer, Ontario Land Surveyor, Architect, Landscape Architect)

1.2 PLAN APPROVALS

1.2.1 The proposed site development drawings and design must be completed to the satisfaction of the Director of Community Services prior to the issuance of building permits.

1.2.2 If a project has multiple phases in the overall plan, each phase must be re-submitted for approval as it is developed.

1.3 OTHER SITE PLAN REQUIREMENTS

1.3.1 Accessibility

- Barrier free design requires that the building be accessible to persons with disabilities and shall conform to the Ontario Building Code, Section 3.7, Ontario Regulation 114-89 and 115-89.

- Barrier free parking stalls will comply with the requirements of Section 4 of Zoning Bylaw 1985-80, as amended.
- The principle entrance of every office, commercial, industrial or multiple residence building shall open to the outdoors at sidewalk level or to a ramp. Flush thresholds are required at the entrances.
- Barrier free parking stalls must be located as close to the main entrance as possible, preferably within 30 metres. The stall(s) should be accessible to a walkway, preferably without requiring a person to pass behind or between parked cars or across traffic. Signage designating barrier free stalls are required on each barrier free parking stall.
- Every barrier free entrance shall provide an unobstructed minimum width of 1.1 metres for passage of wheelchairs.
- Curb cuts or ramps for all walkways must be provided from the public right of way to the main entrance of the building to allow access for all persons. If ramps are used, the slope of the ramp must not exceed 1:12; Landings used for turning, top or bottom and intermediate landings are to have a minimum area of 1.5 m^2 and the length of each ramp section should not exceed 9 metres.

1.3.2 Continuous 15 cm high barrier type, poured concrete curbing will be required in the following areas;

- Between vehicle routes/parking stalls and landscaped areas
- Major internal vehicle routes are to be defined with minimum 3 metre wide raised and curbed traffic islands
- Vehicle access to a site should be defined with a minimum 3 metre wide landscaped area

1.3.2 Garbage enclosures are required for all external garbage storage areas. The enclosures are to have a minimum height of 2 metres with swinging gates for access and shall screen the contents of the interior from surrounding properties. The enclosures are to be detailed in a material similar or complimentary to the building.

1.3.3 All signage will be in accordance with the City's Sign Bylaw 1986-193 as amended and shall have a sign permit prior to construction.

Signs that enhance the architectural characteristics of the building are encouraged, especially in the downtown area where signs that employ natural materials with external lighting are preferred. Wood signs with wrought iron detailing and support are encouraged where located at the storefront level to avoid disrupting the window rhythm of the upper façade.

Section 2 – GRADING AND DRAINAGE

2.1 GRADING PLANS

2.1.1 Grading plans showing existing conditions must show elevations and locations of abutting road works including ditches, sidewalks, curbs, gutters, street centre line; property boundaries (at minimum intervals of 10 metres); grid of the entire property (at minimum intervals of 20 metres); the corners of existing buildings and structures (parking areas, retaining walls, fences); drainage features on or abutting the subject property (ditches, infiltration galleries, swales, catch basins, manholes, culverts, ponds, streams, rivers, creeks, wetland boundaries); surface vegetation such as trees, shrubs and hedges.

2.1.2 In addition to the features included in clause 2.1.1, proposed grading plans must show proposed elevations and locations of new buildings; new structures (parking areas, retaining walls, fences); new sidewalks; new drainage features (manholes, catch basins, infiltration galleries, ditches, swales); flow arrows to indicate direction of surface drainage.

2.2 GRADING REQUIREMENTS

2.2.1 The minimum allowable grade in ditches and swales is 2.0%

2.2.2 The minimum allowable surface grade is 2.0% for landscaped areas; 0.5% for paved areas.

2.2.3 The proposed elevation of the property line abutting the street line shall be 2% higher than the curb, if there is a curb, or 2% higher than the centre line elevation of the road measured from the edge of pavement;

2.2.4 The maximum surface or landscaped slope is 3:1 (H:V)

2.2.5 All storm water on site shall be directed to on site catch basins or to a City maintained ditch.

2.2.6 All retaining walls over 0.6 metres in height must be designed by a Professional Engineer;

2.2.7 All elevations shall be referred to a City Bench Mark and shall be in geodetic metric datum.

2.3 EROSION AND SEDIMENT CONTROL

2.3.1 All erosion and control features shown on the grading and drainage plan shall be implemented and maintained by the Owner until the site has been fully developed.

2.3.2 Reference Documents:

- Ministry of Transportation and Communications Drainage Manual Vol. 2, Chapter F
- Ministry of Environment and Energy: Erosion and Sediment Control on Construction Sites, April 1996

2.4 STANDARD NOTES

2.4.1 The following notes are to appear on the grading and drainage plan:

1. All silt fencing is to be installed prior to the commencement of any grading, excavating or demolition.
2. Erosion control fencing to be installed around the base of all stockpiles.
3. Erosion protection to be provided around all storm and sanitary MH's and CB's.
4. Additional erosion control measures may be required as site development progresses. The contractor is to provide all additional erosion control structures.
5. The design consultant is to monitor erosion control structures to ensure fencing is installed and maintenance is performed to City requirements.
6. Erosion control structures are to be monitored regularly and any damage to structures repaired immediately. Sediments are to be removed on a regular basis and prior to accumulations reaching a maximum of ½ the height of the fence.
7. All erosion control structures are to remain in place until all disturbed ground surfaces have been rehabilitated either by paving or restoration of vegetative ground cover.
8. No alternate methods of erosion protection shall be permitted unless approved by the design consultant and the City of Owen Sound Works Department.
9. The contractor is responsible to ensure that municipal roadways and sidewalks are cleaned of all sediments from vehicular tracking etc. To and from the site at the end of each work day.

2.5 PHASING

2.5.1 If the site plan calls for future development of additional phases of the project, the grading and drainage must be designed for the ultimate build out of the development.

2.5.2 A licensed Professional Engineer, Ontario Land Surveyor or Architect shall submit a drainage certificate **for each phase of the project** to the Manager of Engineering Services certifying that the final property grading and drainage complies with the approved grading and drainage plan.

Section 3 – STORM WATER MANAGEMENT

3.1 DESIGN CRITERION

All areas of the City are subject to storm water management (SWM) criterion setting out quality parameters and limiting the discharge of storm water from the site to a specified rate.

3.1.1 The City of Owen Sound requires that the discharge of surface runoff from any proposed ***new development*** cannot exceed the 5 year design storm level generated by a green field condition for all storm events up to and including the 100 year design storm. For ***infill lots***, post-development peak flow levels to the off-site receiving drainage system for all storm events up to and including the 100 year design storm are not to exceed the existing 5 year design storm level.

3.1.2 Quality control is required to the "Enhanced Protection" level (see Section 3.3.1.1 in the Ministry of the Environment publication "Stormwater Management Planning and Design Manual")

Definition: **Enhanced Protection**: a minimum 80% TSS removal rate for storm water discharged to the municipal collection system is required.

3.1.3 Quality control facilities are required to remove suspended solids and floatables (oil and grit) from areas draining driveways and parking lots (i.e. oil/grit interceptors, catch basins and vegetative buffer strips or a combination thereof). Please note that Goss traps are not acceptable for areas larger than 250m^2.

3.1.4 Maximum allowable site imperviousness = 85%

3.1.5 The overland flow route for storms exceeding the capacity of the on-site SWM system must be shown;

3.1.6 Storm water run-off from building roofs is generally considered "clean" and therefore, additional quality control measures are not required. Clean runoff (roof water and foundation drains) must be directed to pervious areas for infiltration if possible;

3.1.7 The use of exfiltration galleries to facilitate groundwater recharge or provide sub-grade storage is encouraged provided that there is an overflow connection to the City collection system, the water to be exfiltrated is "clean" or treated to an enhanced level prior to inlet to the galleries and the stored water is fully infiltrated within a 24 hour period. Soils reports, which include percolation rates, must be provided along with the design of infiltration facilities;

3.1.8 The City encourages the use of Low Impact Development (LID) strategies including permeable pavement options where feasible in order to minimize impact on the natural water balance;

3.1.9 Storm runoff which is directly discharged to natural watercourses is to incorporate temperature equalization measures to protect the natural environment;

3.1.10 On site control and storage (roof top/parking lot/dry ponds/super pipes) may be required to attenuate flows.

3.1.11 Excess runoff from the five year design storm may pond in parking areas of least anticipated use to a maximum depth of 0.3m.

3.1.12 Major storms are to be routed overland to the City's R.O.W. without exceeding a maximum parking lot pond depth of 0.3m. Sites which cannot meet these criteria or have no positive drainage outlet are required to provide storage on the site for twice the five year design storm runoff volume.

3.1.13 Properties with minimal land areas which cannot accommodate an oil and grit interceptor may be permitted, upon application to the Director of Operations, to provide a capital contribution to the City for common downstream quality control devices. The capital contribution will be set at a rate approved by Council and will apply to the entire land area of the subject lands. The City may also allow a credit for installation of point of entry traps installed in catch basins for sites which do not have an OGI.

3.1.14 Subdivisions are required to control the runoff from the 5 and 100 year design storm events to pre-development levels.

3.1.15 A Professional Engineer must certify the design and construction of the SWM facility.

3.1.16 Notwithstanding any of the above policies, any site development or redevelopment within the City may require a site specific storm water management system at the discretion of the Manager of Engineering Services.

3.1.17 Where the Manager of Engineering Services requires site specific SWM criteria, the applicant or an agent acting on behalf of the applicant must contact the Operations Department, Engineering Services Division (519 - 376 – 4530) for a site specific SWM Criteria.

3.2 STORM WATER MODELLING PARAMETERS

To aid in the design of SWM facilities, the following information is to be used when calculating surface water volumes for the design of SWM systems.

For Rational Method Calculations:

$\boldsymbol{Q} = 0.00278 \times \boldsymbol{C} \times \boldsymbol{i} \times \boldsymbol{A}$

where: $\boldsymbol{Q}$ = runoff volume in m^3/s
$\boldsymbol{C}$ = runoff coefficient (see below)
$\boldsymbol{i}$ = rainfall intensity in mm/hour
(for 5yr design storm use 109.68 mm/hr with 10 minute entry time for parks and residential; use 110 mm/hr with a 5 minute entry time for all other land uses)
$\boldsymbol{A}$ = area in hectares

Runoff Coefficients:

LAND USE	"C" VALUE	% IMPERVIOUS	ENTRY TIME
Green Field, Parks	0.2	0	10 minutes
Unimproved	0.3	14	10 minutes
Single Family	0.6	57	10 minutes
Semi-detached	0.7	71	10 minutes
Townhouses	0.75	79	10 minutes
Apartments, schools, churches	0.75	79	5 minutes
Industrial	0.9	85	5 minutes
Commercial	0.9	85	5 minutes

Intensity – Duration – Frequency Curves

IDF Curves for the Owen Sound area are attached as Appendix 'C' to this document. The curves are derived using the following variables and formula:

$$\boldsymbol{I}_{mm/hr} = \boldsymbol{A} \times \boldsymbol{T}^{\boldsymbol{B}}$$

Where $\boldsymbol{I}$ = intensity
$\boldsymbol{A}$ = coefficient from chart
$\boldsymbol{T}$ = time in hours
$\boldsymbol{B}$ = coefficient from chart

Design Storm	A	B
2 yr	22.3	-0.714
5 yr	29.1	-0.724
10 yr	33.6	-0.729
25 yr	39.3	-0.734
50 yr	43.5	-0.736
100 yr	47.7	-0.738

Chicago Storm Parameters

Most computer modelling programs use the "Chicago Storm" as the default method of simulating rainfall events. For the Owen Sound area, the parameters for modelling using the Chicago storm are as follows:

CHICAGO DESIGN STORM	2 yr	5 yr	25 yr	100 yr
Max. storm duration (min.)	180	180	210	210
Max. hydrograph length (min.)	360	360	360	360
Time step (min.)	5	5	5	5
Coefficient a	854.100	1234.576	1750.276	2171.754
Constant b	7.781	8.297	8.303	8.303
Exponent c	0.830	0.851	0.862	0.867
Fraction r	0.375	0.375	0.375	0.375
Duration t_d (min.)	180	180	210	210
Maximum Intensity (mm/hr)	101.673	134.692	165.718	202.862
Total Depth (mm)	33.228	42.929	59.007	71.271

3.3 STORM WATER MANAGEMENT REPORT

3.3.1 The owner shall have a Professional Engineer prepare a report detailing the modeling, design and features of the proposed SWM system. The SWM Report is to provide system performance data for the 5yr and 100yr design storms and must include scale drawings showing delineated drainage catchment areas, delineated surface pond limits for the 5-year and 100 year design storms (where applicable), overland flow route and a schematic diagram reflecting the model (complex models).

3.4 STORM WATER MANAGEMENT CERTIFICATION

3.4.1 The Professional Engineer who designed the SWM system must certify to the City that he/she supervised the construction of the storm water management system, that it was constructed as approved by the Manager of Engineering Services and that it is functioning properly.

3.5 MAINTENANCE NOTE

The following note is to appear on the SWM design drawing:

> It is the owner's responsibility to conduct routine inspection and maintenance of any oil and grit interception devices or storm water management systems installed or constructed on the owner's property.

3.6 REFERENCE DOCUMENTS

Ontario Ministry Of The Environment Stormwater Management Planning and Design Manual (March 2003) ISBN 0-7794-2969-9

Stormwater Pollution Prevention Handbook (December 2001)
Internet ISBN 0-7794-2553-7
Print ISBN 0-7794-2552-9

Section 4 – LANDSCAPING

Landscaping should be designed to enhance the presence of each building and develop a park like setting. Landscaping should be used as a major visual element to unify the proposed building, existing streetscape and the surrounding environment as an entity and functionally for directing the circulation of pedestrian and vehicular traffic. It must mitigate the visual impacts of parking areas, loading docks, garbage and storage areas etc.

4.1 LANDSCAPE ARCHITECT

4.1.1 All landscape plans are to bear the Landscape Architect's "Ontario Association of Landscape Architects" membership stamp, signature and date.

4.1.2 Where it has been determined by the City's Director of Community Services that the proposed development will require limited landscaping, the requirement above will be waived with the provision that it will be reinstated if satisfactory landscape plans have not been produced after two formal submissions.

4.1.3 Upon completion of the works the Landscape Architect/Designer shall prepare a Completion Notification Certificate for the Owner to forward to the Planning Division, City of Owen Sound.

4.2 APPLICANT/OWNER REQUIREMENTS

4.2.1 The owner agrees to implement the approved landscape plans by the project completion date as outlined in the Site Plan development Agreement and will retain a Landscape Architect/Designer to make periodic site inspections during and on completion of the landscape works.

4.2.2 Upon completion of the works, the owner will forward to the Planning Department, City of Owen Sound, a copy of the Completion Notification Certificate from the Landscape Architect/ Designer.

4.2.3 Any revision to the landscape plans will be submitted to the Planning Department, City of Owen Sound, before commencement of the works, for review and approval.

4.2.4 The owner authorizes the City, its employees, agents or contractors to enter upon the subject lands to which these drawings apply, to complete any required site development works and agree to indemnify the City and it's authorized agents and save them harmless from any and all actions arising out of the exercises by the City, its employees, agents or contractors of the rights hereby given to them. And the owner agrees to notify the City forthwith of any change of ownership of the said lands.

4.3 LANDSCAPE PLANS

The landscape plan for any proposed development will encourage excellence in landscape design in consideration of the distinct character of this community and the natural features of this topography.

Landscape plans are to include the following information and drawing instructions:

4.3.1 General Plan Requirements

a) All landscape plans must be prepared by a member of the Ontario Association of Landscape Architects (OALA) or a landscaping professional satisfactory to the Community Services Department.
b) Landscape plans must have regard for adjacent lands and topography
c) All plans will be to scale, show the location of the site and indicate the north compass direction.
d) The landscape plan must conform to the site plan.
e) The landscape plan will include elements of the Tree Survey Plan where applicable
f) Preserve existing trees, woodlots and natural features wherever possible in accordance with the tree inventory and preservation plan
g) Show location of walkways, curbs, interior roadways, parking lots, fencing, garbage enclosures, hydro transformers, all underground and overhead services, steps, ramps, retaining walls, slopes, berms, street trees, exterior lighting, pole/pylon signs, ground and portable signs, catch basins, manholes, water valves, hydrants, sub-drains, swales and all other existing and proposed features
h) Identify all Surface Materials - paving, sod, hydro-seed, mulch, etc.
i) Recreation amenities: Adult and children facilities, where required, are to be shown on the landscape plan.
j) Snow storage areas or methods of snow disposal.
k) Design for accessibility where required i.e.) drop curbs, barrier-free parking, ramps, etc.
l) Any other landscape feature requiring clarification.
m) All existing vegetation to be preserved, relocated or removed to be accurately shown.
n) General description or detailed inventory of existing vegetation.
o) An evaluation of the vegetation and the impact of the proposed development on the existing vegetation.
p) Description of measures to mitigate the impact of the proposed construction upon vegetation recommended for preservation.

4.3.2 Planting Requirements

a) A plant list clearly labelled with a key system is to include the full botanical name, common name, species and/or variety, quantity, size, spacing and special remarks
b) Planting Details - coniferous and deciduous trees and shrubs (staking, guying, installation, etc.)
c) Soil types and additives to be used (fertilizers, peat moss, mulch etc.)
d) Select plant materials that are ecologically sound, appropriate for the existing and future site conditions and suitable for all seasons
e) Incorporate drought resistant plant material in order to reduce long term maintenance requirements and conserve water
f) As per City policy, native plant materials should be utilized where appropriate and avoid the use of invasive plant species
g) Where existing trees on a municipal right of way are removed, the trees must be replaced to the satisfaction of the City of Owen Sound
h) Plantings consisting of trees and shrubs will be a minimum of 50% coniferous plantings
i) Where landscaped planting areas are abutting public roads, a minimum buffer width in accordance with the Zoning Bylaw must be maintained from inside the property line
j) The maximum slope of all berms and finished grades shall not exceed 3:1 to provide for maintenance and erosion protection
k) Landscaped areas (excluding grassed areas) shall not be used for snow storage
l) No plantings having a mature height greater than 80 cm are to be located within the visibility triangle(s) of access points to the site or municipal street intersections

4.3.3 Existing Tree Preservation

The City's Official Plan has policies that encourage a program of tree preservation and planting so that all areas of the city are provided with a sufficient number of trees to maintain a high standard of amenity and appearance. The retention of healthy trees greater than 150mm in diameter is critical.

4.3.4 Tree Survey Plan

The purpose of a tree survey plan is to identify the existing vegetation on site and determine what can be preserved on the lands subject to a development proposal. It is recommended that the applicant speak to the Planning Division to determine if a tree survey plan is required.

If it is determined that a tree survey is required, all existing vegetation as defined by the following information shall be required:

a) *Individual Trees:*
- Location and calliper of each tree exceeding 100mm diameter: 100 - 200mm measured at 300mm above grade; greater than 200mm measured 1400mm above grade.
- Existing grade at the base of the trunk.
- Species of specimen.
- Limit of canopy drip line
- Condition of the tree
- Indicate whether the tree is to be retained, relocated or removed (including reasons for removal)

b) *Groupings or Woodlots:*
- Location of the outermost trees and existing grade at the base of the trunk.
- Limit and grade of canopy drip line.
- Predominate species within the zone to be preserved.
- Average diameter of trees within the zone measured 1400mm above grade.
- General condition of trees in the zone.

c) *Other:*
- All trees and shrubs exceeding 1.5m in height located on the proposed development site, on the property line, on adjacent lands within 1.5 metres of the common property line and on the boulevard of the public street adjacent to the proposed development.
- All natural features that are existing, indicating those that the developer has designated for preservation or removal.

d) *Site Development Information:*
- Detailed layout of site showing building locations, driveways, parking areas, walkways etc;
- Existing and proposed grades;
- Location and types of services and utilities;
- Construction area requirements (area around the proposed buildings required for excavation of foundations and access during construction)

e) *Hoarding:*

- The applicant is responsible for ensuring that tree protection hoarding is maintained throughout all phases of clearing and grubbing, demolition and construction in the location and condition approved.
- No materials (building materials, soil etc.) should be stockpiled in the area of hoarding.
- The limit of the hoarding area is not to be located inside the canopy drip line of the protected area.

4.4 LANDSCAPE STANDARDS

4.4.1 General Landscape Standards

The following are general Landscape Standards. Applicants are encouraged to work with their consultants to provide innovative or alternate designs.

Appropriate landscaping is required to achieve the following:

- Provide scale, colour, texture and variety (particularly seasonal)
- Add visual interest to open spaces and blank façades
- Soften dominant building mass at a human scale for the pedestrian
- Provide definition of public walkways and open areas
- Provide a consistent visual image between adjacent properties along the streetscape
- Screen unsightly areas
- Provide protection from excessive wind, sun, rain and snow
- Stabilize existing steep embankments with ground cover and trees
- Enhance the appearance of building setbacks and yard areas
- Provide a measure that minimizes the visual impact of parking and service facilities from adjacent properties and streets
- Achieve energy conservation and water efficiency.
- Design practices that aid successful long-term maintenance
- Protection of natural features and tree conservation.
- Creation of safe urban environments.

4.4.2 The minimum Landscape Open Space requirement shall conform to the City of Owen Sound Zoning Bylaw for all developments (See related Zoning Bylaw table for governing regulations).

4.5 SITE LAYOUT STANDARDS FOR SPECIFIC LAND USES

The table below indicates the minimum landscape standards for various types of developments, to be shown on the site plan and detailed on the landscape plans.

Table 4.5 - Landscape Site Standards

Landscape Site Standard	Industrial	Commercial	Apartment	Townhouse	Institutional
Vehicular access to the site is to be defined by access planting	✓	✓	✓	✓	✓
Main building entrances to be identified by a landscape area (accent and/or foundation planting)	✓	✓	✓	✓	✓
Pedestrian walkways to building entrances to be provided from the parking area	✓	✓	✓	✓	✓
Walkways, curb cuts & ramps to be provided and designed for people with disabilities	✓	✓	✓	✓	✓
Landscaping screening required for parking, storage and service areas	✓	✓	✓	✓	✓
Children's recreation facilities c/w walkway connections from the building to the recreational facilities			✓	✓	✓
Landscape screening of privacy areas required from adjacent pedestrian walkways, internal roadways, recreational amenities & service areas			✓	✓	
Landscape screening and/or fencing required for all exposed parking, ground-level units, service & garbage areas adjacent to other uses		✓	✓	✓	✓
Streetscape along internal roads	✓	✓	✓	✓	✓
Landscape screening of rear yard setbacks between privacy areas of townhouse blocks				✓	
Patios which may include wood decks				✓	
Privacy screens (1.8m high wood screen fence) required between rear privacy areas of units				✓	
Privacy screen returns may be required depending upon layout of townhouse blocks				✓	
For large and/or high profile sites, establish focal points or areas of greater interest. For example, a sculpture, flower garden, pool, fountain, patio, naturalized areas, etc.	✓	✓	✓	✓	✓
Incorporate landscape features into rest areas to provide protection from environmental elements such as wind, sun, street noise, etc.	✓	✓	✓	✓	✓
Construction of berms or grade changes is encouraged to provide topographical relief	✓	✓	✓	✓	✓
Bicycle racks	✓	✓	✓	✓	✓
Intense landscape treatment required at intersection of municipal roadways	✓	✓	✓	✓	✓
Pedestrian walkways to be a minimum of 1.5m width, walkways abutting parking stalls to be 1.8m minimum wide	✓	✓	✓	✓	✓
Emergency fire routes, other than vehicular routes, shall conform to the to the satisfaction of Chief Building Official	✓	✓	✓	✓	✓
Retaining walls over 1.0m high require a guard rail at top of the wall	✓	✓	✓	✓	✓
Recycling and garbage enclosure screening	✓	✓	✓	✓	✓
Ground supported and portable sign locations	✓	✓	✓	✓	✓

4.6 PLANTING STANDARDS

4.6.1 Planting Material Specifications

a) Acceptable sizes for plant material are:
- Deciduous Trees: 60 mm calliper
- Small Ornamental Trees: 45 mm calliper
- Coniferous Trees: 175 cm high

- Deciduous Shrubs: 60 cm height; 150 cm height if used for screening purposes (*some exceptions based on species*)
- Coniferous Shrubs: 40 cm spread (*spreading habit*) or 80 cm height (*upright habit*): 150 cm height if used for screening purposes

b) The spacing of plant material should account for the ultimate size and form of the selected species and also the purpose of the planting whether it be for screening, shade, aesthetics, naturalizing, rehabilitation, etc.

c) All plant material to conform to the latest edition of the Canadian Nursery Trades Association Metric Guide Specifications and Standards

d) No planting will be permitted within a drainage swale.

e) All shrubs to be installed in continuous planting beds.

f) Planting beds will be mulched to a minimum depth of 75mm and will be maintained weed free. All mulch will be shredded bark except for planting beds located against buildings

g) The City encourages the use of native plant material indigenous to the Owen Sound area.

h) See "Tree and Shrub Planting Detail" table for general planting requirements.

i) All trees should be wire basket, B&B or container grown

j) Deciduous trees planted in a row will be placed at 11 metres on centre (max.). Smaller flowering trees and ornamentals will be placed at 5 metres to a maximum of 7 metres on centre.

k) Coniferous trees will be centred at 4-8 metres depending on desired effect

4.6.2 Tree Spacing

High branching deciduous trees are required along property lines and within perimeter planting strips for parking lots. The minimum number of trees required will be determined using *Table 4.7.2* (below). The requirements of this chart are in addition to any landscape screening requirements described in the Zoning By-law. These trees can be provided in a group or groups within the landscape strip.

Table 4.6.2 – Minimum Tree Spacing Requirements

Tree Spacing Along Property Boundary Requirements *(one tree required every interval)*						
Proposed Land Use	**Commercial**	**Industrial**	**Institutional**	**Residential**	**Municipal Street**	**Open Space or Park**
Commercial	11 m	9 m	9 m	6 m	7.5 m	9 m
Industrial	9 m	N/A	6 m	6 m	7.5 m	9 m
Institutional	9 m	9 m	9 m	6 m	7.5 m	9 m
Residential	6 m	6 m	6 m	6 m	7.5 m	9 m

Tree Spacing Along Property Boundary Requirements *(one tree required every interval)*						
Proposed Land Use	**Commercial**	**Industrial**	**Institutional**	**Residential**	**Municipal Street**	**Open Space or Park**
Municipal Street	7.5 m	7.5 m	7.5 m	7.5 m	N/A	N/A
Open Space or Park	9 m	9 m	9 m	9 m	N/A	N/A

4.6.3 Tree Selection – Planting of Native tree Species

Planting of native tree species is identified as a best management practice. As part of the implementation of this policy, the following tables shall be the approved Municipal Tree Lists for trees planted within the City of Owen Sound.

Table 4.6.3a – Native Species Tree Selection – Boulevard Trees

Latin Genus	**Common Name**	**Nursery**	**Comments**
Acer freemanii	Autumn Blaze Maple	U, C	
Acer rubrum "Karpick"	Karpick Red Maple	C	Slow growing, needs room for development
Acer rubrum "Morgan"	Morgan Red Maple	U, C	Planted at Kelso Beach Playground
Acer saccharinum	Silver Maple	U, C	Needs room for development
Amelanchier	Serviceberry	U, C	Alleghany variety only, salt resistant, fast growing, room for development
Celtris occidentalis	Common Hackberry	U, C	Fast grower, tolerates dry alkaline condition
Crataegus spp.	Hawthorne	U, C	Thornless varieties only
Fraxinus americana	Ash	U, C	White variety only
Fraxinus pennsylvanica	Globe Ash	U, C	Green or Red variety only
Gymnocladus diocia	Kentucky Coffee tree	U, C	Winter interest
Platanus x acerifolia	London Planetree	U, C	Room to develop
Quercus macrocarpus	Burr Oak	U, C	
Sorbus decora	Showy Mountain Ash		Unavailable from these nurseries
Sorbus thuringiaca	Oakleaf Mountain Ash	U, C	Substitute for above
Pyrus calleryana	Ornamental Pear	U, C	Excellent street tree
Syringa reticula	Japanese Tree Lilac	U, C	Excellent street tree

Table 4.6.3b – Native Species Tree Selection – Greenspace Trees

Latin Genus	Common Name	Nursery	Comments
Acer freemanii	Autumn Blaze Maple	U, C	
Acer rubrum “Karpick”	Karpick Red Maple	C	Slow growing, needs room for development
Acer rubrum “Morgan”	Morgan Red Maple	U, C	Planted at Kelso Beach Playground
Acer saccharinum	Silver Maple	U, C	Needs room for development
Acer saccharum	Sugar Maple	U, C	Intolerant to pollution, needs room for development
Amelanchier	Serviceberry	U, C	Alleghany variety only, salt resistant, fast growing, room for development
Betula papyrifea	Paper/Canoe/White Birch	U, C	Susceptible to disease and insects
Carpinus carolinia	Blue Beech	U, C	
Celtris occidentalis	Common Hackberry	U, C	Fast grower, tolerates dry alkaline condition
Crataegus spp.	Hawthorne	U, C	Thornless varieties only
Fraxinus americana	Ash	U, C	White variety only
Fraxinus nigra	Black Ash	U, C	
Fraxinus pennsylvanica	Globe Ash	U, C	Green or Red variety only
Gymnocladus diocia	Kentucky Coffee tree	U, C	Winter interest
Juglans cinerea	Butternut	U	Short lived
Juglans nigra	Black Walnut	U, C	
Juniperus virginiana	Eastern Red Cedar	U, C	Coniferous
Larix larcinia	Tamarack	U, C	Coniferous
Liriodendrom tulipifera	Tulip Tree	U, C	Lawn or park setting, room to develop, weak limbed
Ostra virginiana	Ironwood	U, C	Slow growing
Picea clauca	White Spruce	U, C	Coniferous, large tree, very tall
Picea clauca	Eastern White Pine	U, C	Coniferous
Platanus x acerifolia	London Planetree	U, C	Room to develop
Platanus occidentalis	American Sycamore	U, C	
Populus spp.	Poplar	U, C	Trembling Aspen variety, use on poor soils
Quercus alba	White Oak	U, C	
Quercus bicolor	Swamp Oak	U, C	
Quercus macrocarpus	Burr Oak	U, C	
Quercus palustris	Pin Oak	U, C	

Latin Genus	Common Name	Nursery	Comments
Quercus ruba	Red Oak	U, C	
Salix spp.	Willow	U, C	
Sorbus decora	Showy Mountain Ash		Unavailable from these nurseries
Sorbus thuringiaca	Oakleaf Mountain Ash	U, C	Substitute for above
Tilia americana	Basswood	U, C	Large tree, very tall
Thuja occidentalis	White Cedar	U, C	
Tsuga canadensis	Eastern Hemlock	U, C	
Ulmus americana	White/American Elm	U, C	Disease
Ulmus thomasii	Rock Elm	U, C	Disease

Nursery: U = Uxbridge; C = Conan

4.6.4 Invasive Non-Native Plant Species

The planting of aggressive non-native species within or adjacent to woodlands or natural areas is discouraged in order to help safeguard the long-term ecological integrity of these areas. The plant species identified in Table 4.6.4 are not suitable for restoration and landscaping within and adjacent to Storm Water Management areas, Woodlands and Natural Areas.

Table 4.6.4 - Invasive Species List

LATIN NAME	COMMON NAME	LATIN NAME	COMMON NAME
HERBACEOUS SPECIES			
Acinos arvensis	Mother-of-thyme	Hedera helix	English ivy
Aegopodium podagraria	Goutweed	Hemerocallis fulva	Orange daylily
Agropyron pectiniforme	Crested Wheat Grass	Hesperis matronalis	Dame's rocket
Ajuga reptans	Bugleweed, Bugle	Hydrocharis morsus-ranae	European frog-bit
Alliaria petiolata	Garlic mustard	Hypericum perforatum	St. John's Wort, Rosin
Ambrosia artemesiifoila	Ragweed, Wild tansy		
Angelica sylvestris	Angelica	Impatiens glandifera	Himalayan balsam
Artemisia absinthium	Absinth, Wormwood	Iris pseudacorus	Yellow flag
Asperula odorata	Sweet woodriff		
		Lathyrus latifolius	Everlasting pea
Berteroa incana	Hoary-alyssum	Lunaria annua	Silver dollar, Honesty
Bromus inermis	Smooth brome grass	Lysimachia nummularia	Moneywort
Butomus umbellatus	Flowering rush	Lythrum salicaria	Purple loosestrife
Campanula rapunculoides	Creeping bellflower	Medicago sativa	Alfalfa
Carduus nutans	Nodding thistle	Melilotus alba	White sweet clover
Centaurea maculosa	Spotted knapweed	Melilotus officinalis	Yellow sweet clover
Chelidonium majus	Celandine, Wartweed	Miscanthus sinensis	Eulalia grass
Cirsium arvense	Canada thistle	Myriophyllum spicatum	Eurasian water milfoil
Convallaria majalis	Lily-of-the-valley		
Coronilla varia	Crown vetch	Nymphoides peltatum	Floating heart
Cystisus scoparius	Scotch broom		
		Origanum vulgare	Wild marjoram
Dipsacus fullonum	Teasel		
		Phalaris arundinacea	Reed canary grass
Euphorbia esula	Leafy spurge	Phragmites communis	Common reed
		Poa compressa	Canada blue grass
Galium mollugo	White bedstraw	Poa pratensis	Kentucky blue grass
Glyceria maxima	Great manna grass	Polygonum cuspidatum	Japanese knotweed

LATIN NAME	COMMON NAME	LATIN NAME	COMMON NAME
Potamogeton crispus	Curly pondweed	Tussilago farfara	Coltsfoot
Rorippa amphibia (islandica)	Marsh cress	Verbascum thapsus	Mullein, Velvet dock
		Vinca minor	Periwinkle, Myrtle
Tanacetum vulgare	Common tansy		
TREE SPECIES			
Acer platanoides (all seed producing varieties)	Norway Maple, Crimson King Maple, Royal Red Maple	Picea abies	Norway spruce
		Pinus sylvestris	Scotch pine
		Populus alba	White poplar
Aesculus hippocastanum	Horse chestnut	Populus nigra var. *italica*	Lombardy poplar
Ailanthus altissima	Tree-of-heaven		
Alnus glutinosa	Black alder	Rhamnus cathartica	European buckthorn
		Rhamnus frangula	Glossy buckthorn
Betula pendula	Silver birch	Robinia pseudoacacia	Black locust
Elaeagnus angustifolia	Russian olive	Sorbus aucuparia	European mountain ash
Elaeagnus umbellate	Autumn olive		
		Ulmus pumila	Siberian elm
Morus alba	White mulberry		
SHRUB AND VINE SPECIES			
Berberis thunbergii	Japanese barberry	Rosa eglanteria	Sweetbriar
		Rosa multiflola	Multiflowered rose
Caragana arborescens	Siberian peashrub	Rosa rugosa	Japanese rose
Celastrus orbiculatus	Asiatic bittersweet	Rubus discolour	Himalayan blackberry
Cynanchum nigrum	Dog-strangling vine		
		Syringa vulgaris	Lilac
Ligustrum vulgare	Common privet		
Lonicera japonica	Japanese honeysuckle	Viburnum lantana	Wayfaring tree
Lonicera tatarica	Taterian honeysuckle	Viburnum opulus	European highbush cranberry

4.6.5 International Society of Arboriculture Tree Planting Details: Introduction and Use Criteria for Figures 4.6a to 4.6d

The details and specifications posted on the ASLA website are intended to be used as guidelines by qualified landscape architects who have a basic understanding of plant biology and soil science. It is assumed that prior to using these guidelines to develop a set of contract documents, the landscape architect has undertaken a survey of the different types of soil at the site including: hand probing of all soil areas where the subtleties of the existing vegetation, topography, drainage patterns and overlays of the sited development history suggest the potential for different soil patterns. The soil survey must include sampling and laboratory testing of each soil type encountered. The testing should meet the same level of evaluation as required for the testing of topsoil. These details also assume that the landscape architect understands the proposed site construction sequencing patterns well enough to predict the pattern of soil disturbance during the proposed construction period and the types of soils and compaction levels that will exist upon the completion of the construction.

Prior to using the ISA Planting Guidelines the landscape architect must read all notes and the specifications that describe the assumptions and basis for the guidelines. The ISA planting details

and specifications must be considered as guidelines only and must not be used directly from the details drawings without first undertaking a full investigation of the assumptions on which the details and specifications are based. The landscape architect must make modifications and changes to these guidelines in all cases where existing and or local conditions of soils, climate, plant type and labour practice suggest that different requirements are appropriate or necessary.

FOR MORE INFORMATION: *www.isa-arbor.com*

Figures 4.6a to 4.6d are located in APPENDIX D

4.7 TOPSOIL AND SOD STANDARDS

4.7.1 Topsoil Requirements

a) All sod covered areas to have a minimum of 150mm topsoil.
b) All Planting Beds to have a minimum planting bed depth of 450mm, consisting of 50% native soil and 50% approved soil mixture supplement and an application of fertilizer (20-20-20).
c) Soil Mixture Supplement to consist of:
   - 2 parts screened sandy loam topsoil
   - 1 part shredded commercial peat moss
   - 1 part well rotted manure
d) Topsoil mixed with subsoil, rocks, roots, foreign debris and toxic material is unacceptable and shall be removed and disposed of off site.
e) All subgrade shall be compacted to 85% SPD except in woodlands.All landscaped areas to be covered with sod unless otherwise noted on the Landscape Plan.

4.7.2 Sod Requirements

a) Sod to curb at all streets or to within 1.5 metres of the traveled portion of the road.
b) All sod is to conform to the Canadian Nursery Sod Growers' Specifications.
c) All rocks over 50mm diameter shall be removed during fine grading of the topsoil and prior to laying sod.

4.8 PROPERTY DEMARCATION MARKERS AND LIVING FENCES

4.8.1 As per the City of Owen Sound's Property Demarcation Policy all site developments adjacent to Hazard Lands, Open Space, Storm Water Management and Parkland blocks are to be demarcated within the City owned lands. Property Demarcation may include the installation of Property Demarcation Markers and/or Living Fences.

4.8.2 All new site developments shall be demarcated through subdivision agreement conditions as per the City of Owen Sound's Property Demarcation Policy.

4.8.3 All redevelopment or infill projects are subject to site plan agreement conditions to ensure the installation of Property Demarcation Markers and Living Fences per the City of Owen Sound's Property Demarcation Policy. Demarcation is to be within the City owned lands.

Table 4.8 - Property Demarcation Requirements

Living Fence	Width varies from 1.5 to 2.5 metres wide	Tree Spacing at 1 per every 11 linear metres of property line	Shrub Spacing at 1 per 3.3m^2 of Planting Bed. Planting Bed to be a Continuous Bed with 100mm Bark Mulch
Demarcation Markers	30 metres Maximum spacing	Required at every Property Line change in direction	Marker set on city property & adjacent to and without disturbing Legal Survey Bar

4.9 LANDSCAPING FOR PARKING LOTS

Parking areas are the least offensive of the required service functions and they may be exposed to the street provided that adequate landscape screening is provided.

In order to maintain well landscaped lots it is preferable to create a continuous landscaped area between the street line and the building, uninterrupted by parking for a portion of the frontage. This landscape connection should be at least as deep as the minimum front yard setback but additional space would provide a greater effect. While it is recognized that functional requirements may make it impossible to achieve this type of layout, the following concepts should be incorporated into the design as much as possible.

- There should be a continuous landscape connection with no parking areas or driveways for commercial and industrial development for at least 30% of the site frontage with a depth equal to or greater than the minimum setback
- Where a single row of parking is necessary at the front of the building, a landscape area should be provided across the face of the building closest to the street and at least 25% of the site frontage should be free of parking stalls
- Where a double row of parking is necessary in front of a building, a landscape area of 2 metres in depth should be provided across the whole site and 25-35% of the site frontage should be kept free of parking

4.9.1 General Landscape Standards for Parking Lots

The following Landscape Standards shall be applied to parking lot design:

a) Provide an aesthetically pleasing view from the street
b) Break up the monotony of large expansive paving surfaces
c) Reduce summer pavement temperatures
d) Unify the appearance/landscaping of the subject site as well as co-ordinate it with the surrounding development
e) To screen adjacent areas from headlights, and the view of automobiles
f) To define access aisles to and from parking facilities
g) Attractively and efficiently separate adjacent paved lots under separate ownership and serving separate developments (except in cases of joint legal access)
h) Counter balance the ecological deterioration caused by extensive pavement area and exhaust emissions from automobiles
i) Promote the safety, orientation and movement of pedestrians
j) There are two landscape components of a parking lot area, namely:
   - **External** – the landscape strip around the perimeter of the parking lot.
   - **Interior** – the area defined within the perimeter curb edge of the parking lot.

4.9.2 External Parking Lot Landscape Development

The following additional Landscape Standards shall be applied to external parking lot design:

a) A three (3) metre wide minimal perimeter landscape strip shall be provided within the subject property for all commercial, park, institutional, aggregate extraction, industrial and residentially zoned parking lots fronting onto a municipal street. The landscaped strip may not include any paved area except pedestrian walkways, parking and loading zone driveways which cross the landscaped strip.
b) Refer to *Table 4.7.2 Minimum Tree Spacing Requirements* for minimum tree planting requirements for perimeter landscape strips.
c) A minimum planting bed area requirement of $1m^2$ per 1m of perimeter or frontage shall be provided within the subject property for all parking lots.
d) The equivalent number of trees and combining of shrub beds can be provided in a group or groupings along the landscaped strip.
e) No shrub shall be more than 0.8 metres high within the first metre parallel to the property line of a street right-of-way. The

remaining shrubs are to be maintained at a maximum eight of 1.2 metres, for safety reasons and 0.8 metre maximum height within a visibility triangle.

f) Berms are encouraged to be incorporated within the landscape strip to provide additional visual buffering. The slope of the berm shall not exceed 33% (3:1) for lawn areas. Berms planted with ground covers and shrubs may be steeper. However, no slope shall exceed 50% (2:1) for elevation differentials of less than 1 metre. Berms should be graded to appear as smooth, rounded, naturalistic forms.

g) The planting strip may also include up to a 0.8 metre high brick, stone or finished concrete wall to aid in the visual screening of the parking lot.

h) The above noted groupings will provide opportunities for visibility windows, mass shrub bed plantings, and pedestrian access points. The use of these groupings will discourage monotonous linear planting and encourage imagination in design and layout.

4.9.3 External Parking Lot Landscape Development for Vehicular Sales Facilities

a) When a vehicular sales facility is located adjacent to a public right-of-way, a three (3) metre wide landscape strip shall be provided. The parking lot area landscape strip requirements for vehicular sales facilities will allow for the creation of picture frame(s) along streets for vehicular sales display.

4.9.4 Internal Parking Lot Landscape Development

a) Divided into smaller sections by the use of curbed, landscaped islands and peninsulas.

b) Islands (and circulation aisles) should be oriented in the direction of pedestrian movement.

c) Islands and peninsulas are also required at the end of the parking aisles.

d) Landscaped planting areas, measured from backside of curb, shall have a minimum dimension of 2.5 m.

e) Islands and peninsulas are to be 1m shorter (face of curb) than the length of adjacent parking stall.

f) Planting area shall contain no more than one shade tree per 11.25 square metres and not less than one shade tree per 22.5 Square metres, minimum 60mm calliper shade tree and suitable ground cover (non-pavement). ("Shade tree" means any deciduous tree where the mature height of its species can be expected to exceed eleven (11) metres and which has an expected crown spread of nine (9) metres or more.)

g) No vehicular parking space shall be located farther than thirty metres (30) from a shade tree planting area.

h) All interior landscaped planting areas must be protected from encroachment of automobile traffic by continuous concrete curbing.

i) Plant material must be carefully chosen for parking lot treatments and should have qualities such as:
- pollution, salt and drought tolerance
- easy maintenance
- free of nuisance fruit or berries
- hardy - strongly branched
- specialized ground cover instead of grass under trees

j) Plant material at intersections shall not obstruct drivers' views of approaching traffic.

k) Consideration is to be given in the design and location of landscaped islands and peninsulas for winter maintenance/snow ploughing and snow storage.

l) It is also strongly encouraged to install underground irrigation systems for high stress areas such as interior landscaped planting areas in parking lots.

Table 4.9 - Landscape Requirements for Parking Islands

Distance from Shade Tree to Parking Space	**Landscape Island Width**	**Minimum Tree Planting for Landscape Islands**	**Maximum Tree Planting for Landscape Islands**
30 metres Maximum	2.5 metres Minimum	1 per 22.5m^2	1 per 11.25m^2

Section 5 – SITE ACCESS, TRAFFIC CIRCULATION AND OFF-STREET PARKING

5.1 SITE ACCESS

5.1.1 Every off-street parking area shall be provided with an adequate means of ingress and egress to and from a street or lane and shall not interfere with the normal public use of a street.

5.1.2 No parking stalls, loading zones, structures, landscaping features, signs or vegetation with a mature height greater than 0.6 metre are to be located within the 5.0 metres by 5.0 metres sight triangles required at the access points or street intersections.

5.1.3 In general, direct access to arterial roads should be minimized to maintain the ability of the arterial road system to efficiently move people and goods. Before proposing direct access to an arterial road, all reasonable access alternatives must be considered and evaluated.

5.1.4 Safe, convenient pedestrian links must also be provided between the buildings, parking areas, sidewalks and transit stations.

5.2 EMERGENCY VEHICLE ACCESS REQUIREMENTS

(See Figures 5.2a, 5.2b and 5.2c)

5.2.1 Access routes which are required to the principal entrance and to faces of the buildings which are required to be provided with openings for fire fighting access, must be located between 3 metres and 15 metres measured horizontally from the building face.

5.2.2 Access routes to all buildings shall be designed to provide an unobstructed path of travel from a fire department pumper to the fire department connection for the building, or, where there is no fire department connection, from a fire department pumper to the principal entrance to the building.

5.2.3 Where a required access route is provided by means of a roadway or yard, the design and location of the roadway or yard required for emergency vehicle use shall:

a) have an overhead clearance of at least 5 metres.
b) have a change in gradient of not more than 8% over a minimum horizontal distance of 15 metres.
c) be connected with a public thoroughfare.
d) have a clear width of at least 6 metres unless it can be shown that lesser widths are satisfactory.
e) have a centre line radius of not less than 12 metres.
f) have turn around facilities for any dead-end portion of the access route exceeding 90 metres from a public thoroughfare.

g) be designed to support the expected loads imposed by fire fighting equipment and be surfaced with concrete, asphalt, paving stones or other material designed to permit accessibility under all climatic conditions.

Figure 5.2a – Emergency Vehicle Access Route General Dimensions

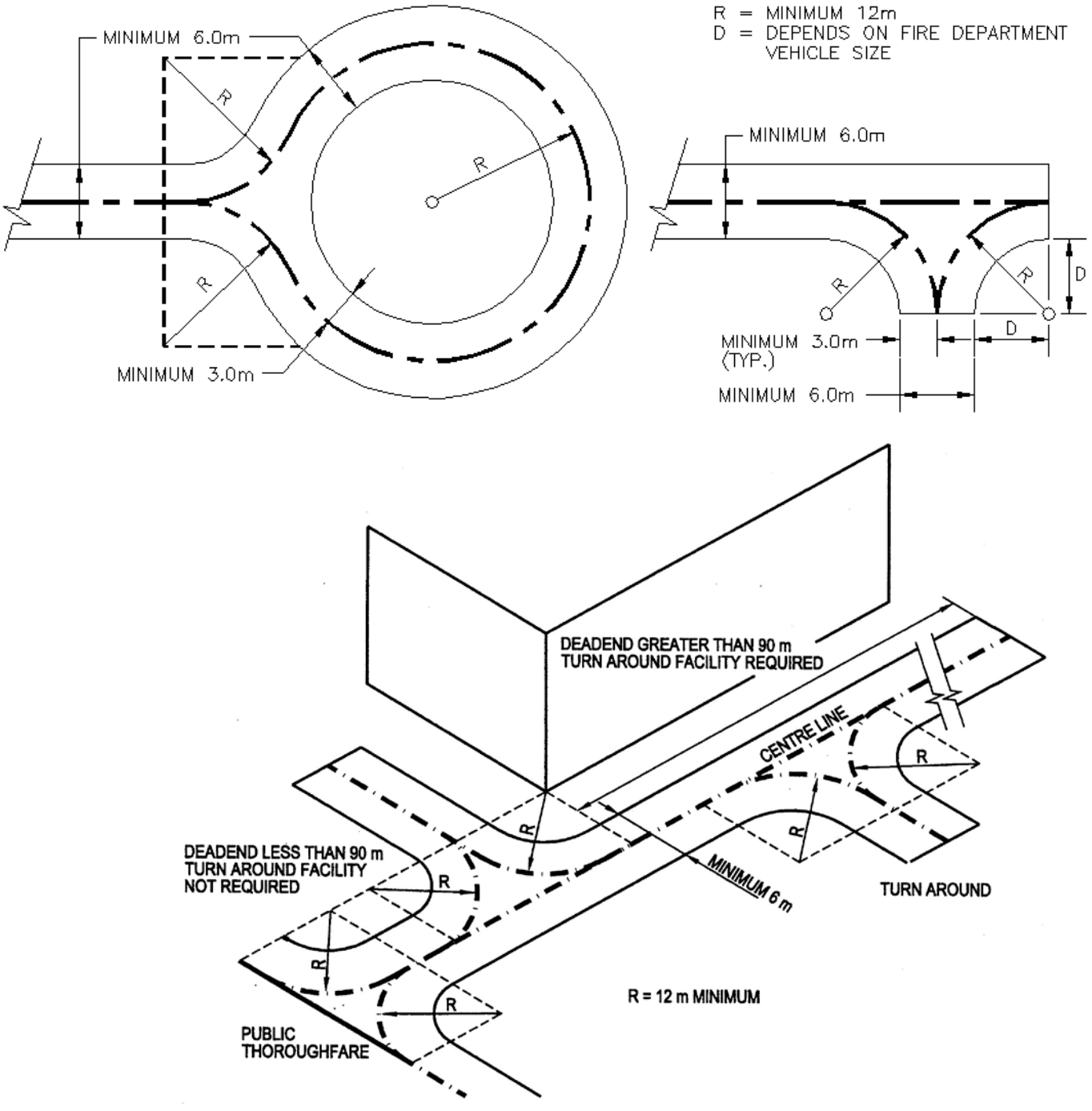
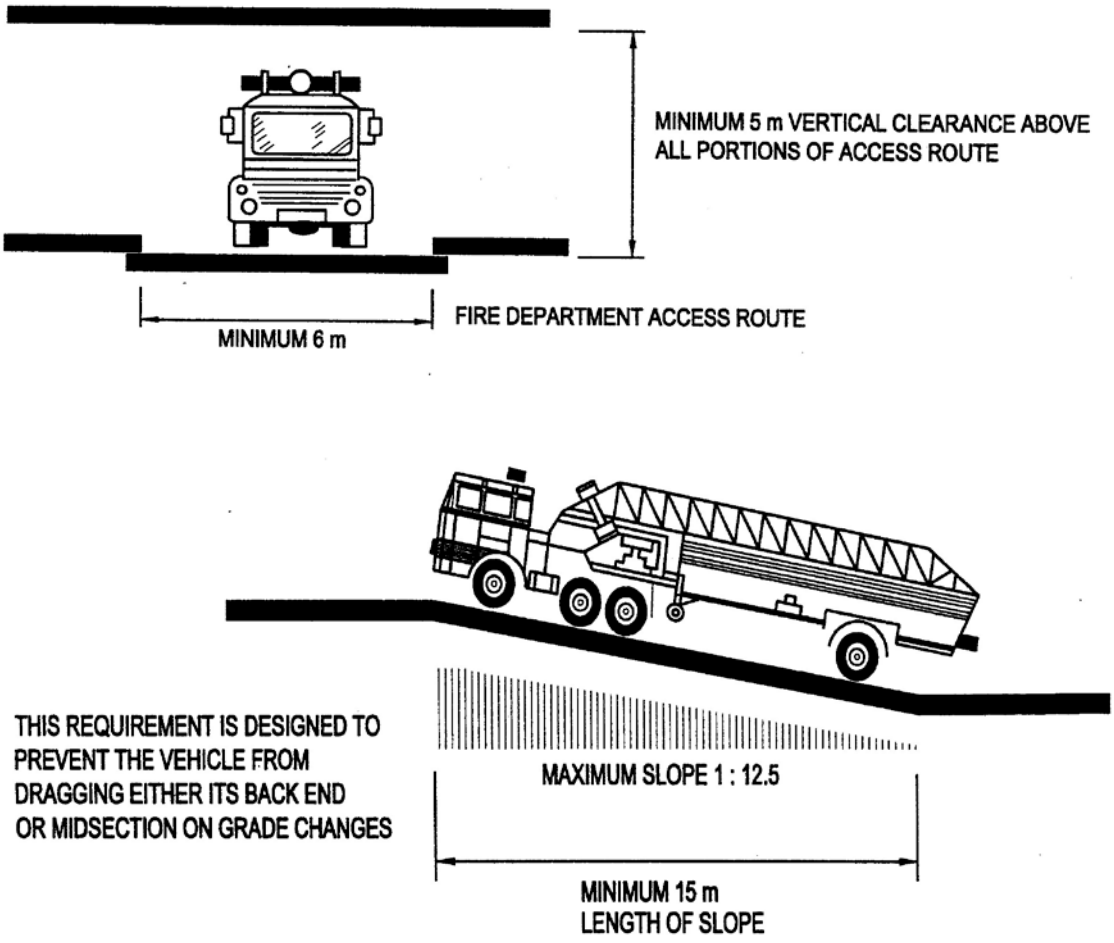
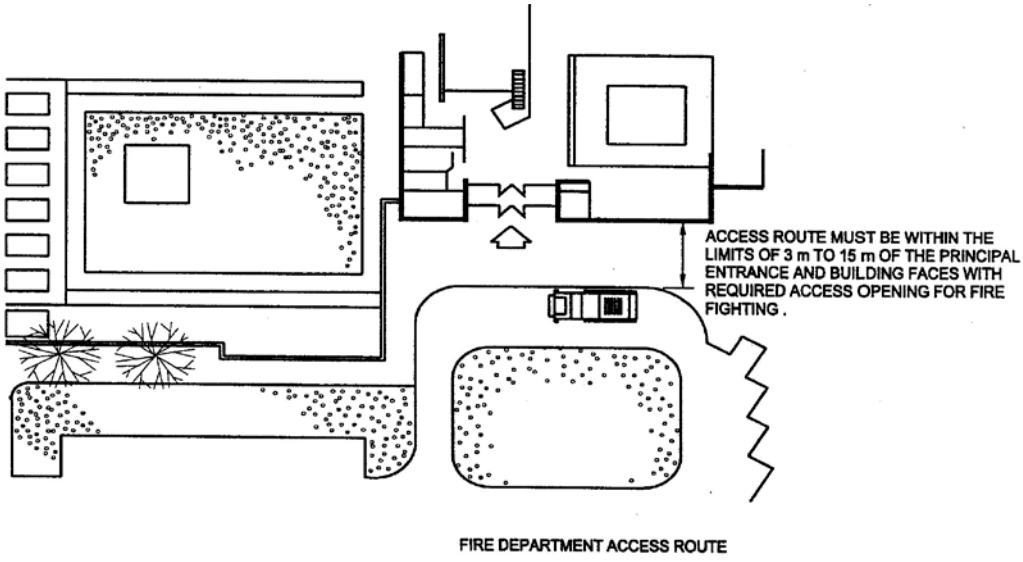


Figure 5.2b – Emergency Vehicle Access Route General Dimensions *(cont'd)*



5.2.4 All Emergency vehicle access route design shall comply with the 2006 Ontario Building Code, Division B, Part 3, Sections 3.2.5.4, 3.2.5.5 and 3.2.5.6.

Figure 5.2c – Emergency Vehicle Access Route General Dimensions *(cont'd)*



5.3 PUBLIC TRANSIT ACCESS

5.3.1 Consultation with City Transit staff will be useful in assessing necessary transit improvements and their feasibility. Where the development or redevelopment is adjacent to an existing or proposed transit route, discussion with Operations Department staff is required to identify any need to consider incorporation in the site plan of transit stations, terminals, transit access facilities, commuter drop-off or parking facilities.

5.3.2 Bus stop and bus shelter locations and pedestrian links to the development are to be shown on the site plan (if applicable).

5.3.3 The relationship of the proposed buildings to transit related structures as well as the impact on transit operations caused by site generated traffic movements or queues must also be considered.

5.4 ACCESS DESIGN

Access to and from multi-residential, commercial, industrial and institutional areas must be provided in accordance with the applicable specifications contained in *Tables 5.4a* and *5.4b.* Separation distances between access driveways from intersections, as well as from other driveways are controlled to minimize traffic congestion and conflict points. Specific design dimensions promote safe, convenient ingress and egress from these areas.

Figure 5.4 illustrates the terms used in this section.

Figure 5.4 – Access Illustrations

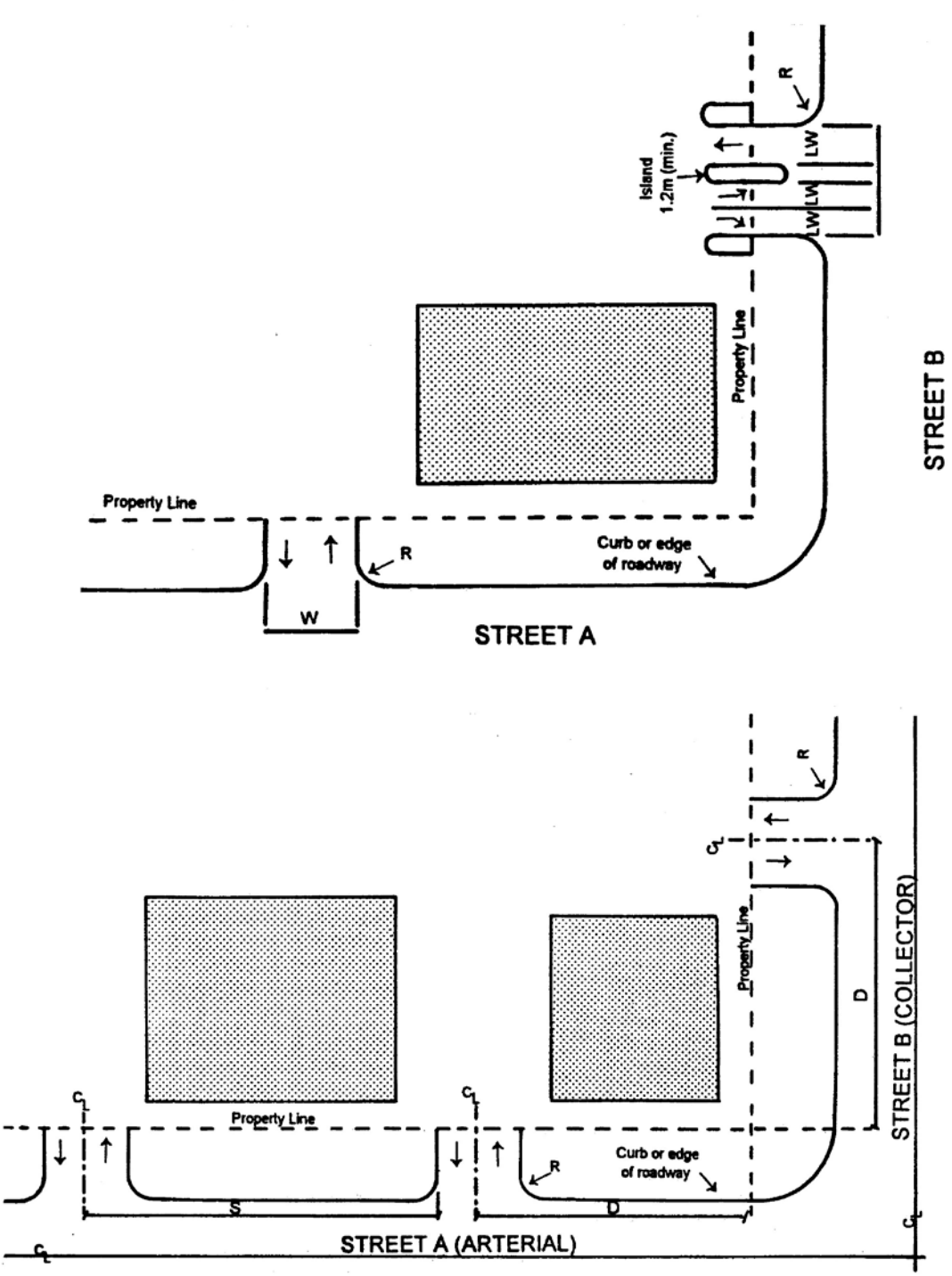


Table 5.4a – Access Layout

Access Classification	**Roadway Classification**	**Throat Width (W) or Lane Width (LW)**	**Radius (R)**	**Distance Between Accesses (S)**
Multi-Residential	Local/Collector	6.0m	6.0m	7.0m
	Arterial	7.5m		25m
Small Volume Commercial and Institutional (2-way access)	Local/Collector	7.5m	6.0m	23-30m
	Arterial	8.0m		60m
High Volume Commercial and Institutional	Collector (undivided)	8.0m	6.0m	60m
	Collector (divided)	3.6m through and right	4.5m	60m
	Arterial (undivided)	9.0m	4.5m	100m
	Arterial (divided)	3.0m left and 1.2m island (min.)	4.5m	100m
Industrial	Collector	9.0m (max. 15.0m)	4.5-6.0m	40-60m
	Arterial			

Table 5.4b – Access Distances

Access Classification	**Roadway Classification**	**Number of Accesses ***	**Distance from Non-Signalized Intersection (D)**	**Distance from Signalized Intersection (D)**
Multi-Residential	Local/Collector	1 access for 1-15m frontage	15m	30m**
	Arterial		30m	60m***
Small Volume Commercial and Institutional (2-way access)	Local/Collector	2 accesses for 15-50m frontage	30m	30m
	Arterial	3 accesses for 50-100m frontage	60m	60m
High Volume Commercial and Institutional	Collector/Arterial	3 accesses for 50-100m frontage	60m	60m
Industrial	Collector/Arterial	4 accesses for 150m frontage	30m	60m

* Based on metres of frontage

** Multi-Residential of up to 30 units

*** Multi-Residential of over 30 units

5.5 OFF-STREET PARKING

Off-street parking, as required in Section 5.18 of the City of Owen Sound's Zoning By-Law 2010-078 (as amended), must be provided in accordance with the applicable specifications contained in *Table 5.5*.

NOTE: *The parking space dimensions apply only to surface, non-structured parking facilities. Module dimensions required for the development of structured parking facilities shall be determined in compliance with the Ontario Building Code and architectural standards.*

5.5.1 Bicycle and Motorcycle/Moped Parking Areas

NOTE: *the provision of motorcycle/moped parking areas are optional. However, the City encourages the use of alternative, fuel-efficient modes of transportation.*

a) Bicycle and motorcycle parking facilities should be located in an area of the parking lot convenient to destination entrances and, where feasible, in an area which is visible to persons within the building.

b) Motorcycle/moped parking can be placed in areas which may be unsuitable for automobile parking due to size or shape. However, motorcycle/moped parking should not interfere with pedestrian traffic, must be clearly delineated by markings and barriers and must be protected from potential damage from other vehicles.

c) Bicycle and motorcycle/moped parking areas should be located in highly visible areas in order to minimize theft and vandalism The designated areas shall be placed on paved surfaces and be well lit.

d) Bicycle stalls shall be a minimum 1.8m long with the minimum number of stalls as determined in Zoning By-law 2010-078 (as amended) accommodated by a rack. The rack size will determine the width of the bicycle parking area with a 1.2m clear access aisle and 1.2m minimum vertical clearance. Stall dimensions for motorcycles/mopeds are 1.0m wide X 2.1m long. Typical parking configurations are shown in *Figure 5.5.1*

e) Bicycle spaces for residents or employees should be in an area equipped with a bicycle rack or locker designed for the purpose of parking and securing bicycles. Where a bicycle rack is used for occupant bicycle parking spaces, it shall be located in a secured room or area.

f) Bicycle spaces for visitors, patrons or couriers should be in an area equipped with a bicycle rack designed for the purpose of parking and securing bicycles. It may be located indoors or outdoors, but not within a secured room, enclosure or bicycle locker.

Table 5.5 – Parking Stall Dimensions

Dimension (m)	Diagram Ref.	Angle (degrees)				
		45	**60**	**75**	**90**	**0**
Stall Width, Parallel to Aisle	A	3.75	3.06	2.74	2.65	6.50
Stall Width, Parallel to Aisle (Barrier Free)	A	4.95	4.04	3.63	3.50	7.00
Stall Length of Line	B	8.65	7.53	6.71	6.00	6.0[Note 1] 7.0[Note 2]
Stall Length of Line (Barrier Free)	B	9.50	8.02	6.95	6.00	6.0[Note 1] 7.0[Note 2]
Stall Depth to Wall	C	6.12	6.52	6.48	6.00	3.10*
Stall Depth to Wall (Barrier Free)	C	6.72	6.95	6.72	6.00	3.10*
Aisle Width, Double Module One Way Traffic	D	3.70	5.00	5.50	6.00	4.00
Aisle Width, Double Module Two Way Traffic or Truck Access	D	6.00	6.00	6.00	6.00	6.00
Aisle Width, Single Module One Way Traffic	D	3.70	5.00	6.00	6.00	4.00
Aisle Width, Single Module Two Way Traffic or Truck Access	D	6.00	6.00	6.00	6.00	6.00
Stall Depth, Interlock	E	5.18	5.86	6.14	6.00	--
Stall Depth, Interlock(Barrier Free)	E	5.48	6.07	6.26	6.00	--
Module, Wall to Interlock	F	J+C+D+E				
Module, Interlocking	G	(Ex2)+D				
Module, Interlock to Curb Face	H	C+D+E				
Bumper Overhang (typical)	J	0.50	0.50	0.50	0.50	--
Offset	K	2.00	2.00	2.00	2.00	--
Cross Aisle, One Way	L	4.00	4.00	4.00	4.00	--
Cross Aisle, Two Way or Truck Access	L	7.00	7.00	7.00	7.00	--

Diagram:

NOTES

1 Two spaces c/w 1.8m manoeuvring space

2 w/o 1.8m manoeuvring space

* Stall depth to curb is 2.60 metres

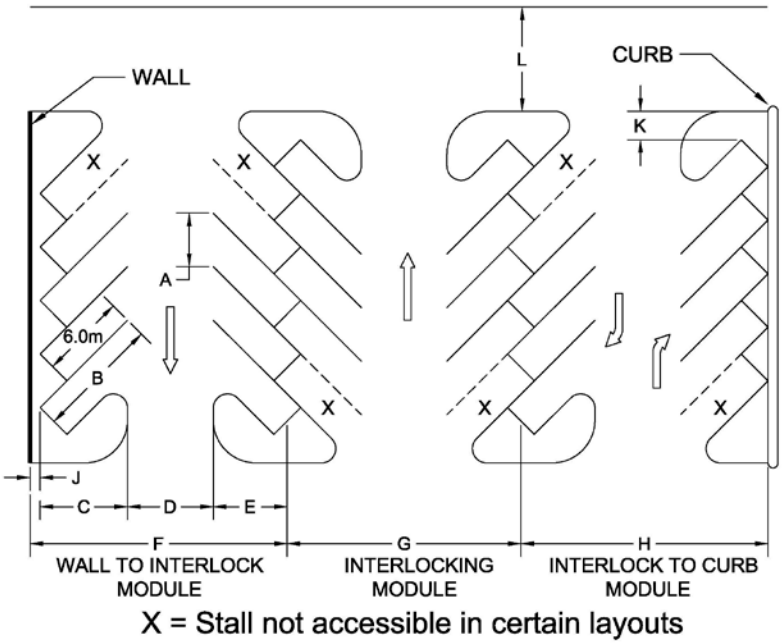
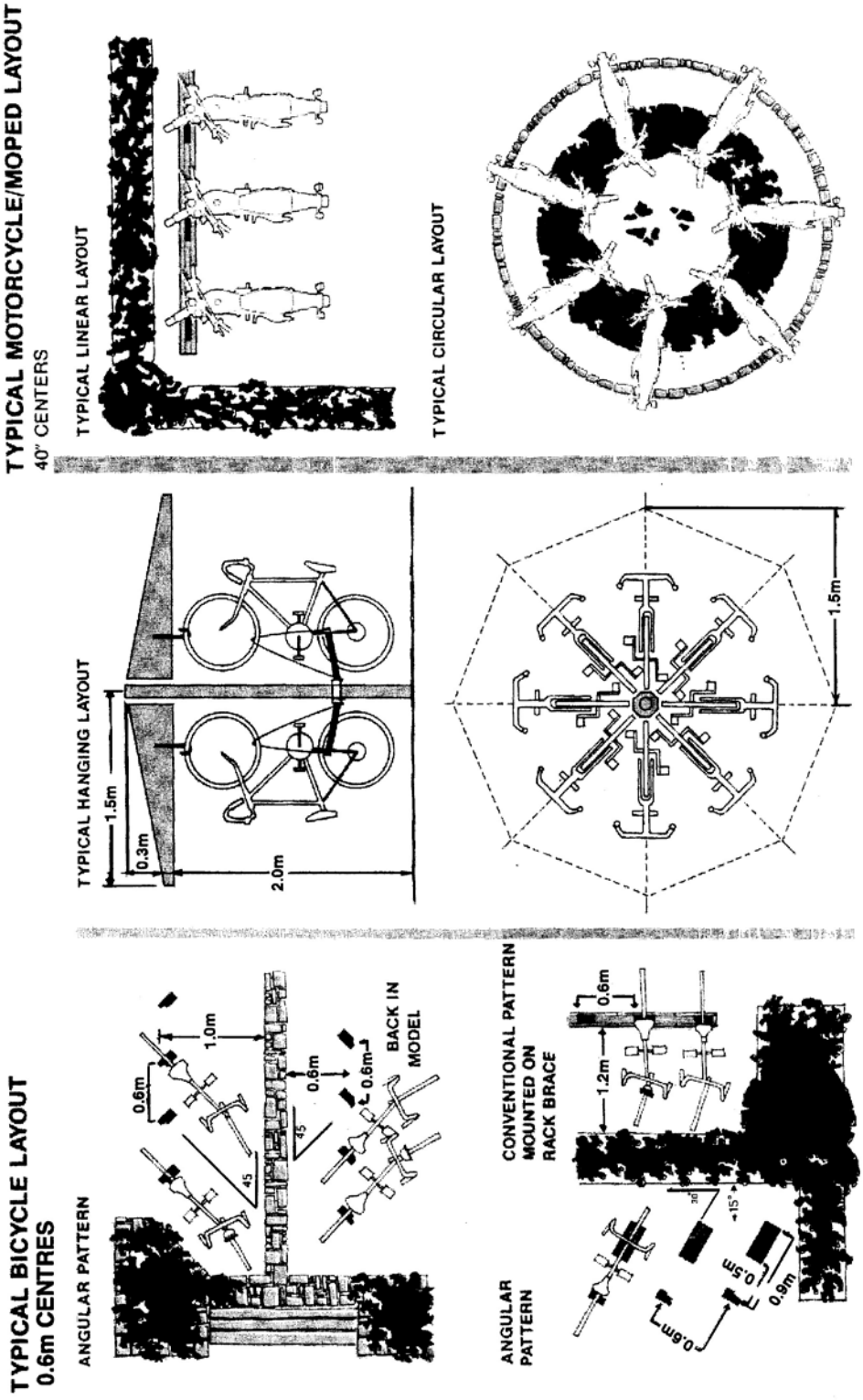


Figure 5.5.1 – Typical Bicycle and Motorcycle Parking Layouts

ILLUSTRATIVE DEPICTIONS ONLY Design dimensions are to comply with the Zoning By-law 2010-078 (as Amended)



5.5.2 Lighting & Landscaping of Parking & Loading Areas (excerpt from Zoning By-law 2010-078 (as amended)

a) Where lighting facilities are provided in conjunction with any off-street parking or loading area, no person shall arrange such lighting such that excessive light and glare is deflected onto adjoining properties.

b) Where a parking area containing four or more parking stalls or a loading spaces(s) abuts a residential use or undeveloped land in a Residential Zone a minimum of 1.5 metres of land abutting the lot line, shall be used for no other purpose than a planting strip in accordance with the provisions of this subsection.

c) Where a parking area containing four or more parking stalls or a loading spaces(s) abuts a portion of the street, a minimum of 1.5 metres of land abutting the lot line, shall be used for no other purpose than a planting strip in accordance with the provisions of this subsection.

d) In a C1 Zone, where a parking area containing four or more parking stalls in any yard which abuts a lot in a Residential Zone, no parking shall be permitted within 7.5 metres of the Residential Zone, unless a continuous privacy fence or solid vegetative screen having a minimum height of 1.5 metres is provided and maintained along the common lot line.

e) A planting strip required for b) shall be used for no other purpose than for a row of trees, a continuous hedgerow of evergreens or shrubs, a berm, a wall, or a privacy fence, not less than 1.5 metres high, immediately adjacent to the lot line or portion thereof along which such planting strip is required hereunder, arranged in such a way as to form a dense or opaque screen; with the remainder of the strip used for shrubs, flower beds or grass, ground cover or a combination thereof.

f) A planting strip required for c) shall be used for no other purpose than for a planting strip arranged in such a way as to form a landscape strip with a row of trees, shrubs, flower beds or grass, ground cover or a combination thereof. Notwithstanding, a berm, a wall, or a privacy fence may be permitted where it is required for noise attenuation purposes.

5.6 TRAFFIC CIRCULATION

5.6.1 Parking areas shall be separated from access roads with concrete barrier islands.

5.6.2 The access roads shall be designed to allow safe and convenient pedestrian travel to public transit access points.

5.6.3 Pedestrian walkways shall be segregated from vehicle access roads.

5.6.4 Drive-Through Queuing Requirements

a) Drive-through operations are required to provide sufficient queuing capacity to ensure queuing vehicles will not negatively impact on-site traffic circulation, pedestrian walkways, parking or the adjacent City street. This queuing capacity is to be provided by a vehicle queuing lane that is isolated from abutting traffic aisles by utilizing concrete curbing or islands.

b) The number of spaces provided in a queuing lane (vehicles in line) from the order station (menu board or bank ATM) is to be in accordance with *Table 5.6.*

Table 5.6 – Drive-Through Queuing Spaces

Type of Use	**Minimum Number of Spaces in Queuing Lanes**
Automated Bank Machine	3 before each ABM
Automotive Service Station /Repair Garage	3 before each service bay 1 at service bay exit if through-bay
Automotive Washing Establishment	3 before each wash bay 1 after each wash bay
Restaurant	12 total including 11 before the service/pick up window and 1 at the service/pick up window
Convenience Retail or Service Establishment	2 before service window

c) The minimum size of queuing spaces is to be 2.75m wide by 5.75m long.

d) Queue spaces must be arranged in a single waiting line in advance and behind the drive through service window.

e) Queue spaces may be arranged in a double waiting line in advance of the menu board/order station.

f) A minimum inside turning radius for queue spaces forming a waiting line is 7.0m.

g) Queue spaces forming a waiting line must be unobstructed by parking stalls or loading spaces and must be clearly delineated by markings and barriers; and,

h) Queuing spaces forming a waiting line or storage space for the service offered cannot form part of a parking aisle providing access to parking stalls.

5.7 LOADING SPACE REQUIREMENTS

5.7.1 Loading spaces, as required in Section 5.22 of Owen Sound's Zoning By-law, must be provided.

5.7.2 The minimum dimensions for a loading space are: minimum 3.5m wide by 10.0m long with a vertical clearance of 4.2m.

5.7.3 Each loading space shall be provided with one or more unobstructed driveways contained within the lot on which the spaces are located and accessible from a street or lane. No part of such driveway shall be used for the parking or temporary storage of vehicles.

5.7.4 A loading space shall be located to the rear of a building's front wall or to the rear of an exterior side wall facing a public right of way. Where the space is visible from the public right-of-way, it shall be effectively landscaped and screened to break up the view of the area.

5.7.5 A loading area shall be maintained with a stable surface which is treated to prevent the raising of dust or loose particles and with provisions for drainage facilities. Where such drainage facilities connect to City storm sewers, a suitable oil and grit interceptor must be installed.

5.7.6 Off-street loading facilities shall be so arranged that they avoid interference with on-site traffic circulation, pedestrian walkways, parking or the adjacent City street.

5.8 TRAFFIC IMPACT AND ACCESS STUDIES

It is not the intent of the City that traffic impact and access studies be undertaken unnecessarily for small developments that have little or no traffic impact. These guidelines identify the minimum level of development for which a traffic study is required. All developments must ensure that good design practice is used for access and circulation on the site.

Moderate sized development may require a study to review driveway access and impact on neighbouring properties but they are too small to cause significant capacity or traffic operational impacts on the street system. For this category of development, a reduced or modified traffic study is all that is normally required.

Large developments require a comprehensive traffic study as they may cause significant capacity or operational impacts on the street system. The size of the development in these guidelines refers to the entire parcel or plan of subdivision. Staging of the development to circumvent the intent of these guidelines will not be allowed.

5.8.1 Small Developments – No Traffic Study Required

The following sizes of developments are estimated to generate about 50 end trips in the p.m. peak hour or less than one per minute. They are exempt from the requirement of undertaking a traffic study because the impact on the adjacent street system will be negligible.

Site access and circulation design must be supported and justified by the applicant, and will be reviewed by the City as part of the site plan review.

• Residential: single family	50 units
• Residential: apartments	75 units
• Hotel	75 rooms
• Day Care Centre	400 m^2 G.F.A.
• Office	2,000 m^2 G.F.A.
• Medical Office	1,500 m^2 G.F.A.
• Retail Shopping Centre	400 m^2 G.F.A.
• Convenience Store	100 m^2 G.F.A.
• Fast Food Restaurant	100 m^2 G.F.A.
• Sit Down Restaurant	500 m^2 G.F.A.
• Bank	400 m^2 G.F.A.

5.8.2 Moderate Size Development – Reduced Traffic Study

The following sizes of developments are estimated to generate about 150 end trips in the p.m. peak hour or about 2-3 end trips per minute. Traffic study requirements would be limited to a review of the driveway traffic operation to ensure that the access is appropriate and that there is little impact on adjacent properties and abutting streets. If the site traffic is oriented all in one direction, the City may require analysis of the nearest major intersection to ensure that capacity is available on the street system.

• Residential: single family	150 units
• Residential: apartments	225 units
• Hotel	225 rooms
• Day Care Centre	1,200 m^2 G.F.A.
• Office	6,000 m^2 G.F.A.
• Medical Office	4,500 m^2 G.F.A.
• Retail Shopping Centre	1,200 m^2 G.F.A.
• Convenience Store	300 m^2 G.F.A.
• Fast Food Restaurant	300 m^2 G.F.A.
• Sit Down Restaurant	1,500 m^2 G.F.A.
• Bank	1,200 m^2 G.F.A.

5.8.3 Large Developments – Comprehensive Traffic Study

For developments of larger size than outlined in the previous sections, a traffic study is required to determine the impact of the development on the street system. The study would recommend the improvements that are required to provide a satisfactory level of traffic operation on the adjacent street system and adequate access to the site. The traffic study would be reviewed by the City and the required improvements would become part of the development agreement to be completed by the developer at no cost to the City.

5.8.4 Traffic Study Consultant Qualifications

When the scale of development warrants a traffic study as outlined in the preceding section, it is the developer's responsibility to retain an experienced traffic consultant or, alternatively, at the discretion of the Manager of Engineering Services, the City may retain a consultant at the developer's expense.

The Consultant should be a member of the Institute of Transportation Engineers and registered as a Professional Engineer in the Province of Ontario. The consultant should have experience in conducting similar traffic studies in Owen Sound and in other locations.

5.8.5 Traffic Study Requirements

The scope of the traffic study shall be as deemed necessary by the Manager of Engineering Services. If, in the opinion of the City, data or analysis is deemed to be missing or incomplete, the report may be returned to the author for revision.

See APPENDIX H for Scoped Traffic Impact Study Terms of Reference.

5.9 ACCESSIBILITY REQUIREMENTS

As part of the Site Plan Approval and Ontario Building Code requirements, the City of Owen Sound requires the provision of barrier-free parking and accessibility to all buildings. Exceptions include houses, high hazard industrial and infrequently occupied buildings (OBC Reference 3.8.1.1.).

Developers are to be aware of the requirements of the "Accessibility for Ontarians with Disabilities Act, 2005" when designing for both new and existing developments.

APPENDIX E contains figures relating to this section.

5.9.1 Universal Design Principles and Guidelines

The following principles and guidelines are intended to provide direction in the design of barrier-free facilities. They are not intended to dictate the design process.

.1 *Equitable Use* – The design is useful and marketable to people with diverse abilities.
   a) Provide the same means of use for all users: identical whenever possible; equivalent when not;
   b) Avoid segregating or stigmatizing any users;
   c) Provisions for privacy, security and safety should be equally available to all users;
   d) Make the design appealing to all users.

.2 *Flexibility in Use* – The design accommodates a wide range of individual preferences and abilities.
   g) Provide choice in methods of use;
   h) Accommodate right or left handed access and use;
   i) Facilitate the user's accuracy and precision;
   j) Provide adaptability to the user's pace.

.3 *Simple and Intuitive Use* – Use of the facility is easy to understand, regardless of the user's experience, knowledge, language skills or current concentration level.
   a) Eliminate unnecessary complexity;
   b) Be consistent with user's expectations and intuition;
   c) Accommodate a wide range of literacy and language skills;
   d) Arrange information consistent with its importance;
   e) Provide effective prompting and feedback during and after task completion.

.4 *Perceptible Information* – The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
   a) Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information;
   b) Provide adequate contrast between essential information and its surroundings;
   c) Maximize legibility of essential information;
   d) Differentiate elements in ways that can be described (i.e. make it easy to give instructions or directions);
   e) Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

.5 *Tolerance for Error* – The design minimizes hazards and the adverse consequences of accidental or unintended actions.
   a) Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated or shielded;

b) Provide warnings of hazards and errors;
c) Provide fail-safe features;
d) Discourage unconscious action in tasks that require vigilance.

.6 *Low Physical Effort* – The design can be used efficiently and comfortably and with a minimum of fatigue.
a) Allow user to maintain a neutral body position;
b) Use reasonable operating forces;
c) Minimize repetitive actions;
d) Minimize sustained physical effort.

.7 *Size and Space for Approach and Use* – Appropriate size and space are provided for approach, reach, manipulation and use regardless of user's body size, posture or mobility.
a) Provide a clear line of sight to important elements for any seated or standing user;
b) Make reach to all components comfortable for any seated or standing user;
c) Accommodate variations in hand and grip size or minimize grip requirements;
d) Provide adequate space for the use of assistive devices or personal assistance.

The Principles of Universal Design address only universally usable design, while the practice of design involves more than the consideration for usability. Designers must also incorporate other considerations such as economic, engineering, cultural, gender and environmental limitations in the design process.

These principles offer designers guidance to better integrate features that meet the needs of as many users as possible.

5.9.2 Design Considerations

The City of Owen Sound Site Development standards require that accessible parking be provided according to the specific zoning requirements. However, approximately one percent of the total numbers of required parking spaces for a proposed development are to be provided for disabled persons if no other regulations apply.

5.9.3 Signage

.1 Accessible parking signage shall incorporate an official designated disabled parking space sign developed by the Ministry of Transportation (1991). See Appendix E, drawing E1a;

.2 Each accessible parking space shall be designated with signage that is:

a) mounted vertically on a post or bollard that is colour contrasted with the background environment;
b) at least 300mm wide x 450mm high;
c) installed at a height of 1275mm from the grade to the bottom of the sign;
d) for perpendicular parking, mounted in a bollard, centred on the parking stall; and
e) for parallel parking, located toward the end of the parking stall, on the opposite side from the access aisle.

.3 Where the location of accessible parking stalls is not obvious or is distant from the approach viewpoints, directional signage shall be placed along the route leading to the designated parking stalls. Such directional signage shall incorporate the symbol of access and the appropriate directional arrows.

.4 Where the location of the nearest accessible entrance is not obvious or is distant from the approach viewpoints, directional signage shall be place along the route leading to the nearest accessible entrance to the facility. Such directional signage will incorporate the symbol of access and the appropriate directional arrows.

5.9.4 Parking

.1 Accessible parking stalls shall be located as close as possible to an accessible walkway and the accessible building entrance. In any case, accessible parking stalls should be located within 30 metres of the main building entrance.

.2 Accessible parking stalls shall be placed to allow immediate access to a barrier-free walkway, ideally without requiring the user to move behind or between parked vehicles or to cross vehicular traffic.

.3 Accessible parking stalls shall:
a) be designed to incorporate the minimum dimensions set out in Zoning By-law 2010-078, or its successor or, for perpendicular parking, be a minimum of 2500mm wide with an *adjacent* access aisle at least 2000mm wide clearly indicated by markings or, for parallel parking, be a minimum of 5400mm long with an *adjacent* access aisle at least 1600mm wide clearly indicated by markings (see Appendix E, drawing E3, E4). In a retrofit situation where it is technically unfeasible to provide a 2000mm access aisle, the access aisle may be reduced to 1300mm;
b) incorporate pavement markings containing the International Symbol of Access in accordance with drawing E1a in Appendix E. Markings to include a

1525mm x 1525mm white border and symbol with a blue background field colour;

c) have a height clearance at the parking stall and along the vehicle access and egress routes, of at least 2750mm for outdoor parking and, at least 2590mm for indoor parking, including vehicular entrances.

d) have a gradient of not more than 1.5% and a crossfall gradient of not more than 1.0%

.4 An accessible path of travel is required to connect the accessible parking stalls to the barrier-free building entrance. Exterior walks shall be slip resistant, continuous, hard surfaced and should drain easily. A brushed concrete finish, at right angles to the path of travel is preferred.

5.9.5 Passenger Loading Zones

.1 A minimum width of 1200mm and a gradient not exceeding 1 in 20 is required for barrier-free exterior walks. Gradients exceeding 1 in 20 shall be designed as a ramp.

.2 In all cases, due regard shall be given to ease of movement of pedestrians using the sidewalk. Sidewalk cross fall exceeding 2% will not be acceptable unless available space is insufficient to allow normal ramp depressions.

.3 Provide a change in surface materials or painted lines in locations in which a barrier-free access traverses a vehicular driveway, fire route or parking aisle.

.4 Drain inlets or catch basins should not be placed to conflict with a barrier-free walk or ramp.

.5 Barrier-free ramp requirements:

a) ramps are required where the slope of a barrier-free path of travel exceeds 1 in 20 (5%).

b) maximum ramp slope: 1 in 12 (8%);

c) minimum ramp width between handrails: 870mm;

d) minimum level area at top and bottom of ramp is to be 1.5m x 1.5m;

e) provide level area minimum 1.5m long at intervals not exceeding 9m in the ramp's surface;

f) handrails are to be a minimum of 865mm high but not exceeding 965mm high and they shall extend horizontally not less than 300mm beyond the ramp.

Section 6 – SITE SERVICING

6.1 ON-SITE SERVICING APPROVALS

All plumbing and site servicing shall comply with the Building Code Act, Ontario Building Code and applicable municipal by-laws.

Private sewers and private water supply piping systems shall be installed according to the:

- Guidelines for the Design of Sanitary Sewage Work Systems
- Guidelines for the Design of Storm Sewers
- Guidelines for the Design of Water Distribution Systems

These documents are issued by the Environmental Approvals & Project Engineering Branch of the Ministry of the Environment.

A Professional Engineer is required to be retained to perform site review of site servicing installations. Review reports to be submitted to the Public Works Division.

A Master Plumber or Drain Contractor licensed with the City of Owen Sound must install all plumbing and site servicing installations.

Where required, all pipe and fittings shall be certified by a testing agency accredited by the Standards Council of Canada and be clearly labelled.

All underground piping located under asphalt, concrete or otherwise subject to vehicular traffic shall have backfill compacted the complete depth of the trench.

All lawn irrigation systems are subject to the guidelines established by the Public Works Division. An approved backflow prevention device must be installed to protect the potable water supply.

A separate permit is required for the installation of site services if these installations are not included with another building permit. This permit is obtained from the Engineering Services Division.

All tests shall be performed as required by subsections 7.3.6. & 7.3.7. of the Ontario Building Code.

Special Conditions for Water Services:

a) All new water service installations (domestic or fire) which are 100mm or larger in diameter shall be sanitized in accordance with City of Owen Sound Specifications for Watermain Construction, Section 4.2: Disinfection.
b) Cathodic protection is required on all ferrous pipe and fittings.

a) Where a water service is to be used for the temporary supply of water for construction, the connection shall be protected from backflow with a hose connection vacuum breaker or equivalent.
b) Private fire hydrants shall be configured to the satisfaction of the Manager of Public Works and shall be tested to ensure proper flow and drainage.
c) A "Contractor's Material & Test Certificate for Private Fire Service Mains" in accordance with NFPA-24 shall be submitted for fire main installations.
d) Water service pipe and fire service main materials must be listed in Table 7.2.11.2. of the Ontario Building Code.
e) If a property has more than one connection to the municipal water supply, a check valve shall be installed at each connection and remain accessible.
f) Thrust restraint of water service piping which is 100 mm or larger in diameter is required.
g) Any interconnection of the municipal water supply to an auxiliary water supply is prohibited.

6.2 OFF-SITE WORKS BY THE CITY

6.2.1 Service Laterals and Roadways: The owner shall pay to the City the estimated cost of constructing service laterals required to accommodate the proposed development and the cost of improving the road, sidewalk, curb and gutter, boulevard and all other works adjacent to the said land, to the satisfaction of the Manager of Engineering Services, prior to the issuance of a building permit.

6.2.2 The owner shall pay the actual cost of the said improvements and shall pay the full amount of which the actual coast exceeds the estimated cost within thirty (30) days of receipt of an invoice from the City. Similarly, upon completion of accounting, should the estimated cost exceed the actual cost, the City shall refund the difference to the owner without interest.

6.2.3 Relocation of existing services: The Owner shall pay the estimated cost or shall make arrangements, financial or otherwise, for the relocation of utilities and municipal services including but not limited to existing sewers, watermains, service laterals, street furniture signs, hydrants, utility poles, street trees as required to accommodate the proposed development, prior to the issuance of a building permit to the satisfaction of the Manager of Engineering Services.

6.2.4 The Owner shall pay the actual cost of said relocations shall pay the full amount by which the actual cost exceeds the estimated cost within thirty (30) days of receipt of an invoice from the City. Similarly, upon completion of accounting, should the estimated cost

exceed the actual cost, the City shall refund the difference to the Owner without interest.

6.3 SERVICING PLAN

The servicing plan shall show:

a) The sewers, catch basins and watermain external to the building for the said lands.
b) The storm, sanitary and water services external to the building including valves; hydrants; manholes; cleanouts; area drains; catch basins
c) The elevation of inverts at all: manholes; catch basins; cleanouts;
d) size and grade of pipes
e) The elevation of inverts at the street line
f) Invert elevation of connections at sewer main and any pipe crossings.

6.4 STANDARD NOTES

The following notes are to appear on the Servicing drawing:

1. All curb cuts or curb fills require a Special Services Application issued by the Engineering Services Division.
2. Tapping of water mains will be performed by City forces and requires a Special Services Application issued by the Engineering Services Division.
3. The sizing of culverts located on the road allowance is to be verified by the Engineering Services Division prior to installation.

6.5 DESIGN CRITERIA

Desirable grade on sanitary sewer laterals is 2.0% - minimum grade is 1.0%

Minimum grade on storm laterals is 0.50%

The design of sewers and watermains shall meet the requirements of the City of Owen Sound Standards

Domestic water lines shall be separated and valved from any sprinkler line a minimum of 9.0 metres from the building

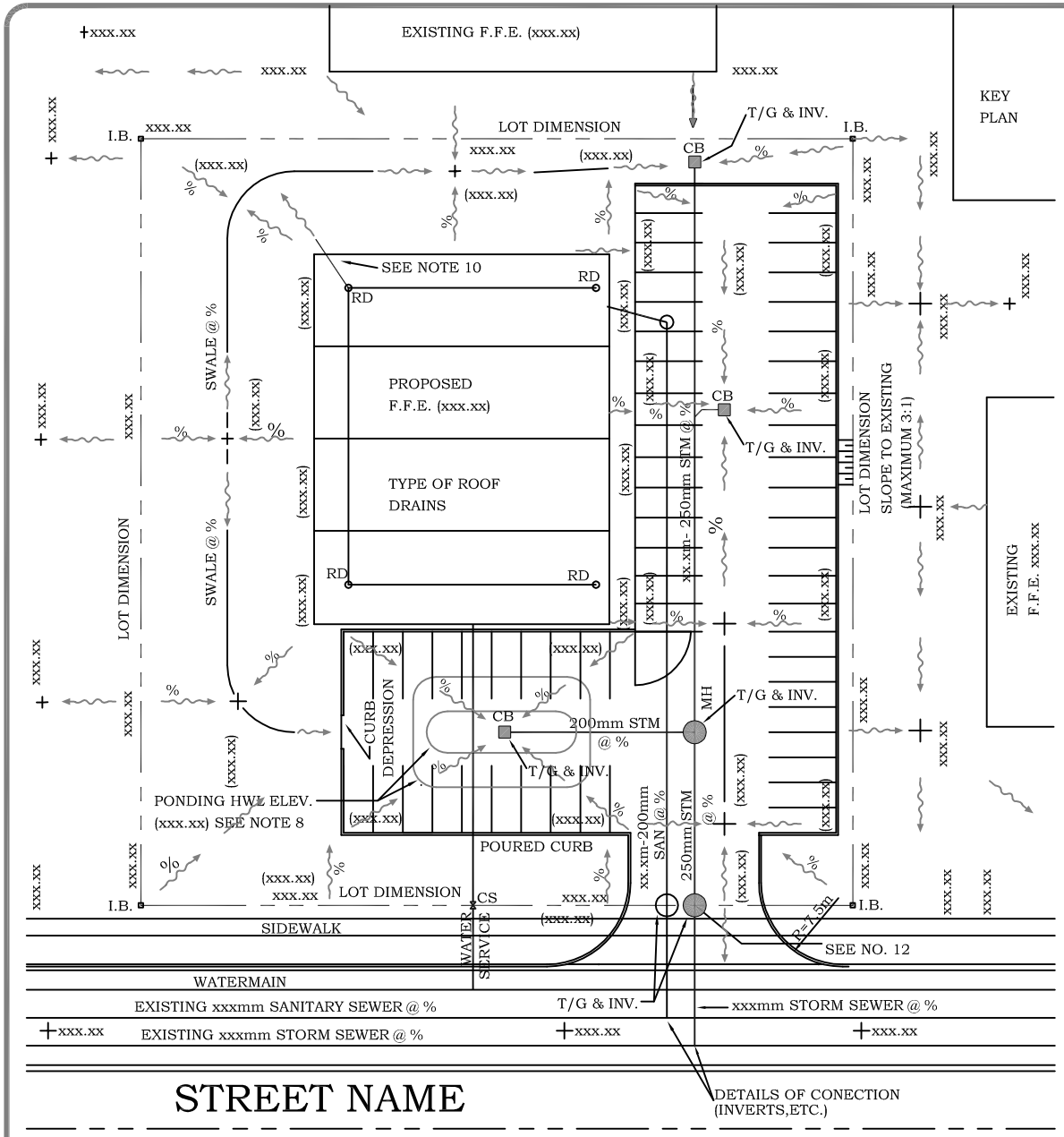
Minimum bury depths for service piping is:

Water: 1.7m to obvert of pipe
Sanitary: 1.5m to 1.7m to invert of pipe
Storm: 1.5m to 1.7m to invert of pipe

Service piping must be insulated if minimum bury depths cannot be achieved due to ground conditions or location of service mains.

APPENDIX A

Sample Grading & Servicing Plan



NOTES:

1. CITY OF OWEN SOUND BENCHMARK TO BE REFERENCED, DRAWING IS TO HAVE A KEY PLAN
2. PLAN TO BE METRIC UNITS
3. ALL DRAINAGE MUST BE SELF CONTAINED
4. SPOT ELEVATIONS ON ADJACENT LANDS TO BE SHOWN AT 5 AND 10 METRE OFFSET FROM PROPERTY LINE ON A 20 METRE GRID TO BE SHOWN TO PERMIT DETERMINATION OF EXISTING DRAINAGE PATTERNS
5. SHOW FINISHED FLOOR ELEVATIONS OF ALL ADJACENT BUILDINGS
6. GRADES FOR ASHPALT TO BE A MINIMUM OF 0.5% AND A MAXIMUM OF 8.0% AND FOR GRASSED AREAS, MINIMUM 2.0%, MAXIMUM 10.0%
7. GRADE CHANGES IN EXCESS OF 1.0 METRE ARE TO BE ACHIEVED BY USE OF A RETAINING WALL. ALL RETAINING WALL DETAILS SHALL BE SUBMITTED FOR REVIEW
8. IF USING SURFACE STORAGE FOR STORM WATER MANAGEMENT, POND LIMITS FOR THE 5 YEAR AND 100 YEAR DESIGN STORMS MUST BE SHOWN. THE ALLOWABLE POND DEPTHE ARE:
   - 0.3m MAXIMUM IN PAVED PARKING AREAS OF LEAST ANTICIPATED USE;
   - 0.5m IN LANDSCAPED AREAS, AND
   - 1.0m IN LOW LEVEL LOADING BAYS
9. ALL RELEVANT DETAILS FOR CURB, SIDEWALK, SEWERS, ORIFICE PLATES, OIL / GRIT INTERCEPTORS, ETC. ARE TO BE SHOWN
10. ROOF LEADERS ARE TO BE DISCHARGED TO GRADE IN LANDSCAPED AREAS IF POSSIBLE. ROOF LEADERS ARE NOT TO BE CONNECTED TO FOUNDATION DRAINS OR SUMP PITS
11. ALL MAINTENANCE HOLES AND CATCHBASINS TO BE INSTALLED AS PER CURRENT ONTARIO PROVINCIAL STANDARD DRAWINGS. ALL CONNECTING PIPE INVERT ELEVATIONS ARE TO BE SHOWN
12. CONTROL MAINTENANCE HOLES, OIL TRAPS AND OIL / GRIT INTERCEPTORS ARE TO BE PLACED AT THE PROPERTY LINE
13. THESE NOTES TO BE USED IN CONJUNCTION WITH THE CURRENT CITY OF OWEN SOUND SITE PLAN ENGINEERING STANDARDS

LEGEND:

xxx.xx	EXISTING ELEVATION
(xxx.xx)	PROPOSED ELEVATION
CB	CATCH BASIN
CS	CURB STOP
MH	MAINTENANCE HOLE
RD	ROOF DRAIN

Owen Sound
COMMUNITY SERVICES DEPARTMENT
PLANNING DIVISION
OWEN SOUND ONTARIO

Title

SAMPLE GRADING, DRAINAGE & SERVICING PLAN

SCALE:	METRIC - A
	N.T.S.
DESIGN:	DMG
DRAWN:	DMG
CHECKED:	DMG
DATE:	NOV 2006

FILE No.: APPENDIX

Drawing No. A1

APPENDIX B

Modified Rational Method Analysis

MODIFIED RATIONAL METHOD
ANALYSIS

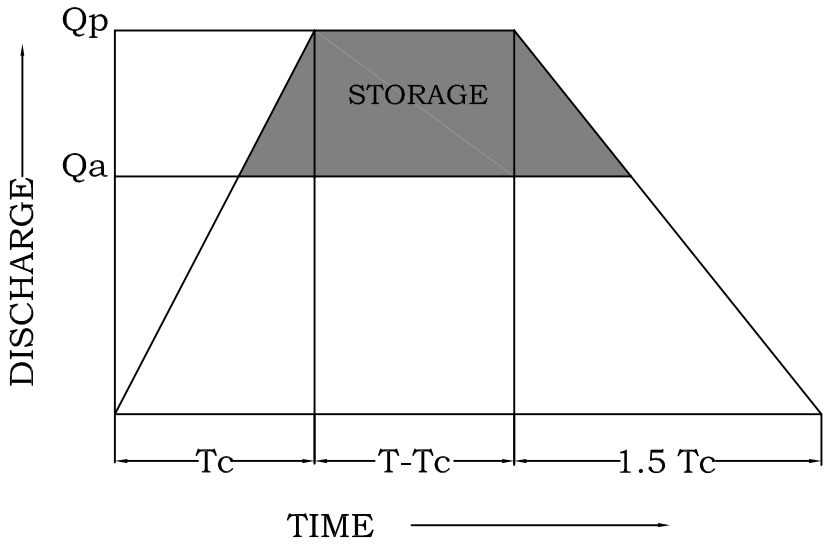
DEFINED Qp = PEAK FLOW
Qa = ALLOWABLE FLOW
Tc = TIME OF CONCENTRATION

$$\text{STORAGE} = (Qp-Qa)(T-Tc) + \left[\frac{Tc\,(Qp-Qa)}{Qp} + 1.5\,Tc\,\frac{(Qp-Qa)}{Qp}\right]\frac{Qp-Qa}{2}$$

$$=(Qp-Qa)(T-Tc) + 2.5\,Tc\,\frac{(Qp-Qa)^2}{2Qp}$$

$$=(Qp-Qa)(T-Tc) + \frac{1.25\,Tc\,(Qp-Qa)^2}{Qp}$$

FOR T = Tc $$\text{STORAGE} = \frac{1.25\,Tc\,(Qp-Qa)^2}{Qp}$$



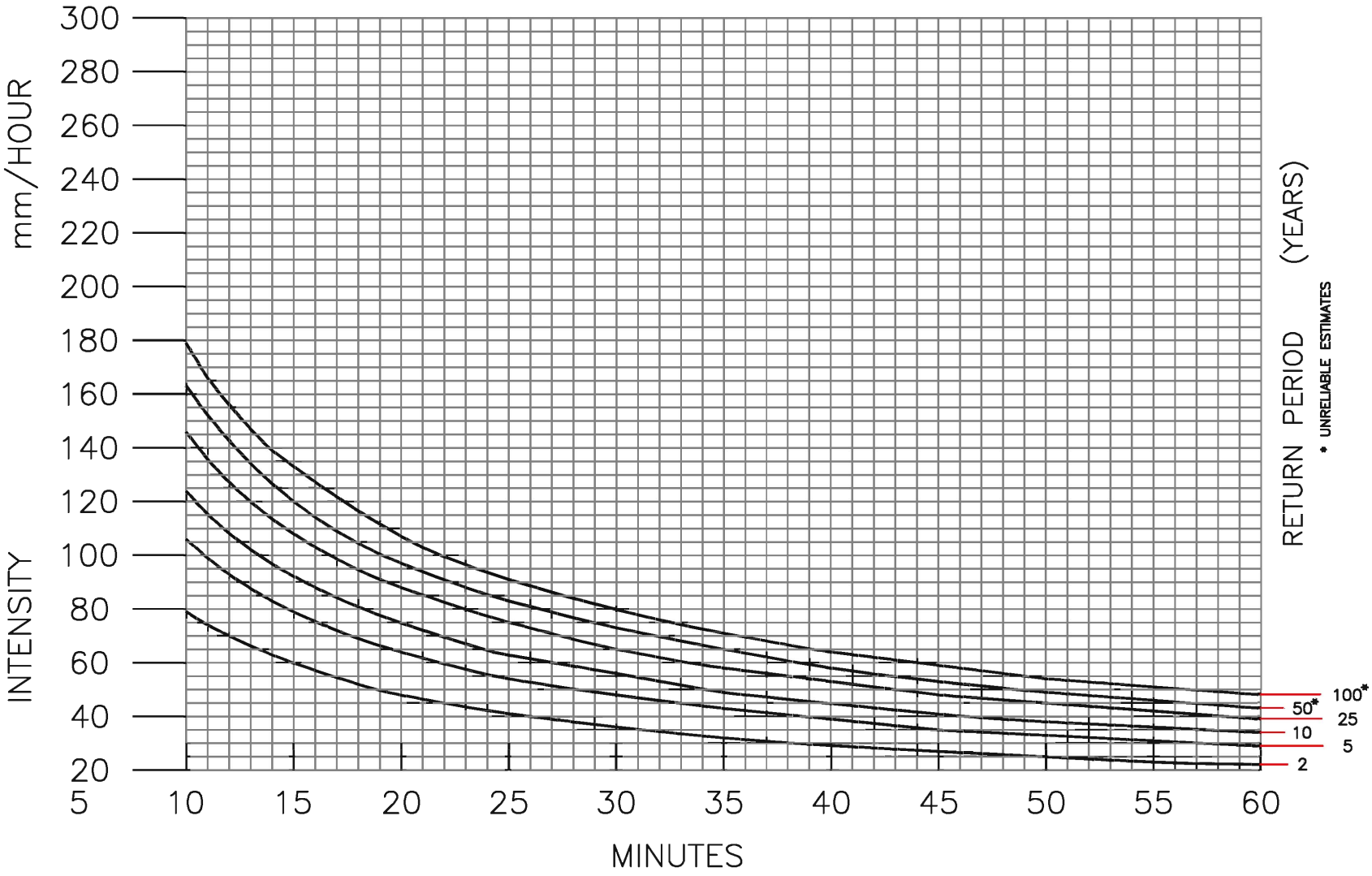
Owen Sound COMMUNITY SERVICES DEPARTMENT PLANNING DIVISION OWEN SOUND ONTARIO	Title MODIFIED RATIONAL METHOD	METRIC - A SCALE: N.T.S. DESIGN: DMG DRAWN: DMG CHECKED: DMG DATE: FEB 2007	FILE No.: APPENDIX Drawing No. B1

APPENDIX C

Owen Sound Area IDF Curves

BASED ON RECORDED RAIN GAUGE DATA FOR THE PERIOD – 1965 TO 1983 OWEN SOUND M.O.E.

LATITUDE: 44°35' LONGITUDE: 80°56' ELEVATION:178m



IDF CURVES ARE BASED ON THE FOLLOWING COEFFICIENTS

RETURN PERIOD	A	B
5yr	29.1	−0.724
100yr	47.7	−0.738

CURVE EQUATION:

$I = A \times T^{B}$

I=INTENSITY

T=TIME IN HOURS

COMMUNITY SERVICES DEPARTMENT
PLANNING DIVISION
OWEN SOUND ONTARIO

Owen Sound

Title
RAINFALL INTENSITY CURVES

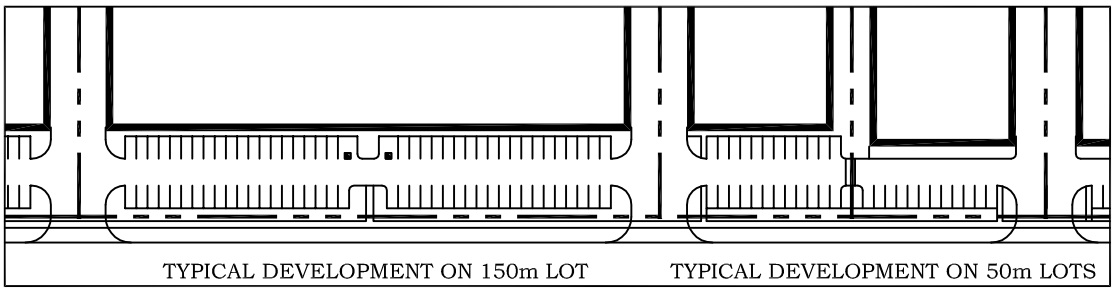
SCALE: N.T.S. METRIC - A
DESIGN: DMG
DRAWN: DMG
CHECKED: DMG
DATE: FEB 2007

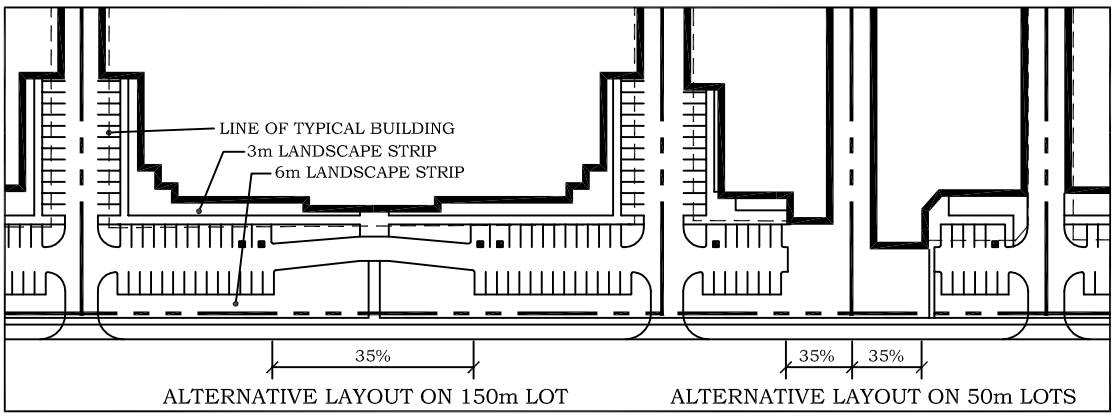
FILE No.: APPENDIX

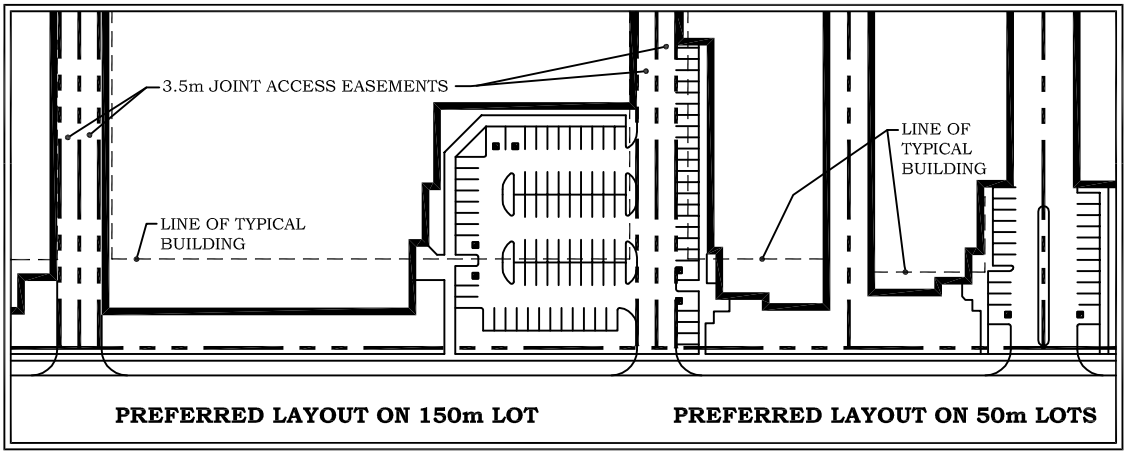
Drawing No. C1

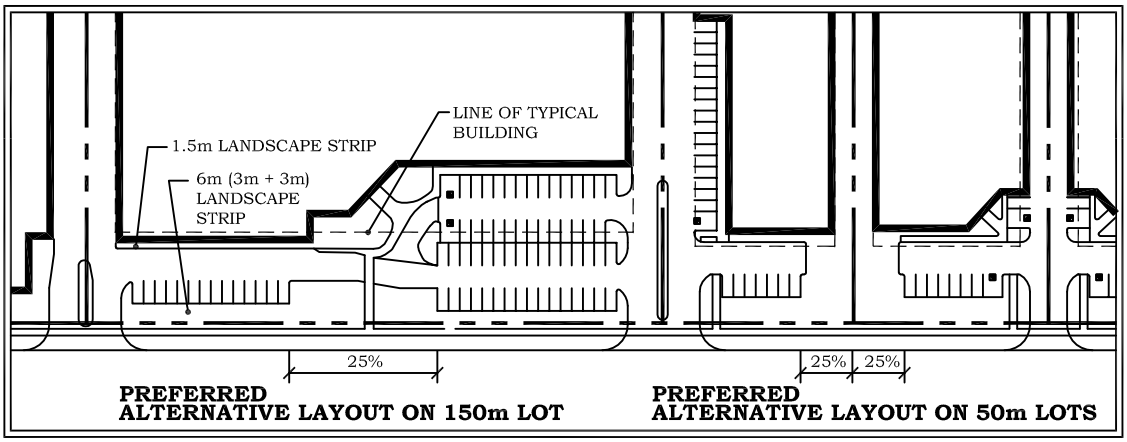
APPENDIX D

Miscellaneous Drawings









Owen Sound
COMMUNITY SERVICES DEPARTMENT
PLANNING DIVISION
OWEN SOUND ONTARIO

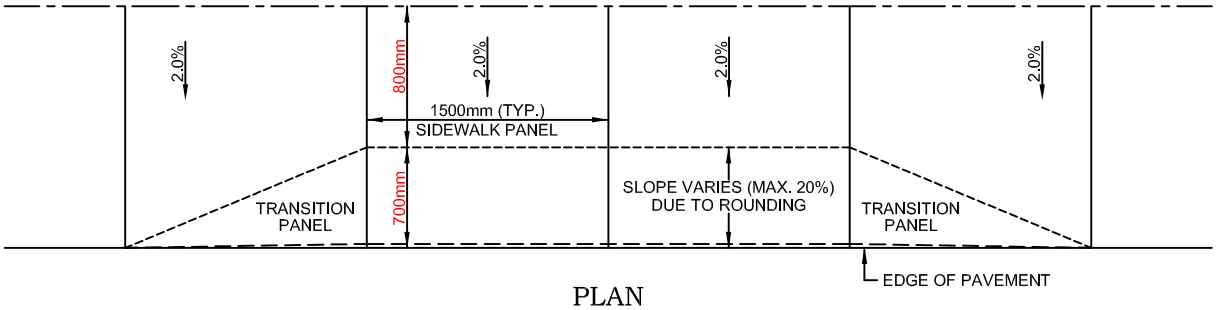
Title

SAMPLE PARKING LAYOUTS

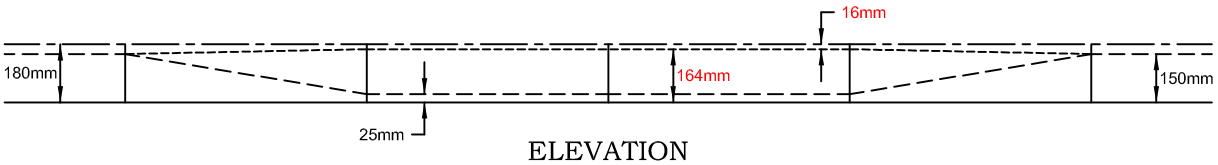
METRIC - A	
SCALE:	N.T.S.
DESIGN:	DMG
DRAWN:	DMG
CHECKED:	DMG
DATE:	MAR 2007

FILE No.: APPENDIX

Drawing No. D1

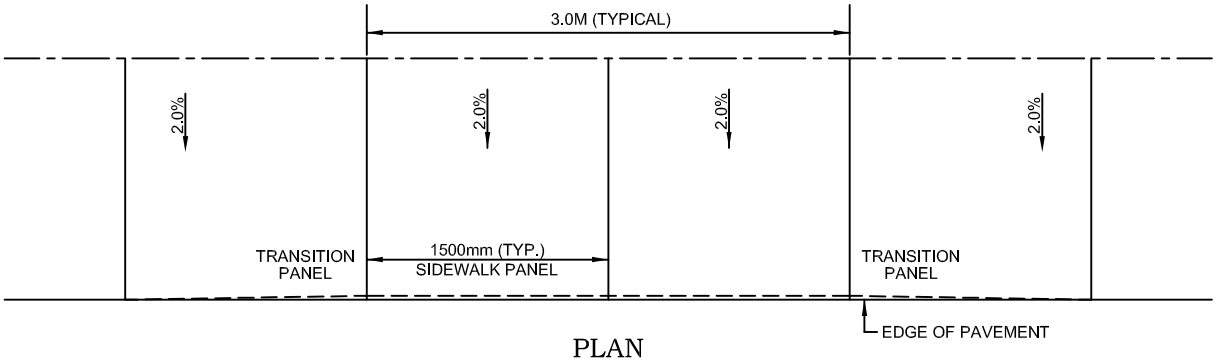


PLAN

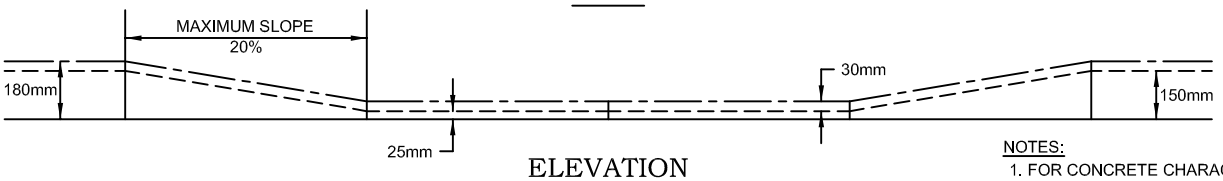


ELEVATION

RAMPED SIDEWALK



PLAN



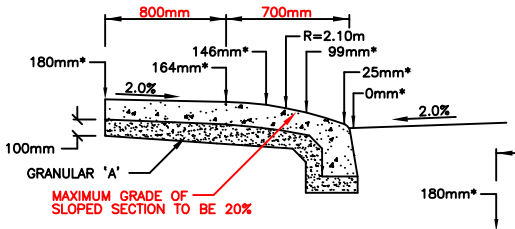
ELEVATION

DEPRESSED SIDEWALK

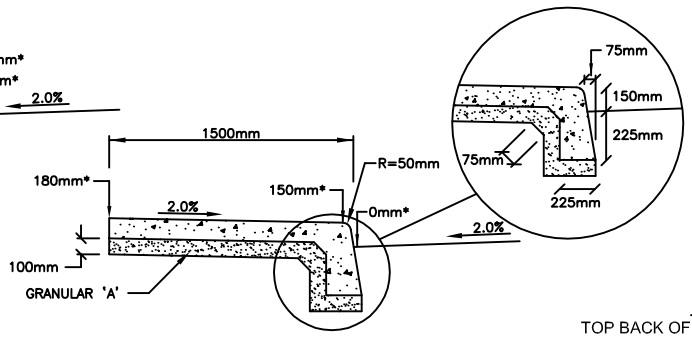
NOTES:

1. FOR CONCRETE CHARACTERISTICS REFER TO O.P.S.S. 353
2. * DENOTES HEIGHT ABOVE EDGE OF PAVEMENT.
3. ADJACENT DRIVEWAYS SEPARATED BY LESS THAN A 7.5m DISTANCE SHALL HAVE DRIVEWAY TYPE (DEPRESSED) SIDEWALK CONSTRUCTED BETWEEN DRIVEWAYS.

SIDEWALK THICKNESS
NORMAL SIDEWALK - 125mm
RES. DWY SIDEWALK - 150mm
IND./COMM. DWY SIDEWALK - 200mm



DRIVEWAY CROSS-SECTION



STANDARD CROSS-SECTION

LEGEND

TOP BACK OF SIDEWALK

TRANSITION LINE FROM 2.0% TO ROUNDED DRIVEWAY/SIDEWALK GRADE

TOP FACE OF SIDEWALK

Owen Sound
COMMUNITY SERVICES DEPARTMENT
PLANNING DIVISION
OWEN SOUND ONTARIO

Title
1.5m CURBFACE s/w
RAMP TREATMENTS

REV.	DATE:	DESCRIPTION	BY:
1	01/08	REVISED DIMENSIONS	DMG

METRIC - A	
SCALE:	N.T.S.
DESIGN:	DMG
DRAWN:	DMG
CHECKED:	DMG
DATE:	APR 2007

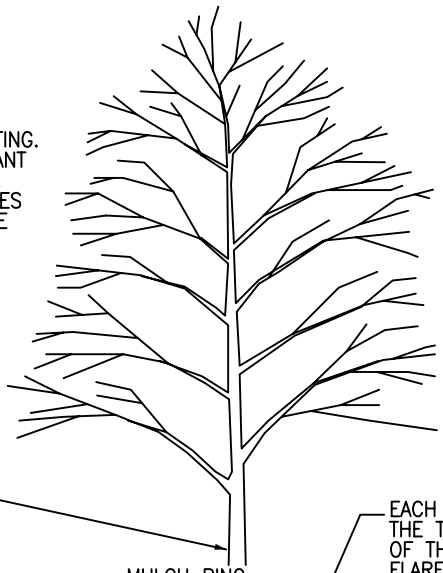
FILE No.: APPENDIX

Drawing No. D2

Q:\MAPPING & DRAFTING\Eng Standards\Barrier Free.dwg, 1:3.1

INTERNATIONAL SOCIETY OF ARBORICULTURE

INTERNATIONAL SOCIETY OF ARBORICULTURE
1400 WEST ANTHONY DRIVE
CHAMPAIGN, IL 61821
(217) 355-9411
(217) 355-9516 FAX



DO NOT HEAVILY PRUNE THE TREE AT PLANTING. PRUNE ONLY CROSSOVER LIMBS, CO-DOMINANT LEADERS, AND BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED; HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.

STAKE TREES ONLY UPON THE APPROVAL OF THE LANDSCAPE ARCHITECT SEE STAKING DETAIL.

WRAP TREE TRUNKS ONLY UPON THE APPROVAL OF THE LANDSCAPE ARCHITECT. SEE WRAPPING DETAIL.

MARK THE NORTH SIDE OF THE TREE IN THE NURSERY, AND ROTATE TREE TO FACE NORTH AT THE SITE WHEN EVER POSSIBLE.

EACH TREE MUST BE PLANTED SUCH THAT THE TRUNK FLARE IS VISIBLE AT THE TOP OF THE ROOT BALL. TREES WHERE THE TRUNK FLARE IS NOT VISIBLE SHALL BE REJECTED. DO NOT COVER THE TOP OF THE ROOT BALL WITH SOIL.

MULCH RING
1800 MM (6 FT.) DIAM. MIN.
2400 MM (8FT.) DIAM. PREFERRED

SET TOP OF ROOT BALL FLUSH TO GRADE OR 25-50 MM (1-2 IN.) HIGHER IN SLOWLY DRAINING SOILS.

200 MM (8 IN.)

100 MM (4 IN.) HIGH EARTH SAUCER BEYOND EDGE OF ROOT BALL.

50 MM (2 IN.) MULCH. DO NOT PLACE MULCH IN CONTACT WITH TREE TRUNK. MAINTAIN THE MULCH WEED-FREE FOR A MINIMUM OF THREE YEARS AFTER PLANTING.

REMOVE ALL TWINE, ROPE AND WIRE, AND BURLAP FROM TOP HALF OF ROOT BALL

IF PLANT IS SHIPPED WITH A WIRE BASKET AROUND THE ROOT BALL, CUT THE WIRE BASKET IN FOUR PLACES AND FOLD DOWN 200 MM (8 IN.) INTO PLANTING HOLE.

PLACE ROOT BALL ON UNEXCAVATED OR TAMPED SOIL.

NOTE: FOR DIMENSIONS OF PLANTING AREAS, TYPES OF SOIL AMENDMENTS, OR SOIL REPLACEMENT, SEE "SOIL IMPROVEMENT DETAILS."

TAMP SOIL AROUND ROOT BALL BASE FIRMLY WITH FOOT PRESSURE SO THAT ROOT BALL DOES NOT SHIFT.

NOTES

1. PLEASE REFER TO INTRODUCTION AND USE CRITERIA PRIOR TO USING THIS DETAIL.
2. THIS DETAIL ASSUMES THAT THE PLANTING SPACE IS LARGER THAN 2400 MM (8 FT.) SQUARE, OPEN TO THE SKY, AND NOT COVERED BY ANY PAVING OR GRATING.

owen sound
OPERATIONS DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO

Title
TREE PLANTING DETAIL
B & B TREES IN ALL SOIL TYPES

No.	DESCRIPTION	DATE	BY
REVISIONS			

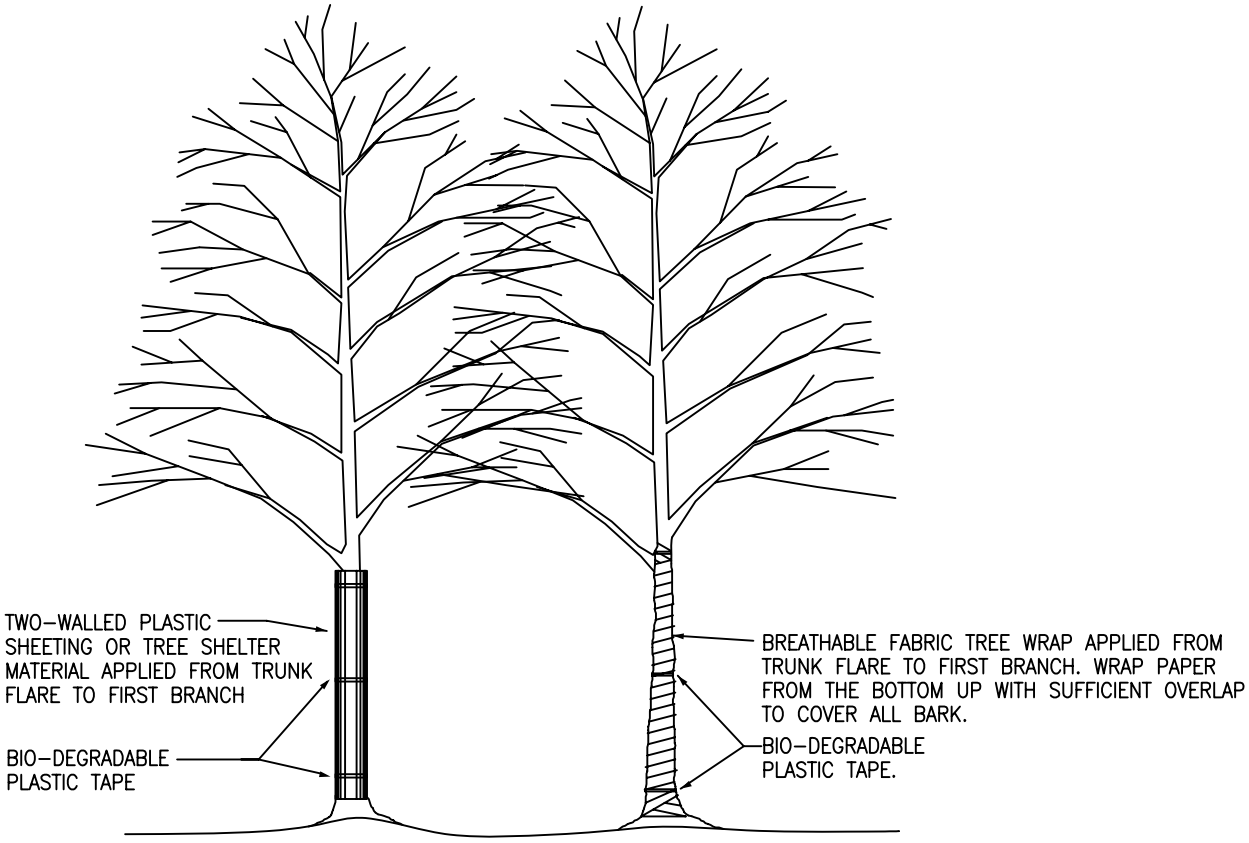
DSN: DMG | METRIC
CHK: DMG | SCALE: N.T.S.
DRN: DMG | DATE: 01/2012

A

FIGURE
Drawing No.
4.6a

INTERNATIONAL SOCIETY OF ARBORICULTURE

INTERNATIONAL SOCIETY OF ARBORICULTURE
1400 WEST ANTHONY DRIVE
CHAMPAIGN, IL 61821
(217) 355-9411
(217) 355-9516 FAX



APPLY THE PLASTIC SHEETING LOOSELY AROUND THE TRUNK TO LEAVE A 12 MM (0.5 IN.) GAP BETWEEN THE TRUNK AND THE SHEETING.

OPTION 1 OPTION 2

TREE WRAP SHOULD BE INSTALLED AT TIME OF PLANTING AND BE REMOVED WHEN DIRECTED BY THE LANDSCAPE ARCHITECT, BUT NO LATER THAN 12 MONTHS AFTER PLANTING.

TREES WHOSE NORTH ORIENTATION IS NOT CHANGED FROM THE NURSERY DO NOT NEED TO BE WRAPPED EXCEPT TREES WITH VERY THIN BARK, SUCH AS RED MAPLE, SHOULD BE WRAPPED IF APPROVED BY THE LANDSCAPE ARCHITECT.

NOTES

1. PLEASE REFER TO INTRODUCTION AND USE CRITERIA PRIOR TO USING THIS DETAIL.

owen sound
OPERATIONS DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO

Title
TREE WRAPPING DETAIL

No.	DESCRIPTION	DATE	BY
REVISIONS			

DSN: DMG | METRIC
CHK: DMG | SCALE: N.T.S.
DRN: DMG | DATE: 01/2012
A

FIGURE
Drawing No.
4.6b

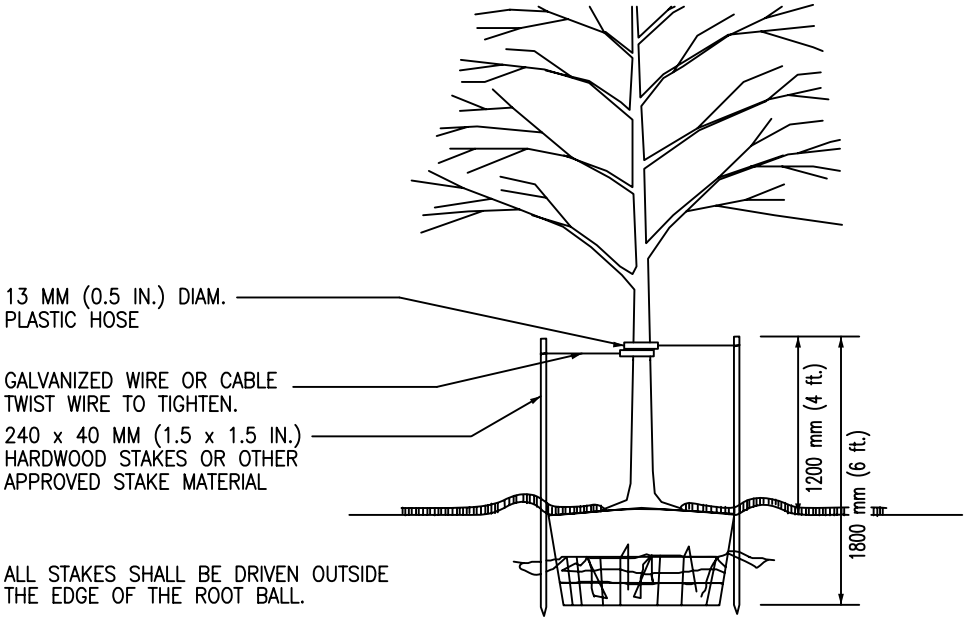
INTERNATIONAL SOCIETY OF ARBORICULTURE

INTERNATIONAL SOCIETY OF ARBORICULTURE
1400 WEST ANTHONY DRIVE
CHAMPAIGN, IL 61821
(217) 355-9411
(217) 355-9516 FAX

WIRE OR CABLE SIZES SHALL BE AS FOLLOWS:
TREES UP TO 65 MM (2.5 IN.) CALIPER – 14 GAUGE
TREES 65 MM (2.5 IN.) TO 75 MM (3 IN.) CALIPER – 12 GAUGE

TIGHTEN WIRE OR CABLE ONLY ENOUGH TO KEEP FROM SLIPPING. ALLOW FOR SOME TRUNK MOVEMENT. PLASTIC HOSE SHALL BE LONG ENOUGH TO ACCOMMODATE 35MM (1.5 IN.) OF GROWTH AND BUFFER ALL BRANCHES FROM THE WIRE.

TUCK ANY LOOSE ENDS OF THE WIRE OR CABLE INTO THE WIRE WRAP SO THAT NO SHARP WIRE ENDS ARE EXPOSED.



ASSURE THAT THE BEARING SURFACE OF THE PROTECTIVE COVERING OF THE WIRE OR CABLE AGAINST THE TREE TRUNK IS A MINIMUM OF 12 MM (0.5 IN.).

REMOVE ALL STAKING AS SOON AS THE TREE HAS GROWN SUFFICIENT ROOTS TO OVERCOME THE PROBLEM THAT REQUIRED THE TREE TO BE STAKED. STAKES SHALL BE REMOVED NO LATER THE END OF THE FIRST GROWING SEASON AFTER PLANTING.

TREES NORMALLY DO NOT NEED TO BE STAKED AND STAKING CAN BE HARMFUL TO THE TREE. STAKING SHOULD BE DONE ONLY WITH THE APPROVAL OF THE LANDSCAPE ARCHITECT IF IT IS EXPECTED THAT THE TREE WILL NOT BE ABLE TO SUPPORT ITSELF. THE FOLLOWING ARE REASONS WHY TREES DO NOT REMAIN STRAIGHT.

- TREES WITH POOR – QUALITY ROOT BALLS OR ROOT BALLS THAT HAVE BEEN CRACKED OR DAMAGED. REJECT RATHER THAN STAKE.
- TREES THAT HAVE GROWN TOO CLOSE TOGETHER IN THE NURSERY, RESULTING IN WEAK TRUNKS. REJECT RATHER THAN STAKE.
- PLANTING PROCEDURES THAT DO NOT ADEQUATELY TAMP SOILS AROUND THE ROOT BALL. CORRECT THE PLANTING PROCEDURE.
- ROOT BALLS PLACED ON SOFT SOIL. TAMP SOILS UNDER ROOT BALL PRIOR TO PLANTING.
- ROOT BALLS WITH VERY SANDY SOIL OR VERY WET CLAY SOIL. STAKING ADVISABLE.
- TREES LOCATED IN A PLACE OF EXTREMELY WINDY CONDITIONS. STAKING ADVISABLE.

NOTES

1. PLEASE REFER TO INTRODUCTION AND USE CRITERIA PRIOR TO USING THIS DETAIL.

owen sound
OPERATIONS DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO

Title
TREE STAKING DETAIL
75mm (3in) CALIPER OR LESS

No.	DESCRIPTION	DATE	BY
REVISIONS			

DSN: DMG | METRIC
CHK: DMG | SCALE: N.T.S.
DRN: DMG | DATE: 01/2012
A

FIGURE
Drawing No.
4.6c

INTERNATIONAL SOCIETY OF ARBORICULTURE

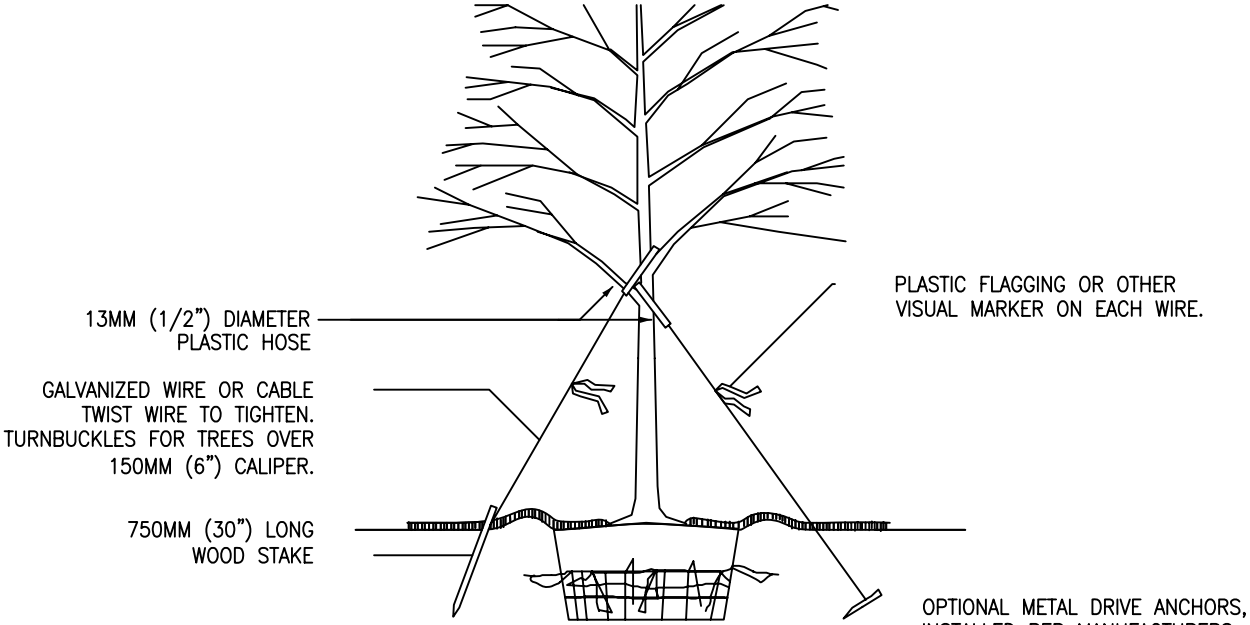
INTERNATIONAL SOCIETY OF ARBORICULTURE
1400 WEST ANTHONY DRIVE
CHAMPAIGN, IL 61821
(217) 355-9411
(217) 355-9516 FAX

WIRE OR CABLE SIZES SHALL BE AS FOLLOWS:
TREES UP TO 65 MM (2.5 IN.) CALIPER – 14 GAUGE
TREES 65 MM (2.5 IN.) TO 75 MM (3 IN.) CALIPER – 12 GAUGE

TIGHTEN WIRE OR CABLE ONLY ENOUGH TO KEEP FROM SLIPPING. ALLOW FOR SOME TRUNK MOVEMENT. PLASTIC HOSE SHALL BE LONG ENOUGH TO ACCOMMODATE 35MM (1.5 IN.) OF GROWTH AND BUFFER ALL BRANCHES FROM THE WIRE.

TUCK ANY LOOSE ENDS OF THE WIRE OR CABLE INTO THE WIRE WRAP SO THAT NO SHARP WIRE ENDS ARE EXPOSED.

INSTALL THREE GUY WIRES PER TREE, SPACED EVENLY AROUND THE TRUNK.



ALL STAKES SHALL BE DRIVEN OUTSIDE THE EDGE OF THE ROOT BALL.

ASSURE THAT THE BEARING SURFACE OF THE PROTECTIVE COVERING OF THE WIRE OR CABLE AGAINST THE TREE TRUNK IS A MINIMUM OF 12 MM (0.5 IN.).

REMOVE ALL STAKING AS SOON AS THE TREE HAS GROWN SUFFICIENT ROOTS TO OVERCOME THE PROBLEM THAT REQUIRED THE TREE TO BE STAKED. STAKES SHALL BE REMOVED NO LATER THE END OF THE FIRST GROWING SEASON AFTER PLANTING.

TREES NORMALLY DO NOT NEED TO BE STAKED AND STAKING CAN BE HARMFUL TO THE TREE. STAKING SHOULD BE DONE ONLY WITH THE APPROVAL OF THE LANDSCAPE ARCHITECT IF IT IS EXPECTED THAT THE TREE WILL NOT BE ABLE TO SUPPORT ITSELF. THE FOLLOWING ARE REASONS WHY TREES DO NOT REMAIN STRAIGHT.

- TREES WITH POOR-QUALITY ROOT BALLS OR ROOT BALLS THAT HAVE BEEN CRACKED OR DAMAGED. REJECT RATHER THAN STAKE.
- TREES THAT HAVE GROWN TOO CLOSE TOGETHER IN THE NURSERY, RESULTING IN WEAK TRUNKS. REJECT RATHER THAN STAKE.
- PLANTING PROCEDURES THAT DO NOT ADEQUATELY TAMP SOILS AROUND THE ROOT BALL. CORRECT THE PLANTING PROCEDURE.
- ROOT BALLS PLACED ON SOFT SOIL. TAMP SOILS UNDER ROOT BALL PRIOR TO PLANTING.
- ROOT BALLS WITH VERY SANDY SOIL OR VERY WET CLAY SOIL. STAKING ADVISABLE.
- TREES LOCATED IN A PLACE OF EXTREMELY WINDY CONDITIONS. STAKING ADVISABLE.

NOTES:

1. PLEASE REFER TO INTRODUCTION AND USE CRITERIA PRIOR TO USING THIS DETAIL.

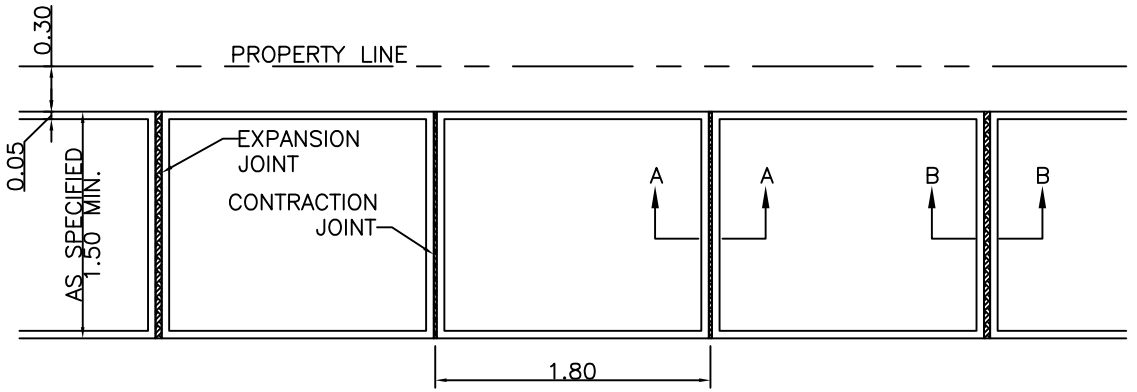
owen sound
OPERATIONS DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO

Title
TREE STAKING DETAIL
LARGER THAN 75mm (3in) CALIPER

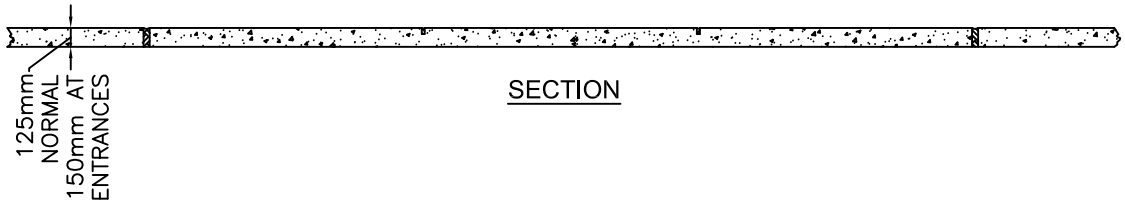
No.	DESCRIPTION	DATE	BY
REVISIONS			

DSN: DMG | METRIC
CHK: DMG | SCALE: N.T.S.
DRN: DMG | DATE: 01/2012
A

FIGURE
Drawing No.
4.6d



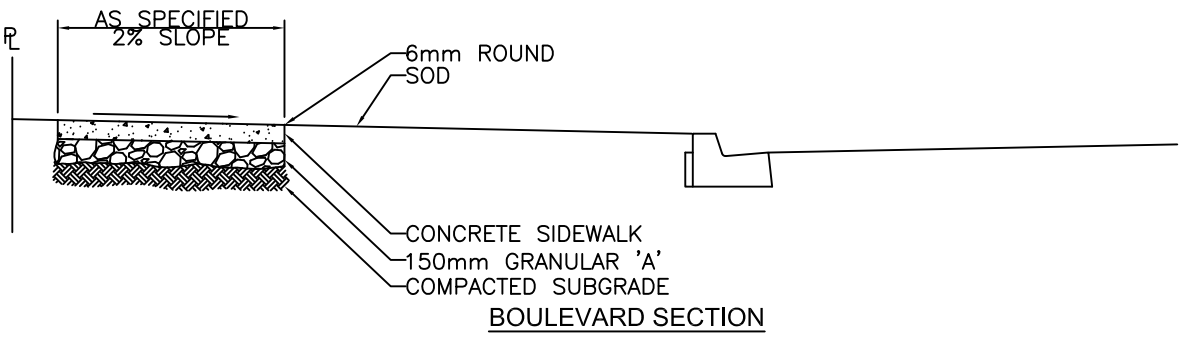
PLAN



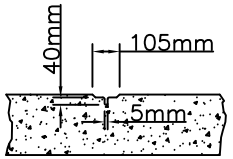
SECTION

NOTES:

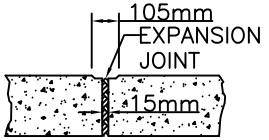
1. ALL SIDEWALKS SHALL BE A MINIMUM OF 1.5m IN WIDTH CONSTRUCTED OF CONCRETE WITH A MINIMUM THICKNESS OF 125mm (150mm MINIMUM THICKNESS AT RESIDENTIAL ENTRANCES AND 200mm MINIMUM THICKNESS AT COMMERCIAL AND INDUSTRIAL ENTRANCES).
2. ALL SIDEWALKS ARE TO HAVE A 150mm GRANULAR 'A' BASE COMPACTED TO 98% STANDARD PROCTOR DENSITY. THE SUBGRADE WILL ALSO BE COMPACTED UNDISTURBED NATIVE SOIL OR ENGINEERED FILL.
3. SIKEWALK CONCRETE SHALL BE 32 MPa COMPRESSIVE STRENGTH WITH 6.5% AIR ENTRAINMENT AND 75mm SLUMP
4. EXPANSION JOINTS ARE REQUIRED AT ALL LOCATIONS WHERE THE SIDEWALK ABUTS OTHER CONCRETE STRUCTURES, WALKS, CURBS, HYDRANTS, MANHOLES, UTILITY POLES AND AT ANY OTHER LOCATION AS DIRECTED BY THE CITY'S MANAGER OF ENGINEERING SERVICES.



BOULEVARD SECTION



SECTION A-A
CONTRACTION JOINT
DETAIL



SECTION B-B
EXPANSION JOINT
DETAIL

owen sound
PUBLIC WORKS & ENGINEERING DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO

Title

CONCRETE SIDEWALK

No.	DESCRIPTION	DATE	BY
1	FIRST ISSUE	2017/06	COS

REVISIONS

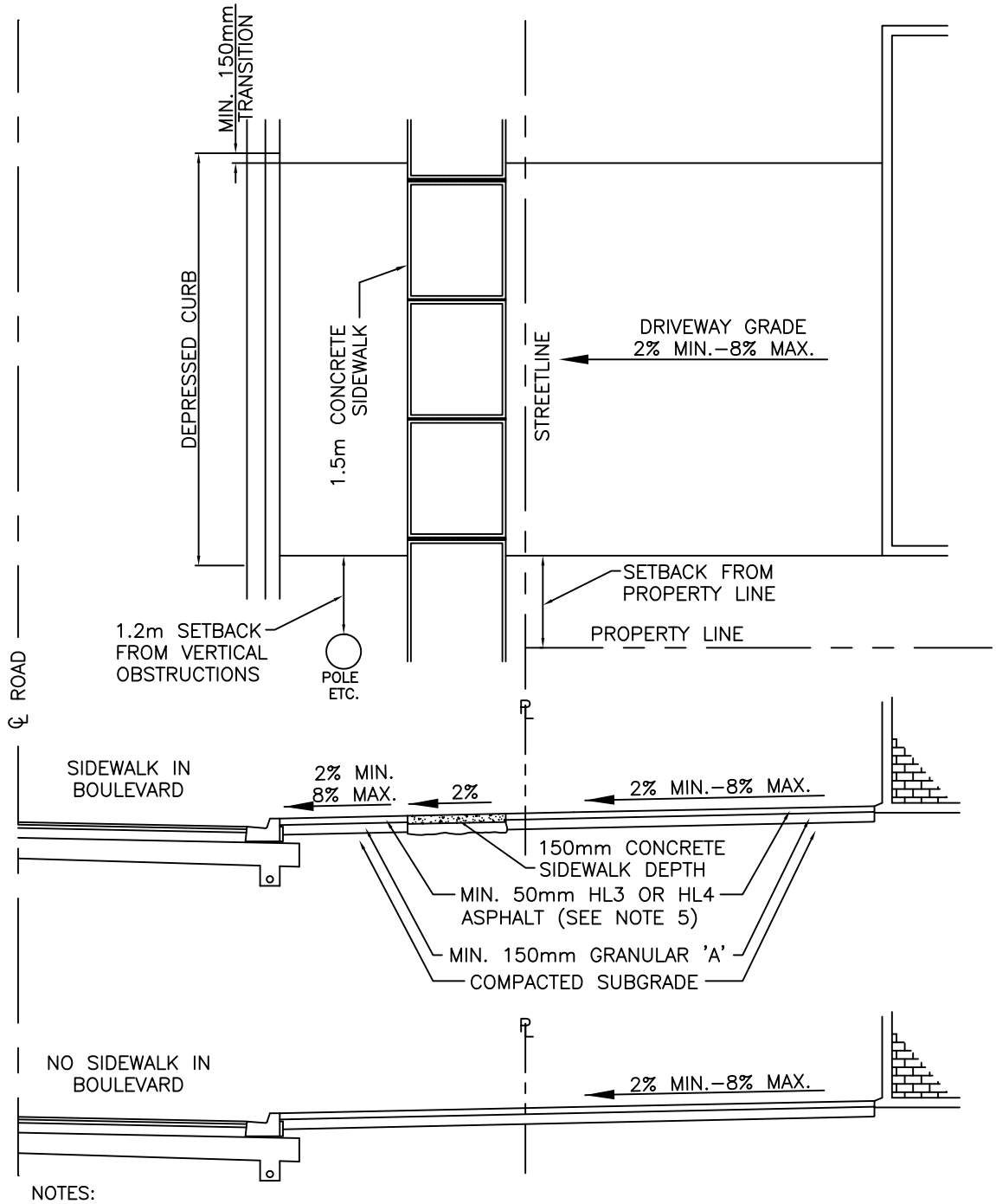
DSN: COS | METRIC
CHK: COS | SCALE: N.T.S.
DRN: COS | DATE: 2017/06

A

FILE No.: N/A

Drawing No.

OSS-111



NOTES:

1. BETWEEN ADJACENT DRIVEWAYS A MINIMUM 300mm LENGTH OF FULL CURB IS TO BE MAINTAINED UNLESS OTHERWISE APPROVED BY ENGINEERING SERVICES.

2. DRIVEWAY WIDTH TO MATCH THE WIDTH OF THE GARAGE (OUTSIDE OF EXTERIOR WALLS). DRIVEWAYS ARE TO BE A CONTINUING PROJECTION OF THE GARAGE WALL WITH NO BENDS OR TAPER BETWEEN THE CURB AND THE GARAGE.

3. DRIVEWAY WIDENINGS, SKEWED DRIVEWAYS, CIRCULAR DRIVEWAYS, AND ADDITIONAL DRIVEWAYS MAY BE PERMITTED SUBSEQUENT TO APPROVAL BY ENGINEERING SERVICES.

4. MAXIMUM RESIDENTIAL DRIVEWAY WIDTHS ARE AS FOLLOWS:
   SINGLE DRIVEWAY: 3.5m PLUS 0.3m VERTICAL TRANSITION
   DOUBLE DRIVEWAY: 6.0m PLUS 0.3m VERTICAL TRANSITION
   DOUBLE DRIVEWAY FOR SEMI–DETACHED: 7.3m PLUS 0.3m VERTICAL TRANSITION
   TRIPLE DRIVEWAY: 8.5m PLUS 0.3m VERTICAL TRANSITION

5. OTHER NON–MIGRATING MATERIALS INCLUDING CONCRETE, TURF STONE, PAVING STONES, PERVIOUS PAVING STONES, ETC. MAY BE USED IN PLACE OF ASPHALT FOR THE SURFACE TREATMENT UPON APPROVAL BY THE ENGINEERING SERVICES DIVISION.

FILE No.: N/A

Drawing No. OSS-112

No.	DESCRIPTION	DATE	BY
1	CHANGED TB	2013-03	COS

REVISIONS

A

DSN: COS | METRIC

CHK: COS | SCALE: N.T.S.

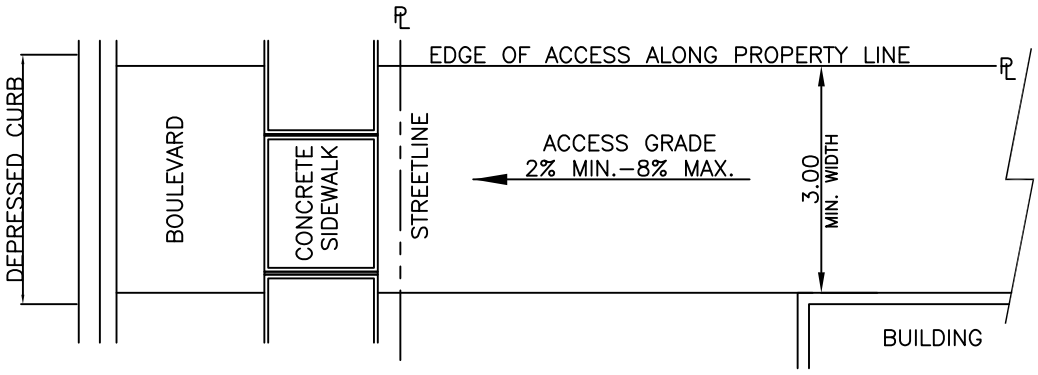
DRN: COS | DATE: 2009-02

Title

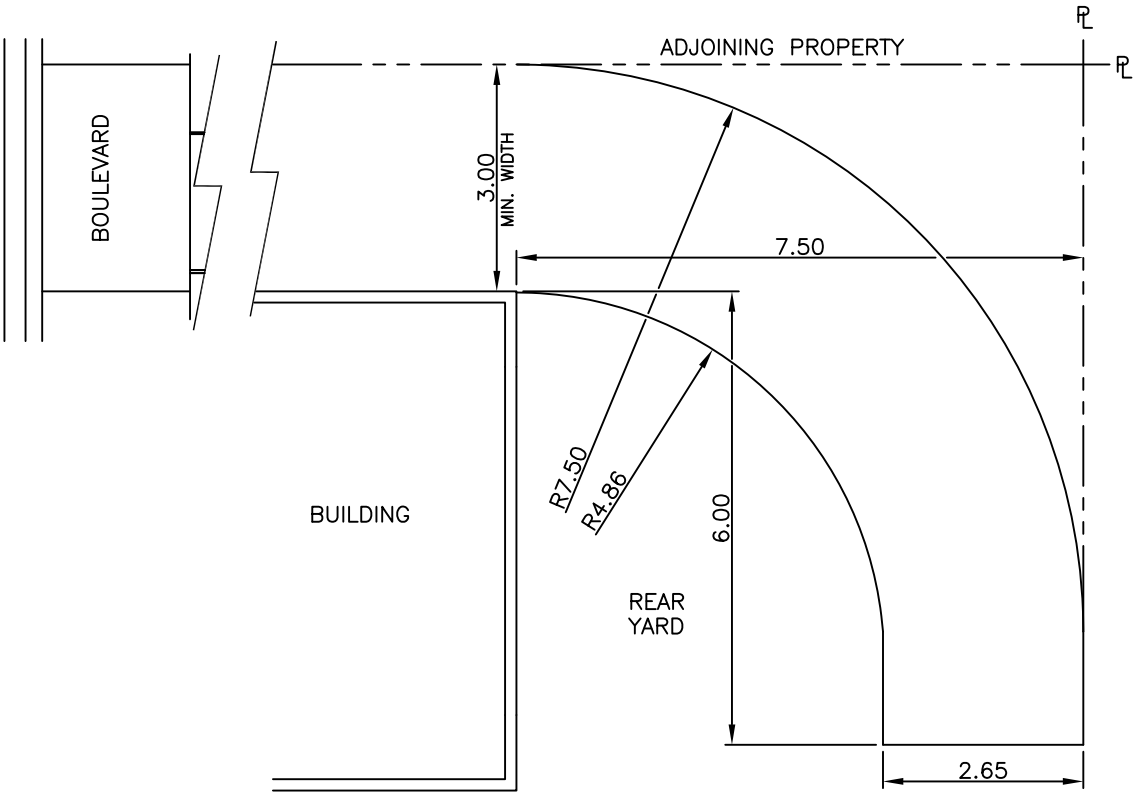
RESIDENTIAL ENTRANCE

owen sound

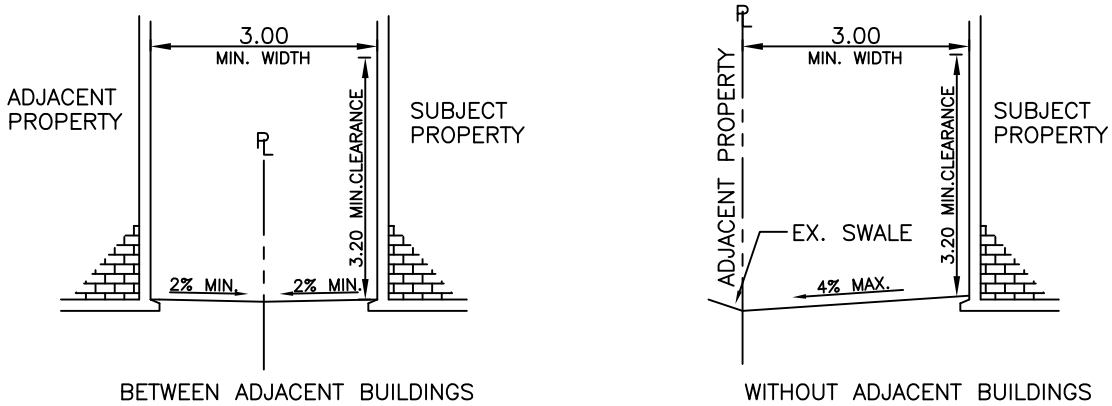
PUBLIC WORKS & ENGINEERING DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO



PLAN VIEW (FRONT YARD)



PLAN VIEW (REAR YARD)



PROFILE VIEWS

NOTES:

1. ALL DIMENSIONS ARE IN METRES.
2. CURVE DATA OBTAINED FROM THE TRANSPORTATION ASSOCIATION OF CANADA (TAC)

FILE No.: N/A

Drawing No. OSS-113

No.	DESCRIPTION	DATE	BY
1	CHANGED TB	2013-03	COS

REVISIONS

A

DSN: COS | METRIC

CHK: COS | SCALE: N.T.S.

DRN: COS | DATE: 2009-02

Title

SHARED ACCESS MINIMUM DIMENSIONS

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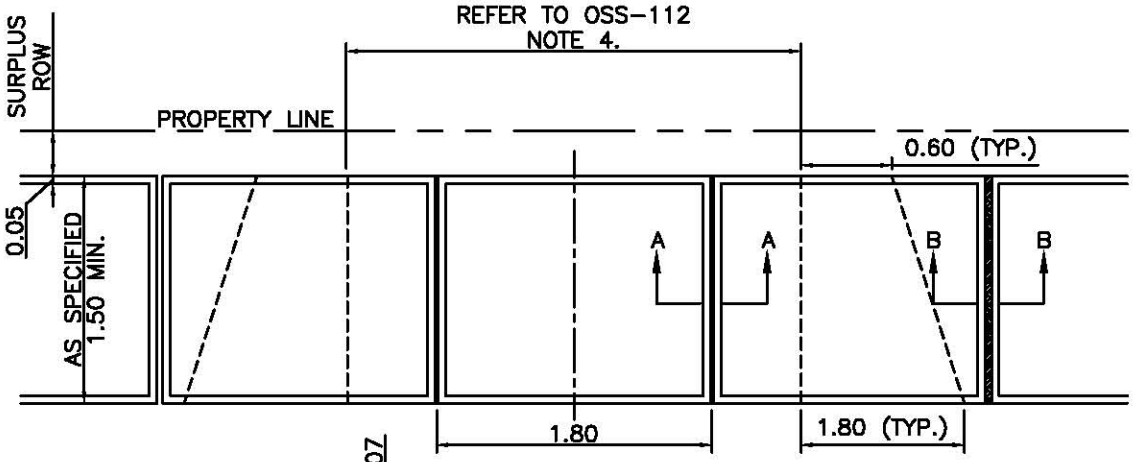
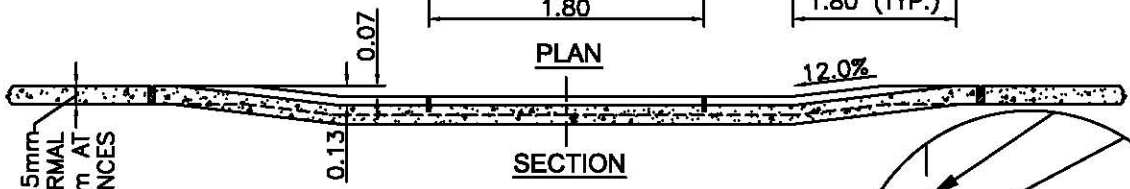
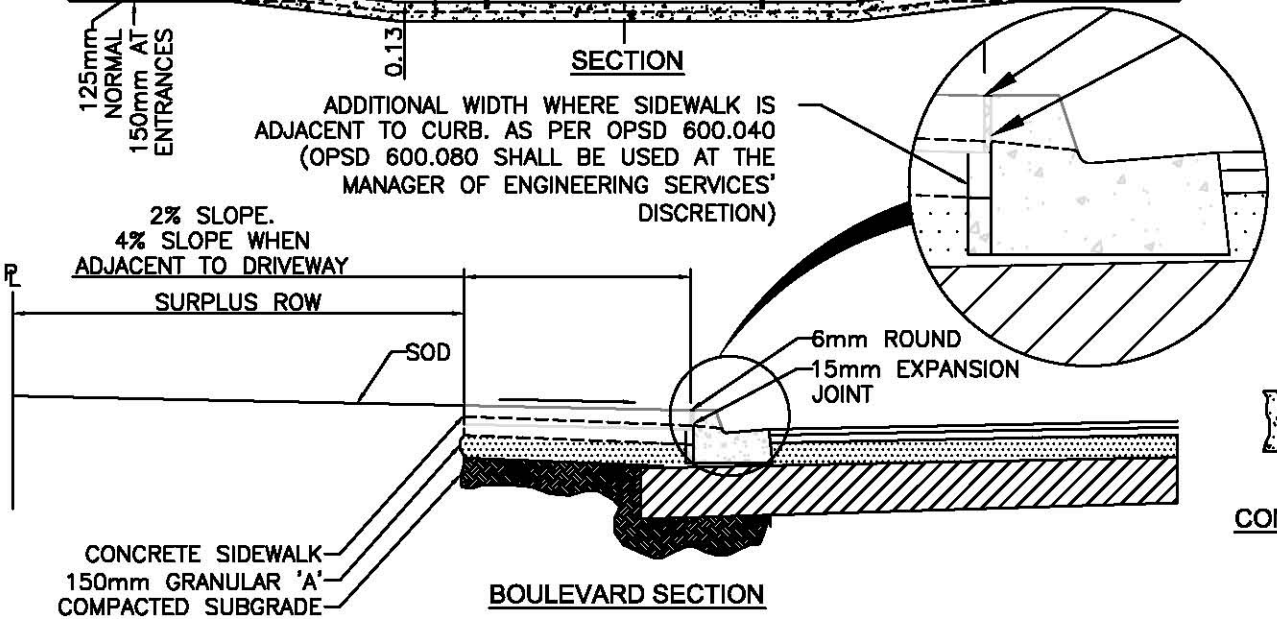
PUBLIC WORKS & ENGINEERING DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO

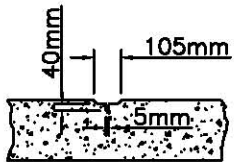




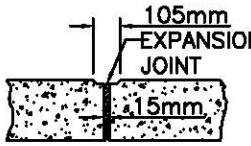


NOTES:

1. ALL SIDEWALKS SHALL BE A MINIMUM OF 1.5m IN WIDTH CONSTRUCTED OF CONCRETE WITH A MINIMUM THICKNESS OF 125mm (150mm MINIMUM THICKNESS AT RESIDENTIAL ENTRANCES AND 200mm MINIMUM THICKNESS AT COMMERCIAL AND INDUSTRIAL ENTRANCES).
2. ALL SIDEWALKS ARE TO HAVE A 150mm GRANULAR 'A' BASE COMPACTED TO 98% STANDARD PROCTOR DENSITY. THE SUBGRADE SHALL BE UNDISTURBED NATIVE SOIL OR ENGINEERED FILL.
3. SIDEWALK CONCRETE SHALL BE 32 MPa COMPRESSIVE STRENGTH WITH 6.5% AIR ENTRAINMENT AND 75mm SLUMP
4. EXPANSION JOINTS ARE REQUIRED AT ALL LOCATIONS WHERE THE SIDEWALK ABUTS OTHER CONCRETE STRUCTURES, WALKS, CURBS, HYDRANTS, MANHOLES, UTILITY POLES AND AT ANY OTHER LOCATION AS DIRECTED BY THE CITY'S MANAGER OF ENGINEERING SERVICES.
5. CURB & GUTTER AS PER O.P.S.D. 600.040



SECTION A-A
CONTRACTION JOINT
DETAIL



SECTION B-B
EXPANSION JOINT
DETAIL

owen sound

OPERATIONS DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO

Title

CURB-FACED CONCRETE SIDEWALK DEPRESSED ENTRANCE

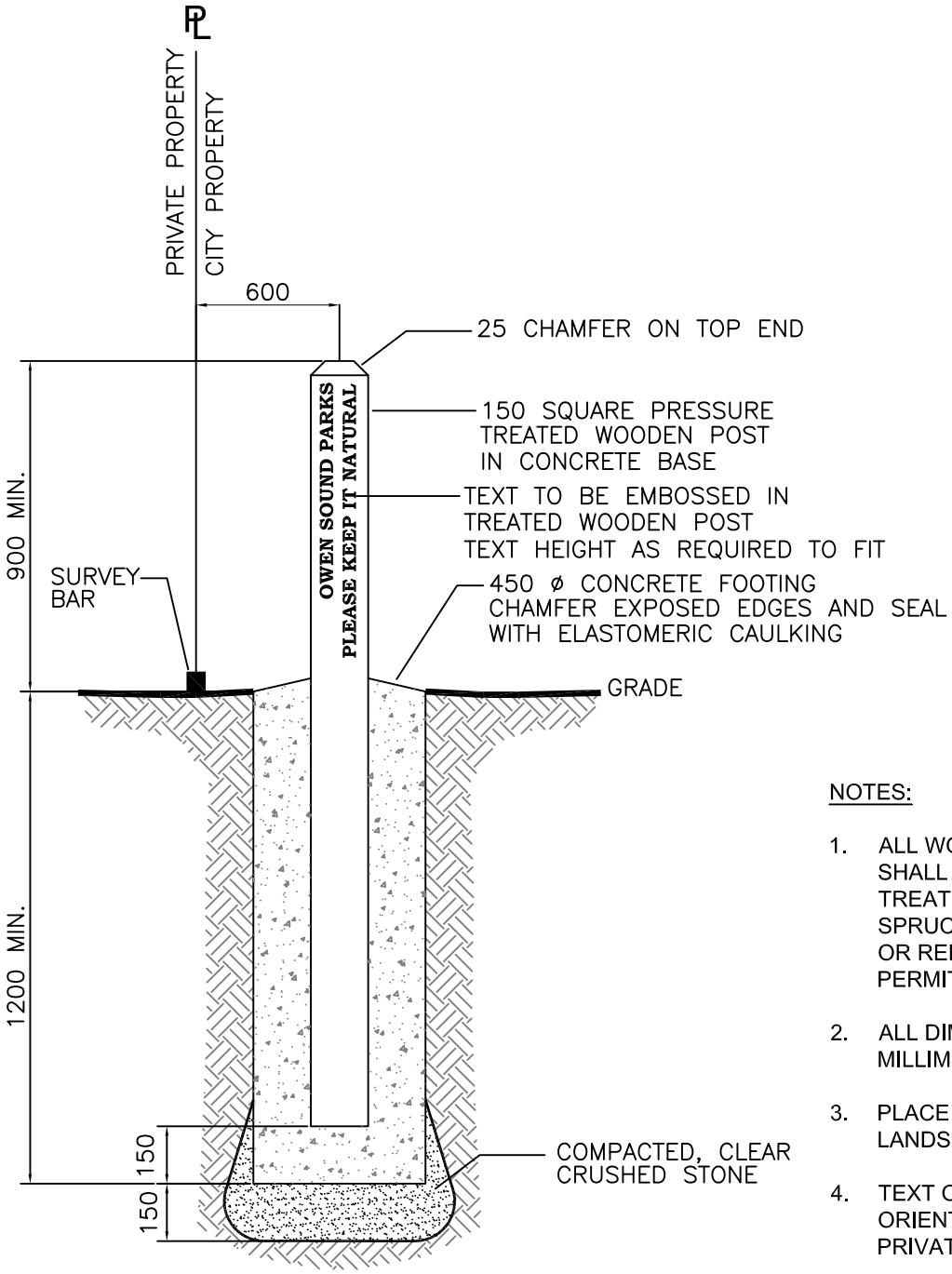
No.	DESCRIPTION	DATE	BY
	REVISIONS		

FILE No.: -/-

Drawing No.

DSN: COS	METRIC
CHK:	SCALE: N.T.S.
DRN: COS	DATE: 03/2014

A OSS-114CF



NOTES:

1. ALL WOOD COMPONENTS SHALL BE PRESSURE TREATED JACK PINE OR SPRUCE, NATURAL CEDAR OR REDWOOD IS ALSO PERMITTED.
2. ALL DIMENSIONS ARE MILLIMETRES.
3. PLACE MARKER ON CITY LANDS
4. TEXT ON POST TO BE ORIENTED TOWARDS PRIVATE PROPERTY

owen sound
OPERATIONS DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO

Title
DEMARCATION POST DETAIL

No.	DESCRIPTION	DATE	BY
REVISIONS			

DSN: cos | METRIC
CHK: cos | SCALE: N.T.S.
DRN: cos | DATE: 05/2014

A

FILE No.: n/a

Drawing No.
OSS-801

APPENDIX E

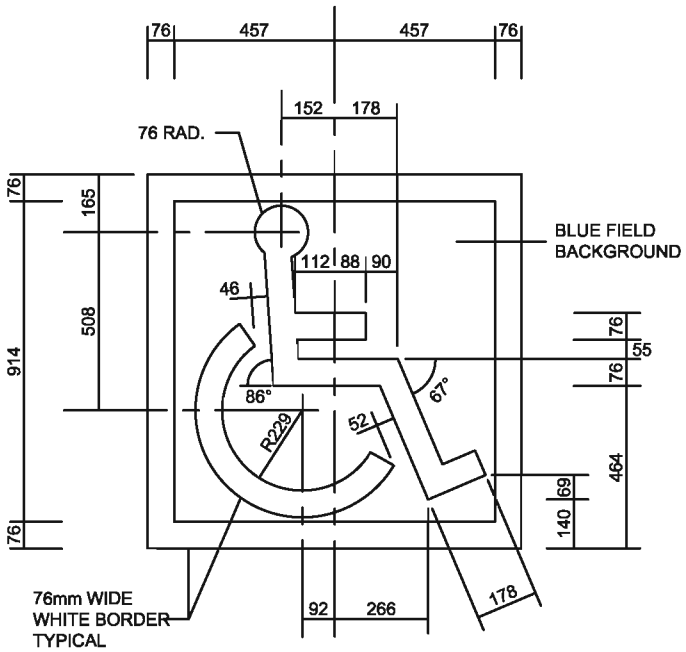
Accessibility Figures

SIGN FOR BOTH TYPE "A" AND TYPE "B" STALLS (SEE DWG. E4)

SIGN FOR TYPE "A" STALLS ONLY

NOTES:
1. SIGN TO BE PER LOCAL REQUIREMENTS
2. PROVIDE SIGN AT EACH ACCESSIBLE PARKING STALL
3. COLOUR SPECIFICATIONS:
   - **WHITE** BACKGROUND
   - **BLACK** LETTER 'P', LEGEND AND BORDER
   - **RED** ANNULAR RING WITH INTERDICTING STROKE
   - **BLUE** SYMBOL BACKGROUND AND OUTLINE
   - 10mm WIDE **BLACK** LINE OFFSET 5mm FROM EDGE
4. ENTIRE SIGN FACE TO BE OF REFLECTIVE MATERIAL
5. BOTH SIGNS ARE TO BE INSTALLED FOR TYPE "A" PARKING STALLS

ACCESSIBLE SIGNS



ACCESSIBLE SYMBOL ON ASPHALT

owen sound
OPERATIONS DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO

Title
ACCESSIBLE SIGNAGE

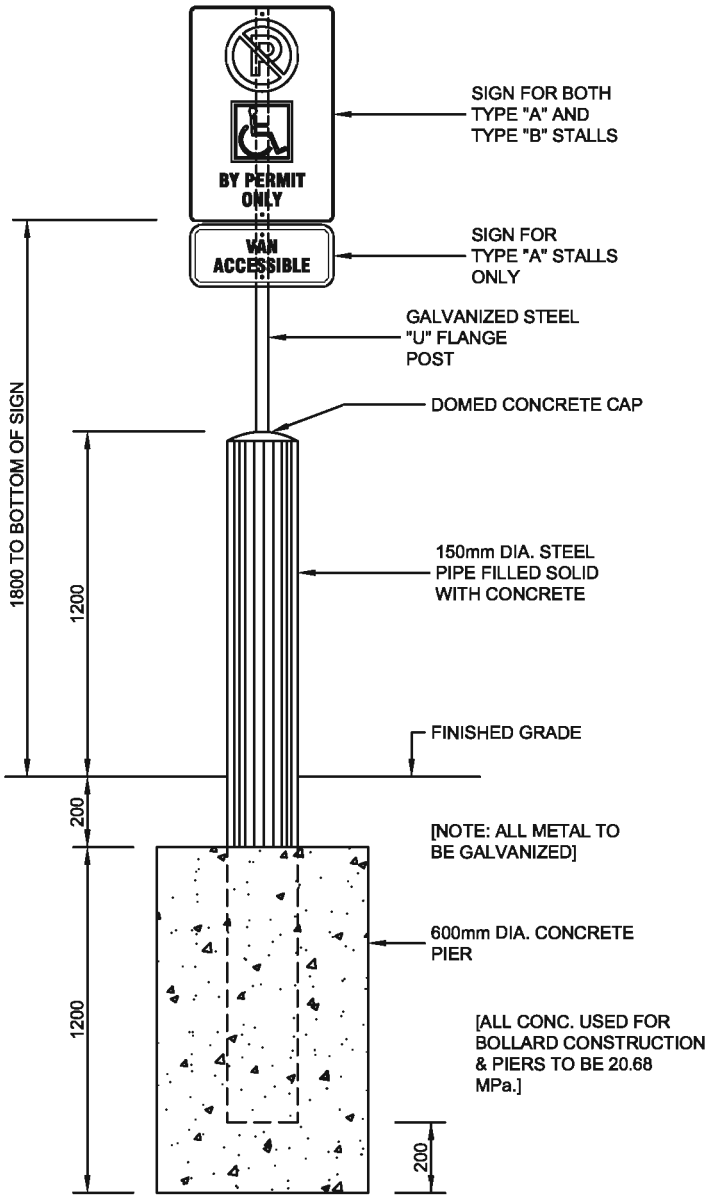
No.	DESCRIPTION	DATE	BY
3	REVISED TO AODA	11/2015	DMG
2	UPDATED TITLE BLOCK	01/2012	DMG
1	REVISED DIMENSIONS	11/2007	DMG

REVISIONS

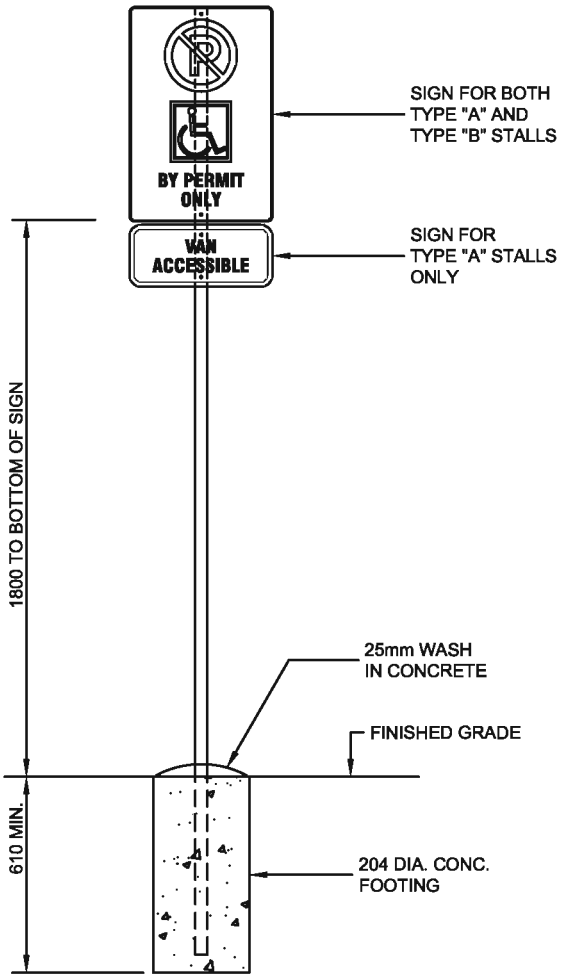
DSN: DMG | METRIC
CHK: DMG | SCALE: N.T.S.
DRN: DMG | DATE: 11/2006

A

FILE No.:
APPENDIX
Drawing No.
E1a



SIGN WITH BOLLARD



SIGN ONLY

owen sound
OPERATIONS DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO

Title
ACCESSIBLE SIGNAGE

No.	DESCRIPTION	DATE	BY
3	REVISED TO AODA	11/2015	DMG
2	UPDATED TITLE BLOCK	01/2012	DMG
1	REVISED DIMENSIONS	11/2007	DMG

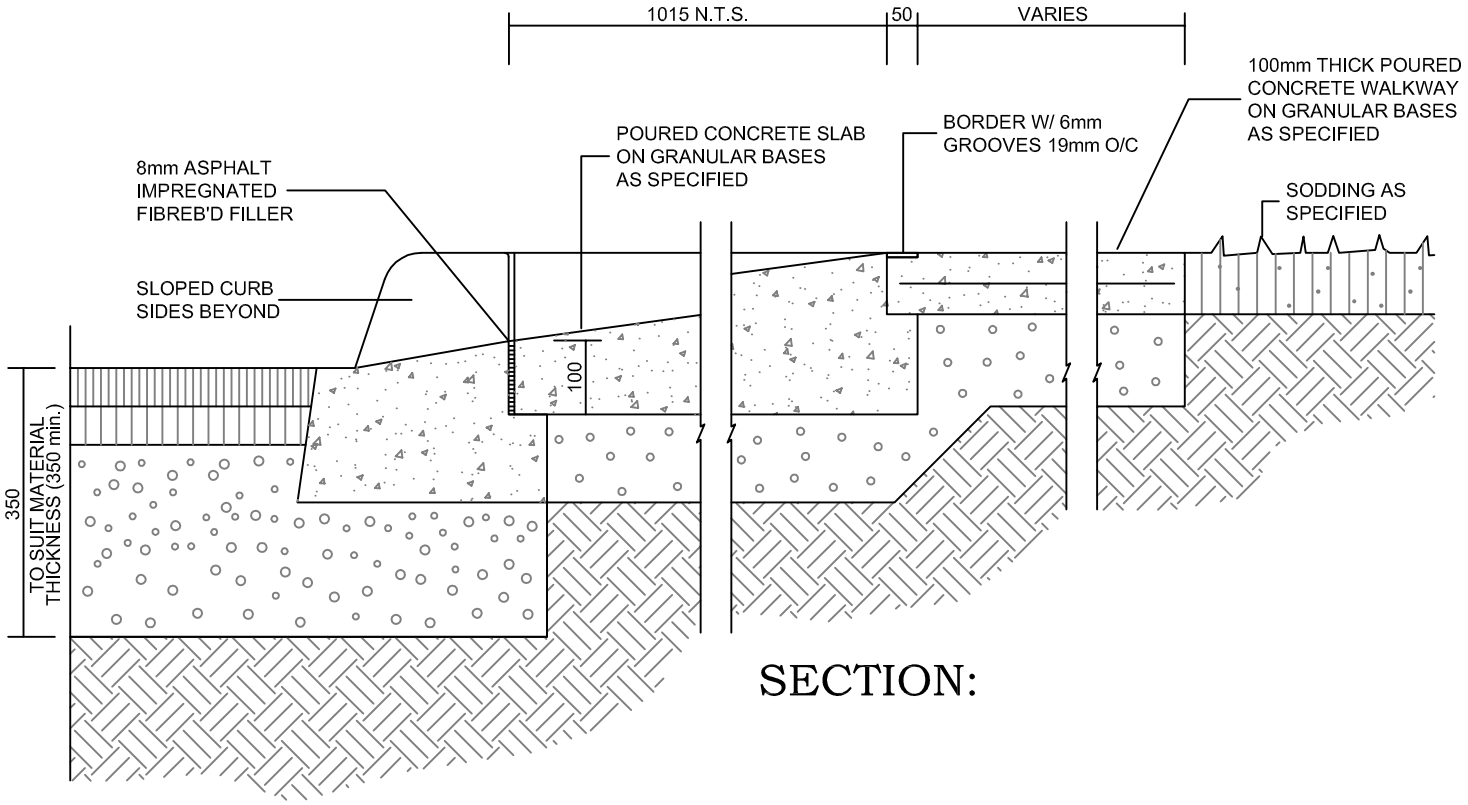
REVISIONS

DSN: DMG | METRIC
CHK: DMG | SCALE: N.T.S.
DRN: DMG | DATE: 11/2006

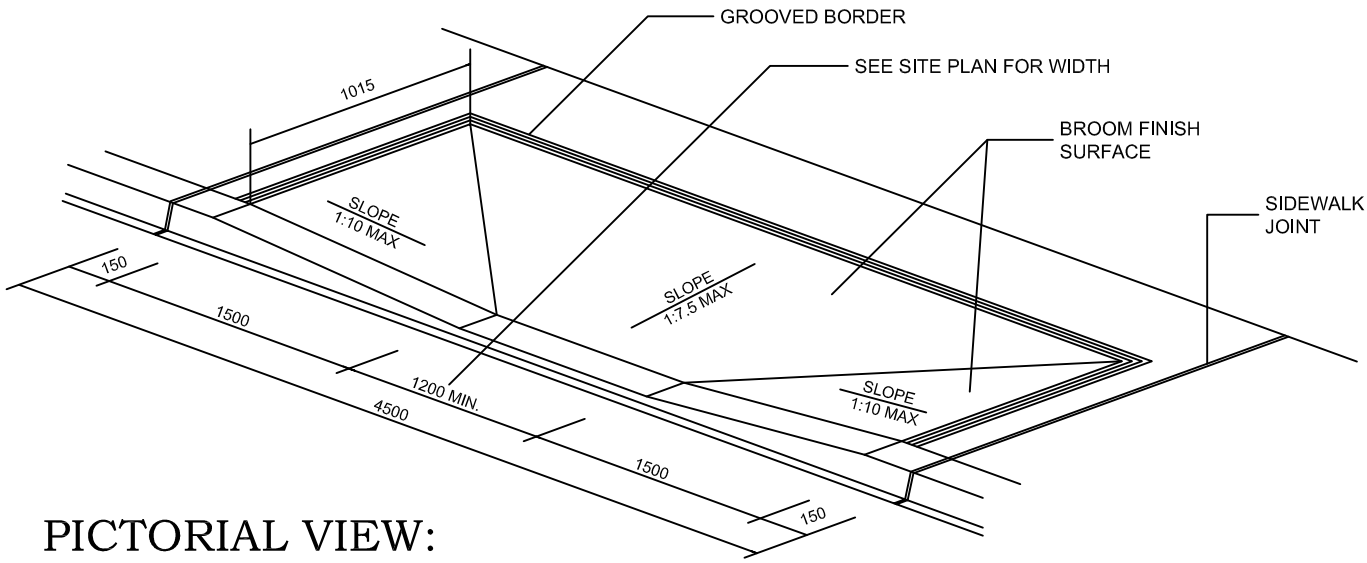
A

FILE No.: APPENDIX

Drawing No. E1b



SECTION:



PICTORIAL VIEW:

Owen Sound
COMMUNITY SERVICES DEPARTMENT
PLANNING DIVISION
OWEN SOUND ONTARIO

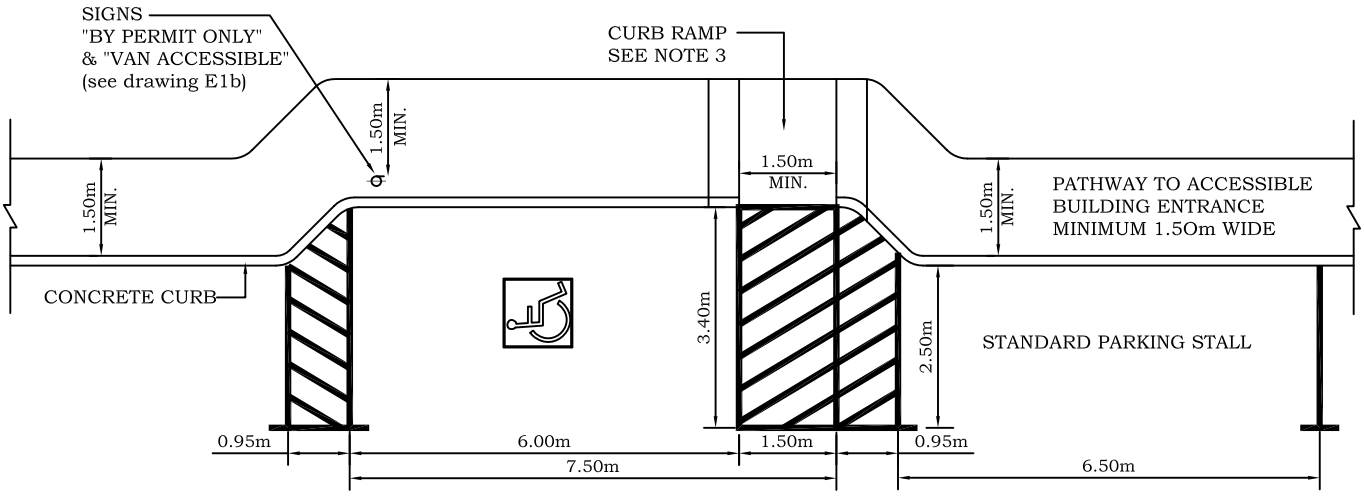
Title

CURB RAMP DETAIL

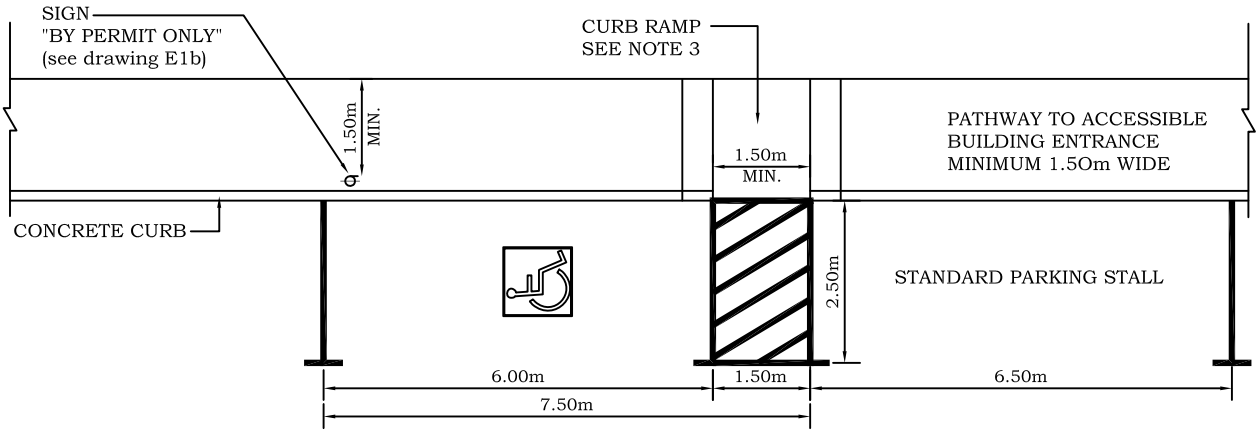
METRIC - A	
SCALE:	N.T.S.
DESIGN:	DMG
DRAWN:	DMG
CHECKED:	DMG
DATE:	NOV 2006

FILE No.: APPENDIX

Drawing No. E2



NEW ACCESSIBLE PARKING STALL (TYPE "A") PARALLEL TO TRAFFIC FLOW



RETRO-FIT ACCESSIBLE PARKING STALL (TYPE "B") PARALLEL TO TRAFFIC FLOW

NOTES:

1. ACCESSIBLE PARKING STALLS ARE TO HAVE A MAXIMUM GRADIENT OF 1.5% AND A MAXIMUM CROSS SLOPE OF 1.0%
2. LOCATION, NUMBER AND TYPE OF ACCESSIBLE PARKING STALLS TO BE AS REQUIRED BY THE ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES ACT (AODA).
3. THE CURB RAMP MUST:
   - i HAVE A MINIMUM CLEAR WIDTH OF 1500mm, EXCLUSIVE OF ANY FLARED SIDES.
   - ii THE RUNNING SLOPE OF THE RAMP MUST BE A MAXIMUM OF 1:8 WHERE THE ELEVATION IS LESS THAN 75mm, OR BE A MAXIMUM OF 1:10 WHERE THE ELEVATION IS GREATER THAN 75mm BUT LESS THAN 200mm ELEVATION.
   - iii THE MAXIMUM CROSS SLOPE OF THE RAMP MUST BE NO MORE THAN 1:5.
   - iv THE MAXIMUM SLOPE ON THE FLARED SIDE OF THE RAMP MUST BE NO MORE THAN 1:10.

owen sound
OPERATIONS DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO

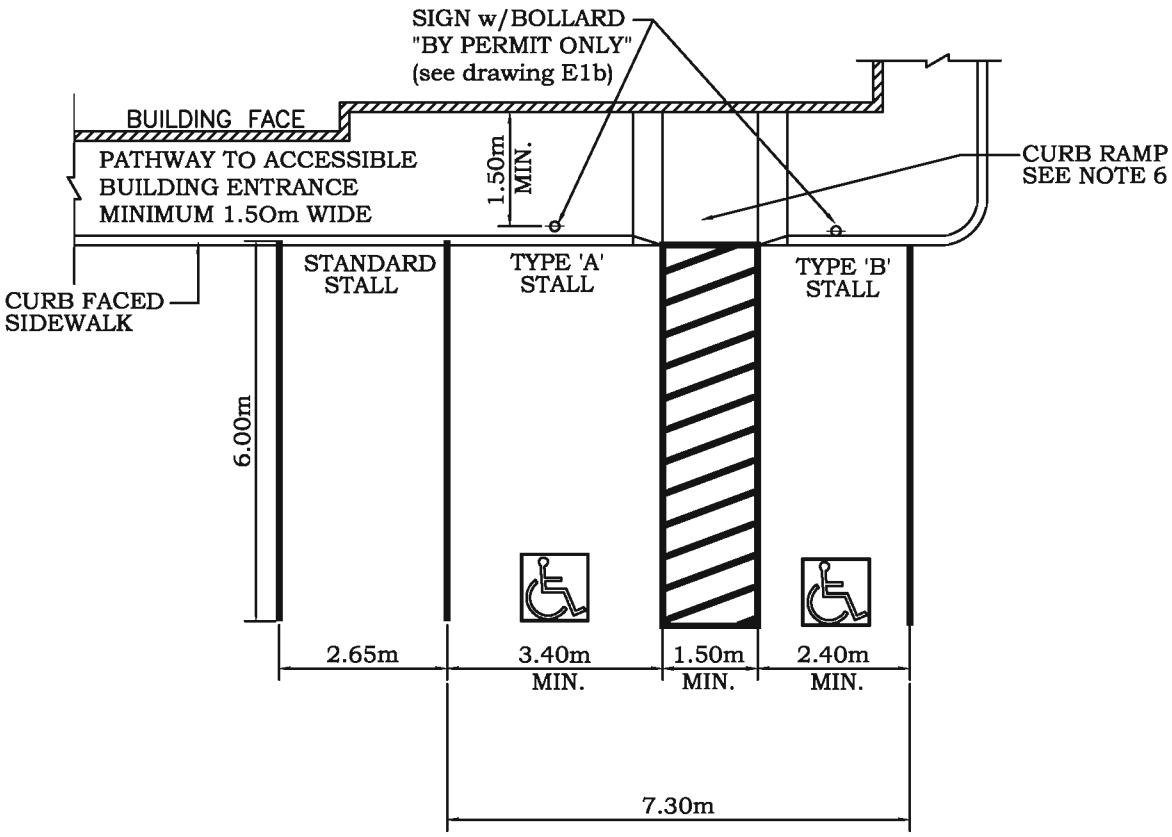
Title
PARALLEL ACCESSIBLE STALL CONFIGURATIONS

No.	DESCRIPTION	DATE	BY
2	REVISED TO AODA	11/2015	DMG
1	UPDATED TITLE BLOCK	01/2012	DMG

REVISIONS

DSN: DMG | METRIC | A
CHK: DMG | SCALE: N.T.S.
DRN: DMG | DATE: 11/2006

FILE No.: APPENDIX
Drawing No. E3



1 TYPICAL ACCESSIBLE PARKING STALLS

NOTES:

1. ACCESSIBLE PARKING SPACES MUST INCLUDE AN ACCESS AISLE THAT CAN BE SHARED BY TWO ACCESSIBLE PARKING SPACES. WHERE THERE IS ONLY ONE ACCESSIBLE PARKING SPACE, ONE ACCESS AISLE IS REQUIRED.
2. ACCESS AISLES ARE REQUIRED TO INCLUDE HIGH TONAL CONTRAST DIAGONAL MARKINGS TO DISCOURAGE PARKING ON AISLES.
3. THE TOTAL WIDTH OF A TYPE 'A' ACCESSIBLE PARKING STALL AND ACCESS AISLE IS INTENDED TO ACCOMMODATE THE COMBINED WIDTH OF A VAN, THE LENGTH OF A WHEELCHAIR RAMP AND THE WHEELCHAIR ITSELF.
4. ACCESSIBLE PARKING STALLS ARE TO HAVE A MAXIMUM GRADIENT OF 1.5% AND A MAXIMUM CROSS SLOPE OF 1.0%
5. LOCATION, NUMBER AND TYPE OF ACCESSIBLE PARKING STALLS TO BE AS REQUIRED BY THE ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES ACT (AODA).
6. THE CURB RAMP MUST:
   - i HAVE A MINIMUM CLEAR WIDTH OF 1500mm, EXCLUSIVE OF ANY FLARED SIDES.
   - ii THE RUNNING SLOPE OF THE RAMP MUST BE A MAXIMUM OF 1:8 WHERE THE ELEVATION IS LESS THAN 75mm, OR BE A MAXIMUM OF 1:10 WHERE THE ELEVATION IS GREATER THAN 75mm BUT LESS THAN 200mm ELEVATION.
   - iii THE MAXIMUM CROSS SLOPE OF THE RAMP MUST BE NO MORE THAN 1:5.
   - iv THE MAXIMUM SLOPE ON THE FLARED SIDE OF THE RAMP MUST BE NO MORE THAN 1:10.

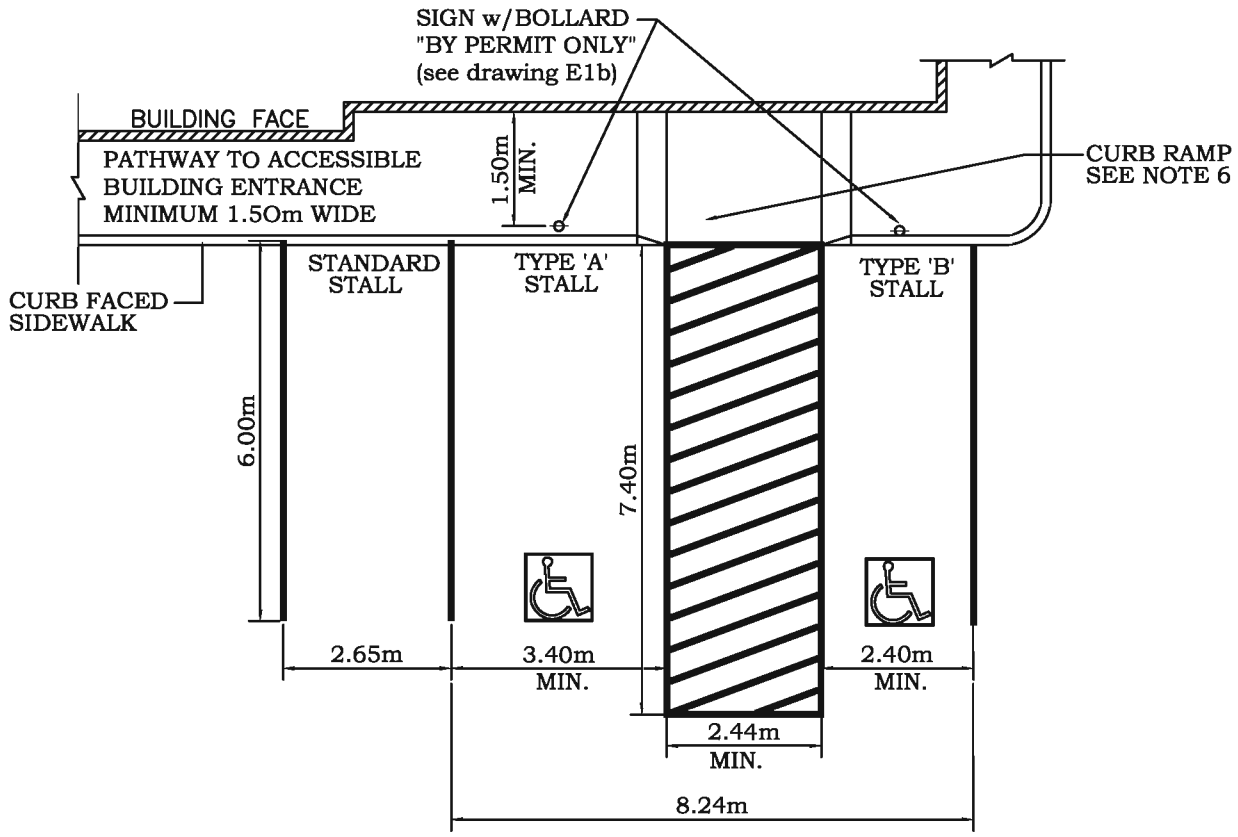
owen sound
OPERATIONS DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO

Title
PERPENDICULAR ACCESSIBLE PARKING STALL

No.	DESCRIPTION	DATE	BY
4	CORRECTED AODA	03/2016	DMG
3	REVISED FOR AODA & OBC	10/2015	DMG
2	ADD GRADIENT	04/2013	DMG
	REVISIONS		

DSN: DMG | METRIC
CHK: DMG | SCALE: N.T.S. | A
DRN: DMG | DATE: 11/2006

FILE No.: APPENDIX
Drawing No. E4a



1 TYPICAL ACCESSIBLE PARKING STALLS

NOTES:

1. ACCESSIBLE PARKING SPACES MUST INCLUDE AN ACCESS AISLE THAT CAN BE SHARED BY TWO ACCESSIBLE PARKING SPACES. WHERE THERE IS ONLY ONE ACCESSIBLE PARKING SPACE, ONE ACCESS AISLE IS REQUIRED.
2. ACCESS AISLES ARE REQUIRED TO INCLUDE HIGH TONAL CONTRAST DIAGONAL MARKINGS TO DISCOURAGE PARKING ON AISLES.
3. THE TOTAL WIDTH OF A TYPE 'A' ACCESSIBLE PARKING STALL AND ACCESS AISLE IS INTENDED TO ACCOMMODATE THE COMBINED WIDTH OF A VAN, THE LENGTH OF A WHEELCHAIR RAMP AND THE WHEELCHAIR ITSELF.
4. ACCESSIBLE PARKING STALLS ARE TO HAVE A MAXIMUM GRADIENT OF 1.5% AND A MAXIMUM CROSS SLOPE OF 1.0%
5. LOCATION, NUMBER AND TYPE OF ACCESSIBLE PARKING STALLS TO BE AS REQUIRED BY THE ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES ACT (AODA).
6. THE CURB RAMP MUST:
   - i HAVE A MINIMUM CLEAR WIDTH OF 1500mm, EXCLUSIVE OF ANY FLARED SIDES.
   - ii THE RUNNING SLOPE OF THE RAMP MUST BE A MAXIMUM OF 1:8 WHERE THE ELEVATION IS LESS THAN 75mm, OR BE A MAXIMUM OF 1:10 WHERE THE ELEVATION IS GREATER THAN 75mm BUT LESS THAN 200mm ELEVATION.
   - iii THE MAXIMUM CROSS SLOPE OF THE RAMP MUST BE NO MORE THAN 1:5.
   - iv THE MAXIMUM SLOPE ON THE FLARED SIDE OF THE RAMP MUST BE NO MORE THAN 1:10.

owen sound
OPERATIONS DEPARTMENT
ENGINEERING SERVICES DIVISION
OWEN SOUND ONTARIO

Title
PERPENDICULAR ACCESSIBLE LOADING/PARKING STALL

No.	DESCRIPTION	DATE	BY
4	CORRECTED AODA	03/2016	DMG
3	REVISED FOR AODA & OBC	10/2015	DMG
2	ADD GRADIENT	04/2013	DMG

REVISIONS

DSN: DMG | METRIC
CHK: DMG | SCALE: N.T.S.
DRN: DMG | DATE: 11/2006
A

FILE No.: APPENDIX
Drawing No. E4b

ENGINEERING SERVICES DIVISION

Information

DATE: 2020 February 25

SUBJECT: AODA TACTILE WALKING SURFACE INDICATOR PLATES

Tactile Walking Surface Indicators (TWSIs) are required to be installed where depressed curbs are provided on exterior paths of travel in accordance with the Accessibility for Ontarians with Disabilities Act (AODO) (2005) and the Integrated Accessibility Standards Regulation (IASR) (O.Reg. 191/11). The IASR identifies that the TWSIs are to have raised tactile profiles and high tonal contrast with the adjacent surface.

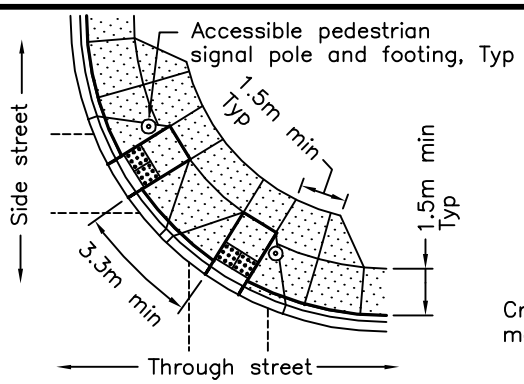
The requirements for Tactile Walking Surface Indicator (TWSI) plates for the City of Owen Sound are as shown in the chart below:

	OPSD
TACTILE WALKING SURFACE INDICATOR PLATE size & material	310.039
INSTALLATION REQUIREMENTS As applicable by intersection type	310.030 310.031 310.033
COLOUR Red powder coating as per Accessibility Advisory Committee	N/A

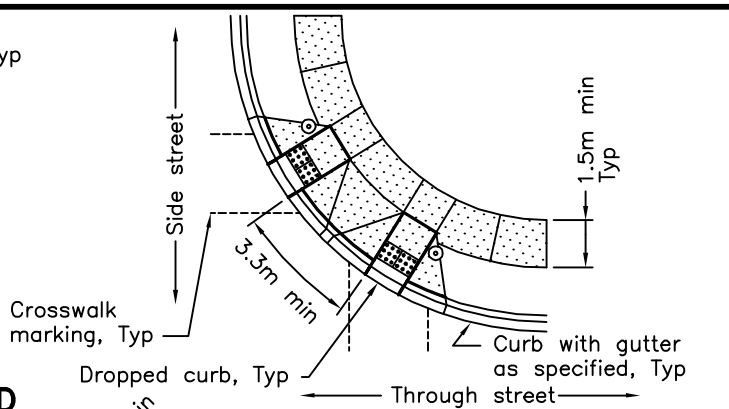
The City of Toronto undertook a pilot project from November 2012 to December 2013 to test different TWSI materials, and summarized their evaluation of performance of the various materials in terms of installation, durability, and cost. The pilot project tested four (4) different TWSI materials: plastic/composite polymers, clay brick pavers, concrete pavers, and cast iron plates.

The summary from the Evaluation Report dated March 28, 2014 identified that the cast iron material performed the best overall based on durability after winter maintenance and effectiveness in terms of detectability (i.e. surface of the domes remaining intact for detection). The recommendation from the Evaluation Report identified that based on durability, cost, maintenance and detectability (intactness of domes) over time, the cast iron material has performed the best among the materials tested.

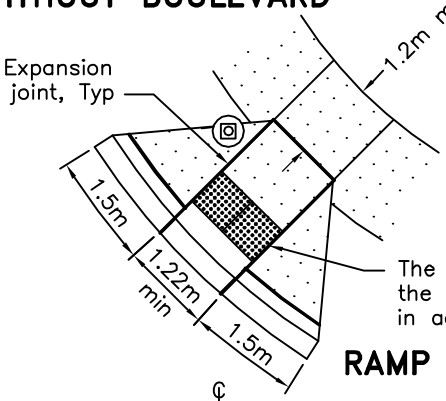
The City of Owen Sound has adopted red colour, cast iron TWSI plates for use on all projects within the City.



DOUBLE RAMP WITHOUT BOULEVARD

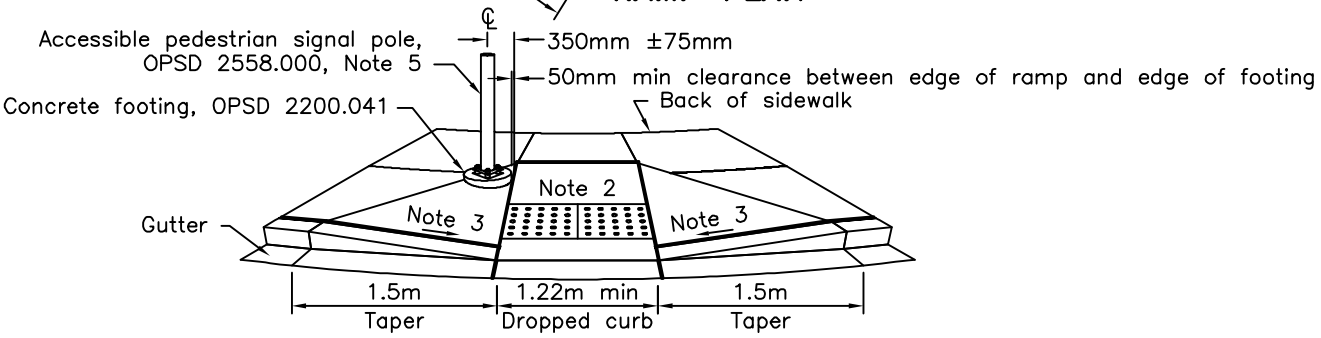


DOUBLE RAMP WITH BOULEVARD

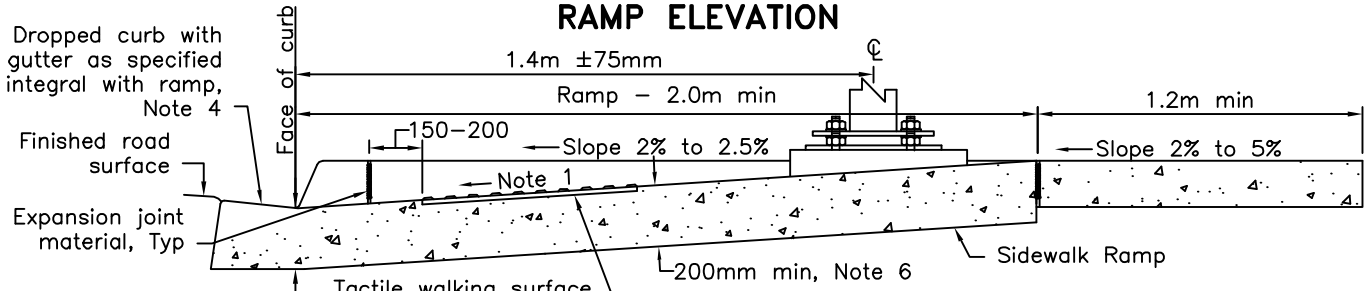


The plates shall extend the entire width of the sidewalk ramp at a minimum length of 610mm, in accordance with OPSD 310.039

RAMP PLAN



RAMP ELEVATION



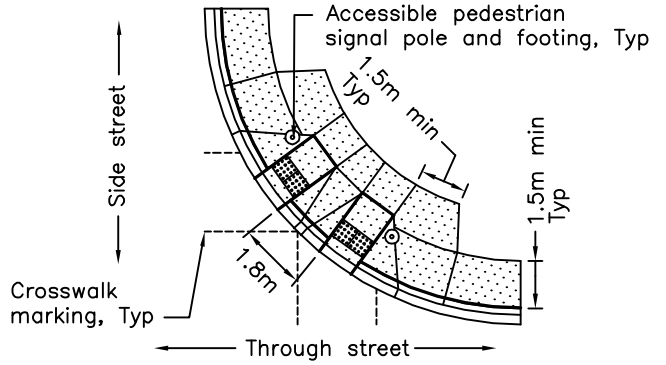
RAMP SECTION

NOTES:

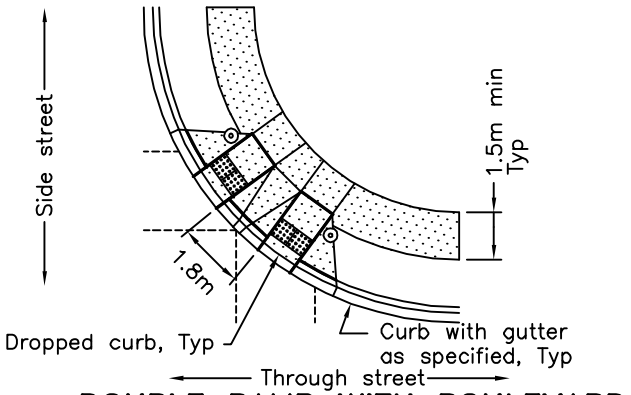
1 Slope of ramp shall not exceed 8%.
2 Cross slope of ramp shall not exceed 2% in either direction.
3 Cross slope of flared side of ramp shall not exceed 8%.
4 Dropped curb at ramp shall be modified to eliminate 30 mm step at gutter.
5 Accessible pedestrian signal to have tactile arrow that aligns with direction of crosswalk.
6 Minimum thickness of ramp is 200mm. Minimum thickness of sidewalk and flared sides adjacent to ramp is 150mm.

A Where only one crosswalk is present at an intersection, only one curb ramp is required.
B All dimensions are in millimetres unless otherwise shown.

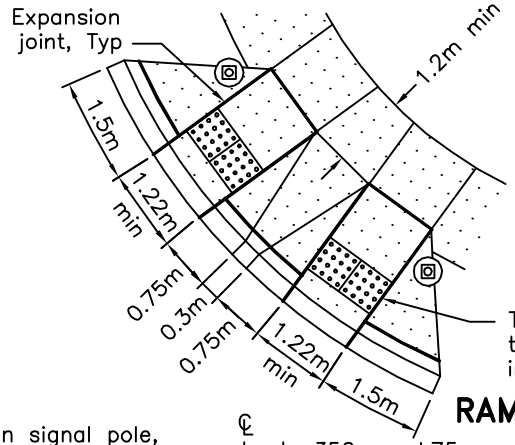
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	1
CONCRETE SIDEWALK RAMPS AT SIGNALIZED INTERSECTIONS			
	OPSD 310.030		



DOUBLE RAMP WITHOUT BOULEVARD

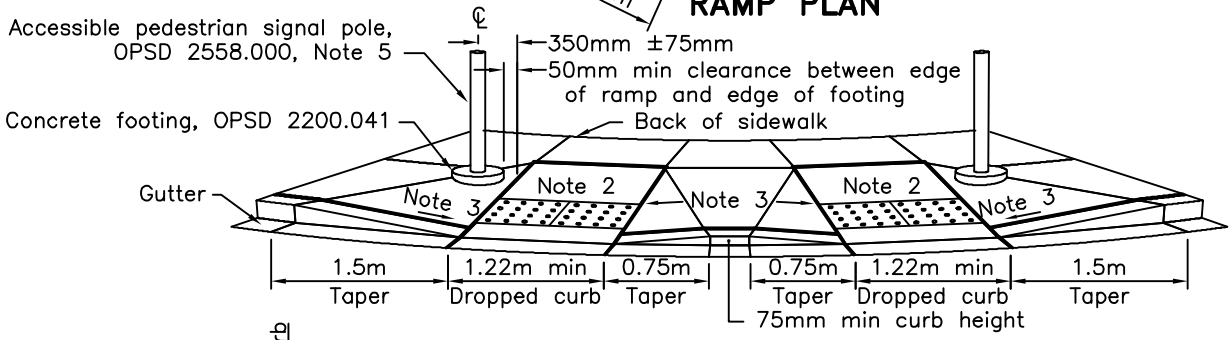


DOUBLE RAMP WITH BOULEVARD

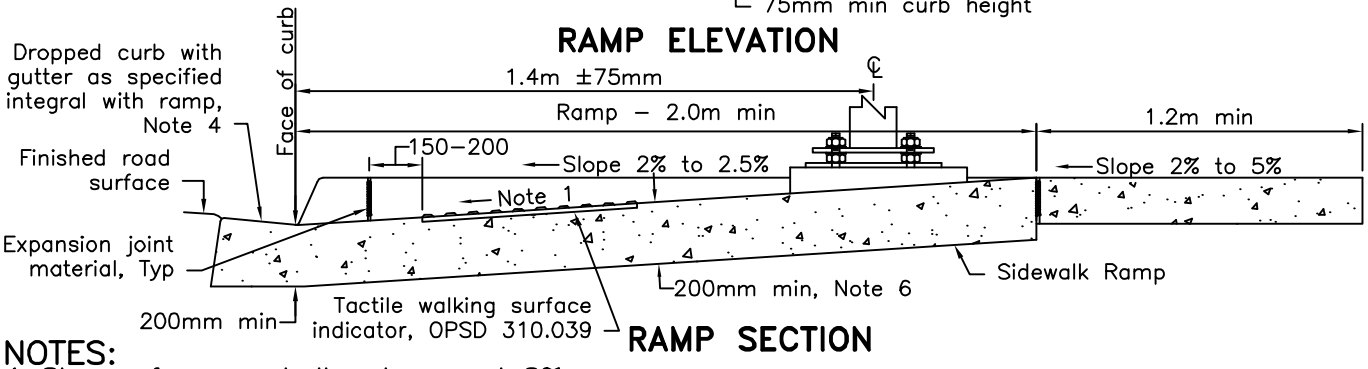


The plates shall extend the entire width of the sidewalk ramp at a minimum length of 610mm, in accordance with OPSD 310.039

RAMP PLAN



RAMP ELEVATION



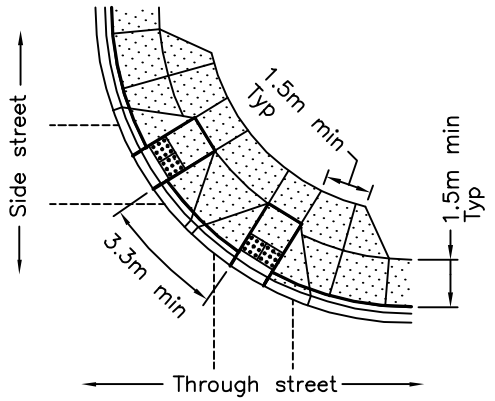
RAMP SECTION

NOTES:

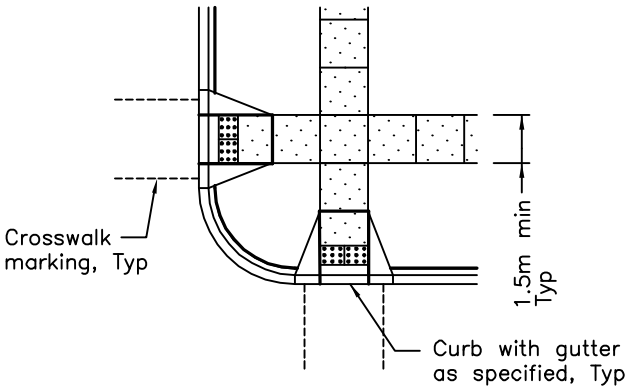
1 Slope of ramp shall not exceed 8%.
2 Cross slope of ramp shall not exceed 2% in either direction.
3 Cross slope of flared side of ramp shall not exceed 8%.
4 Dropped curb at ramp shall be modified to eliminate 30 mm step at gutter line.
5 Accessible pedestrian signal to have tactile arrow that aligns with direction of crosswalk.
6 Minimum thickness of ramp is 200mm. Minimum thickness of sidewalk and flared sides adjacent to ramp is 150mm.

A All dimensions are in millimetres unless otherwise shown.

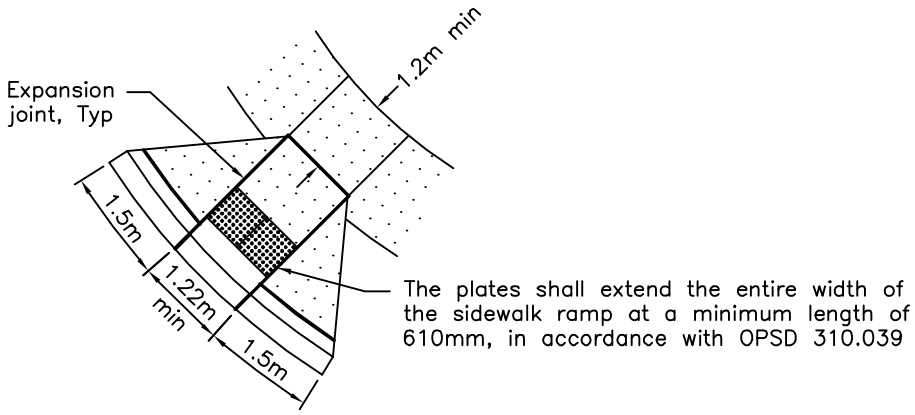
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	0
# CONCRETE SIDEWALK RAMPS AT SIGNALIZED INTERSECTIONS WITH INTERSECTING CROSSWALKS			
	OPSD 310.031		



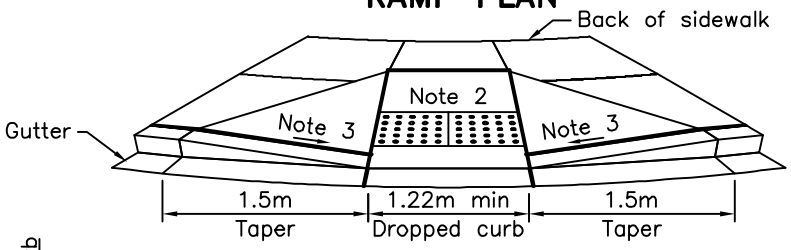
DOUBLE RAMP WITHOUT BOULEVARD



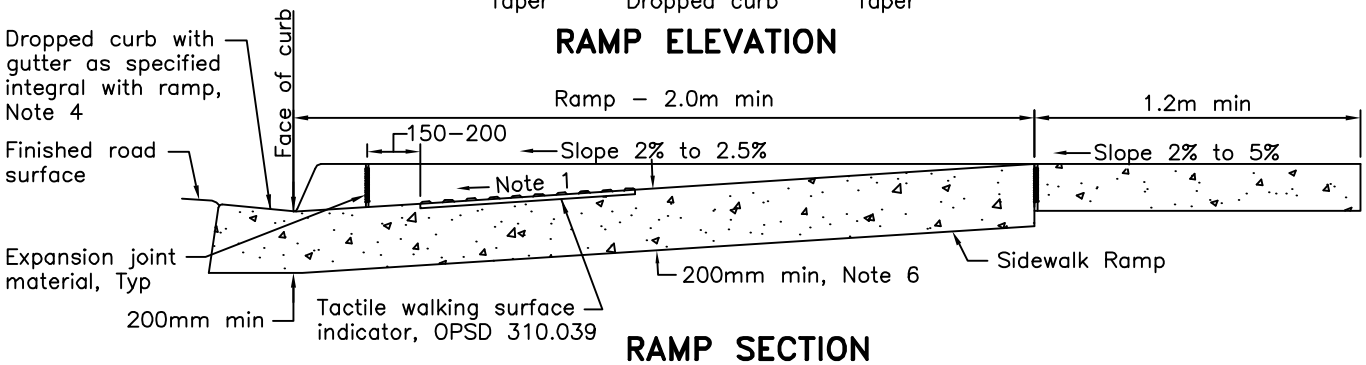
RAMPS WITH BOULEVARD



RAMP PLAN



RAMP ELEVATION

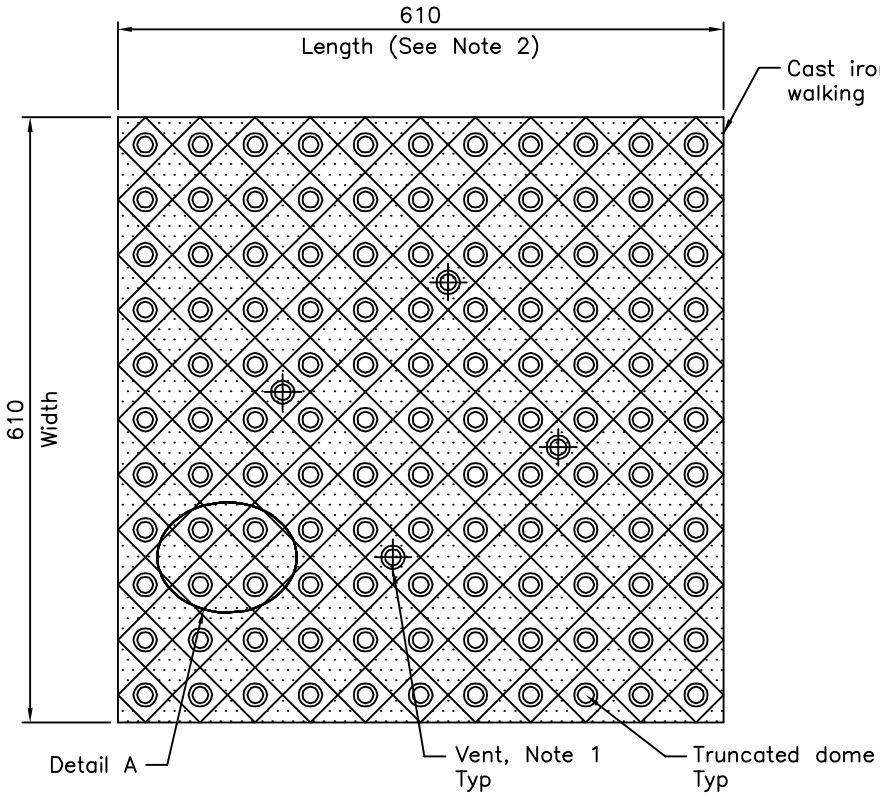


RAMP SECTION

NOTES:

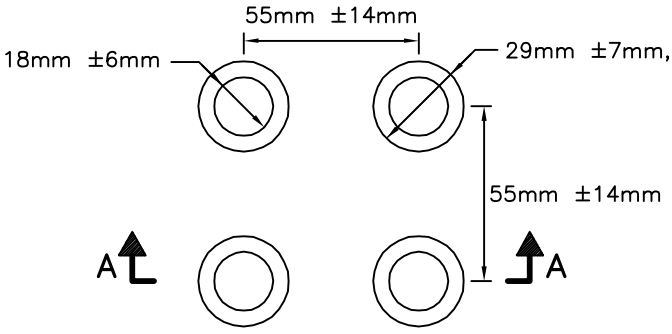
1 Slope of ramp shall not exceed 8%.
2 Cross slope of ramp shall not exceed 2% in either direction.
3 Cross slope of flared side of ramp shall not exceed 8%.
4 Dropped curb at ramp shall be modified to eliminate 30 mm step at gutter line.
5 Minimum thickness of ramp is 200mm. Minimum thickness of sidewalk and flared sides adjacent to ramp is 150mm.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	0
CONCRETE SIDEWALK RAMPS AT UNSIGNALIZED INTERSECTIONS	- - - - - - - - - - - - - - - - - - - -		
	OPSD 310.033		

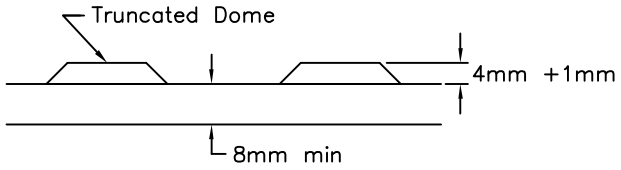


PLAN

ELEVATION



DETAIL A
TRUNCATED DOMES PLAN



SECTION A–A

NOTES:

1 Vents shall be as specified by the manufacturer.
2 Length of plate may be increased to suit the curb depression width.
A Adjacent cast iron plates shall be permanently connected using a locking mechanism and any hardware shall be hot dipped galvanized.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev	0
CONCRETE SIDEWALK RAMPS TACTILE WALKING SURFACE INDICATORS COMPONENT			
	OPSD 310.039		

APPENDIX F

Checklists and Applications

APPENDIX G

Excerpts from Section 5 of Zoning By-law 2010-078

5.18 GENERAL PARKING REGULATIONS

5.18.1 Provision of Parking Stalls

No person shall erect or enlarge any building or structure or establish or change a use unless parking stalls required by this By-law are provided, unless the requirement to provide such parking is reduced or eliminated through an agreement between the Corporation of the City of Owen Sound and the owner of any lot as provided for in the Planning Act.

5.18.2 Off-Street Parking Requirements for all Zones, excluding C1 Zone

Except as may otherwise be provided for, the minimum number of parking stalls for motor vehicles must be provided as set out in the following table:

Land Use Category	Use	Number of Vehicle Parking stalls Required
Residential Uses	Single detached dwelling, duplex dwelling, semi-detached dwelling, converted dwelling, and street fronting townhouse dwelling	1 space per dwelling unit
	Apartment dwelling and cluster townhouse dwelling	1.25 spaces per dwelling unit
	Residential dwelling units in a portion of non-residential building	1 space per dwelling unit
	Bed and breakfast house and boarding or lodging house	1 space plus 1 space per suite
Commercial Uses	Commercial school, financial institution, Laundromat, personal service use, retail store, service shop, studio	1 space per 25 m^2 of gross floor area or 4 spaces, whichever total is greater
	Restaurant, Drive-thru Restaurant	1 space per 9 m^2 of gross floor area, plus 1 space for each 7.5 m^2 of patio or deck area used for dining or drinking
	Funeral home	1 space for each 15 m^2 of gross floor area
	Shopping Centre (Neighbourhood or otherwise)	1 space for each 15.0 m^2 of gross floor area up to 300. 0 m^2, and 1 space for each 20.0 m^2 of gross floor area thereafter; or 10 spaces, whichever is the greater
	Hotel	1.2 spaces per guest room
	Marina	0.5 space for each water craft slip

Land Use Category	Use	Number of Vehicle Parking stalls Required
	Automotive Rental Establishment	4 spaces plus 1 space per 28.0 m^2 gross floor area
	Automotive Service Station, Vehicle Body/Repair Shop	3 spaces for every service bay or repair station
	Automotive Washing Establishment	2 spaces
	Wholesale establishment	1 space per 90m^2 of gross floor area
	Other commercial uses	1 space per 28.0 m^2 gross floor area
Office Uses	Business or professional office and government administrative offices	1 space per 28 m^2 of gross floor area
	Animal kennel, medical centre, veterinary clinic	Minimum of 4 spaces or 6.0 spaces per 100 m^2 gross floor area, whichever is greater
Industrial Uses	Truck transport terminal	1 space per 100 m^2 gross floor area
	Warehouse	1 space per 185 m^2 of gross floor area
	All other industrial uses	5 plus 1 space per 90 m^2 of gross floor area
Institutional Uses	Place of worship	1 for every 5 seats capacity or 1 for each 10 m^2 of gross floor area used for a hall or auditorium, whichever is greater
	Hospital	1 space per 3 beds plus 1 space for every 4 employees
	Elementary School	5 spaces plus 1 space per classroom
	Secondary School	1 space for each classroom; or 1 space per 10 m^2 of floor area in the gymnasium or auditorium, whichever is greater.
	Group home, group residence, crisis residence	1 space per 3 beds
	Long term care facility	1 space per 4 suites

Land Use Category	Use	Number of Vehicle Parking stalls Required
Leisure and Recreation Type Uses	Museum, library, recreational or athletic facility	1 space per 20 m^2 of gross floor area. Playing areas for squash, tennis, handball and badminton courts are to be excluded for the purposes of calculating parking
	Community lifestyle facility	1 space for every 4 seats or 1 space per 20 m^2 of gross floor area
	Bowling alley, lawn bowling club, tennis club, golf course, curling club, racquet club	3 spaces per alley, bowling green, tennis or racquet court, putting green, or sheet of ice, plus 1 space for each 15.0 m^2 of gross floor area devoted to other uses.
Other uses	All other uses permitted by this By-Law other than those listed in this table	1 per 40 m^2 of gross floor area

5.18.3 Off-Street Parking Requirements for C1 Zone

Except as may otherwise be provided for, the minimum number of parking stalls in the C1 Zone for motor vehicles must be provided as set out in the following table:

Land Use Category	Use	Number of Vehicle Parking stalls Required
Commercial Uses	Retail, rental and repair store, personal service use, financial institution, office, clinic, community lifestyle facility, commercial school, funeral home, veterinarian's clinic, studio, drinking establishment, restaurant	1 space per 40 m^2 of gross floor area
Institutional Uses	Community lifestyle facility, athletic or recreational establishment, theatre, church, art gallery, library, museum.	No parking stalls required
Residential / Mixed Uses	Dwelling units in combination with non-residential uses, Multiple Dwellings	1 space for each dwelling unit.
Other Uses	All other uses within C-1 Zones shall be as detailed in Section 5.18.2 of this By-law.	

ZBA [4]

5.18.4 Parking Exemption for C1 Zone

Where, in any C1 Zone, a building exists on the date of passing of this By-law, or where a building or use is established in accordance with this By-law, and where a proposal is made to change the use of any such building to a different use without increasing the floor area of the building:

a. The new use shall be permitted without additional parking being provided notwithstanding that additional parking spaces may be required pursuant to Section 5 of this By-law;

b. Notwithstanding the foregoing, parking shall be required in accordance with this By-law where the change in use is from a residential use to any other permitted use;

c. Where an addition is proposed to any building, parking shall be required only for the addition, and any legal deficiency in parking for the existing building shall not be required to be made up, unless the proposed addition results in the loss of existing parking spaces.

d. No additional parking shall be required where the proposed addition does not exceed 10% of the gross floor area of the existing building.

5.18.5 Use of Parking Areas and Spaces

No parking area or space required under this By-law shall be used for any other purpose than the parking of licensed vehicles used in conjunction with the permitted uses on the lot.

5.18.6 Calculation of Off-Street Parking stalls

Where the calculation of off-street parking requirements results in a fraction, the number of parking stalls to be provided will be rounded to the next highest whole number.

5.18.7 Parking for More Than One Use in a Building

When a lot, building or structure accommodates more than one use as set out in this By-law, the parking stall requirement shall be the sum of the requirements for the separate uses, unless otherwise provided for in this By-law.

5.18.8 Commercial Motor Vehicles, Tractor Trailers and Buses in Residential Zones

No person shall use any lot, building or structure in a Residential Zone for the parking or storage of any commercial motor vehicles unless he is the owner or occupant of such lot, building or structure, and provided that said vehicles shall not exceed 2,721.6 kilograms gross vehicle weight and provided that not more than one commercial motor vehicle is stored in accordance with this Section.

No person shall use any lot, building or structure in a Residential Zone for the parking or storage of any tractor trailer or part thereof. This provision shall not include commercial motor vehicles, and tractor trailers which attend a residential premise for the purposes of delivery and service.

5.18.9 Parking and Storage of Unlicensed and Inoperable Motor Vehicles

Unless specifically provided for by this By-law, no person shall provide outdoor storage for any motor vehicle which is unlicensed or inoperable.

5.18.10 Size and Accessibility of Parking Stalls

Motor vehicle parking stalls and parking aisles shall comply with the standards set out in the following table.

Maximum Angle of Parking stall to Maneuvering Aisle	Parking stall Width		Parking stall Length	
	Standard	Barrier Free	Standard	Barrier Free
0 degrees	2.50 m	3.50 m	6.50 m	6.50 m
30 degrees up to and including 90 degrees	2.65 m	3.50 m	6.00 m	6.00 m

5.18.11 Location of Required Off-Street Parking stalls

Unless otherwise provided in this By-law, required off-street parking stalls shall be located on the same lot as the principle or main building or on a lot no more than 100 m from the lot.

5.18.12 Parking Surfaces and Drainage

All off-street parking stalls and areas shall be constructed of a non-migrating hard surface material and treated to prevent erosion and the raising of dust and loose particles. Surface cover shall consist of asphalt, paving brick, concrete or similar hard-surfaced materials. All off-street parking stalls and areas shall be graded and drained so as to prevent the pooling of surface water or the flow of surface water onto adjacent lots.

5.18.13 Tandem Parking

Where parking is provided at the dwelling unit in an individual driveway, the required parking for that dwelling may be provided by a tandem parking stall.

5.18.14 Parking Facilities

In zones where a parking facility is a permitted use, and the parking is to be provided within a structure, such a structure shall be subject to all requirements of the zone except for parking provisions.

5.18.15 Underground Parking Provisions

All underground parking structures shall be permitted to extend to 0.5 metres from the property line in the side and rear yards only, in the case of the front yard and side yard setback, the regulations of the zone shall apply.

5.18.16 Parking Area Location On-Lot

Notwithstanding the required yard and setback provisions of this By-law to the contrary, uncovered surface parking areas shall be permitted in the required yards or in the area between the street line and the required setback provided **ZBA [4]**

that no part of any parking area, other than a driveway, is located closer than 1.5 m to any street line, unless otherwise specified below:

a) A parking space for individual residential dwelling units with individual private driveways may be located in the front yard provided that not more than 50% of the front yard area is used for driveways and parking areas. Notwithstanding the above a private drive shall be no less than 3.0 m wide and no more than 8.5 m wide.

b) For Extractive Industrial/Disposal Industrial Uses, parking shall be permitted in the rear yard and interior side yard, and where such uses abut a Residential, Commercial, Institutional or Agricultural use, the parking area shall be set back 9.0 m from the abutting lot line.

c) For the conversion of a building, as legally existing on the effective date of this By-law, to permit a residential use containing three (3) or more dwelling units a parking area may be permitted within a front, rear or side yard.

5.19 BARRIER FREE PARKING REGULATIONS

5.19.1 Barrier Free Parking Requirements

No person shall establish, alter or expand a parking area designed to accommodate more than 5 required parking stalls unless the number of required barrier free parking stalls as set out in the following table are provided.

Barrier free parking stalls shall be located near and accessible to the point of entrance to the building and be clearly marked as a barrier free parking stall.

Where the required number of parking stalls equals 100 or more the City may require additional accessible spots for expectant mothers/mothers with small children.

Total Required Parking Stalls	Minimum Number of Barrier Free Parking Stalls
5 to 10	1
11 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2% of the total required
Over 1000	20 + 1% over 1000 of the total required

5.20 BICYCLE PARKING REGULATIONS

5.20.1 Bicycle Space Requirements

ZBA [4]

The minimum number of parking spaces for bicycles, in addition to the required vehicle parking, must be provided as set out in the following table:

Use	Number of Bicycle Spaces Required
Cluster Townhouse or Apartment Dwellings	10% of required vehicle parking
Schools	1 space per 20 m^2 classroom, plus 1 space per 800 m^2 of office area
Offices	4% of required vehicle parking, or 4 spaces, whichever is greater
Commercial Uses (excluding uses in the C1 Zone, unless otherwise noted), including Restaurants (excluding take-out only)	5% of required vehicle parking, or 4 spaces, whichever is greater
Automotive Rental Establishment, Automotive Service Station, Automotive Washing Establishment, Transportation Depot, Vehicle Body/Repair Shop, Vehicle Sales Establishments	1 space
Cinema, Community Lifestyle Facility or Community Centre	10% of required vehicle parking, or 4 spaces, whichever is greater
Hotel	1 space per 20 guest rooms
Industrial Use	4% of required vehicle parking

5.20.2 Bicycle Parking Space Design Standards

ZBA [4]

Bicycle parking shall be provided in an area having a minimum of 1.8 m in length. The minimum number of bicycle parking spaces shall be accommodated by a rack, which will determine the width of the bicycle parking area.

5.20.3 Motorcycle Parking Space Design Standards

a) The minimum dimensions for each space intended for motorcycles or similar vehicles must be 1.0 m in width and 2.1m in length;

b) Motorcycle parking can be located in areas which may be unsuitable for vehicle parking due to size or shape and not intended for pedestrian traffic, however the parking must be clearly delineated by markings and barriers.

5.21 QUEUING REGULATIONS

5.21.1 Queue Space Requirements

Where any of the uses permitted by this by-law offer drive-through service, off-street vehicle queue spaces leading to and from the drive-through service must be provided in accordance with the following table:

Land Use	Required Number of Queuing Spaces
Automated Bank Machine	3.0 before each Automated Bank Machine
Automotive Service Station/Repair Garage	3.0 before each service bay 1.0 at service bay exit if a through-bay
Automotive Washing Establishment	3.0 before each wash bay 1.0 after each wash bay
Restaurant	**12.0 total including 11 before the service/pick up window and 1 at the service/pick up window**
Convenience Retail or Service Establishment	2.0 before service window

5.21.2 Queue Space Design Standards

All required queue spaces must be provided in accordance with the following design standards:

a) The minimum dimensions for each queue space must be 2.75 m in width and 5.75 m in length;
b) Queue spaces must be arranged in a single waiting line in advance and behind the drive through service window.
c) Queue spaces may be arranged in a double waiting line in advance of the menu board/order station.
d) A minimum inside turning radius for queue spaces forming a waiting line is 7.0 m.
e) Queue spaces forming a waiting line must be unobstructed by parking stalls or loading spaces and must be clearly delineated by markings and barriers; and
f) Queuing spaces forming a waiting line or storage space from the service offered cannot form part of a parking aisle providing access to parking stall.

5.22 LOADING SPACE REGULATIONS

5.22.1 Loading Space Requirements

No person shall erect or enlarge a building or establish or change a use unless permanently maintained off-street loading spaces accessible from an improved street or lane are provided in accordance with the following requirements:

Use	Required Number of Loading Spaces
Multiple Dwelling over 25 units	1 space
All uses involving shipping and/or receiving of goods (See Section 5.22.4)	0 spaces for 0 to 300 m^2 gross floor area
	1 space for over 300 m^2 to 3000 m^2 gross floor area
	2 spaces for over 3000 m^2 gross floor area

ZBA [15]

Use	Required Number of Loading Spaces
Uses in the Commercial C1 (C-1) Zone	N/A

5.22.2 Loading Space Access

Each loading space shall be provided with one or more unobstructed driveways of not less than 3.5 m in width and 10 metres in depth. Such driveway shall be contained within the lot on which the spaces are located and are accessible from a street or lane. No part of such driveway shall be used for the parking or temporary storage of vehicles.

5.22.3 Loading Space Surface

The driveways, loading and unloading spaces shall be maintained with a stable surface which is treated so as to prevent the raising of dust or loose particles and with provisions for drainage facilities.

5.22.4 Loading Space for Medical Marihuana Production Facility

ZBA [15]

Loading spaces for a Medical Marihuana Production Facility must be in a wholly enclosed building. The required number of loading spaces, access and surface shall be as otherwise described in Section 5.22.

5.23 LIGHTING & LANDSCAPING OF PARKING AND LOADING AREAS

a) Where lighting facilities are provided in conjunction with any off-street parking or loading area, no person shall arrange such lighting such that excessive light and glare is deflected onto adjoining properties.

b) Where a parking area containing 4 or more parking stalls or a loading space(s) abuts a residential use or undeveloped land in a Residential Zone a minimum of 1.5 metres of land abutting the lot line, shall be used for no other purpose than a planting strip in accordance with the provisions of this subsection.

c) Where a parking area consisting of 4 or more parking stalls or a loading space(s) abuts a portion of a street, a minimum width of 1.5 metres of land adjacent to the street shall be used for no other purpose than a planting strip in accordance with the provisions of this subsection.

d) In a C1 Zone, where a parking area consisting of 4 or more parking stalls in any yard which abuts a lot in a Residential Zone, no parking shall be permitted within 7.5 metres of the Residential Zone, unless a continuous privacy fence or solid vegetative screen having a minimum height of 1.5 metres is provided and maintained along the common lot line.

e) A planting strip required for b) shall be used for no other purpose than for a row of trees, a continuous hedgerow of evergreens or shrubs, a berm, a wall, or a privacy fence, not less than 1.5 m high, immediately adjacent to the lot line or portion thereof along which such planting strip is required hereunder, arranged in such a way as to form a dense or

opaque screen; with the remainder of the strip used for shrubs, flower beds or grass, ground cover or a combination thereof.

f) A planting strip required for c) shall be used for no other purpose than for a planting strip arranged in such a way as to form a landscape strip with a row of trees shrubs, flower beds or grass, ground cover or a combination thereof. Notwithstanding, a berm, a wall, or a privacy fence may be permitted where it is required for noise attenuation purposes.

5.24 DESIGNATED HERITAGE BUILDINGS

Alternative building design or building materials for properties designated under the Ontario Heritage Act that were approved through the issuance of a Heritage Permit shall be deemed to comply with the provisions of this By-law.

APPENDIX H

Scoped Traffic Impact Study – Terms of Reference

H.1 SCOPED TRAFFIC STUDY REQUIREMENTS

The Engineering Services Division requires that the following be included in the Scoped Traffic Study submitted in support of any development application.

The Scoped Traffic Study must have regard to the City of Owen Sound Transportation Master Plan.

The Plan can be found here:

https://www.owensound.ca/en/city-hall/city-of-owen-sound-transportation-master-plan.aspx

General Requirements

The study must provide a full description of the proposed development. This will include, but not be limited to the following:

1. Existing permitted land uses;
2. Proposed land uses;
3. Floor space including a summary of each type of use/number of residential units;
4. Anticipated date of occupancy;
5. Approximate hours of operation;
6. Planned phasing of the development;
7. Nearby intersections and access to adjacent developments, including type of control;
8. Indicate number of lanes, width and configuration;
9. Proposed access points and type of access;
    - When determining the location of an access, consideration should be given to how the access will affect the surrounding road network, area residents and area businesses. All proposed site access points on Arterial or County Roads should be evaluated for capacity, safety and adequacy of queue storage capacity. Approval of the proposed access will be evaluated using sound engineering judgement;
    - **Should the applicant wish to pursue a full moves access onto an Arterial or County Road, all costs associated with the access will be borne by the applicant, including a Letter of Credit in the amount of $120,000 for the future installation of traffic control signals. The applicant must enter into a Maintenance Agreement for the future maintenance of the signals. Signals will only be installed when warranted or directed by Council.**
10. Use a combination of maps and other documentation, which will identify all relevant information.

Traffic Volume Analysis

The traffic volume analysis must include all the signalized intersections nearest to the proposed development, access to adjacent developments and any controlled or minor intersections created or impacted by the proposed development or as directed by Municipal staff.

Please include the following in your analysis:

1. Horizon years of 5 and 10 – depending on full build-out, or as advised by Municipal staff;
2. AM and PM peak periods are acceptable. Commercial development will require Saturday analysis;
3. Analyse Background, Site Generated and Total traffic volumes;
4. Identify the "worst case" combination of site related and background traffic;
5. Use the following growth rate projections:

Base year (2001) pop.	21,425
By 2011	22,580
By 2016	22,700
By 2026	24,461

6. Please contact the Planning Division to discuss surrounding developments in the area.

Trip Generation and Distribution

In trip distribution and trip generation analysis, the following should be included:

1. Trip generation surveys from similar developments in the City which have similar operating characteristics as the proposed development;
2. Latest edition of the ITE trip generation rates are accepted;
3. Provide a table summarizing your findings;
4. Trip distribution assumptions must be supported by one or more of the following:
    - City of Owen Sound Transportation Master Plan;
    - Existing/anticipated travel patterns.

Capacity Analysis

The report must include capacity analysis completed in Synchro, version 7.0 at a minimum. The capacity analysis should also address appropriate truck percentages for each movement, and maximum saturation flow of 1900 is to be utilized.

The analysis should also include the identification of signalized intersections where:

1. Volume/capacity (v/c) ratios for overall intersection operations, through movements or shared through/turning movements increased to 0.90 or above;
2. v/c ratios for exclusive movements that will exceed 1.00;
3. Queues for individual movements and if they exceed available lane storage.

Safety

Identification of potential safety or operational issues must be reviewed that are associated with the following:

1. Weaving;
2. Merging;
3. Corner clearances;
4. Sight distances;
5. Vehicle/pedestrian conflicts;
6. Traffic infiltration;
7. Access conflicts;
8. Heavy truck movement conflicts.

Final Report

The following is a suggested study structure:

1. Site/development description;
2. Study area, including map;
3. Existing conditions;
4. Analysis periods;
5. Background, existing and future background and future total – exhibit required;
6. Site generated traffic – exhibit required;
7. Improvement alternatives;
8. Traffic impacts for future background and total traffic with and without mitigation;
9. Access considerations;
10. Recommendations

Annual **A**verage **D**aily **T**raffic counts, for 126 intersections within the City are available.