

Councillor Briefing Sessions



For Information Only

Roads Standards

Presented To:	Priorities Committee
Presented:	Wednesday, Nov 05, 2008
Report Date	Wednesday, Oct 29, 2008
Type:	Councillor Briefing Sessions

Recommendation

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Background

The Infrastructure Services Department follows engineering design standards in the preparation of road construction contracts.

There are several guidance manuals available for reference in roadway design. The two (2) most common reference manuals utilized in the Province of Ontario are:

1. Ontario Ministry of Transportation, Geometric Design Standards for Ontario Highways
2. Transportation Association of Canada, Geometric Design Guide for Canadian Roads

These reference manuals are used by staff in the engineering of roads projects.

The Infrastructure Services Department has two (2) internally published design reference documents:

1. Engineering Design Manual
2. Standard Specifications and Standard Drawings

These documents supplement the guidance manuals referenced above by providing minor revisions or additional information for projects within the City.

The City design standards are utilized for Subdivision Developments and other work within the municipal right-of-way.

In general, the major components of the road design standards are grades, lane widths, sidewalks, medians

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and boulevards.

Grades

The grade along a roadway is expressed as a percentage (%) that is rise or fall in metres over a horizontal length of one hundred (100) metres. City Standards require the grade of a local road to be between one percent (1%) and eight percent (8%) while the grade for Collector, Tertiary, Secondary and Primary Arterials is required to be between one percent (1%) and six percent (6%). Examples of grade include Corsi Hill, ten percent (10%), Paris Street Bridge (from Van Horne), six percent (6%), and Lloyd Street Hill (west side), twelve percent (12%).

Passenger vehicles can readily negotiate up-grades as steep as four to five percent (4 - 5%) with only a negligible effect on speed. On down-grades greater than five percent (5%) trucks tend to increase speeds. Steeper grades pose problems for winter maintenance and pedestrians. Therefore on Arterial/Collector roads the maximum grades are six percent (6%). Steeper grades are allowed on lower speed and lower volume roads with a maximum grade of eight percent (8%). The minimum grade of one percent (1%) is required to facilitate road drainage. Refer to the the proposed 2009 Transportation Standards attached as **Appendix 'A'**.

The Planning Committee has allowed steeper grades in recent years and in flatter areas a grade below one percent (1%) has been allowed, however the granular requirements for road construction are increased to reduce potential frost heaving.

Lane Widths

In Arterial road reconstructions, the City has implemented a 3.75 metre through lane width standard. This is a common provincial practice for high speed, high volume roads. In urban environments (curb and gutter), the City has increased the outside (curb) lane width to 4.25 metres to provide additional room for bicyclists. In rural environments (open ditches), the City has maintained the 3.75 metre lane width and provided a 2.0 metre paved shoulder for pedestrians and bicyclists. The paved shoulders also increase safety by allowing for vehicles pulling over to access a paved shoulder. Lane painting and/or rumble strips are currently installed to delineate the paved shoulder from the travelled lane.

The Official Plan states "Bicycle facilities for all new road links and road widening projects will be considered based on an assessment of safety, potential usage, cost, and linkages to major employment, educational, or recreational centres". This statement is supported by the additional lane widths and paved shoulders on the majority of projects. Staff have met with the Bicycle Advisory Panel (BAP) to develop the additional lane width and paved shoulders. Staff will continue to meet with the BAP to identify their priority projects and coordinate with the capital program.

As a cost saving measure the paved shoulder does not have the same asphalt thickness as the travelled portion of the road.

With projects that have severe property constraints, the City has relaxed the paved shoulder and additional lane width requirements.

Sidewalks

The City standard sidewalk width is 1.5 metres and is designed to allow two (2) pedestrians to comfortably walk side by side, or pass each other. In areas of high pedestrian traffic a wider sidewalk would be considered.

It is the policy of the Official Plan to provide the following on new and reconstructed roads, when feasible:

- a) Sidewalks on both sides of urban Arterial Roads and Collector Roads adjacent to developed lands;
- b) Sidewalks on one side of Local Roads;
- c) High quality pedestrian connections to transit;
- d) Pedestrian connections between neighbourhoods; and
- e) Pedestrian linkages to major foot traffic generators such as theatres, malls and restaurants.

For new developments and road reconstruction, sidewalks are proposed based on the above.

Medians

A median is a portion of road which physically separates the travel lanes of traffic in opposing directions. A median is a safety device which provides some measure of freedom from interference of opposing traffic. Medians provide a recovery area for errant vehicles, storage area for emergencies, and can reduce headlight glare. They also add a sense of open space and freedom. Medians are only proposed on primary or secondary arterial roads where access is limited to intersections or the occasional, widely spaced driveway access.

There are several types of medians:

- a flush median (additional paved area between opposing lanes as per MR 35 between Azilda and downtown area)
- a raised median (a raised treated island with curbs as per the Kingsway between Falconbridge Highway and the South-East By-Pass, and MR 80 through Guilletville)
- a divided highway (a divided highway as per MR 55 between Copper Cliff and Lively)

Where the City owns sufficient property it is preferred to construct a divided highway, which is proposed for the new portion of the Maley Drive extension. When there is not sufficient property, a raised median has been proposed.

In areas of high visibility, such as major entrances to the City's major intersections or business districts, the City has provided treatments other than asphalt to medians to make the finished work more aesthetically pleasing. For example, the Kingsway project between the South-East By-Pass and Falconbridge Highway had six (6) sections of the median treated with lockstone.

Boulevards

The area between the curb and the sidewalk is referred to as the boulevard. The boulevard serves as a safety separation, as well as a location for underground utilities and snow storage. It is preferred to locate utility poles, street lights, municipal signs, and other objects as far as possible from the travelled roadway, preferably behind the sidewalk and not on the boulevard.

The boulevard is constructed of sod, asphalt or lockstone and has a minimum width of 1.5 metres. This width has been reduced in areas of severe property constraints.

Urban Section Construction

An urban section has curb and gutters and a storm sewer system. A rural section has open ditches and driveway culverts. When the Capital Program identifies work for a rural section that is fully developed with tightly spaced homes, a full reconstruction to an urban standard is considered. The main factors considered are the available capital budget and the available storm sewer outlet.

In 2007/2008 Marcel Street was constructed to an urban standard. In an effort to reduce the higher costs of

reconstructing to a full urban section, local streets have been rebuilt without construction of the curb and sidewalk, for example, Cranbrook Crescent, Fifth Street and Garson-Coniston Road.

These standards are continually reviewed by a Staff Standards Committee and updates are distributed annually.

Appendix "A"

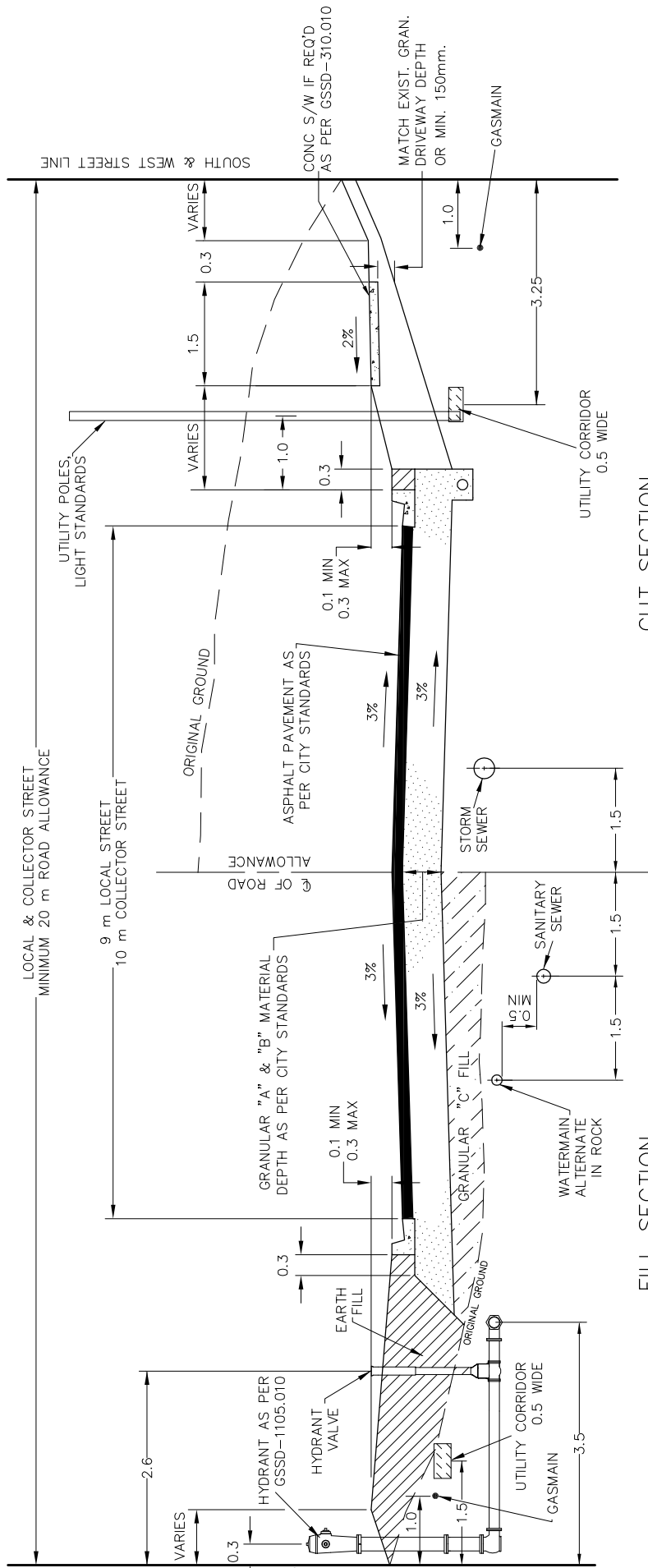
2009 Transportation Standards						
	Standard Residential Roads		Industrial Roads	Major Urban Roads		
	Local	Feeder & Minor Collector	Standard Industrial	Collector & Tertiary, Secondary & Primary Arterials		
Design Speed (km/hr)	60	60	60	60	70	90
Min. Super-Elevated Horizontal Curve Radius (metre)						
e = -0.02				210	300	750
e = 0.00				190	280	475
e = 0.02				170	230	420
e = 0.03				160	220	400
e = 0.04				150	200	380
e = 0.06				130	190	340
Min. Stopping Sight Distance (m)	130	130	130	130	180	260
K-Crest Min. (m)	15	15	15	15	25	50
Illuminated	8	8	-	-	-	
K-Sag Min. (m)	18	18	18	18	25	40
Illuminated (m)	5	5	-	-	-	
Grade (%) - minimum	1.0	1.0	1.0	1.0	1.0	1.0
- maximum	8.0	8.0	6.0	6.0	6.0	6.0

Notes:

A maximum super-elevation of 0.02 is recommended for urban local streets and a maximum of 0.06 for all other urban roads by the Transportation Association of Canada (TAC).

e = Pavement super-elevation (tangent of the angle)

k = The length of a section of curve measured horizontally over which there is a 1% change of gradient.



NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE INDICATED.
2. DIMENSIONS SHOWN ARE TO BE USED UNLESS OTHERWISE SPECIFIED.
3. UTILITY CONDUITS & CABLES WITHIN BOULEVARD TO HAVE 0.75 m MINIMUM COVER.
4. WHEN SIDEWALK IS ON NORTH OR EAST SIDE, UTILITY CORRIDOR LOCATION IS REVERSED.
5. SEE GSSD-225.030 FOR TYPICAL SERVICE LOCATIONS.

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UTILITY SERVICES
LOCATION SECTION

DRAWN BY: STS/RF/MEP REV No: 1

DATE: 2003-03-03

REV DATE: APR/04

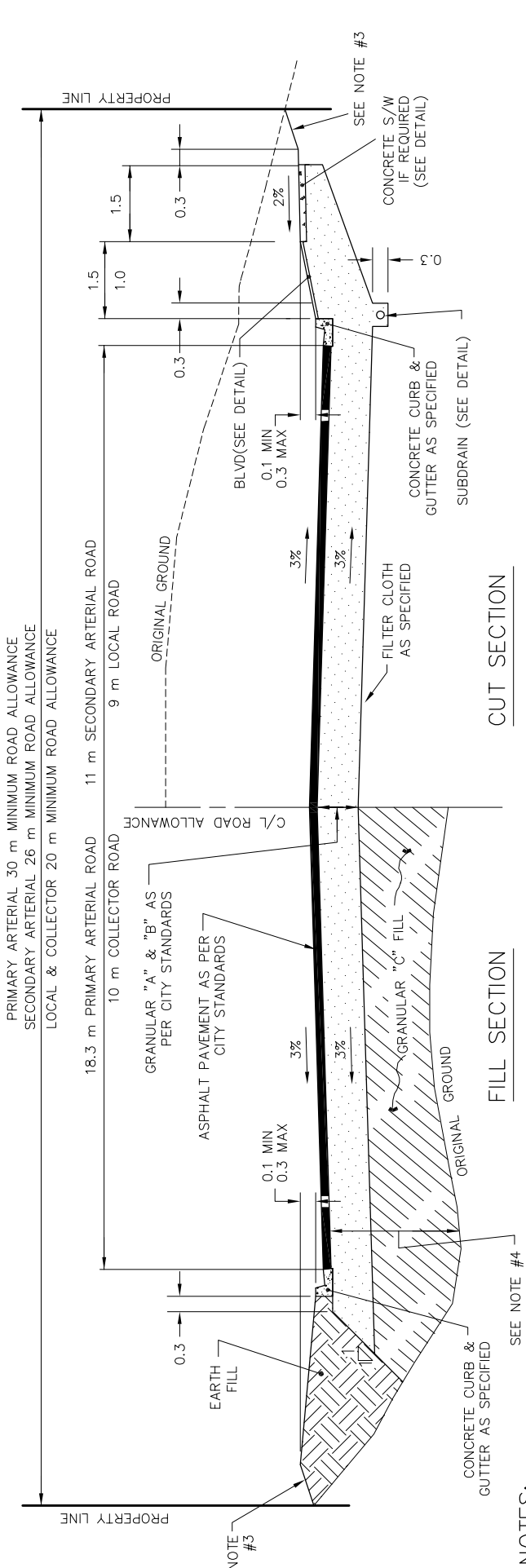
SCALE: NTS

CAD/FILE No.:

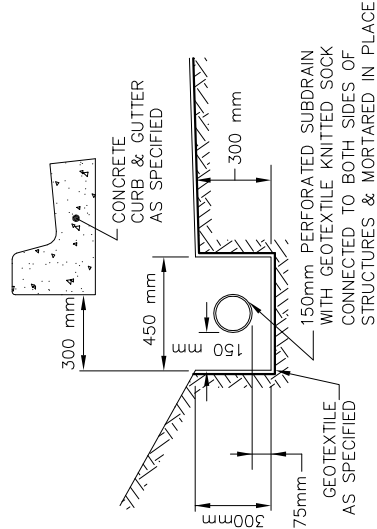
A1986-1 (1 OF 1)

APP'D:

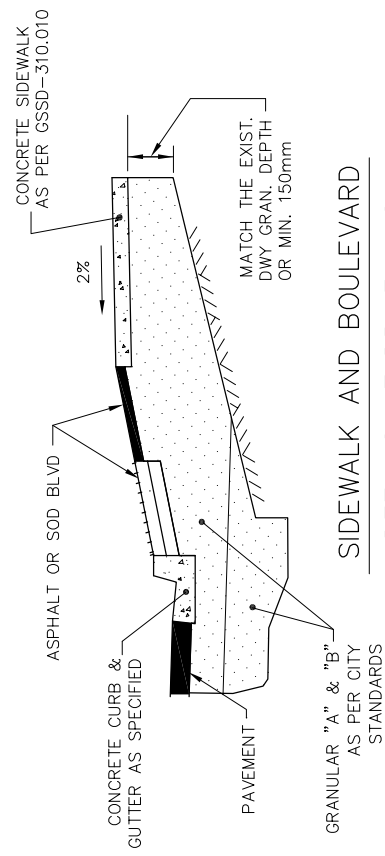
GSSD-225.040



- NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE INDICATED.
 2. DIMENSIONS SHOWN ARE TO BE USED UNLESS OTHERWISE SPECIFIED.
 3. SLOPES : FOR HEIGHTS OF CUT 1 m OR LESS, USE A 3 : 1 SLOPE.
FOR HEIGHTS OF CUT 1 m, DEPTHS OF CUT OVER 1 m, USE A 2 : 1 SLOPE.
 4. SLOPES TO BE SURFACE DRESSED AS SPECIFIED IN THE CONTRACT.
 5. ALL TOPSOIL IS TO BE STRIPPED PRIOR TO GRANULAR MATERIAL BEING PLACED, IF DEPTH IS LESS THAN 1 m.
 6. UTILITY LOCATIONS TO BE APPROVED BY THE CITY ENGINEER.
 7. SEE GSSD-225.030 FOR TYPICAL SERVICE LOCATIONS.



SUBDRAIN DETAIL

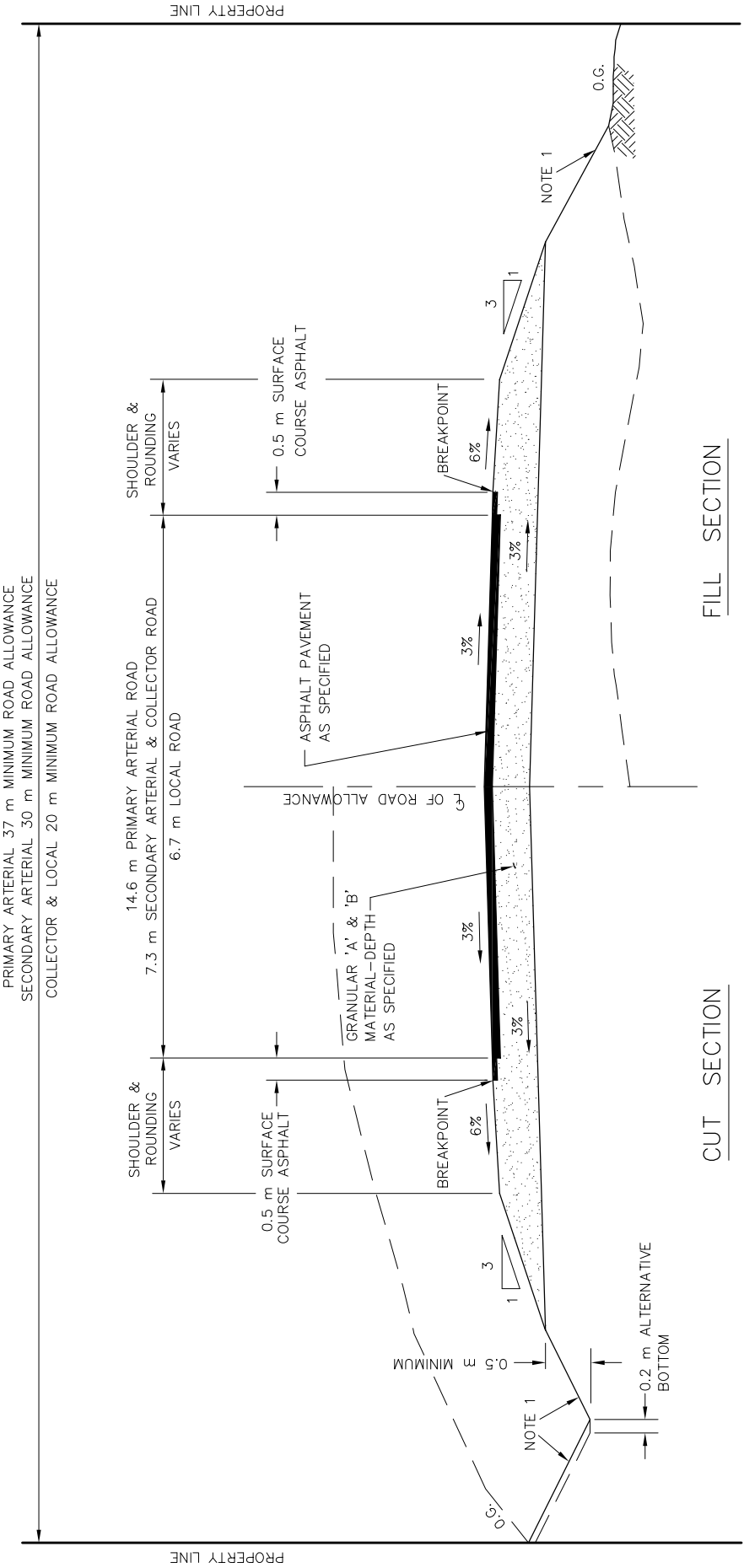


SIDEWALK AND BOULEVARD
DETAILS AT DRIVEWAYS

	STANDARD ROAD SECTION URBAN		DRAWN BY: WJK/STS/RF	REV No:
			DATE: 2003-03-03	REV DATE:
			SCALE: NTS	CAD/FILE No.: A1924-1 (1 OF 1)
			APP'D:	GSSD-225.010

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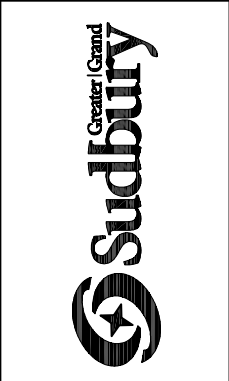


NOTES :

1. SLOPES:
- FOR HEIGHTS OF FILL OR DEPTHS OF CUT 1 m OR LESS, USE 3:1 SLOPE
 - FOR HEIGHTS OF FILL OR DEPTHS OF CUT OVER 1 m, USE 2:1 SLOPE
2. ALL TOPSOIL IS TO BE STRIPPED PRIOR TO GRANULAR MATERIAL BEING PLACED, IF DEPTH IS LESS THAN 1 m.

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STANDARD
ROAD SECTION
RURAL

DRAWN BY: STS/RFRANK	REV No:
DATE: 2003-03-03	REV DATE:
SCALE: NTS	CAD/FILE No.: A1952-1 (1 OF 1)
APP'D:	GSSD-206.010