# CITY OF KELOWNA

# BYLAW NO. 8712

## Amendment No. 6 to
## "Subdivision, Development and Servicing Bylaw No. 7900"

---

The Municipal Council of the City of Kelowna, in open meeting assembled, enacts as follows:

1. THAT "Subdivision, Development and Servicing Bylaw No. 7900" be amended as follows:

   (a) Replacing **Schedule 1 - Works & Services Requirements** with a new **Schedule 1 - Works & Services Requirements** as attached to this bylaw;

   (b) Adding a new Part 7 Hillside Standards to **Schedule 4 – Design Standards** as attached to this bylaw;

   (c) Replacing Part 2 Drawing Index of **Schedule 5 – Construction Standards** with a new Part 2 Drawing Index as attached to this bylaw; and

   (d) Adding Drawings SS-H1 to SS-H15 inclusive to **Schedule 5 – Construction Standards** as attached to this bylaw.

2. This bylaw shall come into full force and effect as and from the date of adoption.

3. This bylaw shall be cited as "Bylaw No. 8712, being Amendment No. 6 to "Subdivision, Development and Servicing Bylaw No. 7900".

Read a first, second and third time by the Municipal Council this 15th day of October, 2001.

Read a second and third time as amended by the Municipal Council this 5th day of November, 2001.

Adopted by the Municipal Council of the City of Kelowna this

_____
Mayor

_____
City Clerk

# WORKS & SERVICES REQUIREMENTS

## KEY SHEET

| **ABBREVIATION** | REQUIREMENT |
|---|---|
| WTR | Community water system. In subdivisions which are to be provided with a community water system, each Parcel within the proposed subdivision, or Parcel being Developed, must be supplied by a water distribution system, including service connections, and with adequate fire flow and protection, which is designed in accordance with the standards prescribed in the Design Standards Water Section. |
| WELL | Where a community water system is not available a proven water supply located on each parcel is permitted. |
| SWR | Community sanitary sewer system. |
| SWRSEP | Sanitary sewer collection and disposal or Sanitary sewage effluent ground disposal in accordance with Part 2, Section 5.2 (o)(viii) of this bylaw. |
| DITCH | Drainage collection and disposal system by open ditches and culverts. |
| STM | Closed drainage collection and disposal system (i.e. a system other than open ditches). |
| SL | Street lighting throughout the subdivision. |
| SLI | Street lighting at street intersections only. |
| OH | Overhead electrical and communication wiring. |
| UG | Underground electrical and communication wiring. |
| W | Communication and electrical wiring to conform to the highest standard of existing adjacent facilities. |

# WORKS & SERVICES REQUIREMENTS

| | UTILITIES (REFER TO KEY SHEET) | | | | | STREET REQUIREMENTS (REFER TO STANDARD DRAWINGS) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ROAD CHARACTER | ROAD CLASSIFICATION | | | |
| ZONE[4] | WATER | SEWER | DRAIN | WIRING | LIGHTING | | LOCAL[1] | COLLECTOR[1] [2] | | ARTERIAL[1] |
| | | | | | | | | NO BIKE LANE | WITH BIKE LANE | |
| | | | | | | | | | | |
| A1 | WELL | SWRSEP | DITCH | OH | SLI | RURAL | SS–R3/R4 | SS – R7 | SS – R6 | |
| A2 | WELL | SWRSEP | DITCH | OH | SLI | RURAL | SS–R3/R4 | SS – R7 | SS – R6 | |
| | | | | | | | | | | |
| RR1 | WTR | SWRSEP | DTICH | OH | SLI | RURAL | SS–R3/R4 | SS – R7 | SS – R6 | |
| RR2 | WTR | SWR | DITCH | OH | SLI | RURAL | SS–R3/R4 | SS – R7 | SS – R6 | |
| RR3 | WTR | SWR | STM | UG | SL | URBAN | SS–R3/R4 | SS – R7 | SS – R6 | IN ACCORDANCE |
| | | | | | | | | | | |
| RU1 | WTR | SWR | STM | UG | SL | URBAN | SS–R3/R4 | SS – R7 | SS – R6 | WITH 'MAJOR |
| RU2 | WTR | SWR | STM | UG | SL | URBAN | SS–R3/R4 | SS – R7 | SS – R6 | |
| RU3 | WTR | SWR | STM | UG | SL | URBAN | SS–R3/R4 | SS – R7 | SS – R6 | ROAD |
| RU4 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R7 | SS – R6 | |
| RU5 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R7 | SS – R6 | NETWORK |
| RU6 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R7 | SS – R6 | |
| | | | | | | | | | | PLAN' |
| RM1 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R7 | SS – R6 | |
| RM2 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R7 | SS – R6 | CLASSIFICATION |
| RM3 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R7 | SS – R6 | |
| RM4 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R7 | SS – R6 | |
| RM5 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R7 | SS – R6 | |
| RM6 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R7 | SS – R6 | |
| RM7 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R7 | SS – R6 | |
| | | | | | | | | | | |
| C1 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | |
| C2 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | |
| C3 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | |
| C4 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | |
| C5 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | |
| C6 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | |

| | UTILITIES (REFER TO KEY SHEET) | | | | | STREET REQUIREMENTS (REFER TO STANDARD DRAWINGS) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ROAD | ROAD CLASSIFICATION | | | |
| ZONE[4] | WATER | SEWER | DRAIN | WIRING | LIGHTING | CHARACTER | LOCAL[1] | COLLECTOR[1] [2] | | ARTERIAL[1] |
| | | | | | | | | NO BIKE LANE | WITH BIKE LANE | |
| | | | | | | | | | | |
| C7 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | |
| C8 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | |
| C9 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | |
| C10 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | |
| | | | | | | | | | | |
| I1 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | IN ACCORDANCE |
| I2 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | |
| I3 | WTR | SWRSEP | DITCH | OH | SLI | RURAL | N/A | SS – R5 | SS – R6 | WITH 'MAJOR |
| I4 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | |
| I5 | WELL | SWRSEP | DITCH | OH | SLI | RURAL | N/A | SS – R5 | SS – R6 | ROAD |
| | | | | | | | | | | |
| | | | | | | | | | | NETWORK |
| P1 | WTR | SWR | STM | UG | SL | RURAL | N/A | SS – R5 | SS – R6 | |
| P2 | WTR | SWR | STM | UG | SL | RURAL | N/A | SS – R7 | SS – R6 | PLAN' |
| P3 | WELL | SWRSEP | STM | W | SLI | RURAL | N/A | SS – R7 | SS – R6 | |
| P4 | WELL | SWRSEP | STM | W | SL | RURAL | N/A | SS – R7 | SS – R6 | CLASSIFICATION |
| | | | | | | | | | | |
| W1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | |
| W2 | AS REQUIRED BASED ON DEVELOPMENT PROPOSAL | | | | | AS REQUIRED BASED ON DEVELOPMENT PROPOSAL | | | | |
| | | | | | | | | | | |
| CD[3] | WTR | SWR | STM | UG | SL | URBAN | AS SPECIFIED IN EQUIVALENT ZONE | | SS – R6 | |
| CD12 | WTR | SWR | STM | UG | SL | URBAN | N/A | SS – R5 | SS – R6 | |

Notes: (1) Sidewalks: Urban Local: No sidewalk required.
Urban Collectors: Class 1, sidewalk on both sides, Class 2, sidewalk on one side.
Urban Arterial: Sidewalk on both sides.
Rural Roads: No sidewalks required.
Note: Sidewalks are required on any road fronting a school or major recreational facilities.

(2) Where the collector road is on a bikeway route, as defined by the City's Bikeway Network Plan the road requirement will be based on Drawing Standard SS – R6.

(3) Comprehensive Development Zones listed in Section 17 of the Zoning Bylaw, except the CD12 – Airport zone.

(4) The zones identified in this table are the zones designated in the Zoning Bylaw. Properties with an 's' as part of the zoning designation shall comply with the works and services requirements of the parent zone (e.g. RU1s shall comply with the requirements of the RU1 zone.) Similarly properties with a 'b' or 'h' as part of the zoning designation shall comply with the works and services requirements of the parent zone (e.g. RU6b shall comply with the requirements of the RU6 zone and RU1h shall comply with the requirements of the RU1 zone).

# DESIGN STANDARDS

## 7. HILLSIDE STREET STANDARDS



**LIST OF TABLES (located at back of section)**



**HILLSIDE STREET STANDARDS**

### 7.1 General

Where development lands receive hillside ("h") zoning, these standards may be utilized in place of the specific sections in the HIGHWAY DESIGN STANDARDS (Section 4 of this Schedule). The Hillside Street Standard drawings are included in Schedule 5, Section 2 (Drawings) of this Bylaw.

The hillside standards have been designed for environmental sensitivity with reduced physical impacts in mind. Generally, the street standards proposed herein have been drawn from the following principles:

- The public interest requires safe, liveable and attractive streets that contribute to the urban fabric;
- Streets should be designed to suit their function. Many streets, especially local ones, have purposes other than vehicular traffic;
- A hierarchical street network should have a rich variety of types, including bicycle, pedestrian and transit routes; and
- Standards should be developed to enhance local streets' contributions to urban design. Issues such as sense of enclosure, landscaping, parking, building setbacks, surface materials, street furniture, signs and street lighting are vital determinants of liveability in neighbourhoods.

These street standards have largely been designed for application under specific traffic volumes and development densities. Traffic volume determines which general street type (Arterial, Collector, Minor Collector, Local, etc.) is required to service an area and, in most cases, density of fronting development determines which specific street condition ("Condition A", "Condition B", "Condition C", etc.) will be applied. In the case of Collector Streets, whether or not the street acts as a village centre "main street" is also a factor. For Arterial Streets, proximity to a village centre and local environmental conditions are the determinants of "condition" application.

Development that has direct public street access is defined as "fronting" the street. In other words, only those units that are oriented to the street are considered to "front" on it. This will most often occur in areas of fee-simple single family, mixed-use, or apartment development. Circumstances where strata units "front" onto a public street may also arise; however, strata and bareland strata developments will primarily be serviced by Private Streets. Standards for Public Lanes, Cul-de-sac Streets and Hillside Emergency Accesses are also included.

### 7.2 Street Trees

Street trees contribute to the liveability of a street. Trees modify the microclimate and foster a sense of comfort and safety for drivers and pedestrians by creating an edge between the sidewalk and the moving traffic. In hillside areas it is desired that the natural landscape be more prominent. While in some instances, such as along Arterials and Collectors and in a village centre, street trees are thought to be appropriate, even necessary, in other areas a more natural approach is desired, and the retention of natural vegetation is encouraged.

Therefore, those hillside street standards that will be applied to areas that will have a tighter "fit" to the natural landscape will not be required to incorporate street trees. For Minor Collector Streets and Local Streets street trees are considered optional. The planting of stands of native trees and vegetation is encouraged in these areas to contribute some of the elements of liveability that would otherwise be missed with the elimination of formal street tree plantings. Street trees and landscaping are to be to the satisfaction of the Parks Department.

A discussion of each class of street follows.

### 7.3 Hillside Street Classification – See Table 1

An overall plan is required allocating the location of each street type and its relationship to adjacent land uses proposed.

A discussion of each class of street follows.

#### 7.3.1 Arterial Streets

Arterial streets provide a continuos drive path for inter-community through traffic. The Arterial corridors of hillside areas will be different in that, while they will continue to provide a throughway for automobiles, the experience will take on qualities of a scenic drive.

### 7.3.2 Village Collector Streets ("Main Street")

Collector streets perform the dual function of land access and traffic movement between arterial and local roads. In the village centre the unique and very social function of this more localized type of street will be reflected in a more urban feel than will be found on collectors elsewhere throughout the site.

### 7.3.3 Collector Streets

Collector streets perform the dual function of land access and traffic movement between arterial and local roads; however, this more localized type of street plays a social as well as a functional role in the neighbourhood. Street design, therefore, must balance all objectives including, but not limited to, the need to provide a driving path for automobiles to access the neighbourhood.

### 7.3.4 Minor Collector Streets

There is the potential for some portions of Collector streets to experience lower traffic volumes. In these instances, Minor Collector streets will be utilized. Toward reducing the street section, a sidewalk will be provided on only one side of the street for all Minor Collectors.

### 7.3.5 Village Local Streets

The residential areas of the village centre will be more urban than those that will be found elsewhere within the Hillside areas. Narrow local streets with on-street parking and framed by street trees and sidewalks on both sides will provide a comfortable environment for all users in the neighbourhood. This condition is for use where development fronts at least one side of the street.

### 7.3.6 Local Streets

Local streets serve a multitude of functions that are important in the day-to-day lives of residents: residents walk their dogs on the street, they wash their cars on the street and they meet and talk to their neighbours on the street. Children play on the street, they learn to ride their bicycles on the street; they treat the street as an extension of the local neighbourhood park system. At this level, the street plays a very social role. Local street design, therefore, should continue to be sensitive to the needs of non-vehicle street users as well as seeking the best fit between street and landscape.

### 7.3.7 Public Lanes

Public Lanes are also used by the residents of a community as a venue for social interaction and play and they can contribute greatly to the fabric of a liveable community. One opportunity for their use, however, is in areas such as the village centre. Such higher density development is generally located in more gently sloping areas where steeply sloping terrain is not an issue. The inclusion of Public Lanes in these neighbourhoods will contribute to the more urban feel envisioned as well as provide an alternate route for bikes and pedestrians.

### 7.3.8 Cul-de-Sac Streets and Hillside Emergency Accesses

Some of the Local streets within complex topographic areas will take the form of a cul-de-sac. Generally, cul-de-sac streets are used where street connectivity is not possible (i.e. steep terrain) or not warranted (i.e. serves very few homes). Although the appropriate Local street standard will also apply to cul-de-sac streets, there are two additional street specifications unique to this street form that must be addressed in relation to liveability: permitted length and the design of the street turnaround.

In complex topographic areas long streets may be required to access developable pockets within areas of steep terrain. Due to the complex topography it will often not be advisable, or even possible, for connectivity to be achieved at both ends of a street.

Longer cul-de-sac streets will result and systems of branching cul-de-sacs will be established to access some areas of extremely difficult terrain. In response to public safety issues, it is desirable that emergency access routes to such areas are available – Hillside Emergency Access standards are included below. This is considered more acceptable from a liveability stance than requiring street connectivity in all situations as the lower standards required for an emergency access will result in a lesser impact to the hillside. Maintaining street connectivity wherever possible will remain a priority.

The radius of a cul-de-sac also plays a role in the liveability of a street. Laying a cul-de-sac requires a relatively large flat area. The larger this area is, the greater the impact to the landscape, particularly in complex topographic areas. Large cul-de-sacs can also decrease the social quality of a street by terminating the public corridor with a large, barren paved surface. A reduction of the cul-de-sac radius is feasible if parking is restricted in the cul-de-sac, which will ensure a large enough circumference for car turning. It is noted that provision must be made on a case by case basis for emergency vehicle turning.

***Cul-de-sac***

- ROW: min 13.0m radius;
- Radius to edge of paved surface: min 12.0m radius;
- Alternative types of street turnarounds will be considered for use based on site specific topographic conditions. In certain circumstances reduced cul-de-sac radii or hammer head type turnarounds will be permitted.
- Cul-de-sac streets may exceed the maximum length as specified by the City of Kelowna - mid-block turnarounds should be considered in this situation;
- A secondary emergency access must be provided for all public cul-de-sac streets that are in excess of the maximum length as specified by the City of Kelowna.

***Hillside Emergency Access***

- Maximum grade: 15%;
- 4.5m ROW; 4.5m roadway;
- Restrict non-emergency vehicles access through the use of removable bollards or gates;
- Shared use with pedestrian trails.

# TABLE 1
# Hillside Street Standards

| Street Conditions | | | Street Section Specifications | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Street Type and Condition (Std Drawing number)** | | **Max. Units Served** | **Design Speed[1] (km/h)** | **Max. Grade (%)** | **ROW (m)** | **Street Width[2] (m)** | **Parking** | **Curb & Gutter** | **Sidewalk[3]** | **Street Trees** |
| **Arterial Streets** | | **>600** | | | | | | | | |
| Condition A (median) (SS-H1) | within village centre where environmental conditions permit | | 60 (50)[4] | 8 (10)[11] | 23.0 | 16.0[5] | none permitted | barrier curb required | required both sides[6] | required both sides and in median |
| Condition B (SS-H2) | within 10-minute walking distance[7] of village centre; or, within village centre where environmental conditions do not permit the use of Condition A | | 60 (50)[4] | 8 (10)[11] | 17.0[8] | 10.0[8] | none permitted | barrier curb required | Required both sides[6] | required both sides |
| Condition C (SS-H3) | greater than a 10-minute walking distance[7] from village centre. | | 60 (50)[4] | 8 (10)[11] | 15.0[8] | 10.0[8] | none permitted | barrier curb required | Required one side[6] | required both sides |
| **Village Collector Streets (main street)** | | **600** | | | | | | | | |
| Condition A (SS-H4) | • where commercial development fronts street | | 50 | 10 | 20.0 | 12.8 | required on-street both sides | barrier curb required | required both sides | required both sides |
| Condition B (SS-H5) | • where no commercial development fronts street | | 50 | 10 | 20.0 | 12.8 | required on-street both sides | barrier curb required | required both sides | required both sides |
| **Collector Streets** | | **600** | | | | | | | | |
| Condition A (SS-H6) | • development[9] fronts both sides | | 50 (40)[4] | 10 (12)[11] | 18.2[8] | 8.6[8] | required above curb both sides | rollover curb required | required both sides[6] | required both sides |
| Condition B (SS-H7) | • development[9] fronts one side only | | 50 (40)[4] | 10 (12)[11] | 14.9[8] | 8.6[8] | required above curb one side | rollover curb required[12] | required one side[6] | required both sides |
| Condition C (SS-H8) | • no development[9] fronts street | | 50 (40)[4] | 10 (12)[11] | 14.0[8] | 8.6[8] | none permitted[10] | rollover curb required[12] | required one side[6] | required both sides |
| **Minor Collector Streets** | | **300** | | | | | | | | |
| Condition A (SS-H9) | • development[9] fronts both sides; or,<br>• development[9] fronts one side only | | 50 (40)[4] | 10 (12)[11] | 13.3[8] | 7.0[8] | required above curb one side | rollover curb required | required one side[6] | optional |
| Condition B (SS-H10) | • no development[9] fronts street | | 50 (40)[4] | 10 (12)[11] | 12.4[8] | 7.0[8] | none permitted[10] | rollover curb required | required one side[6] | optional |

# TABLE 1 (continued)
# Hillside Street Standards

| Street Conditions | | | Street Section Specifications | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Street Type and Condition (Std Drawing number)** | | **Max. Units Served** | **Design Speed[1] (km/h)** | **Max. Grade (%)** | **ROW (m)** | **Street Width[2] (m)** | **Parking** | **Curb & Gutter** | **Sidewalk[3]** | **Street Trees** |
| **Village Local Streets** | | **100** | | | | | | | | |
| Village Local (SS-H11) | • development[9] fronts at least on side | | 40 (30)[4] | 12 | 17.4 | 8.7 | required on-street both sides | barrier curb required | required minimum one side[6] | required both sides |
| **Local Streets** | | **100** | | | | | | | | |
| Condition A (SS-H12) | • development[9] fronts both sides | | 40 (30)[4] | 12 | 14.1 | 6.0 | required above curb both sides | rollover curb required | optional one side[6] | optional |
| Condition B (SS-H13) | • development[9] fronts one side only | | 40 (30)[4] | 12 | 12.3 | 6.0 | required above curb one side | rollover curb required | optional one side[6] | optional |
| Condition C (SS-H14) | • no development[9] fronts street | | 40 (30)[4] | 12 | 10.5 | 6.0 | none permitted[10] | rollover curb required | optional one side[6] | optional |
| **Public Lane** | | -- | | | | | | | | |
| (SS-H15) | • all cases | | 20 | 12 (15)[11] | 6.0 | 5.7 | on edge of paved surface | rollover curb required | none | -- |
| **Hillside Emergency Vehicle Access** | | -- | | | | | | | | |
| • provide a secondary access route, if possible, where a cul-de-sac exceeds maximum street length as specified by the City of Kelowna | | | -- | 15 | 4.5 | 4.5 | -- | -- | -- | -- |

**Footnotes:**

1. See Table 2 for alignment design criteria for each design speed.
2. Street width measured from curb face (gutterline).
3. For all conditions, sidewalks should terminate at a destination or connect with another sidewalk or trailhead.
4. Minimum permitted design speed reduction, where necessary due to topographic constraints, and approved by the City.
5. Separate left turn lanes to be provided in the medians.
6. Where issues of livability warrant, (eg. extreme topographic conditions) sidewalk(s) may be located in a separate dedicated corridor and street ROW width reduced accordingly. Unless necessary for pedestrian connectivity to schools, parks, commercial areas or land beyond, a sidewalk is not required for local streets accessing 30 lots or less. Street right of way may be reduced accordingly if a sidewalk is not required. (see Standard Drawings)
7. For this purpose, the 10-minute walking distance is considered to be ½ mile (0.8 km).
8. Where required, ROW and street widths will be increased at major intersections to provide for separate turning lanes.
9. "Development" includes all residential, mixed-use, commercial, institutional and park uses.
10. All parking shall be managed on-site or within small parking pullouts, as required.
11. Maximum grade permitted where necessary due to topographic constraints and as approved by the City.
12. Where no fronting development (driveway access not required), barrier curbs to be considered to restrict illegal parking on sidewalks.

# Table 2
# Alignment Design Criteria

## 1. Horizontal Curve Radii

| Criteria | 60 km/h | 50 km/h | 40 km/h | 30 km/h |
|---|---|---|---|---|
| Roadway Crossfall | | | | |
| normal crown (-2%) | 260m | 165m | 90m | 45m |
| 2% superelevation | 205m | 120m | 65m | 30m |
| 4% superelevation | 150m | 80m | 45m | 22m |
| 6% superelevation | 120m | - | - | - |
| Through Intersections | 200m | 120m | 70m | 40m |

## 2. Superelevation

| Criteria | 60 km/h | 50 km/h | 40 km/h | 30 km/h |
|---|---|---|---|---|
| Maximum Superelevation | 6% | 4% | 4% | 4% |
| Maximum Superelevation at Intersections | 4% | 4% | 4% | 4% |

## 3. Superelevation Transition Lengths

| Criteria | 60 km/h | 50 km/h | 40 km/h | 30 km/h |
|---|---|---|---|---|
| Transition Lengths ( 2 / 4-lane roadways ) | | | | |
| normal crown to +2% | 24m / 36m | 22m / 34m | 20m | 20m |
| normal crown to +4% | 38m / 54m | 33m / 50m | 30m | 30m |
| normal crown to +6% | 48m / 72m | - | - | - |
| Min Tangent Length between reversing | | | | |
| 2% superelevation (2 / 4-lane | 15m / 22m | 13m / 20m | 12m | 12m |
| 4% superelevation | 28m / 42m | 26m / 40m | 24m | 22m |
| 6% superelevation | 42m / 64m | - | - | - |

1 Values for transition lengths include tangent runout applied at the same rate as superelevation runoff.
2 60% of superelevation runoff occurs on the tangent approach and 40% on the curve, resulting in a minimum length of tangent between reversing curves of 120% of the superelevation runoff length.

# Table 2 (continued)
# Alignment Design Criteria

## 4. Gradients

| Criteria | 60 km/h | 50 km/h | 40 km/h | 30 km/h |
|---|---|---|---|---|
| Minimum Grade | 0.5% | 0.5% | 0.5% | 0.5% |
| Maximum Grades | | | | |
| on horizontal tangents | 8%[1] | 10% [2] | 12% | 12% |
| on minimum radius horizontal curves[3] | 8% | 9% | 10% | 10% |
| Grades Through Intersections | | | | |
| with design speed on major road | 8% | 8% | 8% | - |
| approach distance for major road[4] | 15 / 5m [5] | 5m | 0m | - |
| with design speed on minor road | 5% [6] | 5% | 6% | 6% |
| approach distance for minor road[7] | 20m | 15m | 5m | 5m |

1 Under special circumstances, grades up to 10% may be permitted.
2 Under special circumstances, grades up to 12% may be permitted.
3 Applies where radius is less than 1.5 times minimum allowable radius.
4 Minimum distance back from the gutter line of the minor road that the specified grade may not be exceeded.
5 Distances for design road approach to intersection with collector road / local road.
6. 4% desirable.
7 Minimum distance back from the gutter line of the major road that the specified grade may not be exceeded.

## 5. Vertical Curve K Values

| Criteria | 60 km/h | 50 km/h | 40 km/h | 30 km/h |
|---|---|---|---|---|
| Minimum Crest | 15 | 8 | 4 | 2 |
| Minimum Sag | 10 | 7 | 4 | 2 |
| Crest / Sag on approach to stop | 4 | 3 | 2 | 2 |

*K values listed assume that new roadways will be illuminated*

## 6. Stopping Sight Distances

| Criteria | | 60 km/h | 50 km/h | 40 km/h | 30 km/h |
|---|---|---|---|---|---|
| Down grades: | 12% | 109 | 78 | 52 | 34 |
| | 9% | 101 | 73 | 50 | 32 |
| | 6% | 94 | 69 | 48 | 31 |
| | 3% | 89 | 66 | 46 | 30 |
| | 0% | 85 | 63 | 45 | 30 |
| Up grades: | 3% | 81 | 61 | 44 | 29 |
| | 6% | 78 | 59 | 42 | 29 |
| | 9% | 76 | 57 | 41 | 28 |
| | 12% | 73 | 56 | 40 | 28 |

## 7. Decision Sight Distance

Minimum decision sight distance for 60 km/h: 175m – 235m.

1. Note that decision sight distance applies only to multi-lane roads at intersections.
2. The range of values recognizes the variation in complexity that occurs at various sites. For less complex situations, values towards the lower end of the range are appropriate and for more complexity, values at the upper end are used.

# CITY OF KELOWNA STANDARD DRAWINGS INDEX AND CROSS-REFERENCE TO MMCD

| MMCD Standard Drawings | | City of Kelowna Standard Drawings | | |
|---|---|---|---|---|
| Dwg. | Title | Comment | Dwg. | Title |
| | **GENERAL DETAILS** | | | |
| G1 | General Legend for Contract Drawings | Deleted | | *(Per City A-size Drawing Block)* |
| G2 | Legend for Materials | MMCD | G2 | Legend for Materials |
| G3 | Legend for Street Light and Traffic Signal Drawings | Deleted | | *(Future Amendment – Refer to Utility)* |
| G4 | Utility Trench | Replaced | SS-G4 | Utility Trench |
| G5 | Pavement Restoration | MMCD | G5 | Pavement Restoration |
| G6 | Concrete Encasement for Water Main/ Sewer Separation | MMCD | G6 | Concrete Encasement for Water Main/Sewer Separation |
| G7 | Concrete Protection for Underground Utilities | MMCD | G7 | Concrete Protection for Underground Utilities |
| G8 | Pipe Anchor Blocks | MMCD | G8 | Pipe Anchor Blocks |
| | | | | |
| | **STORM AND SANITARY SEWERS** | | | |
| S1 | Standard and Sump Manholes | Replaced | SS-S1a<br>SS-S1b | Manholes<br>Manhole Frame and Cover |
| S2 | Standard Manhole Connection Details | Replaced | SS-S1a | Manholes |
| S3 | Manhole Connection Details – Drop and Ramp Type | MMCD | S3 | Manhole Connection Details – Drop and Ramp Type |
| S4 | Inside Drop Manhole | MMCD | S4 | Inside Drop Manhole |
| S5 | Precast Riser Manhole | MMCD | S5 | Precast Riser Manhole |
| S6 | Sewer Clean-Out | Replaced | SS-S6 | Clean-Out Detail (Temporary) |
| S7 | Sanitary Sewer Service Connection | MMCD | S7 | Sanitary Sewer Service Connection |
| S8 | Storm Sewer Service Connection | MMCD | S8 | Storm Sewer Service Connection |
| S9 | Inspection Chamber for 100 to 200 Sanitary Sewer Connection | MMCD | S9 | Inspection Chamber for 100 to 200 Sanitary Sewer Connection |
| S10 | Inspection Chamber for 250 to 375 Storm Sewer Connection | MMCD | S10 | Inspection Chamber for 250 to 375 Storm Sewer Connection |

| MMCD Standard Drawings | | City of Kelowna Standard Drawings | | |
|---|---|---|---|---|
| Dwg. | Title | Comment | Dwg. | Title |
| | | | | |
| S11 | Top Inlet Catch Basin | Replaced | SS-S11a<br>SS-S11b<br><br>SS-S11c | Catch Basin 900 mm diameter<br>Catch Basin Castings Combined Side and Gutter Inlet<br>Catch Basin – Top Slabs |
| S12 | Lawn Drains | MMCD | S12 | Lawn Drains |
| S13 | Storm Sewer Inlet with Safety Grillage | MMCD | S13 | Storm Sewer Inlet with Safety Grillage |
| S14 | Concrete Block Endwall | MMCD | S14 | Concrete Block Endwall |
| S15 | Driveway Culvert with Concrete Block Endwalls | MMCD | S15 | Driveway Culvert with Concrete Block Endwalls |
| | | Added | SS-S50 | Manhole Requirement for Services |
| | | Added | SS-S51 | Drainage Drywell |
| | | Added | SS-S52 | Drainage Drywell Installation |
| | | Added | SS-S53 | Pipe Perforation and Bedding Detail for Ground Water Recharge |
| | | Added | SS-S54 | Catch Basin Trapping Hood |
| | **WATERWORKS** | | | |
| W1 | Typical Thrust Block Arrangements | MMCD | W1 | Typical Thrust Block Arrangements |
| W2a | Water Service Connection | Replaced | SS-W2 | Water Service Connection |
| W2b | Water Service Connection | Replaced | SS-W2 | Water Service Connection |
| W3 | Gate Valve Installation | MMCD | W3 | Gate Valve Installation |
| W4 | Fire Hydrant Installation | Replaced | SS-W4 | Hydrant |
| W5 | Test Point Installation | MMCD | W5 | Test Point Installation |
| W6 | Air Valve Assemblies – 25 and 50 mm Valves | MMCD | W6 | Air Valve Assemblies – 25 and 50 mm Valves |
| W7 | Air Valve Assembly – 100 mm Valve | MMCD | W7 | Air Valve Assembly – 100 mm Valve |
| W8 | Blow-Off for Water Main | MMCD | W8 | Blow-Off for Water Main |
| W9 | Blow – Down Chamber | MMCD | W9 | Blow – Down Chamber |
| W10 | Waterworks Chamber Drain | MMCD | W10 | Waterworks Chamber Drain |
| | | Added | SS-W50 | Irrigation Service |
| | | Added | SS-W51 | Joint Restraint Detail (Pipe Crossing Conflict) |
| | | | | |

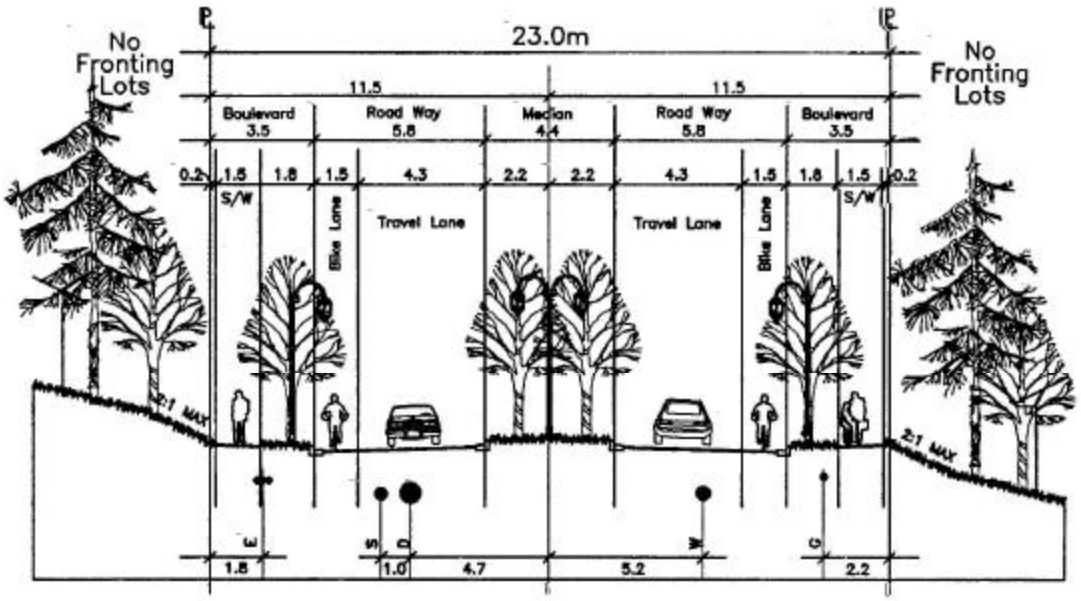
| MMCD Standard Drawings | | City of Kelowna Standard Drawings | | |
|---|---|---|---|---|
| Dwg. | Title | Comment | Dwg. | Title |
| | **CONCRETE AND MISCELLANEOUS DETAILS** | | | |
| C1 | Concrete Sidewalk, Infill and Barrier Curb | MMCD | C1 | Concrete Sidewalk, Infill and Barrier Curb |
| C2 | Concrete Sidewalk and Barrier Curb | MMCD | C2 | Concrete Sidewalk and Barrier Curb |
| C3 | Concrete Sidewalk and Roll-Over Curb | MMCD | C3 | Concrete Sidewalk and Roll-Over Curb |
| C4 | Concrete Curbs – Narrow Base | Partial Change | SS-C4 and C4 | Concrete Curb – Barrier Curb with Gutter *(NOTE: For Roll-Over Curb use MMCD C4)* |
| C5 | Concrete Curbs – Wide Base | MMCD | C5 | Concrete Curbs – Wide Base |
| C6 | Concrete Median Curb and Interim Curbs | MMCD | C6 | Concrete Median Curb and Interim Curbs |
| C7 | Driveway Crossing for Barrier Curbs | MMCD | C7 | Driveway Crossing for Barrier Curbs |
| C8 | Wheelchair Ramp for Sidewalk, Infill and Barrier Curbs | MMCD | C8 | Wheelchair Ramp for Sidewalk, Infill and Barrier Curbs |
| C9 | Wheelchair Ramp for Sidewalk and Barrier Curbs | MMCD | C9 | Wheelchair Ramp for Sidewalk and Barrier Curbs |
| C10 | Concrete Walkway | Replaced | SS-R28 | Walkway Gate |
| C11 | Bicycle Baffle | Replaced | SS-R28 | Walkway Gate |
| C12 | Removable Restriction Post | Replaced | SS-R28 | Walkway Gate |
| C13 | Chain Link Fence for Walkway | MMCD | C13 | Chain Link Fence for Walkway |
| C14 | Handrail on Concrete Retaining Wall | MMCD | C14 | Handrail on Concrete Retaining Wall |
| C15 | Concrete Block Retaining Wall | MMCD | C15 | Concrete Block Retaining Wall |
| | | | | |
| | **ROAD WORKS** | | | |
| R1 | Paved Shoulders | MMCD | R1 | Paved Shoulders |
| | | Added | SS-R2 | Lanes and Emergency and Private Access Roads |
| | | Added | SS-R3 | Local – Class 1 (18 m) |
| | | Added | SS-R4 | Local – Class 2 (15 m) |
| | | Added | SS-R5 | Collector – Class 1 (20 m) |
| | | Added | SS-R6 | Collector – Class 1 with Bike Lanes (22 m) |
| | | Added | SS-R7 | Collector – Class 2 (20 m) |

| MMCD Standard Drawings | | City of Kelowna Standard Drawings | | |
|---|---|---|---|---|
| Dwg. | Title | Comment | Dwg. | Title |
| | **ROAD WORKS (Cont'd)** | | | |
| | | Added | SS-R8 | Arterial – Class 1 Parkway, 4(6) Lanes (35 m) |
| | | Added | SS-R9 | Arterial – Class 1 Parkway, 2(4) Lanes (30 m) |
| | | Added | SS-R10 | Arterial – Class 1 Rural, 2(4) Lanes (30 m) |
| | | Added | SS-R11 | Arterial – Class 2 Residential, 4 Lanes (30 m) |
| | | Added | SS-R12 | Arterial – Class 2 Residential, One Way – 3 lanes (20 m) |
| | | Added | SS-R13 | Arterial – Class 2 Rural, 2 lane (20 m) |
| | | Added | SS-R14 | Arterial – Class 3 Town Centre 4 Lane (28 m) |
| | | Added | SS-R15 | Arterial – Class 3 Town Centre, One Way – 3 lanes (25 m) |
| | | Added | SS-R16 | Arterial – Class 3 – 2 lane (28 m) |
| | | Added | SS-R17 | 15 m Local cul-de-sac |
| | | Added | SS-R20 | Left Turn Lane (Raised Median) |
| | | Added | SS-R21 | Left Turn Lane (Painted) and Two-Way Left Turn Lane |
| | | Added | SS-R22 | Curbed Driveway Widths |
| | | Added | SS-R23 | Concrete Drainage Swale Across Asphalt |
| | | Added | SS-R24 | Density Payment Adjustment Chart |
| | | Added | SS-R25 | Noise Mitigation Criteria |
| | | Added | SS-R26 | Hydrants and Poles Near Ditches |
| | | Added | SS-R27 | Street Name and Stop Sign Standards |
| | | Added | SS-R28 | Walkway Gate |
| | | Added | SS-H1 | Arterial Condition –A (Village Parkway) |
| | | | SS-H2 | Arterial Condition B (With 0.8 km Walking Distance of Village |
| | | | SS-H3 | Arterial Condition C (Greater than 0.8 km Walking Distance of Village) |
| | | | SS-H4 | Village Collector Condition A (Retail/M.F. Fronting) |
| | | | SS-H5 | Village Collector Condition B (No Retail Fronting) |
| | | | SS-H6 | Collection Condition A (Development Both Sides) |
| | | | SS-H7 | Collector Condition B (Development One Side) |
| | | | SS-H8 | Collector Condition C – (No Development Either Side) |

| MMCD Standard Drawings | | City of Kelowna Standard Drawings | | |
|---|---|---|---|---|
| Dwg. | Title | Comment | Dwg. | Title |
| | **ROAD WORKS (Cont'd)** | | | |
| | | | SS-H9 | Minor Collector Condition A |
| | | | SS-H10 | Minor Collector Condition B |
| | | | SS-H11 | Village Local – Residential |
| | | | SS-H12 | Local Condition A (Development Both Sides) |
| | | | SS-H13 | Local Condition B (Development One Side) |
| | | | SS-H14 | Local Condition C (No Development Either Side) |
| | | | SS-H15 | Public Land |
| | | | | |
| | **ELECTRICAL AND TRAFFIC SIGNAL DETAILS** | | | *(Future Amendment – Refer to Utility)* |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS



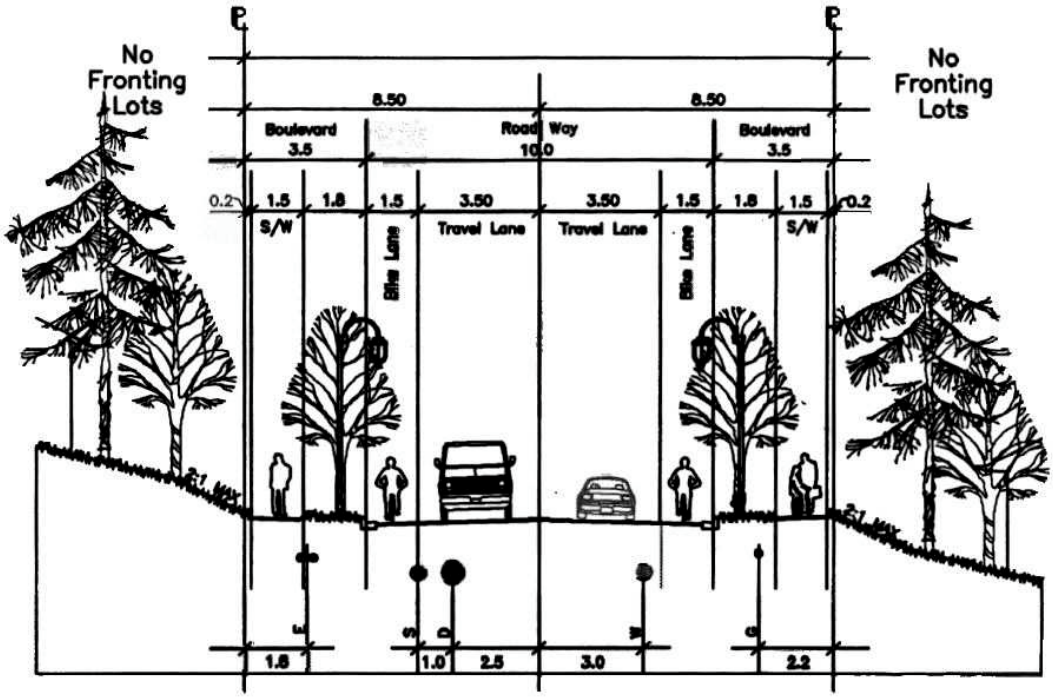

ARTERIAL CONDITION-A
(VILLAGE PARKWAY)

OCT. 01/01

SS-H1

\WU\DRAFTING\STD-DWG\MMCD-STDV\HILLSIDE\SS-H1.DWG

# STANDARD DETAIL DRAWINGS




\\WA\DRAFTING\STD-DWG\MMCD-STD\HILLSIDE\SS-H2.DWG

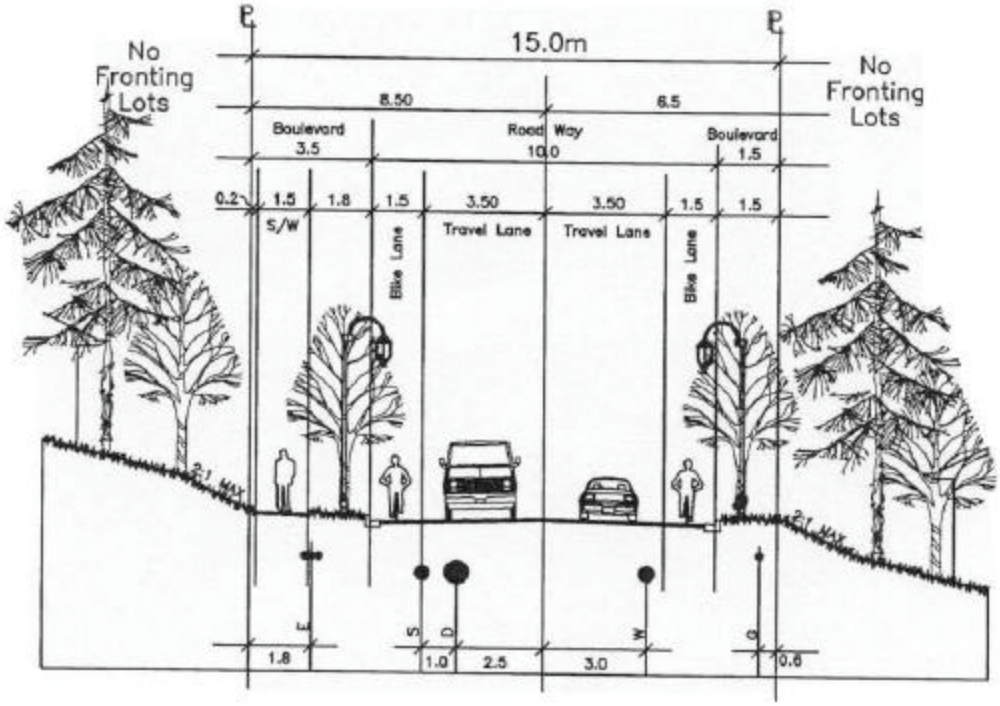
ARTERIAL CONDITION B
(WITH 0.8 KM WALKING DISTANCE OF VILLAGE)

OCT. 01/01

SS-H2

# STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS



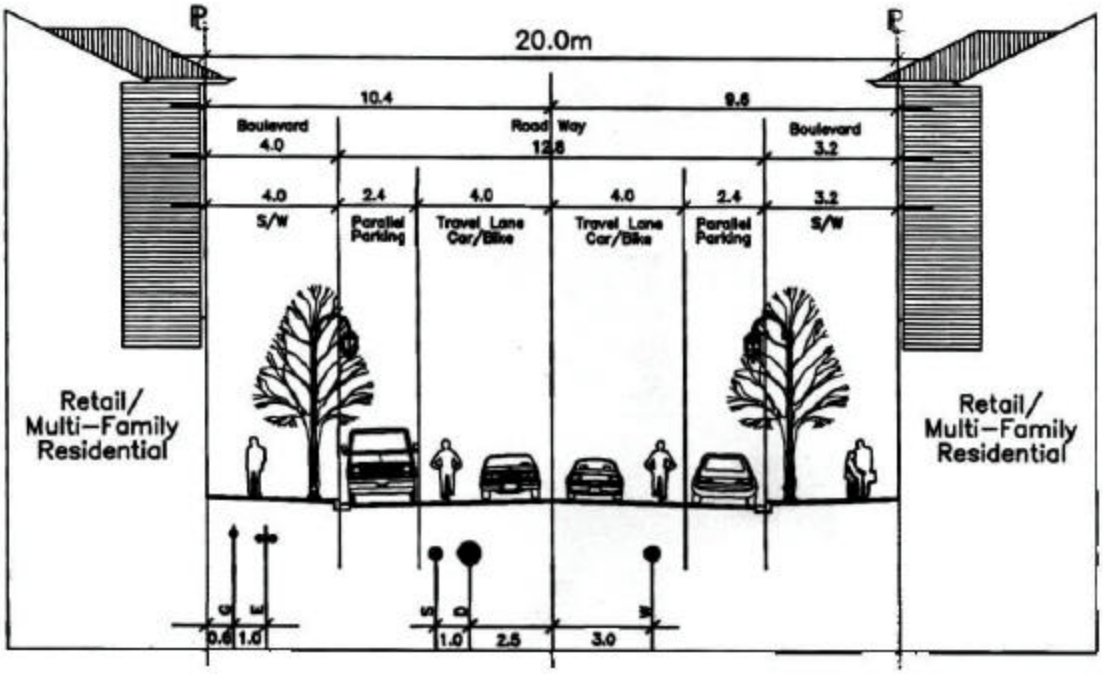

ARTERIAL CONDITION C
(GREATER THAN 0.8 KM WALKING DISTANCE OF VILLAGE)
NOV. 05/01

SS-H3

\WJ\DRAFTING\STD-DWG\MMCD-STD\HILLSIDE\SS-H3.DWG

STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS




\\M1\DRAFTING\STD-DWG\MMCD-STD\HILLSIDE\SS-H4.DWG

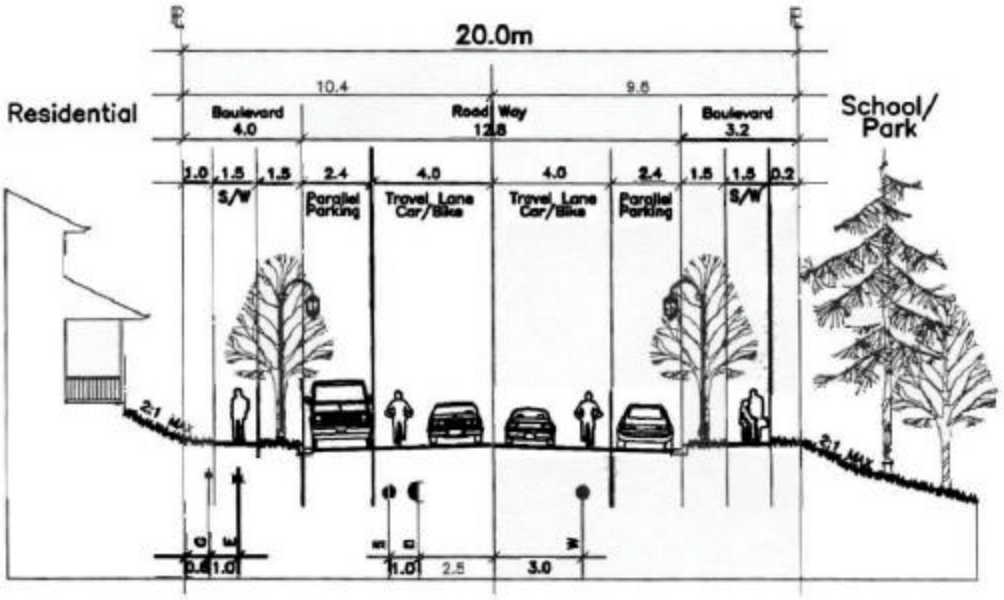
VILLAGE COLLECTOR CONDITION A
(RETAIL/M.F. FRONTING)

NOV. 05/01

SS-H4

# STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS




SS-H5.DWG

STD-DWG

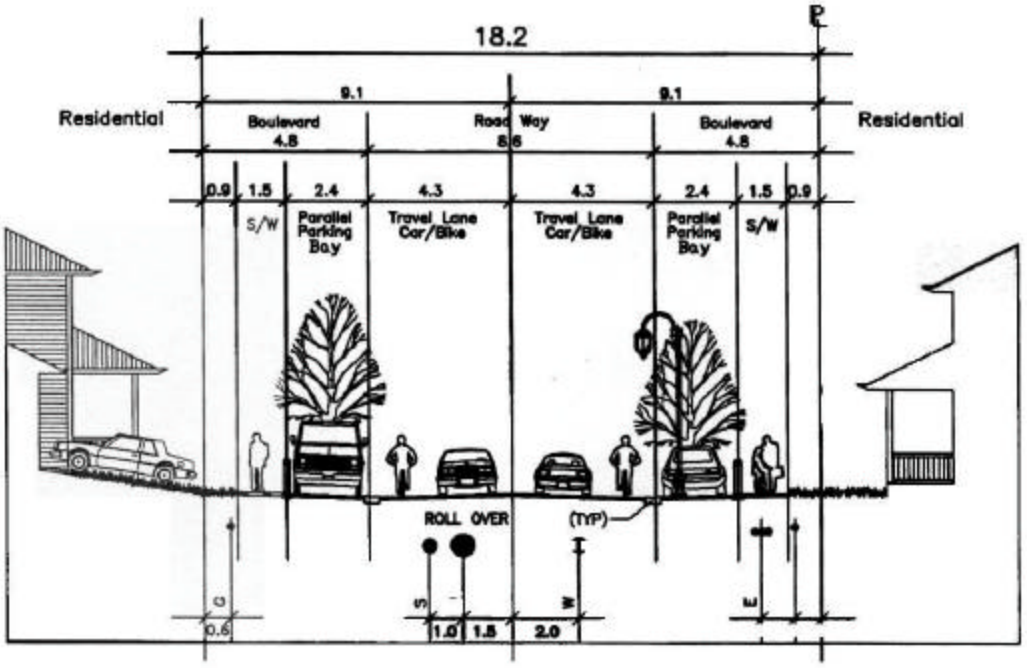
## VILLAGE COLLECTOR CONDITION B (NO RETAIL FRONTING)

NOV. 05/01

SS-H5

# STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS




\WIA\DRAFTING\STD-DWG\MMCD-STD\HILLSIDE\SS-H6.DWG

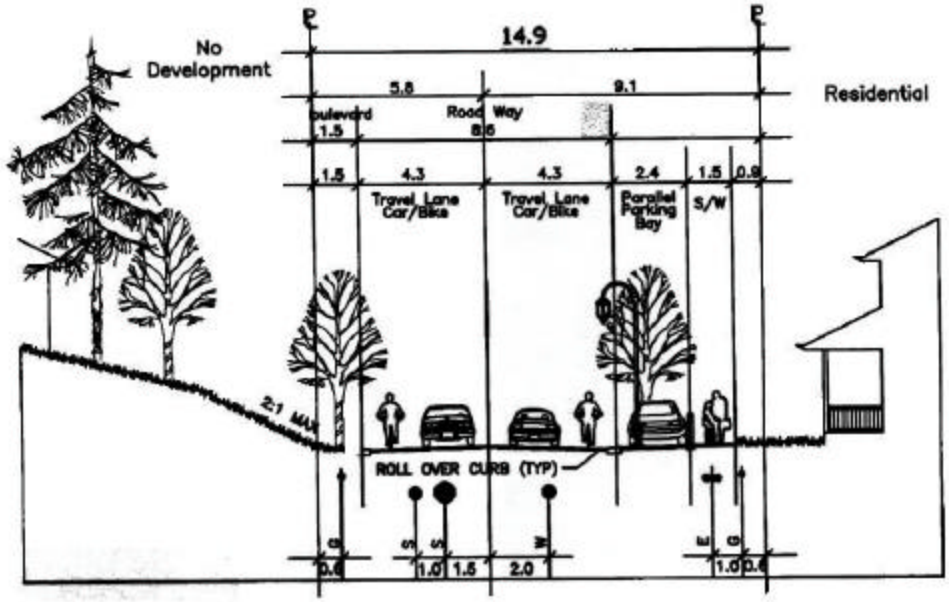
# COLLECTOR CONDITION-A (DEVELOPMENT BOTH SIDES)

NOV. 05/01

SS-H6

# STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS




\WU\DRAFTING\STD-DWG\MMCD-STD\HILLSIDE\SS-H7.DWG

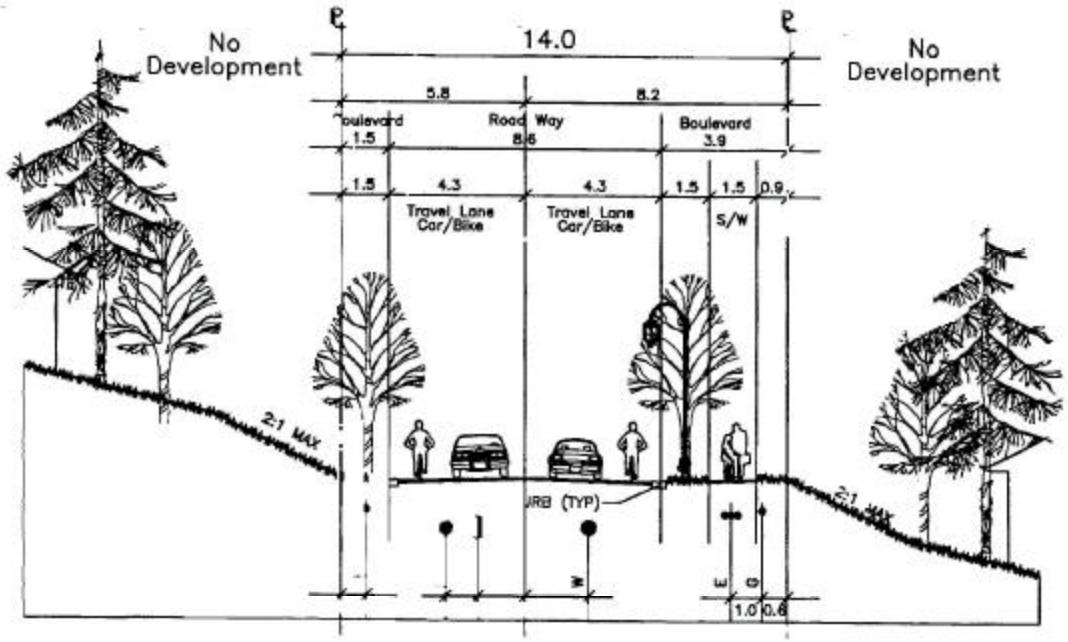
COLLECTOR CONDITION-B
(DEVELOPMENT ONE SIDE)

NOV. 05/01

SS-H7

# STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS



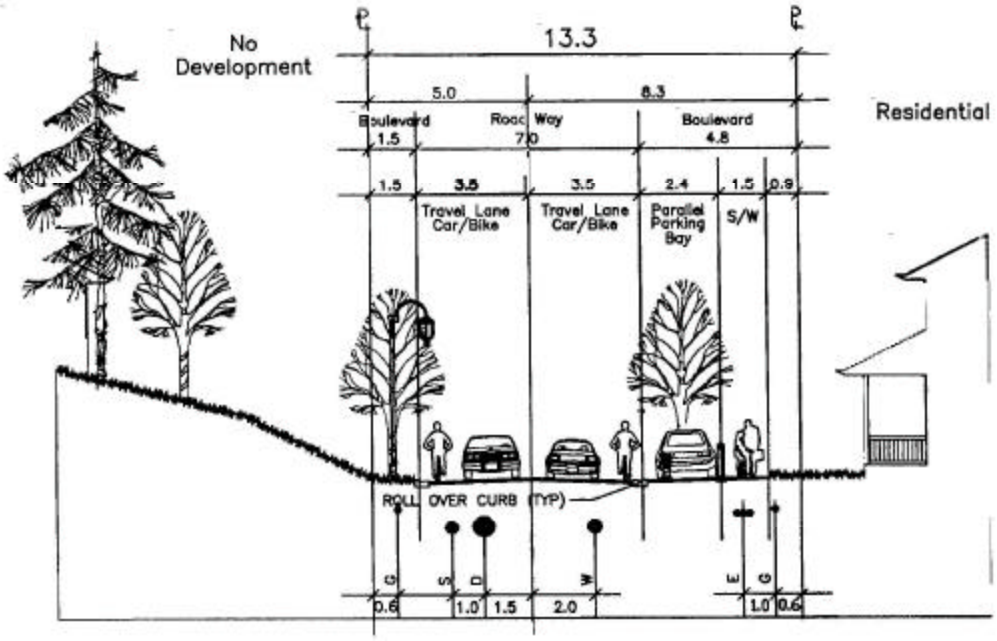

COLLECTOR CONDITION-C
(NO DEVELOPMENT EITHER SIDE)

NOV. 05/01

SS-H8

STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS




\WU\DRAFTING\STD-DWG\WMCD-STD\HILLSIDE\SS-H9.DWG

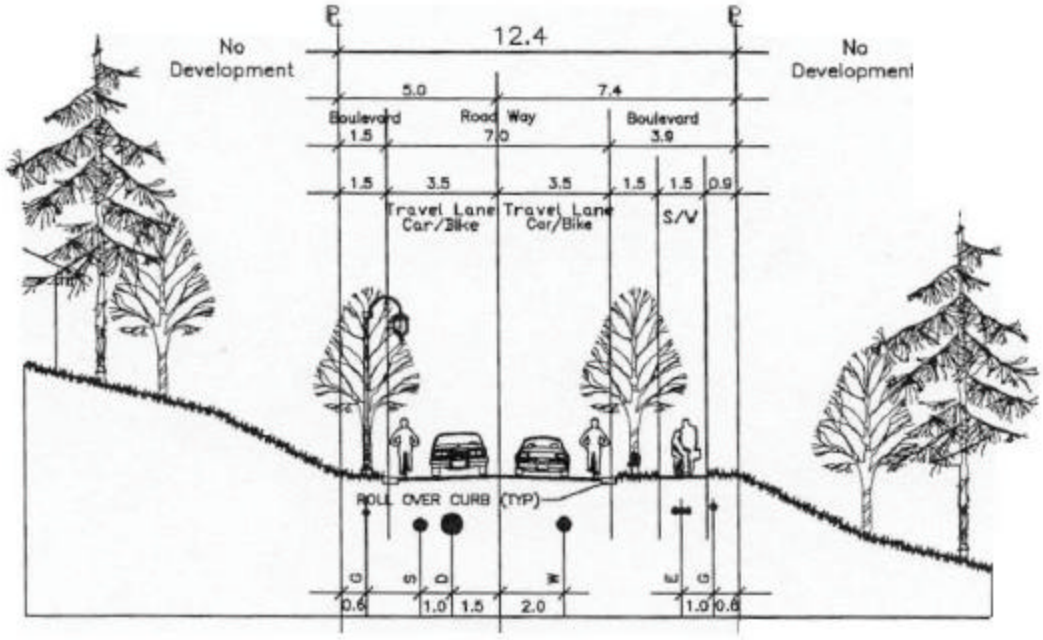
MINOR COLLECTOR CONDITION -A

NOV. 05/01

SS-H9

# STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS




\\BV\DRAFTING\STD-DWG\MMCD-STD\HILLSIDE\SS-H10.DWG

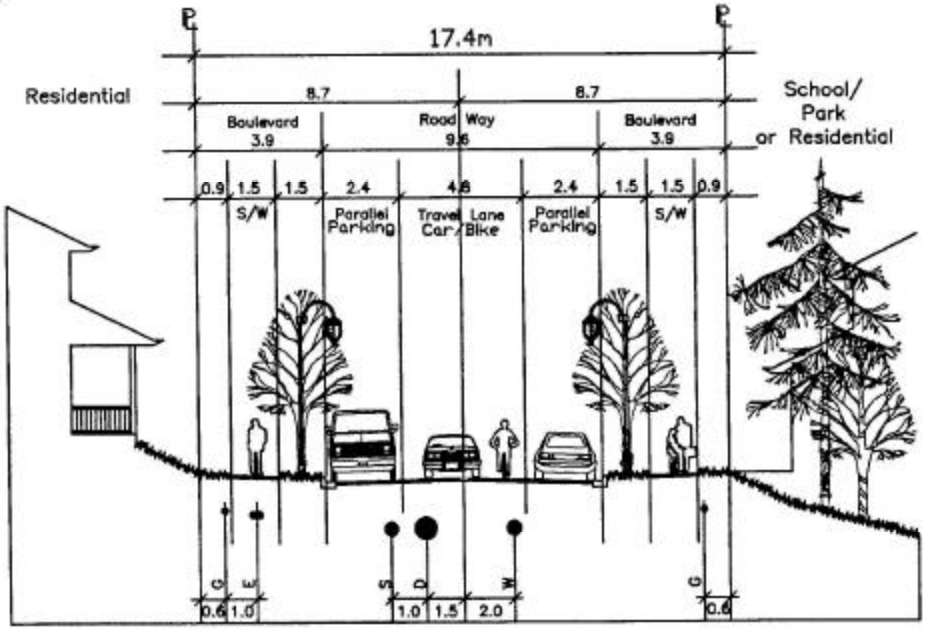
MINOR COLLECTOR CONDITION-B

NOV. 05/01

SS-H10

# STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS




\\H1_DRAFTING\STD-DWG\MMCD-STD\HILLSIDE\SS-H11.DWG

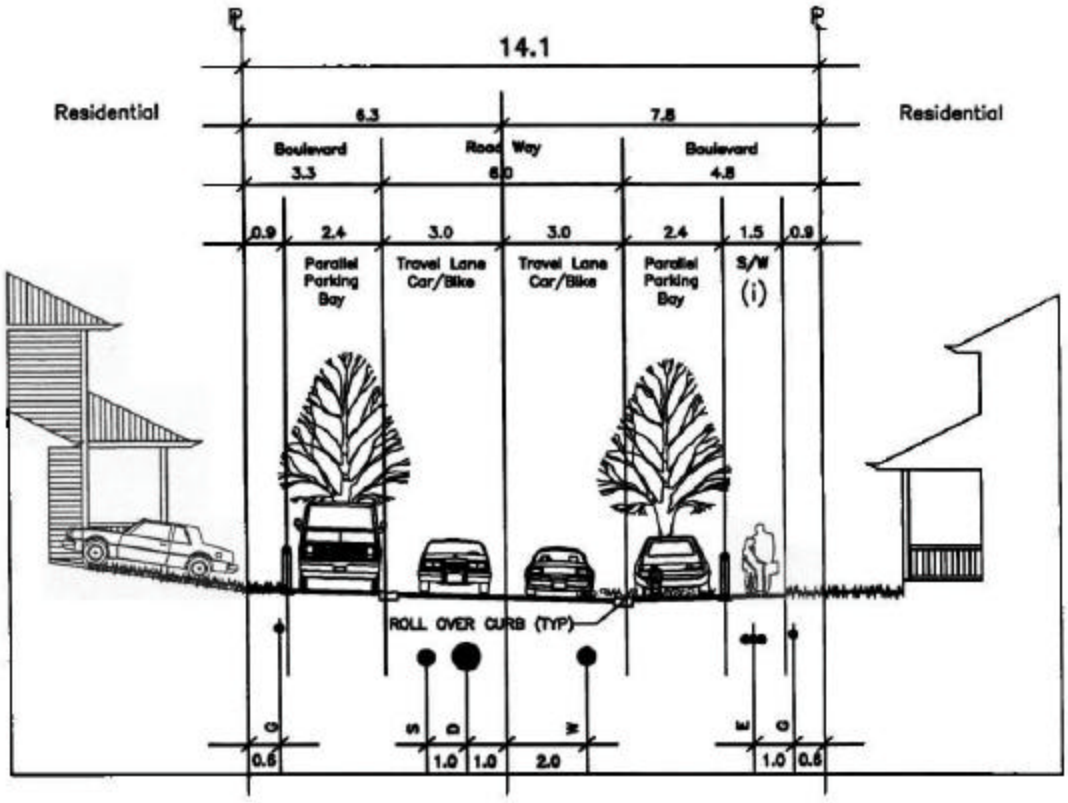
VILLAGE LOCAL-RESIDENTIAL

NOV. 05/01

SS-H11

# STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS




(i)–UNLESS NECESSARY FOR PEDESTRIAN CONNECTIVITY TO SCHOOLS, PARKS, COMMERCIAL AREAS OR LANDS BEYOND, A SIDEWALK IS NOT REQUIRED FOR LOCAL STREETS ACCESSING 30 LOTS OR LESS. THE STREET ROW WIDTH MAY BE REDUCED ACCORDINGLY IF SIDEWALK IS NOT REQUIRED. (SEE TABLE 1)

\W\A\DRAFTING\STD-DWG\MACRO-STD\HILLSIDE\SS-H12.DWG

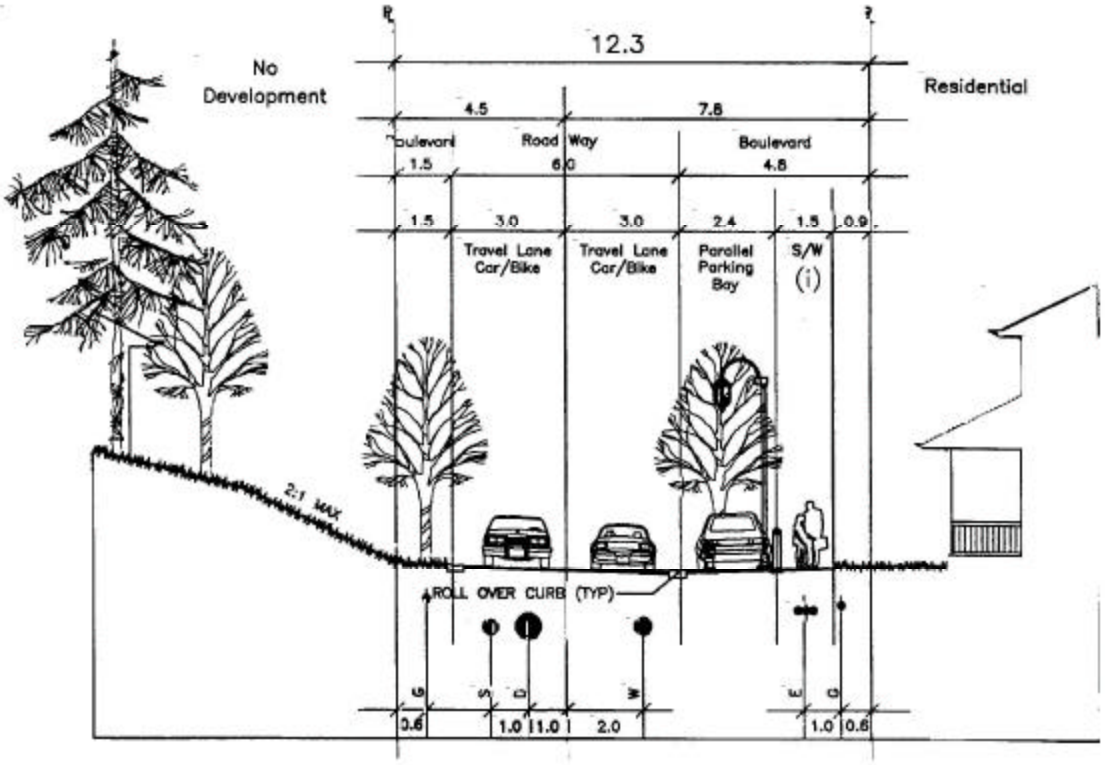
LOCAL-CONDITION A
(DEVELOPMENT BOTH SIDES)

NOV. 05/01

SS-H12

# STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS




(i)–UNLESS NECESSARY FOR PEDESTRIAN CONNECTIVITY TO SCHOOLS, PARKS, COMMERCIAL AREAS OR LANDS BEYOND, A SIDEWALK IS NOT REQUIRED FOR LOCAL STREETS ACCESSING 30 LOTS OR LESS. THE STREET ROW WIDTH MAY BE REDUCED ACCORDINGLY IF SIDEWALK IS NOT REQUIRED. (SEE TABLE 1)

\WU\DRAFTING\STD-DWG\MMCD-STD\HILLSIDE\SS-H13.DWG

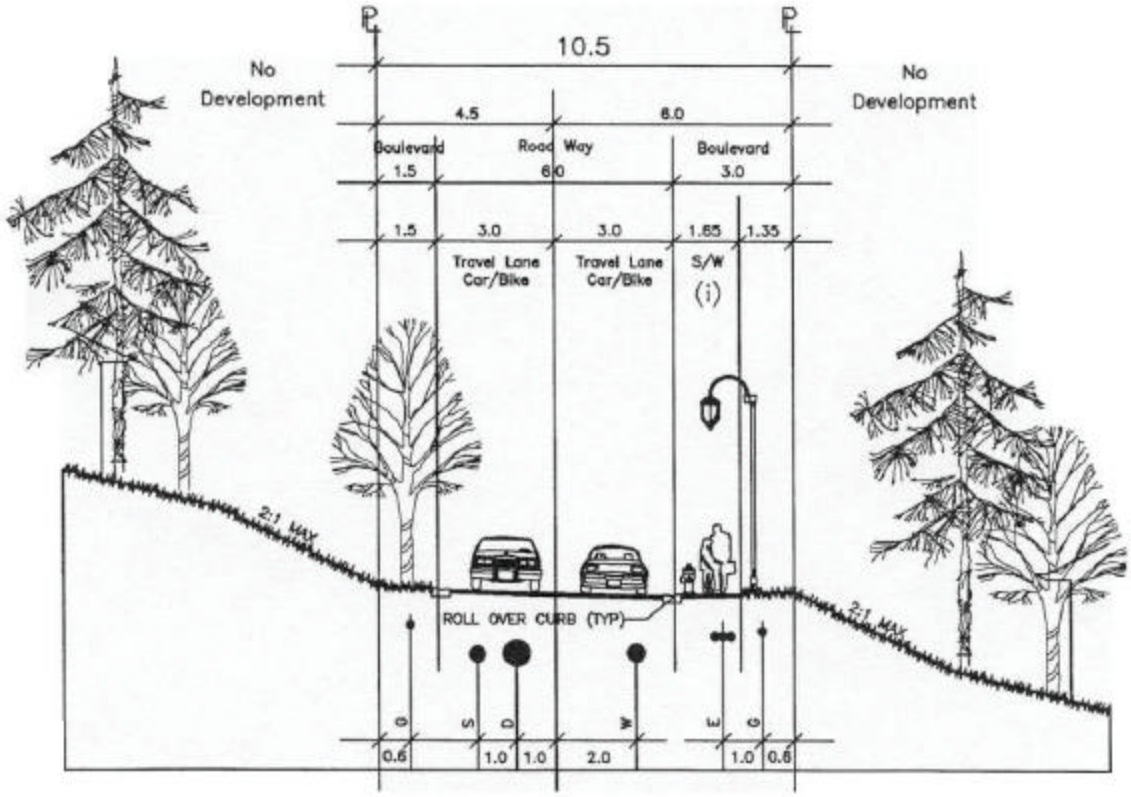
LOCAL CONDITION B
( DEVELOPMENT ONE SIDE)

NOV. 05/01

SS-H13

# STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS




(i)–UNLESS NECESSARY FOR PEDESTRIAN CONNECTIVITY TO SCHOOLS, PARKS, COMMERCIAL AREAS OR LANDS BEYOND, A SIDEWALK IS NOT REQUIRED FOR LOCAL STREETS ACCESSING 30 LOTS OR LESS.

\\RU\DRAFTING\STD-DWG\MMCD-STD\HILLSIDE\SS-H14.DWG

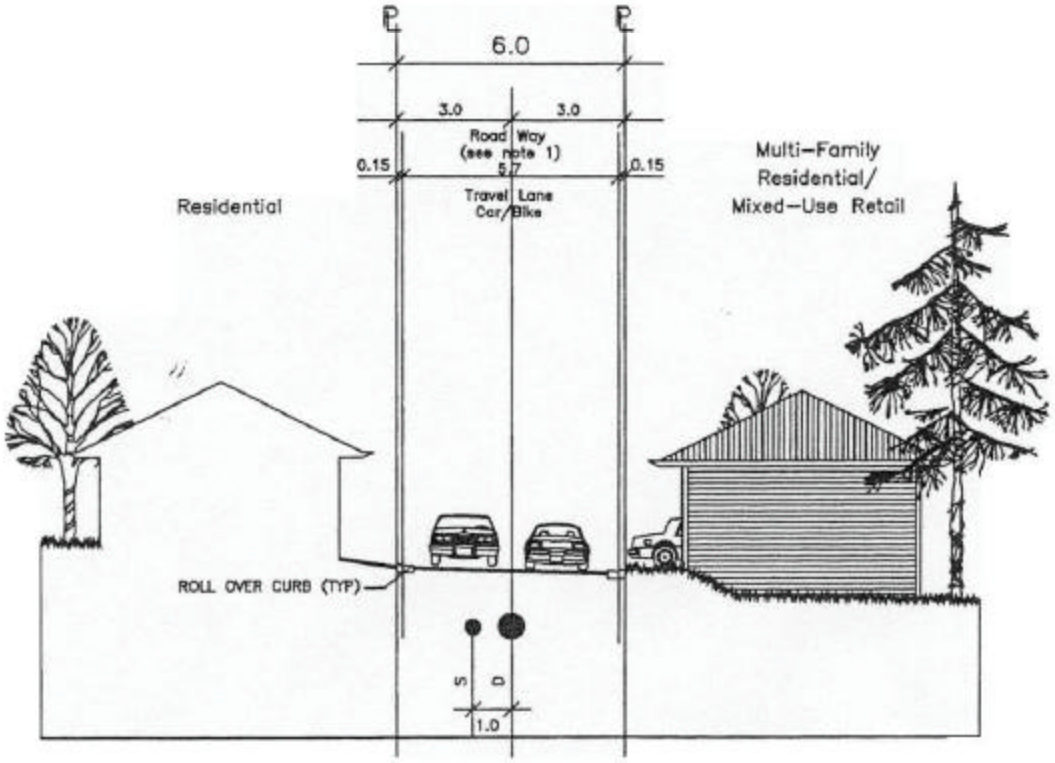
LOCAL CONDITION C
(NO DEVELOPMENT EITHER SIDE)

NOV. 05/01

SS-H14

# STANDARD DETAIL DRAWINGS

## HILLSIDE ZONE STANDARDS




1. WHERE SINGLE FAMILY ABUTS BOTH SIDES, TRAVEL LANE MAY BE REDUCED TO 4.5M. IN THIS CASE, BOULEVARDS MUST BE TREATED WITH A LOW PROFILE, WEED TREE, AUTO ACCESSIBLE SURFACE. THE ROAD GRAVEL BASES TO EXTEND TO FULL WIDTH OF ROW (6.0M).

\WU\DRAFTING\STD-DWG\MMCD-STD\HILLSIDE\SS-H15.DWG

## PUBLIC LANE

NOV. 05/01

SS-H15