

TOWN ROAD AND BRIDGE STANDARDS

(June 5, 2019)

MUNICIPALITY OF Deerby, VERMONT

The Legislative Body of the Municipality of Deerby hereby adopts the following Town Road and Bridge Standards which shall apply to the construction, repair, and maintenance of town roads and bridges.

The standards below are considered minimums. Municipalities that have construction standards / specifications in place that meet or exceed the minimum standards: indicate adoption date and include as Appendix C. **Date of Adoption:** _____

Municipalities must comply with all applicable state and federal approvals, permits and duly adopted standards when undertaking road and bridge activities and projects.

Any new road regulated by and/or to be conveyed to the municipality shall be constructed according to the minimum of these standards.

Circle YES or NO below to indicate town adoption of that section of the Standards

Road and Bridge Standards Sections	Hydrologically-connected road segments*	Non-hydrologically-connected road segments**
Section 1 – Municipal Road Standards	YES (Required by Act 64)	<input checked="" type="radio"/> YES <input type="radio"/> NO
Section 2 – Class 4 Road Standards	YES (Required by Act 64)	<input checked="" type="radio"/> YES <input type="radio"/> NO
Town wide		
Section 3 - Perennial stream- bridge and culvert standards	YES (Required by DEC Stream Alteration Standard)	
Section 4 – Intermittent stream crossings	<input checked="" type="radio"/> YES <input type="radio"/> NO	
Section 5 - Roadway construction standards	<input checked="" type="radio"/> YES <input type="radio"/> NO	
Section 6 - Guardrail standard	<input checked="" type="radio"/> YES <input type="radio"/> NO	
Section 7 - Driveway access standard	<input checked="" type="radio"/> YES <input type="radio"/> NO	

Road segments – ANR Resources Atlas includes a map layer of all of Vermont's municipal roads divided into 100-meter (328 foot) segments, each with a unique identification number.

***Hydrologically-connected road segments** - are those municipal road segments and catch basin outlets, Class 1-4, as shown on the ANR Natural Resources Hydrologically-connected municipal road segment layer (<http://anrmaps.vermont.gov/websites/anra5/>) or the Road Erosion Inventory Scoring (MRGP Implementation Table portal) layer (<https://anrweb.vt.gov/DEC/IWIS/MRGPReportViewer.aspx?ViewParms=True&Report=Portal>).

****Adoption of standards on non-hydrologically-connected road segments** does not indicate that these road segments are then subject to the Municipal Roads General Permit (MRGP).

Municipalities may also find additional resources in the latest version of the Vermont Better Roads Manual.
<https://vtrans.vermont.gov/sites/aot/files/highway/documents/ltf/Better%20Roads%20Manual%20Final%202019.pdf>

Road and Bridge Standards Sections

Section 1 – Municipal Road Standards - See Appendix A

These standards are required by Act 64 and the DEC Municipal Roads General Permit (MRGP) for hydrologically-connected roads only.

Municipalities may adopt Section 1 Road standards by road type for non-hydrologically-connected roads/segments/catch basins.

Section 2 – Class 4 Road Standards - See Appendix A

Section 3 - Perennial stream - bridge and culvert standards

Bridge and culvert work on perennial stream crossings must conform with the statewide DEC Stream Alteration Standard.

"Perennial stream" means a watercourse or portion, segment, or reach of a watercourse, generally exceeding 0.25 square miles in watershed size, in which surface flows are not frequently or consistently interrupted during normal seasonal low flow periods. Perennial streams that begin flowing subsurface during low flow periods, due to natural geologic conditions, remain defined as perennial. All other streams, or stream segments of significant length, shall be termed intermittent. A perennial stream shall not include the standing waters in wetlands, lakes, and ponds.

Streambank stabilization and other in-stream work must conform with the statewide DEC Stream Alteration Standard.

For River Management Engineer Districts: https://dec.vermont.gov/sites/dec/files/wsm/rivers/docs/RME_districts.pdf

Section 4 – Intermittent stream crossings – See Appendix B for sizing table and graphic. These standards are above and beyond the culvert standards in Section 1.

"Intermittent streams" are defined as streams with beds of bare earthen material that run during seasonal high flows but are disconnected from the annual mean groundwater level.

Section 5 - Roadway construction standards – Sub-base and gravel standards

All new or substantially reconstructed gravel roads shall have 12 inches* thick gravel sub-base, with an additional 3 inches* top course of crushed gravel.

All new or substantially reconstructed paved roads shall have 15 inches* thick gravel sub-base.

*Municipalities shall indicate their own construction criteria.

Section 6 - Guardrail standard

When a roadway, culvert, bridge, or retaining wall construction or reconstruction project results in hazards such as foreslopes, drop offs, or fixed obstacles within the designated clear-zone, the AASHTO Roadside Design Guide will govern the analysis of the hazard and the subsequent treatment of that hazard. For roadway situations, an approved barrier system may be steel beam guardrail with 6-foot posts and approved guardrail end treatment. If there is less than 3 feet from the rail to the hazard, then steel beam guardrail with 8-foot posts shall be used. The G-1D is an example of an approved guardrail end treatment. For bridge rails systems, VTrans bridge rail standards shall be referenced

Section 7 - Driveway access standard

The municipality has a process in place, formal or informal, to review all new drive accesses and development roads where they intersect town roads, as authorized under 19 V.S.A. Section 1111. Municipality may reference Vtrans Standard A-76 Standards for Town & Development Roads and B-71 Standards for Residential and Commercial Drives; the Vtrans Access Management Program Guidelines; and the latest version of the Vermont Better Roads Manual for other design standards and specifications.

Passed and adopted by the Legislative Body of the Municipality of Derby, State of Vermont on 7/29, 2019

Selectboard / City Council / Village Board of Trustees:

Brian J. Smith
John A. B...

Beau Jean Skatuck
[Signature]

Appendix A

Section 1: MUNICIPAL ROAD STANDARDS

The following standards constitute the minimum required Best Management Practices (BMPs) for municipal roads. These standards shall apply to the construction, repair, and maintenance of all town roads and bridges.

It is the municipality's responsibility to maintain all practices after installation. Roads not meeting these standards must implement the BMPs listed below in order to meet the required town's standards.

Feasibility

Municipalities shall implement these standards to the extent feasible. In determining feasibility, municipalities may consider the following criteria: The implementation of a standard listed in of this documentation does not require the acquisition of additional state or federal permits or noncompliance with such permits, or noncompliance with any other state or federal law. The implementation of a standard does not require the condemnation of private property; impacts to significant environmental and historic resources, including historic stone walls, historic structures, historic landscapes, or vegetation within 250 feet of a lakeshore; impacts to buried utilities; and excessive hydraulic hammering of ledge.

Standards for All Construction and Soil Disturbing Activities

Following construction and soil disturbance on a road, all bare or unvegetated areas shall be revegetated with seed and mulch, hydroseeded, or stone lined within 5 days of disturbance of soils, or, if precipitations is forecast, sooner.

Standards for Gravel and Paved Roads with Ditches

Baseline Standards for Gravel and Paved Roads with Ditches

The following are the standards for all gravel and paved municipal roads with drainage ditches, whether or not erosion is present. These standards also apply to all new construction and significant upgrades of stormwater treatment practices.

A. Roadway/Travel Lane Standards

1. Roadway Crown

- a. Gravel roads shall be crowned, in or out-sloped:
Minimum: ¼ inch per foot
Recommended: ¼ inch to ½ inch per foot or 2% - 4%
- b. Paved/ditched roads shall be crowned during new construction, redevelopment, or repaving where repaving involves removal of the existing paving.
Minimum: 1/8 inch per foot or 1%
Recommended: 1% - 2%

2. Shoulder berms (also called Grader/Plow Berm/Windrows)

Shoulder berms shall be removed to allow precipitation to shed from the travel lane into the road drainage system. Roadway runoff shall flow in a distributed manner to the drainage ditch or filter area and there shall be no shoulder berms or evidence of a "secondary ditch". Shoulder berms may remain in place if the road crown is in-sloped or out-sloped to the opposite side of the road from berm side of road. The shoulder berm standard only applies to gravel roads with drainage ditches.

B. Road Drainage Standards

Roadway runoff shall flow in a distributed manner to grass or a forested area by lowering road shoulders or conversely by elevating the travel lane level above the shoulder. Road shoulders shall be lower than travel lane elevation. If distributed flow is not possible, roadway runoff may enter a drainage ditch, stabilized as follows:

1. For roads with slopes between 0% and 5%: At a minimum, grass-lined ditch, no bare soil. Geotextile and erosion matting may be used instead of seed and mulch. Alternatively, ditches may be stabilized using any of the practices identified for roads with slopes 5% or greater included in subpart B.2 below.

Recommended shape: trapezoidal or parabolic cross section with mild side slopes; 2 foot horizontal per 1 foot vertical or flatter and 2-foot ditch depth.

2. For roads with slopes 5% or greater but less than 8%:
 - a. Stone-lined ditch: minimum 6 to 8-inch minus stone or the equivalent for new practice construction. Recommended 2-foot ditch depth from top of stone-lined bottom,
 - b. Grass-lined ditch with stone check dams¹, or
 - c. Grass-lined ditch if installed with disconnection practices such as cross culverts and/or turnouts to reduce road stormwater runoff volume. There shall be at least two cross culverts or turnouts per segment disconnecting road stormwater out of the road drainage network into vegetated areas or spaced every 160 feet.
3. For roads with slopes of 8% or greater: Stone-lined ditch.
 - a. For slopes greater than or equal to 8% but less than 10%: minimum 6 to 8-inch minus stone or the equivalent for new construction. Recommended 2-foot ditch depth from top of stone-lined bottom.
 - b. For slopes greater than 10%: minimum 6 to 8-inch minus stone. Recommended 12-inch minus stone or the equivalent. Recommended 2-foot ditch depth from top of stone-lined bottom.
4. If appropriate, bioretention areas, level spreaders, armored shoulders, and sub-surface drainage practices may be substituted for the above road drainage standards.

C. Drainage Outlets to Waters & Turnouts

Roadway drainage shall be disconnected from waterbodies and defined channels, since the latter can act as a stormwater conveyance, and roadway drainage shall flow in a distributed manner to a grass or forested filter area. Drainage outlets and conveyance areas shall be stabilized as follows:

1. Turn-outs – all drainage ditches shall be turned out to avoid direct outlet to surface waters.
2. There must be adequate outlet protection at the end of the turnout, based upon slope ranges below. Turnout slopes shall be measured on the bank where the practice is located and not based on the road slope.
 - a. For turnouts with slopes of 0% or greater but less than 5%: stabilize with grass at minimum. Alternatively, stabilize using the practices identified in subpart b – c below, when possible.
 - b. For turnouts with slopes 5% or greater: stabilize with stone.
 - c. For slopes greater than 5% but less than 10%: minimum 6-inch to 8-inch minus stone or the equivalent for new construction.
 - d. For slopes greater than 10%: minimum 6 to 8-inch minus stone or equivalent for new construction. Recommend 12-inch minus stone or the equivalent.

¹ See check dam installation specifications.

Drainage and Intermittent Stream Culvert Standards

The following are the required culvert standards for all gravel and paved roads with ditches where rill or gully erosion is present. These standards also apply to new construction and significant upgrades of stormwater treatment practices.

1. Municipal Culverts (Drainage and Intermittent Streams)
 1. Culvert end treatment or headwall required for areas with road slopes 5% or greater if erosion is due to absence of these structures. End treatment or headwall is required for new construction on slopes 5% or greater.
 2. Stabilize outlet such that there will be no scour erosion, if erosion is due to absence or inadequacy of outlet stabilization. Stone aprons or plunge pools required for new construction on road slopes 5% or greater.
 3. Upgrade to 18-inch culvert (minimum), if erosion is due to inadequate size or absence of structure.
 4. A French Drain (also called an Underdrain) or French Mattress (also called a Rock Sandwich) sub-surface drainage practice may be substituted for a cross culvert.
2. Driveway Culverts within the municipal ROW
 1. Culvert end treatment or headwall required for areas with road slopes of 5% or greater, if erosion is due to absence of these structures. End treatment or headwall is required for new construction.
 2. Stabilize outlet such that there will be no scour erosion, if erosion is due to absence or inadequacy of outlet stabilization. Stone aprons or plunge pools required for new construction.
 3. Upgrade to minimum 15-inch culvert, 18-inch recommended, if erosion is due to inadequate size or absence of structure.

Standards for Paved Roads with Catch Basins

Catch Basin Outlet Stabilization: All catch basin outlets shall be stabilized to eliminate all rill and gully erosion. Catch basin outfall stabilization practices include: stone-lined ditch, stone apron, check dams and culvert header/headwall.

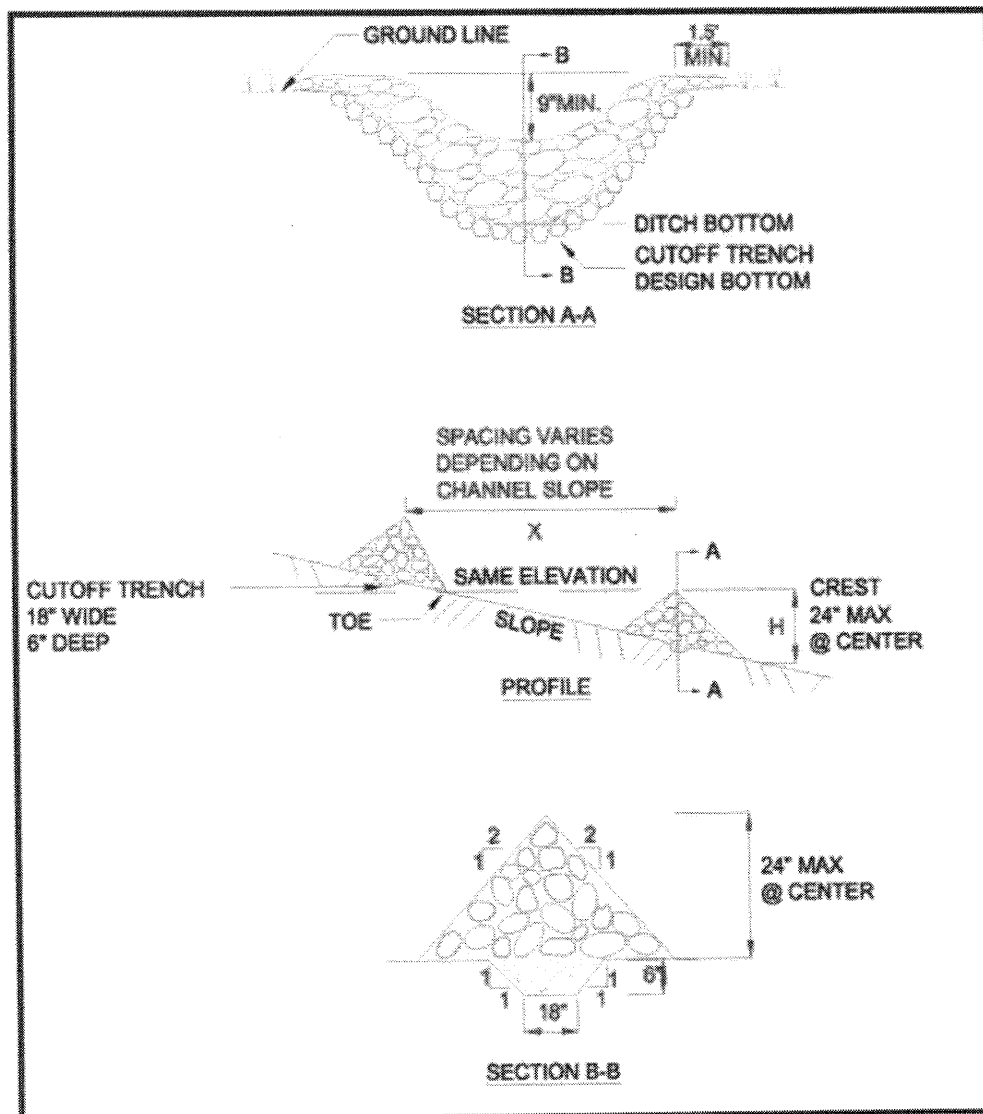
Stone Check Dam Specification

- Height: No greater than 2 feet. Center of dam should be 9 inches lower than the side elevation
- Side slopes: 2:1 or flatter
- Stone size: Use a mixture of 2 to 9-inch stone
- Width: Dams should span the width of the channel and extend up the sides of the banks
- Spacing: Space the dams so that the bottom (toe) of the upstream dam is at the elevation of the top (crest) of the downstream dam. This spacing is equal to the height of the check dam divided by the channel slope.

$$\text{Spacing (in feet)} = \frac{\text{Height of check dam (in feet)}}{\text{Slope in channel (ft/ft)}}$$

- Maintenance: Remove sediment accumulated behind the dam as needed to allow channel to drain through the stone check dam and prevent large flows from carrying sediment over the dam. If significant erosion occurs between check dams, a liner of stone should be installed.

Check Dam Specification:



Section 2: STANDARDS FOR CLASS 4 ROADS

Stabilize any areas of gully erosion with the practices described above or equivalent practices. Disconnection practices such as broad-based dips and water bars may replace cross culverts and turnouts.

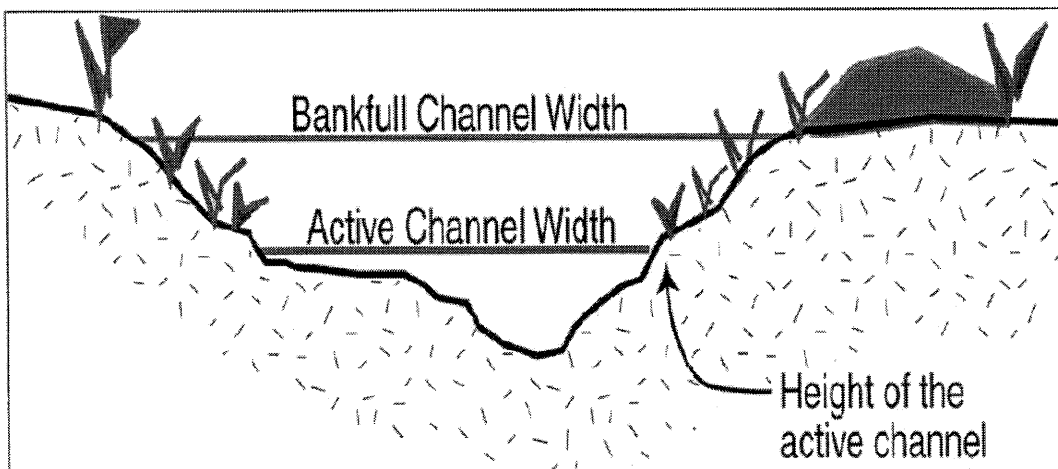
Appendix B

Active Channel Culvert Sizing for Intermittent Stream Crossings

Choose the drainage area closest to your crossing site drainage area

Drainage Area (Acres)	Minimum Diameter for Culverts on Intermittent Streams (inches)
4	15
8	18
16	24
20	30
40	36
50	42
80	48
120	60
160	66
200	<i>Streams with drainage areas of 160 acres or greater are likely to be perennial. Adhere to the VTDEC Technical Guidance for Identification of Perennial Streams</i>
320	
350	
450	
640	

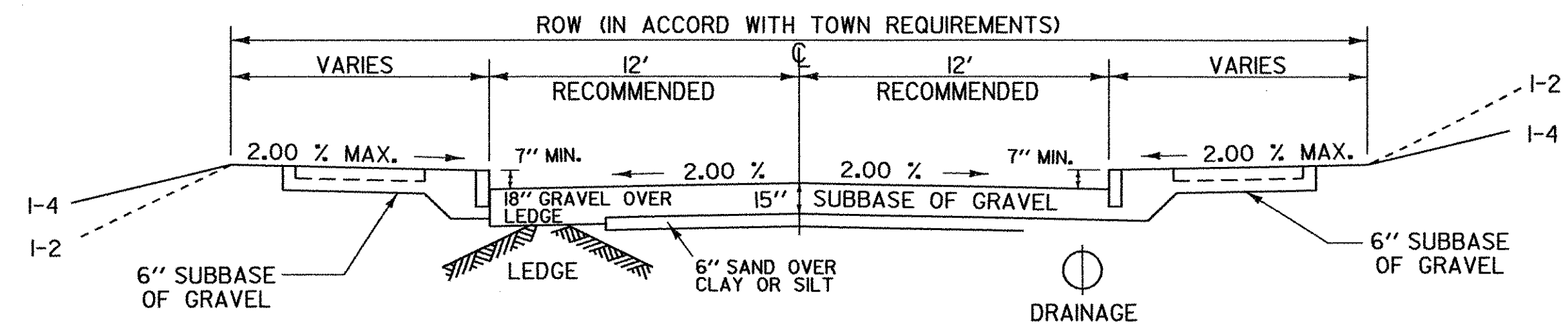
Active Channel Width



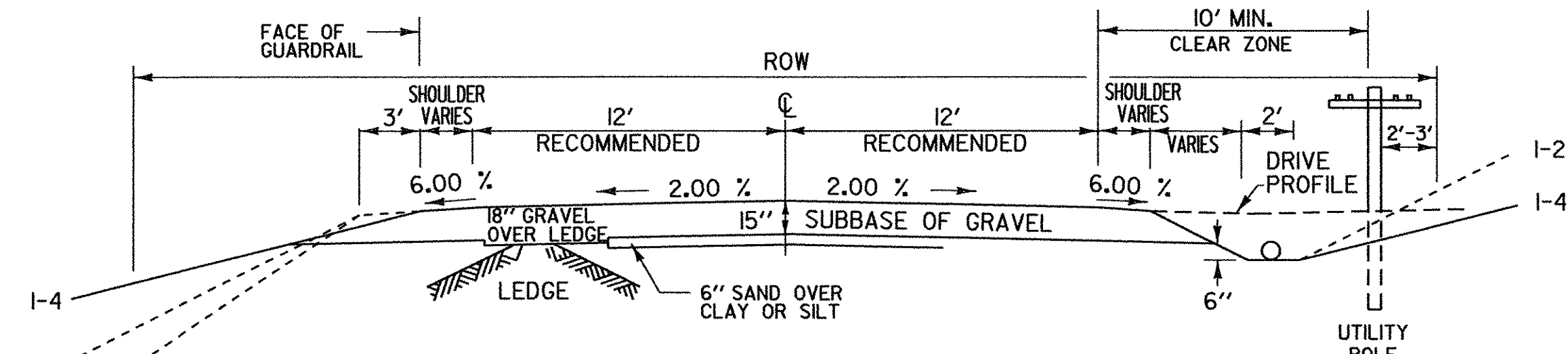
Active Channel Width means the limits of the streambed scour formed by prevailing stream discharges, measured perpendicular to streamflow. The active channel is narrower than the bankfull width (approximately 75%) and is defined by the break in bank slope and typically extends to the edge of permanent vegetation.

Culvert sizing for crossings on intermittent streams: Determine the Active Channel Width by field measurements, *the culvert size should meet or exceed the Active Channel Width*. To obtain the measurements go to the crossing location and obtain several upstream Active Channel Width measurements in riffle (fast moving water) narrower channel locations. The selected channel width should be a representative average of the field measurements. In the absence of field measurements, the drainage areas in the table can be used.

ROADWAY TYPICALS

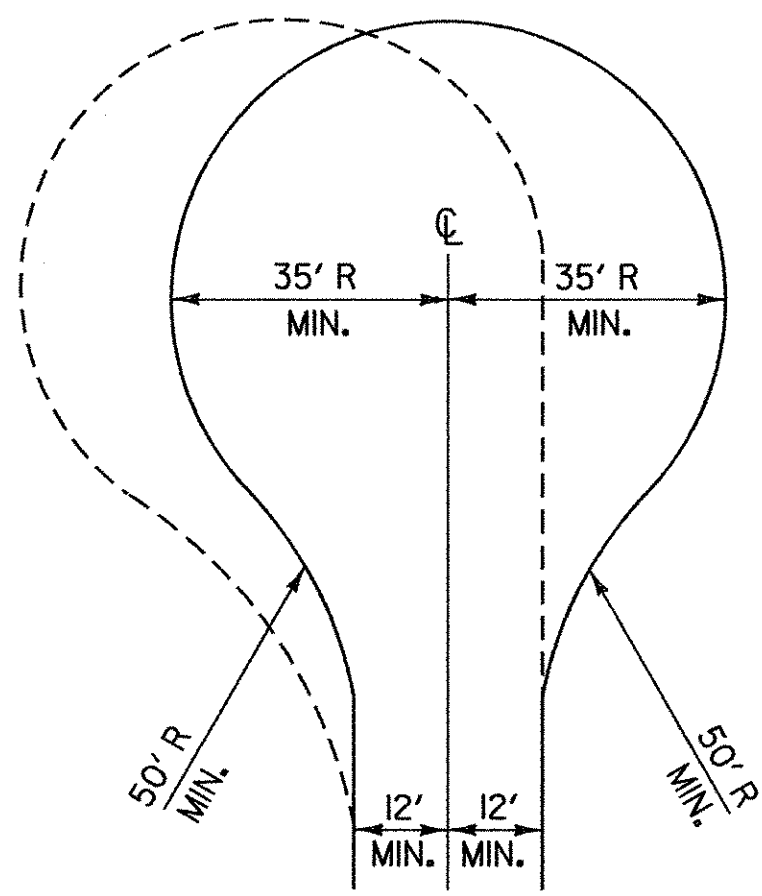


TYPICAL - CURBED SECTION WITH 5' SIDEWALKS

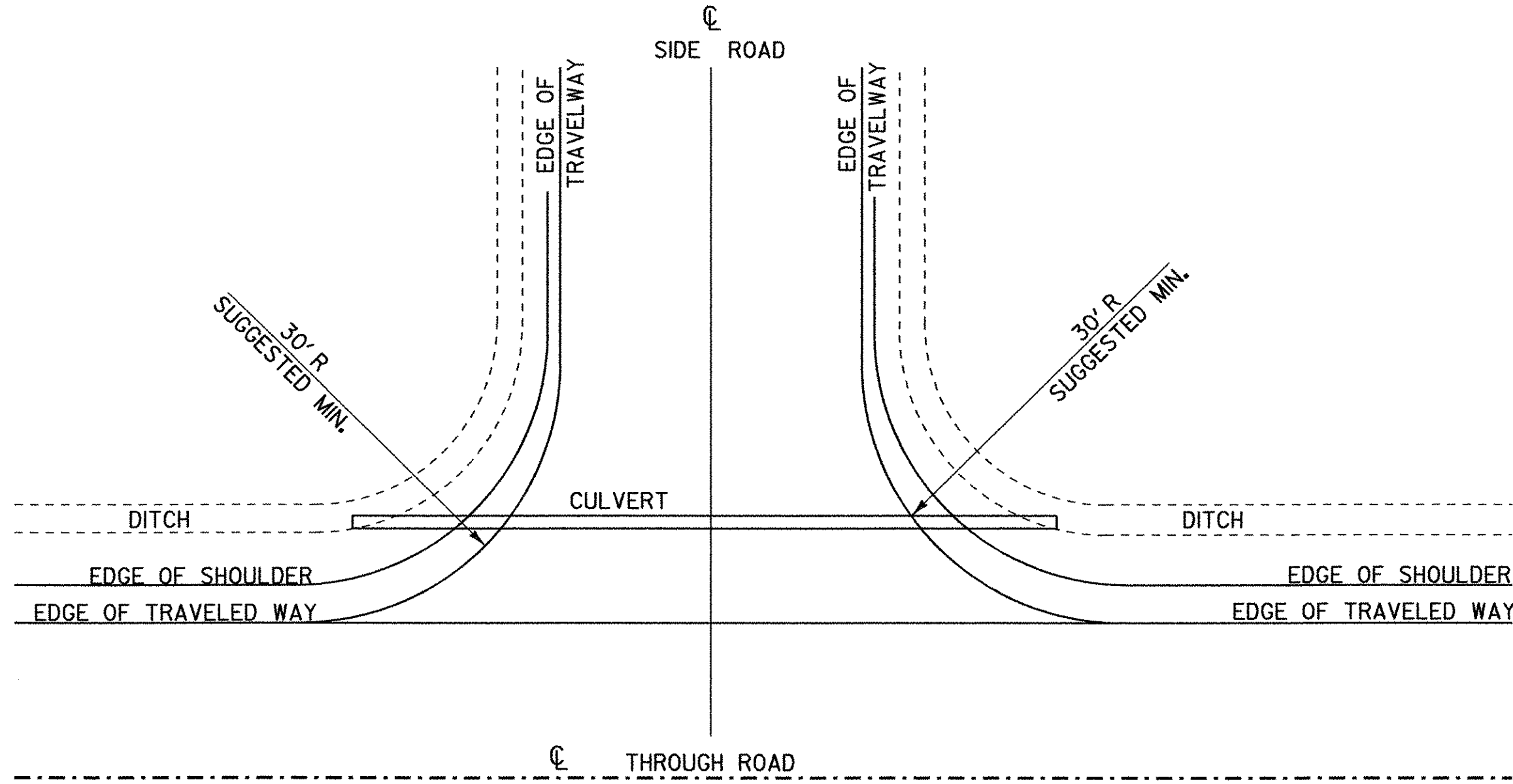


TYPICAL - NON-CURBED SECTION WITH DITCH

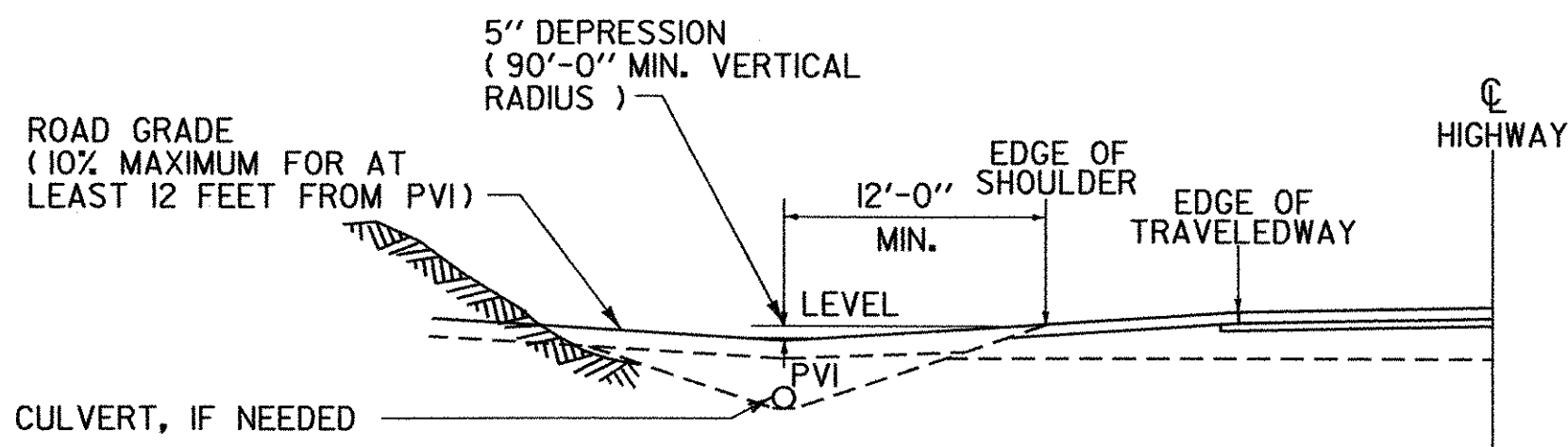
CUL-DE-SAC FOR DEAD END ROADS



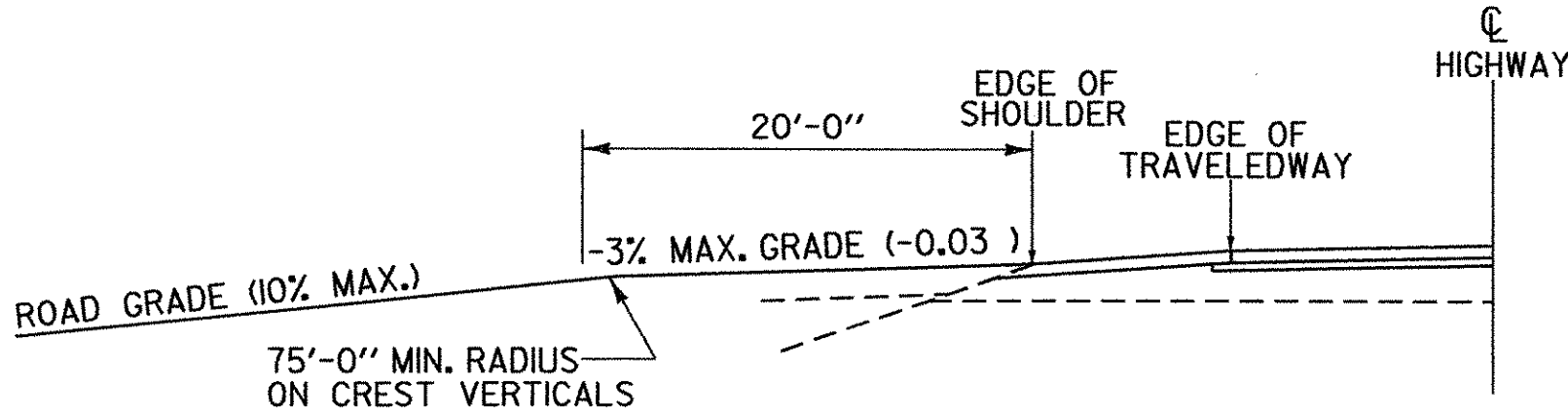
INTERSECTION OF THROUGH ROAD AND SIDE ROAD



FOR THROUGH ROADS WITH SIDEWALKS & CURBING, SEE STANDARDS C2 & C3.
PROVIDE DROP INLETS ON EACH SIDE OF SIDE ROAD AT INTERSECTION AS NECESSARY.



PROFILE OF INTERSECTION (CUT SECTION)
SHOWING 5" DEPRESSION



PROFILE OF INTERSECTION (FILL SECTION)

GENERAL NOTES FOR LOCAL ROADS

- SUBBASE, SAND CUSHION AND SUBGRADE SHOULD BE CONSTRUCTED AND COMPACTED TO THE DIMENSIONS SHOWN IN ACCORDANCE WITH VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION. WHERE LOCAL ORDINANCES HAVE BEEN ADOPTED RELATIVE TO ROAD DIMENSIONS AND CONSTRUCTION, THEY SHOULD GOVERN. THE DIMENSIONS SUGGESTED ARE INTENDED TO BE APPLIED ONLY IN LOW TRAFFIC VOLUME CONDITIONS (AVERAGE DAILY TRAFFIC LESS THAN 250 VEHICLES PER DAY), AND WHERE HEAVY TRUCK TRAFFIC IS INFREQUENT.
- EXPPOSED EARTH SLOPES SHOULD BE SEEDED, FERTILIZED AND MULCHED IN ACCORDANCE WITH VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
- DRAINAGE:
ROADWAY - 18" MINIMUM DIAMETER, OF METAL, REINFORCED CONCRETE OR POLYETHYLENE PIPE, WITH DROP INLETS OR CATCH BASINS, AS REQUIRED. HYDRAULIC ANALYSIS TO DETERMINE APPROPRIATE PIPE DIAMETER IS RECOMMENDED FOR ALL LIVE STREAM CROSSINGS AND ELSEWHERE WHERE LARGE STORM FLOWS MAY BE EXPECTED.

DRIVES - 15" MINIMUM DIAMETER, OF METAL, REINFORCED CONCRETE OR POLYETHYLENE PIPE.

UNDERDRAIN - 6" MINIMUM DIAMETER, OF METAL, PVC PLASTIC OR POLYETHYLENE PIPE.

LOCATION, DEPTH AND CONSTRUCTION DETAILS SHOULD FOLLOW PRACTICE SPECIFIED BY LOCAL ORDINANCE OR THE VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

4. HORIZONTAL CURVATURE - THE FOLLOWING WILL APPLY:

DESIGN SPEED	MINIMUM RADII RURAL ①	MINIMUM RADII URBAN ②
25 MPH	185 FT.	180 FT.
30 MPH	275 FT.	300 FT.
35 MPH	380 FT.	460 FT.
40 MPH	510 FT.	675 FT.
45 MPH	660 FT.	945 FT.
50 MPH	835 FT.	1280 FT.

- ① BASED ON CROSS SLOPE = 6.0 %
② BASED ON MAINTAINING NORMAL CROWN SECTION THROUGHOUT CURVE :
EFFECTIVE CROSS SLOPE = 2.0 %

FOR OTHER SUPERELEVATION RATES, SEE CHAPTER III OF THE AASHTO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" FOR APPROPRIATE CURVE RADII.

- GRADIENT OF ROADS - 10% MAXIMUM GRADE SUGGESTED, ALTHOUGH GRADES UP TO 16 % MAY BE ALLOWED IN MOUNTAINOUS TERRAIN.
- GUARD RAIL - PROVIDE GUARD RAIL WITH TREATED WOOD OR STEEL POSTS, OF A DESIGN IN ACCORDANCE WITH VAOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE AASHTO ROADSIDE DESIGN GUIDE, AND VAOT STANDARD DRAWINGS. GENERALLY, WHERE SLOPES ARE 1:3 OR STEEPER, AND THE HEIGHT OF DROPOFF AT EDGE OF SHOULDER EXCEEDS 5', GUARD RAIL SHOULD BE INSTALLED. ALSO, WHERE SLOPES ARE 1:3 OR FLATTER, GUARD RAIL MAY NOT BE NEEDED IF THE AREA AT THE BOTTOM OF THE SLOPE IS FREE OF HAZARDS. THE LOCAL VAOT DISTRICT TRANSPORTATION ADMINISTRATOR MAY BE CONTACTED FOR ASSISTANCE.
- PAVING - ROADS WITH GRADES EXCEEDING 7% SHOULD BE PAVED UNLESS WAIVED BY THE LOCAL GOVERNING BODY. FOR TRAFFIC VOLUMES GREATER THAN, OR EQUAL TO, 250 VEHICLES PER DAY, OR WHERE HEAVY TRUCKS ARE COMMON, A PAVEMENT DESIGN SHOULD BE PERFORMED TO DETERMINE APPROPRIATE THICKNESSES OF SUBBASE AND PAVEMENT.
- TRAVELED WAY AND SHOULDER WIDTHS - WIDTHS SHOWN ON THIS STANDARD ARE FOR LOW SPEED/LOW TRAFFIC VOLUME CONDITIONS. FOR ADDITIONAL GUIDANCE IN THE DESIGN OF LOCAL ROADS AND STREETS, SEE THE LATEST EDITION OF AASHTO'S PUBLICATION "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS", OR THE VAOT "VERMONT STATE STANDARDS".
- UTILITY LINE LOCATION TO CONFORM TO LOCAL REQUIREMENTS.

REVISIONS AND CORRECTIONS
JAN. 21, 1971 - ORIGINAL DATE OF ISSUE
MAR. 12, 1971 - DIMENSIONS CHANGED ON TURN-A-ROUND
JULY 13, 1973 - INTERSECTION PROFILES ADDED
DEC. 7, 1993 - REVISED TO REFLECT CURRENT DESIGN CRITERIA
JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.
MAR. 10, 1995 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.
MARCH 3, 2003 - REVISED TO REFLECT CURRENT DESIGN CRITERIA

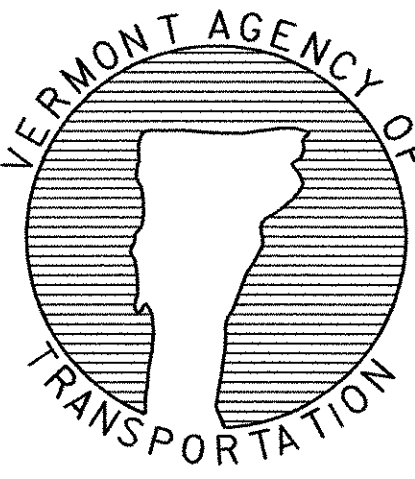
APPROVED

DIRECTOR OF PROGRAM DEVELOPMENT

CHIEF OF UTILITIES

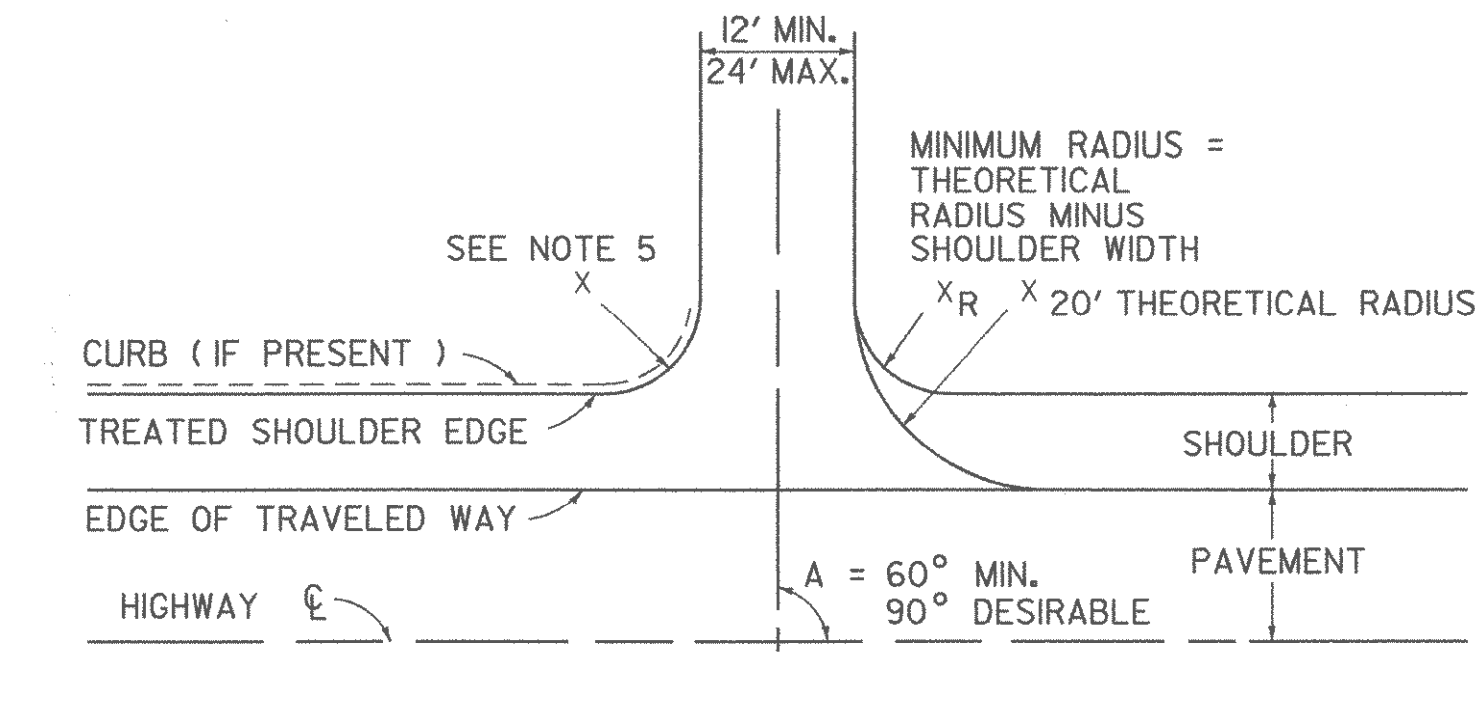
FEDERAL HIGHWAY ADMINISTRATION

STANDARDS FOR TOWN
& DEVELOPMENT ROADS

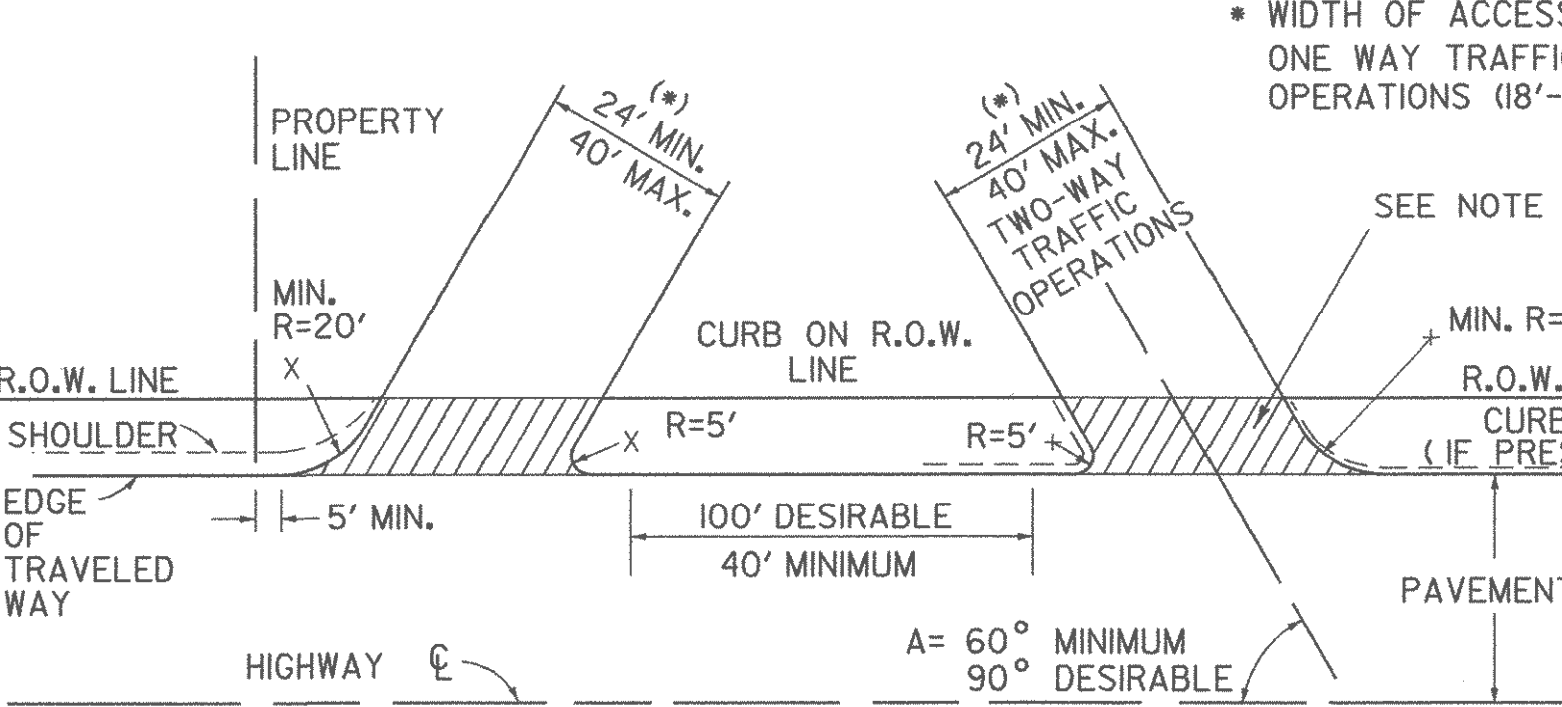


STANDARD
A - 7 6

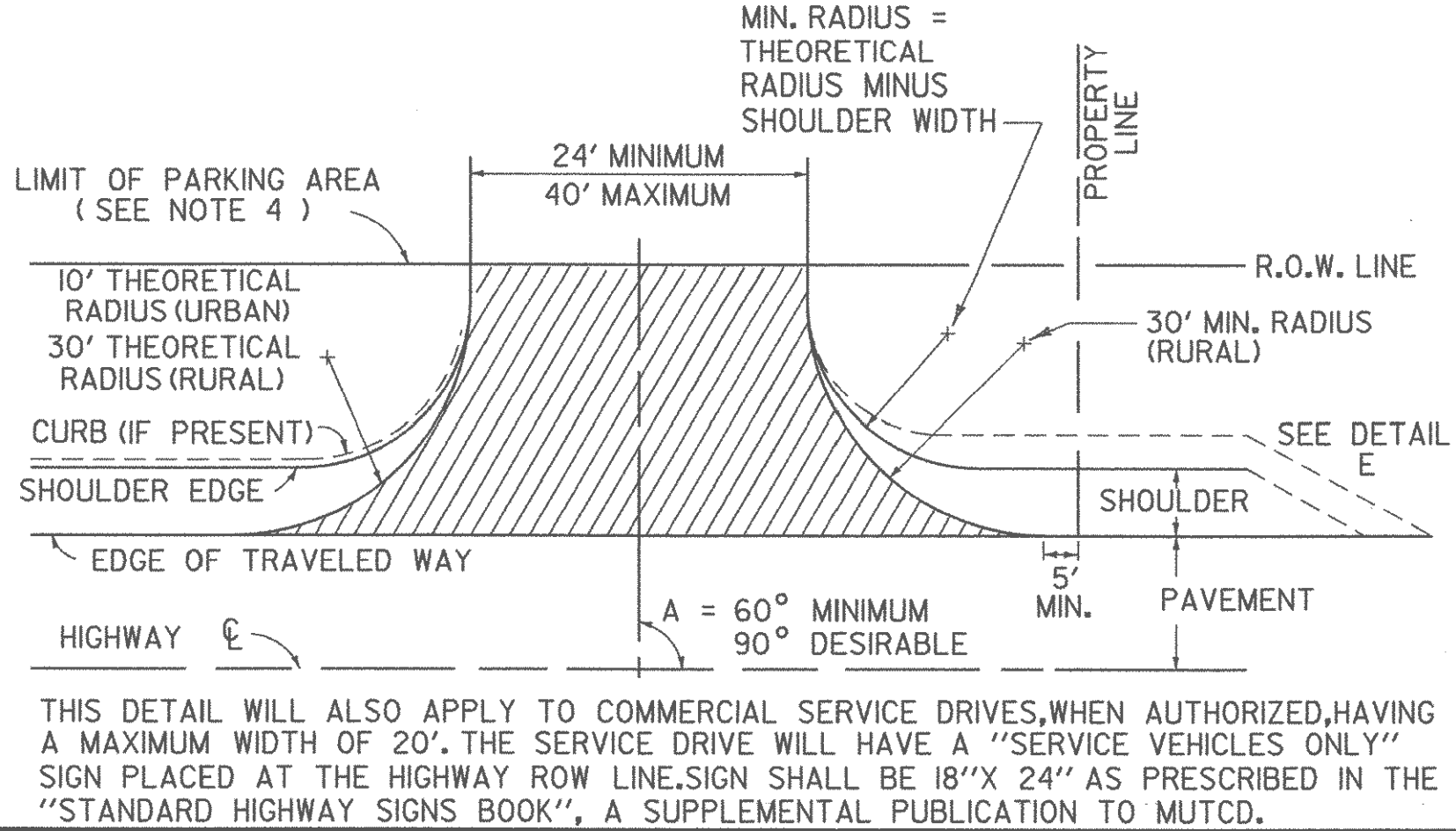
DETAIL A RESIDENTIAL DRIVE



DETAIL B DUAL COMMERCIAL DRIVE TO BE USED ONLY UNDER SPECIAL CONDITIONS

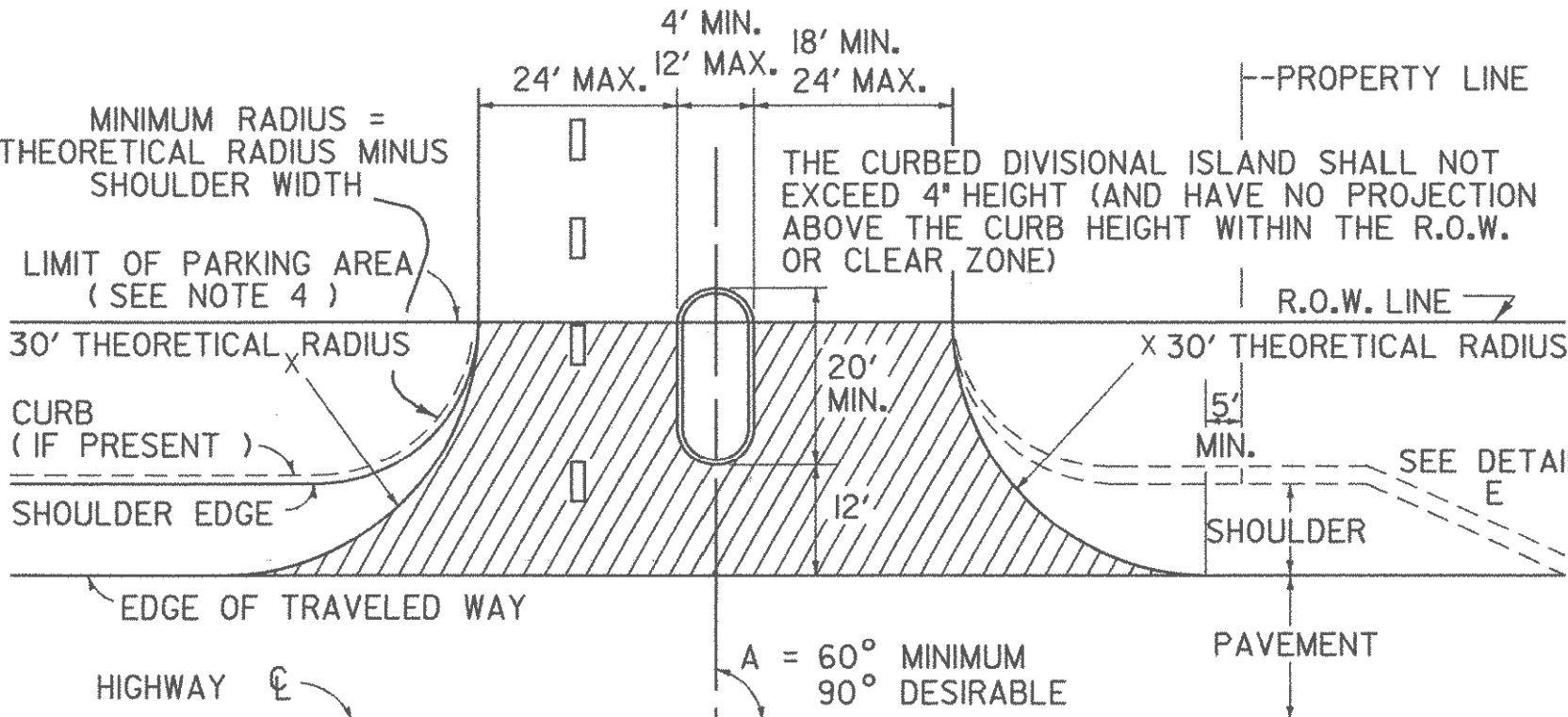


DETAIL C TWO-WAY UNDIVIDED COMMERCIAL DRIVE FOR SINGLE STORES, BUSINESSES, SMALL HOUSING DEVELOPMENTS

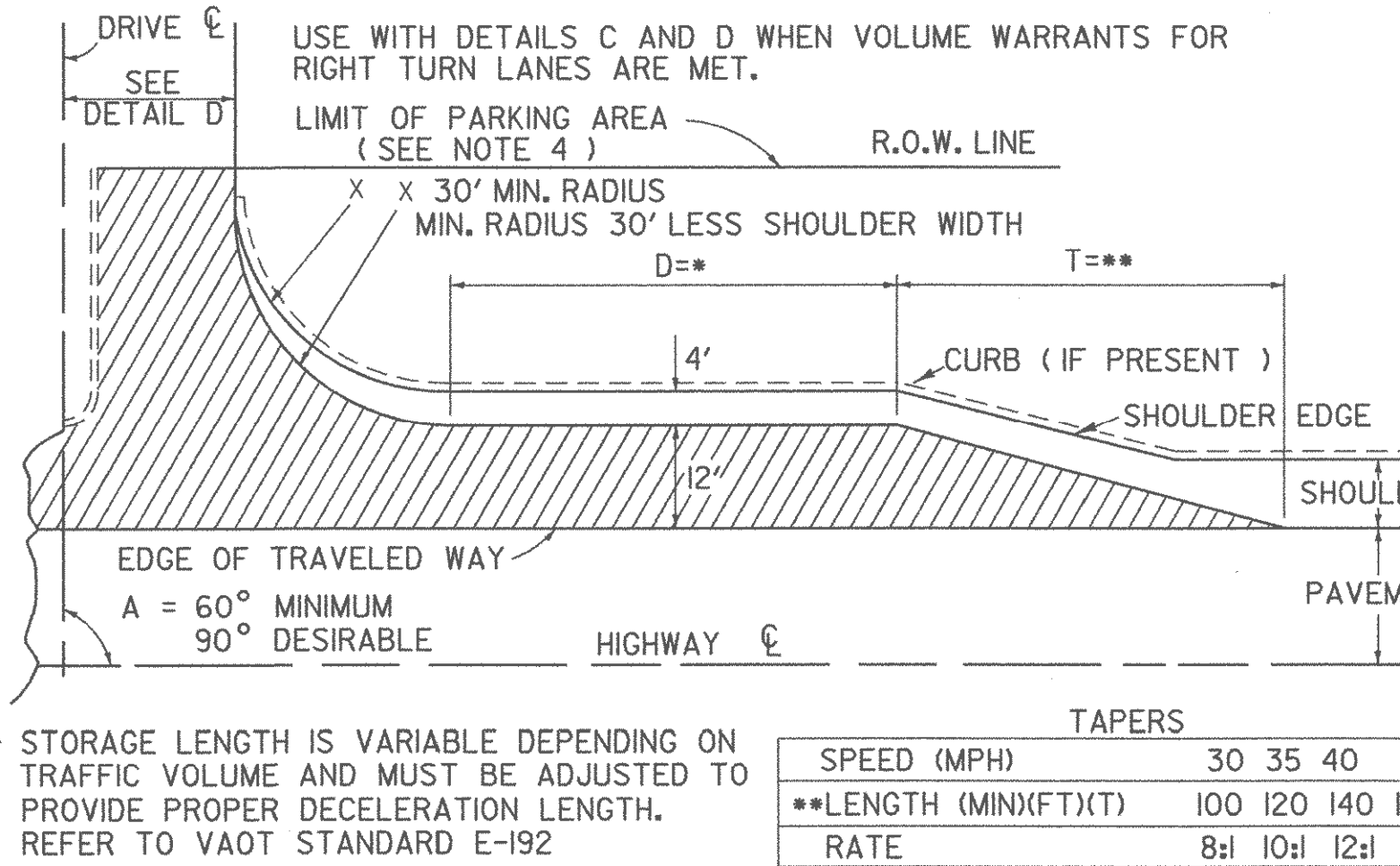


- NOTES:
1. THIS SHEET IS INTENDED FOR USE BY DESIGNERS ON HIGHWAY PROJECTS AND IN CONJUNCTION WITH A PERMIT FOR WORK WITHIN HIGHWAY RIGHTS OF WAY (FORM TA 210). ALL CONSTRUCTION REQUIRED BY THE PERMIT AND INDICATED ON THIS SHEET SHALL BE THE RESPONSIBILITY OF THE APPLICANT AND IS SUBJECT TO THE APPROVAL OF THE VT. AGENCY OF TRANSPORTATION. WHEN USED WITH THE PLANS FOR A HIGHWAY CONSTRUCTION PROJECT, THIS SHEET IS INTENDED TO BE A GUIDE FOR THE DESIGNER CONCERNING DRIVE WIDTHS, HORIZONTAL, VERTICAL AND GEOMETRIC CHARACTERISTICS.
 2. ALL COMMERCIAL DRIVES SHALL BE PAVED FROM THE EDGE OF THE TRAVELED WAY TO THE HIGHWAY RIGHT-OF-WAY, TO THE FARTHEST POINT OF CURVATURE ON THE DRIVEWAY EDGE OR AS DIRECTED BY THE DISTRICT TRANSPORTATION ADMINISTRATOR. THIS PAVING IS INDICATED IN DETAILS (B THRU E) BY HATCHING.
 3. DEPTH OF SUBBASE AND PAVEMENT TO BE THE SAME AS HIGHWAY OR AS SHOWN IN DETAIL J WITHIN THE LIMITS OF THE HIGHWAY RIGHT-OF-WAY.
 4. VEHICULAR ACCESS FROM PARKING AREAS TO THE RIGHT-OF-WAY AT OTHER THAN APPROVED ACCESS POINTS WILL BE PREVENTED BY THE CONSTRUCTION OF CURBING OR OTHER SUITABLE PHYSICAL BARRIER.
 5. IF CURB IS PRESENT, SEE APPROPRIATE CURB DETAIL STANDARD OR MATCH TOWN/CITY STANDARD CURB TREATMENT.
 6. WHERE TRAFFIC VOLUME FOR A PROJECT IS SUBSTANTIAL THE AGENCY MAY REQUIRE SPECIAL LANES FOR TURNING, SIGNALS OR OTHER MODIFICATIONS. BASED ON TRAFFIC STUDIES THE AGENCY WILL DETERMINE SPECIFIC TREATMENT TO BE USED. ON DEVELOPER PROJECTS THE AGENCY WILL WORK WITH THE APPLICANT TO IMPLEMENT CHANGES TO THE STATE HIGHWAY.
 7. CIRCULAR DRAINAGE CULVERTS UNDER DRIVES SHALL HAVE A MINIMUM INSIDE DIAMETER (I.D.) OF 15". PIPE ARCHES USED UNDER DRIVES SHALL HAVE A MINIMUM INSIDE CROSS-SECTIONAL AREA EQUIVALENT TO THAT PROVIDED BY A 15" CIRCULAR PIPE.
 8. THE OFFSET BETWEEN THE PROPERTY LINE AND THE EDGE OF THE DRIVEWAY MAY BE GOVERNED BY LOCAL ZONING LAWS. DRIVEWAY WIDTH RESTRICTIONS SHOWN PERTAIN ONLY TO THE AREA WITHIN THE HIGHWAY R.O.W. OR THE END OF THE TURNING RADIUS WHICHEVER IS GREATEST.
 9. DRIVEWAY GRADES STEEPER THAN THOSE SHOWN MAY BE ALLOWED AS LONG AS A 20' APPROACH AREA IS ACHIEVED FOR THE VEHICLE TO PAUSE BEFORE ENTERING THE HIGHWAY. (WHERE CURB & SIDEWALKS EXIST, SEE STANDARDS C-2A & C-2B)
 10. INTERSECTION SIGHT DISTANCES, EQUAL TO OR GREATER THAN THOSE SHOWN BELOW, SHOULD BE PROVIDED IN BOTH DIRECTIONS FOR ALL DRIVES ENTERING ON PUBLIC HIGHWAYS, UNLESS OTHERWISE APPROVED BY THE AGENCY OF TRANSPORTATION. INTERSECTION SIGHT DISTANCE IS MEASURED FROM A POINT ON THE DRIVE AT LEAST 15 FEET FROM THE EDGE OF TRAVELED WAY OF THE ADJACENT ROADWAY AND MEASURED FROM A HEIGHT OF EYE OF 3.5 FEET ON THE DRIVE TO A HEIGHT OF 3.50 FEET ON THE ROADWAY.

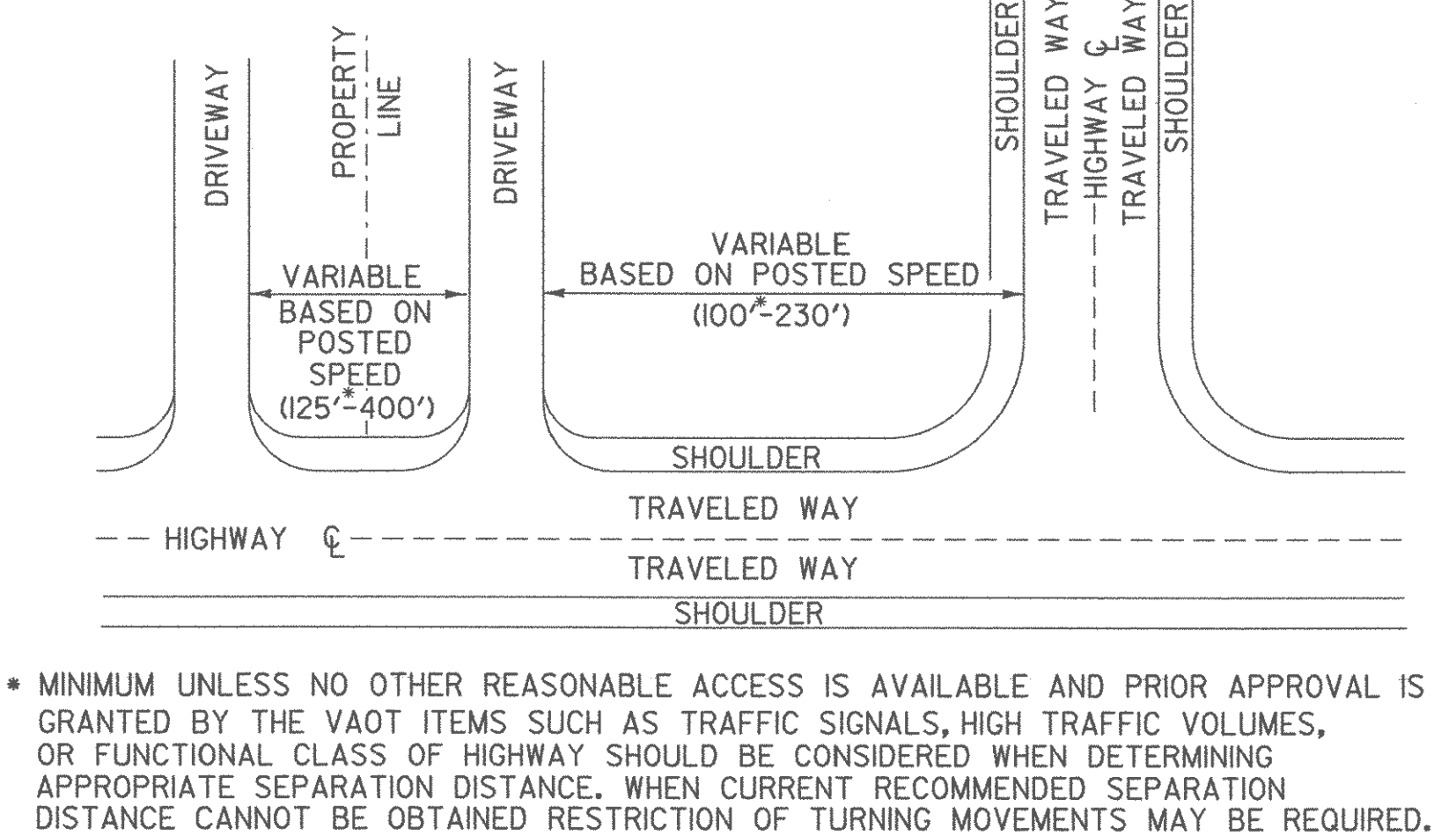
DETAIL D TWO-WAY COMMERCIAL DRIVE WITH DIVISIONAL ISLAND FOR SHOPPING CENTERS, LARGE HOUSING DEVELOPMENTS, INDUSTRIAL PLANTS AND SERVICE STATIONS



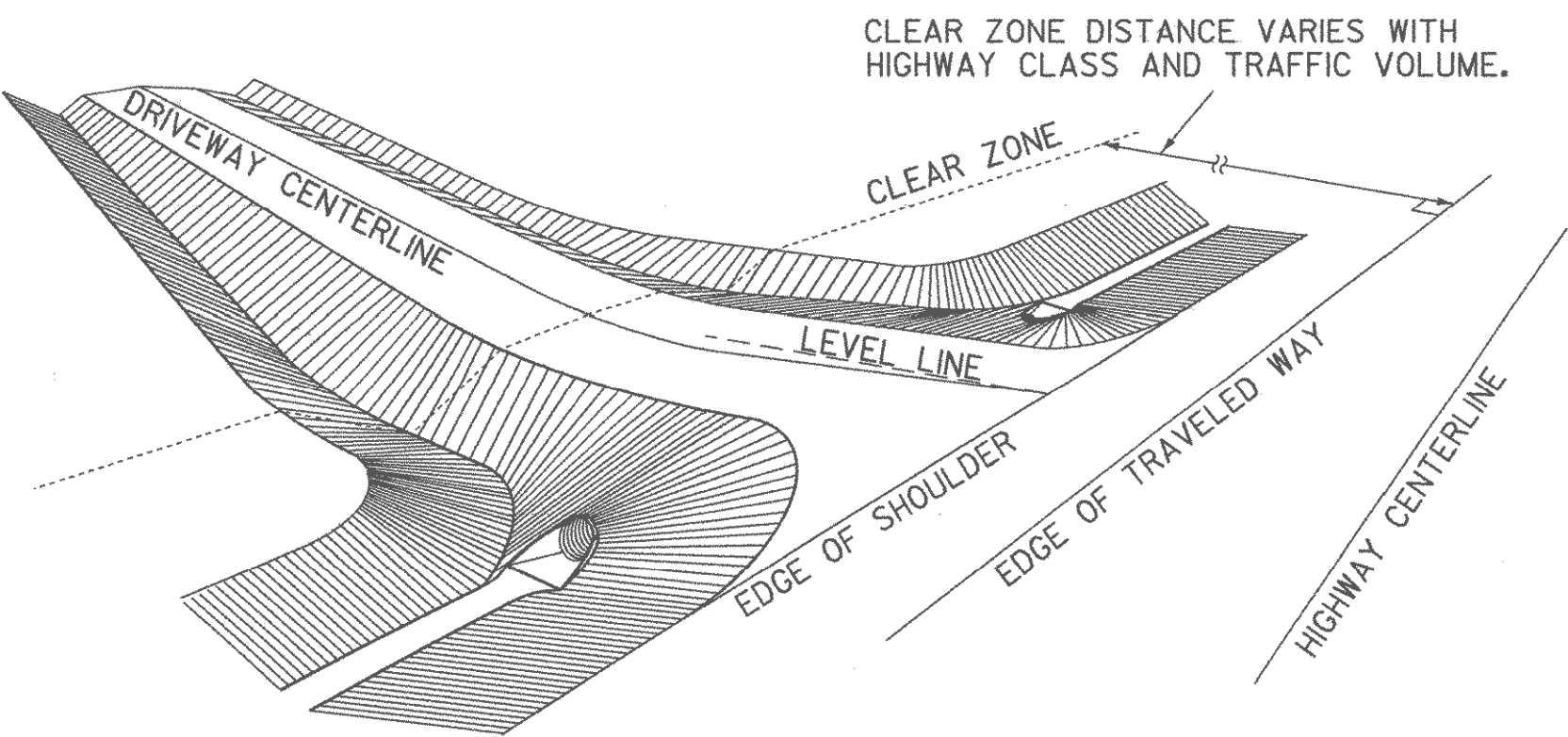
DETAIL E RIGHT TURN LANE FOR COMMERCIAL DRIVE (UNSIGNALIZED INTERSECTIONS ONLY)



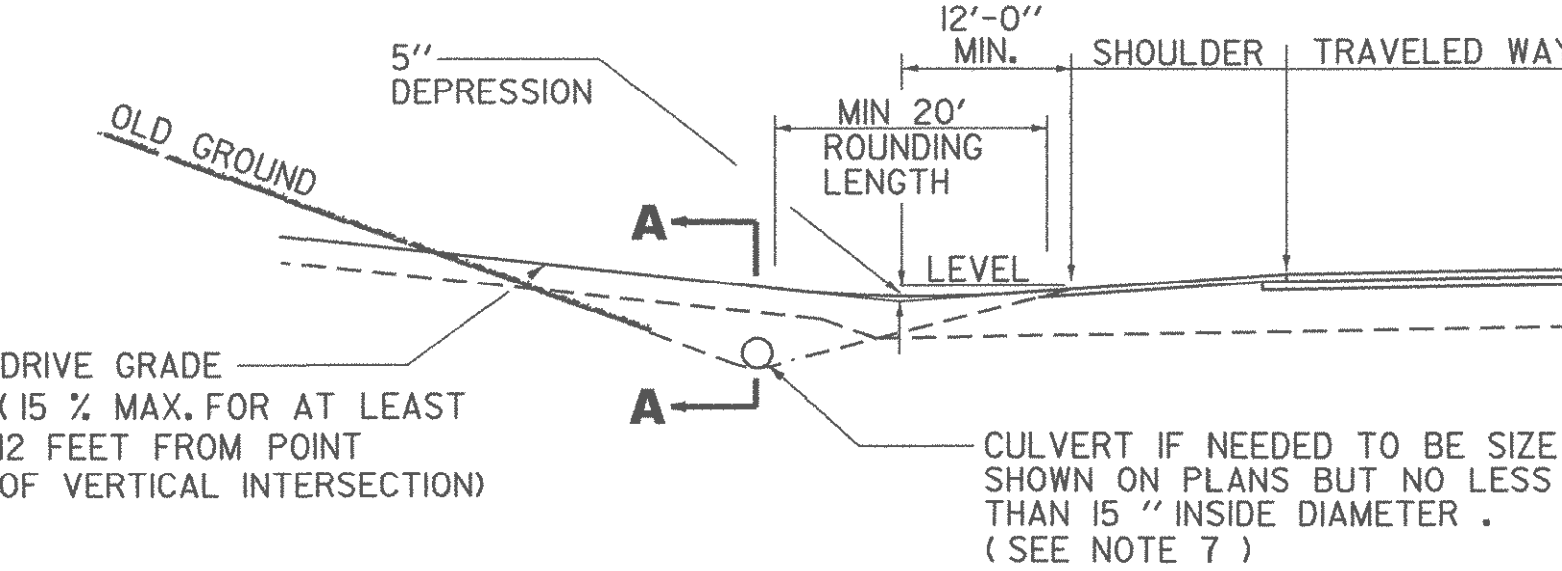
DETAIL F MINIMUM HORIZONTAL SEPARATION BETWEEN DRIVEWAYS AND INTERSECTING SIDEROADS



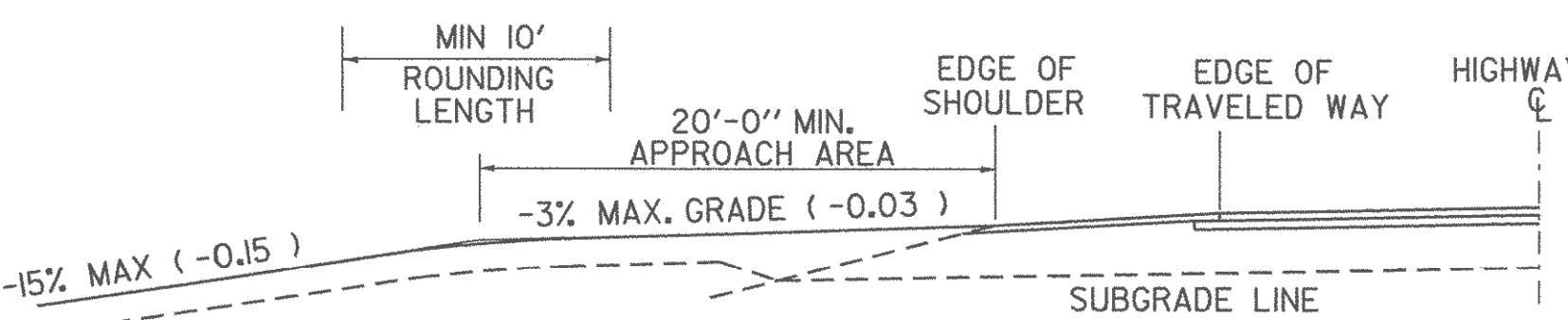
DETAIL G PERSPECTIVE SKETCH OF DRIVE INTERSECTION SHOWING DEPRESSION



DETAIL H PROFILE OF DRIVE INTERSECTION SHOWING 5" DEPRESSION (CUT SECTION)



DETAIL I PROFILE OF DRIVE INTERSECTION (FILL SECTION)



SIGHT DISTANCE CHART		
POSTED SPEED OR DESIGN SPEED (M.P.H.)	MINIMUM STOPPING SIGHT DISTANCE (FT)	MINIMUM INTERSECTION SIGHT DISTANCE * (FT)
25	155	280
30	200	335
35	250	390
40	305	445
45	360	500
50	425	555
55	495	610
60	570	665
65	645	720

THE ABOVE VALUES ARE TAKEN FROM THE 2004 AASHTO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS & STREETS."

NOTE : ADVANCE WARNING SIGNS WILL BE REQUIRED IF OBTAINABLE INTERSECTION SIGHT DISTANCES ARE BELOW MINIMUM STOPPING SIGHT DISTANCES.

THE CHART IS ENTERED TO SELECT DESIGN VALUES BASED ON THE POSTED SPEED LIMIT IN MPH. VALUES FOR DESIGN ARE CALCULATED BASED ON THE DESIGN SPEED IN MPH.

* ASSUMES A GAP OF 7.5 SECONDS IN THE TRAFFIC STREAM ON THE HIGHWAY MAINLINE BASED ON THE HIGHWAY DESIGN SPEED IN MPH. THIS ALLOWS A STOPPED PASSENGER VEHICLE TO ENTER THE MAINLINE FROM THE DRIVE WITHOUT UNDULY INTERFERING WITH THE HIGHWAY OPERATIONS.

DRIVE SIDE SLOPES	
LOCATION OF SLOPE	SLOPE RATE
V > 40 MPH	1:6 OR FLATTER
URBAN AREAS, OR V ≤ 40 MPH	1:4 DESIRABLE 1:2 ALLOWABLE
OUTSIDE CLEAR ZONE	1:2 OR FLATTER

REVISIONS AND CORRECTIONS

- DEC. 11, 1992 - THIS STANDARD SUPERCEDES B-71 (7/23/80R), B-71A (3/12/90), AND B-13 (12/14/71).
- JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.
- MAR. 10, 1995 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.
- NOV. 16, 2000 - CHANGES MADE TO CONFORM WITH LANGUAGE AND DIMENSIONS IN ACCESS MANAGEMENT PROGRAM GUIDELINES.
- FEB 1, 2004 - CHANGES MADE TO SIGHT DISTANCE CHART TO CONFORM WITH NEWEST AASHTO CRITERIA.
- JULY 8, 2005 - CHANGE MADE TO OBJECT HEIGHT TO CONFORM WITH NEWEST AASHTO CRITERIA

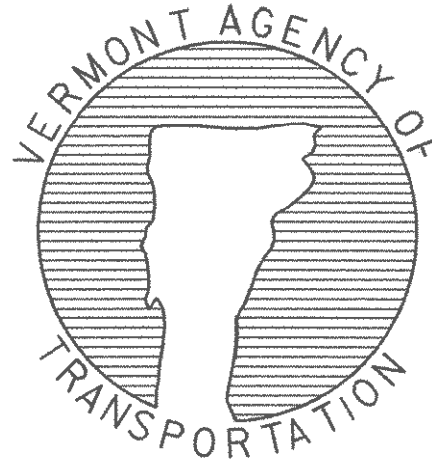
APPROVED

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STANDARDS FOR RESIDENTIAL AND COMMERCIAL DRIVES



STANDARD B-71