

# Town of Indian Trail



## Land Development Standards

July 10, 2007

**Indian Trail Standards Manual**  
**Edition 2.0**

TABLE OF CONTENTS

	<b><u>PAGE NUMBER</u></b>
<b><u>INTRODUCTION</u></b>	2
I. <b><u>STREETS</u></b>	3
A. GENERAL NOTES	
B. STANDARDS OF STREET DESIGN	
C. GRADING	
D. ROADWAY BASE	
E. ROADWAY SURFACE	
F. SIDEWALKS AND DRIVEWAYS	
II. <b><u>STORM DRAINAGE</u></b>	9
A. GENERAL NOTES	
B. STANDARDS FOR DESIGN	
III. <b><u>PLAN REQUIREMENTS</u></b>	12
A. GENERAL NOTES	
B. SUBDIVISIONS-PRELIMINARY PLAN	
C. BOND POLICY-SUBDIVISION IMPROVEMENTS	
IV. <b><u>REFERENCES</u></b>	15
V. <b><u>STANDARD DETAILS</u></b>	16

Standard details included in this issue are valid as of July 10, 2007 and shall be used. Standard details applicable to individual projects shall be noted by reference in the plans.

Subsequent revisions will be issued as individual sheets to be incorporated in this book when issued by the Town of Indian Trail.

Any variations from the standard details shown herein shall be by special details shown on the project plans and are subject to approval by the Town of Indian Trail.

**I. STREETS****A. GENERAL NOTES**

1. All work and materials shall conform to the latest edition of the North Carolina Department of Transportation (NCDOT) Standard Specifications for Roads and Structures unless otherwise specified in this manual.
2. All asphalt cuts shall be made with a saw when preparing street surfaces for patching or widening strips.
3. Paper joints shall be used to seal the ends of an asphalt pour so that future extensions can be made without causing rough joints.
4. When placing asphalt against existing surfaces, a straight edge shall be used to prevent "humping" at that location.
5. Stone shall be primed if paving is not complete within seven days following stone base approval.
6. Surfaces shall be tacked when asphalt is being placed over existing asphalt streets or adjoining concrete, storm-drain and sanitary sewer structures.
7. In rolling and hilly terrain, sweeping of the stone base and/or application of a tack coat may be required near intersections. The Planning and Development director or their designee will establish these requirements on field conditions.
8. All concrete shall have a minimum compressive strength of 3600 PSI at 28 days. The contractor shall prepare concrete test cylinders in accordance with Section 1000 of the NCDOT Standard Specifications at the direction of the project inspector. The contractor shall furnish all equipment and cylinder molds. It shall be the responsibility of the contractor to protect the cylinders until such time as they are transported for testing. An independent testing lab, at no cost to the Town shall perform testing for projects. The contractor shall provide equipment and perform tests on concrete for a maximum slump and air content as defined in Section 1000 of the NCDOT Standard Specifications. These tests shall be performed at a frequency established by the inspector. The contractor shall remove materials failing to meet specifications.
9. All concrete shall be cured with 100% Resin Base, white pigmented curing compound which meets A.S.T.M. Specifications C-309, Type 1, applied at a uniform rate at one (1) gallon to 400 square feet within 24 hours of placement of the concrete.
10. All curb and gutter shall be backfilled with soil approved by the Inspector within 48 hours after construction to prevent erosion.
11. All backfill shall be non-plastic in nature, free from roots, vegetative matter, waste, construction material or other objectionable material. Said material shall be capable of being compacted by mechanical means and the material shall have no tendency to flow

or behave in a plastic manner under the tamping blows or proof rolling.

12. Materials deemed by the Inspector as unsuitable for backfill purposes shall be removed and replaced with select backfill material.

13. All trenches in the street right-of-way shall be backfilled with suitable material immediately after the pipe is laid. The fill around all pipe shall be placed in layers not to exceed six (6) inches and each layer shall be compacted thoroughly.

14. Under no circumstances shall water be permitted to rise in unbackfilled trenches after the pipe has been placed.

15. Compaction requirements shall be attained by the use of mechanical compaction methods. Each six (6) inch layer of backfill shall be placed loose and thoroughly compacted into place.

16. Straight forms shall not be used for forming curb and gutter in curves.

17. All excess concrete on the front edge (lip) of gutter shall be removed when curb and gutter is poured with a machine.

18. All subgrade shall be compacted to 100% of the maximum density obtainable with the Standard Proctor Test to a depth of eight (8) inches, and a density of 95% Standard Proctor for depths greater than eight (8) inches. Developer at no cost to the Town shall perform all tests.

19. A canvas cover or other suitable cover shall be required for transporting plant mix asphalt during cool weather when the following conditions are present:

(a) Air temperature is below 60E F.

(b) Length of haul from plant to job is greater than five (5) miles.

(c) Other occasions at the Inspector's discretion when a combination of factors indicate that material should be covered in order to assure proper placement temperature.

20. Concrete or asphalt shall not be placed until the air temperature measured at the location of the concreting operation is at 35E F and rising by 10:00 A.M. Concrete or paving operations should be suspended when the air temperature is 40E F and descending. The contractor shall protect freshly placed concrete in accordance with Section 420 of the NCDOT Standard Specifications when the air temperature is at or below 35E F and the concrete has not obtained an age of 72 hours.

21. The contractor shall maintain two-way traffic at all times when working within existing streets. The contractor shall place and maintain signs, danger lights, barricades and furnish watchmen or flagmen to direct traffic in accordance with the latest edition

Work Area Traffic Control Handbook (WATCH) or Manual for Uniform Traffic Control Devices (MUTCD).

22. The contractor shall do that which is necessary to control erosion and to prevent sedimentation damage to all adjacent properties and streams in accordance with the North Carolina Clean Water Act. Water standing within the project limits shall be prevented.

23. Refer to the latest edition of the NCDOT Subdivision Roads Minimum Construction Manual for development criteria for sites located within Town of Indian Trail within these areas governed by Town of Indian Trail Land Development Standards Manual and the NCDOT Subdivision Roads Minimum Construction Standards Manual. The more restrictive standard shall apply.

**B. STANDARDS OF STREET DESIGN**

1. PUBLIC STREETS:

	<u>LOCAL</u>		<u>COLLECTOR</u>			
	<u>Level</u>	<u>Rolling</u>	<u>Hilly</u>	<u>Level</u>	<u>Rolling</u>	<u>Hilly</u>
a. Terrain Classification	0-8%	8.1-15%	15%+	0-8%	8.1-15%	15%+
b. Min. Sight Distance (ft.)	200	150	125	250	200	150
c. Maximum Grade	6%	10%	12%	4%	8%	10%
d. Design Speed (mph)	30	25	20	35	30	25
e. Minimum Radius (ft.)	250	150	90	350	250	175
f. Min. Tangent between Reverse Curves	50	50	50	100	100	100(ft.)
g. K Values (crest/sag)	28/35	20/20	10/20	45/45	28/35	20/20

\*Use of Level or Hilly terrain criteria not permitted without prior approval of the Town Engineer.

2. INTERSECTIONS:

	<u>Level</u>	<u>Rolling</u>	<u>Hilly</u>
a. Terrain Classification	0-8%	8.1-15%	15%+
b. Clear Sight Distance (ft.)	35	35	35
c. Vert. Alignment			
(Recommend) within 50 ft.	1%	3%	4%
(Maximum) within 100ft.		5%	
d. Minimum Angle of Intersection	75E	75E	75E
e. Min. Curb & R/W Radius (ft.)			
1. Local	20	20	20
2. Limit Local	20	20	20

3. Collector	30	30	30
f. Min. Street Offsets for Adjacent Intersections (ft.)			
1. Local	125	125	125
2. Collector	200	200	200

\*Use of Level or Hilly terrain criteria not permitted without prior approval of the Town Engineer.

3. Design criteria for arterial streets shall be established by the Town Engineer on a case by case basis using the latest edition of the American Association of State Highway and Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets and/or NCDOT Roadway Design Manual.

4. Intersection corner - A minimum 35'x 35' sight triangle (measured along right-of-way lines) shall be provided at each intersection corner. An additional 10'x 70' sight triangle shall be provided at intersections connecting to NCDOT maintained roadways. Additional sight distance requirements may be required by the NCDOT or the Town Engineer.

**C. GRADING**

1. Proposed street rights-of-way shall be graded to their full width for ditch type streets and a minimum of eight (8) feet behind the curb for curb and gutter sections.

2. Fill embankments shall be formed of suitable material placed in successive layers not to exceed more than six (6) inches in depth for the full width of the cross-section, including the width of the slope area. No stumps, trees, brush, rubbish or other unsuitable materials or substances shall be placed in the embankment. Each successive six (6) inch layer shall be thoroughly compacted by a sheepsfoot tamping roller, 10-ton power roller, pneumatic-tired roller, or other methods approved by NCDOT or the Town Engineer. Embankments over and around all pipe culverts shall be of select material, placed and thoroughly tamped and compacted as directed by NCDOT or the Town Engineer or his representative.

**D. ROADWAY BASE**

1. All roadways shall be improved with a base course to the required width of the roadway.

2. The material for stone base course shall conform to the requirements of Section 1010 of the NCDOT Standard Specifications. Construction methods shall conform to Section 520.

3. The stone base shall be compacted to 100% of the maximum density obtainable with the Standard Proctor Test

(AASHTO-T99) by rolling with ring or tamping roller or with a pneumatic tired roller with a minimum weight of ten tons. When completed, the base course shall be smooth, hard, dense, unyielding and well bonded.

4. In lieu of a stone base course, a bituminous concrete base course, type HB may be substituted. Construction shall conform to the requirements of Section 640 of the NCDOT Standard Specifications.
5. Bituminous concrete base course, type HB, shall be used in widening strips less than five (5) feet in width.

**E. ROADWAY SURFACE**

1. All BST or sub-standard roadways shall be improved with a surface course to the required width of the roadway and a one (1) inch overlay to provide proper tie-in pavement. The existing edge lane shall be completely covered with new asphalt when paving.
2. Paving contractor shall contact NCDOT for a pre-marking inspection of the pavement.
3. Plant mixed asphalt shall conform in all respects to the Section 645 of the NCDOT Standard Specifications (Type I-1 and I-2). A prime coat shall be applied when the base has been in place for seven (7) days or more.
4. Inspector shall be notified prior to use of recycled asphalt and all amounts of recycled asphalt should be in compliance with NCDOT standards.

**F. SIDEWALKS AND DRIVEWAYS**

1. Sidewalks shall be constructed of not less than 3600 P.S.I. concrete and shall be four (4) inches thick, constructed on an adequately graded base. Subgrade shall be compacted to 95% of the maximum density obtainable with the Standard Proctor Test. The surface of the sidewalk shall be steel trowel and light broom finished and cured with an acceptable curing compound. Tooled joints shall be provided at intervals of not less than five (5) feet and expansion joints at intervals of not more than forty-five (45) feet. The sidewalk shall have a maximum lateral slope of one-quarter (1/4) inch per foot.
2. Planting strip adjacent to sidewalk shall be graded to 1/4 inch per foot (min.) up to 1-1/4 inch per foot (max.), except where excessive natural grades make this requirement impractical. In such cases, the Town Engineer may authorize a suitable grade.
3. Sidewalk widths shall be a minimum of five (5) feet unless otherwise specified.

## II STORM DRAINAGE

### A. GENERAL NOTES

1. All work and materials shall conform to the latest edition of the NCDOT Standard Specifications unless otherwise specified in this manual.
2. Only reinforced concrete pipe is allowed within the street right-of-way except for culverts equal to or greater than sixty (60) inches in diameter. For culverts equal to or greater than sixty (60) inches, corrugated steel or aluminum pipe is allowed if it has a concrete poured invert. Minimum gage for metal pipe shall be 14 gage.
3. All storm drainage pipe outside the street right-of-way shall be reinforced concrete pipe, corrugated metal pipe or high density polyethylene (HDPE) pipe, as approved by the Town Engineer. The Town Engineer shall use no other type of pipe without prior approval. All pipe shall be laid with the bell or groove upgrade and the joint entirely interlocking.
4. All concrete shall be 3600 PSI. All pre-cast structures shall have an NCDOT approval stamp for the manufacture before installation. The Town Engineer or his representative must check all pre-cast structures prior to installation for future street acceptance.
5. All high-density polyethylene pipe shall be corrugated exterior/smooth interior, conform to the requirements of AASHTO specification M294 for Corrugated Polyethylene Pipe and shall require coupling bands and fittings.
6. Concrete pipe used within the street right-of-way shall be a minimum of Class III Reinforced Concrete Pipe, with a minimum diameter of fifteen (15) inches (eighteen (18) inches minimum on cross drain culverts).
7. The minimum cover for all pipe is two (2) feet. Special applications for less than two (2) feet of cover will be reviewed individually.
8. Concrete mortar joints shall be used for joining all concrete pipes. The pipe shall be clean and moist when mortar is applied. The lower portions of the bell or groove shall be filled with mortar sufficient to bring the inner surface flush and even when the next joint is fitted into place. The remainder of the joint shall then be filled with mortar and a bead or ring of mortar formed around the outside of the joint. The application of mortar may be delayed until fill is completed when the pipe is larger than thirty (30) inch.
9. Preformed joint sealer, which conforms to AASHTO specification M-198 for Type B flexible plastic gaskets, may be used in lieu of the mortar jointing method.

10. Coupling bands and fittings shall be used for joining all HDPE pipe. Coupling bands shall cover at least one full corrugation on each section of pipe. Gasket coupling bands are required between all pipe joints. The gasket shall be made of closed-cell synthetic expanded rubber meeting the requirements of ASTM D1056, Type 2. Gaskets shall be installed on the coupling band by the pipe manufacturer. All coupling bands shall meet or exceed the soil-tightness requirement of AASHTO Standard Specification for Highway Bridges, section 23, paragraph 23.1.5.4(e). Pipe fittings shall conform to AASHTO M252 or AASHTO M294.
11. The interior surfaces of all storm drainage structures shall be pointed up and smoothed to an acceptable standard using mortar mixed to manufacturer's specifications.
12. All pipes in storm drain structures shall be flush with the inside wall.
13. Any storm drain structures over three (3) feet and six (6) inches in height must have steps in accordance with standard details set forth in this manual.
14. All frames, grates, rings, covers etc., must conform to the standards set forth in this manual.
15. All graded creek banks and slopes shall be at a maximum of two (2) feet horizontal to one (1) foot vertical (2:1).
16. All backfill shall be non-plastic in nature, free from roots, vegetative matter, waste, construction material or other objectionable material. Said material shall be capable of being compacted by mechanical means and shall have no tendency to flow or behave in a plastic manner under the tamping blows or proof rolling.
17. Materials deemed by the Engineer as unsuitable for backfill purposes shall be removed and replaced with select backfill material.
18. Backfilling of trenches shall be accomplished immediately after the pipe is laid. The fill around the pipe shall be placed in layers not to exceed eight (8) inches, each layer shall be thoroughly compacted to 95% of the maximum density obtainable with the Standard Proctor Test (a density of 100% Standard Proctor is required for the top eight (8) inches). An independent testing lab, at no cost to the Town shall perform testing for all lifts.
19. Compaction requirements shall be attained by the use of mechanical compaction methods. Each layer of backfill shall be placed loose and thoroughly compacted in place.
20. Under no circumstances shall water be permitted to rise in unbackfilled trenches after the pipe has been placed.

**B. STANDARDS FOR DESIGN**

1. All storm drainage design shall conform with the standards and specifications as provided in the Indian Trail Storm Water Design Manual, Indian Trail Land Development Standards Manual, or the more restrictive of any standards that conflict.
2. Adequate storm drainage shall be provided throughout the development by means of storm drainage pipes or properly graded channels. All pipes shall be of adequate size and capacity, as approved by the Town Engineer, to carry all storm water in its drainage area.
3. In accordance with Section 219 of the Zoning Ordinance, the Town Engineer shall review the drainage plan for compliance with the standards contained in the current edition of the Town of Indian Trail Land Development Standards Manual and the Town of Indian Trail Storm Water Design Manual and all other relevant and appropriate standards established by the Indian Trail Engineering Department.
4. Sub-surface drainage shall be provided where the ground water level is likely to be near the surface. In capillary soils, the water level should be four (4) to six (6) feet below the surface to prevent the rise of moisture into the subgrade. Four (4) inch PVC or corrugated metal pipe with open joints or perforations shall be used to lower ground water in low areas in the street.

**III. PLAN REQUIREMENTS**

**A. GENERAL NOTES**

1. All erosion control measures shall conform to the standards set forth in the Indian Trail Land Development Standards Manual, State of North Carolina Erosion and Sediment Control Planning and Design Manual, or the more restrictive of any standards that conflict.
2. All storm drainage design shall conform with the standards and specifications as provided in the Indian Trail Storm Water Design Manual, Indian Trail Land Development Standards Manual, or the more restrictive of any standards that conflict.
3. In areas where the Floodway Regulations are applicable, the floodway fringe district line and floodway district encroachment line shall be shown on the preliminary plan and the final plat. All lands being developed in the floodplain must be in compliance with the Federal Emergency Management Act (FEMA). The Town Engineering Department will set forth all requirements for development in the floodplain.
4. Cite all appropriate standard detail numbers for any structures or specifics used within the plans in reference to the Indian Trail Land Development Standards Manual.

**B. SUBDIVISIONS-PRELIMINARY PLAN**

1. The preliminary plan must include, at a minimum, the information described in Appendix A of the Town of Indian Zoning Ordinance as well as the commercial or residential checklists provided by the Planning and Development Department.
2. Pipe systems and open channels on private property shall be placed in a storm drainage easement. Public storm drainage easements for maintenance by private property owners shall be a minimum of twenty (20) feet for pipes and for open channels. Widths of permanent storm drain easements are as follows:

<u>Pipe Diameter</u>	<u>Width</u>
15" - 36"	20'
42" - 48"	25'
54"+	30'

All storm drain easements are to be kept separate from all other easements except where an overlap is approved by the Town Engineering.

**C. BOND POLICY - SUBDIVISION IMPROVEMENTS**

1. Release of the final subdivision plat will not occur until:
  - (a) The improvements required for the area of the final plat are constructed and a final inspection has been performed and found to be in conformance with the plans approved by the Town of Indian Trail.
  - (b) A security has been posted with the Town and all required documents are received in their entirety.
2. Securities shall be posted for a minimum of six months. The security shall remain in force until the construction is complete and found to be in conformance with the plans approved by the Planning and Development Director.
3. The applicant shall give notice to the Planning and Development Director or his assigns, as applicable, before any security will be released declaring that construction is complete, according to the appropriate subdivision ordinance and the Town of Indian Trail Land Development Standards Manual. A final inspection will be made to check completeness of the project upon receipt of a notice.
4. One type of security may be replaced by another type of security in certain situations. The amount of the replacement security will be based on our estimate of the work remaining. If the estimate of work results in a lower amount, the replacement security will be treated as a reduction. Certain situations will require an increase in a security and in such cases the replacement security shall be required to equal the higher amount.
5. A one time reduction in security will be allowed if requested in writing by the principal party of the security. Additional reductions may be approved at the discretion of the Planning and Development Director.
6. Securities in the form of a Letter of Credit must be drawn on a full service bank in Union County.
  - (f) The following items shall be required to be included within the performance bond or security calculation for both developed and undeveloped lots: curb, gutter, sidewalk, pavement, seeding and stabilization, landscaping within right-of-way, storm water facilities for residential subdivisions, and community storm water facilities for commercial subdivisions.
7. If less than 50% of the improvements are complete, a surety of 125% of the remaining construction improvements will be required to be held in the form of a performance surety. If more than 50% of the improvements are complete, the Town will require two (2) sureties to be held:
  - (1) A performance surety for 125% of the cost of improvements which have not been completed.
  - (2) A maintenance surety for 1/3 (33%) of the cost of all the improvements for the final plat.
8. Performance sureties for plats with public roads may be reduced to a maintenance surety once the Town Engineer has inspected

and approved the workmanship, and a “Built to Standards” letter has been received from the North Carolina Department of Transportation. The maintenance surety shall be calculated at 1/3 (33%) of the total cost of improvements for the final plat. The maintenance surety will be released once the improvements have passed reinspection by the Town Engineer and an official letter from the North Carolina Department of Transportation has been received stating the roads have been taken over for maintenance.

9. If the sidewalks are not completed when the maintenance surety is being established, the Town will require a separate performance surety to be held for two (2) years for 125% of the cost of the sidewalk and seeding. If the petitioner proceeds in this manner the maintenance surety mentioned in subsection (h) would not need to include the cost of the sidewalk.

10. Performance sureties for plats with private roads may be reduced to a maintenance surety once the improvements have passed inspection by the Town Engineer. The maintenance surety shall be calculated at 10% of the total cost of improvements for the final plat. Said surety shall be held for a period not to exceed three (3) years or until the road is accepted by the Home Owners Association/Property Owners Association for maintenance which ever occurs first. If the surety is still being held at the end of the three years the Town Engineer will reinspect the improvements. Once all repairs have been completed the surety will be released.

**IV. REFERENCES**

1. North Carolina Department of Transportation, July 2006, Standard Specifications for Roads and Structures.
2. City Of Charlotte Department of Transportation, 2006, Work Area Traffic Control Handbook (WATCH)
3. Town of Indian Trail, Town of Indian Trail Storm Water Design Manual
4. American Association of State Highway and Transportation Officials, 2001, A Policy on Geometric Design of Highways and Streets
5. North Carolina Department of Transportation, Roadway Design Manual
6. North Carolina Department of Environment, Health, and Natural Resources, June 2006, Erosion and Sediment Control Planning and Design Manual

**V. Standards Details**

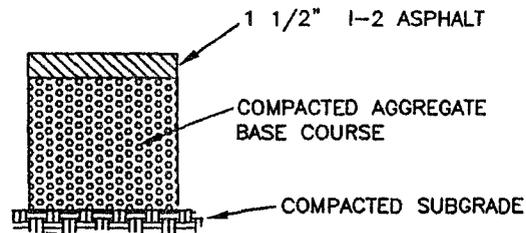
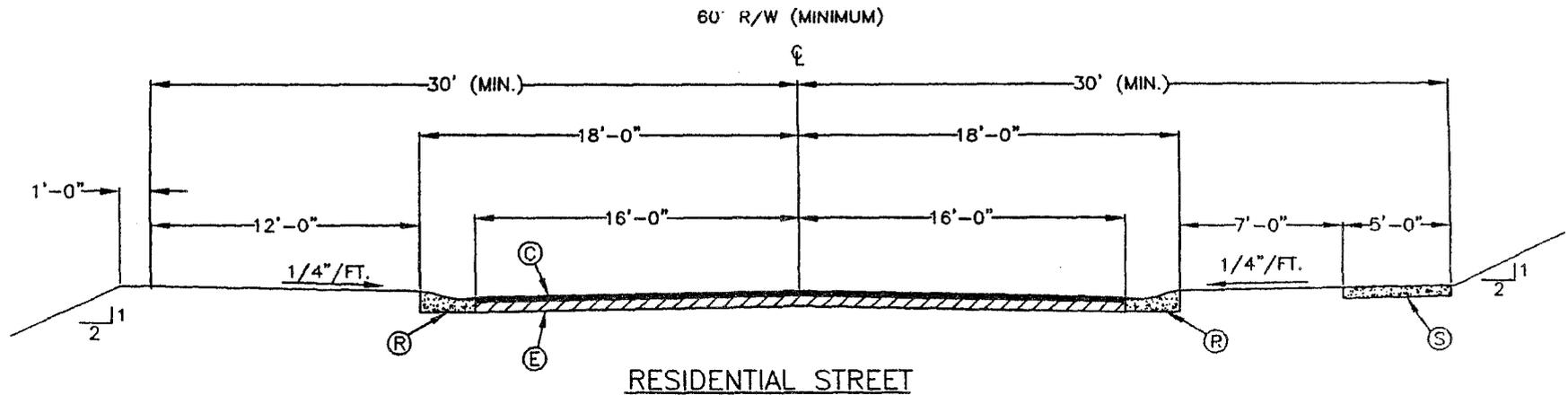
<b>Streets</b>	
Standard Number	Title
1.01	Residential Collector Street
1.02	Local Residential Street
1.03	Local Limited Residential Street
1.04	Residential Cul-de-Sac Detail
1.05	Private Streets
1.05A	Private Streets in "TND" Zoning
1.05B	Private Streets in "TND" Zoning
1.05C	Private Streets in "TND" Zoning
1.05D	Private Streets in "TND" Zoning
1.05E	Private Streets in "TND" Zoning
1.05F	Private Streets in "TND" Zoning
1.05G	Private Streets in "TND" Zoning
1.05H	Private Alleys in "TND" Zoning
1.06	Commercial Street
1.07	Arterial Street
1.08	Divided Residential Street
1.09	Divided Commercial Street
1.10	Divided Private Street
1.11	Improvements on Existing NCDOT Roadways
1.12A	Curb and Gutter
1.12B	Curb and Gutter
1.13	Vertical Curb
1.14	Curb Transition - 2'-6" Curb and Gutter to 2'-0" Valley Gutter
1.15	Curb Transition - 2'-6" Curb and Gutter to 1'-6" Curb and Gutter
1.16	Roof Drains Through 2'-6" Curb and Gutter
1.17	Concrete Sidewalks
1.18	Monolithic Concrete Curb and Sidewalk
1.19	Commercial and Residential Drop Curb Type ii Driveway with Sidewalk Abutting Curb (2'-6" Curb and Gutter)

1.20A	Residential Drop Curb Type 1 Driveway With Planting Strip (2'-6" Curb and Gutter)
1.20B	Commercial Drop Curb Type II Driveway With Planting Strip (2'-6" Curb and Gutter)
1.21	Drop Curb Type II Driveway - Monolithic Curb and Sidewalk
1.22	Residential Driveway (Type I) for Valley Gutter
1.23A	Type III Driveway Entrance
1.23B	Type III Driveway Entrance
1.24	Catch Basin Frame in Valley Gutter
1.25	Catch Basin Placement at Intersection
1.31A	Culvert Crossing on Residential and Commercial Streets
1.31B	Culvert Crossing on Residential and Commercial Streets
<b>Drainage</b>	
2.01A	Brick Catch Basin - 15" Thru 54" Pipe
2.01B	Brick Catch Basin - 15" Thru 54" Pipe
2.02A	Frame, Grate and Hood
2.02B	Frame, Grate and Hood
2.03	Brick Double Catch Basin - 15" Thru 24" Pipe
2.04A	Brick Double Catch Basin - 30" Thru 36" Pipe
2.04B	Brick Double Catch Basin - 30" Thru 36" Pipe
2.05A	Slab Type Catch Basin - 15" Thru 48" Pipe
2.05B	Manhole Ring and Cover For Slab Type Catch Basin
2.06	Brick Junction Box - 42" Thru 66" Pipe
2.07	Block Manhole - 15" Thru 36" Pipe
2.08	Manhole Frame and Cover
2.09	Drainage Structure Steps
2.10	Brick Drop Inlet
2.11	Frame and Grate for Drop Inlet
2.12	Concrete Invert for Corrugated Metal Pipe
2.13A	Concrete Endwall For Single and Double Pipe Culverts - 15" and 48" pipe
2.13B	Concrete Endwall For Single and Double Pipe Culverts - 15" and 48" pipe
2.14A	Concrete Wingwall with Splash Pad
2.14B	Concrete Wingwall with Splash Pad
2.15	Concrete "L" Endwall for Single Pipe Culverts - 15" Thru 48" Pipe
2.16	Concrete "L" Endwall for Single Pipe Culverts - 17" x 13" Thru 71" x 47" Arch Pipe
2.17	Brick Endwall for Single and Double Pipe Culverts 15" Thru 48" Pipe
2.18	Brick "L" Endwall for Single Pipe Culverts - 15" Thru 48" Pipe

2.19	Brick "L" Endwall for Single Pipe Culverts - 17" x 13" Thru 71"x 47" Arch Pipe
2.20	Rip Rap Apron at Pipe Outlets
2.21	Trench Detail for Storm Drain Pipes
2.22	Concrete Paved Ditches
2.23	Rip Rap Ditches
2.24	Subdrain Detail
2.25	Overlapping Storm Drainage/Saintary Sewer Easements
2.26	Minimum Drainage Easement Requirements for Storm Drain Pipesand Open Channels
2.27	Best Management Practices (Wet Pond)
<b>Miscellaneous</b>	
3.01	Concrete and Brick Retaining Walls with No Surcharge
3.02	Concrete and Brick Retaining Walls with Sloping Surcharge
3.03	Concrete Control Monument
3.04A	ADA Ramp and Step Handrail
3.04B	Safety Handrail
3.05A	Street Name Sign
3.05B	Street Name Sign (Optional)
3.06	Street Name Sign Installation Locations
3.07A	Dead End Street Barricade
3.07B	Dead End Street Barricade - General Notes
3.08A	End of Roadway Marker (ER-1)
3.08B	End of Roadway Marker (ER-1) - Guard Rail Clamp Installation
3.09 sheet 1	Parking Standards
3.09 sheet 2	Parking Standards
3.09B	Typical Parking Lot Planting Islands
3.10 sheet 1	Signage Standards
3.10 sheet 2	Accessible Parking Notes
3.11	Trash Enclosure
<b>Tree Planting</b>	
4.01	Tree Planting Detail for Slopes
4.02	Planting Detail - Single Stem Tree
4.03	Planting Detail - Multi-Stem Tree
4.04	Tree Protection Detail
4.05	Detail for Tree Planting Island
4.06	Detail for Tree Planting Strip

4.07	Tree Planting Notes
------	---------------------

<b>NCDOT Curb Ramp Details</b>	
848.01	Concrete Sidewalk
848.05 sheet 1	Wheelchair Ramp (Curb Cut)
848.05 sheet 2	Retrofitting Detectable Warning Domes Onto Existing Wheelchair Ramp (Curb Cut)
848.05 sheet 3	Wheelchair Ramp (Curb Cut)
848.05 sheet 4	Wheelchair Ramp (Curb Cut)
848.06 sheet 1	Wheelchair Ramp and Existing Sidewalk with Grass Strip (Curb Cut)
848.06 sheet 2	Wheelchair Ramp and Existing Sidewalk Adjacent to Curb (Curb Cut)
848.06 sheet 3	Retrofitting Detectable Warning Domes Onto Existing Wheelchair Ramp (Curb Cut)
848.06 sheet 4	Wheelchair Ramp (Curb Cut)
848.06 sheet 5	Wheelchair Ramp and Existing Sidewalk (Curb Cut)



PAVEMENT SCHEDULE

- © BITUMINOUS CONCRETE SURFACE COURSE, TYPE 1-2
- Ⓔ COMPACTED AGGREGATE BASE COURSE (SEE NOTE 3)
- Ⓘ 2'-0" VALLEY GUTTER
- Ⓢ 4" CONCRETE SIDEWALK

TYPICAL PAVEMENT SECTION

NOTES:

1. THE CROWN (TRANSVERSE SLOPE) FOR TYPICAL SECTION IS MINIMUM OF 1/4" PER FOOT.
2. A COLLECTOR STREET IS REQUIRED WHEN SERVING MORE THAN 100 DWELLINGS UNIT.
3. 8" MINIMUM AGGREGATE BASE COURSE OR PAVEMENT DESIGN PER A NCDOT MINIMUM CONSTRUCTION STANDARDS A FOR SUBDIVISION ROADS.

PAVEMENT NOTES:

1. SUBGRADE MUST HAVE A DENSITY OF 100% IN ACCORDANCE WITH AASHTO-T99; BASE COURSE MUST HAVE A DENSITY OF 90% FOR B.C.B.C. AND 100% FOR A.B.C. IN ACCORDANCE WITH AASHTO-T180 SURFACE COURSE SHALL BE COMPACTED TO A DENSITY OF 95%. PROOF ROLLING OF SUBGRADE AND BASE COURSE SHALL BE APPROVED BY NCDOT OR INDEPENDENT TESTING FIRM AT NO COST TO THE TOWN, AND DOCUMENTATION SHALL BE SUBMITTED TO THE TOWN ENGINEER AND TO NCDOT.

REVISIONS

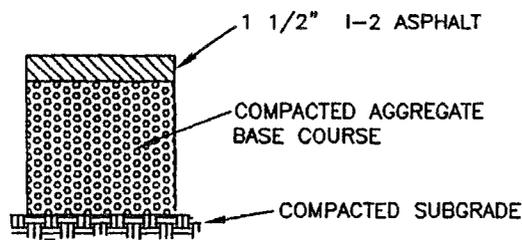
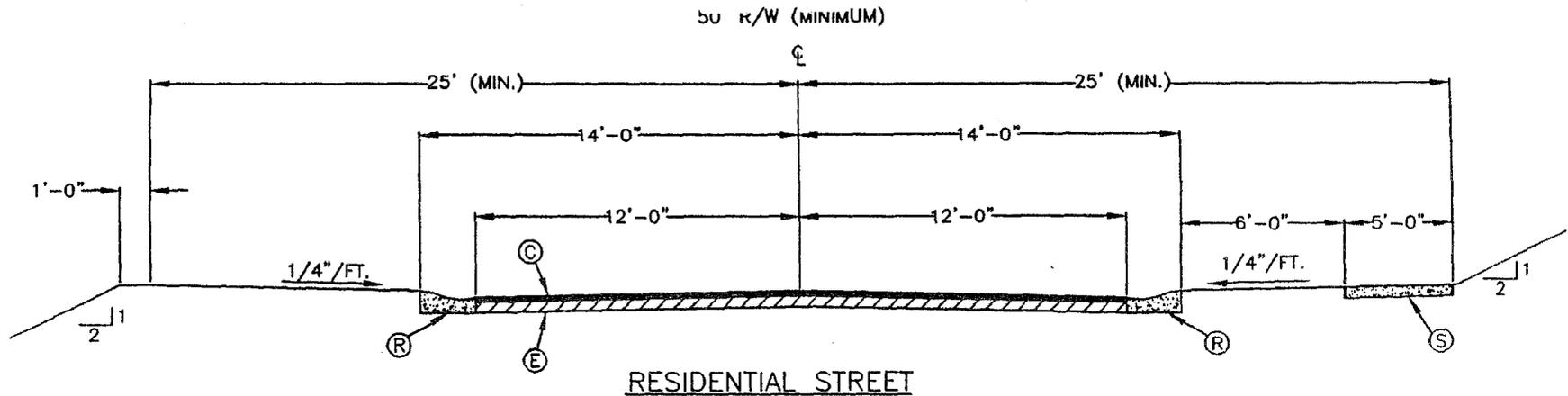
NO.	DATE	DESCRIPTION

APPROVED DATE 8/01/0

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

INDIAN TRAIL TYPICAL SECTION  
RESIDENTIAL COLLECTOR STREET

STD. NO.	REV.
1.01	



TYPICAL PAVEMENT SECTION

NOTES:

1. THE CROWN (TRANSVERSE SLOPE) FOR TYPICAL SECTION IS MINIMUM OF 1/4" PER FOOT.
2. MAXIMUM LENGTH OF A CUL-DE-SAC FOR 50'R/W IS 1000 FEET.
3. ALL CUL-DE-SACS MUST HAVE AT LEAST FOUR (4) DRIVEWAY FOR STREET ACCEPTANCE.
4. A 50 R/W STREET IS REQUIRED WHEN SERVING MORE THAN 25, BUT LESS THAN 100 DWELLING UNITS.
5. 8" MINIMUM AGGREGATE BASE COURSE OR PAVEMENT DESIGN PER A NCDOT MINIMUM CONSTRUCTION STANDARDS A FOR SUBDIVISION ROADS.

PAVEMENT SCHEDULE

- (C) 1.5" BITUMINOUS CONCRETE SURFACE COURSE, TYPE I-2
- (E) COMPACTED AGGREGATE BASE COURSE (SEE NOTE 5)
- (R) 2'-0" VALLEY GUTTER
- (S) 4" CONCRETE SIDEWALK

PAVEMENT NOTES:

1. SUBGRADE MUST HAVE A DENSITY OF 100% IN ACCORDANCE WITH AASHTO-T99; BASE COURSE MUST HAVE A DENSITY OF 90% FOR B.C.B.C. AND 100% FOR A.B.C. IN ACCORDANCE WITH AASHTO-T180 SURFACE COURSE SHALL BE COMPACTED TO A DENSITY OF 95%. PROOF ROLLING OF SUBGRADE AND BASE COURSE SHALL BE APPROVED BY NCDOT OR INDEPENDENT TESTING FIRM AT NO COST TO THE TOWN, AND DOCUMENTATION SHALL BE SUBMITTED TO THE TOWN ENGINEER AND TO NCDOT.

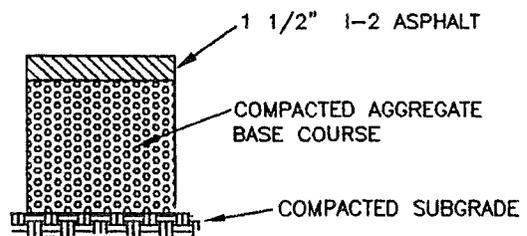
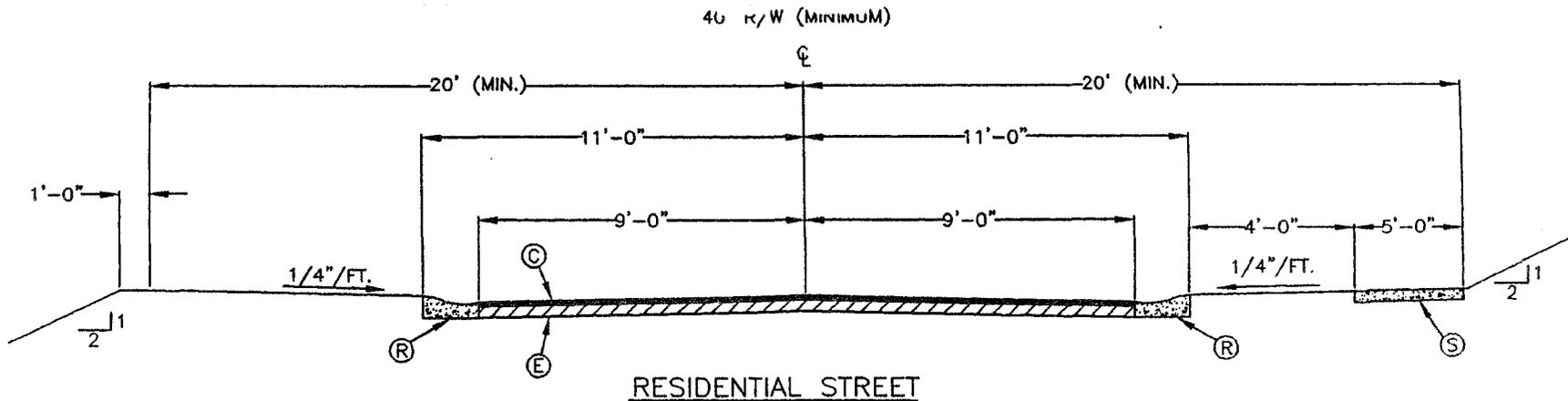
REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE 8/01/0

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

INDIAN TRAIL TYPICAL SECTION  
LOCAL RESIDENTIAL STREET

STD. NO.	R
1.02	



PAVEMENT SCHEDULE

- (C) 1.5" BITUMINOUS CONCRETE SURFACE COURSE, TYPE 1-2
- (E) COMPACTED AGGREGATE BASE COURSE (SEE NOTE 5)
- (R) 2'-0" VALLEY GUTTER
- (S) 4" CONCRETE SIDEWALK

PAVEMENT NOTES:

1. SUBGRADE MUST HAVE A DENSITY OF 100% IN ACCORDANCE WITH AASHTO-T99; BASE COURSE MUST HAVE A DENSITY OF 90% FOR B.C.B.C. AND 100% FOR A.B.C. IN ACCORDANCE WITH AASHTO-T180 SURFACE COURSE SHALL BE COMPACTED TO A DENSITY OF 95%. PROOF ROLLING OF SUBGRADE AND BASE COURSE SHALL BE APPROVED BY NCDOT OR INDEPENDENT TESTING FIRM AT NO COST TO THE TOWN, AND DOCUMENTATION SHALL BE SUBMITTED TO THE TOWN ENGINEER AND TO NCDOT.

TYPICAL PAVEMENT SECTION

NOTES:

1. THE CROWN (TRANSVERSE SLOPE) FOR TYPICAL SECTION IS MINIMUM OF 1/4" PER FOOT.
2. MAXIMUM LENGTH OF A CUL-DE-SAC FOR 40' R/W IS 250 FEET.
3. ALL CUL-DE-SACS MUST HAVE AT LEAST FOUR (4) DRIVEWAY FOR STREET ACCEPTANCE.
4. 40 R/W STREETS SERVES LESS THAN 25 DWELLING UNITS.
5. 8" MINIMUM AGGREGATE BASE COURSE OR PAVEMENT DESIGN A PER NCDOT MINIMUM CONSTRUCTION STANDARDS  
A FOR SUBDIVISION ROADS.

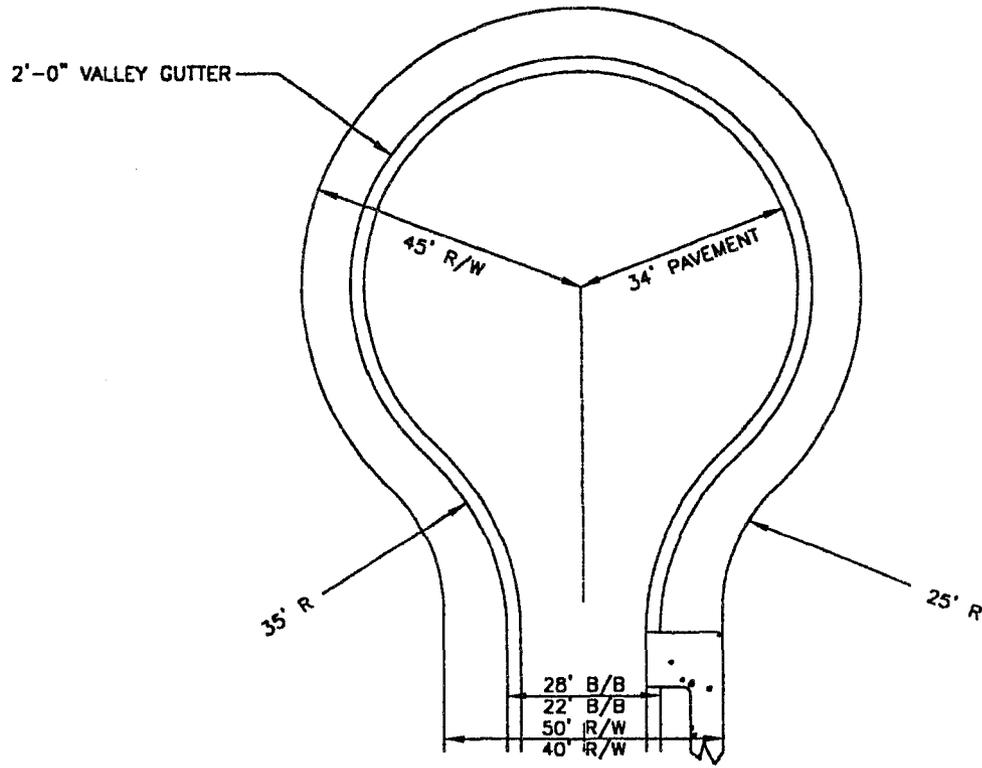
APPROVED DATE 8/01/01

REVISIONS		
NO.	DATE	DESCRIPTION

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

INDIAN TRAIL TYPICAL SECTION  
LOCAL LIMITED RESIDENTIAL STREET

STD. NO.	F
1.03	



NOTES:

1. CURB AND GUTTER STREETS MAY USE VALLEY GUTTER OR STANDARD CURB AND GUTTER.
2. ALTERNATIVE CUL-DE-SAC DESIGNS, INCLUDING ISLANDS SHALL BE SUBMITTED TO INDIAN TRAIL ENGINEERING DEPARTMENT FOR APPROVAL.
3. THE CROWN FOR PAVEMENT SHALL BE 1/4" PER FT. FROM THE CENTER OF THE CUL-DE-SAC.
4. AT LEAST FOUR (4) RESIDENCIES MUST ACCESS THE CUL-DE-SAC FOR STREET ACCEPTANCE.
5. MAXIMUM CUL-DE-SAC LENGTH IS 250'.

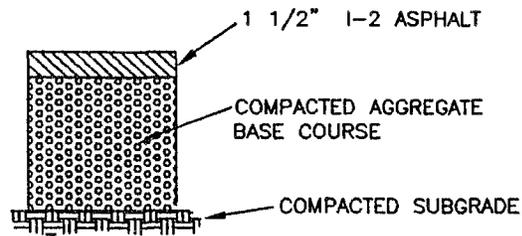
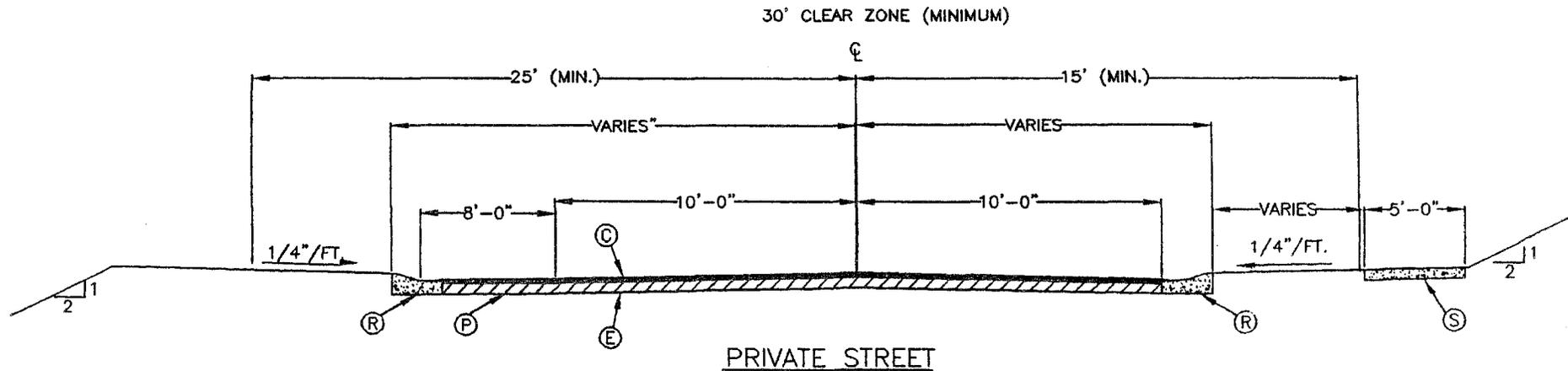
APPROVED DATE - 8-01-00

REVISIONS		
NO.	DATE	DESCRIPTION

TOWN OF INDIAN TRAIL  
 LAND DEVELOPMENT  
 STANDARDS

INDIAN TRAIL RESIDENTIAL  
 CUL-DE-SAC DETAIL

STD. NO.	REV.
1.04	



PAVEMENT SCHEDULE

- Ⓒ 1.5" BITUMINOUS CONCRETE SURFACE COURSE, TYPE 1-2
- Ⓔ COMPACTED AGGREGATE BASE COURSE (SEE NOTE 5)
- Ⓓ CURB TYPE TO VARY WITH USE
- Ⓔ 4" CONCRETE SIDEWALK PER PLANNING DIRECTOR
- Ⓖ ON-STREET PARKING

PAVEMENT NOTES:

1. SUBGRADE MUST HAVE A DENSITY OF 100% IN ACCORDANCE WITH AASHTO-T99; BASE COURSE MUST HAVE A DENSITY OF 90% FOR B.C.B.C. AND 100% FOR A.B.C. IN ACCORDANCE WITH AASHTO-T180 SURFACE COURSE SHALL BE COMPACTED TO A DENSITY OF 95%. PROOF ROLLING OF SUBGRADE AND BASE COURSE SHALL BE APPROVED BY NCDOT OR INDEPENDENT TESTING FIRM AT NO COST TO THE TOWN, AND DOCUMENTATION SHALL BE SUBMITTED TO THE TOWN ENGINEER AND TO NCDOT.

TYPICAL PAVEMENT SECTION

NOTES:

1. THE CROWN (TRANSVERSE SLOPE) FOR TYPICAL SECTION IS MINIMUM OF 1/4" PER FOOT.
2. CURB AND GUTTER IS REQUIRED IN MIXED USE DEVELOPMENTS.
3. PRIVATE STREETS WILL NOT BE ACCEPTED FOR FUTURE MAINTENANCE.
4. ON-STREETS PARKING PERMITTED ON BOTH SIDES OF STREET.
5. 8" AGGREGATE BASE COURSE OR PAVEMENT DESIGN PER A NCDOT MINIMUM CONSTRUCTION STANDARDS A FOR SUBDIVISION ROADS.

REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE 8/01/0

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

TYPICAL SECTION  
PRIVATE STREET

STD. NO.	REV.
1.05	

DESIGN NOTES:

1. THE CROWN (TRANSVERSE SLOPE) FOR TYPICAL SECTION IS MINIMUM OF 1/4" PER FOOT AND A MAXIMUM OF 3/8" PER FOOT.
2. CURB AND GUTTER IS REQUIRED IN MIXED USE DEVELOPMENTS.
3. PRIVATE STREETS WILL NOT BE ACCEPTED FOR FUTURE MAINTENANCE.
4. ON-STREET PARKING PERMITTED ONLY ON THOSE STREETS HAVING A MINIMUM WIDTH OF 27 FEET OF PAVEMENT FOR TWO WAY TRAFFIC, AND 20 FEET OF PAVEMENT FOR ONE WAY.
5. 30" CURB & GUTTER CAN BE USED AS ALTERNATE TO THE 24" VALLEY GUTTER WHERE DESIRED, PROVIDED THE MINIMUM PAVEMENT WIDTH FOR THAT STREET IS MAINTAINED.

BINDER COURSE TO BE APPLIED IMMEDIATELY AFTER STONE IS PLACED.  
 SURFACE COURSE TO BE APPLIED AT COMPLETION OF HOUSE CONSTRUCTION  
 OR AT TIME DETERMINED BY THE OWNER/DEVELOPER.

THIS SHEET SHALL BE USED IN CONNECTION WITH THE  
 FOLLOWING STANDARDS: 1.05-B, 1.05-C, 1.05-D, 1.05-E,  
 1.05-F, 1.05-G AND 1.05-H

GENERAL NOTES:

1. ALL WORK AND MATERIAL SHALL MEET THE REQUIREMENTS SET FORTH IN THE LATEST EDITION OF THE TOWN OF INDIAN TRAIL LAND DEVELOPMENT MANUAL.
2. ALL WORK AND MATERIAL SHALL MEET THE REQUIREMENTS SET FORTH IN THE LATEST EDITION OF THE N.C.D.O.T. STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
3. THESE STANDARDS AND SPECIFICATIONS ARE THE MINIMUM REQUIREMENTS. PLANS SUBMITTED WITH GREATER WIDTHS AND/OR ADDITIONAL IMPROVEMENTS MAY BE APPROVED BY PLANNING STAFF.

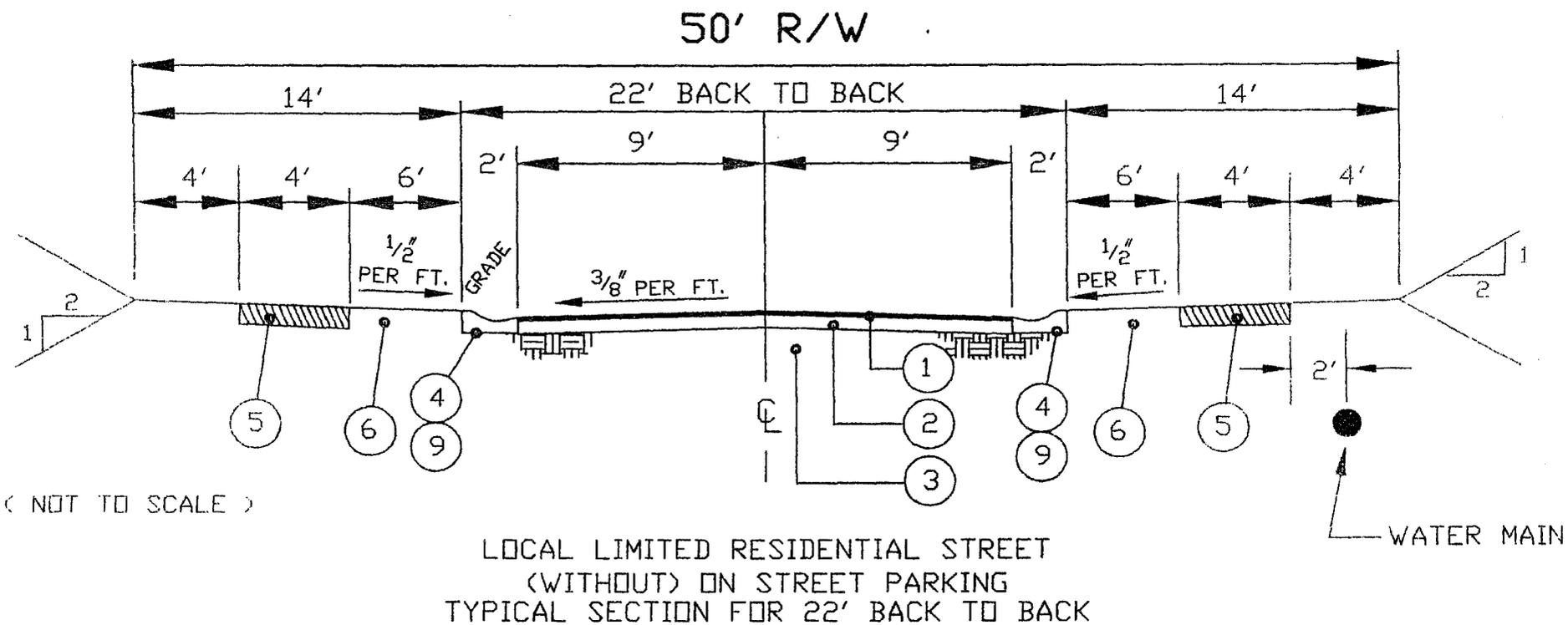
PAVEMENT NOTES:

1. SUBGRADE MUST HAVE A DENSITY OF 100% IN ACCORDANCE WITH AASHTO-T99; BASE COURSE MUST HAVE A DENSITY OF 90% FOR B.C.B.C. AND 100% FOR A.B.C., IN ACCORDANCE WITH AASHTO-T180 SURFACE COURSE SHALL BE COMPACTED TO A DENSITY OF 95%. PROOF ROLLING OF SUBGRADE AND BASE COURSE SHALL BE APPROVED BY NCDOT OR INDEPENDENT TESTING FIRM AT NO COST TO THE TOWN, AND DOCUMENTATION SHALL BE SUBMITTED TO THE TOWN ENGINEER AND TO NCDOT (IF REQUIRED).

TOWN OF INDIAN TRAIL  
 LAND DEVELOPMENT  
 STANDARDS

TYPICAL SECTIONS - PRIVATE STREETS  
 IN "TND" ZONING

STD. NO.	R
1.05-A	9/



### LEGEND

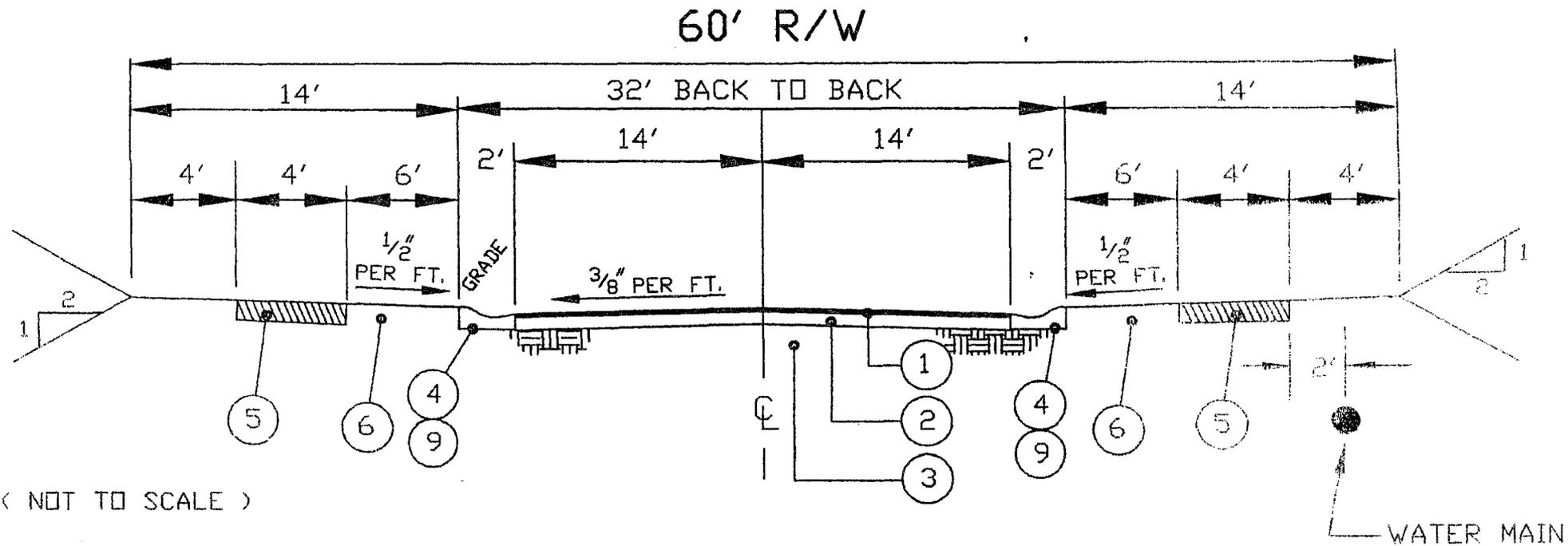
- |   |  |
|---|--|
| <p>① 1 1/2" ASPHALT CONCRETE SURFACE COURSE , TYPE I-2,<br/>OVER A 2" BINDER COURSE</p> <p>② 6" COMPACTED AGGREGATE BASE COURSE (ABC)</p> <p>③ COMPACTED SUBGRADE (SEE GENERAL NOTE 1)</p> <p>④ 24" VALLEY GUTTER</p> <p>⑤ CONCRETE SIDEWALK - 4" THICK</p> | <p>⑥ TREE PLANTING STRIP</p> <p>⑨ 2'6" CURB &amp; GUTTER</p> |
|---|--|

STREET DESIGN SHALL BE SUFFICIENT  
FOR ACCESS FOR GARBAGE TRUCKS AND  
SCHOOL BUS.

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

TYPICAL SECTIONS - PRIVATE STREETS  
IN "TND" ZONING

STD. NO.	REV.
1.05-B	8/01



LOCAL RESIDENTIAL STREET  
 (WITH) ON STREET PARKING  
 TYPICAL SECTION FOR 32' BACK TO BACK

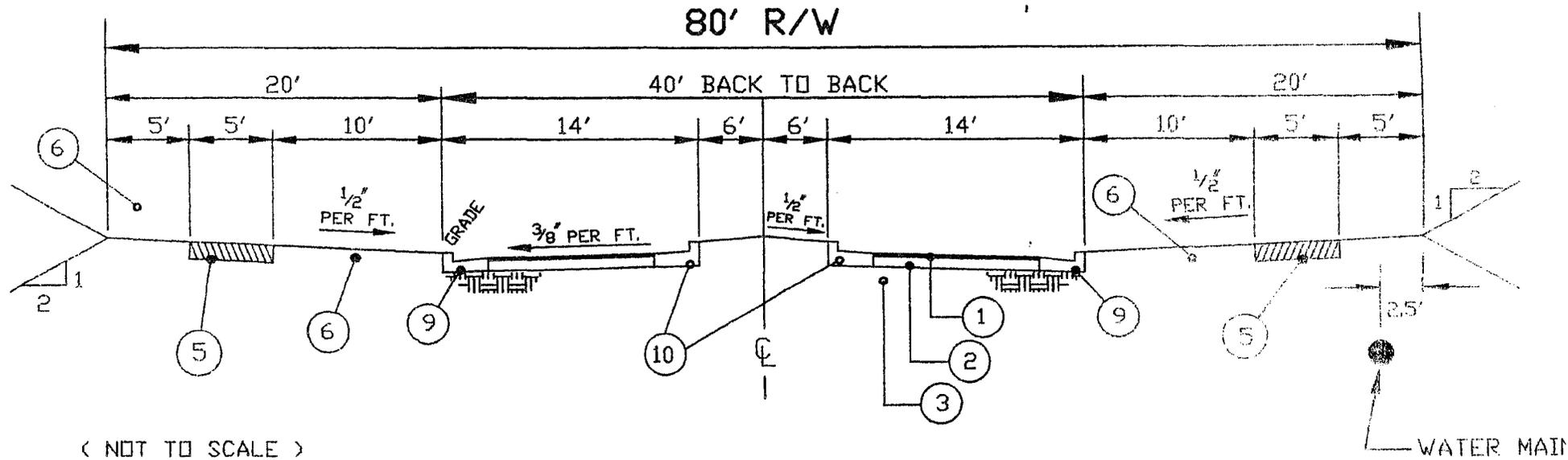
LEGEND

- ① 1 1/2" ASPHALT CONCRETE SURFACE COURSE , TYPE I-2,  
OVER A 2" BINDER COURSE
- ② 6" COMPACTED AGGREGATE BASE COURSE ( ABC )
- ③ COMPACTED SUBGRADE (SEE GENERAL NOTE 1)
- ④ 24" VALLEY GUTTER
- ⑤ CONCRETE SIDEWALK - 4" THICK
- ⑥ TREE PLANTING STRIP
- ⑨ 2'6" CURB & GUTTER

TOWN OF INDIAN TRAIL  
 LAND DEVELOPMENT  
 STANDARDS

TYPICAL SECTIONS - PRIVATE STREETS  
 IN "TND" ZONING

STD. NO.	R
1.05-C	9



DIVIDED COLLECTOR STREET  
TYPICAL SECTION FOR 40' BACK TO BACK

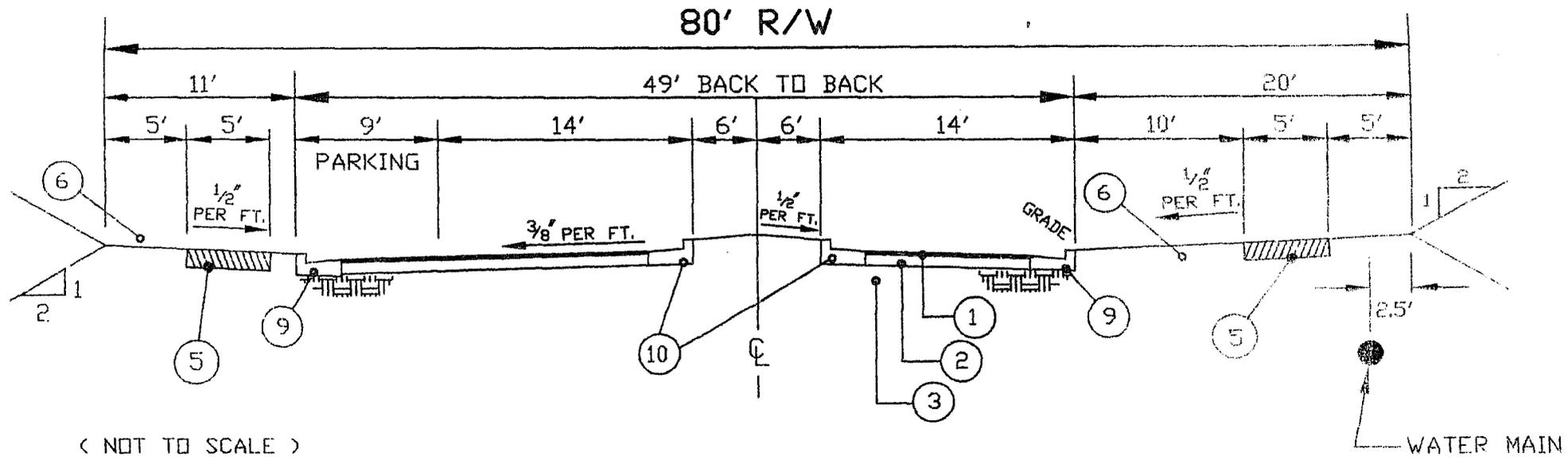
LEGEND

- ① 1 1/2" ASPHALT CONCRETE SURFACE COURSE , TYPE I-2, OVER A 2" BINDER COURSE
- ② 6" COMPACTED AGGREGATE BASE COURSE ( ABC )
- ③ COMPACTED SUBGRADE (SEE GENERAL NOTE 1)
- ④ CONCRETE SIDEWALK - 4" THICK
- ⑤ TREE PLANTING STRIP
- ⑥ 2'6" CURB & GUTTER
- ⑦ 18" REVERSE SLOPE CURB & GUTTER

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

TYPICAL SECTIONS - PRIVATE STREETS  
IN "TND" ZONING

STD. NO.	F
1.05-D	8



DIVIDED COLLECTOR STREET  
TYPICAL SECTION FOR 49' BACK TO BACK  
WITH PARALLEL PARKING

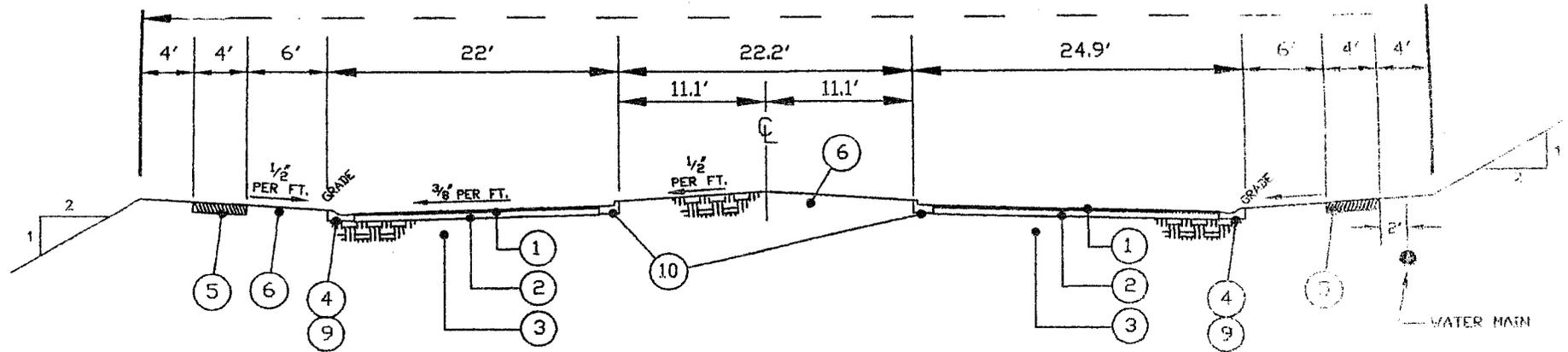
### LEGEND

- |   |   |
|---|---|
| <p>① 1 1/2" ASPHALT CONCRETE SURFACE COURSE , TYPE I-2,<br/>OVER A 2" BINDER COURSE</p> <p>② 6" COMPACTED AGGREGATE BASE COURSE( ABC )</p> <p>③ COMPACTED SUBGRADE (SEE GENERAL NOTE 1)</p> <p>⑤ CONCRETE SIDEWALK - 4" THICK</p> | <p>⑥ TREE PLANTING STRIP</p> <p>⑨ 2'6" CURB &amp; GUTTER</p> <p>⑩ 18" REVERSE SLOPE CURB &amp; GUTTER</p> |
|---|---|

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

TYPICAL SECTIONS - PRIVATE STREETS  
IN "TND" ZONING

STD. NO.	R
1.05-E	8



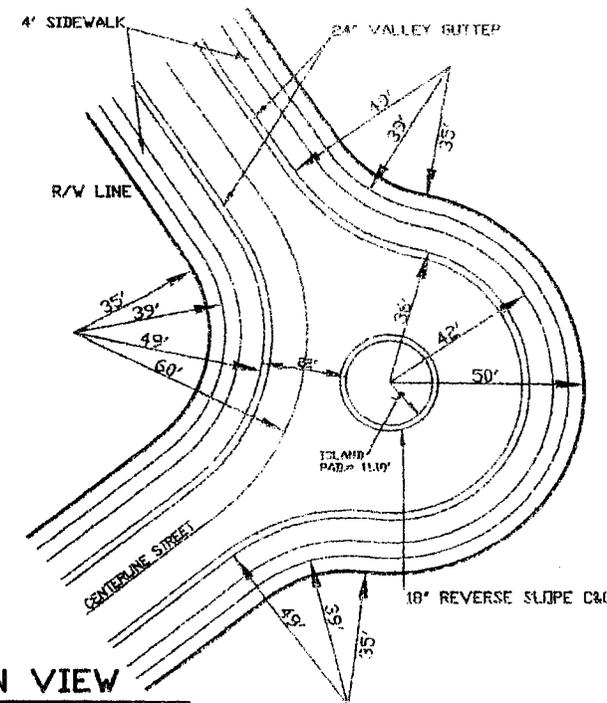
TYPICAL SECTION FOR KNUCKLE

( NOT TO SCALE )

LEGEND

- ① 1 1/2" ASPHALT CONCRETE SURFACE COURSE , TYPE I-2, OVER A 2" BINDER COURSE
- ② 6" COMPACTED AGGREGATE BASE COURSE( ABC )
- ③ COMPACTED SUBGRADE (SEE GENERAL NOTE 1)
- ④ 24" VALLEY GUTTER
- ⑤ CONCRETE SIDEWALK - 4" THICK
- ⑥ TREE PLANTING STRIP
- ⑨ 2'6" CURB & GUTTER
- ⑩ 18" REVERSE SLOPE CURB & GUTTER

STREET DESIGN SHALL BE SUFFICIENT FOR ACCESS FOR GARBAGE TRUCKS AND SCHOOL BUS.



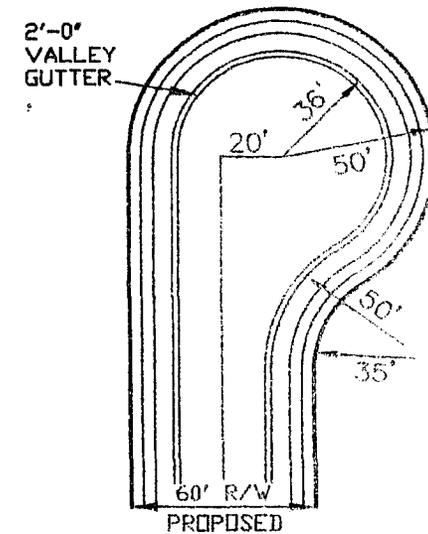
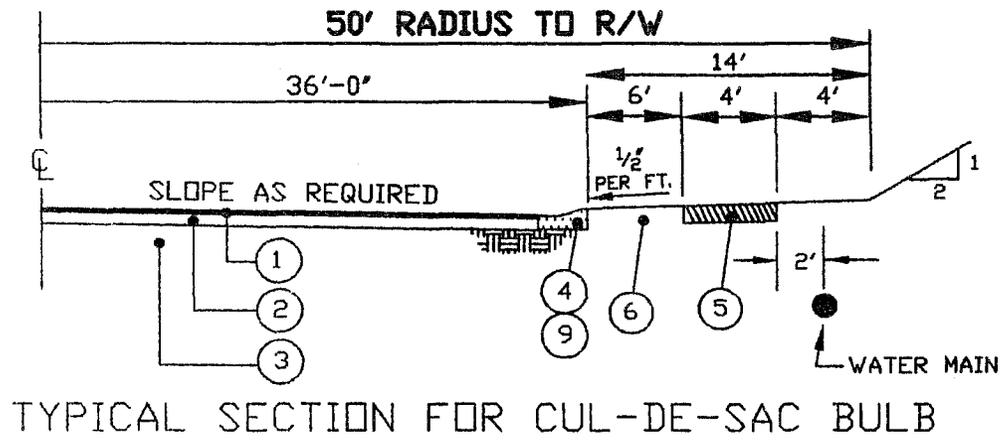
PLAN VIEW

( NOT TO SCALE )

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

TYPICAL SECTIONS — PRIVATE STREETS  
IN "TND" ZONING

STD. NO.	R
1.05-F	84



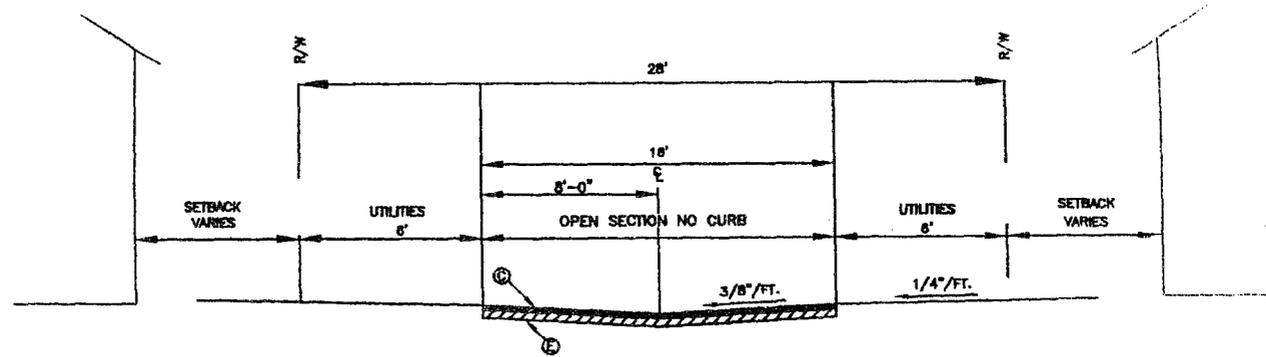
### LEGEND

- |   |                       |
|---|-----------------------|
| ① 1 1/2" ASPHALT CONCRETE SURFACE COURSE , TYPE I-2,<br>OVER A 2" BINDER COURSE | ⑥ TREE PLANTING STRIP |
| ② 6" COMPACTED AGGREGATE BASE COURSE ( ABC )                                    | ⑨ 2'6" CURB & GUTTER  |
| ③ COMPACTED SUBGRADE (SEE GENERAL NOTE 1)                                       |                       |
| ④ 24" VALLEY GUTTER   |                       |
| ⑤ CONCRETE SIDEWALK - 4" THICK  |                       |

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

TYPICAL SECTIONS — PRIVATE STREETS  
IN "TND" ZONING

STD. NO.	RI
1.05-G	8



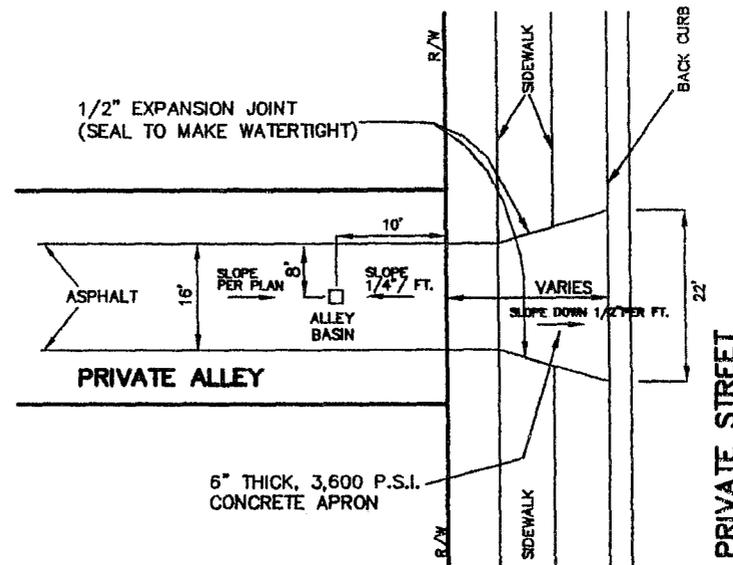
**NOTES:**

1. THE CROWN (TRANSVERSE SLOPE) FOR THE TYPICAL SECTION ON THIS SHEET IS 3/8" PER FT.
2. ALL ALLEY CONSTRUCTION SHALL USE THE INVERTED CROWN AS SHOWN.

**PAVEMENT SCHEDULE**

- ⓐ 1.5" BITUMINOUS CONCRETE SURFACE COURSE, TYPE 1-2
- ⓑ 6" COMPACTED AGGREGATE BASE COURSE, OR 4" BITUMINOUS CONCRETE BASE COURSE, TYPE HB.

**TYPICAL SECTION - 24' R/W (ALLEY)**

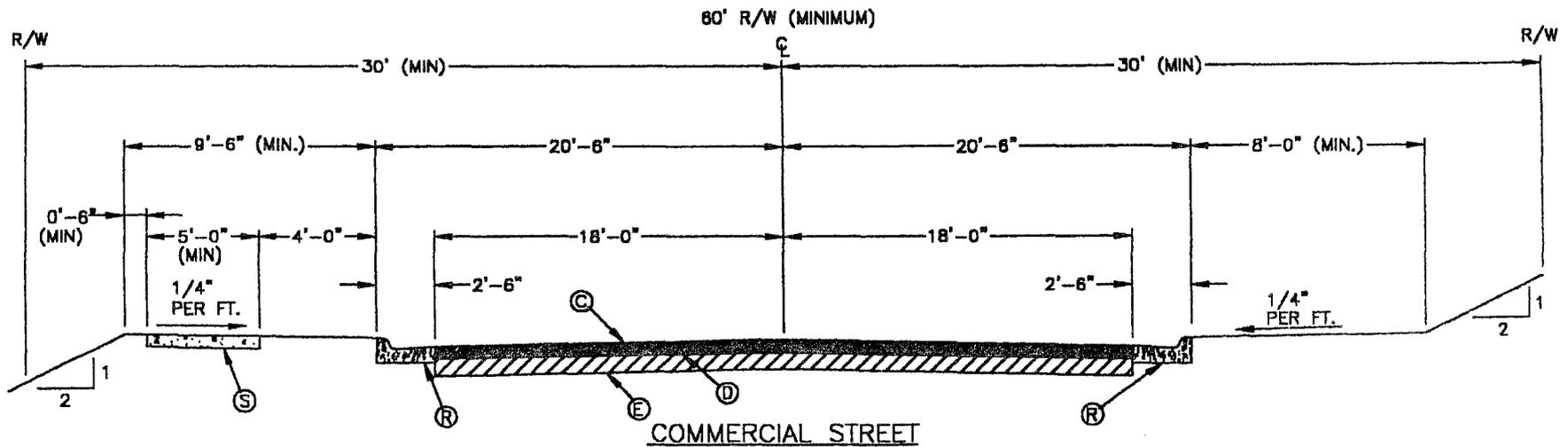


**CONCRETE APRON DETAIL FOR ALLEYWAYS**

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**TYPICAL SECTIONS - PRIVATE ALLEYS  
IN "TND" ZONING**

STD. NO.	RE
1.05-H	8/



ELEVATION DIFFERENCES BETWEEN TOP OF CURB AND FINISH GRADE AT C		
TO FINISH GRADE OF	FOR STONEBASE	FOR HB
SUBGRADE	- 12"	- 7"
BASE COURSE	- 2"	- 2"
BINDER COURSE	0"	0"

**PAVEMENT SCHEDULE**

- Ⓒ 2" BITUMINOUS CONCRETE SURFACE COURSE, TYPE I-1
- Ⓓ 2" BITUMINOUS CONCRETE BINDER COURSE, TYPE H
- Ⓔ 10" COMPACTED AGGREGATE BASE COURSE  
OR 5" BITUMINOUS CONCRETE BASE COURSE, TYPE HB.
- Ⓖ 2'-6" CURB AND GUTTER
- Ⓒ 4" CONCRETE SIDEWALK

**GENERAL NOTES:**

1. 2-INCH BITUMINOUS CONCRETE BINDER COURSE, TYPE H, IS TO BE PLACED IMMEDIATELY FOLLOWING PREPARATION OF A.B.C. PLANT MIX TO MEET NCDOT SPECIFICATIONS.
2. 2-INCH BITUMINOUS SURFACE COURSE, TYPE I-1, IS TO BE PLACED FOLLOWING BINDER COURSE.
3. DEVELOPER MAY SUBMIT AN ALTERNATIVE PAVEMENT SCHEDULE. ALL PERTINENT INFORMATION MAY BE SUBMITTED TO THE APPROPRIATE TOWN ENGINEER.
4. FOR OFFICE DEVELOPMENT, 1-2 SHALL BE USED IN LIEU OF 1-1.
5. THE CROWN (TRANSVERSE SLOPE) FOR THE TYPICAL SECTION ON THIS SHEET IS A MINIMUM OF 1/4" PER FOOT.

**REVISIONS**

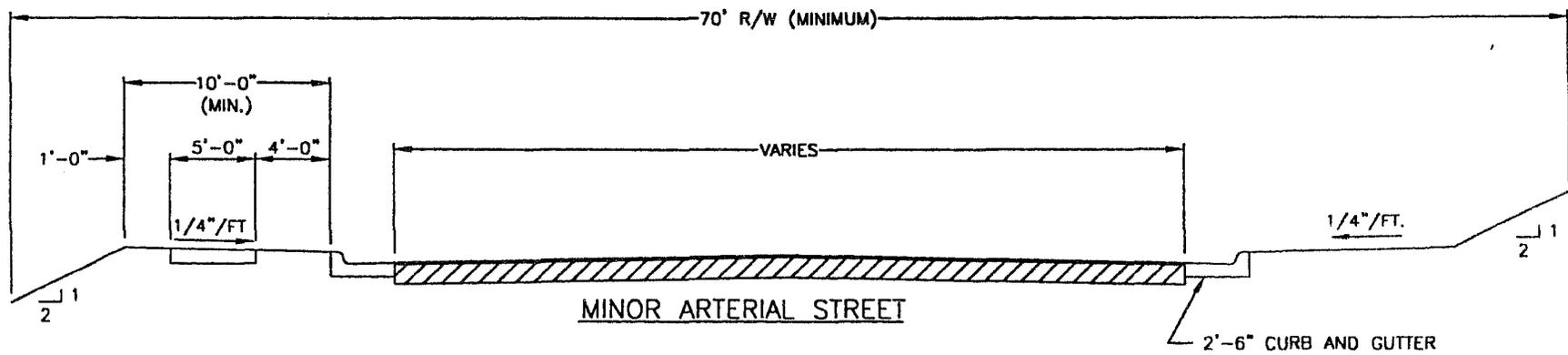
NO.	DATE	DESCRIPTION

APPROVED DATE 8/01/00

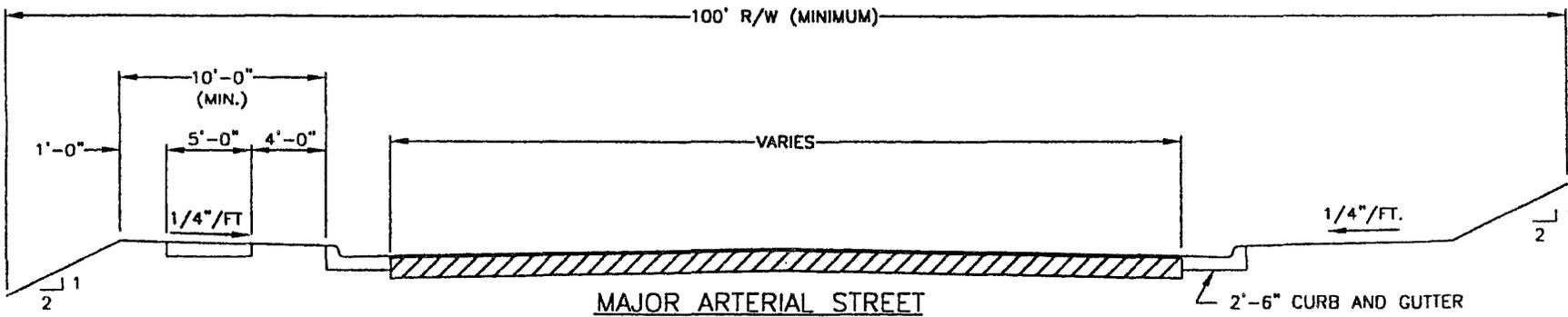
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**TYPICAL SECTION  
COMMERCIAL STREET**

STD. NO.	REV.
1.06	



MINOR ARTERIAL STREET



MAJOR ARTERIAL STREET

PAVEMENT SCHEDULE

PAVEMENT THICKNESS AND TYPE TO BE DESIGNED BASED ON PROJECTED TRAFFIC VOLUMES AND CALIFORNIA BEARING RATIO TEST RESULTS PROVIDED BY THE DEVELOPER. THOROUGHFARES SHALL BE DESIGNED IN ACCORDANCE WITH A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, AASHTO, LATEST EDITION.

NOTES:

1. SIDEWALKS SHALL BE PROVIDED IN ACCORDANCE WITH THE APPLICABLE SUBDIVISION ORDINANCE.
2. DITCH TYPE STREET IS TO BE USED ONLY WHEN APPROVED BY NCDOT OR TOWN ENGINEER.
3. THE CROWN (TRANSVERSE SLOPE) FOR BOTH SECTIONS ON THIS SHEET IS 1/4" PER FOOT.

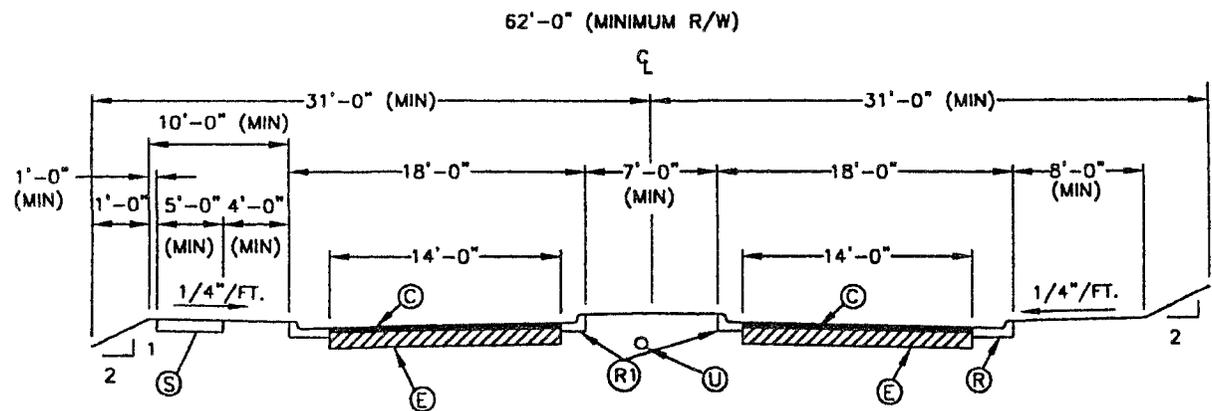
APPROVED DATE *8/01-02*

REVISIONS		
NO.	DATE	DESCRIPTION

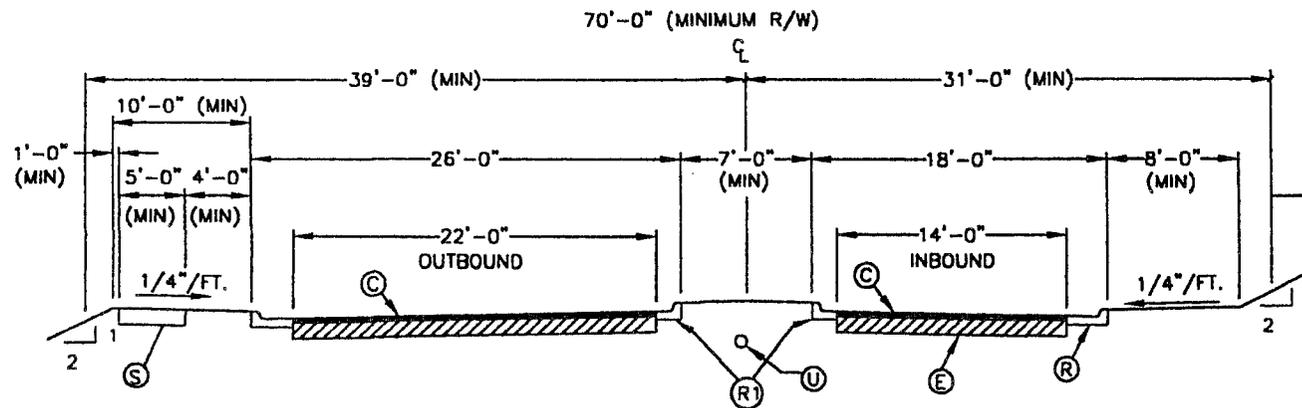
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

TYPICAL SECTIONS  
ARTERIAL STREET

STD. NO.	REV.
1.07	



**DIVIDED RESIDENTIAL STREET**  
(TWO LANE SECTION)



**DIVIDED RESIDENTIAL STREET**  
(THREE LANE SECTION)

- (R) 2'-6" CURB AND GUTTER
- (S) 4" THICK CONCRETE SIDEWALK
- (R) 1'-6" CURB AND GUTTER
- PAVEMENT SCHEDULE (LOCAL STREET)
- (C) 2.5" BITUMINOUS CONCRETE SURFACE COURSE, TYPE 1-2
- (E) 8" COMPACTED AGGREGATE BASE COURSE OR 4" BITUMINOUS CONCRETE BASE COURSE TYPE "HB"
- PAVEMENT SCHEDULE (COLLECTOR STREET)
- (C) 2.5" BITUMINOUS CONCRETE SURFACE COURSE, TYPE 1-2
- (E) 8" COMPACTED AGGREGATE BASE COURSE OR 4" BITUMINOUS CONCRETE BASE COURSE TYPE "HB"
- (U) UNDERDRAIN SYSTEM FOR IRRIGATED OR PLANTED MEDIANS

**NOTES:**

1. CURB RETURN RADIUS DIMENSIONS AT INTERSECTIONS MAY VARY DEPENDING ON MEDIAN WIDTH AND WILL BE REVIEWED ON A CASE BY CASE BASIS.
2. SUBDRAINS WILL BE REQUIRED ON ALL MEDIANS.
3. 2'-0" VALLEY GUTTER MAY BE USED WITH APPROVAL OF APPROPRIATE TOWN ENGINEER.
4. MEDIAN PLANTINGS NEED TO BE APPROVED BY APPROPRIATE TOWN ENGINEER, FOR SIGHT DISTANCE POLICY.
5. THE CROWN (TRANSVERSE SLOPE) FOR ALL TYPICAL SECTIONS ON THIS SHEET IS A MINIMUM OF 1/4" PER FT.
6. FOLLOW SPECIFIC STREET DETAIL FOR PAVEMENT NOTES.
7. FINAL ONE (1) INCH OF ASPHALT TO BE APPLIED WHEN DEVELOPMENT HAS 80% OCCUPANCY.

**REVISIONS**

NO.	DATE	DESCRIPTION

APPROVED DATE *8/10/10*

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**TYPICAL SECTIONS  
DIVIDED RESIDENTIAL STREET**

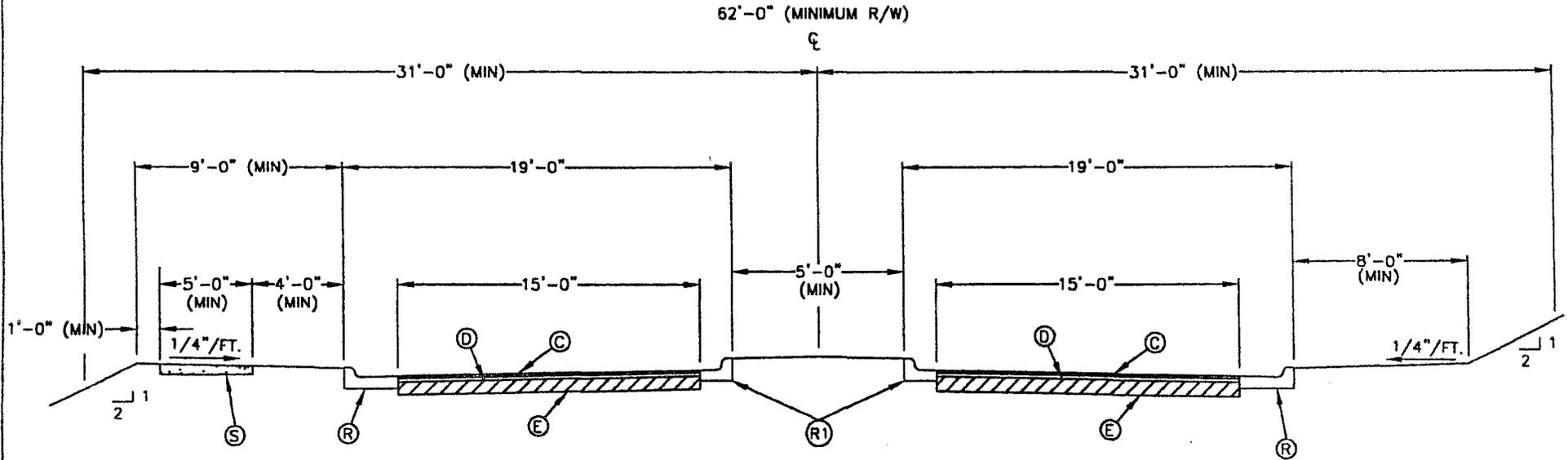
STD. NO.	REV.
1.08	

NOTES:

1. CURB RETURN RADIUS DIMENSIONS AT INTERSECTIONS MAY VARY DEPENDING ON MEDIAN WIDTH AND WILL BE REVIEWED ON A CASE BY CASE BASIS.
2. SUBDRAINS WILL BE REQUIRED ON ALL MEDIANS.
3. IN OFFICE DEVELOPMENTS 1-2 SURFACE COURSE WILL BE REQUIRED IN LIEU OF 1-1.
4. MEDIAN PLANTINGS NEED TO BE APPROVED BY APPROPRIATE TOWN ENGINEER FOR SIGHT DISTANCE.
5. THE CROWN (TRANSVERSE SLOPE) FOR THE TYPICAL SECTION ON THIS SHEET IS A MINIMUM OF 1/4" PER FOOT.
6. EACH ADDITIONAL LANE SHALL BE 11'-0" WIDE.

PAVEMENT SCHEDULE

- (C) 2" BITUMINOUS CONCRETE SURFACE COURSE, TYPE 1-1
- (D) 2" BITUMINOUS CONCRETE BINDER COURSE, TYPE "H"
- (E) 10" COMPACTED AGGREGATE BASE COURSE OR 5" BITUMINOUS CONCRETE BASE COURSE, TYPE "HB"
- (S) 4" THICK CONCRETE SIDEWALK
- (R) 2'-6" CURB AND GUTTER
- (R1) 1'-6" CURB AND GUTTER



DIVIDED COMMERCIAL STREET

REVISIONS

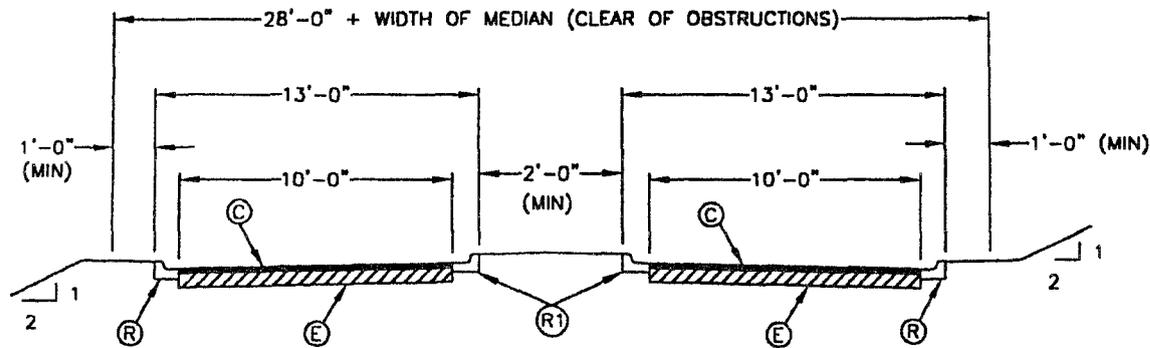
NO.	DATE	DESCRIPTION

APPROVED DATE *8/01/00*

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

TYPICAL SECTION  
DIVIDED COMMERCIAL STREET

STD. NO.	REV.
1.09	



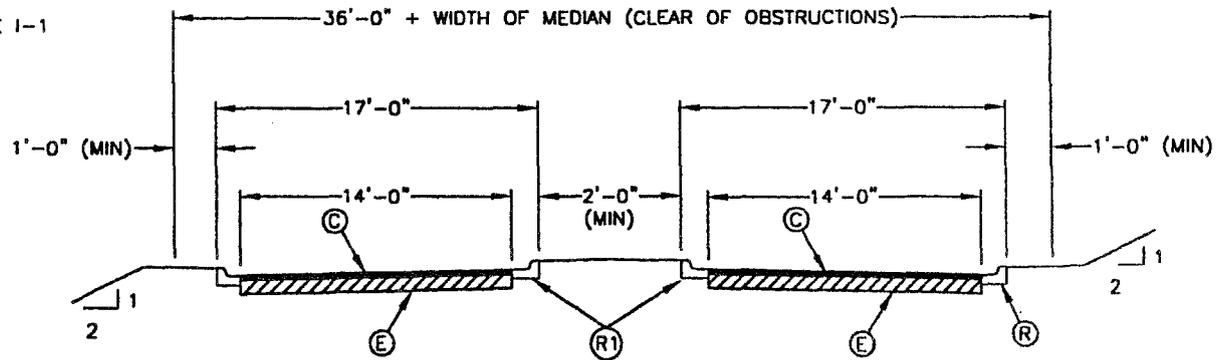
**DIVIDED PRIVATE STREET**  
(INTERNAL)

**NOTES:**

1. CURB RETURN RADIUS DIMENSIONS AT INTERSECTIONS MAY VARY DEPENDING ON MEDIAN WIDTH AND WILL BE REVIEWED ON A CASE BY CASE BASIS.
2. FOR ADDITIONAL LANES ADD 10'(MINIMUM) OF PAVEMENT PER LANE.
3. 2'-0" VALLEY GUTTER MAY BE USED WITH APPROVAL OF APPROPRIATE TOWN ENGINEERING DEPARTMENT.
4. THE CROWN (TRANSVERSE SLOPE) FOR ALL TYPICAL SECTIONS ON THIS SHEET IS 3/8" PER FOOT.
5. NO ON-STREET PARKING WITHIN 15' OF INTERSECTION.
6. FOLLOW SPECIFIC STREET DETAIL FOR PAVEMENT NOTES.
7. FINAL ONE (1) INCH OF ASPHALT TO BE APPLIED WHEN DEVELOPMENT HAS 80% OCCUPANCY.

**PAVEMENT SCHEDULE**

- ⓐ 2.5" BITUMINOUS CONCRETE SURFACE COURSE, TYPE I-1
- ⓔ 8" COMPACTED AGGREGATE BASE COURSE OR 4" BITUMINOUS CONCRETE BASE COURSE, TYPE HB.
- Ⓡ 1'-6" CURB AND GUTTER
- Ⓡ1 1'-6" MEDIAN CURB AND GUTTER



**DIVIDED PRIVATE STREET**  
(AT INTERSECTION WITH A PUBLIC STREET  
FOR 150' OR LENGTH OF MEDIAN WHICHEVER IS GREATER)

**REVISIONS**

NO.	DATE	DESCRIPTION

APPROVED DATE *B/01/00*

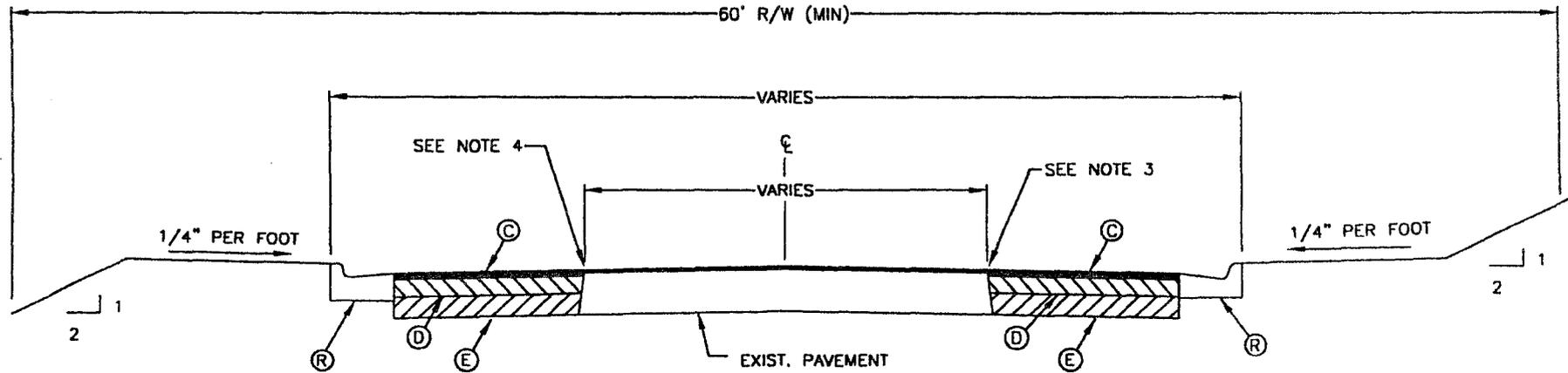
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**TYPICAL SECTIONS  
DIVIDED PRIVATE STREET**

STD. NO.	REV.
1.10	

**NOTES:**

1. CURB LOCATIONS ON STATE ROADS TO BE DETERMINED BY NCDOT OR TOWN ENGINEER.
2. ALL WORK TO BE DONE ON EXISTING NCDOT MAINTAINED STREETS SHALL REQUIRE NCDOT ENCROACHMENT/ACCESS APPLICATIONS, SUBMITTED TO NCDOT.
3. CLEAN CUT LOCATION TO BE DETERMINED IN FIELD.
4. BITUMINOUS CONCRETE BASE COURSE, TYPE HB, SHALL BE USED IN WIDENING STRIPS LESS THAN FIVE (5) FEET IN WIDTH.
5. A 1" OVERLAY OF THE WHOLE EXISTING ROADWAY IS REQUIRED FOR PROPER PAVEMENT TIE-IN.
6. THE EXISTING EDGE LANE SHALL BE COMPLETELY COVERED WITH NEW ASPHALT WHEN PAVING.
7. NCDOT MUST BE CONTACTED FOR A PRE-MARKING INSPECTION BEFORE STRIPING OCCURS.



**IMPROVEMENT REQUIREMENTS FOR:**

**OTHER SECONDARY ROUTES  
PAVEMENT SCHEDULE**

- (C) 2" BITUMINOUS CONCRETE SURFACE COURSE, TYPE 1-2
- (E) 8" COMPACTED AGGREGATE BASE COURSE OR 4" BITUMINOUS CONCRETE BASE COURSE, TYPE HB.
- (R) 2'-6" CURB AND GUTTER

**NC AND US PRIMARY ROUTES (THOROUGHFARE PLAN)  
PAVEMENT SCHEDULE**

- (C) 2" BITUMINOUS CONCRETE SURFACE COURSE, TYPE 1-2
- (D) 2" BITUMINOUS BINDER COURSE, TYPE H
- (E) 10" COMPACTED AGGREGATE BASE COURSE OR 5" BITUMINOUS CONCRETE BASE COURSE, TYPE HB.
- (R) 2'-6" CURB AND GUTTER

**REVISIONS**

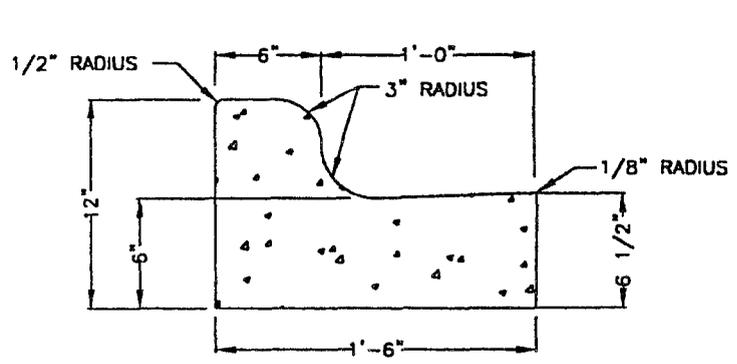
NO.	DATE	DESCRIPTION

APPROVED DATE *8/10/00*

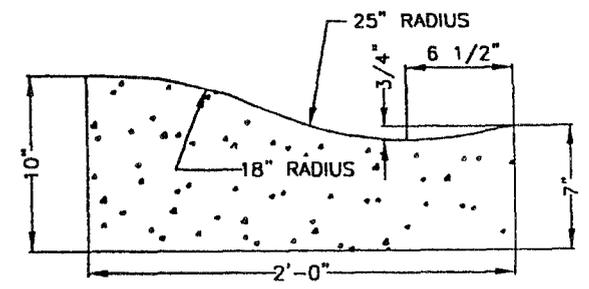
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**TYPICAL SECTION  
IMPROVEMENTS ON EXISTING NCDOT ROADS**

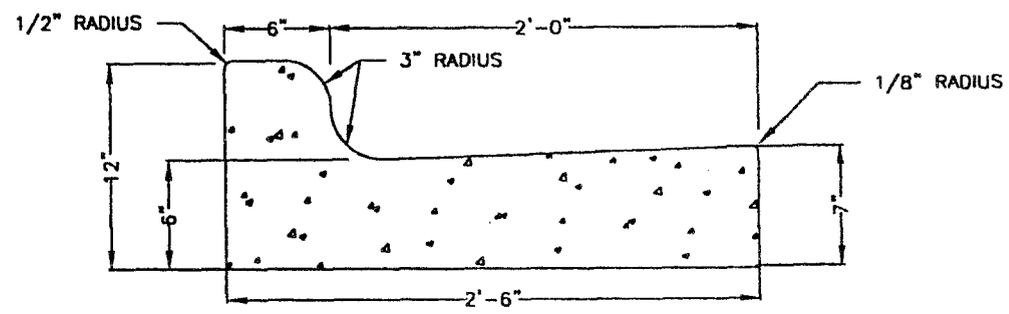
STD. NO.	REV.
1.11	



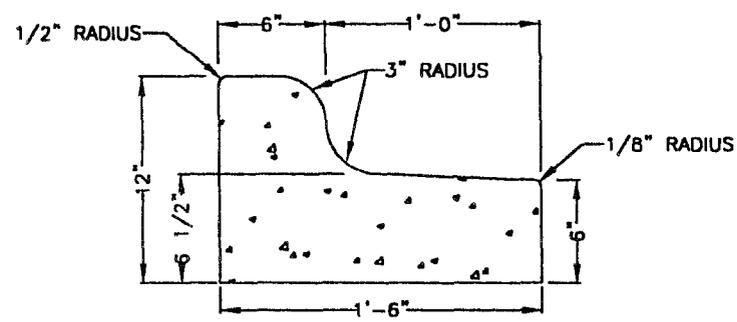
STANDARD 1'-6" CURB AND GUTTER



2'-0" VALLEY GUTTER

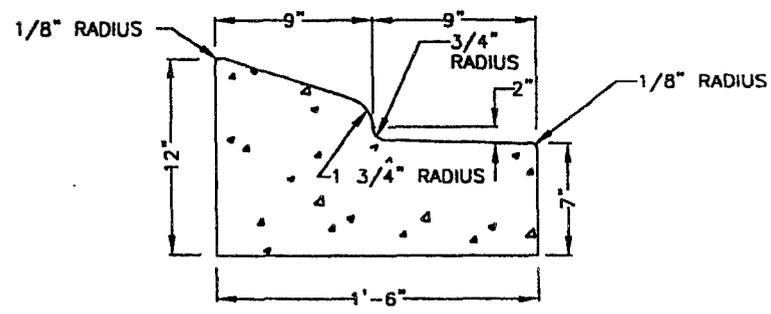


STANDARD 2'-6" CURB AND GUTTER



1'-6" MEDIAN CURB AND GUTTER

TO BE USED IN MEDIANS WHEN LANES ARE SLOPED FROM ISLAND OR AS SPECIFIED BY THE TOWN ENGINEER.



1'-6" MOUNTABLE CURB AND GUTTER

TO BE USED IN MEDIANS ONLY: WHEN SPECIFIED BY THE TOWN ENGINEER.

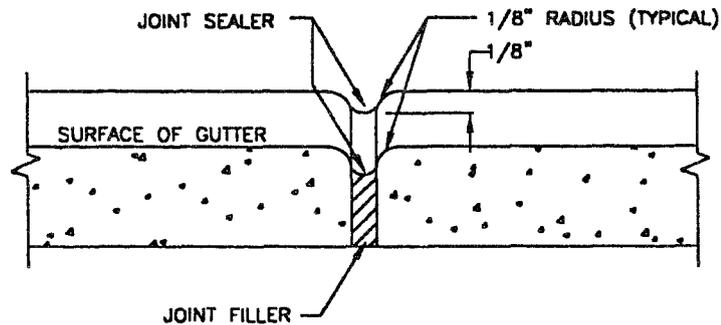
APPROVED DATE 8/20/00

REVISIONS		
NO.	DATE	DESCRIPTION

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

CURB AND GUTTER

STD. NO.	REV.
1.12A	



TRANSVERSE EXPANSION JOINT

NOTES:

1. CONTRACTION JOINTS SHALL BE SPACED AT 10-FOOT INTERVALS. FOR VALLEY GUTTER, A 15-FOOT SPACING MAY BE USED WHEN A MACHINE IS USED. JOINT SPACING MAY BE ALTERED BY THE ENGINEER TO PREVENT UNCONTROLLED CRACKING.
2. CONTRACTION JOINTS MAY BE INSTALLED BY THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS. WHERE SUCH JOINTS ARE NOT FORMED BY TEMPLATES, A MINIMUM DEPTH OF 1 1/2" SHALL BE OBTAINED.
3. ALL EXPANSION JOINTS SHALL BE SPACED AT 90 FOOT INTERVALS, AND ADJACENT TO ALL RIGID OBJECTS. JOINTS SHALL MATCH LOCATIONS WITH JOINTS IN ABUTTING SIDEWALK.
4. CONCRETE COMPRESSIVE STRENGTH SHALL BE 3600 P.S.I. IN 28 DAYS.
5. CURB SHALL BE DEPRESSED AT INTERSECTIONS TO PROVIDE FOR FUTURE ACCESSIBLE RAMPS.
6. TOP 6" OF SUBGRADE BENEATH THE CURB AND GUTTER SHALL BE COMPACTED TO 100% STANDARD PROCTOR DENSITY.

REVISIONS

NO.	DATE	DESCRIPTION

APPROVED DATE *8/01/00*

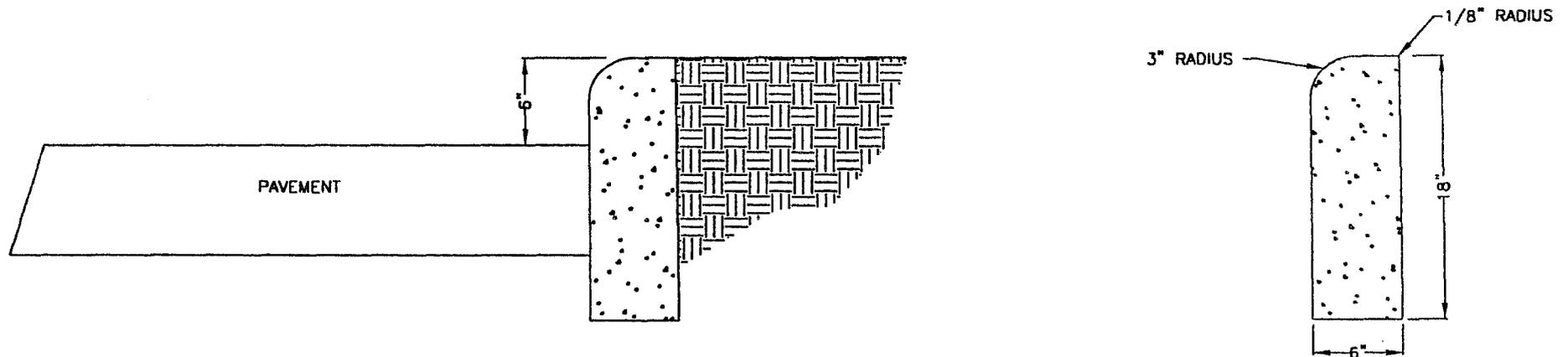
TWON OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

CURB AND GUTTER

STD. NO.	REV.
1.12B	

**NOTES:**

1. CONTRACTION JOINTS SHALL BE SPACED AT 10-FOOT INTERVALS, EXCEPT THAT A 15-FOOT SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT A 10-FOOT INTERVAL. JOINT SPACING MAY BE ALTERED BY THE ENGINEER TO PREVENT UNCONTROLLED CRACKING.
2. CONTRACTION JOINTS MAY BE INSTALLED BY THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS. WHERE SUCH JOINTS ARE NOT FORMED BY TEMPLATES, A MINIMUM DEPTH OF 1 1/2" SHALL BE OBTAINED.
3. ALL EXPANSION JOINTS SHALL BE SPACED AT 90 FOOT INTERVALS, AND ADJACENT TO ALL RIGID OBJECTS. JOINTS SHALL MATCH LOCATIONS WITH JOINTS IN ABUTTING SIDEWALK.
4. CONCRETE COMPRESSIVE STRENGTH SHALL BE 3600 P.S.I. IN 28 DAYS.
5. CURB SHALL BE DEPRESSED AT INTERSECTIONS TO PROVIDE FOR FUTURE ACCESSIBLE RAMPS.
6. TOP 6" OF SUBGRADE BENEATH THE CURB SHALL BE COMPACTED TO 100% STANDARD PROCTOR DENSITY.
7. DETAIL MAY BE USED FOR PRIVATE DRIVES, PARKING LOTS, AND INTERIOR CIRCULATION STREETS.



**REVISIONS**

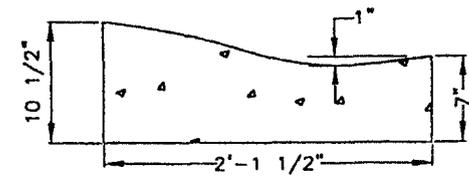
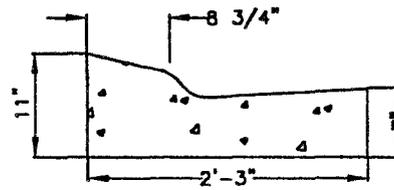
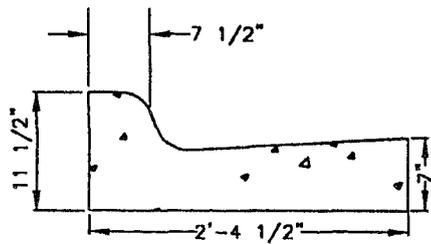
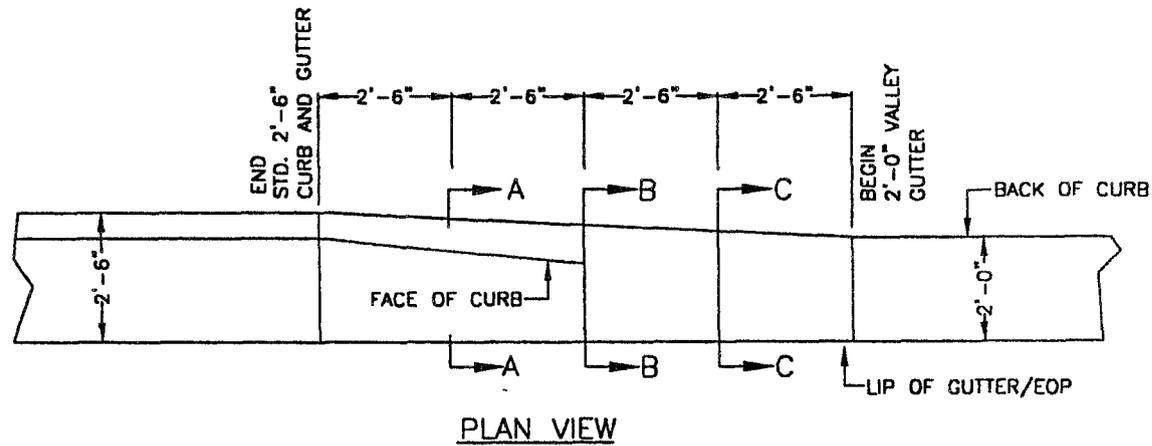
NO.	DATE	DESCRIPTION

APPROVED DATE *8/12/10*

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**VERTICAL CURB**

STD. NO.	REV.
1.13	



REVISIONS

NO.	DATE	DESCRIPTION

NOTES:

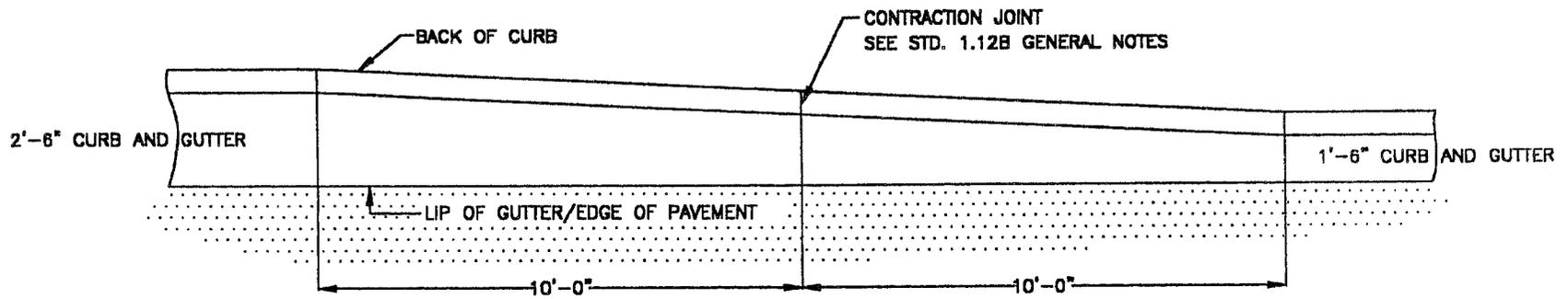
1. TRANSITION IS NOT TO BE LOCATED WITHIN THE CURB RADIUS.

APPROVED DATE *8/10/10*

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

CURB TRANSITION  
2'6" CURB AND GUTTER TO 2'-0"  
VALLEY GUTTER

STD. NO.	REV.
1.14	



PLAN VIEW

- NOTES:**  
 1. TRANSITION TO BE ALONG BACK OF CURB.

REVISIONS

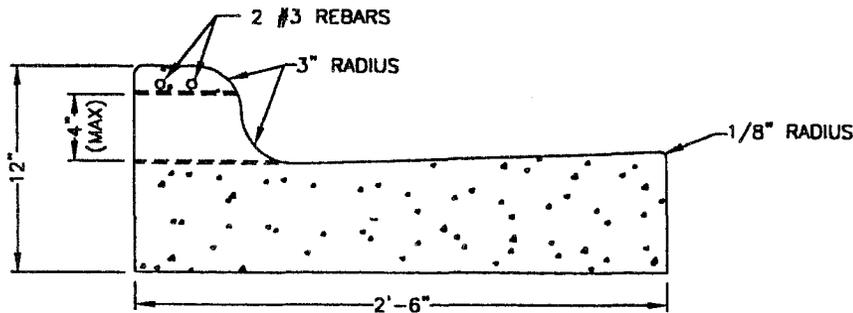
NO.	DATE	DESCRIPTION

APPROVED DATE 8/01/00

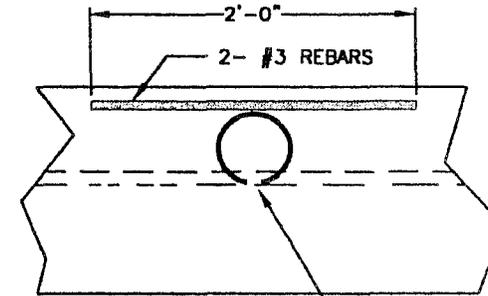
TOWN OF INDIAN TRAIL  
 LAND DEVELOPMENT  
 STANDARDS

CURB TRANSITION  
 2'-6" CURB AND GUTTER TO  
 1'-6" CURB AND GUTTER

STD. NO.	REV.
1.15	



SECTION



THE EDGES OF THE DRAIN HOLE  
MUST BE ROUNDED AND FINISHED  
SMOOTH AT THE FACE OF THE CURB.

ELEVATION

**NOTES:**

1. ROOF DRAIN OUTLETS SHALL NOT BE CONSTRUCTED WITHIN 18" OF CONTRACTION OR EXPANSION JOINTS.
2. OPENING GRADE MAY VARY BETWEEN A MAXIMUM SLOPE OF 1/2" PER FOOT AND A MINIMUM OF 1/4" PER FOOT.
3. MORE THAN ONE HOLE MAY BE INSTALLED PROVIDED THE HOLES ARE LOCATED WITH 18" MINIMUM SPACING.

REVISIONS

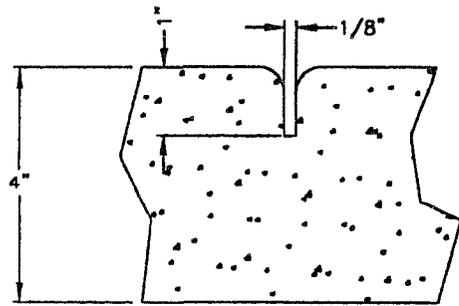
NO.	DATE	DESCRIPTION

APPROVED DATE 8/10/10

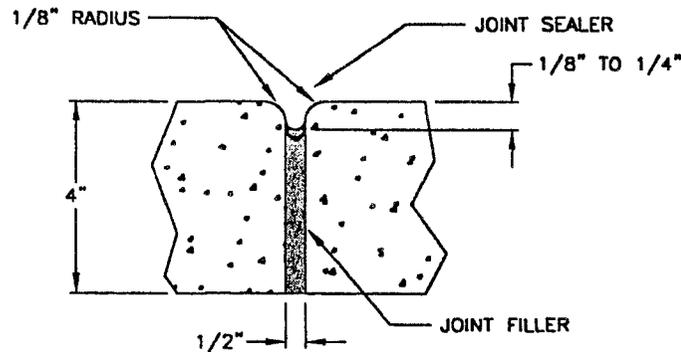
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

ROOF DRAIN OUTLETS  
2'-6" CURB AND GUTTER

STD. NO.	REV.
1.16	



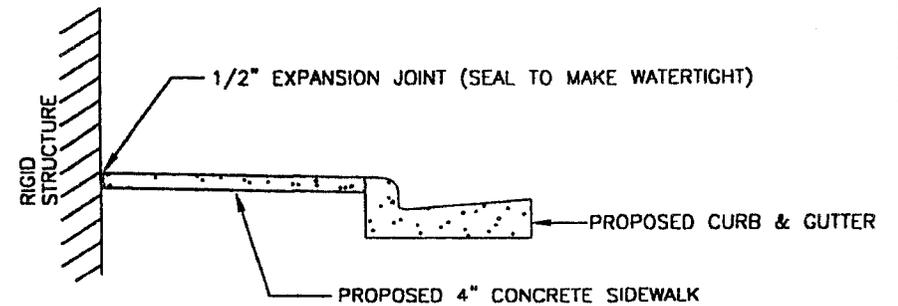
GROOVE JOINT IN SIDEWALK



TRANSVERSE EXPANSION JOINT IN SIDEWALK

GENERAL NOTES:

1. A GROOVE JOINT 1" DEEP WITH 1/8" RADIUS SHALL BE REQUIRED IN THE CONCRETE SIDEWALK AT 5' INTERVALS. ONE 1/2" EXPANSION JOINT WILL BE REQUIRED AT 45' INTERVALS NOT TO EXCEED 50' AND MATCHING EXPANSION/CONSTRUCTION JOINT IN ADJACENT CURB. A SEALED 1/2" EXPANSION JOINT WILL BE REQUIRED WHERE THE SIDEWALK JOINS ANY RIGID STRUCTURE.
2. WIDTH OF SIDEWALKS ON ALL STREETS SHALL BE A MINIMUM OF 5'
3. SIDEWALK TO BE POURED TO END OF RADIUS AT INTERSECTING STREETS.
4. CONCRETE COMPRESSIVE STRENGTH SHALL BE 3600 PSI. IN 28 DAYS.



DETAILS SHOWING EXPANSION JOINTS IN CONCRETE SIDEWALK

REVISIONS

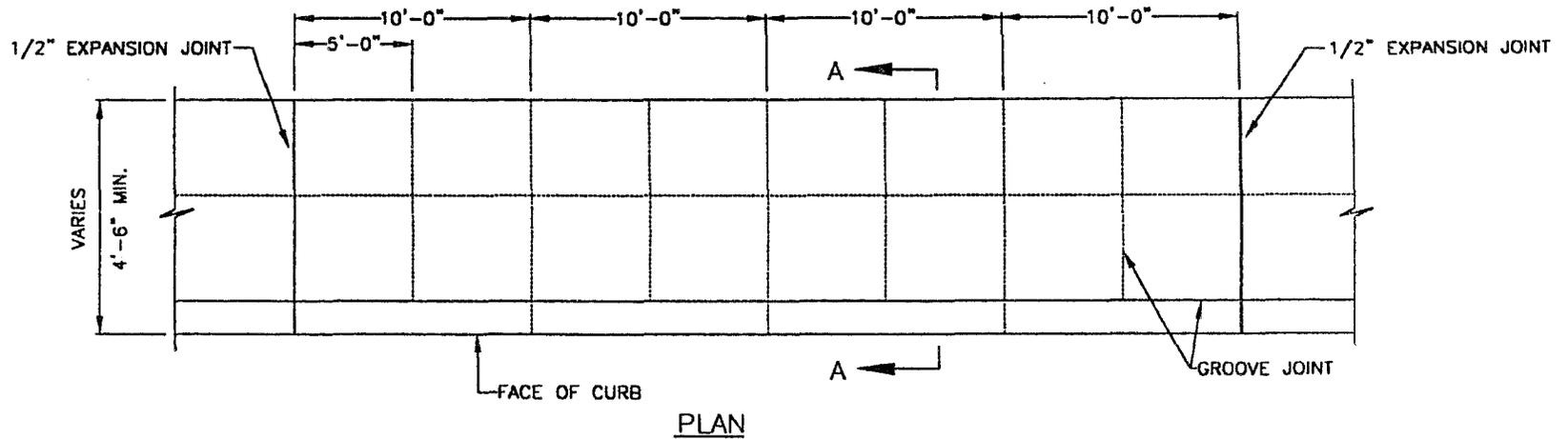
NO.	DATE	DESCRIPTION

APPROVED DATE *Blatta*

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

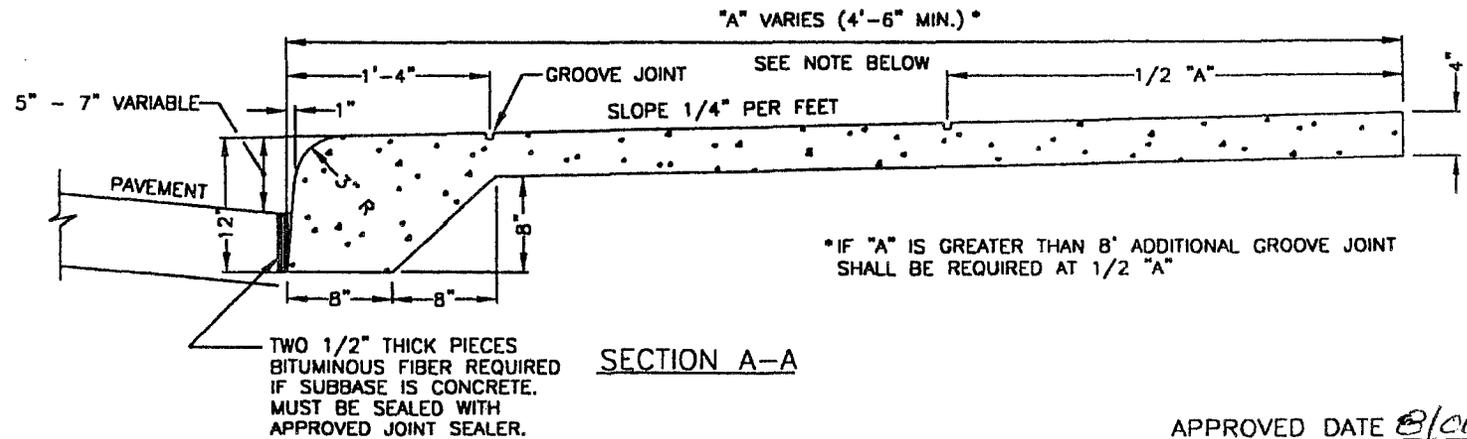
CONCRETE SIDEWALKS

STD. NO.	REV.
1.17	



**GENERAL NOTES:**

1. A GROOVE JOINT 1" DEEP WITH 1/3" RADIUS SHALL BE REQUIRED IN THE CONCRETE SIDEWALK AT 5' INTERVALS. ONE 1/2" EXPANSION JOINT WILL BE REQUIRED AT 40' INTERVALS. A 1/2" EXPANSION JOINT WILL BE REQUIRED WHERE THE SIDEWALK JOINS ANY RIGID STRUCTURE.
2. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
3. SEE STANDARD 1.17 FOR DETAIL OF EXPANSION JOINT AND GROOVE JOINT.
4. SEE STANDARD 1.21 FOR DETAIL OF DRIVEWAY.
5. MONOLITHIC CURB AND SIDEWALK TO BE CONSTRUCTED ONLY AT APPROVED LOCATIONS BY THE TOWN ENGINEER.



REVISIONS		
NO.	DATE	DESCRIPTION

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

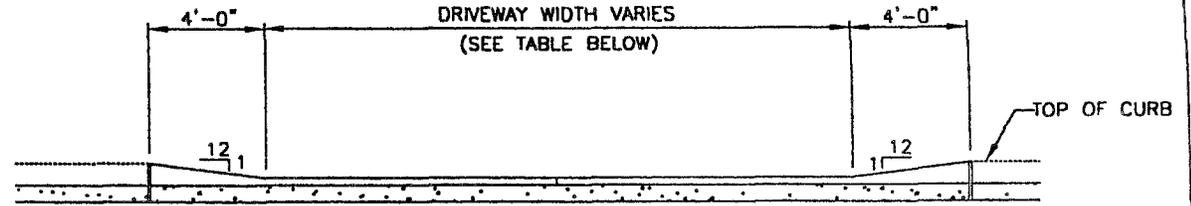
**MONOLITHIC CONCRETE  
CURB AND SIDEWALK**

APPROVED DATE *8/01/00*

STD. NO.	REV.
1.18	

**NOTE:**

- 1/2" EXPANSION JOINTS REQUIRE INSTALLATION OF ONE 1/2" THICK PIECE OF BITUMINOUS FIBER THROUGH THE ENTIRE SLAB.
- TO LIMIT STORM WATER FLOW DOWN DRIVEWAYS, USE STANDARD 1.20A OR 1.20B FOR DRIVEWAYS NEAR LOW POINTS.

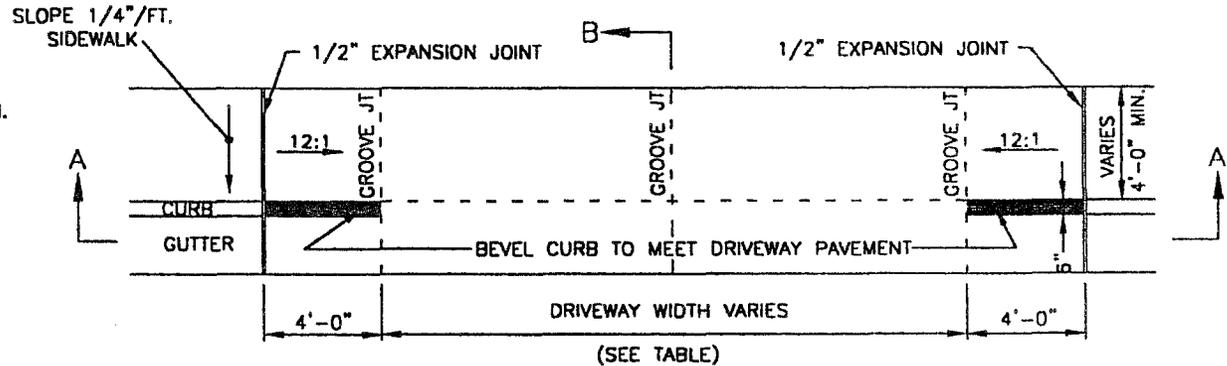


SECTION A - A

**GENERAL NOTES:**

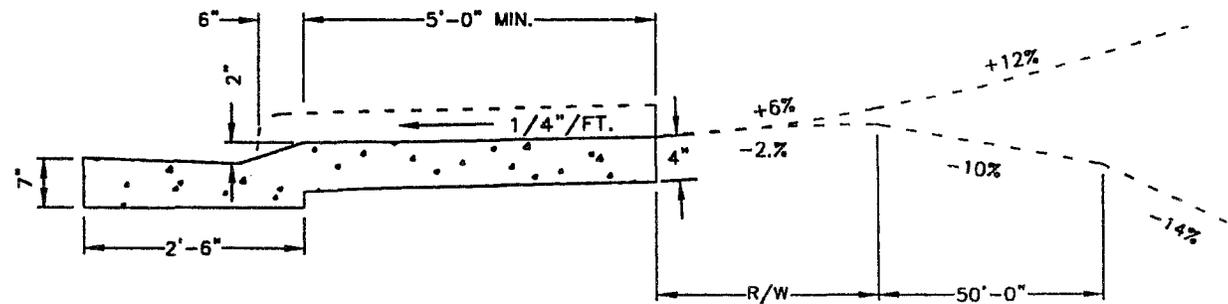
ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.

ALL CURB OR CURB AND GUTTER AND SIDEWALKS ARE TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED. SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT. SEE STD. NO 1.12B FOR DETAIL OF EXPANSION JOINT AND GROOVE JOINT.



PLAN

DRIVEWAY CLASSIFICATION		
TYPE DRIVEWAY	MINIMUM	MAXIMUM
TYPE I--RESIDENTIAL	15'	30'
ONE-WAY TYPE II COMMERCIAL	20'	30'
TWO-WAY TYPE II COMMERCIAL	26'	50'



SECTION B - B

APPROVED DATE 8/10/10

REVISIONS		
NO.	DATE	DESCRIPTION

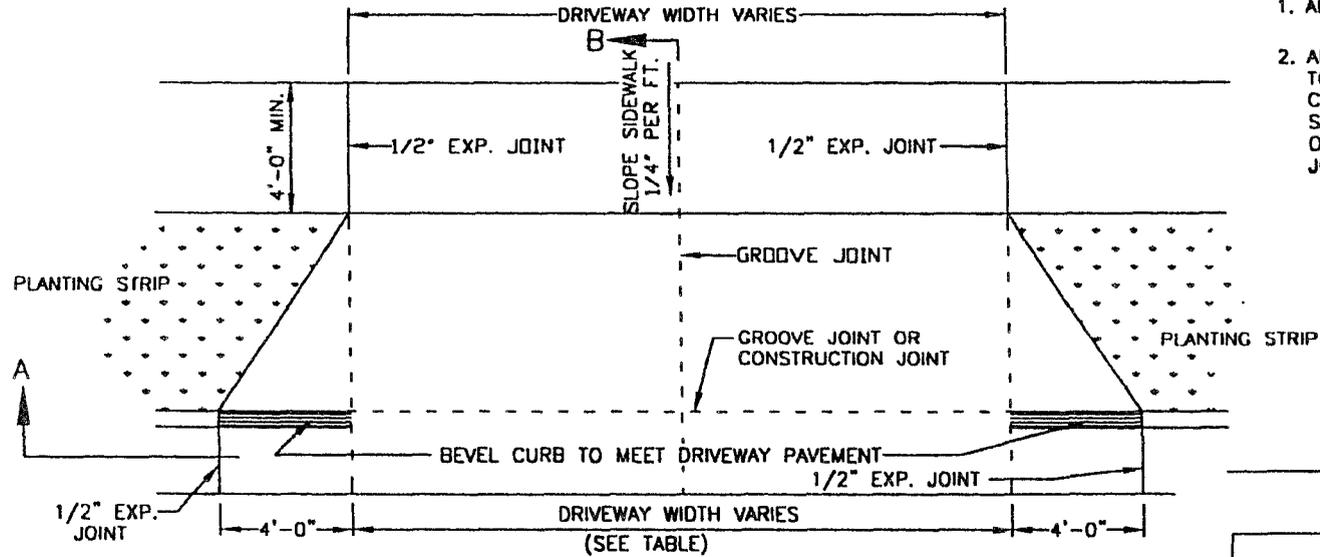
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

COMMERCIAL & RESIDENTIAL DROP CURB  
TYPE II DRIVEWAY WITH SIDEWALK ABUTTING  
CURB (2'-6" CURB AND GUTTER)

STD. NO.	REV.
1.19	

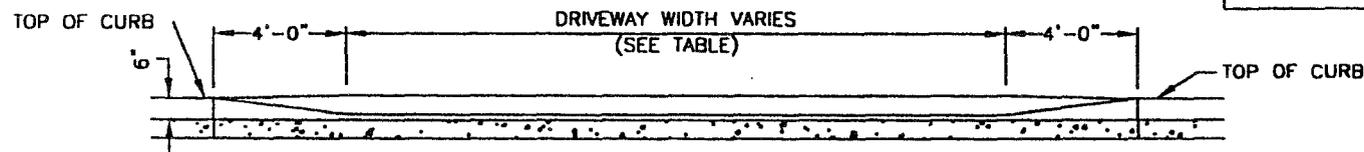
**NOTES:**

1. ALL CONCRETE TO BE 3600 P.S.I.
2. ALL CURB OR CURB AND GUTTER AND SIDEWALKS ARE TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED. SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT. SEE STD. NO. 1.12B FOR JOINT DETAIL.

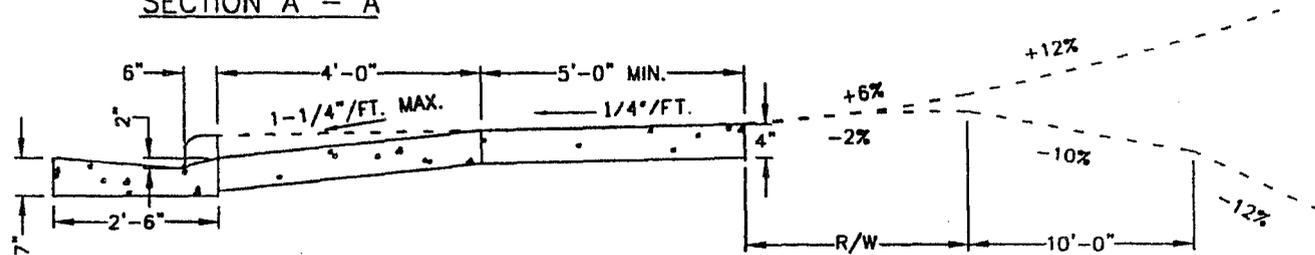


**PLAN VIEW**

DRIVEWAY CLASSIFICATION		
TYPE DRIVEWAY	MINIMUM	MAXIMUM
TYPE I - RESIDENTIAL	15'	30'



**SECTION A - A**



**SECTION B - B**

REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE *8/10/10*

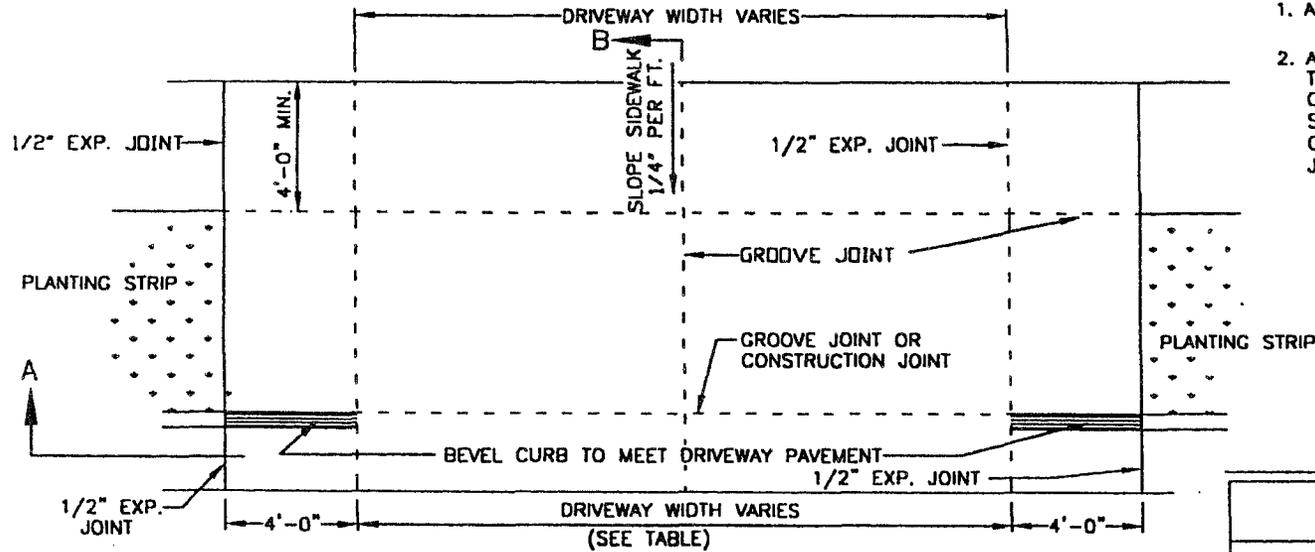
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**RESIDENTIAL DROP CURB TYPE I  
DRIVEWAY WITH PLANTING STRIP  
(2'-6" CURB AND GUTTER)**

STD. NO.	REV.
1.20A	

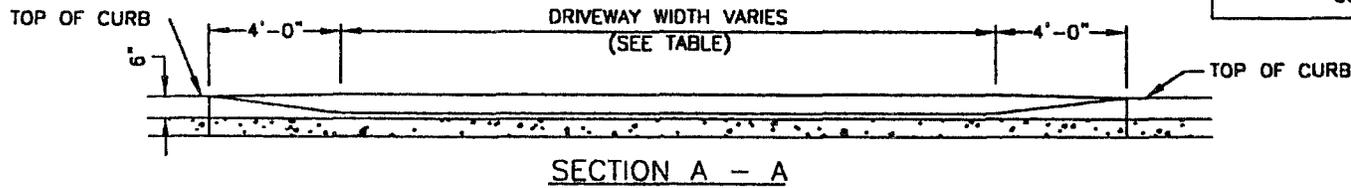
**NOTES:**

1. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
2. AT ALL DRIVEWAYS, SIDEWALKS TO BE REMOVED TO THE NEAREST JOINT BEYOND NEW CONSTRUCTION OR CUT WITH A SAW AND REMOVED. SAW CUT OR JOINT TO BE PERPENDICULAR TO EDGE OF EXISTING PAVEMENT. SEE STD. NO. 1.12B FOR JOINT DETAIL.

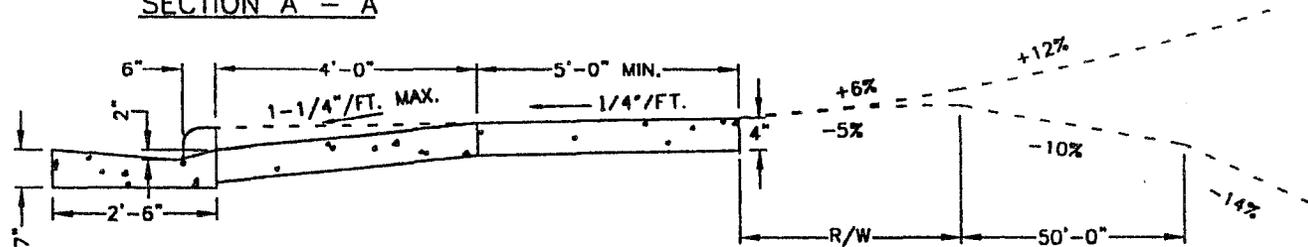


**PLAN VIEW**

DRIVEWAY CLASSIFICATION		
TYPE DRIVEWAY	MINIMUM	MAXIMUM
ONE-WAY TYPE II - COMMERCIAL	20'	30'
TWO-WAY TYPE II - COMMERCIAL	26'	50'



**SECTION A - A**



**SECTION B - B**

REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE *8/10/10*

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**COMMERCIAL DROP CURB TYPE II  
DRIVEWAY WITH PLANTING STRIP  
(2'-6" CURB AND GUTTER)**

STD. NO.	REV.
1.20B	

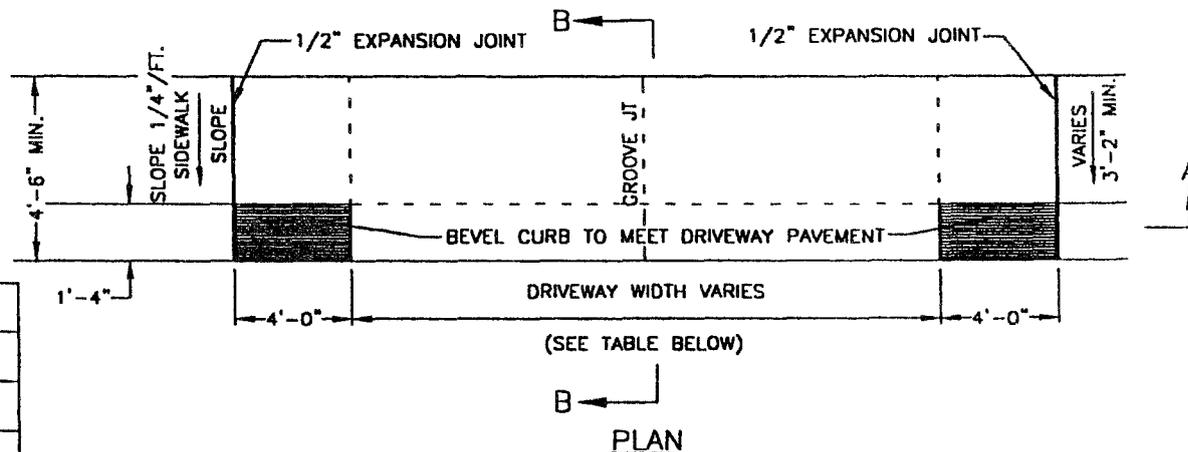
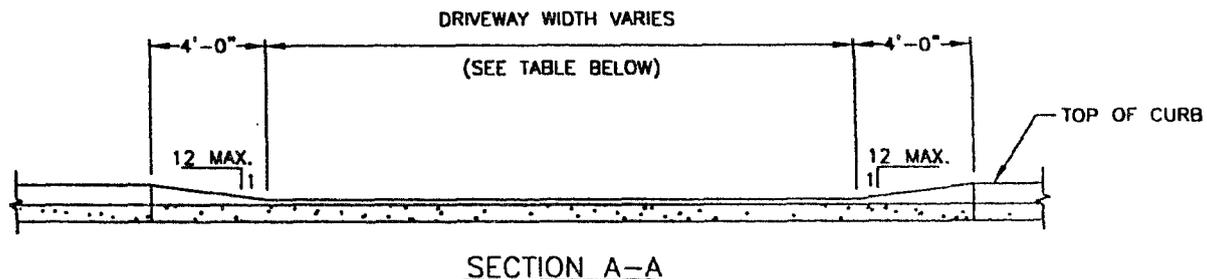
**GENERAL NOTES:**

ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.

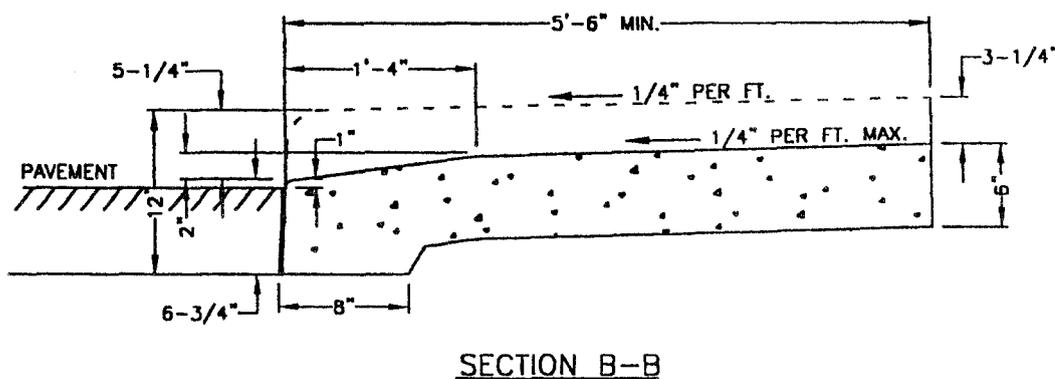
A 1/2" EXPANSION JOINT WILL BE REQUIRED WHERE WHERE THE SIDEWALK JOINS ANY RIGID STRUCTURE. SEE STANDARD 1.17.

THIS DETAIL TO BE USED ONLY IN CONJUNCTION WITH MONOLITHIC SIDEWALK AS ON STANDARD NO. 1.18.

**NOTES:**



DRIVEWAY CLASSIFICATIONS		
TYPE DRIVEWAY	MINIMUM	MAXIMUM
TYPE I- RESIDENTIAL	15'	30'
ONE-WAY - TYPE II COMMERCIAL	20'	30'
TWO-WAY - TYPE II COMMERCIAL	26'	50'



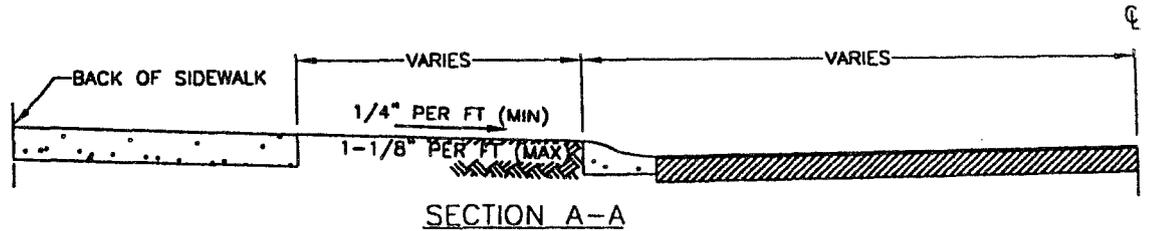
REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE *8/10/10*

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

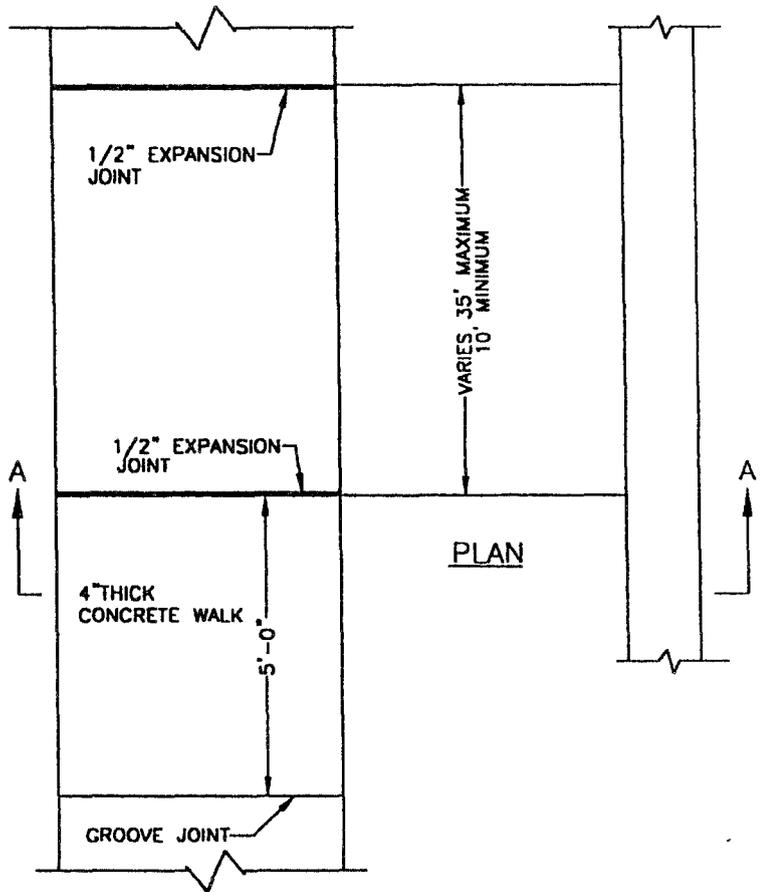
**DROP CURB TYPE II DRIVEWAY  
MONOLITHIC CONCRETE CURB AND  
SIDEWALK**

STD. NO.	REV.
1.21	



**NOTES:**

1. THE ELEVATION OF THE SIDEWALK SHALL BE NOT LESS THAN SIX INCHES OR MORE THAN EIGHTEEN INCHES ABOVE THE ROADWAY CROWN. THIS ELEVATION DIFFERENTIAL SHALL BE CONSISTENT WITHIN EACH BLOCK.
2. ALL DRIVEWAY WIDTHS TO BE DETERMINED BY THE TOWN ENGINEER OR NCDOT.
3. ALL CONCRETE TO BE 3600 PSI STRENGTH.
4. ALL CONSTRUCTION PRACTICES, INCLUDING COMPACTION, CURING, FINISHING, AND ETC. SHALL BE IN ACCORDANCE WITH THE TOWN OF INDIAN TRAIL LAND DEVELOPMENT STANDARDS.



REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE *8/10/12*

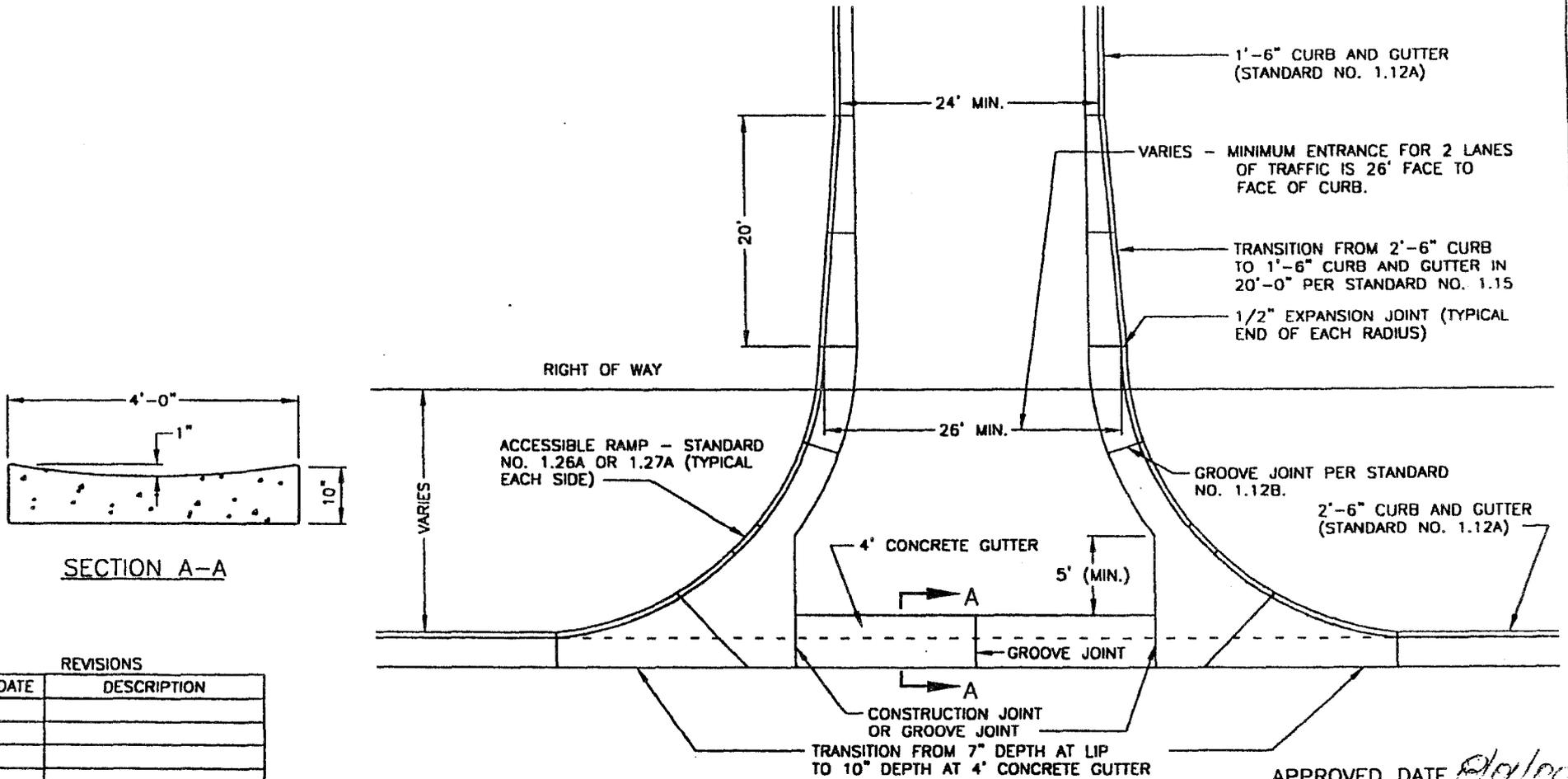
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**RESIDENTIAL DRIVEWAY (TYPE I)  
FOR VALLEY GUTTER**

STD. NO.	REV.
1.22	

**NOTES:**

1. A CONCRETE GUTTER TO BE USED EXCEPT AT EXISTING OR PROPOSED TRAFFIC SIGNAL LOCATIONS. AT THESE LOCATIONS ADDITIONAL DRAINAGE REQUIREMENTS WILL BE NECESSARY TO ELIMINATE THE NEED FOR GUTTER ACROSS THE DRIVEWAY CONNECTION.
2. THE DRIVEWAY MUST RISE 6" FROM THE GUTTER LINE TO PREVENT RUNOFF FROM ENTERING DRIVEWAY.
3. FOUR (4) FOOT GUTTER WILL NOT BE REQUIRED TO DIRECT WATER ACROSS DRIVE IF THE DRIVEWAY GUTTER SLOPE IS GREATER THAN 2%.



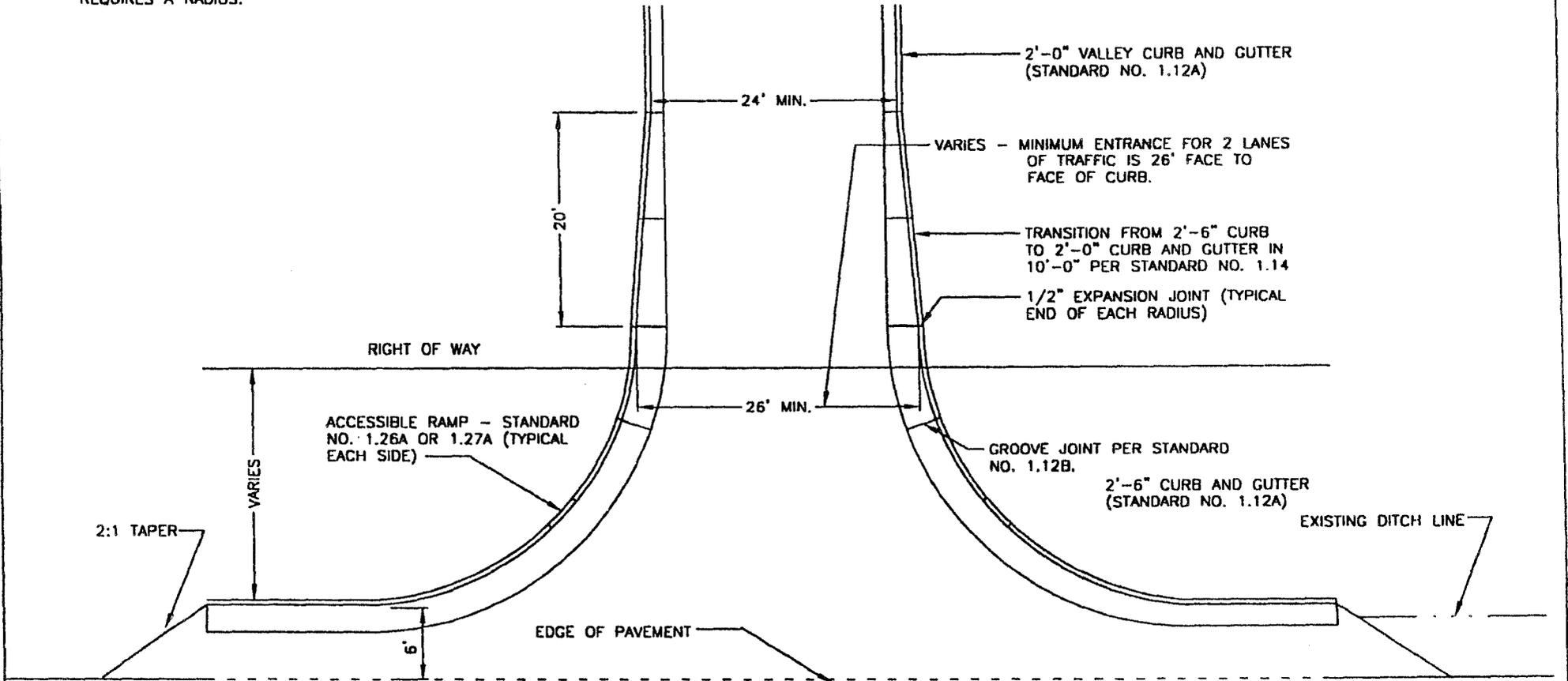
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**TYPE III DRIVEWAY ENTRANCE**

STD. NO.	REV.
1.23A	

**NOTES:**

1. THE DRIVEWAY MUST RISE 6" FROM THE GUTTER LINE TO PREVENT RUNOFF FROM ENTERING DRIVEWAY.
2. ANY DRIVE/ROADWAY CONNECTING TO A NON CURB & GUTTER ROADWAY REQUIRES A RADIUS.



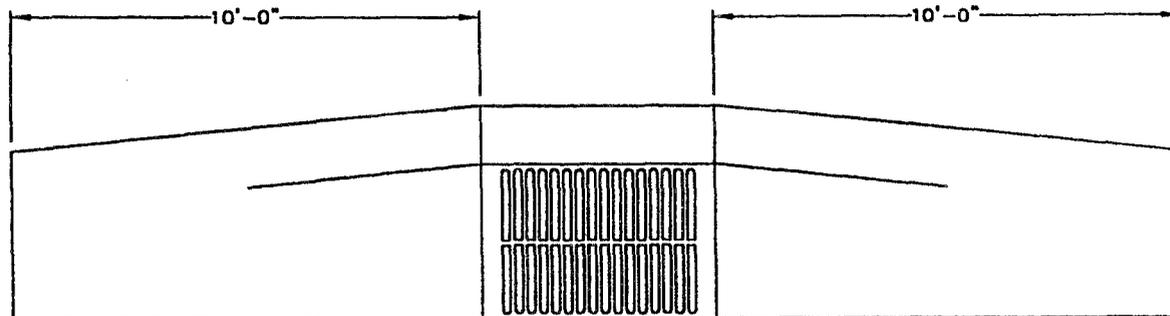
REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE *8/10/10*

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**TYPE III DRIVEWAY ENTRANCE**

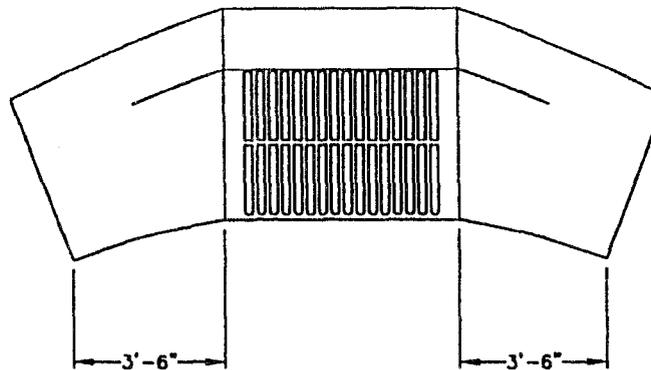
STD. NO.	REV.
1.23B	



PLAN FOR TANGENT SECTION

**NOTE:**

TRANSITION FROM VALLEY GUTTER TO 2'-6" SECTION TO BE MADE PER STD. 1.14.



PLAN FOR RESIDENTIAL CUL-DE-SAC

REVISIONS

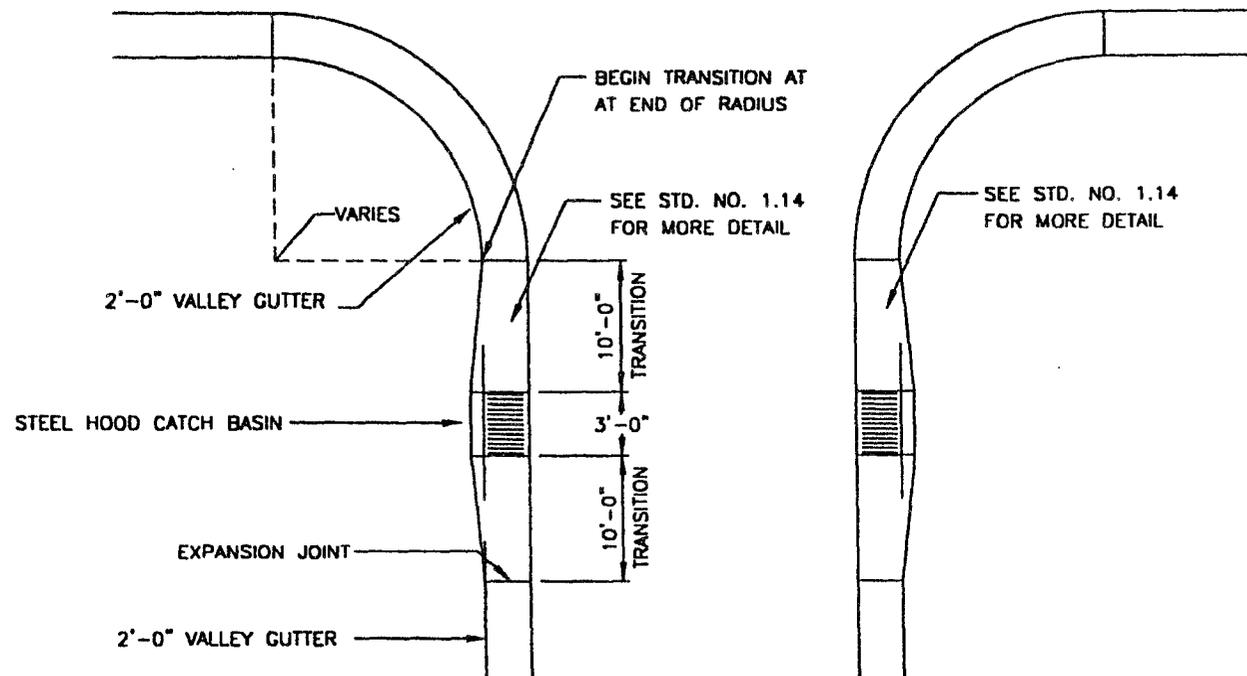
NO.	DATE	DESCRIPTION

APPROVED DATE: *Blodoo*

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**CATCH BASIN FRAME  
IN VALLEY GUTTER**

STD. NO.	REV.
1.24	



PLAN

**NOTE:**

1. WHERE 2'-6" CURB AND GUTTER IS USED, CATCH BASINS MAY BE LOCATED AT END OF RADIUS.
2. RADIUS AT INTERSECTION MAY VARY.

REVISIONS

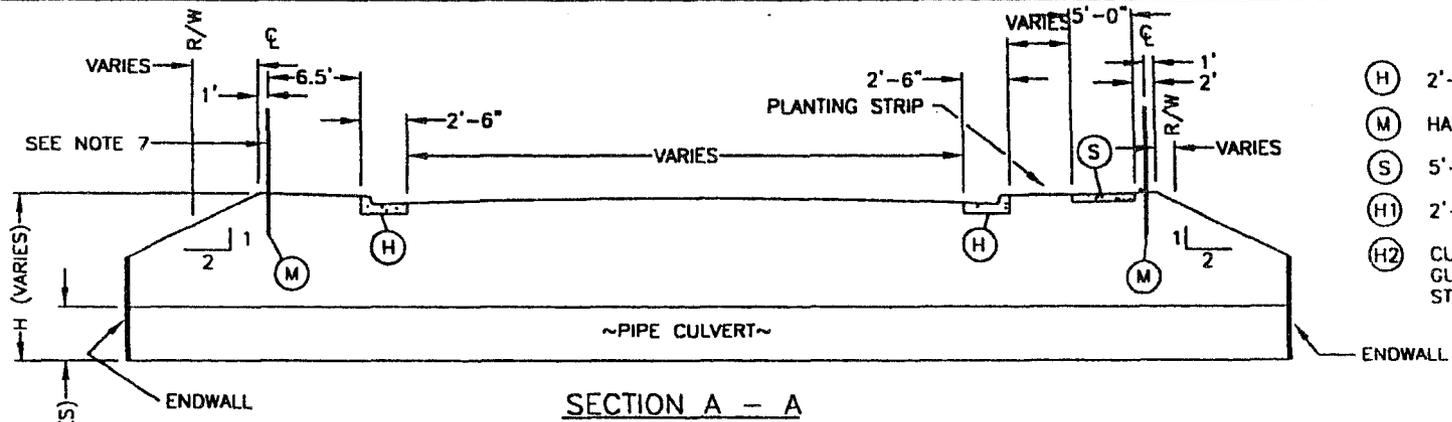
NO.	DATE	DESCRIPTION

APPROVED DATE *8/19/00*

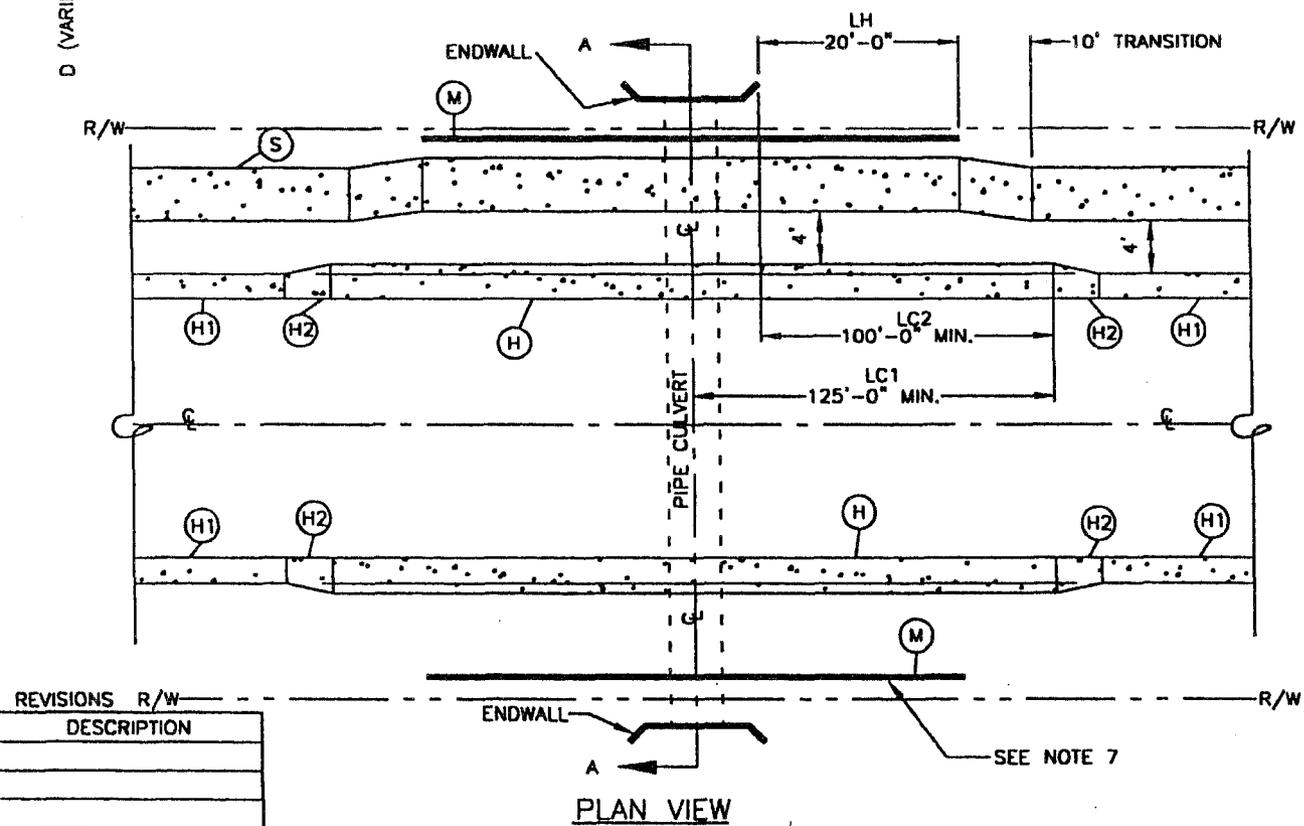
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

CATCH BASIN PLACEMENT  
AT INTERSECTION

STD. NO.	REV.
1.25	



- (H) 2'-6" CURB AND GUTTER, STD. 1.12A.
- (M) HANDRAIL, STD. 3.04
- (S) 5'-0" SIDEWALK, STD. 1.17
- (H1) 2'-0" VALLEY GUTTER, STD. 1.12A
- (H2) CURB TRANSITION 2'-6" CURB AND GUTTER TO 2'-0" VALLEY GUTTER, STD. 1.14



- LH = DISTANCE FROM END OF WINGWALL TO END OF HANDRAIL.
- LC1 = DISTANCE FROM  $\epsilon$  OF CULVERT TO END OF 2'-6" CURB AND GUTTER.
- LC2 = DISTANCE FROM END OF WINGWALL TO END OF 2'-6" CURB AND GUTTER.

REVISIONS R/W		
NO.	DATE	DESCRIPTION

APPROVED DATE *2/2/10*

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**CULVERT CROSSINGS ON RESIDENTIAL  
AND COMMERCIAL STREETS**

STD. NO.	REV.
1.31A	

**GENERAL NOTES:**

1. UNLESS OTHERWISE DETERMINED BY THE TOWN ENGINEER, THE MEASURES ILLUSTRATED SHALL BE USED WHEN CULVERT DIAMETER, D, IS GREATER THAN OR EQUAL TO 24 INCHES AND WHEN THE DIFFERENCE IN ELEVATION BETWEEN THE CULVERT INVERT AND THE TOP OF SLOPE, H, IS GREATER THAN OR EQUAL TO 5 FEET.
2. INSTALLATION OF 2'-6" CURB AND GUTTER MAY NOT BE REQUIRED WHEN AN ADEQUATE CLEAR ZONE IS PROVIDED FOR VEHICLES WITH A MAXIMUM OF 6:1 SLOPE (SEE TABLE 1).
3. INSTALLATION OF HANDRAIL MAY NOT BE REQUIRED WHEN A 10-FOOT PEDESTRIAN CLEAR ZONE IS PROVIDED BEHIND THE SIDEWALK WITH A MAXIMUM OF 6:1 SLOPE. WHERE NO SIDEWALK IS REQUIRED, INSTALLATION OF HANDRAIL MAY NOT BE REQUIRED WHEN A 15-FOOT PEDESTRIAN CLEAR ZONE IS PROVIDED BEHIND THE CURB WITH A MAXIMUM OF 6:1 SLOPE.
4. FOR CULVERT CROSSINGS WITHOUT ENDWALLS, LH AND LC2 SHALL BE MEASURED FROM THE OUTSIDE OF THE NEAREST WALL OF THE CULVERT BARREL.
5. FOR MULTIPLE BARREL CULVERT CROSSINGS, LC1 SHALL BE MEASURED FROM THE CENTERLINES OF THE OUTBOARD CULVERT BARRELS.
6. WHEN NECESSARY, AS DETERMINED BY THE TOWN ENGINEER, MEASURES ADDITIONAL TO THOSE ILLUSTRATED MAY BE REQUIRED.
7. INSTALLATION OF HANDRAIL IS REQUIRED ON THE SIDEWALK SIDE OF STREET IF SIDEWALK IS ONLY REQUIRED ON ONE SIDE OF STREET. INSTALLATION OF HANDRAIL IS REQUIRED ON BOTH SIDES OF STREET IF SIDEWALK IS REQUIRED ON BOTH SIDES OR IF NO SIDEWALK IS REQUIRED.
8. DESIGN ADT IS CALCULATED ASSUMING A TRIP GENERATION OF 13 DAILY TRIPS PER SINGLE FAMILY DWELLING UNIT.

**TABLE 1.  
CLEAR ZONE DISTANCES  
LOCAL, COLLECTOR, AND COMMERCIAL STREETS**

DESIGN ADT	CLEAR ZONE FROM EDGE OF PAVEMENT	
	TANGENT SECTION	CURVE (WITHIN 125' OF CULVERT)
UNDER 750	10'	15'
750 - 1500	12'	18'
1501 - 6000	14'	21'
OVER 6000	16'	24'

**REVISIONS**

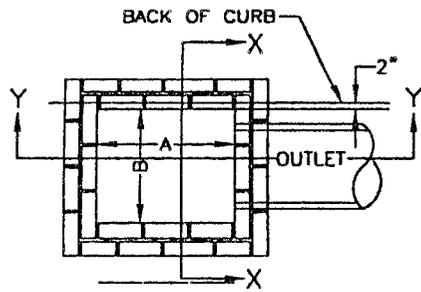
NO.	DATE	DESCRIPTION

APPROVED DATE 8/10/10

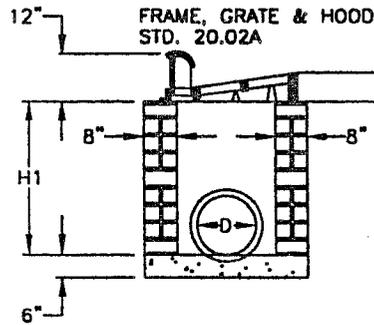
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**CULVERT CROSSINGS ON RESIDENTIAL  
AND COMMERCIAL STREETS**

STD. NO.	REV.
1.31B	



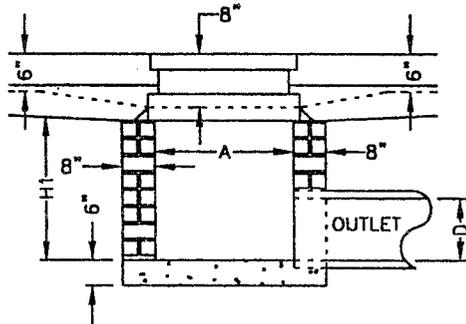
PLAN



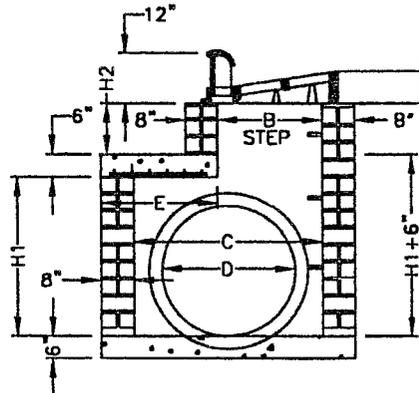
SECTION X-X

GENERAL NOTES:

1. MORTAR JOINTS 1/2" +/- 1/8" THICK
2. ALL CONCRETE TO BE 3600 P.S.I COMPRESSIVE STRENGTH.
3. PRECAST STRUCTURES MAY BE SUBSTITUTED AFTER APPROVAL BY TOWN ENGINEER.
4. ALL CATCH BASIN OVER 3'-6" IN DEPTH SHALL BE PROVIDED WITH STEPS 1'-2" ON CENTERS. STEPS SHALL BE IN ACCORDANCE WITH STD. 2.09
5. CONCRETE BRICK MAY BE USED IN LIEU OF HARD COMMON CLAY BRICK.
6. JUMBO BRICK WILL BE PERMITTED.
7. FOR 8'-0" IN HEIGHT OR LESS USE 8" WALL. OVER 8'-0" IN HEIGHT USE 12" WALL TO 6'-0" FROM TOP OF WALL, AND 8" WALL FOR THE REMAINING 6'-0".
8. FOR FRAME AND GRATE DETAIL SEE STANDARD 2.02
9. ALL PIPE IN STORM DRAIN STRUCTURES SHALL BE STRUCK EVEN WITH THE INSIDE WALL, GROUTED AND BRUSHED SMOOTH.
10. WEEP HOLE(S) SHALL BE PLACED IN BACK WALL. A STONE DRAIN CONSISTING OF 1 (ONE) CUBIC FOOT OF NUMBER 78M STONE CONTAINED IN A BAG OF POROUS FABRIC SHALL BE PLACED AT WEEP HOLE.
11. BRICK SHALL BE BONDED WITH FULL HEADERS EVERY 3 COURSES.
12. SEE STANDARD NUMBERS 1.24 AND 1.25 FOR PLACEMENT OF CATCH BASIN.

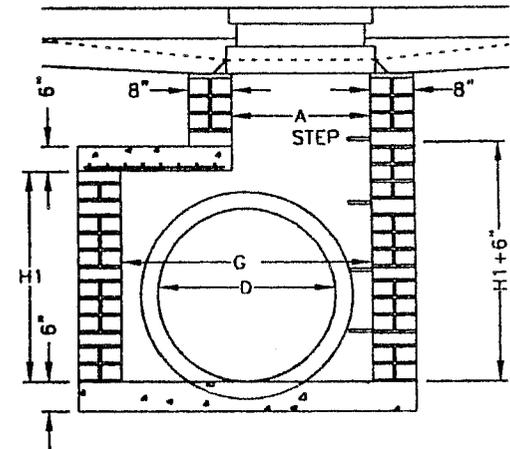


SECTION Y-Y



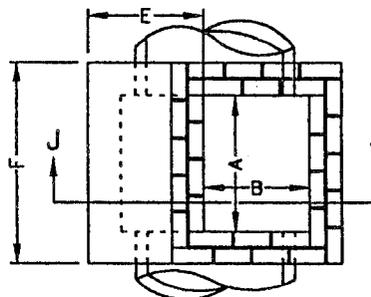
END ELEVATION/SECTION J-J

WHERE 30" TO 36" PIPE IS USED

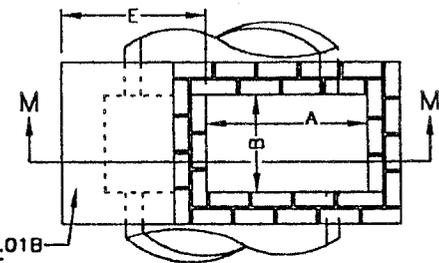


SIDE ELEVATION/SECTION M-M

WHERE 42" TO 54" PIPE IS USED



PLAN



PLAN

APPROVED DATE *10/1/10*

SEE SHEET 20.01B FOR DETAIL OF SLAB

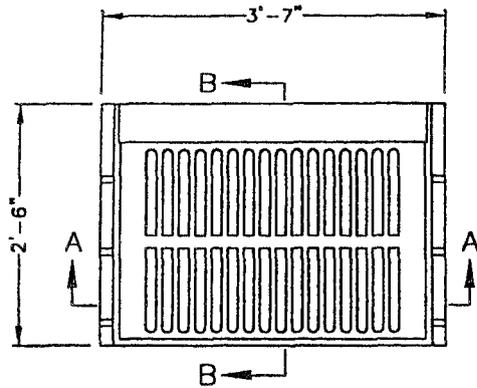
REVISIONS		
NO.	DATE	DESCRIPTION

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

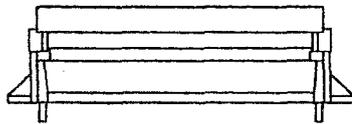
BRICK CATCH BASIN  
15" THRU 54" PIPE

STD. NO.	REV.
2.01A	





**PLAN**  
FRAME, GRATE, & HOOD ASSEMBLY



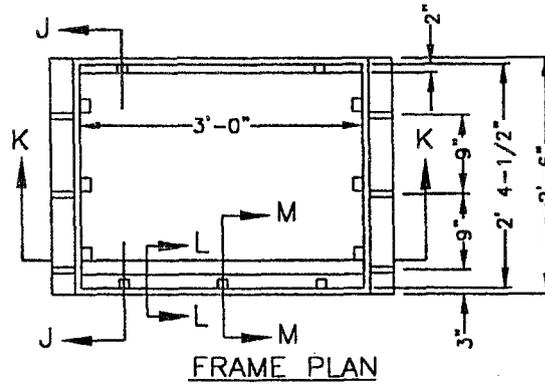
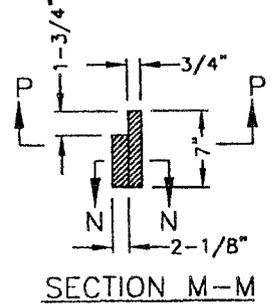
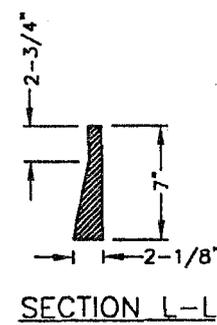
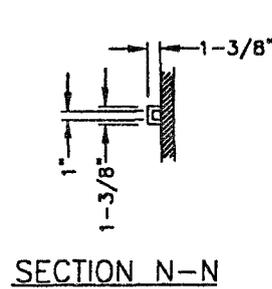
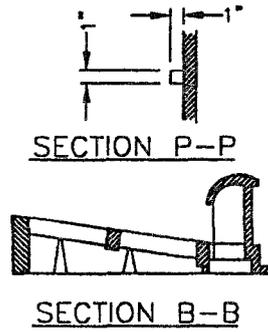
**SECTION A-A**

**GENERAL NOTES:**

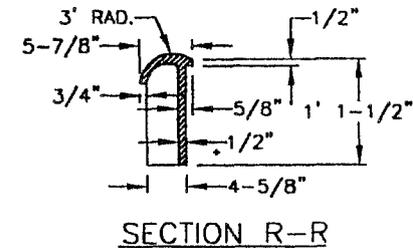
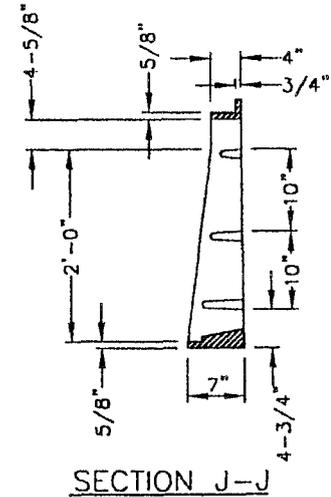
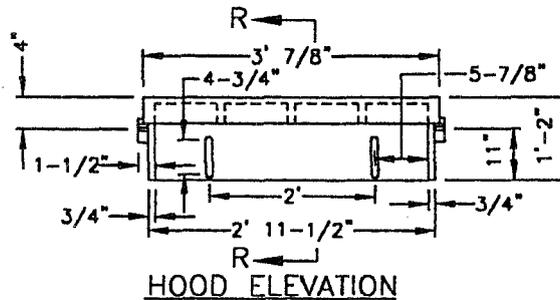
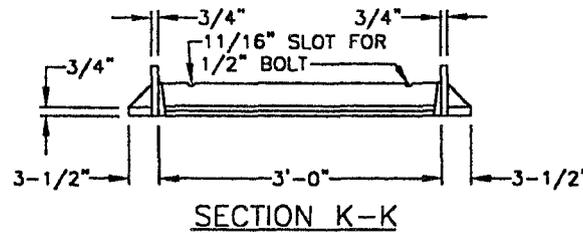
NO SUBSTITUTIONS WILL BE ALLOWED FOR TYPE "E", "F" AND "G" GRATES.

**REVISIONS**

NO.	DATE	DESCRIPTION



**SECTION K-K**



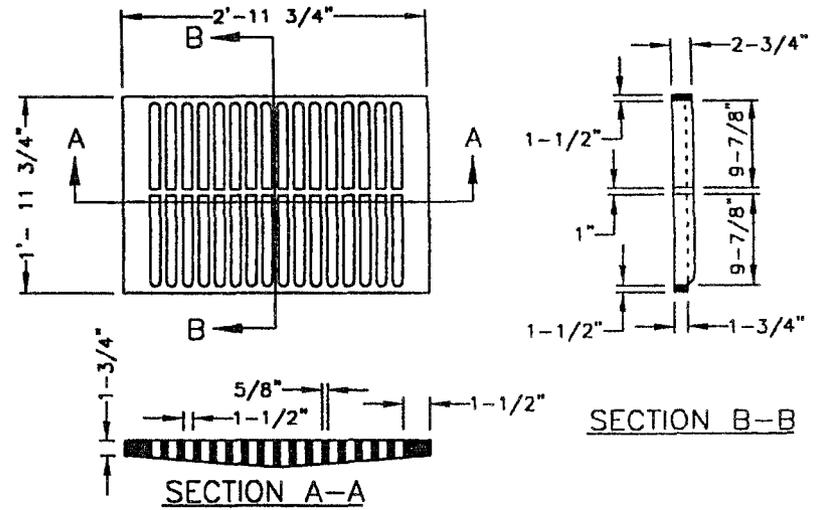
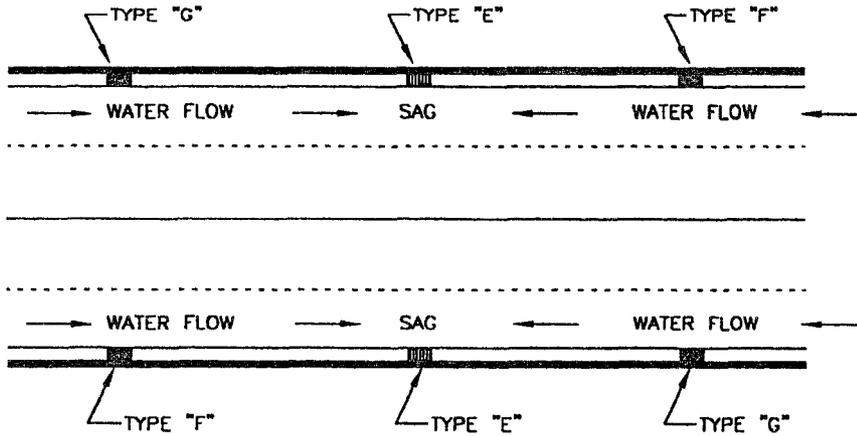
APPROVED DATE *Blotter*

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

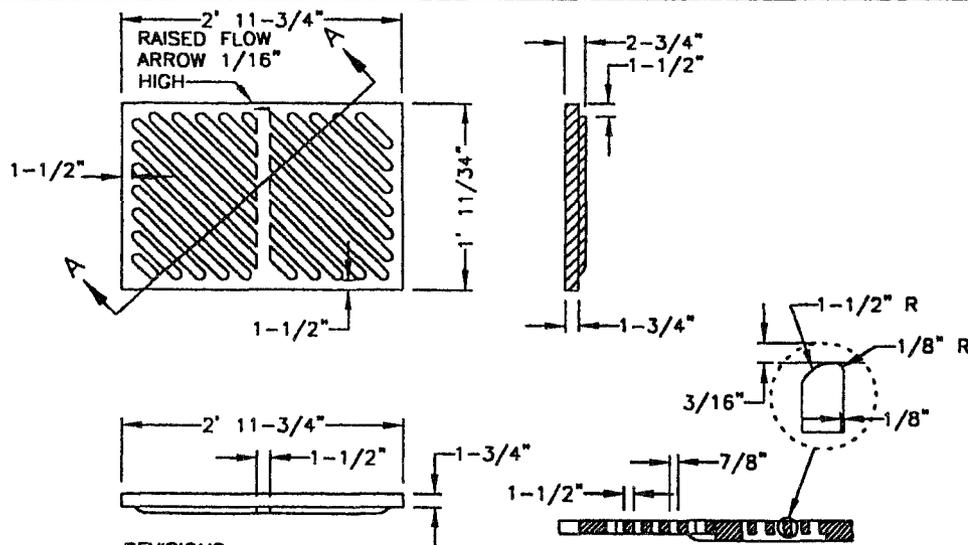
FRAME, GRATE AND HOOD  
FOR USE ON STANDARD CATCH BASIN

STD. NO.	REV.
2.02A	

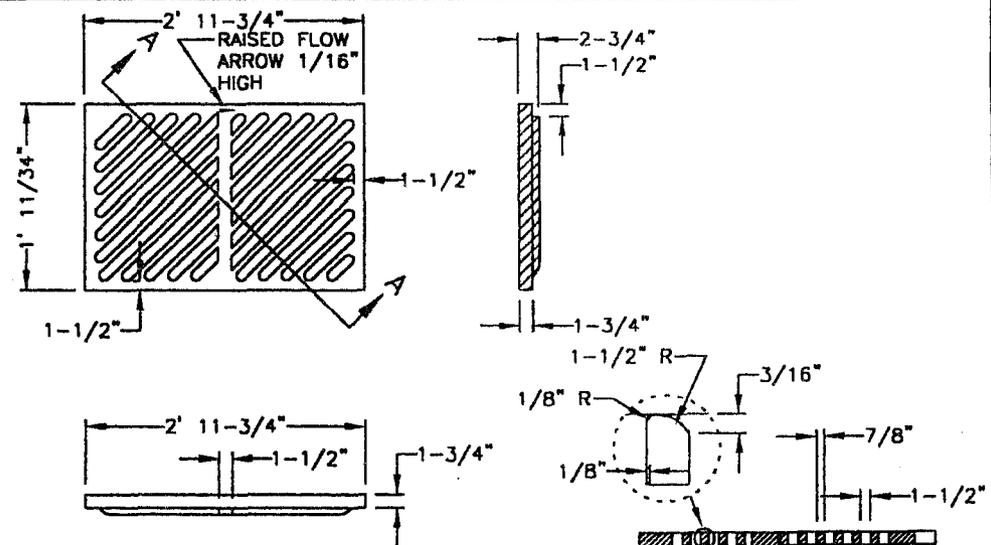
DETAIL SHOWING TYPES OF GRATES TO BE USED  
ACCORDING TO WATER FLOW



TYPE - E



SECTION A-A  
TYPE - F



TYPE - G

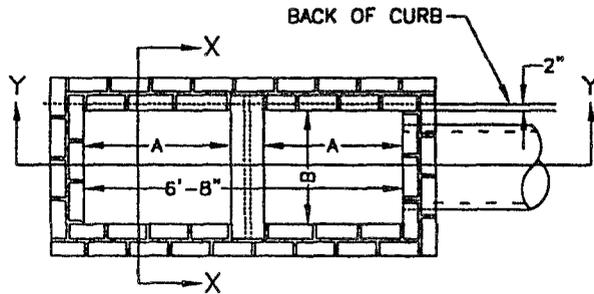
APPROVED DATE *[Signature]*

REVISIONS		
NO.	DATE	DESCRIPTION

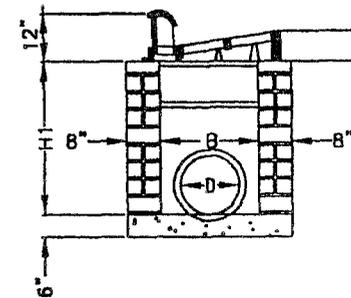
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

FRAME, GRATE AND HOOD  
FOR USE ON STANDARD CATCH BASIN

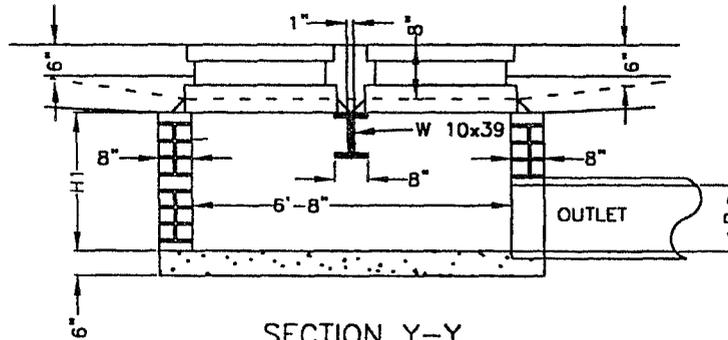
STD. NO.	REV.
2.02B	



PLAN



SECTION X-X



SECTION Y-Y

DIMENSIONS OF BOX AND PIPE				
PIPE	SPAN	WIDTH	HEIGHT	W 10
D	A	B	MIN. H	LENGTH
15"	3'-0"	2'-4"	2'-6"	2'-10"
18"	3'-0"	2'-4"	2'-10"	2'-10"
24"	3'-0"	2'-4"	3'-4"	2'-10"

**GENERAL NOTES:**

1. TWO 4" x 4" x 3/8" ANGLE IRONS MAY BE SUBSTITUTED FOR THE W10x39 BEAM.
2. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
3. MORTAR JOINTS SHOULD BE BETWEEN 3/8" TO 5/8" THICK.
4. ALL CATCH BASINS OVER 3'-6" IN DEPTH TO BE PROVIDED WITH METAL STEPS ON 1'-2" CENTERS. STEPS SHALL BE IN ACCORDANCE WITH STD. 2.09.
5. CONCRETE BRICK MAY BE USED IN LIEU OF HARD COMMON CLAY BRICK. JUMBO BRICK WILL BE PERMITTED.
6. FOR 8'-0" IN HEIGHT OR LESS USE 8" WALL, OVER 8'-0" IN HEIGHT USE 12" WALL TO 6'-0" FROM TOP OF WALL, AND 8" WALL FOR THE REMAINING 6'-0".
7. FOR FRAME AND GRATE DETAIL SEE STANDARD 2.02.
8. ALL PIPE IN STORM DRAIN STRUCTURE SHALL BE STRUCK EVEN WITH THE INSIDE WALL, GROUDED AND BRUSHED SMOOTH.
9. WEEP HOLE(S) SHALL BE PLACED IN BACK WALL. A STONE DRAIN CONSISTING OF 1 (ONE) CUBIC FOOT OF NUMBER 78M STONE CONTAINED IN A BAG OF POROUS FABRIC SHALL BE PLACED AT EACH WEEP HOLE.
10. SEE STANDARD NUMBERS 1.24 AND 1.25 FOR PLACEMENT OF CATCH BASIN.

**REVISIONS**

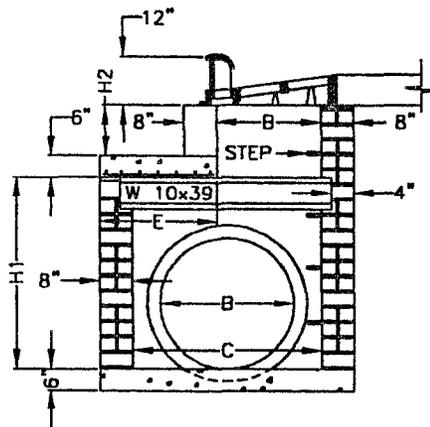
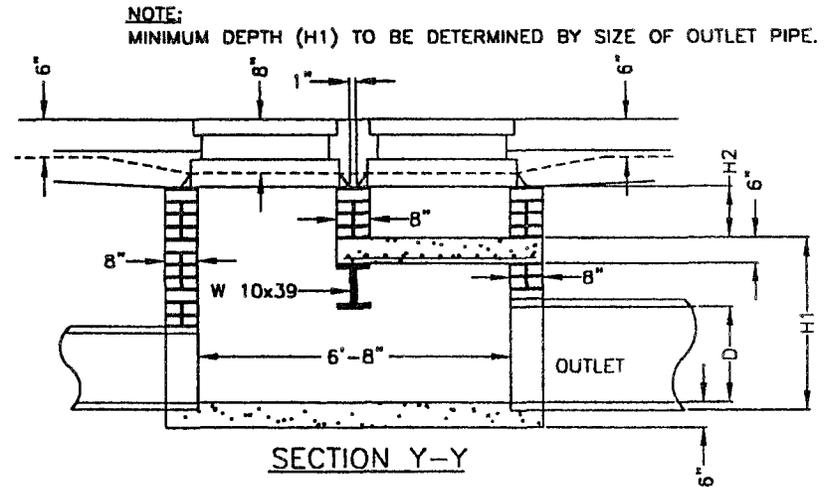
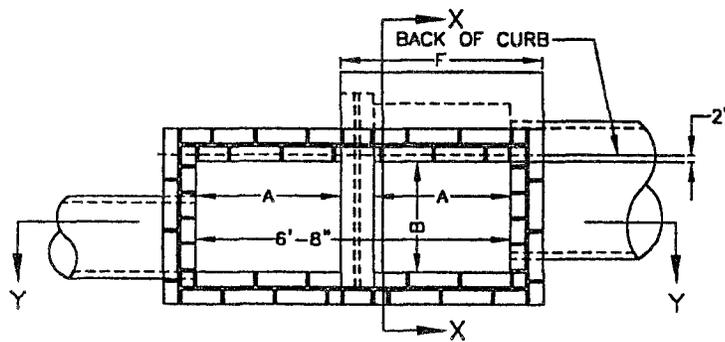
NO.	DATE	DESCRIPTION

APPROVED DATE *8/10/00*

TOWN OF INDIAN TRIAL  
LAND DEVELOPMENT  
STANDARDS

BRICK DOUBLE CATCH BASIN  
15" THRU 24" PIPE

STD. NO.	REV.
2.03	



**GENERAL NOTES:**

1. TWO 3/8"x4" ANGLE IRONS MAY BE SUBSTITUTED FOR THE W10x39 BEAM.
2. ALL CONCRETE TO BE 3600 P.S.I COMPRESSIVE STRENGTH.
3. MORTAR JOINTS SHOULD BE BETWEEN 3/8" AND 5/8" THICK.
4. ALL CATCH BASINS OVER 3'-6" IN DEPTH TO BE PROVIDED WITH METAL STEPS ON 1'-2" +/- CENTERS. STEPS SHALL BE IN ACCORDANCE WITH STD. 2.09.
5. CONCRETE BRICK MAY BE USED IN LIEU OF HARD COMMON CLAY BRICK. JUMBO BRICK WILL BE PERMITTED.
6. FOR 8'-0" IN HEIGHT OR LESS USE 8" WALL, OVER 8'-0" IN HEIGHT USE 12". USE 12" WALL TO 6'-0" FROM TOP OF WALL, AND 8" WALL FOR THE REMAINING 6'-0".
7. FOR FRAME AND GRATE DETAIL SEE STANDARD 2.02.
8. ALL PIPE IN STORM DRAIN STRUCTURE SHALL BE STRUCK EVEN WITH THE INSIDE WALL, GROUTED AND BRUSHED SMOOTH.
9. WEEP HOLE(S) SHALL BE PLACED IN BACK WALL. A STONE DRAIN CONSISTING OF 1 (ONE) CUBIC FOOT OF NUMBER 78M STONE CONTAINED IN A BAG OF POROUS FABRIC SHALL BE PLACED AT EACH WEEP HOLE.
10. SEE STANDARD NUMBERS 1.24 AND 1.25 FOR PLACEMENT OF CATCH BASIN.

**REVISIONS**

NO.	DATE	DESCRIPTION

APPROVED DATE *Bloria*

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

BRICK DOUBLE CATCH BASIN  
30" THRU 36" PIPE

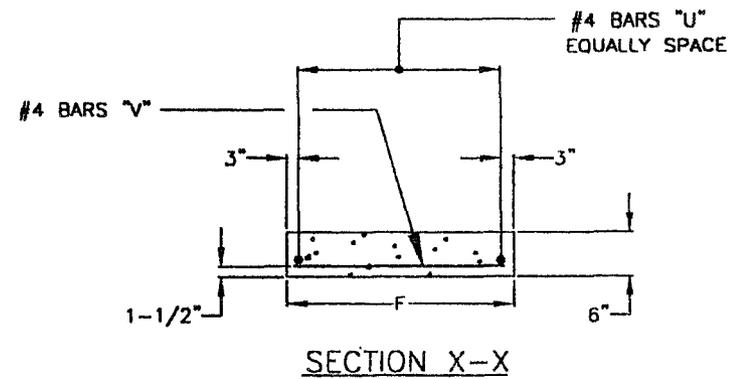
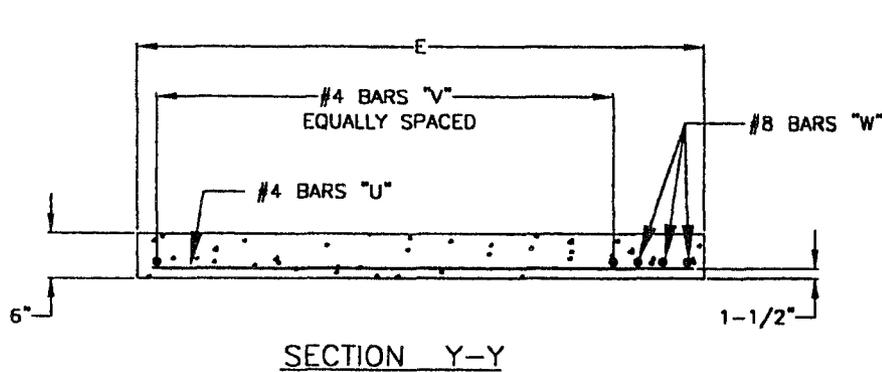
STD. NO.	REV.
2.04A	

15" THRU 24" PIPE

DIMENSIONS OF BOX AND PIPE						
PIPE	SPAN	WIDTH	WIDTH	HEIGHT	HEIGHT	W 10
D	A	B	C	MIN. H1	H2	LENGTH
15"	3'-0"	2'-4"	-	2'-6"	-	2'-10"
18"	3'-0"	2'-4"	-	2'-10"	-	2'-10"
24"	3'-0"	2'-4"	-	3'-4"	-	2'-10"

30" THRU 36" PIPE

DIMENSIONS OF BOX AND PIPE							COVER		TOP SLAB REINFORCEMENT						
PIPE	SPAN	WIDTH	WIDTH	HEIGHT	HEIGHT	W 10	DIMENSION		BARS - U		BARS - V		BARS - W		TOT.
D	A	B	C	MIN. H1	H2	LENGTH	E	F	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	LBS.
30"	3'-0"	2'-4"	3'-4"	3'-2"	VAR.	4'-0"	1'-10"	4'-4"	4	1'-6"	3	4'-1"	3	4'-1"	45
36"	3'-0"	2'-4"	3'-10"	3'-8"	VAR.	4'-6"	2'-4"	4'-4"	4	2'-0"	4	4'-1"	3	4'-1"	49



REVISIONS

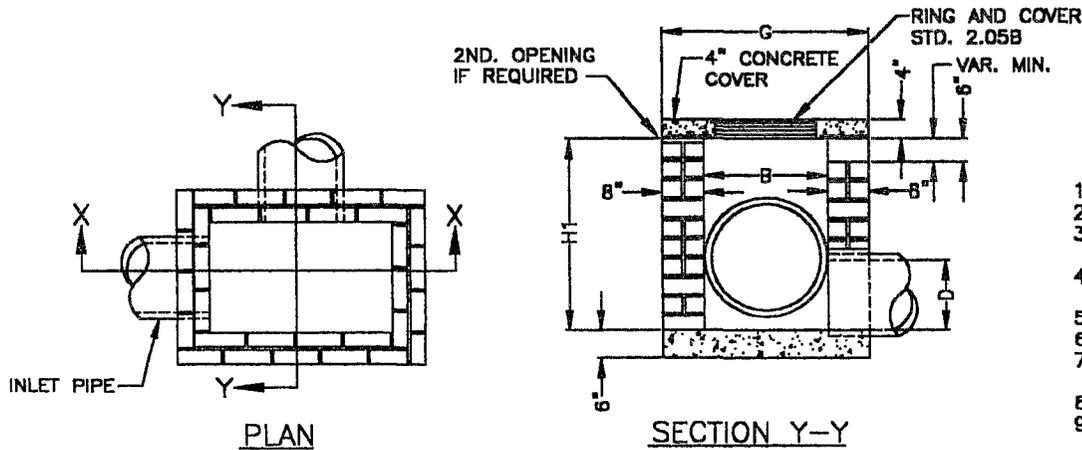
NO.	DATE	DESCRIPTION

APPROVED DATE 8/10/12

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

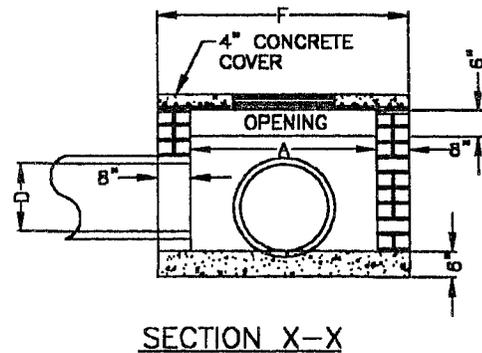
BRICK DOUBLE CATCH BASIN  
30" THRU 36" PIPE

STD. NO.	REV.
2.04B	



**GENERAL NOTES:**

1. MORTAR JOINTS SHOULD BE BETWEEN 3/8" AND 5/8" THICK.
2. ALL CONCRETE TO BE 3600 P.S.I COMPRESSIVE STRENGTH.
3. THE 6" OPENING SHOWN MAY BE INCREASED TO 8" MAX. IF DEEMED TO BE NECESSARY BY THE ENGINEER.
4. ALL CATCH BASIN OVER 3'-6" IN DEPTH SHALL BE PROVIDED WITH STEPS 1'-2" ON CENTERS. STEPS SHALL BE IN ACCORDANCE WITH STD. 2.09.
5. CONCRETE BRICK MAY BE USED IN LIEU OF HARD COMMON CLAY BRICK.
6. JUMBO BRICK WILL BE PERMITTED.
7. FOR 8'-0" IN HEIGHT OR LESS USE 8" WALL. OVER 8'-0" IN HEIGHT USE 12" WALL TO 6'-0" FROM TOP OF WALL, AND 8" WALL FOR THE REMAINING 6'-0".
8. ALL EXPOSED JOINTS WILL BE CONCAVE TOOLED.
9. ALL PIPE IN STORM DRAIN STRUCTURE SHALL BE STRUCK EVEN WITH THE INSIDE WALL, GROUTED AND BRUSHED SMOOTH.
10. WEEP HOLES SHALL BE PLACED IN BACK WALL WITH FILTER FABRIC OR STONE ON BACK SIDE.
11. THIS CATCH BASIN IS NOT TO BE USED WITHIN STREET RIGHT OF WAY UNLESS OTHERWISE APPROVED BY TOWN ENGINEER.



PIPE D	DIMENSIONS OF BOX AND PIPE			REINFORCING					COVER DIMENSION	
	SPAN A	WIDTH B	HEIGHT H1(MIN)	BARS - X		BARS - Y		TOTAL LBS.	F	G
15"	3'-6"	2'-3"	2'-7"	2	3'-4"	7	4'-7"	26	4'-10"	3'-7"
18"	4'-0"	2'-8"	2'-11"	2	3'-9"	8	5'-1"	33	5'-4"	4'-0"
24"	4'-0"	2'-8"	3'-5"	2	3'-9"	8	5'-1"	33	5'-4"	4'-0"
30"	4'-0"	3'-6"	3'-11"	2	4'-7"	9	5'-1"	37	5'-4"	4'-10"
36"	4'-0"	3'-6"	4'-6"	2	4'-7"	9	5'-1"	37	5'-4"	4'-10"
42"	4'-0"	3'-6"	4'-11"	2	4'-7"	9	5'-1"	37	5'-4"	4'-10"
48"	4'-6"	4'-0"	5'-5"	2	5'-1"	10	5'-7"	45	5'-10"	5'-4"

**REVISIONS**

NO.	DATE	DESCRIPTION

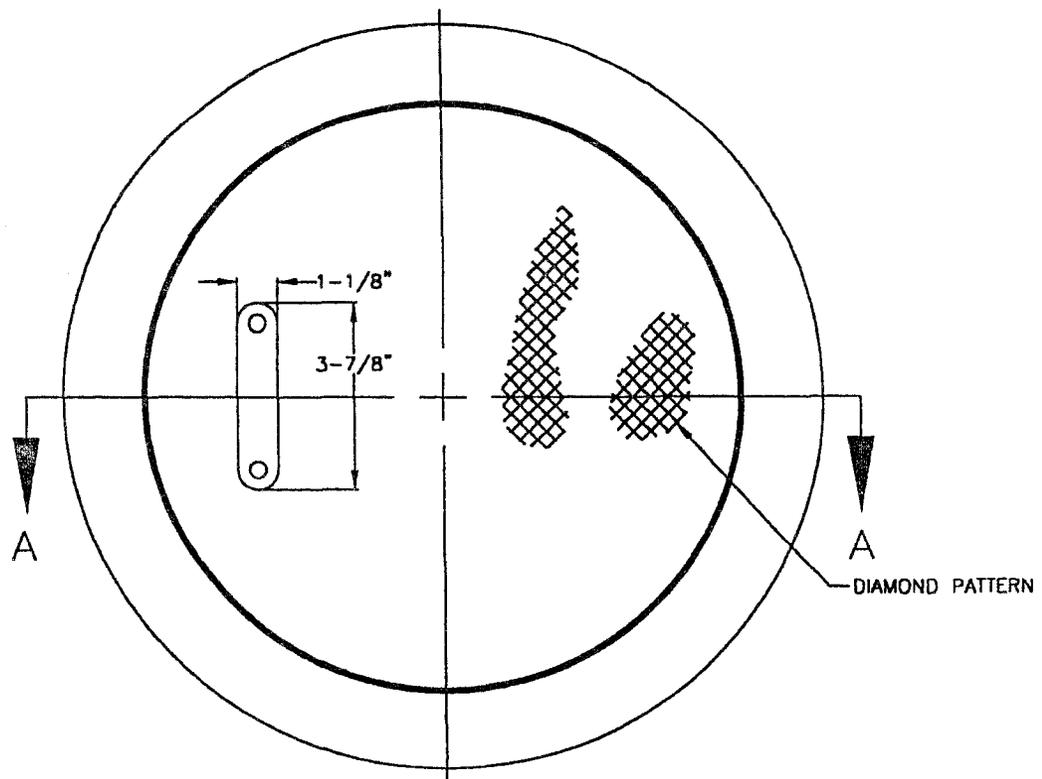
APPROVED DATE 8/01/00

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

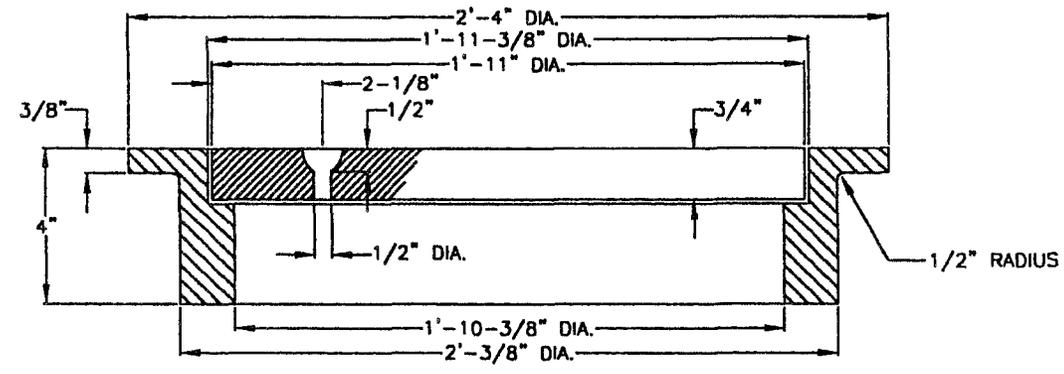
**SLAB TYPE CATCH BASIN  
15" THRU 48" PIPE**

STD. NO.	REV.
2.05A	

MINIMUM WEIGHT	
RING	96 LBS
COVER	86 LBS



PLAN VIEW



SECTION A-A

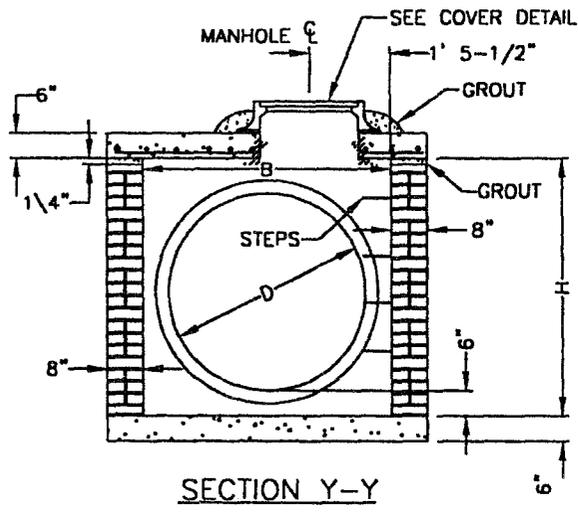
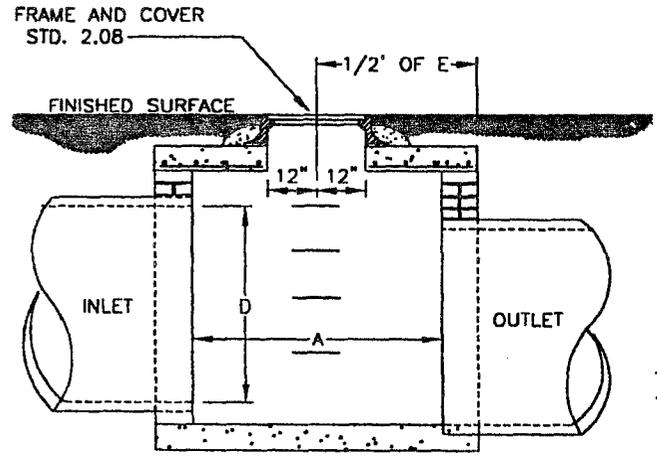
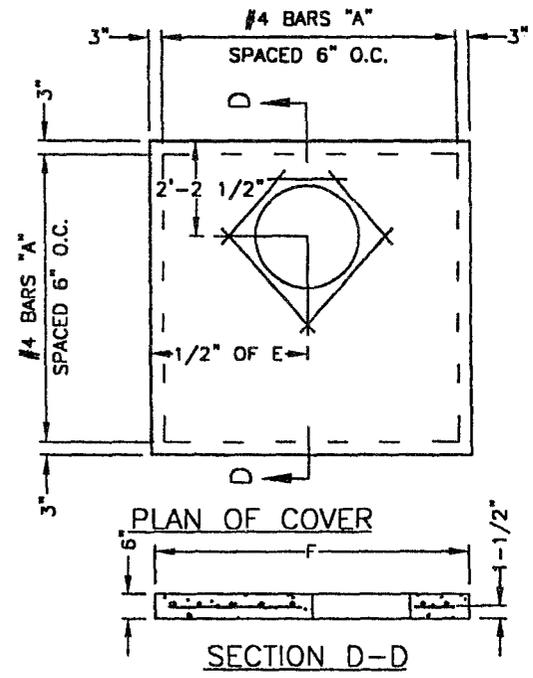
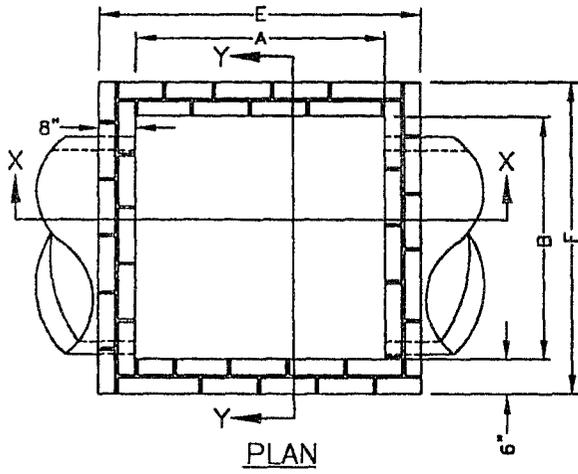
APPROVED DATE *6/1/00*

REVISIONS		
NO.	DATE	DESCRIPTION

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

MANHOLE RING AND COVER  
FOR SLAB TYPE CATCH BASIN

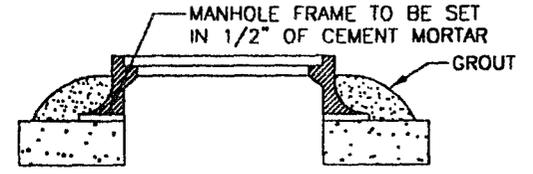
STD. NO.	REV.
2.05B	



**GENERAL NOTES:**

1. ALL EXPOSED CONCRETE TO BE CHAMFERED 1"
2. ALL CONCRETE TO BE 3600 P.S.I
3. ALL EXPOSED JOINTS SHALL BE CONCAVE TOOLED.
4. MORTAR JOINTS SHOULD BE BETWEEN 3/8" AND 5/8" THICK.
5. CONCRETE BRICK MAY BE USED IN LIEU OF HARD COMMON CLAY BRICK. JUMBO BRICK WILL BE PERMITTED.
6. FOR 8'-0" IN HEIGHT OR LESS USE 8" WALL. OVER 8'-0" IN HEIGHT USE 12" WALL TO 6'-0" FROM TOP OF WALL AND 8" WALL FOR THE REMAINING 6'-0".
7. ALL JUNCTION BOXES OVER 3'-6" IN DEPTH SHALL BE PROVIDED WITH STEPS 1'-2" ON CENTERS. STEPS SHALL BE IN ACCORDANCE WITH STD. 2.09. MANHOLE OPENING TO ALIGN WITH STEPS.
8. DETAIL OF PIPE IN CONCRETE SHALL BE IN ACCORDANCE WITH STD. 2.03.
9. FOR FRAME AND COVER DETAIL SEE STD. NO. 2.08
10. ALL PIPE IN STORM DRAIN STRUCTURE TO BE STRUCK EVEN WITH THE INSIDE WALL, GROUTED AND BRUSHED SMOOTH.
11. WEEP HOLES SHALL BE PLACED IN BACK WALL. A STONE DRAIN CONSISTING OF 1 (ONE) CUBIC FOOT OF NUMBER 78M STONE CONTAINED IN A BAG OF POROUS FABRIC SHALL BE PLACED AT EACH WEEP HOLE.
12. ALL SLABS SHALL BE FORMED.

DIMENSIONS OF BOX AND PIPE						REINF. BARS	
PIPE	SPAN	WIDTH	HEIGHT	SIZE		NO.	LENGTH
D	A	B	H	E	F		
42"	4'-8"	4'-8"	4'-9"	6'-0"	6'-0"	22	5'-9"
48"	5'-0"	6'-0"	5'-3"	6'-4"	6'-4"	24	6'-1"
54"	5'-6"	5'-6"	5'-9"	6'-10"	6'-10"	26	6'-7"
60"	6'-0"	6'-0"	6'-3"	7'-4"	7'-4"	28	7'-1"
66"	6'-6"	6'-6"	6'-9"	7'-10"	7'-10"	30	7'-7"



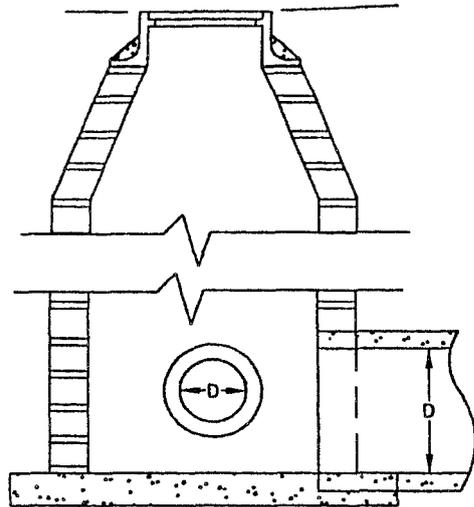
REVISIONS		
NO.	DATE	DESCRIPTION

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

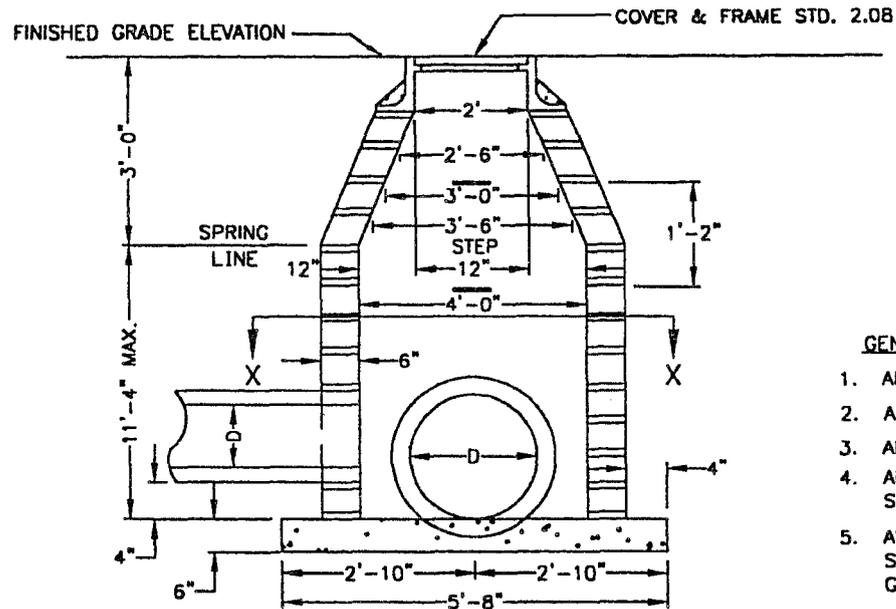
BRICK JUNCTION BOX  
42" THRU 66" PIPE

STD. NO.	REV.
2.06	

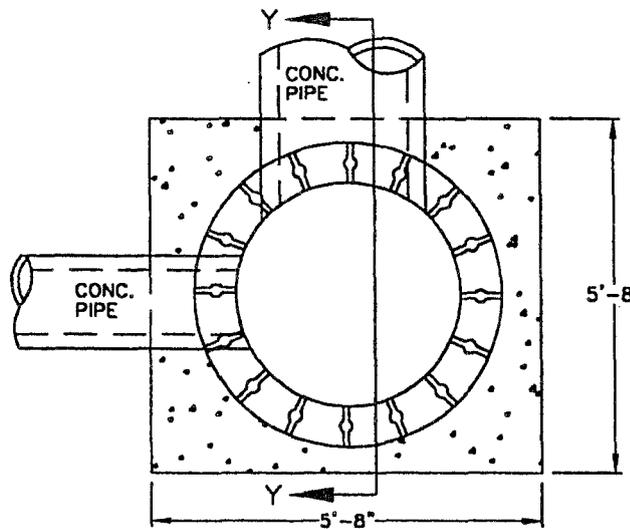
APPROVED DATE *8/10/10*



PART SECTION Y-Y



SECTION ON C



SECTION X-X

**GENERAL NOTES:**

1. ALL MORTAR JOINTS TO BE 1/2" (+/-) 1/8"
2. ALL EXPOSED JOINTS WILL BE CONCAVE TOOLED.
3. ALL SLABS SHALL BE FORMED.
4. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
5. ALL PIPE IN STORM DRAIN STRUCTURES SHALL BE STRUCK EVEN WITH THE INSIDE WALL, GROUTED AND BRUSHED SMOOTH.
6. MANHOLES OVER 3'-6" IN DEPTH SHALL BE PROVIDED WITH STEPS 1'-2" ON CENTERS.
7. STEPS TO BE IN ACCORDANCE WITH STD. 2.09.
8. FOR RING AND COVER SEE DETAIL 2.08.

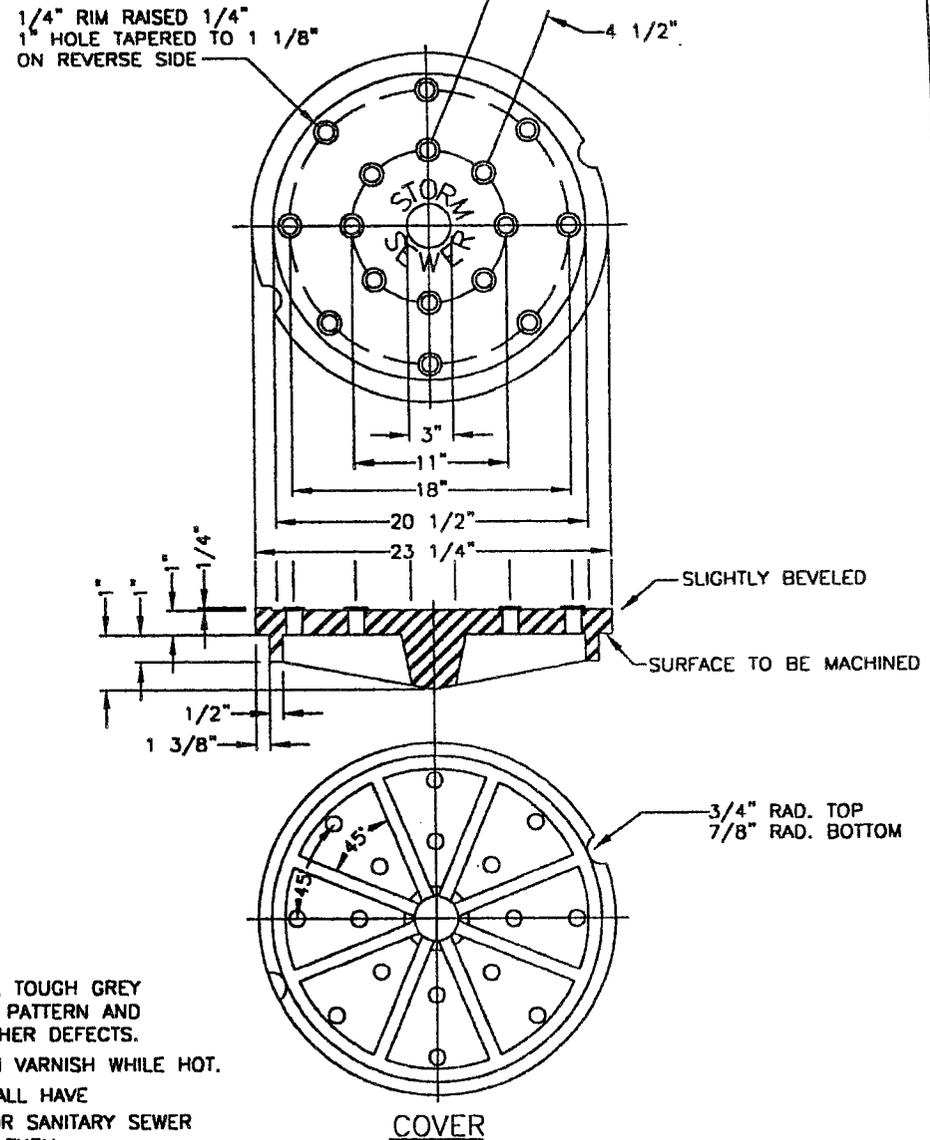
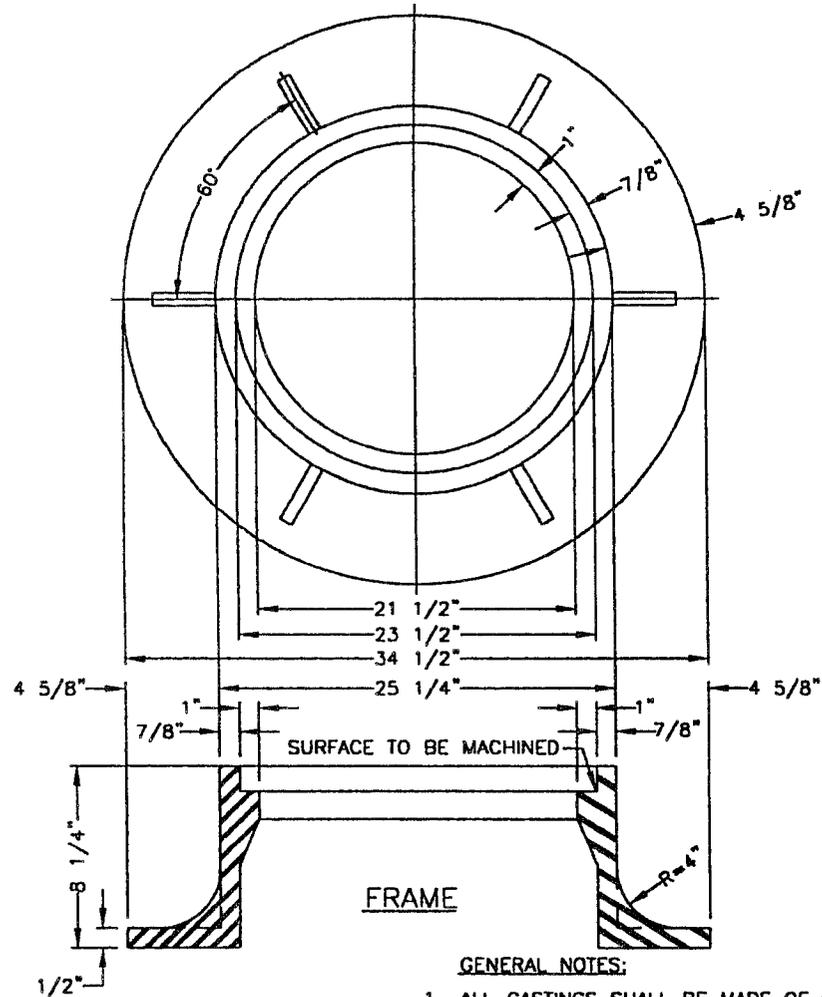
REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE *8/10/00*

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

BLOCK MANHOLE 15" THRU 36" PIPE

STD. NO.	REV.
2.07	



**GENERAL NOTES:**

1. ALL CASTINGS SHALL BE MADE OF CLEAN, EVEN GRAIN, TOUGH GREY CAST IRON. THE CASTING SHALL BE SMOOTH, TRUE TO PATTERN AND FREE FROM PROJECTIONS, SAND HOLES, WARP AND OTHER DEFECTS.
2. ALL CASTINGS SHALL BE COATED WITH COAL TAR PITCH VARNISH WHILE HOT.
3. ALL COVERS USED FOR STORM DRAIN STRUCTURES SHALL HAVE "STORM SEWER" CAST ON THEM. ALL COVERS USED FOR SANITARY SEWER STRUCTURES SHALL HAVE "SANITARY SEWER" CAST ON THEM.
4. THE IRON USED FOR THESE CASTINGS SHALL CONFORM TO THE SPECIFICATIONS OF THE ASTM DESIGNATION A48 FOR CLASS 30 GREY IRON. APPROXIMATE WEIGHT 383 POUNDS.

**REVISIONS**

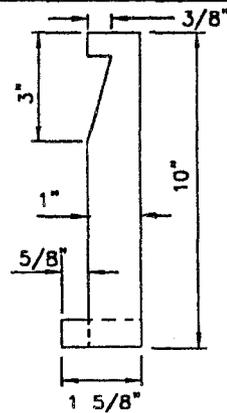
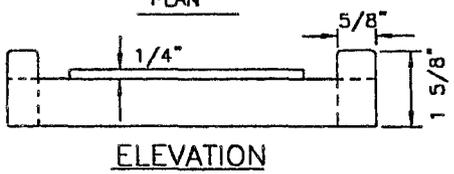
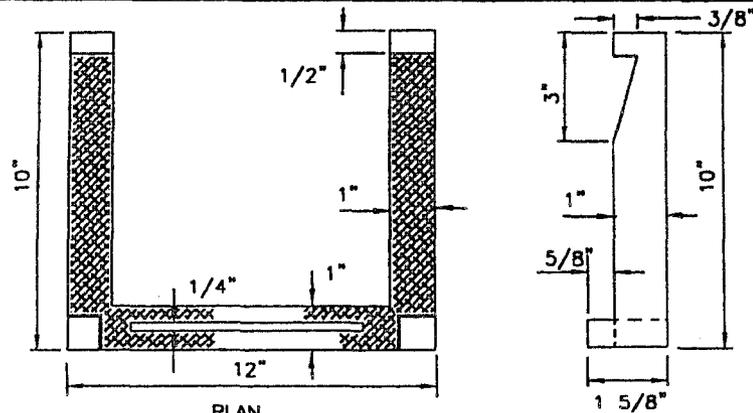
NO.	DATE	DESCRIPTION

APPROVED DATE *@/er/oc*

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

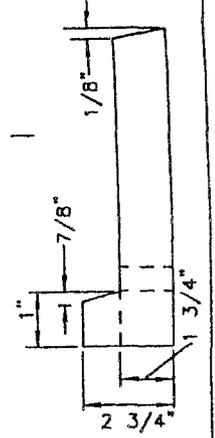
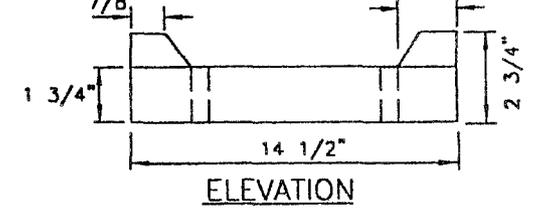
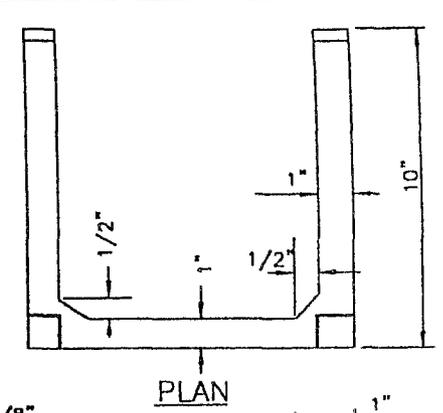
**MANHOLE FRAME AND COVER**

STD. NO.	REV.
2.08	

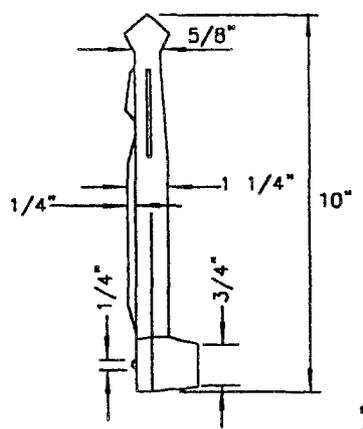


SIDE VIEW  
CAST IRON

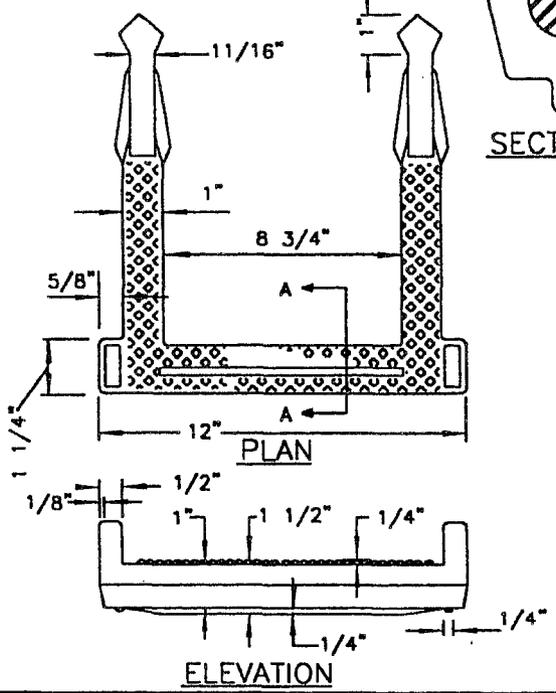
- NOTES:**
1. STEPS DIFFERING IN DIMENSIONS, CONFIGURATION, OR MATERIALS FROM THOSE SHOWN MAY ALSO BE USED PROVIDED THE CONTRACTOR HAS FURNISHED DETAILS OF THE PROPOSED STEPS AND HAS RECEIVED WRITTEN APPROVAL FROM THE TOWN ENGINEER.
  2. ALL STEPS SHALL PROTRUDE 4" FROM INSIDE FACE OF STRUCTURE WALL.



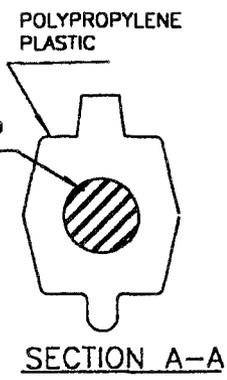
SIDE VIEW  
CAST IRON



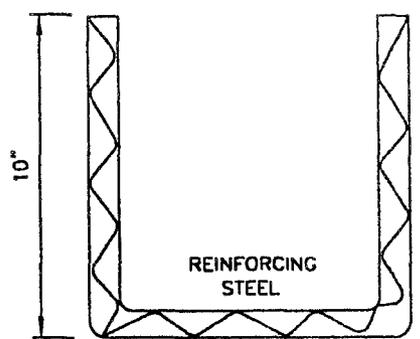
SIDE VIEW  
COMPOSITE  
REVISIONS



ELEVATION

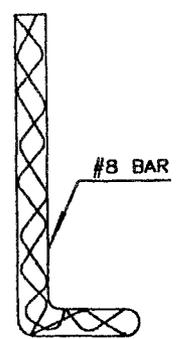


SECTION A-A



REINFORCING STEEL

PLAN



SIDE VIEW

REINFORCING STEEL NOT TO BE USED IN SANITARY SEWER MANHOLES.

REINFORCING STEEL NOT TO BE USED IN SANITARY SEWER MANHOLES.

APPROVED DATE *8/10/00*

NO.	DATE	DESCRIPTION

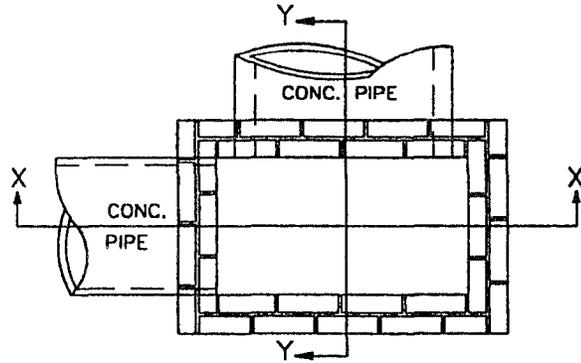
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

DRAINAGE STRUCTURE STEPS

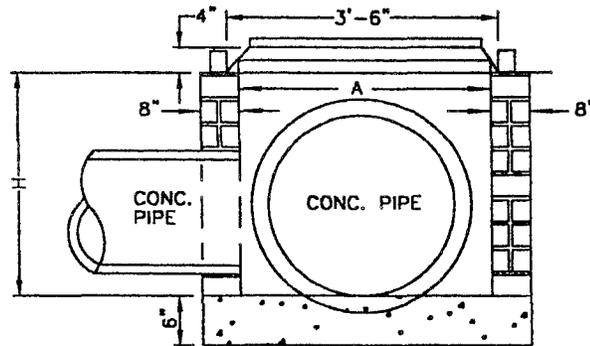
STD. NO.	REV.
2.09	

**GENERAL NOTES:**

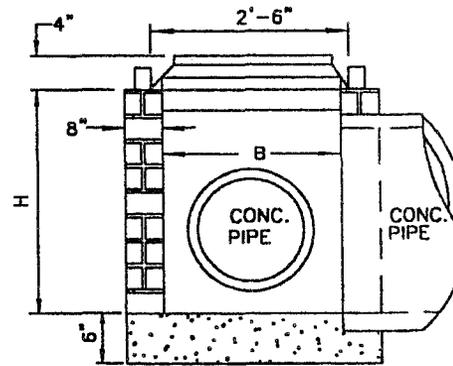
1. ALL DROP INLETS OVER 3'-6" IN DEPTH TO BE PROVIDED WITH STEPS 1'-2" ON CENTERS. STEPS SHALL BE IN ACCORDANCE WITH STD. 2.09
2. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
3. MORTAR JOINTS SHOULD BE BETWEEN 3/8" AND 5/8" THICK.
4. BRICK MASONRY DROP INLET NOT TO BE USED IN LOCATIONS SUBJECT TO TRAFFIC.
5. JUMBO BRICK WILL BE PERMITTED. CONCRETE BRICK OR 4" SOLID CONCRETE BLOCKS MAY BE USED IN LIEU OF HARD COMMON CLAY BRICK.
6. FOR 8"-0" IN HEIGHT OR LESS USE 8" WALL OVER 8"-0" IN HEIGHT USE 12" WALL TO 6'-0" FROM TOP OF WALL AND 8" WALL FOR THE REMAINING 6'-0". QUANTITIES TO BE ADJUSTED ACCORDINGLY.
7. FOR FRAME AND GRATE DETAIL SEE STD. NO. 2.11.
8. ALL PIPE IN STORM DRAIN STRUCTURE TO BE STRUCK EVEN WITH THE INSIDE WALL, GROUTED AND BRUSHED SMOOTH.
9. ALL SLABS SHALL BE FORMED.



**PLAN**  
WITH COPING REMOVED



**SECTION X-X**



**SECTION Y-Y**

**DIMENSIONS AND QUANTITIES**

DIMENSIONS OF BOX & PIPE				CONC. IN BASE C.U. YDS	TOTAL BRICK MASONRY			DEDUCTIONS FOR ONE PIPE	
PIPE	SPAN	WIDTH	HEIGHT		PER FT. HEIGHT	BRICK COPING	MIN. H	C.M.	R.C.
12"	3'-0"	2'-0"	2'-8"	0.267	0.313	0.037	0.871	0.020	0.032
15"	/	/	3'-0"	/	/	/	0.976	0.031	0.047
18"	/	/	3'-5"	/	/	/	1.106	0.044	0.065
24"	3'-0"	2'-0"	4'-0"	0.267	0.313	0.037	1.289	0.078	0.113

**REVISIONS**

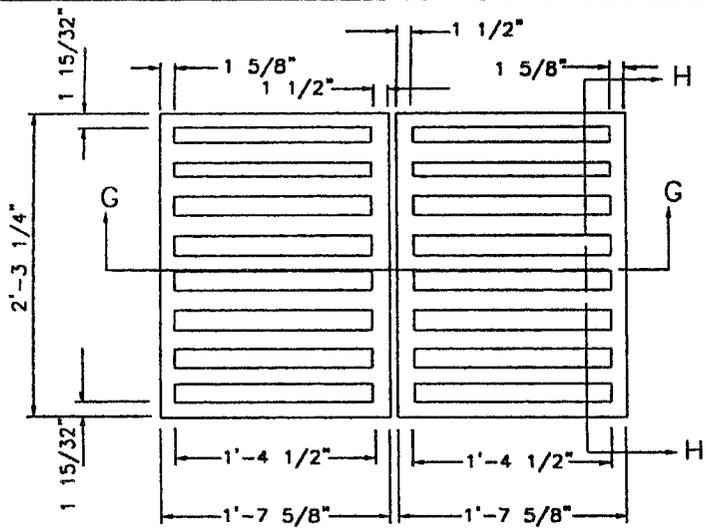
NO.	DATE	DESCRIPTION

APPROVED DATE *8/1/02*

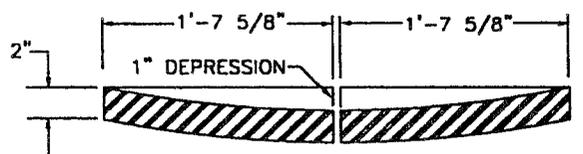
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**BRICK DROP INLET**

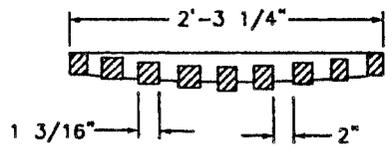
STD. NO.	REV.
2.10	



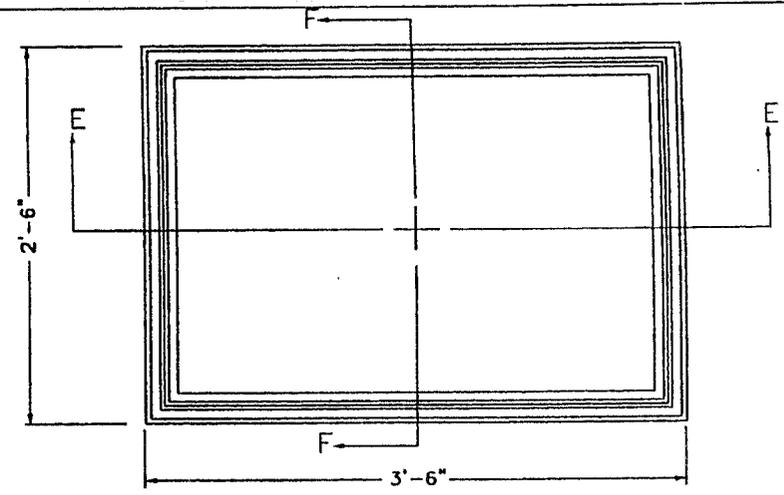
PLAN OF GRATING  
CAST IRON



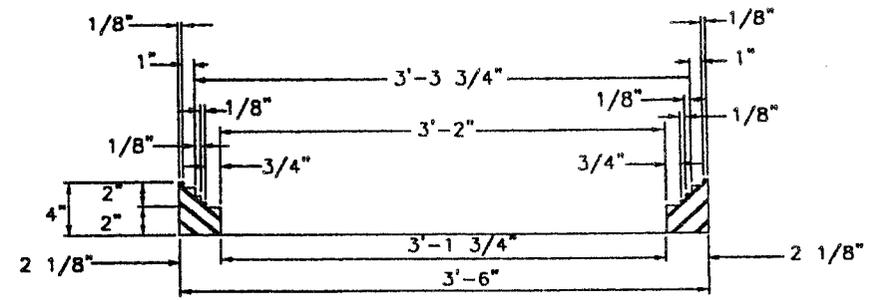
SECTION G-G



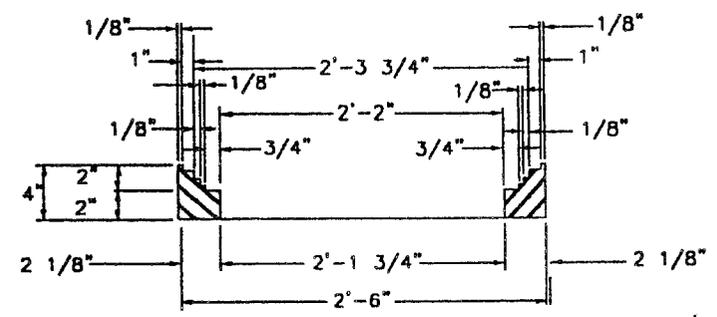
SECTION H-H



PLAN OF FRAME  
CAST IRON



SECTION E-E



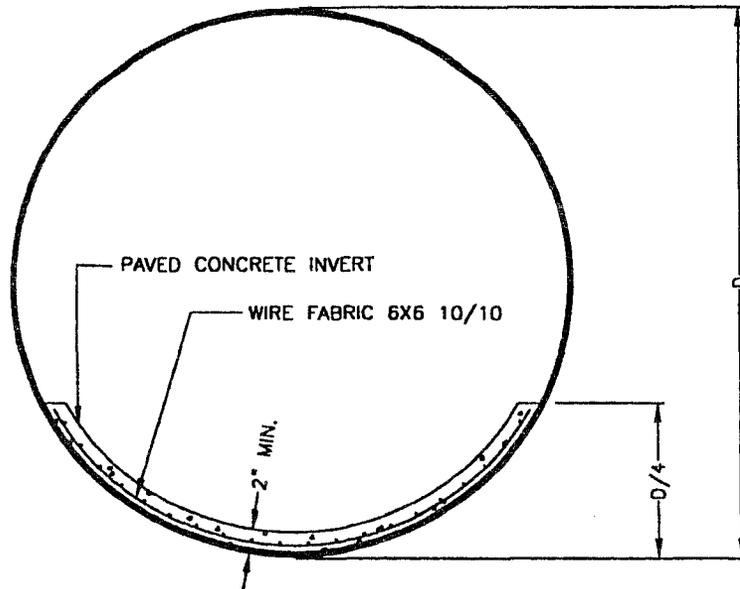
SECTION F-F APPROVED DATE 8/01/00

REVISIONS		
NO.	DATE	DESCRIPTION

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

FRAME AND GRATE  
FOR DROP INLET

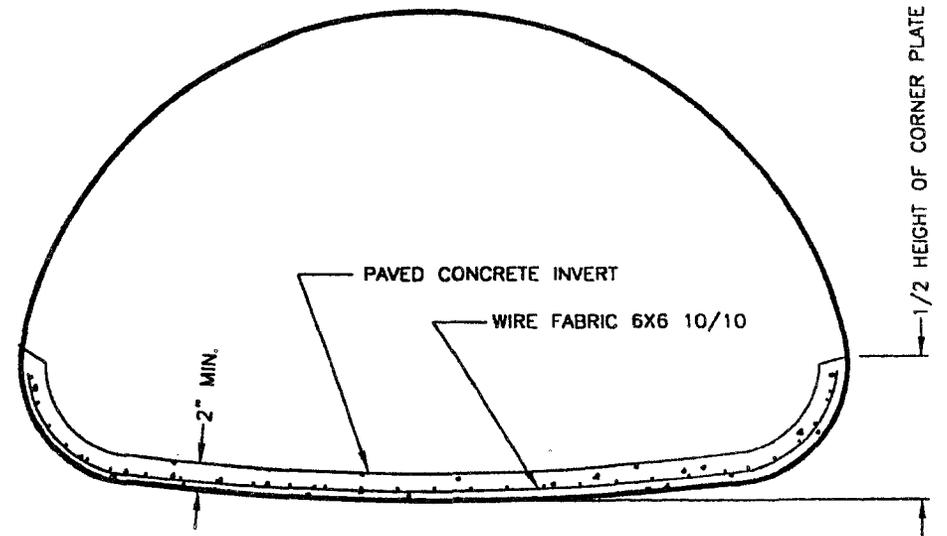
STD. NO.	REV.
2.11	



CORRUGATED METAL PIPE OR SECTIONAL PLATE  
(FLEXIBLE OR RIGID)  
60" AND ABOVE

GENERAL NOTES:

1. ALL CONCRETE TO BE 3600 P.S.I. CONCRETE THICKNESS TO BE 2" OVER THE INSIDE EDGE OF THE CORRUGATION.
2. MINIMUM THICKNESS OF CORRUGATED METAL PIPE USED WITHIN STREET R/W TO BE 14 GAGE.
3. ALL C.M.P. EXCEPT ALUMINUM PIPE TO BE FULL BITUMINOUS COATED.
4. PIPE TO BE BACKFILLED BEFORE THE CONCRETE IS PLACED.



ELLIPTICAL CORRUGATED PIPE  
OR SECTIONAL PLATE PIPE ARCH  
(FLEXIBLE OR RIGID)  
55" AND ABOVE

REVISIONS

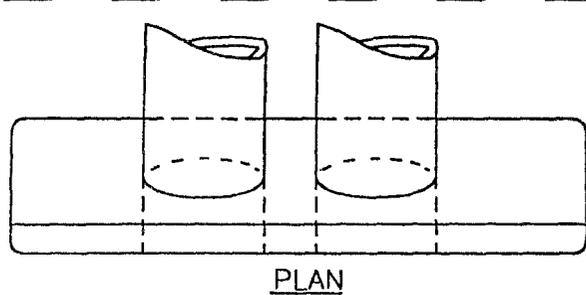
NO.	DATE	DESCRIPTION

APPROVED DATE *2/1/10*

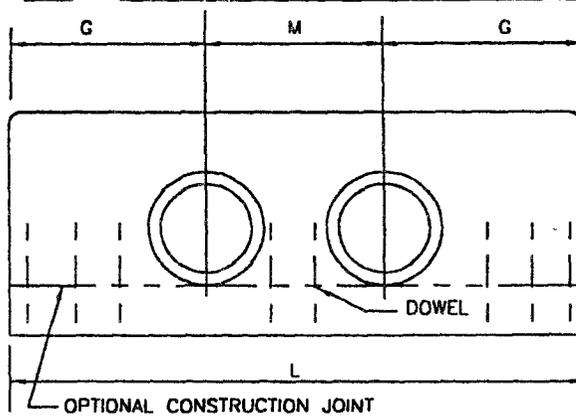
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

CONCRETE INVERT  
FOR CORRUGATED METAL PIPE

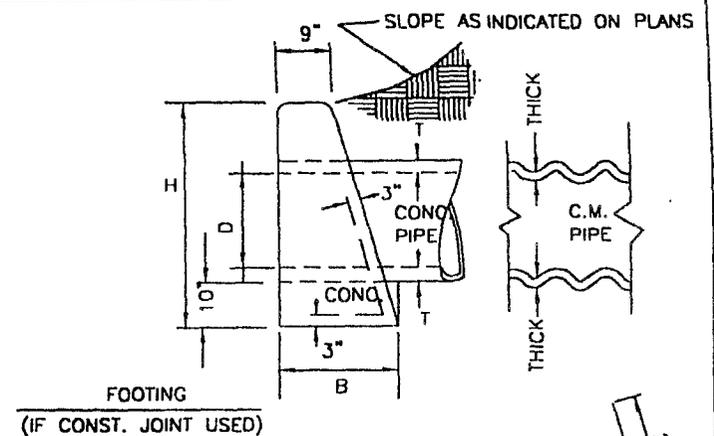
STD. NO.	REV.
2.12	



PLAN



ELEVATION



END ELEVATION

DOWELS IN ENDWALL WITH REINFORCED CONCRETE PIPE																			
L	PIPE DIA.	SINGLE PIPE						DOUBLE PIPE											
		15"	18"	24"	30"	36"	42"	48"	15"	18"	24"	30"	36"	42"	48"				
C.	BARS	"X"	"X"	"X"	"X"	"X"	"X"	Y	"X"	Y	"X"	"X"	"X"	"X"	"X"	Y	"X"	Y	
G	QTY.	2	2	3	3	4	4	2	5	2	2	3	3	4	4	2	3	5	
M	QTY.	-	-	-	-	-	-	2	-	2	1	1	2	2	2	2	2	3	2
G	QTY.	2	2	3	3	4	4	5	5	2	2	3	3	4	4	5	5	5	
TOT.	LBS	9	9	14	14	19	55	65	12	12	19	19	23	77	92				

DOWELS IN ENDWALL WITH CORRUGATED METAL PIPE																		
L	PIPE DIA.	SINGLE PIPE						DOUBLE PIPE										
		15"	18"	24"	30"	36"	42"	48"	15"	18"	24"	30"	36"	42"	48"			
C.	BARS	"X"	"X"	"X"	"X"	"X"	"X"	Y	"X"	Y	"X"	"X"	"X"	"X"	"X"	Y	"X"	Y
G	QTY.	2	2	3	3	4	4	2	5	2	2	3	3	4	4	2	3	5
M	QTY.	-	-	-	-	-	-	2	-	2	1	1	1	2	2	2	2	2
G	QTY.	2	2	3	3	4	4	5	5	2	2	3	3	4	4	5	5	5
TOT.	LBS	9	9	14	14	19	53	62	12	12	16	19	23	73	85			

DIMENSIONS AND QUANTITIES																	
D	USING CONCRETE PIPE										USING CORRUGATED METAL PIPE						
	COMMON DIMENSIONS					SINGLE PIPE		DOUBLE PIPE			COMMON DIMENSIONS			SINGLE PIPE		DOUBLE PIPE	
H	B	G	T	L	CU. YD.	M	L	CU. YD.	H	B	G	L	CU. YD.	M	L	CU. YD.	
15"	3'-4"	1'-8"	2'-9"	1 7/8"	5'-6"	0.734	2'-2"	7'-8"	0.970	3'-0"	1'-6"	2'-6"	5'-0"	0.573	1'-11"	6'-11"	0.760
18"	3'-7"	1'-10"	3'-2"	2"	6'-4"	0.958	2'-7"	8'-11"	1.274	3'-3"	1'-8"	2'-11"	5'-10"	0.767	2'-3"	8'-1"	1.014
24"	4'-2"	2'-1"	4'-0"	2 1/2"	8'-0"	1.506	3'-5"	11'-5"	2.010	3'-9"	1'-11"	3'-8"	7'-4"	1.200	3'-0"	10'-4"	1.597
30"	4'-9"	2'-5"	4'-7"	2 3/4"	9'-2"	2.145	4'-3"	13'-5"	2.920	4'-3"	2'-2"	4'-5"	8'-10"	1.757	3'-9"	12'-7"	2.348
36"	5'-3"	2'-8"	5'-6"	3"	11'-0"	3.040	5'-0"	16'-0"	4.086	4'-9"	2'-5"	5'-2"	10'-4"	2.456	4'-6"	14'-10"	3.288
42"	5'-10"	2'-11"	6'-4"	3 1/2"	12'-8"	4.120	5'-10"	18'-6"	5.534	5'-3"	2'-8"	5'-11"	11'-10"	3.310	5'-3"	17'-1"	4.434
48"	6'-5"	3'-3"	7'-2"	4"	14'-4"	5.535	6'-8"	21'-0"	7.427	5'-9"	2'-11"	6'-8"	13'-4"	4.337	6'-0"	19'-4"	5.812

REVISIONS		
NO.	DATE	DESCRIPTION

GENERAL NOTES:

- SEE NOTES ON STA. NO 2.13B REGARDING Y-BARS.

DOWEL BAR "X"

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

CONCRETE ENDWALL FOR  
SINGLE AND DOUBLE PIPE CULVERTS  
15" THRU 48" PIPE

APPROVED DATE 8/01/00

STD. NO.	REV.
2.13A	

GENERAL NOTES:

1. ALL CORNERS TO BE CHAMFERED 1"
2. THE CONTRACTOR WILL BE REQUIRED TO PLACE 2-#6 BARS "Y" IN THE TOP OF ALL ENDWALLS FOR PIPE CULVERTS 42" AND OVER WITH A MINIMUM 3" COVER AND A LENGTH OF 6" LESS THAN ENDWALL.
3. FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
4. WALL THICKNESS (T) SHOWN IS NOT TO BE INTERPRETED TO MEAN THE THICKNESS ACCEPTABLE, BUT IS USED ONLY IN COMPUTING ENDWALL QUANTITIES.
5. IF CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE, BAR "X" (DOWELS) SHALL BE PLACED IN THE BASE AS SHOWN ON PLANS. SPACING OF BARS TO BE APPROXIMATELY 12" CENTERS UNLESS ENGINEER DIRECTS OTHERWISE.
6. IF CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE, AND POURS BASE SEPARATELY, THE TOP OF BASE SHALL BE LEFT ROUGH.
7. ALL CONCRETE TO BE 3600 P.S.I COMPRESSIVE STRENGTH.

REVISIONS

NO.	DATE	DESCRIPTION

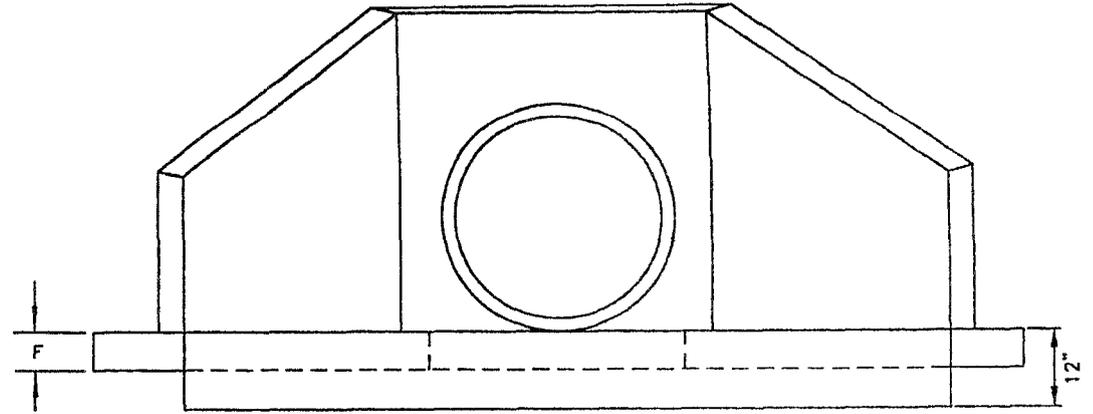
APPROVED DATE *8/10/00*

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

CONCRETE ENDWALL FOR  
SINGLE AND DOUBLE PIPE CULVERTS  
15" THRU 48" PIPE

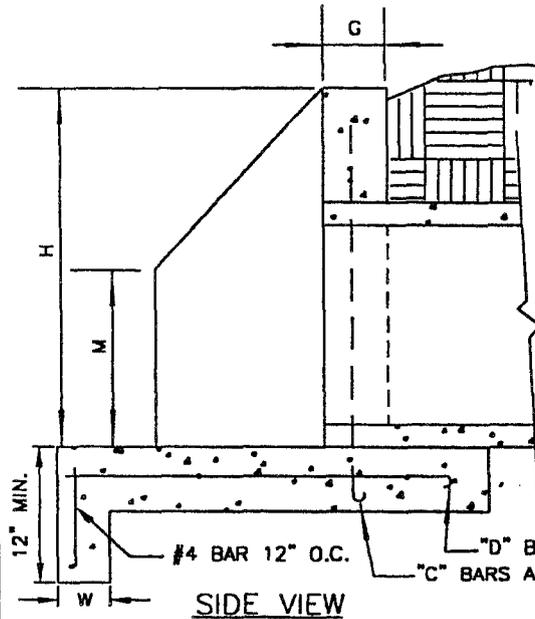
STD. NO.	REV.
2.13B	

CONCRETE PIPE			DIMENSIONS									
WALL THK.	OUT DIA.	IN DIA.	MIN. H	A	B	C	E	F	G	W	K	M
2 1/4"	19 1/2"	15"	27 1/2"	20"	24"	8"	7 1/2"	4"	4"	8"	17"	10"
2 1/2"	23"	18"	31"	20"	24"	8"	9"	4"	4"	8"	17"	12"
3"	30"	24"	38"	20"	30"	8"	12"	4"	4"	8"	21"	15"
3 1/2"	37"	30"	45"	20"	44"	12"	15"	6"	8"	8"	31"	18"
4"	44"	36"	52"	32"	44"	12"	18"	6"	8"	8"	31"	22"
4 1/2"	51"	42"	59"	32"	48"	12"	21"	6"	8"	8"	34"	26"
5"	58"	48"	66"	32"	48"	12"	24"	6"	8"	8"	34"	29"
5 1/2"	65"	54"	73"	32"	54"	12"	27"	6"	8"	8"	38"	33"
6"	72"	60"	80"	36"	66"	12"	30"	8"	12"	12"	46"	36"
6 1/2"	79"	66"	87"	36"	72"	12"	33"	8"	12"	12"	51"	40"
7"	86"	72"	94"	36"	78"	12"	36"	8"	12"	12"	56"	43"



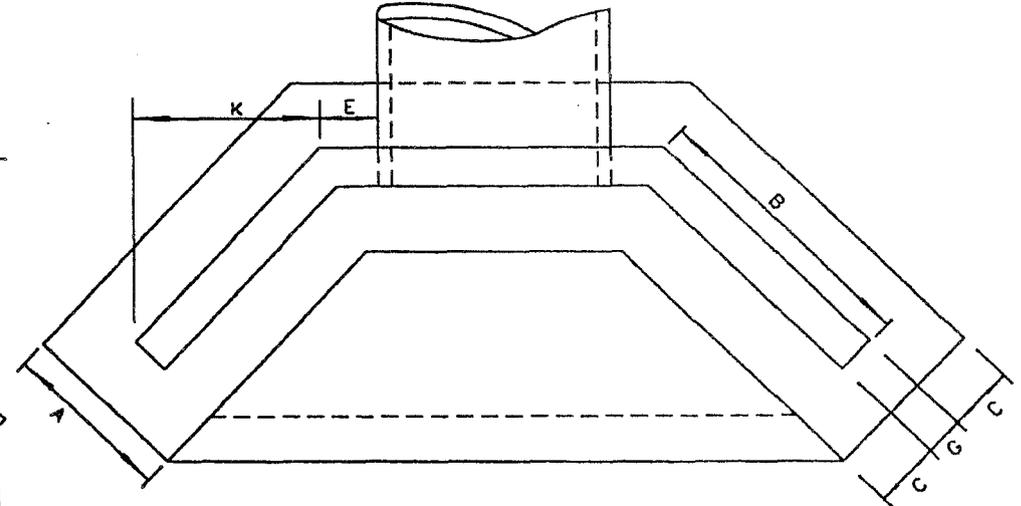
FRONT VIEW

REINFORCING				
DIA.	"C" BAR		"D" BAR	
	NO.	LGT.	NO.	LGT.
15"	4	2'-0"	4	1'-11"
18"	4	2'-3"	4	2'-2"
24"	4	2'-9"	4	2'-8"
30"	4	3'-3"	4	3'-2"
36"	4	3'-9"	4	3'-8"
42"	4	4'-3"	4	4'-2"
48"	4	4'-9"	4	4'-8"
54"	4	5'-3"	4	5'-2"
60"	4	5'-9"	4	5'-8"
66"	4	6'-3"	4	6'-2"
72"	4	6'-9"	4	6'-8"



SIDE VIEW

FOR RIP RAP SPLASH PAD  
REFER TO STD. 2.20



TOP VIEW

REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE *8/11/00*

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

CONCRETE WINGWALL  
WITH SPLASH PAD

STD. NO.	REV.
2.14A	

GENERAL NOTES:

1. ALL CORNERS TO BE CHAMFERED 1" IF CONCRETE.
2. THE CONTRACTOR WILL BE REQUIRED TO PLACE 2-#6 BARS "Y" IN THE TOP OF ALL ENDWALL FOR PIPE CULVERTS 42" AND OVER WITH A MINIMUM 3" COVER AND A LENGTH OF 6" LESS THAN ENDWALL.
3. FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
4. WALL THICKNESS (T) SHOWN IS NOT TO BE INTERPRETED TO MEAN THE THICKNESS ACCEPTABLE, BUT IS USED ONLY IN COMPUTING ENDWALL QUANTITIES.
5. IF CONTRACTOR ELECTS TO USED CONSTRUCTION JOINT AT BOTTOM OF PIPE, BAR "X" (DOWELS) SHALL BE PLACED IN THE BASE AS SHOWN ON PLANS. SPACING OF BARS TO BE APPROXIMATELY 12" CENTERS UNLESS ENGINEER DIRECTS OTHERWISE.
6. IF CONTRACTOR ELECTS TO USED CONSTRUCTION JOINT AT BOTTOM OF PIPE, AND POURS BASE SEPARATELY, THE TOP OF BASE SHALL BE LEFT ROUGH.
7. ALL CONCRETE TO BE 3600 P.S.I COMPRESSIVE STRENGTH.

REVISIONS

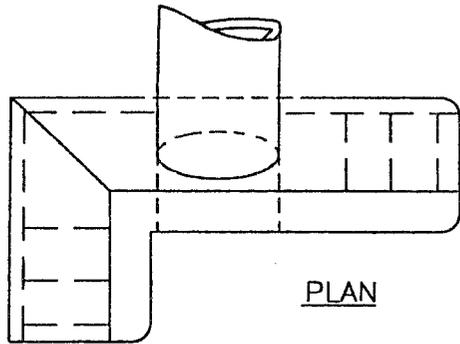
NO.	DATE	DESCRIPTION

APPROVED DATE *8/10/00*

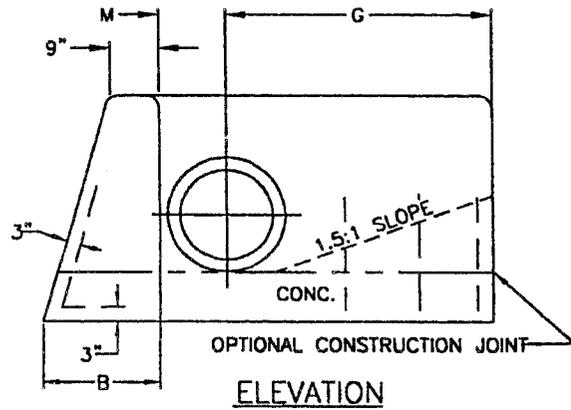
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

CONCRETE WINGWALL  
WITH SPLASH PAD

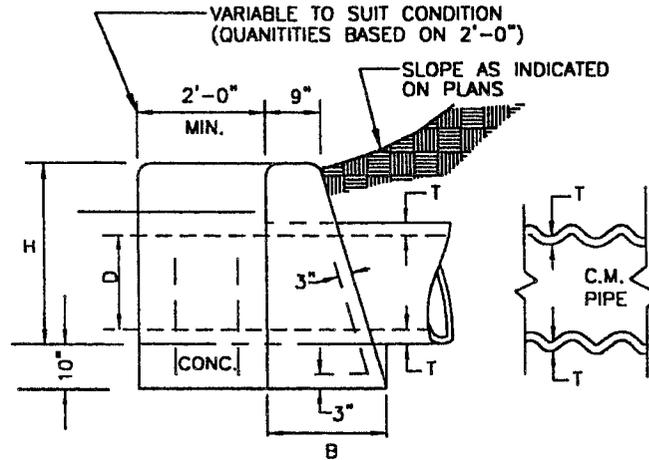
STD. NO.	REV.
2.14B	



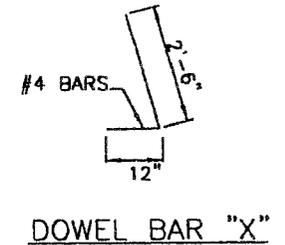
PLAN



ELEVATION



END ELEVATION



DOWEL BAR "X"

**GENERAL NOTES:**

1. ALL CORNERS TO CHAMFERED 1".
2. THE CONTRACTOR WILL BE REQUIRED TO PLACE 2-# 6 BARS "Y" IN THE TOP OF ALL ENDWALLS FOR PIPE CULVERTS 42" AND OVER WITH A MINIMUM OF 3" COVER AND A LENGTH OF 6" LESS THAN ENDWALLS.
3. IF CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE, BAR "X" (DOWELS) SHALL BE PLACED IN THE BASE AS SHOWN OF PLANS, SPACING TO BE APPROXIMATELY 12" CENTERS UNLESS ENGINEER DIRECTS OTHERWISE.
4. WHEN CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE AND POURS SEPARATELY, THE TOP OF BASE SHALL BE LEFT ROUGH.
5. FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
6. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.

REINFORCING QUANTITIES			
DIA.	BARS	QTY.	LBS.
15"	"X"	5	12
18"	"X"	5	12
24"	"X"	6	14
30"	"X"	6	14
36"	"X"	7	16
42" CM	"X"	7	47
	"Y"	2	
42" RC	"X"	7	49
	"Y"	2	
48" CM	"X"	8	52
	"Y"	2	
48" RC	"X"	8	55
	"Y"	2	

DIMENSIONS AND QUANTITIES											
COMMON DIMENSIONS						USING RC PIPE CU. YD.	COMMON DIMENSIONS				USING CM PIPE CU. YD.
D	H	B	G	M	T		H	B	G	M	
15"	3'-4"	1'-8"	2'-9"	1'-0"	1 7/8"	0.960	3'-0"	1'-6"	2'-6"	0'-11"	0.770
18"	3'-7"	1'-10"	3'-2"	1'-2"	2"	1.193	3'-3"	1'-8"	2'-11"	1'-0"	0.964
24"	4'-2"	2'-1"	4'-0"	1'-5"	2 1/2"	1.711	3'-9"	1'-11"	3'-8"	1'-3"	1.385
30"	4'-9"	2'-5"	4'-7"	1'-9"	2 3/4"	2.394	4'-3"	2'-2"	4'-5"	1'-6"	1.908
36"	5'-3"	2'-8"	5'-5"	2'-0"	3"	3.169	4'-9"	2'-5"	5'-2"	1'-9"	2.544
42"	5'-10"	2'-11"	6'-4"	2'-4"	3 1/2"	4.139	5'-3"	5'-3"	5'-11"	2'-0"	3.301
48"	6'-5"	3'-3"	7'-3"	2'-8"	4"	5.422	5'-9"	2'-11"	6'-8"	2'-3"	4.193

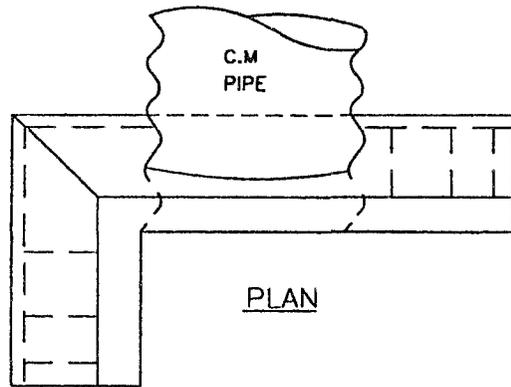
REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE *8/10/10*

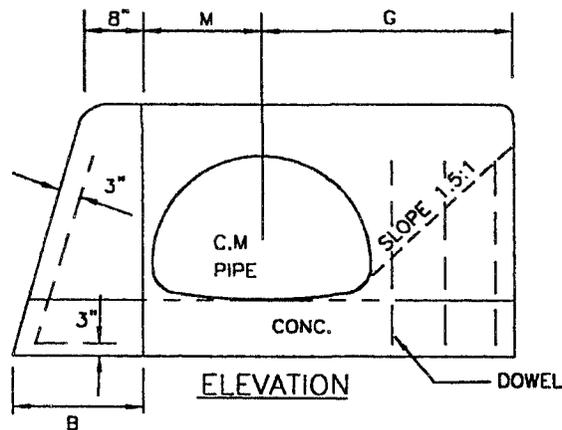
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

CONCRETE "L" ENDWALL  
FOR SINGLE PIPE CULVERTS  
15" THRU 48" PIPE

STD. NO.	REV.
2.15	



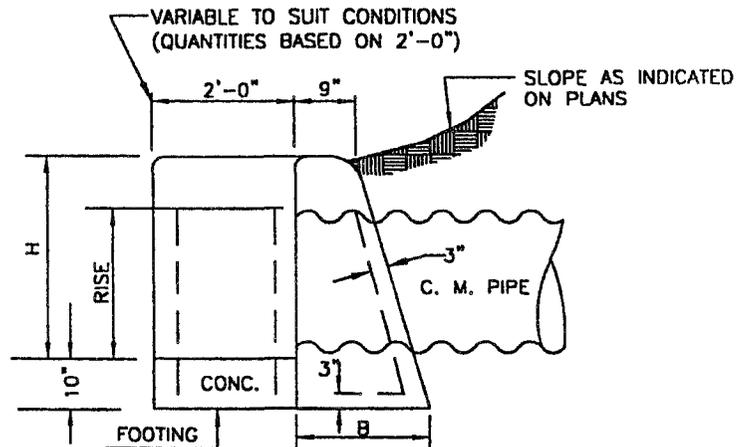
PLAN



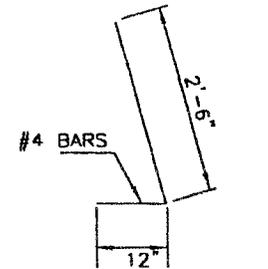
ELEVATION

**GENERAL NOTES:**

1. ALL CORNERS TO CHAMFERED 1".
2. THE CONTRACTOR WILL BE REQUIRED TO PLACE 2-# 6 BARS "Y" IN THE TOP OF ALL ENDWALLS FOR PIPE CULVERTS 42" AND OVER WITH A MINIMUM OF 3" COVER AND A LENGTH OF 6" LESS THAN ENDWALLS.
3. IF CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE, BAR "X" (DOWELS) SHALL BE PLACED IN THE BASE AS SHOWN OF PLANS, SPACING TO BE APPROXIMATELY 12" CENTERS UNLESS ENGINEER DIRECTS OTHERWISE.
4. WHEN CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE AND POURS SEPARATELY, THE TOP OF BASE SHALL BE LEFT ROUGH.
5. FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
6. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.



END ELEVATION



DOWEL BAR "X"

DIMENSIONS AND CONCRETE QUANTITIES							
COMMON DIMENSIONS USING C.M. ARCH PIPE							TOTAL CONC.
SPAN	RISE	THICK	H	B	G	M	CU. YD.
17"	13"	.064	2'-9"	1'-5"	2'-7"	1'-0"	0.695
21"	15"	.064	2'-11"	1'-6"	3'-0"	1'-2"	1.825
24"	18"	.064	3'-2"	1'-7"	3'-5"	1'-3"	0.984
28"	20"	.079	3'-4"	1'-8"	3'-9"	1'-5"	1.133
35"	24"	.079	3'-8"	1'-10"	4'-6"	1'-9"	1.476
42"	29"	.079	4'-1"	2'-1"	5'-4"	2'-0"	1.990
49"	33"	.109	4'-5"	2'-3"	6'-0"	2'-4"	2.450
57"	38"	.109	4'-10"	2'-6"	6'-10"	2'-8"	3.178
64"	43"	.138	5'-3"	2'-8"	7'-8"	2'-11"	3.902
71"	47"	.138	5'-7"	2'-10"	8'-4"	3'-3"	4.603

REINFORCING QUANTITIES										
SPAN	18"	22"	25"	29"	36"	43"	50"	58"	65"	72"
BARS	"X"									
QTY.	5	5	5	6	6	7	7	7	8	8
LBS.	12	12	12	14	14	16	16	16	19	19

REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE *8/10/10*

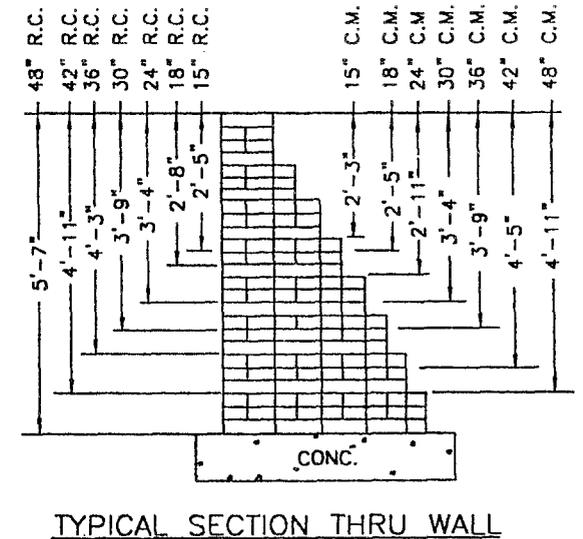
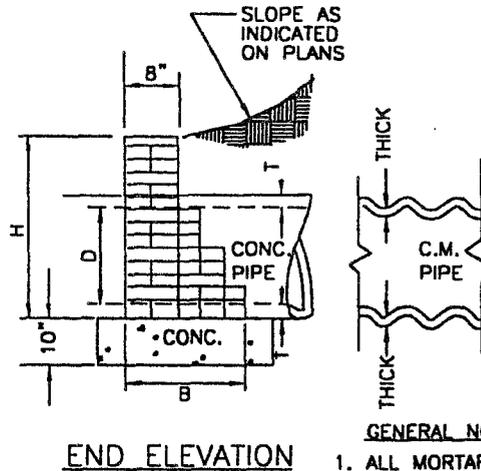
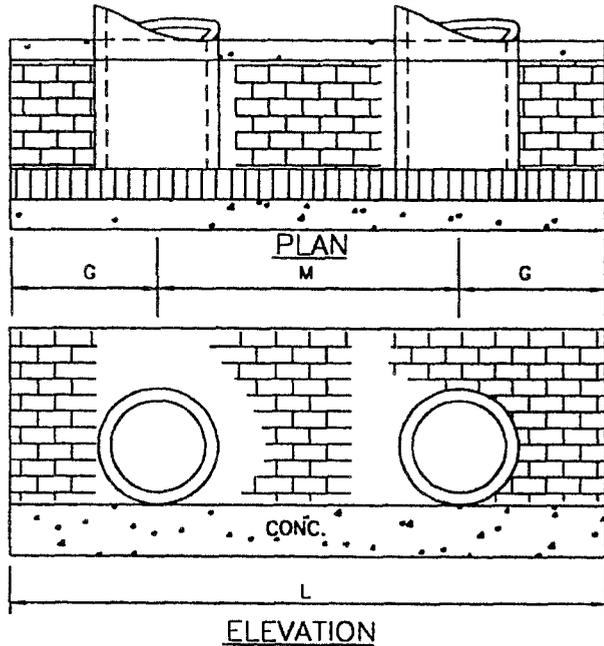
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

CONCRETE "L" ENDWALL FOR SINGLE PIPE  
CULVERTS 17"X13" THUR 71"X47" ARCH PIPE

STD. NO.	REV.
2.16	

**DIMENSIONS AND QUANTITIES**

D	COMMON DIMENSIONS					SINGLE PIPE		DOUBLE PIPE		COMMON DIMENSIONS					SINGLE PIPE		DOUBLE PIPE				
	H	B	G	T	L	BRICK CU. YD.	CONC. CU. YD.	M	L	BRICK CU. YD.	CONC. CU. YD.	H	B	G	L	BRICK CU. YD.	CONC. CU. YD.	M	L	BRICK CU. YD.	CONC. CU. YD.
15"	2'-5"	1'-8"	2'-10"	1 7/8"	5'-8"	0.441	0.291	2'-2"	7'-10"	0.555	0.403	2'-3"	1'-4"	2'-9"	5'-6"	0.384	0.226	1'-11"	7'-5"	0.482	0.305
18"	2'-8"	1'-8"	3'-2"	2"	6'-4"	0.562	0.326	2'-7"	8'-11"	0.722	0.459	2'-5"	1'-8"	3'-0"	6'-0"	0.478	0.309	2'-3"	8'-3"	0.605	0.424
24"	3'-4"	2'-0"	4'-1"	2 1/2"	8'-2"	1.008	0.504	3'-5"	11'-7"	1.285	0.715	2'-11"	1'-8"	3'-9"	7'-6"	0.749	0.386	3'-0"	10'-6"	0.954	0.540
30"	3'-9"	2'-4"	4'-8"	2 3/4"	9'-4"	1.391	0.672	4'-3"	13'-7"	1.820	0.976	3'-4"	2'-0"	4'-5"	8'-10"	1.090	0.545	3'-9"	12'-7"	1.399	0.777
36"	4'-3"	2'-4"	5'-5"	3"	10'-10"	1.895	0.780	5'-0"	15'-10"	2.462	1.140	3'-9"	2'-4"	5'-0"	10'-0"	1.503	0.720	4'-6"	14'-6"	1.965	1.044
42"	4'-11"	2'-8"	6'-4"	3 1/2"	12'-8"	2.867	1.043	5'-10"	18'-6"	3.729	1.523	4'-5"	2'-8"	6'-0"	12'-0"	2.373	0.988	5'-3"	17'-3"	3.062	1.420
48"	5'-7"	3'-0"	7'-3"	4"	14'-6"	4.032	1.343	6'-8"	21'-2"	5.184	1.960	4'-11"	2'-8"	6'-9"	13'-6"	3.102	1.111	6'-0"	19'-6"	4.002	1.605



**GENERAL NOTES:**

1. ALL MORTAR JOINTS ARE TO BE 1/2" (+/-) 1/8".
2. BRICKWORK SHALL BE BONDED WITH FULL HEADERS EVERY THREE COURSES. ALL EXPOSED JOINTS SHALL BE CONCAVE TOOLED. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
3. CONCRETE BRICK MAY BE USED IN LIEU OF HARD COMMON BRICK.
4. JUMBO BRICK WILL BE PERMITTED.
5. WALL THICKNESS (T) SHOWN IS NOT TO BE INTERPRETED TO MEAN THE THICKNESS ACCEPTABLE, BUT IS USED ONLY IN COMPUTING ENDWALL DIMENSIONS AND QUANTITIES.

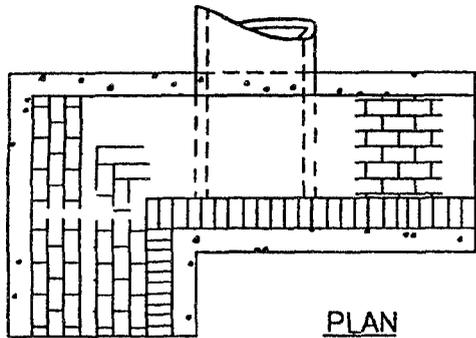
APPROVED DATE *10/1/00*

REVISIONS		
NO.	DATE	DESCRIPTION

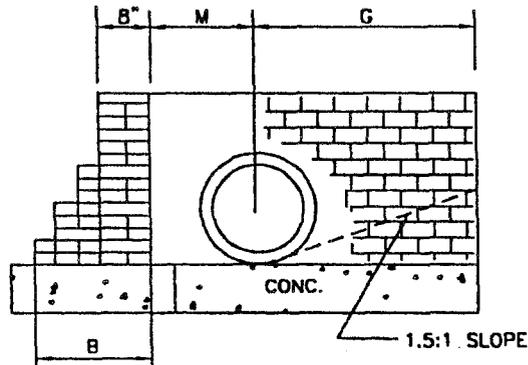
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**BRICK ENDWALL FOR SINGLE AND  
DOUBLE PIPE CULVERTS  
15" THRU 48" PIPE**

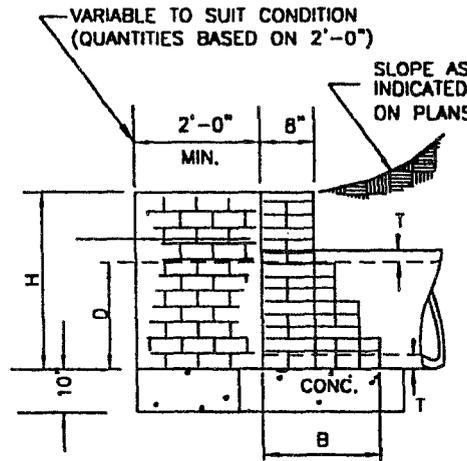
STD. NO.	REV.
2.17	



PLAN



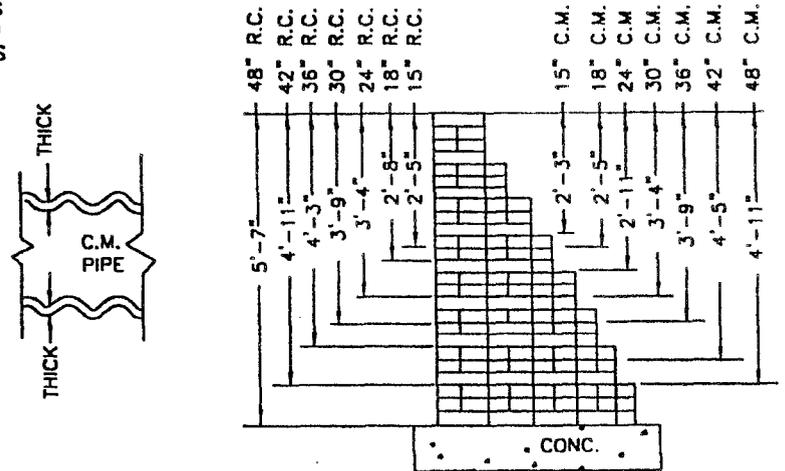
ELEVATION



END ELEVATION

**GENERAL NOTES:**

1. ALL MORTAR JOINTS ARE TO BE 1/2" (+/-) 1/8".
2. BRICKWORK SHALL BE BONDED WITH FULL HEADERS EVERY THREE COURSES. ALL EXPOSED JOINTS SHALL BE CONCAVE TOOLED. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
3. CONCRETE BRICK MAY BE USED IN LIEU OF HARD COMMON BRICK.
4. JUMBO BRICK WILL BE PERMITTED.
5. WALL THICKNESS (T) SHOWN IS NOT TO BE INTERPRETED TO MEAN THE THICKNESS ACCEPTABLE, BUT IS USED ONLY IN COMPUTING ENDWALL DIMENSIONS AND QUANTITIES.



TYPICAL SECTION THRU WALL

DIMENSIONS AND QUANTITIES													
COMMON DIMENSIONS						USING RC PIPE		COMMON DIMENSIONS				USING CM PIPE	
D	H	B	G	M	T	BRICK CU. YD.	CONC. CU. YD.	H	B	G	M	BRICK CU. YD.	CONC. CU. YD.
15"	2'-5"	1'-8"	2'-10"	1'-0"	1 7/8"	0.562	0.386	2'-3"	1'-4"	2'-9"	0'-11"	0.480	0.288
18"	2'-8"	1'-8"	3'-2"	1'-2"	2"	0.691	0.412	2'-5"	1'-8"	3'-0"	1'-0"	0.581	0.394
24"	3'-4"	2'-0"	4'-1"	1'-5"	2 1/2"	1.123	0.586	2'-11"	1'-8"	3'-9"	1'-3"	0.840	0.446
30"	3'-9"	2'-4"	4'-8"	1'-9"	2 3/4"	1.513	0.774	3'-4"	2'-0"	4'-5"	1'-6"	1.167	0.612
36"	4'-3"	2'-4"	5'-5"	2'-0"	3"	1.958	0.846	3'-9"	2'-4"	5'-0"	1'-9"	1.562	0.798
42"	4'-11"	2'-8"	6'-4"	2'-4"	3 1/2"	2.841	1.097	4'-5"	2'-8"	6'-0"	2'-0"	2.318	1.043
48"	5'-7"	3'-0"	7'-3"	2'-8"	4"	3.865	1.381	4'-11"	2'-8"	6'-9"	2'-3"	2.929	1.125

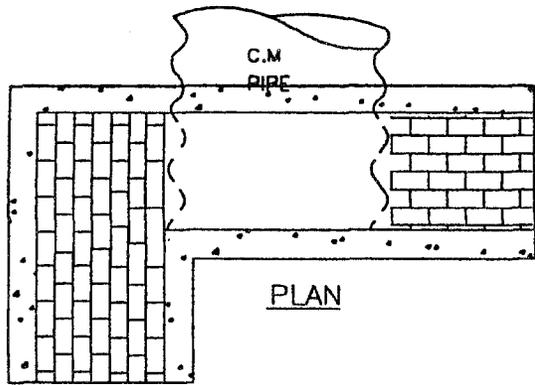
REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE *1/10/00*

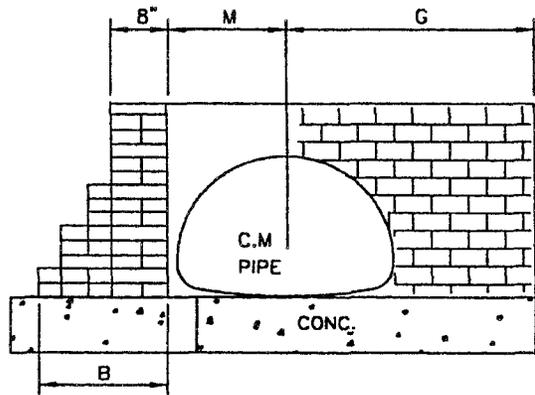
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

BRICK "L" ENDWALL  
FOR SINGLE PIPE CULVERTS  
15" THRU 48" PIPE

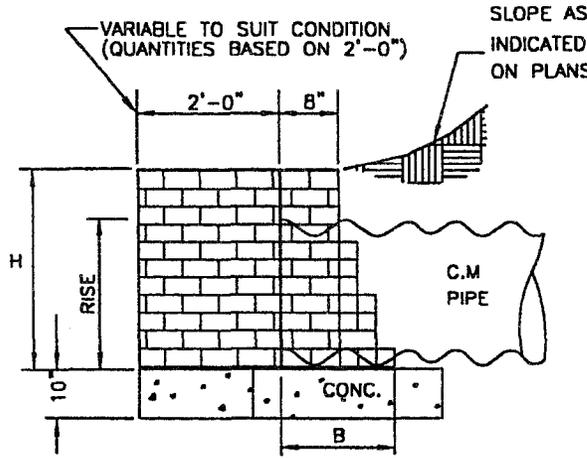
STD. NO.	REV.
2.18	



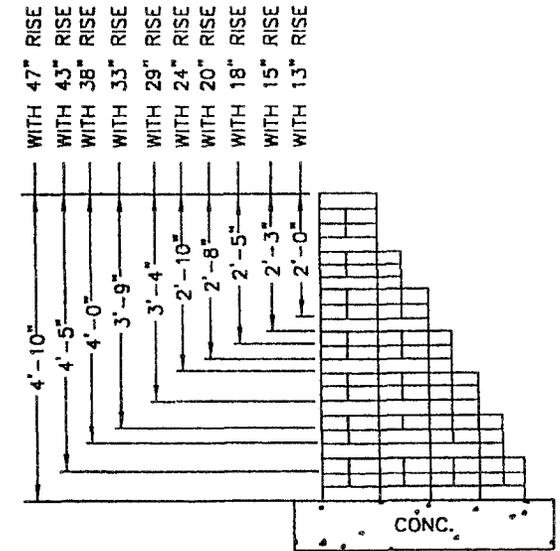
PLAN



ELEVATION



END ELEVATION



TYPICAL SECTION THRU WALL

**GENERAL NOTES:**

1. ALL MORTAR JOINTS ARE TO BE  $1/2" \pm 1/8"$ .
2. BRICKWORK SHALL BE BONDED WITH FULL HEADERS EVERY THREE COURSES.
3. ALL EXPOSED JOINTS SHALL BE CONCAVE TOOLED.  
ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
4. CONCRETE BRICK MAY BE USED IN LIEU OF HARD COMMON BRICK.
5. JUMBO BRICK WILL BE PERMITTED.

DIMENSIONS AND QUANTITIES								
COMMON DIMENSIONS						QUANTITIES		
SPAN	RISE	GAGE	H	B	G	M	BRICK CU. YD.	CONC. CU. YD.
17"	13"	16	2'-0"	1'-4"	2'-9"	1'-0"	0.417	0.291
21"	15"	16	2'-3"	1'-4"	3'-1"	1'-2"	0.511	0.321
24"	18"	16	2'-5"	1'-8"	3'-7"	1'-3"	0.643	0.437
28"	20"	14	2'-8"	1'-8"	3'-11"	1'-5"	0.780	0.463
35"	24"	14	2'-10"	1'-8"	4'-7"	1'-9"	0.940	0.514
42"	29"	14	3'-4"	2'-0"	5'-5"	2'-0"	1.320	0.705
49"	33"	12	3'-9"	2'-4"	6'-1"	2'-4"	1.763	0.918
57"	38"	12	4'-0"	2'-4"	6'-11"	2'-8"	2.124	1.002
64"	43"	10	4'-5"	2'-8"	7'-9"	2'-11"	2.690	1.262
71"	47"	10	4'-10"	2'-8"	8'-10"	3'-3"	3.500	1.379

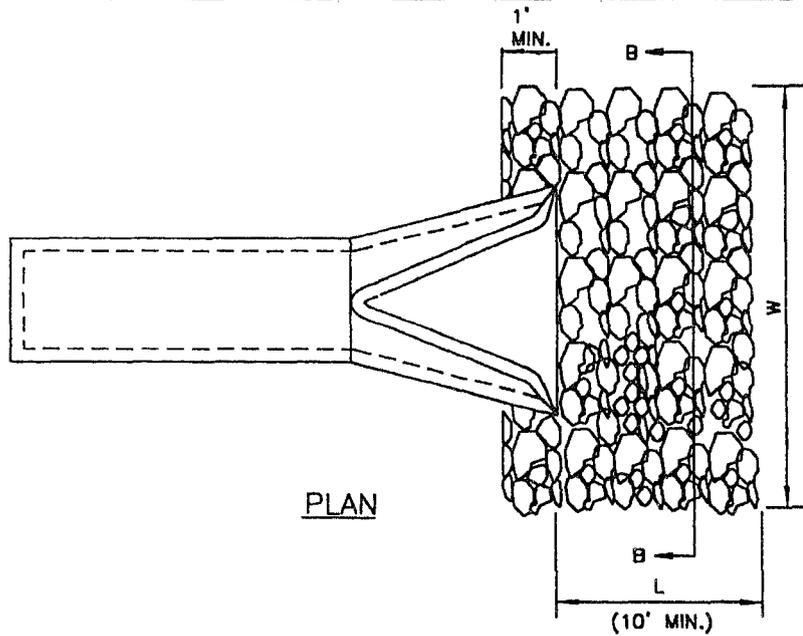
REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE *6/10/10*

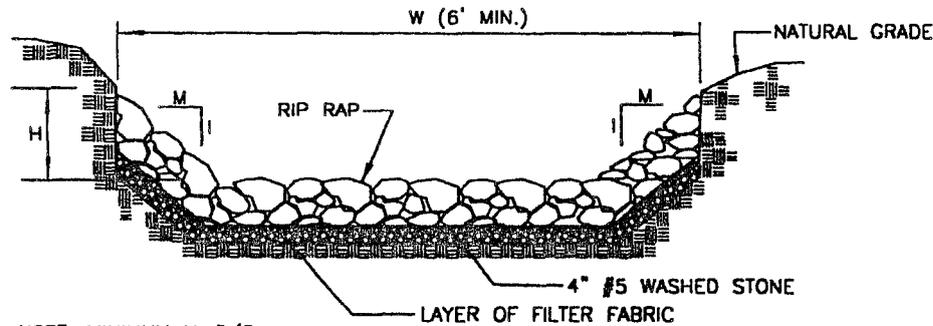
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

BRICK "L" ENDWALL FOR SINGLE PIPE  
CULVERTS 17"X13" THRU 71"X47" ARCH PIPE

STD. NO.	REV.
2.19	



PLAN



SECTION B-B

NOTE: MINIMUM  $H = \frac{2}{3}$  PIPE DIAMETER

**NOTES:**

1. CLASS OR MEDIAN SIZE OF RIPRAP AND LENGTH, WIDTH AND DEPTH OF APRON TO BE DESIGNED BY THE ENGINEER.
2. REFER TO THE TOWN OF INDIAN TRAIL STORM WATER DESIGN MANUAL FOR RIPRAP APRON DESIGN STANDARDS.
3. RIPRAP SHOULD EXTEND UP BOTH SIDES OF THE APRON AND AROUND THE END OF THE PIPE OR CULVERT AT THE DISCHARGE OUTLET AT A MAXIMUM SLOPE OF 2:1 AND A HEIGHT NOT LESS THAN TWO THIRDS THE PIPE DIAMETER OR CULVERT HEIGHT.
4. THERE SHALL BE NO OVERFLOW FROM THE END OF THE APRON TO THE SURFACE OF THE RECEIVING CHANNEL. THE AREA TO BE PAVED OR RIPRAPPED SHALL BE UNDERCUT SO THAT THE INVERT OF THE APRON SHALL BE AT THE SAME GRADE (FLUSH) WITH THE SURFACE OF THE RECEIVING CHANNEL. THE APRON SHALL HAVE A CUTOFF OR TOE WALL AT THE DOWNSTREAM END.
5. THE WIDTH OF THE END OF THE APRON SHALL BE EQUAL TO THE BOTTOM WIDTH OF THE RECEIVING CHANNEL. MAXIMUM TAPER TO RECEIVING CHANNEL 5:1
6. ALL SUBGRADE FOR STRUCTURE TO BE COMPACTED TO 95% OR GREATER.
7. THE PLACING OF FILL, EITHER LOOSE OR COMPACTED IN THE RECEIVING CHANNEL SHALL NOT BE ALLOWED.
8. NO BENDS OR CURVES IN THE HORIZONTAL ALIGNMENT OF THE APRON WILL BE PERMITTED.

NO.	DATE	DESCRIPTION

APPROVED DATE *4/10/08*

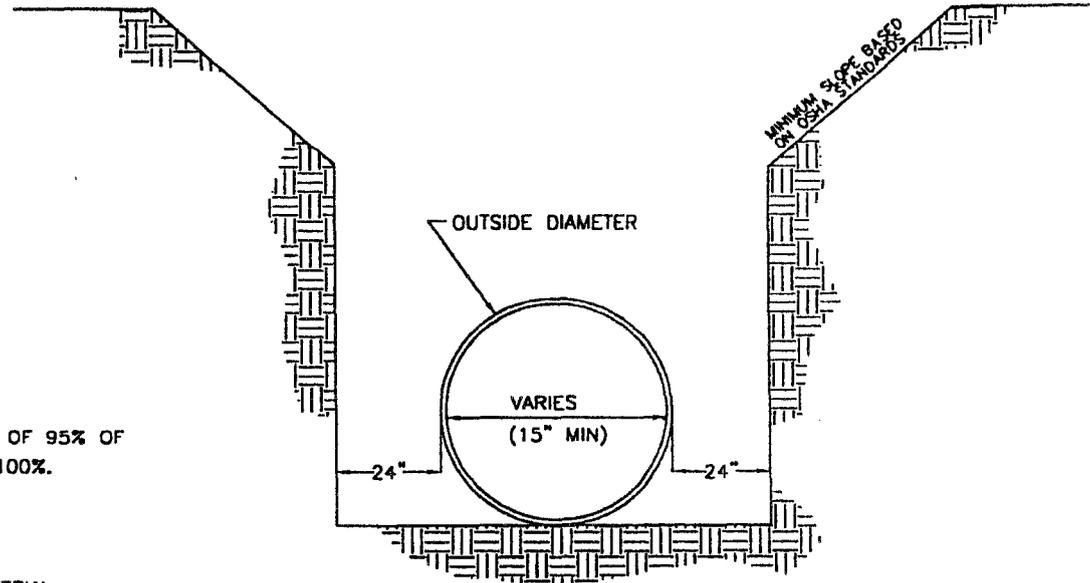
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

RIPRAP APRON  
AT PIPE OUTLETS

STD. NO.	REV.
2.20	

**NOTES:**

1. A MINIMUM OF 24" FROM OUTSIDE DIAMETER OF PIPE TO SIDE OF TRENCH MUST BE ALLOWED FOR COMPACTION OF FILL MATERIAL. BACKFILLING OF TRENCHES SHALL BE ACCOMPLISHED IMMEDIATELY AFTER THE PIPE IS LAID. THE FILL AROUND THE PIPE SHALL BE PLACED IN LAYERS NOT TO EXCEED 6". UNDER NO CIRCUMSTANCES SHALL WATER BE PERMITTED TO RISE IN UNBACKFILLED TRENCHES AFTER THE PIPE HAS BEEN PLACED. COMPACTION REQUIREMENTS SHALL BE ATTAINED BY THE USE OF MECHANICAL TAMPS ONLY. EACH AND EVERY LAYER OF BACKFILL SHALL BE PLACED LOOSE AND THOROUGHLY COMPACTED INTO PLACE.
2. ALL BACKFILL MATERIAL SHALL HAVE AN IN PLACE COMPACTED DENSITY OF 95% OF STANDARD PROCTOR. THE FINAL 2' BELOW FINISHED GRADE SHALL BE 100%.
3. ALL TRENCHING OPERATIONS SHALL MEET OSHA STANDARDS.
4. BACKFILL MATERIAL BENEATH ROADWAY SHALL BE SELECT BACKFILL MATERIAL.



**REVISIONS**

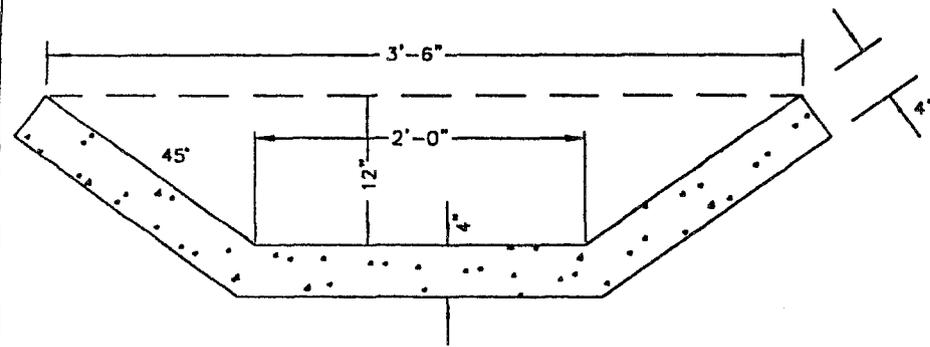
NO.	DATE	DESCRIPTION

APPROVED DATE *8/9/00*

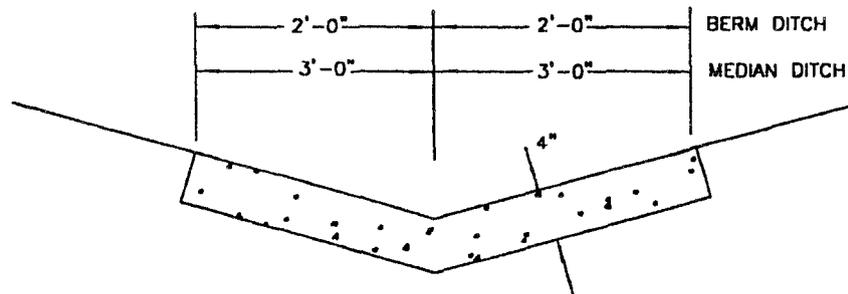
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**TRENCH DETAIL  
FOR STORM DRAIN PIPES**

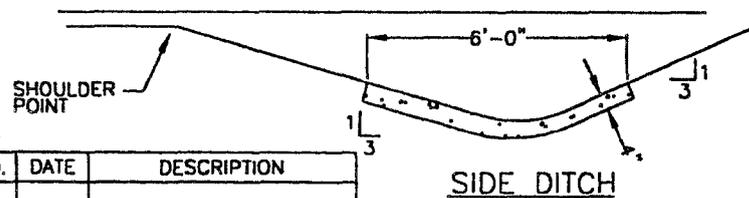
STD. NO.	REV.
2.21	



SLOPE DRAIN, BASE DITCH OR BERM DRAINAGE  
OUTLET DITCH



MEDIAN OR BERM DITCH



SIDE DITCH

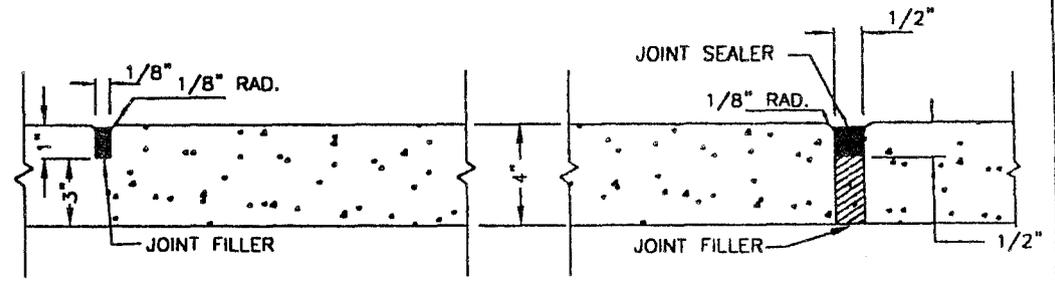
NO.	DATE	DESCRIPTION

**GENERAL NOTES:**

IN THE 4" CONCRETE PAVED DITCHES PLACE 1/2" EXPANSION JOINT AT 30 FT INTERVALS AND AT ALL OTHER POINTS WHERE PROPOSED DITCHES ABUT RIGID OBJECTS. PLACE GROOVED JOINTS 1" DEEP AT 10' INTERVALS BETWEEN EXPANSION JOINTS.

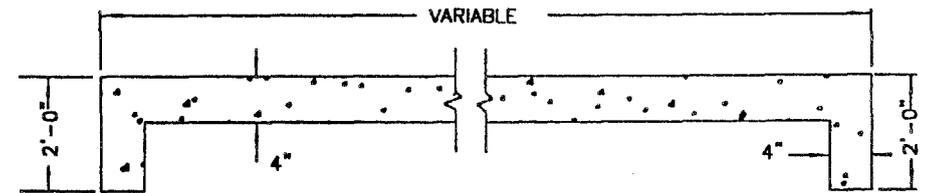
WIDTH AND SHAPE OF PROPOSED 4" CONCRETE PAVED DITCHES SHALL BE AS SHOWN OR AS DIRECTED BY THE ENGINEER.

ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.



SHOWING GROOVED JOINT

SHOWING EXPANSION JOINT



LONGITUDINAL SECTION OF PAVED DITCH

SHOWING 2'-0" CURTAIN WALL REQUIRED AT EACH END

APPROVED DATE *@10/1/00*

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

CONCRETE PAVED DITCHES

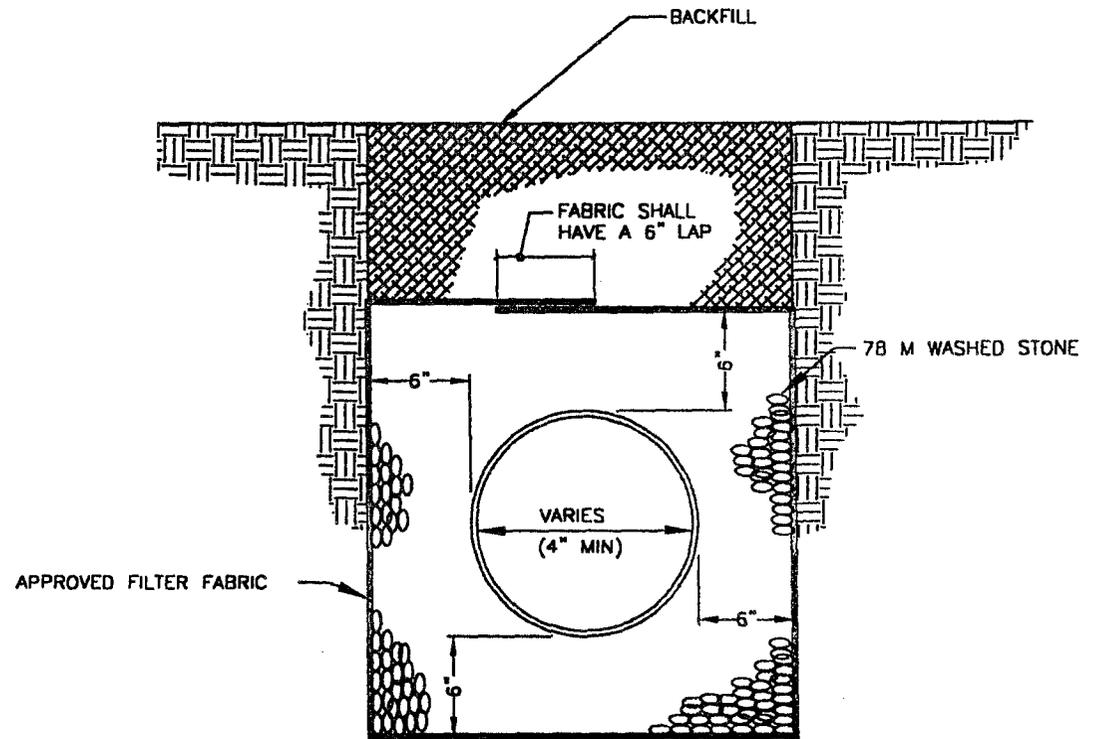
STD. NO.	REV.
2.22	

**NOTES:**

A MINIMUM OF 6" FROM OUTSIDE DIAMETER OF PIPE TO SIDE OF TRENCH MUST BE ALLOWED FOR WASHED STONE. THE METHOD OF COMPACTING BACKFILL MATERIAL IS SUBJECT TO APPROVAL BY THE TOWN ENGINEER.  
 AN APPROVED FILTER FABRIC SHALL BE PLACED AROUND STONE AND OVERLAPPED 6" AT TOP WITHIN STREET RIGHT OF WAY. PIPE SIZE TO BE SHOWN ON PLAN (MINIMUM 4" PIPE). PIPE TO BE SCHEDULE 20 OR 40 PERFORATED PVC.

**SPECIAL NOTE:**

PREFABRICATED DRAINAGE MAY BE USED WITH APPROVAL OF TOWN ENGINEER.



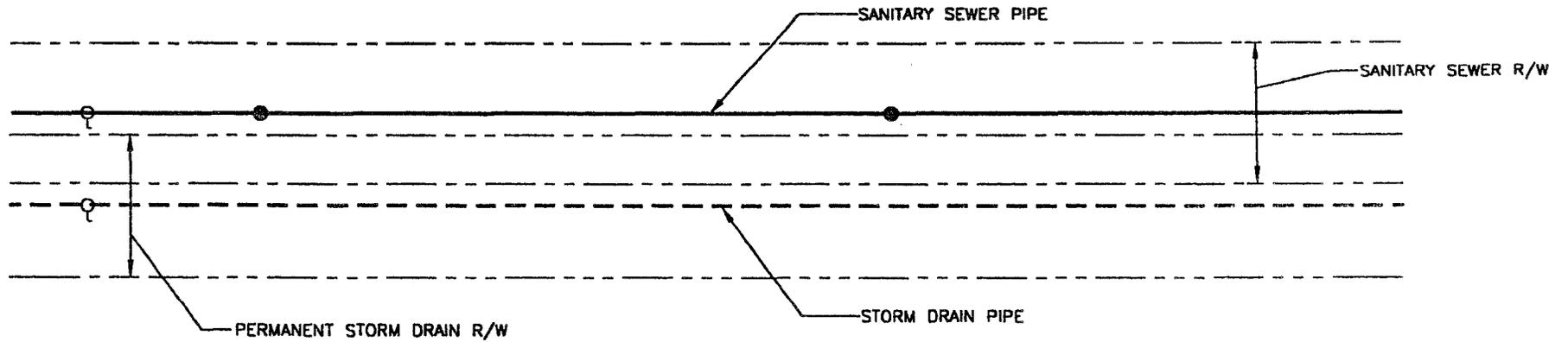
REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE *8/01/00*

TOWN OF INDIAN TRAIL  
 LAND DEVELOPMENT  
 STANDARDS

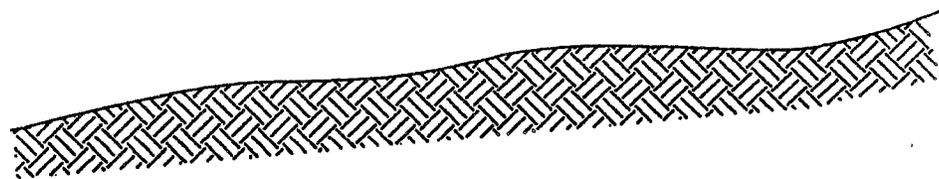
SUBDRAIN DETAIL

STD. NO.	REV.
2.24	

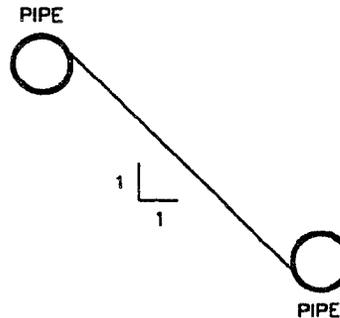


THE SANITARY SEWER AND STORM DRAINAGE RIGHTS OF WAY MAY OVERLAP; HOWEVER THE PIPE AND ASSOCIATED STRUCTURES MUST NOT BE IN THE OTHER UTILITY'S RIGHT OF WAY. THE SANITARY SEWER RIGHT OF WAY WIDTHS SHALL BE AS OUTLINED. THIS DETAIL DOES NOT APPLY TO STORM DRAINAGE UTILIZING OPEN CHANNEL FLOW.

PLAN VIEW



THE VERTICAL SEPARATION GUIDELINE WILL BE USED UP TO THE POINT WHERE THE TWO RIGHTS OF WAY ADJOIN EACH OTHER.



THE SANITARY SEWER AND STORM DRAINAGE PIPES MUST BE NO CLOSER TOGETHER HORIZONTALLY THAN THE VERTICAL DISTANCE BETWEEN THE TOP OF THE HIGHER PIPE AND THE BOTTOM OF THE LOWER PIPE. A MAINTENANCE CREW MUST BE ABLE TO DIG DOWN TO THE LOWER PIPE SLOPING THE DITCH ON A 1:1 SLOPE AND NOT EXPOSE THE HIGHER PIPE.

PROFILE VIEW

REVISIONS

NO.	DATE	DESCRIPTION

APPROVED DATE *10/12/22*

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**OVERLAPPING STORM DRAINAGE/SANITARY  
SEWER EASEMENTS**

STD. NO.	REV.
2.25	

Easement Requirements for Open Storm Drainage Channels	
Area in Acreage	Easement Requirement
0-45 ac.	20'
45-120 ac.	30'
120-500 ac.	40'
500 ac.+	see note

Easement Requirements for Storm Drain Pipe	
Pipe Size	Easement Requirement
15"	15'
18"	15'
24"	15'
30"	20'
36"	20'
42"	25'
48"	25'
54"+	30'MIN (VARIES)

GENERAL NOTES:

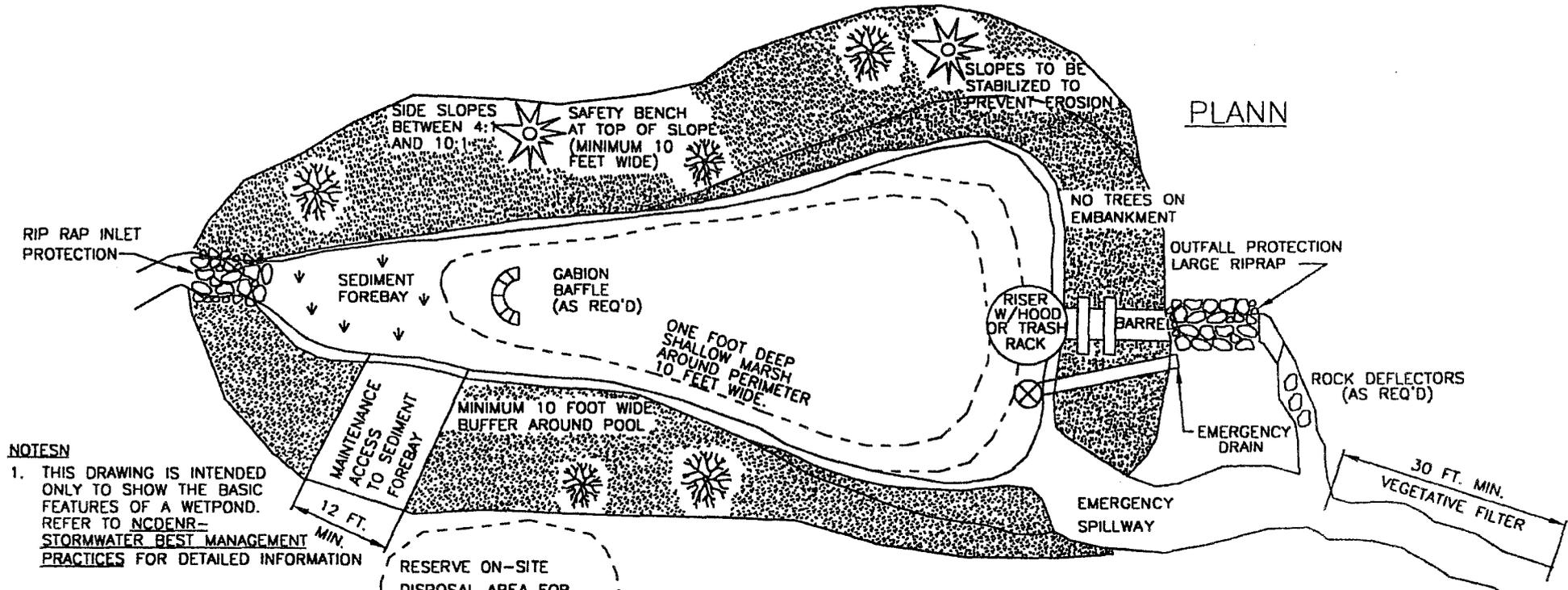
1. FOR STREAMS CARRYING 500 ACRES OR MORE OF SURFACE RUNOFF, THE EASEMENT REQUIREMENT IS TO BE THE WIDTH OF THE STREAM FROM TOP OF BANK TO TOP OF BANK, PLUS (+) 10' ON EACH SIDE OF STREAM. ( 40' MINIMUM WIDTH )
2. FOR OPEN CHANNELS THE MINIMUM EASEMENT MUST CONTAIN THE WIDTH OF THE STREAM FROM TOP OF BANK TO TOP BANK.
3. FOR ALL CHANNELS WITH STREAM BUFFERS, THE EASEMENT IS THE LARGER OF THE STREAM BUFFER OR THE DRAINAGE EASEMENT.

REVISIONS

NO.	DATE	DESCRIPTION

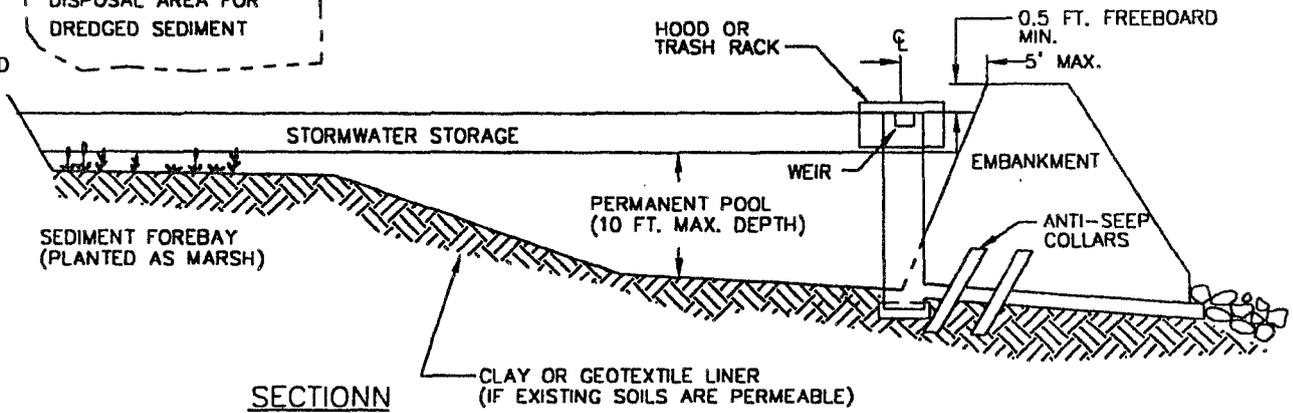
APPROVED DATE: *8/10/00*

<p><b>TOWN OF INDIAN TRAIL LAND DEVELOPMENT STANDARDS</b></p>	<p><b>MINIMUM DRAINAGE EASEMENT REQUIREMENTS FOR STORM DRAIN PIPES AND OPEN CHANNELS</b></p>	<table border="1"> <tr> <th>STD. NO.</th> <th>REV.</th> </tr> <tr> <td>2.26</td> <td> </td> </tr> </table>	STD. NO.	REV.	2.26	
STD. NO.	REV.					
2.26						



**NOTES**

1. THIS DRAWING IS INTENDED ONLY TO SHOW THE BASIC FEATURES OF A WETPOND. REFER TO NCDENR- STORMWATER BEST MANAGEMENT PRACTICES FOR DETAILED INFORMATION
2. WETPONDS ARE REQUIRED FOR HIGH-DENSITY DEVELOPMENTS IN DESIGNATED WATERSHED PROTECTION AREAS.



REFERENCE: CONTROLLING URBAN RUNOFF<sup>1</sup>

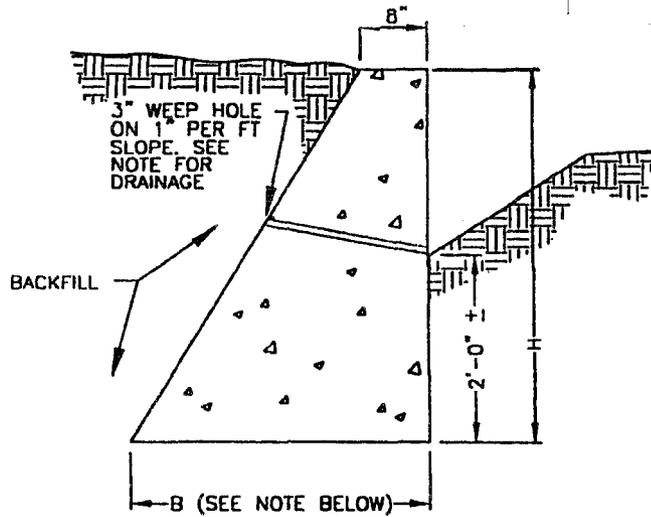
APPROVED DATE *8/1/00*

REVISIONS		
NO.	DATE	DESCRIPTION

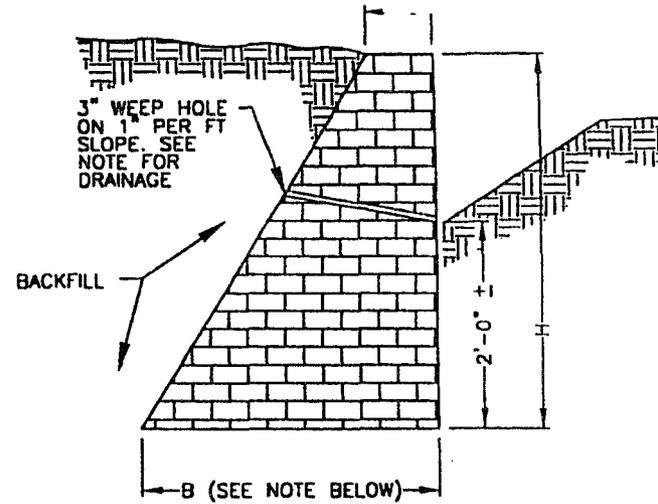
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**BEST MANAGEMENT PRACTICES  
(WET POND)**

STD. NO.	REV.
2.27	



SECTION OF  
CONCRETE RETAINING WALL



SECTION OF  
BRICK MASONRY RETAINING WALL

NOTE: THE FOLLOWING BASE WIDTHS ARE TO BE USED

H	B
4'-0" TO 10'-0"	0.4H + 8"

GENERAL NOTES:

1. WEEP HOLES 3" IN DIAMETER SHALL BE PLACED AT ABOUT 10'-0" INTERVALS. JUST ABOVE THE SURFACE OF THE EXISTING GROUND.
2. A STONE DRAIN CONSISTING OF 1 CUBIC FOOT OF NUMBER 78M STONE CONTAINED IN A BAG OF POROUS FABRIC SHALL BE PLACED AT EACH WEEP HOLE. SUBDRAIN FINE AGGREGATE SHALL BE PLACED BENEATH, AROUND, AND OVER THE STONE DRAIN SO THAT THE STONE DRAIN IS COVERED BY A LAYER OF SUBDRAIN FINE AGGREGATE AT LEAST 1 FOOT THICK. A HORIZONTAL DRAIN OF SUBDRAIN FINE AGGREGATE AT LEAST 1 FOOT SQUARE IN CROSS SECTION SHALL THEN BE PLACED TO CONNECT ALL STONE DRAINS. A VERTICAL DRAIN OF SUBDRAIN FINE AGGREGATE AT LEAST 1 FOOT SQUARE IN CROSS SECTION SHALL BE PLACED AT EACH WEEP HOLE TO AN ELEVATION 2 FEET BELOW THE SURFACE OF THE EMBANKMENT.
3. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH CONCRETE.
4. IN CONCRETE RETAINING WALL, 1/2" EXPANSION JOINT EVERY 25'.

REVISIONS

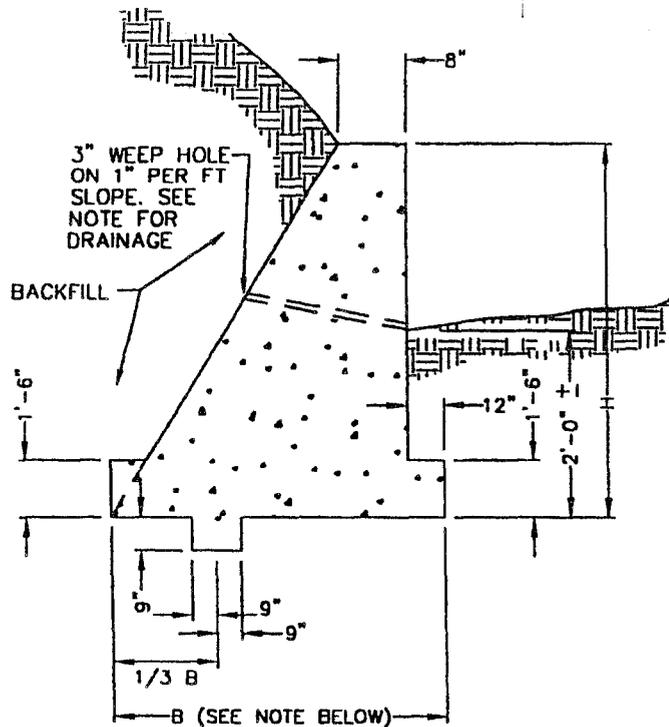
NO.	DATE	DESCRIPTION

APPROVED DATE *8/21/00*

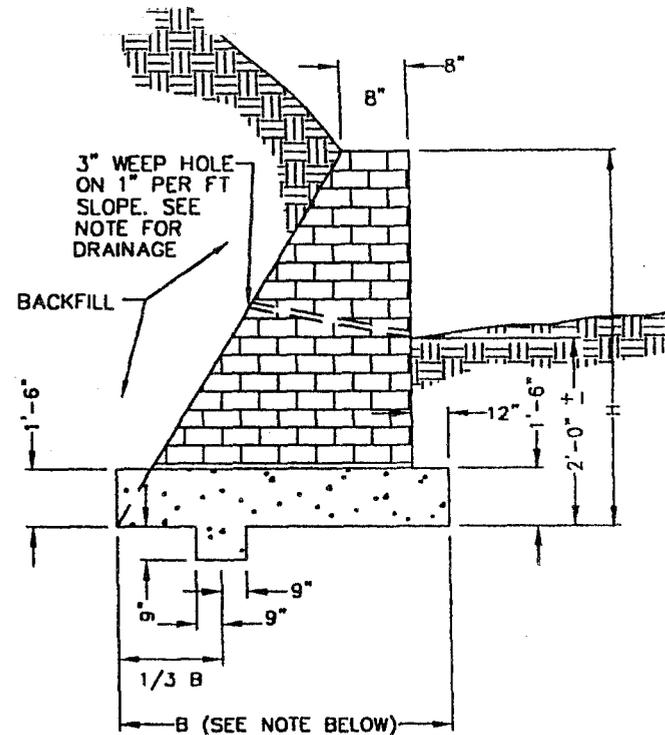
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**CONCRETE AND BRICK RETAINING WALLS  
WITH NO SURCHARGE**

STD. NO.	REV.
3.01	



**SECTION OF  
CONCRETE RETAINING WALL**



**SECTION OF  
BRICK MASONRY RETAINING WALL**

NOTE: THE FOLLOWING BASE WIDTHS ARE TO BE USED

H	B
4'-0" TO 6'-0"	0.5H + 1'-0"
6'-0" TO 10'-0"	0.65H + 1'-0"

REVISIONS

NO.	DATE	DESCRIPTION

**GENERAL NOTES:**

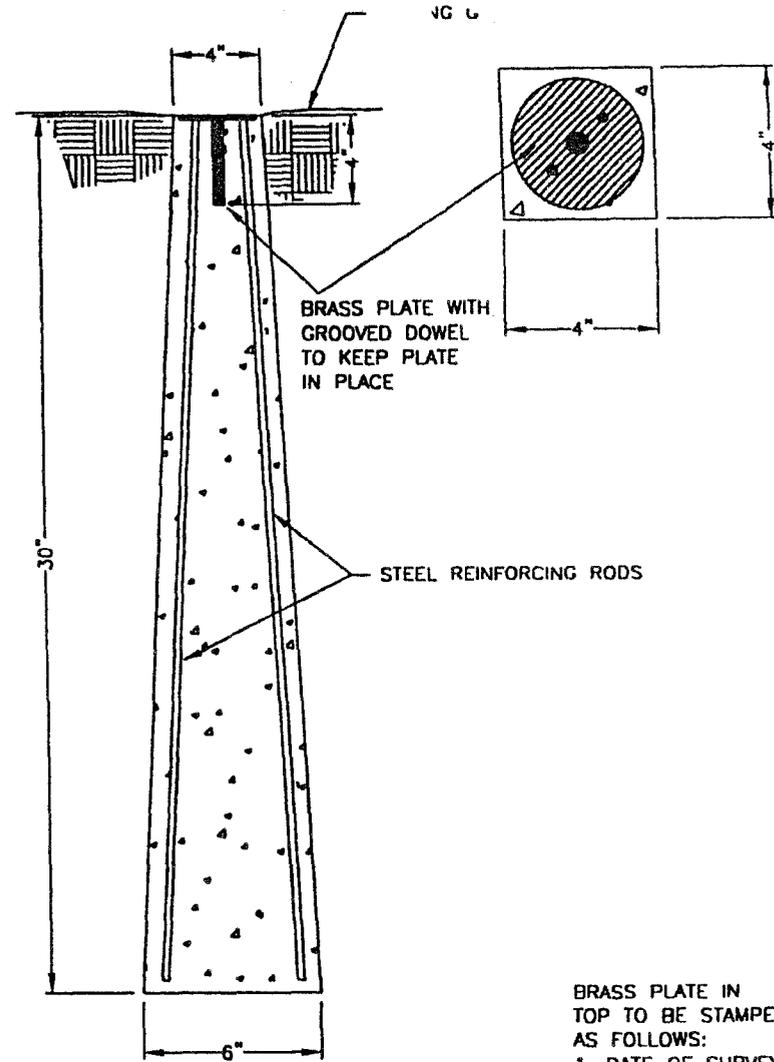
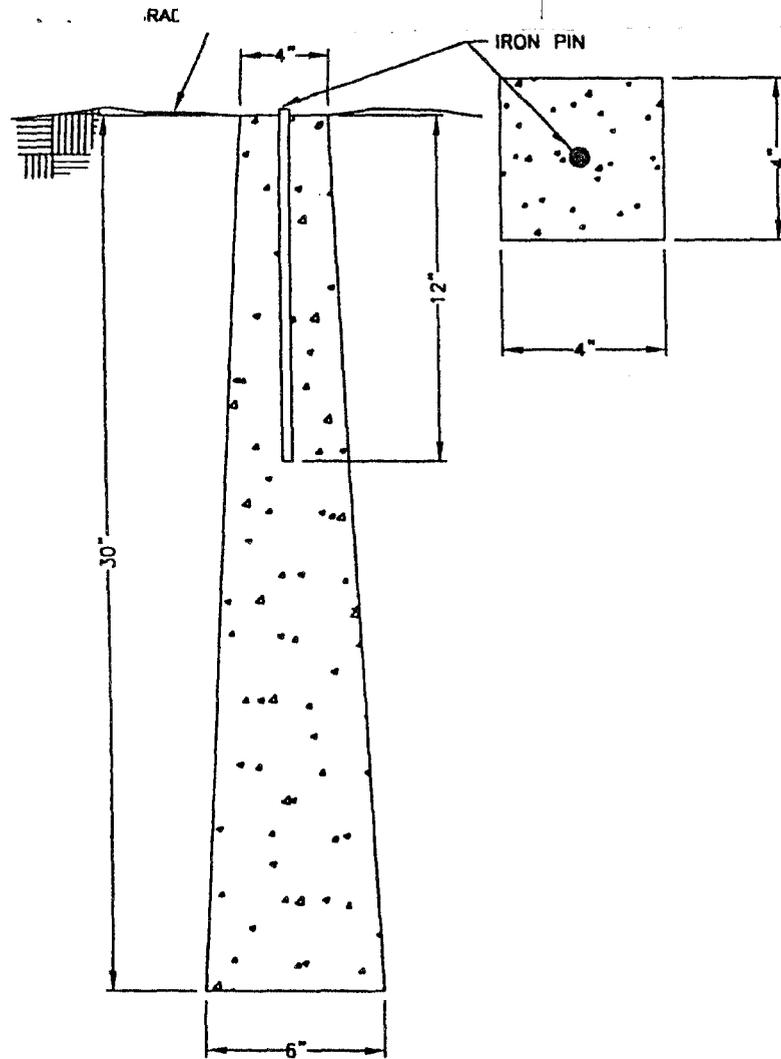
1. WEEP HOLES 3" IN DIAMETER SHALL BE PLACED AT ABOUT 10'-0" INTERVALS, JUST ABOVE THE SURFACE OF THE EXISTING GROUND.
2. A STONE DRAIN CONSISTING OF 1 CUBIC FOOT OF NUMBER 78M STONE CONTAINED IN A BAG OF POROUS FABRIC SHALL BE PLACED AT EACH WEEP HOLE. SUBDRAIN FINE AGGREGATE SHALL BE PLACED BENEATH, AROUND, AND OVER THE STONE DRAIN SO THAT THE STONE DRAIN IS COVERED BY A LAYER OF SUBDRAIN FINE AGGREGATE AT LEAST 1 FOOT THICK. A HORIZONTAL DRAIN OF SUBDRAIN FINE AGGREGATE AT LEAST 1 FOOT SQUARE IN CROSS SECTION SHALL THEN BE PLACED TO CONNECT ALL STONE DRAINS. A VERTICAL DRAIN OF SUBDRAIN FINE AGGREGATE AT LEAST 1 FOOT SQUARE IN CROSS SECTION SHALL BE PLACED AT EACH WEEP HOLE TO AN ELEVATION 2 FEET BELOW THE SURFACE OF THE EMBANKMENT.
3. ALL CONCRETE TO BE 3600 P.S.I. COMPRESSIVE STRENGTH.
4. IN CONCRETE RETAINING WALL, 1/2" EXPANSION JOINT EVERY 25'.

APPROVED DATE *2/1/00*

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**CONCRETE AND BRICK RETAINING WALLS  
WITH SLOPING SURCHARGE**

STD. NO.	REV.
3.02	



ALTERNATE CONTROL MONUMENT

BRASS PLATE IN TOP TO BE STAMPED AS FOLLOWS:  
 1. DATE OF SURVEY  
 2. SURVEYORS NAME  
 3. X TO MARK POINT  
 4. SURVEYORS REGISTRATION NUMBER

APPROVED DATE *6/10/10*

REVISIONS		
NO.	DATE	DESCRIPTION

TOWN OF INDIAN TRAIL  
 LAND DEVELOPMENT  
 STANDARDS

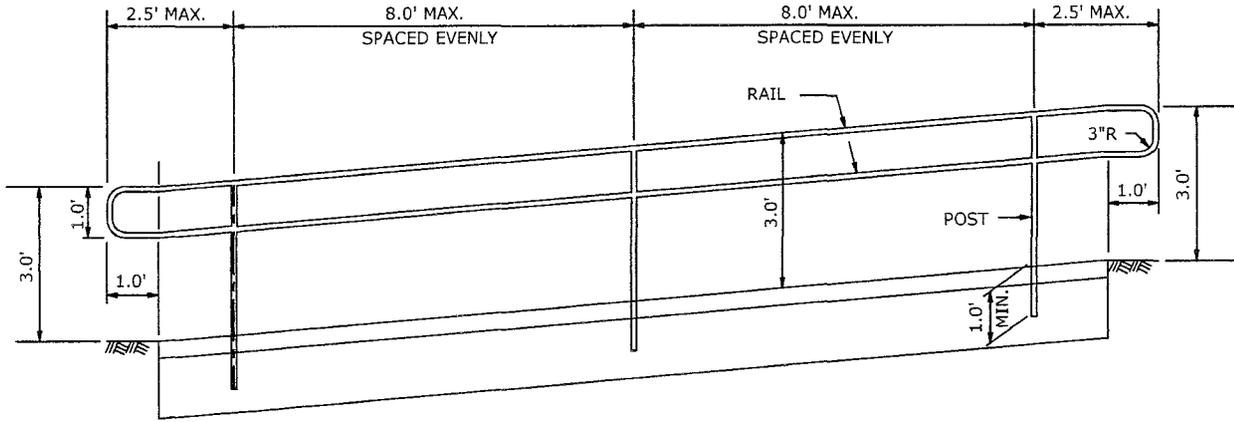
CONCRETE CONTROL MONUMENT

STD. NO.	REV.
3.03	

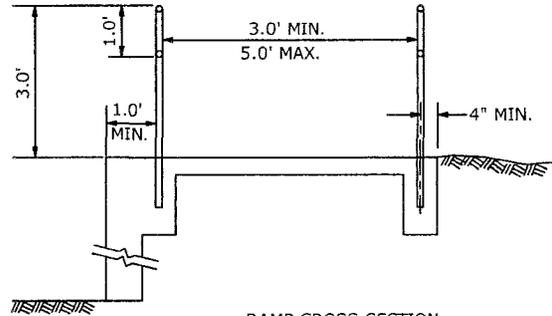
# TOWN OF INDIAN TRAIL

## Land Development Standard Details

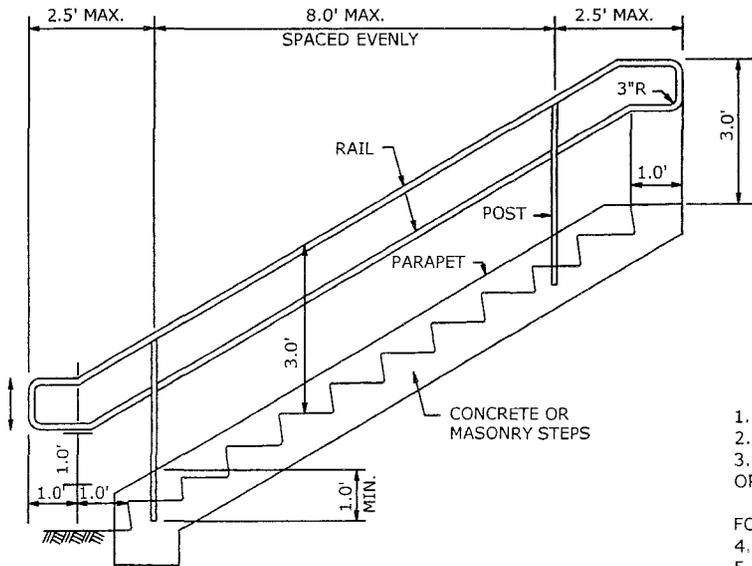
### ADA RAMP AND STEP HANDRAIL



RAMP ELEVATION



RAMP CROSS-SECTION



NOTES

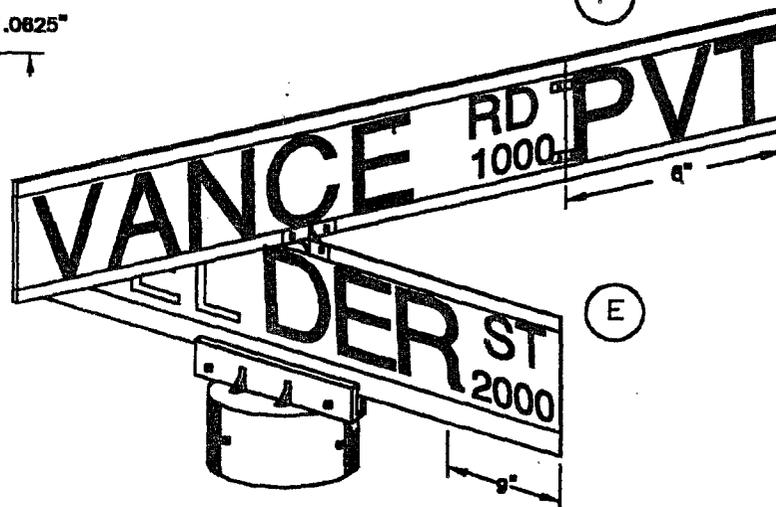
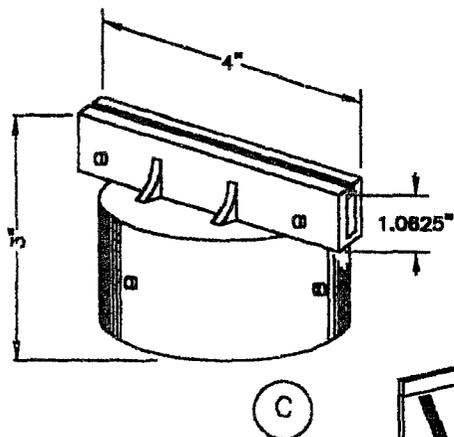
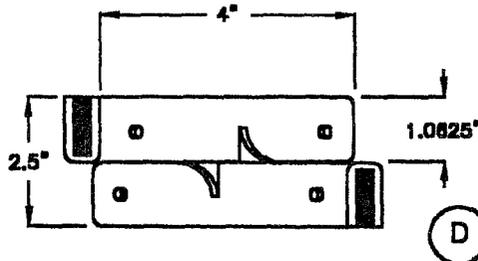
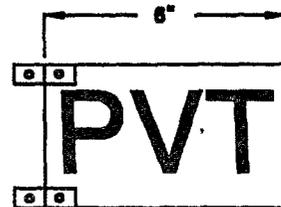
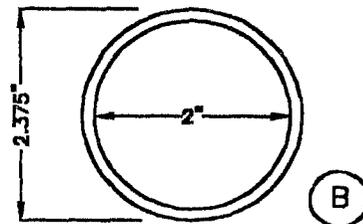
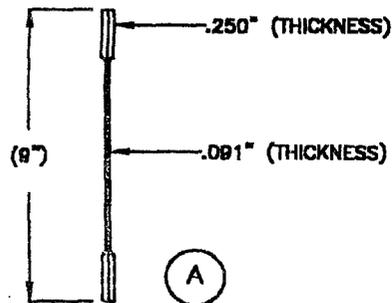
1. RAIL SHALL BE 1.25" TO 1.50" O.D.
  2. POSTS SHALL BE 1.25 NOMINAL.
  3. POSTS AND RAILS SHALL BE BLACK IRON LOW CARBON PIPE OR HEAVY ALUMINUM PIPE IN BLACK FINISH.
- FOR STEPS:
4. POSTS SHALL BE CENTERED IN PARAPET OF STEPS.
  5. HANDRAILS SHALL BE INSTALLED ON BOTH SIDES OF STEPS.
  6. SPACING BETWEEN HANDRAILS IS 3.0' MINIMUM, 5.0' MAXIMUM.
- FOR CONCRETE:
6. ALL CONCRETE TO BE 3600 PSI COMPRESSIVE STRENGTH.
  7. TOP OF CONCRETE SHALL BE FLUSH WITH FINISHED GRADE.
  8. DEPTH OF CONCRETE FOOTER SHALL BE 18" MINIMUM.

Engineer  
S. L. Habina

Date Enacted by Council  
4/10/2007

Standard Number:  
**3.04A**





**NOTES:**

1. BLADES SHALL BE EXTRUDED ALUMINUM 6063T5 OR 6063T6 ALLOY .080" THICK. POST SHALL BE 10'-0" IN LENGTH, TUBULAR 2.375 O.D. GLOSS GALVANIZED STEEL CONTINUOUS MILL DIPPED, WITH NO RAW ENDS; OR 40, 1540 WALL ALUMINUM (SEE DETAIL B).
2. CAP TO BE ALUMINUM #380 ALLOY OR EQUAL, SLOTTED FOR .25" EXTRUDED BLADE; 2.375" I.D. BASE, DIE CAST AND POLISHED. CAP SHALL BE TAPPED TO RECEIVE AND INCLUDE 3 STAINLESS STEEL SET SCREWS FOR POST MOUNTING AND 2 STAINLESS STEEL SET SCREWS FOR BLADE MOUNTING. SET SCREWS TO HAVE ALLEN HEADS (SEE DETAIL C).
3. BLADE SPACER BRACKET SHALL MEET SAME SPECIFICATIONS AS THE CAP WITH 2 SCREWS TO EACH BLADE MOUNTING (SEE DETAIL D).
4. THE FACE OF ALL BLADES SHALL MEET COVERED WITH ENGINEERING GRADE SHEETING WITH #2290 WHITE DIE CUT LETTERS WITH REVERSED SCREENED #708 TRANSPARENT GREEN. THE PRIMARY LETTERS SHALL BE 5" HIGH UPPER CASE, FHWA SERIES B AND PREFIX/SUFFIX LETTERS SHALL BE 2-1/2" HIGH, UPPER CASE, FHWA SERIES C. BLOCK NUMBERS SHALL BE PLACED IN THE LOWER RIGHT CORNER AND SHALL BE 2-1/2" HIGH, FHWA SERIES C. ALL MATERIALS TO BE VACUUM AND HEAT APPLIED TO A PREPARED ALUMINUM BLADE, WHICH HAS BEEN CLEANED AND ALL FOREIGN MATERIAL REMOVED (SEE DETAIL E).
5. LETTERS, NUMBERS AND SPACING SHALL CONFORM TO THE STANDARD ALPHABETS FOR HIGHWAY SIGNS, 1988 EDITION, REPRINT MAY, 1972 BY THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION, OFFICE OF TRAFFIC OPERATION.
6. ALL STREET NAME SIGNS ARE SUBJECT TO APPROVAL BY THE TOWN PLANNER. BLOCK NUMBERS SHALL BE PROVIDED ON SIGNS AND CORRESPOND TO OFFICIALLY APPROVED ADDRESSES.
7. IF THE STREET IS INTENDED TO BE PRIVATE, A SUPPLEMENTAL PLATE IS REQUIRED. THE SUPPLEMENTAL PLATE MAY BE EITHER ATTACHED TO THE SIGN OR AN EXTENDED BLADE WITH BLACK ON YELLOW SHEETING MAY BE USED. THE SIGN SHALL HAVE BLACK LETTERS THAT SHOW PVT TO STAND FOR PRIVATE. THE LETTERS SHALL BE 2-1/2" HIGH, UPPER CASE, FHWA SERIES C, ON ON A BACKGROUND OF YELLOW ENGINEERING GRADE SHEETING. (SEE DETAIL F).
8. ALTERNATE SIGNAGE FOR "TND" MAY BE APPROVED BY THE APPROPRIATE REPRESENTATIVE OF THE TOWN OF INDIAN TRAIL.

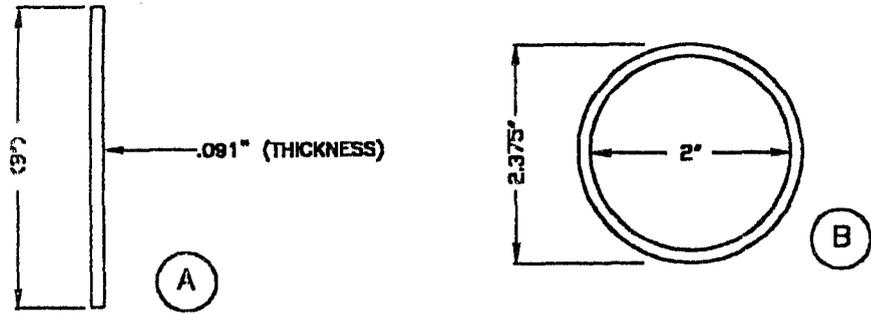
APPROVED DATE \_\_\_\_\_

REVISIONS	
J.	DESCRIPTION

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

STREET NAME SIGN

STD. NO.	REV.
3.05A	



REVISIONS	
O.	DESCRIPTION

- Notes
1. POST SHALL BE 10'-0" IN LENGTH, TUBULAR 2.375" O.D. GLOSS GALVANIZED STEEL CONTINUOUS MILL DIPPED, WITH NO RAW ENDS; OR 40, 1540 WALL ALUMINUM (SEE DETAIL B).
  2. THE FACE OF ALL BLADES SHALL BE COVERED WITH ENGINEERING GRADE SHEETING WITH #2280 WHITE DIE CUT LETTERS WITH REVERSED SCREENED #708 TRANSPARENT GREEN, THE PRIMARY LETTERS SHALL BE 5" HIGH, UPPER CASE, FHWA SERIES B AND PREFIX/SUFFIX LETTERS SHALL BE 2-1/2" HIGH, UPPER CASE, FHWA SERIES C. BLOCK NUMBERS SHALL BE PLACED IN THE LOWER RIGHT CORNER AND SHALL BE 2-1/2" HIGH, FHWA SERIES C. ALL MATERIALS TO VACUUM AND HEAT APPLIED TO A PREPARED ALUMINIUM BLADE, WHICH HAS BEEN CLEANED AND ALL FOREVER MATERIAL REMOVED (SEE DETAIL E).
  3. LETTERS AND NUMERALS AND SPACING SHALL CONFORM TO THE STANDARD ALPHABETS FOR HIGHWAY SIGNS, 1966 EDITION, REPRINT MAY, 1972 BY THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION, OFFICE OF TRAFFIC OPERATION.
  4. ALL STREET NAME SIGNS ARE SUBJECT TO APPROVAL BY THE TOWN PLANNER. BLOCK NUMBERS MUST BE PROVIDED ON SIGNS AND CORRESPOND TO OFFICIALLY APPROVED ADDRESSES.
  5. IF THE STREET IS INTENDED TO BE PRIVATE, A SUPPLEMENTAL PLATE IS REQUIRED. THE SUPPLEMENTAL PLATE MAY BE EITHER ATTACHED TO THE SIGN OR AN EXTENDED BLADE WITH BLACK ON YELLOW SHEETING MAY BE USED. THE SIGN SHALL HAVE BLACK LETTERS THAT SHOW PVT TO STAND FOR PRIVATE. THE LETTERS SHALL BE 2 1/2" HIGH, UPPER CASE, FHWA SERIES C, ON A YELLOW BACKGROUND (SEE DETAIL F).
  6. ALTERNATE SIGNAGE FOR "TND" MAY BE APPROVED BY THE APPROPRIATE REPRESENTATIVE OF THE TOWN OF INDIAN TRAIL.

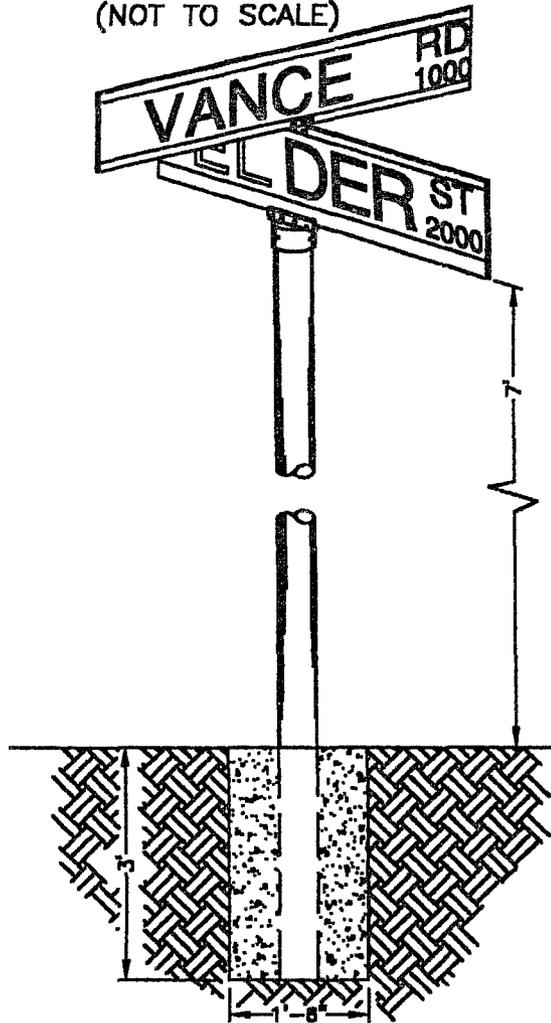
APPROVED DATE \_\_\_\_\_

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

STREET NAME SIGN  
(OPTIONAL)

STD. NO.	REV.
3.05B	

INSTALLATION OF STREET NAME SIGN  
(NOT TO SCALE)

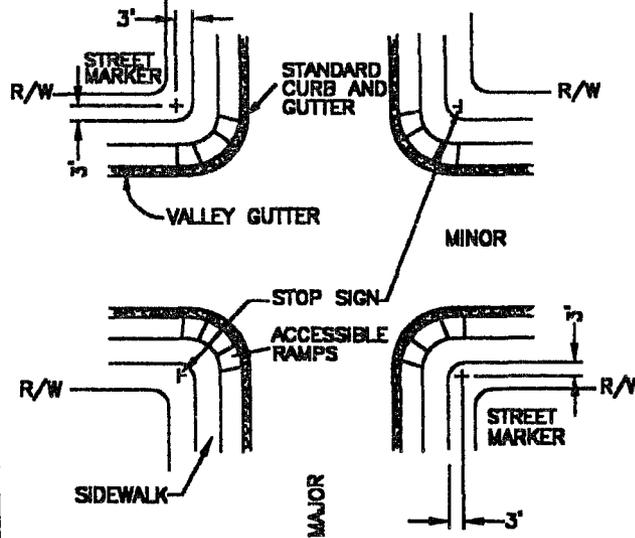


REVISIONS

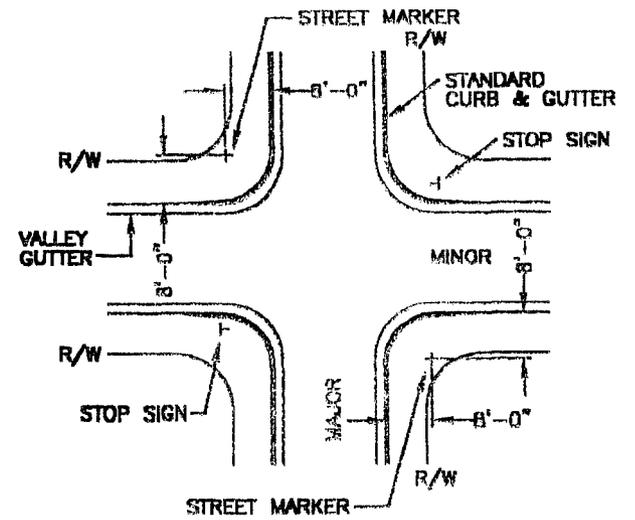
NO.	DATE	DESCRIPTION

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

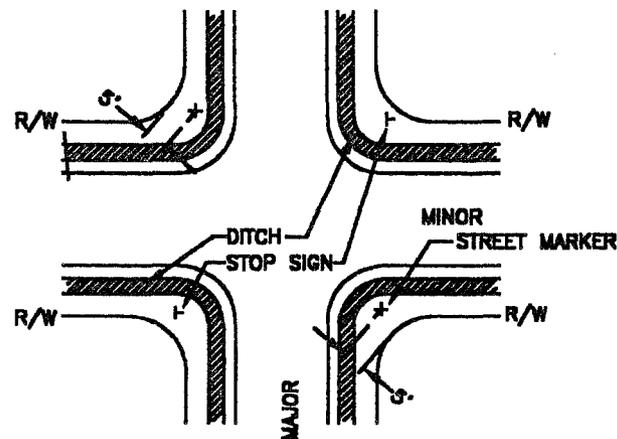
INTERSECTION with  
SIDEWALK, CURB, and GUTTER



INTERSECTION with CURB and GUTTER



INTERSECTION with  
DITCHES, and NO CURB and GUTTER



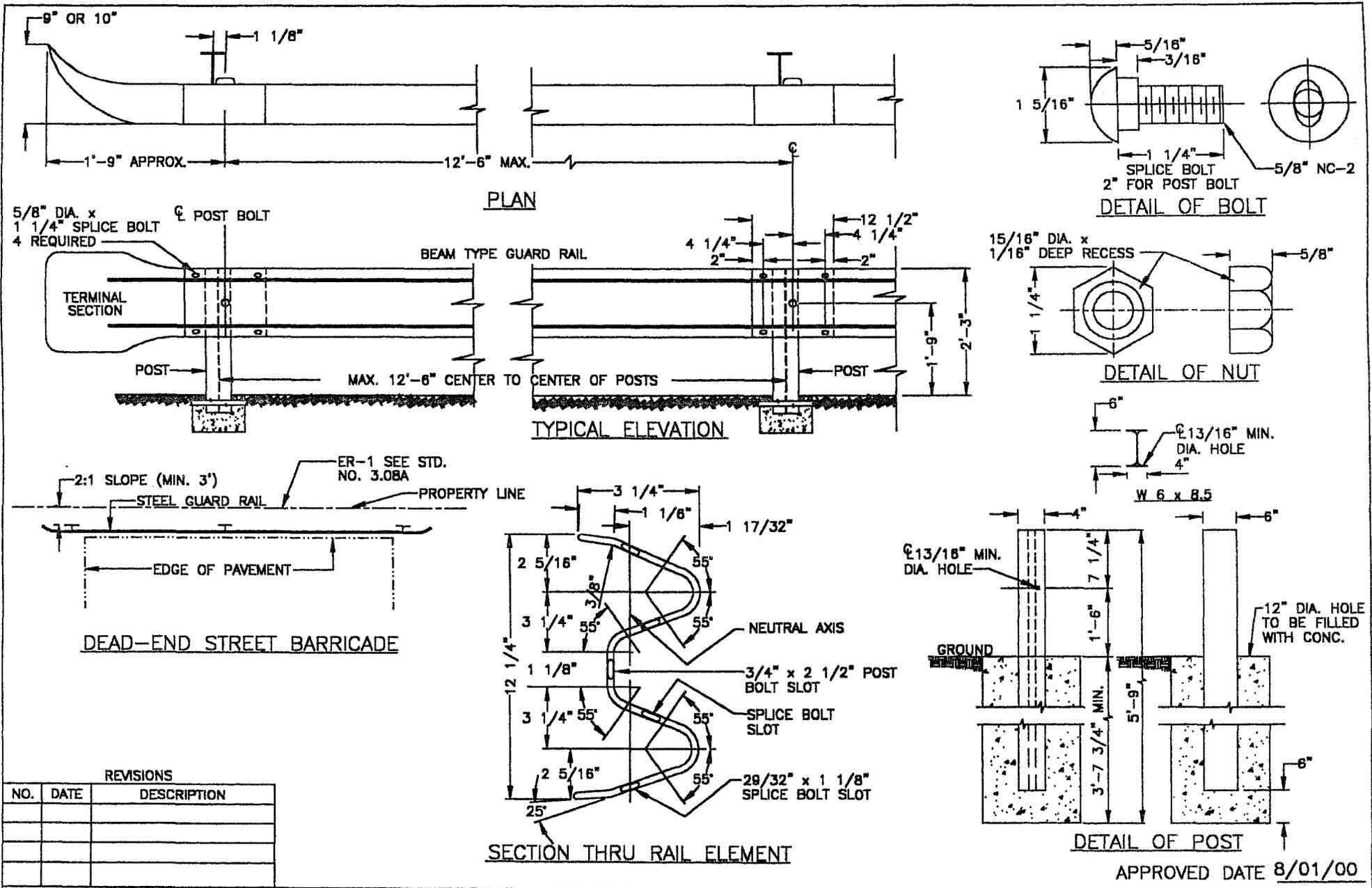
NOTE: ANY VARIANCE FROM THIS STANDARD MUST BE APPROVED BY THE APPROPRIATE REPRESENTATIVE OF THE TOWN OF INDIAN TRAIL OR NCDOT.

ALTERNATE SIGNAGE FOR "TND" MAY BE APPROVED BY THE APPROPRIATE REPRESENTATIVE OF THE TOWN OF INDIAN TRAIL.

APPROVED DATE \_\_\_\_\_

STREET NAME SIGN INSTALLATION  
LOCATIONS

STD. NO.	REV.
3.06	



TOWN OF INDIAN TRAIL  
 LAND DEVELOPMENT  
 STANDARDS

DEAD END STREET BARRICADE

STO. NO.	REV.
3.07A	

**GENERAL NOTES:**

1. STEEL BEAM TYPE GUARD RAILS SHALL BE INSTALLED AT THE END OF ALL DEAD-END STREETS, EXCEPT CUL-DE-SAC STREETS WHICH HAVE BEEN IMPROVED WITH A PERMANENT TURN-AROUND.
2. FOR STREETS 26' IN WIDTH THE GUARD RAIL SHALL CONSIST OF TWO(2) 12'-6" SECTIONS OR ONE(1) 25' SECTION, THREE (3) STEEL POSTS, AND TWO (2) TERMINAL SECTIONS. FOR STREETS GREATER THAN 25' IN WIDTH THE GUARD RAIL SHALL SPAN THE ENTIRE WIDTH OF THE STREET.
3. GUARD RAIL SHALL CONSIST OF RAIL ELEMENTS FABRICATED TO DEVELOP CONTINUOUS BEAM STRENGTH AND INSTALLED AS SHOWN.
4. MINIMUM THICKNESS OF GUARD RAIL SHALL BE 12 GAGE U.S. STANDARD.  
THE RAIL ELEMENT INCLUDING SPLICES, SHALL HAVE A MINIMUM ULTIMATE TENSILE STRENGTH OF 80,000 LBS.  
GUARD RAIL PARTS FURNISHED SHALL BE INTERCHANGEABLE WITH SIMILAR PARTS REGARDLESS OF THE SOURCE OF MANUFACTURER.  
THE HOLES FOR CONNECTING BOLTS SHALL BE PUNCHED OF DRILLED, BURNING WILL NOT BE PERMITTED.
5. THE GUARD, BOLTS, NUTS, STEEL POSTS. AND ALL OTHER METAL PARTS SHALL BE GALVANIZED TO CONFORM TO THE REQUIREMENTS FOR THE COATING CLASS, (2.50 OUNCES PER SQUARE FOOT) OF THE CURRENT SPECIFICATIONS FOR ZINC-COATED (GALVANIZED) IRON, AND STEEL SHEETS, COILS, AND CUT LENGTHS, IN ACCORDANCE WITH ASTM 123A.
6. IF THE AVERAGE SPELTER COATING AS DETERMINED FROM THE REQUIRED SAMPLES IS LESS THAN TWO (2) OUNCES OF SPELTER PER SQUARE FOOT, OR IF ANY ONE SPECIMEN HAS LESS THAN 1.8 ONCES OF SPELTER PER SQUARE FOOT OF DOUBLE EXPOSED SURFACE, THE LOT SAMPLED SHALL BE REJECTED, THE FINISHED SHEETS SHALL BE OF FIRST CLASS COMMERCIAL QUALITY, FREE FROM INJURIOUS DEFECTS, SUCH AS BLISTERS, FLUX, AND UNCOATED SPOTS.
7. THE GUARD RAIL SHALL BE INSPECTED TO DETERMINE THAT THE MATERIAL, DIMENSIONS, AND WORKMANSHIP ARE IN ACCORDANCE WITH THIS PLAN.
8. WHERE A DEAD-END STREET REQUIRES GUARD RAIL, END OF ROADWAY MARKER SIGNS SHALL ALSO BE REQUIRED. (SEE STD. 3.08A & 3.08B) (ER-1).

REVISIONS

NO.	DATE	DESCRIPTION

APPROVED DATE *e/10/00*

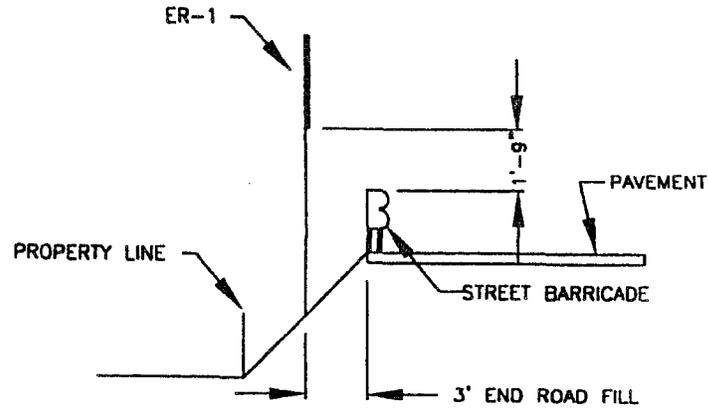
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

DEAD END STREET BARRICADE  
GENERAL NOTES

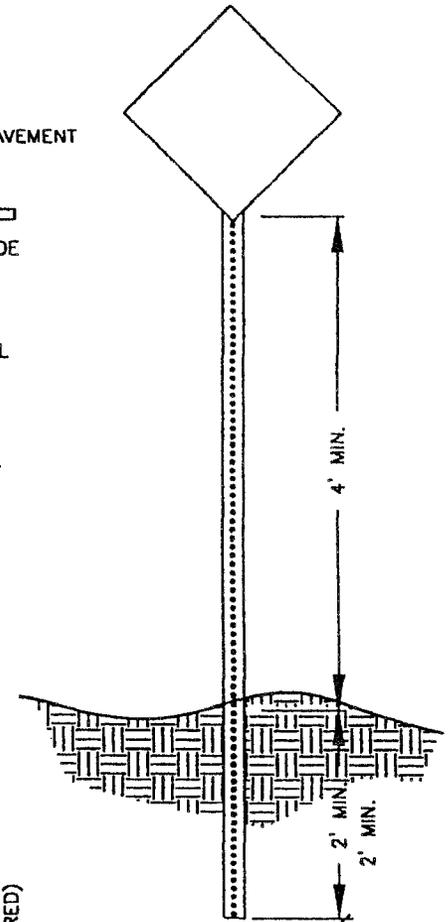
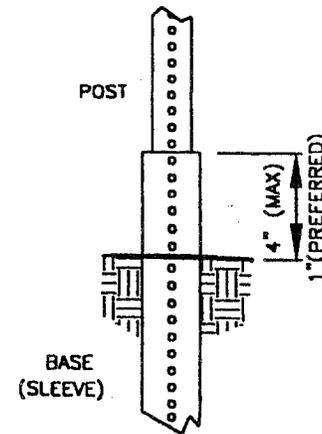
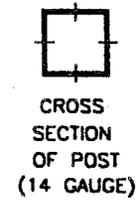
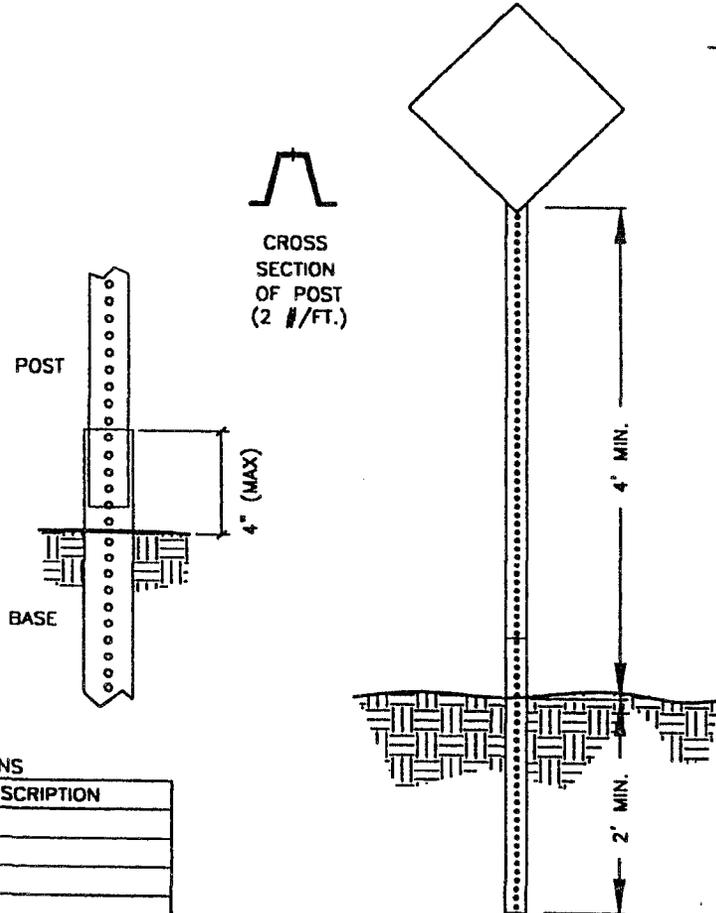
STD. NO.	REV.
3.07B	

NOTES:

1. WHERE A DEAD-END STREET REQUIRES A GUARDRAIL SECTION, END OF ROADWAY MARKER (ER-1, 24"x24", RED) SIGNS ARE REQUIRED.
2. SIGNS ARE TO BE PLACED BEHIND THE GUARDRAIL (SEE STD 3.07A & B) EVENLY SPACED WITH ONE SIGN PLACED AT THE CENTERLINE LOCATION AND ADDITIONAL SIGNS AT 6' O.C. (MINIMUM OF 3 SIGNS, MAXIMUM OF 5 SIGNS).



SIGN LOCATION DETAIL



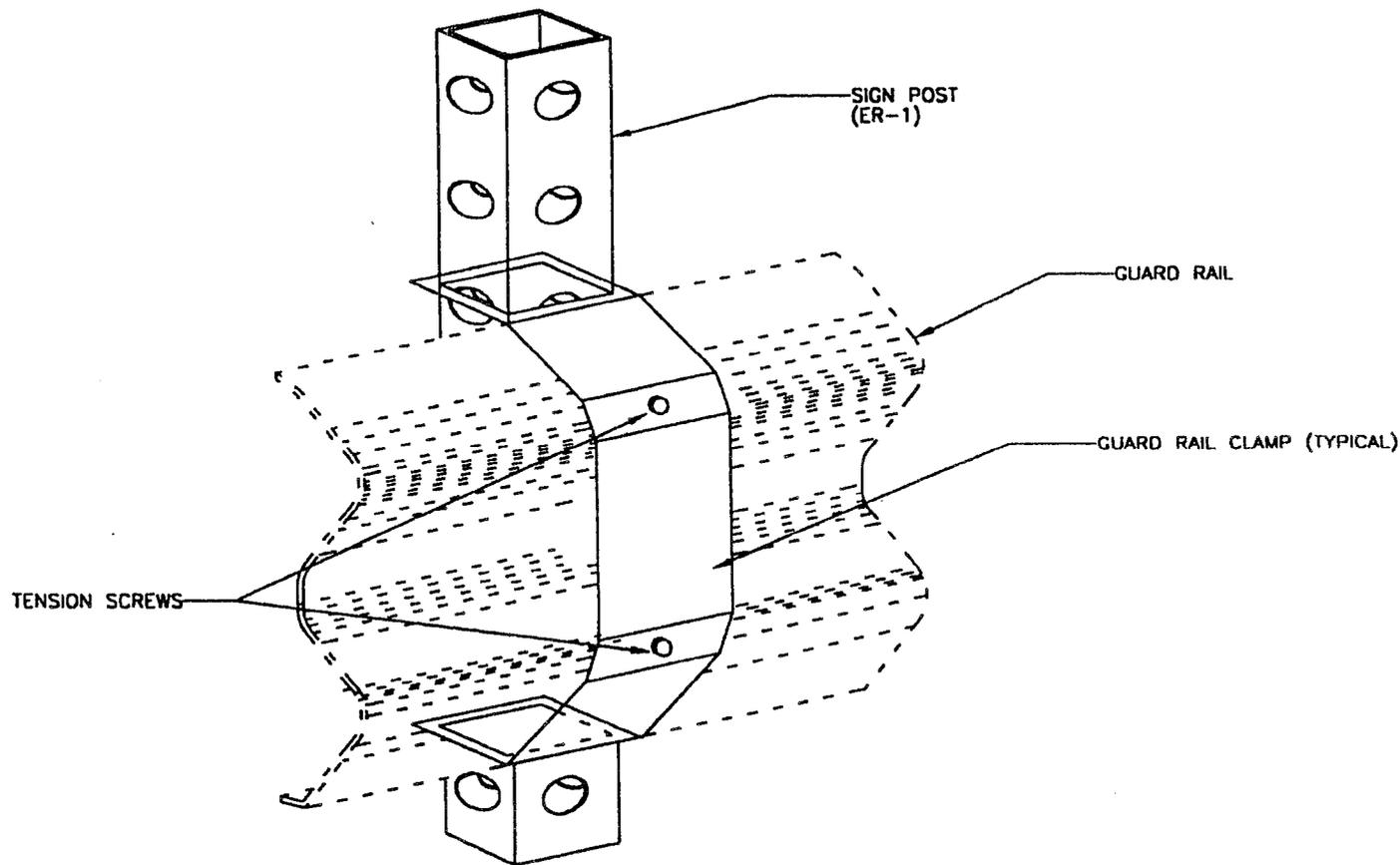
REVISIONS		
NO.	DATE	DESCRIPTION

APPROVED DATE *alodex*

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

END OF ROADWAY MARKER  
(ER-1)

STD. NO.	REV.
3.08A	



REVISIONS

NO.	DATE	DESCRIPTION

APPROVED DATE *elbert*

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

END OF ROADWAY MARKER (ER-1)  
GUARD RAIL CLAMP INSTALLATION

STD. NO.	REV.
3.08B	

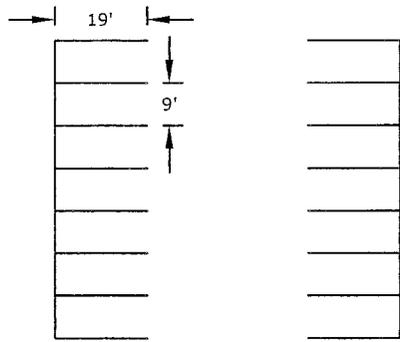
# TOWN OF INDIAN TRAIL

## Land Development Standard Details

### PARKING STANDARDS

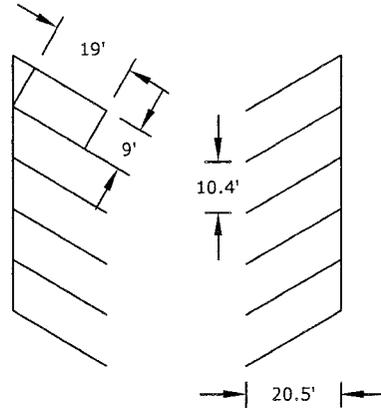
#### RECOMMENDED DIMENSIONS FOR REGULAR SPACES

PERPENDICULAR PARKING ANGLE 90°



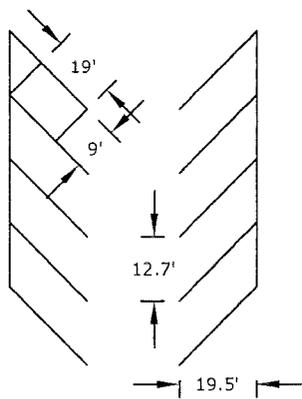
AISLE WIDTH:  
 ONE WAY TRAFFIC 24'  
 TWO WAY TRAFFIC 24'

PARKING ANGLE 60°



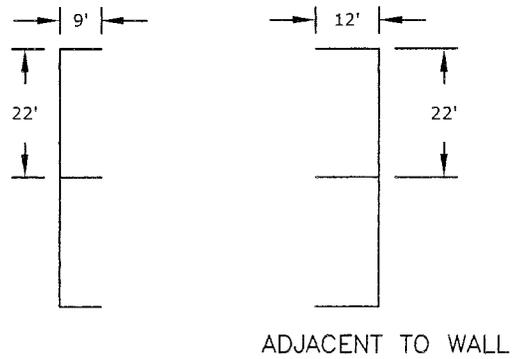
AISLE WIDTH:  
 ONE WAY TRAFFIC 18'  
 TWO WAY TRAFFIC 23'

PARKING ANGLE 45°



AISLE WIDTH:  
 ONE WAY TRAFFIC 13'  
 TWO WAY TRAFFIC 21'

PARALLEL ANGLE 0°



AISLE WIDTH:  
 ONE WAY TRAFFIC 13'  
 TWO WAY TRAFFIC 19'

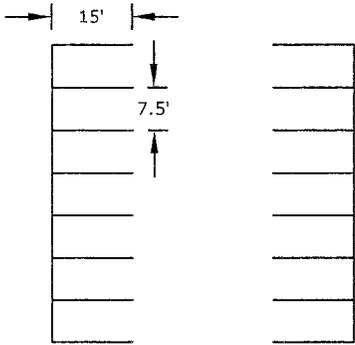
# TOWN OF INDIAN TRAIL

## Land Development Standard Details

### PARKING STANDARDS

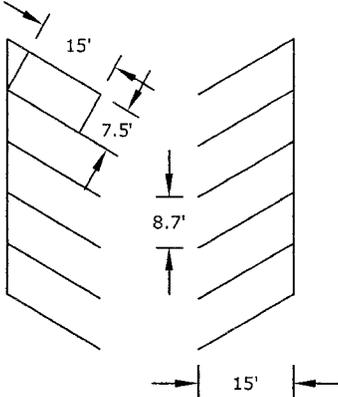
#### RECOMMENDED DIMENSIONS FOR COMPACT SPACES

PERPENDICULAR PARKING ANGLE 90°



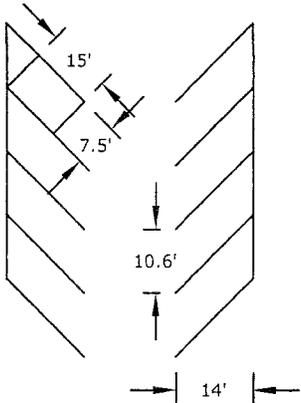
AISLE WIDTH:  
 ONE WAY TRAFFIC 24'  
 TWO WAY TRAFFIC 24'

PARKING ANGLE 60°



AISLE WIDTH:  
 ONE WAY TRAFFIC 18'  
 TWO WAY TRAFFIC 23'

PARKING ANGLE 45°



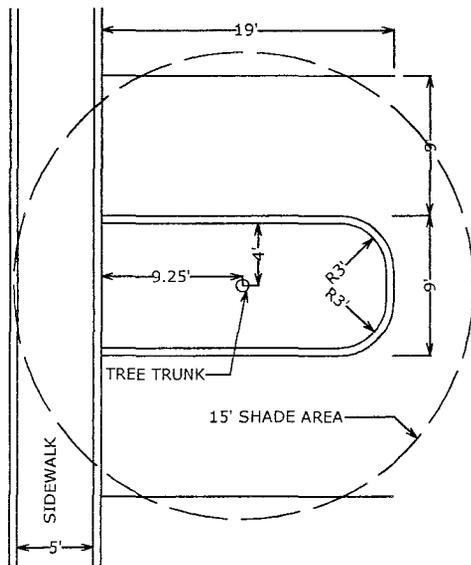
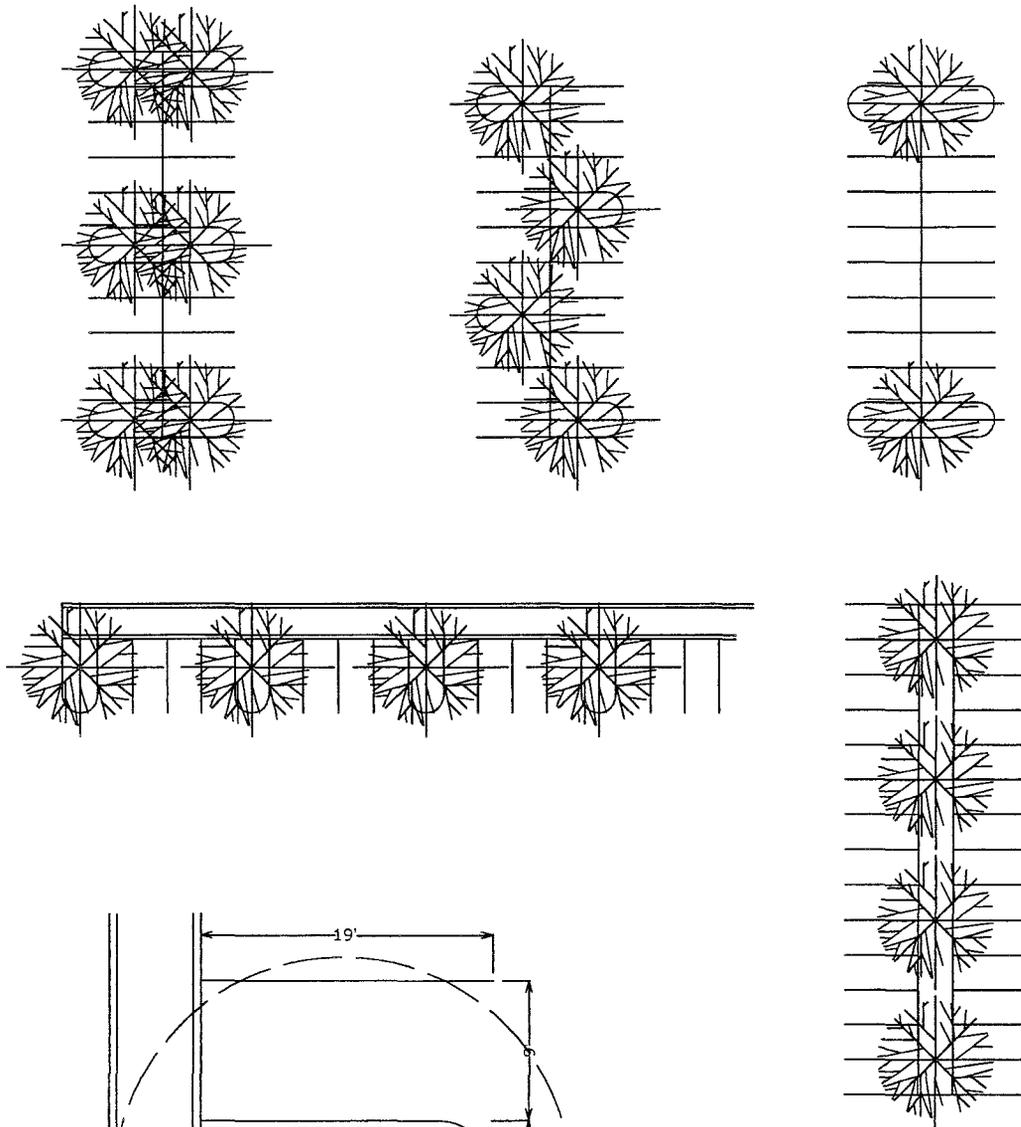
AISLE WIDTH:  
 ONE WAY TRAFFIC 13'  
 TWO WAY TRAFFIC 21'

NOTES:

1. FOR ACCESSIBLE PARKING STANDARDS AND SIGNING SEE STD. 3.10.
2. PAVEMENT MARKINGS SHALL BE 4" WHITE PAINT.
3. COMPACT PARALLEL PARKING NOT ALLOWED

# TOWN OF INDIAN TRAIL

## TYPICAL PARKING LOT PLANTING ISLANDS



PLANTING ISLAND DETAIL  
NTS

**NOTES:**

1. SHADING REQUIREMENTS SHALL COMPLY WITH THE ZONING ORDINANCE.
2. TREE SPECIES TO CONFORM TO STANDARDS SET FORTH IN THE ZONING ORDINANCE.
3. ALL ISLANDS MUST BE CURBED AS SHOWN.
4. ADDITIONAL LANDSCAPING, MULCH, GRASS, ETC., MAY BE REQUIRED.

Engineer  
S. L. Habina

Date Enacted by Council  
04/10/07

Standard Number:  
**3.09B**

# TOWN OF INDIAN TRAIL

## Land Development Standard Details

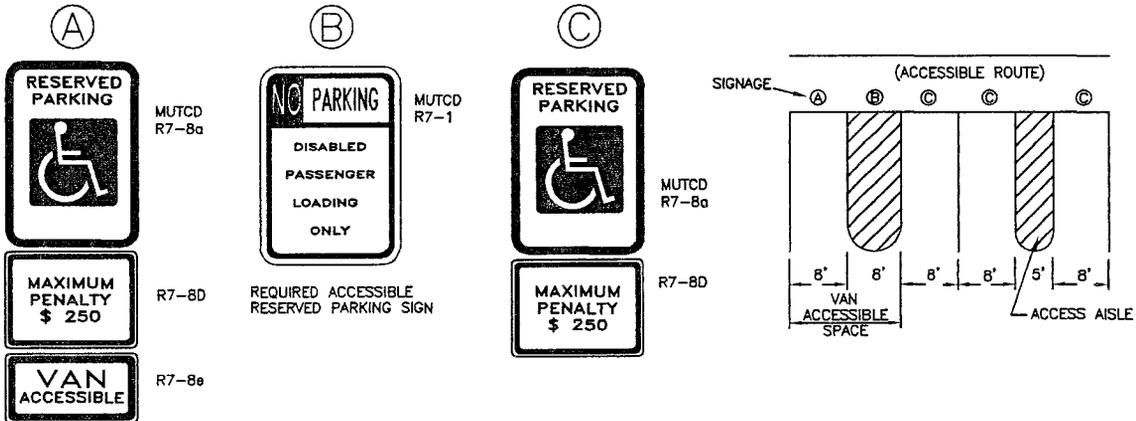
### SIGNAGE STANDARDS

#### ACCESSIBLE PARKING REQUIREMENTS

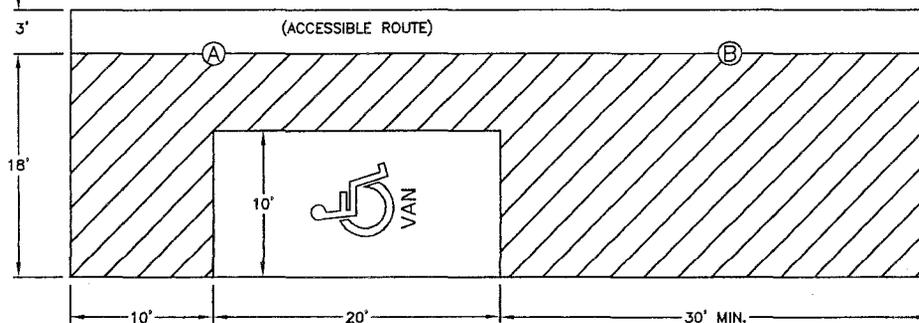
TOTAL PARKING SPACES PROVIDED	MINIMUM TOTAL ACCESSIBLE SPACES REQUIRED	MINIMUM NUMBER REQUIRED PER TYPE		
		REGULAR (8'+5')	VAN (8'+8')	SIDE LOAD VAN
1 TO 25	1	0	1	0
26 TO 50	2	1	1	0
51 TO 75	3	2	1	0
76 TO 100	4	3	1	0
101 TO 150	5	3	2	0
151 TO 200	6	4	2	0
201 TO 300	7	5	2	0
301 TO 400	8	6	2	0
401 TO 500	9	6	2	1
501 TO 1000	2% OF TOTAL	REQUIRED TOTAL LESS VAN SPACES	1 IN 4 TOTAL REQUIRED SPACES	1 FOR EVERY 3 VAN SPACES
1001 AND OVER	20 PLUS 1 FOR EACH 100 OVER 1000	REQUIRED TOTAL LESS VAN SPACES	1 IN 4 TOTAL REQUIRED SPACES	1 FOR EVERY 3 VAN SPACES

REFER 4.1.2(5) OF THE AMERICANS WITH DISABILITIES ACT (ADA), AND 4.1,2,(5)(d) FOR MEDICAL CARE FACILITIES

#### ACCESSIBLE PARKING SPACE MARKINGS



#### SIDE LOAD VAN ACCESSIBLE PARKING SPACE DETAIL



SHEET 1 OF 2

Engineer  
S. L. Habina

Date Enacted by Council  
04/10/07

Standard Number:  
**3.10**

# TOWN OF INDIAN TRAIL

## Land Development Standard Details

### ACCESSIBLE PARKING NOTES

1. ALL ACCESSIBLE SIGNS SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
2. ALL 12"X18" ACCESSIBLE SIGNS (R7-8a & R7-1) SHALL BE MOUNTED AT 7' FROM GRADE TO BOTTOM EDGE OF SIGN FACE (MUTCD). MOUNTING HEIGHT CAN BE REDUCED TO 5' IF PLACED IN AN AREA BETWEEN SIDEWALK AND BUILDING FACE IN WHICH PEDSTRIANS ARE NOT EXPECTED TO USE.
3. STRIPING SHALL BE 4" WHITE OR BLUE REFLECTIVE TAPE OR PAINT. HATCHING SHALL BE 2' ON CENTER (O.C.).
4. REFER TO MUTCD, U.S. DEPARTMENT OF TRANSPORTATION AND NORTH CAROLINA DEPARTMENT OF TRANSPORTATION SUPPLEMENT FOR ADDITIONAL INFORMATION.
5. IF ACCESSIBLE ROUTE IS A RAISED SIDEWALK AREA, THEN RAMPS ARE REQUIRED AT THE ACCESS AISLE.
6. ONE OUT OF EVERY FOUR (4) ACCESSIBLE SPACES OR PART THEREOF, BUT NOT LESS THAN ONE, IS REQUIRED TO BE VAN ACCESSIBLE. WHERE THREE (3) VAN SPACES ARE REQUIRED, ONE SHALL CONFORM TO THE "SIDE LOAD VAN ACCESSIBLE PARKING SPACE DETAIL". SEE TABLE FOR REQUIREMENTS.
7. ACCESSIBLE PARKING SPACES SERVING A PARTICULAR BUILDING SHALL BE LOCATED ON THE SHORTEST ROUTE OF TRAVEL WHICH SHALL BE MADE ASSESSIBLE FROM ADJACENT PARKING TO AN ASSESSIBLE ENTRANCE.
8. IN BUILDINGS WITH MULTIPLE ACCESSIBLE ENTRANCES WITH ADJACENT PARKING, ACCESSIBLE PARKING SPACES SHALL BE DISPERSED AND LOCATED CLOSEST TO THE ACCESSIBLE ENTRANCES. IN PARKING FACILITIES THAT DO NOT SERVE A PARTICULAR BUILDING, ACCESSIBLE PARKING SHALL BE LOCATED ON THE SHORTEST ROUTE OF TRAVEL TO AN ACCESSIBLE PEDESTRAIN ENTRANCE OF THE PARKING FACILITY.
9. PARKING ACCESS AISLES SHALL BE PART OF AN ACCESSIBLE ROUTE TO THE BUILDING OR FACILITY ENTRANCE. TWO ACCESSIBLE PARKING SPACES MAY SHARE A COMMON ACCESS AISLE.
10. PERSONS USING THE ACCESSIBLE SPACES SHALL NOT BE REQUIRED TO CROSS A TRAVEL WAY TO ACCESS THE ENTRANCE OR MANEUVER BEHIND A BACKING VEHICLE.

SHEET 2 OF 2

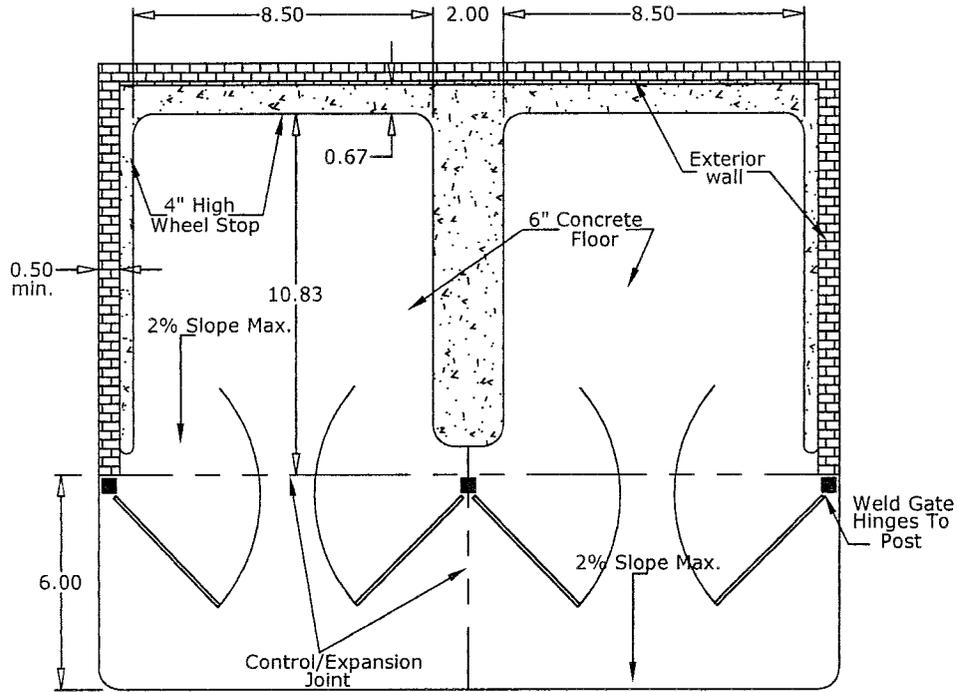
Engineer  
S. L. Habina

Date Enacted by Council  
04/10/07

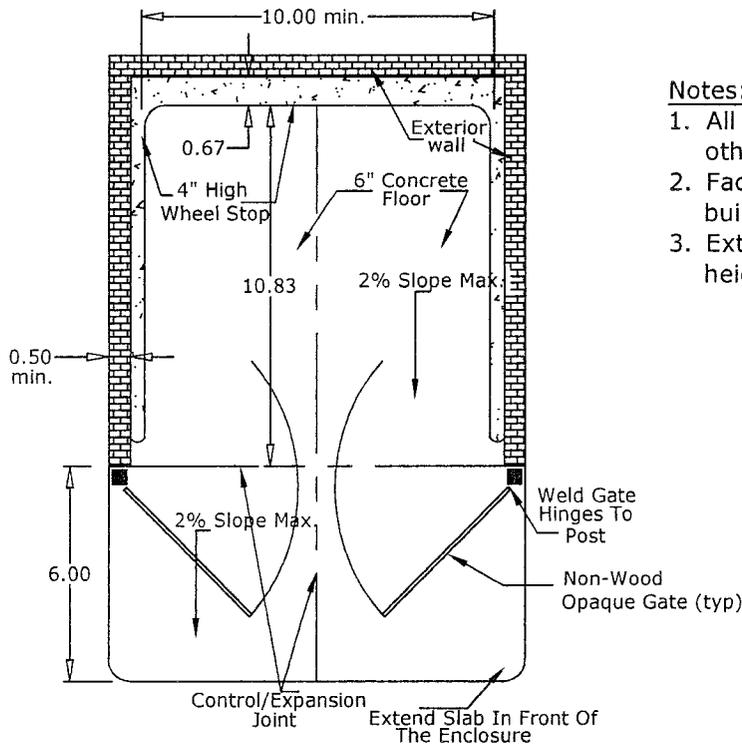
Standard Number:  
**3.10**

**TOWN OF INDIAN TRAIL**  
Land Development Standard Details

# Trash Enclosure



## Enclosure For Two Dumpsters



**Notes:**

1. All dimensions in feet unless otherwise shown.
2. Facade must match exterior of building.
3. Exterior wall must be 8'-0" in height.

## Enclosure For One Dumpster

Date: 12-08-2005

Revisions:

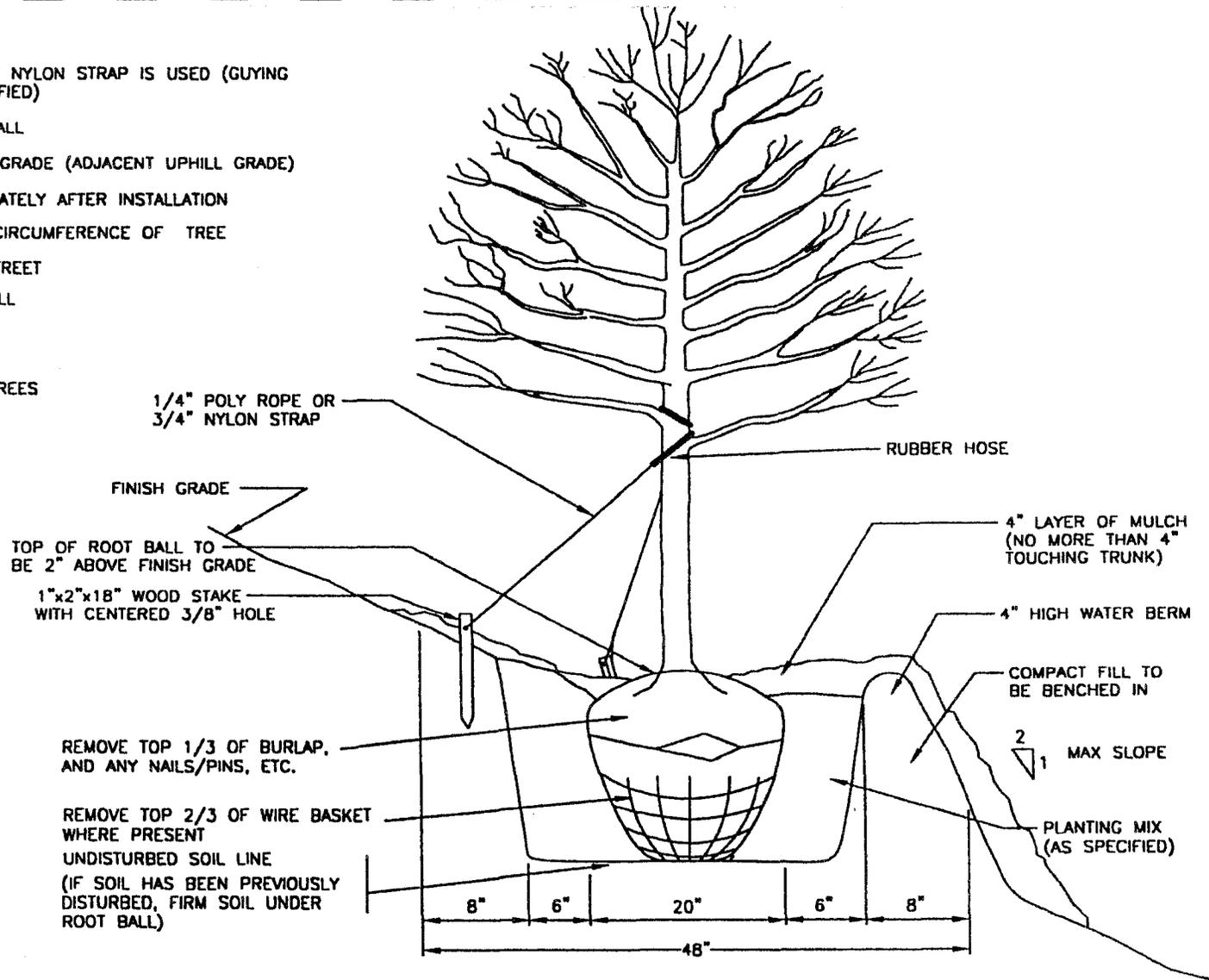
Standard Number:

Approved: \_\_\_\_\_

3.11

**NOTES:**

1. RUBBER HOSE MAY BE DELETED IF 3/4" NYLON STRAP IS USED (GYUING OF TREES NOT REQUIRED UNLESS SPECIFIED)
2. REMOVE WIRE OR NYLON TWINE FROM BALL
3. INSTALL TOP OF BALL 2" ABOVE FINISH GRADE (ADJACENT UPHILL GRADE)
4. SOAK ROOT BALL AND PLANT PIT IMMEDIATELY AFTER INSTALLATION
5. LENGTH OF RUBBER HOSE TO BE 2/3 CIRCUMFERENCE OF TREE
6. PLACE 2 WOOD STAKES PARALLEL TO STREET
7. 4" SAUCER WILL BE OUTSIDE OF BACKFILL
8. SEE SPECIFICATIONS FOR OTHER PLANTING REQUIREMENTS
9. THIS DETAIL APPLIES TO SINGLE STEM TREES AND MULTI-STEM TREES
10. SET TREE IN VERTICAL POSITION PRIOR TO STAKING



**REVISIONS**

NO.	DATE	DESCRIPTION

ALL TREES SHALL MEET AMERICAN STANDARD FOR NURSERY STOCK (ANSI, 1990, PART 1, "Shade and Flowering Trees")

For Example:

Caliper	Height (range)	Max. height	Min. root ball dia.	Min. root ball depth
2"	12-14'	16'	24"	16"
3"	14-16'	18'	32"	21"

APPROVED DATE *6/10/00*

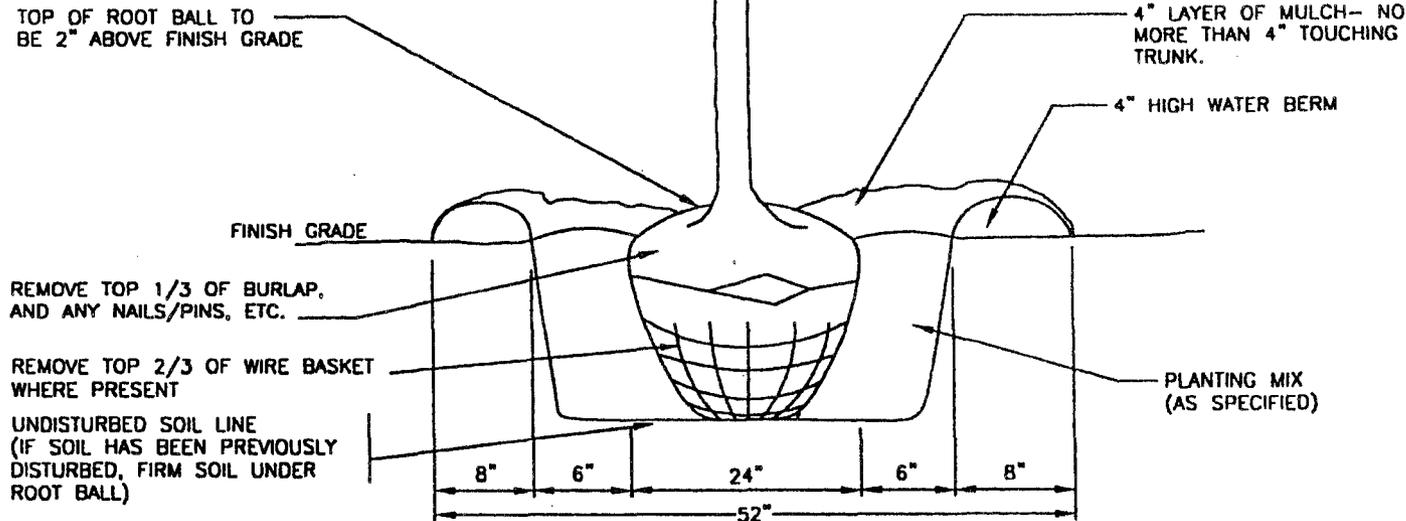
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**TREE PLANTING DETAIL FOR SLOPES**

STD. NO.	REV.
4.01	

**NOTES:**

1. REMOVE WIRE OR NYLON TWINE FROM BALL
2. INSTALL TOP OF BALL 2" ABOVE FINISH GRADE
3. SOAK ROOT BALL AND PLANT PIT IMMEDIATELY AFTER INSTALLATION
4. IF STAKING IS REQUIRED USE DETAIL FOR STD. NO. 4.01
5. 4" SAUCER WILL BE OUTSIDE OF BACKFILL.
6. SEE SPECIFICATIONS FOR OTHER PLANTING REQUIREMENTS.



**REVISIONS**

NO.	DATE	DESCRIPTION

ALL TREES SHALL MEET AMERICAN STANDARD FOR NURSERY STOCK (ANSI, 1990, PART 1, "Shade and Flowering Trees")

For Example:

Caliper	Height (range)	Max. height	Min. root ball dia.	Min. root ball depth
2"	12-14'	16'	24"	16"
3"	14-16'	18'	32"	21"

APPROVED DATE *6/10/10*

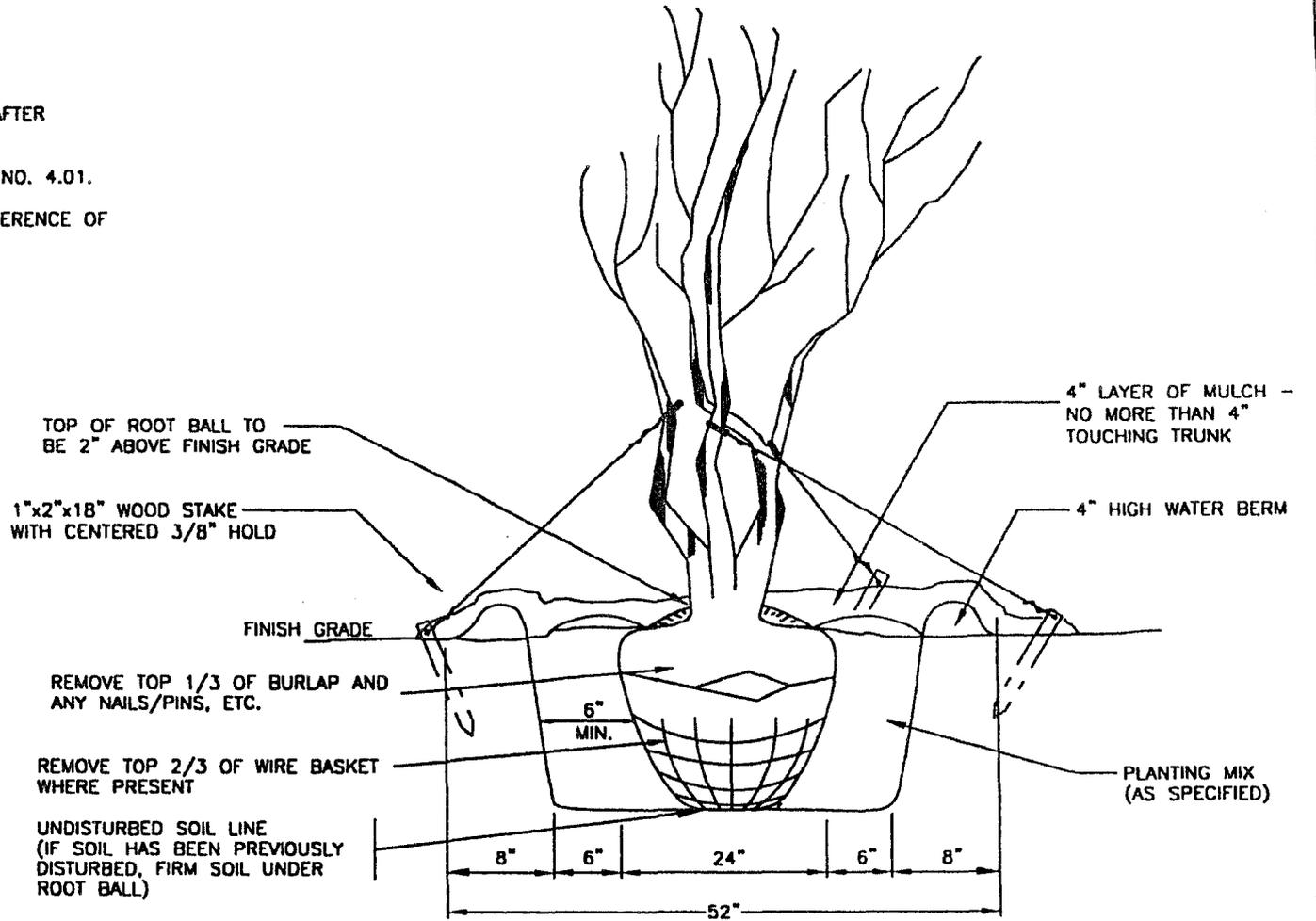
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**PLANTING DETAIL—SINGLE STEM TREE**

STD. NO.	REV.
4.02	

**NOTES:**

1. REMOVE WIRE OR NYLON TWINE FROM BALL
2. INSTALL TOP OF BALL 2" ABOVE FINISH GRADE
3. SOAK ROOT BALL AND PLANT PIT IMMEDIATELY AFTER INSTALLATION
4. IF STAKING IS REQUIRED USE DETAIL FOR STD. NO. 4.01.
5. LENGTH OF RUBBER HOSE TO BE 2/3 CIRCUMFERENCE OF TREE.
6. 4" SAUCER WILL BE OUTSIDE OF BACKFILL.
7. SEE SPECIFICATIONS FOR OTHER PLANTING REQUIREMENTS.



**REVISIONS**

NO.	DATE	DESCRIPTION

ALL TREES SHALL MEET AMERICAN STANDARD FOR NURSERY STOCK (ANSI, 1990, PART 1, "Shade and Flowering Trees")

For Example: 

Height	Min. root ball dia.	Min. root ball depth
8'	22"	15"

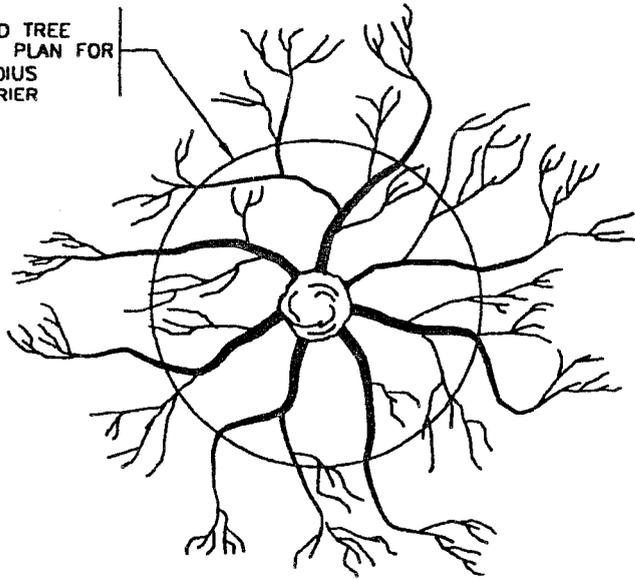
APPROVED DATE *8/10/10*

**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**PLANTING DETAIL—MULTI—STEM TREE**

STD. NO.	REV.
4.03	

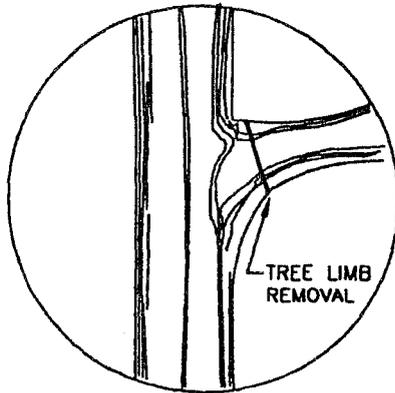
SEE APPROVED TREE PRESERVATION PLAN FOR REQUIRED RADIUS OF TREE BARRIER



PLAN VIEW OF ROOT ZONE

**NOTES:**

1. REMOVE ALL BARRIERS UPON COMPLETION OF PROJECT.
2. SEE PLANS FOR LOCATION OF ALL TREE PROTECTION FENCES.

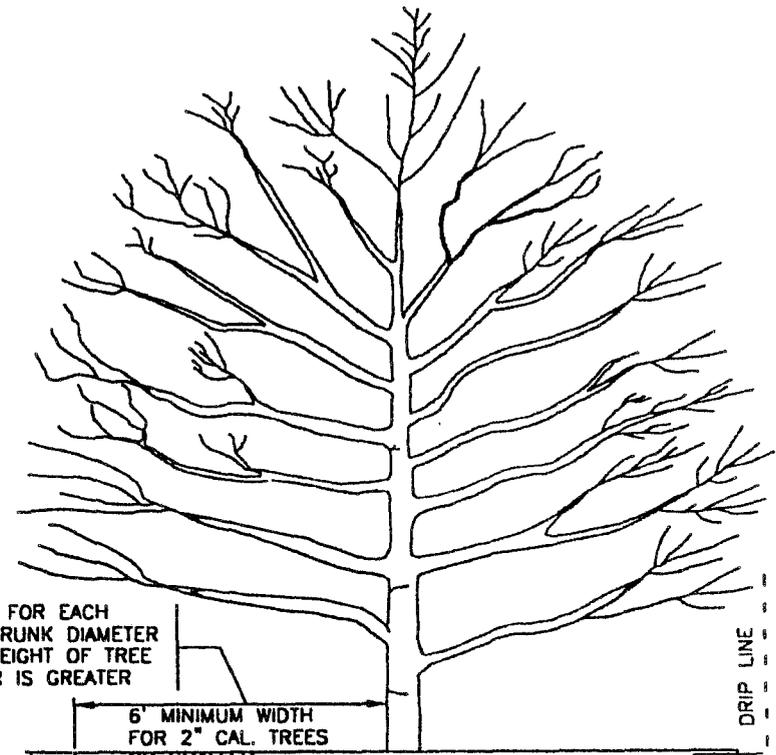


TREE LIMB REMOVAL

FOR PRUNING SEE NATIONAL ARBORIST ASSOCIATION SPECS.

DEAD TREES AND SCRUB OR UNDER GROWTH SHALL BE CUT FLUSH WITH ADJACENT GRADE. NO GRUBBING ALLOWED UNDER DRIP LINE.

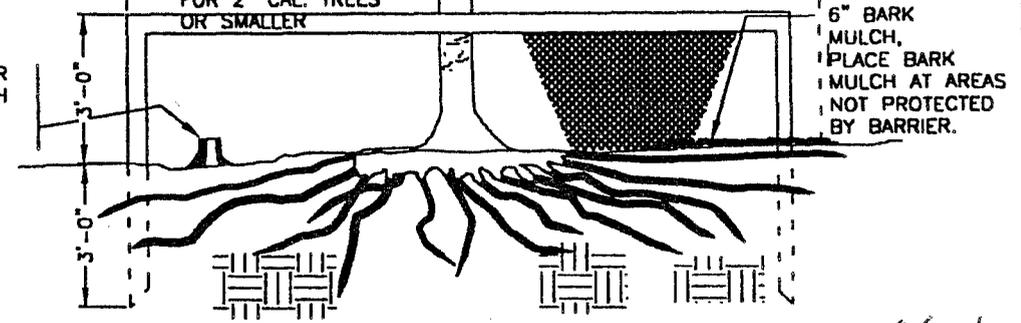
2x4" STANDARDS + 1x4" RAILS OR ORANGE SAFETY FENCING MAY BE USED.



ONE FOOT FOR EACH INCH OF TRUNK DIAMETER OR 1/2 HEIGHT OF TREE WHICHEVER IS GREATER

6" MINIMUM WIDTH FOR 2" CAL. TREES OR SMALLER

DRIP LINE



6" BARK MULCH, PLACE BARK MULCH AT AREAS NOT PROTECTED BY BARRIER.

REVISIONS

NO.	DATE	DESCRIPTION

APPROVED DATE *4/1/10*

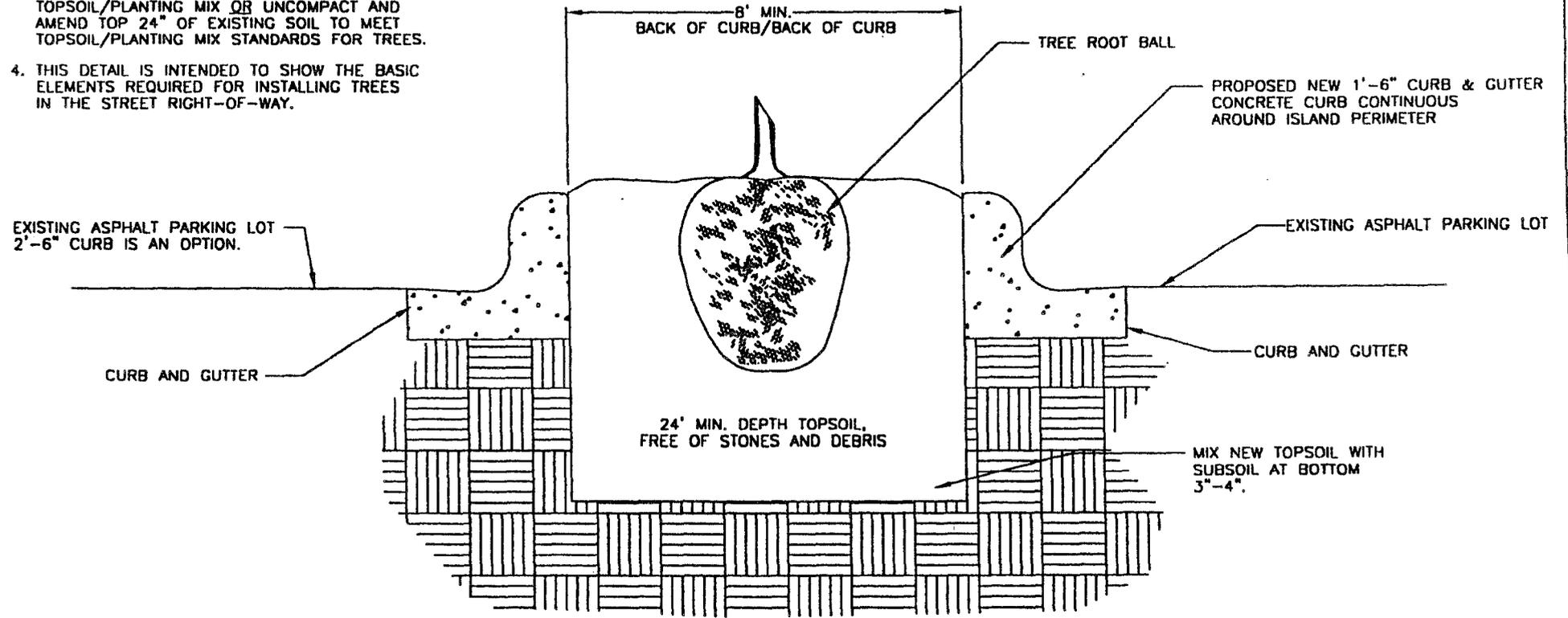
TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

TREE PROTECTION DETAIL

STD. NO.	REV.
4.04	

**NOTES:**

1. 200 SF MIN. TOTAL REQUIRED AREA PER TREE.
2. FOR NEW PLANTING AREAS, REMOVE ALL PAVEMENT, GRAVEL SUB-BASE AND CONSTRUCTION DEBRIS BEFORE PREPARING SOIL AND PLANTING TREES.
3. REMOVE COMPACTED SOIL AND ADD 24" NEW TOPSOIL/PLANTING MIX OR UNCOMPACT AND AMEND TOP 24" OF EXISTING SOIL TO MEET TOPSOIL/PLANTING MIX STANDARDS FOR TREES.
4. THIS DETAIL IS INTENDED TO SHOW THE BASIC ELEMENTS REQUIRED FOR INSTALLING TREES IN THE STREET RIGHT-OF-WAY.



EXISTING ASPHALT PARKING LOT  
2'-6" CURB IS AN OPTION.

CURB AND GUTTER

8' MIN.  
BACK OF CURB/BACK OF CURB

TREE ROOT BALL

PROPOSED NEW 1'-6" CURB & GUTTER  
CONCRETE CURB CONTINUOUS  
AROUND ISLAND PERIMETER

EXISTING ASPHALT PARKING LOT

CURB AND GUTTER

24' MIN. DEPTH TOPSOIL,  
FREE OF STONES AND DEBRIS

MIX NEW TOPSOIL WITH  
SUBSOIL AT BOTTOM  
3"-4"

**REVISIONS**

NO.	DATE	DESCRIPTION

APPROVED DATE *10/10/05*

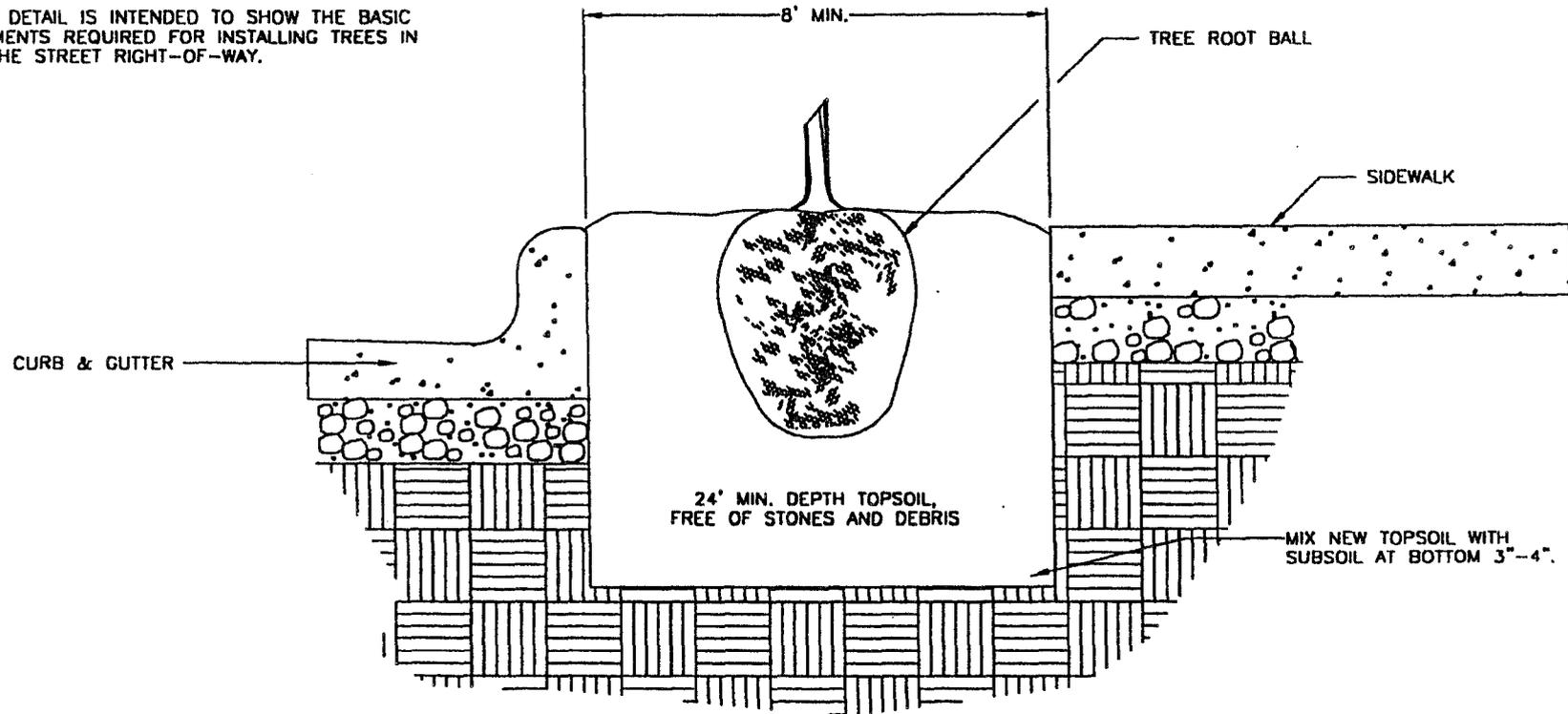
**TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS**

**DETAIL FOR TREE PLANTING ISLAND**

STD. NO.	REV.
4.05	

**NOTES:**

1. 200 SF MIN. TOTAL REQUIRED AREA PER TREE.
2. FOR NEW PLANTING AREAS, REMOVE ALL PAVEMENT, GRAVEL SUB-BASE AND CONSTRUCTION DEBRIS BEFORE PREPARING SOIL AND PLANTING TREES.
3. REMOVE COMPACTED SOIL AND ADD 24" NEW TOPSOIL/PLANTING MIX OR UNCOMPACT AND AMEND TOP 24" OF EXISTING SOIL TO MEET TOPSOIL/PLANTING MIX STANDARDS FOR TREES.
4. THIS DETAIL IS INTENDED TO SHOW THE BASIC ELEMENTS REQUIRED FOR INSTALLING TREES IN IN THE STREET RIGHT-OF-WAY.



REVISIONS

NO.	DATE	DESCRIPTION

APPROVED DATE *Elorico*

TOWN OF INDIAN TRAIL  
LAND DEVELOPMENT  
STANDARDS

DETAIL FOR TREE PLANTING STRIP

STD. NO.	REV.
4.06	

**GENERAL NOTES**

1. TREE GRATES AND ASSOCIATED IRRIGATION SYSTEMS ARE REQUIRED AT VARIOUS LOCATIONS. ALL OTHER INSTALLATIONS OF IRRIGATION SYSTEMS WITHIN THE RIGHT-OF-WAY OF THE TOWN OR STATE MAINTAINED STREETS REQUIRE AN ENCROACHMENT AGREEMENT EXECUTED THROUGH THE TOWN OF NCDOT. THE REVIEW/APPROVAL OF THE ENCROACHMENT AGREEMENT MAY INCLUDE ADDITIONAL REQUIREMENTS. CONTACT THE TOWN OR NCDOT FOR ADDITIONAL INFORMATION INCLUDING COST, SUBMITTAL, AND LIABILITY INSURANCE COVERAGE REQUIREMENTS.
2. A DRAINAGE SYSTEM IS REQUIRED AS SHOWN FOR ALL IRRIGATED PLANTING AREAS LOCATED ADJACENT TO STREET. ALL IRRIGATION/DRAINAGE SYSTEMS NOT ASSOCIATED WITH TREE PITS AT LOCATIONS, REQUIRE AN ENCROACHMENT AGREEMENT EXECUTED THROUGH THE TOWN OR NCDOT FOR TOWN OR STATE-MAINTAINED ROADS, RESPECTIVELY. CONTACT THE TOWN OR NCDOT FOR ADDITIONAL INFORMATION INCLUDING COST, SUBMITTAL AND LIABILITY INSURANCE COVERAGE REQUIREMENTS.

3. PLANTING MIX:

PLANTING MIX SHALL BE NATURAL, FERTILE, AGRICULTURAL TOPSOIL, CAPABLE OF SUSTAINING VIGOROUS PLANT GROWTH. IT MAY BE DEVELOPED BY AMENDING THE EXISTING SOIL OR REMOVING THE EXISTING SOIL AND REPLACING WITH NEW SOIL. IT SHALL BE OF UNIFORM COMPOSITION THROUGHOUT, WITH ADMIXTURE OF SUBSOIL. IT SHALL BE FREE OF STONES, LUMPS, LIVE PLANTS AND THEIR ROOTS, STICKS, AND OTHER EXTRANEIOUS MATTER. PLANTING MIX SHALL NOT BE USED WHILE IN A FROZEN OR MUDDY CONDITION. UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS THE PLANTING MIX SHALL CONTAIN THE FOLLOWING SPECIFIED PERCENTAGES OF CONSTITUENTS:

CLAY - MINIMUM 10% - MAXIMUM 30% CLAY (RED CLAY, WELL PULVERIZED); CLAY SHALL BE STERILE.

SILT - MINIMUM 30% - MAXIMUM 50%.

COARSE SAND - MINIMUM 30% - MAXIMUM 45%. COARSE SAND AND FREE OF ROCK, 1.0mm TO 0.5mm IN DIAMETER.

ORGANIC MATERIAL - MINIMUM 5%. ORGANIC MATERIAL IS DEFINED AS COMPOST/HUMUS SUCH AS SAWDUST OR LEAF MOLD THAT HAS COMPLETED THE DECOMPOSITION PROCESS. PERCENTAGE OF ORGANIC MATTER SHALL BE DETERMINED BY LOSS ON IGNITION, OF MOISTURE FREE SAMPLES DRIED AT 65 DEGREES.

PLANTING MIX SHALL HAVE AN ACIDITY RANGE OF PH 5.5 TO PH 7.0

ELEMENTS - THE PLANTING MIX SHALL HAVE THE FOLLOWING NUTRIENTS AT THE SPECIFIED PERCENT BASE SATURATION, TO BE DETERMINED BY SOIL TEST.

CALCIUM - 55% TO 80%  
 MAGNESIUM - 10% TO 30%  
 POTASSIUM - 5% TO 8%

REVISIONS

NO.	DATE	DESCRIPTION

APPROVED DATE 8/01/00

**TOWN OF INDIAN TRAIL  
 LAND DEVELOPMENT  
 STANDARDS**

TREE PLANTING-NOTES

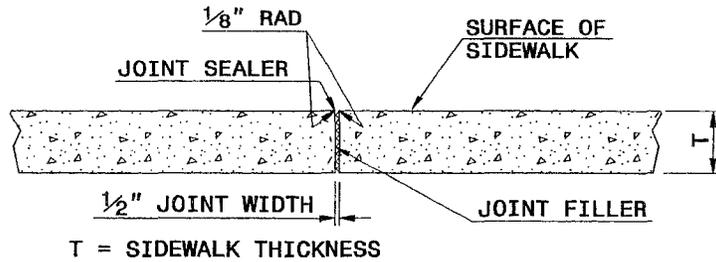
STD. NO.	REV.
4.07	

**NOTES:**

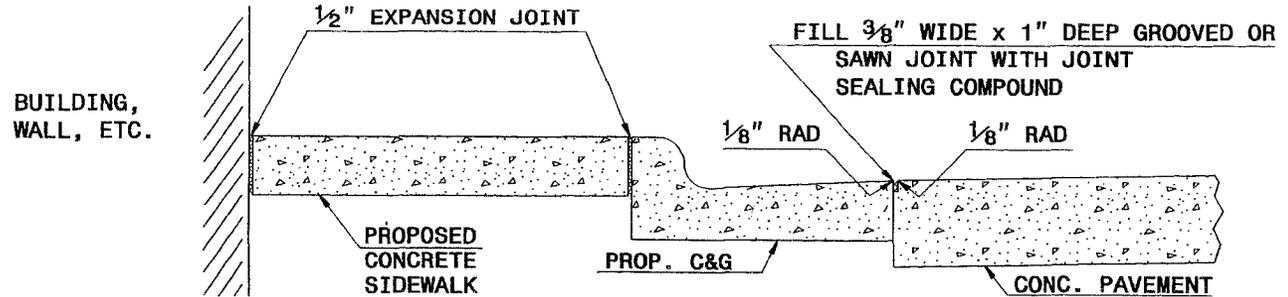
CONSTRUCT STANDARD SIDEWALK 5' WIDE AND 4" THICK UNLESS OTHERWISE DENOTED ON PLANS.

PLACE A GROOVE JOINT 1" DEEP WITH 1/8" RADII IN THE CONCRETE SIDEWALK AT 5' INTERVALS. ONE 1/2" EXPANSION JOINT WILL BE REQUIRED AT 50' INTERVALS. A 1/2" EXPANSION JOINT WILL BE REQUIRED WHERE THE SIDEWALK JOINS ANY RIGID STRUCTURE.

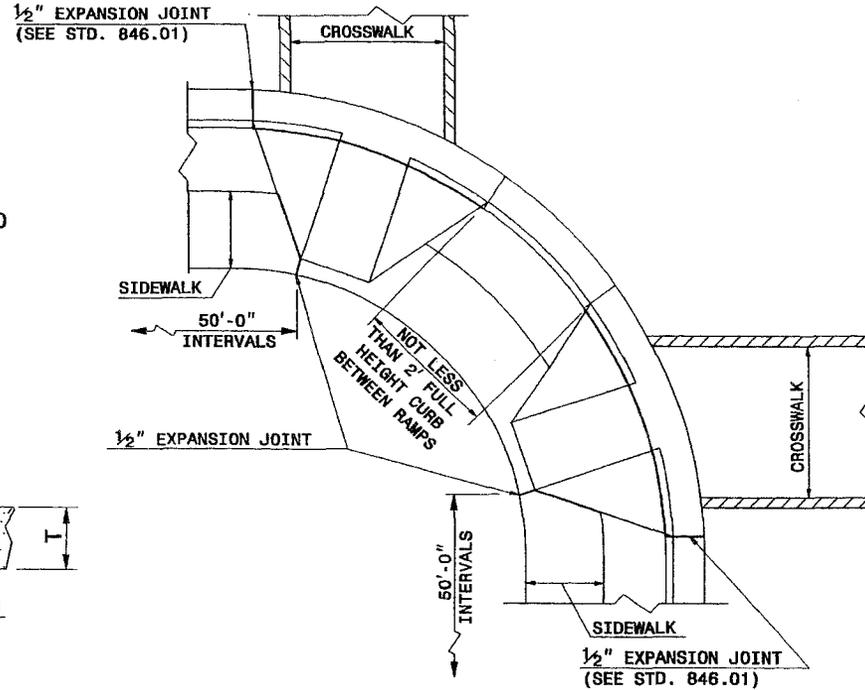
SEE STD. DWG. 848.05 FOR WHEELCHAIR RAMP LOCATION REQUIREMENTS AND CONSTRUCTION GUIDELINES.



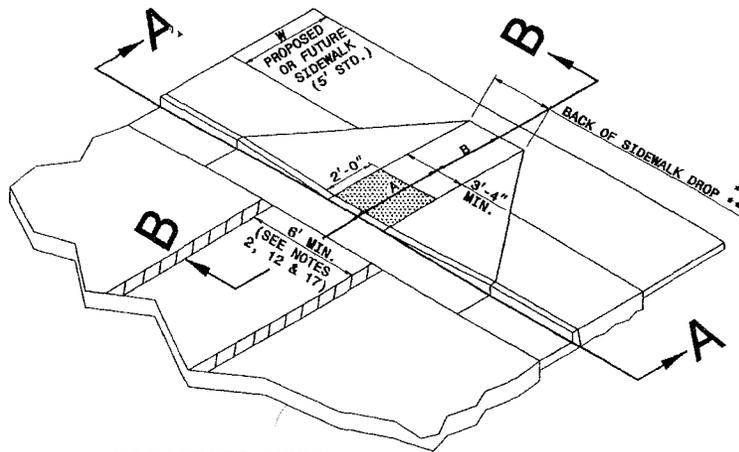
**TRANSVERSE EXPANSION JOINT  
IN SIDEWALK**



**DETAILS SHOWING JOINTS IN CONCRETE SIDEWALK**

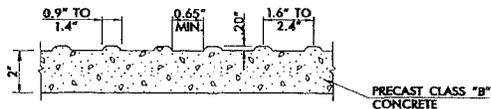
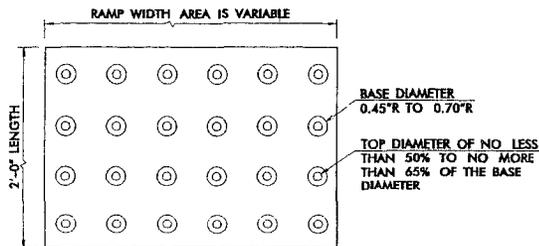


**PLAN VIEW**



ISOMETRIC VIEW

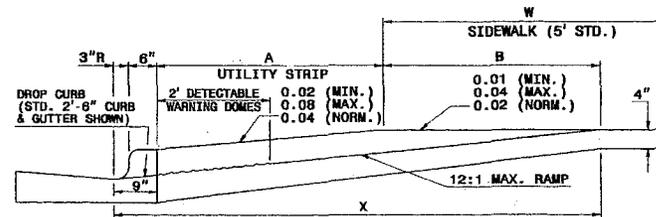
- NOTES:
1. DETECTABLE WARNING DOMES SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.
  2. OBTAIN 70% CONTRAST VISIBILITY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.



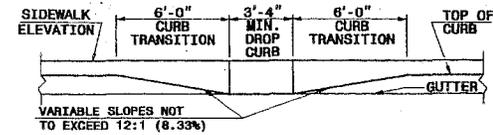
DETECTABLE WARNING DOMES

W	A	W+A+9"	X	B
5'	0.0'	5.8'	5.8'	5.0'*
6'	0.0'	6.8'	6.8'	6.0'**
7'	0.0'	7.8'	7.3'	6.5'**
8'	0.0'	8.8'	7.3'	6.5'**
5'	2.0'	7.8'	7.8'	5.0'
6'	2.5'	8.3'	8.1'	4.8'
5'	3.0'	8.8'	8.3'	4.4'
5'	3.5'	9.3'	8.4'	4.1'
5'	4.0'	9.8'	8.6'	3.8'
5'	4.5'	10.3'	8.7'	3.4'
5'	5.0'	10.8'	8.9'	3.1'

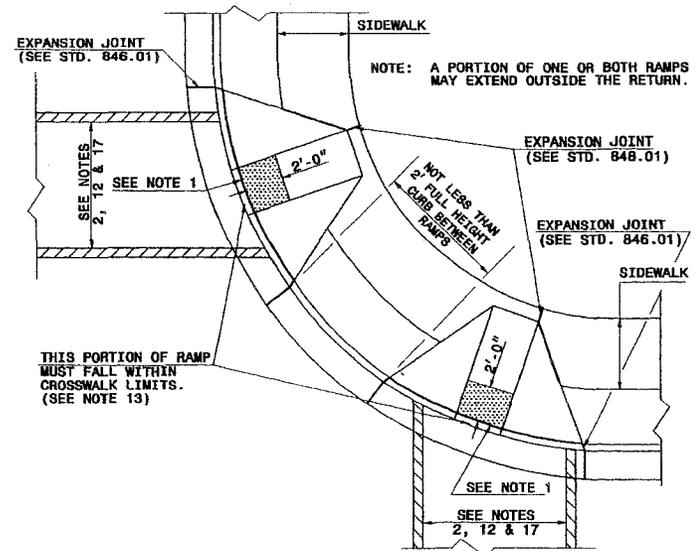
- $B = X - (A + 9")$   
 B = DISTANCE FROM FRONT EDGE OF SIDEWALK TO BACK POINT OF 12:1 (8.33%) SLOPE.  
 \* BACK OF SIDEWALK DROP REQUIRED FOR ALL SIDEWALK SLOPES.  
 \*\* BACK OF SIDEWALK DROP REQUIRED FOR SIDEWALK SLOPES 0.04.



SECTION B-B

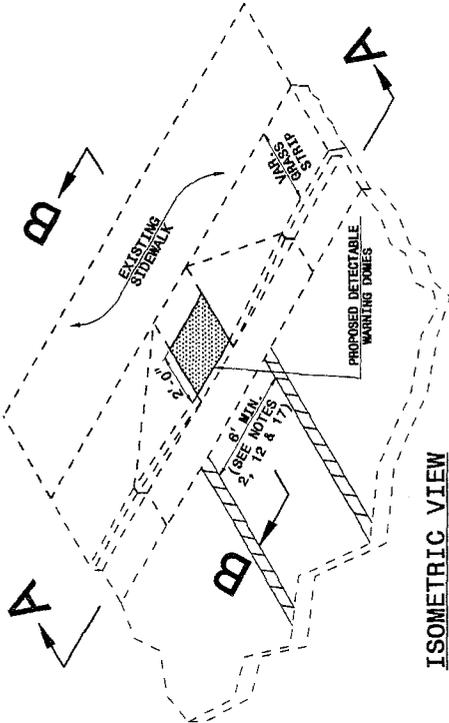
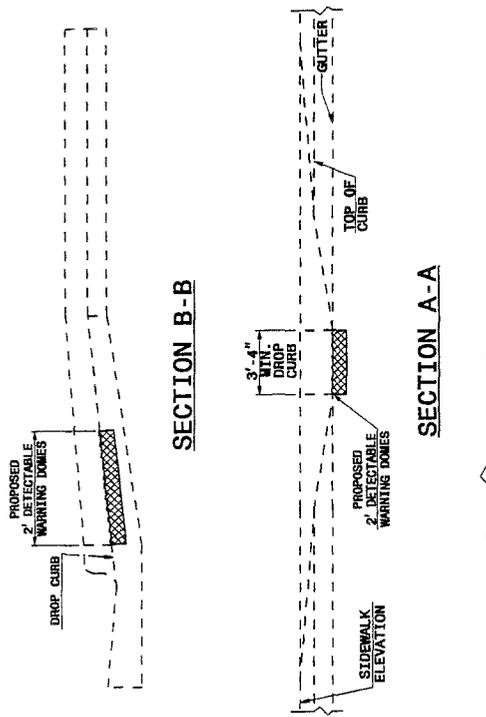


SECTION A-A

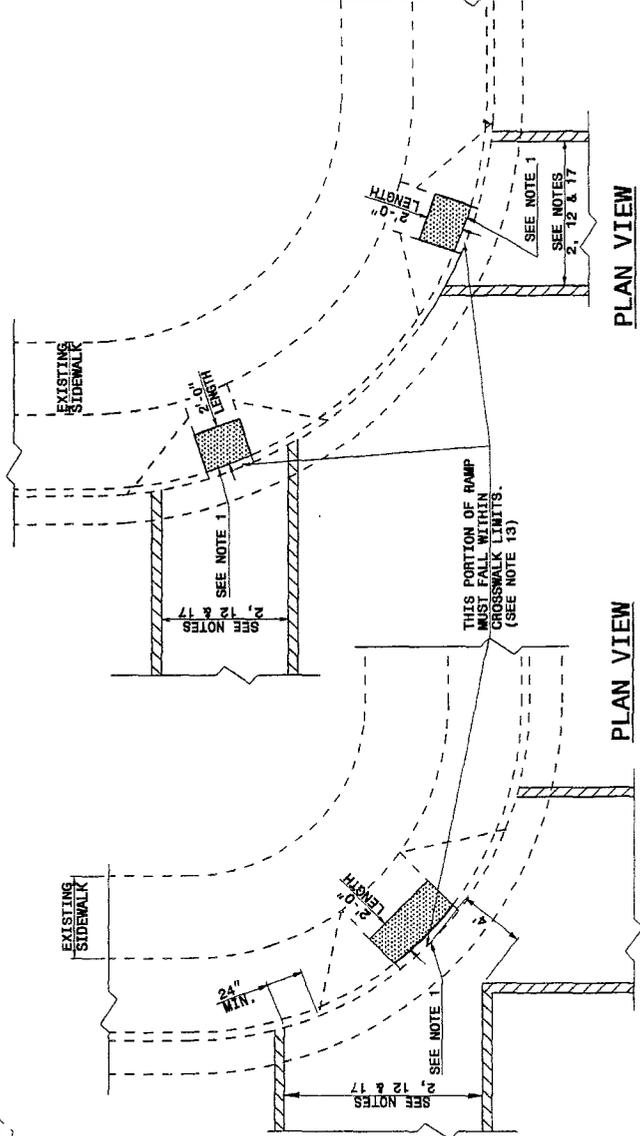
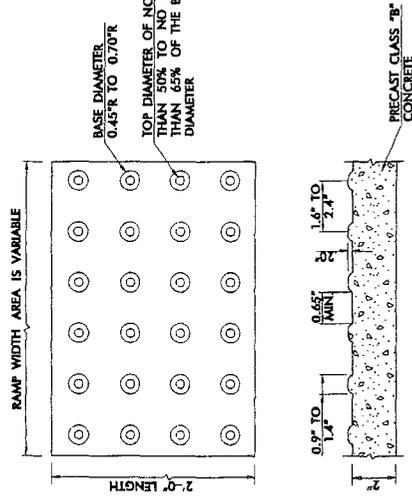


PLAN VIEW

DUAL RAMPS  
ANY RADIUS  
(40" MIN. FLOOR WIDTH)

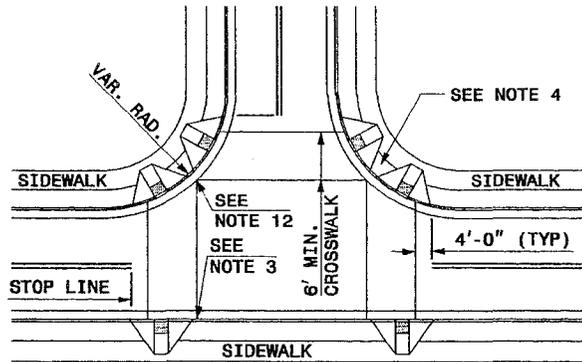


- NOTES:
1. DETECTABLE WARNING DOMES SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.
  2. DETECTABLE WARNING DOMES SHALL BE SET WITH A DRAINAGE SURFACE, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.

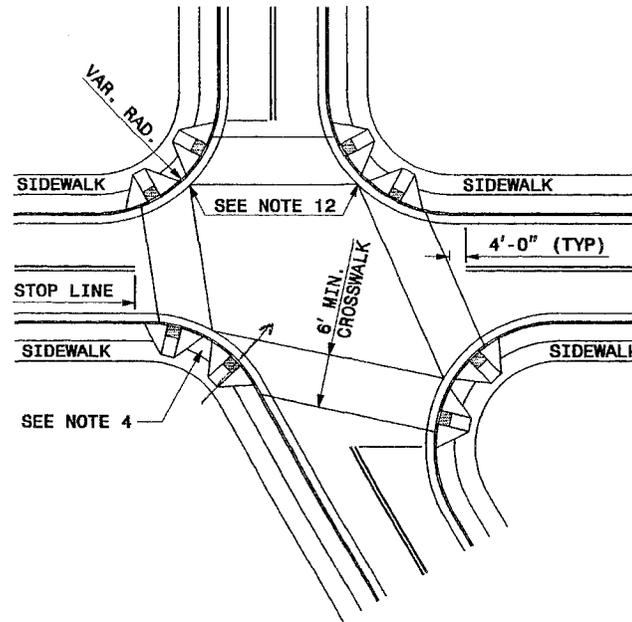


**PLAN VIEW**  
DUAL RAMPS  
ANY RADIUS  
(40" MIN. FLOOR WIDTH)

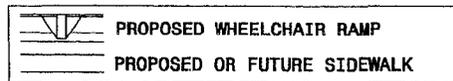
**PLAN VIEW**  
DIAGONAL RAMP  
MAX. 25' RADIUS  
(60" MIN. FLOOR WIDTH)



DETAIL SHOWING TYPICAL LOCATION OF WHEELCHAIR RAMPS,  
PEDESTRIAN CROSSWALKS AND STOP LINES FOR TEE INTERSECTIONS



DETAIL SHOWING TYPICAL LOCATION OF WHEELCHAIR  
RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES



ALLOWABLE LOCATIONS  
-----  
DUAL RAMP RADII.....ANY

STATE OF  
NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

7-06

ENGLISH STANDARD DRAWING FOR  
WHEELCHAIR RAMP  
CURB CUT

SHEET 4 OF 4

848.05

NOTES:

1. CONSTRUCT THE WALKING SURFACE WITH SLIP RESISTANCE AND A 70% CONTRASTING COLOR TO THE SIDEWALK.
2. CROSSWALK WIDTHS AND CONFIGURATION VARY BUT MUST CONFORM TO TRAFFIC DESIGN STANDARDS.
3. NORTH CAROLINA GENERAL STATUTE 136-44.14 REQUIRES THAT ALL STREET CURBS BEING CONSTRUCTED OR RECONSTRUCTED FOR MAINTENANCE PROCEDURES, TRAFFIC OPERATIONS, REPAIRS, CORRECTION OF UTILITIES OR ALTERED FOR ANY REASON AFTER SEPTEMBER 1, 1973 SHALL PROVIDE WHEELCHAIR RAMPS FOR THE PHYSICALLY DISABLED AT ALL INTERSECTIONS WHERE BOTH CURB AND GUTTER AND SIDEWALKS ARE PROVIDED AND AT OTHER POINTS OF PEDESTRIAN FLOW.  
  
IN ADDITION, SECTION 228 OF THE 1973 FEDERAL AID HIGHWAY SAFETY ACT REQUIRES PROVISION OF CURB RAMPS ON ANY CURB CONSTRUCTION AFTER JULY 1, 1976 WHETHER A SIDEWALK IS PROPOSED INITIALLY OR IS PLANNED FOR A FUTURE DATE.  
  
THE AMERICANS WITH DISABILITIES ACT (ADA) OF 1990 EXTENDS TO INDIVIDUALS WITH DISABILITIES. COMPREHENSIVE CIVIL RIGHTS PROTECTIONS SIMILAR TO THOSE PROVIDED TO PERSONS ON THE BASIS OF RACE, SEX, NATIONAL ORIGIN AND RELIGION UNDER THE CIVIL RIGHTS ACT OF 1964. THESE CURB RAMPS HAVE BEEN DESIGNED TO COMPLY WITH THE CURRENT ADA STANDARDS.
4. PROVIDE WHEELCHAIR RAMPS AT LOCATIONS AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. LOCATE WHEELCHAIR RAMPS AS DIRECTED BY THE ENGINEER WHERE EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. AFFECT PLACEMENT. WHERE TWO RAMPS ARE INSTALLED PLACE NOT LESS THAN 2 FEET OF FULL HEIGHT CURB BETWEEN THE RAMPS. PLACE DUAL RAMPS AS NEAR PERPENDICULAR TO THE TRAVEL LANE BEING CROSSED AS POSSIBLE.
5. PAY FOR ALL VARIABLE DEPTH CONCRETE USED FOR CONSTRUCTION OF WHEELCHAIR RAMPS AS CONCRETE WHEELCHAIR RAMPS. (SQ. YDS.)
6. PAY FOR ALL DEPRESSED CURBS AT WHEELCHAIR RAMPS AS THE TYPE CURB AND GUTTER USED ADJACENT TO DEPRESSED CURB. (LN. FT.)
7. SUCH PRICES AND PAYMENTS IS CONSIDERED FULL COMPENSATION FOR ALL MATERIALS, LABOR, EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO SATISFACTORILY COMPLETE THE WORK.
8. DO NOT EXCEED 0.08 (12:1) SLOPE ON THE WHEELCHAIR RAMP IN RELATIONSHIP TO THE GRADE OF THE STREET.
9. CONSTRUCT WHEELCHAIR RAMPS 40" (3'-4") OR GREATER FOR DUAL RAMPS.
10. USE CLASS "B" CONCRETE WITH A SIDEWALK FINISH IN ORDER TO OBTAIN A ROUGH NON-SKID TYPE SURFACE.
11. PLACE A 1/2" EXPANSION JOINT WHERE THE CONCRETE WHEELCHAIR RAMP JOINS THE CURB AND AS SHOWN ON STD. DWG. 848.01.
12. PLACE THE INSIDE PEDESTRIAN CROSSWALK LINES NO CLOSER IN THE INTERSECTION BY BISECTING THE INTERSECTION RADII, WITH ALLOWANCE OF A 4' CLEAR ZONE IN THE VEHICULAR TRAVELWAY WHEN ONE RAMP IS INSTALLED. (SEE NOTE 17)
13. COORDINATE THE CURB CUT AND THE PEDESTRIAN CROSSWALK LINES SO THE FLOOR OF THE WHEELCHAIR RAMP WILL FALL WITHIN THE PEDESTRIAN CROSSWALK LINES. PLACE DIAGONAL RAMPS WITH FLARED SIDES SO 24" OF FULL HEIGHT CURB FALLS WITHIN THE CROSSWALK MARKINGS ON EACH SIDE OF THE FLARES.
14. CONSTRUCT THE PEDESTRIAN CROSSWALK A MINIMUM OF 6 FEET. A CROSSWALK WIDTH OF 10 FEET OR GREATER IS DESIRABLE.
15. USE STOP LINES, NORMALLY PERPENDICULAR TO THE LANE LINES, WHERE IT IS IMPORTANT TO INDICATE THE POINT BEHIND WHICH VEHICLES ARE REQUIRED TO STOP IN COMPLIANCE WITH A TRAFFIC SIGNAL, STOP SIGN OR OTHER LEGAL REQUIREMENT. AN UNUSUAL APPROACH SKEW MAY REQUIRE THE PLACEMENT OF THE STOP LINE TO BE PARALLEL TO THE INTERSECTING ROADWAY.
16. TERMINATE PARKING A MINIMUM OF 20 FEET BACK OF PEDESTRIAN CROSSWALK.
17. PLACE ALL PAVEMENT MARKINGS IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION AND THE NORTH CAROLINA SUPPLEMENT TO THE MUTCD.

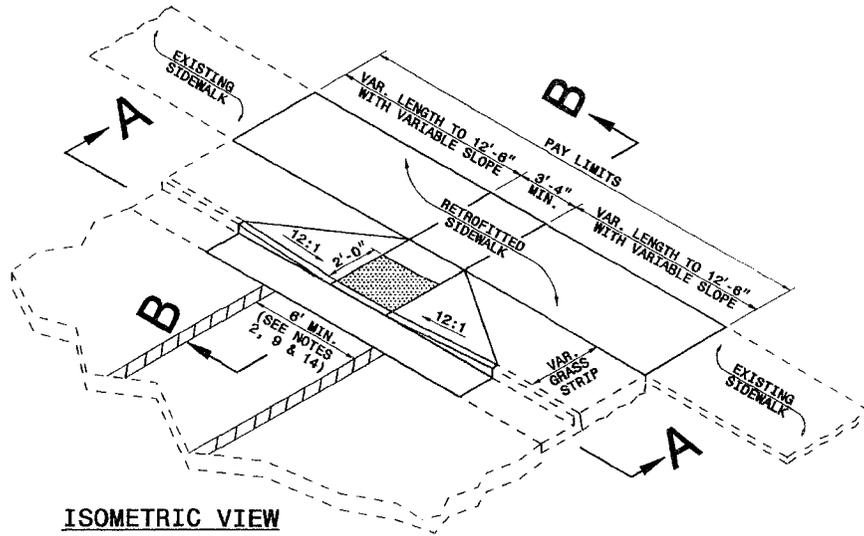
STATE OF  
NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

7-06

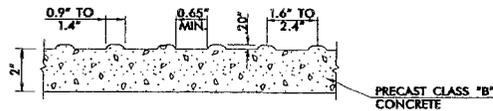
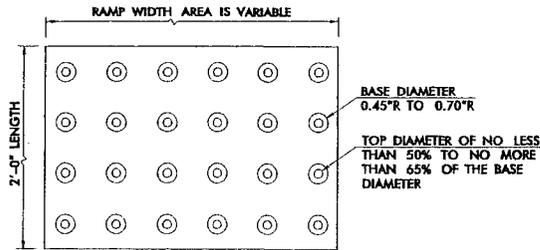
ENGLISH STANDARD DRAWING FOR  
WHEELCHAIR RAMP  
CURB CUT

SHEET 4 OF 4

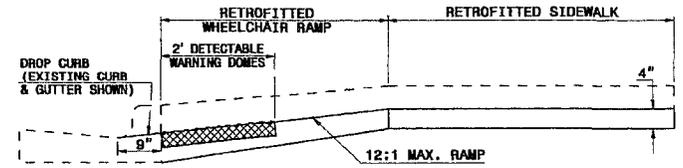
848.05



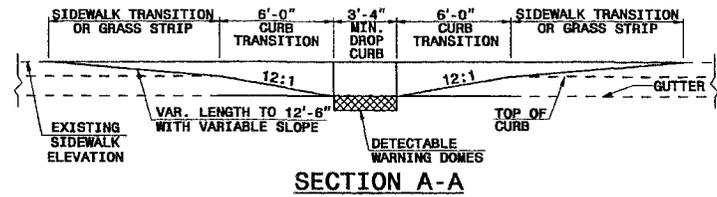
- NOTES:
1. DETECTABLE WARNING DOMES SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.
  2. OBTAIN 70% CONTRAST VISIBILITY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.



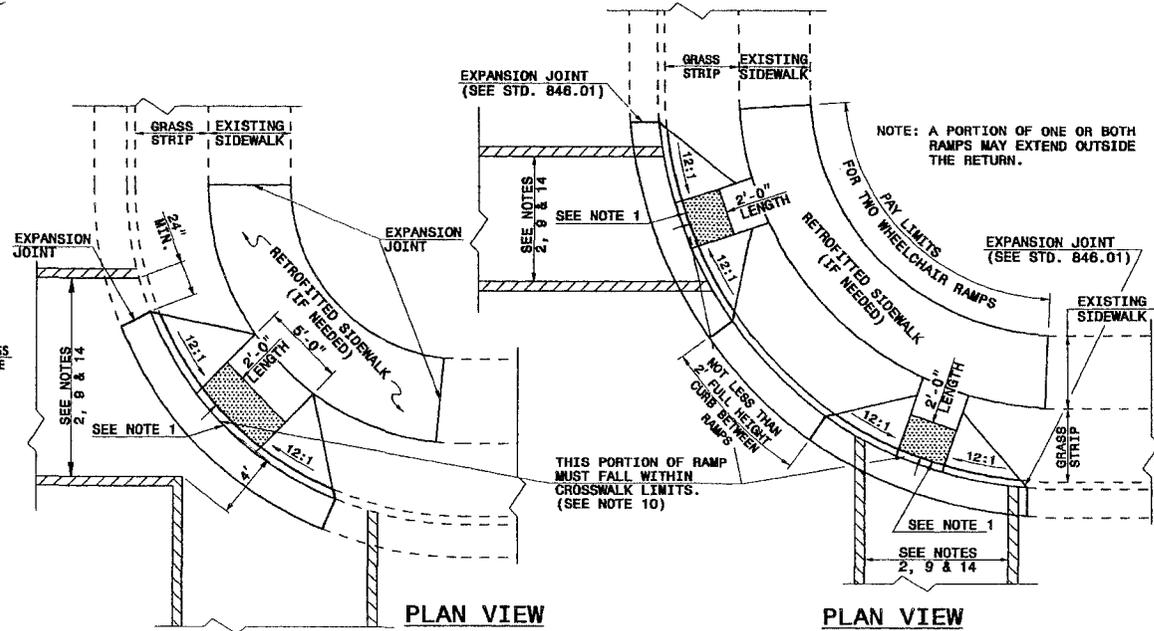
**DETECTABLE WARNING DOMES**



**SECTION B-B**



**SECTION A-A**

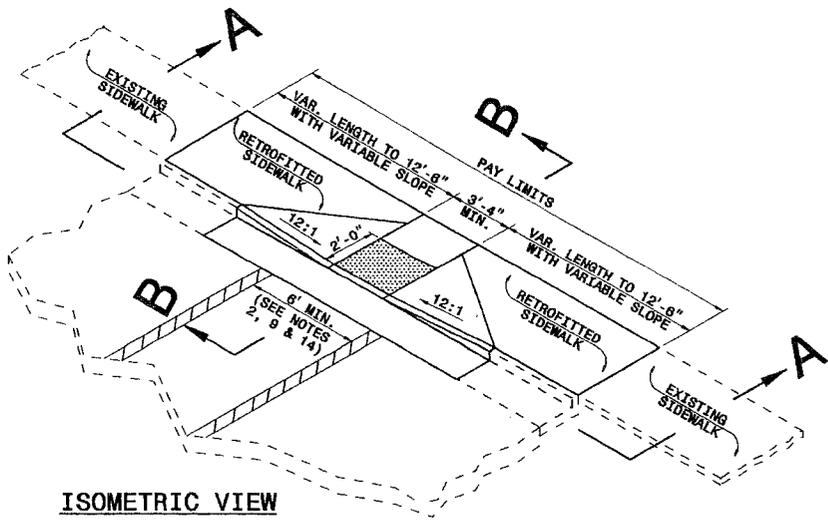


**PLAN VIEW**

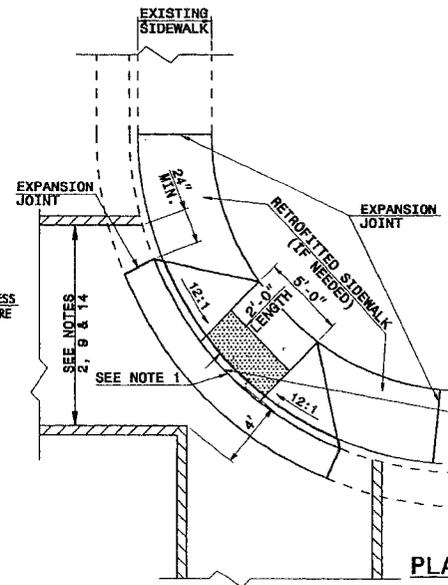
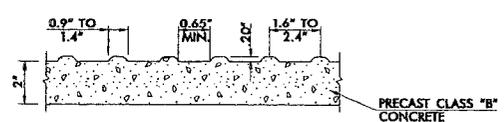
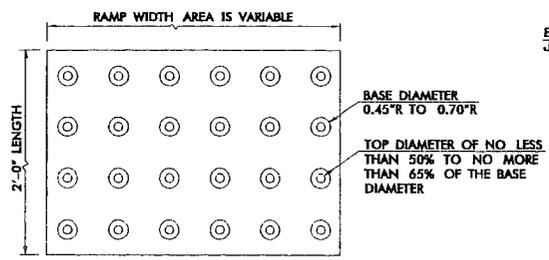
DIAGONAL RAMP  
MAX. 25' RADII  
(80" MIN. FLOOR WIDTH)

**PLAN VIEW**

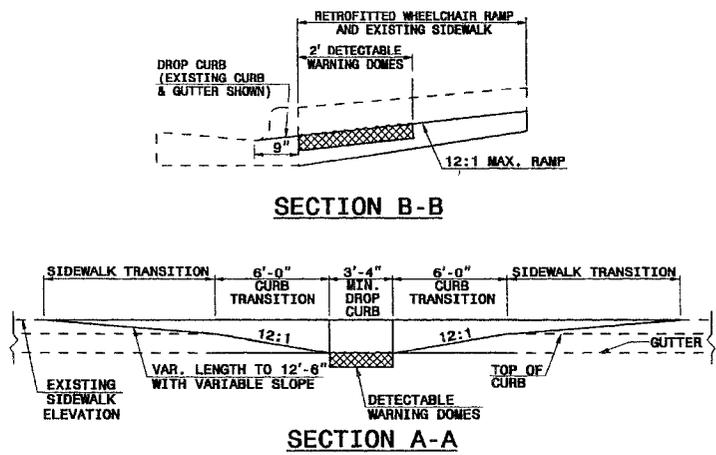
DUAL RAMPS  
ANY RADII  
(40" MIN. FLOOR WIDTH)



- NOTES:
1. DETECTABLE WARNING DOMES SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN IN THE DETAILS.
  2. OBTAIN 70% CONTRAST VISIBILITY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.

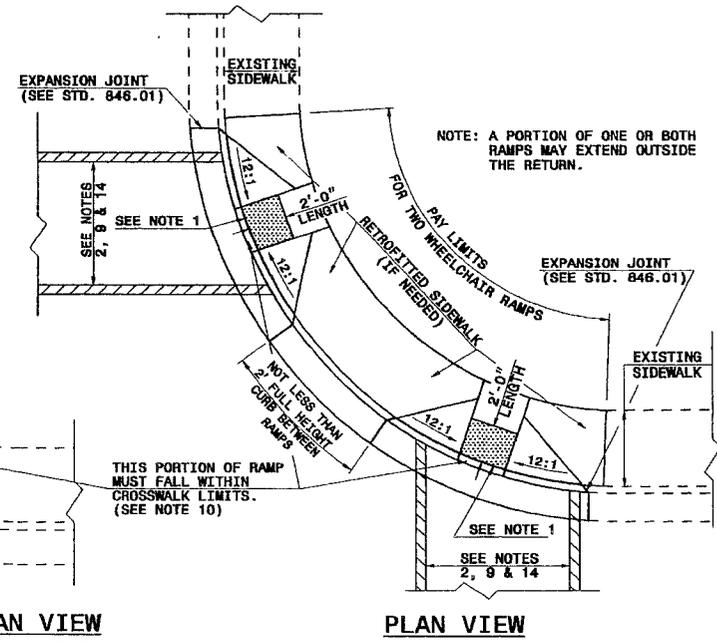


**PLAN VIEW**  
DIAGONAL RAMP  
MAX. 25' RADII  
(60" MIN. FLOOR WIDTH)

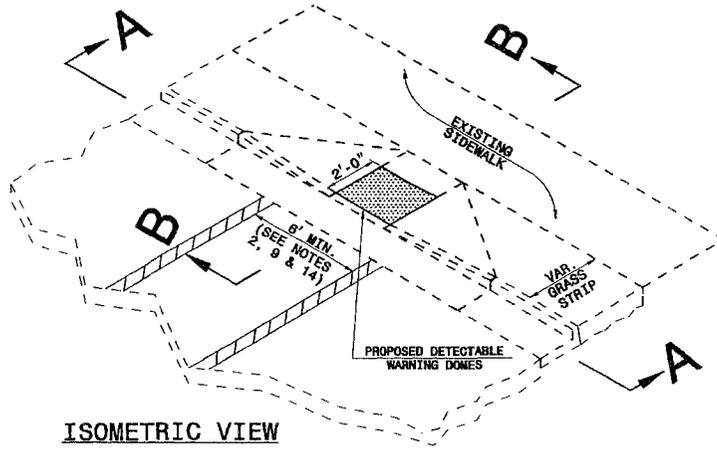


**SECTION B-B**

**SECTION A-A**



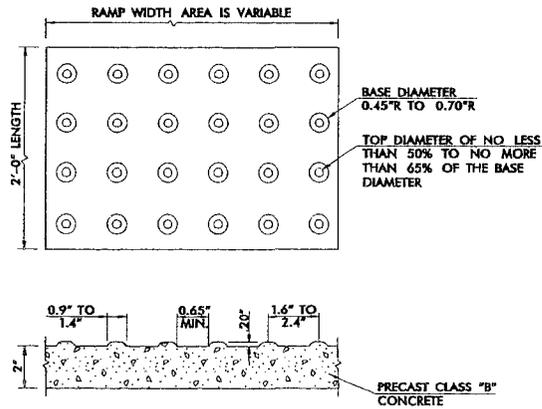
**PLAN VIEW**  
DUAL RAMPS  
ANY RADII  
(40" MIN. FLOOR WIDTH)



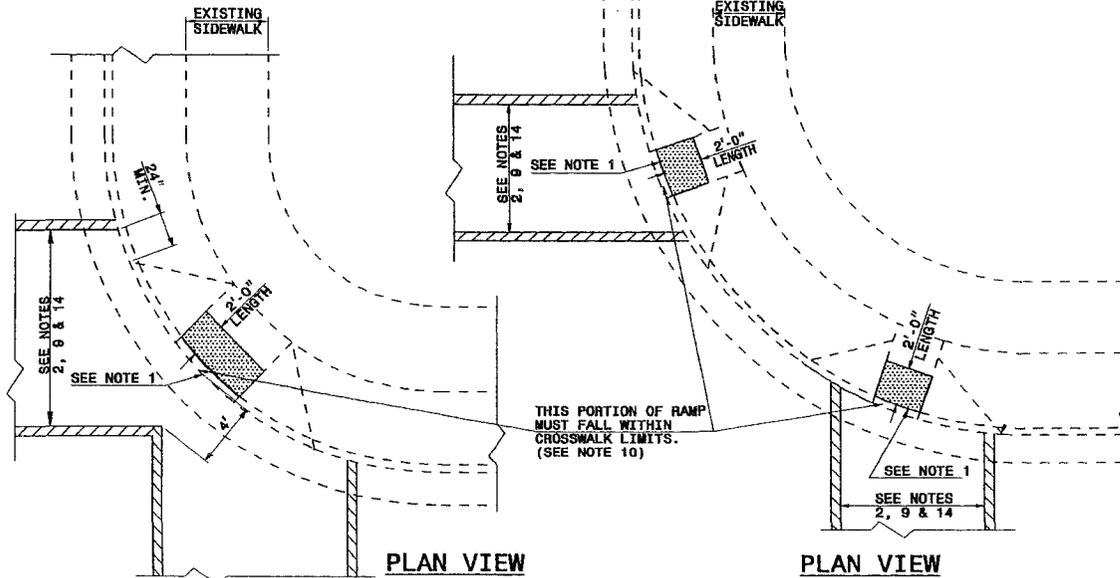
ISOMETRIC VIEW

NOTES:

1. DETECTABLE WARNING DOMES SHALL COVER 2'-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.
2. OBTAIN 70% CONTRAST VISIBILITY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.



DETECTABLE WARNING DOMES

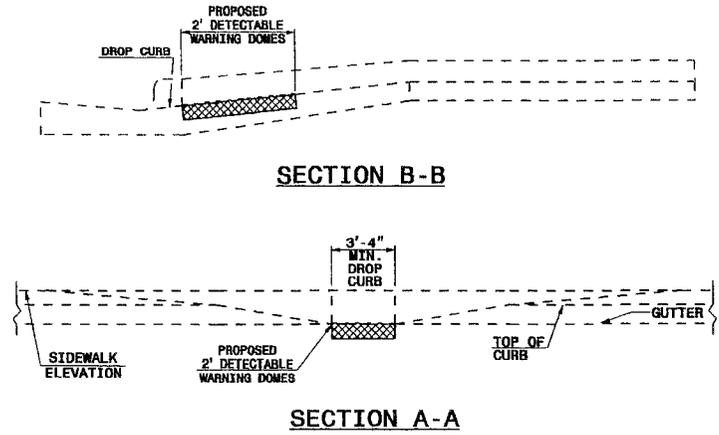


PLAN VIEW

DIAGONAL RAMP  
MAX. 25' RADII  
(60" MIN. FLOOR WIDTH)

PLAN VIEW

DUAL RAMP  
ANY RADII  
(40" MIN. FLOOR WIDTH)

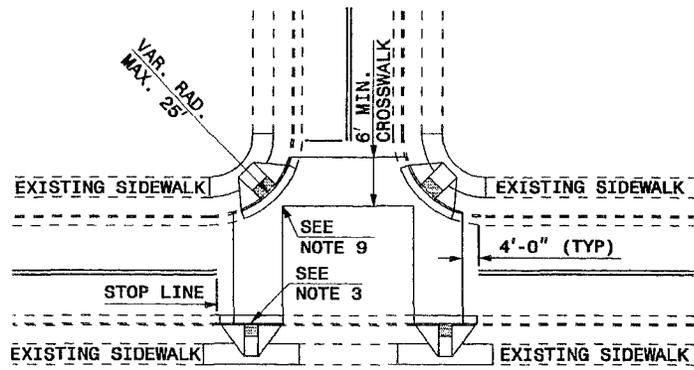


SECTION B-B

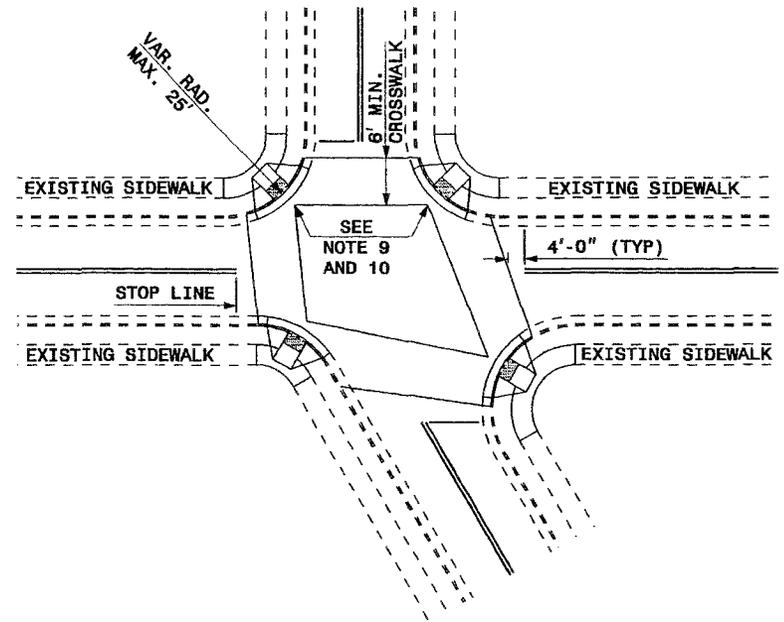
SECTION A-A

7-06

ENGLISH STANDARD DRAWING FOR  
**WHEELCHAIR RAMP**  
 CURB CUT

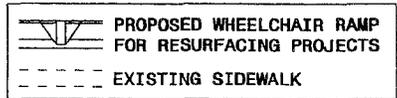


DETAIL SHOWING TYPICAL LOCATION OF WHEELCHAIR RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES FOR TEE INTERSECTIONS



DETAIL SHOWING TYPICAL LOCATION OF WHEELCHAIR RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES

**RESURFACING PROJECTS**



ALLOWABLE LOCATIONS  
 DIAGONAL RAMP RADII...MAX. 25'

7-06

ENGLISH STANDARD DRAWING FOR  
**WHEELCHAIR RAMP**  
 CURB CUT

STATE OF  
NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

7-06

ENGLISH STANDARD DRAWING FOR  
WHEELCHAIR RAMP AND EXISTING SIDEWALK  
CURB CUT

SHEET 5 OF 5

848.06

NOTES:

1. CONSTRUCT THE WALKING SURFACE WITH SLIP RESISTANCE AND A 70% CONTRASTING COLOR TO THE SIDEWALK.
2. CROSSWALK WIDTHS AND CONFIGURATION VARY, BUT MUST CONFORM TO TRAFFIC DESIGN STANDARDS.
3. NORTH CAROLINA GENERAL STATUTE 136-44.14 REQUIRES THAT ALL STREET CURBS BEING CONSTRUCTED OR RECONSTRUCTED FOR MAINTENANCE PROCEDURES, TRAFFIC OPERATIONS, REPAIRS, CORRECTION OF UTILITIES OR ALTERED FOR ANY REASON AFTER SEPTEMBER 1, 1973 SHALL PROVIDE WHEELCHAIR RAMPS FOR THE PHYSICALLY DISABLED AT ALL INTERSECTIONS WHERE BOTH CURB AND GUTTER AND SIDEWALKS ARE PROVIDED AND AT OTHER POINTS OF PEDESTRIAN FLOW.

IN ADDITION, SECTION 228 OF THE 1973 FEDERAL AID HIGHWAY SAFETY ACT REQUIRES PROVISION OF CURB RAMPS ON ANY CURB CONSTRUCTION AFTER JULY 1, 1976 WHETHER A SIDEWALK IS PROPOSED INITIALLY OR IS PLANNED FOR A FUTURE DATE.

THE AMERICANS WITH DISABILITIES ACT (ADA) OF 1990 EXTENDS TO INDIVIDUALS WITH DISABILITIES, COMPREHENSIVE CIVIL RIGHTS PROTECTIONS SIMILAR TO THOSE PROVIDED TO PERSONS ON THE BASIS OF RACE, SEX, NATIONAL ORIGIN AND RELIGION UNDER THE CIVIL RIGHTS ACT OF 1964. THESE CURB RAMPS HAVE BEEN DESIGNED TO COMPLY WITH THE CURRENT ADA STANDARDS.

4. PROVIDE WHEELCHAIR RAMPS AT LOCATIONS AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. LOCATE WHEELCHAIR RAMPS AS DIRECTED BY THE ENGINEER WHERE EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. AFFECT PLACEMENT. WHERE TWO RAMPS ARE INSTALLED PLACE NOT LESS THAN 2 FEET OF FULL HEIGHT CURB BETWEEN THE RAMPS. PLACE DUAL RAMPS AS NEAR PERPENDICULAR TO THE TRAVEL LANE BEING CROSSED AS POSSIBLE.
5. DO NOT EXCEED 0.08 (12:1) SLOPE ON THE WHEELCHAIR RAMP IN RELATIONSHIP TO THE GRADE OF THE STREET.
6. CONSTRUCT WHEELCHAIR RAMPS 40" (3'-4") OR GREATER FOR DUAL RAMPS AND 60" (5'-0") OR GREATER FOR DIAGONAL RAMPS.
7. USE CLASS "B" CONCRETE WITH A SIDEWALK FINISH IN ORDER TO OBTAIN A ROUGH NON-SKID TYPE SURFACE.
8. PLACE A 1/2" EXPANSION JOINT WHERE THE CONCRETE WHEELCHAIR RAMP JOINS THE CURB AND AS SHOWN ON STD. DWG. 848.01.
9. PLACE THE INSIDE PEDESTRIAN CROSSWALK LINES NO CLOSER IN THE INTERSECTION BY BISECTING THE INTERSECTION RADII, WITH ALLOWANCE OF A 4' CLEAR ZONE IN THE VEHICULAR TRAVELWAY WHEN ONE RAMP IS INSTALLED. (SEE NOTE 14)
10. COORDINATE THE CURB CUT AND THE PEDESTRIAN CROSSWALK LINES SO THE FLOOR OF THE WHEELCHAIR RAMP WILL FALL WITHIN THE PEDESTRIAN CROSSWALK LINES. PLACE DIAGONAL RAMPS WITH FLARED SIDES SO 24" OF FULL HEIGHT CURB FALLS WITHIN THE CROSSWALK MARKINGS ON EACH SIDE OF THE FLARES.
11. CONSTRUCT THE PEDESTRIAN CROSSWALK A MINIMUM OF 6 FEET. A CROSSWALK WIDTH OF 10 FEET OR GREATER IS DESIRABLE.
12. USE STOP LINES, NORMALLY PERPENDICULAR TO THE LANE LINES, WHERE IT IS IMPORTANT TO INDICATE THE POINT BEHIND WHICH VEHICLES ARE REQUIRED TO STOP IN COMPLIANCE WITH A TRAFFIC SIGNAL, STOP SIGN OR OTHER LEGAL REQUIREMENT. AN UNUSUAL APPROACH SKEW MAY REQUIRE THE PLACEMENT OF THE STOP LINE TO BE PARALLEL TO THE INTERSECTING ROADWAY.
13. TERMINATE PARKING A MINIMUM OF 20 FEET BACK OF PEDESTRIAN CROSSWALK.
14. PLACE ALL PAVEMENT MARKINGS IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION AND THE NORTH CAROLINA SUPPLEMENT TO THE MUTCD.

7-06

STATE OF  
NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR  
WHEELCHAIR RAMP AND EXISTING SIDEWALK  
CURB CUT

SHEET 5 OF 5

848.06