

# LAND DEVELOPMENT PROCEDURES FOR THE



**APPROVED BY:**

**BOARD OF COUNTY ROAD COMMISSIONERS  
FOR SAGINAW COUNTY**

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*Todd M. Hare*

*Richard F. Mallette*

*John D. Sangster*

*Wallace J. Warner*

**February 22<sup>nd</sup>, 2011**

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## **RESOLUTION: Tuesday March 13<sup>th</sup>, 1979**

Commissioner Falkenhagen moved the adoption of the following resolution:

**WHEREAS**, the Legislature of the State of Michigan has passed and the Governor has signed Act 288 of Public Acts of 1967, otherwise known as the Subdivision Control Act, which pertains to the platting of land in the State of Michigan; and

**WHEREAS**, the Board of County Road Commissioners of Saginaw County, Michigan, has caused certain standards and specifications procedure to the design, construction and dedication of new streets to be adopted in order to conform with said Act; and

**WHEREAS**, from time to time there occurs a need to revise and update these standards and specifications in order to utilize the best available engineering knowledge and techniques in the construction of streets, roads and drainage; and

**WHEREAS**, it is to the best interest of the general public, and particularly the people of Saginaw County, Michigan, that such standards and specifications be provided to guide land developers and others. To assure the public that highways dedicated to public use in approved plats be constructed in a manner and with materials that adequately guarantee the sufficiency of these streets and roads,

**NOW, THEREFORE BE IT RESOLVED**, that the revised requirements and specifications for proposed plats as approved by the Board of County Road Commissioners this date are hereby adopted as the rules and regulations governing platted streets under the jurisdiction of this Commission and are hereinafter to be known as The Requirements and Specification for New Street Construction of the Board of County Road Commissioners of Saginaw County, Michigan, and that previous specifications and regulations are suspended.

Supported by Commissioner Wendling.

Ayes 3 Nays 0

I, Ermin Sallmen, duly appointed Secretary to the Board of County Road Commissioners of Saginaw County, Michigan, do hereby certify that the above is a true and exact copy of a resolution adopted by the Board and extracted from the minutes of a regular meeting held on Tuesday, March 13, 1979, at the Road Commission office at 3020 Sheridan Avenue, Saginaw, Michigan.

*Ermin Sallmen, Secretary*

## **RESOLUTION: Tuesday, July 22, 2003**

Commissioner Warner moved the adoption of the following resolution:

WHEREAS, the Board of County Road Commissioners of Saginaw County, Michigan, did on Tuesday, March 13<sup>th</sup>, 1979, establish rules and regulations governing platted streets under the jurisdiction of this Commission and are hereinafter to be known as The Requirements and Specification for New Street Construction of the Board of County Road Commissioners of Saginaw County, Michigan, and that previous specifications and regulations are suspended.

WHEREAS, from time to time there occurs a need to revise and update these rules and standards in order to utilize the best available technology; and

WHEREAS, it is to the best interest of the general public, and particularly the people of Saginaw County, Michigan, that such rules and standards be provided to guide developers and private individuals and to assure the public that any construction in the public right-of-way be constructed in a manner that adequately guarantees the safety of the public.

NOW, THEREFORE BE IT RESOLVED, that the revised "Procedures, Standards, and Specifications for Plat, Condominium, and Land Division Development for the Saginaw County Road Commission" as approved by the Board of County Road Commissioners this date are hereby adopted as the "Procedures, Standards, and Specifications for Plat, Condominium, and Land Division Development for the Saginaw County Road Commission" by the Board of County Road Commissioners of Saginaw County, Michigan, and that previous specifications and regulations are suspended.

Supported by Commissioner Mallette.

Ayes 3 (Sangster, Mallette, Warner) Nays 0.

I, Julie Lightfoot, duly appointed Secretary to the Board of County Road Commissioners of Saginaw County, Michigan, do hereby certify that the above is a true and exact copy of a resolution adopted by the Board and extracted from the minutes of a regular meeting held on Tuesday, July 22, 2003, at the Road Commission office at 3020 Sheridan Avenue, Saginaw, Michigan.

Julie L. Lightfoot, Director of Finance & HR/Board Secretary

**\*\*Revised and approved by the Board of County Road Commissioners of Saginaw County February 22<sup>nd</sup>, 2011**

## **SECTION 1 – Scope of Document**

It is the intent of this document to limit itself to the subdivision of lands located outside the corporate limits of incorporated places within Saginaw County, or to lands within incorporated places when they are adjacent to public roads under the jurisdiction of the Board of County Road Commissioners of Saginaw County, Michigan.

The contents of this document do not supercede Act 288 of Public Acts of 1967, also known as the Subdivision Control Act of 1967, but are regulations established under Section 105 (c) of that Act. This document is intended for use as an instrument to assist and direct proposed plats and other land development in Saginaw County inasmuch as they involve the interests of the Board of County Road Commissioners of Saginaw County, Michigan.

## SECTION II – Definitions

(A) **A.A.S.H.T.O.**

American Association of State Highway and Transportation Officials.

(B) **ARTERIAL STREET**

Arterial and major arterial streets and roads are those county highways under the jurisdiction of the Board located on section lines, provisions for which are indicated in Section IV, C-3, and Table I of Appendix.

(C) **A.S.T.M.**

American Society for Testing and Materials.

(D) **BOARD**

The Board of County Road Commissioners of Saginaw County, Michigan.

(E) **CONDOMINIUM ACT**

MCL 559.101

(F) **COUNTY HIGHWAY ENGINEER**

The County Highway Engineer or his authorized representatives designated to carry out duties entailed by Act 288, as assigned by the Board.

(G) **ENGINEER**

The Engineer shall be a registered professional engineer or registered land surveyor employed by the proprietor of a plat, to prepare plans and supervise construction of roads and streets within the plat.

(H) **GOVERNING BODY**

Shall be the Township Board of the Township within which said plat is located, or the municipal authority when the designated plat falls within the corporate limits of any incorporated community in Saginaw County and abuts on a road or street under the jurisdiction of and maintained by the Board.

(I) **INSPECTION**

The close observation of construction operations and materials to determine the acceptability of completed roads.

(J) **LAND DIVISION ACT**

MCL 560-101

(K) **M.D.O.T.**

Michigan Department of Transportation

(L) **M.D.O.T. SPECIFICATIONS**

The current standard specifications for road and bridge construction and supplemental specifications thereto, as may be issued by the Michigan Department of Transportation from time to time.

(M) **PLAT, THE**

The properly prepared final map of the layout of all or a portion of subdivision prepared in accordance with provisions and requirements of the Plat Act.

(N) **PLAT ACT, THE**

Shall be Act 288, Public Acts of 1967, sometimes known as the Subdivision Control Act, and amendments thereto.

(O) **PLAT PROPRIETOR OR PROPRIETOR**

A natural person, firm, association, partnership, corporation or combination of any of these, which may hold any owner interest in land either recorded or not recorded.

(P) **PRELIMINARY PLAT**

Shall be a layout of the proposed subdivision in sufficient detail to allow proper review by the municipality, County Engineer and other interested agencies.

(Q) **PUBLIC WORKS COMMISSION**

The Saginaw County Public Works Commissioner or his authorized representative who shall be responsible for determining the sufficiency of any proposed storm water system.

(R) **RURAL CROSS SECTION**

That roadway design, wherever it is used, which provides a traveled surface, road shoulders and valley ditches.

(S) **SAGINAW COUNTY ROAD COMMISSION**

Specifications and design criteria published by the Board from time to time. When such specification conflict with those published by the Michigan Department of Transportation, the Board's specifications will control.

(T) **S.I. NUMBER**

Strength Index Number – Strength index numbers are comparative values for various construction materials on a per inch of material basis. The values used here are based on information furnished by A.A.S.H.T.O. and the various technical societies and associations. See Table II of Appendix for more detailed information.

(U) **URBAN COLLECTOR CROSS SECTION**

That roadway design used for collector streets. Collector streets collect traffic from urban residential or streets of rural design, and convey such traffic to the nearest arterial street. Such urban collector street shall be located approximately on section quarter lines and shall meet right-of-way and utility easement conditions indicated in Section III, C-3, and Table I of Appendix.

(V) **URBAN RESIDENTIAL CROSS SECTION**

That roadway design, wherever it is used, which provides a traveled surface, curb and water disposal as a part of the roadway surface.

(W) **U.S.C. & G.S.**

United States Coast & Geodetic Survey.

(X) **U.S.G.S.**

United States Geological Survey.

(Y) **Address**

As stipulated in ordinance #113 of Saginaw County adopted 2/25/1997, as amended

### SECTION III – PROCEDURES AND GENERAL REQUIREMENTS

- (A) Compliance with Section 113 of the Plat Act by submission to the County Engineer of three (3) copies of the preliminary plat which shall have sufficient topographic detail to show direction of drainage and proposed width of all roads presently under or to come under the jurisdiction of the Board. Condominium developments shall submit preliminary drawing in the same manner.
- (B) Traffic Impact Study shall be completed on all new Plats, Condominium, Metes and Bounds, and Land Division developments when requested by the Saginaw County Road Commission or the local township where development is located, or as required by Section IV-6-b
- (C) Prior to any construction the Saginaw County Road Commission must approve all plans for a final plat, condominium layout or streets with a land division development if the streets or roads are to be accepted into the county road system.
- (D) Construction inspection and documentation of construction must be done under the supervision of a licensed professional engineer, Copies of this documentation must be submitted to the Saginaw County Road Commission. The Saginaw County Road Commission will perform periodic inspections during the course of construction to verify compliance with the Saginaw County Road Commission standards.
- (E) Final inspection and approval. Prior to acceptance of the roadways for maintenance purposes, the Road Commission will perform a final inspection to verify that the roadways have been constructed conforming to our standards.
- (F) Final plat shall be submitted to the Board within one (1) year after approval of preliminary plat and construction of all streets shall be completed within two (2) years after approval of the final plat. Failure to comply with these time requirements shall make the plat subject to any modifications or upgrading of construction specifications and rules which might have been established by the Board subsequent to either the preliminary or the final plat stages. This time frame may be modified by written appeal to the Board and their formal authorization.
- (G) All streets developed under the Condominium Act or the Land Division Act, which are to be accepted into the Saginaw County Road Commission system are subject to all of the requirements set forth in this document, *including easements and right-of-way's as shown in plate XV of this document.*
- (H) Developers Engineer shall submit a complete list of all proposed roads which shall include type of construction, name of road, width of road, and length of road to the nearest 1/100 of a mile.

## SECTION IV – PROCEDURE IN DETAIL

### ***(A) Preliminary Plans***

The preliminary plat/condominium/land division development shall meet the following requirements:

- (1) Shall show the locations and extent of the property.
- (2) Shall show dimensions on the portion of layout for which approval and recommendation is requested.
- (3) Shall give location of the development with regard to the portion of section and township in which parcel is situated.
- (4) Shall show location and names of proposed streets together with the drainage arrows.
- (5) Shall show or be accompanied by a location map showing the development in relation to the existing county road system and all such governing situations as:
  - (a) Adjoining subdivisions and streets.
  - (b) State trunk lines highways, which shall be identified by number.
  - (c) Rivers, natural water courses, existing county drains, and sewers and cross culverts on existing roads.
  - (d) Railroads, cemeteries and parks.
  - (e) Trees and all other features, the location and existence of which might influence the plat layout.
  - (f) The preliminary plans must have been reviewed by the “Land Development Committee” and a copy of the minutes from the review attached.
- (6) Traffic Impact Study when required by the Saginaw County Road Commission or the Local Township in which the proposed development is located shall be conducted in accordance with the following requirements.
  - (a) Intent: Saginaw County Road Commission officials recognize that land use decisions can have a significant impact on traffic operations and safety. Therefore, the Road Commission requires traffic impact studies in certain cases to identify the anticipated traffic impacts to assist in decision making. The intent of this section is to provide specific direction for the preparation of traffic impact studies where such studies are required by this Chapter. The requirements of this section are also intended to help Road Commission officials determine the appropriateness of certain uses at proposed locations in terms of traffic impacts and the adequacy

of proposed access design. Traffic impact studies may also be used by the applicant to justify additional access points.

- (b) **Applicability:** A traffic impact study shall be required when a proposed development would be expected to generate over seventy-five (75) directional trips during the peak hour of the traffic generator or the peak hour on the adjacent streets, or over seven hundred fifty (750) trips in an average day. This requirement applies to new phases or changes to a development where a traffic study is more than two (2) years old and roadway conditions have changed significantly (volumes increasing more than 2 percent annually) or a change in use or expansion at an existing site. The cost of said traffic studies shall be borne by the developer.
- (c) **Submittal Procedures:** The traffic impact study shall be submitted with the site plan or other submittal material. The applicant must discuss or meet with the Director of Engineering or the Permit Enforcement Officer to determine if a study is needed, what type of study is needed and specific items to be addressed. The Road Commission shall submit a copy of the traffic impact study to the all applicable road agencies and township officials to give them the opportunity to provide input prior to the Road Commission taking action on the request.
- (d) **Qualifications of Preparer:** The person responsible for the preparation of the study shall have a degree or specific professional training in the preparation of traffic impact studies. The preparer shall have at least three (3) years of recent experience in the preparation of traffic impact studies, provide evidence of ongoing experience and familiarity with the Highway Capacity Commission Manual and other traffic operation evaluation techniques, be an associate (or higher) member of one or more professional transportation-related organizations and be either a registered professional engineer (PE) or a planner with AICP (American Institute of Certified Planners) or PCP (Professional Community Planner) certification. Any study involving roadway or traffic signal design work shall be prepared by or under the supervision of a registered professional engineer (PE) with specific training in traffic engineering.
- (e) **Traffic Impact Study Contents:** The extent of information to be provided depends upon the expected trip generation of the proposed project. The information provided in the traffic impact study shall be in accordance with the items below.
  - i. **Description of the site, surroundings and study area:** Illustrations and a narrative should describe the characteristics of the site and adjacent roadway system (functional classification, lanes, speed

limits, etc.). This description should include surrounding land uses, expected development in the vicinity which could influence future traffic conditions, special site features and a description of any committed roadway improvements. The study should define and justify the study area selected for analysis.

- ii. Description of the requested zoning or use. If the proposed development requires a rezoning, the traffic impact study shall describe potential permitted uses within the requested zoning district, and applicant must also submit to local township planning commission for consideration of the rezoning request. When the request is for a specific use, factors which relate to traffic generation should be provided such as the number and types of dwelling units, the gross and usable floor area, the number of employees and shift change factors. Intended phasing or future expansion should also be noted.
- iii. Description of existing peak-hour traffic volumes (and daily volumes if applicable) at intersections and on streets adjacent to the site. Existing level of service analysis shall be provided for intersections in the vicinity which are expected to experience an increase in traffic of at least five percent (5%) due to the proposed project. Existing traffic counts shall not be over two (2) years old from the date of report submittal.
- iv. Roadway characteristics shall be described and illustrated, as appropriate. Features to be addressed include existing right-of-way, lane configurations, geometries, signal timing, traffic control devices, posted speed limits, average running speeds, sight distance information, existing driveways and potential turning movement conflicts in the vicinity of the site.
- v. Projects must analyze background traffic, i.e., the expected increase in traffic volumes related to approved projects and historic annual percentage increases.
- vi. Forecasted trip generation of the proposed use for e a.m. peak hour (if applicable), the p.m. peak hour and an average weekday are required. A weekend forecast may also be required for certain commercial uses. The forecasts shall be based on the average rate outlined in the most recent edition of Trip Generation published by the Institute of Transportation Engineers (ITE). The applicant may use other commonly accepted sources of data or supplement the standard data with data from at least three (3) similar projects in Michigan. For rezoning requests, the study should contrast the traffic impacts of typical uses permitted in the requested zoning district with uses permitted in the current zoning district. The determination of typical uses shall be made by the Zoning Administrator. Any trip reduction for pass-by trips, transit, ride

sharing, other modes, internal capture rates, etc., shall be based both on ITE findings and documented survey results acceptable to the Saginaw County Road Commission. The Road Commission may accept in whole or in part the trip reduction rates used. For projects intended to be developed in phases, the trip generation by phase shall be described.

- vii. The projected traffic generated shall be distributed (in-bound versus out-bound, left turn versus right turn) onto the existing street network to project turning movements at site access points and nearby intersections where required. Project peak hour turning movement volumes shall be illustrated in the report. A description of the application of standard engineering procedures for determining the distribution should also be attached (trip distribution model, market studies, counts at existing driveways, etc.).
- viii. Level of service or "capacity" analysis at the proposed access points shall be completed using the procedures outlined in the most recent edition of the Highway Capacity Manual published by the Transportation Research Board. For projects requiring a Traffic Impact Statement or Regional Traffic Analysis, before and after capacity analyses shall also be performed for all street intersections where the expected traffic generated by the proposed project will comprise at least five percent (5%) of the existing intersection capacity, and/or for roadway sections and intersections experiencing congestion or a relatively high crash rate, as determined by the community or applicable road agency. The City may require gap studies for un-signalized intersections where applicable.
- ix. The report shall include a map and description of the location and design of proposed access (driveways or new street intersections).
- x. Mitigation/Alternatives: The study shall outline mitigation measures and demonstrate any changes to the level of service achieved by these measures. Any alternatives or suggested phasing of improvements should be described. The mitigation measures may include items such as roadway widening, need for bypass lanes or deceleration tapers/lanes, changes to signalization, use of access management techniques or a reduction in the proposed intensity of use. Documentation shall be provided from the applicable road agency regarding the proposed mitigation measures. The responsibility and timing of roadway improvements shall be described. Proposal improvements requiring applicable road agency approval (new signals, roadway improvements, etc.) require a submittal of correspondence from the applicable road agency outlining their agreement.

- (F) Modification of Study Requirements: The requirement for a traffic impact study, or the study elements listed in Item 5 above, may be modified by the Road Commission. Reasons for the modification shall be documented by the applicant and may include the following factors:
- i. Roadway improvements are already scheduled which are expected to mitigate any impacts associated with the proposed project,
  - ii. The existing level of service is not expected to be significantly impacted by the proposed project due to specific conditions at the subject location.
  - iii. A similar traffic study was previously prepared for the site and is still considered applicable.

***(B) Final Plat / Plan Acceptance***

Before a final plat, condominium development or land division development may be submitted to the Board for approval, the proprietor through his engineer shall submit a copy to the County Engineer containing all information necessary to assure its approval by the Board. It shall be submitted no less than seven (7) calendar days prior to the Board meeting at which final approval will be requested. If corrections are required to be made, the project will not be placed on the agenda.

The following information must accompany submission of the final plat or condominium project:

- (1) A location map showing the streets and roads in the area and the relationship of the streets within the subdivision to the existing road system.
- (2) Typical cross sections of the streets to be constructed, indicating the kind of construction and right-of-way widths. Construction shall comply with the “Requirements and Specifications for New Street Construction of the Board of County Road Commissioners of Saginaw County, Michigan.”
- (3) The names of the proprietor and his engineer and their addresses and telephone numbers shall be included on construction plans.
- (4) All streets and highways, which are extensions of, or in line with existing streets, should carry the names of those in existence. Other streets and highways shall be given such names as the owner may choose, subject to the approval of the Board. New names may not be duplicates of existing road names.
- (5) Half width streets will not be considered.
- (6) Should the owner decide to construct streets within the proposed development to the minimum rural specifications (gravel surface – see Section V, A). It is to be understood that the Board will not participate in

any cost of providing a higher surface, blacktop or concrete, within a period of five (5) years following the date of acceptance of said streets for maintenance purposes. A letter must accompany the submission of the plans from the township board-indicating acceptance of these conditions.

- (7) Road plans submitted must show plainly the following information, and must be submitted on standard plan and profile sheets (26"x36").
  - (a) Plan view with centerline and top of curb right and left in profile directly below (ditch profile, if no curb and gutter).
  - (b) Typical cross section of road to be constructed and cross-sections of any unusual areas.
  - (c) Grades shall coincide with datum determined by the U.S.G.S. or U.S.C. & G.S., if practicable. One or more permanent benchmarks shall be established in the development and shall be shown on the plans.
  - (d) The location, size and depth of all underground structures used for drainage within the development, and all other utilities.
    - (1) Show clearly the size, length and locations of all cross road culverts.
    - (2) Show locations and type of inlets and cleanup points for all underground drainage systems.
    - (3) Show standard plans for all catch basins, inlets, manholes, etc. See Plates I, II, & III of Appendix.
    - (4) Show locations and profiles of all drains outside of roadway area to be utilized for roadside drainage.
    - (5) Provide documentation showing that the necessary steps for acceptance of the drainage system by the County Public Works Commissioner have been taken.
    - (6) All new streets in excess of 300' must have enclosed storm sewer systems.
- (8) Such plans shall be prepared under the supervision of, and sealed by a civil engineer, registered in the State of Michigan. A copy of the final drawings shall be provided to the Road Commission in digital format showing the location of the platted area with Latitude and Longitude coordinates. No construction of subdivision streets will be approved unless it is based on plans so prepared.
- (9) Financial guarantee and other provisions:
  - (a) An Engineers Estimate for construction shall be provided. The estimate shall include all costs for drainage and roadway construction necessary to complete the project.
  - (b) Final plat or condominium road right-of-way submission before subdivision street construction.

- (1) Submission shall be accompanied by a cash deposit, or an irrevocable letter of credit drawn on a form generally acceptable, and by a financial institution familiar to the Board.
  - (2) All surety provided shall exceed by 10% the amount indicated in the engineer's detailed estimate which shall accompany said surety and shall show all items of work and material involved in construction.
  - (3) When the proprietor chooses to provide surety in the form of a cash deposit, the Board will rebate to the proprietor as work progresses, amounts of the cash deposits equal to the ratio of work completed to the entire project as provided for in the Subdivision Control Act of 1967, being Section 560.183(3) of the Compiled Laws of the State of Michigan.
  - (4) Inspection and administrative fee. A fee in the amount of 2% of the engineer's estimate of all that portion of the construction bonded to the Board shall be paid to the Board prior to construction and development approval. This fee is to cover administrative and inspection costs incurred by the Board in relation to the plat, and will not be returned. The inspection covered by this fee is solely to inform the Board of the progress and quality of work being done and in no way relieves the proprietor of his responsibility to supervise and inspect work being done for him. It is not intended that inspection performed by the Board or its staff is to be a substitute for the inspection performed by the proprietor's engineer. The Board takes no responsibility for the quality of work being performed as a result of its inspection.
- (c) Submission of the final plat or condominium development after the subdivision street construction is completed.
- (1) Submission shall include a statement from the engineer that the streets have been completed in accordance with plans presented at the time of final plat submission. Such plans shall show streets as constructed and that such construction is in compliance with recommendations of the Board as published, and enforced at the time of construction, and shall be accompanied by an estimate as indicated in IV, B9, a.
  - (2) Documentation showing that the drainage has been accepted as a county drain shall be submitted.
  - (3) A fee in the amount of 2%, as indicated in b-4, shall be paid to the Board at the time Board approval is requested. This fee will be based on the engineer's estimate or records kept by the engineer and available to the Board for examination. No development will be approved in which

street construction has been completed unless the Board has been kept informed of the progress of the street construction so that the County Engineer or his staff may have properly inspected its construction.

- (10) Whether submission is made before or after street construction, it shall be the responsibility of the developer's engineer to provide all necessary information and data to properly inform surety as to progress of construction, dates of completion and construction costs, when such requests are made.
- (11) It shall be the responsibility of the sub-divider to name all streets within the subdivision.

### **(C) Street Signs**

Signs will be placed by the Saginaw County Road Commission and contractor will be billed at the current per sign rate in use by the Commission.

### **(D) RIGHT-OF-WAY REQUIREMENTS AND SPECIAL PROVISIONS**

- (1) Right-of-way provisions for state and federal trunklines shall be that required by the M.D.O.T.
- (2) All street right-of-ways within the subdivision shall be 66' wide and provide a 12' utility easement on each side outside of the 66' unless the streets have functional use greater than residential access or secondary collector.
- (3) Right-of-way provision for existing streets on which the proposed development abuts or extension of survey line streets and roads shall conform to the functional requirements indicated in table 1 on page 27 and Plate XV of Appendix.
- (4) All dead-end streets shall provide a turn-around (cul-de-sac) with minimum external diameter of 150 feet. See Plate IV of Appendix. "T" ends will be allowed on streets where future extension is expected. See Plate V of Appendix.
- (5) Boulevard sections shall be permitted **only** at the main entrance to a development where the entrance to the development is not at an existing intersection. Boulevard sections shall not exceed 300 feet in length. Street width on each lane of boulevard shall be no less than twenty (20) feet. See Plate XIV

### **(E) CONSTRUCTION PROCEDURE**

A systematic procedure of construction shall be followed to eliminate disagreement between the Board and the proprietor and/or his agents.

- (1) All available underground utilities should be installed before rough grading has been completed and before construction of finished surface.
- (2) Undesirable topsoil shall be removed from the roadway. All frost heave material shall be removed. Sub-grade undercut shall be made if soil conditions indicate necessity. Construction with frozen materials will not be approved.
- (3) All street name signs and guardrail are to be shown on construction plan and with guardrail installed by owner. Saginaw County Road Commission shall install all street signs with owner paying the current per sign fee in use by the commission.
- (4) The contractors must obtain necessary permits from the Board for any construction within the right-of-way of existing roads.
- (5) Inspection by the Board does not relieve proprietor's engineer of his/her responsibility and obligations. It is done to provide the Board with firsthand knowledge of construction procedures and suitability of results.
- (6) The proprietor's engineer shall set and check grade and alignment; shall inspect and approve materials incorporated in street and drainage construction; shall supervise all construction within the street right-of-way and drainage easements.
- (7) The Board, acting through the County Engineer or his staff, reserves the right to halt construction at any time, when in their opinion the specifications and regulations of the Board are not being complied with.
- (8) Upon completion of construction, the proprietor's engineer shall submit with his letter of acceptance and request for maintenance by the Board, one (1) set of "as constructed" plans in digital format.
- (9) All trees shall be removed from the road right-of-way within the limits of the development.

***(F) Board Approval***

The Board will approve and sign the plat or accept the road right-of-ways for condominium developments or land division developments after the following conditions have been met:

- (1) Submission of all proper documents as previously indicated, surety bond, cash deposit or irrevocable letter of credits guaranteeing completion of construction and inspection fees (see B-9-b of this Section).
- (2) Construction of all roads, streets and drains are completed, and the necessary conditions to qualify them for maintenance by the Board have been complied with, and the necessary maintenance bonds and inspection fees have been submitted (see B-9-b of this Section).

## SECTION V – DESIGN STANDARDS AND CONSTRUCTION METHODS

Road shall be designed and construction methods shall be used which meet the following standards and criteria:

Any minimum standards imposed by the governing bodies of the townships wherein the construction occurs which exceed these standards shall be complied with. Certain design cross sections, which are typical of various kinds of construction, are included in the Appendix. These typical sections are not exclusive. All designs will be based on the use of strength index numbers for various materials and combination of materials. Minimum total accumulative strength indexes established for each type of design will be controlling factors. Certain minimum thickness' of various materials are established and must be met when those materials are used. Surface may be gravel, bituminous aggregate or concrete and may conform to either rural or urban type cross sections. The proprietor through his/her engineer shall make a good and sufficient evaluation of subgrade conditions in all areas where roads and streets are to be constructed. At the time he/she submits construction plans for approval he/she shall provide boring data and soil analysis indicating the kind and nature of soils to a depth of at least 3' below proposed sub-base grade. In all instances where existing soils show a 50% or greater silt content and a plasticity index greater than 10, sub-grade undercutting to a minimum depth of 3' below plan grade will be required. The excavated area shall be filled to the bottom of subbase as required for the type of surface to be constructed with sound earth which shall be compacted in layers of 12" or less to a 95% maximum density as determined by A.A.S.H.T.O T-99 (method C, Modified). The test must be completed with a moisture content between optimum and two percent (2%) below optimum.

This material shall not contain more than 50% silt with a plasticity index of less than 10. A 6" tile under drain shall be installed if granular material Class II is used, or storm sewer placed under roadway with sub-base graded to slope towards this storm sewer to provide drainage of sub-base. In addition to above where new construction meets existing road geometric design must meet requirements as shown on Plates X & XI of Appendix.

### ***(A) Gravel Surface – S.I. 2.36***

Roadways constructed with a gravel-driving surface shall have a minimum compacted gravel thickness of 8". Subbase material shall be carried to ditch slopes. Gravel surface will only be acceptable in situations where underground utilities (water, gas, telephone and sewers) are not available and cannot be installed at the time when road construction takes place.

The roadway subbase shall be granular material conforming to current M.D.O.T. specifications for Class II sand. The surface may be crushed stone or natural gravel with gradation meeting M.D.O.T. specifications 22A and shall be a minimum of 22' wide and shall be compacted to 100% of max density as determined by AASHTO T-99. Liquid Calcium chloride shall be added at the rate of 6 gal/c.y. to stabilize the aggregate surface. The finished roadway surface shall have a parabolic cross section. The road shoulder shall be stabilized in a manner adequate to carry occasional vehicular traffic and be resistant to erosion. Shoulder slope shall be at the rate of ¾" per foot. The Gravel surface shall meet all conditions relative to paving as indicated in Section IV, Part B. See Plate IV of Appendix.

**(B) BITUMINOUS SURFACE, RURAL CROSS SECTION – S.I. 3.83**

Bituminous base course and bituminous wearing course shall meet M.D.O.T. specifications respective for 2C and 36A. The placement of bituminous pavement shall meet standards for Sections 501 and 502 of the current edition of the M.D.O.T. Standard Specifications for construction, as revised and amended. The acceptable pavement depth will be dependent on the base and subbase material used.

Aggregate base course shall have a minimum depth of 6" and shall be applied as indicated in Section V-A, and shall consist of crushed stone or natural gravel meeting M.D.O.T. specifications for 21A or 22A. See Plates VI & VII of Appendix.

The bituminous surface course shall not be placed until the area under the proposed pavement which was disturbed by the installation of the underground utilities has gone through at least one freeze thaw cycle.

**(C) CONCRETE PAVEMENT – S.I. 5.96**

The placement of concrete pavement shall meet MDOT standards Section 601 and 602. The minimum typical cross section shall consist of 12" of Class II sand, 6" of 21A or 22A gravel, and 6" of non-reinforced Portland cement concrete, with a minimum width of 20'. Transverse joints shall be saw cut at 20' centers. The longitudinal centerline joint may either be a construction joint or a saw cut joint. The concrete shall have a minimum compressive strength of 3500 lbs. at 28 days. All longitudinal and transverse joints shall have tie-bars set at 30" centers. Curb and gutter sections shall have a minimum width of 27' back-to-back, and included hook bolts tying curb to pavement as shown in current version of M.D.O.T. standard plans as amended. See Plate VIII of Appendix.

***(D) URBAN RESIDENTIAL CROSS SECTION – S.I. 3.83***

An urban cross section shall provide for curb construction, which shall be a minimum of 27' back of curb to back of curb, based on a 2' wide curb. Curb design for concrete curb and gutter shall conform to Plate IX of Appendix or such modification as may be approved for specific location.

***(E) CONCRETE ROADWAY SURFACES – S.I. 5.96***

Concrete design requirements shall be as indicated in V-C & D.

***(F) INDUSTRIAL, COMMERCIAL AND ALL-SEASON CONSTRUCTION – S.I. 6.23  
for Bituminous & 7.50 for Concrete***

In general the construction practice procedures indicated above will be followed when constructing industrial or commercial all-season streets. On curb and gutter cross sections a minimum of twenty seven feet (27') back of curb to back of curb will be provided, based on a 2' wide curb. See Plates XII & XIII of Appendix.

Where curb and gutter is not to be provided, a minimum of twenty-four feet (24') wearing surface and ten feet (10') Class AA shoulders will be constructed. Where concrete is used the design shall meet a minimum SI number of 7.50 with a 9" reinforced pavement. Where a bituminous surface is planned the minimum design S.I. shall be 6.23 with a minimum bituminous surface thickness of 5.5".

***(G) GENERAL CONSTRUCTION PRACTICE***

For all road construction, all undesirable soil shall be removed from the roadway. All fill soil shall be compacted according to approved methods. All trees, brush, shrubs and stumps shall be removed from the right-of-way. No subdivision street construction will be approved if unsatisfactory or frozen materials have been used. Edge drains shall be installed in all locations, both rural and urban cross sections, where sub-soil drainage, in the opinion of the County Engineer, is inadequate. Such drains to be minimum 6" perforated or slotted plastic pipe with a geotextile fabric wrap, laid at least 36" below the pavement surface and the trench back-filled with Class II or better sand.

## **(H) WEATHER LIMITATIONS**

The following limitations shall apply to concrete and bituminous construction on all subdivision streets:

- (1) Concrete weather and temperature limitations
  - (a) Protection against rain – Precautions will be taken as necessary to protect fresh concrete from damage.
  - (b) Cold weather – Concrete shall be protected from freezing until it has attained at least 20% of its design strength. Any concrete injured by frost action shall be removed and replaced.
  - (c) Cold weather limitations – No concrete shall be placed on frozen ground unless the temperature of the air shall be 35° and rising, without specific approval of the County Engineer.
- (2) Bituminous aggregate construction shall occur between May 15<sup>th</sup> and November 1<sup>st</sup>. After November 1<sup>st</sup> (as per current M.D.O.T. standard specifications, as amended) construction will not be approved or accepted with out prior written permission of the County Highway Engineer of the Saginaw County Road Commission.

## **(I) CUL-DE-SAC, DEAD-END and Boulevard STREETS**

- (1) CUL-DE-SAC: If, in the event a subdivision design necessitates the construction of a cul-de-sac in order to properly utilize the area, then such cul-de-sac shall be so designed as to provide a minimum center of street radius of forty-five feet (45') and a maximum island radius of thirty-two feet (32') to back of curb. Alternate cul-de-sac shapes, other than circles, will be approved provided these minimum turning limitations are met. See Plate IV of Appendix.
- (2) DEAD-END: Squared dead-ends will be approved whenever street extension at some future date is probable, however, a "T" must be provided at the street end on any such dead-end street which extends in excess of 150' from the nearest intersection, and contains at least 1 drive connection. "T" ending will not be required for dead ends 150' or less in length that contain no drive connections. The provided "T" shall extend thirty-three feet (33') each way from the center line of the dead-end street at its extreme end and shall have width on the crossing of twenty feet (20'), and be located entirely within the limits of the development. If street is constructed with curb and gutter the curb must extend to the end of plat with curb cut (low back) at "T" ending. See Plate V of Appendix.

- (3) BOULEVARD: Entrances of this type may be allowed by the Saginaw County Road Commission provided they meet all requirements shown in PLATE XIV.

### **(J) URBAN COLLECTOR STREETS**

Design standards for streets designated urban collector, shall be as follows.

- (1) When curb and gutter is a mandatory requirement:
  - (a) The basic cross section shall be the same as for urban residential streets the pavement shall be designed with a minimum width of 23' edge of pavement to edge of pavement with a curb measurement of 27' back-to-back.
- (2) Design standards for streets designated urban collector when curb and gutter is not being constructed shall be as follows:
  - (a) Basic cross section shall be of a rural design and shall meet the following minimum cross section limits. Roadway widths to be twenty-four feet (24') with eight foot (8') aggregate shoulders. Ditch cross sections as necessary to meet drainage requirements. Surface type shall be as balance of subdivision. All design criteria for pavement previously indicated, shall apply.

### **(K) DRAINAGE**

- (1) When at all possible, storm drainage shall be established through the County Public Works Office and it shall become a part of the county drain system. All rules of the Saginaw County Public Works office shall apply to all storm drainage whether being taken over by them or the Saginaw County road Commission. A video tape inspection shall be conducted and a copy shall be submitted to the Saginaw County Road Commission when requesting acceptance of road for maintenance purposes.
- (2) All streets shall be provided with adequate facilities for draining roadway surfaces in compliance with the specifications of the Board. This shall include cleaning existing county drains or roadside ditches when such development fronts on a county road. On such frontage roads, it shall be the responsibility of the developer to set back where necessary and deepen existing frontage ditch according to recommendations worked out between his engineer and the County Engineer. Street construction plans shall indicate the disposition of storm water to the nearest adequate functioning outlet, whether county drain or existing county road ditches. Whenever existing county road ditches, which are to serve as outlets are inadequate in terms of capacity, elevation, etc., to provide adequate storm drainage, it

shall be the responsibility of the developer, working through the County Drain Commissioner, to provide such outlets.

(3) All storm drainage within the development shall be enclosed and shall conform to the following minimum specifications:

- (a) When the storm sewer lies beneath the roadway, the storm sewer shall be concrete tile ASTM specifications, C76-III with wrapped joints, premium joints will not be accepted or approved. Any other construction material shall have specific written permission from the County Engineer, or its use will not be approved.
- (b) All construction shall be so designed as to provide a minimum thirty-six inches (36") of cover over the pipe beneath all roadways and shoulders, and shall provide no less than twenty-four inches (24") on all other locations, within the road right-of-way.
- (c) All storm drainage shall be designed to provide sufficient area to handle anticipated increases in flow caused by future extensions, etc. In the event any question arises concerning capacity of area, the proprietor's engineer shall provide calculations used to determine recommended size.
- (d) All connections shall be into a drainage structure. (Blind taps are prohibited.)

(4) Catch basins

- (a) Shall be provided at all quadrants of road intersections, and shall be spaced at a distance no greater than 400' (i.e. no more than 400' of roadway can drain into any one catch basin), with placement being on property lines along the roadway. (Exceptions to this rule will be considered on a case-by-case basis.) All catch basins shall be of pre-cast concrete construction.
- (b) Catch basin units, providing minimum 18" sump, constructed according to Plates I, II, or III of Appendix,
- (c) When catch basins are not placed directly on storm sewer, manholes conforming to Plate I of Appendix shall be installed at street intersections and at a distance not greater than 400' apart.
- (d) Curb basin castings shall conform to Plate II of the Appendix.

## SECTION VI – SERVICEABILITY CLAUSE

If any part of these procedures or requirements are further to be invalid, each invalidity shall not affect the remaining portion of the procedures or requirements which can be given effect without the invalid portion, and to this end the procedures or requirements are declared to be severable.

TABLE 1  
FUNCTIONAL CLASSIFICATION OF HIGHWAYS AND STREETS

Classification	Primary Service Function	Access Control	Desirable Operating Speeds (MPH)	Right-of-Way
<u>Arterial System</u> Regional Arterials	Through traffic, limited land service	Usually none	45 – 65	120' – 150'
Metro-Area Arterials	Intra-area traffic, connect other Arterials, moderate level of land service	Usually None	35 – 55	120'
Local Arterials	Lesser arterial service at local level, more emphasis on land access	None	35 – 55	96'
<u>Collector System</u> Principal Collectors	Connect local systems to arterials	None	25 – 45	86' – 96'
Secondary Collectors	Connect local system to arterials and other collectors	None	25 – 35	66' – 86'
<u>Local Road and Street System</u> Residential	Access to residences	None	25	66'
Local Access	Land service, local access	None	25 – 35	66'
Industrial-Commercial	Service to industrial and commercial land areas	None	25 – 35	66'

TABLE II

**STRENGTH INDEX OF CONSTRUCTION MATERIALS PER 1" THICKNESS**

Concrete	.60
HMA Top & Leveling Course	.42
HMA Base Course	.36
Crush & Shape HMA	.20
22A Limestone Aggregate Base	.14
Class II Sand sub-base	.10

\*22a Crushed concrete may be substituted for 22A limestone provided this material meets all gradation requirements of 22A limestone, this material must be tested in accordance with M.D.O.T. material sampling guide, and copies of all tests must be submitted to the Saginaw County Road Commission. Costs of these tests shall be the sole responsibility of the developer requesting to use this material.

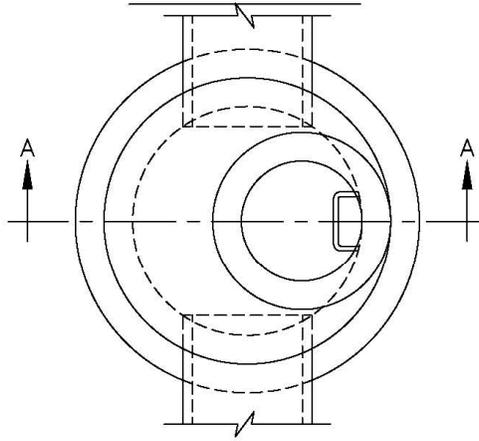
Material not included above will be considered. When a proprietor proposes to use other materials he/she shall provide, through his/her engineer, a proposed index number and sufficient data from recognized sources to support his/her proposal.

**Contractors and Developers are reminded that regardless of minimum depths of construction materials shown on plates minimum Strength Index as shown must be reached!**

## APPENDIX OF TYPICAL DRAWING SAMPLES

<u>Plate #</u>	<u>Description</u>
I	Manhole
II	Curb Catch Basin
III	Yard Catch Basin
IV	Cul-De-Sac
V	“T” Ending
VI	Rural Roadway Cross Section (no Curb)
VII	Bituminous Urban Cross Section (Curb)
VIII	Concrete Urban Cross Section (Curb)
IX	Type “F” Curb
X	Street Approach @ Existing Road
XI	Corner Site Distance Chart (Clear Vision)
XII	Bituminous All Season Construction
XIII	Concrete All Season Construction
XIV	Boulevard Entrances
XV	Functional Right of Way Requirements

**PLATE I  
MANHOLE**

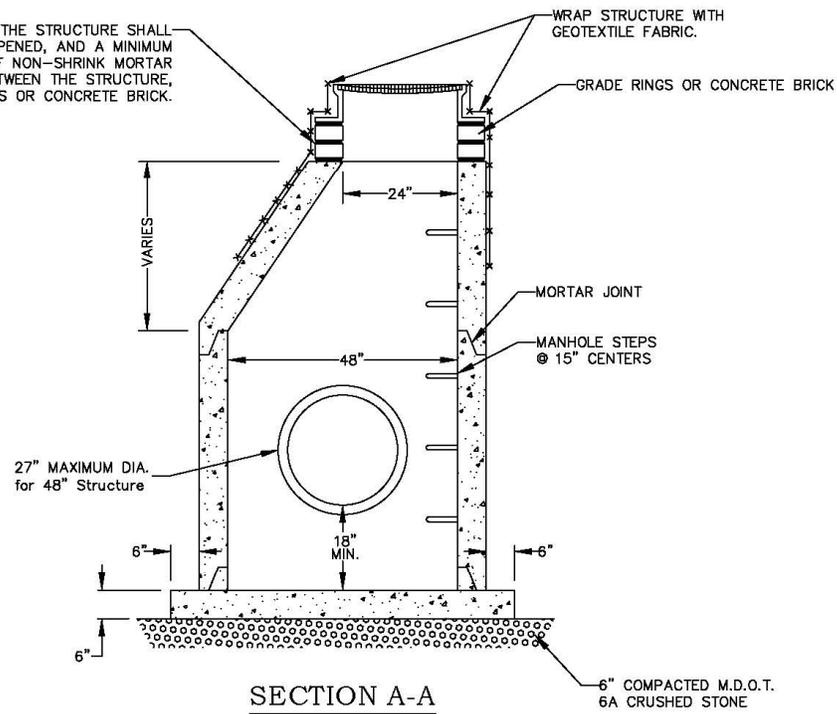


**PLAN VIEW**

THE TOP OF THE STRUCTURE SHALL BE CLEANED, DAMPENED, AND A MINIMUM OF 1/2" BEAD OF NON-SHRINK MORTAR SHALL BE PLACED BETWEEN THE STRUCTURE, CASTING, AND GRADE RINGS OR CONCRETE BRICK.

WRAP STRUCTURE WITH GEOTEXTILE FABRIC.

GRADE RINGS OR CONCRETE BRICK



**SECTION A-A**



**SAGINAW  
COUNTY ROAD  
COMMISSION**

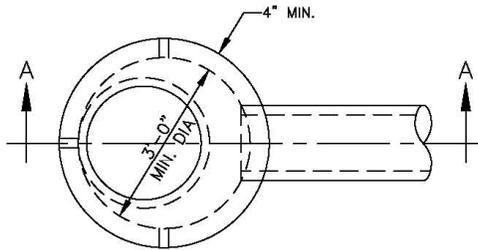
**MANHOLE DETAIL**

DRAWN BY: G.L.S.    DATE: 12/10

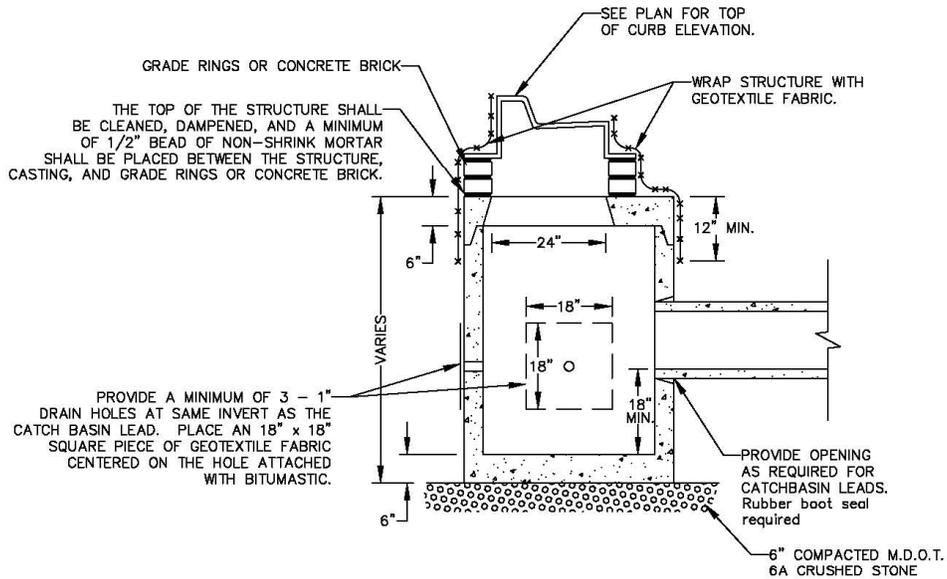
APPROVED BY: R.P.W.    DATE: 12/2010  
COUNTY ROAD ENGINEER

# PLATE II

## CURB CATCH BASIN



PLAN VIEW



SAGINAW  
COUNTY ROAD  
COMMISSION

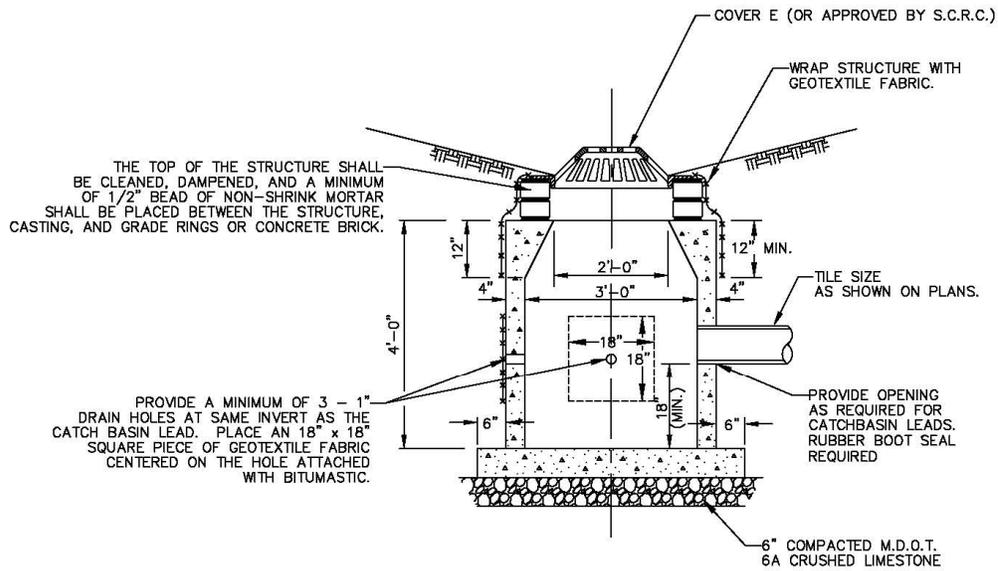
### CATCH BASIN DETAIL

DRAWN BY: G.L.S. DATE: 06/99 MODIFIED BY S.A.H. 12/10

APPROVED BY: R.P.W. DATE: 12/2010  
COUNTY ROAD ENGINEER

# PLATE III

## OUTLAWN OR DITCH CATCH BASIN



**ALTERNATE  
CATCH BASIN DETAIL**



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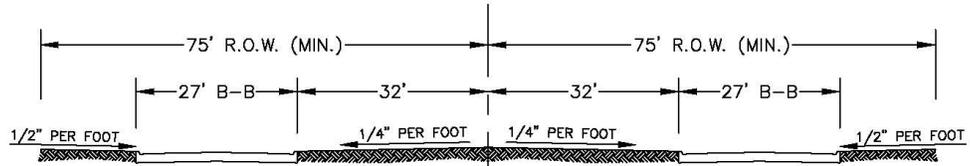
ALTERNATE CATCH BASIN DETAIL

DRAWN BY: G.L.S. DATE: 06/99 MODIFIED BY S.A.H. 12/10

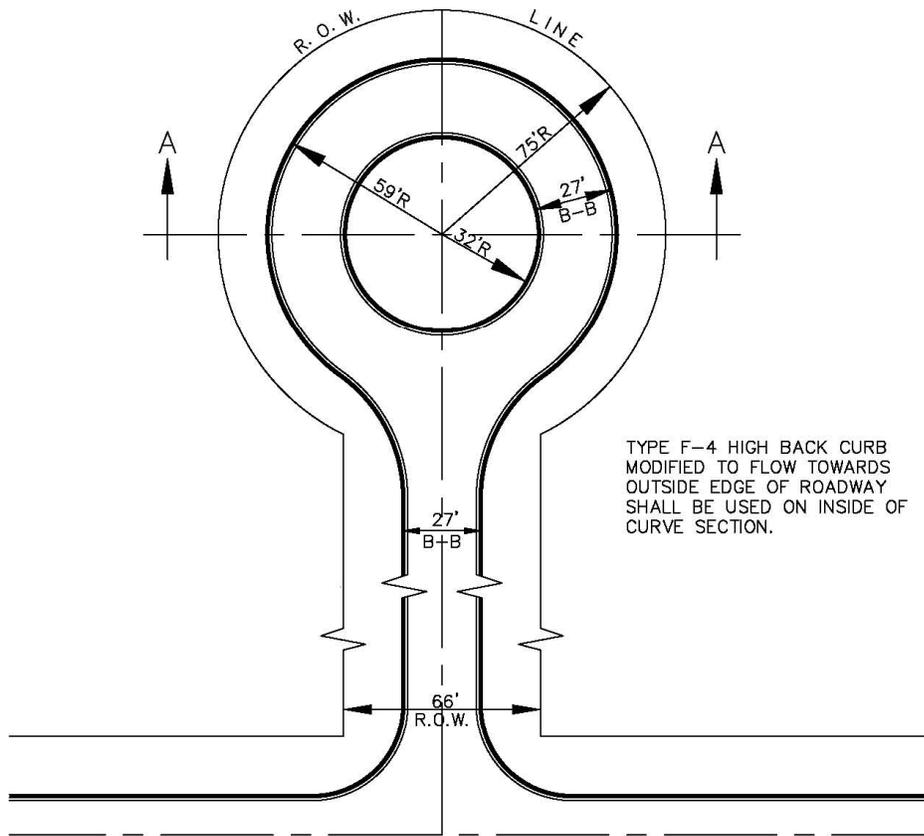
APPROVED BY: R.P.W. DATE: 12/2010  
COUNTY ROAD ENGINEER

# PLATE IV

## TYPICAL CUL-DE-SAC



SECTION A-A



TYPICAL CUL-DE-SAC



TYPICAL CUL-DE-SAC DETAILS

DRAWN BY: G.L.S. DATE: 06/99 MODIFIED BY S.A.H. 12/10

APPROVED BY: R.P.W. DATE: 12/2010  
COUNTY ROAD ENGINEER

# PLATE V

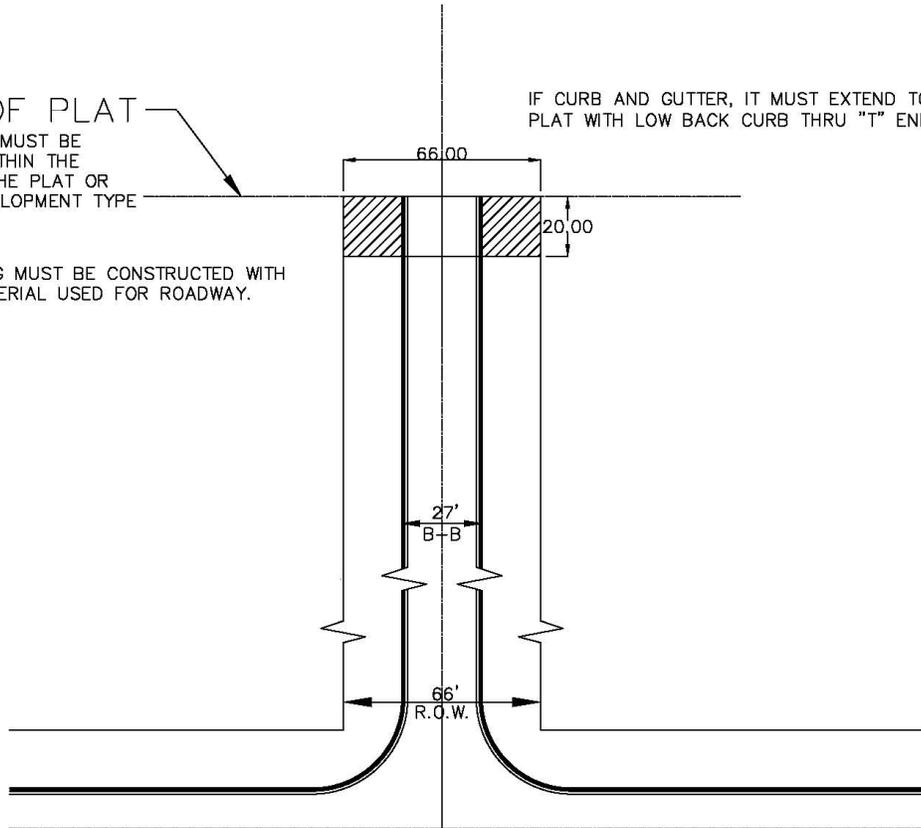
## TYPICAL "T" ENDING

END OF PLAT

"T" ENDING MUST BE LOCATED WITHIN THE LIMITS OF THE PLAT OR OTHER DEVELOPMENT TYPE

"T" ENDING MUST BE CONSTRUCTED WITH SAME MATERIAL USED FOR ROADWAY.

IF CURB AND GUTTER, IT MUST EXTEND TO END OF PLAT WITH LOW BACK CURB THRU "T" ENDING.



TYPICAL "T" ENDING

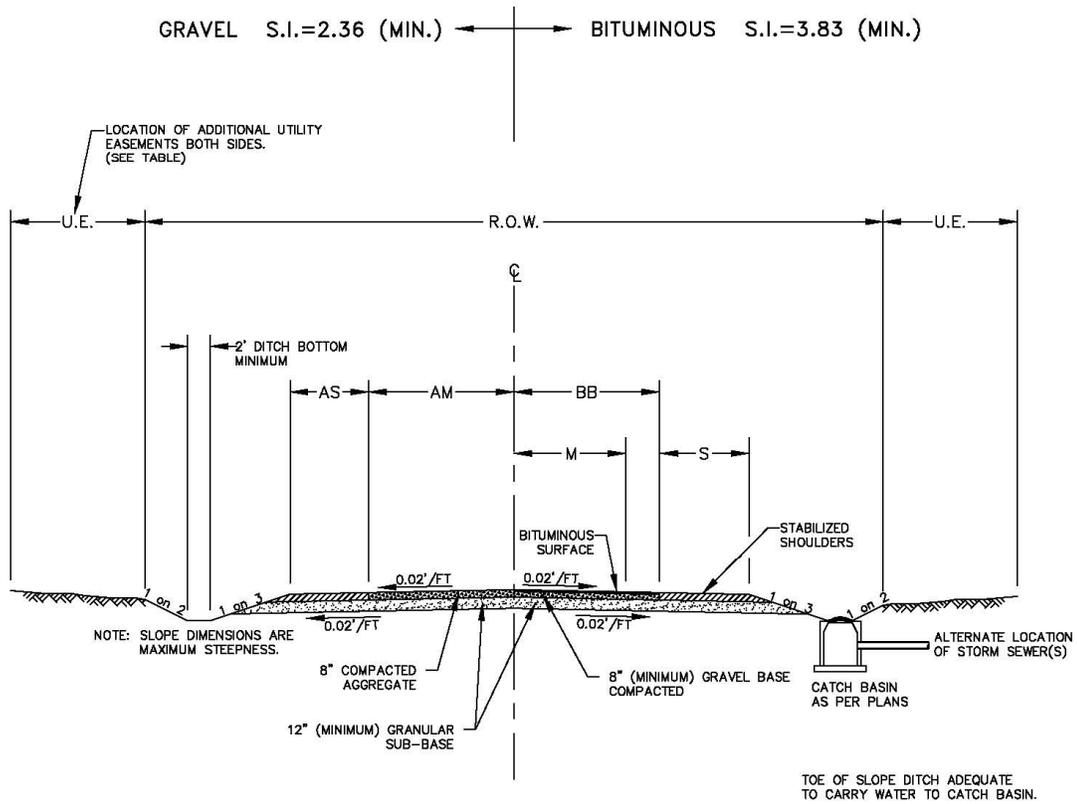


TYPICAL "T" ENDING DETAILS

DRAWN BY: S.A.H. DATE: 12/2002 MODIFIED BY S.A.H. 12/10

APPROVED BY: R.P.W. DATE: 12/2010  
COUNTY ROAD ENGINEER

# PLATE VI RURAL CROSS SECTION



STREET TYPE	R.O.W.	BITUMINOUS			GRAVEL		UTILITY EASEMENT
		M	S	BB	AM	AS	
RESIDENTIAL	66	10	8	11	11	7	12
COLLECTOR	66	12	8	13	13	7	12

DIMENSIONS IN FEET



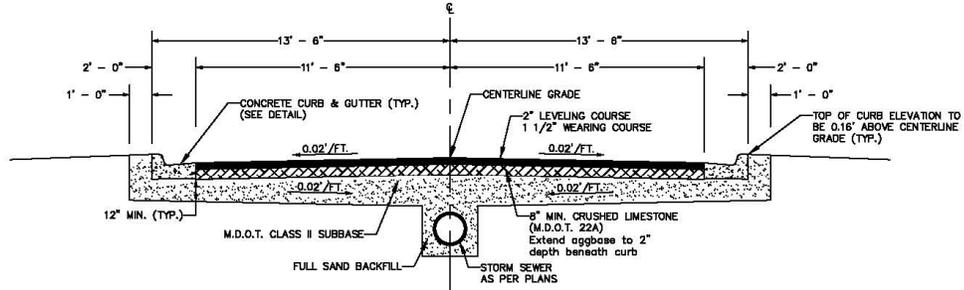
TYPICAL DETAILS FOR  
NEW STREET CONSTRUCTION

DRAWN BY: G.L.S. DATE: 06/99 MODIFIED BY S.A.H. 12/10

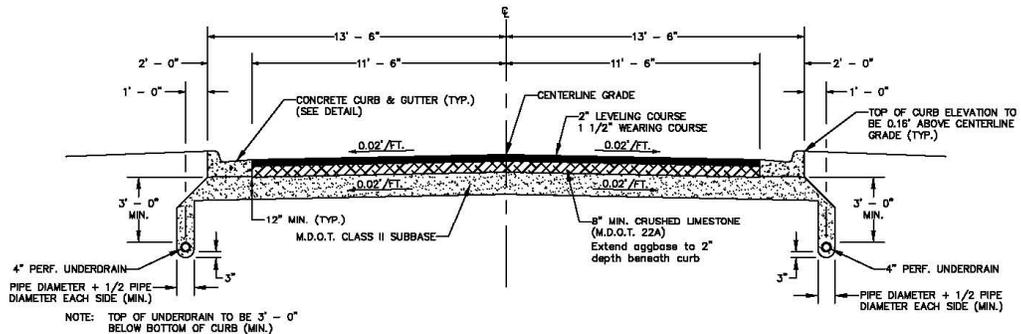
APPROVED BY: R.P.W. DATE: 12/2010  
COUNTY ROAD ENGINEER

# PLATE VII URBAN CROSS SECTION

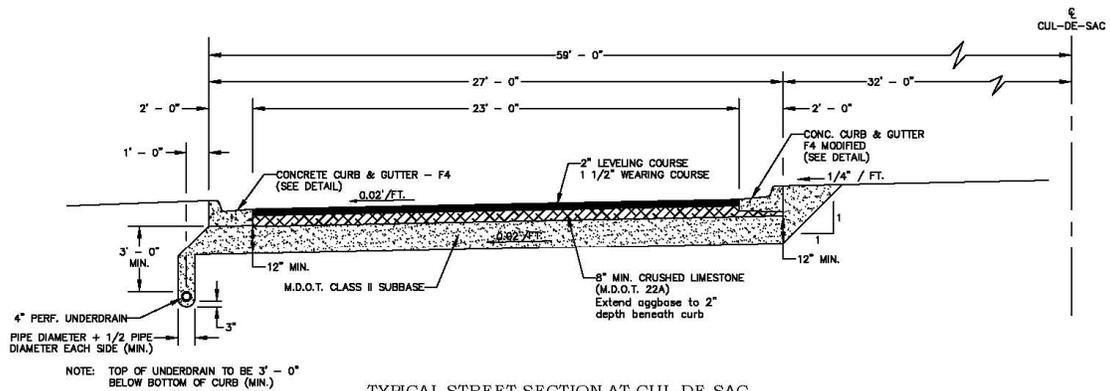
S.I. NO. 3.83 MIN. FOR ALL SUBDIVISION STREETS



TYPICAL STREET SECTION WITHOUT UNDERDRAIN



TYPICAL STREET SECTION WITH UNDERDRAIN



TYPICAL STREET SECTION AT CUL-DE-SAC



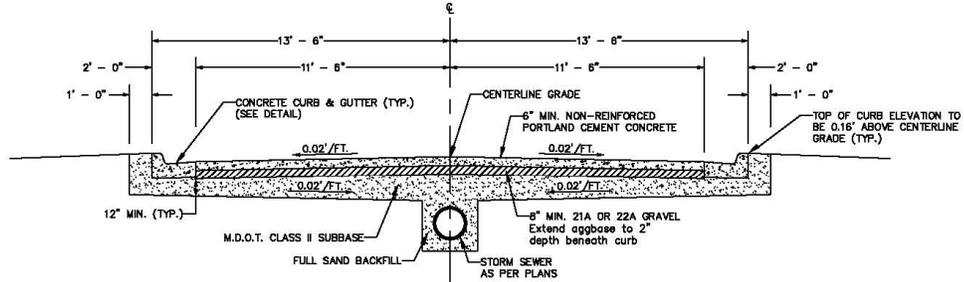
## TYPICAL DETAILS FOR NEW STREET CONSTRUCTION

DRAWN BY: G.L.S. DATE: 06/99 MODIFIED BY S.A.H. 12/10

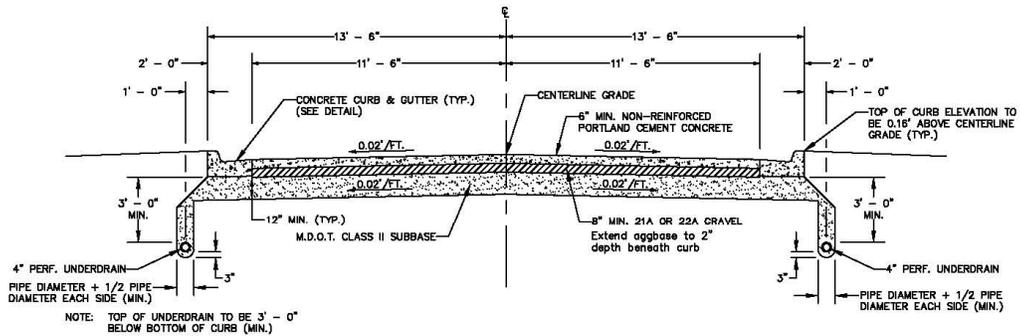
APPROVED BY: R.P.W. DATE: 12/2010  
COUNTY ROAD ENGINEER

# PLATE VIII URBAN CROSS SECTION (CONCRETE)

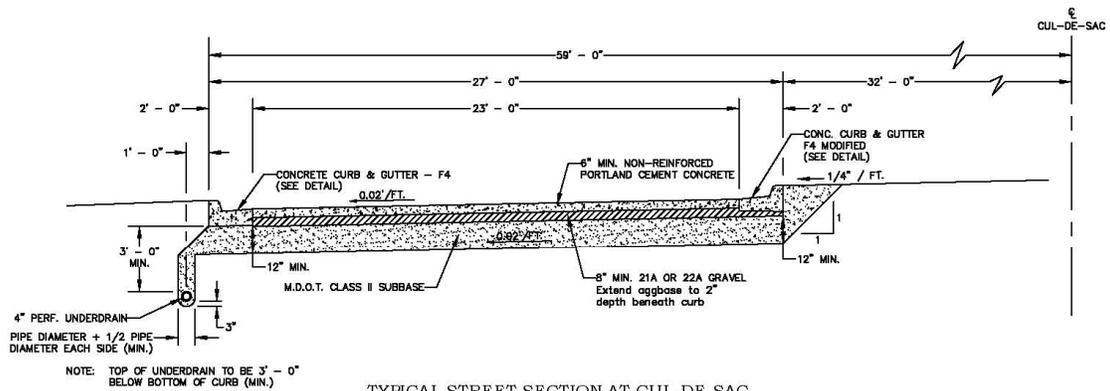
S.I. NO. 5.96 MIN. FOR ALL SUBDIVISION STREETS



TYPICAL STREET SECTION WITHOUT UNDERDRAIN



TYPICAL STREET SECTION WITH UNDERDRAIN



TYPICAL STREET SECTION AT CUL-DE-SAC



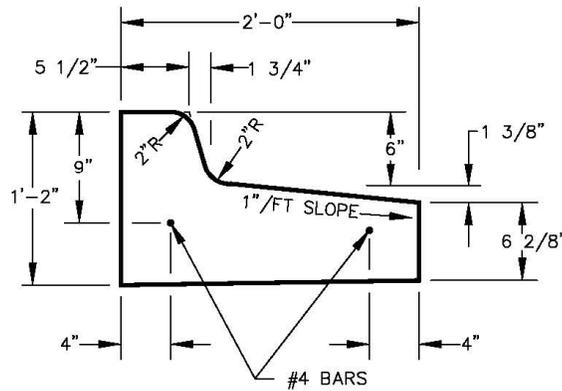
SAGINAW  
COUNTY ROAD  
COMMISSION

TYPICAL DETAILS FOR  
NEW STREET CONSTRUCTION

DRAWN BY: G.L.S. DATE: 06/99 MODIFIED BY S.A.H. 12/10

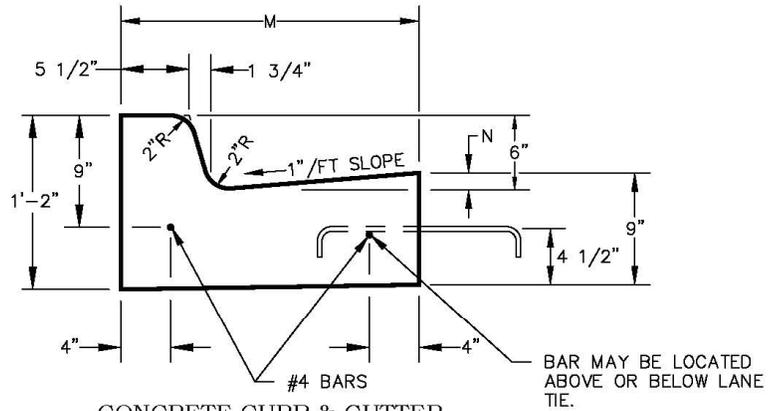
APPROVED BY: R.P.W. DATE: 12/2010  
COUNTY ROAD ENGINEER

# PLATE IX CONCRETE CURB & GUTTER



CONCRETE CURB & GUTTER  
F4 TYPE (MODIFIED)

DETAIL	DIMENSIONS		LANE TIES	CONCRETE CU. YD. / LIN. FT.
	M	N		
F3	2'-0"	1 3/8"	AS SHOWN	0.0610
F4	2'-0"	1 3/8"	OMITTED	0.0610
F5	2'-6"	1 7/8"	AS SHOWN	0.0737
F6	2'-6"	1 7/8"	OMITTED	0.0737



CONCRETE CURB & GUTTER  
F TYPE  
BARRIER DETAIL



SAGINAW  
COUNTY ROAD  
COMMISSION

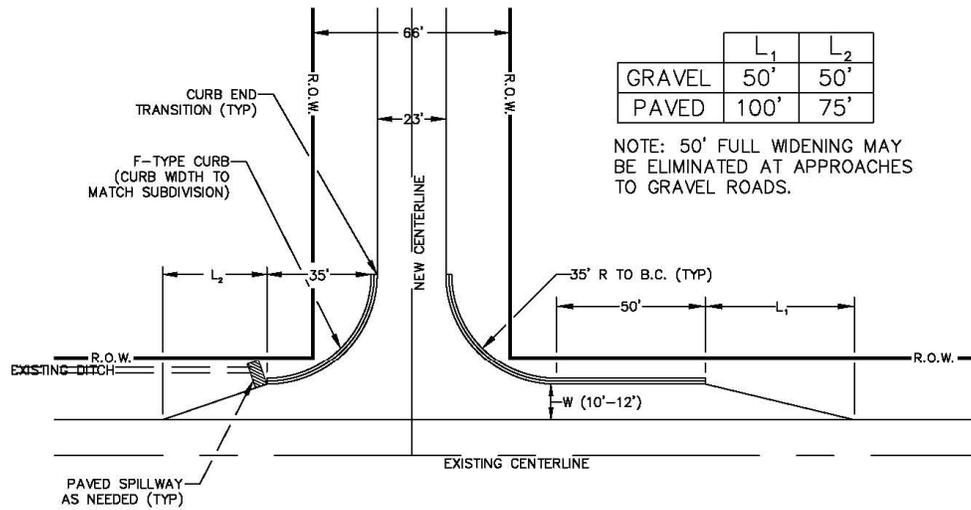
TYPICAL DETAILS FOR  
CONCRETE CURB & GUTTER

DRAWN BY: G.L.S.      DATE: 06/99

APPROVED BY: R.P.W.      DATE: 12/2010  
COUNTY ROAD ENGINEER

# PLATE X

## STREET APPROACH



\* THE ABOVE LAYOUT SHALL BE USED AS A MINIMUM STANDARD FOR STREET APPROACHES ONTO EXISTING COUNTY ROADS. ALL LAYOUTS SHALL BE SUBJECT TO THE COUNTY ENGINEER'S APPROVAL.

### STANDARD FOR STREET APPROACH ONTO EXISTING COUNTY ROAD



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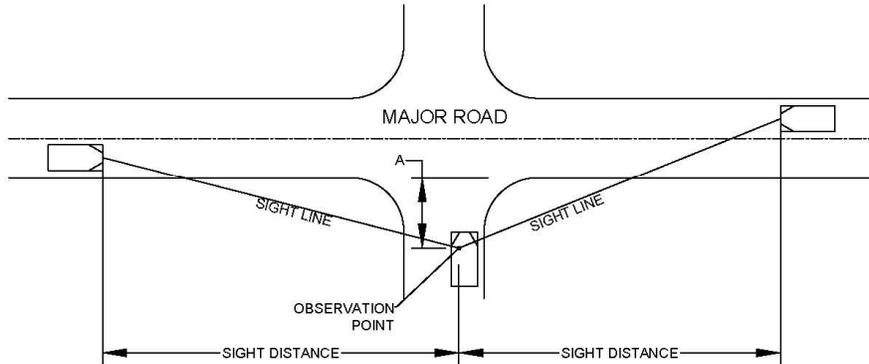
STANDARD FOR STREET APPROACH  
ONTO EXISTING COUNTY ROAD

DRAWN BY: G.L.S. DATE: 06/99 MODIFIED BY S.A.H. 12/10

APPROVED BY: R.P.W. DATE: 12/2010  
COUNTY ROAD ENGINEER

# PLATE XI

## CORNER SIGHT DISTANCE

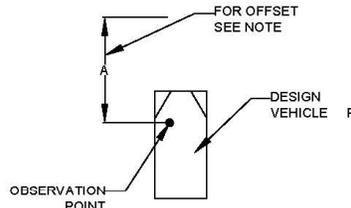


**POINT OF OBSERVATION**

MAJOR ROAD - PAVED SURFACE:  
(A) TWENTY (20) FEET FROM EDGE OF PAVEMENT OF THROUGH LANES

MAJOR ROAD - GRAVEL SURFACE:  
(A) TWENTY (20) FEET FROM EDGE OF GRAVEL.

For gravel surface roads an assumed speed of 45 mph shall be used to determine sight distance unless otherwise posted. Certain existing conditions may require an engineering study to determine the sight distance.



\* FOR RESIDENTIAL DRIVEWAYS APPROACHING GRAVEL OR PAVED ROADS (A) IS 10' FROM THE EDGE OF GRAVEL.

**TABLE 1  
MINIMUM CORNER SIGHT DISTANCE**

MAJOR THROUGH ROAD POSTED SPEED IN MPH	SUBDIVISION STREETS RESIDENTIAL DRIVEWAYS COMMERCIAL DRIVEWAYS	
	2 LANE IN FEET	MULTI LANE
25	250	280
30	310	340
35	360	400
40	410	450
45	460	510
50	510	560
55	560	620

**Note:**  
The above data is based on a left turn maneuver into the intersection major roadway as described in AASHTO. Due to the higher potential accident severity, the left turning sight distance was used to determine the corner sight distance required.

The point of vision shall be from the height of eye, 3.5 feet above the proposed intersection elevation to a height of object 3.5 feet above the existing or proposed road centerline and shall be continuously visible within the specified limits.

Any deviation from given data requires an engineering study by the S.C.R.C. Traffic Safety Department.

For new reconstruction roadway projects the Design Division shall address corner sight distance as suggested by AASHTO (green book 1990) for at-grade intersection design; and at minimum, shall meet sight distance show in table 1. This design guide also applies to new Permit & plot construction projects.



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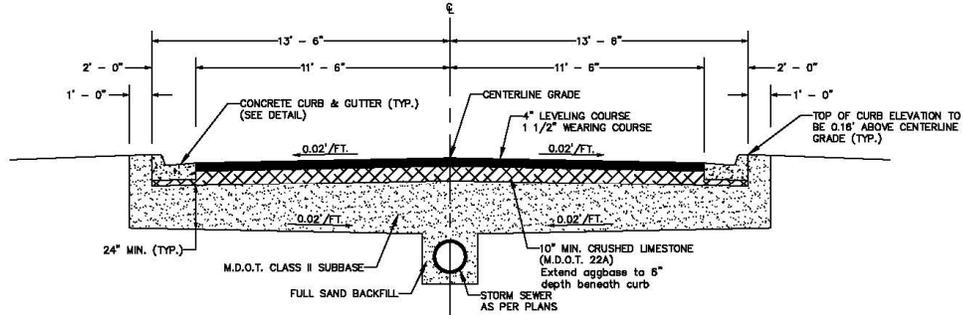
### GUIDE FOR CORNER SIGHT DISTANCE

DRAWN BY: G.L.S. DATE: 12/2002 MODIFIED BY S.A.H. 12/10

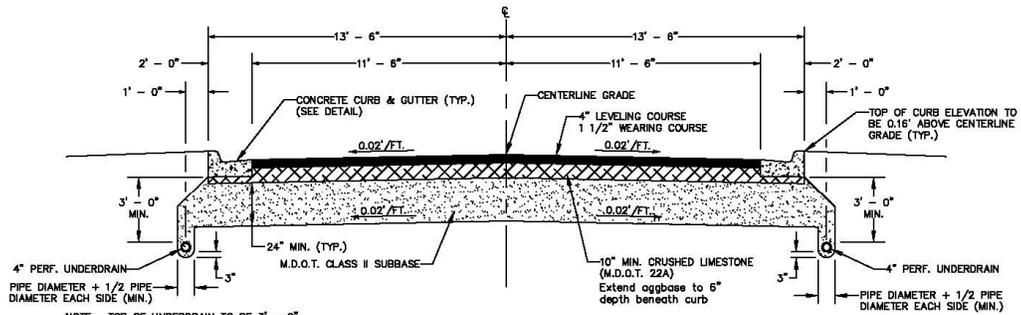
APPROVED BY: R.P.W. DATE: 12/2010  
ENGINEER MANAGER

# PLATE XII ALL SEASON ROADS

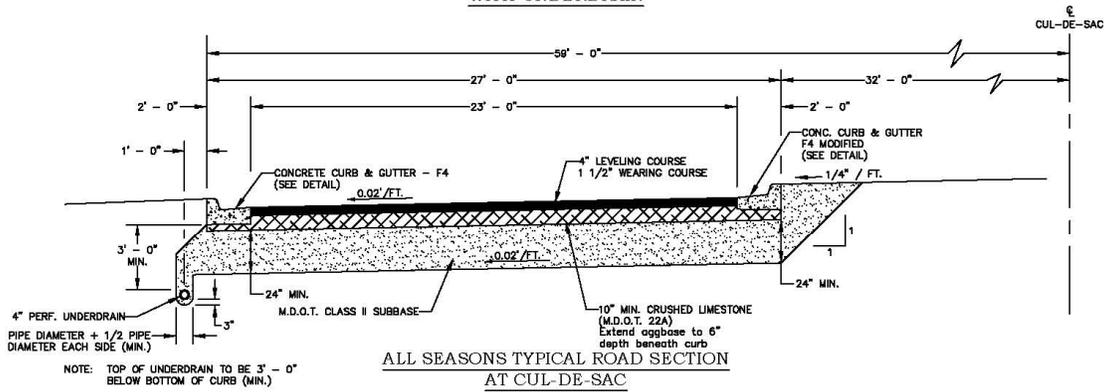
S.I. NO. 6.23 MIN. FOR ALL "ALL SEASON ROADS"



ALL SEASONS TYPICAL ROAD SECTION  
WITHOUT UNDERDRAIN



ALL SEASONS TYPICAL ROAD SECTION  
WITH UNDERDRAIN



ALL SEASONS TYPICAL ROAD SECTION  
AT CUL-DE-SAC



SAGINAW  
COUNTY ROAD  
COMMISSION

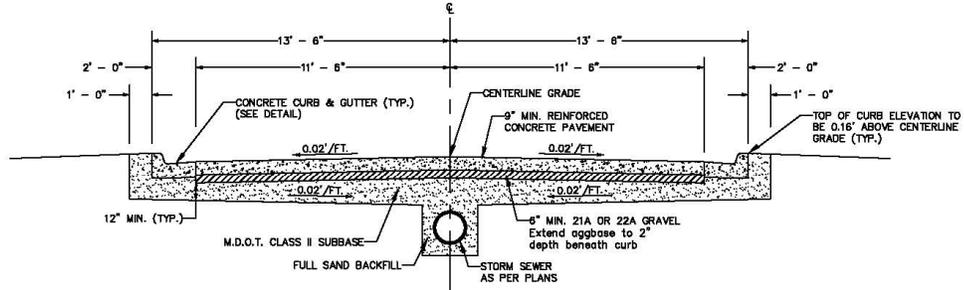
TYPICAL DETAILS FOR  
NEW STREET CONSTRUCTION

DRAWN BY: G.L.S. DATE: 06/99 MODIFIED BY S.A.H. 12/10

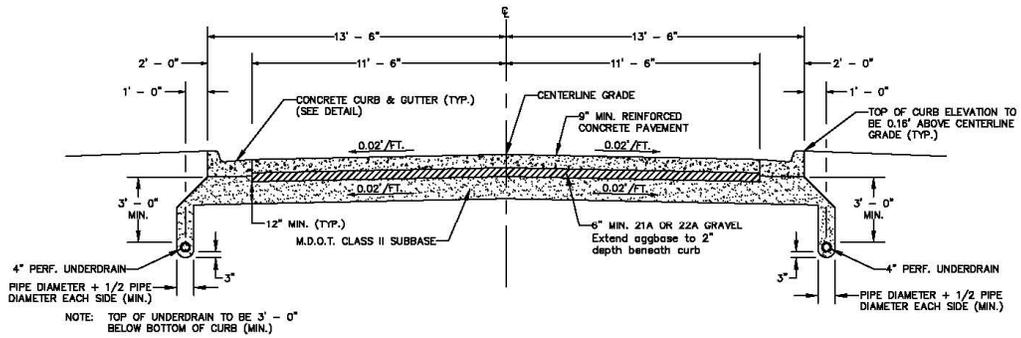
APPROVED BY: R.P.W. DATE: 12/2010  
COUNTY ROAD ENGINEER

# PLATE XIII ALL SEASON ROADS (CONCRETE)

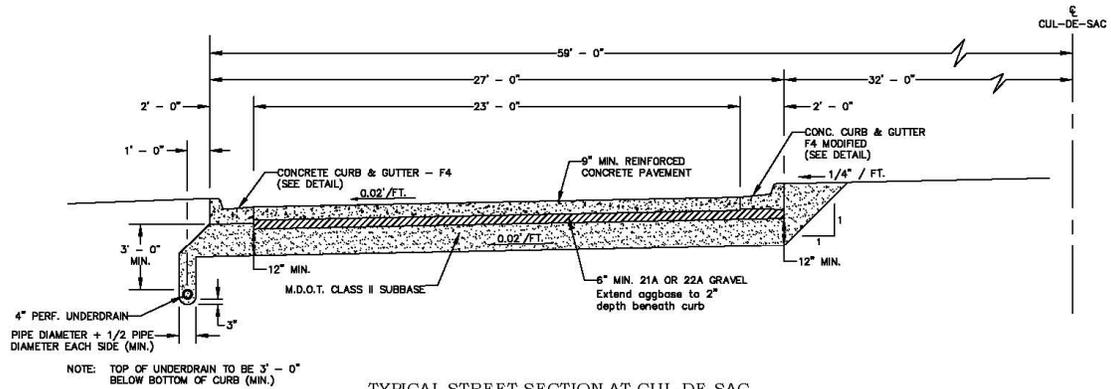
S.I. NO. 7.50 MIN. FOR ALL "ALL SEASON ROADS"



TYPICAL STREET SECTION WITHOUT UNDERDRAIN



TYPICAL STREET SECTION WITH UNDERDRAIN



TYPICAL STREET SECTION AT CUL-DE-SAC



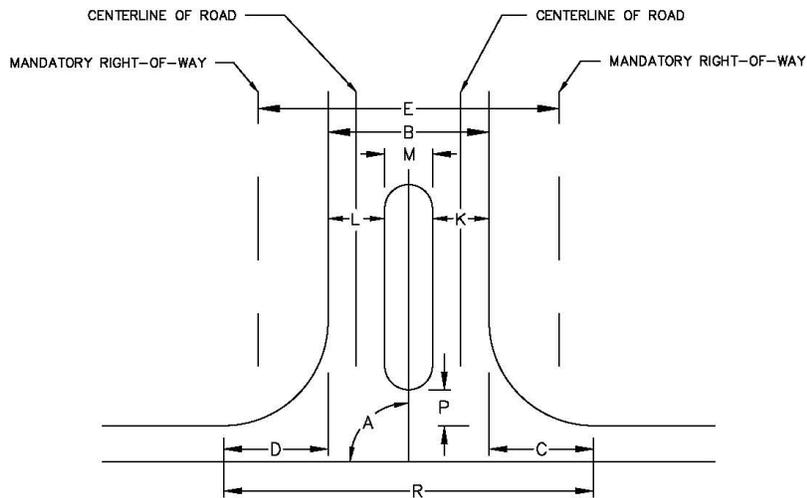
SAGINAW  
COUNTY ROAD  
COMMISSION

TYPICAL DETAILS FOR  
NEW STREET CONSTRUCTION

DRAWN BY: G.L.S. DATE: 06/99 MODIFIED BY S.A.H.12/10

APPROVED BY: R.P.W. DATE: 12/2010  
COUNTY ROAD ENGINEER

# PLATE XIV BOULEVARD ENTRANCES



DESIGN FEATURES	ITEM	TYPICAL	RANGE
INTERSECTING ANGLE	A	90	
DRIVEWAY WIDTH	B	54	46 - 72
ENTERING RADIUS	C	25	15 - 35
EXITING RADIUS	D	25	15 - 35
RIGHT - OF -WAY **	E	104	BASED ON 22' DRIVE WIDTH & 16' ISLAND WIDTH
ENTRANCE DRIVE WIDTH	K	22	20 - 24
EXIT DRIVE WIDTH	L	22	20 - 24
ISLAND WIDTH	M	16	6 - 24
NOSE OFFSET	P	12	6 - 18
TOTAL OPENING			
B + C + D =	R	104	76 - 144

(\*\* The intent of the right-of-way described as item E is to establish a 33' road right-of-way from the centerline of any and all newly constructed Boulevard street entrances.)



SAGINAW  
COUNTY ROAD  
COMMISSION

## BOULEVARD ENTRANCES

DRAWN BY: S.A.H.      DATE: 01/11

APPROVED BY: R.P.W.      DATE: 01/2011  
COUNTY ROAD ENGINEER



