



# LEWIS AND CLARK COUNTY

## Public Works Manual Policies and Procedures



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## SECTION 1. GENERAL PROVISIONS

### 1.1 Definitions

As used within this Manual, except where otherwise specifically defined or unless the context or subject matter clearly otherwise requires, the following terms, phrases words, and their derivations shall have the following meanings:

1. AASHTO: American Association of State Highway and Transportation Officials.
2. AADT: Annual Average Daily Traffic; it is the total volume of vehicle traffic of a highway or road for a year divided by three-hundred sixty-five (365) days. AADT is a useful and simple measurement of how busy the road is. It is also sometimes reported as "average annual daily traffic."
3. ADT: Average daily trips made by vehicles or persons in a twenty-four (24) hour period.
4. Applicant: Any individual or entity seeking a permit required by these standards.
5. Approach: The constructed road surface and associated drainage improvements extending from the point at which a road surface, ramp, or driveway enters the right-of-way of another road in order to create an access point or intersection; for example, where a driveway meets a constructed road or where a local access road intersects another road.
6. Boulevard: An area of public road right-of-way or private easement between the edge of the street or road, whether curbed or not, and the sidewalk.
7. BST: Bituminous Surface treatment.
8. Certified Installer: Contractor, landowner, or landowner's representative certified by Public Works to install approaches onto roadways within the jurisdiction of Lewis and Clark County Public Works.
9. Commission: The Board of County Commissioners of Lewis & Clark County, Montana.
10. Competent Person: The term "competent person" is used in many OSHA standards and documents. An OSHA "competent person" is defined as "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them." 29 CFR 1926.32(f). By way of training and/or experience, a competent person is knowledgeable of applicable standards, is capable of identifying workplace hazards relating to the specific operation, and has the authority to correct them. Some standards add additional specific requirements which must be met by the competent person.
11. Contractor: An individual, general contractor, subcontractor, firm, association, company, partnership, corporation, limited liability partnership, or limited liability company engaged in construction services who has signed a construction contract with an owner.

12. County: Lewis & Clark County, Montana.
13. County Road: any and all ways, roads, rights of way and other general terms denoting a public way for purposes of vehicular travel and include the entire area within the right-of-way as follows:
- (a) A road petitioned by freeholders, approved by resolution, and opened by the Governing Body in accordance with Title 7, MCA;
  - (b) A road dedicated for public use and approved by resolution by the Governing Body;
  - (c) A road acquired by eminent domain and accepted by resolution as a county road by the Governing Body;
  - (d) A road gained by the County in exchange with the State;
  - (e) A road for which a legal route has been recognized by a district court as provided in Mont. Code Ann. § 7-14-2622;
  - (f) A road acquired by adverse use by the public and accepted by the County; or
  - (g) A road accepted by resolution which has been laid out, constructed, and maintained with state department of transportation or county funds.

“County Road” refers to a road within the County’s jurisdiction regardless of whether the road is maintained by the County.

14. Cul-de-sac: A circular turnaround located at the end of a dead-end street.
15. Developer: A person, partnership, company, or corporation that engages in the conversion of land from one use to another. (Referred to as Subdivider in Lewis & Clark Subdivision Regulations).
16. Director: The Director of the Lewis & Clark County Public Works Department, or designated representative.
17. Driveway: An access point onto a road that services a residential or non-residential parcel of land.
18. Easement: See definition for public right-of-way.
19. Encroachment: Any object, personal property or improvement, including but not limited to, trees, landscape rocks, debris, signs, mailboxes, fences, or private utilities placed, built, or located within a county road or public right-of-way.
20. Engineer: A person licensed in conformance with Title 37, Chapter 67, MCA, to practice engineering in the state of Montana.
21. Excavation: Removing, cutting into, and boring under or in any way disturbing the existing road, ditch, or other material within a public right-of-way.

22. Governing Body: The Board of County Commissioners of Lewis and Clark County, Montana.
23. Hammerhead: An alternative to the cul-de-sac turnaround at the end of a dead-end street. A hammerhead consists of two opposite extensions of the dead-end road resembling a double-headed hammer that allows vehicles to turn around and exit in a forward-facing position.
24. Intersection: As defined by Section 61-8-102(2)(i)(i), MCA, "The area embraced within the prolongation or connection of the lateral curb lines or if there are no curb lines then the lateral boundary lines of the roadways of two highways that join one another at or approximately at right angles or the area within which vehicles traveling upon different highways joining at any other angle may come in conflict." MCA: Montana Code Annotated.
25. MPWSS: Montana Public Works Standard Specifications.
26. NACTO: National Association of City Transportation Officials
27. Permittee: A property owner or the property owner's designated agent who has been issued a permit as defined herein.
28. Public Improvements: Any structure, piece of infrastructure or facility constructed to serve the residents of a subdivision or the general public, such as parks, streets or roads, sidewalks, curbs and gutters, street lighting, utilities, and systems for water supply, sewage disposal, fire suppression, and drainage.
29. Public Right-of-Way: An interest in property, also called an easement, often depicted or described on a deed, survey, subdivision plat, or other document filed with the Lewis and Clark County Clerk and Recorder as a strip or area of land including surface, overhead or underground, created for construction and maintenance of highways and other public roadways or to provide access, including but not limited to drainage ditches or storm water retention; electric power, telephone and fiber optic lines; water, sewer, other pipelines, and or other utilities.
30. Road or Roadway: Improvements generally meant to carry vehicular traffic and located within a right-of-way.
31. Segment: A section of road between one (1) road intersection and the next closest road intersection. A segment of road does not include sections of roads outside the jurisdiction of the County.
32. Shared Access: A driveway used by more than one (1) lot; this is generally seen where two (2) or more lots share a common boundary, abut the same road, and use one (1) approach rather than utilizing individual approaches.
33. Sidewalk: Any improvement intended exclusively for pedestrian use that may be located within a public or private right-of-way and may be constructed in combination with concrete curb and gutter improvements.

34. Stormwater Runoff: That part of precipitation (rain or snowmelt) that flows over the land without infiltrating into the soil or being absorbed by plant material.
35. Surveyor: A person licensed in conformance with Title 37, Chapter 67, MCA, to practice surveying in the state of Montana.
36. Swale: A drainage channel or depression that collects or directs surface water.
37. Topography: General term to include characteristics of the ground surface such as plains, hills, mountains, degree of relief, steepness of slope, and other physiographic features.
38. Traveled Way: The portion of roadway for the movement of vehicles, exclusive of shoulders, berms, ditches, sidewalks, and parking lanes.
39. USCS: Unified Soil Classification System.

## 1.2 Applicability

The standards contained within this Manual shall be applicable to:

1. The construction and maintenance of roads, appurtenant structures, and utility facilities built within public rights-of-way.
2. The construction of all new approaches, existing approaches or where property improvements or development require approval of the Public Works Department.
3. The erection or placement of all new traffic control signs, mailboxes, and appurtenant structures within public rights-of-way.
4. Nothing in this Manual shall be construed to require that the County undertake to construct, reconstruct, widen, maintain, or improve a road within the public rights-of-way to the standards and specifications contained in this Manual.
5. Nothing in this Manual shall be construed to require that those portions of new or existing private roads or approaches outside public rights-of-way in the County, be constructed, reconstructed, widened or improved to the standards and specifications contained in this Manual.
6. Nothing in this Manual shall be construed to obligate the County to accept any new or existing public or private road rights-of-way for maintenance, regardless of the standards and specifications used for the construction of such roads.
7. Maintenance of all public rights-of-way within the County is determined by the County per Section 7-14-2103 MCA.

Documents attached as appendices to this manual are current as of the adoption of this manual. Updates to the documents contained in the appendices shall be superseded as they are adopted by the Lewis and Clark County Commission. Updated documents will be posted on the applicable page of the Lewis and Clark County Website.

### **1.3 Standard Specifications**

Except where these standards provide otherwise, design, workmanship and materials shall be in accordance with the current edition of the following specifications, regulations and guidelines:

1. Standard Specifications: The standards for County roads and bridges, and all other construction within the public right-of-way, shall consist of:
  - a. The County Road Design Standards (Section 4);
  - b. The Lewis & Clark County Bridge Standards; and
  - c. The current published edition of the Montana Public Works Standard Specifications (MPWSS) published by the Montana Contractor's Association.
2. Reference Standards: To implement the above standards, the following publications shall apply:
  - a. The current version of the Montana Roadway Design Manual, published by the MDT;
  - b. The current version of the Standard Specifications for Road and Bridge Construction, published by the MDT;
  - c. The current version of the Policy of Geometric Design of Highway and Streets, published by the American Association of State Highway and Transportation Officials (AASHTO);
  - d. The current version of the Manual on Uniform Traffic Control Devices (MUTCD), published by the Federal Highway Administration;
  - e. Roadside Design Guide, published by AASHTO;
  - f. Standard Specifications for Highway Bridges, published by AASHTO;
  - g. Applicable rules, regulations, and resolutions, adopted by the Commission; and
  - h. County Subdivision Regulations in effect at the time the preliminary subdivision application is determined to be complete and sufficient.
3. In the event of conflict with any of the specifications listed in Section 4 of the County Public Works Manual, the Public Works Department shall specify, in writing, which of the standard specifications will apply.

### **1.4 Applicable Laws, Safety and Indemnification of Lewis & Clark County**

1. Any Contractor working within a public right-of-way or any other County property shall give all notices, obtain all permits, and comply with all federal, state and local laws, ordinances and regulations affecting the conduct of the work, and shall indemnify and hold harmless the County and its representatives against any claim or liability arising from, or based on, the violation of any such law, ordinance, regulation, etc., whether by

Contractor, Contractor's Subcontractor, Supplier or Permittee, or any of their employees or agents (all herein referred to as Contractor).

1. The Contractor shall follow all rules and regulations of federal, state, and local health officials. The Contractor shall not require an employee to work in surroundings, or under conditions that are unsanitary, hazardous or dangerous to health or safety. The Contractor shall admit any Occupational Safety and Health Administration (OSHA) inspector or other legally responsible agency involved in safety and health administration without delay and without presentation of an inspection warrant to all areas of the work, project site, County property, or right-of-way upon presentation of proper credentials.
2. The Contractor shall comply with and enforce all federal, state, and local safety standards for Contractor's employees on the project, protecting and indemnifying the County and its representatives from all claims, suits, damages or liabilities from all accidents or safety violations, and ensuring the public's safety.
3. All Contractors working within a public right-of-way or County property, either contracted by the County or permitted by the County shall adhere to all OSHA, Montana Department of Labor and Industry, or other industry standard safety requirements. At a minimum a Contractor will have a competent person onsite at all times while work is being done. It is the Contractor's responsibility to ensure that all work is being completed in a safe and hazard-free manner.
4. If requested by the County, the Contractor will provide paperwork on all competent persons.
5. The County reserves the right to stop work if at any time the County observes a safety concern. This concern will be addressed by the Contractor's competent person immediately and before any work can continue. It is the competent person's responsibility to properly determine how to address and eliminate the safety concern. The County will not direct the Contractor on the means or methods of how to address the safety concern or how to safely construct the project.
6. If the Contractor disagrees with the County and continues working in an unsafe manner or does not have a competent person on site, the County is obligated to report this concern to the proper authority and wait for their recommendations on how to proceed. The County reserves the right to stop work at any time for any reason.
7. If the Contractor is frequently observed violating safety regulations throughout the course of a project the County reserves the right to revoke all permits, contracts or agreements and stop work indefinitely. The County may remove any installations and return public right-of-way or County property to pre-construction condition; all costs are the responsibility of Contractor.

The Contractor will not be re-issued a permit or be given authority to perform work on County property until an extensive review has been completed by OSHA, Montana Department of Labor and Industry, or other relevant safety agency. The



Contractor will provide paperwork showing that all employees working on site have been properly trained by a certified third party safety trainer and have been issued all relevant certifications necessary to continue the work.

The County reserves the right to hire a third party safety inspector to oversee the project at the cost of the Contractor, if and when the project is re-permitted.

The County reserves the right to require higher insurance limits and bonding for the duration of the project. The County may also require a third party risk audit of all accidents and safety violations the Contractor has had in the recent past, at the cost of the Contractor, to determine the proper increases in insurance and bonding requirements.

## 1.5 Permitting and Fees

1. Any proposed project that occurs in or near an intermittent or perennial natural water body is subject to review and approval by various local, state, and federal agencies. To ease the permitting process, many agencies use the "Joint Application for Proposed Work in Montana's Streams, Wetlands, Floodplains and Other Water Bodies," and is available from the following source:

Helena Regional Office  
1424 Ninth Avenue  
P.O. Box 201601  
Helena, Montana 59620-1601  
Phone: (406) 444-6999  
<http://dnrc.mt.gov/Permits/StreamPermitting/JointApplication.asp>

The County does not review this application nor does it issue any permit for working in or near water bodies. Any individual performing work in the vicinity of a natural water body should contact the agencies listed on the joint application to determine which permits are applicable to their project.

2. Any construction activity which results in the disturbance equal to or greater than one (1) acre of total land area will need to obtain permit coverage from the Montana Department of Environmental Quality (Montana DEQ) with the "General Permit for Storm Water Discharge Associated with Construction Activity," available from the following source:

Montana DEQ Office  
Lee Metcalf Building  
1520 East Sixth Avenue  
Helena, MT 59601  
Phone: (406) 444-2544  
<http://www.deq.state.mt.us/wqinfo/MPDES/StormwaterConstruction.asp>

The County does not review this application nor does it issue any permit for stormwater discharge permits. When the permit is issued by the Montana DEQ, the Contractor shall

submit the approved Storm Water Pollution Prevention Plan (SWPPP) to the County. The County will use this permit as a reference during routine County inspections of the project. The County may notify or file a complaint with DEQ if significant negligence or gross violations are noted and not immediately corrected.

## **1.6 Modification Process**

The policies, procedures and standards contained herein are to be used to ensure the uniformity of all work done within Lewis & Clark County. As policies, procedures and standards change within the Public Works Department this document will change accordingly. Modification to this Manual will follow the basic guidelines:

1. The Public will be notified in accordance with state statute;
2. A fourteen (14) day public review process will commence after proper notification has been given; and
3. Final changes will be presented by the Public Works Department to the Commission during one of its regularly scheduled public meetings, for a public hearing; and
4. The Commission will decide whether or not to approval the presented changes.

## **1.7 Severability**

Where any word, phrase, clause, sentence, paragraph, section, or other part of these regulations is held invalid by a court of competent jurisdiction, such judgment shall affect only that part held invalid.

## **SECTION 2. APPROACHES**

The County requires an approach permit prior to the construction of a new or improved approach that provides access to or from a County Road or public right-of-way. A permit is required to ensure that the proposed approach, when constructed, meets certain standards set forth in this Section. To further ensure that the standards are met, the Public Works Department requires the landowner to contract with a County-certified approach installer as defined in this Section. These approach standards and permit process are required for the County to prevent degradation of existing public infrastructure. An example of an Approach Permit Application is provided on the County website.

### **2.1 Permits and Fees**

All new or improved approaches onto public rights-of-way require an approach permit issued by the Public Works Department. No construction in a public right-of-way will be allowed until an approved approach permit has been issued.

Once an approach permit is issued, the Permittee has twelve (12) months to install the approach. Failure to install the approach within the twelve (12) month period voids the permit and reapplication is necessary.

Any person or entity making application for permission to construct an approach into a public right-of-way shall pay the current fee for each approach permit to the Permit Coordinator. Current fee schedules are available from the Public Works Department or the Community Development and Planning Department.

### **2.2 Certified Installer**

Approaches shall only be installed by persons that have been certified by the Public Works Department as having training and experience necessary to properly install approaches that meet safety, drainage, and durability standards. The Public Works Department provides a certification class that interested installers must attend for certification. Certified installers shall meet all requirements set forth by the Public Works Department for certification.

### **2.3 Construction Costs**

The Permittee and/or Applicant shall be responsible for all costs associated with the construction of the approach and any appurtenances on the public road.

## **2.4 Number and Arrangement of Approaches**

The location, number and configuration of all approaches to public roads requested by the Permittee and Applicant are subject to the approval of the County. The number of approaches should be the minimum number to provide access to the property.

## **2.5 Maintenance**

The County reserves the right to make any changes within the public right-of-way. However, nothing in this Section shall be construed to require the County to perform maintenance or repairs on approaches within public rights-of-way. Maintenance and/or repairs of private approaches deemed necessary by the County shall be the responsibility of the Permittee/Property Owner who uses that approach.

## **2.6 Indemnification**

The Permittee/Property Owner shall hold harmless and indemnify the County and its duly-appointed agents and employees against any action for personal injury or property damage sustained by reason of the exercise of the permit.

## **2.7 Design and Layout of Approaches**

The County has the sole discretion of determining the most suitable design and layout of all approaches to public rights-of-way. The design and geometric layout should be in accordance with the following requirements and as shown in Figure 6 of Appendix A:

1. All materials must be inspected and approved by the County.
2. Sight distance must be provided as required by AASHTO.
3. The approach grade shall conform to the slope of the roadway shoulder where practical and if possible be equal to or less than three (3%) percent slope for a distance of twenty (20') feet back from the public road surface unless otherwise directed by the County.
4. The approach shall intersect the public road at an angle of ninety (90) degrees (plus or minus ten (10) degrees) to the roadway.
5. Individual residential approach widths shall be between twelve (12') feet and thirty (30') feet. Shared residential or multifamily approach widths shall be between twelve (12') feet and forty (40') feet. Approaches exceeding these limits may be approved on a case-by-case basis if an engineered design is provided. Approach width is not inclusive of any radius between the approach and the public road. Approaches shall be no wider than necessary to serve the engineering design requirements of the access purposes of the property use.
6. Approaches for driveways and roadways shall be constructed from the edge of the traveled way the approach accesses to the boundary of the road right of way.

7. Vertical clearance of fourteen and one half (14½') feet shall be maintained for the full width of the approach on local roads. Vertical clearance of sixteen and one half (16½') feet shall be maintained for the full width of the approach on major and minor collector roads (refer to section 4.2 for road classifications).
8. Approaches must be constructed in accordance with the current County Road Section Requirements for construction specifications (Section 4.5).
9. When an approach accesses a hard-surfaced arterial, collector, or minor collector, the approach must be built with hard surfacing. Hard surfacing can be accomplished with either concrete or asphalt.

For gravel public roads and hard surfaced low traffic volume (less than 400 ADT), low speed (30 mph or lower) roads within subdivisions, hard surfacing of the approach is not required but the approach must be constructed with an approved crushed material over an approved base material. If subdivision covenants or an RID require hard surfacing, the approach must conform to these requirements.

10. The return radius between the approach and the public road shall be sufficient to accommodate the largest AASHTO design vehicle anticipated to regularly access the facility. At a minimum, the radius for a driveway serving a single-family residence or two-family residence shall ten (10') feet unless otherwise approved by Public Works staff. The minimum curb radius for a driveway serving a multi-family residential project, a commercial or institutional development, and a road or street shall be determined by a qualified engineer based on the design vehicle criteria and drainage considerations.
11. Non-residential driveways approaching hard surfaced public roads are required to provide hard surfacing for the length and width of the approach within the right-of-way. Hard surfacing shall be an engineered design to meet necessary loading and site-specific requirements, but at a minimum shall be constructed within the right-of-way as follows:
  - a. Concrete of sufficient thickness to provide adequate support for the largest AASHTO design vehicle anticipated to regularly access the facility over an approved base material; or
  - b. Asphalt of sufficient thickness to provide adequate support for the largest AASHTO design vehicle anticipated to regularly access the facility and over an approved base material.
  - c. The radius between the approach and the public road shall be of sufficient length to accommodate the largest AASHTO design vehicle anticipated to regularly access the facility.
12. Non-residential approaches to a graveled public road shall be an engineered design to meet necessary loading and site-specific requirements.
13. All approaches shall meet sight distances as required by AASHTO. The minimum spacing between an approach edge and a street intersection centerline shall meet AASHTO recommendations. At a minimum, the near edge of an approach must be at least forty

(40') feet from the near edge of an approach on an adjacent property (forty-five (45') feet on collectors).

14. For either adjacent new approaches or where a new approach may be adjacent to an existing approach, a shared access may be required by the County.
15. Existing drainage in the public right-of-way shall not be altered or impeded without specific approval from the County on the approach permit.
16. Drainage from an adjacent driveway, private road, or structure is not allowed to discharge onto the public road. For this reason, drainage structures designed to keep stormwater drainage in the ditches of the public right-of-way may be required by the approach permit. When drainage structures are required, the specific size of the opening, length of pipe or other design features shall be as noted on the approach permit.
17. All culverts used in the construction of an approach in a public right-of-way must have the minimum diameter specified in Table 4.1 unless a smaller diameter culvert is specified on an engineered drainage plan and/or is approved by the Public Works Department and must be either double-wall smooth interior high-density polyethylene (HDPE), corrugated metal pipe (CMP) or reinforced concrete pipe (RCP) or other approved similar material. Flared end terminal sections or adequate end treatments (riprap) are required and as directed by the County. The minimum amount of cover material over the culvert shall be that recommended by the culvert manufacturer.

## **2.8 Design and Geometric Requirements**

Approaches shall meet the dimensional standards contained in Appendix A Figure 6 – APPROACH DIMENSIONAL STANDARDS.

## **2.9 Covenants, Zoning and Other Restrictions**

An approach permit will not be issued unless it complies with County covenants, zoning, stormwater drainage plans, subdivision conditions, institutional controls, and floodplain regulations-

## **2.10 Penalty/Enforcement**

If the County determines an approach is not in substantial compliance with these standards, the Permittee/Property Owner(s) of the approach will be notified and allowed to correct the deficiency. If the deficiency is not addressed within thirty (30) days, either by corrective action or by notifying the County of a proposal for corrective action, the County will treat the unpermitted or non-compliant approach as an encroachment and will take appropriate action to remedy the situation in accordance with Sections 7-14-2134 through 7-14-2138, Mont. Code Ann. §.

## **SECTION 3. ENCROACHMENTS**

### **3.1 Encroachment Permits**

Encroachments are any object, personal property or improvement, including but not limited to, trees, landscape rocks, debris, signs, mailboxes, fences or private utilities placed, built or located within A County Road or public right-of-way. Encroachments in a County Road or public right-of-way may be allowed at the discretion of the Public Works Director, with the issuance of an encroachment permit (an example of the Encroachment Permit Application is on the County website). No encroachment will be allowed that will interfere with the public's safe use of the easement or hinder the County's ability to maintain the public right-of-way. The County reserves the right to revoke an encroachment permit or not issue an encroachment permit where the encroachment is deemed to be a threat to public safety, interfering with maintenance, or a public nuisance. The County may require the removal of any encroachment, in accordance with Sections 7-14-2134 through 7-14-2138, MCA, and the following County procedures:

1. When provided notice or upon discovery of an encroachment that does not block any portion of the traveled way and is not considered to be an imminent threat to public health or safety, the County will provide written notice of the encroachment to the property owner and the encroachment shall be removed within fourteen (14) days. If the property owner does not remove the encroachment within fourteen (14) days, the County may proceed with removal of the encroachment in accordance with MCA statutes.
2. When provided notice or upon discovery of an encroachment that does not block any portion of the traveled way but is considered to be an imminent threat to public health or safety, the County may remove the encroachment immediately in accordance with MCA.
3. When provided notice or upon discovery of an encroachment that blocks any portion of the traveled way, the County will remove the encroachment immediately in accordance with MCA.
4. If any encroachment is attributable to an individual or group, costs incurred by the County for the removal of the encroachment will be recovered by methods allowed by law.

### **3.2 Mailboxes**

Mailboxes often encroach in the County Road or public right-of-way and are considered an encroachment; however, to accommodate the efficient delivery of mail, an exception is granted, to the encroachment permit requirement, to allow for the installation of a mailbox without a permit as long as the mailbox is installed in substantial compliance with the United States Postal Service (USPS) and County standards. If you are installing a mailbox within the public right-of-way, please be aware of the following:

1. A mailbox is allowed without a permit as an understood necessity if installed according to the United States Postal Service (USPS) design standards. For a list of the USPS mailbox standards, please see/contact the USPS Postmaster.
2. If an installed mailbox is not in substantial compliance with USPS standards, the owner of the mailbox will be notified and the deficiency must be corrected within fourteen (14) days of the date on the notice. If the deficiency is not corrected within the prescribed time frame, the mailbox will be declared an encroachment and will be removed in accordance with Section 3.1 of these standards. The County may treat mailboxes as an encroachment if the mailbox interferes with the public's safe use of the public right-of-way or the mailbox hinders the County's ability to maintain the public right-of-way. The County reserves the right to require the removal of a mailbox, like any other encroachment, if it is a threat to public safety, interfering with maintenance, or a public nuisance.
3. The County is not responsible for the installation, maintenance or replacement of mailboxes within the public right-of-way, with one exception:
  - a. If a mailbox is damaged by County maintenance equipment and if there is sufficient evidence that any piece of maintenance equipment came into physical contact with the mailbox or post, the County may repair or replace the mailbox or post. Mailboxes replaced by the County will be a standard sized mailbox and post in accordance with USPS standards. No custom-made installations or repairs will be completed by the County.

A mailbox damaged by the force of snow being pushed off the road will not be repaired or replaced by the County.

4. The County will review the installations of cluster mailboxes on a case by case basis and work in cooperation with the USPS to determine suitable locations for mailbox clusters.
5. On collectors and arterials, mail delivery will occur outside the travel way. Where a turnout is used, it shall comply with the requirements for turnouts in Section 4.8. If the shoulder is ten (10') feet wide or more in width, a turnout is not necessary. No turnout may be constructed without approval of the managing road authority. Responsibility for maintenance of the turnout shall be by the rural improvement district, if one exists or is required.
6. If several property owners are served by a local road that intersects an arterial or collector, the mailboxes shall be installed in a turnout off of the local road, rather than off the more heavily traveled arterial/collector.
7. Authority to approve mailboxes rests with the USPS. Mailbox design and support systems shall also meet the crash test requirements of the Federal Highway Administration.



## **SECTION 4. ROAD DESIGN STANDARDS**

### **4.1 General**

Construction of new roads or reconstruction of existing roads in the County shall conform to the standards set forth in this section. Roads must be designed to provide safe and adequate passage for vehicular, pedestrian and non-motorized traffic and ensure proper drainage, including surface crown, culverts, curbs and gutters, drainage swales and storm drains. All applicable standard drawings for County design requirements are available in Appendix A. In case of conflict between these regulations, MPWSS, or AASHTO regarding road standards the order of precedence is as follows:

1. County Public Works Manual
2. AASHTO
3. MPWSS

### **4.2 Road Classification**

The purpose of a functional classification system for roads is to provide for the safe and efficient movement of people and goods while preserving residential areas and maintaining the economic vitality of commercial and industrial areas. This system classifies transportation facilities according to an appropriate integrated network. It is intended to link land use development activities with transportation facilities for optimum utilization of both. The County's functional classification system is intended to be in compliance with the Federal classification system. Roadways within the county are functionally classified as:

1. Minor Local Road (Gravel): Roadways used primarily for direct access to residential, commercial, industrial, or other abutting property. The annual average daily traffic (AADT) is projected to be 1 - 400.
2. Local Road: Roadways used primarily for direct access to residential, commercial, industrial, or other abutting property. The annual average daily traffic (AADT) is projected to be 401 - 1,500.
3. Minor Collector: Minor collector streets serve the dual functions of distributing traffic between local roads, major collectors and arterials, and provide access to abutting properties. Therefore, higher traffic volumes and higher speeds are the norm. Minor collector streets typically carry average daily traffic volumes of 1,501 - 3,500 AADT. Minor Collector streets connect arterial networks and neighborhoods to commercial areas; fixed route transit service is low while bicycle and pedestrian activities range from moderate to high.
4. Major Collector: Major collector streets serve the dual functions of distributing traffic between local roads, minor collectors and arterials, and provide access to abutting properties. Therefore, higher traffic volumes and higher speeds are the norm. Major collector streets carry average daily traffic volumes greater than 3,500 AADT. Major

collector streets connect arterial networks and neighborhoods to commercial areas; fixed route transit service is low while bicycle and pedestrian activities range from moderate to high.

5. **Arterial:** That part of the roadway system serving as the principal network for through traffic flow. The routes connect areas of principal traffic generation and important rural highways entering the City of Helena, East Helena, Lincoln, and Augusta. If an arterial roadway standard is needed, the Montana Department of Transportation (MDT) standards for the appropriate roadway shall be used.

Note: Annual average daily counts (AADT) ranges used in the above functional class descriptions are intended to be used for guidance purposes only. Some local roads and collectors in the County may have traffic counts that are higher or lower than their functional class indicates.

### 4.3 Design Controls & Criteria

1. **Plans for Construction of Roads:** Prior to construction plans and specifications for street and utility construction, designed by a Montana Registered Engineer, must be submitted to the Public Works Department for review and approval. The plans and specifications shall include a vicinity map, a plan and profile, special provisions, reference to the standards specifications, and the typical sections designed to meet the specific project needs and conditions.
  - a. **The Plan:** The 11" x 17" submittal plan shall include: the road alignment at a scale of not less than one (1") inch to one hundred (100') feet showing centerline stationing on all intersecting streets, with bearings on centerlines; curve data on all horizontal curves; right-of-way; relevant topography; existing and proposed utility locations; street names in the development and adjoining the development; typical roadway section showing placement of utilities; existing and proposed drainage and stormwater features; sidewalk ramp locations; floodplain and wetland boundaries; signalization, channelization, striping, and signing; and further data as may be required by the County.
  - b. **The Profile:** The profile shall show: the relevant original ground lines using the same stationing as in the plan; control elevations; grade line showing the proposed grades; vertical curves; all benchmarks; the vertical datum; and such further information as may be reasonably required. For new roads, the relevant original ground lines will show the ground line at centerline at a minimum and also at the edges of the right-of-way if grade differences are significant (or alternatively surveyed contour lines on the plan view). For existing roads, the Design Engineer shall provide elevations at the edge of the existing pavement or back top of curb, whichever is applicable. The profile lines for roads extending to the perimeter of any development shall be extended a minimum of three hundred (300') feet

beyond the perimeter to include any change in contours, which would affect the profile of the extension of the proposed road.

- c. **Special Provisions:** Any special technical provisions shall be shown or referenced on the plans and shall be written in accordance with the MPWSS.
  - d. **Format:** The cover sheet of all plans shall include a statement identifying, which standard specifications will apply to the project. Plan and profile may be shown on the same sheet with profiles shown on the bottom half of the sheet. Submitted sheets shall measure 11" x 17" based on being a true half (1/2) size of a 24" x 34" drawing. The 24" x 34" original (not submitted) drawing shall have a borderline of three-fourths (3/4") inch on the left side of the length of the sheet and one-fourth (1/4") inch on remaining sides, so that the true 11" x 17" drawing is proportioned correctly. When more than two (2) plan sheets are used, an overall development layout shall be submitted showing the relationship of roads and utilities.
  - e. **Directional Arrow:** A north arrow shall be shown on each plan view sheet and adjacent to any other drawing, which is not, oriented the same as other drawings on the sheet.
  - f. **Font Size:** Letter size shall not be smaller than eight (8) point type for the submitted 11" x 17" drawing.
  - g. **Detail Drawings:** All detail drawings, including standard drawings, shall be included.
  - h. **Title Block:** A title block shall appear on each sheet of the plan set and shall be placed in the lower, right-hand corner of the sheet, across the bottom edge of the sheet or across the right-hand edge of the sheet. The title block shall include the name of the project, the engineering firm, the sheet title, and the owner.
2. **Design Criteria:** The County Road Design Standards are summarized in Table 4.1 and the following sections. These standards are intended for normal conditions. The County may require higher standards for unusual site conditions.
  3. **Changing Grades:** Continuous grade changes, or "roller-coastering", shall not be permitted. Grade breaks in lieu of vertical curves are permissible if the algebraic difference in grade (A) does not exceed 1.00%.
  4. **Vertical Curves:** All vertical curves shall be symmetrical. Refer to Table 4.1 for design criteria.

**Table 4.1 - County Road Design Standards**

Standard	Terrain	Major Collector	Minor Collector	Local Road
Design Speed (MPH)	Level	55	50	30
	Rolling	45	40	25
	Mountainous	45	30	20
Min. Curve Radius at Centerline	Level	Per AASHTO	575	250
	Rolling	Per AASHTO	440	175
	Mountainous	Per AASHTO	300	110
Min. Stopping Sight Distance (ft)	Level	Per AASHTO	425	200
	Rolling	Per AASHTO	305	150
	Mountainous	Per AASHTO	200	110
Max. Grade	Level	Per AASHTO	6%	6%
	Rolling	Per AASHTO	8%	9%
	Mountainous	Per AASHTO	10%	11%
Length of Max. Grade		Per AASHTO	Per AASHTO	Per AASHTO
Minimum Grade		0.5%	0.5%	0.5%
Super Elevation		Per AASHTO	Per AASHTO	Not Allowed
Min. Vertical Curve "K" Value		Per AASHTO	Per AASHTO	Per AASHTO <sup>1</sup>
Min. Road Intersection Spacing (ft)		500	275	150
Min. Driveway Edge - Intersection $\Phi$ Spacing (ft)		Per AASHTO	Per AASHTO	Per AASHTO
Min. Driveway - Driveway Spacing (ft)		Per AASHTO, 45 min.	Per AASHTO, 45 min.	Per AASHTO, 40 min.
Max. Dead End Length (ft)		Not Allowed	Not Allowed	See Section 4.7
Min. Radius of Cul-de-Sac Turn Around (ft)		Not Applicable	Not Applicable	48
Sight Distance Triangle (ft)	Level	300	255	120
	Rolling	210	170	95
	Mountainous	210	120	80
Min. Right-of-Way Width (ft)		100	80	60
Min. Right-of-Way Radius of Cul-de-Sac Turn Around (ft)		N/A	N/A	60
Vertical Clearance (ft)		16.5	16.5	14.5
Intersection Return Radii (ft) with or w/o curb		Per AASHTO	25	15 <sup>2</sup>
Min. Sidewalk Width (ft)		5	5	5
Sidewalk Offset from Back of Curb (ft)		Per AASHTO	Per AASHTO	5
Bike Lane Width (ft)		Per AASHTO	Per AASHTO	Not Applicable
Min. Culvert Diameter (in)		18	15	15
Min. Culvert Cover		Meet or Exceed Supplier Recommendation	Meet or Exceed Supplier Recommendation	Meet or Exceed Supplier Recommendation
Min. Culvert Grade		0.5%	0.5%	0.5%
Culvert Material		Support HL-93 Loading	Support HL-93 Loading	Support HL-93 Loading

See AASHTO Geometric Design of Highways and Streets, most current Edition

<sup>1</sup> The AASHTO Geometric Design of Very Low-Volume Local Roads (VLVLR) may be applied if 25-year ADT projections are below 400 ADT.

<sup>2</sup>Excludes driveway approaches. Refer to section 2.7 for driveway approach requirements.

#### 4.4 Road Surfacing Design Standards

The County provides two (2) methods for road surfacing design utilizing Uniform Road Design or Engineered Design. These options apply only to the structural section of the road. The profile and section shapes are controlled by the County Road Design Standards. The Uniform Road Design allows for use of a standard County pre-approved road section. The Uniform Road Design is based on new road construction with new materials. Reconstructing or rehabilitating an existing road may require an Engineered Design. Engineered road sections shall be in accordance with the latest edition of the American Association of State Highway and Transportation Officials (AASHTO) *Guide for Design of Pavement Structures* (preferred), *Asphalt Institute Manual Series No. 1 (MS-1)*, or other method. Other methods must be pre-approved by the County Engineer prior to undertaking the surfacing design.

1. Uniform Road Design Standards

a. Local Road #1 Uniform Road Design Standard

Table 4.2 depicts the process for developing a Uniform Road Design for a new Local Road #1. If the input parameter is exceeded, the Engineer shall prepare an Engineered Design. As shown in Table 4.2, the limiting criteria for Local Road #1 are the daily number of heavy trucks. If the trucks exceed fifty (50) trips per day on the road, then the road shall be an Engineered Design. In all cases, the designer shall have the option to provide an Engineered Design equivalent for County approval if the designer so chooses not to use the County’s Uniform Road Design.

**TABLE 4.2 - Uniform Road Design – Local Road #1**

Estimated Daily Number of Heavy Trucks *	Subgrade Condition	Subbase Requirement (inches)
0 to 5	5 < CBR < or = 9	None
	10 < CBR < or = 19	None
	CBR > 20	None
6 to 10	5 < CBR < or = 9	6
	10 < CBR < or = 19	None
	CBR > 20	None
11 to 25	5 < CBR < or = 9	6
	10 < CBR < or = 19	6
	CBR > 20	None
26 to 50	5 < CBR < or = 9	8
	10 < CBR < or = 19	6
	CBR > 20	6
Greater Than 50	NA	Note (1)

- Trucks Classified as FHWA Class 5 or Greater. Class 5 Trucks Are Single Unit Trucks with Two-Axles and Six-Tires
- Note (1) - Provide an Engineered Design

b. Uniform Road Design Standard for Local Road #2, Minor & Major Collectors

Use of the County's Uniform Road Design Standard for a new Local Road #2, Minor Collector #3, and Major Collector #4 includes determining the road's Equivalent Single Axle Loads (ESALs) for the design (performance period), and an assessment of the subgrade condition.

Local Road #2, Minor Collector #3, and Major Collector #4 as shown in Appendix A will be acceptable for a new road constructed under that classification if the ESALs for the twenty (20) year performance period is one hundred twenty thousand (120,000) or less, and the minimum subgrade CBR is thirteen (13) or greater.

In all cases, the designer shall have the option to provide an Engineered Design for County approval. If the new road has more than the 120,000 ESALs, or has subgrade CBR values less than thirteen (13), then the Engineer shall provide an Engineered Design.

2. Engineered Road Design Standards These specifications are the County's minimum standards for engineering new or reconstructed road sections. The engineered design must be based on the available material components, either native or imported, to build the road, site conditions, and traffic loading.
  - a. Engineered designs shall use a performance period per Table 4.5 when determining the ESAL's and proposed overall structural number. Calculations for a 30-year performance period shall also be submitted for comparison purposes. Provide all calculations to the County for review. The performance periods in Table 4.5 are minimum requirements and may be increased based on projected traffic trends.
  - b. Roadway Typical Sections: The minimum surfacing thickness for paved roads in the County is three (3") inches compacted bituminous surface course. The use of existing materials or nonstandard surfacing components in the structural section must be supported by engineering analysis and is subject to County approval prior to implementation. In all cases, the shoulder width shall be adjusted to maintain the proper road surface taper as indicated in Note B of Figures 1 through 4 of Appendix A.
  - c. Material Components: Table 4.3 summarizes the County's accepted structural coefficients for the material indicated.

**TABLE 4.3 - Structural Coefficients of Compacted Material**

New/Virgin Material		Existing Material	
Surfacing Material	Coefficient (Per Inch)	Surfacing Material	Coefficient (Per Inch)
Plant Mix Bituminous Surfacing	0.41	Plant Mix Bituminous Surfacing	0.33
Multi-shot BST	0.25	-	-
Crushed Aggregate Surfacing	0.14	Crushed Aggregate Surfacing	0.12
Crushed Base Course	0.14	Crushed base Course	0.12
Subbase Course	0.07-0.14*	Subbase Course	0.07
Milled Plant Mix Surfacing	0.12	Milled Plant Mix Surfacing	0.12
Rejuvenated Milled Plant Mix Surfacing (<1 year old)	0.18	Rejuvenated Milled Plant Mix Surfacing (>1 year old)	0.15
Pulverized Plant Mix Surfacing Mixed w/Crushed Base Course	0.12	Pulverized Plant Mix Surfacing Mixed w/ Crushed Base Course	0.12
Recycled Portland Cement Concrete	0.14	Recycled Portland Cement Concrete	0.14
Cement Treated Base Course**	0.20	Cement Treated Base Course**	0.20

\*As determined with appropriate analysis.

\*\*Cement Treated base course generally refers to existing material within the roadway prism stabilized with cement powder. Other proprietary products may be used with documentation of engineering properties.

Table 4.3 is based on material properties approved by the Montana Department of Transportation (MDT) Materials Bureau and data collected from other state DOT's. Actual structural coefficients could vary from those shown in the table due to variations in material quality, compaction, or support of the underlying material, position in the surfacing section, etc. Actual structural coefficients shall be used in calculations if supported by appropriate lab data, which typically includes the resilient modulus.

Based on Table 4.3, the following are the County's Uniform Road Design Standard structural numbers for the applicable road classification. Submit to the County for review and approval complete design calculations for proposed overall structural numbers less than those shown in Table 4.4.

**TABLE 4.4 - Uniform Road Design Standard Structural Numbers**

	A	x B	=
Surfacing Material	Surfacing Thickness (Inches)	Layer* Coefficient (Per Inch)	Structural Number
<b>Local Road #1</b>			
Crushed Aggregate Surfacing	3	0.14	0.42
Crushed Base Course	6	0.14	0.84
<b>Overall Structural Number</b>			<b>1.26</b>
<b>Local Road #2, Minor Collector #3, Major Collector #4</b>			
Plant Mix Asphalt Surfacing	3	0.41	1.23
Crushed Base Course	3	0.14	0.42
Crushed Subbase Course	6	0.14	0.84
<b>Overall Structural Number</b>			<b>2.49</b>

- Layer Coefficient for new material (i.e. constructing a new road). See Table 4.3.
- d. Site Conditions: For new or reconstructed roads subgrade samples shall be obtained within each mile of road to be constructed, along the intended road centerline for a two (2') foot depth. A minimum of two (2) representative samples shall be obtained. Depending on noticeable changes in roadbed characteristics, additional samples may be required. Each subgrade sample shall be tested to determine the soil's California Bearing Ratio (CBR). These CBR's shall be used to complete the engineered road design or to assess the Uniform Road Design sections chosen. During geotechnical reconnaissance, soil samples for classification should also be obtained below the two (2') foot subgrade sampling area to ascertain changes in conditions. The Engineer must provide the County with a soil sample plan indicating sample locations and depths prior to undertaking the field work.
- e. Traffic Conditions: Traffic volume and the mix of traffic type are combined into an Equivalent Single Axle Load to be applied over the design life of the surface. The Engineer shall coordinate with the Public Works Department prior to undertaking design activities. In the absence of accurate truck traffic and vehicle classification counts, the Engineer shall coordinate with the Public Works Department on developing an estimated percentage of trucks using the facility as input into the surfacing design parameters.



f. Miscellaneous Other Input Parameters

**TABLE 4.5 - Road Design Parameters**

Parameter	Local Road #2	Minor Collector #3	Major Collector #4
Performance Period (Design Life)	20 years min.	20 years min.	20 years min.
Initial Serviceability	4.2	4.2	4.2
Terminal Serviceability	2	2.5	2.5
Reliability Level	85	90	95
Overall Standard Deviation	0.45	0.45	0.45

**4.5 Typical Roadway Section Requirements**

Typical roadway sections shall be developed specific to each project to meet the project’s needs based on the minimum requirements, as shown on the Typical Road Section in Figures 1, 2, 3, and 4 in Appendix A. The minimum requirements shall be detailed on the construction plans submitted for each new roadway or improvement to an existing roadway. All installation of roadway materials shall be completed in accordance with the requirements of the appropriate sections of the latest edition of MPWSS, and shall be certified by a registered engineer as meeting the applicable County road design standards. The required application of an asphalt chip seal coat shall be considered separately from the typical roadway section. An asphalt chip seal coat shall be allowed to be completed and certified by a registered engineer as meeting the applicable County road design and construction standards at a later date when made part of a subdivision improvements agreement approved by the Commission.

The following requirements shall apply to all roadway structural section elements:

1. Asphalt Chip Seal Coat: When asphalt paving is used as the wearing surface, this item shall consist of a single application of asphalt material on the prepared asphalt surface, followed by spreading seal coat aggregate. The asphalt material application rate shall be between 0.44 and 0.46 gallons per square yard or otherwise approved by the County Engineer and shall meet the requirements of the appropriate sections of the latest edition of MPWSS. The aggregate shall meet the gradation as set forth in Table 4.6 and the aggregate shall be spread per the rate of the latest edition of MPWSS. All required asphalt chip seal coats must be completed within one (1) year after asphalt paving is completed, or as directed by the County, to allow for proper curing of the asphalt surfacing.

**TABLE 4.6 - SPECIFICATION FOR CHIPS - ASPHALT CHIP SEAL COAT MATERIAL**  
3/8" Asphalt Chip Seal Coat Aggregate

<b>TABLE OF GRADATIONS</b>	
Percentage by Weight Passing Square Mesh Sieves (Montana Test Method MT-202)	
<b>Sieve Size</b>	<b>Grade 2</b>
1/2" sieve	100%
3/8" sieve	85-100%
#4 sieve	10-30%
#10 sieve	0-10%
#40 sieve	0-2%

- The material from which aggregate is to be produced shall have a wear factor not to exceed fifty (50%) percent at five hundred (500) revolutions, as determined by MT-209. The abrasion test shall be run using a five thousand (5000g) gram sample charge material between three-eighths (3/8) inch and #4 sieves and an abrasive charge of eight balls.
  - At least fifty (50%) percent by weight of the aggregate retained on the #4 sieve shall have at least one mechanically fractured face.
2. Asphalt Paving: This consists of hot plant mix asphalt concrete consisting of mineral aggregate and asphalt material mixed at a central hot plant. The mineral aggregate and asphalt material shall meet the requirements of the appropriate sections of the latest edition of MPWSS.

3. Crushed Aggregate Surfacing on Gravel Roads: This consists of crushed gravel, stone or other similar material consisting of hard, durable particles or fragments of stone, free of excess flat, elongated, soft or disintegrated pieces, dirt clods or other deleterious matter. This is the surface course on graveled roads, streets, and alleys. The material shall meet the gradation as set forth in Table 4.7.

**TABLE 4.7 - SPECIFICATION FOR CRUSHED AGGREGATE SURFACING**  
(Gravel Roads)

<b>TABLE OF GRADATIONS</b>			
Percentages by Weight Passing Square Mesh Sieves			
<b>Passing</b>	<b>1-1/4" Minus</b>	<b>1" Minus</b>	<b>¾" Minus</b>
2" sieve	--	--	--
1 1/4" sieve	100	--	--
1" sieve	--	100	--
¾" sieve	70-90	97-100	100
½" sieve	--	--	--
3/8 " Sieve	--	65-80	--
No. 4 sieve	45-75	45-64	40-80
No. 10 sieve	25-55	25-42	25-60
No. 16 sieve	--	--	--
No. 40 sieve	--	10-30	--
No. 200 sieve (not more than)	8-20	8-16	8-20
** Preferred use	Gravel Arterial	Subdivision Rd	Low Vol Subdivision Rd

Meet the following requirements for crushed aggregate surfacing, including added binder or blending material:

\*\* In general, these are the preferred use of these gradations. The Design Engineer must submit gradations for approval.

- **The target plasticity index is seven (7), with a tolerance of ± two (2).**
- Dust Ratio: the portion passing the No. 200 sieve cannot exceed two-thirds (2/3) of the portion passing the No. 40 sieve.
- The maximum liquid limit for the material passing the No. 40 sieve must not exceed thirty-five (35).
- A wear factor not exceeding fifty (50%) percent at five hundred (500) revolutions.
- At least twenty (50%) percent by weight of the aggregate retained on the No. 4 sieve must have one (1) fractured face.

4. Crushed Base Course: This consists of crushed gravel, stone or other similar material consisting of hard, durable particles or fragments of stone, free of excess ~~of~~-flat, elongated, soft or disintegrated pieces, dirt clods or other deleterious matter. This material shall meet the gradation as set forth in Table 4.8.

**TABLE 4.8- SPECIFICATION FOR CRUSHED BASE COURSE**

<b>TABLE OF GRADATIONS</b>			
Percentages by Weight Passing Square Mesh Sieve			
<b>Passing</b>	<b>1 1/2" Minus</b>	<b>1" Minus</b>	<b>3/4" Minus</b>
2" sieve	--		
1 1/2" sieve	100		
1" sieve	--	100	
3/4" sieve	--	--	100
1/2" sieve	--	--	--
No. 4 sieve	25-60	40-70	40-70
No. 10 sieve	--	25-55	25-55
No. 200 sieve (not more than)	0-8	2-10	2-10

- A tolerance of five (5%) percent, by weight, up to the next above-specified gradation (1 1/2" for 1" max.) is allowed. The produced material passing the maximum screen opening and retained on the No. 4 sieve shall be reasonably well-graded in its grading between those limits within five (5%) percent.
- Suitability of the aggregate for its particular use is determined by the final gradation required for grading, as established by the Design Engineer, within the limits allowed in the table for the particular grading specified.
- That portion of the fine aggregate passing the No. 200 sieve must be less than sixty (60%) percent of that portion passing the No. 40 sieve.
- The liquid limit for that portion of the fine aggregate passing a No. 40 sieve cannot exceed twenty-five (25), nor the plasticity index exceed six (6), as determined by AASHTO T89 and T90.
- At least twenty (20%) percent by weight of the aggregate retained on the No. 4 sieve must have one (1) mechanically fractured face.

5. Crushed Subbase Course: This consists of crushed gravel, stone, or other similar material consisting of hard, durable particles mixed or blended with sand, stone dust, or other binding or filler materials produced from sources that provide a uniform mixture. The material shall meet the gradation as set forth in Table 4.9.

**TABLE 4.9 - SPECIFICATION FOR CRUSHED SUBBASE COURSE MATERIAL**

<b>TABLE OF GRADATIONS</b>					
Percentages by Weight Passing Square Mesh Sieve					
<b>Passing</b>	<b>4" Minus</b>	<b>3" Minus</b>	<b>2 ½" Minus</b>	<b>2" Minus</b>	<b>1 ½" Minus</b>
4" sieve	100%				
3" sieve	--	100%			
2½" sieve	--	--	100%		
2" sieve	--	--	--	100%	
1½" sieve	--	--	--	--	100%
No. 4 sieve	25-60%	25-60%	25-60%	25-60%	25-60%
No. 200 sieve (not more than)	2-12%	2-12%	2-12%	2-12%	2-12%

- A tolerance of five (5%) percent, by weight, up to the next above-specified gradation (2 1/2" for 2" max.) is allowed. The produced material passing the maximum screen opening and retained on the No. 4 sieve shall be reasonably well graded in its grading between those limits within five (5%) percent.
  - Suitability of the aggregate for its particular use is determined by the final gradation required for grading, as established by the Engineer, within the limits allowed in the table for the particular grading specified.
  - The liquid limit for that portion of the fine aggregate passing a No. 40 sieve cannot exceed twenty-five (25), nor the plasticity index exceed six (6), as determined by AASHTO T89 and T90.
  - At least twenty (20%) percent by weight of the aggregate retained on the No. 4 sieve must have one (1) mechanically fractured face.
6. Subbase Course: This consists of gravel, stone, or other similar material consisting of hard, durable particles mixed or blended with sand, stone dust, or other binding or filler materials produced from sources that provide a uniform mixture. This material shall meet the requirements of Table 4.9, with the exception that the aggregate may be uncrushed. The depth of this layer of material will be determined by the engineer based on existing conditions and design requirements.

## 4.6 Intersections

Intersections shall be designed to meet the standards provided in Table 4.1 (of these standards). The following additional items shall also be incorporated into design and construction.

1. Roads shall be laid out to intersect at an angle as near to a right angle (ninety (90) degree angle) as practicable, but in no case less than sixty (60) degrees for a local road intersection and no less than seventy-five (75) degrees for a collector road intersection.
2. Intersections shall have a minimum corner radius of fifteen (15') feet along the right-of-way lines of local roads and a minimum corner radius of twenty-five (25') feet at the right-of-way line at the intersection of collector or arterial roads, unless road improvements require a greater radius.
3. On collector and arterial roads, the dedication of right-of-way on corners shall include the chord of the radius.
4. Intersections on major collector roads and/or arterial roads shall either be aligned or separated by the minimum distance specified in Table 4.1.
5. No more than two (2) streets may intersect at one point.
6. Intersection design shall provide acceptable visibility for traffic safety per the requirements of Table 4.1.
7. Hilltop and swale intersections are discouraged and will not be allowed where adequate sight distance cannot be assured (per Table 4.1).
8. The approaching roadway shall not have a grade exceeding three (3%) percent for fifty (50') feet from the edge of the through roadway, or for twenty (20') feet outside of the through roadways right-of-way line, whichever is a lesser distance.
9. Intersections of local streets with major collector streets or arterial streets shall be kept to a minimum.

## 4.7 Dead End Roads

A dead end street shall not be greater than seven hundred (700') feet in length unless the existing or proposed road can meet one of the following two exceptions:

1. Maximum of a one thousand three hundred (1,300') foot dead end length is permitted if:
  - a. The topography of the property is classified as level (slope range of 0 to 8.0 percent);
  - b. The fuel hazard rating for the property is classified as low per an on-site inspection by a recognized fire or fuel management specialist or as indicated on the Wildland Fuel Hazard Rating Map prepared by the Tri-County Fire Working Group for Broadwater, Jefferson, and Lewis and Clark Counties; and
  - c. The dead end road is proposed as part of a future road connection including the extension of a county road easement/right-of-way.

2. Maximum of one thousand (1,000') feet in length is permitted if:
  - a. The topography of the property is classified as rolling (slope range of 8.1 to 15.0 percent);
  - b. The fire hazard rating for the property is classified as low to moderate per an on-site inspection by a recognized fire fuel or fuel management specialist or as indicated on the Wildland Fuel Hazard Rating Map prepared by the Tri-County Fire Working Group for Broadwater, Jefferson and Lewis and Clark Counties; and,
  - c. The dead end road is proposed as part of a future road connection including the extension of a county road easement/right-of-way.

The length of a dead end road is measured from the edge of the roadway of the intersecting road to the center of the radius of the cul-de-sac turnaround or to the center of the intersection of the hammerhead turnaround. All dead end roads shall be provided with a cul-de-sac or hammerhead turnaround. A dead end road shall be limited to a length, radius, and right-of-way for the roadway and turnaround as shown in Table 4.1. See Figure 5 in Appendix A for illustrations of acceptable hammerhead turnarounds and cul-de-sacs. The county road easement width for a hammerhead shall be sixty (60') feet.

#### **4.8 Turnouts**

A turnout is a widening of a travel way of sufficient length and width to allow vehicles to pass one another; to provide an area for mail delivery; to provide an area for transit and school bus users; or to provide an area for the provision of emergency services, such as fire protection. All turnouts shall be constructed of the same material as the roadway that it serves. Turnouts shall be no less than fifty (50') feet long with a minimum travel lane width of ten (10') feet for a minimum length of twenty (20') feet. Turnouts shall be located at least fifty (50') feet from the centerline of the nearest road right-of-way or county road easement.

#### **4.9 Road Certification**

In accordance with the testing requirements in Section 7, the Inspecting Engineer shall certify the roadways are constructed to the approved design plans. Upon completion of the inspection, the Inspecting Engineer shall submit a statement, to the Public Works Department, either certifying that the improvements have been completed in the required manner or listing the defect(s) in those improvements that must be corrected.

#### **4.10 Road Maintenance Policy**

The County determines maintenance based on the Road Prioritization Plan criteria approved by the Board of County Commissioners in accordance with MCA 7-14-2103. The County Special Districts Coordinator will assist residents in the formation of RIDs that desire a higher level of service, maintenance, and/or improvements of public rights-of-way in the County.

#### **4.11 Sidewalks and Non-Motorized Facilities**

Maintenance of sidewalks, trails, open space, non-motorized paths and bicycle paths will not be provided by the County without written approval and development of a separate maintenance funding mechanism, such as an RID.

1. Sidewalks and non-motorized facilities constructed within a public right-of-way or easement shall conform to these standards for construction and to the Americans with Disabilities Act (ADA) guidelines for accessibility. All new sidewalks and non-motorized facilities shall be designed and constructed according to the following guidelines and conditions:
  - a. AASHTO Pedestrian Design Guidelines
  - b. AASHTO Bicycle Design Guidelines
  - c. NACTO Urban Bikeway Design Guidelines
2. Curbside Sidewalk Installations
  - a. All curbside sidewalks shall be constructed of concrete meeting the standards set forth in MPWSS.
  - b. Where a sidewalk in a residential area is adjacent to a curb and gutter installation, the minimum width shall be five (5') feet.
  - c. Where a sidewalk is adjacent to a curb and gutter installation on a collector or arterial street, or is located adjacent to a curb and gutter installation within a commercial or industrial area, the minimum width shall be six (6') feet.
  - d. The minimum thickness of three-quarter (3/4") inch crushed base course material (per Table 4.8 or as directed by the Design Engineer) under a curbside sidewalk shall be a minimum of four (4") inches compacted to a minimum of ninety-five (95%) percent ASTM D698 standard proctor density.
  - e. The minimum thickness of concrete shall be a minimum of four (4") inches.
  - f. Geotextile fabric (specified by a Design Engineer or the County) may be required below the gravel crushed base course as directed by the Design Engineer or the County.
3. Boulevard Sidewalk Installations
  - a. All sidewalks with a boulevard between the sidewalk and curb shall be constructed of concrete meeting the standards set forth in MPWSS.
  - b. Where a sidewalk in a residential area is separated from a curb and gutter installation by a boulevard, the minimum sidewalk width shall be five (5') feet and the minimum boulevard width shall be seven (7') feet.
  - c. Where a sidewalk is separated from a curb and gutter installation by a boulevard on a collector or arterial street, or is separated from a curb and gutter installation by a



boulevard within a commercial or industrial area, the minimum sidewalk width shall be six (6') feet and the minimum boulevard width shall be ten (10') feet.

- d. The minimum thickness of three-quarter (3/4") inch crushed base course under a boulevard sidewalk shall be four (4") inches compacted to a minimum of ninety-five (95%) percent ASTM D698 standard proctor density.
- e. The minimum thickness of concrete shall be four (4") inches.
- f. Geotextile fabric (specified by Design Engineer or the County) may be required below the gravel crushed base course as directed by the County or the Design Engineer.
- g. Maintenance of the boulevard section shall be the responsibility of the property owner or if fee title right-of-way, the adjacent property owner.

#### 4. Non-Motorized Facilities

- a. Class I trails are described as those trails connecting major destination nodes such as individual neighborhoods, schools, entertainment venues, or public destinations.
- b. Class II trails are described as those trails contained within individual neighborhoods or connecting individual neighborhoods within 1,200 feet of each other.
- c. Class III trails are described as those trails not contained within developed areas and do not meet the definition for Class I or Class II trails.
- d. Non-motorized facilities are subject to the standards shown in Table 4.10.
- e. Bicycle lanes shall be provided on streets that are functionally classified as a collector or arterial in locations designated by the County. The design of bicycle lanes shall conform to current AASHTO design standards.
- f. Where non-motorized facilities meet roadways, adequate sight distance shall be maintained.
- g. Bridges for non-motorized facilities shall be approved by the County.
- h. The standard section for a non-motorized facility with asphaltic concrete surfacing shall consist of the following:
  - i. A minimum thickness of two (2") inches of asphaltic concrete compacted to a minimum of ninety-three (93%) percent Theoretical Rice density.
  - ii. A minimum thickness of four (4") inches of three-quarter (3/4") inch crushed base course (see Table 4.8) compacted to a minimum of ninety-five (95%) percent ASTM D698 standard proctor density.
  - iii. Geotextile fabric (specified by the Design Engineer or the County) may be required below the gravel crushed base course as directed by the County or the Design Engineer.
- i. The standard section for a non-motorized facility with crushed aggregate surfacing shall consist of the following:

- i. A minimum thickness of four (4") inches of three-quarter (3/4") inch crushed aggregate surfacing (per Table 4.8) compacted to a minimum of ninety-five (95%) percent ASTM D698 standard proctor density over an approved sub-base material.
- ii. The native materials under the surfacing material shall be sterilized with a product approved by the County Weed District.
- iii. Geotextile fabric (specified by the Design Engineer or the County) may be required below the gravel crushed base course as directed by the County or the design engineer.

**TABLE 4.10 - NON-MOTORIZED FACILITIES STANDARDS**

	<b>Class I Core Trail Network</b>	<b>Class II Neighborhood Collector</b>	<b>Class III Low Impact Trail</b>
<b>Surface Width</b>	8' – 10'	5' – 8'	1' – 8'
<b>Vertical Clearance</b>	8'-6"	8'-6"	8'-6"
<b>Recommended Surfaces</b>	Asphalt, concrete	Asphalt, concrete	Crushed rock or native soil
<b>Resting and Passing Space</b>	400'	600'	At trail head

## 4.12 Signs

All road signs must be designed, constructed, and located according to the standards in the current version of the Manual on Uniform Traffic Control Devices (MUTCD), published by the Federal Highway Administration.

1. All named roads shall be identified with a sign, which conforms with the MUTCD and with the mounting guidelines contained in Figures 7 and 8 in Appendix A.
2. Street or road signs and traffic control devices shall be placed at all intersections by the Developer or included as part of the subdivision improvements agreement. Traffic control devices and placement shall be consistent with the MUTCD, available from the Public Works Department.
3. Street names must comply with the provisions of the Road Naming Conventions as determined by the City-County Address Coordinator.
4. Whenever possible, name signs shall be placed on the northeast and southwest corners of all intersections. If it is not feasible to utilize the northeast and southwest corners, signs shall be placed so as to be conspicuous to the majority of people.

5. Lettering on street signs shall not be less than six (6") inch capital letters. For local roads with speed limits of 25 MPH or less, the lettering height may be a minimum of four (4") inches.
6. Signs shall have white letters on a dark green reflective background.
7. Name signs shall be mounted not less than five (5') feet nor more than seven (7') feet above the roadway.
8. Depending upon the status of the road and other circumstances, maintenance of road signs may be the responsibility of the County, homeowners associations, or landowners.
9. At least one (1) road name sign shall be mounted at each intersection.

### **4.13 Road Naming and Addressing Standards**

#### **1. Road Naming Conventions, Addressing Numbers and Plaques, Procedures for Naming or Renaming Roads,**

The following are the general conventions for road naming for all unincorporated areas within the County. See Resolution 2021-63.

### **4.14 Bridges**

Bridges within the County's jurisdiction, including those in incorporated areas of the County shall be constructed to meet the design requirements of the County Bridge Standards and the Floodplain Regulations.

### **4.15 Cattle Guards**

Cattle guards within the public right-of-way shall be constructed of non-combustible materials and shall be rated for HS-20 loading. Design shall conform to MDT standard cattle guard requirements. All cattle guards require an encroachment agreement per the requirements of Section 3.1 and an excavation permit per Section 5. Cattle guards shall be privately installed and the responsibility of the landowner.

### **4.16 Grading, Drainage, and Erosion Control**

Standards for all grading and erosion control associated with all road work are as follows:

1. Grading shall not significantly increase the rate of stormwater runoff, and shall avoid the erosion of natural or constructed slopes and sediment accumulation in natural drainage channels or watercourses.
2. Grading shall not significantly alter the natural drainage patterns.
3. Grading shall preserve and conform to the general natural form and contours of the land surface, as much as practically possible.

4. Grading shall be designed to preserve natural or established vegetation as much as is practically possible. The planned revegetation shall stabilize the slope and be compatible with native vegetation. It is suggested (but not required) to use plant material that is native vegetation appropriate to adjacent plant communities in both species composition and spatial distribution patterns. It is recommended that the use of native vegetation acknowledge certain plant species' relative attractiveness to wildlife.
5. Affected site area shall be revegetated as necessary for the stabilization of disturbed surfaces, with the exception of areas covered by impervious surfaces, road shoulders and/or structures.
6. Grading shall allow for the most rapid possible recovery of disturbed lands to natural or introduced vegetation.
7. Any areas disturbed while installing drainage systems shall be restored and revegetated. Where necessary, topsoil shall be placed on disturbed areas prior to revegetation. The proposed restoration plan, which must include a schedule, shall be included as part of all grading and drainage plans submitted to the Public Works Department.
8. The Contractor and all subcontractors shall use the best management practices for road construction and other surface improvements to address erosion control, debris, and dust abatement during construction activities.

#### **4.17 Grandfathered Typical Roadway Section Requirements**

External and internal access roads constructed to the previous County Road Standards are grandfathered and acceptable as standard physical access if they meet all of the following criteria:

1. The subject road(s) are certified by an engineer registered in the State of Montana as meeting the original standard. Certification shall include a statement that the road meets the original standard for width, base course, surfacing, compaction, and drainage. The certification shall include the engineer's stamp; and,
2. No upgrade is needed because of increased annual average daily trips (AADT's) or decreased Level of Service (LOS). If upgrading is required due to these reasons, then the road must meet the County Road Standards of this Public Works Manual.

#### **4.18 Connecting Different Typical Roadway Sections**

Where roads constructed under the previous county roads construction and design standards connect with roads constructed under the current road standards the connection shall integrate the road profiles as seamlessly as possible, including drainage improvements.

#### **4.19 Subdivision Internal Typical Roadway Section Requirements**

Internal access roads for all major, subsequent minor and first minor subdivisions shall be constructed to the paved standard for local roads. An exemption is allowed from the paving requirement for local roads with between one and four hundred (1-400) annual average daily traffic (AADT) for any subdivision where only residential lots are created and all lots are greater than two and one-half (2 ½) acres in size.

#### **4.20 Speed Limits on Newly Established or Constructed Roads**

Speed limits for newly designed roads shall be recommended by the engineer of record to the Public Works Department within the construction plans. Recommendations shall be based upon the engineering analysis used to design the road and comply with MCA 61-8-303 & 61-8-310.

#### **4.21 Variance from Road Design Standards**

A variance from the road design standards within this section may be granted or approved by the County Engineer if, in their engineering judgment, the variance does not significantly impede, hinder, or reduce the function the roadway system, or any element thereof. Submit requests for a variance in writing to the County Engineer. Requests shall provide engineering analysis and explain the reason for the request. While reducing cost may be a benefit of the requested variance, it will not be considered as a determining factor to grant a variance. The County Commission retains authority to nullify any variance if deemed in the public interest by giving 30 days notice prior to work taking place.

## **SECTION 5. EXCAVATIONS WITHIN THE COUNTY ROAD OR PUBLIC RIGHT-OF-WAY**

Excavations made in any public right-of-way are subject to the following:

- 1.** Anyone excavating in a public right-of-way is required to obtain an Excavation Permit from the Public Works Department (an example of the Excavation Permit Application is on the County website). The Public Works Department will determine the location, number and configuration of all excavations within public rights-of-way.
- 2. UNDERGROUND UTILITY LOCATING CAUTION:** Before any excavations the Permittee is responsible for contacting the Underground Utility Locating Center (One Call Concepts) at 1-800-424-5555 at least two (2) working days before the work is to be performed, or as required by law.
- 3. EAST HELENA CAUTION:** Excavations made in any public right-of-way in the East Helena Superfund Site are subject to the regulations and institutional controls established for this Superfund site. Soil displacement and disposal requires a Soil Displacement Permit from the Lead Education Office ((406) 457-8583).

The East Helena Institutional Controls Program (ICP) is a set of rules and regulations put in place and enforced by the County and the City of East Helena to help ensure the integrity of clean soil and other actions taken to remediate (clean up) contaminants left throughout the East Helena Superfund Site. For additional information about the requirements and regulations, contact Kathy Moore, Division Administrator, at (406) 447-8351.

- 4. NORTH VALLEY CAUTION:** If an excavation is set to occur in the North Valley and is in the general area where you could find unexploded ordnance (UXO) from past military training activities, the Permittee is responsible for contacting the Montana Army National Guard (406) 324-3088. Although the chance of actually finding UXO in a public right-of-way is small, be aware that UXO remains in portions of the Helena Valley. Please visit <http://www.mtarnguxoinformation.info/> for detailed information regarding the Montana Army National Guard UXO program. If you have any questions, please contact the UXO office at Fort Harrison at (406) 324-3088.

**WARNING - If you see UXO, do not approach it, touch it, or disturb it in any way! Leave the area immediately. Call 911 to report UXO to authorities. In addition, immediately contact - (406) 324-3088.**

**What to do if you find a UXO: The three R's**

**RECOGNIZE**

UXO becomes a danger only when it is disturbed. If you see UXO, STOP!

**RETREAT**

Do Not move closer to get a better look! Never attempt to remove anything near it. Do not touch, move, or disturb it. **MOVE AWAY from it.**

## **REPORT**

Call 911 to report suspected UXO.

### **5.1 Excavation Permits**

Excavation permits must be obtained from the Public Works Department for all excavations within the County road or public right-of-way, except for approach installations, which require an approach permit (see Section 2). All permits issued shall obligate the Permittee to perform said work in accordance with acceptable construction practices, applicable County standards and any conditions placed on the permit. Excavation permits will not be required of persons who are under notice to repair defects under the permit conditions or warranty provisions of a previously issued permit.

### **5.2 Application Fees**

Any person or persons applying for permission to excavate within the public right-of-way shall pay the current administrative fee in the County fee schedule, for each excavation permit in addition to the hard surface assessment. The application fees may be waived by the County for one-time excavations across gravel roads for the purpose of repairing or extending irrigation systems.

### **5.3 Permit Conditions**

Excavation permits issued by the County are subject to the following conditions:

1. Excavation permits shall be assigned an expiration date, determined by the type and extent of work being done.
2. Once the permit has been issued, the Public Works Department shall be notified a minimum of twenty-four (24) hours prior to the commencement of any work. Failure to notify the Public Works Department shall void permit.
3. An adequate Traffic Control Plan shall be submitted prior to starting work and is subject to review and approval by the Public Works Department. The approved Traffic Control Plan shall be strictly adhered to during construction. All necessary signs and devices for construction work zones shall conform to the standards set forth in the MUTCD as published by the U.S. Department of Transportation, Federal Highway Administration.
4. The Permittee must have a valid excavation permit on-site at all times during the excavation.
5. Excavation permits cover a period of fourteen (14) days. All necessary excavation, backfill, surface repair and cleanup shall be completed in a timely fashion and within fourteen (14) days of beginning work unless a time extension has been authorized in writing, in the following circumstances:
  - a. The only remaining item is re-vegetation of the disturbed area;
  - b. Seasonal availability of asphalt for surface restoration; or

- c. Adequate progress is being made toward substantial completion on all open permits.
6. No excavation shall extend over one half of the width of the public right-of-way at any one time nor shall construction activities block the existing traveled way unless specific written approval has been granted.
7. It shall be the sole responsibility of the Permittee to notify all utilities of the excavation and be responsible for the location of all utility lines and their repair if damaged. Before any excavations, the Permittee is responsible for contacting the Underground Utility Locating Center (One Call Concepts) at 1-800-424-5555 at least two (2) working days before the work is to be performed, or as required by law.
8. County is not responsible for costs associated with any utility installation or cost for removal/relocation.

#### **5.4 Survey Monumentation**

Reasonable efforts shall be made to protect and avoid damage to existing survey monuments within the excavation area. Any survey monument in danger of disturbance shall be referenced by a professional land surveyor to facilitate the replacement of that monument should disturbance occur. Any survey monument which is disturbed shall be reset or replaced by a professional land surveyor, and it is the responsibility of the disturbing party to provide and pay for those services.

#### **5.5 Cutting of Surface Material**

When the excavation requires cutting concrete, asphalt or other hard surface, the following conditions shall apply:

1. When conditions allow, horizontal boring is preferred to open excavations.
2. All concrete areas to be excavated, including curb and gutter, sidewalks, driveways and slabs shall be cut with a power driven saw to a minimum depth of twenty (20%) percent of its total thickness then broken square and removed. Cut limits will be a minimum of one (1') foot beyond the proposed excavation limits.
3. Asphaltic concrete surface or hard roads shall be cut utilizing a power saw. On a case by case basis in older pavements, the County may allow the asphalt to be cut using a jackhammer with spade bit or with a cutting wheel mounted on power equipment. Square cutting shall produce a smooth vertical face at a minimum distance of one (1') foot beyond the area disturbed by excavation.
4. Cuts shall be rectangular and made parallel and perpendicular to the traveled way of the road. The County reserves the right to extend the cut area to eliminate pavement "slivers" along the edge of the road or near appurtenances.



## **5.6 Micro-Trenching**

Micro-trenching (trenches with a width of less than 2 inches) will only be allowed after an engineering study and plans have been submitted and approved by Public Works. The study and plans will include, but is not limited to location, depth (minimum of 18 inches below bottom of asphalt), type of trenching backfill to be used, and a schedule of work to be performed. An over-cut of 6 inches, either side of the trench, will be required in hard surfaces.

## **5.7 Excavation of Surface and Base Material**

All excavations shall follow current OSHA guidelines and disturb only the minimum of surface area necessary to complete the work, but provide adequate safety for workers and allow for acceptable compaction of backfill material. Undercutting of the surface, base, sub-base, and sub-grade materials will not be allowed. All excavations greater than twenty (20') feet shall require an engineered design as per OSHA regulations. Permittee shall submit plans to the County for review and concurrence per Section 5.13.

## **5.8 Backfilling**

When backfilling an excavation within a public right-of-way, the following conditions apply:

1. All backfill material shall be free from organic matter, refuse, frozen material, saturated material, pieces of concrete and asphalt, boulders or other materials not suitable for use as fill material.
2. Materials used for backfill shall be carefully placed in layers suitable to the equipment used for compaction, and each layer shall be brought to optimum moisture content ( $\pm 3\%$ ) and mechanically compacted to a minimum of ninety-five (95%) percent of ASTM D-698 standard proctor density.
3. Material containing a moisture content higher than that which will allow for acceptable compaction shall be removed, hauled away, and replaced with suitable backfill material. If the native material can efficiently be mechanically processed on-site to meet the County requirements as defined herein, it may be used as backfill material. If the proposed drying process cannot be completed within the time limit prescribed by the County (to be determined by site conditions, including consideration for public convenience and safety), the material shall be removed and replaced. Water flooding and/or compaction will not be allowed, unless specific written permission has been obtained prior to its use.
4. Backfill around the facility being placed or repaired shall be adequate to provide the necessary support and protection to ensure the public right-of-way is not re-opened because of the lack of proper bedding material.
5. Suitable material removed from the excavation may be used for backfill from the top of the bedding material to sub-grade level.
6. From the top of the bedding material to sub-grade level, material containing stones up to eight (8") inches in the greatest dimension may be used.

7. Mechanically fractured washed rock between three-eighths (3/8") inch and two (2") inches may be used as backfill material where standard compaction techniques and equipment cannot be used, subject to prior approval by the County.
8. Flowable fill conforming to MPWSS specifications may be used, subject to prior approval by the County.
9. If the County is unsatisfied with the materials, compaction techniques or efforts, work shall be stopped and an independent testing firm will verify compaction at the Contractor's expense.

## 5.9 Surface Replacement

After an excavation has been backfilled, the following conditions shall apply for surface replacement:

1. Where excavation and construction work takes place on unimproved surfaces outside of the roadway template, the area shall be returned to its original condition immediately after the work is complete. This will include topsoil replacement, reseeding to natural grass and returning drain ditches to grade.
2. Where excavation and construction work take place on asphalt or hard surfaced roads, it is desirable to replace the pavement section to its original or better condition after excavation work. To accomplish this goal, the following conditions shall be met:
  - a. There shall be a minimum of six (6") inches of three (3") inch minus crushed subbase course (as per Table 4.9) and three (3") inches of one (1") inch minus crushed base course gravel (as per Table 4.8) placed on the prepared sub-grade material. All sub-grade, crushed subbase and crushed base materials shall be brought to optimum moisture content ( $\pm 3\%$ ) and compacted to a minimum of ninety-five (95%) percent of the standard proctor density as determined by ASTM D-698, or otherwise directed by the County.

Depending on conditions and road classification, the County may require geogrid, geotextile fabric, increased aggregate sections, or an increased asphalt section, in either single elements or any combination thereof as directed by County or the Engineer.

- b. The square cut edges of all exposed asphalt shall have a tack coat applied prior to placement of a minimum of three (3") inches of hot mix asphaltic concrete compacted to ninety-three (93%) percent of the Rice density, or otherwise directed by the County.
    - c. Asphaltic concrete shall be placed in such a manner leaving no noticeable bump or depression after the replacement is complete.
    - d. Asphaltic cold mix or a concrete slurry mix may be used as a temporary surface patch. This temporary repair shall be removed and replaced with compacted hot mix

asphaltic concrete as soon as weather conditions and hot-mix asphalt availability allow.

- e. If the finished surface replacement does not meet reasonable expectations of the approved plans or excavation permit, the County retains the right to require seal coating to restore original surface conditions.
3. Where excavation and construction work take place on gravel surfaced roads, the gravel surface replacement shall comply with County specifications.

### **5.10 Concrete Replacement**

All concrete areas excavated, including curb and gutter, sidewalks, driveways, and slabs shall be replaced to the same dimension, shape and grade as original condition or to current standards, as directed by the County. Concrete shall be locally available ready-mix concrete with a twenty-eight (28) day compressive strength of four thousand (4,000) psi minimum unless otherwise approved by the County.

### **5.11 Clean Up**

All materials, debris, and items relating to the excavation or construction work shall be removed from the site and if required, pavement surfaces shall be swept. In all respects the site and surrounding area shall be in an equal or better condition than prior to the work being accomplished.

### **5.12 Warranty**

All work and materials used under this permit shall be warranted for a period of two (2) years following acceptance. Should there be any settling from any portion of the work or defect in materials or workmanship it shall be promptly corrected at no cost to the County. The County assumes no responsibility for Permittee's work or damage to adjacent private property. The County requires the repair or construction be equal or better than existing conditions and meet minimum County standards.

### **5.13 Bonding and Insurance**

1. The County requires that all applicants for excavation permits be covered by a Surety Bond and Liability Insurance when working within the public right-of-way. The County shall be listed as an additional insured.
2. Prior to starting work within the public right-of-way, the Permittee shall file or have in effect a Surety Bond in the following amounts:
  - a. Not less than fifty thousand (\$50,000) dollars for Public Utility Companies.
  - b. Not less than twenty thousand (\$20,000) dollars for General Contractors.
  - c. One hundred and twenty-five (125%) percent of the contract amount for engineered projects.

3. The bond shall be conditioned upon the proper installation or repair of the facility, proper backfill of the excavation and proper restoration of the surface in accordance with these standards. Said bond shall remain in full force for the duration of the warranty period.
4. Full Comprehensive General Liability Insurance coverage shall be in effect for the duration of the work. This coverage shall provide for both bodily injury and property damage as follows:
  - a. Bodily injury portion shall include coverage for injury, sickness or disease and death arising directly or indirectly out of or in connection with the performance of work under this permit and shall provide for a limit of not less than one million (\$1,000,000.00) dollars for all damages arising in bodily injury, sickness or disease or death of one person and a total limit of two million (\$2,000,000.00) dollars for damages arising out of bodily injury, sickness or disease and death of two or more persons in any one occurrence.
  - b. Property Damage portion will provide for a limit of not less than that listed below for all damages arising out of damage to or destruction of property of others arising directly or indirectly out of or in connection with the performance of work under this permit in any one occurrence including explosion, collapse and underground exposure.
    - i. Automobile – one hundred thousand (\$100,000.00) dollars
    - ii. Other than automobile – one hundred thousand (\$100,000.00) dollars each occurrence, three hundred thousand (\$300,000.00) dollars aggregate
  - c. Indemnity portion shall hold harmless, indemnify and defend the County, the Public Works Director, and their employees and agents from any and all liability claims, losses or damage arising or alleged to arise from the performance of the work under this permit.
  - d. The bonding and insurance requirements may be waived by the County for one-time excavations across gravel roads for the purpose of repairing or extending irrigation systems, provided that the excavator has in effect a valid homeowners, ranch, or farm general liability insurance policy at the same limits described above.

#### **5.14 Assessment for Opening Hard Surfaces**

A charge of five dollars (\$5.00) per square foot separate from the excavation permit must be paid by the Permittee for each square foot of hard surfacing less than two (2) years old to be removed. Revenue from this assessment shall be credited to the general road fund. This charge may be waived, whenever the pavement to be opened is the result of the need to repair broken utilities or other special circumstances.

## **5.15 Public Utility Companies**

1. Excavation permits are required for new primary installations or any road openings. Any public utility owning or operating a system of distribution lines for electric power, natural or artificial gas, telephone, fiber optics, cable television, sewer or water service or as otherwise recognized by the County, shall not be required to obtain a permit for each excavation necessary for maintenance or service connections outside the road surface. The utility shall notify and coordinate with the Road Department a minimum of two (2) weeks prior to the excavation activity.
2. Public Utility companies shall be governed by the full provisions of these standards except for Sections 5.1, 5.2, 5.3, 5.12, and 5.13. It is recognized that continual maintenance of utility facilities is necessary and that reasonable operation in making excavations to restore or maintain service will be allowed under emergency conditions. The Public Works Department shall be notified as soon as practical in these cases.
3. Utility facilities shall be located to minimize conflicts and avoid the need for future adjustments. Where right-of-way width and terrain features permit, all utilities shall be located outside of the roadway cross section and at or near public right-of-way limits. Hardship cases may necessitate placement of the facility within the roadway cross section, but ample justification must be provided. New facilities or a major revision of existing facilities will require review in regard to location by the County to avoid potential conflict prior to the permit being granted for placement.
4. The County reserves the right to require the utility to change the location or to remove any structures, lines or pipes at any time in order for the County to perform any needed work on or in the right-of-way as per statute. Any change, relocation or removal shall be made at the sole expense of the utility.

## **SECTION 6. TRAFFIC CONTROL**

The use of all traffic control devices is based on the current edition of the following publications:

- Manual on Uniform Traffic Control Devices (MUTCD);
- AASHTO Roadside Design Guide;
- AASHTO A Policy on Geometric Designs of Highways and Streets;
- AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals; and
- American Traffic Safety Services Association (ATSSA) guidelines.

Before installing any sign posts, the Underground Utility Locating Center (One Call Concepts) must be contacted at 1-800-424-5555 at least two (2) working days before the work is to be performed.

### **6.1 Temporary Traffic Control**

Any work proposed within County Road or a public right-of-way that requires a Traffic Control Plan (TCP) will not be approved until the TCP has been approved by the Public Works Department. Any TCP that is submitted is subject to the following conditions:

1. The plan may be represented and referenced appropriately as a Typical Application defined in the most recent edition of the MUTCD.
2. The Contractor is responsible for the set-up, maintenance and removal of the signage or devices.
3. The Contractor shall use signs and devices that are clear in meaning, are located appropriately and are clean and legible.
4. When the work is complete, the Contractor shall remove all traffic control signs and devices within forty-eight (48) hours. If the signs and devices are not removed within forty-eight (48) hours, the Public Works Department will remove them and the Permittee will be responsible for reimbursing the Public Works Department for costs incurred.
5. No work may begin until all traffic control devices are in place. If work is being conducted without appropriate signage in place, the Public Works Department will suspend the work and/or any appropriate permits until the proper traffic control devices are in place.

### **6.2 Permanent Traffic Control**

1. When a proposed project involves removing, relocating, or replacing existing traffic control devices, or when installing new traffic control devices, a signage plan is required. The Contractor has the option of installing the sign(s) or paying the Public Works Department to complete the work.

2. In any subdivision that creates new roads that approach an existing road public right-of-way, the Developer has the option of installing the sign(s) or paying the Public Works Department to complete the work.
3. If a Contractor or Developer requests that the County install permanent signage, payment shall be received prior to the work being completed.
4. If a Contractor or Developer installs signage, the signs shall be installed according to the following regulations:
  - a. All proposed signage must be approved by the Public Works Department prior to any installations. If the signage is not installed in compliance with the plans, the Developer or Contractor shall be required to reinstall, relocate, or replace any deficient signage.
  - b. Street signs shall be visible from both directions, either with a double-sided sign mounted on top of the post or two single-sided signs mounted on each side of the post.
  - c. All signs installed will be in compliance with MUTCD requirements

### **6.3 Pavement Markings**

Markings on highways open to public travel have important functions in providing guidance and information for the road user. Major marking types include pavement and curb markings, delineators, colored pavements, channelizing devices, and islands. In some cases, markings are used to supplement other traffic control devices such as signs, signals, and other markings. In other instances, markings are used alone to effectively convey regulations, guidance, or warnings in ways not obtainable by the use of other devices.

Markings have limitations. Visibility of the markings can be limited by snow, debris, and water on or adjacent to the markings. Marking durability is affected by material characteristics, traffic volumes, weather, and location. However, under most highway conditions, markings provide important information while allowing minimal diversion of attention from the roadway.

Applications of all pavement markings are based on standards from the most recent edition of the MUTCD. Prior to the application of any pavement marking, construction plans must be submitted to the Public Works Department for approval. Materials applied to paved road surfaces shall be readily available, durable commercial products designed for use on road surfaces. Application methods and equipment shall be those recommended by the product's manufacturer.

### **6.4 Speed Bumps**

Permanent speed bumps or dips are not permitted within County Road/public rights-of-way. **Temporary** speed bumps may be authorized in limited circumstances. Authorization for a temporary speed bump may be granted or approved by the Public Works Director, or their

designee, if, in their judgment, the temporary speed bump does not significantly impede, hinder, or reduce the function the roadway system, or any element thereof. Submit requests for a variance in writing to the County Engineer. Requests shall provide engineering analysis and explain the reason for the request. The County Commission retains authority to nullify any variance if deemed in the public interest by giving 30-days notice prior to work taking place.

Any pinning shall be repaired using a tar product compatible with the existing road surface.



## **SECTION 7. CONSTRUCTION TESTING AND CERTIFICATION**

The Public Works Department has developed a Road Review Process which outlines the design and construction approval processes. The intention of this process is to help clarify for an Applicant/Developer what the Public Works Department is looking for during their review and approval of work done within public rights-of-way.

The design and construction checklist in Appendix B helps simplify design criteria and material testing required by both the County Public Works Manual and the Montana Public Works Standard Specifications. The Applicant/Developer will have a much clearer understanding, up front, as to what is expected during the design and construction review and approval processes.

In order to better document the inspection and certification of public infrastructure improvements, the Public Works Department shall require electronic copies of all documentation prior to final acceptance of road improvements within the public right-of-way within the County's jurisdiction; and all costs associated with the required testing and certifications and any peer reviews deemed necessary by the Public Works Department staff to verify submitted results are the sole responsibility of the Applicant/Developer or Permittee.

### **7.1 Engineer's Certification of Construction to County Standards**

1. The Engineer shall submit a letter to the County certifying that all applicable improvements were installed in accordance with the approved plans and specifications. The required as-built drawings shall be scalable 24 inch x 34 inch or 11 inch x 17 inch, as appropriate for the size of the project, with one (1) digital CADD copy.
2. At a minimum, the Engineer shall furnish documentation of tests in accordance with methods prescribed by AASHTO, ASTM or MPWSS and as stated in Appendix B, for theoretical maximum density, optimum moisture content and sieve analysis for the surfacing material on gravel roads, the imported sub-base material, base material and excavation backfill material within the public rights-of-way. The existing base/sub-base material within the rights-of-way shall be field density tested until the material meets ninety-five (95%) percent of the maximum dry density as determined by AASHTO-T-99 or ASTM D698 and Appendix B, when the material is at or near optimum moisture content. This information may be required for all construction work completed within the public rights-of-way at the discretion of the Public Works Department.

### **7.2 Documentation of Density Tests**

At a minimum, the Engineer shall furnish documentation of in-place field density tests. In-place density tests for trenches and embankments shall, at a minimum, be required for the first lift of backfill to set a pattern of compaction and shall be provided daily and as backfill material changes. In-place density tests for roadways shall, at a minimum, be required at intervals defined in Appendix B. Tests for roadways shall be provided for sub-grade, sub-base, imported base, and other aggregate coarse. At a minimum, the top six (6") inches of native sub-grade which will be under a structural section shall be field density tested until the material meets ninety-five (95%)

percent of the maximum dry density as determined by AASHTO-T-99 or ASTM D698 and Appendix B. All trench backfill material in improved areas and all embankments shall be compacted for the fill depth and shall be compacted to ninety-five (95%) percent of the maximum dry density as determined by AASHTO-T-99 or ASTM D698 and Appendix B. This information shall be required for all construction within public rights-of-way.

### **7.3 Documentation of Asphalt Job Mix Testing**

At a minimum, the Engineer shall furnish a dated job mix formula for hot mix bituminous asphaltic concrete which conforms to the procedures of the Asphalt Institute's MS-2 Manual. The job mix formula shall be no older than one (1) year, and shall have the same aggregate and asphalt sources and grades as the mix used for public improvements. The Engineer shall furnish certified results of a Marshall Test showing the bulk specific gravity determination, stability and flow data and density and void analysis. (See construction and testing checklist in Appendix B.)

### **7.4 Documentation of Asphalt Core Samples**

At a minimum, the Engineer shall furnish test results of asphalt core samples for bituminous pavement for applicable construction within public rights-of-way. One set of two (2), four (4") inch diameter minimum core sample shall be required for every one thousand (1000) tons of bituminous pavement with a minimum of two (2) samples per project or as directed by the Engineer, and/or approved by Public Works. The Engineer shall provide a certified laboratory report from the samples taken as to thickness and actual density. This information shall be required for applicable construction within public rights-of-way. (See construction and testing checklist in Appendix B.)

1. See Section 6.6 MPWSS for (asphalt) mat density requirements. Verification of maximum density as determined by ASTM D2041 from plant produced material during production may be required.
2. The field density and thickness of the pavement is determined by measuring the cores tested. The actual thickness must be no less than one-quarter (1/4") inch under the specified thickness from the approved plans. Asphalt that does not meet thickness requirements shall be overlaid the entire width of the roadway in even station increments. Transitions for any required overlays shall be milled in to the existing asphalt.

## 7.5 Documentation of Concrete Testing

At a minimum, the Engineer shall furnish test results of Portland cement concrete tests for concrete placed in the public rights-of-way and concrete incorporated into public infrastructure improvements. One set of tests taken by an approved ACI certified concrete technician shall be required for every fifty (50) cubic yards of concrete placed with a minimum of one (1) set of tests per project. The concrete shall be sampled in the field and specimens made and compliance determined in accordance with the following:

Sampling Fresh Concrete	ASTM C-172
Slump	ASTM C-143 or AASHTO T119
Air Content	ASTM C-231 or C-173 or C-138 or AASHTO T152, T196, & T199
Compressive Strength	ASTM C-39 or AASHTO T22
Making and Curing Test	ASTM C-31 or AASHTO T23

## 7.6 Checklist for Documentation of Testing and Inspections

A full checklist of the items that are required to be submitted to the Public Works Department and those items that will be inspected and approved by the Public Works Department can be found in Appendix B.

See Montana Public Works Standard Specification (MPWSS), Sixth Edition, Section 03310 regarding testing frequency, and specific requirements for structural concrete.

## **SECTION 8. CONSTRUCTION ACTIVITY CONDITIONS**

During any construction activity that is subject to approval and inspection by the County, the following conditions shall be met:

1. All construction activity is subject to the permit and fee requirements as set forth in these standards.
2. Whenever permit authorization is required from the Montana DEQ, a copy of approved permit shall be submitted to the Public Works Department prior to issuance of construction approval.
3. Whenever construction is to commence pursuant to the creation of a subdivision, a preconstruction conference shall be conducted by the engineer of record. Attendees shall include at a minimum the developer's engineer, the county road and bridge supervisor or their designee, the county engineer, and the contractor performing the work.
4. While disturbed areas of one (1) acre or greater requires a stormwater discharge permit authorization from the Montana DEQ, regardless of the disturbed area, erosion control Best Management Practices (BMP's) and Stormwater Pollution Prevention Plan (SWPPP) for all construction activity shall be submitted to the County as part of the construction plan submittal. During construction, the BMP's shall be used and maintained at all times by the Contractor. Once active construction activity has been completed, any temporary BMP's shall be removed and the area reclaimed. Where long-term BMP's are employed after construction activity is substantially complete, their installation shall be completed within fourteen (14) days of direction by the County. Long term BMP's shall be maintained by the Contractor for a period of one (1) year or until vegetation has been established over seventy (70%) percent of the disturbed area, whichever is longer.
5. It is the Contractor's responsibility to remove all material tracked from a construction site onto the abutting road, whether public or private. If a Contractor does not remove material tracked onto a public as needed, on a scheduled interval or at the direction of the County, the County will remove the tracked material and the Contractor will be liable for the costs incurred. If the Contractor fails to reimburse the County for the costs incurred, said costs will be recovered by any method allowed by law.
6. Vehicles, equipment or materials shall not block or impede the travel way or any non-motorized facilities. If any such item is located within a public right-of-way and is deemed by the County to be a nuisance or a threat to public safety, the item(s) will be considered an encroachment and removed from the right-of-way as allowed by law.
7. All construction is subject to section 14 of this manual.

## **SECTION 9. TRAFFIC ENGINEERING ANALYSIS**

### **9.1 Traffic Impact Studies**

Traffic Impact Studies, as described in this Manual, are intended to determine the need for any improvements to the adjacent and nearby transportation network in order to ensure that a proposed development does not adversely affect the transportation network; identify any traffic problems related to a development; to develop solutions to potential problems; and present improvements to be included in a proposed development. A sample Traffic Engineering Analysis outline is included in Appendix C and is based upon the current editions of Institute of Transportation Engineers (ITE) standards and the Highway Capacity Manual.

### **9.2 Preliminary Engineering Reports (PERs)**

1. A preliminary engineering report (PER) may be prepared as an initial task to analyze the deficiencies of a road located in public right-of-way. By evaluating a road or segment of a road's structural and geometric deficiencies or needs, and obtaining an initial snapshot of what improvements are necessary to meet or exceed County Road Standards, the County can better identify funding requirements, and begin subsequent planning for engineering and construction. A sample PER outline is included in Appendix C.
2. A PER, prepared and certified by an engineer licensed in the State of Montana, shall provide estimated costs of improvements necessary to make a road or segment of road meet or exceed the County Road Design Standards (Section 4). The PER shall describe the existing and proposed conditions within the traffic impact corridor to the extent necessary so that all components can be quantified and assigned an estimated cost. Estimated costs shall include the following:
  - a. Estimated preliminary and final engineering costs including, but not limited to, design plans and specifications, material testing during construction, inspection and administration;
  - b. Estimated costs of obtaining and completing necessary permits;
  - c. Estimated surveying costs;
  - d. Estimated right-of-way acquisition costs;
  - e. Estimated utility relocation costs;
  - f. Estimated costs for geotechnical and miscellaneous design related site testing and laboratory analysis;
  - g. Estimated costs for road construction/improvements including materials, turning lanes, horizontal alignment and vertical grade adjustments, construction staking, temporary and permanent erosion control, road subgrade stabilization including geotextiles and subbase, sidewalks, curb and gutter, topsoil salvage and replacement, revegetation, weed management, traffic signals, signal timing changes, temporary traffic control, traffic control, approaches, bridges, guardrails, signage and/or

pavement markings, non-motorized facilities, provisions for storm water drainage, and contingencies to bring the facility into compliance to these regulations; and

- h. Estimated costs for any other items necessary to improve the road.
3. Estimated costs shall not be older than six months at the time of final plat application. The burden of proof for estimated costs is the responsibility of the Developer. Estimated costs must be prepared and certified by an engineer licensed in the State of Montana. Estimated costs shall be submitted to the Public Works Department for review and recommendation. The governing body may, at the Developer's expense, require a third party, designated by the governing body, to review estimated costs as described in the PER.

## **SECTION 10. DUST ABATEMENT**

Any individual who wishes to apply a dust palliative on a County maintained road shall be required to obtain a permit from the Public Works Department. Permits issued by the Public Works Department are subject to the following conditions.

1. If the Public Works Department provides road surface preparation (grading), the Public Works Department will notify the Permittee when grading is complete. The permit will be void three (3) days after the Department gives notice to apply the dust suppressant.
2. It is the Applicator's responsibility to apply the dust palliative in a manner which minimizes the impact on adjacent property, natural resources and the traveling public. The Applicator shall comply with all applicable federal, state and local legislation and regulations which apply. These include, but are not limited to, water quality, waste disposal and hazardous materials disposal requirements.
3. The Permittee shall be responsible for any damage to public or private property caused by the application of the dust palliative.
4. If the above conditions are not met, the Public Works Department may refuse to issue a permit or suspend a permit already issued.
5. The Public Works Department reserves the right to maintain public rights-of-way at any time road conditions deteriorate in the best interest of the traveling public even if such action will diminish or destroy the effect of a dust treatment.
6. The following guidelines have been developed by the Public Works Department to assist individuals with the application of dust palliatives:
  - a. Used oil MAY NOT be used as a dust suppressant on any public road as per state law.
  - b. The Applicator shall use equipment and practices which distribute the dust palliative evenly over the road surface.
  - c. Dust palliatives shall not be applied when measurable precipitation is forecast at greater than thirty (30%) percent chance within the following twenty-four (24) hours by the National Weather Service.
  - d. Applicators of dust palliatives shall not apply dust control materials in a location where they are likely to contaminate water sources. This includes streams, river, ponds, irrigation ditches and creeks. The possibility of contamination from both over-spray and run-off should be closely monitored.
  - e. The Public Works Department reserves the right to restrict or ban the application of any material that it determines may be deleterious to property, water, animal and plant life, or that is a public nuisance.

## SECTION 11. SPEED LIMIT REQUESTS AND REVISIONS

If a public road in the County's jurisdiction does not have an ordinance for a speed limit, speed limits shall follow Section 61-8-310, MCA. The following is the general procedure to request a speed limit revision:

1. If required by statute, a request in writing must be submitted to the Public Works Department, located on 3402 Cooney Drive, Helena, MT, 59602. There is no set language for the request, but the typical language for the top of the request would read something like the following:

***"We, the undersigned, request that a speed limit be placed on " \_\_\_\_\_ Road"***

*(at this point the request needs to specify the road name and section – i.e. "X Road" from the intersection with "Y Road" to the intersection with "Z Road" or the entire length) for the following reasons: (i.e. poor sight distance, road width, safety, etc.).*

*Every signer must include his or her address, phone number and signature.*

2. Once the request is submitted, the County will review the request and determine if a speed limit study is warranted. Once this determination has been made a speed study will be conducted as set forth in Section 61-8-310, MCA, to determine the safest and most appropriate limit to be posted.
3. The County will draft a proposed ordinance and provide public notice as per Section 7-1-2121, MCA, and place it on a public meeting agenda. The proposed ordinance will be read at two separate public meetings. The County suggests at least one person be willing to speak at the public meetings in support of the newly requested speed limit.
4. Following the second reading and approval of the proposed ordinance and a protest period of thirty (30) days, the speed limit goes into effect and is punishable by law. The County will post speed limit signs after the thirty (30) day waiting period.

You may contact the Public Works Department at (406) 447-8037 or (406) 447-8031, if you have any questions or need additional information.



## **SECTION 12. WEIGHT RESTRICTIONS ON COUNTY ROADS AND BRIDGES**

In the interest of preserving the integrity of a County public road or bridge and pursuant to Sections 7-14-2101 and 7-14-2102 MCA, the Commission may authorize the Public Works Department to post appropriate temporary or permanent weight restrictions on any public road or bridge under the County's jurisdiction through the adoption of an Ordinance or a Resolution. Enforcement of these restrictions is conducted by the Lewis & Clark County Sheriff's Office and the Montana Department of Transportation, Motor Carrier Services Division, with penalties as prescribed in Sections 61-10-141 through 61-10-147 MCA.

### **12.1 Road Restrictions**

Seasonal load restrictions are often necessary to prevent surface damage to hard surfaced or gravel roads. The County will place load restrictions for single axle and tandem axle weights based upon pounds per inch width of tire limits on roads vulnerable to distress. The County will place load restrictions only when necessary and lift the limits as soon as possible.

In the order of severity, the following types of restrictions to be imposed on County public road rights-of-way are:

1. Where the public road surfaces for the entire route are adequate to carry legal loads, the County may place a reduced speed limit on those sections that show distress.
2. Where the public road surface is susceptible to damage from heavy loads, load limits will be imposed for the entire section of a public road. The limitation will be eight (8) tons single axle and sixteen (16) ton tandem axle (400 pounds per inch width of tire) and a reduced speed limit may be placed through distressed areas.
3. Where the County determines the public road surface is particularly susceptible to extensive damage from heavy loads, or where surface damage cannot be controlled by less restrictive limits, then the limitation will be seven (7) tons single axle and fourteen (14) tons tandem axle (350 pounds per inch width of tire) and a reduced speed limit may be placed through distressed areas.
4. **Exception:** The County recognizes the need for essential services, such as the supply of propane or heating oil, septic pumping, and the pick-up of solid waste. Overweight permits with identified restrictions may be issued to these service providers by the County and the Montana Department of Transportation that will allow service to continue.

### **12.2 Bridge Restrictions**

In accordance with County Bridge Standards, which can be found on the County website, permanent load restrictions may be necessary for County bridges that are not capable of carrying legal highway loads. If it is determined that a posted weight restriction is necessary, the County will post the restriction at the Inventory Rating. The Inventory Rating is the limit at which

repeated loads may safely cross the structure without causing damage. The Operating Rating is the limit where larger loads may cross the structure at very infrequent intervals without causing damage and is the governing factor for the issuance of overweight permits as related to County bridges.

### **SECTION 13. PARKING RESTRICTIONS**

As provided in Section 61-8-355(4), MCA, the County has the authority to place official traffic control devices prohibiting or restricting the stopping, standing, or parking of vehicles on a highway where in its judgment this stopping, standing, or parking is dangerous to those using the highway or where stopping, standing, or parking unduly interferes with the free movement of traffic.

1. All traffic control devices installed to limit stopping, standing, or parking on all County Roads or a public right-of-way shall contain a reference to Section 61-8-355 (4), MCA, and Section 13 of the County Public Works Manual.

## **SECTION 14. SEEDING AND WEED MANAGEMENT**

Pursuant to Section 7-22-2121, MCA (County Weed Control), anyone significantly disturbing soil must submit a written weed management and re-vegetation plan to the County Weed District for review and approval per the requirements of the Roadside Weed Control Permit found on the County website. All requirements and specifications of an approved plan must be met prior to commencing any road construction project, during construction, and after construction.

## **SECTION 15. APPEAL PROCEDURE**

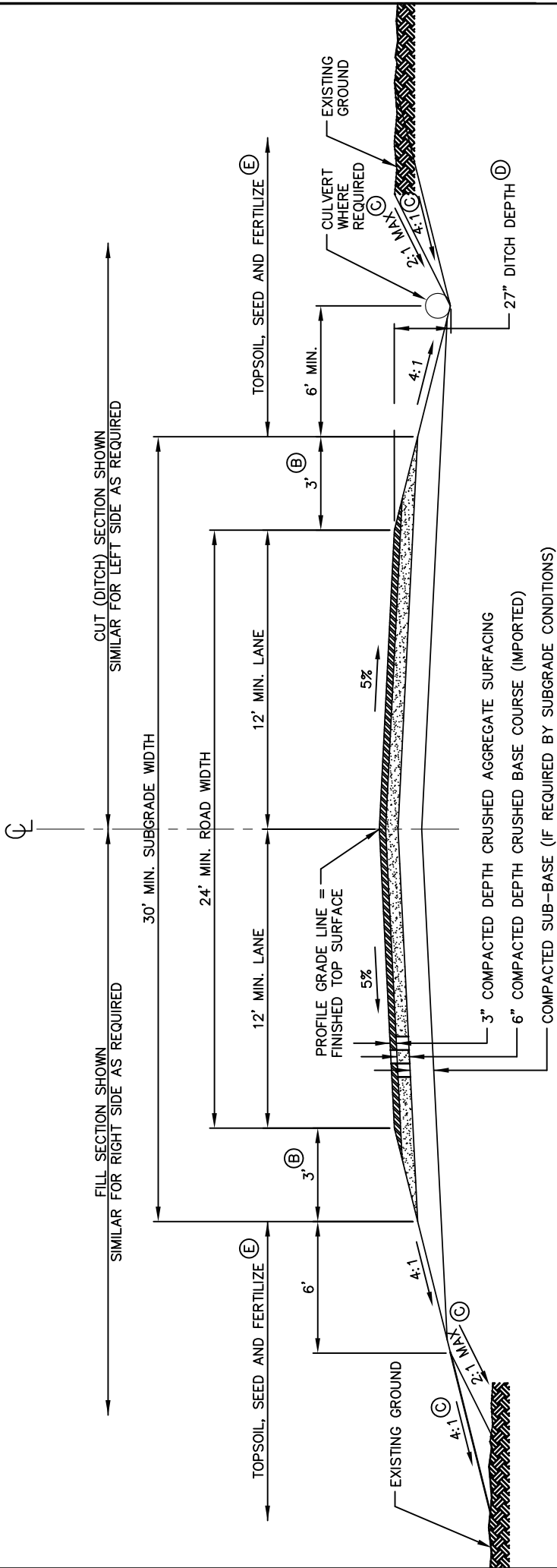
This appeal procedure is established for anyone wishing to depart from the requirements set forth in Sections 2,3, 5, and 6 of this Manual. The appeal should be in writing, signed by Applicant/Owner/Entity or affected party, and should contain, but is not limited to, the following information:

1. The name, address, and phone number of the person filing the appeal;
2. A description of the problem, detailing site-specific restrictions and why they are requesting relief from denial of a permit or conditions of a permit, or an enforcement action and suggested solution;
3. The location and site information to support their appeal; and
4. A copy of the original application and conditions.

The appeal must be submitted within thirty (30) calendar days of receiving notice of specific applicable conditions or a denied application. Appeals shall be submitted to the Secretary for the Board of County Commissioners, 316 N. Park Ave. Rm. 345, Helena, MT 59623.

After receiving an appeal, the Commission will schedule a public hearing. At least five (5) days prior to the hearing date, the Commission shall send notice of the hearing to the Applicant. At the hearing, the Applicant has the burden of proof by preponderance of the evidence and shall first present evidence. The County staff shall then present its evidence. The Applicant may then present rebuttal evidence. The Commission must make a decision affirming, modifying, or overturning the decision of County staff. The Commission shall notify the Applicant of the decision, in writing, within thirty (30) working days following its decision.

Appendix A  
Design Standards  
Drawings



**FOOTNOTES:**

DRAWING NOT TO SCALE

ALL SURFACING COURSES, INCLUDING THE SUBGRADE, SHALL BE COMPACTED PER MPWSS. THE DIMENSIONS AND DEPTHS SHOWN ARE MINIMUM AND MAY REQUIRE AN INCREASE BASED ON PROJECT SPECIFIC NEEDS OR SITE REQUIREMENTS.

(A) REFER TO TYPICAL ROAD SECTION #2 IF PAVED SURFACE IS REQUIRED. TYPICAL ROAD SECTION #1 APPLICABLE TO GRAVEL SURFACED ROADS ONLY.

(B) BASED ON THE MIN. 3" DEPTH CRUSHED AGGREGATE SURFACING AND 6" DEPTH OF CRUSHED BASE COURSE. DIMENSION SHALL BE WIDENED AS MATERIAL DEPTHS INCREASE. PLACE ADDITIONAL 3" COMPACTED DEPTH CRUSHED AGGREGATE SURFACING ON 3' SURFACING INSLOPE (TYPICAL EACH SIDE).

(C) 4:1 SLOPES STANDARD. STEEPER SLOPES MAY BE REQUIRED IF SPECIFIC PROJECT CONDITIONS WARRANT.

(D) 27" DITCH DEPTH IS APPROXIMATE TO MEET RECOMMENDED COVER REQUIREMENTS FOR MINIMUM SIZE (15" DIAMETER) CULVERT. LARGER DIAMETER CULVERTS MAY REQUIRE DEEPER DITCHES TO MEET RECOMMENDED CULVERT COVER REQUIREMENTS.

(E) REVEGETATE CUT & FILL SLOPES IN ACCORDANCE TO THE PROJECT SPECIFIC VEGETATION RESTORATION PLAN.

FEB., 2014	RPA
DATE	DRAWN BY
REVISION NO.	CHECKED BY
REVISION NO.	APPROVED BY



TITLE

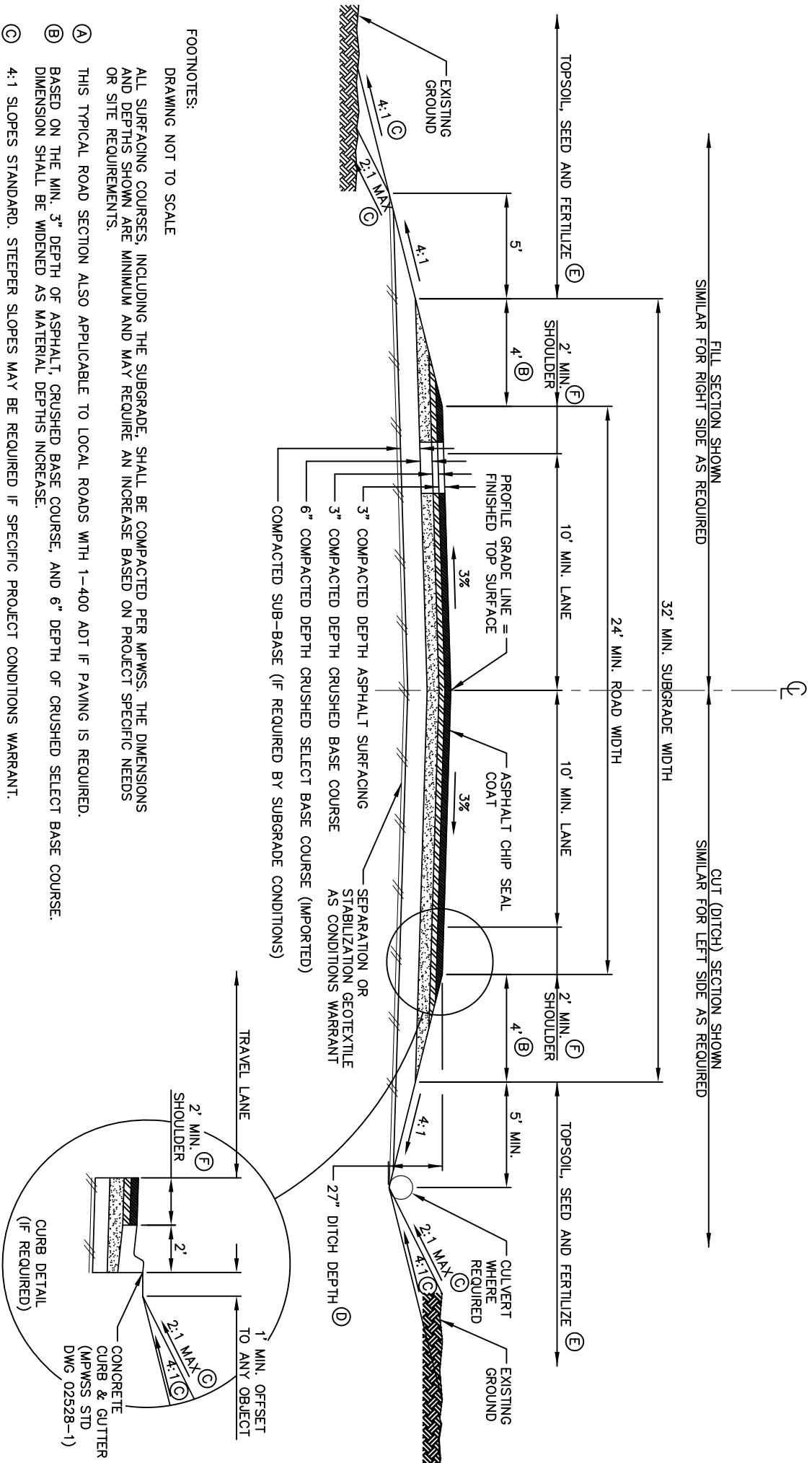
**DEPARTMENT OF PUBLIC WORKS**

FIGURE 1 - TYPICAL SECTION #1  
TYPICAL GRAVEL ROAD SECTION - LOCAL ROAD: 1-400 ADT (A)

SHEET

1

1 OF 4



- FOOTNOTES:  
DRAWING NOT TO SCALE
- ALL SURFACING COURSES, INCLUDING THE SUBGRADE, SHALL BE COMPACTED PER MPWSS. THE DIMENSIONS AND DEPTHS SHOWN ARE MINIMUM AND MAY REQUIRE AN INCREASE BASED ON PROJECT SPECIFIC NEEDS OR SITE REQUIREMENTS.
- (A) THIS TYPICAL ROAD SECTION ALSO APPLICABLE TO LOCAL ROADS WITH 1-400 ADT IF PAVING IS REQUIRED.
  - (B) BASED ON THE MIN. 3" DEPTH OF ASPHALT, CRUSHED BASE COURSE, AND 6" DEPTH OF CRUSHED SELECT BASE COURSE. DIMENSION SHALL BE WIDENED AS MATERIAL DEPTHS INCREASE.
  - (C) 4:1 SLOPES STANDARD. STEEPER SLOPES MAY BE REQUIRED IF SPECIFIC PROJECT CONDITIONS WARRANT.
  - (D) 27" DITCH DEPTH IS APPROXIMATE TO MEET RECOMMENDED COVER REQUIREMENTS FOR MINIMUM SIZE (15" DIAMETER) CULVERT. LARGER DIAMETER CULVERTS MAY REQUIRE DEEPER DITCHES TO MEET RECOMMENDED CULVERT COVER REQUIREMENTS.
  - (E) REVEGETATE CUT & FILL SLOPES IN ACCORDANCE TO THE PROJECT SPECIFIC VEGETATION RESTORATION PLAN.
  - (F) WIDEN SHOULDER IF PARKING IS REQUIRED.

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DEPARTMENT OF PUBLIC WORKS

FIGURE 2 - TYPICAL SECTION #2

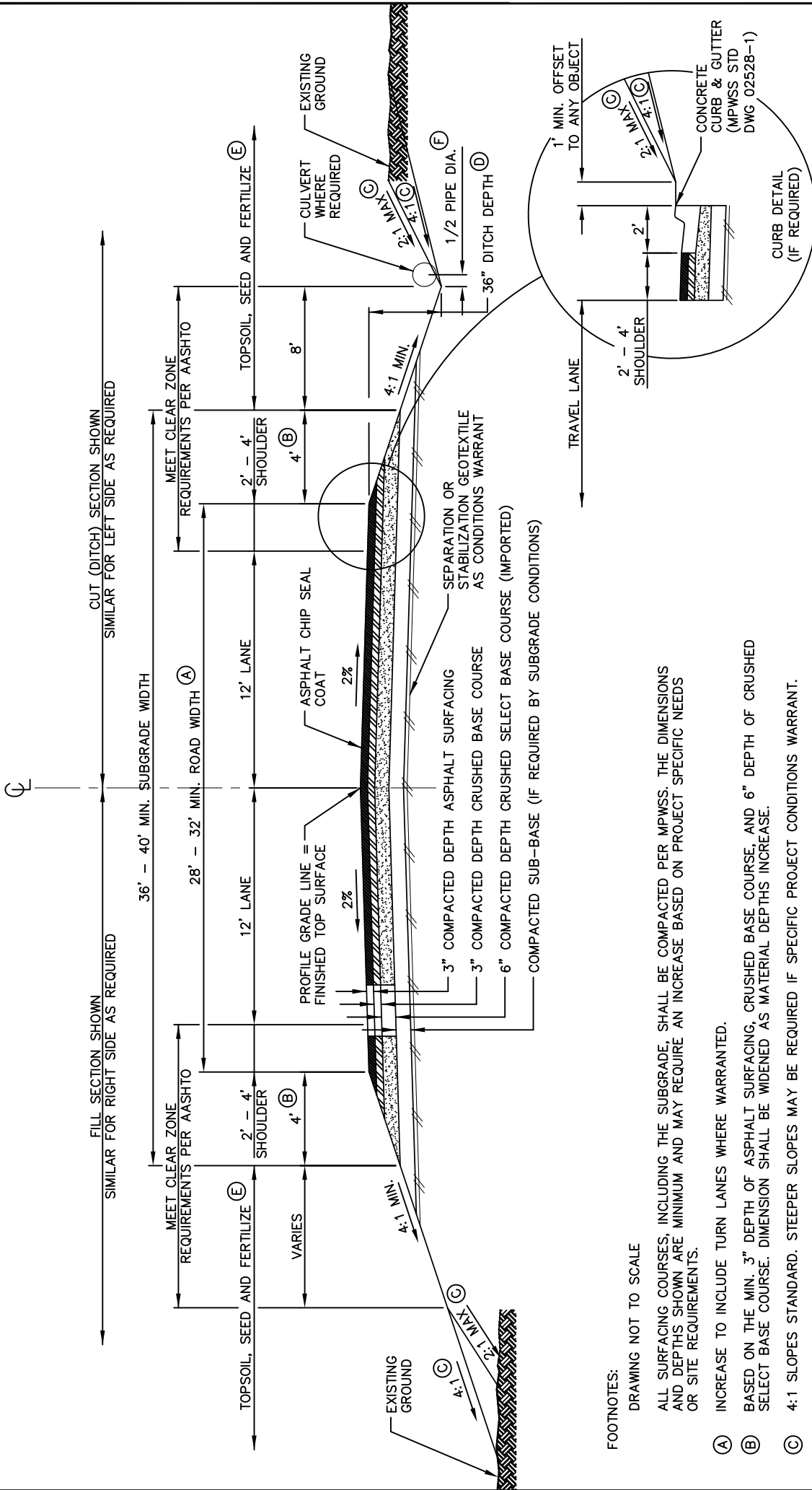
TYPICAL PAVED ROAD SECTION - LOCAL ROAD: 401-1500 ADT (A)

SHEET

2

2 OF 4





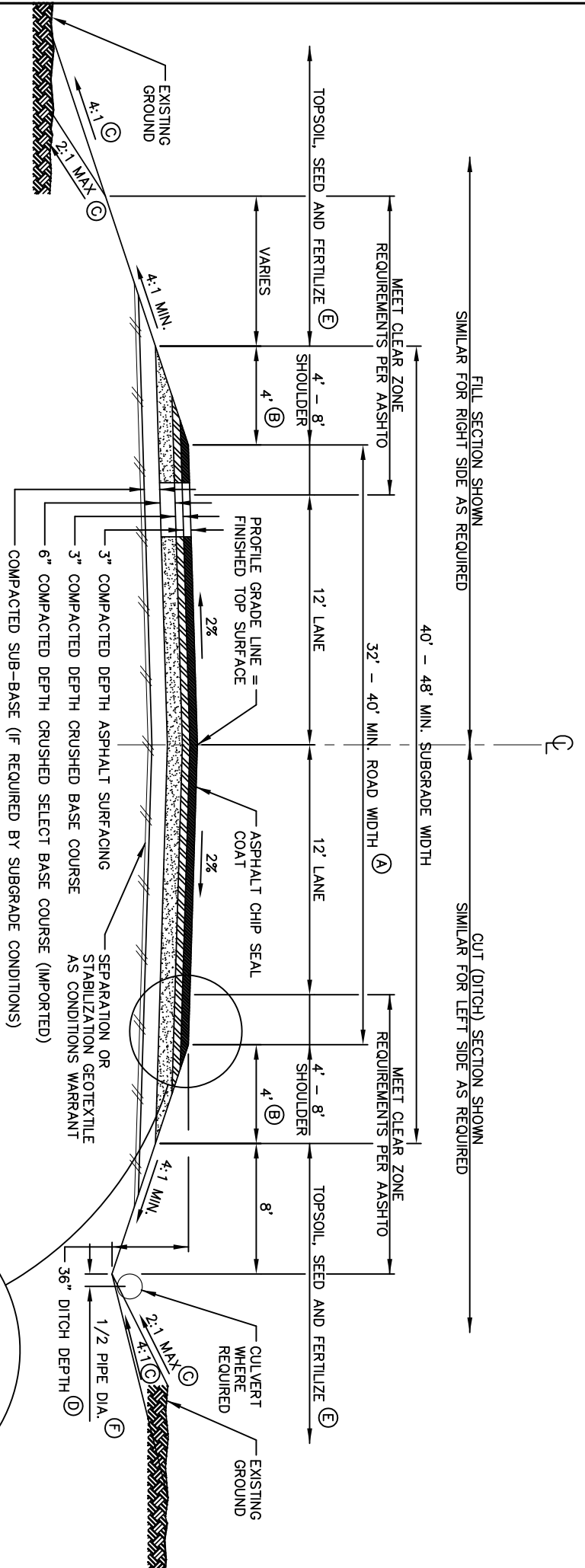
**FOOTNOTES:**

DRAWING NOT TO SCALE

ALL SURFACING COURSES, INCLUDING THE SUBGRADE, SHALL BE COMPACTED PER MPWSS. THE DIMENSIONS AND DEPTHS SHOWN ARE MINIMUM AND MAY REQUIRE AN INCREASE BASED ON PROJECT SPECIFIC NEEDS OR SITE REQUIREMENTS.

- (A) INCREASE TO INCLUDE TURN LANES WHERE WARRANTED.
- (B) BASED ON THE MIN. 3" DEPTH OF ASPHALT SURFACING, CRUSHED BASE COURSE, AND 6" DEPTH OF CRUSHED SELECT BASE COURSE. DIMENSION SHALL BE WIDENED AS MATERIAL DEPTHS INCREASE.
- (C) 4:1 SLOPES STANDARD. STEEPER SLOPES MAY BE REQUIRED IF SPECIFIC PROJECT CONDITIONS WARRANT.
- (D) 36" DITCH DEPTH IS APPROXIMATE TO MEET RECOMMENDED COVER REQUIREMENTS FOR MINIMUM SIZE (15" DIAMETER) CULVERT. LARGER DIAMETER CULVERTS MAY REQUIRE DEEPER DITCHES TO MEET RECOMMENDED CULVERT COVER REQUIREMENTS.
- (E) REVEGETATE CUT & FILL SLOPES IN ACCORDANCE TO THE PROJECT SPECIFIC VEGETATION RESTORATION PLAN.
- (F) CULVERT PIPE PLACED SLIGHTLY ABOVE DITCH GRADE CLOSER TO ROW EDGE WITH MANUFACTURER'S RECOMMENDED COVER & GRADE (12" MINIMUM COVER).

	<p><b>DEPARTMENT OF PUBLIC WORKS</b></p> <p>FIGURE 3 - TYPICAL SECTION #3</p> <p>TYPICAL PAVED ROAD SECTION - MINOR COLLECTOR</p>	<p>SHEET</p> <p style="font-size: 2em; font-weight: bold;">3</p> <p>3 OF 4</p>
<p>JAN., 2012</p> <p>DATE</p> <p>SEPT., 2012</p> <p>REVISION NO.</p> <p>REVISION NO.</p>	<p>RPA</p> <p>DRAWN BY</p> <p>CHECKED BY</p> <p>APPROVED BY</p>	
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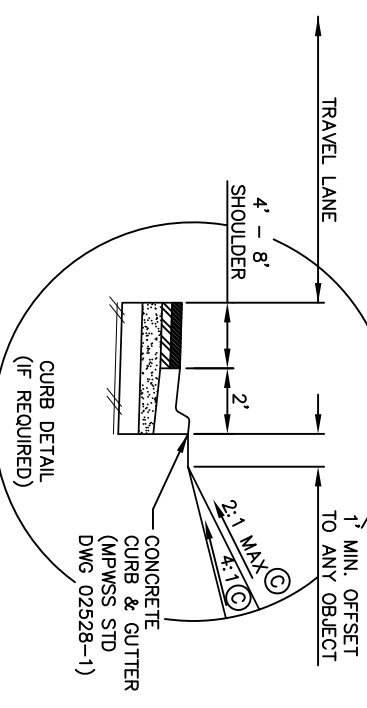


**FOOTNOTES:**

DRAWING NOT TO SCALE

ALL SURFACING COURSES, INCLUDING THE SUBGRADE, SHALL BE COMPACTED PER MPWSS. THE DIMENSIONS AND DEPTHS SHOWN ARE MINIMUM AND MAY REQUIRE AN INCREASE BASED ON PROJECT SPECIFIC NEEDS OR SITE REQUIREMENTS.

- (A) INCREASE TO INCLUDE TURN LANES WHERE WARRANTED.
- (B) BASED ON THE MIN. 3" DEPTH OF ASPHALT SURFACING, CRUSHED BASE COURSE, AND 6" DEPTH OF CRUSHED SELECT BASE COURSE. DIMENSION SHALL BE WIDENED AS MATERIAL DEPTHS INCREASE.
- (C) 4:1 SLOPES STANDARD. STEEPER SLOPES MAY BE REQUIRED IF SPECIFIC PROJECT CONDITIONS WARRANT.
- (D) 36" DITCH DEPTH IS APPROXIMATE TO MEET RECOMMENDED COVER REQUIREMENTS FOR MINIMUM SIZE (18" DIAMETER) CULVERT. LARGER DIAMETER CULVERTS MAY REQUIRE DEEPER DITCHES TO MEET RECOMMENDED CULVERT COVER REQUIREMENTS.
- (E) REVEGETATE CUT & FILL SLOPES IN ACCORDANCE TO THE PROJECT SPECIFIC VEGETATION RESTORATION PLAN.
- (F) CULVERT PIPE PLACED SLIGHTLY ABOVE DITCH GRADE CLOSER TO ROW EDGE WITH MANUFACTURER'S RECOMMENDED COVER & GRADE (12" MINIMUM COVER).

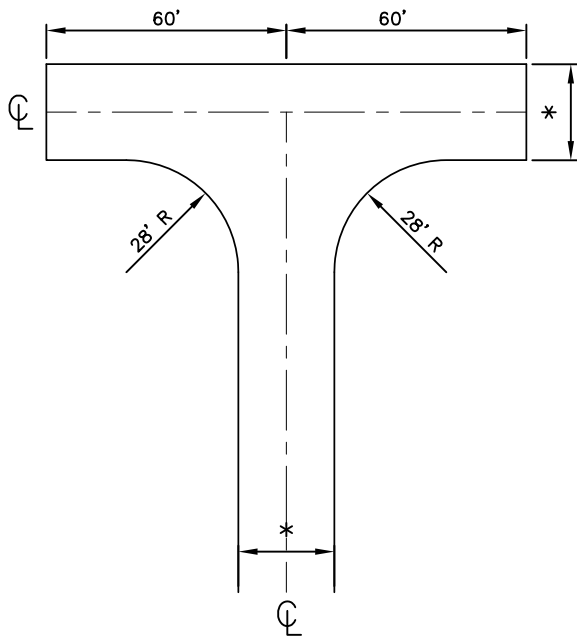


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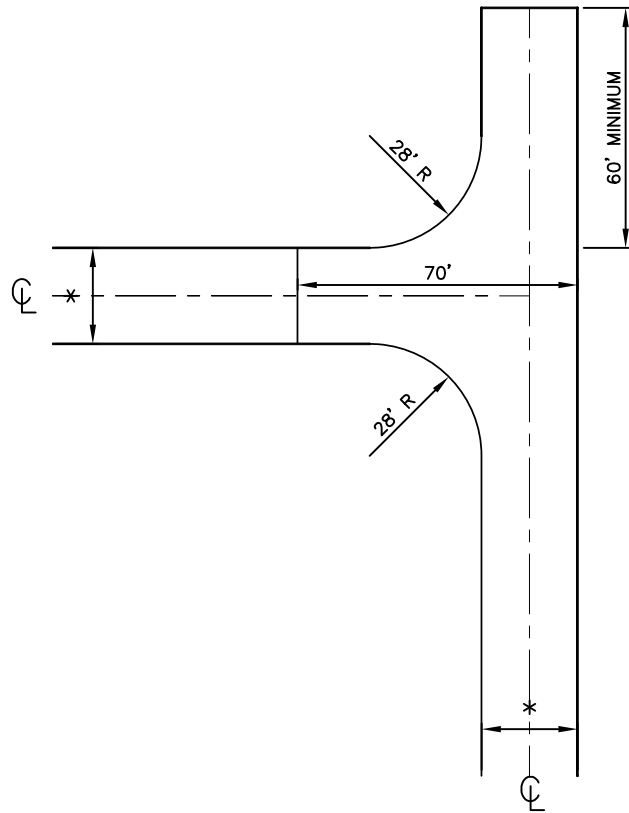


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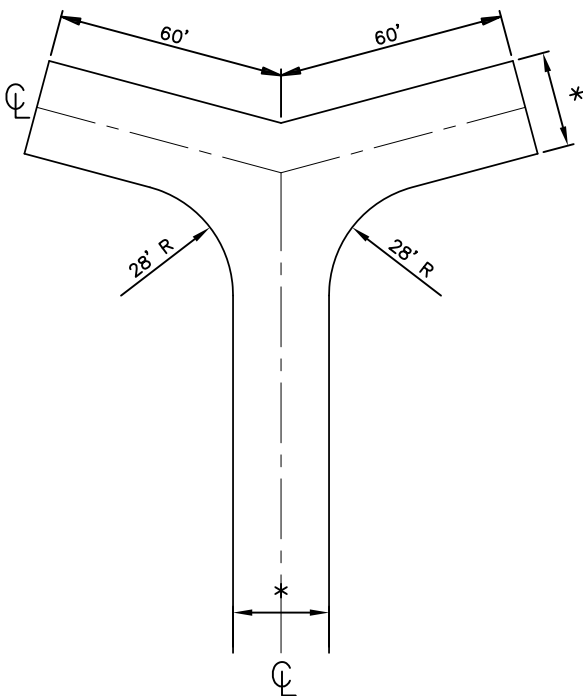
DEPARTMENT OF PUBLIC WORKS  
 FIGURE 4 - TYPICAL SECTION #4  
 TYPICAL PAVED ROAD SECTION - MAJOR COLLECTOR



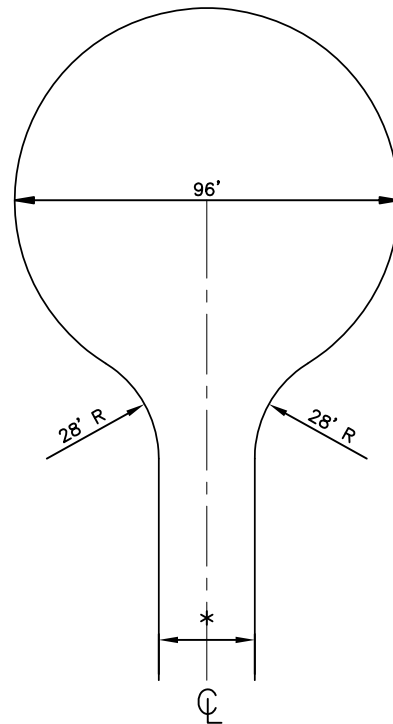
120' HAMMERHEAD



ACCEPTABLE ALTERNATIVE TO 120' HAMMERHEAD



ACCEPTABLE ALTERNATIVE TO 120' HAMMERHEAD



96' CUL-DE-SAC

TURNAROUNDS ARE BASED ON THE INTERNATIONAL FIRE CODE INSTITUTE APPLICATION MANUAL (1995 E)

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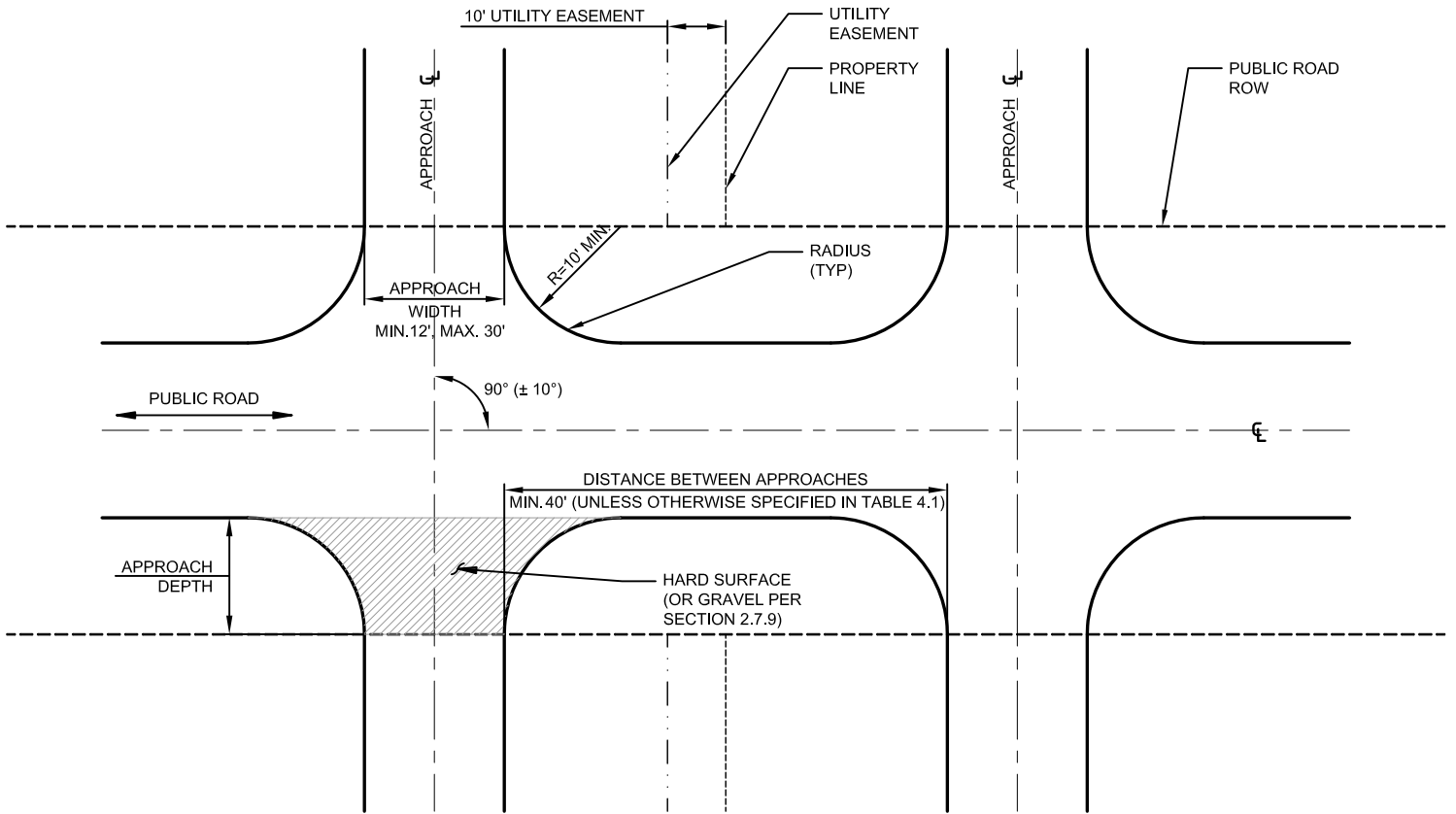
TITLE

DEPARTMENT OF PUBLIC WORKS  
ACCEPTABLE TURNAROUNDS  
FIGURE 5

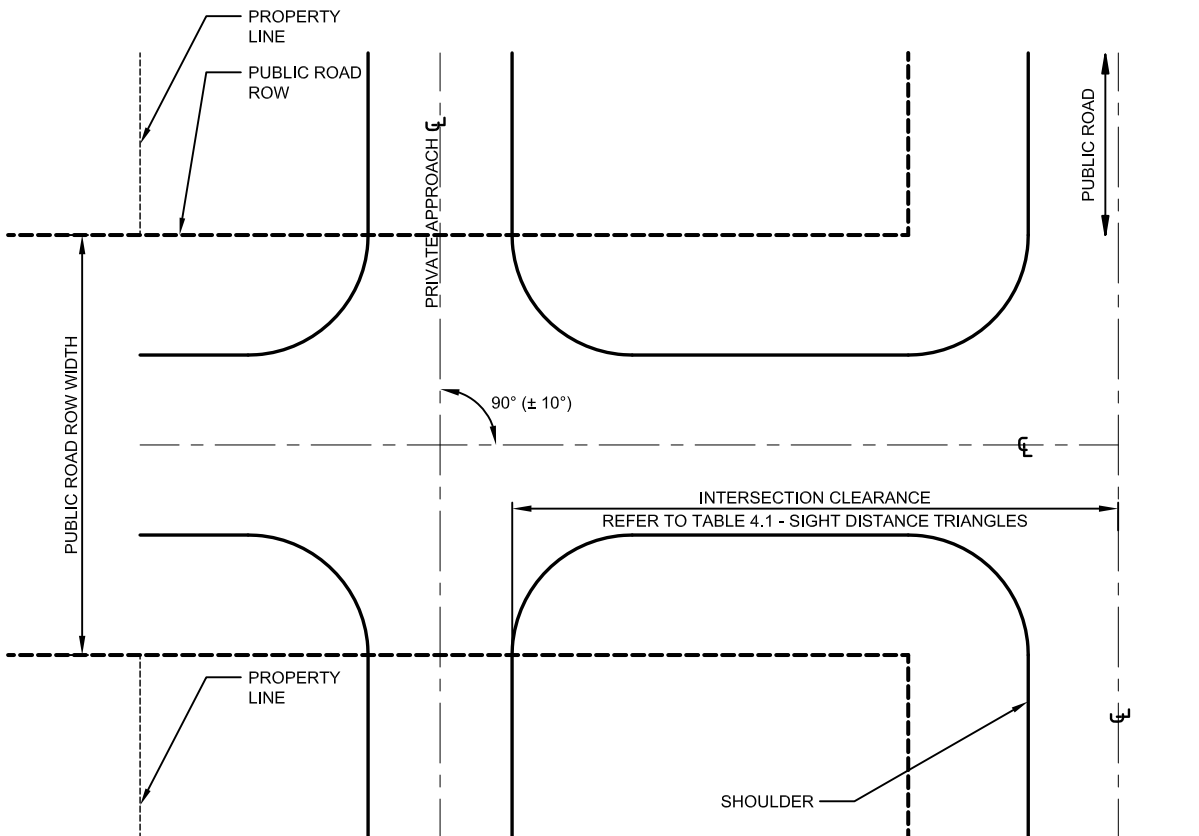
SHEET

1

1 OF 1

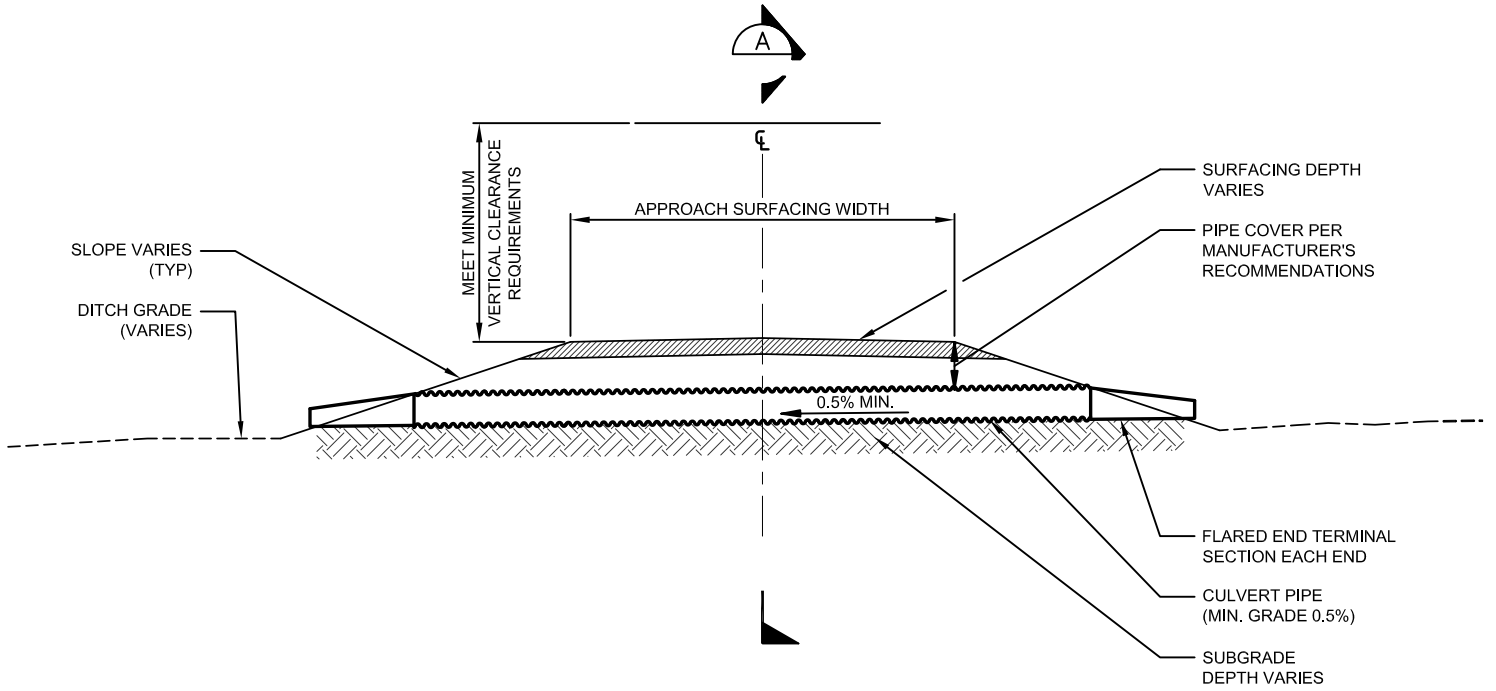


**SEPARATION BETWEEN DRIVEWAY APPROACHES**

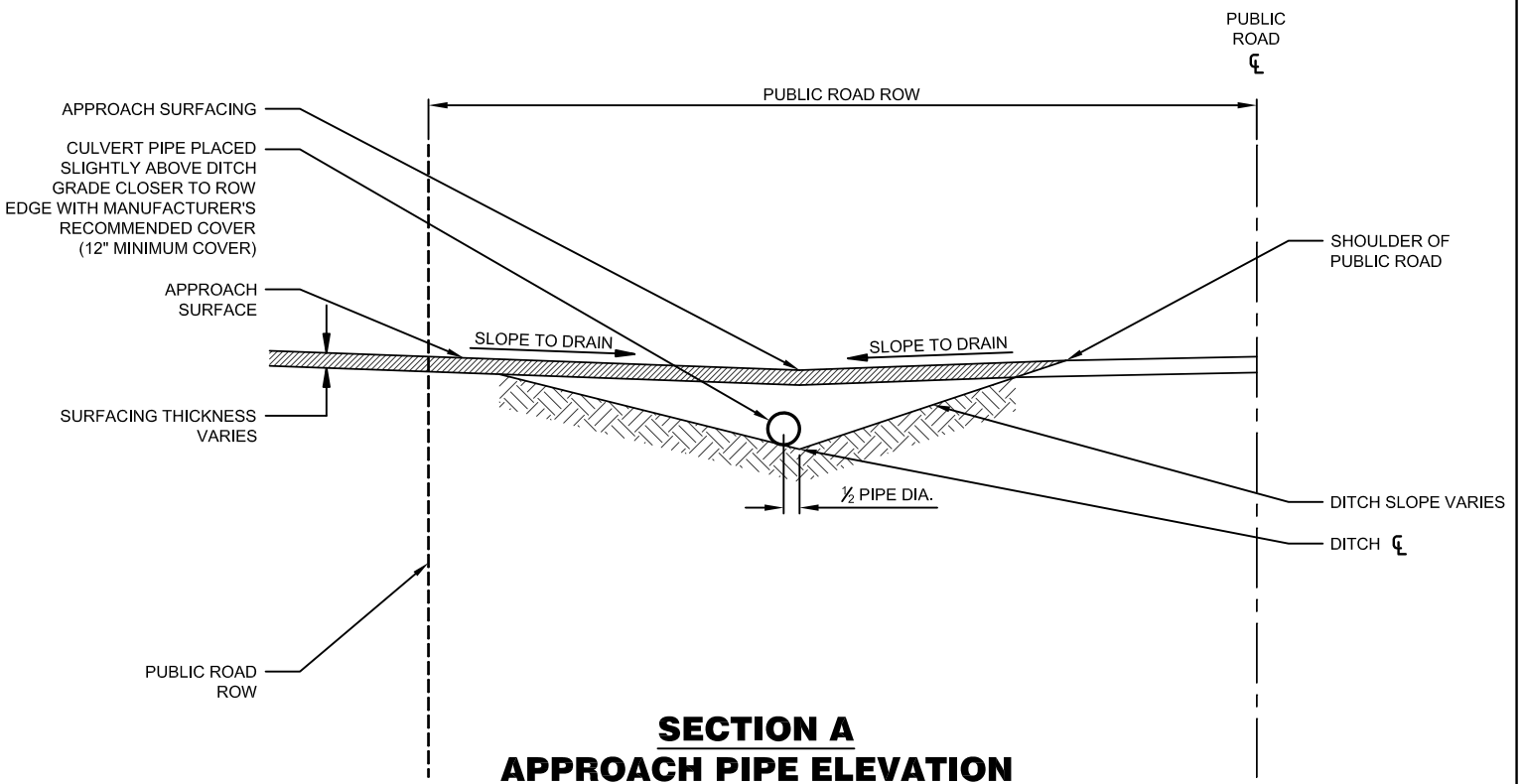


**APPROACH SEPARATION TO INTERSECTION OF PUBLIC ROAD**

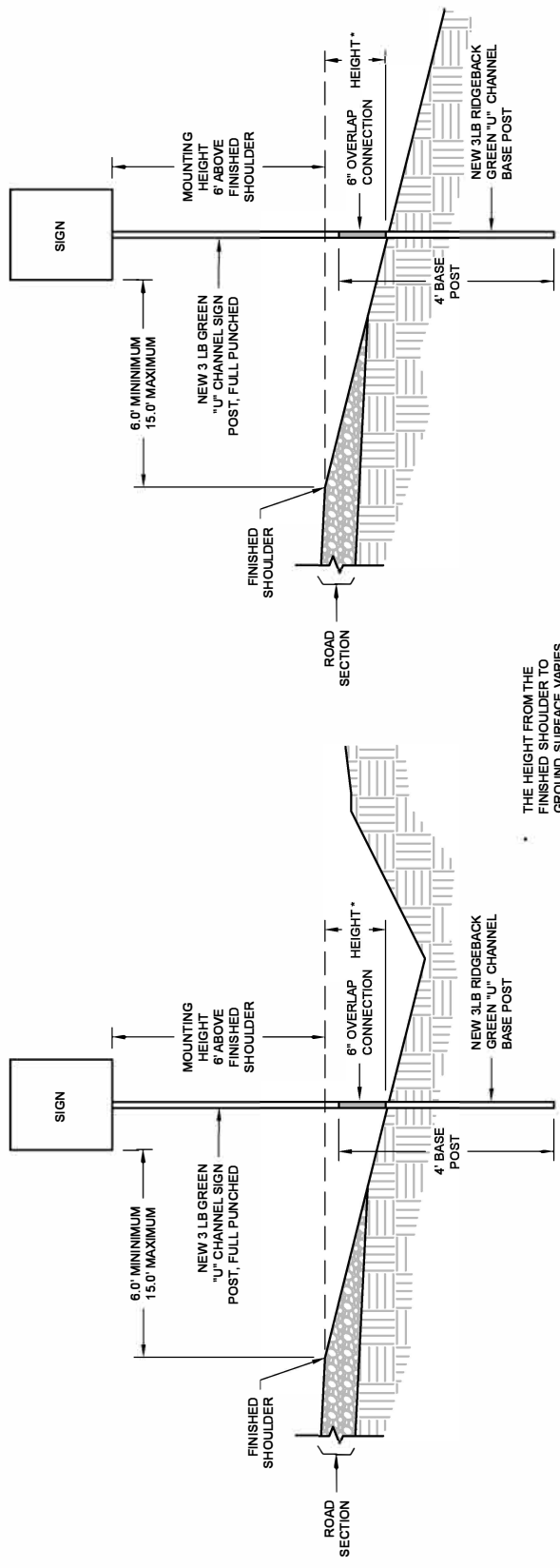
FIGURE 6A - APPROACH DRAINAGE STANDARDS



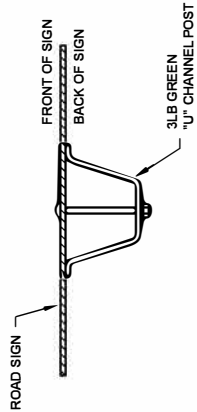
**APPROACH PIPE PROFILE**



**SECTION A  
APPROACH PIPE ELEVATION**



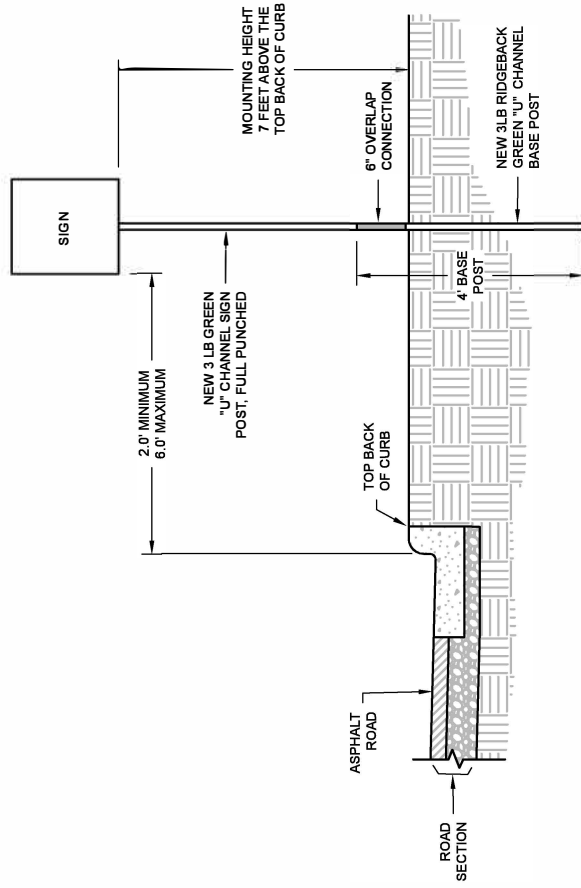
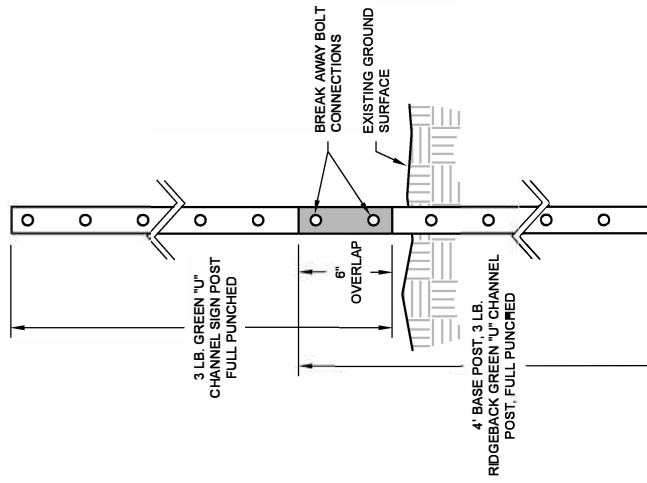
### MOUNTING HEIGHTS AND LATERAL LOCATION



### TYPICAL SIGN MOUNTING

- NOTES:
1. ESTABLISH THE CORRECT LOCATION FOR THE POST AND CALL FOR UTILITY LOCATES.
  2. DRIVE A 4 FOOT LONG 3 LB FULL PUNCHED RIDGEBACK GREEN "U" CHANNEL POST (BASE POST) INTO THE GROUND LEAVING 4 TO 6 INCHES ABOVE GRADE. ESTABLISH THE CORRECT HEIGHT OF POST. CUT THE SIGN POST AND ATTACH IT TO THE BASE POST BY OVERLAPPING THE SIGN POST AND BASE POST BY 6 INCHES AND CONNECTING TWO BREAKAWAY BOLTS. (SEE FIGURE 2)
  3. STOP, YIELD, AND STREET SIGNS WILL BE INSTALLED ON THE RIGHT SIDE OF THE ROAD AS THE DRIVER APPROACHES THE INTERSECTION.
  4. ONLY ONE STREET SIGN(S) PER INTERSECTION.
  5. ALL SIGN MOUNTING HARDWARE MAY BE PURCHASED FROM LEWIS & CLARK COUNTY.

FIGURE 7 - SIGN MOUNTING GUIDELINES



**BASE POST & SIGN POST CONNECTION**

**MOUNTING HEIGHTS AND LATERAL LOCATION**

**FIGURE 8 - SIGN MOUNTING GUIDELINES**

**Appendix B**  
**Construction**  
**Certification Checklist**



**LEWIS AND CLARK COUNTY  
TESTS AND SPECIFICATIONS FOR SUBDIVISIONS AND INFRASTRUCTURE IMPROVEMENTS  
MATERIALS TESTING AND SUBMITTAL CHECKLIST**

Reference	Description	Frequency	Contractor and or Subdivider Responsibility	Information Submitted Yes No
<b>SUBGRADE AND BASE AGGREGATES</b>				
ASTM D1883	California Bearing Ratio	1 per mile if soil classification changes	X	
AASHTO T99	<b>Subgrade:</b> Moisture Density	1 per soil type	X	
AASHTO T99, T11, T27, T89, T90	<b>Select Base:</b> Moisture Density, Agg. Gradation, Liquid and Plastic Limit	1 per aggregate type	X	
AASHTO T99, T11, T27, T89, T90	<b>Crushed Top Surfacing</b> Moisture Density, Agg. Gradation, Liquid and Plastic Limit	1 per aggregate type (Gravel road surfacing or paved surface)	X	
ASTM D2922, D3017	In-place field density	1 test per 300 lineal feet; each lift of subgrade, select base and top surfacing	X	
<b>AGGREGATE SOURCE ACCEPTANCE (SUBMITTAL ONLY REQUIRED)</b>				
If not using approved commercial source, then the following aggregate testing will be required.				
ASTM C131	Los Angeles Abrasion	1 per source	X	
ASTM C88	Sodium Sulfate Soundness	1 per source	X	
ASTM D4318	Atterberg Limits	1 per source	X	
ASTM D2419	Sand Equivalent	1 per source	X	
ASTM D5821	Fractured faces	1 per source	X	
ASTM D4791	Flats & Elongates	1 per source	X	
<b>BITUMINOUS PLANT MIX PAVING (1 LOT = 2000 Tons; 4-SUBLOTS of 500 Tons Each)</b>				
ASTM	Bitumen Certifications	Each Tanker	X	
Asphalt Institute MS-2	Job Mix Formula <b>(Submittal Only)</b>	One per oil type and aggregate source	X	
ASTM D6926/6927 AATM D2041	Marshall Density, Stability and Flow, Air Voids	2 per lot	X	
ASTM D6307 AASHTO T30	Asphalt Content by Ignition Furnace Method Agg. Gradation from Ignition burnout	2 per lot 2 per lot	X X	
AASHTO T329	Moisture content of bituminous mixture by oven method	1 time per lot	X	
ASTM C566 & D1461	Moisture Content of Aggregate & Mixture	1 per lot	X	
ASTM D2726	Cored Bulk Specific Gravity	1 set of 2 cores per 1000 Ton 4" diameter cores	X	
ASTM D3549	Thickness of Cores	Thickness on all cores	X	
Asphalt Institute MS-2	Voids in Mineral Aggregate (VMA)	Calculated 2 times per lot	X	
ASTM D2950	Nuclear In-Place Density	As necessary to achieve specified density <b>Acceptance for density is by cores only</b>	X	

**One lot consists of one days production not to exceed 2,000 tons. Partial lots will be considered for mechanical break down, or shut down due to weather.**

Appendix C  
Traffic Engineering  
Analysis Outlines

## Traffic Impact Study outline

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The contents of a Traffic Impact Study vary with the size and complexity of the development proposal and are customized on a case-by-case basis to meet the specific needs of the study. The following guidelines describe the elements required (at a minimum) for preparing a Traffic Impact Study and provide for the consistent preparation of these studies throughout the County. The purpose of a Traffic Impact Study is to: ensure that the proposed developments do not adversely affect the transportation network; identify any traffic problems related to the development; to develop solutions to the potential problems; and present improvements to be included in the proposed development. The TIS shall contain, at a minimum, the following information and be provided in the recommended format below:

1. Introduction
2. Existing Conditions
  - 2.1. Existing Transportation System
  - 2.2. Traffic Data Collection
  - 2.3. Existing Performance Analysis
3. Future Conditions
4. Proposed Development
  - 4.1. Trip Generation Characteristics
  - 4.2. Trip Distribution and Assignment
5. Traffic Impacts with Development
6. Recommendations
7. Summary and Conclusions

A brief narrative for recommended content of each chapter of the TIS follows.

### Introduction

This section of the Traffic Impact Study should include the location of the development site and a description of the proposed development. The description should include the existing and proposed uses of the site, size of the proposed development, general terrain features, access to the site, and anticipated completion date of the development (including phasing). This will include the square footage of each use or number of units proposed.

#### Figures to be included in this section include:

- Vicinity Map
- Site Plan

### Existing Conditions

This section of the Traffic Impact Study should include discussion about the existing roadways, traffic data collected for the development, and a level of service analysis and volume/capacity ratio for all intersections and road segments within the study area.

### Existing Transportation System

The Traffic Impact Study should identify existing conditions of the roads and intersections within the traffic impact corridor. This should include the geometric data (number of lanes, intersection configurations, functional classification, etc.), traffic controls, and traffic volumes.

### Traffic Data Collection

In order to determine the existing traffic demands within the study area, average daily traffic (ADT) count data and manual turning movement count data should be collected. ADT count data should be adjusted to account for seasonal use factors to achieve an average annual daily traffic (AADT) value. If possible, speed data and vehicle classification data should be collected as well.

Manual turning movement counts should be collected at the study area intersections during peak hours (7:00 a.m. – 9:00 a.m. and 4:00 p.m. – 6:00 p.m.) on a Tuesday, Wednesday, or Thursday during weeks, which have no holidays. Off-peak time periods may be analyzed based on the proposed development type (school, shopping centers, theaters, etc.). All studies should include at least two peak hour periods unless pre-approved otherwise by the governing body.

### Existing Performance Analysis

Utilizing techniques as described in the current *Highway Capacity Manual (HCM)*, the relative balance between roadway volumes and capacity, along with the level of service, should be assessed for all major intersections and road segments within the study area.

#### Figures to be included in this section include:

- Existing AM peak hour volumes
- Existing PM peak hour volumes
- Existing AADT traffic volumes

### Future Conditions

The future conditions should be analyzed for the year in which the project is expected to be built out. If the project is proposed to occur over multiple phases, each phase should be evaluated on its corresponding build-out year. The surface transportation network (without the proposed development) assumed for the future

planning horizon should reflect any existing facilities plus general traffic growth, any firmly committed transportation improvements, and other planned developments that would affect roadways within the study area.

An analysis of the study area should be conducted using anticipated (future) traffic volumes without the proposed development. Future daily and peak hour traffic volumes should be developed for the study area. The method and assumptions should be documented clearly so calculations are easy to follow and replicated if necessary.

A capacity analysis and level of service analysis should be completed for all peak hours for future conditions at all major intersections and road segments within the study area.

Figures to be included in this section include:

- Development site plan
- Future AM peak hour volumes (without development)
- Future PM peak hour volumes (without development)
- Future AADT traffic volumes (without development)

Proposed Development

This section discusses the proposed development characteristics and determines the number of additional trips and distribution rates that are expected to occur as a result of the development.

Trip Generation Characteristics

A trip generation analysis should be performed to determine future traffic volumes attributable to the proposed development in the study area using the latest edition of the *Institute of Transportation Engineers (ITE) Trip Generation Manual* or other industry publications. This analysis establishes the number of trip rates generated by the proposed development. Data limitations (sample sizes,  $R^2$  values, etc.), data age, choice of average rate versus statistical significant modification should be presented and discussed. Methodologies for trip reductions associated with pass-by trips, shared-use trips, and alternative transportation modes should be discussed if applicable.

Trip Distribution and Assignment

Traffic generated by the proposed development must be distributed and assigned to the roadway network. This distribution will determine the extent of the development's impacts on the surrounding roadways. Trip distribution rates may be

based on traffic forecasts, market analysis, existing traffic flows, applied census data, and professional judgment. The basic method and assumptions used must clearly be stated so that the County can replicate these results.

Figures to be included in this section include:

- Trip distribution percentages on the surrounding network
- Estimated AM peak hour volumes generated by the development
- Estimated PM peak hour volumes generated by the development

Traffic Impacts with Development

This section looks at the potential impact that the development will have on the transportation system. Using the trip generation and distribution rates determined in Section 4.0 and applying those trips to the future network discussed in Section 3.0, the future conditions of the transportation system can be analyzed. An intersection and corridor analysis should be completed to determine the future traffic conditions and to determine if any mitigation measures are necessary.

A capacity analysis and level of service analysis should be completed for all peak hours for future conditions with the site developed as proposed at all major intersections and road segments within the study area.

Any mitigation measures that may be required due to the additional trips from development should be discussed. An analysis of the mitigated transportation system should then be completed to show how the system is expected to perform after the mitigation measures have been put in place.

The key elements of the project impact analysis include:

- A peak hour intersection LOS for each study period. Identify whether the traffic from the proposed project will result in a change in the LOS.
- A volume/capacity analysis for all major road segments within the study area.
- The appropriateness of access locations and the need for future traffic signals.
- Turn lane requirements.
- Sight distances where new access points are recommended.
- Appropriateness of acceleration or deceleration lanes.
- Signal warrant analyses if new traffic signals are recommended.
- Impacts on any special issues that were identified such as safety or community concerns.

Figures to be included in this section include:

- Future AM peak hour volumes (with development)
- Future PM peak hour volumes (with development)
- Future AADT traffic volumes (with development)

### Recommendations

If unsatisfactory levels of service are to occur, then the applicants should provided the County with any proposed improvements, which will mitigate any negative impacts generated by the proposed development. Recommendations for improvements needed to remedy deficiencies in the network caused by the proposed development should be discussed in detail. These recommendations should be provided to help ensure that the proposed development functions with the surrounding area.

### Summary and Conclusions

The conclusion of a Traffic Impact Study should be a clear description of the study findings including a reiteration of any recommendations being made as part of the study. This concluding chapter should serve as an executive summary.

## Professional Engineering Report (PER) outline

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In general, the contents of a Preliminary Engineering Report (PER) vary. The content will be based on the size and complexity of the development proposal, and the number and classification of roads inventoried in the traffic impact corridor. As an example, a PER prepared for a Local Road traversing level terrain with few intersecting roads and lesser traffic volumes, would presumably have less in content and complexity than a PER prepared for a proposed development with an impact corridor containing a Minor Collector situated in rolling terrain. The following guidelines describe the minimum elements required, and the recommended format for preparing a PER. These guidelines will provide for consistent report preparation.

### **Cover Page**

The cover page of the PER should have a header listing the proposed development's name. The report name shall duplicate that shown on the subdivision's Traffic Impact Study (TIS). If the PER is being prepared as a road assessment inventory not associated with a proposed development, then show the inventoried road names. Include the date the report was prepared, the engineering firm's name that prepared the report, and the engineering seal and signature of the engineer responsible for completing the PER.

### **Table of Contents**

Include a Table of Contents that follows the format of this document.

#### **1. Introduction**

Provide a brief narrative of why the report is required, and for what subdivision if applicable. In most cases a brief restatement of the development's TIS Introduction will be sufficient with information added herein for identifying the inventoried road segments.

#### **2. Location**

Provide brief narrative of the proposed subdivision's location and traffic impact corridor relative to landmarks and roadways. Include approximate coordinates (e.g. 46° 36' 58" N, 111° 53' 27" W) and legal description (e.g. NW1/4, NW1/4 of Section 20, T10 N, R2W) of the center point enclosed within the proposed subdivision as a quick means of location and reference (e.g. Google Earth). Example descriptions that may be used to briefly describe the narrative of the geographical impact corridor location include:

- Distance and direction from City/town name;



- Highway route number;
- Mile posts; and
- Crossing routes and intersecting road/street names

Include a Vicinity Map in the appendices showing the approximate boundaries of the development and the affected roads identified in the traffic impact corridor. Recommendation is to use the same map as contained in the TIS to provide consistency between reports. Also include a copy of the development's Preliminary Plat, if applicable, in the appendices.

### **3. Traffic Impact Corridor**

Identify the traffic impact corridor by noting all the roads affected (by name). Most of the information in this section of the PER should be previously identified in the Traffic Impact Study (if applicable) as approved in the preliminary plat process. This should allow for a brief summary under this section of the PER. Identify the date and author of the referenced TIS. Include a copy of the approved TIS in the appendices. Note the approximate length (in feet) of each road segment within the corridor. Length can be derived from field review or measured from digital mapping. Regardless, road measurement techniques should be noted in the report (under Part 4. Field Review Methods) to allow for a reasonable check of accuracy by the reviewer. Note the location of the proposed subdivision's ingress/egress points.

### **4. Field Review Methods**

Provide a brief narrative summarizing the field review methods undertaken to complete the PER. In essence, this section allows Lewis and Clark County to review and approve the methodology and to reproduce the results if later field observations are undertaken. It is highly recommended that the PER author first gain Lewis and Clark County's pre-approval of the proposed field review methodology before undertaking the work. Following is a simplistic example of what the narrative might describe.

*"The field review was intended to be a reconnaissance level assessment of the existing roadway conditions. Firm XYZ personnel walked Example Lane, NorthSouth Drive, and NoName Road. A tape measure, range finder, or distance measuring wheel was used for all distance measurements. A handheld clinometer and a 4-foot long digital smart level were used to measure grades and slopes. The radii of horizontal curves were approximated by tracing the curves on aerial photographs. The measurements taken should be considered approximate due to the low level of accuracy associated with these handheld tools and aerial photographs. All locations between mileposts (MP) were based on measuring wheel readings during the field review. A handheld Global Positioning System (GPS) unit was used to mark the location of each significant observation. All measurements and GPS points given within this report should be viewed as approximate representations of actual conditions."*

## **5. Traffic Data**

From the TIS, recapitulate the traffic impact corridor's ADT for each road segment. Note the current ADT and the future ADT based on the growth rate. Lastly, note the ADT with post-development full build out traffic added to the transportation system. This information will be applied to the following sections of the report.

## **6. Roadway Typical Section Standards**

For each road or road segment within the traffic impact corridor as described in the *Traffic Impact Corridor* section, note which Lewis and Clark County road typical section is applicable based on the ADT at the development's full build out year. The current and future post-development ADT should be attainable from the approved TIS.

## **7. Accident Data**

Summarize accident data and crash history for the roads within the traffic impact corridor if statistics are available. Statistics should be based on a minimum 5-year period, with a 10-year period recommended. Coordinate with the Montana Department of Transportation and Lewis and Clark County as applicable to obtain:

- Number of crashes per road segment;
- Types of crashes; and
- A listing of locations with an unexpectedly high number of crashes and a brief description of why a higher than normal number of crashes may be occurring and proposed countermeasures

Include photos with captions of locations in the report appendices to help visualize the potential issues that need to be addressed. Reference crash locations to known features such as intersections or mileposts.

## **8. Design Standards**

### **8.1 Major Design Features**

The previous sections of the report provided background information. This section provides an assessment of the road's condition and work required to bring the road into standards. Standard criteria to assess the conditions are contained in Appendix J: Lewis and Clark Road Standards, and its reference standards. Each applicable section below shall have materials quantified in terms of lengths, volumes, areas, etc. to serve as the basis for presenting the *Cost Estimate* contained later in the PER. The narrative shall provide a description of how each material cost was estimated. Spreadsheet calculations are highly recommended to aid in review and approval of the PER. Include copies of the spreadsheets in the report appendices.

### **8.1.1 General Terrain & Design Speed**

Describe the terrain that each affected road traverses, e.g. level, rolling or mountainous. Note the design speed of the roadway in accordance to the design criteria. A determination of terrain and design speed has a direct affect on certain design standards.

### **8.1.2 Road Width and Number of Lanes**

Document the lane width and shoulder width of each road segment contained in the traffic impact corridor. Recapitulate each to standards based on the narrative provided in the *“Roadway Typical Section Standards”*. Intersections and other auxiliary lanes should be described in the section below entitled *“Intersections”*.

### **8.1.3 Surfacing Types and Thickness**

Identify the existing surfacing type and thickness based on records for each road in the traffic impact corridor. Note the number and thickness of pavement overlay(s). Each changing condition should be described. Developing reasonably accurate information may require coordination with the Montana Department of Transportation (if applicable), and the Lewis and Clark County Road Department to obtain available records, or to make a determination based on historical knowledge and department interviews. Due to the cost prohibitive nature, geotechnical drilling and soil sampling to ascertain the surfacing section makeup is not required for the PER. However, all efforts should be made to review and research available past geotechnical evaluations.

Provide a brief description of the general structural deficiencies based on a visual assessment including rutting, alligator cracking, bleeding, cross slope deficiencies, etc. Although ultimately the PER is a tool in estimating each road segment’s reconstruction cost based on County standards, under certain circumstances information may present a case that the surfacing section is adequate to meet the needs for the future traffic loading demands. Or, based on the findings, the author may also present methodology to rehabilitate the roadway by alternative methods (e.g. full-depth recycle with cement treated base.)

#### **8.1.4 Bridges**

Note the bridge location(s) within the road segment referencing stream or channel name. In addition, describe its location relative to another landmark such as a distance from the nearest milepost, intersection, etc. Arrange a meeting with the Lewis and Clark County Road Department to obtain information on recent bridge repairs, hydraulic conveyance issues, etc. Note the bridge length, overall deck width, barrier rail construction, traveled way width, abutment type, whether it is clear span or number of piers, decking and beam materials, general condition, etc. Review the structure pursuant to current floodplain regulations.

#### **8.1.5 Horizontal Alignment**

Identify all of the major horizontal features for each road segment, including features that may not meet the proposed design criteria. Describe alignment deflections (angled breaks) without horizontal curves that do not meet criteria. Note horizontal curve deflections, radius, etc. to ascertain if reconstruction to meet standards is necessary. Reference these geometric features by milepost or by some other measurable means from an identifiable physical feature (e.g. the horizontal curve begins approximately 400 feet north of (intersection name)). Information provided in this section could be particularly important in accurately estimating such item costs as earthwork, utility relocation, and new right-of-way. Discuss the feasibility of improving substandard horizontal curves.

#### **8.1.6 Vertical Alignment**

Provide a general description for all the major vertical alignment features. The discussion should identify grades that exceed design criteria, sight distance, and the vertical alignment improvements that can be reasonably obtained. An estimate of the improvement needs to be incorporated in the final cost estimate. As an example, if a section of road requires flattening the grade and lengthening a crest vertical curve to obtain adequate sight distance, then an additional amount of earthwork excavation should be assumed, also potentially resulting in wider cut slopes, utility relocations, right-of-way, etc.

#### **8.1.7 Cut / Fill Slopes**

Describe the cut and fill slope standards associated with each road segment. Include in the narrative a discussion on clear zone and barrier warrants.

Compare standards to the actual field conditions. Note the general slope rates, fill heights, cut depths, guardrail locations (or lack thereof), and ditch depth/offsets. The information in this section should be used to help estimate other impacts associated with slope flattening and changing ditch offsets including the need for lengthened culverts, additional right-of-way, and utility impacts as an example. Address the estimated work needed to lay back cut slopes identified as being a sight obstruction around the inside of horizontal curves.

#### **8.1.8 *Sight Distance***

In this section, elaborate on each sight obstruction either identified under Parts 8.1.5 through 8.1.7 or other roadside items such as utilities, vegetation, buildings, etc. Pay special attention to intersections and approaches that may not be warranted for reconstruction due to traffic impacts, but otherwise contain intersection sight obstructions. Make a determination whether the intended road reconstruction will mitigate the observed safety issues.

#### **8.1.9 *Driveways and Misc. Access Points***

Discuss all private access points, with the exception of public approach intersections, which will be described under the section entitled *Intersections* later in this report. From field observations record the number of accesses, widths, locations relevant to other access points, issues on safety, potential means of combining, etc. Each access point will have an associated cost in replacing approach culverts and the approach in general if the road segment to be reconstructed requires substantial widening or horizontal or vertical adjustments.

#### **8.1.10 *Drainage***

Arrange a meeting with the Lewis and Clark County Road Department to determine if there are specific drainage issues that need to be addressed, and to document recommendations. Include storm drain or irrigation adjustments in the narrative and cost estimate. Determine costs associated with either replacing or lengthening each culvert based on the existing size and condition, and provide estimated costs to replace undersized culverts based on the knowledge obtained from the Road Department. During field reviews, notable issues should be recorded that can otherwise be used to prepare the overall PER cost estimate. Such items might include the need for riprap, realignment of a culvert to fit the drainage channel, pipe corrosion (i.e. wrong pipe material), etc.

### **8.1.11 Intersections**

The proposed development's approved TIS should identify intersection deficiencies in terms of affects to the transportation system. Provide a narrative in this section more fully describing the geometric revisions (e.g. addition of a turn lane), or other changes required to the permanent traffic control (e.g. installation of a new signal) as initially addressed in the TIS. Provide an adequate description of intersection reconstruction needs to develop the overall PER cost estimate. Example discussion includes the length, width of new right or left turn lanes and the affects to utilities and right-of-way.

### **8.1.12 Right-of-Way**

Provide an estimate of the additional acreage required to meet standards, and additional acreage needed for site-specific improvements such as flattening cut or fill slopes for safety purposes, or reconstructing substandard horizontal or vertical curves. Discuss how the assumed cost per acre has been estimated. Depending on the length of road or road segments to be reconstructed, a complete right-of-way record research will likely be cost-prohibitive. Instead, if easement fencing is in place, choose a few representative sample locations, and obtain representative field measurements and offsets to record the assumed right-of-way width. While completing field reviews, if property pins along the top of cut or base of fill are observed, taking approximate centerline measurements in sample locations will also suffice for estimating the existing roadway easement width in those locations where there is no roadside fencing.

### **8.1.13 Utilities**

Identify probable utility impacts from field observation noting telephone pedestals, power poles, utility markers, fire hydrants and all other "in the field indications". In addition, contact local utility providers to assess whether their facilities are within the traffic impact corridor. Discuss the methodology used to document the estimated cost to relocate utilities. Depending on the segment or road lengths, representative small sample locations can be chosen based on field review, and these sample sections can be verified with an all-call utility locate.

### **8.1.14 Miscellaneous Features**

Discuss and quantify any other miscellaneous features that do not fall in the above categories that could add appreciable cost to the road reconstruction. Example items may include the need for guardrail, new sidewalk, retaining walls, and detours during construction around major drainage features.

## **9. Cost Estimate**

Estimate the preliminary reconstruction cost for each road or road segments and their appurtenances based on the items and narratives provided in Part 8. The cost estimate shall be based on the future conditions at the time of the development's full build-out. The estimate shall include any other features unique to the facility that present a significant cost due to reconstruction or relocation. Following is the recommended format. Provide the estimate spreadsheet in the appendices. The quantity calculations in Part 8 to be applied herein shall provide a clear and concise methodology on the estimating procedure to allow for reviewer approval. Lump sum costs are discouraged.

### **A. Construction Estimate**

#### **1. Earthwork (Excavation – Cubic Yards)**

- 1.1 Roadway (average end area methodology)
- 1.2 Corrective Measures for Horiz. Curves
- 1.3 Corrective Measures for Vertical Curves
- 1.4 Turn Lanes/Intersections/Misc. Spot Widening
- 1.5 Other Slope Modifications
- 1.6 Approach Reconstructions
- 1.7 Clearing and Grubbing (Acre)
- 1.8 Miscellaneous Other

#### **2. Roadway Surfacing**

- 2.1 Sub-base Course (cubic yards)
- 2.2 Select Base Course (cubic yards)
- 2.3 Crushed Top Surfacing (cubic yards)
- 2.4 Hot Plant Mix Asphalt Surfacing Incl. Binder (tons or square yards)
- 2.5 Subgrade Geotextile Stabilization (square yards)
- 2.6 Asphalt Seal Coat Incl. Aggregate (tons or square yards)

#### **3. Bridge**

- 3.1 Decking Rehabilitation (square foot)
- 3.2 Beams (linear foot)
- 3.3 Abutments (cubic yards)
- 3.4 Structure Excavation (cubic yards)
- 3.5 Select Structure Backfill (cubic yards)
- 3.6 Barrier Rail (linear foot)

#### **4. Drainage**

- 4.1 Cross-Drain Road Culverts (linear feet for each size and type)
- 4.2 Road Approach Culverts (linear feet for total number approaches)

- 4.3 New Storm Drain Pipe (linear feet)
- 4.4 Irrigation Pipe (linear feet)
- 4.5 Irrigation Channel Change (cubic yards)
- 4.6 Trench Excavation (cubic yards)
- 4.7 New Manholes (each)
- 4.8 New Drop Inlets (each)
- 4.9 Pipe Bedding (cubic yards)
- 4.10 Riprap (cubic yards)
- 4.11 Concrete Curb & Gutter (linear feet)
- 5. Remove and Adjust Misc. (As Applicable)**
  - 5.1 Remove Pavement (square yards)
  - 5.2 Remove Sidewalk (square yards)
  - 5.3 Remove Curb & Gutter (linear feet)
  - 5.4 Remove Fencing (linear feet)
  - 5.5 Remove Guardrail (linear feet)
  - 5.6 Adjust Manholes (Each)
  - 5.7 Adjust Valve Boxes (Each)
  - 5.8 Relocate Mailboxes (Each)
  - 5.9 Adjust Water Line (linear feet)
- 6. Erosion Control**
  - 6.1 Condition Seedbed Surface (Acre)
  - 6.2 Permanent Seeding (Acre)
  - 6.3 Fertilizer (Acre)
  - 6.4 Temporary Erosion Control, e.g. silt fence (linear feet)
- 7. Utility Relocations (by Type)**
  - 7.1 TV
  - 7.2 Gas
  - 7.3 Fiber Optic
  - 7.4 Telephone
  - 7.5 Power
- 8. Fencing**
  - 8.1 Farm Field (linear feet Steel or Wood Posts)
  - 8.2 Single Fence Panel (Each)
  - 8.3 Double Fence Panel (Each)
  - 8.4 Gate (linear feet by Type: Steel or Drop Wire)
- 9. Right-of-Way**
  - 9.1 Cost per Acre
  - 9.2 Landscape Replacement
- 10. Permanent Traffic Control**
  - 10.1 Traffic Signal (Each)
  - 10.2 Signs (Each)
  - 10.3 Striping (linear feet)
  - 10.4 Highway/Intersection Lighting
- 11. Miscellaneous Other**



- 11.1 New Guardrail (linear feet)
- 11.2 New Sidewalk (square yards)
- 11.3 Retaining Walls (square yards)
- 11.4 Detours
- 11.5 Other

- B.** Subtotal **Costs** (Item A. Construction Estimate Excluding Item 7, Utility Relocations and Item 9, Right-of-Way)
- C.** Estimated **Traffic Control** During Construction (10% of Item B)
- D.** **Subtotal B. + C.**
- E.** Estimated **Construction Mobilization** (8% of Subtotal D.)
- F.** **Subtotal D. + E.**
- G.** **Construction Contingency** (15% of Subtotal F.)
- H.** **Subtotal F. + G.**
- I.** **Inflation** (3% per year of Construction Subtotal H. See Equation Below.)
- J.** Estimated **Total Construction Cost (H. + I.)**
- K.** Estimated **Engineering Design** (15%-25% of Item J.)
- L.** Estimated **Construction Engineering Administration** (5%-10% of Item J.)
- M.** **Total Cost to Reconstruct** (Sum Items J.+K.+L.+ Right of Way & Utility Relocates)

Adjust the estimate for an annual inflation. For Item I., Inflation, the formula is:

$$\text{Future Cost (i.e. Item J.)} = (\text{Present Cost, i.e. Item H.}) \times (1+i)^n$$

Where:  $i$  = Inflation factor. Use 3% unless requested otherwise by the County ( $i = 0.03$ )

$n$  = the number of years from the time the estimate is prepared to the construction of the road, estimated as the development full build-out year)

**Example:**

B.	Subtotal of Construction =	\$400,000
	(Excluding right-of-way and utility relocations)	
C.	Traffic Control (10%) =	<u>\$40,000</u>
D.	Subtotal =	\$440,000
E.	Construction Mobilization (8%) =	<u>\$35,200</u>
F.	Subtotal =	\$475,200
G.	Construction Contingency (15%) =	<u>\$71,280</u>
H.	Subtotal =	\$546,480
I.	Inflation (@3% for 5 years) =	<u>\$87,040</u>
J.	Total Construction =	\$633,520
K.	Engineering Design (20%)	\$126,700
L.	Construction Administration (5%)	<u>\$31,700</u>
M.	Subtotal =	\$791,920
	Right-of-Way Acquisition =	\$100,000

Utility Relocations =	<u>\$75,000</u>
<b>Grand Total Cost</b> (Rounded to \$1k) =	<b>\$967,000</b>

## 10. Summary and Conclusions

The concluding section of the PER should serve as an executive summary with a clear description of the study findings and estimated cost.