RESOLUTION 36-2010

JEFFERSON COUNTY ROAD STANDARDS

WHEREAS, the Board of County Commissioners of Jefferson County are charged with the protection of the health, safety and welfare of the people of Jefferson County; and

WHEREAS, growth and development within Jefferson County results in new roadways, approaches, and bridges being built to provide access to subdivision and lots for residential and commercial use; and

WHEREAS, these roadways, approaches, and bridges will be privately built and maintained for public use, they must be constructed adequately for several types of transportation and safe for all user; and

WHEREAS, a standard is also needed to which existing roads should be upgraded as time and resources permit;

NOW, THEREFORE, BE IT RESOLVED that the Board of County Commissioners of Jefferson County hereby adopts the following Road Design Standards.

DATED this 14th day of December, 2010

ATTEST:

BONNIE RAMEY
CLERK AND RECORDER

TOMAS E. LYTHGOE, CHAIR

DAVE KIRSCH, COMMISSIONER

LEONARD WORTMAN, COMMISSIONER

JEFFERSON COUNTY ROAD STANDARDS

Part 1 – General Information

Road design standards can be complex. Developers and the public are encouraged to contact the Jefferson County Road Department for additional information.

1.1 Project Approval

Certified Plans, site-specific drawings, sketches, drafts, and/or completion of required improvements is the responsibility of the developer. All plans, drawings, drafts, and sketches to be submitted for Preliminary Plat review will be marked "Preliminary" as appropriate, and are not to be construed or considered as "approved" in any manner by any party or their representatives, in lieu of achieving full compliance with adopted County Road Standards. Final stamped certifications, stamped plans, sketches or drafts/drawings will be submitted by the developer to the Commission and to the Jefferson County Authorized Representative for final review, for the specific purpose of achieving verification and compliance with adopted Jefferson County Road Standards, regarding the installation of required improvements.

All new access roads, including subdivisions, will be inspected by the Authorized Jefferson County Representative. Certification of compliance, performance and installation is the sole responsibility of the developer and will be submitted by the developer's licensed engineer or surveyor as applicable, prior to final plat review to determine compliance, performance and sufficiency with these Road Standards by the Jefferson County Authorized Representative and County Commission.

1.2 Variances

Provisions for any deviation to the established Jefferson County Road Standards will be made through the appropriate variance process, with review conducted by the Jefferson County Road Supervisor, County Planner, and County Commission.

A. Hardship

The County Commission may grant variance from the Jefferson County Road Standards when strict compliance would result in undue hardship and when it is not essential to the public welfare. Such variances shall not have the effect of nullifying the intent and purpose of these regulations. An innovative alternative proposal which does not circumvent the purpose of these regulations may be reason for granting of a variance by the County Commission. The County Commission shall not approve variances unless it makes findings based upon the evidence in each specific case that:

1. The granting of the variance will not be detrimental to the public health, safety, or general welfare.

2. Because of the particular physical surrounding, shape, or topographical conditions of the specific property involved, and undue hardship to the owner would result if the strict letter of the regulations is enforced.

3. The variance will not cause an increase in public costs.

B. Procedure

The developer shall include a written statement including plans and specifications describing the requested variance and the facts of hardship upon which the request is based. The County Commission shall consider each requested variance at the public meeting or hearing.

C. Conditions

In granting variances, the Jefferson County Commission may impose such conditions as will in its' judgment to substantially secure the objectives of these road standards.

1.3 Reference Design Specifications

Except where these Standards provide otherwise; design detail, workmanship, and construction materials shall conform to the following specifications/publications:

A. Jefferson County Bridge Standards, March 2006;

B. MPWSS (Montana Public Works Standard Specifications), current published edition;

C. FHWA, Manual on Uniform Traffic Control Devices, henceforth referred to as MUTCD, current edition.

Part 2 – County Road Classification

The purpose of a functional road classification system is to guarantee that roads are provided to accommodate the vehicular and pedestrian needs safely and effectively while ensuring orderly development of the area. The following is a list of county roadway classifications.

2.1 Road Classification:

A. **Major Arterial (ADT 700+):** A through road providing service to corridors with or travel densities greater than those served by collectors or local roads.

B. **Minor Collector (ADT 400-700):** Exhibiting lower travel distances and speeds than roads included on the arterial systems. Collectors are primarily for land use and are spaced at intervals consistent with population density to provide service to smaller county travel generators such as local roads.

C. **Local Road (ADT 0-400):** These are the remaining roads not classified under a higher system. The purpose of rural local roads is to provide land access and serve short distance travel.

2.2 Density Classification:

A. **Low Density Areas:** An area in which the density of development is less than one dwelling unit per acre exclusive of public roadways, and which is located one mile or more from a third class city, two miles or more from a second class city, or three miles or more from a first class city.

B. **High Density Areas:** An area in which the density of development is greater than one dwelling unit per acre exclusive of public roadways, or which is located within one mile of a town or third class city, two miles of a second class city, or three miles of a first class city.

Part 3 – Construction Plans

3.1 General Requirements

A. Any and all public access road construction, reconstruction, or improvements in Jefferson County must be designed in accordance with the Jefferson County Road Standards and stamped by a Professional Engineer or Licensed Land Surveyor registered in the State of Montana.

B. The arrangement, type, extent, width, grade and location of all roads shall be considered in their relation to existing and planned roads, to topographical conditions and to public convenience and safety, and in their relation to the proposed uses of the land to be served by them.

3.2 Submittal Procedure

Where applicable and appropriate, the public access road design plans and profiles are to be marked "Preliminary" for submission to the County and are to be submitted for review with the Preliminary Plat application. Failure by the developer to provide the required materials or complete improvements per Jefferson County Road Standards may result in substantial and increased costs associated with final installation and certification of required improvements.

3.3 Plan Elements

All road construction or reconstruction work is the responsibility of the developer and must be certified by a licensed engineer or licensed land surveyor where appropriate, as having been completed according to the Jefferson County Road Standards prior to final plat review.

At a minimum, the plans shall contain the following information:

- Profile View: Topographic information, right-of-way (R.O.W.) lines, horizontal alignment of roadway in relation to R.O.W., horizontal curve information (radius, length, Dc, PC, PT, PI, etc.), angle and point of intersection of connecting roads, underground and overhead utilities, and stormwater drainage/detention facilities.

- Profile View: Finished grade lines (centerline and one or both flowlines), vertical curve information (VPC, VPI, VPT, k value, curve length, etc.), location of underground utilities, and proposed culverts/ drainage structures.

- Typical Section: R.O.W. width, road width, base course type and thickness, surface course type and thickness, subgrade compaction density, superelevation or crown slope, cut/fill slopes, borrow ditches, number of driving lanes, driving lane width and shoulder width.

Part 4 – Design Criteria

4.1 General Design Criteria

A. All roads within a new development shall be located in an easement of appropriate width (per road standards) dedicated to public use. The roads shall be maintained by an approved property owners' association. The lot boundaries shall extend to the center of the road easement, with the easement being dedicated to public access.

B. Any public access roads within a development with a minimum projected average daily traffic (ADT) of 400 or greater must be hard surfaced with an approved material such as double chip seal, minimum 6" of compacted asphalt millings with a chip seal, or a minimum 3" of asphalt paving. All public access roads shall be built with the minimum standard road base course material per these Road Standards.

C. Any development that proposes further development for an adjacent or to an existing development that will access or utilize public access roads within the existing development, resulting in an ADT of 400 or greater to existing public access roads, will be required to commit to participate in setting up a Rural Improvement District (RID) with all property owners directly utilizing the affected public access road. The existing public access roads will be required to be upgraded with a County approved hard surface such as double chip seal, 6" of compacted asphalt millings with chip seal, or minimum 3" of asphalt paving. All public access roads shall be built with the minimum standard road base course material per these Road Standards.

D. All roads for schools, churches, or other public facilities must be hard surfaced with a County approved material such as double chip seal, 6" of compacted asphalt millings with chip seal, or minimum 3" of asphalt paving, and be built with the minimum standard road base course material per these Road Standards.

E. All public access roads in or to any development for commercial or industrial use must be paved with a minimum of 3" compacted lift of asphalt paving with the minimum standard road base course material per these County Standards.

F. Residential driveways and arterial roads shall not have direct access to primary highways. For extreme circumstances, the Montana Department of Highways may issue a road approach permit.

G. Local roads shall be designed so as to discourage through traffic.

H. Whenever a subdivision abuts or contains an existing or proposed arterial roadway or major thoroughfare, the County Commission may require frontage roads.

I. Dead-end roads are discouraged. Where a future road extension is proposed, a cul-de-sac will be provided. Roads ending in cul-de-sacs will be no longer than 1,500 feet.

J. Half roads are prohibited except when essential to the development and where the County Commission is assured that it will be possible to require the dedication of the other half of the road when the adjoining property is subdivided. Whenever an existing half road is adjacent to a tract to be subdivided, the other half of the road shall be platted within such a tract.

K. Horizontal alignment of roads must ensure adequate sight distances. When road center lines deflect more than five degrees, connection must be made by horizontal curves

L. Intersections. The following items apply to intersections:

1. Roads must intersect at 90 degree angles, except when topography precludes and has been approved by the Jefferson County Authorized Representative, and in no case will the angle of intersection be less than 80 degrees to the center line of roadway being intersected.

2. Two roads meeting a third road from opposite sides must meet at the same point.

3. No more than two roads may intersect at one point (four legs maximum).

4. Intersections of local roads with major arterial or highways must be kept to a minimum.

5. Intersection design must provide acceptable visibility for traffic safety as dictated by the designed operating speeds on the individual roadways.

6. When a new road intersects an existing minor arterial, collector or local road at an inclining or declining angle greater than five percent, the new road approach will include a thirty-foot landing for sight distance and drainage. The landing shall meet the requirements delineated in Part 4.4.B of this document. A culvert may be required.

7. Hilltop intersections are prohibited, except where no alternatives exist. Intersections on local roads within 100 feet of a hilltop are prohibited. Intersections on arterial and collector roads within 200 feet of a hilltop are prohibited.

M. Where new roads are added, all signs required by the latest MUTCD publication must be provided at the expense of the developer. All signs must be laid out and/or designed according to the latest edition of the MUTCD. A sign plan must be submitted for review before installing any new signs. Names of new roads aligned with existing roads will be named the same as those of the existing roads. Proposed road names will not duplicate or cause confusion with existing road names, in conformance with the county addressing system. Road names must be approved by the Jefferson County Address Coordinator / GIS Technician prior to installation. Address assignments with be commensurate with final plat approval for 911 purposes. The lettering on road identification markers will not be less than 3 inches high and not less than one half inch in stroke. All road markers shall be at least 5 feet but no more than 7 feet above ground level so as to be visible to emergency vehicles for a minimum distance of 100 feet.

N. Driveways to building sites must access ingress/egress roads at right angles and have a 12' minimum traffic lane with a 13' 6" height clearance. The ends of driveways exceeding 150' must have a turnaround area for emergency vehicles which are designated as a cul-de-sac with minimum 50' driving

surface radius. Refer to the Jefferson County Subdivision Regulations for the definition of a driveway.

4.2 Improvements

A. All roadway improvements including pavement, curbs, gutters, sidewalks, and drainage features shall be constructed in accordance with the specifications and these Road Standards, using materials approved by the Jefferson County Authorized Representative or approved independent agency at developers cost.

B. Where access to a development will be by an easement across privately owned property, the developer must provide evidence that the necessary easement has been acquired and that the easement encompasses the nature and intensity of the use which will result from development.

C. Road signs and traffic control devices shall be placed at all intersections by the developer in accordance with the MUTCD manual.

4.3 Mail Delivery

A. The developer shall provide an off-road area for mail delivery within the development as approved by the Jefferson County Authorized Representative and coordinated with the local Postmaster.

B. All mailbox clusters are to be set a minimum of 12 feet off the edge of the county road driving surface in a location approved by the Jefferson County Authorized Representative. Mailbox clusters must be at least 50 feet from any intersection, and must not be located on arterial roadways.

4.4 Encroachment and Approaches

A. Any person who encroaches upon any county road easement within Jefferson County must obtain a permit from the Jefferson County Road Department prior to any construction.

B. Where feasible, all approaches will enter the county road with a negative degree of slope not more than three percent (3%) for a minimum of 30 feet back from the edge of roadway of the county road. Under no circumstance shall an approach exceed a positive slope of three percent (3%) for a minimum of 30 feet back from the edge of roadway of the county road. See attached Figure 1 and 2.

C. All residential approaches shall be a minimum of 20 feet wide.

D. On paved roads, the approaches should be paved to the easement line from the shoulder of the road. Farm or field approaches should have a 12 foot long by 3 foot wide strip of asphalt placed parallel to the roadway to avoid edge breakaway.

E. Any encroachment upon state owned and maintained roads must be authorized by the Montana Department of Transportation. The developer must obtain an approach permit and comply with state standards prior to Final Plat approval.

F. Failure to obtain a permit prior to any construction will result in a two hundred dollar ($200.00) late charge.

Part 5 – Drainage Features and Crossings

5.1 Drainage Features

A. The drainage features required for any surface run-off or run-off affecting development shall meet the minimum standards of the Montana Department of Environmental Quality and all regulations adopted pursuant thereto, and are subject to the approval of the governing body. The intent of these regulations is to assure that proper drainage facilities are provided for any runoff in addition to historic amounts, caused by the development of the property.

B. All access roads shall be designed to ensure proper drainage.

C. Culverts shall be designed of an adequate size and spacing to pass the flow from a 25 year storm event. They shall be provided and installed by the developer where any proposed roadway intersects a drainage channel or feature. Minimum culvert size shall be 15" in diameter for any private approaches. All cross-drains on public access roads shall have a minimum opening of 18" in diameter for runs less than 60' and a minimum diameter of 24" for all runs greater than 60'. Culverts shall extend a minimum of 1' beyond the toe of the roadway fill. Where feasible, all culverts shall be installed with standard flared end sections to properly direct flow, protect the ends of the pipe, and to correctly riprap fill slopes around the ends of the pipe. The minimum fill cover over culverts shall be determined by the manufacturers' recommendations for HS-20-44 loading.

D. Bridges shall be designed and constructed in accordance with the adopted Jefferson County Bridge Standards. They shall be provided and installed by the developer where any proposed roadway intersects a drainage channel or feature of sufficient size and flow to warrant the use of a bridge.

E. Drainage facilities shall be located in County road rights-of-way or in perpetual drainage easements of appropriate widths and are subject to review by the Jefferson County Authorized Representative.

F. Drainage features shall not discharge into any sanitary sewer facility or any identified hazardous materials.

G. All new drainages and culverts shall be installed using BMP's (Best Management Practice) and must follow guidelines provided in Appendix A.

H. The grading and drainage features shall be designed in accordance with these Road Standards and applicable regulations, and stamped by a Professional Engineer or Licensed Surveyor, as applicable, registered in the State of

Montana, except where a property is at the head of the drainage area and all natural historic drainage channels will be protected by perpetual easements as reviewed by the Jefferson County Authorized Representative.

I. Drainage ditches shall have a minimum grade of 1.0%. A minimum grade of 0.5% may be used for distances of 200 feet or less.

J. Any and all maintenance, replacement, or repair of irrigation culverts and/or drainage structures within County road rights-of-way will be the responsibility of the appropriate water users.

5.2 Cattle Crossings and Gates

Cattle crossings are discouraged. Gates will not be allowed across public roads. Where allowed, cattle crossings shall meet the following:

A. All cattle guards are to be installed and maintained by the property owner(s).

B. Cattle guards will be of new construction and designed for HS-20-44 loading.

C. Cattle guards will have a concrete footing of 10" width and 16" height.

D. Cattle guards will provide a minimum of twenty-four (24) feet of opening.

E. A wire or steel gate providing eighteen (18) feet of opening will be constructed adjacent to any and every cattle guard.

F. All encroachment or approach gates shall be located a minimum of 30 feet from the edge of the roadway and shall operate inward with a clear opening of 12 feet.

Part 6 – Roadway Structural Design Elements

6.1 Grading

All roads and alleys shall be excavated or filled to within one-tenth (0.1) of a foot of the grade established by an approved design plan.

6.2 Sub-Grades

Roadway sub-grades must be free of topsoil, sod, vegetation, organic matter, or other unsuitable soil foundation material which is not able to be adequately compacted. Sub-grades must be properly bladed, shaped, and rolled to the minimum specified compaction and subject to review by the Jefferson County Authorized Representative.

6.3 Base Course

Base course material placed immediately below a crushed top surfacing or asphalt paving shall meet the requirements of these Road Standards and the approved design.

6.4 Surface Course

Aggregate surface course material shall consist 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 or other deleterious matter. This is the surface course on gravel roads. The material shall meet the requirements and specifications of these Road Standards and the approved design.

6.5 Asphalt Paving

Asphalt shall consist of a bituminous 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 addition of the MPWSS.

6.6 Compaction

All materials used for road construction shall be compacted meeting the requirements set forth in the MPWSS and addenda. Density testing shall be at the developer/contractor's expense and performed by an independent agency and reviewed by Jefferson County's Authorized Representative.

6.7 Road Surface

A. For aggregate road surfacing, the entire roadway shall consist of a minimum 6" of ¾" minus crushed aggregate surface course material meeting the requirements of Part 7 of these Road Standards. The surfacing will be shaped, watered, and rolled to obtain the minimum specified compaction.

B. Chip-seal road surfacing shall meet the requirements of Part 8 of these Road Standards placed over a minimum of 6" of ¾" minus crushed aggregate base course material properly bladed, shaped, watered, and rolled to the minimum specified compaction. Use of 1" minus or 1-1/2" minus crushed aggregate base course material may be used in approved specified design.

C. Asphalt surfacing shall consist of a minimum of 3" of compacted bituminous hot mix over a minimum 6" of an approved crushed aggregate base course material properly bladed, shaped, watered, and rolled to the minimum specified compaction. Use of 1" minus or 1-1/2" minus crushed aggregate base course material may be used in a specified design.

D. Road shape will consist of a crown in the middle of the road with not less than 3% cross slope. See Figure 1 and 2.

E. Ditch in-slopes shall be between 3:1 and 6:1 with a maximum back-slope of 2:1. The ditch shall be a minimum of 1 foot in depth from the edge of subgrade elevation. See Figure 1 and 2.

The following are minimum design standards and may be increased by the Jefferson County Commission as conditions warrant:

TABLE 1. ROAD DESIGN STANDARDS FOR LOW DENSITY AREAS*

Minimum Design Standards	Major Arterial	Minor Collector	Local Road
1. Minimum right-of-way width	60 ft.	60 ft.	60 ft.
2. Minimum roadway width (Refer to Table 3)	24-28 ft.	24-28 ft.	24-28 ft.
3. Minimum curb radius or edge of pavement at intersection	30 ft.	25 ft.	25 ft.
4. Minimum design speed of road	40 mph	35 mph	25 mph
5. Maximum grades: Grades should fall within a 10% maximum, however, in some instances, in mountainous terrain, a maximum allowable grade shall be no greater than 13% for a distance no greater than 150 feet. Mountainous terrain is land with a cross slope of 15% or greater.			
6. Maximum Rate of Vertical Curvature – per AASHTO for all roads. Vertical curves will not be required when the algebraic grade difference is 1% or less.			
7. Minimum stopping sight distance	250 ft	205 ft.	125 ft.
8. Minimum horizontal curve radius	420 ft.	300 ft.	125 ft.
9. Minimum intersection spacing	500 ft.	250 ft.	150 ft.
10. Minimum encroachment/approach spacing	----	150 ft.	100 ft.
11. Cul-de-sacs			
a. maximum length			1500 ft.
b. minimum outside right-of-way radius			60 ft.
c. minimum outside roadway radius			50 ft.

TABLE 2. ROAD DESIGN STANDARDS FOR HIGH DENSITY, MAJOR AND COMMERCIAL AREAS*

Minimum Design Standards	Minor Arterial	Collector	Local Road
1. Minimum right-of-way width	60 ft.	60 ft.	60 ft.
2. Minimum roadway width (Refer to Table 3)	24-28 ft.	24-28 ft.	24-28 ft.
3. Minimum curb radius or edge of pavement at intersection	30 ft.	30 ft.	25 ft.
4. Minimum design speed of road	40 mph	35 mph	25 mph
5. Maximum grades			
a. flat and rolling terrain	6%	8%	9%
b. mountainous terrain	8%	9%	9%
6. Maximum Rate of Vertical Curvature – per AASHTO for all roads. Vertical curves will not be required when the algebraic grade difference is 1% or less.			
7. Minimum stopping sight distance	375 ft.	250 ft.	200 ft.
8. Minimum horizontal curve radius	565 ft.	420 ft.	125 ft.
9. Minimum intersection spacing	500 ft.	250 ft.	150 ft.
10. Minimum encroachment/approach spacing	----.	100 ft.	100 ft.
11. Cul-de-sacs			
a. maximum length			1500 ft.
b. minimum outside right-of-way radius			60 ft.
c. minimum outside roadway radius			50 ft.

TABLE 3. MINIMUM ROADWAY WIDTHS

Roadway width according to Average Daily Traffic Count (ADT):

ADT Count			
0-400	24 ft.	24 ft.	24 ft.
400-700	24 ft.	24 ft.	24 ft.
700+	28 ft.	28 ft.	28 ft.

Right-of-way and road width requirements shall be specified by the County Commission at the time of Preliminary Plat approval based upon site conditions and project design within the design specification ranges outlined in these regulations. The standards presented should be considered "minimum standards", and may be increased if conditions warrant.

*American Association of State Highway Transportation Officials (AASHTO) may be used as a further reference guide regarding these road standards. Right-of-way and road width requirements shall be specified by the County Commission at the time of Preliminary Plat approval based upon site conditions and project design within the design specifications ranges outlined in these regulations. The standards presented should be considered "minimum standards," and may be increased if conditions warrant.

Part 7 – Aggregate

7.1 Aggregate for Road Mix Bituminous Base

A. Aggregates for road mix bituminous base construction shall be crushed stone, crushed slag, or crushed or natural gravel meeting the quality requirements of Table 4 unless shown otherwise in the approved specific project specifications.

B. The gradation shall be as described in the approved specific project specifications. When crushed gravel is used, not less than 50 percent by weight of the particles retained on the Number 4 sieve shall be at least one fractured face.

7.2 Aggregate for Base or Surface Courses

Aggregate materials shall conform to the requirements shown below unless shown otherwise in the approved specific project specifications.

A. Pit-Run Aggregate. Pit-run aggregates shall consist of native materials of a size and gradation that can be taken directly from the source and placed on the road without crushing or screening. No gradation, other than a maximum size, will be required. The maximum size shall be as shown in the approved specific project specifications.

B. Grid-Rolled Aggregate. Grid-rolled aggregate shall consist of native materials of a quality that can be taken directly from the source, without crushing or screening, and broken down on the road by grid-rolling. No gradation other than a maximum size will be required. The maximum size shall be as shown in the approved specific project specifications.

C. Screened Aggregate. Material shall consist of gravel, talus, rock, sand, shale, or other suitable material, and be reasonably hard and durable and reasonably free of organic material, mica, clay lumps, or other deleterious materials. The gradation requirements shall be as shown on the approved specific project specifications.

D. Crushed Aggregate. Aggregate for crushed base or surface courses shall be crushed stone, slag, or gravel meeting the requirements shown in Table 4 and the gradations shown on Table 5 and 6 unless shown otherwise in the approved specific project specifications. Aggregate shall be well graded from coarse to fine within the gradation band.

Table 4
Specification for Crushed Aggregate

Crushed aggregate quality requirements for base or surface courses			
Description	AASHTO Test Method	Requirement	
		Base	Surfacing
LA Abrasion	T 96	50 max.	50 max.
Durability Index, Coarse and Fine	T 210	35 min.	35 min.
Liquid Limit	T 89	25 max.	25 max.
Plasticity Index	T 90	6 max.	2-9 max.
Dust Ratio: % Passing No. 200 / % Passing No. 40	T 11 T 27	2/3 max.	2/3 max.
Sand Equivalent (alternate Method Number 2	T 176	35 min.	--

When crushed gravel is used, at least 40 percent by weight of the particles retained on the Number 4 sieve shall be at least one fractured face. Naturally fractured faces may be included in the 50 percent requirement, provided the roughness and angularity produce strength characteristics equivalent to mechanically fractured faces.

Table 5 Specification for Crushed Surface Course	
Table of Gradations Percentage by weight passing square mesh sieve	
Sieve Size	Grade 2
1 Inch Sieve	
¾ Inch Sieve	100%
½ Inch Sieve	
No. 4 Sieve	40-80%
No. 10 Sieve	25-60%
No. 200 Sieve	8-20%

Table 6 Specification for Crushed Base Course			
Table of Gradations Percentages by Weight passing square mesh sieve			
Passing	1 ½" Minus	1" minus	¾" Minus
2 Inch Sieve	--		
1 ½ Inch Sieve	100%		
1 Inch Sieve	--	100%	
¾ Inch 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%

Table 7 Specification for Select Sub-Base Material Table of Gradations Percentages by Weight passing square mesh sieve					
Passing	4" Minus	3" Minus	2 ½" Minus	2" Minus	1 ½" Minus
4 Inch Sieve	100%				
3 Inch Sieve	--	100%			
2 ½" Sieve	--	--	100%		
2 Inch Sieve	--	--	--	100%	
1 ½ Inch 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%

Part 8 – Chip Seal Specifications

8.1 Material Requirements

A. The chip seal surfacing design shall be a double bituminous surface treatment (double shot) consisting of a first application of 0.40 – 0.50 gallons per square yard of MC800 or equal and 25 pounds of ½"chips per square yard. The second application shall be 0.40 – 0.50 gallons per square yard of MC 800, MC3000 or equal and 25 pounds of ½" chips per square yard. Where applicable a prime coat of MC70 at a rate of 0.25 - 0.38 is to be used prior to the application of MC800. The prime coat is to be allowed to cure per the manufactures recommendation before the MC800 application is applied. All spread rates to be verified by the manufacture prior to construction.

B. The specification for chip material is defined as follows:

Table 8 Specification for Chips Material	
Table of Gradations Percentage by weight passing square mesh sieve	
Sieve Size	Grade 4A
1/2 Inch Sieve	100%
3/8 Inch Sieve	100%
No. 4 Sieve	0-30%
No. 8 Sieve	0-15%
No. 200 Sieve	0-2%

C. The composite aggregate must not have adherent film or clay, vegetal matter, frozen lumps and other extraneous matters that prevents through coating with bituminous material. Bituminous material must remain adhered to the material upon contact with water. No combination of shale, clay, coal and soft particles can exceed 1.5 percent.

D. A wear factor not exceeding 30 percent at 500 revolutions.

E. A minimum of 70 percent by weight, of coarse aggregate for grade 4A must have at least one fractured face.

8.2 Construction Requirements

A. Sampling, Testing and Acceptance.

1. Furnish at least 2 aggregate sampling pans, each a minimum of 2 feet x 2 feet x 2 inches. Leg mount or support the pans to prevent disturbing the fresh asphalt when sampling.

2. Take samples while spreading chips at locations randomly selected by the project manager. Place two sample pans on the roadway immediately ahead of the spreader between the spreader wheel paths. Stagger the pans 3 to 6 feet apart. Once the spreader passes, retrieve the sample pans and turn them over to the project manager for review.

3. Replace or correct all asphalt removed or disturbed by the sampling and place cover aggregate over the sampling area at the specified rate.

B. Seasonal and Weather Limitations.

1. Perform chip seal operations between June 1 and August 30.

2. Do not perform chip seal work during the 48-hour period immediately preceding a holiday or a holiday weekend.

3. Do not perform chip seal work if local weather forecasts includes a predicted temperature lower than 45° F (70 C) within 12 hours after the intended close of the work for the day.

4. Do not perform chip seal work if the local weather forecast includes a probability of precipitation greater than 45% within the intended schedule of operations for the day. Chip seal work may be suspended if impending adverse weather conditions occur in the vicinity of the work site.

5. Do not apply chip seal to damp or wet road surfaces.

6. Immediately stop chip seal work if the wind velocity affects the distribution of chips and oil or if current weather conditions prevent providing the specified results.

7. Stop chip seal work at least ½ hour before sunset.

C. Rolling Requirements.

1. Begin rolling immediately behind the spreader. Provide the number of rollers needed to cover the full width of the aggregate spread in one pass.

2. Make at least 4 complete passes with each roller. Do not allow the speed to exceed 7 mph on the initial coverage. Additional rolling may be required.

D. Opening to Traffic.

1. Open the roadway to traffic within one week after the chip seal work is completed.

2. Broom within 48 hours of the completion of chip seal work. Broom in the early morning to minimize dust and reduce loosening or displacing of embedded aggregate. Provide water for dust control. Provide additional rolling if necessary.

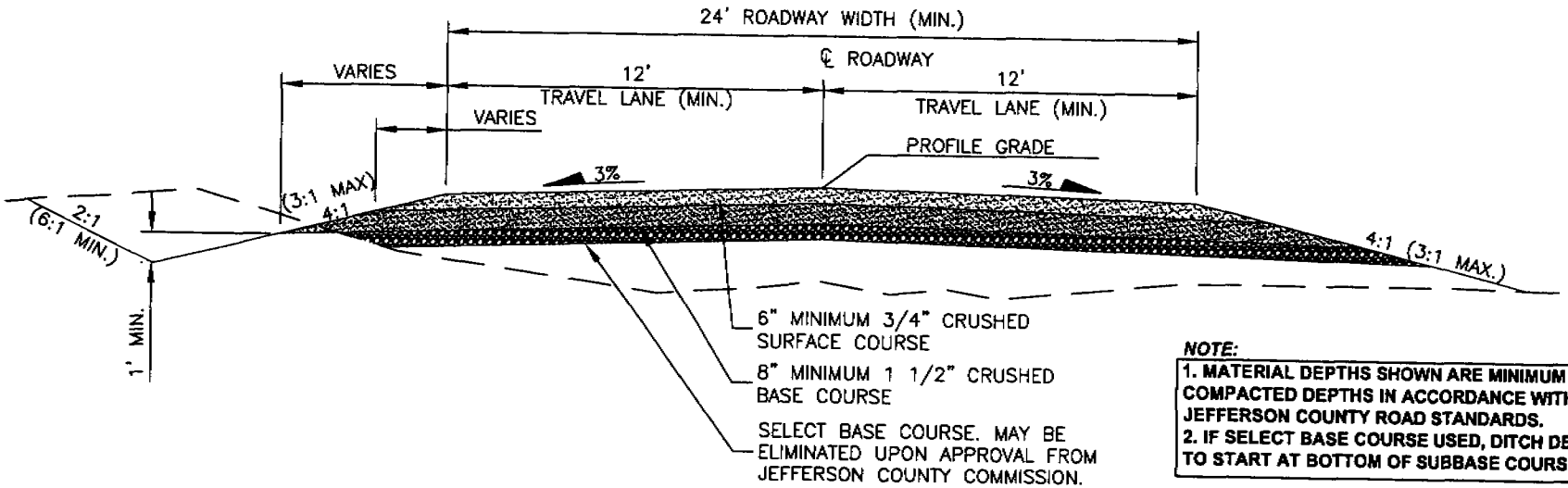
3. If the chip seal fails to cure properly, or inclement weather interrupts the 48-hour curing period, continue traffic control as appropriate.

4. Correct surface irregularities affecting the ride quality at the contractors' expense.

E. Traffic Control.

1. Traffic control is the contractors' responsibility and must be in accordance with MUTCD standards.

2. All Flaggers must have a current certification.



NOTE:

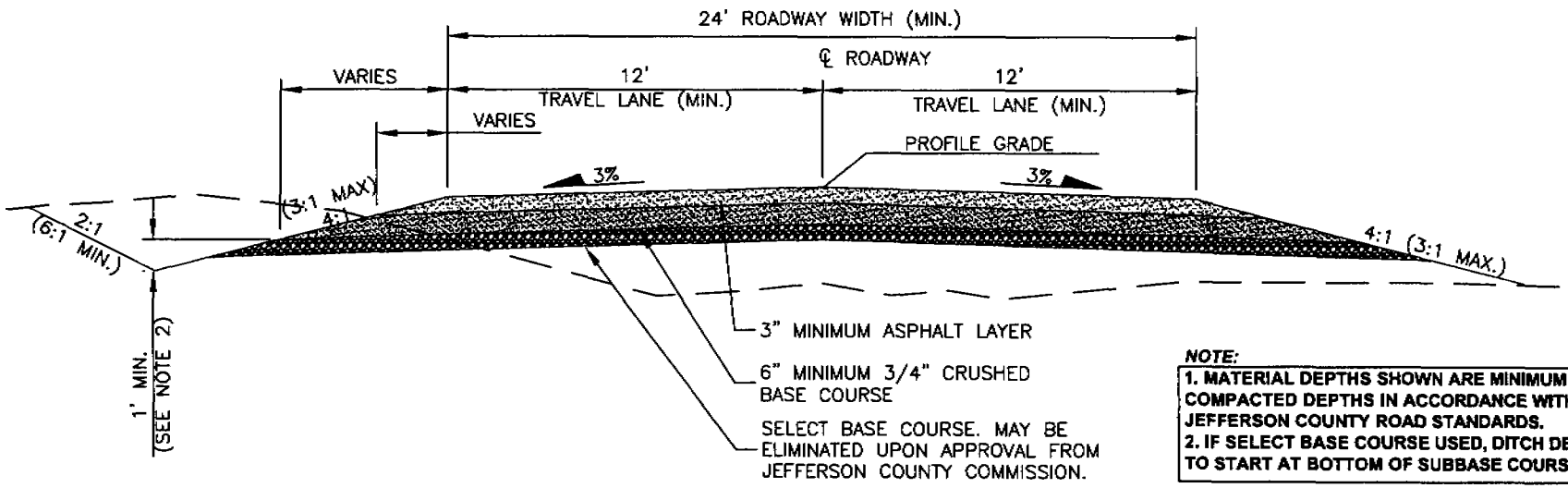
1. MATERIAL DEPTHS SHOWN ARE MINIMUM COMPACTED DEPTHS IN ACCORDANCE WITH JEFFERSON COUNTY ROAD STANDARDS.
2. IF SELECT BASE COURSE USED, DITCH DEPTH TO START AT BOTTOM OF SUBBASE COURSE.

TYPICAL GRAVEL ROADWAY SECTION

NOT TO SCALE

FIGURE 1

JEFFERSON COUNTY ROAD STANDARDS



NOTE:

1. MATERIAL DEPTHS SHOWN ARE MINIMUM COMPACTED DEPTHS IN ACCORDANCE WITH JEFFERSON COUNTY ROAD STANDARDS.
2. IF SELECT BASE COURSE USED, DITCH DEPTH TO START AT BOTTOM OF SUBBASE COURSE.

TYPICAL ASPHALT ROADWAY SECTION

NOT TO SCALE

FIGURE 2

JEFFERSON COUNTY ROAD STANDARDS

APPENDIX A:
Best Management Practice Guidelines

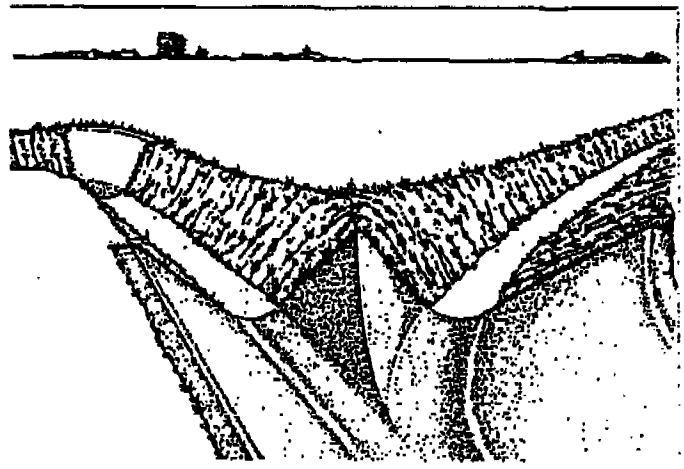


Figure 1–1. Lined channel.

Grass or sod linings are the most common types of foliage used. They are cheap and easy to maintain. Any type of grass (adaptable to the area) is suitable. In many cases, all that is needed to establish a grass lining is to sow grass seed on the banks. In other cases, some type of protection must be provided until the grass can establish itself. Straw mulches are commonly used for protecting seeds and slopes from erosion while the seeds are sprouting. Another means of protection is an asphaltic emulsion sprayed over the sown seed. This emulsion provides erosion control and maintains moisture until the grass is established. Where good turf cannot be established, you may need to pave the channel with riprap (stone), asphalt, or concrete.

Light reinforced concrete is very good for lining drainage channels. In some cases, drainage ditches can be lined with segmented concrete. But, segmented concrete fails unless it is constructed properly. Figure 1–2 shows a properly configured (segmented) drainage channel.

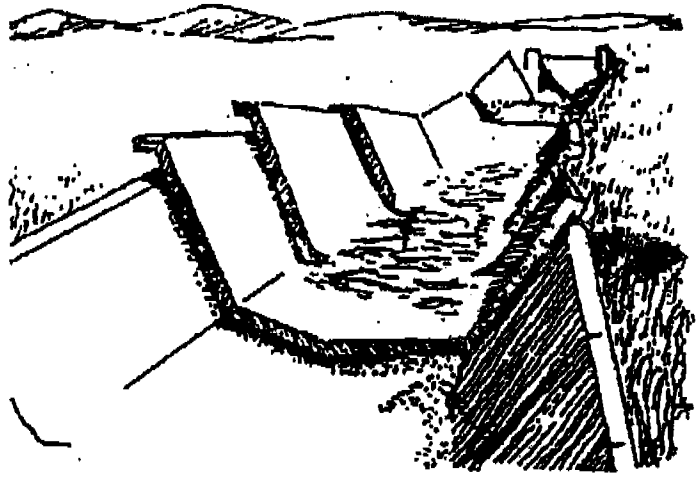


Figure 1–2. Breaks in lined channel.

Shallow lateral channels can be lined with reinforced concrete pipe rounds (fig. 1–3). The pipe rounds are precast in the form of culvert pipe. The concrete pipe rounds have break inserts that allow the pipe to be broken into segments equaling one-third or one-half the pipe's circumference. The separated pipe rounds are then laid to form a ditch lining. Though the initial cost of this type of lining is relatively expensive, maintenance and replacement of washed out or settled sections are inexpensive.

In some situations, asphaltic concrete (hot or cold), 2 to 3 inches (50.80 to 76.20 millimeters) thick, is an economical material to use when lining channels. This material is often used for roadside channels where standard gutters or curbs have been installed. When an asphaltic concrete lining is used, the soil should contain sufficient clay to provide a stable supporting base. Asphaltic concrete lining is hard to keep backfilled, and weeds can grow through it. To prevent weed growth, treat the channel surfaces with a soil sterilant (herbicide) before placing the asphalt.

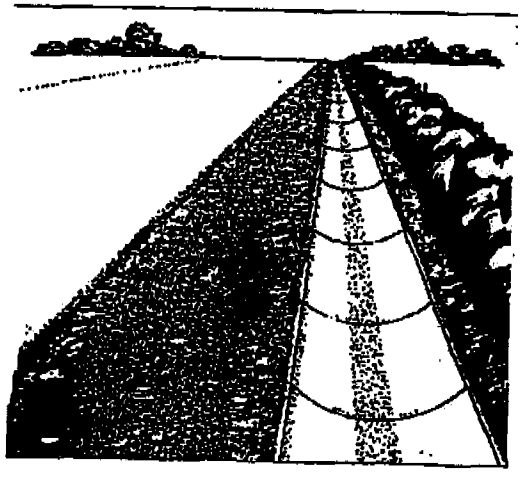


Figure 1–3. Ditch lined with reinforced concrete pipe rounds.

Check dams

Check dams are often used to retard the flow of water in drainage ditches. Depending on the situation, these dams can be built with several types of materials. They must be high enough and long enough to keep water from flowing around the ends. Notches are left in the center of the dams for the normal flow of water. Figure 1–4 shows check dams being used to control erosion in a drainage ditch.

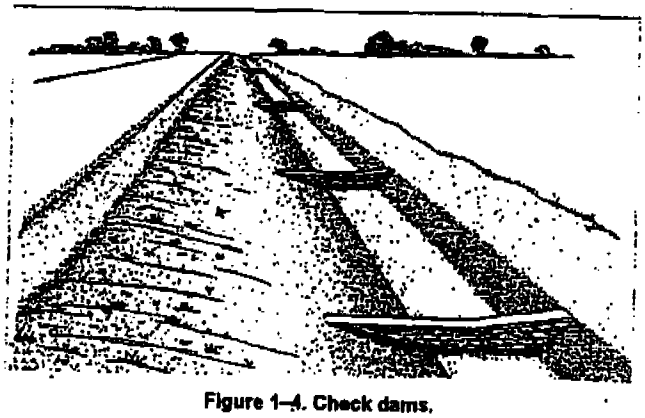


Figure 1–4. Check dams.

Several small check dams are more desirable than one large dam. Build the dams far enough into the bed and sidewalls of the ditch to prevent washouts. Inspect them occasionally, especially after heavy rainstorms, to see whether they are functioning properly and whether repairs are needed.

Culverts

Culverts are normally made from pipes or cement enclosures. They are used to divert water under all types of paved surfaces. Culverts carry off surface water that cannot be diverted any other way. The most common type of culvert is a single straight conduit. Both the inlet and outlet are at ground level. Multiple conduits are sometimes used where high water flow is expected. Culverts are normally made of pipe. Pipe culverts are usually made of corrugated metal, concrete, or cast iron. A culvert should be long enough to extend completely through the fill. This length often eliminates the need for protection around the culvert ends. If protection is needed, cover the area around each end with native grass. If the length of the culvert is *less than* 30 feet (9.144m), the diameter of the pipe must be 15 inches (0.38100m) or more. If the length of the culvert is *over* 30 feet (9.144M), the diameter of the pipe must be at least 18 inches (0.4520m). Small pipes clog easily and are difficult to maintain. Positioning, installing, and maintaining culverts are covered in the following paragraphs.

Positioning

Culverts should coincide, as closely as possible, with stream alignment. Position the inlet of the culvert so the water does not have to travel out its natural course to enter the opening.

Whenever drainage allows flooding across a paved surface, a relief culvert is used to provide cross drainage. Cross drainage allows water to be drained away from the road or pavement area. The number of relief culverts to be installed is determined by the grade of the road. Relief culverts should be no more than 300 feet (91.44m) apart (fig. 1–5). When two or more pipes are placed side by side, a space equal to one-half the diameter of the pipe must be left between them. This permits proper compacting of the backfill. Inlet and outlet elevations of relief culverts should follow the natural ground slope.

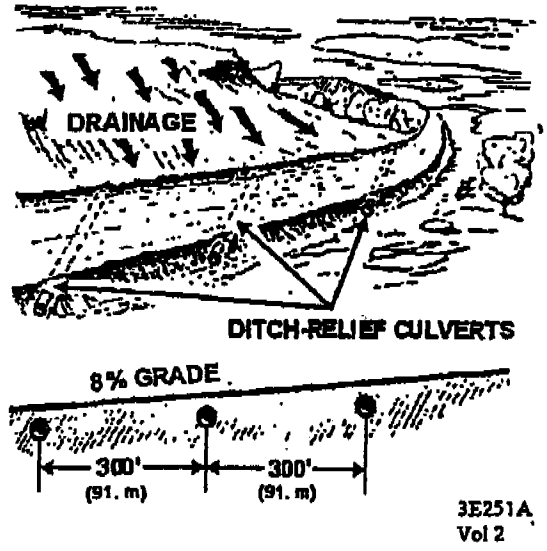


Figure 1–5. Spacing of ditch-relief culverts.

When the culvert grade must be flatter than the inlet ditch grade, use a sump at the inlet. A sump helps to eliminate silting inside the culvert. If the inlet end of the culvert is below ditch level, use a drop inlet (fig. 1–6).

The culvert should extend considerably beyond the fill if the ground drops sharply at the outlet. A spillway must be built under the outlet to prevent erosion and backwash.

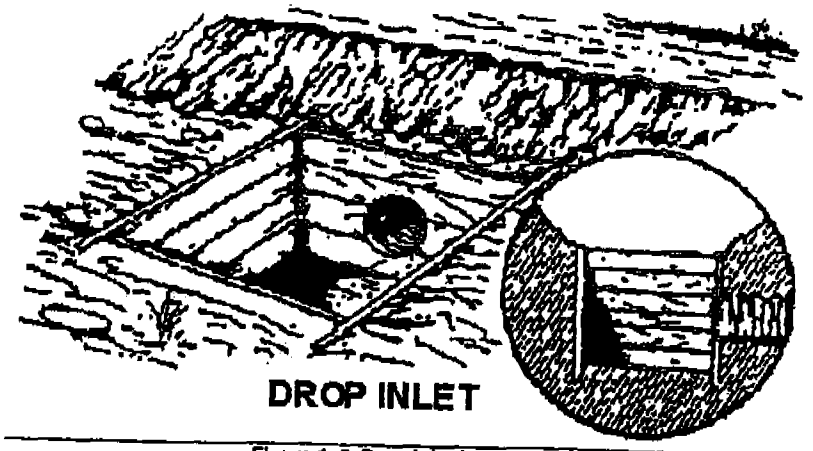


Figure 1–6. Drop inlet for culverts.

Installation

Except in extremely flat lands, install culverts with a minimum grade of 2 percent to help drainage. This grade also helps eliminate silting in the culvert. To ensure that culverts are installed true to grade, use a reference string (fig. 1–7). After you find the centerline of the culvert, drive stakes about 1 foot (0.30m) in length, past the end position. Mark these stakes at a predetermined distance above the ends of the culvert. Stretch a string between these reference marks. Maintain the proper grade by measuring from the string.

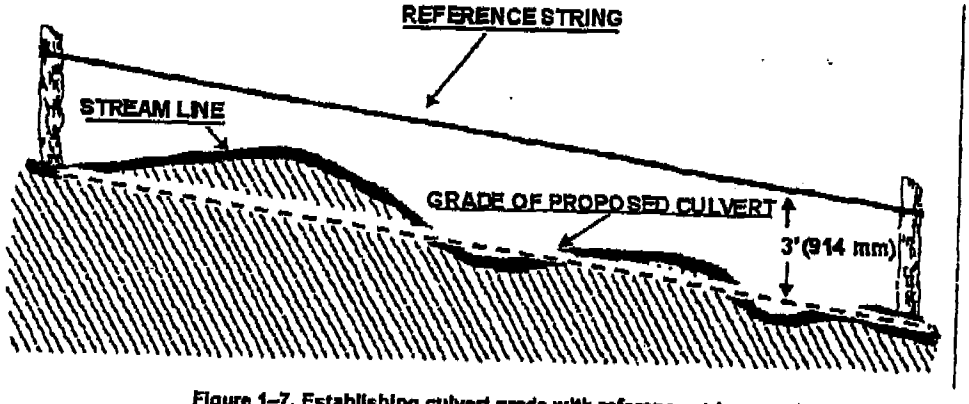


Figure 1–7. Establishing culvert grade with reference string.

When you install a culvert under a roadway carrying traffic, open the trench half the width of the road. Install the culvert in that half and cover it. Then, open the trench in the other half of the road. This method of installation eliminates the need for closing the road completely.

If pipe is to be installed under roads or railroads where fills are deep or traffic cannot be disturbed, use the jacking method of installation. The jacking method uses a hydraulic jack of 30- to 250-ton (27216 to 226796 kg) capacity.

JEFFERSON COUNTY ROAD STANDARDS

April 1, 2008

Section I

WHEREAS, the Board of County Commissioners of Jefferson County are charged with the protection of the health, safety and welfare of the people of Jefferson County; and

WHEREAS, growth and development within Jefferson County results in new roadways, approaches and bridges being built to provide access to subdivision and lots for residential and commercial use; and

WHEREAS, these roadways, approaches, and bridges will be privately built and maintained for the public use, they must be constructed adequately for several types of transportation and safe for all users; and

WHEREAS a standard is also needed to which existing roads should be upgraded as time and resources permit;

NOW, THEREFORE, BE IT RESOLVED that the Board of County Commissioners of Jefferson County hereby adopts the following Street and Road design Standards.

DATED this 8th day of April, 2008.

ATTEST:

BONNIE RAMEY
CLERK AND RECORDER

KEN WEBER, CHAIR

TOMAS E. LYTHGOE, COMMISSIONER

CHUCK NOTBOHM, COMMISSIONER

STREETS AND ROADS

Road design standards can be complex. Developers and the public are encouraged to contact the Jefferson County Road Department for additional information or clarification.

A. Definitions

1. Minor Arterial: a through road providing service to corridors with or travel densities greater than those served by collectors or local roads.

2. Collector: exhibiting lower travel distances and speeds than roads included on the arterial systems. Collectors are primarily for land use and are spaced at intervals consistent with population density to provide service to smaller county travel generators such as local roads.

3. Local Road: These are the remaining roads not classified under a higher system. The purpose of rural local roads is to provide land access and serve short distance travel.

B. Designs

1. The arrangement, type, extent, width, grade and location of all streets shall be considered in their relation to existing and planned streets, to topographical conditions and to public convenience and safety, and in their relation to the proposed uses of the land to be served by them.

2. Any and all public access road construction, reconstruction, or improvements in Jefferson County must be designed in accordance with the Jefferson County Road Standards and stamped by a Professional Engineer registered in the State of Montana.

   The public access road design plans are to be submitted to the County for approval after the Preliminary Plat application has been approved by the County and prior to any construction activities for the proposed project. At a minimum,

the plans shall contain the following information:

- All road construction or reconstruction work must be certified by a licensed engineer as having been completed according to the Jefferson County Road Standards and approved plans.

- Plan View: Topographic information, right-of-way (R.O.W.) lines, horizontal alignment of roadway in relation to R.O.W., horizontal curve information (radius, length, Dc, PC, PT, PI, etc.), angle and point of intersection of connecting streets or roads, underground and overhead utilities, and stormwater drainage/detention facilities.

- Profile View: Finished grade lines (centerline and one or both flowlines), vertical curve information (VPC, VPI, VPT, k value, curve length, etc.), location of underground utilities, and proposed culverts/ drainage structures.

- Typical Section: R.O.W. width, street width, base course type and thickness, surface course type and thickness, subgrade compaction density, superelevation or crown slope, cut/fill slopes, borrow ditches, number of driving lanes, driving lane width and shoulder width.

3. Roads in low density areas will meet the design specifications in Table 1.

4. Streets and roads in high density and commercial areas shall meet the design specifications in Table 3.

5. All streets or roads within a new development shall be located in an easement of appropriate width (per road standards) dedicated to public use. The roads shall be maintained by an approved property owners' association. The lot boundaries shall extend to the center of the road easement, with the easement being dedicated to public access.

6. Any public access roads within a development with a minimum projected average daily traffic (ADT) of 400 or greater must be hard surfaced with an approved material such as double chip seal, minimum 10" of compacted asphalt millings with a chip seal, or a minimum 3" of asphalt paving. All public access roads shall be built with the minimum standard road base course material per these Road Standards.

7. Any development that proposes further development for an adjacent or to an existing development that will access or utilize public access roads within the existing development, resulting in an ADT of 400 or greater to existing public access roads, will be required to commit to participate in setting up a Rural Improvement District (RID) with all property owners directly utilizing the affected public access road. The existing public access roads will be required to be upgraded with a County approved hard surface such as double chip seal, 10 inches of compacted asphalt millings with chip seal, or minimum 3" of asphalt paving. All public access roads shall be built with the minimum standard road base course material per these Road Standards.

8. All roads for schools, churches, or other public facilities must be hard surfaced with a County approved material such as double chip seal, 10 inches of compacted asphalt millings with chip seal, or minimum 3" of asphalt paving, and be built with the minimum standard road base course material per these Road Standards.

9. All public access roads in or to any development for commercial or industrial use must be paved with a minimum of 3" compacted lift of asphalt paving with the minimum standard road base course material per these County Standards.

10. Residential driveways shall not have direct access to primary highways. For extreme circumstances, the Montana Department of Highways may issue a road approach permit.

11. Local streets shall be designed so as to discourage through traffic.

12. Specific requirements for depth of road base, aggregate materials, compaction, and type and depth of surface materials shall be as follows:

a. Grading: All roads, streets and alleys shall be excavated or filled to within one tenth (0.1) of a foot of the grade established by an approved design plan.

b. Sub-grades: Roadway sub-grades must be free of topsoil, sod, vegetation, organic matter, or other unsuitable soil foundation material which is not able to be adequately compacted. Sub-grades must be properly bladed, shaped, and rolled to the minimum specified compaction and subject to approval by the Jefferson County Authorized Representative.

c. Base Course: Base course material placed immediately below a crushed top surfacing or asphalt paving shall meet the requirements of Section II of these Road Standards and the approved design.

d. Surface Course: Aggregate surface course material shall consist 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 or other deleterious matter. This is the surface course on gravel roads and streets. The material shall meet the requirements of Section II of these Road Standards and the approved design.

e. Asphalt Paving: Asphalt shall consist of a bituminous 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 addition of the Montana Public Works Standard Specifications (MPWSS).

f. Compaction efforts for subgrade and all aggregate base and surface courses on all public access road construction shall be a minimum of 95% of standard maximum density. Density testing shall be at the

developer/contractor's expense and performed by an independent agency as approved by the Jefferson County's Authorized Representative.

g. Road Surface:

(1) For aggregate road surfacing, the entire roadway shall consist of a minimum 6" of ¾" minus crushed aggregate surface course material meeting the requirements of Section II of these Road Standards. The surfacing will be shaped, watered, and rolled to obtain the minimum specified compaction.

(2) Chip-seal road surfacing shall meet the requirements of Section III of these Road Standards placed over a minimum of 6" of ¾" minus crushed aggregate base course material properly bladed, shaped, watered, and rolled to the minimum specified compaction. Use of 1" minus or 1-1/2" minus crushed aggregate base course material may be used in an approved design.

(3) Asphalt surfacing shall consist of a minimum of 3" of compacted bituminous hot mix over a minimum 6" of an approved crushed aggregate base course material properly bladed, shaped, watered, and rolled to the minimum specified compaction. Use of 1" minus or 1-1/2" minus crushed aggregate base course material may be used in an approved design

(4) Road shape will consist of a crown in the middle of the road with not less than 3% cross slope. See Figure 1 and 2.

(5) Ditch in-slopes shall be between 3:1 and 6:1 with a maximum back-slope of 2:1. The ditch shall be a minimum of 1 foot in depth from the edge of subgrade elevation. See Figure 1 and 2.

13. All new public access roads, including subdivisions, will be inspected for compliance with the approved design and these Road Standards by the Jefferson County Authorized Representative or an independent licensed professional

engineer approved by the Jefferson County Authorized Representative.

14. Whenever a subdivision abuts or contains an existing or proposed arterial roadway or major thoroughfare, the County Commission may require frontage roads.

15. Dead-end streets are discouraged. Where a future street extension is proposed, a cul-de-sac will be provided. Streets ending in cul-de-sacs will be no longer than 1,500 feet.

16. Half streets are prohibited except when essential to the development and where the County Commission is assured that it will be possible to require the dedication of the other half of the street when the adjoining property is subdivided. Whenever an existing half street is adjacent to a tract to be subdivided, the other half of the street shall be platted within such a tract.

17. Horizontal alignment of streets must ensure adequate sight distances. When street center lines deflect more than five degrees, connection must be made by horizontal curves.

18. Intersections. The following items apply to intersections:

    a. Streets must intersect at 90 degree angles, except when topography precludes and has been approved by the Jefferson County Authorized Representative, and in no case will the angle of intersection be less than 80 degrees to the center line of roadway being intersected.

    b. Two streets meeting a third street from opposite sides must meet at the same point.

    c. No more than two streets may intersect at one point (four legs maximum).

    d. Intersections of local streets with major arterial or highways must be kept to a minimum.

e. Intersection design must provide acceptable visibility for traffic safety as dictated by the designed operating speeds on the individual roadways.

f. When a new road intersects an existing minor arterial, collector or local road at an inclining or declining angle greater than five percent, the new road approach will include a thirty-foot landing for sight distance and drainage. The landing shall meet the requirements delineated in Section I.E.2 of this document. A culvert may be required.

g. Hilltop intersections are prohibited, except where no alternatives exist. Intersections on local roads within 100 feet of a hilltop are prohibited. Intersections on arterial and collector roads within 200 feet of a hilltop are prohibited.

h. Approach permits will be required for construction of approaches to county roads prior to any construction.

19. Where new streets are added, all signs required by the latest Manual on Uniform Traffic Control Devices must be provided at the expense of the developer. All signs must be laid out and/or designed according to the latest edition of the Manual on Uniform Traffic Control Devices. A sign plan must be submitted for approval before installing any new signs. Names of new streets aligned with existing streets will be named the same as those of the existing streets. Proposed street names will not duplicate or cause confusion with existing street names, in conformance with the county addressing system. Street names must be approved by the Jefferson County Planning Department prior to installation. The lettering on street or road identification markers will not be less than 3 inches high and not less than one half inch in stroke. All street markers shall be at least 5 feet but no more than 7 feet above ground level so as to be visible to emergency vehicles for a minimum distance of 100 feet.

20. Driveways to building sites must access ingress/egress roads at right angles and have a 12' minimum traffic lane with a 13' 6" height clearance. The ends of driveways exceeding 150' must have a turnaround area for emergency vehicles

which are designated as a cul-de-sac with minimum 50' driving surface radius. Please refer to the Jefferson County Subdivision Regulations for the definition of a driveway.

The following are minimum design standards:

TABLE 1. ROAD DESIGN STANDARDS FOR LOW DENSITY AREAS

Low Density Areas:

An area in which the density of development is not more than one dwelling unit per acre exclusive of public roadways, and which is located one mile or more from a third class city, two miles or more from a second class city, or three miles or more from a first class city.

Minimum Design Standards	Minor Arterial	Collector	Local Road
1. Minimum right-of-way width	60 ft.	60 ft.	60 ft.
2. Minimum roadway width (Refer to Table 2)	24-28 ft.	24-28 ft.	24-28 ft.
3. Minimum curb radius or edge of pavement at intersection	30 ft.	25 ft.	25 ft.
4. Minimum design speed of road	40 mph	35 mph	25 mph
5. Maximum grades			
a. flat and rolling terrain	6%	8%	9%
b. mountainous terrain	8%	10%	10%

Flat and rolling terrain is land with a cross slope of less than 15%

Mountainous terrain is land with a cross slope of 15% or greater

6. Maximum Rate of Vertical Curvature – per AASHTO for all roads. Vertical curves will not be required when the algebraic grade difference is 1% or less.

7. Minimum stopping sight distance	250 ft	205 ft.	125 ft.
8. Minimum horizontal curve radius	420 ft.	300 ft.	125 ft.
9. Minimum intersection spacing	500 ft.	250 ft.	150 ft.
10. Minimum encroachment/approach Spacing	----	150 ft.	100 ft.

11. Cul-de-sacs
    a. maximum length 1500 ft.
    b. minimum outside right-of-way radius 60 ft.
    c. minimum outside roadway radius 50 ft.

12. New bridges

All new bridge design must meet the requirements of the Jefferson County Bridge Standards and be designed by a professional engineer licensed in the State of Montana.

*American Association of State Highway Transportation Officials may be used as a further authority. Right-of-way and road width requirements shall be specified by the County Commission at the time of Preliminary Plat approval based upon site conditions and project design within the design specifications ranges outlined in these regulations. The standards presented should be considered "minimum standards," and may be increased if conditions warrant.

TABLE 2. MINIMUM ROADWAY WIDTHS

Roadway width according to Average Daily Traffic Count (ADT) and Topography

	ADT Count	Flat	Rolling	Mountainous
	0-400	24 ft.	24 ft.	24 ft.
	400-700	24 ft.	24 ft.	24 ft.
	700+	28 ft.	28 ft.	28 ft.
For design speeds in excess of 40 mph	Over 700	28 ft.	28 ft.	28 ft.

Note: ADT counts are available from the Montana Department of Transportation, Preconstruction Section, for most major collectors.

Right-of-way and road width requirements shall be specified by the County Commission at the time of Preliminary Plat approval based upon site conditions and project design within the design specification ranges outlined in these regulations. The standards presented should be considered "minimum standards", and may be increased if conditions warrant.

TABLE 3. STREET DESIGN STANDARDS FOR HIGH DENSITY, MAJOR AND COMMERCIAL AREAS

High Density Areas:

An area in which the density of development is greater than one dwelling unit per acre exclusive of public roadways, or which is located within one mile of a town or third class city, two miles of a second class city, or three miles of a first class city.

Minimum Design Standards	Minor Arterial	Collector	Local Road
1. Minimum right-of-way width	60 ft.	60 ft.	60 ft.
2. Minimum roadway width (Refer to Table 2)	24-28 ft.	24-28 ft.	24-28 ft.
3. Minimum curb radius or edge of pavement at intersection	30 ft.	30 ft.	25 ft.
4. Minimum design speed of road	40 mph	35 mph	25 mph
5. Maximum grades			
a. flat and rolling terrain	6%	8%	9%
b. mountainous terrain	8%	9%	9%
6. Maximum Rate of Vertical Curvature – per AASHTO for all roads. Vertical curves will not be required when the algebraic grade difference is 1% or less.			
6. Minimum stopping sight distance	375 ft.	250 ft.	200 ft.
8. Minimum horizontal curve radius	565 ft.	420 ft.	205 ft.
9. Minimum intersection spacing	500 ft.	250 ft.	150 ft.
10. Minimum encroachment/approach Spacing	----	100 ft.	100 ft.

11. Cul-de-sacs

a.	maximum length	1500 ft.
b.	minimum outside right-of-way radius	60 ft.
c.	minimum outside roadway radius	50 ft.

12. New bridges

All new bridge design must meet Jefferson County Bridge Standards and must be designed by a professional engineer licensed in the State of Montana.

*American Association of State Highway Transportation Officials may be used as a further authority. Right-of-way and road width requirements shall be specified by the County Commission at the time of Preliminary Plat approval based upon site conditions and project design within the design specifications ranges outlined in these regulations. The standards presented should be considered "minimum standards," and may be increased if conditions warrant.

Right-of-way and road width requirements shall be specified by the County Commission at the time of Preliminary Plat approval based upon site conditions and project design within the design specification ranges outlined in these regulations. The standards presented should be considered "minimum standards", and may be increased if conditions warrant.

C. Improvements

1. All roadway improvements including pavement, curbs, gutters, sidewalks, and drainage features shall be constructed in accordance with the specifications and these Road Standards, using materials approved by the Jefferson County Authorized Representative or approved independent agency at developers cost

2. Where access to a development will be by an easement across privately owned property, the developer must provide evidence that the necessary easement has been acquired and that the easement encompasses the nature and intensity of the use which will result from development.

3. Street or road signs and traffic control devices shall be placed at all intersections by the developer in accordance with the "Manual of Uniform Traffic Control Devices for Streets and Highways", available from the Montana Department of Transportation.

D. Mail Delivery

1. The developer shall provide an off-road area for mail delivery within the development as approved by the Jefferson County Authorized Representative.

2. All mailbox clusters are to be set a minimum of 12 feet off the edge of the county road driving surface in a location approved by the Jefferson County Authorized Representative. Mailbox clusters must be at least 50 feet from any intersection, and must not be located on arterial roadways.

E. Encroachment and Approaches

1. Any person who encroaches upon any county road easement within Jefferson County must obtain a permit from the Jefferson County Road Department prior to any construction.

2. Where feasible, all approaches will enter the county road with a negative degree of slope not more than three percent (3%) for a minimum of 30 feet back from the edge of roadway of the county road. Under no circumstance shall an approach exceed a positive slope of three percent (3%) for a minimum of 30 feet back from the edge of roadway of the county road. See attached Figure 1and 2.

3. All residential approaches shall be a minimum of 20 feet wide.

4. On paved roads the approaches should be paved to the easement line from the shoulder of the road. Farm/Field approaches should have a 12 foot long by 3 foot wide strip of asphalt placed parallel to the roadway to avoid edge breakaway.

5. Any encroachment upon state owned and maintained roads must be authorized by

the Montana Department of Transportation. The developer must obtain an approach permit and comply with state standards prior to Final Plat approval.

6. Failure to obtain a permit prior to any construction will result in a two hundred dollar ($200.00) late charge.

F. Drainage Features

1. The drainage features required for any surface run-off or run-off affecting the development shall meet the minimum standards of the Montana Department of Environmental Quality and all regulations adopted pursuant thereto, and are subject to the approval of the governing body. The intent of these regulations is to assure that proper drainage facilities are provided for any runoff in addition to historic amounts, caused by the development of the property.

2. Public access roads shall be designed to ensure proper drainage.

3. Culverts shall be designed of an adequate size and spacing to pass the flow from a 25 year storm event. They shall be provided and installed by the developer where any proposed roadway intersects a drainage channel or feature. Minimum culvert size shall be 15" in diameter for any private approaches. All crossdrains on public access roads shall have a minimum opening of 18" in diameter for runs less than 60' and a minimum diameter of 24" for all runs greater than 60'. Culverts shall extend a minimum of 1' beyond the toe of the roadway fill. Where feasible, all culverts shall be installed with standard flared end sections to properly direct flow, protect the ends of the pipe, and to correctly rap fill slopes around the ends of the pipe. The minimum fill cover over culverts shall be determined by the manufacturer's recommendations for HS-20 loading.

4. Bridges shall be designed and constructed in accordance with the adopted Jefferson County Bridge Standards. They shall be provided and installed by the developer where any proposed roadway intersects a drainage channel or feature of sufficient size and flow to warrant the use of a bridge. Bridges shall meet the

design standards as specified in Tables 2 and 3 of these Road Standards and will not be narrower than the approaching roadways.

5. Drainage facilities shall be located in County road rights-of-way or in perpetual drainage easements of appropriate widths and are subject to approval by the Jefferson County Authorized Representative.

6. Drainage features shall not discharge into any sanitary sewer facility or any identified hazardous materials.

7. All new drainages and culverts shall be installed using BMP's, best management practice and must follow guidelines provided in Appendix A.

8. The grading and drainage features shall be designed in accordance with these Road Standards and applicable regulations, and stamped by a Professional Engineer registered in the State of Montana, except where a property is at the head of the drainage area and all natural historic drainage channels will be protected by perpetual easements as approved by the Jefferson County Authorized Representative.

9. Drainage ditches shall have a minimum grade of 1.0%. A minimum grade of 0.5% may be used for distances of 200 feet or less.

10. Any and all maintenance, replacement, or repair of irrigation culverts and/or drainage structures within County road rights-of-way will be the responsibility of the appropriate water users.

G. Cattle Crossings and Gates

Cattle crossings are discouraged. Gates will not be allowed across public roads. Where allowed, cattle crossings shall meet the following:

1. All cattle guards are to be installed and maintained by the adjacent property owner(s).

2. Cattle guards will be of new construction and designed for HS-20-44 loading.

3. Cattle guards will have a concrete footing of 10" width and 16" height.

4. Cattle guards will provide a minimum of twenty-four (24) feet of opening.

5. A wire or steel gate providing eighteen (18) feet of opening will be constructed adjacent to any and every cattle guard.

6. All encroachment or approach gates shall be located a minimum of 30 feet from the edge of the roadway and shall operate inward with a clear opening of 12 feet.

H. Variances:

1. Hardship

The County Commission may grant variance from the Jefferson County Road Standards when strict compliance would result in undue hardship and when it is not essential to the public welfare. Such variances shall not have the effect of nullifying the intent and purpose of these regulations. An innovative alternative proposal which does not circumvent the purpose of these regulations may be reason for granting of a variance by the County Commission. The County Commission shall not approve variances unless it makes findings based upon the evidence in each specific case that:

a. The granting of the variance will not be detrimental to the public health, safety, or general welfare.

b. Because of the particular physical surrounding, shape, or topographical conditions of the specific property involved, and undue hardship to the owner would result if the strict letter of the regulations is enforced.

c. The variance will not cause an increase in public costs.

2. Procedure

The developer shall include with the submission of the Preliminary Plat a written statement describing the requested variance and the facts of hardship upon which the request is based. The County Commission shall consider each requested variance at the public meeting or hearing on the Preliminary Plat.

3. Conditions

In granting variances, the Jefferson County Commission may impose such conditions as will in its' judgment substantially secure the objectives of these road standards.

SECTION II

Aggregates

A. Aggregate for Road Mix Bituminous Base

1. Aggregates for road mix bituminous base construction shall be crushed stone, crushed slag, or crushed or natural gravel meeting the quality requirements of table 703-3 unless shown otherwise in the approved specific project specifications.

2. The gradation shall be as described in the approved specific project specifications. When crushed gravel is used, not less than 50 percent by weight of the particles retained on the Number 4 seive shall have at least on fractured face.

B. Aggregate for Base or Surface Courses

Aggregate materials shall conform to the requirements shown below unless shown otherwise in the approved specific project specifications.

1. Pit-Run Aggregate. Pit-run aggregates shall consist of native materials of a size and grading that can be taken directly from the source and placed on the road without crushing or screening. No gradation, other than a maximum size, will be required. The maximum size shall be as shown in the approved specific project specifications.

2. Grid-Rolled Aggregate. Grid-rolled aggregate shall consist of native materials of a quality that can be taken directly from the source, without crushing or screening, and broken down on the road by grid-rolling. No gradation other than a maximum size will be required. The maximum size shall be as shown in the approved specific project specifications.

3. Screened Aggregate. Material shall consist of gravel, talus, rock, sand, shale, or other suitable material, and be reasonably hard and durable and reasonably free of organic material, mica, clay lumps, or other deleterious materials. The gradation requirements shall be as shown on the approved specific project specifications.

4. Crushed Aggregate. Aggregate for crushed base or surface courses shall be crushed stone, slag, or gravel meeting the requirements shown in table 703-3 unless shown otherwise in the approved specific project specifications.

   Unless shown otherwise in the approved specific project specifications, the crushed aggregate gradation shall meet the requirements of table 703-4. Aggregate shall be well graded from coarse to fine within the gradation band.

Table 703-3 – Crushed aggregate quality requirements for base or surface courses.

Description	AASHTO Test Method	Requirement	
		Base	Surfacing
approved specific project specifications	T 96	50 max.	50 max.
Durability Index, Coarse and Fire	T 210	35 min.	35 min.
Liquid Limit	T 89	25 max.	25 max.
Plasticity Index	T 90	6 max.	2-9 max.
Dust Ratio: % Passing No. 200	T 11	2/3 max.	2/3 max.
% Passing No. 30	T 27		
Sand Equivalent (alternate Method Number 2	T 176	35 mm.	--

When crushed gravel is used, at least 40 percent by weight of the particles retained on the Number 4 sieve shall be at least one fractured face. Naturally fractured faces may be included in the 50 percent requirement, provided the roughness and angularity produce strength characteristics equivalent to mechanically fractured faces.

Table II-1 Specification for Crushed Surface Course	
Table of Gradations **Percentage by weight passing square mesh sieve**	
1 Inch Sieve	
¾ Inch Sieve	100%
½ Inch Sieve	
No. 4 Sieve	40-80%
No. 10 Sieve	25-60%
No. 200 Sieve	8-20%

Table II-2 Specification for Crushed Base Course			
Table of Gradations Percentages by Weight passing square mesh sieve			
2 Inch Sieve	--		
1 ½ Inch Sieve	100%		
1 Inch Sieve	--	100%	
¾ Inch 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%

Table II-3 Specification for Select Sub-Base Material					
Table of Gradations Percentages by Weight passing square mesh sieve					
4 Inch Sieve	100%				
3 Inch Sieve	--	100%			
2 ½" Sieve	--	--	100%		
2 Inch Sieve	--	--	--	100%	
1 ½ Inch 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%

SECTION III

Specifications for Chip Seal Surfacing and Cover

A. Material Requirements:

1. The chip seal surfacing design shall be a double bituminous surface treatment (double shot) consisting of a first application of 0.40 – 0.50 gallons per square yard of MC800 or equal and 25 pounds of ½"chips per square yard. The second application shall be 0.40 – 0.50 gallons per square yard of MC3000 or equal and 25 pounds of ½" chips per square yard. Where applicable a prime coat of MC70 at a rate of 0.25 - 0.38 is to be used prior to the application of MC800. The prime coat is to be allowed to cure per the manufactures recommendation before the MC800 application is applied. All spread rates to be verified by the manufacture prior to construction.

2. The specification for chips material

Table II-1 Specification for Chips Material	
Table of Gradations Percentage by weight passing square mesh sieve	
1/2 Inch Sieve	100%
3/8 Inch Sieve	100%
No. 4 Sieve	0-30%
No. 8 Sieve	0-15%
No. 200 Sieve	0-2%

2. The composite aggregate must not have adherent film or clay, vegetable matter, frozen lumps and other extraneous matters that prevents through coating with bituminous material. Bituminous material must remain adhered to the material upon contact with water. No combination of shale, clay, coal and soft particles can exceed 1.5 percent.

3. A wear factor not exceeding 30 percent at 500 revolutions.

4. A minimum of 70 percent by weight, of coarse aggregate for grade 4A must have at least one fractured face.

B. Construction Requirements:

1. Sampling, Testing and Acceptance.

a. Furnish at least 2 aggregate sampling pans, each a minimum of 2 feet x 2 feet x 2 inches. Leg mount or support the pans to prevent disturbing the fresh asphalt when sampling.

b. Take samples while spreading chips at locations randomly selected by the project manager. Place 2 sample pans on the roadway immediately ahead of the spreader between the spreader wheel paths. Stagger the pans 3 to 6 feet apart. Once the spreader passes, retrieve the sample pans and turn them over to the project manager for review.

c. Replace or correct all asphalt removed or disturbed by the sampling and place cover aggregate over the sampling area at the specified rate.

2. Seasonal and Weather Limitations.

a. Performance chip seal operations between June 1 and August 30.

b. Do not perform chip seal work during the 48-hour period immediately preceding a holiday or a holiday weekend.

c. Do not perform chip seal work if local weather forecasts includes a predicted temperature lower than 45° F (70 C) within 12 hours after the intended close of the work for the day.

d. Do not perform chip seal work if the local weather forecast includes a probability of precipitation greater than 45% within the intended schedule of operations for the day. Chip seal work may be suspended if impending adverse weather conditions occur in the vicinity of the work site.

e. Do not apply chip seal to damp or wet road surfaces.

f. Immediately stop chip seal work if the wind velocity affects the distribution of chips and oil or if current weather conditions prevent providing the specified results.

g. Stop chip seal work at least ½ hour before sunset.

3. Rolling Requirements.

   a. Begin rolling immediately behind the spreader. Provide the number of rollers needed to cover the full width of the aggregate spread in one pass.

   b Make at least 4 complete passes with each roller. Do not allow the speed to exceed 7 mph on the initial coverage. Additional rolling may be required.

4. Opening to Traffic.

   a. Open the roadway to traffic within one week after the chip seal work is completed.

   b. Broom within 48 hours of the completion of chip seal work. Broom in the early morning to minimize dust and reduce loosening or displacing of embedded aggregate. Provide water for dust control. Provide additional rolling if necessary.

   c. If the chip seal fails to cure properly, or inclement weather interrupts the 48-hour curing period, continue traffic control as appropriate.

   d. Correct surface irregularities affecting the ride quality at contractor's expense.

5. Traffic Control.

   a. Traffic control is the contractor's responsibility and must be in accordance with MUTCD standards.

   b. All Flaggers must have a current certification.

APPENDIX A:
Best Management Practice Guidelines