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LOCAL ROADS PLAN

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Introduction

The Local Roads Plan is a document prepared by the South Dakota Department of Transportation (SDDOT), through its office of Local Government Assistance (LGA) and approved for applicable content by the South Dakota Transportation Advisory Council and the Federal Highway Administration (FHWA), for use by local governments throughout South Dakota. The Local Roads Plan is intended to be a resource for any local government project independent of funding source or administrator, containing guidance on planning, geometric design, and best management practices specifically for constructing roads and bridges on local government highway systems in South Dakota.

This document is not a standalone document and should be used along with the AASHTO "*A Policy on Geometric Design of Highways and Streets*," the AASHTO "*Guidelines for Geometric Design of Low-Volume Roads, 2019"* (ADT ≤ 2000), the USDOT FHWA "*Gravel Roads Construction & Maintenance Guide*", the FHWA *Manual on Uniform Traffic Control Devices*, the *SDDOT Road Design Manual* (which includes Design Standards for Restoration, Rehabilitation, Resurfacing, and Reconstruction in Chapter 2), the *SDDOT Bridge Design Manual*, and other applicable policies and publications.

The guidance found in the Local Roads Plan has a great deal of flexibility based on local needs, long-term maintenance considerations, future planning, traffic, and accident history. The ultimate goal is to provide a product that will fit local needs while taking into consideration safety, maintenance, and cost. Due to the flexibility found within these guidelines, the use of design exceptions will only be necessary for federally funded projects where a specific deviation beyond the flexibility of the guidelines is necessary. This process will be facilitated and documented between the Office of Local Government Assistance, the local government, and FHWA for federally funded projects.

The Office of Local Government Assistance will assist in any transportation endeavor at the local level. If there are questions concerning current or future project needs, please contact the Local Government Assistance Engineering Supervisor.

The SDDOT internet site is the primary location for the most current information. The following links are provided for this reason.

SDDOT Home –
https://dot.sd.gov/

Local Roads Plan – Under Local Governments / Forms & Documents / Publications
https://dot.sd.gov/doing-business/local-governments/forms-documents#listItemLink_1365

- Chapters 1, 2, and 9 contain bookmarks

USDOT FHWA Gravel Roads Construction & Maintenance Guide
https://www.fhwa.dot.gov/construction/pubs/ots15002.pdf

Standard Bid Items, Standard Plates, Standard Notes and Plan Sheets for roads and structures (under “Downloadable files”), and the Road Design and Drainage Manuals (under “Manuals”) – Under Doing Business
https://dot.sd.gov/

ENGINEERING/DESIGN SERVICES

Consultant Services

Downloadable Files

Manuals

News & Updates

Right of Way / Relocation Assistance

Standard Bid Items

Standard Plates

Surveyors

Utility Coordination

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Revision History

1990 SDDOT “Secondary & Off-System Road Plan” Agreement between the Federal Highway Administration & the South Dakota Department of Transportation

This document was created as required by *23 Codified Federal Regulations (CFR), Part 642, Secondary Road Plan*

1997 South Dakota Department of Transportation Secondary & Off-System Road Plan (a.k.a “Secondary Roads Plan”)

This document was created after the cancellation of 23 CFR, Part 642, October 8, 1993.

2011 South Dakota Department of Transportation Local Roads Plan

This document was created to update the previous document based on the most current version of the AASHTO *A Policy on Geometric Design of Highways and Streets*.

2024 South Dakota Department of Transportation Local Roads Plan

This document was created to update the previous document based on the most current version of the AASHTO *A Policy on Geometric Design of Highways and Streets*, expand to include more information as found in the Chapter Directory, and restructure for more ease in updating.

SDDOT
LOCAL ROADS PLAN

General Information
Federally Funded Projects

General Information – Federally Funded Projects

South Dakota Department of Transportation, Administration Program, Office of Local Government Assistance

The Local Government Assistance Engineer and staff within the Administration Program, SDDOT, and under the direction of the Administration Program Manager, are responsible for administration of projects under the Local Roads Plan. Advice, consultation and recommendations are available from all sections within the SDDOT and will be requested and coordinated by the Local Government Assistance Engineer.

The primary function of the Local Government Assistance (LGA) Office is to provide the counties and cities with information and guidance on all phases of the Local Roads Plan on a continuous basis and assure compliance with all Federal and State requirements. Cooperation with local government officials will be continuous during project selection, development and construction.

The SDDOT Region Engineer will be responsible for the construction administration of the projects.

Authority and Applicability – Federally Funded Projects

The SDDOT will administer projects financed with Surface Transportation Block Grant Program (STBGP) funds on roads functionally classified, as per 23 U.S.C. section 133 (Federal-aid System), under the provisions of this Local Roads Plan. Where Federal-aid is made available for projects not on the Federal-aid System, the SDDOT will administer those projects under this Local Roads Plan when Federal regulation permits. All phases of project activity will be accomplished in accordance with this Local Roads Plan and applicable Federal requirements.

Authority under the Local Roads Plan extended from FHWA to the SDDOT does not include FHWA responsibilities under the National Environmental Policy Act of 1969, Section 138 of Title 23, Title VI of the Civil Rights Act of 1964, Title VIII of the Civil Rights Act of 1968 as amended in 1974, and the Uniform Relocation Assistance and Land Acquisition Policies Act of 1970 (as amended) and 49 CFR Part 24.

Provisions of the Local Roads Plan are applicable only to projects sponsored by the counties, cities or other local political subdivisions in cooperation with the applicable county or city. Projects not included under this Local Roads Plan are:

- Railroad crossing projects not on the Federal-aid System
- Projects in cities of populations greater than 5,000, not on the Federal-aid System, and those not using state or federal transportation funding.

Legal authority creating the SDDOT, permitting compliance with Title 23 USC, establishing the Federal-aid System and providing standards, specifications and assistance to the counties is contained in SDCL, Chapter 31-1, 31-2, 31-5 and 31-6.

Allotment of STBGP Funds for Counties and Class I Cities

STBGP funds are allocated to the 66 counties based on the following formula: $1 per person in a Class I city (population over 5,000) within a county will be distributed to that county with that amount deducted from the total of the STBGP funds allocated to the 66 counties, of the remaining funds one-third is distributed based on a county's highway system miles compared to the total county system miles statewide, one-third is distributed based on a county's rural population (including cities under 5,000) compared to the total state rural population, and one-third is distributed based on a county's land area compared to the total state land area. Authority for apportionment of funds is by action of the SDDOT Transportation Commission. County officials will be advised of their STBGP Fund balance annually.

STBGP Funds are sub-allocated to the cities, and are divided, based on population, among cities greater than 5,000 in population. Authority for apportionment of funds is by action of the SDDOT Transportation Commission, as of October 8, 1965. City officials will be advised of their STBGP Fund balance annually.

Bridge replacement and rehabilitation projects, both on and off the Federal-aid System, sponsored by a county, city, or other local political subdivision will be administered in accordance with this Local Roads Plan. Design standards will be in accordance with the Design Criteria sections of the Local Roads Plan.

Project Selection and Public Involvement

Projects will be selected by the County Commissioners or City Councils in cooperation with the SDDOT and other appropriate local officials. The county or city is the political entity that will be held responsible by SDDOT for all required documents, actions and functions during project development, construction and for required future project maintenance.

Public and interagency involvement in accordance with SDDOT Public Involvement Plan, available on the SDDOT website. SDDOT will provide assistance to the counties in assuring compliance with Public Involvement Procedures. The environmental classification will be submitted at an appropriate time after program submission for concurrence by the FHWA except for projects that require significant right-of-way, 404 permits, wetland findings, 4(f) statements, Environmental Assessments or Environmental Impact Statements. These projects will require an individual environmental classification approved by FHWA prior to advertising for bids.

All projects requiring acquisition of significant amounts of right-of-way, temporary easements or that substantially change the layout or function of connecting roads or have a significant adverse impact on abutting property or have significant environmental impact will require a public meeting providing a Notice of Opportunity for Public Meeting in accordance with the SDDOT Public Involvement Plan.

Programming, Authorization and System Revision

The annual statewide program of county or city sponsored projects will be submitted as part of the Statewide Transportation Improvement Program (STIP) to the FHWA for approval before the first of October. Project changes shall be made prior to the first of April each year for consideration and approval by the SDDOT and inclusion in the annual program.

Selection of the Federal-aid System shall be accomplished cooperatively by the SDDOT and appropriate local officials. Revision of the county or city street portion of the Federal-aid System shall be by request of the County Commissioners or City Councils in resolution form subject to approval of the SDDOT and the FHWA. System revision will be accomplished in accordance with 23 CFR.

Preliminary Engineering

Survey, design and plans preparation will be accomplished by the county or city, consulting engineering firms, or the SDDOT. Agreements for engineering services by consultants with Federal participation will be in accordance with 23 CFR 172 and the SDDOT Policy for Procuring Consultant Engineering Services.

Project plans will be reviewed by the county or city, Local Government Assistance, Region Engineer, Area Engineer, applicable central offices within the SDDOT, and FHWA if applicable.

Review of hydraulics, foundations, materials, surfacing, construction and permanent traffic signing, or recommendations as applicable, will be provided by the SDDOT on all projects. Economic studies will be provided by the SDDOT if required, or upon request on all projects.

When required, Section 404 permits will be obtained by the SDDOT and required contract provisions included in the contract proposal.

Where projects include unusual or complex bridges, bridges that are estimated to cost over $5 million or have other unusual features, preliminary plans will be submitted to FHWA for review and technical guidance.

Project plans will be approved by the Local Government Assistance Office prior to scheduling for letting.

The South Dakota Standard Specifications for Roads and Bridges (latest edition), Supplemental Specifications, Special Provisions, and required contract provisions as applicable, will be made a part of the contract documents on all projects. Standard title and typical plan sheets for most all types of work are available and will be used to the maximum extent practicable to provide uniformity and economy.

Construction – Contract

Projects will be let to contract by the SDDOT in accordance with 23 CFR 635 and South Dakota State Law. Contract award will be made by the State Transportation Commission.

Adequate justification will be formally documented and retained in the project file when bids are substantially higher than the engineer's estimate, are unusual or have substantial variations. The guidelines included in the FHWA 'Guidelines on Preparing Engineer's Estimate, Bid Reviews and Evaluation' (which replaces FHWA Technical Advisories TA T 5080.4 and 5080.6) will be used to evaluate bids received. Where the low bid does not meet the guidelines and the county desires to award the contract as bid, justification will be submitted to SDDOT. Where the low bid does meet the guidelines and the county desires to reject all bids, justification will be submitted to SDDOT.

Construction engineering will be provided on all projects in accordance with current operating policy as defined by policy letters and procedures issued by the SDDOT Operations Division. Project supervision will be at the direction of the SDDOT Area Engineer. All projects will be constructed in accordance with current South Dakota Standard Specifications for Roads and Bridges. Quality control, sampling, testing and material certification will be performed in accordance with the SDDOT Materials Manual.

Approval authority for routine construction change orders rests with the Region Engineer and the County Highway Superintendent or City Engineer. Construction change orders shall be prepared and processed in accordance with the Division of Operation's current policies concerning construction change orders.

Construction change orders that involve a change in the scope of the work or substantial cost increase (greater than 20% over the total project cost), as determined by the Region Engineer and the County Highway Superintendent or City Engineer, will be reviewed with the Local Government Assistance Office prior to approval. Approval of the construction change orders will be in accordance with the Division of Operation's current policies concerning construction change orders. In the event that the change in scope is significant or involves work beyond the project termini, a re-evaluation of the environmental document shall be coordinated with the SDDOT Environmental Office.

Right-of-Way

Appraisals will be the responsibility of the county or city and may be accomplished by the Director of Equalization, staff appraisers or fee appraisers. The Local Government Assistance Office, as assisted by Right-of-Way Program personnel, will review the appraisals and supervise right-of-way acquisition procedures. The negotiation process will be the responsibility of a qualified individual within the county. Relocation Assistance, if required, will be accomplished by Right-of-Way Program personnel within

the SDDOT upon request by the Local Government Assistance Office. Prior to advertising of contracts the FHWA Division Administrator will be furnished a Right-of-Way Certification on all projects to assure compliance with applicable provisions of Right-of-Way Directives and approved procedures.

Chapter 5 of this Local Roads Plan contains a detailed description of the right-of-way acquisition procedure. The required, pre-approved, right-of-way forms can be requested from the Local Government Assistance Office at any time.

The county or city may request the SDDOT Right-of-Way Office to perform appraisals, review appraisals, negotiations, and acquisitions on behalf of the county on a case-by-case basis. Condemnation proceedings are handled by the county.

Utility Adjustments

Adjustment of Utilities and Railroads will be in accordance with South Dakota State Law and 23 CFR 645. The county or city is responsible for utility notification and coordinating any utility relocation work. Assistance can be requested of the Utility Coordinator of the SDDOT Project Development Office.

Utility facilities will be adjusted or removed from the right-of-way in cases where they constitute a safety hazard. Minimum lateral clearances as shown in Chapter 2 of this Local Roads Plan, as applicable, may be allowed on a project by project basis considering traffic volume, right-of-way width, removal cost and location. Exceptions to these criteria shall be approved by the Local Government Assistance Engineer.

Safety Program

A continuing safety improvement effort will be provided to local officials by all elements of the SDDOT using Safety Funds and normal Federal-aid Funds. Areas receiving priority and emphasis are: design standards, individual project design, permanent traffic signing, construction signing, pavement marking, removal of roadside obstacles, elimination of deficient bridges, stand alone rumble strips, and rumble stripes.

The SDDOT Safety Engineer is available to provide safety related services to local agencies upon request. Typical services available include traffic control signing recommendations, intersection geometrics recommendations, crash data, cost-benefit studies for proposed safety projects, and Road Safety Audit Reviews.

Accounting Procedures and Guide Compliance

Accounting control and current billing will be in accordance with procedures established through the FHWA Stewardship agreements and through the SDDOT Finance Office.

Audits and Internal Review will evaluate selected projects and activities for Local Roads Plan compliance. Reports of review, deficiencies and corrective actions will be

furnished to Office Supervisors, Division Directors, Region Engineers, applicable Program Managers, Area Engineers, FHWA and local officials.

Assurance of compliance by local officials with existing and subsequent Federal or State Laws and requirements will be provided by the Local Government Assistance Office by continuous review of all phases of each project. Changes in the current Local Roads Plan or policy will be provided by the Local Government Assistance Office by direct mailing and will be discussed at various State, Area, and local government meetings.

Use of Standard Forms, Agreements and Certificates

The following standard forms will be used on all projects as applicable. Forms will be revised as necessary to comply with future changes in Federal or State Laws and regulations.

- Grant Applications
- Program Resolution (includes Maintenance Agreement acknowledgment)
- Funding Agreement
- Design Sheets
- Public Hearing Standard Forms
- Utilities Certificate
- Right-of-Way Certificate
- All Right-of-Way Acquisition Forms
- Letting Authorization
- Encroachment Survey

All forms are available from the Local Government Assistance Office.

Final Inspection and Acceptance

A final inspection will be made of each completed project by a representative of the applicable local authority and the Region Engineer. The Region Engineer will furnish notification of final inspection and acceptance to the Division of Operations.

The Division of Operations will furnish the notification of project completion to the FHWA. All project records and documents will be available for review and inspection by FHWA officials at all times during project development and construction, and will be retained and available as per 23 CFR 17 for review and inspection for a three year period after payment of the final voucher to FHWA for the project.

Evaluation and Revision

The Local Roads Plan will be revised as required by changes in SDDOT operation, significant changes in the applicable AASHTO design publications, where review has shown change to be desirable, or due to changes in applicable Federal and State Laws, orders and directives. Revisions of the Local Roads Plan will be documented, dated,

and issued to local officials. Changes of the Local Roads Plan may be initiated by the counties, cities or the South Dakota Department of Transportation, through the Local Government Assistance Office.

SDDOT / Local Roads Plan
Executive Summary

SDDOT / Local Roads Plan
Executive Summary

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The guidance found in the Local Roads Plan has a great deal of flexibility based on local needs, long-term maintenance considerations, future planning, traffic, and accident history. The ultimate goal is to provide a product that will fit local needs while taking into consideration safety, maintenance, and cost. Due to the flexibility found within these guidelines, the use of design exceptions will only be necessary for federally funded projects where a specific deviation beyond the flexibility of the guidelines is necessary. This process will be facilitated and documented between the Office of Local Government Assistance, the local government, and FHWA.

Design Standards for Restoration, Rehabilitation, and Reconstruction

Refer to Chapter 2 of the SDDOT Road Design Manual.

Design Criteria / Roadway Classifications

As per AASHTO guidance, Local Project Design Standards are based on the road's functional classification. This applies to both hydraulic and roadway design.

Design criteria will be in accordance with the most current edition of the AASHTO publication, "A Policy on Geometric Design of Highways and Streets," referred to in this document as 'AASHTO Green Book.'

The best possible design should be selected considering safety, existing and future needs, economy, reasonable maintenance costs and available funding. In restricted areas, or where there are other unusual considerations, it may not be possible to meet all minimum design values. Exceptions to applicable design criteria will be considered upon request by the county or city on a project by project basis when in the public interest and subject to approval by the SDDOT.

Local Roads & Streets

Projects not on the Federal-aid System will be designed to meet the criteria found in Chapter 5 of the AASHTO Green Book, 'Local Roads and Streets'. Structure projects on these roads will have a prefix of BRO.

Collector Roads & Streets

Projects on the Federal-aid System under the jurisdiction of the counties will be designed to meet the criteria found in Chapter 6 of the AASHTO Green Book, 'Collector Roads and Streets'. Projects on the Federal-aid System under the jurisdiction of the cities will be designed to meet the criteria found in Chapter 6, 'Collector Roads and Streets', and in Chapter 7, 'Rural and Urban Arterials'. Structure projects on these roads will have a prefix of BRF.

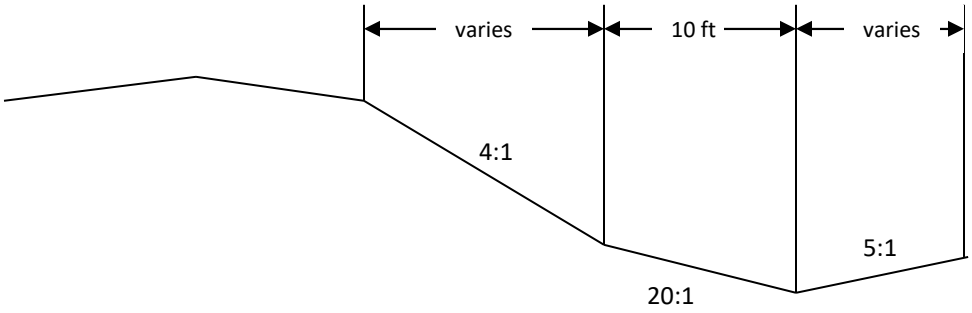
Roadway Widths

As South Dakota is primarily an agricultural state, a minimum subgrade width of 32' has long been the standard for all local rural and rural collector roads constructed with state and federal funding through the SDDOT LGA Office. This provides for a desired top width of 28', comprised of 2-12' driving lanes and 2-2' shoulders on paved surfaces. Over the years counties have adopted this standard in addition to even wider shoulders as can be found in their transportation plans as funded by the SDDOT State Planning & Research Program for Local Governments. The lane and shoulder widths noted above are also consistent with the minimum standard for all state rural highways as outlined in Chapter 7 of the Road Design Manual entitled "Cross Sections" providing a continuity for the agricultural transportation needs of South Dakota. Deviations from this standard can be made based on local needs.

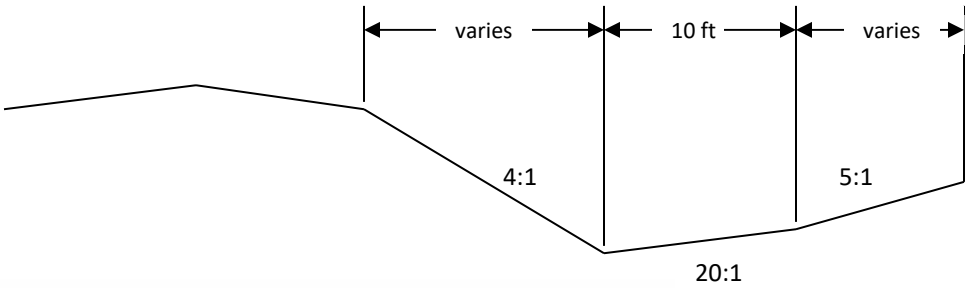
Typical Cross Section – All Rural Roads

The typical section will include a crown slope of 4 percent for gravel surfaces or 2 percent for paved surfaces, 4:1 inslopes, a standard 10' ditch at 20:1, and 5:1 backslopes. When conditions don't allow this, the inslope (foreslope) can be steepened to 1V:2H on Local Rural Roads or 1V:3H on Rural Collectors as discussed in the section on Foreslopes within this chapter.

The following typical section keeps the ditch drainage farther from the roadway but requires larger work limits and potentially the need for more right-of-way.



The following typical section works well in areas where the project limits and impact to the right-of-way must be kept to a minimum.



Horizontal Clearance to Obstructions - Clear Zone

Local Rural Roads

A clear zone of 10 ft or more from the edge of the traveled way, appropriately graded with relatively flat slopes and rounded cross-sectional design, is desirable. An exception may be made where guardrail protection is provided. The recovery area should be clear of all unyielding objects such as trees, fixed sign supports, utility poles, light poles, and any other fixed objects that might severely damage an out-of-control vehicle.

To the extent practical, where another highway or railroad passes over, the structure should be designed so that the pier or abutment supports have lateral clearance as great as the clear roadside area on the approach roadway. For further information on providing roadside lateral clearance, see the *AASHTO Roadside Design Guide (3).*

Where it is not practical to carry the full-width approach roadway across an overpass or other bridge, an appropriately transitioned roadside barrier should be provided. At selected locations, such as the outside of a sharp curve, a broader recovery area with greater horizontal clearances should be provided to any roadside obstruction.

Rural Collectors

For rural collector roads with a design speed of 45 mph or less, a minimum clear zone of 10 ft measured from the edge of the traveled way should be provided. This recovery area should be clear of all unyielding objects such as trees, fixed sign supports, utility poles, light poles, and other fixed objects. The benefits of removing these obstructions should be weighed against any environmental and aesthetic effects.

For rural collector roads with a design speed of 50 mph or more, the *AASHTO Roadside Design Guide (3)* should be used for guidance in selecting an appropriate clear-zone width.

Guidance can also be found in Chapter 10 of the SDDOT Road Design Manual.

The approach roadway width (traveled way plus shoulders) should be carried across an overpass or bridge, where practical. Approach roadside barriers, anchored to the bridge rails or parapets, should be provided. Sidewalks should extend across a bridge if the approach roadway has sidewalks or sidewalk areas. To the extent practical, where another highway or railroad passes over the roadway, the overpass structure should be designed so that the pier or abutment supports have lateral clearance as great as the clear zone on the approach roadway. Where a setback beyond the clear zone is not practical, roadside barrier protection should be provided at the piers.

Cross Slope

Local Rural Roads

Pavement cross slope should be adequate to provide proper drainage. Normally, cross slopes range from 1.5 to 2 percent for high-type pavements and 2 to 6 percent for low-type pavements.

High-type pavements are those that retain smooth riding qualities and good non-skid properties in all weather with little maintenance.

For low-type pavements such as surface treatments, stabilized or loose gravel, or stabilized earth surfaces, a 4 percent cross slope is desirable. For further information on pavement cross slope, see Chapter 4 *(*of the AASHTO Green Book).

Rural Collectors

Pavement cross slope should be adequate to provide proper drainage. Normally, cross slopes range from 1.5 to 2 percent for high-type pavements. High-type

pavements are those that retain smooth riding qualities and good non-skid properties in all weather under heavy traffic volumes and loadings with little maintenance required.

Low-type pavements are those with treated earth surfaces and those with loose aggregate surfaces. A cross slope of 4 to 6 percent is desirable for low-type pavements. For further information, see the section on “Cross Slope” in Chapter 4 *(*of the AASHTO Green Book).

Note for Cross Slope with Bridges on Gravel Roads

This topic needs to be discussed as the difference between the deck slope and the road slope can have quite an impact on the length of taper sections between a bridge and the existing road. This information needs to be documented in the TS&L letter. 4 percent is nationally recommended for gravel road cross slopes and SDDOT requires all hard surfaces (bridge decks & asphalt/concrete pavements over boxes) to be 2 percent.

Superelevation

Super elevation rates will be according to current SDDOT standards. As stated in the SDDOT Road Design Guide, because of South Dakota's weather conditions, the maximum permissible rate of super elevation is 6 percent. This will apply to all paved surface roads. The maximum permissible rate of super elevation on gravel surface roads will be 8 percent. If other conditions arise that warrant consideration of greater rates, these will be discussed on an individual basis with the following information as a reference.

Local Rural Roads

For rural roads with paved surfaces, super elevation should be not more than 12 percent except where snow and ice conditions prevail, in which case the super elevation should be not more than 8 percent. For aggregate roads, super elevation should be not more than 12 percent.

Super elevation runoff is the length of highway needed to accomplish the change in cross slope from a section with the adverse crown removed to a fully super elevation section. Minimum lengths of runoff are given in Chapter 3 (of the AASHTO Green Book). Adjustments in design runoff lengths may be desirable for smooth riding, surface drainage, and good appearance. For a general discussion on this topic, see Chapter 3 (of the AASHTO Green Book).

Rural Collectors

Many rural collector highways have curvilinear alignments. A super elevation rate compatible with the design speed should be used. For rural collectors,

super elevation should not exceed 12 percent. Where snow and ice conditions may be a factor, the super elevation rate should not exceed 8 percent. Super elevation runoff denotes the length of highway needed to accomplish the change in cross slope from a section with the adverse crown removed to a fully super elevation section and vice versa. Adjustments in design runoff lengths may be needed to provide a smooth ride, surface drainage, and good appearance. The section on "Horizontal Alignment" in Chapter 3 (of the AASHTO Green Book) provides a detailed discussion on super elevation for appropriate design speeds.

Foreslopes

Local Rural Roads

The maximum rate of foreslope depends on the stability of local soils as determined by soil investigation and local experience. Slopes should be as flat as practical, and other factors should be considered to determine the design slope. Flat foreslopes increase safety by providing a maneuver area in emergencies, are more stable than steep slopes, aid in the establishment of plant growth, and simplify maintenance work. Vehicles that leave the traveled way can often be kept under control if slopes are gentle and drainage ditches are well-rounded. Such recovery areas should be provided where terrain and right-of-way controls permit.

Combinations of rate and height of slope should provide for vehicle recovery. Where controlling conditions (such as high fills, right-of-way restrictions, or the presence of rocks, watercourses, or other roadside features) make this impractical, consideration should be given to the provision of guardrail, in which case the maximum rate of foreslope could be used.

Cut sections should be designed with adequate ditches. Preferably, the foreslope should not be steeper than 1V:2H, and the ditch bottom and slopes should be well-rounded. The backslope should not exceed the maximum required for stability.

Rural Collectors

The maximum rate of foreslope should depend on the stability of local soils as determined by soil investigation and local experience. Slopes should be as flat as practical, taking into consideration other design constraints. Flat foreslopes improve safety by providing a maneuvering area in emergencies, are more stable than steep slopes, aid in the establishment of plant growth, and simplify maintenance work. Roadside barriers may be used where topography and right-of-way are restrictive and a need is justified.

Drivers who inadvertently leave the traveled way can often recover control of their vehicles if foreslopes are 1V:4H or flatter and shoulders and ditches are well

rounded or otherwise made traversable. Such recoverable slopes should be provided where terrain and right-of-way conditions allow.

Where provision of recoverable slopes is not practical, the combinations of rate and height of slope provided should be such that occupants of an out-of-control vehicle have a good chance of survival. Where high fills, right-of-way restrictions, watercourses, or other problems render such designs impractical, roadside barriers should be considered, in which case the maximum rate of fill slope may be used. Reference should be made to the current edition of the *AASHTO Roadside Design Guide (3)*. For further information, see the section on "Traffic Barriers" in Chapter 4 (of the AASHTO Green Book).

Cut sections should be designed with adequate ditches. Preferably, the foreslope should not be steeper than 1V:3H and, where practical, should be 1V:4H or flatter. The ditch bottom and slopes should be well rounded, and the backslope should not exceed the maximum needed for stability.

Structure Widths

Due to South Dakota being an agriculture state, all structures should accommodate at least a 28' roadway top as discussed in the previous section on Roadway Widths. For bridges, the 28' clear width is measured between the inside of the bridge rail. If approaching roadway is wider than 28' (lane & shoulder), the bridge clear width shall match the overall width of the approaching roadway. Box culverts should be long enough to accommodate 2-12' lanes plus the clear zone to the inside face of the parapet. This has been the standard practice for decades. Deviations from this practice can be made based on local needs which shall be documented in the TS&L letter. Consideration for future widening of the roadway should be part of the structure width determination, or future widening may result in the structure being too narrow (bridge) or within the clear zone (box.) This is not a desirable situation so thinking ahead and providing a structure width that will cover the future is important. If a master transportation plan or local standard has been adopted that differs from the recommendations above, those standards should be discussed in determining the width requirements to be used for design.

National Bridge Inventory System and SD Codified Law Definitions – All Rural Roads

A structure is considered a bridge when its length, measured along the center of the roadway, is more than 20 feet from abutment to abutment, or extreme ends of openings for multiple boxes and pipes where the clear distance between the openings is less than half of the smaller opening. In the case of arch pipe, the measurement shall be made at its widest opening. A structure is a culvert when it cannot be classified as a bridge and provides an opening under a roadway. (SDCL 31-14-1) Culverts shall be no less than 24 feet in length. (SDCL 31-12-18)

If an option is included for a replacement structure less than the 20 feet length, the local government needs to be made aware that this will remove that structure from future federal and state funding. If this is the chosen option and it is on a Township Road, SDDOT will require a Joint Powers Agreement between the County and the Township prior to the project being let to bid.

Bridge Rail

Steel rail shall meet NCHRP 350 Test Level 2 or better. In South Dakota the rail used is T101, T115, or SL1. Plates are provided by LGA. Turned down ends are used if the ADT is less than 150. Approach rail is needed if ADT is greater than 150 which is covered by either the SL1 or T101 with approach rail details available through LGA.

Concrete rail shall meet 32" MASH TL-3 and can be a Jersey, sloped, or vertical shape. Anything taller will adversely affect agricultural traffic and a higher test level will increase the cost of construction due to the extra steel required and possibly a thicker deck.

Rail designs that may be needed for special conditions (i.e. an approach or intersection located within such close proximity to a structure as to interfere with the standard rail placement, rehabilitation of existing rail, etc.) will be in accordance with current SDDOT guidelines.

Box Culverts – Parapets, Aprons, Mixing of Materials

Parapets are standard on all rural box culverts at the request of the counties. The parapets are essential to reduce sluff of shoulder material reducing the long term maintenance issues. The parapet is considered a hazard, according to AASHTO design standards, and must be kept outside of the clear zone.

Aprons are most often concrete as they provide another cut off wall and make a box easier to access for inspection. Riprap is acceptable in situations where landowners do not want cattle to get through the box. It is recommended boxes are either all precast or all cast-in-place as mixing these has resulted in higher costs. This has been the standard practice in South Dakota on rural structures for decades in order to keep cost down for the owners.

Hydraulics

This section addresses standards and design criteria specific to roads not on the state system. Because of the relatively low traffic volumes and extensive roadway mileage on roads functionally classified as local roads and streets (off-system) and collector roads and streets (federal aid system), design criteria are comparatively lower as a matter of practicality. Although the *South Dakota Drainage Manual* https://dot.sd.gov/doing-business/engineering/design-services/forms-manuals shall be referred to for guidance on performing drainage investigations and preparing hydraulic designs, this section shall be the primary starting point for designers working on local

government projects to ensure designs are appropriate for the noted local road systems.

Hydraulic recommendations will be reported on the Hydraulic Data Sheet. (Note that a special Hydraulic Data Sheet for Local Government projects has been prepared for this use and is available for distribution in electronic format as provided by LGA).

Collector Roads and Streets / On-System

Hydraulically size the structure(s) so no roadway overtopping occurs for less than, or equal to, the 25-year frequency flood event.

Where the project ADT (current or 20-year projection) is 100 or less, the design may be reduced to a 10-year frequency provided the following is met: 1) The current structure frequency is less than a 25-year frequency; 2) there is an overtopping section located away from the structure; and 3) the local government is willing to accept this reduction in standards and service to their taxpayers along this route.

Bridge designs shall provide for a minimum of one foot of freeboard at the design event from the low bridge girder to the water surface for bridge installations with the desirable overflow section being away from the bridge location.

If current conditions do not meet the noted design frequencies and the local government has no issue with the current level of service, they may opt to have the structure sized to meet the current frequency. This situation shall be documented on the hydraulic data sheet, along with local government concurrence in the form of commission action or a letter from their highway department.

Local Roads and Streets / Off-System

When an overtopping section is available away from the structure location, hydraulically size the structure so no roadway overtopping occurs for less than, or equal to, the 10-year frequency flood event.

When no overtopping section away from the structure exists, the structure must be hydraulically sized for no roadway overtopping for less than, or equal to, the 25-year frequency flood event.

Bridge designs shall provide for a minimum of one foot of freeboard at the design event from the low bridge girder to the water surface for bridge installations with the desirable overflow section being away from the bridge location.

If current conditions do not meet the noted design frequencies and the local government has no issue with the current level of service, they may opt to have

the structure sized to meet the current frequency. This situation shall be documented on the hydraulic data sheet, along with local government concurrence in the form of commission action or a letter from their highway department.

Eligible & Ineligible Costs – Structure Projects

When expending funds, federal or state, for the replacement or rehabilitation of structures, every effort is made to maintain those funds for work on the structure.

Minimization of grading work has long been required for federally funded projects as grading is only eligible between what is called the "touchdown" points of the structure. These are the limits of roadway disturbance needed to remove and replace the structure. Grading outside of what is determined to be the touchdown points, is ineligible for bridge funds and will need to be funded by state or local funds. This can be found in 23 CFR 650.405 (c)

> *(c) Ineligible work. Except as otherwise prescribed by the Administrator, the costs of long approach fills, causeways, connecting roadways, interchanges, ramps, and other extensive earth structures, when constructed beyond the attainable touchdown point, are not eligible under the bridge program.*

In addition to grading outside of the touchdown points, the South Dakota Association of County Highway Superintendents has created a list of additional items that are ineligible for federal and state funded structure projects. These items include the following: right-of-way costs, utility relocations, roadway surfacing, sidewalk/bikepath concrete off the structure, drop inlets and other urban drainage features off the structure, fencing, aesthetics, and off-site environmental mitigation and monitoring costs.

Ineligible work included in a project must be clearly discussed, defined, and most importantly agreed to in writing with the local government as they will be responsible for 100 percent of the associated costs. Ineligible costs must be clearly marked in the plans.

On-Site Traffic Detours at Structures – Try to Avoid

On-site traffic detours should be avoided if at all possible as they are expensive and must be constructed as a part of the project as per all the DOT/Environmental requirements. Discussing this with the local government early is essential.

Right-Of-Way

Local government federal-aid and state-grant projects usually have ROW acquisition handled by the local government without federal or state funds. This is done as a matter of practice on bridge replacements and for cost effectiveness on grading projects. When the local government acquires ROW, Uniform Act requirements must

be followed. Documentation must be provided before the project can be advertised for bids.

All local projects must use the Local Government ROW Forms specifically created for them and approved by SDDOT and FHWA. LGA has all the forms available. Failure to use these forms can jeopardize the funding of the project and will prevent a timely letting as the project will not be let without the submission of these forms to the DOT. LGA must keep a copy of the completed forms for the FHWA annual ROW audit.

Appraisals will be the responsibility of the county or city and may be accomplished by the Director of Equalization, staff appraisers or fee appraisers. The Local Government Assistance Office, as assisted by Right-of-Way Program personnel, will review the appraisals and supervise right-of-way acquisition procedures. The negotiation process will be the responsibility of a qualified individual within the county. Relocation Assistance, if required, will be accomplished by Right-of-Way Program personnel within the SDDOT upon request by the Local Government Assistance Office. Prior to advertising of contracts, the FHWA Division Administrator will be furnished a Right-of-Way Certification on all projects to assure compliance with applicable provisions of Right-of-Way Directives and approved procedures.

Utility Adjustments

Adjustment of utilities will be in accordance with South Dakota State Law and 23 CFR 645. The county or city is responsible for utility notification and coordinating any utility relocation work. Assistance can be requested of the Utility Coordinator of the SDDOT Road Design Office.

Utility facilities will be adjusted or removed from the right-of-way in cases where they constitute a safety hazard. Minimum lateral clearances as shown in the 'Design Criteria for Rural Roads' section of the Local Roads Plan, as applicable, may be allowed on a project by project basis considering traffic volume, right-of-way width, removal cost and location. Exceptions to these criteria shall be approved by the Administration Program Manager.

Prior to advertising of contracts, the FHWA Division Administrator will be furnished a Utility Certification on all projects to assure compliance with applicable provisions.

PS&E (Plans Specifications & Estimate) Packet Required for Formal SDDOT Bid Letting of Local Government Projects

For all local government projects let by the SDDOT, a packet of forms must be submitted with the final plans. These items are required by FHWA and SDDOT. When projects are let in conjunction, a PS&E packet is required for each PCN (project number) as all clearances, agreements, etc. must cover each project independently. All the required documents are noted below. Only LGA's standard forms will be accepted

as they have been approved for use by SDDOT and FHWA and cover all the necessary requirements. Please note that some of these must be signed by the local government.

- Bid Letting Form for Local Government Project (prepared by DOT Project Manager)
- Special Provision Checklist (prepared by DOT Project Manager)
- ROW Certification (signed by local government – all ROW docs must be submitted before this certification can be signed by the local government; failure to do so will jeopardize federal funding)
- 404 Permit (prepared by DOT Project Manager OR Environmental Office)
- Utility Certification (signed by local government)
- Letting Authorization (prepared by DOT Project Manager & signed by local government)
- Funding Agreement (includes Maintenance Agreement; signed by local government)
- Encroachment Survey (prepared by consultant, submitted to DOT Project Manager)
- FAA Obstruction Evaluation (prepared by DOT Project Manager)