Design Standards

City of Gillette
Engineering Division
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ACKNOWLEDGEMENTS

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City Engineer
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ADOPTING ORDINANCE

ORDINANCE NO. 3780

AN ORDINANCE AMENDING SECTIONS 7-1 AND 7-2 OF THE GILLETTE CITY CODE, TO ADOPT THE CITY OF GILLETTE 2012 STANDARD CONSTRUCTION SPECIFICATIONS AND THE CITY OF GILLETTE 2012 DESIGN STANDARDS, RENUMBERING SECTION 7-5 TO 7-6 AND AMENDING SECTION 7-5 TO ADOPT THE 2011 STORM DRAINAGE DESIGN MANUAL AND SETTING AN EFFECTIVE DATE OF JANUARY 1, 2013

BE IT ORDAINED BY THE GOVERNING BODY OF THE CITY OF GILLETTE, WYOMING:

SECTION ONE. Section 7-1 of the Gillette City Code is amended to read as follows:

§ 7-1. ADOPTION OF CITY OF GILLETTE 2012 STANDARD CONSTRUCTION SPECIFICATIONS

The City of Gillette 2012 Standard Construction Specifications, prepared by the Department of Engineering of the City of Gillette is hereby adopted by this reference and incorporated herein as if set out in full to regulate construction within the City of Gillette starting January 1, 2013. One copy shall be available for public inspection at the office of the Department of Engineering and the office of the City Clerk during normal business hours. The Department of Engineering will also provide copies for sale at a reasonable charge to cover the cost of preparation of the volume.

SECTION TWO. Section 7-2 of the Gillette City Code is enacted to read as follows:

§ 7-2. ADOPTION OF CITY OF GILLETTE 2012 DESIGN STANDARDS

The City of Gillette 2012 Design Standards, prepared by the Department of Engineering of the City of Gillette is hereby adopted by this reference and incorporated herein as if set out in full to regulate the design of public improvements within the City of Gillette starting January 1, 2013. One copy shall be available for public inspection at the office of the Department of Engineering and the office of the City Clerk during normal business hours. The Department of Engineering will also provide copies for sale at a reasonable charge to cover the cost of preparation of the volume.

SECTION THREE. Section 7-5 of the Gillette City Code is renumbered Section 7-6, and Section 7-5 is amended to read as follows:

§ 7-5 ADOPTION OF THE 2011 STORM DRAINAGE DESIGN MANUAL

The City of Gillette 2011 Storm Drainage Design Manual, prepared by the Department of Engineering of the City of Gillette is hereby adopted by this reference and incorporated herein as if set out in full to regulate the design of public improvements within the City of Gillette starting January 1, 2012. One copy shall be available for public inspection at the office of the
Department of Engineering and the office of the City Clerk during normal business hours. The Department of Engineering will also provide copies for sale at a reasonable charge to cover the cost of preparation of the volume.

SECTION FOUR. This ordinance shall be effective on January 1, 2013.

PASSED, APPROVED AND ADOPTED this 17th day of December, 2012.

(SEAL)

ATTEST:

Karlene Abelson, City Clerk

Published: December 26, 2012
ORDINANCE NO. 1641

AN ORDINANCE TO AMEND SECTION TWO OF
ORDINANCE 1437, TO DESIGNATE THE CITY ENGINEERING
DIVISION AND THE CITY ENGINEER AS THE DELEGATED LOCAL
OFFICIAL TO ENFORCE THE PERMITTING PROGRAM DELEGATED
TO THE CITY OF GILLETTE BY THE STATE OF WYOMING
PURSUANT TO THE APPROVAL OF ORDINANCE 1437

BE IT ORDAINED BY THE GOVERNING BODY OF THE CITY OF GILLETTE
WYOMING:

SECTION ONE. Section Two of Ordinance 1437 is amended to read as
follows:

SECTION TWO. The City of Gillette hereby designates the
City Engineering Division and the City Engineer as the Delegated
Local Official who is authorized to enforce and administer the
permitting program delegated by the State of Wyoming, acting
through the Administrator of the Water Quality Division of the
Department of Environmental Quality.

PASSED, APPROVED AND ADOPTED this 16th day of February, 1987.

H.A. CARTER, Mayor

( S E A L )

ATTEST:

Mildred Huravitch, City Clerk
INTRODUCTION

The City of Gillette Design Standards contains the general design standards to be used for Private Development contracted projects and for City contracted projects. The Design Standards document also contains general pre-construction requirements and construction requirements for permitting and obtaining approval of development projects and other public improvements.

The Design Standards document is comprised of the following sections:

1. Section 101 - General Pre-Construction Requirements and Procedures for Development.
2. Section 102 - General Construction Requirements and Procedures for Development.
3. Section 103 - General Requirements and Procedures for Acceptance of A Project.
5. Section 401 - Design of Sanitary Sewer Systems.
7. Section 504 – Design of Concrete Sidewalks and Curb Ramps.
8. Section 609 - Design of Flexible Pavements.
10. Section 611 - Street Geometrics.

The Design Standards are intended to cover the typical design methods, and to give the minimum values the City will accept. The City Engineer encourages the use of the design methods given, but may accept proven alternative design methods.

When submitting the plans and reports for approval by the City Engineer, calculations should be included. The calculations should be submitted in a neat and readable fashion but need not be typed.

Where a reference is made to an ASTM, ANSI, AASHTO, DEQ, MUTCD, or any other standardized document or designation, it shall be the latest revision at the time. Where conflicts regarding design elements for public improvements between the City Design Standards and City Subdivision Regulations exist, the Design Standards shall govern.
SECTION 101

GENERAL PRE-CONSTRUCTION REQUIREMENTS AND PROCEDURES FOR DEVELOPMENT
SECTION 101

GENERAL PRE-CONSTRUCTION REQUIREMENTS AND PROCEDURES FOR DEVELOPMENT

101.00 PRELIMINARY PLAN SUBMITTAL REQUIREMENTS AND PROCEDURES:

Applicants seeking review of Preliminary Plans for developments and other public improvements on private development contracted projects as deemed necessary by the City Engineer shall follow the requirements and submittal procedures outlined in this section. Preliminary Plan requirements are administered by the Engineering Division and are to coincide with any Planning Division and/or Building Division preliminary requirements for development and other public improvements on private development contracted projects.

The engineering plans shall be labeled as Preliminary Plans for this stage. The Plans shall be in conformance with the City of Gillette CAD Standards and shall be prepared by a Professional Engineer licensed to practice in Wyoming. The Preliminary Plans shall be submitted through the City of Gillette electronic plans review program (ePlans) through the City Planning Division. The City of Gillette website, under the Engineering, Planning, or Building Divisions, can be referenced for guidance and instructions on using ePlans.

101.01 PRELIMINARY PLAN REQUIREMENTS:

Preliminary Plans shall include the following items. Only the information that applies to each of the associated development processes: Preliminary Platting, Commercial Site Plans, or Development Plans, shall be required for that particular process. Sketch Plat requirements are as identified in the Subdivision Regulations and do not require the Preliminary Plans as related to this section.

A. PRELIMINARY PLAT. When preliminary platting a project area, the Preliminary Plans shall include a copy of the preliminary plat in conformance with the current Subdivision Regulations.

B. UTILITY PLAN. The Utility Plan shall include the proposed location of water, sanitary sewer, electric, gas, cable TV, and phone lines and all associated easements. Also, the proposed locations of all fire hydrants, water valves and manholes, and the size of the proposed water mains and sanitary sewer mains shall be shown. The Utility Plan shall also include the location of all existing utilities and, if applicable, shall indicate the location of the proposed connections to these existing utility systems.

C. STREET, DRAINAGE AND GRADING PLANS. The plans shall include the right-of-way widths, street widths, proposed street grades, and conceptual grading plans. The plans shall also include the boundary of the one hundred (100) year flood plain, known geotechnical hazards, if applicable, existing and proposed contour lines, drainage flow arrows, location of detention ponds, proposed storm sewers, drainage structures, area(s) of disturbance, drainage easements, or any other applicable permanent stormwater Best Management Practices (BMPs) as associated with the project improvements. The
Project Contractor is responsible for the BMPs associated with the methods and procedures of their construction activities and shall be in accordance with DEQ requirements and permitting. City of Gillette Vertical Control Monuments (VCM) shall be used for the elevation datum.

D. OFFSITE PUBLIC IMPROVEMENTS. If offsite public improvements are required in order to connect into existing city facilities, the offsite plans shall include the proposed lines, connection locations, and identify the status of the right-of-way or easements for the improvements.

101.02 SUPPLEMENTAL REPORTS TO BE SUBMITTED WITH THE PRELIMINARY PLANS:

The following documents, as applicable, shall be uploaded into ePlans utilizing the ePlans Preliminary Plan permit numbering system (e.g. BPXX-00000XXX) that is provided by the Planning Division.

A. PRELIMINARY DRAINAGE REPORT. A Preliminary Drainage Report shall be prepared in conformance with the requirements of the City of Gillette Storm Drainage Design Manual, and shall be prepared by a Professional Engineer licensed to practice in Wyoming. This report is required with the Preliminary Plans.

B. PRELIMINARY GEOTECHNICAL REPORT. If the geotechnical investigation report is completed (See Section 101.20) or if preliminary reports have been made, the City will review these documents with the Preliminary Plans.

C. TRAFFIC IMPACT ANALYSIS REPORT. If a Traffic Impact Analysis Report is required as per Section 611, the City will review this report with the Preliminary Plans.

101.03 PRELIMINARY PLAN SUBMITTAL PROCEDURE:

A. The Applicant shall submit the Preliminary Plans via the ePlans program through the Planning Division. The City of Gillette website, Engineering Division, can be referenced for guidance and instructions on using ePlans. The Application for Permit to Construct for the infrastructure improvements is not required at the preliminary stage.

B. The Preliminary Plans shall be submitted to the Engineering Division at the same time the preliminary plat is submitted to the Planning Division for consideration by the City Planning Commission. This is accomplished by uploading all of the required preliminary plat requirements (Preliminary Plat, Preliminary Plans, and Preliminary Reports) to ePlans utilizing the permit number issued by the Planning Division. The Engineering Division will review the Preliminary Plans and also make any comments regarding the Preliminary Plat to the Planning Division.

C. The Engineering Division will also review the preliminary geotechnical report, if submitted, and may request additional testing or information, if necessary.

D. After reviewing the Preliminary Plans, the Engineering Division will make any comments (markups) through ePlans, which will be presented at the Staff Review Meeting coordinated by the Planning Division. At any time during the review process, the
Applicant may log in to the ePlans program and see any comments that have been made on
the documents. No paper copies are required to be submitted to the Engineering Division
at this stage.

E. The Applicant shall then revise and resubmit the plans as Final Construction Plans.
(See Section 101.20 on FINAL SUBMITTAL REQUIREMENTS AND PROCEDURES).

101.10 MINOR PLAT APPROVAL:

A plat is considered a Minor Plat when the following conditions are met:

1. The plat is a subdivision or a re-subdivision that adjusts the lot lines of more
   than two (2) lots without creating additional lots; combines more than two (2) lots
   into one (1) lot; combines two (2) or more lots into multiple lots; or creates no
   more than ten (10) new lots from any single or multiple parcels, tracts, or lots.

2. The subdivision is served by existing utilities and does not require extension of
   streets, utilities or other infrastructure improvements.

According to the Subdivision Regulations, once the plat is declared a Minor Plat, the sub-
divider may proceed directly to the preparation of the Final Plat.

A. In order to coordinate the Engineering Division’s recommendations on the Minor Plat
with the Planning Division, the required supporting materials must be submitted to the
Engineering Division, through the Planning Division, via ePlans in accordance with their
yearly adopted Development Review Schedule.

The supporting materials shall include the existing plat with lot lines and existing water
and/or sewer services clearly identified in relation to their proposed alterations.

The Engineering Division will review the supporting materials and make any comments
regarding the Minor Plat to the Planning Division.

B. Any water and/or sewer service lines not needed shall be abandoned according to the
City of Gillette Design Standards and Standard Construction Specifications prior to the
plat being recorded. Any new service lines shall either be installed prior to recording the
plat or provided a financial guarantee for their installation on residential lots prior to the
plat being recorded. A financial agreement between the applicant and the City of Gillette
shall be completed. This agreement is known as a Service Line Agreement and it covers
the installation or abandonment of service lines only.

Water and sanitary sewer services may be installed at time of development for commercial,
institutional and industrial subdivisions.

101.20 FINAL SUBMITTAL REQUIREMENTS AND PROCEDURES:

Applicants seeking approval of Final Plans for construction of developments and other
public improvements on private developer contracted projects as deemed necessary by the
City Engineer shall follow the requirements and submittal procedures outlined in this
section. The Final Construction Plan submittal and review process is administered by the
City Engineering Division. This process is directly linked to the associated application for Permit to Construct for the infrastructure improvements presented in the Final Plans. These documents are submitted to the Engineering Division via ePlans and are separate from the Final Plat submittal which is required and administered by the Planning Division.

101.21 FINAL SUBMITTAL REQUIREMENTS:

A. CONSTRUCTION DRAWINGS/FINAL PLANS. The final plans shall include the following, if applicable: cover sheet, notes and legends sheet, final plat, overall grading plan, detailed grading plan, erosion and sediment control plan, final drainage plan, overall utility plan, electrical and dry utility plan, street and alleys (if applicable) plans and profiles, temporary traffic control plan, signing and striping plan, sanitary sewer main plans and profiles, water main plans and profiles, storm sewer plans and profiles, and detail sheets. These plans shall include the applicable information detailed in the Final Submittal Checklist. The Plans shall be in conformance with the City of Gillette CAD Standards and shall be prepared by a Professional Engineer licensed to practice in Wyoming.

B. GEOTECHNICAL INVESTIGATION REPORT. The final submittal shall include a geotechnical investigation report, prepared by a Professional Engineer registered to practice in Wyoming, which identifies any special geotechnical hazards, and develops recommendations regarding the hazards, grading, and pavements. Four (4) separate reports: Geotechnical Hazards, Grading, Pavement Design, and Subsurface Profile (Soil Borings) are required and may be submitted together as long as they comprise a complete report.

1. The Geotechnical Hazards portion shall consider but not be limited to: expansive or collapsible soils, slope instability, groundwater, springs, mine subsidence, and any other geotechnical or geological hazards the investigating Engineer becomes aware of. The report shall include a map illustrating the location of potential hazards.

2. The Grading portions shall include: data regarding the distribution and engineering characteristics of the various soils; data about groundwater levels, especially those within the depth of influence to proposed structures; the geotechnical feasibility of development as planned; recommendations concerning mitigation of geotechnical/geologic hazards, grading criteria, and any other information pertinent to the proposed land use.

3. The Pavement Design portion shall include the vertical and horizontal distribution of various subgrade soils, and for each soil type, design tests and correlations to estimate the resilient modulus. The pavement design procedure and all assumptions used (including the average daily traffic and equivalent 18 kip single axle load calculations) to determine the pavement section(s) shall be presented. The selected design procedure must not result in a lesser pavement section than would have resulted from use of the procedures outlined in Sections 609 and 610.

4. Soils shall be classified in accordance with the Unified Soil Classification System (ASTM D:2487 / ASTM D:2488) or the AASHTO (M 145-91) Classification system. The classification and engineering properties of
representative soils shall be confirmed by the appropriate ASTM tests and observations.

Soil strength, effect of engineering properties due to moisture variation in soil, bearing capacity, compressibility/collapse potential, and expansive properties shall be established using the appropriate ASTM test procedures on representative, relatively undisturbed soil samples. It is required there be a minimum of one (1) boring per five-hundred (500) longitudinal feet of R.O.W. being developed or rehabilitated. Each boring shall adequately depict subsurface conditions within the street right-of-way. The minimum depth of each boring shall be five (5) feet below the base of pavement, at least ten (10) feet below the bearing elevation of proposed structures, and at least fifteen (15) feet below the proposed final grade. Drilling methods for borings below the groundwater table shall be by hollow stem auger, mud rotary, or other submitted method approved by the City Engineer.

Soil sampling shall be performed by ASTM D1586-99 (2000) Standard Test Method for Penetration Test and Split Barrel Sampling of Soils. The sampling interval shall be no greater than every five (5) feet of boring depth. In very soft soils, Standard Penetration Tests can be supplemented by ASTM D 1587-94 (2000) Standard Practice for Thin-Walled Tube Geotechnical Sampling of Soils. Alternative sampling methods shall be used only as approved by the City Engineer.

C. WATER AND SANITARY SEWER DESIGN REPORTS. The final submittal shall include a Water System Design Report and a Sanitary Sewer System Design Report, as applicable, and shall be prepared by an Engineer registered to practice in Wyoming. The report(s) shall conform to the requirements of Wyoming Department of Environmental Quality (DEQ) as outlined in their Water Quality Rules and Regulations, Chapters 11 and 12.

D. FINAL DRAINAGE REPORT. The final submittal shall include a Final Drainage Report, prepared in conformance with the City of Gillette Storm Drainage Design Manual by a Professional Engineer licensed to practice in Wyoming.

E. TRAFFIC IMPACT ANALYSIS REPORT. If applicable, the final submittal shall include a Traffic Impact Analysis Report. (see Section 611)

F. STORMWATER PERMIT APPLICATION AND STORMWATER POLLUTION PREVENTION PLAN (SWPPP). The final submittal shall include a copy of the Stormwater Permit Application and SWPPP in accordance with the City of Gillette Storm Drainage Design Manual.

G. SUBMITTAL OF FORMS. The Application for Permit to Construct (PTC) and Final Submittal Check List shall be completed, signed, and submitted with the final plans.

H. VARIANCES. If the Applicant desires to design and construct improvements in variance to criteria in these standards, such variance(s) should be identified in the initial submittal of the construction plans. The variance request(s) shall consist of:

1. Identification of the criteria provisions to be waived or varied.
2. Identification of the alternative design or construction criteria to be adhered to.

3. A thorough justification of the variance request including impact on capital and maintenance requirements and cost.

101.22 FINAL SUBMITTAL PROCEDURES:

The Final Plans submittal procedures are completed via the ePlans program through the Engineering Division. This creates a separate permit number that will be associated with the DEQ Permit to Construct (PTC) and is different from the project number that was used to upload the Preliminary Plan documents through the City Planning Division. The City of Gillette website, Engineering Division, can be referenced for guidance and instructions on using ePlans.


The Application for Permit to Construct and the Final Submittal Check List must be submitted with the Final Plans.

B. The Final Plans along with the associated Final Reports and Application for Permit to Construct must be approved by the Engineering Division before the Permit to Construct will be issued.

C. The Permit to Construct must have been issued at least one (1) week before the resolution approving the final plat is scheduled for reading at the Gillette City Council. If the Permit to Construct has not been issued at least one (1) week prior to the scheduled reading, the reading of the final plat resolution shall be taken off of the City Council Agenda until such time the Permit to Construct is issued.

D. No construction will begin on a project before the Permit to Construct has been issued, except that a Grading Only Permit may be issued by the City Engineer upon approval of the final overall grading plan, erosion and sediment control plan and any applicable detail sheets, and issuance of a Storm Water Permit.

101.30 PERMITTING PROCEDURES:

The City of Gillette has received authority from the State of Wyoming Water Quality Division of the Department of Environmental Quality to regulate publicly owned or controlled sewage collection facilities and publicly owned or controlled water distribution facilities. The delegation of this authority to the City of Gillette requires that the City administer the Permit to Construct.

No construction for developments or other public improvements on private development contracted projects as deemed necessary by the City Engineer, and no construction, installation, or modification of public infrastructure including but not limited to: a public...
water supply, sewerage system, treatment works, disposal system, or other facility capable of causing or contributing to pollution shall be allowed unless a Permit to Construct has been obtained from the City Engineer.

101.31 APPLICATION REQUIREMENTS:

A. Any person who proposes to construct, install, or modify a facility required to be permitted shall submit one (1) copy of the Application for Permit to Construct, which is incorporated herein by this reference. A digital version of this document may be emailed to the Engineering Division or can be uploaded into ePlans to start the process, but an original signed copy must also be submitted in order for the Permit to Construct to be issued.

B. The Application for Permit to Construct must be accompanied by the Final Plans, Final Design Report(s), Stormwater Permit Application and SWPPP, other pertinent information covering the project, and any additional information required by the City Engineer.

C. All plans and design reports submitted shall carry the seal and signature of the designing engineer, who must be a Professional Engineer registered in the State of Wyoming.

101.32 APPLICATION PROCESSING PROCEDURES:

All applications for Permit to Construct will be processed in the following manner:

A. The City Engineer shall review each completed application to determine whether:

1. The Application meets minimum applicable standards and the requirements of the City of Gillette Standard Construction Specifications, Design Standards, and D.E.Q. Water Quality Rules and Regulations, and should be authorized; or
2. The Application should be authorized with modification.

B. Incomplete applications will be processed in the following manner:

1. Additional information will be requested from the applicant in order to complete the review.
2. If the application is grossly incomplete, it will be returned to the applicant with a request for completion and re-submittal on a new application.
3. If an application is returned to the applicant because of incompleteness, the applicant shall have a maximum of six (6) months to provide the additional information. If the applicant fails to provide the requested information within that period, the entire incomplete application shall be denied and the application returned to the applicant.
4. If the applicant does not address all comments and make the appropriate revisions identified in the initial review on the re-submittal, a charge of $100.00 will be assessed for review of each submittal thereafter.
C. The application will be reviewed and final action taken by the City Engineer within fifteen (15) working days. The review time will be lengthened if the submittal is incomplete and additional information is requested.

D. All plans and reports must meet or exceed the City of Gillette Standard Construction Specifications and Design Standards and applicable regulations.

E. Each application will be reviewed on its own merit. Processing of an application with respect to recommendations or required changes will be done in accordance with the provisions of applicable statutes, rules and regulations enforced by the City Engineer.

F. The City Engineer shall promptly notify the applicant in writing of the final action taken on the application. If the conditions of the permit are different from the proposed application submitted by the applicant for review, the notification shall include reasons for the changes made.

G. If, upon review of an application, the City Engineer determines that a permit is not required, the City Engineer shall notify the applicant of this determination in writing. Such notification shall constitute final action on the application.

101.33 DURATION, TERMINATION, AND TRANSFER OF PERMITS:

A. The City Engineer may require an expiration date less than two (2) years on the permit issued. Those permits issued without a specified expiration date will be in force no more than two (2) years from the date of issuance.

B. Permits will be issued only to the official applicant of record, who must be the owner of the permitted facility, for only the type of construction of record and shall be automatically terminated:

   1. Within sixty (60) days after sale or exchange of the facility.
   2. Upon issuance of a new, renewed or modified permit.
   3. Upon written request of the permittee.

C. Permits may be transferred to new owners by completion and submittal of application forms by the new owner to the City Engineer. The new owner shall also submit a written request from the existing owner to transfer ownership. The City Engineer shall act within ten (10) working days after receipt of the request.

D. Any conditions established in a construction, installation or modification permit would be automatically transferred to the new owner whenever a transfer of ownership of the facility occurs.

101.34 RENEWAL OF A PERMIT

A permit may be renewed on the following conditions:

A. A written statement is filed with the City Engineer stating that there will not be any changes in the plans for construction, installation, or modification of a permitted facility.
The written statement should be filed with the City Engineer prior to the expiration date of
the permit; and

B. No modifications to the permit are required under Section 101.36 of these regulations.

101.35 DENIAL OF A PERMIT:

A. The City Engineer may deny a permit for any of the following reasons:

1. The application is grossly incomplete or does not meet applicable City of Gillette
   Standard Construction Specifications and Design Standards;

2. The project, if constructed, will cause violation of applicable State surface or
groundwater standards;

3. The project does not comply with applicable State and local water quality
   management plans;

4. The project, if constructed, would result in hydraulic and/or organic overloading of
   wastewater facilities;

5. The project, if constructed, would result in public water supply demand in excess
   of source, treatment or distribution capabilities; or

6. Other justifiable reasons necessary to carry out the provisions of the City’s
   Agreement with WDEQ and the Environmental Quality Act.

B. If the City Engineer proposes to deny issuance of a permit, the applicant shall be
   notified by registered or certified mail of the intent to deny and the reason for denial.

C. In the case of denial of a permit by the City Engineer, the applicant, if he so
   desires, may request a hearing before the City Administrator. The request for a hearing
   shall be made in writing within twenty (20) days of notification of this denial to the City
   Administrator, and shall state the grounds for the request.

101.36 MODIFICATION OF PERMIT:

A. When reviewing an application or before construction on a facility is completed,
   the City Engineer may modify a permit due to the following reasons:

1. Changing site conditions which would result in violations of the City’s standards
   and regulations;

2. Receipt of additional information; or

3. Any other reason necessary to meet applicable statutes, standards or regulations.

B. The City Engineer shall notify the permittee by registered or certified mail of intent
   to modify the permit.
C. Such notification shall include the proposed modification and the reasons for modification and time frame to have modifications constructed, installed and operational. Modification requirements shall be implemented before construction, installation, or modification of a facility is completed.

D. The modification shall become final within twenty (20) days from the date of receipt of such notice unless within that time the permittee requests a hearing before the appropriate body. Such request for a hearing shall be made in writing to the City Engineer and shall state the grounds for the request. Any hearing held shall be conducted pursuant to Chapter 2 of the City of Gillette City Code.

E. A copy of the modified permit shall be forwarded to the permittee as soon as the modification becomes effective.

101.37 SUSPENSION OR REVOCATION OF A PERMIT:

A. The City Engineer may suspend or revoke a permit before construction, installation or modification of a facility is completed for the reasons set forth below, in item C.

B. Before a permit may be suspended or revoked, the permittee shall be given an opportunity to show compliance with all lawful requirements for the retention of the permit.

C. The City Engineer shall notify the permittee by registered or certified mail of its intent to suspend or revoke the permit in the event that it becomes necessary due to:

1. non-compliance with the terms of the permit; or
2. unapproved changes in design or construction; or
3. false information submitted in the application; or
4. conflict with an approved water quality management plan prepared under Sections 303, 208 and/or 201 of the Federal Clean Water Act, as amended.
5. any other reasons necessary to meet applicable statutes, standards or regulations.

D. The notification shall include the reasons for suspension or revocation.

E. The suspension or revocation shall become final twenty (20) days from the date of receipt of such notice unless within that time the permittee requests a hearing before the appropriate body. Such a request for a hearing shall be made in writing to the City Engineer and shall state the grounds for the request. Any hearing held shall be conducted pursuant to Chapter 2 of the City of Gillette City Code.

F. The City Administrator, and the Director of Environmental Quality Council, may suspend or revoke permits issued by the City Engineer in the event that there is non-compliance with any of the provisions of item (C) above. Suspension or revocation shall become final twenty (20) days from the receipt of such notice unless within that time the permittee or delegated local entity requests a hearing before the Environmental Quality Council. Such a request shall be made in writing to the Director and shall state the grounds for the request. Any hearing shall be conducted pursuant to the regulations of the Department of Environmental Quality.
101.38 PROVIDING INFORMATION

The City Engineer shall return a copy of the executed Permit To Construct with an associated comment letter that contains the pertinent review comments to the permit applicant, and a digital copy of the same documents to the Engineer of Record.

101.40 NOTICE OF CHANGE IN ENGINEERING SERVICES:

If the Owner changes the construction engineering firm or the engineering materials testing firm during the construction phase of the project, the City shall be notified immediately.

101.50 FORMS:

- Application for Permit to Construct
- Final Submittal Check List

101.60 PRE-CONSTRUCTION MEETING

The Developer, Engineer, Inspector, and the Contractor’s Superintendent shall meet for a pre-construction meeting with the City Engineer, or his representative, before construction begins. The purpose of the meeting is to discuss the following: contractor’s schedule, any road closures, construction traffic routes, construction traffic control plans, dust prevention, SWPPP, locations of fill disposal sites, locations of imported borrow sites, and any special conditions of the Permit to Construct.
APPLICATION FOR PERMIT TO CONSTRUCT
CITY OF GILLETTE

1. Name of Project

_______________________________________________________

2. Location of Project

(____ ¼, ____ ¼, Sec ____, T ____N, R____W)

General Physical Address:___________________________________________________

3. Does this project include:

A. Public water supply well?
   
   _____ Yes    _____ No

B. Potable water supply pumping station?
   
   _____ Yes    _____ No

   If yes, what is the design flow (GPM)? ____________ GPM

C. Potable water storage facility?
   
   _____ Yes    _____ No

   If yes, what is the size (GAL)? ____________ Gallons

D. Potable water mains?
   
   _____ Yes    _____ No   ( _____ New _____ Replacement)

   If yes, what is the additional peak day demand (GPD)? ____________ GPD

E. Sanitary sewage pumping station and force main?
   
   _____ Yes    _____ No   ( _____ New _____ Replacement)

   If yes, what is the design flow (GPM)? ____________ GPM

F. Sanitary sewage collection lines?
   
   _____ Yes    _____ No   ( _____ New _____ Replacement)

   If yes, what is the additional average daily volume (GPD)? ____________ GPD

G. Site Drainage?
   i. Open Channels?
      
      _____ Yes    _____ No   ( _____ New _____ Replacement)

   i. Storm Drains?
      
      _____ Yes    _____ No   ( _____ New _____ Replacement)

   iii. Culverts/Hydraulic Structures?
      
      _____ Yes    _____ No   ( _____ New _____ Replacement)
iv. Detention Ponds?

________ Yes ______ No  ( _____ New _____ Replacement)

v. Water Quality Structures?

________ Yes ______ No  ( _____ New _____ Replacement)

H. Public Streets/sidewalks/approaches?

________ Yes ______ No  ( _____ New _____ Replacement)

I. Earthwork/Overlot Grading

________ Yes ______ No

Total area of disturbance________ AC
Stormwater Permit Application Submitted____Yes _____No
WYPDES Permit____Yes _____No____NA

J. Drainage Report Completed?

________ Yes ______ No

Title of Report:___________________________________________
Prepared by:_____________________________________________

K. Water System Design Report Completed?

________ Yes ______ No

Title of Report:___________________________________________
Prepared by:_____________________________________________

L. Sewer System Design Report Completed?

________ Yes ______ No

Title of Report:___________________________________________
Prepared by:_____________________________________________

M. Traffic Impact Analysis Report Completed?

________ Yes ______ No

Title of Report:___________________________________________
Prepared by:_____________________________________________

N. Geotechnical Report Completed?

________ Yes ______ No

Title of Report:___________________________________________
Prepared by:_____________________________________________

O. Development in the Floodway/Flood Plain?

________ Yes ______ No

If yes, describe the type of improvement proposed (within the Flood Plain):______
And provide a description of the extent to which any watercourse will be altered or relocated as a result of the proposed development:

__________________________________________________________________________________________________________________________________________

And provide certification by a registered professional engineer or architect that the criteria in City Code, Section 5-85(b) [§ 7-13(b)] SPECIFIC STANDARDS are met.

I certify that the above described facility has been submitted in accordance with local and state rules and regulations. I have authorized the following engineering and testing firm to act upon my behalf during the design and construction phases of the project. They are authorized on my behalf to receive and release correspondence regarding this project to the City of Gillette. If I fail to comply with the obligations stipulated within local and state rules and regulations, I hereby authorize the City of Gillette to act as necessary, and upon 20 day written notice, on my behalf, and at my expense, to mitigate any known violations such that they are in compliance with all local and state rules and regulations.

Name of Owner of the Project: ________________________________________________

Mailing Address: __________________________________________________________

City_________________________ State_________ Zip________________________

Business Phone: ___________________________ Home Phone: ______________________

Print Owner Name

Signature of Owner __________________________________ Date ________________

Name of Engineering Firm: ________________________________________________

Mailing Address: __________________________________________________________

City_________________________ State_________ Zip________________________

Business Phone: ___________________________

Name of Professional Engineer ______________________________________________

Engineer’s P.E. Number ____________________________________________________

*Name of Testing Firm: ____________________________________________________

Mailing Address: __________________________________________________________

City_________________________ State_________ Zip________________________

Business Phone: ___________________________

*If the Engineering Firm is responsible for quality control and testing on the project, write "same" on this line.

Utility Operator of the Project: ______________________________________________

Mailing Address: __________________________________________________________

City_________________________ State_________ Zip________________________

Business Phone: ___________________________ Home Phone: ______________________

Utility Operator Name

Signature of Operator __________________________________ Date ________________

# FINAL SUBMITTAL CHECK LIST

(Name of Subdivision or Project)

<table>
<thead>
<tr>
<th>Preliminary Construction Plans</th>
<th>Record Drawings</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Final Construction Plans

Submitted | N/A (to be completed by the Engineer/applicant)

### FORMS AND REPORTS

- Application for Permit To Construct (PTC)
  *(can be found on the City Website)*
- Final Drainage Report
- Water System Design Report
- Sanitary Sewer System Design Report
- Geotechnical Report *(Subsurface Investigation)*
- Traffic Impact Analysis
  *(only required if projected trip generation equals 150 trips/day or 100 peak hour trips)*
- Construction Drawings
  *(must utilize City CAD Standards)*
- Stormwater Permit Application
- SWPPP

### COVER SHEET

- Vicinity Map
- Subdivision or Development Project Name
- Project Location
- Complete Index of Sheets
- Certification Statement, P.E. Seal, and Signature
- Identify Benchmark Used for Elevation Data

### NOTES AND LEGENDS

- Standard Construction Notes
- Linetype Legend
- Symbol and Hatch Pattern Legend

### FINAL PLAT

- Bearings
- North Arrow
- Scale Bar and Written Scale
- Block and Lot Numbers and Dimensions
- Street Names
- Easements for Utilities and Drainage
- Complete Legend *(symbols, linetypes, hatching)*
OVERALL GRADING PLAN

___ ___ Property Boundary Lines
___ ___ Existing Contour Lines (dashed and shaded)
___ ___ Proposed Contour Lines (solid w/ elevation labels)
___ ___ Spot Elevations (TBC, PCR, FL, etc.)
___ ___ Proposed Streets and Lot Lines (shaded)
___ ___ Designate Controlled Fill Areas > 2’

DETAILED GRADING PLAN

___ ___ Existing Contour Lines (dashed and shaded)
___ ___ Proposed Contour Lines (solid w/ elevation labels)
___ ___ Spot Elevations (TBC, PCR, FL, etc.)
___ ___ Show Inter-Lot Drainage Flow Patterns Using High (HP) and Low (LP) Point Spot Elevations, Contour Lines, Drainage Swales (Ditches), and Flow Arrows
___ ___ Building or Housing Footprint Locations (shaded)
___ ___ Proposed Streets and Lot Lines (shaded)
___ ___ Recommended Top of Foundation Elevations (shaded)

EROSION AND SEDIMENT CONTROL PLAN

___ ___ Property Boundary Lines
___ ___ Existing Contour Lines (dashed and shaded)
___ ___ Proposed Contour Lines (solid w/ elevation labels)
___ ___ Proposed Streets and Lot Lines (shaded)
___ ___ Limits of Disturbance (include total area)
___ ___ Show the Locations of Necessary BMPs Including: (silt fence, inlet protection, outlet protection, hay bales, wattles, vehicle tracking control, etc.)
FINAL DRAINAGE PLAN

DRAINAGE BASINS, CONTOURS, AND FLOW PATTERNS

- Existing and Proposed Contour Lines
- Existing and Proposed Drainage Easements
- Location and Elevation of All Existing Floodplain
- Existing Drainage Facility and Structure locations
- Overall Drainage Basin and Sub-basin boundaries
- Drainage Flow Arrows (post-development patterns)
- Detention Pond Locations and Volume Information

STORM SEWER

- Proposed Storm Sewer and Open Channel Locations Including: (inlets, manholes, culverts, and other appurtenances; riprap sizing and location; profiles showing existing and proposed pipe sizes, materials, and grades; and hydraulic grade lines for minor and major storm runoff)
- Outlet Structure Location and Information
- Proposed Outfall Points for Runoff from the Site (post-development)
- Stormwater Quality Facility locations

OVERALL UTILITY PLAN

WATER

- Existing and Proposed Fire Hydrant Locations and Spacing Per Latest Edition of the IFC (Appendix C)
- Length, Size, and Type of Proposed Pipe Material Valve and Fitting (tees, reducers, etc.) Locations
- All Water Service Connection Locations
OVERALL UTILITY PLAN (continued)

SANITARY SEWER

___ ___ Length, Size, and Type of Pipe Material
___ ___ Slope of All Proposed Sewer Lines
___ ___ All Sanitary Sewer Service Connection Locations and Existing Invert Elevations of Tie-in Manholes

ELECTRICAL & DRY UTILITY PLAN

ELECTRICAL, CABLE TV, TELEPHONE, GAS

___ ___ Existing and Proposed dry utility locations

STREET AND ALLEYS (IF APPLICABLE) PLANS AND PROFILES

___ ___ Plans and Profiles for Every Street and/or Alley (the plan and profile must be located on one sheet and the plan view shall always be located directly above the profile view)
___ ___ Grade labels for Every Street and/or Alley
___ ___ Arrows Indicating Direction of Stormwater Flow on Plan View
___ ___ Show Linework and Label Sidewalk Location/Width
___ ___ Show Linework for Curb and Gutter
___ ___ Show and Label Right-of-way (R.O.W.) and Street Widths (per latest edition of the C.O.G. Design Standards and the Subdivision Regulations), Curves, Radius Points, and Lengths of Cul-de-sacs
___ ___ Show Access to All Lots
___ ___ Show at Least Two (2) Access Points to the Site
___ ___ Detailed Street Cross-Sections (for each street) (include pavement type & thickness, base thickness, depth of sub-grade prep, and other pertinent measurements (sidewalk, blvd., etc.))
TEMPORARY (DURING CONSTRUCTION) TRAFFIC CONTROL PLAN

| __  __ | Show Exact Locations of Temporary Traffic Control Devices Including: (cones, barrels, Type III barricades, flashing warning lights, flaggers, etc.) | __  __  __ |
| __  __ | Show Arrows Indicating Detour Traffic Patterns | __  __  __ |
| __  __ | Show Temporary Sign details and MUTCD Numbers | __  __  __ |

SIGNING AND STRIPING PLAN

| __  __ | Street Name Sign Locations | __  __  __ |
| __  __ | Stop Signs and Other Regulatory Signs | __  __  __ |
| __  __ | Detailed Sign Size/Shape Information | __  __  __ |
| __  __ | MUTCD Numbers for All Proposed Signs | __  __  __ |
| __  __ | Street Striping | __  __  __ |

SANITARY SEWER MAIN PLANS AND PROFILES

| __  __ | Manhole Locations (including stationing) | __  __  __ |
| __  __ | Elevations for All Inverts (IN and OUT) | __  __  __ |
| __  __ | Percent Grade (slope) for All Mains | __  __  __ |
| __  __ | Exact Locations of All Sewer Services | __  __  __ |
| __  __ | Length, Size, and Type of Pipe Material | __  __  __ |

WATER MAIN PLANS AND PROFILES

| __  __ | Locations of All Appurtenances (tees, valves, bends, reducers, etc.) | __  __  __ |
| __  __ | Length, Size, and Type of Pipe Material | __  __  __ |
| __  __ | Locations of Fire Hydrants | __  __  __ |
| __  __ | Locations of Meter Pits/Curb Stops | __  __  __ |
| __  __ | Depth of Water Mains (5.5’ MIN - 6.0’ MAX) | __  __  __ |

STORM SEWER PLANS AND PROFILES

| __  __ | Locations of All Appurtenances (inlets, manholes, culverts, trickle channels, swales, etc.) | __  __  __ |
| __  __ | Length, Size, and Type of Pipe Material | __  __  __ |
| __  __ | Include Cross-Sections of Any Trickle Channels or Swales on These Sheets (for verification of capacity) | __  __  __ |
## DETAILS

### EROSION AND SEDIMENT CONTROL DETAILS

<table>
<thead>
<tr>
<th>Standard Drawing Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01500-01</td>
<td>Stabilized Construction Entrance</td>
</tr>
<tr>
<td>01500-02</td>
<td>Storm Drain Inlet Protection</td>
</tr>
<tr>
<td>01500-03</td>
<td>Stormwater Inlet/Outlet Protection</td>
</tr>
<tr>
<td>01500-04</td>
<td>Check Dam</td>
</tr>
<tr>
<td>01500-05</td>
<td>Wattle Detail</td>
</tr>
<tr>
<td>01500-06</td>
<td>Silt Fence</td>
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<tr>
<td>01500-07</td>
<td>Silt Fence Winter/Frozen Ground</td>
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<tr>
<td>01500-08</td>
<td>Silt Fence – Gravel Filter</td>
</tr>
<tr>
<td>01500-09</td>
<td>Filter Berm</td>
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<tr>
<td>01500-10</td>
<td>Sediment Basin</td>
</tr>
<tr>
<td>01500-11</td>
<td>Sediment Trap</td>
</tr>
<tr>
<td>01500-12</td>
<td>Sediment Trap – Straw Bale</td>
</tr>
<tr>
<td>01500-13</td>
<td>Sediment Trap – Straw Bale 2</td>
</tr>
<tr>
<td>01500-14</td>
<td>Sediment Trap – Excavated</td>
</tr>
<tr>
<td>01500-15</td>
<td>Sediment Trap – Earth Berm</td>
</tr>
<tr>
<td>01500-16</td>
<td>Sediment Trap – Ditch</td>
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<tr>
<td>01500-17</td>
<td>Sediment Trap – Silt Fence</td>
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<tr>
<td>01500-18</td>
<td>Diversion Swale/Berm</td>
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<tr>
<td>01500-19</td>
<td>Diversion Berm and Ditch</td>
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<tr>
<td>01500-20</td>
<td>Diversion Ditch</td>
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<tr>
<td>01500-21</td>
<td>Temporary Slope Drain</td>
</tr>
<tr>
<td>01500-22</td>
<td>Erosion Control Blanket</td>
</tr>
<tr>
<td>01500-23</td>
<td>Surface Roughening</td>
</tr>
<tr>
<td>01500-24</td>
<td>Terracing</td>
</tr>
<tr>
<td>01500-25</td>
<td>Excavated Concrete Washout</td>
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### DETAILS (continued)

#### TRAFFIC CONTROL DETAILS

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>01510-01</td>
<td>Project ID Sign (for Capital Projects)</td>
</tr>
<tr>
<td>01510-02</td>
<td>Sign Installation Detail</td>
</tr>
<tr>
<td>01510-03</td>
<td>Minor Speed Road - Shoulder Work</td>
</tr>
<tr>
<td>01510-04</td>
<td>Lane Closure – Minor Street</td>
</tr>
<tr>
<td>01510-05</td>
<td>Lane Closure with flaggers</td>
</tr>
<tr>
<td>01510-06</td>
<td>Lane Closure – Low Vol. Two Lane Rd.</td>
</tr>
<tr>
<td>01510-07</td>
<td>Center Work – Low Volume Road</td>
</tr>
<tr>
<td>01510-08</td>
<td>Lane Closure – Center Turn Lane</td>
</tr>
<tr>
<td>01510-09</td>
<td>Intersection Closure – Center</td>
</tr>
<tr>
<td>01510-10</td>
<td>Intersection Closure – Side</td>
</tr>
<tr>
<td>01510-11</td>
<td>Intersection Closure – Far Rt. Side Lane</td>
</tr>
<tr>
<td>01510-12</td>
<td>Intersection Closure – Far Lt. Side Lane</td>
</tr>
<tr>
<td>01510-13</td>
<td>Lane Closure – Interior Multi-Lane</td>
</tr>
<tr>
<td>01510-14</td>
<td>Stationary Lane Closure – Multi-Lane</td>
</tr>
<tr>
<td>01510-15</td>
<td>Temporary Road Closure</td>
</tr>
<tr>
<td>01510-16</td>
<td>Channelizing Devices</td>
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#### STREET DETAILS

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>02511-01</td>
<td>Typical Street Repair</td>
</tr>
<tr>
<td>02512-01</td>
<td>Typical Arterial Street Cross Section (Include thickness of surface and sub</td>
</tr>
<tr>
<td></td>
<td>sub-surface courses)</td>
</tr>
<tr>
<td>02512-02</td>
<td>Typical Collector/Local Street Sections (Include thickness of surface and sub</td>
</tr>
<tr>
<td></td>
<td>sub-surface courses)</td>
</tr>
<tr>
<td>02512-03</td>
<td>Typical Alley Sections (Include thickness of surface and sub sub-surface courses)</td>
</tr>
<tr>
<td>02528-01</td>
<td>Typical A &amp; C Curb/Gutter w/Sidewalk</td>
</tr>
<tr>
<td>02530-01</td>
<td>Street Corner w/ and w/o Crosspan</td>
</tr>
<tr>
<td>02530-02</td>
<td>Residential Driveway Dimensions</td>
</tr>
<tr>
<td>02530-03</td>
<td>Com/Industrial Driveway Dimensions</td>
</tr>
<tr>
<td>02530-04</td>
<td>Standard Residential Driveway Detail</td>
</tr>
<tr>
<td>02530-05</td>
<td>Handicap Ramp Detached Sidewalk – Arterial and Collector Streets</td>
</tr>
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# Design Standards

## TRENCH EXCAVATION DETAILS

<table>
<thead>
<tr>
<th>Drawing Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>01015-01</td>
<td>Carsonite Marker</td>
</tr>
<tr>
<td>02220-01</td>
<td>Water/Sewer/Storm Sewer Trench and Bedding</td>
</tr>
<tr>
<td>02225-01</td>
<td>Cement Treated Fill Pipe Saddle</td>
</tr>
<tr>
<td>02665-03</td>
<td>Typical Utilities Layout</td>
</tr>
<tr>
<td>02665-04</td>
<td>Insulation Board Installation</td>
</tr>
<tr>
<td>02665-06</td>
<td>Water/Sanitary Sewer Bore Casing Detail</td>
</tr>
</tbody>
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## SANITARY SEWER DETAILS

<table>
<thead>
<tr>
<th>Drawing Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>02570-01</td>
<td>Manhole Adjustment Detail</td>
</tr>
<tr>
<td>02700-01</td>
<td>Sanitary Sewer Manhole (Precast)</td>
</tr>
<tr>
<td>02700-02</td>
<td>Sanitary Sewer Manhole (Flat Top)</td>
</tr>
<tr>
<td>02700-03</td>
<td>Standard Steps for Manholes</td>
</tr>
<tr>
<td>02700-04</td>
<td>Manhole Bases (48”, 60”, 72”)</td>
</tr>
<tr>
<td>02700-05</td>
<td>Manhole Channel Details</td>
</tr>
<tr>
<td>02700-06</td>
<td>Sanitary Sewer Service Line</td>
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## WATER MAIN DETAILS

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<tbody>
<tr>
<td>02570-02</td>
<td>Water Valve Adjustment Detail</td>
</tr>
<tr>
<td>02645-01</td>
<td>Fire Hydrant Installation</td>
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<tr>
<td>02645-02</td>
<td>Fire Hydrant Placement</td>
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<tr>
<td>02645-03</td>
<td>Fire Hydrant Guards (3 Poles)</td>
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<tr>
<td>02645-04</td>
<td>Fire Hydrant Guards (4 Poles)</td>
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<tr>
<td>02645-05</td>
<td>Splash Pad for Fire Hydrant Detail</td>
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<tr>
<td>02645-06</td>
<td>Fire Hydrant Tracer Wire</td>
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### DETAILS (continued)

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<th>Standard Drawing Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>02665-01</td>
<td>Thrust Blocking for Water Main Fittings</td>
</tr>
<tr>
<td>02665-02</td>
<td>Water Main Valves</td>
</tr>
<tr>
<td>02665-05</td>
<td>Cathodic Prot./Tracer Wire Test Stations</td>
</tr>
<tr>
<td>02665-07</td>
<td>2” Air Vacuum Air Release Valve</td>
</tr>
<tr>
<td>02665-08</td>
<td>3” Air Vacuum Air Release Valve</td>
</tr>
<tr>
<td>02665-09</td>
<td>4” Air Vacuum Air Release Valve</td>
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<tr>
<td>02665-10</td>
<td>Typical Water Service Connection Detail</td>
</tr>
<tr>
<td>02665-11</td>
<td>Water Meter Pit Frame Cover</td>
</tr>
<tr>
<td>02665-12</td>
<td>Meter Pit For 1” and Smaller Meters</td>
</tr>
<tr>
<td>02665-13</td>
<td>Typical Meter Installation 1” and Smaller</td>
</tr>
<tr>
<td>02665-14</td>
<td>Thermal-Coil Meter Box</td>
</tr>
<tr>
<td>02665-15</td>
<td>Meter Pit For 1.5” &amp; 2” Meters</td>
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<tr>
<td>02665-16</td>
<td>Typical Meter Inst. for 1.5” &amp; 2” Meters</td>
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<tr>
<td>02665-17</td>
<td>Typical Meter Pit Placement</td>
</tr>
<tr>
<td>02665-18</td>
<td>3” and Larger Meter Vault (Inside)</td>
</tr>
<tr>
<td>02665-19</td>
<td>3” and Larger Meter Vault (Outside)</td>
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<tr>
<td>02665-20</td>
<td>Water Access Manhole Ring &amp; Cover</td>
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### SITE DRAINAGE DETAILS

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<th>Description</th>
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<tbody>
<tr>
<td>02725-01</td>
<td>Single Inlet Detail</td>
</tr>
<tr>
<td>02725-02</td>
<td>Double Inlet Detail</td>
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<tr>
<td>02725-03</td>
<td>Curb Opening Inlet</td>
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<tr>
<td>02725-04</td>
<td>Typical Trickle Channel</td>
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<tr>
<td>02725-05</td>
<td>Sub-Drain Detail New Construction</td>
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<tr>
<td>02725-06</td>
<td>Sub-Drain Detail Existing Construction</td>
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<tr>
<td>02725-07</td>
<td>Storm Sewer Manhole Ring &amp; Cover</td>
</tr>
<tr>
<td>02725-08</td>
<td>Storm Sewer Manhole</td>
</tr>
<tr>
<td>02725-09</td>
<td>Storm Sewer Manhole (Flat Top MH)</td>
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<tr>
<td>02725-10</td>
<td>Single Area Inlet Detail</td>
</tr>
<tr>
<td>02725-11</td>
<td>Typical Low Flow Channel</td>
</tr>
</tbody>
</table>
GENERAL NOTES

Each sheet must show the name of the streets shown thereon (font provided in CAD Template)

Each plan and profile sheet must have a location map that shows the pertinent area within the site

All Water Sheets shall contain the following notes:
1. “All valves are to be installed in the exact locations shown on this plan.”
2. “All valves are to be installed 18”-24” from tees or crosses.”

All Sewer Sheets shall contain the following notes:
1. “The maximum amount of adjusting rings shall depend upon the height of the ring and cover that is chosen. See Std. Detail # 02665-20, 02700-07, and 02725-07 for the approved amount.”
2. “Ram-nek shall be installed between the cone Section and the bottom adjusting ring, between all additional adjusting rings (concrete rings), and between the top adjusting ring (concrete) and the cast iron ring & cover.”

FINAL CONSTRUCTION REPORT (See Section 103)

Compaction (Density) Test Results
Asphalt Pavement Test Results
Concrete Test Results
Water Main Pressure Test Results
Water Main Disinfection (Bac-T) Test Results
Sewer Light Test Results
Sewer Leakage Test Results
Sewer Deflection Test Results
RECORD DRAWINGS (See Section 103)

___ ___ Design Values (strike-thru amended values) ___ ___ ___
___ ___ Actual Field Values (cloud or highlight new values)  ___ ___ ___

COMMENTS

____________________________________________________

____________________________________________________

____________________________________________________

____________________________________________________

____________________________________________________

____________________________________________________

(Name of Engineer)                      (Date)

(Name of Reviewer)                      (Date)
(City Engineering Division)
SECTION 102

GENERAL CONSTRUCTION
REQUIREMENTS AND PROCEDURES
FOR DEVELOPMENT
SECTION 102

GENERAL CONSTRUCTION
REQUIREMENTS AND PROCEDURES
FOR DEVELOPMENT

102.00 REQUIREMENTS DURING CONSTRUCTION:

102.01 INSPECTIONS:

A. ENGINEER. The Engineer or his project representative shall follow the guidelines set forth in Article 9, ENGINEER'S STATUS DURING CONSTRUCTION, of the General Conditions of the Standard Construction Specifications of the City of Gillette. The Engineer or his project representative shall be present at the site full time for all underground utility installation and backfill, and for a sufficient time during other construction activities to assess compliance with the plans and specifications for each element of the construction. When construction activities warrant the Engineer or his project representative to be on site other than full time, it shall be no less than twice a day.

B. CITY. In addition to the above inspections, the City Engineer's Office shall make periodic inspections during construction of the project.

102.02 WEEKLY REPORTS:

The Engineer or his project representative shall be responsible for submitting weekly progress reports to the City Engineer. The weekly progress report shall include the results of all tests taken during that week. The reports shall be submitted by the end of business on Monday of the following week for the previous week’s work.

102.10 TESTING DURING CONSTRUCTION:

Testing during the construction phase shall be done in accordance with the appropriate sections set forth in the City of Gillette Standard Construction Specifications.

102.20 SAFETY:

The Contractor shall comply with and shall require all subcontractors to comply with all applicable health and safety laws, rules and regulations, including without limitations, the Occupational Safety and Health Act of 1970 and the rules and regulations issued pursuant thereto. Neither the City of Gillette nor the Engineer shall be responsible for safety on the project.
102.30  OPTIONAL INTERIM ACCEPTANCE AND RECORD DRAWINGS PROCEDURES:

The interim acceptance of water, sanitary sewer, grading, and curb and gutter (as applicable) may be exercised upon request from the Engineer. The curb and gutter requirement is for residential development, or other site improvements that would require the presence of curb and gutter to establish proper foundation elevations above the flow line. This option may be exercised for the potential advancement of the development processes, prior to street surfacing, such as: drawing down the cost of the interim completed infrastructure improvements from the financial guarantee, and/or to gain the ability to obtain building permits within the development project.

This option allows for the Engineer or his project representative to request that the City Engineer inspect the grading, curb and gutter, water, and sanitary sewer improvements after they have been completely installed and before any street surfacing has begun. All required pressure tests and disinfectant tests should have been performed and passed specifications prior to the City inspecting the improvements.

At the time the request for the interim inspection is made, the Engineer shall also submit “Interim Record Drawings” on the curb and gutter grade elevations at the midpoint of each lot, water, and sanitary sewer improvements. Attached to the interim plans will be the “Interim Record Drawings Approval Check List”, included in this section. All items on the checklist shall be completed prior to approval of the interim acceptance by the City Engineer.

Two, size B (11” X 17”), black line copies of the “Interim Record Drawings” plans shall be submitted. Included on those drawings shall be top of curb and gutter elevations at center of each lot, all manhole inverts, the slope of all sanitary sewer lines, the stationing of all sanitary sewer services, inverts on all sanitary sewer service stub-outs, and the stationing of all water services.

The approval of the grading, curb and gutter, water, and sanitary sewer improvements and the “Interim Record Drawings” plans shall be done only to start the process of issuing building permits. The approval does not mean that the water and sanitary sewer improvements are being final accepted for City maintenance.
INTERIM ACCEPTANCE CHECK LIST

1. Inspection of grading (overlot and roadway), curb and gutter, water, and sewer improvements by (*this section for City use only*):
   a. _____ City Engineering Division
   b. _____ City Water Division
   c. _____ City Wastewater Division

2. Grading, Sewer, Water, and Curb and Gutter Improvement Interim Record Drawings Checklist:
   a. _____ Water services stationed on drawing
   b. _____ Sewer services stationed on drawing with stub invert elevations
   c. _____ Manhole inverts
   d. _____ Slope of all sanitary sewer lines
   e. _____ Curb and gutter with top of curb elevations at the midpoint of each lot

3. Test Results for the following tests (as applicable):
   a. _____ Water Pressure Test
   b. _____ Water Disinfection (City Water Dept. present during filling and flushing)
   c. _____ Sewer Light Test
   d. _____ Sewer Leakage Test
   e. _____ Sewer Deflection Test
   f. _____ Sewer Manhole Vacuum Test (if required due to groundwater)
   g. _____ Trench Compaction Test
   h. _____ Subgrade and Base Course Compaction Tests (as applicable)
   i. _____ Concrete Tests Performed (results as available)

4. Site grading and public utility improvements checklist:
   a. _____ Overlot grading per submitted Plans?
   b. _____ Erosion & Sediment Control per submitted Plans?
   c. _____ Water (valves open), sanitary sewer, storm sewer components per Plans?

Comments: __________________________________________________
____________________________________________________________
____________________________________________________________

____________________________________________________________
(Project Engineer)

____________________________________________________________
(City Reviewer)

____________________________________________________________
(Date)
SECTION 103

GENERAL REQUIREMENTS AND PROCEDURES FOR ACCEPTANCE OF A PROJECT
SECTION 103

GENERAL REQUIREMENTS AND PROCEDURES
FOR ACCEPTANCE OF A PROJECT

103.00 GENERAL:

Engineers seeking City acceptance of the completed public improvements on Private Development Contracted Projects and on certain City Contracted Projects shall follow the requirements and procedures outlined in this section.

103.10 REQUIREMENTS:

103.10.1 FINAL INSPECTION:

At completion of the project, the Engineer shall request from the City Engineer, in writing, a Final Inspection of the public improvements.

103.10.2 RECORD DRAWINGS:

At the time the Engineer requests the Final Inspection, he shall submit “Record Drawings” of the project.

A. One electronic copy, two unbound sets and one bound set of size B (11X17) black line prints shall be submitted to the City Engineering Division for review.

B. The “Record Drawings” shall be certified and submitted with the following statement included on the plans:

"I certify that the construction inspection and “Record Drawings” preparation were performed by me or under my direct control and supervision. The construction details as shown on these “Record Drawings” are accurate and complete to the best of my knowledge and belief."

103.10.3 RECORD DRAWING FORMAT

1. The paper size for Record Drawings shall be size B (11X17).
2. The minimum scale ratio for plan and profile sheets shall be 1” = 60’.
3. CD, DVD, FTP site, Flash/Jump Drive, or other acceptable electronic version of Record Drawings in CAD (.dwg) format.

103.10.4 FINAL SUBMITTAL CHECKLIST:

The Final Submittal Checklist, available at the City Engineer's Office shall be filled out, signed by the responsible Engineer, and submitted with the “Record Drawings”.
(An example copy of the checklist is presented at the end of the Section 101.50)
103.10.5 FINAL REPORT:

A Final Report shall be submitted to the City Engineer upon completion of the project. The Engineer shall compile the Final Report or the Engineer may ask the Engineering Materials Testing Firm to complete the report.

The report shall include a brief summary of the testing on the project and a statement as to whether the observations and tests indicate that the various materials in place comply with the plans and specifications.

Included also in the report shall be the following information:

1. A summary of all Field Density Tests and Compaction Tests on trench backfill, on street subgrade and base material and on any fill material;

2. Asphalt pavement mix design and all results on Marshall, Gradation, Asphalt Content and Compaction Tests;

3. All Concrete mix designs and all test results on Air Content, Slump, Unit Weight, Compressive Strength at 7 and 28 days;

4. A summary of all water pressure, leakage and disinfection tests and sewer light, leakage and deflection tests;

5. A copy of the application for Permit to Construct with any applicable revisions;

6. Any other information that may add to the integrity of the report.

103.10.6 CERTIFICATE OF COMPLIANCE:

A Certificate of Compliance must be submitted to the City Engineer upon completion of the project.

103.20 PROCEDURE:

103.20.1 FINAL INSPECTION:

The City and the Engineer shall make the final inspection of all public improvements in the project. If there are any items that are not in conformance with the City Specifications, the Private Developer and Engineer will be notified. The Private Developer shall be required to bring the items into conformance. On City contracted projects, the Contractor shall be notified and required to bring the items into conformance.
103.20.2 RECORD DRAWINGS:

The City Engineering Division shall review the “Record Drawings”. If the plans need to be revised or if additional information is required, a set of prints will be returned to the Engineer. The Engineer shall then revise and resubmit the “Record Drawings”.

103.20.3 TWO-YEAR WARRANTY STATEMENT:

Private Development Projects shall provide a two-year warranty statement covering all the public improvements in the project.

103.20.4 RECOMMENDATION OF ACCEPTANCE:

When the public improvements have passed the final inspection, the “Record Drawings” have been stamped and approved, and the Warranty Statement has been provided, the City Engineer shall make a written recommendation to the Gillette City Council to accept the public improvements for maintenance.

103.30 WARRANTY PERIOD ON PUBLIC IMPROVEMENTS:

The warranty period begins on the day that the City Council approves and accepts the public improvements.

During the warranty period, the Private Developer is responsible for repair work on any of the public improvements. The City Engineering Division will periodically inspect the public improvements and will notify the Private Developer if repair work is required. The Private Developer is responsible for having the repair work done prior to the end of the warranty period.

For City Contracted projects, the Contractor shall provide warranty repair work for the duration of the warranty as defined in the City of Gillette Standard Construction Specifications or as defined in the Contract Documents.

Supplementary Condition (SC) 13.07 of the City of Gillette Standard Construction Specifications may be referenced for further information regarding correction periods.
SECTION 301

DESIGN OF WATER DISTRIBUTION SYSTEMS
SECTION 301

DESIGN OF WATER DISTRIBUTION SYSTEMS

301.00 The City of Gillette adopts the most current version of Chapter XII of the rules of the Wyoming Department of Environmental Quality, Water Quality Division, as the design standards for water distribution systems, well pumps, water storage structures and pumping facilities, except the following which amend, supplement, or revise the above referenced standards.

Section 6. ENGINEERING DESIGN REPORT

Add the following language at the end of Subsection 6-b-ii:

“The average day per capita flow will be two hundred three (203) gallons/day. The maximum day per capita flow will be five hundred sixty two (562) gallons/day. The maximum hourly flow will be eight hundred twelve (812) gallons/day/person. The system shall provide static pressure ranging from fifty (50) psi to one hundred ten (110) psi. The system shall maintain a twenty (20) psi minimum residual pressure at the finish floor elevation of the highest unit proposed during peak day plus fire flow demand or peak hour plus fire flow demand, whichever demand is greater, and a forty (40) psi minimum residual pressure during the peak hour demand. The maximum pressure fluctuation at any location in the distribution system between peak hour demand and average day demand should not exceed thirty (30) psi.”

Add the following language at the end of Subsection 6-b-iii:

“Subject to the following minimums, fire flow will be calculated according to the "Guide for Determination of needed Fire Flow," as published by the Insurance Services Office, and will be added to the maximum day hourly average flow to adequately size the system for fire flow conditions. The following minimum fire flows shall be provided based on the zoning type. In areas with multiple zoning types, the greatest fire flow required shall govern. The required fire flow shall be provided by a single hydrant or multiple hydrants, up to the maximum number of hydrants listed below that are allowed to collectively achieve the minimum flow requirement.”

<table>
<thead>
<tr>
<th>Zoning Type</th>
<th>Fire Flow</th>
<th>Maximum Number of Hydrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>1500 gpm</td>
<td>1</td>
</tr>
<tr>
<td>Commercial</td>
<td>2500 gpm</td>
<td>3</td>
</tr>
<tr>
<td>Industrial</td>
<td>3500 gpm</td>
<td>4</td>
</tr>
</tbody>
</table>
Section 14. DISTRIBUTION SYSTEMS

Add the following language at the end of Subsection 14-b-iii:

“The design must be in substantial conformance with the latest City's Master Water Plan. Twelve inch mains shall be grid spaced at approximately one mile intervals. Eight inch mains shall be grid spaced at approximately 1/4 mile intervals, subject to the approval of the City Engineer. Pipes will be designed so the maximum velocity obtained will be less than five (5) ft./sec, excluding fire flow.

Dedicated fire sprinkler lines or combination fire/domestic service lines shall be installed at right angles to the distribution main or lateral and be extended directly, without horizontal bends or offsets, to the property line. A valve must be installed in the City right-of-way or easement. If a combination fire/domestic service line is being used, the domestic service line shall be tapped off of the larger combination line inside the structure and metered separately. The fire line shall not be metered. The size of the fire sprinkler lines shall be determined by the needed fire flow required for the building sprinkler system. Any horizontal bends or offsets in the fire service line between the property line and the building shall be accounted for in the fire flow calculations.”

Add the following language at the end of Subsection 14-b-v:

“Fire hydrants shall be spaced per Appendix C in the latest edition of the International Fire Code.”

Delete subsection 14-b-vi in its entirety and insert the following:

“All waterlines shall be looped. Dead-end lines are prohibited, with the exception of lines extending into cul-de-sacs. These lines shall be limited in length by serving no more than twenty (20) single-family residential units or equivalent demand. Those dead-end lines that are allowed as described above shall be terminated with a fire hydrant or other flushing device.”

Add a new subsection immediately after Subsection 14-b-vii:

“(viii) Services.

The latest edition of The International Plumbing Code shall be used as the basis of design for water service lines.

There shall be only one tap and water service line from the main to the property line for each lot. Multiple services on one lot may be divided at the property line with each individual service having a meter and a curb stop. Where multiple structures are on one lot which could be subdivided in the future, one tap and
water service line from the main to the property line for each main structure will be allowed only upon approval by the City Engineer.

Services larger than 2” will need to be approved by the City Engineer and will require a “Permit to Construct.” The portion of the service line between the main and the property line shall be one continuous length of Type K copper pipe or HDPE pipe, installed perpendicular from the main to a meter pit or curb stop and box at the property line.

Service lines shall be installed at least ten (10) feet laterally, from any foreign non-potable conduit and a minimum of five (5) feet from the side property line of the lot being served unless the property is zoned Mobile Home or Enhanced Manufacture Home and in that case two services may be installed in a meter pit on the property line.

When serving lots at the end of a cul-de-sac, the length of the service line between the main and the property line shall not exceed seventy (70) feet.

Under no circumstances shall any tap be made on a fire hydrant lateral line.

Service lines shall be adequate to supply the requirements of the property being served. The minimum size allowed for a water service line is one (1) inch. In general, the corporation stop, the meter, and that portion of the service pipe between the meter and the corporation stop on the main, shall all be of the same size for services two (2) inch and smaller. For services larger than two (2) inch the meter may be of a different size than the service pipe as long as the meter is sized appropriately for the anticipated flows. The size for a service line from the City water main to any unit being served shall be selected such that the following design criteria are not exceeded during total peak demand flow:

1. Eighty (80) percent of the manufacturer’s maximum meter capacity.
2. Service line pipe flow velocity does not exceed fifteen (15) feet per second (fps).
3. The pressure drop from the City water main to any unit being served shall not be greater than thirty (30) psi and the minimum residual pressure at the finish floor elevation to any unit shall not be less than twenty (20) psi.

The water requirements of the property being served shall be defined as “total peak demand flow.” Peak domestic water requirements shall be calculated in accordance with the latest edition of the International Plumbing Code and the American Water Works Association M22 Standard. The irrigation demand flow and continuous load demands (when applicable) shall be added to the peak designed flow to get the total peak demand flow.

Meter pits are required for:

1. all mobile home and enhanced manufactured home lots
2. where the service is over one hundred feet (100’) in length
3. for all connections outside the incorporated City Limits.

One meter pit is allowed for two (2) water services as long as both services are to adjacent lots.

For areas served without a meter pit, meters will be installed accordingly:

1. All meters shall be installed within a full-depth basement, or in a location within three (3) feet of the access if in a crawl space.
2. The service line between the curb-stop and the meter shall be a single, continuous (un-spliced) section and will be buried to prevent future connections prior to the meter.
3. If the aforementioned requirements of 1. and 2. cannot be met, a meter pit to be located immediately after the curb stop will be allowed, provided the meter pit conforms to other requirements within adopted City of Gillette Standard Construction Specifications.
4. Depending on the hazard classification of the building, an appropriate backflow prevention device may be installed in the meter pit; however, for high-hazard installations, the required backflow prevention device might need to be installed within the mechanical room of the new building provided appropriate floor drains exist to dispense water discharged from the device during a back-pressure situation.”

Add a new subsection 14-b-ix

“(ix) Easements and Right-of-Ways

The minimum width right-of-way or easement for City use in which a water main will be installed is twenty (20) feet. If the final depth, as measured from finished grade to the top of the water main exceeds 6.0 feet, the following table shall be used to determine the minimum width of right-of-way or easement required:”

<table>
<thead>
<tr>
<th>Depth of water main measured from finished grade to top of pipe (feet).</th>
<th>Minimum distance (feet) from center of proposed water main to edge of building or established R-O-W/easement.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5 to 6.0</td>
<td>10.0 (20.0 feet total width)</td>
</tr>
<tr>
<td>6.1 to 10.0</td>
<td>15.0 (30.0 feet total width)</td>
</tr>
<tr>
<td>Greater than 10.0 feet</td>
<td>At least 20’ (40’ total), and function of soil type.</td>
</tr>
</tbody>
</table>

Add a new subsection 14-b-x

“(x) Fittings.
Water main shall be designed to minimize the number of fittings. All fittings shall be in conformance with the City of Gillette Standard Construction Specifications.”

Delete Subsection 14-C in its entirety and insert the following:

“(c) Valves.

Valves shall be provided on water mains so inconvenience and sanitary hazards will be minimized during repairs. Valves shall be located at not more than five hundred (500) foot intervals on distribution and lateral mains and one thousand (1000) foot intervals on transmission mains. Valves will be placed at all pipe junctions so that the total number of valves at the junction is one less than the number of branches, except as approved by the City Engineer. Line valves shall also be placed:

- Such that no more than one (1) fire hydrant is isolated at any one time.
- At each end of a line running through an easement on private property.
- On each side of a creek, channel crossing, or arterial street/highway crossing.
- On fire hydrant laterals.”

Delete Subsections 14-f-i and 14-f-ii in their entirety and insert the following in their place:

“(i) Excavation.

Shall be in conformance with the City of Gillette Standard Construction Specifications and O.S.H.A. Regulations.

(ii) Bedding.

Shall be in conformance with the City of Gillette Standard Construction Specifications.”

Add the following language at the end of Subsection 14-f-v:

“Water mains shall be installed with a minimum of five and a half (5½’) to six (6’) feet of cover from final grade to top of pipe. Any exception to this minimum depth shall be approved by City Engineer.”

Delete Subsections 14-i in its entirety and insert the following:

“(i) Cross Connection Control.

All water services connected to the public water system shall comply with the City’s “Cross Connection Control Program” as described within City of Gillette Ordinance No. 3309, as referenced within Section 17-31 of Gillette City Code.”
301.10 WATER TRANSMISSION LINES (18-INCH AND LARGER):

1. No person shall in any manner tap or make any connections for the purpose of providing water to serve areas outside current designated service area boundaries.

2. No person shall tap or connect to any 18-inch and larger water transmission pipeline unless the applicant has been granted written permission by the City Engineer for doing such.

3. No installation of a utility transmission line, conduit, or underground structure should be nearer than twenty (20) feet clear separation from the outside surface of all 24-inch and larger transmission pipelines when it is required to run parallel to said pipeline(s). No installation of a utility transmission line, conduit, or underground structure should be nearer than two (2) feet clear separation above or below the outside surface of all 18-inch and larger transmission pipelines when it should be required to cross said pipeline(s).

4. Connections to untreated (raw) water transmissions pipelines shall be prohibited.

301.20 DEQ REQUIREMENTS FOR SERVICE CONNECTIONS:

Any potable water supply service connection from any public water supply to the building shall require a "Permit to Construct" from the City of Gillette if any of the following conditions exist:

1. A tee must be installed in order to make the connection.

2. Fire hydrants will be installed.

3. The service pipe is larger than two (2) inches.

4. Any appurtenance will be connected to the service pipe that will have an adverse impact on the quality or quantity of the supply.

5. The service connection is tied to the City of Gillette’s water system and is outside of the City Limits.

The information to be submitted as an application for "Permit to Construct" may include plan sketches, valve arrangements, material information, hazard classification for back flow preventer, and hydraulic calculations.

301.30 PUMP STATIONS:
Pump stations shall be designed to the current standards of the Wyoming Department of Environmental Quality, Water Quality Division. Pump stations shall include necessary control and telemetry equipment, compatible with the City's existing system, for remote operations of the facility. Water system pump stations shall be permitted through the Wyoming Department of Environmental Quality, Water Quality Division.
SECTION 401

DESIGN OF SANITARY SEWER SYSTEMS
SECTION 401

DESIGN OF SANITARY SEWER SYSTEMS

401.00 The City of Gillette adopts the most current version of Chapter XI of the rules of the Wyoming Department of Environmental Quality, Water Quality Division, as the design standards for sanitary sewers, except the following, which amend, supplement, or revise the above-referenced standards.

401.01 DEFINITIONS

Lateral Sewer: A lateral sewer is a sewer with no tributary flow except from sewer services.

Submain Sewer: A submain sewer collects flow from one or more laterals as well as sewer services.

Collector Sewer: A collector sewer collects flow from several submains as well as laterals.

Trunk, Outfall Sewer: A trunk and outfall sewer is a sewer, which carries the collected waste from lateral, submain, and collector sewer to a point of treatment.

Section 6 ENGINEERING DESIGN REPORT

Add the following language and tables at the end of Subsection 6-b-ii:

The design flow will be calculated for the entire area tributary to the outfall point as based on best-projected land use. The average daily per capita flow of sewage will be one hundred forty (140) gal. per day. The estimated average equivalent densities for new development in Gillette are as follows:

<table>
<thead>
<tr>
<th>RESIDENTIAL LAND USE</th>
<th>UNIT DENSITY</th>
<th>EQUIVALENT POPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Family</td>
<td>2.5 dwellings/acre</td>
<td>8.8 persons/acre</td>
</tr>
<tr>
<td>Mobile Home</td>
<td>6 dwellings/acre</td>
<td>21 persons/acre</td>
</tr>
<tr>
<td>Multi-Family</td>
<td>15 dwellings/acre</td>
<td>52.5 persons/acre</td>
</tr>
<tr>
<td>COMMERCIAL LAND USE</td>
<td></td>
<td>18 persons/acre</td>
</tr>
<tr>
<td>INDUSTRIAL LAND USE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy</td>
<td>15 persons/acre</td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>10 persons/acre</td>
<td></td>
</tr>
</tbody>
</table>
The following peaking factors will be used in the calculation of design flows:

<table>
<thead>
<tr>
<th>CATEGORY OF SEWER</th>
<th>PEAKING FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateral, Submain Sewers</td>
<td>4.0</td>
</tr>
<tr>
<td>Collector Sewers</td>
<td>3.5</td>
</tr>
<tr>
<td>Trunk, Outfall Sewers</td>
<td>2.5</td>
</tr>
</tbody>
</table>

The design flow will be calculated by multiplying the anticipated equivalent population for the area served, by the average per capita flow, and then by the appropriate peaking factor.

Section 9 **DESIGN OF SEWERS**

Add the following language to Subsection 9-a:

The design of sanitary sewer mains must be in substantial conformance with the latest City of Gillette Sewer Master Plan.

Delete the following Subsections of 9-b-vi:

C,D,E and J.

Add the following language to Subsection 9-C-i-A:

Sewer mains shall have a minimum of eight (8) feet of cover so that adjacent lots with basements may have service for floor drains. Sewer mains with less than eight (8) feet of cover will be considered on an individual basis and will be allowed only upon approval by the City Engineer.

Delete Subsection 9-C-i-B in its entirety and insert the following in its place:

(B) Sanitary sewer lines subject to having service connections thereon and hereafter referred to as laterals and submains shall be sized to flow at a maximum of seventy five (75) percent full at peak hour flow rates with the minimum size no less than eight (8) inches in diameter. City designated collector, trunk, and outfall lines, lines which require specific City approval for service connections, shall be sized to flow at a maximum of ninety (90) percent full at peak hour flow rates. All sewer lines shall be installed in a straight alignment and on a uniform slope between manholes. Curvilinear alignment between manholes will not be allowed.

Delete the following Subsections of 9-c-i-F:

I,II, and III in their entirety and insert the following in their place:
(I) Excavation. Excavation shall conform to the City of Gillette Standard Construction Specifications and O.S.H.A. Regulations.

(II) Bedding. Bedding shall conform to the City of Gillette Standard Construction Specifications.

(III) Backfill. Backfill shall conform to the City of Gillette Standard Construction Specifications.

Add the following language to Subsection 9-C-iii:

One sewer service line, from the tap to the property line, shall be required for each lot, zoned lot or building to be served.

Add the following language to Subsection 9-C-iii-A:

Four-inch (4”) services will be provided for normal residential lots. Commercial and industrial lots sewer services shall be sized according to lot size and grade of property, ranging from four (4) inches to eight (8) inches in diameter. For commercial and industrial applications, service lines eight (8) inches and larger diameter must enter through a manhole.

Delete Subsection 9-C-iii-D in its entirety and insert the following in its place:

(D) Connections: All service connections to sewage collection lines shall be made with a wye for new construction, except as identified above, and a tapping saddle or wye for connection to existing collection lines. Tapping saddles for main line service connections will only be allowed for service connections six (6) inch in diameter or less. Tapping saddles which are six (6) inches in diameter will be permitted on a case-by-case basis, provided the main which is proposed for connection is of adequate size to accept a six (6) inch tapping saddle.

The City discourages the connection of sewer services less than eight (8) inches in diameter directly into manholes, however these connections will be considered on an individual basis and will be allowed only upon approval by the City Engineer.

In general, sewer services will be extended to a point on each lot, which is ten (10) feet from the lower property corner.

Delete Subsection 9-d-i in its entirety and insert the following in its place:

Manholes shall be installed at the end of each main and at changes in direction, size, or slope of the main. The maximum spacing of manholes shall be four hundred (400) feet. Dead-end lateral lines shall terminate in a manhole. Plugged inlets set in the direction of future line expansion shall be provided in the terminating manhole. Upstream terminating manholes shall be located within ten (10) feet of the most distant property line of the lot or building site being served.
or perimeter line of a new development. In general, sewers that are in the street should be designed so that manholes are located seven (7) feet from the centerline of the streets. Manholes outside the street area must be accessible to City maintenance vehicles. A minimum horizontal spacing of ten (10) feet (clear separation) or a minimum vertical spacing of eighteen (18) inches (clear separation) must be maintained from water mains. Where vertical or horizontal clearances cannot be maintained, the sewer line shall be placed in a separate conduit pipe.

Add the following language to Subsection 9-d-ii:

Manholes of forty eight (48) inches minimum inside diameter shall be used on eight (8) inch through twenty four (24) inch mains. Larger mains and crowded intersecting mains will have oversized manholes.

Add the following language to subsection 9-d-iv

Flow through inverts in manholes shall provide a minimum of one tenth (0.1) foot drop in a straight through manhole or a manhole angled at ninety (90) degrees to two hundred and seventy (270) degrees; and two tenths (0.2) foot drop in manholes angled less than ninety (90) degrees or greater than two hundred and seventy (270) degrees.

In manholes where the downstream sewer line is larger in diameter than the upstream line, the pipe crown elevations of the two (2) pipes shall match.

Delete Subsection 9-d-vi in its entirety and insert the following:

(vi) Access to manholes shall be provided with non-corrosive, rubber-coated, aluminum or nylon steps spaced at twelve (12) inch minimum and sixteen (16) inch maximum.

Add a new subsection 9-g

9-g  EASEMENTS

The minimum width of an easement for City use in which a sanitary sewer will be installed is twenty (20) feet. If the final depth as measured from finished grade to the top of the sewer main exceeds 8.0 feet, the following table shall be used to determine the minimum width of right-of-way or easement required:

<table>
<thead>
<tr>
<th>Depth of sewer main measured from finished grade to top of pipe (feet)</th>
<th>Minimum distance (feet) from center of proposed sewer main to edge of building or established R-O-W/easement.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0 to 9.0</td>
<td>10.0 (20.0 feet total width)</td>
</tr>
<tr>
<td>9.1 to 12.0</td>
<td>15.0 (30.0 feet total width)</td>
</tr>
<tr>
<td>Greater than 12.0 feet</td>
<td>At least 20’ (40’ total), and function of soil type.</td>
</tr>
</tbody>
</table>
401.02 LIFT STATIONS

Lift stations shall be designed to meet the minimum requirements of the Wyoming Department of Environmental Quality, Water Quality Division. All lift stations, which are to be operated and maintained by the City, shall include control and telemetry equipment compatible with the City's existing system. The telemetry equipment shall be housed in permanent, above grade structures designed for that purpose. Sanitary Sewer system lift stations shall be permitted through the Wyoming Department of Environmental Quality, Water Quality Division.
SECTION 403

DESIGN OF STORM DRAINAGE SYSTEMS
SECTION 403

DESIGN OF STORM DRAINAGE SYSTEMS

403.00 GENERAL

All storm drainage improvements within the City of Gillette (City) shall be designed and constructed according to the latest approved versions of the City of Gillette Storm Drainage Design Manual, the City of Gillette Stormwater Master Plan, the City of Gillette Standard Construction Specifications and other City regulations and ordinances as they apply to storm drainage. Depending on specific site conditions, storm drainage systems may need to exceed these minimum standards in order to meet the goals of City policies and provide adequate protection from flooding. Should these design standards conflict with the requirements of other agencies the designer shall seek direction from the City Engineer to determine the appropriate standard to apply.
SECTION 504

DESIGN OF CONCRETE SIDEWALKS
AND CURB RAMPS
SECTION 504

DESIGN OF CONCRETE SIDEWALKS AND CURB RAMPS

504.10 SIDEWALKS

504.10.1 Cross Slope:

The maximum cross slope for sidewalk shall be ¼ inch per foot (1V:48H or 2%). Generally, the sidewalk shall be sloped toward the street at 2% to promote positive drainage away from private property.

504.10.2 Running Slope:

The maximum running (longitudinal) slope shall be 1V:20H (5%). Where terrain dictates that the adjacent roadway grades are steeper than 1V:20H, the same grade may be used for the sidewalk. When a 1:20 running slope must be exceeded and not directly controlled by the roadway slope, the slope then becomes classified as a ramp. A maximum ramp slope of 1V:12H (8.33%) may then be utilized with five (5) ft by five (5) ft level ramp landings every thirty (30) ft minimum.

504.10.3 Thickness:

Sidewalk thickness shall not be less than 4 inches. Sidewalks through driveways shall not be less than six (6) inches thick.

504.10.4 Width:

The minimum sidewalk width in residential areas shall not be less than four (4) feet. Sidewalks adjacent to collector and arterial streets or in commercial, educational, or industrial districts shall not be less than five (5) feet in width.

504.10.5 Jointing:

The spacing of transverse joints shall be equal to the width of the sidewalk. An expansion joint shall be located at the beginning and the end of each straight run, at intervals not to exceed one hundred fifty (150) feet for new construction, at locations where new concrete joins existing concrete or other structures, and at other locations as may be deemed necessary by the City Engineer, or the design engineer.

504.10.5 Alignment:

For detached sidewalks, the property edge of sidewalk shall be set one (1) foot from the property line parallel to the street unless otherwise approved by the City Engineer.

For detached sidewalks, the minimum height above the top of curb shall be a slope of one-fourth (1/4) inch per foot from the curb to the property side edge of sidewalk, unless otherwise approved by City Engineer.
504.20 SIDEWALK CURB RAMPS

504.20.1 Curb Ramps:

All curb ramps shall have a maximum running slope of 1V:12H (8.33%) and a maximum cross slope of one-fourth (1/4) inch per foot (2%). Counter slopes of adjoining gutters and roadway surfaces immediately adjacent to the bottom of the curb ramp shall not be steeper than 1V:20H (5%). Curb ramp flares shall not exceed a 1V:10H (10%) slope. The maximum running distance of a curb ramp shall be fifteen (15) feet. Transition points at the top and bottom of the ramp, where the ramp meets the landing and the gutter, shall be flush without abrupt level changes.

504.20.2 Landings:

All ramps are required to have a landing area with no more than a 2% (1/4” per foot) slope in any direction. The landing area shall be a minimum of four foot (4’) by four foot (4’) in size. Typically, the landing area shall be located where a pedestrian makes a turning movement to line up with the ramp and curb opening. For example, the landing area shall be located where two (2) detached sidewalks join and connect to the ramp. The landing area on a curb side sidewalk shall be located at the curb opening. It may be necessary to have multiple landing areas when combining attached and detached sidewalks. Grade changes from the connecting sidewalk or ramp to the landing area must be perpendicular to the direction of travel.

504.20.3 Detectable Warning Panels:

Install pre-manufactured detectable warning panels in accordance with manufacture’s recommendations at all locations where the curb ramp enters into a street or parking lot. The City Engineer’s office has an approved list of manufactures on file. See Standard Drawings for detectable warning panel size and location. Detectable warning panels shall be an approved brick red color except in locations where the adjoining concrete sidewalk is red or dark in color. At these locations, the detectable warning panel shall be a contrasting color approved by the City Engineer.

504.20.4 Free Width:

Obstructions such as signal poles, light poles, traffic control cabinets, etc. cannot be located in the landing area or the ramp slope. All sidewalks shall have a four foot (4’) minimum width free of obstructions to accommodate pedestrian travel.

504.20.5 Parallel Curb Ramps (Ramps on Curbside Sidewalk):

Depending on adjoining grades and existing conditions, a curb with a maximum height of six inches (6”) may need to be installed on the back of the landing area and attached sidewalk. This curb may also need to be installed to ensure street drainage does not overflow the area behind the landing area and ramp. See Standard Drawings for details.
SECTION 609

DESIGN OF FLEXIBLE PAVEMENTS
SECTION 609
DESIGN OF FLEXIBLE PAVEMENTS

609.00 GENERAL
Flexible pavements for all City streets and alleys, and required off-street parking, shall be designed by a Professional Civil Engineer registered to practice in the State of Wyoming. A designed pavement will be required for all new construction or full depth reconstruction. Overlays may be designed using the method contained in this section or by any other acceptable method. The pavement should include site specific stabilization recommendations for subgrade preparation.

This section will serve as a guide for the design of flexible pavements. For detailed information on this design method the designer should refer to the latest edition of the "AASHTO Guide for Design of Pavement Structures", which is published by the American Association of State Highway and Transportation Officials. If another method of thickness design is used, the Engineer must show that the selected design procedure does not result in a lesser pavement section than would have resulted from using this procedure.

A full pavement design report shall be provided to the City by the design engineer documenting all traffic assumptions with vehicle classifications, soils test results including laboratory reports, boring locations, and depth, linear variability of the soil, and values used to calculate the pavement section, including design of proposed subgrade preparation depth.

The design of City Streets by this method will be based on a twenty-year (20) design life.

609.10 THICKNESS DESIGN FACTORS:
The primary factors involved in the design thickness of asphalt pavement are:

1. Traffic
2. Reliability
3. Subgrade, Subbase, and Base Strengths
4. Plant Mix Properties

609.11 TRAFFIC:
Estimates of traffic volume and axle load distribution during the design life are essential, and can be made using the traffic counts and reasonable predictions of traffic growth. Growth predictions should be consistent with current community growth and traffic plans, and the practical design capacity of the street.

For the purpose of design, mixed traffic must be converted to common units. To convert between different axle loads and axle configurations, all vehicles should be converted to 18-kip equivalent single axle loads (E18SAL).

Section 2.1.2 of the “AASHTO Guide for Design of Pavement Structures” shall be used to determine the cumulative expected 18-kip equivalent single axle loads (E18SAL) during the analysis period.
For Local and Local-Through Streets, the designer shall submit the traffic assumptions incorporated in the design, including the distribution of vehicle classification over the design period. No growth will be considered for Local Streets. In no case shall the design $E_{18SAL}$ be less than the minimum noted in Section 609.20.

For Collector and Arterial pavement design, the City of Gillette shall provide the initial Average Daily Traffic count (ADT), distribution of vehicle classifications, and anticipated rate of growth over the design period.

**609.12 RELIABILITY:**

Reliability is the probability that the load applications a pavement can withstand in reaching a specified minimum serviceability level is not exceeded by the number of load applications that are actually applied to the pavement. Simply put reliability is a factor of safety. A pavement designed at a fifty (50) percent level of reliability will on the average carry about the same number of $E_{18SAL}$ for which it was designed. At eighty (80) percent it will carry 1.97 times the $E_{18SAL}$, and at ninety-five (95) percent 3.76 times the $E_{18SAL}$.

Since reliability is used as a factor of safety in this method, the designer should take care to use best estimate, and average values for the other design factors, rather than using limiting values, to avoid overly conservative designs.

Reliability factors used in this design shall be based on suggested levels of reliability for various functional classifications, and those are as follows:

<table>
<thead>
<tr>
<th>FUNCTIONAL CLASSIFICATION</th>
<th>RECOMMENDED LEVEL OF RELIABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local/Local Through</td>
<td>80%</td>
</tr>
<tr>
<td>Collector</td>
<td>90%</td>
</tr>
<tr>
<td>Arterial</td>
<td>95%</td>
</tr>
</tbody>
</table>

**609.13 RESILIENT MODULUS:**

The standard for material characterization in this design method shall be the resilient modulus. The roadbed soil resilient modulus can be determined using the AASHTO T274 test procedure on representative samples or predicted from correlations with other methods of testing. The resilient modulus must be determined by a soil engineer licensed to practice engineering in the State of Wyoming. To facilitate the use of the more direct CBR test, the Asphalt Institute has determined a conversion factor that can be used to convert the CBR to the resilient modulus value. This is given as $M_r = 1500 \text{ CBR}$. The above conversion factor should be used only for material that can be classified under the unified classification system as CL, CH, ML, SC, SM, and SP or when the resulting resilient modulus is less than 30,000 psi.
609.14 DESIGN SERVICEABILITY LOSS

The following criteria shall be used for all City of Gillette roadways to be dedicated for public use:

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterials</td>
<td>2.5</td>
</tr>
<tr>
<td>Collector</td>
<td>2.5</td>
</tr>
<tr>
<td>Local/Local Through</td>
<td>2.0</td>
</tr>
</tbody>
</table>

609.15 STRUCTURAL LAYER COEFFICIENTS:

The structural coefficient is an index derived by correlation with the resilient modulus for each structural material in the pavement section.

The following layer coefficients shall be used for City of Gillette materials:

- City of Gillette Plant Mix Asphalt Pavement - 0.40
- Aged existing asphalt pavement - 0.25
- Base (COG Grading W or L) - 0.12
- Sub-base - 0.09 (shall meet COG requirements for sub-base and have a CBR of at least 20)

Acceptable base course materials shall be grading L, crushed limestone, and grading W as provided in the Aggregates section of the City of Gillette Standard Construction Specifications.

Table 1 gives recommended drainage modifiers for structural coefficients. Unless an edge drain is provided, the drainage coefficient shall not be greater than 0.8.

For further details in determining structural coefficients for various structural materials along with modifiers to the coefficients for drainage conditions, the designer is referred to Section 2.3.5 of the "AASHTO Guide for Design of Pavement Structures".

The designer may consider the use of geosynthetics for separation or reinforcement of the base if there is a demonstrated cost and/or pavement section performance advantage.
Table 1
Recommended mi values for modifying structural layer coefficients of untreated base and sub-base materials in flexible pavements. Unless an edge drain is provided, the drainage coefficient shall not be greater than 0.8.

<table>
<thead>
<tr>
<th>Quality of Drainage</th>
<th>Percent of Time Pavement Structure is Exposed to Moisture Levels Approaching Saturation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than 1%</td>
</tr>
<tr>
<td>Excellent</td>
<td>1.40-1.35</td>
</tr>
<tr>
<td>Good</td>
<td>1.35-1.25</td>
</tr>
<tr>
<td>Fair</td>
<td>1.25-1.15</td>
</tr>
<tr>
<td>Poor</td>
<td>1.15-1.05</td>
</tr>
<tr>
<td>Very Poor</td>
<td>1.05-0.95</td>
</tr>
</tbody>
</table>

609.20 MINIMUM PAVEMENT SECTION:

The following table provides the minimum acceptable pavement sections for public roadways in the City of Gillette. These pavement and base course thicknesses are based on the given $E_{18SAL}$ and CBR values for each road classification. Any proposed pavement section of lesser thicknesses or alternate materials shall be fully documented by the design engineer to substantiate that such alternate will provide an equivalent capacity as the pavement noted below and must be approved by the City Engineer.

<table>
<thead>
<tr>
<th>Classification</th>
<th>$E_{18SAL}$ (20 yrs)</th>
<th>CBR</th>
<th>Asphalt (inches)</th>
<th>Aggregate Base (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alleys</td>
<td></td>
<td>3</td>
<td>4.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Local/Local Through</td>
<td>65,600</td>
<td>3</td>
<td>4.5</td>
<td>6.0</td>
</tr>
<tr>
<td>Collector</td>
<td>231,000</td>
<td>3</td>
<td>5.5</td>
<td>6.0</td>
</tr>
<tr>
<td>Arterial</td>
<td>539,500</td>
<td>3</td>
<td>6.5</td>
<td>6.0</td>
</tr>
</tbody>
</table>
609.30 PAVEMENT DESIGN PROCEDURE:

The following procedure should be used in determining the structural number (SN) of the pavement being designed:

A. Determine the \( E_{18SAL} \) per Section 2.1.2 of the “AASHTO Guide for Design of Pavement Structures”.
B. Determine the reliability as shown in Section 609.12.
C. The overall standard deviation (So) for design shall be \( So = 0.45 \).
D. Determine the effective roadbed soil resilient modulus (Mr).
E. Determine the Design Serviceability Loss as shown in Section 609.14.
F. Using the above information determine the Structural Number (SN) from the appropriate design nomograph shown in Figure 1.

Once the design structural number (SN) for a pavement structure is determined, it is necessary to identify a set of pavement layer thicknesses which when combined, will provide the load-carrying capacity corresponding to the design SN. The following equation provides the basis for converting SN into actual thicknesses of surfacing, base and subbase:

\[
SN = a_1D_1 + a_2D_2m_2 + a_3D_3m_3
\]

where

\( a_1, a_2, a_3 = \) layer coefficients representative of surface, base, and subbase courses, respectively.

\( D_1, D_2, D_3 = \) actual thicknesses of surface, base, and subbase courses.

\( m_2, m_3 = \) drainage coefficients for base and subbase layers.

The thickness of the flexible pavement layers shall be rounded up to the next one-half (½)-inch. When selecting appropriate values for the layer thicknesses, it is necessary to consider their cost effectiveness along with the construction and maintenance constraints in order to avoid the possibility of producing an impractical design. From a cost-effective view, if the ratio of costs for layer one (1) to layer two (2) is less than the corresponding ratio of layer coefficients times the drainage coefficient, then the optimum economical design is one where the minimum base thickness is used.

The design charts in Section 2.3.5 of the “AASHTO Guide for Design of Pavement Structures” may be used when conditions allow to determine the appropriate layer coefficients.

For design thickness using soil strengths or reliability factors other than those shown, interpolation may be used. Thicknesses should be rounded up to the next one-half (½)-inch.

609.40 SPECIFICATIONS FOR PLANT MIX MATERIALS:

The material specifications for flexible pavements are given in Section 02512 and 02545 of the current edition of the City of Gillette Standard Construction Specifications.
Figure 4  Design Chart for Flexible Pavements Based on Using Mean Values for Each Input
SECTION 610

DESIGN OF RIGID PAVEMENTS
SECTION 610

DESIGN OF RIGID PAVEMENTS

610.00 GENERAL:

Concrete pavements for all City streets and alleys, and required off-street parking, shall be designed by a Professional Civil Engineer registered to practice in the State of Wyoming. A designed pavement will be required for all new construction or full depth reconstruction. Overlays may be designed using the method contained in this section or by any other acceptable method. The pavement design shall include site specific stabilization recommendations for subgrade preparation.

This section will serve as a guide for the design of rigid concrete pavements. For detailed information on this design method, the designer should refer to the latest addition of the "AASHTO Guide for the Design of Pavement Structures”, which is published by the American Association of State Highway and Transportation Officials. If another method of thickness design is used, the Engineer must show that the selected design procedure does not result in a lesser pavement section than would have resulted from using this procedure.

A full pavement design report shall be provided to the City by the design engineer documenting all traffic assumptions with vehicle classifications, soils test results including laboratory reports, boring locations, and depth, linear variability of the soil, and values used to calculate the pavement section.

The design of City Streets by this method will be based on a twenty (20)-year design life.

610.10 THICKNESS DESIGN FACTORS:

The primary factors involved in the design thickness of concrete pavement are:

A. Traffic
B. Reliability
C. Subgrade Strength
D. Concrete Properties

610.11 TRAFFIC:

Estimates of traffic volume and axle load distribution during the design life are essential, and can be made using traffic counts and reasonable predictions of traffic growth. Growth predictions should be consistent with current community growth and traffic plans, and the practical design capacity of the street.

For the purpose of design, mixed traffic must be converted to common units. To convert between different axle loads and axle configurations, all vehicles should be converted to 18-kip equivalent single axle loads (E_{18SAL}).

Section 2.1.2 of the “AASHTO Guide for Design of Pavement Structures” shall be used to determine the cumulative expected 18-kip equivalent single axle loads (E_{18SAL}) during the analysis period.
For Collector and Arterial pavement design, the City of Gillette shall provide the initial Average Daily Traffic count (ADT), distribution of vehicle classifications, and anticipated rate of growth over the design period.

610.12 RELIABILITY:

Reliability is the probability that the load applications a pavement can withstand in reaching a specified minimum serviceability level is not exceeded by the number of load applications that are actually applied to the pavement. Simply put reliability is a factor of safety. A pavement designed at a fifty (50) percent level of reliability will on the average carry about the same number of $E_{18SAL}$ for which it was designed. At eighty (80) percent it will carry 1.97 times the $E_{18SAL}$, and at ninety-five (95) percent 3.76 times the $E_{18SAL}$.

Since reliability is used as a factor of safety in this method, the designer should take care to use best estimate, and average values for the other design factors, rather than using limiting values, to avoid overly conservative designs.

Reliability factors used in this design shall be based on the suggested levels of reliability for various functional classifications and which are as follows:

<table>
<thead>
<tr>
<th>FUNCTIONAL CLASSIFICATION</th>
<th>RECOMMENDED LEVEL OF RELIABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local/Local Through</td>
<td>80%</td>
</tr>
<tr>
<td>Collector</td>
<td>90%</td>
</tr>
<tr>
<td>Arterial</td>
<td>95%</td>
</tr>
</tbody>
</table>

610.13 SUBGRADE REACTION ($k$):

Economical concrete pavements that will give good performance can be built on most in-place soils. Subgrade soils should be of uniform material and density for satisfactory pavement performance. Soft spots that show up during construction should be excavated and re-compacted with the same type of material found in the adjacent subgrade.

The supporting power of the subgrade is expressed as values of $k'$, the modulus of subgrade reaction, and can be determined by plate bearing tests. The $k$ may be estimated by correlation to $M_R$ using Figure 3.3 of the 1986 AASHTO Guide for Design of Pavements. The $k$-value must be determined by a soil engineer licensed to practice engineering in the State of Wyoming.

610.14 CONCRETE QUALITY AND MATERIAL SPECIFICATIONS:

Concrete paving mixes are designed: 1) for economy; 2) to give satisfactory durability under the conditions the pavement will be subject to; and 3) to produce the desired flexural strength.

The material specifications for concrete pavements are given in Section 02520 of the current edition City of Gillette Standard Construction Specifications.
**610.15  DESIGN SERVICEABILITY LOSS**

The following criteria shall be used for all City of Gillette roadways to be dedicated for public use:

- **Arterial**: 2.5
- **Collector**: 2.5
- **Local/Local Through**: 2.0

**610.20  MINIMUM PAVEMENT SECTION:**

The following table provides the minimum acceptable pavement sections for public roadways in the City of Gillette. These pavement and aggregate base thicknesses are based on the given $E_{18 \text{SAL}}$ and CBR values and road classification. Any proposed pavement section of lesser thicknesses or alternate materials shall be fully documented by the design engineer to substantiate that such alternate will provide an equivalent capacity as the pavement noted below and must be approved by the City Engineer.

<table>
<thead>
<tr>
<th>Classification</th>
<th>$E_{18 \text{SAL}}$ (20 yrs)</th>
<th>CBR</th>
<th>Concrete (inches)</th>
<th>Aggregate Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alleys</td>
<td>3</td>
<td>5.0</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Local/Local Through</td>
<td>83,900</td>
<td>3</td>
<td>5.0</td>
<td>6</td>
</tr>
<tr>
<td>Collector</td>
<td>319,970</td>
<td>3</td>
<td>5.5</td>
<td>6</td>
</tr>
<tr>
<td>Arterial</td>
<td>839,000</td>
<td>3</td>
<td>6.5</td>
<td>6</td>
</tr>
</tbody>
</table>

**610.30  THICKNESS DESIGN CRITERIA:**

The following procedure should be used in determining the required pavement thickness

A. Determine the $E_{18 \text{SAL}}$ per Section 2.1.2 of the “AASHTO Guide for Design of Pavement Structures”.
B. Determine the reliability as shown in 610.12
C. The overall standard deviation (So) for design shall be So=0.35
D. Determined the Design Serviceability Loss as shown in Section 610.15
E. Determine the concrete elastic modulus
F. Determine the concrete modulus of rupture
G. Determine the load transfer coefficient (j) (without curb and gutter=3.6, with curb and gutter=3.1)
H. Determine the drainage coefficient

In these design charts "with curb and gutter" refers to curbs poured integral with the pavement or tied to the pavement in such a manner the curb and gutter act structurally as a thickened edge of the pavement.

For design thicknesses using K values, concrete strength, or reliability factors other than shown, interpolation may be used.
For design thicknesses on projects with radically different conditions than those shown, see the "AASHTO Guide for Design of Pavement Structures". Pavement thickness obtained using these design charts shall be rounded up to the next one-half (½)-inch.

610.40 JOINTS

Joints must be carefully designed and constructed to ensure good performance. Details of actual joint pattern will be included in design, and shall be approved by City Engineer prior to use.

Longitudinal Joints

Longitudinal joints are installed to control longitudinal cracking. Unless otherwise specified by Engineer, all longitudinal joints, sawed or construction, including curb and gutter, shall be tied with rebar. They shall be spaced to coincide with lane markings at eight (8) to twelve (12) feet intervals. Longitudinal joint spacing should not be greater than thirteen (13) feet. The depth of longitudinal joints should be one-fourth (¼) to one-third (1/3) of the pavement thickness (D/4 to D/3).

Transverse Joints

Transverse contraction joints are used to control transverse cracking. Contraction joints relieve (1) tensile stresses that occur when the slab contracts and (2) curling and warping stresses caused by differential temperatures and moisture contents within the slab. The depth of the transverse joint shall be equal to one-quarter (D/4) of the pavement thickness. This depth should be increased to D/3 for pavements built on stabilized (cement or asphalt) subbase. For plain jointed concrete city street pavements, the joint spacing should not exceed twenty-four (24) to thirty (30) times the pavement thickness with the maximum of fifteen (15) feet. Smooth dowels shall be used on transverse joints for pavements seven (7) inches or thicker (see Engineering Design Standard details).
Design Chart for Rigid Pavement Based on Using Mean Values for Each Input Variable (Segment 1)
Design Slab Thickness, D (inches)

Estimated Total 18-kip Equivalent Single Axle Load (ESAL) Applications, \( W_{es} \) (millions)

Design Serviceability Loss, DSGI

Match Line

NOTE: Application of reliability in this chart requires the use of mean values for all the input variables.

Continued—Design Chart for Rigid Pavements Based on Using Mean Values for Each Input Variable (Segment 2)
SECTION 611

STREET GEOMETRICS
SECTION 611

STREET GEOMETRICS

611.0 GENERAL

All curb, gutter, sidewalk, street design, and rights-of-way width shall conform to the minimum requirements of the City of Gillette Standard Construction Specifications and the City Subdivision Regulations. Where standards differ between the Subdivision Regulations and the Design Standards the Design Standards shall govern. Care shall be taken to ensure continuity of grades, widths, etc., of proposed, existing and future installations. Private non-commercial streets and parking lots shall be built to these Standards, including curbs, gutter, and sidewalks unless otherwise approved by the City Engineer.

611.01 REPORTS

611.01.1 Traffic Impact Analysis Report

A Traffic Impact Analysis (TIA) shall be required with applications for development review and approval when the trip generation is expected to exceed more than one hundred (100) trips during any one-hour (1) peak or to exceed two hundred fifty (250) trips per day, based on traffic generation estimates of the Institute of Transportation Engineer’s Trip Generation Manual (or any successor publication). The City may also require a TIA for any of the following conditions:

1. Any project that has significant impact to the existing Level of Service (LOS) on any collector or arterial street;
2. Any application for rezoning;
3. Any case where the previous TIA for the property is more than two (2) years old;
4. Any case where increased land use density will result in increased traffic generation; and
5. As may be required by the City Engineer to address traffic issues that may be affected by the proposed project.

Traffic Impact Analysis reports shall be completed by a Professional Civil Engineer licensed in the state of Wyoming. The report shall be based on the following outline at minimum, and include appropriate background information, and supporting data.

1. Executive summary
2. Purpose and objectives
3. A description of the site and study area
4. Existing conditions in the area of development
5. Anticipated nearby development
6. Trip generation
7. Trip distribution
8. Modal split
9. Traffic assignment resulting from the development
10. Projected future traffic volumes
11. Assessment of the change in roadway operating conditions resulting from
the development traffic
12. Recommendations for site access and transportation improvements needed
to maintain traffic flow to, from, within, and past the site at an acceptable
and safe level of service.

611.01.2 Pavement Design Report

All roadway construction in the City of Gillette shall require a pavement design report.
The report content shall be in accordance with Section 609 and Section 610 of these
Standards and include a supporting geotechnical report.

611.02 STREET CLASSIFICATIONS

611.02.1 Local (see local standard detail 02512-02 for cross sections and additional
information)

A local street is a general term denoting a roadway designed or operating with the
following characteristics:

A. **Street Width (b/c to b/c)** - thirty-six feet to forty feet (36’ to 40’).
B. **Design Speed** - twenty-five (25) miles per hour with a generally posted
speed limit of twenty to twenty-five (20-25) miles per hour.
C. **Traffic Volumes** - Generally less than one thousand five hundred (1,500)
vehicles per day.
D. **Function/Access** - Designed for ease of direct access to adjacent parcels of
land. Residential properties may front on local streets. Driveway widths
shall be twelve feet (12’) minimum and thirty-two feet (32’) maximum.
E. **Traffic Control** - Regulation of traffic is accomplished through stops signs,
yield signs, or right-of-way rules for uncontrolled intersection as in
accordance with the current edition of the Manual on Uniform Traffic
Control Devices (MUTCD).
F. **Cul-De-Sacs** - In accordance with Section 611.08 of these standards.
G. **Alleys** - In accordance with Section 611.09 of these standards.

611.02.2 Local Through (see Local through standard detail 02512-02 for cross
sections and additional information)

A local through is a general term denoting a roadway designed or operating with the
following characters:

A. **Street Width (b/c to b/c)** - forty feet to 44 feet (40’ to 44’).
B. **Design Speed** - between twenty-five (25) and thirty-five (35) miles per
hour with a generally posted speed limit of twenty-five to thirty (25-30)
miles per hour.
C. **Traffic Volume** - Generally between one thousand five hundred (1,500)
and two thousand five hundred (2,500) vehicles per day.
D. **Level of Service** – Designed to a minimum Level of Service (LOS) C with a volume to capacity ratio of 0.40 based on the twenty-year (20) forecasted volumes.

E. **Function/Driveway Access** – Local through are designed to handle traffic volumes loading from and onto private drives, locals, other collectors, and arterial roadways. Local through collect and distribute traffic between local streets and collector and arterial streets. Residential properties may front on and have direct access to local through streets. Driveway widths shall be twelve feet (12’) minimum and thirty-two feet (32’) maximum. The minimum driveway access spacing shall be one hundred (100) feet for non-residential areas.

F. **Traffic Control** – Regulation of traffic is accomplished through the use of signs, traffic signals and channelization in accordance with the current edition of the Manual on Uniform Traffic Control Devices (MUTCD).

**611.02.3 Collector** (see collector standard detail 02512-02 for cross sections and additional information)

A collector is a general term denoting a roadway designed or operating with the following characteristics:

A. **Street Width (b/c to b/c)** – thirty-six feet to fifty-six feet (36’ to 56’)

B. **Design Speed** – Between thirty-five (35) and forty-five (45) miles per hour with a generally posted speed limit between thirty (30) and forty (40) miles per hour.

C. **Traffic Volumes** – Generally between two thousand five hundred (2,500) to three thousand five hundred (3,500) vehicles per day.

D. **Level of Service** – Designed to a minimum Level of Service (LOS) C with a volume to capacity ratio of 0.40 based on the twenty (20) year forecasted volumes.

E. **Function/Driveway Access** – Collectors are designed to handle traffic volumes loading from and onto local, local through, other collector, and arterial roadways. Collector streets collect and distribute traffic within the community. Left turn lanes and channelization may be required at intersections and driveway access points by the City Engineer. Driveway access is generally limited and may be restricted. Single-family residential frontage is discouraged and back-out drives are prohibited except in unique circumstances. Driveway access widths shall be twelve feet (12’) minimum and forty feet (40’) maximum. The minimum driveway access spacing shall be one hundred (100) feet.

F. **Traffic Control** – Regulation of traffic is accomplished through the use of signs, traffic signals, and channelization in accordance with the current edition of the Manual on Uniform Traffic Control Devices (MUTCD).

**611.02.4 Arterial** (see arterial standard detail 02512-01 for cross section and additional information)
An arterial street is a general term denoting a roadway designated or operating with the following characteristics:

A. **Street Width (b/c to b/c)** – Minor forty-eight feet (48’) to seventy-four feet (74’), Major sixty feet (60’) to ninety-eight feet (98’).

B. **Design Speed** – Between forty (40) and fifty (50) miles per hour with a generally posted speed limit between thirty-five (35) and forty-five (45) miles per hour.

C. **Traffic Volumes** – Generally greater than three thousand five hundred (3,500) vehicles per day.

D. **Level of Service** – Designed to a minimum Level of Service (LOS) C with a volume to capacity ratio of 0.40 based on the twenty (20) year forecasted volumes.

E. **Function/Driveway Access** – Arterial streets are designed to handle traffic loading from other arterials, collector streets and occasionally from local streets. They are intended to serve regional and intra-city multi-modal travel. Direct driveway access from residential properties is prohibited. Direct driveway access from all other land uses may require a traffic impact analysis demonstrating that the driveway access can function safely with minimal impact to travel on the arterial. Driveway access movements may be restricted or prohibited. Driveway widths shall be twelve feet (12’) minimum and 40’ maximum. The minimum driveway access spacing shall be two hundred fifty (250) feet.

F. **Traffic Control** – Regulation of traffic is accomplished by signs, traffic signals, and channelization in accordance with the current edition of the Manual on Uniform Traffic Control Devices (MUTCD).

### 611.03 HORIZONTAL ALIGNMENT

#### 611.03.1 Horizontal Curves

The minimum horizontal curves for roadway alignment shall be in accordance with the table below. AASHTO design guidelines shall be considered and must be approved by the City Engineer for unique or unusual circumstances that are different from this table.

#### TABLE 611.1

**HORIZONTAL CURVES**

<table>
<thead>
<tr>
<th>Minimum Curve Radius (ft)</th>
<th>Arterial AASHTO Standards</th>
<th>Collector AASHTO Standards</th>
<th>Local Through</th>
<th>Local</th>
</tr>
</thead>
</table>

180
611.03.2 Curb Return Radii

Minimum return radii shall be as shown in the table below:

<table>
<thead>
<tr>
<th>Through Street</th>
<th>Arterial</th>
<th>Collector</th>
<th>Local/Local Through</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial</td>
<td>50 ft*</td>
<td>40 ft*</td>
<td>20 ft*</td>
</tr>
<tr>
<td>Collector</td>
<td>40 ft*</td>
<td>30 ft</td>
<td>20 ft</td>
</tr>
<tr>
<td>Local</td>
<td>20 ft</td>
<td>20 ft</td>
<td>20 ft</td>
</tr>
</tbody>
</table>

(* May deviate as per the City Engineer’s considerations to multi-modal uses)

611.03.3 Superelevation

All roadway designs using superelevation are subject to review and approval by the City Engineer. Recommendations of the AASHTO “A Policy on Geometric Design of Highways and Streets”, latest edition shall be consulted in the design of superelevation.

Superelevation shall not be used on local or local through roads without approval from the City Engineer.

611.03.4 Stopping Sight Distance

The minimum stopping sight distance is the distance required by the driver of a vehicle traveling at the design speed to bring the vehicle to a stop after an object on the street becomes visible. Stopping sight distance is calculated in accordance with the latest edition of the AASHTO “A Policy on Geometric Design of Highways and Streets”. Object height is assumed to be two (2.0) feet above road surface and viewer’s eye height is three and a half (3.50) feet above road surface. A likely obstruction may be a bridge abutment or line of columns, wall, cut side slope, or a side or corner of a building. The sight distance design procedure shall assume a six (6.0) foot fence (as measured from actual finished grade) exists at all property lines except in the sight-distance triangles required at all intersections.

Where an object off the pavement restricts sight distance, the stopping sight distance determines the minimum radii of curvature. In no case shall the stopping sight distance be less than as specified in Table 611.3. To allow for the effect of grade on stopping sight distance the factors in table 611.4 shall be used.
### TABLE 611.3

**STOPPING SIGHT DISTANCE**

<table>
<thead>
<tr>
<th>DESIGN SPEED (mph)</th>
<th>STOPPING SIGHT DISTANCE (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>155</td>
</tr>
<tr>
<td>30</td>
<td>200</td>
</tr>
<tr>
<td>35</td>
<td>250</td>
</tr>
<tr>
<td>40</td>
<td>305</td>
</tr>
<tr>
<td>45</td>
<td>360</td>
</tr>
<tr>
<td>50</td>
<td>425</td>
</tr>
</tbody>
</table>

### TABLE 611.4

**EFFECT OF GRADE ON STOPPING SIGHT DISTANCE**

<table>
<thead>
<tr>
<th>DESIGN SPEED (MPH)</th>
<th>STOPPING SIGHT DISTANCE ADJUSTMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increase for Down Grade (ft)</td>
</tr>
<tr>
<td></td>
<td>Decrease for Upgrades (ft)</td>
</tr>
<tr>
<td>25</td>
<td>3% 10 18 7 12 15</td>
</tr>
<tr>
<td>30</td>
<td>5% 15 27 10 16 21</td>
</tr>
<tr>
<td>35</td>
<td>7% 21 37 13 21 28</td>
</tr>
<tr>
<td>40</td>
<td>10% 32 49 16 27 36</td>
</tr>
<tr>
<td>45</td>
<td>18% 40 67 16 29 40</td>
</tr>
<tr>
<td>50</td>
<td>21% 49 82 20 37 50</td>
</tr>
</tbody>
</table>

### 611.03.5 Alignment at Bridges

Ending a curve on a bridge is undesirable and adds to the complication of design and construction. Likewise, curves beginning or ending near a bridge should be placed so that no part of any transition extends onto the bridge. Compound curves on a bridge are equally undesirable. If curvature is unavoidable, every effort should be made to keep the bridge within the limits of the simple curve.

### 611.03.6 Coordination With Vertical Alignment

To avoid the possibility of introducing serious traffic hazards, coordination is required between horizontal and vertical alignment. Particular care must be exercised to maintain proper sight distance at all times. Sharp horizontal curves introduced at or near the top of pronounced crest or bottom of sag vertical curves should be avoided.

### 611.03.7 Railroad Crossings

All railroad crossings on arterial streets shall be steel reinforced rubber or concrete panels for the full width of the roadway. A timber pedestrian walk and vehicle recovery area shall be provided on both sides of the steel reinforced rubber.
Timber crossings may be considered for use in place of steel reinforced rubber on local streets only. Minimum crossing width shall be the full width of the right-of-way to provide for pedestrians and vehicle recovery area.

The appropriate railroad company must approve all railroad crossings.

611.04 VERTICAL ALIGNMENT

611.04.1 Permissible Roadway Grade

The minimum desirable grade for roadways is one (1) percent. Maximum desirable grades for local streets are eight (8) percent, collectors are seven (7) percent, and arterials are six (6) percent. Maximum grades should only be used in extreme topographic conditions, and the designer should strive to minimize the use of maximum grades for considerable lengths. The City Engineer must approve grades in excess of the maximum or below the minimum desirable.

611.04.2 Permissible Intersection Grades (public rights-of-way)

The maximum permissible grade at intersections shall be as shown in the table below. These grades are maximum instantaneous flowline grades for the stated distances (each side of the street) for the minor (intersecting) street.

<table>
<thead>
<tr>
<th>TABLE 611.5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intersection of:</strong></td>
</tr>
<tr>
<td>Local Street with</td>
</tr>
<tr>
<td>Collector Street with</td>
</tr>
</tbody>
</table>

The intersection grade of the major (through) street at the intersection may be dictated by design considerations for the street. However, if the major street intersection grade exceeds three (3) percent, the type of access and access control will be as directed by the City Engineer.

In general, all private commercial driveways with curb return radii shall have a maximum grade of four (4) percent, with the length of the maximum grade for the commercial driveway a minimum of fifty (50) feet measured from the flowline intersection of the public roadway.

611.04.3 Changing Grades

Instantaneous grade changes shall not be permitted. The use of grade breaks in lieu of vertical curves is discouraged. However, if a grade break is necessary and the algebraic difference in grade does not exceed four-tenths of a percent (0.004 ft./ft.) along the roadway, the grade break may be permitted. The maximum grade break allowed at the point of tangency at a curb return for local and collector roads shall be two (2) percent
and a maximum of one (1) percent for arterial roadways. Special consideration shall be given to necessary drainage structures.

611.04.4 Vertical Curves

When the algebraic difference in grade (A) is at, or exceeds, four tenths of a percent (0.004 ft./ft.), a vertical curve is to be used. All vertical curves shall be symmetrical. The minimum gradients into and out of a sag vertical curve shall be one (1) percent (0.01 ft./ft.). All vertical curves shall be labeled in the profile with length of curve (L), \( K = \frac{L}{A} \) values, VPC, VPT, VPI, and stationing and elevation of these components. In addition, the low point or high point of the vertical curve shall be shown. The minimum vertical curve K values are shown in Table 611.6.

**TABLE 611.6**

<table>
<thead>
<tr>
<th>Design Speed</th>
<th>K Value (Length = K X Algebraic Difference in Grades)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crest</td>
</tr>
<tr>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td>30</td>
<td>19</td>
</tr>
<tr>
<td>35</td>
<td>29</td>
</tr>
<tr>
<td>40</td>
<td>44</td>
</tr>
<tr>
<td>45</td>
<td>61</td>
</tr>
<tr>
<td>50</td>
<td>84</td>
</tr>
</tbody>
</table>

611.04.5 Intersections

In addition, the following criteria shall apply at intersections:

A. The grade of the “through” street shall take precedence at intersections. At the intersections of roadways with the same classification, the more important roadway, as determined by the City Engineer, shall have this precedence. The design should warp side streets to match through streets with as short of a transition as possible. Crown warping of the major street shall be considered to allow for higher speeds of cross street traffic at signalized intersections.

B. The key criteria for determining the elevation of the curb return on the side street and the amount of warp needed on a side street transitioning to a through street are:

1. Permissible grade in the stop/start lane (See section 611.04.2).
2. Pavement cross slope at the PCR’s on the side street and permissible warp in pavement cross slope (see section 611.06.1(B)).
3. Normal vertical curve criteria.
4. Vertical controls within the curb return itself.

C. The elevation at the PCR on the through street is always set by the grade of the through street in conjunction with the pavement cross slope.
D. Carrying the crown at a side street into the through street is permitted only when drainage consideration warrants such a design.
E. A more detailed review shall be performed for arterial intersections to maximize drivability.
F. Whenever possible, intersections shall be made at right angles or radial to a curve. No intersecting angle of less than eighty (80) degrees will be allowed without approval of the City Engineer.
G. Intersections for Collector and Arterial Streets should be four (4) legged, as opposed to two (2) tee intersections.
H. Street jogs with centerline offsets of less than one hundred fifty feet (150’) shall not be permitted.

611.04.6 Curb Returns

Minimum fall around curb returns for flow along the curb line shall be a minimum of one and one half (1.5) percent.

611.04.7 Curb Return Profiles

Curb return profiles are required for radii equal to or greater than thirty (30) feet within the public right-of-way. A mid-point elevation along the arc length of the curb return shall be shown in the plan view for radii less than thirty (30) feet. Curb return design shall be set in accordance with the following design procedure. General standards for flowline control and profiles with the curb returns shall be as follows:

A. The point of tangency at each curb return shall be determined by the projected tangent grade beginning at the point of intersection (PI) of the flowlines.
B. The arc length and external distance of the curb return shall be computed and indicated on the drawing.
C. Show the corresponding flowline (or top of curb) grade for each roadway beyond the Point of Curvature of the Return (PCR).
D. Design the curb return flowline such that a maximum cross slope between the mid-point of the curve and the Point of Intersection of the Return (PICR) (external distance) does not exceed five (5) percent. Grade breaks at the PCRs shall not exceed two (2) percent for local and collector streets and one (1) percent for arterials. The flowline design of the curb return shall be accomplished within the return without affecting street grades beyond the PCR. The elevation and location of the high or low point within the return, if applicable, is to be called out in the profile.
E. Scale for the curb return profile to be one inch equals one foot (1”=1’) vertically and one inch equals ten feet (1”=10’) horizontally.
F. Curb return radii, existing and proposed, shall be shown.

611.04.8 Connection with Existing Roadways

A. Connection with existing roadways shall be smooth transitions conforming to normal vertical curve criteria if the algebraic difference in grade between the existing and proposed grade exceeds four-tenths of a percent (0.004 ft/ft). When a vertical curve is used to make this transition, it shall be fully
accomplished prior to the connection with the existing improvements and shall also comply with the grade requirements at intersection approaches.

B. Existing center line grade shall be shown for at least three hundred (300) feet with field verified as-builts showing stations and elevations at twenty-five (25) foot intervals. In the case of connection with an existing intersection, these as-builts are to be shown within a three hundred (300) foot radius of the centerline of the intersection. This information will be included in the plan and profile that shows that proposed roadway. Limits and characteristics of the proposed improvements are the primary concern in the plan view. Such characteristics include horizontal alignment, off-site intersections, limits of the improvements, etc.

C. Previously approved designs for the proposed improvement are not an acceptable means of establishing existing grades. However, they are to be referenced on the construction plan where they occur.

D. The basis of the as-built elevations shall be the same as the design elevations (both proposed and existing flow line or both proposed and existing top of curbs, etc.) when possible.

E. If a connection to a Wyoming Department of Transportation (WYDOT) road is required, an access permit must be obtained from WYDOT.

611.04.9 Off-Site Design

The design grade, and existing ground at that design grade, of all roadways that dead end due to project phasing, subdivision boundaries, etc. shall be continued, in the same plan and profile as the proposed design, for at least five hundred (500) feet or to its intersection with an existing collector or arterial roadway which ever is less. This limit shall be extended to one thousand (1,000) feet when arterial roadways are being designed.

611.05 INTERSECTION AND DRIVEWAY SIGHT DISTANCES

611.05.1 General

Adequate intersection design necessitates the provision of safe ingress and egress from one street or driveway to the other, based in part on the ability of a driver to see oncoming vehicles or pedestrians. The following guidelines shall be used in the design of intersections, private driveways, and public streets that intersect other traffic carrying facilities.

611.05.2 Sight Distance Triangle

At the intersection of two (2) public streets or a private driveway and a public street, sight distance shall be evaluated across a “sight distance triangle” where obstructions are restricted according to the following criteria. Within the area of the triangle there must be no wall, fence, sign, foliage, berming, or other structure, which will obscure the driver’s view of traffic approaching that intersection. The structures or berms within the sight distance triangle can extend no higher than two (2) feet above the curb elevation and no lower than eight (8) feet above the curb. Exceptions to this requirement exist for public facilities such as fire hydrants, utility poles, and traffic control devices. These
facilities must be located to minimize visual obstruction. Two (2) types of clear sight triangles are considered based on the functional classification of the street.

611.05.2.1 Local and Local Through Street Sight Triangles

Each quadrant of an intersection should contain a triangular area free of obstructions that might block an approaching driver’s view of potentially conflicting vehicles. The length of the legs of this triangular area, along both intersecting roadways, should be seventy-five feet (75’) measured from the center of the intersection as shown in Figure 611.1.

Figure 611.1
Sight Triangles

611.05.2.2 Collector and Arterial Street Sight Triangles

All Collector and Arterial street sight triangles shall be designed in accordance with the latest addition of AASHTO Policy on Geometric Design of Highways and Streets.

611.06 ROADWAY CROWN

611.06.1 Cross Slope

Except at intersections or where superelevation is required, roadways shall have no more than one (1) foot difference in elevation from top of curb to top of curb (or flowline to
flowline. Design for new high-type surfaced roadways, such as asphalt or concrete paving, shall have a minimum of two (2) percent to a maximum of two and one-half (2.5) percent cross slope for Local, and Local Through streets and two (2) percent cross slope for Collector and Arterial streets. This cross slope may be increased to three (3) percent for rehabilitation efforts, such as milling and overlying asphalt surfaces, for Local and Local Through streets. Within one hundred fifty feet (150’) of an intersection, the maximum elevation difference between flow lines shall be dictated by the allowable intersection grade and the actual distance between flowlines.

A. Parabolic or curved crowns are not allowed. In no case shall the pavement cross slope at warped intersections exceed the grade of the through street.

B. The rate of change in pavement cross slope when warping side streets at intersections shall not exceed one (1) percent every twenty-five (25) feet horizontally on a local/local through roadway, one (1) percent every thirty-seven-and one-half (37.5) feet horizontally on a collector roadway, or one percent (1%) every (56.5) fifty-six and one-half feet horizontally on an arterial roadway.

C. In the case of conflict caused by requirements of the Storm Drainage Design Section, the drainage requirements shall govern.

6.11.07 SIDEWALKS, CURB AND GUTTER, CURB RAMPS, AND DRIVEWAYS

A. Roadway typical sections shall be as specified by the City of Gillette Standard Construction Specifications.

B. Sidewalks and/or bicycle paths shall be constructed as depicted in the typical roadway cross-section details unless specifically deleted by action of the City Council.

C. Curb ramps shall be constructed in accordance with the City of Gillette Standard Construction Specifications, Design Standards, and ADA requirements.

D. Drainage structures shall not be placed off the end of curb ramps. Location of curb ramps shall take precedence over location of the drainage structure.

E. Where curb cuts are allowed based on traffic considerations, concentrated storm water runoff must not be discharged across the sidewalk. These flows must be directed to a sidewalk chase section. If this is not possible due to grading restraints, radius returns, and cross-pan shall be used.

F. Curb cuts and driveways shall be constructed in accordance with the City of Gillette Standard Construction Specifications.

611.08 CUL-DE-SACS

The following criteria shall be used for cul-de-sac horizontal geometry.

A. The minimum right-of-way radius shall be sixty (60) feet

B. The minimum flowline radius shall be forty-eight (48) feet

C. The minimum width of the street shall be forty (40) feet from back of curb to back of curb.
D. The length of a cul-de-sac shall be determined by the average number of daily trips made to and from the cul-de-sac. No cul-de-sac shall contain a number of lots that exceeds two hundred (200) average daily trips. The two hundred (200) average daily trips number is derived from the latest edition of the Institute of Transportation Engineers Trip Generation informational report and accompanying handbook.

E. Vertical alignment shall be in accordance with Section 611.04 of these standards.

F. Cul-de-sacs are not allowed in commercial and industrial developments unless approved by the City Engineer.

G. The City Engineer may allow the use of hammerhead designs or other non-standard designs.

611.09 ALLEYS

The following criteria shall be used for alley geometry.

A. The minimum right-of-way shall be twenty (20) feet.
B. The minimum width of the paved section shall be sixteen (16) feet in residential areas and twenty (20) feet for commercial and industrial areas.
C. See alley standard detail 02512-03 for cross sections and additional information.

611.10 AUXILIARY LANES (ACCELERATION AND DECELERATION LANES)

The design of the arterial street system depends upon the proper control of access to developments. The location and design of access points must minimize traffic hazards and interference to through traffic movements. To ensure proper control, the following standards for acceleration and deceleration lanes have been established. The approved traffic impact analysis study or the City Engineer shall establish the need for acceleration and deceleration lanes.

Right and left turn lanes from arterial streets shall have a minimum of one hundred fifty (150) feet of storage length and one hundred fifty (150) feet of transition taper. Additional storage length may be required dependent on the volume of turn movements. At the discretion of the City Engineer, consideration may be given to require longer minimum length of tapers as may be necessary for acceleration lanes.

611.11 STREET LIGHTING

Street lights shall be provided at all arterial street/road intersections and as required on all newly developed and dedicated public streets in the City. In general, street light poles shall not be placed within sidewalk or curb ramps and, at minimum, shall not interfere with the required four (4) foot free width for pedestrian travel as per ADA guidelines.

The land developer shall contact the City’s Electrical Division to initiate street light design for any new development during the plan review process. The private developer must provide a copy of the proposed site plan, which will be used for proposed street
light layout design. The plan will be returned to the private developer showing all required street lights.

611.12 SIGNING AND STRIPING

Signing/striping plans of new streets/roads and re-signing/striping of existing streets/roads necessitated by development shall be submitted as part of the construction plans. All signing/striping shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and must be approved by the City Engineer. Depending on the street construction in relation to development build-out, final installation of signage/striping may not be required prior to opening the street for traffic, as warranted by the City Engineer, but will still be provided to the City.

611.13 DRAINAGE

All streets shall be designed to provide continuous surface drainage directed to storm drain inlets and drainage courses. Grades shall permit flow without ponding. Inlets shall be located to intercept the curb flow at the point flow capacity is exceeded by storm runoff according to the Design Standards, Section 403. Inlets shall also be installed to intercept cross-pavement flows at points of transition in superelevation. Due to the presence of handicap ramps, inlets shall not be allowed in the curb return but shall be located outside the tangent points of the curb returns. Gutter transition sections abutting inlets shall not be within the curb return.

Eight feet (8') wide concrete cross-pans shall normally be installed across those streets at intersections carrying traffic, which must stop. Installation of cross-pans between intersections or across streets carrying through traffic at intersections shall be avoided in all cases. Cross-pans are not permitted across collector or arterial roadways. The use of any cross-pan on arterial roadways where the vertical grade exceeds four and one-half percent (4.5%) will be considered only after all alternatives have been exhausted. Mid block cross-pans are discouraged and must be approved by the City Engineer.

Storm water from concentrated points of discharge shall not be allowed to flow over sidewalks, but shall drain to the roadway or storm inlet by use of chase sections. Sidewalk chase sections shall not be located within a curb cut or driveway. Hydraulic design shall be in accordance with the Design Standards, Section 403. Sidewalk chases will only be allowed where approved by the City Engineer. Sidewalk chases will only be used to allow surface drainage to enter into the street gutter, rather than being used to avoid the use of standard inlet. Sidewalk chase sections shall be constructed in accordance with City of Gillette Design Standards, Standard Drawings.

A check shall be made to be sure of continuity of drainage design between the proposed construction, and existing and/or future construction. In no case shall surface drainage be permitted to be disposed of overland except by approved storm drainage facilities.
STANDARD DRAWINGS
<table>
<thead>
<tr>
<th>DRAWING NAME</th>
<th>NO.</th>
<th>DRAWING NAME</th>
<th>NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project ID Sign</td>
<td>01015-01</td>
<td>Lane Closure - Center Turn Lane</td>
<td>01510-07</td>
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<tr>
<td>Stabilized Construction Entrance</td>
<td>01500-01</td>
<td>Intersection Closure - Center Location</td>
<td>01510-08</td>
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<tr>
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<tr>
<td>Stormwater Inlet &amp; Outlet Protection</td>
<td>01500-03</td>
<td>Intersection Closure - Far Side, Right Lane</td>
<td>01510-10</td>
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<tr>
<td>Check Dam</td>
<td>01500-04</td>
<td>Intersection Closure - Far Side, Left Lane</td>
<td>01510-11</td>
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<tr>
<td>Sediment Control Wattle</td>
<td>01500-05</td>
<td>Lane Closure - Interior of Multi-Lane</td>
<td>01510-12</td>
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<tr>
<td>Silt Fence</td>
<td>01500-06</td>
<td>Stationary Lane Closure - Multi-Lane Highway</td>
<td>01510-13</td>
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<tr>
<td>Sanitary Sewer Manhole (Flat Top)</td>
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<td>Manhole Bases (48”, 60” &amp; 72”)</td>
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<td>Sanitary Sewer Service Line</td>
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<td>Sanitary Sewer Manhole Ring &amp; Cover</td>
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</table>
CITY OF GILLETTE
(PROJECT NAME)
(YEAR)
(PROJECT #)

PROJECT FUNDING:
STATE GRANT FUNDING:
LOCAL 1% SALES TAX:

CONTRACTOR:
ENGINEER:

GENERAL NOTES:
1. 4” Radius On Each Corner Is Optional
2. Sign Face, Back and Edges Shall Receive One Coat Primer And Two Coats Of White Paint.
4. Posts Shall Receive One Coat Of Cedar Stain.
5. Dollar Amounts To Be Determined After Contract Award.
NOTES:

1. TO BE INSTALLED PRIOR TO CONSTRUCTION ACTIVITIES.
2. STONE SIZE SHALL BE 2" - 4" OPEN GRADED ROCK.
3. THICKNESS OF CRUSHED STONE PAD TO BE NOT LESS THAN 8".
4. LENGTH SHALL BE A MINIMUM OF 50' FROM ACTUAL ROADWAY, AND WIDTH NOT LESS THAN FULL WIDTH OF INGRESS/EGRESS. (12' MINIMUM)
5. ENTRANCE SHALL BE PROPERLY GRADED TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY BY CONTRACTOR. AS NECESSARY, WHEELS MUST BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT OF WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.
6. ALL ROCK AND FABRIC TO BE REMOVED UPON COMPLETION OF CONSTRUCTION, AND THE AREA BACKFILLED AND RECLAIMED, OR RE-SEEDED, APPROPRIATE TO THE SITE.
STORM DRAIN INLET PROTECTION (CURB OPENING)
INLET PROTECTION SHALL EXTEND 12 IN. PAST EACH END OF THE INLET.

STORM DRAIN INLET PROTECTION (COMBINATION)
INLET PROTECTION SHALL EXTEND 12 IN. PAST EACH END OF THE INLET.

NOTES:
1. INLET PROTECTION BMP SHALL BE INSTALLED BEFORE CONSTRUCTION BEGINS.
2. INLET PROTECTION SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
3. INLET PROTECTION SHALL BE REMOVED ONCE CONSTRUCTION IS COMPLETED.
METAL PIPE INSTALLATION PROFILE

NOT TO SCALE

FINISHED GROUND LINE

A = ON SITE STRUCTURAL BACKFILL, PLACED TO
AT LEAST 12 INCHES ABOVE TOP OF PIPE.
B = COMPACTED STRUCTURAL BACK FILL PLACED
TO AT LEAST THE CULVERT SPRING LINE
C = 3 INCHES (IN SOIL) OR 12 INCHES (IN ROCK)
BELOW THE BOTTOM OF THE PIPE OF LOOSE
STRUCTURAL BACK FILL

PIPE TRENCHING DETAIL

NOT TO SCALE

TOP OF ROADWAY
ROADWAY EMBANKMENT
(SLOPE VARIES)

PROVIDE MIN. 1" DEEP DEPRESSION

PROVIDE MIN. 1" DEEP DEPRESSION

RIPRAP

RIE

L1

L

D

2D

2

L1

L

D

2D

RIE

PROVIDE MIN. 1" DEEP DEPRESSION

CULVERT OUTLET PROTECTION DETAIL

NOT TO SCALE

RIE-RAP APRON SIZING DIMENSIONS - INLET AND OUTLET

<table>
<thead>
<tr>
<th>PIPE DIAMETER</th>
<th>RIP-RAP END SECTION LENGTH</th>
<th>LENGTH L</th>
<th>WIDTH W</th>
<th>DEPRESSION (2 x D50)</th>
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<tr>
<td>24&quot;</td>
<td>8&quot;</td>
<td>78&quot;</td>
<td>102&quot;</td>
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<td>96&quot;</td>
<td>126&quot;</td>
<td>150&quot;</td>
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<tr>
<td>36&quot;</td>
<td>12&quot;</td>
<td>96&quot;</td>
<td>132&quot;</td>
<td>180&quot;</td>
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</table>

CONSTRUCTION SPECIFICATIONS:

1. CORRUGATED METAL PIPE SIZING VARIES, SEE PLANS FOR LENGTH AND DIAMETER.
2. PIPE SLOPE: MINIMUM SLOPE = 0.3%, MAXIMUM SLOPE = 10%.
3. MINIMUM PIPE COVER IS TWO FEET. MAXIMUM PIPE COVER IS FIFTEEN FEET OR MANUFACTURER’S
   RECOMMENDED VALUES.
4. STRUCTURE BACKFILL SHALL BE COMPOSED OF SUITABLE MATERIALS DEVELOPED ON THE PROJECT.
   TO BE SUITABLE FOR USE UNDER THE CLASSIFICATION, BACKFILL SHALL BE FREE OF FROZEN LUMPS, WOOD,
   OR OTHER ORGANIC MATERIALS. IF THE MATERIAL CONTAINS ROCK FRAGMENTS THAT, IN THE OPINION OF THE
   ENGINEER, WILL BE INJURIOUS TO THE STRUCTURE, THE NATIVE MATERIAL SHALL NOT BE USED FOR BACKFILLING
   AND IMPORTED STRUCTURE BACKFILL SHALL BE USED.
5. CONNECT END SECTION TO PIPE AS RECOMMENDED BY THE MANUFACTURER.
USE A STAKE EVERY 36" AT ALTERNATE 90 DEGREE ORIENTATION THROUGHOUT THE WATTLE.

USE TWO STAKES 1 1/2 " x 1 1/2 " x SUFFICIENT LENGTH TO EMBED AT LEAST 12" INTO SOIL AT EACH END OF WATTLE.

WATTLE INSTALLATION NOTES

1. SEE PLAN VIEW FOR LOCATION AND LENGTH OF WATTLE.
2. WATTLES INDICATED ON INITIAL SWMP PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITIES.
3. WATTLES SHALL CONSIST OF STRAW, COMPOST, EXCELSIOR, OR COCONUT FIBER.
4. NOT FOR USE IN CONCENTRATED HIGH FLOW AREAS.
5. THE WATTLE SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 2".
6. EXTEND END OF WATTLE UPSLOPE TO AVOID FLOW AROUND END.

WATTLE MAINTENANCE NOTES

1. SEDIMENT ACCUMULATED UPSTREAM WATTLE SHALL BE REMOVED WHEN THE UPSTREAM SEDIMENT DEPTH IS WITHIN 1/2 THE HEIGHT OF THE CREST OF WATTLE.
WINTER/FROZEN GROUND  
SILT FENCE

SILT FENCE B

SILT FENCE A

SILT FENCE B

SILT FENCE A

UNDISTURBED VEGETATION

GEOTEXTILE FILTER FABRIC
FASTENED ON UPHILL SIDE,
TOWARDS EARTH DISRUPTION

1' MIN

PLACE FILTER FABRIC FLAP  
ON THE GROUND AND PLACE  
6' HIGH PEASTONE ON  
FLAP AS SHOWN

SECTION A

SECTION B

SPACING 6' MAX.

13/8" X 1/2" HARDWOOD STAKES  
DRIVEN INTO GROUND 1' MIN

LATH (TYP)

GEOTEXTILE FILTER  
FABRIC  
(MIN 10 GAL/MIN/SQ. FT.)

24" (MIN.)

1' MIN

SUPPORT FENCE  
(IF REQUIRED)

PLAN VIEW

FRONT VIEW

SILTFENCE JOINT  
SECTION B-B

SHEET FLOW

PEASTONE

GEOTEXTILE FILTER  
FABRIC

SUPPORT FENCE

2 WRAP MIN

1 1/2" X 1 1/2" HARDWOOD STAKES

UPPER VIEW
Place geotextile fabric under stone with 6 inch min. overlap and trenched in 6 inch min.
EMERGENCY SPILLWAY
CONTROL SECTION—20 FT.
MIN. LENGTH FLAT SECTION

EMERGENCY SPILLWAY SHOULD NOT BE
CONSTRUCTED OVER FILL MATERIAL

CHANNEL LINING MATERIAL
TO WITHSTAND 4% DESIGN STORM (100-YR.) FLOW

PROVIDE SILT FENCE
BAFFLES IF LENGTH/WIDTH
RATIO IS LESS THAN 2

PRIMARY SPILLWAY
(LOCATED FOR
ACCESSIBILITY IN
EVENT OF BLOCKAGE)

50% STORM DESIGN ELEVATION
(NOT TO OVERTOP
EMERGENCY SPILLWAY)

SETTLEMENT ZONE AND
SEDIMENT STORAGE
(134 CY/AC. MIN.)

STORMWATER
STORAGE

INLET FOR STORM
WATER SYSTEM

SILT FENCE BAFFLE
(IF REQUIRED)

CONCRETE BLOCK—SIZED
BY ENGINEER TO PREVENT
FLOTATION

RISER—PERFORATE SUCH THAT
BASIN WILL DEWATER

100 YR. STORM
DESIGN ELEVATION

EMBANKMENT STABILIZED
WITH VEGETATION

6' MAX

INFLOW

6' MAX

FREEBOARD

1' MIN

PRINCIPLE
SPILLWAY
CONDUIT

ANTI-SEEP
COLLARS

COMPACTED
FILL

STABILIZED
OUTLET

1' MIN

TRANS RACK
PRINCIPLE RISER
15" MIN. DIA.

TEMPORARY SEDIMENT
BASIN — CROSS SECTION

SEDIMENT BASIN NOTES

DESIGN REQUIREMENTS:

1. THE PLAN AND PROFILES ARE SCHEMATIC IN NATURE. CONSTRUCTION PLANS MUST PROVIDE SPECIFIC SITE
   CONSTRUCTION ARRANGEMENTS. DETAILS GIVEN IN THIS DRAWING SHALL BE USED UNLESS ALTERNATE
   DETAILS ARE SHOWN IN PLAN AND APPROVED BY THE CITY OF GILLETTE.

2. IF THE LENGTH TO WIDTH RATIO IS LESS THAN 2, INTERIOR SEDIMENT FENCE BAFFLES SHALL BE PROVIDED
   TO REDUCE SHORT-CIRCUITING OF THE BASIN.

3. EMERGENCY SPILLWAYS TO BE LOCATED IN A NON-FILL LOCATION WHEN FEASIBLE AND SHALL BE LINED WITH
   A NON-ERODIBLE MATERIAL SUCH AS RIP-RAP OR TURF REINFORCEMENT MATERIAL.

MAINTENANCE/SAFETY REQUIREMENTS:

4. CLEAN OUT DEPOSITED SEDIMENT WHEN SEDIMENT STORAGE HAS
   BEEN REDUCED BY 50% OF THE ORIGINAL DESIGN STORAGE VOLUME. THE CLEANOUT LEVEL SHALL BE
   INDICATED ON THE RISER PIPE WITH PAINTED RED HORIZONTAL LINE.

5. SEDIMENT BASINS SHALL BE FENCED USING CONSTRUCTION FENCE OR OTHER MATERIAL FOR SAFETY
   REASONS AND INCLUDE SIGNS READING: "DANGER — KEEP OUT"
CONSTRUCTION SPECIFICATIONS:

1. RIPRAP SHOULD BE MECHANICALLY PLACED AND SHAPED.

2. SEDIMENT TRAP MUST BE CLEANED OUT WHEN SEDIMENT STORAGE VOLUME IS HALF FULL.

3. ALL AREAS OF THE SEDIMENT TRAP SHALL BE TEMPORARILY SEEDED EXCEPT FOR THE BOTTOM OF THE BASIN.

4. FOLLOW-UP INSPECTION AND ANY NEEDED MAINTENANCE SHALL BE PERFORMED EVERY 14 DAYS AND AFTER EACH STORM.
EROSION BALE INSTALLATION

1. EROSION BALES SHALL BE ENTRANCED 4" MIN. INTO SOIL, TIGHTLY ABUTTED WITH NO GAPS, STACKED AND BACKFILLED AROUND THE ENTIRE OUTSIDE PERIMETER.

2. IT IS RECOMMENDED THAT STRAW BALES SHALL BE USED IN CONJUNCTION WITH SILT FENCE IN ORDER TO BE AN EFFECTIVE BMP.
DOWNSTREAM SEDIMENT TRAP
NOT TO SCALE

EROSION BALES INSTALLATION

1. Erosion bales shall be entrenched 4" min. into soil, tightly abutted with no gaps, staked and backfilled around the entire outside perimeter.

SEDIMENT TRAP FOR
CONCENTRATED FLOW

DATE: MARCH 2012
DRAWING NO. 01500-13

CITY OF GILLETTE
ENGINEERING DIVISION
P.O. BOX 3003, 201 E. 5TH STREET
GILLETTE, WYOMING 82717
PHONE: (307) 686-5311

DRAWN BY: KEB
APPROVED BY: ENGINEER HV/KDS

şe 2"X2"X4' NOMINAL

Erosion bale size (approx.)
15"X18"X3.5'
EXCAVATED SEDIMENT TRAP
STONE FILTER OUTLET
NOT TO SCALE

EXCAVATED SEDIMENT TRAP
STRAW BALE OUTLET—TYPE A
NOT TO SCALE

EXCAVATED SEDIMENT TRAP
STRAW BALE OUTLET—TYPE B
NOT TO SCALE
SEDIMENT TRAP - EARTH BERM

DATE: MARCH 2012
DRAWING NO. 01500-15

DRAWN BY: KEB
APPROVED BY: CITY ENGINEER HV/KDS

1. Gravel for drains (grading B)
2. Surface drainage
3. Culvert
4. Section A: Not to scale
   - Height of stone filter to be 0.5' to 1' below top of berm
5. Section B: Not to scale
   - Varies
   - Erosion control
   - Drainage control

City Of Gillette
ENGINEERING DIVISION
P.O. BOX 3003, 201 E. 5TH STREET
GILLETTE, WYOMING 82717
PHONE: (307) 686-5311
PLAN VIEW

2 x 4 OR EQUAL BRACING (TYP)

GEOTEXTILE FILTER FABRIC (100 Gal./Min./Sq Ft)

SCREENING TO HOLD FILTER MATERIAL IN PLACE

4"X4" (MIN)

END VIEW

TOP OF BANK

1'-3'

2'-3'

2'-4'

SECTION A

SEDIMENT TRAP - DITCH
SILT FENCE FABRIC

8" STAPLES SHALL BE PLACED AT EACH POST TO SECURE THE SILT FENCE FABRIC TO THE BOTTOM OF THE TRENCH

FLOW

SILT TRAP

STEEL T FENCE POST

26" WOVEN WIRE FENCE

6' MIN. 4'±

THE ELEVATION AT THESE LOCATIONS SHALL BE AT A MINIMUM, HIGHER THAN TOP OF THE SILT FENCE FABRIC AT ITS LOWEST ELEVATION.

FLOW

THE SILT FENCE LENGTH AND WIDTH MAY BE ADJUSTED DUE TO A LARGER PIPE, MULTIPLE PIPE, OR OTHER CIRCUMSTANCES DURING CONSTRUCTION AS DETERMINED BY THE ENGINEER.

POST SPACING SHALL BE 3' FOR THESE TYPES OF APPLICATIONS OF SILT FENCE. ALL OTHER COMPONENTS OF THE SILT FENCE SHALL BE THE SAME AS SHOWN ABOVE.
GENERAL NOTES:

1. REMOVE TOPSOIL PRIOR TO GRADING AND STOCKPILE OUTSIDE.

2. PROVIDE MINIMUM 4” OF TOPSOIL TO FACILITATE REVEGETATION.

3. IF THE EXPECTED LIFE SPAN OF THE DIVERSION STRUCTURE IS GREATER THAN 15 DAYS, BOTH THE BERM AND DITCH MUST BE SEEDED.
CONSTRUCTION SPECIFICATIONS:

1. THE AREA UP-SLOPE OF THE BERM AT THE BASE OF INITIAL FILL SLOPE SHALL HAVE A MINIMUM SLOPE OF 0.5%.

2. COMPACT BERMS WITH HAND HELD COMPACTION DEVICE, TRACKHOE BUCKET OR OTHER METHOD CAPABLE OF ATTAINING 85% DENSITY.

3. FOLLOW-UP INSPECTION AND ANY NEEDED MAINTENANCE SHALL BE PERFORMED EVERY 14 DAYS AND AFTER EACH STORM.

4. SEE PLAN FOR BERM WIDTH, DEPTH AND LOCATIONS.

PERIMETER BERM DETAIL
NOT TO SCALE
UNDISTURBED VEGETATION

SEED AND MULCH OR SOD

2' MIN

2' MIN

1 ½' MIN

EXCAVATED SOIL MAY BE PILED AND COMPACTED ON THE DOWNHILL SIDE OF THE DITCH

CROSS-SECTION

ISOMETRIC VIEW

DIVERSION DITCH
CONSTRUCTION SPECIFICATIONS:

1. THE SLOPE DRAIN SHALL HAVE A MINIMUM SLOPE OF 5%.

2. THE TOP OF THE EARTH BERM OVER THE INLET PIPE AND THOSE BERM'S CARRYING WATER TO THE PIPE SHALL BE AT LEAST 1.5 FEET HIGHER THAN THE TOP OF THE INLET PIPE.

3. THE PIPE SHALL BE FLEXIBLE WITH WATER TIGHT CONNECTING BANDS. FLEXIBLE PIPE SHOULD BE STAKED ON EITHER SIDE.

4. A RIPRAP APRON SHALL BE PROVIDED AT THE OUTLET.

5. THE SOIL AROUND AND UNDER THE INLET PIPE AT THE ENTRANCE SECTION SHALL BE HAND TAMMED IN 4" LIFTS TO THE TOP OF THE EARTH BERM.

6. FOLLOW-UP INSPECTION AND ANY NEEDED MAINTENANCE SHALL BE PERFORMED EVERY 14 DAYS AND AFTER EACH RAINFALL EVENT.

7. SEE PLAN FOR PIPE DIAMETER, LENGTH AND LOCATIONS.
NOTES:

1. ALL FABRIC TRENCHING (A, B, D, E) ARE TO BE 6" D X 6" W MINIMUM.

2. DEPENDING ON THE VELOCITY, SLOPE, SOILS, USE PROPER BLANKET OR TURF MAT LINING PER MANUFACTURES SPECIFICATIONS TO HANDLE SHEER STRESSES OF THE SLOPE/CHANNEL.
UNVEGETATED SLOPES SHOULD BE TEMPORARILY SCARIFIED TO MINIMIZE RUNOFF VELOCITIES
INSTALLATION NOTES:

1. SEE GRADING PLAN VIEW FOR LOCATION OF TERRACING, WIDTH (W), AND SLOPE (Z).

2. TERRACING IS TYPICALLY NOT REQUIRED FOR SLOPES OF 4:1 OR FLATTER.

3. GRADE TERRACES TO DRAIN BACK TO SLOPE AT A MINIMUM OF 3% GRADE.

MAINTENANCE NOTES:

1. RILL EROSION OCCURRING ON TERRACED SLOPES SHALL BE REPAIRED, RESEEDED, MULCHED OR STABILIZED IN A MANNER APPROVED BY THE CITY.

2. TERRACING MAY NEED TO BE RE-GRADED TO RETURN THE SLOPE TO THE FINAL DESIGN GRADE. THE SLOPE SHALL THEN BE COVERED WITH TOPSOIL, SEEDED AND MULCHED, OR OTHERWISE STABILIZED AS APPROVED BY THE CITY.
CONCRETE WASHOUT AREA INSTALLATION NOTES

1. SEE PLAN VIEW FOR LOCATIONS OF WASHOUT AREA

2. THE CONCRETE WASHOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT ON SITE.

3. VEHICLE TRACKING CONTROL IS REQUIRED AT ACCESS POINT.

4. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE WASHOUT AREA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CONCRETE WASHOUT AREA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.

5. EXCAVATED MATERIAL SHALL BE UTILIZED IN PERIMETER BERM CONSTRUCTION.

CONCRETE WASHOUT MAINTENANCE NOTES

1. THE CONCRETE WASHOUT AREA SHALL BE REPAIRED AND ENLARGED OR CLEANED OUT AS NECESSARY TO MAINTAIN CAPACITY FOR WASHED CONCRETE.

2. AT THE END OF CONSTRUCTION, ALL CONCRETE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF AT AN APPROVED WASTE SITE.

3. WHEN THE CONCRETE WASHOUT AREA IS REMOVED, THE DISTURBED AREA SHALL BE STABILIZED.

4. INSPECT WEEKLY, DURING AND AFTER ANY STORM EVENT.
NOTE:
1. Utility markers will be provided by the City of Gillette at cost.
2. Installation of utility markers are the responsibility of the contractor/developer.
NOTES
1. See MUTCD TA-6 for additional guidance.
2. For short duration work, the taper and channelizing devices may be omitted if a shadow vehiical with activated rotating or strobe lights is used.

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* where L = WS/60 for 40 mph or less and L = WS for 45 mph or greater
NOTES
1. See MUTCD TA-18 for additional guidance.
2. This temporary traffic control is only used for low-volume, low-speed facilities with adequate sight distance.

**Road Work Ahead**

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* where L = WS^2/80 for 40 mph or less and L = WS for 45 mph or greater

**L A N E C L O S U R E**

**MINOR STREET**

A, B, and C

Spacing of advanced Warning Signs

L Taper Length

X Width of Travel Way (10’ min, 9’ if few trucks & low volume)

Arrow Panel

Channelizing Device

Direction of Traffic

Flagger Station

High-Level Warning Device (Flag Tree)

Sign (Shown Facing Left)

Truck Mounted Attenuator

Warning Light (or Flags)

Type III Barricade

Work Vehicle

Work Area

City Of Gillette
ENGINEERING DIVISION
PO BOX 9193, 201 E 7TH STREET
GILLETTE, WYOMING 82717
PHONE (307) 689-5311

LANE CLOSURE
(MINOR STREET)

DATE: MAY 2009

DRAWN BY: JAC

APPROVED BY: CITY ENGINEER

01510-03
Legend

A, B, and C
Spacing of advanced Warning Signs
L
Taper Length
X
Width of Travel Way (10' min, 9' if few trucks & low volume)
Arrow Panel
Channelizing Device
Direction of Traffic
Flagger Station
High-Level Warning Device (Flag Tree)
Sign (Shown Facing Left)
Truck Mounted Attenuator
Warning Light (or Flags)
Type III Barricade
Work Vehical
Work Area

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* where L = WS'80 for 40 mph or less and
L = WS for 45 mph or greater
L = Taper Length (feet)
W = Width of offset (feet)
S = Posted Speed Limit (mph)

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NOTES
1. See MUTCD TA-11 for additional guidance.
2. This temporary traffic control may be used as an alternate plan to the lane closure with flaggers if:
a. the volume of traffic is low enough that the yielding traffic has sufficient gaps.
b. drivers from both directions are able to see approaching motor vehicles through and beyond the work site.
**Legend**

- A, B, and C: Spacing of advanced Warning Signs
- L: Taper Length
- X: Width of Travel Way (10' min, 9' if few trucks & low volume)
- Arrow Panel
- Channelizing Device
- Direction of Traffic
- Flagger Station
- High-Level Warning Device (Flag Tree)
- Sign (Shown Facing Left)
- Truck Mounted Attenuator
- Warning Light (or Flags)
- Type III Barricade
- Work Vehical
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* where L = WS/80 for 40 mph or less and  
L = WS for 45 mph or greater  
L = Taper Length (feet)  
W = Width of offset (feet)  
S = Posted Speed Limit (mph)

**NOTES**
1. See MUTCD TA-15 for additional guidance.

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NOTES:
1. See MUTCD TA-22 for additional guidance.
2. Closings the right lane in advance of the intersection and prohibiting left turns is another option.
NOTES:
1. See MUTCD TA 23 for additional guidance.
2. When the left turn number is limited, an alternative is to close the inside lane allowing only through movements.

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**Legend**
- Spacing of advanced Warning Signs
- Taper Length
- Width of Travel Way (10’ min, 9’ if few trucks & low volume)
- Arrow Panel
- Channelizing Device
- Direction of Traffic
- Flagger Station
- High-Level Warning Device (Flag Tree)
- Sign (Shown Facing Left)
- Truck Mounted Attenuator
- Warning Light (or Flags)
- Type III Barricade
- Work Vehicle
- Work Area

**INTERSECTION CLOSURE**
(FAR SIDE, LEFT LANE)

**City Of Gillette**
ENGINEERING DIVISION
1200 Exploration Avenue
Gillette, Wyoming 82716
Toll Free 1-800-832-4763
Phone (307) 682-0381

**DATE:**
MAY 2009

**DRAWING NO.:**
01510-11

**DRAWN BY:** JAC
**APPROVED BY:** CITY ENGINEER DLH/KDS
NOTES:
1. See MUTCD TA-30 for additional guidance.

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- Sign (Shown Facing Left)
- Truck Mounted Attenuator
- Warning Light (or Flags)
- Type III Barricade
- Work Vehicle
- Work Area

LANE CLOSURE
(INTERIOR OF MULTI-LANE)
NOTES:
1. See MUTCD TA-6 for additional guidance.

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Legend
A, B, and C
L
X
Spacing of advanced Warning Signs
Taper Length
Width of Travel Way (10’ min, 9’ if few trucks & low volume)
Arrow Panel
Channelizing Device
Direction of Traffic
Flagger Station
High-Level Warning Device (Flag Tree)
Sign (Shown Facing Left)
Truck Mounted Attenuator
Warning Light (or Flags)
Type III Barricade
Work Vehical
Work Area

City Of Gillette

STATIONARY LANE CLOSURE
(MULTI-LANE HIGHWAY)

DATE: MAY 2009
DRAWN BY: JAC
APPROVED BY: CITY ENGINEER

01510-13
NOTES:
1. See MUTCD TA-13 for additional guidance.
2. This temporary traffic control is only used for daylight work where the closure is not more than 20 minutes.
NOTE:
THESE EXHIBITS ARE FOR GENERAL INFORMATION ONLY.
ALL TRAFFIC CONTROL COMPONENTS SHALL BE DESIGNED
ACCORDING TO THE LATEST EDITION OF THE MUTCD.
Notes:

1. Comply with Specification Section 02220 for trench excavation & backfill.

2. Tracer wire and/or warning tape will be provided as shown on the plans and/or where applicable.

3. Tracer wire is required on all water lines and may be required on sanitary and storm sewer lines on a case by case basis or as specified on the plans.
PAVEMENT REPAIR AND TRENCH BACKFILL DETAIL

Asphaltic Concrete Compacted to 92% of the Marshall Design Criteria
(Section 02512)

Emulsified Asphalt Tack Coat, Typ. All Edges
(Section 02551)

Mill the 12" outside perimeter at a 2" depth for a moisture barrier lip.

Existing Asphalt

Existing Asphalt

1" Minimum

Minimum 12" Removal Required Beyond Excavated Area. (Section 02075)

BASE COURSE

SUBGRADE

Match Existing Base Thickness or use 12" Minimum Thickness
(see Note 1)
Compact to 95% Modified Proctor Density – AASHTO T-180
(Section 02231)

Minimum 12" Subgrade Processing
Compact to 90% (Clay) or 92% (Sand)
Modified Proctor Density – AASHTO T-180 (Section 02225)

This minimum compaction is to be obtained through the full depth for Utility Trenches.

DRIVEWAY/CURB & GUTTER REPLACEMENT DETAIL

- Driveway Approach inside City R.O.W.
- City Class B Concrete (4000 psi).

Existing Driveway

City R.O.W.

New Sidewalk (6" thick, 4000 psi, City Class B) No reinforcement in sidewalk
Maximum cross-slope shall be 1" per foot to meet ADA criteria.

Existing Sidewalk

Existing Curb & Gutter

18" of asphalt street shall be cut and removed through the entire width of the driveway.

Minimum 12" Subgrade Processing
Compact to 92% Modified Proctor Density – AASHTO T-180 (Section 02225)

Gravel Base (if currently existing) shall match the existing thickness, and the new asphalt shall be 1" thicker than existing. (see detail above)

Minimum 6" taper length to meet ADA criteria

Mill additional 12" width & 2" depth around perimeter of asphalt lip (see detail above)

Existing Curb & Gutter

Existing Sidewalk

Center Line Street

NOTES:

1. For pavement failure areas, a minimum of 12" of base course shall be used. Alternatively, in areas where no failures have occurred (i.e. "Cut Permit" patch over new water or sewer service), the same depth of base course as existing can be used.

2. All repair areas shall be cut in a square or rectangular shape. Irregular shapes are not allowed.

3. All Section numbers referenced correspond with the current City of Gillette Standard Construction Specifications.

4. Compaction requirements on concrete street repairs shall be the same as asphalt streets.

5. When the saw cut on a concrete street repair is within 10' of the joint, the concrete shall be removed to the joint.

6. All joints on concrete street repairs shall be resealed.

7. The thickness of a Portland Cement Concrete Pavement (PCCP) patch shall match the existing PCCP pavement thickness.
TYPICAL ARTERIAL STREET CROSS SECTION

City Of Gillette

TYPICAL ARTERIAL STREET CROSS SECTION

ENGINER DIVISION
P.O. BOX 3003, 201 E. 5TH STREET
GILLETTE, WYOMING 82717
PHONE: (307) 686-5311

MAJOR ARTERIAL

MINOR ARTERIAL

ROW Width 100 - 120
Street Width 60 - 98
Center Turn Lane

ROW Width 76 - 90
Street Width 48 - 74
Center Turn Lane

Sidewalk or Bike Path

Sidewalk or Bike Path

Type A curb and gutter

Type A curb and gutter

12 - 24
12 - 24
6
2 - 15
5
1

12 - 24
12 - 24
6
2 - 15
5
1

Street Width 48 - 74

Street Width 48 - 74

5
1

0 - 14
12 - 14
6
5
1

6; 2+%

6; 2+%
**COLLECTOR**

- **Local Street Width 36-40 and Local Through Street Width 40-44**
- **Boulevard**
- **Parking**
- **Bike Lane**
- **Sidewalk**

**LOCAL OR LOCAL THROUGH**

- **Local Street Width 36-40 and Local Through Street Width 40-44**
- **Boulevard**
- **Parking**
- **Bike Lane**

**Local Residential Street**

- **R-S and R-R Zones**
- **Travel Way**
- **4:1 slope**
- **ROW Width 60’ Min.**

*Local street option where streets have no, or limited, continuity and serving properties in an R-S and R-R Zone.*
INVERTED CROWN-STYLE ALLEY
RESIDENTIAL &
COMMERCIAL / INDUSTRIAL

NOTE:
1. The invert location may be offset from the centerline if conditions warrant and with approval by the City Engineer.
Type "A" High Back Curb & Gutter with Sidewalk

Type "C" Rollover Curb & Gutter with Sidewalk

Notes:
1. Subgrade compaction shall conform to SECTION 02528.
2. 3/4" expansion joint material shall be placed at P.C., P.T., curb returns and straight run at 150' maximum.
3. Jointing shall comply with SECTION 02528 and 03251.
4. No curb and gutter shall be placed without a final form or stringline inspection by the ENGINEER.
5. Curb and gutter shall be Class B concrete used unless otherwise specified.
6. Contraction joints shall be constructed by sawing or scoring. When scoring, a tool shall be used which will leave corners rounded and destroy aggregate interlock for specified minimum depth.
7. Detached sidewalk must be installed within 1' of the property boundary.
8. The sidewalk shall be 6" in depth through all driveway areas.
PLAN OF CORNER WITH VALLEY GUTTER

VALLEY GUTTER DETAIL

PLAN OF CORNER WITHOUT VALLEY GUTTER
### Driveway Throat Width
- **Minimum:** 12
- **Maximum:** 32

### Corner Radius
- **Min/Max:** 20

### Curb Taper
- **Minimum:** 6
- **Maximum:** 10

### Spacing (min)
- From Property Line: **P**
- From Street Corner: **C**
- Between Street Intersections: **S**

* Not applicable in Cul-de-sacs
** Minimum driveway spacing length for unsignalized intersections
** Referenced from the property line parallel to the intersecting street

### NOTES:
1. Driveway spacing length from signalized intersections shall be individually determined taking into consideration signal cycle length, traffic volumes, lane tapers and vehicle stacking lengths.
2. The City Engineer may require larger driveway spacing from what is listed above if the street geometrics and traffic volumes warrant larger spacing.
NOTES:

1. Driveway spacing length from signalized intersections shall be individually determined taking into consideration signal cycle length, traffic volumes, lane tapers and vehicle stacking lengths.

2. The City Engineer may require larger driveway spacing from what is listed above if the street geometrics and traffic volumes warrant larger spacing.

* Minimum driveway spacing length for unsignalized intersections
* Referenced from the Property Line parallel to the intersecting street

---

**Commercial & Industrial Access Control**

**City Of Gillette**

**P.O. Box 3003, 201 E. 5th Street**, **Gillette, Wyoming 82717**

**Phone**: (307) 686-5311

**DATE:**

**OCTOBER 2012**

**DRAWING NO.**

**02530-03**
### General Notes:

A. Refer to the standard specifications for pavement type and thickness.

B. Where site or other conditions warrant, the City Engineer may require or allow an alternate curb cut design.

C. Residential driveways are generally not allowed on collector or arterial streets.

D. The maximum cross slope for any sidewalk, including through driveways or approach pavement shall be $\frac{\pi}{8}$ inch/ft.

### General Slope Requirements:

1. **Ramp Slope:** Do not exceed a 1V:12H (8.33%) ramp slope

2. **Cross Slope:** Slope sidewalk towards street. Do not exceed 1V:48H (2%)

3. **Approach Pavement Slope:** The approach pavement slope may exceed the slope required for a ramp when it is not used as a combined approach and wheelchair ramp. A bypass must be provided around approach pavement slopes exceeding 1V:48H (2%) so pedestrians don’t encounter steeper cross slopes.

### Table A

<table>
<thead>
<tr>
<th>Street Type</th>
<th>Width of Throat (W)</th>
<th>Maximum Driveway Grade (G)</th>
<th>Control Dist. (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local and Local Through</td>
<td>12'-32'</td>
<td>6 %</td>
<td>13 %</td>
</tr>
<tr>
<td>Collector</td>
<td>Curb cut by special approval only</td>
<td>3 %</td>
<td>4 %</td>
</tr>
<tr>
<td>Arterial</td>
<td></td>
<td>1 %</td>
<td>4 %</td>
</tr>
</tbody>
</table>
GENERAL NOTES:
A. 5 foot minimum sidewalk width adjacent to Collector and Arterial Streets.
B. 4 foot minimum for existing infrastructure where it is not feasible to construct 5 foot width. Use 5 foot x 5 foot minimum passing zones every 200 foot maximum.
C. Provide 1V:48H (2%) cross slope for sidewalks and landings for drainage. Slope towards curb and gutter unless otherwise shown.
D. Provide colored detectable warning panels at all locations where the curb ramp enters into a street or parking lot.

GENERAL SLOPE REQUIREMENTS:
1) RAMP SLOPE: Do not exceed a 1V:12H (8.33%) ramp slope
2) CROSS SLOPE: Slope sidewalk towards street. Do not exceed 1V:48H (2%)
3) LANDING SLOPE: Do not exceed 1V:48H (2%) in any direction.
4) RAMP FLARES: Do not exceed 1V:10H (10%) flared slopes

CURB RAMP
ARTERIAL AND COLLECTOR STREETS (Detached Sidewalk)
BULB INTERSECTION

GENERAL SLOPE REQUIREMENTS:
1. **RAMP SLOPE:** Do not exceed a 1V:12H (8.33%) ramp slope
2. **CROSS SLOPE:** Slope sidewalk towards street.
   Do not exceed 1V:48H (2%)
3. **LANDING SLOPE:** Do not exceed 1V:48H (2%) in any direction
4. **RAMP FLARES:** Do Not Exceed 1V:10H (10%) Flared Slope

CURB RAMP
ARTERIAL & COLLECTOR STREETS (Bulb Intersection)
PLAN VIEW – DIAGONAL CURB RAMP

PERSPECTIVE VIEW – BOULEVARD AND CURBSIDE COMBO SIDEWALK

GENERAL SLOPE REQUIREMENTS:

- Ramp Slope: Do Not Exceed 1V:12H (8.33 %)
- Cross Slope: Do Not Exceed 1V:48H (2%)
- Landing Slope: Do Not Exceed 1V:48H (2%) In Any Direction

CURB RAMP
LOCAL/LOCAL THROUGH STREETS (Detached Sidewalk)

DATE: OCTOBER 2012
DRAWING NO. 02530-07

DRAWN BY: KEB
APPROVED BY: CITY ENGINEER HV/KDS
When Using Diagonal Ramps, Provide A Large Enough Radius To Allow An Imaginary Projection Of 4 Ft. Beyond The Ramp To Be Fully Contained Within The Intersecting Tangent Lines From The Face Of Curb For Each Direction Of Travel. (e.g. R=15 Ft. Or Greater For A Perpendicular Intersection And A 5 FT. Wide Ramp).

PLAN VIEW – SINGLE CURBSIDE SIDEWALK RAMP

GENERAL SLOPE REQUIREMENTS:

1. RAMP SLOPE: Do not exceed a 1V:12H (8.33%) ramp slope
2. CROSS SLOPE: Slope sidewalk towards street
   Do not exceed 1V:48H (2%)
3. LANDING SLOPE: Do not exceed 1V:48H (2%) in any direction

CURB RAMP
LOCAL/LOCAL THROUGH STREETS (Attached Sidewalk)
Parallel Public Sidewalk Curb Ramp

Perpendicular Public Sidewalk Curb Ramp

Combined Parallel/Perpendicular Public Sidewalk Curb Ramp
GENERAL NOTES:

A. Provide Pedestrian Cuts Through Medians That Are Aligned For All Directions Of Travel


**Curb Ramp – Plan View**

- Flat Landing 4' x 4' Min.
- Ramp Flare 10% Max.
- Curb Transition

**Detail – B**

- Ramp Slope Ends Perpendicular To Direction Of Travel
- Transition Area 1V:20H (5%) Max.
- Ramp Flare 10% Max.
- Back Of Curb

**Detail – C**

- Colored Detectable Warning Panels 2' x 4' Min.
- Sidewalk Thickness
- Flush
- 12

**Section A–A**

- See Detail C (Below)
- Gutter Slope 1:20 (5%) Max.
- Landing
- Curb Ramp
- Pavement
- Curb & Gutter

**Detectable Warning Panels**

- DATE: FEBRUARY 2012
- DRAWN BY: KEB
- APPROVED BY: ENGINER__HV/KDS
- DRAWING NO.: 02530-11
Bond Breaker (e.g. Masking Tape)

1/2"

Preformed Expansion Joint Filler (Full Depth - Start About 1/2" below Surface To Allow Room For Silicone Sealant)

1/4" Silicone Joint Sealant

TYPICAL PREFORMED EXPANSION JOINT DETAIL
Typical Chase Section

Plan View
(Detached curb & gutter)

Isometric View
(Mountable curb and gutter)

Isometric View
(Attached curb & gutter)

4" x 4" square tubing, 3/16" thickness

3-#4 or #5 bars 3" long at 12" spacing each side of chase

3/8" typical

Sidewalk

Min. 2% Slope

6" compacted subgrade

5' Min.

Mountable Curb and Gutter

Vertical Curb and Gutter

City Of Gillette
LOW VOLUME SIDEWALK CHASE

DRAWN BY: JAC
APPROVED BY: CITY ENGINEER

MARCH 2012
DRAWING NO. 02530-13
TYPICAL CHASE SECTION

PLAN VIEW

ISOMETRIC VIEW

NOTE:
1. Neenah Series R-4990 and R-4999, Type D or approved equal.
2. Installation to be per Manufacturer's Recommendations.
3. Depth of chase channel will vary based on type of curb. Highback curb chase to be 4.5" deep and Roll Over curb chase to be 2.5" deep. Both channels to align with flowline of curb.
CONCRETE MANHOLE COLLAR

NOTES:

1. Grout shall only be used in and around the invert of the pipe and shall not be used around the adjusting rings.
2. HDPE adjusting rings shall be used in increments of \( \frac{3}{4} \)" in order to obtain the optimal final grade adjustments.
3. If any shimming of the adjusting rings is used, the shims shall be inserted from the outside of the manhole.
4. All rings shall be D&L Foundry A-1071 (4"), A-1043 (6"), A-1161 (8"), or Engineer-approved equal. The combined height of manhole ring used and adjusting rings shall not exceed 16" total.
5. The lid (cover) shall be D&L Foundry A-1161 (non-ventilated, self-sealing, with closed pick hole).

HDPE adjusting rings = see Note 4
(maximum height varies based on ring used)

Adjusting rings are to be sealed with Ram-nok,
only between the top of the cone and the bottom
adjusting ring and between the top adjusting ring
and the bottom of the cast ring and cover.

P.C.C. or Asphaltic Concrete Paving

Ring & Cover (see Notes 4 & 5)

Concrete collar \( \frac{1}{2} " \) lower
than surrounding pavement

Compacted base & subgrade

Seal between concrete
and surrounding pavement

\( 2' - 0" \) (min)
\( 2' - 4" \) (max)

Suitable Compacted Backfill
or Class S Concrete (slurry)
(slurry is recommended for repairs)
CONCRETE VALVE BOX COLLAR

Concrete collar $\frac{1}{4}''$ lower than surrounding pavement

Seal between concrete and surrounding pavement

P.C.C. or Asphaltic Concrete Paving

Compacted base & subgrade

or Class S Concrete (slurry) (recommended for repairs)

Traffic direction
FIRE HYDRANT:

A) Mueller Super Centurion 250 or American AVK 2780 or American Flow Control Waterous Pacer WB-67-250 (5 1/4" barrel).
B) 18" back of curb or 18" back of sidewalk.
C) 5' unobstructed area around hydrant.

NOTES:

2. The 6" pipe connection from the water main to the hydrant will be direct. Vertical or horizontal offset using elbows shall not be allowed.
3. Tracer wire shall be installed per Standard Detail 02645-06.
4. Mars Company, Zinc Anode Caps along with a Mechanical Joint Shoe may be used in place of the 17lb Galvanic Anode Bags.
5. Whenever a fire hydrant is taken out of service, it shall immediately be bagged with an orange or black bag that completely covers the hydrant.

DATE: MARCH 2012
DRAWN BY: CJS APPROVED BY: CITY ENGINEER HY/KDS
DRAWING NO. 02645-01
NOTE:

1. A minimum 5' 0" unobstructed area is required around Fire Hydrants.

2. Whenever a fire hydrant is taken out of service, it shall immediately be bagged with an orange or black bag that completely covers the hydrant.
NOTE:

Generally, fire hydrant guards are only installed in areas where there is no curb and gutter.
NOTE:

Generally, fire hydrant guards are only installed in areas where there is no curb and gutter.
NOTES:

1. The hydrant is to be located 18" from the back of the curb for detached sidewalk or 18" from the back of attached sidewalk. The splash pad shall be attached to the back of the sidewalk or curb and gutter. A narrow strip will not be allowed between the front edge of the splash pad and the sidewalk or curb and gutter.

2. For hydrants not located immediately adjacent to the street, a larger splash pad with dimensions of 24" (2') behind and 48" (4') in front of the hydrant shall be used.

3. If the fire hydrant and splash pad sit at the back edge of a steep slope, such as a borrow ditch, and there is significant chance for erosion in front of the hydrant, a smaller (4'x4') splash pad may be allowed in addition to the placement of appropriately sized riprap (3" nominal diameter rock) in front of the hydrant and down the slope adjacent to the street.
1. Tracer wire shall be installed to maintain a continuous current flow.
NOTES:

1. Wrap all metallic fittings with 8 mil. polyethylene in accordance with ANSI/AWWA A21.5/C105.
2. Comply with Specification Section 02665 (Pipe installation for water mains).
3. This table is based on 150 PSI Main Pressure 2000 PSF Soil Bearing Pressure.
4. For other conditions, size of thrust blocks must be computed and approved by Engineer.
5. All thrust blocks must be placed against undisturbed soil.
6. Ensure all bolts are unobstructed by concrete.
Restrain both sides of Valve:
MJ Valve - EBAAIron Series 2000
Push-On Valve - Ford Series 1300
or EBAA Iron Series 1600
or Approved equal

Gate Valves:
Mueller A-2360,
American AVK Series 25,
American Flow Control Series 2500

Butterfly Valves:
Mueller Line Seal III
or Approved equal

Valve Box
Tyler 6850 or
Approved Equal

Adaptor Inc., Valve
Box Adaptor II or
Approved Equal

Word "Water" on Lid

NOTES:
1. Fire Hydrant Isolation Valves may be restrained directly to the tee.
2. All Valves 14" and larger are required to be Butterfly Valves.
3. When a valve is located at a fitting, (tee, cross's, etc... ), it must be installed
18" to 24" away from the fitting.
NOTES:

1. Mark curb where service crosses beneath: A "W" for water, and an "S" for sewer shall be either stamped into newly finished concrete or ground into cured concrete to appropriately mark the utility location.

2. All services to be stubbed to property line.

3. Locate water service uphill from sanitary sewer services.

4. Fire hydrants should be located on the northwest corner of each intersection, where practical.

5. All water lines shall have a 5'-6" to 6'-0" of cover.

6. All sanitary sewer line shall have 8'-0" (minimum) of cover, unless the City Engineer authorizes less cover based on justified design.
NOTES:

1. If depth of cover is between 3.0 and 5.0 feet, board shall extend a minimum of four feet either side of pipe.
Notes:

1. Install Galvanic Anode 1' below pipeline invert elevation.
2. Provide sufficient slack in test wires/tracer wires to allow terminal block to extend 18" out of test station.
3. Carsonite Markers shall be required only in non-urban areas.
4. If Cathodic protection is not required and a Test Station is provided exclusively for trace wire, a two (2) terminal Test Station is acceptable.
Water and Sewer pipe joints shall be restrained with FORD Uni-Flange Restrained Casing Spacer

35KSI Welded Steel Pipe Sleeve Minimum 0.375" Wall Thickness

Casing ID to be a minimum of 12" greater than diameter of pipe bell or in accordance with spacer manufacturer recommendations

NOTE:

1. Casing pipe that is bored shall have 32 lb. anode bags cad welded to each end.
Notes:

1. Concrete - 4000 psi 28 day strength.
2. Reinforcement - ASTM A-615 Grade 60 and A-185 WWF.
3. Cement - Type V or Type II with W/C ratio < 0.45.
4. ASTM C-478 governs.
5. Steps shall be non corrosive rubber coated aluminum or nylon and be supplied with the vault.
6. The vault shall be 72” in diameter.
**3" AIR VACUUM AIR RELEASE VALVE**

**Notes:**
1. Concrete - 4000 psi 28 day strength.
2. Reinforcement - ASTM A-615 Grade 60 and A-185 WWF.
3. Cement - Type V or Type II with W/C ratio < 0.45.
4. ASTM C-478 governs.
5. Steps shall be non corrosive rubber coated aluminum or nylon and be supplied with the vault.
6. The vault shall be 72" in diameter.
Red Rubber Gasket
#32 316 Stainless Steel mesh screen

Flange

4" Flange x Flare
Ductile Iron 90 Degree Bend

4" x 48" FlxFL
Ductile Iron Spool

Break-off bolts

4" (Varies) FlxPE
Ductile Iron Spool

4" Mechanical Joint
Ductile Iron 90 Degree Elbow

Thrust Block

4" x (Varies) FlxPE
Ductile Iron Spool

Link Seal or PSX Boot
8" I.D. Hole

3" Crispin AV/ARV

4" FlxFL
Ductile Iron 90 Degree Elbow

4" FlxFL
Ductile Iron 90 Degree Elbow

4" FlxFL Resealant Seat Gate Valve w/2" operating Nut

Opening to be 8" larger than O.D. of Pipe

Paint Vent Riser Blue

Tyler Valve Box
Top Section
6855 Series
w/Lid - WATER

4" 90 Degree Tapped Flanged Fitting

3/4" Flap Check W/Close Brass Nipple

4" I.P. Companion Flange

4" x 6" Brass Nipple

VARIES

Foam - IMCOA Polyolefin
1FS Sheet Insulation
1" thick - 3 Layers Required

Stainless Steel Tapping Sleeve
Ford - Style FTSS or Equal
Mueller - H-304 all stainless

Notes:
1. Concrete - 4000 psi 28 day strength.
2. Reinforcement - ASTM A-615 Grade 60 and A-185 WWF.
3. Cement - Type V or Type II with W/C ratio < 0.45.
4. ASTM C-478 governs.
5. Steps shall be non corrosive rubber coated aluminum or nylon and be supplied with the vault.
6. The vault shall be 72" in diameter.
NOTES:

1. Water Service lines shall have a minimum 5'-6" to 6'-0" maximum cover measured from the existing ground surface, except that cover shall be measured from centerline street grade when service lines are laid to a street side which has an uphill slope.

2. Water Service lines shall be installed EXACTLY where shown on the drawings or as specified.

3. Bedding shall be 1" diameter (maximum) within 6" of service pipe.

4. All brass fittings shall be lead-free.
FORD - No. 11-T round pit ring and extra heavy lid (3" height).

FORD - RR11-T ring casting with extra heavy duty top lid (6" height).

MATERIAL: Cast gray iron
ASTM A-48 Class 35B
**NOTES:**

1. Concrete - 4000 PSI 28 day strength.
2. Reinforcement - ASTM A-615 Grade 60 and A-185 WWF.
3. Cement - Type V or Type II with 5.5 bag mix and W/C ratio < 0.45.
4. ASTM C-478 governs.
5. Meter Pit installation to be located outside of sidewalk perimeters.

**STEPS:**
Non corrosive rubber coated aluminum or nylon.
Steps to be supplied with pit.
Steps must be on incoming side of water line.

**Rings and Cover**
(Std Dwg. 02665-11)

**NOTE:** Opening in lid to be above steps.

HDPE adjusting rings - 12" max.

**Holes for key locks**

Overall Pit Depth to be the same depth of water main 5'-6" min.

**Notes:**

- 48"x48"x4" Concrete Pad
- 48"x48"x4" Concrete Pad
- 6" thick monolithic slab
- 21"
- 48"x48"x4" Concrete Pad
- 48"x48"x4" Concrete Pad
- 5"
STEPS
Non-corrosive rubber coated aluminum or nylon.
Steps to be supplied with pit.
Steps must be on the incoming side of water line.

48''X48''X4''
Concrete Pad

Ring and Cover
(Std. Dwg. 02665-11)

HDPE adjusting rings - 12'' max.

Cover Slab

Overall Pit Depth to be the same
depth of watermain 5'-6'' min.

Varies

12'' min.
16'' max.

Varies

Flow from main

Mueller meter yoke
H-1404

Type K Copper or
Polyethylene PE-3408
service line from main

The City of Gillette
supplies all meters

Service line to residence

FORD valve 1'' - B43-444W Grip Joint

NOTES:
1. Opening in lid to be above steps and valve.
2. 48''x48''x4'' Concrete Pad is required when not located within a paved area.
3. Meter Pit Installation not allowed within sidewalk perimeters.
NOTES:

1. City Maintenance Ends at Property Line. City will not Maintain Meter Pit.

2. Meter Pit shall not be installed within driveways or sidewalks.

3. All meters are to be supplied by the City of Gillette.
**STEPS:**
Non corrosive rubber coated aluminum or nylon.
Steps to be supplied with pit.
Steps must be on the incoming side of water line.

**NOTE:** Opening in lid is to be above steps and Valve.

**NOTES:**
1. Concrete - 4000 PSI 28 Day strength.
2. Reinforcement - ASTM A-615 Grade 60 and A-185 WWF.
3. Cement - Type V or Type II modified.
4. ASTM C-478 governs.
5. Meter Pit Installation to be located outside of sidewalk perimeters.
6. 48"x48"x4" Concrete Pad is required when not in a paved area.
To Residence Service Line to residence

12" 72"

Ring and Cover
(Std. Dwg. 02665-11)

FORD Valve
2.0" BF43-777W
1.5" BF43-666W

Type K Copper or Polyethylene PE-3408

NOTE:

1. Opening in lid to be above steps and valve.
2. 48"x48"x4" Concrete Pad is required when not located within a paved area.
3. Meter Pit installation to be located outside of sidewalk perimeter.

City Of Gillette
ENGINEERING DIVISION
P.O. BOX 3003, 201 E. 5TH STREET
GILLETTE, WYOMING 82717
PHONE: (307) 686-5311

TYPICAL METER INSTALLATION FOR
1 ½" & 2" METERS

NOTES:
Plan View - Attached Sidewalk

Plan View - Detached Sidewalk

**NOTE:**
1. Not Applicable for Thermal-Coil Meter Pits.
VAULT PLAN VIEW

NOTE:
1. Length of vault is indefinite per the repeating reinforcement pattern shown on Detail No. 02665-188.
#4 Bar W/Stil. Hook

1 1/2" CLR

8"

8"

1 1/2" CLR

TYPICAL DETAIL @ WALL CORNERS
NOTE:
1. Full Open Gate Valve Included In Straight Run Of Pipe.
<table>
<thead>
<tr>
<th>NOTES: (all of the following must be specified when ordering)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Furnished with machined horizontal bearing surface.</td>
</tr>
<tr>
<td>2. &quot;WATER&quot; lettering on cover.</td>
</tr>
<tr>
<td>3. All lids shall have a cross-hatched pattern with a closed pick hole.</td>
</tr>
<tr>
<td>4. All lids shall be self-sealing.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MATERIAL: Cast gray iron (ASTM A-48 Class 35B)</th>
</tr>
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<tbody>
<tr>
<td>LID #: D&amp;L FOUNDRY #A-1161 = Lid (cover) to be used for all rings</td>
</tr>
<tr>
<td>RING #: D&amp;L FOUNDRY #A-1071 (4&quot;) = 12&quot; adjusting rings (max.)</td>
</tr>
<tr>
<td>FINISH: No paint</td>
</tr>
<tr>
<td>RING #: D&amp;L FOUNDRY #A-1043 (6&quot;) = 10&quot; adjusting rings (max.)</td>
</tr>
<tr>
<td>LID: SELF SEALING</td>
</tr>
<tr>
<td>RING #: D&amp;L FOUNDRY #A-1161 (8&quot;) = 8&quot; adjusting rings (max.)</td>
</tr>
</tbody>
</table>

**WATER ACCESS MANHOLE**
**RING & COVER**

<table>
<thead>
<tr>
<th>Dimensions</th>
</tr>
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<tbody>
<tr>
<td>24-1/16&quot;</td>
</tr>
<tr>
<td>23-7/8&quot;</td>
</tr>
<tr>
<td>1-1/16&quot;</td>
</tr>
<tr>
<td>22&quot;</td>
</tr>
<tr>
<td>33-3/4&quot;</td>
</tr>
</tbody>
</table>

Varies (4", 6", 8")
NOTE:

1. Tapping Saddle shall be Smith-Blair 622 Series, Dresser Style 610, or engineer approved equal.
2. If Tee is used, Valve shall be located 18" - 24" from Tee and be restrained to pipe.
3. Free Runs before and after meter are only required for domestic services 1.5" and larger. The length of the free run shall be determined by the service size.
4. Zinc caps shall be provided for Cathodic protection of all tapping sleeve bolts.
HDPE adjusting rings =
(height varies based on ring used - see Note 2)
(see details 02665-20, 02700-07, 02725-07)

Adjusting rings are to be sealed with Ram-nek,
only between the top of the cone and the bottom
adjusting ring and between the top adjusting ring
and the bottom of the cast ring and cover.
If shims are necessary, they shall be inserted
from the outside of the adjusting rings.

Precast reinforced concrete MH riser & eccentric
cone top manufactured in accordance with ASTM
C-478

NOTE: Where free drop exceeds 2’, a drop manhole
shall be used.

O-ring type or Ram-nek
seal all joints
Annular space
around the pipe
shall be grouted.

NOTE: Concrete Base to be
placed on undisturbed soil.

1. All Sanitary Sewer MH covers shall be non-ventilated, self-sealing, D&L Foundry A-1161 with closed pick hole and
   a cross-hatched lid design, or Engineer-approved equal.

2. All rings shall be D&L Foundry A-1071 (4”), A-1043 (6”), A-1161 (8”), or Engineer-approved equal. The combined
   height of manhole ring used and adjusting rings shall not exceed 16” total.

3. No grout shall be used anywhere in the interior of the manhole except for the pipe invert. NO GROUTING AROUND
   ADJUSTING RINGS.

4. Channelization of flowline between pipe inverts may be formed directly in the concrete of the base or may be a
   half-pipe laid in concrete.
NOTE: Concrete Base to be placed on undisturbed soil.

NOTES:

1. All Sanitary Sewer MH covers shall be non-ventilated, self-sealing, D&L Foundry A-1161 with closed pick hole and a cross-hatched lid design, or Engineer-approved equal.

2. All rings shall be D&L Foundry A-1071 (4"), A-1043 (6"), A-1161 (8"), or Engineer-approved equal. The combined height of manhole ring used and adjusting rings shall not exceed 16" total.

3. No grout shall be used anywhere in the interior of the manhole except for the pipe invert. NO GROUTING AROUND ADJUSTING RINGS.

4. Channelization of flowline between pipe inverts may be formed directly in the concrete of the base or may be a half-pipe laid in concrete.
NOTES:

3. Steps meet ASTM C478 requirements and are on a 12" min./16" max. vertical spacing.
4. Step legs are driven into 1" diameter holes in the manhole wall.
5. Steps are nonsparking, nonconducting and nonabrasive.
O.D. 6"

SIZE  O.D.  REINFORCING  TOTAL WT.

48"  64"  #4@8" EACH WAY  1675+

60"  78"  #4@8" EACH WAY  2409+

72"  92"  #4@6" EACH WAY  3465+

NOTES:
1. Bases may be cast in place or precast.
2. All concrete shall be City Class B.
3. Bases to be placed on undisturbed soil.
4. If over-excavated, shall re-establish elevation with compacted base.
NOTES:

1. Slope all shelves to channel at min. 1" per foot or 2" per foot max.
2. See plan and profile sheets for slope of channel.
Center of wye branch to be placed in upper third of main

45 Degree pipe bend

Sewer pipe Wye, Tee Wye combination,

Cross-Sectional View

45 Degree pipe bend

Sewer service 4" min. dia.

Plan View

NOTES:

1. 6" services tying into 8" (or larger) mains are required to have a WYE connection.

2. In general all service lines, 6" and larger, should enter through manholes.

3. Fernco-type flexible connections are NOT permitted.
### NOTES: (all of the following must be specified when ordering)

1. Furnished with machined horizontal bearing surface.
2. "SEWER" lettering on cover.
3. All lids shall have a cross-hatched pattern with a closed pick hole.
4. All lids shall be self-sealing.

| MATERIAL: Cast gray iron (ASTM A-48 Class 35B) | LID #: D&L FOUNDRY #A-1161 = Lid (cover) to be used for all rings |
| FINISH: No paint | RING #: D&L FOUNDRY #A-1071 (4") = 12" adjusting rings (max.) |
| LID: SELF SEALING | RING #: D&L FOUNDRY #A-1043 (6") = 10" adjusting rings (max.) |
| | RING #: D&L FOUNDRY #A-1161 (8") = 8" adjusting rings (max.) |

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
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<tbody>
<tr>
<td>23-7/8&quot;</td>
<td>Varies (4&quot;, 6&quot;, 8&quot;)</td>
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<tr>
<td>22&quot;</td>
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<td>33-3/4&quot;</td>
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<td>1-1/16&quot;</td>
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<tr>
<td>24-1/16&quot;</td>
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</table>
NOTE:
Curb radius point should fall at edge of basin

NOTE:
Neenah R-3246-AL or D&L Foundry I-3520 curb inlet frame, grate, curb box or equivalent

PLAN VIEW

Expansion Joint @ each side of Inlet

SECTION A-A

NOTE:
1. Sump condition inlets will require a Type "C" grate.
NOTE:
Curb radius point should fall at edge of expansion joint

NOTE:
Neenah R-3246-AL Double with "L" type grate, curb inlet frame, grate, curb box or equivalent

Expansion Joint each side of Inlet

PLAN VIEW

SECTION A-A

Pipe size varies

18" min

#4 12"

#4 12"

12" Min. Granular Base 95% of maximum dry density

1. Sump condition inlets will require a Type "C" grate.
2. Curb Inlets, frames, grates, and curb boxes are available as triple units.

E.G.
CURB OPENING INLET

PLAN

- 3/4" dia. bar
- 2" Clear
- Paid as Curb and Gutter
- Paid As Inlet
- Paid as Curb and Gutter
- 8" Paid As Inlet
- 3' min. 6' max.
- 6'0'' Top of Gutter
- Gutter Line

ELEVATION

- Manhole Ring and Cover
- NEENAH R1737
- 1/4" ft. min.
- 2'' or 4'' angle Iron
- 4''
- 6''
- #4 rebar
- 12'' o.c.
- VARIES
- 8''
- 4'' 8''
- VARIES
- 3' min. 6' max.
- 4''
- 8'' 4''

SECTION

- #4, 8 each way

DATE: MARCH 2012
DRAWING NO. 02725-03

CITY OF GILLETTE
ENGINEERING DIVISION
P.O. BOX 3003, 201 E. 5TH STREET
GILLETTE, WYOMING 82717
PHONE: (307) 686-5311

DRAWN BY: E.G.
APPROVED BY: CITY ENGINEER HV/KDS
NOTES:

1. Bottom width of channel may exceed the 6'-0" (minimum).

2. Tolerances - 1/2" on design grade and 1" on design alignment.

3. Contraction joints cut a maximum of every 10 feet.
NOTE:

Access to low flow channel will be provided every 400' and one at each street intersection for cleaning purposes. The maximum slope for access to low flow channel shall be 10%.

---

NOTES:

1. Bottom width of channel may exceed the 6'-6'' min.
2. Tolerances – 1/2'' on design grade and 1'' on design alignment.
3. Contraction joints cut a maximum of every 10 feet.
SUB-DRAIN CLEANOUT

NOTE:
1. A Concrete Collar Shall Be Required On All Sub-Drain Cleanouts In Absence Of Sidewalk (Reference Drawing 0257-02).
2. If Located in The Street, A Non-Ventilated, Self-Sealing, D & L. Foundry H-8012 With Closed Pick Hole And Cross-Hatch Lid Design Will Be Required, Or Engineer-Approved Equal.

SUB-DRAIN WITH SUMP PUMP DETAIL (where allowed as per outfall storm sewer design flow capacity)

NOTE:
1. Silt To Be Cut In Fitter, A Small Piece Of Fabric Shall Also Be Wrapped Around Pipe To Ensure A Tight Fit To Prevent Infiltration.
2. Maintain sump pump discharge line separate from street subdrain in all circumstances.

SUB-DRAIN DETAIL (with or without Curb & Gutter)

NOTE:
1. Location Varies Per Application, Front Of Curb For Existing Retro-Fit, And Back Of Curb For New Construction.
NOTES: (all of the following must be specified when ordering)
1. Furnished with machined horizontal bearing surface.
2. "STORM" lettering on cover.
3. All lids shall have a cross-hatched pattern with a closed pick hole.
4. All lids shall be self-sealing.
NOTES:

1. All Storm Sewer MH covers shall be non-ventilated, self-sealing, D&L Foundry A-1161 with closed pick hole and recessed lug lid design, or Engineer-approved equal.

2. All rings shall be D&L Foundry A-1071 (4"), A-1043 (6"), A-1161 (8"), or Engineer-approved equal. The combined height of manhole ring used and adjusting rings shall not exceed 16" total.

3. No grout shall be used anywhere in the interior of the manhole except for the pipe invert. NO GROUTING AROUND ADJUSTING RINGS.

4. Channelization of flowline between pipe inverts may be formed directly in the concrete of the base or may be a half-pipe laid in concrete.

5. Pipe shall protrude into manhole a sufficient distance to accommodate manufacturer's installation instructions for watertight seal jointing material.
NOTE: Concrete Base to be placed on undisturbed soil.

NOTES:

1. All Storm Sewer MH covers shall be non-ventilated, self-sealing, D&L Foundry A-1161 with closed pick hole and recessed lug lid design, or Engineer-approved equal.

2. All rings shall be D&L Foundry A-1071 (4"), A-1043 (6"), A-1161 (8"), or Engineer-approved equal. The combined height of manhole ring used and adjusting rings shall not exceed 16" total.

3. No grout shall be used anywhere in the interior of the manhole except for the pipe invert. NO GROUTING AROUND ADJUSTING RINGS.

4. Channelization of flowline between pipe inverts may be formed directly in the concrete of the base or may be a half-pipe laid in concrete.

5. Pipe shall protrude into manhole a sufficient distance to accommodate manufacturer's installation instructions for watertight seal jointing material.
NOTE:

1. Neenah R-3362-L, Deeter 2501, or D&L Foundry 1-3386 inlet frame, grate, or equivalent

Concrete Apron (Minimum 2'-0" wide around perimeter of frame and grate)

£ Trickle Channel (optional)  
May be a natural or grass-lined drainage swale

NOTE:

1. Sump condition inlets will require a Type "C" grate.
2. Grate and Frame is available as a double unit.
SIGN SURFACING NOTES:

WARNING SIGNS:
Diamond Grade VIP Reflective Sheeting, Type IX

PEDESTRIAN SIGNS, BIKE LANE SIGNS, AND DOWNWARD ARROWS:
Strong Yellow Green Diamond Grade VIP Reflective Sheeting, Type IX

NOTES:
1. Drill or vactor out a 8" diameter hole.
2. Use only High Intensity Prismatic Sheeting for Regulatory Signs (Types III, IV, and X).
3. All signs to be 100 gauge aluminum.
4. All signs to be mounted with 3/8" x 3" grade 5 bolts using NYLOCK nuts.
5. The contractor shall contact the City of Gillette Engineering Traffic Safety Division @ 686-5265 prior to installing signs. The Traffic Safety Division will mark the location of signs and inspect installation upon completion of the installation.

NEW SUBDIVISION SPECIFICATIONS:
1. When an additional information sign is placed directly under the main sign, the distance from the ground surface to the bottom of the lowest sign may be six feet (6').
2. All signs will be perpendicular to approaching traffic to allow the street name sign to be legible from the street. (signs shall not be angled or twisted)
3. The City of Gillette Sign Technician will fabricate, provide, and install the street name signs with all the hardware included. The developer is responsible for bearing the cost of all signs associated with the project.
4. Round posts are 2-3/8" x 12' x 10 gauge and can be used for Parking Restriction signs only.
5. When necessary to mount signs on street light poles, permission shall be obtained from the City Engineer. Use 5/8" stainless steel banding with the correct hardware for mounting.
NOTE:

ALL SIGNAGE AND TRAFFIC CONTROL COMPONENTS ARE TO BE IN COMPLIANCE WITH THE CURRENT EDITION OF THE MUTCD.

Utilize appropriate markings (see different options below)

Utilize appropriate sign (see different options below)

Posts shall extend to top of sign (flush)

NOTE:

ALL SIGNAGE AND TRAFFIC CONTROL COMPONENTS ARE TO BE IN COMPLIANCE WITH THE CURRENT EDITION OF THE MUTCD.

Utilize appropriate markings (see different options below)

Utilize appropriate sign (see different options below)

Posts shall extend to top of sign (flush)

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ALL SIGNAGE AND TRAFFIC CONTROL COMPONENTS ARE TO BE IN COMPLIANCE WITH THE CURRENT EDITION OF THE MUTCD.

Utilize appropriate markings (see different options below)

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Posts shall extend to top of sign (flush)

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Utilize appropriate markings (see different options below)

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Posts shall extend to top of sign (flush)

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ALL SIGNAGE AND TRAFFIC CONTROL COMPONENTS ARE TO BE IN COMPLIANCE WITH THE CURRENT EDITION OF THE MUTCD.

Utilize appropriate markings (see different options below)

Utilize appropriate sign (see different options below)

Posts shall extend to top of sign (flush)

NOTES:

1. Use steel telespan 2” x 2” - 12 gauge posts with 2 1/2” x 2 1/2” - 7 gauge anchors.
2. Marking for barricade rails shall be alternating between red and white for permanent installations, and orange and white for temporary installations. The stripes shall be 6” wide, sloping downward at an angle of 45 degrees in the direction traffic is to pass. The material shall be High Intensity Sheeting.
3. Barricade panels shall be 96” (length) x 8” (height) x 3/8” (width) Dapco-Plastic.
CONSTRUCTION AND NEW CONTRACTION TRANSVERSE WEAKENED PLANE JOINTS
(FOR INSTALLATION OF CONCRETE PAVING SECTIONS LESS THAN 7" IN THICKNESS)

NOTES:
1. The initial saw cut may be 3/8" wide for the full T/3 and T/4 depth at the contractor's option.
2. See Typical Sections details for values of T.
3. All joint sealant shall be as specified in the specifications or special provisions.
4. If the transverse joints do not fracture at the joint on the outer edges of the slab, the ENGINEER may direct that the saw cut depth be increased for no additional payment.

CONSTRUCTION AND NEW CONTRACTION TRANSVERSE JOINTS
(FOR INSTALLATION OF CONCRETE PAVING SECTIONS 7" THICK & GREATER)

NOTES:
1. Drill hole for 1 1/2" Dia. x 24" steel epoxy-coated Smooth Dowel Bars, (lightly greased on one end), @ 24" centers.
2. The first dowel bar shall be 6" from any concrete edge parallel to bar.
3. All joint sealant shall be as specified in the specifications or special provisions.
4. All backer rod shall be 1/2" closed cell polyethylene foam.
5. Refer to Standard Construction Specs. Sections 2520 and 3200 for epoxy coating requirements.
NOTES:

1. Drill hole for #4 x 24" epoxy-coated Rebar on 24" centers
2. All backer rod shall be 1/2" closed cell polyethylene foam.
3. The first tie bar shall be 6" from any concrete edge parallel to bar.
4. All joint sealant shall be as specified in the specifications or special provisions.
5. Refer to Standard Construction Specs. Sections 2520 and 3200 for epoxy coating requirements.