

**City of Great Falls  
Public Works/Engineering**

**INTER-OFFICE MEMORANDUM**

**DATE:** August 24, 2021

**PROJECT:** City of Great Falls Standards for Design and Construction, OF 1723.0  
Proposed Modifications Creating Revision No. 2

The following is a list of the proposed changes to the City of Great Falls Standards for Design and Construction. The original document was adopted via Resolution 10346 on May 19, 2020. Revision Number 1 was adopted on June 8, 2020. The following changes will modify the Revision Number 1 version of the City of Great Falls Standards for Design and Construction, and if approved will create the official “City of Great Falls Standards for Design and Construction Revision No. 2”.

1. Minor spelling corrections and formatting revisions were made throughout the document.
2. Chapter 1 Construction in the Right of Way – Section 1.4.2.A - Modify the sentence:

“An independent accredited testing laboratory shall be retained to provide the following tests and frequency.”

To read

“A testing laboratory or engineering firm personnel as approved by the City shall be retained to provide the following tests and frequency.”

3. Chapter 1 Construction in the Right of Way – Section 1.4.2.A.I.a.i and 1.4.2.A.I.a.ii -  
Revise the test depth above the pipe from 12” above the pipe to 24” above the pipe.
4. Chapter 1 Construction in the Right of Way – Create a new Section 1.4.4 which states:

1.4.4 Portland Cement Concrete Testing

- A. Use ACI Grade 1 or equivalent certified field testing technicians for all concrete tests. One set of tests shall be required for every 50 cubic yards of concrete placed within the public right of way, with a minimum of one set of tests per day of concrete placed. Curb and gutter, sidewalks, driveways, approaches, curb turn fillets, valley gutters, and other miscellaneous new surface concrete construction shall be constructed with 6.5 sac cement and have a 28 day strength of 4,000 psi, with an air entrainment between 5% to 8%. The concrete

tests shall be performed in accordance with MPWSS Section 03310 Paragraph 3.7.

5. Chapter 2 Design Criteria – Section 2.1.1.B.I – Modify the statement in parentheses:

“(typically 19.15 feet lower than City) “

To read

“(typically 19.15 feet higher than City)”

6. Chapter 2 Design Criteria – Section 2.1.2.F – Modify the section:

F. Public Land Survey System Information:

- I. Township;
- II. Range; and
- III. Section(s)

- a. If contained within a single section, provide the  $\frac{1}{2}$ ,  $\frac{1}{4}$ , or  $\frac{1}{4}$   $\frac{1}{4}$  information as applicable (e.g. SW  $\frac{1}{4}$  NE  $\frac{1}{4}$ ).

To read

F. Property Address and Legal Description, Including:

- I. Lot, Block, and Subdivision Name;
- II. Township;
- III. Range; and
- IV. Section(s)

- a. If contained within a single section, provide the  $\frac{1}{2}$ ,  $\frac{1}{4}$ , or  $\frac{1}{4}$   $\frac{1}{4}$  information as applicable (e.g. SW  $\frac{1}{4}$  NE  $\frac{1}{4}$ ).

7. Chapter 2 Design Criteria – Section 2.1.2.G – Modify the section:

“Table of Contents.”

To read

“Table of Contents or Sheet Index.”

8. Chapter 2 Design Criteria – Section 2.1.4.C.VI.a – Modify the section:

“Length”

To read

“Size and Length”

9. Chapter 2 Design Criteria – Section 2.1.4.C.IX.d.ii – Delete the section which states:

“Hydraulic Grade Line (HGL).”

10. Chapter 2 Design Criteria – Section 2.1.4.C.X.a - Modify the section:

“Grades”

To read

“Centerline grades, grade break (PVI) locations and centerline elevation, existing grades and elevations at connections;”

11. Chapter 2 Design Criteria – Section 2.1.4.C.X – Create a new sub-section c which states:

c. TBC grades shown in profile view if super-elevation or warping occurs.

12. Chapter 2 Design Criteria – Section 2.1.4 – Create a new sub-section D which states:

D. Shall include existing utilities and structures, including where appropriate; line size and material, valves, fittings, hydrants, manholes, service lines, inlets, gas lines, electric lines, telephone poles, light poles, junction boxes, irrigation systems, communication lines, private utility lines and appurtenances, proposed connection to existing utility locations and field verified invert elevations.

13. Chapter 2 Design Criteria – section 2.1.6.B – Create new sub-sections IX and X which state:

IX. Top Back of Curb spot elevations for all PCs, PTs, PCCs, grade breaks, connections to existing curbs, and inlets.

X. Typical Street Sections.

14. Chapter 2 Design Criteria – Section 2.1.8.C.II – Modify the section:

“Basin limits”

To read

“Delineated runoff basin limits with weighted C coefficients, if applicable.”

15. Chapter 3 Project Submittals – Section 3.1.1.A.I – Modify the section:

“Shall be submitted to PCD with 3 hard copies;”

To read

“Shall be submitted to PCD with 2 hard copies;”

16. Chapter 3 Project Submittals – Section 3.1.1.B.III.e – Modify the section:

“Traffic Impact Study”

To read

“Traffic Impact Study, if required per Section 8.1.2”

17. Chapter 3 Project Submittals – Section 3.1.4.A.I – Modify the section:

“Three (3) complete sets of the site civil final plans, signed and stamped by a PE (half sized plan sets are encouraged);”

To read

“Two (2) complete sets of the correctly scaled site civil final plans, signed and stamped by a PE (sheet size dictated by plan reviewer);”

18. Chapter 4 Development - Section 4.1.2.D – Modify the sentence:

“Underground private utilities should be located on private property between the lot line and the easement line, unless written permission is provided by the City Engineer;”

To read

“Underground private utilities, including fiber optic communication lines, should be located on private property between the lot line and the easement line, unless written permission is provided by the City Engineer;”

19. Chapter 5 Water System - Section 5.2.7.H – Modify the sentence:

“Utilize gaskets per requirements outlined in the gasket section above;”

To read

“Utilize gaskets per requirements outlined in the gasket Section 5.1.2.E above;”

20. Chapter 5 Water System - Section 5.2.11.A.VIII – Modify the sentence:

“When a lot or parcel is developed to a permitted use, all duplicate, excess, and/or unused water services and fire services, including stub-outs, shall be disconnected from the main and the main shall be plugged”

To read

“When a lot or parcel is developed to a permitted use, all duplicate, excess, and/or unused water services and fire services, including stub-outs, shall be disconnected from the main and shall be plugged at the main”.

21. Chapter 5 Water System - Section 5.2.16 - Revise section title from “Entrance Valve” to “Entrance Valve and Backflow Assembly” and create a new sub section G which states:

- G. All irrigation service lines, commercial water service lines, and commercial and residential fire service lines shall be equipped with an approved backflow prevention assembly in accordance with the latest version of the Uniform Plumbing Code adopted by the City of Great Falls and shall meet the following criteria;
  - I. Backflow assemblies shall be tested yearly by an ASSE 5000 certified tester;
  - II. Backflow assembly certifiers shall be licensed per city licensing rules;
  - III. The property owner shall maintain backflow test reports (required 3 year minimum on file), and such reports shall be available upon request to the authority having jurisdiction; and
  - IV. Floor drains or floor sinks (with trap primers) may be required when the backflow is installed within a building.

22. Chapter 5 Water System - Section 5.2.20.D – Modify the section:

- D. In the event ground water prohibits the use of  $\frac{3}{4}$  inch minus base course,  $\frac{3}{8}$  inch aggregate (chips) may be used, with the Engineers approval, under the following conditions;
  - a. Filter fabric shall be laid on the excavated ditch bottom and encase the bedding and pipe;
  - b. The open graded aggregate shall be free draining and non-plastic;
  - c. The open graded aggregate shall conform to all applicable portions of MPWSS Section 02250, GRAVEL MATERIAL, meeting the gradation requirements for No. 2 gravel material; and
  - d. Trench plugs, as defined by CoGF detail 5-34, shall be installed once every 100 feet;

To read

- D. In the event ground water prohibits the use of  $\frac{3}{4}$  inch minus base course,  $\frac{3}{4}$  inch minus washed round rock aggregate may be used, with the Engineers approval, under the following conditions;

- a. Filter fabric shall be laid on the excavated ditch bottom and encase the bedding and pipe;
- b. The open graded aggregate shall be free draining and non-plastic;
- c. The open graded aggregate shall conform to all applicable portions of MPWSS Section 02221, Type 1 Pipe Bedding, and shall generally be ¾” minus washed round rock (non-crushed or non-fractured) meeting the gradation requirements as specified below:
  - Passing the 1” Sieve - 100% by weight
  - Passing the ¾” Sieve – 90-100% by weight
  - Passing the #4 Sieve – 0-10% by weight
- d. Trench plugs, as defined by CoGF detail 5-34, shall be installed once every 100 feet;

23. Chapter 5 Water System - Section 5.2.22.M – Modify the section:

“Anodes shall be manufactured approved for direct bury;”

To read

“Anodes shall be manufactured approved for direct bury and if required shall be placed at both the beginning and end of main segments that require tracer wire;”

24. Chapter 6 Sanitary Sewer Systems – Section 6.1.5.H – Add the sentence:

Open trench replacement of existing sanitary sewer service lines shall also meet the recommended minimum bury depths or provide sufficient insulation to protect the service line from freezing. Trenchless replacement methods, such as cured in place lining or pipe bursting, do not require additional insulation.

25. Chapter 6 Sanitary Sewer Systems – Section 6.2.3.F – Modify the section:

F. Pipe bursting of existing sewer service lines:

- I. An existing service line that is less than the minimum grade (but not negative grade) can be burst at the existing grade;
- II. A video inspection shall be performed before and after the bursting process;
- III. Negative grade and obstructions shall be removed and repaired prior to bursting;
- IV. The contractor shall fuse the HDPE in accordance with manufacturer specifications;
- V. Sewer service pipe material used for pipe bursting shall be either DR-17 HDPE or DR-21 HDPE; and
- VI. Permitting, testing, and inspection per City Code is required when pipe bursting an existing sewer service line.

To read

- F. Pipe bursting and cured in place lining of existing sewer service lines:
- I. An existing service line that is less than the minimum grade (but not negative grade) can be burst or lined at the existing grade;
  - II. A video inspection shall be performed before and after the bursting or lining process. The City shall be present to witness video inspections. Prior to bursting or lining the existing host pipe, the existing line shall be free of any obstacles that would cause an unfavorable grade in the new liner;
  - III. Negative grade and obstructions shall be removed and repaired prior to bursting or lining;
  - IV. Sewer service pipe material used for pipe bursting shall be either DR-17 HDPE or approved equal. A Fernco coupler or approved equal shall be used to make the connection between dissimilar pipe materials. The Fernco shall be completely encased with concrete down to firm native ground. The contractor shall fuse the HDPE in accordance with manufacturer specifications. Fused butt joint material in the interior of the pipe shall be removed. The inside of the pipe shall be free of any burrs or rough edges that may collect material passing through the service line; and
  - V. Sewer service pipe lining material shall conform to the manufacturer's recommendations. Existing clean out connections or other connections must be cut out of the lining to an equivalent diameter at the connection location(s). A Fernco coupler or approved equal shall be used to make the connection between dissimilar pipe materials. The Fernco shall be completely encased with concrete down to firm native ground.
  - VI. Permitting, testing, and inspection per City Code is required when pipe bursting or lining an existing sewer service line. Final acceptance shall be at the discretion of the City of Great Falls Engineering Inspectors.
  - VII. During construction or after completion of in place lining, the contractor shall contact the City of Great Falls PWD to TV the connecting sewer main to check for protrusions of lining into the City main. Lining shall not extend more than ¼" into the main at the location where the service enters the main. The costs of all video inspections by City staff will be billed to the contractor.

26. Chapter 6 Sanitary Sewer Systems – Section 6.2.3.G.II – Modify the section:

“Minimum pipe strength shall be schedule 40 PVC”

To read

“Minimum pipe strength shall equal or exceed Schedule 40 PVC or Class 200 SDR 21 PVC and shall meet or exceed 1.5 times the pump manufacturer's recommended maximum pressure”

27. Chapter 6 Sanitary Sewer Systems – Section 6.2.3.H.II – Add the sentences:

Gravity sewer service pipes that are 8 to 15 inch in diameter shall be PVC ASTM D 3034 SDR 35 and/or SDR 26 PVC. Gravity sewer service pipe and fittings shall utilize Styrene Butadiene Copolymer (SBR) gaskets. In areas with hydrocarbon contamination Acylonitrile Butadine (NBR) pipe joint gaskets shall be utilized;

28. Chapter 6 Sanitary Sewer Systems – Section 6.2.3.H.VI – Modify the section:

“Force service lines sized as required to provide 3-feet per second velocity, shall be PVC pressure pipe, ASTM 2241, Class 200 SDR 21 and force service lines shall meet or exceed 1.5 times the manufacture’s recommended maximum pressure.”

To read

“Force service lines sized as required to provide 3-feet per second velocity, shall be PVC pressure pipe, ASTM 2241, Class 200 SDR 21 or Schedule 40 PVC and force service lines shall meet or exceed 1.5 times the pump manufacture’s recommended maximum pressure.”

29. Chapter 6 Sanitary Sewer Systems – Section 6.3.3 – Create a new section which states:

6.3.3 Manhole Damp-proofing

- A. Manholes shall be damp-proofed at the direction of the City Engineer’s office on an as needed basis. Manholes that potentially require damp-proofing include:
  - I. Development connections to existing brick manholes that have yet to be damp-proofed.
  - II. Manholes with high potential for Hydrogen Sulfide (H<sub>2</sub>S) gas corrosion
  - III. Manholes with force mains discharging into the manhole.
- B. All exposed interior surfaces of the manhole structure to be installed, including walls, floor, grouted areas, and ring and cover shall be damp-proofed as follows:
  - I. Materials
    - a. Epoxy modified skim coat mortar – Tnemec Mortar Clad Series 218, or equal.
    - b. Hydrophobic aromatic polyurethane – Tnemec Series 446 Perma-Shield MCU, or equal.
  - II. Surface Preparation
    - a. All surfaces to be coated shall be clean and dry. All dirt, dust, sand, grit, mud, oil, grease and other foreign matter shall be removed. Prepare all surfaces to be coated per Steel Structures



Painting Council Specification SP 13 (Surface Preparation of Concrete) or SP 6 (commercial Blast Cleaning).

III. Application

a. Apply the specified epoxy modified mortar skim coat and hydrophobic aromatic polyurethane to all interior surfaces per the manufacturer's application instructions. Patch and fill voids ¼" to ½" in depth. Apply skim coat covering 100% of all concrete surfaces at 1/16" to 1/4" spread rate. The hydrophobic aromatic polyurethane shall be brushed, rolled or sprayed on in two coats, 8-10 dry mil thickness per coat, 16-20 dry mil total thickness. Concrete surfaces shall be cured and dry prior to coating.

IV. Curing

a. Curing shall adhere to manufacturer's curing and drying schedule. Coatings must be fully cured and dried before placing the manhole into service.

30. Chapter 7 – Storm Sewer Systems – Section 7.1.2 – Create a new section which states:

7.1.2 The developer may elect to utilize PVC storm water piping within the right of way, so long as manufacturer's recommendations for depth of cover are met, and the bedding on the top of the pipe does not extend into the roadway section. PVC storm drainage pipe shall meet one of the following specifications.

- A. Pipe Sizes 4" to 15" – ASTM 3034 SDR 35
- B. Pipe Sizes 18" to 24" – ASTM F679 SDR 35
- C. Pipe Sizes greater than 24" - Reinforced Concrete Pipe (RCP) ASTM C76, Class III Minimum. RCP pipe is an acceptable substitute for any storm drainage pipe.

31. Chapter 8 – Transportation Systems – Section 8.1.2.G.VIII – Delete the section as it is a duplicate of the previous section VII and re-number the subsequent sections accordingly.

32. Chapter 8 – Transportation Systems – Modify any reference to a back of curb radius at street intersections from "22.5 degrees" to "22.5 feet."

33. Chapter 8 – Transportation Systems – Section 8.1.3 – Create a new sub-section H which states:

H. The grade and crown of the principle street shall continue through the intersection. At intersections of roadways with the same classification, the roadway with more peak hour trips, or as directed by the City Engineering Office, shall take precedence. Side streets shall warp at intersections to match the through street. The side street crown warp transition shall occur within 75 feet to 150 feet horizontally of the center of the intersection. The pavement cross slope of the warped street shall not exceed 5%, or the running grade of the through street, whichever is greater.

34. Chapter 8 – Transportation Systems – Section 8.1.4.B – Modify cul-de-sac dimensions per latest adopted IFC:

“Cul-de-sacs must meet a forty-two and one-half (42½) foot radius from center of cul-de-sac to back of curb, a fifty-five (55) foot radius on the right-of-way, and cannot be longer than five hundred (500) feet; and”

To read

“Cul-de-sacs must meet a forty-eight and one half (48.5) foot radius from center of cul-de-sac to back of curb, a sixty-one (61) foot radius on the right-of-way, and cannot be longer than five hundred (500) feet; and”

35. Chapter 8 – Transportation Systems – Table 7 – Modify the table:

Crest Vertical Curve Length	Based on DS	Based on DS	Based on DS	200 ft (min)	200 ft (min)
Sag Vertical Curve Length	Based on DS	Based on DS	Based on DS	200 ft (min)	200 ft (min)
Cul-de-sac turnaround	a.	Minimum back of curb radius		42.5 ft	
	b.	Minimum right-of-way radius		55 ft	

To read

Crest Vertical Curve Length	Based on DS	Based on DS	Based on DS	50 ft (min)	50 ft (min)
Sag Vertical Curve Length <sup>[5]</sup>	Based on DS	Based on DS	Based on DS	50 ft (min)	50 ft (min)
Cul-de-sac turnaround	a.	Minimum back of curb radius		48.5 ft	
	b.	Minimum right-of-way radius		61 ft	

36. Chapter 8 – Transportation Systems – Table 7 – Add footnote 5 which states:

“<sup>5</sup> Drainage easements or other overflow provisions shall be provided at sag curves to prevent flooding or storm water runoff damage to adjacent properties”.

37. Chapter 8 – Transportation Systems – Section 8.1.8.M – Modify the sentence:

“Sidewalks shall be constructed with 6.5 sac cement and have a 28 day strength of 4,000 psi; and”

To read

“Sidewalks shall be constructed with 6.5 sac cement and have a 28 day strength of 4,000 psi, and shall have an air entrainment between 5% and 8%; and”

38. Chapter 8 – Transportation Systems – Section 8.1.16.D – Create a new sub-section VII which states:

VII. A geotextile fabric such as Mirafi 600X (or approved equal) shall be placed between the base course and the subgrade (or between the sub base course and subgrade).

39. Chapter 8 – Transportation Systems – Section 8.2.1.C – Add the sentence:

If the existing base course and or sub base gravel sections exceed 12 inches, the gravel sections shall match the existing section thicknesses

40. Chapter 8 – Transportation Systems – Section 8.2.2.B.III – Modify the sentence:

“A geotextile such as Mirafi 600X (or approved equal) shall be placed between the base course and the sub base (or existing sub surface ground).”

To read

“A geotextile such as Mirafi 600X (or approved equal) shall be placed between the base course and the subgrade.

41. Chapter 8 – Transportation Systems – Section 8.2.2.C – Create a new sub-section II which states:

II. A geotextile such as Mirafi 600X (or approved equal) shall be placed between the sub base and the subgrade.

42. Chapter 8 – Transportation Systems – Section 8.2.2 – Add the following section D:

D. Compaction:

I. All street construction shall meet the minimum compaction requirements set forth in Section 1.4.2 of these Standards.

43. Appendix B – Update Driveway Application to latest version, dated 03.25.2021

44. Appendix C – Update Checklist & Deviation Request form to incorporate revisions

45. Appendix E – Remove Appendix E from Design Standards and incorporate it into Chapter 5 Water Systems – Section 5.2.16, see item # 21 of this document.

46. City of Great Falls Standard Details – Added Detail 5-55 Force Main Discharge into Standard Details and update the Detail Index to include it.

This concludes the proposed revisions to incorporate into the official “City of Great Falls Standards for Design and Construction Revision No. 2”. Once you have reviewed and are satisfied with the proposed revisions, please sign below for approval. Please feel free to contact me if you have any questions.

Respectfully Submitted,




Mark Juras, PE  
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**Approved**

  
\_\_\_\_\_  
Jesse Patton – Interim City Engineer

8/24/21  
Date

  
\_\_\_\_\_  
Paul Skubinna - Public Works Director

9/3/21  
Date

  
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Greg Doyon – City Manager

9.30.21  
Date