



REQUIREMENTS  
for  
ENGINEERING SERVICES  
on  
PUBLIC CONSTRUCTION PROJECTS

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Requirements  
for  
Engineering Services  
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Public Construction Projects

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## **Project Management and Coordination**

### General Project Management

Engineer shall provide and coordinate general project management services.

### Work Planning and Scheduling

1. General day to day project management and administration
2. Work-planning schedule and coordination
3. Provide monthly progress reports to the City of Fargo
4. Provide general project coordination with involved agencies to include:
  - A. City of Fargo
  - B. NDDOT, FHWA, FMCOG as applicable
  - C. Any private or public utility companies
  - D. Any permitting agencies
  - E. Other government agencies as required
5. Prepare for and attend meetings
  - A. Preparation
    - Advertise
    - Send notice to property owners
    - Presentation documents and displays
  - B. Presentation(s) to public
  - C. Summary
    - Prepare and distribute minutes of meetings
6. Maintain project log to document key decisions and project activities

### **Preliminary Engineering and Layout**

1. Data Collection
  - A. Collect and review digital and hardcopy data
    1. Preliminary design layout
    2. Survey and mapping to include utilities, DTM, aerial photography, files, etc.
    3. Traffic data
    4. Utility data
    5. As-built plan information
    6. Other pertinent data
2. Geotechnical Investigation
3. Topographic Survey
  - A. Survey to provide both horizontal and vertical control
  - B. Datum to be NAVD 88
  - C. Survey to be compatible with City of Fargo coordinate system
  - D. Locate and tie all pertinent above and below grade features for preparation of full topographic basemap and Digital Terrain Model (DTM)
    1. Buildings
    2. Roads- type and surfacing
    3. Trees-size
    4. Power poles
    5. Private and public utilities including culverts
    6. Driveways and sidewalks
    7. Perform bridge surveys if necessary

- E. Submittal format
  - 1. ASCII file of survey data in PNZED format
    - a. Either comma or space delineated
  - 2. Topographical and spot elevation drawing in City Standard AutoCAD drawing
  - 3. AutoCAD drawing file of all pertinent data
- 4. Preliminary Design
  - A. Develop geometrics and profiles for proposed improvements
  - B. Evaluate alternatives for consideration
  - C. Evaluate potential utility conflicts
  - D. Conduct appropriate preliminary analysis
    - 1. Hydraulic (storm sewer and drains)
    - 2. Traffic control layouts and construction staging
    - 3. Sewer or lift station hydraulics, population projections, service areas
    - 4. Water transmission/ distribution
    - 5. Etc.
  - E. Conduct preliminary lighting design
  - F. Provide preliminary cost estimate

### **Right of Way**

1. Prepare legal descriptions and plats for easements and right of way
2. Conduct title searches as necessary
3. Complete property appraisals
4. Coordinate document preparation with City Attorney's office
5. Conduct negotiations for acquisition on behalf of City

### **Utility Relocation/Adjustment**

1. Prepare utility plans displaying all in-place public and private utilities located within the proposed construction limits
2. Contact utility owners to determine potential need for utility relocations or adjustments
3. Coordinate utility work with City contract work.

### **Final Design**

Develop and provide the following as appropriate:

1. Final horizontal and vertical alignment, typical sections, details, etc.
2. Cross sections and earthwork computations
3. Hydraulic/storm sewer design
4. Water, sewer and lighting design
5. Street configurations, turn lanes and grading plans
6. Signing and pavement marking design
7. Permitting
  - Prepare and submit application on behalf of City
  - Coordinate, support, follow-up and document permit process
8. Traffic control plans and construction staging
9. Special features- lift stations, control systems, buildings, etc
10. Prepare standard and special erosion control plans
11. Develop contract documents, contract pay items, engineers estimate of cost, funding sources
12. Prepare and compile contract specification and special instructions
13. Perform quality control/quality assurance on all construction documents

## **Bid Documents**

### All Projects

Develop and provide the following documents for placement of the City Commission agenda

1. Engineers Report- Nature and Scope; Purpose; Feasibility (with estimated cost and funding sources)
2. Bid Sheet, Proposal, Bidder's Bond
  - A. Bid items to conform Fargo BidJob codes
3. Bids Wanted
4. Standard Specifications (City of Fargo) and Special Instructions
5. Addendum requirements (note that legal requirements require that addendum acknowledgement be placed in with the bid bond envelope)

### Special Assessment Projects

These additional items are required for any projects that are special assessed. Protestable projects require advertising for a 30 day time frame.

1. Assessment District maps (1 sized for publication, 1 sized for inclusion in book)
2. Location and Comprising
3. Notice to property owners
  - A. Two week lead time for Special Assessment Coordinator to compute estimated assessed amount after receipt to cost estimate and assessment map
  - B. Conduct public information meeting

### Post Bid Opening Documents

1. All Projects
  - A. Provide tabulation of all bids received
  - B. Provide bid award letter
  - C. Provide contract documents
  - D. Issue Notice to Proceed for construction at appropriate time
2. Special Assessment Projects
  - A. Develop/provide Engineer's Statement of Estimated Cost
  - B. Determine protest sufficiency/percentage



8. Existing trees, fences, walks, drives, buildings, ditches and drainage structures, pavements and other obstacles or improvements in or near the work area. (Show existing features as dashed or less prominently)
9. All temporary or permanent easements
10. Survey or reference line if necessary (with stationing)
11. Large buildings, structures, trees, etc. indicated for removal or in close proximity to the proposed construction
12. Show scale or indicate scale in the title block
13. Special details and/or notes when required
14. Plan view and profile shall line up whenever possible
15. Symbols and abbreviations used on plans when different than City of Fargo standards
16. Traffic detours or special traffic control shall be shown on plans. Traffic control/detours shall be approved by the City of Fargo Traffic Engineer and shall have an approval block on that page for his signature.
17. Revision block showing description, date and initials
18. Other information deemed necessary by the Engineer certifying the plans

### Sanitary Sewer Plans

The following information should be shown when applicable:

1. Stationing, location and type of all manholes or structures. Type of structures shall be in conformance with the City of Fargo Standard Specifications for Construction of Public Utilities. Details shall be shown for all structures that are not standard or covered in that reference
2. Plan and profile of all sewer lines. Include existing ground profile
3. Size, length, type and grade of sewers
4. Invert elevations of inlets & outlets of manholes and other structures
5. Locations, size and type of all sewer stubouts, wyes, or tees. Wye and tee locations shall be stationed and referenced to manholes and sewer service stubouts shall be double tied to lot corners if possible. When risers are installed, riser length and size shall be indicated
6. Rim elevations and numbering system for manholes and structures
7. Existing underground utilities such as cables, water, storm sewers, gas lines or any other underground features that cross or are near the proposed sewer. Show exact elevations, if possible where there may be a conflict with new construction

### Storm Sewer Plans

The following information should be shown when applicable:

1. Stationing, location and type of all manholes, inlets or structures. Type of structures shall be in conformance with the City of Fargo Standard Specifications for Construction of Public Utilities. Details shall be shown for all structures that are not standard or covered in that reference.
2. Plan and profile of all storm sewer lines. Include existing ground profile.
3. Size, length, type and grade of storm sewers
4. Invert elevations at all manholes, inlets, and other structures
5. Rim elevations and numbering system for manholes and structures
6. Existing underground utilities such as cables, water, sanitary sewers, gas lines or any other underground features that cross or are near the proposed storm sewer. Show exact elevations, if possible where there may be a conflict with new construction.
7. When storm sewer is included as part of a paving plan, storm sewer should be shown on the same sheets as the paving plan.

## Water Main Plans

The following information should be shown when applicable:

1. Stationing, location and type of all waterlines, manholes, valves, hydrants or appurtenances. Type of structures shall be in conformance with the City of Fargo Standard Specifications for Construction of Public Utilities. Details shall be shown for all structures and appurtenances that are not standard or covered in that reference
2. Plan and profile of all water lines
3. Size, type and length of all water lines
4. Elevations for top of pipe at all fittings, valves, high and low points or appurtenances
5. Locations, size and type of all water stubouts and services. Corporation stops and tee locations shall be stationed and referenced to valves and manholes. Curb stops\water service stubouts shall be double tied to lot corners if possible. Curb stops on replacement type projects shall be tied to existing structures
6. Top nut elevations for all hydrants shall be listed along with the pipe distance from the tee to the gate valve and from the gate valve to the hydrant

## Street and Paving Plans

The following information should be shown when applicable:

1. Beginning and ending stationing if necessary
2. Match lines with sheet numbers referenced at intersections or where they do not follow in order
3. Curb grades and type showing length and per cent grade
4. Spot elevations at all PC's, High and Low points, curb radius points
5. Elevations for all culverts, with grade and length shown
6. Ditch grades with percent slope
7. Existing ground and finish paving and ditch elevations should be shown in the profile
8. Horizontal curve data should be shown near the curve or coded for clarity if several curves are shown or if the sheet is crowded. Show radius, interior angle, and arc length at a minimum. All PC's and PT's should be labeled and show spot elevations. Vertical curves when used should show stationing, length and elevations along the curve. The Point of Vertical Curvature (PVC), the Point of Vertical Intersection (PVI), the Point of Vertical Tangent (PVT) as well as the vertical offset distance from the tangent intersect to the actual curve
9. Show intersection details to the extent necessary to insure proper horizontal and vertical alignment. The following information is required:
  - A. Spot elevations along radius of curb
  - B. Spot elevations along center lines and curb lines extended through the intersection (1/4 line elevations may be necessary on large intersections)
  - C. Geometric information necessary for design and staking
10. Show proposed paving improvements including street, curb and gutter, driveways, sidewalks and ADA walks
11. Show typical sections as required including information on the following:
  - A. Shoulder slopes, backslopes, sideslopes
  - B. Paving widths, thickness and type
  - C. Lane widths
  - D. Pavement cross slopes
  - E. Subgrade, fabric and drainage details
  - F. Median details
  - G. Typical Right-of-way lines
  - H. Joint pattern details and reinforcing information
  - I. Other typical details of paving or grading not otherwise covered on the standard paving details



## Drainage Ditch and Drainageway Plans

The following information should be shown when applicable:

1. Stationing and flow line elevation at beginning and end of ditch construction
2. Length and slope of ditches, culverts and pipes
3. Typical section showing dimensions, backslopes, invert and slope treatment
4. Invert elevations at all structures
5. Cross sections and topographic map showing existing ground and finish grade
6. Typical details for all special structures
7. Flap gate and sluice gate sizes and pertinent information
8. Drainage design data

## **Contract Administration**

1. Meetings – Schedule, notify, conduct and prepare/distribute minutes
  - Preconstruction
  - Progress
  - Closeout
2. Coordinate construction staking
3. Coordinate and document field testing-construction QA/QC
4. Coordinate Construction Inspection (see next section)
5. Coordinate work with independent utility companies/contractors
6. Review and approve shop drawings
7. Review, approve, coordinate and notify public for construction staging and traffic control
8. Prepare and approve progress pay documents
9. Analyze and prepare extra work change orders and supplemental design services and agreements
10. Review and approve contractor payroll submittals as applicable

## Construction Inspection

### Policy

The on-site inspection personnel shall have background and training as construction inspectors and work directly under the supervision of a Registered Professional Engineer. Inspection personnel shall be present during the performance of all meaningful work and keep an accurate record of the construction progress. (Sample forms are available from the City Engineer). Inspectors shall have in their possession and be familiar with the City of Fargo Standard Specifications for the Construction of Public Utilities

1. Change Orders: In the event of any change from the plan, change orders shall be approved by the City Commission prior to the work being performed
2. Interpretation of Plans and Specifications
  - A. City of Fargo Standard Specifications for the Construction of Public Utilities: The Engineer shall contact the City Engineer for any unclear aspects of these specifications. Interpretation of the City's Standard Specifications shall be made only by the City Engineer's office so that the specifications will be uniformly enforced.
  - B. Interpretation of Plans and special instructions: The interpretation of the plans and job specific specifications and instructions shall be the responsibility of the Engineer who certified the plans

### Procedure

1. Start of work: The Engineer's inspector shall notify the City Engineer no later than 24 hours prior to the commencement of work
2. Work in right-of way: If the work is in the City of Fargo right-of-way, the contractor shall also notify the City of Fargo Traffic Engineer at least 24-hours prior to the start of work. All barricades and traffic control shall comply with the latest edition of the Manual on Uniform Traffic Control Devices
3. Reports: All reports made by the Engineer shall be filed with the City Engineer's office on a bi-weekly basis

### Testing

1. Certification: Testing performed by the Engineer or a testing company for the Engineer shall be done under the supervision of a Registered Professional Engineer and certified by the same. Testing shall be done in accordance with appropriate ASTM; AASHTO or other recognized Standards
2. Test Results: Results of all field tests shall be recorded on the daily inspection report. The inspection report shall note any samples taken for laboratory tests and the location that said samples were taken and any field or visual inspections made on said samples when they were taken
3. Testing Requirements: The Engineer shall submit a proposed testing schedule to the City Engineer for approval. The schedule shall designate the testing firm who will be responsible for performing the necessary tests. The schedule will also designate the approximate number and types of tests that the Engineer feels adequate so as to ensure compliance with the intent of the specifications

### Construction Staking and Survey

- Establish and preserve horizontal and vertical survey control monuments
- Stake construction limits
- Perform construction staking
- As-built surveys

## **Acceptance Procedures and Requirements**

### Final Acceptance

Once public improvements are completed, the Engineer shall submit a final inspection request for the public improvements for final acceptance

Request for final acceptance:

1. Request shall be made in a letter that fully describes the improvements and that the project has been substantially completed
2. A final project inspection shall be requested
3. The Engineer shall note any deficiencies and make a recommendation on the acceptance of the project

### City Acceptance

1. Upon receipt of the request, the City will issue a response that will indicate a date and time for a final inspection. The public improvement shall be clean and free of debris at the time of inspection. Water valve boxes, curb stops, manholes and inlets shall be exposed
2. During the field inspection, the Engineer, with the aid of the Street and Water Departments, will complete a listing of items requiring remedial action (punch list) noted during the inspection
3. Correction of all items requiring remedial action shall be completed prior to final acceptance of the project
4. Upon satisfactory completion of this final inspection, the City Engineer shall grant final acceptance
5. Granting of the acceptance does not relieve the Contractor of any responsibility to maintain, repair, or correct any deficiencies that may occur during the warranty period

## **Plan of Record and Construction Report**

### Information to be Shown on Plans of Record

Upon completion of the work, as-built information shall be added to the original plans. The as-built information shall be clearly shown. No original design data shall be removed from the plans. The Engineer shall certify the as-built information and submit the plans to the City Engineer for filing as the plans of record. Record plans shall be reproducible mylars or submitted in digital electronic form with an accompanying paper hard copy

### Plans of Record

Plans of Record shall include the following information:

1. Engineer's certification
2. Final quantities and dollar amount of contract
3. Name of contractor and completion date
4. Type of contract
5. Any other information
6. As-built alignment (horizontal and vertical), elevations, lengths, stationing, locations, materials, and other information as determined by the Engineer
7. Ties to all bends, gate valves, water and sewer stubouts
8. As-built cross sections are not generally required, however a copy of the excavation worksheet tabulation should be submitted. If quantities seem unusual, as-built cross sections may be required
9. Manufacturer's name when applicable
10. Drainage plan- A detailed street and storm sewer plan showing the data pertaining to the design of the storm drainage system is required. The following information is to be shown on the drainage plan:
  - A. Drainage area map- The map shall show all drainage areas contributing storm runoff to the project. The map shall indicate the outline of the individual drainage areas including a line drawing showing the location of the proposed piping, manholes, inlets, culverts and other structures
  - B. Front and rear yard elevations- A map shall be attached showing proposed front and rear yard grades for all lots in the subdivision. Spot elevations shall be indicated at all lot corners and at all intermediate high and low points. Front yard elevations are to be set at 0.5 feet above top of curb unless accepted by the City Engineer
  - C. Pipe design data- Pipe design data shall indicate the design flow in each pipe along with the velocity, size and type of pipe

### Project Construction Report

A report shall be compiled, bound, and submitted to the City Engineer. The report shall include sequential copies of all daily reports, weekly reports, material tests, field diaries and survey notes. The report shall also include a copy of the final inspection report and indication that punchlist items have been completed and accepted. Provide Operations and Maintenance manuals as necessary and/or Maintenance Crew Training Specifics

**Submittal Check List  
for  
Subdivisions and Major Projects**

\_\_\_\_\_  
Name of Subdivision or Project- Include Project ID Number

	Final Construction Plans	For City Use Only	
_____	_____	_____	_____
_____	Plans of Record	_____	_____
_____ <u>Bid Documents</u>		_____	_____
_____ Assessment Map for Book		_____	_____
_____ Location & Comprising		_____	_____
_____ Engineer's Report		_____	_____
_____ Bids Wanted		_____	_____
_____ Bid Sheet		_____	_____
_____ Notice to Property Owners		_____	_____
_____ <u>Cover Sheet</u>		_____	_____
_____ Vicinity Map		_____	_____
_____ Subdivision or Project Name		_____	_____
_____ Sheet Index		_____	_____
_____ Engineer's Certification and Signature		_____	_____
_____ Legend		_____	_____
_____ <u>Plat</u>		_____	_____
_____ Bearings		_____	_____
_____ North Arrow		_____	_____
_____ Scale		_____	_____
_____ Block and lot numbers and dimensions		_____	_____
_____ Street names		_____	_____
_____ Easements for utilities and drainage		_____	_____
_____ Legend for plat		_____	_____
_____ <u>Overall Water and Sewer Map</u>		_____	_____
_____ <u>Water</u>		_____	_____
_____ Existing and proposed fire hydrant locations and spacing		_____	_____
_____ Length, size and type of pipe		_____	_____
_____ Valve Locations		_____	_____
_____ Water service locations shown		_____	_____
_____ Special details required		_____	_____

<u>Sanitary Sewer</u>	_____	_____	_____
Existing and proposed manhole locations and spacing	_____	_____	_____
Length, size and type of pipe to be used	_____	_____	_____
Grade of proposed sewer line	_____	_____	_____
Sewer Service locations shown	_____	_____	_____
Special details required	_____	_____	_____
<u>Storm Sewer</u>	_____	_____	_____
Existing and proposed manhole locations and spacing	_____	_____	_____
Length, size and type of pipe to be used	_____	_____	_____
Grade of proposed storm sewer line	_____	_____	_____
Special details required	_____	_____	_____
<u>Street Plans and Profiles</u>	_____	_____	_____
Plans and Profiles for every street	_____	_____	_____
Grades	_____	_____	_____
Sidewalk widths and locations, ADA ramps	_____	_____	_____
Right of Way and Street widths to meet standards	_____	_____	_____
Curves radius points, angles and lengths	_____	_____	_____
Elevations of all PC's, PT's, LP's, Hp's and Grade Changes	_____	_____	_____
Access to all lots? Lengths of cul-de-sacs?	_____	_____	_____
<u>Sewer, Water, Storm Sewer Plan and Profiles</u>	_____	_____	_____
Rim elevations, inverts (in and out) for sewers	_____	_____	_____
Top of pipe elevations on water main and fittings	_____	_____	_____
Per cent grade	_____	_____	_____
Length, size and type of pipe	_____	_____	_____
Locations of valves, hydrants, manholes, inlets, appurtenances	_____	_____	_____
Minimum depths on water and sewer	_____	_____	_____
Locations of sewer and water services	_____	_____	_____
<u>Grading and Drainage layout</u>	_____	_____	_____
Sidewalk and rearyard grades are noted on plat	_____	_____	_____
Water flow- grades, location of drainage way	_____	_____	_____
Detention ponds located, sized	_____	_____	_____
Flood plain boundary shown, permit obtained	_____	_____	_____
Fill areas designated or shown	_____	_____	_____
<u>Street Details</u>	_____	_____	_____
Right of Way and street width dimensions	_____	_____	_____
Street cross section/detail	_____	_____	_____
Thickness of base, asphalt or concrete, geotextile?	_____	_____	_____
Curb and walk details	_____	_____	_____
Intersection plan and profiles	_____	_____	_____

_____	<u>Traffic Control Plan</u>	_____	_____	_____
_____	Pavement marking plan	_____	_____	_____
_____	Construction area traffic control plan	_____	_____	_____
_____	Traffic signing locations and types	_____	_____	_____
_____	<u>General Notes</u>	_____	_____	_____
_____	Title block in lower right hand corner of sheet	_____	_____	_____
_____	Page number, Project number on each page	_____	_____	_____
_____	Signature blocks on each page	_____	_____	_____
_____	Revision number and date	_____	_____	_____
_____	Benchmark information	_____	_____	_____
_____	<u>Engineers Report</u>	_____	_____	_____
_____	Nature and Scope of Project	_____	_____	_____
_____	Cost estimate	_____	_____	_____
_____	Funding Source (i.e. Special assessment, EDA, etc.)	_____	_____	_____
_____	<u>Geotechnical Report</u>	_____	_____	_____
_____	Geotechnical Special Conditions	_____	_____	_____
_____	Grading and foundations	_____	_____	_____
_____	Design	_____	_____	_____
_____	<u>Drainage Report</u>	_____	_____	_____
_____	Calculations	_____	_____	_____
_____	Facility sizes and capacity	_____	_____	_____
_____	Plans	_____	_____	_____
_____	<u>Construction Reports</u>	_____	_____	_____
_____	Material test reports	_____	_____	_____
_____	Daily reports	_____	_____	_____
_____	Weekly reports	_____	_____	_____
_____	Inspectors Diary	_____	_____	_____
_____	Change orders or changed condition explanation	_____	_____	_____
_____	Final Inspection report and punchlist	_____	_____	_____
_____	<u>Comments</u>	_____	_____	_____



Submitted by: \_\_\_\_\_  
Name of Engineering Firm

\_\_\_\_\_  
Signature of Engineer Date

Reviewed by: \_\_\_\_\_  
City of Fargo

<b>Accepted</b> _____	<b>Date</b> _____
<b>Returned for Revisions</b> _____	<b>Date</b> _____