CITY OF ELKO NEW MARKET

ENGINEERING MANUAL

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CITY OF ELKO NEW MARKET

ENGINEERING MANUAL

PART 1 - INTRODUCTION

This manual presents standards to be incorporated into the designs, plans and specifications for new subdivision and public infrastructure in easements on private property construction within the City of Elko New Market. These standards will promote high-quality projects and uniform systems throughout the City. High quality and uniformity will maximize infrastructure safety, function and reliability and minimize long term costs for Elko New Market taxpayers.

This manual also provides sections related to procedures for conducting projects and design rules.

This version of the City of Elko New Market Engineering Manual was approved by the City Council on _____ by motion. The Engineering Department recommends this manual be annually reviewed and updated as changing regulations, construction and maintenance experiences, and technology warrant.

PART 2 - APPLICABILITY

The City of Elko New Market Engineering Manual is intended to supplement City Code, especially the Subdivision and Zoning Ordinances. If any conflicts between the Engineering Manual and the City Code are identified, the City Code will govern.

PART 3 - ROLES DEFINED

Where the term "City" appears in this or referenced documents, it refers to the City of Elko New Market or its representative, including the City Engineer. "Developer" means the entity named in the Development Contract for the project or his representative. Where the term "Owner" appears in referenced documents, it refers to the Developer or its representative.

City codes require Developers of property within the City to submit certain documents and drawings for review and approval by the City. These include, but are not limited to, items such as grading plans, drainage plans and computations, topographic surveys, plats, and construction plans and technical specifications for all public utilities and streets. The Developer may not have the credentials required by law to prepare the required submittals, so he typically hires an engineering firm for this service. "Developer's Engineer" in this document refers to a civil engineer licensed in the State of Minnesota and responsible for the plans and specifications for the project. It may also include other professionals appropriately licensed for the portions of the project they are responsible for. These professionals may be land surveyors, landscape architects, architects, or planners.

PART 4 - IMPROVEMENT PROCUREMENT

Two methods are available to finance and develop subdivision projects in the City.

Publicly Financed Improvement - A Developer may request and the City may approve the work to be done as a Public Improvement project, where the City bonds for and constructs the "Public Improvements" (commonly streets, drainage, and utilities) and assesses the benefiting properties. Only work eligible under State Statutes can be financed under this method. Final design and construction services are provided by the City for these projects. Developers are advised that the City will not conduct a Public Improvement project for subdivisions unless the City Council determines it is in the City's interest to do so. Projects to be approved for this method must offer significant benefits to the community such as education or healthcare, employment, or desirable commercial development. The City will also require security for the payment of assessments resulting from these projects. The Developer remains responsible for the procurement and cost of any private improvements on the parcel.

Privately Financed Improvement - The other and most common procurement method requires the Developer to finance and construct the public improvements with City oversight. The remainder of this document is focused on projects to be financed and constructed solely by the Developer.

PART 5 - DEVELOPER FINANCED IMPROVEMENT PROCESS

5.01 Improvements in Rights of Ways and Easements

A. The following procedures will apply after the Preliminary Plat is approved:

1. The Developer may be issued a grading permit based on the Preliminary Plat subject to requirements in the Zoning and Subdivision Ordinances.

2. The Developer must submit plans, specifications, and other documents to the City for the purpose of obtaining a grading permit as required by the Zoning Ordinance. These plans and specifications must be in accordance with City rules and standards outlined herein. The City's comprehensive plans for sanitary sewer, water, storm drainage and thoroughfares must be reflected in the design. The City Engineer will prepare plans and specifications for any wastewater pumping stations and forcemains, pressure reducing stations, or other work required for the project not described by the Code or this manual. These plans will be used by the Developer to construct the improvement.

3. The City does not check grading elevations in the field during mass grading work. The Developer must submit an as-built survey demonstrating that mass site grading was performed in accordance with the final grading plan for release of security associated with grading and before building permits can be approved. The survey may; however, be submitted as soon as grading is substantially complete. This may avoid contractor re-mobilization and additional restoration costs. The information provided must include 1-foot contours and spot elevations at every lot corner and building pad as well as spot elevations at the bottom of rear yard drainage swales where they cross lot lines and at side-yard swale high points.

4. All necessary permits must be obtained by the Developer and copies provided to the City Engineer prior to commencing any utility and street work. The City will issue written notification to proceed when all approvals have been obtained.

5. The Developer must furnish to the City a list of contractors and sub-contractors being considered for retention by the Developer for any of the public improvement work required in the project. The City may reject any contractor based on past performance or lack of applicable experience, equipment, or available personnel.

6. The Developer is responsible to bid/negotiate the construction contract, including the methods of measurement and payment for all items of work. The contract price must be broken down into four categories: 1) streets/walks/misc., 2) sanitary sewerage, 3) water distribution, and 4) storm water facilities (pipe, erosion control, ponds, etc.). Upon the completion of the work the final construction cost for each category must be furnished to the City before the improvements will be accepted.

7. Any deviations from the approved plans and specifications during construction deemed minor by the City Engineer must be approved by the City Engineer in writing before they are made. Major revisions will require a Development Agreement amendment through the Planning Commission/City Council process.

8. The Developer's Engineer must provide staking in accordance with the requirements in Appendix A. The City will review staking calculations, control, or stakes at the Developer's expense as deemed necessary. The Developer may also request the City Engineer provide the staking at the Developer's expense.

9. The City of Elko New Market delegates MPCA General Stormwater for Construction Permit Construction Site Inspection responsibilities to developers for developer-financed improvement projects by default unless the developer requests the City, and the City agrees to, provide these inspections at the developer's cost.

The Developer must provide a qualified inspector to perform inspections in accordance with the MPCA General Stormwater Permit for the project. The inspector must be listed on the Storm Water Pollution Prevention Plan (SWPPP) document in the plans. In addition to the required inspection and documentation responsibilities in the SWPPP, the inspector must provide the resulting reports to the City Engineer's Office on a weekly basis if the inspections are required by the permit. Copies of the reports are preferred in electronic format, but paper is also acceptable.

The developer will be notified immediately of missing or incomplete reports or discrepancies between reports and field conditions noted by the City Engineer's Office and will have one week after notification to bring reporting up to date and reconciled with any corrected field conditions. Failure to correct within the one-week grace period may result in the City not allowing subsequent items of work to proceed, withholding of project securities pending corrections, and/or work stoppage in accordance with the Development Contract.

10. It shall be the policy of the City of Elko New Market to perform construction site erosion and sediment control inspections as required by its 2020 Municipal Separate Storm Sewer (MS4) permit separately from and in addition to the Developer's General Stormwater Permit inspections for any developer-led improvement. These MS4 inspections will be performed by the City Engineer's office and will be billed to the developer. The City will provide MS4 construction site inspections on City or County-led projects at City cost; however, inspections will otherwise be performed in the same manner.

Sites will be classified as "high-priority" or "low-priority". Construction sites are considered high priority under the following conditions:

- Whenever there is a collective disturbed but non-stabilized area of 2 acres or more present on the site(s), AND
- Runoff from the site discharges to a receiving water with no intervening permanent and functional stormwater management pond to intercept runoff and remove sediment prior to discharge.

-OR-

- Whenever there is a collective disturbed but non-stabilized area of 10 acres or more present on the development parcel(s), regardless of in place BMPs.

-OR-

- There have been one or more notifications of deficient inspections or violations of the General Stormwater Permit for the site.

All other sites will be low-priority. The City Engineer's Office will inspect high priority sites no less frequently than every two weeks and low priority sites no less frequently than once per month. MS4 field inspections will terminate when the City Engineer's Office has determined that all disturbed areas have been stabilized and has notified the developer and City Planning Dept. in writing. Termination of MS4 inspections will have no bearing on whether inspections are required to continue under the General Storm Water Permit.

The City Engineer's Office MS4 inspections will, at a minimum, include a review of submitted Construction Stormwater Permit inspection reports for construction sites from the site's inspector as well as examining sample inspection locations in the reports and comparing the documentation to actual field conditions. MS4 inspections will be documented and submitted to the City's Community Development department within 48 hours of the inspection.

To ensure inspectors from the City Engineer's Office are appropriately trained and to facilitate training documentation, the inspectors will be certified under the University of Minnesota Erosion and Sediment Control Training program and hold a current certification for SWPPP Design or SWPPP Inspection at the time of any inspection.

11. The City Engineer will provide observation of public improvement work for conformance with the approved plans and specifications or standard industry practice. The City must be notified 48 hours in advance of all work so representatives can be present. Required tests are described in the attached Standard Specifications (See Appendix B). City observation in no way lessens the responsibility of the Developer to provide supervision of Contractors or other oversight to protect his interests. City observers have no authority to relieve the Developer or Contractor from the duty to comply with the plans and specifications and City Code.

12. All sanitary sewer and watermain testing must be completed and copies of service ties submitted to the City prior to issuance of any service connection permits.

13. Upon completion of all work through substantial completion, the City Engineer, a representative of the Developer's Contractor and the Developer's Engineer will make final inspections. This includes a final inspection of all site grading. City Engineer approval of the work is required before any release of security. Acceptance of said work shall be made by Resolution of the City Council upon the recommendation of the City Engineer.

B. The development contract will typically contain the following requirements:

1. The Developer must guarantee all work relating to utilities and their appurtenances, material and equipment furnished by him for a period of two years from the date of City Council acceptance of the work by resolution.

2. The Developer must guarantee all work relating to street, sidewalk, and trail construction including concrete curb and gutter, materials and equipment furnished by him for a period of one year from the date of City Council acceptance of the work by resolution.

3. The City Engineer will update City maps at the Developer's expense. The Developer's Engineer will furnish digital as-built plan files to the City for this purpose.

5.02 Improvements on Private Property

A. If private drives or utilities are included in a development, the following rules apply:

1. Design layout, section, and materials to meet International Fire Code requirements.

2. Be aware that the City's Right of Way Ordinance would apply when public utilities in easements are located under private streets and driveways. The Owner of the street or driveway would be liable for repair/restoration costs if work is required on the utility.

3. A minimum twenty-foot-wide utility and drainage easement (ten feet on each side of the utility) will be required for any public utilities that are not constructed within the public street right-of-way. Widths will increase as necessary for deeper installations.

4. Private utility installation requires a sewer/water permit from the City and will be required to meet all applicable City Standards as determined by the City Engineer and/or Building Official.

5. The entrance to each private drive must include design features that clearly differentiate it from a public street such as a concrete apron or different paving material.

PART 6 - CITY STANDARDS FOR CONSTRUCTION PLANS

6.01 General Requirements

A. Incorporate a title sheet indicating the components of the entire project with corresponding sheet numbers on each separate sheet and an index into the set of plans.

B. Issue plan sheets in a .pdf format legible and scalable when printed on 11 by 17 inch paper only.

C. Use Scott County's coordinate and datum system. Cross-check elevations with City Benchmarks and report any discrepancies.

D. Lay out all utilities in the following approximate locations:

1. Sanitary Sewer ..... on centerline of street right-of-way

2. Watermain ..... 10 feet north or east of centerline

3. Storm Sewer ..... under gutters located south or west of centerline

E. Place a title block in the lower right corner of each sheet. Label each sheet clearly as to its purpose.

F. Place all detail drawings on a separate sheet and reference them from the appropriate sheets.

G. Use symbols common to the industry and lines that are digitally continuous from node to node.

H. Place the profile directly below the plan with the stationing aligned as closely as practical. Show stationing on the plan view as well as the profile.

I. Label all parcels properly, with lot and block numbers and plat name, or P.I.D. in unplatted areas. Show the address of developed parcels on the plan.

J. Clearly label all streets.

K. Create clean matchline breaks and clearly mark reference points. Place all plans which are broken by a matchline on the same or consecutive sheets.

L. Show existing utilities in both plan and profile, stationed and labeled as existing.

M. Show the approximate locations of existing and proposed gas, electric, telephone, and other utility lines.

N. Show rights-of-way and easements and pavement or curb and gutter alignment data.

O. Properly place north arrows for each plan on the sheets.

P. Show benchmarks on all sheets.

Q. Number all manholes and other utility structures in both the plan and profile views.

6.02 Sanitary Sewer Plans

A. Place an "S" in front of the stationing to indicate the stationing of sanitary sewer wyes.

B. Draw all sanitary sewer services on the plan to the proposed length and note the length. Indicate if service is to be installed via a trenchless method. If only the sanitary sewer wye only is to be constructed with no service piping, note "Wye Only" after the stationing. This will only be permitted in areas with no overlying improvements.

C. Show all sanitary sewers in the profile with the appropriate information such as size, material, grades, invert elevations, etc.

D. Show the size, type, and invert elevation at termination of all sanitary sewer services on the plans. If risers are installed, indicate the height of each on the plans and draw them on the profile, calling out the height of each riser as defined by the City's standard detail.

E. On combination sewer and water projects, show services in the same trench, with sanitary sewer services three feet downstream in the sanitary sewer flow direction from water services. Note locations on the plans with an "S & W" in front of the stationing.

6.03 Watermain

A. Call out stations for hydrants, valves and watermain fittings at the bottom of the profile. Provide proposed surface elevations at hydrants.

B. Indicate all water curb stop boxes by a "W" in front of its stationing. Provide proposed surface elevations at curb stops.

C. Draw all water services to the proposed length. Indicate if service is to be installed via a trenchless method. Call out required minimum cover.

D. Show all watermain in the profile with the appropriate information such as size, material, depth below proposed grade, etc.

E. Note the size and type of all water services on the plans.

6.04 Storm Sewer

A. Show all storm sewers in the profile with the appropriate information such as structure type, size, material, gradients, elevations, casting type, etc.

PART 7 - RULES FOR DESIGNERS AND SPECIFIERS

7.01 General

A. General design standards are provided in City Subdivision and Zoning Ordinances (City Code). Consult the Code during design. The City's Standard Construction Specifications and Details are in Appendices B and C of this document. Include relevant sections of the Specifications in the Project Manual and relevant details in the project plans.

B. Project designers and specifiers may need to make decisions during the design that are not dictated by the City Code or Standard Specifications and Details. To guide these decisions, the following rules apply to the design and preparation of plans and specifications for improvement projects in

the City. These rules use terms applicable to design and construction. Use the intent of the rules in preparing documents that create the required result.

C. The Developer's Engineer is solely responsible for providing a quality design that meets all applicable laws and conforms to industry practice. These rules are meant to provide guidance and consistency within the City, but not replace sound engineering judgment and industry practice. Consult with the City Engineer on matters related to the design where there is a difference of opinion or clarification is needed.

D. Do not deviate from the Standard Specifications and Details or the following rules without prior written consent from the City Engineer.

7.02 Grading and Erosion/Sedimentation Control

A. Topographic Survey

1. To minimize drainage problems and disputes at the perimeter of development projects, collect more detailed topographic information and show it on the drawings in these areas.

2. Collect sufficient survey shots such that 0.5-foot contours would be accurate within 0.25 feet. Show these existing spot elevations on any hard surfaces to remain on the grading plan. Provide this level of detail within 50 feet either side of the parcel boundary, at all adjacent drainage ditches, and at all bodies of water, including wetlands.

3. Provide shots on existing adjacent pavement edges or curbs at all breakpoints and at no more than 25-foot intervals.

B. Diversion, Erosion and Sediment Control

1. Divert run-on to the site around or safely through the site to the extent possible to reduce the amount of sediment-free runoff that must be managed by erosion and sediment control devices. Use temporary berms, swales, silt fences or pipes as appropriate.

2. Design erosion and sediment control BMPs in accordance with the General Stormwater Permit for Construction Activity administered by the MPCA and the Minnesota Stormwater Manual.

3. Do not use straw bale check dams; rock dams or roll-type dams with erosion blankets will be required for channelized flows. Design silt fence for sediment control on contour observing maximum tributary areas. Choose construction fence for perimeter delineation if more appropriate than silt fence. Specify orange silt fence on subdivision grading plans and black on lot surveys accompanying a building permit or grading plans for a single parcel.

4. Require tags on BMPs installed by the Developer to facilitate distinguishing from builder BMPs at later stages of the project.

C. Emergency Overflow Path

1. Protect structures per City Code. Do not use pipes for emergency overflows unless no reasonable alternative exists as determined by the City Engineer.

D. Gradients

1. The maximum non-reinforced slope allowed is 4:1 (h:v) in maintained areas and 3:1 (h:v) in non-maintained areas. Use a typical minimum grade for drainage swales of 2% and parking lot pavements of 1.5%; 2% is preferred. Use a maximum grade for parking lot pavements of 6%, except for accessible routes. Comply with ADA rules in these areas.

2. See rules for street design also.

E. Retaining walls

1. Do not show retaining walls, fences, or railings in rights of way or easements without first consulting with the City Engineer.

2. Provide a design by an engineer licensed in accordance with State Law for retaining walls exceeding four feet in height (exposed wall). Place a chain link or decorative barrier fence a minimum of four feet high at the top of walls exceeding 30 inches of drop when within 5 feet of a public area (path, trail, or street).

3. Design retaining walls across multiple lots such that wall on any one lot can be repaired or replaced with no dismantling of walls on adjacent property required. This may require side by side returns into the slope at the property lines or other means to avoid interdependent walls. This requirement may be waived in cases where the wall will be owned and maintained by a Homeowner's Association.

F. Drainage Swale Protection

1. Cover all permanent drainage swales immediately after grading and seeding with 3 or higher, natural-fiber erosion control blanket installed in accordance with manufacturer's recommendations. These swales must be finished to a permanent condition before seeding and blanketing as the intent is to discourage future disturbance or revision of the swale grades by builders or homeowners. The blanket must be installed on the bottom and to one foot above the bottom of all swales to minimize erosion and discourage later modification of the swale by builders or homeowners. Check to see if more rigorous or higher elevation protection of the swale is required due to expected flows.

G. Agricultural Tile Encountered

1. Maintain flow from tile upstream of the site by diversion via piping through the site in drainage easements and reconnection to the existing downstream tile end or receiving water. Do not connect to City storm sewer or treatment facilities. Use non-perforated tile with watertight joints of equal or greater capacity than the existing tile – do not use diversion for temporary or permanent drainage of the site. Use PVC SDR piping 35 in rights of way. Place a cleanout at the connection points to existing tile and at edges of rights of way that conforms with applicable City details.

H. Cut Areas

1. Creation of cut-slopes can expose waterbearing/conducting layers that lead to chronic wetness issues in backyards. Scrutinize up-gradient areas within 500 feet of the grade change for the presence of wetlands or other features that may feed waterbearing layers and evaluate the soil profile using borings and piezometers to determine if curtain drains or alternative grading design is warranted. Alternatively, provide a curtain drain design for installation by the Contractor should waterbearing layers be encountered during grading. The curtain drain shall be designed to prevent water from emerging from the slope.

7.03 Sanitary Sewer

A. Use the following pipe types for gravity sanitary sewer 8-inch through 12-inch. Do not change types between structures.

0-15 feet	PVC SDR 35
15-21 feet	PVC SDR 26
>21 feet	PVC SDR 21

B. Use 4-inch PVC Schedule 40 for service connections.

C. Provide 0.1-foot drop between the inlets and the outlet through manholes unless the pipe size increases.

D. Do not place sewer services directly into dead-ends or manholes.

E. Do not construct inside drops into manholes unless approved by the City Engineer.

F. Connections to existing manholes shall be core drilled with rubber boots inserted into the opening for connection to the new pipe. Call out reconstruction of the invert if necessary to maintain laminar flow and prevent deposition of sediments.

G. Require a mechanical, watertight plug at the connection point to the existing system to prevent groundwater and accidental inflows to the existing collection system during construction of the streets and utilities. This plug can only be removed when grading is complete, all structures are complete to final grade, and all drainage systems including EOFs are operable. Pneumatic plugs are prohibited unless a connected pressure gage is visible from the surface to allow monitoring of the status of the plug.

H. Extend a sanitary sewer stub and plug a minimum of 20 feet beyond pavement edges and/or to the parcel boundary when future extensions are anticipated. The City will require a cash payment in the Developer's Agreement to extend to the parcel boundary if a stub is not possible or pavements are held back to allow access to stubs.

7.04 Watermain

A. Use resilient seat wedge-type gate valves for all pipe diameters.

B. Design services with a minimum nominal size of 1-inch diameter.

C. Couplings are not allowed between the watermain and curb stop.

D. For watermains use Pressure Class 350 ductile iron pipe with poly-wrap or AWWA C900 PVC DR 18 pipe w/ tracer wire only.

E. The use of Mega-lugs, or approved equal, with Cor-Blu bolts, or equal, is allowed in lieu of tie rods.

F. Place watermain and water services with a minimum 8.0 feet of ground cover from the top of pipe to finished grade.

G. Provide hydrants in conformance with the Fire Code.

H. Install gate valves on all hydrant leads. Provide sufficient valves on the system such that each hydrant can be isolated without relying on hydrant valves

I. Use plugs at the terminal end rather than valves on future stubs to avoid the need for future extensions to test against existing valves or the need for redundant valving. It is recognized that this will require a short outage in the future.

J. The Developer is responsible to ensure all hydrants are at the required height after lawns, boulevards, etc. are finished (sod, seed, etc.). To ensure the requirement is met, compute the finished grade at the hydrant and provide this information on the plans.

K. Install hydrant flags on all fire hydrants.

L. Extend a watermain stub a minimum of 10 feet beyond pavement edges and/or to the parcel boundary when future extensions are anticipated. The City will require a cash payment in the Developer's Agreement to extend to the parcel boundary if a stub is not possible or pavements are held back to allow access to stubs. Place a valve and hydrant at the end of the stub.

7.05 Storm Sewer and Stormwater Facilities

A. Design the storm sewer piping system for a 10-year storm using the Rational Method. Design an overland conveyance system (emergency overflow) for a 100-year storm, ensuring large storms are routed to ponds or other stormwater management facilities and will not bypass them.

B. Provide adequate inlet locations and capacity to keep flow spreads at least 8 feet from road centerlines for a 10-year storm.

C. Use RCP or dual-wall HDPE for all piping applications unless approval is received for alternatives. All storm sewer must have water-tight joints.

D. Use Corrugated metal pipe and HDPE pipe only with **prior** written approval by the City Engineer.

E. Use perforated 4–inch or 6–inch HDPE for subsurface drainage. Ensure filter aggregate cannot infiltrate perforations.

Commented [RR1]: 36 inches of cover minimum, no inlets at property corners

F. Place subgrade drains 50 feet each way and perpendicular to centerline at low point catch basins and 50 feet on the uphill side and perpendicular to centerline for all on-grade catch basins.

G. Use precast boxes and sections wherever possible. Do not use block construction if avoidable. The City Engineer may require sumps in some areas to capture larger sediments.

H. Fit all existing inlets receiving runoff from the site and all new storm sewer inlets when functional with a sediment trapping device per the City's Standard Detail or pre-approved equal in order to prevent sediment from entering storm sewer systems during construction.

I. Equip flared end sections with trash guards when requested by the City Engineer.

J. Riprap and/or energy dissipaters are required for all sizes of aprons or end sections to prevent erosion.

K. Tie the last three joints approaching inlet and outlet aprons or end sections.

L. Extend a storm sewer stub and plug a minimum of 10 feet beyond pavement edges and/or to the parcel boundary when future extensions are anticipated. The City will require a cash payment in the Developer's Agreement to extend to the parcel boundary if a stub is not possible or pavements are held back to allow access to stubs.

M. Use the following values for hydraulic and hydrologic design unless variation is clearly supported by engineering data.

1. Rational Method Runoff Coefficients

   a. Pavements 0.95

   b. Rooftops.....0.95

   c. Lawns/Landscaping.....0.20

2. Manning's Equation "n" Values

   a. PVC/HDPE 0.011

   b. RCP 0.013

   c. CMP 0.024

   d. Grass Channel .....0.030 – 0.040

3. Time of Concentration "Tc" is to be computed and summed for each flow regime for the longest-duration flow path tributary to the point of interest. Provide computations for review.

N. Design all grading and overflow drainage routes with elevation differentials per the Zoning Ordinance.

O. Design the maximum backyard swale length at 300 feet or four residential lots, whichever is shorter. Use storm sewer and inlets as necessary to meet this requirement. The City Engineer may require draintile in other swales or low areas if surface drainage feasibility is questionable. Inlets placed at lot corners are prohibited due to interference with future private fencing and property irons.

P. Sump pump discharges are prone to create nuisances in yards and slippery algae and ice buildup on City streets. Install perforated drain tile in the backyard of all houses to aid surface drainage between storms with an outlet and cleanout riser at each lot for sump pump connections and future private drain tile. The backyard tile may be omitted from yards adjacent to wetlands or stormwater ponds if approved by the City Engineer. The tile will be separate from and in addition to any storm sewers placed in the rear yard for primary surface drainage.

1. Provide a capped service stub for each house. Do not call for connecting sump pump outlets to street subsurface drainage systems.

2. Include the tile, service stub, and sump pump connection details on the plans.

3. Provide a minimum of 6 inches of crushed rock below the tile and 12 inches above the tile to promote infiltration instead of drainage of sump discharges, promote absorption of surface water and increase the capacity of the tile system.

4. Inlets placed at lot corners are prohibited due to interference with future private fencing and property irons.

Q. Design the project's grading and drainage system to meet the requirements of the City Code.

R. Additional Pond Design Parameters

1. Design basin side slopes to a maximum of 3:1 above the normal water level. Create a 10 foot wide bench with a maximum slope of 10:1 extending into the pond from the normal water level. Design slopes inside the bench in the dead storage area with 3:1 (h:v) side slopes or steeper if supported by recommendations from a geotechnical engineer.

2. Provide an emergency overflow structure or stabilized spillway to accommodate discharges from storms greater than the design storm.

3. Provide adequate access to the safety shelf and outlet structure for future maintenance including easements, grading and elimination of obstructions. The minimum width of the route is 10 feet. Keep slopes under 15% in the running direction and 4% in the cross direction to travel. Design a means for draining or pumping the pond dry for maintenance from an accessible structure.

4. Design landscaping to provide a vegetative buffer landward from the edge of the permanent pool per the Zoning Ordinance. The purpose of the buffer is to provide a more natural aesthetic, prevent erosion near the pond banks, discourage entry by persons, provide for wildlife diversity, filter runoff, and minimize nuisance conditions from waterfowl.

S. Bioretention (Rain Garden) or Infiltration Device Design Parameters

a. Do not use rain gardens or infiltration devices for temporary sediment control during construction. Establish rain gardens only after other disturbed areas have been stabilized.

b. Prevent disturbance, especially compaction, of the area where the facility is planned. If disturbance is unavoidable, do not allow excavation within 12 inches of the final design grade until immediately prior to establishing the rain garden.

c. Design rain gardens or basins to drain the surface in 72 hours or less to protect vegetation and minimize mosquito breeding. All raingardens and infiltration facilities require an underdrain system with an invert at least 6 inches above subgrade and fully enclosed by the engineered soil filter. Provide subgrade storage as needed to meet volume control requirements intended for the device.

d. Import and/or modify soils as necessary to create an infiltration layer that will support vegetation yet allow water to pass through in the required time frame. The facility will be rejected if vegetation is not established or sustainable due to too-rapid drainage and/or surface water does not infiltrate through the infiltration layer as required.

e. Design the system to bypass storms exceeding the design storm around the basin, not flush through it.

f. Submit recommendations from a licensed landscape architect for plantings.

g. Provide adequate access for future maintenance including easements, grading and elimination of obstructions.

T. Wetland Design Parameters

a. Do not discharge untreated, post-development runoff to natural wetlands or wetlands created to replace impacted wetlands. Do not alter hydrologic conditions, including groundwater levels, for natural wetlands. Streets within 50 feet of wetlands require geotechnical analysis to ensure soils can be made stable with no impact on wetland water levels.

b. The City is the LGU for the Wetland Conservation Act. Refer to the Zoning Ordinance for grading permit requirements.

c. Include an outlet structure and emergency spillway or bypass in the design as described for ponds and rain gardens, above. Use a bypass system whenever possible.

d. Require the removal of all existing wetland soils from the created wetland buffer and mitigation areas. Do not allow wetland soils to be used as fill or topsoil in the wetland mitigation or new buffer areas. This is to help eliminate undesirable plant species such as Reed Canary Grass or Cattails.

e. Treat all newly constructed wetland and buffer areas with herbicide prior to planting and seeding to control weed growth. Use herbicide that breaks down within 14 days. Treat the areas sufficiently in advance to allow breakdown to occur before planting.

f. Plant all new wetland mitigation sites with a variety of wetland species at a minimum rate of 1,000 plugs per acre in addition to appropriate seeding.

g. Install a line of silt fence along the edge of the existing wetland prior to any grading for new wetland buffer areas adjacent to existing wetlands. Install a second line of silt fence along the edge of the buffer area after the buffer area has been graded, prepared, seeded, planted and buffer monuments placed. Maintain both lines of silt fence.

7.06 Streets and Walks

A. Use Detail 1000 ENM and street widths per the Subdivision Ordinance.

B. Obtain a recommendation from a licensed Geotechnical Engineer for corrective work where soil tests indicate the presence of unsuitable soils, frost susceptible soils, or excessive ground moisture.

C. Detail an 18-inch milled lap joint when connecting to an existing pavement to facilitate grade matching and avoid a full-depth transverse joint.

D. Use a minimum grade for all streets of one half of one percent (0.5%). Set grades within thirty (30) feet of travel lane edges at intersections with arterial and collector streets and grades for the turnaround portion of a cul-de-sac street at a maximum of three percent (3%). Use the following maximum grades on other City streets:

1. Minor Arterial – 5% maximum grade
2. Collector – 5% maximum grade
3. Local/Residential, Commercial Driveways – 8% maximum grade
4. Residential Driveways – 10% maximum grade, 15% max. grade change

E. Valley gutters are not allowed. Use storm sewer with inlets at low point corners where a minimum grade of 2% cannot be maintained in the flow path across any intersection.

F. Provide a cul-de-sac at the end of any permanent dead-end street.

G. Close all temporary dead-end streets with barricades (MnDOT 8002F) that are fully reflectorized and properly maintained until the street is extended. Provide a paved temporary Fire Code-compliant turn-a-round if there will be driveway access to any street exceeding 150 feet that is

dead-ended until future expansion. Design drainage and erosion control to prevent soil erosion at the dead-end.

H. Obtain the street classifications, design speeds, intersection setbacks, and connection permits from the City Engineer or County Engineer, depending upon roadway jurisdiction.

I. Place the final surface at least winter season after the base construction is completed and in conformance with the Development Contract.

J. If the City Engineer approves the placement of bituminous base and wear in the same year, the Developer will be required to repair any settlements, holes, etc. caused by construction in the area the following year and then fog seal the street.

K. Extend the street section to the parcel boundary where future extensions are anticipated. Place sufficient funds in escrow with the City if construction to the plat boundary is not possible.

L. Design and include all traffic control signage and pavement markings required for the project in accordance with the current version of the Minnesota Manual of Uniform Traffic Control Devices (MMUTCD).

M. Include Pedestrian Curb Ramps for the Handicapped per MnDOT Standard Plans when applicable.

7.07 Trails

A. Use City Standard Detail for trails. Excavate unsuitable soils and make recommendations for necessary corrective work. The City may require cash payment in lieu of trail surfacing by the Developer. In these cases the trail will be graded and surfaced with four inches of wood chips by the developer. The City will place the aggregate base and pave the trail when it deems completion is appropriate.

B. Install culverts as necessary to accommodate cross drainage.

C. Provide horizontal, vertical, and cross sectional design elements per the MnDOT Bikeway Design Guide for Shared Use Paths.

D. Clear all trees, stumps, brush, etc., within four (4) feet of the edge of the trail. The exception will be only hardwood trees or others that the City agrees should remain. Plant no landscaping prone to grow branches into the trail area or cause root damage to the trail.

7.08 Street Lights

A. Provide street lights in coordination with the Electric Service Provider's lease program at the following locations: where any street intersects another and favoring the quadrant where most ped crossings are expected to occur; any mid-block pedestrian crossings; points of special interest such as a park or trail entrance, transit stop, or similar feature; lights subject to a maximum spacing of 600 feet.

B. Street lights to be cobra-head style on 30 foot fiberglass black or brown direct-bury poles with LED luminaires.

C. Decorative lighting desired by the Developer would be above and beyond the minimum lighting described above and installation, operation, and maintenance would not be paid by the City.

7.09 General Rules to be reflected in Plans and Specifications:

A. Submit a plan for the routing of construction traffic to the City Engineer for his approval. If alternative major streets are available, the use of local City streets is prohibited. Keep City streets

that are used for access or egress to the construction site free of dirt and other debris. Maintain adequate control of dust.

B. Furnish, erect, and maintain signs and barricades as provided in MnDOT 1710 "Traffic Control Devices" under the General Conditions to protect the public. Notify the City Engineer 48 hours prior to the proposed partial blockage or closure of any street or public right-of-way. Close no street or public right-of-way without an Obstruction Permit obtained from the City and issued under the City's Right of Way Ordinance.

C. Protect and leave undisturbed those markers or monuments set for the subdivision of land.

D. Clear and grub the standard ten (10) foot utility and drainage easement adjacent to the street right-of-way for the placement of utilities. The only exception will be any hardwood trees or others that the City Forester authorizes to remain standing. Call out the tree removal and grubbing on the plans. Call out those trees to be protected.

E. .

F. Perform all seeding and sodding in conformance with MnDOT Specifications. Cover all disturbed areas with a minimum of 4" of topsoil, free of unsuitable materials, prior to turf establishment pursuant to the Subdivision Regulations. Stabilize slopes equal or steeper than 3:1 with erosion control blanket Category 3 or higher with natural fibers only. Indicate the type of turf establishment and areas requiring blankets on the plans.

G. Place structure marker signs at the City's request per City details for aprons/flared ends, manholes, and gate valves that will be located in green areas to be maintained by the City or County or not regularly mowed.

H. Require the Contractor to maintain vegetation heights at 12 inches or less at all times during construction except for pond and wetland buffers. Hand pull or spot treat noxious or invasive weeds as necessary in these areas until accepted by the City.

PART 8 - CITY STANDARDS FOR RECORD PLANS (IF PREPARED BY DEVELOPER)

8.01 General

A. Draft record plans using CAD. Copy the project plan file and identify it as "Record Plan" in the title block and lower right-hand corner of each sheet.

8.02 Provide x,y coordinates of all gate valves and water service shutoffs using survey-grade GPS equipment or better. The Developer may request the City Engineer obtain this information at the Developer's expense. Information Required

1. List the name and address of the contractors that performed the work.

2. Cross out incorrect elevations, distances, etc. on record plans with a single line, leaving the design information legible. Add the as-built information above or below the crossed out design information, making sure the notation clearly indicates the revision.

3. Provide record plans of all drainage swales and ponding areas. Indicate spot elevations, breaklines, and finished contours at two-foot intervals from the bottom of the pond to a minimum of two feet above the emergency overflow level cited on the plans. Show the normal water elevation, high water elevation, overflow elevation, and the acre-feet of storage for each ponding area, along with the storm sewer outlet on the plans. Clearly identify the required 10:1 bench and the access routes on the record plan if changed.

4. Provide spot elevations for the corners of all building pads.

5. Shoot elevations and x,y coordinates of any casing pipe ends and the top nut of all new or relocated/adjusted hydrants on the record plan sheets. Provide top nut of hydrant elevations on the watermain plan sheet.

6. Revise as-built horizontal dimensions if deviating from proposed locations by more than one foot. Recalculate and show the revised percent of grade.

7. Record force main locations by tying in all bend locations. Refer to Items 10 and 11.

8. The City Engineer will create record information for lift stations. Refer to Items 10 and 11.

9. Locate all gate valves with at least two ties, using the following priority:

   a. Fire hydrants

   b. Manholes

   c. Catch basins, if curb and gutter is installed

   d. Building or other permanent structures

   e. Power poles, trees, other semi-permanent items

   f. Stationing from hydrant, manhole, or catch basins may be used with back of curb distance only as last possible means

10. Locate all services with at least two ties, using the following priority:

    a. Fire hydrants

    b. Manholes

    c. Catch basins, if curb and gutter is installed

    d. Building or other permanent structures

    e. Power poles, trees, other semi-permanent items

    f. Stationing from hydrant, manhole, or catch basins may be used with offset to back of curb distance only as the last possible means

11. The size, material and class, and invert elevation of all sanitary sewer services shall be shown on the plans. If risers are installed, the height of each shall be indicated on the plans, also drawn on the profile, along with the height of each riser. Locations of the services will be noted on the plans with an "S & W" preceding the stationing. Stationing must be provided as measured from the nearest downstream sanitary manhole.

12. Show storm sewer mainlines and laterals on the plan and profile sheets.

13. Show where geotextile grid, fabric or pipe insulation has been placed and subgrade corrections made on the plan portion of the record plans. Also indicate if any surcharging has been used.

8.03 Submittal of Record Plans

A. Prior to submitting the final record plans, submit two 22"x34" paper copies to the City Engineer for review and comments.

B. Submit a digital copy in a format acceptable to the City Engineer **after** final comments from the City have been addressed.

PART 9 - STANDARD TECHNICAL SPECIFICATIONS

Applicable Specifications:

9.01 City of Elko New Market Standard Construction Specifications
Copies of these specifications are included as an appendix to this manual.

9.02 City Engineer's Association of Minnesota (CEAM), Construction Standard Specifications
This information is available at www.ceam.govoffice.com .

9.03 Minnesota Department of Transportation Standard Specifications for Construction, latest edition.
A copy of this document is not included in this manual. However, the MnDOT "Spec" is widely used and distributed throughout the industry. It is also available for viewing online at www.dot.state.mn.us.

PART 10 - DETAILS

The following Details shall be used in the preparation of plans and specifications. Details higher on the list supersede details lower on this list when similar

10.01 Standard City Details – Available from the City Engineer

10.02 MnDOT Standard Plans and Details – Available online at www.dot.state.mn.us

10.03 Manufacturer Details for the item or material furnished.

10.04 Details prepared by the Developer or his Consultant