

Project Scope (Check All That Apply):

Water Main Extension

Description / Notes: _____

Sewer Main Extension

Description / Notes: _____

*If the site requires a line extension, the remaining sections of this packet must be completed and submitted to BGMU.

Private Utility Connections (Check All That Apply):

New Water Service

Description / Notes: _____

New Sewer Service

Description / Notes: _____

*If the site only requires private utility connections, BGMU's review will be limited to the Joint Utility Plan, and no further documentation from this packet is required. Tap applications, however, must still be submitted and paid for through the BGMU office once construction has started.

BGMU Project #	
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**APPLICATION FOR THE CONNECTION OF
NEW FACILITIES TO EXISTING WATER AND/OR SANITARY SEWER UTILITIES**

Name of Development: _____

Owner Developer Information

Owner (s) – Developer (s) Name & Addresses:	_____	
Main Contact Name:	_____	
Contact Phone #:	Contact Email:	_____

Engineer Information

Firm Name & Addresses:	_____	
Design Eng. Name:	_____	
KY. PE Lic. #	Phone #	_____
Contact Phone #:	Contact Email:	_____

Development Information

Acreage	_____	Zoning	_____
Density	_____	Est. Const. Start	_____
Estimated Average Lot Size (if development is other than single-family dwelling, give an adequate description of proposed type, number, locations, uses, etc. of proposed buildings.)			

Est. Peak Water Demand without Fire Flow:	_____
Est. Peak Water Demand with Fire Flow:	_____
Est. Peak Wastewater Flow:	_____
Breakdown of Expected Meters	5/8" _____
	1" _____
	2" _____
	Other _____

Checklist of Attachments:

- Overall Utility Plan Attached
- Executed Owner/Engineer Contract
- Executed Conditions for Acceptance Form

Review Fees	
<input type="checkbox"/> Small Development Review	\$1,000 – Water or sewer lines less than or equal to 8” in diameter and less than 3,000 linear feet each.
<input type="checkbox"/> Large Development Review	\$1,500 – Water or sewer lines greater than 8” in diameter or includes a pump station or water/sewer lines greater than 3,000 linear feet each.
<p>BGMU will utilize the attached checklist for review. If a set of plans contains a deficiency that is clearly shown on the checklist, BGMU will return the set of plans with a copy of the marked-up checklist. Owner/Developer will then be responsible for payment of an additional review fee once the project is resubmitted.</p>	

Owner/Developer Signature _____

Date: _____

Engineer Signature _____

Date: _____

BOWLING GREEN MUNICIPAL UTILITIES WATER DIVISION
BOWLING GREEN, KENTUCKY

WAIVER OF REFUND PROVISIONS OF KRS 96.539

The undersigned developer acknowledges that he (it) has been duly advised by representatives of the Water Division of Bowling Green Municipal Utilities (BGMU) of the provisions of KRS 96.539 (which is set out in its entirety at the bottom of this form) and further acknowledges that he (it) has been advised by representatives of BGMU that under the applicable regulations of BGMU the developer is entitled to enter into a contract with BGMU under the terms of which BGMU will charge privilege fees to customers connecting their service lines to the water and/or wastewater extensions which have been or are now being installed by the developer and to refund to the developer all or a portion of the cost of such water and or wastewater lines over a period not to exceed ten years by utilizing the privilege fees collected from persons attaching to such service lines.

The developer represents to BGMU that he (it) considers it to be in his (its) best interest to attempt to recover the cost of the extended water and/or wastewater facilities in some manner other than provided by KRS 96.539 and the regulations of BGMU, such as by utilizing a special assessment bond issue or by adding to the tentative selling price of property owned by the developer which is intended to be served by the extended water and/or sewer mains a sufficient sum to recover the cost of such extensions.

The developer hereby elects to waive any and all rights he (it) might have under the provisions of KRS 96.539 and the BGMU regulations issued pursuant thereto to obtain refunds from BGMU for all or a portion of the cost of the water and/or wastewater main extensions.

The water and/or wastewater main extensions which are the subject of this waiver are more particularly described as follows:

Date (month date, year): _____

Owner/Developer: Printed Name: _____

Signature: _____

Title: _____

96.539 Any water or sewer utility owned by a city shall develop rules to govern extensions of service to unserved customers and areas. These rules may require that the applicants for new service pay to the utility all or part of the cost of extending utility lines. Where such payment is required, however, the cost of any extensions greater than one hundred feet per applicant shall be subject to refund by the utility on a prorated basis for each additional customer whose service line is directly connected to the extension line paid for by the initial applicant or applicants. The refund period shall extend at least ten years, and in no case shall the refund amounts exceed the amount paid. Nothing in this section shall be construed to prevent a water or sewer utility from adopting extension or refund policies which are more lenient to customers than are herein specified.

BOWLING GREEN MUNICIPAL UTILITIES WATER-WASTEWATER DIVISION
BOWLING GREEN, KENTUCKY

ELECTION TO UTILIZE REFUND PROVISIONS OF KRS 96.539

The undersigned developer acknowledges that he (it) has been duly advised by representatives of the Water and Wastewater Division of Bowling Green Municipal Utilities (BGMU) of the provisions of KRS 96.539 (which is set out in its entirety at the bottom of this form) and further acknowledges that he (it) has been advised by representatives of BGMU that under the applicable regulations of BGMU the developer is entitled to enter into a contract with BGMU under the terms of which BGMU will charge privilege fees to customers connecting their service lines to the water and/or wastewater extensions which have been or are now being installed by the developer and to refund to the developer all or a portion of the cost of such water and or wastewater lines over a period not to exceed ten years by utilizing the privilege fees collected from persons attaching to such service lines.

The developer represents to BGMU that he (it) considers it to be in his (its) best interest to attempt to recover the cost of the extended water and/or wastewater facilities as provided by KRS 96.539 and the regulations of BGMU, and does therefore agree to comply with the following regulations:

1. The plat of the development submitted to the Bowling Green-Warren County Planning and Zoning Commission for recordation shall contain language on the face of it and in prominent lettering that any person who desires to connect to the water and/or wastewater mains in that development must pay a privilege fee prior to making the connection.
2. The Licensed Professional Engineer (Engineer) employed by the developer shall submit a preliminary agreement to BGMU which includes a cost estimate for the total project and a proposal as to how privilege fees can be determined in order to attempt to provide for recovery of the costs over a period not to exceed ten years. It is suggested in the BGMU Specifications Manual that the privilege fee be based on a formula with the denominator being linear front footage, square footage or service connection numbers and sizes, with the final judgment to be reserved by BGMU. The numerator will be total of all engineering and construction costs, excluding interest.
3. Bids for the water and/or wastewater facilities shall be advertised and received in accordance with KRS 45A.365 and will be opened in the presence of a representative of the Engineer, Developer and BGMU and any bidders who may desire to attend. Subject to joint approval of all three parties, bids will be awarded based on the lowest and/or best bid.

4. A refund agreement shall be prepared based on the preliminary agreement as covered in Item 2 above, stating the exact amount and application of privilege fees, which will be collected by BGMU and paid to the Developer on January 1 of each year over a period not to exceed ten years, with total payment not to exceed total project cost. Where the refund agreement is applicable to a subdivision, a copy of the refund agreement will be lodged for record in the Miscellaneous Book in the office of the Clerk of the Warren County Court in order to enable prospective purchasers of lots, title examiners and the other interested persons to determine from the public records the amount of the privilege fee applicable to any particular lot in the development.

The water and/or wastewater mains extensions which are subject of this election are more particularly described as follows:

Date (month date, year): _____

Owner/Developer: Printed Name: _____

Signature: _____

Title: _____

96.539 Any water or sewer utility owned by a city shall develop rules to govern extensions of service to unserved customers and areas. These rules may require that the applicants for new service pay to the utility all or part of the cost of extending utility lines. Where such payment is required, however, the cost of any extensions greater than one hundred feet per applicant shall be subject to refund by the utility on a prorated basis for each additional customer whose service line is directly connected to the extension line paid for by the initial applicant or applicants. The refund period shall extend at least ten years, and in no case shall the refund amounts exceed the amount paid. Nothing in this section shall be construed to prevent a water or sewer utility from adopting extension or refund policies which are more lenient to customers than are herein specified.

**Conditions for Acceptance of
Water and/or Sanitary Sewer Facilities by BGMU Water Division**

1. All procedures and requirements state in the “Water/Wastewater Standards and Construction Specifications Manual” for the design, construction, inspection and final acceptance of facilities that will become assets of the BGMU system shall comply with, unless a variance is granted in writing by this Utility.
2. It is the responsibility of the Owner/Developer to employ a contractor that is qualified and experienced in performing the type of construction required for this project.
3. A copy of the letter to the Kentucky Energy and Environment Cabinet from a licensed engineer in the state of Kentucky certifying that facilities have been constructed in accordance with approved plans and specifications shall be sent to BGMU.
4. Shop Drawings for all material and equipment must be approved by the Engineer and will be reviewed by BGMU prior to issuance of the Notice to Proceed for construction.
5. The Engineer’s inspector must submit daily inspection reports on a weekly basis to the utility during the construction phase of the project. The engineer is required to have an inspector present during any construction of facilities that are to become part of the BGMU water and/or sanitary sewer system.
6. The notice to proceed for construction of water and/or sanitary sewer facilities will not be issued by BGMU until the rough grade on the streets and drainage ditches have been approved by the correct governing agencies.
7. A final surface inspection of the project will be conducted and punch list generated before acceptance. “As-Built” plans, kept in the field by the Engineer’s Inspector and Contractor, shall reflect any changes of the approved plans and shall show final elevations of all facilities, to include sewer service laterals.
8. Record Drawings shall include a dated certification by a licensed engineer that the facilities were constructed in accordance with BGMU specifications and shall have an original signature of the engineer on each sheet.
9. A copy of the Record Drawings shall be submitted in electronic format compatible with AutoCAD. Record drawings are required to use NAD83/Kentucky Single Zone coordinate system and utilize field techniques for an accuracy of 90% within 2 centimeters of real-world coordinates.
 - a. Points will be required on all water main fittings, fire hydrants, valves, curb stops, manholes, cleanouts, and end of sewer laterals.
 - b. GPS data must be submitted in a format compatible with AutoCAD or ESRI products.

Failure of the Owner/Developer, Contractor or Engineer to comply with the above conditions shall result in the utility not accepting the water and/or sanitary sewer facilities constructed.

Owner/Developer Signature _____ Date: _____

Engineer Signature _____ Date: _____

Inspection Fee – Estimation

The form below is an excerpt from a spreadsheet that BGMU will use to estimate Construction Inspection Fees. These fees will be collected before construction can begin on any water or sewer line that will become part of BGMU’s Distribution or Collections System.

The form has been completed with a basic project that has a 500’ water line extension and 500’ sewer line extension. Spreadsheet is available upon request, to estimate fees for owner/developers. However, it is the sole discretion of BGMU on what the final numbers are used to calculate the estimate. BGMU will have daily inspection reports for time spent on site, and will return any funds remaining from the estimate once as-builts have been received and the line is fully accepted.

Breakdown of Water Inspection and Testing Fees			
Standard Costs			
	Inspector Charged Hourly Rate	\$52.50	
Water Line Inspection Fees			
	Linear footage of Water Line in Development	500 LF	
	Expected Installation Production	150 LF/Day	
	Expected Construction Time	3 Days	
	Expected time on jobsite per day	2 Hours	
	Estimated Inspector time for construction	6	
	Cost of Onsite inspection	\$315.00	
Water Line Testing Fees			
	Bac-T Tests	1 Each	
	Fill line and check for super chlorination	2 Hours	
	Flush line to System Chlorine	1 Hour	
	Bac-T Test run by BGMU Lab	\$100.00	
	Cost per Bac-T Sample	\$157.50	
	Cost for estimate Bac-T Samples	\$157.50	
	Pressure Test	1 Each	
	Pressurize Line	1 Hour	
	Download Pressure Recorder	1.5 Hours	
	Cost of Recorder	\$20.00 per test	
	Cost of Pressure Tests	\$151.25	
	Tracer Wire Test		
	Test Production	500 LF/Hour	
	Expected Testing	1 Hours	
	Cost of Tracer Wire Inspection	\$52.50	
Estimated Total Water Inspection Fees		\$676.25	

Breakdown of Sewer Inspection and Testing Fees			
Standard Costs			
	Inspector Charged Hourly Rate	\$52.50	
Sewer Line Inspection Fees			
	Linear footage of Gravity Sewer Line in Development	500	LF
	Number of Manholes	3	Each
	Pipe Segments	2	Each
	Expected Utility Production	100	LF/Day
	Pump Station Installation	0	Each
	Linear footage of Force Main	0	LF
Expected Construction Time			
	Linework	5	Days
	Manholes (assume 2 hours)	6	Hours
		0.75	Days
	Pump Station (assumed 20 days construction time)	0	Days
	Inspection Time onsite per day	2	Hours
	Inspection Hours	11.5	Hours
	Inspection Cost	\$603.75	
Sewer Testing Fees			
Manhole Vacuum Testing			
	Time per Vacuum Test	0.5	Hour
	Total Time for Vacuum Testing	1.5	Hours
	Cost of Vacuum Testing	\$78.75	
Low Pressure Testing			
	Time per Segment	0.5	Hour
	Total Time for Pressure Testing	1	Hours
	Cost of Pressure Testing	\$52.50	
Pressure Test Forcemain			
		0	
	Pressurize Line	1	Hour
	Download Pressure Recorder	1.5	Hours
	Cost of Recorder	\$20.00	per test
	Cost of Pressure Tests	\$0.00	
Tracer Wire Test			
	Test Production	500	LF/Hour
	Expected Test Length	0	Hours
	Cost of Tracer Wire Test	\$0.00	
Estimated Total Sewer Inspection and Testing Fees		\$735.00	

Owner/Developer Project Milestones

The following is a list of the milestones for your use during the development of this project. The requirements are listed in the order they should be submitted/conducted. Please contact your Engineer as to the status of your development. He is required to provide full-time inspection and contact administration during construction, testing, and acceptance of these facilities.

1. Development Packet with attachments signed and payment of review fees.
2. Project design submitted to Utility for review. (1 electronic set in PDF format)
 - a. Project design returned to Engineer for corrections, BGMU will review within 2 weeks.
 - b. Project design returned to Utility correct and with payment of additional review fees, BGMU will review within 2 weeks. (1 electronic set in PDF format)
3. Project design approved by Utility for construction and Acceptance Letters provided to Engineer for Division of Water application.
4. Engineer to send plans, specifications, and acceptance letters to Division of Water for approval.
5. Utility line(s) inspection and fee paid (this is an estimation of cost). Additional money to be refunded after final as-built drawings and shape files have been received and approved by the utility.

Breakdown of Water Inspection and Testing Fees			Breakdown of Sewer Inspection and Testing Fees			Summary Sheet											
Standard Costs	Inspector Charged Hourly Rate	\$52.50	Standard Costs	Inspector Charged Hourly Rate	\$52.50	The detail in these tables above, are designed to establish estimates for inspection services. BGMU will track hours for the inspector and return any money not spent during the course of the job. However, underestimated hours or additional time required for the inspector will result in the Owner/Developer receiving a bill for the additional costs.											
Water Line Inspection Fees			Sewer Line Inspection Fees					<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;">Summary Table</td> </tr> <tr> <td>Water Line Inspection and Testing Fees</td> <td style="text-align: right;">\$1,148.75</td> </tr> <tr> <td>Sanitary Sewer Inspection and Testing Fees</td> <td style="text-align: right;">\$945.00</td> </tr> <tr> <td>Deposit for Inspection Services</td> <td style="text-align: right;">\$2,100.00</td> </tr> <tr> <td colspan="2" style="text-align: center;">Rounded to nearest \$100</td> </tr> </table>		Summary Table		Water Line Inspection and Testing Fees	\$1,148.75	Sanitary Sewer Inspection and Testing Fees	\$945.00	Deposit for Inspection Services	\$2,100.00
Summary Table																	
Water Line Inspection and Testing Fees	\$1,148.75																
Sanitary Sewer Inspection and Testing Fees	\$945.00																
Deposit for Inspection Services	\$2,100.00																
Rounded to nearest \$100																	
Linear footage of Water Line in Development	500 LF		Linear footage of Gravity Sewer Line in Development	500 LF													
Expected Installation Production	100 LF/Day		Number of Manholes	2 Each													
			Pipe Segments	1 Each													
Expected Construction Time	5 Days		Expected Utility Production	100 LF/Day													
Expected time on jobsite per day	3 Hours		Pump Station Installation	0 Each													
			Linear footage of Force Main	0 LF													
Estimated Inspector time for construction	15		Expected Construction Time														
Cost of Onsite Inspection	\$787.50		Linework	5 Days													
Water Line Testing Fees			Manholes (assume 2 hours)	4 Hours													
Bac-T Tests	1 Each			0.5 Days													
Fill line and check for super chlorination	2 Hours		Pump Station (assumed 20 days construction time)	0 Days													
Flush line to System Chlorine	1 Hour		Inspection Time onsite per day	3 Hours													
Bac-T Test run by BGMU Lab	\$100.00																
			Inspection Hours	16.5 Hours													
Cost per Bac-T Sample	\$157.50		Inspection Cost	\$866.25													
Cost for estimate Bac-T Samples	\$157.50		Sewer Testing Fees														
			Manhole Vacuum Testing														
Pressure Test	1 Each		Time per Vacuum Test	0.5 Hour													
Pressurize Line	1 Hour		Total Time for Vacuum Testing	1 Hours													
Download Pressure Recorder	1.5 Hours		Cost of Vacuum Testing	\$52.50													
Cost of Recorder	\$20.00 per test		Low Pressure Testing														
Cost of Pressure Tests	\$151.25		Time per Segment	0.5 Hour													
			Total Time for Pressure Testing	0.5 Hours													
Tracer Wire Test			Cost of Pressure Testing	\$26.25													
Test Production	500 LF/Hour		Pressure Test Forcemain														
Expected Testing	1 Hours		Pressurize Line	1 Hour													
Cost of Tracer Wire Inspection	\$52.50		Download Pressure Recorder	1.5 Hours													
			Cost of Recorder	\$20.00 per test													
			Cost of Pressure Tests	\$0.00													
Estimated Total Water Inspection Fees	\$1,148.75		Tracer Wire Test														
			Test Production	500 LF/Hour													
			Expected Test Length	0 Hours													
			Cost of Tracer Wire Test	\$0.00													
			Estimated Total Sewer Inspection and Testing Fees	\$945.00													

6. Division of Water approval for construction received. Engineer to submit Division of Water approved plans and specs to BGMU. (1 electronic set in PDF format)

7. Engineer to send reviewed shop drawings to Utility for review, in electronic format. (1 electronic set in PDF format)
8. Pre-construction Conference with Utility to ensure Contractor has all approved plans and discuss schedule.
9. Notice to Proceed from Utility to Developer.
10. Construction initiated (BGMU must be informed when construction is initiated and the inspector will visit site daily to GPS locate utilities, verify quality of work and progress).
11. Any changes to project must be approved in writing by the utility. (if required)
12. Construction completed.
13. Testing (BGMU must be present for any utility testing)
 - a. Water system disinfected
 - b. Disinfection Record Complete
 - c. Bacteriological test results received and passed
 - d. System Pressure Tests
 - i. Water
 - ii. Sewer – Low Pressure Test
 - iii. Force main
 - iv. Manhole – Vacuum Test
 - e. Mandrel Test conducted (gravity sewer)
 - f. CCTV Inspection of Gravity Sewer (PACP certified)
14. Walkthrough and punch list with preliminary set of paper “As Built” drawings. Utility to provide punch-list from walkthrough and final inspection to Owner/Developer and Engineer.
15. Contractor to correct any deficiencies noted on punch list. Owner/Developer and Engineer to notify Utility that project is ready for final inspection.
16. Final inspection performed.
17. Engineer will send a dwg or shapefile of points collected during construction as well as an electronic set of record drawings in PDF format.
18. Any overage of inspection estimated fees will be refunded upon receipt and approval of the dwg or shapefile by the Utility.
19. Required easements or plat recorded.
20. Engineer will submit their Certification Letter that all water and sanitary sewer facilities were built as planned and specified, to both Division of Water and Utility.
21. Letter of Acceptance and Bond from Owner/Developer.

Owner/Developer Signature _____ Date: _____

Engineer Signature _____ Date: _____

Water Project Review Checklist

Design Plans – General Information	
	Provide electronic file in AutoCAD .DWG in KY State Plane Single Zone US Survey Feet (1602) Projection.
	BGMU's standard water note block shall be attached to any water or joint utility plan.
	All water lines shall be on combined plan and profile sheets at a 1"=50' scale (unless otherwise approved) with a vertical exaggeration of 10 times.
	BGMU's most recent standard details shall be attached to the plan set. (detail sheet on website)
	Include a vicinity map. Include a key map for linear or large projects.
	Proposed water features shall be bold or blue and water main shall include stationing.
	Show location of existing and proposed utilities (water, sewer, storm, gas, power, communication, etc.). Must include size and material of crossings if known.
	Show faint existing contours and bold proposed contours on utility plans.
	Water mains shall be proposed at least 5' horizontally from any existing or proposed utilities. Variances to this require DOW approval.
	Profile of proposed water main(s), including: all existing and proposed utility and storm crossing(s). Must include size and material of crossings if known.
	Where possible, water mains shall be installed along traversable paths. No water main shall be proposed in ditch lines and when passing through a steep slope, the main shall run perpendicular to the slope.
	When proposing water main extensions under paved areas, ductile iron pipe shall be utilized.
	Show all utility crossings (Gas, Storm, Electric, etc.) on water and sanitary sewer profile(s).
	Show service connections and meters for all lots.
	Show clear depiction of future phases of development with proper tie in location(s).
	Water mains shall be extended to the end of any proposed stub street.
	Dead end mains shall be equipped with a means to provide adequate flushing via a fire hydrant.
	No tree or shrub plantings shall be proposed within 5' of any water, sewer, or force mains or services.
	Profile shall include:
	<ul style="list-style-type: none"> • Major and minor gridlines that allow for at least one foot vertical accuracy. • Existing and proposed ground surfaces. • Alignment stationing at main intersections. • Locations of air release valves, if applicable. • Waterlines less than 12" in diameter require a minimum of 36" of cover. Waterlines 12" in diameter or greater require a minimum of 48" of cover.
	Water mains shall be proposed at least 10' horizontally from any existing or proposed Sanitary Sewer Lines. Variances to this require BGMU or DOW approval. Must include size and material of crossings if known.
	Existing and proposed crossings with water, sewer, storm, or force mains with 2' of vertical separation or less shall include a dimension stating the vertical separation to the hundredth of a foot on a profile. If 18" cannot be achieved due to site constraints, casing or encasement with concrete can be utilized down to a minimum separation of 6". Where possible, water mains shall be installed above other utilities at crossings.
	For projects requiring work in state or county rights-of-way, provide ROW Permit.

	Plans shall be sealed by a KY-licensed professional engineer.
Material & Construction Requirements	
Main Line	
	<ul style="list-style-type: none"> Hydrant leads and feed lines shall be a minimum of 6" in diameter. Auxiliary valves shall be installed on all hydrants.
	<ul style="list-style-type: none"> Pipe material to be ductile iron pipe (DIP). All water contact materials shall meet ASTM, AWWA, and ANSI/NSF standards. Design Engineer to check USGS mapping for acidic soils in the area. If acidic soils are shown in the area, pipe must be poly-wrapped.
	<ul style="list-style-type: none"> No cross fittings will be accepted by BGMU. All four-way intersections at mains shall include two offset tees with valving on each main.
	<ul style="list-style-type: none"> Two 45° fittings shall be used in lieu of a 90° fitting where possible.
	<ul style="list-style-type: none"> All proposed bores under state or federal roadways shall be cased in steel pipe with a diameter as specified in BGMU's standard casing detail.
	<ul style="list-style-type: none"> All casings shall extend through ROW unless otherwise approved by BGMU. Carrier pipe in casings at or above 50 feet shall be restrained joint ductile iron pipe (DIP).
	<ul style="list-style-type: none"> When proposing water main through a creek, construct main by BGMU Standard Details.
	All water main within 200' of an underground storage tank or area of known organic contamination must be DIP and utilize non-permeable gaskets. If installing an underground storage tank (i.e. for a gas station), all existing nonmetallic water mains must be replaced with DIP and utilize non-permeable gaskets. Commercial developments will require nitrile non-permeable gaskets.
	<ul style="list-style-type: none"> Hydrants shall be installed at high points in water mains, where air can accumulate and released during normal flushing. Proposed plans and contractor should minimize intermediate high points.
Line Valves	
	<ul style="list-style-type: none"> In-line valves shall maintain a spacing of no more than 500 ft in commercial and industrial uses, and no more than 800 ft in single family residential uses - or as directed by BGMU. In-line valve spacing shall be maintained even when the main will run under paved areas.
	<ul style="list-style-type: none"> 3 gate valves shall be installed at every Tee between mains.
Service Lines & Meters	
	For single-family residential, each lot shall be served by a separate service line and meter, which shall be approximately located in the middle of the lot, ten feet into the property from the right-of-way.
	<ul style="list-style-type: none"> For multi-family developments, note the requested metering (meter per unit, meter per building, etc.).
	<ul style="list-style-type: none"> 1" and smaller service lines under sidewalks, driveways, or pavement shall be encased in 2" Sch40 PVC. Roadways should be back of sidewalk to back of sidewalk.
	<ul style="list-style-type: none"> Meter size shall be approved by BGMU Engineering Department. Developer's Engineer shall provide anticipated demands for use in sizing meters.

Fire Protection	
	<p>Provide proposed fire flow requirements for hydrant and fire protection systems on design plans and hydraulic analysis.</p> <ul style="list-style-type: none"> NOTE: Proposed system improvements as needed to meet fire flow conditions shall be subject to BGMU's review and acceptance.
Fire Hydrant Spacing & Location	
	<ul style="list-style-type: none"> Verify sufficient hydrant spacing per proposed zoning and local regulations.
	Minimum fire flow rate shall be 1000-gpm. City Ordinance BG2021-15 Section 12-4.05, b.1.
Easements & Property	
	Minimum 10-ft Utility Easement (5' ESOL) is required for all public water mains.
	It is the responsibility of the developer to obtain all needed easements.
	Utility Easements or subdivision plats must be recorded before the system will be accepted by BGMU.
	Easements are required on service lines that cross private property to service another lot.

Hydraulic Analysis & Design Narrative	
	An excel sheet may be utilized to model a project as an unlooped connection. Otherwise, a waterline modeling software such as EPANET, KY Pipe, or Autodesk InfoWater must be used. Regardless, a brief design narrative shall accompany the hydraulic analysis summarizing the results of the scenarios below, as well as population served, domestic demands, fire flow requirements, corresponding pressures, hydraulic grade lines, and pumping requirements. A node shall be placed at each hydrant, intersection of mains, and the highest point in the waterline.
	Boundary condition cannot be static. Use a rated pressure supply from static pressure, residual pressure, and residual flow at nearest hydrant provided by BGMU.
	All of the following scenarios shall be provided with flow rates/velocities through the pipes and corresponding node residual pressures in PSI and absolute HGL.
	<ul style="list-style-type: none"> Scenario 1: Average demand output. Average demand, if not provided by Mechanical, Electrical, Plumbing Designer, can be estimated using the table in the BGMU Minimum Standards and Design Manual. This scenario shall demonstrate that the proposed water main does not exceed 150 PSI at every node.
	<ul style="list-style-type: none"> Scenario 2: Peak demand. Peak demand shall be evaluated using a diurnal curve provided by BGMU or appropriate peaking factor. This scenario shall demonstrate that the proposed water main maintains 30 PSI at every node.
	<ul style="list-style-type: none"> Scenario 3: Flushing scenario. The hydraulic analysis shall demonstrate that the proposed water main can be flushed at a minimum of 2.5 feet per second while keeping system pressure above 20 PSI within the pressure zone of the project.
	<ul style="list-style-type: none"> Scenario 4: Ultimate Capacity. Show a continued increase in demand on the system until 20 PSI is achieved at a junction node. The ultimate capacity flow of the system shall be adequately larger than the flows from Scenario 3.
	All water mains, including those not designed to provide fire protection, shall be sized after a hydraulic analysis based on flow demand and pressure requirements. All water mains and feed lines for a fire hydrant shall be a minimum of 6" in diameter.
	Larger sized mains will be required, if necessary, to accommodate fire flow while maintaining residual pressure.
	Hydrant spacing and flushing analysis shall be designed in accordance with the requirements listed above in the "Fire Protection" section of this checklist.
	Identify future phases of development. Verify initial design is adequate to serve future growth.
	Hydraulic analysis and design narratives shall be sealed by a KY-licensed professional engineer.

Sanitary Sewer Design Checklist

Hydraulic Analysis & Design Narrative	
	Summarize population served, average flows, peak flows, corresponding velocities, etc.
	Identify future phases of development. Verify initial design is adequate to serve future growth.
	Hydraulic analysis and design narratives shall be sealed by a KY-licensed professional engineer.
Design Plans - General Information	
	Provide electronic file in AutoCAD .DWG in KY State Plane Single Zone US Survey Feet (1602) Projection.
	BGMU's standard sewer note block shall be attached to any sewer or joint utility plan.
	All sewer lines shall be on combined plan and profile sheets at a 1"=50' scale (unless otherwise approved) with a vertical exaggeration of 10 times.
	BGMU's most recent standard details shall be attached to the plan set. (detail sheet on website)
	Include a vicinity map. Include a key map for linear or large projects.
	Proposed sewer features shall be bold or green and sewer main shall include stationing and flow arrows.
	Show location of existing and proposed utilities (water, sewer, storm, gas, power, communication, etc.). Must include size and material of crossings if known.
	Show faint existing contours and bold proposed contours on utility plans.
	Sewer mains shall be proposed at least 10' horizontally from any existing or proposed utilities. Variances to this require BGMU or DOW approval. Must include size and material of crossings if known.
	Profile of proposed sewer main(s), including: all existing and proposed utility and storm crossing(s). Must include size and material of crossings if known.
	Show service connections from proposed sewer to clean out for all lots.
	Show clear depiction of future phases of development with proper tie in location(s).
	Sewer mains shall be extended to the end of any proposed stub street at minimum slope. End line with a manhole and install a plugged 5' length stub-out of consistent diameter gravity main.
	No tree plantings shall be proposed within 5' of any water, sewer, or force mains or services.
Plan view shall include:	
	<ul style="list-style-type: none"> • Horizontal separation with other utilities.
	<ul style="list-style-type: none"> • Manhole deflection angles for entering and exiting lines, as well as rim elevation and all invert in and out elevations along with pipe sizes and material (if known).
	<ul style="list-style-type: none"> • Stub-out location(s) and elevation(s).
	<ul style="list-style-type: none"> • Service line location(s).
Profile shall include:	
	<ul style="list-style-type: none"> • Major and minor gridlines that allow for at least one-foot vertical accuracy.
	<ul style="list-style-type: none"> • Existing and proposed ground surfaces.
	<ul style="list-style-type: none"> • Alignment stationing at manholes.
	<ul style="list-style-type: none"> • Invert elevations for incoming and outgoing lines along with line sizes and materials (if known).

	<ul style="list-style-type: none"> • Top elevation of manhole cover.
	<ul style="list-style-type: none"> • Sewer lines require 36" of cover.
	<ul style="list-style-type: none"> • Existing and proposed crossings with water, sewer, storm, or force mains with 2' of vertical separation or less shall include a dimension stating the vertical separation to the hundredth of a foot on a profile. If 18" cannot be achieved due to site constraints, casing or encasement with concrete can be utilized down to a minimum separation of 6". Where possible, water mains shall be installed above other utilities at crossings.
	For projects requiring work in state or county rights-of-way, provide ROW Permit.
	Include locations of permanent Utility Easement(s) and temporary Construction Easement(s).
	Plans shall be sealed by a KY-licensed professional engineer.
Material & Construction Requirements	
Manholes	
	<ul style="list-style-type: none"> • Public sewer mains shall be terminated with a manhole meeting BGMU Specifications.
	<ul style="list-style-type: none"> • Max spacing not to exceed 400-ft. Variances to this require DOW approval.
	<ul style="list-style-type: none"> • An external drop manhole connection is the standard drop connection configuration. When elevation difference between the inlet and outlet pipe is more than 24", a drop manhole is required. Internal drop connections are not allowed unless approved by BGMU.
	<ul style="list-style-type: none"> • Each manhole should have an elevation drop of a tenth of a foot from the inlet crown to the outlet crown (top of pipe to top of pipe).
	<ul style="list-style-type: none"> • Manholes shall not be proposed in ditch lines, basins, areas on streets with high storm water spread, or any other area where storm water would infiltrate. However, if site conditions don't allow for this, the manhole lid shall be watertight bolt-lids per BGMU Standard Details.
Gravity Main Line – Size and Material	
	<ul style="list-style-type: none"> • Sanitary sewer mains shall have a minimum diameter of 8 inches. Sewer mains shall be SDR-35 where the maximum installation depth does not exceed 12 feet. If any portion of a sewer main exceeds 12 feet in depth, the entire length of that sewer main shall be constructed of SDR-26.
	<ul style="list-style-type: none"> • Slope – General minimum slope of 0.50%. Lower slopes may be approved on a case-by-case basis, but in all cases, meet minimum slopes in Ten State Standards. Using larger pipes than necessary to achieve Ten States Minimum slope will not be allowed unless site constraints dictate and approved by BGMU. The flow must justify the size of the pipe.
Lateral Lines & Cleanouts	
	<ul style="list-style-type: none"> • Each lot shall be served by a separate service line and cleanout.

Easements & Property	
	20-ft Utility Easement (10' ESOL) is required for all public gravity sewer mains.
	It is the responsibility of the developer to obtain all needed easements.
	Property for sewer lift station shall be deeded to BGMU or proof of easement shown. Depending on location, BGMU may require a dedicated 20-ft wide access easement to pump station.
	Easements are required on lateral lines that cross private property to service another lot.
	Utility Easements or subdivision plats must be recorded before the system will be accepted by BGMU.

Sanitary Sewer Pump Station Design Checklist

Design Report & Design Narrative	
	Design per Ten State Standards Chapter 40. Any deviation shall be clearly noted.
	Summarize the population served, per capita flows, percentage of units contributing flow, design flows, corresponding velocities, minimum/maximum elevations, and minimum/maximum pressures.
	<ul style="list-style-type: none"> • Verify the line sizes match between calculation and plans.
	<ul style="list-style-type: none"> • Use CHW roughness coefficient not greater than 120.
	<ul style="list-style-type: none"> • 2-Hour Emergency Storage should be calculated to an elevation 4' below the nearest overflow elevation of the collection system or sanitary sewer pump station top slab. (whichever is lower).
	<ul style="list-style-type: none"> • Sewer Pump Stations designed for BGMU's collection system shall utilize 3 pump cycles per hour. 15 minutes of fill time and then 5 minutes to pump out the stored volume, plus incoming flow at average daily flow.
	If proposed forcemain manifolds into an existing forcemain, sewer pump station shall be evaluated to operate at both minimum and maximum pressures as provided by BGMU.
	Identify future phases of development. Verify initial design is adequate to serve future growth.
	Hydraulic analysis and design narratives shall be sealed by a KY-licensed professional engineer.
Design Plans - General Information	
	Include a vicinity map. Include a key map for linear or large projects.
	BGMU's most recent standard details shall be attached to the plan set.
	BGMU's most recent sewer pump station details shall be attached to the plan set.
	Force main features shall be bold or orange and force main shall include stationing and flow arrows.
	Show location of existing and proposed utilities (water, sewer, storm, gas, power, communication, etc.). Size and material shall be included if known.
	Show faint existing contours and bold proposed contours on utility plans.
	Force mains shall be proposed at least 5' horizontally from any existing or proposed utilities (10' separation with water). Variances to this require DOW approval.
	Access to Sewer Pump Station shall be approved by Bowling Green Municipal Utilities.
	Air/Vacuum valves shall be installed at all high points and as directed by BGMU.
	Where possible, force mains shall be installed along traversable paths. No force main shall be proposed in ditch lines and when passing through a steep slope, the main shall run perpendicular to the slope.
	Show clear depiction of future phases of development with proper tie in locations.
	Accurate location of proposed force main lines, valves, air/vacuum release valves, fittings, and appurtenances.
	No tree plantings shall be proposed within 5' of any water, sewer, or force mains or services.

Plan view shall include:	
	<ul style="list-style-type: none"> Horizontal separation with other utilities.
	<ul style="list-style-type: none"> Service line location(s).
	<ul style="list-style-type: none"> Alignment stationing at notable features (ARV's, line valves, bends, casing locations, etc.).
Profile shall include:	
	<ul style="list-style-type: none"> Major and minor gridlines that allow for at least half a foot vertical accuracy.
	<ul style="list-style-type: none"> Existing and proposed ground surfaces.
	<ul style="list-style-type: none"> Provide continuous upward or downward slopes in force main between air/vacuum valves and low points.
	<ul style="list-style-type: none"> Alignment stationing at notable features (ARV's, line valves, bends, casing locations, etc.).
	<ul style="list-style-type: none"> Invert elevations for force main discharge into gravitysewer.
	<ul style="list-style-type: none"> Existing and proposed crossings with water, sewer, storm, or force mains with 2' of vertical separation or less shall include a dimension stating the vertical separation to the hundredth of a foot on a profile. If 18" cannot be achieved due to site constraints, casing can be utilized down to a minimum separation of 6". Where possible, water mains shall be installed above other utilities at crossings.
Lift station design shall be in compliance with Chapter 10, 20, and 40 of the Ten State Standards and shall include considerations for:	
	<ul style="list-style-type: none"> Site Plan with existing and proposed grading depicting orientation of incoming gravity sewer, wet well, valve vault, force main discharge, and electrical transformers if applicable.
	<ul style="list-style-type: none"> The top of the lift station shall be at least 1' above finished grade. When adjacent to drainage basins, the top of the sanitary sewer pump station shall be a minimum of 2' above the HW-100.
	<ul style="list-style-type: none"> Sanitary sewer pump station detail shall include a plan view, section view, and, when applicable, shall include an auxiliary wet well (all to scale). Refer to BGMU standard sanitary sewer pump station detail templates.
	<ul style="list-style-type: none"> For projects requiring work in state or county rights-of-way, provide ROW Permit.
	<ul style="list-style-type: none"> Plans shall be sealed by a KY-licensed professional engineer.
Material & Construction Requirements	
Size and Material	
	All proposed force mains shall be C900.
	Casings shall be required when crossing existing roadways and in new construction for any street above local road classification. Casings may be required in other scenarios on a case-by-case basis defined by BGMU.
	<ul style="list-style-type: none"> Carrier pipe in casings above 50 feet in length shall be restrained (either restrained joint PVC, external PVC bell clamps, or fused DR-11 HDPE).
	<ul style="list-style-type: none"> Forcemain diameter shall be dictated by velocity in force main at future flow conditions. See BGMU Minimum Standards and Design Manual.

Connection to Existing Sewer	
	<ul style="list-style-type: none"> For public force main connections, construct “external drop” tie-in per BGMU Standard Drawings.
	<ul style="list-style-type: none"> Connection to existing manhole requires application of BGMU approved corrosion prevention coating to the connecting manhole and next two downstream manholes.
	<ul style="list-style-type: none"> For private force main connections, consult with BGMU.
	<ul style="list-style-type: none"> Spacing of line valves shall be approximately 1,000-ft. or as directed by BGMU.
Easements & Property	
	10-ft Utility Easement (5' ESOL) is required for all public force mains.
	It is the responsibility of the developer to obtain all needed easements.
	Property for sewer lift station shall be deeded to BGMU. Depending on location, BGMU may require a dedicated 20-ft wide access easement to sanitary sewer pump station.
	Utility Easements or subdivision plats must be recorded before the system will be accepted by BGMU.