JOHNSON COUNTY WASTEWATER
MINIMUM PLAN REQUIREMENTS FOR GRAVITY SEWER MAIN PROJECTS

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SCOPE: This document establishes the minimum standards for plans for sanitary sewer main extensions, relocations, removals, in-place abandonments, manhole additions, and other modifications for gravity sanitary sewer systems (including privately-financed main projects) within the jurisdiction of the Johnson County Wastewater (JCW). The following requirements are minimum requirements, unless specifically noted as a suggestion.

This document supplements the "Minimum Standards of Design for Water Pollution Control Facilities" adopted by the State of Kansas Department of Health and Environment (KDHE). In the event of a conflict between the two documents, the stricter or more conservative requirement shall apply.

I. SUBMITTAL REQUIREMENTS

A. INITIAL SUBMITTAL REQUIREMENTS. The initial plan submittal shall include all of the following documentation: two (2) sets of plans, the JCW Information Sheet, the KDHE Application, the preliminary plat or parcel legal description if the property will not be platted and District Enlargement exhibits. The submittal will not be reviewed if any of the items referenced in this section have been omitted from the submittal. The JCW Plan Review Comment form, Attachment A, should be used as a checklist to aid in ensuring all required information is provided in the submittal.

1. Plan Sets. Two sets of hard copy plans shall be submitted with the initial submittal. All plan sheets in the initial submittal shall be signed, sealed and dated by a Professional Engineer (P.E.) licensed in the State of Kansas in accordance with Kansas Board of Technical Professions requirements. Plans shall not be reviewed if the seal, signature and date have been omitted. All references to the Engineer in this document shall be to the Professional Engineer (P.E.) licensed in the State of Kansas preparing the plans.

2. JCW Information Sheet. See Attachment B. The Engineer must complete the Information Sheet in its entirety.
   a. Indicate total tributary area to each new main connected to the existing system and provide a tributary area map showing the tributary area on Item 1.
   b. For relocations, indicate the total area tributary to the relocated segment.
   c. Add items 12, 13, 14, etc. to the Information Sheet for additional information as needed (i.e. list existing manhole stubs, existing tees, etc. in the plat).

3. KDHE Application. See Attachment C. The KDHE Application is not required for projects that do not include extensions.
   a. The Engineer must complete Items 1 and 4 on Page 1 and Items 1, 2, 4 and 5 on Page 2.
   b. Peak and average flow estimate calculations shall be submitted for Item 4 on Page 2 for all projects. The wastewater flow estimates are to be based upon the actual usage(s) proposed for the buildings on the site. A wastewater flow estimate for each building in the proposed plat or lot connecting to the main shall be included. Flow estimates based on drainage fixture units (DFUs) will not be
accepted. Flow estimates for buildings in future plats, where the future plat will be served by future main extension projects, are to be included in the application for the future main extension project only. For commercial buildings, building usage shall be provided for each connection. Include the number of units in each building for multi-unit buildings such as town homes, apartments, etc.

c. Peak flow may not exceed the site allowable flow, which can vary from approximately 0.01 cfs/acre in older areas of the system to 0.025 cfs/acre in newer areas of the system.

d. A copy of all supporting documentation, including any reference material used in the calculation of the flow estimates must be included with the submittal and referenced on the calculation page.

e. The application and the calculations shall be signed, sealed and dated by the P.E. sealing the plans.

4. PLAT AND WRITTEN EASEMENTS

a. PLAT OR LEGAL DESCRIPTION
   i. The draft final plat shall be provided with the initial plan submittal.
   ii. The property legal description shall be included on the layout sheet if the City (or County) is not requiring the property to be platted.
   iii. The initial submittal will be reviewed only if the draft plat or property legal description (as applicable) is provided.
   iv. Any revisions to the draft plat shall be submitted as soon as available.

b. WRITTEN EASEMENTS
   i. Draft written easement(s), if applicable to the project, are required with the second submittal. If applicable, the second submittal will be reviewed only if the draft written easement(s) have been provided. See Section I.B.1.
   ii. It is suggested that draft written easements be submitted with the initial plan submittal.

5. DISTRICT ENLARGEMENT. All areas served by Johnson County Wastewater (JCW) must be in the legally created Consolidated Main Sewer District (CMSD). Contact the JCW Survey Group with any questions regarding district designation or enlargement requirements. Sample documents are available from JCW.

a. ENLARGEMENT EXHIBIT WITH BOUNDARY DESCRIPTION AND EXHIBIT. If the area served is not located within the CMSD (and/or Joint Sewer District (JSD) and/or Lateral Sewer District (LSD), as applicable), the Engineer must submit two 8-1/2 x 11 exhibits for the area to be enlarged into the CMSD (and/or JSD and/or LSD) as follows with the first submittal:
   i. BOUNDARY DESCRIPTION EXHIBIT. Provide the written boundary description for the property and title this exhibit as follows: “Exhibit A - CMSD District Enlargement Description” “Sheet 1 of 2”. Note: If the area is adjacent to a street or streets, the boundary shall be described to the center of adjacent street(s).
   ii. MAP EXHIBIT. Title the map exhibit as follows: “Exhibit A - Enlargement to the Consolidated Main Sewer District (and/or to the Joint Sewer District and/or to the Lateral Sewer District, as applicable)” “Sheet 2 of 2”. The map shall include the following information:
      1) A map showing the property boundary
2) The point of beginning for the boundary description and the description from the point of beginning to the property boundary
3) The Section, Township and Range numbers
4) The north arrow
5) The date of document preparation or subsequent document revision(s).
6) The L.S. signature, seal and date shall also be included.

b. **JOINT SEWER DISTRICT (JSD), LATERAL SEWER DISTRICT (LSD) BUY-INS.**
   Buy-ins and associated agreements are required when connecting to a publicly financed JSD or LSD sewer mains where payment for the public district has not been completed. Contact JCW for calculation of the buy-in amount and preparation of the agreement(s). All buy-ins must be paid and the associated agreements executed and provided to JCW before the project will be released for construction.

c. **PETITION.**
   i. Upon receipt of the enlargement map and boundary description exhibits from the Engineer, JCW will prepare a petition.
   ii. The petition will be returned to the Engineer to be executed (signed) by the property owner(s).
   iii. The executed petition must be returned to JCW with a check for processing the documents. The amount of the check is $100 per parcel with separate ownership up to $300. The check shall be made out to JCW, shall include the following language on the check: “Enlargement document fee for *project name*”.

d. **CITY CONSENT.**
   i. JCW will request City consent from the applicable City as needed.
   ii. Plans will not be released for construction until the applicable City has provided consent.

e. **BOCC CONSENT.**
   i. After JCW has received and approved the correct exhibits, fees, signed petition and City Consent, JCW will transmit the documents to the Board of County Commissioners (BOCC) for execution.
   ii. Plans shall not be released for construction until the BOCC has authorized the District Enlargement.

B. **SECOND SUBMITTAL REQUIREMENTS**
   The second submittal will not be reviewed if any of the required items identified in the project’s Review Comments or in this section have been omitted from the submittal.

1. **Written Easements.** Drafts of all written easements (as applicable) are required with the second submittal. The drafts shall be submitted in the format noted in Section XI - Easement Requirements. The second submittal will be reviewed only when the draft written easements (as applicable) are included with the submittal.

2. **Project Administration Fee (PAF).**
   a. The PAF is required for all private main extension and relocation projects and is due with the second submittal. JCW plan review may be suspended if the PAF has not been provided with the second submittal.
b. PAF checks that are included with the plan submittal must be listed in the plan transmittal letter.

c. All PAF checks must include the project name and plat or phase.

d. Checks that are hand-delivered are to be given to the JCW Permit Group only.

e. PAF fees are subject to change.

f. Additional PAF fees may be charged for projects with substantial changes from the alignment presented in the initial submittal.

g. See Attachment D for the current PAF schedule.

3. Gas/Railroad Agreement(s). If applicable, copies of any draft agreement(s) for crossing gas easements or railroads should be submitted with the first submittal and are required with the second submittal. Provide written verification from the gas company or railroad if the company will not require an agreement.

C. PROJECT REVIEW COMMENTS

1. The initial submittal and all subsequent submittals shall be reviewed by JCW and written review comments shall be provided.

2. JCW shall send written comments to the Engineer and Developer by email.

3. The Engineer must address all comments by revisions to the submittal or in written response as applicable.

4. The Engineer is encouraged to contact JCW with any questions regarding JCW’s review comments.

5. JCW will not release the plans for construction until all comments have been addressed by the Engineer.

6. If significant issues remain after the second submittal, JCW, at its discretion, may require a meeting with the Engineer and Developer to facilitate resolution of remaining design issues.

7. JCW will prepare a set of “mark-ups” for the first submittal at the request of the Engineer.

8. The Engineer may schedule a meeting to review JCW comments after the first review.

D. FINAL SUBMITTAL REQUIREMENTS. In addition to any information or revisions to the plans, JCW Information Sheet, KDHE Application, and/or easement documents required to address JCW comments, the final plan submittal shall include five (5) sets of plans (minimum) and three (3) copies of the General Layout for distribution as follows:

1. Plan Sets
   
   JCW - 2 Sets (1 Set JCW File Copy, 1 Set JCW Inspection Dept.)
   
   KDHE - 1 Set
   
   ENGINEER - 2 Sets. One set of the plans released for construction by JCW must be kept on the job-site at all times during construction. For projects in Gardner, Leawood, Lenexa or Olathe, only one set will be returned to the Engineer. Please submit one additional set of plans for approval if 2 sets are required by the Engineer.
   
   CITY - 1 Set (Applies to Gardner, Leawood, Lenexa and Olathe only.)

2. General Layouts. – 3 copies (One each distributed to: City, Power and Gas)

3. Plat. JCW acceptance of the draft final plat is required for construction plan release. A copy of the recorded plat shall be submitted to JCW for JCW Project Acceptance. The
recorded plat shall match the draft final plat accepted by JCW. Discrepancies between the draft final plat and the recorded plats shall be corrected prior to JCW Project Acceptance.

4. Written Easements. Upon JCW acceptance of the Written Easement(s), the executed easement original shall be returned to JCW for construction plan release and recording of the easement. Acceptance of the easement for recording by the Department of Records and Tax Administration (RTA) is required for JCW Project Acceptance.

II. COVER SHEET REQUIREMENTS
This section establishes the minimum standards relating to all items that must be included on the Cover Sheet for the project. Sheet size shall be 24" x 36". Refer to Section XI for Drafting Standards including text size and weight requirements. The General Layout of the project (preferred scales: 1" = 50’, 1” = 100’ or 1” = 200’) may be included on the Cover Sheet. The entire plat or parcel to be served must be shown on the General Layout and include sufficient area to allow the nearest cross street to be shown. If necessary, the nearest cross street may be shown on the general location map.

A. PROJECT TITLE. Include the following information in the project title on the Cover Sheet and in a title block on each plan sheet as follows:

1. PROJECT NAME:
   a. Use the plat name and number.
   b. Add a Phase Numbers to the project name when multiple sewer main projects will serve the plat.
   c. If the property will not be platted, use the building name for the project title (i.e. Smith Store Main Extension).
   d. All projects that include Relocations, Removals, In-place Abandonments, LPS, etc. must include that descriptor in the project name.

2. SEWER DISTRICT: Sewer sub-district name and number (SSD), the lateral sewer district (LSD) number, section (Sec) number. (i.e. BR05, LSD 1, SEC 1). JCW will assign the District, LSD and Sec information when the submittal is received. Other designations such as JSD, Contract District, Contract, etc. will be provided when applicable.

3. PROJECT LOCATION: City in which the project is located.

B. SIGNATURE AND DATE LINES. Provide the following signature and date lines on the Cover Sheet:

1. For Johnson County Wastewater Chief Engineer. Include following note below the signature line: “Authorization to begin construction expires one year from the signature date”.

2. For the Kansas Department of Health and Environment:
   a. For all projects that include a main extension, two title sheets per drawing set are required as follows:
      i. The first title sheet, attached to each plan set, must include “KDHE PERMIT PENDING” on the KDHE signature line.
ii. The second title sheet will leave the KDHE signature line blank. Five copies of this second standard title sheet are to be submitted as separate sheets (i.e. not attached to the plan sets).

b. KDHE permits are not required for projects that do not include a main extension (i.e. relocation only; removal only or in-place abandonment only projects). For these projects, only one title sheet is required with “Relocation (or Removal, or In-Place Abandonment, etc) only. KDHE permit not required.” on the KDHE signature line.

c. On the As-builts, add the project’s KDHE Permit number and Permit date to the KDHE signature line.

3. For the Cities of Gardner, Leawood, Lenexa or Olathe only.
4. For the Kansas Registered Professional Engineer responsible for the project. Seal of the Kansas Registered Professional Engineer (P.E.) shall be displayed on all sheets of the plan set. The P.E.’s signature and date shall be prominently displayed across the seal in accordance with Kansas State Board of Technical Professions requirements. Each submittal must be sealed, signed and dated.

C. ENGINEER AND DEVELOPER INFORMATION. Provide the following information for both the engineering firm and P.E. preparing the plans and the Site Developer funding the sewer main project:
   1. Company Name
   2. Address
   3. Phone number
   4. Fax number
   5. Contact person
   6. Email address

D. GENERAL LOCATION MAP. A general location map shall be included on the cover sheet and include the following attributes:
   1. Show and label the actual project area (i.e. plat or phase boundary).
   2. The nearest N – S and E – W arterial streets surrounding the section, township and range and those in the immediate vicinity of the project area must be shown and labeled.
   3. The scale of the map shall be 1” = 2,000’.
   4. A north arrow and the scale for the map must be noted.
   5. Label the ¼ sections with township and range where the project is located under the General Location Map.
   6. Show and label the Johnson County Vertical Control Network (JCVCN) benchmark location on the site location map when the benchmark cannot be located in the project area window on the page.

E. GENERAL NOTES. The General Notes shall include the following and the text shall conform to Section XI:
   1. Reference to Specifications. Include the following notes: “The specifications for the project shall be “JCW Construction and Material Specifications for Sanitary Sewers –
KDHE Permit No. 33301. The contractor shall have one (1) signed copy of the plans and one (1) copy of the specifications at the job site at all times.

2. Utility Warning. Include a note indicating: “Existing utilities have been indicated to the greatest extent available to the Engineer. The contractor is responsible for obtaining the field location of the utilities.”

3. Compaction. Before preparing the title sheet, the Design Engineer shall confirm backfill requirements in street right-of-way with the applicable City. The Engineer shall provide all special notes and details as required by the City for placement of backfill within street right-of-way in the general notes and attribute those notes to the City. Where the JCW standards are stricter than the City backfill standards, the following JCW minimum requirements shall be included:

a. “All trenches shall be backfilled in uniform lifts and compacted in accordance with JCW standard specifications.

i. For pipe located within street or alley right-of-way and for all non-public pavement crossings (private drives, parking lots, etc.), the backfill materials from the top of the pipe embedment to finish grade shall be compacted to at least 95% of maximum dry density at a moisture content within 2% of optimum moisture as determined by ASTM D698. Required compaction and percentage of maximum density must be obtained before pavement is placed. Compaction tests representative of each three (3) feet of trench depth shall be taken at a minimum of five hundred (500) feet intervals along the pipe. In no case shall less than two compaction tests be taken. Compaction tests taken at the top of trench only shall not be accepted by JCW.

ii. For pipe located in areas other than street or alley right-of-way, from the top of the pipe embedment to finish grade, the backfill material shall be compacted to no less than 90% of maximum dry density at a moisture content within 2% of the optimum moisture as determined by ASTM D698. Compaction tests representative of each three (3) foot of trench depth shall be taken at one-thousand (1,000) foot intervals along the pipe.

iii. Compaction tests shall be taken at each pavement crossing.

iv. Compaction tests shall be ordered at random times, depths and locations as determined by the Engineer.”

b. In Cities that require special backfill (i.e. CA-5, AS-3, flowable fill, etc.) within public street right-of-way, add the following note: “Certification of proper placement of the (insert special backfill type) within street right-of-way, as required by the City of (insert City name), is required in lieu of soil compaction reports. Soil compaction reporting requirements for areas beyond street right-of-way remain in effect.”

c. “The Engineer shall confirm that all compaction tests meet the specifications during the construction. All backfill which does not pass the compaction requirement shall be removed, compacted and tested until the required compaction is achieved.”

d. “Copies of all compaction testing reports and, as applicable, special backfill placement certifications shall be provided to the Engineer and to JCW during..."
construction. Test results showing passing compaction at all test locations are required for project acceptance.

4. Boring, Open Cut of Streets. Where crossing existing City streets, the Engineer shall obtain approval for open cut of the City streets and provide verification of the City approval to JCW with the initial plan submittal. For bores, include the following note: "Bores shall be constructed in accordance with JCW standard specifications and Casing Pipe and End Seal Detail." Also, include any and all additional notes for boring or open cut as required by the applicable City for work in street right-of-way. The notes required by the City shall be attributed to the specific City.

5. Site Disturbance. Include the following note: "All site disturbance permits as required by (insert applicable city) and the Kansas Department of Health and Environment (NPDES Phase II Storm Water permit) shall be obtained prior to construction." A copy of the permit shall be provided to JCW for the plan release if required by the City. Include any and all additional site disturbance notes as required by the applicable City in the General Notes. These notes shall be attributed to the applicable City.

6. Acceptance Testing. Include the following note: "All testing shall be done in accordance with JCW Construction and Material Specifications for Sanitary Sewers after the backfill and compaction operations have been completed. All sanitary sewer mains, stubs and cleanouts installed on the project shall be air-tested. All mains shall be mandrel tested. All manholes shall be vacuum tested. Any other special testing requirements shall be as noted on the drawings or in the specifications. All tests shall be witnessed by the Engineer and, as required, by JCW. Copies of all test records shall be provided to JCW for project acceptance."

7. Hours of Operation. Include the following note: "Hours of operation shall be as required by the City of (insert applicable City). The contractor shall not be allowed to work Saturdays, Sundays or Holidays unless written permission from the JCW Senior Inspector and the City of (insert applicable City) has been provided."

8. Separation from Water Lines. Include the following note: "Ten feet (10') of horizontal separation shall be provided between water lines and the sewer mains or service lines when they parallel each other."

9. Maintenance of Flow. Include the following note for all projects: "Flow in existing mains and service lines shall be maintained at all times and shall not be discharged to the environment.” Include the following note for relocation projects: "Flow shall not be transferred to the relocated main until JCW has inspected and accepted the relocated main.”

10. Maintenance Bond. Include the following note: "The Contractor shall post a 3-year maintenance bond in an amount equal to 50% of the contract amount for the sanitary sewer work. The JCW maintenance bond form shall be used. The Engineer must provide written certification of the contract amount for the sanitary sewer work to JCW before the bond can be reviewed for acceptance.

11. Platting, Re-platting or Parcel Modification. Include the following note for all projects: "If the property is {platted}{re-platted}{boundaries modified} in the future, a copy of the proposed {plat}{ boundary modification} and updated as-built drawings identifying the {plat and lot number(s)}{new lot(s)} shall be approved by JCW."
F. **REFERENCE TO BENCHMARK.** Provide the permanent Johnson County Vertical Control Network (JCVCN) benchmark information utilized for the project on the Cover Sheet.

G. **UTILITY INFORMATION.** Provide the following information for all utilities with service in the project area:
   1. Utility name
   2. Address
   3. Phone number
   4. Fax number
   5. Contact person
   6. Contact email address (if available).

H. **SUMMARY OF QUANTITIES.** Summary of Quantities are not required and will not be reviewed by JCW.

III. **GENERAL LAYOUT SHEET REQUIREMENTS:**
This section establishes the minimum standards relating to all items that must be shown and labeled on the General Layout sheet for the project. The General Layout of the project may be included on the Cover Sheet. The entire plat or parcel to be served must be shown on the General Layout Sheet. The nearest cross street must also be indicated. All drafting, including line types and weights and text sizes and weights, shall conform to JCW Drafting Standards as noted in Section XI.

A. **GENERAL ELEMENTS**
   1. Show and label proposed and existing sanitary sewers and easements.
   2. The entire plat or parcel to be served shall be shown on the General Layout. All tributary areas shall be shown on the General Layout or a separate plan sheet may be provided to show all tributary areas.
   3. Show and label all structures including buildings, retaining walls, trash enclosures, carports, separate garages, signs, subdivision monuments, etc.
   4. Show and label all paved areas such as streets, parking lots, sidewalks, etc.
   5. Show and label storm sewers, water courses, BMPs, gas, water lines, utility transmission lines, railroad crossings, etc. Include the name of the operating company as applicable.
   6. Sheet size shall be 24” x 36”.

B. **NORTH ARROW AND SCALE.** Provide a north arrow and drawing scale. The preferred drawing scales for the General Layout are: 1” = 50’, 1” = 100’ or 1” = 200’, or as required to show the entire project area.

C. **SANITARY SEWER MAIN AND MANHOLE DESIGNATIONS**
   1. **Existing Sanitary Sewer Main Designations.** The existing sanitary sewer mains shall be labeled with the line name, JCW District designation, LSD number, and Section number or District, Contract numbers as applicable, as labeled on the as-built drawings. Label the existing mains on the General Layout, Site Grading Plan and in the Plan and Profile views. Existing main label examples:
Many as-built records are available for viewing using the Sanitary Sewer System Maps link on the Privately Financed Sewer Main Projects page in the Development and Permitting section at [www.jcw.org](http://www.jcw.org). Instructions are included on the webpage. If an As-built card link is not returned with the search and the As-built is listed as “No As-Built Scan”, contact JCW’s New Development Group for assistance.

2. **Existing Sanitary Sewer Manholes.** Existing sanitary sewer manholes must be referenced by the JCW District(Basin)Manhole number designations (i.e. BRM1(05)121). JCW manhole designations are available in the Sanitary Sewer System Mapping application. Access to the mapping application is noted in the paragraph above.

3. **Proposed Mains and Manholes.** Main and manhole designation labels must be provided for all proposed mains and manholes. The proposed mains and manholes shall be labeled in a consecutive alpha and/or numeric manner. Example preferred designations for proposed mains are: “Line A”, “Line B”. Proposed mains shall be labeled on the grading plan, General Layout and in the plan and profile views. The preferred designation for a proposed manhole is to use the letter of the sewer main, followed by the number of the manhole on that sewer main, with number “1” being the most downstream manhole on that main. Example: “MH A1”. Manhole numbers shall be indicated on the General Layout, Site Grading Plan and in the Plan and Profile views.

D. **PLAT, PARCEL, and PHASE BOUNDARY LINES.** Each plat, lot, block, tract and parcel for the area to be served shall be shown and labeled on the General Layout. The entire plat or parcel boundary (as applicable) shall be shown. Label the Plat or, if the City is not requiring the property to be platted, provide property boundary description on the General Layout sheet and label the property as “Unplatted” on all plan sheets. If the project will be phased, phase boundary lines shall be shown and labeled to clearly identify each phase of the project and the phase served by the mains included in the plan set.

E. **ON-SITE BUILDINGS.** For commercial projects and for large lot residential developments, all buildings shall be shown and labeled on each parcel and the entire building outline shall be shown and designations provided for each building. All existing buildings that will remain in the project area shall be shown and labeled for all projects. Include “Existing” or “Future” labels with the building designations for existing buildings or buildings that are proposed in future development. Label the number of units within the building for multi-family dwellings or multi-unit commercial. Buildings that will never require sewer service shall be labeled as: “Sanitary Service Not Required” or “SSNR”.

F. **SURROUNDING PARCELS.** Surrounding parcel information may be obtained in the Sanitary Sewer System Mapping application. Access to the mapping application is
noted in Section III.C.1. above. Surrounding parcel information shall be identified as follows:
1. Label all plats surrounding the project site to be served.
2. Areas that have not been platted must be labeled as “Unplatted”.
3. Label areas where future plat plans are known as “Future Platting”. Do not label the lot numbers for lots in areas that will be platted in the future.
4. Each individual lot surrounding the project site must be shown. Each individual lot directly affected by the sewer main construction shall shown and labeled.

G. STREETS AND PAVED AREAS. Label all Streets as named by the City. Include a “Private” label with the street name where applicable. Drives that are Private and will not be named by the City must be labeled as “Private Drive”. All other paved areas must be shown and identified as necessary. The nearest cross streets shall be shown and labeled on the Layout where cross streets are not provided in the project area. Break lines with distance labels may be used for cross streets that lie well beyond the project area.

F. STORM SEWERS, WATER COURSES, BMPs. All storm sewers, water courses, and BMPs shall be shown and labeled as follows:
1. The 100-year flood elevation boundaries shall be shown and labeled for all water courses and BMPs.
2. For water courses, the centerline and top of cut bank shall also be shown and labeled.
3. For BMPs, the maximum and normal water surface elevations and the boundaries for those elevations shall be clearly shown and labeled. See Section V.G for complete design and labeling requirements at BMPs.
   a. A “dry basin” note must be included for those BMPs that will not retain water after the storm event routing has been completed.
   b. The limits of the dam structures for all BMPs shall be shown and labeled.

I. SECTION LINE OR CORNER REFERENCE. The distance and direction from the nearest corner of the plat or parcel to the nearest quarter section line or corner shall be shown and labeled. The section line label shall include the direction and section reference (i.e. West Line of the SW ¼ of Section 4-15-26). Break lines with distance labels may be used for section line or corner reference locations that lie well beyond the project area.

J. REFERENCE TO BENCHMARK
1. A permanent Johnson County Vertical Control Network (JCVCN) benchmark closest to the project site shall be used and referenced for the project. Provide and label the permanent project benchmark and temporary benchmarks on the General Layout. Show and label the JCVCN benchmark location on the site location map. JCVCN benchmarks can be found on the Johnson County AIMS website.
2. The permanent benchmark shall be from the Johnson County Vertical Control Network.
3. JCW manholes may be used as temporary benchmarks only. For JCW manholes used as temporary benchmarks, label with the JCW District (Basin) Manhole number.

IV. SITE GRADING PLAN
A Site Grading Plan shall be provided as a separate sheet in the plan set, or may be included on the General Layout sheet, provided all information required both the General Layout Sheet and Site Grading Plan is legible. This section establishes the minimum requirements relating to all items that must be included on the Site Grading Plan for the project. Preferred drawing scales for the Site Grading Plan are: 1” = 50’, 1” = 100’ or 1” = 200’ for larger plats. A north arrow and scale must be provided. The contours for existing and proposed features must be shown, clearly labeled and provided at intervals no greater than five (5) feet. All drafting, including line types and weights and text sizes and weights, shall conform to J CW Drafting Standards as noted in Section XI. J CW review of the site grading plan is to confirm conformance to J CW standards only.

A. GENERAL ELEMENTS
1. Show and label the proposed and existing sewer mains, easements, and service stubs.
2. The entire project area including the plat or parcel to be served, as well as tributary areas, shall be shown on the Site Grading Plan, separate plan sheet or General Layout as noted above. Tributary areas outside of the project area can be shown in a separate reduced scale map on the page provided the reduced scale map clearly shows the limits (parcel boundaries, etc.) of the tributary area.
3. Show and label all structures such as buildings, retaining walls, trash enclosures, carports, separate garages, signs, subdivision monuments, etc.
4. Show all paved areas such as streets, parking lots, etc.
5. Show and label storm sewers, water courses, BMPs, gas, power and water transmission mains and lines, railroad crossings, etc. Include the name of the operating company as applicable.
6. Sheet size shall be 24” x 36”.

B. NORTH ARROW AND SCALE. Provide a north arrow and drawing scale. The drawing scale for the Grading Plan should match the General Layout.

C. SANITARY SEWER MAINS AND MANHOLES. Show and label the existing and proposed sanitary sewer mains and manholes. See Section III.C for manhole labeling requirements.

D. SITE FEATURES. Show and label the following:
1. Existing Features. The plan shall show and label all existing topographic features as well as any existing features such as: sanitary sewer mains and manholes, water lines, gas mains, electric transmission lines, streets, parking areas, buildings, structures, and all storm sewers, water courses and BMPs with all applicable elevation and boundary information.
2. Proposed Site Alterations. The plan shall show and label all proposed topographic changes including: final limits of grading, cuts and fills, retaining walls and final contours, as well as, proposed sanitary sewer mains and manholes, relocation of
major utilities, streets, parking areas, buildings, structures, and all storm sewers, drainage ways and storm water management basins, etc.

3. **Storage.** Storage of excavated or other materials shall not occur in existing easement areas.

4. **JCW approval of the construction plans is based upon the information provided in the plan set.** Changes in the scope of the proposed site alterations approved by JCW may result in required modifications to the sanitary sewer system.

E. **CONSTRUCTION EROSION CONTROL.** Construction erosion control measures are required by other Jurisdictional Agencies and shall be shown on separate sheets in the drawing set. Each drawing sheet and all notes pertaining to Erosion Control shall be attributed to the applicable City (or other Jurisdictional Agency) by note and shall be included as the last sheet(s) in the drawing set.

V. **PLAN AND PROFILE REQUIREMENTS.**
This section establishes the minimum standards relating to horizontal and vertical alignment of the sanitary sewer main. The horizontal and vertical alignments are reviewed for issues such as the following:

1. Conflicts or access restrictions.
2. Service availability to all lots and buildings and all tributary areas (watershed and sewershed).
3. Separations and protection.
5. Protection at water courses and BMPs.
6. Minimum and maximum cover.
7. Conflicts with other underground utilities, storm sewers, etc.
8. Maintaining hydraulic gradients.
9. Engineer shall also ensure the depth of the sewer main is adequate to serve all areas tributary to each main segment.

These standards are intended to minimize the need for future extension or realignment and excessive maintenance of the sanitary sewer. All drafting, including line types and weights and text sizes and weights, shall conform to JCW Drafting Standards as noted in Section XI.

A. **GENERAL ELEMENTS**

1. Show and label all proposed and existing sewer mains, easements, and service stubs. See Section XI for requirements for showing and labeling easements and right-of-way on the plans. Provide the book and page number for recorded sanitary sewer easements.
2. Show and label the entire plat(s) or parcel(s) to be served. For large lots, bearings, distances and break-lines can be used to define the lot boundary.
3. Show and label all structures such as buildings, retaining walls, trash enclosures, carports, separate garages, signs, subdivision monuments, etc.
4. Show and label all paved areas such as streets, private drives, parking lots, etc.
5. Show and label storm sewers, water courses, BMPs, gas, power and water transmission mains and lines, railroad crossings, etc. Include the name of the operating company as applicable.

6. Plan/profile view(s) of existing main(s) shall be shown and labeled in the plan set for those lots to be served by existing main(s).

7. In addition to the plan view, profiles shall be provided for all existing mains that will include connections for service stubs within the plat and/or phase served on the project.

8. Sheet size shall be 24” x 36”.

B. STREETS
1. Show and label all existing and proposed streets, drives, parking, and all other paved areas.
2. Provide the City assigned street name for all streets and drives.
3. All streets named by the City that are private shall include “Private” in the label. All private streets not named by the City and all private drives shall be labeled as a “Private Drive”.
4. Show and label all existing and proposed street right-of-way (ROW) in and adjacent to the project area. See Section XI for requirements for showing and labeling right-of-way on the plans.

C. EXISTING AND PROPOSED GRADE
1. Show and label the existing and proposed grades (ground profiles) along the centerline of the sanitary sewer main in the profile view.
2. If the proposed grade equals the existing grade, label the grade as: “Proposed grade = Existing grade”.
3. A minimum of three (3) feet of cover must be provided and maintained over the top of the main and service stubs in all locations. Include the following note for mains and service stubs that are three (3) to five (5) feet deep: “A minimum of three (3) feet of cover shall be provided over the sanitary sewer main and service stubs and maintained at all times.”
4. Where the top of the proposed main or service stub is less than three (3) feet from the existing ground surface, provide the following note: “Compacted fill shall be placed to a minimum height of three (3) feet above the top of the proposed sewer main or service stub prior to installation.” Show and label the limits of the compacted fill placement in the profile view.

D. NORTH ARROW AND SCALE. Provide a north arrow and the horizontal and vertical drawing scales. Drawing scales in the plan and profile views shall be provided as follows: 1 inch = 50 feet horizontal, 1 inch = 10 feet vertical. Other scale increments cannot be accepted; however, enlarged details may be provided on the plan sheet where greater detail is required.

E. LOT LINES, LOT AND BLOCK NUMBERS AND BUILDING DESIGNATIONS
1. For single family residential, show and label all lot(s), block(s) (if applicable), tract(s), parcel(s) for the area to be served. All parcels shall match the draft plat. The legal
boundary description for each lot must be provided on the plan sheet if the property will not be platted.

2. For multi-unit building and commercial developments, show and label all lot(s), tract(s), parcel(s), and building(s) for the area to be served. All lots and tracts shall match the draft plat. Each building shall be uniquely labeled, and include the number of units within each building as applicable. Include “Existing” or “Future” labels with the building designations for existing buildings or buildings that are proposed well in the future. The entire building outline shall be shown in the plan view where the building’s connection information is provided. Break lines and dimensions may be used for large buildings.

3. If the project will be phased, the phase boundary line for each phase shall be shown and labeled to identify each phase of the project on each applicable plan sheet.

4. Show and label all surrounding areas. Label each plat and lot number(s) or as “Unplatted” as applicable. If an unplatted area will be platted in the future, label the area as “Future Plat”. Do not provide lot numbers for unplatted future lots.

5. Show and label the building setback lines in the vicinity of the sanitary sewer mains.

F. PLAT OR PARCEL MODIFICATIONS
When an area is platted, replatted, or the property otherwise altered after the main has been constructed, refer to Section XIII.C. Sewer permits for modified lots can be issued only after JCW approval of service for the new lots and the lot modification document.

G. EXISTING AND PROPOSED UTILITIES, STORM SEWERS, WATER COURSES AND BMPs
1. Utilities
   a. All existing and proposed water, gas and power transmission lines shall be shown and labeled in both the plan and profile views. The name of each applicable utility company shall be indicated with the line label in the plan view.
   b. See the General Note in Section II.E.8 for water line separation requirements.
   c. Requirements for monitoring crossing gas or power transmission lines shall be as required by the applicable utility company and shall be noted on the plans. Contact JCW for review of any crossing agreement requested by the utility.
   d. Coordinate the location of all utility crossings between the plan and profile views.

2. Storm Sewers
   a. Show all existing and proposed storm sewers and associated storm system structures in the plan view.
   b. Within the project area, show and label all storm sewers and structures with the size, flow line elevations and (as applicable) type where the storm sewer lies within the easement required for any sanitary sewer or within 1:1 of any service line or service stub.
   c. A minimum horizontal separation of 7.5 feet shall be provided between the outer walls of the sanitary and storm sewer pipes located in the same corridor. At all locations where the storm sewer parallels the sanitary sewer within 15 feet, label the separation between the outside walls of the storm sewer and sanitary sewer pipes. If the storm sewer is not shown at a crossing in a profile view, label the
size of the storm sewer in the plan view. Additional horizontal separation shall be provided when the storm sewer is 36 inches or larger and/or the differential depth between the storm sewer and sanitary sewer exceeds 7.5 feet. Please contact JCW to discuss separation requirements in these situations. A 1:1 separation ratio between the horizontal separation and the flow lines of the pipes shall be achieved.

d. The storm sewer shall not cross the sanitary sewer main where both are located within the same corridor between lots or buildings.

e. Storm sewers shall cross the sanitary sewer as close to 90 degrees as possible. Where a 90 degree crossing cannot be achieved, reinforced concrete encasement (RCE) shall be extended on each end of the crossing to a point where 7.5 feet of horizontal separation has been provided between the adjacent outside walls of the pipes.

f. The sanitary sewer main and service lines shall be encased in reinforced concrete (RCE) when:

i. The storm sewer is located above the sanitary main or stub and the outer wall of the storm sewer crosses within 30 inches of the top of the sanitary sewer. Provide a minimum of 10 linear feet of RCE centered on the crossing.

ii. The storm sewer is located above the sanitary main or stub and the storm pipe diameter is 36 inches to 54 inches (see paragraph V.H.2.h where the storm exceeds 54 inches). The RCE shall be centered on the crossing and extend a distance equal to the difference in elevation between the top of the storm sewer and the flow line of the sanitary in both directions for a total RCE length of two times the difference in elevation plus the diameter of the storm sewer pipe, with a minimum of 10 feet of RCE length.

iii. The horizontal separation between the sanitary main or stub and a storm structure (inlet, junction, etc) is less than the vertical separation between the flow line of the sanitary sewer and the bottom of the storm structure. The RCE shall be centered on the structure and extend a distance equal to the difference in elevation between the top of the storm sewer entering the structure and the flow line of the sanitary in both directions for a total RCE length of two times the difference in elevation plus the width of the storm structure, with a minimum of 10 feet of RCE length.

g. The sanitary sewer main and service lines shall be encased in cage reinforced concrete (CRCE) when the storm sewer is greater than 54 inches in diameter or a storm structure is located directly above the sanitary. The CRCE shall be centered on the crossing and extend a distance equal to the difference in elevation between the top of the storm sewer and the flow line of the sanitary plus the diameter of the storm sewer in both directions plus a minimum bearing distance of one foot on each side for a total CRCE length of two times the difference in elevation plus the storm sewer diameter plus two feet, with a minimum of 10 feet of CRCE length.

h. The sanitary sewer shall be encased in CRCE designed as a beam to bridge the excavation for the storm sewer in all cases where the storm sewer crosses beneath the sanitary sewer. The CRCE shall be centered on the crossing and extend a distance equal to the difference in elevation between the top of the
sanitary sewer and the flow line of the storm sewer plus two feet of earthen contact on each side of the crossing for a total CRCE length of two times the difference in elevation plus four feet, with a minimum of 10 feet of CRCE length. Calculations sealed by the PE designing the beam shall be provided.

i. Show and label all RCE/CRCE as “RCE” or “CRCE” as applicable in the plan and profile views.
   i. Label the beginning and ending stationing for all RCE/CRCE in the profile view.
   ii. Provide RCE/CRCE stationing to the nearest foot.
   iii. Include reference to the CRCE detail with the encasement label if the detail is not included on the affected sheet.
   iv. For RCE/CRCE on service stubs, include the beginning and ending RCE/CRCE stationing with the stub information.

j. The Engineer shall design the RCE/CRCE and shall modify the design of the reinforcing shown on the RCE/CRCE detail(s) to meet the requirements of the project and the site conditions. The P.E. seal with signature and date shall be provided with the RCE/CRCE detail.

k. When service connections are not provided on the segment, Ductile Iron Pipe (DIP) in the proper class with a PolyBond Plus or Protecto 401 lining, and polyethylene encasement may be used in place of RCE (not in place of CRCE) and shall be placed for the full segment length between manholes. DIP class, lining type and encasement shall be labeled in the profile view.

l. Ensure adequate separation is provided between sanitary manholes and other underground utility structures, such as storm inlets, to allow room for proper compaction methods. Label the separation when the distance between the outside walls of the two structures is less than 5 feet. Flowable backfill is required where the separation between the two structures is less than two feet. Include notes accordingly.

m. If storm sewers do not exist and will not be provided for the project, provide the following note: “Storm sewers do not exist and the {Insert City} will not require storm sewers to be installed in this project area.” on each applicable plan sheet.

3. **Watercourses**
   a. A watercourse is defined as a channel in which a flow of water occurs, either continuously or intermittently.
   b. Show and label the centerline, 100-year Maximum Water Surface Elevation (MWSE) boundary and top of cut bank for all watercourses (existing and proposed) within the project area in the plan and profile views.
   c. Permanent erosion control measures shall be provided in all watercourse areas as required to prevent erosion over the sanitary sewer main. Velocity calculations sealed by the Engineer shall be provided for all watercourse crossings to define the protection area and type required. All supporting information necessary to identify the area and type of protection shall be submitted with the calculations.
   d. Horizontal placement dimensions shall be provided to clearly identify the protected area. Minimum placement along the watercourse channel shall equal
a distance twice the greatest depth of the sewer main within the 100-year flood elevation boundary plus a minimum of two foot beyond the boundary or as required by the selected control measure. Additional placement limits may be required at manholes.
e. Provide temporary erosion control measures where vegetation is determined to be adequate to facilitate establishment of the vegetation.
f. Specifications and placement details for the provided control measure shall be provided and referenced in the plan set.
g. For the various permanent erosion control measures required at crossings, provide the additional following information:
i. Riprap. The calculations for the riprap selection shall also include size, gradation, bed thickness and any other specification requirements. Include notes specifying the riprap type, weight and gradation in either the plan or profile view.
ii. Erosion Control Blankets or Matting. Include notes specifying the blanket or mat type, manufacturer, etc. in either the plan or profile view. Provide and reference installation details within the plan set.
iii. Vegetation. Where velocity calculations indicate that vegetation is adequate as the erosion control method, include the following notes to the plan view: “{indicate vegetation type} shall be placed at {identify location}. The Contractor shall ensure the vegetation is established for project acceptance and maintained during the 3-year maintenance period. The property owner shall maintain the area during the post maintenance period.” Matting will be required where seeding is proposed and shall be described as noted in Section f.ii above.
iv. Overland Flow. At locations that the Engineer has determined that flow will dissipate overland and a channelized watercourse will not cross the main or service line, provide sealed calculations showing that the discharge of the storm sewer or watercourse will dissipate before reaching the main or service line. Show and label the location that overland flow will occur and dissipate in the plan view and on the site grading plan.
h. A minimum 5 foot depth of cover should be provided at all watercourse crossings. Where that is not possible and the depth of cover over the main at a watercourse crossing is five (5) feet or less, cage reinforced concrete encasement (CRCE) shall extend beyond the MWSE boundary by a minimum of two feet. The CRCE shall be provided regardless of pipe type.
i. Cage reinforced concrete encasement (CRCE) shall be provided at crossings of all significant watercourses.
j. Impervious ditch checks shall be provided immediately downstream of all watercourse crossings or bodies of water such as detention or retention basins or BMPs and upstream of the next downstream manhole. Show and label the impervious ditch check in the plan and profile views.
k. City requirements for crossing stream/riparian corridors shall be coordinated with JCW and clearly noted on the drawings.
4. **Storm Best Management Practices (BMPs)**
   a. BMPs are defined as a “stormwater management practice used to prevent or control the discharge of pollutants and minimize runoff to waters of the U.S. BMPs may include structural or non-structural solutions, a schedule of activities, prohibition of practices, maintenance procedures, or other management practices.” The requirements for addressing various types of permanent and temporary BMPs are as follows:

<table>
<thead>
<tr>
<th>BMP Category</th>
<th>Design Requirements</th>
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<tbody>
<tr>
<td>a) Overland BMP</td>
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<td>i. Existing Native Vegetation Preservation (Stream Buffer Zones)</td>
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<tr>
<td>ii. Native Vegetation Restoration</td>
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<td>iii. Vegetated Filter Strips</td>
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<td>b) Conveyance BMPs</td>
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<td>i. Turf Grass Swales</td>
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<td>ii. Native Vegetation Swales</td>
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<td>c) Permeable Pavement BMPs</td>
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<td>i. Pervious Concrete</td>
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<td>iv. Porous Asphalt</td>
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<td>i. Proprietary Pavement Systems</td>
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<td>d) Temporary Storage/Treatment BMPs</td>
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<td>i. Bio-Swales</td>
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<td>ii. Rain Gardens</td>
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<td>iii. Infiltration Basins</td>
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<td>iv. Infiltration Trenches</td>
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<td>v. Bioretention Basins Surface</td>
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<td>vi. Sand Filters</td>
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<td>vii. Pocket Sand Filters</td>
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<td>viii. Extended Dry Detention Basins</td>
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<td>e) Permanent Storage/Treatment BMPs</td>
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<td>i. Extended Detention Wetlands</td>
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<td>ii. Wetland Swales</td>
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<td>iii. Extended Wet Detention Basins (Retention Basins)</td>
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<td>a) All existing and proposed sanitary sewer mains or service lines near BMPs shall be located a minimum of two (2) horizontal feet away from the edge of the maximum water surface elevation (MWSE) for each one (1) foot of depth of the sanitary main. If only one (1) horizontal foot of separation for each foot of depth of the main or service line can be achieved between a sanitary sewer main or service line and a BMP, the sanitary sewer shall be constructed of DIP and be labeled with pipe class, polyethylene, Polybond Plus or Protecto 401 lining, and polyethylene encasement. Include notes for backfill with compacted clay (no bedding rock) in the profile.</td>
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<td>b) A ditch check must be provided immediately downstream of any BMP to prevent water from entering the next MH downstream. A ditch check shall be provided downstream of the basin where is not required when DIP with compacted clay backfill is used.</td>
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<td>f) In-Conduit BMPs</td>
<td>a) A 1:1 separation ratio between the horizontal separation BMP structures, outer wall of MH, and the flow lines of the sanitary sewer pipe shall be achieved.</td>
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<tr>
<td>i. Hydro Dynamic Separators</td>
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<td>ii. Baffle Boxes</td>
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<td>iii. Oil/Grit Separators</td>
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<td>iv. Catch Basin Inserts</td>
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<td>v. Underground Sand Filters</td>
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<td>vi. Perimeter Sand Filters</td>
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<td>vii. Proprietary Media Filtration Devices</td>
<td></td>
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<tr>
<td>viii. Storm Treatment Units</td>
<td></td>
</tr>
</tbody>
</table>

b. Show and label all existing or proposed BMPs facilities including dam structure limits. The maximum and normal water surface elevations and boundary outlines must be clearly shown and labeled. For detention basins, the MWSE and boundary outline shall be clearly shown and labeled. A “**DRY BOTTOM BASIN**” note must be included to indicate the Detention basin will not retain water after the storm event routing has been completed.

c. Dam Structure Limits are described as the boundary for the limits of the dam that cannot be disturbed in order to maintain the structural integrity of the dam. The following note shall be included at the dam structure: **“The dam structure shall not encroach upon any portion of the easement required for the sanitary sewer.”**

**VI. SERVICE LINE REQUIREMENTS.** The following items shall be addressed for providing a point of connection to the main or manhole:

A. **SERVICE STUBS.** A service stub shall be provided for each lot and each building on a lot. The service stub is provided on the main to accommodate connection of the building service line. See also Attachment E for the JCW Service Line Design and Construction Standards.

1. The installation of the service line between the service stub and the building and connection of the building shall **not** be done as part of the sewer main project. A separate connection permit is required for this installation and connection. Provide a minimum of ten (10) feet of separation between the end of the service stub and the building.

2. Multiple service lines shall not be provided in lieu of a main extension. A service line shall not duplicate the sanitary sewer main routing or plumbing routing within the building.

3. A service line for a lot shall generally not cross another lot to access the sewer. The service line for a lot may enter another lot only if the other lot is contiguous with or located immediately across street right-of-way from the lot to be served. The entrance to the other lot (beyond the street right-of-way, where applicable) shall be no more than one half the width of the minimum allowable sewer easement, i.e. seven and one-half (7.5) feet. The service line entering another lot shall be located only in the sanitary sewer easement (or utility easement) for the sanitary sewer main or street right-of-way.
4. Service lines shall not cross wetland areas or Best Management Practices (BMPs) for storm water mitigation. Service lines shall not generally cross water courses unless by specific written authorization by JCW. Refer to Section V.G.4.

5. Service lines shall not cross existing or future arterial or four (4) lane roads.

6. If an existing or proposed building or tract will never require sanitary sewer service, provide the following label on the building or tract: “Sanitary Service Not Required” or “SSNR”. If SSNR is used, include the following note on the applicable sheet: “SSNR = Sanitary Service Not Required”. A written explanation of why service is not required must be submitted.

7. For lots with an existing main and no connection, the connection shall be located as close as possible to the building as follows:
   a. Existing precast manholes on the lot shall be core drilled (and PSX-type gasket used).
   b. Where a manhole is not available on the lot, a tee installation or saddle may be used upon JCW approval.
   c. Connections shall generally not be made at brick manholes.
   d. Saddles may be used only on vitrified clay pipe (VCP) or ductile iron pipe (DIP) mains with JCW approval.
   e. These connections shall be installed with the sewer main project. Special details shall be provided and referenced where applicable.

8. Connections shall not be provided on mains larger than 18 inches. Manhole connections are required on mains larger than 18 inches. The installation of a new manhole on an 18 inch or larger main shall be provided if access to an existing manhole is not available on the lot to be served. Sewer main project plans are required for manhole installations.

9. To ensure maintenance of service to the existing building that will be reconnected to the sanitary sewer or for a building where the septic system or holding tank will be damaged by the construction of the main, add the following notes to the applicable Lot in the plan view: "The following items are required for connection to the existing building on Lot {insert lot number} to the sewer main:
   a. JCW acceptance of the portion of the sewer main project required to serve the building.
   b. JCW acceptance of the Maintenance Bond from the sewer main contractor and Developer Bond Option from the site developer.
   c. JCW acceptance of the as-builts.
   If immediate connection to the main is necessary to allow the building to remain in service, the design engineer shall provide the following written acknowledgement on the plans: {Insert Engineering Firm name} understands that JCW may delay review of other {Insert Engineering Firm name} projects if the as-built drawings for this project are not submitted within 30 days from JCW acceptance of the main and accepted by JCW within 60 days from JCW acceptance of the main. This note should be removed or struck on the as-builts.
   d. JCW issuance of a sewer connection permit for the building.
   e. Include the following for existing buildings on Septic or Holding tanks: {"A permit for abandonment of the {septic system}{holding tank} issued by Johnson County Department of Health and Environment is required for JCW issuance of}
10. Existing service stubs shall be used. However, for lots with more than one existing connection point, the extra existing service stub shall be permanently capped in accordance with JCW standards. Please contact JCW for the details to be provided and referenced in the plan set.

B. CONNECTION INFORMATION. A connection shall be shown and connection information labeled for each lot and/or building as follows:
   1. Only tee or manhole connections shall be used for connections to the proposed main.
   2. All connections must be installed at a 90-degree angle (or greater for manhole stubs) to the downstream main. Wye connections shall not be used.
   3. Connections shall be placed a minimum of five (5) feet apart. Connections and service lines shall not be installed in the same trench.
   4. Label the service connection pipe material on each plan/profile sheet.
   5. The following information shall be provided for each service connection and placed on the residential lot or building to be served:
      a. Label the distance from the connection to the center of the downstream manhole as “__ DDS MH __” (distance in linear feet to downstream manhole and the manhole number)
      b. Label the connection type (i.e. “MH Stub” or “Tee”). For tees, include the tee dimensions (i.e. 8”x 6” tee).
      c. Label the service stub pipe diameter (i.e. “6-inch”), the linear footage of stub, and the slope of the stub. Only the linear footage of stub to be installed by the main extension contractor shall be shown on the main extension drawings.
      d. Reinforced concrete encasements shall be shown, labeled and location dimensioned along the stub where required.
      e. Horizontal bends (no greater than 45 degrees) may be provided on the service stubs where required. The location of the bend shall be dimensioned and right angle coordinates for locating the end of stub (or next bend) shall be provided.
      f. A cleanout is required when the total service line length from the building to the main will exceed 100 feet.
         i. Label the location of the cleanout on the service stub.
         ii. The cleanout must be placed in a non-paved area to the greatest extent possible and be located as close as possible to the midpoint between the main and the building.
         iii. Ten (10) linear feet of stub must extend beyond the cleanout as noted in the standard cleanout detail.
         iv. The cleanout shall be installed and tested with the sewer main project.
      g. If the lot sizes are too small to accommodate all the information, a table may be provided on the plan sheet showing the lot service.
   6. Show the proposed service stubs at the same line weight as the proposed main.
   7. The minimum slope for a six (6) inch service line is 1.0% and the minimum slope for a four (4) inch service line is 2.0%.
8. A minimum of ten (10) linear feet of service stub shall be provided for each connection. In addition, stubs shall extend through all easements (such as utility, public utility, right-of-way or others) which may contain other utilities.

9. A minimum of three (3) feet of cover must be provided and maintained above all service stubs.

10. For service stubs to be installed on a main located between two lots, the stub shall be located in front (on the street side) of the front building line or a minimum of 50 feet behind the front building line to avoid connections between foundations. A distance greater than 50 feet should be provided for lots with larger homes.

11. Connections should be avoided on DIP mains to the greatest extent possible. Where necessary, DIP tees are required on DIP mains. Include the following note to the plan sheet(s): “All ductile iron fitting and pipe transitions to PVC shall be made using a mechanical joint fitting with a MJ x IPS Ethylene Propylene Diene Methylene (EPDM) Rubber Transition Gasket by Romac Industries or approved equal. SBR gaskets shall not be used.”

C. END OF STUB REFERENCES

1. Show and label the interior angle between the manhole stub and the downstream main. The manhole stub shall not be installed at an angle less than 90 degrees to the downstream main.

2. Provide right angle coordinates to the nearest foot identifying the location of the end of manhole stubs that exceed 20 feet in length and are installed at an angle greater than 90 degrees to the downstream main. Right angle coordinates must also be provided at each bend in a service stub and at each cleanout (as applicable). For multiple bends, etc., the right angle coordinates shall be provided and measured from the immediate downstream pipe segment (main or stub).

3. A minimum of ten (10) feet of separation must be provided between the end of the stub and the building. Show and label the separation when the separation is less than 20 feet.

D. STUB ELEVATION TOLERANCE AND MINIMUM SERVICEABLE FLOOR ELEVATION

1. Label the flow line elevation at the upstream end of each service stub.

2. Risers are required when the depth of the end of stub will exceed 12 feet. Label the length of the riser as the actual linear footage (LF) of pipe to be installed from the tee (i.e. “Install __ LF riser”). The remainder of the stub shall be installed upstream of the riser. In cases where excessive depth for the stub is required due to extra basement depth, etc., include a note stating the depth and cause for the extra depth on the lot. Where a riser is required on a manhole stub, a five (5) foot section of pipe shall be extended from the manhole at the standard slope required for the stub diameter. The riser shall be installed upstream of the five (5) foot pipe section.

3. The Minimum Serviceable Floor Elevation (MSFE) shall be provided for each connection. A distance of three feet between the floor elevation and the flow line of the main at the connection is considered the minimum vertical clearance provided for connection. This clearance must be increased for long service lines, deep lots, or other special circumstances.
4. Where required by JCW, backflow prevention devices shall be installed in accordance with JCW Backup Prevention Program standards. Backflow Valves (BFV) shall be required for all connections with an MSFE equal to or less than the elevation determined by JCW. All under-slab basement plumbing and basement fixtures shall be routed through this valve. Written approval from the City to allow the installation of these valves in the manner required by JCW is required for plan release.

a. If the BFV will be permitted by the City as required by JCW, provide a “BFV” acronym in bold text on each applicable lot and the following note in bold text on the General Layout and each affected plan sheet(s): “BFV Permit Condition: A (insert current valve requirement info) backflow valve, or equal as approved by JCW, shall be installed inside the basement for Lot(s) {list affected lots}. All plumbing under the basement slab and all basement fixtures shall be routed through this valve. JCW shall confirm installation of each backflow valve during the connection inspection. The Builder is required to instruct the homeowner on the purpose, use and routine maintenance requirements for this valve. Adherence to the BFV requirement is a condition of approval for basement service for these lots. The valve shall be placed in a meter box set flush with the basement floor. A cleanout shall be placed immediately downstream of the valve.”

b. If the BFV is not permitted by the City as required by JCW, basement service for those affected lots connections shall not be allowed. Add the following note in bold text on the General Layout and the affected plan sheet(s) and provide a reference to this note with the connection information for each affected lot: “Basement sewer service is not available for Lot(s) {list affected lots}. A pump and associated piping located on the interior of the building may be provided to lift basement flows up to the building service line.”

E. BUILDING DEMOLITION
When an existing building is to be demolished and replaced at the project site, the existing building service line shall be temporarily capped-off at the main. A temporary cap-off permit shall be obtained from JCW and inspected by JCW prior to building demolition. If the building will be permanently removed and not replaced, the existing service line shall be permanently capped at the main under a permit issued by JCW. Provide a note in the Plan view as follows: “The existing connection point at {provide location} shall be {temporarily}{permanently} capped at the main and inspected by JCW prior to demolition of the existing building.” For permanent cap-offs, contact JCW for the required permanent cap details to be provided and referenced in the plan set. Note: Service lines may be reused only upon JCW confirmation that service line meets the current version of the JCW Service Line Design and Construction Standards.

VII. MANHOLE REQUIREMENTS
This section establishes the minimum standards relating to all items to be shown and labeled for proposed and existing manholes within the project boundary. All drafting shall conform to JCW Drafting Standards.
A. MANHOLE DESIGNATIONS AND STATIONING

1. STATIONING
   a. PLAN VIEW. Label all proposed and existing manholes. See Section III.C for proposed and existing manhole label formats.
   b. PROFILE VIEW. Label all proposed and existing manholes. See Sections III.C for proposed and existing manhole label formats. Provide the stationing for each manhole in the profile view. Stationing for all new mains shall begin at Station 0+00 and mains shall be stationed from downstream to upstream. Station equations shall be provided at each manhole where a line change occurs (i.e. between an existing main and a proposed main and between each new line on the proposed main (Line A to Line B, etc.). The station equation shall equate the stationing of the downstream main to the stationing of the upstream main (i.e. Line A Sta. 3+25 = Line B Sta. 0+00).

2. SPACING. See paragraph VIII.B for maximum spacing of manholes.

3. DIMENSIONING. When a new manhole will be constructed on an existing sewer main, the distance to the nearest existing manhole that will remain in service shall be dimensioned and the existing manhole shall be shown and labeled in the plan and profile views.

4. DOG HOUSE MANHOLES. “Doghouse” type manholes shall not be installed on 8-inch through 12-inch Polyvinyl Chloride (PVC) or Ductile Iron (DIP) mains. Add the following note in the plan and profile views to the label for manholes to be constructed on existing mains: “The existing main shall be removed and a standard MH installed. A doghouse manhole shall not be installed.” A “Doghouse” type manhole may be installed only when the manhole is constructed over an existing main of 15-inches diameter or larger or on existing Vitrified Clay Pipe (VCP) mains. Provide and reference JCW’s MH Doghouse Detail for the manhole installation where a doghouse manhole is necessary. Contact JCW for the detail.

5. BRICK MANHOLES. Existing brick manhole(s) shall be replaced entirely with a precast manhole where a connection is required. Connections to existing manholes shall be allowed only at precast manholes.

6. SHALLOW MANHOLES. Designate and label a “Shallow-Type Manhole” for manholes 9 feet deep or less.

B. MANHOLE DIAMETER

The manhole internal diameter shall be indicated in the profile view. Standard manhole diameter criteria are as follows:

1. MH Diameter vs. Main Depth. See Section IX.C regarding sewer main depth requirements.
   a. Four (4) feet in diameter minimum for depths up to 20 feet deep.
   b. Five (5) feet diameter minimum for depths 20 to 25 feet deep.
   c. Six (6) feet diameter minimum for depths over 25 feet deep.

2. Larger manhole diameters will be necessary for larger diameter pipes and/or for various angles between pipes in accordance with JCW specification and manhole manufacturer requirements.

3. The minimum distance between the outside diameter of the holes for the pipes in the manhole wall shall be 12 inches or one half the outside diameter of the smaller
pipe, whichever is greater, as measured along the inside wall of manhole. Provide an enlarged detail showing the achievement of separation between the pipe outer walls.

4. A maximum of four (4) pipes (mains or stubs) may be installed in a four (4) foot diameter manhole. The number of pipes that may be installed in a manhole may be reduced for large diameter pipes.

C. MANHOLE LOCATION
1. Manholes shall generally not be located in paved areas, in “backyards”, or other areas which are not accessible by maintenance vehicles. Where backyard locations can not be avoided, an access easement shall be provided for JCW. Larger interceptor sewers to serve water or sewer sheds will parallel area watercourses and may be located in “backyard” areas.

2. When a downstream manhole is located in a backyard or green-space, the upstream manhole shall be accessible to the maintenance vehicle with the center of the manhole cover being located two (2) to five (5) feet behind the back of curb (BOC) or the pavement edge where there is no curb. The actual distance from the back of curb to the center of the manhole shall be labeled in the plan view. Label the manhole as “BOC” in the plan view and provide and reference a Back of Curb Detail. Contact JCW for the BOC Detail.

3. Dimension the distance from the manhole center to the property line in the plan view for manholes located within ten (10) feet of a property line located between lots.

4. When extending the main to tributary area, locate the manhole center a minimum of two (2) feet off of the property line between lots (or the extension of the property line into street ROW or other area).

5. When a new manhole will be constructed on an existing sewer main, the distance to the nearest existing manhole shall be indicated, and show the existing manhole in the plan and profile view. For relocations, the distance to the nearest existing manhole that will remain in place shall be noted.

6. For existing manholes that must be located in pavement, a protective concrete collar shall be installed around the lid and frame in accordance with JCW standards. Contact JCW for the detail. Show and label the detail for the collar on the plan and profile sheet.

7. Manholes shall not be located in parking stalls.

D. MANHOLE TOP ELEVATIONS
1. Show top elevations only in the profile view for all new and existing manholes. Label the elevation as “Surveyed” where there is a variance between the as-built record elevation for an existing manhole.

2. Provide a bolt-down cover at each manhole located in 100-year flood areas where the top elevation is equal to or lower than the 100-year flood elevation. Add the “Install Bolt-Down Cover” label to each applicable manhole in the Profile view.

3. Adjustments to existing manholes may be made with precast concrete adjustment rings in accordance with JCW standards; however, the total height of adjustment rings on the manhole shall not exceed 12 inches. If the adjustment will exceed 12 inches, the barrel sections shall be replaced to match grade. The manhole shall
be vacuum tested. Add the following note to the MH(s): “Replace/add barrel sections as required to meet the grade requirements.”

4. When additional fill is placed over an existing main resulting in a depth greater than 16 feet from top of manhole to the invert out, the Engineer shall field verify the existing manhole wall thickness. The manhole shall be reconstructed and raised to grade using precast concrete manhole barrel sections with a minimum wall thickness of 1/12 the manhole internal diameter in inches, plus one inch below the 16 foot elevation, unless the existing manhole is precast concrete and already meets the minimum wall thickness requirement. The Engineer shall include applicable notes on the drawings.

E. INTERIOR ANGLES AT MANHOLES  The interior angle between incoming and outgoing lines for both existing and new mains shall be clearly labeled at all manholes in the plan view in degrees, minutes, and seconds. Interior angles less than 90 degrees shall not be accepted. Ensure the interior angle will provide for a minimum of twelve (12) inches of manhole wall between the outside edges of the pipe.

F. MANHOLE INVERT ELEVATIONS
1. Show invert elevations in the profile view only for each connecting sewer (main or stub) at each new and existing manhole. Label each pipe invert elevation uniquely (a direction identifier (i.e. N, S, E...) is preferred) in the profile for multiple pipes in a manhole. For existing inverters, label elevations as “Surveyed” where there is a variance between the as-built record elevation(s).
2. The invert elevations labeled in the profile shall be the elevation determined by carrying the slope of the pipe to the center of the manhole. The maximum total drop in elevation across a manhole (measured at the manhole walls) shall not exceed 0.5 feet, except that the crown elevation of all incoming sewers or stubs shall not be lower than the crown elevation of the outlet sewer. Adjust the drop indicated by the inverts labeled at the center of the manhole to provide no more than 0.5 feet of drop across the manhole.
3. Based on the interior angle between pipes, provide the following minimum drops in invert elevation across a manhole (measured at the manhole walls):
   a. 0.1 feet for interior angles between 180 degrees and 150 degrees.
   b. 0.2 feet for internal angles between 135 degrees and 150 degrees.
   c. 0.3 feet for internal angles between 90 degrees and 135 degrees.
4. When an existing pipe will be removed from a manhole, the manhole wall shall be repaired to a watertight condition with concrete and the invert reformed. Provide and reference the Manhole Cap-off Detail in the profile view. Contact JCW to obtain the detail.

VIII. PIPE REQUIREMENTS  This section establishes the minimum standards for items that must be shown and labeled for all pipe provided for the project.

A. MAIN DESIGNATIONS
1. Plan View. Label all proposed and existing sewer mains. See Sections III.C. for proposed and existing sewer main designations.
2. **Profile View.** Provide the line name label for all mains at the top of the profile view for each line. See Sections III.C for main labeling designations. Show and label a minimum 50 ft portion of the existing upstream or downstream main at the end manholes including the pipe size, type and slope. When the surveyed information does not match the as-built pipe size or pipe type, label as “Surveyed”.

B. **MAXIMUM DISTANCE BETWEEN MANHOLES.** Label the length of each pipe segment between manholes in the profile view in feet to one decimal place. Length shall will be measured from center of manhole to center of manhole. The number of manholes shall be minimized to the greatest extent possible; however, pipe length between manholes should not exceed the following maximum distances:

<table>
<thead>
<tr>
<th>Pipe Diameter</th>
<th>Maximum Distance between Manholes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ten (10) inches or less</td>
<td>300 feet</td>
</tr>
<tr>
<td>Twelve (12) to Eighteen (18) inches</td>
<td>400 feet</td>
</tr>
<tr>
<td>Greater than Eighteen (18) inches</td>
<td>500 feet</td>
</tr>
</tbody>
</table>

C. **PIPE SIZE.** Label the diameter (inches) of each existing and proposed pipe between manholes in the profile view. Pipes shall be sized to provide adequate capacity in accordance with Section IX.A of this document. The minimum sewer main diameter between manholes shall be eight (8) inches.

D. **PIPE MATERIAL.** Label the material and class for each existing and each proposed main section between manholes in the profile view as follows:
1. Polyvinyl Chloride (PVC) pipe (up to 48 inches diameter) shall be labeled with the SDR 26 (minimum).
2. Ductile Iron Pipe (DIP) shall be labeled with pipe class 50, 51 or other as applicable, PolyBond Plus or Protecto 401 lining, and polyethylene encasement.
3. High Desity Polyethylene Pipe (HDPE) shall be labeled as SDR 11 or SDR 17 as applicable.
4. Reinforced Concrete Pipe (RCP) (30 inches and greater in diameter) shall be labeled with pipe class.
5. Glass-Fiber-Reinforced Thermosetting-Resin Sewer Pipe (RTRP) (8 inches and larger) shall be labeled with pipe stiffness.
6. Transitions between pipe materials shall occur only at manholes for new mains.
7. Pipe depth shall not exceed the following maximums for each pipe material:

<table>
<thead>
<tr>
<th>Sewer Pipe Material</th>
<th>Depth to Invert</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC SDR-26, HDPE</td>
<td>Up to and including 20 feet</td>
</tr>
<tr>
<td>RCP, RTRP or DIP</td>
<td>Greater than 20 feet</td>
</tr>
</tbody>
</table>

E. **PIPE SLOPE.** Label the slope of each existing pipe and each new pipe section between manholes in the profile view in percentage to one decimal point. Pipe slope shall adhere to the minimum slope requirements in Section IX.B of this document.
Maximum allowable pipe slopes are controlled by the gaskets for the inlet and outlet piping at manholes. Maximum slopes for the applicable manhole gaskets for 8-inch to 15-inch pipe are noted in the following table:

<table>
<thead>
<tr>
<th>Manhole Gasket Manufacturer</th>
<th>A-LOK Products, Inc.</th>
<th>Press-Seal Gasket Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasket Type</td>
<td>A-LOK X-CEL</td>
<td>Z-LOK PSX Direct Drive Boot Gasket</td>
</tr>
<tr>
<td>Maximum Pipe Slope</td>
<td>17%</td>
<td>46%</td>
</tr>
</tbody>
</table>

Label the required manhole gasket type with the applicable manhole information in the profile view if the slope of an 8-inch to 15-inch main will exceed 17%. In no case shall the slope of a pipe entering a manhole exceed 46%.

See the JCW Standard Specifications for requirements for other pipe sizes and manhole diameters.

Concrete anchors shall be provided on pipe with the following slopes in accordance with JCW Standard Specifications:
1. 15-35% slope at 36 ft spacing.
2. 35-46% slope at 24 ft spacing.

F. PIPE PROTECTION. Structures shall not encroach on the easement required for the sewer main. See Section XI for Easement Requirements. At retaining walls, the wall shall not parallel the main within the easement required for the main. Where retaining walls cross existing or proposed mains or service lines, the following apply:
1. Encase the main or service line in reinforced concrete (RCE) or installed in a steel casing pipe meeting the casing pipe specifications referenced in Section G.
2. The RCE or steel casing shall extend a horizontal distance on each side of the wall equal to the depth of the main or service line on each side of the wall.
3. Stationing for each end of the RCE or casing shall be clearly labeled in the plan and profile view.
4. The following elevations shall be provided at each wall crossing: top of wall, finish grade on each side of the wall, bottom of footing, and pipe flow line.
5. Provide the following a note at the wall: “The retaining wall (footing or key) shall not bear directly or indirectly upon the (RCE) or {casing pipe}.”
6. All note information shall be provided in the profile view for the main and may be provided in the plan view for service lines that are not shown in the profile view.

See Section V.G of this document for pipe protection requirements relating to crossings of storm sewers, water courses, BMPs or other utilities. Also, see Section VIII.D for pipe requirements relating to depth.

G. BORING. All bores shall be shown and labeled in the plan view. Show and label the stationing, length, diameter, and type of both the casing pipe and the carrier pipe in the
profile view. The casing pipe shall be steel pipe conforming to ASTM A 139 and having a diameter and minimum wall thickness in accordance with the table provided in the JCW Construction and Material Specifications for Sanitary Sewers. Add the following notes on the plan view:

**Bore Tolerances**

1. **Horizontal tolerances for the bore shall not exceed one foot to the left or right of the alignment center line.** Variances beyond Specification Section 2536 - 3.03.B.2.a shall not be accepted.
2. **Vertical tolerances for the bore shall not exceed 0.5 feet and shall not affect capacity or velocities in the bored main segment between manholes or the main segment between manholes upstream or downstream of the bored main segment.** Variances beyond Specification Section 2536 - 3.03.B.2.a shall not be accepted.
3. **Low spots in the carrier pipe shall not be accepted.**

Refer to the JCW Standard Detail drawing for the casing and carrier pipe installation detail. Full blocking shall be provided in the casing pipe to prevent movement of the carrier pipe within the casing pipe during placement of the fill in the annular space. The proposed casing pipe diameter and required skid size(s) shall be noted on the standard detail.

**H. OPEN CUT OF EXISTING STREETS.** Provide written verification from the City where the City will allow open cut in lieu of boring an existing street.

**IX. DESIGN REQUIREMENTS** This section establishes minimum standards for the system design, capacity, and flow elements to ensure a properly functioning system.

A. **DESIGN CAPACITY.** Sewers shall be designed to carry the design flows obtained from the JCW 10-year Design Flow Curves, Attachment F, at 94% depth of the sewer using a Manning’s n-value of 0.013. Pipe capacity calculations shall be provided for all extensions.

1. **Pipe Capacity Calculations.** In addition to the pipe capacity calculation(s), a tributary area map must be included for all projects with tributary area outside of the project area and for all relocation projects. Include the tributary map as a sheet in the plan set. On-site and off-site areas must be shown and labeled on the map. The capacity calculations shall show that the main(s) for the project will carry the JCW design flows based upon the total area tributary to each main(s). For projects with tributary area greater than 50 acres, a breakdown of area tributary to individual pipe segments between manholes and capacity calculations for each segment is required.

2. **Site Allowable Flow.** Calculations for Average and Peak Wastewater Flow discharges from the development and the Site Allowable Flow Rate signed, sealed and dated by the Kansas PE sealing the project plans are required. Calculate wastewater flows based on the usage types proposed for the development and not on fixture unit flows used for building MEP design. Peak Flows from development
may not exceed the Site Allowable Flow Rate. The Site Allowable Flow Rate is calculated by multiplying the total acreage in the development by the Design Flow Rate applicable to the development’s location in JCW’s collection system. The Design Flow Rate for newer areas in JCW’s collection system is 0.025 cfs/acre. For older areas of JCW collection system, lower Design Flow Rates will be applied due to lower design flow capacities available in the system. These Design Flow Rates vary from 0.01 cfs/acre in older areas of the system to the 0.025 cfs/acre in newer areas of the system. Contact JCW for verification of the Design Flow Rate applicable to the development. Where serving areas with on-site systems and large lots, alternate design flow rates may be considered on a case-by-case basis.

B. MINIMUM PIPE SLOPES. Minimum acceptable slopes for 8-inch sewer mains with the corresponding number of connections upstream are as follows:

<table>
<thead>
<tr>
<th>Connections</th>
<th>Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 15 connections</td>
<td>1.00%</td>
</tr>
<tr>
<td>15 - 30 connections</td>
<td>0.80%</td>
</tr>
<tr>
<td>31 or more connections</td>
<td>0.64%</td>
</tr>
</tbody>
</table>

For pipe larger than eight (8) inches in diameter, the slope shall provide a minimum velocity of two (2) feet per second when the pipe is flowing half full. Calculations must show the pipe will achieve half full flow based on the proposed wastewater flows based on the usage types proposed for the development as noted in paragraph A.2 above. Capacities and velocities in the pipe shall be provided. All calculations shall be signed, sealed and dated by the PE sealing the plans.

C. MAXIMUM SEWER DEPTH. The maximum allowed depth of lateral sewers and manholes is generally 20 feet as measured from flow line of pipe to final grade. Exceptions to this requirement will be made on a case-by-case basis and only if no other feasible alternatives exist. In general, exceptions will not be approved if the sole purpose of the extra depth is to provide service to areas outside the watershed or sewershed to be served by the project.

D. STRUCTURE SEPARATION. Sewers shall be located at least the minimum distance from existing and proposed buildings or other structures in accordance with the easement width requirements of this document. See Section XI. All existing, proposed and future proposed buildings shall be shown on the plans. Any structure such as trash enclosures, carports, entrance signage, etc., shall not be constructed within the easement required for the sanitary sewer.

E. TRIBUTARY AREA SERVICE. The sanitary sewer main must be extended to the project property boundary to serve tributary areas which lie outside of the project boundary and do not have direct access to the sanitary sewer main. Locate the center of the manhole two feet to the property line and on the development property (unless otherwise requested by the tributary property). JCW’s determination of a tributary area shall consider watershed and “sewershed” boundary factors. The determination will also consider the location of upstream drainage ways and lot lines. If an upstream
property can be served in more than one direction, the first project proposed downstream of the property will be required to extend the main to serve the property. Refer to Section XI for Off-Site Easement acquisition requirements.

F. RELOCATIONS. See Section IX.A for design capacity and calculation requirements. The capacity of the existing main shall be maintained or shall be modified to meet overall system capacity requirements as deemed necessary by JCW. All costs associated with relocating existing sewer mains, manholes, and service lines shall be borne by the developer or entity proposing the project. JCW may participate in costs associated with upsizing a main if additional main capacity is deemed necessary by JCW.

The existing main to be removed from service shall be removed or abandoned-in-place as follows:
1. Removals. Existing mains and manholes to be removed from service that are in residential areas or are not in a sanitary sewer easement dedicated to JCW shall be excavated and removed entirely. The following labels and notes apply:
   a. Label the manholes and stationing limits and length of pipe to be removed, pipe size and type in the Layout and Plan views (including on the Grading Plan). Example: “Remove 150.35 LF of 10 inch PVC SDR-26 from existing Line A of BRM1 Contract 1 between MH BRM1(19)109 at Sta.1+00.20 to MH BRM1(20)001 at Sta.2+50.55”. For manhole removal: “Completely remove existing MH BRM1(20)001”.
   b. For permanent caps, provide and reference the JCW Cap-Off Detail and include the following note: “The Contractor shall permanently cap the existing main at the tie-in points. See Detail __ on Sh __.”
2. In-place Abandonments. Where the existing sewer main to be removed from service lies within a dedicated sanitary sewer easement and the property to be served is non-residential, in-place abandonment of existing mains (by completely filling with flowable fill) will be allowed upon written recommendation of the design engineer (see Note c.i. below). The property owner (and building owner, as applicable) shall execute the Agreement for In-place Abandonment of a Sanitary Sewer Main for the project. The following are required with the initial plan submittal for in-place abandonment of the sewer main:
   a. Label the manholes and stationing limits and length of pipe (with pipe sizes and types) to be abandoned-in-place in the Layout and Plan views (including on the Grading Plan). Example: “Abandon-in-place 150.35 LF of 10 inch PVC SDR-26 of existing Line A of BRM1 Contract 1 between MH BRM1(19)109 at Sta.1+00.20 to MH BRM1(20)001 at Sta.2+50.55”.
   b. All existing manholes to be abandoned-in-place shall be removed to a minimum of four feet below grade then filled completely with flowable fill. Include notes on the plans as follows: “Abandon existing MH BRM1(20)001 in-place. See Note iii.”
   c. Add the following notes to the applicable plan/profile sheet(s):
i. In-place abandonment of Line ____ from Sta. ___ to Sta. ___ and manhole(s) _____ has been requested by INSERT PROPERTY OWNER NAME and recommended by INSERT DESIGN ENGINEERING COMPANY NAME.

ii. Line ___ shall be abandoned-in-place by filling completely with flowable fill from Sta. ____ to Sta. _____. ____ cubic yards of flowable fill are required to completely fill the abandoned main.

iii. Manholes abandoned-in-place shall be removed 4 feet below grade (min) and fill entirely with flowable fill.

iv. Full time inspection by INSERT DESIGN ENGINEERING COMPANY NAME of the placement of the flowable fill and a report of the inspection, including the amount of flowable fill placed and the delivery tickets for the flowable fill placed, shall be provided to JCW by INSERT DESIGN ENGINEERING COMPANY NAME for project final acceptance by JCW.

v. Stand pipe inspection ports shall be provided at the midpoint of each line segment between manholes to be abandoned-in-place. The stand pipes shall be of adequate diameter to visually verify the installation of the flowable fill material.

vi. (BOLD the following note): INSERT PROPERTY OWNER NAME HERE has executed an Agreement for In-place Abandonment of a Sanitary Sewer Main pertaining to the in-place abandonment of the existing sanitary sewer main shown in this plan set. This document has been filed against the property with the Johnson County Records and Tax Administration.

d. In-Place Abandonment Agreement. The following information is required with the initial plan submittal:

i. Full Property Ownership name(s).

ii. Full Building Ownership names, where building owner is known and if different than Property Ownership.

iii. Full name of individual that will execute the Agreement and is formally authorized to legally bind the Ownership(s). Provide name as the individual signs (i.e. John Smith vs. Jonathan Smith vs. Jonathan Q. Smith).

iv. Title of individual signing the Agreement. The following Officers shall sign:
1) For corporations, President or Vice-President;
2) For LLCs, LCs, LPs (Managing Member);
3) For other individuals, provide legal documentation showing the individual signing the document can legally bind the Ownership.

v. Property Street Address, City, Zip.

vi. Exhibit A - legal description for the parcel on an 8-1/2” x 11” sheet.

vii. Exhibit B – graphic exhibit showing, labeling and stationing the main and manholes to be abandoned-in-place. Exhibit shall be similar to the plan view included in the sewer main project place and comply with JCW Drafting Standards. Exhibit shall not exceed an 8-1/2”x14” sheet.

Upon JCW acceptance of the sewer main project plans, Agreement information and the Exhibits for in-place abandonment from the Engineer, JCW will prepare and forward original Agreement for In-Place Abandonment of Sanitary Sewer Main document (In-Place Abandonment Agreement) for execution by the
property owner(s) (and, if applicable, the building owner(s)). The In-Place Abandonment Agreement shall not be modified in any manner. JCW will also identify the amount for the Agreement Recording Fee (ARF) to be paid with the return of the executed Agreement. The name of the project shall be provided on the ARF check.

e. JCW acceptance of the executed In-Place Abandonment Agreement original document and the Agreement Recording Fee (ARF) are required items for release of the relocation project plans for construction.

f. The project shall not be accepted until JCW has successfully recorded the In-Place Abandonment Agreement document with the Johnson County Department of Records and Tax Administration (RTA).

3. Additionally for sewer main relocations:
   a. Provide the following note in bold lettering on each applicable plan sheet: “THE FLOW FROM THE EXISTING MAIN {add main designation} SHALL NOT BE DIVERTED TO THE RELOCATED MAIN UNTIL JCW HAS INSPECTED AND PROVIDED WRITTEN ACCEPTANCE FOR THE RELOCATED MAIN. FLOW SHALL BE MAINTAINED AT ALL TIMES AND SHALL NOT BE DISCHARGED TO THE ENVIRONMENT.”

   b. Include the following note on each applicable plan sheet: “Bypass pumping, including the design engineer’s confirmation of the acceptability of the contractor’s plan, shall be in accordance with Section 1000.1.07 of the current version of the JCW Construction and Material Specifications for Sanitary Sewers.”

Note: Removals changed to in-place-abandonment after the initial submittal (or vice versa) will be reviewed as a first submittal. If the change is proposed after the plans have been released for construction, review and release for construction will not be expedited for construction. Work may not proceed until JCW has released the plans for construction.

Criteria for addressing existing structures over existing lines will be considered on a case-by-case basis.

G. REQUIREMENTS FOR ADDITIONAL FILL AREAS. If grading for the project places additional fill over existing sewer mains or service lines, extra protection, replacement or relocation shall be required in accordance with JCW pipe and manhole requirements. The main shall be constructed of the pipe type required for the depth as listed in Section VIII.D of this document. If only a portion of the main exceeds the noted depths, CRCE may be used with written JCW approval. Additional easement width, in accordance with Section XI. Easement Requirements shall also be provided.

H. ALIGNMENT. The main alignment shall be designed to minimize number of manholes and length of the main, service lines, and building plumbing necessary to serve a building while meeting the requirements for JCW maintenance of and accessibility to the main and service to tributary parcels.
I. REVISIONS DURING CONSTRUCTION. Any deviations from the plans released by JCW shall be submitted to JCW for review and approval before the deviation may be constructed. Five copies of the applicable plan sheet(s) showing the plan revisions shall be submitted to JCW with all revisions clouded. The revision(s) shall also be numbered and a brief explanation of the revision(s) shall be included (with the corresponding number) on the plan sheet(s). A revised JCW Information Sheet, calculations, easements, additional PAF, etc., may be required. The revised sheet(s) shall be released by JCW and shall be on the job site before construction may proceed.

X. DETAIL SHEET REQUIREMENTS
A. The JCW Standard Detail sheet is available for download in AutoCAD and PDF formats at www.jcw.org under the Development and Permitting section on the Privately-Financed Projects page.
B. The basic elements of the JCW Standard Detail sheet cannot be changed without expressed written authorization from JCW.
C. Contact JCW to discuss details that are necessary for your project and are not included on the JCW Standard Detail sheet.
D. Where casing pipe is required, the Engineer shall revise the Casing Pipe and End Seal Detail to label the size and material for the casing pipe and the blocking type to be used.

XI. EASEMENT REQUIREMENTS
All sanitary sewer lines must lie in either a platted sanitary sewer easement or a sanitary sewer easement dedicated to Consolidated Main Sewer District of Johnson County, Kansas. The sanitary sewer may generally be located in City Right-of-Way or Utility Easement provided sanitary sewer is specifically provided for in the easement dedication; however, where sanitary sewer easement width requirements exceed the standard U/E or right-of-way width, the additional easement shall be sanitary sewer easement (S/E) dedicated to JCW. Mains located between lots shall be in an easement dedicated as a sanitary sewer easement only.

JCW receipt and acceptance of the draft plat and/or signed written easement is required for JCW release of the project drawings for construction. Signed easement originals shall be recorded by JCW. JCW acceptance of the recorded plat is required for acceptance of the project construction and issuance of the JCW Project Acceptance Date.

A. SUBMITTAL REQUIREMENTS. Where platted easements will be utilized, the draft final plat is required with the initial plan submittal. When easements will be dedicated by separate written easement conveyance, the draft easements on the JCW Easement Form with Exhibits should be submitted with the first submittal and are required with the second submittal. See Attachments G-1, G-2, or G-3 for the JCW Easement Forms. The entire form, including all grantor and signatory information, shall be completed and provided to JCW for review and approval. The easement exhibit map (drawn to scale) showing the limits of the easement(s) shall also be provided. Incomplete draft forms and/or exhibits will be returned for completion and a hold will be placed on the project review.
B. EASEMENT WIDTH REQUIREMENTS
Permanent easements for sanitary sewer mains on all projects shall be centered on the main and the width of the easement shall be equal to two times the depth of the main at the deepest point on the main segment between manholes. The easement width shall not be less than 15 feet in any case. Lateral sewer (primarily privately-financed projects) depths greater than 20 feet deep are generally not approved; therefore, easement widths would generally not exceed 40 feet on lateral sewer projects. Easement widths for main district and sub-district (publicly-financed) projects shall exceed 40 feet on a case-by-case basis as determined by the main depth parameters.

Where additional easement is required for mains located along dedicated public street right-of-way, provide an additional S/E on the parcel side of the ROW so that the total easement provided is equal to the depth of the main at the deepest point on the main segment (minimum 7.5 feet). Easements shall extend beyond end manholes a distance equal to the depth of the manhole (minimum 7.5 feet).

Provide additional sanitary sewer easement for existing mains in conformance with current easement requirements. Additional sanitary sewer easement is required in all cases where fill will be (or has been) placed over the sanitary sewer main.

Sanitary sewer easement widths may be reduced in accordance with the following table if ductile iron pipe (DIP) (with required lining and encasement) is used. The pipe shall be centered in the permanent sanitary sewer easement.

<table>
<thead>
<tr>
<th>Depth to Invert</th>
<th>Easement Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 10 feet</td>
<td>15 feet</td>
</tr>
<tr>
<td>Greater than 10 to 15 feet</td>
<td>20 feet</td>
</tr>
<tr>
<td>Greater than 15 to 20 feet</td>
<td>30 feet</td>
</tr>
</tbody>
</table>

C. SHOWING EASEMENTS AND ROW ON THE PLANS. All easements required for existing and proposed sanitary sewer mains shall be shown including:
  a. dedicated sanitary sewer easements
  b. right-of-way
  c. utility easements with sanitary sewer dedication

shall be shown and labeled on the plan and profile sheets and the grading plan. The dimensions for all easements shall be labeled. Detailed dimensioning of irregularly shaped easements shall be provided on the plan and profile sheets and be sufficient to clearly determine the limits of the ROW such that the easement can be readily located and staked in the field. Easements shown on the plans shall match the easements provided on the plat or the written easement(s). The recorded book and page number for existing sanitary sewer easements shall be labeled on the plan and profile sheets.

Show and label all street right-of-way (ROW) in the vicinity of the sewer main. Label the width of the ROW for streets and the radius of the right-of-way at cul-de-sacs. Detailed
dimensioning of irregularly shaped ROW shall be provided on the plan and profile sheets and be sufficient to clearly determine the limits of the ROW such that the ROW can be readily located and staked in the field.

Restoration of the Temporary Construction Easements (TCE) area(s) is required. Provide the following note with all TCEs in the Plan view(s): “The area within the Temporary Construction Easement shall be restored to equal or better condition in accordance with JCW Construction and Material Specifications for Sanitary Sewers. Restoration of the temporary construction easement areas is required for project acceptance.”

All drafting for the easements shall conform to JCW Drafting Standards. See Section XII for the Drafting Standards or view the standards at: https://www.jocogov.org/sites/default/files/documents/JCW/JCWDraftingStandards3_18_13.pdf.

D. PLATTED EASEMENTS

1. Easement Dedication. Dedication of platted easements to JCW shall be included on the plat and read as follows: “An easement or license to lay, construct, maintain, alter, repair, replace and operate one or more sewer lines and all appurtenances convenient for the collection of sanitary sewage, together with the right of ingress and egress, over and through those areas designated as "Sanitary Sewer Easement" or "S/E" on this plat, together with the right of ingress and egress over and through adjoining land as may be reasonably necessary to access said easement and is hereby dedicated to Johnson County Wastewater of Johnson County, Kansas or their assigns. Alteration of land contours will be permitted only with the express written approval of J CW. Any placing of improvements or planting of trees on said permanent right-of-way will be done at the risk of subsequent damage thereto without compensation thereof.”

2. Showing S/Es on the Plat. Lines delineating S/Es on plats shall be clearly distinct from other line types and be clearly labeled throughout. Detailed dimensioning of irregularly shaped S/Es shall be provided on the plan and profile sheets and be sufficient to clearly determine the limits of the S/Es such that the easement can be readily located and staked in the field. Where sanitary sewer easement requirements exceed standard U/E width, the additional easement shall be S/E dedicated to J CW. The recorded book and page number for existing sanitary sewer easements shall be labeled on the Plat.

E. WRITTEN SANITARY SEWER EASEMENTS. The completed J CW Easement form(s) with the legal description and exhibit depicting the easement shall be submitted to J CW for review no later than the second (2nd) submittal for the project. Submittals missing any of these required elements are considered incomplete and the project review will continue only when the complete submittal is provided. Use Attachment G1 for Permanent Easements and Attachment G2 for temporary construction easement only applications. For document recording requirements, refer to the Register of Deeds.
website at http://jocogov.org/dept/records-and-tax-administration/rtaservices/document-filing-requirements. Complete the forms as follows:

1. **Grantor.** Enter the name of the Grantor (the property owner’s name shall be indicated as it would be shown on the ownership title report) in the first blank. A title report or a copy of a document of conveyance may be required to determine accurate ownership. Entities such as trusts and LLC’s require special attention. The name of the trust shall be obtained from the trust document. The trust grants the easement and all trustee(s) shall execute the easement unless otherwise designated in the trust. LLC members may consist of various entities: individual(s), corporation(s), trust(s), partnership(s), etc. The applicable entity as authorized under the LLC shall execute the easement. Granting an easement is a legal conveyance of property rights and, as such, the grantor’s ownership name shall be accurate in all aspects as would be required for a deed transfer.

2. **Grantor Address.** Enter the address of the Grantor in the second blank.

3. **Grantor State of Residence.** Enter the State in which the Grantor resides in the third blank.

4. **Easement Disbursement.** Enter the amount paid for the easement in the fourth blank. If an amount was not paid, enter a token amount of One Dollar. When acquiring off-site easement, enter a fair market value amount for the easement.

5. **Disbursement Numerical Notation.** Enter the amount paid in numerical notation in the fifth blank.

6. **Easement Legal Description.** Enter the legal description of the easement area in the seventh or large blank area in the middle of the form. Legal descriptions shall be (1) centerline and width with a caveat that “the outer boundaries shall be lengthened or shortened so as to begin and terminate on the Grantor’s property line” or (2) perimeter. It is essential that referenced plat corners or features be of record at the Johnson County Department of Records and Tax Administration (RTA). If the easement description is a metes and bounds description, include the section, township, range, the city name (if incorporated), Johnson County, Kansas. The legal description and any associated map must be signed in blue ink, sealed, and dated by a Kansas Land Surveyor and include the name, address and telephone number of the professional’s company.

7. **Grantor Signature Lines.** The signature line must be completed either by (1) individual owner(s), (2) president, vice president or authorized representative for a corporation, (3) partner(s) for a partnership, (4) member or manager for a limited liability company or (5) trustee(s) for a trust. The typed name(s) and title(s) of the individual(s) signing are required below the signature line. Granting an easement is a legal conveyance of property rights and as such, the grantor’s ownership name must be accurate in all aspects as required for a deed transfer.

8. **Exhibit.** Provide an exhibit map to scale that depicts the entire legal description (with labeled bearings and distances) from the point of commencement and shows property lines and streets that fall within the view.

9. **Acknowledgement.** After JCW has approved the draft document and when the original document is executed by the Grantor, the notary paragraph shall be completed by a notary public who witnessed signing of the document in the acknowledgement section. The notary’s official seal, signature, County/State, date,
year and expiration date (K.S.A. 53-508) shall be included. There are two (2) notary formats for the notary to choose from: 1) Individual Acknowledgement or 2) Corporate, Limited Liability Company, Trusts, Partnership, Etc. Acknowledgement, depending on the type of ownership. The signors name shall appear in the notary paragraph. The notary’s name shall be typed under his/her signature if the round embossed type seal is used. An embossed seal shall be inked or blackened and legible when copied.

NOTE: Signed easement originals shall be provided to and recorded by JCW. The project shall not be released for construction or permitting until the executed original easement document(s) have been submitted to, accepted by and recorded by JCW.

F. **OFF-SITE EASEMENTS.** Acquisition of temporary and/or permanent easements may be required from properties adjacent to the project property. It is the Engineer's and/or Developer’s responsibility to obtain the easements. Off-site easement acquisition can be difficult and time consuming. JCW recommends submitting a preliminary layout prior to the first plan submittal for confirmation of the locations where off-site easements may be required. Draft easements should be submitted with the initial plan submittal and shall be submitted no later than the second plan submittal. Efforts to acquire any required off-site easements must commence as soon as the alignment is set and draft easements are approved to prevent untimely delays. Copy JCW on all correspondence with the property owner(s).

After JCW approval of the easement document, reasonable effort to acquire the easement includes a minimum of three written correspondences to the offsite property owner(s) including the following:

1. The JCW easement forms and exhibits for both the permanent JCW easement and the temporary construction easement between the developer and the owner (as approved by JCW).
2. Include JCW as a carbon copy (cc) on all written (letter and email) correspondence.
3. Provide documentation of records of other types of contact (phone, e-mail, fax, in-person) to JCW and include the name of the contact, date of contact, and phone number(s) and, if applicable, e-mail address(es).
4. For service to tributary property, JCW suggests including a description of the cost the tributary property owner would incur for extending the main to their property to hi-light the benefit provided by the extension.

If, after the developer has provided all information noted above and JCW has confirmed the developer has demonstrated reasonable effort to acquire an off-site easement and the adjoining property owner refuses to execute the easement, one of two options may apply:
1. If the main extension is to service the adjoining property exclusively, JCW will consider a variance to allow the end MH to be placed a distance equal to the depth of the main from the tributary property line under the following conditions:
   a. JCW will provide the required Transmittal Letter and Easement Denial Form Letter to the Engineer to be completed with the affected property owner’s specific information. The Easement Denial Form Letter provides the tributary property owner the option to specifically decline their opportunity for direct sanitary sewer access. The Engineer shall obtain written JCW approval of the draft before transmitting to the property owner.
   b. Once approved by JCW, the letters, easement documents, exhibits and a copy of the associated plan sheet shall be mailed to the property owner(s) via both standard and certified mail with a delivery confirmation receipt to be executed by the addressee. JCW shall be copied on all correspondence with the property owner and provided with a copy of the mail certificate and the return receipt signed by the addressee.
   c. JCW may at any time require a repeat of the process with an alternative proposition.
   d. JCW will contact the property owner to verify the owner’s understanding of the acquisition process before consideration of the variance for service to the tributary property.
   e. JCW authorization of variance for service to the tributary property may be granted upon:
      i. JCW receipt of the executed Easement Denial Letter by the affected property owner(s) refusing the grant of the easement; OR,
      ii. The passing of two (2) weeks from the date the proof of delivery receipt was signed by a recipient at the affected property owner’s address with no response.
   f. Upon JCW authorization, the end MH may be placed a distance equal to the depth of the main from the tributary property line. Extend the corresponding easement, with a width equal to two times the depth of the main, to the tributary property line.

2. If the main must cross an off-site property to serve the project property, the use of Eminent Domain (Condemnation) may be proposed as follows:
   a. The use of Eminent Domain is the method of last resort after all full faith efforts to acquire the off-site easements have been unsuccessful. JCW and Johnson County Legal Department must recommend and the Board of County Commissioners (BOCC) must approve the use of Eminent Domain. The BOCC may not grant the request.
   b. All costs and expenses incurred in the Eminent Domain proceedings (i.e. filing fees, legal publications, title reports, fees for three court appointed appraisers and Court ordered awards, etc.) shall be paid by the Developer. Payment of these costs must be secured by an escrow account, non-revocable letter of credit or other means approved by the Johnson County Legal.
   c. The Developer shall provide the following for JCW to consider recommending the use of Eminent Domain to the BOCC:
i. Prior to any offers being presented, the easement shall be appraised by a licensed land appraiser. A copy of the appraisal shall be provided to JCW.

ii. Full documentation of three (3) full-faith written requests (as described above) to acquire the easement from the affected property owner(s).

d. JCW and/or Johnson County Legal Department will contact the affected property owner(s) before making recommendation to the BOCC for the use of Eminent Domain.

e. Eminent Domain proceedings require several months to complete. The project shall not proceed until award has set by the Court, the funds for the award have been received by the Court and the Court has certified the receipt of the funds.

G. ACCESS EASEMENTS. When a downstream manhole or end of line manhole is located in a backyard, in a green-space or is not accessible to maintenance vehicles and the main cannot meet the requirements of Section VII.C or where otherwise required by JCW, an Access Easement shall be provided. Proposed Access Easements shall be shown and labeled on the General Layout and Plan and Profile sheets. See Attachment G3 for the JCW Access Easement form. The entire form, including all grantor and signatory information, and the easement exhibit map (drawn to scale) shall be completed and provided for JCW review and approval as described in XI.E above. Incomplete drafts will be returned for completion and review of the project will be held.

H. GAS MAIN CROSSING AGREEMENTS. Written acknowledgement or authorization from the gas company for the location of the sewer main at significant gas transmission main crossings is required. In the event the gas company requests an agreement, copies of the draft gas company agreement(s) shall be submitted to JCW for review with the initial plan submittal. The draft agreement shall be accepted by JCW before an agreement is executed. Johnson County Legal and Risk Management Departments shall review the documents as necessary. The developer shall be responsible for payment of any contract fees, required certificates of insurance and all expenses associated with the compliance and administration of the agreement. Copies of the written acknowledgement, authorization or executed agreement(s) (as applicable) shall be submitted to JCW prior to the release of plans for construction.

I. POWER TRANSMISSION LINE AUTHORIZATIONS. For power transmission lines, written acknowledgement or authorization from the power company for the location of the sewer main at the power transmission line crossing is required. Copies of the written acknowledgement or authorization shall be submitted to JCW prior to the release of the plans for construction.

J. RAILROAD CROSSING AGREEMENTS. When a railroad crossing is required, contact the railway company for their agreement requirements and to obtain a crossing agreement application. Complete the application and submit it to JCW along with any application fee, if required by the railway company. JCW will transmit and coordinate the application to the railway company or their designated agent. Johnson County Legal and Risk Management Departments shall also review the documents as
necessary. This process can take several months to complete and should be started as early as possible in the design process to prevent project delay.

The railway company will send the final crossing agreement to JCW for Wastewater General Manager signature. The developer shall be responsible for payment of any contract fees, required certificates of insurance and all expenses associated with the compliance and administration of the agreement.

K. KDOT ROW PERMITS. A permit is required from the Kansas Department of Transportation (KDOT) for any work performed in right-of-way (ROW) owned by KDOT. A copy of the permit shall be submitted to JCW prior to the release of plans for construction.

L. EASEMENT VACATION. A sanitary sewer easement may be vacated only when an existing main has been removed or when the Agreement for In-Place Abandonment of Sanitary Sewer Main document has been executed and the relocation and abandonment project has been accepted by JCW. Other requirements apply as follows:
1. Sanitary sewer easements are vacated by the Board of County Commissioners (BOCC) at the recommendation of JCW.
2. The project engineer shall provide a copy of:
   a. The original easement including the book, page, document number, and date recorded
   b. A legal description of the easement segment to be vacated on a company title block sheet or letterhead with the second construction plan submittal. A Kansas Land Surveyor certification is required next to the legal description and map. Label the heading on the Land Surveyor certified sheet as "Exhibit A".
3. For document recording requirements such as required margin sizes, refer to the Johnson County Department of Records and Tax Administration (RTA) website at http://jocogov.org/dept/records-and-tax-administration/rtax-administration/rtaservices/document-filing-requirements. Do not highlight information on the easement document original. Documents with highlighted information will be rejected by the RTA.
4. JCW will submit the release of easement documentation for execution by the Board of County Commissioners and record it with the Johnson County Department of Records and Tax Administration (RTA).

XII. DRAFTING STANDARDS.
A. GENERAL INFORMATION. The project drawing as-builts are the permanent record of Johnson County Wastewater's (JCW) system. The information provided on these drawings is also used for:
2. Connection permit issuance.
3. Service line installations.
4. Extensions to the system.
5. Modeling, maintenance, repair and protection of the system.
6. The contractor providing Kansas One-Call system location services for JCW facilities.
7. This information is used by: Engineers, developers, contractors, builders, architects, other utilities and the public in general.

It is critical for the long term management of the sewer system that the information provided on these drawings be accurate, clearly shown and labeled. JCW drawing requirements are intended to facilitate drawing clarity and consistency among the many firms that provide drawings to JCW.

JCW scans all drawing originals to make them accessible via Johnson County’s AIMS mapping service that is available on the internet. Thousands of as-built drawing images are available on-line. Line widths and types, text sizes and adherence to common drafting protocol are essential to rendering these images properly and making them readily usable in the mapping application. While strict adherence to the requirements in the Drafting Standard example sheet is not necessary, all information on the plans must be legible.

B. GENERAL DRAFTING REQUIREMENTS.
   1. Drafting shall generally conform to the JCW Drafting Standard sheet. The Drafting Standard sheet provides information on layout, line types and weights, texts, etc. The sheet is available for download in a PDF format on the Privately-Financed Projects page at www.jcw.org.
   2. All sheets in the plan set shall be 24” x 36”.
   3. A single plan/profile view format shall be used for each plan and profile sheet. The profile should be located immediately under the corresponding plan view and shall be oriented to match the direction of the plan view.
   4. Stationing for all new mains or segments shall begin at Station 0+00 at the downstream end of the proposed main.
   5. Provide the 100 foot station labels for every 100 feet of stationing at the bottom of the profile views.
   6. Provide the elevation grid labels on both sides of the profile in 10 foot increments.
   7. Labels shall be positioned as close as possible to the feature they are identifying without conflicting with other lines. Text shall not overlap other text.
   8. Match lines between sheets shall occur at a manhole.
   9. Clouding is only to be used for revisions to plans that have been released for construction. Revisions to plans released for construction shall be clouded and numbered. A corresponding explanation of the revision shall be included on the drawing. All revisions shall be approved by JCW prior to construction. Clouding shall be removed on the as-built record drawings; however, revision numbers and explanations shall remain.

XIII. AS-BUILT RECORDS. As-Built records are required for every sewer main project. Permits for connection to the project mains may be held until the As-Built records have been provided to and accepted by JCW. This section establishes the minimum standards for JCW acceptance of the As-Built records for the project.

As-built records shall be provided to JCW within 30 days after JCW Project Acceptance. As-built records submitted prior to the Project Acceptance Date will not be reviewed. With
certain exceptions, connection permits may be issued with the condition that the service line and/or any other service appurtenances shall not be installed and will not be inspected by JCW until the As-Built records have been provided to and accepted by JCW. If the As-built records for the project have not been approved by JCW within 60 days of project acceptance, connection permits will not be issued and service lines and/or appurtenances shall not be installed. Permit issuance and JCW inspection of any conditioned service line and/or appurtenance permits will not resume until the As-built records have been accepted by JCW.

A. SUBMITTAL REQUIREMENTS.
1. FIRST SUBMITTAL. The first submittal shall include the following items:
   a. Submit a set of As-built records in PDF format.
   b. The Professional Engineer (PE) overseeing the project design and construction shall electronically seal (with signature and date) each sheet in the record set in accordance with the Kansas State Board of Technical Professions. The date on the PE seal shall not precede the Project Acceptance Date issued by JCW.
   c. Using the JCW Letter of Acceptance format, submit a draft Letter of Acceptance in PDF format electronically signed and sealed by the Kansas PE sealing the plans in accordance with the Kansas State Board of Technical Professions. Please see Attachment 5 of the JCW Procedures for Privately-Financed Gravity Sewer Main Projects document.
   d. A copy of the Engineer’s As-Built survey notes and the Engineer’s inspection record notes shall be submitted to JCW upon request.

2. FINAL SUBMITTAL. The final submittal shall include the following items:
   a. One (1) set of As-builts on reproducible mylars. Paper sepia shall not be accepted.
   b. The Professional Engineer (PE) overseeing the project design and construction shall seal (with signature and date) each sheet in the record set. The date on the PE seal shall not precede the Project Acceptance Date issued by JCW.
   c. Submit one of the following digital files with the final As-built submittal and reflect the center of each manhole structure (not the center of the manhole lid) and corrected and adjusted to the State Plane “Grid” Coordinate System (NAD 1983 Kansas North FIPS1501 feet) removing the curvature of the earth:
      i. An ArcGIS compatible point shapefile depicting the center of each sewer manhole structure.
      ii. A digital file of the General Layout at full scale in Autocad (2012 or later) with all layers frozen except the sanitary main and manholes, property lines and streets. Ensure all mains intersect at the center of the MH symbol (i.e. depicting the center of each MH structure).
      iii. A table of X,Y (northing and easting) coordinate values for the center of each MH structure each manhole in either delimited text or Microsoft Excel (version 2010 or later) format.
   d. Submit the final original of the Letter of Acceptance on the Engineer’s letterhead, signed and sealed by the PE sealing the records.
e. Engineer to send one (1) set of As-built records to the Kansas Department of Health and Environment (KDHE) if any changes are made to the construction plans after State approval as required by KDHE. The transmittal letter shall explain the changes made after KDHE permitting. A copy of the transmittal letter to KDHE shall be sent to JCW’s New Development Compliance Engineer.

3. RECORD DRAWINGS. All minimum requirements for construction plans as noted in this document are required for the As-built plans with the following modifications:
   a. Provide a BOLD note on each sheet to identify the records as “As-built” with the As-built (“date”). The As-built date shall not precede the Project Acceptance Date issued by JCW.
   b. Provide the project’s “KDHE Permit {number} and Permit {“date”} on the KDHE signature line and remove the “KDHE Permit Pending” note.
   c. Revise all top and invert elevations to reflect the As-built elevations by striking through the original elevation and listing the revised elevation next to them. Please refer to the Drafting Standard for strike-through information. All elevations and slopes shall be revised numerically. All vertical and horizontal changes shall be graphically revised on the drawings to reflect the As-built conditions.
   d. Revise all distances between manholes, service stub lengths, clean-out locations and manhole location dimensions to reflect the As-built dimensions by striking through the original dimension and listing the revised dimension next to them. Please refer to the Drafting Standard for strike-through information. All dimensions shall be revised numerically. All vertical and horizontal changes shall be graphically revised on the drawings to reflect the As-built conditions.
   e. Revise all stub stationings to reflect the As-built Distance to the DownStream manhole (DDS). Changes shall be numerically and graphically revised on the plans to reflect As-built conditions. Distances shall be rounded to the nearest foot and shown with the designation, “DDS”, after the footage. (i.e. 75 ft DDS)
   f. Remove vegetation (within the easement required for the sanitary sewer and at all stubs), street design information, sanitary sewer center line stationing on the main in the plan views, northing/easting (GPS) coordinates for manholes, and any other items deemed necessary by JCW.

B. PLAT, PARCEL AND ORIGINAL AS-BUILT RECORD REVISIONS. After the main has been constructed and accepted by JCW, JCW approval of updates to the original sewer main as-built records, plat or other lot modification documents and, if applicable, easement documents is required prior to the sale of sewer connection permits for the affected lot area for the following:
   a. When an area, plat or parcel is platted, re-platted, or property lines are otherwise altered.
   b. Connection stub additions are proposed.
   c. Connection stubs are permanently abandoned.
   d. Updates for modifications to the main which are deemed minor by JCW may also be required.

1. SUBMITTAL REQUIREMENTS. Submit the following to JCW for review and approval:
a. Updates to the original sewer main as-built records (including the layout, plan/profile, site grading, etc. sheets) showing:
   i. All new or revised lot lines
   ii. Service stub(s) to be added.
   iii. Existing connections to be permanently capped.
   iv. Minor modifications to the main including such as the addition of RCE, manhole adjustments, etc.
b. A draft copy of the (re)plat, other lot modification document(s) and easement document(s) shall be submitted to JCW for review and approval prior to recording. All sanitary easements shall meet current JCW standards for the property being revised.

2. JCW shall review, approve and release all modified drawing, plat, lot modification and easement documents for construction prior to construction proceeding.

3. As-built records shall be updated to reflect the lot changes, showing the new lot numbers, lot lines, plat lines, etc. Revised as-builds shall be reviewed for compliance with the JCW Minimum Plan Requirements, Drafting Standards, Codes and Specifications. Also, in accordance with Kansas State Board of Technical Professions (KSBTP) requirements, revisions to existing as-built record sheets may be made only by the original design engineer.

4. Stub installation(s) and/or permanent capping of unused existing connections on newly created parcels shall require JCW review and release of drawings for construction. All revisions shall be clouded on the construction copies of the revised as-built record sheet(s) and clearly identified with a revision marker. Clouding shall be removed from the record sheet(s) on the final as-built record submittal. The standard JCW process for construction, acceptance and inspection will apply. All work shall be completed by a contractor listed on the JCW Contractor List and the design Engineer shall provide full-time inspection.

5. In accordance with Kansas State Board of Technical Professions (KSBTP) requirements, the Engineer of record for the original as-built record drawings shall update those records or shall provide written authorization to JCW for another engineer to acquire and modify the record drawings.

6. The updating Engineer shall provide revision markers and notes indicating the specific revisions to the record as-built plans and seal, sign and date the specific revisions.

7. All areas tributary to the main serving the newly created parcels shall be provided with access to the sanitary main in accordance with the tributary area requirements noted in Design Section IX.E.

8. Manhole designations shall be revised to reflect the JCW assigned manhole designations as shown on AIMS and on the updated as-built record plans.

9. Sewer connection permits for lots in the (re)platted, or otherwise modified area, shall not be issued until JCW has accepted the updated as-built record plans.
Johnson County Wastewater
Plan Review Comments

The Items Marked "No" Need to be Addressed by Modifications to the Drawings or in Writing.
Resubmittal Comments will follow original comments separated by slashes "//".

For more information concerning plan requirements and design, please see our web page at WWW.JCW.ORG

<table>
<thead>
<tr>
<th>Project Name</th>
<th>District</th>
<th>Lateral Sewer District</th>
<th>Section No.</th>
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<tr>
<th>Engineering Co.</th>
<th>Contact's Name</th>
<th>Engineer's Fax#</th>
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### Submittal Requirements

1. Five sets of plans
2. JCW "Poop" sheet
3. Four layouts
4. KDHE Application
5. Project Administration Fee (PAF)
6. Legal Documents, if required
7. Preliminary Plat and/or Draft Easements

### Title Sheet Requirements

1. LSD #; Section #; Main District #
2. Project Name
3. Engineer Name and Address
4. PE Seal
5. General Location Map
6. General Notes
7. Reference to specifications
8. Utility Warning Note
9. Potty Memo Note
10. System Development Fee Note Included
11. Developer Info
12. Both Cover Sheets Included

Title Sheet Comments

### Layout Requirements

1. North Arrow/Scale
2. Lot and Block Numbers
3. Building Designations
4. Street names - include private
5. Existing and Proposed Sanitary Sewers
6. Area within LSD or JSD?
7. Reference to Section line or corner
8. Names of surrounding subdivisions

Layout Sheet Comments

Friday, January 03, 2003
### Plan/Profile Requirements

1. One plan/profile per sheet
2. North arrow(s)
3. Existing and Prop. Street ROW
5. Present and proposed grade
6. Scale - 1:50 Horizontal and 1:10 Vertical
7. Reference to benchmark
8. Lot or property lines, lot and block no.s
9. Existing and proposed storm sewers
10. System Development Fee Note Included

**Plan/Profile Comments:**

### Service Line Requirements

1. Service connection for each lot
2. Station, size, length, slope, and type of connections
3. End stub lines referenced
4. Service line elevation tolerance

**Service Line Comments:**

### Manhole Requirements

1. Every MH numbered and Stationed
2. Located in Street ROW or Esm'ts
3. Not in paved areas, parking spaces or backyards
4. Invert elevation within 0.5'
5. Distance between MH's 300' or less
6. Located and shown 2' min. either side of property line
7. Top elevations shown

**Manhole Comments:**

### Pipe Requirements

1. Existing lines referenced by name and number
2. Distance to closest existing MH for new MH's
3. Angle between incoming and outgoing lines
4. Angle between existing and new lines
5. Each line w/ length of pipe
6. Each line w/ size of pipe
7. Each line w/ type of pipe
8. Each line w/ slope of pipe

**Pipe Comments:**

### Design Requirements

**Design Comments:**

### Detail Sheet Requirements

**Detail Comments**

### Easement Requirements

**Easement Comments:**

---

Friday, January 03, 2003
### Address Items Marked as "Yes" on As-Builts

<table>
<thead>
<tr>
<th>1. Centerline Stationing</th>
<th>5. Street Design Information e.g. Centerline Stationing</th>
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<tbody>
<tr>
<td>2. Vegetation</td>
<td>6. Contours</td>
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<tr>
<td>3. Northing and Easting Coordinates for Manholes</td>
<td>7. Deflection Angles (label inner flow angle only)</td>
</tr>
<tr>
<td>4. Stationing for Individual Connection Points (convert to distance from downstream manhole)</td>
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**As-Built Comments:**

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### Additional Comments

**Additional Comments:**
ATTACHMENT B

JOHNSON COUNTY WASTEWATER
INFORMATION SHEET

SUBDIVISION/PROJECT:________________________________________________________

SUBMITTAL DATE:__________, 20__   SUB SEWER DISTRICT:______________

ENGINEERING FIRM:_________________   CONTRACT # OR JSD #:____________

P.E.:______________________________   LATERAL SEWER DISTRICT No.:____

PROJECT is:(PRIVATELY FINANCED)(JCW FINANCED)   SECTION No.:___________

1. TOTAL TRIBUTARY AREA (ACRES) TO EACH NEW CONNECTION TO THE EXISTING MAIN. A
tributary area map and pipe capacity calculations shall be included for all relocation projects and for
all projects with tributary area outside of the project area. Attach map and sealed calculations as
required.

    _____ ACRES TO MANHOLE    _____ ACRES TO MANHOLE
    _____ ACRES TO MANHOLE    _____ ACRES TO MANHOLE
    _____ ACRES TO MANHOLE    _____ ACRES TO MANHOLE
    _____ ACRES TO MANHOLE    _____ ACRES TO MANHOLE

2. NUMBER OF CONNECTIONS FOR THIS PLAT (OR PARCEL IF UNPLATTED) ONLY: ___
TOTAL NUMBER OF CONNECTIONS PROVIDED ON PROJECT: _______
STATEN OF KANSAS
DIVISION OF ENVIRONMENT
APPLICATION FOR SEWER EXTENSION PERMIT

The applicant hereby requests a permit for extension of sanitary sewers in compliance with the requirements of K.S.A. 65-165 and K.S.A. 65-166. Plans and specifications submitted must comply with the Kansas Department of Health and Environment, Division of Environment, "Minimum Standards of Design for Water Pollution Control Facilities."

APPLICANT DATA

1. ____________________________________________
   Name of Project (as it appears on plans)

2. ____________________________________________
   Johnson County Wastewater
   Name of Applicant (Governmental Unit)

3. ____________________________________________
   Kansas Water Pollution Control Permit Number for the Wastewater Treatment Facility which will treat the flow from this sewer extension.

4. ____________________________________________
   Name the engineer or engineering firm responsible for inspection of this extension.

In making application for a sewer extension permit, I hereby certify that continuous engineering observation of the construction of the proposed improvement, including building connections, shall be provided in accordance with Kansas Department of Health and Environment Regulation 28-16-55.

Signature: ________________________
Authorized Official

Print Name: ________________________, P.E.
Title: Chief Engineer

Mailing Address: Johnson County Wastewater
11811 S. Sunset, Ste. 2500
Olathe, Kansas 66061-7061

E-Mail Address: ________________________
DESIGN ENGINEER DATA

1. Name of Project (as it appears on plans) ________________________________________________________________

2. Engineers estimate of construction cost ________________________________________________________________

3. What are the conditions and capacity of the existing sewer system downstream of this sewer extension?
   a. What is the present average daily flow at the wastewater treatment facility? ____________________________ MGD
   
   CIRCLE YES OR NO

   b. Do the downstream sewer lines presently convey the peak flow without inducing backup into buildings or bypass to the environment? YES NO

   c. Can the downstream receiving sewers convey the additional peak design flow generated after completion of this sewer extension without backup into buildings or bypassing to the environment? YES NO

   d. If the answer to either of the above questions is NO, what steps are being taken to eliminate or prevent bypass or service line backup conditions? ________________________________________________________________

   Attach additional pages if necessary.

4. What are the design flows for this sewer extension?
   (Include a copy of the calculations for flow and list the following values)

   Average daily __________________ MGD    Peak __________________ MGD

5. If wastewater pumping facilities are included in the project, provide with this application the following: system curve, pump curve and total head calculations and planned control elevations i.e. pumps off, low level on, high level on, and alarm level.

The information contained above is accurate to the best of my knowledge.

Signature: ___________________________________________ Kansas Licensed Engineer

Print Name: __________________________________________

Address: ____________________________________________

E-Mail Address: _______________________________________

P.E. Seal with signature and date
The Project Administration Fee (PAF) applies to 8 inch and larger sewer main that will be installed, removed, abandoned in-place or otherwise altered by the project. Effective January 1, 2017, the fee schedule is as follows:

- Project \( \leq 100 \text{ L.F.} \) $1,345.00
- Project \( > 100 \text{ L.F.} \) Where \( N \) =Number of 100 L.F. blocks\(^*\) $1,345 + ($30.00) (N-1)

\(^*\)Project length must be rounded up to the next 100 foot block.

An additional $126.00 will be added to each project in the Cities of Gardner, Leawood, Lenexa or Olathe.
The following Design and Construction Standards adopted by Johnson County Wastewater (JCW) on March 29, 2017 are the standard for design and construction of building (service) sewer lines extending from the building foundation to the sanitary sewer main owned, operated and maintained by JCW.

SECTION 1. MATERIALS

A. Pipe, Fittings, Joints

1. Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe & Fittings:
   a. Pipe and fittings shall conform to ASTM D2751 SDR 23.5, ASTM D1527 Schedule 40, ASTM F628 Foamed Core DWV, ASTM D2661 DWV.
   b. Joints shall be solvent welded. The solvent cement shall meet the requirements of ASTM D 2235.

2. PolyVinyl Chloride (PVC) Pipe & Fittings:
   a. Pipe and fittings shall be made of PVC plastic pipe having a minimum cell classification of 12454 conform to ASTM D2241 SDR-26, ASTM D3034 SDR-26. Minimum cell class shall be 12454.
   b. Joints shall conform to ASTM D3212 and shall be of a push-on type with a bell-end grooved to receive a synthetic rubber gasket. The basic polymer of the synthetic gasket shall conform to ASTM F477, except when the gasket is anticipated to come in contact with petroleum based products in which case oil-resistant Nitrile (Buna-N) gaskets shall be used. Natural rubber gaskets shall not be accepted.

3. High Density Polyethylene Pipe (HDPE) and Fittings:
   a. Shall meet the requirements of ASTM F714 Polyethylene (PE) Plastic Pipe (SDR-PR) based on outside diameter, ASTM D1248, ASTM D3350. All HDPE pipe shall be marked with a green stripe to signify its use for sanitary sewer utilities. Only solid wall HDPE pipe in accordance with ASTM F714 shall be accepted. HDPE profile wall pipe and fittings will not be accepted.
   b. Pipe shall be manufactured from high density high molecular weight polyethylene resin and shall conform to ASTM D1248. Minimum cell classification shall be 345434C as referenced in ASTM D3350-84.
   c. Pipe supplied under this specification shall have a nominal IPS (Iron Pipe Size) OD. The SDR (Standard Dimension Ratio) of the pipe shall be SDR 11, 160 psi or SDR 17, 100 psi.
   d. Pipe shall be joined by use of the heat fusion technique of butt fusion resulting in a monolithic pipe. Friatec fusion welded couplings are also acceptable. All joints shall be fully restrained and as strong as the pipe in both tension and hydrostatic loading.
   e. Fittings shall be molded from a polyethylene compound having a cell classification equal to or exceeding the compound used in the pipe or shall be manufactured using a polyethylene compound having a cell classification equal to or exceeding the compound used in the pipe supplied under this specification. All fittings supplied under this specification shall be of the same manufacturer as the pipe being supplied, unless electrofused couplings are used. Minimum cell classification shall be 345434 C as referenced in ASTM D 3350-84.
   f. The HDPE pipe shall be provided to the project site in straight sections and shall not have been coiled at any time. The pipe shall be furnished in pipe lengths normally produced by the manufacturer, except for fittings, closures, and specials.

4. Ductile Iron Gravity Sewer Pipe (DIP) & Fittings: DIP shall not be used for new installations. For connecting to existing DIP, the following apply as needed:
   a. Pipe shall meet the requirements of ANSI/AWWA C150/A21.50, ANSI/AWWA C151/A21.51. Minimum allowed thickness shall be Special Class 50 and 51 as required on the drawings. Fittings shall be in accordance with ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53.
   b. Pipe and fittings shall have mechanical or push-on joints conforming to ANSI/AWWA C111/ A 21.11. Hubless joints are not allowed.
   c. Gaskets shall be neoprene or other synthetic rubber. Nitrile (Buna-N) gaskets shall be used where the gasket may come into contact with petroleum based products.
   d. All DIP pipe and fittings shall be furnished with a 1 mil exterior bituminous coating conforming to ANSI/AWWA C 151/A21.51.
   e. All DIP pipe and fittings shall be wrapped in a seamless polyethylene tube encasement, ANSI/AWWO C105/A21.5, LLD-8 mil or HDCL-4 mil and installed with Method A. All clay, mud, cinders, etc shall be removed from the pipe prior to installing the tube encasement. Where DIP is encased in concrete, the polyethylene tube shall be installed over the pipe for 5 feet either side of each end of the concrete encasement.
   f. All DIP pipe and fittings shall be lined with a hydrogen sulfide resistant interior lining of either Protec 401 Ceramic Epoxy as manufactured by Induron Coatings, Inc. or PolyBond Plus as manufactured by American Ductile Iron Pipe. Lining shall be installed and field cuts shall be repaired as recommended by the manufacturer.
5. **Couplers for Dissimilar Pipe Materials:**
   The connection of pipes of different materials shall be made using a Mission Flex-Seal ARC Coupling, Fernco Strong Back RC Coupling or approved equal that provides a permanent and watertight connection which includes a stainless steel solid wall will withstand the hydrostatic test pressure and prevent offset of the joint within the coupling.

6. **Saddles:**
   See Section II.D.2 for usage allowances and requirements. A Multi Fittings Saddle Tee Gasket Hub and Gasket Skirt with Stainless Steel Bands conforming to ASTM D3034, F679, F170 or approved equal.

**B. Pipe Embedment**

1. **Bedding Aggregate:**
   All material used for granular embedment for pipe bedding shall conform to the requirements of ASTM C33 and shall meet the following gradation: Sieve size gradations: 1 - 100% passing, ¼ - 80 to 100% passing, 3/8 – 30 to 60% passing, No. 4 – 0 to 25% passing, No. 8 - 0 to 5% passing. Testing shall be in accordance with Section 2536, Paragraph 2.01 of the JCW Construction and Material Specifications for Sanitary Sewers where required.

2. **Haunching and Initial Backfill Aggregate:**
   Where granular material is required for haunching and initial backfill, it shall conform to the Bedding Aggregate Specification.

3. **Groundwater Interruption Barrier:**
   a. A groundwater interruption barrier shall be installed for a minimum length of four (4) feet as measured along the sewer service line. The upstream end of the barrier shall begin at a point where the sides of the trench consist of undisturbed earth, not previously excavated for footing or foundation construction.
   b. The groundwater interruption barrier shall consist of one of the following:
      1) **Concrete Encasement.** The service line shall be fully encased in concrete having a minimum compressive strength of 2500 pound per square inch (psi). Encasement shall be poured against undisturbed earth on the bottom and sides of the trench and poured to a depth of 6 inches above the top of the pipe. Encasement shall begin and end at a pipe joint, fitting, or other point of flexibility for deflection. The pipe shall be anchored to prevent flotation during the placement of concrete. Backfill above the concrete encasement wall consist of compacted earth material only; no gravel shall be used for a depth of at least two feet over the top of the pipe.
      2) **Compacted Clay.** The service line shall be installed on clay embedment compacted to a minimum of 95% standard density as established by AASHO Standard Method T-99. The clay embedment shall be free of rocks and stones having a dimension larger than one inch, and shall be compacted by hand tamping under and around the sides of the pipe in lifts not to exceed six (6) inches. The pipe shall be fully supported by the clay embedment to the spring line for rigid pipes and to the top of pipe for flexible pipe materials. Above the support limits, the clay shall be compacted to a minimum of 90% standard density (AASHO Std. Method T-99) in lifts not to exceed eight (8) inches, and shall continue to the top of the trench as required to receive finish grade work. A testing laboratory may be required to perform in-situ density tests to verify compaction in accordance with specified limits. The cost for tests whose results indicate failure to achieve the specified compaction limits shall be paid for by the permit applicant.

**SECTION II. INSTALLATION**

A. **Maximum Trench Width:**
   The maximum allowable trench width below a horizontal plane 6 inches above the top of pipe shall be 30 inches.

B. **Pipe Bedding:**
   The thickness of bedding material below the pipe shall be a minimum of 6 inches for any of the pipe types listed in this Standard. The bedding material shall be placed before installation of the pipe in the trench and shall be prepared to provide a continuous pipe support between pipe bells and joints. Embedment shall be placed and densified by shovel slicing, or vibrating and prepared so that the pipe will be true to line and grade after installation. If unsuitable sub-grade conditions are encountered, additional granular material shall be added to provide support for the pipe.

C. **Pipe Joining**
   1. **ABS (Solvent Weld Only):**
      Apply cement to the outside of spigot and inside of coupling in sufficient quantity so that when the spigot is fully inserted into the coupling a bead of excess cement will form around the entire perimeter of the pipe. Make joint within one minute by shoving spigot home with one-quarter rotation. Care should be taken to keep the joint free of water and dirt while making the connection. Make sure that the pipe marking is visible for material verification by the JCW. Remove excess cement from joint exterior with a clean, dry cloth. The joint shall not be disturbed for 15 minutes after assembly.
   2. **PVC (Gasket Joint Only):**
      a. Clean and dry surfaces of all joint components. Apply approved pipe lubricant immediately before jointing. Lubricate according to manufacturer's recommendations. Keep the lubricant and joint surfaces free from foreign material.
         b. Align the pipe section and insert the spigot straight into the bell until the spigot insertion mark is flush with the entrance of bell. Do not swing or stab the joint.
c. Check for proper jointing and gasket seating after joint assembly by rotation of the spigot by hand for one-fourth (1/4) to one half (1/2) turn. Make sure that the pipe marking is visible for material verification by JCW.

3. **DIP**: DIP shall not be used for new installations. For connecting to existing DIP, the following apply:
   a. All grooves, sockets, gaskets and plain ends shall be clean of all dirt and foreign materials and lubricated as recommended by the pipe manufacturer.
   b. All field cut joint ends shall be beveled as recommended by the manufacturer and shall be repaired with an epoxy polyamide paint system. The cut surface of the pipe to be coated shall be dry and free of dirt, dust, sand, grit, mud, oil grease, rust, loose mill scale or other objectionable substances. Cleaning and painting operations shall be performed in a manner which will prevent contaminants from getting on freshly painted surfaces. Any damages to the lining system that result from the field cut or other shall be repaired according to the manufacturer’s recommendations.
   c. **Push-On Joint**
      1) Insert the gasket, making sure that it faces the proper direction and is correctly seated.
      2) Push the plain end into the bell of the pipe keeping the joint straight while pushing. Make any necessary deflection after the joint is assembled.
   d. **Mechanical Joint**
      1) Place the gland on the plain end with the lip extension toward the plain end. Follow gland installation by placing the gasket with the narrow edge toward the plain end of the pipe.
      2) Push the pipe into the bell socket. Press the gasket around the entire socket. Push the gland up to the bell and center on the pipe.
      3) Insert and hand-tighten the bolts until all are even. Tighten the bolts evenly with a torque wrench to the manufacturer’s torque specifications.

4. **HDPE**: TWO JCW INSPECTIONS are required for HDPE pipe as noted below. An additional partial inspection fee for INSPECTION 2 shall be included with the permit fees.
   a. **Butt-fused Joint**
      1) The polyethylene pipe shall be assembled and joined at the site using the butt-fusion method to provide a leak proof joint. Socket fusion, extrusion welding or hot gas welding, threaded or solvent cement joints and connections are not permitted. All equipment and procedures used shall be in strict compliance with the manufacturer’s recommendations. Fusion shall be accomplished by personnel certified as fusion technicians by a manufacturer of polyethylene pipe and/or fusing equipment. Certifications for all personnel shall be submitted to JCW prior to the inspection of the work.
      2) The butt-fused joint shall have true alignment and uniform roll back beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of the pressure. The fused joint shall be water tight and shall have tensile strength equal to that of the pipe and shall indicate a ductile rather than brittle fracture when tested. All defective joints shall be cut out and replaced. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than five percent (5%) of the wall thickness, shall not be used and must be removed from the site. However, a defective area of the pipe may be cut out and the joint fused in accordance with the procedures stated above. In addition, any section of the pipe having other defects such as concentrated ridges, discoloration, excessive spot roughness, pitting, variable wall thickness or any other defect of manufacturing or handling in the opinion of JCW shall be discarded and not used.
      3) Butt fusion beads shall be uniform on both sides of the joint (i.e. no wrinkles or discontinuities).
      4) All internal beads shall be removed after the cooling time using a suitable bead removal tool from the manufacturer. The bead removal tool shall not induce any slits, gouges or defects in the pipe wall. The bead removed from each joint shall be provided to JCW at the time of inspection and will be retained by JCW.
      5) After the pipe has been successfully joined, the installer shall place the pipe in the trench and haunch the pipe.
      6) For JCW INSPECTION 1: JCW shall inspect all butt fused joints and haunched pipe in the trench. The JCW inspector shall inspect the removed internal beads from each joint and bend the removed internal beads back at several positions. No evidence of the bead splitting shall be seen. If the bead splits at any point, then the joint shall be cut from the pipeline and remade. If a similar defect recurs, all further production jointing shall cease until the equipment has been thoroughly cleaned and examined. New trial joints shall be made and shown to be satisfactory.
      7) After JCW INSPECTION 1, the HDPE pipe shall be allowed sufficient time (6 hours minimum) to rest and contract prior to tie-ins and connections. The pipe, except at the tie-in locations, may be backfilled during the rest period.
      8) For JCW INSPECTION 1 of the joints and haunched pipe.
   b. **Fusion Joint**
      1) Fusion shall be accomplished by personnel certified as fusion technicians by a manufacturer of polyethylene pipe and/or fusing equipment. Certifications for all personnel shall be submitted to JCW prior to the inspection of the work.
2) Pipe edges shall be chamfered and the pipe interior and exterior shall be cleaned and pipe shall be rounded as recommended by the manufacturer.
3) The oxide layer of the pipe shall be removed using a scraper tool from the manufacturer. Files, rasps, sand paper and other similar tools shall not be used.
4) Pipe shall be inserted in the coupling for final connection in a manner to ensure a stress-free assembly of the component parts.
5) The coupling shall be connected by fusion leads to the electrofusion unit and the fusion process shall be recorded, completed and documented as required by the manufacturer.
6) Joint shall be allowed to cool as recommended by the manufacturer before moving or placing any stress on the joint.
7) All defective joints shall be removed and replaced.
8) After JCW inspection of the joints, the pipe shall be placed in the trench and haunched to allow the completion of JCW INSPECTION 1.
9) After JCW INSPECTION 1, the HDPE pipe shall be allowed sufficient time (6 hours minimum) to rest and contract prior to tie-ins and connections. The pipe, except at the tie-in locations, may be backfilled during the rest period.
10) JCW INSPECTION 2: JCW shall inspect all tie-ins and connections a minimum of 6 hours after JCW INSPECTION 1 of the joints and haunched pipe.

5. Special Joints
   a. Where two different types of pipe material are to be joined or where the pipe size is enlarged or reduced, fittings noted in Section 1.A.5 designed for such use shall be utilized.
   b. No right angle (90°) bends shall be installed. When making a bend that is equal to 90°, two (2) 45° bends with a minimum of one (1) foot of pipe between the bends is required.
   c. Angles less than 90° to the downstream pipe shall not be installed in the service line and service lines shall not be installed at an angle less than 90° to the downstream main.

D. Tee Connections, Taps and Saddles
1. Permission, Usage, Type
   a. No connections or saddles shall be made on JCW's facilities without obtaining a connection permit from JCW.
   b. JCW shall inspect all sanitary sewer piping and appurtenances located on the exterior of the building from the building foundation to the connection on the main.
   c. Connections or saddles shall not be allowed on any pipe 18 inches or larger.
   d. Existing connection points on the sanitary sewer main shall be used. Where multiple connection points exist for a lot, unused connection points shall be permanently capped. Where an existing connection point does not exist for a lot, connection shall be made by core drilling a manhole or, on PVC pipe, by installing a new tee on the main.
   e. The service line bell on the tee or the tap for a saddle shall be located above the center line of the pipe the connection is made to at 45° from the horizontal. See the Tee Orientation and Riser Detail on the JCW Sanitary Sewer Standard Details document.

2. Saddles
   a. Saddles shall be used only for connection to existing DIP and Vitrified Clay Pipe (VCP). JCW written approval for use of a saddle is required and, if approved, will be included on the sewer connection permit.
   b. The main shall be exposed six (6) inches in all directions from the tap hole for JCW inspection of the tap hole before the saddle is installed. The service line shall be ready for inspection when JCW inspection of the tap hole is made. Contact JCW for the JCW Saddle Detail.
   c. All taps for saddles shall be machine tapped.
   d. Exposed pipe filler material on ABS Composite mains shall be sealed with an epoxy coating.
   e. The field cut on DIP shall be cleaned and repaired with an epoxy polyamide paint system as noted in Section II.C.3.b of this document.
   f. The Multi Fittings Saddle Tee Gasket Hub and Gasket Skirt shall be joined to the main with stainless steel bands.

E. Allowable Grades
1. Service lines shall be installed on a straight alignment and at a uniform grade of not less than 1/4 inch of fall per foot of pipe (2%) for 4-inch pipe and 1/8 inch per foot (1%) for 6-inch pipe.
2. No lines shall be installed with a grade greater than 45° (100% slope).
3. Anchors on 36 foot centers will be required where the service line is installed at grades between 15 to 35% and on 24 foot centers for pipe at grades between 35 to 100% in accordance with JCW Construction and Material Specifications for Sanitary Sewers.

F. Haunching and Backfill
1. Haunching of the pipe shall be done by placing bedding aggregate above the bedding up to the pipe centerline for all pipe types. The bedding aggregate shall extend from the exterior of the pipe to the trench walls and be densified by shovel slicing or vibrating. Haunching shall be placed to the centerline of the pipe for JCW inspection and approval of all exterior sanitary piping and appurtenances.
2. After JCW inspection and approval, bedding aggregate shall be placed from the pipe centerline to a minimum of 6 inches above the top of the pipe for all pipe types.
3. Service lines that have not been inspected by JCW shall be excavated and uncovered for JCW inspection. Service lines shall be reinstalled as required to allow complete inspection.

4. For all pipe types, the initial backfill material from the centerline of the pipe to a point three (3) feet above the top of the pipe shall be material free of rocks or stones having a dimension larger than six (6) inches.

5. The remainder of the trench shall be backfilled with job excavated material free of large rocks, debris and vegetation. For areas outside of street or alley right-of-way or other pavement, the backfill material from the top of the pipe embedment to a point at grade shall be compacted to at least 90% of maximum dry density at a moisture content within 2% of optimum moisture as determined by ASTM D698.

6. Backfill in public street or alley right-of-way shall be installed in accordance with the entity having jurisdiction. Under other areas to be paved, the backfill material from the top of the pipe embedment to a point at grade shall be compacted to at least 95% of maximum dry density at a moisture content within 2% of optimum moisture as determined by ASTM D698.

7. Service Lines shall be encased in reinforced concrete encasement (RCE) in accordance with the JCW Minimum Plan Requirements for Gravity Main Projects Standard Detail where required by JCW.

G. Pipe Cover
The building sewer shall be installed in a trench deep enough to provide a minimum of thirty inches (30") of earth cover over the top of the pipe.

SECTION III. DESIGN STANDARDS
A. Allowable Connections
1. A current permit issued by JCW is required and shall be obtained for each connection to the JCW sanitary sewer system, for each new service line, for all appurtenances connected to the sanitary sewer system and for all modifications or repairs to existing service lines or appurtenances.

2. A single separate and independent connection shall be provided for every building.

3. The service line shall not duplicate plumbing routing inside the building or the sanitary sewer main.

4. Multiple service lines shall not be installed in lieu of a main extension.

5. All Commercial Buildings (including any building other than a single-family residence) require a distinct JCW permit and additional fees to connect to the JCW sanitary sewer system. In addition, a Modified Use Permit shall be obtained by the property owner for any change of use, redevelopment, expansion or other modification of an existing use for an existing building.

6. Existing service lines, or portions thereof, may be reused only when the line meets current JCW Service Line Design and Construction Standards. Inspection (video (as noted below) and spot excavation at locations required by JCW) and air pressure testing of existing service line to be reused shall occur and be witnessed and approved by JCW prior to permitting and reuse. For service lines that shall not be reused:
   a. The service line shall be replaced in accordance with the current JCW Service Line Design and Construction Standards.
   b. OR, the service line may be evaluated for CIPP lining or pipe bursting as follows:
      i. The service line shall be cleaned by the applicant prior to the evaluation video.
      ii. The applicant shall introduce dye water and video the line in question while witnessed by a JCW inspector.
      iii. The applicant shall provide a copy of the evaluation video to the JCW inspector at the time of the video.
      iv. JCW will review the evaluation video to verify whether CIPP lining or pipe bursting will be authorized.
      v. JCW will provide written results for the evaluation.
      vi. CIPP lining or pipe bursting including video and JCW inspection requirements shall be in accordance with current JCW Standard Specifications.

B. Non-Allowable Connections
1. Roof, areaway, garage, foundation or storm sewers shall not be connected to JCW facilities either directly or indirectly.

2. Swimming pools shall not be connected directly to and, unless by specific written authorization from JCW, shall not be drained to JCW facilities.

3. In accordance with the current Johnson County Code of Regulations for Sanitary Sewer Use, no person or user shall introduce into any public sanitary sewer or into the sewerage system any pollutant which may cause damage to the sewage system or workers, pass through, interference or significant inhibition of microbial activity, etc.

C. Alignment and Service
1. A service line for a lot shall generally not cross another lot (or extension of the lot to the back of curb at the street) to access the sewer. The service line for a lot may enter another lot only if the other lot is contiguous with the lot served or located immediately across public street right-of-way from the lot served. The distance that the service crosses another lot (beyond the public street right-of-way, if applicable) shall be no more than one half the width of the minimum allowable sewer easement, i.e. seven and one-half (7.5) feet. The portion of service line that crosses another lot shall be located only in the sanitary sewer easement (or utility easement) required for the sanitary sewer main.

2. Service lines shall not cross wetland areas or Best Management Practices (BMPs) for storm water mitigation. Service lines shall not generally cross water courses unless by specific written authorization by JCW.

3. Service lines shall not cross existing or future arterial, four (4) lane, or wider roads.
4. Any property connecting to the sanitary sewer shall extend the sanitary sewer main to the project property boundary to serve tributary areas which lie outside of the project boundary and do not otherwise have direct access to the sanitary sewer main.

5. The provided point of connection for the lot or building shall be used. Where a connection point does not exist, the connection point shall be installed at a precast manhole or on the main at the closest location to the building unless otherwise directed by JCW.

6. Plumbing for building additions and/or tenant finish revisions shall be routed into the interior building plumbing unless the addition is constructed within 10 feet of the existing building service line and can connect to that service line.

D. Service Line Sizing and Length

1. Single family and duplex dwellings shall use 4-inch (minimum) or 6-inch pipe(s) as service lines.

2. Pipe diameters for the service lines of multi-family, commercial and industrial structures shall be sized according to the rate of wastewater discharge. Rate calculations sealed by a Kansas PE supporting pipe diameters larger than 6 inches shall be provided.

3. The diameter of the service line shall be equal to or less than the diameter of the sewer main. Two service lines shall be provided when the diameter of the service line would exceed the diameter of the sewer main unless the connection is made at a sewer manhole. Manholes shall not be added to accommodate a service line installation in this case.

3. When the length of service line installed within the boundaries of the lot served will exceed 100 feet and the proposed use of the property is for single family residential purposes:
   a. The JCW Sewer Service Line Agreement and Covenant document shall be executed by the property owner(s) prior to permitting.
   b. The owner shall provide a to scale plot plan as on record with the City or other jurisdictional agency showing the following: a north arrow, street address, Plat with #, Lot #, Block # (for unplatted lots, legal boundary description shall be included), Lot dimensions including all easements, structures, sanitary sewer and storm structures and pipe, utilities, all water courses, all bodies of water, entire route (with direction changes and distances noted) of the service line from the building to the connection on the main (with building exit location, building plumbing and main flow lines, pipe length and slope, and cleanouts with locations shown and labeled) for JCW approval prior to permitting.

4. Where retaining walls must cross a service line, the crossing shall be in a perpendicular fashion and the service line shall be encased in reinforced concrete (RCE) meeting the JCW standard specifications. The following elevations at the location the wall crosses the service line or main shall be noted on the Site plan: flow line elevation of the pipe, finish grade at top of the wall, finish grade at the bottom of the wall, and elevation of the bottom of the foundation. The length of RCE along the pipe on each side of the wall shall be equal to the depth of the pipe on each side of the wall. See the JCW Minimum Plan Requirements for Gravity Main Projects on the Privately-Financed Projects page at www.jcw.org for additional requirements. Retaining walls shall not bear weight directly or indirectly on sanitary service lines.

E. Cleanouts

1. Cleanouts (C/O) shall be provided in accordance with JCW Standard Details and shall be provided at 100 foot intervals when the service line length exceeds 100 feet. For service lines less than 200 feet, placement of the cleanout should be at the service line mid-point where possible. The number of exterior cleanouts shall be limited to the greatest extent possible.

2. Cleanouts shall be placed outside of pavement to the greatest extent possible. For existing cleanouts that must be located in pavement, a protective concrete pad shall be installed around the lid and frame in accordance with JCW standards.

3. The contractor shall clearly record the horizontal location of the threaded plug at the top of all C/Os by providing distances from two fixed points on the building or other structure that will not be removed so that the cleanout can readily be located in the event it is damaged or buried in the future. This information shall be provided to the JCW inspector at the time of the inspection for JCW inspector concurrence.

F. Manhole Connections

1. External drop connections shall not be allowed. Internal drop connections shall generally not be allowed; however, internal drop connections may be considered by JCW where unusual conditions or circumstances are encountered. Site specific written approval from JCW is required for an internal drop.

2. The top of the sewer service pipe shall be set equal to the top of the upstream main sewer. A concrete invert directing the service line's flow toward the downstream main sewer is required. Existing concrete inverts shall be reformed in accordance with JCW standard details.

3. When connecting plastic pipe to a precast manhole for which no service stub was provided, the connection shall be made by core drilling the manhole, installing a PSX Direct Drive Boot Gasket by the Press-Seal Gasket Corporation, and reforming the invert.

4. An angle 90° or greater to the downstream main is required.

5. A minimum of one (1) foot of manhole wall is required between the holes required for the pipe.

6. New service line connections shall not be made into existing brick manholes unless under specific written authorization from JCW.
G. Service Cap-offs

1. Service connections for all buildings that will be demolished shall be capped as required by JCW. A JCW permit and JCW inspection of the cap is required before demolition of the building or other modifications.

2. The contractor shall clearly record the horizontal location of the cap by providing an exhibit indicating the distances to the cap from two fixed points on the building or other structure that will not be removed so that the cap location can readily be located in the future. The exhibit shall be provided to the JCW inspector at the time of the inspection for JCW inspector concurrence.

3. Temporary Caps. Tee, Wye or manhole service connections that will be reused for a new building at the site shall be temporarily capped in accordance with JCW’s standard detail and specifications. A fitting meeting the specifications noted in this standard for the applicable material type of the tee or wye. For VCP, a Low Pressure Nylon Expansion Plug by COB Industries with a synthetic gasket conforming to ASTM F477 or approved equal shall be used. Natural rubber seals shall not be accepted.

4. Permanent Caps. Each service connection intended for the lot that will not be used for the current project shall be permanently capped or plugged as follows:
   a. Tee or wye connections shall be permanently decommissioned by capping or plugging the tee or wye and concrete encasing the plug or cap in accordance with the JCW Standard Tee or Wye Cap-off Detail.
      i. Where the main is located outside of pavement, disconnect service line at the tee or wye on the main.
      ii. Where the main is located in pavement, disconnect the service line as close as possible to edge of said pavement. Location shall be as required by JCW’s Inspector.
   b. Manhole connections shall be permanently decommissioned by plugging the service line (may be plugged from inside the manhole), filling the line with specified cementitious material and repairing the manhole wall and reforming the invert in accordance with the JCW Standard MH Cap-off Detail.

SECTION IV. INSPECTION PROCEDURE

All lines and appurtenances related to sanitary sewer service and located outside of the building shall be inspected by JCW. Appurtenances located inside the building shall be inspected by JCW where required to confirm compliance with the Sewer Use Code. Before calling the JCW for a service line inspection, the line should be completely installed but not backfilled as outlined under Section II, Item F. When requesting an inspection the caller is required to know the permit number, correct address and the name of the plumber. All requests for inspections shall be made before 4:00 PM. A copy of the sewer connection permit and all other documents attached to the permit as issued by JCW shall be at the site during all phases of installation and at the time of inspection(s). Failure to have the sewer permit at the site or failure to completely and properly install the sewer line shall require re-installation and re-inspection of the sewer line and payment of partial inspection fee(s) in accordance with a current fee schedule.

Johnson County, Kansas, 2017
JCUWD Design Flow Curves

cfs/acre = (0.11385) x \left[ \text{tributary acres} \right]^{-0.29735}

Extrapolation between acreage breakpoints unnecessary

Design flow for areas less than 100 acres need not exceed 0.025 cfs/acre
PERMANENT SANITARY SEWER EASEMENT

KNOW ALL MEN BY THESE PRESENTS, That (type name of Grantor.Owner of property, i.e., all individual names and their spouses with marital status OR corporation, L.L.C., partnership or trust name) of the Post Office of (type complete address with zip code of Grantor.Owner) in the State of Kansas, in consideration of (type actual amount, ex.: One and No/100ths Dollars ($1.00)) and other valuable consideration, the receipt of which is hereby acknowledged, hereby grant(type s if applicable) and convey(type s if applicable) unto Consolidated Main Sewer District of Johnson County, Kansas its successors and assigns, a permanent easement to lay construct, maintain, alter, repair, replace and operate one or more sewer lines and all appurtenances convenient for the collection of sanitary sewage, over and through the easement premises in the County of Johnson in the State of Kansas, more particularly described in the attached Exhibit “A”, together with the right of ingress and egress over and through adjoining land as may be reasonably necessary to access said easement.

See attached Exhibit “A” for easement description.

This grant is a permanent easement for the purpose aforesaid and full consideration therefore is acknowledged.

Grantor(type s if applicable) shall retain the right to use the surface of said easement, so long as said use does not interfere with the installation and maintenance of the sewer main and so long as no building(s) or structure(s) are erected within the easement. No alteration of land contours will be permitted without the express written approval of Grantee. Any placing of improvements or planting of trees on said permanent easement will be done at the risk of subsequent damage thereto without compensation therefore.

All grass, sidewalks, streets, drives and parking lots existing on the date of this grant and subsequently damaged by the installation of said line or by making future repairs or in removing said property shall be replaced by Grantee.

This easement is binding upon the heirs, executors, administrators, successors, and assigns of the Grantor and Grantee hereto, and this easement shall not be changed in any way except in writing, signed by the Grantor(type s if applicable) and by a duly authorized agent of the Grantee.
(Insert and complete the appropriate Acknowledgement and delete those that do not apply along with this instruction.)

INDIVIDUAL ACKNOWLEDGEMENT

By: (type name(s) of individual owners with marital status)

By: (type name(s) of individual owners with marital status)

STATE OF KANSAS )
COUNTY OF _____________________ )SS.

This instrument was acknowledged before me on this _____ day of ________________20____.

_______________________________________
Notary Public

My commission expires

CORPORATION ACKNOWLEDGEMENT

By: name(s) of person(s)] as (type of authority, e.g., officer, trustee, etc.) of (name of party on behalf of whom instrument was executed.)

STATE OF KANSAS )
COUNTY OF _____________________ )SS.

This instrument was acknowledged before me on this _____ day of ________________20____.

_______________________________________
Notary Public

My commission expires
LIMITED LIABILITY COMPANY ACKNOWLEDGEMENT

By: [name(s) of person(s)] as [type of authority, e.g., officer, trustee, etc.] of [name of party on behalf of whom instrument was executed.]

STATE OF KANSAS )
COUNTY OF ___________________) SS.

This instrument was acknowledged before me on this _____ day of __________________20_____.

_________________________________________             __________________________
Notary Public                                            My commission expires
Delete the bold face print instructions and this instruction before printing the easement form.

1. Provide legal description and scale drawing depicting the easement and property crossed.

2. Provide the business name, address and telephone number along with signature and date in blue ink across the seal of a Licensed Kansas Land Surveyor certifying that the real property legal description has been prepared by or under the direct supervision of said licensee in accord with K.S.A. 74-7001 et seq., and amendments thereto or the rules and regulations promulgated by the Kansas Board Of Technical Professions; this is required on all easement legal descriptions, including attached map exhibits. (Example: "I hereby certify that this real property legal description has been prepared by me or under my direct supervision."

3. When using metes and bounds expressions, include a preamble that clearly identifies the location of the parcel. Example: “A parcel of land located in the NW ¼ of the NW ¼ of Section 12, Township 12 South, Range 25 East, Sixth Principal Meridian being further described as follows:”
TEMPORARY SANITARY SEWER EASEMENT

KNOW ALL MEN BY THESE PRESENTS, That (type name of Grantor/Owner of property, i.e., all individual names and their spouses with marital status OR corporation, L.L.C., partnership or trust name) of the Post Office of (type complete address with zip code of Grantor/Owner) in the State of Kansas, in consideration of (type actual amount, ex.: One and No/100ths Dollars ($1.00)) and other valuable consideration, the receipt of which is hereby acknowledged, hereby grant (type s if applicable) and convey (type s if applicable) unto Consolidated Main Sewer District of Johnson County, Kansas, its successors and assigns, a temporary easement to lay, construct, maintain, alter, repair, replace and operate one or more sewer lines and all appurtenances convenient for the collection of sanitary sewage, over and through the easement premises in the County of Johnson in the State of Kansas, more particularly described in the attached Exhibit “A”, together with the right of ingress and egress over and through adjoining land as may be reasonably necessary to access said easement.

See attached Exhibit “A” for easement description.

This grant is a temporary easement for the purpose aforestated and full consideration therefore is acknowledged. The period of said temporary easement shall be no longer than three years from the date of acceptance of construction of sewers within said Sewer District.

All grass, sidewalks, streets, drives, and parking lots existing on the date of this grant and subsequently damaged by the installation of said line or by making future repairs or in removing said property shall be replaced by grantee.

This easement is binding upon the heirs, executors, administrators, successors, and assigns of the Grantor and Grantee hereto, and this easement shall not be changed in any way except in writing, signed by the grantor (type “s” if applicable) and by a duly authorized agent of the grantee.
Insert and complete the appropriate Acknowledgement and delete those that do not apply along with this instruction.

INDIVIDUAL ACKNOWLEDGEMENT

By: (type name(s) of individual owners with marital status)

By: (type name(s) of individual owners with marital status)

STATE OF KANSAS )
COUNTY OF ___________________) SS.

This instrument was acknowledged before me on this _____ day of ___________________20____.

Notary Public My commission expires

CORPORATION ACKNOWLEDGEMENT

By: name(s) of person(s)] as (type of authority, e.g., officer, trustee, etc.) of (name of party on behalf of whom instrument was executed.)

STATE OF KANSAS )
COUNTY OF ___________________) SS.

This instrument was acknowledged before me on this _____ day of ___________________20____.

Notary Public My commission expires
LIMITED LIABILITY COMPANY ACKNOWLEDGEMENT

By: [name(s) of person(s)] as [type of authority, e.g., officer, trustee, etc.] of [name of party on behalf of whom instrument was executed.]

STATE OF KANSAS )
COUNTY OF [ ] )SS.

This instrument was acknowledged before me on this [day of [ ] day of [ ] 20].

_________________________________________  My commission expires

Notary Public
Delete the bold face print instructions and this instruction before printing the easement form.

1. **Provide legal description and scale drawing depicting the easement and property crossed.**

2. **Provide the business name, address and telephone number along with signature and date in blue ink across the seal of a Licensed Kansas Land Surveyor certifying that the real property legal description has been prepared by or under the direct supervision of said licensee in accord with K.S.A. 74-7001 et seq., and amendments thereto or the rules and regulations promulgated by the Kansas Board Of Technical Professions; this is required on all easement legal descriptions, including attached map exhibits. (example: “I hereby certify that this real property legal description has been prepared by me or under my direct supervision.”)

3. **When using metes and bounds expressions, include a preamble that clearly identifies the location of the parcel. Example: “A parcel of land located in the NW ¼ of the NW ¼ of Section 12, Township 12 South, Range 25 East, Sixth Principal Meridian being further described as follows:**
ACCESS EASEMENT

THIS CONVEYANCE is made of this ____ day of _____________, 20__, by
and between (type name of Grantor/Owner of property, i.e., all individual names
and their spouses with marital status OR corporation, L.L.C., partnership or trust
name) of the Post Office of (type complete address with zip code of Grantor/Owner)
in the State of Kansas, its successors, administrators, and assigns, all of which are
hereinafter collectively referred to as Grantor, and the CONSOLIDATED MAIN SEWER
DISTRICT OF JOHNSON COUNTY, KANSAS, its successors, administrators, and
assigns, all of which are hereinafter collectively referred to as Grantee.

IN CONSIDERATION of the sum of One Dollar and other valuable
considerations, receipt and sufficiency of which is hereby acknowledged, Grantor
hereby grants and conveys unto Grantee an easement for the purpose of allowing
ingress and egress, as reasonably necessary to transport materials, equipment, and
personnel in any part of said Access Easement, from _________________ (Property
Location) to the existing sanitary sewer easement of record on Grantor’s real estate,
over and through the following described real estate lying and situated in the County of
Johnson, State of Kansas, to-wit:

SEE EXHIBIT "A" ATTACHED HERETO AND
INCORPORATED HEREBY BY THIS REFERENCE

THIS ACCESS EASEMENT is executed, delivered, and granted upon the
following conditions and considerations:

1. Grantee, its employees and agents, shall have the right of access at all
reasonable times to enter upon the described real estate for the purposes herein
described.

2. The rights granted herein shall not be construed to interfere with or restrict
Grantor from the use of the described real estate with respect to the construction and
maintenance of property improvements within this Easement so long as the same are
so constructed as not to impair or interfere with the ability to access Grantee’s sanitary
sewer facilities.

3. Grantee shall restore any disturbed property to Grantor to a neat and
presentable condition. Specifically, all sod, sidewalks, dives, parking lots, and similar
property improvements, damaged by the use of said Easement, including wheel track rutting, shall be repaired and/or replaced by Grantee to Grantor’s satisfaction. All such restoration shall be completed as soon as reasonably practicable. This easement is contingent upon and subject to Grantee’s timely restoration as provided in this paragraph.

4. This Easement is not a waiver of a claim for damage to or use of any property not restored promptly to Grantor.

5. This Easement shall apply to all interests in the described real estate, now owned or hereafter acquired or assigned by Grantor or Grantee; this covenant to run with the land.

*Insert and complete the appropriate Acknowledgement and delete those that do not apply along with this instruction.*

INDIVIDUAL ACKNOWLEDGEMENT

By: (type name(s) of individual owners with marital status)

By: (type name(s) of individual owners with marital status)

STATE OF KANSAS )
COUNTY OF __________________ )SS.

This instrument was acknowledged before me on this _____ day of ______________________20____.

______________ Notary Public _______________ My commission expires

CORPORATION ACKNOWLEDGEMENT

By: name(s) of person(s)] as (type of authority, e.g., officer, trustee, etc.) of (name of party on behalf of whom instrument was executed.)
STATE OF KANSAS )
COUNTY OF ___________________) SS.

This instrument was acknowledged before me on this _____ day of
____________________20____.

______________________________ ___________________________
Notary Public                                         My commission expires

LIMITED LIABILITY COMPANY ACKNOWLEDGEMENT

By: name(s) of person(s)] as (type of authority, e.g., officer, trustee,
    etc.) of (name of party on behalf of whom instrument was executed.)

STATE OF KANSAS )
COUNTY OF ___________________) SS.

This instrument was acknowledged before me on this _____ day of
____________________20____.

______________________________ ___________________________
Notary Public                                         My commission expires
4. Provide legal description and scale drawing depicting the easement and property crossed.

5. Provide the business name, address and telephone number along with signature and date in blue ink across the seal of a Licensed Kansas Land Surveyor certifying that the real property legal description has been prepared by or under the direct supervision of said licensee in accord with K.S.A. 74-7001 et seq., and amendments thereto or the rules and regulations promulgated by the Kansas Board Of Technical Professions; this is required on all easement legal descriptions, including attached map exhibits. (example: "I hereby certify that this real property legal description has been prepared by me or under my direct supervision."

6. When using metes and bounds expressions, include a preamble that clearly identifies the location of the parcel. Example: “A parcel of land located in the NW ¼ of the NW ¼ of Section 12, Township 12 South, Range 25 East, Sixth Principal Meridian being further described as follows: