# THE VILLAGE OF HANOVER

## SANITARY SEWER DESIGN STANDARDS
## AND
## PLAN PREPARATION GUIDELINES

Draft

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## ARTICLE I

## 100.00 DESIGN GUIDELINES.

### 101.00 GRAVITY SYSTEMS, MAINS.

Depth of Cover (to top of pipe):

a) Absolute minimum: 36" (frost depth)
b) Other minimum: Shall provide service to all basements (below floor)
c) Maximum for PVC: 15' (SDR 35), 25' (SDR 26), 30' (SDR 18)

Size and Slope:

a) Maximum: 20% (without slope protection and anchoring)
b) Minimum: See table below:

| Size | 8" | 10" | 12" | 15" | 18" | 21" | 24" | 30" | 36" |
|---|---|---|---|---|---|---|---|---|---|
| Slope (OEPA) | 0.40 | 0.28 | 0.22 | 0.15 | 0.12 | 0.10 | 0.08 | 0.058 | 0.046 |
| | | | | | | | | | |

Sewer Calculations:

a) Use spreadsheets for submittal of calculations.
b) Flow rates are based on actual flows per capita, OEPA: 100 gpcd.
c) Peak Factors are 3.5 and infiltration/inflow is 0.003 cfs/acre of tributary area.
d) Design Flow is based on the items listed above.
e) Design Capacity is 50% (8" – 15") and 75% (18" – 27") and 92% (30" and up).
f) Minimum Velocity: 2.0 fps.
g) Maximum Velocity: 15.0 fps (anything greater requires velocity protection).

General:

a) Manholes required at all horizontal deflections and changes in slope.
b) Drop manholes required if more than 2.0' of drop is contained within a manhole.
    - Inside Drop Manhole Construction: ONLY if manhole is 5' or greater in diameter
    - Outside Drop Manhole Construction: Proposed manhole connections.
c) Manhole Spacing: Maximum 400'
d) Clearance (H & V) from water mains (if applicable):
    - Horizontal: 10' minimum.
    - Vertical: 1.5' minimum. (unless pressure pipe specified for sewer line)

### 102.00 PRESSURE SYSTEMS, MAINS.

Force Main Requirements:

a) Minimum Depth of Cover: 36" (frost depth).
b) Minimum Pipe Size: 4" (must pass a 3" solid, per OEPA).
c) Minimum Pipe Velocity: 2 fps.
d) Pipe Material shall match that of a waterline. (PVC, DIP, etc)
e) Flow Calculations.
    - Utilize Hazen Williams equation and a standard spreadsheet.
    - "C" value must match pipe material type.

Pump Station Requirements:

a) Must be a minimum of two (2) 4" pumps meeting all local and federal review agency requirements
b) Cycle times between pumps on & off
    - Minimum Time: 2 minutes (minimize wear & tear on the equipment)
    - Maximum Time 30 minutes (minimize odor and septic situation)

## 103.00 GRAVITY SYSTEMS, LATERALS.

Depth of Cover (to top of pipe):

a) Absolute minimum: 36" (frost depth)
b) Other minimum: Shall provide service to all basements (below floor)
c) Maximum: 10' @ main (use riser if greater than 10') (unless design dictates otherwise)

Size and Slope:

a) 6" Standard
b) 2.08% Slope Minimum (1/4" per Ft)

Sewer Lateral Calculations:

a) The WYE location (WYE STA) is based on the perpendicular location of the lateral to the main.
b) Riser calculations (RISER LENGTH) shall be as follows:
    1. Assume the WYE and riser point upward at a 45 degree angle:
        b) Then the length of the riser is the hypotenuse side of a 45 degree triangle:
            a. 1' vertical requires a 1.4' riser length
            b. 2' vertical requires a 2.8' riser length
            c. 3' vertical requires a 4.2' riser length
            d. Additional lengths are based on the same ratio
c) The length of the service lateral (LOS) is measured from the main to the EOS (plan view)
d) The end of service elevation (EOS ELEV) is calculated by starting at the service lateral elevation at the WYE as calculated above (or from the riser elevation). From this point, the standard slope is multiplied by the LOS information and added to the elevation at the WYE/Riser. (EOS = WYE/Riser Elev + slope * LOS)
e) LOOK FOR CONFLICTS WITH OTHER UTILITIES

### 104.00 PRESSURE SYSTEMS, INDIVIDUAL SERVICE.

Force Main Requirements:

a) Minimum Depth of Cover: 36" (frost depth)
b) Minimum Pipe Size: 1 1/2"
c) Minimum Pipe Velocity: 2 fps
d) Pipe Material should match that of a waterline (PVC, etc.)
e) Flow Calculations
    - Utilize Hazen Williams equation and a standard spreadsheet
    - "C" value must match pipe material type

Pump Station Requirements:

a) Single grinder pump meeting Licking County Health Department requirements.
b) Cycle times between pumps on & off
    - Per Manufacturer

## ARTICLE II

## 200.00 PLAN PREPARATION

### 201.00 TITLE SHEET.

Title Block:

a) Show information in the following order:
    - "NAME OF PROJECT"
    - "SANITARY SEWER IMPROVEMENTS"
    - "SITUATED IN THE STATE OF OHIO"
    - "COUNTY OF Licking, VILLAGE OF HANOVER"

Location Map:

a) Draw map to a large enough scale to show the shape of the site & nearby street.
b) Provide north arrow.
c) Show site location.
d) Show adjacent street names and names of other arterials & highways in the area.

Schematic Plan:

a) Provide 200 scale schematic plan.
b) Show scale and north arrow.
c) Show Tributary boundary of sewer.(On separate plan if necessary)
d) Show balloons of each manhole. (w/leaders)
e) Show property owners, corp. lines, etc.
f) Show "See Sheet" numbers for large plan sets.

Benchmarks:

a) Source Benchmark (BM): List BM used to bring control to the site. (specify 29 or 88 datum)
b) Local Benchmarks: List BM's set on site by survey crew.
c) Include detailed description of all benchmarks, per the survey notes.

Information Blocks:

a) OUPS Note.
b) Owner / Developer / 24 hr Contact. (with name, address, phone number)
c) Architect. (with name, address, phone number) – if applicable

Index of Sheets:

a) List name and page number of all sheets in the plan.

List of Standard Drawings:

a) Provide a list of standard drawings used on the project. (note whose standards they are)

Change Order Schedule:

a) Provide a standard revision / change order table.

Signature Blocks:

a) Provide Design Engineers signature block & name of PE to sign.
b) Village signatures shall include, but not limited to:
    - Village Engineer, Village of Hanover
    - Mayor, Village of Hanover
    - Chairman, Planning & Zoning Commission, Village of Hanover

## 202.00 GENERAL NOTES SHEET.

Design Standards:

a) General Notes: Village of Hanover.
b) Standard Construction Drawings: City of Columbus.
c) Material Specifications: City of Columbus.

Sanitary Notes:

a) General Notes provided by the Village of Hanover Engineer. (available by request)
b) Add any job specific General Notes.

Maintenance of Traffic Notes:

a) Provide notes and details as necessary for this item.
b) Required if the proposed construction falls within the existing right-of-way of a street.

Special Notes:

a) These notes will be added on a case-by-case basis, as needed. They may include special construction information for shallow pipes, deep pipes, or construction materials.

## 203.00 GENERAL SUMMARY SHEET.

Design Standards:

a) Specifications: City of Columbus.
b) All item numbers shall match the specifications for the project. (as shown in the General Notes)

Listing of Estimated Quantities:

a) All items, units, and descriptions shall match per the specification book being used.

b) Any items which require notation for standard drawings should be noted in "( )".
c) All work shown on the plan must be included within one of the items for payment:

## 204.00 PLAN & PROFILE SHEETS.

Plan View:

a) Label increasing structure numbers from downstream to upstream
b) Label pipe sizes (#" San)
c) Show flow arrows
d) Show wye locations and services
e) Provide a table with the following for each sanitary service to a lot:

| |
|---|
| WYE STA = |
| RISER LENGTH = |
| LOS = |
| EOS ELEV = |

Note: All wye stations shall be measured at the main line sewer where the service lateral would tee into the main line.

f) Label all easements (20' minimum – use wider easement for excessive depth > 10')
g) The following "As-Built" information shall be provide to the Village of Hanover on each plan & profile sheet at the end of construction:
   - Structure Numbers, Rim Elevations, Invert Elevations, and Northing & Easting Coordinates.
   - No as-built elevation shall be accepted if the same as designed.

Profile View:

a) Draw sanitary sewer to exaggerated vertical scale. (5 or 10 scale)

Profile Labeling:

a) Label increasing stations from left to right. (start all runs at 0+00)
b) Label the following along the bottom of the profile. (@ 50'min to 100'max spacing):
   - Station
   - Surface (Existing Ground)
   - Invert
   - Cut

Structure Labeling:

a) T/C (or Rim) (place vertically, above the structure)
b) Structure type and standard drawing. (place vertically, above the structure)
c) F/L's of OUT/IN. (place vertically, below the structure)
d) STA of structure. (place vertically, below the structure)

Pipe Labeling

a) Pipe. #" Pipe w/ Type 1 Bedding @ #%.
b) Bearings. (deg, min, sec)

Backfill

a) Show CGB limits STA to STA. (per Columbus 912)

b) Show CB limits STA to STA. (per Columbus 911)

Utility Crossings

a) Label all utility crossings & minimum clearances.
b) If utility location unknown, label “Caution – Approximate Location Shown of _____main – Field Verify”.