



**PIMA COUNTY**

**REGIONAL WASTEWATER RECLAMATION DEPARTMENT**  
201 NORTH STONE AVENUE  
TUCSON, ARIZONA 85701-1207

**JACKSON JENKINS**  
DIRECTOR

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Engineering Directive: ENG2014-01

Effective Date: July 1, 2014  
Review Date: July 1, 2016

**SUBJECT: Public Sanitary Sewer Formatting Standards**

STATEMENT OF PURPOSE

It is the policy of Pima County Regional Wastewater Reclamation Department that all new public sanitary sewer facilities are to be designed and constructed in accordance with accepted practices. In order to ensure the design drawings/plans are clear, consistent and legible, the public sanitary sewer formatting standards herein are to be incorporated.

GENERAL PROVISIONS

All new public sanitary sewer drawings/plans shall comply with the public sanitary sewer formatting Standards in Attachment A. The public sanitary sewer formatting standards are intended to complement the latest edition of Pima County Regional Wastewater Reclamation Department (RWRD) Engineering Design Standards and the Standard Specifications and Details for Construction.

REVISIONS

The public sanitary sewer formatting standards may be revised periodically either as part of the annual review of the Engineering Design Standards and Standard Specifications and Details for Construction or as necessary.

AUTHORITY

Pima County is empowered by A.R.S. 11-264 to construct and maintain a sewer system and it is necessary to establish design standards to be adhered to in the construction plans for facilities which are to be incorporated in the Pima County public sanitary sewer system.

PROCEDURE

Effective September 1, 2014, all first submittals of design drawings/plans (construction plans) shall incorporate these public sanitary sewer formatting standards.

PROCEDURAL RESPONSIBILITY

The Sanitary Engineering Manager of Pima County Regional Wastewater Reclamation Department, and/or designated representative(s), is responsible for the enforcement of this Directive and the associated Standards.

**RECOMMEND:**

  
\_\_\_\_\_  
Carol A. Johnson, P.E.  
Sanitary Engineering Manager

**CONCUR:**

  
\_\_\_\_\_  
Eric Wieduwilt, P.E.  
Deputy Director, Planning & Engineering

**APPROVED:**

  
\_\_\_\_\_  
Jackson Jenkins  
Director, RWRD

Date: 6/30/14

# **SEWER IMPROVEMENT PLAN FORMATTING STANDARDS**

## **1-1 All Sheets**

1. All construction plans if paper shall be drawn on 24"x36" sheets and accomplished in a manner that clear and readable print, microfiche, and electronic plans are attainable.
2. Sheet title blocks;  
Title block should contain the following;
  - A. Project title
  - B. Lot numbers to be served, and for single parcels, provide address or the assessors tax ID
  - C. Engineer's name, address and phone number
  - D. Sheet \_\_\_\_\_ # \_\_\_\_\_ of \_\_\_\_\_ ## \_\_\_\_\_
3. Plans shall be sealed by an Arizona Licensed Professional Engineer, with valid expiration date to practice in the State of Arizona.
4. Sheet name: All sheets created for different purposes should have different names (i.e.: cover sheet, legend and note sheet, detail sheet, survey layout sheet, plan and profile sheet, etc.)
5. Revision Block: Any revision to the approved drawing must be numbered, described, and initialed by the registered Engineer or surveyor, see Exhibit #6.
6. Manhole numbers shall start from the most downstream manhole and increase upstream. Sewers should be drawn on the plan in the most probable construction sequence. Stationing should start from the most downstream manhole and increase upstream from left to right on the plan sheet when practical.
7. Blue Stake Logo – "Call for Blue Stake at 1-800-782-5348 two working days prior to construction excavation", see Exhibit #6.
8. As-built Certification: Any change to the constructed project must be checked, approved, sealed, signed and dated by a Registered Land Surveyor or Registered Civil Engineer. See Standard Specifications and Details for Construction 2012 item 1.4.7.

## **1-2 Cover Sheet (see Exhibit # 1)**

1. Project Title: Title to include the word "Public Sewer Improvement Plan" the project name, the specific lots to be served, address or parcel ID when the sewer system serves a single parcel, and the subdivision name (case number, and recording information if already recorded). If the sewer plan is for offsite sewers include word "offsite" in the project title.
2. A location map at a scale of 3"=1 mile with proposed development highlighted, adjacent platted subdivisions called out, major street intersection and section(s), township(s) and range(s) noted.
3. Overall Map (Key Map):
  - A. Overall maps should be to scale (typically 1"=100') to ensure clarity.

- B. The overall system lay out and the location of the sewer mains, manholes, HCS's and the lots requiring back water valves
  - C. The background of the layout shall be a scaled presentation of the plat, the development plan right-of-way, or easements, inclusive of street name and lot numbers.
  - D. Sheet numbers shall be called out.
  - E. The sewer layout shall be consistent with the most recently approved Tentative Plat, Final Plat, Development Plan, Preliminary Sewer layout, sewer easements or right-of-ways.
  - F. Street names (actual names, NOT "Street 'A'"), identified as 'PUBLIC' or 'PRIVATE'.
  - G. Manholes numbered sequentially from downstream to upstream.
  - H. Lots or adjacent property owner info with docket/page, tax ID (proposed-solid, existing-dashed) for parcels that may be affected by the construction of the new sewer or properties granting public sewer easements
  - I. Provide the northing and easting at the point of connection to the public sewer.
  - J. Define the status of the downstream public sewer as being proposed or existing; if downstream public sewer is "proposed", add text box with note addressing status of downstream sewer in relation to construction and release of proposed sewer.
  - K. Describe and identify on the plan bench mark elevation based on NAVD 88 (vertical control), and the basis and record of bearing NAD 83 (horizontal control).
4. Signature Block:
- A. Approval (signature) blocks for Pima County Regional Wastewater Reclamation Department and for the Department of Transportation and Flood Control District as appropriate. Sample of signature block is shown below.

**ACCEPTED:**

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PIMA COUNTY REGIONAL WASTEWATER RECLAMATION DEPARTMENT      DATE

- B. Add a Department of Transportation signature line for the appropriate jurisdiction (PCDOT, COTDOT, etc.) if work will be done in a public street AND the plans are for sewers only.

**ACCEPTED:**

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AGENCY (FOR SEWER LOCATION IN R.O.W. ONLY)      DATE

- 5. Sheet Index List: The purpose of the sheet index list is to provide a comprehensive list of all content to quickly facilitate locating plan information.

- A. Sheet Index List - The Sheet Index, sometimes referred to as the Plan or Drawing Index List, is a list containing sheet numbers and corresponding sheet subtitles used in the plans. This list shall be labeled "Sheet Index."
- B. Group Categories - The Index should be categorized into groups with headings and sheet subtitles such as:
  - 1. General
    - a. Cover Sheet - Location Map, Site Plan
    - b. Legend and Note sheet, Second Sheet (Additional Construction Notes, Boundary and Marker, Symbols, Legend, Sheet Index, Abbreviations, Culture Symbols)
  - 2. Plan Sheets
    - a. Plan and Profile Sheets
    - b. Section and Detail Sheets
- 6. As-built Certification: Any change to the constructed project must be checked, approved, sealed, signed, and dated by an Arizona Registered Land Surveyor or Arizona Professional Engineer (Civil). The as-built certification verbiage on the cover page shall be in accordance with the Standard Specifications and Details for Construction, section 1.4.7.
- 7. North Arrow - The north arrow shall be located in the upper right corner of maps, location maps, and plan views whenever possible.
- 8. Owner/developer's name, address, phone number and e-mail address
- 9. Design consultant's name, address, phone number, logo, and engineer seal with expiration date
- 10. Sheet title blocks shall contain the following:
  - A. Project Title - consistent with project title.
  - B. Lot Numbers to be served.
  - C. Sheet   #   of   ##
  - D. Blue Stake Logo – "Call for Blue Stakes at 1-800-782-5348 two working days before digging any excavation for construction", see Exhibit #6
- 11. Revision Block: Any revision to the approved drawing must be numbered, described, and initialed for review, see Exhibit #6.
- 12. Project G-#####-### along right edge of the sheet, should be bold and obvious.

**1-3 Legend and Note Sheet (see Exhibit # 2)**

- 1. Legend: The legend is a list containing symbols and corresponding features used in the project plans. This list shall be labeled "Legend."
  - A. Symbols - Include all symbols used on the plans for this project, see Exhibit #3.
  - B. Symbol Sources - Use only symbols that are in the Symbols section of the Exhibit #3.
  - C. Symbol Limitations - Do not include symbols that are not applicable to the project.
- 2. Construction Sewer Notes
  - A. General Sewer Notes - General construction sewer notes can be found on Pima County Regional Wastewater Reclamation Department's website.

- B. Additional Construction Notes - Additional construction notes shall be located to the left side of the sheet, and labeled "Additional Construction Notes."
  - 1. Include, as the first note, the entire text contents of Note No. 1, found in RWRD, General Construction Sewer Notes.
  - 2. General Sewer Notes included in the Sewer Improvements Formatting Standards apply to this project.
  - 3. Do not include construction notes that are already in the General Construction Sewer Notes, other than those required above.
  - 4. Do not include notes that are not applicable to this project.
- 3. Describe and show on the plan bench mark elevation based on NAVD 88 (vertical control), and the basis and record of bearing NAD 83 (horizontal control).
- 4. Abbreviations List - The Abbreviations List is a list containing letters and corresponding definitions used in the plans and shall be labeled "Abbreviations List."
  - A. Include all abbreviations used on the plan sheets for this project.
  - B. Use only abbreviations that are in the Abbreviations section of the Pima County RWRD Engineering Standards and Standard Specifications and Details for construction 2012.
  - C. Do not include abbreviations that are not applicable to this project.

#### **1-4 Plan and Profile Sheets**

- 1. Plan views shall contain the following information:
  - A. Existing sewer pipe material
  - B. New and existing sewer directional flow arrows
  - C. Within a right-of-way, the sewer alignment shall be described using bearings, coordinates, or calculated stationing in combination with calculated right angle dimensional ties to the centerline of the right-of-way.
  - D. New sewer bearing and distance if the sewer does not follow the street centerline
  - E. Dimensions from section lines, survey control lines, property lines and/or easement boundaries for all new sewers to the nearest hundredth of a foot
  - F. Horizontal ties from existing street monuments to the proposed sewer system. Include station and offsets to the street monuments along the path of the proposed sewer main.
  - G. Station of all appurtenant facilities such as manholes, cleanouts and house connection sewers
  - H. Station equations when manholes are shown in different stationing alignments.
  - I. Show and label all new and existing service laterals (HCS/BCS). Locate all laterals by stationing or dimensioning to the nearest property corner to the nearest foot. Location information may be shown on the plan view or provided in a data table on the plan sheet.
  - J. New manhole numbers
  - K. Existing manhole IMS numbers
  - L. Show and station all existing and proposed structures over, under, or near public sewers.
  - M. All existing utilities

- N. All new utilities, including water and drainage improvements, if possible
  - O. Dimension distance between sewer and water
  - P. All areas of pavement replacement according to Standard Details, of the applicable agency or jurisdiction.
  - Q. Coordinates and/or bearings will be utilized to define the horizontal position of the proposed main line sewer in all instances except when the main is located within a dedicated or monumented public right-of-way.
  - R. Existing contours for areas where sewer is not under improved roadways
  - S. Drainage flow arrows
2. Profile views shall contain the following information:
    - A. New sewer pipe diameters (inches)
    - B. New sewer pipe material
    - C. New sewer length, measured between manhole centerlines to the nearest hundredth of a foot
    - D. New sewer true pipe length, measured from the inside walls of adjacent manholes to the nearest hundredth of a foot
    - E. New sewer true pipe slope, measured from the inside walls of adjacent manholes to the nearest hundredth of a percent
    - F. New manhole numbers
    - G. Existing manhole IMS numbers
    - H. New manhole rim elevations to the nearest hundredth of a foot
    - I. New and existing manhole inlet and outlet inverts to the nearest hundredth of a foot
    - J. Identify the invert direction if there is more than one invert per manhole.
    - K. Show, station, and provide elevation of existing and proposed structures over, under, or near public sewers.
    - L. All existing utilities
    - M. All new utilities, including water and drainage improvements
    - N. Dimension between sewer and water to the nearest hundredth of a foot
    - O. Finished and existing grade profile along sewer alignment
    - P. Show and station each appurtenance relevant to the sewer system
    - Q. Drainage  $Q_{100}$ , velocity, scour and water surface elevation (text and graphically)
  3. The plan and profile views shall be aligned at the beginning of each sheet.
  4. Sewer plans should be oriented so that the flow in the sewer is from right to left on the sheet.
  5. Verify distances, elevations and other information shown on multiple sheets are consistent with each other.
  6. The north arrow shall be located in the upper right corner of the plan view whenever possible.
  7. Unless otherwise approved, the scales used in the main body of the drawings shall be one inch equals forty feet (1" = 40') horizontally and one inch equals four feet (1" = 4') vertically. Where the profile is exceptionally irregular or steep, a vertical scale up to one inch equals eight feet (1" = 8') may be used.
  8. Symbols and line types used in the plans shall be as shown in Exhibit #3 & #7.

9. Identify point of connection to existing downstream manhole number, invert elevation, plan number and block out alignment; Invert elevations of existing manholes shall be from actual survey information.
10. Plan and profile stationing should increase from left to right.
11. Sewer plans must include HCS/BCS and Manhole Tables (Exhibit #5) and the distance from the downstream public manhole for each private sewer lateral along the length of the public sewer.
12. Where adjacent drainage ways or washes are in possible conflict with, or could have a future negative impact upon the proposed line, special details such as enlarged profiles, plotting the flow line invert elevation of the adjacent wash on the sewer design profile or related cross sections may be required on the construction plans by the reviewing agency. Attention must be given to local run-off conditions where flood damage to the line may occur, or where run-off may be diverted onto contiguous private property.
13. Provide flood prone/erosion hazard setback limits in unpaved areas or areas requiring all weather access (ie. flows over pavement).
14. Show location and method of connection to existing public sewer.
15. If sewer plans include both public and private sewers, label sewers appropriately as public or private.
16. Ensure that the lots and numbering are consistent with the cover sheet.
17. Show match lines and stationing as needed for information that continues onto another sheet.
18. Show all areas of pavement replacement according to the Standard Details of the applicable agency or jurisdiction.
19. Call-out the typical street/roadway cross section detail on every plan sheet.
20. Provide as-built manhole and HCS tables on plan & profile sheets, separate detail sheet, or cover page. Tables shall be left blank and completed during preparation of as-builts, see Exhibit #5.

#### **1-5 Section and Detail Sheets**

1. Special profiles or details drawn to scale may be required for connections to existing manholes and large diameter (24 inches or more in diameter) trunk or interceptor sewers, as well as non-standard structures which are a part of the system or provide structural support. All details should be accompanied by notes explaining their function, capacities and their location in the system. Where Pima County RWRD Standard Specification and Details for Construction 2012 apply, reference may be made to these details by number only.
2. Section and detail sheets are usually created when it is determined necessary to clarify or make specific requirements on the construction item. These sheets shall be labeled as "Section and Detail Sheets."

EXHIBIT # 1  
**(GENERAL GUIDELINE)**

**Project Title Block**  
**PUBLIC SEWER IMPROVEMENT PLAN**  
 project name,  
 lot (and/or buildings) served,  
 Subdivision case number (or book and page, if already recorded) or if  
 offsite, the word "offsite", and Project G-####-###

1

**Overall Map (Key Map)**

3

**Location Map**  
 A location map at a scale of 3"=1  
 mile with proposed  
 development highlighted,  
 adjacent platted subdivisions  
 called out, major street  
 intersection and section(s),  
 township(s) and range(s) noted.

2

North  
Arrow

North  
Arrow

7

**Sheet Index**

5

As-built Certification:  
**AS-BUILT:**  
 Text in accordance with Standard Specifications and Details  
 for Construction 2012, section 1.4.7

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REGISTERED LAND SURVEYOR (OR REGISTERED P.E.) **6** DATE

Blue Stake Logo

Signature Block:

**ACCEPTED:**

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PIMA COUNTY REGIONAL WASTEWATER RECLAMATION DEPARTMENT DATE

Add a Department of Transportation signature line for the appropriate  
 Agency if work will be done in a public street AND the plans are for  
 sewers only.

**ACCEPTED:**

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AGENCY (FOR SEWER LOCATION IN R.O.W. ONLY) DATE

4

10

12

Project G-####-###

Revisions Block

11

Engineer's Seal  
 Expiration Date

Design Consultant's Contact Info.  
 (name, address, phone number, and logo)

9

Owner/Developer's Contact Info.  
 (name, address and phone number)

8

Title Blocks  
 Project Title, Lot Numbers to be served

10

Sheet no # of ##

**EXHIBIT #2  
(GENERAL GUIDELINE)**

**Legend**

The legend is a list containing symbols and corresponding features used in the project plans. This list shall be labeled "legend."

Include all symbols used on the plans for this project.

Symbols and line types used in the plans shall be in accordance to the Standard Details For Public Improvements of the City of Tucson /Pima County, 2003 edition.

**1**

**Abbreviations List**

**4**

**A-General Sewer Notes      B- Additional Construction Notes**

**2**

Add special detail if there is enough room (optional)

Blue Stake Logo

Bench mark, datum base and survey control.  
Or on the cover sheet (optional)

**3**

Legend and note sheet

**Revisions Block**

**Engineer's Seal**

Expiration Date

**Design Consultant's Contact Info.**

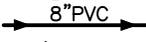
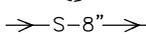
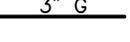
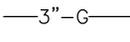
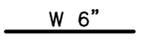
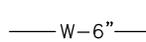
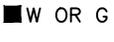
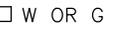
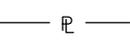
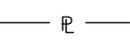
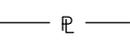
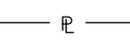
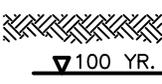
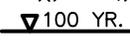
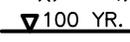
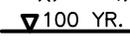
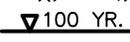
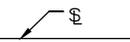
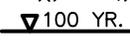
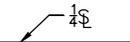
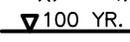
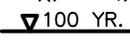
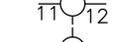
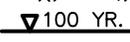
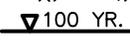
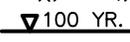
**Owner/Developer's Contact Info.**  
(name, address and phone number)

**Title Blocks**

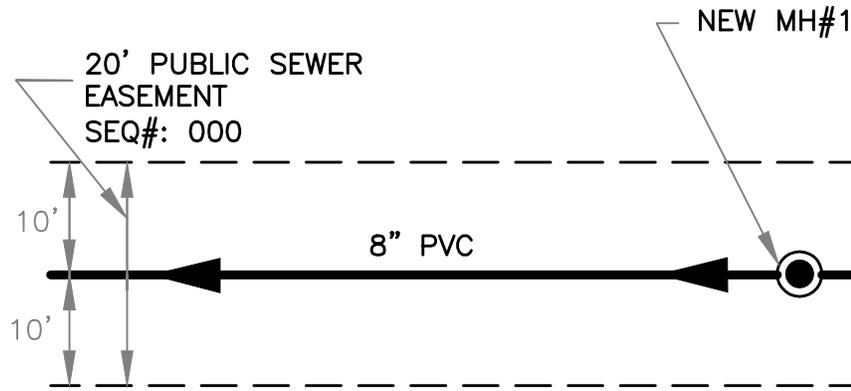
Project title, lot numbers to be served  
Sheet no # \_\_\_\_\_ of ## \_\_\_\_\_.

PROJECT G -###-###

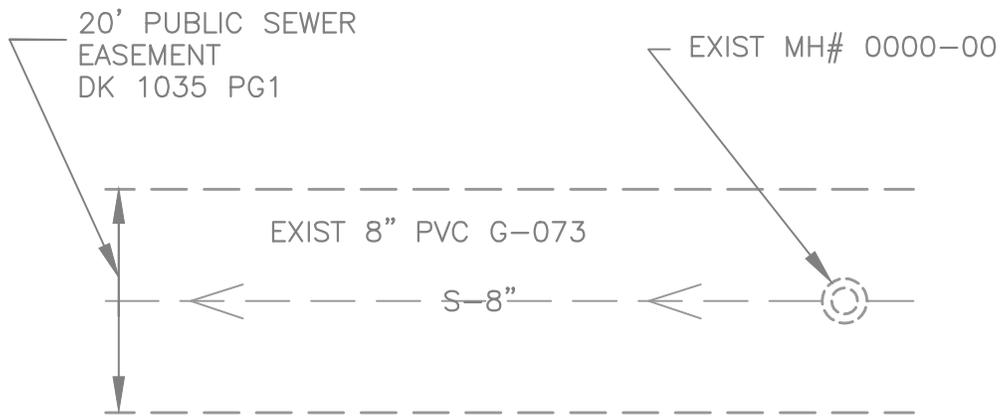
EXHIBIT # 3

LEGEND		
NEW	EXISTING	FEATURE
IMS# 0000-000 	IMS# 0000-000 	SANITARY SEWER MANHOLE AND CLEANOUT IMS#
		SANITARY SEWER MANHOLE
		SANITARY SEWER LINE
		HOUSE CONNECTION SEWER
		CLEAN OUT
		GAS LINE W/SIZE
		UNDERGROUND TELEPHONE LINE
		UNDERGROUND ELECTRIC LINE
		UNDERGROUND CABLE TELEVISION
		WATER MAIN
		WATER OR GAS METER BOX
		WATER OR GAS VALVE
		BACK WATER VALVE
		IRRIGATION BOX
		TELEPHONE
		ELECTRIC POWER POLE DOWN GUY WIRE
		ELECTRIC BOX
		POWER PEDESTAL
		PROPERTY LINE
		EASEMENT LINE
		FIRE HYDRANT
		SHRUB, HEDGE, ETC.
		UNCLASSIFIED TREE
		☉ GRADE PROFILE
		TERRAIN LINE PROFILE
		TERRAIN LINE CROSS SECTION
		WATER SURFACE ELEVATION, 100 YEAR
		TOWNSHIP OR RANGE LINE
		SECTION LINE
		QUARTER SECTION LINE
		SECTION CORNERS
		QUARTER CORNERS
		BENCH MARK
		SURVEY MONUMENT
		SURVEY CONTROL POINT MONUMENT

LEGEND



NEW SEWER LINE WITH EASEMENT



EXISTING SEWER LINE WITH EASEMENT

	<b>SEWER LINE WITH EASEMENT</b>	
--	---------------------------------	--

AS-BUILT MANHOLE AND HCS TABLES

MANHOLE AS-BUILT INFO		
MH NO	STATE PLANE COORDINATES (AZ CENTRAL) NAD 83 INTERNATIONAL FEET	
	NORTHING	EASTING

HCS AS-BUILT INFO				
STATE PLANE COORDINATES (AZ CENTRAL) NAD 83 INTERNATIONAL FEET AT CLEANOUT			DISTANCE FROM TAP TO DOWNSTREAM MANHOLE	SEWER LINE STATIONING AT HCS/BCS CONNECTION
LOT #	NORTHING	EASTING		

AS-BUILT MH & HCS

NO.	DESCRIPTION	REV BY	NAME	AGENCY	DATE
REVISION BLOCK			APPROVED BY		

REVISION BLOCK



BLUE STAKE LOGO  
(USE LAST UPDATE)

REVISION BLOCK /  
BLUE STAKE LOGO

# PLAN SYMBOLS AND DETAILS

DISCRIPTION			LINE TYPE	ACTUAL LINE THICKNESS (IN.)
SANITARY SEWER LINE SMALLER	EXISTING		DASHED	0.012
	NEW		CONTINUOUS	0.040
SANITARY SEWER MANHOLE *	EXISTING		DASHED	0.012
	NEW		CONTINUOUS	0.020
SANITARY SEWER CLEAN OUT **	EXISTING		DASHED	0.012
	NEW		CONTINUOUS	0.020
SEWER EASEMENT LINE	EXISTING		HIDDEN	0.014
	NEW		HIDDEN	0.024
RIGHT OF WAY LINE	EXISTING		ROW	0.020
	NEW		ROW	0.032
SANITARY SEWER LINE TEXT	EXISTING	S-8"	CONTINUOUS	0.012
	NEW	8" PVC	CONTINUOUS	0.024
	EXISTING			
	NEW			
	EXISTING			
	NEW			
	EXISTING			
	NEW			
	EXISTING			
	NEW			
	EXISTING			
	NEW			

\* MANHOLES TO BE DRAWN TRUE SCALE IN CAD BASE FILE

\*\* CLEANOUTS DIAMETER TO BE 0.125" WHEN PRINTED ON PLAN AND PROFILE SHEETS

## PLAN SYMBOLS AND DETAILS