

## CHAPTER 2

### CONSTRUCTION RECORD DRAWINGS

#### 2.0 GENERAL

The purpose of Construction Record Drawings (CRD) is to provide the City with a permanent record of public facility construction and associated equipment and comply with the requirements of State law. Deviations in the approved plan and as-constructed data shall be marked on the CRD for review and acceptance by the City. The drawings and/or certifications also provide verification that facilities are installed in accordance with the appropriate specifications.

A. Combined Submittals:

The City requires Construction Record Drawings and/or certifications for all public facilities, and some specific private construction to insure compliance with requirements. The required timing for submittal/approval of these various requirements is as indicated herein; however, the City accepts and encourages combined submittals to fulfill multiple CRD requirements. Combined submittals should be provided for review/approval in advance of the first deadline for the components of the combined CRD's.

B. Submittal Requirements:

CRD must be reviewed and approved by the City prior to the acceptance of streets, public storm drainage, public utility systems and traffic control systems as indicated herein. Three (3) prints of the Construction Record Drawings must be submitted for review by the City. Upon approval, a reproducible mylar (3 mil minimum) must be submitted. ~~The final reproducible CRD for Public Utilities must be on a double matte mylar (3 mil minimum).~~ If a combined submittal is provided, two sets of mylars will be required upon approval (~~Public Utilities copy double matte~~) [one copy for Public Utilities, one copy for Public Works].

The CRD shall be prepared on the approved plans, with additional as-constructed information specified herein. Construction that deviates from the approved plans should be clearly distinguished by strike-through and as-constructed details added.

C. Certification Statement:

The following CRD certification statement shall be placed on the cover sheet of the mylars and prints submitted to the City:

This set of plans is entitled “**SEWER, WATER AND STORM DRAINAGE CONSTRUCTION RECORD DRAWINGS OF** \_\_\_\_\_ [name of subdivision or development] [, if not the entire subdivision or development, indicate section, phase or other portion.]” These Construction Record Drawings (CRD’s) are:

- a. Based on the construction plans for this project entitled and dated as follows:
  - i. Title: \_\_\_\_\_
  - ii. Date of last approval, including latest post-approval revisions: \_\_\_\_\_
  - iii. Preparing firm: \_\_\_\_\_
- b. A collaborative effort of those who, by signing below and on each additional sheet, state the accuracy of their respective contributions.

1. **LAYOUT FIRM:** My firm set layout stakes for the sewer, water and storm drainage facilities which are the subject of these CRD’s, and that those stakes were set in the manner, and to the standards of accuracy and precision, customary for such construction surveying in the Hampton Roads, Virginia area.

Firm Name: \_\_\_\_\_ Signature and Date: \_\_\_\_\_  
\_\_\_\_\_ Name, Title, License Type and Number: \_\_\_\_\_

2. **CONTRACTOR:** My firm installed the sewer, water and storm drainage facilities which are the subject of these CRD’s, and, with respect to those improvements and, except as noted on these CRD’s, that

- a. They were installed In accordance with the construction plans listed above,
- b. They were installed In accordance with all Volumes of the *Public Facilities Manual* and any other standards, criteria and details referenced in the construction plans,
- c. With regard to that portion of the improvements which are underground and whose as-installed position could not be measured by the post-installation survey (paragraph 3 below), they were installed in accordance with the stakes and marks set by the firm signing paragraph 1 above, to the construction tolerances for such improvements set forth in the *Public Facilities Manual*, unless approved by the City, and that
- d. All information on valves, etc., which we have furnished to the firm signing paragraph 3 below, for inclusion on these CRD’s, is correct.

Firm Name: \_\_\_\_\_ Signature and Date: \_\_\_\_\_  
\_\_\_\_\_ Name and Title: \_\_\_\_\_

3. **CRD PREPARING PROFESSIONAL:** My firm measured the as-installed locations and elevations of that portion of the improvements which can be measured from the surface and that those measurements...

- a. Were taken in the manner and to the accuracy set forth in the *Public Facilities Manual*, and
- b. Have been indicated on the following sheets accurately and in a manner which distinguishes this as-installed information from the as-designed information, and that
- c. Any additional information furnished by the installing contractor signing paragraph 2 above (such as valve information, per 2.d above) has been accurately transcribed onto these CRD’s.

Firm Name: \_\_\_\_\_ Signature and Date: \_\_\_\_\_  
\_\_\_\_\_ Name, Title, License Type and Number: \_\_\_\_\_

The following CRD Certification Statement shall be placed on all sheets other than the cover.

By our dated signatures below, we reaffirm our respective declarations on the first sheet of these <b><u>SEWER WATER AND STORM DRAINAGE CONSTRUCTION RECORD DRAWINGS</u></b> , as relates specifically to the contents of this sheet. Our responsibility for the accuracy of the information hereon is limited as set forth in those declarations.	
1. <b><u>Layout Firm</u></b>	
2. <b><u>Contractor</u></b>	
3. <b><u>CRD Preparing Professional</u></b>	

D. City Review:

City staff will review the CRD to insure all required information is included. Items constructed beyond specified tolerances may require plan revisions or analysis to insure the facility functions as intended.

**2.1 LOT GRADING CERTIFICATION**

A. General:

A Rough Grading Certification is required for residential subdivisions prior to plat recordation. The certifications must be provided and sealed by a Professional Engineer or Surveyor in accordance with the certification form provided in the appendix.

B. Tolerances:

Rough grading tolerances are specified in Chapter 5 – Drainage, and on the Certification Form, located in the Appendices. In the event the constructed grades are not within the specified tolerances, a plan revision may be required.

If an alternate drainage pattern (direction of flow, utilization of swale, etc.) is constructed by the Contractor, a standard plan revision must be submitted and approved by the development review section. Upon approval the engineer or surveyor may certify construction is within the specified tolerances for the approved plan revision.

The City will accept a lot grading CRD in lieu of a plan revision for rough grading that exceeds the approved grades in a manner that enhances lot grading and maintains the approved drainage pattern. In these situations, the engineer or surveyor shall provide a modified lot grading certification and four (4) copies of a lot grading CRD. The modified lot grading certification should state the minimum slopes are provided, and describe the revisions to the approved plans. The lot grading CRD should clearly depict the revised design grades, by strike-through and italics script. This lot grading as-built will be processed by Public Works as a plan revision for subsequent use by builders for the final lot grading. In the event the revised grading is not considered an enhancement, it will be rejected and a standard plan revision required.

C. Certification Exceptions:

Lot grading certifications are not required for SDMP lots and commercial subdivisions.

## 2.2 ROADS AND DRAINAGE

A. General:

Prior to acceptance of roadway and drainage facilities, a CRD must be approved by Public Works. The CRD must show the entire approved plan with any field changes reflected by strike-through and appropriate designation of the modification, in addition to construction data as indicated herein.

B. Construction Data Requirements:

Final constructed elevations shall be provided for all ditch, pipe and structure inverts and rims.

## 2.3 PUBLIC UTILITIES

A General:

CRD for all public utilities must be submitted and approved by the Public Works and Public Utilities departments prior to activation of the utilities. The CRD must show the entire approved plan with any field changes reflected by strike-through and appropriate designation of the modification, in addition to construction data as indicated herein.

B. Construction Data Requirements:

1. Water and Sewer Mains

- a. Size, material, depth, profiles, and location of all main lines (both water and sewer) with relationship to curb and gutter or edge of pavement are required. (Measurements shall be taken at least every 200 feet except on sewer mains where manhole locations and inverts are adequate.)
- b. All horizontal bends, vertical offsets, valves, ends of all lines, and other fittings shall also be accurately located on the plans by triangulation from two permanent structures, which will be visible on the ground surface.
- c. Data required for valves: date set, cover, size, manufacturer, number of turns to open, direction of opening, and joint types.
- d. Data required for hydrants: date set, manufacturer, depth of bury, distances main to valve, and valve to hydrant.

2. Sewer Laterals

- a. Size (if other than 4 inches), material, depth (if not between 24 – 40 inches deep) and location of sewer laterals are required.
- b. Measurements will be made from the nearest downstream manhole, then measure over perpendicular from that point on the main to the end of the lateral.
- c. If lateral comes out of a manhole in a cul-de-sac; triangulation from that manhole will be required.
- d. Measure depth from the finished grade at the end of the lateral. If no depth is indicated, then the depth will be assumed to be 24 – 40 inches.

3. Water Service Lines

- a. Size (if other than  $\frac{3}{4}$  inch), material, depth and location of both ends of the water service lines are required. (If no size is indicated, then the size will be assumed to be  $\frac{3}{4}$  inch.)
- b. Measurements will be made with relationship to the nearest downstream manhole, wherever sewer is available, and in a similar manner to that of the sewer lateral location procedure.
- c. Measurements will be made with relationship to the nearest fire hydrant or water valve, where sewer is not available, and in a similar manner to that of the sewer lateral location procedure.

4. Non-Standard Details

Any alternate to a standard detail or special condition must be detailed.

5. Procedure for Locating Sewer Laterals and Water Service Lines

The following notations have been adopted and shall be uniformly used by all personnel involved in generating the sewerage lateral location. See Appendix 3.

- a. Measurement for the station shall always be made from the closest downstream manhole.
- b. All measurements are taken from the center of the manhole cover.
- c. All measurements shall be made on a horizontal plane (ground level).

d. Definitions:

Run Up (RU) = The horizontal measurement of the actual lateral pipe.

Height (Ht) = The distance measurement at 90 degrees from the main line to the property line.

Depth (D) = Depth of lateral at property line. (Note: Normally between 24" and 40".)

Wye = The station location of the wye (actual location) from the manhole.

Corp. = The station location of the corporation stop.

6. Pump Stations

Information for pump stations shall include all drawings submitted with the plan approval with construction record information shown on the drawings.

- a. Internal piping and mechanical layout with sizes, dimensions, material and measurements from the structure.
- b. Architectural drawing of the structure showing sizes, dimensions, and materials.
- c. Dimensioned site plan showing how the station external piping, driveway, landscaping, other utilities, and drainage are situated on the site.
- d. All pump criteria as to present and ultimate capacity, head conditions, RPM's, impeller size, pump type and motor size.
- e. Field surveyed elevations of all floor slabs, influent and effluent lines, and pump suction and discharge piping.
- f. Wiring schematics for pumping station.

## 2.4 CONSTRUCTION DATA TOLERANCES

A. General:

Table 2-1 (based on HRPDC Regional Construction Standards) indicates some requirements for the various components of the CRD. These requirements are intended to supplement the specifications. In the event of a conflict, the most restrictive shall govern.

B. Tolerance Deficient Construction:

CRD with construction deficiencies that exceed established tolerances are subject to rejection. Such deficiencies in construction and proposed corrective action should be identified by the developer's representative, to expedite CRD approval.

**TABLE 2-1**

	RECORD INFORMATION			Construction Tolerance
	Survey Accuracy	Construction Measurement	Record Drawings	
Manhole Rim	X		Note Elevation on Plans	± 0.1 ft.
Manhole Invert	X		Note Elevation on Plans, Note 1	± 0.05 ft. *
Gravity Sewer Slope			Note on Plans	± 0.02%
Manhole Location	X		Note 2	± 1.0 ft.
Fire Hydrant	X		Note 2	± 1.0 ft.
Valve	X		Note 2	± 1.0 ft.
Valve Depth	X		Note 1	± 0.1 ft.
Air Vent	X		Note 2	± 1.0 ft.
Fitting		X	Note 2	± 1.0 ft.
Offset		X	Note 1, 2	± 1.0 ft.
Lateral		X	Note 2	± 1.0 ft.
Lateral Depth		X	Note 1	± .25 ft.
Corporation Stop		X	Note 2	± 1.0 ft.
Meter	X		Note 2	± 1.0 ft.
Blow Off Assembly	X		Note 2	± 1.0 ft.
Pressure Pipe Location		X	Note 1	± 1.0 ft.
Pressure Pipe Depth		X	Note 1	± 1.0 ft.
Pump Station Elevations	X		Note 3	± 0.10 ft.
Pump Station Dimensions		X	Note 3	± 1.0 inches

\* The total deviation of both inverts at each end of a particular line shall be within ± 0.08 ft.

- Notes:
1. The record drawings must be adjusted to reflect the actual elevation if the variance from the approved plans is more than 10% of the vertical scale.
  2. The record drawings must be adjusted to reflect the actual location if the variance from the approved plans is more than 10% of the horizontal scale.
  3. The record drawings must show dimensions and elevations as identified in the PFM.
  4. Record drawing information must be shown in a manner to easily distinguish it from the original design.

## 2.5 PUBLIC IMPOUNDMENT CERTIFICATION

An acceptable Public Impoundment Certification is required prior to acceptance of the drainage facilities. The certification must be provided and sealed by a Professional Engineer or Surveyor in accordance with the certification form provided in the appendix. Deviations from the approved design may require additional analysis to insure the facilities function in accordance with the appropriate design criteria.

## 2.6 SITE PLANS

### A. General:

Prior to activation of any Public Utilities, a CRD for water and sewer improvements must be submitted and approved in accordance with the requirements specified in this chapter. Prior to issuance of a Certification of Occupancy, a site plan CRD for the entire development must be submitted with certifications as indicated herein.

### B. Submittal Requirements:

1. Three (3) sets of prints are required for review of all CRD's.
2. Reproducible mylar (3 mil minimum) must be provided for final approval.

### C. Public Utilities:

1. Public Utility CRD's are required for site plans that include any water or sewer improvements to be dedicated to the City
2. Required Information:
  - a. Information required in Section 2.3 for all public utilities.
  - b. As constructed details for meter vaults.

### D. Site Plan Construction Record Drawings (CRD):

1. The most current approved site plan must be provided with the following certification statement:

#### **CRD SITE PLAN CERTIFICATION**

##### General Site Plan

I hereby certify that the public improvements on these Construction Record Drawings "As-Built" are an accurate reflection of conditions as noted hereon and are correct to within the tolerances specified in the Public Facilities Manual and the onsite private improvements are in substantial conformity with the approved final site plan.

##### On Site Pavement Sections

The onsite typical pavement sections are consistent with the approved site plan design specifications and that standard pavement construction practices were followed.

BMP/Private Lake Detention

I certify that the SWMF has been constructed substantially in accordance with the approved plan and the design volume has been achieved.

Lot Grading

Lot grading has been provided in accordance with the performance standards and design criteria of the stormwater management regulations and other design standards established by the Public Works Director as necessary to assure positive lot drainage from the site and proper drainage in the area.

Firm Name: \_\_\_\_\_

Signature & Date: \_\_\_\_\_

Name, Title, License type & Number: \_\_\_\_\_

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2. Impoundment certification data as indicated in the appendix must either be provided on the CRD or as a separate certification.
  3. All public facilities must be clearly denoted, such that there is clear delineation between public and private facilities. The CRD for the public facilities must meet criteria in this chapter and include the appropriate certification statements.
  4. The site plan CRD's must show the entire approved plan with any public facility field changes reflected by strike-through and appropriate designation of the modification, in addition to the construction data as indicated herein. Any private facilities not in substantial conformance or not meeting the requirements in the as-built certification must be reflected by strike-through or be addressed by submission of a plan revision.