SECTION 5
STORMWATER SYSTEM ANALYSIS

General

This section describes the hydrologic and hydraulic analyses performed for the City's stormwater system. Specifically, the analysis was used to complete the following tasks:

- Identify data gaps in the City stormwater facility records
- Assist in identifying causes of observed historical flooding
- Identify potential flooding areas that have not been identified in the historical record
- Assist in developing projects to improve City stormwater facilities

As indicated in Section 4, Analysis Methodology, a detailed survey of the existing stormwater facilities was not performed as part of this project, and there were some limitations in data available to define existing pipe slopes, invert elevations, and open channel geometry in many areas. Section 4 lists the minimum analysis criteria that were used where information on the existing system was not available. In some areas, further data collection will be required to perform a more detailed hydraulic analysis of existing and proposed systems.

For purposes of this master plan, analyses have been made on those conveyance facilities which are considered necessary to convey significant local stormwater flows from drainage basins within the Sheridan Urban Growth Boundary (UGB).

Stormwater System Analysis

Overview

The following section discusses the system analyses performed for each of the major drainage basins. The drainage basins were divided into subbasins for the hydrologic analysis. Runoff from the 25-year event was analyzed for each subbasin using the hydrologic analysis methodology described in Section 4. The PCSWMM model applied the calculated runoff hydrograph for each subbasin to a single model node, which represents a point in the model at the end of pipe, to conduct the hydraulic analysis. Subbasins were delineated such that all the runoff from the subbasin enters a single pipe or ditch.

The hydraulic performance of both closed conduits and open channels was analyzed using the methodology described in Section 4. There are several locations within the existing system where there is a flow bifurcation, or splitting, for all flows or high flow situations only (i.e. high flow bypass). In these cases, the flow path during the 25-year storm was analyzed. PCSWMM places excess water volume is storage nodes in the cases where the system did not have the capacity to convey runoff from the 25-year event. An analysis of overflow paths at these locations is beyond the scope of this analysis. The portions of the system that were shown to be under capacity in the analysis are identified as problem areas.

Stormwater System Analysis Results

The stormwater system analysis identified several areas of the system where adequate capacity was determined to be deficient at the 25-year storm event. The model-identified system deficiencies are described below. Figures 5-1 and 5-2 show the locations of problems identified in the stormwater system analysis for the north and south basins, respectively. Table 5-1 shows the peak runoff for each basin from the 25-year design storm for the existing and future conditions.

Table 5-1
Peak Flows for Existing and Build-out Conditions by Drainage Basin

NORTH BASINS	Peak Basin Runoff (cfs)		
Basin	**Existing**	**Future**	**Increase (%)**
Cherry Hill	72.5	80.2	10.7%
Elm Street	103.1	119.5	15.9%
Evans Street	40.3	42.4	5.2%
Olive Street	66.7	81.6	22.3%
Viola Street	34.6	40.8	17.8%
Western Street	44.5	49.5	11.4%
Richard Street	59.1	64.7	9.6%
Orchard Avenue	57.6	65.7	14.0%
Industrial	40.8	60.5	48.4%
Rock Creek	25.8	25.8	0.0%
SOUTH BASINS	**Peak Basin Runoff (cfs)**		
Basin	**Existing**	**Future**	**Increase (%)**
Monroe Street	10.2	11.4	11.7%
Mason Street	8.3	8.3	0.0%
Water Street	2.1	2.2	3.9%
Morgan Street	3.0	3.2	4.0%
South Bridge Street	29.3	29.3	0.0%
Hope Court	10.2	11.9	17.2%
South	93.1	100.4	7.9%

Model-Identified System Deficiencies at Existing Conditions

<u>*Cherry Hill Basin*</u>

Deficiency Number: CH-X-1

Description: Minor storm piping near Blair Street and Bockes Loop is currently under capacity, possible surcharging under 25-year storm. Further detailed study is recommended.

Deficiency Number: CH-X-2

Description: Storm system at Yamhill Street and Cherry Hill Road may be under-capacity, possible surcharging under 25-year storm. Further detailed study is recommended.

<u>*Elm Street Basin*</u>

Deficiency Number: EL-X-1

Description: Existing 36-inch diameter culverts at Center Street, Hill Street along primary open channel conveyance are under-capacity, pipe surcharging causing ditch overtopping upstream.

Deficiency Number: EL-X-2

Description: The 12-inch and 18-inch diameter pipes running east on Yamhill Street to the 36-inch diameter storm drain system are undersized, causing minor surcharging.

Deficiency Number: EL-X-3

Description: Existing 36-inch diameter storm drain between Yamhill Street and East Main Street culvert inlet has minor surcharging at 25-year storm.

<u>*Evans Street Basin*</u>

Deficiency Number: EV-X-1

Description: Existing storm drain in Lincoln Street shows minor surcharging at 25-year storm. Further study is recommended.

Deficiency Number: EV-X-2

Description: Existing 24-inch diameter storm drain system in Washington Street shows significant surcharging from 25-year storm flows. Further study is recommended.

Deficiency Number: EV-X-3

Description: Existing storm drain in North Bridge Street shows minor surcharging at 25-year storm. Further study is recommended.

Olive Street Basin

Deficiency Number: OL-X-1

Description: The storm drainage system inlet and first 42-inch pipe downstream of the storm drainage inlet does not have capacity for the 25-year storm. Minor flooding likely during surcharging at system inlet.

Deficiency Number: OL-X-2

Description: The 36-inch diameter reach of pipe in Olive Street between Yamhill Street and the river outfall shows possible minor surcharging during 25-year storm.

Viola Street Basin

Deficiency Number: V-X-1

Description: The existing 24-inch diameter storm drain in Viola Street north of Sherman Street shows minor surcharging during 25-year storm.

Western Street Basin

Deficiency Number: W-X-1

Description: The existing drainage ditch overtops its banks during the 25-year storm.

Richard Street Basin

Deficiency Number: R-X-1

Description: The existing culvert under Richard Street is under capacity, drainage ditch behind culvert overtops its banks during the 25-year storm.

Deficiency Number: R-X-2

Description: The existing drainage ditch between railroad tracks and Richard Street overtops its banks during the 25-year storm.

Orchard Avenue Basin

No Existing Problems Identified.

Industrial Basin

No Existing Problems Identified.

Rock Creek Basin

No Existing Problems Identified.

South Bridge Street Basin

Deficiency Number: B-X-1

Description: The 36-inch diameter pipe from SE Harney Street to the river outfall is identified to be surcharging for existing conditions at the 25-year storm event.

Water Street Basin

Deficiency Number: B-X-1

Description: The 12-inch diameter storm drain from Mill Street to the river outfall has minor surcharging for existing conditions at the 25-year storm event.

Morgan Street Basin

Deficiency Number: B-X-1

Description: The 12-inch diameter storm drain from Mill Street to the river outfall has minor surcharging for existing conditions at the 25-year storm event.

South Basin

Deficiency Number: B-X-1

Description: The 30-inch diameter bypass storm drain line the inlet at the southerly City limits to the open channel south of Excel Court Mill Street shows significant surcharging for existing conditions under the 25-year storm.

Model-Identified System Deficiencies at Future Build-out Conditions

Additional deficiencies in the storm drainage system were identified when future development conditions (build-out) were applied to the stormwater model. These deficiencies are also shown on Figure 5-1.

Cherry Hill Basin

Deficiency Number: CH-F-1

Description: Existing 36-inch diameter culvert under Cherry Hill Road at Selby Lane does not have sufficient capacity to handle flows from future development upstream, surcharging and overtopping of road possible.

Orchard Basin

Deficiency Number: OR-F-1

Description: Existing ditch along north side of railroad tracks not have sufficient capacity to handle flows from future development upstream, including Industrial Basin flows entering Orchard Basin via drainage ditches.