

TECHNICAL MEMORANDUM



TM 3.3 – Updated Sub-basin Delineation

To: Heidi Lansdowne
City of Bend, Oregon
Engineering Division
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From: R. Dale Richwine - MWH

Prepared By: Chaithanya Vuppala – MWH
Dale Richwine - MWH

Reviewed by: Ian Lang - MWH

Copies: Paul Rheault – Bend
Michael Megee – Bend
Gordon Merseth – CaMES

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INTRODUCTION

The City of Bend, Oregon (City) has contracted with MWH Americas, Inc. (MWH) to develop a Collection System Master Plan for the current and future wastewater service areas within the Urban Growth Boundary (UGB) and the planned Urban Area Reserve (UAR). MWH developed a calibrated flow model using InfoSWMM during Task 1 of this project. In this task, the sub-basins were delineated for allocation of flows from each area to the model. Additional information has been assembled during Task 2 and Task 3 for this study. This additional information has been used to update the Task 1 sub-basins. This Technical Memorandum (TM) 3.3 describes the updated delineation of model sub-basins that are being used for the system modeling in the Collection System Master Plan.

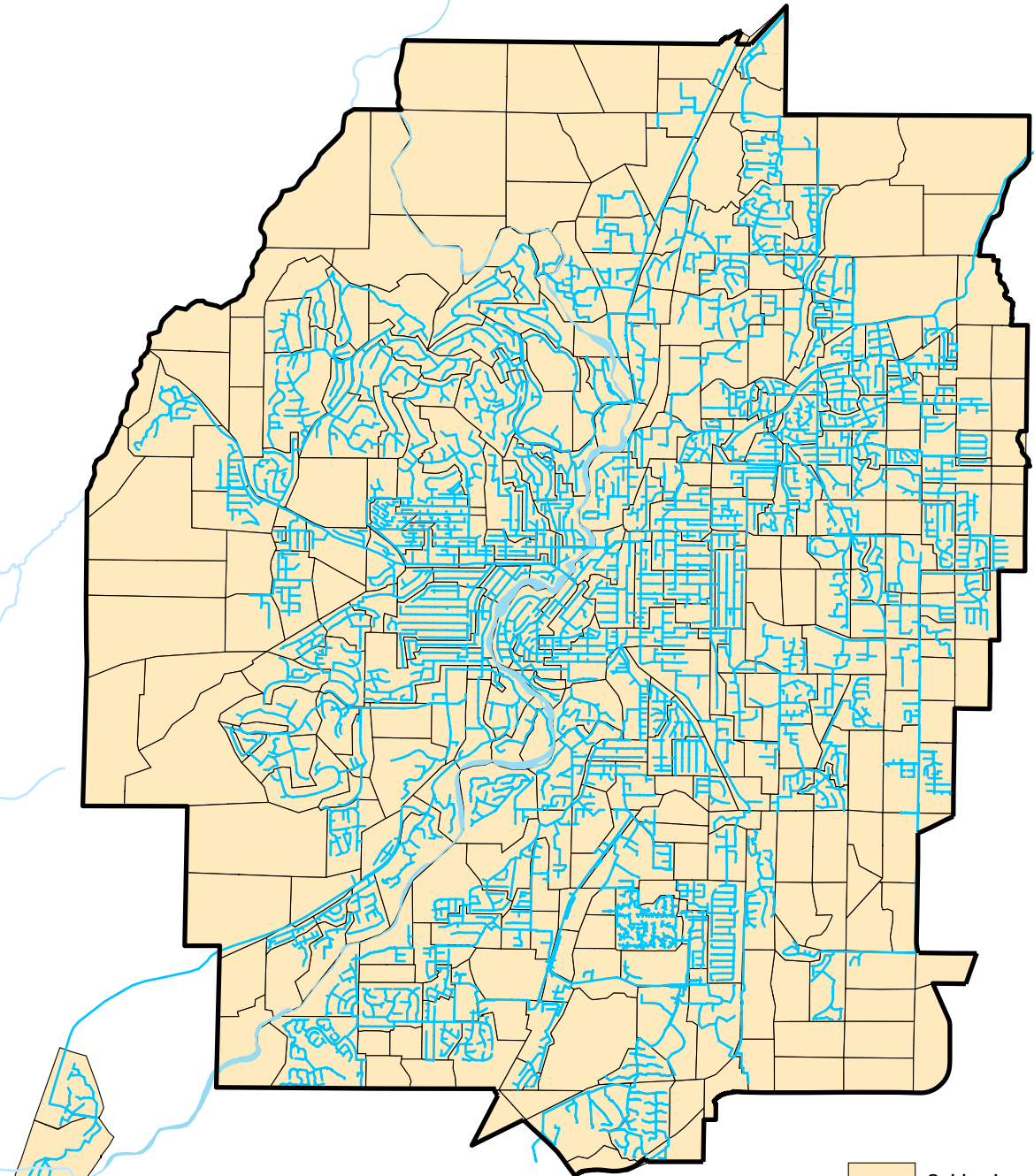
SUB-BASIN DELINEATION




As part of the model build that was done in Task 1, sub-basins were delineated within the collection system to assist in development of model loads and defining where those loads will enter the modeled network. Each sub-basin represents an area draining to a single manhole in the modeled network or several manholes in close proximity. Sub-basins were delineated within the existing collection system in a logical manner to meet the needs of developing and calibrating the hydraulic model. Sub-basins were also delineated for undeveloped or unsewered areas inside of the Urban Growth Boundary (UGB) and the Urban Area Reserve (UAR) boundary. In general, sub-basins within the existing collection system were delineated to be between 30 and 50 acres in size. The Task 1 sub-basin delineation is shown in *Figure 1*.

In Task 3, the sub-basins that were delineated in Task 1 were reviewed to ensure that they would still provide the necessary distribution of flow for modeling of the current and future systems. There have been many developments within the City and on the project since the model was developed in Task 1. The developments include:

- Further development of the Concept Plan for Juniper Ridge
- Acceptance of the City of the development plans for the Tetherow (Formerly Cascade Highlands) destination resort on the west side of the City
- The development of a concept plan for a North Interceptor to service the north areas of the City from Juniper Ridge to Aubrey Glen. This plan includes trunk sewers to serve basins on the northern UAR areas
- Development of a planning concept for Section 11 in the southeast area of the City

Most of these developments were outside of the UGB, but within the UAR. Modifications to the sub-basins affected by these developments were required to provide a means for sizing of the proposed North and SE Interceptors as well as new area trunk sewers. The areas where major updates to the sub-basins were made are shown in *Figure 2*.

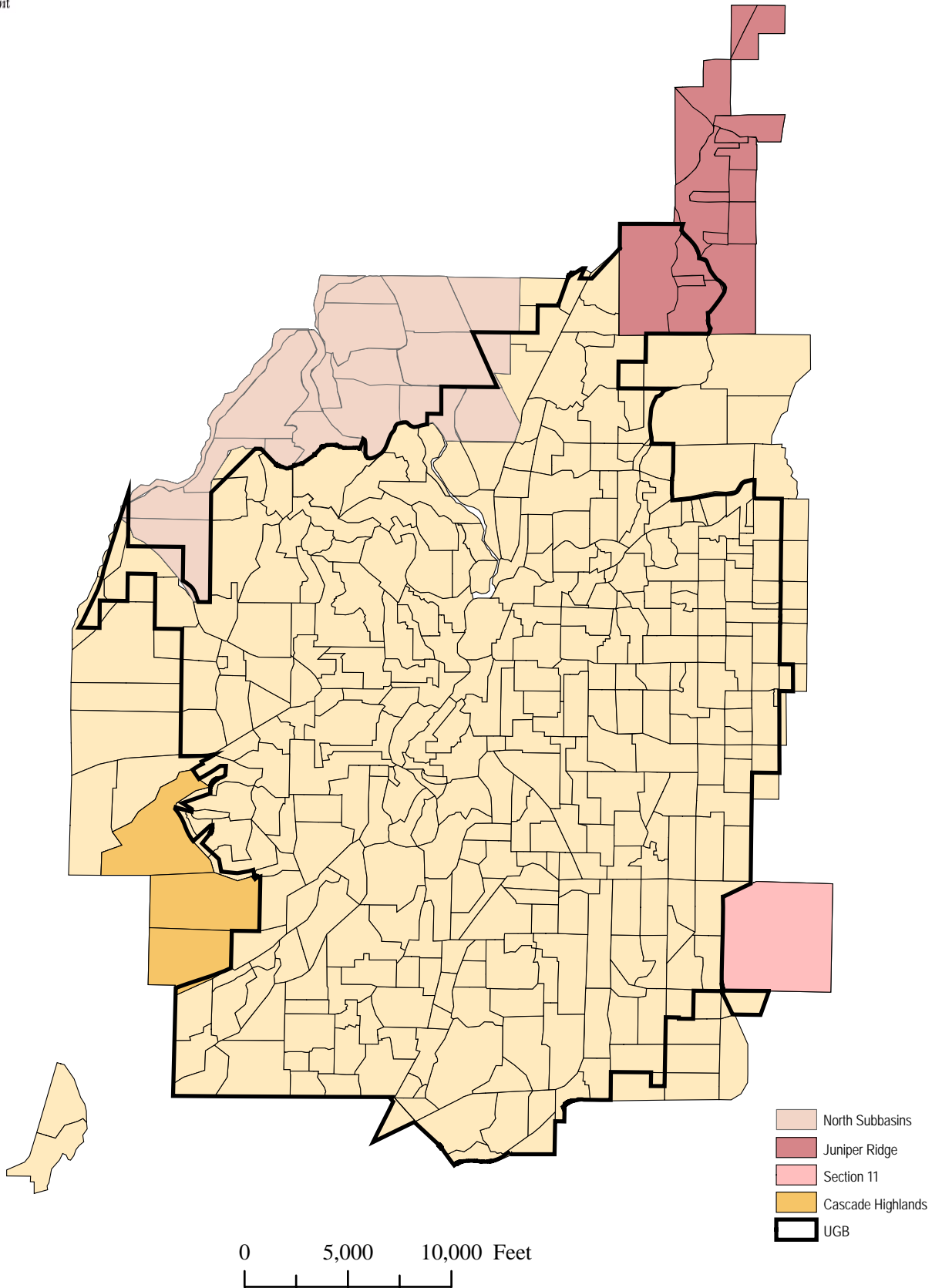


-  Subbasin
-  UAR Boundary
-  Sewers

0 5,000 10,000 Feet

Note : Sewer System as of May 2005

Figure 1
Preliminary Sub-basin Delineation



Juniper Ridge

Juniper Ridge is a new development planned on the north area of the City. This development will include residential, light industrial and a possible future educational facility. No definitive layout of the area has been done. This is a fairly large area so it was important to determine flows to the greatest level of refinement possible. For this reason, the Juniper Ridge sub-basins were developed using the “Juniper Ridge Concept Plan” dated August 2005.

The Juniper Ridge Concept Plan provided a figure of the proposed zoning of the parcels in Figure 1 of the Concept Plan. This figure was used to develop sub-basins by zoning type. This will allow for the development of flows from each sub-basin for input into the model based on the unit flows developed in TM 3.1 and the acreage of each defined sub-basin.

Tetherow

The Tetherow is a destination resort that will occupy three large parcels on the west side of the City. The development plan for this resort has been approved. The development plan included a “Conceptual Master Plan Sanitary Sewer System”. This sanitary sewer system plan had flows generated in the development discharged to the existing sanitary system at three separate points. The plan also provided estimated flows for the resort.

The Tetherow resort will be treated as a single sub-basin in the model. The flows provided in the resorts sanitary sewer system plan will be distributed to each of the three manholes in the existing collection system based on the relative percentage served by each of the three inputs.

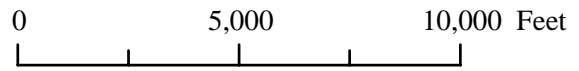
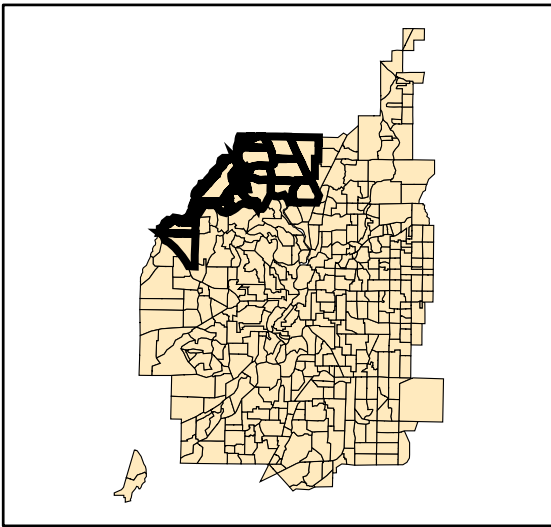
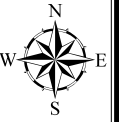
North Interceptor Trunk Sub-basins







The North Interceptor concept was developed in the North Area Interceptor Evaluation Report developed in Task 2 of this study. This concept took an existing design for an interceptor in the north area and expanded it to also include the areas between Highway 97, the Deschutes River and west of the Deschutes River to Awbrey Glen. Included in this concept plan were trunk sewers and drainage basins for providing service to the UAR parcels on the north side of the City. The trunk sewers and the respective drainage basin for each trunk sewer are shown in *Figure 3*.

The existing parcels in the UAR are relatively large. In some cases, these parcels included more than one of the proposed drainage basins. Therefore, parcels that crossed the drainage basin boundaries were divided into separate sub-basins within each drainage basin. If the parcel was fully contained within a single drainage basin, it was not divided and was made a sub-basin.

Section 11

Section 11 is a nearly one square mile area located on the southeast edge of the existing UGB. A small portion of this section is owned by Deschutes County and receives sewer service from the City. The wastewater generated in the County buildings is pumped by a private County pump



-  North Interceptor-Part A
-  North Interceptor-Part B
-  North Interceptor Part C
-  Proposed Trunk Sewers
-  North Subbasins
-  Subbasins

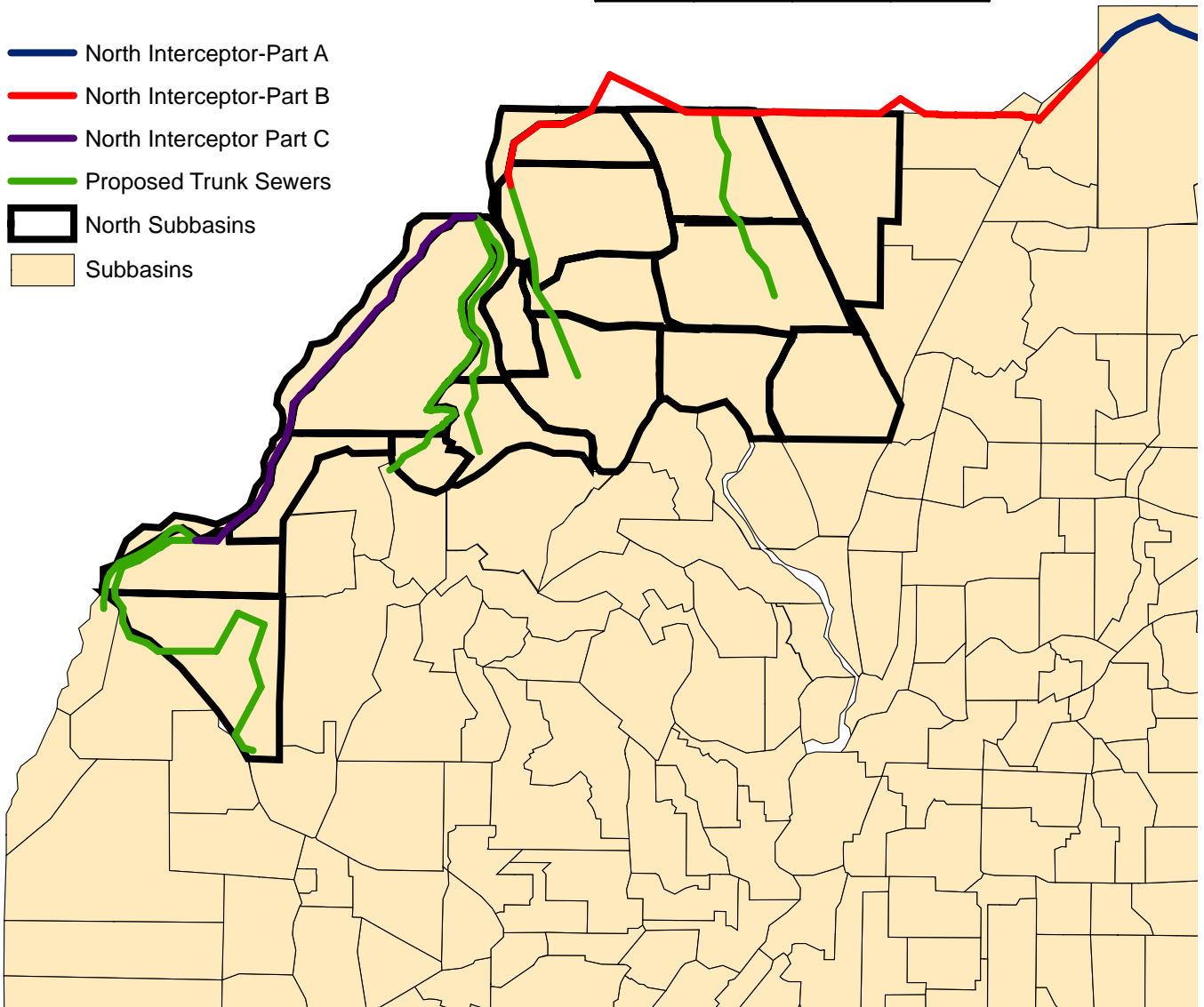


Figure 3
Northwest Proposed Drainage Basins

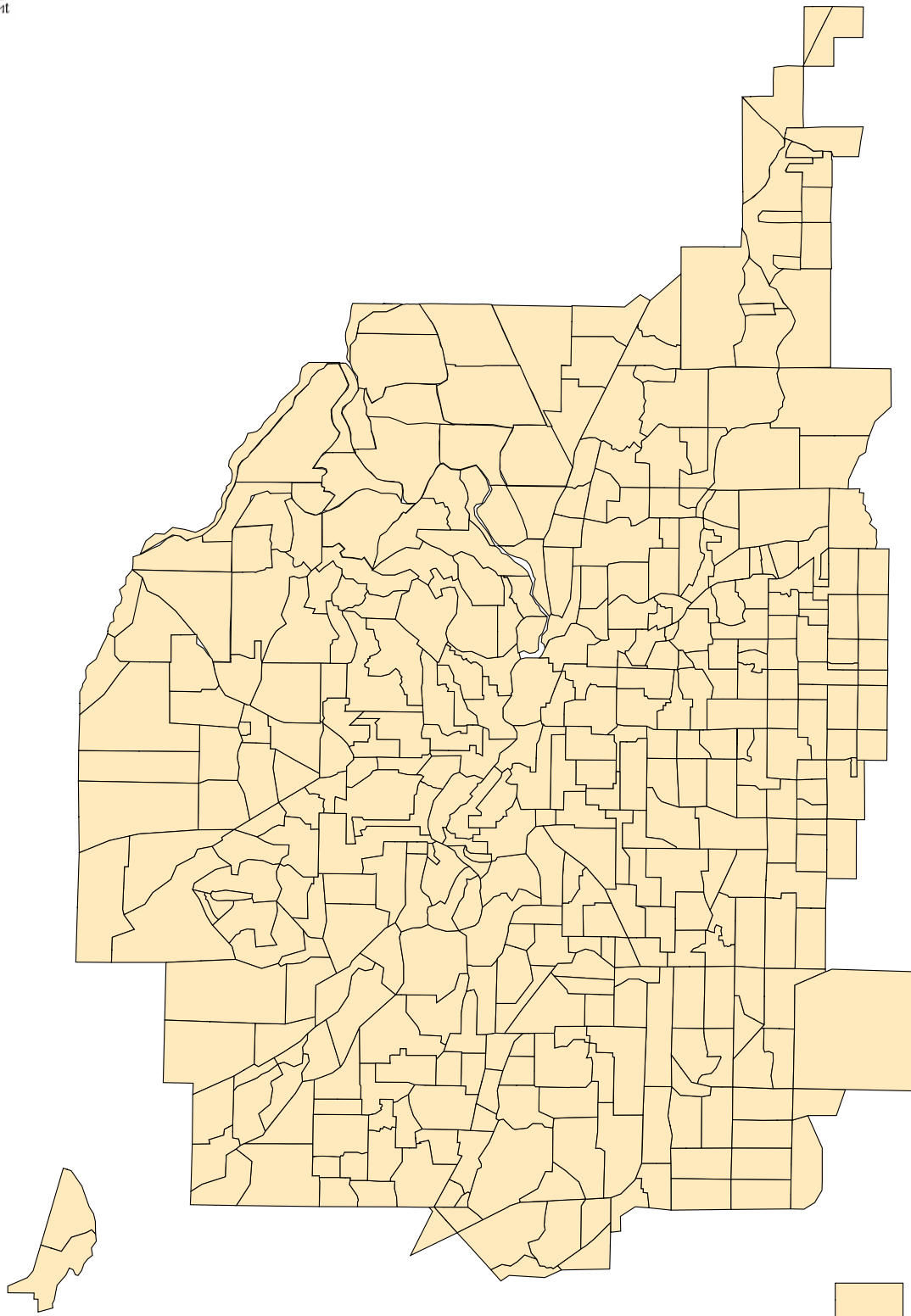


station to an existing force main used by the Camden, Ridgewater No. 1 and Ridgewater No. 2 pump stations.

Conceptual planning information for the Section 11 parcel was provided. This information outlined the acres of residential and commercial development as well as parks and schools. Flows for this area were developed using the planning criteria summarized in TM 3.1. The Section 11 parcel will not be broken into sub-basins as the actual development plan is not available. Flow from this area will be input as a single source into the SE interceptor.

MASTER PLAN SUB-BASINS

The sub-basins used to model the future development scenarios were defined based on the original Task 1 sub-basins with the modifications as described above. The final delineation of sub-basins used in the Collection System Master Plan is shown in *Figure 4 - Task 3 Sub-basin Delineation*.



0 5,000 10,000 Feet