

**FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PHOENIX, ARIZONA**



**METRO PHOENIX ADMP
LEVEL III REPORT
FCD 2004C040**

DRAFT

Prepared by:



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3.2 Hydrologic Models for Recommended Plan

Wood/Patel prepared the existing condition models and EEC prepared the proposed condition models for the Recommended Plan. EEC prepared 10-year models for the two areas, Cave Creek and Downtown. EEC used the same modeling techniques and parameters that were used in the existing condition models.

For a complete understanding of the hydrology, please see "Hydrologic Study Report for Metro Phoenix Area Drainage Master Study/Plan" by Wood/Patel (October 2006). There were custom values used for certain parameters that are explained in depth in that report. The following paragraph summarizes the overall hydrologic modeling approach.

The hydrologic modeling parameters were as follows:

- Used the U.S. Army Corps of Engineers' Flood Hydrograph Package (HEC-1)
- Used the new MCUHPI procedures from DDMSW 3.2.6.
- NOAA Atlas 2 was used for the design precipitation
- Soil parameters were provided by FCDMC in GIS format
- Land Use data was provided by FCDMC in GIS format.
- Green and Ampt Rainfall Loss Method
- Surface Retention Parameter (IA) were custom values (see Wood/Patel report for explanation)
- Impervious Area Percentage (RTIMP) were custom values (see Wood/Patel report for explanation)
- Storm Drain Diversions were routed using Kinematic Wave routing
- Cumulative Area Computation Data is reset downstream of basins.

The following are the basic assumptions made by EEC within the proposed condition models. These are the assumptions made for the proposed condition models that vary from the Wood/Patel report.

The COP has an existing 2-year storm drain system in place. The overall goal is to take advantage of this system and increase it to a 10-year system to protect Cave Creek and Downtown. It is assumed the existing storm drains are able to intercept flow until it reaches capacity. Currently, the existing storm drains have only 2-year interception capabilities. There will need to be additional inlets for the existing storm drains to intercept the 10-year flows.

Cave Creek Recommended Plan

The Cave Creek Recommended Plan consists of two proposed retention basins and proposed storm drains. The retention basins are sized based upon sketches (See Appendix for plan sheets) and the stage-storage-discharge relationships are based on the sketches. The basic assumption made is that all proposed storm drains will collect and drain the associated drainage areas completely.

The existing storm drains have an associated drainage area but they may not collect all the flow. The proposed laterals for these drainage areas should still be sized for the 10-year flows even if the mainline is undersized. In locations where the existing storm drain

does not have capacity for the 10-year flows, there are diversions in the model for the surface flows. These flows are diverted to the next sub-basin until they are collected in a proposed storm drain or a storm drain that has additional capacity.

In certain cases, there is an existing and proposed storm drain in the same street and has the same associated drainage area. It will be the responsibility of the design engineer to study the interaction between the two storm drains, existing and proposed, and determine the flow in the individual storm drains. The peak discharges are given and the drainage areas are determined. To size the proposed storm drain, EEC used the difference between the total flow and the existing capacity. The final design should verify this size, if the existing pipe is not able to collect the full flow, the proposed will need to be upsized.

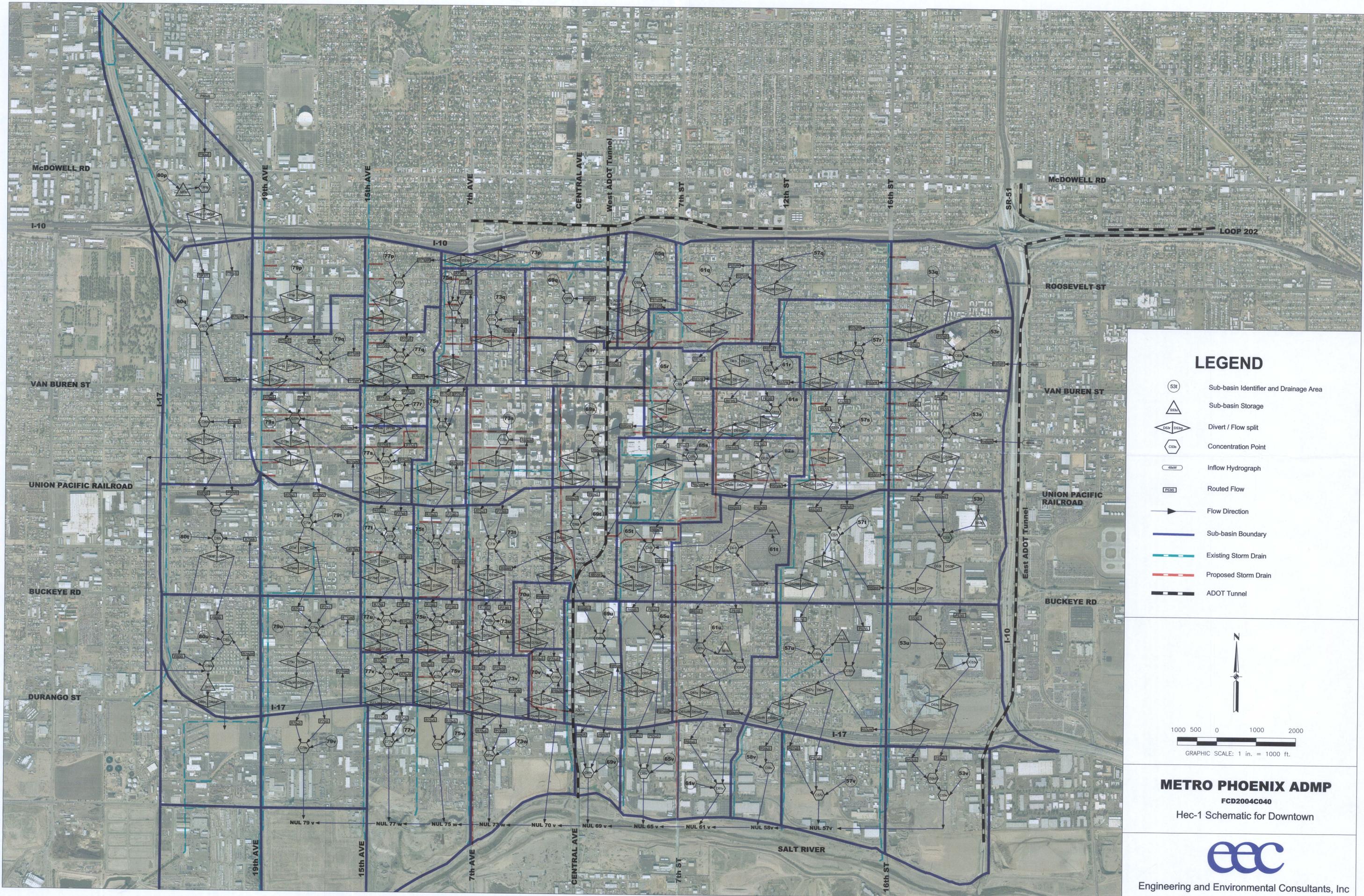
Downtown Recommended Plan

The Downtown Recommended hydrologic model included all storm drains within the Recommended Plan. The basic assumption made is that all proposed storm drains will collect and drain the associated drainage areas completely. The existing storm drains have an associated drainage area but they may not collect all the flow. The proposed laterals for these drainage areas should still be sized for the 10-year flows even if the mainline is undersized.

The Downtown Recommended Plan assumed laterals of 100' feet long (and 30" storm drain) will be necessary to collect the 10-year flows. It was not within the scope to size the laterals and determine the lengths of the laterals so those will need to be part of the final design.

There is one key assumption made that should be noted. It is that the McDowell Road Storm Drain (in the Cave Creek Area) is in place. The McDowell Road storm drain cuts off the flows to the 15th and 19th Avenue existing storm drains and removes the drainage north of McDowell. So it is assumed that these pipes have no flow at I-10.

The final assumption



LEGEND

- Sub-basin Identifier and Drainage Area
- Sub-basin Storage
- Divert / Flow split
- Concentration Point
- Inflow Hydrograph
- Routed Flow
- Flow Direction
- Sub-basin Boundary
- Existing Storm Drain
- Proposed Storm Drain
- ADOT Tunnel



1000 500 0 1000 2000
 GRAPHIC SCALE: 1 in. = 1000 ft.

METRO PHOENIX ADMP
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 Hec-1 Schematic for Downtown



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