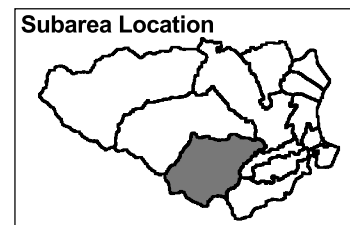
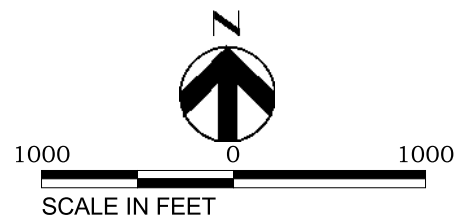


**LEGEND**

- Drainage Subarea Boundary
- Drainage Subbasin Boundary
- Drainage Network
- Streets
- 31 Subbasin Identification Number



Source: HEC-HMS CRWR PRE-PRO, ArcView Version 4

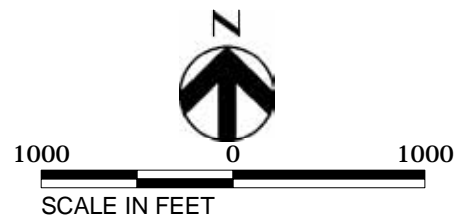
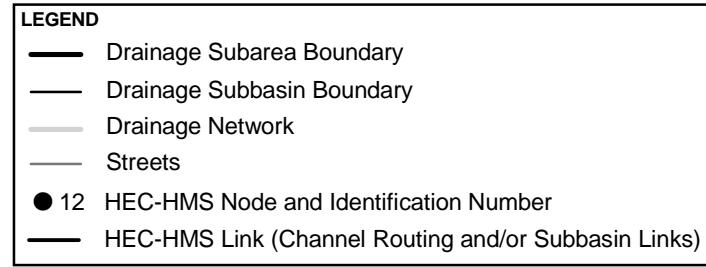
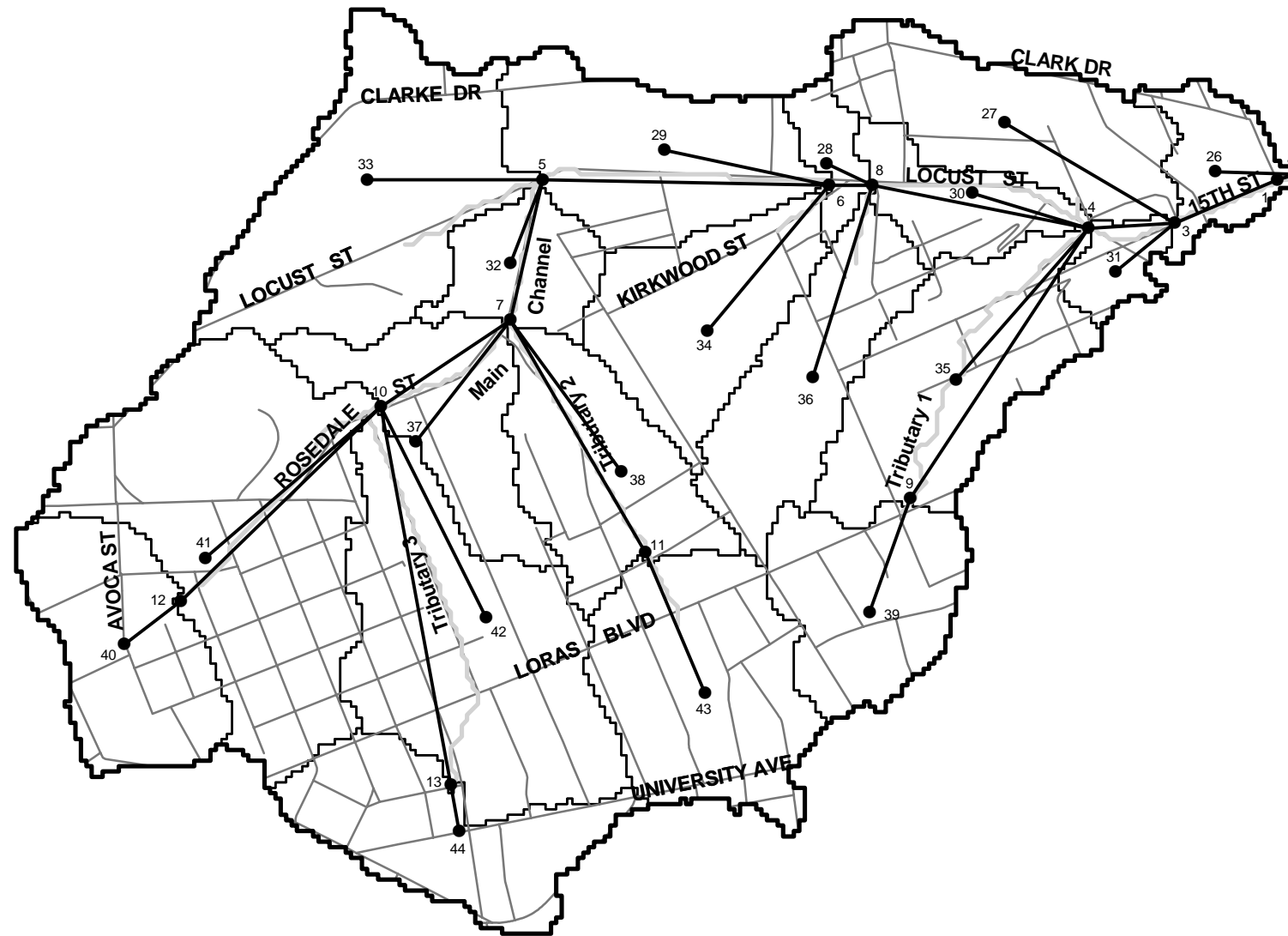
## Locust Street Drainage Subarea HEC-HMS Subbasin Delineation



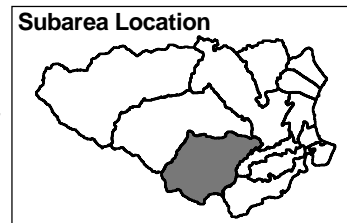
**Drainage Basin Master Plan**  
City of Dubuque, Iowa

Date  
FALL 2001

Figure  
4-14



- Notes:
1. Location of peak discharges defined by HEC-HMS node identification number.
  2. HEC-HMS links represent combining runoff from adjacent subbasins and/or routing runoff through a channel section.



Source: HEC-HMS CRWR PRE-PRO, ArcView Version 4

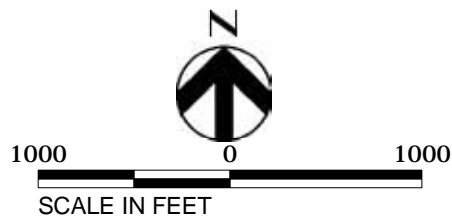
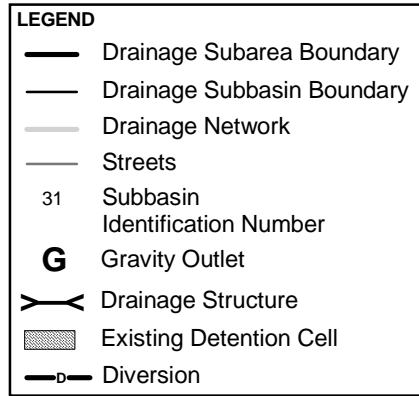
## Locust Street Drainage Subarea HEC-HMS Model Schematic



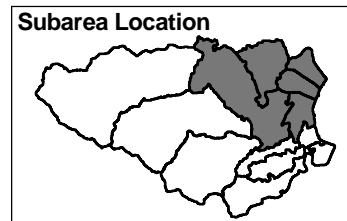
**Drainage Basin Master Plan**  
City of Dubuque, Iowa

Date  
FALL 2001

Figure  
4-15



- Notes:
1. Central Business District North Subarea includes Washington, Windsor, Hamilton, Dock, and Upper Kerper.
  2. Hamilton and Dock Subareas divert into 16th Street Detention Cell when the Mississippi River is at stage 603.5 and 600.5 respectively.



Source: HEC-HMS CRWR PRE-PRO, ArcView Version 4

## Central Business District-North Drainage Subareas HEC-HMS Subbasin Delineation

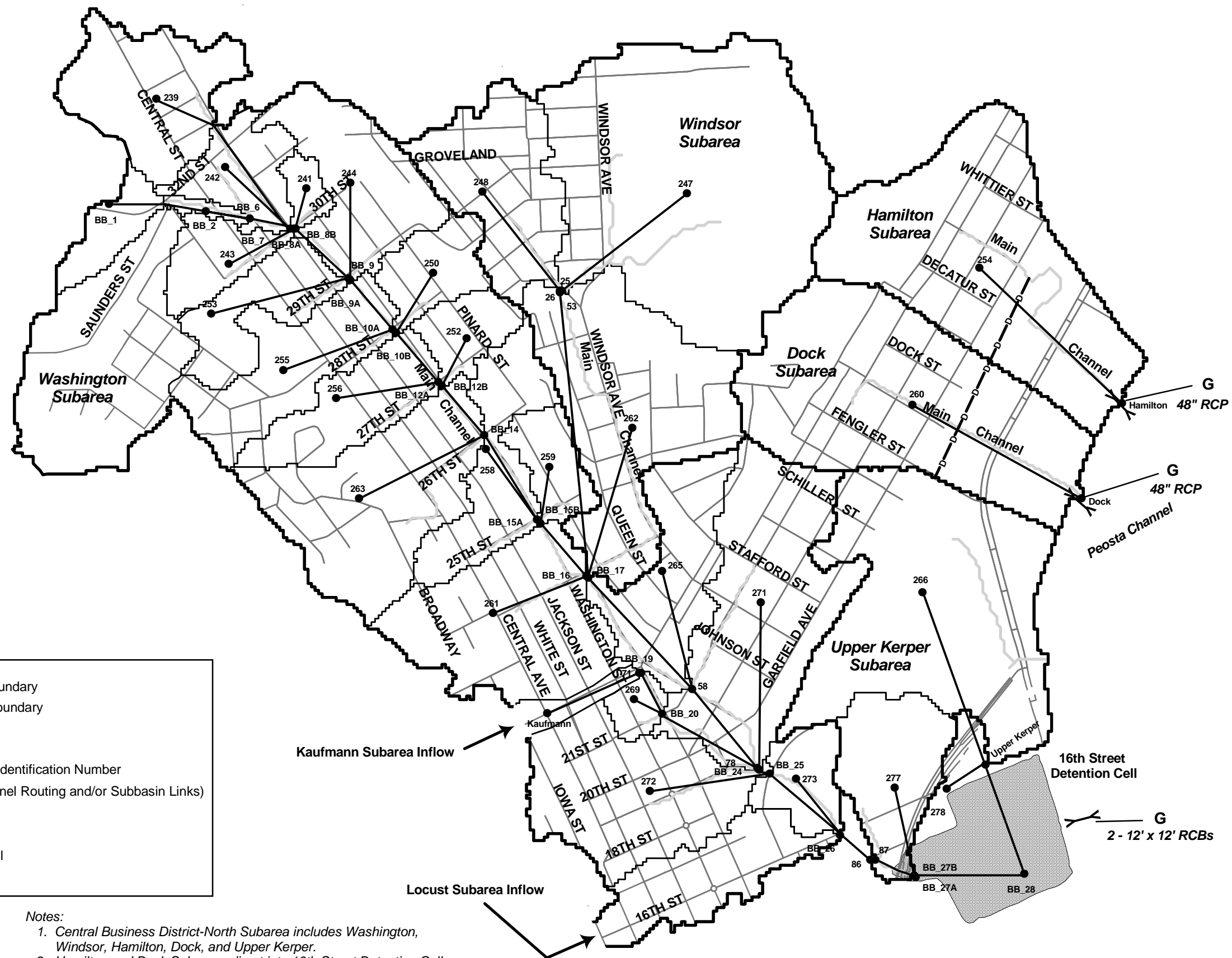


**Drainage Basin Master Plan**  
City of Dubuque, Iowa

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FALL 2001

Figure  
4-16

Layout: Central Business District North HEC-HMS Model Schematic  
ENVIRO/CITY\_OF\_DUBUQUE/007-134\_stormwater/GIS\_MODELING/DOWNTOWN/REPORT\_fall-2001.APR

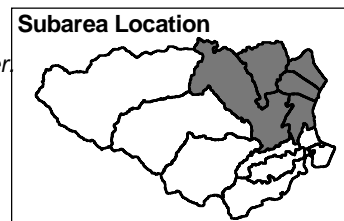


**LEGEND**

- Drainage Subarea Boundary
- Drainage Subbasin Boundary
- Drainage Network
- Streets
- 12 HEC-HMS Node and Identification Number
- HEC-HMS Link (Channel Routing and/or Subbasin Links)
- G Gravity Outlet
- Y Drainage Structure
- Existing Detention Cell
- Diversion

**Notes:**

1. Central Business District-North Subarea includes Washington, Windsor, Hamilton, Dock, and Upper Kerper.
2. Hamilton and Dock Subareas divert into 16th Street Detention Cell when the Mississippi River is at stage 603.5 and 600.5 respectively.
3. The nodes labeled BB\_XX coincide with the XP-SWMM model nodes.
4. Location of peak discharges defined by HEC-HMS node identification number.
5. HEC-HMS links represent combining runoff from adjacent subbasins and/or routing runoff through a channel section.
6. HEC-HMS model was used to route hydrographs to the Bee Branch storm sewer trunk line. XP-SWMM was used to combine and route hydrographs along the trunk line.



Source: HEC-HMS CRWR PRE-PRO, ArcView Version 4

## Central Business District-North Drainage Subareas HEC-HMS Model Schematic

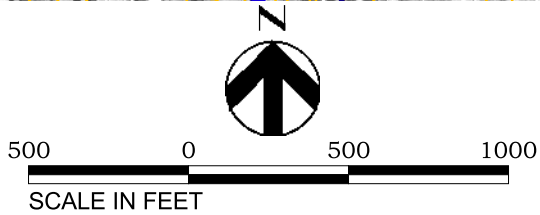
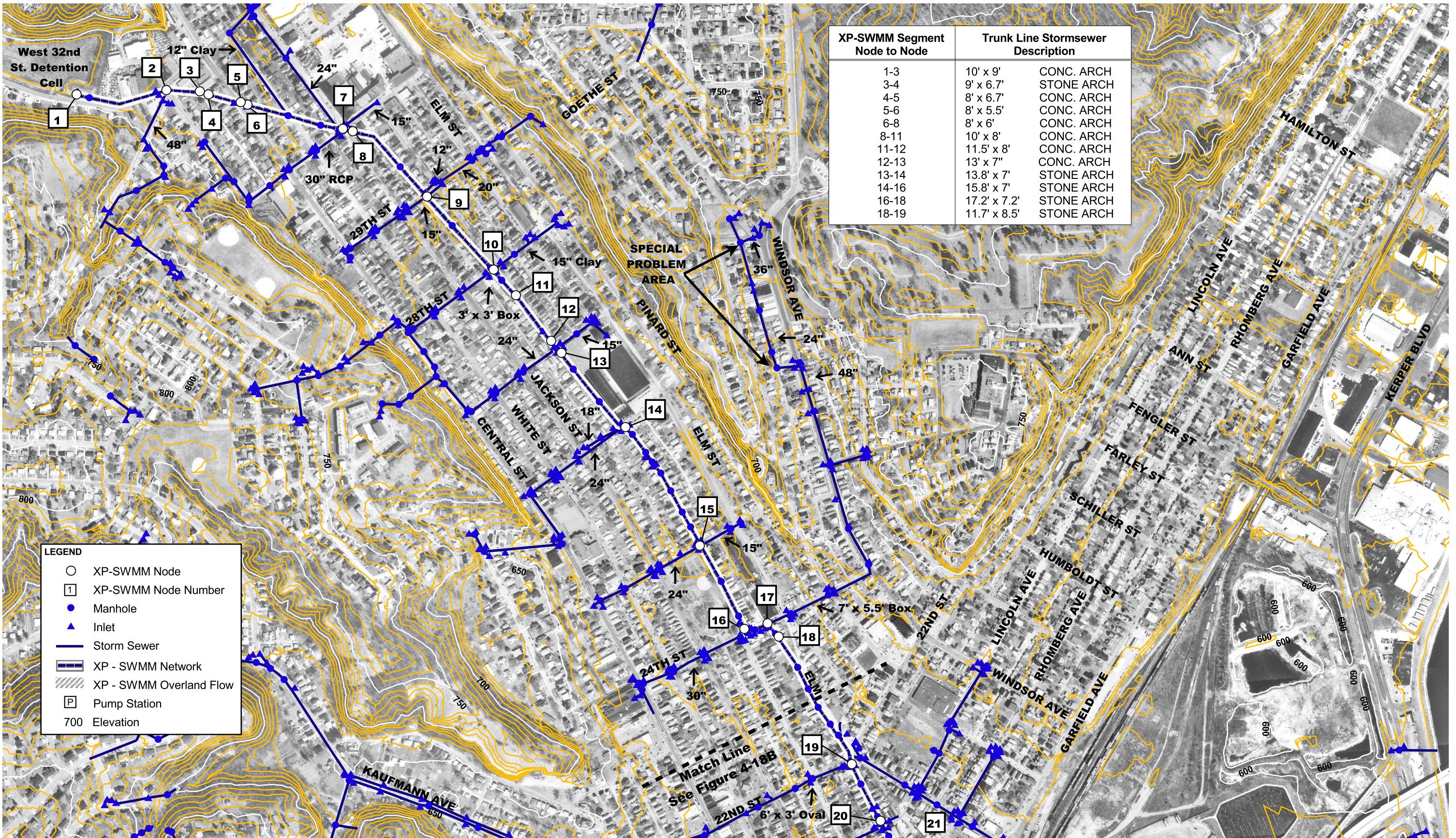


**Drainage Basin Master Plan**  
City of Dubuque, Iowa

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FALL 2001

Figure  
4-17

Layout: XP-SWMM Model Schematic (1 of 2)  
ENVIRO\CITY\_OF\_DUBUQUE\007-134\_stormwater\GIS\_MODELING\Downtown\dwrtnw\_swmm\_10-22-01.APR



**HDR**  
HDR Engineering, Inc.

Source: Dubuque Area Geographic Information System (DAGIS), dated May 2000, Aerial Photography, dated 1997

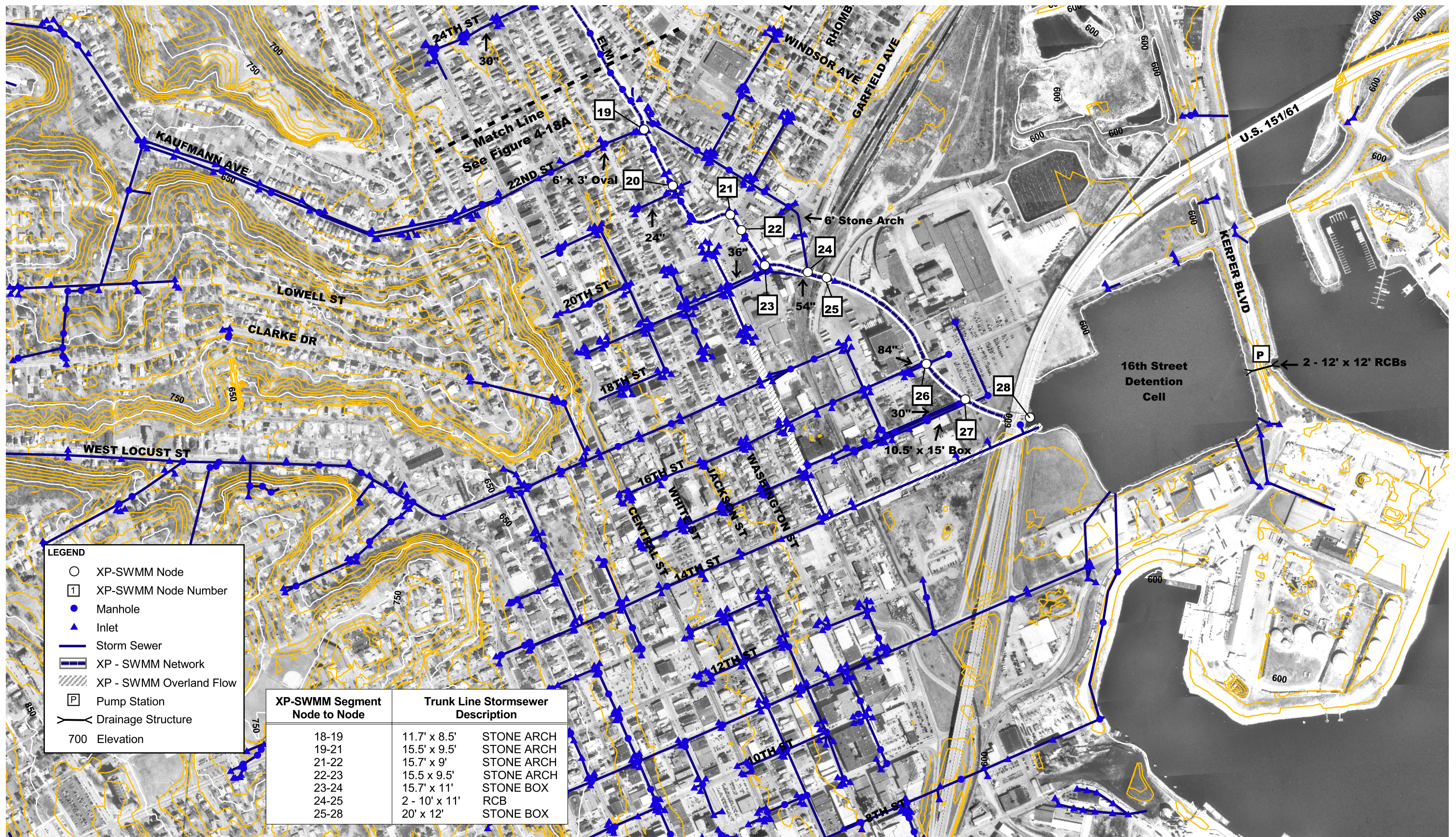
**Washington Street Subarea  
Bee Branch Storm Sewer Trunk Line  
XP-SWMM Model Schematic (1 of 2)**

**Drainage Basin Master Plan  
City of Dubuque, Iowa**

Date  
FALL 2001

Figure  
4-18A

Layout: XP-SWMM Model Schematic (2 of 2)  
ENVIOR/CITY\_OF\_DUBUQUE/007-134\_stormwater/GIS\_MODELING/Downtown/dwntwn\_swmm\_10-22-01.APR



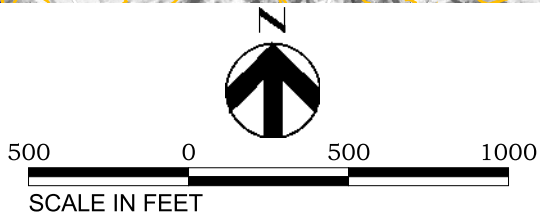
**LEGEND**

- XP-SWMM Node
- 1 XP-SWMM Node Number
- Manhole
- ▲ Inlet
- Storm Sewer
- XP - SWMM Network
- ▨ XP - SWMM Overland Flow
- P Pump Station
- Y Drainage Structure
- 700 Elevation

| XP-SWMM Segment<br>Node to Node | Trunk Line Stormsewer<br>Description |            |
|---------------------------------|--------------------------------------|------------|
| 18-19                           | 11.7' x 8.5'                         | STONE ARCH |
| 19-21                           | 15.5' x 9.5'                         | STONE ARCH |
| 21-22                           | 15.7' x 9'                           | STONE ARCH |
| 22-23                           | 15.5 x 9.5'                          | STONE ARCH |
| 23-24                           | 15.7' x 11'                          | STONE BOX  |
| 24-25                           | 2 - 10' x 11'                        | RCB        |
| 25-28                           | 20' x 12'                            | STONE BOX  |

**Notes:**

1. XP-SWMM nodes have been defined where pipe size or slope changes, or at tributary junctions.
2. Overland flow path between XP-SWMM Nodes 1 to 20 are assumed to be the same as the trunk line storm sewer. Overland flow path between XP-SWMM Nodes 20 to 28 are defined by an alternative overland flow path.
3. 16th Street Detention Cell pump station consists of 2 - 90,000 gpm pumps and 1 - 20,000 gpm pump.

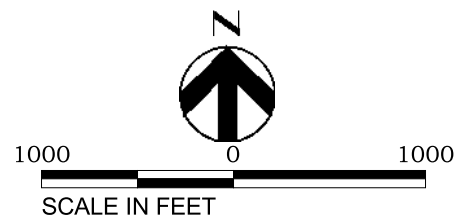
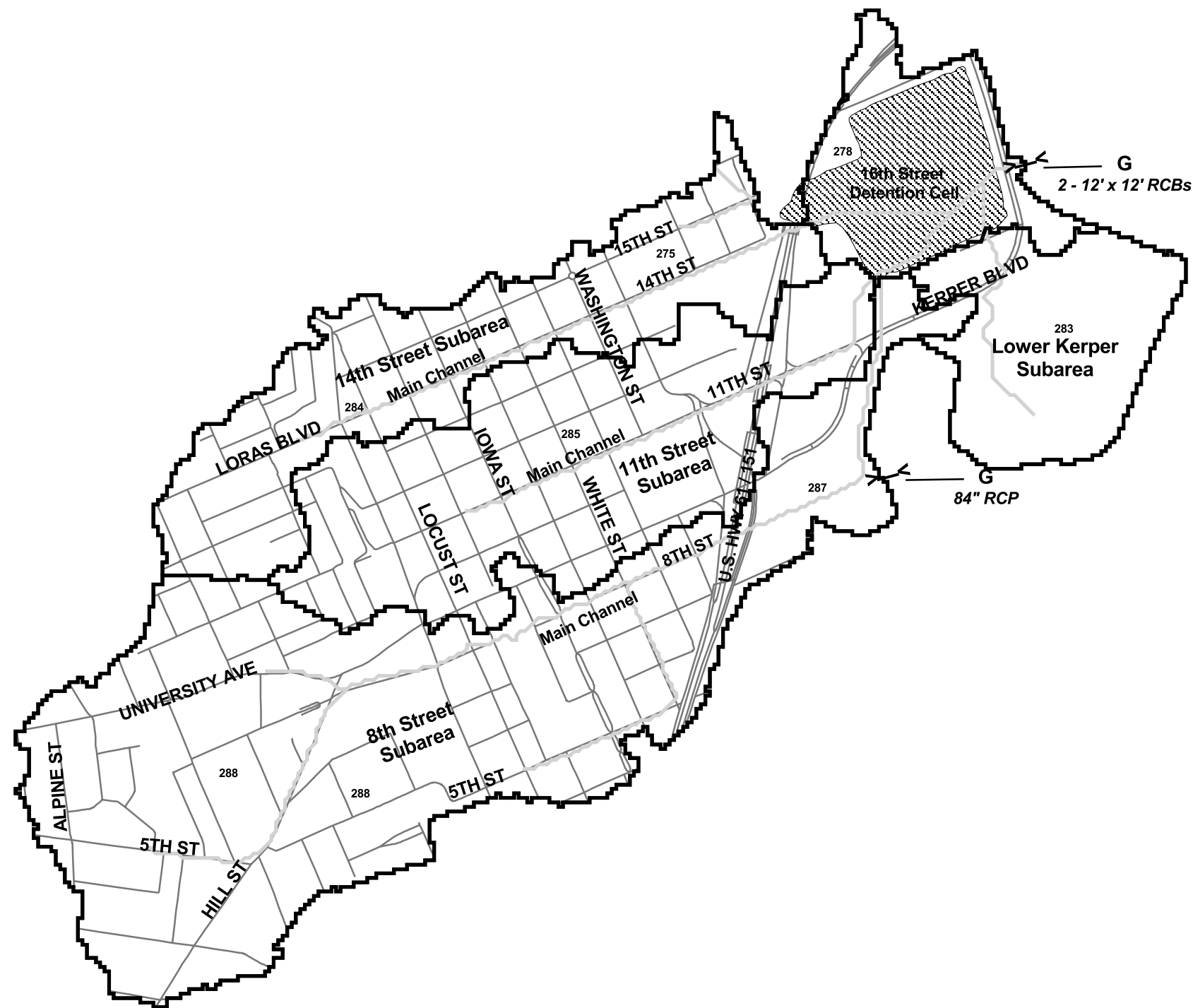
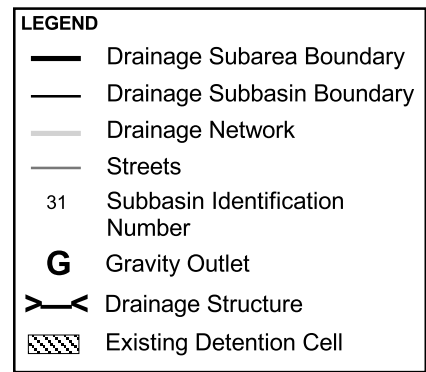


Source: Dubuque Area Geographic Information System (DAGIS), dated May 2000, Aerial Photography, dated 1997

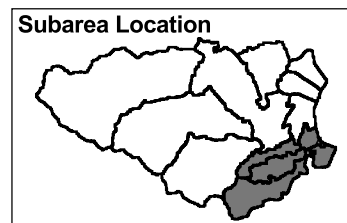
**Washington Street Subarea  
Bee Branch Storm Sewer Trunk Line  
XP-SWMM Model Schematic (2 of 2)**

**Drainage Basin Master Plan**  
City of Dubuque, Iowa

|        |           |
|--------|-----------|
| Date   | FALL 2001 |
| Figure | 4-18B     |



- Notes:
1. Central Business District Subarea includes 8th, 11th, and 14th Street Subareas.
  2. 8th Street Subarea diverts into 16th Street Detention Cell when Mississippi River at stage 598.5.



Source: HEC-HMS-PRE-PRO, ArcView Version 4

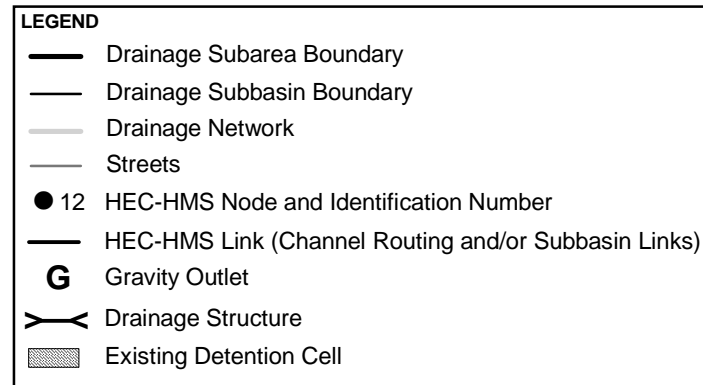
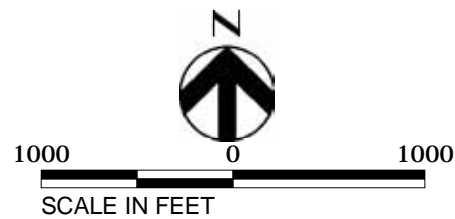
## Central Business District Drainage Subareas HEC-HMS Subbasin Delineation



**Drainage Basin Master Plan**  
City of Dubuque, Iowa

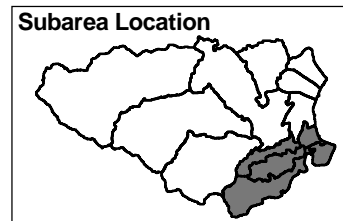
Date  
FALL 2001

Figure  
4-19



**Notes:**

1. Central Business District Drainage Subarea includes 8th, 11th, and 14th Street Subareas.
2. 8th Street Drainage Subarea diverts into 16th Street Detention Cell when Mississippi River at stage 598.5.
3. Location of peak discharges defined by HEC-HMS node identification number.
4. HEC-HMS links represent combining runoff from adjacent subbasins and/or routing runoff through a channel section.



Source: HEC-HMS CRWR PRE-PRO, ArcView Version 4

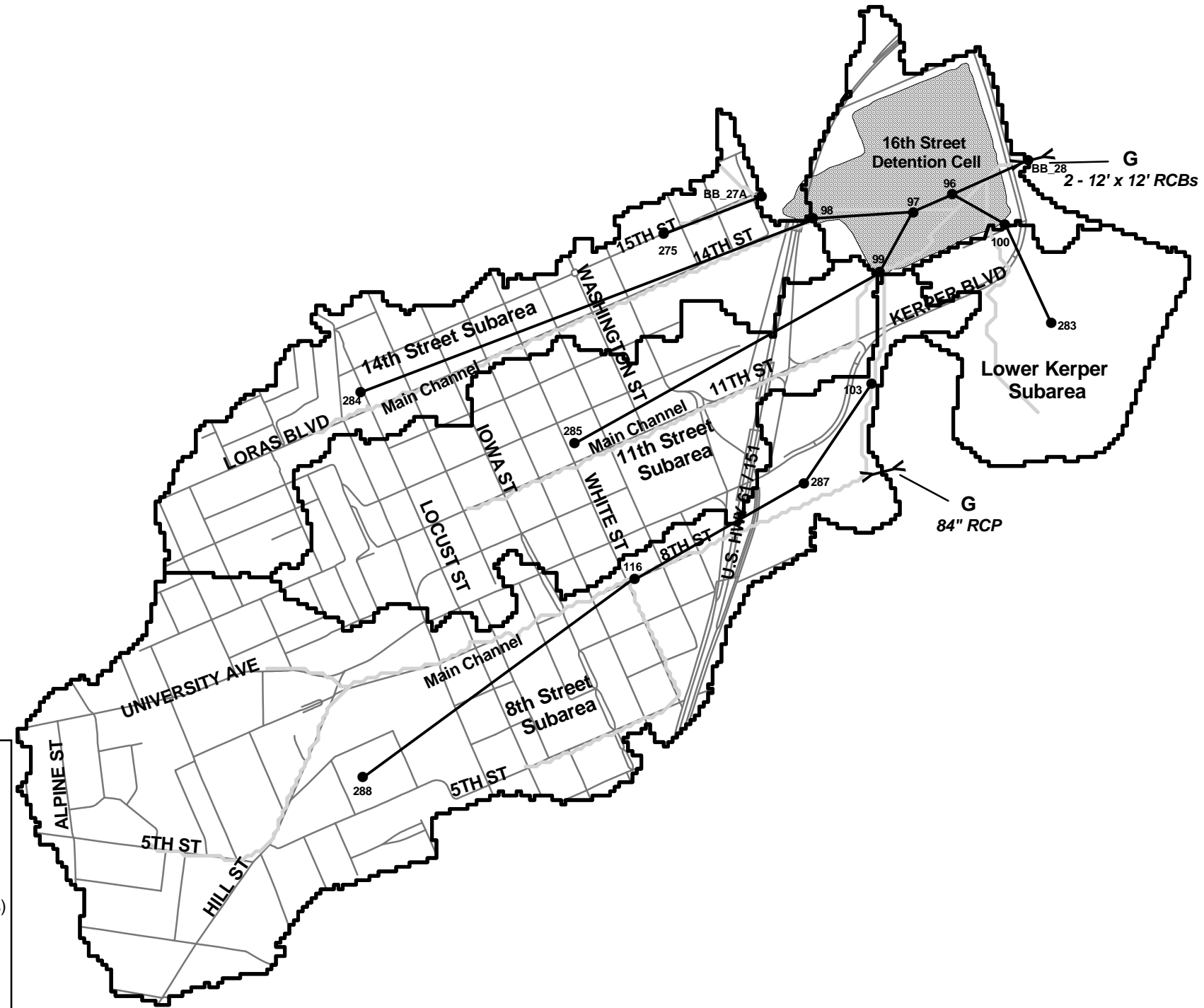
**Central Business District Drainage Subareas  
HEC-HMS Model Schematic**

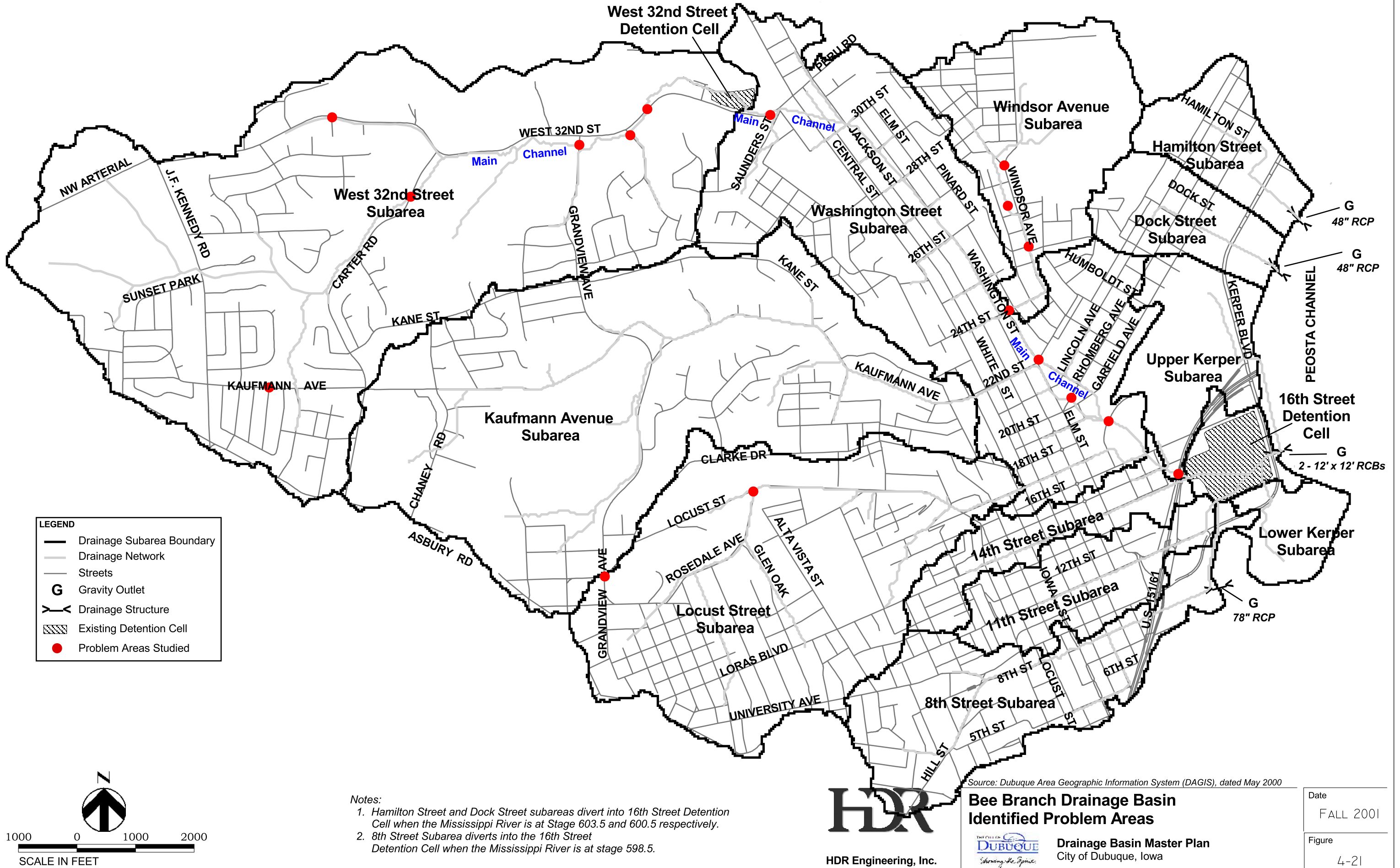


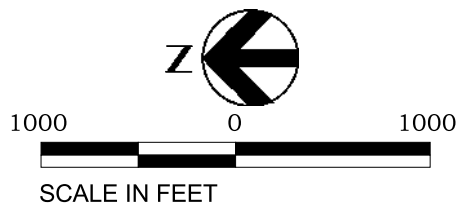
**Drainage Basin Master Plan**  
City of Dubuque, Iowa

Date  
FALL 2001

Figure  
4-20







- Notes:
1. Flooding depths shown are peak depths for the 100-year flood with West 32nd Street Subarea Alternative W32-5 improvements and a flood control channel constructed from 16th Street Detention Cell to 24th Street.
  2. Inundated area shown represents flooding from the Bee Branch storm sewer trunk line only. Flooding from tributary subareas are not included.



Source: Dubuque Area Geographic Information System (DAGIS), dated May 2000, Aerial Photography, 1997

## Washington Street Drainage Subarea West 32nd Street Improvement Impacts

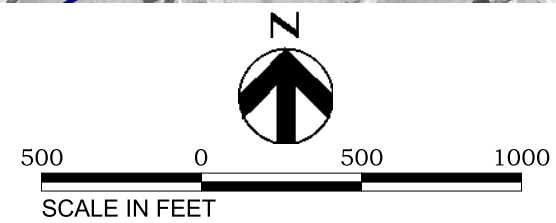


Drainage Basin Master Plan  
City of Dubuque, Iowa

Date  
FALL 2001

Figure  
4-22

Layout: Proposed Relief Sewer Alternative  
ENVI/CITY\_OF\_DUBUQUE/007-134\_Stormwater/GIS\_MODELING/DOWNTOWN/dwntwn\_swmr\_10-22-01.APR



Notes:  
(Reference symbol listed in figure legend.)  
1. Existing Storm Sewer - Labels 1, 3, 4, 7, 8  
2. Proposed Relief Storm Sewer - Labels 2, 4, 7, 8 and 1, 3, 9, 10  
3. Proposed Storm Sewer Option - Labels 1, 3, 3A, 5, 6, 8 and 2, 4, 7, 8



Source: Dubuque Area Geographic Information System (DAGIS), dated May 2000, Aerial Photography, dated 1997

## Bee Branch Drainage Basin Proposed Relief Sewer Alternative



Drainage Basin Master Plan  
City of Dubuque, Iowa

Date  
FALL 2001

Figure  
4-23

Layout: Proposed Floodway Alternative  
ENVIRO\CITY\_OF\_DUBUQUE\007-134\_stormwater\GIS\_MODELING\DOWNTOWN\dwtwn\_swm\_10-22-01.APR



Notes:  
1. Phase I - 16th Street Detention Cell to Garfield Avenue.  
2. Phases I & II - 16th Street Detention Cell to 24th Street.

**HDR**  
HDR Engineering, Inc.

Source: Dubuque Area Geographic Information System (DAGIS), dated May 2000, Aerial Photography, dated 1997

## Bee Branch Drainage Basin Proposed Flood Control Channel Alternatives



**Drainage Basin Master Plan**  
City of Dubuque, Iowa

Date  
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Figure  
4-24



Notes:

1. Flooding depths shown are peak depths for the 100-year flood with West 32nd Street Subarea Alternative W32-5 improvements and a flood control channel constructed from 16th Street Detention Cell to Garfield Ave (Phase I).
2. It was assumed the tributaries from 16th Street Detention Cell to Garfield Avenue were improved as necessary to convey the 100-year flood flows to the Bee Branch storm sewer trunk line.
3. Inundated area shown represents flooding from the Bee Branch storm sewer trunk line only. Flooding from tributary subareas are not included.

**HDR**  
HDR Engineering, Inc.

Source: Dubuque Area Geographic Information System (DAGIS), dated May 2000, Aerial Photography, 1997

**Washington Street Drainage Subarea  
Phase I Flood Control Channel Impacts**



**Drainage Basin Master Plan**  
City of Dubuque, Iowa

Date  
FALL 2001

Figure  
4-25



- Notes:
1. Flooding depths shown are peak depths for the 100-year flood with West 32nd Street Subarea Alternative W32-5 improvements and a flood control channel constructed from 16th Street Detention Cell to 24th Street (Phases I & II).
  2. It was assumed the tributaries from 16th Street Detention Cell to 24th Street were improved as necessary to convey the 100-year flood flows to the Bee Branch storm sewer trunk line.
  3. Inundated area shown represents flooding from the Bee Branch storm sewer trunk line only. Flooding from tributary subareas are not included.

**HDR**  
HDR Engineering, Inc.

Source: Dubuque Area Geographic Information System (DAGIS), dated May 2000, Aerial Photography, dated 1997

**Washington Street Drainage Subarea  
Phase I & II Flood Control Channel Impacts**



**Drainage Basin Master Plan**  
City of Dubuque, Iowa

Date  
FALL 2001

Figure  
4-26