CITY OF PEORIA
BUTLER DRIVE STORM DRAIN
83RD AVENUE TO 79TH AVENUE

This signature acknowledges receipt of final report

12/16/05

Engineering Director Date

DESIGN CONCEPT REPORT

SOLICITATION NUMBER P05-0035
PROJECT NUMBER SS-0502

APPROVALS	
ENGINEERING DIRECTOR	DATE

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November 2005

SS-0202

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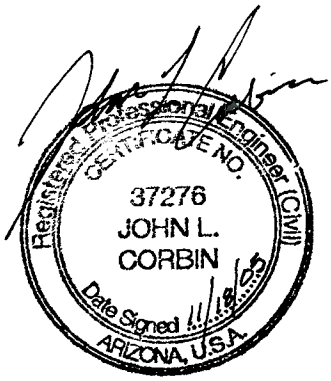

1.0 Introduction

The intent of this report is to present a detailed drainage study providing a basis for development and evaluation of storm drain alternatives for the Study Area. This drainage study includes the following:

- A hydrologic analysis of the study area to estimate the existing and build-out peak drainage flows and volumes corresponding to the 10-year and 100-year design storm events.
- The development and hydraulic analysis of two alternative solutions for disposal of the study area drainage flows.
- A recommendation regarding the future utilization of the existing retention basin located at 79th Avenue and Seldon Lane.
- A proposed alignment and conceptual design for the selected storm drain alternative within Butler Drive from 75th Avenue to 83rd Avenue and in 83rd Avenue from Butler Drive to Las Palmaritas.

1.1 Study Area Location

The Study Area for the Butler Drive Storm Drain Design Concept Report (DCR) is defined as the northeast quarter section of Section 35 of Township 3 North, Range 1 East which is bounded by Olive Avenue to the north, 75th Avenue to the east, Butler Drive to the south, and 79th Avenue to the west. The Study Area is shown on **Figure 1**. The Study Area drainage analyses also include storm water runoff generated along the Butler Drive alignment from 75th Avenue to 83rd Avenue. Storm water runoff generated along 83rd Avenue from Olive Avenue to Las Palmaritas was addressed in a previous drainage report and the results of that study have been incorporated into the hydraulic analyses in this report.

1.2 Previous Hydraulic Studies and Models

The City of Peoria provided Black & Veatch with the following documents.

- 1987 Glendale–Peoria Area Drainage Master Plan, Camp Dresser & McKee Inc and James M. Montgomery, Consulting Engineers.

- 1988 City of Peoria Master Plan of Storm Drainage, James M Montgomery, Consulting Engineers, Inc.
- City of Peoria Design Concept Report 83rd Avenue from Northern Avenue to Olive Avenue. Prepared by PBS&J
- City of Peoria Drainage Report for Lot 74, 79th Avenue and Seldon Lane, Peoria Industrial Park. Prepared by Wood, Patel & Associates, Inc., September 1999
- Maricopa County DOT Plans for the Construction of 83rd Avenue – Northern Avenue to Olive Avenue. Preliminary plans prepared by INCA Engineers, May 2000

2.0 Study Area Drainage

2.1 Drainage Sub-Basins

The Study Area is divided into three separate drainage sub-basins (see **Figure 1**): *1* the existing 80-acre Peoria Industrial Park, *2.* the undeveloped 80-acres of agricultural land located east of the Peoria Industrial Park, and *3.* Butler Drive from 75th Avenue to 83rd Avenue. Details of the three Study Area drainage sub-basins are provided below

2.1.1 Peoria Industrial Park. The Peoria Industrial Park is located at the southeast corner of 79th Avenue and Olive Avenue. The site slopes to the southwest. Field observations were performed and existing catch basins were located to confirm that storm water runoff in Olive Avenue would not enter the northern boundary of the Industrial Park via 79th Avenue or 78th Avenue. On-site retention basins for the developed lots in the area were observed. From current aerial photography, it is estimated that the Industrial Park is 66-percent developed.

Lots developed prior to 1995 within the Peoria Industrial Park were required to provide storm water retention for a 10-year, 2-hour storm event. Subsequently, the City's Infrastructure Development Guidelines were modified such that lots developed after 1995 are now required to provide on-site retention for the 100-year, 2-hour storm event. Therefore, in the course of a 100-year, 2-hour storm event, retention basins in those pre-1995 lots are expected to overtop and allow runoff to drain to the adjacent streets. The volume of this runoff would be the difference between the 10-year, 2-hour event and the 100-year, 2-hour event. Additionally, storm water

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BLACK & VEATCH Corporation
Phoenix, Arizona

CITY OF PEORIA
BUTLER DRIVE
STORM DRAIN DCR

STUDY AREA

DESIGNED:
DETAILED:
CHECKED:
APPROVED:
DATE:

PROJECT NO.
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runoff generated by the undeveloped lots within the Industrial Park area is assumed to drain to the streets once percolation of rainfall and saturation of the undeveloped ground occurs.

Storm water runoff generated by rainfall on the Industrial Park access streets, runoff not contained by the individual on-site retention basins, and runoff from the undeveloped lots drain to a 12' deep retention basin at the southeast corner of 79th Ave and Seldon Lane. This retention basin was constructed to remediate flooding problems in this area due to runoff from the Industrial Park. The basin was designed to provide retention for the Industrial Park's 100-year, 2-hour runoff volume based on the existing level of development at the time of the design study This basin design did account for the additional runoff from the pre-1995 developed lots, but was not sized to accommodate any future runoff from development of the agricultural land to the east. The basin has no outlet but does contain four drywells to speed infiltration.

In the future, each of the undeveloped lots within the Peoria Industrial park will provide on-site storm water storage for the 100 year, 2-hour storm. However, it is expected that excess runoff from the pre-1995 developed lots will still drain to the access streets. Therefore, at build-out, only street drainage and the pre-1995 excess storm water will drain through the Industrial Park to the existing retention basin.

2.1.2 Agricultural Land / Future Industrial Park. Currently, land within the Study Area located east of the Peoria Industrial Park is undeveloped agriculture land. Field observations were performed to confirm that no street drainage from the west half of 75th Avenue enters this area. Irrigation tail-water ditches run north to south along the western edge of the property and east to west along the southern edge of the property Under existing conditions, the site slopes to the southwest and any storm water runoff is assumed to drain to one of the two tail-water ditches. No additional retention for this property is currently provided.

In the future, it is assumed that this land will be developed into an industrial complex similar to the existing Peoria Industrial Park. At build-out, it is expected that the developed lots will each provide on-site retention for the 100-year, 2-hour storm event or will have a regional basin for the 100 year, 2 hour storm event. Therefore, ultimately, the only storm water runoff from this site will be generated by the access streets located within the parcel. These streets are expected to maintain the current drainage pattern by routing the storm water in a southwesterly direction. This runoff will ultimately be conveyed west via a storm drain located in Butler Drive.

2.1.3 Butler Drive. Currently, Butler Drive from 75th Avenue to 83rd Avenue, is unimproved. From field observations, it is believed that storm water runoff drains to the agricultural land located to the south. No storm water collection/conveyance facilities currently exist in this section of Butler Drive. Ultimately, it is expected that Butler Drive will be improved and will include catch basins and a storm drain to collect drainage from the street. The storm drain will also carry runoff from the future and existing industrial parks to the regional storm drain connection at 83rd Avenue and Las Palmaritas.

3.0 Hydrologic / Hydraulic Analyses

3.1 Storm Drainage System Requirements

The following *City of Peoria Storm Drainage Facilities – Design and Construction* and the *Drainage Design Manual for Maricopa County, Volume 2* requirements and assumptions were used as design criteria for the storm drain systems proposed in this report.

- Major collectors and local streets are required to carry ten year runoff flows between the curbs, the fifty year flow between the property lines, and the one hundred year flow within the right-of-way.
- All retention basin/detention facilities constructed after 1995 shall be sized to retain 100% of the one hundred, two hour storm falling over the entire project site including the total adjacent right(s)-of-way
- Storm water collection pipes should be design to carry excess runoff to meet the 10-year street encroachment criteria. Once the design storm flow has been admitted to the storm drain system, additional runoff can be carried by surcharge in the streets to a level of encroachment as defined above.

3.2 Study Area Hydrologic Modeling

Prior to development of alternative drainage solutions for the Study Area, the quantity of storm water runoff is computed. Storm Water Management Model (SWMM) software is used to perform both the hydrologic and hydraulic modeling for this study Within the model, the two 80-acre sub-basins are further subdivided into multiple small subcatchments corresponding to street right-of-ways and groups of lots (including both developed and undeveloped). Details of the subcatchments are provided in Appendix A Storm water runoff from these subcatchments is

then directed (in a southwesterly direction) into "links" which are used to route the drainage to an outlet. The model links used to convey storm water through the study area are representative of street cross-sections or storm drain pipes.

From the *Drainage Design Manual for Maricopa County, Arizona, Volume I, Hydrology*, the total rainfall depth for the 10-year and 100-year 2-hour design storm events are 1.58 and 2.53-inches respectively However, the SWMM model requires input of an entire rainfall pattern for a storm rather than a peak rainfall intensity or a total precipitation depth. An idealized synthetic rainfall pattern indicating rainfall intensities at 5-minute increments over the storm duration is constructed for the design storms. A 2-hour mass distribution curve from the Maricopa County drainage manual is used to obtain *percent rainfall depth* at 5-minute intervals. These values are then used with the total rainfall depth to calculate the incremental rainfall depths and intensities throughout the duration of the storm events. The rainfall patterns constructed for this study are provided in Appendix B.

The design storm pattern is applied to all of the subcatchment areas in the model. Runoff hydrographs are computed by the software based on the physical parameters input for each subcatchment. These physical parameters include variables such as the area, overland flow path length and slope, area-averaged permeability, and depression storage depth of the subcatchments (retention volume provided).

The runoff hydrographs are routed via the streets to study area outlet. A dynamic wave modeling routine is used by SWMM to route the individual runoff hydrographs and compute the resulting outfall hydrograph. The dynamic wave approach includes storage effects in the streets / pipes and momentum effects to achieve the best modeling accuracy.

The hydrologic analysis is performed assuming build-out conditions for both the existing and future industrial park areas. Street alignments and subcatchment characteristics in the future industrial park are modeled to closely resemble those of the existing Peoria Industrial Park.

3.3 Drainage Alternatives

Two alternatives were analyzed for the ultimate disposal of storm water for the Study Area. The alternatives included:

1 Utilization of the Existing Retention Basin to dampen out peak discharges into the Bulter Drive Storm Drain or,

2. Eliminating the existing basin and directly accepting storm water runoff into the storm drain system.

Hydraulic analyses were performed for the two Alternatives to determine the required storm drain sizes needed to convey the runoff generated by the design storm event from the Study Area. The analysis of the storm drain and basin outlet hydraulics is performed in conjunction with the runoff computations in the SWMM dynamic model. The dynamic model will effectively handle backwater effects from the downstream water surface elevation at the storm drain connection.

Preliminary design plans for the improvement of 83rd Avenue between Olive Avenue and Northern Avenue were prepared by INCA Engineering in May 2000 for Maricopa County DOT These plans include the construction of a storm drain and associated catch basins in 83rd Avenue from south of Olive Avenue to the connection north of Las Palmaritas Drive. The plans indicate that a 24-inch drain is required in 83rd Ave north of Butler Drive and a 66-inch drain is required south of Butler Drive to the stub-out.

The 83rd Avenue catch basin flows computed for the 2000 preliminary design of the storm drain were incorporated (unchanged) into the hydraulic analysis for this study Likewise, the 24-inch drain north of Butler Drive is modeled as represented in the preliminary design. The hydraulic grade line presented in the INCA plans for the storm drain connection at Las Palmaritas Drive is used as the downstream control for the hydraulic models.

Storm drain flows generated within the proposed Butler Drive extension (83rd Ave to 75th Ave) are computed assuming that the constructed street slopes will provide for matching of existing pavement elevations at the 83rd Avenue, 79th Avenue, and 75th Avenue intersections. Additionally, the existing pavement elevation at Seldon Lane and (approximately) 77th Ave was used to estimate future pavement grade at Butler and 77th Ave.

3.3.1 Alternative 1 – Utilization of Existing Retention Basin Analysis. Alternative 1 proposes that the existing basin at 79th Avenue and Butler Drive remain in place and be converted from a *retention* basin to a *detention* basin. This would be accomplished by the construction of a basin outlet located at the bottom of the basin which would allow the basin to drain into the proposed storm drain in Butler Drive. The basin outlet and downstream storm drain are then sized only as

large as is necessary to prevent the detention basin from overtopping during design storm conditions.

The drainage areas were analyzed for the 10-year and 100-year storm event to ensure the proposed drainage system will meet the requirements previously discussed in Section 3 1 SWMM Model results and detailed calculations for the proposed system are provided in Appendix C. Conceptual plan and profile drawings Alternative 1 are provided in sheets **PP1, 2, 3, 4, and 5** in Appendix D.

Three catch basins are required at Seldon Lane and the 77th Avenue alignment to intercept runoff generated from the future industrial park. The catch basins will discharge into a 30-inch storm drain located in anticipated 77th Ave alignment. The storm drain alignment will start at the intersection of Seldon Lane and 77th Avenue and will connect to the storm drain in Butler Drive.

The recent construction of Golden Lane between 75th Ave and the 77th Ave alignment included an open grate crossing the pavement width. This grate, near the 77th Ave alignment, intercepts the storm drainage flowing west in the pavement cross-section. This flow is then conveyed south along the west boundary of the existing agricultural field. Due to this approach for construction of the new segment of pavement, it will be necessary for the City to maintain a small drainage easement to convey some portion of the flow from Golden Lane south to Butler Drive. This runoff can be conveyed to the intersection of 77th Avenue and Seldon Lane via an open channel where it can enter the storm drain system at the corner of 77th Avenue and Seldon Lane through a headwall.

Runoff generated in Butler between 75th Avenue and 77th will be intercepted by a pair of catch basins located on the northeast and southwest corners of 77th Avenue and Butler Drive. A 30-inch pipe will collect flows intercepted by the catch basins and will connect to the storm drain at the 77th Avenue alignment and will continue west. Between 77th Avenue and 79th Avenue, runoff generated in Butler Drive will be intercepted by a catch basin located at the southeast corner of Butler and 79th Avenue.

The storm water runoff collected in the 30-inch storm drain east of 79th Ave will then be discharged to the existing detention basin. In addition to a new basin inlet headwall, improvements to the basin include a 24-inch basin outlet structure located at the bottom of the basin. This 24" outlet drain is coupled to the 30-inch storm drain in Butler Drive from the 79th

Avenue to 83rd Avenue. The outlet is sized allow the 100-year storm water flows to enter the basin without overtopping and to keep the surcharge of the outlet storm drain to around 3-feet below the top of the storm drain manholes. At build-out conditions, the 100-year event peak inflow to the existing basin from the industrial parks and Butler Drive east of 79th Avenue is approximately 140 cfs. The 12-foot deep retention basin surcharges about 11-feet during this design storm event. (***Note:*** *While the storm drain system east of 79th Avenue is sized to convey the 10-year storm event, the storm drains will likely surcharge and carry a greater flow during the 100 year storm event. A portion of the excess flow carried in the street may bypass the curb inlets and be conveyed beyond the detention basin. A conservative approach for sizing the basin outlet was used which assumed that the entire 100-year storm runoff event from the future industrial park and Butler Drive east of 79th Avenue will be conveyed to the retention basin.)*

A catch basin located on the northwest corner of 79th and Butler will intercept runoff generated on the west half-street of 79th Avenue from Olive Ave to Butler Drive. This inlet will tie into the 24-inch storm drain outlet exiting the detention basin. A 30-inch storm drain will then continue west from the intersection of 79th Avenue and Butler Drive to 83rd Avenue. The 30-inch drain in Butler Drive also accepts flows from three pairs of catch basins between 79th Avenue and 83rd Avenue.

At the intersection of 83rd Avenue and Butler Drive, the 30-inch drain connects to a 42-inch storm drain in 83rd Avenue from Butler Drive to the connection at Las Palmaritas. The 66-inch drain size proposed in the MCDOT preliminary design is reduced to the 42-inch drain due to the reduced peak flow from the detention basin. The 24-inch drain in 83rd Avenue north of Butler Drive is presumed to remain as proposed in the MCDOT plans.

3.3.2 Alternative 2 – Elimination of Existing Retention Basin. Alternative 2 proposes that the existing retention basin be removed from service and that flows converging at 79th Avenue and Butler Drive from the existing and planned industrial parks directly enter the storm drain in Butler Drive. SWMM Model results and detailed calculations for the proposed system are provided in Appendix E. Conceptual plan and profile drawings Alternative 2 are provided in sheets **PP1, 2, 3, 4, and 5** in Appendix F

Runoff generated by the future industrial park and Butler Drive east of 79th Avenue will enter the storm drain system in a similar manner as described in Alternative 1 However, due to down-

stream backwater effects, a 36-inch storm drain will be required in Butler Drive between 79th Ave and 77th Ave.

Four additional catch basins will be required in Seldon and 79th Avenue to capture the runoff generated by the existing industrial park and the east half-street flow in 79th Avenue. The catch basins will discharge into a 36-inch drain pipe in 79th Avenue which connects to the storm drain in Butler Drive. Similar to Alternative 1, a catch basin will be required on the northwest corner of 79th Ave and Butler Drive to intercept flow from the west half-street of 79th Avenue from Olive Avenue to Butler Drive. A 42-inch storm drain in Butler Drive from 79th Avenue to 83rd Avenue is required to handle the build-out, 10-year peak runoff from the existing and planned industrial parks without overtopping estimated manhole rim elevations. As in Alternative 1, the 42-inch drain accepts catch basin flows along Butler Drive. A 48-inch storm drain in 83rd Avenue south of Butler Drive is required to convey 10-year event drainage flows to the connection at Las Palmaritas.

4.0 Alternatives Evaluation

4.1 Decision Matrix

Table 4.1 shows a matrix of weighted criteria, which was used to determine the recommended storm drain alternative.

Table 4.1 - Matrix of Weighted Decision Criteria

Criteria	Weight (percent)
Capital Cost	40
Operations and Maintenance	20
Implementation	30
Aesthetics	10

For each alternative, the criteria were given a rating from 1 to 5 (1 being the least favorable and 5 being the most favorable rating). The results of the weighted analysis are shown in Table 4.2.

Table 4.2 - Evaluation Matrix					
Criteria	Weight	Alternative 1		Alternative 2	
		Raw Score	Wtd. Score	Raw Score	Wtd. Score
Capital Cost	40	5.00	2 00	3.08	1.41
O&M Cost	20	1.33	0.27	5.00	1.00
Implementation	30	5.00	1 50	2.50	0.75
Aesthetics	10	3.00	0.30	5.00	0 50
Total	**100**		**4.07**		**3.48**

Capital Cost

Detailed preliminary estimates are provided in Appendix G. Construction in 83rd Avenue is assumed to require pavement replacement. However, since the drain in Butler Drive would likely be constructed before or with the Butler improvements, no pavement replacement is considered in this alignment. Street improvement costs of Butler between 79th and 83rd are not included in the cost estimates. The estimates include the storm drains, manholes, and associated catch basins in 83rd Avenue between Olive Avenue and Las Palmaritas.

Table 4.3 – Alternative Cost Estimates	
Alternative	**Cost Estimate**
Alternative 1 – With Detention Basin	$ 2,302,000
Alternative 2 – Without Detention Basin	$ 3,732,000

Rehabilitation of the existing retention basin lot is included in the capital cost estimate for Alternative 2. Resale value of the lot is also included as an offset to the capital cost of Alternative 2.

Alternative 1 is given the most favorable rating (5) based on having the lowest overall capital cost. Alternative 2 was ranked at 3.08 according to its respective capital cost total.

Operation and Maintenance Cost

Alternative 2 is given the most favorable rating (5) based on a lower O&M cost associated with removal of the existing retention basin. The 20-year present value O&M costs of the storm drain piping and curb inlets are expected to be roughly equivalent for both alternatives at about $5,000.

Alternative 1 was ranked lower due to the O&M costs for up-keep of the retention basin. The 20-year present value cost of weed control for the basin is estimated to be $14,000

Implementation

Alternative 1 was given a ranking of 5 based on this alternative having the easiest implementation. Alternative 2 was given a lower ranking of 2.5 due the extensive site remediation prior to sale of the property Alternative 1 will require only the construction of the basin outlet and inlet headwalls in the existing basin. All additional infrastructure implementation will be equivalent for both alternatives.

Aesthetics

Alternative 2 was given a ranking of 5 based on not having the aesthetic and nuisance issues associated with the retention basin. Alternative 1 was given the lower ranking of 3.0 due to the possibility of residential development to the south of Butler Drive.

4.2 Preferred Alternative

Based on the Evaluation Matrix, Alternative 1 is recommended. This is largely due to the fact that there is little additional cost associated with the existing retention basin. Therefore, the difference in installed pipe costs reflects the majority of the difference between the two alternatives.

5.0 Land Ownership, Right of Way, and Easements

The north properties along the Butler Drive alignment between 79th Avenue and 83rd Avenue have recently been acquired by the City of Peoria. These properties will be developed into a regional park to the west and the site for the Butler Drive Water Reclamation Facility (WRF) to the east. Although improvement plans for Butler Drive in this area remain uncertain, property (north of the monument line) for the storm drain and WRF-associated pipelines is available. Ownership maps for parcels along the proposed alignment are provided in Appendix H.

The rights-of-way located along 83rd Avenue are already in place and provide enough room for the planned storm drains. The existing and anticipated rights-of-way are shown on the plan and profile sheets in Appendix F No additional right-of-way is expected to be required.

6.0 Environmental Permits and Approvals

In addition to Maricopa County Flood Control District permitting, permits may also be required for crossing of SRP irrigation pipelines in 83rd Avenue.

7.0 Existing Utilities

The conceptual plan and profile drawings present the locations of major water, sewer, and irrigation pipelines in 83rd Avenue and Butler Drive. Not indicated on the plans are numerous gas, telephone, and cable lines in 83rd Avenue. Although crossing of these utilities will require the normal construction safety procedures, the existing storm drain structure in 83rd Avenue is deep enough that there should be no conflicts.

Proposed irrigation pipelines crossing the Butler alignment in 83rd Avenue could not be verified. These pipelines may not have been constructed as of June 2005

The existing utilities located in the vicinity of the proposed Butler Drive storm drain alignment are listed in the table below

Utility	Contact
City of Peoria (Sewer)	623-773-7286
City of Peoria (Water)	623-773-7286
Cox Communications	623-322-7086
Southwest Gas	602-484-5018
Qwest	602-630-0492
SRP (Irrigation)	602-236-2737
SRP (Power)	602-236-2924

APPENDIX A

Rainfall Criteria	
10 year, 2 year Rainfall Depth	1.58
100 year 2 hour	2.53
100 year 6 hour	3.00
100 year 24 hour	3.80

C Values		
Area Type	C10	C100
Light Industrial	0.65	0.82
Bare Ground	0.25	0.32
Agriculture	0.15	0.19

General Description Data							Current Conditions						Buildout Conditions				
Sub- basin	Description	Acreage (acres)	Width* (length)	Slope (lft/ft)	Percent Impervious (Existing)	Percent Impervious (Buildout) (%)	Developed Acres prior to 1995 (acres)	Developed Acres after to 1995 (acres)	Undeveloped Acres (acres)	Volume of Storage provided within Sub-basin (Assuming no "C") (acre-feet)	Area over which storage is spread (acres)	Depth of Depression Storage (inches)	Developed Acres prior to 1995 (acres)	Developed Acres after to 1995 (acres)	Volume of Storage provided within Sub-basin (Assuming no "C") (acre-feet)	Area over which storage is spread (acres)	Depth of Depression Storage Over entire subcatchment (inches)
Sub-basin 1	lots 1,2,3,4,5,6,7,8,9,10	7.51	950	0.5	9%	100%	0.00	0.65	6.86	0.14	0.65	2.53	0.00	7.51	1.58	7.43	2.53
Sub-basin 2	78th Olive to Golden	0.98	714	0.4	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.00
Sub-basin 3	lots 11, 12, 13, 14, 15, 16, 17, 18, 1A	13.28	1100	0.5	67%	100%	5.98	2.96	4.34	1.41	8.94	1.89	5.98	7.30	2.33	13.15	2.10
Sub-basin 4	lots 26,25,24,27,28,29,30,41,42,43,44	8.04	1100	0.5	45%	100%	0.00	3.58	4.46	0.75	3.58	2.53	0.00	8.04	1.70	7.96	2.53
Sub-basin 5	lots 31,32,33,34,35,36,37,38,39,40	7.20	800	0.5	100%	100%	5.84	1.36	0.00	1.06	7.20	1.76	5.84	1.36	1.06	7.13	1.76
Sub-basin 6	lots 20,21,22,26,45,46,47,48,49,59,60,61	8.56	900	0.5	90%	100%	5.40	2.29	0.87	1.19	7.69	1.86	5.40	3.16	1.38	8.47	1.93
Sub-basin 7	lots 50,51,52,53,54,55,56,57,58	6.76	780	0.5	68%	100%	2.93	1.65	2.18	0.73	4.58	1.92	2.93	3.83	1.19	6.69	2.12
Sub-basin 8	lots 19,62,63,64	3.48	750	0.5	100%	100%	3.48	0.00	0.00	0.46	3.48	1.58	3.48	0.00	0.46	3.45	1.58
Sub-basin 9	78th Golden to Midpoint	1.10	780	0.4	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.00
Sub-basin 10	78th Midpoint to Seldon	0.90	650	0.4	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.00
Sub-basin 11	77th Golden to Midpoint	1.10	800	0.4	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.00
Sub-basin 12	7th Midpoint to Seldon	0.90	650	0.4	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.00
Sub-basin 13	Golden Property Line to 77th	0.34	250	0.3	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00
Sub-basin 14	Golden 77th to 78th	0.76	550	0.3	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.00
Sub-basin 15	Golden 78th to 79th	0.76	550	0.3	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.00
Sub-basin 16	Seldon Property line to 77th	0.34	250	0.3	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00
Sub-basin 17	Seldon 77th to 78	0.76	550	0.3	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.00
Sub-basin 18	Seldon 78th to 79th	0.76	550	0.3	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.00
Sub-basin 19	79th near exsiting retention basin	0.28	300	0.3	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00
Sub-basin 20	lots 74,73,72,71,70,69	7.67	1340	0.5	84%	100%	6.48	0.00	1.19	0.85	6.48	1.58	6.48	1.19	1.10	7.59	1.73
Sub-basin 24	lots 65,66,67,68	3.21	670	0.5	36%	100%	1.17	0.00	2.43	0.15	1.17	1.58	1.17	2.43	0.67	3.18	2.49
Sub-basin 27	79th to halfstreet	1.84	1000	0.4	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.82	0.00
Sub-basin 28	79th half street to retention basin	1.38	1500	0.4	0%	100%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.36	0.00
Sub-basin 32	Golden Midpoint to West Property Line	1.69	600	0.3	0%	100%	0.00	0.00	1.69	0.00	0.00	0.00	0.00	1.69	0.36	1.67	2.53
Sub-basin 40	East Property Line to Midpoint	1.69	600	0.3	0%	100%	0.00	0.00	1.69	0.00	0.00	0.00	0.00	1.69	0.36	1.67	2.53
Sub-basin 42	North Property Street	0.96	700	0.4	0%	100%	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.96	0.20	0.95	2.53
Sub-basin 43	West Portion of North Ag Property	11.88	1050	0.5	0%	100%	0.00	0.00	11.88	0.00	0.00	0.00	0.00	11.88	2.50	11.76	2.53
Sub-basin 44	East Portion of North Ag Property	7.92	890	0.5	0%	100%	0.00	0.00	7.92	0.00	0.00	0.00	0.00	7.92	1.67	7.84	2.53
Sub-basin 46	Ag land south of Seldon	7.49	1340	0.5	0%	100%	0.00	0.00	7.49	0.00	0.00	0.00	0.00	7.49	1.58	7.42	2.53
Sub-basin 47	Butler South of Ag Property	2.20	1200	0.3	0%	100%	0.00	0.00	2.20	0.00	0.00	0.00	0.00	2.20	0.46	2.18	2.53
Sub-basin 48	West Road Golden to Midpont	1.10	780	0.4	0%	100%	0.00	0.00	1.10	0.00	0.00	0.00	0.00	1.10	0.23	1.09	2.53
Sub-basin 49	West Street Midpoint to Seldon	0.90	650	0.4	0%	100%	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.90	0.19	0.89	2.53
Sub-basin 50	Similar to Subcatcchment 4	8.04	1100	0.5	0%	100%	0.00	0.00	8.04	0.00	0.00	0.00	0.00	8.04	1.70	7.96	2.53
Sub-basin 51	Similar to subcatchment 5	7.20	800	0.5	0%	100%	0.00	0.00	7.20	0.00	0.00	0.00	0.00	7.20	1.52	7.13	2.53
Sub-basin 52	East Street Golden to Midpint	1.10	780	0.4	0%	100%	0.00	0.00	1.10	0.00	0.00	0.00	0.00	1.10	0.23	1.09	2.53
Sub-basin 53	East Stret Midpooint to Seldon	0.90	650	0.4	0%	100%	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.90	0.19	0.89	2.53
Sub-basin 54	Similar to Subcatchment 6	8.56	900	0.5	0%	100%	0.00	0.00	8.56	0.00	0.00	0.00	0.00	8.56	1.80	8.47	2.53
Sub-basin 55	Similar to Subcatchment 7	6.60	780	0.5	0%	100%	0.00	0.00	6.60	0.00	0.00	0.00	0.00	6.60	1.39	6.53	2.53
Sub-basin 56	Silimilar to Subcatchment 8	3.48	750	0.5	0%	100%	0.00	0.00	3.48	0.00	0.00	0.00	0.00	3.48	0.73	3.45	2.53
Sub-basin 57	Similar to Subcatchment 24	3.21	670	0.5	0%	100%	0.00	0.00	3.21	0.00	0.00	0.00	0.00	3.21	0.68	3.18	2.53
Sub-basin 58	Seldon Midpoint to west property line	0.93	600	0.3	0%	100%	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.93	0.20	0.92	2.53
Sub-basin 59	East Property Line to Midpoint	0.93	600	0.4	0%	100%	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.93	0.20	0.92	2.53
Sub-basin 69	Butler Drive South of Industrial Park	2.20	1200	0.3	0%	100%	0.00	0.00	2.20	0.00	0.00	0.00	0.00	2.20	0.46	2.18	2.53

* Width Characteristic width of the overland flow path for sheet flow runoff

APPENDIX B

BUTLER DRIVE STORM DRAIN

PRECIPITATION DATA

100-year, 2 hour 2.53

2-Hour Storm Distribution			
Time	% Rainfall Depth	Rainfall Depth	Rainfall Intensity
(minutes)	(percentage)	(inches)	(inch / hour)
0	0.0%	0	0.00
5	1.1%	0.02783	0.33
10	1.8%	0.04554	0.21
15	2.3%	0.05819	0.15
20	2.8%	0.07084	0.15
25	3.2%	0.08096	0.12
30	4.6%	0.11638	0.43
35	7.1%	0.17963	0.76
40	10.0%	0.253	0.88
45	13.7%	0.34661	1.12
50	17.6%	0.44528	1.18
55	23.2%	0.58696	1.70
60	32.7%	0.82731	2.88
65	60.1%	1.52053	8.32
70	74.3%	1.87979	4.31
75	86.3%	2.18339	3.64
80	90.1%	2.27953	1.15
85	93.0%	2.3529	0.88
90	95.4%	2.41362	0.73
95	96.2%	2.43386	0.24
100	97.0%	2.4541	0.24
105	97.7%	2.47181	0.21
110	98.2%	2.48446	0.15
115	99.2%	2.50976	0.30
120	100.0%	2.53	0.24

BUTLER DRIVE STORM DRAIN

PRECIPITATION DATA

10-year. 2 hoı 1.58

2-Hour Storm Distribution			
Time	% Rainfall Depth	Rainfall Depth	Rainfall Intensity
(minutes)	(percentage)	(inches)	(inch / hour)
0	0.0%	0	0.00
5	1.1%	0.01738	0.21
10	1.8%	0.02844	0.13
15	2.3%	0.03634	0.09
20	2.8%	0.04424	0.09
25	3.2%	0.05056	0.08
30	4.6%	0.07268	0.27
35	7.1%	0.11218	0.47
40	10.0%	0.158	0.55
45	13.7%	0.21646	0.70
50	17.6%	0.27808	0.74
55	23.2%	0.36656	1.06
60	32.7%	0.51666	1.80
65	60.1%	0.94958	5.20
70	74.3%	1.17394	2.69
75	86.3%	1.36354	2.28
80	90.1%	1.42358	0.72
85	93.0%	1.4694	0.55
90	95.4%	1.50732	0.46
95	96.2%	1.51996	0.15
100	97.0%	1.5326	0.15
105	97.7%	1.54366	0.13
110	98.2%	1.55156	0.09
115	99.2%	1.56736	0.19
120	100.0%	1.58	0.15

APPENDIX C

STREET RUNOFF COMPUTATION
BUTLER HALF STREET - STA 8+76.5
10-Year Event

Street Slope (ft/ft) $S := .0014$ Ten year $C := .85$

Street Length (ft) $L := 576$

Half Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 0.529$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.042$

Initial guess values.
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} \cdot Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 3.23$ (in/hr)

$Tc = 0.249$ (hr) $Tc \cdot 60 = 14.920$ (min)

Peak runoff (cfs): $Q := i \cdot C \cdot A$ $Q = 1.452$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH STA 8+76.5

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$	Street Cross-Slope	$n := 0.016$	Street Roughness
$S := .005$	Street Long Slope		
$a := 0.167$	2" Gutter Depression	$Qt := 1.45$	Total Street+Gutter Flow
$W := 1.5$	Gutter Width	$L := 13$	Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0\ 131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8$ $Qs := 1$ $Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56\left[\left[T\,Sx + W\cdot(Sw - Sx)\right]^{2.67} - \left[(T - W)\cdot Sx\right]^{2\,67}\right]\cdot S^{0.5}}{n\cdot Sw} \qquad Qs = \frac{0.56\left[(T - W)\cdot Sx\right]^{2.67}\cdot S^{0.5}}{n\cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 0.562$ Street Flow $T = 8.131$ Total Flow Width

$Qw = 0.888$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.612$ Gutter Flow Ratio

$Se := Sx + Swp\cdot Eo$ $Se = 0.088$ Equivalent Cross Slope

$Lt := \frac{1}{.80}\cdot 0.6\cdot Qt^{0.42}\, S^{0.3}\cdot\left(\frac{1}{n\cdot Se}\right)^{0.6}$ $Lt = 9\ 181$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

STREET RUNOFF COMPUTATION
BUTLER HALF STREET - STA 14+52.33
10-Year Event

Street Slope (ft/ft) $S := .0014$ Ten year $C := .85$

Street Length (ft) $L := 650$

Half Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 0.597$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.041$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1\ 3825\ Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 3.071$ (in/hr)

$Tc = 0.268$ (hr) $Tc \cdot 60 = 16.089$ (min)

Peak runoff (cfs): $Q := i \cdot C\ A$ $Q = 1.558$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH · STA 14+52.33

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$ Street Cross-Slope

$S := .005$ Street Long Slope

$a := 0.167$ 2" Gutter Depression

$W := 1.5$ Gutter Width

$n := 0.016$ Street Roughness

$Qt := 1.56$ Total Street+Gutter Flow

$L := 13$ Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

$Qs + Qw = Qt$

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 0.634$ Street Flow

$T = 8.437$ Total Flow Width

$Qw = 0.926$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.593$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.086$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$$

$Lt = 9.604$ Required Curb Opening Length (ft)
(Assuming 80% Capacity)

STREET RUNOFF COMPUTATION
BUTLER HALF STREET STA 21+02.33
10-Year Event

Street Slope (ft/ft) $S := .0014$ Ten year $C := .85$

Street Length (ft) $L := 650$

Half Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 0.597$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.041$

Initial guess values.
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} \cdot Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 3.071$ (in/hr)

$Tc = 0.268$ (hr) $Tc\ 60 = 16.089$ (min)

Peak runoff (cfs). $Q := i \cdot C\ A$ $Q = 1.558$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - STA 21+02.33

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$	Street Cross-Slope	$n := 0.016$	Street Roughness
$S := .005$	Street Long Slope		
$a := 0.167$	2" Gutter Depression	$Qt := 1.56$	Total Street+Gutter Flow
$W := 1.5$	Gutter Width	$L := 13$	Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8$ $Qs := 1$ $Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 0.634$ Street Flow $T = 8.437$ Total Flow Width

$Qw = 0.926$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.593$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.086$ Equivalent Cross Slope

$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \, S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$ $Lt = 9.604$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

STREET RUNOFF COMPUTATION
BUTLER HALF STREET · STA 27+52.33
10-Year Event

Street Slope (ft/ft) $S := .0014$ Ten year $C := .85$

Street Length (ft) $L := 700$

Half Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 0.643$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.041$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 2.978$ (in/hr)

$Tc = 0.281$ (hr) $Tc \cdot 60 = 16.851$ (min)

Peak runoff (cfs): $Q := i \cdot C \cdot A$ $Q = 1.627$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - STA 27+52.33

Determine inlet length (Lt) to intercept total street and gutter flow. Compute flow intercepted by inlet length less than Lt.

$Sx = .02$	Street Cross-Slope	$n := 0.016$	Street Roughness
$S := .005$	Street Long Slope		
$a := 0.167$	2" Gutter Depression	$Qt := 1.63$	Total Street+Gutter Flow
$W := 1.5$	Gutter Width	$L := 13$	Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $\quad Swp = 0\ 111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $\quad Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T\,Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 0.681$	Street Flow	$T = 8.623$	Total Flow Width
$Qw = 0.949$	Gutter Flow		

$Eo := \frac{Qw}{Qt}$ $\quad Eo = 0.582$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $\quad Se = 0.085$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6} \qquad Lt = 9.868$$

Required Curb Opening Length (ft) (Assuming 80% Capacity)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB1**

Determine inlet length (Lt) to intercept total street and gutter flow. Compute flow intercepted by inlet length less than Lt.

$Sx := .02$ Street Cross-Slope

$n := 0.016$ Street Roughness

$S := .005$ Street Long Slope

$a := 0.167$ 2" Gutter Depression

$Qt := 18.5$ Total Street+Gutter Flow (FROM SWMM)

$W := 1.5$ Gutter Width

$L := 20$ Available Curb Inlet Length (ft)

$$Swp := \frac{a}{W} \qquad Swp = 0.111$$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 14.824$ Street Flow

$T = 24.085$ Total Flow Width

$Qw = 3.676$ Gutter Flow

$$Eo := \frac{Qw}{Qt} \qquad Eo = 0.199$$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.042$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6} \qquad Lt = 41.665$$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

$$E := 1 - \left(1 - \frac{L}{Lt} \right)^{1.8} \qquad E = 0.692$$ Interception Efficiency

$Qt \cdot E = 12.799$ Intercepted Flow (cfs)

STREET RUNOFF COMPUTATION
SELDON - 77TH TO 79TH AVE HALF STREET (CB2)
10-Year Event

Street Slope (ft/ft) $S := .005$ Ten year $C := .85$

Street Length (ft) $L := 1200$

Street ROW (ft) $W := 25$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 0.689$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.041$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} \cdot Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 3.338$ (in/hr)

$Tc = 0.237$ (hr) $Tc \cdot 60 = 14.205$ (min)

Peak runoff (cfs): $Q := i \cdot C \cdot A$ $Q = 1.954$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB2**

Determine inlet length (Lt) to intercept total street and gutter flow. Compute flow intercepted by inlet length less than Lt.

$Sx := .02$ Street Cross-Slope

$n := 0.016$ Street Roughness

$S := .005$ Street Long Slope

$a := 0.167$ 2" Gutter Depression

$Qt := 1.95$ Total Street+Gutter Flow

$W := 1.5$ Gutter Width

$L := 13$ Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8$ $Qs := 1$ $Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 0.899$ Street Flow

$T = 9.406$ Total Flow Width

$Qw = 1.051$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.539$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.08$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$$

$Lt = 11.022$ Required Curb Opening Length (ft)
(Assuming 80% Capacity)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB3**

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$ Street Cross-Slope $n := 0.016$ Street Roughness

$S := .005$ Street Long Slope

$a := 0.167$ 2" Gutter Depression $Qt := 5.7$ Total Street+Gutter Flow (BYPASS FROM CB 1)

$W := 1.5$ Gutter Width $L := 20$ Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 3.794$ Street Flow $T = 15.057$ Total Flow Width

$Qw = 1.906$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.334$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.057$ Equivalent Cross Slope

$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$ $Lt = 21.145$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

$E := 1 - \left(1 - \frac{L}{Lt}\right)^{1.8}$ $E = 0.995$ Interception Efficiency

$Qt \cdot E = 5.67$ Intercepted Flow (cfs)

STREET RUNOFF COMPUTATION
BUTLER 75th AVE to 77th AVE HALF STREET (CB4. CB5)
10-Year Event

Street Slope (ft/ft) $S := .0069$ Ten year $C := .85$

Street Length (ft) $L := 1200$

Half Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 1.102$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.04$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} \cdot Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 3.704$ (in/hr)

$Tc = 0.203$ (hr) $Tc \cdot 60 = 12.155$ (min)

Peak runoff (cfs): $Q := i \cdot C \cdot A$ $Q = 3.469$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH **CB4**

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$	Street Cross-Slope	$n := 0.016$	Street Roughness
$S := .005$	Street Long Slope		
$a := 0.167$	2" Gutter Depression	$Qt := 3.47$	Total Street+Gutter Flow
$W := 1.5$	Gutter Width	$L := 20$	Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 2.021$ Street Flow $T = 12.209$ Total Flow Width

$Qw = 1.449$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.417$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.066$ Equivalent Cross Slope

$Lt := \frac{1}{80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$ $Lt = 15.69$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

STREET RUNOFF COMPUTATION
77TH AVE FULL STREET (CB5)
10-Year Event

Street Slope (ft/ft) $S := .005$ Ten year $C := .85$

Street Length (ft) $L := 300$

Street ROW (ft) $W := 50$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 0.344$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.043$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 6.077$ (in/hr)

$Tc = 0.096$ (hr) $Tc \cdot 60 = 5\ 790$ (min)

Peak runoff (cfs): $Q := i \cdot C \cdot A$ $Q = 1\ 779$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB5**

Determine inlet length (Lt) to intercept total street and gutter flow. Compute flow intercepted by inlet length less than Lt.

$Sx := .02$ Street Cross-Slope

$n := 0.016$ Street Roughness

$S := .005$ Street Long Slope

$a := 0.167$ 2" Gutter Depression

$Qt := 3.47 + 1\ 78$ Total Street+Gutter Flow

$W := 1.5$ Gutter Width

$L := 20$ Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 3.429$ Street Flow

$T = 14.552$ Total Flow Width

$Qw = 1.821$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.347$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.059$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$$

$Lt = 20.134$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

STREET RUNOFF COMPUTATION
79TH AVE · OLIVE TO BUTLER WEST HALF STREET (CB9)
10-Year Event

Street Slope (ft/ft) $S := .005$ Ten year $C := .85$

Street Length (ft) $L := 2540$

Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 2.332$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.038$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} \cdot Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 2.482$ (in/hr)

$Tc = 0.369$ (hr) $Tc \cdot 60 = 22.138$ (min)

Peak runoff (cfs): $Q := i \cdot C\, A$ $Q = 4.921$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB9**

Determine inlet length (Lt) to intercept total street and gutter flow. Compute flow intercepted by inlet length less than Lt.

$Sx := .02$	Street Cross-Slope	$n := 0.016$	Street Roughness
$S := .005$	Street Long Slope		
$a := 0.167$	2" Gutter Depression	$Qt := 4.9$	Total Street+Gutter Flow
$W := 1.5$	Gutter Width	$L := 20$	Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $\quad Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $\quad Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := Find(Qs, Qw, T)$$

$Qs = 3.147$ Street Flow $\quad T = 14.14$ Total Flow Width

$Qw = 1\ 753$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $\quad Eo = 0.358$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $\quad Se = 0.06$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6} \quad Lt = 19.321$$

Required Curb Opening Length (ft)
(Assuming 80% Capacity)

STREET RUNOFF COMPUTATION
BUTLER 77th AVE to 79th AVE HALF STREET (CB11)
10-Year Event

Street Slope (ft/ft) $S := .0031$ Ten year $C := .85$

Street Length (ft) $L := 1250$

Half Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 1\ 148$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.04$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 2.917$ (in/hr)

$Tc = 0.29$ (hr) $Tc \cdot 60 = 17.384$ (min)

Peak runoff (cfs): $Q := i \cdot C \cdot A$ $Q = 2.846$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB11**

Determine inlet length (Lt) to intercept total street and gutter flow. Compute flow intercepted by inlet length less than Lt.

$Sx := .02$ Street Cross-Slope

$n := 0.016$ Street Roughness

$S := .005$ Street Long Slope

$a := 0.167$ 2" Gutter Depression

$Qt := 2.85$ Total Street+Gutter Flow

$W := 1.5$ Gutter Width

$L := 20$ Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0\ 111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8$ $Qs := 1$ $Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 1\ 551$ Street Flow

$T = 11\ 197$ Total Flow Width

$Qw = 1.299$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.456$ Gutter Flow Ratio

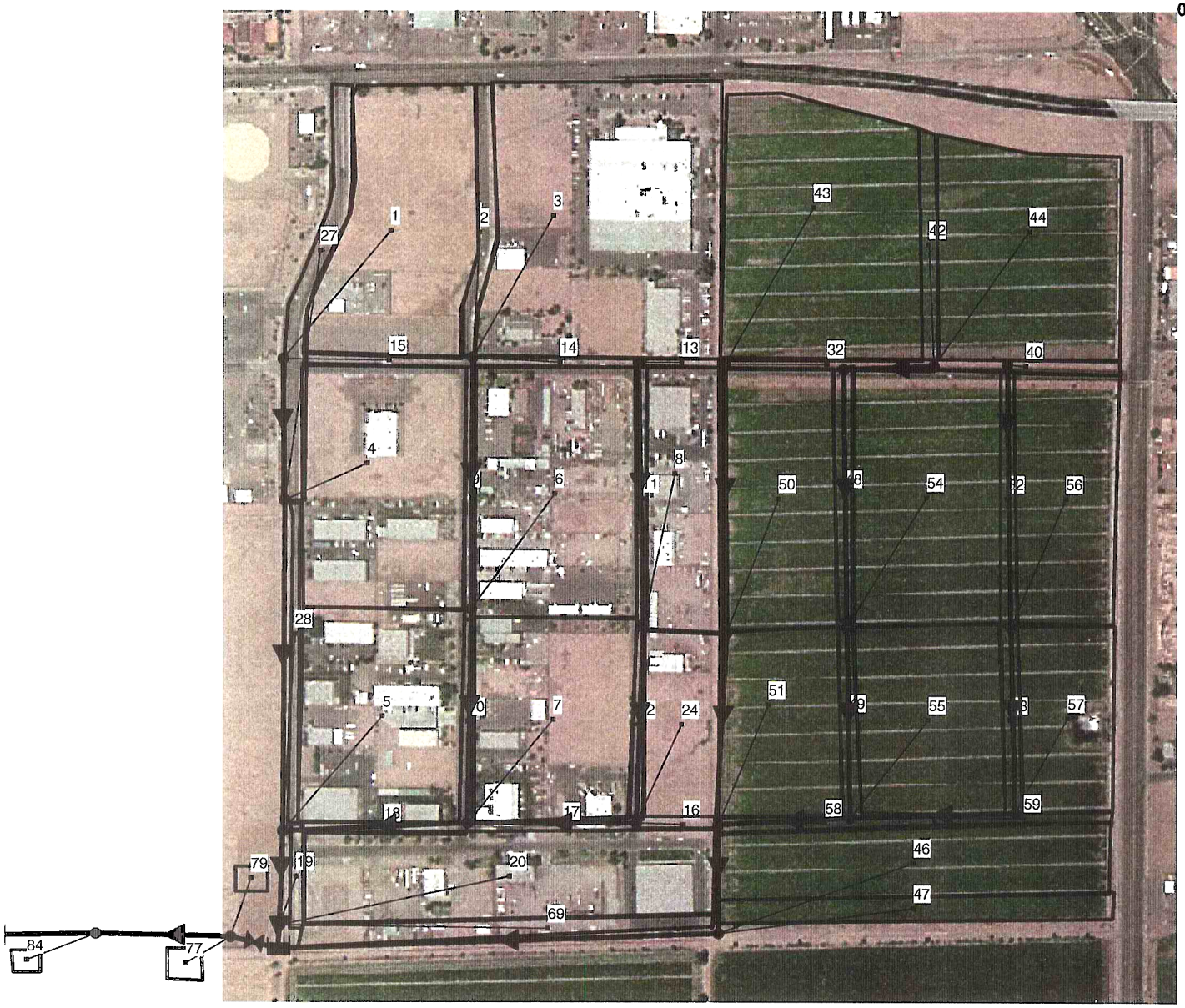
$Se := Sx + Swp \cdot Eo$ $Se = 0.071$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$$

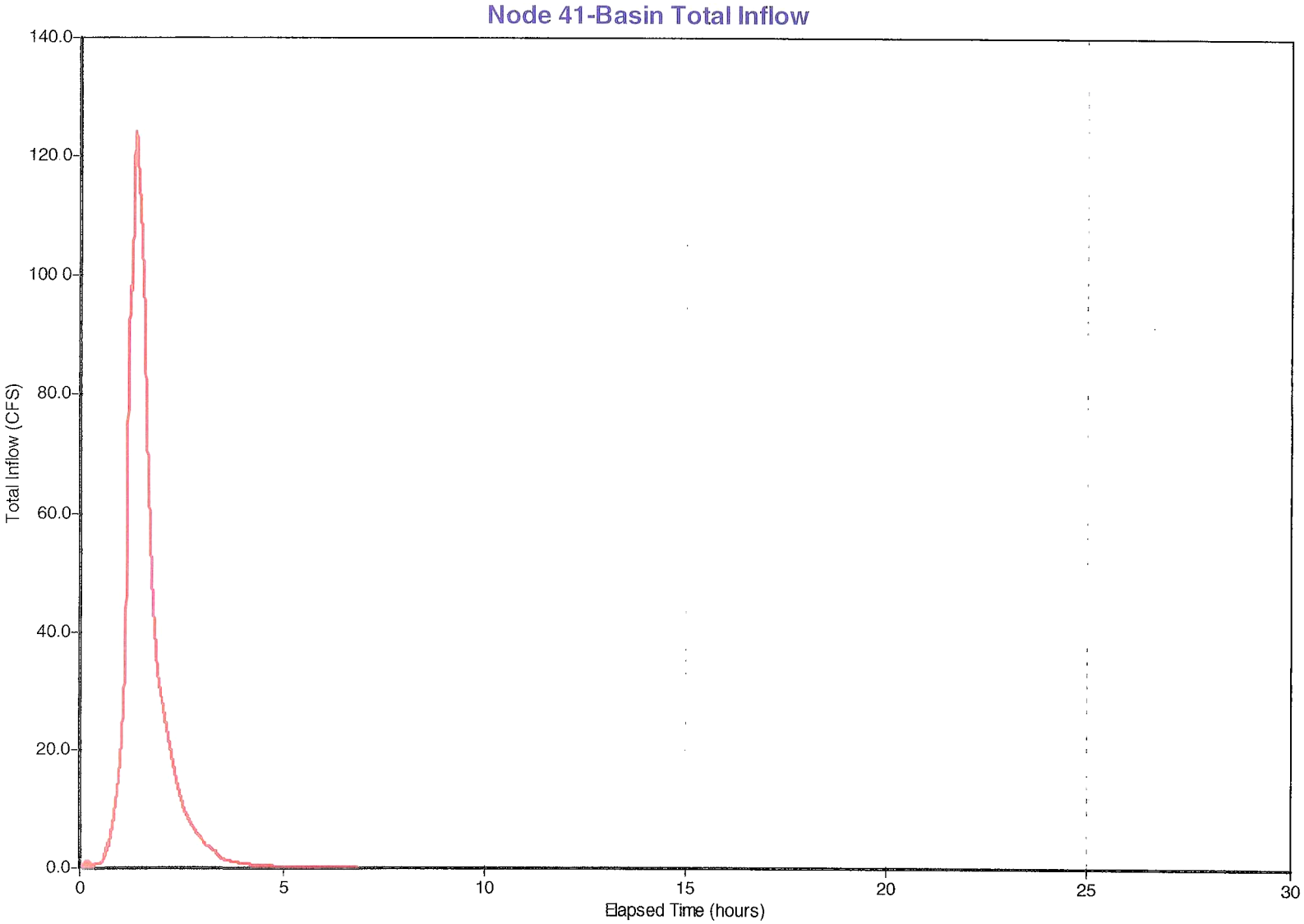
$Lt = 13.916$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

Alternative 1 - Utilization of Existing Basin

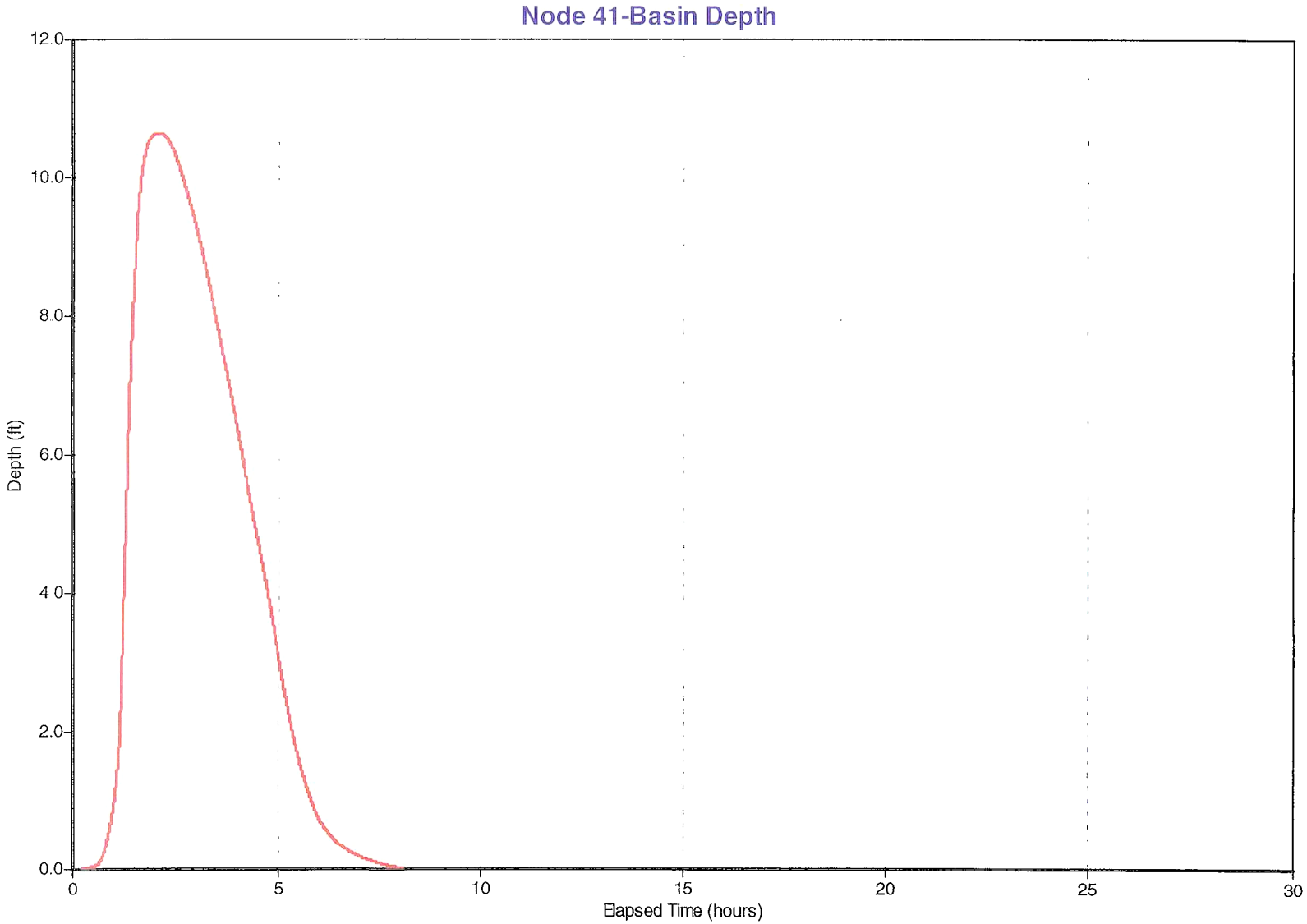
05/04/2005 00:00:10



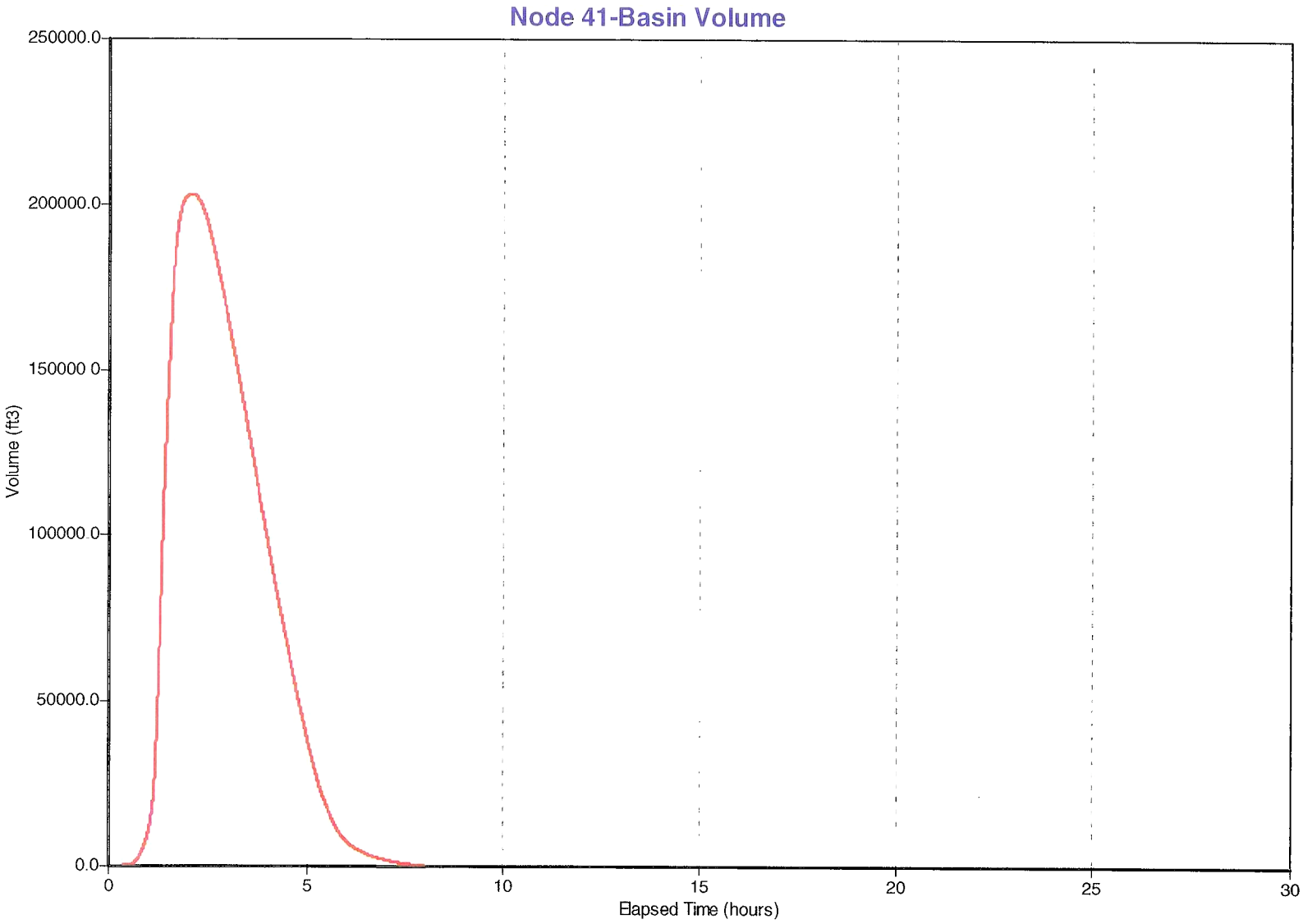
Alternative 1 - Utilization of Existing Basin



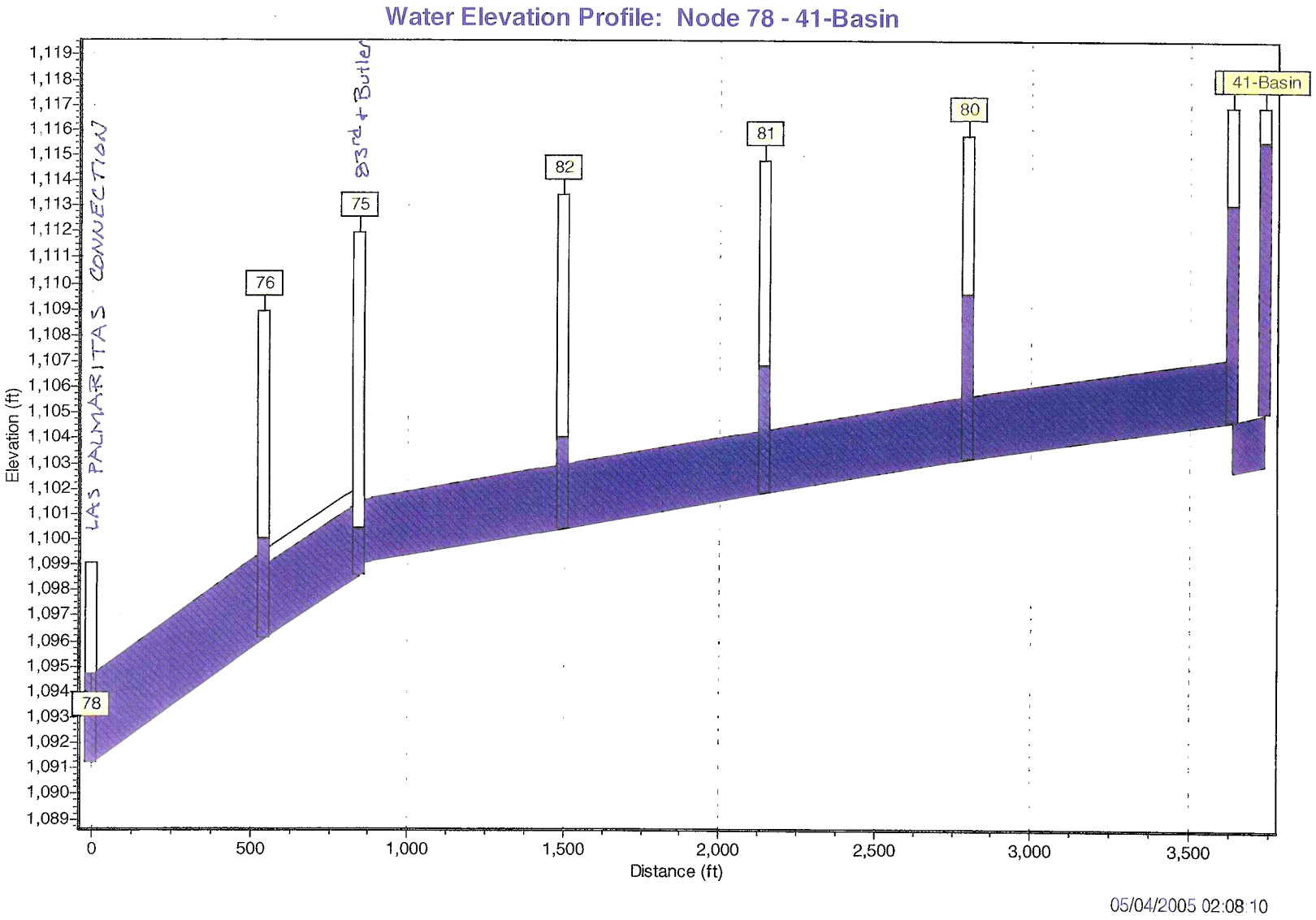
Alternative 1 - Utilization of Existing Basin



Alternative 1 - Utilization of Existing Basin



Alternative 1 - Utilization of Existing Basin



Alternative 1 - Utilization of Existing Basin

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.004)

****
Analysis Options
****

Flow Units	CFS
Infiltration Method	GREEN_AMPT
Flow Routing Method	DYNWAVE
Starting Date	MAY-04-2005 00:00:00
Ending Date	MAY-05-2005 06:00:00
Wet Time Step	00:15:00
Dry Time Step	01:00:15
Routing Time Step	00:00:10
Report Time Step	00:00:10

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	34.114	2.527
Evaporation Loss	0.000	0.000
Infiltration Loss	0.118	0.009
Surface Runoff	8.878	0.658
Final Surface Storage	25.242	1.870
Continuity Error (%)	-0.361	

Flow Routing Continuity	Volume acre-feet	Volume Mgallons
Dry Weather Inflow	37.038	12.069
Wet Weather Inflow	8.919	2.906
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.094	0.031
Internal Flooding	0.000	0.000
External Outflow	47.303	15.414
Evaporation Loss	0.000	0.000
Initial Stored Volume	0.060	0.019
Final Stored Volume	0.247	0.080
Continuity Error (%)	-3.122	

****
Node Depth Summary
****

	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Average Depth Change	Total Minutes Flooded
JUNCTION 29	0.01	0.29	1124.79	0 01:10	0.0001	0
JUNCTION 30	0.03	0.31	1123.71	0 01:11	0.0001	0
JUNCTION 31	0.01	0.16	1125.36	0 01:13	0.0000	0
JUNCTION 33	0.02	0.38	1122.88	0 01:14	0.0001	0
JUNCTION 34	0.04	0.41	1120.71	0 01:24	0.0001	0
JUNCTION 35	0.02	0.35	1122.85	0 01:20	0.0001	0
JUNCTION 36	0.06	0.55	1118.95	0 01:26	0.0001	0
JUNCTION 37	0.07	0.73	1119.53	0 01:26	0.0001	0
JUNCTION 38	0.03	0.37	1120.97	0 01:21	0.0001	0
JUNCTION 39	0.07	2.39	1107.39	0 01:24	0.0004	0
JUNCTION 45	0.01	0.26	1139.20	0 01:10	0.0001	0
JUNCTION 60	0.01	0.22	1137.66	0 01:13	0.0000	0
JUNCTION 61	0.02	0.30	1137.74	0 01:11	0.0001	0
JUNCTION 62	0.02	0.26	1133.45	0 01:13	0.0000	0
JUNCTION 63	0.02	0.27	1133.46	0 01:15	0.0000	0
JUNCTION 64	0.03	0.37	1127.56	0 01:16	0.0001	0
JUNCTION 65	0.02	0.30	1130.24	0 01:16	0.0001	0
JUNCTION 66	0.01	0.77	1129.21	0 01:11	0.0001	0
JUNCTION 67	0.01	0.35	1126.79	0 01:13	0.0001	0
JUNCTION 68	0.27	7.65	1120.67	0 01:21	0.0015	0
JUNCTION 70	0.21	8.38	1122.38	0 01:22	0.0016	0

JUNCTION	71	0.64	0.64	1111.81	0	01:15	0.0001	0
JUNCTION	72	0.84	0.84	1109.93	0	01:12	0.0001	0
JUNCTION	73	1.14	1.14	1105.78	0	01:34	0.0001	0
JUNCTION	74	1.09	1.09	1104.35	0	01:17	0.0001	0
JUNCTION	75	1.02	2.00	1100.58	0	01:14	0.0005	0
JUNCTION	76	3.22	4.08	1100.16	0	01:15	0.0008	0
JUNCTION	80	0.91	6.38	1109.58	0	02:06	0.0012	0
JUNCTION	81	0.81	5.29	1107.12	0	01:22	0.0010	0
JUNCTION	82	0.70	4.17	1104.63	0	01:14	0.0008	0
JUNCTION	83	1.08	8.35	1113.05	0	02:05	0.0016	0
OUTFALL	78	7.90	7.90	1099.08	0	00:00	0.0000	0
STORAGE	41-Basin	1.04	10.57	1115.57	0	02:04	0.0020	0

****
Conduit Flow Summary
****

Conduit	Maximum Flow CFS	Time of Max Occurrence days	hr:min	Maximum Velocity ft/sec	Length Factor	Maximum /Design Flow	Total Minutes Surcharged
12	5.89e+000	0	01:10	2.31	1.00	0.12	0
13	9.36e+000	0	01:14	2.15	1.00	0.25	0
14	6.11e+001	0	01:26	3.87	1.00	0.03	0
15	1.22e+001	0	01:11	2.34	1.00	0.01	0
16	2.13e+001	0	01:24	1.51	1.00	0.02	0
17	2.06e+000	0	01:13	0.83	1.00	0.00	0
18	1.63e+001	0	01:21	2.49	1.00	0.02	0
19	1.97e+001	0	01:22	1.46	1.00	0.02	0
20	4.34e+001	0	01:26	2.26	1.00	0.08	0
23	8.10e+001	0	01:20				
24	1.20e+001	0	01:12	3.21	1.00	0.01	0
25	9.93e+000	0	01:15	2.44	1.00	0.01	0
26	1.34e+001	0	01:17	2.40	1.00	0.01	0
27	3.26e+001	0	01:16	5.96	1.00	0.02	0
28	6.37e+000	0	01:13	2.67	1.00	0.00	0
29	1.23e+001	0	01:14	2.56	1.00	0.01	0
30	1.28e+001	0	01:12	4.28	1.00	0.12	0
31	1.18e+001	0	01:13	5.86	1.00	0.05	0
32	4.01e+001	0	01:12	8.17	1.00	1.45	27
33	4.33e+001	0	01:21	8.81	1.00	1.57	123
34	7.88e+000	0	01:11	2.87	1.00	0.01	0
35	2.98e+000	0	01:05	3.25	1.00	0.22	0
36	6.70e+000	0	01:34	4.69	1.00	0.37	0
37	9.05e+000	0	10:20	5.01	1.00	0.62	0
38	1.28e+001	0	06:58	7.27	1.00	0.58	0
39	4.27e+001	0	01:15	4.81	1.00	0.47	0
44	2.67e+001	0	02:04	5.93	1.00	1.42	205
45	2.70e+001	0	02:07	5.49	1.00	1.43	197
46	2.99e+001	0	01:14	6.09	1.00	1.58	104
47	2.65e+001	0	02:00	5.40	1.00	1.53	212
48	4.49e+001	0	01:15	4.67	1.00	0.47	1800

****
Flow Classification Summary
****

	--- Fraction of Time in Flow Class ----							Avg.	Avg.
Conduit	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Froude Number	Flow Change
12	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.08	0.0000
13	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.07	0.0000
14	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.55	0.0000
15	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.18	0.0000
16	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0000
17	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0000
18	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.18	0.0000
19	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
20	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.22	0.0000
24	0.00	0.00	0.00	0.97	0.03	0.00	0.00	0.16	0.0000
25	0.00	0.00	0.00	0.98	0.01	0.00	0.00	0.21	0.0000

26	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.20	0.0000
27	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.62	0.0000
28	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.17	0.0000
29	0.00	0.00	0.00	0.98	0.02	0.00	0.00	0.17	0.0000
30	0.00	0.29	0.00	0.69	0.01	0.00	0.00	0.09	0.0000
31	0.00	0.00	0.00	0.01	0.00	0.00	0.98	0.15	0.0000
32	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.31	0.0003
33	0.00	0.00	0.00	0.11	0.00	0.00	0.89	0.47	0.0003
34	0.00	0.00	0.00	0.97	0.03	0.00	0.00	0.10	0.0000
35	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.58	0.0001
36	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.76	0.0001
37	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.83	0.0001
38	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.23	0.0001
39	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.33	0.0001
44	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.55	0.0003
45	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.55	0.0003
46	0.00	0.00	0.00	0.80	0.00	0.00	0.20	0.44	0.0003
47	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.53	0.0004
48	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0002

****
Highest Continuity Errors
****
Node 41-Basin (-18 85%)
Node 68 (5 92%)
Node 33 (-4.35%)
Node 31 (-2 92%)
Node 67 (2.03%)

****
Routing Time Step Summary
****
Total Routing Time : 30 00 hrs
Minimum Time Step : 10.00 sec
Average Time Step : 10 00 sec
Maximum Time Step : 10.00 sec

****
Routing Iterations Summary
****
Avg. Iterations per Time Step: 2 5

Number of Iterations:	1	2	3	4	5	6	7	8	9	>=10
Fract. of Time Steps:	0 00	0 83	0 05	0 09	0 01	0 00	0 00	0.00	0.00	0 02

Analysis begun on: Tue Oct 04 12:07:12 2005
Total elapsed time: 00:00:12

Alternative 1 - Utilization of Existing Basin

```
[TITLE]

[OPTIONS]
 FLOW_UNITS            CFS
 INFILTRATION          GREEN_AMPT
 FLOW_ROUTING          DYNWAVE
 START_DATE            05/04/2005
 START_TIME            00:00:00
 REPORT_START_DATE     05/04/2005
 REPORT_START_TIME     00:00:00
 END_DATE              05/05/2005
 END_TIME              06:00:00
 SWEEP_START           12/01
 SWEEP_END             12/31
 DRY_DAYS              0
 WET_STEP              00:15:00
 DRY_STEP              01:00:15
 ROUTING_STEP          00:00:10
 REPORT_STEP           00:00:10
 ALLOW_PONDING         NO
 INERTIAL_DAMPING      PARTIAL
 VARIABLE_STEP         0.00
 LENGTHENING_STEP      0
 MIN_SURFAREA          0
 COMPATIBILITY         5

[RAINGAGES]
;;                Rain      Recd.  Snow   Data       Source           Station    Rain
;;Name            Type      Freq.  Catch  Source     Name             ID         Units
;;--------------------------------------------------------------------------------
  Gage1           INTENSITY 0:05   1.0    TIMESERIES TS1

[SUBCATCHMENTS]
;;                                                    Total     Pcnt.              Pcnt      Curb      Snow
;;Name            Raingage         Outlet             Area      Imperv   Width     Slope     Length    Pack
;;--------------------------------------------------------------------------------------------------------
;Lots 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
  1               Gage1            29                 7 51      100      500       0.5       0
;78th Avenue - Olive to Golden
  2               Gage1            30                 0.983     100      500       0.4       0
;Los 11, 12, 14, 15, 16, 17, 18, 1A
  3               Gage1            30                 13 28     100      1100      0.5       0
;Lots 26, 25, 24, 27, 28, 29, 30, 41, 42, 43, 44
  4               Gage1            33                 8.04      100      1100      0.5       0
;lots, 31, 32, 33, 34, 35, 36, 39, 40
  5               Gage1            36                 7 2       100      500       0.5       0
;Lots 20, 21, 22, 26, 46, 46, 47, 48, 49, 59, 60, 61
  6               Gage1            34                 8.34      100      900       0.5       0
;Lots 50, 51, 52, 53, 54, 55, 56, 57, 58
  7               Gage1            37                 6 76      100      780       0.5       0
;lots 19, 62, 63, 64
  8               Gage1            35                 3.48      100      750       0.5       0
;78th Avenue - Golden to midpoint in 78th
  9               Gage1            34                 1.10      100      500       0.4       0
;78th Avenue - Midpoint to in 78th to Seldon
  10              Gage1            37                 0.895     100      650       0.4       0
;77th Avenue - Golden to Midpoint
  11              Gage1            35                 1.10      100      800       0.4       0
;77th Avenue - Midpoint in 77th to Seldon
  12              Gage1            38                 0.895     100      650       0.4       0
;Golden - Property Line to 77th
  13              Gage1            31                 0.344     100      250       0.3       0
;Golden - 77th to 78th Avenue
  14              Gage1            30                 0.76      100      550       0.3       0
;Golden - 78th to 79th
  15              Gage1            29                 0.758     100      550       0.3       0
;Seldon - Property line to 77th
  16              Gage1            38                 0.344     100      250       0.3       0
;Seldon 77th to 78th Avenue
  17              Gage1            37                 0.758     100      550       0.3       0
;Seldon 78th to 79th Avenue
  18              Gage1            36                 0.758     100      550       0.3       0
;79th near existing retention basin
  19              Gage1            39                 0.275     100      300       0.4       0
;Lots 74, 73, 72, 71, 70, 69
  20              Gage1            39                 7.67      100      1340      0.5       0
```

Alternative 1 - Utilization of Existing Basin

```
;Lots 56, 66, 67, 68
  24                Gage1             38                3.21      100       670       0 5       0
;79th Avnue - Olive to Half-street
  27                Gage1             33                0.92      100       1000      0.4       0
;79th Avenue half street to retention basin
  28                Gage1             36                1.38      100       1500      0.4       0
;Golden Midpoint to West Property Line
  32                Gage1             66                1.69      100       600       0.3       0
;East Property Line to Midpoint
  40                Gage1             61                1.69      100       600       0.3       0
;North Property Street
  42                Gage1             45                0.96      100       700       0.4       0
  43                Gage1             66                11.88     100       1050      0.5       0
  44                Gage1             45                7.92      100       890       0.5       0
;Similiar to Subcatchment 20
  46                Gage1             68                7.49      100       1340      0.5       0
;Full width (80') Butler from 77th to 75th
  47                Gage1             68                2.20      100       1200      0.5       0
;West Road Golden to Midpoint
  48                Gage1             62                1.10      100       780       0.4       0
;West Street Midpoint to Seldon
  49                Gage1             64                0.90      100       650       0.4       0
;Similiar to Subcatchment 4
  50                Gage1             67                8.04      100       1100      0.5       0
;Similiar to Subcatchment 5
  51                Gage1             70                7.20      100       800       0.5       0
;East Street Goldend to Midpoint
  52                Gage1             63                1.10      100       780       0.4       0
;East Street Midpoint to Seldon
  53                Gage1             65                0.90      100       650       0.4       0
;Similiar to Subcatchment 6
  54                Gage1             62                8.56      100       900       0.5       0
;Similiar to Subcatchment 5
  55                Gage1             64                6 76      100       780       0.5       0
;Similiar to Subcatchment 8
  56                Gage1             63                3 48      100       750       0.5       0
;Similiar to Subcatchment 24
  57                Gage1             65                3 21      100       670       0.5       0
;Seldon Midpoint to west property line
  58                Gage1             70                0 93      100       600       0.3       0
;East property line to midpoint
  59                Gage1             64                0.93      100       600       0.3       0
;South half street (40') of Butler from 79th to 77th.
;North half street of Butler is developed
  69                Gage1             39                1.1       100       1200      0.3       0
  77                Gage1             83                1.2       100       650       0.5       0
;East half 79th Ave from Olive to Butler
  79                Gage1             83                2.42      25        2640      0.5       0
  84                Gage1             80                1.2       100       650       0.5       0
  85                Gage1             81                1.2       100       650       0.5       0
  86                Gage1             82                1.2       100       650       0.5       0

[SUBAREAS]
;;Subcatchment     N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-----------------------------------------------------------------------------------------
  1                 0.011      0.2        2.53       0          0          OUTLET
  2                 0.011      0.2        0.05       0          100        OUTLET
  3                 0.011      0.2        2.10       0          0          OUTLET
  4                 0.011      0.2        2.53       0          0          OUTLET
  5                 0.011      0.2        1.76       0          0          OUTLET
  6                 0.011      0.2        1.93       0          0          OUTLET
  7                 0.011      0.2        2.12       0          0          OUTLET
  8                 0.011      0.2        1.58       0          0          OUTLET
  9                 0.011      0.2        0.05       0          100        OUTLET
  10                0.011      0.2        0.05       0          100        OUTLET
  11                0.011      0.2        0.05       0          100        OUTLET
  12                0.011      0.2        0.05       0          100        OUTLET
  13                0.011      0.2        0.05       0          100        OUTLET
  14                0.011      0.2        0.05       0          100        OUTLET
  15                0.011      0.2        0.05       0          100        OUTLET
  16                0.011      0.2        0.05       0          100        OUTLET
  17                0.011      0.2        0.05       0          100        OUTLET
  18                0.011      0.2        0.05       0          100        OUTLET
  19                0.011      0.2        0.05       0          100        OUTLET
  20                0.011      0.2        1.73       0          0          OUTLET
  24                0.011      0.2        2.49       0          0          OUTLET
```

27	0.011	0.2	0.05	0	100	OUTLET
28	0.011	0.2	0.05	0	100	OUTLET
32	0.011	0.2	0.05	0	100	OUTLET
40	0.011	0.2	0.05	0	100	OUTLET
42	0.011	0.2	0.05	0	100	OUTLET
43	0.011	0.2	2.53	0	0	OUTLET
44	0.011	0.2	2.53	0	0	OUTLET
46	0.011	0.2	2.53	0	0	OUTLET
47	0.011	0.2	0.05	0	100	OUTLET
48	0.011	0.2	0.05	0	100	OUTLET
49	0.011	0.2	0.05	0	100	OUTLET
50	0.011	0.2	2.53	0	0	OUTLET
51	0.011	0.2	2.53	0	0	OUTLET
52	0.011	0.2	2.53	0	0	OUTLET
53	0.011	0.2	0.05	0	100	OUTLET
54	0.011	0.2	2.53	0	0	OUTLET
55	0.011	0.2	2.53	0	0	OUTLET
56	0.011	0.2	2.53	0	0	OUTLET
57	0.011	0.2	2.53	0	0	OUTLET
58	0.011	0.2	0.05	0	100	OUTLET
59	0.011	0.2	0.05	0	100	OUTLET
69	0.011	0.2	0.05	0	100	OUTLET
77	0.011	0.1	0.05	0.05	100	OUTLET
79	0.01	0.1	0.05	0.05	100	OUTLET
84	0.011	0.1	0.05	0.05	100	OUTLET
85	0.011	0.1	0.05	0.05	100	OUTLET
86	0.011	0.1	0.05	0.05	100	OUTLET

[INFILTRATION]

;;Subcatchment	Suction	HydCon	IMDmax
1	3.5	0.13	0.231
2	3.5	0.13	0.231
3	3.5	0.13	0.231
4	3.5	0.13	0.231
5	3.5	0.13	0.231
6	3.5	0.13	0.231
7	3.5	0.13	0.231
8	3.5	0.13	0.231
9	3.5	0.13	0.231
10	3.5	0.13	0.231
11	3.5	0.13	0.231
12	3.5	0.13	0.231
13	3.5	0.13	0.231
14	3.5	0.13	0.231
15	3.5	0.13	0.231
16	3.5	0.13	0.231
17	3.5	0.13	0.231
18	3.5	0.13	0.231
19	3.5	0.13	0.231
20	3.5	0.13	0.231
24	3.5	0.13	0.231
27	3.5	0.13	0.231
28	3.5	0.13	0.231
32	3.5	0.13	0.231
40	3.5	0.13	0.231
42	3.5	0.13	0.231
43	3.5	0.13	0.231
44	3.5	0.13	0.231
46	3.5	0.13	0.231
47	3.5	0.13	0.231
48	3.5	0.13	0.231
49	3.5	0.13	0.231
50	3.5	0.13	0.231
51	3.5	0.13	0.231
52	3.5	0.13	0.231
53	3.5	0.13	0.231
54	3.5	0.13	0.231
55	3.5	0.13	0.231
56	3.5	0.13	0.231
57	3.5	0.13	0.231
58	3.5	0.13	0.231
59	3.5	0.13	0.231
69	3.5	0.13	0.231
77	3.5	0.13	0.231
79	3.5	0.13	0.231

```
  84              3.5         0.13        0.231
  85              3.5         0.13        0.231
  86              3.5         0.13        0.231

[JUNCTIONS]
;;                Invert      Max.        Init.       Surcharge   Ponded
;;Name            Elev.       Depth       Depth       Depth       Area
;;--------------------------------------------------------------------------
  29              1124.5      2.0         0           0           0
  30              1123.4      2.0         0           0           0
  31              1125.2      2.0         0           0           0
  33              1122.5      2.0         0           0           0
  34              1120.3      2.0         0           0           0
  35              1122.5      2.0         0           0           0
  36              1118.4      2.0         0           0           0
  37              1118.8      2.0         0           0           0
  38              1120.6      2.0         0           0           0
  39              1105        12          0           0           0
  45              1138.94     2.0         0           0           0
  60              1137.44     2.0         0           0           0
  61              1137.44     2.0         0           0           0
  62              1133.19     2.0         0           0           0
  63              1133.19     2.0         0           0           0
  64              1127.19     2.0         0           0           0
  65              1129.94     2.0         0           0           0
  66              1128.44     2.0         0           0           0
  67              1126.44     2.0         0           0           0
  68              1113.02     9           0           0           0
  70              1114        8           0           0           0
;MH at Sta 11+410
  71              1111.17     9.24        0           0           0
;MH at Sta  11+230
  72              1109.09     10          0           0           0
;MH at 11+020
  73              1104.64     10          0           0           0
;MH at 10+920
  74              1103.26     10          0           0           0
;Butler tie in at 10+818
  75              1098.58     13.4        0           0           0
;mh at Sta 10+725
  76              1096.08     12.85       0           0           0
  80              1103.20     12.6        0           0           0
  81              1101.83     13.0        0           0           0
  82              1100.46     13.         0           0           0
  83              1104.7      12.3        0           0           0

[OUTFALLS]
;;                Invert      Outfall     Stage/Table      Tide
;;Name            Elev.       Type        Time Series      Gate
;;-------------------------------------------------------------
  78              1091.18     FIXED       1099.08 NO

[STORAGE]
;;                Invert   Max.     Init.    Shape      Shape                    Ponded   Evap.
;;Name            Elev.    Depth    Depth    Curve      Parameters               Area     Frac
;;-------------------------------------------------------------------------------------------
  41-Basin        1105     12       0        TABULAR    Retention                0        0

[CONDUITS]
;;                Inlet           Outlet                      Manning    Inlet      Outlet     Init
;;Name            Node            Node            Length      N          Height     Height     Flow
;;-------------------------------------------------------------------------------------------------
  12              29              33              400         0.011      0          0          0
  13              33              36              1500        0.011      0          0          0
  14              36              39              300         0.011      0          12         0
  15              30              34              800         0.011      0          0          0
  16              34              37              650         0.011      0          0          0
  17              31              35              850         0.011      0          0          0
  18              35              38              650         0.011      0          0          0
  19              38              37              550         0.011      0          0          0
  20              37              36              550         0.011      0          0          0
  23              39              41-Basin        20          0.001      0          12         0
  24              61              63              850         0.011      0          0          0
  25              63              65              650         0.011      0          0          0
  26              65              64              550         0.011      0          0          0
  27              64              70              550         0.011      0          8          0
```

28	60	62	800	0.011	0	0	0
29	62	64	650	0.011	0	0	0
30	66	67	850	0.011	0	0	0
31	67	70	650	0.011	0	6	0
32	70	68	300	0.011	0	0	0
33	68	41-Basin	1200	0.011	0	4 13	0
34	45	60	300	0.011	0	0	0
35	71	72	590	0.013	0	0	0
36	72	73	689	0.013	0	0	0
37	73	74	330	0.013	0	0	0
38	74	75	335	0.013	0	1 5	0
39	75	76	305	0.013	0	0	0
44	80	81	650	0.013	0	0	0
45	81	82	650	0.013	0	0	0
46	82	75	650	0.013	0	5	0
47	83	80	841	0.013	0	0	0
48	76	78	541	0.013	0	0	0

[ORIFICES]

;;Name	Inlet Node	Outlet Node	Type	Invert Height	Disch. Coeff.	Flap Gate
1	41-Basin	83	BOTTOM	-2	0 65	NO

[XSECTIONS]

;;Link	Type	Geom1	Geom2	Geom3	Geom4	Barrels
12	IRREGULAR	1b	0	0	0	1
13	IRREGULAR	1b	0	0	0	1
14	IRREGULAR	1a	0	0	0	1
15	IRREGULAR	4	0	0	0	1
16	IRREGULAR	4	0	0	0	1
17	IRREGULAR	4	0	0	0	1
18	IRREGULAR	4	0	0	0	1
19	IRREGULAR	4	0	0	0	1
20	IRREGULAR	4	0	0	0	1
23	DUMMY	2.0	0	0	0	1
24	IRREGULAR	4	0	0	0	1
25	IRREGULAR	4	0	0	0	1
26	IRREGULAR	4	0	0	0	1
27	IRREGULAR	4	0	0	0	1
28	IRREGULAR	4	0	0	0	1
29	IRREGULAR	4	0	0	0	1
30	TRAPEZOIDAL	2.0	5	1	1	1
31	TRAPEZOIDAL	2.0	5	1	1	1
32	CIRCULAR	2.5	0	0	0	1
33	CIRCULAR	2.5	0	0	0	1
34	IRREGULAR	4	0	0	0	1
35	CIRCULAR	2.0	0	0	0	1
36	CIRCULAR	2.0	0	0	0	1
37	CIRCULAR	2.0	0	0	0	1
38	CIRCULAR	2.0	0	0	0	1
39	CIRCULAR	3.5	0	0	0	1
44	CIRCULAR	2.5	0	0	0	1
45	CIRCULAR	2.5	0	0	0	1
46	CIRCULAR	2.5	0	0	0	1
47	CIRCULAR	2.5	0	0	0	1
48	CIRCULAR	3.5	0	0	0	1
1	CIRCULAR	2	0	0	0	

[TRANSECTS]

```
NC 0 01     0 01     0 01
X1 1a               9        0.0      0.0      0 0      0 0      0.0      0 0      0.0
GR 2        0        0 5      0.5      0.5      8        0        8.1      0 64     40
GR 0        72        5       72.1     .5       80       2        80.1

NC 0 01     0 01     0 01
X1 2                3        0.0      0.0      0 0      0 0      0.0      0 0      0 0
GR 0 25     0        0        0.5      0.5      32

NC 0 01     0.01     0 01
X1 3                5        0.0      0.0      0 0      0 0      0.0      0 0      0.0
GR 0 5      0        0        0.5      0.25     32       0        63.5     0 5      64
```

```
 NC 0.01     0 01     0.01
 X1 4                 9          0.0       0.0       0 0       0 0       0.0       0.0       0 0
 GR 2        0        0.5        0.5       0.5       10        0         10 5      0.36      28
 GR 0        45 5     0.5        46        0.5       55 5      2         56

 NC 0.01     0 01     0.01
 X1 5                 5          0.0       0.0       0 0       0.0       0 0       0.0       0 0
 GR 0.5      0        0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01     0 01     0.01
 X1 6                 5          0.0       0.0       0 0       0 0       0 0       0.0       0 0
 GR 0.5      0        0          0.5       0.25      18        0         35.5      0.5       36

 NC 0.01     0 01     0.01
 X1 7                 5          0.0       0.0       0 0       0 0       0 0       0.0       0 0
 GR 0.5      0        0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01     0 01     0.01
 X1 8                 5          0.0       0.0       0 0       0 0       0 0       0.0       0 0
 GR 0.5      0        0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01     0 01     0.01
 X1 9                 5          0.0       0.0       0.0       0 0       0 0       0.0       0 0
 GR 0.5      0        0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01     0 01     0.01
 X1 11                5          0.0       0.0       0 0       0 0       0.0       0.0       0.0
 GR 0.5      0        0          0.5       0.25      18        0         35.5      0.5       36

 NC 0.01     0 01     0.01
 X1 12                5          0.0       0.0       0.0       0 0       0 0       0.0       0 0
 GR 0.5      0        0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01     0 01     0.01
 X1 13                5          0.0       0.0       0 0       0 0       0 0       0.0       0 0
 GR 0.5      0        0          0.5       0.25      18        0         35.5      0.5       36.

 NC 0.01     0 01     0.01
 X1 14                5          0.0       0.0       0 0       0.0       0 0       0.0       0 0
 GR 0.5      0        0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01     0 01     0.01
 X1 15                5          0.0       0.0       0 0       0 0       0.0       0.0       0 0
 GR 0.5      0        0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01     0 01     0.01
 X1 16                5          0.0       0.0       0 0       0 0       0 0       0.0       0 0
 GR 0.5      0        0          0.5       0.25      18        0         35.5      0.5       36

 NC 0.01     0 01     0.01
 X1 17                5          0.0       0.0       0 0       0 0       0.0       0.0       0 0
 GR 0.5      0        0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01     0 01     0.01
 X1 18                5          0.0       0.0       0 0       0 0       0 0       0.0       0 0
 GR 0.5      0        0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01     0 01     0.01
 X1 20                5          0.0       0.0       0 0       0 0       0.0       0.0       0 0
 GR 0.5      0        0          0.5       0.25      32        0         63 5      0.5       64

 NC 0.01     0 01     0.01
 X1 1b                5          0.0       0.0       0 0       0 0       0 0       0.0       0 0
 GR 2        0        .5         .1        5         8         0         8 1       64        40

[DWF]
;;
;;Node            Parameter        Average    Time
;;                                 Value      Patterns
;;-------------------------------------------------------
  71              FLOW             2.98
  72              FLOW             3.72
  73              FLOW             2.35
  74              FLOW             3.72
  76              FLOW             2.17

[CURVES]
```

Alternative 1 - Utilization of Existing Basin

```
;;Name            Type       X-Value     Y-Value
;;--------------------------------------------------
;Existing retention basin
  Retention       Storage    0           10000
  Retention                  1           11122
  Retention                  2           13860
  Retention                  3           15288
  Retention                  4           16940
  Retention                  5           18560
  Retention                  6           18592
  Retention                  7           22188
  Retention                  8           24165
  Retention                  9           26085
  Retention                  10          26980
  Retention                  11          29988
  Retention                  12          32000

[TIMESERIES]
;;Name            Date       Time        Value
;;--------------------------------------------------
;100 Year, 2 Hour
  TS1                        0           0
  TS1                        0:05        0.33
  TS1                        0:10        0.21
  TS1                        0:15        0.15
  TS1                        0:20        0.15
  TS1                        0:25        0.12
  TS1                        0:30        0.43
  TS1                        0:35        0.76
  TS1                        0:40        0.88
  TS1                        0:45        1.12
  TS1                        0:50        1.18
  TS1                        0:55        1.70
  TS1                        1:00        2.88
  TS1                        1:05        8.32
  TS1                        1:10        4.31
  TS1                        1:15        3.64
  TS1                        1:20        1.15
  TS1                        1:25        0.88
  TS1                        1:30        0.73
  TS1                        1:35        0.24
  TS1                        1:40        0.24
  TS1                        1:45        0.21
  TS1                        1:50        0.15
  TS1                        1:55        0.30
  TS1                        2:00        0.24

;100 Year, 6 Hour
  TS2                        0:00        0
  TS2                        0:15        0.18
  TS2                        0:30        0.06
  TS2                        0:45        0.12
  TS2                        1:00        0.216
  TS2                        1:15        0.18
  TS2                        1:30        0.156
  TS2                        1:45        0.168
  TS2                        2:00        0.18
  TS2                        2:15        0.168
  TS2                        2:30        0.192
  TS2                        2:45        0.204
  TS2                        3:00        0.276
  TS2                        3:15        0.564
  TS2                        3:30        0.984
  TS2                        3:45        2.016
  TS2                        4:00        2.376
  TS2                        4:15        1.512
  TS2                        4:30        0.864
  TS2                        4:45        0.528
  TS2                        5:00        0.408
  TS2                        5:15        0.168
  TS2                        5:30        0.156
  TS2                        5:45        0.168
  TS2                        6:00        0.156

;10 year, 2 hour
  TS3                        0:05        0
```

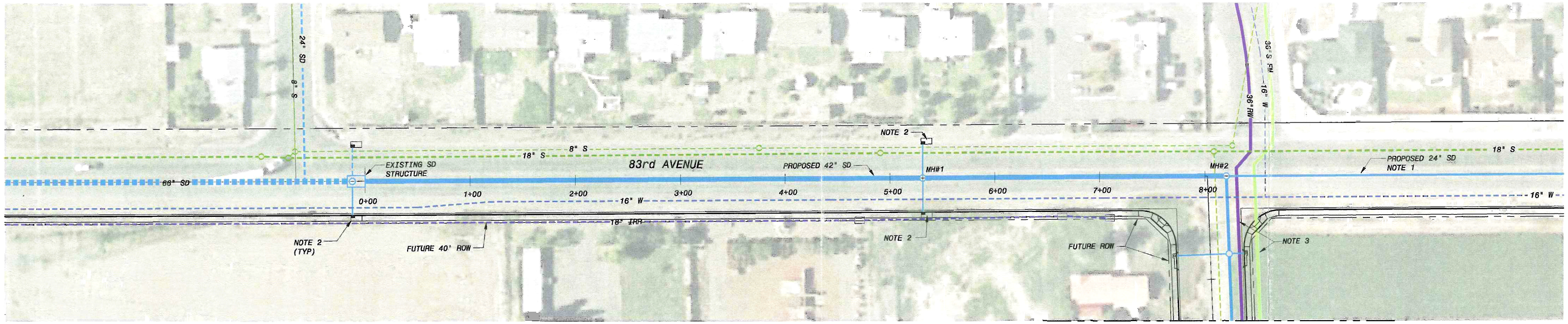
```
 TS3                      0:10       0.21
 TS3                      0:15       0.13
 TS3                      0:20       0.09
 TS3                      0:25       0.09
 TS3                      0:30       0.08
 TS3                      0:35       0.27
 TS3                      0:40       0.47
 TS3                      0:45       0.70
 TS3                      0:50       0.74
 TS3                      0:55       1.06
 TS3                      1:00       1.80
 TS3                      1:05       5.20
 TS3                      1:10       2.69
 TS3                      1:15       2.28
 TS3                      1:20       0.72
 TS3                      1:25       0.55
 TS3                      1:30       0.46
 TS3                      1:35       0.15
 TS3                      1:40       0.15
 TS3                      1:45       0.13
 TS3                      1:50       0.09
 TS3                      1:55       0.19
 TS3                      2:00       0.15

[REPORT]
 CONTROLS  NO

[OPTIONS]
 TEMPDIR   "C:\DOCUME~1\cor17454.NA\LOCALS~1\Temp\"
```

APPENDIX D

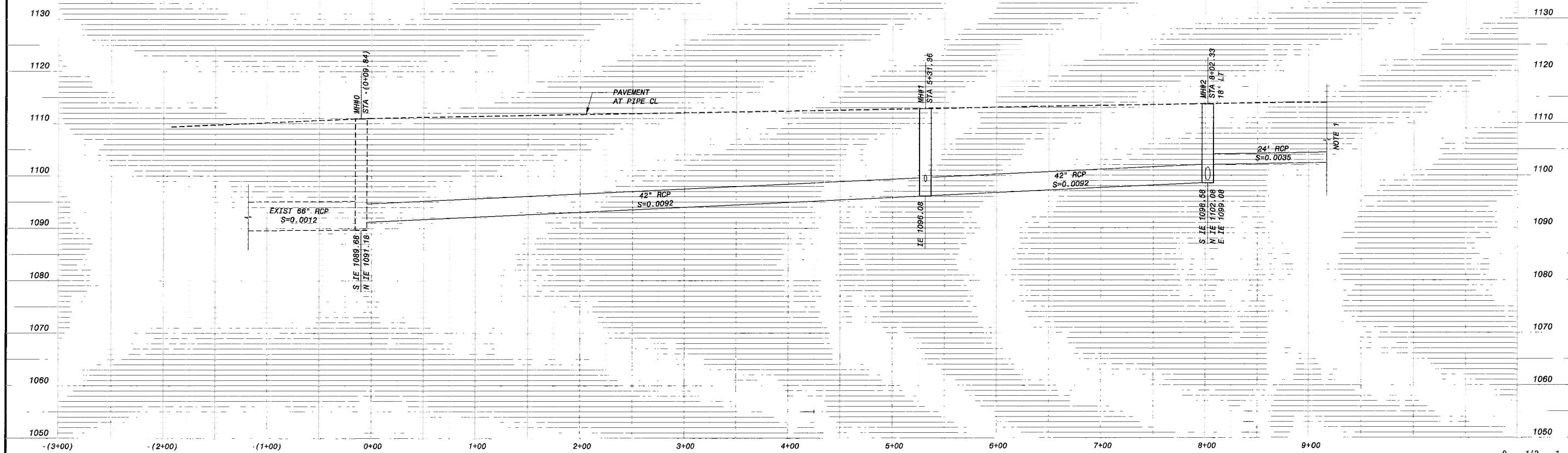
50' 25' 0 50' 100'

1"=50'

NOTES
1 24"SD IN 83RD AVE NORTH OF BUTLER DRIVE TO BE CONSTRUCTED AS PRESENTED IN PRELIMINARY DESIGN PREPARED BY INCA ENGINEERS INC FOR MCDOT
2. TYPE M CATCH BASIN PER CITY OF PHOENIX STD DTL P1569-1 SIZE BASED ON INCA ENGINEERS PRELIMINARY DESIGN.
3 PROPOSED PIPELINES ASSOCIATED WITH CITY OF PEORIA BUTLER DRIVE WRF.



SEE SHEET PP2 FOR CONT



0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

NO.	REVISIONS AND RECORD OF ISSUE	BY	CK	APP
	DATE			
	CYGNET ID: 131866-1000-C-BOOOOBK7			
	SAVED: CDR17454, 11/16/2005 2:27:24 PM			
	DWG VER #: 1.5			
	PLOTTED: CDR17454, 11/21/2005 12:26:24 PM			
	USER: CDR17454			

XREF1 ID:
XREF2 ID:
XREF3 ID:
XREF4 ID:
XREF5 ID:
SW: BOOOOBK7.dwg

BLACK & VEATCH Corporation
Concord, California

CITY OF PEORIA
BUTLER DRIVE
STORM DRAIN DCR

PROPOSED BUTLER DRIVE STORM DRAIN
CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 1

DESIGNED: JLC
DETAILED: JLC
CHECKED:
APPROVED:
DATE: 9/22/04

PROJECT NO.
136825

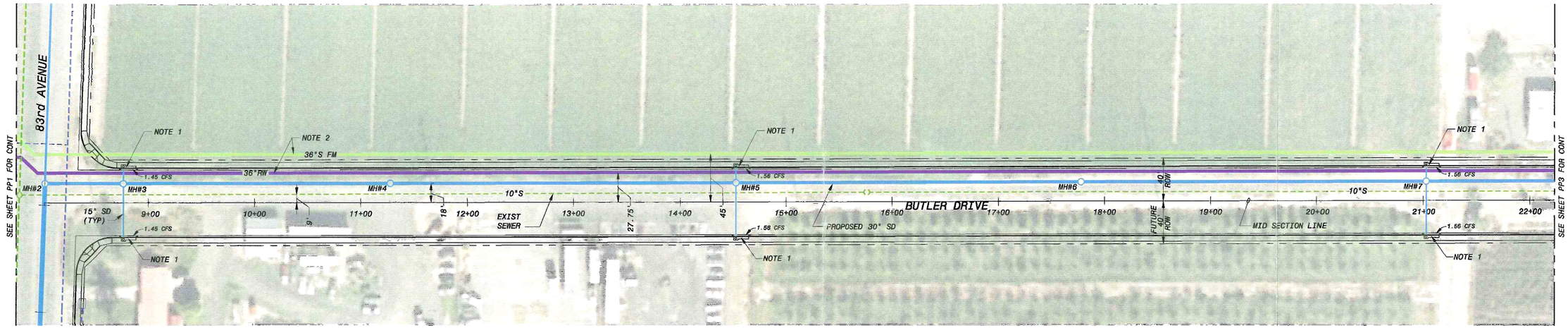
PP1

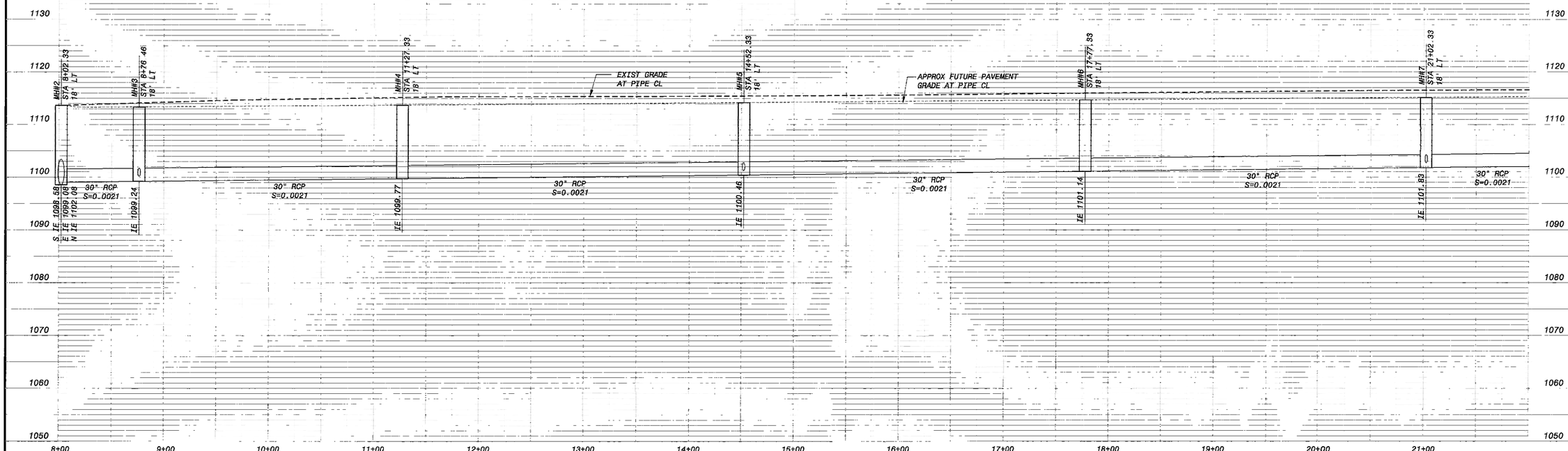
SHEET OF

F05000
D90ESS

50' 25' 0 50' 100'
1"=50'

NOTES:
1. TYPE M CATCH BASIN PER CITY OF PHOENIX STD DTL P1569-1 10' WING LENGTH
2. PROPOSED PIPELINES ASSOCIATED WITH CITY OF PEORIA BUTLER DRIVE WRF





0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

NO.	BY	CK	APP	REVISIONS AND RECORD OF ISSUE	DATE

CYGNET ID: 131866-1000-C-BOOOOBK7 | XREF1 ID:
SAVED: COR17454, 11/16/2005 2:27:24 PM | XREF2 ID:
DWG VER #: 1.5 | XREF3 ID:
PLOTTED: COR17454, 11/21/2005 12:26:50 PM | XREF4 ID:
USER: COR17454 | SW: BOOOOBK7.dwg | XREF5 ID:

BLACK & VEATCH Corporation
Concord, California

CITY OF PEORIA
BUTLER DRIVE
STORM DRAIN DCR

PROPOSED BUTLER DRIVE STORM DRAIN
CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 1

DESIGNED: JLC
DETAILED: JLC
CHECKED:
APPROVED:
DATE: 9/22/04

PROJECT NO.
136825

PP2

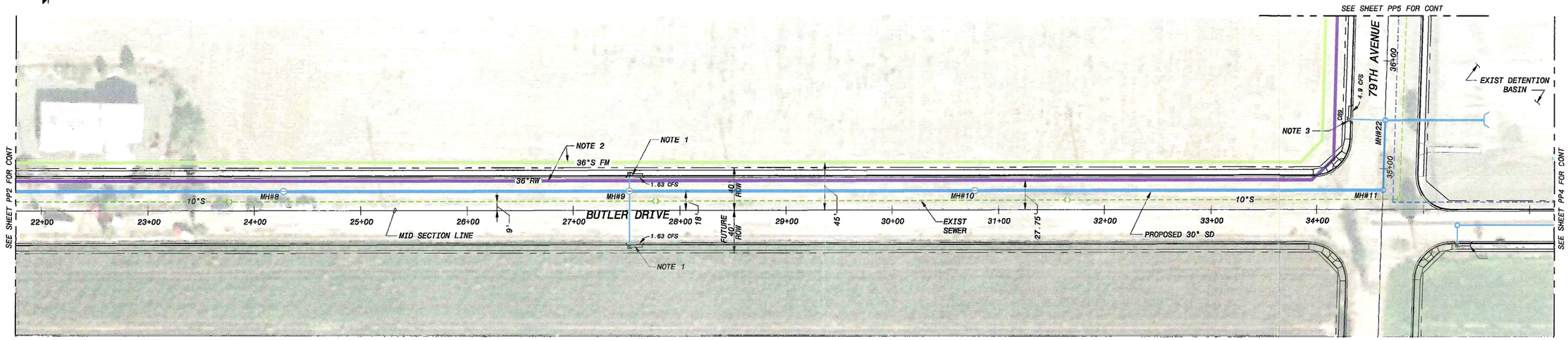
SHEET
OF

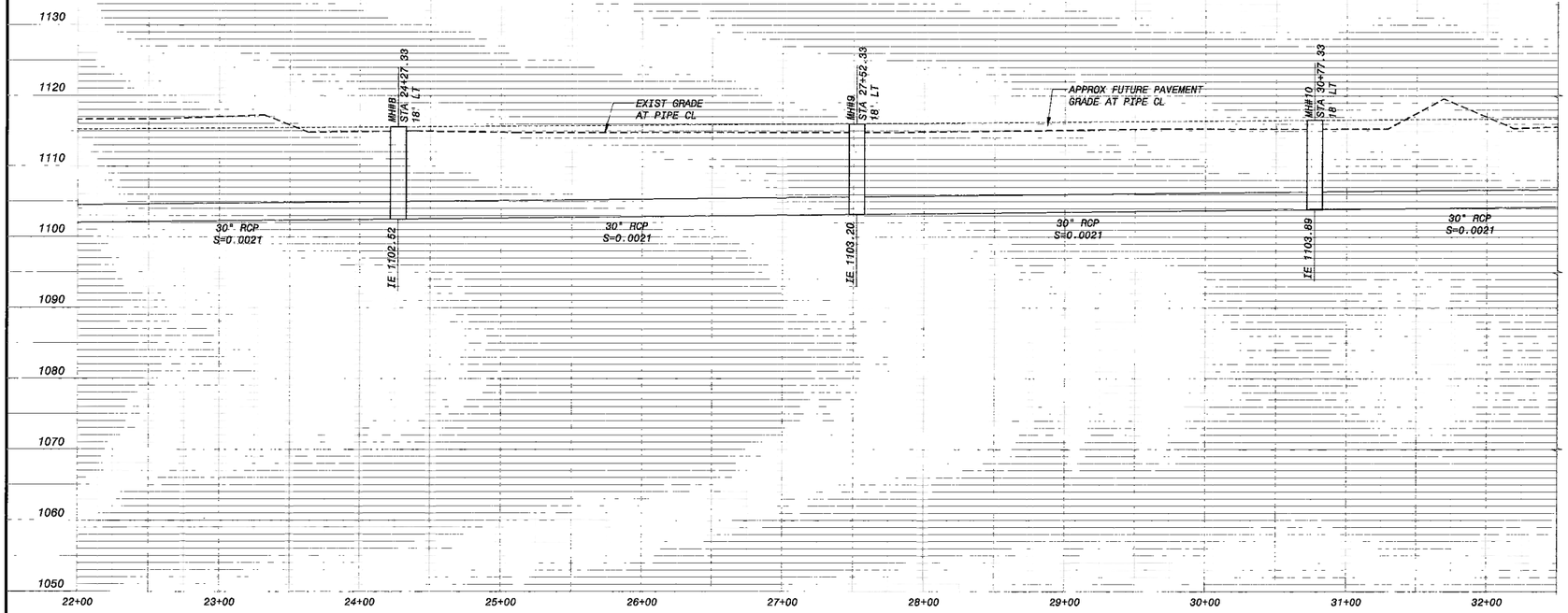
FD5000
D0025S

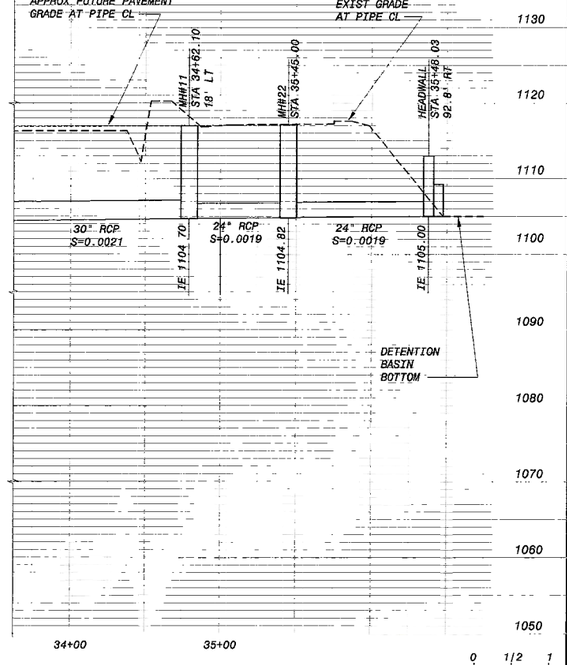
50' 25' 0 50' 100'

1"=50'

NOTES
1. TYPE M CATCH BASIN PER CITY OF PHOENIX STD DTL P1569-1 10' WING LENGTH
2. PROPOSED PIPELINES ASSOCIATED WITH CITY OF PEORIA BUTLER DRIVE WRF
3. TYPE M CATCH BASIN PER CITY OF PHOENIX STD DTL P1569-1 17' WING LENGTH







0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

NO.	BY	CK	APP	DATE	REVISIONS AND RECORD OF ISSUE
					CYGNET ID: 131886-1000-C-B0000GBK7
					SAVED: COR17454, 11/16/2005 2:27:24 PM
					DWG VER #: 1.5
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					USER: COR17454

XREF1 ID:
XREF2 ID:
XREF3 ID:
XREF4 ID:
XREF5 ID:
SW: B0000GBK7.dwg

BLACK & VEATCH Corporation
Concord, California

CITY OF PEORIA
BUTLER DRIVE
STORM DRAIN DCR

PROPOSED BUTLER DRIVE STORM DRAIN
CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 1

DESIGNED: JLC
DETAILED: JLC
CHECKED:
APPROVED:
DATE: 9/22/04

PROJECT NO.
136825

PP3

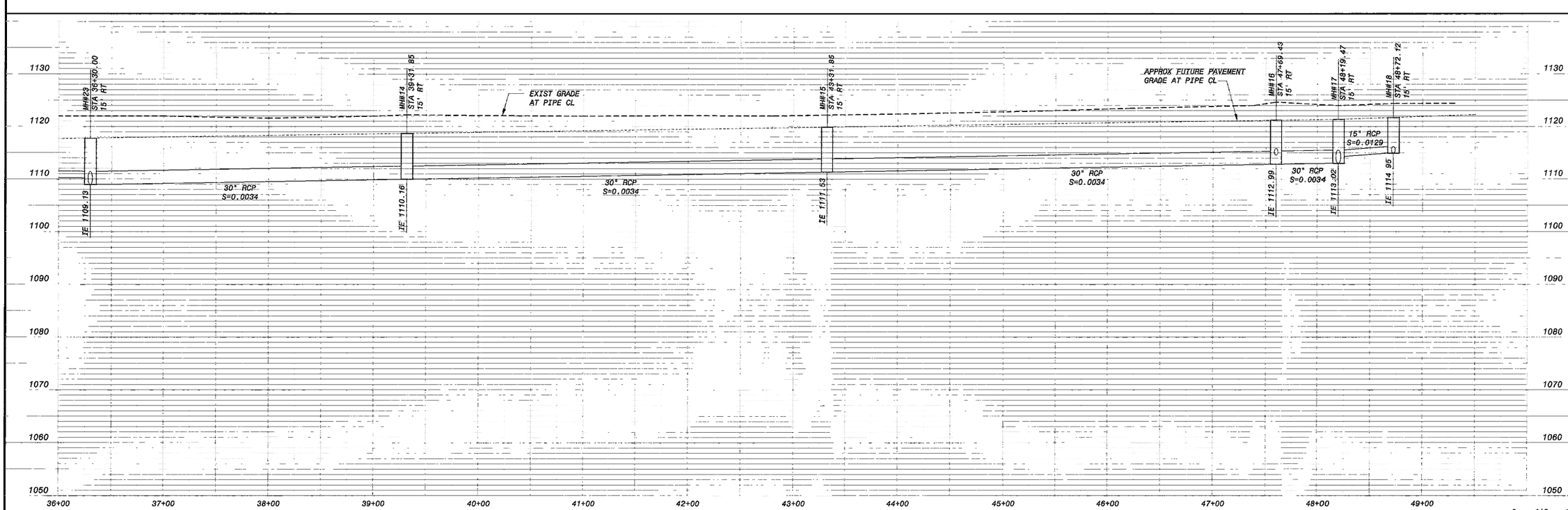
SHEET
OF

FD5000
DS0255

50' 25' 0 50' 100'

1"=50'

NOTES
1. TYPE M CATCH BASIN
PER CITY OF PHOENIX STD DTL P1569-1
17' WING LENGTH.



0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

NO.	BY	CK	APP
REVISIONS AND RECORD OF ISSUE			

DATE
CYGNET ID: 131886-1000-C-B00006BK7
SAVED: COR17454, 11/16/2005 2:27:24 PM
DWG VER #: 1.5
PLOTTED: COR17454, 11/21/2005 12:27:14 PM
USER: COR17454

XREF1 ID:
XREF2 ID:
XREF3 ID:
XREF4 ID:
XREF5 ID:
Str: B00006BK7.dwg

BLACK & VEATCH
Corporation
Concord, California

CITY OF PEORIA
BUTLER DRIVE
STORM DRAIN DCR

PROPOSED BUTLER DRIVE STORM DRAIN
CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 1

DESIGNED: JLC
DETAILED: JLC
CHECKED:
APPROVED:
DATE: 9/22/04

PROJECT NO.
136825

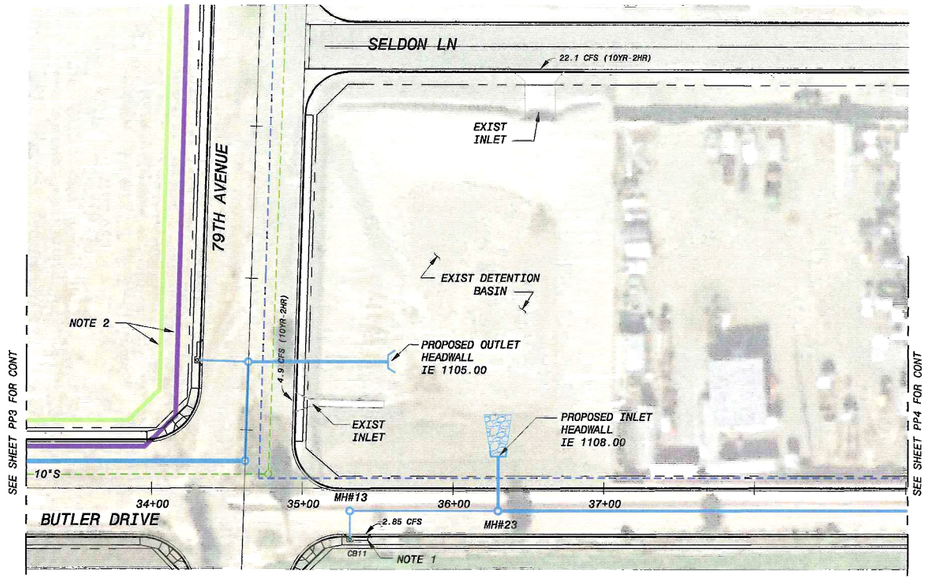
PP4

SHEET
OF

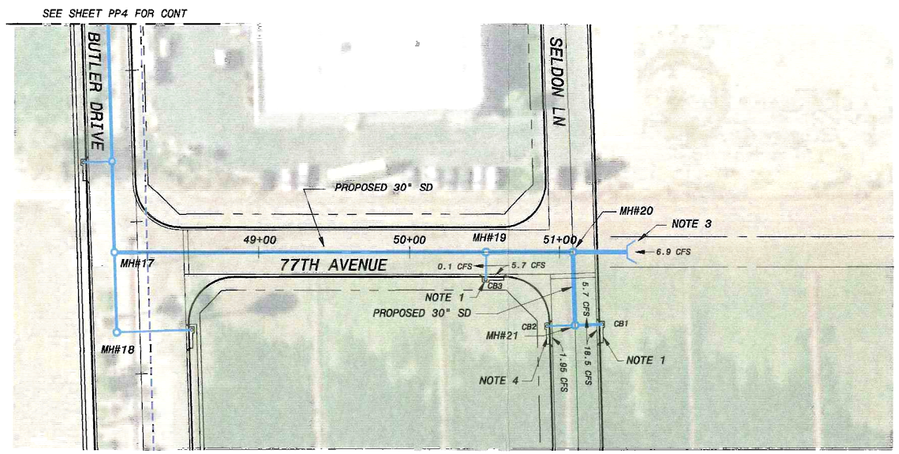
FD5000
D5025S

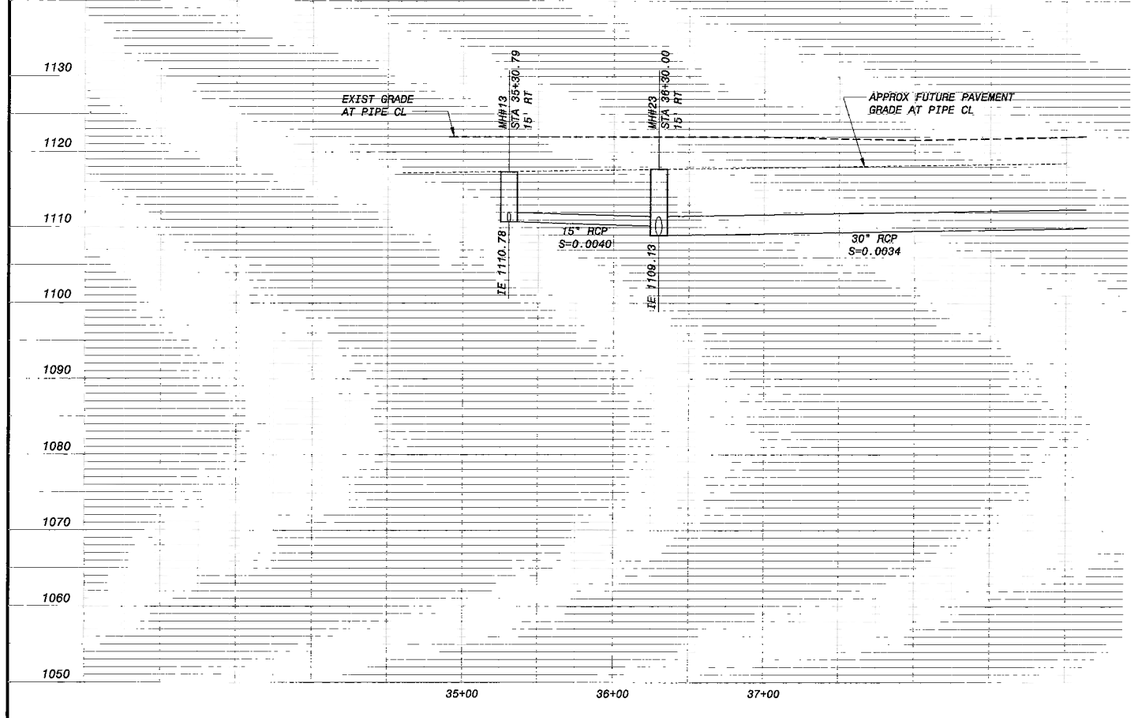
50' 25' 0 50' 100'

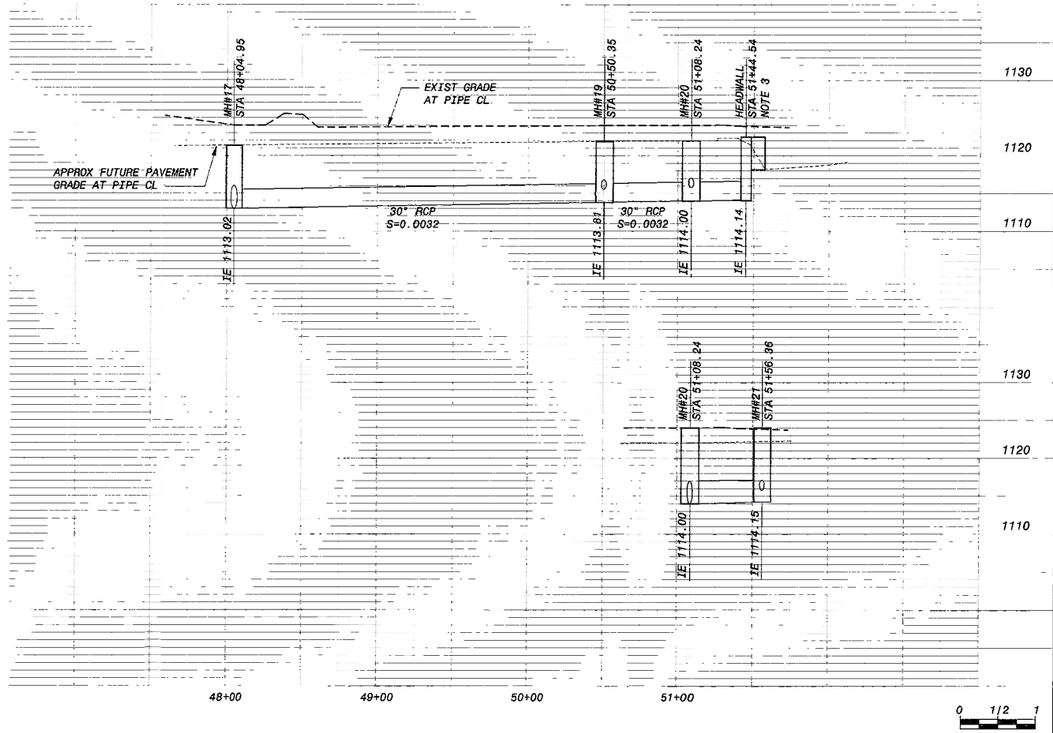
1"=50'



NOTES
1. TYPE M CATCH BASIN PER CITY OF PHOENIX STD DTL P1569-1 17' WING LENGTH.
2. PROPOSED PIPELINES ASSOCIATED WITH CITY OF PEORIA BUTLER DRIVE WRF.
3. DROP HEADWALL WITH TRASH RACK PER MAG STD DTL 502-1.
4. TYPE M CATCH BASIN PER CITY OF PHOENIX STD DTL P1569-1 10' WING LENGTH.







0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

NO.	BY	CK.	APP

DATE
REVISIONS AND RECORD OF ISSUE
CYGNET ID: 131866-1000-C-B000068K7 XREF1 ID:
SAVED: CDR17454, 11/16/2005 2:27:24 PM XREF2 ID:
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PLOTTED: CDR17454, 11/21/2005 12:27:25 PM XREF4 ID:
USER: CDR17454 SW: B000068K7.DWG XREF5 ID:

BLACK & VEATCH Corporation
Concord, California

CITY OF PEORIA
BUTLER DRIVE
STORM DRAIN DCR

PROPOSED BUTLER DRIVE STORM DRAIN
CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 1

DESIGNED: JLC
DETAILED: JLC
CHECKED:
APPROVED:
DATE: 9/22/04

PROJECT NO.
136825

PP5

SHEET
OF -

FD5000
D5028S

APPENDIX E

STREET RUNOFF COMPUTATION
BUTLER HALF STREET - STA 8+76.5
10-Year Event

Street Slope (ft/ft) $S := .0014$ Ten year $C := .85$

Street Length (ft) $L := 576$

Half Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 0.529$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.042$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} \cdot Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 3.23$ (in/hr)

$Tc = 0.249$ (hr) $Tc \cdot 60 = 14.920$ (min)

Peak runoff (cfs): $Q := i \cdot C \cdot A$ $Q = 1.452$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - STA 8+76.5

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$	Street Cross-Slope	$n := 0.016$	Street Roughness
$S := .005$	Street Long Slope		
$a := 0.167$	2" Gutter Depression	$Qt := 1.45$	Total Street+Gutter Flow
$W := 1.5$	Gutter Width	$L := 13$	Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56\left[\left[T \cdot Sx + W \cdot (Sw - Sx)\right]^{2.67} - \left[(T - W) \cdot Sx\right]^{2.67}\right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56\left[(T - W) \cdot Sx\right]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 0.562$ Street Flow $T = 8.131$ Total Flow Width

$Qw = 0.888$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.612$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.088$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se}\right)^{0.6}$$

$Lt = 9.181$ Required Curb Opening Length (ft)
(Assuming 80% Capacity)

STREET RUNOFF COMPUTATION
BUTLER HALF STREET - STA 14+52 33
10-Year Event

Street Slope (ft/ft) $S := .0014$ Ten year $C := .85$

Street Length (ft) $L := 650$

Half Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 0.597$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.041$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 3.071$ (in/hr)

$Tc = 0.268$ (hr) $Tc \cdot 60 = 16.089$ (min)

Peak runoff (cfs): $Q := i \cdot C \, A$ $Q = 1.558$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - STA 14+52.33

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$	Street Cross-Slope	$n := 0.016$	Street Roughness
$S := .005$	Street Long Slope		
$a := 0.167$	2" Gutter Depression	$Qt := 1.56$	Total Street+Gutter Flow
$W := 1.5$	Gutter Width	$L := 13$	Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 0.634$	Street Flow	$T = 8.437$	Total Flow Width
$Qw = 0.926$	Gutter Flow		

$Eo := \frac{Qw}{Qt}$ $Eo = 0.593$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.086$ Equivalent Cross Slope

$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \, S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$ $Lt = 9.604$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

STREET RUNOFF COMPUTATION
BUTLER HALF STREET - STA 21+02.33
10-Year Event

Street Slope (ft/ft) $S := .0014$ Ten year $C := .85$

Street Length (ft) $L := 650$

Half Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 0.597$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.041$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 3.071$ (in/hr)

$Tc = 0.268$ (hr) $Tc \cdot 60 = 16.089$ (min)

Peak runoff (cfs): $Q := i \cdot C \cdot A$ $Q = 1.558$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - STA 21+02 33

Determine inlet length (Lt) to intercept total street and gutter flow. Compute flow intercepted by inlet length less than Lt.

$Sx := .02$	Street Cross-Slope	$n := 0.016$	Street Roughness
$S := .005$	Street Long Slope		
$a := 0.167$	2" Gutter Depression	$Qt := 1.56$	Total Street+Gutter Flow
$W := 1.5$	Gutter Width	$L := 13$	Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $\quad Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $\quad Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 0.634$ Street Flow $\quad T = 8.437$ Total Flow Width

$Qw = 0.926$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $\quad Eo = 0.593$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $\quad Se = 0.086$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6} \quad Lt = 9.604$$

Required Curb Opening Length (ft)
(Assuming 80% Capacity)

STREET RUNOFF COMPUTATION
BUTLER HALF STREET STA 27+52.33
10-Year Event

Street Slope (ft/ft) $S := .0014$ Ten year $C := .85$

Street Length (ft) $L := 700$

Half Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 0.643$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.041$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 2.978$ (in/hr)

$Tc = 0.281$ (hr) $Tc \cdot 60 = 16.851$ (min)

Peak runoff (cfs): $Q := i \cdot C \cdot A$ $Q = 1.627$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - STA 27+52.33

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$	Street Cross-Slope	$n := 0.016$	Street Roughness
$S := .005$	Street Long Slope		
$a := 0.167$	2" Gutter Depression	$Qt := 1.63$	Total Street+Gutter Flow
$W := 1.5$	Gutter Width	$L := 13$	Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 0.681$ Street Flow $T = 8.623$ Total Flow Width

$Qw = 0.949$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.582$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.085$ Equivalent Cross Slope

$$Lt = \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$$ $Lt = 9.868$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB1**

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$ Street Cross-Slope $n := 0.016$ Street Roughness

$S := .005$ Street Long Slope

$a := 0.167$ 2" Gutter Depression $Qt := 18.5$ Total Street+Gutter Flow (FROM SWMM)

$W := 1.5$ Gutter Width $L := 20$ Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 14.824$ Street Flow $T = 24.085$ Total Flow Width

$Qw = 3.676$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.199$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.042$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} 0.6 \cdot Qt^{0.42} S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$$ $Lt = 41.665$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

$$E := 1 - \left(1 - \frac{L}{Lt} \right)^{1.8}$$ $E = 0.692$ Interception Efficiency

$Qt \cdot E = 12.799$ Intercepted Flow (cfs)

STREET RUNOFF COMPUTATION
SELDON · 77TH TO 79TH AVE HALF STREET (CB2)
10-Year Event

Street Slope (ft/ft) $S := .005$ Ten year $C := .85$

Street Length (ft) $L := 1200$

Street ROW (ft) $W := 25$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 0.689$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.041$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 3.338$ (in/hr)

$Tc = 0.237$ (hr) $Tc \cdot 60 = 14.205$ (min)

Peak runoff (cfs) $Q := i \cdot C \cdot A$ $Q = 1.954$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB2**

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$ Street Cross-Slope $n := 0.016$ Street Roughness

$S := .005$ Street Long Slope

$a := 0.167$ 2" Gutter Depression $Qt := 1.95$ Total Street+Gutter Flow

$W := 1.5$ Gutter Width $L := 13$ Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 0.899$ Street Flow $T = 9.406$ Total Flow Width

$Qw = 1.051$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.539$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.08$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$$

$Lt = 11.022$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB3**

Determine inlet length (Lt) to intercept total street and gutter flow. Compute flow intercepted by inlet length less than Lt.

$Sx := .02$	Street Cross-Slope	$n := 0.016$	Street Roughness
$S := .005$	Street Long Slope		
$a := 0\ 167$	2" Gutter Depression	$Qt := 5\ 7$	Total Street+Gutter Flow (BYPASS FROM CB 1)
$W := 1.5$	Gutter Width	$L := 20$	Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $\quad Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $\quad Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 3\ 794$ Street Flow $\quad T = 15.057$ Total Flow Width

$Qw = 1.906$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $\quad Eo = 0.334$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $\quad Se = 0.057$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6} \quad Lt = 21.145$$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

$$E := 1 - \left(1 - \frac{L}{Lt} \right)^{1.8} \quad E = 0.995$$ Interception Efficiency

$Qt \cdot E = 5.67$ Intercepted Flow (cfs)

STREET RUNOFF COMPUTATION
BUTLER 75th AVE to 77th AVE HALF STREET (CB4, CB5)
10-Year Event

Street Slope (ft/ft) $S := .0069$ Ten year $C := .85$

Street Length (ft) $L := 1200$

Half Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 1\ 102$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.04$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 3.704$ (in/hr)

$Tc = 0.203$ (hr) $Tc \cdot 60 = 12.155$ (min)

Peak runoff (cfs): $Q := i \cdot C\ A$ $Q = 3.469$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB4**

Determine inlet length (Lt) to intercept total street and gutter flow. Compute flow intercepted by inlet length less than Lt.

$Sx := .02$ Street Cross-Slope

$n := 0.016$ Street Roughness

$S := .005$ Street Long Slope

$a := 0.167$ 2" Gutter Depression

$Qt := 3.47$ Total Street+Gutter Flow

$W := 1.5$ Gutter Width

$L := 20$ Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := Find(Qs, Qw, T)$$

$Qs = 2.021$ Street Flow

$T = 12.209$ Total Flow Width

$Qw = 1.449$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.417$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.066$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \left(\frac{1}{n \cdot Se} \right)^{0.6}$$

$Lt = 15.69$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

STREET RUNOFF COMPUTATION
77TH AVE FULL STREET (CB5)
10-Year Event

Street Slope (ft/ft) $S := .005$ Ten year $C := .85$

Street Length (ft) $L := 300$

Street ROW (ft) $W := 50$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 0.344$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.043$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} \cdot Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 6.077$ (in/hr)

$Tc = 0.096$ (hr) $Tc \cdot 60 = 5\ 790$ (min)

Peak runoff (cfs): $Q := i \cdot C \cdot A$ $Q = 1\ 779$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB5**

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := 02$ Street Cross-Slope $n := 0.016$ Street Roughness

$S := .005$ Street Long Slope

$a := 0.167$ 2" Gutter Depression $Qt := 3.47 + 1\ 78$ Total Street+Gutter Flow

$W := 1.5$ Gutter Width $L := 20$ Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 3.429$ Street Flow $T = 14.552$ Total Flow Width

$Qw = 1.821$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.347$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.059$ Equivalent Cross Slope

$$Lt = \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$$ $Lt = 20.134$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

STREET RUNOFF COMPUTATION
SELDON - 77TH TO 79TH AVE SOUTH HALF STREET (CB6)
10-Year Event

Street Slope (ft/ft) $S := .005$ Ten year $C := .85$

Street Length (ft) $L := 1250$

Street ROW (ft) $W := 25$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 0.717$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.041$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 3.282$ (in/hr)

$Tc = 0.243$ (hr) $Tc \cdot 60 = 14.571$ (min)

Peak runoff (cfs) $Q := i \cdot C \cdot A$ $Q = 2.001$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB6**

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$	Street Cross-Slope	$n := 0.016$	Street Roughness
$S := .005$	Street Long Slope		
$a := 0.167$	2" Gutter Depression	$Qt := 2.0$	Total Street+Gutter Flow
$W := 1.5$	Gutter Width	$L := 13$	Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := Find(Qs, Qw, T)$$

$Qs = 0.934$	Street Flow	$T = 9.52$	Total Flow Width
$Qw = 1.066$	Gutter Flow		

$Eo := \frac{Qw}{Qt}$ $Eo = 0.533$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.079$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$$

$Lt = 11\ 196$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

STREET RUNOFF COMPUTATION
79TH AVE - OLIVE TO SELDON EAST HALF STREET (CB7)
10-Year Event

Street Slope (ft/ft) $S := .005$ Ten year $C := .85$

Street Length (ft) $L := 2272$

Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 2.086$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.038$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} \cdot Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 2.599$ (in/hr)

$Tc = 0.344$ (hr) $Tc \cdot 60 = 20.659$ (min)

Peak runoff (cfs): $Q := i \cdot C \cdot A$ $Q = 4.609$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB7**

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$ Street Cross-Slope $n := 0.016$ Street Roughness

$S := .005$ Street Long Slope

$a := 0.167$ 2" Gutter Depression $Qt := 23.1$ Total Street+Gutter Flow $(4.6 + 18.5) = 23.1$ CFS (SWMM)

$W := 1.5$ Gutter Width $L := 20$ Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 18.931$ Street Flow $T = 26.251$ Total Flow Width

$Qw = 4\ 169$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.18$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.04$ Equivalent Cross Slope

$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$ $Lt = 47.115$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

$E := 1 - \left(1 - \frac{L}{Lt}\right)^{1.8}$ $E = 0.63$ Interception Efficiency

$Qt \cdot E = 14.555$ Intercepted Flow (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB8**

Determine inlet length (Lt) to intercept total street and gutter flow. Compute flow intercepted by inlet length less than Lt.

$Sx := .02$ Street Cross-Slope

$n := 0.016$ Street Roughness

$S := .005$ Street Long Slope

$a := 0.167$ 2" Gutter Depression

$Qt := 9.3$ Total Street+Gutter Flow

$W := 1.5$ Gutter Width

$L := 20$ Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 6.8$ Street Flow

$T = 18.367$ Total Flow Width

$Qw = 2.5$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.269$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.05$ Equivalent Cross Slope

$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$ $Lt = 28.185$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

$E := 1 - \left(1 - \frac{L}{Lt} \right)^{1.8}$ $E = 0.892$ Interception Efficiency

$Qt \cdot E = 8.296$ Intercepted Flow (cfs)

STREET RUNOFF COMPUTATION
79TH AVE · OLIVE TO BUTLER WEST HALF STREET (CB9)
10-Year Event

Street Slope (ft/ft) $S := .005$ Ten year $C := .85$

Street Length (ft) $L := 2540$

Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 2.332$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.038$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} \cdot Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 2.482$ (in/hr)

$Tc = 0.369$ (hr) $Tc \cdot 60 = 22.138$ (min)

Peak runoff (cfs): $Q := i \cdot C \cdot A$ $Q = 4.921$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB9**

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$ Street Cross-Slope $n := 0.016$ Street Roughness

$S := .005$ Street Long Slope

$a := 0.167$ 2" Gutter Depression $Qt := 4.9$ Total Street+Gutter Flow

$W := 1.5$ Gutter Width $L := 20$ Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 3.147$ Street Flow $T = 14.14$ Total Flow Width

$Qw = 1\ 753$ Gutter Flow

$Eo := \frac{Qw}{Qt}$ $Eo = 0.358$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.06$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$$ $Lt = 19.321$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB10**

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$	Street Cross-Slope	$n := 0.016$	Street Roughness
$S := .005$	Street Long Slope		
$a := 0.167$	2" Gutter Depression	$Qt := 1.8$	Total Street+Gutter Flow
$W := 1.5$	Gutter Width	$L := 13$	Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T\,Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

$Qs = 0.796$	Street Flow	$T = 9.052$	Total Flow Width
$Qw = 1.004$	Gutter Flow		

$Eo := \frac{Qw}{Qt}$ $Eo = 0.558$ Gutter Flow Ratio

$Se := Sx + Swp \cdot Eo$ $Se = 0.082$ Equivalent Cross Slope

$$Lt := \frac{1}{80}\, 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$$

$Lt = 10.491$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

STREET RUNOFF COMPUTATION
BUTLER 77th AVE to 79th AVE HALF STREET (CB11)
10-Year Event

Street Slope (ft/ft) $S := .0031$ Ten year $C := .85$

Street Length (ft) $L := 1250$

Half Street ROW (ft) $W := 40$

Drainage Area (ac) $A := L \cdot \frac{W}{43560}$ $A = 1\ 148$

Watershed Resistance Coeff

$m := -.00625$ $b := .04$

$Kb := m \cdot \log(A) + b$ $Kb = 0.04$

Initial guess values:
$i := 1$ $Tc := 5$

Given

10-Year IDF Curve (Fig 3.2 FCDMC) is adjusted to Peoria rainfall depth and fitted to the following:

Rainfall intensity (in/hr) $i = \left(\frac{1.91}{2.07}\right) \cdot \left(1.3825 \cdot Tc^{-.6676}\right)$

Time of concentration (hr) $Tc = 11.4 \cdot \left(\frac{L}{5280}\right)^{0.5} \cdot Kb^{0.52} \cdot (S \cdot 5280)^{-0.31} \cdot i^{-0.38}$

$\begin{pmatrix} i \\ Tc \end{pmatrix} := \text{Find}(i, Tc)$

SOLUTION:

$i = 2.917$ (in/hr)

$Tc = 0.29$ (hr) $Tc \cdot 60 = 17.384$ (min)

Peak runoff (cfs): $Q := i \cdot C \cdot A$ $Q = 2.846$ (cfs)

DEPRESSED-GUTTER CURB INLET LENGTH - **CB11**

Determine inlet length (Lt) to intercept total street and gutter flow Compute flow intercepted by inlet length less than Lt.

$Sx := .02$	Street Cross-Slope	$n := 0.016$	Street Roughness
$S := .005$	Street Long Slope		
$a := 0.167$	2" Gutter Depression	$Qt := 2.85$	Total Street+Gutter Flow
$W := 1.5$	Gutter Width	$L := 20$	Available Curb Inlet Length (ft)

$Swp := \frac{a}{W}$ $Swp = 0.111$ Relative Gutter Cross-Slope

$Sw := Swp + Sx$ $Sw = 0.131$ Absolute Gutter Cross-Slope

Initial Guess Values

$T := 8 \quad Qs := 1 \quad Qw := Qt - Qs$

Given

Equations from Land Development Handbook, Dewberry & Davis, 1996, McGraw-Hill, pgs.551-552
This method provides equivalent results to the use of nomographs provided in Figures 3.22, 3.23, 3.20 in FCDMC Drainage Design Manual, Volume 2.

$Qs + Qw = Qt$

$$Qw = \frac{0.56 \cdot \left[[T \cdot Sx + W \cdot (Sw - Sx)]^{2.67} - [(T - W) \cdot Sx]^{2.67} \right] \cdot S^{0.5}}{n \cdot Sw} \qquad Qs = \frac{0.56 \cdot [(T - W) \cdot Sx]^{2.67} \cdot S^{0.5}}{n \cdot Sx}$$

Solve Three Equations + Three Unknowns

$$\begin{pmatrix} Qs \\ Qw \\ T \end{pmatrix} := \text{Find}(Qs, Qw, T)$$

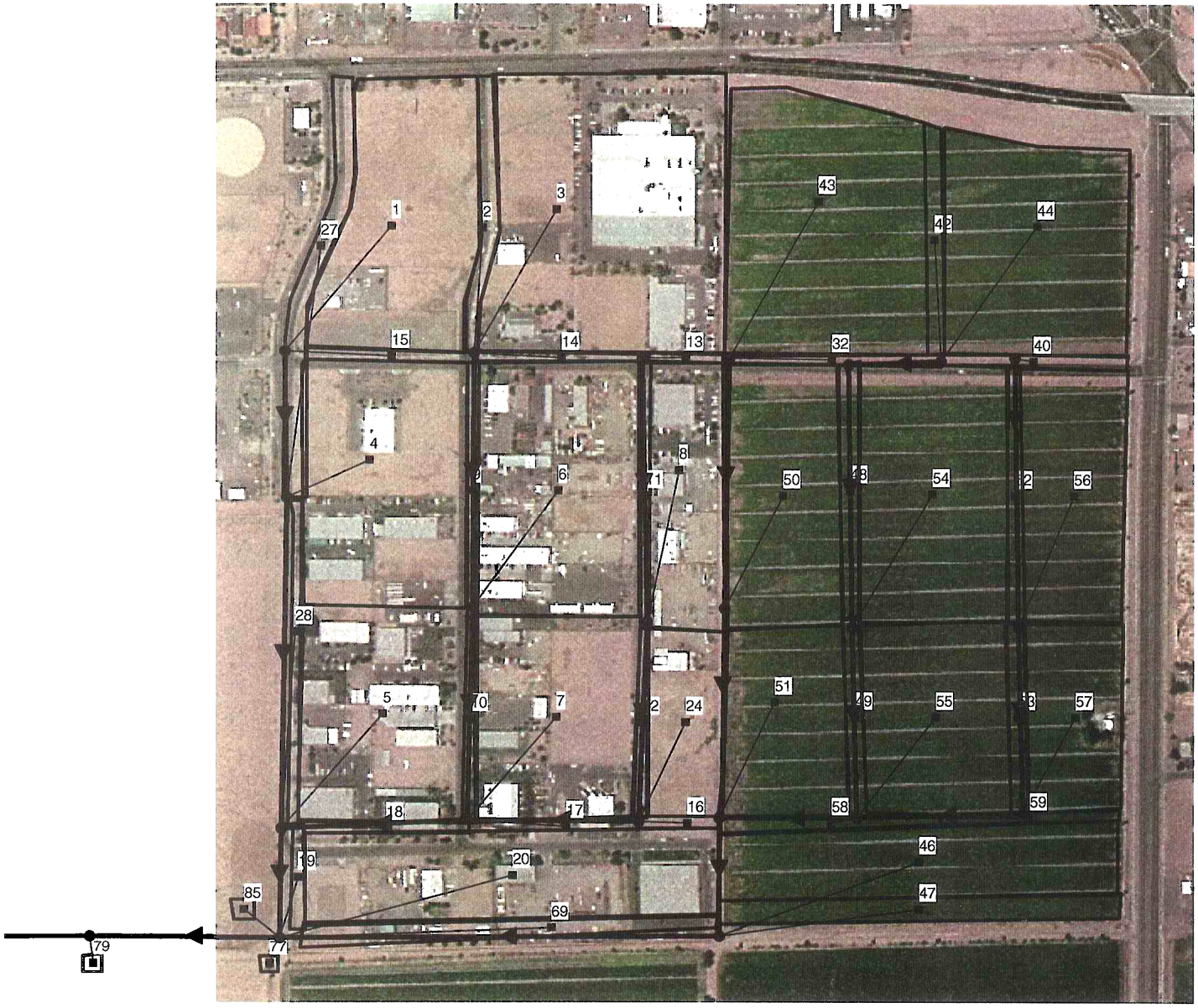
$Qs = 1.551$	Street Flow	$T = 11\ 197$	Total Flow Width
$Qw = 1.299$	Gutter Flow		

$Eo := \frac{Qw}{Qt}$ $Eo = 0.456$ Gutter Flow Ratio

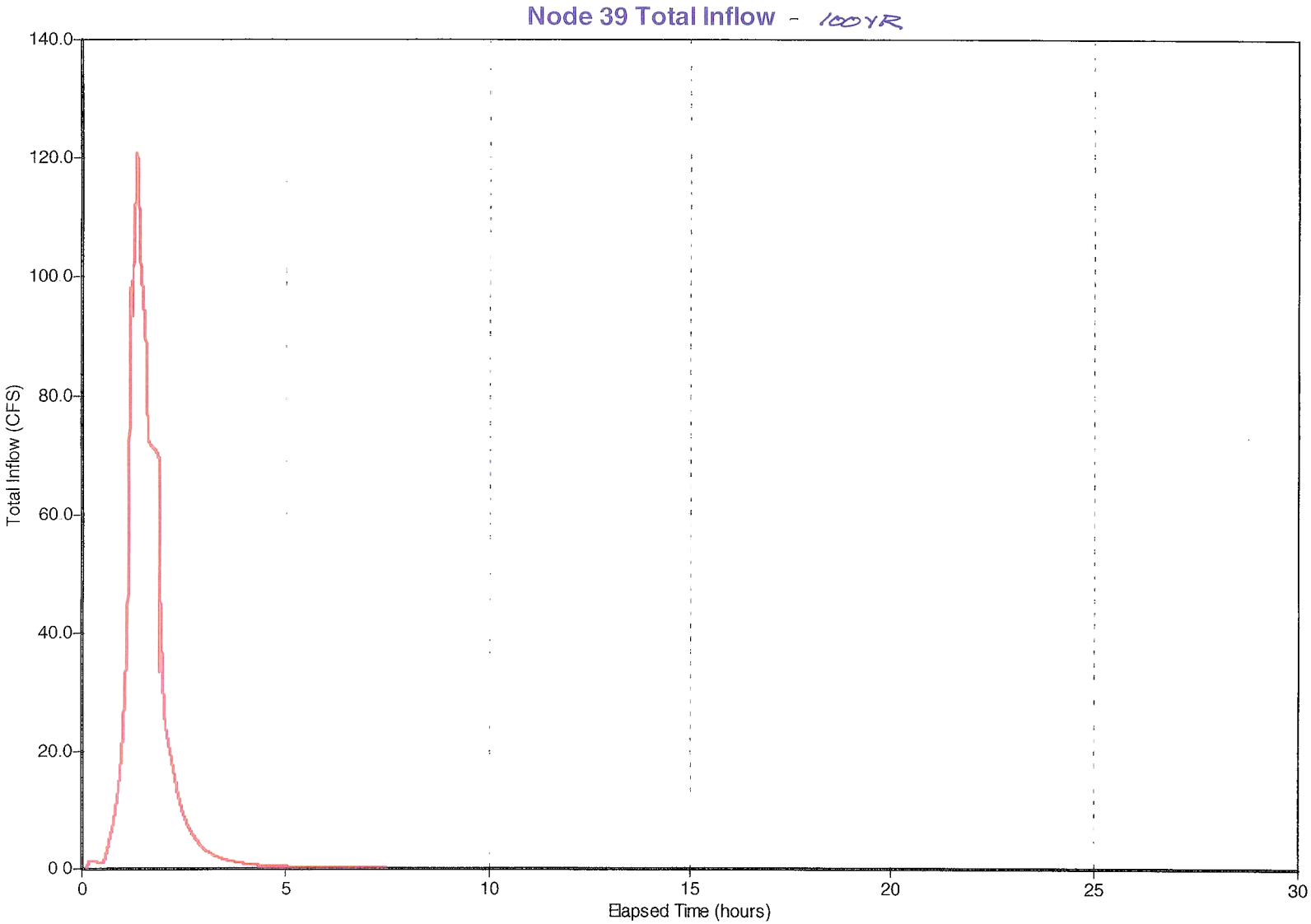
$Se := Sx + Swp \cdot Eo$ $Se = 0.071$ Equivalent Cross Slope

$$Lt := \frac{1}{.80} \cdot 0.6 \cdot Qt^{0.42} \cdot S^{0.3} \cdot \left(\frac{1}{n \cdot Se} \right)^{0.6}$$ $Lt = 13.916$ Required Curb Opening Length (ft) (Assuming 80% Capacity)

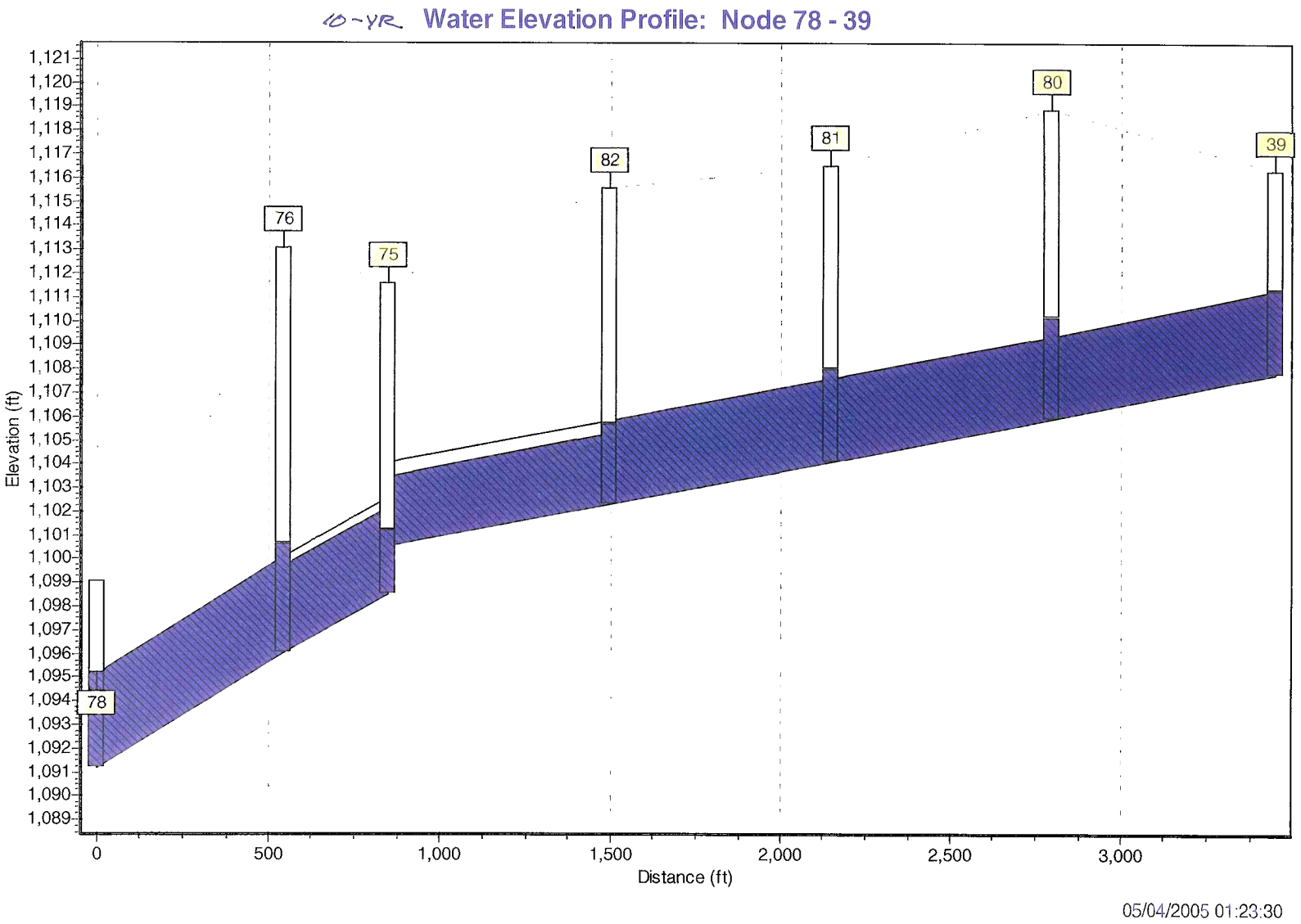
Alternative 2 - Eliminate Existing Basin



Alternative 2 - Eliminate Existing Basin



Alternative 2 - Eliminate Existing Basin



Alternative 2 - Eliminate Existing Basin

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.004)

****
Analysis Options
****

Flow Units	CFS
Infiltration Method	GREEN_AMPT
Flow Routing Method	DYNWAVE
Starting Date	MAY-04-2005 00:00:00
Ending Date	MAY-05-2005 06:00:00
Wet Time Step	00:15:00
Dry Time Step	01:00:15
Routing Time Step	00:00:10
Report Time Step	00:00:10

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	20.420	1.533
Evaporation Loss	0.000	0.000
Infiltration Loss	0.000	0.000
Surface Runoff	3.702	0.278
Final Surface Storage	16.756	1.258
Continuity Error (%)	-0.185	

Flow Routing Continuity	Volume acre-feet	Volume Mgallons
Dry Weather Inflow	37.038	12.069
Wet Weather Inflow	3.702	1.206
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.120	0.039
Internal Flooding	0.000	0.000
External Outflow	40.810	13.298
Evaporation Loss	0.000	0.000
Initial Stored Volume	0.078	0.025
Final Stored Volume	0.261	0.085
Continuity Error (%)	-0.322	

****
Node Depth Summary
****

	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Average Depth Change	Total Minutes Flooded
JUNCTION 29	0.01	0.28	1124.78	0 01:11	0.0001	0
JUNCTION 30	0.01	0.22	1123.62	0 01:12	0.0000	0
JUNCTION 31	0.01	0.11	1125.31	0 01:13	0.0000	0
JUNCTION 33	0.04	0.34	1122.84	0 01:21	0.0001	0
JUNCTION 34	0.02	0.26	1120.56	0 01:15	0.0000	0
JUNCTION 35	0.02	0.19	1122.69	0 01:14	0.0000	0
JUNCTION 36	0.12	2.08	1111.68	0 01:23	0.0004	0
JUNCTION 37	0.04	0.34	1119.14	0 01:20	0.0001	0
JUNCTION 38	0.02	0.23	1120.83	0 01:15	0.0000	0
JUNCTION 39	0.15	3.53	1111.35	0 01:23	0.0007	0
JUNCTION 45	0.01	0.19	1139.13	0 01:10	0.0000	0
JUNCTION 60	0.01	0.16	1137.60	0 01:14	0.0000	0
JUNCTION 61	0.01	0.22	1137.66	0 01:12	0.0000	0
JUNCTION 62	0.01	0.17	1133.36	0 01:14	0.0000	0
JUNCTION 63	0.01	0.17	1133.36	0 01:16	0.0000	0
JUNCTION 64	0.03	0.29	1125.04	0 01:20	0.0001	0
JUNCTION 65	0.02	0.21	1127.71	0 01:19	0.0000	0
JUNCTION 66	0.01	0.57	1129.01	0 01:11	0.0001	0
JUNCTION 67	0.01	0.25	1126.69	0 01:15	0.0000	0
JUNCTION 68	0.10	1.73	1114.75	0 01:20	0.0003	0
JUNCTION 70	0.09	1.71	1115.71	0 01:18	0.0003	0

JUNCTION	71	0.64	0.64	1111.81	0	01:25	0.0001	0
JUNCTION	72	0.84	0.84	1109.93	0	01:15	0.0001	0
JUNCTION	73	1.20	1.22	1105.86	0	00:59	0.0001	0
JUNCTION	74	1.01	1.02	1104.28	0	00:12	0.0001	0
JUNCTION	75	0.89	2.66	1101.23	0	01:23	0.0007	0
JUNCTION	76	3.08	4.55	1100.63	0	01:23	0.0010	0
JUNCTION	80	0.18	4.30	1110.19	0	01:22	0.0008	0
JUNCTION	81	0.18	3.90	1108.02	0	01:22	0.0007	0
JUNCTION	82	0.20	3.39	1105.74	0	01:22	0.0006	0
OUTFALL	78	7.90	7.90	1099.08	0	00:00	0.0000	0

****
Conduit Flow Summary
****

Conduit	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Velocity ft/sec	Length Factor	Maximum /Design Flow	Total Minutes Surcharged
12	3.49e+000	0 01:11	1.73	1.00	0.01	0
13	4.24e+000	0 01:21	1.75	1.00	0.01	0
14	2.67e+001	0 01:19	5.53	1.00	0.65	0
15	7.25e+000	0 01:12	1.92	1.00	0.01	0
16	9.28e+000	0 01:15	1.60	1.00	0.01	0
17	1.14e+000	0 01:14	0.70	1.00	0.00	0
18	4.39e+000	0 01:15	1.36	1.00	0.00	0
19	7.72e+000	0 01:16	1.53	1.00	0.01	0
20	1.91e+001	0 01:21	2.52	1.00	0.02	0
24	7.06e+000	0 01:13	2.73	1.00	0.00	0
25	5.94e+000	0 01:16	2.19	1.00	0.00	0
26	7.86e+000	0 01:19	1.77	1.00	0.01	0
27	1.80e+001	0 01:20	3.12	1.00	0.01	0
28	3.71e+000	0 01:14	3.27	1.00	0.00	0
29	7.16e+000	0 01:14	2.06	1.00	0.00	0
30	7.38e+000	0 01:13	3.49	1.00	0.07	0
31	6.58e+000	0 01:15	5.04	1.00	0.03	0
32	2.37e+001	0 01:19	5.71	1.00	0.62	0
33	2.60e+001	0 01:20	5.50	1.00	0.63	0
34	4.85e+000	0 01:11	2.38	1.00	0.00	0
35	2.98e+000	0 01:13	3.26	1.00	0.22	0
36	6.70e+000	0 01:38	4.67	1.00	0.37	0
37	9.14e+000	0 00:12	5.13	1.00	0.62	0
38	1.29e+001	0 00:08	8.94	1.00	0.48	0
39	7.46e+001	0 01:23	6.26	1.00	0.57	0
44	5.82e+001	0 01:25	6.38	1.00	1.11	12
45	6.01e+001	0 01:23	6.52	1.00	1.14	9
46	6.19e+001	0 01:23	7.20	1.00	1.18	0
47	5.85e+001	0 01:17	7.07	1.00	0.82	8
48	7.68e+001	0 01:24	6.11	1.00	0.56	1800

****
Flow Classification Summary
****

	Fraction of Time in Flow Class							Avg.	Avg
Conduit	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Froude Number	Flow Change
12	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.04	0.0000
13	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.27	0.0000
14	0.01	0.00	0.00	0.01	0.00	0.00	0.98	0.50	0.0001
15	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.10	0.0000
16	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.09	0.0000
17	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.08	0.0000
18	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.17	0.0000
19	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.13	0.0000
20	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.35	0.0000
24	0.01	0.00	0.00	0.96	0.03	0.00	0.00	0.17	0.0000
25	0.01	0.01	0.00	0.97	0.02	0.00	0.00	0.21	0.0000
26	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.16	0.0000
27	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.48	0.0000
28	0.01	0.00	0.00	0.98	0.01	0.00	0.00	0.18	0.0000

Alternative 2 - Eliminate Existing Basin

29	0.01	0.00	0.00	0.98	0.01	0.00	0.00	0.14	0.0000
30	0.01	0.28	0.00	0.70	0.01	0.00	0.00	0.08	0.0000
31	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.16	0.0000
32	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.31	0.0001
33	0.01	0.00	0.00	0.02	0.00	0.00	0.98	0.51	0.0001
34	0.01	0.00	0.00	0.98	0.02	0.00	0.00	0.09	0.0000
35	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.58	0.0001
36	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.73	0.0001
37	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.85	0.0001
38	0.00	0.00	0.00	0.02	0.98	0.00	0.00	1.59	0.0001
39	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.28	0.0002
44	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.38	0.0002
45	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.34	0.0002
46	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.50	0.0002
47	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.42	0.0002
48	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0002

```
**************************
Highest Continuity Errors
**************************
Node 33 (-2.75%)
Node 68 (-2.34%)
Node 29 (-1.98%)
Node 30 (-1.45%)
Node 31 (-1.36%)


**************************
Routing Time Step Summary
**************************
Total Routing Time :  30.00   hrs
Minimum Time Step  :  10.00   sec
Average Time Step  :  10.00   sec
Maximum Time Step  :  10.00   sec


**************************
Routing Iterations Summary
**************************
Avg  Iterations per Time Step:  2 2
Number of Iterations:     1       2       3       4       5       6       7       8       9    >=10
                        ---------------------------------------------------------------------------
Fract  of Time Steps: 0 00    0.94    0 03    0 01    0 01    0 01    0.00    0 00    0.00    0 00

Analysis begun on:  Tue Oct 04 13:39:53 2005
Total elapsed time: 00:00:13
```

Alternative 2 - Eliminate Existing Basin

```
[TITLE]

[OPTIONS]
 FLOW_UNITS            CFS
 INFILTRATION          GREEN_AMPT
 FLOW_ROUTING          DYNWAVE
 START_DATE            05/04/2005
 START_TIME            00:00:00
 REPORT_START_DATE     05/04/2005
 REPORT_START_TIME     00:00:00
 END_DATE              05/05/2005
 END_TIME              06:00:00
 SWEEP_START           12/01
 SWEEP_END             12/31
 DRY_DAYS              0
 WET_STEP              00:15:00
 DRY_STEP              01:00:15
 ROUTING_STEP          00:00:10
 REPORT_STEP           00:00:10
 ALLOW_PONDING         NO
 INERTIAL_DAMPING      PARTIAL
 VARIABLE_STEP         0 00
 LENGTHENING_STEP      0
 MIN_SURFAREA          0
 COMPATIBILITY         5

[RAINGAGES]
;;                Rain      Recd.  Snow   Data       Source           Station    Rain
;;Name            Type      Freq.  Catch  Source     Name             ID         Units
;;--------------------------------------------------------------------------------------
  Gage1           INTENSITY 0:05   1 0    TIMESERIES TS3

[SUBCATCHMENTS]
;;                                                    Total     Pcnt                Pcnt.     Curb      Snow
;;Name            Raingage         Outlet            Area      Imperv    Width     Slope     Length    Pack
;;--------------------------------------------------------------------------------------------------------
;Lots 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
  1               Gage1            29                7 51      100       500       0 5       0
;78th Avenue - Olive to Golden
  2               Gage1            30                0 983     100       500       0 4       0
;Los 11, 12, 14, 15, 16, 17, 18, 1A
  3               Gage1            30                13 28     100       1100      0 5       0
;Lots 26, 25, 24, 27, 28, 29, 30, 41, 42, 43, 44
  4               Gage1            33                8 04      100       1100      0 5       0
;lots, 31, 32, 33, 34, 35, 36, 39, 40
  5               Gage1            36                7 2       100       500       0 5       0
;Lots 20, 21, 22, 26, 46, 46, 47, 48, 49, 59, 60, 61
  6               Gage1            34                8.34      100       900       0 5       0
;Lots 50, 51, 52, 53, 54, 55, 56, 57, 58
  7               Gage1            37                6.76      100       780       0 5       0
;lots 19, 62, 63, 64
  8               Gage1            35                3.48      100       750       0 5       0
;78th Avenue - Golden to midpoint in 78th
  9               Gage1            34                1 10      100       500       0 4       0
;78th Avenue - Midpoint to in 78th to Seldon
  10              Gage1            37                0 895     100       650       0.4       0
;77th Avenue - Golden to Midpoint
  11              Gage1            35                1 10      100       800       0.4       0
;77th Avenue - Midpoint in 77th to Seldon
  12              Gage1            38                0 895     100       650       0 4       0
;Golden - Property Line to 77th
  13              Gage1            31                0.344     100       250       0 3       0
;Golden - 77th to 78th Avenue
  14              Gage1            30                0 76      100       550       0 3       0
;Golden - 78th to 79th
  15              Gage1            29                0 758     100       550       0 3       0
;Seldon - Property line to 77th
  16              Gage1            38                0 344     100       250       0 3       0
;Seldon 77th to 78th Avenue
  17              Gage1            37                0 758     100       550       0.3       0
;Seldon 78th to 79th Avenue
  18              Gage1            36                0 758     100       550       0 3       0
;East half 79th near existing retention basin
  19              Gage1            39                0 275     100       300       0 4       0
;Lots 74, 73, 72, 71, 70, 69
  20              Gage1            39                7 67      100       1340      0 5       0
```

Alternative 2 - Eliminate Existing Basin

```
;Lots 56, 66, 67, 68
  24              Gage1           38              3.21    100     670     0.5     0
;East-half 79th Ave - Olive to Half-street
  27              Gage1           33              1.21    100     1000    0.4     0
;East Half 79th Avenue - half street to retention basin
  28              Gage1           36              0.94    100     1500    0.4     0
;Golden Midpoint to West Property Line
  32              Gage1           66              1.69    100     600     0.3     0
;East Property Line to Midpoint
  40              Gage1           61              1.69    100     600     0.3     0
;North Property Street
  42              Gage1           45              0.96    100     700     0.4     0
  43              Gage1           66              11.88   100     1050    0.5     0
  44              Gage1           45              7.92    100     890     0.5     0
;Similiar to Subcatchment 20
  46              Gage1           68              7.49    100     1340    0.5     0
;Half of Butler Drive - 77th Ave to 75th Ave
  47              Gage1           68              1.10    100     1200    0.3     0
;West Road Golden to Midpoint
  48              Gage1           62              1.10    100     780     0.4     0
;West Street Midpoint to Seldon
  49              Gage1           64              0.90    100     650     0.4     0
;Similiar to Subcatchment 4
  50              Gage1           67              8.04    100     1100    0.5     0
;Similiar to Subcatchment 5
  51              Gage1           70              7.20    100     800     0.5     0
;East Street Goldend to Midpoint
  52              Gage1           63              1.10    100     780     0.4     0
;East Street Midpoint to Seldon
  53              Gage1           65              0.90    100     650     0.4     0
;Similiar to Subcatchment 6
  54              Gage1           62              8.56    100     900     0.5     0
;Similiar to Subcatchment 5
  55              Gage1           64              6.76    100     780     0.5     0
;Similiar to Subcatchment 8
  56              Gage1           63              3.48    100     750     0.5     0
;Similiar to Subcatchment 24
  57              Gage1           65              3.21    100     670     0.5     0
;Seldon Midpoint to west property line
  58              Gage1           64              .45     100     600     0.3     0
;East property line to midpoint
  59              Gage1           64              0.45    100     600     0.3     0
;Half Butler - 79th to 77th
  69              Gage1           39              1.10    100     1200    0.3     0
  77              Gage1           39              1.2     100     650     0.5     0
  79              Gage1           80              1.2     100     650     0.5     0
  83              Gage1           81              1.2     100     650     0.5     0
  84              Gage1           82              1.2     100     650     0.5     0
  85              Gage1           39              2.42    100     2640    0.5     0

[SUBAREAS]
;;Subcatchment     N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;---------------------------------------------------------------------------------------------
  1               0.011      0.2        2.53       0          0          OUTLET
  2               0.011      0.2        0.05       0          100        OUTLET
  3               0.011      0.2        2.10       0          0          OUTLET
  4               0.011      0.2        2.53       0          0          OUTLET
  5               0.011      0.2        1.76       0          0          OUTLET
  6               0.011      0.2        1.93       0          0          OUTLET
  7               0.011      0.2        2.12       0          0          OUTLET
  8               0.011      0.2        1.58       0          0          OUTLET
  9               0.011      0.2        0.05       0          100        OUTLET
  10              0.011      0.2        0.05       0          100        OUTLET
  11              0.011      0.2        0.05       0          100        OUTLET
  12              0.011      0.2        0.05       0          100        OUTLET
  13              0.011      0.2        0.05       0          100        OUTLET
  14              0.011      0.2        0.05       0          100        OUTLET
  15              0.011      0.2        0.05       0          100        OUTLET
  16              0.011      0.2        0.05       0          100        OUTLET
  17              0.011      0.2        0.05       0          100        OUTLET
  18              0.011      0.2        0.05       0          100        OUTLET
  19              0.011      0.2        0.05       0          100        OUTLET
  20              0.011      0.2        1.73       0          0          OUTLET
  24              0.011      0.2        2.49       0          0          OUTLET
  27              0.011      0.2        0.05       0          100        OUTLET
  28              0.011      0.2        0.05       0          100        OUTLET
```

Alternative 2 - Eliminate Existing Basin

32	0.011	0.2	0.05	0	100	OUTLET
40	0.011	0.2	0.05	0	100	OUTLET
42	0.011	0.2	0.05	0	100	OUTLET
43	0.011	0.2	2.53	0	0	OUTLET
44	0.011	0.2	2.53	0	0	OUTLET
46	0.011	0.2	2.53	0	0	OUTLET
47	0.011	0.2	0.05	0	100	OUTLET
48	0.011	0.2	0.05	0	100	OUTLET
49	0.011	0.2	0.05	0	100	OUTLET
50	0.011	0.2	2.53	0	0	OUTLET
51	0.011	0.2	2.53	0	0	OUTLET
52	0.011	0.2	2.53	0	0	OUTLET
53	0.011	0.2	0.05	0	100	OUTLET
54	0.011	0.2	2.53	0	0	OUTLET
55	0.011	0.2	2.53	0	0	OUTLET
56	0.011	0.2	2.53	0	0	OUTLET
57	0.011	0.2	2.53	0	0	OUTLET
58	0.011	0.2	0.05	0	100	OUTLET
59	0.011	0.2	0.05	0	100	OUTLET
69	0.011	0.2	0.05	0	100	OUTLET
77	0.011	0.1	0.05	0.05	100	OUTLET
79	0.011	0.1	0.05	0.05	100	OUTLET
83	0.011	0.1	0.05	0.05	100	OUTLET
84	0.011	0.1	0.05	0.05	100	OUTLET
85	0.011	0.1	0.05	0.05	100	OUTLET

[INFILTRATION]

;;Subcatchment	Suction	HydCon	IMDmax
1	3.5	0.13	0.231
2	3.5	0.13	0.231
3	3.5	0.13	0.231
4	3.5	0.13	0.231
5	3.5	0.13	0.231
6	3.5	0.13	0.231
7	3.5	0.13	0.231
8	3.5	0.13	0.231
9	3.5	0.13	0.231
10	3.5	0.13	0.231
11	3.5	0.13	0.231
12	3.5	0.13	0.231
13	3.5	0.13	0.231
14	3.5	0.13	0.231
15	3.5	0.13	0.231
16	3.5	0.13	0.231
17	3.5	0.13	0.231
18	3.5	0.13	0.231
19	3.5	0.13	0.231
20	3.5	0.13	0.231
24	3.5	0.13	0.231
27	3.5	0.13	0.231
28	3.5	0.13	0.231
32	3.5	0.13	0.231
40	3.5	0.13	0.231
42	3.5	0.13	0.231
43	3.5	0.13	0.231
44	3.5	0.13	0.231
46	3.5	0.13	0.231
47	3.5	0.13	0.231
48	3.5	0.13	0.231
49	3.5	0.13	0.231
50	3.5	0.13	0.231
51	3.5	0.13	0.231
52	3.5	0.13	0.231
53	3.5	0.13	0.231
54	3.5	0.13	0.231
55	3.5	0.13	0.231
56	3.5	0.13	0.231
57	3.5	0.13	0.231
58	3.5	0.13	0.231
59	3.5	0.13	0.231
69	3.5	0.13	0.231
77	3.5	0.13	0.231
79	3.5	0.13	0.231
83	3.5	0.13	0.231
84	3.5	0.13	0.231

Alternative 2 - Eliminate Existing Basin

```
  85              3 5        0.13       0 231

[JUNCTIONS]
;;                Invert     Max        Init       Surcharge  Ponded
;;Name            Elev.      Depth      Depth      Depth      Area
;;--------------------------------------------------------------------
  29              1124.5     2.0        0          0          0
  30              1123.4     2.0        0          0          0
  31              1125.2     2.0        0          0          0
  33              1122.5     2.0        0          0          0
  34              1120.3     2.0        0          0          0
  35              1122.5     2.0        0          0          0
  36              1109.60    8          0          0          0
  37              1118.8     2.0        0          0          0
  38              1120.6     2.0        0          0          0
  39              1107.82    8.5        0          0          0
  45              1138.94    2.0        0          0          0
  60              1137.44    2.0        0          0          0
  61              1137.44    2.0        0          0          0
  62              1133.19    2.0        0          0          0
  63              1133.19    2.0        0          0          0
  64              1124.75    2.0        0          0          0
  65              1127.5     2.0        0          0          0
  66              1128.44    2.0        0          0          0
  67              1126.44    2.0        0          0          0
  68              1113.02    8.5        0          0          0
  70              1114.0     8          0          0          0
;MH at Sta 11+410
  71              1111.17    9.24       0          0          0
;MH at Sta  11+230
  72              1109.09    10         0          0          0
;MH at 11+020
  73              1104.64    10         0          0          0
;MH at 10+920
  74              1103.26    10         0          0          0
;Butler tie in at 10+818
  75              1098.58    13         0          0          0
;mh at Sta 10+725
  76              1096.08    17         0          0          0
  80              1105.89    13         0          0          0
  81              1104.12    12.4       0          0          0
  82              1102.35    13.2       0          0          0

[OUTFALLS]
;;                Invert     Outfall    Stage/Table      Tide
;;Name            Elev.      Type       Time Series      Gate
;;--------------------------------------------------------------
;Downstream 66" @ IE 1098 68
;Match crown of nwe 48" for IE 1091 18
  78              1091.18    FIXED      1099 08 NO

[CONDUITS]
;;                Inlet          Outlet                    Manning    Inlet      Outlet     Init
;;Name            Node           Node           Length     N          Height     Height     Flow
;;--------------------------------------------------------------------------------------------------
  12              29             33             400        0.011      0          0          0
  13              33             36             1500       0.011      0          8          0
  14              36             39             300        0.013      0           64        0
  15              30             34             800        0.011      0          0          0
  16              34             37             650        0.011      0          0          0
  17              31             35             850        0.011      0          0          0
  18              35             38             650        0.011      0          0          0
  19              38             37             550        0.011      0          0          0
  20              37             36             550        0.011      0          8          0
  24              61             63             850        0.011      0          0          0
  25              63             65             650        0.011      0          0          0
  26              65             64             550        0.011      0          0          0
  27              64             70             550        0.011      0          8          0
  28              60             62             800        0.011      0          0          0
  29              62             64             650        0.011      0          0          0
  30              66             67             850        0.011      0          0          0
  31              67             70             650        0.011      0          6          0
  32              70             68             300        0.013      0          0          0
  33              68             39             1200       0.013      0          .64        0
  34              45             60             300        0.011      0          0          0
  35              71             72             590        0.013      0          0          0
```

```
  36              72              73              689         0.013       0           0           0
  37              73              74              330         0.013       0           0           0
  38              74              75              335         0.013       0           0           0
  39              75              76              305         0.013       0           0           0
  44              80              81              650         0.013       0           0           0
  45              81              82              650         0.013       0           0           0
  46              82              75              650         0.013       0           2           0
  47              39              80              650         0.01        0           0           0
  48              76              78              541         0.013       0           0           0

[XSECTIONS]
;;Link            Type         Geom1      Geom2      Geom3      Geom4      Barrels
;;--------------------------------------------------------------------------------
  12              IRREGULAR    HW         0          0          0          1
  13              IRREGULAR    HW         0          0          0          1
  14              CIRCULAR     3          0          0          0          1
  15              IRREGULAR    4          0          0          0          1
  16              IRREGULAR    4          0          0          0          1
  17              IRREGULAR    4          0          0          0          1
  18              IRREGULAR    4          0          0          0          1
  19              IRREGULAR    4          0          0          0          1
  20              IRREGULAR    4          0          0          0          1
  24              IRREGULAR    4          0          0          0          1
  25              IRREGULAR    4          0          0          0          1
  26              IRREGULAR    4          0          0          0          1
  27              IRREGULAR    4          0          0          0          1
  28              IRREGULAR    4          0          0          0          1
  29              IRREGULAR    4          0          0          0          1
  30              TRAPEZOIDAL  2.0        5          1          1          1
  31              TRAPEZOIDAL  2.0        5          1          1          1
  32              CIRCULAR     3          0          0          0          1
  33              CIRCULAR     3          0          0          0          1
  34              IRREGULAR    4          0          0          0          1
  35              CIRCULAR     2.0        0          0          0          1
  36              CIRCULAR     2.0        0          0          0          1
  37              CIRCULAR     2.0        0          0          0          1
  38              CIRCULAR     2.0        0          0          0          1
  39              CIRCULAR     4          0          0          0          1
  44              CIRCULAR     3.5        0          0          0          1
  45              CIRCULAR     3.5        0          0          0          1
  46              CIRCULAR     3.5        0          0          0          1
  47              CIRCULAR     3.5        0          0          0          1
  48              CIRCULAR     4          0          0          0          1

[TRANSECTS]
;;-------------------------------------------------------------------------------------------

 NC 0 01     0 01     0.01
 X1 1a                9        0.0      0.0      0 0      0 0      0.0      0.0      0 0
 GR 2        0        0.5      0.5      0.5      10       0        10 5     0.25     42
 GR 0        73 5     0.5      74       0.5      83 5     2        84

 NC 0.01     0 01     0.01
 X1 2                 3        0.0      0.0      0.0      0 0      0 0      0.0      0 0
 GR 0.25     0        0        0.5      0.5      32

 NC 0.01     0 01     0.01
 X1 3                 5        0.0      0.0      0 0      0 0      0 0      0.0      0 0
 GR 0.5      0        0        0.5      0.25     32       0        63 5     0.5      64

 NC 0.01     0 01     0.01
 X1 4                 9        0.0      0.0      0 0      0 0      0 0      0.0      0 0
 GR 2        0        0.5      0.5      0.5      10       0        10 5     0.25     28
 GR 0        45 5     0.5      46       0.5      55 5     2        56

 NC 0.01     0 01     0.01
 X1 5                 5        0.0      0.0      0 0      0.0      0 0      0.0      0.0
 GR 0.5      0        0        0.5      0.25     18       0        35 5     0.5      36

 NC 0.01     0.01     0.01
 X1 6                 5        0.0      0.0      0 0      0 0      0 0      0.0      0.0
 GR 0.5      0        0        0.5      0.25     18       0        35 5     0.5      36

 NC 0.01     0 01     0.01
 X1 7                 5        0.0      0.0      0 0      0 0      0.0      0.0      0 0
 GR 0.5      0        0        0.5      0.25     18       0        35.5     0.5      36
```

Alternative 2 - Eliminate Existing Basin

```
 NC 0.01      0 01      0 01
 X1 8                   5          0.0       0.0       0 0       0 0       0 0       0.0       0 0
 GR 0.5       0         0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01      0 01      0 01
 X1 9                   5          0.0       0.0       0 0       0 0       0 0       0.0       0 0
 GR 0.5       0         0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01      0 01      0 01
 X1 11                  5          0.0       0.0       0 0       0 0       0.0       0.0       0 0
 GR 0.5       0         0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01      0 01      0 01
 X1 12                  5          0.0       0.0       0 0       0 0       0 0       0.0       0 0
 GR 0.5       0         0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01      0 01      0 01
 X1 13                  5          0.0       0.0       0 0       0 0       0 0       0.0       0 0
 GR 0.5       0         0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01      0 01      0 01
 X1 14                  5          0.0       0.0       0 0       0 0       0.0       0.0       0 0
 GR 0.5       0         0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01      0 01      0 01
 X1 15                  5          0.0       0.0       0 0       0 0       0 0       0.0       0 0
 GR 0.5       0         0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01      0 01      0 01
 X1 16                  5          0.0       0.0       0 0       0.0       0 0       0.0       0 0
 GR 0.5       0         0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01      0 01      0 01
 X1 17                  5          0.0       0.0       0 0       0 0       0 0       0.0       0 0
 GR 0.5       0         0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01      0 01      0 01
 X1 18                  5          0.0       0.0       0.0       0 0       0 0       0.0       0 0
 GR 0.5       0         0          0.5       0.25      18        0         35 5      0.5       36

 NC 0.01      0 01      0 01
 X1 20                  5          0.0       0.0       0.0       0 0       0 0       0.0       0 0
 GR 0.5       0         0          0.5       0.25      32        0         63 5      0.5       64

 NC 0.016     0 016     0 016
 X1 HW                  6          0.0       40        0 0       0 0       0 0       0.0       0 0
 GR 2         0          5          01        5         8         0         8.1        64       40
 GR 2         40 01

[DWF]
;;                                          Average     Time
;;Node                Parameter              Value       Patterns
;;--------------------------------------------------------------
  71                  FLOW                   2.98
  72                  FLOW                   3.72
  73                  FLOW                   2.35
  74                  FLOW                   3.72
  76                  FLOW                   2.17

[CURVES]
;;Name                Type         X-Value     Y-Value
;;----------------------------------------------------
;Existing retention basin
  Retention           Storage      0           10000
  Retention                        1           11122
  Retention                        2           13860
  Retention                        3           15288
  Retention                        4           16940
  Retention                        5           18560
  Retention                        6           18592
  Retention                        7           22188
  Retention                        8           24165
  Retention                        9           26085
  Retention                        10          26980
  Retention                        11          29988
```

Alternative 2 - Eliminate Existing Basin

```
  Retention                12          32000

[TIMESERIES]
;;Name            Date       Time       Value
;;--------------------------------------------
;100 Year, 2 Hour
  TS1                       0          0
  TS1                       0:05       0.33
  TS1                       0:10       0.21
  TS1                       0:15       0.15
  TS1                       0:20       0.15
  TS1                       0:25       0.12
  TS1                       0:30       0.43
  TS1                       0:35       0.76
  TS1                       0:40       0.88
  TS1                       0:45       1.12
  TS1                       0:50       1.18
  TS1                       0:55       1.70
  TS1                       1:00       2.88
  TS1                       1:05       8.32
  TS1                       1:10       4.31
  TS1                       1:15       3.64
  TS1                       1:20       1.15
  TS1                       1:25       0.88
  TS1                       1:30       0.73
  TS1                       1:35       0.24
  TS1                       1:40       0.24
  TS1                       1:45       0.21
  TS1                       1:50       0.15
  TS1                       1:55       0.30
  TS1                       2:00       0.24

;100 Year, 6 Hour
  TS2                       0:00       0
  TS2                       0:15       0.18
  TS2                       0:30       0.06
  TS2                       0:45       0.12
  TS2                       1:00       0.216
  TS2                       1:15       0.18
  TS2                       1:30       0.156
  TS2                       1:45       0.168
  TS2                       2:00       0.18
  TS2                       2:15       0.168
  TS2                       2:30       0.192
  TS2                       2:45       0.204
  TS2                       3:00       0.276
  TS2                       3:15       0.564
  TS2                       3:30       0.984
  TS2                       3:45       2.016
  TS2                       4:00       2.376
  TS2                       4:15       1.512
  TS2                       4:30       0.864
  TS2                       4:45       0.528
  TS2                       5:00       0.408
  TS2                       5:15       0.168
  TS2                       5:30       0.156
  TS2                       5:45       0.168
  TS2                       6:00       0.156

;10 year, 2 hour
  TS3                       0:05       0
  TS3                       0:10       0.21
  TS3                       0:15       0.13
  TS3                       0:20       0.09
  TS3                       0:25       0.09
  TS3                       0:30       0.08
  TS3                       0:35       0.27
  TS3                       0:40       0.47
  TS3                       0:45       0.70
  TS3                       0:50       0.74
  TS3                       0:55       1.06
  TS3                       1:00       1.80
  TS3                       1:05       5.20
  TS3                       1:10       2.69
  TS3                       1:15       2.28
  TS3                       1:20       0.72
```

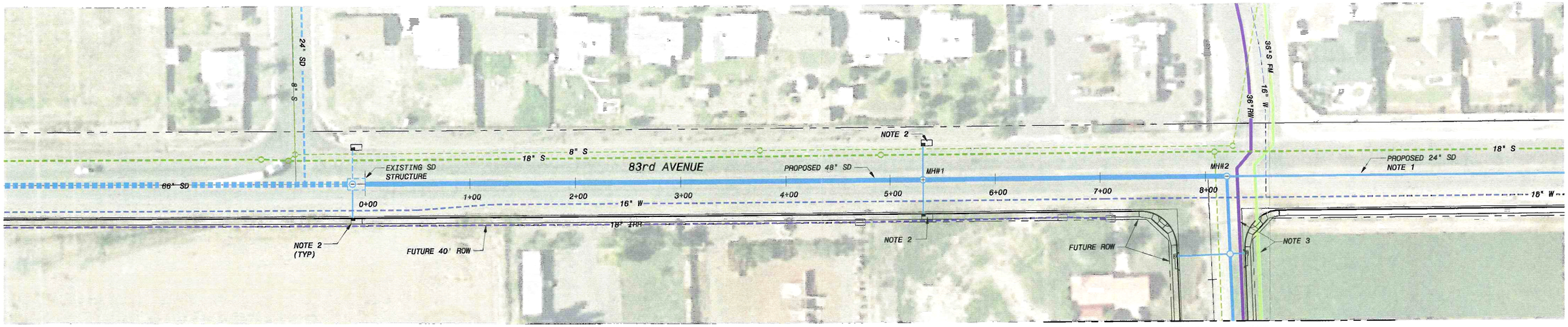
```
 TS3                     1:25       0.55
 TS3                     1:30       0.46
 TS3                     1:35       0.15
 TS3                     1:40       0.15
 TS3                     1:45       0.13
 TS3                     1:50       0.09
 TS3                     1:55       0.19
 TS3                     2:00       0.15

[REPORT]
 CONTROLS  NO

[OPTIONS]
 TEMPDIR   "C:\DOCUME~1\cor17454 NA\LOCALS~1\Temp\"
```

APPENDIX F

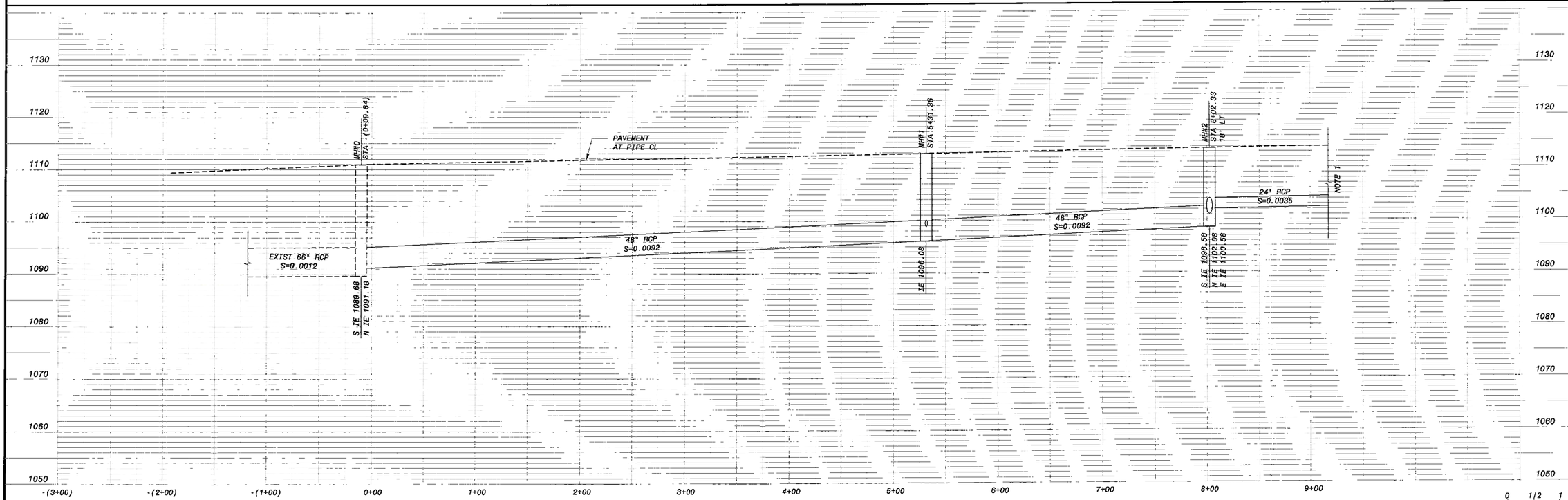
50' 25' 0 50' 100'

1"=50'

NOTES
1. 24"SD IN 83RD AVE NORTH OF BUTLER DRIVE TO BE CONSTRUCTED AS PRESENTED IN PRELIMINARY DESIGN PREPARED BY INCA ENGINEERS INC FOR MCDOT.
2. TYPE M CATCH BASIN PER CITY OF PHOENIX STD DTL P1569-1 SIZE BASED ON INCA ENGINEERS PRELIMINARY DESIGN.
3. PROPOSED PIPELINES ASSOCIATED WITH CITY OF PEORIA BUTLER DRIVE WRF.



SEE SHEET PP2 FOR CONT



0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

NO.	BY	CK	APP	DATE	REVISIONS AND RECORD OF ISSUE

CYGNET ID: 131868-1000-C-B0D0D8B7 XREF1 ID:
SAVED: COR17454, 11/16/2005 2:27:09 PM XREF2 ID:
DWG VER #: 1.5 XREF3 ID:
PLOTTED: COR17464, 11/16/2005 8:44:03 AM XREF4 ID:
USER: COR17454 DWG: B0D0D8B7.dwg XREF5 ID:

BLACK & VEATCH Corporation
Concord, California

CITY OF PEORIA
BUTLER DRIVE STORM DRAIN DCR

PROPOSED BUTLER DRIVE STORM DRAIN
CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 2

DESIGNED: JLC
DETAILED: JLC
CHECKED:
APPROVED:
DATE: 9/22/04

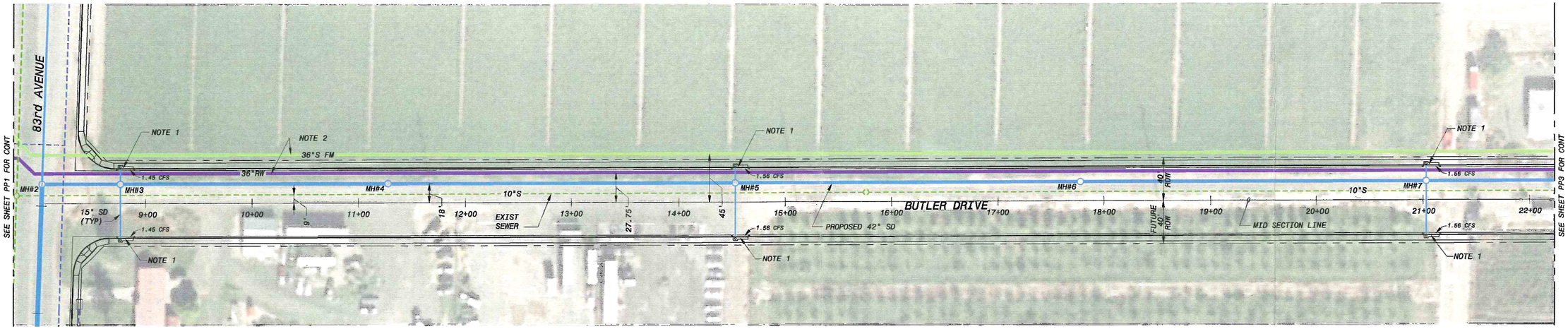
PROJECT NO.
136825

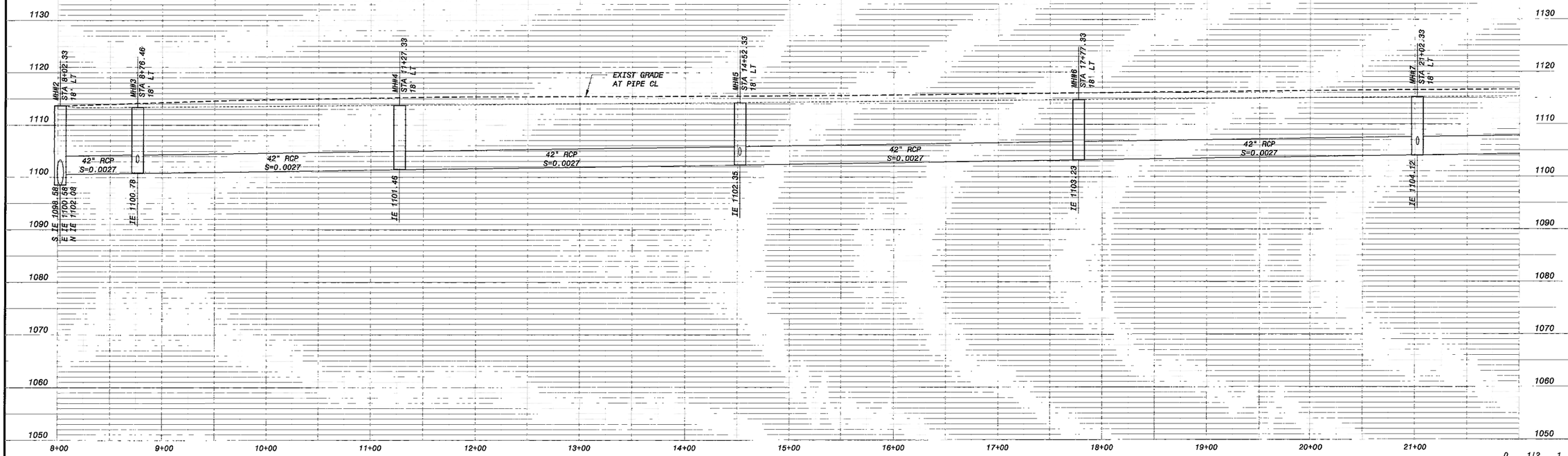
PP1
SHEET OF

FD0D0D
D0D2SS

50' 25' 0 50' 100'
1"=50'

NOTES
1. TYPE M CATCH BASIN
PER CITY OF PHOENIX STD DTL P1569-1
10' WING LENGTH
2. PROPOSED PIPELINES ASSOCIATED WITH
CITY OF PEORIA BUTLER DRIVE WRF





0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

NO.	BY	CK.	APP	DATE	REVISIONS AND RECORD OF ISSUE

CYGNET ID: 131866-1000-C-B0000GBK7 XREF1 ID:
SAVED: COR17454, 11/16/2005 2:27:09 PM XREF2 ID:
DWG VER #: 1.5 XREF3 ID:
PLOTTED: COR17454, 11/18/2005 8:46:06 AM XREF4 ID:
USER: COR17454 SW: B0000GBK7.dwg XREF5 ID:

BLACK & VEATCH Corporation
Concord, California

CITY OF PEORIA
BUTLER DRIVE
STORM DRAIN DCR

PROPOSED BUTLER DRIVE STORM DRAIN
CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 2

DESIGNED: JLC
DETAILED: JLC
CHECKED:
APPROVED:
DATE. 9/22/04

PROJECT NO.
136825

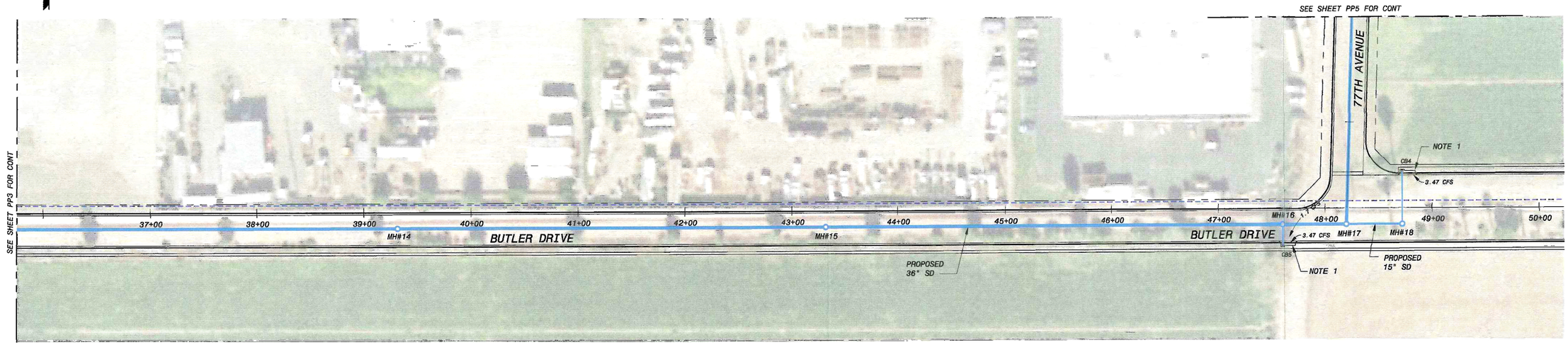
PP2
SHEET
OF

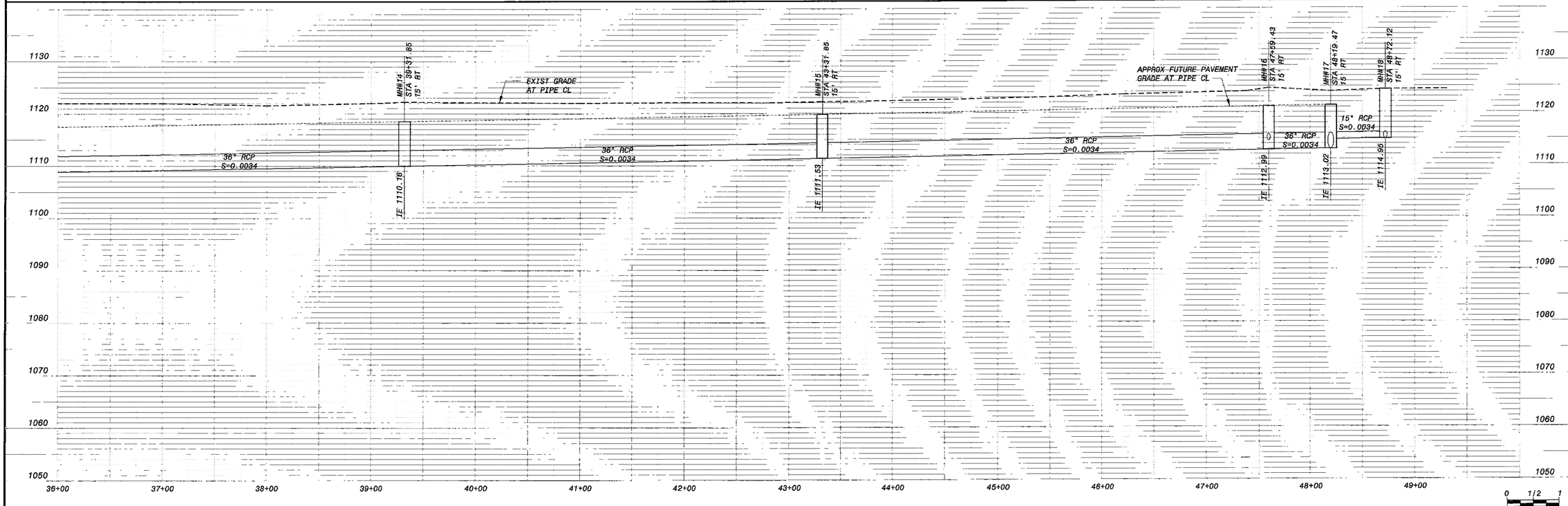
FD5000
DS02SS

50' 25' 0 50' 100'

1"=50'

NOTES
1. TYPE M CATCH BASIN
PER CITY OF PHOENIX STD DTL P1569-1
17' WING LENGTH





0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

NO.	BY	CK	APP
REVISIONS AND RECORD OF ISSUE			

DATE
CYGNET ID: 131866-1000-C-B0000BK7 XREF1 ID:
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DWG VER #: 1.5 XREF3 ID:
PLOTTED: COR17454, 11/16/2005 8:46:31 AM XREF4 ID:
USER: COR17454 DWF B0000BK7.dwg XREF5 ID:

BLACK & VEATCH Corporation
Concord, California

CITY OF PEORIA
BUTLER DRIVE
STORM DRAIN DCR

PROPOSED BUTLER DRIVE STORM DRAIN
CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 2

DESIGNED: JLC
DETAILED: JLC
CHECKED:
APPROVED:
DATE. 9/22/04

PROJECT NO.
136825

PP4

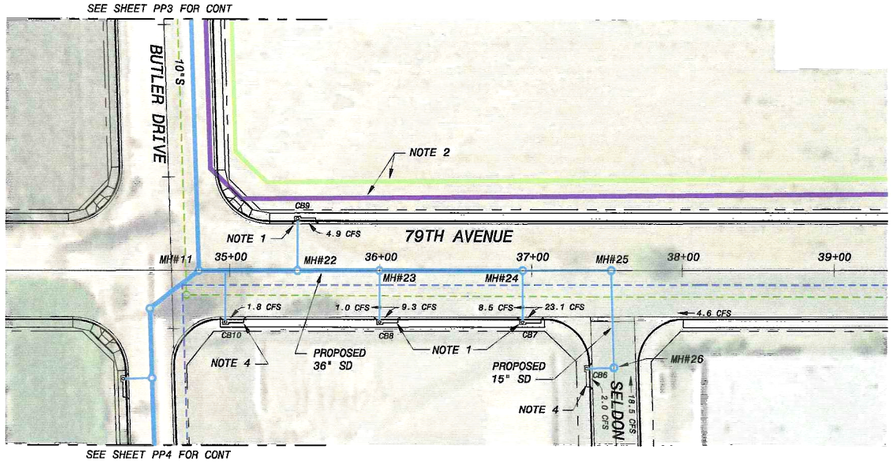
SHEET
OF

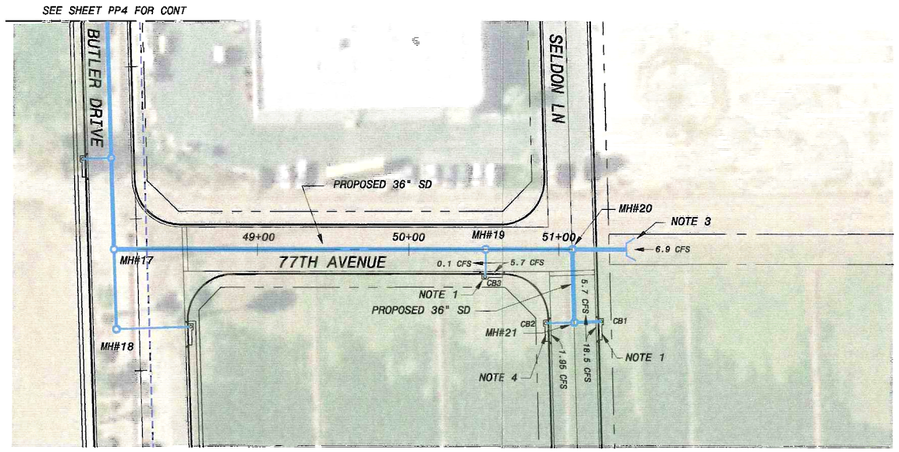
FD5000
D5025S

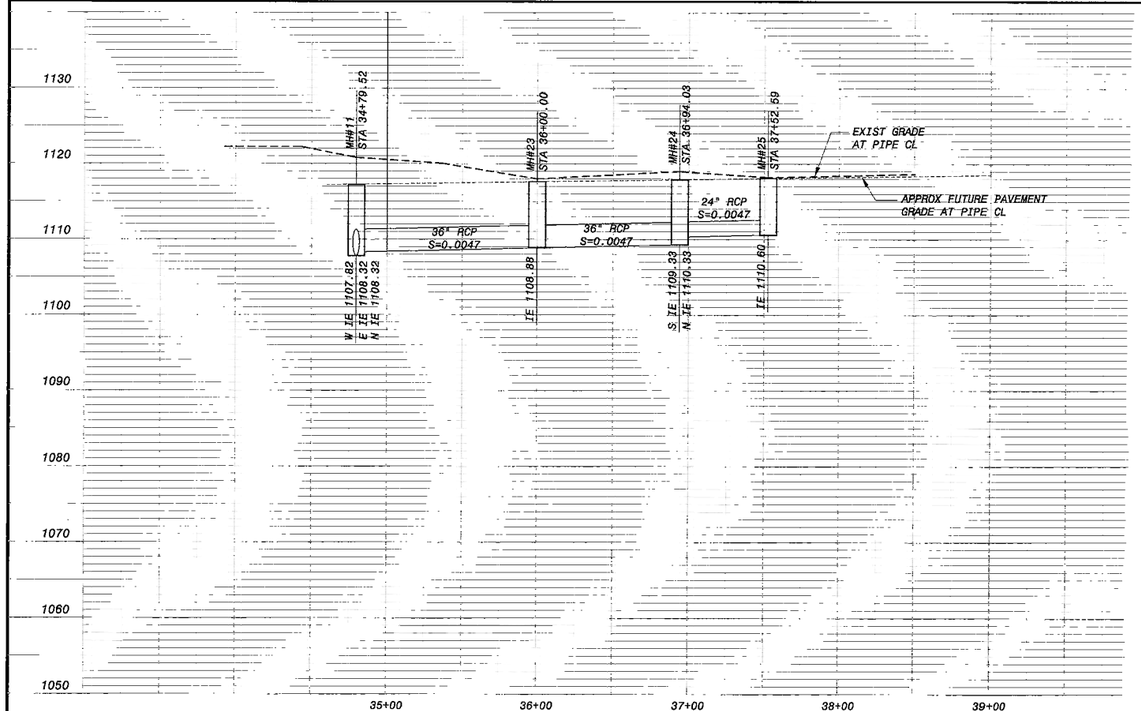
50' 25' 0 50' 100'

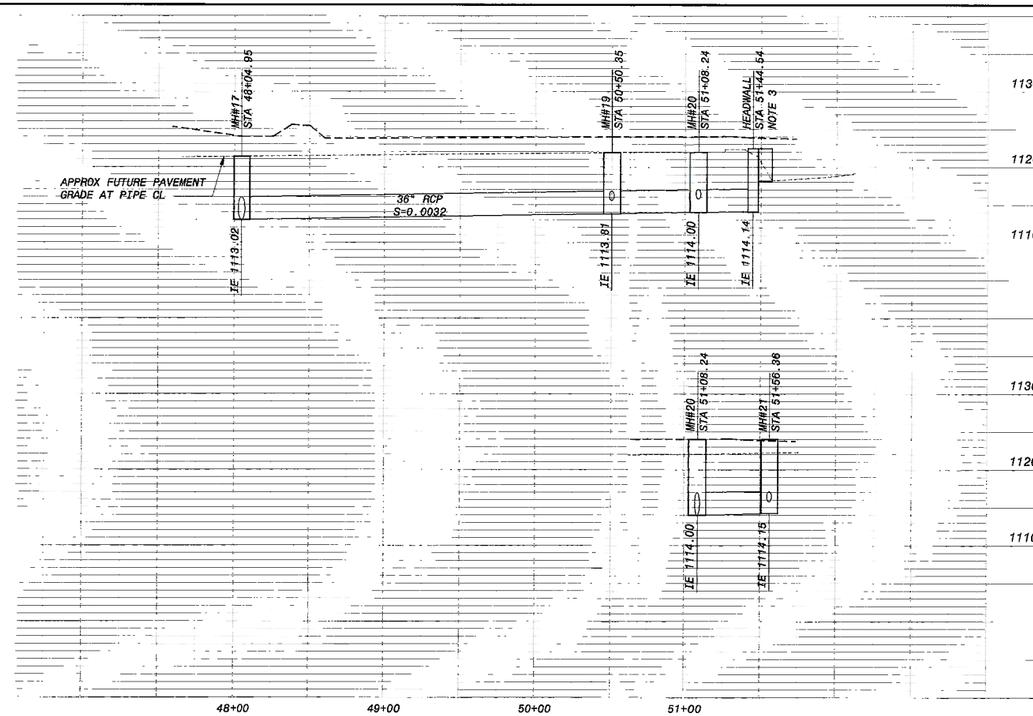
1"=50'

NOTES
1. TYPE M CATCH BASIN PER CITY OF PHOENIX STD DTL P1569-1 17' WING LENGTH.
2. PROPOSED PIPELINES ASSOCIATED WITH CITY OF PEORIA BUTLER DRIVE WRF
3. DROP HEADWALL WITH TRASH RACK PER MAG STD DTL 502-1.
4. TYPE M CATCH BASIN PER CITY OF PHOENIX STD DTL P1569-1 10' WING LENGTH.









0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

NO.	REVISIONS AND RECORD OF ISSUE	BY	CK	APP	DATE
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	DWG VER #: 1.5				
	PLOTTED: CORT7454, 11/16/2005 8:46:40 AM				
	USER: CORT7454				

XREF1 ID:
XREF2 ID:
XREF3 ID:
XREF4 ID:
XREF5 ID:
SW: B0000BK7.dwg

BLACK & VEATCH Corporation
Concord, California

CITY OF PEORIA
BUTLER DRIVE
STORM DRAIN DCR

PROPOSED BUTLER DRIVE STORM DRAIN
CONCEPTUAL PLAN AND PROFILE
ALTERNATIVE 2

DESIGNED: JLC
DETAILED: JLC
CHECKED:
APPROVED:
DATE: 9/22/04

PROJECT NO.
136825

PP5

SHEET OF -

FD5000
D5025S

APPENDIX G

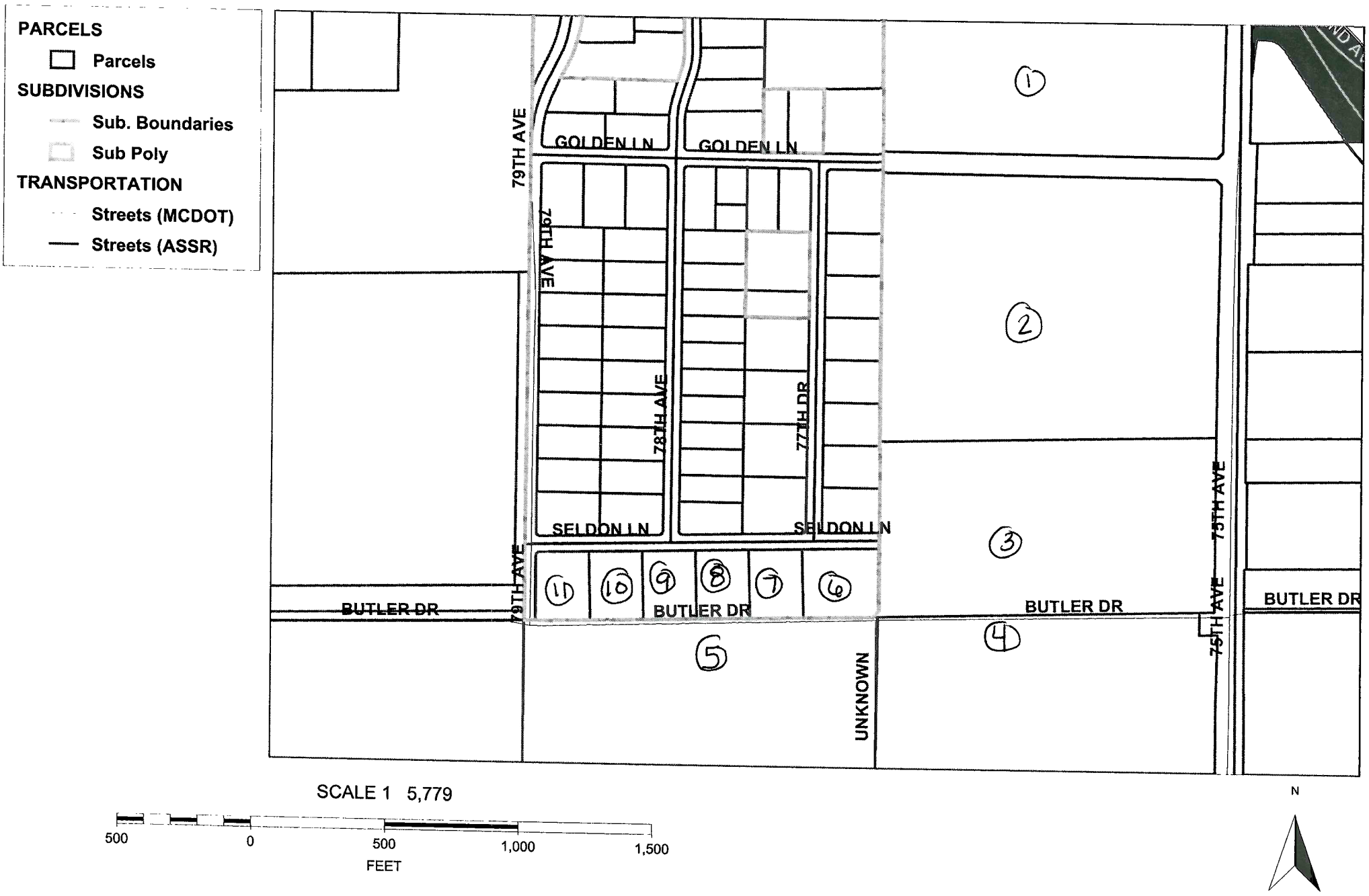
Butler Drive Storm Drain
Preliminary Estimate of Probable Cost

Alternative 1 Utilizing Detention Basin	Qty	Unit	Unit Cost	Total
Butler Drive 79th Ave to 83rd Ave				
Manholes				
24" Pipe	1	ea	4,400.00	4,400
30" Pipe	11	ea	4,800.00	52,800
Catch Basin Curb Inlets	14	ea	3,600.00	50,400
Headwall	3	ea	5,000.00	15,000
RCP				
15"	600	lf	75.00	45,000
24"	90	lf	120.00	10,800
30"	4,226	lf	150.00	633,900
No pavement replacement assumed in Butler.				
83rd Avenue Olive Ave to Las Palmaritas				
Manholes				
42" Pipe	2	ea	5,000.00	10,000
24" Pipe	6	ea	4,400.00	26,400
Catch Basin Curb Inlets	12	ea	3,600.00	43,200
RCP				
42"	840	lf	210.00	176,400
24"	1,940	lf	120.00	232,800
15"	420	lf	75.00	31,500
Pavement Replacement				72,560
Option 1 - Subtotal				**1,405,160**
Mobilization @ 5%				70,258
Option 1 - Total Probable Construction Cost				**1,475,418**
Contingency @ 30%				442,625
Total Probable Construction with Contingency				**1,918,043**
Engineering @ 20%				383,609
Capital Cost				**2,301,652**

Alternative 2 Without Detention Basin	Qty	Unit	Unit Cost	Total
Butler Drive 79th Ave to 83rd Ave				
Manholes				
36" Pipe	19	ea	4,600.00	87,400
42" Pipe	6	ea	4,800.00	28,800
Catch Basin Curb Inlets	19	ea	3,600.00	68,400
RCP				
42"	2,600	lf	210.00	546,000
36"	2,230	lf	180.00	401,400
15"	660	lf	75.00	49,500
No pavement replacement assumed in Butler.				
83rd Avenue Olive Ave to Las Palmaritas				
Manholes				
48" Pipe	2	ea	5,000.00	10,000
24" Pipe	6	ea	4,400 00	26,400
Catch Basin Curb Inlets	12	ea	3,600.00	43,200
RCP				
48"	840	lf	240.00	201,600
24"	1,940	lf	120.00	232,800
15"	420	lf	75.00	31,500
Pavement Replacement				72,560
Site Rehabilitation				
Engineered Backfill	14,200	cy	40.00	568,000
Well Abandonment		lump sum		5,000
Demolition				
Fence Removal	650	lf	12.00	7,800
Concrete Structure Removal		lump sum		5,000
Replace curb/gutter/sidewalk	75	lf	45.00	3,375
Pavement Replacement	20	sy	29.00	580
Option 2 Subtotal				**2,389,315**
Mobilization @ 5%				119,466
Option 2 Total Probable Construction Cost				**2,508,781**
Contingency @ 30%				752,634
Total Probable Construction with Contingency				**3,261,415**
Engineering @ 20%				652,283
Capital Cost				**3,913,698**
Sale of Parcel	51,836	sf	3 50	181,426
Capital Cost with Sale of Parcel				**3,732,272**

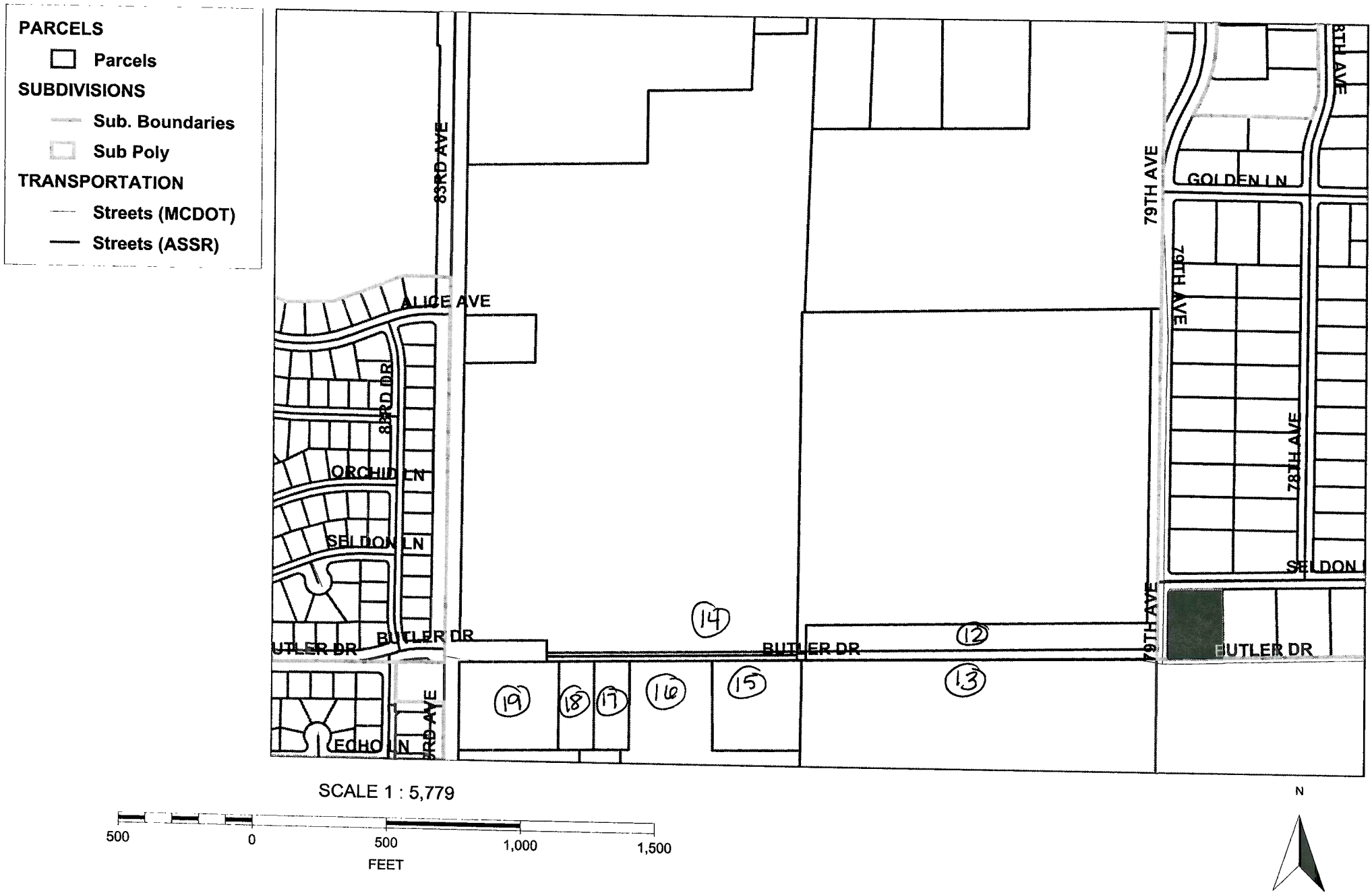
APPENDIX H

County Parcels



Friday, September 30, 2005 2:12 PM

County Parcels



Friday, September 30, 2005 2:09 PM

(2)

New Search

Property Information

View GIS Maps

Parcel #: 142-20-003-F
MCR #:
Subdivision Name:
Lot #:
Property Address: 8770 N 75TH AVE
PEORIA 85345
Property Description: TH PT LYG S & W OF ROW DESCRIPTION 2-LN 2 AS DESC P/F 03-200540 OF FOLL DESC PROP TH N2 SE4 NE4 & NE4 NE4 OF SEC 35 T-3N R-1E & ALSO TH PT OF W2 NE4 SEC 35 WH LIES ELY OF EXISTING FENCE LN SITUATED SLIGHTLY W OF E LN OF SD W2 NE4 MORE PARTIC DAF COM N4 COR OF SD SEC TH N 88D 04M E ALG N LN SD SEC 1317 89F TO TPOB TH CONT N 88D 04M E 9F TH S 2634.65F TH N 88D W ALG S LN W2 NE4 20.91F TH N 44D 42M E 29.35F TH N 24M W 602 90F TH N 26M W 699.01F TH N 12M W 672.07F TH S 88D 04M W 640.31F TO TPOB EX S2 S2 W2 NE4 TH/OF & ALSO EX RD P/F 90-239139 & EX RD P/F 98-0005222 & EX RD P/F 03-200540
Section Township Range: 35 3N 1E
Associated Parcel:

Owner Information

View Tax Information

Owner: ROVEY INVESTMENTS
In Care Of:
Mailing Address: 7711 W NORTHERN
GLENDALE AZ 85303 USA
Deed #: 960668039
Deed Date: 9/23/1996

Sales Price: n/a *
Sales Date: n/a *
* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	2006	2005	2004
Full Cash Value (FCV):	$54,101	$48,993	$48,993
Limited Property Value (LPV):	$44,191	$40,174	$48,993
Legal Class:	2	2	2
Assessment Ratio:	16%	16%	16%
Assessed FCV:	$8,656	$7,839	$7,839
Assessed LPV:	$7,071	$6,428	$7,839
Property Use Code:	4110	4110	4110
Tax Area Code:	111200	111200	111200

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:

recorder glossary forms

(4)

New Search

Property Information

View GIS Maps

Parcel #: 142-23-012-A
MCR #:
Property Address:
Property Description: NE4 SE4 SEC 35 EX S 330F TH/OF & EX E 33F RD & EX RD P/F 98-0017434
Section Township Range: 35 3N 1E
Subdivision Name:
Lot #:
Associated Parcel:

Owner Information

View Tax Information

Owner: EMRLAND LLLP
In Care Of:
Mailing Address: 7711 W NORTHERN AVE
GLENDALE AZ 85303 USA
Deed #: 020604969
Deed Date: 6/13/2002

Sales Price: n/a *
Sales Date: n/a *
* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	2006	2005	2004
Full Cash Value (FCV):	$54,146	$48,934	$48,934
Limited Property Value (LPV):	$53,827	$48,934	$47,617
Legal Class:	2	2	2
Assessment Ratio:	16%	16%	16%
Assessed FCV:	$8,663	$7,829	$7,829
Assessed LPV:	$8,612	$7,829	$7,619
Property Use Code:	4110	4110	4110
Tax Area Code:	111200	111200	111200

Additional Component Information (for this Parcel)

Valuation Characteristics

New Search

Helpful Information:

recorder glossary forms

(5)

New Search

Property Information

View GIS Maps

Parcel #: 142-23-006-A
MCR #:
Property Address:
Property Description: NW4 SE4 EX S 330' 30.00 AC
Section Township Range: 35 3N 1E

Subdivision Name:
Lot #:

Associated Parcel:

Owner Information

View Tax Information

Owner: EMRLAND LLLP
In Care Of:
Mailing Address: 7711 W NORTHERN AVE
GLENDALE AZ 85303 USA
Deed #: 020604969
Deed Date: 6/13/2002

Sales Price: n/a *
Sales Date: n/a *
* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	2006	2005	2004
Full Cash Value (FCV):	$56,100	$50,700	$50,700
Limited Property Value (LPV):	$55,770	$50,700	$49,335
Legal Class:	2	2	2
Assessment Ratio:	16%	16%	16%
Assessed FCV:	$8,976	$8,112	$8,112
Assessed LPV:	$8,923	$8,112	$7,894
Property Use Code:	4110	4110	4110
Tax Area Code:	110000	110000	110000

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:
recorder glossary forms

(6)

New Search

Property Information

View GIS Maps

Parcel #: 142-20-120
Subdivision Name: PEORIA INDUSTRIAL PARK LT 1 1A 2-74 TR A
MCR #: 23227
Lot #: 69
Property Address: 7733 W SELDON LN PEORIA 85345
Property Description: PEORIA INDUSTRIAL PARK MCR 232-27
Section Township Range: 35 3N 1E
Associated Parcel:

Owner Information

View Tax Information

Owner: SMITH KARLAN & KURT SMITH
In Care Of:
Mailing Address: 7612 N 74TH AVE GLENDALE AZ 85303 USA
Deed #: 860634125
Deed Date: 11/17/1986
Sales Price: n/a *
Sales Date: n/a *

* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	20062005		2004
Full Cash Value (FCV):	$935,888	$815,377	$805,875
Limited Property Value (LPV):	$896,915	$815,377	$805,875
Legal Class:	1	1	1
Assessment Ratio:	25%	25%	25%
Assessed FCV:	$233,972	$203,844	$201,469
Assessed LPV:	$224,229	$203,844	$201,469
Property Use Code:	3740	3740	3740
Tax Area Code:	111200	111200	111200

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:

recorder glossary forms

Disclaimer

The data contained in this database is deemed reliable but not guaranteed. This information should be used for informational use only and does not constitute a legal document for the description of these properties. Every effort has been made to insure the accuracy of this data; however. this material may be slightly dated which would have an impact on its accuracy. The Maricopa County Assessor's Office disclaims any responsibility or liability for any direct or indirect damages resulting from the use of this data.

(7)

New Search

Property Information

View GIS Maps

Parcel #: 142-20-121
Subdivision Name: PEORIA INDUSTRIAL PARK LT 1 1A 2-74 TR A
MCR #: 23227
Lot #: 70
Property Address: 7753 W SELDON LN PEORIA 85345
Property Description: PEORIA INDUSTRIAL PARK MCR 232-27
Section Township Range: 35 3N 1E
Associated Parcel:

Owner Information

View Tax Information

Owner: CLUSIAU ENTERPRISE INC
In Care Of:
Mailing Address: 26230 S RIBBON RD SUN LAKES AZ 85224 USA
Deed #: 860243975
Deed Date: 5/16/1986
Sales Price: n/a *
Sales Date: n/a *
* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	20062005		2004
Full Cash Value (FCV):	$188,514	$135,055	$134,820
Limited Property Value (LPV):	$142,622	$127,324	$115,749
Legal Class:	1	1	1
Assessment Ratio:	25%	25%	25%
Assessed FCV:	$47,129	$33,764	$33,705
Assessed LPV:	$35,656	$31,831	$28,937
Property Use Code:	1074	1074	1074
Tax Area Code:	111200	111200	111200

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:
recorder glossary forms

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8

New Search

Property Information

View GIS Maps

Parcel #: 142-20-122
Subdivision Name: PEORIA INDUSTRIAL PARK LT 1 1A 2-74 TR A
MCR #: 23227
Lot #: 71
Property Address: 7773 W SELDON LN PEORIA 85345
Property Description: PEORIA INDUSTRIAL PARK MCR 232-27
Section Township Range: 35 3N 1E
Associated Parcel:

Owner Information

View Tax Information

Owner: CLUSIAU ENTERPRISE INC
In Care Of:
Mailing Address: 26230 S RIBBON RD SUN LAKES AZ 85224 USA
Deed #: 860243975
Deed Date: 5/16/1986
Sales Price: n/a *
Sales Date: n/a *
* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	20062005		2004
Full Cash Value (FCV):	$452,627	$382,904	$378,784
Limited Property Value (LPV):	$421,194	$382,904	$375,933
Legal Class:	1	1	1
Assessment Ratio:	25%	25%	25%
Assessed FCV:	$113,157	$95,726	$94,696
Assessed LPV:	$105,299	$95,726	$93,983
Property Use Code:	3710	3710	3710
Tax Area Code:	111200	111200	111200

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:

recorder glossary forms

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(9)

New Search

Property Information

View GIS Maps

Parcel #: 142-20-123
Subdivision Name: PEORIA INDUSTRIAL PARK LT 1 1A 2-74 TR A
MCR #: 23227
Lot #: 72
Property Address: 7803 W SELDON LN PEORIA 85345
Property Description: PEORIA INDUSTRIAL PARK MCR 232-27
Section Township Range: 35 3N 1E
Associated Parcel:

Owner Information

View Tax Information

Owner: BODLEY JAMES R/JACALYN C
In Care Of:
Mailing Address: 5004 W MERCER GLENDALE AZ 85381 USA
Deed #: 050947014
Deed Date: 7/8/2005
Sales Price: n/a *
Sales Date: n/a *
* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	20062005		2004
Full Cash Value (FCV):	$447,013	$372,694	$369,177
Limited Property Value (LPV):	$408,007	$370,915	$337,195
Legal Class:	1	1	1
Assessment Ratio:	25%	25%	25%
Assessed FCV:	$111,753	$93,174	$92,294
Assessed LPV:	$102,002	$92,729	$84,299
Property Use Code:	3710	3710	3710
Tax Area Code:	111200	111200	111200

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:

recorder glossary forms

(10)

New Search

Property Information

View GIS Maps

Parcel #: 142-20-124
Subdivision Name: PEORIA INDUSTRIAL PARK LT 1 1A 2-74 TR A
MCR #: 23227
Lot #: 73
Property Address: 7823 W SELDON LN PEORIA 85345
Property Description: PEORIA INDUSTRIAL PARK MCR 232-27
Section Township Range: 35 3N 1E
Associated Parcel:

Owner Information

View Tax Information

Owner: STARLIN WILLIAM R/PAMELA
In Care Of:
Mailing Address: 9638 W CAMINO DE ORO PEORIA AZ 85383 USA
Deed #: 041172948
Deed Date: 10/6/2004
Sales Price: n/a *
Sales Date: n/a *

* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	20062005		2004
Full Cash Value (FCV):	$187,172	$172,899	$172,446
Limited Property Value (LPV):	$178,072	$161,884	$147,167
Legal Class:	1	1	1
Assessment Ratio:	25%	25%	25%
Assessed FCV:	$46,793	$43,225	$43,112
Assessed LPV:	$44,518	$40,471	$36,792
Property Use Code:	1040	1040	1040
Tax Area Code:	111200	111200	111200

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:

recorder glossary forms

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(11)

New Search

Property Information

View GIS Maps

Parcel #: 142-20-125
Subdivision Name: PEORIA INDUSTRIAL PARK LT 1 1A 2-74 TR A
MCR #: 23227
Lot #: 74
Property Address: 7843 W SELDON LN PEORIA 85345
Property Description: PEORIA INDUSTRIAL PARK MCR 232-27
Section Township Range: 35 3N 1E
Associated Parcel:

Owner Information

View Tax Information

Owner: PEORIA CITY OF
In Care Of:
Mailing Address: 8401 W MONROE PEORIA AZ 85345 USA
Deed #: 010331014
Deed Date: 4/24/2001
Sales Price: n/a *
Sales Date: n/a *
* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	20062005		2004
Full Cash Value (FCV):	$159,500	$149,500	$149,500
Limited Property Value (LPV):	$142,605	$129,641	$117,855
Legal Class:	2	2	2
Assessment Ratio:	16%	16%	16%
Assessed FCV:	$25,520	$23,920	$23,920
Assessed LPV:	$22,817	$20,743	$18,857
Property Use Code:	9700	9700	9700
Tax Area Code:	111200	111200	111200

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:
recorder glossary forms

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(12)

New Search

Property Information

View GIS Maps

Parcel #: 142-22-011-B
MCR #:
Property Address:
Property Description: NE4 SW4 EX S 330F TH/OF
Section Township Range: 35 3N 1E

Subdivision Name:
Lot #:
Associated Parcel:

Owner Information

View Tax Information

Owner: METZ WILLIAM E/REBECCA S
In Care Of:
Mailing Address: 7711 E NORTHERN AVE
GLENDALE AZ 85303 USA
Deed #: 15661-0087
Deed Date: 11/24/1981

Sales Price: n/a *
Sales Date: n/a *
* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	2006	2005	2004
Full Cash Value (FCV):	$56,100	$50,700	$50,700
Limited Property Value (LPV):	$55,770	$50,700	$49,335
Legal Class:	2	2	2
Assessment Ratio:	16%	16%	16%
Assessed FCV:	$8,976	$8,112	$8,112
Assessed LPV:	$8,923	$8,112	$7,894
Property Use Code:	4110	4110	4110
Tax Area Code:	110000	110000	110000

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:
recorder glossary forms

(13)

New Search

Property Information

View GIS Maps

Parcel #: 142-22-011-B
MCR #:
Property Address:
Property Description: NE4 SW4 EX S 330F TH/OF
Section Township Range: 35 3N 1E

Subdivision Name:
Lot #:
Associated Parcel:

Owner Information

View Tax Information

Owner: METZ WILLIAM E/REBECCA S
In Care Of:
Mailing Address: 7711 E NORTHERN AVE
GLENDALE AZ 85303 USA
Deed #: 15661-0087
Deed Date: 11/24/1981

Sales Price: n/a *
Sales Date: n/a *
* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	2006	2005	2004
Full Cash Value (FCV):	$56,100	$50,700	$50,700
Limited Property Value (LPV):	$55,770	$50,700	$49,335
Legal Class:	2	2	2
Assessment Ratio:	16%	16%	16%
Assessed FCV:	$8,976	$8,112	$8,112
Assessed LPV:	$8,923	$8,112	$7,894
Property Use Code:	4110	4110	4110
Tax Area Code:	110000	110000	110000

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:
recorder glossary forms

New Search

Property Information

View GIS Maps

Parcel #: 142-21-002-H
MCR #:
Subdivision Name:
Lot #:

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Property Address: 8107 W OLIVE AVE
PEORIA 85345

Property Description: PT NW4 SEC 35 DAF COM NW COR SD SEC TH N 88D 2M E 1326 69F TO NW COR NE4 NW4 SEC 35 S 55.03F TO TPOB TH N 88D 2M E 33.02F S 1262.29F TO PT ON S LN NE4 NW4 SEC 35 TH S 88D 3M W 33.02F S 1297.31F S 88D 3M W 984.42F N 40.02F W 289 98F TO PT ON LN WHICH IS 55F ELY FROM W LN NW4 SEC 35 TH N 1076.34F E 268F N 179F W 268F N 567.25F N 88D 3M E 674.22F N 273.31F N 88D 3M E 400.11F N 423.64F TH N 88D 2M E 198.11F TO TPOB EX S 13F OF E 984.42F & EX COM NW COR SEC 35 TH N 88D 33M E 1326.78F S 55.03F TO TPOB TH CONT S 215.12F S 88D 33M W 198.11F N 215.12F TH N 88D 33M E 198.11F TO TPOB

Section Township Range: 35 3N 1E

Associated Parcel:

Owner Information

View Tax Information

Owner: CITY OF PEORIA
In Care Of:
Mailing Address: 8401 W MONROE ST STE 340
PEORIA AZ 85345 USA
Deed #: 031754483
Deed Date: 12/31/2003

Sales Price: n/a *
Sales Date: n/a *

* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	2006	2005
Full Cash Value (FCV):	$5,821,500	$144,364
Limited Property Value (LPV):	$4,133,265	$132,291
Legal Class:	2	2
Assessment Ratio:	16%	16%
Assessed FCV:	$931,440	$23,098
Assessed LPV:	$661,322	$21,167
Property Use Code:	9720	9720
Tax Area Code:	111200	111200

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:
recorder glossary forms

(15)

New Search

Property Information

View GIS Maps

Parcel #: 142-22-012-B
MCR #:
Property Address:
Property Description: NE4 NE4 NW4 SW4
Section Township Range: 35 3N 1E

Subdivision Name:
Lot #:

Associated Parcel:

Owner Information

View Tax Information

Owner: ROVEY INVESTMENTS
In Care Of:
Mailing Address: 7711 W NORTHERN AVE GLENDALE AZ 85303 USA
Deed #: 920746095
Deed Date: 12/31/1992

Sales Price: n/a *
Sales Date: n/a *
* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	2006	2005	2004
Full Cash Value (FCV):	$4,675	$4,225	$4,225
Limited Property Value (LPV):	$4,648	$4,225	$4,112
Legal Class:	2	2	2
Assessment Ratio:	16%	16%	16%
Assessed FCV:	$748	$676	$676
Assessed LPV:	$744	$676	$658
Property Use Code:	4110	4110	4110
Tax Area Code:	110000	110000	110000

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:
recorder glossary forms

Property Information

View GIS Maps

Parcel #: 142-22-012-D
Subdivision Name:
MCR #:
Lot #:
Property Address:
Property Description: N2 S2 NW4 SW4 SEC 35 EX W 55F RD & EX NE4 NE4 NW4 SW4 TH OF & EX TH PT DAF BEG W4 COR TH E 693F TH S 330F TH W 33F M/L TH S 330F M/L TH W 660F M/L TH N TO POB
Section Township Range: 35 3N 1E
Associated Parcel:

Owner Information

View Tax Information

Owner: ROVEY INVESTMENTS
In Care Of:
Mailing Address: 7711 W NORTHERN AVE GLENDALE AZ 85303 USA
Deed #: 920746095
Deed Date: 12/31/1992
Sales Price: n/a *
Sales Date: n/a *

* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	2006	2005	2004
Full Cash Value (FCV):	$31,485	$28,455	$28,455
Limited Property Value (LPV):	$25,284	$22,985	$20,895
Legal Class:	2	2	2
Assessment Ratio:	16%	16%	16%
Assessed FCV:	$5,038	$4,553	$4,553
Assessed LPV:	$4,045	$3,678	$3,343
Property Use Code:	4110	4110	4110
Tax Area Code:	110000	110000	110000

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:
recorder glossary forms

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New Search

Property Information

View GIS Maps

Parcel #: 142-22-007-H
Subdivision Name:
MCR #:
Lot #:
Property Address:
Property Description: TH PART SEC 35 DAF COM NW COR SW4 SD SEC TH E 560.94F TO POB TH CONT E 132.06F TO A PT TH S 330F TH W 132.06F TO A PT TH N 330F TO POB
Section Township Range: 35 3N 1E
Associated Parcel:

Owner Information

View Tax Information

Owner: BAKER PAUL E/LORENA J TR
In Care Of:
Mailing Address: 7309 W ACOMA DR
PEORIA AZ 85381 USA
Deed #: 020378874
Deed Date: 4/12/2002
Sales Price: n/a *
Sales Date: n/a *
* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	2006	2005	2004
Full Cash Value (FCV):	$73,000	$57,000	$57,000
Limited Property Value (LPV):	$51,572	$44,429	$40,238
Legal Class:	2	2	2
Assessment Ratio:	16%	16%	16%
Assessed FCV:	$11,680	$9,120	$9,120
Assessed LPV:	$8,252	$7,109	$6,438
Property Use Code:	0012	0012	0012
Tax Area Code:	110000	110000	110000

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information.

recorder glossary forms

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New Search

Property Information

View GIS Maps

(18)

Parcel #: 142-22-007-J
Subdivision Name:
MCR #:
Lot #:
Property Address:
Property Description: PT NW4 SW4 SEC 35 DAF COM NW COR SW4 SD SEC TH E 428.88F TO TPOB TH CONT E 132.06F S 330F W 132.05F N 330F TO TPOB
Section Township Range: 35 3N 1E
Associated Parcel:

Owner Information

View Tax Information

Owner: BAKER PAUL E/LORENA J TR
In Care Of:
Mailing Address: 8112 N 75TH AVE
PEORIA AZ 85345 USA
Deed #: 030070641
Deed Date: 1/21/2003
Sales Price: n/a *
Sales Date: n/a *
* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	2006	2005	2004
Full Cash Value (FCV):	$73,000	$57,000	$57,000
Limited Property Value (LPV):	$52,578	$45,771	$41,610
Legal Class:	2	2	2
Assessment Ratio:	16%	16%	16%
Assessed FCV:	$11,680	$9,120	$9,120
Assessed LPV:	$8,412	$7,323	$6,658
Property Use Code:	0014	0014	0014
Tax Area Code:	110000	110000	110000

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information.

recorder glossary forms

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(A)

New Search

Property Information

View GIS Maps

Parcel #: 142-22-007-K
MCR #:
Property Address:
Property Description: PT NW4 SW4 SEC 35 DAF BEG W4 COR SD SEC TH E 693F S 330F W 693F TH N 330F TO TPOB EX W 55F RD & EX TH PART DAF COM NW COR SW4 SD SEC TH E 428.88F TO POB TH CONT E 264.12F TO A PT TH S 330F TH W 264.11F TH N 330F TO POB
Section Township Range: 35 3N 1E

Subdivision Name:
Lot #:
Associated Parcel:

Owner Information

View Tax Information

Owner: DOLZA JOYCE C MOTHERSHED/BERG ELIZABETH ETAL
In Care Of:
Mailing Address: 8445 N 83RD AVE
PEORIA AZ 85345 USA
Deed #: 040152470
Deed Date: 2/12/2004

Sales Price: n/a *
Sales Date: n/a *
* Only sales for the last three years are maintained.

Valuation Information

View Comparables (COMPS)

Tax Year:	20062005		2004
Full Cash Value (FCV):	$199,500	$199,500	$178,000
Limited Property Value (LPV):	$199,500	$189,926	$172,660
Legal Class:	3	3	3
Assessment Ratio:	10%	10%	10%
Assessed FCV:	$19,950	$19,950	$17,800
Assessed LPV:	$19,950	$18,993	$17,266
Property Use Code:	0134	0134	0134
Tax Area Code:	110000	110000	110000

Additional Component Information (for this parcel)

Valuation Characteristics

New Search

Helpful Information:
recorder glossary forms

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