BUCKEYE AREA DRAINAGE MASTER PLAN

FCD 2004C058

APPENDIX K
CONCEPTUAL DESIGN PLANS

JUNE 2009

Prepared By:

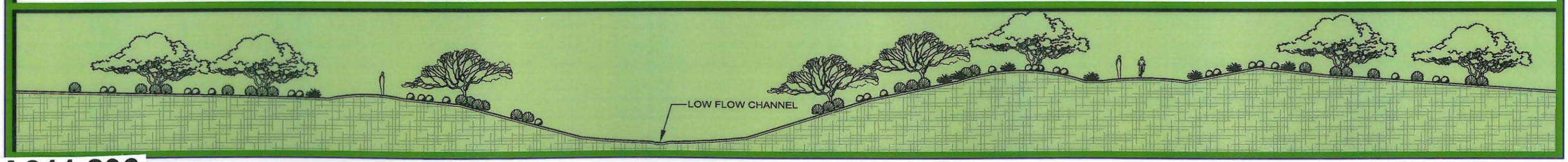
Dibble Engineering

ACS Archaeological Consulting Services, Ltd.

HDR

OLSSON ASSOCIATES

JE FULLER HYDROLOGY & GEOMORPHOLOGY, INC.



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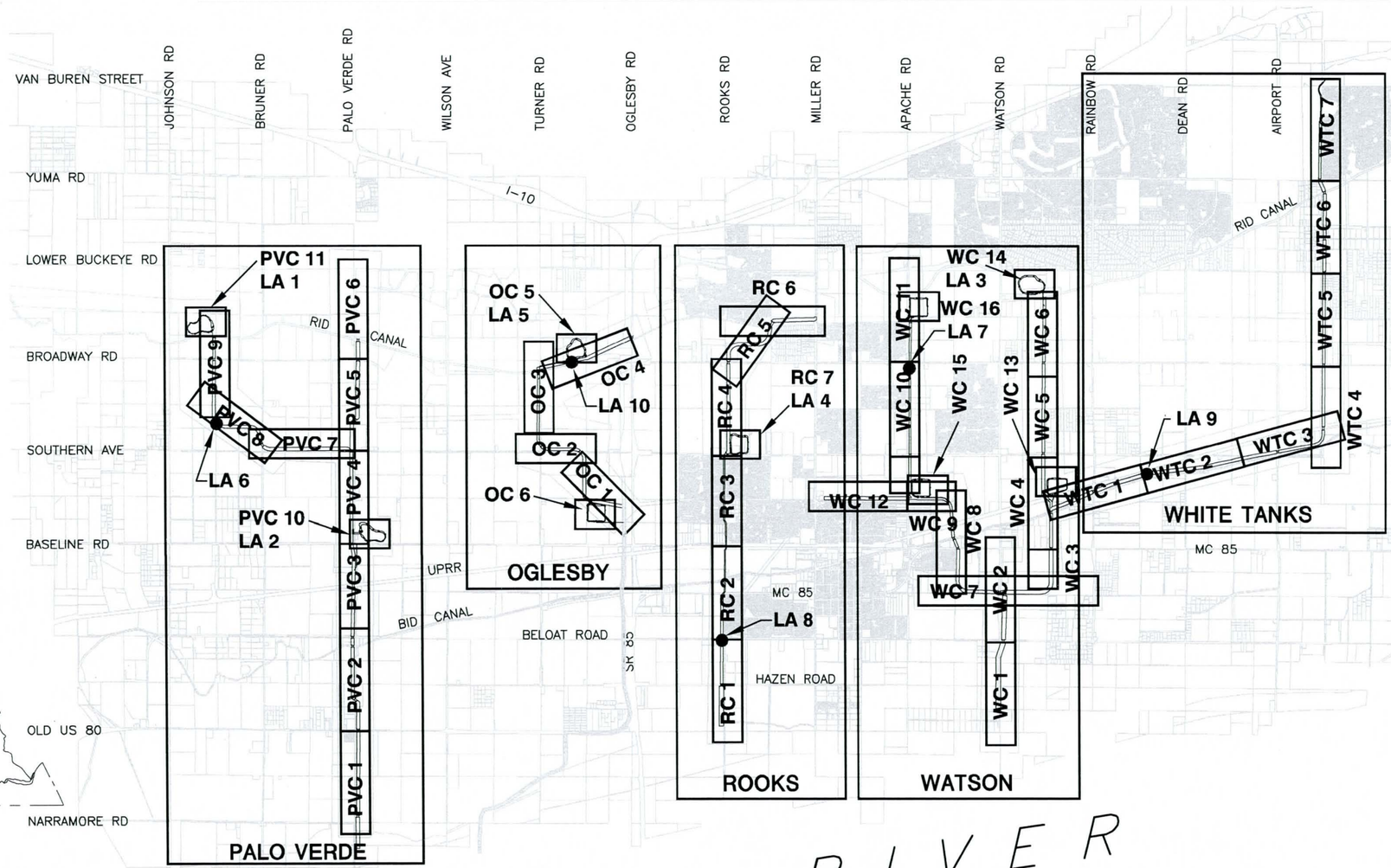
BUCKEYE AREA DRAINAGE MASTER PLAN
F.C.D. CONTRACT NO. 2004C058
Conceptual Design Plans



C01	COVER SHEET
WTC 0 TO WTC 7	WHITE TANKS SYSTEM
WC 0 TO WC 16	WATSON SYSTEM
RC 0 TO RC 7	ROOKS SYSTEM
OC 0 TO OC 6	OGLESBY SYSTEM
PVC 0 TO PVC 12	PALO VERDE SYSTEM
LA 1 TO LA 10	TYPICAL LANDSCAPE, AESTHETICS & MULTI-USE TREATMENTS

N

3000 0 3000 6000 9000
SCALE IN FEET

NOTE:
CONTROL DATUMS ARE BASED ON THE FOLLOWING:

HORIZONTAL – STATE PLANE COORDINATE SYSTEM 1927
VERTICAL – NORTH AMERICAN VERTICAL DATUM 1988

BASE MAP PROVIDED BY FCDMC

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN
PROJECT DESCRIPTION: COVER SHEET	
PRIME CONSULTANT: Dibble Engineering	DRN. CDF DATE: 06/09 · DES. JTB DATE: 06/09 · CKD. DCF DATE: 06/09 · SHEET --

FILE:J:\2006\10-0607\CAD\COVR01.dwg DATE:Jun, 04 2009 TIME: 01:48 pm

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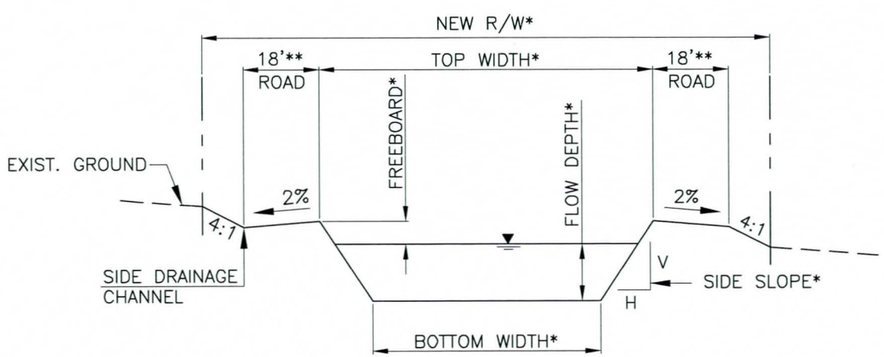
BUCKEYE AREA DRAINAGE MASTER PLAN
F.C.D. CONTRACT NO. 2004C058
Conceptual Design Plans

Flood Control District of Maricopa County 1959–2009

LEGEND

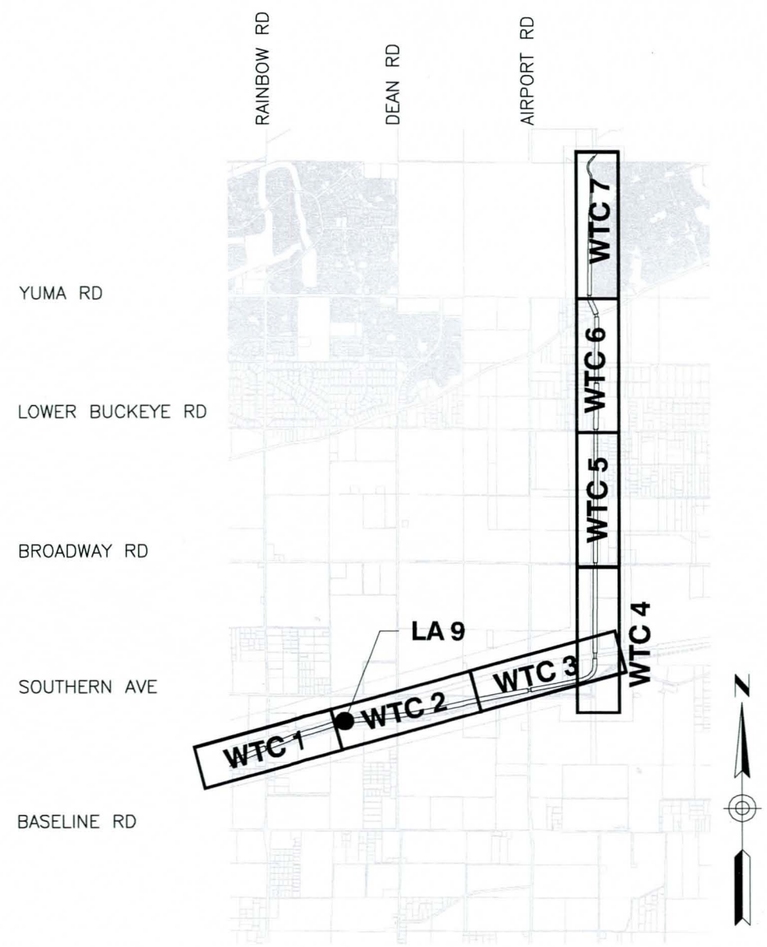
- XX-01 — CHANNEL REACH
- NEW CHANNEL
- NEW DETENTION BASIN SLOPE
- NEW DRAIN PIPE
- NEW CULVERT
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- EXISTING ROAD
- 1410 — EXIST. INDEX CONTOUR
- EXIST. INTERMEDIATE CONTOUR
- 15"S — EXISTING UTILITY
- EXISTING STRUCTURE
- 304 — ENVIRONMENTAL SITE



*DIMENSIONS PER PLANS

**NOT ALL LOCATIONS REQUIRE DUAL MAINTENANCE ROADS– SEE PLANS

TYPICAL CHANNEL SECTION
N.T.S.



KEY MAP

SHEET INDEX

WT 0	WHITE TANKS SYSTEM COVER SHEET
WTC G	WHITE TANKS SYSTEM GENERAL NOTES SHEET
WTC 1 TO WTC 7	WHITE TANKS SYSTEM PLAN & PROFILE SHEETS

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION WHITE TANKS SYSTEM			
PRIME CONSULTANT Dibble Engineering	DRN. CDF DATE: 06/09		SHEET WTC 0
	DES. JTB DATE: 06/09		
	CKD. DCF DATE: 06/09		

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WHITE TANKS SYSTEM DESIGN GUIDELINES

CHANNELIZED WHITE TANKS CHANNEL SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE CHANNEL AND BASIN WITH SEMI-NATURAL LOWER SONORAN DESERT LANDSCAPE DESIGN THEMES. THE LIMIT OF THESE GUIDELINES IS AT THE BOUNDARY OF THE ADMP. CHANNEL SEGMENTS BEYOND THE ADMP BOUNDARY DO NOT FALL UNDER THESE DESIGN GUIDELINES.

Design Concept

White Tanks System shall consist of the following elements:

1. An earthen channel and basins with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that recreation multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the system including biological, cultural and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for both channels and basins are shown for reference and will be designed and constructed by others. While only a typical 1000' long channel section and one basin multi-use scenario is provided, the intent is to incorporate the scenarios system wide.

Channel Criteria

1. Channel Engineering Design
   - Overall channel sizing and design shall use a Manning's n-value of 0.045 to allow for grasses, wildflower mixes, some shrubs and trees within the channel bottom. The n-value will also account for variable side slopes and a meandering channel/ low flow alignment.
2. Configuration
   - The overall channel form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the channel to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - The center line of the channel shall meander within the right of way to reinforce a sinuous appearance, minimizing straight alignments for extended lengths.
   - The low flow channel shall meander along the bottom of the channel, in differing alignments to the center line to provide visual movement of the low flow channel on the channel bottom.
3. Vegetation
   Channels
   - Typical channel cross-sections shall include areas of grasses, wildflowers, scattered shrubs, and occasional trees that are planted to reinforce the form of the meandering channel side slopes, and channel/ low flow alignment. Three differing seed mixes shall be provided, one for the overbank, another for the side slopes, and the last for the channel bottom. The overbank mix will have a generous mix of grasses, shrubs, and tree species. The side slope mix will contain the same mix with a more conservative amount of tree species seed. The bottom mix will be limited to grasses and a limited amount of shrubs.
   - Tall Pot trees are recommended predominently on the upper portion of the channel side slopes and the overbank. Utilize the typical channel length scenario for plant densities.
4. Perimeter
   - A minimum of 50' of ROW or 30% additional, whichever is greater, shall be added to the channel width as a setback from adjacent landuse.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the channel. Design motifs have been developed for the drainage infrastructure as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
6. Multi-use
   - The designated multi-use components to be coordinated and provided by others in pre-design and design.

OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION DESIGN GUIDELINES			
PRIME CONSULTANT Dibble Engineering	DRN. BSM DATE: 05/09	SCALE	SHEET
	DES. SH DATE: 05/09		WTCG
	CKD. SH DATE: 05/09		

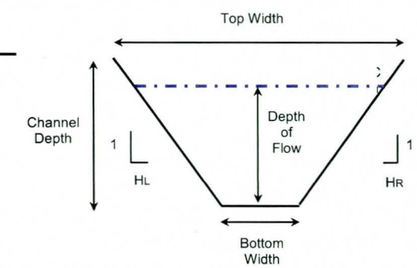
FILE: F:\Projects\20070071\MasterXrefs\X0607-GENERAL NOTES WTC.dwg DATE: May 29 2009 TIME: 02:38 pm

Buckeye Area Drainage Master Plan
White Tanks System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WT-01	MCWT11	1263	881	882.29	2580	0.0005	LLE	0.030	44	5.6	7	7	0	0	468.7	123.5	0.24	Sub	2.7	1.4	7.1	143	193
WT-02	MCWT10	1257	882.35	885.01	5315	0.0005	LLE	0.030	44	5.6	7	7	0	0	466.8	123.2	0.24	Sub	2.7	1.4	7.0	142	192

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WT-C1	1257	120	882.35	882.29	0.0005	5	8	6	RCBC	0.012	Wingwall	5.62	6.27	0.94

Utility Crossings

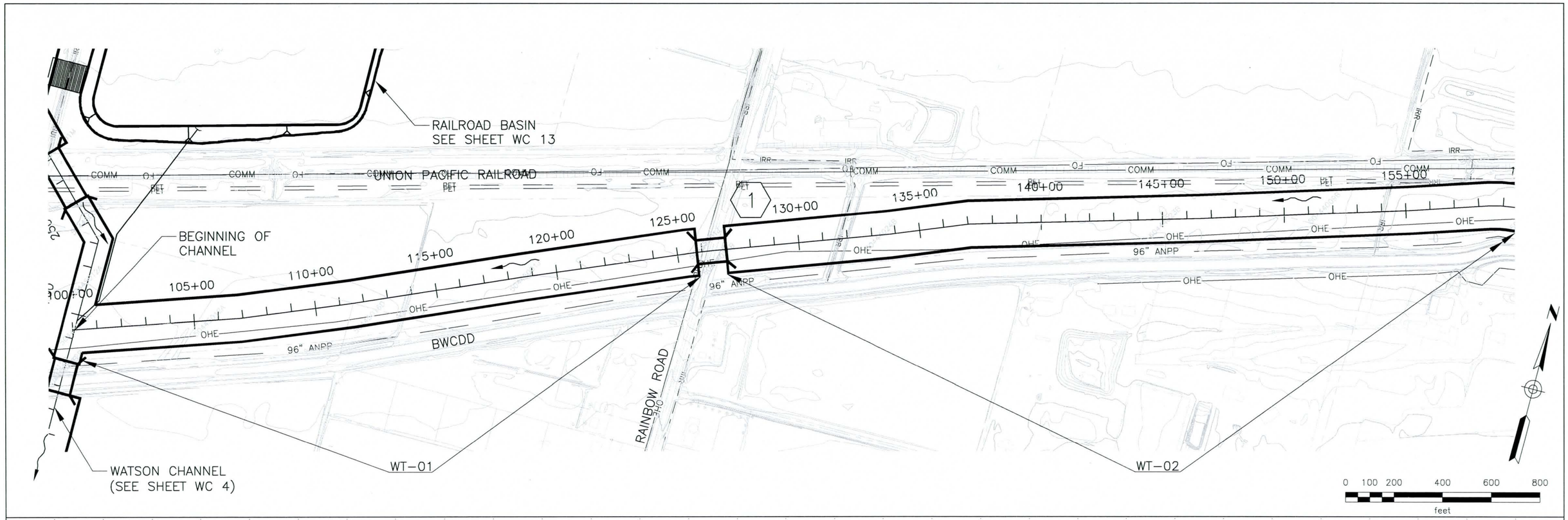
Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WT-01	White Tanks	WTC 1	0	0	0	0	0	0	0	0	0
WT-02	White Tanks	WTC 1	0	2	0	0	0	0	0	0	2

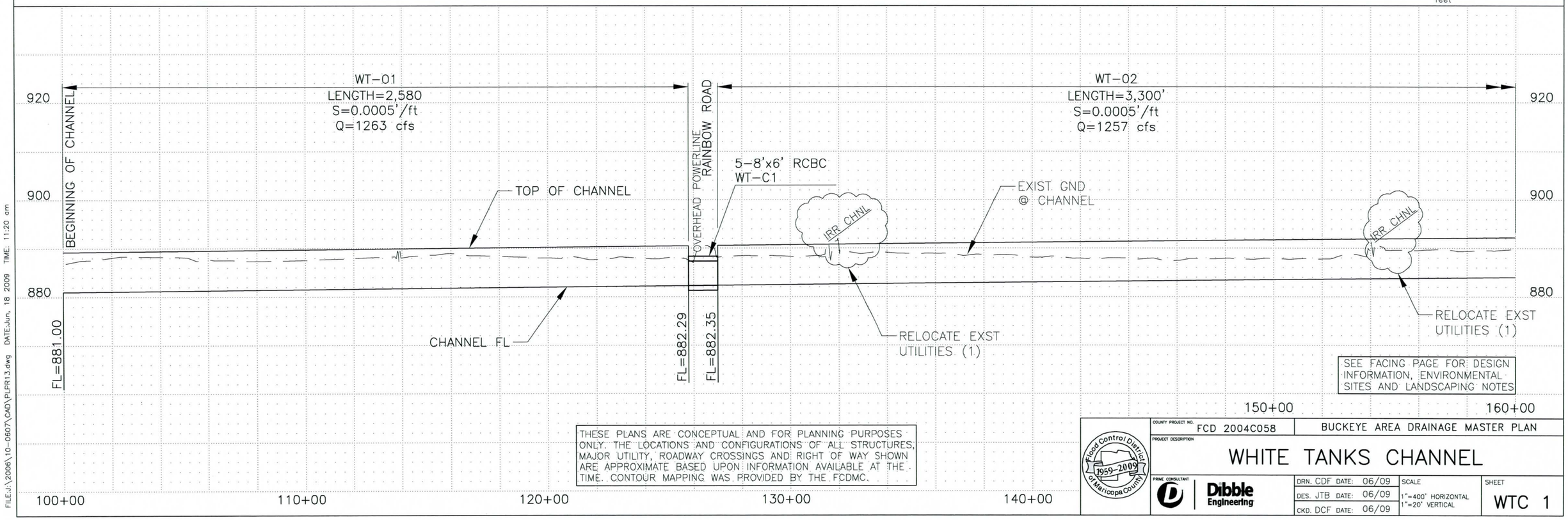
Landscape Notes:

Landscape Design Theme: Semi-natural Sonoran Desert.
Design Motif: Railroad/Canal
Multi-use: multi-use trails and cultural interpretation of historic irrigation and historic railroad.

Environmental Notes:

Map ID 36, Wilbur-Ellis Co. This site is an SSTS pesticide-producing establishment, a small quantity RCRA generator, and has a UST.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

WHITE TANKS CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09	SCALE	SHEET
DES. JTB DATE: 06/09	1"=400' HORIZONTAL 1"=20' VERTICAL	WTC 1
CKD. DCF DATE: 06/09		

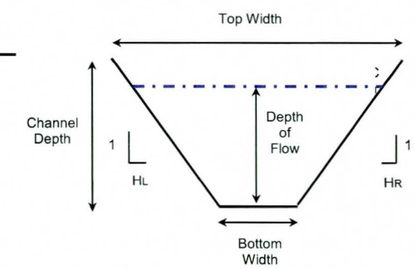
FILE:J:\2006\10-0607\CAD\PLPR13.dwg DATE:Jun. 18 2009 TIME: 11:20 am

Buckeye Area Drainage Master Plan
White Tanks System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WT-02	MCWT10	1257	882.35	885.01	5315	0.0005	LLE	0.030	44	5.6	7	7	0	0	466.8	123.2	0.24	Sub	2.7	1.4	7.0	142	192
WT-03	MCWT09	949	885.06	887.7	5278	0.0005	LLE	0.030	36	5.2	7	7	0	0	376.4	109.6	0.24	Sub	2.5	1.3	6.5	127	177

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

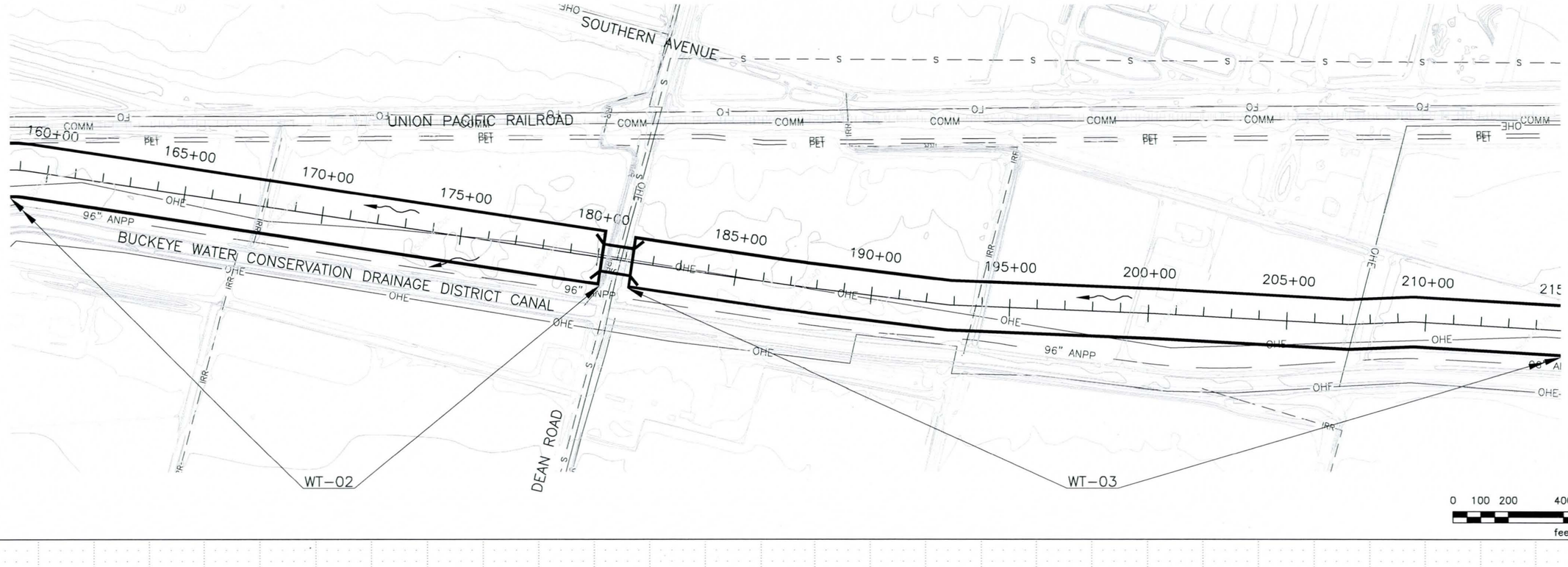
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WT-C2	949	110	885.06	885.01	0.0005	4	10	5	RCBC	0.012	Wingwall	5.62	6.14	1.04

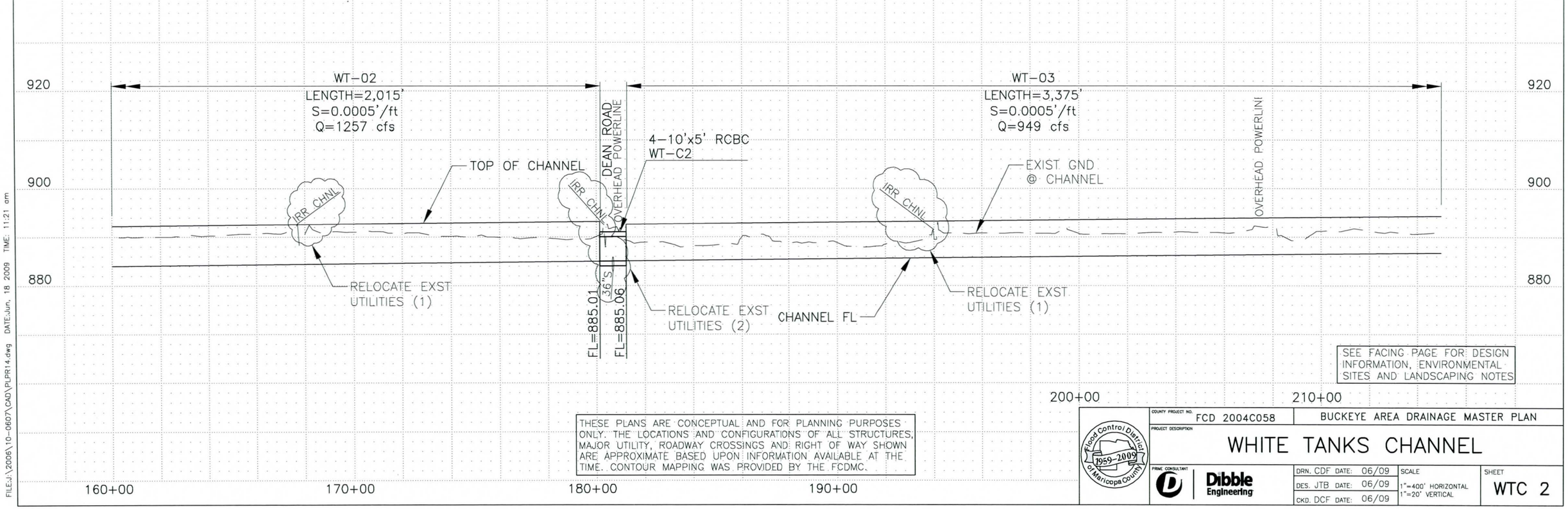
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WT-02	White Tanks	WTC 2	0	2	0	0	0	0	1	0	3
WT-03	White Tanks	WTC 2	0	1	0	0	0	0	0	0	1

Landscape Notes:

Landscape Design Theme: Semi-natural Sonoran Desert.
Design Motif: Railroad/Canal
Multi-use: multi-use trails and cultural interpretation of historic irrigation and historic railroad.





SEE FACING PAGE FOR DESIGN INFORMATION, ENVIRONMENTAL SITES AND LANDSCAPING NOTES

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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION: WHITE TANKS CHANNEL		
PRIME CONSULTANT: Dibble Engineering	DRN. CDF DATE: 06/09 DES. JTB DATE: 06/09 CKD. DCF DATE: 06/09	SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL
SHEET: WTC 2		

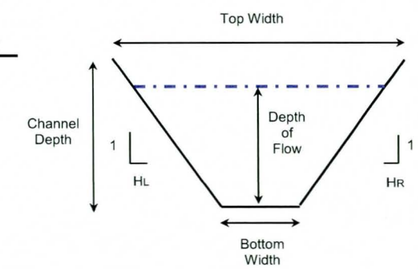
FILE:J:\2006\10-0607\CAD\PLPR14.dwg DATE:Jun. 18 2009 TIME: 11:21 am

Buckeye Area Drainage Master Plan
White Tanks System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WT-03	MCWT09	949	885.06	887.7	5278	0.0005	LLE	0.030	36	5.2	7	7	0	0	376.4	109.6	0.24	Sub	2.5	1.3	6.5	127	177
WT-04	MCWT08	704	887.75	891.66	3193	0.0012	LLE	0.030	25	4.0	7	7	0	0	214.2	82.0	0.36	Sub	3.3	1.0	5.1	96	146

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

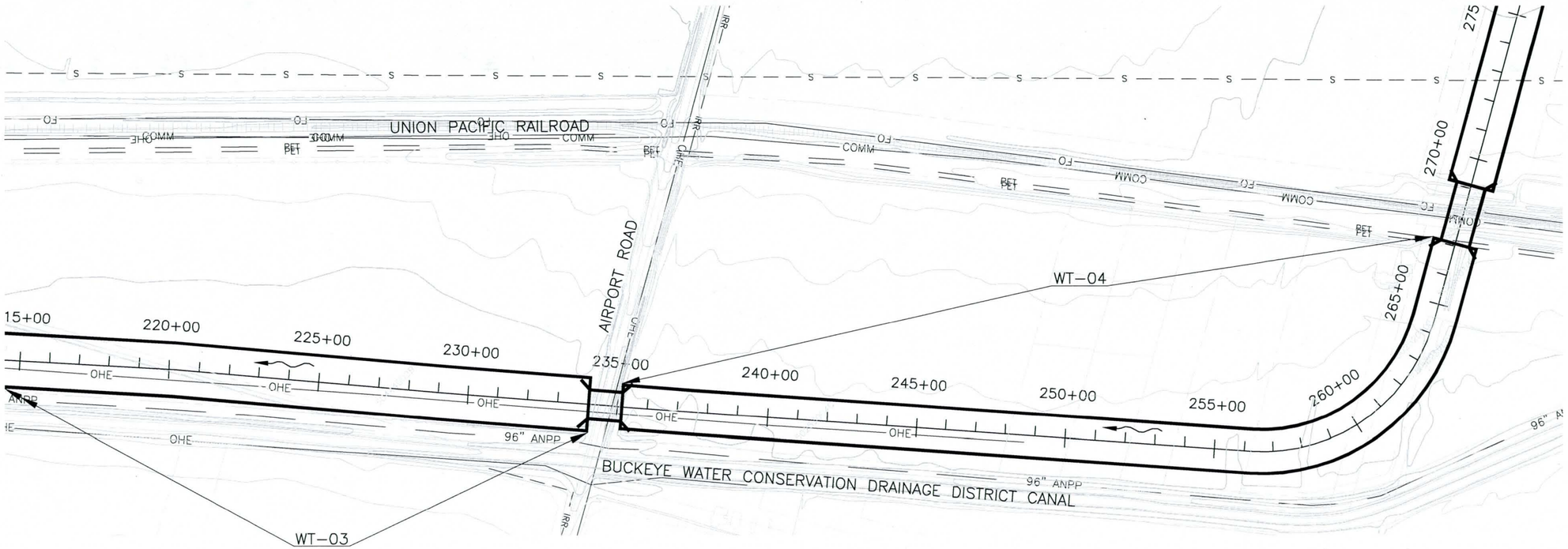
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WT-C3	704	112	887.75	887.70	0.0004	3	8	4	RCBC	0.012	Wingwall	5.18	6.57	1.00

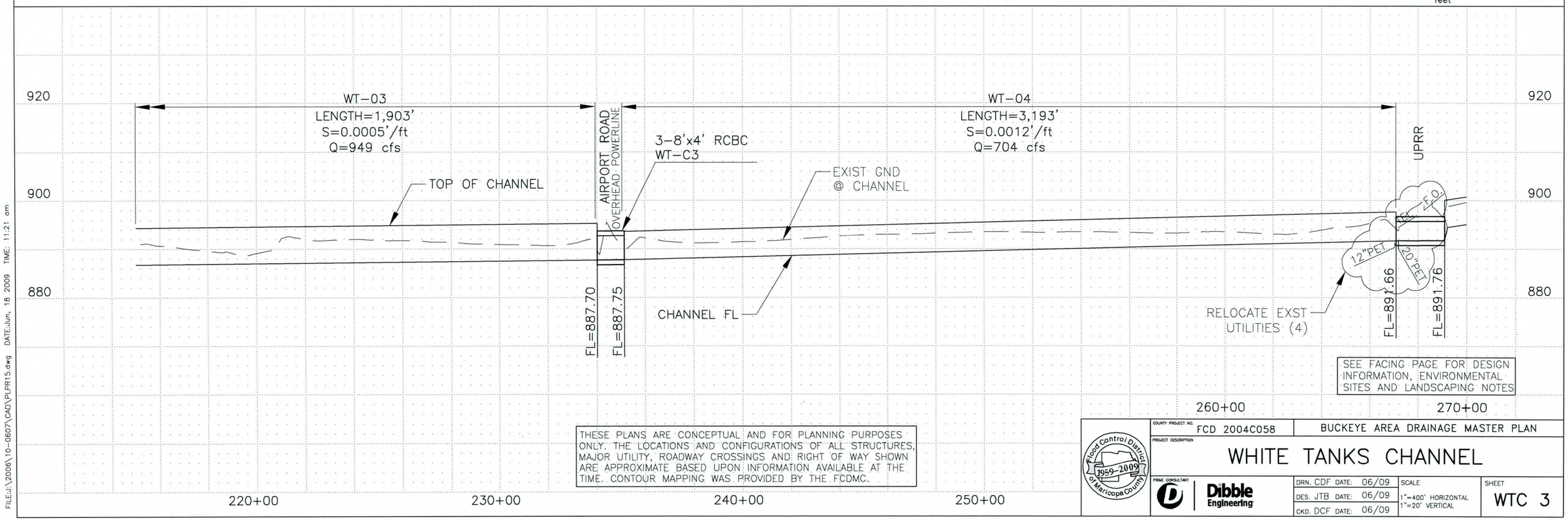
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WT-03	White Tanks	WTC 3	0	0	0	0	0	0	0	0	0
WT-04	White Tanks	WTC 3	0	0	1	0	2	0	0	0	3

Landscape Notes:

This sheet is outside of the ADMP study area. No landscaping included.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

WHITE TANKS CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09	SCALE	SHEET
DES. JTB DATE: 06/09	1"=400' HORIZONTAL 1"=20' VERTICAL	WTC 3
CKD. DCF DATE: 06/09		

FILE:J:\2006\10-0607\CAD\PLPR15.dwg DATE:Jun. 18 2009 TIME: 11:21 am

Buckeye Area Drainage Master Plan
White Tanks System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WT-05	MCWT07	781	894.46	921.51	3458	0.0078	LE	0.045	22	3.4	7	7	18	0	156.7	70.4	0.59	Sub	5.0	1.0	4.4	122	190

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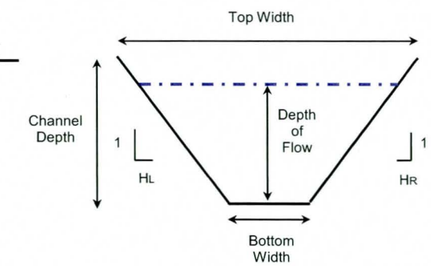

Typical Channel Section

Culvert Properties

I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WT-C4	781	202	891.76	891.66	0.0005	3	8	4	RCBC	0.012	Wingwall	4.02	5.95	0.85

Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WT-05	White Tanks	WTC 4	0	0	0	0	0	1	0	0	1

Landscape Notes:

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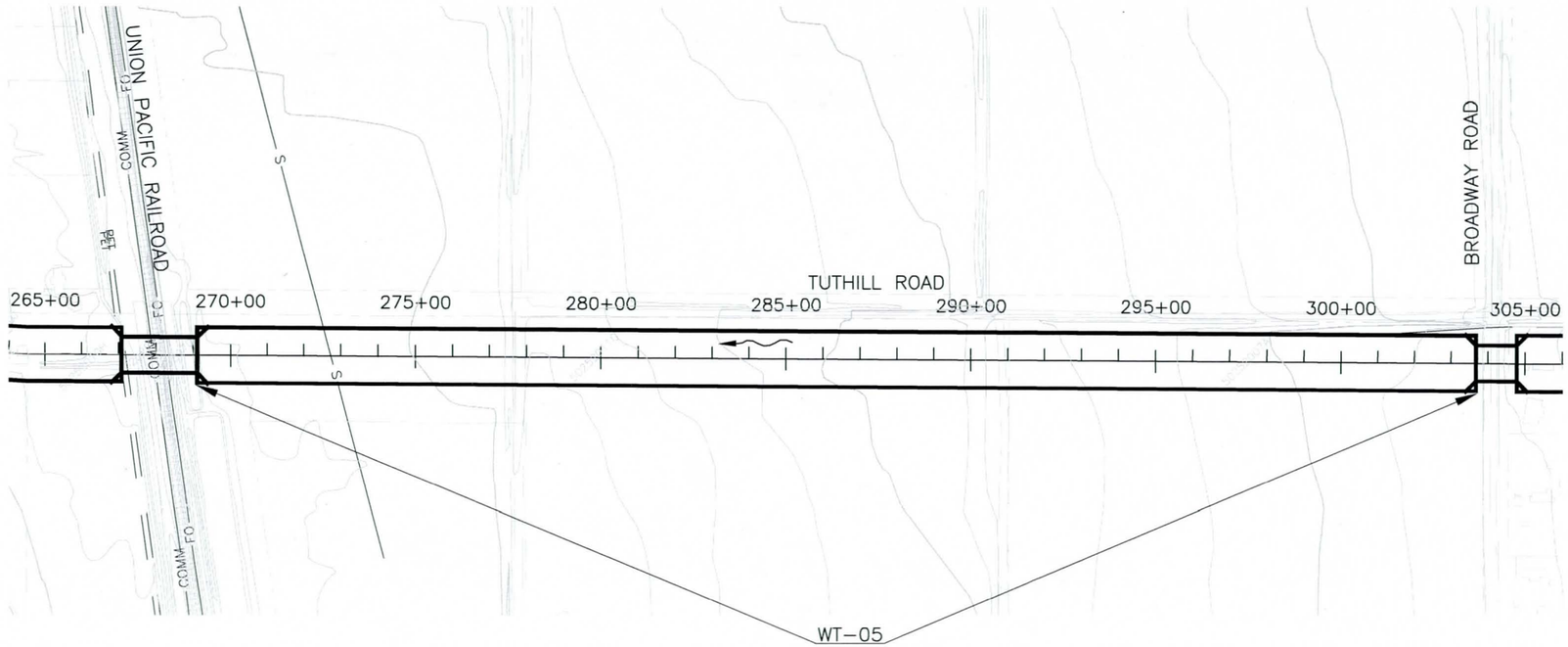

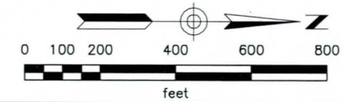

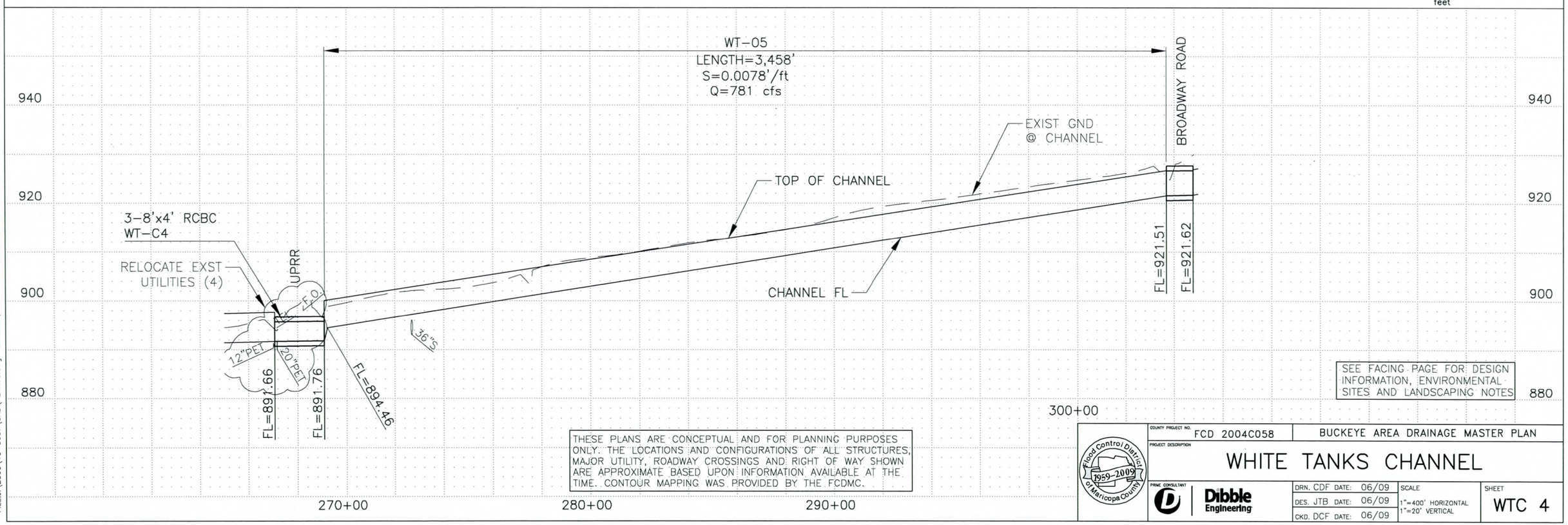

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PROJECT DESCRIPTION: WHITE TANKS CHANNEL			
PRIME CONSULTANT: Dibble Engineering	DRN. CDF DATE: 06/09	SCALE	SHEET
	DES. JTB DATE: 06/09	1"=400' HORIZONTAL 1"=20' VERTICAL	WTC 4
	CKD. DCF DATE: 06/09		

Flood Control District of Maricopa County 1959-2009

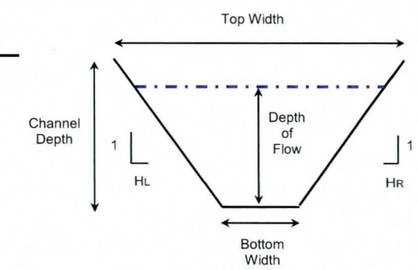
FILE:J:\2006\10-0607\CAD\PLPR16.dwg DATE:Jun. 18 2009 TIME: 11:21 am

Buckeye Area Drainage Master Plan
White Tanks System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WT-06	MCWT06	898	921.62	943.28	2535	0.0085	LE	0.045	24	3.5	7	7	18	0	168.7	73.3	0.62	Sub	5.3	1.0	4.5	87	155
WT-07	MCWT05	898	943.39	960.54	2535	0.0068	LE	0.045	25	3.6	7	7	18	0	184.2	76.6	0.55	Sub	4.9	1.0	4.6	90	158

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

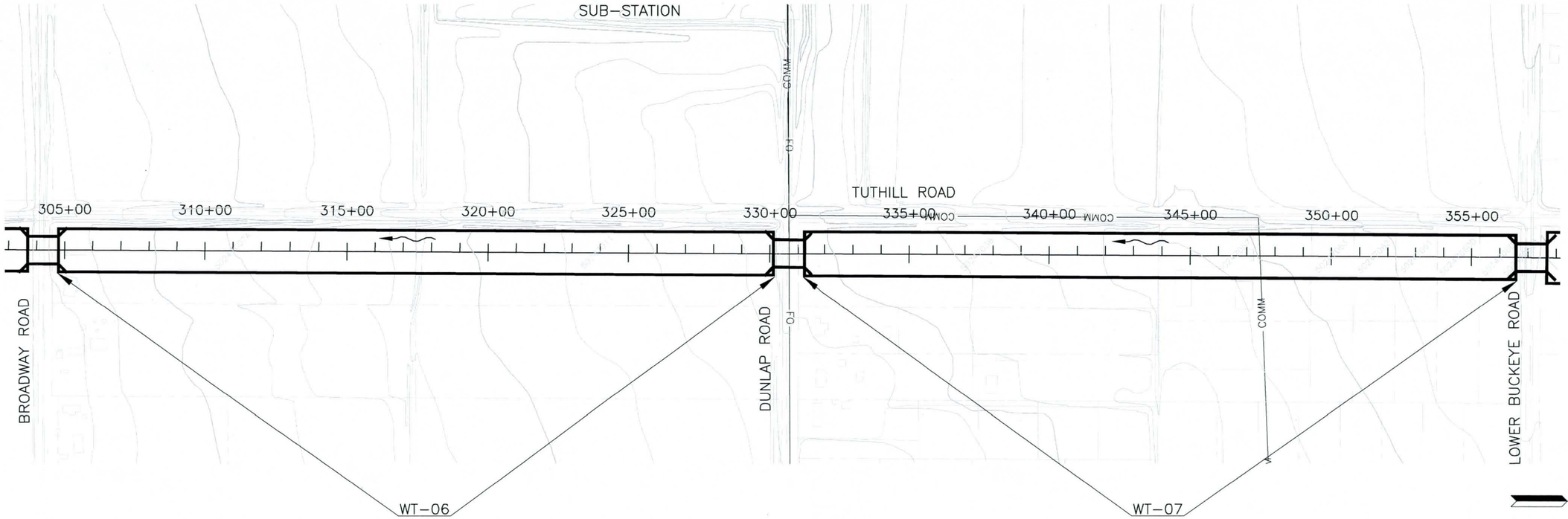
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WT-C5	898	110	921.62	921.51	0.0010	3	8	4	RCBC	0.012	Wingwall	3.41	6.60	0.87
WT-C6	898	110	943.39	943.28	0.0010	3	8	4	RCBC	0.012	Wingwall	3.49	6.60	0.91

Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WT-06	White Tanks	WTC 5	0	0	0	0	0	0	0	0	0
WT-07	White Tanks	WTC 5	0	1	1	0	0	1	0	0	3

Landscape Notes:

This sheet is outside of the ADMP study area. No landscaping included.



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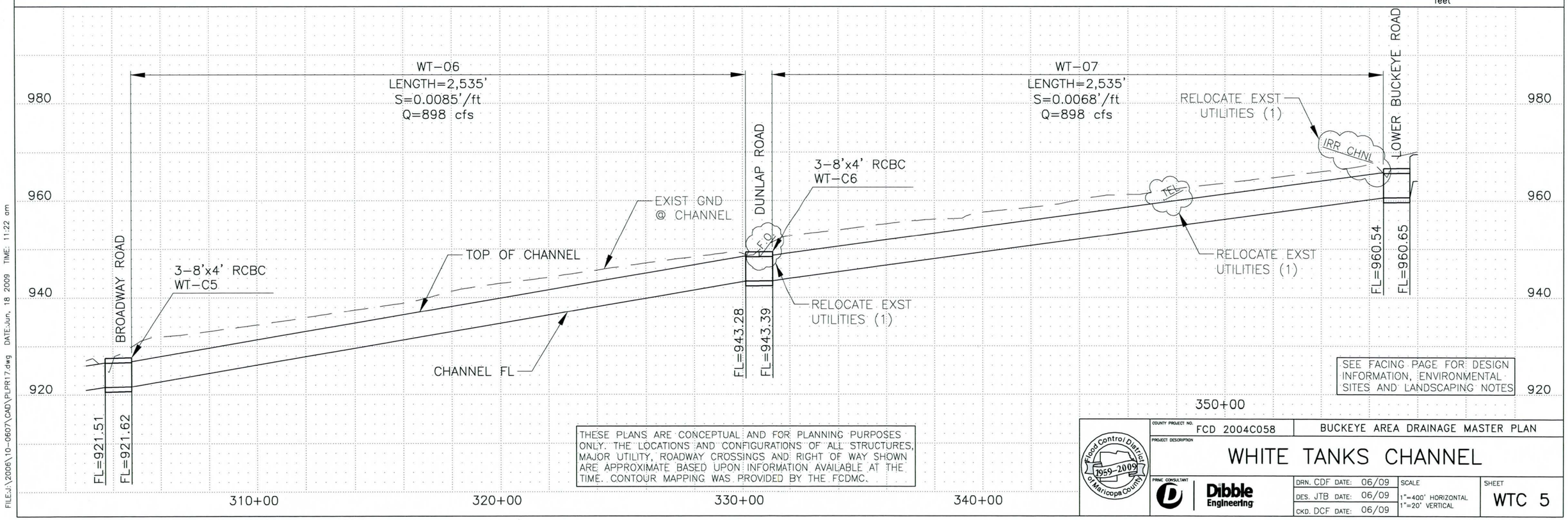
feet



SEE FACING PAGE FOR DESIGN INFORMATION, ENVIRONMENTAL SITES AND LANDSCAPING NOTES

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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

WHITE TANKS CHANNEL

PRIME CONSULTANT Dibble Engineering

DRN. CDF DATE: 06/09	SCALE 1"=400' HORIZONTAL 1"=20' VERTICAL	SHEET WTC 5
DES. JTB DATE: 06/09		
CKD. DCF DATE: 06/09		

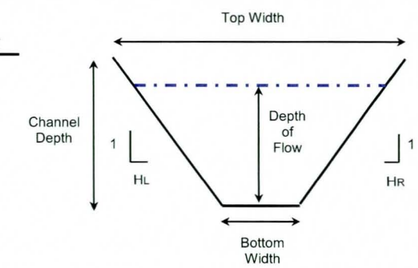
FILE:J:\2006\10-0607\CAD\PLPR17.dwg DATE:Jun, 18 2009 TIME: 11:22 am

Buckeye Area Drainage Master Plan
White Tanks System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WT-08	MCWT04	1452	963.97	973.62	1821	0.0053	LE	0.045	36	4.4	7	7	18	0	291.7	97.9	0.51	Sub	5.0	1.2	5.6	160	232
WT-09	MCWT03	1452	977.78	994.73	2523	0.0067	LE	0.045	34	4.2	7	7	18	0	266.9	93.7	0.57	Sub	5.4	1.2	5.3	165	238
WT-10	MCWT02	1317	998.17	1001.69	685	0.0051	LE	0.045	34	4.3	7	7	0	18	273.8	94.5	0.50	Sub	4.8	1.2	5.4	110	178

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

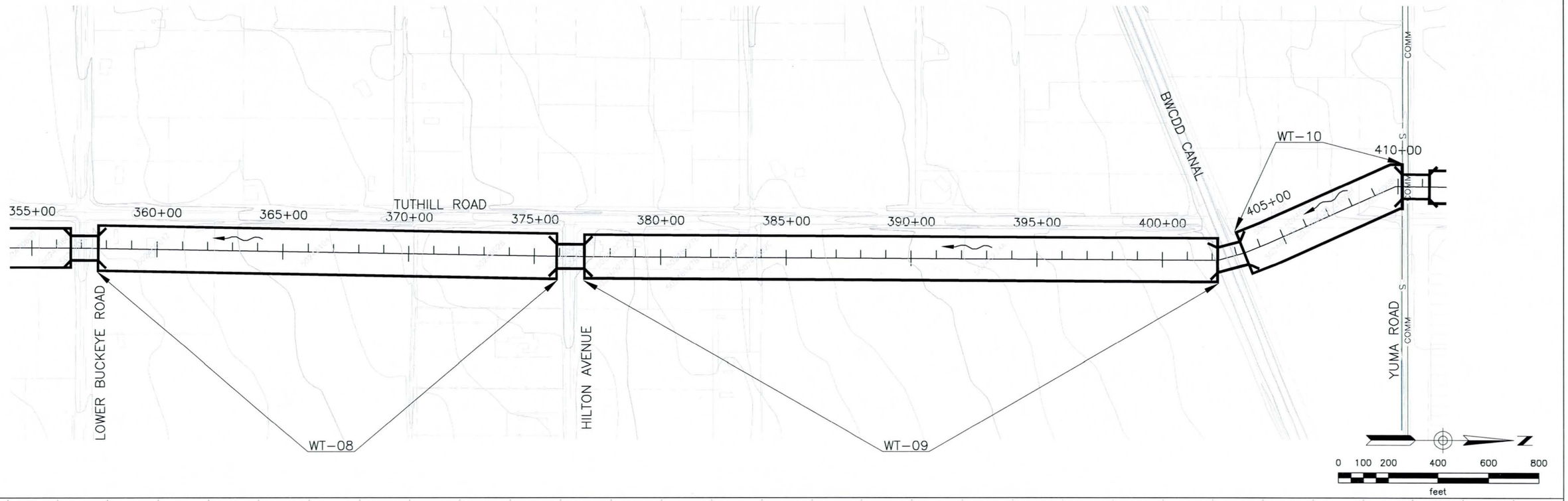
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WT-C7	1452	110	960.65	960.54	0.0010	5	8	5	RCBC	0.012	Wingwall	3.64	5.59	0.88
WT-C8	1452	110	973.73	973.62	0.0010	4	8	4	RCBC	0.012	Wingwall	4.38	8.19	1.05
WT-C9	1317	111	998.17	994.73	0.0311	4	8	5	RCBC	0.012	Wingwall	4.19	6.02	0.86

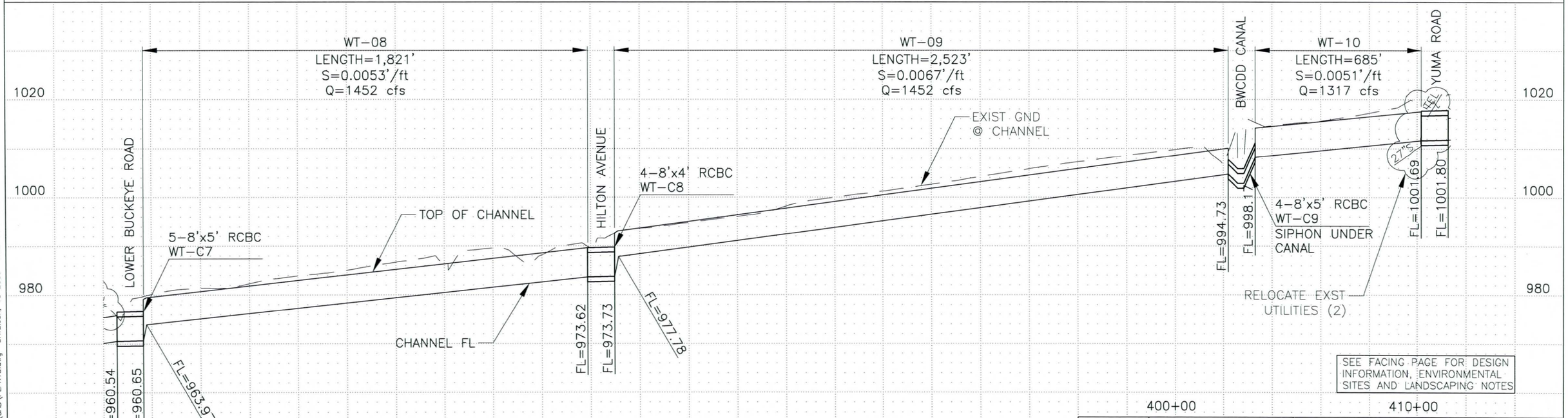
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WT-08	White Tanks	WTC 6	0	0	0	0	0	0	0	0	0
WT-09	White Tanks	WTC 6	0	0	0	0	0	0	0	0	0
WT-10	White Tanks	WTC 6	0	0	0	0	0	0	1	0	1

Landscape Notes:

This sheet is outside of the ADMP study area. No landscaping included.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

WHITE TANKS CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL

SHEET: WTC 6

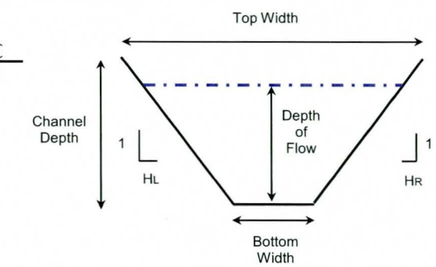
FILE:J:\2006\10-0607\CAD\PLPR18.dwg DATE:Jun. 18 2009 TIME: 11:22 am

Buckeye Area Drainage Master Plan
White Tanks System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required ((ft)
WT-11	MCWT01	353	1001.8	1027.05	3278	0.0077	LE	0.045	13	2.7	7	7	0	18	86.1	51.2	0.55	Sub	4.1	1.0	3.7	65	133

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

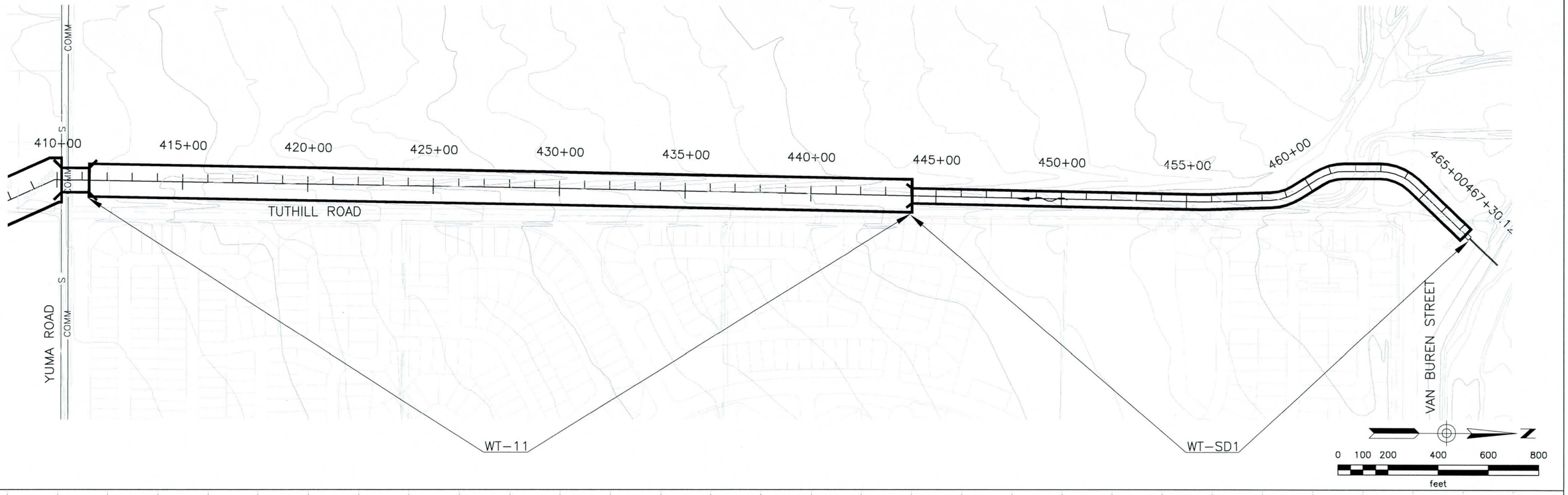
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WT-C10	353	110	1001.80	1001.69	0.0010	2	6	4	RCBC	0.012	Wingwall	4.28	5.65	0.67
WT-SD1	353	2,324	1,032.64	1,027.05	0.0024	2	8	4	RCBC	0.012	Wingwall	4.28	4.00	1.00

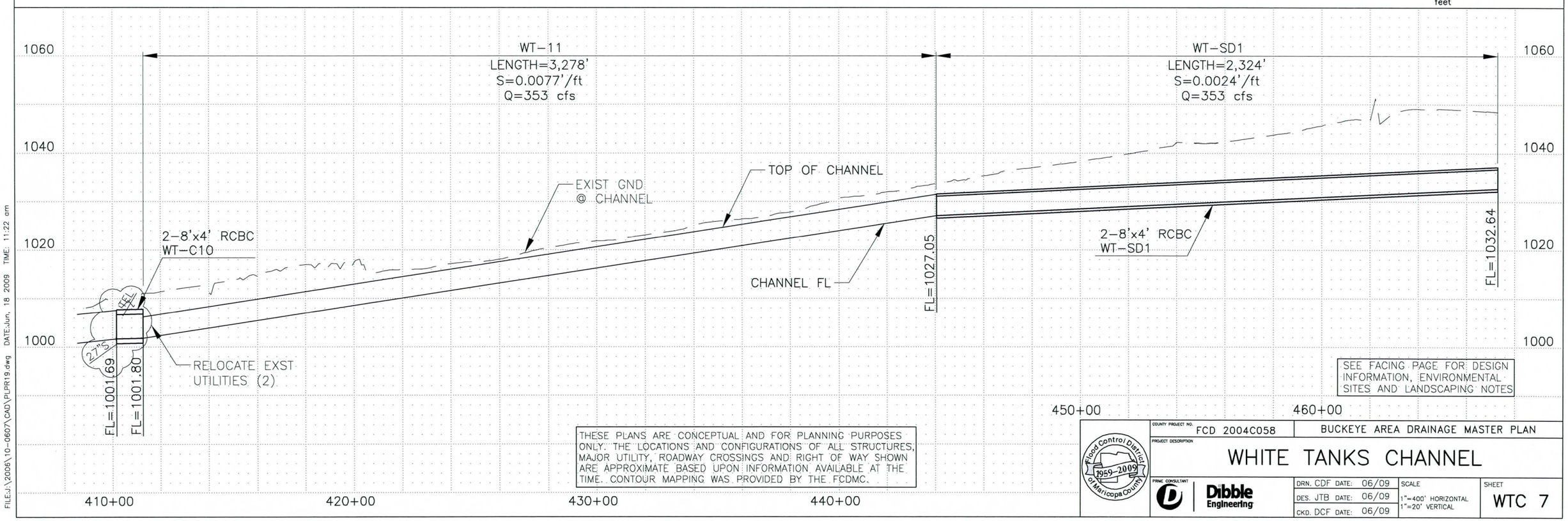
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WT-11	White Tanks	WTC 7	0	0	0	0	0	1	0	0	1

Landscape Notes:

This sheet is outside of the ADMP study area. No landscaping included.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

WHITE TANKS CHANNEL

PRIME CONSULTANT Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE 1"=400' HORIZONTAL 1"=20' VERTICAL

SHEET WTC 7

FILE:J:\2006\10-0607\CAD\PLPR19.dwg DATE:Jun. 18 2009 TIME: 11:22 am

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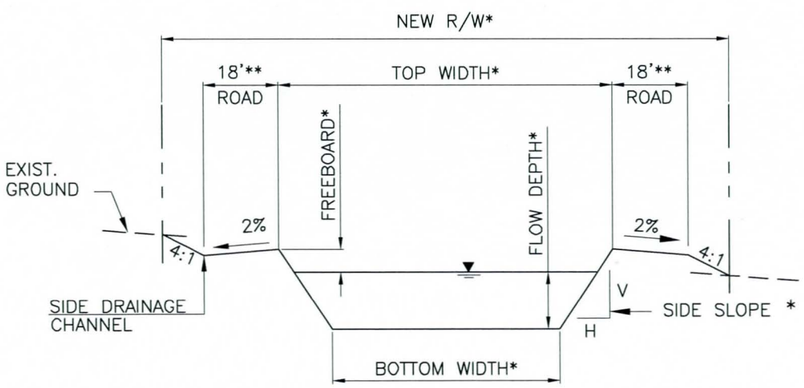
BUCKEYE AREA DRAINAGE MASTER PLAN
F.C.D. CONTRACT NO. 2004C058
Conceptual Design Plans

Flood Control District of Maricopa County 1959–2009

LEGEND

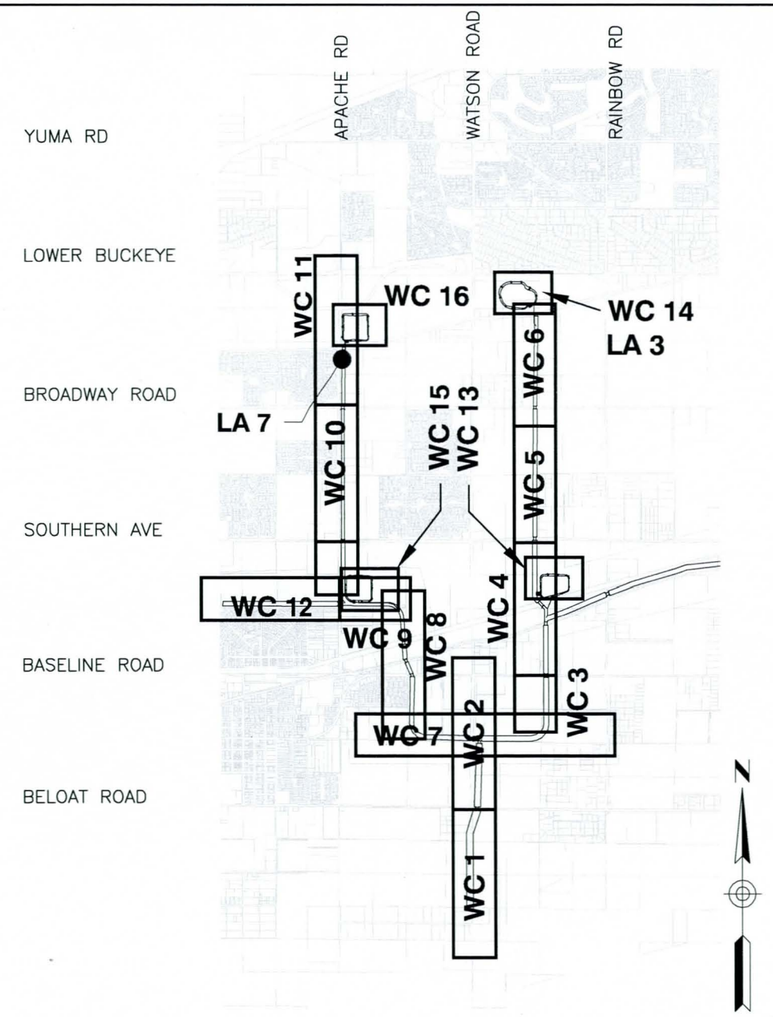
- XX–01 — CHANNEL REACH
- NEW CHANNEL
- NEW DETENTION BASIN SLOPE
- NEW DRAIN PIPE
- NEW CULVERT
- PROPERTY LINE
- RIGHT–OF–WAY LINE
- EXISTING ROAD
- 1410 — EXIST. INDEX CONTOUR
- EXIST. INTERMEDIATE CONTOUR
- 15"S — EXISTING UTILITY
- EXISTING STRUCTURE
- 304 — ENVIRONMENTAL SITE



*DIMENSIONS PER PLANS

**NOT ALL LOCATIONS REQUIRE DUAL MAINTENANCE ROADS– SEE PLANS

TYPICAL CHANNEL SECTION
N.T.S.



3000 0 3000 6000 9000
SCALE IN FEET

KEY MAP

SHEET INDEX

WC 0	WATSON SYSTEM COVER SHEET
WC G	WATSON SYSTEM GENERAL NOTES SHEET
WC 1 TO WC 12	WATSON CHANNEL PLAN & PROFILE SHEETS
WC 13	RAILROAD BASIN
WC 14	RAINBOW PARK BASIN
WC 15	MARICOPA BASIN
WC 16	APACHE BASIN

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION: WATSON SYSTEM		
PRIME CONSULTANT: Dibble Engineering	DRN. CDF DATE: 06/09 DES. JTB DATE: 06/09 CKD. DCF DATE: 06/09	SHEET WC 0

FILE:J:\2006\10-0607\CAD\COVR03-WC.dwg DATE:Jun, 04 2009 TIME: 01:51 pm

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WATSON SYSTEM DESIGN GUIDELINES

CHANNELIZED WATSON CHANNEL AND BASINS SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE CHANNEL AND BASINS WITH NATURAL LOWER SONORAN DESERT RIPARIAN, SEMI-NATURAL SONORAN DESERT, AND DESERT PARK LANDSCAPE DESIGN THEMES.

Design Concept

Watson System shall consist of the following elements:

1. An earthen channel and basins with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that recreation multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the system including biological, cultural and recreational amenities. Maintenance roads will be multi-use trails. Typical multi-use scenarios for both channels and basins are shown for reference and will be designed and constructed by others. While only a typical 1000' long channel section and one basin multi-use scenario is provided, the intent is to incorporate the scenarios system wide.

Channel Criteria

1. Channel Engineering Design
   - Overall channel sizing and design shall use a Manning's n-value of 0.045. Typical channel cross-sections shall include areas of grasses, wildflowers, scattered shrubs, and occasional trees that are planted to reinforce the form of the meandering channel side slopes, and channel/ low flow alignment. Three differing seed mixes shall be provided, one for the overbank, another for the side slopes, and the last for the channel bottom. The overbank mix will have a generous mix of grasses, shrubs, and tree species. The side slope mix will contain the same mix with a more conservative amount of tree species seed. The bottom mix will be limited to grasses and a limited amount of shrubs. The n-value will also account for variable side slopes and a meandering channel/ low flow alignment.
   - Tall Pot trees are recommended predominently on the upper portion of the channel side slopes and the overbank. Utilize the typical channel length scenario for plant densities.
2. Configuration
   - The overall channel form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the channel to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp, architectonic edges.
   - The center line of the channel shall meander within the right of way to reinforce a sinuous appearance, minimizing straight alignments for extended lengths.
   - The low flow channel shall meander along the bottom of the channel, in differing alignments to the center line to provide visual movement of the low flow channel on the channel bottom.
3. Perimeter
   - A minimum of 50' of ROW or 30% additional, whichever is greater, shall be added to the channel width as a setback from adjacent landuse.
4. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the channel. Design motifs have been developed for the drainage infrastructure as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
5. Multi-use
   - The designated multi-use components to be coordinated with others in pre-design and design.

RAINBOW PARK BASIN DESIGN GUIDELINES

RAINBOW PARK BASIN SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE BASINS. PRE-DESIGN AND DESIGN WILL SHOW ACTUAL LAYOUT.

Design Concept

Park Basin shall consist of the following elements:

1. An earthen basin with low-flow designed as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that biological and educational multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the basin including biological and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for the basin are shown for reference. Coordination with the Town of Buckeye will be required to determine the multi-use requirements for each basin in the system.

Basin Criteria

1. Basin Engineering Design
   - Overall Basin sizing and design shall use a Manning's n-value of 0.045 and storage calculations to allow for turf grass, native grasses, wildflower mixes, shrubs and trees within the basin bottom. One of the primary multi-use options is the joint use of the basin as an active recreation park. The basin size shall accommodate for increased levels of flora within the basin side slopes and bottom that will be utilized for shade.
2. Configuration
   - The overall basin form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the basin edge to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - Low flow channels shall be subsurface perforated pipe sloped to drain to the lower basin.
3. Vegetation
   - Landscape Design Theme: The landscape design theme will be Desert Park. The vegetation will be a combination of shade trees, shrubs, and native grasses and will be utilized throughout the basin bottom and side slopes. The overbank area will be a combination of turf grass and desert planting, but will be predominantly transitionary native plant material to blend in with the adjacent land uses.
   - Tall Pot trees are recommended predominently on the upper portion of the channel side slopes and the overbank. Utilize the typical channel length scenario for plant densities.
4. Perimeter
   - An additional 30% was included as a part of the design of the basin area to provide integration of the facility and for use as a setback. This setback shall be located to maximize the effects it will provide for both recreation users and adjacent development. The additional size required for this concept is 56% beyond a minimally graded and engineered basin. 26% of the land shall be acquired by others.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the basin. Design motifs have been developed for the drainage infrastructure. Irrigation/Canal Motif as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
6. Multi-use
   - The designated multi-use components to be coordinated in pre-design and design include a parking lot, restroom, lighted multi-use fields, sports courts, cultural interpretation of historic and prehistoric irrigation, and a connection to the regional trail system.

WATSON SYSTEM BASIN DESIGN GUIDELINES

WATSON SYSTEM BASIN SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE BASIN. PRE-DESIGN AND DESIGN DEVELOPMENT BY OTHERS WILL SHOW ACTUAL LAYOUT.

Design Concept

Basin shall consist of the following elements:

1. An earthen basin with low-flow design as a semi-soft structure. The basin shall be designed to retain the natural and beneficial functions served by the flood plain and be responsive to the Town of Buckeye's development guidelines for public health safety, and well being. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that biological and educational multi-use is incorporated.
2. Various multi-use components will be incorporated throughout the basin including biological and recreational amenities. Maintenance roads will be multi-use trails. Multi-use shall be discussed with the Town of Buckeye Parks and Recreation Department prior to starting predesign.

Basin Criteria

1. Basin Engineering Design
   - Overall Basin sizing and design shall use a Manning's n-value of 0.045 and storage calculations to allow for turf grass, native grasses, wildflower mixes, shrubs and trees within the basin bottom. The basin size shall accommodate for increased levels of flora within the basin side slopes and bottom.
2. Configuration
   - The overall basin form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the basin edge to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - Low flow channels shall be subsurface perforated pipe sloped to drain to the lower basin or as open low flow channels constructed of boulders and rip rap to emulate a natural channel appearance.
3. Vegetation
   - Landscape Design Theme: The landscape design theme will vary depending upon the multi-use designation. The vegetation will be a combination of trees, shrubs, and native grasses and will be utilized throughout the basin bottom and side slopes.
4. Perimeter
   - An additional 30% was included as a part of the design of the basin area to provide context sensitive integration of the facility and for use as a setback for multi-use functions developed by others. This setback shall be located to maximize the effects it will provide for both recreation users and adjacent development.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the channel. Design motifs have been developed for the drainage infrastructure. Farming/Agriculture as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
6. Multi-use
   - The designated multi-use components to be coordinated with others in pre-design and design are not determined at this time. Coordination with the Town of Buckeye Parks and Recreation Department will be required prior to moving forward with the concept.

OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION DESIGN GUIDELINES			
PRIME CONSULTANT Dibble Engineering	DRN. BSM DATE: 05/09	SCALE	SHEET
	DES. SH DATE: 05/09		WCG
	CKD. SH DATE: 05/09		

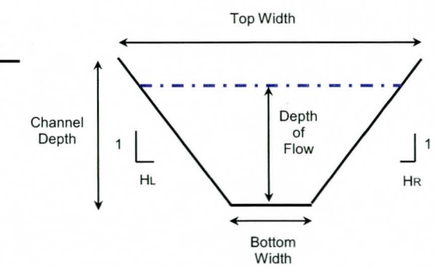
FILE: F:\Projects\20070071\MasterXrefs\X0607-GENERAL NOTES WC.dwg DATE: Jun. 17 2009 TIME: 10:16 am

Buckeye Area Drainage Master Plan
Watson System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WC-01	MCWD17	1666	841.66	843.64	3981	0.0005	LE	0.045	61	7.1	7	7	18	18	785.9	161.6	0.17	Sub	2.1	1.8	8.9	186	288

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

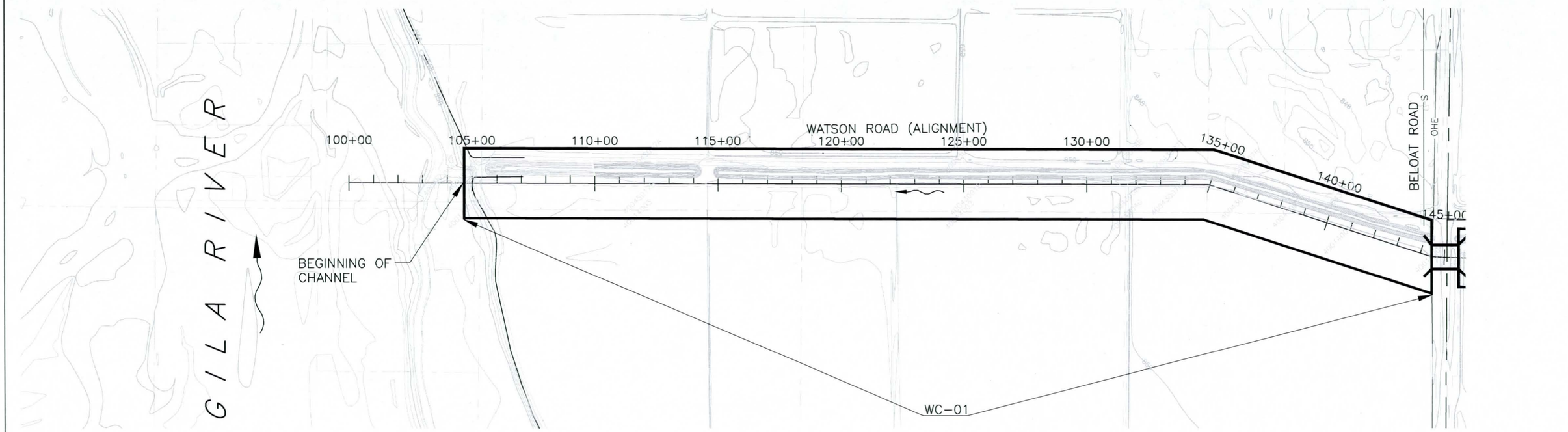
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D

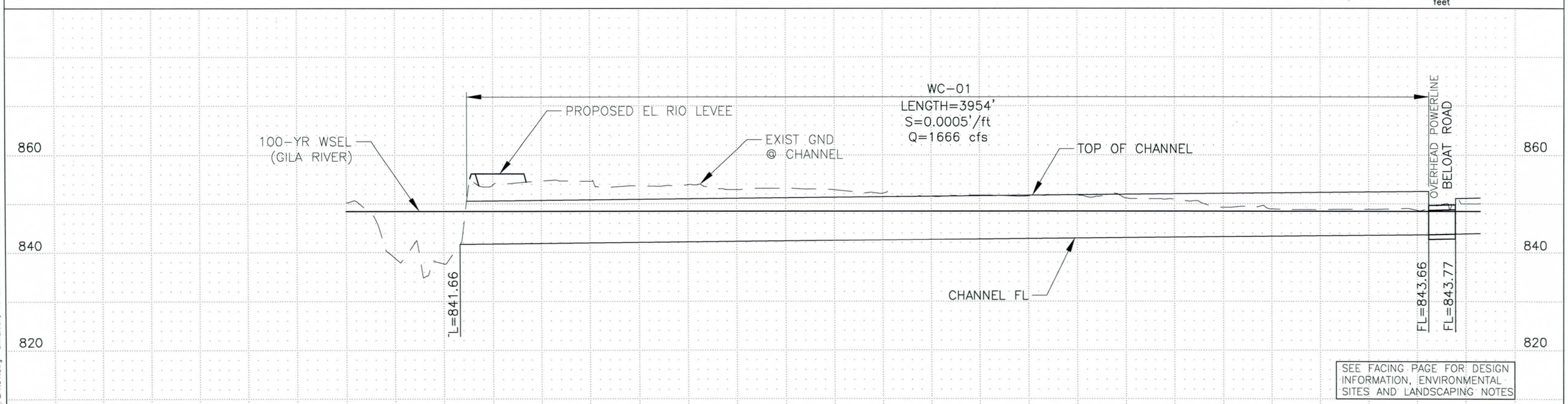
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WC-01	Watson	WC 1	0	0	0	0	0	0	0	0	0

Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert Riparian
Design Motif: River/Recreation
Multi-use: multi-use trails, and cultural interpretation of a prehistoric land use.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION WATSON CHANNEL		
PRIME CONSULTANT Dibble Engineering	DRN. CDF DATE: 06/09 DES. JTB DATE: 06/09 CKD. DCF DATE: 06/09	SCALE 1"=400' HORIZONTAL 1"=20' VERTICAL
		SHEET WC 1

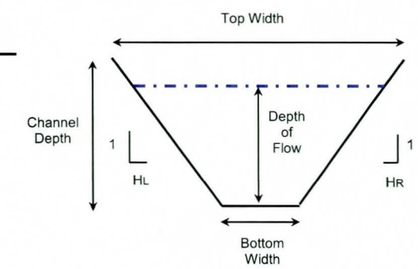
FILE:J:\2006\10-0607\CAD\PLPR01.dwg DATE:Jun. 18 2009 TIME: 11:23 am

Buckeye Area Drainage Master Plan
Watson System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WC-02	MCWD16	1601	843.77	846.91	2526	0.0012	LE	0.045	50	5.9	7	7	18	18	541.7	133.9	0.26	Sub	3.0	1.5	7.4	154	247
WC-03A	MCWD06	1470	847.02	850	2805	0.0011	LE	0.045	49	5.9	7	7	18	18	538.0	133.0	0.24	Sub	2.7	1.5	7.4	153	246

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

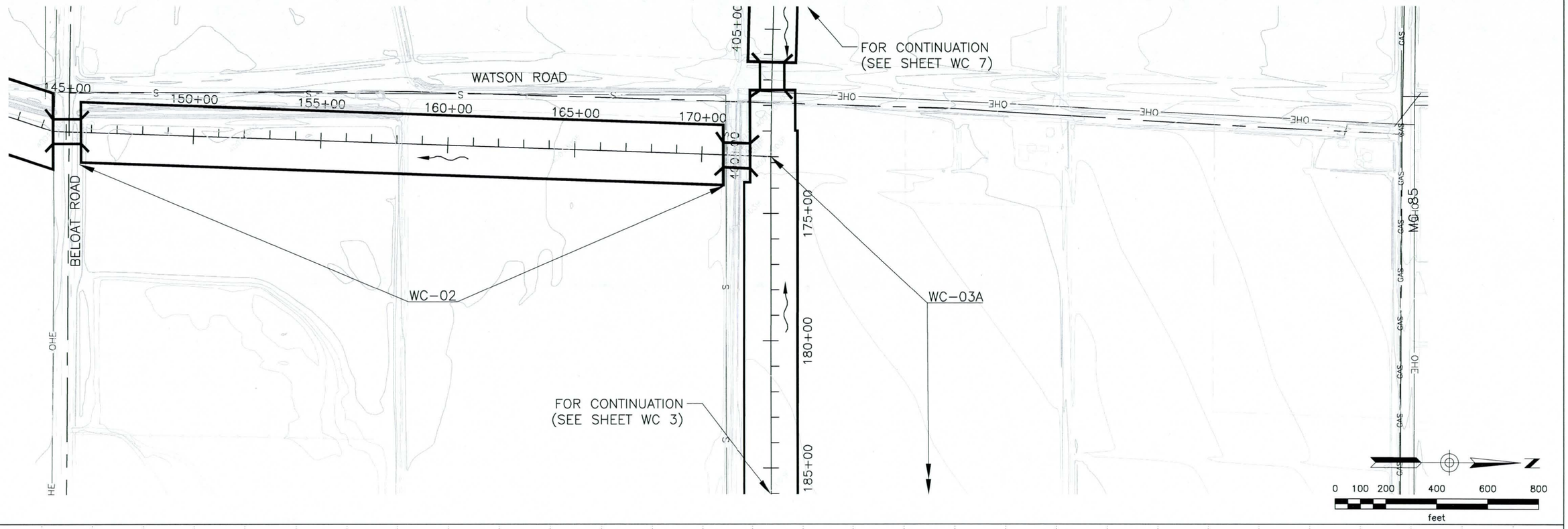
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WC-C1	1601	110	843.77	843.66	0.0010	5	10	6	RCBC	0.012	Wingwall	7.08	7.68	0.98
WC-C2	1470	110	847.02	846.91	0.0010	4	10	5	RCBC	0.012	Wingwall	5.90	7.16	0.90

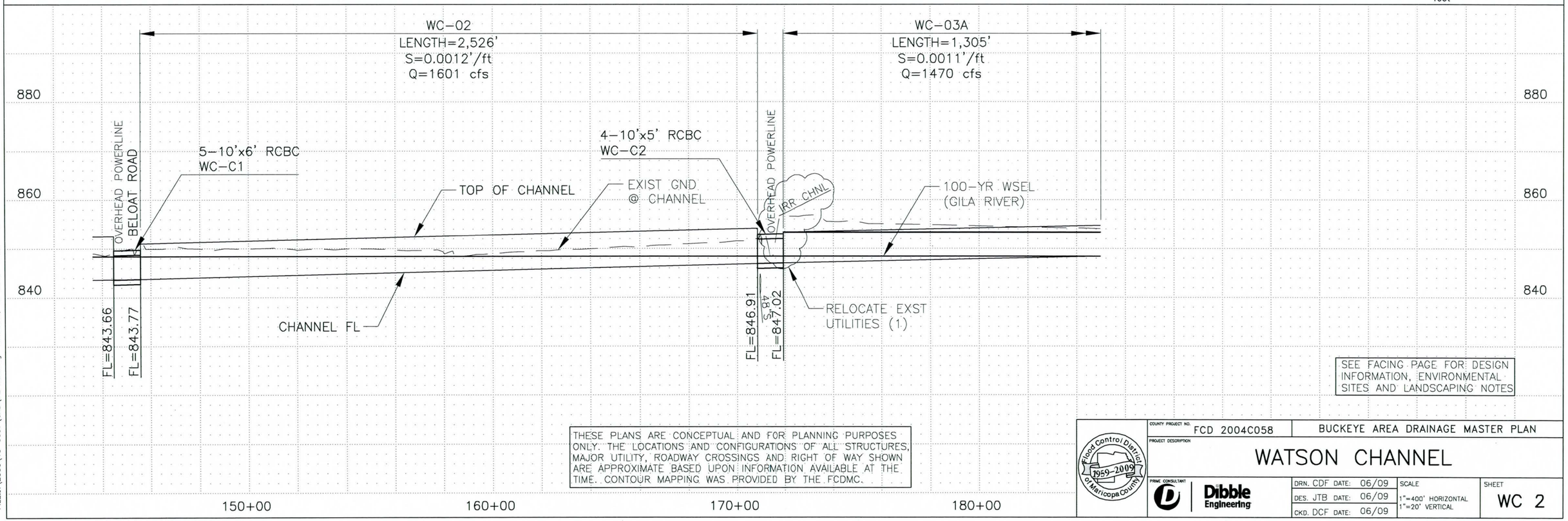
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WC-02	Watson	WC 2	0	1	0	0	0	0	0	0	1
WC-03A	Watson	WC 2	0	2	0	0	0	0	0	0	2

Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert Riparian
Design Motif: Farming/Agriculture
Multi-use: multi-use trails.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

WATSON CHANNEL

PRIME CONSULTANT Dibble Engineering

DRN. CDF DATE: 06/09	SCALE 1"=400' HORIZONTAL 1"=20' VERTICAL	SHEET WC 2
DES. JTB DATE: 06/09		
CKD. DCF DATE: 06/09		

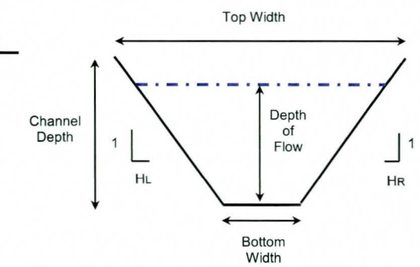
FILE:J:\2006\10-0607\CAD\PLPR02.dwg DATE:Jun. 18 2009 TIME: 11:23 am

Buckeye Area Drainage Master Plan
Watson System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WC-03A	MCWD06	1470	847.02	850	2805	0.0011	LE	0.045	49	5.9	7	7	18	18	538.0	133.0	0.24	Sub	2.7	1.5	7.4	153	246
WC-03B	MCWD06	1470	850	859.96	2119	0.0047	LE	0.045	37	4.5	7	7	18	18	308.1	100.7	0.48	Sub	4.8	1.2	5.7	117	203

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

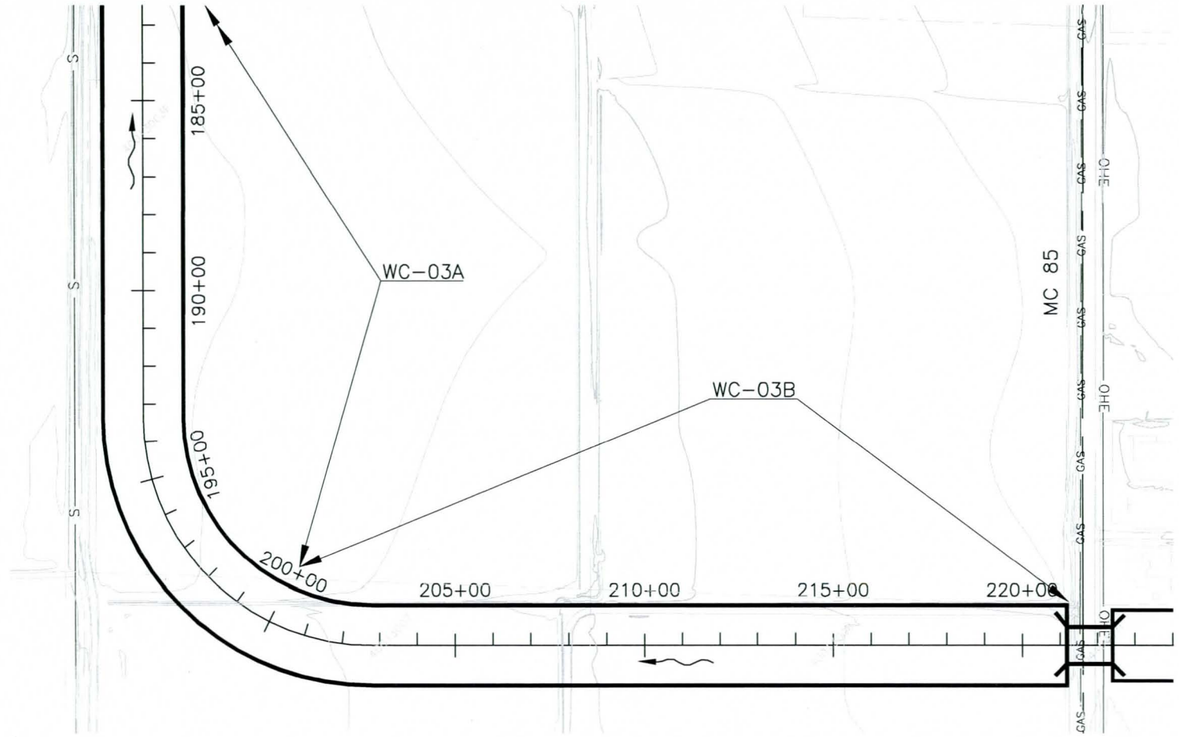
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WC-C2	1470	110	847.02	846.91	0.0010	4	10	5	RCBC	0.012	Wingwall	5.90	7.16	0.90

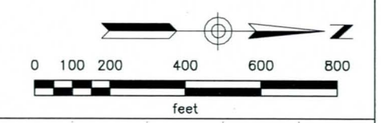
Utility Crossings

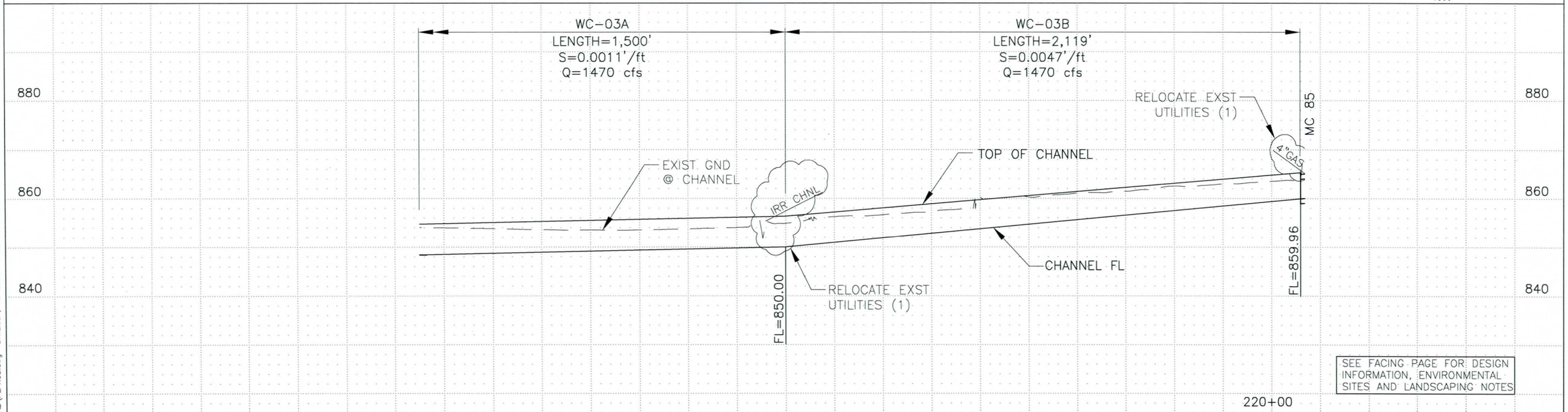
Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WC-03A	Watson	WC 3	0	1	0	0	0	0	0	0	1
WC-03B	Watson	WC 3	0	0	0	1	0	0	0	0	1

Landscape Notes:

Landscape Design Theme: East/West=Natural Lower Sonoran Desert Riparian, North/South=Semi-natural Sonoran Desert.
Design Motif: Farming/Agriculture
Multi-use: multi-use trails and cultural interpretation of a historic road crossing.







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Flood Control District of Maricopa County 1959–2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

WATSON CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL

SHEET: WC 3

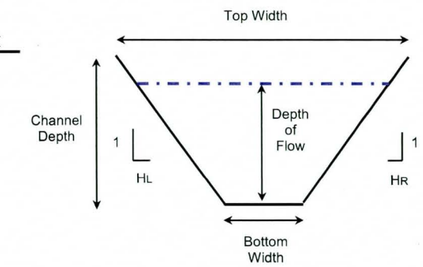
FILE:J:\2006\10-060\CAD\PLPR03.dwg DATE:Jun. 18 2009 TIME: 11:23 am

Buckeye Area Drainage Master Plan
Watson System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WC-04	MCWD05	1463	863.11	878.1	1932	0.0078	LE	0.045	34	4.1	7	7	18	18	254.3	91.5	0.61	Sub	5.8	1.1	5.2	150	242
WC-05	MCWD04	251	880.09	885.04	690	0.0072	LE	0.045	10	2.5	7	7	0	0	68.3	45.3	0.53	Sub	3.7	1.0	3.5	59	109
WC-06	MCWD03	1035	887.34	907.16	2495	0.0079	LE	0.045	27	3.7	7	7	18	18	193.3	78.8	0.60	Sub	5.4	1.0	4.7	93	179

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

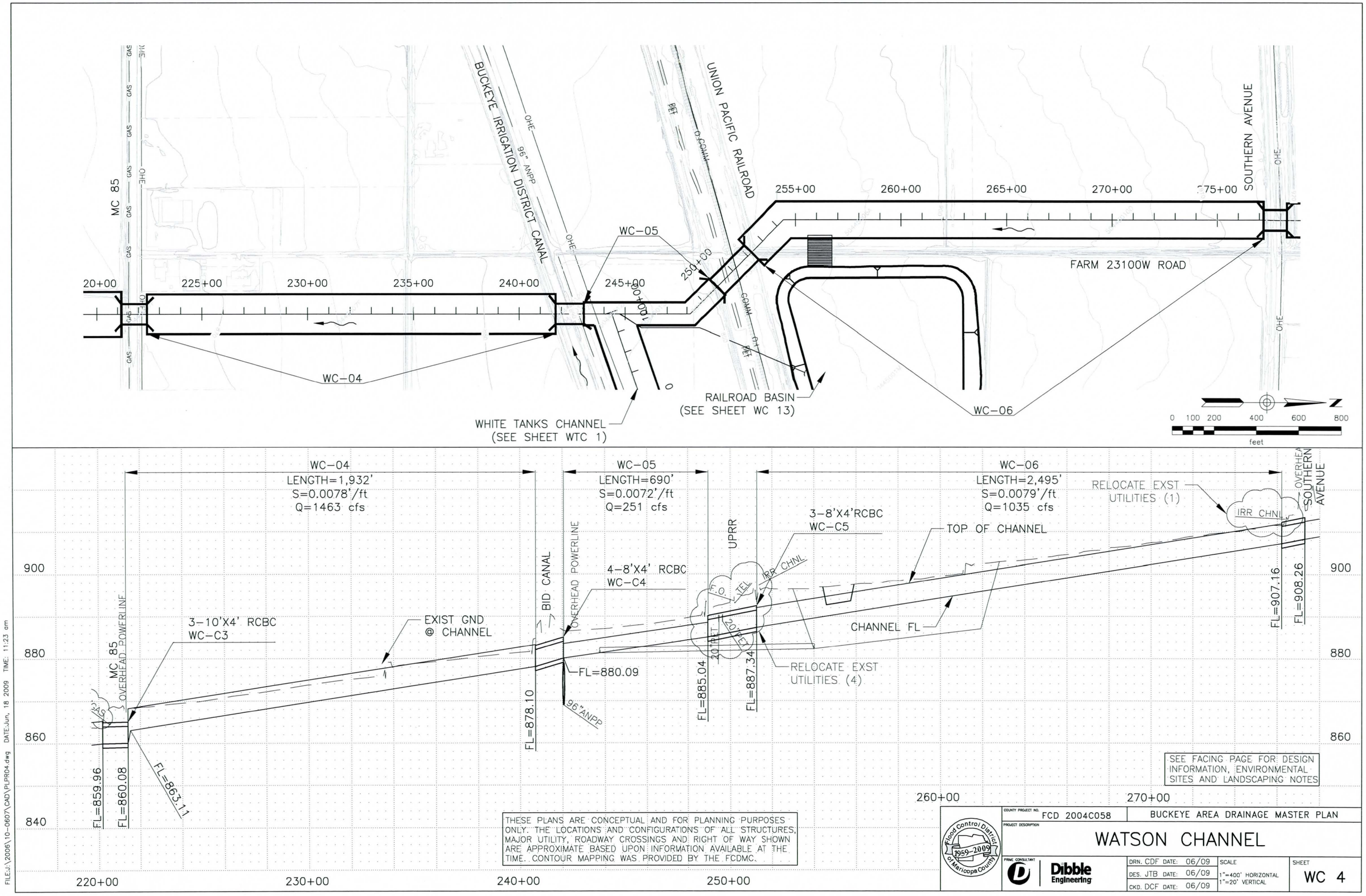
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WC-C3	1463	122	860.08	859.96	0.0010	4	8	4	RCBC	0.012	Wingwall	4.49	8.27	1.02
WC-C4	1463	132	880.09	878.10	0.0150	4	8	4	RCBC	0.012	Wingwall	4.08	8.21	0.62
WC-C5	1035	230	887.34	885.04	0.0100	3	8	4	RCBC	0.012	Wingwall	2.46	7.68	0.92

Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WC-04	Watson	WC 4	0	1	1	0	2	1	0	0	5
WC-05	Watson	WC 4	1	0	0	0	0	0	0	0	1
WC-06	Watson	WC 4	0	1	0	0	0	0	0	0	1

Landscape Notes:

Landscape Design Theme: Semi-natural Sonoran Desert.
Design Motif: Irrigation/Canal from Station 237+00 to Station 265+00. Railroad from Station 265+00 to Station 295+00
Multi-use: multi-use trails and cultural interpretation of a historic road crossing, historic irrigation, and historic railroad.


MC 85
BUCKEYE IRRIGATION DISTRICT CANAL
96" ANPP
UNION PACIFIC RAILROAD
SOUTHERN AVENUE
FARM 23100W ROAD
20+00
225+00
230+00
235+00
240+00
245+00
250+00
255+00
260+00
265+00
270+00
275+00
100+00
WC-04
WC-05
WC-06
WHITE TANKS CHANNEL
(SEE SHEET WTC 1)
RAILROAD BASIN
(SEE SHEET WC 13)
0 100 200 400 600 800
feet
WC-04
LENGTH=1,932'
S=0.0078'/ft
Q=1463 cfs
WC-05
LENGTH=690'
S=0.0072'/ft
Q=251 cfs
WC-06
LENGTH=2,495'
S=0.0079'/ft
Q=1035 cfs
RELOCATE EXST
UTILITIES (1)
IRR CHNL
OVERHEAD
SOUTHERN
AVENUE
3-8'X4'RCBC
WC-C5
TOP OF CHANNEL
UPRR
BID CANAL
OVERHEAD POWERLINE
4-8'X4' RCBC
WC-C4
F.O.
TEL
IRR CHNL
3-10'X4' RCBC
WC-C3
EXIST GND
@ CHANNEL
CHANNEL FL
FL=880.09
96"ANPP
RELOCATE EXST
UTILITIES (4)
FL=907.16
FL=908.26
FL=878.10
FL=885.04
FL=887.34
FL=859.96
FL=860.08
FL=863.11
900
880
860
840
220+00
230+00
240+00
250+00
260+00
270+00
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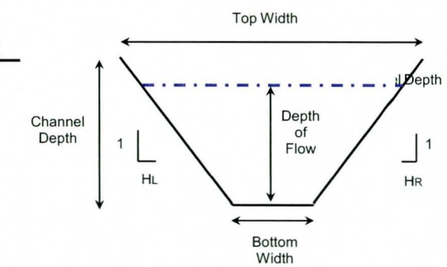
Flood Control District of Maricopa County
1959-2009
COUNTY PROJECT NO.
FCD 2004C058
BUCKEYE AREA DRAINAGE MASTER PLAN
PROJECT DESCRIPTION
WATSON CHANNEL
PRIME CONSULTANT
Dibble Engineering
DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09
SCALE
1"=400' HORIZONTAL
1"=20' VERTICAL
SHEET
WC 4
FILE:J:\2006\10-0607\CAD\PLPR04.dwg DATE:Jun, 18 2009 TIME: 11:23 am

Buckeye Area Drainage Master Plan
Watson System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WC-07	MCWD02	672	908.26	952.66	5074	0.0088	LE	0.045	20	3.2	7	7	18	18	134.0	64.8	0.61	Sub	5.0	1.0	4.2	78	164

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

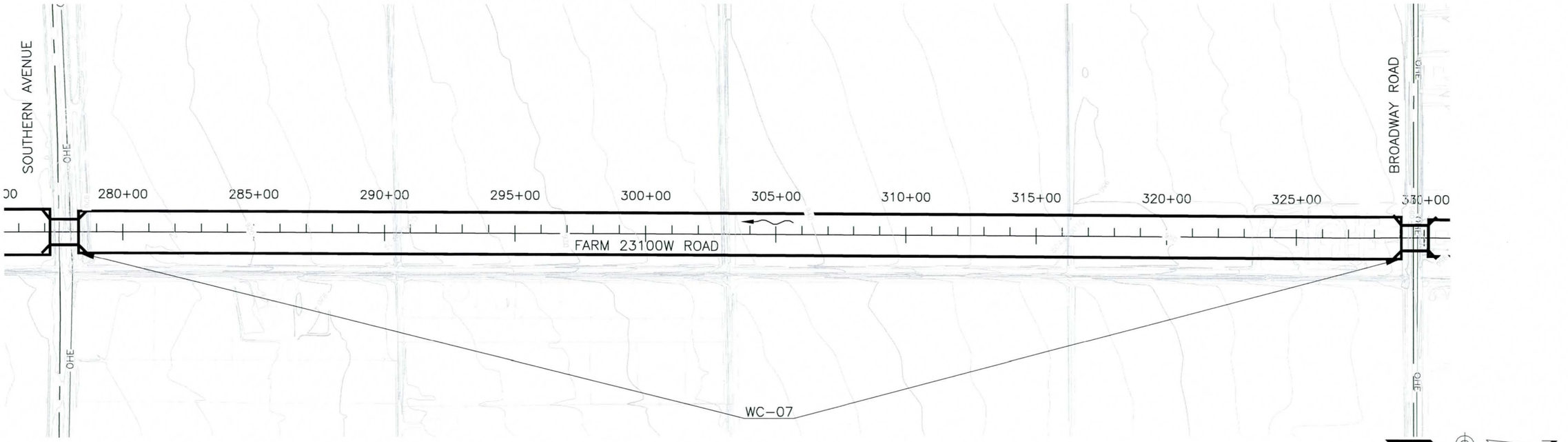
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WC-C6	672	110	908.26	907.16	0.0100	2	10	4	RCBC	0.012	Wingwall	3.68	5.92	0.80

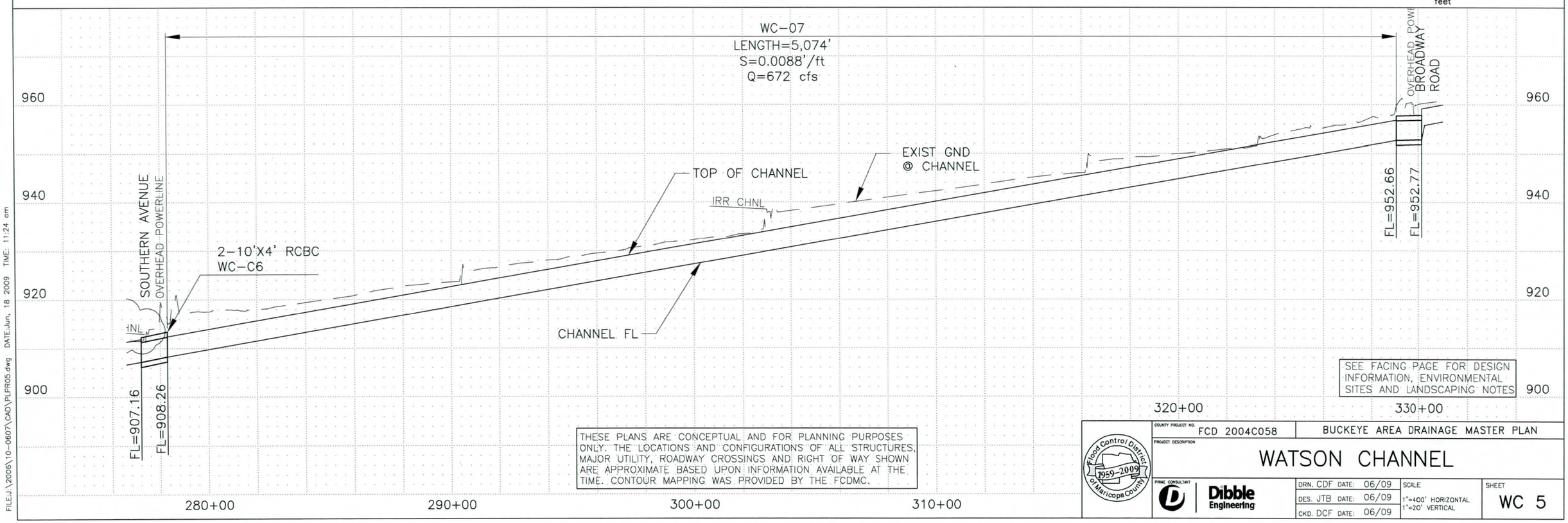
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WC-07	Watson	WC 5	0	0	0	0	0	0	0	0	0

Landscape Notes:

Landscape Design Theme: Semi-natural Sonoran Desert.
Design Motif: Farming/Agriculture
Multi-use: multi-use trails.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

WATSON CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL

SHEET: WC 5

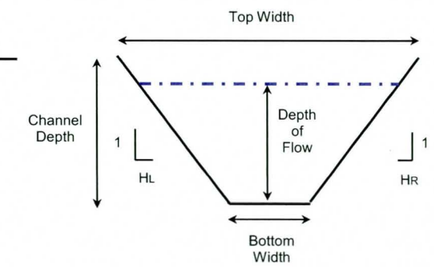
FILE:J:\2006\10-060?\CAD\PLPROS.dwg DATE:Jun. 18 2009 TIME: 11:24 am

Buckeye Area Drainage Master Plan
Watson System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (HL)	Sideslope (H:1) Right (HR)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WC-08	MCWD01	266	955.72	989.31	3579	0.0094	LE	0.045	10	2.4	7	7	18	18	64.5	44.1	0.60	Sub	4.1	1.0	3.4	98	184

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

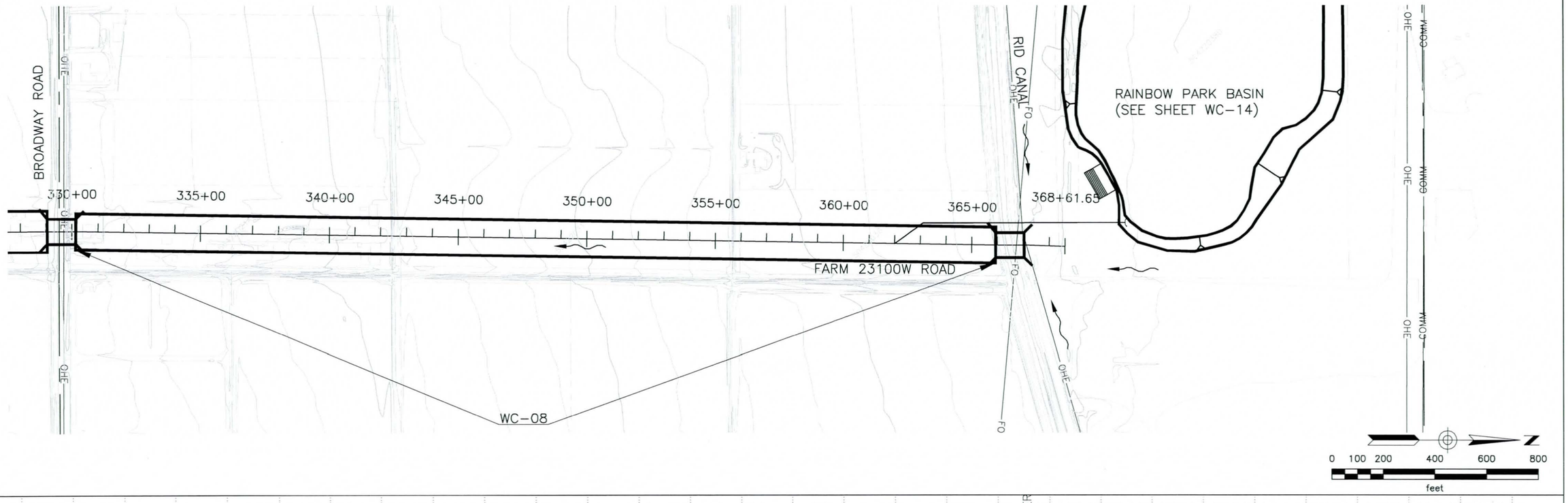
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WC-C7	266	110	952.77	952.66	0.0010	1	10	4	RCBC	0.012	Wingwall	3.19	4.55	0.60
WC-C8	266	110	989.42	989.31	0.0010	1	10	4	RCBC	0.012	Wingwall	2.39	4.55	0.60

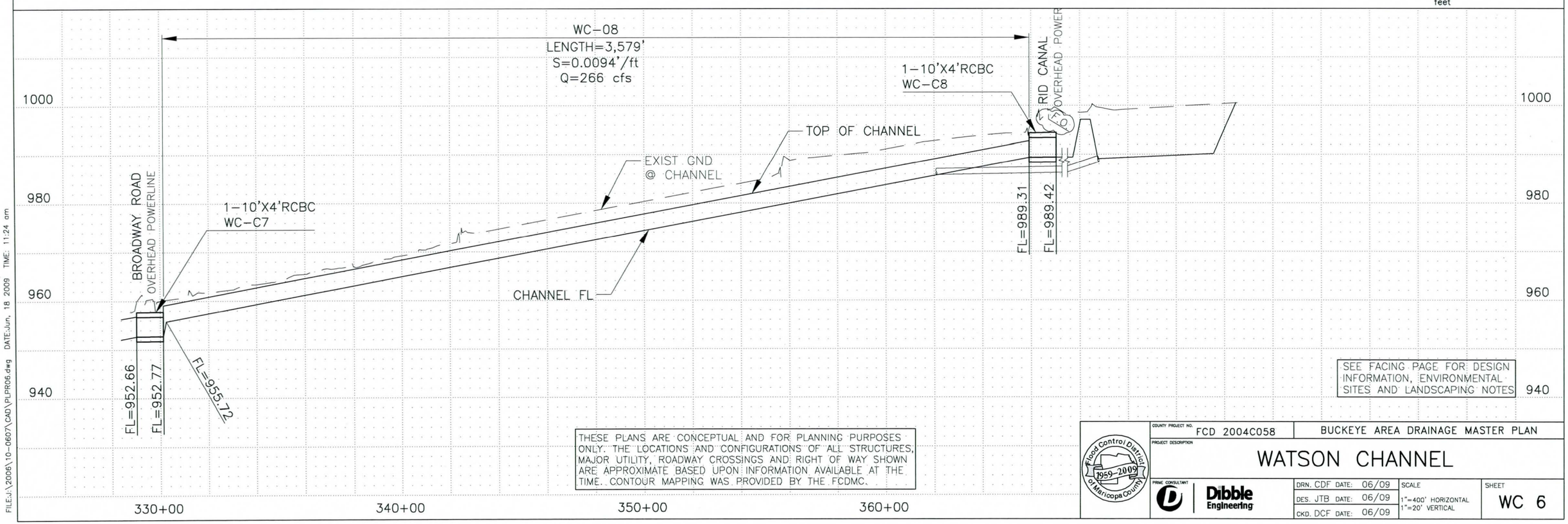
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WC-08	Watson	WC 6	0	0	1	0	0	0	0	0	1

Landscape Notes:

Landscape Design Theme: Semi-natural Sonoran Desert.
Design Motif: Irrigation/Canal
Multi-use: multi-use trails and cultural interpretation of historic and prehistoric irrigation.





SEE FACING PAGE FOR DESIGN INFORMATION, ENVIRONMENTAL SITES AND LANDSCAPING NOTES

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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

WATSON CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL

SHEET: WC 6

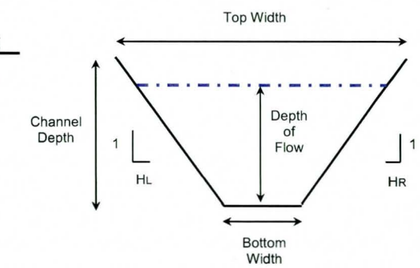
FILE:J:\2006\10-0607\CAD\PLPR06.dwg DATE:Jun, 18 2009 TIME: 11:24 am

Buckeye Area Drainage Master Plan
Watson System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WC-09A	MCWD15	799	847.02	847.79	261	0.0029	LE	0.045	27	4.1	7	7	18	18	230.0	85.3	0.37	Sub	3.5	1.1	5.2	100	186
WC-09B	MCWD15	799	850.67	855	2130	0.0020	LE	0.045	29	4.4	7	7	18	18	264.4	91.4	0.31	Sub	3.0	1.1	5.6	146	237

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

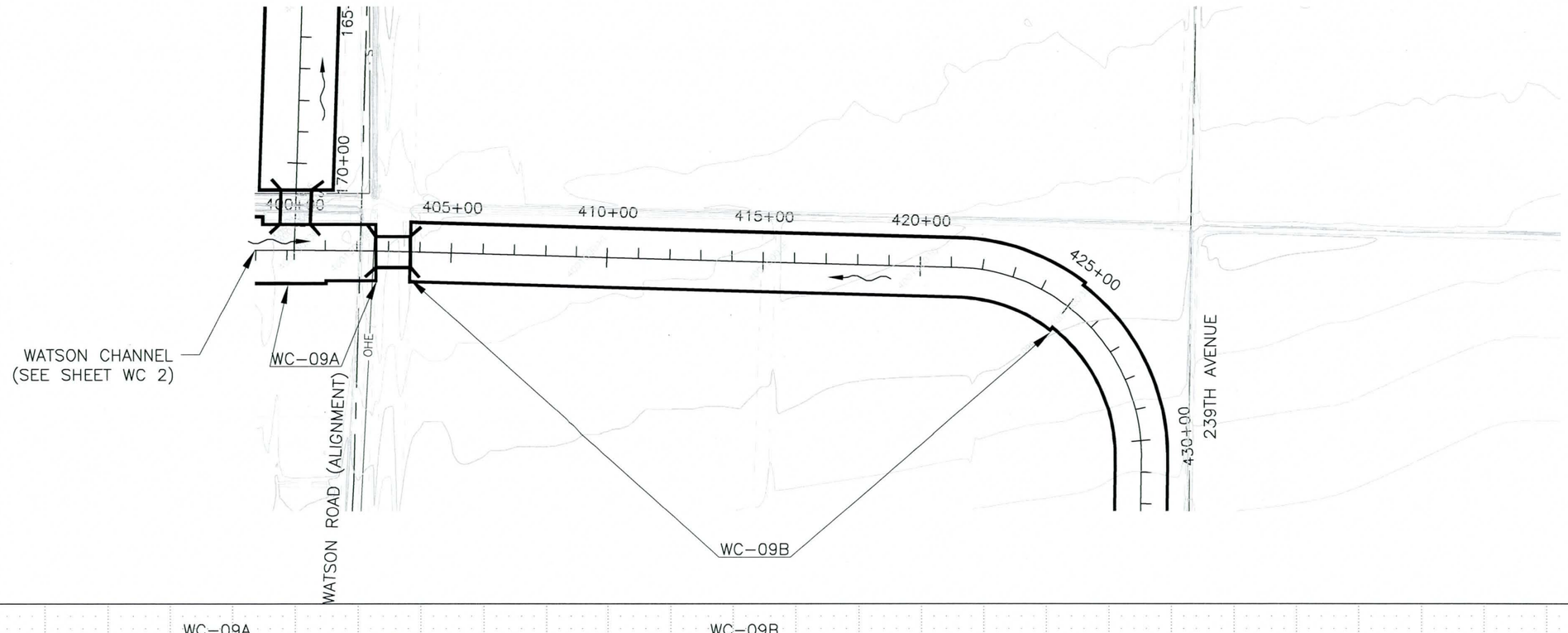
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WC-C9	799	109	847.90	847.79	0.0010	3	8	4	RCBC	0.012	Wingwall	3.50	5.90	0.88

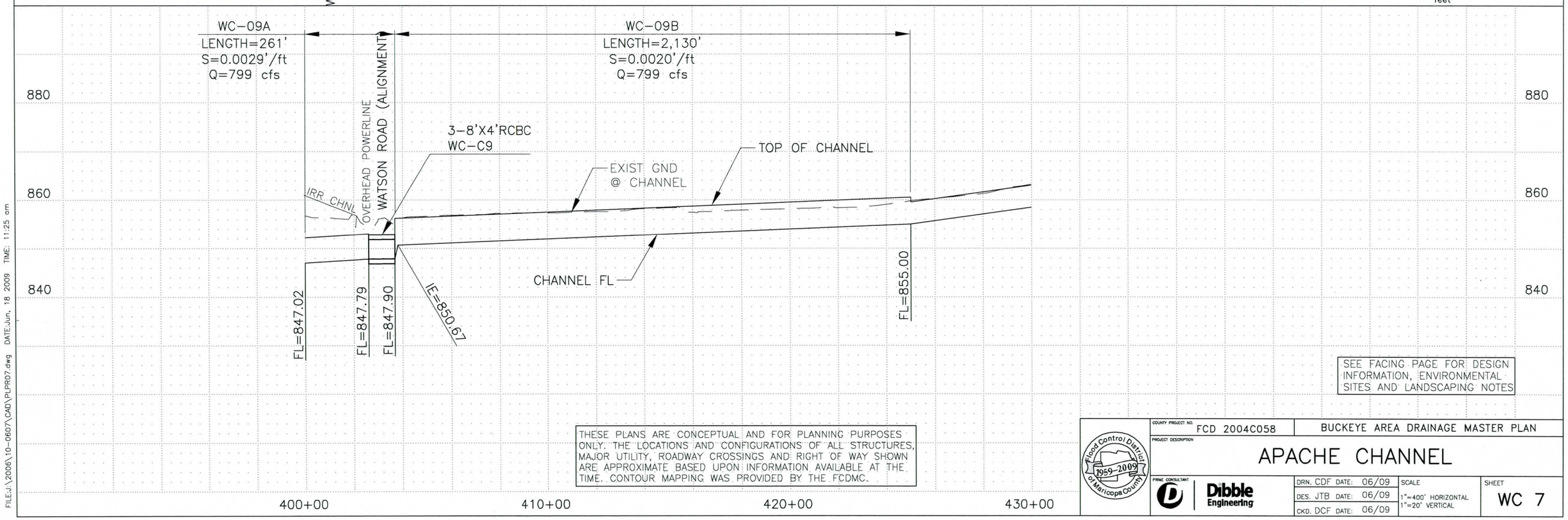
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WC-09A	Apache	WC 7	0	0	0	0	0	0	0	0	0
WC-09B	Apache	WC 7	0	0	0	0	0	0	0	0	0

Landscape Notes:

Landscape Design Theme: Semi-natural Sonoran Desert.
Design Motif: Farming/Agriculture
Multi-use: multi-use trails and cultural interpretation of historic road crossing.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

APACHE CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL

SHEET: WC 7

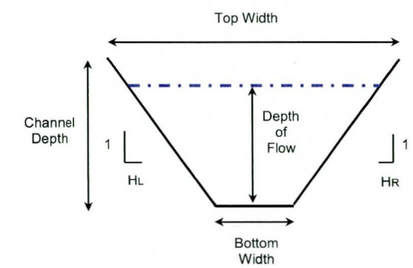
FILE:J:\2006\10-060?\CAD\PLPR07.dwg DATE:Jun. 18 2009 TIME: 11:25 am

Buckeye Area Drainage Master Plan
Watson System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (HL)	Sideslope (H:1) Right (HR)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WC-09C	MCWD15	799	855	871.41	2361	0.0070	LE	0.045	23	3.5	7	7	18	18	166.7	72.6	0.56	Sub	4.8	1.0	4.5	86	172
WC-10	MCWD14	799	871.52	875.12	502	0.0072	LE	0.045	23	3.5	7	7	0	0	164.8	72.2	0.56	Sub	4.8	1.0	4.5	86	136
WC-11	MCWD13	901	878.01	880.16	600	0.0036	LE	0.045	28	4.1	7	7	0	0	234.3	86.4	0.41	Sub	3.8	1.1	5.2	140	190
WC-12A	MCWD12	156	880.36	894.26	1505	0.0092	LE	0.045	7	2.0	7	7	18	18	43.3	35.9	0.57	Sub	3.6	1.0	3.0	50	136

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

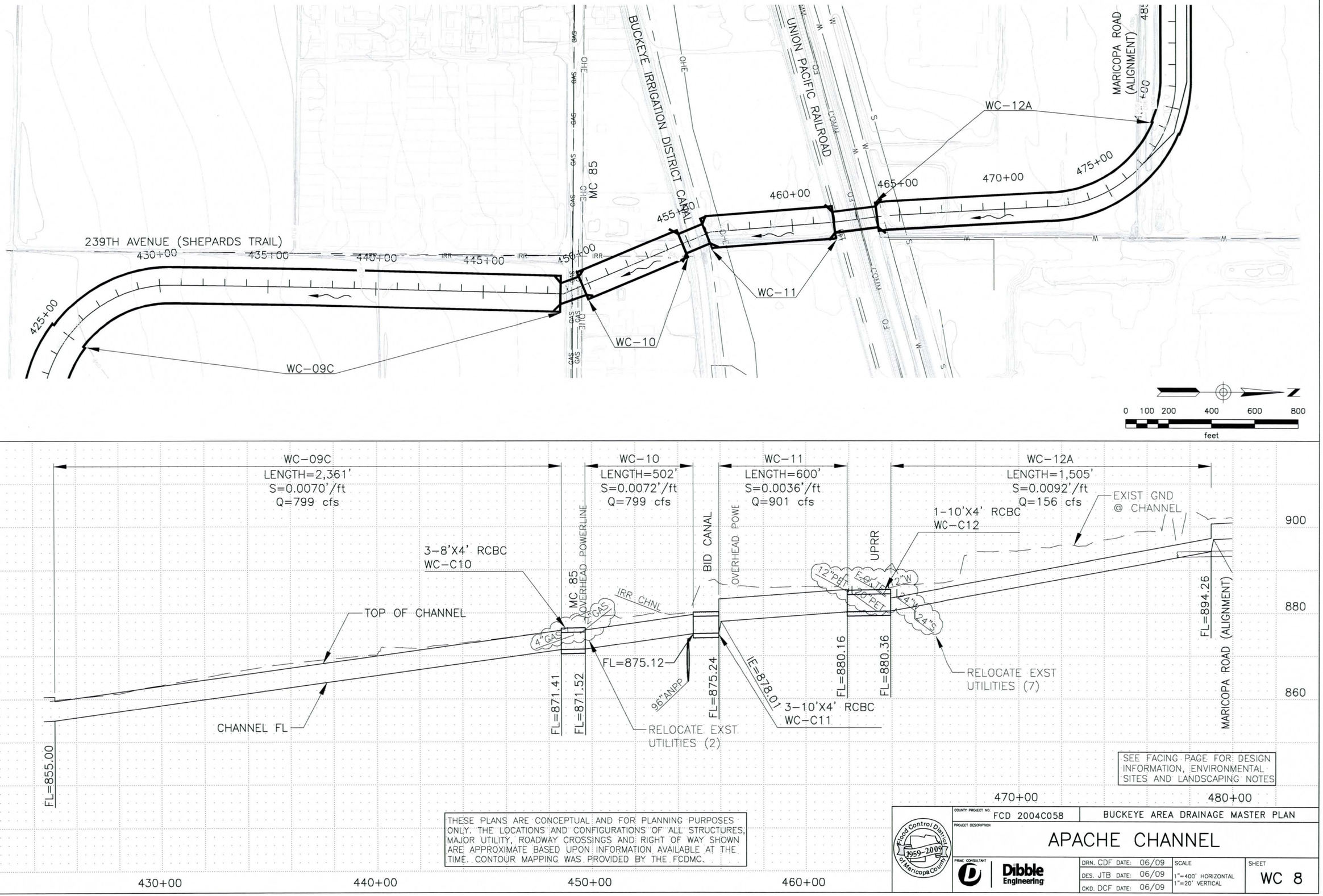
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WC-C10	799	110	871.52	871.41	0.0010	3	8	4	RCBC	0.012	Wingwall	3.50	5.90	0.87
WC-C11	901	121	875.24	875.12	0.0010	3	10	4	RCBC	0.012	Wingwall	3.48	5.41	1.03
WC-C12	156	202	880.36	880.16	0.0010	1	10	4	RCBC	0.012	Wingwall	4.11	4.36	0.65

Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WC-09C	Apache	WC 8	0	0	0	0	0	0	0	0	0
WC-10	Apache	WC 8	1	0	0	2	0	0	0	0	3
WC-11	Apache	WC 8	0	0	0	0	0	0	0	0	0
WC-12A	Apache	WC 8	0	0	1	0	2	1	1	2	7

Landscape Notes:

Landscape Design Theme: Semi-natural Sonoran Desert.
Design Motif: Irrigation/Canal from Station 430+00 to Station 454+00. Railroad/Canal from Station 454+00 to Station 463+00. Railroad from Station 463+00 to Station 475+00
Multi-use: multi-use trails and cultural interpretation of historic road crossing, historic irrigation, and historic railroad.



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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

APACHE CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL

SHEET WC 8

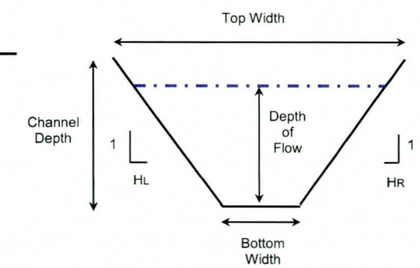
FILE:J:\2006\10-0607\CAD\PLPR08.dwg DATE:Jun, 18 2009 TIME: 11:25 am

Buckeye Area Drainage Master Plan
Watson System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WC-12B	MCWD12	156	897.03	902.1	2136	0.0024	LE	0.045	9	2.6	7	7	18	18	72.1	46.3	0.30	Sub	2.2	1.0	3.6	99	185
WC-13	MCWD10	495	902.1	920.01	2092	0.0086	LE	0.045	16	2.9	7	7	18	0	107.0	57.5	0.60	Sub	4.6	1.0	3.9	71	139

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

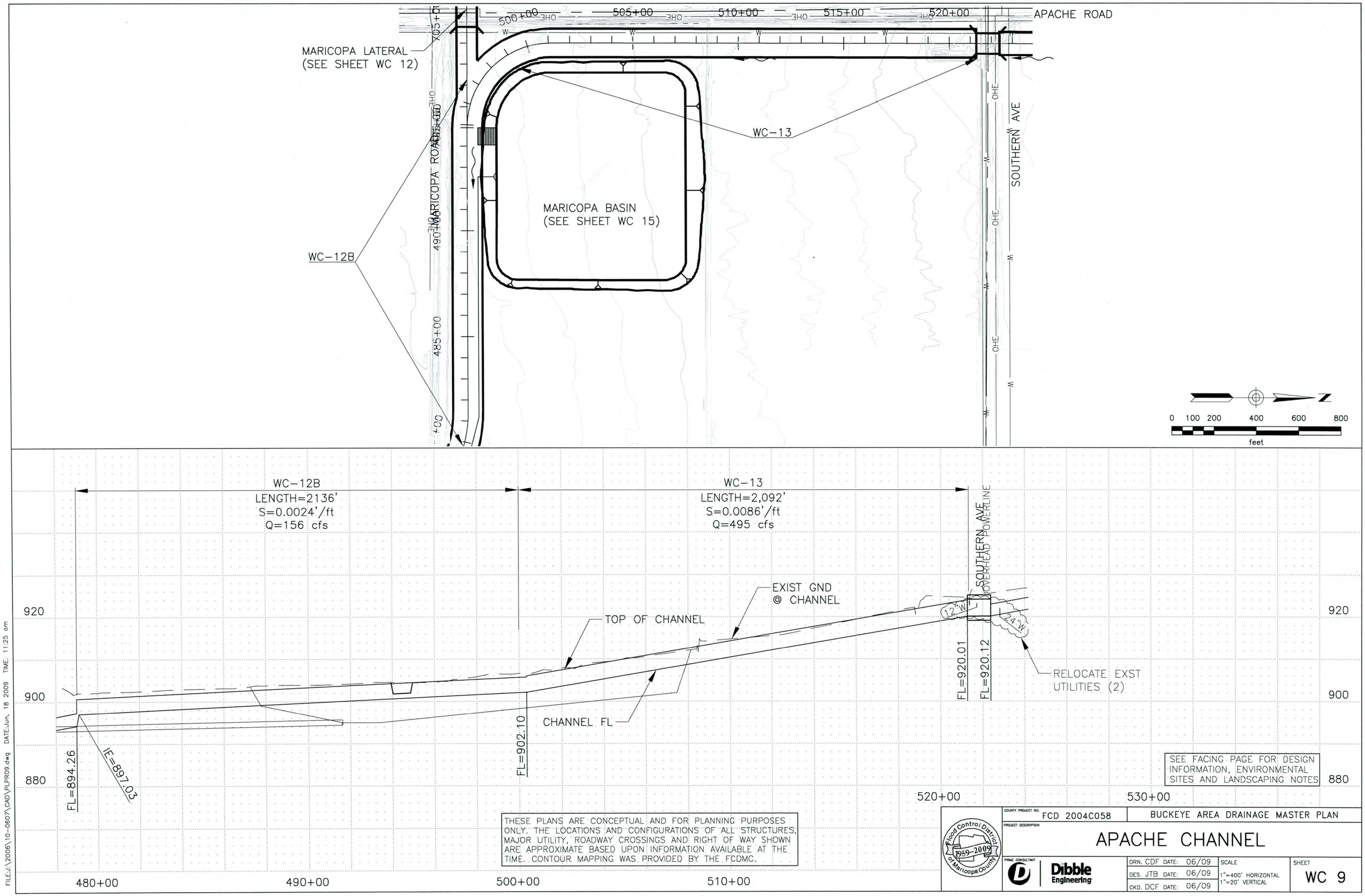
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D

Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WC-12B	Apache	WC 9	0	0	0	0	0	0	0	0	0
WC-13	Apache	WC 9	0	0	0	0	0	0	0	0	0

Landscape Notes:

Landscape Design Theme: Semi-natural Sonoran Desert.
Design Motif: Farming/Agriculture
Multi-use: multi-use trails.


APACHE ROAD
500+00
505+00
510+00
515+00
520+00
MARICOPA LATERAL
(SEE SHEET WC 12)
WC-13
MARICOPA ROAD
SOUTHERN AVE
MARICOPA BASIN
(SEE SHEET WC 15)
WC-12B
485+00
490+00
495+00
0 100 200 400 600 800
feet
WC-12B
LENGTH=2136'
S=0.0024'/ft
Q=156 cfs
WC-13
LENGTH=2,092'
S=0.0086'/ft
Q=495 cfs
SOUTHERN AVE
OVERHEAD POWERLINE
EXIST GND
@ CHANNEL
TOP OF CHANNEL
12"W
24"W
FL=920.01
FL=920.12
RELOCATE EXST
UTILITIES (2)
CHANNEL FL
FL=902.10
FL=894.26
IE=897.03
920
900
880
520+00
530+00
480+00
490+00
500+00
510+00
SEE FACING PAGE FOR DESIGN
INFORMATION, ENVIRONMENTAL
SITES AND LANDSCAPING NOTES
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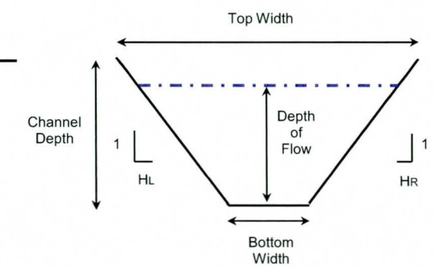
Flood Control District of Maricopa County
1959-2009
COUNTY PROJECT NO.
FCD 2004C058
BUCKEYE AREA DRAINAGE MASTER PLAN
PROJECT DESCRIPTION
APACHE CHANNEL
PRIME CONSULTANT
Dibble Engineering
DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09
SCALE
1"=400' HORIZONTAL
1"=20' VERTICAL
SHEET
WC 9
FILE:J:\2006\10-0607\CAD\PLPR09.dwg DATE:Jun. 18 2009 TIME: 11:25 am

Buckeye Area Drainage Master Plan
Watson System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WC-14	MCWD08	105	920.12	966.13	5179	0.0089	LE	0.045	6	1.8	7	7	18	0	32.6	31.0	0.55	Sub	3.2	1.0	2.8	45	113

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

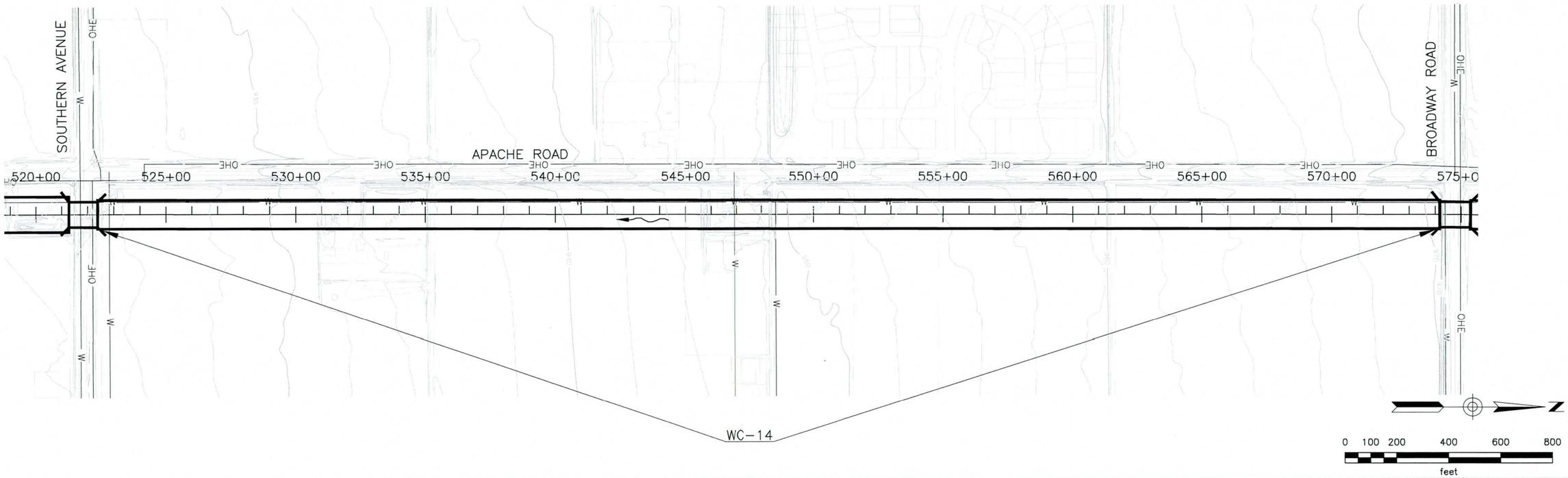
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WC-C13	105	110	920.12	920.01	0.0010	1	6	4	RCBC	0.012	Wingwall	2.93	3.47	0.45

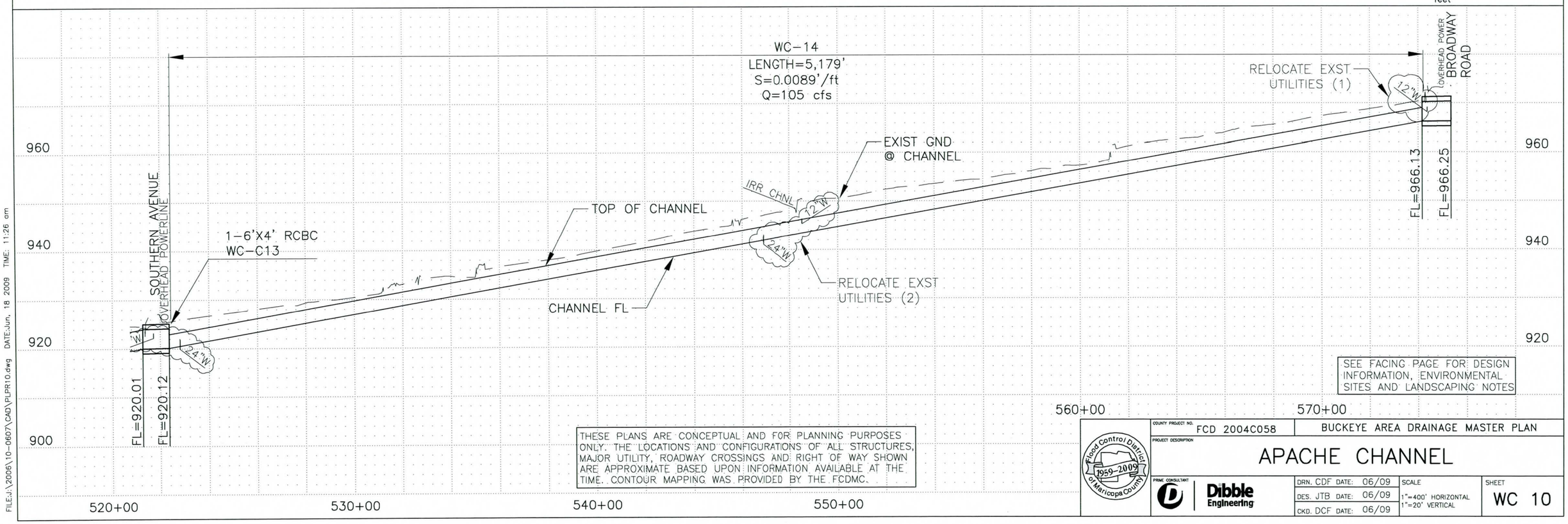
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WC-14	Apache	WC 10	0	0	0	0	0	0	0	5	5

Landscape Notes:

Landscape Design Theme: Semi-natural Sonoran Desert.
Design Motif: Farming/Agriculture
Multi-use: multi-use trails and cultural interpretation of historic road crossing.





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COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION: APACHE CHANNEL		
PRIME CONSULTANT: Dibble Engineering	DRN. CDF DATE: 06/09 DES. JTB DATE: 06/09 CKD. DCF DATE: 06/09	SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL
		SHEET: WC 10

Flood Control District of Maricopa County 1959-2009

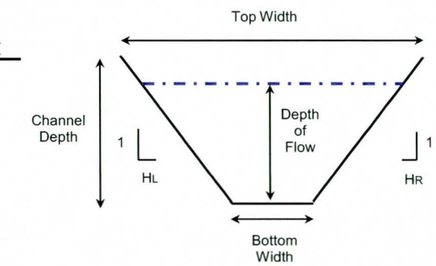
FILE:J:\2006\10-0607\CAD\PLPR10.dwg DATE:Jun. 18 2009 TIME: 11:26 am

Buckeye Area Drainage Master Plan
Watson System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (HL)	Sideslope (H:1) Right (HR)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WC-15	MCWD07	105	968.4	990.34	2232	0.0098	LE	0.045	5	1.8	7	7	18	0	31.4	30.4	0.58	Sub	3.3	1.0	2.8	75	143

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

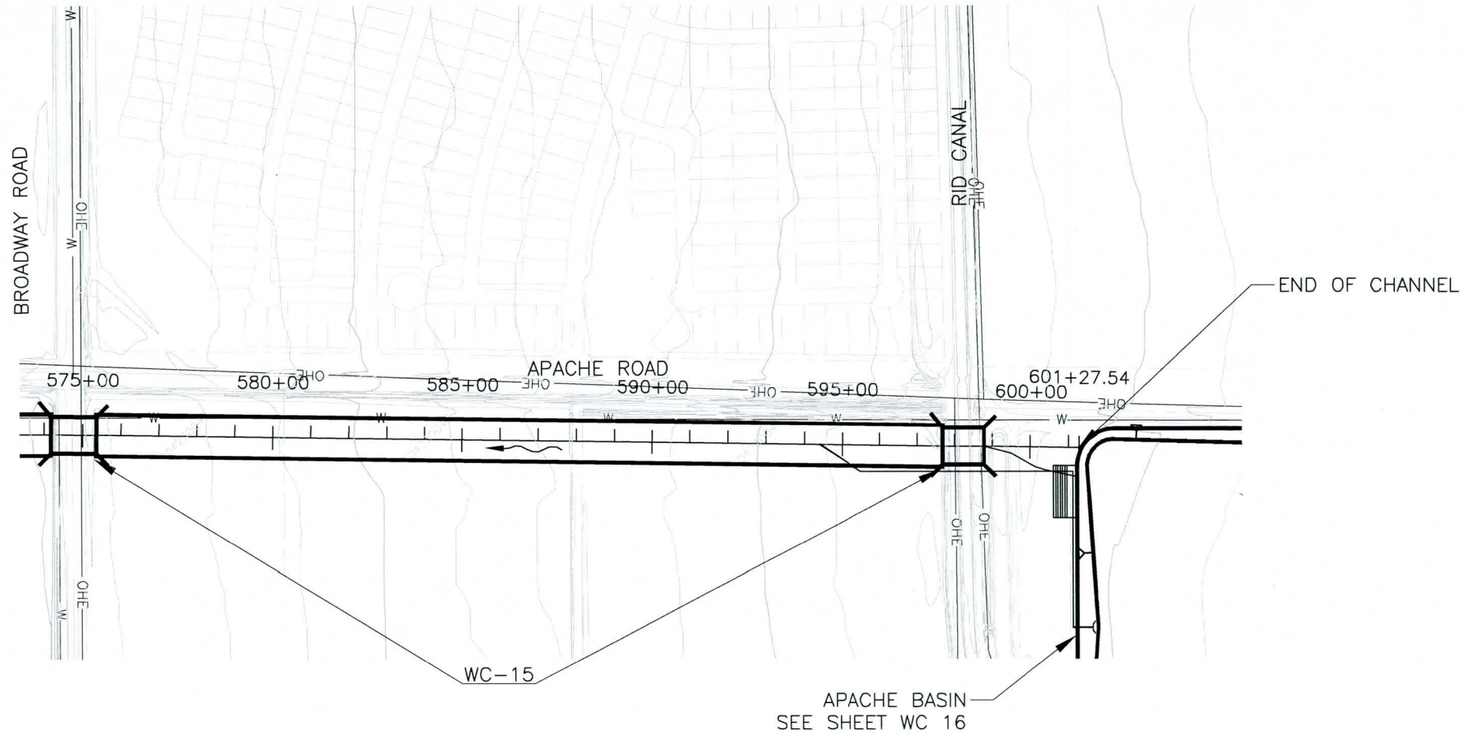
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WC-C14	105	119	966.25	966.13	0.0010	1	6	4	RCBC	0.012	Wingwall	1.80	3.47	0.44
WC-C15	105	110	990.45	990.34	0.0010	1	6	4	RCBC	0.012	Wingwall	1.77	3.47	0.44

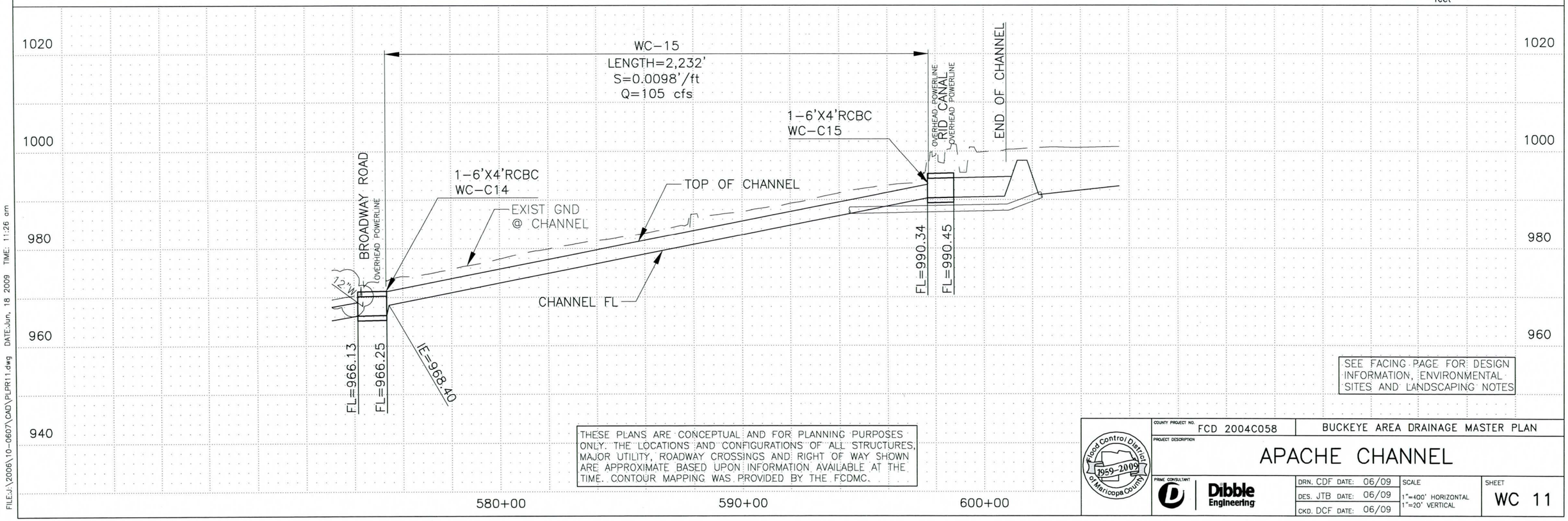
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WC-15	Apache	WC 11	0	0	0	0	0	0	0	0	0

Landscape Notes:

Landscape Design Theme: Semi-natural Sonoran Desert.
Design Motif: Irrigation/Canal
Multi-use: multi-use trails and cultural interpretation of historic and prehistoric irrigation.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

APACHE CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL

SHEET WC 11

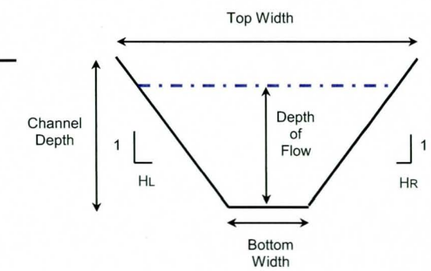
FILE:J:\2006\10-0607\CAD\PLPR11.dwg DATE:Jun, 18 2009 TIME: 11:26 am

Buckeye Area Drainage Master Plan
Watson System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (HL)	Sideslope (H:1) Right (HR)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
WC-16	MCWD11	953	898.04	903.19	4718	0.0011	LE	0.045	37	5.2	7	7	18	0	382.0	110.5	0.24	Sub	2.5	1.3	6.5	128	196

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

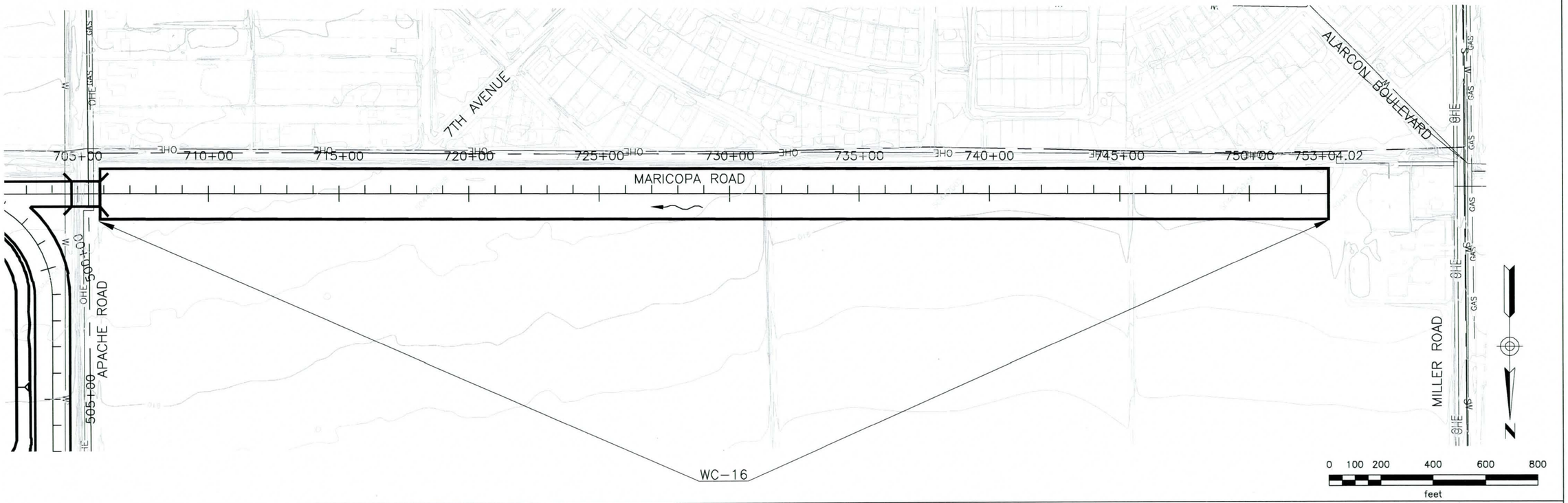
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
WC-C16	953	110	898.04	897.93	0.0010	4	10	6	RCBC	0.012	Wingwall	5.22	5.50	0.87

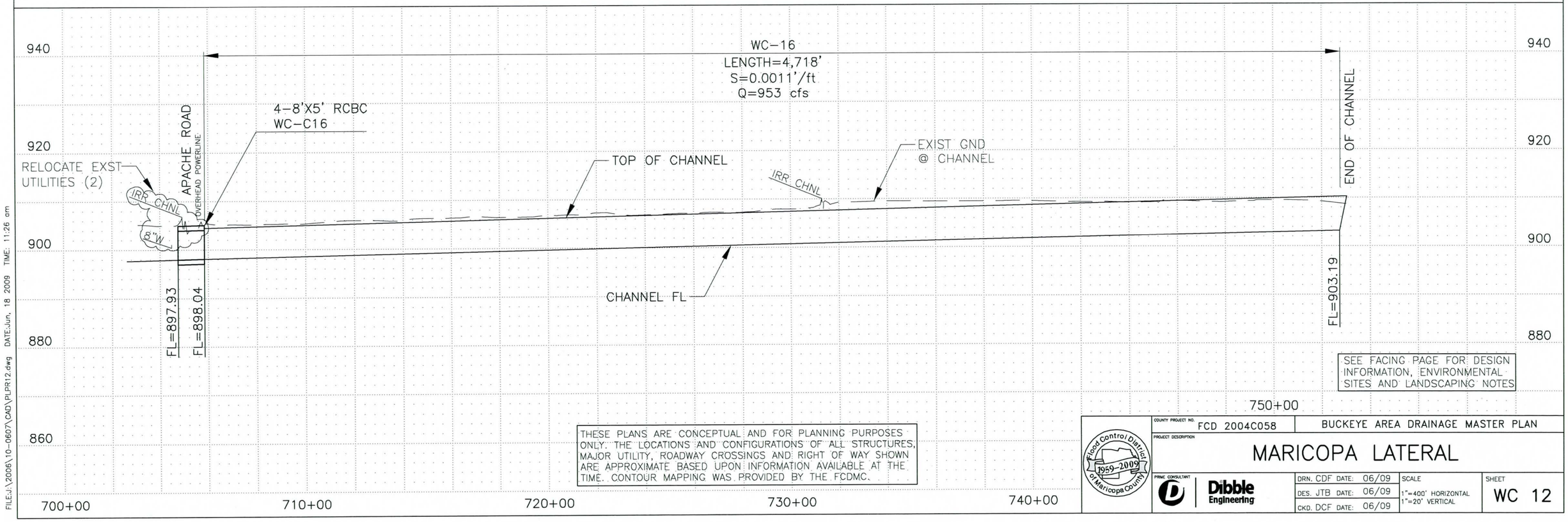
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
WC-16	Maricopa Latera	WC 12	0	1	0	0	0	0	0	1	2

Landscape Notes:

Landscape Design Theme: Semi-natural Sonoran Desert.
Design Motif: Heritage Historic Community
Multi-use: include multi-use trails and cultural interpretation of Velencia historic community development.





SEE FACING PAGE FOR DESIGN INFORMATION, ENVIRONMENTAL SITES AND LANDSCAPING NOTES

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Flood Control District of Maricopa County 1959–2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

MARICOPA LATERAL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL

SHEET: WC 12

FILE:J:\2006\10-0607\CAD\PLPR12.dwg DATE:Jun. 18 2009 TIME: 11:26 am

Buckeye Area Drainage Master Plan
Railroad Basin

Detention Basin Properties

Railroad Basin

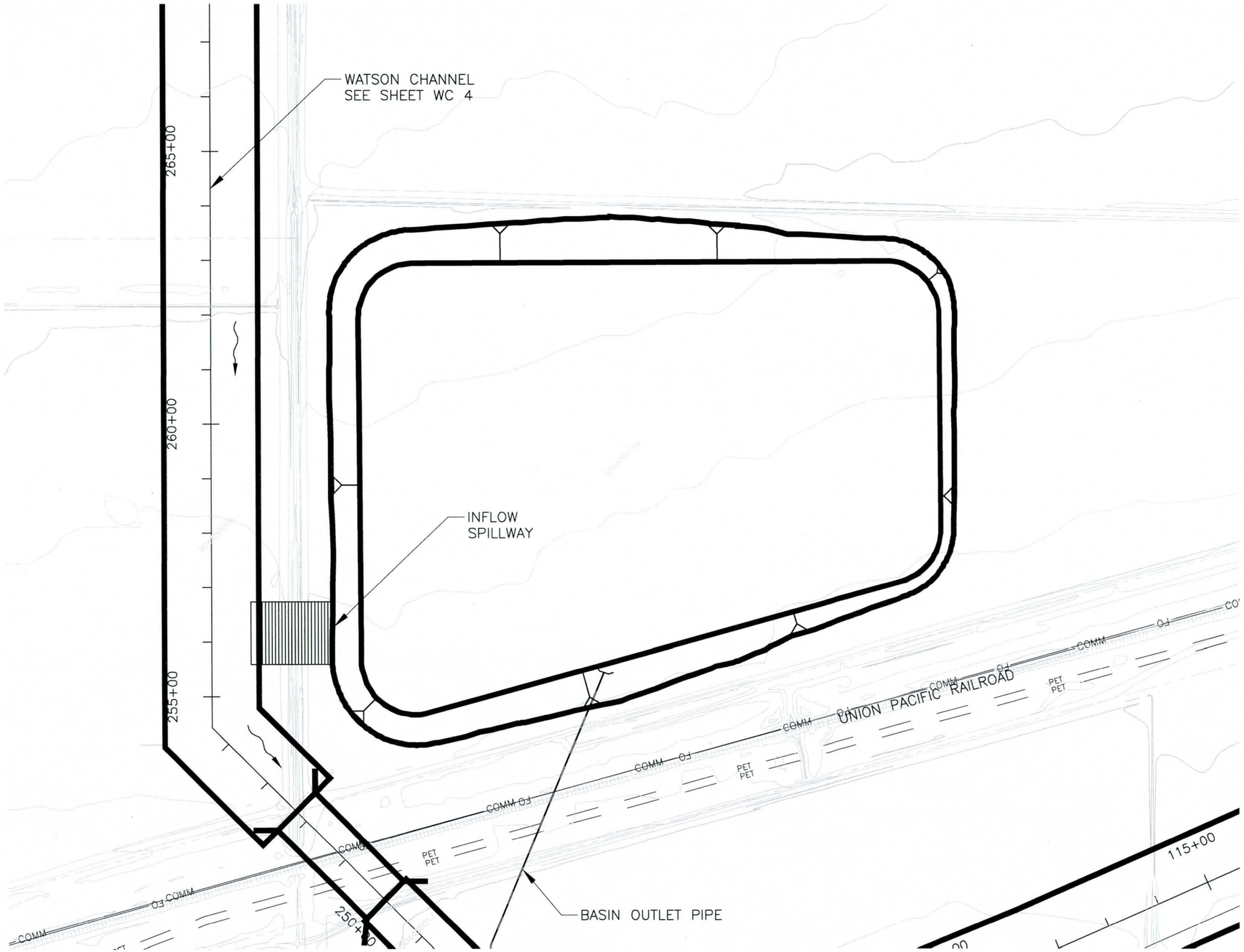
Basin Land Area =	21.61	Acres	Outflow Pipe (no. & Dia.) =	1	24	in.
Basin Storage Volume =	56	Ac.-Ft.	Pipe Invert at Inlet=		882.3	ft
			Pipe Invert at Outlet=		880.9	ft
Inflow upstream of spillway =	1,065	cfs	Pipe Length =		1024	ft
Inflow over spillway (Into basin) =	814	cfs	Pipe Slope =		0.001	ft/ft
Discharge downstream of spillway (Bypass flow) =	251	cfs	Inflow Spillway Width (2) =		242	ft
Spillway Elev. =	892	ft	Inflow Spillway Length (2) =		120	ft
Maximum Ponding Depth =	891	ft				
Maximum Excavation Depth =	10	ft				

Note:

(1) Volume computations based upon results obtained from surface modeling software.

(2) Width is perpendicular to flow. Length is measured down the slope.

(3) Landscape notes not applicable for this sheet



NOTE:
CONTOURS ARE FOR CONCEPTUAL DESIGN CALCULATIONS ONLY.

FINAL DESIGN SHOULD INCORPORATE VARIED SIDE SLOPES AND OTHER AESTHETIC FEATURES.

BASIN IS INTENDED TO OPERATE AS AN "OFF-LINE" BASIN AND RECEIVE FLOW ONLY FROM THE INFLOW SPILLWAY. FINAL DESIGN SHOULD CONSIDER ROUTING OFF-SITE FLOWS AROUND BASIN.

N

0 100 200 400 600 800
feet

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SEE FACING PAGE FOR DESIGN INFORMATION, ENVIRONMENTAL SITES AND LANDSCAPING NOTES

Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

RAILROAD BASIN

PRIME CONSULTANT: Dibble Engineering

DRN. MTM DATE: –
DES. JTB DATE: –
CKD. DCF DATE: –

SCALE 1"=200' HORIZONTAL

SHEET WC 13

FILE:J:\2006\10-0607\CAD\BASIN-MB02.dwg DATE:Jun. 18 2009 TIME: 11:26 am

Buckeye Area Drainage Master Plan
Rainbow Park Basin

Detention Basin Properties

Rainbow Park Basin

Basin Land Area =	30.02	Acres	Outflow Pipe (no. & Dia.) =	1	24	in.
Basin Storage Volume =	103	Ac.-Ft.	Pipe Invert at Inlet=		986.4	ft
			Pipe Invert at Outlet=		985.8	ft
Inflow upstream of spillway =	1,065	cfs	Pipe Length =		643	ft
Inflow over spillway (Into basin) =	799	cfs	Pipe Slope =		0.001	ft/ft
Discharge downstream of spillway (Bypass flow) =	266	cfs	Inflow Spillway Width (2) =		237	ft
Spillway Elev. =	999	ft	Inflow Spillway Length (2) =		118	ft
Maximum Ponding Depth =	997	ft				
Maximum Excavation Depth =	11	ft				

Note:

(1) Volume computations based upon results obtained from surface modeling software.

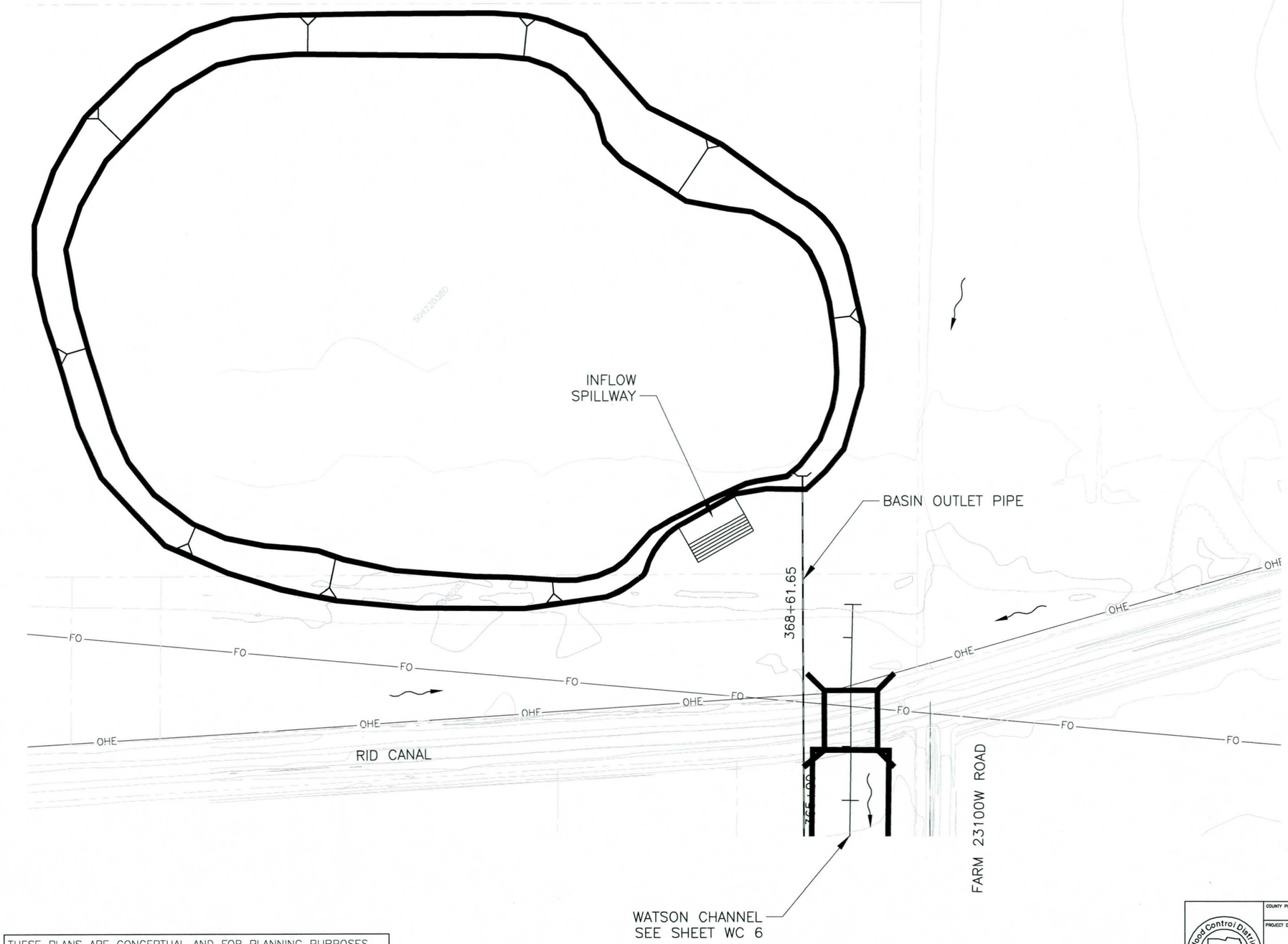
(2) Width is perpendicular to flow. Length is measured down the slope.

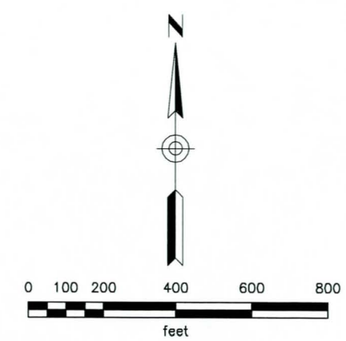
(3) See Sheet LA 3 for landscape notes.

NOTE:
CONTOURS ARE FOR CONCEPTUAL DESIGN CALCULATIONS ONLY.

FINAL DESIGN SHOULD INCORPORATE VARIED SIDE SLOPES AND OTHER AESTHETIC FEATURES.

BASIN IS INTENDED TO OPERATE AS AN "OFF-LINE" BASIN AND RECEIVE FLOW ONLY FROM THE INFLOW SPILLWAY. FINAL DESIGN SHOULD CONSIDER ROUTING OFF-SITE FLOWS AROUND BASIN.





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SEE FACING PAGE FOR DESIGN INFORMATION, ENVIRONMENTAL SITES AND LANDSCAPING NOTES

Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION: RAINBOW PARK BASIN		
PRIME CONSULTANT: Dibble Engineering	DRN. MTM DATE: – / DES. JTB DATE: – / CKD. DCF DATE: –	SCALE 1"=200' HORIZONTAL / SHEET WC 14

FILE:J:\2006\10-0607\CAD\BASIN-MB01.dwg DATE:Jun, 18 2009 TIME: 11:27 am

Buckeye Area Drainage Master Plan
Maricopa Basin

Detention Basin Properties

Maricopa Basin

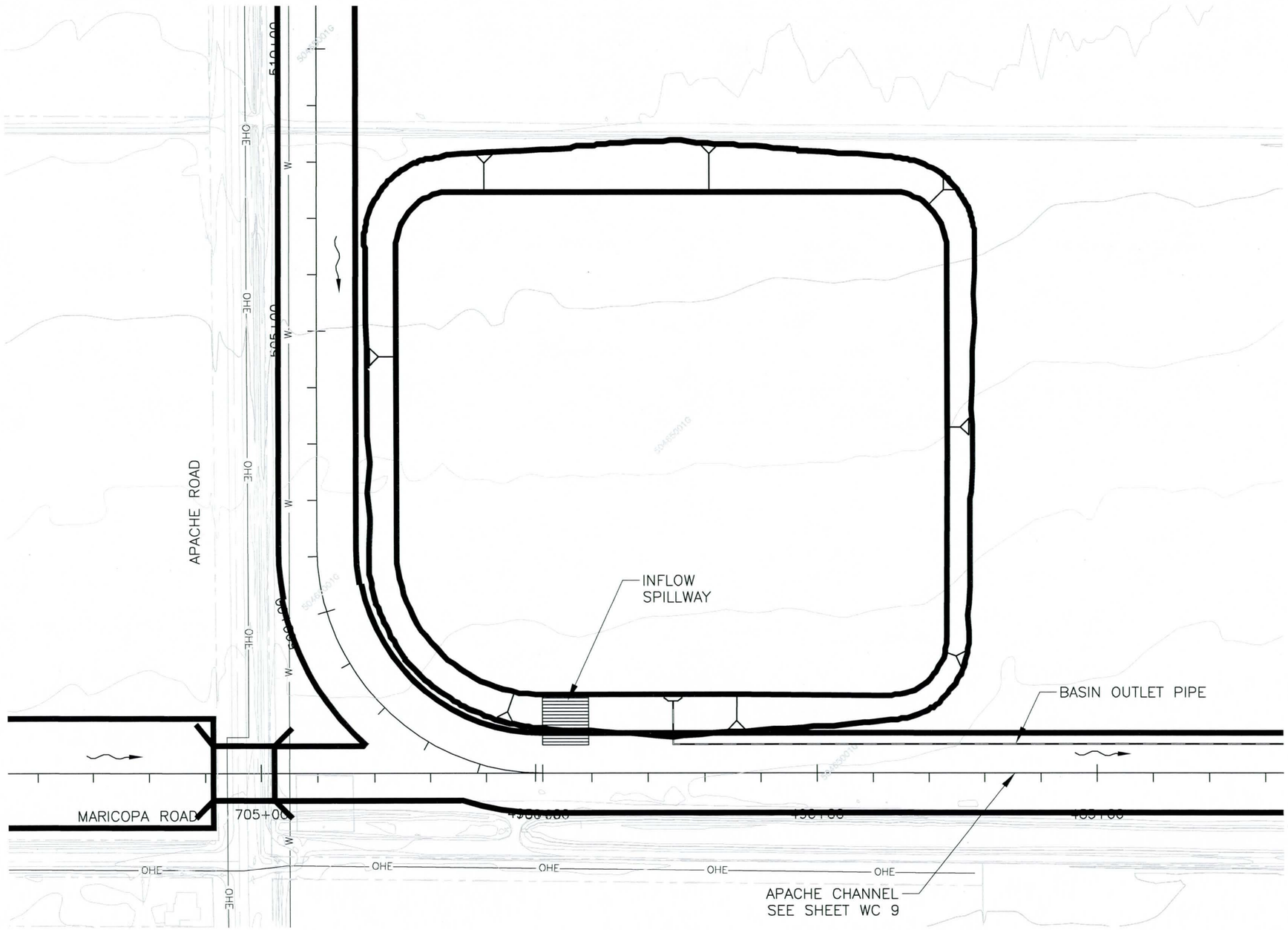
Basin Land Area =	24.51	Acres	Outflow Pipe (no. & Dia.) =	1	24 in.
Basin Storage Volume =	67	Ac.-Ft.	Pipe Invert at Inlet=		892.6 ft
			Pipe Invert at Outlet=		891.2 ft
Inflow upstream of spillway =	740	cfs	Pipe Length =		1418 ft
Inflow over spillway (Into basin) =	584	cfs	Pipe Slope =		0.001 ft/ft
Discharge downstream of spillway (Bypass flow) =	156	cfs	Inflow Spillway Width (2) =		173 ft
Spillway Elev. =	902	ft	Inflow Spillway Length (2) =		86 ft
Maximum Ponding Depth =	901	ft			
Maximum Excavation Depth =	9	ft			

Note:

(1) Volume computations based upon results obtained from surface modeling software.

(2) Width is perpendicular to flow. Length is measured down the slope.

(3) Landscape notes not applicable for this sheet



NOTE:
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BASIN IS INTENDED TO OPERATE AS AN "OFF-LINE" BASIN AND RECEIVE FLOW ONLY FROM THE INFLOW SPILLWAY. FINAL DESIGN SHOULD CONSIDER ROUTING OFF-SITE FLOWS AROUND BASIN.

N

0 100 200 400 600 800
feet

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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION: MARICOPA BASIN			
PRIME CONSULTANT: Dibble Engineering	DRN. MTM DATE: –	SCALE 1"=200' HORIZONTAL	SHEET WC 15
	DES. JTB DATE: –		
	CKD. DCF DATE: –		

FILE:J:\2006\10-0607\CAD\BASIN-MB04.dwg DATE:Jun. 18 2009 TIME: 11:27 am

Buckeye Area Drainage Master Plan
Apache Basin

Detention Basin Properties

Apache Basin

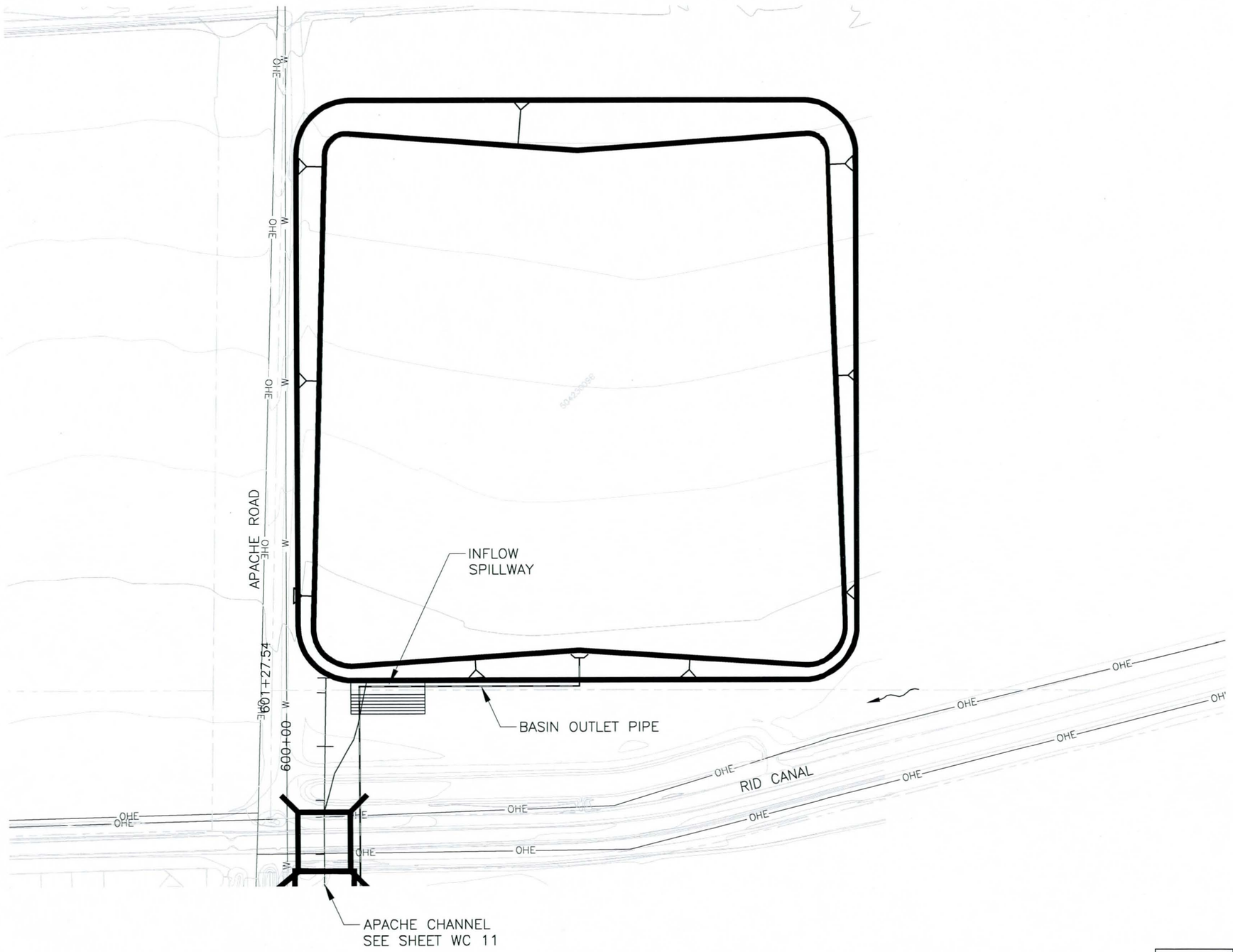
Basin Land Area =	25.56	Acres	Outflow Pipe (no. & Dia.) =	1	24	in.
Basin Storage Volume =	41	Ac.-Ft.	Pipe Invert at Inlet=		987.9	ft
			Pipe Invert at Outlet=		986.7	ft
Inflow upstream of spillway =	1,042	cfs	Pipe Length =		1175	ft
Inflow over spillway (Into basin) =	937	cfs	Pipe Slope =		0.001	ft/ft
Discharge downstream of spillway (Bypass flow) =	105	cfs	Inflow Spillway Width (2) =		278	ft
Spillway Elev. =	997	ft	Inflow Spillway Length (2) =		138	ft
Maximum Ponding Depth =	996	ft				
Maximum Excavation Depth =	7	ft				

Note:

(1) Volume computations based upon results obtained from surface modeling software.

(2) Width is perpendicular to flow. Length is measured down the slope.

(3) Landscape notes not applicable for this sheet



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N

0 100 200 400 600 800
feet

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SEE FACING PAGE FOR DESIGN INFORMATION, ENVIRONMENTAL SITES AND LANDSCAPING NOTES

Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION APACHE BASIN			
PRIME CONSULTANT Dibble Engineering	DRN. MTM DATE: –	SCALE 1"=200' HORIZONTAL	SHEET WC 16
	DES. JTB DATE: –		
	CKD. DCF DATE: –		

FILE:J:\2006\10-0607\CAD\BASIN-MB03.dwg DATE:Jun, 18 2009 TIME: 11:27 am

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BUCKEYE AREA DRAINAGE MASTER PLAN
F.C.D. CONTRACT NO. 2004C058
Conceptual Design Plans

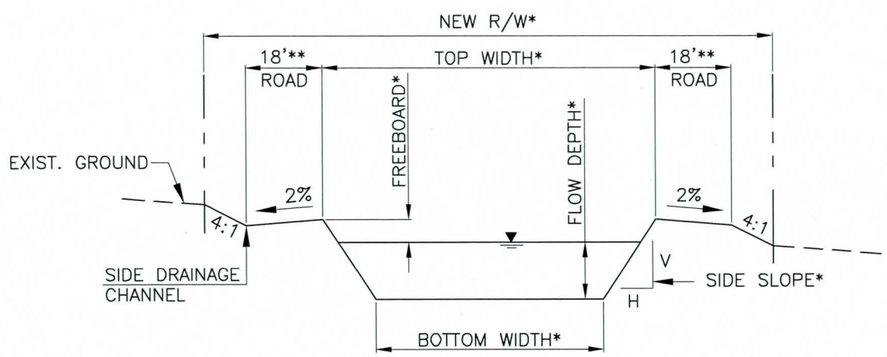
Flood Control District of Maricopa County 1959–2009

LEGEND

- XX–01 — CHANNEL REACH
- NEW CHANNEL
- NEW DETENTION BASIN SLOPE
- NEW DRAIN PIPE
- NEW CULVERT
- PROPERTY LINE
- RIGHT–OF–WAY LINE
- EXISTING ROAD
- 1410 — EXIST. INDEX CONTOUR
- EXIST. INTERMEDIATE CONTOUR
- 15"S — EXISTING UTILITY
- EXISTING STRUCTURE
- 304 — ENVIRONMENTAL SITE

SHEET INDEX

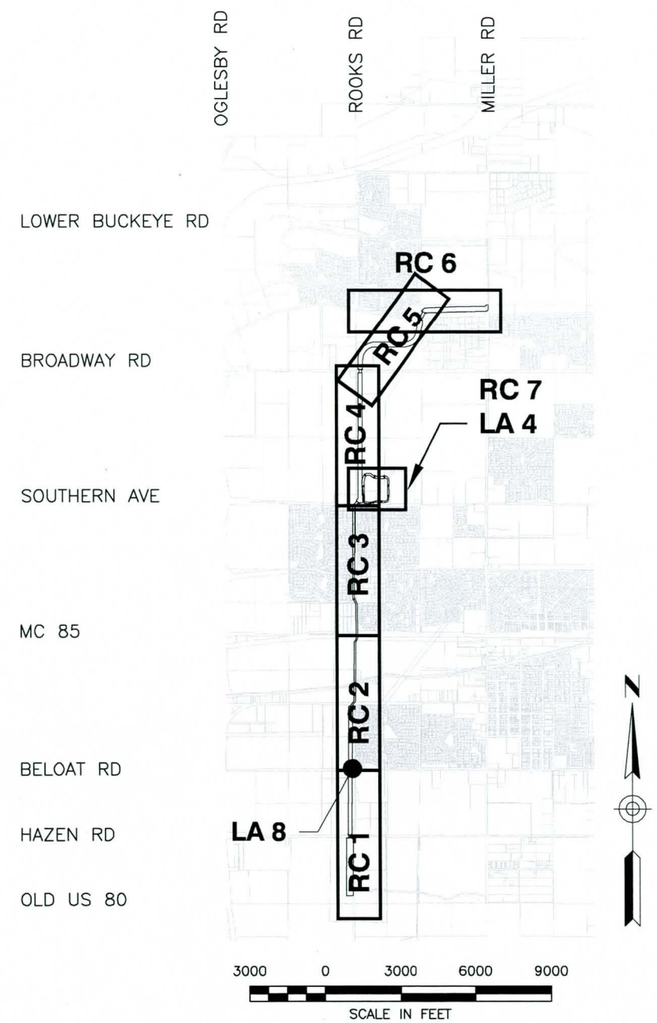
RC 0	ROOKS SYSTEM COVER SHEET
RC G	ROOKS CHANNEL GENERAL NOTES SHEET
RC 1 TO RC 6	ROOKS CHANNEL PLAN & PROFILE SHEETS
RC 7	ROOKS BASIN



*DIMENSIONS PER PLANS

**NOT ALL LOCATIONS REQUIRE DUAL MAINTENANCE ROADS– SEE PLANS

TYPICAL CHANNEL SECTION
N.T.S.



KEY MAP

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION ROOKS SYSTEM		
PRIME CONSULTANT Dibble Engineering	DRN. CDF DATE: 06/09 DES. JTB DATE: 06/09 CKD. DCF DATE: 06/09	SHEET RC 0

FILE:J:\2006\10-0607\CAD\COVR06-RC.dwg DATE:Jun, 04 2009 TIME: 01:56 pm

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ROOKS SYSTEM DESIGN GUIDELINES

CHANNELIZED ROOKS CHANNEL AND BASINS SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE CHANNEL AND BASIN WITH DESERT PARK, SEMI-NATURAL LOWER SONORAN DESERT, AND NATURAL LOWER SONORAN DESERT RIPARIAN LANDSCAPE DESIGN THEMES.

Design Concept

Rooks System shall consist of the following elements:

1. An earthen channel and basins with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that recreation multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the system including biological, cultural and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for both channels and basins are shown for reference and will be designed and constructed by others. While only a typical 1000' long channel section and one basin multi-use scenario is provided, the intent is to incorporate the scenarios system wide.

Channel Criteria

1. Channel Engineering Design
   - Overall channel sizing and design shall use a Manning's n-value of 0.045 to allow for grasses, wildflower mixes, some shrubs and trees within the channel bottom. The n-value will also account for variable side slopes and a meandering channel/ low flow alignment.
2. Configuration
   - The overall channel form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the channel to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - The center line of the channel shall meander within the right of way to reinforce a sinuous appearance, minimizing straight alignments for extended lengths.
   - The low flow channel shall meander along the bottom of the channel, in differing alignments to the center line to provide visual movement of the low flow channel on the channel bottom.
3. Vegetation
   Channels
   - Typical channel cross-sections shall include areas of grasses, wildflowers, scattered shrubs, and occasional trees that are planted to reinforce the form of the meandering channel side slopes, and channel/ low flow alignment. Three differing seed mixes shall be provided, one for the overbank, another for the side slopes, and the last for the channel bottom. The overbank mix will have a generous mix of grasses, shrubs, and tree species. The side slope mix will contain the same mix with a more conservative amount of tree species seed. The bottom mix will be limited to grasses and a limited amount of shrubs.
   - Tall Pot trees are recommended predominently on the upper portion of the channel side slopes and the overbank. Utilize the typical channel length scenario for plant densities.
4. Perimeter
   - A minimum of 50' of ROW or 30% additional, whichever is greater, shall be added to the channel width as a setback from adjacent landuse.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the channel. Design motifs have been developed for the drainage infrastructure.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance as opposed to a man-made appearance.
6. Multi-use
   - The designated multi-use components to be coordinated with others in pre-design and design.

ROOKS PARK BASIN DESIGN GUIDELINES

ROOKS PARK BASIN SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE BASIN. PRE-DESIGN AND DESIGN DEVELOPMENT WILL SHOW ACTUAL LAYOUT.

Design Concept

Park Basin shall consist of the following elements:

1. An earthen basin with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that biological and educational multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the basin including biological and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for the basin are shown for reference. Coordination with the Town of Buckeye will be required to determine the multi-use requirements for each basin in the system

Basin Criteria

1. Basin Engineering Design
   - Overall Basin sizing and design shall use a Manning's n-value of 0.045 and storage calculations to allow for turf grass, native grasses, wildflower mixes, shrubs and trees within the basin bottom. One of the primary multi-use options is the joint use of the basin as an active recreation park. The basin size shall accommodate for increased levels of flora within the basin side slopes and bottom that will be utilized for shade.
2. Configuration
   - The overall basin form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the basin edge to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - Low flow channels shall be subsurface perforated pipe sloped to drain to the lower lake elevation.
   - An urban fishing lake shall be located at the low elevation of the basin.
3. Vegetation
   - Landscape Design Theme: The landscape design theme will be Desert Park. The vegetation will be a combination of shade trees, shrubs, and native grasses and will be utilized throughout the basin bottom and side slopes. The overbank area will be a combination of turf grass and desert planting, but will be predominantly transitionary native plant material to blend in with the adjacent land uses.
   - Tall Pot trees are recommended predominently on the upper portion of the channel side slopes and the overbank. Utilize the typical channel length scenario for plant densities.
4. Perimeter
   - An additional 30% was included as a part of the design of the basin area to provide context sensitive integration of the facility and for use as a setback for multi-use functions. This setback shall be located to maximize the effects it will provide for both recreation users and adjacent development.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the basin. Design motifs have been developed for the drainage infrastructure. Farming/Agriculture Motif as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
6. Multi-use
   - The designated multi-use components to be coordinated in pre-design and design include a parking lot, urban fishing lake, lighted multi-use fields, picnic areas, and cultural interpretation of historic farming.

OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION DESIGN GUIDELINES			
PRIME CONSULTANT Dibble Engineering	DRN. BSM DATE: 05/09	SCALE	SHEET
	DES. SH DATE: 05/09		RCG
	CKD. SH DATE: 05/09		

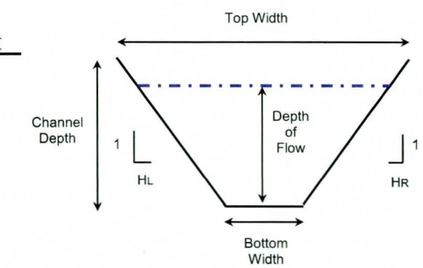
FILE: F:\Projects\20070071\MasterXrefs\X0607-GENERAL NOTES RC.dwg DATE: Jun. 17 2009 TIME: 10:15 am

Buckeye Area Drainage Master Plan
Rooks Road System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
RC-01	MCRR08	2032	831.52	834.17	2289	0.0012	LE	0.045	60	6.4	7	7	18	18	668.5	150.2	0.25	Sub	3.0	1.6	8.0	172	271
RC-02	MCRR07	838	834.23	868.93	5077	0.0068	LE	0.045	24	3.6	7	7	0	18	174.0	74.3	0.55	Sub	4.8	1.0	4.6	110	178

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
RR-C1	838	119	834.23	834.17	0.0005	3	8	4	RCBC	0.012	Wingwall	6.39	8.39	0.89

Utility Crossings

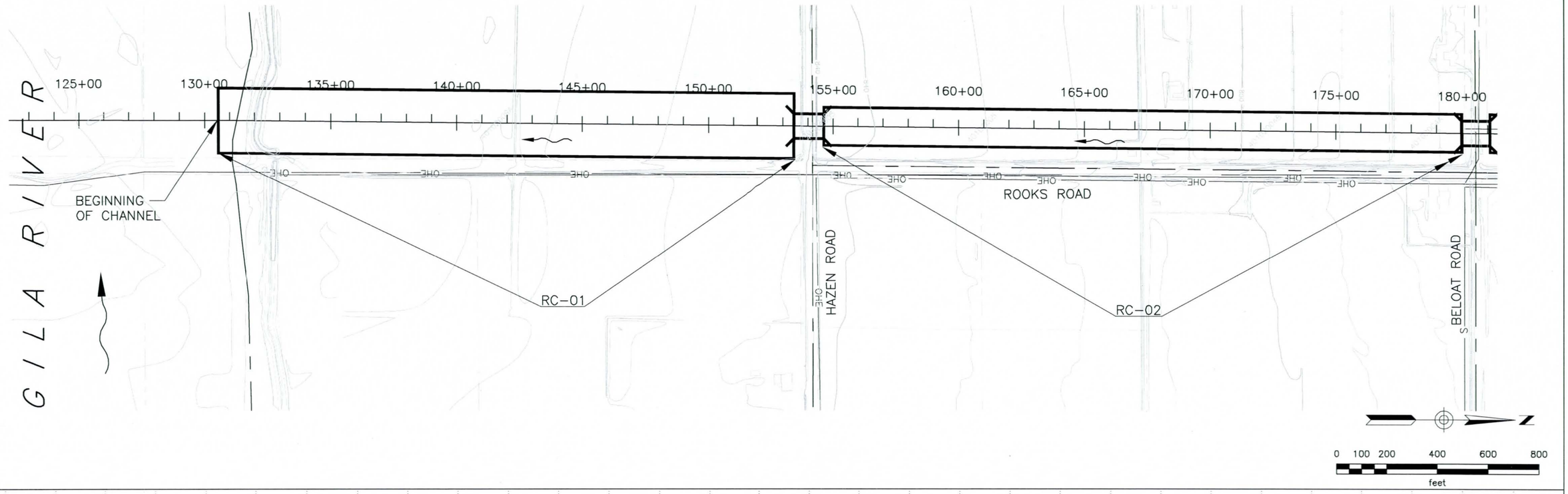
Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
RC-01	Rooks	RC 1	0	0	0	0	0	0	0	0	0
RC-02	Rooks	RC 1	0	0	0	0	0	0	0	0	0

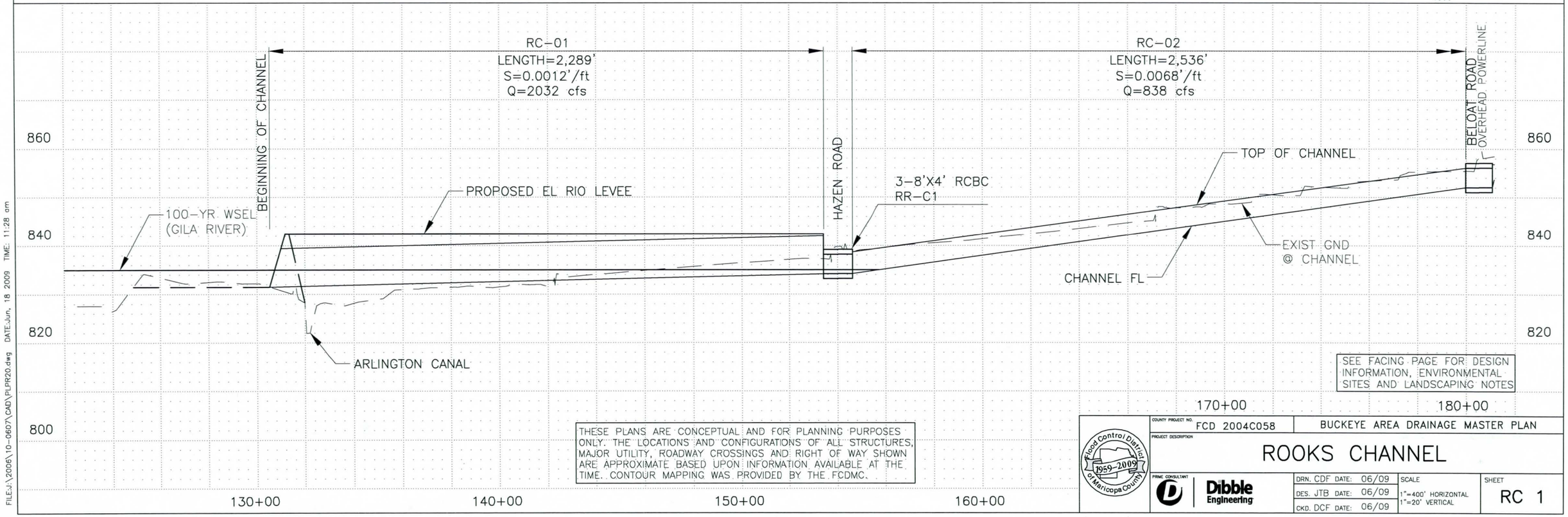
Landscape Notes:

Landscape Design Theme: South of Hazen Road=Natural Lower Sonoran Desert Riparian, North of Hazen Road=Semi-Natural Sonoran Desert

Design Motif: River from Station 121+00 to Station 155+00. Farming/Agriculture from Station 155+00 to Station 180+00

Multi-use: multi-use trails and cultural interpretation of historic irrigation.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

ROOKS CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL

SHEET: RC 1

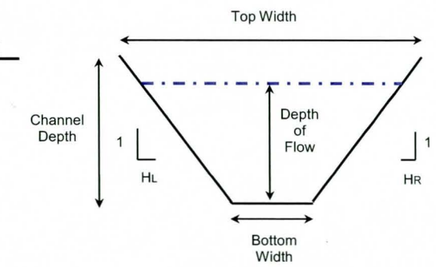
FILE:J:\2006\10-0607\CAD\PLPR20.dwg DATE:Jun. 18 2009 TIME: 11:28 am

Buckeye Area Drainage Master Plan
Rooks Road System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
RC-02	MCRR07	838	834.23	868.93	5077	0.0068	LE	0.045	24	3.6	7	7	0	18	174.0	74.3	0.55	Sub	4.8	1.0	4.6	110	178

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

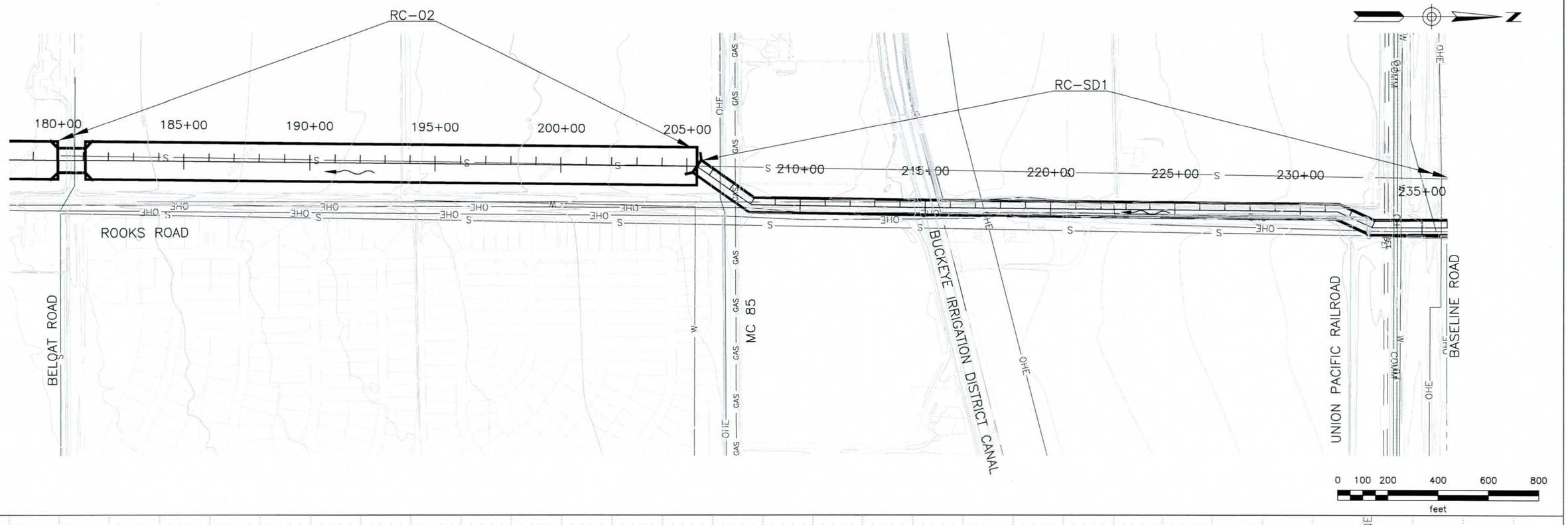
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
RR-C2	838	110	852.05	851.99	0.0005	3	8	4	RCBC	0.012	Wingwall	3.56	6.17	0.89
RC-SD1	745	4335	874.71	868.93	0.0013	2	8	5	RCBC	0.012	Wingwall	4.40	4.00	0.80

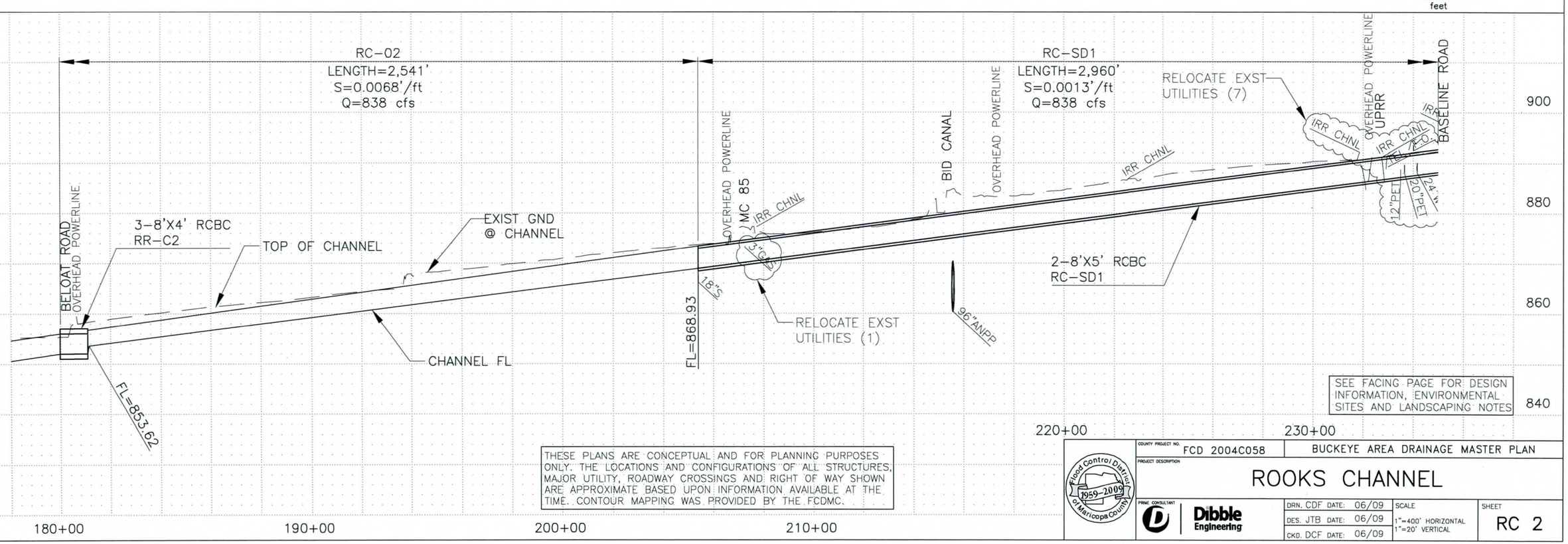
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
RC-02	Rooks	RC 2	0	0	0	0	0	0	1	0	1

Landscape Notes:

Landscape Design Theme: Semi-Natural Sonoran Desert
Design Motif: Irrigation/Canal from Station 180+00 to Station 222+00. Railroad from Station 222+00 to Station 235+00
Multi-use: multi-use trails and cultural interpretation of historic irrigation and railroad.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

ROOKS CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL

SHEET: RC 2

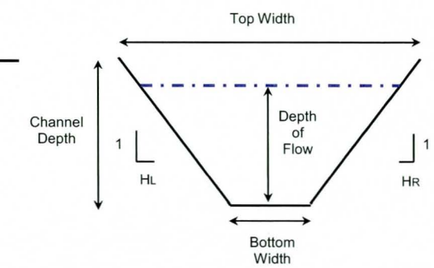
FILE:J:\2006\10-0607\CAD\PLPR21.dwg DATE:Jun. 18 2009 TIME: 11:28 am

Buckeye Area Drainage Master Plan
Rooks Road System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
RC-03	MCRR04	205	897.09	922.03	3666	0.0068	LE	0.030	20	3.0	4	4	0	18	96.0	44.7	0.81	Sub	6.8	1.0	4.0	52	70

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

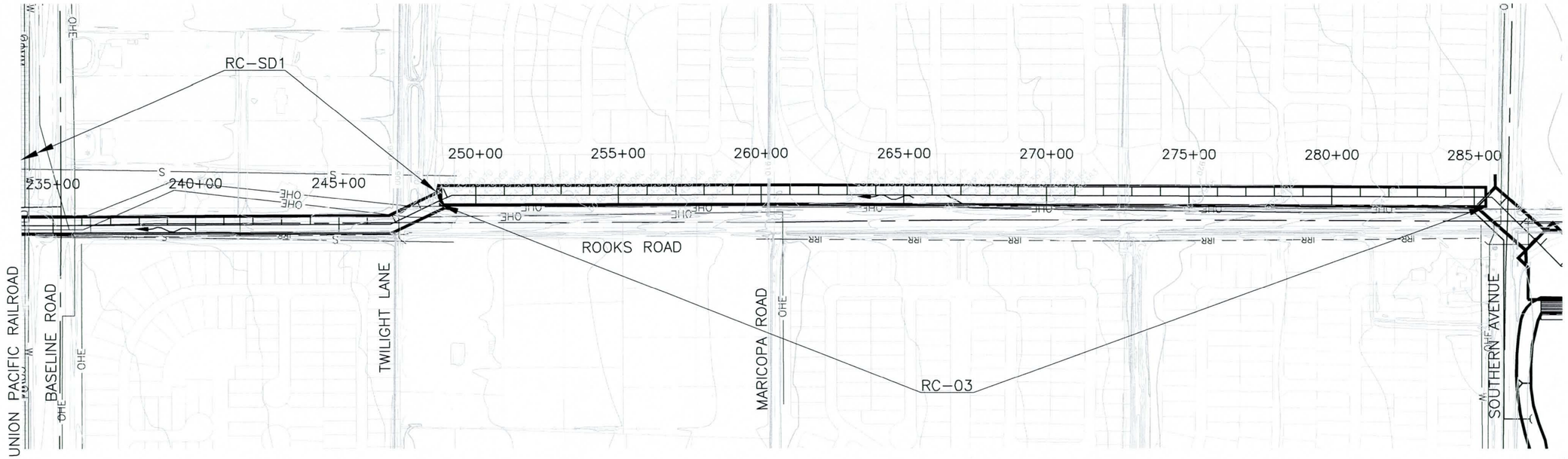
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
RC-SD1	838	4,335	897.09	868.93	0.0065	2	8	5	RCBC	0.012	Wingwall	4.40	4.00	0.80

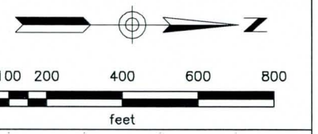
Utility Crossings

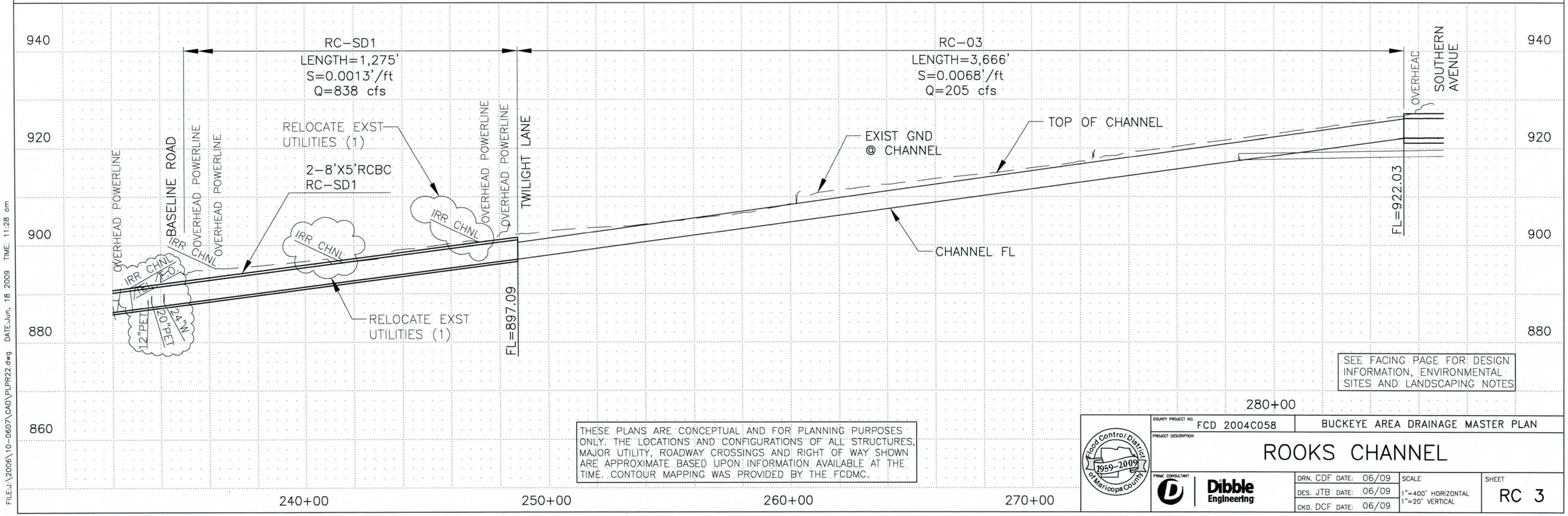
Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
RC-03	Rooks	RC 3	0	0	0	0	0	0	0	0	0

Landscape Notes:

Landscape Design Theme: Semi-Natural Sonoran Desert
Design Motif: Railroad from Station 235+00 to Station 255+00. Farming/Agriculture from Station 255+00 to Station 285+00
Multi-use: multi-use trails and cultural interpretation of historic railroad and farming.







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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION ROOKS CHANNEL			
PRIME CONSULTANT Dibble Engineering	DRN. CDF DATE: 06/09	SCALE 1"=400' HORIZONTAL 1"=20' VERTICAL	SHEET RC 3
	DES. JTB DATE: 06/09		
	CKD. DCF DATE: 06/09		

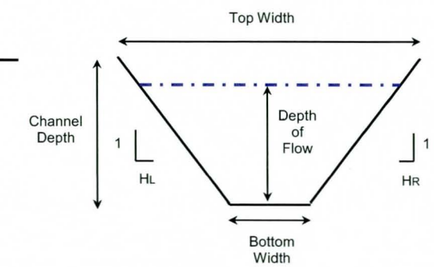
FILE:J:\2006\10-0607\CAD\PLPR22.dwg DATE:Jun, 18 2009 TIME: 11:28 am

Buckeye Area Drainage Master Plan
Rooks Road System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
RC-04	MCRR03	1501	925.43	960.74	5157	0.0068	LE	0.045	35	4.2	7	7	18	0	271.8	94.6	0.57	Sub	5.5	1.2	5.4	165	238

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

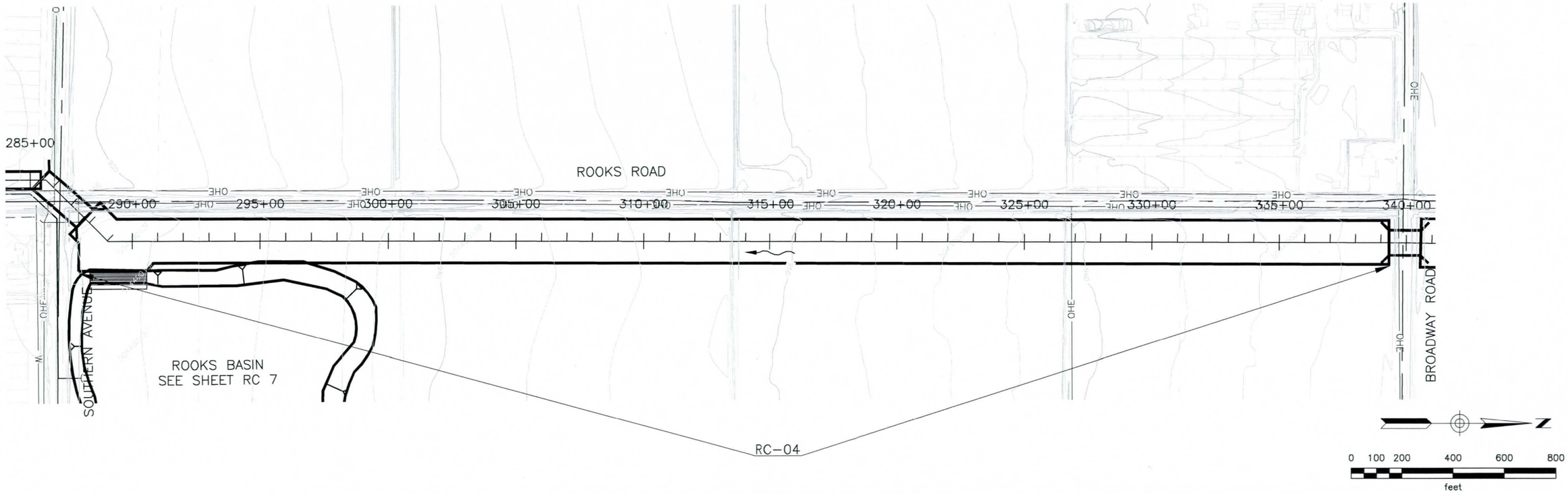
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
RR-C3	205	235	922.15	922.03	0.0005	1	10	5	RCBC	0.012	Wingwall	3.00	4.05	0.84

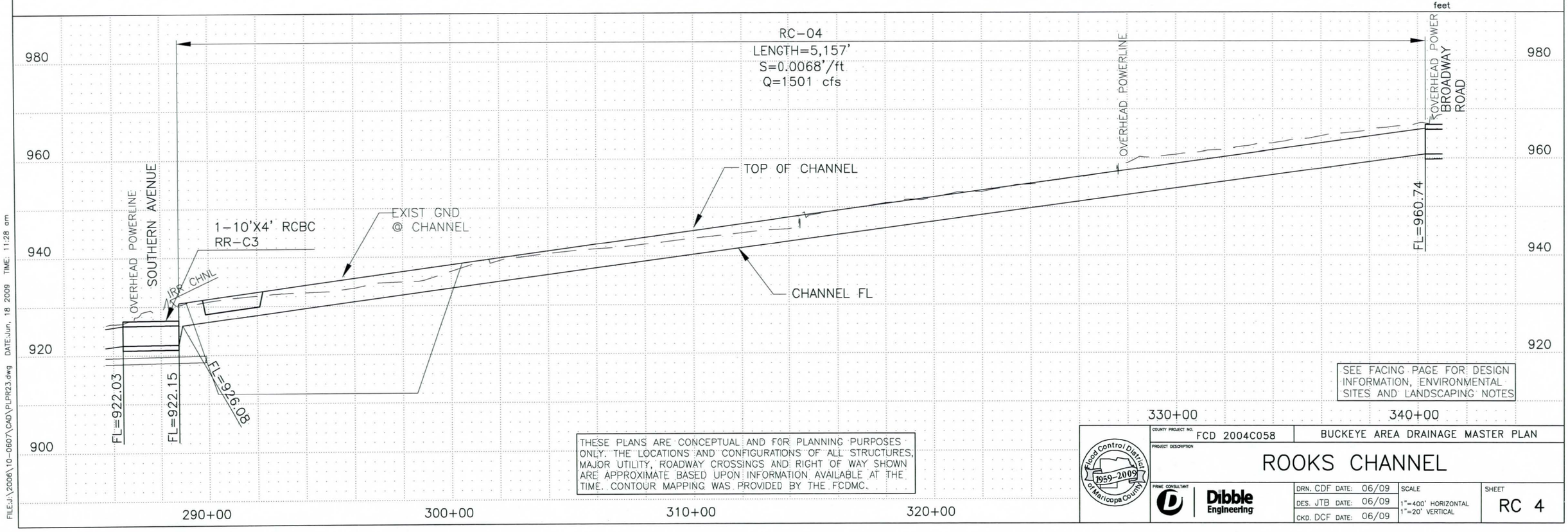
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
RC-04	Rooks	RC 4	0	1	0	0	0	0	0	0	1

Landscape Notes:

Landscape Design Theme: Semi-Natural Sonoran Desert
Design Motif: Farming/Agriculture
Multi-use: multi-use trails and cultural interpretation of farming.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

ROOKS CHANNEL

PRIME CONSULTANT Dibble Engineering

DRN. CDF DATE: 06/09	SCALE	SHEET
DES. JTB DATE: 06/09	1"=400' HORIZONTAL 1"=20' VERTICAL	RC 4
CKD. DCF DATE: 06/09		

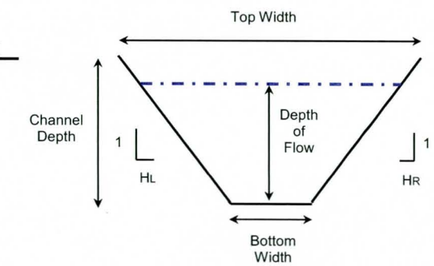
FILE:J:\2006\10-060?\CAD\PLPR23.dwg DATE:Jun, 18 2009 TIME: 11:28 am

Buckeye Area Drainage Master Plan
Rooks Road System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (HL)	Sideslope (H:1) Right (HR)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
RC-05	MCRR02	1347	964.32	984.26	3812	0.0052	LE	0.045	34	4.3	7	7	18	18	276.7	95.1	0.50	Sub	4.9	1.2	5.5	167	264

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

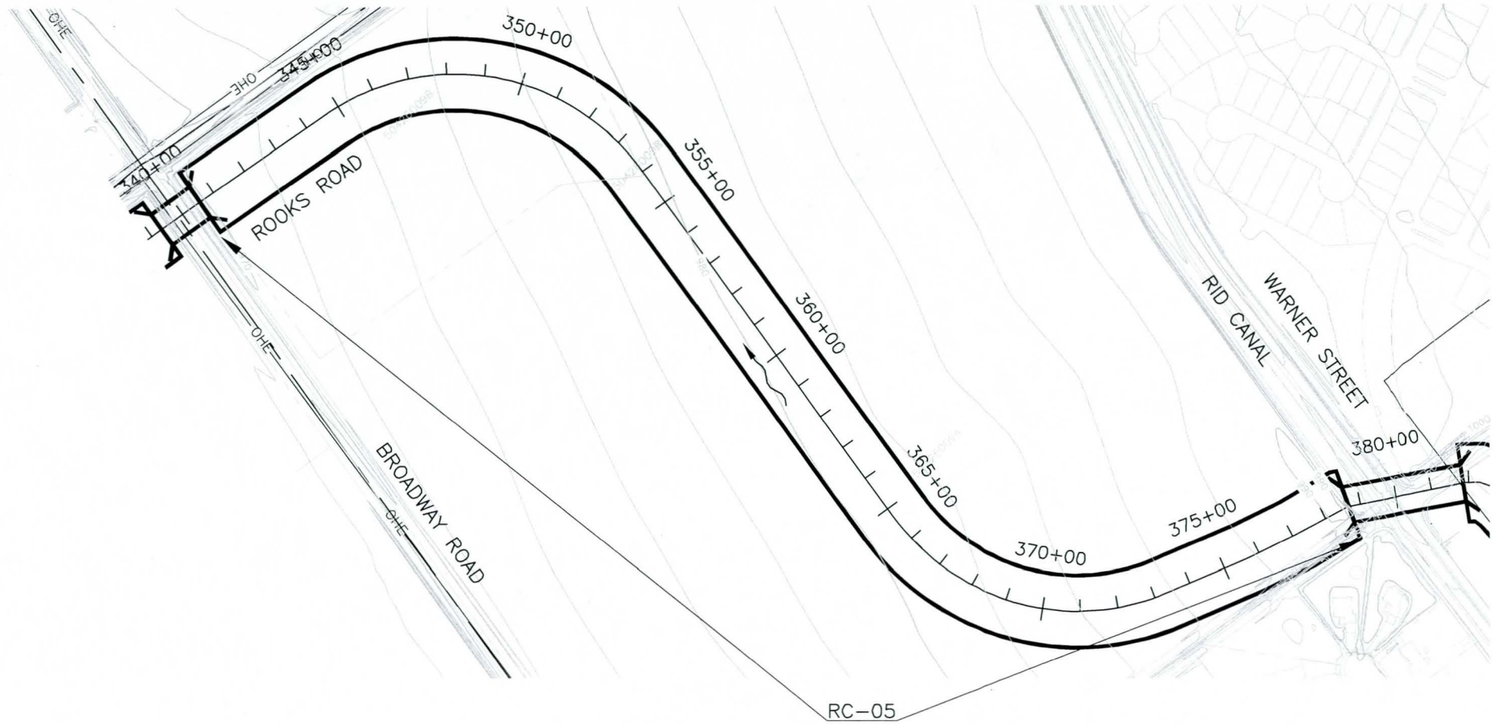
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
RR-C4	1347	124	960.80	960.74	0.0005	4	8	5	RCBC	0.012	Wingwall	4.21	6.78	0.86

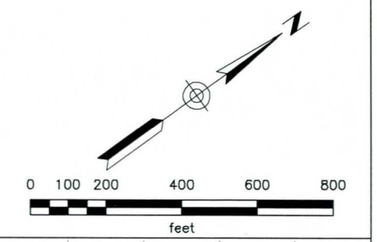
Utility Crossings

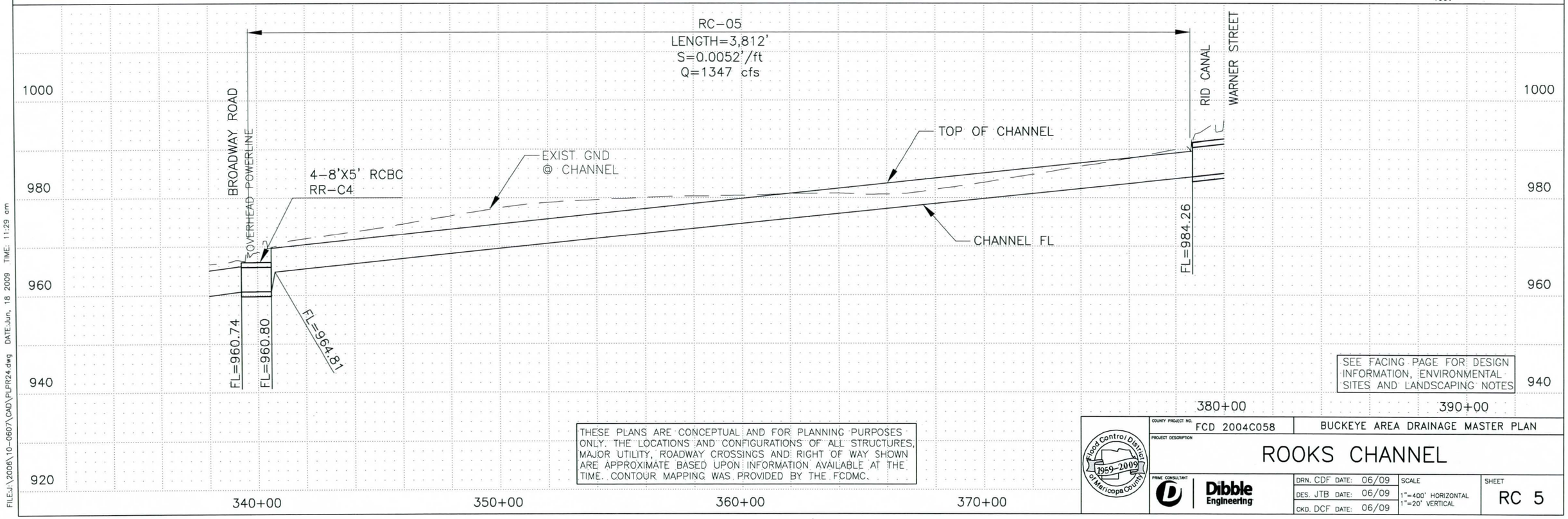
Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
RC-05	Rooks	RC 5	0	0	0	0	0	0	0	0	0

Landscape Notes:

Landscape Design Theme: Semi-Natural Sonoran Desert
Design Motif: Irrigation/Canal
Multi-use: multi-use trails.







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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

ROOKS CHANNEL

PRIME CONSULTANT Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE 1"=400' HORIZONTAL 1"=20' VERTICAL

SHEET RC 5

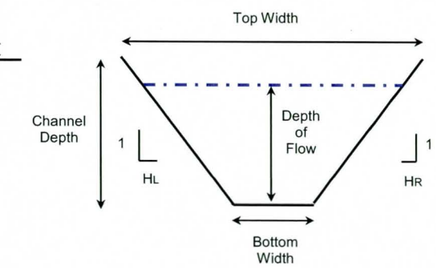
FILE:U:\2006\10-0607\CAD\PLPR24.dwg DATE:Jun. 18 2009 TIME: 11:29 am

Buckeye Area Drainage Master Plan
Rooks Road System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (HL)	Sideslope (H:1) Right (HR)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
RC-06	MCRR01	1081	986	990.26	2455	0.0017	LE	0.045	37	5.0	7	7	18	18	353.6	106.7	0.30	Sub	3.1	1.3	6.2	124	210

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

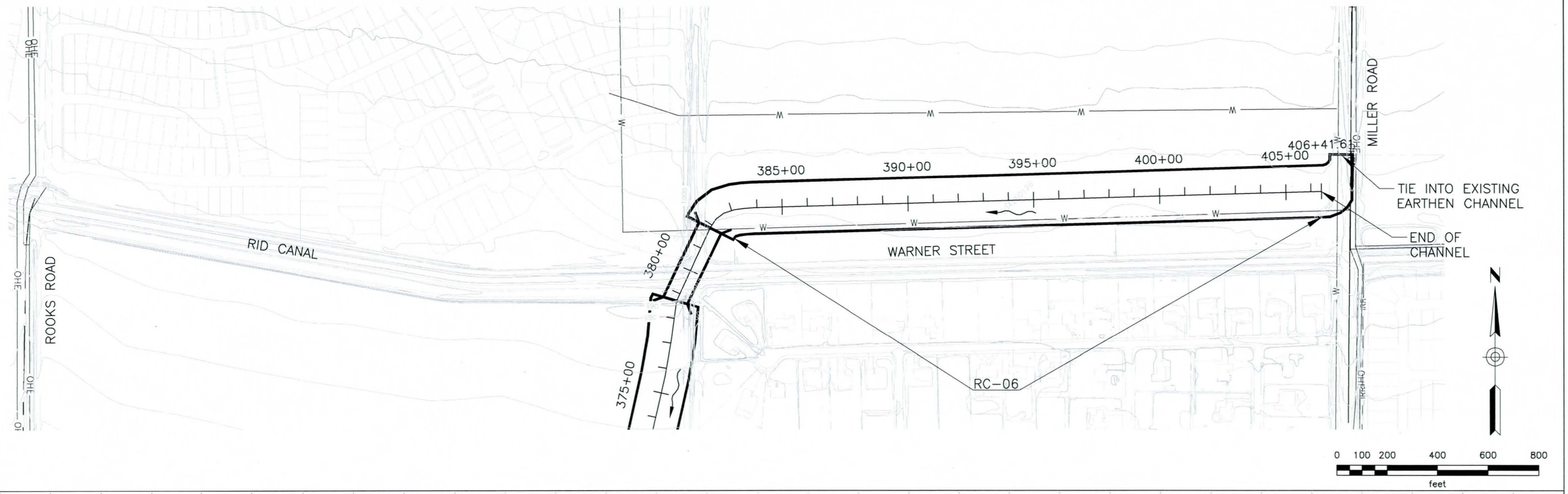
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
RR-C5	1081	317	986.00	984.26	0.0055	4	10	5	RCBC	0.012	Wingwall	4.29	4.55	0.99

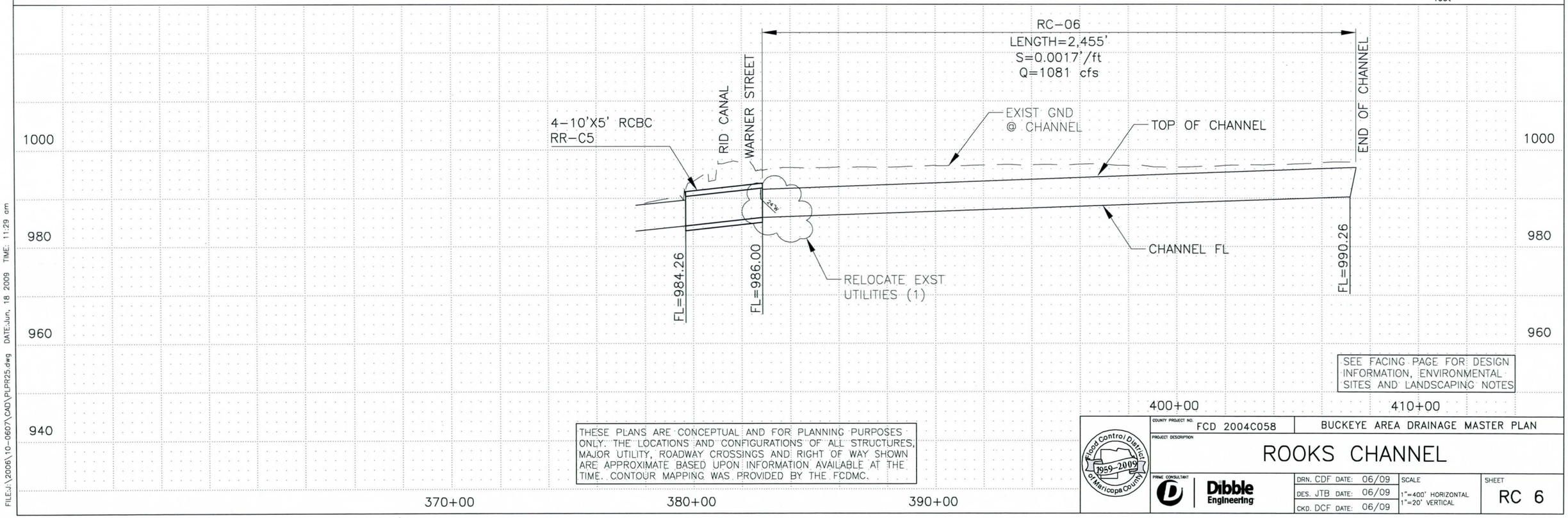
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
RC-06	Rooks	RC 6	0	0	0	0	0	0	0	1	1

Landscape Notes:

Landscape Design Theme: Semi-Natural Sonoran Desert
Design Motif: Irrigation/Canal
Multi-use: multi-use trails and cultural interpretation of historic and prehistoric irrigation.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

ROOKS CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL

SHEET: RC 6

FILE:J:\2006\10-0607\CAD\PLPR25.dwg DATE:Jun. 18 2009 TIME: 11:29 am

Buckeye Area Drainage Master Plan
Rooks Basin

Detention Basin Properties

Rooks Basin

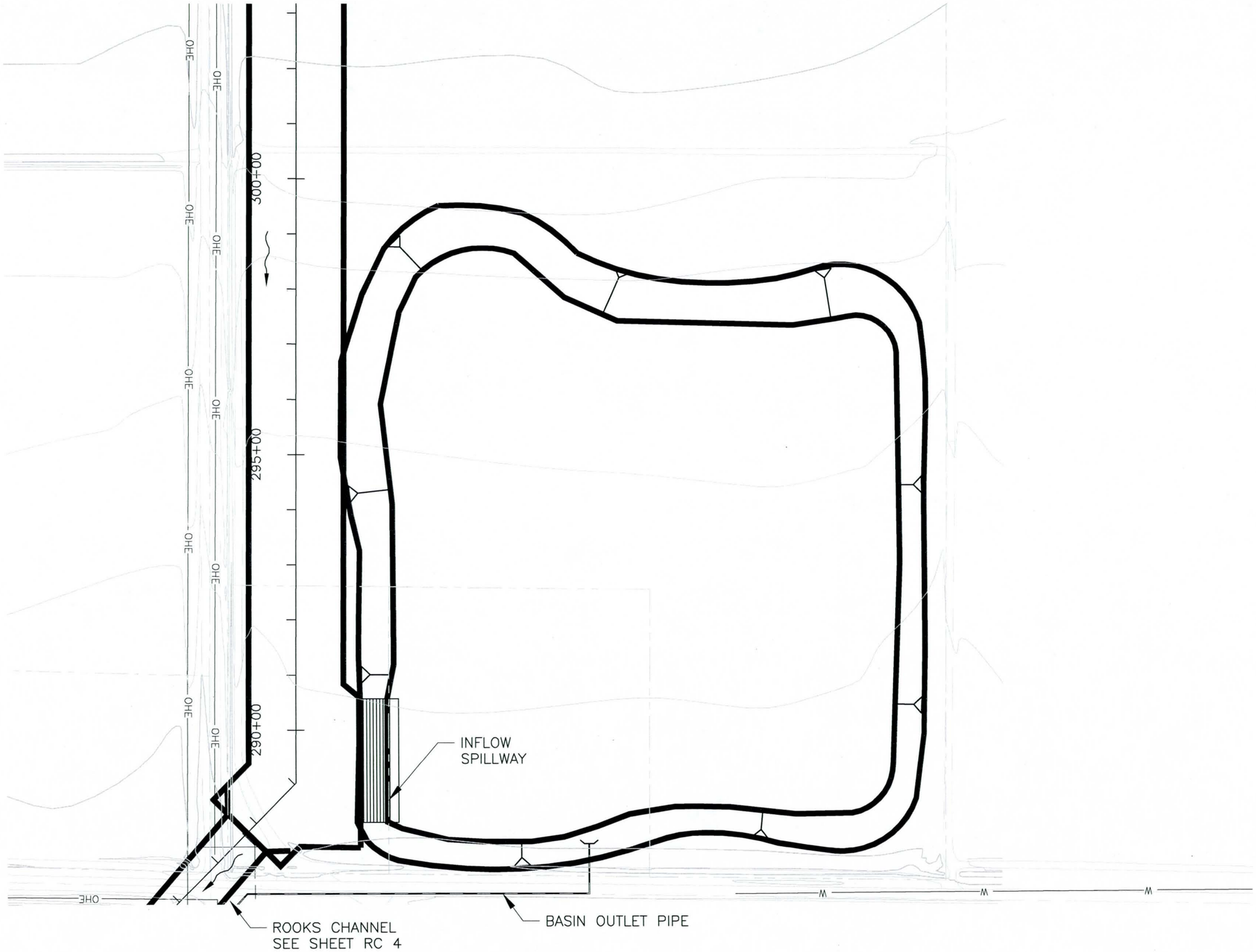
Basin Land Area =	25.73	Acres	Outflow Pipe (no. & Dia.) =	1	24	in.
Basin Storage Volume =	134	Ac.-Ft.	Pipe Invert at Inlet=		919.0	ft
			Pipe Invert at Outlet=		917.0	ft
Inflow upstream of spillway =	1,889	cfs	Pipe Length =		1030	ft
Inflow over spillway (Into basin) =	1,684	cfs	Pipe Slope =		0.001	ft/ft
Discharge downstream of spillway (Bypass flow) =	205	cfs	Inflow Spillway Width (2) =		500	ft
Spillway Elev. =	928	ft	Inflow Spillway Length (2) =		248	ft
Maximum Ponding Depth =	926	ft				
Maximum Excavation Depth =	18	ft				

Note:

(1) Volume computations based upon results obtained from surface modeling software.

(2) Width is perpendicular to flow. Length is measured down the slope.

(3) See Sheet LA 4 for landscape notes.



NOTE:
CONTOURS ARE FOR CONCEPTUAL DESIGN CALCULATIONS ONLY.

FINAL DESIGN SHOULD INCORPORATE VARIED SIDE SLOPES AND OTHER AESTHETIC FEATURES.

BASIN IS INTENDED TO OPERATE AS AN "OFF-LINE" BASIN AND RECEIVE FLOW ONLY FROM THE INFLOW SPILLWAY. FINAL DESIGN SHOULD CONSIDER ROUTING OFF-SITE FLOWS AROUND BASIN.

N

0 50 100 200
1"=200'

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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION ROOKS BASIN		
PRIME CONSULTANT Dibble Engineering	DRN. MTM DATE: – / DES. JTB DATE: – / CKD. DCF DATE: –	SCALE 1"=200' HORIZONTAL / SHEET RC 7

FILE:J:\2006\10-0607\CAD\BASIN-MB07.dwg DATE:Jun, 18 2009 TIME: 11:29 am

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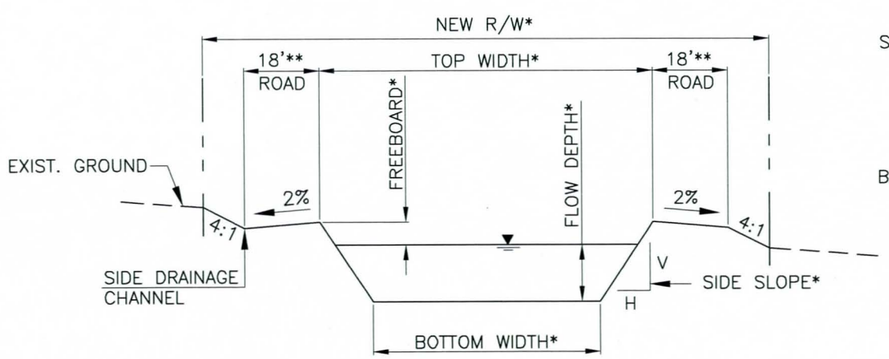
BUCKEYE AREA DRAINAGE MASTER PLAN
F.C.D. CONTRACT NO. 2004C058
Conceptual Design Plans

Flood Control District of Maricopa County 1959–2009

LEGEND

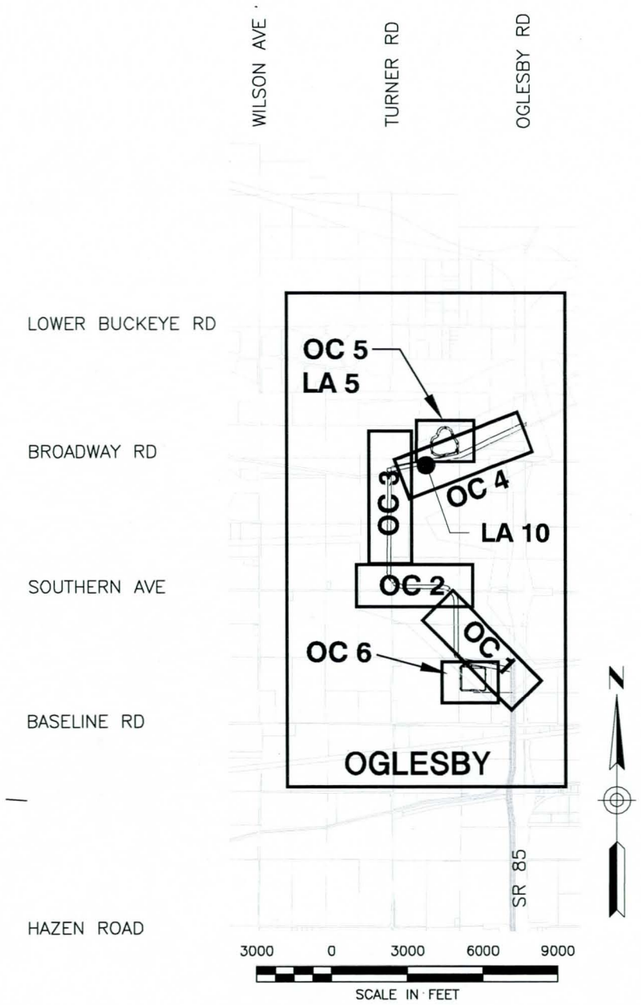
- XX–01 — CHANNEL REACH
- NEW CHANNEL
- NEW DETENTION BASIN SLOPE
- NEW DRAIN PIPE
- NEW CULVERT
- PROPERTY LINE
- RIGHT–OF–WAY LINE
- EXISTING ROAD
- 1410 — EXIST. INDEX CONTOUR
- EXIST. INTERMEDIATE CONTOUR
- 15"S — EXISTING UTILITY
- EXISTING STRUCTURE
- 304 — ENVIRONMENTAL SITE



*DIMENSIONS PER PLANS

**NOT ALL LOCATIONS REQUIRE DUAL MAINTENANCE ROADS– SEE PLANS

TYPICAL CHANNEL SECTION
N.T.S.



KEY MAP

SHEET INDEX

OC 0	OGLESBY SYSTEM COVER SHEET
OC G	OGLESBY SYSTEM GENERAL NOTES SHEET
OC 1 TO OC 4	OGLESBY CHANNEL PLAN & PROFILE SHEETS
OC 5	ROOSEVELT BASIN
OC 6	TURNER BASIN

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION OGLESBY SYSTEM		
PRIME CONSULTANT Dibble Engineering	DRN. CDF DATE: 06/09 DES. JTB DATE: 06/09 CKD. DCF DATE: 06/09	SHEET OC 0

FILE:J:\2006\10-0607\CAD\COVR04-OC.dwg DATE:Jun. 04 2009 TIME: 01:58 pm

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OGLESBY SYSTEM DESIGN GUIDELINES

CHANNELIZED OGLESBY CHANNEL AND BASINS SHALL BE DESIGNED AS SEMI-SOFT STRUCTURAL DRAINAGE CHANNEL AND BASINS WITH NATURAL LOWER SONORAN DESERT, SEMI-NATURAL SONORAN DESERT, AND DESERT PARK LANDSCAPE DESIGN THEMES. SPECIFIC LANDSCAPE DESIGN THEMES WILL BE SHOWN ON THE PLAN SHEETS.

Design Concept

Oglesby System shall consist of the following elements:

1. An earthen channel and basins with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that recreation multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the system including biological, cultural and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for both channels and basins are shown for reference and will be designed and constructed by others. While only a typical 1000' long channel section and one basin multi-use scenario is provided, the intent is to incorporate the scenarios system wide.

Channel Criteria

1. Channel Engineering Design
   - Overall sizing and design shall use a Manning's n-value of 0.045 to allow for grasses, wildflower mixes, some shrubs and trees within the channel bottom. The n-value will also account for variable side slopes and a meandering channel/ low flow alignment.
2. Configuration
   - The overall form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the channel to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - The center line of the channel shall meander within the right of way to reinforce a sinuous appearance, minimizing straight alignments for extended lengths.
   - The low flow channel shall meander along the bottom of the channel, in differing alignments to the center line to provide visual movement of the low flow channel on the channel bottom.
3. Vegetation

   Channels
   - Typical channel cross-sections shall include areas of grasses, wildflowers, scattered shrubs, and occasional trees that are planted to reinforce the form of the meandering channel side slopes, and channel/ low flow alignment. Three differing seed mixes shall be provided, one for the overbank, another for the side slopes, and the last for the channel bottom. The overbank mix will have a generous mix of grasses, shrubs, and tree species. The side slope mix will contain the same mix with a more conservative amount of tree species seed. The bottom mix will be limited to grasses and a limited amount of shrubs.
   - Tall Pot trees are recommended predominently on the upper portion of the channel side slopes and the overbank. Utilize the typical channel length scenario for plant densities.

   Basins
   - Basin vegetation will depend upon the multi-use function designated for the basin. Coordinate with the Town of Buckeye Parks and Recreation department to determine recreation multi-use potential.
4. Perimeter

   Channels
   - A minimum of 50' of ROW or 30% additional, whichever is greater, shall be added to the channel width as a setback from adjacent landuse.

   Basins
   - An additional 30% was included as a part of the design of the basin areas to provide context sensitive integration of the facility and for use as a setback for multi-use functions developed by others. This setback shall be located to maximize the effects this buffer will provide for both recreation users and adjacent development.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the channel. Design motifs have been developed for the drainage infrastructure.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance as opposed to a man-made appearance.
6. Multi-use
   - The designated multi-use components to be coordinated with others in pre-design and design.

ROOSEVELT PARK BASIN DESIGN GUIDELINES

ROOSEVELT PARK BASIN SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE BASIN. PRE-DESIGN AND DESIGN WILL SHOW ACTUAL LAYOUT.

Design Concept

Park Basin shall consist of the following elements:

1. An earthen basin with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that biological and educational multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the basin including biological and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for the basin are shown for reference. Coordination with the Town of Buckeye will be required to determine the multi-use requirements for each basin in the system.

Basin Criteria

1. Basin Engineering Design
   - Overall Basin sizing and design shall use a Manning's n-value of 0.045 and storage calculations to allow for turf grass, native grasses, wildflower mixes, shrubs and trees within the basin bottom. One of the primary multi-use options is the joint use of the basin as an active recreation park. The basin size shall accommodate for increased levels of flora within the basin side slopes and bottom that will be utilized for shade.
2. Configuration
   - The overall basin form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the basin edge to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - Low flow channels shall be subsurface perforated pipe sloped to drain to the lower basin.
3. Vegetation
   - Landscape Design Theme: The landscape design theme will be Desert Park. The vegetation will be a combination of shade trees, shrubs, and native grasses and will be utilized throughout the basin bottom and side slopes. The overbank area will be a combination of turf grass and desert planting, but will be predominantly transitionary native plant material to blend in with the adjacent land uses.
   - Tall Pot trees are recommended predominently on the upper portion of the channel side slopes and the overbank. Utilize the typical channel length scenario for plant densities.
4. Perimeter
   - An additional 30% was included as a part of the design of the basin area to provide integration of the facility and for use as a setback for multi-use functions. This setback shall be located to maximize the effects it will provide for both recreation users and adjacent development.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the basin. Design motifs have been developed for the drainage infrastructure. Irrigation/Canal Motif as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
6. Multi-use
   - The designated multi-use components to be coordinated in pre-design and design include a parking lot, restroom, lighted multi-use fields, sports courts, biological multi-use of burrowing owl habitat, cultural interpretation of historic and prehistoric irrigation, and a connection to the regional trail system.

OGLESBY SYSTEM BASIN DESIGN GUIDELINES

OGLESBY SYSTEM BASIN SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE BASIN. PRE-DESIGN AND DESIGN DEVELOPMENT BY OTHERS WILL SHOW ACTUAL LAYOUT.

Design Concept

Basin shall consist of the following elements:

1. An earthen basin with low-flow design as a semi-soft structure. The basin shall be designed to retain the natural and beneficial functions served by the flood plain and be responsive to the Town of Buckeye's development guidelines for public health safety, and well being. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that biological and educational multi-use is incorporated.
2. Various multi-use components will be incorporated throughout the basin including biological and recreational amenities. Maintenance roads will be multi-use trails. Multi-use shall be discussed with the Town of Buckeye Parks and Recreation Department prior to starting predesign.

Basin Criteria

1. Basin Engineering Design
   - Overall Basin sizing and design shall use a Manning's n-value of 0.045 and storage calculations to allow for turf grass, native grasses, wildflower mixes, shrubs and trees within the basin bottom. The basin size shall accommodate for increased levels of flora within the basin side slopes and bottom.
2. Configuration
   - The overall basin form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the basin edge to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - Low flow channels shall be subsurface perforated pipe sloped to drain to the lower basin or as open low flow channels constructed of boulders and rip rap to emulate a natural channel appearance.
3. Vegetation
   - Landscape Design Theme: The landscape design theme will vary depending upon the multi-use designation. The vegetation will be a combination of trees, shrubs, and native grasses and will be utilized throughout the basin bottom and side slopes.
4. Perimeter
   - An additional 30% was included as a part of the design of the basin area to provide context sensitive integration of the facility and for use as a setback for multi-use functions developed by others. This setback shall be located to maximize the effects it will provide for both recreation users and adjacent development.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the channel. Design motifs have been developed for the drainage infrastructure. Farming/Agriculture as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
6. Multi-use
   - The designated multi-use components to be coordinated with others in pre-design and design are not determined at this time. Coordination with the Town of Buckeye Parks and Recreation Department will be required prior to moving forward with the concept.

OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION DESIGN GUIDELINES			
PRIME CONSULTANT Dibble Engineering	DRN. BSM DATE: 05/09	SCALE	SHEET
	DES. SH DATE: 05/09		OCG
	CKD. SH DATE: 05/09		

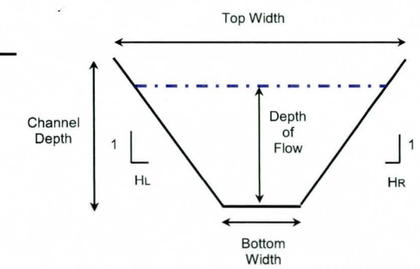
FILE: F:\Projects\2007001\MasterXrefs\X0607-GENERAL NOTES OC.dwg DATE: Jun, 17 2009 TIME: 10:13 am

Buckeye Area Drainage Master Plan
Oglesby System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
OC-01	MCOG06	579	907.51	912.1	2035	0.0023	LE	0.045	23	3.9	7	7	18	18	198.9	78.6	0.32	Sub	2.9	1.0	5.0	92	178
OC-02	MCOG05	632	916.51	934.69	2628	0.0069	LE	0.045	20	3.3	7	7	18	18	139.7	66.0	0.55	Sub	4.5	1.0	4.3	140	228

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

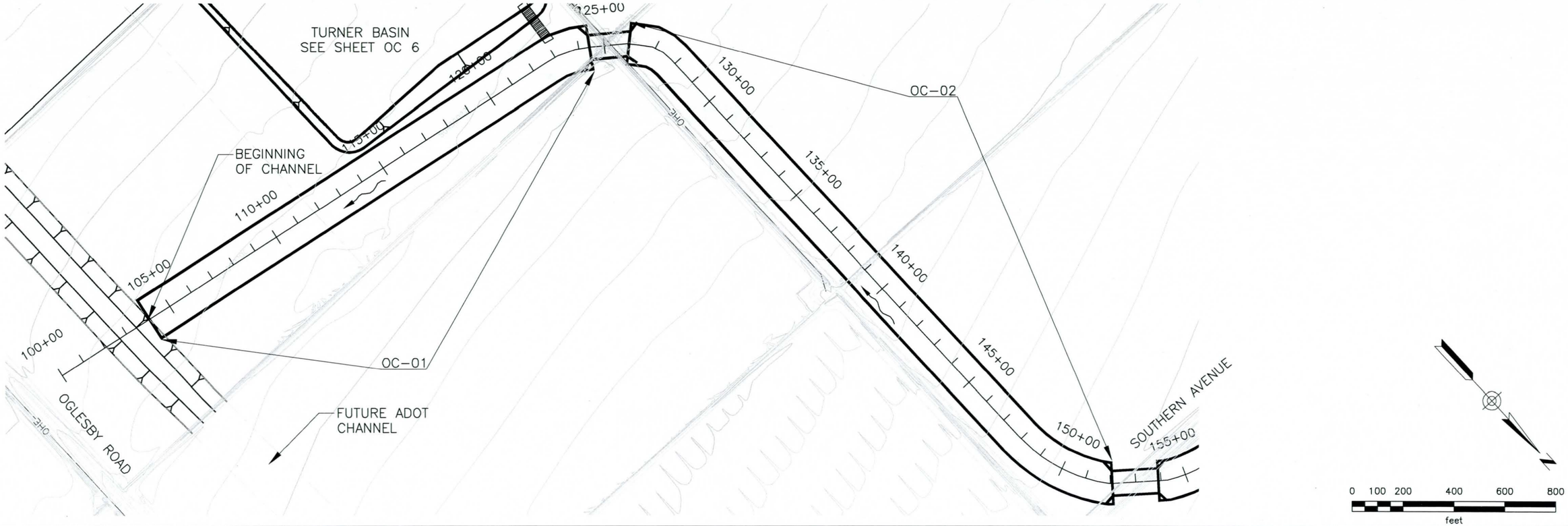
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
OC-C1	632	137	912.24	912.10	0.0010	2	10	4	RCBC	0.012	Wingwall	3.94	5.64	0.82

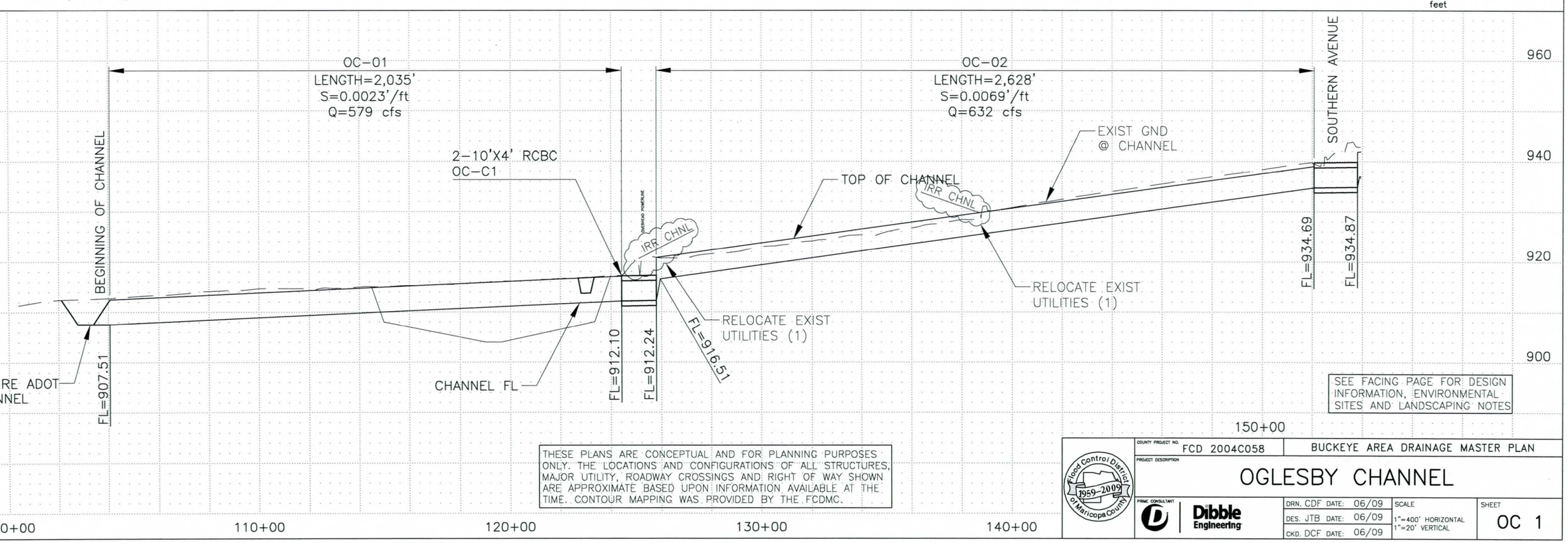
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
OC-01	Oglesby	OC 1	0	0	0	0	0	0	0	0	0
OC-02	Oglesby	OC 1	0	2	0	0	0	0	0	0	2

Landscape Notes:

Landscape Design Theme: Desert Park
Design Motif: Farming/Agriculture
Multi-use: multi-use trails, cultural interpretation of historic farming, and biological multi-use with creation of burrowing owl habitat.





THESE PLANS ARE CONCEPTUAL AND FOR PLANNING PURPOSES ONLY. THE LOCATIONS AND CONFIGURATIONS OF ALL STRUCTURES, MAJOR UTILITY, ROADWAY CROSSINGS AND RIGHT OF WAY SHOWN ARE APPROXIMATE BASED UPON INFORMATION AVAILABLE AT THE TIME. CONTOUR MAPPING WAS PROVIDED BY THE FCDMC.

Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

OGLESBY CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09	SCALE	SHEET
DES. JTB DATE: 06/09	1"=400' HORIZONTAL 1"=20' VERTICAL	OC 1
CKD. DCF DATE: 06/09		

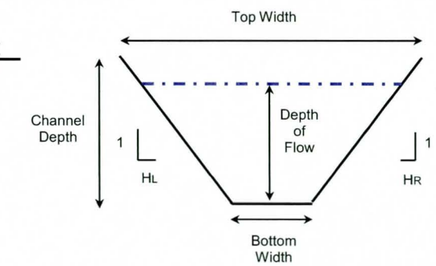
FILE:J:\2006\10-0607\CAD\PLPR26.dwg DATE:Jun. 18 2009 TIME: 11:29 am

Buckeye Area Drainage Master Plan
Oglesby System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
OC-03	MCOG04	510	937	941.9	2241	0.0022	LE	0.045	21	3.8	7	7	18	0	182.7	75.1	0.31	Sub	2.8	1.0	4.8	118	186

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

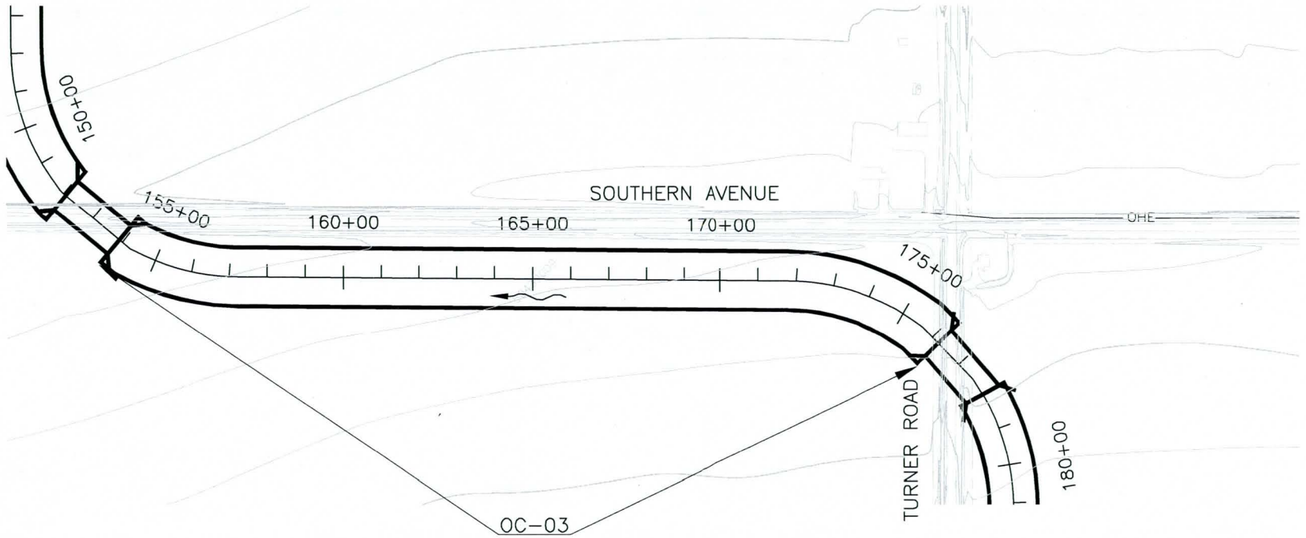
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
OC-C2	510	174	934.87	934.69	0.0010	3	8	4	RCBC	0.012	Wingwall	3.28	3.93	0.95

Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
OC-03	Oglesby	OC 2	0	0	0	0	0	0	0	0	0

Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert
Design Motif: Farming/Agriculture
Multi-use: multi-use trails and biological multi-use with creation of burrowing owl habitat.



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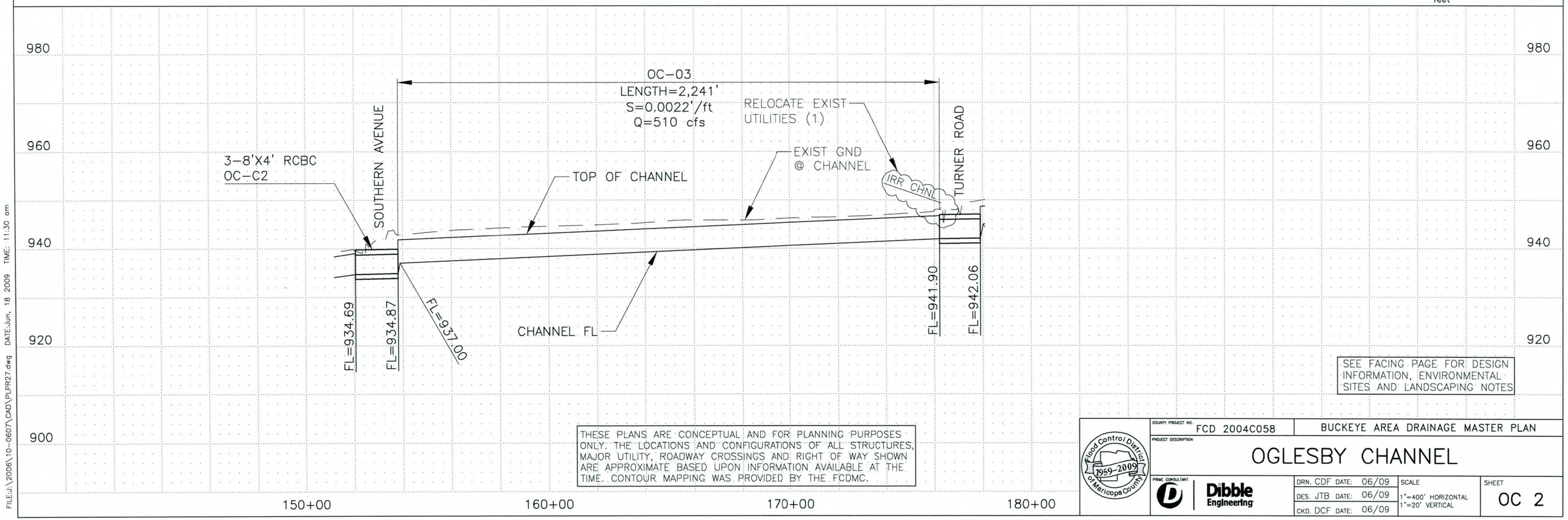

SEE FACING PAGE FOR DESIGN INFORMATION, ENVIRONMENTAL SITES AND LANDSCAPING NOTES

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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

OGLESBY CHANNEL

PRIME CONSULTANT Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE 1"=400' HORIZONTAL 1"=20' VERTICAL

SHEET OC 2

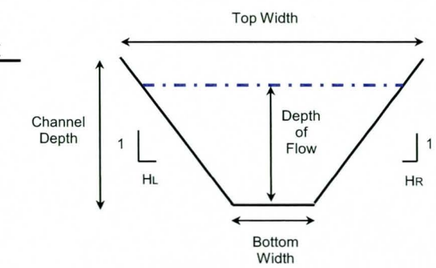
FILE:J:\2006\10-0607\CAD\PLPR27.dwg DATE:Jun. 18 2009 TIME: 11:30 am

Buckeye Area Drainage Master Plan
Oglesby System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
OC-04	MCOG03	328	945	981.91	4070	0.0091	LE	0.045	12	2.6	7	7	0	18	76.6	48.2	0.60	Sub	4.3	1.0	3.6	102	170

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

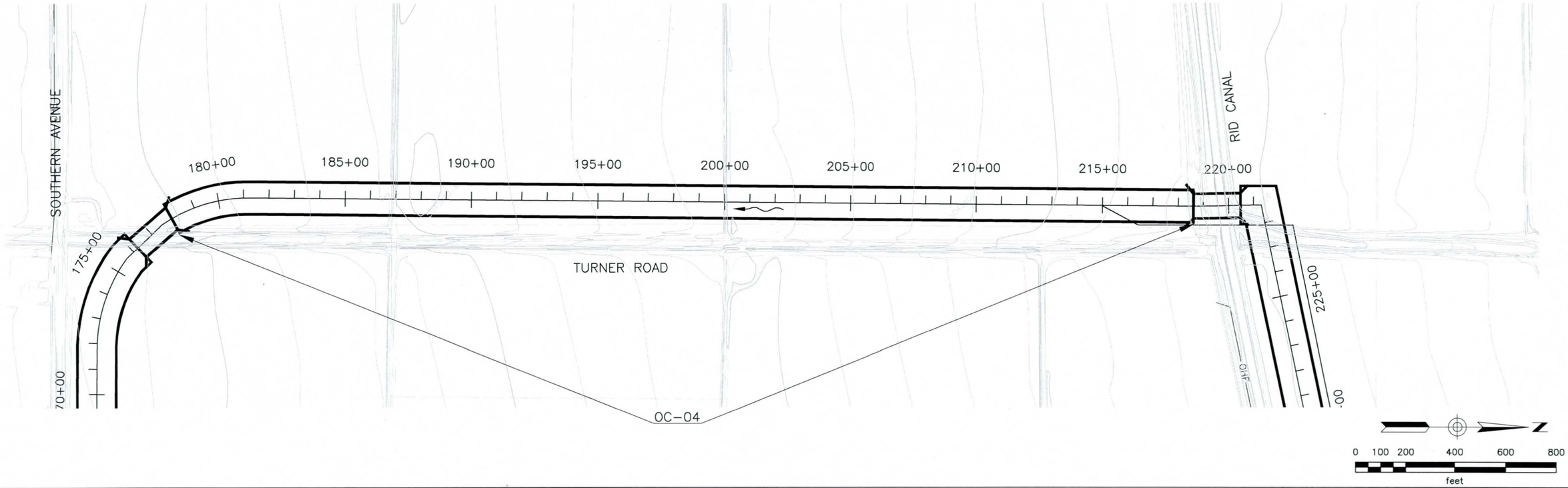
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
OC-C3	328	167	942.06	941.90	0.0010	2	6	4	RCBC	0.012	Wingwall	3.82	5.07	0.64

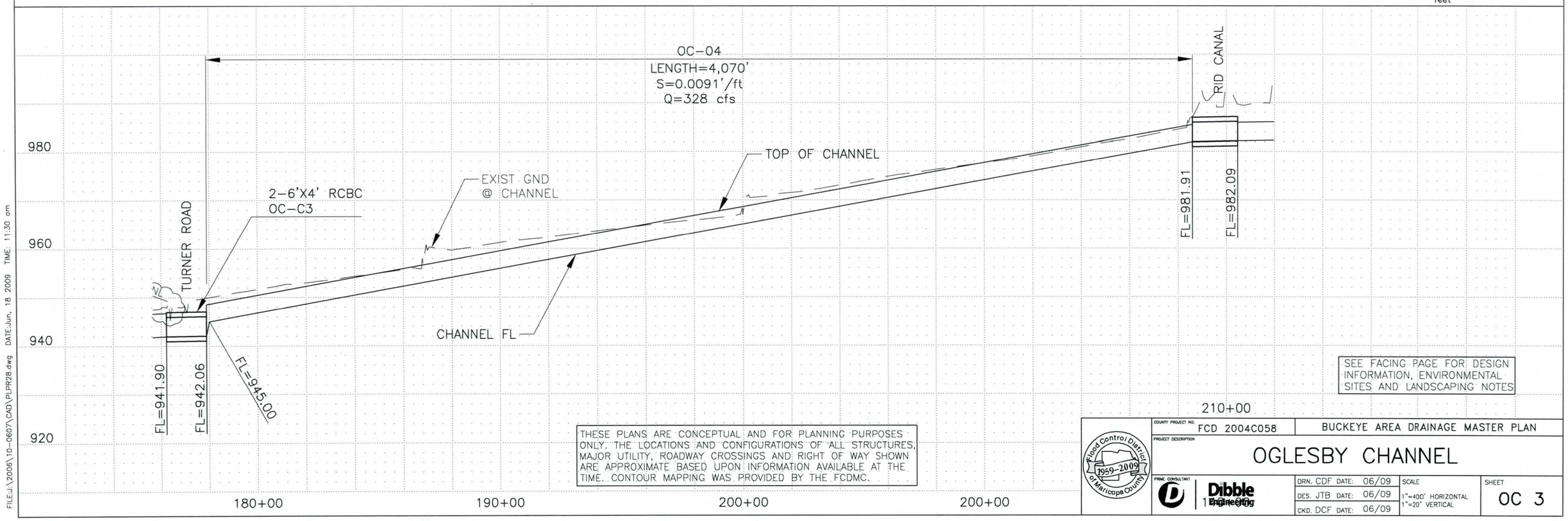
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
OC-04	Oglesby	OC 3	0	1	0	0	0	0	0	0	1

Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert
Design Motif: Farming/Agriculture from Station 184+00 to Station 200+00. Irrigation/Canal from Station 200+00 to Station 229+00
Multi-use: multi-use trails, cultural interpretation of historic road, and biological multi-use with creation of burrowing owl habitat.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

OGLESBY CHANNEL

PRIME CONSULTANT Dibble Engineering

DRN. CDF DATE: 06/09	SCALE	SHEET
DES. JTB DATE: 06/09	1"=400' HORIZONTAL 1"=20' VERTICAL	OC 3
CKD. DCF DATE: 06/09		

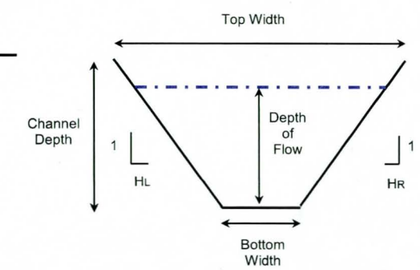
FILE:J:\2006\10-0607\CAD\PLPR28.dwg DATE:Jun. 18 2009 TIME: 11:30 am

Buckeye Area Drainage Master Plan
Oglesby System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
OC-05	MCOG02	170	982.09	984.47	2873	0.0008	LLE	0.030	10	2.8	7	7	18	18	84.3	50.1	0.27	Sub	2.0	1.0	3.8	64	150
OC-06	MCOG01	675	984.47	986.82	2848	0.0008	LE	0.045	31	5.0	7	7	18	18	325.9	101.0	0.20	Sub	2.1	1.3	6.2	118	204

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

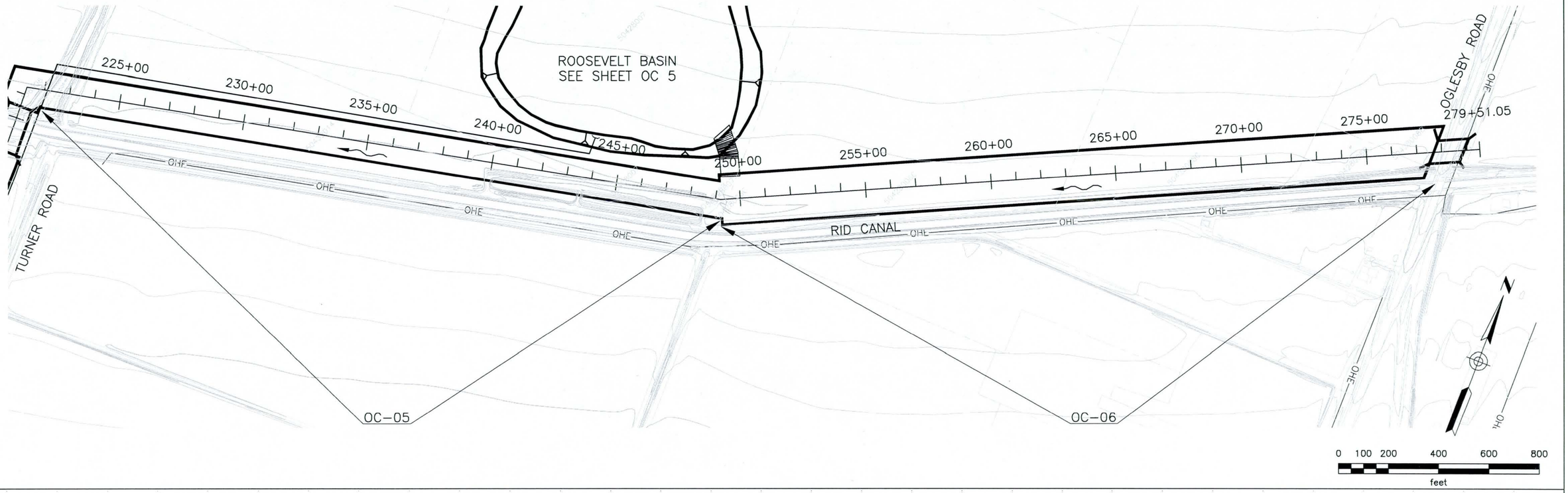
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
OC-C4	170	188	982.09	981.91	0.0010	1	10	4	RCBC	0.012	Wingwall	2.56	3.39	0.70
OC-C5	675	122	986.94	986.82	0.0010	3	10	5	RCBC	0.012	Wingwall	4.98	5.38	1.00

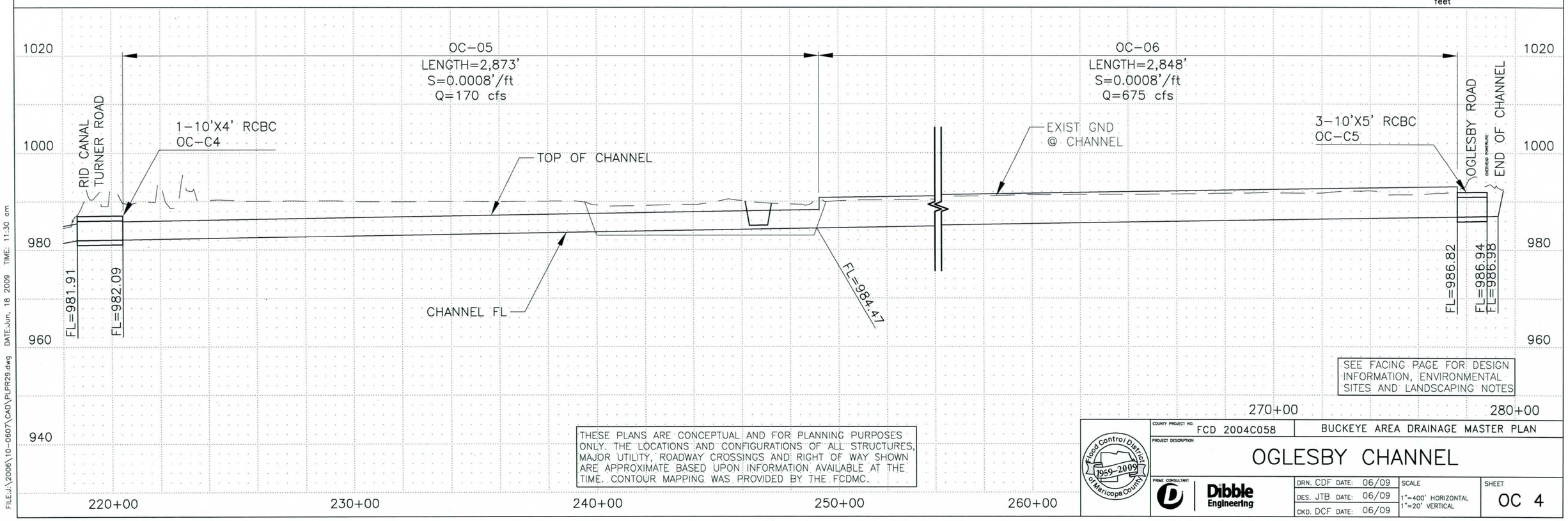
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
OC-05	Oglesby	OC 4	0	0	0	0	0	0	0	0	0
OC-06	Oglesby	OC 4	0	0	0	0	0	0	0	0	0

Landscape Notes:

Landscape Design Theme: Semi-Natural Sonoran Desert
Design Motif: Irrigation/Canal
Multi-use: include multi-use trails, cultural interpretation historic and prehistoric irrigation, and biological multi-use with creation of burrowing owl habitat.





SEE FACING PAGE FOR DESIGN INFORMATION, ENVIRONMENTAL SITES AND LANDSCAPING NOTES

THESE PLANS ARE CONCEPTUAL AND FOR PLANNING PURPOSES ONLY. THE LOCATIONS AND CONFIGURATIONS OF ALL STRUCTURES, MAJOR UTILITY, ROADWAY CROSSINGS AND RIGHT OF WAY SHOWN ARE APPROXIMATE BASED UPON INFORMATION AVAILABLE AT THE TIME. CONTOUR MAPPING WAS PROVIDED BY THE FCDMC.

Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION: OGLESBY CHANNEL			
PRIME CONSULTANT: Dibble Engineering	DRN. CDF DATE: 06/09 DES. JTB DATE: 06/09 CKD. DCF DATE: 06/09	SCALE: 1"=400' HORIZONTAL 1"=20' VERTICAL	SHEET: OC 4

FILE:J:\2006\10-0607\CAD\PLPR29.dwg DATE:Jun. 18 2009 TIME: 11:30 am

Buckeye Area Drainage Master Plan
Roosevelt Basin

Detention Basin Properties

Roosevelt Basin

Basin Land Area =	21.95	Acres	Outflow Pipe (no. & Dia.) =	1	24	in.
Basin Storage Volume =	71	Ac.-Ft.	Pipe Invert at Inlet=		982.4	ft
			Pipe Invert at Outlet=		977.6	ft
Inflow upstream of spillway =	683	cfs	Pipe Length =		2582	ft
Inflow over spillway (Into basin) =	513	cfs	Pipe Slope =		0.001	ft/ft
Discharge downstream of spillway (Bypass flow) =	170	cfs	Inflow Spillway Width (2) =		152	ft
Spillway Elev. =	989	ft	Inflow Spillway Length (2) =		76	ft
Maximum Ponding Depth =	986	ft				
Maximum Excavation Depth =	8	ft				

Note:

(1) Volume computations based upon results obtained from surface modeling software.

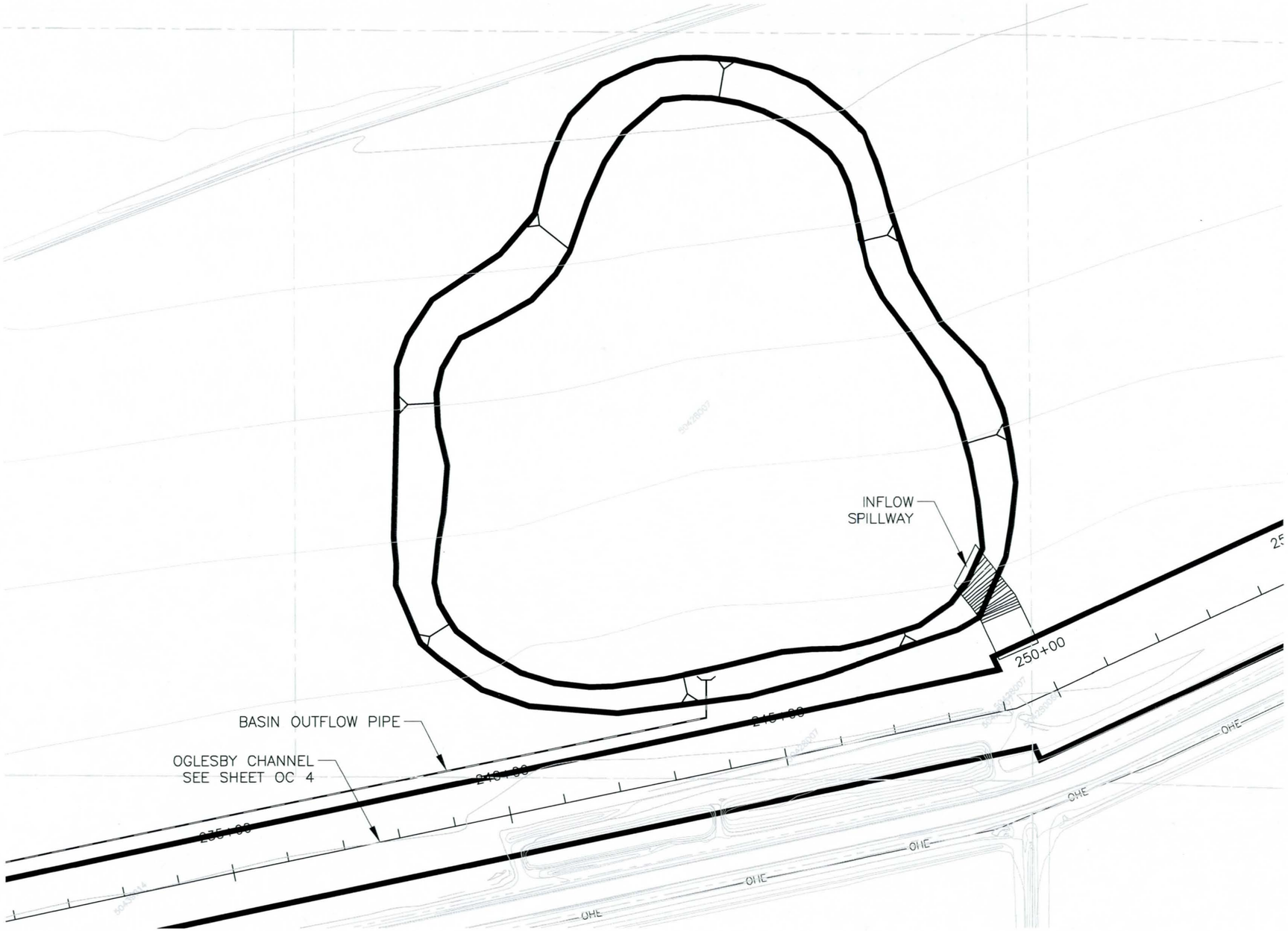
(2) Width is perpendicular to flow. Length is measured down the slope.

(3) See Sheet LA 5 for landscape notes.

NOTE:
CONTOURS ARE FOR CONCEPTUAL DESIGN CALCULATIONS ONLY.

FINAL DESIGN SHOULD INCORPORATE VARIED SIDE SLOPES AND OTHER AESTHETIC FEATURES.

BASIN IS INTENDED TO OPERATE AS AN "OFF-LINE" BASIN AND RECEIVE FLOW ONLY FROM THE INFLOW SPILLWAY. FINAL DESIGN SHOULD CONSIDER ROUTING OFF-SITE FLOWS AROUND BASIN.



N

0 100 200 400 600 800
feet

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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

ROOSEVELT BASIN

PRIME CONSULTANT: Dibble Engineering

DRN. MTM DATE: –
DES. JTB DATE: –
CKD. DCF DATE: –

SCALE 1"=200' HORIZONTAL

SHEET OC 5

FILE:J:\2006\10-0607\CAD\BASIN-MB05.dwg DATE:Jun. 18 2009 TIME: 11:30 am

Buckeye Area Drainage Master Plan
Turner Basin

Detention Basin Properties

Turner Basin

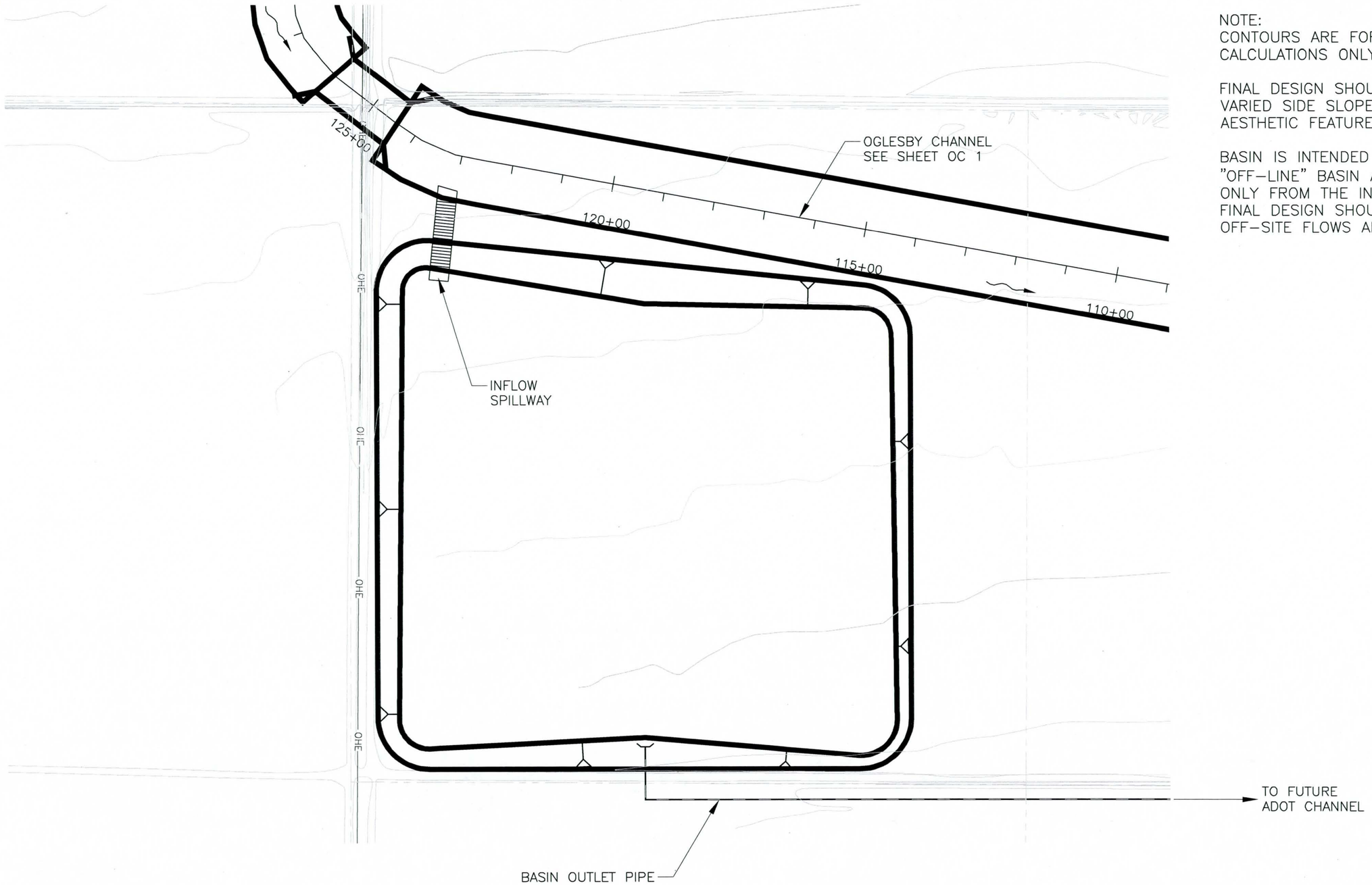
Basin Land Area =	23.44	Acres	Outflow Pipe (no. & Dia.) =	1	24	in.
Basin Storage Volume =	62	Ac.-Ft.	Pipe Invert at Inlet=		903.0	ft
			Pipe Invert at Outlet=		896.0	ft
Inflow upstream of spillway =	632	cfs	Pipe Length =		1700	ft
Inflow over spillway (Into basin) =	474	cfs	Pipe Slope =		0.001	ft/ft
Discharge downstream of spillway (Bypass flow) =	158	cfs	Inflow Spillway Width (2) =		141	ft
Spillway Elev. =	905	ft	Inflow Spillway Length (2) =		70	ft
Maximum Ponding Depth =	904	ft				
Maximum Excavation Depth =	8	ft				

Note:

(1) Volume computations based upon results obtained from surface modeling software.

(2) Width is perpendicular to flow. Length is measured down the slope.

(3) Landscape notes not applicable for this sheet



NOTE:
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FINAL DESIGN SHOULD INCORPORATE VARIED SIDE SLOPES AND OTHER AESTHETIC FEATURES.

BASIN IS INTENDED TO OPERATE AS AN "OFF-LINE" BASIN AND RECEIVE FLOW ONLY FROM THE INFLOW SPILLWAY. FINAL DESIGN SHOULD CONSIDER ROUTING OFF-SITE FLOWS AROUND BASIN.

N

0 50 100 200
1"=200'

THESE PLANS ARE CONCEPTUAL AND FOR PLANNING PURPOSES ONLY. THE LOCATIONS AND CONFIGURATIONS OF ALL STRUCTURES, MAJOR UTILITY, ROADWAY CROSSINGS AND RIGHT OF WAY SHOWN ARE APPROXIMATE BASED UPON INFORMATION AVAILABLE AT THE TIME. CONTOUR MAPPING WAS PROVIDED BY THE FCDMC.

SEE FACING PAGE FOR DESIGN INFORMATION, ENVIRONMENTAL SITES AND LANDSCAPING NOTES

Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

TURNER BASIN

PRIME CONSULTANT Dibble Engineering

DRN. MTM DATE: –
DES. JTB DATE: –
CKD. DCF DATE: –

SCALE 1"=200' HORIZONTAL

SHEET OC 6

FILE:J:\2006\10-0607\CAD\BASIN-MB06.dwg DATE:Jun. 18 2009 TIME: 11:30 am

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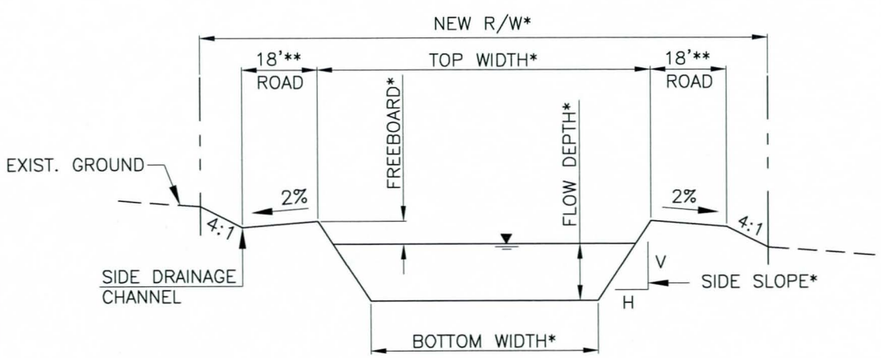
BUCKEYE AREA DRAINAGE MASTER PLAN
F.C.D. CONTRACT NO. 2004C058
Conceptual Design Plans

Flood Control District of Maricopa County 1959–2009

LEGEND

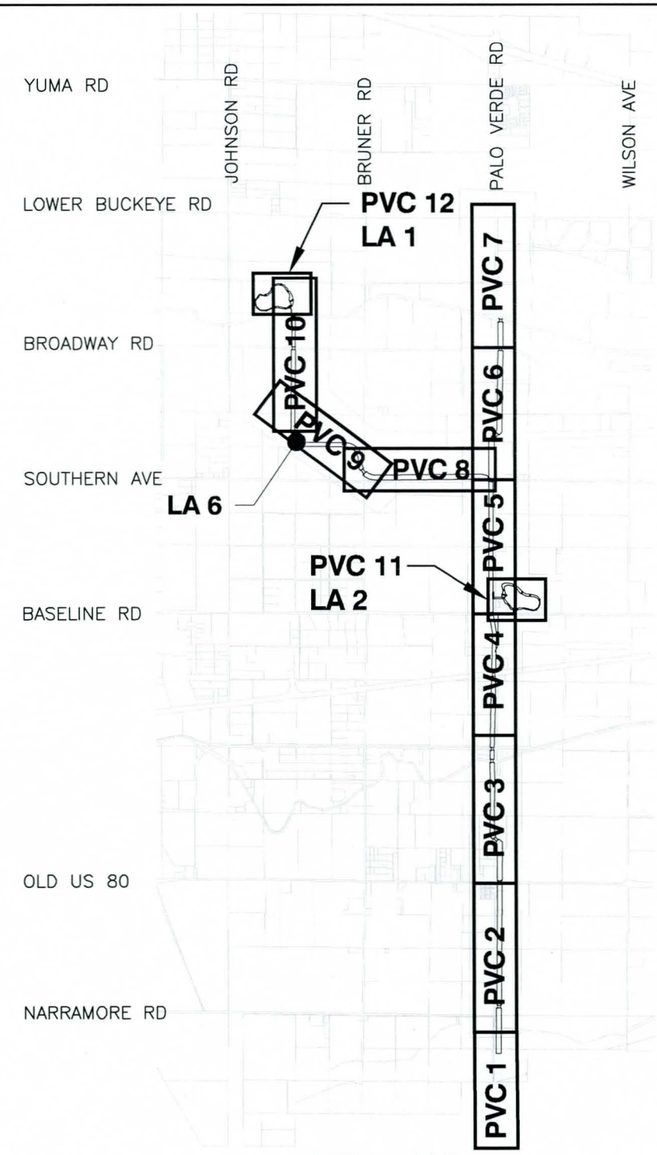
- XX–01 — CHANNEL REACH
- NEW CHANNEL
- NEW DETENTION BASIN SLOPE
- NEW DRAIN PIPE
- NEW CULVERT
- PROPERTY LINE
- RIGHT–OF–WAY LINE
- EXISTING ROAD
- 1410 — EXIST. INDEX CONTOUR
- EXIST. INTERMEDIATE CONTOUR
- 15"S — EXISTING UTILITY
- EXISTING STRUCTURE
- 304 — ENVIRONMENTAL SITE



*DIMENSIONS PER PLANS

**NOT ALL LOCATIONS REQUIRE DUAL MAINTENANCE ROADS– SEE PLANS

TYPICAL CHANNEL SECTION
N.T.S.



KEY MAP

SHEET INDEX

PVC 0	PALO VERDE SYSTEM COVER SHEET
PVC G	PALO VERDE SYSTEM GENERAL NOTES SHEET
PVC 1 TO PVC 10	PALO VERDE CHANNEL PLAN & PROFILE SHEETS
PVC 11	PALO VERDE BASIN
PVC 12	JOHNSON BASIN

N

3000 0 3000 6000 9000
SCALE IN FEET

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION: PALO VERDE SYSTEM		
PRIME CONSULTANT: Dibble Engineering	DRN. CDF DATE: 06/09 DES. JTB DATE: 06/09 CKD. DCF DATE: 06/09	SHEET PVC 0

FILE:J:\2006\10-0607\CAD\COVR05-PVC.dwg DATE:Jun, 04 2009 TIME: 02:00 pm

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PALO VERDE SYSTEM DESIGN GUIDELINES

CHANNELIZED PALO VERDE CHANNEL AND BASINS SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE CHANNEL AND BASINS WITH NATURAL LOWER SONORAN DESERT, SEMI-NATURAL LOWER SONORAN DESERT, AND NATURAL LOWER SONORAN DESERT RIPARIAN LANDSCAPE DESIGN THEMES.

Design Concept

Palo Verde System shall consist of the following elements:

1. An earthen channel and basins with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that recreation multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the system including biological, cultural and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for both channels and basins are shown for reference. While only a typical 1000' long channel section and one basin multi-use scenario is provided, the intent is to incorporate the scenarios system wide.

Channel Criteria

1. Channel Engineering Design
   - Overall channel sizing and design shall use a Manning's n-value of 0.045. Typical channel cross-sections shall include areas of grasses, wildflowers, scattered shrubs, and occasional trees that are planted to reinforce the form of the meandering channel side slopes, and channel/ low flow alignment. Three differing seed mixes shall be provided, one for the overbank, another for the side slopes, and the last for the channel bottom. The overbank mix will have a generous mix of grasses, shrubs, and tree species. The side slope mix will contain the same mix with a more conservative amount of tree species seed. The bottom mix will be limited to grasses and a limited amount of shrubs. The n-value will also account for variable side slopes and a meandering channel/ low flow alignment.
   - Tall Pot trees are recommended predominently on the upper portion of the channel side slopes and the overbank. Utilize the typical channel length scenario for plant densities.
2. Configuration
   - The overall channel form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the channel to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - The center line of the channel shall meander within the right of way to reinforce a sinuous appearance, minimizing straight alignments for extended lengths.
   - The low flow channel shall meander along the bottom of the channel, in differing alignments to the center line to provide visual movement of the low flow channel on the channel bottom.
3. Perimeter
   - A minimum of 50' of ROW or 30% additional, whichever is greater, shall be added to the channel width as a setback from adjacent landuse.
4. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the channel. Design motifs have been developed for the drainage infrastructure.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance as opposed to a man-made appearance.
5. Multi-use
   - The designated multi-use components to be coordinated with others in pre-design and design.

JOHNSON MOUNTAIN BIKE BASIN DESIGN GUIDELINES

JOHNSON MOUNTAIN BIKE BASIN SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL BASIN UTILIZING NATURAL LOWER SONORAN DESERT, AND NATURAL LOWER SONORAN DESERT RIPARIAN LANDSCAPE DESIGN THEMES. SPECIFIC LOCATIONS OF LANDSCAPE DESIGN THEMES WILL BE SHOWN ON THE PLAN SHEET AS A MEANS TO SHOW INTENT.

Design Concept

Mountain Bike Basin shall consist of the following designed elements:

1. An earthen basin with low-flow designed as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that biological and educational multi-use is incorporated.
2. Various multi-use components will be incorporated throughout the basin including biological and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for the basin are shown for reference. Coordination with the Town of Buckeye will be required to determine the multi-use requirements for each basin in the system.

Basin Criteria

1. Basin Engineering Design
   - Overall Basin sizing and design shall use a Manning's n-value of 0.045 and storage calculations to allow for grasses, wildflower mixes, shrubs and trees within the basin bottom. The basin size shall accommodate for increased levels of flora within the basin side slopes and bottom.
2. Configuration
   - The overall basin form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the basin edge to prevent the appearance of long, continuous runs with the same side slope. Some areas may contain steeper slopes to provide a challenging circuit for mountain bike riders. These areas will require erosion control measures.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - Low flow channel shall meander along the bottom of the basin, around the islands to provide visual movement of the low flow channel on the basin bottom. Low flow channels shall have a natural appearance with use of rip-rap and boulders and be enhanced by riparian planting when possible and create challenges for mountain bike crossings.
   - Islands shall be provided within the basin to minimize the visual impression of a basin and provide varied topography for enhanced rider experience. They will be of enough size and abundance as to provide a variable appearing bottom of basin as shown in the concept.
3. Vegetation
   - Landscape Design Theme: The landscape design theme will be a combination of Natural Lower Sonoran Desert and Natural Lower Sonoran Desert Riparian. The vegetation will be a combination of trees, shrubs, and native grasses and will be utilized throughout the basin bottom, side slopes, and overbank. The riparian theme will be clustered around the low flow areas to give the appearance of a naturally occurring wash.
4. Perimeter
   - An additional 30% was included as a part of the design of the basin area to provide a setback for multi-use functions. This setback shall be located to maximize the effects it will provide for both recreation users and adjacent development. The additional size required for this concept is 51% beyond a minimally graded and engineered basin. 21% of the land shown on this concept shall be provided by others.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the basin. Design motifs have been developed for the drainage infrastructure. Irrigation/Canal Motif as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
6. Multi-use
   - The designated multi-use components to be coordinated and provided by others in pre-design and design include a parking lot, a designated area for bike staging, a restroom, mountain bike pathways of varying difficulty around and within the basin, biological multi-use of burrowing owl habitat, cultural interpretation of historic and prehistoric irrigation, and a connection to the regional trail system.
   - One of the primary multi-use options is the joint use of the basin as a mountain bike circuit requiring the incorporation of plant materials.

PALO VERDE BOTANICAL BASIN DESIGN GUIDELINES

PALO VERDE BOTANICAL BASIN SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL BASIN UTILIZING NATURAL SONORAN DESERT UPLANDS, NATURAL SONORAN DESERT UPLANDS RIPARIAN, NATURAL LOWER SONORAN DESERT, NATURAL LOWER SONORAN DESERT RIPARIAN, AND NATURAL SONORAN DESERT HYDRO RIPARIAN LANDSCAPE DESIGN THEMES.

Design Concept

Botanical Basin shall consist of the following elements:

1. An earthen basin with low-flow designed as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that biological and educational multi-use is incorporated.
2. Various multi-use components will be incorporated throughout the basin including biological, cultural and recreational amenities. Typical Multi-use scenarios for the basin are shown for reference. Coordination with the Town of Buckeye will be required to determine the multi-use requirements for each basin in the system.

Basin Criteria

1. Basin Engineering Design
   - Overall Basin sizing and design shall use a Manning's n-value of 0.045 and storage calculations to allow for grasses, wildflower mixes, shrubs and trees within the basin bottom. One of the primary multi-use options is the joint use of the basin as a botanical garden. The basin size shall accommodate for increased levels of flora within the basin side slopes and bottom.
2. Configuration
   - The overall basin form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the basin edge to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - Low flow channel shall meander along the bottom of the basin, around the islands to provide visual movement of the low flow channel on the basin bottom. Low flow channels shall have a natural appearance with use of rip-rap and boulders and be enhanced by riparian planting when possible.
   - A wetland area with a permanent water source is suggested at the basin bottom low flow accumulation and basin outfall.
   - Islands shall be provided within the basin to minimize the visual impression of a basin. They will be of enough size and abundance as to provide a variable appearing bottom of basin as shown in the concept.
3. Vegetation
   - Landscape Design Theme: The landscape design theme will vary greatly in this basin due to its multi-use potential as a botanical garden. Each landscape design theme will be used to approximate where it would be found in a natural setting. For example, the Natural Sonoran Desert Hydro Riparian will be found in the low lying area within the basin while the Natural Sonoran Desert Uplands will be found in the high berming located in the overbank. The vegetation will be a combination of trees, shrubs, and native grasses and will be utilized throughout the basin bottom, side slopes, and overbank.
4. Perimeter
   - An additional 30% was included as a part of the design of the basin area to provide integration of the facility and for use as a setback. This setback shall be located to maximize the effects it will provide for both recreation users and adjacent development. The additional size required for this concept is 67% beyond a minimally graded and engineered basin. 37% of the land shall be acquired by others.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the basin. Design motifs have been developed for the drainage infrastructure. Farming/Agriculture Motif as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
6. Multi-use
   - The designated multi-use components to be coordinated in pre-design and design include a parking lot, a designated area for an interpretive learning center with a restroom, interpretive pathways around and within the basin, wetlands, flower gardens, butterfly gardens, biological multi-use forming burrowing owl habitat, and cultural interpretation of historic farming.

OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION DESIGN GUIDELINES			
PRIME CONSULTANT Dibble Engineering	DRN. BSM DATE: 05/09	SCALE	SHEET
	DES. SH DATE: 05/09		PVCG
	CKD. SH DATE: 05/09		

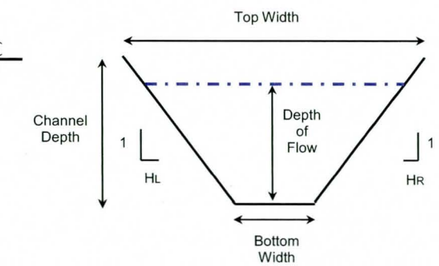
FILE: F:\Projects\20070071\MasterXrefs\X0607-GENERAL NOTES PVC.dwg DATE: Jun, 17 2009 TIME: 10:14 am

Buckeye Area Drainage Master Plan
Palo Verde System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
PV-01	MCPV12	1863	799.22	803.54	1782	0.0024	LE	0.045	49	5.4	7	7	18	0	473.8	126.0	0.36	Sub	3.9	1.4	6.9	145	213

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

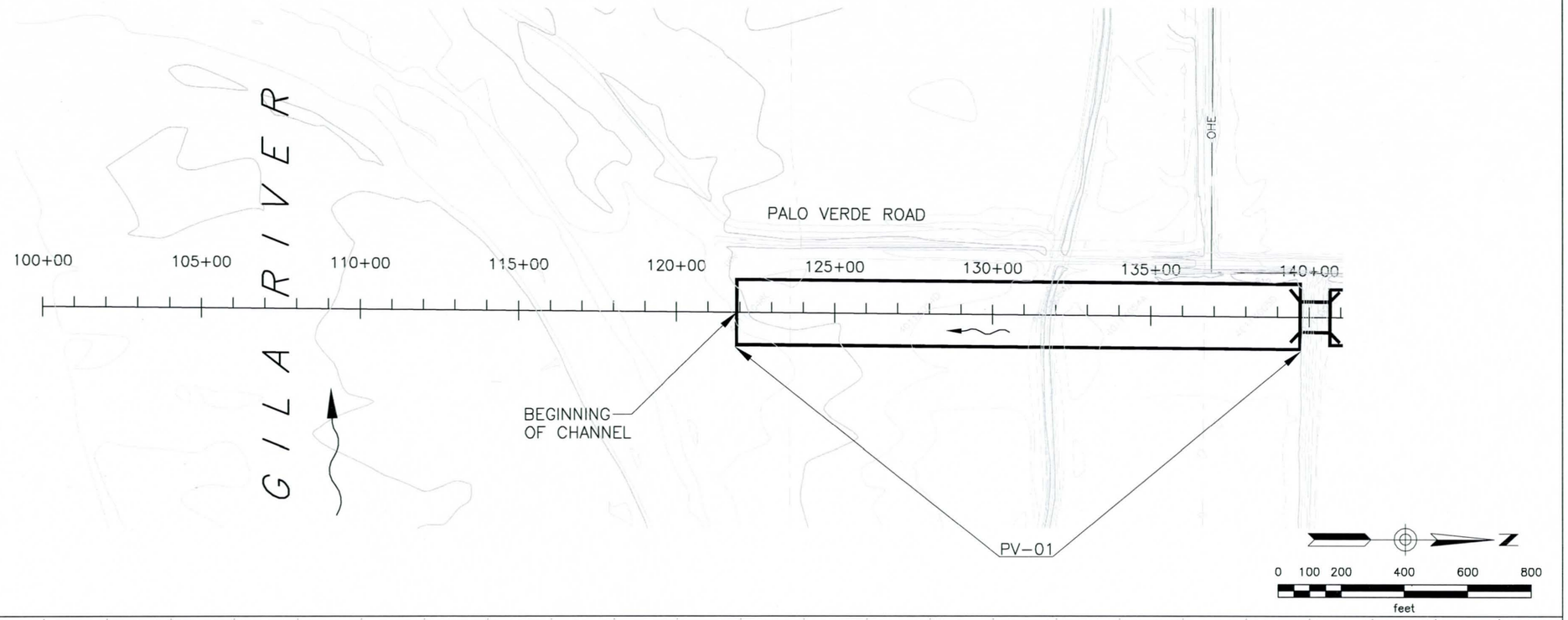
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D

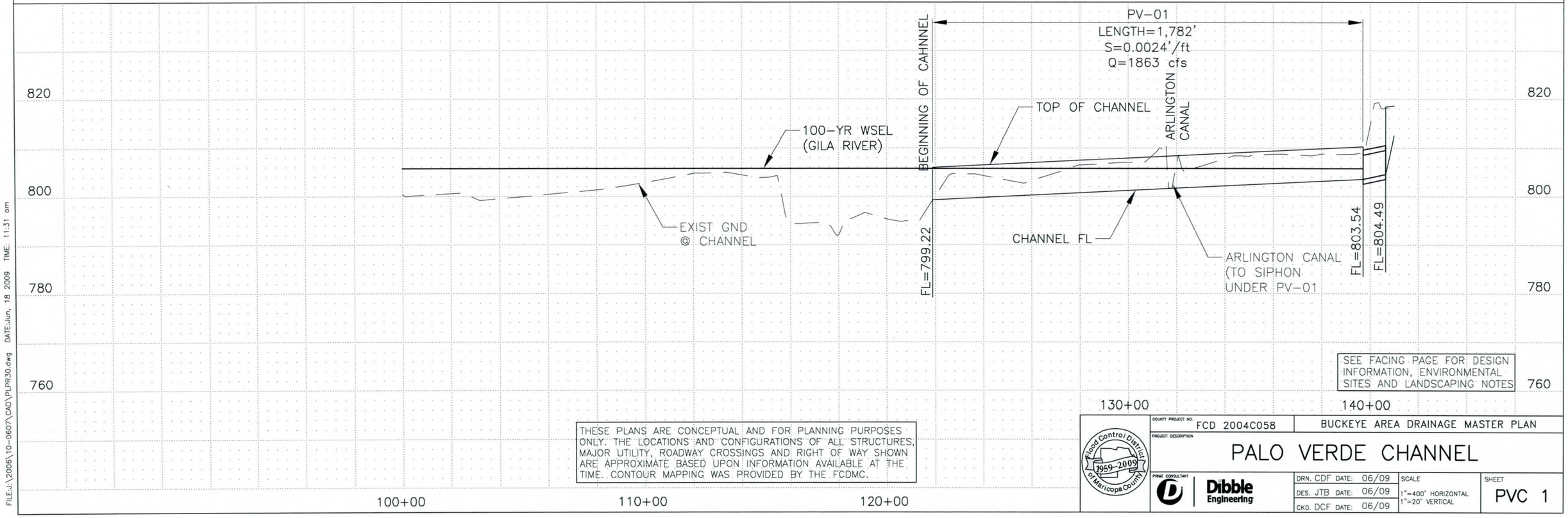
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
PV-01	Palo Verde	PVC 1	0	0	0	0	0	0	0	0	0

Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert Riparian
Design Motif: River from Station 130+00 to 175+00. Heritage Historic Community from Station 175+00 to 187+00
Multi-use: multi-use trails, cultural interpretation of a historic road crossing, and biological multi-use potential with creation of burrowing owl habitat.





SEE FACING PAGE FOR DESIGN INFORMATION, ENVIRONMENTAL SITES AND LANDSCAPING NOTES

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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

PALO VERDE CHANNEL

PRIME CONSULTANT Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE 1"=400' HORIZONTAL 1"=20' VERTICAL

SHEET PVC 1

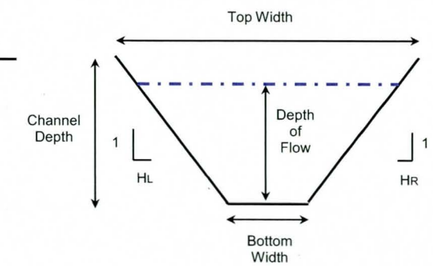
FILE:J:\2006\10-0607\CAD\PLPR30.dwg DATE:Jun. 18 2009 TIME: 11:31 am

Buckeye Area Drainage Master Plan
Palo Verde System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (HL)	Sideslope (H:1) Right (HR)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
PV-02	MCPV11	1565	813.18	839.93	4814	0.0056	LE	0.045	38	4.4	7	7	18	0	303.6	100.2	0.52	Sub	5.2	1.2	5.6	116	184

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

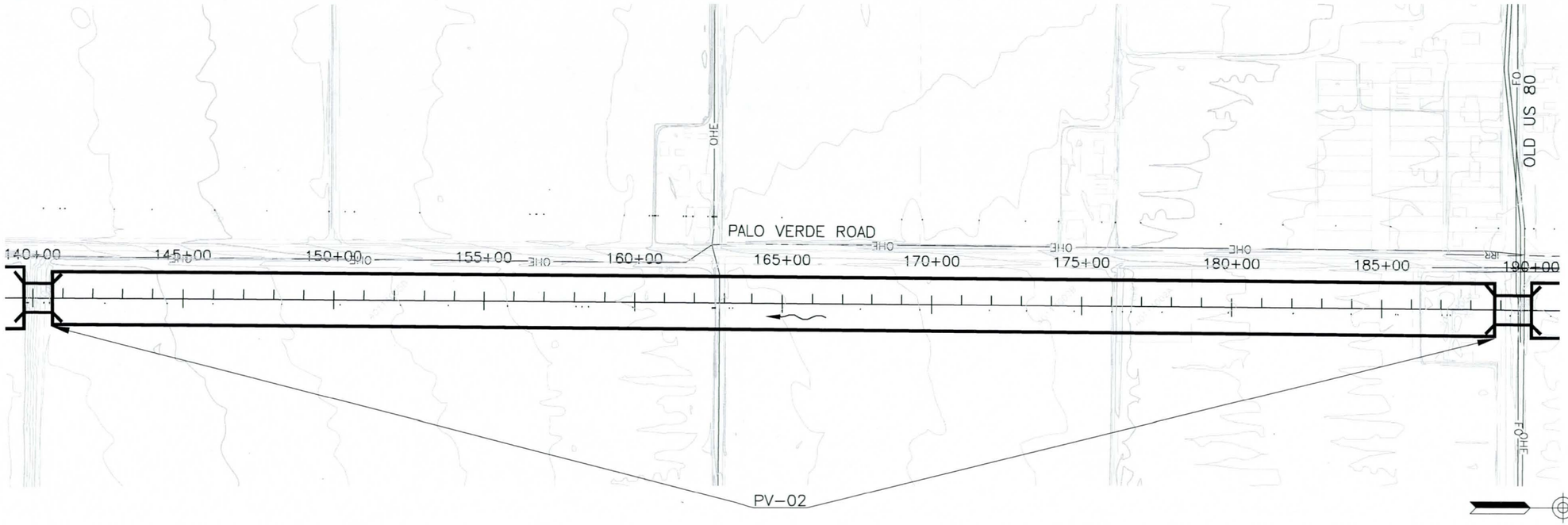
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
PV-C1	1565	94	804.49	803.54	0.0101	4	10	5	RCBC	0.012	Wingwall	5.43	6.00	0.89

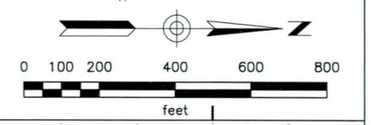
Utility Crossings

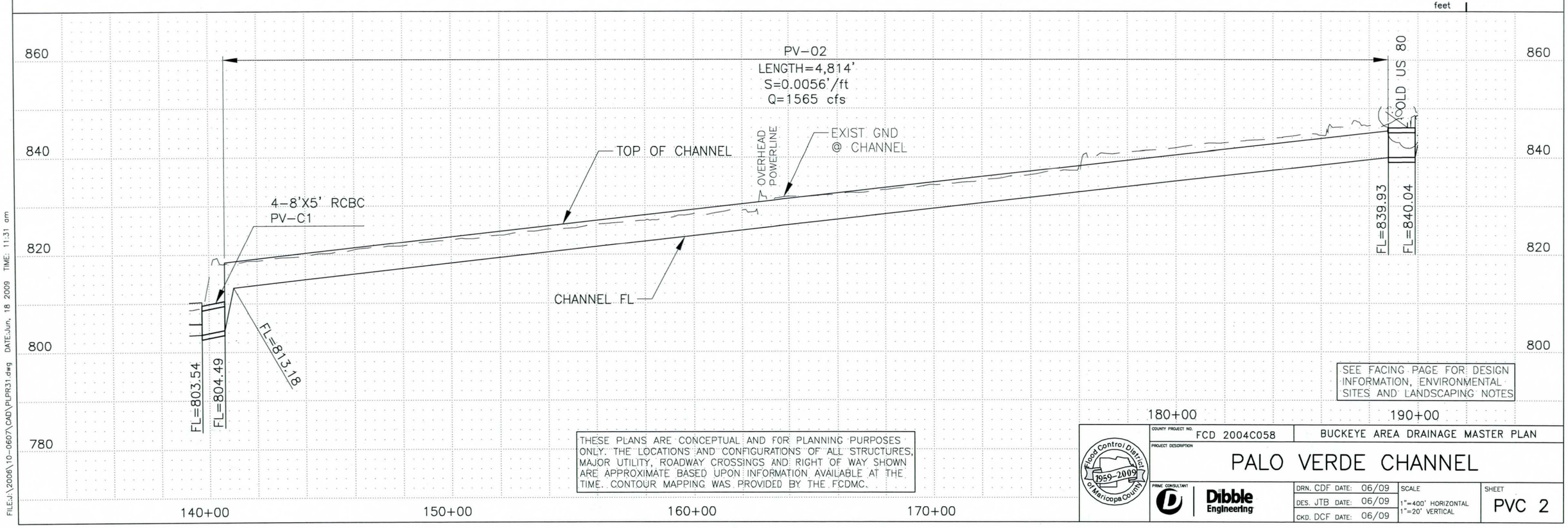
Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
PV-02	Palo Verde	PVC 2	0	0	0	0	0	0	0	0	0

Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert
Design Motif: Heritage Historic Community from Station 187+00 to Station 215+00. Irrigation /Canal from Station 215+00 to Station 245+00
Multi-use: multi-use trails, cultural interpretation of historic Palo Verde community development, and biological multi-use potential with creation of burrowing owl habitat.







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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

PALO VERDE CHANNEL

PRIME CONSULTANT Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE 1"=400' HORIZONTAL 1"=20' VERTICAL

SHEET PVC 2

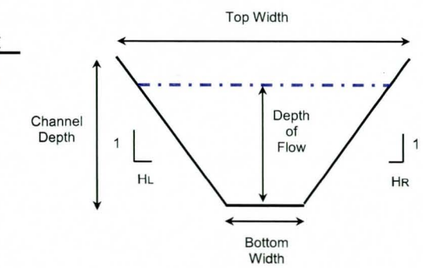
FILE:J:\2006\10-0607\CAD\PLPR31.dwg DATE:Jun, 18 2009 TIME: 11:31 am

Buckeye Area Drainage Master Plan
Palo Verde System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
PV-03	MCPV10	1534	842.85	848.74	1642	0.0036	LE	0.045	40	4.8	7	7	18	0	352.3	107.8	0.42	Sub	4.4	1.3	6.1	164	237
PV-04	MCPV09	1534	852.28	866.32	3023	0.0046	LE	0.045	38	4.6	7	7	0	18	319.7	102.7	0.48	Sub	4.8	1.2	5.8	167	240

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

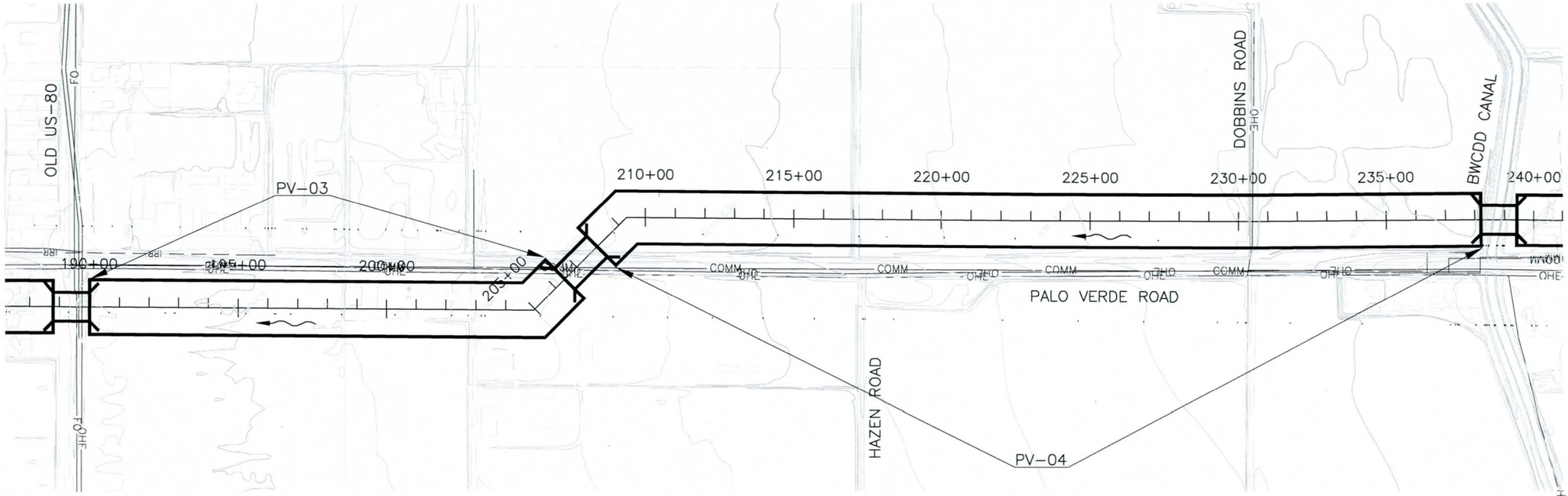
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
PV-C2	1534	121	840.04	839.93	0.0009	4	10	5	RCBC	0.012	Wingwall	4.43	5.83	0.96
PV-C3	1534	154	848.88	848.74	0.0009	4	10	5	RCBC	0.012	Wingwall	4.78	6.22	0.91

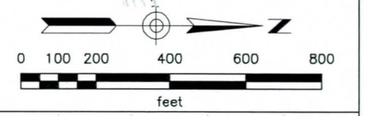
Utility Crossings

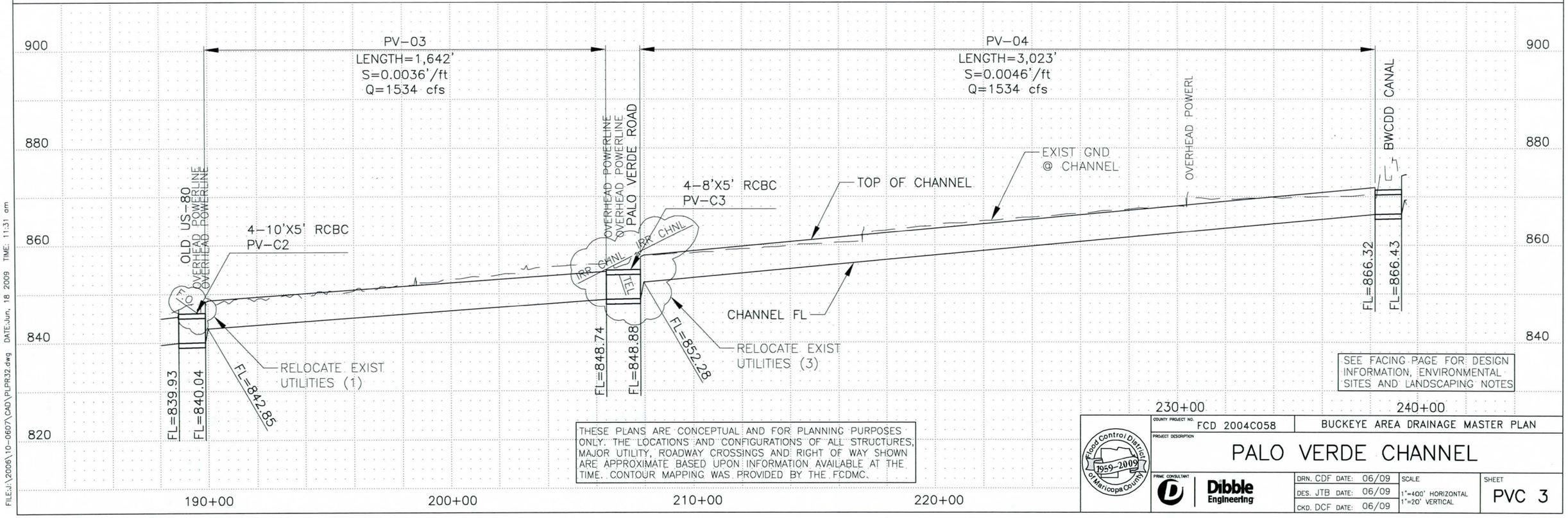
Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
PV-03	Palo Verde	PVC 3	0	0	1	0	0	0	0	0	1
PV-04	Palo Verde	PVC 3	0	2	0	0	0	1	0	0	3

Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert
Design Motif: Irrigation/Canal from Station 245+00 to Station 297+00
Multi-use: multi-use trails, cultural interpretation historic irrigation and historic railroad, and biological multi-use potential with creation of burrowing owl habitat.







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COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION: PALO VERDE CHANNEL		
PRIME CONSULTANT: Dibble Engineering	DRN. CDF DATE: 06/09	SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL
	DES. JTB DATE: 06/09	SHEET: PVC 3
	CKD. DCF DATE: 06/09	

Flood Control District of Maricopa County 1959-2009

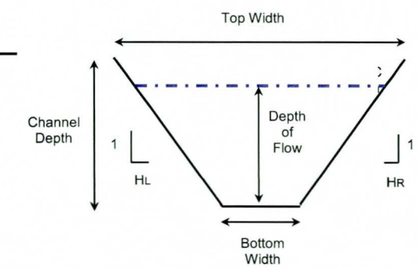
FILE:J:\2006\10-0607\CAD\PLPR32.dwg DATE:Jun. 18 2009 TIME: 11:31 am

Buckeye Area Drainage Master Plan
Palo Verde System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
PV-05	MCPV08	1385	869.2	884.13	3307	0.0045	LE	0.045	36	4.4	7	7	0	18	298.7	98.9	0.47	Sub	4.6	1.2	5.6	154	224
PV-06	MCPV07	1300	889.22	898.82	2225	0.0043	LE	0.045	35	4.4	7	7	0	18	289.5	97.2	0.46	Sub	4.5	1.2	5.6	158	229

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

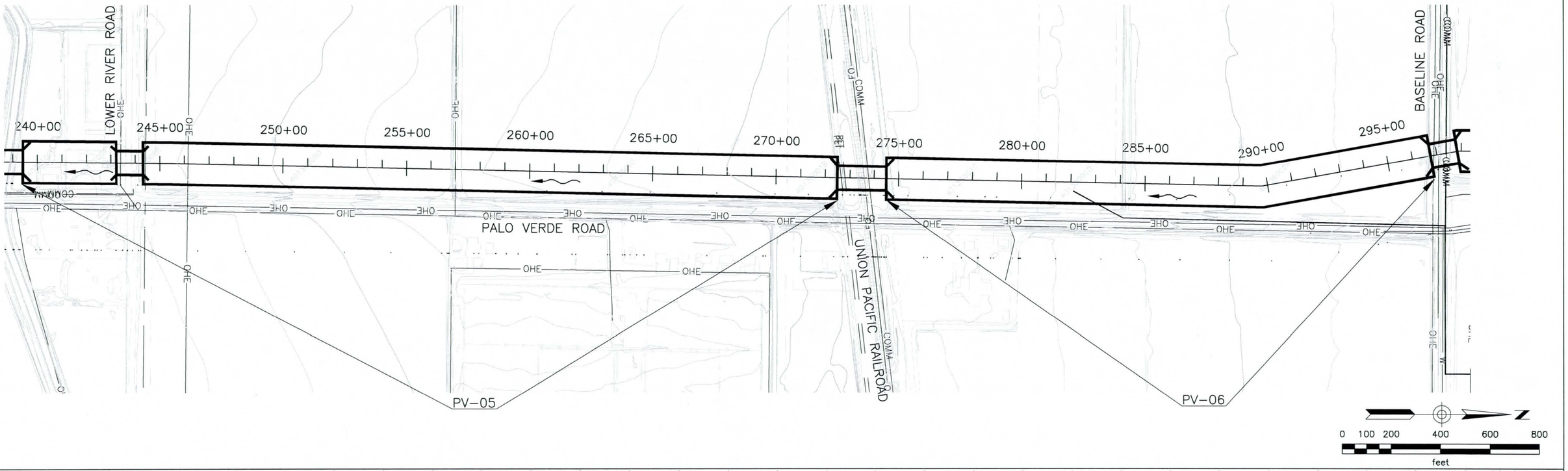
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
PV-C4	1385	121	866.43	866.32	0.0009	4	8	5	RCBC	0.012	Wingwall	4.56	6.93	0.89
PV-C5	1385	110	871.55	871.44	0.0010	4	8	5	RCBC	0.012	Wingwall	4.45	6.93	0.89
PV-C6	1300	202	886.05	884.13	0.0095	4	8	5	RCBC	0.012	Wingwall	4.45	6.02	0.88

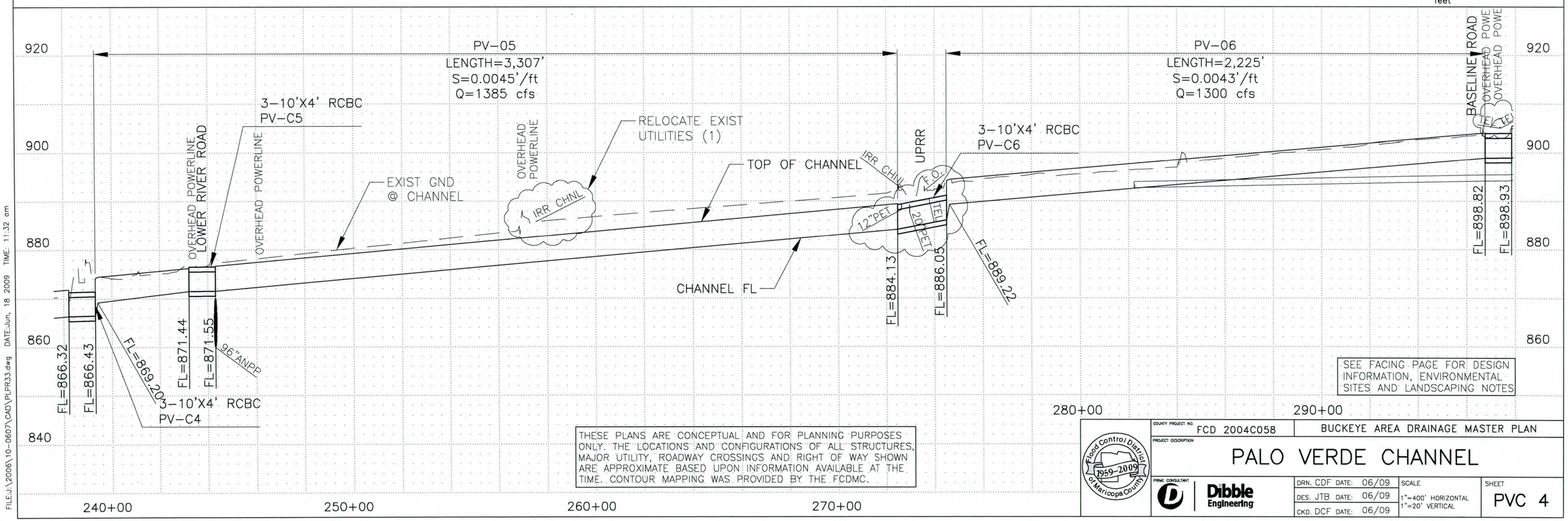
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
PV-05	Palo Verde	PVC 4	1	0	0	0	0	0	0	0	1
PV-06	Palo Verde	PVC 4	0	1	0	0	0	0	0	0	1

Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert
Design Motif: Farming/Agriculture
Multi-use: multi-use trails and biological multi-use potential with creation of burrowing owl habitat.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

PALO VERDE CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL

SHEET: PVC 4

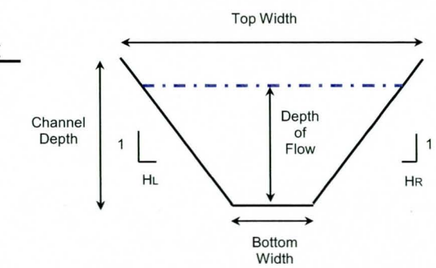
FILE:J:\2006\10-0607\CAD\PLPR33.dwg DATE:Jun. 18 2009 TIME: 11:32 am

Buckeye Area Drainage Master Plan
Palo Verde System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
PV-07	MCPV06	2812	898.93	930.09	5178	0.0060	LE	0.045	54	5.1	7	7	0	18	463.0	126.9	0.56	Sub	6.1	1.4	6.6	146	214

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

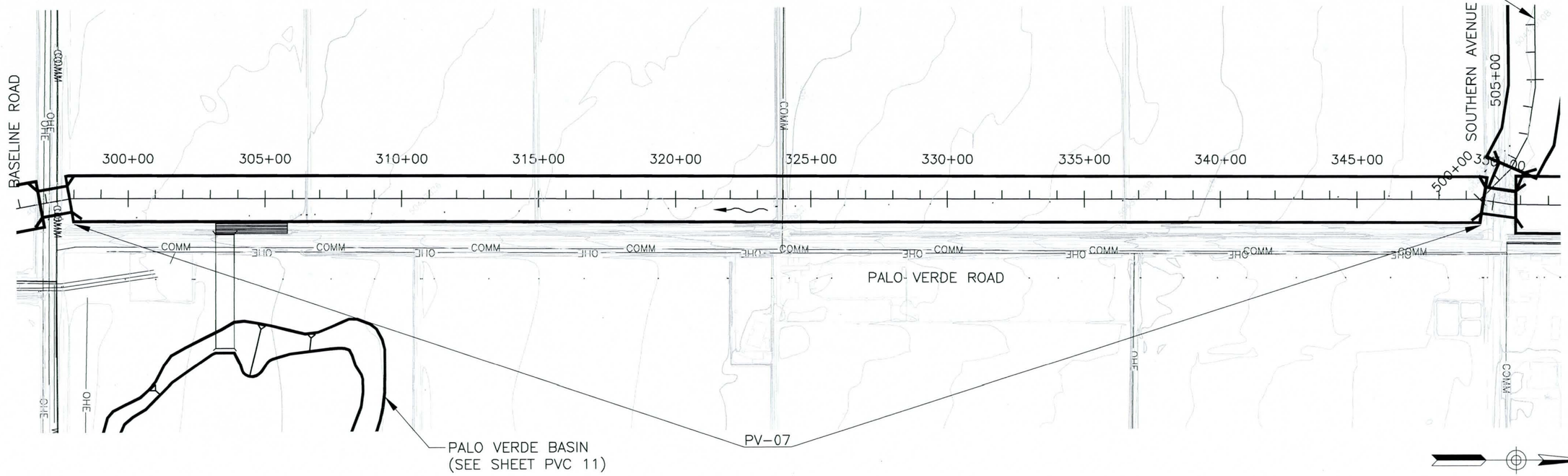
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
PV-C7	1300	111	898.93	898.82	0.0010	4	8	5	RCBC	0.012	Wingwall	4.41	6.04	0.88

Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
PV-07	Palo Verde	PVC 5	0	0	0	0	0	3	0	0	3

Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert
Design Motif: Farming/Agriculture
Multi-use: multi-use trails and biological multi-use potential with creation of burrowing owl habitat.



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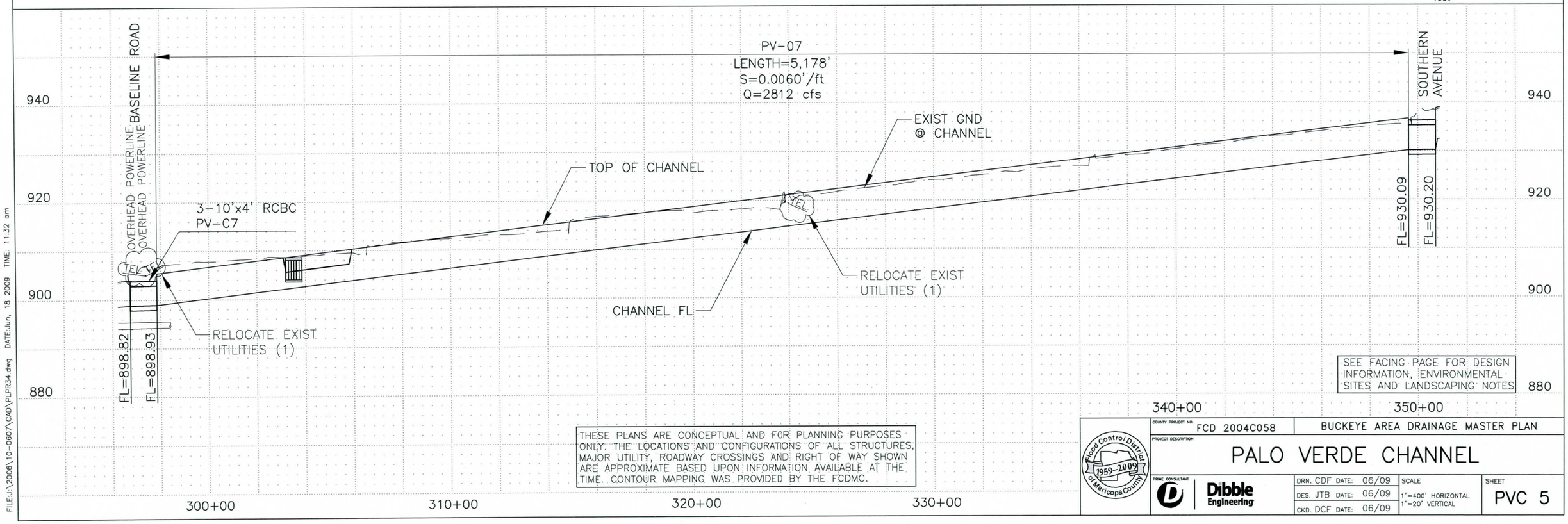
feet



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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

PALO VERDE CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09	SCALE	SHEET
DES. JTB DATE: 06/09	1"=400' HORIZONTAL 1"=20' VERTICAL	PVC 5
CKD. DCF DATE: 06/09		

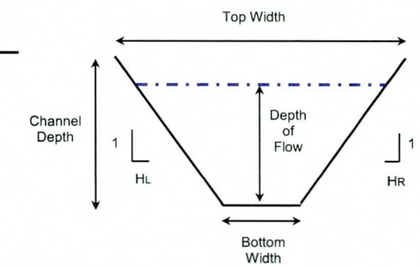
FILE:J:\2006\10-0607\CAD\PLPR34.dwg DATE:Jun, 18 2009 TIME: 11:32 am

Buckeye Area Drainage Master Plan
Palo Verde System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
PV-08	MCPV02	2523	932.3	941.33	1670	0.0054	LE	0.045	52	5.1	7	7	0	18	443.2	123.5	0.53	Sub	5.7	1.4	6.5	172	247
PV-09	MCPV01	2523	945.8	978.57	4465	0.0073	LE	0.045	49	4.8	7	7	18	0	395.2	116.6	0.61	Sub	6.4	1.4	6.2	195	277

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

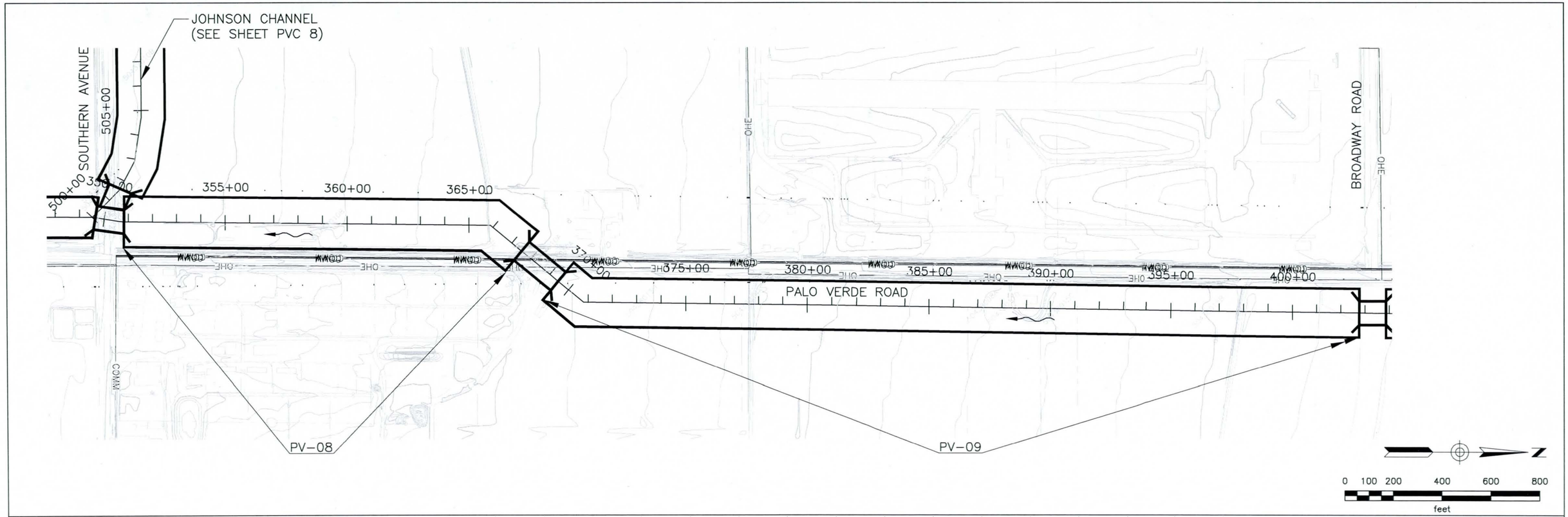
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
PV-C8	2523	118	930.20	930.09	0.0009	6	8	5	RCBC	0.012	Wingwall	5.13	8.30	1.02
PV-C9	2523	193	941.51	941.33	0.0009	5	10	5	RCBC	0.012	Wingwall	5.08	7.97	0.96

Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
PV-08	Palo Verde	PVC 6	0	0	0	0	0	0	0	0	0
PV-09	Palo Verde	PVC 6	0	1	0	0	0	3	0	0	4

Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert
Design Motif: Irrigation/Canal
Multi-use: multi-use trails, cultural interpretation of historic and prehistoric irrigation, and biological multi-use potential with creation of burrowing owl habitat.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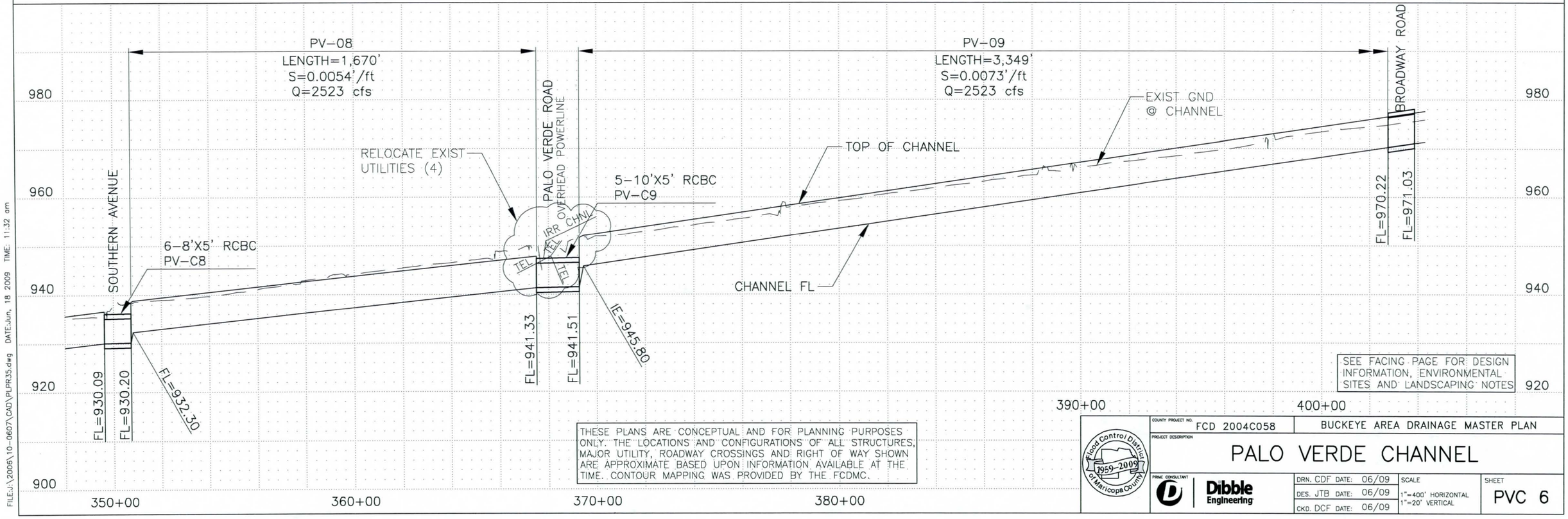
(SEE SHEET PVC 8)
SOUTHERN AVENUE
505+00
500+00
350+00
355+00
360+00
365+00
370+00
375+00
380+00
385+00
390+00
395+00
400+00
PALO VERDE ROAD
BROADWAY ROAD
OHE
COMM
PV-08
PV-09
0 100 200 400 600 800
feet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LENGTH=1,670'
S=0.0054'/ft
Q=2523 cfs
PV-09
LENGTH=3,349'
S=0.0073'/ft
Q=2523 cfs
980
960
940
920
900
SOUTHERN AVENUE
PALO VERDE ROAD
OVERHEAD POWERLINE
BROADWAY ROAD
RELOCATE EXIST UTILITIES (4)
6-8'X5' RCBC
PV-C8
5-10'X5' RCBC
PV-C9
IRR CHNL
TEL
TOP OF CHANNEL
EXIST GND @ CHANNEL
CHANNEL FL
FL=930.09
FL=930.20
FL=932.30
FL=941.33
FL=941.51
IE=945.80
FL=970.22
FL=971.03
350+00
360+00
370+00
380+00
390+00
400+00
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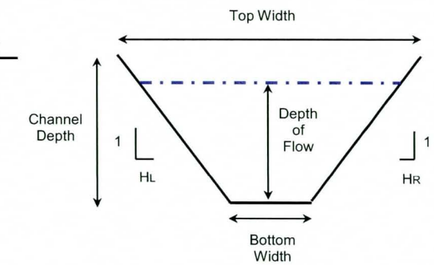
Flood Control District of Maricopa County 1959-2009
COUNTY PROJECT NO. FCD 2004C058
BUCKEYE AREA DRAINAGE MASTER PLAN
PROJECT DESCRIPTION
PALO VERDE CHANNEL
PRIME CONSULTANT
Dibble Engineering
DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09
SCALE
1"=400' HORIZONTAL
1"=20' VERTICAL
SHEET
PVC 6
FILE:J:\2006\10-0607\CAD\PLPR35.dwg DATE:Jun. 18 2009 TIME: 11:32 am

Buckeye Area Drainage Master Plan
Palo Verde System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
PV-09	MCPV01	2523	945.8	978.57	4465	0.0073	LE	0.045	49	4.8	7	7	18	0	395.2	116.6	0.61	Sub	6.4	1.4	6.2	195	277

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

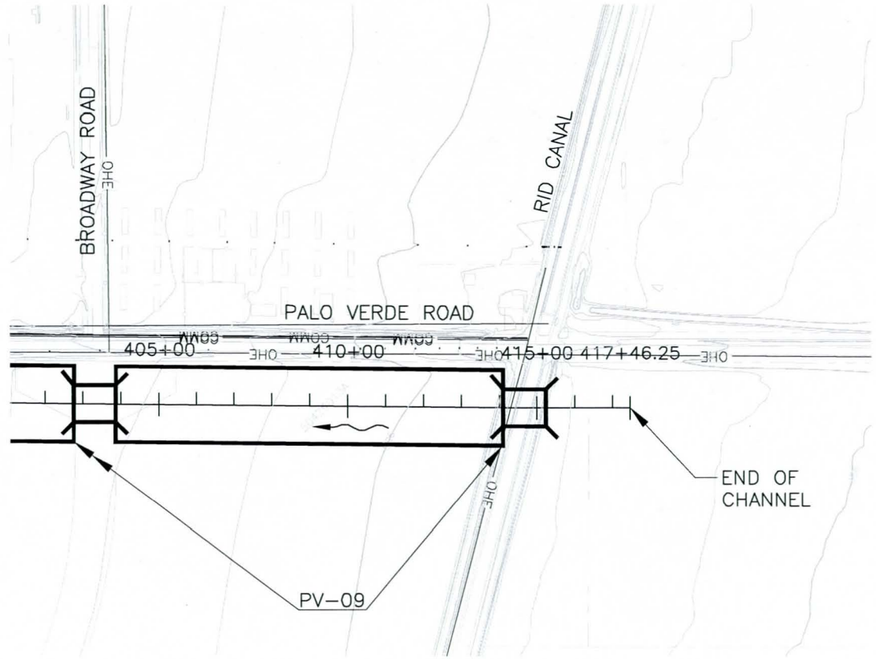
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia. / Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
PV-C10	2523	110	971.03	970.22	0.0074	5	10	6	RCBC	0.012	Wingwall	4.80	6.95	0.96
PV-C11	2523	114	978.68	978.57	0.0010	5	10	6	RCBC	0.012	Wingwall	4.80	6.97	0.96

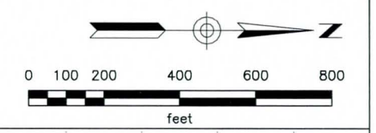
Utility Crossings

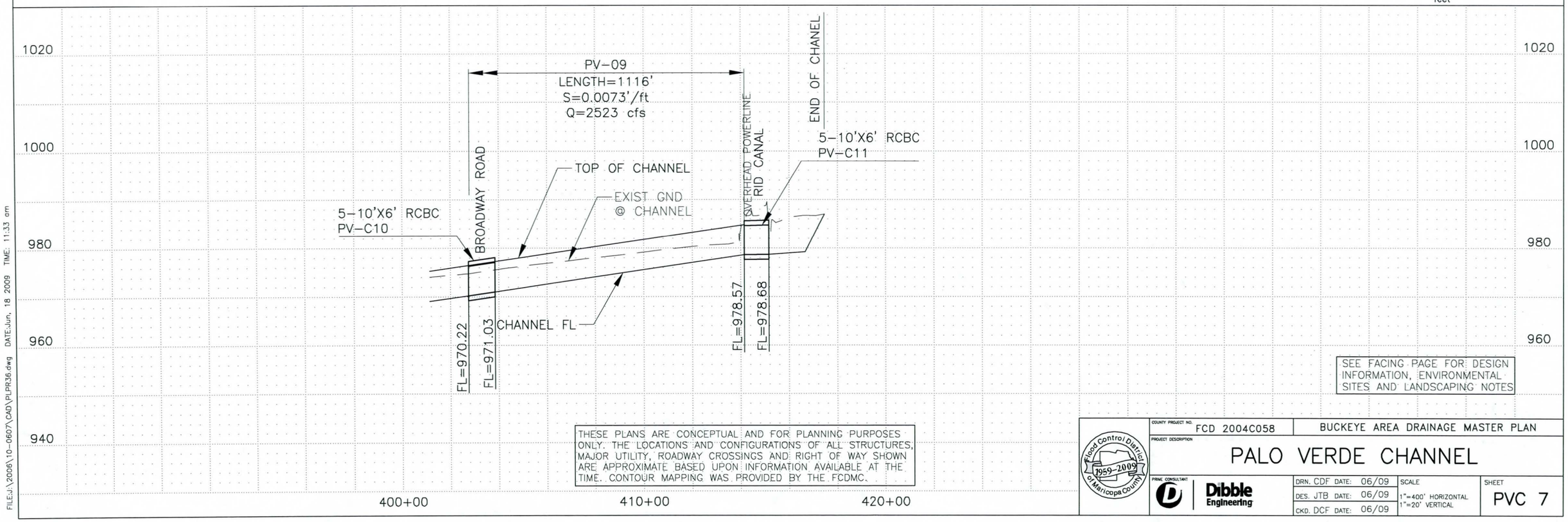
Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
PV-09	Palo Verde	PVC 7	0	0	0	0	0	0	0	0	0

Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert
Design Motif: Farming/Agriculture
Multi-use: multi-use trails and biological multi-use potential with creation of burrowing owl habitat.







SEE FACING PAGE FOR DESIGN INFORMATION, ENVIRONMENTAL SITES AND LANDSCAPING NOTES

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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

PALO VERDE CHANNEL

PRIME CONSULTANT: Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL

SHEET: PVC 7

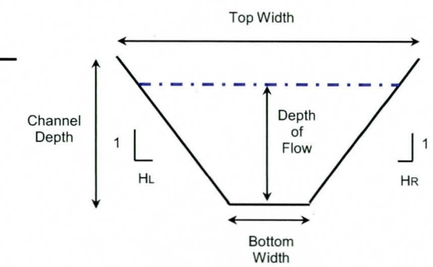
FILE:J:\2006\10-0607\CAD\PLPR36.dwg DATE:Jun, 18 2009 TIME: 11:33 am

Buckeye Area Drainage Master Plan
Palo Verde System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
PV-10	MCPV05	961	929.91	935.19	5003	0.0011	LE	0.045	37	5.3	7	7	18	0	389.3	111.6	0.23	Sub	2.5	1.3	6.6	130	198

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

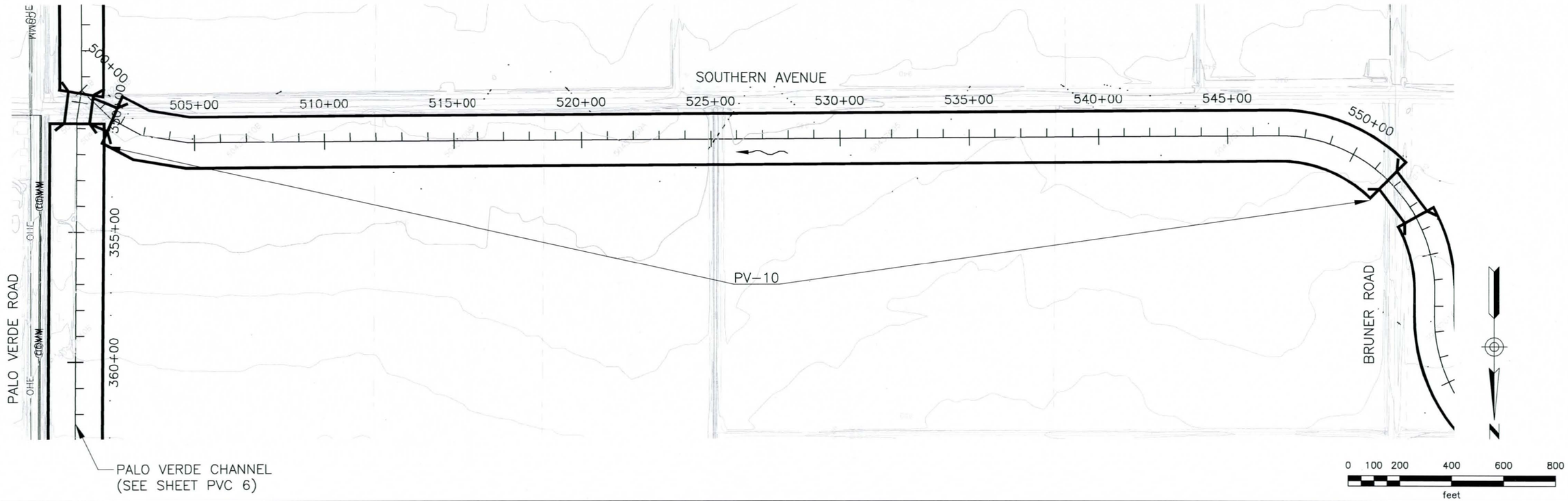
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
PV-C12	961	126	929.91	929.76	0.0012	4	10	6	RCBC	0.012	Wingwall	5.13	5.39	0.88

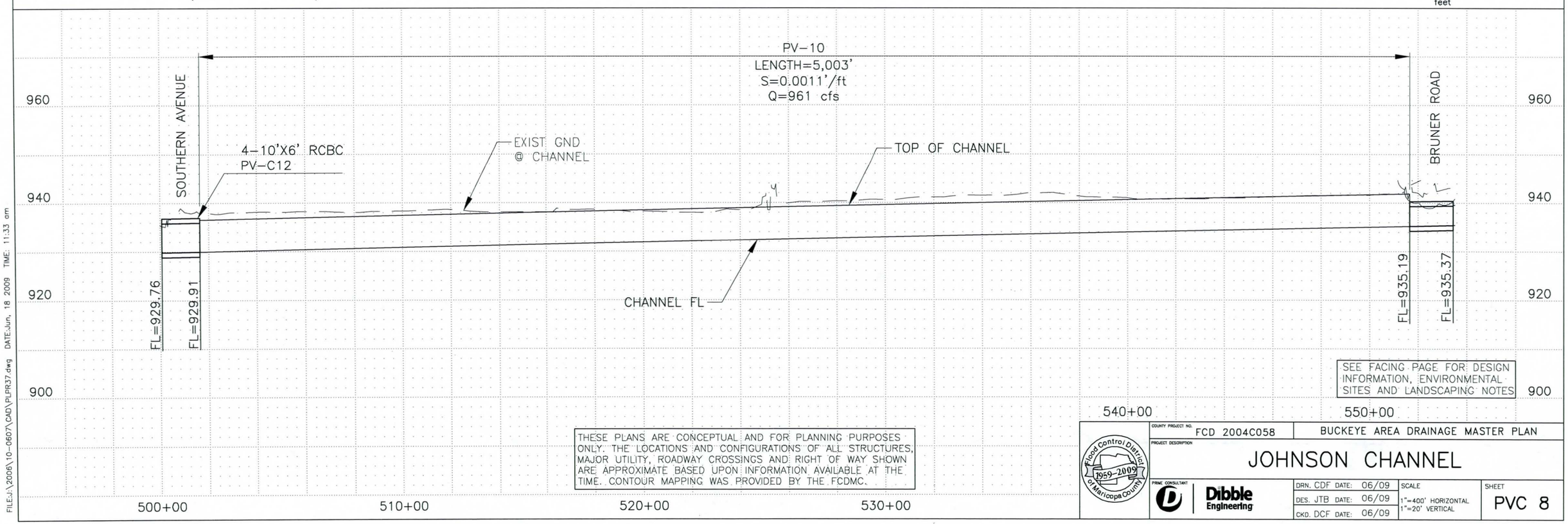
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
PV-10	Johnson	PVC 8	0	1	0	0	0	0	0	0	1

Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert
Design Motif: Farming/Agriculture
Multi-use: multi-use trails and biological multi-use potential with creation of burrowing owl habitat.





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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

JOHNSON CHANNEL

PRIME CONSULTANT Dibble Engineering

DRN. CDF DATE: 06/09	SCALE 1"=400' HORIZONTAL 1"=20' VERTICAL	SHEET PVC 8
DES. JTB DATE: 06/09		
CKD. DCF DATE: 06/09		

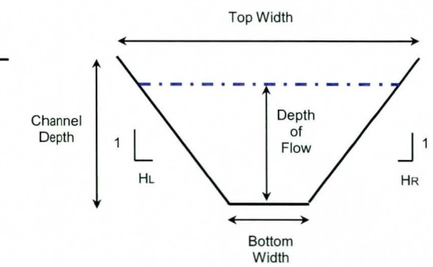
FILE:J:\2006\10-0607\CAD\PLPR37.dwg DATE:Jun, 18 2009 TIME: 11:33 am

Buckeye Area Drainage Master Plan
Palo Verde System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (HL)	Sideslope (H:1) Right (HR)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
PV-11	MCPV04	395	935.37	964.03	6888	0.0042	LE	0.045	16	3.1	7	7	18	18	118.2	60.1	0.42	Sub	3.3	1.0	4.1	74	160

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

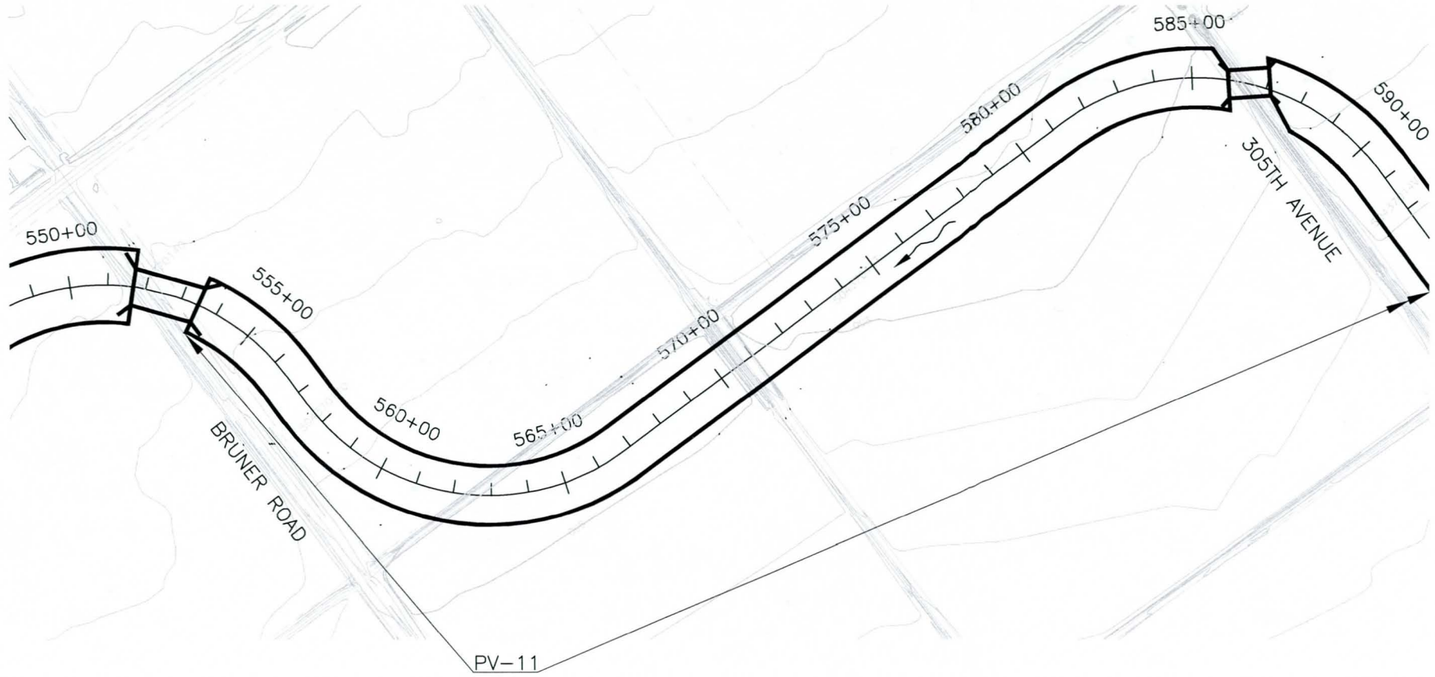
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
PV-C13	395	178	935.37	935.19	0.0010	2	8	4	RCBC	0.012	Wingwall	5.26	6.21	0.78
PV-C14	395	175	946.11	945.94	0.0010	2	10	4	RCBC	0.012	Wingwall	3.13	3.70	0.78

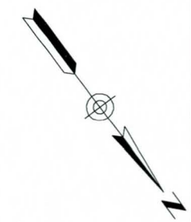
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
PV-11	Johnson	PVC 9	0	2	0	0	0	0	0	0	2

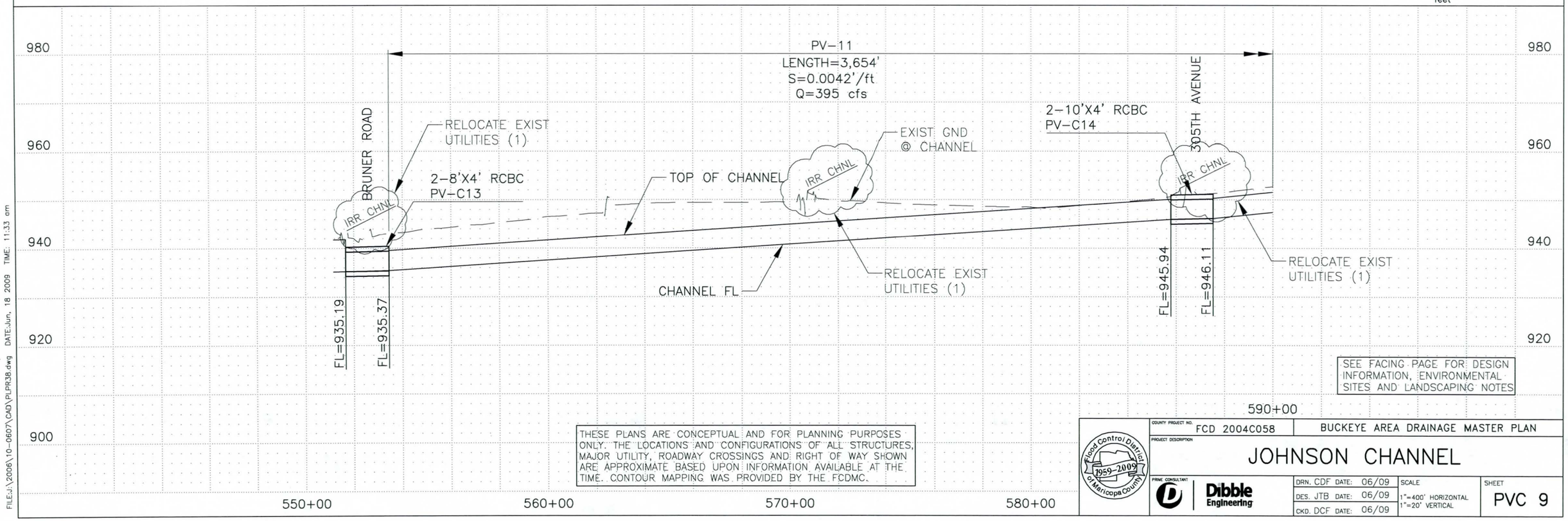
Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert
Design Motif: Farming/Agriculture from Station 620+00 to Station 653+65.96
Multi-use: multi-use trails, cultural interpretation of historic and prehistoric irrigation, and biological multi-use potential with creation of burrowing owl habitat.





0 100 200 400 600 800
feet



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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058

BUCKEYE AREA DRAINAGE MASTER PLAN

PROJECT DESCRIPTION

JOHNSON CHANNEL

PRIME CONSULTANT Dibble Engineering

DRN. CDF DATE: 06/09
DES. JTB DATE: 06/09
CKD. DCF DATE: 06/09

SCALE 1"=400' HORIZONTAL 1"=20' VERTICAL

SHEET PVC 9

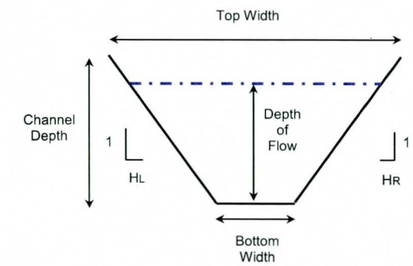
FILE:J:\2006\10-0607\CAD\PLPR38.dwg DATE:Jun. 18 2009 TIME: 11:33 am

Buckeye Area Drainage Master Plan
Palo Verde System

Channel Properties

Plan ID	HEC-1 I.D.	Design Q100 (cfs)	Downstream Invert Elevation (ft)	Upstream Invert Elevation (ft)	Length (ft.)	Design Invert Slope (ft./ft.)	Material Type	Manning's "n" Value	Bottom Width, W (ft.)	Depth of Flow(ft.)	Sideslope (H:1) Left (H_L)	Sideslope (H:1) Right (H_R)	Left Access Road Width (ft)	Right Access Road Width (ft)	Area (sf.)	Wetted Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Channel Topwidth (ft)	Total ROW Width Required (ft)
PV-11	MCPV04	395	935.37	964.03	6888	0.0042	LE	0.045	16	3.1	7	7	18	18	118.2	60.1	0.42	Sub	3.3	1.0	4.1	74	160
PV-12	MCPV03	126	964.14	973.91	1202	0.0081	LE	0.045	6	1.9	7	7	18	18	38.7	33.8	0.53	Sub	3.3	1.0	2.9	115	201

Channel Material Type: C = Concrete, R = Riprap, GR = Grass, E = Natural or Earth, LE = Landscaped Earth, LLE = Light Landscaped Earth



Typical Channel Section

Culvert Properties

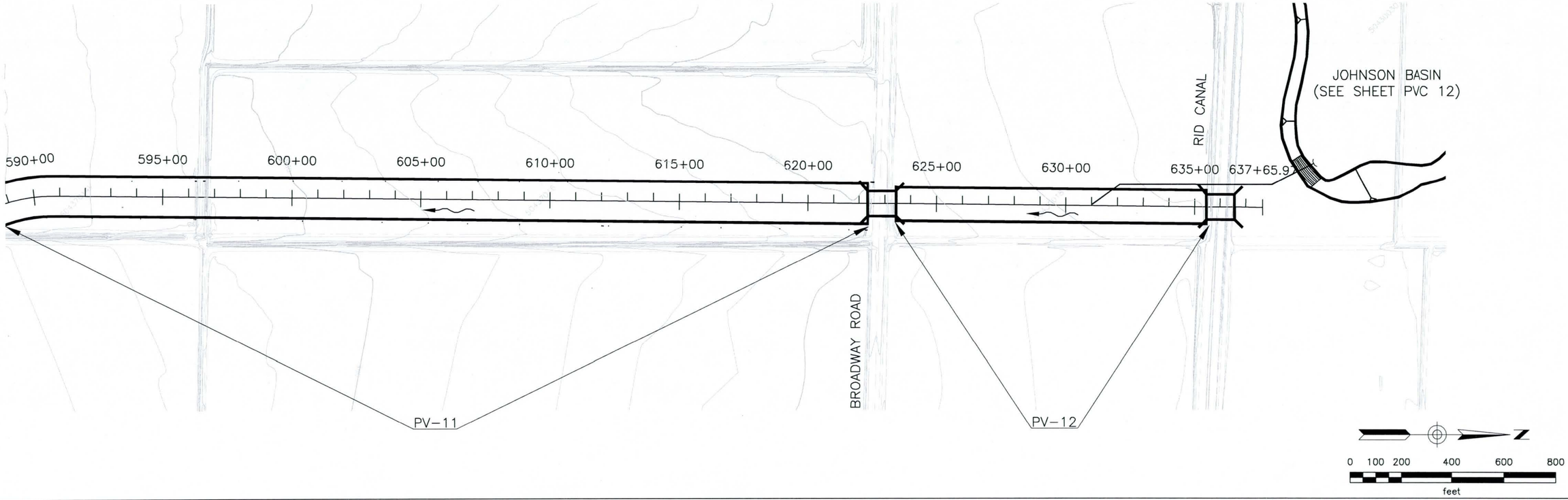
I.D.	Design Q100 (cfs)	Length (ft.)	Inlet Inv. (ft.)	Outlet Inv. (ft.)	Slope (ft./ft.)	Number of Barrels	Culvert Span (ft.)	Culvert Dia./ Height (ft.)	Barrel/ Material	Manning's "n" Value	Entrance (Wingwall, Headwall or Project)	Tailwater Depth (ft.)	Computed Headwater	Computed HW/D
PV-C15	126	110	964.14	964.03	0.0010	2	6	4	RCBC	0.012	Wingwall	3.13	3.21	0.49
PV-C16	126	110	974.01	973.90	0.0010	2	6	4	RCBC	0.012	Wingwall	1.94	2.83	0.49

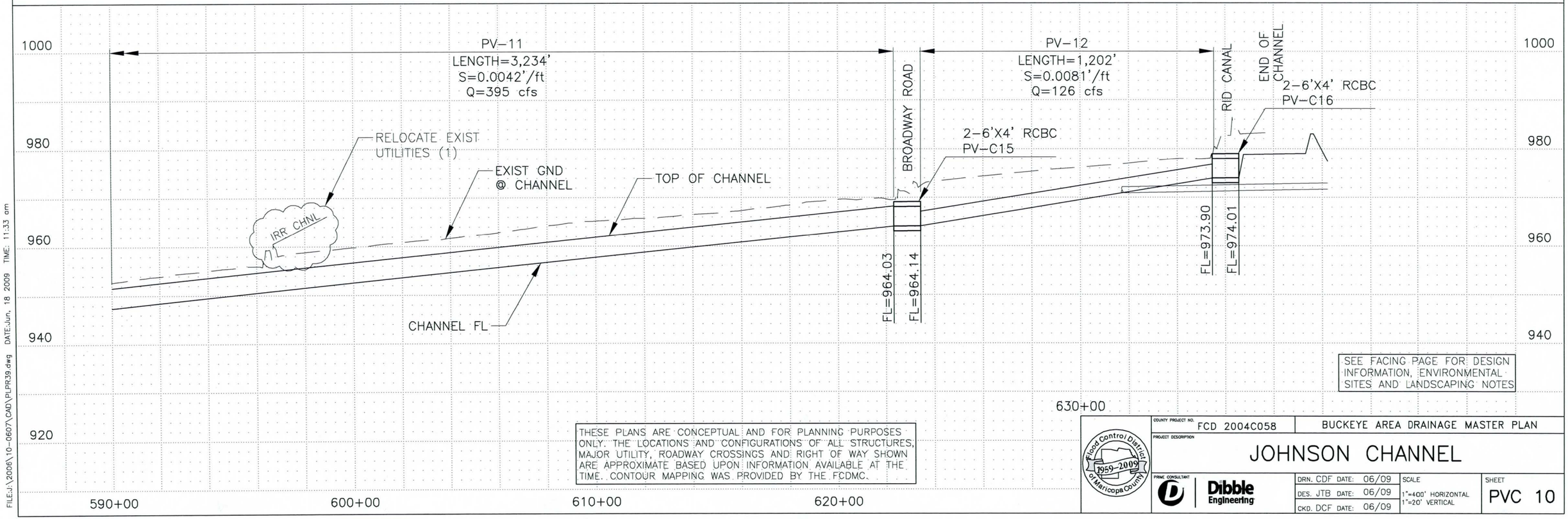
Utility Crossings

Plan ID	Plan	Sheet	ANPP	Ditch - Irrigation	Fiber Optic	Gas	Petroleum	Telephone	Sewer	Water	Total
PV-11	Johnson	PVC 10	0	1	0	0	0	0	0	0	1
PV-12	Johnson	PVC 10	0	0	0	0	0	0	0	0	0

Landscape Notes:

Landscape Design Theme: Natural Lower Sonoran Desert
Design Motif: Farming/Agriculture
Multi-use: multi-use trails, cultural interpretation of historic and prehistoric irrigation, and biological multi-use potential with creation of burrowing owl habitat.





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COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION: JOHNSON CHANNEL		
PRIME CONSULTANT: Dibble Engineering	DRN. CDF DATE: 06/09 DES. JTB DATE: 06/09 CKD. DCF DATE: 06/09	SCALE: 1"=400' HORIZONTAL, 1"=20' VERTICAL
		SHEET: PVC 10

Flood Control District of Maricopa County 1959-2009

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Buckeye Area Drainage Master Plan
Palo Verde Basin

Detention Basin Properties

Palo Verde Basin

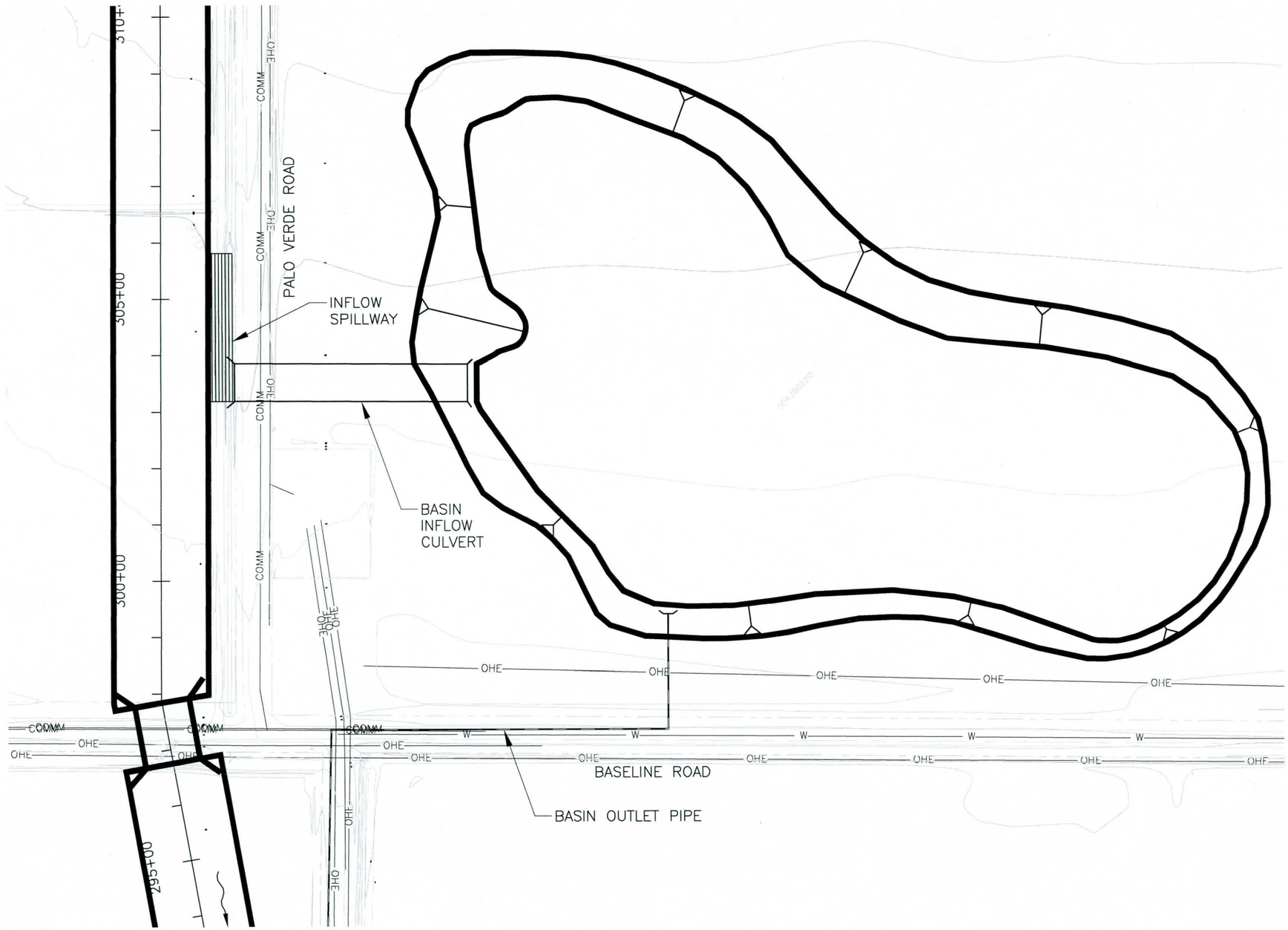
Basin Land Area =	24.55	Acres	Outflow Pipe (no. & Dia.) =	1	24	in.
Basin Storage Volume =	150	Ac.-Ft.	Pipe Invert at Inlet=		894.3	ft
			Pipe Invert at Outlet=		891.9	ft
Inflow upstream of spillway =	2,876	cfs	Pipe Length =		2365	ft
Inflow over spillway (Into basin) =	1,576	cfs	Pipe Slope =		0.001	ft/ft
Discharge downstream of spillway (Bypass flow) =	1,300	cfs	Inflow Spillway Width (2) =		468	ft
Spillway Elev. =	906	ft	Inflow Spillway Length (2) =		232	ft
Maximum Ponding Depth =	901	ft				
Maximum Excavation Depth =	15	ft				

Note:

(1) Volume computations based upon results obtained from surface modeling software.

(2) Width is perpendicular to flow. Length is measured down the slope.

(3) See Sheet LA 2 for landscape notes.



NOTE:
CONTOURS ARE FOR CONCEPTUAL DESIGN CALCULATIONS ONLY.

FINAL DESIGN SHOULD INCORPORATE VARIED SIDE SLOPES AND OTHER AESTHETIC FEATURES.

BASIN IS INTENDED TO OPERATE AS AN "OFF-LINE" BASIN AND RECEIVE FLOW ONLY FROM THE INFLOW SPILLWAY. FINAL DESIGN SHOULD CONSIDER ROUTING OFF-SITE FLOWS AROUND BASIN.

N

0 100 200 400 600 800
feet

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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION: PALO VERDE BASIN			
PRIME CONSULTANT: Dibble Engineering	DRN. MTM DATE: –	SCALE 1"=200' HORIZONTAL	SHEET PVC 11
	DES. JTB DATE: –		
	CKD. DCF DATE: –		

FILE:J:\2006\10-0607\CAD\BASIN-MB09.dwg DATE:Jun. 18 2009 TIME: 11:34 am

Buckeye Area Drainage Master Plan
Johnson Basin

Detention Basin Properties

Johnson Basin

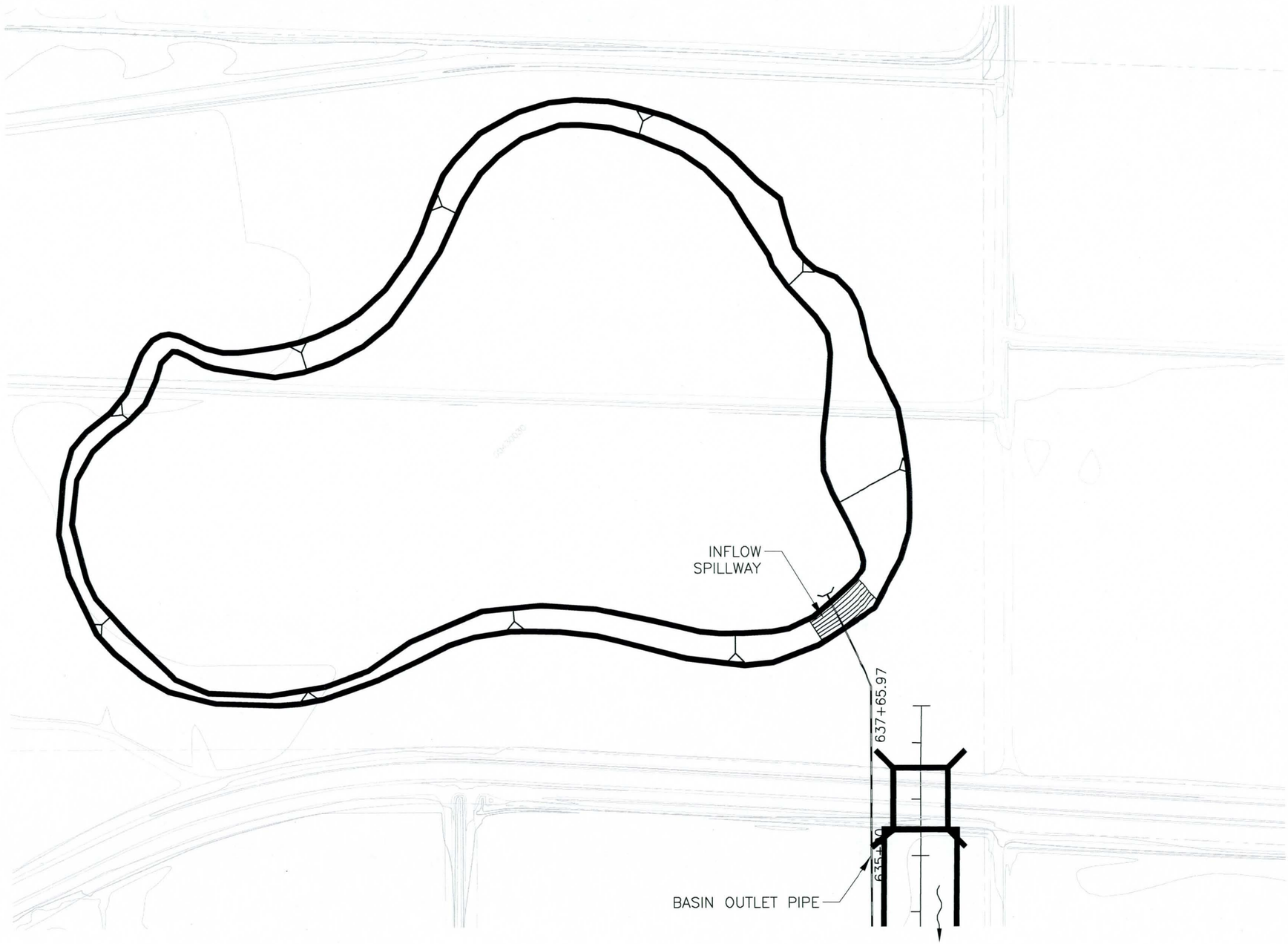
Basin Land Area =	24.89	Acres	Outflow Pipe (no. & Dia.) =	1	24 in.
Basin Storage Volume =	27	Ac.-Ft.	Pipe Invert at Inlet=		971.7 ft
			Pipe Invert at Outlet=		970.4 ft
Inflow upstream of spillway =	933	cfs	Pipe Length =		962 ft
Inflow over spillway (Into basin) =	807	cfs	Pipe Slope =		0.001 ft/ft
Discharge downstream of spillway (Bypass flow) =	126	cfs	Inflow Spillway Width (2) =		240 ft
Spillway Elev. =	982	ft	Inflow Spillway Length (2) =		119 ft
Maximum Ponding Depth =	981	ft			
Maximum Excavation Depth =	10	ft			

Note:

(1) Volume computations based upon results obtained from surface modeling software.

(2) Width is perpendicular to flow. Length is measured down the slope.

(3) See Sheet LA 1 for landscape notes.



NOTE:
CONTOURS ARE FOR CONCEPTUAL DESIGN CALCULATIONS ONLY.

FINAL DESIGN SHOULD INCORPORATE VARIED SIDE SLOPES AND OTHER AESTHETIC FEATURES.

BASIN IS INTENDED TO OPERATE AS AN "OFF-LINE" BASIN AND RECEIVE FLOW ONLY FROM THE INFLOW SPILLWAY. FINAL DESIGN SHOULD CONSIDER ROUTING OFF-SITE FLOWS AROUND BASIN.

N

0 100 200 400 600 800
feet

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Flood Control District of Maricopa County 1959-2009

COUNTY PROJECT NO FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION JOHNSON BASIN			
PRIME CONSULTANT Dibble Engineering	DRN. MTM DATE: –	SCALE 1"=200' HORIZONTAL	SHEET PVC 12
	DES. JTB DATE: –		
	CKD. DCF DATE: –		

FILE:J:\2006\10-0607\CAD\BASIN-MB08.dwg DATE:Jun. 18 2009 TIME: 11:34 am

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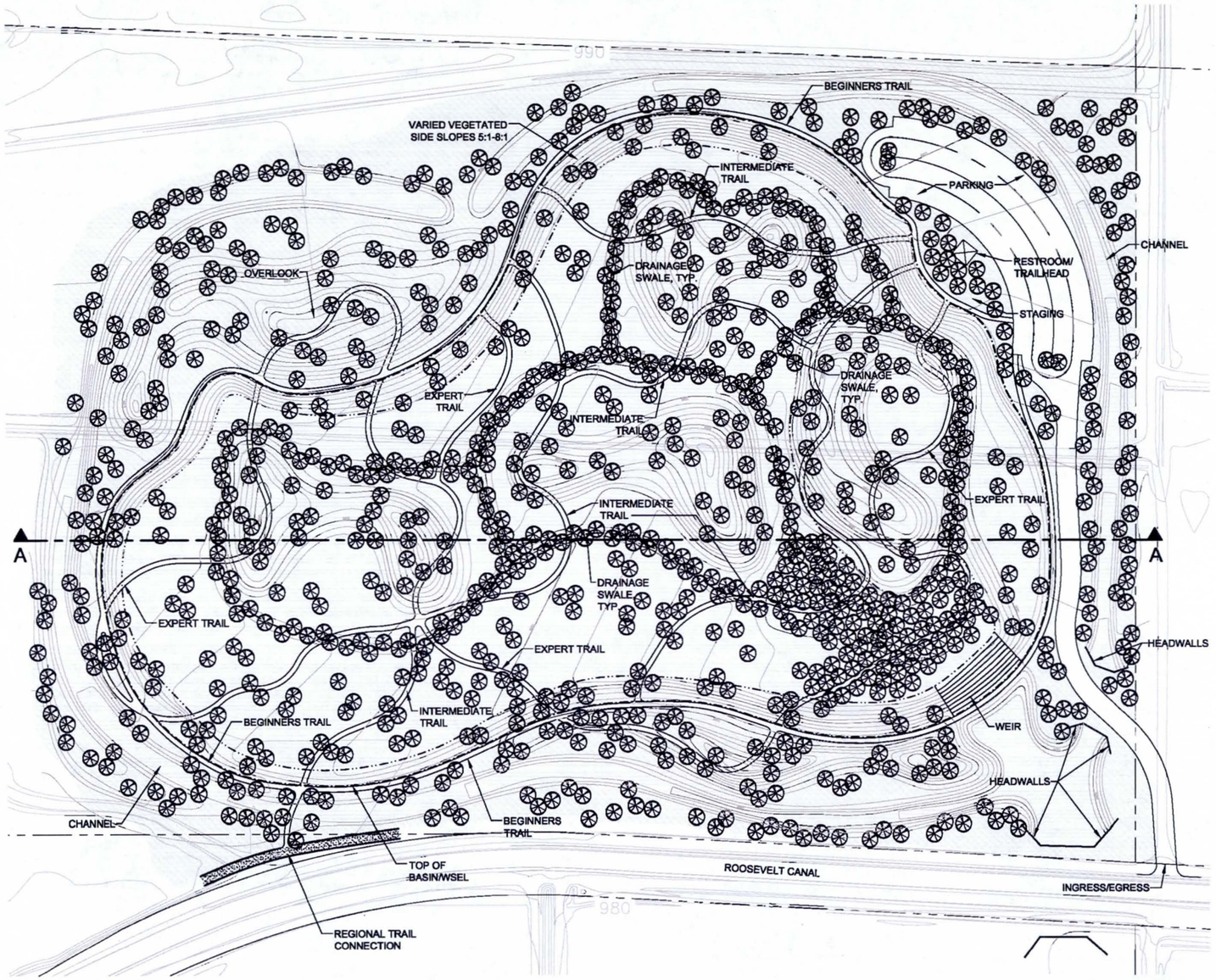
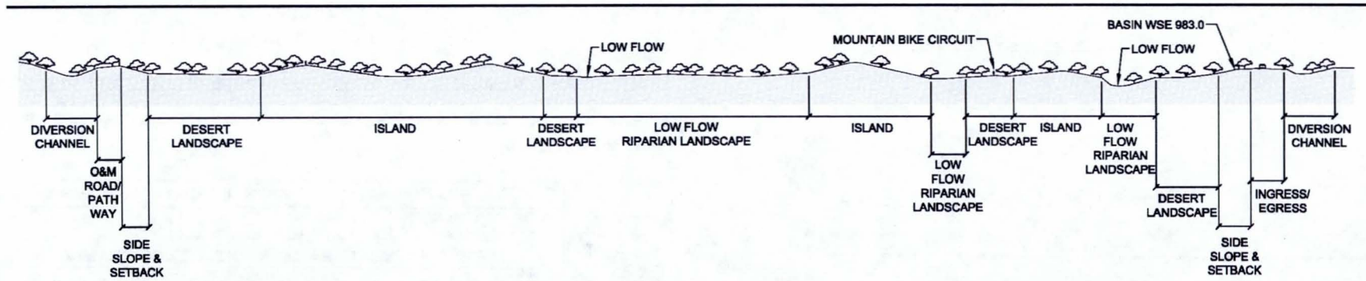


TYPICAL PLAN VIEW



TYPICAL SECTION VIEW

HORIZONTAL SCALE 1" = 100'
VERTICAL SCALE 1" = 50'

JOHNSON MOUNTAIN BIKE BASIN DESIGN GUIDELINES

JOHNSON MOUNTAIN BIKE BASIN SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL BASIN UTILIZING NATURAL LOWER SONORAN DESERT, AND NATURAL LOWER SONORAN DESERT RIPARIAN LANDSCAPE DESIGN THEMES. SPECIFIC LOCATIONS OF LANDSCAPE DESIGN THEMES WILL BE SHOWN ON THE PLAN SHEET AS A MEANS TO SHOW INTENT.

Design Concept

Mountain Bike Basin shall consist of the following designed elements:

1. An earthen basin with low-flow designed as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that biological and educational multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the basin including biological and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for the basin are shown for reference. Coordination with the Town of Buckeye will be required to determine the multi-use requirements for each basin in the system.

Basin Criteria

1. Basin Engineering Design
   - Overall Basin sizing and design shall use a Manning's n-value of 0.045 and storage calculations to allow for grasses, wildflower mixes, shrubs and trees within the basin bottom. The basin size shall accommodate for increased levels of flora within the basin side slopes and bottom.
2. Configuration
   - The overall basin form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the basin edge to prevent the appearance of long, continuous runs with the same side slope. Some areas may contain steeper slopes to provide a challenging circuit for mountain bike riders. These areas will require erosion control measures.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - Low flow channel shall meander along the bottom of the basin, around the islands to provide visual movement of the low flow channel on the basin bottom. Low flow channels shall have a natural appearance with use of rip-rap and boulders and be enhanced by riparian planting when possible and create challenges for mountain bike crossings.
   - Islands shall be provided within the basin to minimize the visual impression of a basin and provide varied topography for enhanced rider experience. They will be of enough size and abundance as to provide a variable appearing bottom of basin as shown in the concept.
3. Vegetation
   - Landscape Design Theme: The landscape design theme will be a combination of Natural Lower Sonoran Desert and Natural Lower Sonoran Desert Riparian. The vegetation will be a combination of trees, shrubs, and native grasses and will be utilized throughout the basin bottom, side slopes, and overbank. The riparian theme will be clustered around the low flow areas to give the appearance of a naturally occurring wash.
4. Perimeter
   - An additional 30% was included as part of the design of the basin area to provide a setback for multi-use functions. This setback shall be located to maximize the effects it will provide for both recreation users and adjacent development. The additional size required for this concept is 51% beyond a minimally graded and engineered basin. 21% of the land shown on this concept shall be provided by others.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the basin. Design motifs have been developed for the drainage infrastructure. Irrigation/Canal Motif as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
6. Multi-use
   - The designated multi-use components to be coordinated and provided by others in pre-design and design include a parking lot, a designated area for bike staging, a restroom, mountain bike pathways of varying difficulty around and within the basin, biological multi-use of burrowing owl habitat, cultural interpretation of historic and prehistoric irrigation, and a connection to the regional trail system.
   - One of the primary multi-use options is the joint use of the basin as a mountain bike circuit requiring the incorporation of plant materials.

Note:

1. Recreational facilities shown to convey conceptual layout and programming.
2. Amenities not required for flood control function and maintenance and will be provided by others.

OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION MOUNTAIN BIKE BASIN (SEE JOHNSON BASIN IN ENGINEERING DRAWINGS)		
PRIME CONSULTANT Dibble Engineering	DRN. BSM DATE: 05/09	SCALE
	DES. SH DATE: 05/09	
	CKD. SH DATE: 05/09	
		SHEET LA 1

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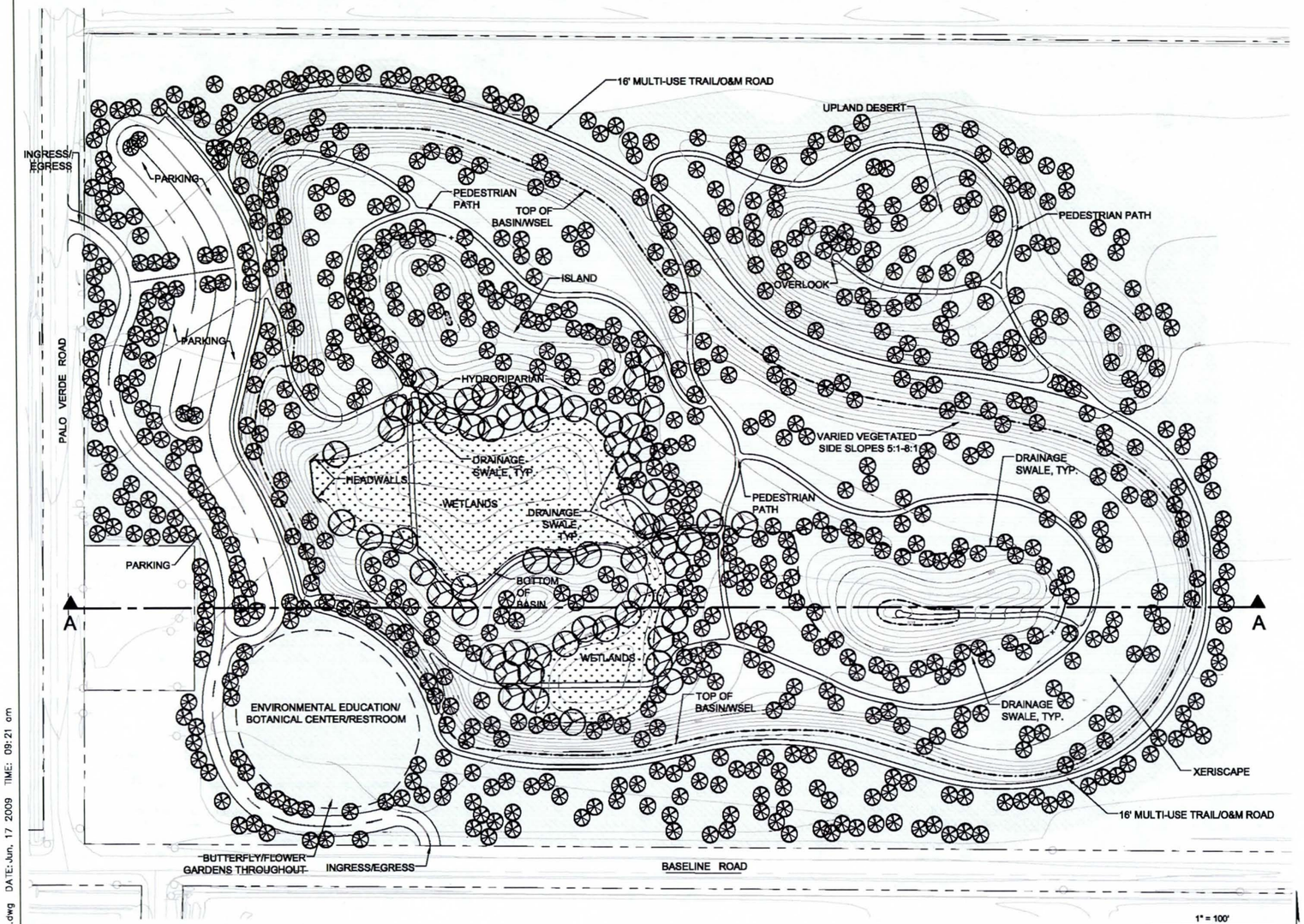
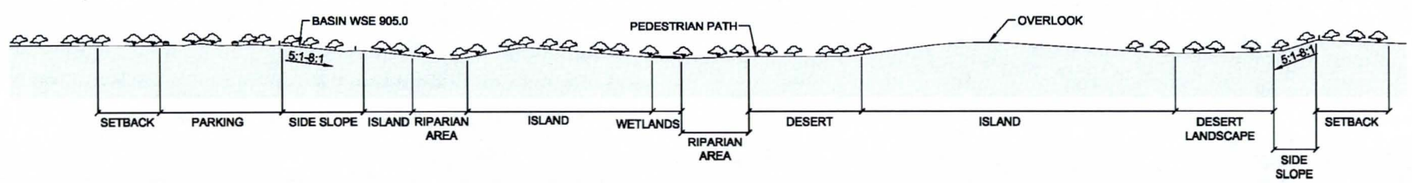


TYPICAL PLAN VIEW



TYPICAL SECTION VIEW

HORIZONTAL SCALE 1" = 100'
VERTICAL SCALE 1" = 50'

PALO VERDE BOTANICAL BASIN DESIGN GUIDELINES

PALO VERDE BOTANICAL BASIN SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL BASIN UTILIZING NATURAL SONORAN DESERT UPLANDS, NATURAL SONORAN DESERT UPLANDS RIPARIAN, NATURAL LOWER SONORAN DESERT, NATURAL LOWER SONORAN DESERT RIPARIAN, AND NATURAL SONORAN DESERT HYDRO RIPARIAN LANDSCAPE DESIGN THEMES.

Design Concept

Botanical Basin shall consist of the following elements:

1. An earthen basin with low-flow designed as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that biological and educational multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the basin including biological, cultural and recreational amenities. Typical Multi-use scenarios for the basin are shown for reference. Coordination with the Town of Buckeye will be required to determine the multi-use requirements for each basin in the system.

Basin Criteria

1. Basin Engineering Design
   - Overall Basin sizing and design shall use a Manning's n-value of 0.045 and storage calculations to allow for grasses, wildflower mixes, shrubs and trees within the basin bottom. One of the primary multi-use options is the joint use of the basin as a botanical garden. The basin size shall accommodate for increased levels of flora within the basin side slopes and bottom.
2. Configuration
   - The overall basin form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the basin edge to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - Low flow channel shall meander along the bottom of the basin, around the islands to provide visual movement of the low flow channel on the basin bottom. Low flow channels shall have a natural appearance with use of rip-rap and boulders and be enhanced by riparian planting when possible.
   - A wetland area with a permanent water source is suggested at the basin bottom low flow accumulation and basin outfall.
   - Islands shall be provided within the basin to minimize the visual impression of a basin. They will be of enough size and abundance as to provide a variable appearing bottom of basin as shown in the concept.
3. Vegetation
   - Landscape Design Theme: The landscape design theme will vary greatly in this basin due to its multi-use potential as a botanical garden. Each landscape design theme will be used to approximate where it would be found in a natural setting. For example, the Natural Sonoran Desert Hydro Riparian will be found in the low lying area within the basin while the Natural Sonoran Desert Uplands will be found in the high berming located in the overbank. The vegetation will be a combination of trees, shrubs, and native grasses and will be utilized throughout the basin bottom, side slopes, and overbank.
4. Perimeter
   - An additional 30% was included as a part of the design of the basin area to provide integration of the facility and for use as a setback. This setback shall be located to maximize the effects it will provide for both recreation users and adjacent development. The additional size required for this concept is 67% beyond a minimally graded and engineered basin. 37% of the land shall be acquired by others.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the basin. Design motifs have been developed for the drainage infrastructure. Farming/Agriculture Motif as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
6. Multi-use
   - The designated multi-use components to be coordinated in pre-design and design include a parking lot, a designated area for an interpretive learning center with a restroom, interpretive pathways around and within the basin, wetlands, flower gardens, butterfly gardens, biological multi-use forming burrowing owl habitat, and cultural interpretation of historic farming.

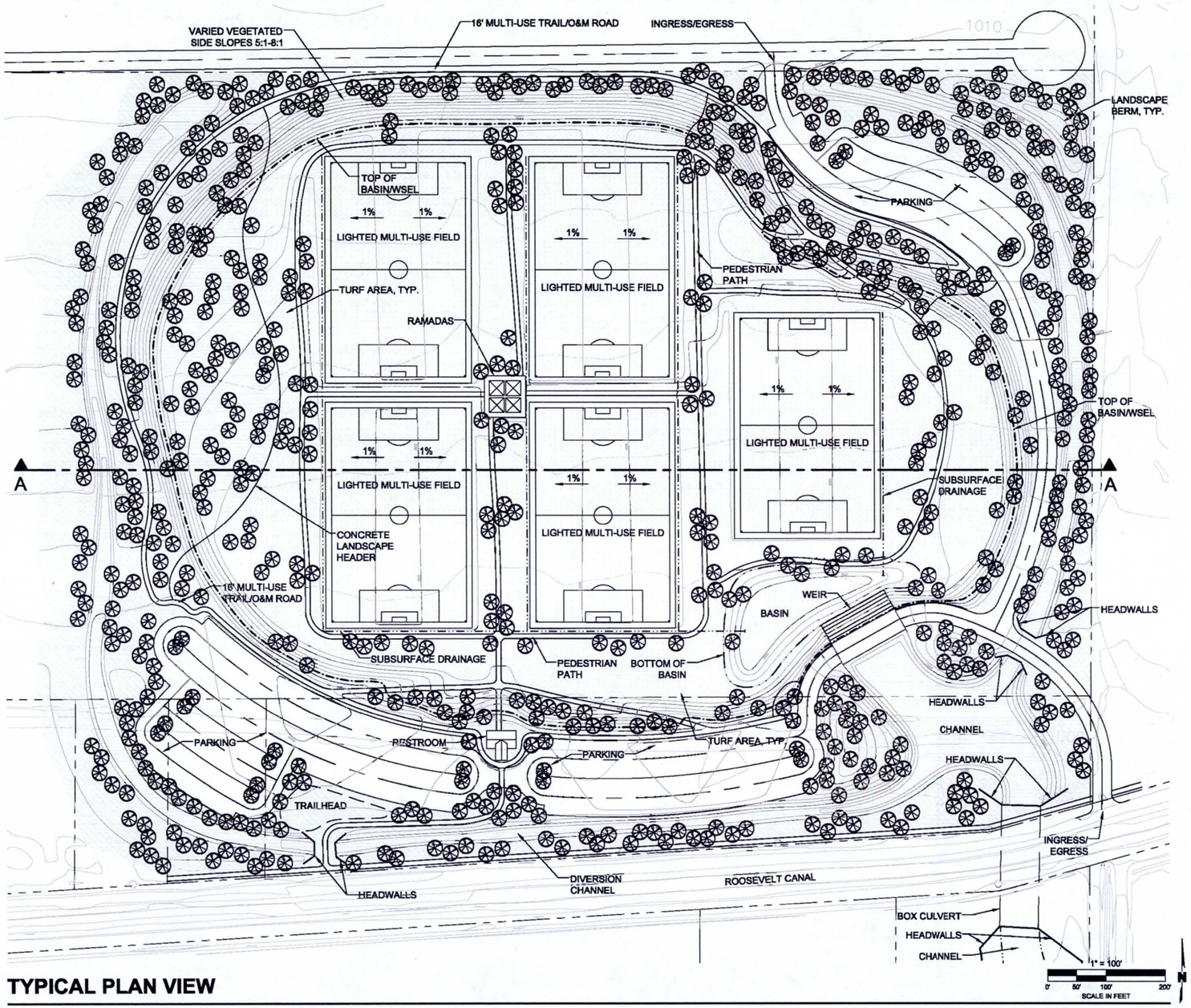
Note:

1. Recreational facilities shown to convey conceptual layout and programming.
2. Amenities not required for flood control function and maintenance and will be provided by others.

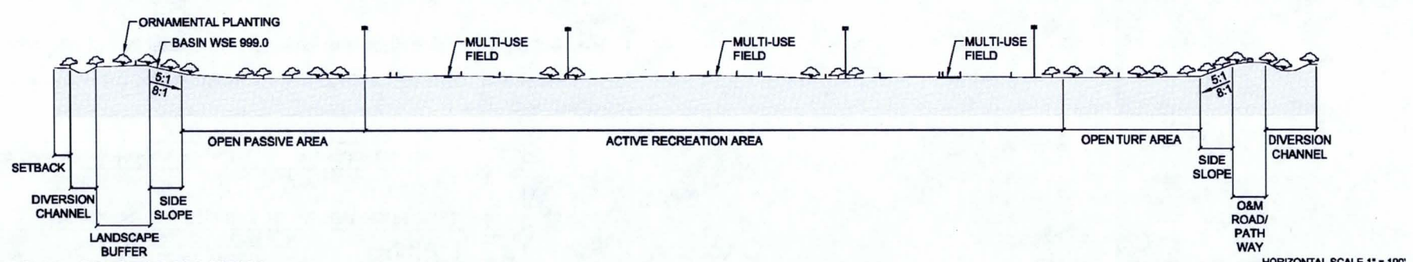
OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION: BOTANICAL BASIN (SEE PALO VERDE BASIN IN ENGINEERING DRAWINGS)		
PRIME CONSULTANT: Dibble Engineering	DRN. BSM DATE: 05/09	SCALE
	DES. SH DATE: 05/09	SHEET LA 2
	CKD. SH DATE: 05/09	

FILE:F:\Projects\2007071\MasterXrefs\X0607-BASIN GRADING-PALO VERDE.dwg DATE: Jun, 17 2009 TIME: 09:21 am



TYPICAL PLAN VIEW



TYPICAL SECTION VIEW

RAINBOW PARK BASIN DESIGN GUIDELINES

RAINBOW PARK BASIN SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE BASINS. PRE-DESIGN AND DESIGN DEVELOPMENT WILL SHOW ACTUAL LAYOUT.

Design Concept

Park Basin shall consist of the following elements:

1. An earthen basin with low-flow designed as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that biological and educational multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the basin including biological and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for the basin are shown for reference. Coordination with the Town of Buckeye will be required to determine the multi-use requirements for each basin in the system.

Basin Criteria

1. Basin Engineering Design
   - Overall Basin sizing and design shall use a Manning's n-value of 0.045 and storage calculations to allow for turf grass, native grasses, wildflower mixes, shrubs and trees within the basin bottom. One of the primary multi-use options is the joint use of the basin as an active recreation park. The basin size shall accommodate for increased levels of flora within the basin side slopes and bottom that will be utilized for shade.
2. Configuration
   - The overall basin form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the basin edge to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - Low flow channels shall be subsurface perforated pipe sloped to drain to the lower basin.
3. Vegetation
   - Landscape Design Theme: The landscape design theme will be Desert Park. The vegetation will be a combination of generous amounts of shade trees, shrubs, and native grasses and will be utilized throughout the basin bottom and side slopes. The overbank area will be a combination of turf grass and desert planting, but will be predominantly transitionary native plant material to blend in with the adjacent land uses.
4. Perimeter
   - An additional 30% was included as a part of the design of the basin area to provide integration of the facility and for use as a setback. This setback shall be located to maximize the effects it will provide for both recreation users and adjacent development. The additional size required for this concept is 56% beyond a minimally graded and engineered basin. 26% of the land shall be acquired by others.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the basin. Design motifs have been developed for the drainage infrastructure. Irrigation/Canal Motif as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
6. Multi-use
   - The designated multi-use components to be coordinated in pre-design and design include a parking lot, restroom, lighted multi-use fields, sports courts, cultural interpretation of historic and prehistoric irrigation, and a connection to the regional trail system.

Note:

1. Recreational facilities shown to convey conceptual layout and programming.
2. Amenities not required for flood control function and maintenance and will be provided by others.

OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION PARK BASIN (SEE RAINBOW PARK BASIN IN ENGINEERING DRAWINGS)		
PRIME CONSULTANT Dibble Engineering	DRN. BSM DATE: 05/09	SCALE
	DES. SH DATE: 05/09	SHEET LA 3
	CKD. SH DATE: 05/09	

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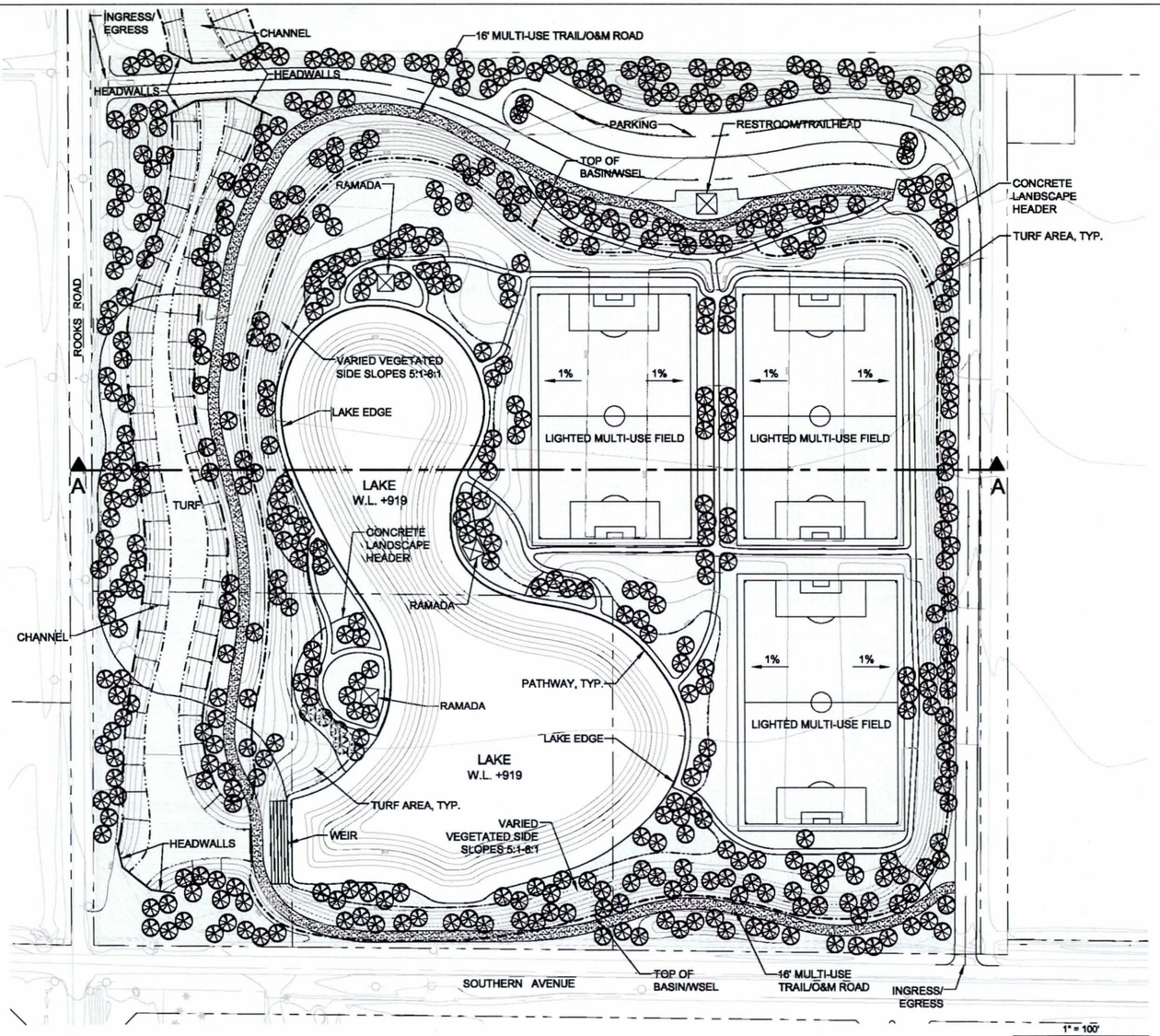
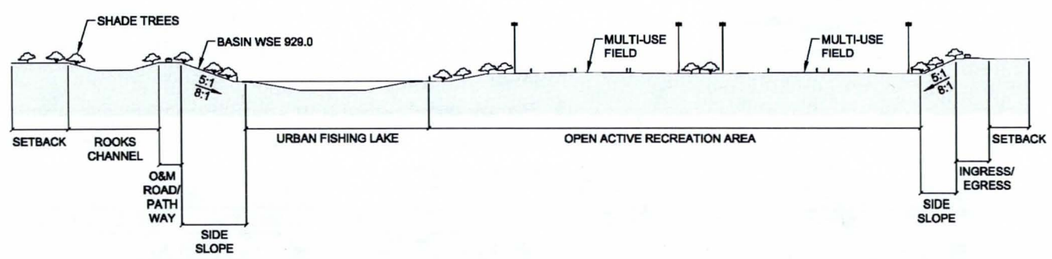


TYPICAL PLAN VIEW



TYPICAL SECTION VIEW

HORIZONTAL SCALE 1" = 100'
VERTICAL SCALE 1" = 50'

ROOKS PARK BASIN DESIGN GUIDELINES

ROOKS PARK BASIN SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE BASIN. PRE-DESIGN AND DESIGN DEVELOPMENT WILL SHOW ACTUAL LAYOUT.

Design Concept

Park Basin shall consist of the following elements:

1. An earthen basin with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that biological and educational multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the basin including biological and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for the basin are shown for reference. Coordination with the Town of Buckeye will be required to determine the multi-use requirements for each basin in the system

Basin Criteria

1. Basin Engineering Design
   - Overall Basin sizing and design shall use a Manning's n-value of 0.045 and storage calculations to allow for turf grass, native grasses, wildflower mixes, shrubs and trees within the basin bottom. One of the primary multi-use options is the joint use of the basin as an active recreation park. The basin size shall accommodate for increased levels of flora within the basin side slopes and bottom that will be utilized for shade.
2. Configuration
   - The overall basin form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the basin edge to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - Low flow channels shall be subsurface perforated pipe sloped to drain to the lower lake elevation.
   - An urban fishing lake shall be located at the low elevation of the basin.
3. Vegetation
   - Landscape Design Theme: The landscape design theme will be Desert Park. The vegetation will be a combination of generous amounts of shade trees, shrubs, and native grasses and will be utilized throughout the basin bottom and side slopes. The overbank area will be a combination of turf grass and desert planting, but will be predominantly transitionary native plant material to blend in with the adjacent land uses.
4. Perimeter
   - An additional 30% was included as a part of the design of the basin area to provide context sensitive integration of the facility and for use as a setback for multi-use functions. This setback shall be located to maximize the effects it will provide for both recreation users and adjacent development.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the basin. Design motifs have been developed for the drainage infrastructure. Farming/Agriculture Motif as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
6. Multi-use
   - The designated multi-use components to be coordinated in pre-design and design include a parking lot, urban fishing lake, lighted multi-use fields, picnic areas, and cultural interpretation of historic farming.

Note:

1. Recreational facilities shown to convey conceptual layout and programming.
2. Amenities not required for flood control function and maintenance and will be provided by others.

OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION: PARK BASIN (SEE ROOKS BASIN IN ENGINEERING DRAWINGS)		
PRIME CONSULTANT: Dibble Engineering	DRN. BSM DATE: 05/09	SCALE
	DES. SH DATE: 05/09	SHEET LA 4
	CKD. SH DATE: 05/09	

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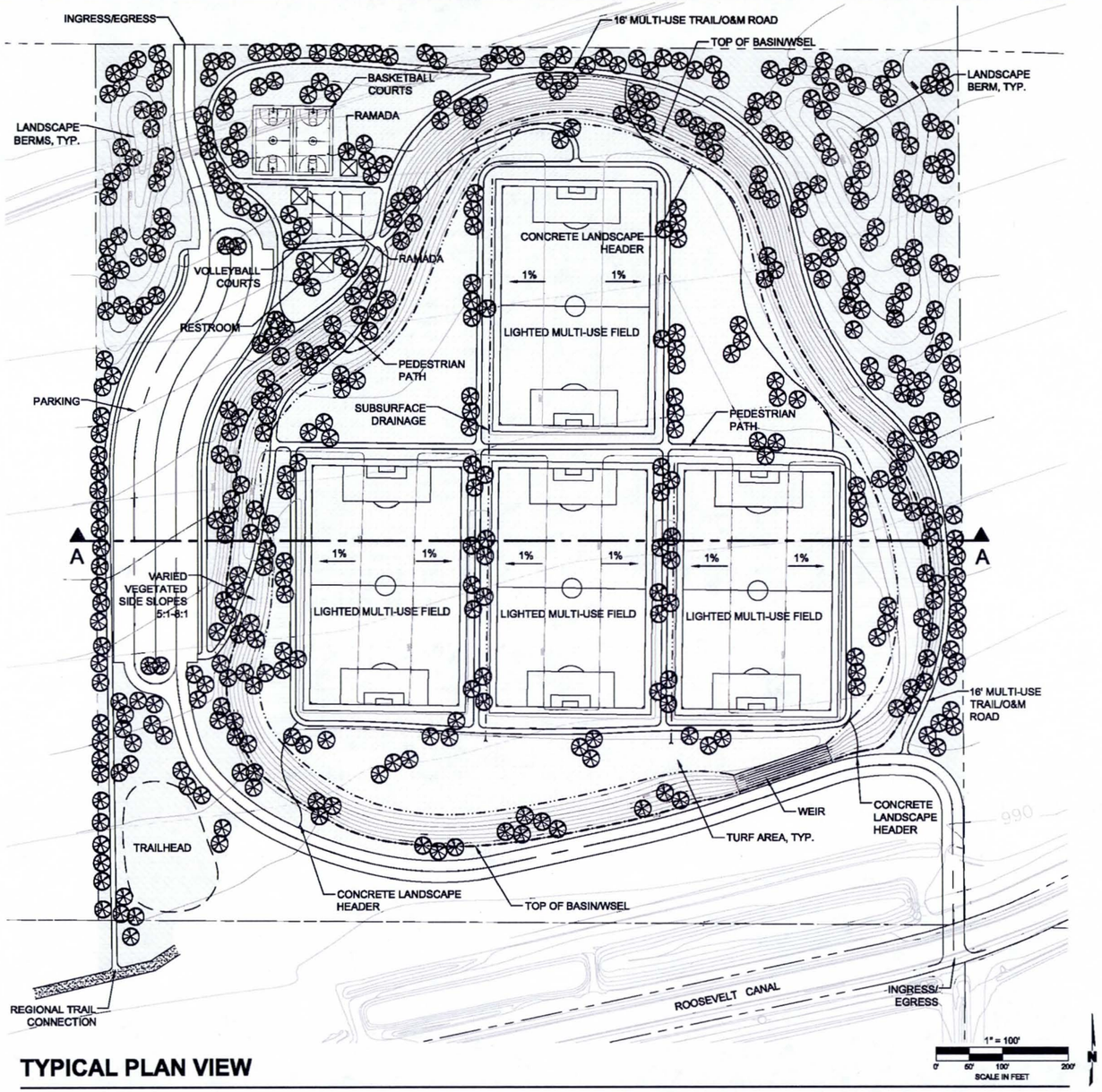
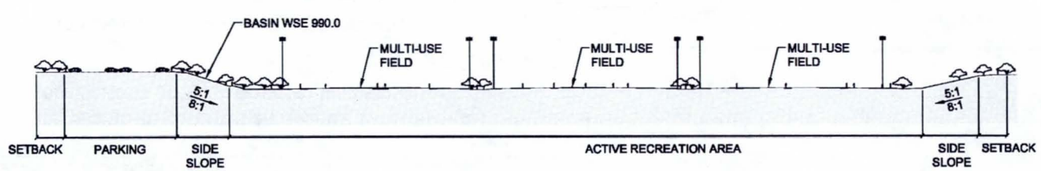


TYPICAL PLAN VIEW



TYPICAL SECTION VIEW

HORIZONTAL SCALE 1" = 100'
VERTICAL SCALE 1" = 50'

ROOSEVELT PARK BASIN DESIGN GUIDELINES

ROOSEVELT PARK BASIN SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE BASIN. PRE-DESIGN AND DESIGN DEVELOPMENT WILL SHOW ACTUAL LAYOUT.

Design Concept

Park Basin shall consist of the following elements:

1. An earthen basin with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that biological and educational multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the basin including biological and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for the basin are shown for reference. Coordination with the Town of Buckeye will be required to determine the multi-use requirements for each basin in the system.

Basin Criteria

1. Basin Engineering Design
   - Overall Basin sizing and design shall use a Manning's n-value of 0.045 and storage calculations to allow for turf grass, native grasses, wildflower mixes, shrubs and trees within the basin bottom. One of the primary multi-use options is the joint use of the basin as an active recreation park. The basin size shall accommodate for increased levels of flora within the basin side slopes and bottom that will be utilized for shade.
2. Configuration
   - The overall basin form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the basin edge to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - Low flow channels shall be subsurface perforated pipe sloped to drain to the lower basin.
3. Vegetation
   - Landscape Design Theme: The landscape design theme will be Desert Park. The vegetation will be a combination of shade trees, shrubs, and native grasses and will be utilized throughout the basin bottom and side slopes. The overbank area will be a combination of turf grass and desert planting, but will be predominantly transitionary native plant material to blend in with the adjacent land uses.
4. Perimeter
   - An additional 30% was included as a part of the design of the basin area to provide integration of the facility and for use as a setback for multi-use functions. This setback shall be located to maximize the effects it will provide for both recreation users and adjacent development.
5. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the basin. Design motifs have been developed for the drainage infrastructure. Irrigation/Canal Motif as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
6. Multi-use
   - The designated multi-use components to be coordinated in pre-design and design include a parking lot, restroom, lighted multi-use fields, sports courts, biological multi-use of burrowing owl habitat, cultural interpretation of historic and prehistoric irrigation, and a connection to the regional trail system.

Note:

1. Recreational facilities shown to convey conceptual layout and programming.
2. Amenities not required for flood control function and maintenance and will be provided by others.

OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION PARK BASIN (SEE ROOSEVELT PARK BASIN IN ENGINEERING DRAWINGS)		
PRIME CONSULTANT Dibble Engineering	DRN. BSM DATE: 05/09	SCALE
	DES. SH DATE: 05/09	
	CKD. SH DATE: 05/09	
		SHEET LA 5

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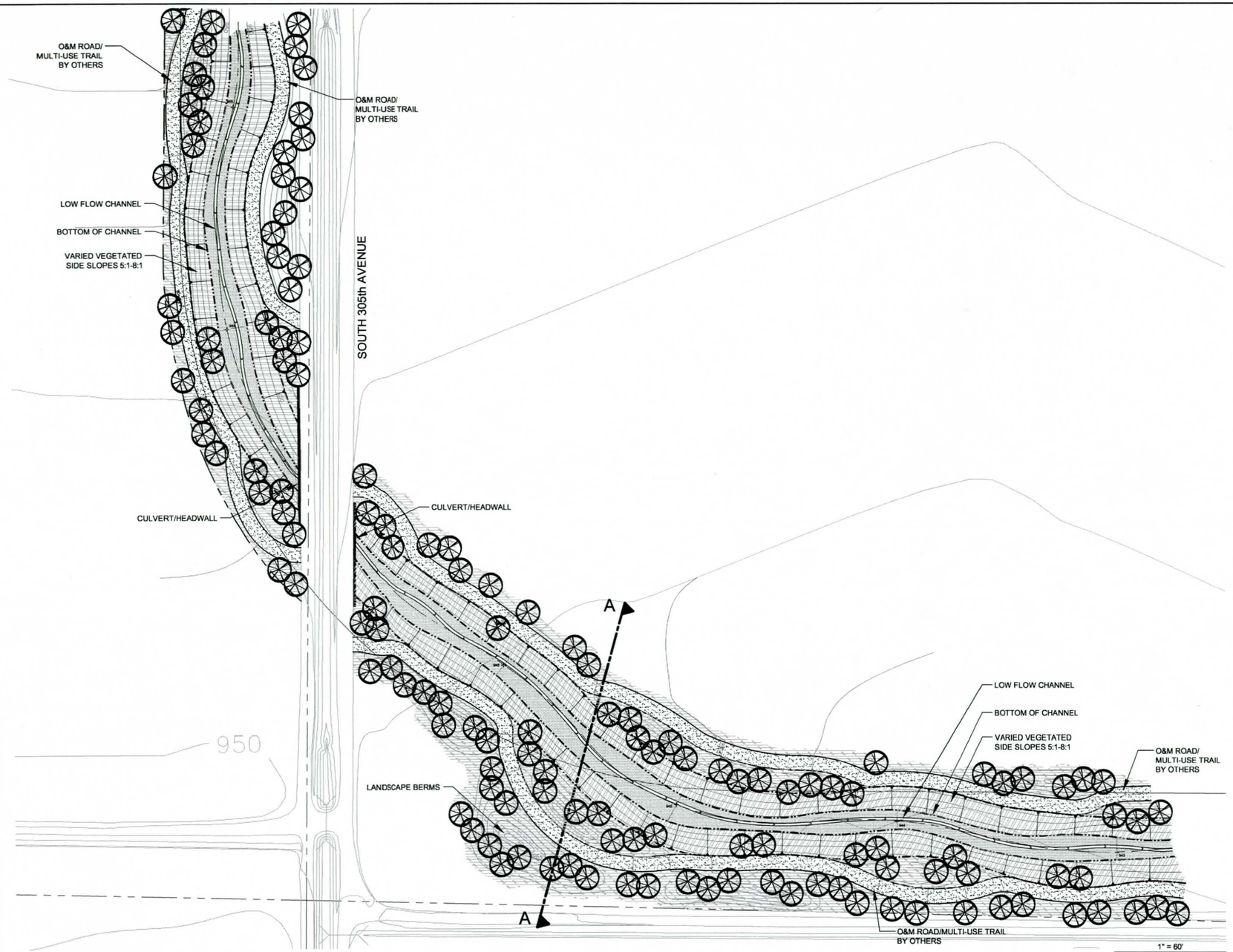
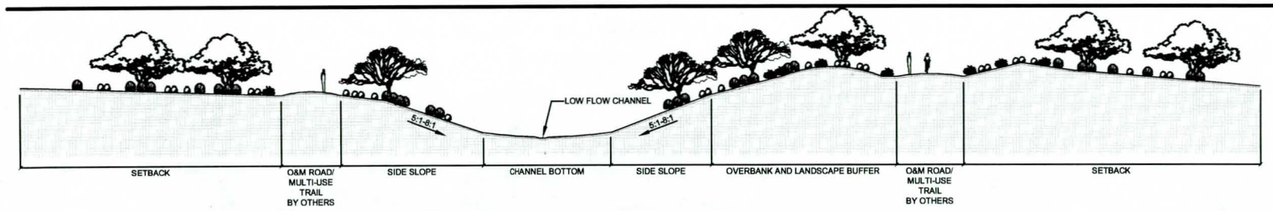


TYPICAL PLAN VIEW



TYPICAL SECTION VIEW

HORIZONTAL SCALE 1" = 20'
VERTICAL SCALE 1" = 10'

PALO VERDE SYSTEM DESIGN GUIDELINES

CHANNELIZED PALO VERDE CHANNELS SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL CHANNEL WITH NATURAL LOWER SONORAN DESERT, SEMI-NATURAL LOWER SONORAN DESERT, AND NATURAL LOWER SONORAN DESERT RIPARIAN LANDSCAPE DESIGN THEMES.

Design Concept

Palo Verde System shall consist of the following elements:

1. An earthen channel with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that recreation multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the system including biological, cultural and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for both channels and basins are shown for reference. While only a typical 1000' long channel section scenario is provided, the intent is to incorporate the scenarios system wide.

Channel Criteria

1. Channel Engineering Design
   - Overall channel sizing and design shall use a Manning's n-value of 0.045. Typical channel cross-sections shall include areas of grasses, wildflowers, scattered shrubs, and occasional trees that are planted to reinforce the form of the meandering channel side slopes, and channel/ low flow alignment. Three differing seed mixes shall be provided, one for the overbank, another for the side slopes, and the last for the channel bottom. The overbank mix will have a generous mix of grasses, shrubs, and tree species. The side slope mix will contain the same mix with a more conservative amount of tree species seed. The bottom mix will be limited to grasses and a limited amount of shrubs. The n-value will also account for variable side slopes and a meandering channel/ low flow alignment.
   - Tall Pot trees are recommended predominently on the upper portion of the channel side slopes and the overbank. Utilize the typical channel length scenario for plant densities.
2. Configuration
   - The overall channel form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the channel to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - The center line of the channel shall meander within the right of way to reinforce a sinuous appearance, minimizing straight alignments for extended lengths.
   - The low flow channel shall meander along the bottom of the channel, in differing alignments to the center line to provide visual movement of the low flow channel on the channel bottom.
3. Perimeter
   - A minimum of 50' of ROW or 30% additional, whichever is greater, shall be added to the channel width as a setback from adjacent landuse.
4. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the channel. Design motifs have been developed for the drainage infrastructure.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance as opposed to a man-made appearance.
5. Multi-use
   - The designated multi-use components to be coordinated with others in pre-design and design.

Note:

1. Recreational facilities shown to convey conceptual layout and programming.

2. Amenities not required for flood control function and maintenance and will be provided by others.

OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION CHANNEL No. 1 (SEE PALO VERDE SYSTEM IN ENGINEERING DRAWINGS)			
PRIME CONSULTANT Dibble Engineering	DRN. BSM DATE: 05/09	SCALE	SHEET
	DES. SH DATE: 05/09		LA 6
	CKD. SH DATE: 05/09		

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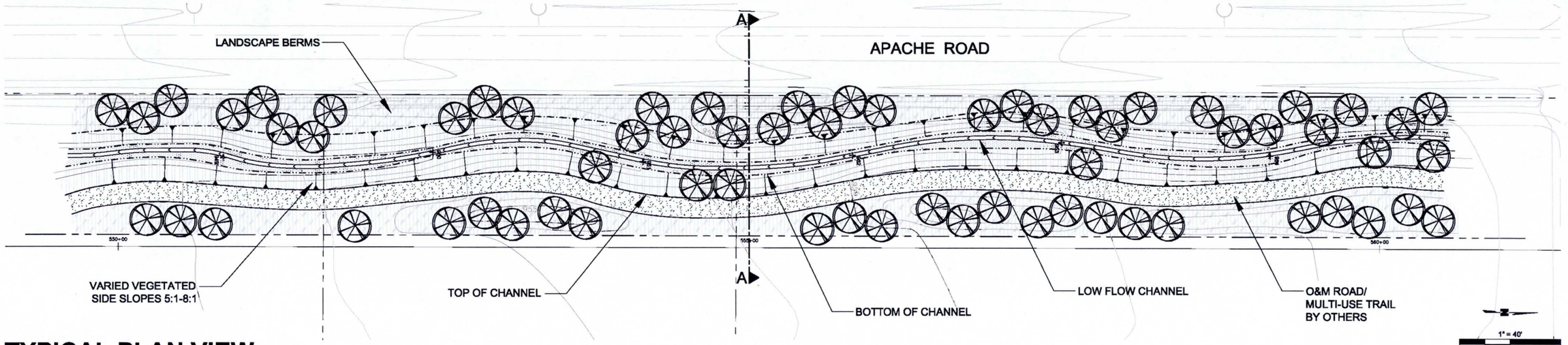
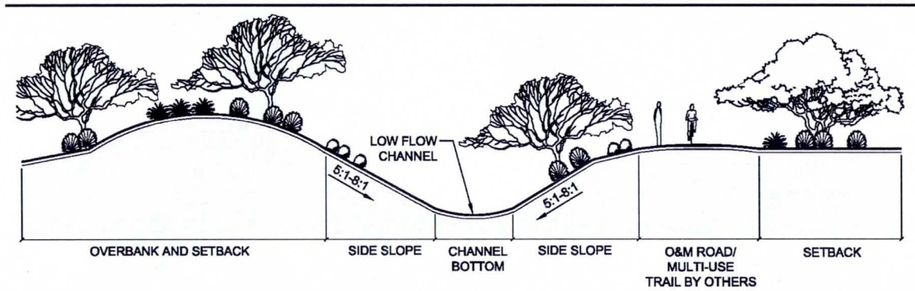


TYPICAL PLAN VIEW



TYPICAL SECTION VIEW

HORIZONTAL SCALE 1" = 10'
VERTICAL SCALE 1" = 5'

WATSON SYSTEM DESIGN GUIDELINES

CHANNELIZED WATSON CHANNEL AND BASINS SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE CHANNEL WITH NATURAL LOWER SONORAN DESERT RIPARIAN, SEMI-NATURAL SONORAN DESERT, AND DESERT PARK LANDSCAPE DESIGN THEMES.

Design Concept

Watson System shall consist of the following elements:

1. An earthen channel with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that recreation multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the system including biological, cultural and recreational amenities. Maintenance roads will be multi-use trails. Typical multi-use scenarios for both channels and basins are shown for reference and will be designed and constructed by others. While only a typical 1000' long channel section, the intent is to incorporate the scenarios system wide.

Channel Criteria

1. Channel Engineering Design
   - Overall channel sizing and design shall use a Manning's n-value of 0.045. Typical channel cross-sections shall include areas of grasses, wildflowers, scattered shrubs, and occasional trees that are planted to reinforce the form of the meandering channel side slopes, and channel/ low flow alignment. Three differing seed mixes shall be provided, one for the overbank, another for the side slopes, and the last for the channel bottom. The overbank mix will have a generous mix of grasses, shrubs, and tree species. The side slope mix will contain the same mix with a more conservative amount of tree species seed. The bottom mix will be limited to grasses and a limited amount of shrubs. The n-value will also account for variable side slopes and a meandering channel/ low flow alignment.
   - Tall Pot trees are recommended predominently on the upper portion of the channel side slopes and the overbank. Utilize the typical channel length scenario for plant densities.
2. Configuration
   - The overall channel form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the channel to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - The center line of the channel shall meander within the right of way to reinforce a sinuous appearance, minimizing straight alignments for extended lengths.
   - The low flow channel shall meander along the bottom of the channel, in differing alignments to the center line to provide visual movement of the low flow channel on the channel bottom.
3. Perimeter
   - A minimum of 50' of ROW or 30% additional, whichever is greater, shall be added to the channel width as a setback from adjacent landuse.
4. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the channel. Design motifs have been developed for the drainage infrastructure as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
5. Multi-use
   - The designated multi-use components to be coordinated with others in pre-design and design.

Note:

1. Recreational facilities shown to convey conceptual layout and programming.
2. Amenities not required for flood control function and maintenance and will be provided by others.

OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION CHANNEL No. 2 (SEE WATSON SYSTEM IN ENGINEERING DRAWINGS)			
PRIME CONSULTANT Dibble Engineering	DRN. BSM DATE: 05/09	SCALE 1"=40'	SHEET LA 7
	DES. SH DATE: 05/09		
	CKD. SH DATE: 05/09		

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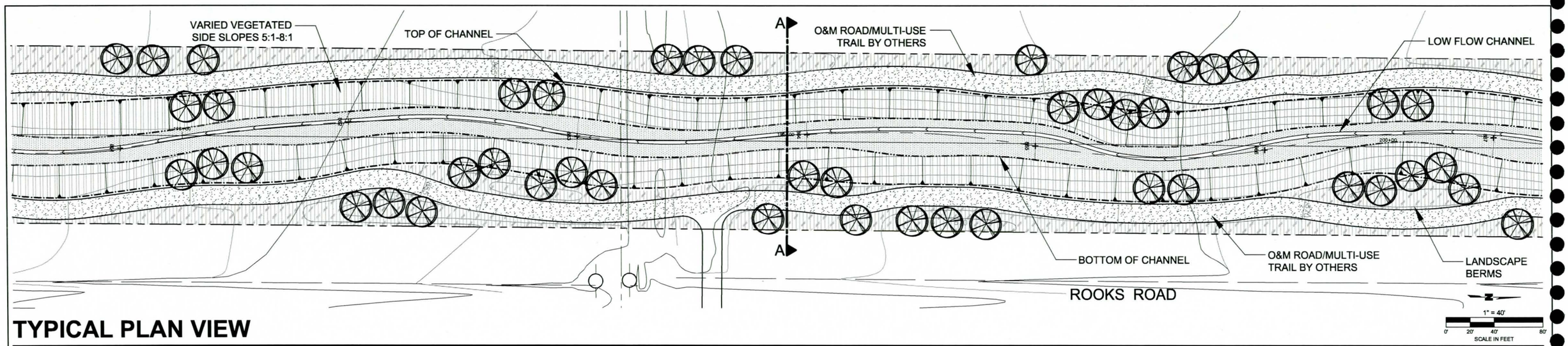
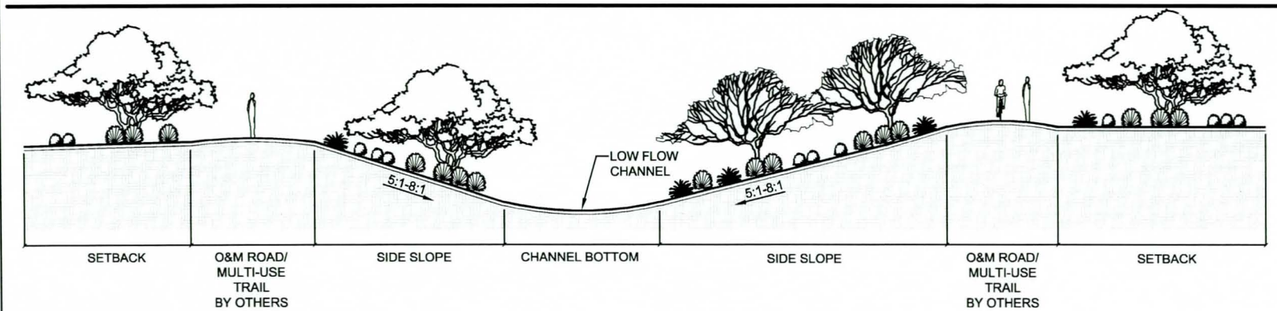


TYPICAL PLAN VIEW



TYPICAL SECTION VIEW

HORIZONTAL SCALE 1" = 10'
VERTICAL SCALE 1" = 5'

ROOKS SYSTEM DESIGN GUIDELINES

CHANNELIZED ROOKS CHANNEL SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE CHANNEL WITH DESERT PARK, SEMI-NATURAL LOWER SONORAN DESERT, AND NATURAL LOWER SONORAN DESERT RIPARIAN LANDSCAPE DESIGN THEMES.

Design Concept

Rooks System shall consist of the following elements:

1. An earthen channel and basins with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that recreation multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the system including biological, cultural and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for both channels and basins are shown for reference and will be designed and constructed by others. While only a typical 1000' long channel section, the intent is to incorporate the scenarios system wide.

Channel Criteria

1. Channel Engineering Design
   - Overall channel sizing and design shall use a Manning's n-value of 0.045. Typical channel cross-sections shall include areas of grasses, wildflowers, scattered shrubs, and occasional trees that are planted to reinforce the form of the meandering channel side slopes, and channel/ low flow alignment. Three differing seed mixes shall be provided, one for the overbank, another for the side slopes, and the last for the channel bottom. The overbank mix will have a generous mix of grasses, shrubs, and tree species. The side slope mix will contain the same mix with a more conservative amount of tree species seed. The n-value will also account for variable side slopes and a meandering channel/ low flow alignment.
   - Tall Pot trees are recommended predominently on the upper portion of the channel side slopes and the overbank. Utilize the typical channel length scenario for plant densities.
2. Configuration
   - The overall channel form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the channel to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - The center line of the channel shall meander within the right of way to reinforce a sinuous appearance, minimizing straight alignments for extended lengths.
   - The low flow channel shall meander along the bottom of the channel, in differing alignments to the center line to provide visual movement of the low flow channel on the channel bottom.
3. Perimeter
   - A minimum of 50' of ROW or 30% additional, whichever is greater, shall be added to the channel width as a setback from adjacent landuse.
4. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the channel. Design motifs have been developed for the drainage infrastructure.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance as opposed to a man-made appearance.
5. Multi-use
   - The designated multi-use components to be coordinated with others in pre-design and design.

Note:

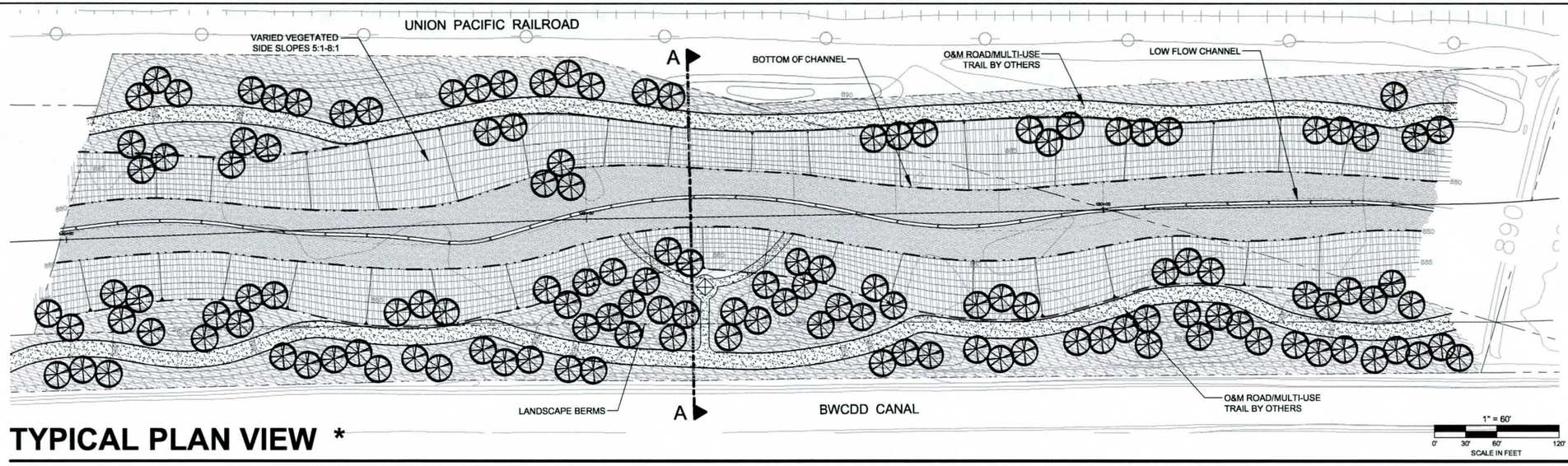
1. Recreational facilities shown to convey conceptual layout and programming.

2. Amenities not required for flood control function and maintenance and will be provided by others.

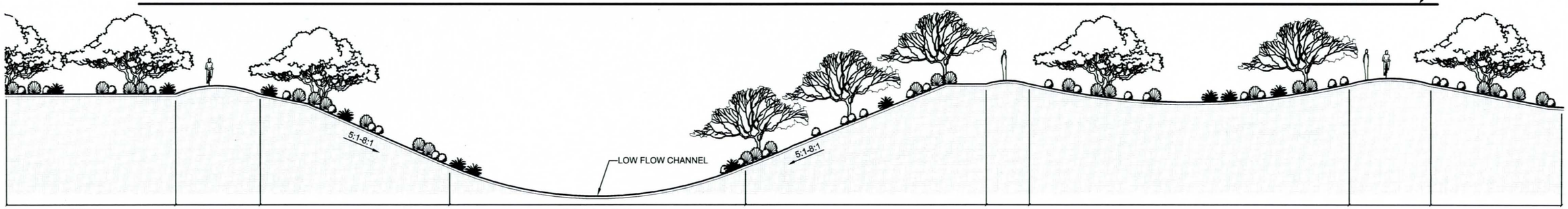
OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION CHANNEL No. 3 (SEE ROOKS SYSTEM IN ENGINEERING DRAWINGS)			
PRIME CONSULTANT Dibble Engineering	DRN. BSM DATE: 05/09	SCALE 1"=40'	SHEET LA 8
	DES. SH DATE: 05/09		
	CKD. SH DATE: 05/09		

FILE: F:\Projects\20070071\MasterXrefs\X0607-CHANNEL GRADING-3.dwg DATE: Jun, 03 2009 TIME: 10:17 am



TYPICAL PLAN VIEW *



TYPICAL SECTION VIEW *

* PORTIONS OF THIS CHANNEL MAYBE CONSTRAINED - SEE THE ADMP NARRATIVE FOR MITIGATIVE MEASURES

HORIZONTAL SCALE 1" = 10'
VERTICAL SCALE 1" = 5'

WHITE TANKS SYSTEM DESIGN GUIDELINES

CHANNELIZED WHITE TANKS CHANNEL SHALL BE DESIGNED AS A SEMI-SOFT STRUCTURAL DRAINAGE CHANNEL WITH SEMI-NATURAL LOWER SONORAN DESERT LANDSCAPE DESIGN THEMES. THE LIMIT OF THESE GUIDELINES IS AT THE BOUNDARY OF THE ADMP. CHANNEL SEGMENTS BEYOND THE ADMP BOUNDARY DO NOT FALL UNDER THESE DESIGN GUIDELINES.

Design Concept

White Tanks System shall consist of the following elements:

1. An earthen channel and basins with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that recreation multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the system including biological, cultural and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for both channels and basins are shown for reference and will be designed and constructed by others. While only a typical 1000' long channel section, the intent is to incorporate the scenarios system wide.

Channel Criteria

1. Channel Engineering Design
   - Overall channel sizing and design shall use a Manning's n-value of 0.045. Typical channel cross-sections shall include areas of grasses, wildflowers, scattered shrubs, and occasional trees that are planted to reinforce the form of the meandering channel side slopes, and channel/ low flow alignment. Three differing seed mixes shall be provided, one for the overbank, another for the side slopes, and the last for the channel bottom. The overbank mix will have a generous mix of grasses, shrubs, and tree species. The side slope mix will contain the same mix with a more conservative amount of tree species seed. The bottom mix will be limited to grasses and a limited amount of shrubs. The n-value will also account for variable side slopes and a meandering channel/ low flow alignment.
   - Tall Pot trees are recommended predominently on the upper portion of the channel side slopes and the overbank. Utilize the typical channel length scenario for plant densities.
2. Configuration
   - The overall channel form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the channel to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - The center line of the channel shall meander within the right of way to reinforce a sinuous appearance, minimizing straight alignments for extended lengths.
   - The low flow channel shall meander along the bottom of the channel, in differing alignments to the center line to provide visual movement of the low flow channel on the channel bottom.
3. Perimeter
   - A minimum of 50' of ROW or 30% additional, whichever is greater, shall be added to the channel width as a setback from adjacent landuse.
4. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the channel. Design motifs have been developed for the drainage infrastructure as the foundation for design ideas that will guide the aesthetic finish of structural components.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance.
5. Multi-use
   - The designated multi-use components to be coordinated and provided by others in pre-design and design.

Note:

1. Recreational facilities shown to convey conceptual layout and programming.

2. Amenities not required for flood control function and maintenance and will be provided by others.

OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION CHANNEL No. 4 (SEE WHITE TANKS SYSTEM IN ENGINEERING DRAWINGS)			
PRIME CONSULTANT Dibble Engineering	DRN. BSM DATE: 05/09	SCALE	SHEET
	DES. SH DATE: 05/09	1"=60'	LA 9
	CKD. SH DATE: 05/09		

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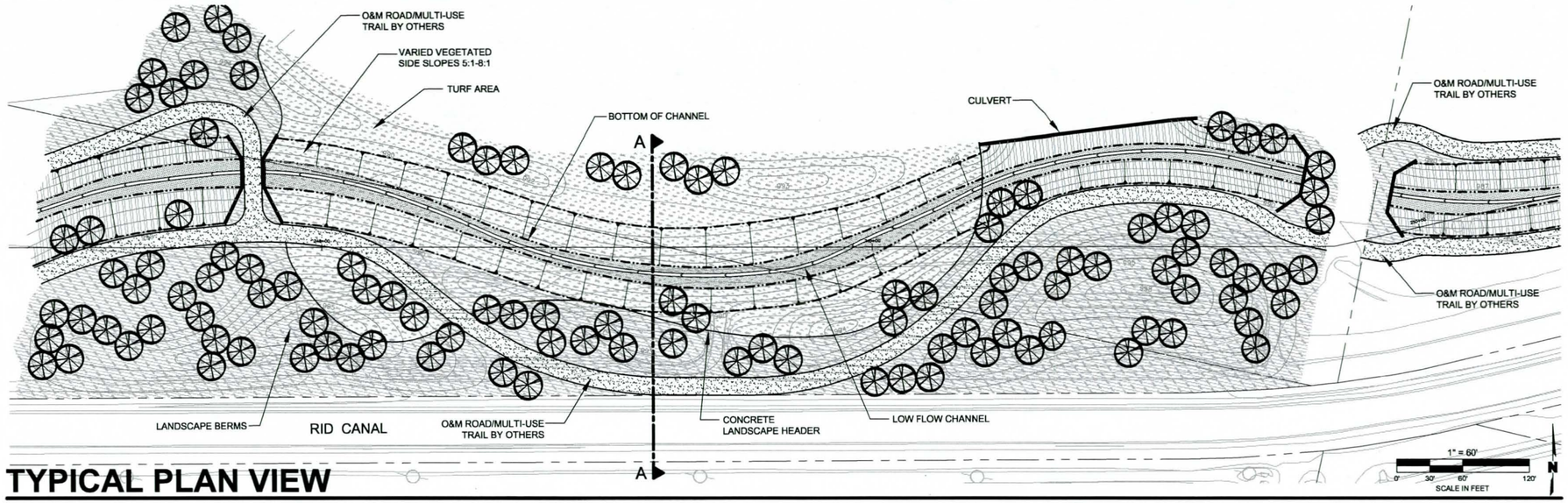
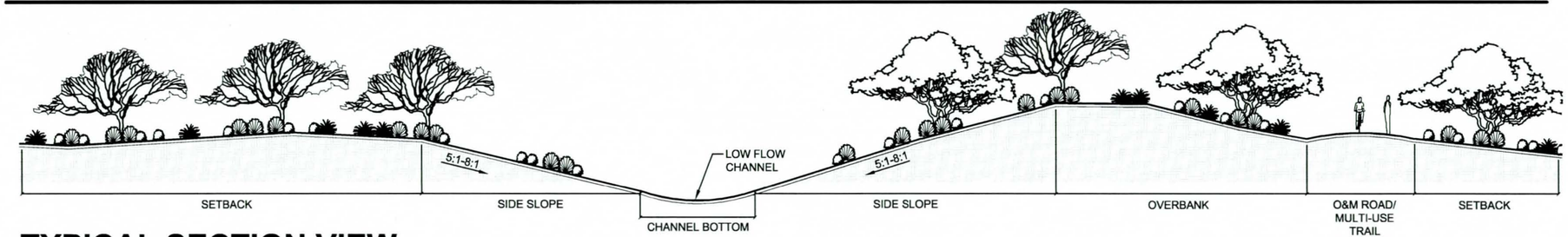


TYPICAL PLAN VIEW



TYPICAL SECTION VIEW

OGLESBY SYSTEM DESIGN GUIDELINES

CHANNELIZED OGLESBY CHANNEL SHALL BE DESIGNED AS SEMI-SOFT STRUCTURAL DRAINAGE CHANNEL WITH NATURAL LOWER SONORAN DESERT, SEMI-NATURAL SONORAN DESERT, AND DESERT PARK LANDSCAPE DESIGN THEMES. SPECIFIC LANDSCAPE DESIGN THEMES WILL BE SHOWN ON THE PLAN SHEETS.

Design Concept

Oglesby System shall consist of the following elements:

1. An earthen channel and basins with low-flow design as a semi-soft structure. Coordination with the Town of Buckeye's Parks and Recreation department will be required to assure that recreation multi-use is incorporated.
2. Various multi-use opportunities will be incorporated throughout the system including biological, cultural and recreational amenities. Maintenance roads will be multi-use trails. Typical Multi-use scenarios for both channels and basins are shown for reference and will be designed and constructed by others. While only a typical 1000' long channel section, the intent is to incorporate the scenarios system wide.

Channel Criteria

1. Channel Engineering Design
   - Overall sizing and design shall use a Manning's n-value of 0.045. Typical channel cross-sections shall include areas of grasses, wildflowers, scattered shrubs, and occasional trees that are planted to reinforce the form of the meandering channel side slopes, and channel/ low flow alignment. Three differing seed mixes shall be provided, one for the overbank, another for the side slopes, and the last for the channel bottom. The overbank mix will have a generous mix of grasses, shrubs, and tree species. The side slope mix will contain the same mix with a more conservative amount of tree species seed. The bottom mix will be limited to grasses and a limited amount of shrubs. The n-value will also account for variable side slopes and a meandering channel/ low flow alignment.
   - Tall Pot trees are recommended predominently on the upper portion of the channel side slopes and the overbank. Utilize the typical channel length scenario for plant densities.
2. Configuration
   - The overall form should be sinuous with a meandering top and bottom slope.
   - Side slopes shall vary between 5:1 and 8:1, with an average side slope of 7:1. The variation of side slopes shall occur throughout the channel to prevent the appearance of long, continuous runs with the same side slope.
   - Transitions in grade shall be sufficiently gradual to prevent sharp edges.
   - The center line of the channel shall meander within the right of way to reinforce a sinuous appearance, minimizing straight alignments for extended lengths.
   - The low flow channel shall meander along the bottom of the channel, in differing alignments to the center line to provide visual movement of the low flow channel on the channel bottom.
3. Perimeter
   - A minimum of 50' of ROW or 30% additional, whichever is greater, shall be added to the channel width as a setback from adjacent landuse.
4. Structural Components
   - Structural elements should enhance the visual experience of the viewer within and adjacent to the channel. Design motifs have been developed for the drainage infrastructure.
   - Boulders, rip-rap, or other stone treatments shall be native to the area and/or stained to match local color. They are to be varied in overall size to create a natural appearance as opposed to a man-made appearance.
5. Multi-use
   - The designated multi-use components to be coordinated with others in pre-design and design.

Note:

1. Recreational facilities shown to convey conceptual layout and programming.

2. Amenities not required for flood control function and maintenance and will be provided by others.

OLSSON ASSOCIATES

COUNTY PROJECT NO. FCD 2004C058	BUCKEYE AREA DRAINAGE MASTER PLAN		
PROJECT DESCRIPTION CHANNEL No. 5 (SEE OGLESBY SYSTEM IN ENGINEERING DRAWINGS)			
PRIME CONSULTANT Dibble Engineering	DRN. BSM DATE: 05/09	SCALE 1"=60'	SHEET LA 10
	DES. SH DATE: 05/09		
	CKD. SH DATE: 05/09		

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White Tanks System, Recommended Plan, Sheet 1

Channel Cost

ID	Excavated Volume (cy)	Unit Cost ($/cy)	Excavation Cost	Utilities Cost	Channel Length (ft)	Left Access Road Width (ft)	Right Access Road Width (ft)	6" ABC Access Road Unit Cost ($/sf)	Access Road Cost	Drainage Corridor Width-Channel+Access Rd (ft)	Total Right-of-Way Width Required Including Landscape (ft.)	Landscape Unit Cost ($/sf)	Total Landscape Cost	Required Land Acquisition (Ac.)	Land Acquisition Cost	Total Construction Cost	Total Contingencies Cost	Total Construction, Land, Landscape, and Contingencies Costs
WT-11	17,472	$11	$192,000	$0	3,278	0	18	$0.65	$38,000	83	133	$0.23	$100,000	9.99	$2,002,000	$231,000	$69,000	**$2,402,000**
WT-10	9,956	$11	$110,000	$3,000	685	0	18	$0.65	$8,000	128	178	$0.23	$28,000	2.80	$562,000	$121,000	$36,000	**$746,000**
WT-09	35,927	$11	$395,000	$0	2,523	18	0	$0.65	$30,000	183	238	$0.23	$138,000	13.81	$2,766,000	$533,000	$160,000	**$3,597,000**
WT-08	28,160	$11	$310,000	$0	1,821	18	0	$0.65	$21,000	178	232	$0.23	$97,000	9.68	$1,940,000	$417,000	$125,000	**$2,580,000**
WT-07	25,111	$11	$276,000	$80,000	2,535	18	0	$0.65	$30,000	108	158	$0.23	$92,000	9.20	$1,843,000	$386,000	$116,000	**$2,437,000**
WT-06	23,332	$11	$257,000	$0	2,535	18	0	$0.65	$30,000	105	155	$0.23	$90,000	9.01	$1,805,000	$286,000	$86,000	**$2,267,000**
WT-05	29,917	$11	$329,000	$0	3,458	18	0	$0.65	$40,000	140	190	$0.23	$151,000	15.06	$3,017,000	$423,000	$127,000	**$3,718,000**
WT-04	36,314	$11	$399,000	$30,000	3,193	0	0	$0.65	$0	96	146	$0.23	$107,000	10.71	$2,146,000	$429,000	$129,000	**$2,811,000**
WT-03	104,079	$11	$1,145,000	$70,000	5,278	0	0	$0.65	$0	127	177	$0.23	$215,000	21.49	$4,307,000	$1,215,000	$364,000	**$6,102,000**
WT-02	129,240	$11	$1,422,000	$283,000	5,315	0	0	$0.65	$0	142	192	$0.23	$235,000	23.49	$4,706,000	$1,705,000	$511,000	**$7,157,000**
WT-01	62,973	$11	$693,000	$0	2,580	0	0	$0.65	$0	143	193	$0.23	$114,000	11.42	$2,288,000	$693,000	$208,000	**$3,303,000**
													$1,367,000	**136.65**	**$27,382,000**	**$6,439,000**	**$1,931,000**	**$37,120,000**

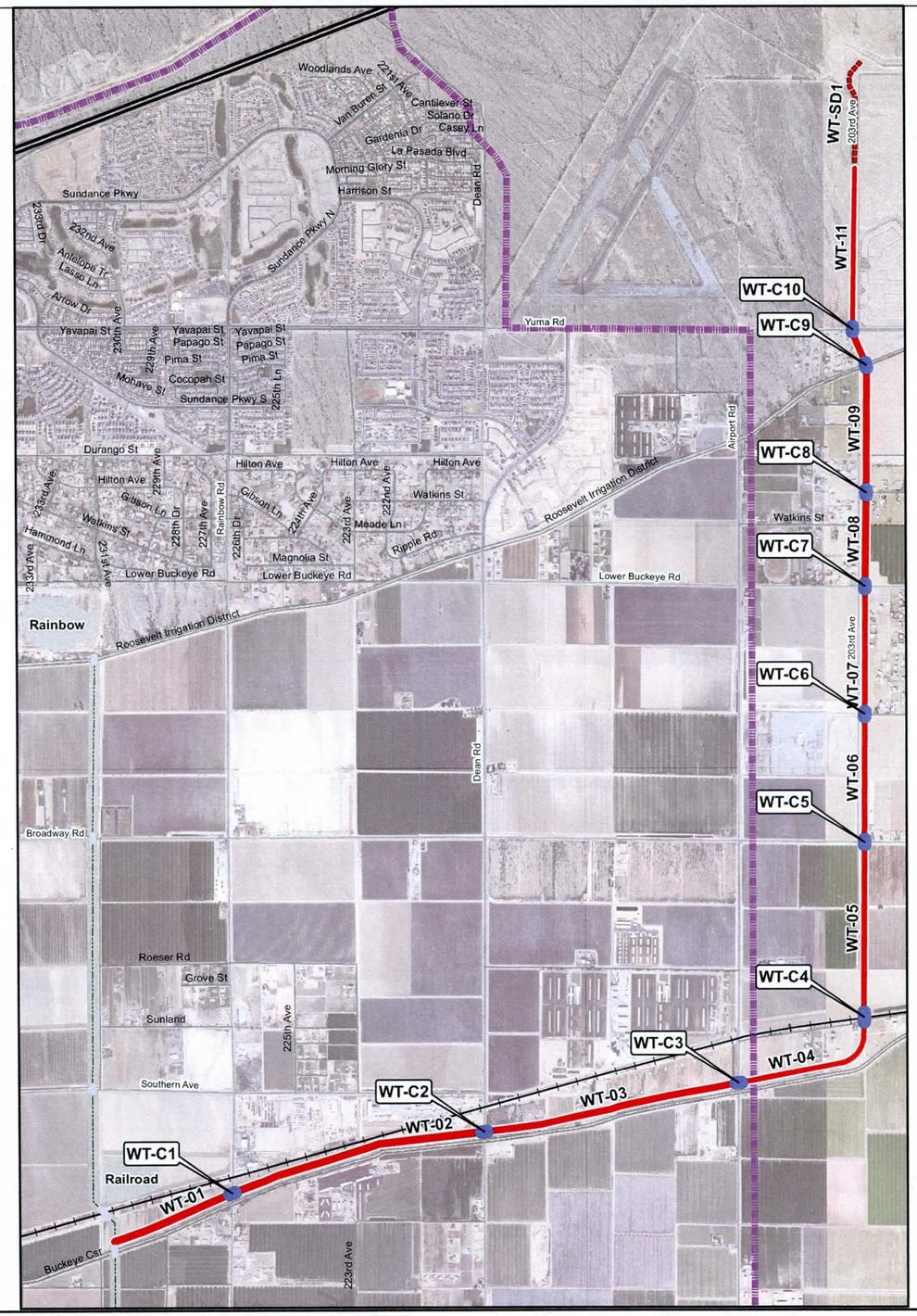
Culvert Cost

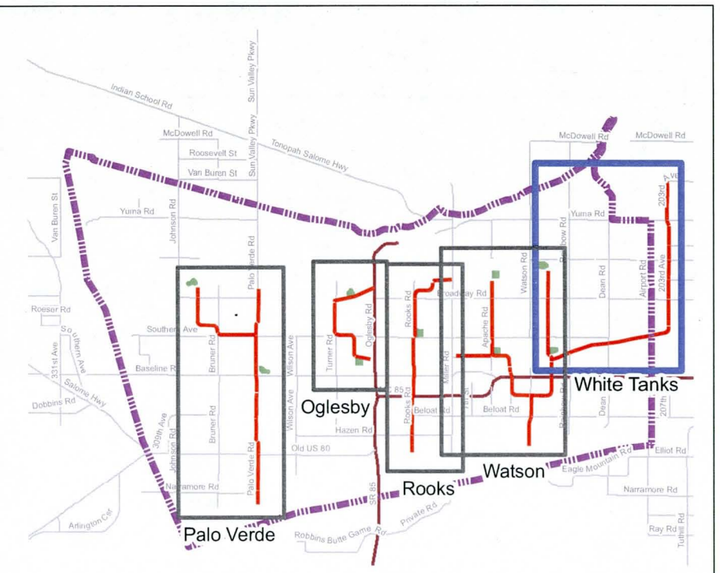
ID	Location	Length (ft.)	Number of Barrels	Culvert Dia./ Height	Unit	Width ft)	Pipe/Box Culvert Cost	Inlet Headwall	Unit Cost (Ea.)	Inlet Headwall Cost	Outlet Headwall	Unit Cost (Ea.)	Outlet Headwall Cost	Culvert Land Acquisition Cost	Culvert Materials Cost	Culvert Contingencies Cost	Total Land, Construction, and Contingencies Costs
WT-C1	RAINBOW ROAD	120	5	6	ft.	8	$353,000	1	$13,200	$13,200	1	$19,900	$19,900	$0	$386,000	$155,000	**$541,000**
WT-C2	DEAN ROAD	110	4	5	ft.	10	$318,000	1	$11,400	$11,400	1	$17,200	$17,200	$0	$346,000	$139,000	**$485,000**
WT-C3	AIRPORT ROAD	112	3	4	ft.	8	$191,000	1	$7,200	$7,200	1	$10,800	$10,800	$0	$209,000	$84,000	**$292,000**
WT-C4	UPRR	202	3	4	ft.	8	$344,000	1	$7,200	$7,200	1	$10,800	$10,800	$0	$362,000	$145,000	**$507,000**
WT-C5	BROADWAY ROAD	110	3	4	ft.	8	$187,000	1	$7,200	$7,200	1	$10,800	$10,800	$0	$205,000	$82,000	**$288,000**
WT-C6	DUNLAP ROAD	110	3	4	ft.	8	$187,000	1	$7,200	$7,200	1	$10,800	$10,800	$0	$205,000	$82,000	**$288,000**
WT-C7	LOWER BUCKEYE ROAD	110	5	5	ft.	8	$311,000	1	$11,400	$11,400	1	$17,100	$17,100	$0	$339,000	$136,000	**$475,000**
WT-C8	HILTON AVE	110	4	4	ft.	8	$244,000	1	$8,600	$8,600	1	$12,900	$12,900	$0	$266,000	$106,000	**$372,000**
WT-C9	RID CANAL	111	4	5	ft.	8	$255,000	1	$10,000	$10,000	1	$15,000	$15,000	$0	$280,000	$112,000	**$392,000**
WT-C10	YUMA ROAD	110	2	4	ft.	6	$99,000	1	$5,300	$5,300	1	$7,900	$7,900	$0	$112,000	$45,000	**$157,000**
															$2,710,000	**$1,086,000**	**$3,797,000**

Storm Drain Cost

ID	Length (ft.)	Number of Barrels	Culvert Height	Unit	Width ft)	Pipe/Box Culvert Cost	Total Lateral Cost	Catchbasins	Manholes	Surface Replacement (Unit Cost @ width required)	Surface Replacement Cost	Traffic Control	Junction Structures	Mobilization	ANPP 96" Crossing ($100K per 24' spool)	Miscellaneous Removals	Total Cost/LF	Total Construction Cost	Contingency Cost	Design Cost	Total Land, Construction, and Contingencies Costs
WT-SD1	1,033	2	4	ft	8	$2,845,995	$38,761	$61,977	$38,738	$471	$1,093,687	$27,886	$18,591	$46,477	$100,000	$13,943	$1,801	$4,286,054	$1,285,816	$428,605	**$6,000,476**

TOTAL PROJECT COST	**$46,917,000**





SYSTEM KEY MAP

Conceptual Design Cost Reference Map
White Tanks System

Flood Control District of Maricopa County

Buckeye Area Drainage Master Plan

FCD Contract No. 2004C058

Project Location

2,000 1,000 0 2,000 4,000 Feet

NOTE:
Planned project footprint and locations are a graphical representation only, and does not necessarily portray the actual locations of future projects.

Dibble Engineering

Sheet 1 of 5

Watson System, Recommended Plan, Sheet 2

Channel Cost

ID	Excavated Volume (cy)	Unit Cost ($/cy)	Excavation Cost	Utilities Cost	Channel Length (ft)	Left Access Road Width (ft)	Right Access Road Width (ft)	6" ABC Access Road Unit Cost ($/sf)	Access Road Cost	Drainage Corridor Width-Channel+Access Rd (ft)	Total Right-of-Way Width Required Including Landscape (ft.)	Landscape Unit Cost ($/sf)	Total Landscape Cost	Required Land Acquisition (Ac.)	Land Acquisition Cost	Total Construction Cost	Total Contingencies Cost	Total Construction, Land, Landscape, and Contingencies Costs
WC-08	15,277	$11	$168,000	$10,000	3,579	18	18	$0.65	$84,000	134	184	$0.92	$607,000	15.15	$3,035,000	$308,000	$92,000	**$4,043,000**
WC-07	38,587	$11	$424,000	$0	5,074	18	18	$0.65	$119,000	114	164	$0.23	$192,000	19.14	$3,835,000	$543,000	$163,000	**$4,733,000**
WC-06	26,021	$11	$286,000	$70,000	2,495	18	18	$0.65	$58,000	129	179	$0.23	$103,000	10.24	$2,051,000	$415,000	$124,000	**$2,693,000**
WC-05	3,071	$11	$34,000	$0	690	0	0	$0.65	$0	59	109	$0.23	$17,000	1.73	$346,000	$134,000	$40,000	**$537,000**
WC-04	26,329	$11	$290,000	$100,000	1,932	18	18	$0.65	$45,000	186	242	$0.23	$108,000	10.74	$2,153,000	$511,000	$153,000	**$2,925,000**
WC-03B	34,496	$11	$379,000	$10,000	2,119	18	18	$0.65	$50,000	153	203	$0.23	$99,000	9.88	$1,979,000	$439,000	$132,000	**$2,649,000**
WC-03A	78,339	$11	$862,000	$210,000	2,805	18	18	$0.65	$66,000	189	246	$0.23	$159,000	15.85	$3,177,000	$1,137,000	$341,000	**$4,814,000**
WC-15	5,665	$11	$62,000	$0	2,232	18	0	$0.65	$26,000	93	143	$0.23	$73,000	7.32	$1,468,000	$115,000	$35,000	**$1,691,000**
WC-14	13,486	$11	$148,000	$15,000	5,179	18	0	$0.65	$61,000	63	113	$0.23	$134,000	13.40	$2,685,000	$224,000	$67,000	**$3,110,000**
WC-13	13,254	$11	$146,000	$0	2,092	18	0	$0.65	$24,000	89	139	$0.23	$67,000	6.68	$1,338,000	$170,000	$51,000	**$1,626,000**
WC-16	94,392	$11	$1,038,000	$73,000	4,718	18	0	$0.65	$55,000	146	196	$0.92	$852,000	21.27	$4,261,000	$1,167,000	$350,000	**$6,630,000**
WC-12B	9,889	$11	$109,000	$0	2,136	18	18	$0.65	$50,000	135	185	$0.23	$91,000	9.08	$1,819,000	$204,000	$61,000	**$2,175,000**
WC-12A	4,786	$11	$53,000	$39,000	1,505	18	18	$0.65	$35,000	86	136	$0.23	$47,000	4.68	$938,000	$127,000	$38,000	**$1,150,000**
WC-11	7,457	$11	$82,000	$0	600	0	0	$0.65	$0	140	190	$0.23	$26,000	2.62	$525,000	$146,000	$44,000	**$741,000**
WC-10	4,527	$11	$50,000	$20,000	502	0	0	$0.65	$0	86	136	$0.23	$16,000	1.56	$313,000	$170,000	$51,000	**$550,000**
WC-09C	21,493	$11	$236,000	$0	2,361	18	18	$0.65	$55,000	122	172	$0.23	$93,000	9.33	$1,869,000	$292,000	$87,000	**$2,341,000**
WC-09B	29,724	$11	$327,000	$0	2,130	18	18	$0.65	$50,000	182	237	$0.23	$116,000	11.56	$2,317,000	$443,000	$133,000	**$3,009,000**
WC-09A	3,184	$11	$35,000	$0	261	18	18	$0.65	$6,000	136	186	$0.23	$11,000	1.11	$223,000	$41,000	$12,000	**$288,000**
WC-02	70,982	$11	$781,000	$70,000	2,526	18	18	$0.65	$59,000	190	247	$0.23	$144,000	14.34	$2,874,000	$910,000	$273,000	**$4,200,000**
WC-01	161,508	11	$1,777,000	$0	3,981	18	18	$0.65	$93,000	222	288	$0.23	$264,000	26.33	$5,275,000	$1,870,000	$561,000	**$7,970,000**
													$3,219,000	**212.01**	**$42,481,000**	**$9,366,000**	**$2,808,000**	**$57,875,000**

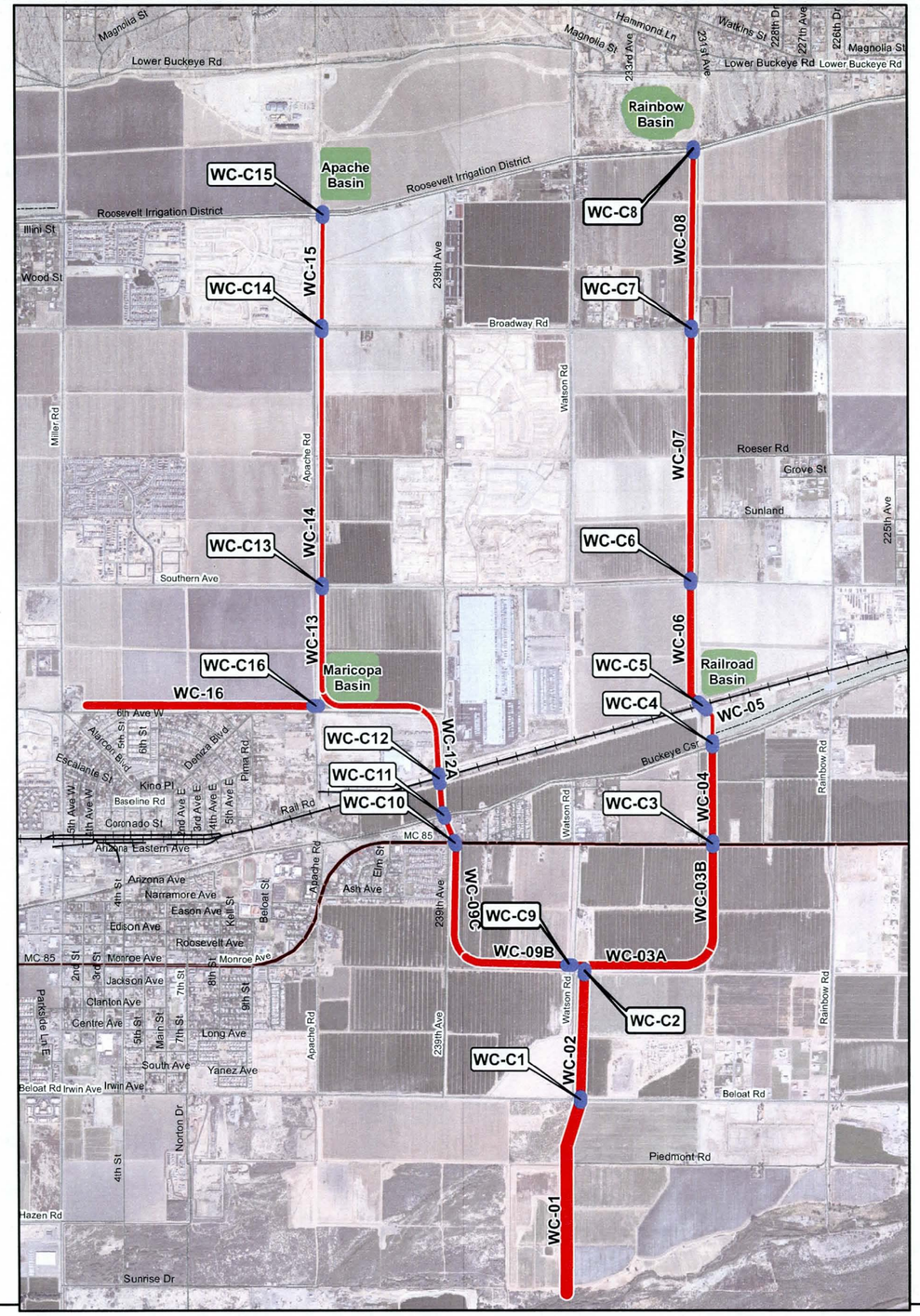
Culvert Cost

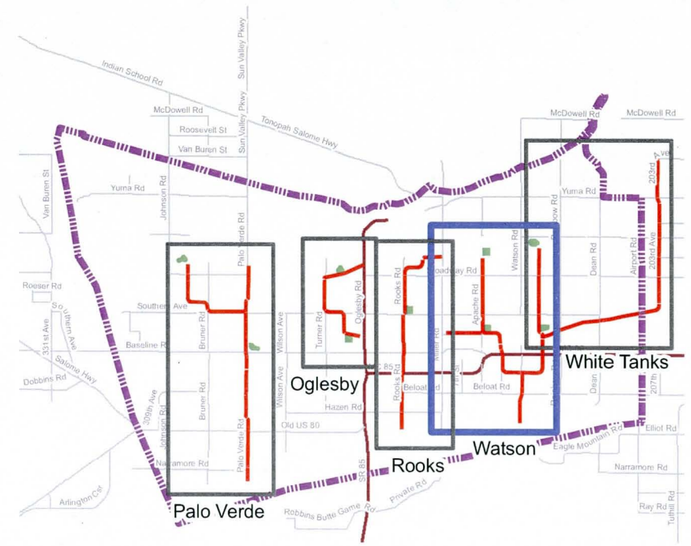
ID	Location	Length (ft.)	Number of Barrels	Culvert Dia./ Height	Unit	Width ft)	Pipe/Box Culvert Cost	Inlet Headwall	Unit Cost (Ea.)	Inlet Headwall Cost	Outlet Headwall	Unit Cost (Ea.)	Outlet Headwall Cost	Culvert Land Acquisition Cost	Culvert Materials Cost	Culvert Contingencies Cost	Total Land, Construction, and Contingencies Costs
WC-C1	BELOAT	110	5	6	ft.	10	$385,000	1	$15,200	$15,200	1	$22,700	$22,700	$0	$423,000	$169,000	**$592,000**
WC-C2	MONROE- 1/2 NORTH OF BELOAT	110	4	5	ft.	10	$318,000	1	$11,400	$11,400	1	$17,200	$17,200	$0	$347,000	$139,000	**$485,000**
WC-C3	MC 85	122	4	4	ft.	8	$270,000	1	$8,600	$8,600	1	$12,900	$12,900	$0	$292,000	$117,000	**$408,000**
WC-C4	BWCDD	132	4	4	ft.	8	$294,000	1	$8,600	$8,600	1	$12,900	$12,900	$0	$315,000	$126,000	**$441,000**
WC-C5	UPRR	230	3	4	ft.	8	$497,000	1	$7,200	$7,200	1	$10,800	$10,800	$0	$515,000	$206,000	**$722,000**
WC-C6	SOUTHERN AVE	110	2	4	ft.	10	$165,000	1	$6,500	$6,500	1	$9,800	$9,800	$0	$181,000	$72,000	**$254,000**
WC-C7	BROADWAY ROAD	110	1	4	ft.	10	$87,000	1	$4,900	$4,900	1	$7,300	$7,300	$0	$99,000	$40,000	**$139,000**
WC-C8	RID CANAL	110	1	4	ft.	10	$87,000	1	$4,900	$4,900	1	$7,300	$7,300	$0	$99,000	$40,000	**$139,000**
WC-C9	WATSON ROAD	109	3	4	ft.	8	$186,000	1	$7,200	$7,200	1	$10,800	$10,800	$0	$204,000	$82,000	**$286,000**
WC-C10	MC 85	110	3	4	ft.	8	$187,000	1	$7,200	$7,200	1	$10,800	$10,800	$0	$205,000	$82,000	**$288,000**
WC-C11	BWCDD	121	3	4	ft.	10	$262,000	1	$8,200	$8,200	1	$12,300	$12,300	$0	$282,000	$113,000	**$395,000**
WC-C12	UPRR	202	1	4	ft.	10	$159,000	1	$4,900	$4,900	1	$7,300	$7,300	$0	$172,000	$69,000	**$240,000**
WC-C13	SOUTHERN AVE	110	1	4	ft.	6	$55,000	1	$4,300	$4,300	1	$6,500	$6,500	$0	$66,000	$26,000	**$92,000**
WC-C14	BROADWAY ROAD	119	1	4	ft.	6	$60,000	1	$4,300	$4,300	1	$6,500	$6,500	$0	$70,000	$28,000	**$99,000**
WC-C15	RID CANAL	110	1	4	ft.	6	$55,000	1	$4,300	$4,300	1	$6,500	$6,500	$0	$66,000	$26,000	**$92,000**
WC-C16	APACHE ROAD	110	4	6	ft.	10	$330,000	1	$13,300	$13,300	1	$19,900	$19,900	$0	$363,000	$145,000	**$508,000**
															$3,699,000	**$1,480,000**	**$5,180,000**

Detention Basin Cost

I.D.	Basin Excavation Volume (cy)	Unit Cost ($/cy)	Detention Basin Excavation Cost	Length of Drain Pipe/ Box Culvert (ft.)	Unit Cost ($/ft.)	Pipe/Box Culvert Cost	Number of Manholes	Manhole Total Cost ($)	Headwall	Unit Cost (Ea.)	Headwall Cost	Inflow Spillway Area (sf)	Inflow Spillway Unit Cost ($/sf)	Inflow Spillway Cost ($/sf)	Basin Top Area (ac)	Required Land Acquisition (Ac.)	Unit Cost ($/ac)	Total Land Acquisition Cost	Landscape Restoration (sf)	Landscape Unit Cost ($/sf)	Landscape Cost	Total Construction Cost	Total Landscape Cost	Total Construction, Land, and Landscape Costs
Rainbow Park Basin	443,400	$12.00	$5,321,000	643	$60	$39,000	2	$9,000	2	$1,100	$2,200	27,931	$5	$139,700	30.0	39.0	$200,000	$7,800,000	1,698,840	$0.92	$1,563,000	$5,510,000	$1,563,000	**$17,077,000**
Railroad Basin	266,400	$12.00	$3,197,000	1,024	$60	$61,000	3	$13,500	2	$1,100	$2,200	28,990	$5	$145,000	21.6	28.1	$200,000	$5,620,000	1,224,036	$0.92	$1,126,000	$3,419,000	$1,126,000	**$11,533,000**
Apache Basin	304,500	$12.00	$3,654,000	1,175	$60	$71,000	3	$13,500	2	$1,100	$2,200	38,413	$5	$192,100	25.6	33.2	$200,000	$6,640,000	1,446,192	$0.92	$1,330,000	$3,933,000	$1,330,000	**$13,476,000**
Maricopa Basin	335,300	$12.00	$4,024,000	1,418	$60	$85,000	4	$18,000	2	$1,100	$2,200	14,922	$5	$74,600	24.5	31.9	$200,000	$6,380,000	1,389,564	$0.92	$1,278,000	$4,204,000	$1,278,000	**$13,543,000**

TOTAL PROJECT COST	**$118,684,000**





SYSTEM KEY MAP

Conceptual Design Cost Reference Map Watson System

Flood Control District of Maricopa County

Buckeye Area Drainage Master Plan

FCD Contract No. 2004C058

Project Location

2,000 1,000 0 2,000 4,000 Feet

NOTE:
Planned project footprint and locations are a graphical representation only, and does not necessarily portray the actual locations of future projects.

Dibble Engineering

Sheet 2 of 5

Rooks System, Recommended Plan, Sheet 3

Channel Cost

ID	Excavated Volume (cy)	Unit Cost ($/cy)	Excavation Cost	Utilities Cost	Channel Length (ft)	Left Access Road Width (ft)	Right Access Road Width (ft)	6" ABC Access Road Unit Cost ($/sf)	Access Road Cost	Drainage Corridor Width-Channel+Access Rd (ft)	Total Right-of-Way Width Required Including Landscape (ft.)	Landscape Unit Cost ($/sf)	Total Landscape Cost	Required Land Acquisition (Ac.)	Land Acquisition Cost	Total Construction Cost	Total Contingencies Cost	Total Construction, Land, Landscape, and Contingencies Costs
RC-06	45,489	$11	$500,000	$3,000	2,455	18	18	$0.65	$57,000	160	210	$0.23	$119,000	11.83	$2,370,000	$561,000	$168,000	**$3,218,000**
RC-05	55,973	$11	$616,000	$0	3,812	18	18	$0.65	$89,000	203	264	$0.23	$231,000	23.08	$4,624,000	$814,000	$244,000	**$5,913,000**
RC-04	74,782	$11	$823,000	$70,000	5,157	18	0	$0.65	$60,000	183	238	$0.23	$282,000	28.17	$5,644,000	$1,058,000	$317,000	**$7,302,000**
RC-03	19,551	$11	$215,000	$0	3,666	0	18	$0.65	$43,000	70	70	$0.00	$0	0.00	$0	$0	$0	**$0**
RC-02	47,910	$11	$527,000	$3,000	5,077	0	18	$0.65	$59,000	128	178	$0.23	$208,000	20.77	$4,161,000	$618,000	$185,000	**$5,173,000**
RC-01	78,951	$11	$868,000	$0	2,289	18	18	$0.65	$54,000	208	271	$0.23	$142,000	14.22	$2,850,000	$922,000	$277,000	**$4,191,000**
													$982,000	**98.06**	**$19,649,000**	**$3,973,000**	**$1,191,000**	**$25,797,000**

Culvert Cost

ID	Location	Length (ft.)	Number of Barrels	Culvert Dia./ Height	Unit	Width ft)	Pipe/Box Culvert Cost	Inlet Headwall	Unit Cost (Ea.)	Inlet Headwall Cost	Outlet Headwall	Unit Cost (Ea.)	Outlet Headwall Cost	Culvert Land Acquisition Cost	Culvert Materials Cost	Culvert Contingencies Cost	Total Land, Construction, and Contingencies Costs
RR-C1	Hazen Road	119	3	4	ft.	8	$203,000	1	$7,200	$7,200	1	$10,800	$10,800	$0	$221,000	$88,000	**$309,000**
RR-C2	Beloat Road	110	3	4	ft.	8	$188,000	1	$7,200	$7,200	1	$10,800	$10,800	$0	$206,000	$82,000	**$288,000**
RR-C3	Southern Ave	235	1	5	ft.	10	$196,000	1	$6,200	$6,200	1	$9,300	$9,300	$0	$211,000	$84,000	**$296,000**
RR-C4	Broadway Road	124	4	5	ft.	8	$286,000	1	$10,000	$10,000	1	$15,000	$15,000	$0	$311,000	$125,000	**$436,000**
RR-C5	RID, Warner	317	4	5	ft.	10	$917,000	1	$11,400	$11,400	1	$17,200	$17,200	$0	$945,000	$378,000	**$1,323,000**
															$1,894,000	**$757,000**	**$2,652,000**

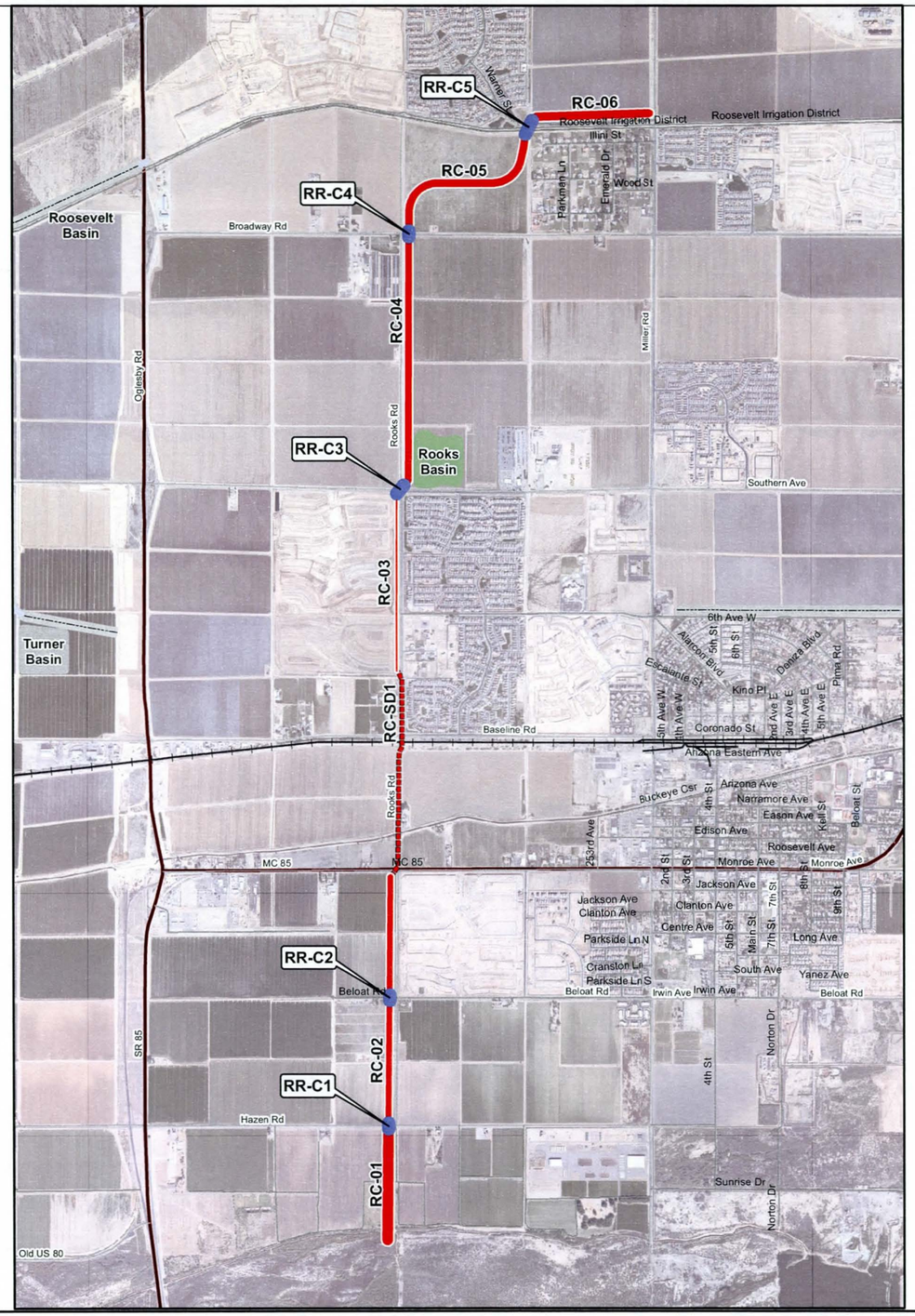
Storm Drain Cost

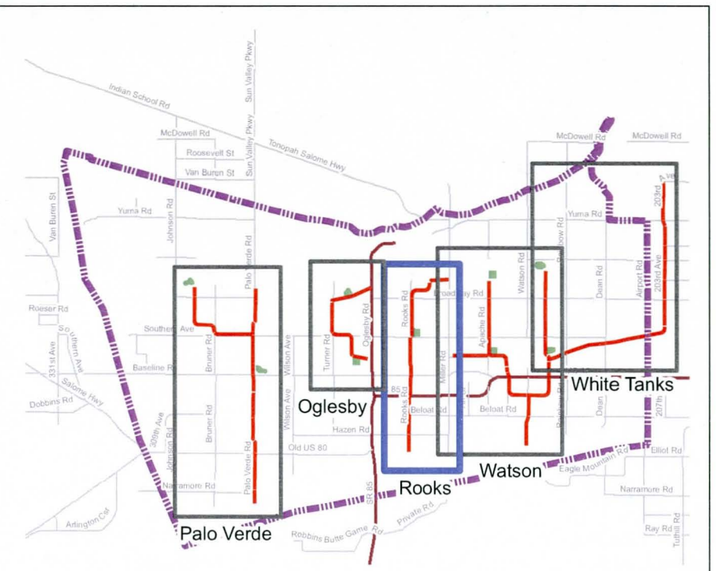
ID	Length (ft.)	Number of Barrels	Culvert Height	Unit	Width ft)	Pipe/Box Culvert Cost	Total Lateral Cost	Catchbasins	Manholes	Surface Replacement (Unit Cost @ width required)	Surface Replacement Cost	Traffic Control	Junction Structures	Mobilization	ANPP 96" Crossing ($100K per 24' spool)	Miscellaneous Removals	Total Cost/LF	Total Construction Cost	Contingency Cost	Design Cost	Total Land, Construction, and Contingencies Costs
RC-SD1	897	2	5	ft	8	$5,489,997	$72,307	$115,613	$72,264	$471	$2,040,201	$52,019	$34,680	$86,699	$100,000	$26,010	$1,843	$8,089,790	$2,426,937	$808,979	**$11,325,706**

Detention Basin Cost

I.D.	Basin Excavation Volume (cy)	Unit Cost ($/cy)	Detention Basin Excavation Cost	Length of Drain Pipe/ Box Culvert (ft.)	Unit Cost ($/ft.)	Pipe/Box Culvert Cost	Number of Manholes	Manhole Total Cost ($)	Headwall	Unit Cost (Ea.)	Headwall Cost	Inflow Spillway Area (sf)	Inflow Spillway Unit Cost ($/sf)	Inflow Spillway Cost ($/sf)	Basin Top Area (ac)	Required Land Acquisition (Ac.)	Unit Cost ($/ac)	Total Land Acquisition Cost	Landscape Restoration (sf)	Landscape Unit Cost ($/sf)	Landscape Cost	Total Construction Cost	Total Landscape Cost	Total Construction, Land, and Landscape Costs
Rooks Basin	503,400	$12.00	$6,040,000	1,030	$60	$62,000	3	$13,500	2	$1,100	$2,200	124,075	$5	$620,400	25.7	33.4	$200,000	$6,680,000	1,454,904	$0.23	$335,000	$6,738,000	$335,000	**$16,448,000**

TOTAL PROJECT COST	**$56,223,000**





SYSTEM KEY MAP

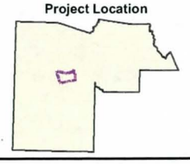
Conceptual Design Cost Reference Map Rooks System

Flood Control District of Maricopa County

Buckeye Area Drainage Master Plan

FCD Contract No. 2004C058

Project Location



2,000 1,000 0 2,000 4,000 Feet

NOTE:
Planned project footprint and locations are a graphical representation only, and does not necessarily portray the actual locations of future projects.

Dibble Engineering

Sheet 3 of 5

Oglesby System, Recommended Plan, Sheet 4

Channel Cost

ID	Excavated Volume (cy)	Unit Cost ($/cy)	Excavation Cost	Utilities Cost	Channel Length (ft)	Left Access Road Width (ft)	Right Access Road Width (ft)	6" ABC Access Road Unit Cost ($/sf)	Access Road Cost	Drainage Corridor Width-Channel+Access Rd (ft)	Total Right-of-Way Width Required Including Landscape (ft.)	Landscape Unit Cost ($/sf)	Total Landscape Cost	Required Land Acquisition (Ac.)	Land Acquisition Cost	Total Construction Cost	Total Contingencies Cost	Total Construction, Land, Landscape, and Contingencies Costs
OC-06	48,890	$11	$538,000	$0	2,848	18	18	$0.65	$67,000	154	204	$0.92	$534,000	13.34	$2,672,000	$604,000	$181,000	**$3,992,000**
OC-05	14,993	$11	$165,000	$0	2,873	18	18	$0.65	$67,000	100	150	$0.92	$396,000	9.87	$1,978,000	$232,000	$70,000	**$2,675,000**
OC-04	19,817	$11	$218,000	$70,000	4,070	0	18	$0.65	$48,000	120	170	$0.23	$160,000	15.93	$3,191,000	$384,000	$115,000	**$3,850,000**
OC-03	21,931	$11	$241,000	$0	2,241	18	0	$0.65	$26,000	136	186	$0.23	$96,000	9.57	$1,917,000	$308,000	$92,000	**$2,413,000**
OC-02	20,660	$11	$227,000	$140,000	2,628	18	18	$0.65	$62,000	176	228	$0.23	$138,000	13.79	$2,763,000	$527,000	$158,000	**$3,586,000**
OC-01	21,529	$11	$237,000	$0	2,035	18	18	$0.65	$48,000	128	178	$0.23	$83,000	8.33	$1,670,000	$284,000	$85,000	**$2,123,000**
													$1,407,000	**70.82**	**$14,191,000**	**$2,339,000**	**$701,000**	**$18,639,000**

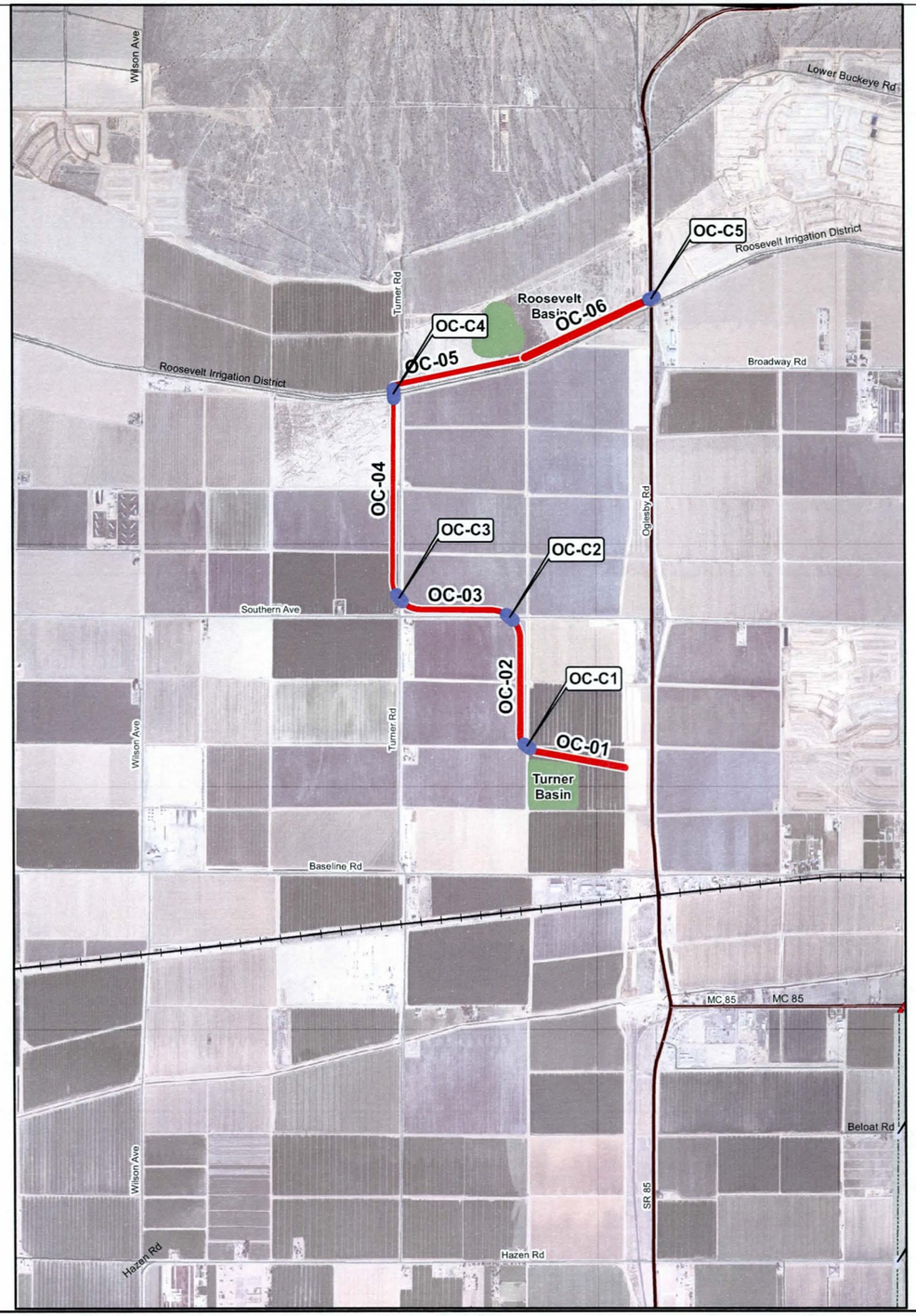
Culvert Cost

ID	Location	Length (ft.)	Number of Barrels	Culvert Dia./ Height	Unit	Width ft)	Pipe/Box Culvert Cost	Inlet Headwall	Unit Cost (Ea.)	Inlet Headwall Cost	Outlet Headwall	Unit Cost (Ea.)	Outlet Headwall Cost	Culvert Land Acquisition Cost	Culvert Materials Cost	Culvert Contingencies Cost	Total Land, Construction, and Contingencies Costs
OC-C1	1/2 mile west of Oglesby, east of Turner	137	2	4	ft.	10	$206,000	1	$6,500	$6,500	1	$9,800	$9,800	$0	$222,000	$89,000	**$311,000**
OC-C2	Southern Ave	174	3	4	ft.	8	$296,000	1	$7,200	$7,200	1	$10,800	$10,800	$0	$314,000	$126,000	**$440,000**
OC-C3	Turner Road	167	2	4	ft.	6	$150,000	1	$5,300	$5,300	1	$7,900	$7,900	$0	$163,000	$65,000	**$228,000**
OC-C4	RID canal	188	1	4	ft.	10	$148,000	1	$4,900	$4,900	1	$7,300	$7,300	$0	$160,000	$64,000	**$225,000**
OC-C5	SR 85	122	3	5	ft.	10	$274,000	1	$9,800	$9,800	1	$14,600	$14,600	$0	$299,000	$119,000	**$418,000**
															$1,158,000	**$463,000**	**$1,622,000**

Detention Basin Cost

I.D.	Basin Excavation Volume (cy)	Unit Cost ($/cy)	Detention Basin Excavation Cost	Length of Drain Pipe/ Box Culvert (ft.)	Unit Cost ($/ft.)	Pipe/Box Culvert Cost	Number of Manholes	Manhole Total Cost ($)	Headwall	Unit Cost (Ea.)	Headwall Cost	Inflow Spillway Area (sf)	Inflow Spillway Unit Cost ($/sf)	Inflow Spillway Cost ($/sf)	Basin Top Area (ac)	Required Land Acquisition (Ac.)	Unit Cost ($/ac)	Total Land Acquisition Cost	Landscape Restoration (sf)	Landscape Unit Cost ($/sf)	Landscape Cost	Total Construction Cost	Total Landscape Cost	Total Construction, Land, and Landscape Costs
Roosevelt Basin	320,600	$12.00	$3,847,000	2,582	$60	$155,000	7	$31,500	2	$1,100	$2,200	11,514	$5	$57,600	22.0	28.5	$200,000	$5,700,000	1,241,460	$0.92	$1,142,000	$4,093,000	$1,142,000	**$12,573,000**
Turner Basin	268,700	$12.00	$3,224,000	1,700	$60	$102,000	5	$22,500	2	$1,100	$2,200	9,830	$5	$49,200	23.4	30.5	$200,000	$6,100,000	1,328,580	$0.23	$306,000	$3,400,000	$306,000	**$11,166,000**

TOTAL PROJECT COST	**$44,000,000**



SYSTEM KEY MAP

Conceptual Design Cost Reference Map Oglesby System

Buckeye Area Drainage Master Plan
FCD Contract No. 2004C058

Project Location

2,000 1,000 0 2,000 4,000 Feet

NOTE:
Planned project footprint and locations are a graphical representation only, and does not necessarily portray the actual locations of future projects.

Dibble Engineering

Palo Verde System, Recommended Plan, Sheet 5

Channel Cost

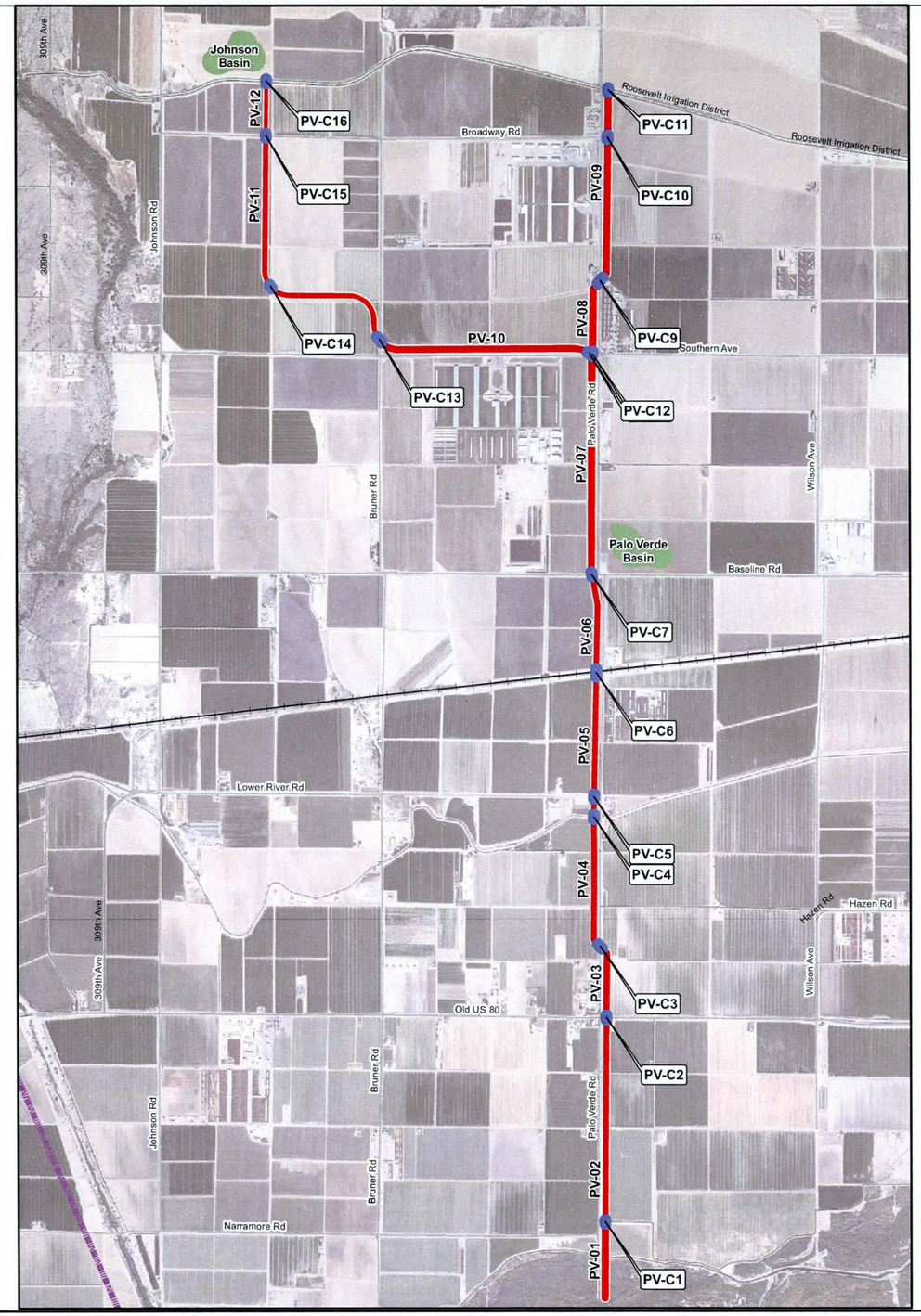
ID	Excavated Volume (cy)	Unit Cost ($/cy)	Excavation Cost	Utilities Cost	Channel Length (ft)	Left Access Road Width (ft)	Right Access Road Width (ft)	6" ABC Access Road Unit Cost ($/sf)	Access Road Cost	Drainage Corridor Width-Channel+Access Rd (ft)	Total Right-of-Way Width Required Including Landscape (ft.)	Landscape Unit Cost ($/sf)	Total Landscape Cost	Required Land Acquisition (Ac.)	Land Acquisition Cost	Total Construction Cost	Total Contingencies Cost	Total Construction, Land, Landscape, and Contingencies Costs
PV-09	93,544	$11	$1,029,000	$70,000	4,465	18	0	$0.65	$52,000	213	277	$0.23	$285,000	28.40	$5,691,000	$1,288,000	$386,000	**$7,650,000**
PV-08	38,856	$11	$427,000	$0	1,670	0	18	$0.65	$20,000	190	247	$0.23	$95,000	9.45	$1,894,000	$506,000	$152,000	**$2,646,000**
PV-12	3527	$11	$38,797	$0	1,202	18	18	$0.65	$28,135	150.7	201	$0.92	$222,029	5.5	$1,110,144	$156,688	$47,006	**$1,535,867**
PV-11	47146	$11	$518,604	$210,000	6,888	18	18	$0.65	$161,186	109.6	160	$0.92	$1,011,702	25.2	$5,058,511	$889,790	$266,937	**$7,226,941**
PV-10	101984	$11	$1,121,824	$70,000	5,003	18	0	$0.65	$58,537	147.6	198	$0.23	$227,342	22.7	$4,546,840	$1,250,361	$375,108	**$6,399,651**
PV-07	126042	$11	$1,386,460	$100,000	5,178	0	18	$0.65	$60,582	164.1	214	$0.92	$1,019,919	25.5	$5,099,596	$1,547,042	$464,113	**$8,130,670**
PV-06	34051	$11	$374,562	$70,000	2,225	0	18	$0.65	$26,036	175.8	229	$0.92	$468,019	11.7	$2,340,096	$552,932	$165,880	**$3,526,927**
PV-05	52208	$11	$574,285	$0	3,307	0	18	$0.65	$38,688	172.2	224	$0.23	$170,283	17.0	$3,405,660	$883,363	$265,009	**$4,724,315**
PV-04	51018	$11	$561,194	$140,000	3,023	0	18	$0.65	$35,368	184.9	240	$0.23	$167,098	16.7	$3,341,955	$829,043	$248,713	**$4,586,808**
PV-03	30388	$11	$334,272	$10,000	1,642	18	0	$0.65	$19,217	182.1	237	$0.92	$357,738	8.9	$1,788,692	$438,391	$131,517	**$2,716,338**
PV-02	77438	$11	$851,821	$0	4,814	18	0	$0.65	$56,322	134.5	184	$0.23	$204,262	20.4	$4,085,236	$908,143	$272,443	**$5,470,084**
PV-01	43913	$11	$483,046	$0	1,782	18	0	$0.65	$20,844	163.1	213	$0.23	$87,315	8.7	$1,746,305	$503,890	$151,167	**$2,488,677**
													$4,315,707	**200.17**	**$40,108,034**	**$9,753,642**	**$2,925,893**	**$57,102,277**

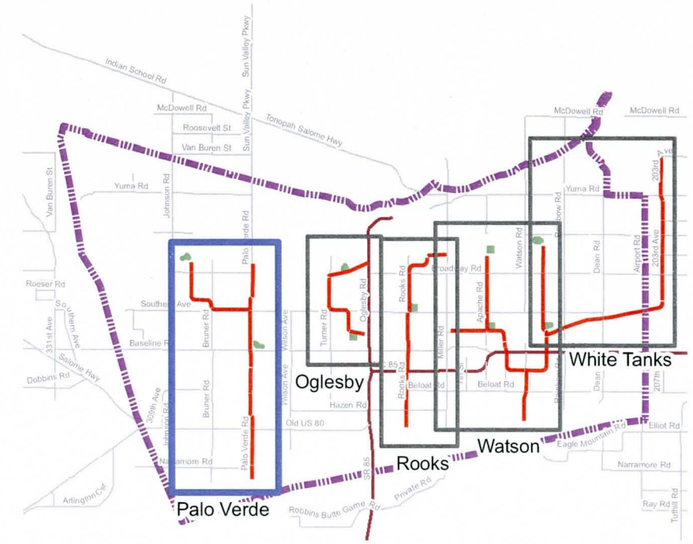
Culvert Cost

ID	Location	Length (ft.)	Number of Barrels	Culvert Dia./ Height	Unit	Width ft)	Pipe/Box Culvert Cost	Inlet Headwall	Unit Cost (Ea.)	Inlet Headwall Cost	Outlet Headwall	Unit Cost (Ea.)	Outlet Headwall Cost	Culvert Land Acquisition Cost	Culvert Materials Cost	Culvert Contingencies Cost	Total Land, Construction, and Contingencies Costs
PV-C1	BENCH	94.25	4	5	ft.	10	$272,317	1	$11,440	$11,440	1	$17,161	$17,161	$0	$300,918	$120,367	**$421,285**
PV-C2	Old US 80	121	4	5	ft.	10	$350,000	1	$11,000	$11,000	1	$17,161	$17,161	$0	$378,900	$151,560	**$530,460**
PV-C3	Palo Verde Road	154.29	4	5	ft.	10	$445,790	1	$11,440	$11,440	1	$17,161	$17,161	$0	$474,391	$189,756	**$664,148**
PV-C4	BWCDD	121.07	4	5	ft.	8	$349,808	1	$9,982	$9,982	1	$14,973	$14,973	$0	$374,763	$149,905	**$524,668**
PV-C5	Lower River Road, (ANPP-244+31.47)	110	4	5	ft.	8	$317,823	1	$9,982	$9,982	1	$14,973	$14,973	$0	$342,778	$137,111	**$479,889**
PV-C6	UPRR	201.68	4	5	ft.	8	$464,792	1	$9,982	$9,982	1	$14,973	$14,973	$0	$489,747	$195,899	**$685,645**
PV-C7	Baseline Road	110.51	4	5	ft.	8	$254,681	1	$9,982	$9,982	1	$14,973	$14,973	$0	$279,636	$111,855	**$391,491**
PV-C8	Southern Ave	118.39	6	5	ft.	8	$398,001	1	$12,816	$12,816	1	$19,223	$19,223	$0	$430,040	$172,016	**$602,055**
PV-C9	Palo Verde Road	193.4	5	5	ft.	10	$695,805	1	$13,294	$13,294	1	$19,941	$19,941	$0	$729,040	$291,616	**$1,020,656**
PV-C10	Broadway Road	109.96	5	6	ft.	10	$410,112	1	$15,164	$15,164	1	$22,745	$22,745	$0	$448,021	$179,209	**$627,230**
PV-C11	RID Canal	113.6	5	6	ft.	10	$423,688	1	$15,164	$15,164	1	$22,745	$22,745	$0	$461,597	$184,639	**$646,236**
PV-C12	Southern Ave	125.55	4	6	ft.	10	$376,644	1	$13,281	$13,281	1	$19,922	$19,922	$0	$409,847	$163,939	**$573,785**
PV-C13	Bruner Road	178.44	2	4	ft.	8	$218,535	1	$5,972	$5,972	1	$8,958	$8,958	$0	$233,465	$93,386	**$326,852**
PV-C14	1/2 mile west of Bruner	174.87	2	4	ft.	10	$262,038	1	$6,538	$6,538	1	$9,808	$9,808	$0	$278,384	$111,354	**$389,738**
PV-C15	Broadway Road	110	2	4	ft.	6	$98,687	1	$5,285	$5,285	1	$7,928	$7,928	$0	$111,900	$44,760	**$156,659**
PV-C16	RID Canal	110.14	2	4	ft.	6	$98,812	1	$5,285	$5,285	1	$7,928	$7,928	$0	$112,025	$44,810	**$156,835**
															$5,855,451	**$2,342,180**	**$8,197,631**

Detention Basin Cost

I.D.	Basin Excavation Volume (cy)	Unit Cost ($/cy)	Detention Basin Excavation Cost	Length of Drain Pipe/ Box Culvert (ft.)	Unit Cost ($/ft.)	Pipe/Box Culvert Cost	Number of Manholes	Manhole Total Cost ($)	Headwall	Unit Cost (Ea.)	Headwall Cost	Inflow Spillway Area (sf)	Inflow Spillway Unit Cost ($/sf)	Inflow Spillway Cost ($/sf)	Basin Top Area (ac)	Required Land Acquisition (Ac.)	Unit Cost ($/ac)	Total Land Acquisition Cost	Landscape Restoration (sf)	Landscape Unit Cost ($/sf)	Landscape Cost	Total Construction Cost	Total Landscape Cost	Total Construction, Land, and Landscape Costs
Johnson Basin	147,100	$12.00	$1,765,000	962	$60	$58,000	3	$13,500	2	$1,100	$2,200	28,494	$5	$142,500	24.9	32.4	$200,000	$6,480,000	1,411,344	$0.23	$325,000	$1,981,000	$325,000	**$9,577,000**
Palo Verde Basin	393,400	$12.00	$4,720,000	2,365	$60	$142,000	6	$27,000	2	$1,100	$2,200	108,671	$5	$543,400	24.5	31.9	$200,000	$6,380,000	1,389,564	$0.23	$320,000	$5,435,000	$320,000	**$14,308,000**
																							TOTAL PROJECT COST	**$89,185,000**





SYSTEM KEY MAP

Conceptual Design Cost Reference Map
Palo Verde System

Buckeye Area
Drainage Master Plan
FCD Contract No. 2004C058

Project Location

2,000 1,000 0 2,000 4,000 Feet

NOTE:
Planned project footprint and locations are a graphical representation only, and does not necessarily portray the actual locations of future projects.

Dibble Engineering

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