CITY OF ALBUQUERQUE

July 26, 2006

Mario Juarez-Infante, PE
Wilson & Company
2600 American Rd, SE, Ste. 100
Rio Rancho, NM 87124

Re: Westside Blvd / Golf Course Drainage Report
Engineer Stamp dated 5-22-06 (A12/D24)

Dear Mr. Juarez-Infante,

Based upon information provided in your submittal dated 5-22-06, the above referenced drainage report is approved for the Work Order requirements.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham

Bradley L. Bingham, PE
Principal Engineer, Planning Dept.
Development and Building Services

C: file

P.O. Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

Westside Boulevard Storm Drain
Between East Branch Channel to Seven Bar Loop Road NW

Drainage Report

Prepared for

Prepared by

WILSON
&COMPANY
ENGINEERS & ARCHITECTS
4900 Lang Ave. NE
Albuquerque, NM 87109

FINAL SUBMITTAL VERSION

May 22, 2006

I, Mario G. Juarez-Infante, P.E., do hereby certify that this document was prepared by me or under my direction, and is true and correct to the best of my knowledge and belief and that I am a duly registered Professional Engineer under the laws of the State of New Mexico.

5/22/06
Mario G. Juarez-Infante, PE, CFM
NMPE No. 15340

Date

I. INTRODUCTION

This report is based on the drainage section of the approved *Cabezon Communities Drainage Management Plan, 2003* (hereinafter Reference 1), which specifically outlines the drainage plan for Phase 2 of Cabezon development, and the *Golf Course Road Drainage System Analysis, Revised April 2006* (hereinafter Reference 2). Reference 1 addresses requirements of the Communities Master Plan and is consistent with both the Black Arroyo Drainage Management Plan (BLWMP) (ASCG, 2002) and the Cabezon Phase 1 Drainage Management Plan. Reference 2 is an amendment to the Golf Course Road Widening Project from Southern Boulevard to Westside Boulevard, sealed by the Design Engineer on January 5, 2002.

Cabezon Communities, Phase 2, comprises approximately 625 acres of development. *Figure 1* shows the entire Cabezon Community Development, with Phase 2 development in blue. Phase 1 development is in green. The *Reviewer* is cautioned that Tract 14 (mixed use) and Tract 13 (commercial) are not owned by owned by Curb Inc. and are being developed by a separate entity.

The portion of Westside Boulevard pertaining to this drainage report extends from the East Branch Channel to east of Golf Course Rd., approximately 800-ft. The project limits are shown on Figure 2 and Figure 3.

II. BASIN CHARACTERISTICS

A. Existing Characteristics

The existing basin shape is characterized as a "cigar like" watershed approximately 2630-ft, long. The watershed is further sub-divided into two sub-basins; Basin 101E and Basin 101W (see Figure 2).

Basin 101E is bounded at the east end by Seven Bar Loop Road NW. An existing 24" storm drainpipe intersects surface flows east of Westside Boulevard/Seven Bar Loop Road NW Intersection and conveys flows south, cutting off offsite drainage from the east. A copy of the Bohannan Huston Inc. *Master Drainage Plan, Tracts B-1 through B-9, Seven Bar Ranch North, dated May 1, 1994* is attached to Appendix D. Two primary grade ridges; Estrella Del Norte at Seven Bar North sub-division party walls and the natural topographic ridgeline define the southern basin boundary east of Golf Course Rd. The west basin boundary is defined by the intersection of Westside Boulevard/Golf Course Rd. Finally, Block 22, Unit 16, Rio Rancho Estates Sub-division party walls define the north basin boundary. Westside Boulevard/Golf Course Rd. bound Basin 101W at the east Intersection. The southern boundary is defined by an earthen berm, which redirects flows west into the

LEGEND

- PROPOSED WQ / SEDIMENT FACILITIES
- CABEZON COMMUNITIES PHASE I DMP
- CABEZON COMMUNITIES PHASE II DMP
- WQ ① PROPOSED WQ / SEDIMENT FACILITIES NUMBER
- GOLF COURSE ROAD DRAINAGE SYSTEM ANALYSIS BASIN BOUNDARY
- CABEZON COMMUNITIES DMP BASIN BOUNDARY
- WESTSIDE BOULEVARD BASIN BOUNDARY

1000 0 500 1000 2000

GRAPHIC SCALE (IN FEET) 1" = 1000 ft.

CITY OF ALBUQUERQUE

WILSON & COMPANY
4900 LANG AVE NE
ALBUQUERQUE, NEW MEXICO
87109
P (505) 348-4000
F (505) 348-4072
www.wilsonco.com

FIGURE 1a

CABEZON COMMUNITIES
OVERALL BASIN MAP

I:\Projects\X421801201\Phase 05-Westside\CADD\Sheets\FIGURE 1.dwg 5/22/2006 8:31:45 AM MST

Black Dam. The west boundary is established the by the East Branch Arroyo; and finally the northern basin boundary is characterized by an earth swale, which redirects runoff west into the East Branch Channel.

Westside Blvd. is an unpaved, natural dirt road; exception is made to Westside Boulevard/Golf Course Rd. Intersection, which is paved. The road is approximately 40 feet wide. Slopes vary from 3 - 4% where the road enters the arroyo, and from 0.5 - 1% between the Golf Course Rd. intersection and the arroyo crossing. In addition, a series of existing ponds—the 23rd Ave. ponds—are located northwest of the Westside Boulevard/Golf Course Rd. Intersection, and accept flows from Rio Rancho that are conveyed to the East Branch Channel (see Reference 2).

B. Proposed Characteristics

Cabezon Communities Development agreement requires the construction of the northern half-street section between Unser Blvd. and Golf Course Rd. East of Golf Course Rd., Curb Inc. has agreed to continue the northern two-lanes east, approximately 800 LF, and tie into the existing two south lanes. Proposed hydrologic

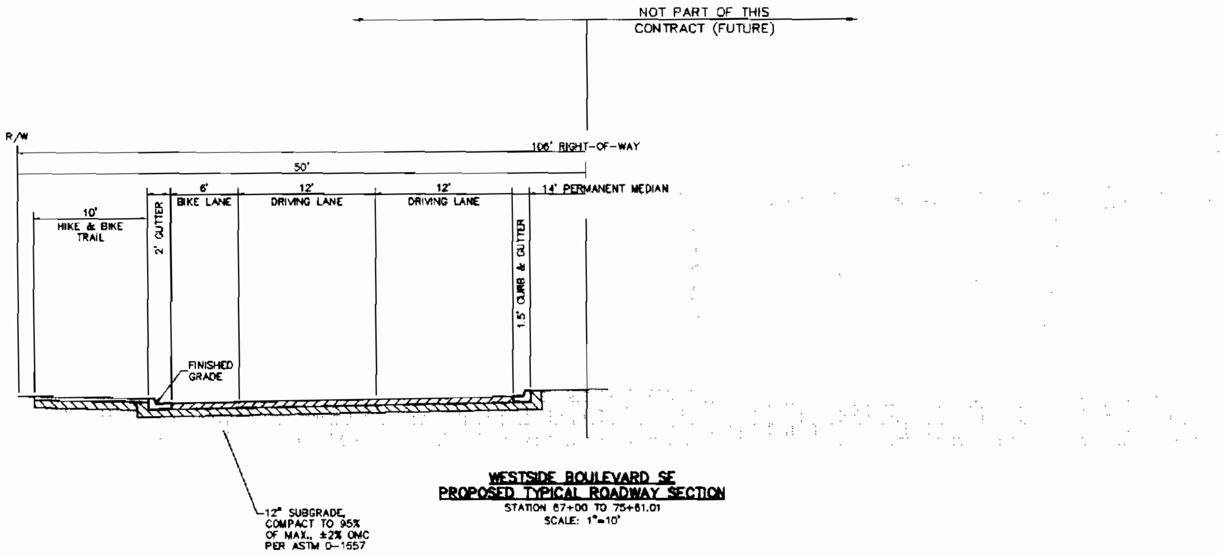


Figure 1b: Westside Boulevard Preliminary Street Section employed for calculating land treatments

analysis assumes full roadway typical build-out land treatment (see Figure 1b). This assumption is appropriate to adequately size storm drain system within Westside Blvd.

III. HYDROLOGY

A. Existing Conditions

Off-Site Flows

Reference 2 identifies the 100_{year} Golf Course Rd. storm drain peak flow as Q_{100} = 242.5 ft^3/s. Furthermore, the report recommendation requires that additional inlets be provided upstream of Westside Blvd./Golf Course Rd. Intersection to capture Q_{100} = 63.02 ft^3/s. Currently, this runoff is captured by a series of existing ponds—the 23rd Ave. ponds—located northwest of the Westside Boulevard/Golf Course Rd. Intersection. The flows are detained and discharged to the East Branch Channel. The total off-site peak flow is therefore Q_{100} = 305.52 ft^3/s. Appendix A provides section of Reference 2 for the *Reviewer.*

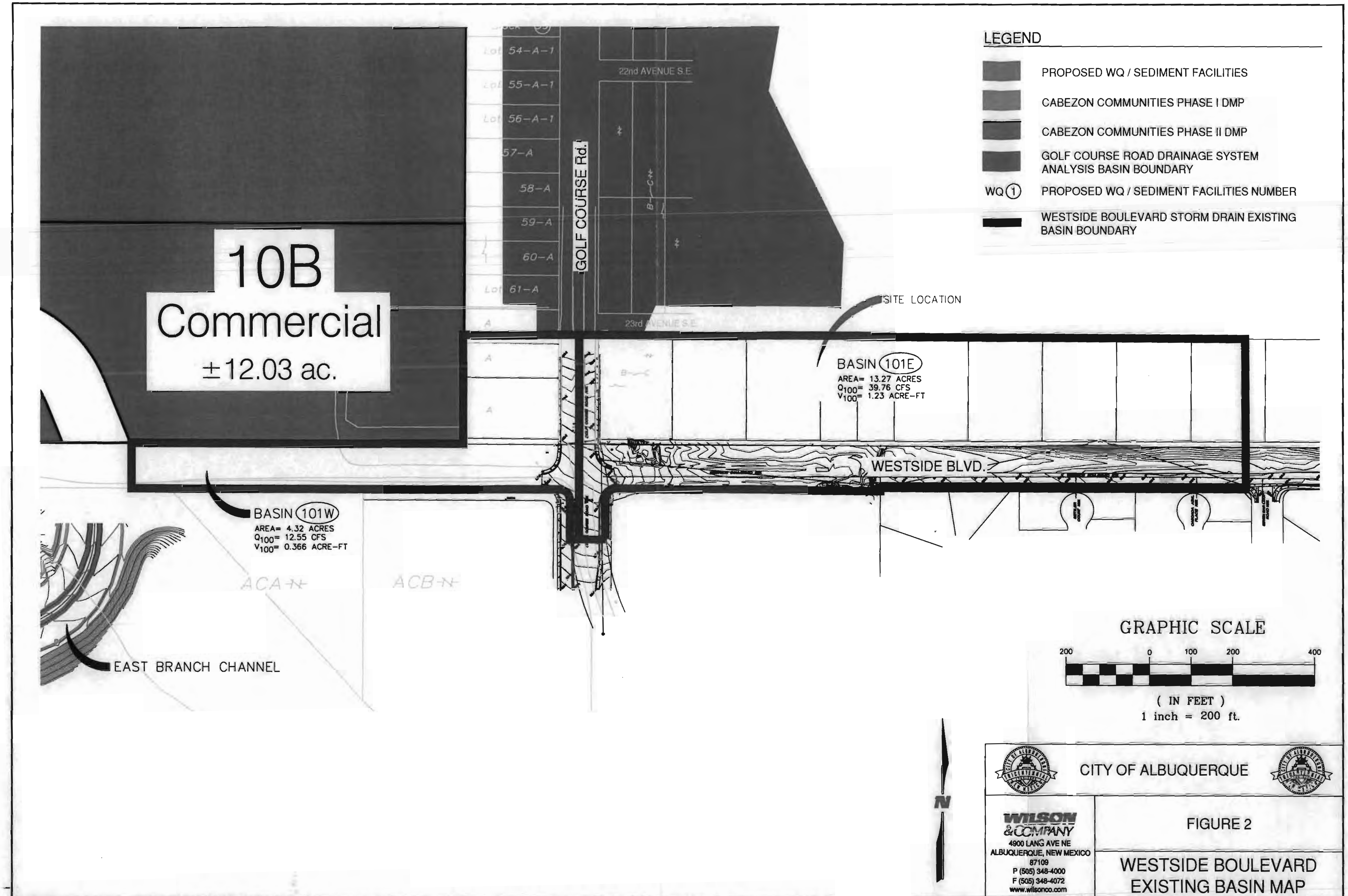
On-site Flows (Project Flows)

Basin 101E & 101W, located east of the East Branch Channel drains west into the arroyo and is approximately 2630-ft in length. It is an existing dirt road, approximately 40 feet wide. Slopes on this portion range from 3 - 4% where the road enters the arroyo, and from 0.5 - 1% between the Golf Course Road intersection and the arroyo crossing.

Soil properties are based on the USDA Natural Resources Conservation Service soil mapping of Bernalillo County (see Soils Map). Soils are loamy fine sands, of the Bluepoint and Madurez series within Bernalillo County. The Bluepoint series is described, as a deep, somewhat excessively drained soil comprised mostly of fine sand. The surface layer is pale brown loamy fine sand about 8 inches thick. The underlying layer is pale brown loamy sand to a depth of 20 inches and light yellowish brown loamy sand to a depth of 60 inches or more. Water erosion hazard is low, while wind erosion hazard is severe. The Madurez series consists of deep, well-drained soils that formed on piedmonts in old unconsolidated alluvium modified by wind. The surface layer is a brown fine sandy loam about four inches thick, with subsoil consisting of sandy clay and fine sandy loam. All soils have low runoff potential.

Figure 2, illustrates the existing hydrologic conditions. Table 1 provides a summary of peak existing flows and volumetric runoff.

Table 1	**Area**	**Land Treatment Type (%)**				**Q_{100}**	**V_{100}**
Basin ID	(acre, ac)	A	B	C	D	ft^3/s	(ac-ft)
101 E	13.27	0	14.62	68.58	16.80	39.76	1.23
101W	4.32	0	0	97.31	2.69	12.55	0.37



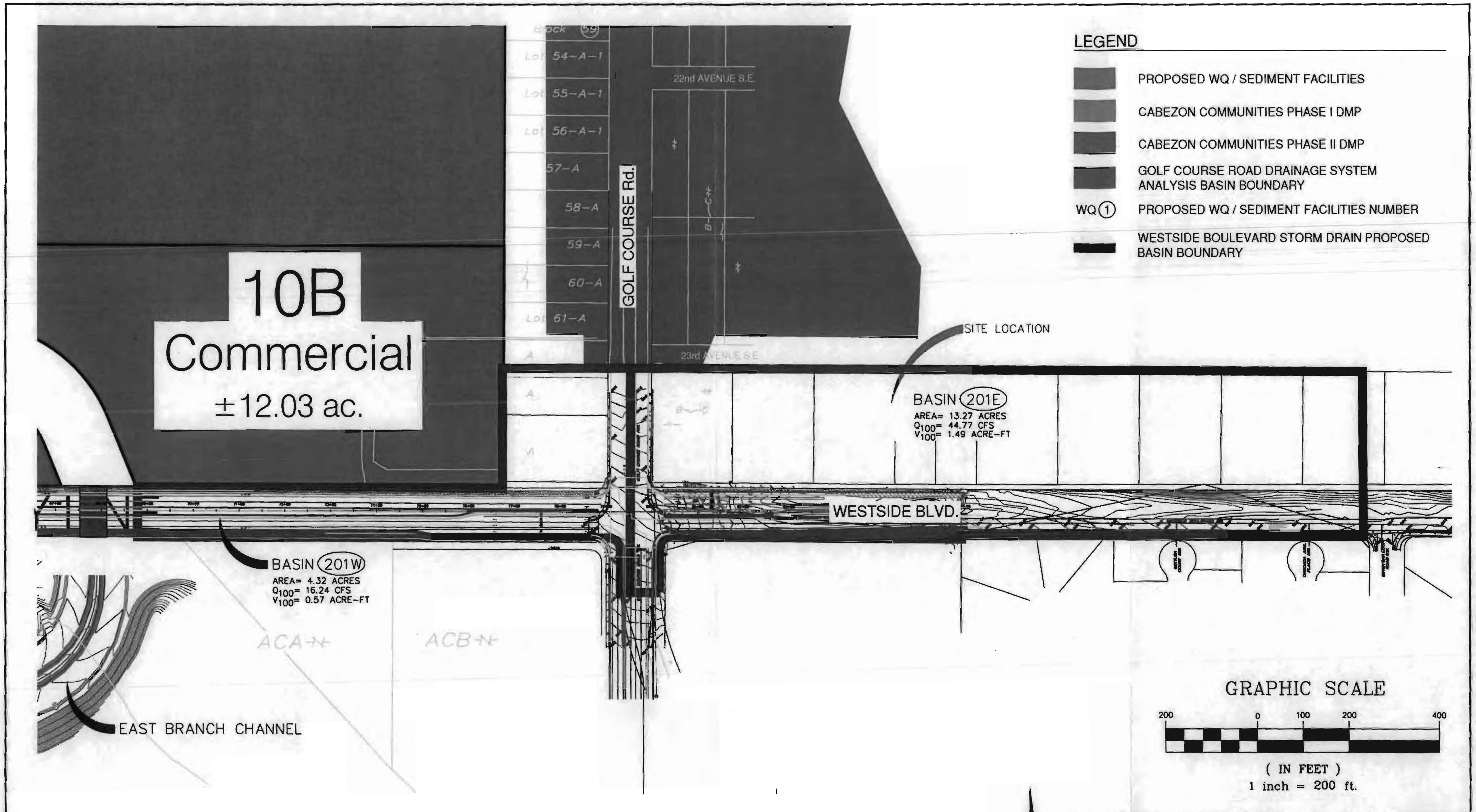
CITY OF ALBUQUERQUE

WILSON & COMPANY
4900 LANG AVE NE
ALBUQUERQUE, NEW MEXICO
87109
P (505) 348-4000
F (505) 348-4072
www.wilsonco.com

FIGURE 2

WESTSIDE BOULEVARD
EXISTING BASIN MAP

I:\Projects\X4218012O1\Phase 05-Westside\CADD\Sheets\FIGURE 2.dwg 5/18/2006 1:56:55 PM MST



CITY OF ALBUQUERQUE

WILSON & COMPANY
4900 LANG AVE NE
ALBUQUERQUE, NEW MEXICO
87109
P (505) 348-4000
F (505) 348-4072
www.wilsonco.com

FIGURE 3

WESTSIDE BOULEVARD PROPOSED BASIN MAP

B. PROPOSED CONDITIONS

Figure 3, illustrates the existing hydrologic conditions. Table 2 provides a summary of peak existing flows and volumetric runoff.

Table 2	Area	Land Treatment Type (%)				Q_{100}	V_{100}
Basin ID	(acre, ac)	A	B	C	D	ft^3/s	(ac-ft)
201 E	13.27	0	12.64	46.51	40.85	44.77	1.49
201W	4.32	0	0	40.74	59.26	16.24	0.57

IV. HYDRAULICS

This report evaluates the improved roadway hydraulic capacity based on full build-out typical section. Proposed area drain inlet capacity recommendations along with hydraulic analysis is also provided.

A. STREET CAPACITIES

Street hydraulic analysis is based on the DPM, Section 22.3, subsection E. Existing Street capacities are analyzed approximately 100 feet upstream of each respective intersection and recommendations for inlet locations are provided. The following street hydraulic design criteria is employed:

a. Manning's roughness coefficient is 0.017
b. Conjugate and/or sequent depth in the 100_{year} design event may not exceed 0.2 feet above curb height and shall be contained within the street Right-of-Way.
c. The product of the depth times the velocity may not exceed 6.5 in any location in any street in the 10_{year} design storm.

Westside Boulevard (East of Golf Course Rd.)

Westside Boulevard is a limited access road, approximately 30'-0" wide (measured Face-to-Face, ½ street section). The proposed roadway profile grade varies between 2% and 3%. Therefore, the maximum half-street section conveyance capacity, Q_{100} = 60.83 ft^3/s. (Refer to Appendix B).

Basin 201 E, which represents the area east of Golf Course Rd., has a peak discharge Q_{100} = 44.77 ft^3/s. Therefore the half-street flow depth will be 0.62 ft

B. CURB INLET ANALYSIS

FlowMaster 6.1v was employed in modeling curb inlet capacity, which basis design and analysis on the FHWA Hydraulic Engineering Circular No. 22 methodology. City standard catch basins "Type A and C, single and combination inlets are analyzed within this report. The curb opening type inlets are preferred; because debris accumulation and offset lost capacity due to grate clogging is limited.

Westside Blvd./Golf Course Rd.
Type "A" and Type "C" basins are recommended upstream of the east and north leg at Westside Blvd./Golf Course Rd. Intersection. Installation of combination curb inlets will fully capture flow from entering the major intersection. Transportation safety, primarily friction factors associated with breaking distance and intersection sight distance, merit capturing surface runoff, minimizing depth of street flows, and maintaining optimal driving lane conditions. A minimum of 25' between curb transitions is required for compliance with the City's DPM.

A recommendation to install 1 single Type 'A' inlet upstream followed by 2-double Type 'C' inlets on both the WBL and EBL is provided. The total half-street inlet capacity is 25 ft^3/s, assuming no bypass flow , 25% grate clogging, and 65% inlet efficiency.

Similarly, a recommendation to install 1 single Type 'A' inlet upstream followed by 3-double Type 'C' inlets on the SBL; and install 1 single Type 'A' inlet upstream followed by 1-double Type 'C' inlets on the NBL is provided. The total NBL street flow is 18 ft^3/s, while the SBL street flow is 40 ft^3/s. The recommendation assumes no bypass flow, 25% grate clogging, and 65% inlet efficiency. Proposed street and inlet capacity computations are provided in Appendix B.

C. Storm Drain Hydraulic Analysis

Hydraflow Sewers by Intelisolve 2005, Version 11.0.01 was used to perform a hydraulic grade line analysis and pipe sizing. Hydraflow uses the energy-based Standard Step method when computing the hydraulic profile. This methodology is an iterative procedure that applies Bernoulli's energy equation between the downstream and upstream ends of each line in the system. Manning's equation is used to determine head losses due to pipe friction. The greatest benefit to using this method is that a solution can always be found regardless of the flow regime. This method makes no assumptions as to the depth of flow and is only accepted when the energy equation has balanced.

The main storm drain alignment originates upstream of 23rd Ave. Ponds, captures an existing 60"ϕ and 24"ϕ storm drain, carrying a total routed peak flow Q_{100} = 242.50 ft^3/s. The proposed storm drain alignment extends south to Westside Blvd., turns west to the new Westside Blvd./East Branch Channel Bridge along the roadway centerline, and outfalls into an existing 60" diameter stub-out at the East Branch Channel. A 36"ϕ storm drain branch also extends from Westside Blvd./Golf Course Rd. approximately 146 ft east across the intersection (measured from Intersection CL), capturing ROW runoff upstream. The contributing basins are illustrated in Figure 3. The storm drain construction across the intersection will require temporary traffic control phasing, lane closures, and lane detours.

A 6-ft ∅ storm drain manhole is recommended to tie the existing Golf Course Rd. 60" RCP outfall into the new storm drain. Immediately downstream, a 36" ∅ T-Manhole should also be installed to tie the existing 23rd Ave. 24" RCP storm drain. A 10-ft ∅ storm drain manhole is recommended where the new 66" ∅ RCP, turns 90° west and the new 36" ∅ RCP comes in from the east side of the intersection.

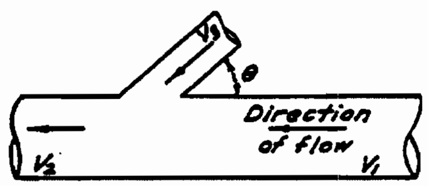
The underground storm drain is sized to convey a total routed peak flow Q_{100} = 305.52 ft^3/s. The *Reviewer* is advised that routed peak flow, Q_{100} = 305.52 ft^3/s, occurs at t_p = 1.70 hours, whereas Basin 201E peak discharge of Q_{100} = 44.77 ft^3/s, occurs at t_p = 0.24 hours (see Appendix A). Therefore Basin 201E hydrograph peaks and drains long before the off-site upstream peak flow occurs. The hydraulic analysis of the 36" storm drain is therefore analyzed independently, based on sub-critical flow, with the downstream HGL equal to the 36" ∅ RCP soffit elevation.

Junction Losses

The Classical Method is used to predict minor losses at pipe entrances, exits, bends, and junctions. The head loss is the product of the minor loss coefficient, K, and the difference between the upstream and downstream velocity heads:

$$h_L = K \left| \frac{V_2^2 - V_1^2}{2g} \right|$$

Where h_L is head loss due to minor losses (ft), K is the minor loss coefficient, V is the velocity of flow (ft/s), and g is the gravitational acceleration constant (32.2 ft/s^2).



$$h_j = \frac{V_2^2}{2g} - \frac{V_1^2}{2g} - \frac{2A_3}{A_2} \cdot \frac{V_3^2}{2g} \cdot \cos\theta$$

Figure 4: COA DPM, Section 22, page 22-99, Pressure flow Junction Losses

Locations where Tee manholes are used in conjunction with bends, the pipe node are modeled as a bend. This situation occurs primarily at those locations where inlet laterals are tied into the storm mainline. The bend loss coefficient, K, may be computed as:

$$K = 0.25\ \sqrt{\theta/90°} = 0.25\ (90°/90°)^{0.5} = 0.25$$

The manhole junction losses, where the 66" ∅ storm drain has an incoming 36-inch line, within the Intersection of Westside Boulevard/Golf Course Rd., is a special case of pressure flow. If $A_1 = A_2$; at incoming junction line is at $\theta = 90°$, then the junction loss coefficient (k) may be computed by the following equation shown in Figure 4;

$$h_j = ((17.29ft/s)^2/2g) - ((17.16ft/s)^2/2g) - 0 = 0.06ft$$

Contraction Losses

The minor loss coefficient for the contraction from 66" to 60" diameter pipe, north of Irving Boulevard, depends on the relative abruptness of the transition, flow velocity, and pipe diameters. Table 4.14, American Iron and Steel Institute *Modern Sewer Design 4th Edition*, is used to estimate the sudden contraction losses employed in the model. A contraction coefficient, $K_T = 0.1225$.

V. SUMMARY & RECOMMENDATIONS

The storm drain vertical alignment grades, pipe sizes, and horizontal alignment are provided in Appendix C. The *Reviewer* is advised that this drainage report is in compliance with Reference 1 and Reference 2. All pipe material, inlets, manholes, and analysis variables are compliant with Section 22, City of Albuquerque Vol. II DPM.

Table 4.14 Values of K_3 for Determining Loes of Head Due to Sudden Contraction From the Formula $H_3 = K_3(V_2^2/2g)$ [7]

d_2/d_1 = Ratio of Larger Pipe to Smaller Pipe V_2 = Velocity in Smaller Pipe

d_2/d_1	Velocity, V_2, in Meters Per Second (feet per second)												
	0.6	0.9	1.2	1.5	1.8	2.1	2.4	3.0	3.6	4.5	6.0	9.0	12.0
	(2.0)	(3.0)	(4.0)	(5.0)	(6.0)	(7.0)	(8.0)	(10)	(12)	(15)	(20)	(30)	(40)
1.1	.03	.04	.04	.04	.04	.04	.04	.04	.04	.04	.05	.05	.06
1.2	.07	.07	.07	.07	.07	.07	.07	.08	.08	.08	.09	.10	.11
1.4	.17	.17	.17	.17	.17	.17	.17	.18	.18	.18	.18	.19	.20
1.6	.26	.26	.26	.26	26	.26	.26	.26	.26	.25	.25	.25	.24
1.8	.34	.34	.34	.34	.34	.34	.33	33	.32	.32	.31	.29	.27
2.0	.38	.38	.37	.37	.37	.37	.36	.36	.35	.34	.33	.31	.29
2.2	.40	.40	.40	.39	.39	.39	39	.38	.37	.37	.35	.33	.30
2.5	.42	.42	.42	.41	.41	.41	.40	40	.39	.38	.37	.34	.31
3.0	.44	.44	.44	.43	.43	.43	.42	.42	.41	.40	.39	.36	.33
4.0	.47	.46	.46	.46	.45	.45	.45	.44	43	.42	.41	.37	.34
5.0	.48	.48	.47	.47	.47	.46	.46	.45	45	.44	.42	.38	.35
10.0	49	.48	.48	.48	.48	.47	.47	.46	.46	45	.43	.40	.36
∞	.49	.49	.48	.48	.48	.47	.47	.47	.46	.45	.44	.41	38

Figure 5: Reference: American Iron & Steel Institute, Modern Sewer Design, 4th Edition, 1999.

VI. REFERENCES

1. American Iron and Steel Institute, *Modern Sewer Design, 3rd Edition*, 1995.

2. Bohannan Huston, Inc., *Master Drainage Plan, Tracts B-1 through B-9, Seven Bar Ranch North,* dated May 1, 1994.

3. City of Albuquerque, *Development Process Manual, Volume II – Design Criteria*, 2003 Revision.

4. *Cabezon Communities Drainage Master Plan (Master Plan), 2003* (hereinafter Reference 1)

5. *Golf Course Road Drainage System Analysis, Revised April 2006*

6. Haestad Durrans, Stormwater Conveyance Modeling and Design, 1st Edition, 2003.

7. HydraFlow Storm Sewers 2003, *User's Manual*, Version 10.0.

APPENDIX A – Hydrologic Analysis

GOLF COURSE ROAD
DRAINAGE SYSTEM ANALYSIS

Prepared by:
Wilson & Company, Inc.
2600 The American Road SE
Rio Rancho, New Mexico 87124
(505) 898-8021 Phone
(505) 898-8501 Fax

WILSON
& COMPANY

REVISED
April 2006

```
                       AP7EST  and   68        .00263        21.97         .269     1.91323    1.500    13.038
*S42
ADD HYD                AP7CSD 65&67  64        .01958        31.00        2.228     2.13398    1.400     2.474
*S44
ADD HYD                 AP7SD 37&64  36        .06428       135.83        7.658     2.23388    1.500     3.302
*S46
ROUTE MCUNGE            AP822   36   37        .06428    [illegible]      7.541     2.19960    1.550     3.057 CCODE =     .2
*S******************END AP 7*****************************************************
*S******************BEGIN AP 8****************************************************
*S64
COMPUTE NM HYD             9E    -   13        .01300        32.05        1.327     1.91328    1.500     3.852 PER IMP=   60.00
DIVIDE HYD            AP822SD   13   80        .01098        16.00        1.121     1.91326    1.400     2.276
                      AP822ST  and   81        .00202        16.05         .206     1.91326    1.500    12.445
*S******************20TH STREET POND MODEL****************************************
*S INSERT PUNCH HYDROGRAPH FROM BLACKS ARROYO DMP FOR 20TH STREET POND AND
*S DISCHARGE INTO EXISTING 48" PIPE.  ASSUME THAT IMPROVEMENTS WILL BE MADE
*S TO CONTROL FLOW RATE IN PIPE WITH FUTURE DEVELOPMENTS.
*S70
RECALL HYD             530.92    -   17        .13340        59.07        9.968     1.40108    1.950      .692
*S71
ADD HYD               AP8POND 37&17  18        .19768       180.41       17.509     1.66073    1.550     1.426
ADD HYD               AP822ND 80&18  82        .20866       196.41       18.630     1.67403    1.550     1.471
*S72
ROUTE MCUNGE            AP9SD   82   19        .20866       196.41       18.630     1.67403    1.550     1.471 CCODE =     .0
*S******************END AP 8*****************************************************
*S******************BEGIN AP 9****************************************************
*S61
COMPUTE NM HYD             9W    -   11        .00323         8.90         .416     2.41367    1.500     4.303 PER IMP=   90.00
*S62

                                FROM   TO                  PEAK        RUNOFF                TIME TO    CFS       PAGE =    5
                   HYDROGRAPH    ID    ID        AREA     DISCHARGE     VOLUME      RUNOFF      PEAK     PER
COMMAND        IDENTIFICATION   NO.   NO.      (SQ MI)      (CFS)      (AC-FT)    (INCHES)   (HOURS)   ACRE       NOTATION

ADD HYD                  8W9W 66&11  12        .00753        64.19         .945     2.35137    1.500    13.317
*S67
COMPUTE NM HYD            10E    -   15        .01950        48.07        1.990     1.91328    1.500     3.852 PER IMP=   60.00
*S68
ADD HYD                  AP9E 68&81  16        .00465        38.02         .474     1.91324    1.500    12.781
*S73
COMPUTE NM HYD            10W    -   20        .00320         8.81         .412     2.41367    1.500     4.303 PER IMP=   90.00
*S74
ADD HYD                  AP9W 12&20  21        .01073        73.00        1.356     2.36992    1.500    10.629
*S79
DIVIDE HYD             AP9WSD   21   24        .00787        28.00         .995     2.36992    1.450     5.557
                   [redacted]  and   25        .00286     [redacted]       .361     2.36992    1.500    24.605
*S80
DIVIDE HYD             AP9ESD   16   26        .00328        20.00         .335     1.91324    1.450     9.530
                   [redacted]  and   27        .00137     [redacted]       .140     1.91324    1.500    20.567
*S81
ADD HYD             AP9EAP9W 24&26   28        .01115        48.00        1.330     2.23565    1.450     6.725
*S83
ADD HYD                 AP9SD 19&28  29        .21982       242.50       19.960     1.70252    1.550     1.724
*S******************END AP 9*****************************************************
FINISH
```

need correct with area of 13.268 acres

WILSON &COMPANY

FROM: Robert Fierro DATE: FILE pg I

TO: SUBJECT:

Existing

Basin 101 E:

13.268

$\boxed{\text{Total Area} = 13.27 \text{ acres}}$

Calculating Percent Treatment D (impervious)

- 0.5 acres of Road from west Blvd.
- Residential

$$n = \frac{\text{units}}{\text{acre}} = \frac{9}{10}$$

$$\text{Percent} = 7 \times \sqrt{(n \times n) + (5 \times N)} = 7 \times \sqrt{\left(\tfrac{9}{10} \times \tfrac{9}{10}\right) + \left(5 \times \tfrac{9}{10}\right)}$$

$$P_D = 16.13\% \text{ of } 10 \text{ acres}$$

$$A_D = 0.5 \text{ acres} + 10 \text{ acres } (0.1613) + \frac{480 \text{ ft} \left(\frac{21 \text{ ft}}{2}\right)}{43560 \frac{\text{acre}}{\text{ft}^2}}$$

Golf Road

$$A_D = 2.23 \text{ acres of impervious}$$

Calculating Percent of C

- From 10 acres

D → 16.13%, C → 80% of 83.87%, B → 20% of 83.87%

D → 16.13%, C → 67.1%, → 16.774%

Total 100% of 10 acres

$$A_C = 67.1\% \,(10 \text{ acres}) = 6.71 \text{ acres}$$

- Rest of lot

$$A_R = 13.27 - 10 \text{ acres} - 0.5 \text{ acres} - 0.116 = 2.65$$

$$A_C = 90\% \text{ of } 2.65 \text{ acres} = 2.385 \text{ acres}$$

$$\text{Total } A_C = 6.71 \text{ acre} + 2.385 = 9.10 \text{ acres}$$

Calculating Percent of B

- From 10 acres

$$A_B = 10\,(16.774\%) = 1.677 \text{ acres}$$

- Rest of lot

$$A_B = 10\% \text{ of } 2.65 \text{ acres} = 0.265 \text{ acres}$$

$$\text{Total } A_B = 1.94 \text{ acres}$$

$$A_{total} = 2.23 + 9.10 + 1.94 = 13.27$$

Fr[illegible] 13.27

PRINTED ON RECYCLED PAPER

WILSON & COMPANY

FROM: Robert Fierro

DATE:

FILE Pg 2

TO:

SUBJECT:

continuing 101 E: Existing

Discharge:

$$\text{Total } Q_p = C_B \times I \times A_B + C_c \times I \times A_c + C_o \times I \times A_o$$

$$= 0.43 \times 4.7 \times 1.94 + 0.61 \times 4.7 \times 9.10 + 0.93 \times 4.7 \times 2.23$$

$$\underline{\underline{\text{Total } Q_p = 39.76 \ ft^3/sec}}$$

Volume:

$$\text{Weighted } E = \frac{E_B A_B + E_c A_c + E_o A_o}{A_B + A_c + A_o} = \frac{0.67(1.94) + 0.99(9.10) + 1.97(2.23)}{13.27}$$

$$\text{Weighted } E = 1.108 \text{ inches}$$

$$\text{Volume} = 1.108 \text{ inches} \left(\frac{1 ft}{12 inches}\right) (13.27 \text{ acres})$$

$$\underline{\underline{\text{Volume} = 1.23 \text{ acre-ft}}}$$

PRINTED ON RECYCLED PAPER

WILSON
&COMPANY

FROM: Robert Fierro | DATE: | FILE pg 3

TO: | SUBJECT:

Basin 101 W: Existing

$\boxed{\text{Total Area} = 4.317 \text{ acres}}$

Area of paved road = 480 ft $\left(\frac{21 ft}{2}\right)$ = 5040 ft^2

$\Rightarrow$ 0.116 acres

Treatment D = 0.116 acres

Treatment C:

A_c = 4.317 acres − 0.116 acres = 4.201 acres

Discharge:

Total $Q_p = C_c \times I \times A_c + C_D \times I \times A_D$

$= 0.61 \times 4.7 \times 4.201 + 0.93 \times 4.7 \times 0.116$ acres

$Q_p = 12.55 \ ft^3/sec$

Volume:

weighted $E = \dfrac{E_C A_C + E_D A_D}{A_C + A_D} = \dfrac{0.99(4.201) + 1.97(0.116\text{acres})}{4.317}$

W_E = 1.016 inches

Volume = 1.016 inches $\left(\frac{1 ft}{12 inches}\right)$ (4.317 acres) = 0.366 acre-ft

PRINTED ON RECYCLED PAPER

WILSON
&COMPANY

FROM: Robert Fierro

TO:

DATE:

FILE Pg 4

SUBJECT:

Proposed with Paved Roads

Basin 201 E: Total 13.27 acre

From 10 acre housing

Treatment D → 16.13% of 10 acres = 1.613 acres

Treatment C → 67.1% of 10 acres = 6.71 acres

Treatment B → 16.774% of 10 acres = 1.677 acres

Treatment D:

Proposed road: $875\,ft\,(96\,ft)\left(\frac{1\,acre}{43560\,ft^2}\right) + 724\,ft\,(106\,ft)\left(\frac{1\,acre}{43560\,ft^2}\right)$

$= 3.69$ acre $+ 500\,ft\,\left(\frac{21'}{2}\right)\frac{1\,acre}{43560} = 3.81$ acre

reduce A_c of 10 acres $= 3.81 - 3.27 = 0.54$ acres

Total D → $3.81 + 1.613 = 5.42$ Total C → $6.71 - 0.54 =$

Discharge:

$Q = 0.43 \times 4.7 \times 1.677 + 0.61 \times 4.7 \times 6.17 + 0.93 \times 4.7 \times 5.42$

$Q = 44.77\ ft^3/sec$

Volume:

$$\text{weighted } E = \frac{0.67(1.677) + 0.99(6.17) + 1.97(5.42)}{13.27}$$

weighted E = 1.34 inches

Volume $= 1.34\,inches\left(\frac{1\,ft}{12\,inch}\right)(13.27\,acres)$

Volume = 1.49 acre-ft

PRINTED ON RECYCLED PAPER

WILSON
&COMPANY

FROM: Robert Fierro

TO:

DATE:

FILE Pg 5

SUBJECT:

Proposed

Basin 201 W:

Total 4.32 Acre

Treatment D: $480\,ft\left(\frac{20\,ft}{2}\right) + 106\,ft\,(1005\,ft)$

$111330\,ft^2 \rightarrow 2.56$ acres

Treatment C:

4.32 Acre − 2.56 acres = 1.76 acres

Discharge:

Total $Q_p = 0.61 \times 4.7 \times 1.76$ acres $+ 0.93 \times 4.7\,(2.56$ acres$)$

$Q_p = 16.24\ ft^3/sec$

Volume:

$$\text{weighted } E = \frac{0.99(1.76) + 1.97(2.56)}{4.32 \text{ Acre}}$$

$= 1.57$ inches

Volume $= 1.57$ inches $\left(\frac{1\,ft}{12\,inches}\right)(4.32$ acres$) = 0.57$ acre-ft

PRINTED ON RECYCLED PAPER

WILSON
&COMPANY

FROM: Robert Fierro

TO:

DATE: 5-22-06 FILE pg 6

SUBJECT: Robert Fierro

hydrograph for Existing 101 East

$A_t = 13.27$

$A_o = 2.23$

$t_c = 0.2\ hr$

$Q_p = 39.76$

$E = 1.108$ inches

$$t_B = 2.107 \times 1.108 \times \frac{13.27}{39.76} - 0.25 \times \frac{2.23}{13.27}$$

$$t_B = 0.7372\ hrs$$

$$t_p = (0.7 \times 0.2) + ((1.6 - \frac{2.23}{13.27}))/12)$$

$$t_p = 0.2593\ hrs$$

$$\text{Duration of peak} = 0.25 \times \frac{A_o}{A_t}$$

$$= 0.25 \times \frac{2.23}{13.27}$$

$$= 0.0420\ hrs$$

Robert

PRINTED ON RECYCLED PAPER

WILSON
&COMPANY

FROM: Robert Fierro

TO:

DATE: 5-22-06 FILE pg 7

SUBJECT: Robert Fierro

hydrograph 101 west

A_t = 4.317 acres

A_o = 0.116 acres

t_c = 0.2 hr

Q_p = 12.55 ft^3/sec

E = 1.016 inches

$$t_B = 2.107 \times 1.016 \times \frac{4.317}{12.55} - 0.25\left(\frac{0.116}{4.317}\right)$$

t_B = 0.7297 hrs

$$t_p = (0.7 \times 0.2) + \left(\left(1.6 - \frac{0.116}{4.317}\right)/12\right)$$

t_p = 0.2711 hrs

Duration of peak = $0.25 \times \frac{0.116}{4.317}$ = 0.0067 hrs

PRINTED ON RECYCLED PAPER

WILSON
&COMPANY

FROM: Robert Fierro

TO:

DATE: 5-22-06 FILE pg 8

SUBJECT: Robert Fierro

hydrograph for Proposed 201 East

$A_T =$ 13.27 acre

$A_D =$ 5.42 acre

$t_c =$ 0.2 hour

$Q_p =$ 44.77 ft^3/sec

$E =$ 1.34 inches

$$t_B = \left(\frac{2.107 \times E \times A_T}{Q_p}\right) - \left(\frac{0.25 \times A_D}{A_T}\right)$$

$$= \left(2.107 \times 1.34 \times \frac{13.27\,acres}{44.77\,\frac{ft^3}{sec}}\right) - 0.25 \times \frac{5.42}{13.27}$$

$t_B =$ 0.7348 hours

$$t_p = (0.7 \times t_c) + ((1.6 - \left(\frac{A_d}{A_t}\right))/12)$$

$$= (0.7 \times 0.2) + ((1.6 - \left(\frac{5.42}{13.27}\right)/12)$$

$t_p =$ 0.2393 hours

Duration of Peak $= 0.25 \times A_D/A_T$

$= 0.25 \times \frac{5.42}{13.27}$

Duration of Peak $=$ 0.1021 hrs

PRINTED ON RECYCLED PAPER

WILSON
&COMPANY

FROM: Robert Fierro

TO:

DATE: 5-22-06 FILE Pg 9

SUBJECT: Robert Fierro

hydrograph for proposed 201 west

$A_T =$ 4.32 Acre

$A_0 =$ 2.56 Acre

$t_c =$ 0.2

$Q_p =$ 16.24 ft^3/sec

$E =$ 1.57 inches

$$t_B = \frac{2.107 \times 1.57 \times 4.32}{16.24\ ft^3/sec} - \frac{0.25 \times 2.56}{4.32}$$

$$t_B = 0.7318\ hrs$$

$$t_p = (0.7 \times 0.2) + \left(\left(1.6 - \frac{2.56}{4.32}\right)\right)/12)$$

$$t_p = 0.2240\ hrs$$

$$\text{Duration of Peak} = 0.25 \times \frac{2.56}{4.32}$$

$$= 0.1481\ hrs$$

PRINTED ON RECYCLED PAPER

APPENDIX B – Hydraulic Analysis

A. Existing Street Capacities

Westside Boulevard, Basin 201 E
Worksheet for Gutter Section

Project Description	
Worksheet	Basin 201E Half Street S
Type	Gutter Section
Solve For	Discharge

Input Data		
Slope	020000	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slo	062500	ft/ft
Road Cross Slop	020000	ft/ft
Spread	30.00	ft
Mannings Coeffic	0.017	

Results		
Discharge	30.83	cfs
Flow Area	9.1	ft²
Depth	0.69	ft
Gutter Depress	1.0	in
Velocity	6.70	ft/s

 © Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Westside Boulevard, Basin 201W
Worksheet for Gutter Section

Project Description	
Worksheet	Basin 201W Half Street S
Type	Gutter Section
Solve For	Discharge

Input Data		
Slope	005000	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slo|	062500	ft/ft
Road Cross Slop	020000	ft/ft
Spread	30.00	ft
Mannings Coeffic	0.017	

Results		
Discharge	30.41	cfs
Flow Area	9.1	ft²
Depth	0.69	ft
Gutter Depress	1.0	in
Velocity	3.35	ft/s

Westside Boulevard, Depth of Flow
Worksheet for Gutter Section

Project Description	
Worksheet	Flow Depth Basin 201E Half Stree
Type	Gutter Section
Solve For	Spread

Input Data		
Slope	020000	ft/ft
Discharge	44.77	cfs
Gutter Width	2.00	ft
Gutter Cross Slo	062500	ft/ft
Road Cross Slop	020000	ft/ft
Mannings Coeffic	0.017	

Results		
Spread	26.69	ft
Flow Area	7.2	ft²
Depth	0.62	ft
Gutter Depress	1.0	in
Velocity	6.21	ft/s

B. INLET CAPACITIES

Basin 201 E (TYPE A, East Intersection Leg, half street section)
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	Basin 201 E Type A Combination
Type	Combination Inlet On Grade
Solve For	Curb Opening Length

Input Data		
Discharge	8.75	cfs
Local Depression	2.7	in
Local Depression \	2.00	ft
Efficiency	0.65	
Slope	0.020000	ft/ft
Gutter Width	2.50	ft
Gutter Cross Slope	0.062500	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.013	
Grate Width	2.00	ft
Grate Length	3.33	ft
Grate Type	) mm (P-1-7/8")	
Clogging	25.0	%

Options	
Calculation Opt	Use Both
Grate Flow Opti	:lude None

Results		
Curb Opening Lengtr	4.44	ft
Intercepted Flow	5.69	cfs
Bypass Flow	3.06	cfs
Spread	11.61	ft
Depth	0.34	ft
Flow Area	1.5	ft²
Gutter Depression	1.3	in
Total Depression	4.0	in
Velocity	5.13	ft/s
Splash Over Velocity	9.10	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.05	
Grate Flow Ratio	0.57	
Equivalent Cross Slo	093188	ft/ft
Active Grate Length	2.50	ft
Length Factor	0.07	
Total Interception Le	25.95	ft

Basin 201 E (TYPE C, East Intersection Leg, half street section)
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	Basin 201 E Type C Combination
Type	Combination Inlet On Grade
Solve For	Equal Opening Lengths

Input Data		
Discharge	25.00	cfs
Local Depression	2.7	in
Local Depression \	2.00	ft
Efficiency	0.65	
Slope	0.020000	ft/ft
Gutter Width	2.50	ft
Gutter Cross Slope	0.062500	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.013	
Grate Width	2.00	ft
Grate Type	) mm (P-1-7/8")	
Clogging	25.0	%

Options	
Calculation Opt	Use Both
Grate Flow Opti	:lude None

Results		
Curb Opening Lengtl	11.01	ft
Grate Length	11.01	ft
Intercepted Flow	16.25	cfs
Bypass Flow	8.75	cfs
Spread	18.23	ft
Depth	0.47	ft
Flow Area	3.5	ft²
Gutter Depression	1.3	in
Total Depression	4.0	in
Velocity	6.51	ft/s
Splash Over Velocity	22.54	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.37	
Grate Flow Ratio	0.38	
Equivalent Cross Slo	069193	ft/ft
Active Grate Length	8.26	ft
Length Factor	0.06	
Total Interception Lei	48.22	ft

Basin 201 North Leg, TYPE C Combination Inlet - 1
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	Basin 201 North Leg, Type C Combinati
Type	Combination Inlet On Grade
Solve For	Equal Opening Lengths

Input Data		
Discharge	40.00	cfs
Local Depression	2.7	in
Local Depression \	2.00	ft
Efficiency	0.65	
Slope	0.020000	ft/ft
Gutter Width	2.50	ft
Gutter Cross Slope	0.062500	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.013	
Grate Width	2.00	ft
Grate Type	) mm (P-1-7/8")	
Clogging	25.0	%

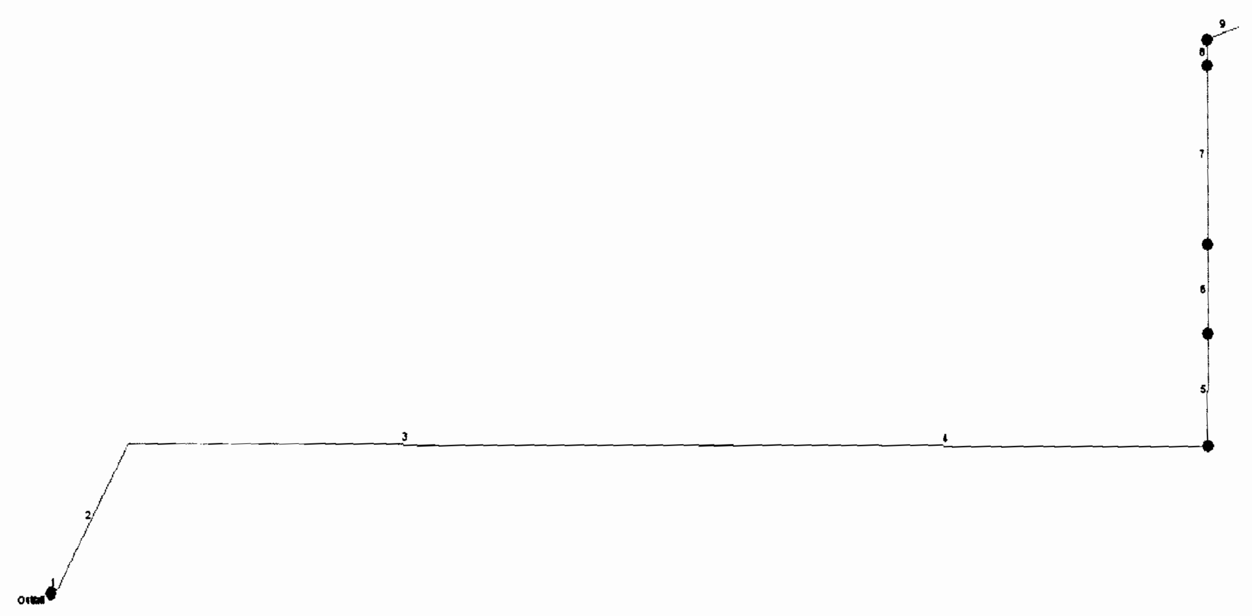
Options	
Calculation Opt	Use Both
Grate Flow Opti	:lude None

Results		
Curb Opening Lengtr	13.48	ft
Grate Length	13.48	ft
Intercepted Flow	26.00	cfs
Bypass Flow	14.00	cfs
Spread	22.02	ft
Depth	0.55	ft
Flow Area	5.0	ft²
Gutter Depression	1.3	in
Total Depression	4.0	in
Velocity	7.28	ft/s
Splash Over Velocity	34.08	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.43	
Grate Flow Ratio	0.32	
Equivalent Cross Slo	061001	ft/ft
Active Grate Length	10.11	ft
Length Factor	0.05	
Total Interception Le	63.35	ft

© Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

C. HydraFlow Analysis

Hydraflow Plan View



Project File: Westside Boulevard 052306.stm	No. Lines: 9	05-22-2006

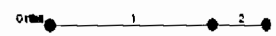
Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Up	Dn	Up	Dn	Up	Dn	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	8.0	0.00	0.00	0.00	0.00	0.00	0.0	2.0	0.0	305.5	278.2	19.21	54	2.00	5167.63	5167.47	5172.73	5172.53	5172.93	0.00	
2	1	137.6	0.00	0.00	0.00	0.00	0.00	0.0	1.8	0.0	305.5	300.3	12.86	66	0.80	5168.73	5167.63	5177.60	5176.46	5183.12	5172.93	
3	2	516.0	0.00	0.00	0.00	0.00	0.00	0.0	1.2	0.0	305.5	300.5	12.86	66	0.80	5172.86	5168.73	5182.13	5177.86	5185.32	5183.12	
4	3	493.6	0.00	0.00	0.00	0.00	0.00	0.0	0.5	0.0	305.5	300.4	12.86	66	0.80	5176.81	5172.86	5186.48	5182.39	5187.86	5185.32	
5	4	93.5	0.00	0.00	0.00	0.00	0.00	0.0	0.4	0.0	305.5	569.7	12.86	66	2.88	5179.50	5176.81	5187.90	5187.12	5189.70	5187.86	
6	5	75.0	0.00	0.00	0.00	0.00	0.00	0.0	0.3	0.0	305.5	709.9	12.86	66	4.47	5182.85	5179.50	5189.80	5189.18	5192.25	5189.70	
7	6	149.0	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	242.5	832.2	11.27	66	6.14	5192.00	5182.85	5196.24	5191.40	5199.73	5192.25	
8	7	21.4	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	242.5	443.2	13.47	60	2.90	5192.62	5192.00	5197.01	5196.24	5201.10	5199.73	
9	8	30.6	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	242.5	442.0	12.93	60	2.88	5193.50	5192.62	5197.89	5197.38	5201.10	5201.10	

Project File: Westside Boulevard 052306.stm | Number of lines: 9 | Run Date: 05-22-2006

NOTES: Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs.

Hydraflow Plan View



Project File: Westside Boulevard 052306_36.stm	No. Lines: 2	05-22-2006

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Up	Dn	Up	Dn	Up	Dn	
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	End	152.4	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	44.77	73.46	9.41	30	3.21	5181.70	5176.81	5183.93	5179.81	5188.67	5187.86	
2	1	50.0	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	44.77	66.13	9.48	30	2.60	5183.00	5181.70	5185.23	5184.09	5188.73	5188.67	

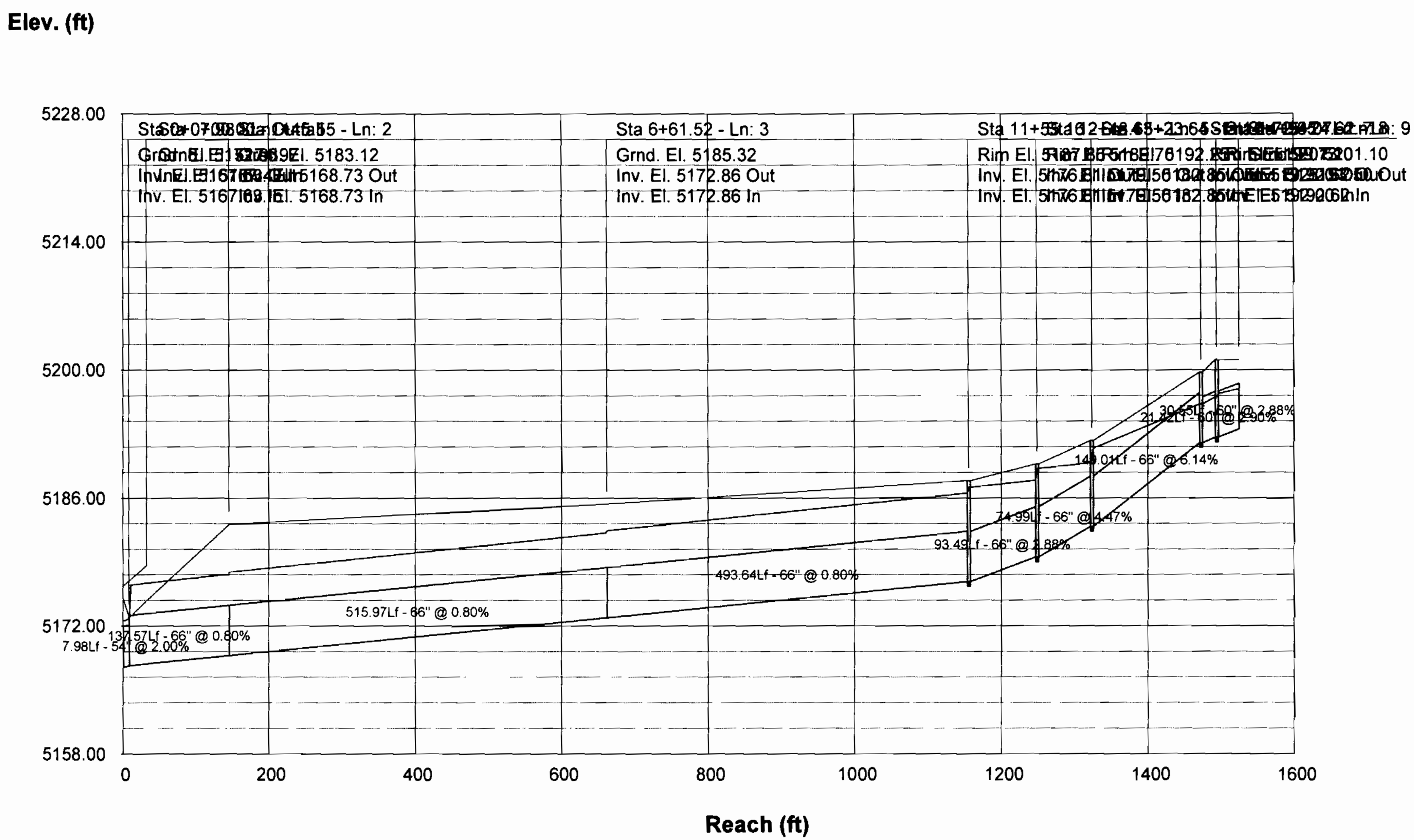
Project File: Westside Boulevard 052306_36.stm | Number of lines: 2 | Run Date: 05-22-2006

NOTES: Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period = 100 Yrs.

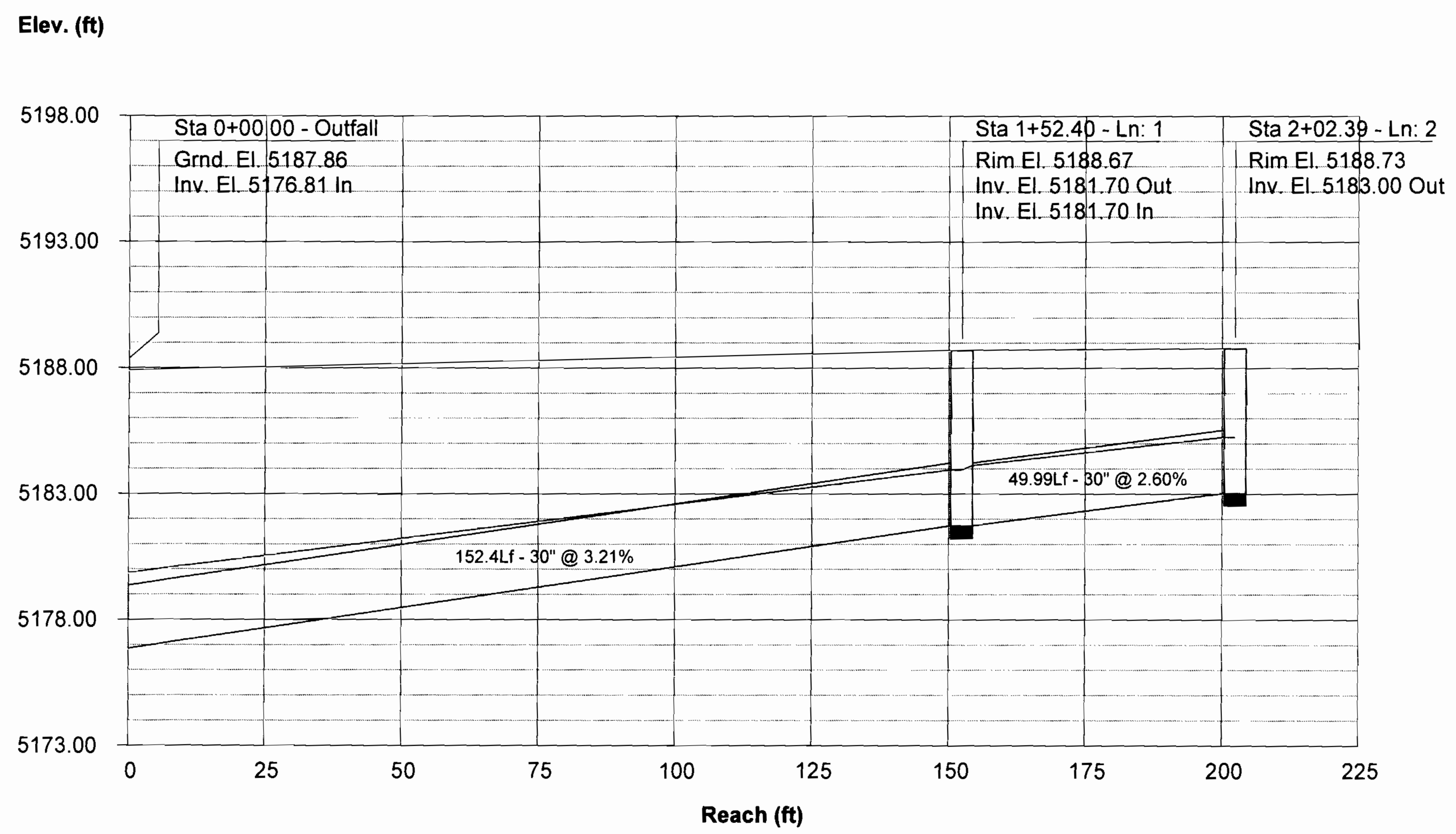
APPENDIX C –Conceptual Storm Drain Plan & Profile

Storm Sewer Profile

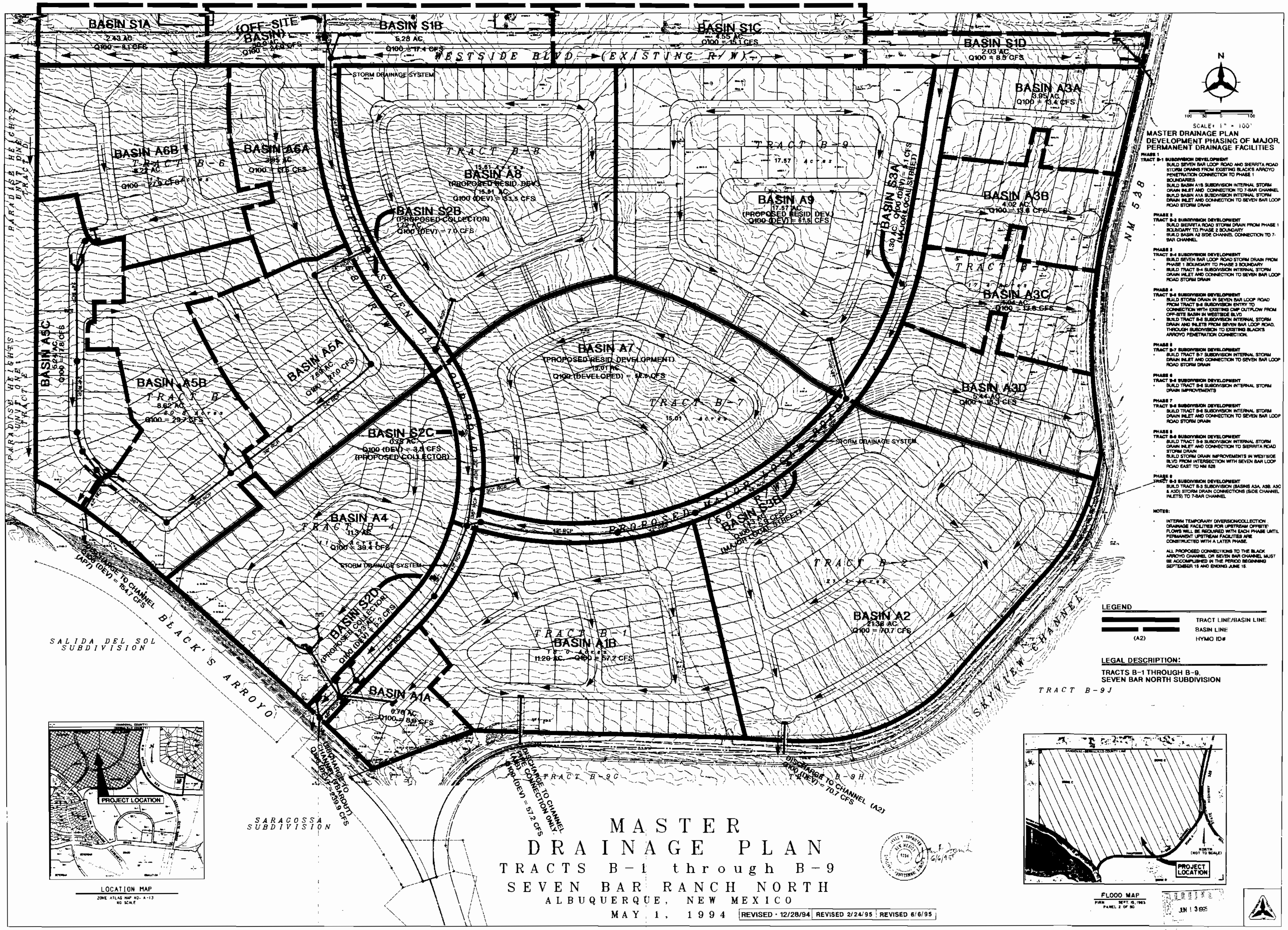
Proj. file: Westside Boulevard 052306.stm



Storm Sewer Profile



APPENDIX D – Master Drainage Plan, Tracts B-1 through B-9, Seven Bar Ranch North


MASTER
DRAINAGE PLAN
TRACTS B-1 through B-9
SEVEN BAR RANCH NORTH
ALBUQUERQUE, NEW MEXICO
MAY 1, 1994
REVISED - 12/28/94 REVISED 2/24/95 REVISED 6/6/95
SCALE: 1" = 100'
MASTER DRAINAGE PLAN
DEVELOPMENT PHASING OF MAJOR, PERMANENT DRAINAGE FACILITIES
PHASE 1
TRACT B-1 SUBDIVISION DEVELOPMENT
• BUILD SEVEN BAR LOOP ROAD AND SIERRITA ROAD STORM DRAINS FROM EXISTING BLACK'S ARROYO PENETRATION CONNECTION TO PHASE 1 BOUNDARIES
• BUILD BASIN A1B SUBDIVISION INTERNAL STORM DRAIN INLET AND CONNECTION TO 7-BAR CHANNEL
• BUILD BASIN A1A SUBDIVISION INTERNAL STORM DRAIN INLET AND CONNECTION TO SEVEN BAR LOOP ROAD STORM DRAIN
PHASE 2
TRACT B-2 SUBDIVISION DEVELOPMENT
• BUILD SIERRITA ROAD STORM DRAIN FROM PHASE 1 BOUNDARY TO PHASE 2 BOUNDARY
• BUILD BASIN A2 SIDE CHANNEL CONNECTION TO 7-BAR CHANNEL
PHASE 3
TRACT B-4 SUBDIVISION DEVELOPMENT
• BUILD SEVEN BAR LOOP ROAD STORM DRAIN FROM PHASE 1 BOUNDARY TO PHASE 3 BOUNDARY
• BUILD TRACT B-4 SUBDIVISION INTERNAL STORM DRAIN INLET AND CONNECTION TO SEVEN BAR LOOP ROAD STORM DRAIN
PHASE 4
TRACT B-8 SUBDIVISION DEVELOPMENT
• BUILD STORM DRAIN IN SEVEN BAR LOOP ROAD FROM TRACT B-8 SUBDIVISION ENTRY TO CONNECTION WITH EXISTING CMP OUTFLOW FROM OFF-SITE BASIN IN WESTSIDE BLVD
• BUILD TRACT B-8 SUBDIVISION INTERNAL STORM DRAIN AND INLETS FROM SEVEN BAR LOOP ROAD, THROUGH SUBDIVISION TO EXISTING BLACK'S ARROYO PENETRATION CONNECTION.
PHASE 5
TRACT B-7 SUBDIVISION DEVELOPMENT
• BUILD TRACT B-7 SUBDIVISION INTERNAL STORM DRAIN INLET AND CONNECTION TO SEVEN BAR LOOP ROAD STORM DRAIN
PHASE 6
TRACT B-6 SUBDIVISION DEVELOPMENT
• BUILD TRACT B-6 SUBDIVISION INTERNAL STORM DRAIN IMPROVEMENTS
PHASE 7
TRACT B-5 SUBDIVISION DEVELOPMENT
• BUILD TRACT B-5 SUBDIVISION INTERNAL STORM DRAIN INLET AND CONNECTION TO SEVEN BAR LOOP ROAD STORM DRAIN
PHASE 8
TRACT B-9 SUBDIVISION DEVELOPMENT
• BUILD TRACT B-9 SUBDIVISION INTERNAL STORM DRAIN INLET AND CONNECTION TO SIERRITA ROAD STORM DRAIN
• BUILD STORM DRAIN IMPROVEMENTS IN WESTSIDE BLVD FROM INTERSECTION WITH SEVEN BAR LOOP ROAD EAST TO NM 528
PHASE 9
TRACT B-3 SUBDIVISION DEVELOPMENT
• BUILD TRACT B-3 SUBDIVISION (BASINS A3A, A3B, A3C & A3D) STORM DRAIN CONNECTIONS (SIDE CHANNEL INLETS) TO 7-BAR CHANNEL
NOTES:
• INTERIM TEMPORARY DIVERSION/COLLECTION DRAINAGE FACILITIES FOR UPSTREAM OFFSITE FLOWS WILL BE REQUIRED WITH EACH PHASE UNTIL PERMANENT UPSTREAM FACILITIES ARE CONSTRUCTED WITH A LATER PHASE.
• ALL PROPOSED CONNECTIONS TO THE BLACK ARROYO CHANNEL OR SEVEN BAR CHANNEL MUST BE ACCOMPLISHED IN THE PERIOD BEGINNING SEPTEMBER 15 AND ENDING JUNE 15.
LEGEND
TRACT LINE/BASIN LINE
BASIN LINE
(A2) HYMO ID#
LEGAL DESCRIPTION:
TRACTS B-1 THROUGH B-9, SEVEN BAR NORTH SUBDIVISION
BASIN S1A 2.43 AC Q100 = 6.1 CFS
(OFF-SITE BASIN)
BASIN S1B 5.28 AC Q100 = 17.4 CFS
BASIN S1C 4.55 AC Q100 = 15.1 CFS
BASIN S1D 2.03 AC Q100 = 8.5 CFS
WESTSIDE BLVD (EXISTING R/W)
BASIN A3A 3.95 AC Q100 = 13.4 CFS
BASIN A3B 4.02 AC Q100 = 13.6 CFS
BASIN A3C Q100 = 13.6 CFS
BASIN A3D Q100 = 16.3 CFS
BASIN A6B
BASIN A6A
BASIN A8 (PROPOSED RESID. DEV.) 15.81 AC Q100 (DEV) = 53.5 CFS
BASIN S2B (PROPOSED COLLECTOR) Q100 (DEV) = 7.0 CFS
BASIN A9 17.57 AC (PROPOSED RESID. DEV.) Q100 (DEV) = 61.8 CFS
BASIN S3A (MAJOR LOCAL STREET)
BASIN A7 (PROPOSED RESID. DEVELOPMENT) 15.01 AC
BASIN A5C
BASIN A5B 8.62 AC Q100 = 29.7 CFS
BASIN A5A 7.68 AC Q100 = 27.0 CFS
BASIN S2C 0.76 AC Q100 (DEV) = 3.8 CFS (PROPOSED COLLECTOR)
BASIN A4 11.3 AC Q100 = 38.4 CFS
BASIN S3B (MAJOR LOCAL STREET)
BASIN A2 21.38 AC Q100 = 70.7 CFS
BASIN S2D (PROPOSED COLLECTOR)
BASIN A1B 11.20 AC Q100 = 57.2 CFS
BASIN A1A 6.76 AC Q100 = 5.9 CFS
STORM DRAINAGE SYSTEM
TRACT B-1
TRACT B-2
TRACT B-3
TRACT B-4
TRACT B-5
TRACT B-6
TRACT B-7
TRACT B-8
TRACT B-9
TRACT B-9G
TRACT B-9H
TRACT B-9J
NM 528
SKYVIEW CHANNEL
BLACK'S ARROYO
SALIDA DEL SOL SUBDIVISION
SARAGOSSA SUBDIVISION
PARADISE HEIGHTS UNIT ONE TRACT E
DISCHARGE TO CHANNEL Q100 (DEV) = 57.2 CFS
DISCHARGE TO CHANNEL (A2) Q100 (DEV) = 70.7 CFS
PROJECT LOCATION
LOCATION MAP
FLOOD MAP