CITY OF ALBUQUERQUE

PLANNING DEPARTMENT – Development Review Services

Richard J. Berry, Mayor

August 3, 2016

Doug Hughes, P.E.
Mark Goodwin & Associates, P.A.
P.O. Box 90606
Albuquerque, NM 87199

RE: **Desert Sands Subdivision**
Drainage Report, and Grading and Drainage Plan
Engineer's Stamp Date 4-27-2016 (File: N09D014)

Dear Mr. Hughes:

Based upon the information provided in your submittal received 6-6-16, the above referenced submittals cannot be approved for Preliminary Plat action by the DRB until the following comments are addressed.

1. Retention pond was designed for the 100 yr-10 day storm; however, show the 100-yr 10-day storm volume on Sheet 5 (Volume shown is for the 6-hr storm). Similarly on Sheet 2, Section D-D, volume shown is for the 6-hr storm. What storm is used for the elevation shown – the 10day or 6 hr? Label as Max WSEL and indicate the storm. See DPM for freeboard requirements.
2. The Offsite First Flush/Water Quality Pond presents some erosion concerns, especially due to the velocity of the flow.
   a. Provide Rip-Rap *into* the pond
   b. An impervious weir at the discharge point appears to be needed.
   c. Address downstream erosion of the arroyo (per the City Engineer), specific to erosion caused by the water having less sediment content. Are drop structures necessary?
3. Retaining wall heights along northern boundary appear to be taller than the 8ft maximum allowed per the zoning code, once the guard height is included. Coordinate with Zoning to determine if wall heights shown are acceptable.
4. Pipe size for SD Pipe P-5 is shown as 30" on Construction Drawings, but calculations and tables show 36" dia. pipe. Correction required on Work Order Construction drawings, and not required for approvals.
5. Are losses of transition structure/ junction box accurately accounted for in CivilDesign analysis? Will the program account for the 54" SD is coming into the transition structure at 90 deg., and increase the losses? Provide the program input/output to show that the shape was incorporated into the analysis.
6. Remove Grading Note 11 (first flush) since it no longer applies.
7. Lots 1 & 2 of Block 1 require a retaining wall since drop is greater than 2ft.
8. Account for the upstream flows in Colobel. Flow can be found in Drainage Report for Anderson Heights.
9. Section Cuts on Sheet 2 show slopes can be up to 2:1. Slope protection is required. DPM Committee has determined new slope protection requirements for updated DPM and can be provided to you if you are interested in using them.

PO Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

10. A approved ESC plan is required prior to approval for grading (or ESC permit)
11. Typ. Lot Detail w/ Sideyard wall: plan view shows street slope w/ 4% max, but section states 7.2% max. Typo? Also, provide the relative spot elev. at the front right corner of the lot.
12. Section H-H, Sht. 2, shows that SW culverts have reverse flow. Indicate so with a note. On construction drawings a note should state that the lip shown on the standard drawing is to be omitted (due to the reversal of flow). Show Flowline Elev. on both ends of the culverts. Also, multiple culverts in a series have been discouraged due to failures. Can the number of culverts be reduced?
13. Lot 1-Block 8, Sht. 1: It is still not clear how the lot will discharge. Response did not seem to address my comment. Low point elev. 36.50 is at NW corner of lot at end of the retaining wall. If you provide a screen wall around the corner and no wall openings, ponding will occur within the lot. If you install wall openings, or if there is no screen wall, it will discharge thru the curb ramp, which is not acceptable.
14. Addressing response to comment e. of previous letter: Hydrology will accept flows running along a sidewall, but it is discouraged. The wall could be raised another 0.5' and still not be considered a retaining wall. This would allow a swale without increasing the slope away from the house, and a positive slope in the swale would not cause ponding. This is a recommendation only, based on performance of the wall.
15. Addressing your response to comment j. and l. of previous letter: The Revision to Std Drwg 2405A and 2405B, Landscape Buffer Swale detail, shows that erosion protection is to be used. If the slope is high, then larger size cobble should be called out. This Revision is to be used on all major streets, as well as on streets within the subdivision. Since it is part of the Std. Dwg., it is not optional, and must be shown as a detail on the Grading plans.
16. Addressing your response to comment k. of previous letter: My comment was intended to state that the runoff from the tract will flow into the Landscape Buffer, which is not optional, (rather than the curb and gutter) and then will need to be directed into the Retention Pond somehow. I was suggesting that it be collected at the SW Culverts where they cross the Landscape Buffer. This may also reduce the number of culverts. If this is not possible, then the flows in the landscape buffer will overflow into the street and into the SW culverts.
17. Addressing your response to comment p. of previous letter: It is understood that project is phased, but will be completely graded at once. Show the boundary between Phase 1 and Phase 2. It is the heavy dashed line? If so, define in legend. Also state in the Grading Notes that Phase 2 is to be temporarily stabilized with a spray on stabilizer.
18. Sheet 4: Provide Contours At SW corner of subdivision. Provide T.O.Wall and B.O.Wall elevations along the retaining wall up to the end of Farinosa Ave. Verify that the retaining wall extends far enough south.

If you have any questions, you can contact me at 924-3695.

Sincerely,

Rita T. H

Rita Harmon, P.E.
Senior Engineer, Hydrology
Planning Department

CC: Addressee via Email

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 09/2015)

Project Title: Desert Sands Building Permit #: _____ City Drainage #: N09D014

DRB#: 1005224 EPC#: _____ Work Order#: _____

Legal Description: Tracts A-1-A & A-1-B Lands of Salazar Family Trust, Et AL

City Address: 98th St at Colobel Ave

Engineering Firm: Mark Goodwin & Associates Contact: Doug hughes

Address: PO Box 90606 Albuquerque NM 87199

Phone#: 505-828-2200 Fax#: 505-897-7539 E-mail: doug@goodwinengineers.com

Owner: LGI Homes - New Mexico, LLC by contract with Salazar Family Trust Contact: Erik Hillstrom

Address: 9150 E Del Camino Drive, Suite 118 Scottsdale AZ 85258

Phone#: 415-595-4293 Fax#: _____ E-mail: ehillstrom@lgihomes.com

Architect: n/a Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Other Contact: _____ Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

Check all that Apply:

DEPARTMENT:

x HYDROLOGY/ DRAINAGE

_____ TRAFFIC/ TRANSPORTATION

_____ MS4/ EROSION & SEDIMENT CONTROL

TYPE OF SUBMITTAL:

_____ ENGINEER/ ARCHITECT CERTIFICATION

_____ CONCEPTUAL G & D PLAN

x GRADING PLAN

_____ DRAINAGE MASTER PLAN

x DRAINAGE REPORT

_____ CLOMR/LOMR

_____ TRAFFIC CIRCULATION LAYOUT (TCL)

_____ TRAFFIC IMPACT STUDY (TIS)

_____ EROSION & SEDIMENT CONTROL PLAN (ESC)

_____ OTHER (SPECIFY) _____

CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

_____ BUILDING PERMIT APPROVAL

_____ CERTIFICATE OF OCCUPANCY

x PRELIMINARY PLAT APPROVAL

_____ SITE PLAN FOR SUB'D APPROVAL

_____ SITE PLAN FOR BLDG. PERMIT APPROVAL

_____ FINAL PLAT APPROVAL

_____ SIA/ RELEASE OF FINANCIAL GUARANTEE

_____ FOUNDATION PERMIT APPROVAL

x GRADING PERMIT APPROVAL

_____ SO-19 APPROVAL

_____ PAVING PERMIT APPROVAL

_____ GRADING/ PAD CERTIFICATION

_____ WORK ORDER APPROVAL

_____ CLOMR/LOMR

_____ PRE-DESIGN MEETING

_____ OTHER (SPECIFY) _____

IS THIS A RESUBMITTAL?: x Yes _____ No

DATE SUBMITTED: 7/5/2016 By: Doug Hughes

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED: ___

D. Mark Goodwin & Associates, P.A.
Consulting Engineers
P.O. BOX 90606, ALBUQUERQUE,NM 87199
(505) 828-2200 FAX 797-9539

~ 2012 ACEC/NM Award Winner for Engineering Excellence ~
~ 2008 ACEC/NM Award Winner for Engineering Excellence ~

July 5, 2016

Ms. Rita Harmon
Hydrology Department
City of Albuquerque
600 2nd Street
Albuquerque, NM

Re: ***Desert Sands Response to Drainage Report Comments***
File Number N09D014

Dear Ms. Harmon,

We have revised the Drainage report and Grading Plan to address the comments made in your letter dated June 15, 2016. Please see a description of how each comment has been addressed in red below.

1. Per DPM 22-5.1, retention ponds must be designed for the 100 yr-10 day storm, as opposed to 2x 100 yr -6 hr storm (pg 11 of report). Provide calculations quantifying the required volume. Page 11 has been revised to include the 100 year 10 day volume for Basin 120.

2. Quantify the first flush volumes and show that the correct volume has been provided. Storm Water Quality, SWQ, volume calculations have been added to page 16 of the Drainage Analysis Report.

3. As discussed and offsite ponding area is intended. Provide the pond grading on the G&D Plan set, which is to be certified as part of the Engineer's Certification. The SWQ pond grading has been added to Sheet 3 of the G&D plan, and volume calculations are on page 16 of the drainage report.

4. Provide Street Slopes on the Grading Plan. Street slopes have been added to the G&D plan.

5. Provide a full size sheet of the Basin Map, showing legible street slopes. Basin map has been added as sheet 5 of the G&D Plan and street slope lettering height has been increased so that it is also legible on the half size plan in the report (p18).

6. NMDOT inlets cannot be used unless approved by DMD and City Engineer- use Single A with Dbl. wings in sump. Provide calculations. For single grate, use area of 3.84SF for orifice equation, and length of 10.8 ft for weir. For weir calculations, can use both wings. The NMDOT inlets have been replaced by COA Type Double C inlets since there is a Type A inlet less than 150' upstream of each sump. The FHA HEC-22 method of determining sump inlet flow depth has been added to the report in the table on page 12, and the hydraulic analysis report has been added to Appendix 2. Note that HEC- 22 was not used for inlets on grade because it does not calculate the street flow depth correctly. The nomographs in

appendix 2 have been made more legible in the revised report and the nomographs were used for inlets on grade.

7. 98 Street Improvements DR, based on Lands of Salazar report, estimated 137 cfs. Its close enough to the discharge you calculate, but the references should be changed — especially since the 2-36" culverts across Street were based on this number. References to the 98th St Improvements Drainage Report, Lands of Salazar Drainage Management Plan, and Longford at Arrowwood Drainage Management Plan were added to the report on pages 11, 12, and 13. All of the reports agree that this site is allowed free discharge and statements to that effect have been added to pages 5, 13, and 17. This Desert Sands Drainage Report does not rely on any of these other reports to demonstrate capacity in the existing 36" culvert, but instead provides HGL calculations to demonstrate adequate capacity. Since this development will be connecting a storm drain to the existing culverts (previously analyzed using culvert procedures) the culverts will be converted to a storm drain system (now analyzed using HGL calculations).

8. Raise the pad elevation of Lot 11-P1 to be 8.7 ft. The pad elevation of Lot 11 Block 4 has been raised to 09.2 on sheet 3 of the G&D plan. The grade of Sacate Blanco Ave was raised about half of a foot at the low spot to get it above the HGL there. The Sump inlet table on page 15 has been revised accordingly.

9. Move inlets 1 and 2 further upstream so that EGL is lowered. Two inlets (17 and 18) were added upstream of inlets #1 and 2 on the G&D Plan sheets 3, 4, & 5. The Hydrology and Surface Drainage Table on page 14 was updated to reflect the addition of the two new inlets and the Storm Drain Pipe Summary was updated with the new flows intercepted by each inlet.

10. On the Civildesign output, handwrite in the sidebar the inlet # and grate el next to the corresponding station. Do the same for MHs and Rim El. (the construction plans are too small to compare the HGL). Also, label the output so that it corresponds to the construction drawing, ie. Sacate Blanco. Inlets and MHs have been hand labled on the WSPGW output along with the elevations. Full size copies of the construction plans are being provided along with the Drainage Report and Grading Plan and better quality half size copies have been provided in the report.

11. Provide a conceptual detail of the Transition structure in the report that is from the 54" SD to the 2 — 36" pipe culverts. How were losses accounted for in Civildesign? A detail of the structure has been added to sheet 3 of the G&D Plan. WSPGW (AKA Civildesign) software uses the equations in the DPM to calculate this transition and all of the other losses. WSPGW is the only software that I know of that actually uses the momentum equation to calculate junction losses in closed conduits per DPM Section 22.3.B.2.d (3). It is one of the few programs accepted by FEMA for Hydraulic calculations in closed conduits (see https://www.fema.gov/hydraulic-numerical-models-meeting-minimum-requirement-national-flood-insurance-program). The City of Albuquerque should insist that all HGL calculations be done with the equations in the DPM and then WSPGW would be the only software that any engineer ever uses.

12. Revise the infrastructure list so that each trunk line size is a separate line item. Since more detailed information is available on the G&D Plan, an official DRB document, the infrastructure list remains as it was when originally submitted. Footnote 5 on the Infrastructure List states that final pipe sizes will be determined with DRC review of construction plans.

13. Add to the infrastructure list the First flush pond, along with an Agreement and Covenant. Both the first flush pond and the retention pond were added.

14. The SD trunk lines need to be moved so that the Curb and Gutter is outside of the trench prism. Laterals should be used to connect the inlets to a MH along the main trunk line. The trunk line has been shifted out from under the curb and gutter on Tierra Dorado Dr., and extra manholes have been added on Sacate Blanco and Francisco Ave.

15. An approved ESC plan is required prior to approval for grading (or ESC permit). An E&S plan will be submitted separately.

16. Additional Grading Plan comments: (see attached electronic mark up)

a. Show road slopes The Basin Map has been added to the G&D Plan as sheet 5 and now shows the slopes clearly both on the full sized plan and on the half sized plan bound into the report. The Slopes have also been added to the other 4 G&D sheets.

b. Retaining wall along southern boundary is shown right up against the existing screen walls and there may be constructability issues. Provide a section cut along the southern boundary. Section K-K has been added to sheet 3 of the G&D and note 12 has been added to sheet 1 to protect the wall on the south and the sidewalks on the west and east.

c. Spot el= 39.46 between 60-P 1 and 59-P 1 is low. The grades have been lowered along the west edge of the project to make sure that none of the lots are within the 2WR water service zone that has a top of zone elevation of 5140.0.

d. Provide FL EL. along Pauza Dr Elevations added to sheet 4 along Pauza Dr.

e. Section B-B implies runoff flows along sidewall, as opposed to a parallel swale. Yes, in order maintain proper drainage away from the pad and to get drainage from the rear yard around the house and to the street the side yard slopes are necessarily too steep to grade a swale between the house and the garden wall. There is a minimum of 0.3' fall away from the house at the highest point on the swale and the swale falls another 1.1' between the high spot in the rear yard and the street, making the swale elevation 1.4' below the pad at the front corner, so the side yard slope is nearly 3:1. The geotechnical report identified collapse prone soils and prescribes foundation design for the houses based on positive drainage away from the house.

f. Lot 1-P1: how will lot discharge? Low point seems to beat end of retaining wall. Will there be a screen wall around the corner? Runoff should not discharge should curb ramp. On lot 1 block 8 the pad is 2' higher than the grade at the top of the wall, and the wall is not intended to block or channel drainage.

g. Provide elevations between Lots 1-P1 and 2-P1. Elevations have been added between lots 1 and 2 Block 8 on sheet 1.

h. North of Lot l6-P1, elev along Ret. Wall is 43.09. Typo? Elevation north of lot 16 block 1 corrected to 47.77 on sheet 1.

i. Provide Elevations north of Lot 17-P1 Elevation added to street north of lot 17 Block 1 on sheet 1.

j. South side of Colobel, North of Lots 1 thru 16: How does the area between the Sidewalk and retaining wall drain? Provide proposed contours. It seems that the swale within the landscape buffer should be used to collect these flows. A dirt swale will be erosive at this slope, so the area is planned to sheet drain at 2% towards the street.

k. On south side of Colobel, east of Pauza, the swale in the landscape buffer should be used. The swale should be able to discharge to the SW culvert downstream with a cut in the channel. The right of way outside of the paved roadway is planned to sheet drain into the curb and gutter at 2%. Drainage in the south side paved roadway is planned to discharge south through the sidewalk culverts into the HOA Tract south of Colobel where the 100 year ten day volume will be retained in the portion of that tract west of 98Th St so that this development will not discharge any drainage into the sump in 98th St. which seems to have been designed as a surge pond with an unknown depth of ponding in 98th St.

l. Show the landscape buffer swale in the section cuts. If this development actually provides landscaping in the buffer, then the swale will be part of that landscape plan. Otherwise the dirt buffer will sheet drain at 2% into the roadway.

m. Provide a section of Colobel (showing existing and proposed construction) and existing FL EL along the North side of Colobel to show that it is super-elevated, and that a Water- block is not needed at the Pauza Drive and Colobel intersection. Also, more FL. Elevations on Pauza Dr, south of Cobble should be shown. Pauza drive does not have a water block south of Colobel; instead it is designed to receive drainage from the south half of Colobel in an effort to reduce drainage to the sump in 98th St just south of the intersection of Colobel. This development is not planned to connect any new storm drains or to contribute any new drainage to the existing storm drain in 98th St at the intersection of Colobel. HGL analysis of that existing storm drain system was not included in the WHPacific Drainage Report even though that construction project added inlets at the 98th St sump that are lower than the HGL shown in the original design of the 60" RCP by Wilson & Co. Pauza drive is graded to reduce the flow in Colobel to 98th St.

n.

o. Each lot should have a unique lot number. Many have the same number. Please note that the numbering of lots starts over in each block. The block numbers were on the previous G&D Plan and the symbol has now been added to the legend. The P1 suffix indicates narrower roadways using the DPM infrequent parking design that prescribes the minimum number of off street parking spaces required on each lot dependent on the number of bedrooms in each house.

p. Is this a phased project? if so, an interim grading plan is required for each phase, showing how the drainage for the undeveloped areas are to discharge. Yes this is a phased project with two phases, but it all going to be graded at the same time because the cut from the west half of the site will be used to fill the east half of the site. The east half, especially the north east half of the site has to be filled to a high enough elevation to make it drain to the high spot on 98th St. where the existing double 36" culverts are located at a very shallow depth under 98th St. The west side of the site has to be cut down to a low enough elevation to be served by the 2WR water zone. A verbal description of the "Phasing Plan" will be added to the preliminary Plan in accordance with the 2015 amended subdivision ordinance that allows phased subdivisions to be approved as one project rather than separate projects. The first phase will be the lower half of the development and it will receive drainage from the upstream developed basins as shown on the basin map only with significantly less drainage until Phase 2 infrastructure is constructed. The rough graded phase 2 is to be temporarily stabilized using a spray on stabilizer.

q. What is intended for Tract B? Show proposed contours. Proposed contours have been added to Tract B which is intended as a Private Park. See sheet 1.

Please feel free to contact me with any further questions.

Sincerely,
MARK GOODWIN & ASSOCIATES, PA

James D. Hughes, PE
Senior Engineer

Desert Sands Subdivision
Drainage Analysis Report

Prepared For:

LGI Homes - New Mexico, LLC
9150 E. Del Camino
Suite 118
Scottsdale, AZ 85258
(415) 595-4293

Prepared By:

Mark Goodwin & Associates, PA
PO BOX 90606
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(505) 828-2200

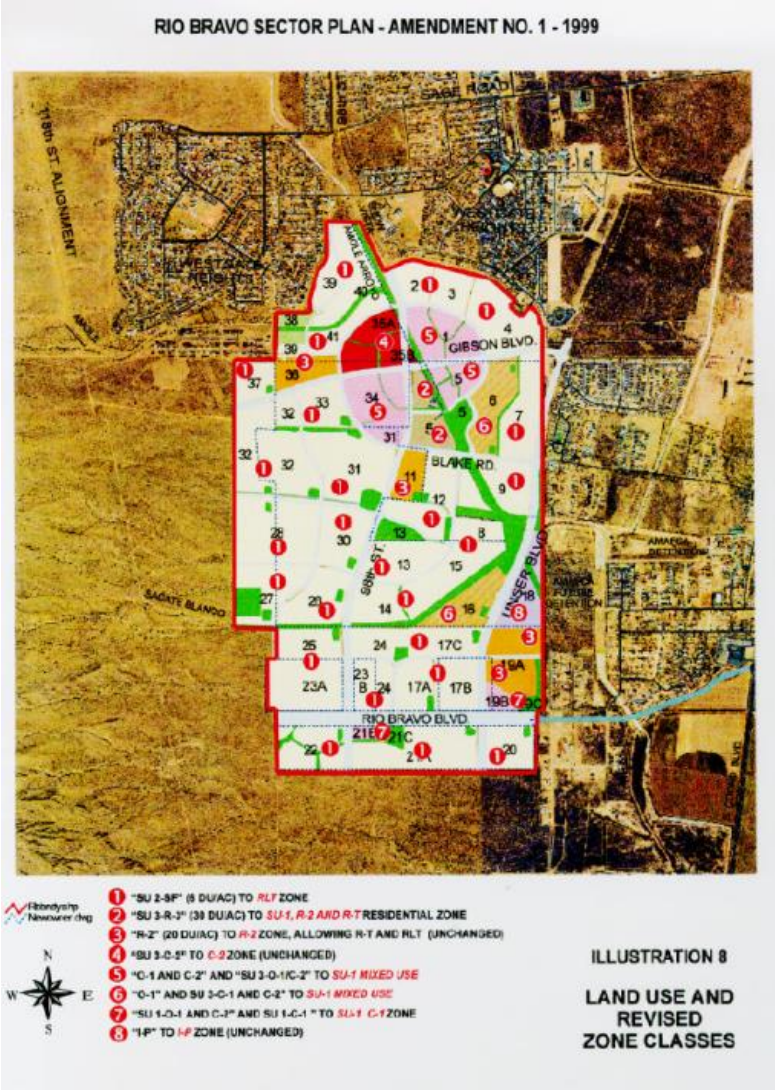
Contents

Introduction

LGI Homes –New Mexico, LLC has a purchase agreement with the Lands of Salazar Trust for the purchase of Tracts A1A and A1B Lands of Salazar Family Trust containing 41.83 acres. LGI Homes wishes to develop a residential subdivision on the property, so they hired Mark Goodwin and Associates to prepare the Preliminary Plat, Grading and Drainage Plan, Drainage Report, Construction Plans, and a request for CLOMR/LOMR.

Project Scope

The Desert Sands Subdivision is a 41.83 acre residential subdivision with 216 single family detached residential lots and 31 duplex lots for a total of 247 lots. The property lies within the Rio Bravo Sector Plan (Corporation, 1999) and is currently zoned R-LT. This development is consistent with both the current zoning and the sector plan so the next step in the development approval process is the preliminary Plat approval by the City of Albuquerque Development Review Board.



The infrastructure associated with this development consists primarily of onsite public streets with public utilities. The project includes dedication of 3 acres where the frontage streets, 98th St. and Colobel Ave., have already been granted as easements. 98th St. has already been completely constructed as a 4 lane divided arterial roadway with sidewalks and bike lanes on both sides and Colobel has already been constructed to 24' width with sidewalk on the north side. So the only remaining frontage improvement is the completion of Colobel Ave "Major Local" paving section with sidewalk on the south side.

This is a phased project with two phases, but it must be all to be graded at the same time because the cut from the west half of the site will be used to fill the east half of the site. The east half, especially the north east half of the site has to be filled to a high enough elevation to make it drain to the high spot on 98th St. where the existing double 36" culverts are located at a very shallow depth under 98th St. The west side of

the site has to be cut down to a low enough elevation to be served by the 2WR water zone. The first phase will be the lower half of the development and it will receive drainage from the upstream developed basins as shown on the basin map but with significantly less drainage until Phase 2 infrastructure is constructed. The rough graded phase 2 is to be temporarily stabilized using a spray on stabilizer.

An existing upper Zone 2WR 12" water line that crosses diagonally thru the west side of the site will have to be relocated to within the newly proposed onsite streets and an additional 12" water line will need to connect to the existing water lines in 98Th street, offsite, about 100' north and south of the site all with Phase 1. The sanitary sewer outfall is also in 98th St. about 100' south of this site.

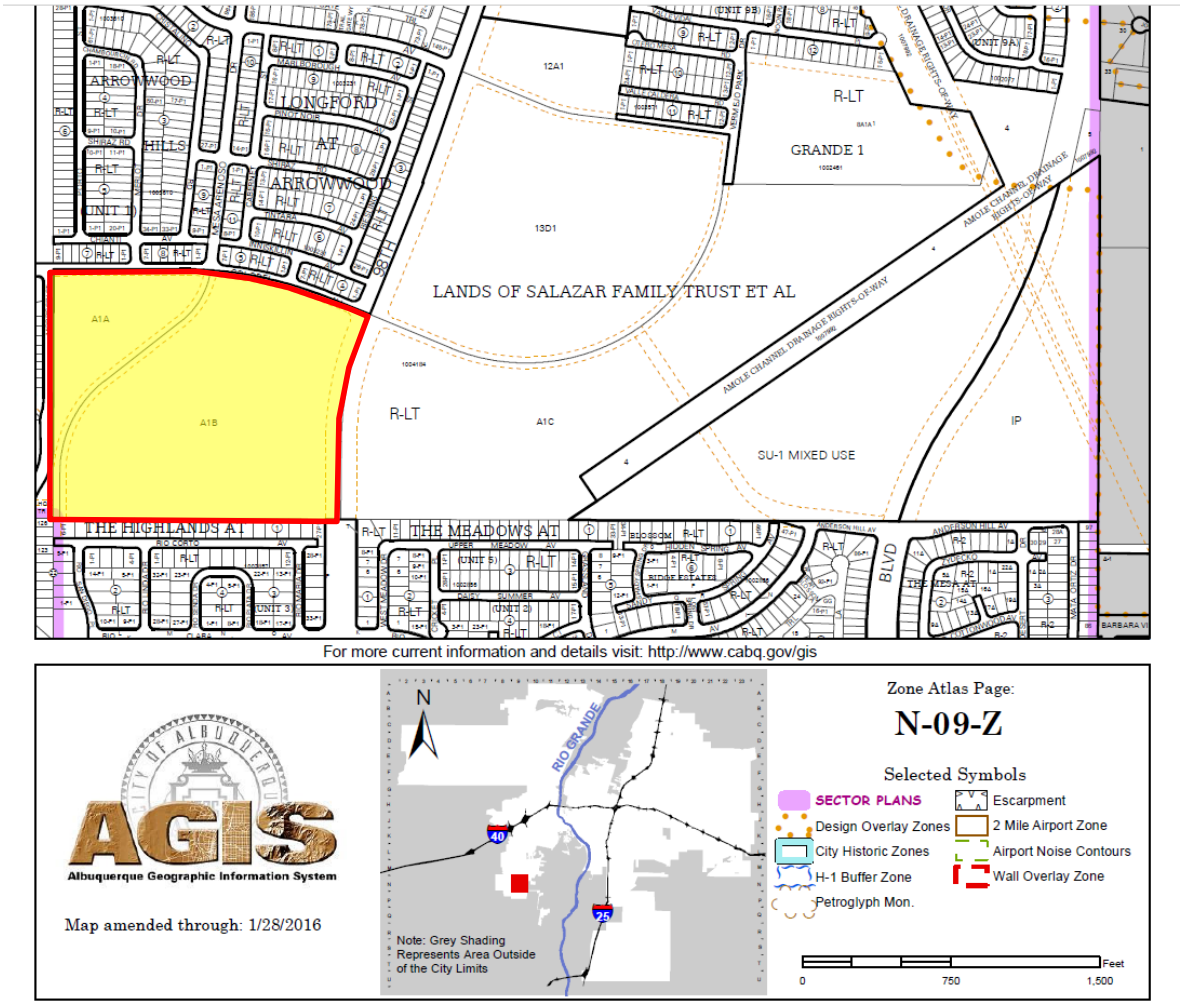
Generally speaking this site will be allowed to discharge 100 year peak flow rates in accordance with the planning history for this site. Nearly all of the onsite storm drainage will free discharge to the existing double 36" RCP culverts under 98th St. Basin 119 will flow south in 98th St and Basin 120 will be retained onsite in a pond. This development is not planned to connect any new storm drains or to contribute any new drainage to the existing storm drain in 98th St at the intersection of Colobel. Pauza drive does not have a water block south of Colobel; instead it is designed to receive drainage from the south half of Colobel in an effort to reduce drainage to the sump in 98th St just south of the intersection of Colobel. An offsite Storm Water Quality pond will be located east of 98Th Street to treat the first flush from the portion of the site that drains to the existing double 36" RCP culverts.

Purpose

The purpose of this Drainage Analysis Report is to fulfill the City of Albuquerque Development Process Manual (Albuquerque, 2008), DPM, requirements as administered by the Hydrology Section Development and Building Services Division the Planning Department of the City of Albuquerque, and as a prerequisite to DRB approval of the Preliminary Plat and Grading Plan.

Location

The Desert Sands Subdivision is located in Southwest Albuquerque New Mexico north of Senator Dennis Chavez Blvd. and west of 98Th St. on Zone Atlas Page N-9.

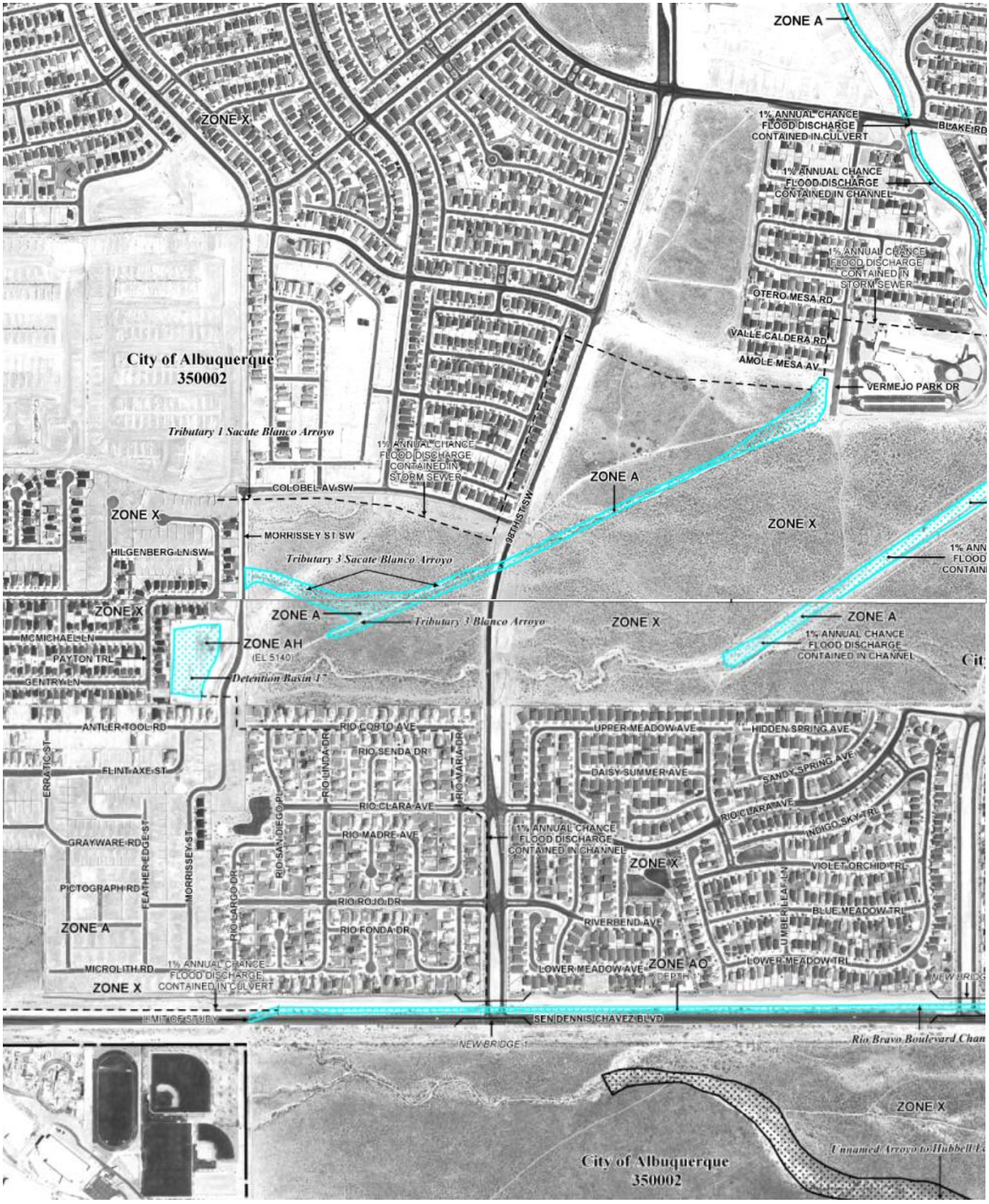


Legal Description

The legal description is Two tracts of land situated within Projected Section 4, Township 9 North Range 2 East, New Mexico Principal Meridian, Town of Atrisco Grant, City of Albuquerque, Bernalillo County New Mexico being all of Tracts A-1-A and A-1-B, Lands of Salazar Family Trust ET AL, as the same is shown and designated on said plat filed for record in the Office of the county Clerk of Bernalillo County, New Mexico on August 1, 2006 in Book 2006C, Page 237 and contains 41.8263 acres more or less.

Flood Hazard Zones

According to FEMA's Flood Insurance Rate Map, see below, Number 35001C0336H and 35001C0338H, Effective August 16, 2012, Tributary 3 of the Sacate Blanco Arroyo bisects this site from west to east.



However, the upstream offsite drainage basin has been diverted south to the Rio Bravo Channel see Rio Bravo Existing Basin map on page 10). So there should not be any flood plain mapped on this site since the remaining flow rates and depths are too small to be mapped.

Amole Hubble Drainage Master Plan 2013

Wilson & Company Engineering prepared the *Amole-Hubble Drainage Master Plan Update May 2013 Final Report* (Company, 2013) for AMAFCA for the purposes of identifying and prioritizing public drainage projects within the Amole-Hubble watershed. The South Powerline Existing Basin Map (to the right) shows large offsite basins drained through this site until the South Powerline Project, as identified in the Amole Hubble Drainage master Plan diverted the drainage from these basins south to the

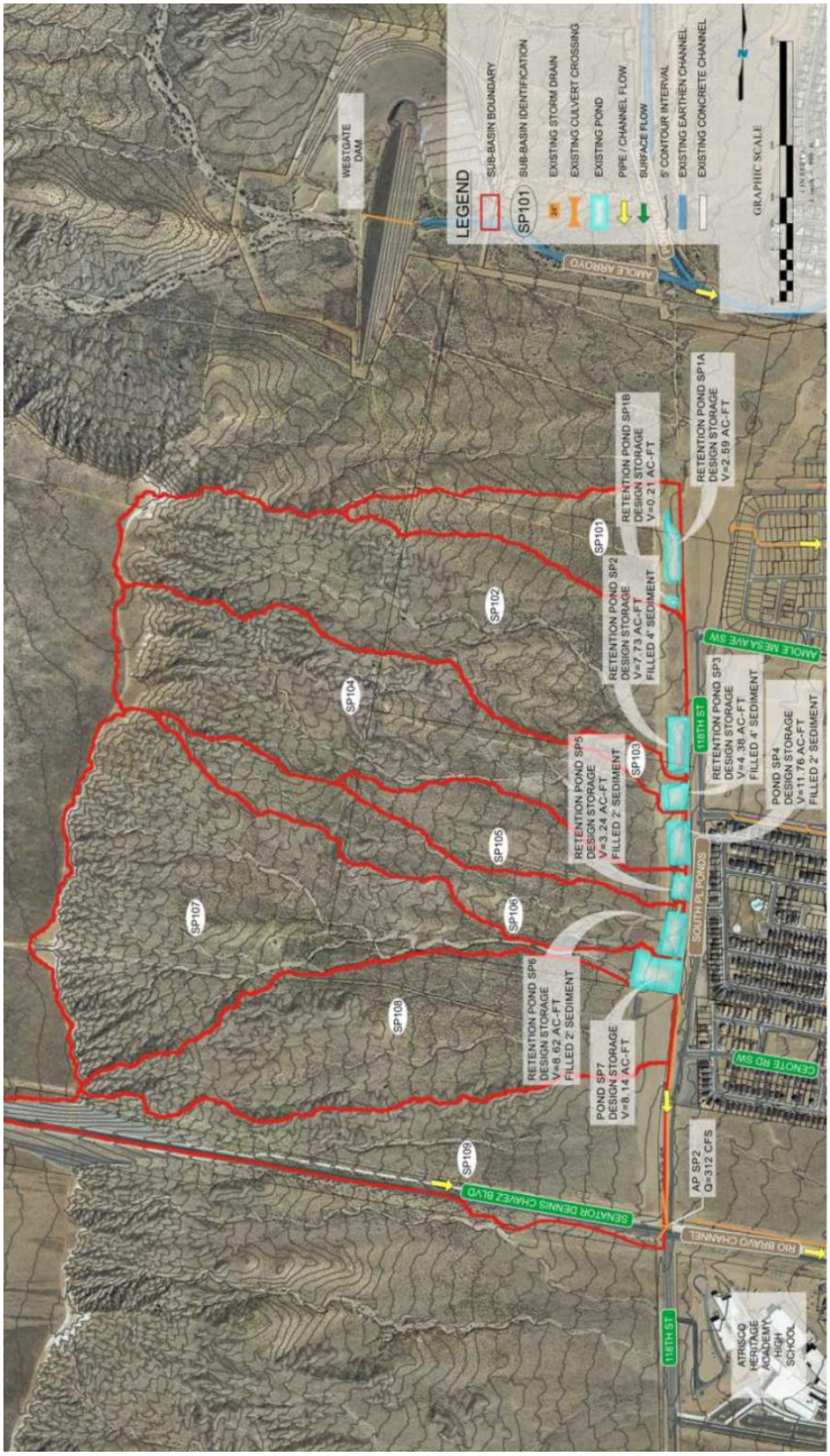


Figure A-5: South Powerline Basin - Existing Basin Map

Rio Bravo Channel in 2005. See Rio Bravo Existing Basins Map to the right. The Anderson Heights Subdivision was developed in 2006 and diverted the rest of the upstream offsite area to the Rio Bravo Channel.

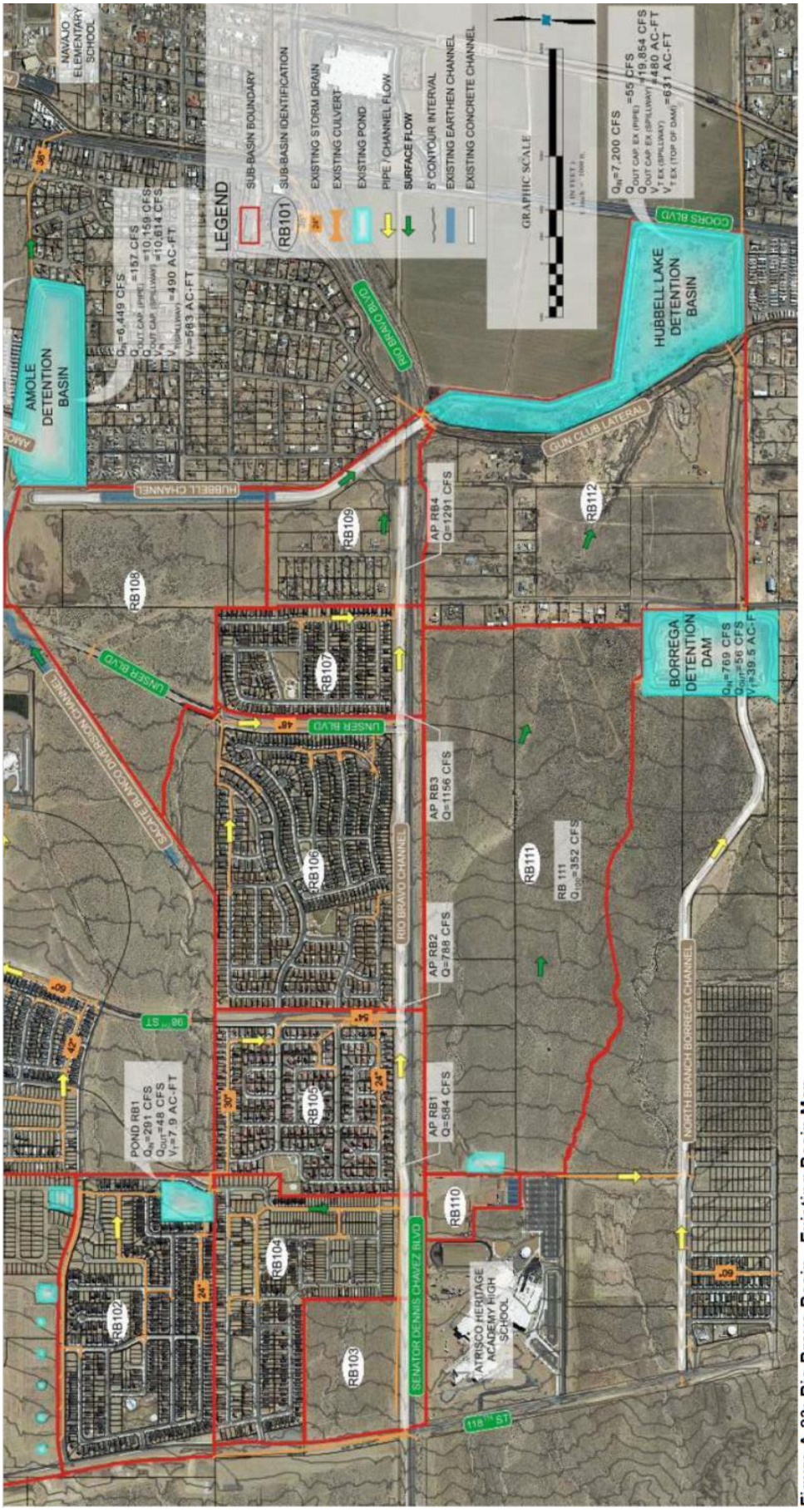


Figure A-23: Rio Bravo Basin - Existing Basin Map

This site is shown on the Amole Existing Basin Map (to the right) as Basin A132. This site is allowed free discharge in the Master Plan hydrology calculations.

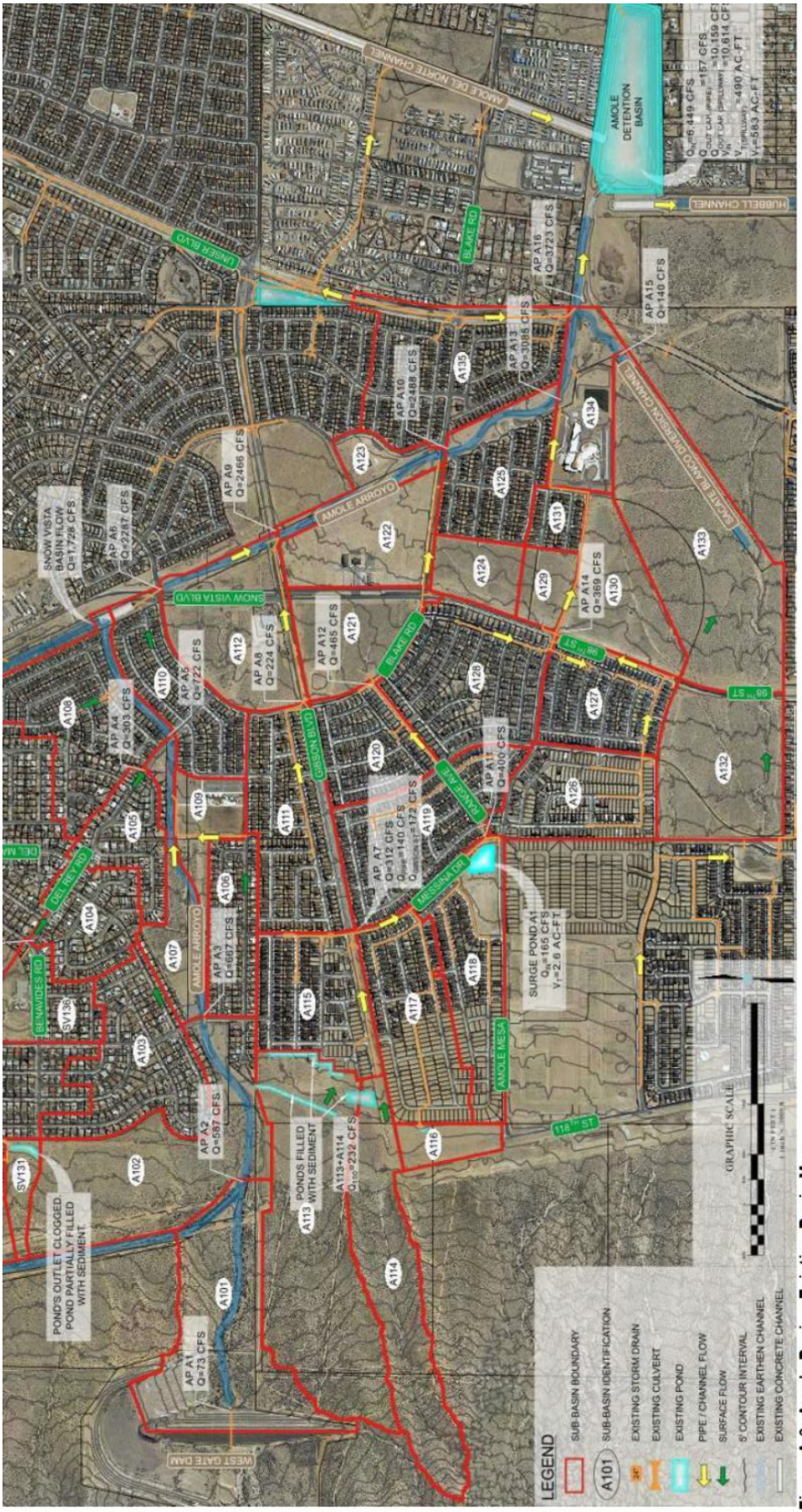
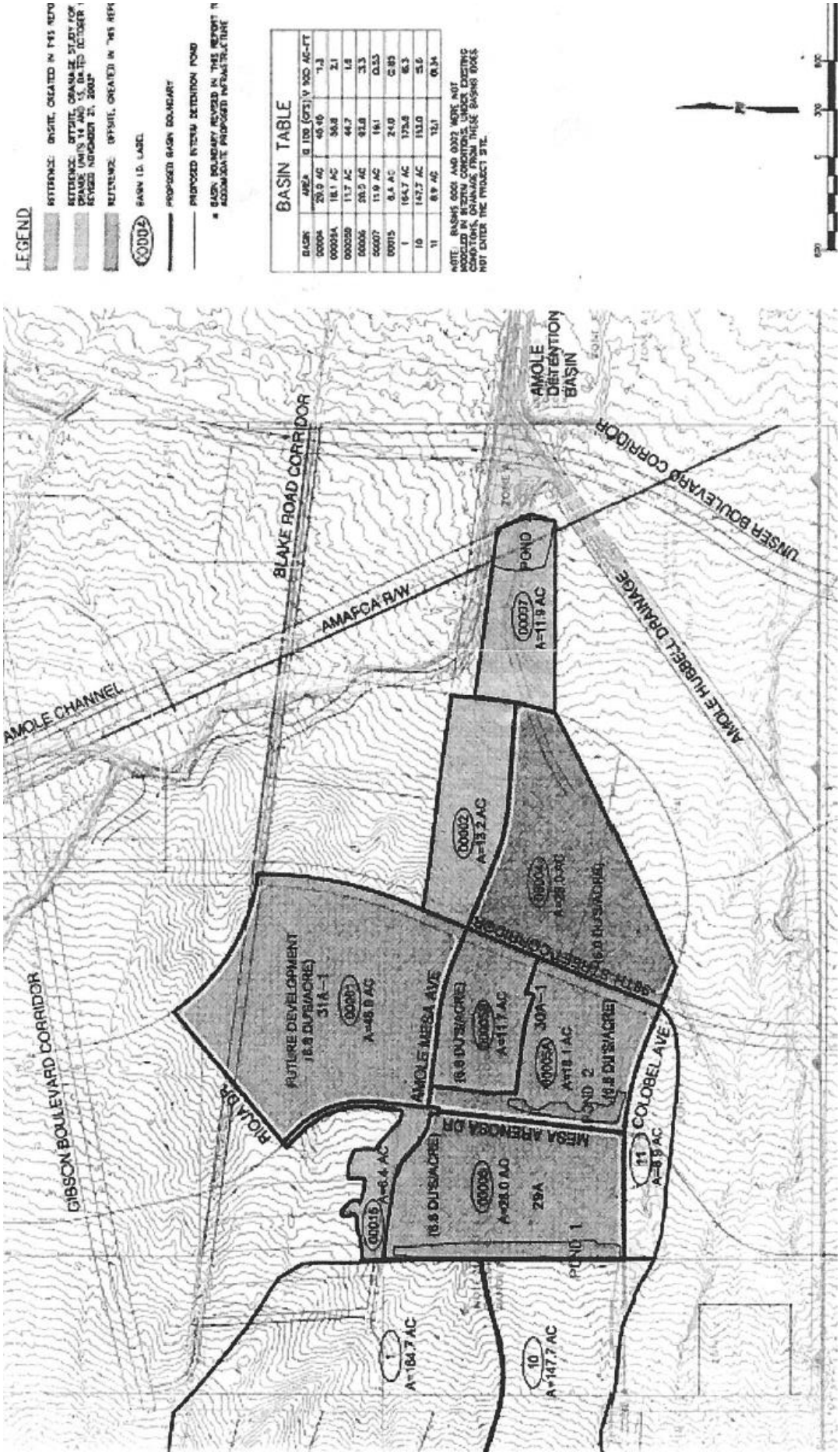


Figure A-9: Amole Basin - Existing Basin Map

Longford at Arrowwood Drainage Management Plan 2005

The *Longford at Arrowwood Drainage Management Plan* (Wilson & Company, 2005) designed the 60" storm drain in 98th St. north of Colobel Ave. in 98th St. Note that Wilson's design included undeveloped flows from basins 1, 10, and 11(see basin map to the right), and note further that those offsite basins do not contribute drainage to the 60" storm drain in 98th Street any more. However the 2013 98th St Improvements designed by WHPacific added new drainage to the 60" storm drain in 98th St. that had not been planned to drain there in any of the previous reports.



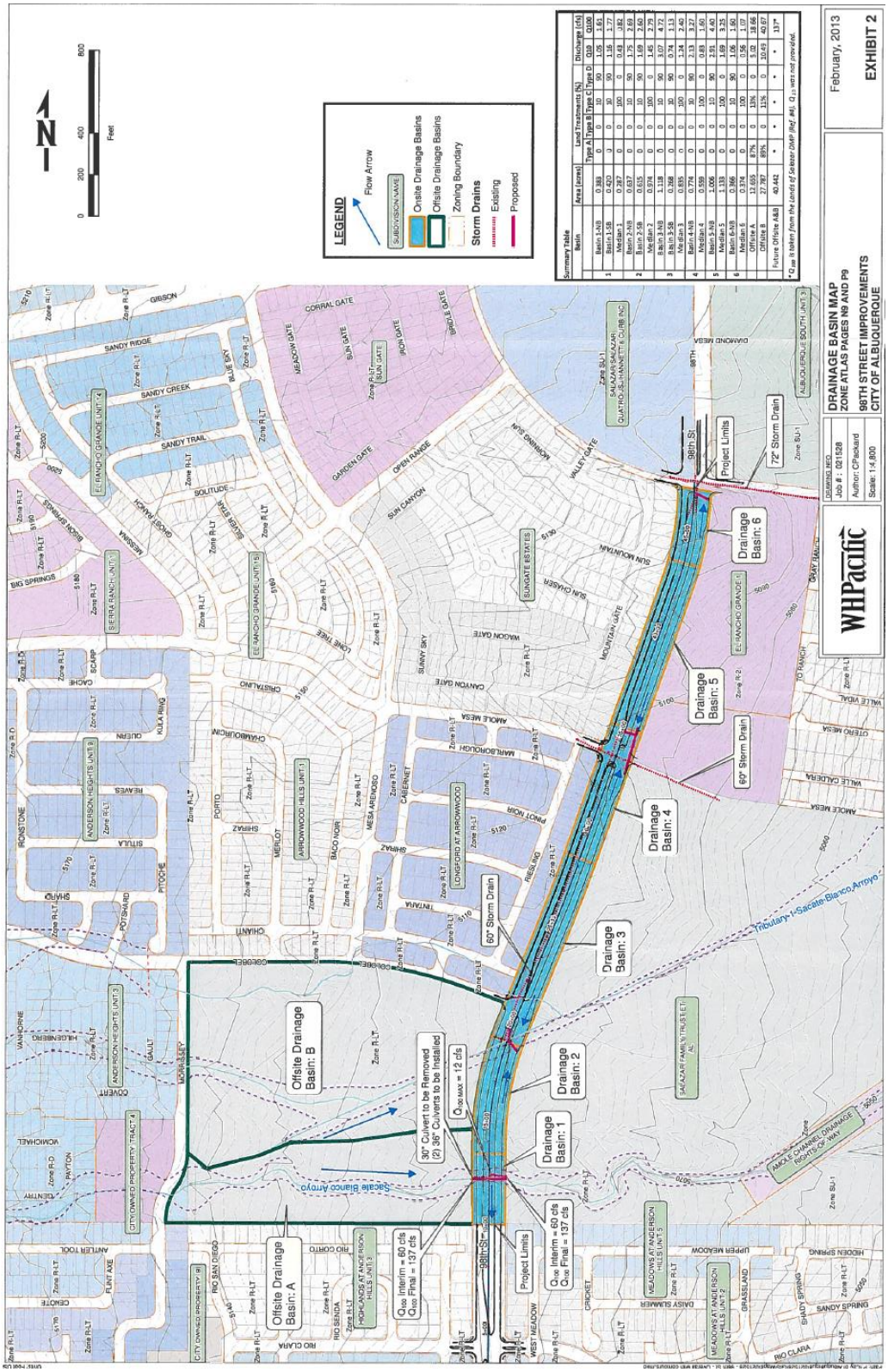
Lands of Salazar Drainage Management Plan 2006

The *Lands of Salazar Drainage Management Plan* (Community Sciences Corporation, 2006) shows most of the Desert Sands development draining to the Sacate Blanco Arroyo. The 100 year peak flow rate of 132.28 cfs is shown at analysis point #1. AP-1 is located just downstream of 98th St. and includes drainage from basins 2 and 3 but does not include 12.69 from onsite basin 1 which is shown to contribute to the 18.29 cfs total at AP-A at the intersection of Colobel Ave. and 98th St. This plan establishes the intent to free discharge the peak 100 year storm water runoff from developed condions from basins 2 through 7 through an onsite storm drain into the Amole Channel at Unser Blvd. (AP-4) and to replace the open channel Sacate Blanco with that storm drain. Basins 8, and 9 are also shown to drain to the Amole Channel (AP-5) but Unser Boulevard does not appear to slope in that dirrection. The lands of Salazar Family Trust owns all of this land including the Desert Sands Subdivision and is cooperating with LGI Homes – New Mexico, LLC, the developer of Desert Sands Subdivision.

98th Street Improvements Drainage Report 2013

The 98th Street Improvements Drainage Report (WHPacific, 2013) designed 98th St from Gibson Boulevard to Dennis Chavez Boulevard does not include analysis of the 60" storm drain HGL in 98th St north of Colobel Ave even though the 98th St. Improvements project added storm inlets in the 98th Street sump with grate elevations lower than the HGL elevation that had been shown on the 60" storm drain construction plans by Wilson. The 98th St, Improvements project also added 12.8 cfs from basin 2 and the east half of basin 3 that previously did not drain there. Basin 2 had been shown to drain into the Sacate Blanco Arroyo in the Lands of Salazar Drainage Management Plan, and the east half of basin 3 had been shown to drain east in the Longford @ Arrowwood Drainage Management Plan. WHPacific designed these basins to drain north in the 60" RCP constructed by the Longford @ Arrowwood development through inlets with grate elevations set lower than the previously calculated HGL without including revised HGL calculations in the Drainage Report for that project.

Desert Sands does not contribute any drainage to that 60" RCP that flows north in 98th St. Instead, nearly all of the onsite drainage will free discharge through the existing double 36" RCPs under 98th St in accordance with all of these referenced plans. The capacity of the double 36" RCP culvers will be changed by the construction of the upstream storm drain planned with the Desert Sands Subdivision so the capacity is documented in the Desert Sands Drainage Report rather than using the old capacity calculations in the 98th St. Improvements Drainage Report.



Hydrology

The “PROCEDURE FOR 40 ACRE AND SMALLER BASINS” is implemented in the following table per DPM Section 22.2 Part A to calculate the 100 year peak flow rates for each basin. The basins are shown on the Drainage Plan on sheet 13 of this report.

Hydrology and Surface Drainage Summary

Hydrology								Street flows						Inlet Calcs		
BASIN ID	AREA	Ground Cover (%)				Peak 100-YR Flow Q_{100} (cfs)		Location	Curb Type	Slope	Depth	Velocity	Energy	Inlet ID	Intercepted	By-pass
	(Ac)	A	B	C	D	Incremental	Surface			(%)	(ft)	(fps)	(ft)	#	(cfs)	(cfs)
101	4.10	-	19	19	62	14.93	14.93	Sacate Blanco Ave.	Roll (4")	3.1	0.28	4.0	0.53	-	0.00	14.93
102	3.03	-	19	19	62	11.03	25.96	Sacate Blanco Ave.	Std. (8")	2.9	0.43	4.0	0.68	13 & 14	13.20	12.76
							12.76	Sacate Blanco Ave.	Std. (8")	Sump				15 & 16	12.76	
103	3.32	-	19	19	62	12.09	12.09	Farinosa Ave.	Roll (4")	3.6	0.26	4.0	0.51	-	0.00	12.09
104	1.70	-	19	19	62	6.19	18.27	Farinosa Ave.	Std. (8")	4.1	0.36	4.7	0.70	17 & 18	11.80	6.47
105	4.14	-	19	19	62	15.07	15.07	Andrews Ave.	Roll (4")	3.3	0.28	4.0	0.53	-	0.00	15.07
106	3.08	-	19	19	62	11.21	26.28	Pauza Drive	Std. (8")	0.5	0.54	2.8	0.66		0.00	26.28
107	1.22	-	19	19	62	4.44	37.20	Farinosa Ave.	Std. (8")	2.7	0.47	5.1	0.87	1 & 2	15.00	22.20
							22.20	Farinosa Ave.	Std. (8")	2.7	0.40	4.1	0.66	3 & 4	12.00	10.20
108	3.56	-	19	19	62	12.96	26.70	Bosque de Oro Dr.	Std. (8")	0.6	0.54	2.9	0.67	-	0.00	26.70
109	1.06	-	19	19	62	3.86	40.76	Farinosa Ave.	Std. (8")	0.5	0.62	3.4	0.80	5 & 6	15.00	25.76
							25.76	Farinosa Ave.	Std. (8")	Sump				7 & 8	25.76	
111	3.79	-	19	19	62	13.80	13.80	Artemsia Ave.	Roll (4")	3.5	0.28	4.0	0.53	-	0.00	13.80
112	1.45	-	19	19	62	5.28	19.08	Artemsia Ave.	Std. (8")	3.5	0.37	4.6	0.70	-	0.00	19.08
113	2.31	-	19	19	62	8.41	27.49	Artemsia Ave.	Std. (8")	0.8	0.52	3.2	0.68	-	0.00	27.49
116	1.53	-	19	19	62	5.57	19.31	Artemsia Ave.	Std. (8")	0.7	0.48	2.7	0.59	-	0.00	19.31
117	2.81	-	19	19	62	10.23	29.54	Tierra Dorando Dr.	Std. (8")	0.5	0.57	2.9	0.70	9 & 10	12.20	17.34
118	0.85	-	19	19	62	3.09	20.44	Tierra Dorando Dr.	Std. (8")	Sump				11 & 12	20.44	0.00
119	0.81	-	19	19	62	2.95	15.70	Sacate Blanco Ave.	Std. (8")	1.8	0.44	4.2	0.71		2.95	12.76
120	1.23	-	0	66	34	4.16		98th St/Colobel								
						130.33									141.10	

Peak Flow rates are calculated using the rate for Zone 1 in Table A-9 of DPM Section 22.2 where A=1.29, B=2.03, C=2.87, and D=4.37 cfs/ac
Flow from Basin 113 devides and is split evenly between Basins 108 and 116
The 100 Year 6 Hour and 10 Day Precipitation depths are 2.9" and 5.95" respectively
Table A-8 Excess is 0.44 0.67 0.99 1.97 5,908 cf for the 100 year 6 hour storm and 10,538 cf for the 100 year 10 day storm for Basin 120 (0.24 ac-ft)

Storm Drain Pipe Summary

Inlet			Pipe							
Location	INLET ID	Q_{100}	Q_{100}	PIPE ID	SLOPE	Diam.	Capacity	Velocity	K	Area
	#	cfs	cfs	#	%	in	cfs	fps		sf
Sacate Blanco Ave.	13	6.60	13.20	18	0.50	24	15.99	4.20	226.2	3.142
Sacate Blanco Ave.	14	6.60	6.60	19	0.50	18	7.42	3.74	105.00	1.767
Sacate Blanco Ave.	15	6.38	6.38	20	0.50	18	7.42	3.61	105.00	1.767
Sacate Blanco Ave.	16	6.38	25.96	21	0.50	36	47.16	3.67	666.9	7.069
Farinosa Ave.	1	7.50	7.50	1	1.00	18	10.50	4.24	105	1.767
Farinosa Ave.	2	7.50	7.50	2	2.70	18	17.25	4.24	105.00	1.767
Farinosa Ave.	3	6.00	6.00	3	1.00	18	10.50	3.40	105	1.767
Farinosa Ave.	4	6.00	6.00	4	1.00	18	10.50	3.40	105	1.767
Farinosa Ave.			38.80	5	0.50	36	47.16	5.49	666.9	7.069
Farinosa Ave.	5	7.50	7.50	6	1.00	18	10.50	4.24	105	1.767
Farinosa Ave.	6	7.50	7.50	7	1.00	18	10.50	4.24	105	1.767
Farinosa Ave.			53.80	8	0.60	42	77.92	5.59	1006	9.621
Farinosa Ave.	7	12.88	12.88	9	1.00	24	22.62	4.10	226.2	3.142
Farinosa Ave.	8	12.88	12.88	10	1.00	24	22.62	4.10	226.2	3.142
Farinosa Ave.			79.56	11	0.70	42	84.17	8.27	1006	9.621
Tierra Dorando Dr.	9	6.10	6.10	12	1.00	18	10.50	3.45	105	1.767
Tierra Dorando Dr.	10	6.10	12.20	13	0.50	24	15.99	3.88	226.2	3.142
Tierra Dorando Dr.	11	10.22	10.22	14	1.20	18	11.50	5.78	105	1.767
Tierra Dorando Dr.	12	10.22	32.64	15	0.50	36	47.16	4.62	666.9	7.069
Tierra Dorando Dr.			112.20	16	0.70	54	164.57	7.05	1967	15.904
Lot 29 Esm't			138.15	17	1.00	54	196.70	8.69	1967	15.904
Ex Double 36" RCP @ 98th St.			138.15	18	2.00	36	188.63	9.77	666.9	7.069
Farinosa Ave.	17	5.90	5.90	22	1.00	18	10.50	3.34	105.00	1.767
Farinosa Ave.	18	5.90	5.90	23	1.00	18	10.50	3.34	105.00	1.767
Farinosa Ave.			11.80	24	4.10	24	45.80	3.76	226.2	3.142
Farinosa Ave.			26.80	25	2.70	24	37.17	8.53	226.2	3.142

Hydraulics

Street flow depths and velocities are summarized in the Hydrology and Surface Drainage Summary table on page 13.The depths and velocities are determined from Plate 22.3 D-1 of the DPM (see appendix). The 100 year flow depths should not exceed the top of curb and the energy grade elevation should not exceed the elevation at the street right of way which is typically 0.20' higher than the top of curb. Roll (4") curb is used in the upper portion of the watershed where flow depths are shallow, and Standard (8") curb is used in the lower portion of the watershed.

Storm drain inlets on grade are located where the street drainage capacity is exceeded and the interception rate is determined using Plate 22.3 D-5 as summarized in the table to the right. Inlet capacity at three sump locations is determined using the greatest depth as calculated from the weir and orifice equations as summarized in the following table on page 15. Each of the three sumps is designed to overflow in the event the sump inlet clogs. The overflow will pass over the crest in the street adjacent to the sump. The emergency elevation of the water is determined based on the critical depth as determined from Plate 22.3 D-1. The emergency water surface elevation is lower than the lowest adjacent pad elevation.

Storm pipes are summarized in the table on page 14. The capacities shown in that table are based on the pipe slope and Manning's normal depth for pipe flowing full. Hydraulic Grade Line elevations are determined using WSPGW software. Printouts are in the appendix and the HGL is shown on the pipe profiles also in the appendix.

This development is not planned to connect any new storm drains or to contribute any new drainage to the existing storm drain in 98th St at the intersection of Colobel.

Sump Inlet Summary Table

Inlet #	Alignment	Type	Area (SF)	Effective Perimiter (FT)	Q100 (CFS)	Orifice depth[1] (FT)	Weir Depth[2] (FT)	Top of Curb Elevation	100-YR Water Surface Elev.	Overflow Crest Elevation	Emergency Overflow Depth	Emergency Overflow Elevation	Lowest Adjacent Pad Elevation
7	E	Dbl 'C'	17.39	10.50	12.88	0.02	0.55	5107.51	5107.52	5107.78	0.67	5108.45	5108.70
8	E	Dbl 'C'	17.39	10.50	12.88	0.02	0.55	5107.51	5107.52	5107.78	0.67	5108.45	5108.70
11	F	Dbl 'C'	16.09	10.50	10.22	0.02	0.47	5107.59	5107.52	5107.78	0.67	5108.45	5108.70
12	F	Dbl 'C'	16.09	10.50	10.22	0.02	0.47	5107.59	5107.52	5107.78	0.67	5108.45	5108.70
15	D	Dbl 'C'	16.09	10.50	6.38	0.01	0.34	5107.74	5107.54	5107.57	0.40	5107.97	5108.70
16	D	Dbl 'C'	16.09	10.50	6.38	0.01	0.34	5107.74	5107.54	5107.57	0.40	5107.97	5108.70

1) Orifice Equa $Q = 0.6\ A\ (2gh)^{0.5}$ so $h=(Q/.6/A)^2/2/g$

2) Weir Equati $Q = 3\ L\ h^{3/2}$ so $h= (Q/3/L)^{2/3}$

3) The orifice equation is used in accordance with FHA HEC-22, and the height is added to the center of the grate elevation which is 0.72' below the top of curb elevation.

4) The weir equation is used in accordance with FHA HEC-22, and the height is added to the lip of gutter elevation which is 0.54' below the top of curb elevation.

5) The Area and Effective Perimiter are calculated by "Hydraulic Tool Box 4.2" in accordance with Federal Highway Administration HEC-22 3rd eddition, Rev Aug., 2013

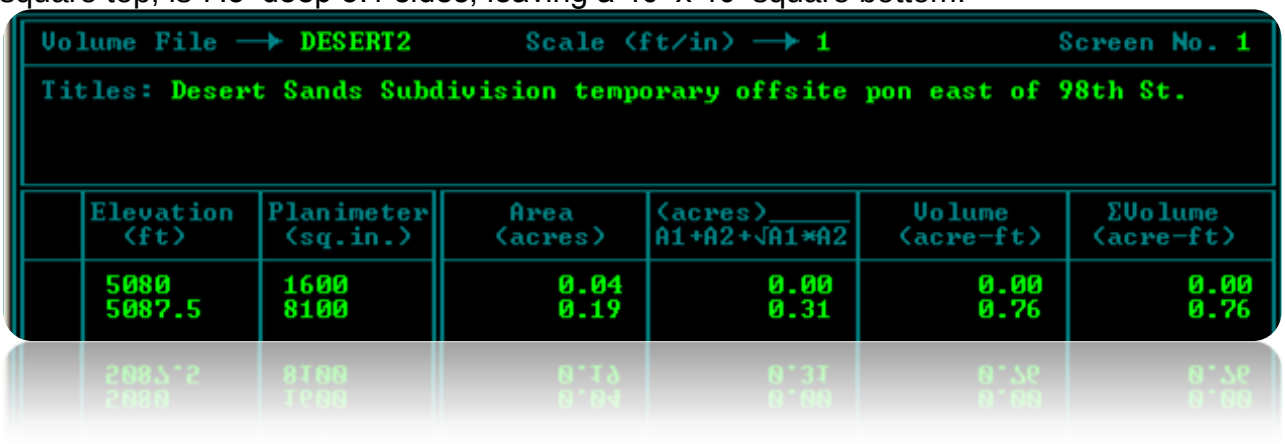
6) Emergency Overflow from inlets #7, 8, 11, & 12 goes south in alignment F to alignment D. The total flow is 52.58 cfs and has a normal depth of 0.67' at 0.5% slope.

7) Emergency Overflow from inlets #15 & 16 goes east in alignment D to 98th St. The total flow is 12.28 cfs and has a critical depth of 0.40' at the high spot.

Storm Water Quality Pond

The SWQ volume required by the City of Albuquerque is calculated as 0.34" depth over the area of impervious surfaces. The onsite area that drains to the culvers under 98th St. is 38.76 acres with 62% impervious cover, so the impervious area is:
0.62 x 38.76 =24.03 acres.
The required SWQ volume is:
0.34"/12(in/ft) x 24.03 ac =0.68 ac-ft (or 29,657 cf)

The SWQ pond is to be located east of 98th St. just downstream of the existing double 36" culverts. The pond will be excavated below the elevation of the bed of the arroyo so that overflow will continue down the arroyo at the existing arroyo grade. The downstream arroyo will act as the spillway and there will not be a dam (dam height = 0.0'). The effective volume has a 90' x 90' square top, is 7.5' deep 3:1 sides, leaving a 40' x 40' square bottom.



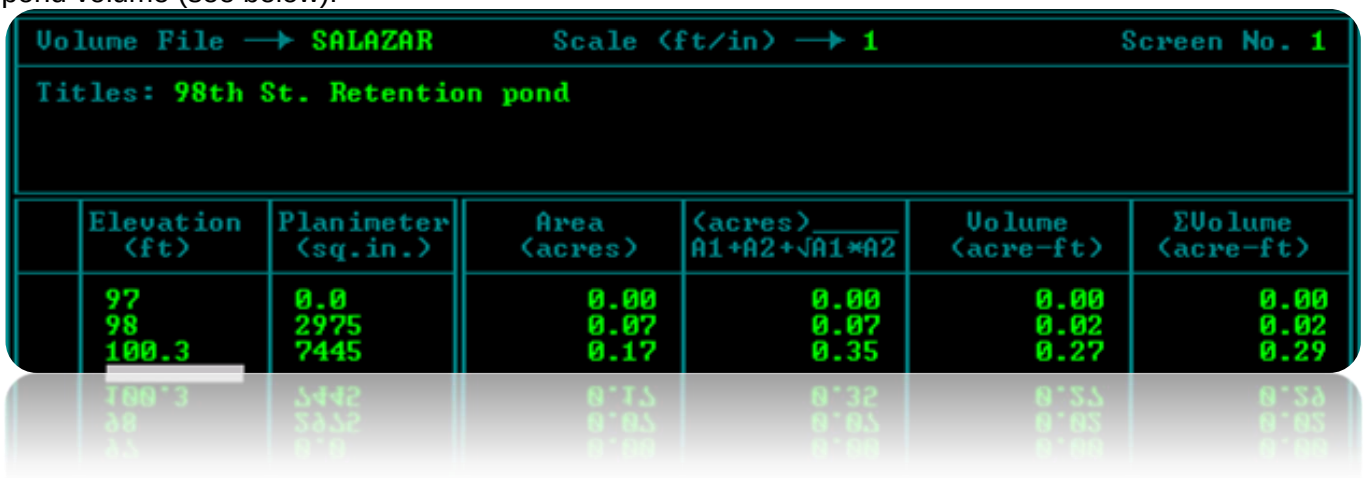
Volume File → DESERT2 Scale (ft/in) → 1 Screen No. 1

Titles: Desert Sands Subdivision temporary offsite pon east of 98th St.

	Elevation (ft)	Planimeter (sq.in.)	Area (acres)	(acres) A1+A2+√A1*A2	Volume (acre-ft)	ΣVolume (acre-ft)
	5080	1600	0.04	0.00	0.00	0.00
	5087.5	8100	0.19	0.31	0.76	0.76

Basin 120 Retention Pond Volume

The retention pond in the northeast corner of the project will be located on the HOA Tract G and will receive drainage from the south half of the public right of way of Colobel Ave between 98th St. and Pauza Dr. So a maintenance agreement and covenant will need to be provided to the City of Albuquerque to insure that the HOA will maintain the retention pond. The volume provided in the pond is greater than the 100 year 10 day runoff volume of 0.24 acre feet. The conic section method is used to calculate the actual pond volume (see below).



Volume File → SALAZAR Scale (ft/in) → 1 Screen No. 1

Titles: 98th St. Retention pond

	Elevation (ft)	Planimeter (sq.in.)	Area (acres)	(acres) A1+A2+√A1*A2	Volume (acre-ft)	ΣVolume (acre-ft)
	97	0.0	0.00	0.00	0.00	0.00
	98	2975	0.07	0.07	0.02	0.02
	100.3	7445	0.17	0.35	0.27	0.29

Summary

This site will free discharge developed 100 year peak flow rates through the existing double 36" RCP culvert under 98th St. in accordance with all of the history of drainage design and analysis for this basin. Onsite runoff will be conveyed in public streets and storm drains to the discharge point in accordance with the City of Albuquerque design standards as established in the DPM. A Storm Water Quality pond will be located east of 98th St. to serve this development. See the Grading and Drainage Plan for details. Basin 119 will flow south in 98th St and Basin 120 will be retained onsite in a pond.

Drainage Plan

Insert map instead of this page.

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Appendix 1 – Amole-Hubble AHYMO

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 11 NOTATION
DIVIDE HYD	SV136DIV1	1	3	0.02482	48.04	1.884	1.42357	1.567	3.025	
	SV136DIV2	and	48	0.02481	48.04	1.884	1.42357	1.567	3.025	
ROUTE MCUNGE	SV236SUM1RT	3	1	0.02482	47.86	1.884	1.42375	1.600	3.014	CCODE = 0.2
ADD HYD	SV237SUMA	20& 1	1	0.09837	210.99	8.350	1.59170	1.567	3.352	
COMPUTE NM HYD	SV237	-	2	0.03272	77.17	2.893	1.65779	1.533	3.685	PER IMP= 45.85
ADD HYD	SV237SUMB	1& 2	1	0.13109	284.73	11.243	1.60819	1.533	3.394	
*S APSV12										
ROUTE MCUNGE	SV237SUMBRT	1	2	0.13109	284.55	11.237	1.60734	1.567	3.392	CCODE = 0.1
COMPUTE NM HYD	SV240	-	1	0.04727	109.49	4.036	1.60089	1.533	3.619	PER IMP= 42.00
ADD HYD	SV240SUM	2& 1	1	0.17836	386.55	15.273	1.60563	1.567	3.386	
*S APSV13										
ROUTE MCUNGE	SV240sumRT	1	2	0.17836	385.67	15.278	1.60614	1.567	3.379	CCODE = 0.2
COMPUTE NM HYD	SV241	-	1	0.04160	96.36	3.552	1.60089	1.533	3.619	PER IMP= 42.00
ADD HYD	SV241SUM	2& 1	1	0.21996	475.43	18.830	1.60514	1.567	3.377	
*S APSV14										
ROUTE MCUNGE	SV241SUMRT	1	2	0.21996	475.19	18.829	1.60511	1.567	3.376	CCODE = 0.2
ADD HYD	SV243SUMA	10& 2	10	1.40835	1295.82	125.010	1.66432	1.667	1.438	
*S APSV15										
COMPUTE NM HYD	SV242	-	1	0.08119	180.79	8.674	2.00317	1.567	3.479	PER IMP= 70.13
*S APSV16										
ROUTE MCUNGE	SV242RT	1	2	0.08119	180.38	8.668	2.00188	1.600	3.471	CCODE = 0.2
COMPUTE NM HYD	SV243	-	1	0.02884	80.26	3.430	2.22977	1.500	4.348	PER IMP= 84.60
ADD HYD	SV243SUMB	1& 2	1	0.11003	245.97	12.098	2.06160	1.567	3.493	
*S APSV17										
ROUTE MCUNGE	SV243SUMBRT	1	2	0.11003	246.02	12.091	2.06042	1.600	3.494	CCODE = 0.2
ADD HYD	SV243SUMC	10& 2	1	1.51838	1514.48	137.101	1.69302	1.667	1.558	
COMPUTE NM HYD	SV244	-	2	0.02736	63.15	2.603	1.78376	1.533	3.607	PER IMP= 54.35
ADD HYD	SV244SUM	1& 2	1	1.54574	1558.48	139.704	1.69463	1.633	1.575	
*S APSV18										
ROUTE MCUNGE	SVBASIN	1	47	1.54574	1558.48	139.704	1.69463	1.633	1.575	CCODE = 0.0
*S**********										
*S******* END OF SNOW VISTA BASIN										
*S**********										
*S**********										
*S******* AMOLE BASIN										
*S**********										
*S										
*S RECALL HYD Below From ORIGINAL DMP AHYMO Files under										
*S Folder EX Amole Hubbell Basins File WGEXIST.PUN										
*S Offsite flows from Westgate Dam flow into the Amole Basin										
*S										
RECALL HYD	WGDAM	-	70	18.68360	73.15	167.311	0.16791	11.250	0.006	
*S										
*S END of RECALL HYD										
*S										
ROUTE MCUNGE	PLBASINRT	46	2	1.23801	287.41	76.085	1.15232	3.100	0.363	CCODE = 0.0
DIVIDE HYD	ADIVSUMA	70	1	18.67907	73.00	167.271	0.16791	9.150	0.006	
	ADIVSUMB	and	91	0.00453	0.15	0.041	0.16792	11.250	0.051	
ROUTE MCUNGE	ADIVSUMART	1	3	18.67907	73.00	167.271	0.16791	9.150	0.006	CCODE = 0.0
*S APA1										
ADD HYD	A201SUMA	3& 2	1	19.91708	352.16	243.188	0.22894	3.100	0.028	

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 12 NOTATION
COMPUTE NM HYD	A201	-	2	0.07236	122.09	4.373	1.13307	1.533	2.636	PER IMP= 21.72
ADD HYD	A201SUMB	1& 2	1	19.98944	353.26	247.561	0.23221	3.100	0.028	
*S APA2										
ROUTE MCUNGE	A201SUMBRt	1	10	19.98944	353.26	247.561	0.23221	3.100	0.028	CCODE = 0.0
COMPUTE NM HYD	SV229	-	1	0.02916	69.85	2.652	1.70546	1.533	3.743	PER IMP= 49.00
COMPUTE NM HYD	SV230	-	2	0.01824	45.29	1.774	1.82355	1.533	3.880	PER IMP= 57.00
ADD HYD	SV230SUM	1& 2	1	0.04740	115.14	4.426	1.75089	1.533	3.795	
ROUTE RESERVOIR	PondSV10	1	30	0.04740	55.05	4.426	1.75089	1.700	1.815	AC-FT= 1.734
ROUTE MCUNGE	SV230SUMRT	30	1	0.04740	54.85	4.419	1.74802	1.766	1.808	CCODE = 0.2
COMPUTE NM HYD	A202.1	-	2	0.05920	60.67	3.969	1.25702	1.733	1.601	PER IMP= 28.49
ADD HYD	SV202.1SUMA	2& 1	1	0.10660	114.85	8.388	1.47534	1.733	1.683	
ROUTE MCUNGE	A202.1SUMARt	1	2	0.10660	114.85	8.388	1.47534	1.733	1.683	CCODE = 0.0
ADD HYD	A202.1SUMB	10& 2	1	20.09604	402.82	255.949	0.23881	1.567	0.031	
COMPUTE NM HYD	A202.2	-	2	0.02663	53.58	1.938	1.36468	1.533	3.144	PER IMP= 32.70
ADD HYD	A202.2SUM	1& 2	1	20.12267	455.77	257.887	0.24030	1.533	0.035	
*S APA3										
ROUTE MCUNGE	A202.2SUMRt	1	2	20.12267	455.75	257.882	0.24029	1.633	0.035	CCODE = 0.2
COMPUTE NM HYD	A206	-	1	0.03109	74.47	2.828	1.70546	1.533	3.743	PER IMP= 49.00
ROUTE MCUNGE	A206Rt	1	3	0.03109	73.94	2.824	1.70334	1.533	3.716	CCODE = 0.1
ADD HYD	A206SUM	2& 3	10	20.15376	517.33	260.707	0.24255	1.600	0.040	
ROUTE MCUNGE	SV236SUM2Rt	40	1	0.02481	47.91	1.883	1.42270	1.633	3.017	CCODE = 0.1
*S APA4										
COMPUTE NM HYD	A203	-	2	0.06206	143.75	5.299	1.60089	1.533	3.619	PER IMP= 42.00
ROUTE MCUNGE	A203Rt	2	3	0.06206	142.23	5.290	1.59827	1.600	3.561	CCODE = 0.1
ADD HYD	A204SUMA	3& 1	2	0.08687	189.27	7.173	1.54810	1.633	3.404	
COMPUTE NM HYD	A204	-	1	0.03430	78.99	2.908	1.58949	1.533	3.598	PER IMP= 41.50
ADD HYD	A204SUMB	2& 1	1	0.12118	252.56	10.081	1.55982	1.600	3.257	
ROUTE MCUNGE	A204SumRRt	1	2	0.12118	251.47	10.080	1.55974	1.633	3.243	CCODE = 0.2
COMPUTE NM HYD	A205	-	1	0.02852	61.77	2.435	1.60089	1.533	3.384	PER IMP= 42.00
ADD HYD	A205Sum	2& 1	1	0.14970	305.30	12.515	1.56758	1.600	3.187	
*S APA5										
ROUTE MCUNGE	A205SumRt	1	2	0.14970	305.28	12.516	1.56773	1.633	3.186	CCODE = 0.2
ADD HYD	A207SUMA	10& 2	1	20.30345	819.61	273.223	0.25232	1.633	0.063	
COMPUTE NM HYD	A207	-	2	0.04014	60.01	1.945	0.90836	1.533	2.336	PER IMP= 10.71
ADD HYD	A207SUMB	1& 2	1	20.34359	868.78	275.168	0.25361	1.600	0.067	
*S APA6										
ROUTE MCUNGE	A207SUMBRT	1	2	20.34359	867.19	275.163	0.25361	1.633	0.067	CCODE = 0.2
COMPUTE NM HYD	A208	-	1	0.06723	164.52	6.375	1.77804	1.533	3.824	PER IMP= 54.00
ADD HYD	A208SUMA	47& 1	1	1.61297	1686.85	146.079	1.69810	1.600	1.634	
ADD HYD	A208SUMB	2& 1	1	21.95656	2538.88	421.242	0.35972	1.633	0.181	
ROUTE MCUNGE	A208SUMBRt	1	2	21.95656	2533.06	421.237	0.35972	1.667	0.180	CCODE = 0.2
COMPUTE NM HYD	A209	-	1	0.01282	18.08	0.571	0.83568	1.533	2.203	PER IMP= 7.30
ROUTE MCUNGE	A209Rt	1	3	0.01282	17.37	0.566	0.82788	1.900	2.116	CCODE = 0.1
COMPUTE NM HYD	A210	-	1	0.04365	111.71	4.491	1.92914	1.533	3.999	PER IMP= 64.24
ADD HYD	A210SUMA	3& 1	1	0.05647	112.03	5.057	1.67912	1.533	3.100	
ADD HYD	A210SUMB	2& 1	1	22.01303	2601.00	426.294	0.36310	1.633	0.185	
*S APA7										
ROUTE MCUNGE	A210SUMBRT	1	2	22.01303	2575.77	426.171	0.36300	1.667	0.183	CCODE = 0.1
COMPUTE NM HYD	A211	-	1	0.06511	165.76	6.637	1.91115	1.533	3.978	PER IMP= 63.00
*S APA8										
ROUTE MCUNGE	A211Rt	1	3	0.06511	164.68	6.623	1.90740	1.567	3.952	CCODE = 0.1
COMPUTE NM HYD	A212	-	1	0.06224	174.78	7.656	2.30653	1.533	4.388	PER IMP= 89.80

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ADD HYD	A212SUMA	3& 1	1	0.12735	328.91	14.280	2.10246	1.567	4.036	
ADD HYD	A212SUMB	2& 1	1	22.14038	2806.84	440.451	0.37300	1.667	0.198	
*S APA9										
ROUTE MCUNGE	A212SUMBRT	1	10	22.14038	2796.09	440.460	0.37301	1.667	0.197	CCODE = 0.2
COMPUTE NM HYD	A214	-	1	0.02567	61.49	2.335	1.70546	1.533	3.743	PER IMP= 49.00
ROUTE MCUNGE	A214RT	1	2	0.02567	61.05	2.333	1.70423	1.633	3.716	CCODE = 0.1
COMPUTE NM HYD	A215	-	1	0.07926	191.61	7.261	1.71772	1.533	3.777	PER IMP= 49.00
ADD HYD	A215SUM	2& 1	1	0.10493	233.66	9.596	1.71441	1.533	3.479	
*S APA10										
ROUTE MCUNGE	A215SUMRt	1	2	0.10493	220.08	9.490	1.69570	1.600	3.277	CCODE = 0.2
COMPUTE NM HYD	A216	-	1	0.00913	21.87	0.830	1.70410	1.533	3.743	PER IMP= 48.90
ROUTE MCUNGE	A216Rt	1	3	0.00913	21.60	0.827	1.69876	1.633	3.696	CCODE = 0.1
COMPUTE NM HYD	A217	-	1	0.05761	133.19	4.615	1.50215	1.533	3.613	PER IMP= 31.10
ADD HYD	A117SUMA	3& 1	1	0.06674	144.72	5.443	1.52903	1.533	3.388	
ADD HYD	A217SUMB	1& 2	1	0.17167	360.59	14.932	1.63091	1.567	3.282	
ROUTE MCUNGE	A217SUMBRt	1	2	0.17167	329.24	14.600	1.59467	1.633	2.997	CCODE = 0.2
COMPUTE NM HYD	A218	-	1	0.05592	128.79	4.429	1.48500	1.533	3.599	PER IMP= 29.70
ADD HYD	A218SUMA	2& 1	1	0.22759	428.67	19.029	1.56772	1.600	2.943	
*S ****DIVIDE 235 CFS through 54" pipe and remaining to Surge Pond										
DIVIDE HYD	A218SUMB	1	1	0.18179	235.00	15.200	1.56772	1.433	2.020	
	A218SUMC	and	2	0.04580	193.67	3.830	1.56772	1.600	6.607	
ROUTE RESERVOIR	PondA1	2	30	0.04580	0.30	2.218	0.90789	1.800	0.010	AC-FT= 3.825
ADD HYD	A218SUMD	1&30	1	0.22759	235.29	17.417	1.43493	1.766	1.615	
*S APA11										
ROUTE MCUNGE	A218SUMDRt	1	2	0.22759	234.95	17.122	1.41064	1.766	1.613	CCODE = 0.2
COMPUTE NM HYD	A219	-	1	0.06433	159.68	6.256	1.82356	1.533	3.879	PER IMP= 57.00
ADD HYD	A219SUM	2& 1	1	0.29192	383.01	23.379	1.50163	1.533	2.050	
ROUTE MCUNGE	A219SUMRt	1	2	0.29192	352.54	23.062	1.48130	1.633	1.887	CCODE = 0.2
COMPUTE NM HYD	A220	-	1	0.03619	89.59	3.514	1.82035	1.533	3.868	PER IMP= 57.03
ADD HYD	A220SUM	2& 1	1	0.32811	423.01	26.576	1.51869	1.600	2.014	
*S APA12										
ROUTE MCUNGE	A220SUMRt	1	2	0.32811	396.63	26.125	1.49292	1.667	1.889	CCODE = 0.2
COMPUTE NM HYD	A221	-	1	0.04187	118.26	5.098	2.28291	1.500	4.413	PER IMP= 88.20
ADD HYD	A221SUM	2& 1	1	0.36998	468.86	31.223	1.58232	1.633	1.980	
ROUTE MCUNGE	A221SUMRt	1	2	0.36998	446.04	30.570	1.54926	1.733	1.884	CCODE = 0.2
COMPUTE NM HYD	A222	-	1	0.04520	128.19	5.539	2.29752	1.500	4.431	PER IMP= 89.19
ADD HYD	A222SUM	2& 1	1	0.41518	505.15	36.109	1.63072	1.667	1.901	
ADD HYD	A223SUMA	10& 1	1	22.55556	3301.24	476.569	0.39616	1.667	0.229	
COMPUTE NM HYD	A223	-	2	0.02061	57.77	2.479	2.25499	1.500	4.380	PER IMP= 86.30
ADD HYD	A223SUMB	2& 1	1	22.57617	3333.91	479.048	0.39786	1.667	0.231	
*S APA13										
ROUTE MCUNGE	A223SUMBRT	1	10	22.57617	3319.18	478.885	0.39772	1.733	0.230	CCODE = 0.1
COMPUTE NM HYD	A224	-	1	0.02007	48.08	1.826	1.70546	1.533	3.743	PER IMP= 49.00
ROUTE MCUNGE	A224RT	1	2	0.02007	47.67	1.824	1.70410	1.633	3.711	CCODE = 0.1
COMPUTE NM HYD	A225	-	1	0.04681	119.33	4.782	1.91545	1.533	3.983	PER IMP= 63.30
ADD HYD	A225SUMA	2& 1	1	0.06688	153.28	6.606	1.85202	1.567	3.581	
ROUTE MCUNGE	A225SUMBRT	1	2	0.06688	153.16	6.606	1.85193	1.567	3.578	CCODE = 0.2
ADD HYD	A225SUMB	10& 2	10	22.64305	3413.00	485.491	0.40202	1.733	0.236	
*S APA15										
COMPUTE NM HYD	A226	-	1	0.04817	122.90	4.929	1.91841	1.533	3.987	PER IMP= 63.50
ROUTE MCUNGE	A226Rt	1	2	0.04817	119.56	4.909	1.91085	1.600	3.878	CCODE = 0.1
COMPUTE NM HYD	A227	-	1	0.04342	104.57	4.474	1.93209	1.533	3.763	PER IMP= 64.44

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ADD HYD	A227SUM	2& 1	1	0.09159	221.03	9.383	1.92091	1.567	3.771	
COMPUTE NM HYD	A228	-	2	0.06983	167.59	6.379	1.71271	1.533	3.750	PER IMP= 49.50
ADD HYD	A228SUM	1& 2	1	0.16142	376.88	15.762	1.83084	1.567	3.648	
*S APA14										
ROUTE MCUNGE	A228SUMRt	1	2	0.16142	281.42	14.819	1.72129	1.667	2.724	CCODE = 0.2
COMPUTE NM HYD	A229	-	1	0.01395	33.43	1.269	1.70546	1.533	3.744	PER IMP= 49.00
ADD HYD	A229SUM	1& 2	1	0.17537	300.52	16.088	1.72003	1.667	2.678	
ROUTE MCUNGE	A229SUMRT	1	2	0.17537	300.11	16.089	1.72019	1.667	2.674	CCODE = 0.2
COMPUTE NM HYD	A230	-	1	0.04312	112.97	4.625	2.01129	1.533	4.094	PER IMP= 69.80
ADD HYD	A230SUM	1& 2	1	0.21849	374.61	20.714	1.77764	1.633	2.679	
COMPUTE NM HYD	A231	-	2	0.01188	30.23	1.209	1.90795	1.533	3.976	PER IMP= 62.80
ADD HYD	A231SUMA	1& 2	1	0.23037	396.03	21.923	1.78435	1.600	2.686	
ROUTE MCUNGE	A231SUMCRt	1	2	0.23037	361.65	21.278	1.73187	1.700	2.453	CCODE = 0.2
ADD HYD	A231SUMB	10& 2	1	22.87342	3769.13	506.770	0.41541	1.733	0.257	
ROUTE MCUNGE	A231SUMBRt	1	10	22.87342	3365.62	506.647	0.41531	1.800	0.230	CCODE = 0.2
COMPUTE NM HYD	A232	-	1	0.06536	171.36	7.021	2.01424	1.533	4.096	PER IMP= 70.00
ROUTE MCUNGE	A232RT	1	2	0.06536	166.32	6.985	2.00394	1.766	3.976	CCODE = 0.1
COMPUTE NM HYD	A233	-	1	0.11362	245.20	12.206	2.01424	1.600	3.372	PER IMP= 70.00
ADD HYD	A233SUM	2& 1	1	0.17898	338.06	19.191	2.01047	1.700	2.951	
*S APA16										
ROUTE MCUNGE	A233SUMRT	1	2	0.17898	333.43	19.167	2.00790	1.733	2.911	CCODE = 0.1
ADD HYD	A234SUMA	10& 2	1	23.05240	3683.53	525.814	0.42768	1.800	0.250	
COMPUTE NM HYD	A234	-	2	0.03607	89.40	3.501	1.82001	1.533	3.873	PER IMP= 56.84
ADD HYD	A234SUMB	1& 2	1	23.08847	3708.74	529.315	0.42985	1.800	0.251	
COMPUTE NM HYD	A235	-	2	0.08192	194.03	7.857	1.79834	1.533	3.701	PER IMP= 55.30
ADD HYD	A235SUM	1& 2	1	23.17039	3775.20	537.172	0.43469	1.766	0.255	
*S APA17										
ROUTE MCUNGE	ABASIN	1	49	23.17039	3756.56	537.026	0.43457	1.833	0.253	CCODE = 0.1
*S**********										
*S*******	END OF AMOLE BASIN									
*S**********										
*S**********										
*S*******	SOUTH AMOLE BASIN									
*S**********										
COMPUTE NM HYD	SA202	-	1	0.03705	95.83	3.882	1.96478	1.533	4.041	PER IMP= 66.60
ROUTE MCUNGE	SA202Rt	1	2	0.03705	95.11	3.874	1.96028	1.567	4.011	CCODE = 0.1
*S Extended Storm System to Avoid Excess Street Flow										
COMPUTE NM HYD	SA204	-	1	0.02776	66.16	2.501	1.68909	1.533	3.724	PER IMP= 47.90
ROUTE RESERVOIR	PONDSA1	1	30	0.02776	6.49	2.501	1.68908	2.066	0.365	AC-FT= 1.754
ROUTE MCUNGE	PondSA1Rt	30	1	0.02776	6.49	2.500	1.68876	2.100	0.365	CCODE = 0.2
*S Extended Storm System to Avoid Excess Street Flow										
ADD HYD	SA203SUMA	2& 1	1	0.06481	97.85	6.374	1.84397	1.567	2.359	
COMPUTE NM HYD	SA203	-	2	0.02384	55.23	2.035	1.60089	1.533	3.620	PER IMP= 42.00
ADD HYD	SA203SUMB	1& 2	1	0.08865	149.30	8.409	1.77859	1.567	2.631	
*S APSA1										
ROUTE MCUNGE	SA203SUMBRt	1	2	0.08865	148.74	8.407	1.77823	1.567	2.622	CCODE = 0.2
*S Extended Storm System to Avoid Excess Street Flow										
COMPUTE NM HYD	SA205	-	1	0.07789	154.79	6.232	1.50027	1.567	3.105	PER IMP= 38.20
ADD HYD	SA205SUM	2& 1	1	0.16654	303.53	14.640	1.64822	1.567	2.848	
*S APSA2										
ROUTE MCUNGE	SA205SUMRt	1	2	0.16654	300.99	14.637	1.64789	1.600	2.824	CCODE = 0.2
*S Extended Storm System to Avoid Excess Street Flow										

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COMPUTE NM HYD	SA206	-	1	0.04163	101.98	3.950	1.77927	1.533	3.828	PER IMP= 54.00
ADD HYD	SA206SUM	2& 1	1	0.20817	393.55	18.587	1.67416	1.567	2.954	
ROUTE MCUNGE	SA206SUMRT	1	10	0.20817	390.58	18.587	1.67413	1.567	2.932	CCODE = 0.2
*S Increased Pipe Size to Allow Extended Storm System										
COMPUTE NM HYD	SA207	-	1	0.01910	48.84	1.962	1.92566	1.533	3.996	PER IMP= 64.00
ROUTE MCUNGE	SA207RT	1	2	0.01910	48.62	1.961	1.92477	1.533	3.977	CCODE = 0.1
COMPUTE NM HYD	SA208	-	1	0.03950	106.90	4.608	2.18735	1.533	4.229	PER IMP= 81.72
ADD HYD	SA208SUM	2& 1	1	0.05860	155.52	6.569	2.10175	1.533	4.147	
*S APSA3										
ROUTE MCUNGE	SA208SUMRT	1	2	0.05860	140.28	6.463	2.06785	1.567	3.741	CCODE = 0.2
ADD HYD	SA213SUMA	10& 2	10	0.26677	530.87	25.050	1.76061	1.567	3.109	
COMPUTE NM HYD	SA209	-	1	0.03817	98.39	4.701	2.30949	1.567	4.027	PER IMP= 90.00
ROUTE MCUNGE	SA209RT	1	2	0.03817	97.29	4.698	2.30781	1.600	3.983	CCODE = 0.1
COMPUTE NM HYD	SA210	-	1	0.05112	131.15	5.863	2.15027	1.533	4.009	PER IMP= 81.18
ADD HYD	SA210SUM	2& 1	1	0.08929	223.96	10.561	2.21761	1.567	3.919	
*S APSA4										
ROUTE MCUNGE	SA210SUMRT	1	2	0.08929	222.93	10.559	2.21722	1.567	3.901	CCODE = 0.2
COMPUTE NM HYD	SA211	-	1	0.02232	49.88	1.867	1.56858	1.533	3.492	PER IMP= 43.00
COMPUTE NM HYD	SA212	-	3	0.06692	145.65	6.184	1.73266	1.567	3.401	PER IMP= 50.85
ADD HYD	SA212SUMA	1& 3	1	0.08924	192.83	8.051	1.69161	1.533	3.376	
ADD HYD	SA212SUMB	2& 1	1	0.17853	415.11	18.610	1.95449	1.567	3.633	
*S APSA5										
ROUTE MCUNGE	SA212SUMBRT	1	2	0.17853	410.49	18.597	1.95319	1.600	3.593	CCODE = 0.2
ADD HYD	SA213SUMB	10& 2	1	0.44530	938.85	43.647	1.83782	1.567	3.294	
COMPUTE NM HYD	SA213	-	2	0.06061	136.03	5.280	1.63324	1.533	3.507	PER IMP= 46.75
ADD HYD	SA213SUMC	1& 2	1	0.50591	1068.40	48.926	1.81331	1.567	3.300	
ROUTE RESERVOIR	PONDSA2	1	30	0.50591	412.78	48.926	1.81331	1.833	1.275	AC-FT= 19.074
*S PondSA2 is undersized with the 48" RCP as an outlet.										
*S Runoff will overflow on Arenal. Added Elev. 5031' to route combined										
*S Overflow and pipe flow to Amole del Norte.										
*S Increasing Outlet in Proposed has allowed entire flow to be carried to chann										
*S Increased to Prevent Overtopping to Double-60" RCP.										
ROUTE MCUNGE	PONDSA2RT	30	10	0.50591	412.60	48.900	1.81232	1.866	1.274	CCODE = 0.1
ROUTE MCUNGE	TSBASINRT	45	1	4.97175	1656.83	475.230	1.79224	1.766	0.521	CCODE = 0.2
COMPUTE NM HYD	SA201	-	2	0.16721	309.58	16.338	1.83203	1.633	2.893	PER IMP= 58.76
ADD HYD	SA201SUM	1& 2	1	5.13896	1908.91	491.568	1.79353	1.733	0.580	
ADD HYD	SA214SUMA	10& 1	1	5.64487	2305.74	540.468	1.79522	1.733	0.638	
*S APSA6										
ROUTE MCUNGE	SA214SUMART	1	2	5.64487	2305.74	540.468	1.79522	1.733	0.638	CCODE = 0.0
COMPUTE NM HYD	SA214	-	1	0.06684	123.59	6.676	1.87267	1.633	2.889	PER IMP= 60.86
ADD HYD	SA214SUMB	2& 1	1	5.71171	2412.65	547.143	1.79612	1.733	0.660	
ROUTE MCUNGE	SA214SUMBRT	1	2	5.71171	2412.65	547.143	1.79612	1.733	0.660	CCODE = 0.0
COMPUTE NM HYD	SA215	-	1	0.05396	112.89	5.292	1.83876	1.567	3.269	PER IMP= 59.00
ADD HYD	SA215SUM	2& 1	1	5.76567	2490.38	552.435	1.79652	1.700	0.675	
ROUTE MCUNGE	SA215SUMRT	1	2	5.76567	2490.78	552.433	1.79652	1.733	0.675	CCODE = 0.2
COMPUTE NM HYD	SA216	-	1	0.13141	263.18	12.990	1.85342	1.600	3.129	PER IMP= 59.54
ADD HYD	SA216SUM	2& 1	1	5.89708	2701.48	565.423	1.79778	1.700	0.716	
*S APSA7										
ROUTE MCUNGE	SA216SUMRT	1	20	5.89708	2697.01	565.419	1.79777	1.700	0.715	CCODE = 0.2
COMPUTE NM HYD	SA218	-	1	0.03281	78.87	3.008	1.71899	1.533	3.756	PER IMP= 50.00
COMPUTE NM HYD	SA219	-	2	0.01224	29.09	1.098	1.68139	1.533	3.714	PER IMP= 47.45
ADD HYD	SA219SUM	1& 2	1	0.04505	107.97	4.106	1.70876	1.533	3.745	

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
ROUTE MCUNGE	SA219SUMRT	1	2	0.04505	107.41	4.104	1.70806	1.533	3.725	CCODE = 0.2
*S Extended Storm System to Avoid Excess Street Flow										
COMPUTE NM HYD	SA220	-	1	0.06240	159.66	7.686	2.30948	1.567	3.998	PER IMP= 90.00
ADD HYD	SA220SUM	2& 1	1	0.10745	266.80	11.790	2.05732	1.567	3.880	
ROUTE MCUNGE	SA220SUMRT	1	2	0.10745	232.43	11.478	2.00284	1.600	3.380	CCODE = 0.2
*S Extended Storm System to Avoid Excess Street Flow										
COMPUTE NM HYD	SA221	-	1	0.00802	21.53	0.919	2.14876	1.533	4.195	PER IMP= 81.10
ADD HYD	SA221SUM	2& 1	1	0.11547	249.80	12.397	2.01297	1.600	3.380	
*S APSA8										
ROUTE MCUNGE	SA221SUMRT	1	2	0.11547	249.12	12.393	2.01230	1.633	3.371	CCODE = 0.2
*S Extended Storm System to Avoid Excess Street Flow										
COMPUTE NM HYD	SA222	-	1	0.05066	121.15	4.876	1.80470	1.533	3.737	PER IMP= 56.20
ADD HYD	SA222SUM	2& 1	10	0.16613	350.46	17.269	1.94899	1.600	3.296	
*S APSA9										
COMPUTE NM HYD	SA223	-	1	0.07060	171.74	6.866	1.82356	1.533	3.801	PER IMP= 57.00
ROUTE MCUNGE	SA223RT	1	2	0.07060	170.54	6.863	1.82278	1.533	3.774	CCODE = 0.2
COMPUTE NM HYD	SA224	-	1	0.01720	48.30	2.074	2.26109	1.500	4.388	PER IMP= 86.71
ADD HYD	SA224SUM	2& 1	1	0.08780	218.79	8.937	1.90863	1.533	3.894	
COMPUTE NM HYD	SA225	-	2	0.02910	75.31	3.052	1.96638	1.533	4.044	PER IMP= 66.70
ADD HYD	SA225SUM	1& 2	1	0.11690	294.10	11.989	1.92300	1.533	3.931	
*S APSA10										
ROUTE MCUNGE	SA225SUMRT	1	2	0.11690	294.10	11.989	1.92300	1.533	3.931	CCODE = 0.0
ADD HYD	SA226SUMA	10& 2	1	0.28303	628.13	29.258	1.93825	1.567	3.468	
*S APSA11										
COMPUTE NM HYD	SA226	-	2	0.06223	154.48	6.052	1.82356	1.533	3.879	PER IMP= 57.00
ADD HYD	SA226SUMB	1& 2	1	0.34526	774.84	35.310	1.91758	1.533	3.507	
ROUTE RESERVOIR	PONDSA3	1	30	0.34526	342.02	35.310	1.91758	1.800	1.548	AC-FT= 12.919
*S Pond is adequate or close to adequate.										
*S Added elevation 5052'										
ROUTE MCUNGE	PONDSA3RT	30	1	0.34526	341.99	35.309	1.91754	1.833	1.548	CCODE = 0.2
*S Increased to Prevent Overtopping to Double-48" RCP.										
*S Also redirected to avoid extending into residents backyards by										
*S running storm drain South down Unser Blvd to Amole Arroyo.										
ADD HYD	SA217SUMA	20& 1	1	6.24234	3026.52	600.729	1.80440	1.733	0.758	
COMPUTE NM HYD	SA217	-	2	0.12026	230.86	11.964	1.86526	1.633	2.999	PER IMP= 59.90
ADD HYD	SA217SUMB	1& 2	1	6.36260	3229.89	612.692	1.80555	1.700	0.793	
*S APSA12										
ROUTE MCUNGE	SA217SUMBRT	1	2	6.36260	3223.16	612.689	1.80554	1.733	0.792	CCODE = 0.2
COMPUTE NM HYD	SA227.1	-	1	0.08008	170.52	7.337	1.71788	1.567	3.327	PER IMP= 49.90
ADD HYD	SA227.1SUMA	2& 1	1	6.44268	3336.58	620.026	1.80445	1.700	0.809	
ROUTE MCUNGE	SA227.1SUMRT	1	2	6.44268	3330.82	620.023	1.80444	1.733	0.808	CCODE = 0.2
ADD HYD	SA227.1SUMB	49& 2	1	29.61307	6918.42	1157.052	0.73261	1.800	0.365	
COMPUTE NM HYD	SA227.2	-	2	0.12451	237.70	8.173	1.23078	1.533	2.983	PER IMP= 24.58
ADD HYD	SABASIN	1& 2	80	29.73758	6980.38	1165.224	0.73469	1.800	0.367	
*S APSA13										
*S**********										
*S********** END OF SOUTH AMOLE BASIN										
*S**********										
*S										
*s ********** AMOLE POND **********										
*S										
ROUTE RESERVOIR	AMOLEPOND	80	60	29.73758	1345.62	910.917	0.57435	3.366	0.071	AC-FT= 505.154

Appendix 2 – Street Capacity and Grate Capacities

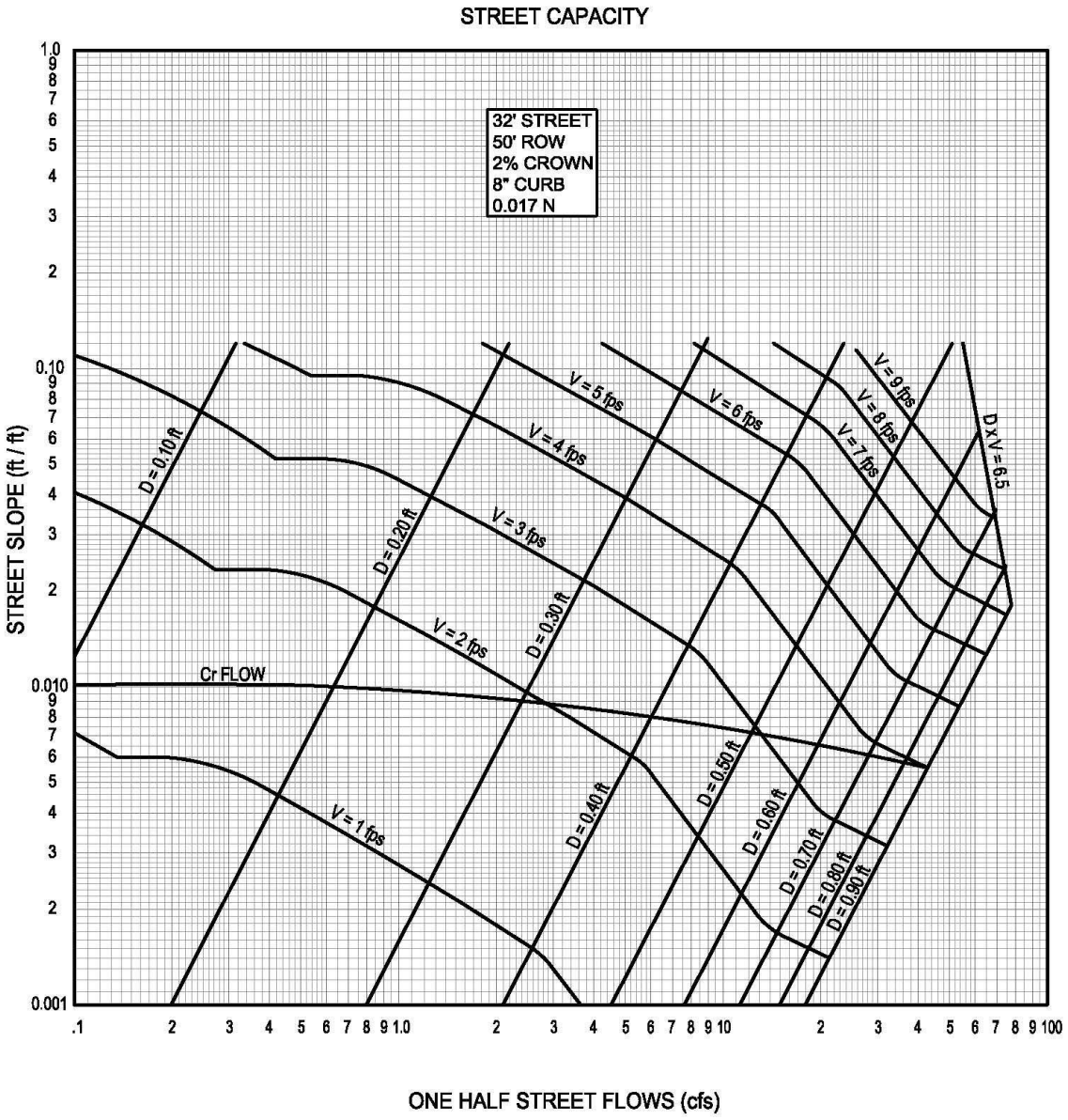
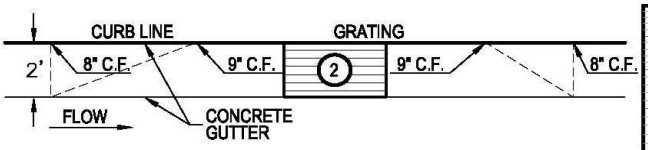
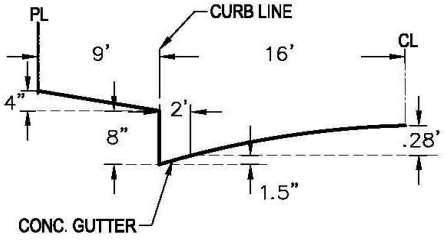


PLATE 22.3 D-1

GRATING CAPACITIES FOR TYPE "A", "C" AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

PLATE 22.3 D-5

Appendix 3 – WSPGW – HGL Calculations & Storm Profiles

Hydraulic Analysis Report

Project Data

Project Title: Desert Sands Subdivision

Designer:

Project Date: Friday, June 17, 2016

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: Inlets 7 & 8

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0630 ft/ft

Manning's n: 0.0170

Gutter Width: 2.0000 ft

Design Flow: 12.8800 cfs

Gutter Result Parameters

Width of Spread: 21.5603 ft

Gutter Depression: 1.0320 in

Area of Flow: 4.7345 ft^2

Eo (Gutter Flow to Total Flow): 0.2601

Gutter Depth at Curb: 6.2065 in

Inlet Input Parameters

Inlet Location: Inlet in Sag

Percent Clogging: 0.0000 %

Inlet Type: Equal-length Combo

Grate Type: P - 1-7/8

Grate Width: 2.0000 ft

Grate Length: 6.5000 ft

Length of Inlet: 6.5000 ft

Curb opening height: 6.2500 in

Local Depression: 4.2500 in

Inlet Result Parameters

Perimeter: 10.5000 ft

Effective Perimeter: 10.5000 ft

Area: 17.3875 ft^2

Effective Area: 17.3875 ft^2

Depth at center of grate: 0.5509 ft

Computed Width of Spread at Sag: 26.3948 ft

Flow type: Weir Flow

Efficiency: 1.0000

Curb and Gutter Analysis: Inlets 11 & 12

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0050 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0630 ft/ft

Manning's n: 0.0170

Gutter Width: 2.0000 ft

Design Flow: 10.2200 cfs

Gutter Result Parameters

Width of Spread: 19.7096 ft

Gutter Depression: 1.0320 in

Area of Flow: 3.9707 ft^2

Eo (Gutter Flow to Total Flow): 0.2847

Gutter Depth at Curb: 5.7623 in

Inlet Input Parameters

Inlet Location: Inlet in Sag

Percent Clogging: 0.0000 %

Inlet Type: Equal-length Combo

Grate Type: P - 1-7/8 - 4

Grate Width: 2.0000 ft

Grate Length: 6.5000 ft

Length of Inlet: 6.5000 ft

Curb opening height: 6.2500 in

Local Depression: 4.2500 in

Inlet Result Parameters

Perimeter: 10.5000 ft

Effective Perimeter: 10.5000 ft

Area: 16.0875 ft^2

Effective Area: 16.0875 ft^2

Depth at center of grate: 0.4722 ft

Computed Width of Spread at Sag: 22.4582 ft

Flow type: Weir Flow

Efficiency: 1.0000

Curb and Gutter Analysis: Inlets 15 & 16

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0200 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Depressed Gutter Geometry

Cross-Slope of Gutter: 0.0630 ft/ft

Manning's n: 0.0170

Gutter Width: 2.0000 ft

Design Flow: 6.3800 cfs

Gutter Result Parameters

Width of Spread: 12.3955 ft

Gutter Depression: 1.0320 in

Area of Flow: 1.6225 ft^2

Eo (Gutter Flow to Total Flow): 0.4467

Gutter Depth at Curb: 4.0069 in

Inlet Input Parameters

Inlet Location: Inlet in Sag

Percent Clogging: 0.0000 %

Inlet Type: Equal-length Combo

Grate Type: P - 1-7/8 - 4

Grate Width: 2.0000 ft

Grate Length: 3.0000 ft

Length of Inlet: 3.0000 ft

Curb opening height: 6.2500 in

Local Depression: 4.2500 in

Inlet Result Parameters

Perimeter: 7.0000 ft

Effective Perimeter: 7.0000 ft

Area: 7.4250 ft^2

Effective Area: 7.4250 ft^2

Depth at center of grate: 0.4519 ft

Computed Width of Spread at Sag: 21.4463 ft

Flow type: Weir Flow

Efficiency: 1.0000

Program Package Serial Number: 1454

WATER SURFACE PROFILE LISTING Date: 6-29-2016 Time: 1:27:30

Lands of Salazar
Sacate Blanco Ave.
2016-03-30

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1000.000	5093.750	1.803	5095.553	138.16	15.57	3.76	5099.32	.00	2.65	2.94	3.000	.000	.00	2 .0
110.040	.0245					.0225	2.48	1.80	1.58	1.78	.013	.00	.00	PIPE
1110.040	5096.451	1.863	5098.314	138.16	14.97	3.48	5101.80	.00	2.65	2.91	3.000	.000	.00	2 .0
54.960	.0245					.0202	1.11	1.86	1.48	1.78	.013	.00	.00	PIPE
1165.000	5097.800	1.941	5099.741	138.16	14.28	3.17	5102.91	.00	2.65	2.87	3.000	.000	.00	2 .0
MH#5 TRANS STR	.0334					.0123	.07	1.94	1.37		.013	.00	.00	PIPE
Rim = 5105.0														
1171.000	5098.000	3.456	5101.456	138.16	10.54	1.73	5103.18	.00	3.46	3.80	4.500	.000	.00	1 .0
7.625	.0032					.0054	.04	3.46	1.00	4.50	.013	.00	.00	PIPE
1178.625	5098.024	3.629	5101.653	138.16	10.05	1.57	5103.22	.00	3.46	3.56	4.500	.000	.00	1 .0
33.829	.0032					.0049	.16	3.63	.90	4.50	.013	.00	.00	PIPE
1212.454	5098.133	3.827	5101.960	138.16	9.58	1.43	5103.39	.00	3.46	3.21	4.500	.000	.00	1 .0
82.546	.0032					.0045	.37	3.83	.80	4.50	.013	.00	.00	PIPE
1295.000	5098.400	4.058	5102.458	138.16	9.15	1.30	5103.76	4.50	3.46	2.68	4.500	.000	.00	1 .0
MH#2 JUNCT STR	.0334					.0029	.02	4.50	.68		.013	.00	.00	PIPE
Rim = 5107.83														
1301.000	5098.600	7.151	5105.751	25.96	3.67	.21	5105.96	.00	1.65	.00	3.000	.000	.00	1 .0
82.000	.0040					.0015	.12	7.15	.00	1.70	.013	.00	.00	PIPE
MH#3														
1383.000	5098.930	7.018	5105.948	25.96	3.67	.21	5106.16	.00	1.65	.00	3.000	.000	.00	1 .0
Rim = 5107.55														
94.000	.0069					.0015	.14	7.02	.00	1.44	.013	.00	.00	PIPE

Lands of Salazar
Sacate Blanco Ave.
2016-03-30

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS) / Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1477.000	5099.580	6.510	5106.090	25.96	3.67	.21	5106.30	.00	1.65	.00	3.000	.000	.00	1	.0
MH#65															
JUNCT STR	.0250					.0025	.01	6.51	.00		.013	.00	.00	PIPE	
Rim = 5107.29															
1481.000	5099.680	6.524	5106.204	13.20	4.20	.27	5106.48	.00	1.31	.00	2.000	.000	.00	1	.0
28.000	.0114					.0034	.10	6.52	.00	1.05	.013	.00	.00	PIPE	
1509.000	5100.000	6.381	5106.381	13.20	4.20	.27	5106.65	.00	1.31	.00	2.000	.000	.00	1	.0
MH#66															
JUNCT STR	.0750					.0037	.01	.00	.00		.013	.00	.00	PIPE	
Rim = 5107.40															
1513.000	5100.300	6.486	5106.786	6.60	3.73	.22	5107.00	.00	.99	.00	1.500	.000	.00	1	.0
22.000	.0136					.0039	.09	6.49	.00	.78	.013	.00	.00	PIPE	
Inlet#14															
1535.000	5100.600	6.337	5106.937	6.60	3.73	.22	5107.15	.00	.99	.00	1.500	.000	.00	1	.0
TC = 5107.93															

Program Package Serial Number: 1454

WATER SURFACE PROFILE LISTING Date: 6-30-2016 Time: 8: 3:41

Lands of Salazar
Farinosa Ave
2016-06-29

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1000.000	5093.750	1.803	5095.553	138.16	15.57	3.76	5099.32	.00	2.65	2.94	3.000	.000	.00	2 .0
110.040	.0245					.0225	2.48	1.80	1.58	1.78	.013	.00	.00	PIPE
1110.040	5096.451	1.863	5098.314	138.16	14.97	3.48	5101.80	.00	2.65	2.91	3.000	.000	.00	2 .0
54.960	.0245					.0202	1.11	1.86	1.48	1.78	.013	.00	.00	PIPE
1165.000	5097.800	1.941	5099.741	138.16	14.28	3.17	5102.91	.00	2.65	2.87	3.000	.000	.00	2 .0
MH#5 TRANS STR	.0334					.0123	.07	1.94	1.37		.013	.00	.00	PIPE
Rim 5105.0 1171.000	5098.000	3.456	5101.456	138.16	10.54	1.73	5103.18	.00	3.46	3.80	4.500	.000	.00	1 .0
7.625	.0032					.0054	.04	3.46	1.00	4.50	.013	.00	.00	PIPE
1178.625	5098.024	3.629	5101.653	138.16	10.05	1.57	5103.22	.00	3.46	3.56	4.500	.000	.00	1 .0
33.829	.0032					.0049	.16	3.63	.90	4.50	.013	.00	.00	PIPE
1212.454	5098.133	3.827	5101.960	138.16	9.58	1.43	5103.39	.00	3.46	3.21	4.500	.000	.00	1 .0
82.546	.0032					.0045	.37	3.83	.80	4.50	.013	.00	.00	PIPE
1295.000	5098.400	4.058	5102.458	138.16	9.15	1.30	5103.76	4.50	3.46	2.68	4.500	.000	.00	1 .0
MH#2 JUNCT STR	.0334					.0038	.02	4.50	.68		.013	.00	.00	PIPE
Rim 5107.83 1301.000	5098.600	4.828	5103.428	112.20	7.05	.77	5104.20	.00	3.12	.00	4.500	.000	.00	1 .0
150.000	.0041					.0033	.49	4.83	.00	3.30	.013	.00	.00	PIPE
1451.000	5099.220	4.696	5103.916	112.20	7.05	.77	5104.69	.00	3.12	.00	4.500	.000	.00	1 .0
MH#9 JUNCT STR	.0166					.0048	.03	.00	.00		.013	.00	.00	PIPE

Rim = 5107.35

Program Package Serial Number: 1454

WATER SURFACE PROFILE LISTING Date: 6-30-2016 Time: 8: 3:41

Lands of Salazar
Farinosa Ave
2016-06-29

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1457.000	5099.320	4.583	5103.903	79.56	8.27	1.06	5104.96	.00	2.79	.00	3.500	.000	.00	1 .0
92.000	.0077					.0063	.58	4.58	.00	2.60	.013	.00	.00	PIPE
1549.000	5100.030	4.448	5104.478	79.56	8.27	1.06	5105.54	.00	2.79	.00	3.500	.000	.00	1 .0
MH#12 JUNCT STR	.0117					.0046	.03	4.45	.00		.013	.00	.00	PIPE
Rim=5107.06														
1555.000	5100.100	5.387	5105.488	53.80	5.59	.49	5105.97	.00	2.29	.00	3.500	.000	.00	1 .0
63.000	.0065					.0029	.18	5.39	.00	2.08	.013	.00	.00	PIPE
1618.000	5100.510	5.158	5105.668	53.80	5.59	.49	5106.15	.00	2.29	.00	3.500	.000	.00	1 .0
MH#4 JUNCT STR	.0151					.0031	.02	5.16	.00		.013	.00	.00	PIPE
Rim=5107.33														
1624.000	5100.600	5.295	5105.895	38.80	5.49	.47	5106.36	.00	2.03	.00	3.000	.000	.00	1 .0
130.000	.0108					.0034	.44	5.30	.00	1.61	.013	.00	.00	PIPE
1754.000	5102.000	4.335	5106.335	38.80	5.49	.47	5106.80	.00	2.03	.00	3.000	.000	.00	1 .0
MH#1 JUNCT STR	.0601					.0087	.03	4.33	.00		.013	.00	.00	PIPE
Rim=5108.37														
1758.000	5102.240	3.910	5106.151	26.80	8.53	1.13	5107.28	.00	1.80	.00	2.000	.000	.00	1 .0
130.000	.0212					.0140	1.82	3.91	.00	1.37	.013	.00	.00	PIPE
1888.000	5105.000	3.311	5108.311	26.80	8.53	1.13	5109.44	.00	1.80	.00	2.000	.000	.00	1 .0
MH#6 JUNCT STR	.0250					.0084	.03	3.31	.00		.013	.00	.00	PIPE
Rim=5111.72														
1892.000	5105.100	5.066	5110.167	11.80	3.76	.22	5110.39	.00	1.23	.00	2.000	.000	.00	1 .0
126.000	.0199					.0027	.34	5.07	.00	.84	.013	.00	.00	PIPE

Program Package Serial Number: 1454

WATER SURFACE PROFILE LISTING Date: 6-30-2016 Time: 8: 3:41

Lands of Salazar
Farinosa Ave
2016-06-29

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
2018.000	5107.610	2.965	5110.574	11.80	3.76	.22	5110.79	.00	1.23	.00	2.000	.000	.00	1 .0
JUNCT STR	.0250					.0029	.01	.00	.00		.013	.00	.00	PIPE
2022.000	5107.710	3.011	5110.722	5.90	3.34	.17	5110.89	.00	.94	.00	1.500	.000	.00	1 .0
18.000	.0894					.0032	.06	3.01	.00	.44	.013	.00	.00	PIPE
2040.000	5109.320	1.510	5110.830	5.90	3.34	.17	5111.00	.00	.94	.00	1.500	.000	.00	1 .0

MH #11
Rim 5115.9
Inlet #17
TC = 5117.45

Program Package Serial Number: 1454

WATER SURFACE PROFILE LISTING Date: 6-30-2016 Time: 9:18: 3

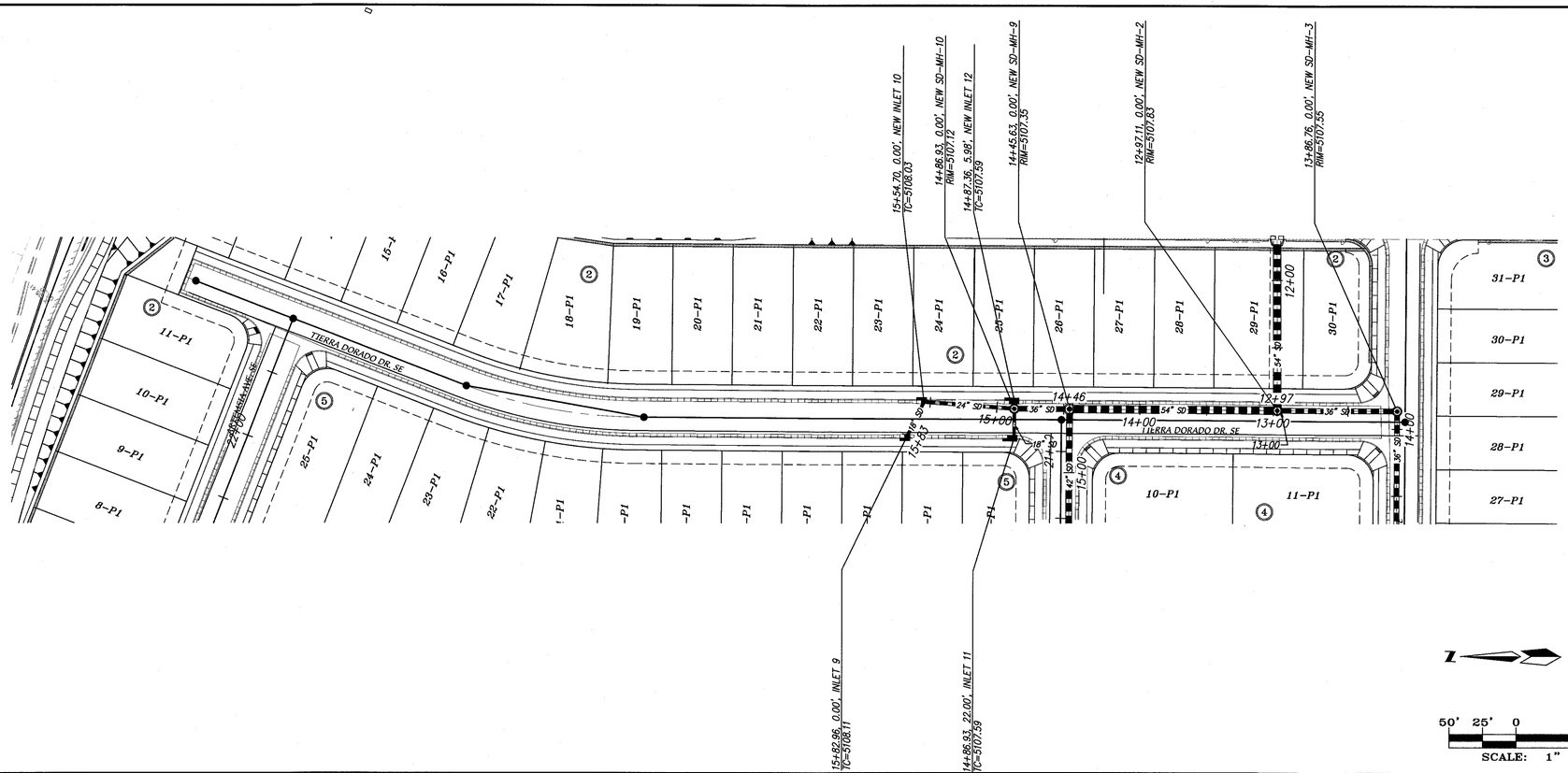
Lands of Salazar
Tierra Dorado Dr.
2016-06-30

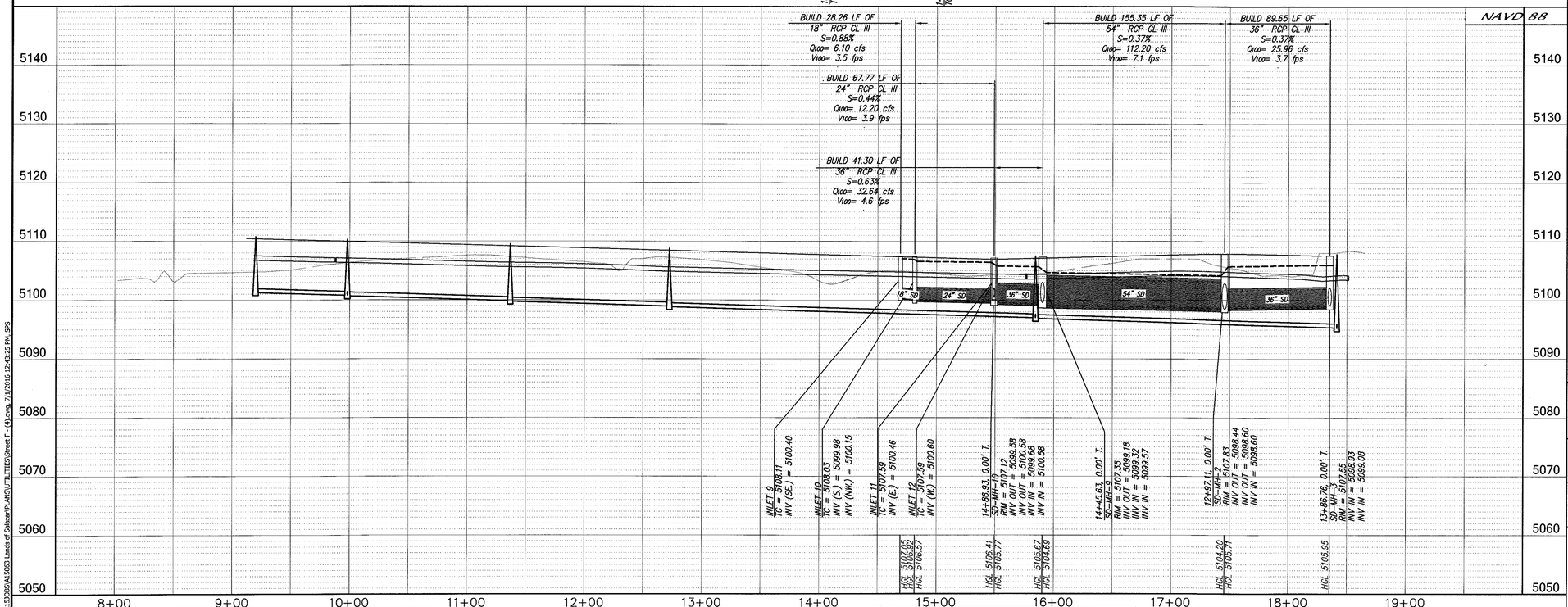
Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1000.000	5093.750	1.803	5095.553	138.16	15.57	3.76	5099.32	.00	2.65	2.94	3.000	.000	.00	2 .0
110.040	.0245					.0225	2.48	1.80	1.58	1.78	.013	.00	.00	PIPE
1110.040	5096.451	1.863	5098.314	138.16	14.97	3.48	5101.80	.00	2.65	2.91	3.000	.000	.00	2 .0
54.960	.0245					.0202	1.11	1.86	1.48	1.78	.013	.00	.00	PIPE
1165.000	5097.800	1.941	5099.741	138.16	14.28	3.17	5102.91	.00	2.65	2.87	3.000	.000	.00	2 .0
MH#5 TRANS STR	.0334					.0123	.07	1.94	1.37		.013	.00	.00	PIPE
Rim 5105.10														
1171.000	5098.000	3.456	5101.456	138.16	10.54	1.73	5103.18	.00	3.46	3.80	4.500	.000	.00	1 .0
7.625	.0032					.0054	.04	3.46	1.00	4.50	.013	.00	.00	PIPE
1178.625	5098.024	3.629	5101.653	138.16	10.05	1.57	5103.22	.00	3.46	3.56	4.500	.000	.00	1 .0
33.829	.0032					.0049	.16	3.63	.90	4.50	.013	.00	.00	PIPE
1212.454	5098.133	3.827	5101.960	138.16	9.58	1.43	5103.39	.00	3.46	3.21	4.500	.000	.00	1 .0
82.546	.0032					.0045	.37	3.83	.80	4.50	.013	.00	.00	PIPE
1295.000	5098.400	4.058	5102.458	138.16	9.15	1.30	5103.76	4.50	3.46	2.68	4.500	.000	.00	1 .0
MH#2 JUNCT STR	.0334					.0038	.02	4.50	.68		.013	.00	.00	PIPE
Rim=5107.83														
1301.000	5098.600	4.828	5103.428	112.20	7.05	.77	5104.20	.00	3.12	.00	4.500	.000	.00	1 .0
150.000	.0041					.0033	.49	4.83	.00	3.30	.013	.00	.00	PIPE
1451.000	5099.220	4.696	5103.916	112.20	7.05	.77	5104.69	.00	3.12	.00	4.500	.000	.00	1 .0
MH#9 JUNCT STR	.0166					.0028	.02	4.70	.00		.013	.00	.00	PIPE
Rim 5107.35														

Lands of Salazar
Tierra Dorado Dr.
2016-06-30

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/ Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1457.000	5099.320	6.346	5105.666	32.64	4.62	.33	5106.00	.00	1.85	.00	3.000	.000	.00	1 .0
27.000	.0096					.0024	.06	6.35	.00	1.50	.013	.00	.00	PIPE
1484.000	5099.580	6.150	5105.730	32.64	4.62	.33	5106.06	.00	1.85	.00	3.000	.000	.00	1 .0
JUNCT STR	.0167					.0027	.02	6.15	.00		.013	.00	.00	PIPE
1490.000	5099.680	6.695	5106.375	12.20	3.88	.23	5106.61	.00	1.26	.00	2.000	.000	.00	1 .0
63.000	.0048					.0029	.18	6.69	.00	1.33	.013	.00	.00	PIPE
1553.000	5099.980	6.578	5106.558	12.20	3.88	.23	5106.79	.00	1.26	.00	2.000	.000	.00	1 .0
JUNCT STR	.0425					.0031	.01	6.58	.00		.013	.00	.00	PIPE
1557.000	5100.150	6.754	5106.904	6.10	3.45	.19	5107.09	.00	.95	.00	1.500	.000	.00	1 .0
26.000	.0096					.0034	.09	6.75	.00	.83	.013	.00	.00	PIPE
1583.000	5100.400	6.647	5107.046	6.10	3.45	.19	5107.23	.00	.95	.00	1.500	.000	.00	1 .0

MH #10
Rim = 5107.12
Inlet #10
TC = 5109.03
Inlet #9
TC = 5108.11





P:\A15085\A15063 Lands of Sisters\PLANS\UTILITIES\Sheet F - (4).dwg, 7/1/2016 12:43:25 PM, SPS

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SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

BENCH MARKS

AGRS Aluminum Cap stamped "TRANS 1969" from the intersection of Central Avenue and 98th Street SW go south on 98th Street 1.2 miles to the intersection of 98th Street and Snow Vista Boulevard. Then go southeast along Snow Vista Boulevard and the co-op electric transmission line 0.85 miles to pylon numbered 52. The station is just east of this point. Geographic Position (NAD83). In feet N.M. State Plane Coordinates(Central Zone) N=1471885.503, E=1495145.466 Elevation (NAVD88), in feet = 5121.089

AS BUILT INFORMATION

CONTRACTOR

WORK COMPLETED BY	DATE
INSPECTORS ACCEPTANCE BY	DATE
FIELD VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

MICRO-FILM INFORMATION

RECORDED BY DATE

NO.

ENGINEER'S SEAL

JAMES D. HUGHES 9857 NEW MEXICO REGISTERED PROFESSIONAL ENGINEER

6-30-2016

CERTIFICATE OF SUBSTANTIAL COMPLIANCE

NO.	DATE	REVISIONS	BY
		DESIGN	
		DESIGNED BY JDH	04/16
		DRAWN BY SPS	04/16
		CHECKED BY DMG	04/16

dmg MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
OFFICE (505) 828-2200, FAX (505) 797-9539

CITY OF ALBUQUERQUE
PLANNING DEPARTMENT

TITLE:

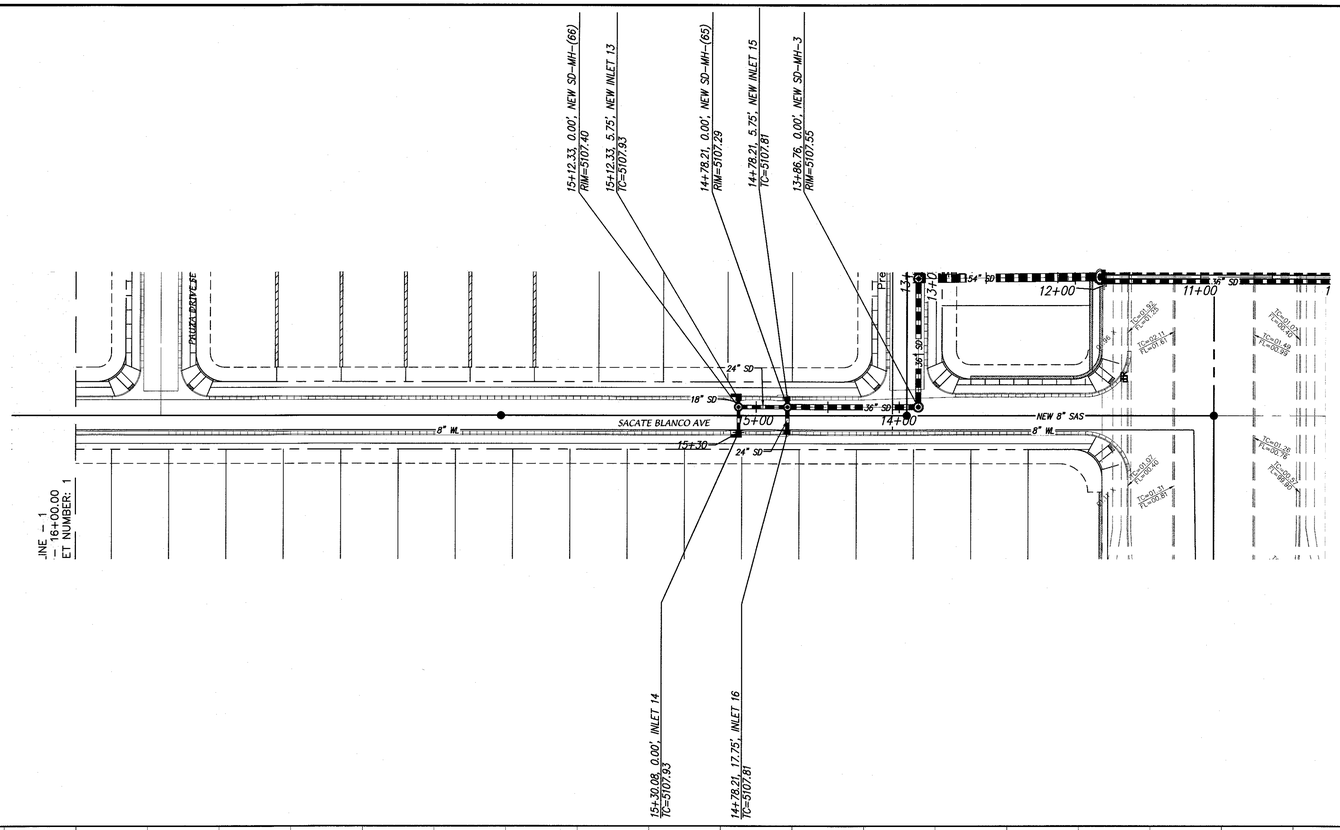
DESERT SANDS SUBDIVISION DRAINAGE PLAN & PROFILE

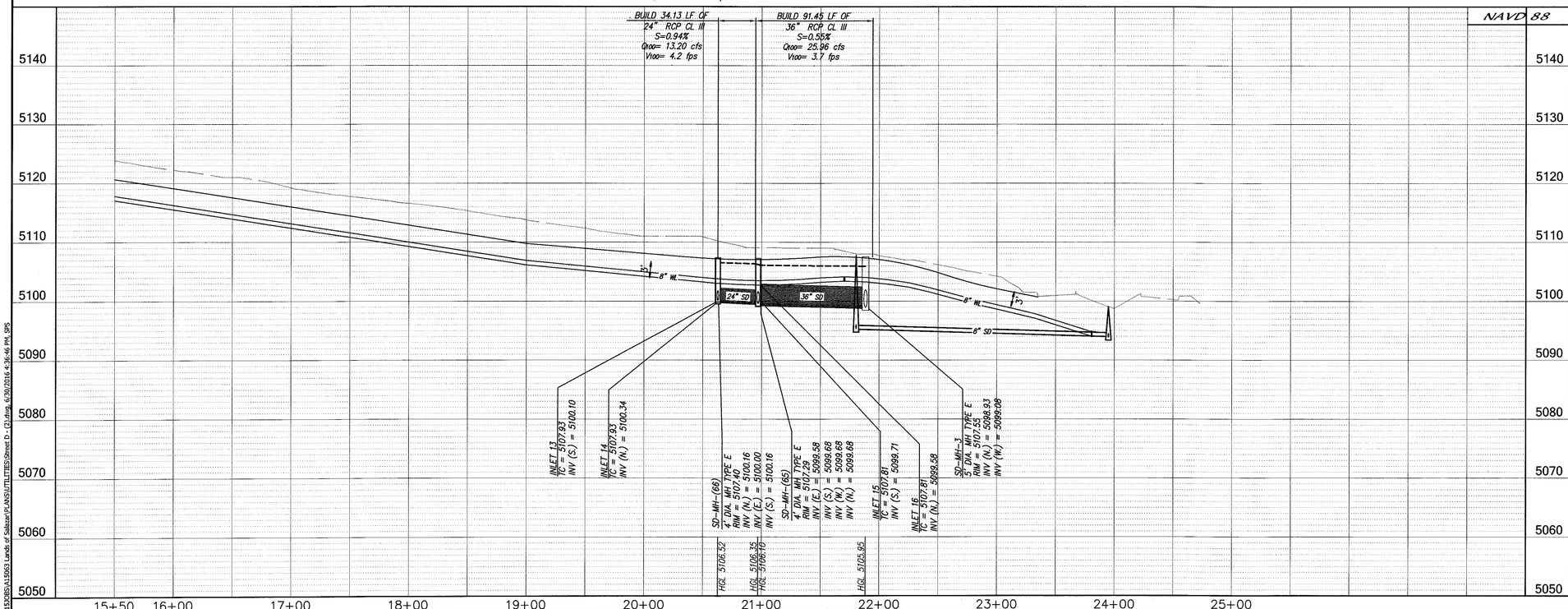
DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO. -

ZONE MAP NO.

SHEET 28 OF 39





AS BUILT INFORMATION

CONTRACTOR
WORK STAGED BY — DATE
INSPECTIONS ACCEPTANCE BY — DATE
FIELD VERIFICATION BY — DATE
DRAWINGS CORRECTED BY — DATE

MICRO-FILM INFORMATION
RECORDED BY — DATE
NO.

BENCH MARKS

AGRS Aluminum Cap stamped "TRANS 1989" From the intersection of Central Avenue and 98th Street SW go south on 98th Street 1.2 miles to the intersection of 98th Street and Snow Vista Boulevard. Then go southeast along Snow Vista Boulevard and the co-op electric transmission line 0.85 miles to pylon numbered 52. The station is just east of this point. Geographic Position (NAD83), in feet N.M. State Plane Coordinates(Central Zone) N=1471885.503, E=1495145.466 Elevation (NAVD88), in feet = 5121.089

SURVEY INFORMATION
FIELD NOTES
NO. | BY | DATE

ENGINEER'S SEAL
JAMES D. HOLLA
NEW MEXICO
10874
REGISTERED PROFESSIONAL ENGINEER
6-30-2016

CERTIFICATE OF SUBSTANTIAL COMPLIANCE

REVISIONS
NO. | DATE | REMARKS | BY
DESIGNED BY JDH — DESIGN — DATE 04/16
DRAWN BY SPS — DATE 04/16
CHECKED BY DMG — DATE 04/16

dmg
MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
OFFICE (505) 828-2200, FAX (505) 797-9539

CITY OF ALBUQUERQUE
PLANNING DEPARTMENT

TITLE:
DESERT SANDS SUBDIVISION DRAINAGE PLAN & PROFILE

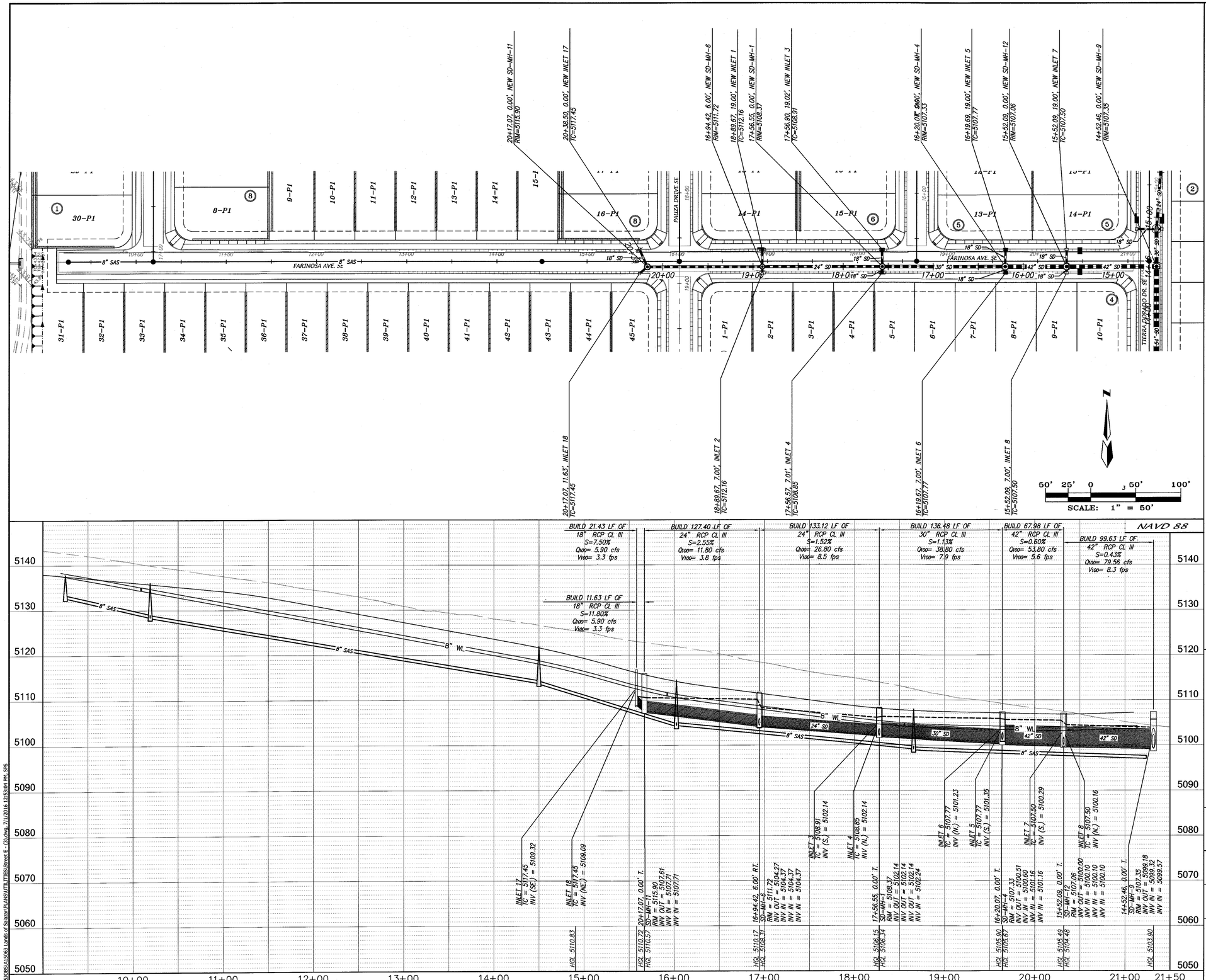
DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO. .

ZONE MAP NO.

SHEET 30 OF 39

F:\A15\DBS\A15063 Lands of Salazar\PLANS\UTILITIES\Sheet D - (2).dwg, 6/30/2016 4:36:46 PM, SPS



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SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

BENCH MARKS

AGRS Aluminum Cap stamped "TRANS 1969" From the intersection of Central Avenue and 98th Street SW go south on 98th Street 1.2 miles to the intersection of 98th Street and Snow Vista Boulevard. Then go southeast along Snow Vista Boulevard and the co-op electric transmission line 0.85 miles to pylon numbered 52. The station is just east of this point. Geographic Position (NAD83), in feet N.M. State Plane Coordinates(Central Zone) N=1471885.503, E=1495145.466 Elevation (NAVD88), in feet = 5121.089

AS BUILT INFORMATION

CONTRACTOR	
WORK ORDERED BY	DATE
INSPECTORS ACCEPTANCE BY	DATE
AS BUILT VERIFICATION BY	DATE
DRAWING CHECKED BY	DATE

MICRO-FILM INFORMATION

RECORDED BY DATE

NO.

ENGINEER'S SEAL

JAMES D. HUGHES
NEW MEXICO
PROFESSIONAL ENGINEER
6-30-2016

CERTIFICATE OF SUBSTANTIAL COMPLIANCE

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
		DESIGNED BY JDH	04/16
		DRAWN BY SPS	04/16
		CHECKED BY DMG	04/16

dmg
MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
OFFICE (505) 828-2200, FAX (505) 797-9539

CITY OF ALBUQUERQUE
PLANNING DEPARTMENT

TITLE:

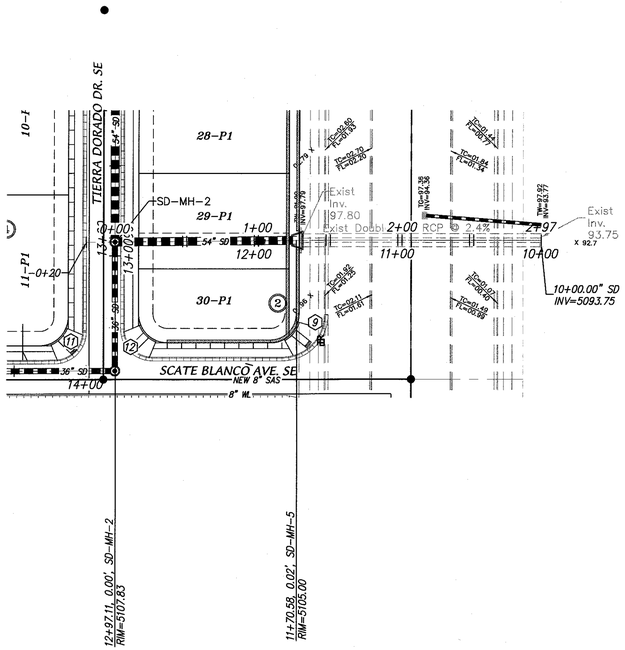
DESERT SANDS SUBDIVISION DRAINAGE PLAN & PROFILE

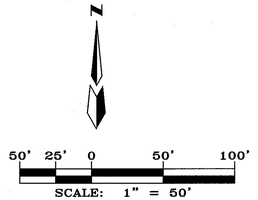
DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

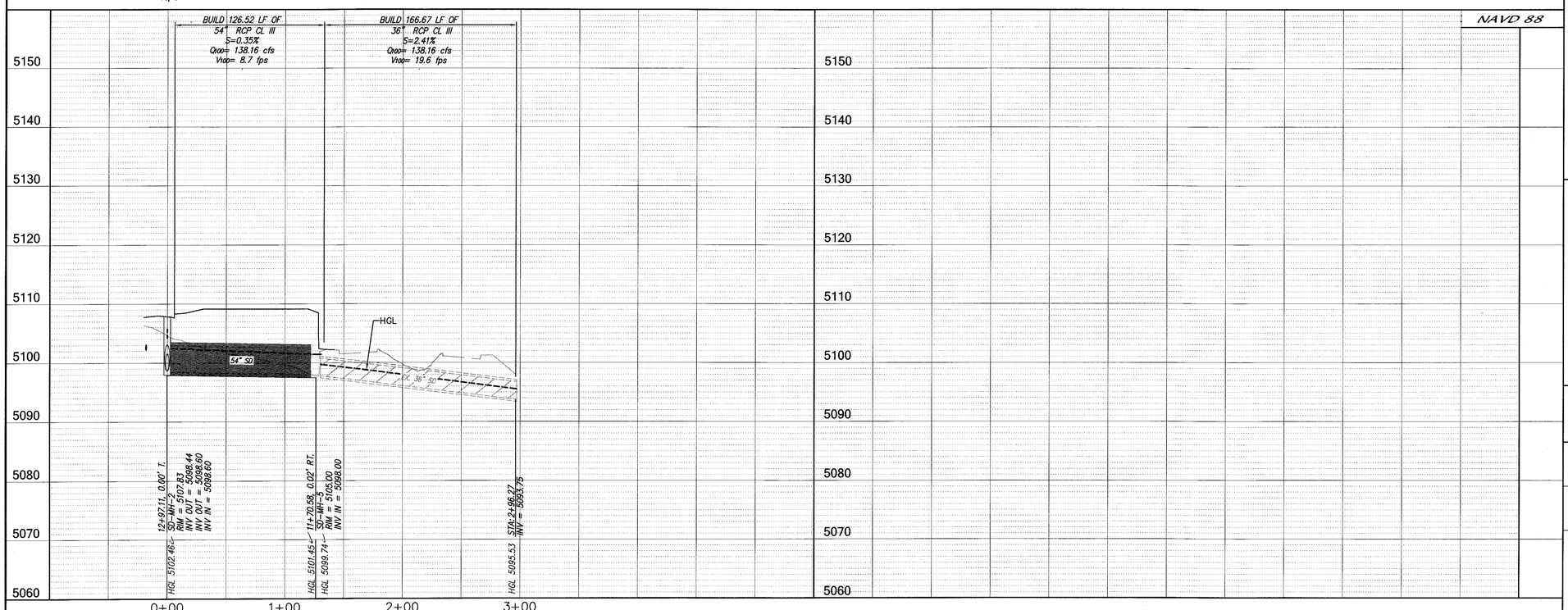
CITY PROJECT NO. .

ZONE MAP NO.

SHEET 31 OF 39







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SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

BENCH MARKS

AGRS Aluminum Cap stamped "TRANS 1969" From the intersection of Central Avenue and 98th Street SW go south on 98th Street 1.2 miles to the intersection of 98th Street and Snow Vista Boulevard. Then go southeast along Snow Vista Boulevard and the co-op electric transmission line 0.85 miles to pylon numbered 52. The station is just east of this point. Geographic Position (NAD83), in feet N.M. State Plane Coordinates(Central Zone) N=1471885.503, E=1495145.486 Elevation (NAVD88), in feet = 5121.089

AS BUILT INFORMATION

CONTRACTOR
WORK CHANGES BY — DATE
INSPECTOR'S ACCEPTANCE BY — DATE
FIELD VERIFICATION BY — DATE
DRAWING CORRECTED BY — DATE

MICRO-FILM INFORMATION

RECORDED BY — DATE
NO.

ENGINEER'S SEAL

JAMES D. HAGGERTY
11574
NEW MEXICO
PROFESSIONAL ENGINEER
6-30-2016

CERTIFICATE OF SUBSTANTIAL COMPLIANCE

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	

DESIGNED BY JDH 04/16
DRAWN BY SPS 04/16
CHECKED BY DMG

MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
OFFICE (505) 828-2200, FAX (505) 797-9539

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

TITLE:

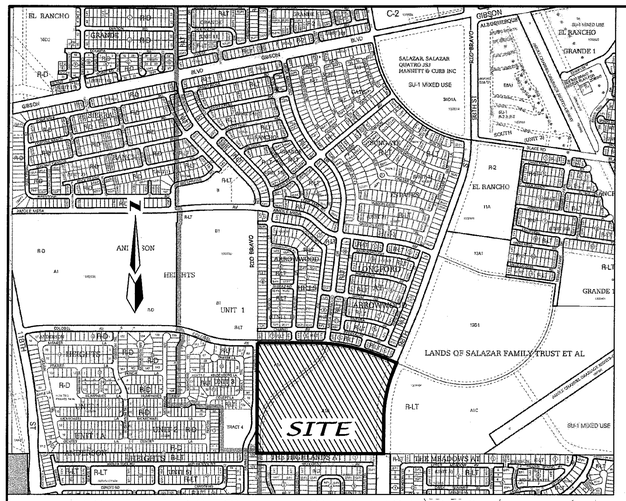
DESERT SANDS SUBDIVISION DRAINAGE PLAN & PROFILE

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO. .

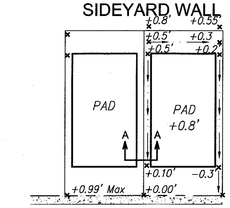
ZONE MAP NO.

SHEET 38 OF 39



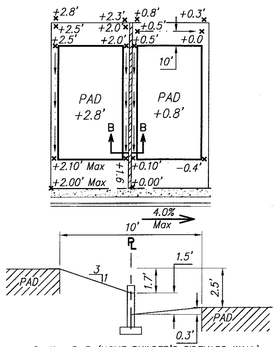
VICINITY MAP (NTS) ZONE ATLAS MAP N-9

TYPICAL LOT GRADING W/O SIDEYARD WALL

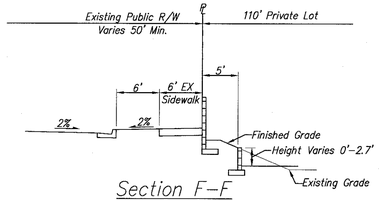


Section A–A (NO SIDEYARD WALL)

TYPICAL LOT GRADING WITH SIDEYARD WALL



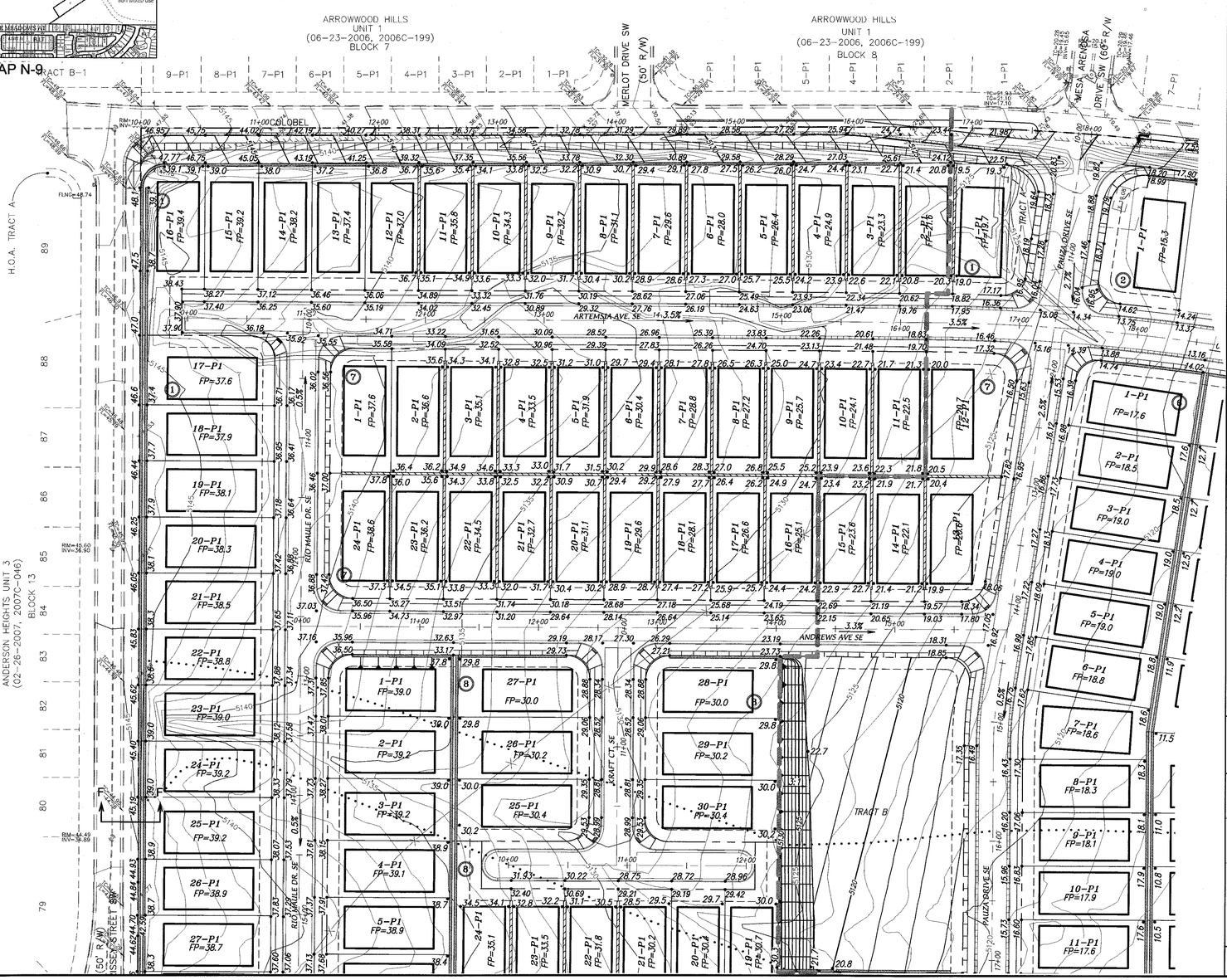
Section B–B (HOME BUILDER'S SIDEYARD WALL)
7.2% MAX STREET SLOPE FOR 3' HIGH WALL



Section F–F
Scale: 1" = 10'

LEGEND

- 4" MOUNTABLE CURB AND GUTTER
- 8" STANDARD CURB AND GUTTER
- SIDEWALK CONSTRUCTED THIS PROJECT
- SIDEWALK TO BE DIFFERED
- LIMITS OF GRADING (THIS PROJECT)
- HANDICAPPED RAMP
- EXISTING PAVEMENT
- RETAINING WALLS THIS PROJECT
- RETAINING WALLS DEFERRED TO THE HOME BUILDERS
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- PROPOSED CONTOUR
- PROPOSED SLOPE
- FEMA FLOOD ZONE
- LOT NUMBER — 1–P1
- BLOCK NUMBER — 3



GRADING NOTES:

1. THE CONTRACTOR(S) MUST COMPLY WITH NPDES TEMPORARY CONSTRUCTION REQUIREMENTS AND OBTAIN A PERMIT. CONTRACTOR SHALL ALSO PROVIDE A COPY OF THE APPLICATION FOR PERMIT AND NOTICE OF TERMINATION TO THE OWNER.
2. THE CONTRACTOR(S) IS RESPONSIBLE FOR PREPARING AND MAINTAINING A SWPPP FOR THE DURATION OF INFRASTRUCTURE CONSTRUCTION AND UNTIL THE CITY OF ALBUQUERQUE ACCEPTS THE PUBLIC INFRASTRUCTURE. CONTRACTOR SHALL PROVIDE THE OWNER WITH A COPY OF THE SWPPP AT THE BEGINNING OF THE PROJECT AND AT THE TIME OF NOTICE OF TERMINATION.
3. THE CONTRACTOR(S) IS RESPONSIBLE FOR CONSTRUCTING AND MAINTAINING EROSION CONTROLS FOR THE DURATION OF THE CONSTRUCTION OF THE PUBLIC INFRASTRUCTURE AND FOR THE REMOVAL OF THE EROSION CONTROLS WHERE DIRECTED TO DO SO BY THE OWNER AT THE TIME OF NOTICE OF TERMINATION.
4. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION STAKING AND IS TO PROVIDE AN AS-BUILT SURVEY CERTIFIED BY A REGISTERED PROFESSIONAL SURVEYOR TO THE OWNER UPON COMPLETION OF THE CONSTRUCTION. THE EARTHWORK CONTRACTOR IS TO PROVIDE EARTHWORK SURVEY, AND THE WALL BUILDER IS TO PROVIDE WALL SURVEY.
5. EARTHWORK CONTRACTOR SHALL PREPARE ROUGH SUBGRADE FOR THE RETAINING WALL CONSTRUCTION AND PROVIDE SUFFICIENT BACKFILL MATERIAL STOCKPILED ON THE HIGH SIDE OF EACH WALL FOR THE WALL BUILDER TO COMPLETELY BACKFILL THE WALLS.
6. RETAINING WALLS ARE SHOWN FOR GRADING PURPOSES ONLY. RETAINING WALL DESIGN IS TO BE PERFORMED BY OTHERS, AND SHALL BE SUBMITTED TO THE CITY OF ALBUQUERQUE FOR REVIEW, APPROVAL, PERMIT, AND INSPECTION
7. EARTHWORK CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL INVESTIGATION BY $X^{E}E$ VINEYARD, INC. DATED NOVEMBER 27, 2015.
8. TOPOGRAPHIC AND BOUNDARY SURVEY ARE BY ALDRICH LAND SURVEYING MARCH 2016.
9. BENCHMARK USED IS AGRS BRASS CAP STAMPED"TRANS 1969" HAVING AN ELEVATION OF 5121.089 (NAVD88).
10. FEMA SPECIAL FLOOD HAZARD ZONE ON THIS PROPERTY AS SHOWN ON FIRM 35001C0336H AND 35001C0338H REVISED AUGUST 16, 2012
11. ALL LOTS ARE TO BE PROVIDED WITH A STORM WATER QUALITY POND IN THE FRONT YARD BETWEEN THE SIDEWALK AND STREET PER SECTION C-C.
12. EARTHWORK CONTRACTOR TO PROVIDE VIDEO DOCUMENTATION OF THE EXISTING CONDITION OF IMPROVEMENTS AROUND THE PERIMETER OF PROJECT TO THE OWNER PRIOR TO BEGINNING CONSTRUCTION.

N

60' 30' 0 60' 120'

SCALE: 1" = 60'

CERTIFICATE OF SUBSTANTIAL COMPLIANCE

MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
OFFICE (505) 828-2200, FAX (505) 797-9539

SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

BENCH MARKS

AGRS Aluminum Cap stamped "TRANS 1969" from the intersection of Central Avenue and 98th Street SW go south on 98th Street 1.2 miles to the intersection of 98th Street and Snow Vista Boulevard. Then go southeast along Snow Vista Boulevard and the co-op electric transmission line 0.85 miles to pylon numbered 52. The station is just east of this point. Geographic Position (NAD83). in feet N.M. State Plane Coordinates(Central Zone) N=1471885.503, E=1495145.466 Elevation (NAVD88), in feet = 5121.089

AS BUILT INFORMATION

CONTRACTOR

WORK STAKED BY	DATE
ACCEPTANCE BY	DATE
VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

MICRO-FILM INFORMATION

RECORDED BY DATE

NO.

ENGINEER'S SEAL

JAMES D. HUGHES 10074 NEW MEXICO REGISTERED PROFESSIONAL ENGINEER
7-6-2016

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
		DESIGNED BY JDH	DATE 03/16
		DRAWN BY SPS	DATE 01/16
		CHECKED BY DMG	DATE 01/16

CITY OF ALBUQUERQUE
PLANNING DEPARTMENT

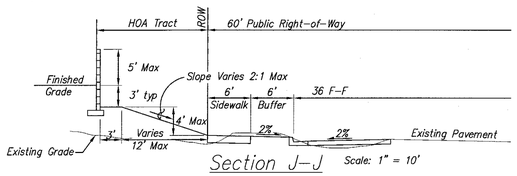
TITLE:

DESERT SANDS SUBDIVISION GRADING & DRAINAGE PLAN

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO. . ZONE MAP NO. SHEET 1 OF 5

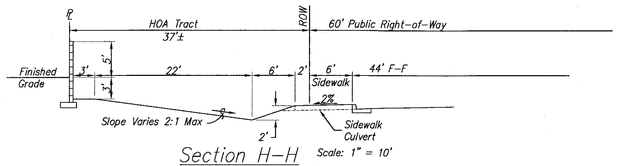
F:\A15063\SA15063 Lands of Salazar\GRADE & DRAIN\1 A15063 GD - GD Plan 1.dwg, 7/6/2016 3:27:41 PM, SPS



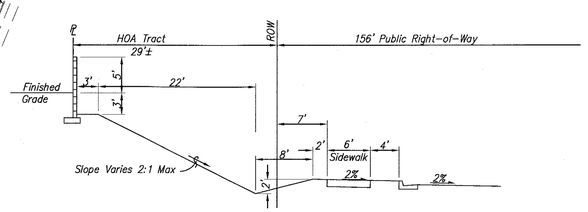
Section J–J Scale: 1" = 10'

LEGEND

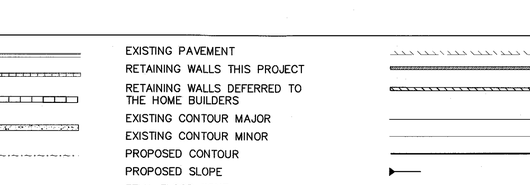
- 4" MOUNTABLE CURB AND GUTTER
- 8" STANDARD CURB AND GUTTER
- SIDEWALK CONSTRUCTED THIS PROJECT
- SIDEWALK TO BE DIFFERED
- LIMITS OF GRADING (THIS PROJECT)
- HANDICAPPED RAMP
- EXISTING PAVEMENT
- RETAINING WALLS THIS PROJECT
- RETAINING WALLS DEFERRED TO THE HOME BUILDERS
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- PROPOSED CONTOUR
- PROPOSED SLOPE
- FEMA FLOOD ZONE
- LOT NUMBER (1–P1)
- BLOCK NUMBER (3)



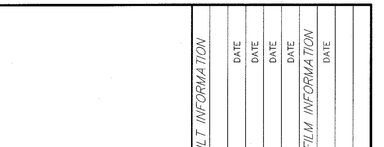
Section H–H Scale: 1" = 10'



Section G–G Scale: 1" = 10'



Section D–D Scale: 1" = 10'



CERTIFICATE OF SUBSTANTIAL COMPLIANCE

dmg
MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
OFFICE (505) 828-2200, FAX (505) 797-9539

SURVEY INFORMATION

FIELD NOTES

NO.	BY	DATE

BENCH MARKS

AGRS Aluminum Cap stamped "TRANS 1969" From the intersection of Central Avenue and 98th Street SW go south on 98th Street 1.2 miles to the intersection of 98th Street and Snow Vista Boulevard. Then go southeast along Snow Vista Boulevard and the co-op electric transmission line 0.85 miles to pylon numbered 52. The station is just east of this point. Geographic Position (NAD83), in feet N.M. State Plane Coordinates(Central Zone) N=1471885.503, E=1495145.466 Elevation (NAVD88), in feet = 5121.089

AS BUILT INFORMATION

CONTRACTOR
WORK STARTED BY: DATE
INSPECTOR'S ACCEPTANCE BY: DATE
VERIFICATION BY: DATE
DRAWINGS CORRECTED BY: DATE

MICRO-FILM INFORMATION

RECORDED BY: DATE
NO.

ENGINEER'S SEAL

JAMES M. WILSON
14674
NEW MEXICO
REGISTERED PROFESSIONAL ENGINEER
7-6-2016

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
		DESIGNED BY	JDH
		DRAWN BY	SPS
		CHECKED BY	DMG

DATE
03/16
01/16
01/16

CITY OF ALBUQUERQUE
PLANNING DEPARTMENT

TITLE:
DESERT SANDS SUBDIVISION GRADING & DRAINAGE PLAN

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO. .

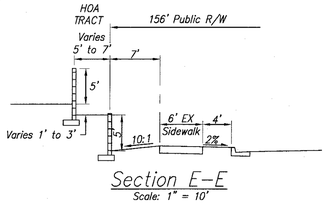
ZONE MAP NO.

SHEET 2 OF 5

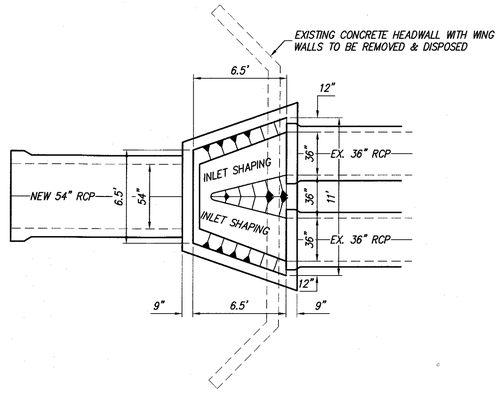
F:\A15305\A15063 Lands of Salazar\GRADE & DRAIN\1 A15063 GD - GD Plan 1.dwg, 7/5/2016 4:46:43 PM, SPS

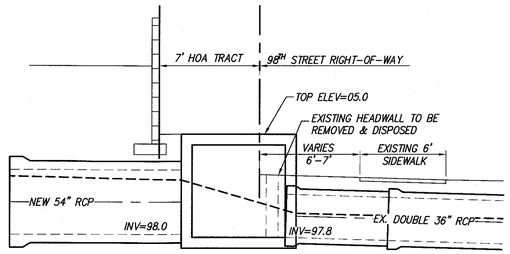
LEGEND

4" MOUNTABLE CURB AND GUTTER	EXISTING PAVEMENT
8" STANDARD CURB AND GUTTER	RETAINING WALLS THIS PROJECT
SIDEWALK CONSTRUCTED THIS PROJECT	RETAINING WALLS DEFERRED TO THE HOME BUILDERS
SIDEWALK TO BE DIFFERED	EXISTING CONTOUR MAJOR
LIMITS OF GRADING (THIS PROJECT)	EXISTING CONTOUR MINOR
HANDICAPPED RAMP	PROPOSED CONTOUR
	PROPOSED SLOPE
	FEMA FLOOD ZONE
	LOT NUMBER (1-P1)
	BLOCK NUMBER (3)



Section E-E
Scale: 1" = 10'





N

60' 30' 0 60' 120'

SCALE: 1" = 60'

CERTIFICATE OF SUBSTANTIAL COMPLIANCE

dmg MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
OFFICE (505) 828-2200, FAX (505) 797-9539

SURVEY INFORMATION

FIELD NOTES

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BENCH MARKS

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AS BUILT INFORMATION

CONTRACTOR

WORK STARTED BY	DATE
FINAL INSPECTIONS ACCEPTANCE BY	DATE
FIELD VERIFICATION BY	DATE
DRAWINGS CORRECTED BY	DATE

MICRO-FILM INFORMATION

RECORDED BY DATE

NO.

ENGINEER'S SEAL

JAMES D. HUGHES 10574 REGISTERED PROFESSIONAL ENGINEER NEW MEXICO

7-6-2016

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	

DESIGNED BY JDH DATE 03/16
DRAWN BY SPS DATE 01/16
CHECKED BY DMG DATE 01/16

CITY OF ALBUQUERQUE
PLANNING DEPARTMENT

TITLE: DESERT SANDS SUBDIVISION GRADING & DRAINAGE PLAN

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO. .

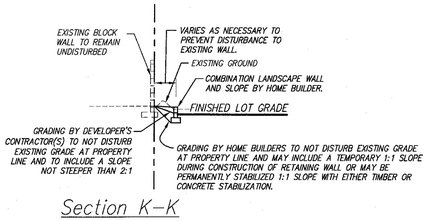
ZONE MAP NO.

SHEET 3 OF 5

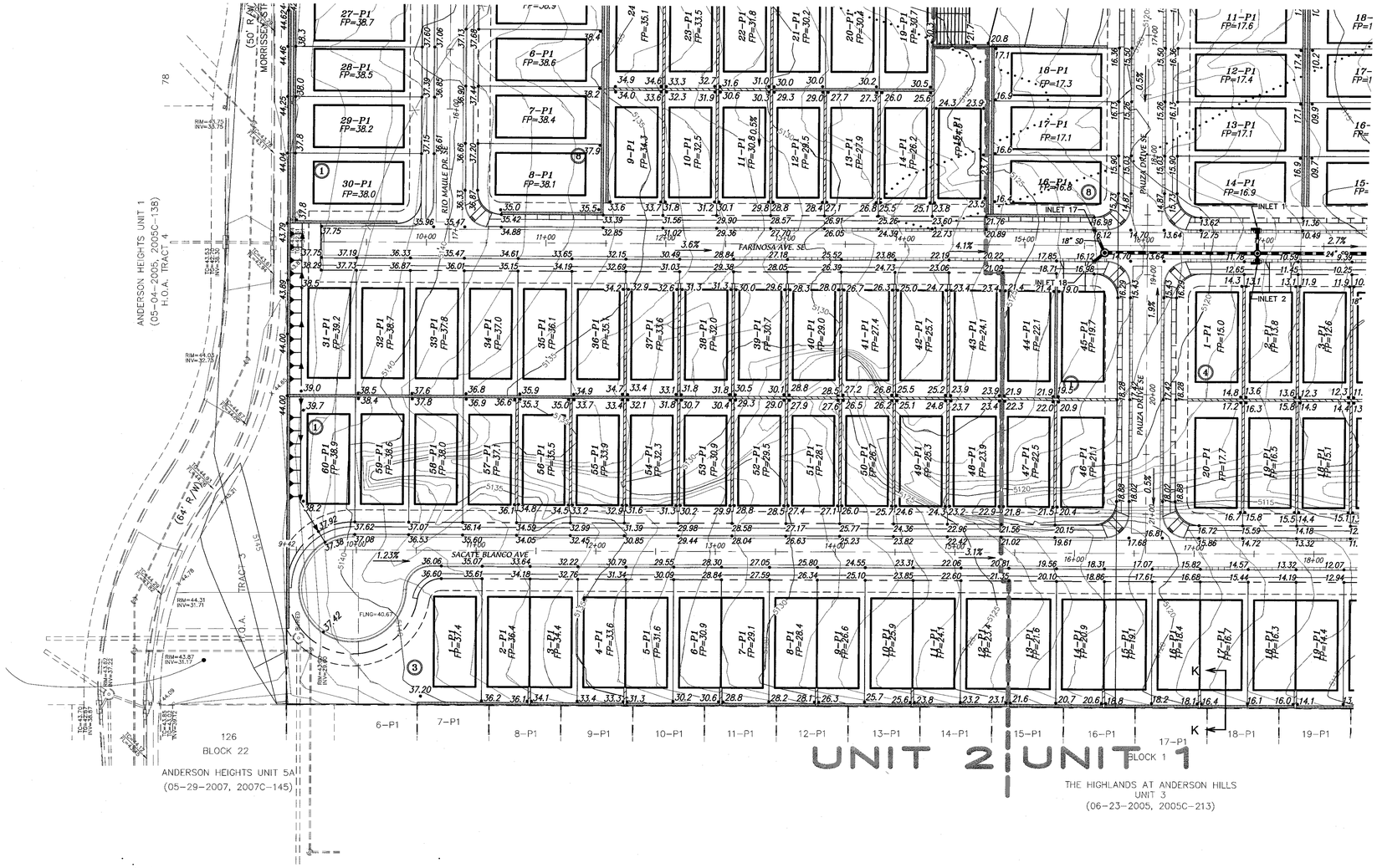
F:\A15\DBS\A15063 Lands of Salazar\GRADE & DRAIN\1 A15063 GD - GD Plan 1.dwg, 7/5/2016 4:49:58 PM, SPS

LEGEND

- 4" MOUNTABLE CURB AND GUTTER
- 8" STANDARD CURB AND GUTTER
- SIDEWALK CONSTRUCTED THIS PROJECT
- SIDEWALK TO BE DIFFERED
- LIMITS OF GRADING (THIS PROJECT)
- HANDICAPPED RAMP
- EXISTING PAVEMENT
- RETAINING WALLS THIS PROJECT
- RETAINING WALLS DEFERRED TO THE HOME BUILDERS
- EXISTING CONTOUR MAJOR
- EXISTING CONTOUR MINOR
- PROPOSED CONTOUR
- PROPOSED SLOPE
- FEMA FLOOD ZONE
- LOT NUMBER — *1–P1*
- BLOCK NUMBER — ③



Section K–K



60' 30' 0 60' 120'

SCALE: 1" = 60'

CERTIFICATE OF SUBSTANTIAL COMPLIANCE

MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
OFFICE (505) 828-2200, FAX (505) 797-9539

CITY OF ALBUQUERQUE
PLANNING DEPARTMENT

TITLE: *DESERT SANDS SUBDIVISION GRADING & DRAINAGE PLAN*

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO. -

ZONE MAP NO.

SHEET 4 OF 5

AS BUILT INFORMATION

CONTRACTOR

	DATE
WORK STARTED BY	
INSPECTOR'S ACCEPTANCE BY	
AS BUILT VERIFICATION BY	
DRAWINGS CORRECTED BY	

MICRO-FILM INFORMATION

RECORDED BY DATE

NO.

BENCH MARKS

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SURVEY INFORMATION

FIELD NOTES

NO.	DATE	BY

ENGINEER'S SEAL

JAMES D. HUGHES 15269 REGISTERED PROFESSIONAL ENGINEER NEW MEXICO 7-6-2015

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
	03/16	DESIGNED BY JDH	
	01/16	DRAWN BY SPS	
	01/16	CHECKED BY DMG	

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Sump Inlet Summary Table

Inlet #	Alignment	Type	Area (SF)	Effective Perimiter (FT)	Q100 (CFS)	Orifice depth[1] (FT)	Weir Depth[2] (FT)	Top of Curb Elevation	100-YR Water Surface Elev.	Overflow Crest Elevation	Emergency Overflow Depth	Emergency Overflow Elevation	Lowest Adjacent Pad Elevation
7	E	Dbl 'C'	17.39	10.50	12.88	0.02	0.55	5107.51	5107.52	5107.78	0.67	5108.45	5108.70
8	E	Dbl 'C'	17.39	10.50	12.88	0.02	0.55	5107.51	5107.52	5107.78	0.67	5108.45	5108.70
11	F	Dbl 'C'	16.09	10.50	10.22	0.02	0.47	5107.59	5107.52	5107.78	0.67	5108.45	5108.70
12	F	Dbl 'C'	16.09	10.50	10.22	0.02	0.47	5107.59	5107.52	5107.78	0.67	5108.45	5108.70
15	D	Dbl 'C'	16.09	10.50	6.38	0.01	0.34	5107.74	5107.54	5107.57	0.40	5107.97	5108.70
16	D	Dbl 'C'	16.09	10.50	6.38	0.01	0.34	5107.74	5107.54	5107.57	0.40	5107.97	5108.70

1) Orifice Equa Q = 0.6 A (2gh)$^{0.5}$ so h=(Q/.6/A)^2/2/g
2) Weir Equati Q = 3 L h$^{3/2}$ so h= (Q/3/L)$^{2/3}$
3) The orifice equation is used in accordance with FHA HEC-22, and the height is added to the center of the grate elevation which is 0.72' below the top of curb elevation.
4) The weir equation is used in accordance with FHA HEC-22, and the height is added to the lip of gutter elevation which is 0.54' below the top of curb elevation.
5) The Area and Effective Perimiter are calculated by "Hydraulic Tool Box 4.2" in accordance with Federal Highway Administration HEC-22 3rd eddition, Rev Aug., 2013
6) Emergency Overflow from inlets #7, 8, 11, & 12 goes south in alignment F to alignment D. The total flow is 52.58 cfs and has a normal depth of 0.67' at 0.5% slope.
7) Emergency Overflow from inlets #15 & 16 goes east in alignment D to 98th St. The total flow is 12.28 cfs and has a critical depth of 0.40' at the high spot.

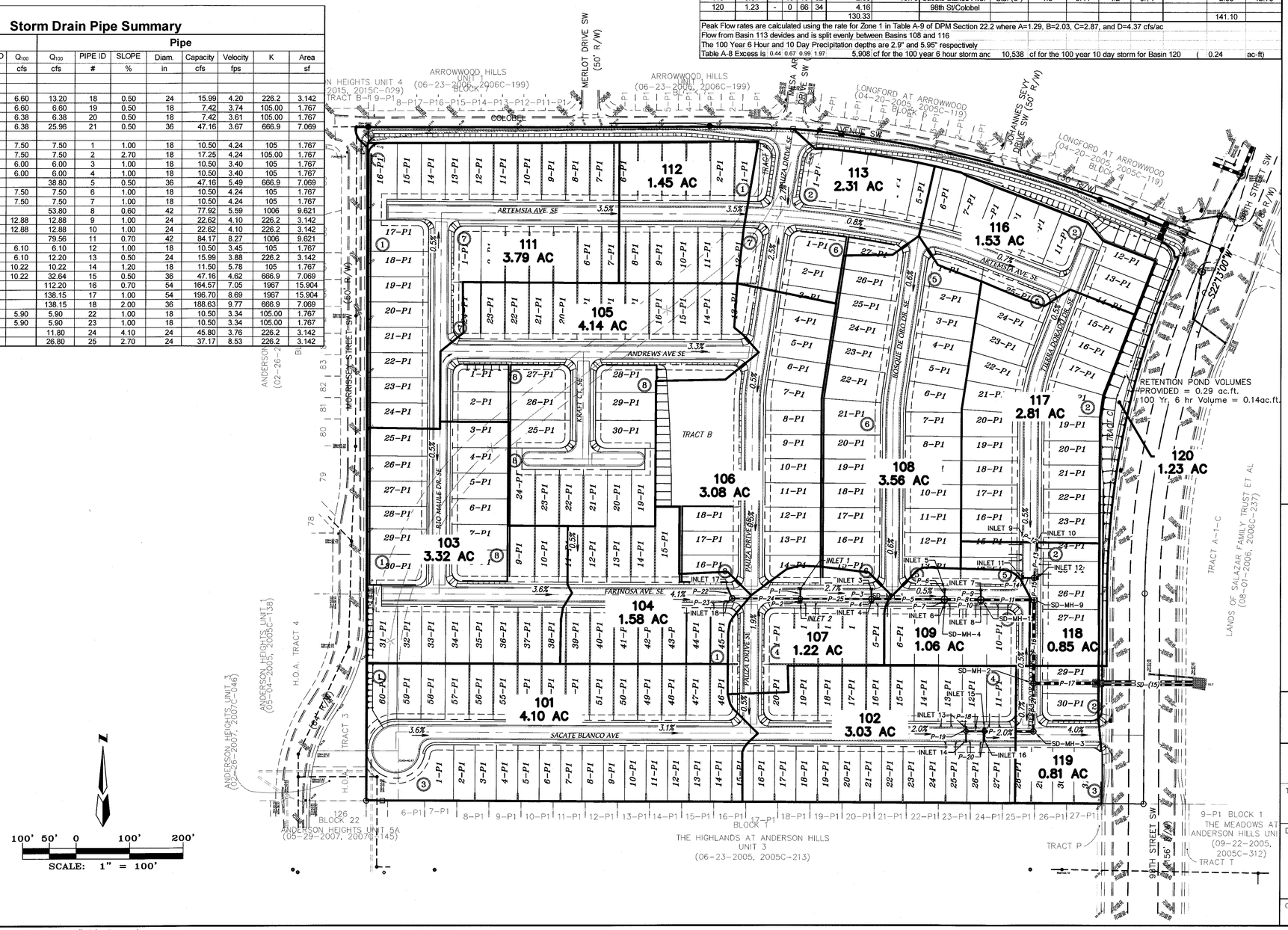
Storm Drain Pipe Summary

Inlet Location	Inlet ID #	Inlet Q_{100} cfs	Pipe Q_{100} cfs	Pipe ID #	Pipe SLOPE %	Pipe Diam. in	Pipe Capacity cfs	Pipe Velocity fps	Pipe K	Pipe Area sf
Sacate Blanco Ave.	13	6.60	13.20	18	0.50	24	15.99	4.20	226.2	3.142
Sacate Blanco Ave.	14	6.60	6.60	19	0.50	18	7.42	3.74	105.00	1.767
Sacate Blanco Ave.	15	6.38	6.38	20	0.50	18	7.42	3.61	105.00	1.767
Sacate Blanco Ave.	16	6.38	25.96	21	0.50	36	47.16	3.67	666.9	7.069
Farinosa Ave.	1	7.50	7.50	1	1.00	18	10.50	4.24	105	1.767
Farinosa Ave.	2	7.50	7.50	2	2.70	18	17.25	4.24	105.00	1.767
Farinosa Ave.	3	6.00	6.00	3	1.00	18	10.50	3.40	105	1.767
Farinosa Ave.	4	6.00	6.00	4	1.00	18	10.50	3.40	105	1.767
Farinosa Ave.			38.80	5	0.50	36	47.16	5.49	666.9	7.069
Farinosa Ave.	5	7.50	7.50	6	1.00	18	10.50	4.24	105	1.767
Farinosa Ave.	6	7.50	7.50	7	1.00	18	10.50	4.24	105	1.767
Farinosa Ave.			53.80	8	0.60	42	77.92	5.59	1006	9.621
Farinosa Ave.	7	12.88	12.88	9	1.00	24	22.62	4.10	226.2	3.142
Farinosa Ave.	8	12.88	12.88	10	1.00	24	22.62	4.10	226.2	3.142
Farinosa Ave.			79.56	11	0.70	42	84.17	8.27	1006	9.621
Tierra Dorando Dr.	9	6.10	6.10	12	1.00	18	10.50	3.45	105	1.767
Tierra Dorando Dr.	10	6.10	12.20	13	0.50	24	15.99	3.88	226.2	3.142
Tierra Dorando Dr.	11	10.22	10.22	14	1.20	18	11.50	5.78	105	1.767
Tierra Dorando Dr.	12	10.22	32.64	15	0.50	36	47.16	4.62	666.9	7.069
Tierra Dorando Dr.			112.20	16	0.70	54	164.57	7.05	1967	15.904
Lot 29 Esm't			138.15	17	1.00	54	196.70	8.69	1967	15.904
Ex Double 36" RCP @ 98th St.			138.15	18	2.00	36	188.63	9.77	666.9	7.069
Farinosa Ave.	17	5.90	5.90	22	1.00	18	10.50	3.34	105.00	1.767
Farinosa Ave.	18	5.90	5.90	23	1.00	18	10.50	3.34	105.00	1.767
Farinosa Ave.			11.80	24	4.10	24	45.80	3.76	226.2	3.142
Farinosa Ave.			26.80	25	2.70	24	37.17	8.53	226.2	3.142

Hydrology and Surface Drainage Summary

BASIN ID	AREA (Ac)	Ground Cover (%) A	B	C	D	Peak 100-YR Flow Q_{100} (cfs) Incremental	Surface	Location	Curb Type	Slope (%)	Depth (ft)	Velocity (fps)	Energy (ft)	Inlet ID #	Intercepted (cfs)	By-pass (cfs)
101	4.10	-	19	19	62	14.93	14.93	Sacate Blanco Ave.	Roll (4")	3.1	0.28	4.0	0.53	-	0.00	14.93
102	3.03	-	19	19	62	11.03	25.96	Sacate Blanco Ave.	Std. (8")	2.9	0.43	4.0	0.68	13 & 14	13.20	12.76
							12.76	Sacate Blanco Ave.	Std. (8")	Sump				15 & 16	12.76	
103	3.32	-	19	19	62	12.09	12.09	Farinosa Ave.	Roll (4")	3.6	0.26	4.0	0.51	-	0.00	12.09
104	1.70	-	19	19	62	6.19	18.27	Farinosa Ave.	Std. (8")	4.1	0.36	4.7	0.70	17 & 18	11.80	6.47
105	4.14	-	19	19	62	15.07	15.07	Andrews Ave.	Roll (4")	3.3	0.28	4.0	0.53	-	0.00	15.07
106	3.08	-	19	19	62	11.21	26.28	Pauza Drive	Std. (8")	0.5	0.54	2.8	0.66		0.00	26.28
107	1.22	-	19	19	62	4.44	37.20	Farinosa Ave.	Std. (8")	2.7	0.47	5.1	0.87	1 & 2	15.00	22.20
							22.20	Farinosa Ave.	Std. (8")	2.7	0.40	4.1	0.66	3 & 4	12.00	10.20
108	3.56	-	19	19	62	12.96	26.70	Bosque de Oro Dr.	Std. (8")	0.6	0.54	2.9	0.67	-	0.00	26.70
109	1.06	-	19	19	62	3.86	40.76	Farinosa Ave.	Std. (8")	0.5	0.62	3.4	0.80	5 & 6	15.00	25.76
							25.76	Farinosa Ave.	Std. (8")	Sump				7 & 8	25.76	
111	3.79	-	19	19	62	13.80	13.80	Artemsia Ave.	Roll (4")	3.5	0.28	4.0	0.53	-	0.00	13.80
112	1.45	-	19	19	62	5.28	19.08	Artemsia Ave.	Std. (8")	3.5	0.37	4.6	0.70	-	0.00	19.08
113	2.31	-	19	19	62	8.41	27.49	Artemsia Ave.	Std. (8")	0.8	0.52	3.2	0.68	-	0.00	27.49
116	1.53	-	19	19	62	5.57	19.31	Artemsia Ave.	Std. (8")	0.7	0.48	2.7	0.59	-	0.00	19.31
117	2.81	-	19	19	62	10.23	29.54	Tierra Dorando Dr.	Std. (8")	0.5	0.57	2.9	0.70	9 & 10	12.20	17.34
118	0.85	-	19	19	62	3.09	20.44	Tierra Dorando Dr.	Std. (8")	Sump				11 & 12	20.44	0.00
119	0.81	-	19	19	62	2.95	15.70	Sacate Blanco Ave.	Std. (8")	1.8	0.44	4.2	0.71		2.95	12.76
120	1.23	-	0	66	34	4.16		98th St/Colobel								
						130.33									141.10	

Peak Flow rates are calculated using the rate for Zone 1 in Table A-9 of DPM Section 22.2 where A=1.29, B=2.03, C=2.87, and D=4.37 cfs/ac
Flow from Basin 113 devides and is split evenly between Basins 108 and 116
The 100 Year 6 Hour and 10 Day Precipitation depths are 2.9" and 5.95" respectively
Table A-8 Excess is 0.44 0.67 0.99 1.97 5,908 cf for the 100 year 6 hour storm anc 10,538 cf for the 100 year 10 day storm for Basin 120 (0.24 ac-ft)



AS BUILT INFORMATION

CONTRACTOR
WORK MADE BY DATE
INSPECTORS
ACCEPTANCE BY DATE
FIELD VERIFICATION BY DATE
DRAWINGS DATE
CORRECTED BY DATE

BENCH MARKS
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SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S SEAL
JAMES D. HUGHES 15974 REGISTERED PROFESSIONAL ENGINEER NEW MEXICO
6-30-2016
7-6-2016

CERTIFICATE OF SUBSTANTIAL COMPLIANCE

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	
		DESIGNED BY JDH	DATE 03/16
		DRAWN BY SPS	DATE 01/16
		CHECKED BY DMG	DATE 01/16

dmg MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
OFFICE (505) 828-2200, FAX (505) 797-9539

CITY OF ALBUQUERQUE
PLANNING DEPARTMENT

TITLE: *DESERT SANDS SUBDIVISION DRAINAGE PLAN*

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO. . | ZONE MAP NO. | SHEET 5 OF 5

F:\A15\DWG\A1563 Lands of Salazar\GRADE & DRAIN\A1563 BASINS.dwg, 7/1/2016 1:12:09 PM, SPS