

January 20, 1998

Martin J. Chávez, Mayor

Sara McCollam Tierra West, LLC 4421 McLeod Road NE, Suite D Albuquerque, New Mexico 87109

RE: Drainage Report and Grading and Drainage Plan for West Ridge Mobile Home Park (K9/D6) Submitted for Preliminary Plat, Site Development Plan, Building Permit and Grading Permit Approval, Engineer's Stamp Dated 1/9/98.

Dear Ms. McCollam:

Based on the information provided in the submittal of January 9, 1998, the above referenced plan and report are approved for Preliminary Plat, Site Development Plan and Building Permit Approval.

As you are aware, Agreement and Covenants are required for each of the proposed ponds prior to Work Order approval. The Grading and Drainage Certification is required prior to release of Financial Guarantees.

If you have any questions, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.

City/County Floodplain Administrator

c: Ronald R. Bohannan, P.E.
Fred Seeley, Great Western Realty
File



DRAINAGE REPORT

for

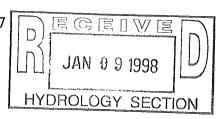
West Ridge Mobile Home Park

Prepared by

Tierra West, LLC 4421 McLeod Road NE, Suite D Albuquerque, New Mexico 87109

Prepared for

Fred Seeley
Great Western Realty
3511 Carlisle Blvd, NE
Albuquerque, New Mexico 87107

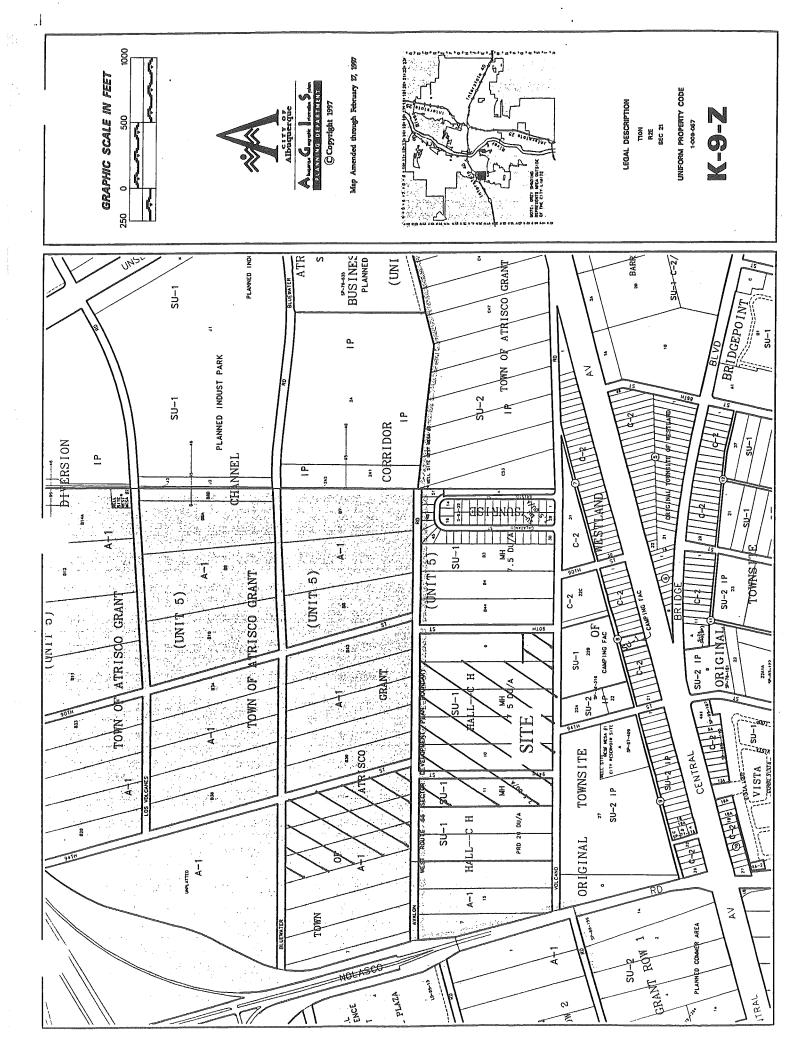


October 1997

Ronald R. Bohannan P.E. No. 7868 PRI

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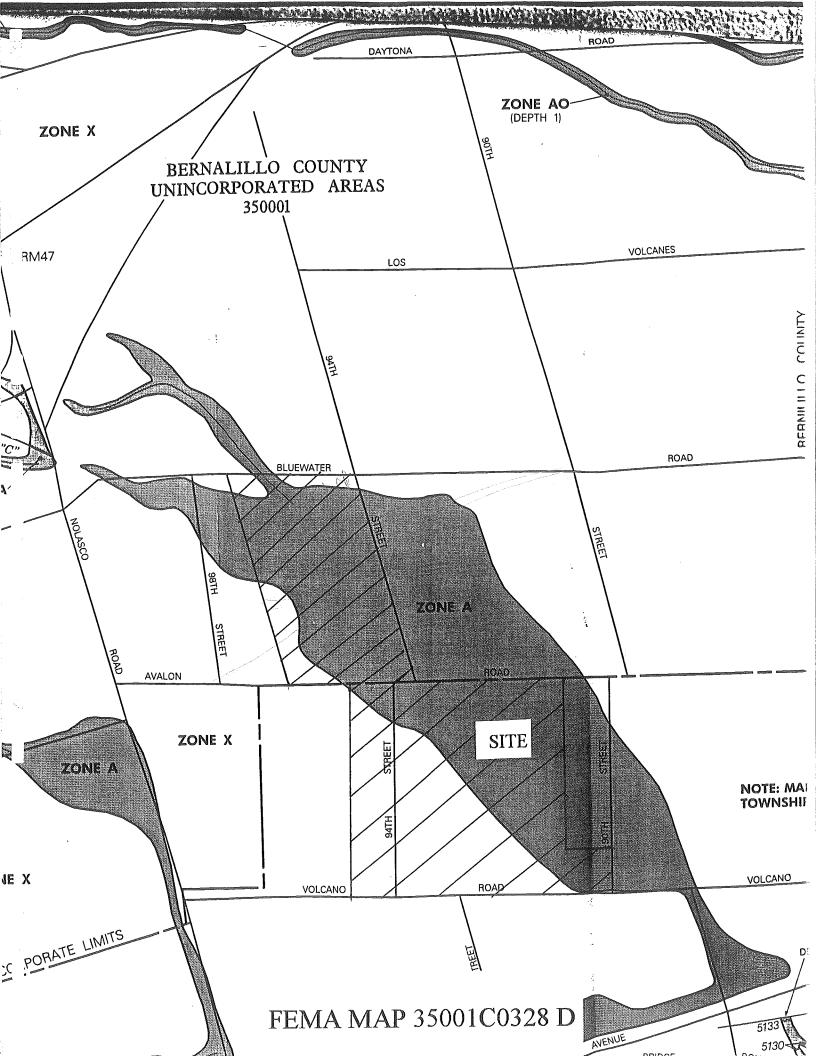
Location

West Ridge Mobile Home Park is located south of Avalon Road between 90th and 94th Streets. The site is shown on the attached Zone Atlas Map (K-9) and contains approximately 27.4 acres. The site is identified as Tracts 6, 7, 8, 9, 10, and 11 of C.H. Hall. The purpose of this report is to provide the drainage analysis and management plan for the mobile home park. An RV park is Phase II of the project and is included to the north of the mobile home park. The drainage solution for the RV park is provided here although it is conceptual and a detailed report will be provided when the park is developed.

FEMA Map and Soil Conditions

The site is located on FIRM Map 35001C0328 D as shown on the attached excerpt. The map shows that the site lies within a 100 year flood plain. A Letter of Map Revision (LOMR) will be submitted for the site that will remove the 100 year flood plain. The LOMR will only affect the flood plain downstream of the site and will not remove the flood plain north of the site. Future upstream development will have to submit additional LOMRs after upstream improvements are constructed. The residents of the site will be required to acquire flood insurance until improvements are constructed that remove the flood plain and the LOMR is approved.

The site contains two different soils from the Soil Conservation Service Soil Survey of Bernalillo County. The first is a Pajarito loamy fine sand which has moderately rapid permeability. The second soil is a Bluepoint loamy fine sand and has rapid permeability. Runoff is slow and the hazard of soil blowing is severe for both soils.



Off-site Drainage Management Plan

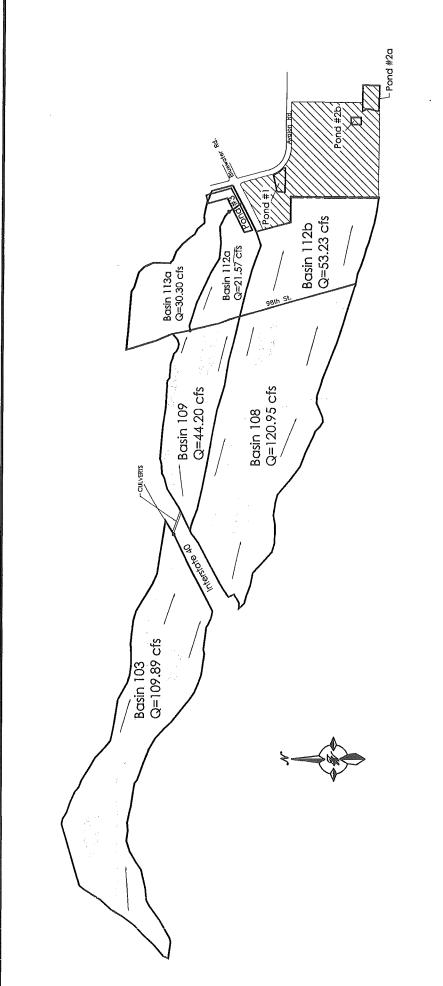
The site is currently undeveloped and drains to the southeast with 44.27 cfs of undeveloped runoff. The offsite undeveloped flows impacting the site have been divided into six basins, Basins 103, 108, 109, 112a, 112b, and 113a. These six basins consist of several smaller basins that were used for ease in computation but are not needed for narrative purposes. Basin 103 consists of basins 103a and 103b. Basin 108 consists of basins 108.1 and 109a. Basin 109 consists of basins 109b and 110. (see attached exhibit). These basins directly impact the site from the northwest.

Undeveloped flows that consist of Basins 103, 109, 112a, 113a will be cut off from the site by Bluewater Road. This undeveloped offsite flow will be ponded in an temporary off-site pond north of Bluewater Road and west of 94th Street (Pond 3). Pond 3 will be designed for the undeveloped upstream runoff. The pond will not have capacity for developed flows and is not intended as an outfall for upstream basins. Offsite Basins 108, and 112b will be captured in a proposed 48" RCP storm sewer in Volcano Road and routed to a proposed retention pond on the mobile home park site (Pond 2a).

In the future, the developed flows from the west will be cut off by Interstate 40 and 98th Street. The temporary retention ponds will be removed and the proposed storm sewer will be designed for the developed flows east of 98th Street.

Interim Solution

Basin 103 consists of the area west of Interstate 40. Basin 103 has an undeveloped runoff of 109.89 cfs. This basin flows southeast and passes under the Interstate through a series of existing culverts. The runoff will be detained in a temporary off-site retention pond located north of Bluewater Road (Pond 3). In the future, the developed runoff from Basin 103 will not affect the site as it will be contained at the Interstate with the I-40 Interceptor Project.



Off-Site Undeveloped Basin Layout

Basins 109 is located between Interstate 40 and 98th Street. Basin 109 has an undeveloped runoff flow of 44.20 cfs. This basin drains southeast towards the site and will be contained in the same temporary off-site retention pond (Pond 3) located north of Bluewater Road (Pond 3). In the future, Basin 109 will be intercepted by 98th Street and will not affect the site.

Basin 112a will have an undeveloped runoff of 21.57 cfs and is located between 98th Street and the site. This runoff will be captured in the temporary retention pond (Pond 3) located north of Bluewater Road.

Basin 113a will have an undeveloped runoff of 30.30 cfs and is located north of basin 112a and east of 98th Street. The basin consists of the northern portion of the floodplain impacting the site. This runoff and the floodplain will be captured in the temporary retention pond (Pond 3) located north of Bluewater Road.

The proposed off-site retention pond (Pond 3) is located north of Bluewater Road. It will collect a total flow of 205.96 cfs. The pond has a capacity of 6.46 ac-ft which is greater than the required capacity of 5.86 ac-ft. In the event of an emergency, the runoff will overflow from a 70.0 foot wide spillway. The pond will be removed after 98th Street is improved and the offsite basins intercepted.

Basin 108 drains east towards the site and is too far south to be captured in the temporary retention pond near Bluewater Road. Basin 108 has an undeveloped runoff of 120.95 cfs. This basin will sheet flow east until it reaches the western edge of the mobile home park and is directed south to Volcano Road via a waterproofed wall. The flows will then be conveyed to Volcano Road and captured in a cattleguard inlet. The proposed 48" RCP storm drain in Volcano Road has been designed to have capacity for the undeveloped flows from west of the site. The 48" RCP storm drain will transport the off-site flows to a proposed on-site temporary retention pond (Pond 2a). In the future, Basin 108 will be intercepted by

improvements in 98th Street and will no longer affect the site.

Basin 112b will flow east with an undeveloped runoff of 53.23 cfs. This basin is located between 98th Street and the site, and south of Basin 112a. Basin 112b will be captured by the storm drain in Volcano Road and conveyed to the proposed on-site retention pond (Pond 2a).

Offsite basins 108, and 112b will drain to a proposed on-site retention pond (Pond 2a) located in the southeast corner of the mobile home park. A total of 10.43 ac-ft of volume from the undeveloped off-site flows and the developed on-site flows must be ponded on the site.

There will be a large pond (Pond 2a) in the southeast corner of the mobile home park and a second smaller pond (Pond 2b) located near the basketball court in the center of the site.

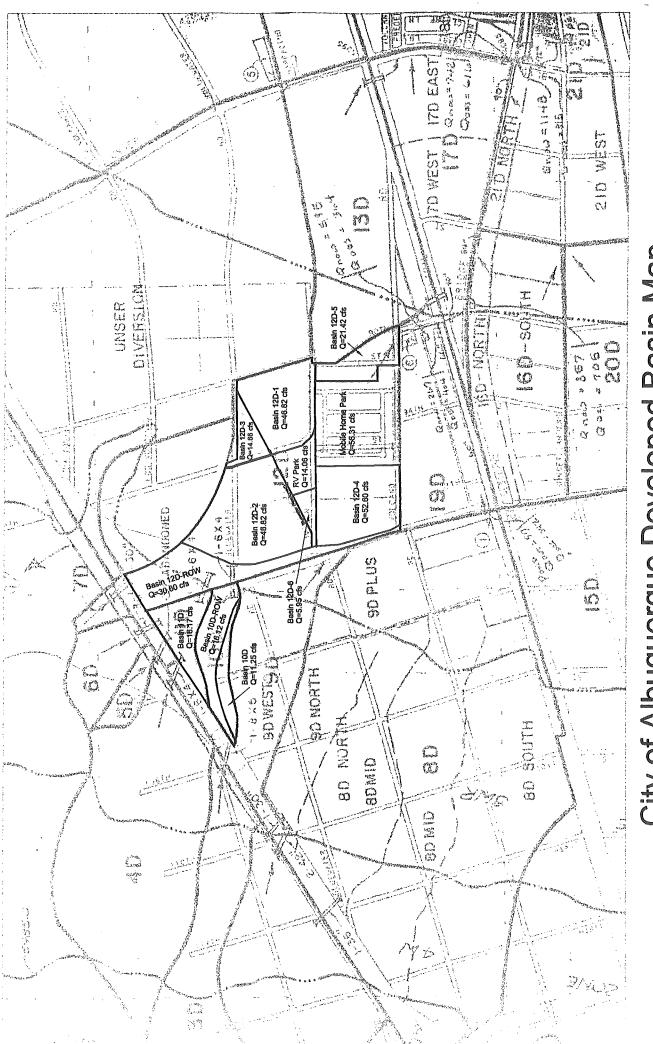
Pond 2a will have a capacity of 9.9813 ac-ft and Pond 2b will have a capacity of 0.49 ac-ft.

These two ponds total 10.47 ac-ft which is greater than the 10.43 required. In the event of an emergency, the runoff from Pond 2a will overflow from a 90.0 foot wide spillway.

The proposed 48" RCP storm drain in Volcano Road has been designed to carry the undeveloped flow of 174.18 cfs from the offsite basins to the retention pond (Pond 2a). A cattle guard inlet will capture the offsite flows as they enter Volcano Road at the west end of the mobile home park. In the future, when downstream improvements are constructed, the on-site retention ponds will be removed and a permanent detention pond constructed. The upstream basins will be cut off at 98th Street when upstream improvements are constructed. The storm drain in Volcano Road will be required to convey the offsite developed basin 12D-4 with a developed runoff flow of 52.60 cfs and the controlled discharge from the site of 56.31 cfs, which is a total of 108.91 cfs.

Future Solution

The developed future basins are based on the City of Albuquerque's long range storm sewer plan for the 98th Street and I-40 area. According to this plan, the site is located within



City of Albuquerque Developed Basin Map Sub-basins for Storm Sewer Analysis

Basin 12D (see attached developed offsite basin map). Basins 10D and 11D are routed through Basin 12D. Basin 10D and 11D are located northwest of the site between 98th Street and I-40. Basin 12D includes the area north of the site all the way to I-40. These three basins flow to a proposed 66" storm drain in 90th Street.

The original hydrology for the proposed storm drain in 90th Street estimated the flow from Basins 10D, 11D, and 12D to be 364 cfs. New hydrology for the area estimates the developed runoff for the area as 595 cfs. The proposed 66" RCP in 90th Steet was designed using the old hydrology and will not have capacity for the new runoff flow of 595 cfs. The City of Albuquerque has made no provisions for the discrepancy. For the purposes of this report, we have assumed each tract will be required to detain the difference in flows onsite. A portion of each basin is right-of-way belonging to the State Highway Department. This ROW is undeveloped with no improvements planned. This land cannot be expected to detain the difference in flows. The undeveloped right-of-way will discharge a total of 63.09 cfs. This leaves 300.70 cfs for the developable portion of the basins to discharge. There is a total of 146.94 developable acres in the three basins. This will be an allowable discharge of 2.05 cfs/acre, not including the ROW which will discharge the existing undeveloped flow rate. The allowable discharge rate includes street flow from streets within and adjacent to each parcel.

This offsite flow must be routed around the site in a storm sewer system located within the public streets. A 48" RCP storm sewer in Bluewater west of 94th Street will collect the offsite flows from the north, which includes Basins 10D, 11D, and 12D-2 and the ROW areas. This is a total developed flow of 152.49 cfs. The storm drain in Bluewater will connect to a proposed 48" RCP storm sewer in 94th Street. The storm drain in 94th Street will connect to a 54" storm drain Avalon. This system will convey the developed flows from the RV Park, Basin 12D-6 and Basin 12D-1, located south of Bluewater Road and north of Avalon Road, and also the incoming flows from the Bluewater storm drain. The Avalon storm sewer will convey a total

of 219.32 cfs from the developed upland basins and the RV park. The 54" storm drain in Avalon will flow east to 90th Street. A second storm drain located west of 94th Street in Bluewater will convey the 14.66 cfs from Basin 12D-3 via a 24" pipe to 90th Street. At 90th Street the 60" RCP storm drain will flow south until it connects with the proposed 66" storm sewer located at the intersection of 90th Street and Volcano Road.

The storm sewer in Volcano Road will collect the flow from the west of the site. The developed offsite basin 12D-3 has a developed runoff of 52.60 cfs. A 48" RCP storm drain in Volcano Road will collect the developed flows from Basin 12D-3. This storm drain has been sized for the offsite undeveloped flow rate of 174.18 and will have capacity for the 52.60 of developed future offsite flows.

When the temporary on-site retention pond is removed, the developed flows from the mobile home park will drain to the storm drain in Volcano Road. The 48" RCP storm drain will contain 108.91 cfs at this point. The 60" RCP in north 90th Street will connect to the storm drain in Volcano and a total of 364.31 cfs will continue to drain east in a 66" RCP in Volcano Road to south 90th Street. This storm sewer will connect to the proposed 66" storm sewer in 90th Street and the flows conveyed south to the eventual outfall.

On-Site Drainage Management Plan

The proposed drainage solution is to route the onsite runoff to three temporary retention ponds located onsite. One retention pond (Pond 1) will be located on the future RV park site. The other two ponds (Ponds 2a and 2b) will be located on the proposed mobile home park site. The undeveloped offsite runoff from basins 108 and 112b will be ponded in the mobile home park site in the onsite retention pond (Ponds 2a).

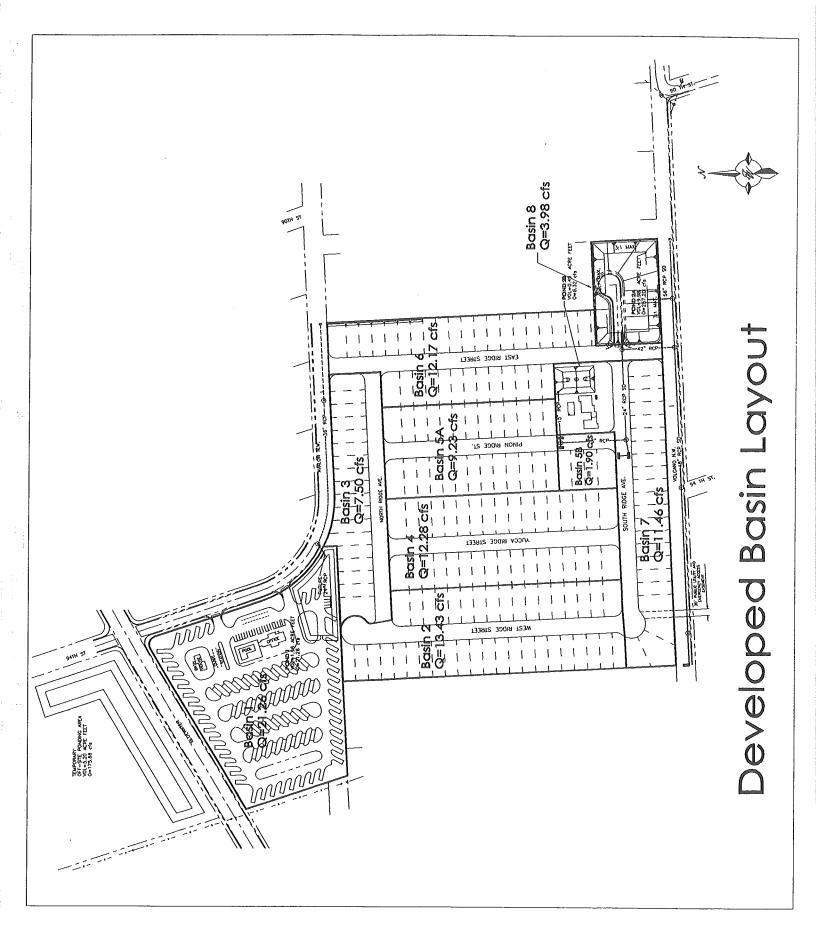
In the future, the developed flows from offsite basins Basin 103, 108, and 109 will be intercepted by Interstate 40 and 98th Street. The offsite developed runoff from basins 112a

and 113a will be included in the developed basin 12D-2 captured in a proposed storm drain in Bluewater Road. The offsite developed runoff from basin 112b will be part of the developed basin 12D-4 and will be conveyed by the proposed 48" storm drain in Volcano Road to a proposed 66" storm drain in 90th Street. At this time the temporary onsite retention ponds (Ponds 2a and 2b) will be removed and a permanent detention pond constructed. The mobile home park will drain to the proposed storm sewer in Volcano Road. The onsite retention pond (Pond 1) in the RV park will also be removed and a permanent detention pond constructed in its place. The RV park will drain to a proposed 60" storm drain in Avalon Road.

The site contains eight on-site proposed basins. The basins, the runoff values and the ponding location are shown in the following table.

Basin	Runoff (cfs)	Location	
1	21.26	Pond 1	
2	13.43	Pond 2a	
3	7.50	Pond 2a	
4	12.28	Pond 2a	
5a	9.23	Pond 2b	
5b	1.90	Pond 2a	
6	12.17	Pond 2a	
7	11.46	Pond 2a	
8	3.98	Pond 2a	

Basin 1 consists of the future proposed RV park and will drain to a proposed temporary retention pond (Pond 1) located in the southeast corner of the basin. Basin 1 has 21.26 cfs of developed runoff flow. Pond 1 will have a capacity of 1.9842 ac-ft which is greater than the required capacity of 1.8073 ac-ft. In the event of an emergency, the runoff will overflow from a 20.50 foot wide spillway. When the area is fully developed the retention pond will be removed and a permanent detention pond constructed. The detention pond will drain to a proposed 60" RCP storm drain in Avalon Road. The storm drain in Avalon Road has been designed to carry



the developed controlled flows from the RV park, the developed flows from the upstream basin 12D-1 and 12D-6 and the incoming flows from the Bluewater storm sewer.

The on-site basins 2 thru 8 consist of the mobile home park and will drain to the two proposed retention ponds (Pond 2a and Pond 2b) located in the southeast corner of the mobile home park. A proposed 24" RCP storm drain system in South Ridge Avenue will collect the flows from the site and convey them to retention Pond 2a. An eight foot channel will transport the flows that are not intercepted by the proposed 24" RCP storm drain system into Pond 2a. A total of 65.6 cfs will be retained from the mobile home park in Pond 2a. An 18" RCP pipe with a 13" orifice plate in Pinon Ridge Street will convey 6.32 cfs from Basin 5A into Pond 2b. The remaining flow from Basin 5A will drain to Pond 2a. When the retention ponds are removed the 18" storm drain will connect to the 24" RCP storm drain in South Ridge Street and eventually drain to the proposed 48" RCP in Volcano Road.

Summary

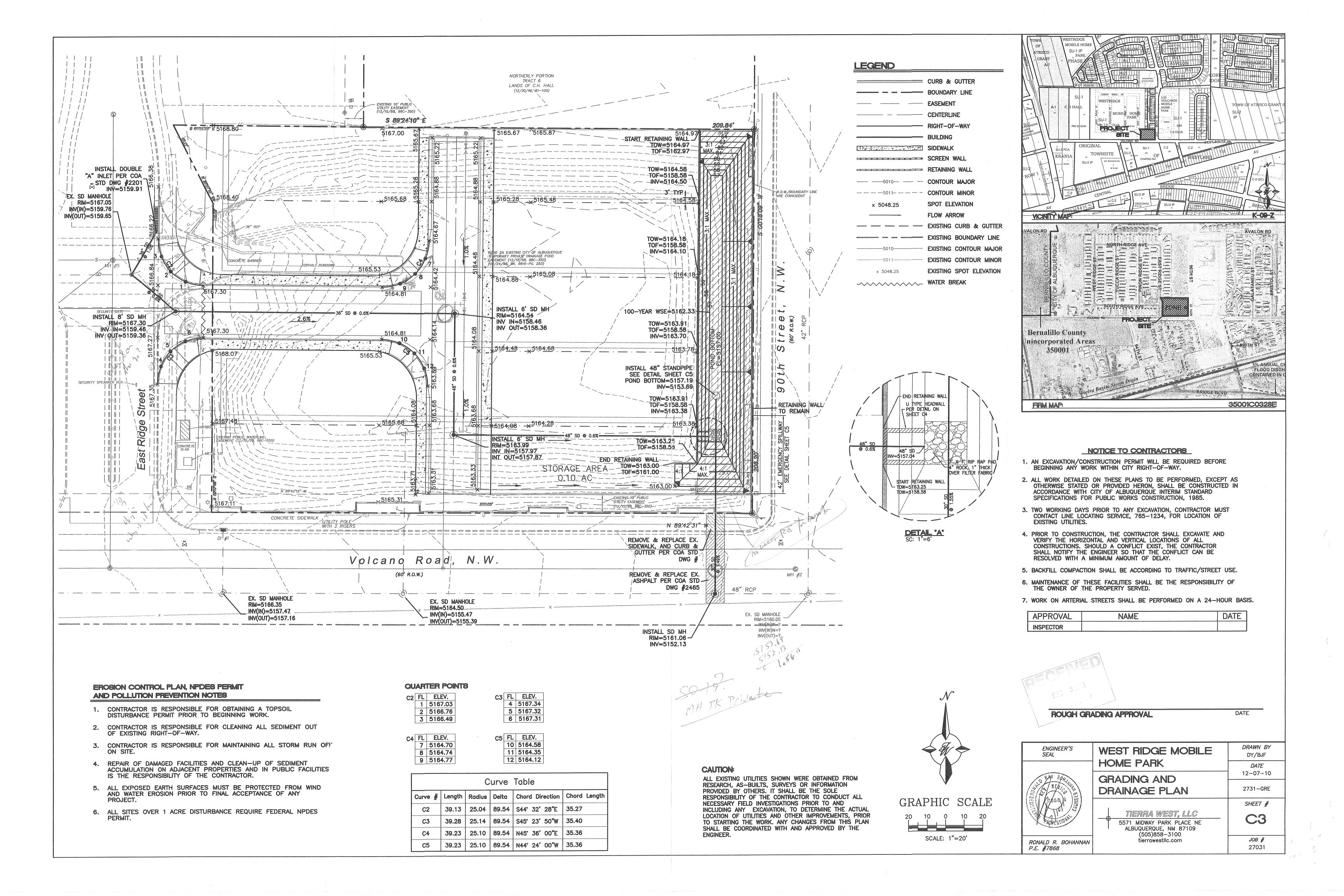
Basin 1 consists of the RV park and a total of 21.26 cfs will be ponded in a proposed on-site retention pond. Basin 2 thru 8 consist of the mobile home park and will be ponded in two proposed on-site retention ponds. When downstream improvements are constructed the retention ponds will be removed and permanent detention ponds constructed.

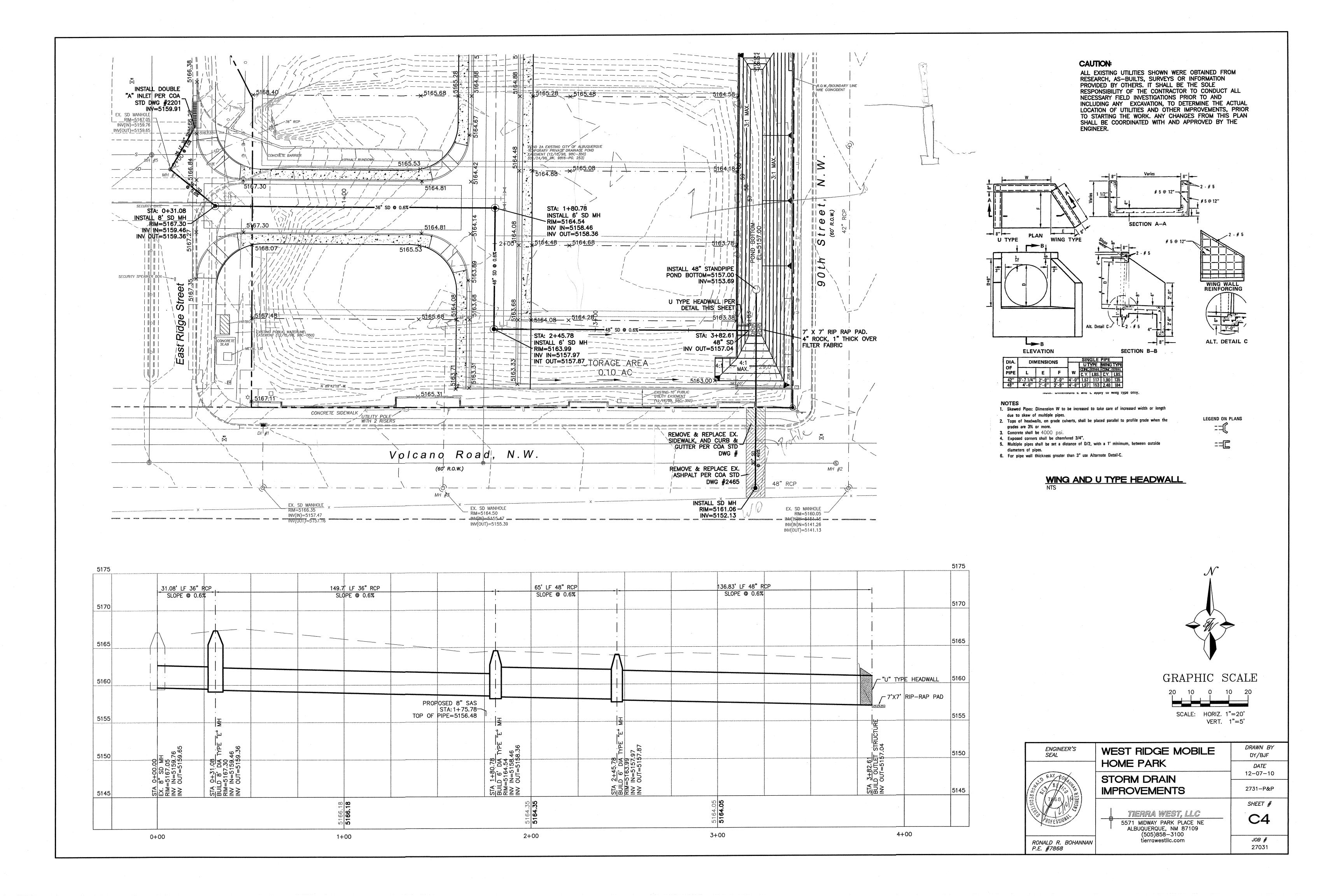
The offsite flows from the northwest (Basins 103, 109, 112a, and 113a), will be ponded in a temporary retention pond located north of Bluewater Road (Pond 3). When upstream improvements are constructed the offsite flows will be cut off at 98th Street and the retention pond removed. The storm drain in Bluewater will be designed the convey the offsite developed basin east and north of 98th Street.

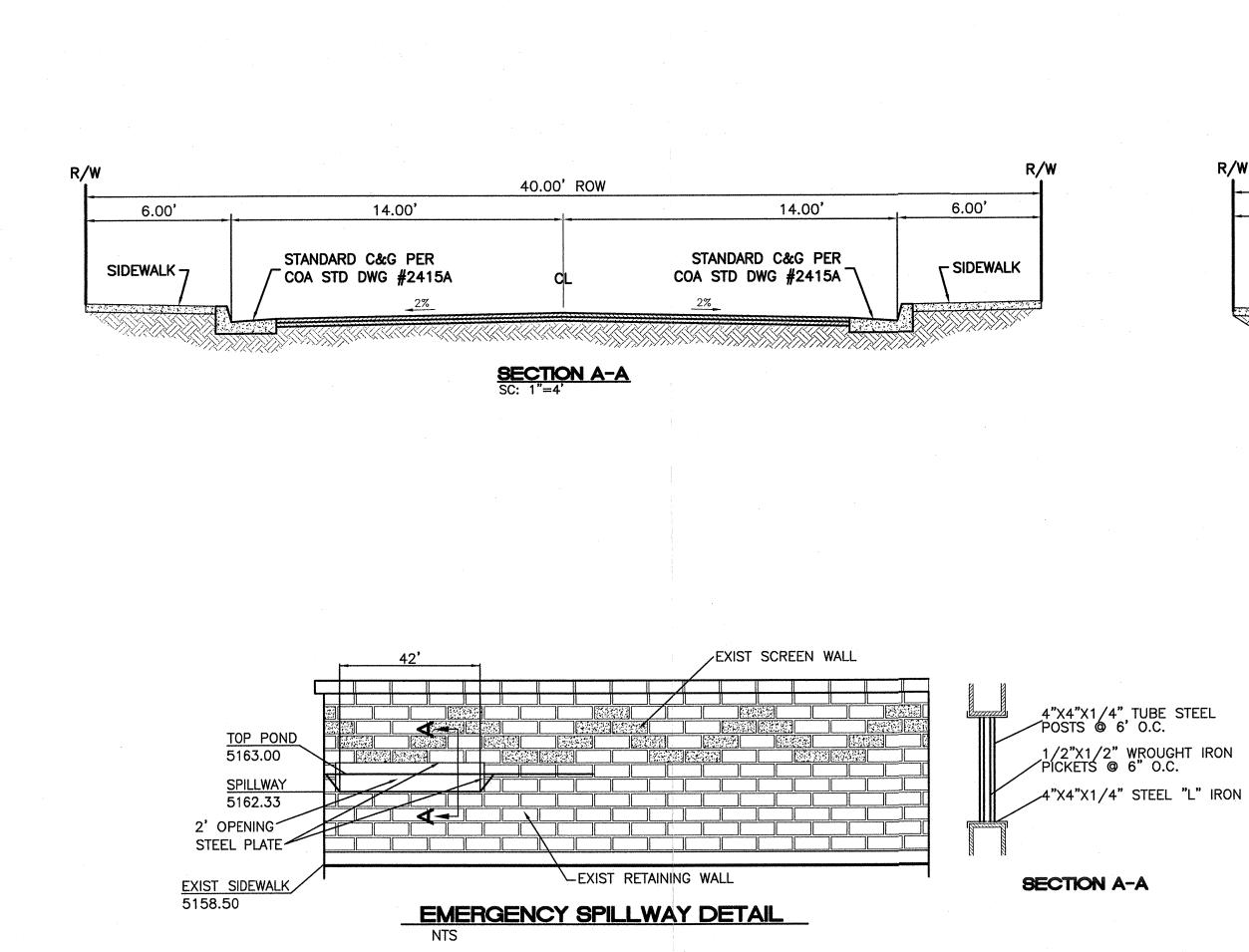
The offsite flows from the west (Basins 108, and 112b), will be retained in the two proposed retention on-site ponds in the mobile home park (Pond 2a and 2b). When

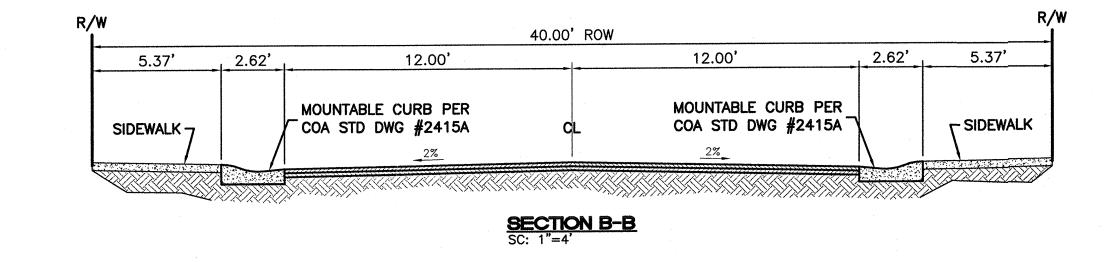
detention pond constructed. The site will discharge to Volcano Road at a controlled rate. The developed flows from the west will be cut off at 98th Street and the developed flows from east of the site will be conveyed via the 48" RCP pipe in Volcano Road. Storm drains in Bluewater and Avalon will convey the flow from the developed basin (Basin 12D) to the proposed 66" storm drain located at 90th Street and Volcano.

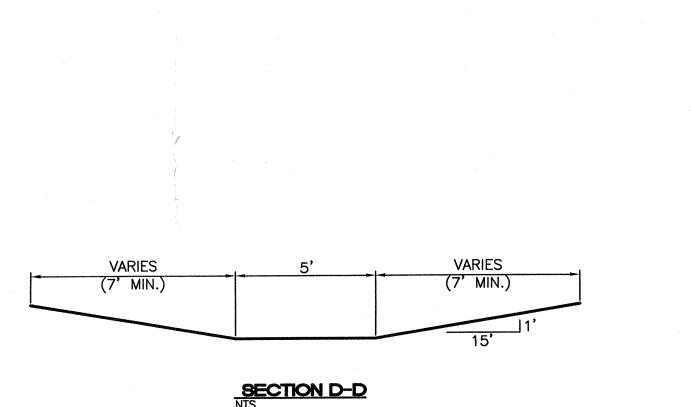
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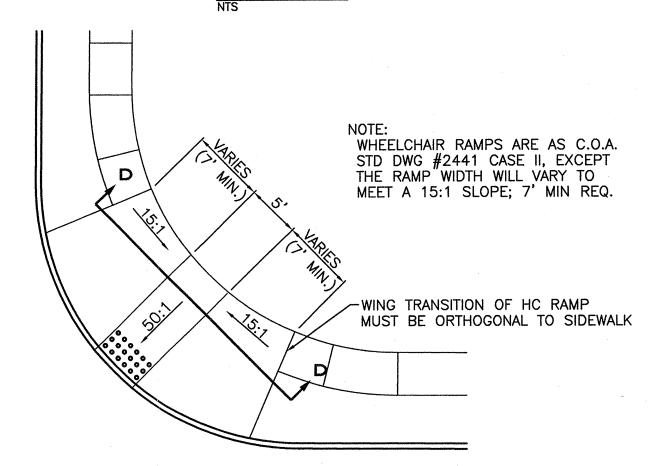




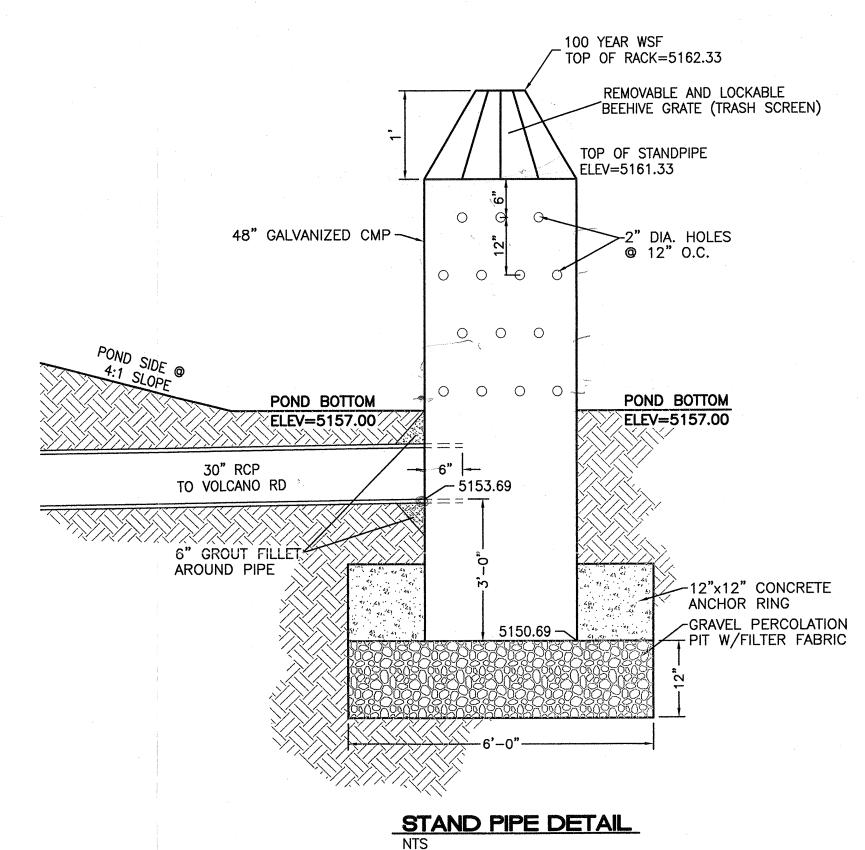


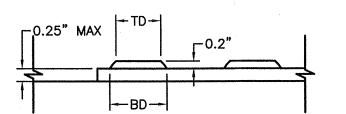






WHEELCHAIR RAMP DETAIL (TYP.)
NTS



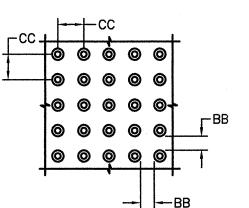


DOME SECTION

BD - BASE DIAMETER 0.9" MIN

TD - TOP DIAMETER 50% OF BD MIN TO

65% OF BD MAX



DOME SPACING

CC - CENTER TO CENTER SPACING

2.35"

BB - BASE TO BASE SPACING

1.48" MIN

SEE TABLE GROUT SOLID 4" WEEP HOLE 10' O.C. OPEN JOINTS BW-BOTTOM OF WALL AT FINISH CRAPE 2+1/2" (8" WALLS) 3" (12" WALLS) T 1 CU.FT GRAVEL PACKED DRAIN	8' MAXIMUM	TW PER PLAN TW PER PLAN TW PER PLAN TW SCREEN WALL DURO WALL EVERY OTHER COURSE TW TOP OF WALL AT FINISH GRADE TIE #4 BARS ON 24" O.C. MIN. 12" GROUT SOLID BOND BEAM 2+#5 BARS WATER PROCEING	(ISTIN
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 ALL CONCRETE IS TO BE 4000 PSI @ 28 DAYS. MINIMUM COMPACTION UNDER FOOTINGS IS TO BE 95% PER ASTM. D 1557 FOR A DEPTH OF 12" MOISTURE CONTENT IS TO BE ± 2.0%. BACK FILL AGAINST WALLS IS TO BE HAND—PLACED AND COMPACTED. ALL BARS ARE TO BE GRADE 60, ASTM 615. TRUSS TYPE DUR—O—WALL EVERY OTHER COURSE. DOWELS SHALL BE AT LEAST EQUAL IN SIZE AND SPACING TO V—BARS, SHALL PROJECT A MINIMUM OF 30 BAR DIA. INTO THE FILLED BLOCK CORES, AND SHALL EXTEND TO THE TOE OF THE FOOTING. PROVIDE KEY FOR 8" AND 12" WALLS WHERE H EXCEEDS 6'—8. USE EITHER EXPANSION JOINTS ON 20' CENTERS OR PILASTER EVERY 16'. BOND BEAM. 1—#4 BARS FOR WALLS UNDER 3'—4", 2—#4 BAI
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9. BOND BEAM, 1-#4 BARS FOR WALLS UNDER 3'-4", 2-#4 BAF FOR WALLS UNDER 5'-4", 2-#5 BARS FOR WALLS OVER 5'-4"

8 INCH REINFORCED CONCRETE MASONRY WALL

H A B T Y-BARS X-BARS

ENGINEER'S SEAL	WEST RIDGE MOB HOME PARK
RAY BOHANA	DETAILS
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RONALD R. BOHANNAN P.E. #7868	tierrawestllc.com

DRAWN BY DY/BJF

DATE 12-07-10

2731-DETAILS

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