City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

December 13, 2002

D. Mark Goodwin, PE
Mark Goodwin & Associates
P.O. Box 90606,
Albuquerque, NM 87199

Re: Vista del Norte North Pond Drainage Report
Engineer's Stamp dated 12-1-03, (D16/D2)

Dear Mr. Goodwin,

Based upon the information provided in your submittal dated 12-3-03, the above referenced plan is approved for Work Order. Any minor comments can be addressed at DRC.

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

Sincerely,

Bradley L. Bingham, PE
City Hydrologist

C: file

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE MASTER PLAN
FOR
VISTA DEL NORTE SUBDIVISION

Prepared for:
Sundt Corp
4101 E. Irvington
Tucson, AZ 85726

RECEIVED
MAR 20 1998
HYDROLOGY SECTION

D-14/D002

Prepared by:
AVID Engineering, Inc.
5801 Osuna Rd, Suite 200
Albuquerque, NM 87109

March 1998

DAVID B. THOMPSON
REGISTERED PROFESSIONAL ENGINEER
9677
3-19-98

INTRODUCTION AND SITE LOCATION

The proposed Vista del Norte Subdivision, located in the lower northeast heights, is zoned SU-1 for mixed uses including single family residential, townhomes, multi-family residential, commercial, industrial, and neighborhood park uses (see Figure 1). The 408 acre subdivision is bounded by Osuna Road and developed commercial properties (Sego-Cox subdivision) on the south; primarily developed residential and industrial properties on the west; Paseo Del Norte and Way-Cor concrete plant on the north; and the AMAFCA North Diversion Channel on the east. This report will serve as the Drainage Master Plan for the entire subdivision and specific drainage plan for Phase 1, identifying major infrastructure required to handle the 100-year storm runoff so that the subdivision can be developed. As each tract develops, individual drainage reports, following the concepts described in this report, will be submitted for approval.

This report addresses the ultimate drainage solution and major drainage infrastructure as well as the phasing of the development and required drainage improvements for each phase of development. Included with this report is a mass grading plan for the entire property that will be used to rough grade the site.

METHODOLOGY

The hydrologic and hydraulic criteria in Section 22 of the City of Albuquerque Development Process Manual (DPM), entitled "Drainage, Flood Control, and Erosion Control," was followed to perform the analyses given in this report. The design storm used for both the existing undeveloped and fully developed conditions of Vista del Norte is the 100-year, 24-hour storm event for peak flow computations and for ponding volume calculations.

A hydrologic computer model using AHYMO 194 was developed for both existing and fully developed conditions to determine both the peak flows and peak volume expected for the development. A detailed sediment analysis was performed for both existing conditions and fully developed conditions following the methods described in Section 3.3 of the "Sediment and Erosion Design Guide" by AMAFCA. Finally, a hydraulic grade line (HGL) analysis of the entire storm sewer collection system was performed to assist in the sizing of the infrastructure.

EXISTING DRAINAGE CONDITIONS

INTRODUCTION

The Vista del Norte subdivision site is currently zoned SU-1. Presently Cal-Mat leases the site and utilizes it as an open-pit sand and gravel mine. All runoff generated on-site is

LAND USE	ACRES
RA-2 uses (3 du/ac)	20.0
R-1 uses (4 du/ac)	182.0
Mixed Residential uses (R-T, R-LT, and R-2)	122.6
C-2 uses	29.0
I-P uses	25.0
Neighborhood Park	6.5
Landscape Trail Easement	7.0
Setback Area	3.0
Drainage Pond (I-P uses)	10.0
TOTAL ACRES/DU'S	**405.0**

Park dedication required - 6.5 Acres

Landscape Trail Easement shall be 25' in width

Setback Area shall be a minimum of 15' in width

NOTES

1. Tracts B, C, D, E, F, K, and I: Uses permissive and as regulated by the R-1 zone, except that a 5' sideyard setback is permitted regardless of lot orientation.

2. Tracts L, G, H, and J: A mix of uses permissive and as regulated by the R-T, R-LT, and R-2 zones. Maximum of 50 acres of R-2.

3. Tract M: Uses permissive and as regulated in the C-2 zone, except that alcoholic drink sales for consumption off-premise within 500 feet of a residentially zoned property shall be permissive with the following exception:

   A. No drive-up liquor sales shall be allowed

   Tract N: Uses permissive and as regulated in the C-2 zone, except that alcoholic drink sales for consumption off-premise within 500 feet of a residentially zoned property shall be permissive with the following exceptions:

   A. No drive-up or drive-thru windows are permitted

   B. Liquor sales from gas stations or convenience stores are not permitted

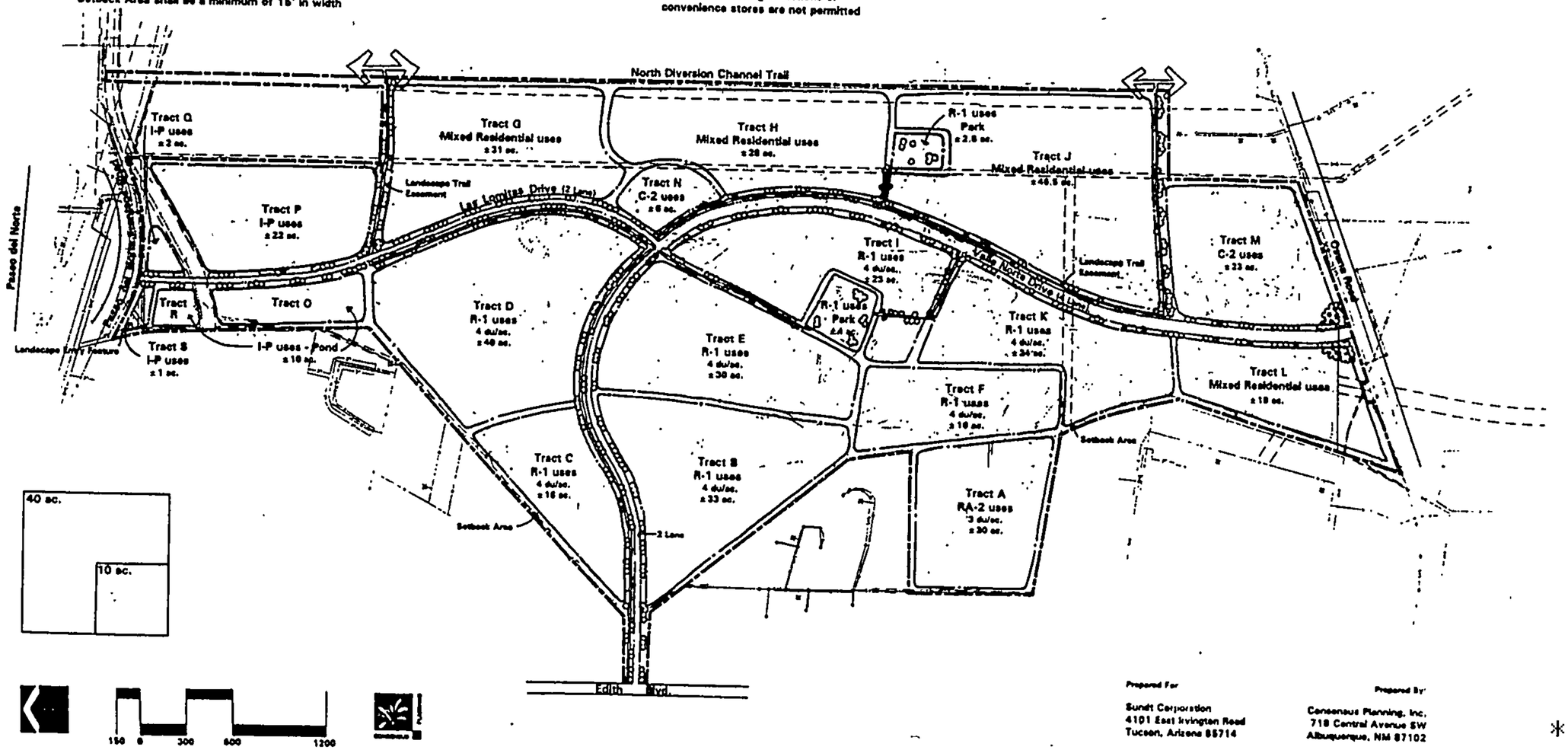
4. Tracts O, Q, R, and S: Uses permissive and as regulated in the I-P zone, except no uses requiring air pollution control permits shall be allowed.

5. Tract P: Uses permissive and as regulated in the I-P zone, except no uses requiring air pollution control permits shall be allowed.

6. Zoning of the entire 405 acre site is "SU-1 for Limited Mixed Uses" to include sand and gravel extraction under specific restrictions, followed by the phasing-in of other land uses as shown on this Plan.

Land Use and Zoning Plan

Vista del Norte



Prepared For

Sundt Corporation
4101 East Irvington Road
Tucson, Arizona 85714

Prepared By

Consensus Planning, Inc.
718 Central Avenue SW
Albuquerque, NM 87102

November 29, 1995

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FIGURE 1.

retained by an earth berm that is constructed along the perimeter of the property. The open-pit mining operation has excavated several holes in the site topography. Due to the nature of the site's present use, vegetation is scarce. Once the site is mass-graded, the property will be reclaimed. The AMAFCA North Diversion Channel adjacent to the east property line diverts off-site runoff from the site's historic arroyo's. As a result, no significant drainage courses traverse the site.

OFF-SITE FLOWS

Two tracts of land contribute off-site flows to Vista del Norte. These properties are the Sego-Cox commercial subdivision to the southeast corner of the property and the Way-Cor concrete plant located at the northeast corner of site. First, the 10 acre Sego-Cox subdivision adjacent to the southeast corner of the site discharges 47 cfs peak flows, contributing a total runoff volume of 2 acre-feet. This flow rate and volume were calculated by assigning 92% of the site to a type "D" land treatment (impermeable), with the remaining 8% assigned to a type "B" land treatment. Additionally, the 22.4 acre site of the Way-Cor concrete plant discharges 99.45 cfs peak flows contributing a total runoff volume of 4.1 cfs acre-feet from the 100-year storm event. This flow rate and volume were calculated treating the property as an industrial site with 80% type "D" and 20% type B land treatment.

ON-SITE FLOWS

For the existing conditions hydrologic analysis, a type "C" land treatment was used to determine peak flows and peak volumes. The on-site drainage basin boundaries coincide with each tract boundary so that peak flows from each tract can be determined. Table 1 shows the peak flows and volumes for each basin under existing conditions. All peak flows include sediment bulking.

Table 1 Existing Drainage Conditions

BASINS	Area (acres)	100yr-24hr Peak Flow (cfs)	100yr-24hr Runoff Volume (acre-ft)	Sediment Bulking Factor	Land Treatment
A	19.94	66.30	1.97	1.07	100%C
B-1	17.92	60.43	1.82	1.10	100%C
B-2	17.28	58.27	1.75	1.10	100%C
C	17.06	56.21	1.67	1.06	100%C
D	42.67	141.78	4.21	1.07	100%C
E-1	17.60	59.35	1.78	1.10	100%C
E-2	17.00	57.41	1.72	1.10	100%C
F	17.43	58.71	1.76	1.09	100%C
G	31.63	105.95	3.14	1.08	100%C
H	24.06	80.41	2.42	1.09	100%C
I	17.28	58.28	1.75	1.10	100%C
J	48.17	169.19	5.01	1.13	100%C
K	15.74	52.61	1.58	1.09	100%C
L	19.16	66.50	1.97	1.09	100%C
M	23.71	80.09	2.38	1.12	100%C
N	6.54	21.28	.63	1.05	100%C
O	7.93	25.86	.77	1.05	100%C
P	23.96	78.73	2.34	1.06	100%C
Q	3.14	10.81	.32	1.11	100%C
R	2.55	8.75	.26	1.10	100%C
S	1.27	4.26	.13	1.07	100%C
Park "A"	2.50	8.14	.24	1.05	100%C
Park "B"	4.00	13.14	.39	1.05	100%C
Sego-Cox	10.00	46.92	1.96	1.06	8%B, 92%D
Way-Cor site	22.41	99.45	4.09	1.07	20%C, 80%D
West	1.60	5.17	.15	1.04	100%C

SEDIMENT ANALYSIS

A detailed sediment analysis was performed for existing conditions following the methods described in Section 3.3 of the "Sediment and Erosion Design Guide" by AMAFCA. First, the sediment wash load was computed for each basin using the Modified Universal Soil Loss Equation (MUSLE) as shown in the AMAFCA Sediment Guide. Input parameters of the MUSLE equation were determined for each basin following the procedure given in Appendix B of the AMAFCA Sediment Guide. Next, the coefficients and exponents for the unit bed load power function equation (equation 3.41 in the AMAFCA Sediment Guide) were determined using Figure 3.10 in the AMAFCA Sediment Guide inputting an average D_{50} for the site. Table 1 shows the results of the sediment analysis under existing conditions. Peak bulking factors range from 1.04 to 1.13 under existing conditions.

Figure 2 is a reproduction of the SCS soils maps showing the location of the various soils units within the subdivision. The FEMA floodplain maps, shown in Figure 3, do not indicate the presence of any floodplains on or near the site, other than the North Diversion Channel east of the site.

DEVELOPED DRAINAGE CONDITIONS

DRAINAGE BASIN DELINEATION

The site is divided into three major drainage basins, a north basin, a middle basin, and a south basin (see Plate 1). Each of the major basins drain to a detention pond. The north basin detention pond outlets to the North Diversion Channel east of the property via a stormwater pump station. The middle basin detention pond drains by gravity through a stormsewer system to the middle basin detention pond, which in turn drains to the south detention pond via a stormsewer. The south basin detention pond, located offsite to the west of the development within Bernalillo County, discharges to the Edith Boulevard Detention Pond No. 6 located near Bear Canyon Lane. These major basins are divided into several subbasins that generally follow the layout of the tracts. Generally, each subbasin fronting a major street (Valle Norte Drive and Las Lomitas Drive) includes one-half of the street right-of-way for the basin characteristics. Park "A" and Park "B" basins are the two exceptions. These two park basins comprise 6.5 acres that will be dedicated as neighborhood parks. Plate 1 displays the major basins and each of their subbasins.

The north basin consists of the on-site parcels north of Valle Norte Drive and includes the off-site subbasin of the Way-Cor concrete plant. The middle basin mostly includes the tracts south of Valle Norte Drive and west of Vista del Norte Drive in the middle of the development. The south basin includes most of the tracts at the south end of the development and the off-site basin of the Sego-Cox subdivision. There is one basin, the west basin, where on-site ponding will be allowed. The west basin, which is the west entrance from Edith Boulevard, is located mostly in Bernalillo County and is much lower in elevation than the rest of the development. Therefore, the west basin will pond the runoff adjacent to the entrance road just east of Edith Boulevard.

HYDROLOGIC ANALYSIS

To determine the peak flows and runoff volumes of each subbasin an AHYMO analysis was performed in accordance to section 22.2 of the Development Process Manual (DPM.) The analysis included the 100-year 24-hour storm. The 100-year 24-hour storm was the basis for determining peak flows to size the storm sewer collection system and was used to determine the required capacity of the detention and retention ponds. The design storm values are based on Tables C-1, C-2, and C-3 of the DPM's section 22.2. The Vista del Norte subdivision site is contained within sections D-16-Z and E-16-Z of the City of

Albuquerque Zone Atlas Map. The location of the site results in the following design storms:

100-year 1-hour event -- 2.00 inches,
100-year 6-hour event -- 2.30 inches,
100-year 24-hour event -- 2.60 inches.

Subbasins were assigned land treatment values in accordance with Tables A-4 and A-5 of the DPM's section 22.2. The off-site basins were assigned the land treatments discussed in the existing drainage conditions. The Vista del Norte subdivision consists of many tracts with a variety of land uses. Mixed residential tracts are governed by R-T, R-LT, and R-2 zoning, with a maximum of 50 acres zoned R-2. Since R-2 has a high percentage of land treatment type "D" (impervious), it was assigned to the mixed residential tracts at the upstream end of the stormsewer where it would have the greatest impact to the stormsewer collection system. The remaining mixed residential land was proportioned one-half R-LT and one-half R-T. A second analysis with the 50 acres of R-2 placed downstream near the ponding site required nearly the same pipe sizes throughout the stormsewer system. Table 2 shows the land treatments and areas for each subbasin within the north, middle, and south basins.

For basins smaller than 40 acres, the time of concentration was determined according to subsection A.6 of the DPM section 22.2. All of the basins, except for basins B and D, are smaller than 40 acres; therefore, they were assigned a time of concentration of 0.20 hr. The time of concentration for basins B and D was calculated using the SCS Upland Method Calculated outlined in subsection B.2 of DPM section 22.2. Appendix B presents these calculations.

SEDIMENT ANALYSIS

After the subbasin peak flows were calculated a sediment analysis in accordance with AMAFCA's Sediment and Erosion Design Guide was performed for each subbasin. The same procedure that was described earlier for existing conditions was followed for the developed conditions. The bulking factor applied to the subbasin peak flows (shown in Table 2) ranged from 1.03 on the smaller flatter subbasins to a high of 1.13 on the larger steeper subbasins. These values are conservative considering bed material load is unlikely to occur in fully developed tracts with stormsewer systems. The calculations leading to these bulking factors are in Appendix A.

Table 2 Developed Drainage Conditions

BASINS	Area (acres)	100yr-24hr Peak Flow (cfs)	100yr-24hr Runoff Volume (acre-ft)	Sediment Bulking Factor	Land Treatment
North Basin Subbasin	—	—	—	—	—
C	17.06	61.68	2.25	1.06	58%B, 42%D
D	42.67	134.85	5.68	1.07	58%B, 42%D
G	31.63	123.48	4.77	1.09	44%B, 56%D
H	24.06	94.85	3.66	1.10	44%B, 56%D
N	6.54	30.07	1.26	1.05	10%B, 90%D
O	7.93	22.80	0.75	1.05	80%B, 20%D
P	23.96	105.28	4.33	1.06	20%B, 80%D
Q	3.14	14.46	0.59	1.11	20%B, 80%D
R	2.55	11.70	0.48	1.10	20%B, 80%D
S	1.27	5.70	0.23	1.07	20%B, 80%D
Way-Cor site	22.41	99.45	4.09	1.07	20%B, 80%D
Middle Basin Subbasins	—	—	—	—	—
B-1	17.92	63.42	2.36	1.10	58%B, 42%D
B-2	17.28	61.15	2.27	1.10	58%B, 42%D
E-1	17.60	62.29	2.31	1.10	58%B, 42%D
E-2	17.00	60.25	2.24	1.10	58%B, 42%D
F	17.43	61.61	2.29	1.10	58%B, 42%D
I	17.28	61.18	2.27	1.10	58%B, 42%D
½ J	24.09	110.35	4.54	1.13	23%B, 77%D
Park "A"	2.50	7.08	0.23	1.04	80%B, 20%D
Park "B"	4.00	11.59	0.38	1.05	80%B, 20%D
South Basin Subbasins	—	—	—	—	—
A	19.94	65.37	2.33	1.06	65%B, 35%D
½ J	24.09	110.35	4.54	1.13	23%B, 77%D
K	15.74	55.21	2.05	1.09	58%B, 42%D
L	19.16	81.63	3.28	1.09	20%B, 80%D
M	23.71	116.30	4.88	1.12	10%B, 90%D
Sego-Cox	10.00	46.92	1.98	1.06	8%B, 92%D
Other Basins	—	—	—	—	—
West	1.60	6.85	0.28	1.03	20%B, 80%D

DRAINAGE MASTERPLAN CONCEPT

Introduction

This drainage report addresses the drainage concept for the fully developed condition of Vista del Norte. Also, this report addresses the interim drainage concepts and infrastructure required for each phase of development of the project.

The ultimate drainage masterplan concept for the Vista del Norte subdivision is to collect storm water runoff from each basin in a stormsewer system and discharge the stormwater into detention ponds, which are either discharged into the North Diversion Channel through a stormwater pump station or discharged to the County Maintained Edith Boulevard Drainage System (see Plate 1, Drainage Plan). There is one basin, the west basin, where the 100-year, 10-day storm will be allowed to pond on-site with no outlet. Runoff from the west basin, located mostly in Bernalillo County, will be retained in a pond located along the north side of the entrance road. The 100-year, 10-day storm for the west basin is 0.58 acre-feet.

As mentioned previously, the site is divided into three major drainage basins, the north basin, the middle basin, and south basin. These major basins have separate stormsewer systems draining into detention ponds. A stormwater pump station, constructed to City of Albuquerque standards, will evacuate the north detention pond within 24 hours by discharging approximately 16 cfs into the North Diversion Channel. Preliminary discussions with AMAFCA have indicated that discharging the stormwater into the North Diversion Channel is feasible, but will need to be approved by both AMAFCA and the Corps of Engineers. City of Albuquerque stormwater pump maintenance personnel have indicated that if the proposed pump station is designed and constructed to City of Albuquerque criteria, the City will take over maintenance of the facility.

The middle basin detention pond, located on Tract B-2, drains to the south basin detention pond through a 24" stormsewer. The south basin detention pond, which accepts flows from both the middle detention pond and directly from the south drainage basins, is located west of Vista del Norte within Bernalillo County. The south basin detention ponds are discharged through a 24" stormsewer in Edith Boulevard at a rate of 7.5 cfs to the Edith Boulevard Detention Pond No. 6. According to the "Edith Boulevard Drainage Analysis Report" by Boyle Engineering, the Edith Boulevard Detention Pond No. 6 has a discharge of 7.5 cfs to the Alameda Drain adjacent to 2nd Street.

The South Detention Pond is a series of five detention ponds that are connected through an 18 inch pipe with stand pipe inlets in each pond. Each of the five detention ponds has an overflow spillway, sized to pass the 100-year peak flow, to the next pond down stream. The most downstream pond has a stand pipe that drains to a 24 inch stormsewer, located in the Edith Boulevard Right-of-Way on the east side of the road, which drains to Edith Boulevard Detention Pond No. 6.

An AHYMO analysis of the Edith Boulevard Detention Pond No. 6 was completed. According to the Boyle report, Basin 13 drains directly into Pond 6. The analysis indicated that the pond did not have enough capacity to detain the runoff from Basin 13. Therefore, the capacity of Pond 6 was increased to accommodate the additional runoff volume that drains to the pond using AHYMO instead of the HEC-1 hydrologic model, which was used by Boyle. The pond will require regrading to allow for the detention of additional stormwater volume without overtopping the emergency spillway (see Plate 4).

Storm Sewer Hydraulics Analysis

Once the hydrologic and sediment analysis were completed, a hydraulic grade line (HGL) analysis was performed to size the proposed stormsewer pipes. The HGL was analyzed in accordance with the DPM's criteria for the hydraulic design of closed conduits. The control water surface at the outfall of the stormsewer was equal to the 100-year water surface elevation of each of the detention ponds. The stormsewer sizes are shown on the Drainage Plan. The HGL analysis is shown in Appendix B.

Detention Pond Analysis

The next step was to analyze the outfall of the stormsewer system. The north, middle, and south drainage basins each drain to their own detention pond. The middle and south ponds are linked together with a 24 inch diameter stormsewer conveying runoff volume from the middle basin to the south pond. The pumping station in the North Detention Pond will be designed to release 16 cfs into the North Diversion Channel. The required capacity of the detention ponding system was taken from the overall site runoff volume of the 100-year 24-hour storm calculated with AHYMO. Each pond will be fenced and have 3:1 side slopes. The middle and north detention ponds do not include an overflow spillway because the available ponding volume is much greater than the 100-year, 24-hour volume for each basin. The detention pond designs will be submitted to the State Engineers Office for their review and approval. Table 4 illustrates the capacities of the detention ponds.

Stormwater Pump Station

The proposed stormwater pump station will be designed and constructed to City of Albuquerque criteria. The Claremont stormwater pump station and the Osage/La Media stormwater pump station will be used as models for the design of the Vista del Norte pump station. The proposed pump station will have redundant main pumps and sump pumps, a climber screen, a radio telemetry system, above ground control building, and one power source. The north detention pond will act as the wet well for the pump station. The north detention pond will have enough volume to store the 100-year, 24-hour volume with no outfall. The pond and pump station will be fenced and access will be obtained from Las Lomitas Drive. Prior to the design of the pump station, a Design Analysis

Report will be prepared to size all of the mechanical and electrical equipment for the pump station.

Table 3 Detention Pond Capacities

Drainage Basin	100yr-24hr Runoff Volume (acre-ft)	Pond Capacity (acre-ft)	100yr-24hr Water Surface Elevation	Comments
North	23.5	62.4	5016.10	Pump Station at Pond discharges within 24 hours.
Middle	15.4	22.4	5026.50	Discharges to South Pond.
South	18.9	38.1	Varies from 5005 to 5025	Discharges to Edith Blvd. Detention Pond No. 6.
Total Site	57.8	122.9	---	

Offsite South Detention Basin

It is proposed that Tracts 9 and 10A3, MRGCD Map 29, be constructed as a joint-use storm drainage/ park facility for the County of Bernalillo (see Plate 3, South Detention Basin Area). On January 7, 1998, a Special Use Permit was approved with conditions by the Bernalillo County Planning Commission for Recreation and Drainage Facilities. The proposed park area would include three youth soccer fields that double as storm water detention facilities during larger more infrequent storms. In addition, one small bio-filter area and three separate detention facilities would be constructed within the property that would detain the majority of storm flows from the Vista del Norte development located east of the property. The proposed plan provides a unique opportunity for the County to obtain some much-needed youth soccer fields while providing detention facilities for storm water runoff from Vista del Norte.

The property is located just north of Tyler Road between Edith Boulevard and the proposed Vista del Norte development. The plan, which is modeled after the City's Osage/La Media bio-filter and low flow ponds near Central and the Rio Grande, includes constructing a bio-filter area and as many as five storm water detention areas along the length of the property with three of the detention areas serving as youth soccer fields. The sedimentation/detention basin and bio-filter area will be maintained by the City of Albuquerque and the control release pond and three athletic fields/detention ponds will be maintained by Bernalillo County.

Storm runoff from the Vista del Norte project will be discharged into the sedimentation basin through underground storm sewers. Low flows and nuisance flows will be captured

in the sedimentation basin to drop out sediment before discharging to the bio-filter area. Flows from frequent storms will filter through the rock dam between the sedimentation pond and the upper detention basin. From the upper detention basin, a 18 inch pipe with a stand pipe inlet to control the discharge, will convey flows to the lower control release pond adjacent to Edith Boulevard, bypassing the middle three ponds/ athletic fields. The sedimentation basin, upper detention pond, and lower control release pond will detain the volume from more frequent storm events. Runoff from larger more infrequent storms will spill into the middle three ponds/ athletic fields through hard-lined emergency spillways sized to pass the 100-year storm.

The middle three ponds will have standpipes connected to the 18 inch drain pipe which drains to the control release pond. Stormwater from the control release area, located adjacent to Edith Boulevard, will be discharged via a standpipe into a 24 inch outlet pipe at a rate of about 7.5 cfs. The outlet pipe, located within the Edith Boulevard right-of-way, will run south until it discharges to the existing Edith Boulevard Pond No. 6. Edith Boulevard Pond No. 6 discharges through a pipe and natural channel to the Alameda Drain located west of Second Street. In preliminary discussions with Bernalillo County Public Works, they indicated that the Edith Pond No. 6 has plenty of capacity to accept flows from this system. It is proposed that the City would maintain the sedimentation basin, detention basin, and the bio-filter area, and the County would maintain the three detention ponds/ athletic fields, and the control release pond.

A parking area would be located approximately 1000 feet east of Edith Boulevard with access to Tyler Road through an existing 30 foot access easement. Also, a 15 foot-wide, gravel-surfaced maintenance road will be located along the north side of the detention ponds. Ramps into the sedimentation basin and into the control release pond will be constructed for access into the ponds for maintenance. The sedimentation basin and detention pond are separated by a 4 foot high rock filter dam. The rock filter dam will retain the sediment and allow the stormwater to filter through the dam. A 6 inch diameter pipe will connect the sedimentation basin at the upstream side of the facility with the bio-filter area, which is similar to the Osage/La Media bio-filter area. The bio-filter area will be planted with vegetation as suggested by Mr. Loren Meinz with City Hydrology to assist in removing pollutants in the storm water. The bio-filter area, which will be lined, will have a 2 foot deep pool of standing water. An overflow pipe will discharge out of the bio-filter area into the 18 inch drain pipe connecting the detention basins.

A geotechnical investigation was completed by Vinyard & Associates, Inc. for the offsite south detention pond area (see Appendix C). There was some concern about lateral migration of water from the detention ponds. As a result of the geotechnical investigation, it is recommended by Vinyard to line the bio-filter area with an impervious liner since it will have water most of the time. Vinyard also recommended that the bottom four feet and a ten foot thickness of the sideslopes of the detention pond areas be over-excavated and reconstructed and compacted with structural fill composed of site soils.

Phasing of Drainage Improvements

The Vista del Norte subdivision will be developed in three phases. Phase 1 will require the construction of the middle detention pond and the south detention pond and associated stormsewer system for Tracts A, F, J, K, L, and M included in Phase 1. During Phase 1, the entire site will be mass graded and reclaimed. Interim detention ponds sized to retain the 100-year 10-day storm volume from the basins not included in Phase 1 will be constructed (see Plate 2). Table 4 shows the required volume to be retained in the interim drainage ponds. Each interim drainage pond will have one foot of freeboard. The north detention pond, the stormwater pump station, and associated stormsewer system will be required to be constructed in Phase 2. Only the stormsewer system will be required to be constructed in Phase 3. A preliminary infrastructure list for Phase 1 is included in Appendix B showing the required drainage improvements.

Table 4 Interim Retention Pond Volumes

Interim Pond	Basins Draining to Each Pond	100yr-10-day Volume (ac-ft)	100yr-10-day Water Surface Elevation	Comments
Number 1	B-1, B-2, E-1, E-2, I	9.21	5029.9	3.9 foot depth
Number 2	C	1.67	5028.9	3.9 foot depth
Number 3	0.2D, 0.33G, H,N	4.91	5031.0	4 foot depth
Number 4	0.8D, 0.67G,O,P,Q, R,S,Way Cor	12.60	5027.1	7.1 foot depth (location of north detention pond)

VISTA DEL NORTE

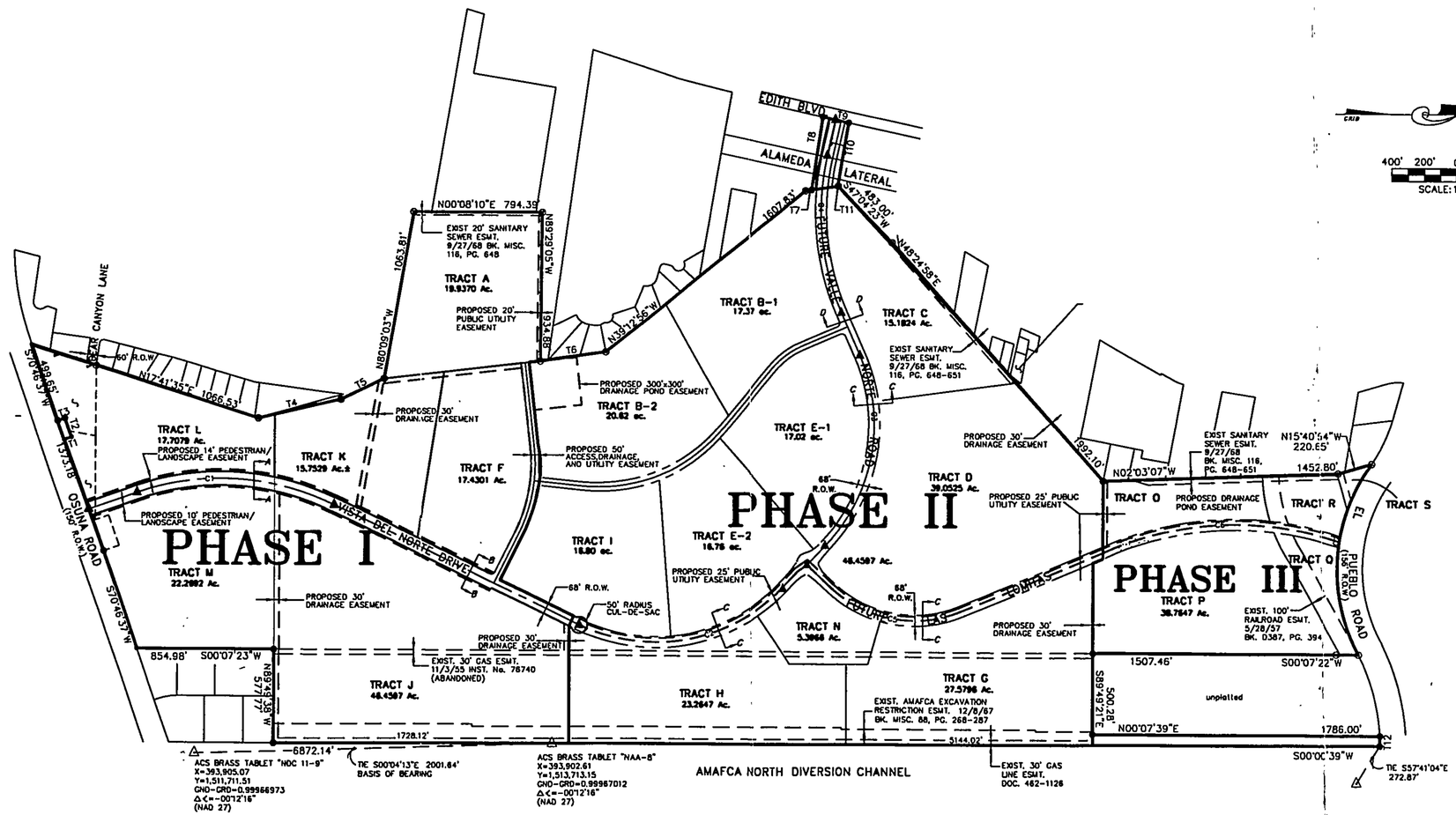
PHASING PLAN

CURVE DATA

CURVE	RADIUS	LENGTH	CHORD	BEARING	DELTA
C1	1600.00'	1265.68'	1232.94'	N03°26'20"E	45°19'26"
C2	1100.00'	1398.79'	1304.82'	N10°16'36"W	72°45'16"
C3	1100.00'	1279.21'	1206.33'	N79°58'08"W	66°37'49"
C4	1600.00'	1007.68'	991.11'	S84°45'30"W	36°05'06"
C5	750.00'	862.18'	815.48'	N10°24'48"E	65°51'55"
C6	1987.54'	1499.32'	1464.02'	S02°53'03"E	43°13'18"
C7	1104.70'	1233.12'	1170.09'	S86°39'52"E	63°57'23"

TANGENT DATA

LINE	DIRECTION	DISTANCE
T1	N19°13'23"W	45.00'
T2	S70°46'37"W	125.99'
T3	S19°13'23"E	45.00'
T4	N13°01'35"W	525.66'
T5	N26°15'18"W	293.13'
T6	N08°19'01"W	412.43'
T7	N08°02'07"W	38.26'
T8	N81°30'22"W	464.11'
T9	N12°48'03"E	164.01'
T10	S80°19'14"E	405.59'
T11	N09°09'38"W	5.06'
T12	S89°32'50"E	63.92'



LEGEND

- △ FND. CITY OF ALBUQUERQUE CONTROL SURVEY MONUMENT
- ▲
- ⊕ FND. 2" ALUM. CAP STAMPED "AGP" OR "AAR"
- ● FND. PROPERTY CORNER
- ○ #5 REBAR W/CAP STAMPED "AVID ENG. INC. NMPS 11462" TO BE SET.

****

DATE: JANUARY 1998
AVID JOB No. 8012 06

AVID ENGINEERING, INC.
Civil • Structural • Transportation
5801 Osuna Rd. NE – Suite 200
Albuquerque, NM 87109 – (505) 881-5357

SHEET NO. 1 OF 1

EXISTING SEDIMENT
ANALYSIS USING MUSLE EQUATION

BASIN	AREA SQ MI				PERCENT IMPERV	QP CFS	VOL AC-FT	WGHTD K	C	GAMMA	SLOPE %	N	LS	YS TONS	YS TONS	CS PPM	QFS WASH LOAD
A	0.03120				0%	61.96	1.840	0.100	0.45	400	0.50	0.3	0.15	27.12	27.12	10728	0.25
K	0.04000				0%	79.43	2.359	0.100	0.45	400	0.83	0.3	0.18	42.97	42.97	13225	0.40
F	0.02530				0%	50.24	1.492	0.100	0.45	400	1.00	0.3	0.20	28.06	28.06	13650	0.26
PARK B	0.00630				0%	12.52	0.371	0.100	0.45	400	0.63	0.3	0.16	4.86	4.86	9555	0.05
I	0.04480				0%	88.97	2.642	0.100	0.45	400	0.90	0.3	0.19	50.59	50.59	13894	0.47
E	0.03940				0%	78.24	2.323	0.100	0.45	400	0.31	0.3	0.13	31.42	31.42	9853	0.29
B	0.04790				0%	95.12	2.824	0.100	0.45	400	0.16	0.3	0.12	35.53	35.53	9173	0.33
L	0.02990				0%	59.38	1.763	0.100	0.45	400	0.92	0.3	0.19	32.49	32.49	13380	0.30
M	0.03700				0%	73.48	2.182	0.100	0.45	400	1.76	0.3	0.28	60.64	60.64	20040	0.57
CIBOLA	0.01560				92%	44.05	1.632	0.100	0.45	400	0.50	0.3	0.15	20.95	1.68	755	0.01
J	0.07530				0%	149.72	4.440	0.100	0.45	400	2.00	0.3	0.30	148.14	148.14	23962	1.39
PARK A	0.00390				0%	7.75	0.230	0.100	0.45	400	0.67	0.3	0.16	2.91	2.91	9219	0.03
H	0.03760				0%	74.67	2.217	0.100	0.45	400	2.10	0.3	0.32	70.71	70.71	22929	0.66
N	0.01020				0%	20.26	0.601	0.100	0.45	400	0.46	0.3	0.15	7.57	7.57	9183	0.07
D	0.06670				0%	132.51	3.933	0.100	0.45	400	0.41	0.3	0.14	60.23	60.23	11143	0.56
G	0.04940				0%	98.10	2.913	0.100	0.45	400	2.10	0.3	0.32	95.99	95.99	23673	0.90
N.E.	0.03500				0%	69.51	2.064	0.100	0.45	400	0.50	0.3	0.15	30.84	30.84	10876	0.29
P	0.03740				0%	74.27	2.205	0.100	0.45	400	0.94	0.3	0.19	42.17	42.17	13878	0.39
S	0.00200				0%	3.98	0.118	0.100	0.45	400	2.00	0.3	0.30	2.55	2.55	15639	0.02
Q	0.00490				0%	9.74	0.289	0.100	0.45	400	3.00	0.3	0.43	9.92	9.92	24637	0.09
R	0.00400				0%	7.95	0.236	0.100	0.45	400	2.90	0.3	0.42	7.65	7.65	23296	0.07
C	0.02670				0%	53.03	1.574	0.100	0.45	400	0.57	0.3	0.16	23.71	23.71	10961	0.22
O	0.01240				0%	24.63	0.731	0.100	0.45	400	0.50	0.3	0.15	9.65	9.65	9617	0.09
WEST FR.	0.00250				0%	4.97	0.147	0.100	0.45	400	0.50	0.3	0.15	1.60	1.60	7961	0.02

BED MATERIAL AND TOTAL SEDIMENT YIELD ANALYSIS

a = 1.20E-02 n = 0.042
b = 2.50
c = 0.70
d = 1.80

BASIN	AREA SQ MI	QP CFS	VOL AC-FT	YS TONS	SED. VOL AC-FT	Cfs PPM	q unit width	AVG. SLOPE	VEL	DEPTH	WD	qs (unit width bed load)	QS BED LOAD	QS TOTAL	BF	Q BULK	SED VOL AC-FT
A	0.03120	61.96	1.840	27.12	0.0125	10728	4.92	0.005	3.28	1.50	12.6	0.30	3.83	4.09	1.07	66.05	0.12
K	0.04000	79.43	2.359	42.97	0.0197	13225	5.71	0.0079	3.99	1.43	13.9	0.48	6.67	7.07	1.09	86.50	0.21
F	0.02530	50.24	1.492	28.06	0.0129	13650	4.34	0.01	3.84	1.13	11.6	0.37	4.26	4.53	1.09	54.77	0.13
PARK B	0.00630	12.52	0.371	4.86	0.0022	9555	1.89	0.0063	2.39	0.79	6.6	0.09	0.59	0.63	1.05	13.15	0.02
I	0.04480	88.97	2.642	50.59	0.0232	13894	6.11	0.009	4.27	1.43	14.6	0.57	8.24	8.71	1.10	97.68	0.26
E	0.03940	78.24	2.323	31.42	0.0144	9853	5.66	0.0022	2.71	2.09	13.8	0.24	3.30	3.59	1.05	81.83	0.11
B	0.04790	95.12	2.824	35.53	0.0163	9173	6.36	0.0016	2.58	2.46	14.9	0.24	3.55	3.89	1.04	99.01	0.12
L	0.02990	59.38	1.763	32.49	0.0149	13380	4.80	0.0087	3.83	1.25	12.4	0.39	4.88	5.18	1.09	64.56	0.15
M	0.03700	73.48	2.182	60.64	0.0278	20040	5.45	0.014	4.65	1.17	13.5	0.60	8.14	8.70	1.12	82.18	0.26
CIBOLA	0.01560	44.05	1.632	1.68	0.0008	755	4.01	0.005	3.02	1.33	11.0	0.23	2.55	2.56	1.06	46.61	0.09
J	0.07530	149.72	4.440	148.14	0.0680	23962	8.36	0.012	5.27	1.59	17.9	1.01	18.12	19.51	1.13	169.23	0.58
PARK A	0.00390	7.75	0.230	2.91	0.0013	9219	1.41	0.0063	2.13	0.66	5.5	0.06	0.32	0.35	1.05	8.10	0.01
H	0.03760	74.67	2.217	70.71	0.0325	22929	5.50	0.0075	3.87	1.42	13.6	0.43	5.90	6.56	1.09	81.23	0.19
N	0.01020	20.26	0.601	7.57	0.0035	9183	2.52	0.0046	2.45	1.03	8.1	0.11	0.91	0.98	1.05	21.24	0.03
D	0.06670	132.51	3.933	60.23	0.0277	11143	7.77	0.0038	3.62	2.14	17.1	0.50	8.56	9.12	1.07	141.63	0.27
G	0.04940	98.10	2.913	95.99	0.0441	23673	6.48	0.0057	3.81	1.70	15.1	0.47	7.14	8.04	1.08	106.14	0.24
N.E.	0.03500	69.51	2.064	30.84	0.0142	10876	5.27	0.005	3.37	1.56	13.2	0.34	4.43	4.71	1.07	74.22	0.14
P	0.03740	74.27	2.205	42.17	0.0194	13878	5.49	0.0031	2.97	1.85	13.5	0.27	3.69	4.09	1.06	78.36	0.12
S	0.00200	3.98	0.118	2.55	0.0012	15639	0.95	0.02	2.57	0.37	4.2	0.06	0.26	0.28	1.07	4.26	0.01
Q	0.00490	9.74	0.289	9.92	0.0046	24637	1.62	0.03	3.60	0.45	6.0	0.16	0.97	1.06	1.11	10.80	0.03
R	0.00400	7.95	0.236	7.65	0.0035	23296	1.44	0.029	3.39	0.42	5.5	0.13	0.74	0.81	1.10	8.76	0.02
C	0.02670	53.03	1.574	23.71	0.0109	10961	4.48	0.0047	3.10	1.45	11.8	0.26	3.05	3.27	1.06	56.30	0.10
O	0.01240	24.63	0.731	9.65	0.0044	9617	2.83	0.005	2.63	1.08	8.7	0.14	1.21	1.30	1.05	25.93	0.04
WEST FR.	0.00250	4.97	0.147	1.60	0.0007	7961	1.08	0.005	1.79	0.61	4.6	0.04	0.16	0.18	1.04	5.15	0.01

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FUTURE SEDIMENT
ANALYSIS USING MUSLE EQUATION

BASIN	AREA SQ MI				PERCENT IMPERV	QP CFS	VOL AC-FT	WGHTD K	C	GAMMA	SLOPE %	N	LS	YS TONS	YS' TONS	CS PPM	QFS WASH LOAD
A	0.03120				35%	61.67	2.025	0.100	0.45	400	0.50	0.3	0.15	28.54	18.55	6695	0.16
K	0.04000				42%	83.28	2.791	0.100	0.45	400	1.00	0.3	0.20	52.89	30.67	8022	0.25
F	0.02530				42%	52.68	1.765	0.100	0.45	400	1.00	0.3	0.20	31.66	18.36	7597	0.15
PARK B	0.00630				20%	11.04	0.343	0.100	0.45	400	0.63	0.3	0.16	4.34	3.47	7390	0.03
I	0.04480				42%	93.72	3.126	0.100	0.45	400	0.75	0.3	0.17	52.89	30.68	7169	0.26
E	0.03940				42%	82.03	2.749	0.100	0.45	400	0.50	0.3	0.15	39.73	23.04	6130	0.19
B	0.04790				42%	99.72	3.342	0.100	0.45	400	0.16	0.3	0.12	40.09	23.25	5094	0.19
L	0.02990				70%	74.89	2.670	0.100	0.45	400	1.00	0.3	0.20	48.61	14.58	4003	0.11
M	0.03700				90%	103.84	3.820	0.100	0.45	400	2.50	0.3	0.37	133.72	13.37	2569	0.10
CIBOLA	0.01560				92%	44.26	1.632	0.100	0.45	400	0.50	0.3	0.15	21.00	1.68	757	0.01
J	0.07530				65%	182.93	6.462	0.100	0.45	400	5.00	0.5	1.07	719.18	251.71	27863	1.98
PARK A	0.00390				20%	6.84	0.212	0.100	0.45	400	0.63	0.3	0.16	2.53	2.03	6988	0.02
H	0.03760				56%	86.23	2.991	0.100	0.45	400	8.50	0.5	2.16	620.98	273.23	62983	2.19
N	0.01020				90%	28.64	1.053	0.100	0.45	400	0.50	0.3	0.15	12.88	1.29	899	0.01
D	0.06670				42%	138.91	4.654	0.100	0.45	400	0.50	0.3	0.15	71.66	41.56	6528	0.34
G	0.04940				56%	113.28	3.929	0.100	0.45	400	7.80	0.5	1.91	745.89	328.19	57903	2.63
N.E.	0.03500				80%	92.95	3.370	0.100	0.45	400	0.50	0.3	0.15	47.76	9.55	2081	0.07
P	0.03740				80%	99.32	3.601	0.100	0.45	400	6.30	0.5	1.43	493.38	98.68	19764	0.76
S	0.00200				80%	5.33	0.193	0.100	0.45	400	2.10	0.3	0.32	4.11	0.82	3123	0.01
Q	0.00490				80%	13.03	0.472	0.100	0.45	400	3.00	0.3	0.43	15.37	3.07	4769	0.02
R	0.00400				80%	10.64	0.385	0.100	0.45	400	1.80	0.3	0.28	7.91	1.58	3014	0.01
C	0.02670				42%	55.59	1.863	0.100	0.45	400	0.50	0.3	0.15	25.70	14.90	5852	0.12
O	0.01240				20%	21.71	0.675	0.100	0.45	400	0.50	0.3	0.15	8.60	6.88	7441	0.06
WEST FR.	0.00250				80%	6.65	0.241	0.100	0.45	400	0.50	0.3	0.15	2.49	0.50	1518	0.00

BED MATERIAL AND TOTAL SEDIMENT YIELD ANALYSIS

a = 1.20E-02 n = 0.042
b = 2.50
c = 0.70
d = 1.80

BASIN	AREA SQ MI	QP CFS	VOL AC-FT	YS' TONS	SED. VOL. AC-FT	Cfs PPM	q unit width	AVG. SLOPE	VEL	DEPTH	WD	qs (unit width bed load)	QS BED LOAD	QS TOTAL	BF	Q BULK	SED VOL AC-FT
A	0.03120	61.96	1.840	18.55	0.0085	7363	4.92	0.005	3.28	1.50	12.6	0.31	3.86	4.01	1.06	65.97	0.12
K	0.04000	79.43	2.359	30.67	0.0141	9477	5.71	0.0079	3.99	1.43	13.9	0.48	6.71	6.97	1.09	86.40	0.21
F	0.02530	50.24	1.492	18.36	0.0084	8974	4.34	0.01	3.84	1.13	11.6	0.37	4.30	4.45	1.09	54.69	0.13
PARK B	0.00630	12.52	0.371	3.47	0.0016	6836	1.89	0.0063	2.39	0.79	6.6	0.09	0.59	0.62	1.05	13.14	0.02
I	0.04480	88.97	2.642	30.68	0.0141	8472	6.11	0.009	4.27	1.43	14.6	0.57	8.32	8.57	1.10	97.54	0.25
E	0.03940	78.24	2.323	23.04	0.0106	7246	5.66	0.0022	2.71	2.09	13.8	0.24	3.32	3.51	1.04	81.75	0.10
B	0.04790	95.12	2.824	23.25	0.0107	6022	6.36	0.0016	2.58	2.46	14.9	0.24	3.57	3.77	1.04	98.89	0.11
L	0.02990	59.38	1.763	14.58	0.0067	6050	4.80	0.0087	3.83	1.25	12.4	0.40	4.94	5.06	1.09	64.44	0.15
M	0.03700	73.48	2.182	13.37	0.0061	4489	5.45	0.014	4.65	1.17	13.5	0.62	8.37	8.47	1.12	81.95	0.25
CIBOLA	0.01560	44.05	1.632	1.68	0.0008	757	4.01	0.005	3.02	1.33	11.0	0.23	2.55	2.56	1.06	46.61	0.09
J	0.07530	149.72	4.440	251.71	0.1156	40044	8.36	0.012	5.27	1.59	17.9	0.98	17.59	19.57	1.13	169.29	0.58
PARK A	0.00390	7.75	0.230	2.03	0.0009	6444	1.41	0.0063	2.13	0.66	5.5	0.06	0.32	0.34	1.04	8.09	0.01
H	0.03760	74.67	2.217	273.23	0.1255	83143	5.50	0.0075	3.87	1.42	13.6	0.39	5.26	7.44	1.10	82.11	0.22
N	0.01020	20.26	0.601	1.29	0.0006	1574	2.52	0.0046	2.45	1.03	8.1	0.11	0.92	0.93	1.05	21.19	0.03
D	0.06670	132.51	3.933	41.56	0.0191	7716	7.77	0.0038	3.62	2.14	17.1	0.50	8.61	8.95	1.07	141.46	0.27
G	0.04940	98.10	2.913	328.19	0.1507	76552	6.48	0.0057	3.81	1.70	15.1	0.43	6.46	9.09	1.09	107.19	0.27
N.E.	0.03500	69.51	2.064	9.55	0.0044	3394	5.27	0.005	3.37	1.56	13.2	0.34	4.49	4.56	1.07	74.07	0.14
P	0.03740	74.27	2.205	98.68	0.0453	31878	5.49	0.0031	2.97	1.85	13.5	0.26	3.57	4.33	1.06	78.60	0.13
S	0.00200	3.98	0.118	0.82	0.0004	5098	0.95	0.02	2.57	0.37	4.2	0.06	0.26	0.27	1.07	4.25	0.01
Q	0.00490	9.74	0.289	3.07	0.0014	7765	1.62	0.03	3.60	0.45	6.0	0.17	1.00	1.02	1.11	10.76	0.03
R	0.00400	7.95	0.236	1.58	0.0007	4907	1.44	0.029	3.39	0.42	5.5	0.14	0.77	0.78	1.10	8.73	0.02
C	0.02670	53.03	1.574	14.90	0.0068	6919	4.48	0.0047	3.10	1.45	11.8	0.26	3.07	3.20	1.06	56.23	0.09
O	0.01240	24.63	0.731	6.88	0.0032	6875	2.83	0.005	2.63	1.08	8.7	0.14	1.22	1.28	1.05	25.91	0.04
WEST FR.	0.00250	4.97	0.147	0.50	0.0002	2486	1.08	0.005	1.79	0.61	4.6	0.04	0.17	0.17	1.03	5.14	0.01

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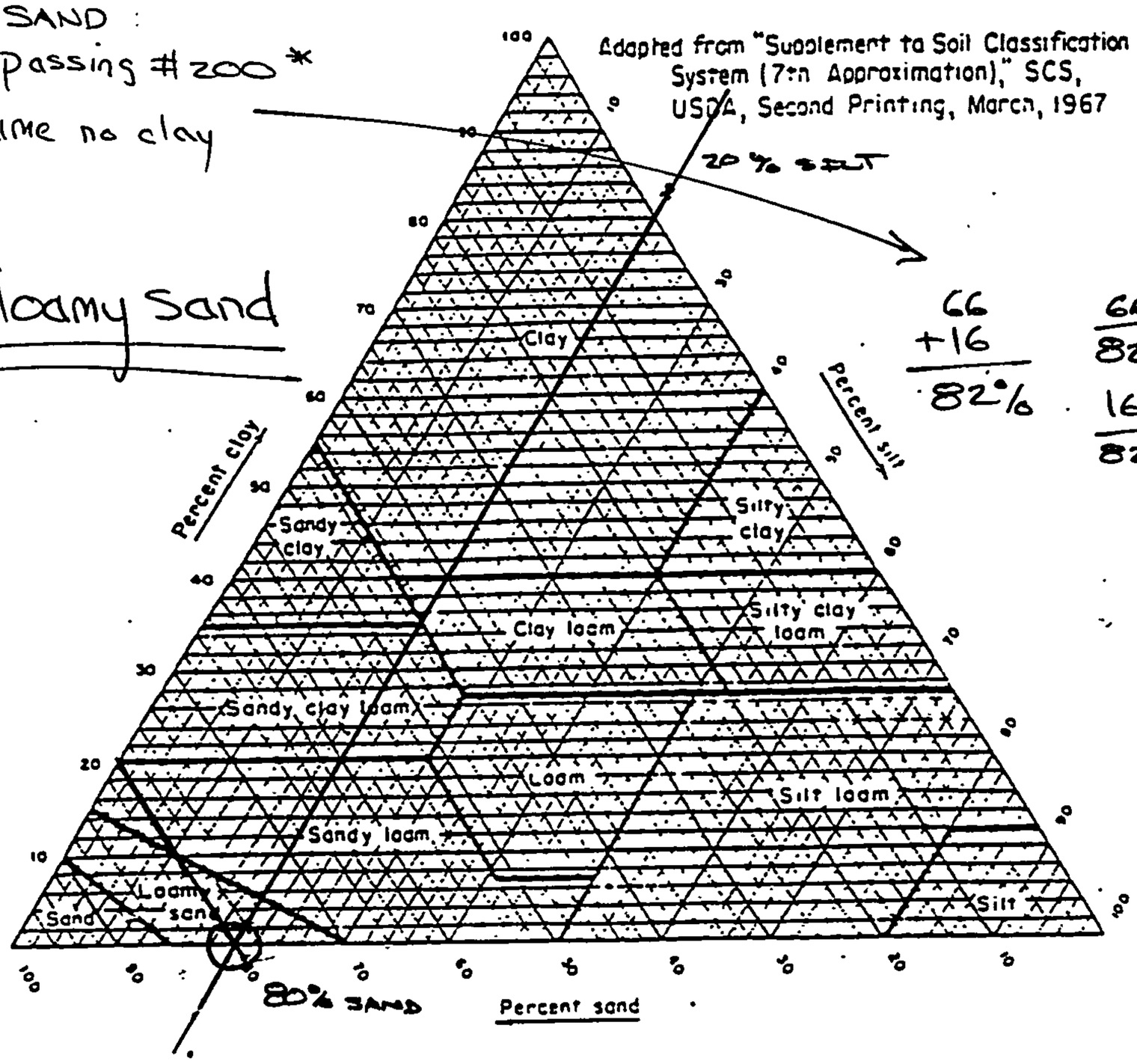
VDN

18% Gravel
66% SAND
16% passing #200 *
* assume no clay

∴ use loamy sand



66
+16
82%

$\frac{66}{82} = 80\%$ sand

$\frac{16}{82} = 20\%$ silt

COMPARISON OF PARTICLE-SIZE SCALES

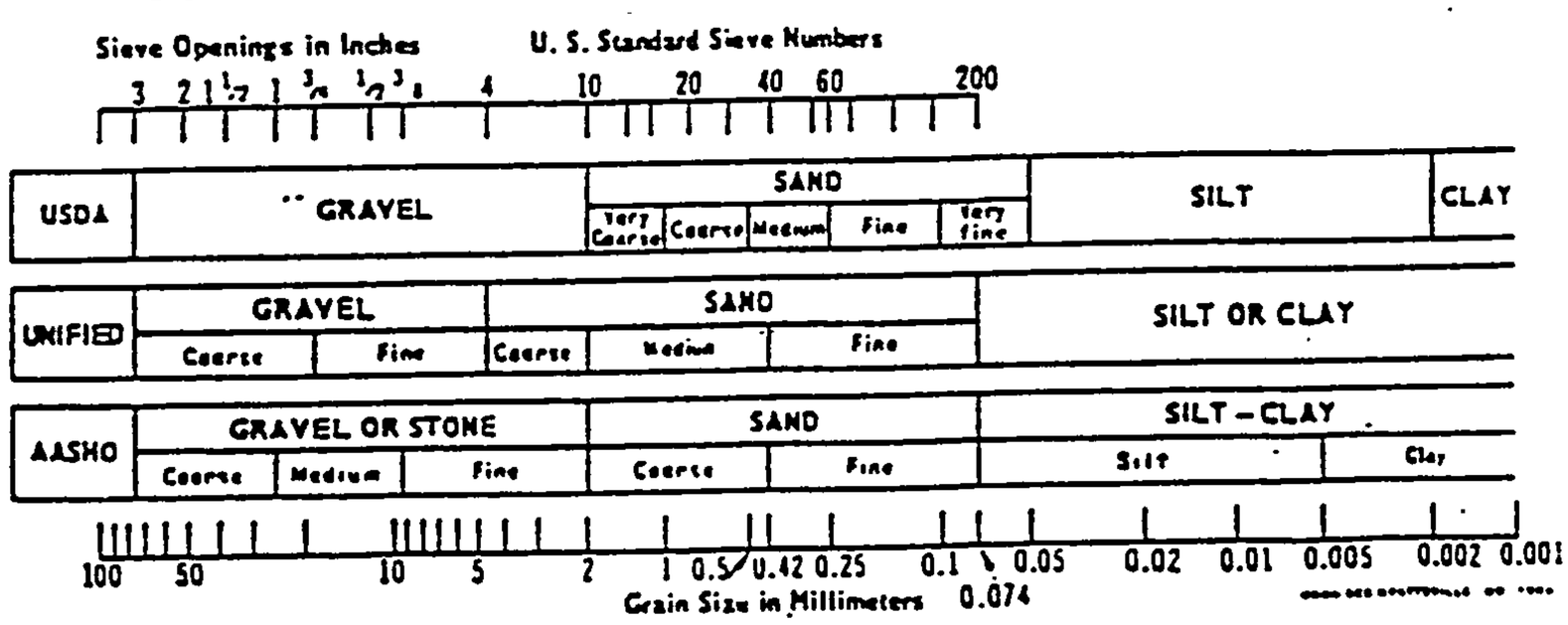
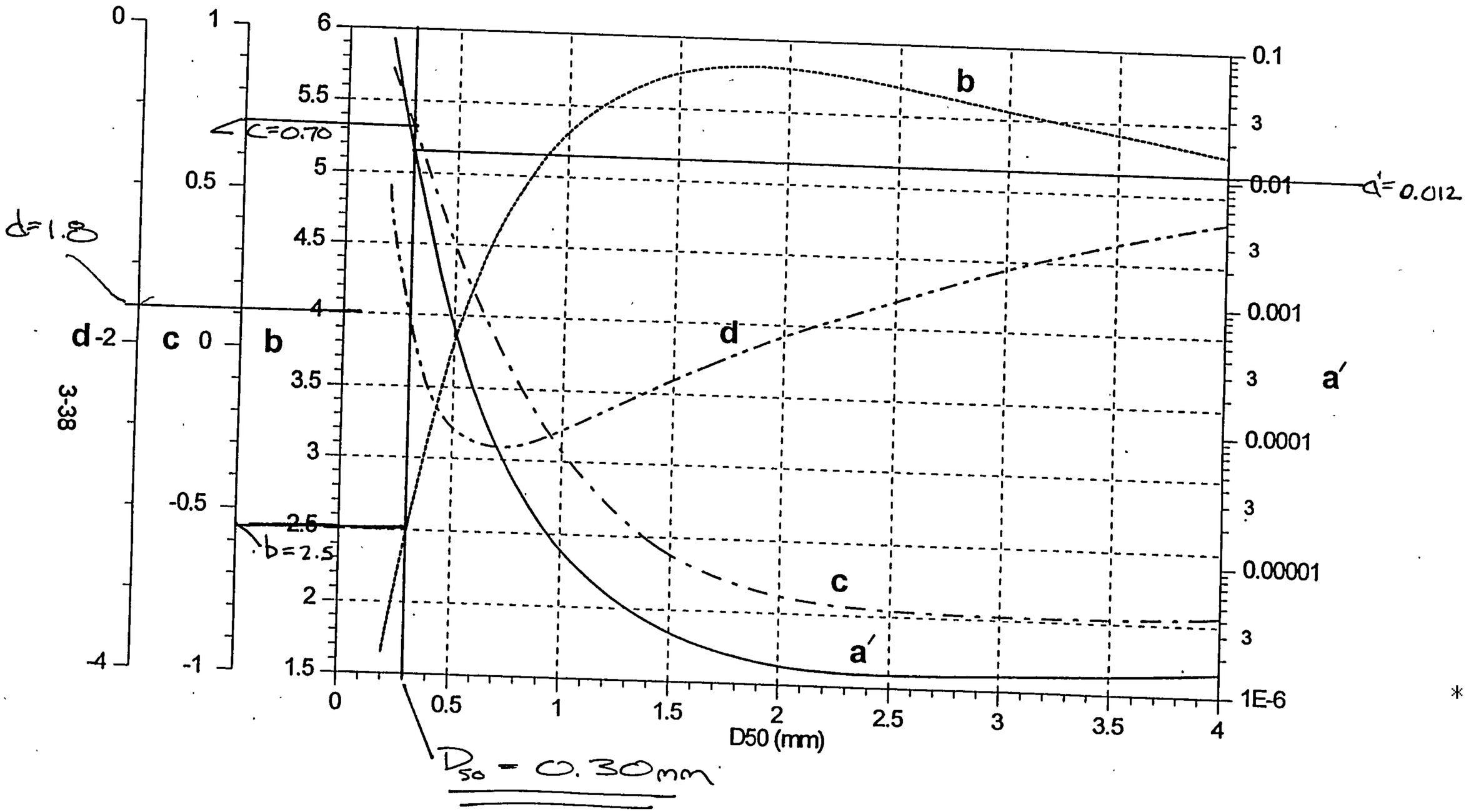


Figure B.1. Guide for the textural classification of soil.

$D_{50} = 0.30\,mm$

USE → $a' = 0.012$, $b = 2.5$, $c = 0.70$, $d = 1.8$



3-38

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UDA

USE K = 0.10

Table B.1. Soil Erodibility Factor K Based on USDA Texture.

USDA Texture	Estimated K Factor[1]			
	Normal[2]	Gravelly[2]	Very Gravelly[2]	Extremely Gravelly[2]
Coarse Sand	0.10	0.05	0.02	0.02
Sand	0.10	0.05	0.02	0.02
Fine Sand	0.17	0.10	0.05	0.02
Very Coarse Sand	0.10	0.05	0.02	0.02
Loamy Coarse Sand	0.15	0.10	0.05	0.02
Loamy Sand	0.17	0.10	0.05	0.02
~~Loamy Fine Sand~~	~~0.20~~	~~0.10~~	0.05	0.02
Loamy Very Fine Sand	0.49	0.28	0.15	0.05
Coarse Sandy Loam	0.20	0.10	0.05	0.02
Sandy Loam	0.24	0.15	0.10	0.05
Fine Sandy Loam	0.28	0.15	0.10	0.05
Very Fine Sandy Loam	0.55	0.28	0.17	0.10
Loam	0.37	0.20	0.10	0.05
Silt Loam	0.43	0.24	0.15	0.05
Silt	0.64	0.37	0.20	0.10
Sandy Clay Loam	0.32	0.15	0.10	0.05
Clay Loam	0.32	0.15	0.10	0.05
Silty Clay Loam	0.37	0.20	0.10	0.05
Sandy Clay	0.32	0.15	0.10	0.05
Silty Clay	0.24	0.15	0.10	0.05
Clay	0.20	0.10	0.05	0.02

[1]Where a Soils Survey Interpretation Sheet, SOILS-5, is available for a soil, the K Factor listed will be more accurate than the factor provided by this table.

[2]Total rock fragments are included in these figures, not just gravel. Normal = 0-15 percent, gravelly = 15-35 percent, very gravelly = 35-60 percent, and extremely gravelly = over 60 percent.

Table B.2. Cover and Management Factor C for Permanent Pasture, Range, and Idle Land.[1]

Vegetative Canopy		Cover that contacts the soil surface						
Type and Height[2]	Percent Cover[3]	Type[4]	Percent ground cover					
			0	20	40	60	80	95+
No appreciable canopy		G	0.45	0.20	0.10	0.042	0.013	0.003
		W	0.45	0.24	0.15	0.091	0.043	0.011
Tall weeds or short brush with average drop fall height of 20 inches	25	G	0.36	0.17	0.09	0.038	0.013	0.003
		W	0.36	0.20	0.13	0.083	0.041	0.011
	75	G	0.26	0.13	0.07	0.035	0.012	0.003
		W	0.26	0.16	0.11	0.076	0.039	0.011
Appreciable brush or brushes with average drop fall height of 6-1/2 ft	25	G	0.40	0.18	0.09	0.040	0.13	0.003
		W	0.40	0.22	0.14	0.087	0.42	0.011
	50	G	0.34	0.16	0.08	0.038	0.012	0.003
		W	0.34	0.19	0.13	0.082	0.041	0.011
	75	G	0.28	0.14	0.08	0.036	0.012	0.003
		W	0.28	0.17	0.12	0.078	0.040	0.011
Trees, but no appreciable low brush. Average drop fall height of 13 ft	25	G	0.42	0.19	0.10	0.041	0.013	0.003
		W	0.42	0.23	0.14	0.089	0.042	0.011
	50	G	0.39	0.18	0.09	0.040	0.013	0.003
		W	0.39	0.21	0.14	0.087	0.042	0.011
	75	G	0.36	0.17	0.09	0.039	0.012	0.003
		W	0.36	0.20	0.13	0.084	0.041	0.011

USE C = 0.45

[1]The listed C values assumes that the vegetation and mulch are randomly distributed over the entire area.

[2]Canopy height is measured as the average fall height of water drops falling from the canopy to the ground. Canopy effect is inversely proportional to drop fall height and is negligible is fall height exceeds 33 ft.

[3]Portion of total-area surface that would be hidden from view by canopy in a vertical projection (a bird's eye view).

[4]G = Cover at surface is grass, grasslike plants, decaying compacted duff, or liter 2 in. deep. W = Cover at surface is mostly broadleft herbaceaous plants (as weeds with little lateral-root network near the surface) or undecayed residues or both.

202

****

D-16/DOC 2

MYERS, OLIVER & PRICE, P.C.
LAWYERS
1401 CENTRAL AVENUE, N.W.
ALBUQUERQUE, NEW MEXICO 87104

JOHN A. MYERS
SCOTT OLIVER*
CHARLES P. PRICE III
KEVIN J. McCREADY
HOPE MEAD WYNN

*ALSO LICENSED IN TEXAS

TELEPHONE
(505)247-9080

FACSIMILE
(505)247-9109

e-mail: jmyers@moplaw.com

December 24, 2003

Via Facsimile 314-0480

Catherine VerEcke
Zoning, Building and Planning
Bernalillo County
111 Union Square Street SE, Suite 100
Albuquerque, New Mexico 87102

Re: Zone Change Request Application No. ZCSU 40002

Dear Katherine:

Thank you for talking to me on the telephone about the above-referenced Special Use Permit request. You advised me that you thought that there might be some questions whether the City had agreed to accept the obligation to maintain the Storm Drainage Facility associated with these ponds. I assured you that the City had agreed to accept this maintenance responsibility.

Enclosed is a copy of the Agreement and Grant of Easement entered into by and among Sundt, the City and the County. The City has not taken the position that it is relieved of its obligations under this Agreement as a result of the County's election not to proceed with the soccer fields.

Since the Storm Drainage Ponds are the only remaining function for this property, we have suggested to the City that it accept dedication of this property. This issue has not been resolved.

I am providing copies of this letter to Fred Aguirre, the City Engineer, Richard Dourte, the new City Engineer, and Kevin Curran, Assistant City Attorney. You are welcome to confirm any of these matters with these gentlemen.

Please call if you have questions.

Sincerely,

Myers, Oliver & Price, P.C.

By: _____
John A. Myers

JAM:ck
Enclosure

cc: Ron Brown (via facsimile 883-0746
Richard Dourte (via facsimile 924-3864)
Fred Aguirre (via facsimile 924-3864)
Kevin Curran (via facsimile 924-3440)

H:\SUNDT\JAM\LETTERS\Ltr to VerEcke.doc

Original delivered 8/21/00 to Roberta Dixon at PWD

THIS DOCUMENT RE-RECORDED TO ATTACH EXHIBIT "C".

AGREEMENT AND GRANT OF EASEMENT

THIS AGREEMENT AND GRANT OF EASEMENT is entered into as of the ____ day of December, 1998, by and among SUNDT CONSTRUCTION, INC., an Arizona corporation ("Sundt"), the CITY OF ALBUQUERQUE, a New Mexico municipal corporation (the "City"), and the COUNTY OF BERNALILLO, a political subdivision of the State of New Mexico (the "County").

Background Information:

1. Sundt is the owner of Vista del Norte subdivision (the "Project");

2. Sundt is the owner of a ±13 acre tract of property, more particularly described on Exhibit "A" attached hereto and incorporated herein (the "Property"), which Property is an approximately 250-foot wide strip of property running from the Project to Edith Boulevard;

3. The Property will be graded to fulfill two functions, storm water detention and sedimentation basins (the "Drainage Function"), and athletic fields (the "Recreational Function") pursuant to the site development plan conceptual pond/park layout Vista del Norte (the "Site Plan"), a copy of which is attached hereto as Exhibit "B". The Property is served with access from Tyler Road by way of a 30-foot wide access road (the "Access Road") created pursuant to the Access Easement Agreement recorded in the

2000081868 5493235 Page: 1 of 12 08/21/2000 04:15P Bk-A9 Pg-1536 R 29.00 Bernalillo Co Clerk Bern. Co. AGRE

1998162255 5152618 Page: 1 of 11 12/17/1998 08:38A Bk-9828 Pg-379 R 27.00 Judy D. Woodward Bern. Co. AGRE

Bernalillo County, New Mexico, real estate records on December 14, 1993, in Book 93-35, Pages 8729-8735 (the "Easement Agreement").

4. The parties desire to establish certain rights and responsibilities with respect to the Property.

NOW, THEREFORE, the parties agree as follows:

1. Sundt agrees as follows:

1.1. Drainage Improvements. Sundt agrees to grade the Property and construct the Drainage Improvements as shown on the Site Plan, in accordance with constructions plans prepared by Sundt's consultants, and approved and accepted by the City and County pursuant to City and County requirements (the "Drainage Improvements");

1.2. Pavement. To pave the parking area, shown on the Site Plan, and the Access Road, to paving standards acceptable to the County (the "Paving Improvements");

1.3. Recreational Improvements. To install an irrigation system for the athletic fields, to seed the fields, and to crimp straw into the fields, as shown on the Landscape Plan attached as Exhibit "C" (the "Recreational Improvements");

1.4. Conveyance of Property. To convey the Property to the County, subject to the easement described herein, within 30 days after completion, inspection and acceptance by the City and the County (including specifically the County Parks and Recreation Department) of the Drainage Improvements, the Recreational Improvements, and the Paving Improvements.

2. Grant of Easement. Sundt grants to the City and the

2000081868 5463235 Page: 2 of 12 08/21/2000 04:15P Bk-A9 Pg-1536 R 29.00 Bernalillo Co Clerk Bern. Co. AGRE

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County an exclusive (except that the easements are non-exclusive to the extent that both the City and the County are granted an easement) permanent easement ("Easement") in, over, upon and across the Property for the construction, installation, maintenance, repair, modification, replacement, and operation of the Drainage Improvements, including the right to remove trees, bushes, undergrowth, and any other obstacle upon the Property that the City or the County determines interfere with the use of the Easement for the purposes set out herein. Provided, however, that the City shall repair, at the City's expense, any damages to the Property, including but not limited to the athletic fields 1, 2 and 3 resulting from its activities. Sundt shall be permitted to grant additional easements within the Easement with prior written approval of the City Engineer and the County.

Sundt covenants and warrants that Sundt is the owner in fee simple of the Property, that Sundt has a good and lawful right to convey the Property and that Sundt will forever warrant and defend the title to the Property against all claims from all persons or entities.

This Grant of Easement and the provisions contained herein constitute covenants running with the land for the benefit of the City and its successors and assigns until terminated.

2.1. Maintenance Responsibilities. The City accepts the responsibility to maintain the portions of the Drainage Facilities identified on the Site Plan as follows (the "City Facilities"):

(a) Proposed storm sewer inlet,

2000081869 Page: 3 of 12 08/21/2000 04:15P Bk-R9 Pg-1536 R 29.00 Bernalillo Co Clerk Bern. Co. AGRE

1998162255 5152816 Page: 3 of 11 12/17/1998 08:38A Judy D. Woodward Bern. Co. AGRE R 27.00 Bk-9828 Pg-379

(b) Sedimentation basin,

(c) Detention basin,

(d) Biofilter area,

(e) 8-inch drain pipe; and

(f) 12-inch drain pipe.

The County shall maintain the facilities identified on the Site Plan as follows (the "County Facilities"):

(a) Athletic fields 1, 2 and 3,

(b) Parking area,

(c) Access road,

(d) Control release pond, and

(e) Storm sewer outlet to Edith Pond No. 6.

Pursuant to the Easement granted herein, both the City and the County have the right to maintain any of the Facilities to be maintained by the other party (the "Defaulting Party") in the event that the Defaulting Party fails to adequately maintain its Facilities, however, such right by the City or the County does not relieve the Defaulting Party of its responsibility to maintain its Facilities.

3. Governing Laws. Except as otherwise specifically provided herein, this Agreement shall be governed by, construed and enforced in accordance with the laws of the State of New Mexico.

4. Notices. All notices with respect to this agreement shall be in writing and shall be delivered personally, sent via confirmed telefax, or sent postage prepaid by United States Mail, certified mail, return receipt requested, to the addresses set

2000081868 5403235 Page: 4 of 12 08/21/2000 04:15P R 29.00 Bk-A9 Pg-1536 Bernalillo Co Clerk Bern. Co. AGRE

1998162255 5152818 Page: 4 of 11 12/17/1998 08:38A Judy D. Woodward Bern. Co. AGRE R 27.00 Bk-9828 Pg-379

forth below or such other addresses as hereafter specified in writing by one party to the other:

SUNDT CONSTRUCTION, INC.
P. O. Box 26685
Tucson, Arizona 85726

City of Albuquerque
c/o Chief Executive Officer
P. O. Box 1293
Albuquerque, New Mexico 87103

County of Bernalillo
c/o County Manager
One Civic Plaza, 10th Floor
Albuquerque, New Mexico 87102

5. Entire Agreement. This Agreement contains the entire agreement between the parties hereto and all prior understandings, oral or in writing, by the parties hereto with respect to this agreement. No variations, modifications, supplements, waivers or changes herein or hereof shall be binding upon any party hereto unless set forth in a document duly executed by or on behalf of such party.

6. Severability. If any provision of this Agreement or the application thereof to any person or circumstance shall be invalid or unenforceable to any extent, the remainder of this Agreement and the application of such provisions to other persons or circumstance shall not be affected thereby and such provisions shall be enforced to the greatest extent permitted by law.

7. Binding Agreement. This Agreement shall inure to the benefit of and be binding upon the undersigned parties and their respective successors and assigns. Whenever in this Agreement a reference to any party or Partnership is made, such reference shall

2000081868 5463235 Page: 5 of 12 08/21/2000 04:15P Bk-A9 Pg-1536 R 29.00 Bernalillo Co Clerk Bern. Co. AGRE

1998162255 5152616 Page: 5 of 11 12/17/1998 08:38A Bk-9828 Pg-379 Judy D. Woodward Bern. Co. AGRE R 27.00

be deemed to include a reference to the successors and permitted assigns of such Partner.

8. Authority. Each individual signing for each of the parties hereunder, warrants and represents that he/she is an authorized agent of such party, on whose benefit he/she is executing this Agreement, and is authorized to execute the same.

9. Further Assurances. Each party agrees to execute such other and further instruments and documents as may be necessary or proper in order to complete the transactions contemplated by this Agreement.

10. Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, and said counterparts shall constitute but one and the same instrument which may sufficiently be evidenced by one counterpart.

11. City/County Third Party Beneficiary. It is specifically agreed between the City and the County that this Agreement does not, and is not intended to, create in the public, or any member thereof, any rights whatsoever, such as but not limited to, the rights of a third party beneficiary, nor to authorize anyone not a party to this Agreement to maintain a suit for wrongful death or any other claim whatsoever.

12. Tort Claims. It is specifically agreed between the City and the County that each shall be solely responsible for any and all liability from personal injury, including death, or damage tc property, arising from any negligent or intentional act or failure to act of either the City or the County, its officials, agents,

2000081868 5493235 Page: 6 of 12 08/21/2000 04:15P Bk-A9 Pg-1536 R 29.00 Bernalillo Co Clerk Bern. Co. AGRE

1998162255 5152818 Page: 6 of 11 12/17/1998 08:38A Bk-9828 Pg-379 Judy D. Woodward Bern. Co. AGRE R 27.00

contractors or employees, pursuant to this Agreement. Liabilities of the City or County shall be subject to the immunities and limitations of the Tort Claims Act, §§41-4-1, et seq., NMSA, 1978, and any amendments thereto. By entering into this Agreement, the County and its "public employees" as defined in the New Mexico Tort Claims Act, and the City and its "public employees" as defined in the New Mexico Tort Claims Act, do not waive sovereign immunity, do not waive any defense and/or do not waive any limitation of liability pursuant to law. No provision in this Agreement modifies and/or waives any provision of the New Mexico Tort Claims Act.

SUNDT CONSTRUCTION, INC., an Arizona corporation

By: _____
Its: Sr. Vice President

CITY OF ALBUQUERQUE, a New Mexico municipal corporation

By: _____
Lawrence Rael
Chief Executive Officer

12/18/98

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Page: 7 of 12
08/21/2000 04:15P
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Judy D. Woodward Bern. Co. AGRE R 27.00
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Page: 7 of 11
12/17/1998 08:38A
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SUPPLEMENTAL SHEET

Motion to approve the agreement and grant of easement among Bernalillo County, the City of Albuquerque and Sundt Construction Inc. that grants a multipurpose easement and defines responsibilities for drainage and park facilities maintenance related to Vista del Norte subdivision was approved by the Board of County Commissioners at the December 15, 1998 Commission Meeting.

APPROVED AS TO FORM ONLY:

County Attorney

BOARD OF COUNTY COMMISSIONERS

EXCUSED

Steve D. Gallegos, Chairman

Ken Sanchez, Vice Chairman

Les Houston, Member

Tom Rutherford, Member

Barbara J. Seward, Member

ATTEST:

Judy D. Woodward, County Clerk

2000081868
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Page: 8 of 12
08/21/2000 04:15P
Bk-A9 Pg-1536
Bernalillo Co Clerk Bern. Co. AGRE R 29.00

1998162255
5152818
Page: 8 of 11
12/17/1998 08:38A
Bk-9820 Pg-379
Judy D. Woodward Bern. Co. AGRE R 27.00

STATE OF ~~NEW MEXICO~~ ARIZONA)
) ss.
COUNTY OF ~~BERNALILLO~~ PIMA)

This instrument was acknowledged before me on December 4, 1998 by PETER JOHNSON, SR. VICE PRESIDENT of Sundt Construction, Inc., an Arizona corporation.

Jan Irwin
Notary Public

My Commission Expires:
July 30, 2002

OFFICIAL SEAL
JAN IRWIN
NOTARY PUBLIC
Pima Co., Arizona
My Comm. Exp. July 30, 2002

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on December 14, 1998, by Lawrence Rael, as Chief Executive Officer of the City of Albuquerque, a New Mexico municipal corporation.

Roberta Duran
Notary Public

My Commission Expires:
July 8, 2002

OFFICIAL SEAL
Roberta Duran
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 7/8/02

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on December _____, 1998, by _____, _____ of the County of Bernalillo, a political subdivision of the State of New Mexico.

_____
Notary Public

My Commission Expires:
_____

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Page: 9 of 12
08/21/2000 04:15P
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Bernalillo Co Clerk Bern. Co. AGRE R 29.00

1998162255
5152618
Page: 9 of 11
12/17/1998 08:38A
Bk-9820 Pg-379
Judy D. Woodward Bern. Co. AGRE R 27.00

A tract of land situate within the Elena Gallegos Grant, Bernalillo County, New Mexico, being and comprising Tract 9 as shown on the Middle Rio Grande Conservancy District Property Map No. 29, and being also designated as Tract "C" on that certain plat entitled Plat Showing Lands of Albert G. Simms, within the Elena Gallegos Grant, Bernalillo County, New Mexico, for assessment purposes, filed in the Office of the County Clerk of Bernalillo County, New Mexico, on the 14th day of November, 1955; and being more particularly described as follows:

Beginning at the Northwest Corner No. 1 of the tract herein set forth, a point on the Easterly right-of-way line of Edith Boulevard NE whence the Section Corner common to Sections 14, 15, 22 and 23 (as projected), Township 11 North, Range 3 East, N.M.P.M., bears N.40°48'08"E., 7716.77 feet distant; and running thence, S.80°21'E., 2393.73 feet to the Northeast Corner No. 2 of the tract herein set forth, a point on the Westerly boundary of the Lands of the Albuquerque Gravel Products Company; Thence, S.26°17'E., 147.10 feet along said Westerly boundary to the Southeast Corner No. 3 of the tract herein set forth; Thence, leaving said Westerly boundary and running N.80°39'20"W., 2496.70 feet to the Southwest Corner No. 4 of the tract herein set forth, a point on said Easterly right of way line of Edith Boulevard NE; Thence, N.16°48'E., 133.47 feet along said Easterly right of way line of Edith Boulevard NE to the Northwest Corner No. 1 and the place of beginning.

PARCEL 10-A-3:

A certain parcel of land situate within Section 27, Township 11 North, Range 3 East, N.M.P.M., Bernalillo County, New Mexico, and being identified as the Easterly 5.7757 acres, more or less of Tract 10-A, Middle Rio Grande Conservancy District Property Map No. 29 and being more particularly described as follows:

Beginning at the Southeast corner of the tract herein described, said corner being common to the Northeast corner of Sunnymeade Subdivision, as the same is shown and designated on the plat of said Subdivision, filed in the Office of the County Clerk of Bernalillo County, New Mexico, on April 19, 1955; Thence, running N.80°36'31"W., 893.15 feet distance to a point; Thence, N.80°34'58"W., 699.67 feet distance to a point; Thence, N.80°26'23"W., 364.19 feet distance to a point; Thence, N.80°26'23"W., 200.25 feet distance to the Southwest corner; Thence, N.16°01'49"E., 119.05 distance to the Northwest corner; Thence, S.80°39'20"E., 186.30 feet distance to a point; Thence, S.80°36'52"E., 742.50 feet distance to a point; Thence, S.80°32'29"E., 1129.40 feet distance to the Northeast corner; Thence, S.26°17'00"E., 146.23 feet distance to the Southeast corner and point of beginning.

2000081868 5403235 Page: 10 of 12 08/21/2000 04:15P Bk-A9 Pg-1536 R 29.00 Bernalillo Co Clerk Bern. Co. AGRE

1998162255 5152613 Page: 13 of 11 12/17/1998 08:38A Bk-9828 Pg-379 Judy D. Woodward Bern. Co. AGRE R 27.00

EXHIBIT

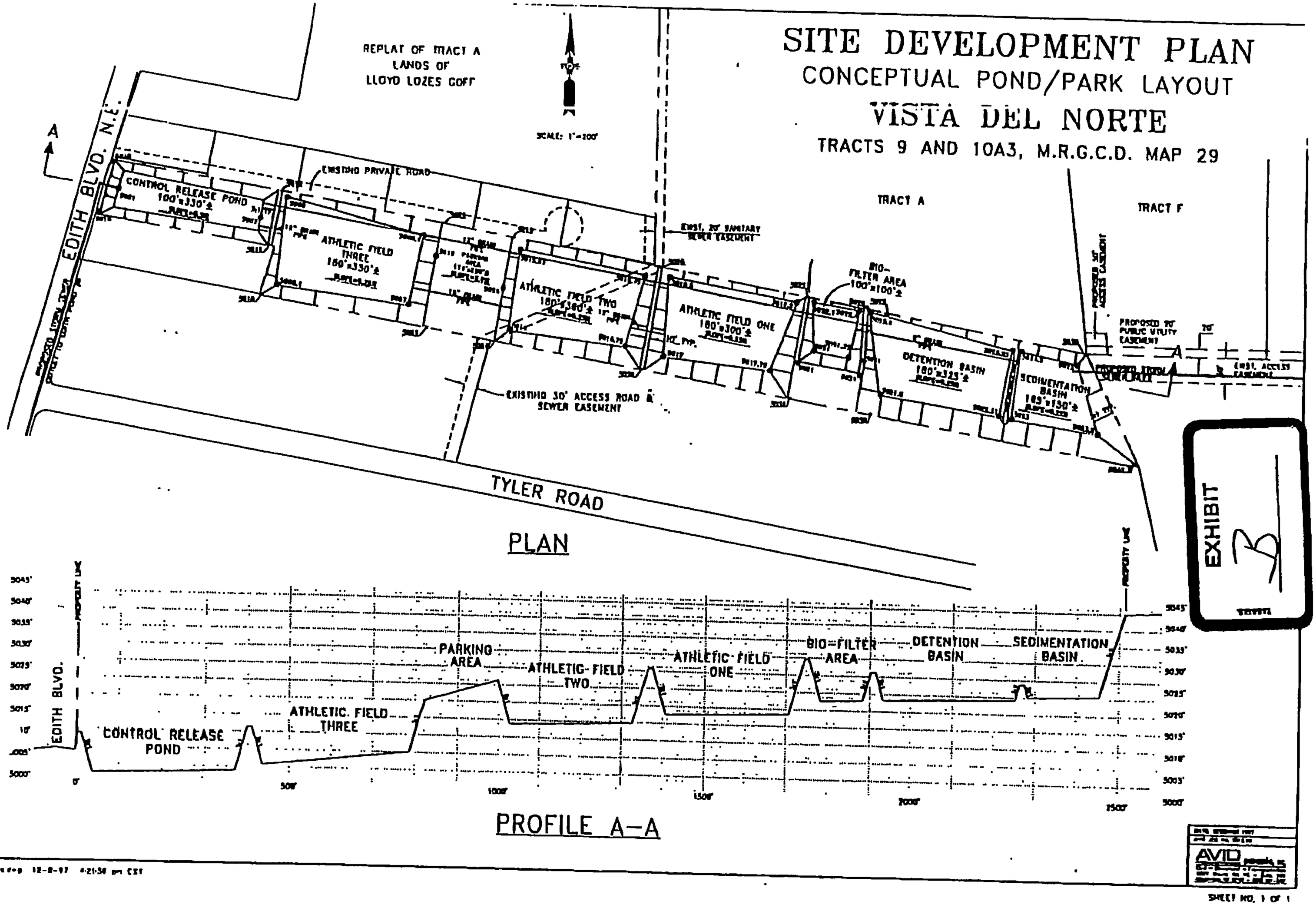
A

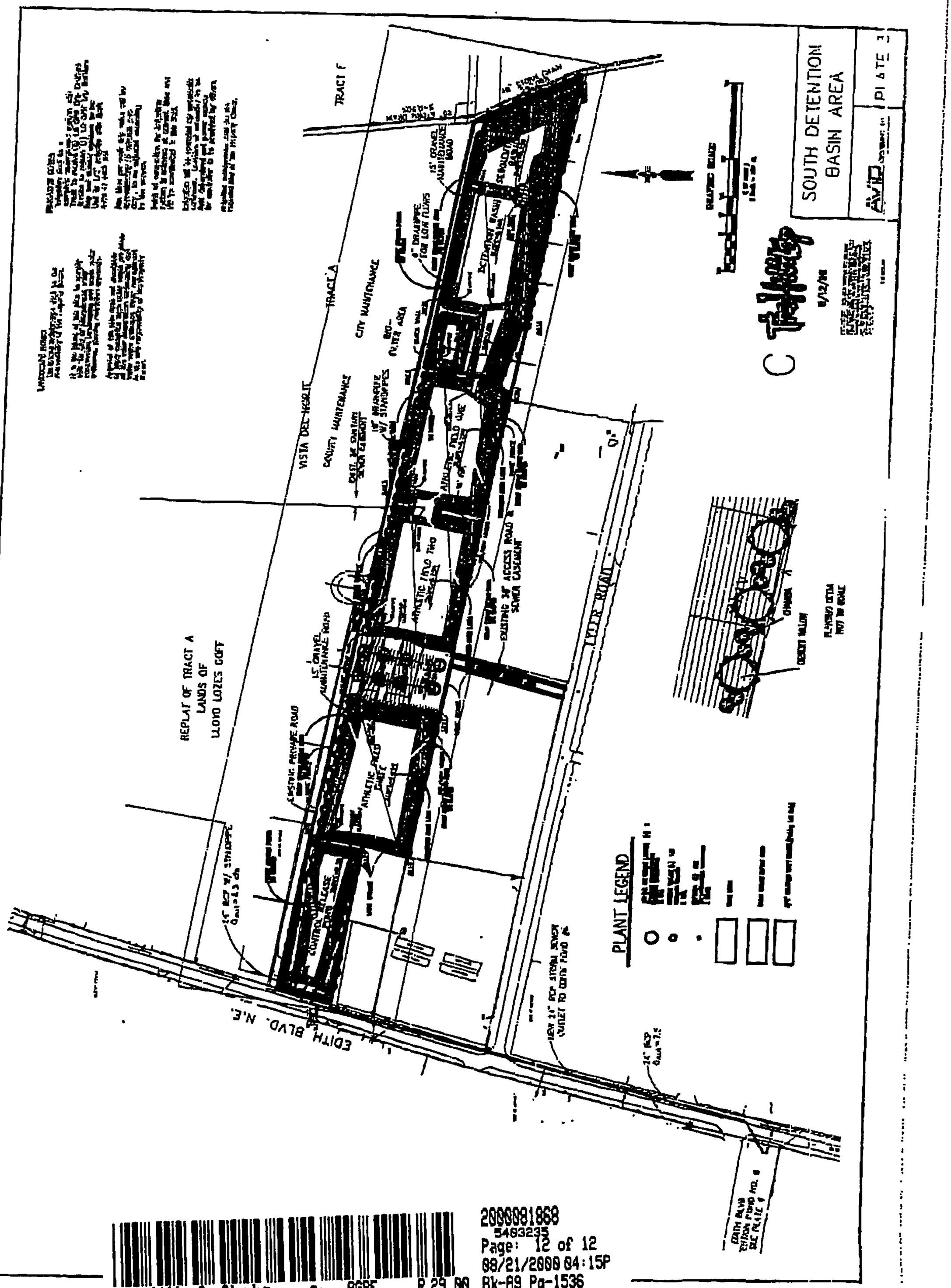
SITE DEVELOPMENT PLAN

CONCEPTUAL POND/PARK LAYOUT

VISTA DEL NORTE

TRACTS 9 AND 10A3, M.R.G.C.D. MAP 29





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Page: 12 of 12
08/21/2000 04:15P
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*** RX REPORT ***
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RECEPTION OK

TX/RX NO	8077
CONNECTION TEL	5052479109
SUBADDRESS	
CONNECTION ID	MYERS OLIVER & P
ST. TIME	12/24 11:32
USAGE T	06'39
PGS.	15
RESULT	OK

MYERS, OLIVER & PRICE, P.C.
1401 Central Ave. NW
Albuquerque, New Mexico 87104
(505) 247-9080
e-mail: jmyers@moplaw.com

TELECOPY COVER SHEET

DATE SENT: December 24, 2003

TO:	Catherine VerEcke	TELECOPIER NUMBER:	314-0480
	Ron Brown	TELECOPIER NUMBER	883-0746
	Richard Dourte	TELECOPIER NUMBER	924-3864
	Fred Aguirre	TELECOPIER NUMBER	924-3864
	Kevin Curran	TELECOPIER NUMBER	924-3440

FROM: John A. Myers, Esq.

TELECOPY NO: **(505) 247-9109** CLIENT/MATTER NO. 3992.0

ENCLOSURE:

TOTAL NUMBER OF PAGES SENT INCLUDING COVER SHEET: 15

COMMENTS:

NOTICE OF CONFIDENTIALITY

This facsimile transmission and any documents or other instruments accompanying it may contain confidential information belonging to Myers, Oliver & Price, or any of its clients, all of which are protected by the attorney-client privilege. The information is intended only for the use of the individual or entity named above. If you have inadvertently received this transmission in error, or otherwise, and are not the intended recipient, please take notice that any disclosure, copying, distributing, communicating or other action on your part in reliance upon, or otherwise involving any party of this transmission, is strictly prohibited. If you have received this transmission in error, please immediately notify Myers, Oliver & Price by telephone to arrange for the return of all documents and other instruments accompanying this transmission.

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 24, 2001

Mark Goodwin, P.E.
Mark Goodwin & Associates
P.O. Box 90606
Albuquerque, New Mexico 87199

RE: **Grading and Drainage Certification**
Vista Del Norte Unit 1 (Osuna & Vista Del Norte Dr NE) (D-16/D2)
Submitted for Release of Financial Guaranty
Engineers Work Order Plans Approved 10/29/1998
Engineer's Certification dated 3/30/2001

Dear Mr. Goodwin:

Based upon the information provided in your submittal dated March 30, 2001, regarding my letter dated March 26, 2001,
- stamping and dating the certification letter
- supplying copies of the grading survey information that the certificaiton was based on

The above referenced plan is adequate to satisfy the Grading and Drainage Certification requirements for Release of Financial Guaranty.

If you have any questions, please call me at 924-3986.

Sincerely,

Bradley L. Bingham, P.E.
Senior Civil Engineer, Hydrology
Public Works Dept., C.O.A.

C: Arlene Portillo, PWD – #5970.81
File

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 25, 2004

Diane Hoelzer, P.E.
Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199

Re: Vista del Norte Unit 3B, SIA/Financial Guarantee Release
Engineer's Stamp dated 10-16-02 (D16/D2)
Certification dated 2-25-04

Dear Ms. Hoelzer,

Based upon the information provided in your submittal received 2-25-04, the above referenced certification is approved for release of SIA and Financial Guarantee.

If you have any questions, you can contact me at 924-3981.

Sincerely,

Kristal D. Metro
Engineering Associate, Planning Dept.
Development and Building Services

C: Arlene Portillo, COA# 682684 (Unit 3B)
File

CITY OF ALBUQUERQUE

September 21, 2007

Diane Hoelzer, PE
Mark Goodwin & Associates
P.O. 90606
Albuquerque, NM 87199

Re: Vista del Norte North Pond Plan and Profile
Engineer's Stamp dated 8-2-07 (D16/D2)

Dear Ms. Hoelzer,

Based upon the information provided in your submittal dated 8-2-07, the above referenced plan is approved for final DRC action on this pond. Please provide Construction a copy of this plan for final close out.

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

Sincerely,

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

C: Paul Olson, Construction Engineering
file

P.O. Box 1293

Albuquerque

New Mexico 87103

www.cabq.gov

City of Albuquerque

P.O. Box 1293 Albuquerque, NM 87103
Public Works Department

January 18, 2001

Certificate of Work Order Completion

City Engineer
600 Second St.
Plaza Del Sol
Albuquerque, NM 87102

Re: Vista del Norte Unit 1 Project No: 5970.81 (Map No. D16 & E16)

Dear Sir:

This is to certify that Project No. 5970.81 has been completed according to approved plans and construction specifications. Please be advised this Certificate of Work-Order Completion does not constitute acceptance of the city infrastructure until all requirements of the subdivision improvements agreement have been satisfied and a Certificate of Completion and Acceptance is issued by the City Engineer.

The project is described as follows:

The work done under this work order provides the backbone infrastructure for Phase 1 of the 420-acre Vista del Norte Development. Phase 1 contains Tracts A, F, I, J, through M, and W.

[Subdivisions have not been constructed on Tracts I, J1, K, and W. They are, respectively, Los Prados del Norte (Project No. 6160.81), Bernardo del Norte (Project No. 6757.81), La Sala del Norte Unit 1, (Project No. 6035.81), and Villa del Norte (Project No. 6132.81). Hereinafter, tract names will usually be used instead of subdivision names.]

The Phase 1 infrastructure systems are described conceptually as follows:

1. The Street System consists of three (temporarily) asphalt concrete curb-and-gutter dead-end streets (with temporary turnarounds): Vista del Norte Drive, Vista Monte Drive, and Bosque Road. Vista del Norte Drive is an arterial, while the other two are local streets.
   a. Vista del Norte Drive, which is the main entrance to Vista del Norte Development, connects to Osuna Road, where turn lanes and a signal light have been installed. Under this work order, it terminates just north of Tracts I and W, but will eventually loop to Ranchitos Road.
   b. Vista Monte Drive terminates just past the north boundary of Tract I under this work order, but will eventually connect to Vista del Norte Drive east of Ranchitos Road.
   c. Bosque Road provides access to the Middle Detention Pond. It will in the future serves as the main entrance to a future subdivision to be developed on Tract A.

Turn lanes and turnouts have been provided to serve future developments on Vista del Norte and Vista Monte Drives.

2. The Storm Drainage Systems has RCP conduits, precast manholes, and Type A inlets. Special manholes - consisting of 4' precast barrels installed on precast intermediate landings installed on conventional cast-in-place bases - were

substituted for all manholes over 4' inch diameter. The Phase I Storm Drainage System consists of two subbasins:

a. The south subbasin is served by the South and West Storm Drains which transport the runnoff from offsite properties east of the development, as well as from Tracts L and M (which adjoin Osuna Road). The south subbasin discharges directly into the multicompartment South Detention Pond.
b. The north subbasin, consisting of the remainder of the Phase I land area, is served by the street storm drainage system (north of the South Storm Drain) which discharges into the Middle Detention Pond.

The Middle Detention Pond allows restricted discharge via a 30" storm sewer to the South Detention Pond which in turn allows restricted discharge via a 24" storm sewer on Edith Boulevard to the ultimate outfall of the Phase 1 runoff into the County's Edith Boulevard Detention Pond No. 6.

Storm sewer stub-outs were provided for Tracts I, J, K, L, M, and W to facilitate storm sewer discharge from future developments in those tracts.

3. The Sanitary Sewer Collection System, which has 8" SDR 35 PVC pipe and precast manholes, consists of sanitary sewers along the centerlines of the three streets collecting at the west end of Bosque Road where the system discharges into a sanitary sewer routed overland across Tract A. The Tract A sanitary sewer discharges into an existing manhole on the north side of the South Detention Pond (which manhole is part of the 42" Edith Interceptor Sanitary Sewer). An odor-control siphon was installed just upstream of this manhole. Sanitary sewer stub-outs(8") were provided for Tracts I, J, K, L, M, and W to facilitate sanitary sewer discharge from future developments in those tracts.
4. The Water Distribution System consists of a 16" ductile iron trunk main (with butterfly valves) on Vista del Norte and Los Lamitas Drives feeding 8" PVC branches (with gate valves) on Vista Monte Drive and Bosque Loop.

   a. The trunk main consists of a 16" loop on Vista del Norte Drive from the 12" main on Osuna Road to a 6" water line on Ranchitos Road. [Eventually, the Vista del Norte trunk will loop to the 42" trunk main on El Pueblo Road via an 18" main on Las Lomitas Drive, but except for the 42"x18" connection to the El Pueblo trunk main, the 18" line has been deferred until a later phase of the backbone infrastructure.]
   b. Branching from the trunk are dead-end 8" water mains and stub-outs on Bosque Loop and Vista Monte Drive, as well as 8" stub-outs on Vista del Norte Drive.

Valved 8" water stub-outs were also provided for Tracts I, J, K, L, M, and W to facilitate dry water hookups for future developments in those tracts.

5. The Streetlight System consists of standard streetlights installed per PNM standards and specifications along the three streets in Phase 1.

Osuna Road Improvements

In the initial stages of the Osuna Road Improvements, three PNM street lights and a fire hydrant were relocated behind the curb line for the new west-bound turn lane. A new 12" PVC water line was installed in the westbound lane after the existing arterial asphalt concrete pavement and underlying aggregate base course above the line were removed. This line included a 12" PVC extension to the south side of Osuna Road near the west end of the 12" main. The arterial pavement over the new line was replaced after the line was successfully hydrostatic and potability tested.

The existing median just west of Osuna Road at Vista del Norte Drive was modified to add an eastbound turn lane. A westbound turn lane was added just east of this intersection by removing part of the north curb and adding new curb and gutter and pavement to it. Arterial pavement was used for the new turn lanes.

A video-controlled traffic signal was installed at the intersection of Osuna Road and Vista del Norte Drive and the required traffic striping was placed along Osuna Road.

Edith Boulevard Storm Sewer

A 24" storm sewer (which transport the discharge from the South Detention Pond) was installed between the county's

Edith Boulevard Detention Pond No. 6 and the outfall pipe from the Control Release Pond at the west end of the South Detention Pond. South of Tyler Street, this storm sewer is on the west side of Edith Boulevard. North of Tyler Street, it is on the east side of Edith Boulevard.

Onsite infrastructre (Outside right-of-ways)

South Storm Drain

A custom-designed drainage structure was installed at the upper (east) end of this system to handle the runoff from the U.S. Forest Service property east of Vista del Norte Development. This structure discharges into an 8" diamter manhole which in turn discharges into a 36" to 48" east-west storm sewer system which crosses Vista del Norte Drive and ends at a storm manhole at the west boundary of Vista del Norte Development (also on the common boundary of Tracts K and L).

West Storm Drain

The discharge manhole for the South Storm Drain is the upper manhole for the West Storm Drain. From that manhole, a 48" storm sewer system was installed which parallels the west boundary of Tract K and discharges into the east end of the South Detention Pond.

Middle Detention Pond

As noted earlier, the Middle Detention Pond detains the 100-year runoff from the street storm sewer system in Phase 1 and releases it gradually via a 30" storm sewer to the South Detention Pond. Excavation of the pond was done during the earlier project to fill the gravel pit that operated on the Vista del Norte Development property earlier in the last century. During the earthwork phase, a maintenance road on the west side of the pond was also constructed.

An impermeable liner was installed on the perimeter slopes of the pond to 6' above and 5' below its floor. Reinforced concrete headwalls with rip-rap aprons were installed for the 60" pipes discharging into the pond from the east and southeast and for the 30" pipe exiting the pond at its southwest corner. Al low-flow valley gutter was installed between the apron for the 60" pipe entering side of the pond and the 30" pipe exiting the southwest corner of the pond.

Gravel surfacing was installed on the maintenance ramp to the floor of the pond from its southwest corner. The perimeter of the pond was fenced, with a 6' pipe fence with wire mesh on the west side and a 6' reinforced concrete block wall elsewhere. A maintenance gate was provided at the southwest corner of the pond.

South Detention Pond

As noted earlier, the multi-compartment South Detention Pond detains the 100-year runnoff from all the land in Phase 1 and releases it gradually via the 30" Edith Road Storm Sewer which discharges into the County's Edith Boulevard Detention Pond No. 6. Excavation of the South Detention Pond was also done during the earlier project to fill the gravel pit that operated on the Vista del Norte Development property earlier in the last century. During the earthwork phase, a maintenance road was also constructed on the north side of the pond (connecting to Edith Boulevard via Vigil Road): it was gravel surfaced during this project.

An impermeable liner was installed in the South Detention Pond as follows:

a. Detention/Sedimentation Basins: Perimeter slopes are lined to 6.5' above and 6' below the floor of the pond.
b. Bio-filter Area and Controlled Release Pond: Perimeter slopes are fully lined from the top of the slope to 3' below the floor of the compartment. The floor of both compartments are fully lined.
c. Athletic Fields one and two: Unlined.
d. Athletic Field Three: The west perimeter slope and the west half of the south perimeter lsope are lined to 7' above and 3' below the floor of the compartment.

Reinforced concrete spillway structures were installed between the Detention Basin & Athletic Field One, between

Athletic Fields One & Two and Two & Three, and at the west end of the Control Release Pond (located at the west end of the South Detention Pond). Standard Portland Cement concrete was used for the spillways between the Detention Basin & Athletic Field One and between Athletic Fields Two &Three; Gunnite was used for the other spillways. An asphalt concrete parking apron was installed on the north and south sides of the spillway between Athletic Fields Two & Three.

Reinforced Gunnite rundowns were installed at the southwest corners of the Sedimention Basin and Athletic Fields Two and Three. A rip-rapped swale was installed above most of the south slope of Athletic Field Three; this swale drains into the pond via the rundown at the southwest corner of the compartment.

Reinforced concrete headwalls with rip-rap aprons were installed for the RCP's discharging into the Sedimentation Basin(the 48" from the east and the 30" from the north) and for the 30" RCP exiting the Controlled Release Pond at the west end of the South Detention Pond.

Low-flow storm sewers were installed between the Detention Basin and the Bio-Filter Area (6" PVC) and between Athletic Field One and the Control Release Pond (18" RCP). Standpipes were installed to collect the low-flow runoff in each compartment. These standpipes are a 6" galvanized pipe (with 2" holes) in the Detention Basin and Single Type D inlets (with sealed covers and two rows of 3" holes on one side) in each of the three athletic fields.

A 6' pipe fence with wire mesh was installed around the perimeter of the Control Release Pond. A maintenance gate was provided at the north east corner of the compartment.

Tract A Storm Sewer

As noted earlier, this 30" storm sewer (in the center of a 30' drainage easement) carries the runof from the Middle Detention Pond to the South Detention Pond. It begins at a manhole south of the Middle Detention Pond near the west end of Bosque Road and travels west 150' to a manhole where it turns south and parallels the east boundary of Tract A before discharging into the north side of the Sedimentation Basin at the east end of the South Detention Pond.

Tract A Sanitary Sewer

As noted earlier, this deep 8" sanitary sewer carries all the Phase 1 sanitary sewage across Tract A (in the center of a 20' sanitary easement) to a previously existing manhole on the north side of the South Detention Pond which is a part of the Edith Interceptor Sanitary Sewer. It begins at the west end of Bosque Road and follows an east-route across Tract A (130' west of its east boundary) to a point 156' east of its west boundary, then turns south for two manholes, then turns southwest to connect to the previously existing manhole.

Vista del Norte Drive

Vista del Norte Drive has arterial pavement throughout its length. South of Vista Monte Drive, Vista del Norte Drive is four lane divided, with two 25' face to face pavement sections widening to 36' in the turn lanes; the 16' median correspondingly narrows to 5' in the turn lanes. North of Vista Monte Drive, Vista del Norte Drive is two lane divided, with 16' face-to-face pavement sections widening to 27' in the turn lanes; the 14' median correspondingly narrows to 3' at the turn lanes. A curb temporary cul-de-sac has been provided at the end of Vista del Norte Drive, which under this work order dead ends just north of Tracts I and W.

A south-bound turn lane (to westbound Osuna) occurs where Vista del Norte Drive connects to Osuna Road. North- and south-bound turn lanes occur at street turnouts at:

a. Station 7+00 (to Tracts L to the west and M to the east);
b. Calle del Camp (to Tracts K to the west to and J to the east);
c. Vista Monte Drive (to Tract J1 to the ease and Vista Monte Drive to the west); and
d. Villa del Valle (to Tracts I to the west and W to the east).

Valley gutters were installed at each turnout.

Standard curb and gutter was installed on both sides of Vista del Norte Drive. Median curb and gutter was installed on the medians. Colored patterned concrete was installed in the narrow stretches of median. Pairs of wheelchair ramps were installed at Osuna Road and at each of the four turnouts listed above.

A meandering 10' asphalt concrete bike and pedestrian trail was installed on the west side of Vista del Norte Drive for its entire length. A meandering 6' concrete sidewalk was installed on the east side of Vista del Norte Drive for its entire length.

Irrigated landscaping was installed in the wide stretches of median on Vista del Norte Drive. A backflow preventor was installed on the irrigation systems at the meter near the south end of Vista del Norte Drive.

Traffic striping was installed on Vista del Norte Drive as directed by the City Traffic Engineer.

Vista del Norte Drive Drainage

The upper end of the street storm sewer system for Phase 1 of Vista del Norte Development occurs at two pairs of curb inlets on Vista del Norte Drive just north of the southern-most turnout (to Tracts L and M). Those inlets feed into a 24" storm sewer which discharges into the South Storm Drain.

North of the South Storm Drain, the Vista del Norte Drive storm sewer system collects at a manhole at Vista Monte Drive. South of Vista Monte Drive, the 54" storm sewer drains north to this manhole. North of Vista Monte Drive, the 30" to 48" storm sewer drains south to the manhole (which is the upper manhole on the Vista Monte Drive sanitary sewer system).

Paired inlets occur on each curb at the turnout to Tract J and about 200' south of Vista Monte Drive. North of Vista Monte Drive, a single inlet occurs on each curb at two locations.
Five storm sewer stub-outs to the east were provided along Vista del Norte Drive to serve adjoining tracts as follows: One 54" at the turnout to Tract J and four for Tract W (three 24" and one 30"; the 30" stub-out is the northernmost one.)

Vista del Norte Drive Sanitary

The upper end of the 8" street sanitary sewer system for Phase 1 of Vista del Norte Development occurs at a manhole located just south of the South Storm Drain crossing of Vista del Norte Drive. The system drains north from that manhole to Vista Monte Drive.

The adjoining land north of Vista Monte Drive, Tracts I and W - Los Prados del Norte and Villa del Norte Subdivisions, respectively - is served by an 8" sanitary sewer through Tract I which was constructed during the construction of Villa del Norte Subdivision (on Tract W). An eastwest 8" stub-out was installed during this project at Villa del Valle to facilitate connection of the Villa del Norte Subdivision sanitary sewer system to the sanitary sewer through Tract I. Other 8" sanitary sewer stub-outs were installed to serve future developments on Tract L and M.

Vista del Norte Drive Water

The 16" water main on Vista del Norte Drive is part of the 16"-18" trunk main for Vista del Norte Development. It extends from the 12" water main on Osuna Road past the temporary cul-de-sac at the end of the paving on Vista del Norte Drive and northward in the center of the 68" public road-way easement (for the future extension of Vista del Norte Drive). The 16" line dead ends 172' north of the intersection of the future Vista del Norte and Las Lomitas Drives and branches to a 16" main on the future Las Lomitas Drive at that intersection.

The Vista del Norte Drive water system includes 8" stub-outs from the 16" trunk main at the street turnouts serving Tracts I, J, J1, L, and W. Four 8" stub-outs past back-of-curb were installed at 400' foot intervals north of the temporary cul-de-sac at the end of the pavement to serve future developments adjoining Vista del Norte Drive. A 4" waterline branch was extended south from the 8" water stub-out to Tract L for the landscaping meter in the median of Vista del Norte Drive; a backflow preventer was installed just upstream of the meter.

Fire hydrants were installed on Vista del Norte Drive at the street turn outs to Tracts I, L, and W. Fire hydrants were also installed on the four 8" stub-outs north of the temporary cul-de-sac at the end of the pavement.

Los Lamitas Drive (water only)

The 16" water main on Los Lamitas Drive is part of the 16"-18" trunk main for Vista del Norte Development. It extends from the 16" main on (the future) Vista del Norte Drive down the center of the 68' public road easement (which will in the future be Los Lamitas Drive). The 16" main ends at a butterfly valve at station 21+65.79 on Los Lamitas Drive.

[At that valve, the deferred 18" water main will be extended in a future project to connect to the 42"x18" stub-out from the 42" trunk main on El Pueblo Road. The 42"x18" stub-out was installed under Project No. 5970.82.]

Six 8" stub-outs past back-of-curb were installed at 400' intervals to serve future developments adjoining Las Lomitas Drive. Fire hydrants were installed at the end of each stub-out.

Vista Monte Drive Paving and Concrete work

Vista Monte Drive extends from Vista del Norte Drive to a curbed temporary cul-de-sac just north of Tract I. It has a 32' fact-to-face residential pavement except from the segment nearest to Vista del Norte Drive which widens to 36' face-to-face to accommodate a turn lane (to southbound Vista del Norte Drive). Vista Monte Drive has standard curb and gutter on both sides and a standard 4' sidewalk on its north side; the sidewalk on the south side is deferred.

A pair of wheelchair ramps was installed at Vista del Norte Drive and two pairs of wheelchair ramps were installed at Via Chamisa [which is an entrance to the subdivisions in Tract I (Lost Prados) and K (La Sala del Norte Unit 1)]. Valley gutters were also installed at Via Chamisa on both sides of Vista Monte Drive.

Vista Monte Drive Drainage

The upper end of the Vista Monte Drive drainage system is the manhole on Vista del Norte Drive (which collects all of the runoff from the storm drainage system on Vista del Norte Drive). Downstream of that manhole, the 60" storm sewer carries the runoff to a manhole at the inter-section of Vista Monte Drive and Bosque Road. Pairs of curb inlets were installed east of Via Chamisa and southeast of Bosque Road. No storm sewer stub-outs were provided on Vista Monte Drive.

Vista Monte Drive Sanitary

The upper end of the Vista Monte Drive sanitary sewer system is the manhole on Vista del Norte Drive (which collects all of the discharge from the sanitary sewer system on that street). Downstream of that manhole, the 8" sanitary sewer carries the sanitary sewage to a manhole at the intersection of Vista Monte Drive and Bosque Road. North of Bosque Road, the 8" sanitary sewer on Vista Monte Drive drains southward to this manhole (which is the upper manhole on the Bosque Road sanitary sewer system). An 8" sanitary sewer stub-out was provided on the north side of Vista Monte Drive at Via Chamisa to facilitate a future hookupfor the subdivision in Tract I (Los Prados del Norte).

Vista Monte Drive Water

The 8" water main on Vista Monte Drive extends from the 16" main on Vista del Norte Drive to a dead end just north of the temporary cul-de-sac at the north end of the street. It branches to the 8" water main on Bosque Road. Stub-outs (8") were provided for the subdivisions on Tracts I (Los Prados del Norte) and K (La Sala del Norte Unit 1).

Bosque Road Paving and Concrete work

Bosque Road, which will eventually provide access to a subdivision on Tract A, extends from Vista Monte Drive westward and dead ends at the Tract A east boundary. It has a 32' face-to-face residential pavement, and standard curb and gutter on both sides. Bosque Road has no sidewalks. A valley gutter and a pair of wheelchair ramps were installed

at Vista Monte Drive.

Bosque Road Drainage

The upper end of the Vista Monte Drive drainage system is the manhole on Vista del Norte Drive (which collects all the runoff from the storm drainage system on that street). Downstream of that manhole, the 60" storm sewer carries the runoff to a manhole at the intersection of Vista Monte Drive and Bosque Road. Pairs of Type A curb inlets were installed east of Via Chamisa and southeast of Bosque Road. No storm sewer stub-outs were provided on Vista Monte Drive.

Bosque Road Sanitary

The upper end of the Bosque Road sanitary sewer system is the manhole on Vista Monte Drive (which collects all the discharge from the Phase I sanitary sewer system upstream of it). Downstream of that manhole, the 8" line carries the sanitary sewage to a manhole 156' west of the west end of Bosque Road (which is the upper manhole for the Tract A sanitary sewer system described earlier). An 8" sanitary sewer stub-out was provided to serve Tract K.

Bosque Road Water

The 8" water main on Bosque Road extends from the 8" main on Vista Monte Drive to a dead end just west of the west end of the street. An 8" stub-out was provided for a future subdivision on Tract K.

Other Right-of Way Infrastructure

Public streetlights. Public streetlights were installed by PNM throughout Phase I

The contractor's correction period will begin the date of the City Engineers Certificate of Completion and Acceptance letter and is effective for a period of one (1) year.

Sincerely,

Peter Chang 1/22/01

Peter Chang, P.E.
Chief Construction Engineer
Public Works Department

c: Sundt Construction
HMS Consulting
Project Administrator
Master Scheduler
Martin Barker, Materials Testing Lab
Sam Hall, Water Systems
Dave Harmon, Traffic Engineering, PWD
Josie Jaramillo, New Meter Sales, PWD
Maps & Records, PWD
Project No. 5970.81
Warranty:Contract

VDN

SCS-ENG-353 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO _____

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	SOIL CLASSIFICATION

PROJECT and STATE: Vista Del Norte			SAMPLE LOCATION
FIELD SAMPLE NO.: 10	DEPTH: 2'	GEOLOGIC ORIGIN	
TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
SYMBOL: SP-SM	DESCRIPTION: SAND, silty, gravelly		

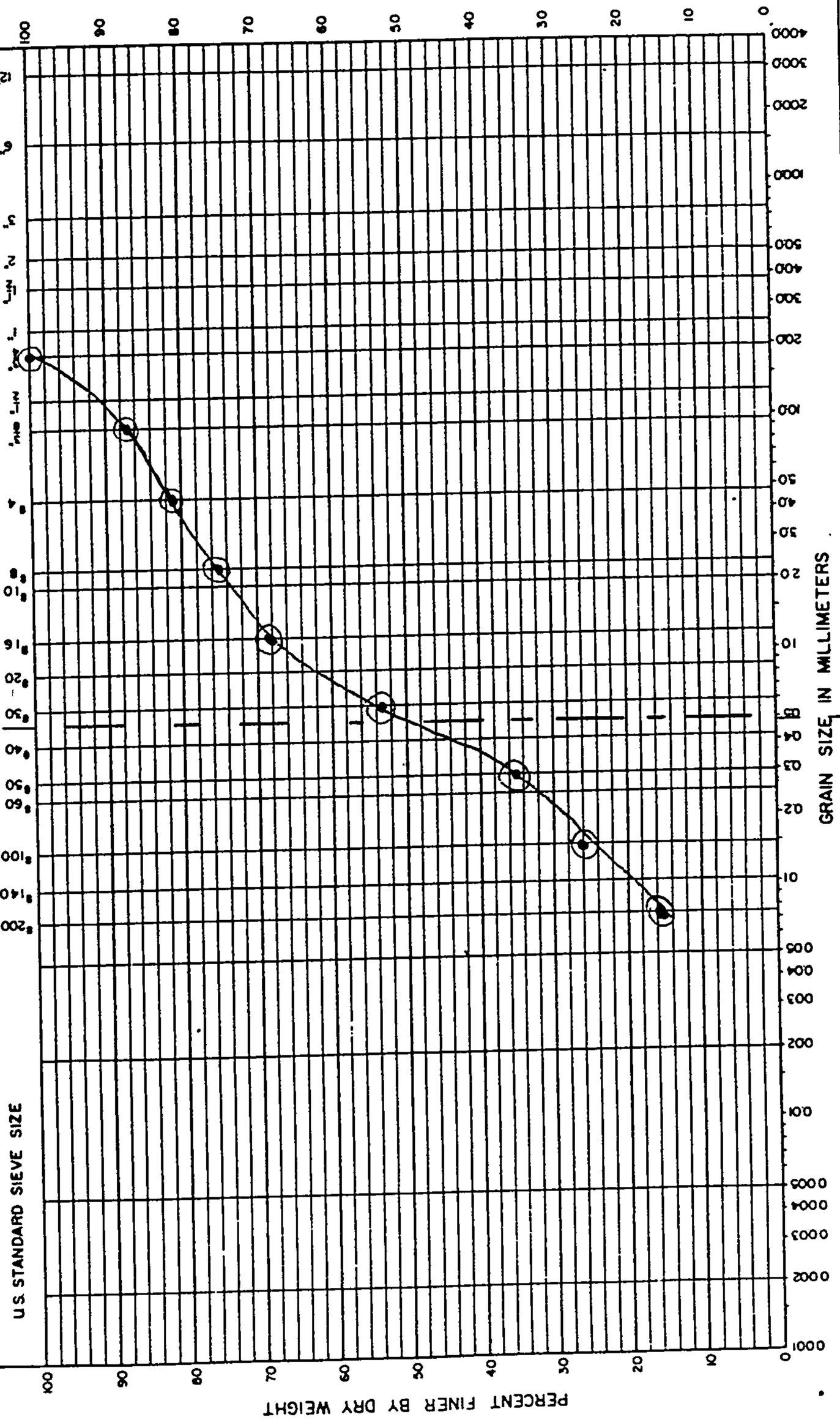
GRAIN SIZE DISTRIBUTION

C_c | C_u | D_{MAX} | D_{85} | D_{60} | D_{50} = .48mm | D_{30} | D_{15} | D_{10}

COBBLES | GRAVELS | SANDS | FINES

SIEVE OPENING, (mm): (304.8) (152.4) (76.1) (50.8) (38.1) (25.4) (19.0) (12.7) (9.51) (4.76) (2.36) (2.00) (1.19) (0.841) (0.595) (0.420) (0.297) (0.250) (0.149) (0.105) (0.074)

U.S. STANDARD SIEVE SIZE: 12" 6" 3" 2" 1½" 1" ¾" ½" ⅜" #4 #8 #10 #16 #20 #30 #40 #50 #60 #100 #140 #200



UNDISTURBED CONDITION		
MOISTURE	%	
DRY UNIT WEIGHT	g/cc	
	pcf	

SHRINKAGE LIMIT	%
SOLUBLE SALTS	%

ATTERBERG LIMITS

	AIR DRY		OVEN DRY		NATURAL MOISTURE	
	LL	PI	LL	PI	LL	PI

SPECIFIC GRAVITY (G_s): (−) #4 | (+) #4

REMARKS: % Sand = 81-15 = 66
% silt = 15

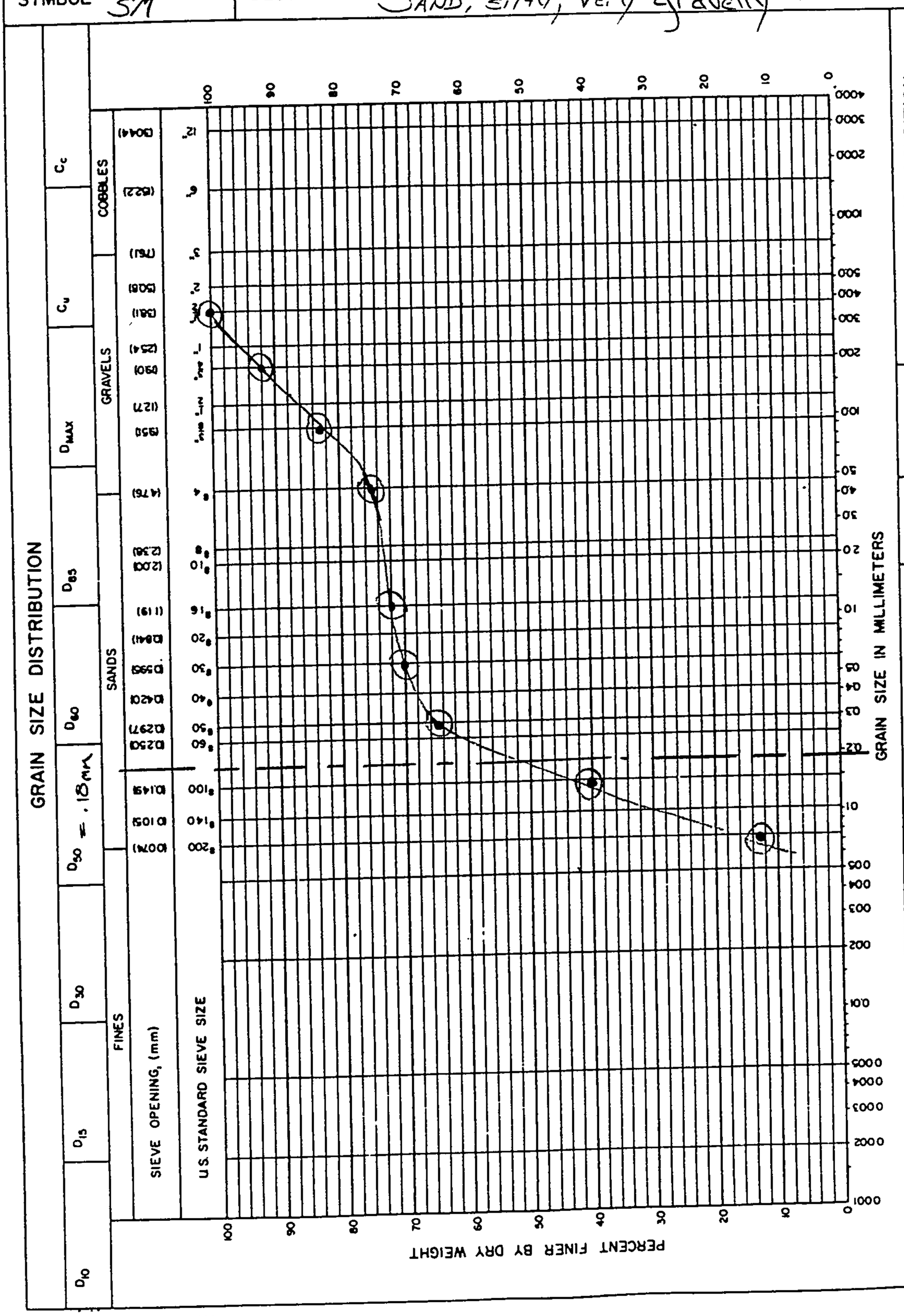
USDA SCS HYATTSVILLE MD 1966

SCS-ENG-353 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO _____

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	SOIL CLASSIFICATION

PROJECT and STATE: Vista Del Norte			SAMPLE LOCATION
FIELD SAMPLE NO.: 9	DEPTH: 2'	GEOLOGIC ORIGIN	
TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
SYMBOL: SM	DESCRIPTION: SAND, silty, very gravelly		



UNDISTURBED CONDITION		
MOISTURE	%	DRY UNIT WEIGHT g/cc pcf
SHRINKAGE LIMIT	%	
SOLUBLE SALTS	%	

ATTERBERG LIMITS

	NATURAL MOISTURE		AIR DRY		OVEN DRY	
	LL	PI	LL	PI	LL	PI
SPECIFIC GRAVITY (G_s) (+) #4						
(-) #4						

REMARKS:

% sand = 75 - 13 = 62
% silt = 13

USDA SCS HYATTSVILLE MD 1966

SCS-ENG-353 (REV. 3-70)
FILE CODE ENG-22

LABORATORY NO _____

MATERIALS TESTING REPORT	U. S. DEPARTMENT of AGRICULTURE SOIL CONSERVATION SERVICE	SOIL CLASSIFICATION

PROJECT and STATE: Vista del Norte			SAMPLE LOCATION
FIELD SAMPLE NO.: 5	DEPTH: 2'	GEOLOGIC ORIGIN	
TYPE OF SAMPLE	TESTED AT	APPROVED BY	DATE
SYMBOL: SM	DESCRIPTION: SAND, silty, sli. gravelly		

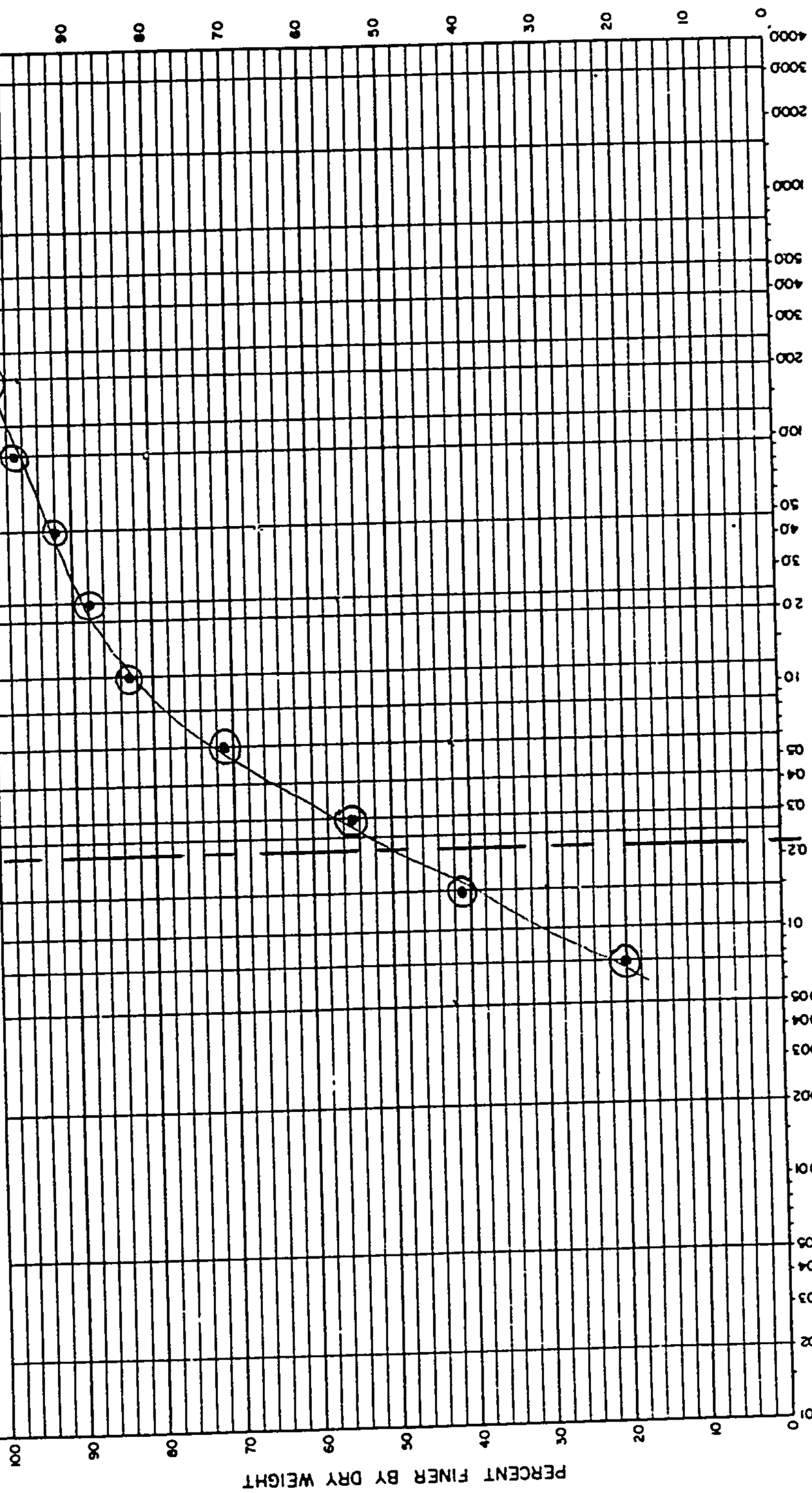
GRAIN SIZE DISTRIBUTION

C_c | C_u | D_{MAX} | D_{85} | D_{60} | D_{50} = .25mm | D_{30} | D_{15} | D_{10}

COBBLES | GRAVELS | SANDS | FINES

SIEVE OPENING, (mm): (304) (152) (76) (50) (38) (25) (19) (12) (9.5) (4.76) (2.36) (2.00) (1.19) (0.841) (0.595) (0.420) (0.297) (0.250) (0.149) (0.105) (0.074)

U.S. STANDARD SIEVE SIZE: 12" 6" 3" 2" 1½" 1" ¾" ½" ⅜" #4 #8 #10 #16 #20 #30 #40 #50 #60 #100 #140 #200



ATTERBERG LIMITS

	NATURAL MOISTURE		AIR DRY		OVEN DRY	
	LL	PI	LL	PI	LL	PI
SPECIFIC GRAVITY (G_s) (+) #4						
SPECIFIC GRAVITY (G_s) (−) #4						

SOLUBLE SALTS %	SHRINKAGE LIMIT %	UNDISTURBED CONDITION: MOISTURE %	DRY UNIT WEIGHT: g/cc, pcf

REMARKS:

% sand = 100 − 90 = 10
% silt = 90 − 20 = 70

USDA SCS HYATTSVILLE MD 1966

AVID ENGINEERING, INC.

$$\text{Ave } D_{50} = \frac{\sum_{i=1}^{n} D_{50}}{n}$$

$$D_{50\ \text{Ave}} = \frac{.48 + .18 + .23}{3} = \boxed{.30\text{mm} = \bar{D}_{50}}$$

$$\overline{\%\ \text{sand}} = \frac{66 + 62 + 70}{3} = 66$$

$$\overline{\%\ \text{silt}}^{*} = \frac{15 + 13 + 20}{3} = 16$$

* assumes no clay in #200 + passing

PROJECT NAME _____ SHEET _____ OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

Time of Concentration Calculations

Basin D

subbasin reach length is less than 4000 ft.
∴ Compute time of concentration, t_c (hours), For the entire (pervious & impervious) watershed by the SCS Upland Method.

$$t_c = (L_1/V_1 + L_2/V_2 + \ldots L_x/V_x) / 3600 \text{ sec/hr.}$$

&

$$(L_1 + L_2 + \cdots + L_x) < 4000 \text{ ft.}$$

where L_x is the subreach length & V is the velocity (feet/sec) in that subreach, as determined by the following equation:

$$V = K * \sqrt{(S * 100)} = 10 * K * \sqrt{S}$$

where s is the slope in foot per foot, and K depends upon the conveyance condition, as shown in Table B-1 of DPM section 22.2. If t_c is computed to be less than 0.2 hrs., use t_c = 0.2 hours.

$L_1 = 2000'$ $S_1 = 0.005$ ft/ft $K_1 = 3$ (street flow & stormsewers)

$$V_1 = 10 * 3 * 0.005^{1/2} = 2.12$$

$$t_c = \left(\frac{2000}{2.12}\right) / 3600 = .26 \text{ hr}$$

PROJECT NAME _____ SHEET _____ OF _____
PROJECT NO. _____ BY _____ DATE _____
SUBJECT _____ CH'D _____ DATE _____

AVID ENGINEERING, INC.

Basin J – reach < 4000'

$L_1 = 1500$ $S_1 = 0.012$ $K = 3.0$

$L_2 = 400$ $S_2 = 0.05$ $K = 0.7$

$V_1 = 10 * 3 * 0.012^{1/2} = 3.29$

$V_2 = 10 * 0.7 * 0.05^{1/2} = 1.57$

$t_c = \left(\frac{1500}{3.29} + \frac{400}{1.57} \right) / 3600 \, s/hrs = 0.197$

use $t_c = 0.20$

PROJECT NAME _____ SHEET _____ OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

AVID ENGINEERING, INC.

Basin A - Ponding Requirements

$V_{360} = 2.33$ ac-ft

$V_{10day} = V_{360} + A_D * (P_{10days} - P_{360}) / 12 in/ft$

$A_D = (35\%$ Land Treatment D$)(19.94$ acres$)$

$A_D = 6.98$ acres

$P_{10day} = 3.95''$, $P_{360} = 2.35''$ (from Table A-2 DPM 22.2)

$V_{10\ day} = 2.33 + 6.98$ ac. $(3.95'' - 2.35'') / 12 in/ft$

$V_{10\ day} = 3.26$ ac-ft

PROJECT NAME _____ SHEET _____ OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

AVID ENGINEERING, INC.

WEST BASIN – PONDING REQUIREMENTS

SITE RUNOFF —

From AHYMO 194 analysis

On-site runoff (100yr-6hr) = 0.248 Ac-ft

OFF-SITE RUNOFF —

The grade transistion from Tracts "B" & "C" to the West Tract fronting Edith Blvd. contributes offsite flows.

Contributing Area: 2-25' wide x 300' length Landscape Esmts.
1-60' wide x 300' Length ROW

∴ 1) .34 acres Landscape Easment with
7% Type D Land Treatment
93% Type B Land Treatment

2) .47 acres ROW with
90% Type D Land Treatment
10% Type B Land Treatment

Equivalent site
.81 acres 55.2% Type D (0.45 Ac)
44.8% Type B

USING PRECIPITATION ZONE II
Excess Runoff Type D Land Treatment = 2.12"
" " " B " " 0.78"

WEIGHTED EXCESS RUNOFF:

$E_W = 55.2\%(2.12") + 44.8\%(0.78")$

$E_W = 1.52"$

DETERMINE RUNOFF VOLUME FROM OFFSITE FLOWS FOR 100-year SIX-HOUR STORM.

$V_{360} = (1.52" \text{ Excess})(\frac{1'}{12"})(.81 \text{ acres})$

$V_{360} = 0.10 \text{ Ac-ft}$

PROJECT NAME _____ SHEET _____ OF _____
PROJECT NO. _____ BY _____ DATE _____
SUBJECT _____ CH'D _____ DATE _____

AVID ENGINEERING, INC.

Adjust off-site runoff for sediment using Basin C & B sediment values.

Basin C = 1.06 Basin B = 1.04 USE 1.05

$V_{360} = 1.05 \times (0.10\ ac\text{-}ft) = 0.105\ ac\text{-}ft$

TOTAL 100yr - 6 hr RUNOFF

TOTAL = SITE + OFFSITE

TOTAL RUNOFF = 0.298 + 0.105 = 0.386 ac-ft

$V_{T\,360} = 0.353\ ac\text{-}ft$

$V_{10\,day} = V_{360} + A_D * (P_{10\,days} - P_{360}) / 12\ in/ft$

$P_{10\,days} = 3.95$, $P_{360} = 2.35$ (Table A-2 DPM 22.2)

$A_D = (80\%D)(1.60\,ac) + (55.2\%D)(81\,ac)$

%D WEST BASIN % D OFFSITE

$A_D = 1.73\ ac$

$V_{10\,day} = 0.353\ ac\text{-}ft + 1.73\,ac(3.95 - 2.35)/12\,in/ft$

$V_{10\,day} = 0.58\ ac\text{-}ft$

PROJECT NAME _____ SHEET _____ OF _____

PROJECT NO. _____ BY _____ DATE _____

SUBJECT _____ CH'D _____ DATE _____

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EXHIBIT A
TO SUBDIVISION IMPROVEMENT AGREEMENT
DEVELOPMENT REVIEW BOARD
REQUIRED INFRASTRUCTURE LISTING

VISTA DEL NORTE

DRB Case No.:	DRB-98-71
DRC Project No.:	
Prelim. Plat Approved:	
Prelim. Plat Expires:	
Site Plan Approved:	
Date Submitted:	3 / 17 / 98

Following is a summary of PUBLIC/PRIVATE Infrastructure required to be constructed or financially guaranteed for the above development. This summary is not necessarily a complete listing. During CPC, BCC, the design process and/or in the preparation of the construction drawings, if the City, County, and/or AMAFCA determines that appurtenant items have not been included in the summary, those items will be included in the listing and related financial guarantee, if the items normally are the Subdivider's responsibility. In addition, any unforeseen items which arise during construction which are necessary to complete the project and which normally are the Subdivider's responsibility are the responsibility of the Subdivider and will be included in the financial guarantee provided to the City, County, and/or AMAFCA.

ITEM	LOCATION	FROM	TO
PHASE 1 (Tracts A, F, J, K, L, M)			
PAVING			
2-25' F-F Arterial Paving w/standard C&G, median C&G 6' sidewalk east side, and 10' Bicycle/Pedestrian Trail west side	Vista del Norte Drive	Osuna Rd.	North Property Line of Tract F
2-16' F-F Arterial Paving w/standard C&G, 4' sidewalk east side, and 10' Bicycle/Pedestrian Trail west side	Vista del Norte Drive	North Property Line of Tract F	North Property Line of Tract J
12'x150' Arterial Paving deceleration lane	Osuna Road On Westbound Approach	Vista del Norte Dr. Intersection	
12' Wide Arterial Paving 2nd left-turn lane	Vista del Norte Drive On Southbound Approach	Osuna Road Intersection	

Figure II
EXHIBIT "D"
Page 2

ITEM	LOCATION	FROM	TO
PAVING (continued)			
12' Wide Arterial Paving left-turn lane	Osuna Road On Eastbound Approach	Vista Del Norte Dr. Intersection	
24' Wide Temporary Paving	Tract F	Vista del Norte Dr.	Tract A
Signalization	Vista Del Norte/Osuna Intersection		
Residential Street Lights per DPM			
SANITARY SEWER			
8" SAS	Vista del Norte Drive	North Property Line of Tract F	North Property Line of Tract J
8" SAS	Vista del Norte Drive	North Property Line of Tract F	North Property Line of Tract M
8" SAS	North and East Property Line of Tract A	West Property Line of Tract A (existing 36" line)	North and West Property Line of Tract F
8" SAS	North Property Line of Tract F	East Property line of Tract A	Vista del Norte Dr.
WATER			
16" Waterline	Vista Del Norte Drive	Osuna Rd.	Las Lomitas Dr.
12" Waterline	Osuna Road	Existing 10" Line at Tokay Court connecting at south side of Osuna Blvd.	Vista del Norte Dr.
8" Waterline	North Property Line of Tract F	Vista del Norte Dr.	Tract A

ITEM	LOCATION	FROM	TO
WATER (continued)			
18" Waterline	Las Lomitas Drive	El Pueblo Rd.	1600 feet south
16" Waterline	Las Lomitas Drive	1600 feet south of El Pueblo Rd.	Vista del Norte Dr.
10" Waterline	Within 25' Public Utility Easement 1600 feet south of El Pueblo Rd.	Las Lomitas Dr.	Existing 6" waterline in Ranchitos Rd.
DRAINAGE			
City of Albuquerque			
Drainage Pond	Tract T		
Drainage Ponds	Tracts 9 and 10A3 MRGCD Map No. 29	West Property Line of Tract K	Edith Blvd.
30" RCP	Tract J	East Property Line of Tract M	Vista del Norte Dr.
48" RCP	Vista del Norte Drive	North Property Line of Tract M	550 feet north of Tract M
48" RCP	Vista del Norte Drive	550 feet north of Tract M	750 feet north of Tract M
66" RCP	30' Drainage Easement in Tract K	Vista del Norte Dr.	West Property Line of Tract K
42" RCP	Vista del Norte Drive	North Property Line of Tract J	North Property Line of Tract F
42" RCP	50' Access, Drainage, & Utility Easement in Tract F	Vista del Norte Dr.	600 feet west

ITEM	LOCATION	FROM	TO
DRAINAGE (continued)			
48" RCP	50' Access, Drainage, & Utility Easement in Tract F	600 feet west of Vista del Norte Dr.	Tract T Drainage Pond
30" RCP	West Property Lines of Tracts F and K	Tract T Drainage Pond	Tracts 9 and 10A3 MRGCD Map No. 29 Drainage Pond
Bernalillo County			
Drainage Ponds	Tracts 9 and 10A3 MRGCD Map No. 29	West Property Line of Tract K	Edith Blvd.
24" RCP	Edith Blvd.	Tracts 9 and 10A3 MRGCD Map No. 29 Drainage Pond	Edith Blvd. Detention Basin No. 6 (County Facility)

Grading and Drainage Certification is required prior to release of Financial Guarantees

NOTES:
1) Waterlines include valves, fittings and services.
2) Storm Drain includes catch basins, connector pipes, manholes and outlet structures.
3) Sanitary Sewer Lines include manholes and services.
4) Paving Items include street lighting and sidewalks.

Signed By:_____
Print Name:_____
Firm:_____

Figure II
EXHIBIT "D"
Page 5

ITEM	LOCATION	FROM	TO

DEVELOPMENT REVIEW BOARD MEMBERS

Traffic	Date	AMAFCA	Date
City Engineer	Date	DRB Chairperson	Date
Utility Development	Date	BCPWD DRE	Date
Parks & General Services	Date	BCPWD DRAN	Date

SUMMARY OF HYDRAULIC CALCULATIONS
CLOSED CONDUIT 3/17/98

n = 0.013

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
										JUNCTION		LOSSES											
STATION	STRUCT	D	Q	A	V	K	Sf	L	DELTA	D	ANGLE	hf	hb	hj	hmh	ht	hmisc	SUM	E.G.	hv	H.G.	GROUND ELEV.	COMMENT
SOUTH	POND																				5020.00		
	OUTFALL																	0.00	5024.25	4.25	5020.00	5040.00	
		60.00	325	19.64	16.55	2606	0.0156	450				7.00						7.00	5031.25	4.25	5027.00		
	MH												0.00	0.00	0.22	0.04		0.27	5031.52	4.48	5027.05	5047.00	
		54.00	270	15.90	16.98	1967.6	0.0188	425				8.00						8.00	5039.52	4.48	5035.05		
	MH/B/J								90	36	90		0.51	5.50	0.00	0.00		6.01	5045.53	2.55	5042.98	5049.00	
		48.00	161	12.57	12.81	1437.2	0.0125	132				1.66						1.66	5047.19	2.55	5044.64		
	MH/B/J												0.00	0.00	0.13	0.00		0.13	5047.32	2.55	5044.77	5053.00	
		48.00	161	12.57	12.81	1437.2	0.0125	400				5.02						5.02	5052.34	2.55	5049.79		
	MH								90				0.27	0.00	0.07	-0.24		0.10	5052.44	1.36	5051.08	5054.00	
		30.00	46	4.91	9.37	410.33	0.0126	550				6.91						6.91	5059.35	1.36	5057.99		
	MH/J												0.00	0.00	0.07	0.00		0.07	5059.42	1.36	5058.06	5061.00	
		30.00	46	4.91	9.37	410.33	0.0126	550				6.91						6.91	5066.33	1.36	5064.97		
	MH/B												0.00	0.00	0.00	0.00		0.00	5066.33	0.00	5066.33	5070.00	
		30.00	0	4.91	0.00	410.33	0.0000	0				0.00						0.00	5066.33	0.00	5066.33		
	INLET												0.00	0.00	0.00	0.00		0.00	5066.33	0.00	5066.33	5076.00	
		30.00	0	4.91	0.00	410.33	0.0000	0															
																					5042.98		
	TIE-IN												0.00	0.00	0.06	0.24		0.30	5044.47	1.19	5043.28	5050.00	
		48.00	110	12.57	8.75	1437.2	0.0059	450				2.64						2.64	5047.11	1.19	5045.92		
	MH/B												0.00	0.00	0.00	0.00		0.00	5047.11	0.00	5047.11	5048.00	
		48.00	0	12.57	0.00	1437.2	0.0000	0				0.00						0.00	5047.11	0.00	5047.11		
																					5020.00		
	OUTFALL																	0.00	5024.77	4.77	5020.00	5040.00	
		30.00	86	4.91	17.52	410.33	0.0439	550				24.16						24.16	5048.93	4.77	5044.16		
	INLET												0.00	0.00	0.24	0.00		0.24	5049.16	4.77	5044.40	5053.00	
		30.00	86	4.91	17.52	410.33	0.0439	0															
MIDDLE	POND																				5026.50		
	OUTFALL																	0.00	5028.57	2.07	5026.50	5032.00	
		48.00	145	12.57	11.54	1437.2	0.0102	385				3.92						3.92	5032.49	2.07	5030.42		
	MH/J												0.00	0.00	0.10	0.00		0.10	5032.59	2.07	5030.52	5039.00	
		48.00	145	12.57	11.54	1437.2	0.0102	90				0.92						0.92	5033.51	2.07	5031.44		
	MH/J												0.00	0.00	0.11	0.03		0.14	5033.65	2.22	5031.43	5040.00	
		42.00	115	9.62	11.95	1006.6	0.0131	450				5.87						5.87	5039.52	2.22	5037.30		
	MH												0.00	0.00	0.11	0.00		0.11	5039.63	2.26	5037.38	5044.00	
		42.00	116	9.62	12.06	1006.6	0.0133	150				1.99						1.99	5041.63	2.26	5039.37		
	MH								90				0.45	0.00	0.11	0.00		0.56	5042.19	2.26	5039.93	5045.00	
		42.00	116	9.62	12.06	1006.6	0.0133	200				2.66						2.66	5044.85	2.26	5042.59		
	MH												0.00	0.00	0.00	0.00		0.00	5044.85	0.00	5044.85	5047.00	
		42.00	0	9.62	0.00	1006.6	0.0000	0				0.00						0.00	5044.85	0.00	5044.85		
																					5026.50		
	OUTFALL												0.00	0.00	0.03	0.12		0.16	5027.28	0.62	5026.66	5032.00	
		42.00	61	9.62	6.34	1006.6	0.0037	600				2.20						2.20	5029.48	0.62	5028.86		
	MH/B												0.00	0.00	0.00	0.00		0.00	5029.48	0.00	5029.48	5032.00	
		42.00	0	9.62	0.00	1006.6	0.0000	0				0.00						0.00	5029.48	0.00	5029.48		
																					5026.50		
	OUTFALL																	0.00	5027.38	0.88	5026.50	5039.00	
		60.00	148	19.64	7.54	2606	0.0032	465				1.50						1.50	5028.88	0.88	5028.00		
	MH/B												0.00	0.00	0.04	0.00		0.04	5028.92	0.87	5028.05	5038.00	
		54.00	119	15.90	7.48	1967.6	0.0037	475				1.74						1.74	5030.66	0.87	5029.79		
	MH/B												0.00	0.00	0.01	0.00		0.01	5030.67	0.23	5030.44	5035.00	
		54.00	61	15.90	3.84	1967.6	0.0010	450				0.43						0.43	5031.10	0.23	5030.88		
	INLET												0.00	0.00	0.00	0.00		0.00	5031.10	0.00	5031.10	5032.00	
		54.00	0	15.90	0.00	1967.6	0.0000	0															
PIPE BETWEEN PONDS																					5020.00		
	OUTFALL																	0.00	5020.23	0.23	5020.00	5034.00	
		24.00	12	3.14	3.82	226.29	0.0028	150				0.42						0.42	5020.65	0.23	5020.42		
	MH/B												0.00	0.00	0.01	0.00		0.01	5020.66	0.23	5020.43	5037.00	
		24.00	12	3.14	3.82	226.29	0.0028	450				1.27						1.27	5021.93	0.23	5021.70		
	INLET												0.00	0.00	0.00	0.00		0.00	5021.93	0.00	5021.93	5038.50	
		24.00	0	3.14	0.00	226.29	0.0000	150															

SUMMARY OF HYDRAULIC CALCULATIONS
CLOSED CONDUIT 3/17/98

n = 0.013

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
										JUNCTION		LOSSES											
STATION	STRUCT	D	Q	A	V	K	Sf	L	DELTA	D	ANGLE	hf	hb	hj	hmh	ht	hmisc	SUM	E.G.	hv	H.G.	GROUND ELEV.	COMMENT
NORTH	POND																				5016.10		
	OUTFALL																	0.00	5018.14	2.04	5016.10	5030.00	
		84.00	442	38.48	11.47	6393	0.0048	250				1.19						1.19	5019.34	2.04	5017.29		
	MH/B/J/J/J								35	36	90		0.12	5.19	0.00	0.00		5.31	5024.65	0.99	5023.66	5030.00	
		48.00	100	12.57	7.99	1437.2	0.0049	450				2.20						2.20	5026.85	0.99	5025.86		
	MH												0.00	0.00	0.05	0.00		0.05	5026.90	0.99	5025.90	5030.00	
		48.00	100	12.57	7.99	1437.2	0.0049	195				0.95						0.95	5027.85	0.99	5026.86		
	INLET									36	90		0.00	1.98	0.00	0.00		1.98	5029.83	0.00	5029.83	5030.00	
		48.00	0	12.57	0.00	1437.2	0.0000	0															
																					5023.66		
	TIE-IN												0.00	0.00	0.08	0.32		0.39	5025.63	1.58	5024.05	5030.00	
		66.00	239	23.76	10.08	3360.3	0.0051	450				2.28						2.28	5027.91	1.58	5026.34		
	MH												0.00	0.00	0.08	0.00		0.08	5027.99	1.57	5026.42	5030.50	
		66.00	239	23.76	10.06	3360.3	0.0051	450				2.28						2.28	5030.27	1.57	5028.70		
	MH/B								15	36	90		0.07	2.41	0.00	0.00		2.48	5032.75	0.84	5031.91	5033.00	
		54.00	117	15.90	7.37	1967.6	0.0035	450				1.60						1.60	5034.35	0.84	5033.50		
	MH/B								35				0.11	0.00	0.04	0.00		0.15	5034.49	0.84	5033.65	5036.00	
		54.00	117	15.90	7.37	1967.6	0.0035	450				1.60						1.60	5036.09	0.84	5035.25		
	MH/B								15				0.07	0.00	0.04	0.00		0.11	5036.20	0.84	5035.36	5037.50	
		54.00	117	15.90	7.37	1967.6	0.0035	172				0.61						0.61	5036.81	0.84	5035.97		
	MH/B/J								83	36	90		0.16	0.38	0.00	0.00		0.55	5037.36	0.85	5036.51	5037.50	
		48.00	93	12.57	7.40	1437.2	0.0042	450				1.88						1.88	5039.24	0.85	5038.39		
	MH/B								20				0.08	0.00	0.04	0.00		0.12	5039.36	0.85	5038.51	5040.00	
		48.00	93	12.57	7.40	1437.2	0.0042	160				0.67						0.67	5040.03	0.85	5039.18		
	INLET												0.00	0.00	0.00	0.00		0.00	5040.03	0.00	5040.03	5043.00	
		48.00	0	12.57	0.00	1437.2	0.0000	0															
																					5016.10		
	OUTFALL																	0.00	5018.88	2.78	5016.10	5030.00	
		42.00	129	9.62	13.38	1006.6	0.0164	135				2.21						2.21	5021.09	2.78	5018.31		
	INLET									36	90		0.00	5.56	0.00	0.00		5.56	5026.65	0.00	5026.65	5030.00	
		42.00	0	9.62	0.00	1006.6	0.0000	0															
																					5016.10		
	OUTFALL																	0.00	5017.19	1.09	5016.10	5030.00	
		36.00	59.3	7.07	8.38	667.28	0.0079	100				0.79						0.79	5017.98	1.09	5016.89		
	MH/B								170				0.30	0.00	0.05	0.00		0.35	5018.33	1.09	5017.24	5030.00	
		36.00	59.3	7.07	8.38	667.28	0.0079	450				3.55						3.55	5021.88	1.09	5020.79		
	MH												0.00	0.00	0.05	0.00		0.05	5021.94	1.09	5020.85	5029.00	
		36.00	59.3	7.07	8.38	667.28	0.0079	450				3.55						3.55	5025.48	1.09	5024.39		
	INLET									36	90		0.00	2.18	0.00	0.00		2.18	5027.67	0.00	5027.67	5028.00	
		36.00	0	7.07	0.00	667.28	0.0000	0															
																					5016.10		
	OUTFALL																	0.00	5017.74	1.64	5016.10	5030.00	
		24.00	32.3	3.14	10.27	226.29	0.0203	210				4.27						4.27	5022.01	1.64	5020.37		
	MH/B								35				0.20	0.00	0.08	0.00		0.29	5022.30	1.64	5020.66	5033.50	
		24.00	32.3	3.14	10.27	226.29	0.0203	300				6.10						6.10	5028.40	1.64	5026.76		
	MH/J/J									36	90		0.00	3.17	0.00	0.00		3.17	5031.57	0.05	5031.52	5037.50	
		24.00	5.75	3.14	1.83	226.29	0.0006	150				0.10						0.10	5031.67	0.05	5031.61		
	INLET									36	90		0.00	0.10	0.00	0.00		0.10	5031.77	0.00	5031.77	5039.00	
		24.00	0	3.14	0.00	226.29	0.0000	0															

Vinyard & Associates, Inc.

8916-A Adams Street, NE
Albuquerque, New Mexico 87113
(505) 797-9743 • Fax: (505) 797-9749

Geotechnical Engineering • Materials Testing • Environmental Engineering

GEOTECHNICAL INVESTIGATION
VISTA DEL NORTE
DETENTION PONDS AND PARK

Prepared for:
Sundt Corporation

Project No.: 98-1-24
January 22, 1998

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation for the proposed detention ponds and park to be located west of the Vista Del Norte Development.

The investigation was performed to determine site subsurface conditions and based upon the conditions observed in the test holes to develop geotechnical recommendations for: design and construction of the proposed detention ponds.

The conclusions and recommendations presented are based on information provided to us regarding the proposed development, on subsurface conditions disclosed by the test holes, on laboratory testing, and upon the local standards of our profession at the time this report was prepared.

This investigation was not performed to determine the presence of potentially hazardous waste or radon gas. Determination of the presence of potentially hazardous materials was beyond the scope of this investigation and requires the use of exploration techniques and analytic testing which were not appropriate for this investigation. If desired, Vinyard & Associates, Inc. will perform an environmental audit of the site.

2.0 PROPOSED CONSTRUCTION

Based upon information obtained from personnel with Sundt Corp. and AVID Engineering, Inc., we anticipate the site will be developed with a series of stormwater detention ponds and a wetlands pond. The proposed ponds will receive stormwater from the Vista Del Norte Development. Configuration of the proposed ponds and wetlands is indicated on Figure 1.

The wetlands pond will contain some water at all times. The remaining ponds will receive water only during storm events. Anticipated times required for the ponds to drain is summarized below:

Event	Hours to Evacuate
2 year storm	18
5 year storm	27
10 year storm	35
100 year storm	62

Maximum water depth in the various ponds will range from 3 feet to 7 feet. The ponds will be excavated below the level of the surrounding ground surface.

We anticipate the western ponds will be utilized as athletic fields.

Final site grading plans were not available during preparation of this report. We anticipate that substantial cut/fill earthwork will be required to develop the site.

3.0 SITE CONDITIONS

The relatively flat lying site is bound on the north by a residential development and vacant land, on the south by the Osuna Nursery, vacant land, and a residential development, on the west by Edith Boulevard, and on the east by vacant land. The topography of the eastern most 500 feet of the site is defined by a roughly circular depression, which is approximately 20 to 25 feet deep.

Vegetation at the site consists of a moderate to heavy growth of shrubs, grasses, weeds, and cactus. There is a moderate amount of concrete debris, building debris, and trash scattered about the surface of the site.

4.0 SITE SUBSURFACE CONDITIONS

To explore the site subsurface conditions, five test holes were drilled at the approximate locations shown on the Site Plan, Figure 1. Logs of the Test Holes are presented on Figures 2 through 6. The soil profile encountered in the test holes typically consisted of a surficial layer of silty fine to medium sand which extended to a depth of five to ten feet. At greater depths the test holes typically encountered

sandy silt which extended to an average depth of seventeen feet. At greater depths sandy clay and clayey sand was encountered.

Neither flowing groundwater nor bedrock was encountered in the test holes to a depth of thirty feet, the maximum depth of exploration. However groundwater conditions may change with time due to precipitation, variations in groundwater level, seepage from ponding areas or leaking utilities.

The sandy silt and sandy clay soils encountered in the test holes will consolidate substantially upon an increase in moisture content. Additionally layers of loose soil were encountered at the following locations:

Test Hole	Depth of Loose Soil Layer
1	5', 10', 15'
2	2', 10, 15'
3	10'
4	15'
5	10', 15'

The above loose layers are particularly susceptible to moisture induced settlement.

The site soils are deposited by an ancestral Rio Grande. Therefore the soils are horizontally stratified. Due to this depositional process we anticipate fairly

similar soil conditions below the parcels adjacent to the site.

The test holes allow observation of a very small portion of the soils below the site. Significant variations in subsurface conditions may occur across the site which were not disclosed by the test holes.

5.0 LABORATORY TESTING

A laboratory testing program was performed on samples obtained during the field investigation which appeared representative of the soils encountered in the test holes. The laboratory testing program was structured to determine the physical properties of the soils encountered in the test holes necessary for development of geotechnical recommendations.

The laboratory testing program included:

- Moisture Content;
- Dry Density;
- Sieve Analysis; and
- Atterberg Limits.

Moisture Content and Dry Density tests were performed to evaluate the in-place soil density and moisture content. Test results help to evaluate settlement potential. Test results indicate the soils encountered in the test holes are loose to

medium dense with an average dry density of approximately 95 pcf. Natural moisture content averaged approximately four percent. Test results are presented on the Logs of Test Holes, Figures 2 through 6 and are summarized on Table 1.

Sieve Analysis and Atterberg Limits tests were performed to confirm field soil classifications and to provide information on general physical soil properties. Test results are presented on Table 1.

6.0 CONCUSIONS AND RECOMMENDATIONS

6.1 General

Our study indicates the site is compatible with the proposed development. However the site soils are very moisture sensitive and will consolidate upon an increase in moisture content. Therefore it is necessary to control offsite migration of water to prevent moisture induced settlement of the adjoining property.

6.2 Wetlands

We anticipate the wetlands will always retain some water to keep the vegetation alive. To control offsite migration of water an impermeable synthetic liner should be installed in the wetlands ponds. The liner may be overlain with as much soil as necessary to support the proposed vegetation.

Side slopes of the wetlands should be no steeper than 3:1 (horizontal:vertical). The impermeable membrane should be installed as specified by the material supplier.

6.3 Detention Ponds

The proposed detention ponds will retain water for a very brief period. These ponds should be designed and constructed to drain completely within the design detention period. A synthetic liner is not considered necessary for the proposed detention ponds. However a compacted soil liner should be placed on the sides and bottom of the proposed ponds.

The sides of the proposed ponds should be lined with compacted structural fill. The thickness of the fill, measured horizontally should be a minimum of ten feet. Fill should be placed and compacted as detailed in the attached Appendix. Fill should be compacted using a sheepsfoot type compactor.

If pipes will be placed in the berms between ponds consideration should be given to placing antiseep collars on the pipes if there is a significant head difference between the ponds.

The bottom of the proposed ponds should also be lined with compacted structural fill. A minimum of four feet of structural fill should be placed in the bottom of the ponds.

Side slopes of the proposed ponds should be no steeper than 3:1 (horizontal:vertical). Crest width of the berm between ponds should be no less than ten feet.

6.4 EARTHWORK

6.4.1 General

The recommendations presented in this report are based upon the assumption that site earthwork will be performed as recommended in this report and the attached Appendix. Presented below is a summary of the site earthwork recommendations. Detailed earthwork procedures are presented in the attached Appendix.

6.4.2 Clearing and Grubbing

Prior to placing structural fill, all borrow and fill areas should be stripped of vegetation and deleterious materials. All strippings should be hauled offsite or utilized in landscaped areas.

6.4.3 Excavation

We anticipate that on site soils can be excavated with conventional earthwork equipment. Occasional cobbles or boulders may be encountered during excavation.

Cobbles and boulders should be disposed of off site or utilized for landscaping. Cobbles and boulders should not be placed within structural fills.

6.4.4 Natural Ground Preparation

Prior to placing structural fill and subsequent to final grading in cut areas, the exposed soils should be scarified to a depth of eight inches and moisture conditioned to a near optimum (±3%) moisture content. The exposed soils should then be compacted to a minimum of 95% of maximum density as determined by ASTM D-1557. A sheepsfoot type compactor should be utilized to compact the pond liners. If vibratory compaction poses a threat to nearby structures, static compaction should be utilized.

6.4.5 Fill Placement and Compaction

Structural fill should be placed in horizontal lifts a maximum of eight inches in loose thickness, moisture conditioned to a near optimum moisture content and mechanically compacted. Fill for the pond liners should be compacted to a minimum of 95% of maximum dry density as determined by ASTM D-1557. Fill for general site grading should be compacted to a minimum of 90% of maximum dry density as determined by ASTM D-1557. Fill above the synthetic liner should be compacted to within 85% to 90% of maximum dry density as determined by ASTM D-1557.

6.4.6 Fill Material

Fill material for the earthen pond liners may be composed of on site soils. Fill material should be well blended and should conform to the following gradations:

Sieve Size	Percent Passing By Weight
4"	100
1"	90-100
No. 4	70-100
No. 200	35-70

Fill material over the pond liner should conform to the vendors specifications.

6.4.7 Observation and Testing

Placement and compaction of structural fill should be observed and tested by a qualified Geotechnical Engineer or his representative. The purpose of the observation and testing is to confirm that the recommendations presented herein are followed and to provide supplemental recommendations if subsurface conditions differ from those anticipated.

6.5 TRENCHES AND EXCAVATIONS

All trenches greater than four feet in depth must be sloped, shored or braced or otherwise supported according to OSHA Construction and Safety Standards. Material excavated from the trench or spoil must be placed a minimum of two feet from the edge of the excavation. The spoil should be retained in an effective manner such that no loose material can fall into the excavation.

Temporary construction excavations less than eight feet deep should be sloped no steeper than 1-1/2:1 (horizontal:vertical). If deeper excavations are required, this office should be contacted for supplemental recommendations. Limited raveling of slopes will occur particularly as the exposed soils dry out. Heavy equipment and material stockpiles should be located a minimum of five feet from the top of slope.

7.0 CLOSURE

The recommendations presented in this report are based upon the subsurface conditions disclosed by the test holes. Soil and groundwater conditions may vary between test holes and with time.

If conditions are encountered during construction which differ from those presented herein, this office should be contacted for supplemental

recommendations. The staff of **Vinyard & Associates, Inc.** is available for supplemental consultation as necessary.

This office would be pleased to review site grading and drainage plans to evaluate conformance with the recommendations presented herein. All site earthwork should be observed by a qualified geotechnical engineer or his representative. **Vinyard & Associates, Inc.** would be pleased to provide these services.

Vinyard & Associates, Inc.

Martin D. Vinyard, P. E.

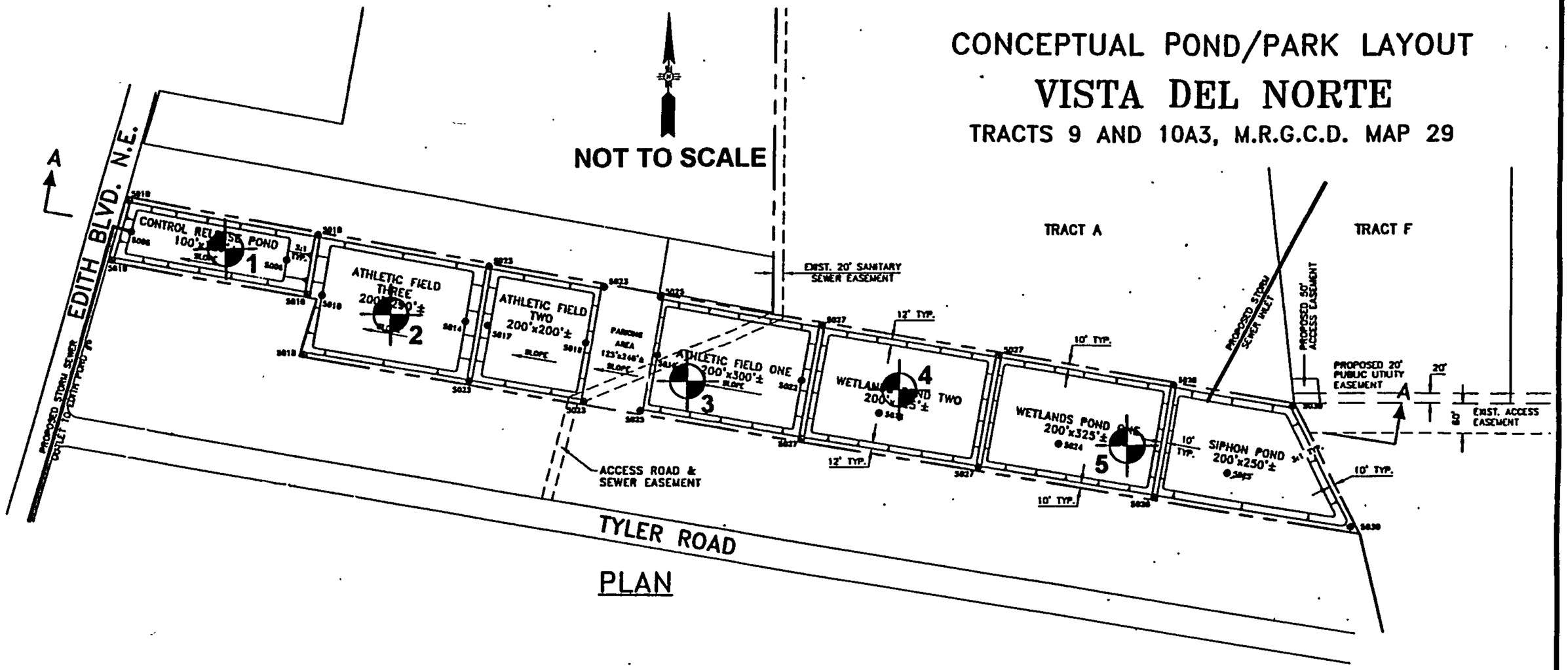
SITE PLAN

CONCEPTUAL POND/PARK LAYOUT

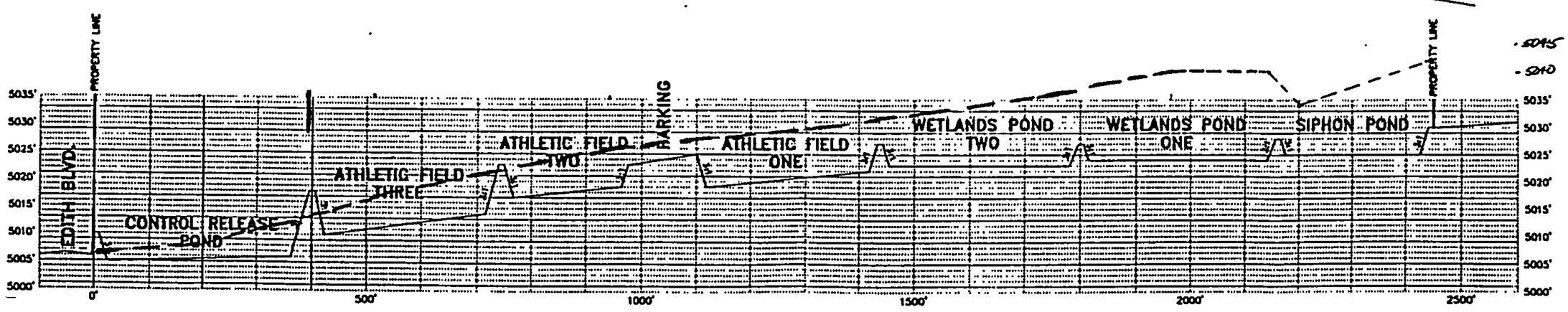
VISTA DEL NORTE

TRACTS 9 AND 10A3, M.R.G.C.D. MAP 29

NOT TO SCALE



PLAN



PROFILE A–A

LOCATION OF TEST HOLE

VINYARD & ASSOCIATES, INC.
FIGURE 1.

V & A

LOG OF TEST HOLE NO. 1

Project: Vista del Norte
Elevation - Top of Test Hole: n/a
Depth to Groundwater: not encountered

Project No.: 98-1-24
Date Drilled: 1/17/98
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5	12	R	93	4.6	1	SM	SAND, silty to very silty, fine to medium-grained, medium dense, slightly moist, brown
10	9	R	82	14	1,2	ML	SILT, sandy to slightly sandy, fine sand, stiff, slightly moist, brown, contains layers of very silty sand
	6	S		5	1		Layers of silty to very silty sand
15							Occasional layers of slightly silty, medium sand
	6	S		7.3	1,2		Increase silt, with layers of very sandy silt, very silty sand
20	22	S		5.7	1,2	CL	CLAY, sandy, fine-grained sand, very stiff, slightly moist, brown
25							
30	77	S		11.9			Becomes sandier, hard
35							Bottom of hole at 31-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 2

V & A

LOG OF TEST HOLE NO. 2

Project: Vista del Norte
Elevation - Top of Test Hole: n/a
Depth to Groundwater: not encountered

Project No.: 98-1-24
Date Drilled: 1/17/98
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	5	R	100	3.5	1	SM	SAND, silty to very silty, fine to medium-grained, loose, moist, brown
5	16	R					Gravel layer, 5 to 6-1/2'
10	4	S		5.3			Occasional layers of very sandy silt
15	12	S		4.1	1		Medium dense, occasional layers of very silty coarse sand and gravel and very sandy silt
20	17	S		1.4			Increase gravel, gravel to 2"
25							
30	14	S		2			
35							Bottom of hole at 31-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 3

V & A

LOG OF TEST HOLE NO. 3

Project: Vista del Norte
Elevation - Top of Test Hole: n/a
Depth to Groundwater: not encountered

Project No.: 98-1-24
Date Drilled: 1/17/98
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	8	R		8.9	1	SP-SM	SAND, silty to slightly silty, fine to coarse-grained with gravel to 1", loose, moist, brown
5	15	R		2.6	1		Occasional layers of silty sand Medium dense Increase silt and clay
10	5	S		5.9	1,2	ML	SILT, very sandy, fine sand, medium stiff, slightly moist, brown, contains stringers and layers of very silty sand
15	14	S		2.7	1	SM	SAND, silty, fine to coarse-grained, medium dense, slightly moist, brown
20	16	S		1			Layers of poorly graded, fine sand
25							
30	21	S		3.5	1		Occasional layers of very sandy silt
35							Bottom of hole at 31-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 4

V & A

LOG OF TEST HOLE NO. 5

Project: Vista del Norte
Elevation - Top of Test Hole: n/a
Depth to Groundwater: not encountered

Project No.: 98-1-24
Date Drilled: 1/17/98
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
5	11 13	R R	89 102	3.6 2.2	1 1	SM	SAND, very silty, fine-grained, medium dense, moist, brown, contains layers of silty fine and coarse sand and very sandy silt, roots to 2' depth
10	8	S		2.9	1	SM-ML	SILT, very sandy to sand, very silty, fine sand, loose to soft, slightly moist, brown, contains layers of very sandy silt
15 20 25	2 20	S S		2.4 4.1		SM	SAND, very silty, fine-grained, loose, slightly moist, brown Becomes medium dense with layers of sandy silt to 2" thick and gravel layers to 2" thick, gravel to 1"
30	39	S		6.4	1	SC-CL	CLAY, very sandy to sand, very clayey, fine sand, hard, slightly moist, brown
35							Bottom of hole at 31-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 6

TABLE 1 - SUMMARY OF LABORATORY TEST DATA

Test Hole	Depth (feet)	Unified Classification	Natural Dry Density (pcf)	Natural Moisture Content (%)	Atterberg Limits		SIEVE ANALYSIS-% PASSING BY WEIGHT										Description
					LL	PI	1 1/2"	3/4"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
1	2	SM	93.0	4.6				100	96	96	95	95	95	92	76	42.8	Sand, Very Silty, Trace Gravel
1	5	ML	81.5	14.0	26	6						100	99	98	95	90.8	Silt, Slightly Sandy
1	10	ML		5.0					100	99	98	97	96	90	78	53.5	Silt, Very Sandy
1	15	ML		7.3	22	NP							100	99	96	83.0	Silt, Sandy
1	20	CL		5.7	22	NP						100	99	99	97	88.8	Clay, Sandy
1	30			11.9													
2	2	SM	99.9	3.5					100	98	91	83	78	73	65	44.8	Sand, Very Silty, Trace Gravel
2	10			5.3													
2	15	ML		4.1					100	99	98	97	96	95	89	65.3	Silt, Very Sandy, Trace Gravel
2	20			1.4													
2	30			2.0													
3	2	SM		8.9				100	98	94	83	72	65	59	50	34.6	Sand, Very Silty, Slightly Gravelly
3	5	SP/SM		2.6				100	98	93	79	48	30	20	15	12.0	Sand, Slightly Silty, Very Gravelly
3	10	ML		5.9	25	5							100	99	96	83.3	Silt, Sandy
3	15	SM		2.7					100	96	90	82	74	63	53	35.6	Sand, Very Silty, Trace Gravel
3	20			1.0													
3	30	SM		3.5					100	96	86	75	66	57	47	34.9	Sand, Very Silty, Trace Gravel
4	2	ML	96.2	6.6							100	99	95	86	73	50.9	Silt, Very Sandy
4	5	SM	97.5	6.2				100	88	86	84	81	78	73	64	44.1	Sand, Very Silty, Gravelly ***

TABLE 1 - SUMMARY OF LABORATORY TEST DATA

Test Hole	Depth (feet)	Unified Classification	Natural Dry Density (pcf)	Natural Moisture Content (%)	Atterberg Limits		SIEVE ANALYSIS-% PASSING BY WEIGHT										Description
					LL	PI	1 1/2"	3/4"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
4	10			2.0													
4	15	SM		1.9			100	95	93	84	75	66	56	44	35	23.0	Sand, Very Silty, Gravelly
4	20			4.2													
4	30	SM		1.6				100	98	87	65	44	34	27	21	14.3	Sand, Silty, Gravelly
5	2	SM	88.8	3.6					100	98	97	95	93	86	67	35.8	Sand, Very Silty, Trace Gravel
5	5	SM	101.6	2.2					100	98	94	87	82	74	56	34.5	Sand, Very Silty, Trace Gravel
5	10	ML		2.9				100	99	96	94	93	91	87	78	54.9	Silt, Very Sandy, Trace Gravel
5	15			2.4													
5	20			4.1													
5	30	SC		6.4						100	99	97	93	84	71	48.4	Sand, Very Clayey

***

V
&
A

Appendix

EARTHWORK PROCEDURES

General

The Geotechnical Engineer shall be the Owner's representative to observe and evaluate the earthwork operations. The Contractor shall cooperate with the Geotechnical Engineer in the performance of the Engineer's duties.

Clearing and Grubbing

Prior to placing structural fill all borrow areas and areas to receive structural fill shall be stripped of vegetation and deleterious materials. Strippings shall be hauled offsite or stockpiled for subsequent use in landscaped areas or non structural fill areas as designated by the Owner or his representative and approved by the Geotechnical Engineer.

Site Preparation - Fill Areas

Prior to placing structural fill the areas to be filled shall be scarified to a depth of eight inches and moisture conditioned as described below. The area to be filled shall then be compacted to a minimum of 95 percent of maximum density as determined by ASTM D-1557. If vibratory compaction techniques pose a threat to the structural integrity of near by facilities a static compactor shall be used. Any soft or "spongy" areas shall be removed as directed by the Geotechnical Engineer and replaced with structural fill as described herein.

Site Preparation - Cut Areas

Following excavation to rough grade all building and pavement areas shall be scarified to a depth of eight inches and moisture conditioned as described below. All building and paved areas shall be compacted to a minimum of 95 percent of maximum density as determined by ASTM D-1557. If vibratory compaction techniques pose a threat to the structural integrity of near by facilities a static

V & A

Moisture Conditioning

Fill material shall be dried or moistened as necessary, prior to compacting, to within ± three percent of optimum moisture content as determined by ASTM D-1557. Moisture shall be distributed uniformly throughout each lift.

Compaction

Structural fill shall be mechanically compacted to the following:

	Minimum Compaction ASTM D-1557
Earthen Liner	95%
General Site Grading	90%

Fill for the earthen liner shall be compacted using a sheepsfoot type compactor.

Compaction by flooding and jetting is specifically prohibited unless authorized in advance by the Owner or his representative and the Geotechnical Engineer.

Observation and Testing

The Geotechnical Engineer or his representative shall perform field density tests with a frequency and at the locations he feels appropriate. The Geotechnical Engineer or his representative will perform Proctor tests on representative samples of all fill material. To minimize delays the Earthwork Contractor is encouraged to submit soil samples prior to use for proctor testing.

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 13, 2004

Diane Hoelzer, P.E.
Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199 4, 5A, 5B

Re: Vista del Norte Units 4 and 5, SIA/Financial Guarantee Release
Engineer's Stamp dated 11-18-03 (D16/D2)
Certification dated 1-13-04

Dear Ms. Hoelzer,

Based upon the information provided in your submittal received 1-13-04, the above referenced certification is approved for release of SIA and Financial Guarantee.

If you have any questions, you can contact me at 924-3981.

Sincerely,

Kristal D. Metro
Engineering Associate, Planning Dept.
Development and Building Services

C: Arlene Portillo, COA# 682686, 682685, 682687
file

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 15, 2004

Diane Hoelzer, P.E.
Mark Goodwin & Associates, PA
P.O. Box 90606
Albuquerque, NM 87199

Re: Vista del Norte Units 2 and 3A, SIA/Financial Guarantee Release
Engineer's Stamp dated 3-04-02 (D16/D2)
Certification dated 1-13-04

Dear Ms. Hoelzer,

Based upon the information provided in your submittal received 1-13-04, the above referenced certification is approved for release of SIA and Financial Guarantee.

If you have any questions, you can contact me at 924-3981.

Sincerely,

Kristal D. Metro
Engineering Associate, Planning Dept.
Development and Building Services

C: Arlene Portillo, COA# 682688 (Unit 2), 682682 (Unit 3A)
file

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

October 27, 1999

James Domenick, P.E.
Parsons Brinckerhoff, Inc.
5801 Osuna Road NE, Suite 200
Albuquerque, New Mexico 87109

RE: Change Order Plans for the Cascading Pond for the South Detention Pond, Vista Del Norte Subdivision (D16/~~D1~~) Engineer's Stamp Dated 10/15/99.
D2

Dear Mr. Domenick:

Based on the information provided the above referenced plans for the Cascading ponds are acceptable for approval of the Change Order.

As you are aware, County Public Works must accept the portion of the project within the County and City staff must accept the ponds within the City. Final acceptance from both agencies is required prior to release of financial guarantees for this project.

If you have any questions, or if I may be of further assistance to you, please call me at 924-3982.

Sincerely,

Susan M. Calongne, P.E.
City/County Floodplain Administrator

c: Elias Archuleta, Parsons Brinckerhoff
File

EASEMENT

This grant of Easement, between VISTA DEL NORTE DEVELOPMENT, LLC, a New Mexico limited liability company ("Grantor"), whose address is c/o Brown and Associates, Carlisle Comanche Center 3804 Carlisle, NE, Albuquerque, New Mexico 87107 and the CITY OF ALBUQUERQUE, a New Mexico municipal corporation ("City"), whose address is P.O. Box 1293, Albuquerque, New Mexico 87103, is made in Albuquerque Bernalillo County, New Mexico, and is entered into as of the date Grantor signs this Easement.

1. Recital. Grantor is the owner of certain real property within the Vista del Norte subdivisions, Albuquerque, New Mexico, Bernalillo County, New Mexico.

2 Grant of Easement. The Grantor grants to the City a non-exclusive, permanent easement for vehicular and pedestrian access, ingress and egress over and across the property as described and shown on Exhibit A attached hereto ("Easement Property"), together with the right of the City to improve the property with roadway improvements and to enter upon the Easement Property at any time for the inspection, installation, maintenance, repair or modification of the roadway improvements and the right to remove trees, bushes, undergrowth and any other obstacles upon the Easement Property if the City determines they interfere with the appropriate use of the easement.

3. Purpose. The purpose of this Easement is to provide to the City access to maintain the storm drainage improvements constructed, or to be constructed, at the western end of the Easement Property.

4 Warranty. Grantor covenants and warrants that it is the owner in fee simple of the Easement Property and that is has a good lawful right to convey the Easement Property or any part thereof, that the Easement Property is free from all encumbrances except encumbrances of record in the Bernalillo County, New Mexico real estate records

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Page: 1 of 3
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Mary Herrera Bern. Co. EASE R 13.00 Bk-A103 Pg-2897

(the "Record Encumbrances") and taxes due and owing the Treasurer of Bernalillo County, and that the Grantor will forever warrant and defend the title to the Easement Property against all claims from all persons or entities, except the Record Encumbrances.

5. Disclosure. The Grantor has disclosed to the Grantee that the Easement Property is encumbered with a prior easement for an underground natural gas line (the "Gasline Easement"). This Easement is subject to and subordinate to the Gasline Easement as well as all other Record Encumbrances.

6 Binding on Grantor's Property. The grant and other provisions of this Easement constitute covenants running with the Easement Property for the benefit of the City and its successors and assigns until terminated.

Witness my hand and seal this 22nd day of August, 2005.

VISTA DEL NORTE DEVELOPMENT, LLC, a New Mexico limited liability company

By: _____
John A. Myers
Assistant Manager Pro Tem

STATE OF NEW MEXICO)
) ss.:
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on August 22, 2005, by John A. Myers, Assistant Manager Pro Tem, of Vista del Norte Development, LLC, a New Mexico limited liability company.

Karen Lee Anderson
Notary Public

My commission expires: 11-18-2005

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Mary Herrera Bern. Co. EASE R 13.00
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Page: 2 of 3
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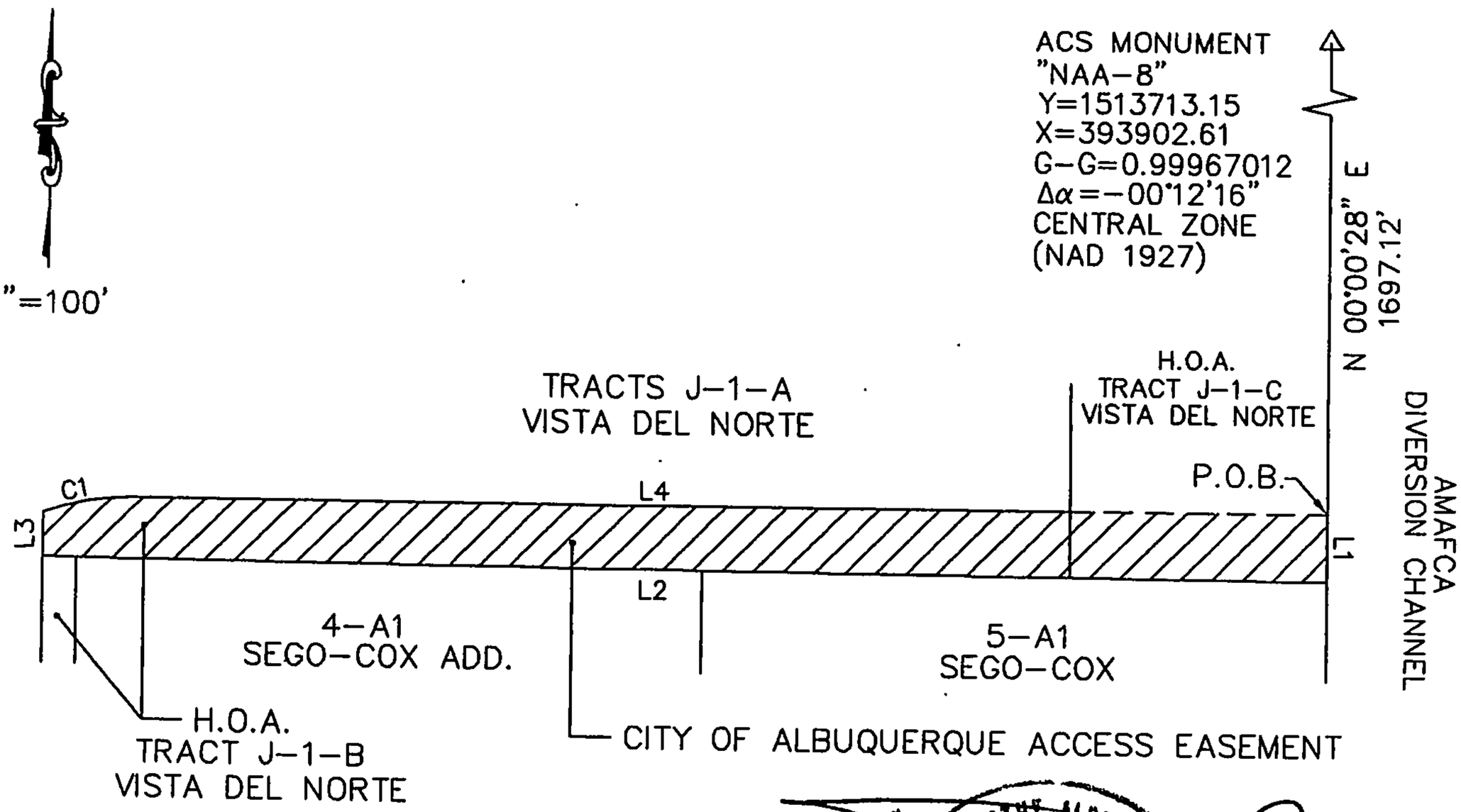
"EXHIBIT FOR"
CITY OF ALBUQUERQUE ACCESS EASEMENT



NUMBER	DIRECTION	DISTANCE
L1	S 00°00'24" W	30.98'
L2	N 89°42'03" W	593.91'
L3	N 00°00'00" E	20.02'
L4	N 90°00'00" E	552.22'

08-24-05

NUMBER	DELTA ANGLE	CHORD DIRECTION	RADIUS	ARC LENGTH	CHORD LENGTH
C1	21°22'58"	N 79°18'58" E	114.33'	42.67'	42.42'

DESCRIPTION

A City of Albuquerque Access Easement within the Elena Gallegos Grant, projected Section 27, Township 11 North, Range 3 East, New Mexico Pricipal Meridian, City of Albuquerque Bernalillo County, New Mexico being within TRACTS J-1-B AND J-1-C, VISTA DEL NORTE, 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 March 31, 2003 in Book 2003C, Page 87 and being more particularly described as follows:

BEGINNING at the northeast corner of the herein described Easement from whence the Albuquerque Control Survey Monument "NAA-8" bears N 00°00'28" E 1697.12 feet;

THENCE S 00°00'24" W, 30.98 feet to the southeast corner;

THENCE N 89°42'03" W, 593.91 feet to the southwest corner;

THENCE N 00°00'00" E, 20.02 feet to a point;

THENCE 42.67 feet along a curve to right, whose radius is 114.33 feet through a central angle of 21°22'58" and whose chord bears N 79°18'58" E, 42.42 feet to a point;

THENCE S 90°00'00" E, 552.22 feet to the point of beginning and containing 0.3988 acres more or less.

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Original delivered 8/21/00 to Roberta Duran at AWD

THIS DOCUMENT RE-RECORDED TO ATTACH EXHIBIT "C".

AGREEMENT AND GRANT OF EASEMENT

THIS AGREEMENT AND GRANT OF EASEMENT is entered into as of the ____ day of December, 1998, by and among SUNDT CONSTRUCTION, INC., an Arizona corporation ("Sundt"), the CITY OF ALBUQUERQUE, a New Mexico municipal corporation (the "City"), and the COUNTY OF BERNALILLO, a political subdivision of the State of New Mexico (the "County").

Background Information:

1. Sundt is the owner of Vista del Norte subdivision (the "Project");

2. Sundt is the owner of a ±13 acre tract of property, more particularly described on Exhibit "A" attached hereto and incorporated herein (the "Property"), which Property is an approximately 250-foot wide strip of property running from the Project to Edith Boulevard;

3. The Property will be graded to fulfill two functions, storm water detention and sedimentation basins (the "Drainage Function"), and athletic fields (the "Recreational Function"), pursuant to the site development plan conceptual pond/park layout, Vista del Norte (the "Site Plan"), a copy of which is attached hereto as Exhibit "B". The Property is served with access from Tyler Road by way of a 30-foot wide access road (the "Access Road") created pursuant to the Access Easement Agreement recorded in the

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Page: 1 of 11
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Bernalillo County, New Mexico, real estate records on December 14, 1993, in Book 93-35, Pages 8729-8735 (the "Easement Agreement").

4. The parties desire to establish certain rights and responsibilities with respect to the Property.

NOW, THEREFORE, the parties agree as follows:

1. Sundt agrees as follows:

1.1. Drainage Improvements. Sundt agrees to grade the Property and construct the Drainage Improvements as shown on the Site Plan, in accordance with constructions plans prepared by Sundt's consultants, and approved and accepted by the City and County pursuant to City and County requirements (the "Drainage Improvements");

1.2. Pavement. To pave the parking area, shown on the Site Plan, and the Access Road, to paving standards acceptable to the County (the "Paving Improvements");

1.3. Recreational Improvements. To install an irrigation system for the athletic fields, to seed the fields, and to crimp straw into the fields, as shown on the Landscape Plan attached as Exhibit "C" (the "Recreational Improvements");

1.4. Conveyance of Property. To convey the Property to the County, subject to the easement described herein, within 30 days after completion, inspection and acceptance by the City and the County (including specifically the County Parks and Recreation Department) of the Drainage Improvements, the Recreational Improvements, and the Paving Improvements.

2. Grant of Easement. Sundt grants to the City and the

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Judy D. Woodward Bern. Co. AGRE

County an exclusive (except that the easements are non-exclusive to the extent that both the City and the County are granted an easement) permanent easement ("Easement") in, over, upon and across the Property for the construction, installation, maintenance, repair, modification, replacement, and operation of the Drainage Improvements, including the right to remove trees, bushes, undergrowth, and any other obstacle upon the Property that the City or the County determines interfere with the use of the Easement for the purposes set out herein. Provided, however, that the City shall repair, at the City's expense, any damages to the Property, including but not limited to the athletic fields 1, 2 and 3 resulting from its activities. Sundt shall be permitted to grant additional easements within the Easement with prior written approval of the City Engineer and the County.

Sundt covenants and warrants that Sundt is the owner in fee simple of the Property, that Sundt has a good and lawful right to convey the Property and that Sundt will forever warrant and defend the title to the Property against all claims from all persons or entities.

This Grant of Easement and the provisions contained herein constitute covenants running with the land for the benefit of the City and its successors and assigns until terminated.

2.1. Maintenance Responsibilities. The City accepts the responsibility to maintain the portions of the Drainage Facilities identified on the Site Plan as follows (the "City Facilities"):

(a) Proposed storm sewer inlet,

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Page: 3 of 11
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(b) Sedimentation basin,

(c) Detention basin,

(d) Biofilter area,

(e) 8-inch drain pipe; and

(f) 12-inch drain pipe.

The County shall maintain the facilities identified on the Site Plan as follows (the "County Facilities"):

(a) Athletic fields 1, 2 and 3, ND

(b) Parking area, ND

(c) Access road, yes

(d) Control release pond, and / yes

(e) Storm sewer outlet to Edith Pond No. 6. ND

Pursuant to the Easement granted herein, both the City and the County have the right to maintain any of the Facilities to be maintained by the other party (the "Defaulting Party") in the event that the Defaulting Party fails to adequately maintain its Facilities, however, such right by the City or the County does not relieve the Defaulting Party of its responsibility to maintain its Facilities.

3. Governing Laws. Except as otherwise specifically provided herein, this Agreement shall be governed by, construed and enforced in accordance with the laws of the State of New Mexico.

4. Notices. All notices with respect to this agreement shall be in writing and shall be delivered personally, sent via confirmed telefax, or sent postage prepaid by United States Mail, certified mail, return receipt requested, to the addresses set

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Page: 4 of 11
12/17/1998 08:38A
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Judy D. Woodward Bern. Co. AGRE R 27.00

forth below or such other addresses as hereafter specified in writing by one party to the other:

SUNDT CONSTRUCTION, INC.
P. O. Box 26685
Tucson, Arizona 85726

City of Albuquerque
c/o Chief Executive Officer
P. O. Box 1293
Albuquerque, New Mexico 87103

County of Bernalillo
c/o County Manager
One Civic Plaza, 10th Floor
Albuquerque, New Mexico 87102

5. Entire Agreement. This Agreement contains the entire agreement between the parties hereto and all prior understandings, oral or in writing, by the parties hereto with respect to this agreement. No variations, modifications, supplements, waivers or changes herein or hereof shall be binding upon any party hereto unless set forth in a document duly executed by or on behalf of such party.

6. Severability. If any provision of this Agreement or the application thereof to any person or circumstance shall be invalid or unenforceable to any extent, the remainder of this Agreement and the application of such provisions to other persons or circumstance shall not be affected thereby and such provisions shall be enforced to the greatest extent permitted by law.

7. Binding Agreement. This Agreement shall inure to the benefit of and be binding upon the undersigned parties and their respective successors and assigns. Whenever in this Agreement a reference to any party or Partnership is made, such reference shall

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Page: 5 of 11
12/17/1998 08:38A
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Judy D. Woodward Bern. Co. AGRE R 27.00

be deemed to include a reference to the successors and permitted assigns of such Partner.

8. Authority. Each individual signing for each of the parties hereunder, warrants and represents that he/she is an authorized agent of such party, on whose benefit he/she is executing this Agreement, and is authorized to execute the same.

9. Further Assurances. Each party agrees to execute such other and further instruments and documents as may be necessary or proper in order to complete the transactions contemplated by this Agreement.

10. Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, and said counterparts shall constitute but one and the same instrument which may sufficiently be evidenced by one counterpart.

11. City/County Third Party Beneficiary. It is specifically agreed between the City and the County that this Agreement does not, and is not intended to, create in the public, or any member thereof, any rights whatsoever, such as but not limited to, the rights of a third party beneficiary, nor to authorize anyone not a party to this Agreement to maintain a suit for wrongful death or any other claim whatsoever.

12. Tort Claims. It is specifically agreed between the City and the County that each shall be solely responsible for any and all liability from personal injury, including death, or damage to property, arising from any negligent or intentional act or failure to act of either the City or the County, its officials, agents,

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contractors or employees, pursuant to this Agreement. Liabilities of the City or County shall be subject to the immunities and limitations of the Tort Claims Act, §§41-4-1, et seq., NMSA, 1978, and any amendments thereto. By entering into this Agreement, the County and its "public employees" as defined in the New Mexico Tort Claims Act, and the City and its "public employees" as defined in the New Mexico Tort Claims Act, do not waive sovereign immunity, do not waive any defense and/or do not waive any limitation of liability pursuant to law. No provision in this Agreement modifies and/or waives any provision of the New Mexico Tort Claims Act.

SUNDT CONSTRUCTION, INC., an Arizona corporation

By: _____
Its: Sr. Vice President

CITY OF ALBUQUERQUE, a New Mexico municipal corporation

By: _____
Lawrence Rael
Chief Executive Officer

12/14/98

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Page: 7 of 11
12/17/1998 08:38A
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Judy D. Woodward Bern. Co. AGRE R 27.00

SUPPLEMENTAL SHEET

Motion to approve the agreement and grant of easement among Bernalillo County, the City of Albuquerque and Sundt Construction Inc. that grants a multipurpose easement and defines responsibilities for drainage and park facilities maintenance related to Vista del Norte subdivision was approved by the Board of County Commissioners at the December 15, 1998 Commission Meeting.

APPROVED AS TO FORM ONLY:

County Attorney

BOARD OF COUNTY COMMISSIONERS

EXCUSED

Steve D. Gallegos, Chairman

Ken Sanchez, Vice Chairman

Les Houston, Member

Tom Rutherford, Member

Barbara J. Seward, Member

ATTEST:

Judy D. Woodward, County Clerk

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Page: 8 of 11
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Judy D. Woodward Bern. Co. AGRE R 27.00

STATE OF ~~NEW MEXICO~~ ARIZONA)
) ss.
COUNTY OF ~~BERNALILLO~~ PIMA)

This instrument was acknowledged before me on December 4, 1998 by PETER JOHNSON, SR. VICE PRESIDENT of Sundt Construction, Inc., an Arizona corporation.

Jan Irwin
Notary Public

My Commission Expires:
July 30, 2002

OFFICIAL SEAL
JAN IRWIN
NOTARY PUBLIC
Pima Co., Arizona
My Comm. Exp. July 30, 2002

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

14 This instrument was acknowledged before me on December 14, 1998, by Lawrence Rael, as Chief Executive Officer of the City of Albuquerque, a New Mexico municipal corporation.

Roberta Duran
Notary Public

My Commission Expires:
July 8, 2002

OFFICIAL SEAL
Roberta Duran
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: 7/8/02

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

This instrument was acknowledged before me on December _____, 1998, by _____, _____ of the County of Bernalillo, a political subdivision of the State of New Mexico.

_____
Notary Public

My Commission Expires:
_____

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A tract of land situate within the Elena Gallegos Grant, Bernalillo County, New Mexico, being and comprising Tract 9 as shown on the Middle Rio Grande Conservancy District Property Map No. 29, and being also designated as Tract "C" on that certain plat entitled Plat Showing Lands of Albert G. Simms, within the Elena Gallegos Grant, Bernalillo County, New Mexico, for assessment purposes, filed in the Office of the County Clerk of Bernalillo County, New Mexico, on the 14th day of November, 1955; and being more particularly described as follows:

Beginning at the Northwest Corner No. 1 of the tract herein set forth, a point on the Easterly right-of-way line of Edith Boulevard NE whence the Section Corner common to Sections 14, 15, 22 and 23 (as projected), Township 11 North, Range 3 East, N.M.P.M., bears N.40°48'08"E., 7716.77 feet distant; and running thence, S.80°21'E., 2393.73 feet to the Northeast Corner No. 2 of the tract herein set forth, a point on the Westerly boundary of the Lands of the Albuquerque Gravel Products Company; Thence, S.26°17'E., 147.10 feet along said Westerly boundary to the Southeast Corner No. 3 of the tract herein set forth; Thence, leaving said Westerly boundary and running N.80°39'20"W., 2496.70 feet to the Southwest Corner No. 4 of the tract herein set forth, a point on said Easterly right of way line of Edith Boulevard NE; Thence, N.16°48'E., 133.47 feet along said Easterly right of way line of Edith Boulevard NE to the Northwest Corner No. 1 and the place of beginning.

PARCEL 10-A-3:

A certain parcel of land situate within Section 27, Township 11 North, Range 3 East, N.M.P.M., Bernalillo County, New Mexico, and being identified as the Easterly 5.7757 acres, more or less of Tract 10-A, Middle Rio Grande Conservancy District Property Map No. 29 and being more particularly described as follows:

Beginning at the Southeast corner of the tract herein described, said corner being common to the Northeast corner of Sunnymeade Subdivision, as the same is shown and designated on the plat of said Subdivision, filed in the Office of the County Clerk of Bernalillo County, New Mexico, on April 19, 1955; Thence, running N.80°36'31"W., 893.15 feet distance to a point; Thence, N.80°34'58"W., 699.67 feet distance to a point; Thence, N.80°26'23"W., 364.19 feet distance to a point; Thence, N.80°26'23"W., 200.25 feet distance to the Southwest corner; Thence, N.16°01'49"E., 119.05 distance to the Northwest corner; Thence, S.80°39'20"E., 186.30 feet distance to a point; Thence, S.80°36'52"E., 742.50 feet distance to a point; Thence, S.80°32'29"E., 1129.40 feet distance to the Northeast corner; Thence, S.26°17'00"E., 146.23 feet distance to the Southeast corner and point of beginning.

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Page: 10 of 11
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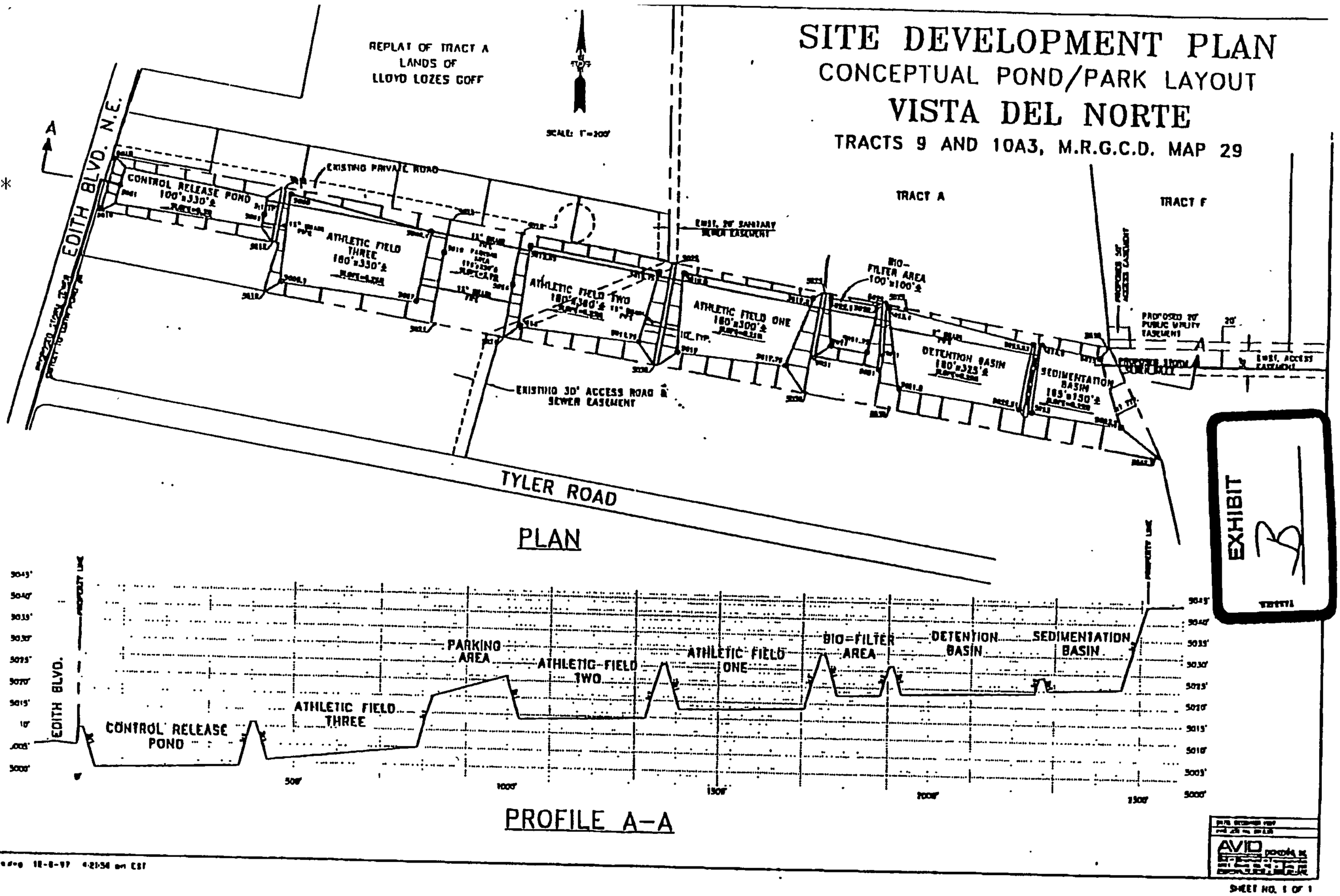
EXHIBIT

SITE DEVELOPMENT PLAN
CONCEPTUAL POND/PARK LAYOUT
VISTA DEL NORTE
TRACTS 9 AND 10A3, M.R.G.C.D. MAP 29



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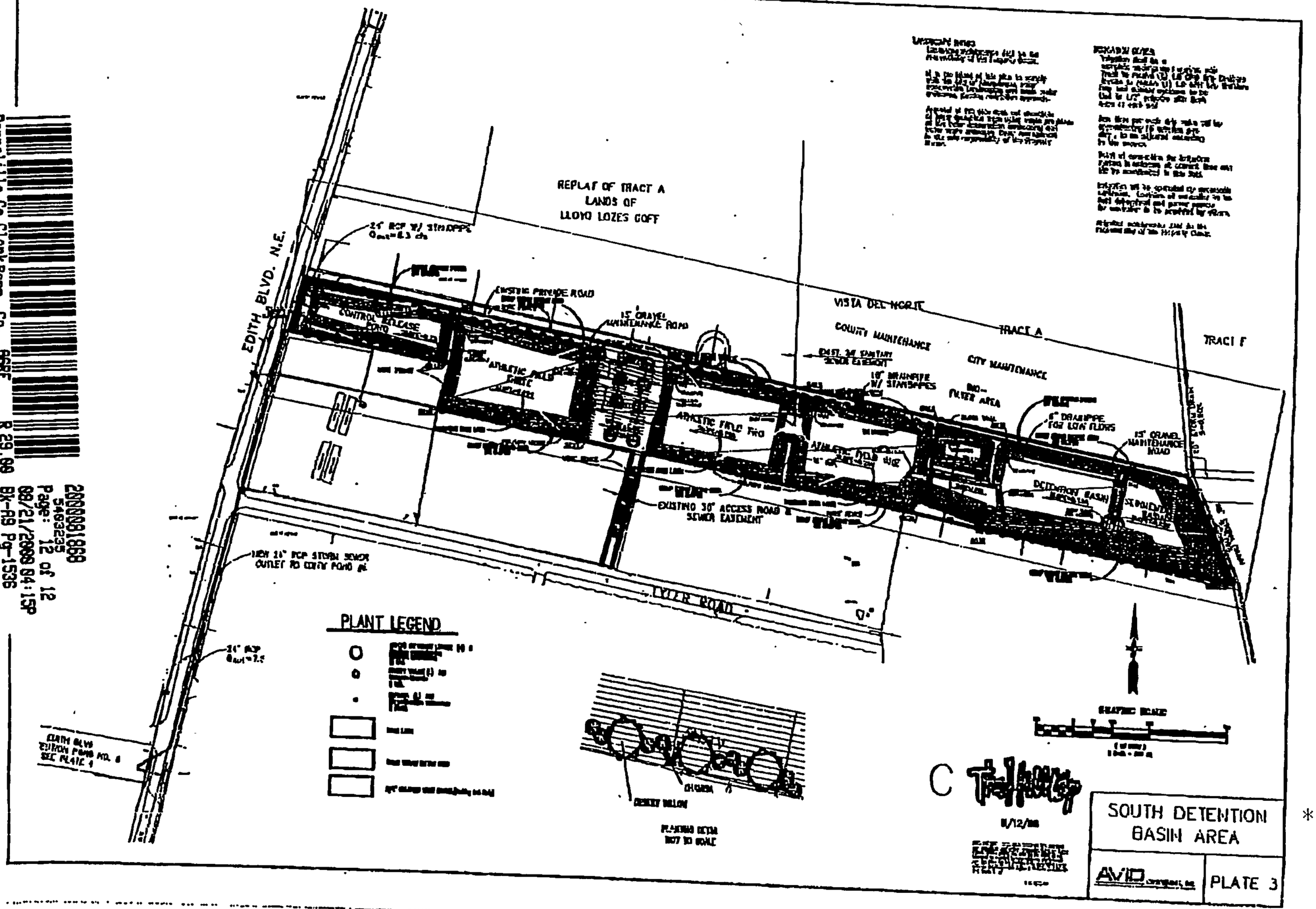


Specifications for Construction of the Middle Detention Pond

Vista Del Norte Subdivision Back Bone Infrastructure Improvements

RECEIVED
JUL 19 1999
HYDROLOGY SECTION

July 16, 1999

Prepared by:
Parsons Brinckerhoff, Inc.
5801 Osuna Rd. NE, Suite 200
Albuquerque, NM 87109

CHRIS E. BACA
NEW MEXICO
12133
7-15-99
REGISTERED PROFESSIONAL ENGINEER

Vista Del Norte

Specifications for Construction of Middle Detention Pond

Site Conditions & Product Description

Due to the presence of moisture sensitive soils present within the Middle Detention Pond at the proposed Vista Del Norte Subdivision, a synthetic liner is necessary to prevent moisture migration to homes on all sides of the pond.

A "Rufco® 2010B" mono-layer membrane shall be used. Specifications for the Rufco® 2010B are included in this package as Appendix A. A comparable equivalent liner may be used provided it meets the product specifications and is accepted by the City Inspector.

Installation of Liner

The liner shall be installed per the manufacture's specifications and under the supervision of a Geotechnical Engineer. The liner shall extend six feet (6') below the pond bottom on all sides of the pond, and the sides of the pond shall be lined to a height of four feet (4') on the North, East and South slopes of the pond and to a height of six feet (6') along the West slope of the pond. The liner shall be anchored at the top by dropping the liner a minimum of two feet (2') down vertically into slope. The liner shall be covered with a minimum of one-foot (1') of soil. The liner shall be installed in soil compacted in accordance with procedures defined in these specifications and all soil disturbed in the installation process shall be re-compacted to specified densities.

Construction and Compaction Side Slopes

The side slopes of the pond shall not be steeper that 3:1 (horizontal:vertical). Any uncontrolled existing fill on the slope shall be removed and replaced with compacted fill. All slopes shall be heavily benched as the fill is being placed. The benches shall be spaced at no more than two-foot (2') vertical intervals. The fill shall be placed in horizontal lifts with a maximum loose thickness of eight inches (8"). All fill shall be compacted to 90% of maximum density as determined by ASTM D-1557. All fill slopes shall be overfilled and cut back to properly compacted material. Procedures for fill placement and compaction are included in this package as Appendix B.

Vegetation may be placed in the bottom of the pond upon written approval from the City Storm Drain Maintenance Engineer and the owner' representative. The vegetation will be beneficial in reducing moisture migration beyond the pond's limits.

A 12' wide maintenance access road shall be constructed along the top of the pond. The road shall have a cross slope of 2.0% on the North side of the pond and a 4.0% cross slope on the West, East, and South sides of the ponds. The cross slope on the access road shall slope towards the pond.

Three displays detailing the pond are included in this package. Plate 1 shows the pond in plan view; Plate 2 shows dimensions of the pond bottom and Plate 3 shows two cross sections of the pond.

Quality Control and Construction Inspection

Construction of the pond and installation of the liner shall be completed under the supervision of a Geotechnical Engineer. The Geotechnical Engineer will be responsible for the complete inspection and testing of the pond construction and liner installation. The extent and frequency of testing shall be at the discretion of the Geotechnical Engineer.

Procedure for Controlling Storm Runoff during Construction of Pond

No developed drainage runoff shall be stored or detained in the Middle Detention Pond prior to or during the construction of the pond and the placement of the synthetic liner. Flows occurring in the sixty-inch (60") RCP storm drain which enters the pond in the Southeast corner shall be diverted directly to the pond's thirty-inch (30") RCP storm drain outfall located in the Southwest corner of the pond. This shall be achieved by connecting the two RCP pipes with a thirty-inch (30") *HDPE Polymeric Pipe* also known as "Trench Coat®". This is a flexible corrugated plastic pipe that can be easily placed and fitted. The "Trench Coat®" shall be thoroughly secured into the thirty-inch (30") RCP pipe outfall ensuring no runoff leakage. Likewise, the thirty-inch (30") "Trench Coat®" pipe shall be placed into the sixty-inch (60") storm drain and the open area between the thirty-inch (30") "Trench Coat®" and the sixty-inch (60") RCP shall be sealed with sand bags and manually compacted soil to ensure no runoff leakage.

Flow occurring in the sixty-inch (60") RCP storm drain which enters the pond along the Eastern slope, shall be controlled by sealing the catch basins and preventing the flows from entering this storm drain. The catch basins shall be filled with sandbags from the base of the catch basins to the flowline of the curb. The street flow intercepted by these inlets are not yet fully developed flows and can be contained in the street until the pond is constructed.

All interim construction measures shall be inspected and approved by the City Inspector before pond construction may begin.

APPENDIX B

EARTHWORK PROCEDURES

General

The Geotechnical Engineer shall be the Owner's representative to observe and evaluate the earthwork operations. The Contractor shall cooperate with the Geotechnical Engineer in the performance of the Engineer's duties.

Clearing and Grubbing

Prior to placing structural fill, all borrow areas and areas to receive structural fill shall be stripped of vegetation and deleterious materials. Strippings shall be hauled off-site or stockpiled for subsequent use in landscaped areas or non-structural fill areas as designated by the Owner or his representative and approved by the Geotechnical Engineer.

Site Preparation – Fill Areas

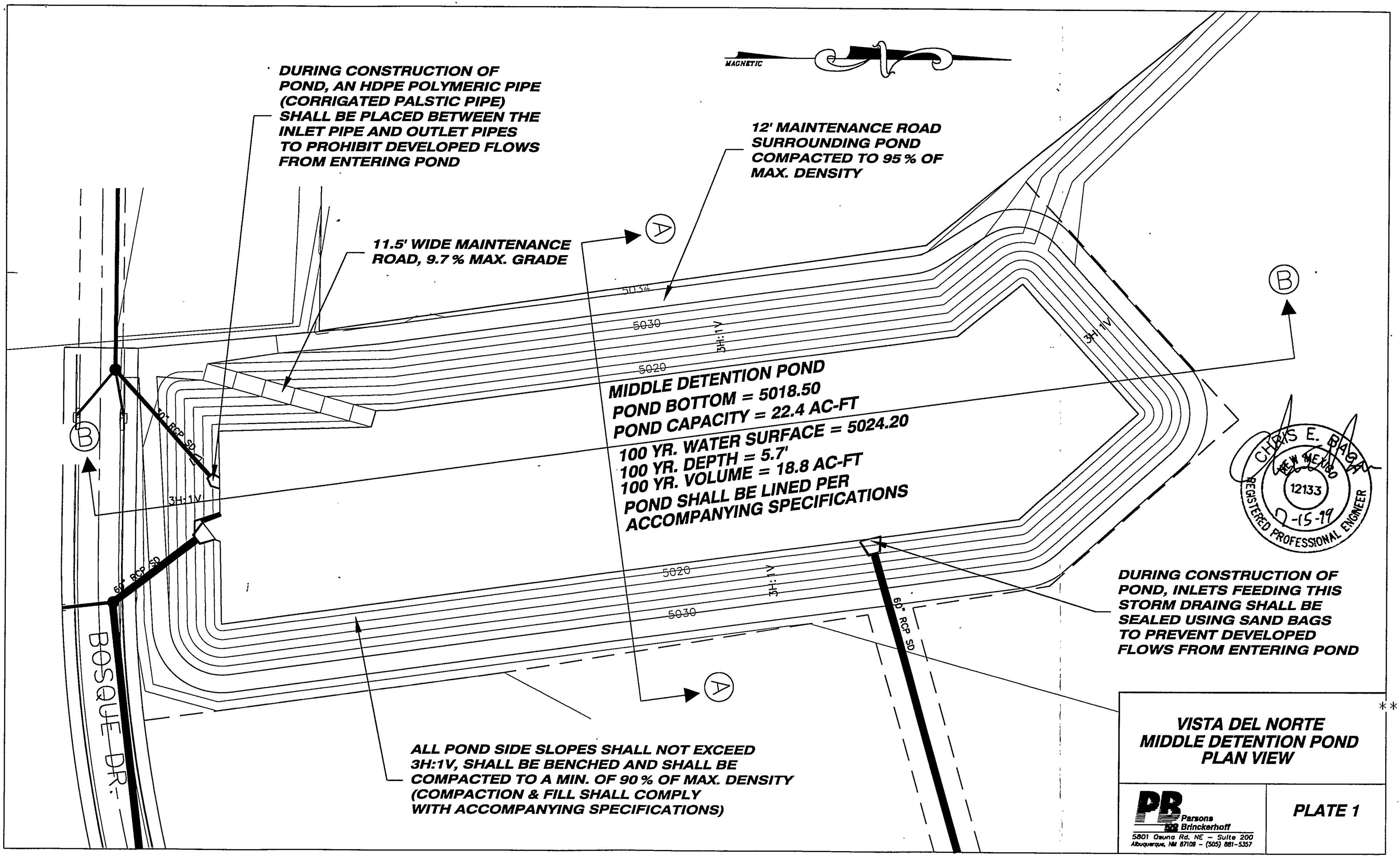
Prior to placing structural fill, the areas to be filled shall be scarified to a depth of eight inches and moisture conditioned as described below. The area to be filled shall then be compacted to a minimum of 90 percent of maximum density as determined by ASTM D-1557. If vibratory compaction techniques pose a threat to the structural integrity of nearby facilities, a static compactor shall be used. Any soft or "spongy" areas shall be removed as directed by the Geotechnical Engineer and replaced with structural fill as described herein.

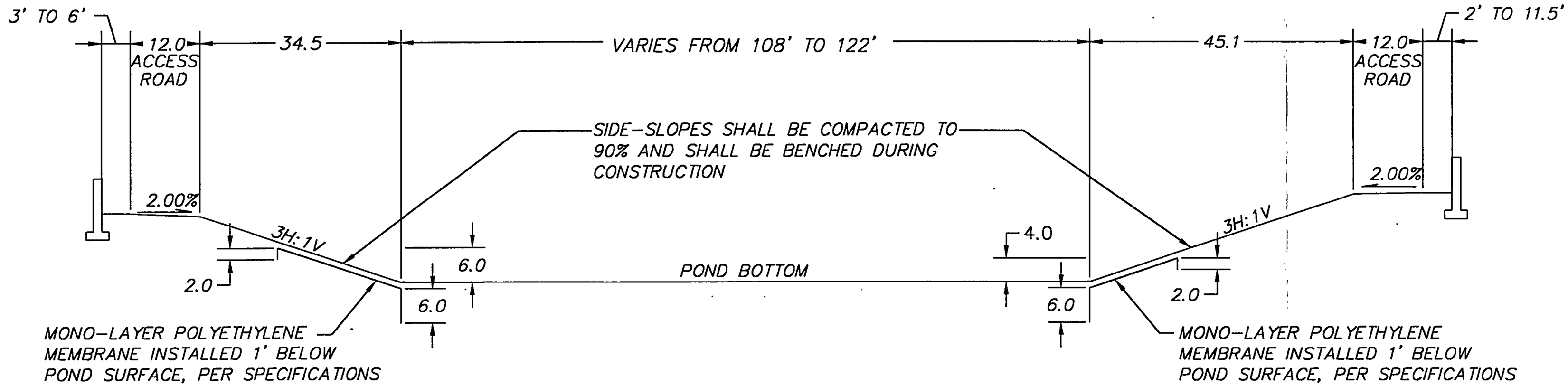
Site Preparation – Cut Areas

Following excavation to rough grade, all fill areas shall be scarified to a depth of eight inches and moisture conditioned as described below. All fill areas shall be compacted to a minimum of 90 percent of maximum density as determined by ASTM D-1557. If vibratory compaction techniques pose a threat to the structural integrity of nearby facilities, a static compactor shall be used. Any soft or "spongy" areas shall be removed s directed by the Geotechnical Engineer and replaced with structural fill as described herein.

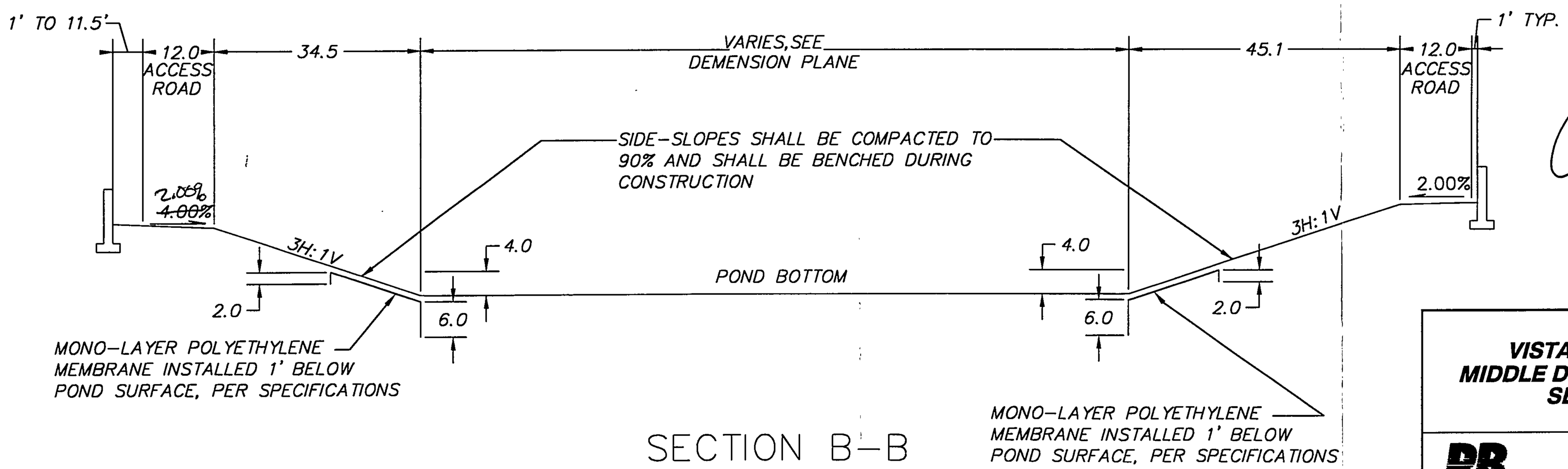
Fill Material

Fill material shall be non-expansive soil which may be gravel, sand, silt or clay or a combination thereof.


DURING CONSTRUCTION OF POND, AN HDPE POLYMERIC PIPE (CORRIGATED PALSTIC PIPE) SHALL BE PLACED BETWEEN THE INLET PIPE AND OUTLET PIPES TO PROHIBIT DEVELOPED FLOWS FROM ENTERING POND
12' MAINTENANCE ROAD SURROUNDING POND COMPACTED TO 95 % OF MAX. DENSITY
11.5' WIDE MAINTENANCE ROAD, 9.7 % MAX. GRADE
A
B
5034
5030
5020
3H:1V
MIDDLE DETENTION POND
POND BOTTOM = 5018.50
POND CAPACITY = 22.4 AC-FT
100 YR. WATER SURFACE = 5024.20
100 YR. DEPTH = 5.7'
100 YR. VOLUME = 18.8 AC-FT
POND SHALL BE LINED PER ACCOMPANYING SPECIFICATIONS
10" RCP SD
60" RCP SD
BOSQUE DR.
DURING CONSTRUCTION OF POND, INLETS FEEDING THIS STORM DRAING SHALL BE SEALED USING SAND BAGS TO PREVENT DEVELOPED FLOWS FROM ENTERING POND
ALL POND SIDE SLOPES SHALL NOT EXCEED 3H:1V, SHALL BE BENCHED AND SHALL BE COMPACTED TO A MIN. OF 90 % OF MAX. DENSITY (COMPACTION & FILL SHALL COMPLY WITH ACCOMPANYING SPECIFICATIONS)
CHRIS E. BIGGS
NEW MEXICO
12133
9-15-19
REGISTERED PROFESSIONAL ENGINEER
VISTA DEL NORTE
MIDDLE DETENTION POND
PLAN VIEW
PB Parsons Brinckerhoff
5801 Osuna Rd. NE – Suite 200
Albuquerque, NM 87109 – (505) 881-5357
PLATE 1



SECTION A-A



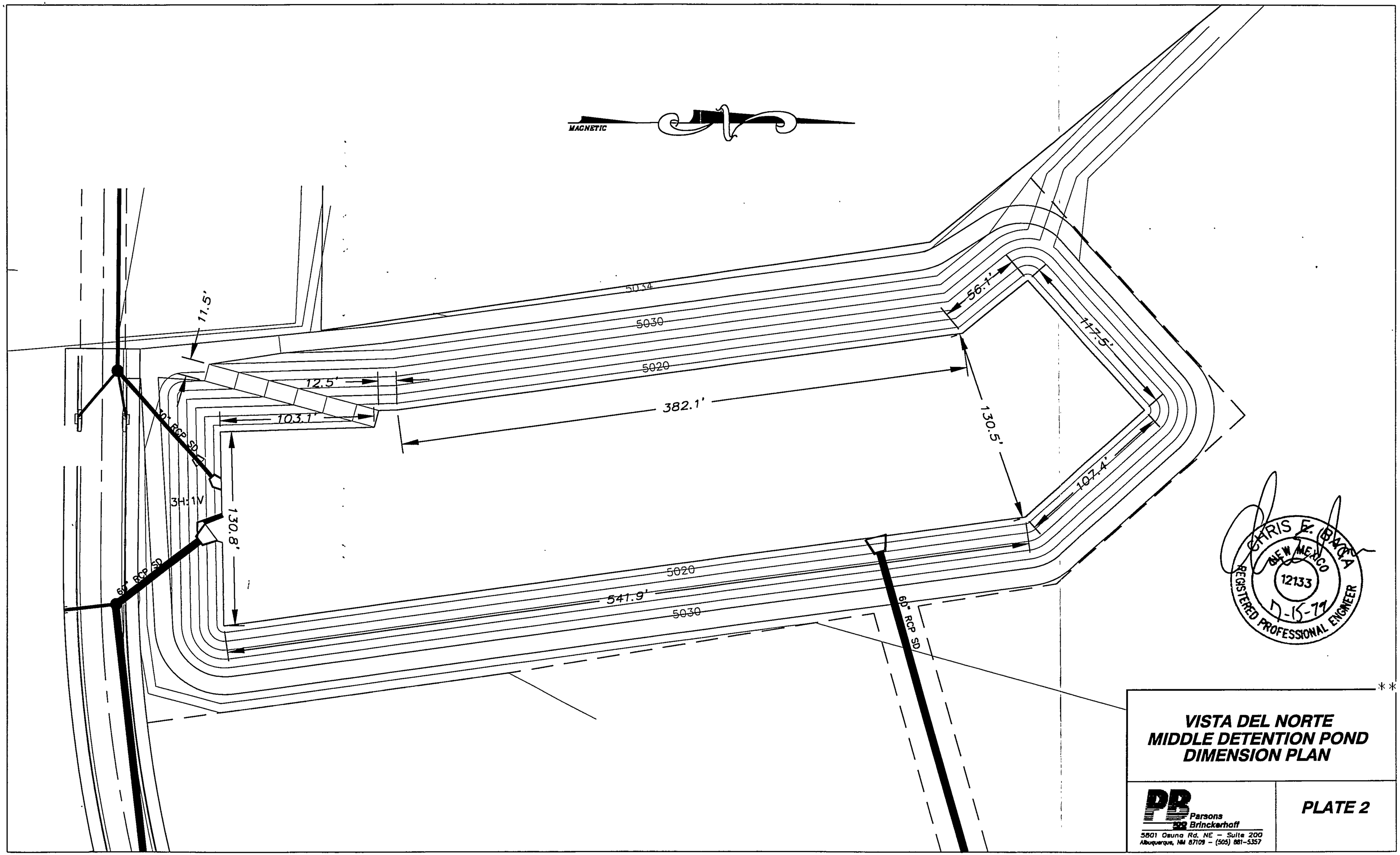
SECTION B-B

CHRIS E. ELLIS
NEW MEXICO
12133
REGISTERED PROFESSIONAL ENGINEER
7-15-95

VISTA DEL NORTE
MIDDLE DETENTION POND
SECTIONS

Parsons Brinckerhoff
5801 Osuna Rd. NE – Suite 200
Albuquerque, NM 87109 – (505) 881-5357

PLATE 3



VISTA DEL NORTE
MIDDLE DETENTION POND
DIMENSION PLAN

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PLATE 2

Vista Del Norte

Supplemental Specifications for Construction of

Detention Ponds and Park

1.0 Introduction

These specifications are to serve as a supplement to the *Construction Plans for Vista Del Norte Unit 1,* City Project # 5970.81. Plans for the location, dimensions, grades, cross-sections and details for the pond system are included in the original plans-set on sheets 51-56. These specifications will encompass the installation of an impermeable liner and earthwork procedures for the compaction of the pond side-slopes. These specifications are based on the geotechnical recommendation set forth in the Geotechnical Investigation Report prepared by Vineyard and Associates prepared Jan. 22, 1998 and revised July 6, 1999. A copy of that report accompanies these specifications.

2.0 Existing Conditions

The existing site conditions are relatively flat bounded by a residential development and vacant land on the north, a residential development, vacant land and the Osuna Nursery on the south, Edith Blvd. on the west, and the proposed Vista Del Norte Subdivision on the east. The eastern most 500 feet of the site contains a roughly circular depression that is approximately 20 to 25 feet deep.

Subsurface conditions consist of fine and medium silty sand ranging from depths of 5 to 10 feet, sandy silt extended to approximately 17 feet, and sandy clay and clayey sand at depths greater than 17 feet. Maximum depth of exploration was 30 feet. The sandy silt and sandy clay will consolidate substantially upon an increase in moisture content, and measures need to be taken to control this condition.

3.0 Proposed Conditions

The developed conditions for this site will consist of a series of storm water detention ponds and a wetland pond. This system receives storm water run-off from the proposed Vista Del Norte Subdivision and releases it at the historical runoff rate. The pond system, shown on Figure 1, consists of (from east to west) a sedimentation basin, a detention basin, a bio-filter (wet-land) pond, three athletic fields which serve as detention ponds, and a control release basin. The ponds will be excavated, below grade structures with no above grade berms or dams. Due to the presence of moisture sensitive soils on the site, which will consolidate upon an increase in moisture, it is necessary to control offsite migration of water to adjoining properties. To control the migration of water, some of the basins will require some order of artificial lining.

The basins and fields are connected with a series of storm drainpipes and spillways that regulate the rate of discharge from the site. As a result of this, the various basins and fields receive a variable amount of runoff based on the type of rainstorm. The sedimentation, detention basin bio-filter and controlled release ponds are the only ponds that will receive runoff with all storms. The athletic fields will receive runoff on a less frequent basis. Athletic Field One will receive runoff with the 2-year storm, Field Two will receive runoff with the 10-year storm, and Field Three will receive runoff with the 50-year storm. Since there is variation in runoff depth in the basins, each basin requires a different lining solution.

4.0 Installation of Liner

The geotechnical report requires measures be utilized to control offsite migration of water in order to prevent moisture induced settlement in the adjoining properties. The measures required for the individual basins are based on the soil conditions and the duration of runoff present in the basin.

The impermeable liner to be used shall be a "Rufco® 2010B" monolayer membrane or comparable equivalent, as approved by the City Inspector. The specifications for the liner are included as Appendix A. The liner shall be installed per the manufacturer's specifications and under the supervision of a Geotechnical Engineer. In all cases where a liner is installed, the liner shall be installed in soil compacted in accordance with procedures defined in these specifications, and all soil disturbed in the installation process shall be re-compacted to specified densities.

4.1 Bio-Filter

The bio-filter (wetland) basin will accommodate the nuisance flows from the Vista Del Norte Subdivision. Suitable vegetation will be planted in the bio-filter to absorb the nuisance flows. Since water will be constantly present in the bio-filter, an impermeable liner will be required for the entire basin. The liner shall be installed on the bottom of the basin and on all sides. A minimum of 3 feet of fill shall be placed over the liner on the bottom of the pond to enable the vegetation to root and to prevent damage to the liner during maintenance operations. On the side-slopes a minimum of 1 feet of cover is required to prevent damage during maintenance operations. The liner shall be anchored at the top by dropping the liner a minimum of 2 feet down vertically into the top of the slope.

4.2 Sedimentation Basin and Detention Basin

These basins will receive runoff on a regular basis but will drain rapidly. The possibility of offsite migration exists in this basin therefore lining is necessary. The basins shall be lined on all sides to a height of 6.5 feet above the pond bottom with an impermeable liner. The liner shall extend a minimum of 6 feet below the bottom of the pond. On the side-slopes a minimum of 1 foot of cover is required to prevent damage during maintenance operations. The liner shall be anchored at the top of the slope by dropping the liner a minimum of 2 feet vertically into the compacted slope. The soil disturbed by anchoring the liner into the slope shall be replaced and re-compacted to a minimum of

90% of maximum density. The bottom of the pond does not require lining. Vegetation and cottonwood trees may be planted in the pond bottom upon approval of the City Storm Drain Maintenance Engineer.

4.3 Athletic Fields One and Two

These basins receive runoff infrequently and drain rapidly. Therefore, offsite migration is unlikely, and a liner is unnecessary.

4.4 Athletic Field Three

This basin will receive a significant runoff during the 50-year, 24-hour storm. The maximum water depth during the 50-year storm is 7 feet. Due to the amount of water stored in the pond during the 50-year storm and the existence of a structure near the southwest corner of the pond, an impermeable liner shall be installed to prevent offsite migration of water to the structure. The liner shall be placed along the entire length of the western slope of the pond and the western half (1/2) of the southern slope of the pond. See Figure 2 for extents of lining required in Athletic Field 3. The liner shall extend to a height of 7 feet above the pond bottom and a minimum of 3 feet vertically below the bottom of the pond. On the side-slopes a minimum of 1 foot of cover is required to prevent damage during maintenance operations. The liner shall be anchored at the top of the slope by dropping the liner a minimum of 2 feet vertically into the compacted slope. The soil disturbed by anchoring the liner into the slope shall be replaced and re-compacted to a minimum of 90% of maximum density.

4.5 Controlled Release Basin

This basin will receive runoff regularly and shall be completely lined. The impermeable liner shall be installed on the bottom of the basin and on all sides to a height of 8 feet from the bottom of the pond. A minimum of 3 feet of fill shall be placed over the liner on the bottom of the pond to enable the vegetation to root and to prevent damage to the liner during maintenance operations. On the side-slopes a minimum of 1 foot of cover is required to prevent damage during maintenance operations. The liner shall be anchored at the top by dropping the liner a minimum of 2 feet down vertically into the top of the slope.

4.6 Observation and Testing

A qualified Geotechnical Engineer or his representative shall observe installation of the impermeable liner. The observation is to confirm that the installation is in accordance with the manufacturer's specifications. Testing will be at the discretion of the Geotechnical Engineer or his representative.

5.0 Earthwork

Earthwork shall be performed in accordance with procedures outlined in these specifications and Appendix B. Side slopes in the ponds shall be no steeper than 3:1 (horizontal:vertical). The following are earthwork specifications for the site. Detailed earthwork procedures are presented in Appendix B.

5.1 Clearing and Grubbing

Prior to placing structural fill, all borrow and fill areas shall be stripped of vegetation and deleterious materials. All strippings shall be hauled offsite or utilized in landscaped areas.

5.2 Excavation

It is anticipated that on site soils can be excavated with conventional earthwork equipment. Occasional cobbles or boulders may be encountered during excavation. Cobbles and boulders should be disposed of offsite or utilized for landscaping. Cobbles and boulders shall not be placed in structural fill.

5.3 Natural Ground Preparation

Prior to placing structural fill and subsequent to final grading in cut areas, the exposed soils shall be scarified to a depth of 8 inches and moisture conditioned to a near optimum (±3%) moisture content. The exposed soils shall then be compacted to 90% of maximum density as determined by ASTM D-1557. If vibratory compaction poses a threat to nearby structures, static compaction shall be utilized.

5.4 Fill Placement and Compaction

Structural fill shall be placed in horizontal lifts a maximum of 8 inches in loose thickness, moisture shall be conditioned to near optimum moisture content and mechanically compacted. Fill shall be compacted to a minimum of 90% of maximum dry density as determined by ASTM D-1557. Fill above the synthetic liner shall be compacted to 90% of maximum density as determined by ASTM D-1557.

5.5 Fill Material

Fill material over the liner shall conform to the vendor's specifications.

5.6 Trenches and Excavations

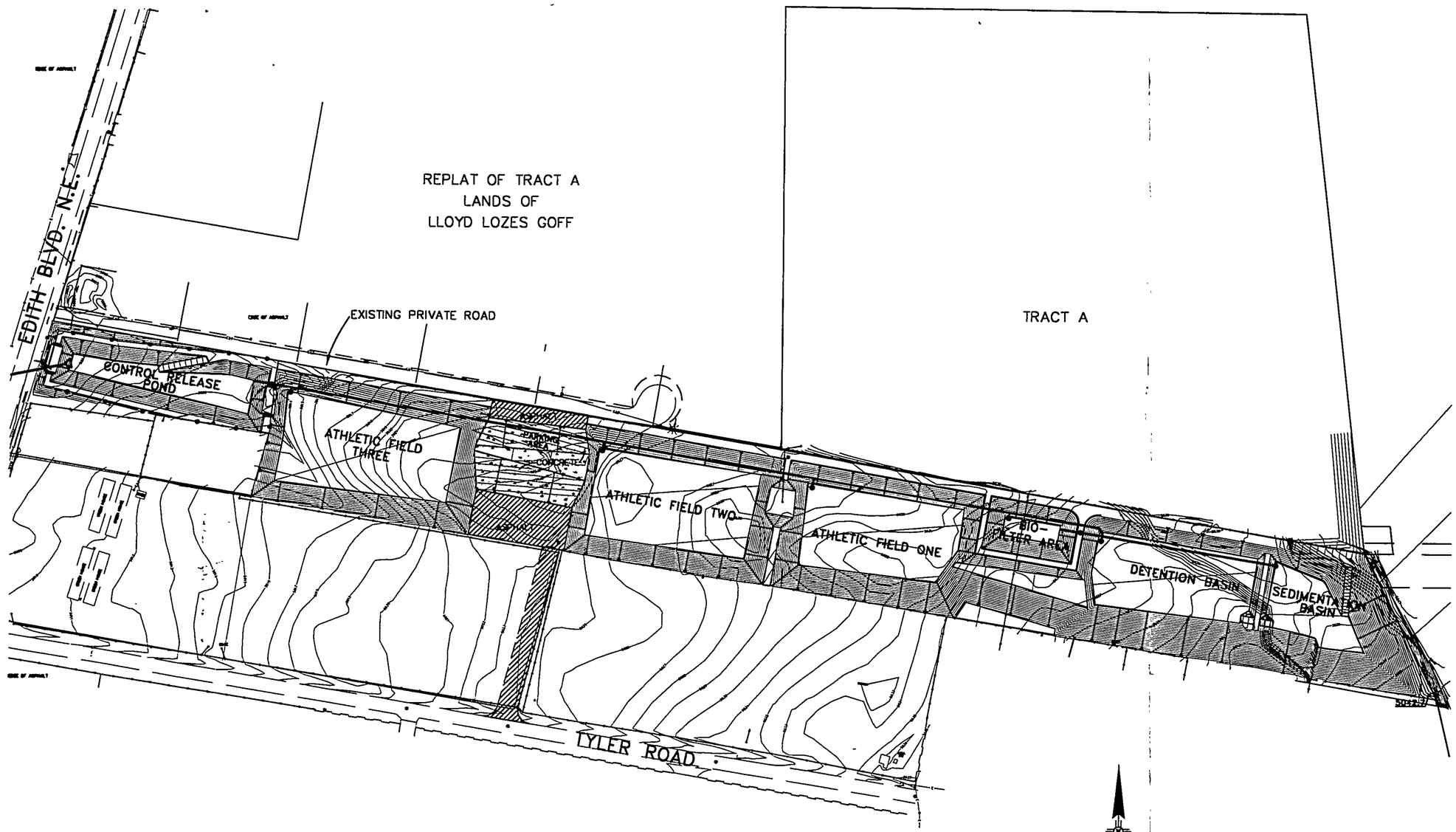
All trenches greater than 4 feet in depth shall be sloped, shored or braced or otherwise supported according to OSHA Construction and Safety Standards. Material excavated from the trench or spoil shall be placed a minimum of two feet from the edge of the excavation. The spoil shall be retained in an effective manner such that no loose material can fall into the excavation.

Temporary construction excavations less that eight feet in depth shall be sloped no steeper than 1-1/2:1 (horizontal:vertical). If deeper excavations are required, the

Geotechnical Engineer shall be contacted for recommendations. Limited raveling of slopes will occur particularly as the exposed soils dry out. Heavy equipment and material stockpiles shall be located a minimum of 5 feet from the top of the slope.

5.7 Observation and Testing

Placement and compaction of structural fill should be observed and tested by a qualified Geotechnical Engineer or his representative. The Geotechnical Engineer shall be responsible for implementing a testing regimen that will ensure the ponds are constructed in accordance with these specifications. The extent and frequency of the testing shall be at the discretion of the Geotechnical Engineer.



GRAPHIC SCALE

(IN FEET)
1 inch = 200 ft.

FIGURE 1
SITE PLAN

PB Parsons Brinckerhoff

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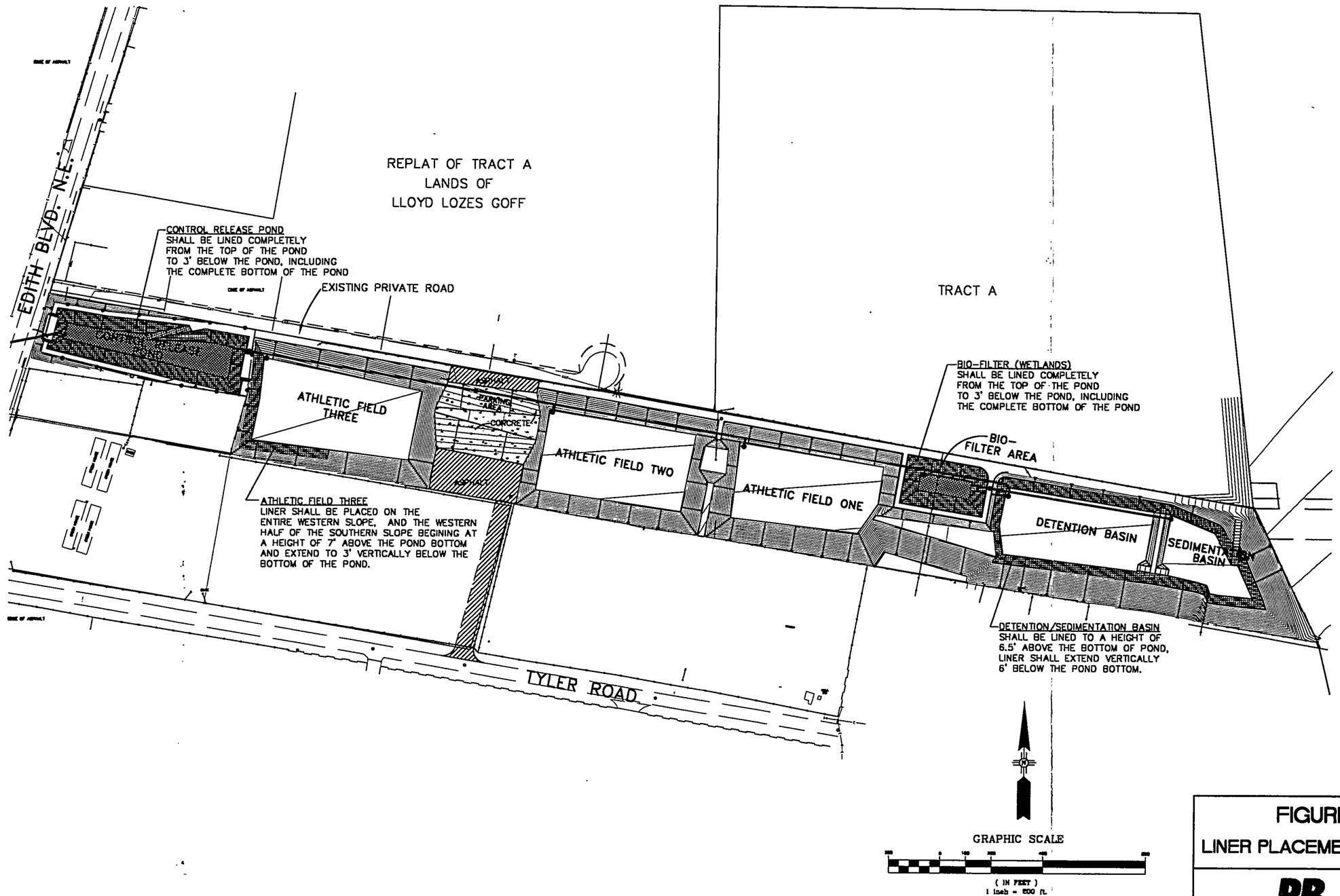

FIGURE 2
LINER PLACEMENT DISPLAY

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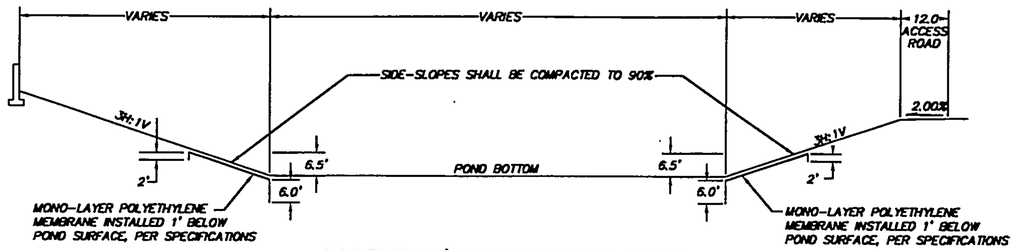
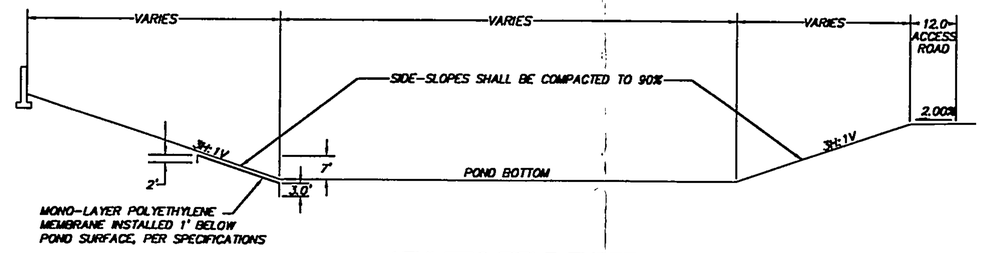


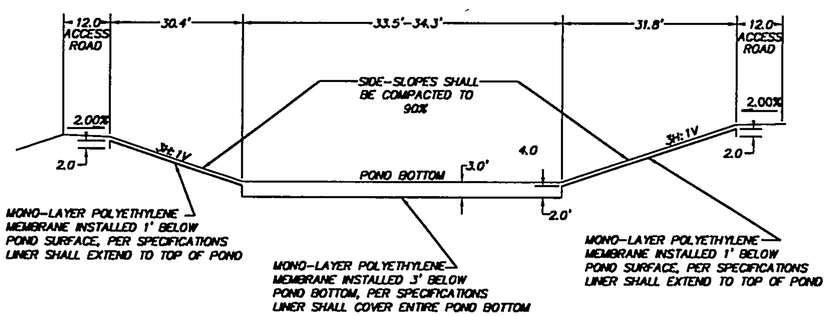
DETENTION/SEDIMENTATION POND
LOOKING WEST

NTS



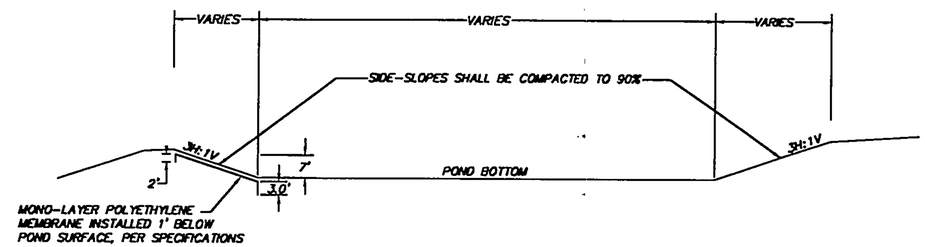
ATHLETIC FIELD THREE
LOOKING WEST

NTS



BIO-FILTER (WETLANDS)
LOOKING WEST

NTS



ATHLETIC FIELD THREE
LOOKING NORTH

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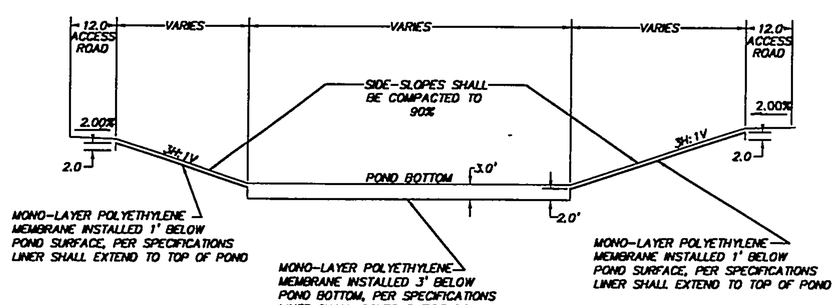

CONTROL RELEASE POND
LOOKING WEST

NTS

FIGURE 3
POND CROSS SECTIONS

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APPENDIX B

EARTHWORK PROCEDURES

General

The Geotechnical Engineer shall be the Owner's representative to observe and evaluate the earthwork operations. The Contractor shall cooperate with the Geotechnical Engineer in the performance of the Engineer's duties.

Clearing and Grubbing

Prior to placing structural fill, all borrow areas and areas to receive structural fill shall be stripped of vegetation and deleterious materials. Strippings shall be hauled off-site or stockpiled for subsequent use in landscaped areas or non-structural fill areas as designated by the Owner or his representative and approved by the Geotechnical Engineer.

Site Preparation – Fill Areas

Prior to placing structural fill, the areas to be filled shall be scarified to a depth of eight inches and moisture conditioned as described below. The area to be filled shall then be compacted to a minimum of 90 percent of maximum density as determined by ASTM D-1557. If vibratory compaction techniques pose a threat to the structural integrity of nearby facilities, a static compactor shall be used. Any soft or "spongy" areas shall be removed as directed by the Geotechnical Engineer and replaced with structural fill as described herein.

Site Preparation – Cut Areas

Following excavation to rough grade, all fill areas shall be scarified to a depth of eight inches and moisture conditioned as described below. All fill areas shall be compacted to a minimum of 90 percent of maximum density as determined by ASTM D-1557. If vibratory compaction techniques pose a threat to the structural integrity of nearby facilities, a static compactor shall be used. Any soft or "spongy" areas shall be removed s directed by the Geotechnical Engineer and replaced with structural fill as described herein.

Natural Ground Preparation

Prior to placing fill or the synthetic liner soils shall be prepared, moisture conditioned and compacted as described herein.

Observation and Testing

The Geotechnical Engineer or his representative shall perform field density tests with a frequency and at the locations he feels appropriate. The Geotechnical Engineer or his representative will perform Proctor tests on representative samples of all fill material. To minimize delays the Earthwork Contractor is encouraged to submit soil samples prior to use for proctor testing.

Manufacturer's Specifications

The specifications of the synthetic liner vendor shall take precedence over this report.

				South Detention Pond System											
	Middle Detention Pond			Detention/Sedimentation Pond			Athletic Field #1		Athletic Field #2		Athletic Field #3		Control Release Pond		
Storm Event	Depth (ft)	Time (hrs.)	Volume' (ac-ft)	Depth (ft)	Time (hrs.)	Volume (ac-ft)	Depth (ft)	Volume (ac-ft)	Depth (ft)	Volume (ac-ft)	Depth (ft)	Volume (ac-ft)	Depth (ft)	Time (hrs.)	Volume (ac-ft)
1yr-24hr (0.87")	1.25	31	3.81	4.23	44	3.91	0	0	0	0	0	0	4.16	52	1.63
2yr –24hr (1.128")	1.76	_	5.44	5.02	_	5.07	1.38	0.39	0	0	0	0	5.09	_	2.18
5yr-24hr (1.474")	2.60	_	8.17	5.19	_	5.35	4.93	3.75	0	0	0	0	5.69	_	2.57
10yr-24hr (1.734")	3.26	_	10.41	5.42	_	5.71	7.01	6.17	0.40	0.16	0	0	6.16	_	2.89
25yr-24hr (2.080)	4.17	_	13.58	5.61	_	6.02	7.08	6.25	4.48	1.08	0	0	7.03	_	3.52
50yr-24hr (2.340")	5.33	_	16.09	5.86	_	6.41	7.10	6.28	5.05	5.99	2.10	1.24	7.44	_	3.81
100yr-24hr (2.600")	5.69	_	18.67	6.08	_	6.77	7.39	6.64	6.13	6.10	7.00	7.96	7.87	_	4.15

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