HYDROLOGY L15/D4 ONE OF TWO ONE PLAN

L15-D4

1 PLAN

18 Oct 76

V.M. Kimmick
K.H. Laws

Transit System Maintenance Terminal.

The drainage appears to meet the requirements of the AMAFCA Drainage Resolution. The area does not show as a federally defined flood hazard area.

I approve of the inlet on the northeast return of Bell Avenue.

The architect should submit his drainage calculations or include them on final plans for building permit approval.

Sidewalk ordinance requires walk all around the ~~building~~ property.

November 19, 1976

TO : Mr. E. F. Hensch, Public Works Director

FROM : Louis G. Hesselden, Architect

SUBJECT: Preliminary Plans Transit Terminal Revisions and Modifications

Dear Mr. Hensch:

The following are answers to comments from:

Mr. Joe Della Longa, Architect/Special Projects
Mr. Kleston Laws, City Engineer-Hydrology
Mr. Robert P. Lowe, Liquid Waste Engineer
Mr. James Brooks, Assistant Liquid Waste Engineer
Mr. Dan Morehead, Design Water Engineer
Mr. C. D. Sheppard, Assistant City Engineer - Field

COPY

Answers to Joe Della Longa's comments:

1. The cost estimate was discussed extensively with Mr. Beck and Mr. Gore. We have since talked it over with Mr. Orr and sent a letter to Mr. Beck and Mr. Gore along with an updated estimate.

2. The other methods of complying with the Fire Department requirement would mean dividing the building into allowable areas by walls, without interior access to these areas as no penetrations would be allowed in these dividing walls.

3. Consideration has been given for female employee's restrooms and it was decided that females are not presently employed in this type facility and should they be in the future, arrangements will be made at that time. Water closet requirements for the handicapped will be adhered to.

4. Ceramic tile eliminates many maintenance factors in a wet area and we feel in the long run will pay for itself since it is a relatively low cost item in comparison to the total cost of the building.

5. We have changed the toilet room access.

6. We have eliminated the cased opening between lunch room and locker room.

7. A door was added in the 3' - 0" opening of Space No. 23.

8. (a) We do not recommend adding additional load on the pre-engineered metal building columns.

(b) Concrete offers a sound barrier to spaces below, it is also a good wearing surface and provides fire protection.

9. We have added a "mandoor" as suggested in the Washrack building.

10. (a) We have added skylights as suggested.

Answers to K. H. Laws comments:

Drainage calculations are being submitted with final drawings. A sidewalk is shown all around the property at new construction.

Answers to Robert P. Lowe's comments:

The 8-inch sanitary sewer connection to the 21" City sewer in Buena Vista Street is existing, the new sewer lines will tie into the existing 8" line.

Answers to Mr. Brook's comments:

Mr. Brooks had no comments.

Answers to Dan Morehead's comments:

Mr. Morehead had no commants.

Answers to C. D. Sheppard's comments:

General:

1. The initial budget was $500,000 for the first phase construction. The preliminary plans deviated from the schematic plans because of additional program needs which were necessary in the first phase construction, but were not included in the schematic drawings because of the $500,000 budget limitation.

2. The preliminary plans and estimate were current at that point in time.

Specific:

1. The final plans indicate proposed traffic circulation patterns.

2. Soil data is being forwarded with the final drawings.

3. A perimeter sidewalk will be part of the contract.

4. According to City sources there is adequate water available.

5. The transformer location was changed to the east side of the building.

Please advise if additional information is desired.

Sincerely yours,

By: _____

Louis G. Hesselden

COPY

LGH/med

WILLIAM MATOTAN & ASSOCIATES • ENGINEERS

230 Truman Street, N.E. Albuquerque, New Mexico 87108 Phone (505) 265-8467

November 24, 1976

Mr. Mike Del Mastro
Louis Hesselden, Architect
213 4th S.W.
Albuquerque, N.M. 87103

Subject: Transit System Maintenance Terminal

Dear Mr. DelMastro:

Transmitted herewith are three (3) copies of the Storm Water Drainage Analysis for subject project.

Very truly yours,

WILLIAM MATOTAN & ASSOCIATES, INC.

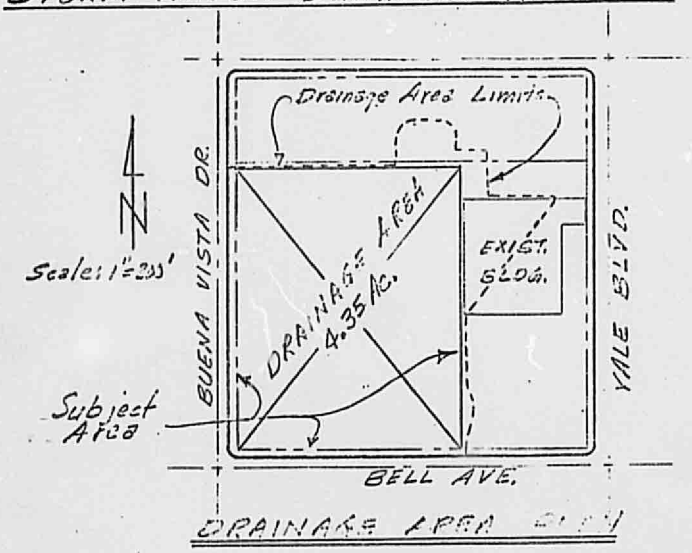
John A. Andrews

John A. Andrews, P.E.
Vice President

JAA:ys
Enc: 3

WILLIAM MATOTAN & ASSOCIATES, INC. ENGINEERS 230 Truman Street, N.E. - Albuquerque, N.M. 87108 Telephone 265-8467	Project TRANSIT SYSTEM MAINTENANCE TERMINAL	Sheet 1 of 7
	By JM Chk'd JA	Job No. 526 Date 11-22-76

STORM WATER DRAINAGE ANALYSIS



CRITERIA

Runoff rate not to increase due to developed conditions - 100 yr. frequency storm.

Assumptions

Peak rate of runoff to be determined by Rational Formula due to small drainage area.

$Q = CIA$

C: Coefficient of Runoff.

C = 0.875 - Paved Areas
C = 0.825 - Roof Areas
C = 0.40 - Unsurfaced Areas

I = Rainfall Intensity from Albuquerque Area Intensity Duration Frequency Curves (1951)

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ENGINEERS
230 Truman Street, N.E. – Albuquerque, N.M. 87108
Telephone 265-8467

RUNOFF

Existing Conditions

Area = 4.35 Acres

			% of total
Roof Area.	=	0.50 Ac.	11.5
Paved Area.		0.97 Ac.	22.3
Unsurfaced Area.		2.88 Ac.	66.2
		4.35	100.0

$C = .115 \times .825 + .223 \times .775 + .662 \times .410 = \underline{\underline{.555}}$

T_c = Time of Concentration -

Overland flow - Length of Drainage Area = 720'
Elev. Diff. of Drainage Area = 4'

From Nomograph by Kirpich - T_c = 8 minutes.

Due to existing conditions use $\underline{T_c = 10 \text{ minutes}}$

I - Intensity - from Curve - = 5.40 inches/hr.

$Q = CIA = 0.555 \times 5.4 \times 4.35 = 13$ cfs - peak flow

Inflow Hydrograph -

Assume $T_c = T_p$ - Time to peak

For Simple Triangular hydrograph.

Hydrograph base = 2.67, T_p = 2.67 x 10 = 27 minutes

Volume of runoff = (13 cfs)(27 min)(60) = 10,530 ft^3

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ENGINEERS
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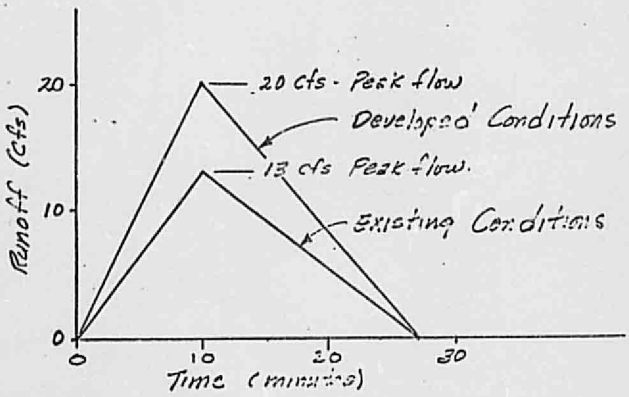
Telephone 265-8467

Project TRANSIT - [illegible] MAINTENANCE TERMINAL Sheet 3 of 7
Job No. [illegible]
By JM Chk'd JA Date [illegible]



RUNOFF HYDROGRAPHS

Developed Conditions

3' [illegible] Area = 4.35 Acres

Roof Area	=	0.72 Acres	16.6
Paved Area	=	3.63 Acres	83.4
		4.35	100.0

$C = 0.166 \times .825 + .834 \times .875 = 0.867$

T_c = Same as Existing Conditions - 10 minutes

I = Same as Existing Conditions = 5.40 inches/hr.

$Q = CIA = (0.867)(5.4)(4.35) = 20$ cfs

Volume of runoff = (20 cfs)(27 min.)(60)/2 = 16,200 cf

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Telephone 265-8467

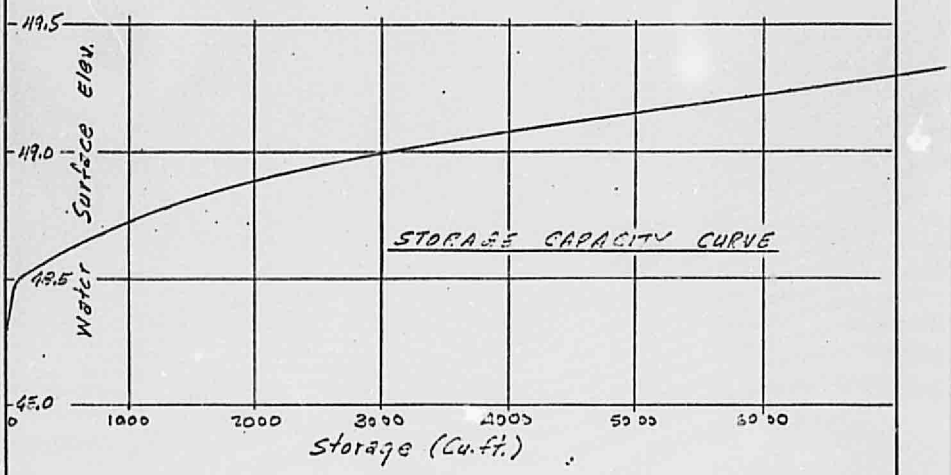
Project TRANSIT SYSTEM MAINTENANCE TERMINAL Sheet 4 of 7
Job No. 55'3
By JM Chk'd JA Date 11-25-76

SOLUTION:

Provide detention storage with controlled outlet.

Storage Capacity - See Contract Plans.

Elev.	Storage (Cu.ft.)
48.3	0
48.5	71
49.0	3052
49.2	5548



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Telephone 265-8467

Project TRANSIT SYSTEM Sheet 5 of 7
MC MAINTENANCE TERMINAL Job No. 5[illegible]
By JMA Chk'd JF Date [illegible]

Outlet flow from storage

See Contract for Outlet Detail.

Assume channel flow for depth of flow - 0 to 6½"

Assume orifice flow for depth of flow - 6½" to 0.90'

Assume broad-crested weir flow over 0.90' depth.

Channel flow - mannings formula. $Q = A \frac{1.486}{n} r^{2/3} s^{1/2}$

Elev.	depth of flow	wp	A	r	V	Q
48.55	3" = 0.25'	2.5	0.5	0.2	1.68	0.84 cfs
48.84	6½" = .54'	3.08	1.08	0.32	5.95	5.95 cfs

Orifice flow - $Q = CA\sqrt{2gh}$

Elev.	depth of flow	h	c	A	Q
49.05	9" = 0.75'	0.5	0.63	1.08	3.33 cfs
49.3	12" = 1.0'	0.75	0.63	1.08	4.75 cfs
49.55	15" = 1.25'	1.0	0.63	1.08	5.48 cfs

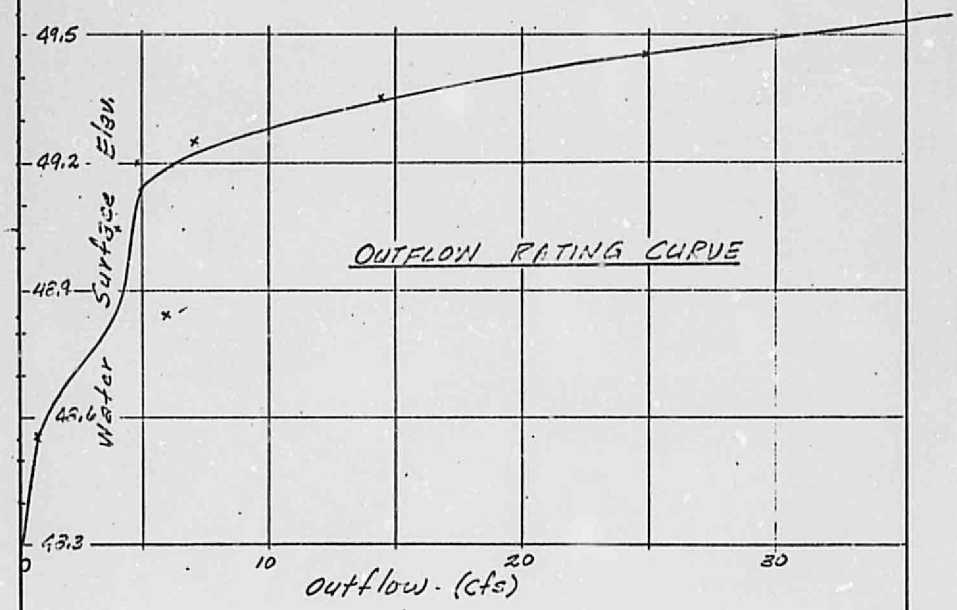
Broad-Crested Weir $Q = CLh^{3/2}$

Elev.	depth of flow	h	C	L	Q
49.25	0.95'	0.05	2.63	60'	1.76 cfs
49.35	1.05'	0.15	2.63	60'	9.17 cfs
49.45	1.15'	0.25	2.63	60'	19.72 cfs
49.55	1.25'	0.35	2.63	60'	32.67 cfs

WILLIAM MATOTAN & ASSOCIATES, INC. ENGINEERS 230 Truman Street, N. E. - Albuquerque, N.M. 87108 Telephone 265-8467	Project TRANSIT SYSTEM Sheet 6 of 7 MAINTENANCE TERMINAL Job No. 556 By JM Chk'd JF Date 11-23-76

Total Outflow - Channel + Orifice + Weir

Elev.	Q
48.3	0
48.55	0.84
48.84	5.95
49.05	3.88
49.20	4.75
49.25	6.88
49.35	14.28
49.45	24.94
49.55	38.15



FLOOD ROUTING THROUGH STORAGE AREA - Developed Conditions

Time t (min)	Δt (min)	Inflow @ t (cfs)	Avg. rate of Inflow (cfs)	Inflow (ft³)	Total storage elev. @ t (ft)	Outflow @ t (cfs)	Avg. rate of Outflow (cfs)	Outflow (ft³)	Increm. storage (ft³)	Total storage	Storage Elev. @ end Δt (ft)
0	2	0	2	240	48.55	0	0.42	50.4	189.6	189.6	48.53
2	2	4	6	720	48.63	0.84	1.17	140.4	579.6	769.20	48.68
4	2	8	10	1200	48.86	1.50	2.65	318.0	882	1651	48.85
6	2	12	14	1680	48.99	3.80	4.00	480	1200	2851	48.97
8	2	16	18	2160	49.12	4.20	4.5	540	1620	4471	49.12
10	2	20	18.8	2256	49.24	4.8	5.9	708	1548	6019	49.23
12	2	17.5	16.4	1968	49.30	7.0	8.25	990	978	6997	49.30
14	2	15.3	14.2	1704	49.33	10.6	12.05	1446	258	7255	49.32
16	2	13	11.8	1416	49.32	13.5	13.45	1614	-198	7057	49.31
18	2	10.5	9.4	1128	49.29	13.4	11.95	1434	-306	6751	49.29
20	2	8.3	7.2	864	49.27	10.5	9.45	1134	-270	6481	49.27
22	2	6	4.8	576	49.24	8.4	7.45	894	-318	6163	49.24
24	2	3.6	2.5	300	49.21	6.5	6.20	744	-444	5719	49.21
26	2	1.3	0.7	84	49.17	5.9	5.35	642	-573	5126	49.16
28	2	0	0	0	49.12	4.8	4.75	570	-570	4556	49.12
30						4.7					

PEAK OUTFLOW = 13.45 CFS, TIME TO MAXIMUM STORAGE = 66 min

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ENGINEERS
230 Truman Street, N.E. - Albuquerque, N.M. 87108
Telephone 265-8467

Project: TRANSIT STORAGE MAINTENANCE FACILITY Sheet 1 of 1
By: JM Chk'd: JA Date: 11-20-86 Job No.: 5-5

CITY OF ALBUQUERQUE FIRE DEPARTMENT
BUREAU OF FIRE PREVENTION
131 ADAMS NE
766-7890

APR 14 1977

OCCUPANCY: Industrial (Fire Hazard) DATE CHECKED 4/14/77

BUILDING PLANS FOR: NEW ☐ REMODEL EXISTING ☒ ADDITION ☐

ADDRESS: 913 Forth SW

ARCHITECT: John C. H. Scolder

CONTRACTOR: ?

OWNER: City of Albuquerque

CONDITIONS, SURROUNDING AND ARRANGEMENTS TO BE IN ACCORDANCE WITH THE FIRE PREVENTION CODE REGULATIONS ADOPTED BY COMMISSION ORDINANCE NO. 50-1975.

Section 7. PENALTIES. Any person violating any of the provisions of this Code or failing or neglecting to comply with any orders issued pursuant to any section thereof shall be deemed guilty of a misdemeanor and such person shall be guilty of a separate offense for each and every day or portion thereof during which any such violation is continued or permitted. Upon conviction for any such violation such person shall be guilty of a misdemanor, punishable by a fine of not more than three hundred dollars, ($300.00) or by imprisonment for not more than ninety (90) days, or by both such fine and imprisonment.

DISCREPANCIES NOTED: ① Portable fire extinguishers required ABC Type ② Verify extent of exploding painting - life-safety code (A-4321 ③ Verify specific protection in paint spray booth and show spray booth ④ Two exits required from every paint in every floor area (Repair shop mezzanine) ⑤ Sliding doors do not constitute required exit doors 21, 26, 31, 30

DATE REJECTED: / / (Initial) CH KT

DATE APPROVED: / / _____ INSPECTOR: _____

(CIRCLE ONE) ARCHITECT / REPRESENATIVE SIGNATURE: _____

ADDRESS: _____

PHONE: _____

COMMENTS BY INSPECTOR: _____

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

INTER-OFFICE CORRESPONDENCE

REF. NO. DR77-24

April 13, 1977

TO: E. F. HENSCH, DIRECTOR OF PUBLIC WORKS

FROM: R. A. FOSHAUGH, TRAFFIC ENGINEER
BY: JON C. DuFRESNE, ASST. TRAFFIC ENGINEER

SUBJECT: FINAL PLANS AND SPECIFICATIONS - TRNASIT SYSTEM MAINTENANCE TERMINAL

The new site plan for the above referenced project has been reviewed as per your request and our comments are as follows.

1. The radius at Yale Boulevard and Bell Avenue should be enlarged to a 35 foot radius in order to permit turning buses to negotiate this intersection more easily.
2. The eastern curb cut on Bell Avenue should be increased from its proposed 30 foot width to a 35 foot width.

If you have any further questions, do not hesitate to contact me.

dcs

cc: Edwin L. Beck

APR 20 1977

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

INTER-OFFICE CORRESPONDENCE April 19, 1977 REF. NO._____

TO: E. F. Hensch, Director of Public Works

FROM: Patrick L. McDonald, Assistant City Attorney

SUBJECT: Final Plans and Specifications -
Transit System Maintenance Terminal

I have reviewed the contract documents for the above-mentioned project and I have the following comments to make:

1. Instructions to Bidders:

a. In the first sentence of Section 7, delete the words "by virtue of State of New Mexico statute."

b. There probably should be some mention of the fact that certain wage rates will be applicable.

c. Perhaps the bid opening procedures should be specified.

2. I did not note any provision for liquidated damages in the event that the contractor does not complete the work within the prescribed time.

3. The state statutes relating to resident labor should be quoted.

4. On the second page of the proposal, reference is made that the certificate of surety company will be attached hereto. Is this certificate a bid bond or something in addition to the bid bond? Also, on that page, reference is made to "Instructions for Bidders" whereas the document is entitled "Instructions to Bidders."

5. Are there any Affirmative Action provisions that are applicable to this contract?

I did not review the technical specifications.

PLM/mf

APR 26 1977

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

INTER-OFFICE CORRESPONDENCE April 22, 1977 REF. NO._____

TO: E. F. HENSCH, DIRECTOR OF PUBLIC WORKS

FROM: BUILDING & INSPECTION DIVISION

SUBJECT: FINAL PLANS AND SPECIFICATIONS
TRANSIT SYSTEM MAINTENANCE TERMINAL

The following items have been noted during a recent plancheck of the subject location:

Structural: 1) Provide design data as per Uniform Building Code Section 301 (d).

2) Tire storage area 15, stock room 13 and stock area 20 must be separated from rest of building with a 1-hour occupancy separation as per Uniform Building Code Section 503 (a).

3) 2 exits required out of service repair 23 as per Section 3319, Uniform Building Code (sliding doors cannot be used as exit as per Uniform Building Code Section 3303 (f).

Mechanical: Check existing material in sewer line under new building.

Electrical: Okay.

Fire Department: 1) Portable fire extinguishers required A.B.C. type as required in N.E.P.A. pamphlet 10.

2) Verify extent of explosion venting (Life Safety Code 14-4321).

3) Verify sprinkler protection in paint spray booth and above spray booth.

4) Two exits required from every point in every floor area (Repair Shop, Mezzanine).

5) Sliding doors do not constitute required exits, doors 21, 26, 31, 30.

/cc

APR 28 1977

CITY OF ALBUQUERQUE, NEW MEXICO
WATER RESOURCES DEPARTMENT

MEMORANDUM - April 26, 1977

TO: H.R. Orr, Director, Public Works Department

FROM: Mark Holstad, Design Engineer, Water Resources Department MH

SUBJECT: FINAL PLANS AND SPECIFICATIONS TRANSIT SYSTEM AND MAINTENANCE TERMINAL

The Water Resources Engineering Division has reviewed the above plans and has no comments.

MH:gs

cc: P. D. Noland
W. H. Otto
H. R. Orr (3)
M. Holstad (2)

MAY 10 1977

LEGAL DEPARTMENT
CITY OF ALBUQUERQUE
NEW MEXICO

Date: 5/6/77
To: E. F. Lewalen
From: Dante Pacheco
About: Final Planet Secs. Transit Maintenance Facility

- [ ] Review and Comment
- [ ] For Your Information
- [ ] Note and See Me
- [ ] Necessary Action
- [ ] Note and Return
- [ ] Per conversation
- [ ] As requested
- [ ] Read and File

Article 17, pp 56C-1 & 56C-2 need to be changed as follows:

A. Property damage insurance in amounts not less than $250,000 each person, $500,000 per occurrence.

B. Eliminate "with same limits as provided in the General Comprehensive Liability policy" and substitute therefor "with a $500,000 single limit of liability"

Requirement for a Builders Risk Coverage in the full amount of the contract should be added.

MCR

CITY OF ALBUQUERQUE, NEW MEXICO

CITY ENGINEER'S OFFICE

MEMORANDUM-May 20, 1977

TO: Mr. H. R. Orr, Jr., Acting Director of Public Works
FROM: C. D. Sheppard, Assistant City Engineer-Field
SUBJECT: Transit System Maintenance Terminal, Phase I, Final Plans and Specifications, Review Comments

SPECIFIC COMMENTS:

Plans

Sheet C-1

a.) What is to be included in the demolition item.

b.) How much of the foundations and existing utility installation needs to be removed.

Sheet C-2

a.) What is to be provided between the sidewalk and the Type A curb where asphalt surface course is not to be placed.

b.) What happens to existing light or power poles in the same area.

c.) The transition in pavement grades along the fence line on the East side from elevations 52.10 to 51.60 is quite abrupt. Recommend modifying.

d.) The top of curb elevations for the Type A curb along Bell Avenue do not clearly indicate what the profile of the curb is intended to be. Recommend clarifying.

e.) Note No. 10 indicates the contractor is to make provisions for extra earth work or revise earth work from the plan contours. The specifications contain language that says contractor will be compensated at unit prices for any extra work. This should be reconciled.

Sheet S-1

a.) Note No. 15, first sentence conflicts with the specifications page 2-5.

b.) Note No. 15C, should also refer to approach aprons at the garages.

Sheet A-5

a.) Any required fire rating for doors should be cleared with the fire prevention bureau prior to advertising. so that the contract requires the actual door that is to be installed.

Sheet -1

a.) The location of the power transformer pole on the West side of the site does not seem suitable as it is apparently in direct pattern traffic. Recommend location outside of fence.

b.) Indicate the disposition of the existing light or power poles on the South side of the site.

SPECIFICATIONS

Page 4	The contract time should be indicated in the proposal and the affirmative action plan requirements should be indicated in the instructions to bidders.
Page 5	As noted previously, the time limit should be included in the proposal.
Page 1-1 Paragraph 1.3	There do not appear to be sufficient base line monuments on the plans so this paragraph seems to require a contractor to do all of his basic layout work. Recommend that at least basic control be provided.
Page 2-1	As mentioned in plan comments, the extent of demolition is not clearly defined.
Page 2-4 Paragraph 1.4	As noted in plan comments, this conflicts with requirements regarding extra work by contractor. Recommend that this paragraph be deleted and that the current contours be provided on the plans.
Paragraph 1.6	Reference to AASHO test methods should be revised to reflect current city policy using ASTM test methods. Basic test method should be ASTM D-1557. Compaction requirements should be at least 95 percent of maximum density.

Page 2.5 Paragraph 3.1	Requirements to fill excavation with 2,500 PSI concrete conflicts with Note 15, Sheet S-1, on the plans. Reconcile.
Page 2-6 Paragraph 3.3	As noted previously, compaction requirements should be at least 95 percent of maximum density as per ASTM D-1557.
Paragraph 3.5	Revise compaction requirement as noted above.
Paragraph 3.6	The engineered fill requirements conflict with Paragraph 3.1 of these specifications. Reconcile.
Page 2-7	The entire asphalt paving specifications should preferably be revised to those contained in the current city utility and paving contract documents. As a minimum, the marshall stability requirements should be changed to 1,800 pounds for surface course and 1,500 pounds for base course. In addition, subgrade requirements should require a minimum of 20 soil bearing value for a depth of at least 6 inches. Refer any questions to the Paving and Testing engineer.
Page 2-14 Paragraph 3.3B	Tact coat requirements should reflect the residual asphalt content and should not exceed approximately 0.05 gallons per square yard. Reconcile.
Page 2-18	Fence specifications appear minimum. Suggest verifying quality of existing installation and specify more exactly what is desired.

SUMMARY COMMENT

The plans and specifications appear to be close to bidding documents but as pointed out in the comments above, a final review by the architect needs to be made to eliminate conflicts and to take care of any ommisions.

End of Comments.

JUL 6 1977

LOUIS G. HESSELDEN
ARCHITECT

P. O. BOX 803 ALBUQUERQUE, NEW MEXICO 87103

July 5, 1977

TO: Mr. H. R. Orr, Public Works Director

FROM: Louis G. Hesselden, Architect

SUBJECT: Final Plans and Specifications
Transit System Maintenance Terminal

Dear Mr. Orr:

In accordance with your comments of the final plans and specifications for the above subject project, we have made the following modifications:

Building and Inspection Comments

Structural: 1) Design data has been provided on Sheet C-1.

2) Tire Storage Area 15, Stockroom 13 and Stockroom 20 are separated from rest of building with one hour fire separation.

3) An additional exit has been provided from Service Repair Room 23.

Mechanical: All existing sewer lines under new building will be removed.

Fire Department: 1) Portable fire extinguishers have been added.

2) In conversation with officials of the fire department, it was decided that the diluted paint to be used had such a low explosive point the venting was not needed.

3) Additional sprinklers have been provided in paint booth and above.

4) Additional exits have been provided including an additional stair.

5) Additional exits are provided in addition to the sliding doors giving required exits.

C. D. Sheppard Comments

Sheet C-1

a.) Specifications have been changed to clarify the demolition items.

b.) DIVISION 2, Section 02100, Para. 2.1 gives a general coverage of foundations that are to be removed.

Copy: Bob Lielich

Sheet C-2

a.) Where asphalt is not placed between the concrete walk and type A curb, the area shall remain dirt.

b.) Existing light and power poles are to remain. (Notes have been added to show same).

c.) Transition of paving grades have been changed to give a more gentle slope.

d.) Note has been added to clarify curb detail.

e.) Existing contours have been changed to show present contours. Note ten has been deleted.

Sheet S-1

a.) Specifications have been changed to agree with structural Note #15.

b.) Note has been added to include approach aprons.

Sheet A-5

a.) We have checked the doors with the Fire Prevention Bureau and agreed that Doors 27 and 28 should be 1 1/2 hour label and 32 and 33 should be one hour label.

Sheet E-1

a.) Power transformer pole is presently located outside of fence.

b.) Existing power and light poles are to remain.

SPECIFICATIONS

Page 4	The contract time has been inserted into the proposal, and the Affirmative Action Plan requirements are now in the Instructions to Bidders.
Page 5	The time limit is in the proposal.
Page 1-1, Para. 1.3	There appears to be sufficient dimensions for the contractor to lay out his work, and a bench mark has been shown.
Page 2-1	Demolition: Specifications have been changed to clarify items.

Page 2-4 Para. 1.4	Current contours are now shown on the plans. This paragraph is needed where unforseen soil conditions may occur.
Para. 1.6	Specifications have been changed to show ASTM D-1557 and 95% compaction.
Page 2.5 Para. 3.1	Concrete fill has been deleted.
Page 2.6 Para. 3.3 Para. 3.5 Para. 3.6-Para. 3.1	Changes have been made in specs. to concur. Compaction requirements have been revised. Has been changed.
Page 2.7	Asphalt paving specifications have been changed to meet city requirements.
Page 2-14 Para. 3.3B	Tack coat requirements have been changed and John Andrews and C. D. Sheppard have agreed to the new requirements.
Page 2-18	Fence specifications have been changed to include more information.

McDonald Comments

1. a.) Instructions to Bidders: in Section 7, "by virtue of State of New Mexico statute", has been deleted.

   b.) Wage rates have been referred to.

   c.) The bid opening procedures are now specified, (Para. 18).

2. Liquidated damages are now called out. (Instr. to Bidders Para. 16)

3. Resident labor statutes are now called out. (Instr. to Bidders Para. 19)

4. Certificate of surety company has been noted as (bid bond). "Instructions for Bidders", has been changed to "Instructions to Bidders".

5. Affirmative Action provisions have been added to Instructions to Bidders Para. 20.

Fosnaugh Comments

1. The radius at Yale and Bell Avenue has been enlarged to 35'.

2. The eastern curb cut on Bell Avenue has been increased to 35'.

We are enclosing a copy of the City of Albuquerque Comments of our Final Plans and Specifications, and an updated Construction Cost Estimate based on

inflationary trends and additions to the contract drawings.

Please contact us if additional information is required.

Sincerely yours,

Louis G. Hesselden

LGH/ml
Enclosures

cc: Mr. Edwin L. Beck

Copies: Building & Inspection
Fire Dept. - Fire Prevention Bureau
Dwayne Sheffert
Pat McDonald
Bob Fosnaugh

Cost Estimate to Bob Kielich
and Ed Beck

AUG 10 1977

CITY OF ALBUQUERQUE, NEW MEXICO
CITY ENGINEER'S OFFICE

MEMORANDUM - August 10, 1977

TO: H. R. Orr, Acting Director of Public Works
THRU: V. M. Kimmick, City Engineer
FROM: Q. R. Kielich, Assistant City Engineer-Design
SUBJECT: REVIEW OF COST ESTIMATE FOR TRANSIT SYSTEM MAINTENANCE TERMINAL

1. The architect's cost estimate has been reviewed and has been found to be reasonable as follows: $39.15 per sq. ft. for Maintenance Shop & Storage Bldg., and other spot items were checked from available information.

2. Recommend architect's estimate of $990,280.00 be used as the engineer's estimate at the bid opening.

QRK/tl

Approved:

H. R. Orr, Acting Director
Public Works Department

cc: Mr. Hesselden
Ed Beck

OCT 1 1 1976

CITY OF ALBUQUERQUE, NEW MEXICO
PUBLIC WORKS DEPARTMENT

MEMORANDUM -- October 11, 1976

TO: Mr. H. R. Orr, Ass't. Director of Public Works

FROM: Joe Della Longa, Architect/Special Projects jdl

SUBJECT: COMMENTS ON THE TRANSIT MAINTENANCE TERMINAL
(PLANS MARKED PRELIMINARY, DATED 9/30/76)

1. The cost estimate submitted appears to be substantially in excess of the amount ($500,000) in the Architects Agreement. Are any provisions being considered for the increases in the design services as well as construction?

2. Supplemental to (1) above, an automatic sprinkler system is being considered for this project which would compound the "over-expenditure". It should be noted the sprinkler system is only one way of complying with a Fire Dept. requirement.

3. Has any consideration been given for female employee's restroom and for handicapped employees?

4. Ceramic tile floors in toilet and locker room apppears extravagant. Also ceramic tile wainscot 6'-0" high in toilet.

5. Access to toilet through lunch room and locker room is questionable.

6. Cased opening between locker room and lunch room is undesirable.

7. 3'-0" opening in northwest corner of space number 23 is undefined.

8. Reference stock area-space 20 (Mezzanine)
   a). Why not continue the area 6'-8" easterly and tie in structurally with columns 3 and 4?
   b). Is a concrete floor necessary?

9. Reference Wash Rack
   a). "Mandoor" might be in order in addition to the overhead doors.

10. General
   a). I feel this complex affords a good opportunity to implement the use of skylites in an effort to provide natural daylight and save electricity.
   b). Review to be continued upon submission of subsequent plans.

JD:lm

OCT 15 1976

CITY OF ALBUQUERQUE, NEW MEXICO
PUBLIC WORKS DEPARTMENT
WATER DIVISION

MEMORANDUM - October 15, 1976

TO: Mr. E. F. Hensch, Public Works Director
FROM: D. Morehead, Design Engineer - Water Division DM
SUBJECT: PRELIMINARY PLANS TRANSIT TERMINAL REVISIONS AND MODIFICATIONS

The Water Division has reviewed subject plans and has no comments concerning them.

DM:rm

cc: E. F. Hensch (3)

From: City Engineer

OCT 13 1976

Date: 10-18-76

To:
- [ ] Public Works Director
- [x] Assist. Pub. Works Director
- [ ] Liquid Waste Division
- [ ] Streets Division
- [ ] Water Division
- [ ] Assist. City Eng. Field
- [ ] Assist. City Eng. Design
- [ ] Assist. City Eng. Hydrology
- [ ] Chief Surveyor
- [ ] Contract Manager
- [ ] Office Coordinator
- [ ] Special Projects Engineer
- [ ] _____

SUBJECT: _____

Rep: See enclosed. We mentioned S.W. ord. but they have fund problem.

Li

OCT 18 1976

CITY OF ALBUQUERQUE, NEW MEXICO
CITY ENGINEER'S OFFICE

MEMORANDUM - October 18, 1976

TO: Mr. V. M. Kimmick, City Engineer
FROM: K. H. Laws, Assist. City Engineer-Hydrology
SUBJECT: TRANSIT SYSTEM MAINTENANCE TERMINAL

The drainage appears to meet the requirements of the AMAFCA Drainage Resolution. The area does not show as a federally defined flood hazard area.

I approve of the inlet on the northeast return of Bell Avenue.

The architect should submit his drainage calculation or include them on final plans for building permit approval.

Sidewalk ordinance requires walk all around the property.

KHL/fs

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

OCT 22 1976

INTER-OFFICE CORRESPONDENCE

REF. NO._____

October 20, 1976

TO: Robert P. Lowe, Liquid Waste Engineer

FROM: James H. Brooks, Ass't Liquid Waste Engineer JHB

SUBJECT: Preliminary Plans, Transit Terminal Revisions and Modifications

The subject plans have been reviewed and are acceptable as submitted.

JHB:dlk

cc: R.P. Lowe, Liquid Waste Engineer
Reading File
File

OCT 22 1976

CITY OF ALBUQUERQUE, N. M.
PUBLIC WORKS DEPARTMENT
LIQUID WASTE DIVISION

MEMORANDUM - October 22, 1976

TO - H. R. Orr, Assistant Public Works Director

FROM - Robert P. Lowe, Liquid Waste Engineer RPL

SUBJECT - PRELIMINARY PLANS--TRANSIT TERMINAL REVISIONS AND MODIFICATIONS

* The Liquid Waste Division has reviewed the above preliminary plans and has no comments to make. Mr. James H. Brooks, Assistant Liquid Waste Engineer - Maintenance, reviewed the items in regard to mechanical and electrical portions of the work and you will find attached a copy of his October 20, 1976 memo to me.

RPL/hk
Attachment

*We do have one concern in regard to the 8-inch sanitary sewer connection to the 21-inch City sewer in Buena Vista Street. As this sewer is approximately 15-feet deep at this point, a drop manhole connection or sloping service line connection to the bottom shelf of the manhole will be required. As our information indicates no manhole at this point, construction of a new manhole will be required under City design standards with approval through the City Engineer's office. A request form is available for design of this manhole by the Engineering Division.

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

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Frank A. Kleinhenz

October 26, 1976

Mr. Mike De Mastro
Louis Hesselden & Associates
213 Fourth Street SW
Albuquerque, NM 87103

Subject: PRELIMINARY PLANS
TRANSIT TERMINAL REVISIONS AND MODIFICATIONS

Dear Mr. De Mastro:

Attached are comments on the above project from:

Mr. Joe Della Longa, Architect/Special Projects
Mr. Kleston Laws, City Engineer-Hydrology
Mr. Robert P. Lowe, Liquid Waste Engineer
Mr. James Brooks, Assistant Liquid Waste Engineer
Mr. Dan Morehead, Design Water Engineer

Comments should be forthcoming within the next few days from Dwayne Sheppard, Assistant City Engineer-Field. These will be transmitted to you when received.

Yours very truly,

H. R. Orr, Jr.
Assistant Director of Public Works

HRO:lm
cc: Mr. E. L. Beck, w/attachments
Mr. V. M. Kimmick, w/attachments

Public Works Department

Director – Erwin F. Hensch, P. E. 766-7457
Engineering 766-7441 – V. M. Kimmick, P. E.
Street Maint. 766-7755 – G. E. Paul, P. E.
Ass't. Director – Harold R. Orr, Jr. P. E.
Liquid Waste 766-7535 – R. P. Lowe, P. E.
Water 766-7437 – W. H. Otto, P. E.

AN EQUAL OPPORTUNITY EMPLOYER

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

MAYOR
Harry E. Kinney

CHIEF
ADMINISTRATIVE OFFICER
Frank A. Kleinhenz

November 15, 1977

Mr. Louis G. Hesselden
213 Fourth St. S.W.
Albuquerque, New Mexico

Dear Mr. Hesselden:

I have received for review the site plans for the City of Albuquerque Transit System Maintenance Terminal and I will not be able to approve it in its present form.

I understand from Mr. V. M. Kimmick that substantial flooding problems exist along Bell Ave. S.E. due to the large contributing drainage area and to the inadequacy of the existing drainage system.

I have seen the letter by my predecessor, Mr. Kleston Laws approving the drainage concept submitted (letter dated 11-18-76) and the drainage report by William L. Matotan Engineers dated 11-24-76 and I do not concur with the proposal submitted.

The main thrust of the proposed scheme is to reduce the peak rate of flow after development of 20.0 cfs to the undeveloped rate of flow of 13.0 cfs per a 100 years storm of 10 minutes duration. Admittedly, a storm of larger duration (say 1.0 hr.) would not produce as high an instantaneous peak discharge. Nevertheless, the total volume of runoff would decidedly be increased with the result that the existing poor conditions on Bell Ave. would be worsened.

According to the procedure presently followed and which are complied with by the private sector, a storage ponding volume with infiltration capacity equivalent to 10% of the surface area of the parcel, is provided. In this particular case, given a surface area of 189.500 ± sq. ft., a ponding volume of 19000 cu. ft. should be available to minimize problems downstream.

It is my feeling that rather than lagging behind, the City should be on the forefront in the compliance of its own Drainage policy resolution and of the A.M.A.F.C.A. Resolution 72-2.

If you feel you want to discuss and review the matter further, feel free to contact me.

Very Truly Yours,

Bruno Conegliano
Asst. City Engineer-Hydrology

BC/tl

cc: V. M. Kimmick, City Engineer
Rip Orr, Acting Public Works Director
Drainage File
W. L. Matotan

Bruno

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

October 1, 1979

RECEIVED
OCT 02 1979
CITY ENGINEER

Design Professionals, Inc.
4125 Carlisle Blvd., NE
Albuquerque, NM 87107

RE: Site for New City Bus Barn and Maintenance Terminal

Gentlemen:

This letter will confirm the issues discussed at our September 27, 1979, meeting.

SITE SURVEY - Your office will provide and be responsible for a composite survey for the entire block, including topography and boundary lines. Your surveyor will spot-check the contours and other data previously done by Mr. Del Mastro's surveyor.

PARKING AND LANDSCAPING - Your office will be responsible for satisfying the parking and landscaping requirements for the entire block. Coordination with Mr. Del Mastro is essential.

DRAINAGE - Mr. Del Mastro will confer with his hydrology engineer to determine if the entire block was included in the original drainage calculations. After that determination is made, a decision will be rendered by the City as to which consultant will be responsible for drainage of the entire site.

ONE SINGLE GENERAL CONTRACTOR BIDDING BOTH BUILDINGS - The idea is appealing and would be the City's desire in lieu of having two general contractors working on the same site. However, before a determination is made on this matter, we should consider and evaluate all the merits and pitfalls.

SOILS TESTING - Your proposal for the Bus Barn site is being evaluated, and the City will respond under separate cover.

Sincerely,

Joseph A. DellaLonga

Joseph A. DellaLonga
Architect/Special Projects

JDL/mm

cc: Gary House, Special Projects, Transportation Dept.
Dick Heller, City Engineer, MDD/ENG
Ida Pearle Jeffers, CIP Official, MDD/CIP

MICHAEL DEL MASTRO · ARCHITECT AIA
610 GOLD AVE S.W. · P.O. BOX 358 · ALBUQUERQUE, NEW MEXICO 87103 · 505-243-4559

September 11, 1981

Mr. Charles M. Easterling
Prin. Assist. City Engineer/Hydrology
Municipal Development Department
Engineering Division
CITY OF ALBUQUERQUE
Box 1293
Albuquerque, New Mexico 87103

Project: Transit System Maintenance Terminal
City of Albuquerque, New Mexico

Dear Mr. Easterling:

The following is to confirm, as per your instructions, your approval of the drainage plan for the referenced project. The plan to be incorporated in the Contract Documents, Sheet C-2, was presented and discussed during your meeting with Bill McConnell on September 10, 1981.

Sincerely yours,

Michael Del Mastro
MICHAEL DEL MASTRO, AIA
Architect

I have approved the referenced drainage plan and determined that the facility is not in jeopardy from a 100-year frequency storm.

Charles M. Easterling
CHARLES M. EASTERLING
Principal Assistant City Engineer/Hydrology
City of Albuquerque, New Mexico

MDM:njc

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

INTER-OFFICE CORRESPONDENCE January 6, 1983 REF. NO._____

TO: Fred Aguirre, Hydrology

FROM: Phil Fischer, Field Engineering P.F.

SUBJECT: DRAINAGE INSPECTION FOR THE NEW SUNTRAN MAINTENANCE FACILITY AT 601 YALE BLVD. SE

The subject site has been graded and a three inch asphalt base course has been placed in accordance with the New Site Plan as shown on sheet C-2 of the construction plans. The remaining one inch surface course to be placed when weather permits will complete the surface treatment of the site and should not have any adverse effects on drainage. In short, site drainage is in substantial compliance with the drainage plan as expressed in the construction documents.

PF/dw

cc: Cliff Pedroncelli, Inspector
Project File

PLEASE GIVE US TIME FRAME AS TO WHEN WE WILL RECEIVE REVISED PLAN FROM BARRY SIMMON ENGINEERING/FIELD.

FJA
B.M.
BERNIE, PLEASE [redacted] ADVISE ME OF THE SITUATION.

April 23, 1985

RECEIVED
APR 25 1985
DH0047
HYDROLOGY SECTION

City of Albuquerque
Post Office Box 1293, Hydrology Department
Albuquerque, New Mexico 87103

ATTENTION: Fred Aguirre

SUBJECT: Confirmation of Acceptance of Detention Pond Subgrade at City Bus Storage Facility, 601 Yale S.E.

Dear Mr. Aguirre:

This is to confirm the decision made by Rick Duran of the Hydrology Department at the meeting held at the construction site Monday, April 21, 1985, 10:15 AM. Persons in attendance included: Jim Sanders, Wescon, Inc.; Rick Duran, City Hydrology Department; Cliff Pedronelli, City Engineering Inspector; John N. Eagan, Design Professionals, Inc. It is my opinion that the detention pond subgrade profile does not meet the approved Contract Drawings or the "Drainage Report for Transit System Maintenance Terminal Improvements" dated March, 1980 and approved by the City Hydrology Department. The subgrade profile was visually checked by Rick Duran and he stated that it was acceptable. Please confirm by signing this letter that the as built conditions accepted by Rick Duran meets the City's Hydrology requirements and return as soon as possible.

If there are any questions, please contact the undersigned.

Sincerely,

DESIGN PROFESSIONALS, INC.

John N. Eagan
JOHN N. EAGAN, AIA

Acceptance Confirmed - City Hydrology Department

DESIGN PROFESSIONALS, INC.
4301 CARLISLE BOULEVARD, NE/ALBUQUERQUE, NEW MEXICO 87107/(505) 881-6336
ARCHITECTS/ENGINEERS
PRINCIPALS:
GEORGE H. BOLLING
HOWARD S. COTTRELL

4504

CITY OF ALBUQUERQUE

ALBUQUERQUE, NEW MEXICO

June 4, 1985

INTER-OFFICE CORRESPONDENCE

REF. NO._____

TO: Jim Fink, Hydrology, City Engineering/MDD

FROM: Cliff Pedroncelli, Field, City Engineering/MDD

SUBJECT: BUS STORAGE FACILITY, PROJECT #1652

This is to verify that the water drainage and ponding facility at the said project was accomplished as per approved construction plans and specifications.

CP:dg

cc: File #1652

Cliff Pedroncelli
6-3-85

K15-D15 L15-D4

CITY OF ALBUQUERQUE
ALBUQUERQUE, NEW MEXICO

DRAINAGE REPORT

FOR

TRANSIT SYSTEM MAINTENANCE TERMINAL

IMPROVEMENTS

APR 1980
CITY ENGINEER

MARCH, 1980

Prepared By

ANDREWS, ASBURY & ROBERT, INC.
Consulting Engineers

401 San Pedro, NE
Albuquerque, New Mexico 87108

505-265-6631

DRAINAGE REPORT

FOR

TRANSIT SYSTEM MAINTENANCE TERMINAL
IMPROVEMENTS

TABLE OF CONTENTS

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II	Existing Conditions	2
III	Developed Conditions	3
	Phase I Construction	4
	Phase II Construction	5
	Phase III Construction	6
	Location Map	MAP NO. 1
IV	Drainage Analysis	7
		Sheets 1 through 19

MAPS

Existing Conditions	MAP NO. 2
Developed Conditions	MAP NO. 3

(See pocket at back of report for Map No. 2 and Map No. 3)

I

INTRODUCTION

The City of Albuquerque's Transit System proposes to improve a 7.32-acre tract of land, hereinafter referred to as the Transit System Maintenance Terminal. The Transit System Maintenance Terminal is located within the Southeast Quadrant of the City of Albuquerque, New Mexico, and being situate in the Northeast Quarter (NE¼) of Section 28, Township 10 North, Range 3 East, N.M.P.M. (see enclosed Location Map No. 1 - Zone Atlas Map L-15).

The improvements proposed for this tract consists of expanding and rebuilding of the present facilities in order to accommodate more vehicles and to increase the maintenance and storage capability of the existing terminal.

Although the total improvements, as proposed, will be constructed in multiple phases, it is the intent of this report to provide for an acceptable method of controlling excess storm water runoff for the ultimate development (all phases) in the event of a 100-year frequency storm.

Guidelines for the analysis are based on the Albuquerque Metropolitan Arroyo Flood Control Authority's Drainage Resolution 1972-2 and the City of Albuquerque Drainage Ordinance.

II

EXISTING CONDITIONS

The subject property is presently semi-developed and is being utilized by the City of Albuquerque's Transit System for the maintenance and storage of City buses. Existing improvements include several buildings and some asphalt and concrete pavement. (See Map No. 2 enclosed).

Under existing conditions, the project site has a gentle slope from north to south of approximately 0.80%.

The subject property is bounded on the north by St. Cyr Avenue, on the east by Yale Boulevard, on the south by Bell Avenue, and on the west by Buena Vista Drive, all of which are improved streets, with curb and gutter. Therefore, external drainage areas have not been considered as contributing drainage to subject property. All excess storm water runoff generated from on-site drainage areas flows uncontrolled to the surrounding streets.

III

DEVELOPED CONDITIONS

In the proposed developed condition, it is proposed to control the excess storm water runoff created by the extensive site improvements by means of onsite detention ponding (see Map No. 3 enclosed for drainage area designations).

Drainage Area D-2 will be graded to drain to Pond D-2, and runoff from Drainage Area D-4 will be directed to Pond D-4 by means of roof drains located at the south wall of the proposed Bus Storage Facility. All remaining drainage areas will be allowed to flow to the surrounding improved streets and away from the subject property, as under Existing Conditions.

Due to project funding restraints, as related to the extensive scope of construction work proposed to improve the City's Transit System Maintenance Terminal, along with the need for certain existing facilities to remain in operation while new construction is in progress, it is necessary that the proposed improvements be constructed in basically three (3) phases, as hereinafter described.

It is the intent of this report to provide a method for controlling excess storm water runoff for the proposed ultimate improved conditions. Therefore, this report addresses each of the project phases and provides for construction of drainage facilities in each of these phases, as necessary to control the site drainage in the interim condition, as well as the fully developed conditions.

PHASE I CONSTRUCTION

Phase I Construction provides for improvements to the major portion of the area and consists of constructing the new Maintenance Shop and Stock Building, Service Islands with canopy, Wash Rock Building and the grading and installation of pavement on the westerly and northerly portion of the site.

Existing buildings to be removed under this phase include the Wash Bay, Tire & Welding Shop and the Body Shop and Storage Building. The existing Service Garage and Administration Building will remain.

Existing pavement to the west of the Service Garage and to the West of the Administration Building will also be removed under this Phase I Construction project.

Michael Del Mastro, Architect, has been employed by the City of Albuquerque for the design of the Transit System Maintenance Terminal - Phase I Project and is scheduled to begin construction immediately upon approval of the final Contract Plans, April, 1980. Site grading and drainage facilities, as proposed in this report, have been incorporated in the Phase I Construction Plans.

Detention Pond D-2 will be constructed as a portion of the Phase I project, as shown on Map No. 3 enclosed. This pond will intercept all flows from Drainage Area D-2 and as sized herein (see Drainage Analysis computations) will detain all

excess flows created by the proposed improvements lying within this area, including portions of the new Bus Storage Facility that will be constructed under subsequent phases.

PHASE II CONSTRUCTION

Phase II Construction provides for the construction of the southerly 182 feet of the new Bus Storage Facility. No major removals of existing facilities are necessary to provide for this phase of construction. Design Professionals, Inc., Architects/Engineers, have been retained by the City of Albuquerque for the design of this Phase II Construction project, which is scheduled to begin construction in August, 1980.

Detention Pond D-4 will be constructed as a portion of the Phase II project and will intercept and detain all flows from Drainage Area D-4 (see Map No. 3 enclosed). The remaining portion of the Storage Facility to be constructed under this phase falls within Drainage Area D-2 and, as stated previously, Detention Pond D-2 is sized to accommodate the increased flow created by the portion of this facility lying in this drainage area. The drainage requirements relative to the Bus Storage Facility has been coordinated with Design Professionals, Inc. in the preparation of this report.

PHASE III CONSTRUCTION

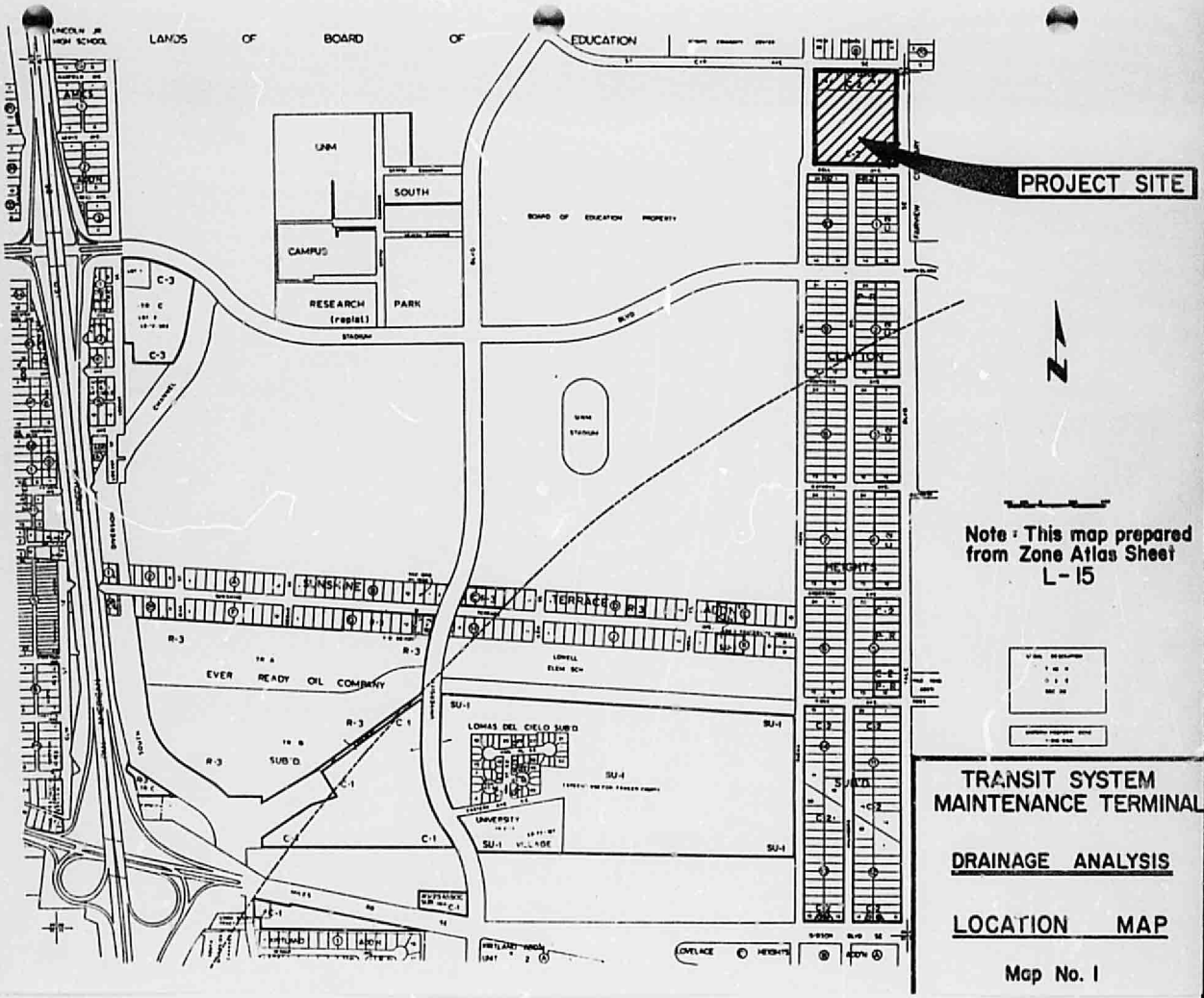
Phase III Construction provides for the construction of the remainder of the new Bus Storage Facility not constructed under Phase II (see Map No. 3 enclosed).

The existing Service Garage, as shown on Map No. 2, will be removed as a portion of this Phase III project. Design Professionals, Inc., Architects/Engineers, are the designers for this Phase III project and, as of this writing, an exact date for construction of this phase has not been established.

Excess runoff from Drainage Area D-5, consisting of the easterly portion of the Phase III project, as shown on Map No. 3, will be allowed to flow to Yale Boulevard, as do the flows from the existing Service Garage Facility under present conditions.

The remaining portion of the Bus Storage Facility (westerly portion) falls within Drainage Area D-2 and, as previously stated, Detention Pond D-2 is sized to accommodate the increased flow created by the portion of this facility lying in the D-2 Drainage Area.

Again, as stated for Phase II, the drainage requirements relative to the Bus Storage Facility have been coordinated with Design Professionals, Inc. in the preparation of this report.


LANDS OF BOARD OF EDUCATION
LINCOLN JR HIGH SCHOOL
UNM
SOUTH
CAMPUS
RESEARCH PARK
(replat)
BOARD OF EDUCATION PROPERTY
PROJECT SITE
SUNSHINE
TERRACE
ADDN
HEIGHTS
EVER READY OIL COMPANY
SUB'D
LOMAS DEL CIELO SUB'D
UNIVERSITY
VILLAGE
LOVELACE
HEIGHTS
ADDN
Note: This map prepared from Zone Atlas Sheet L-15
TRANSIT SYSTEM MAINTENANCE TERMINAL
DRAINAGE ANALYSIS
LOCATION MAP
Map No. 1

IV

DRAINAGE ANALYSIS

Following is the Drainage Analysis (computations) for the improvements to the City's Transit System Maintenance Terminal for both the Existing Conditions and the Developed Conditions.

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Drainage Analysis

Criteria

Design Storm - 100 year frequency
AMAFCA Drainage Resolution 1972-2
City of Albuquerque - Drainage Ordinance.

Reference Material

1. Albuquerque Area (1961) Intensity - Duration - Frequency Curves.
2. 100 year - 6 hour precipitation, Rainfall Frequency Map, U.S. Weather Bureau.
3. Time of concentration nomograph, p. 2, Kirpich.

Design Parameters

Peak runoff rate - Rational Formula, $Q = cIA$

Runoff Volume = V = Runoff coefficient × Rainfall × Area

Runoff Coefficients:

Existing Ground Surface	= 0.40
Open Areas (developed landscaping)	= 0.40
Paved Areas	= 0.875
Roof Areas	= 0.825

Due to the characteristics of the Drainage Areas considered in this analysis, the Time of Concentration for all Drainage Areas will be less than 10 minutes, therefore a maximum Intensity of 5.4 in/hr will be used in all runoff computations herein.

Existing Conditions

Peak Flows & Volumes
(Refer to Map No 2 for Drainage Area Designations)

Drainage Area E-1

Total Area = 0.113 ac.

Paved Area = 0.011 ac.
Open Area = 0.102 ac.

$$C_{combined} = \frac{0.011 \times 0.875 + 0.102 \times 0.40}{0.113}$$

$$= 0.446$$

$$Q = CIA = 0.446 \times 5A \times 0.113 = \underline{0.272 \text{ cfs}}$$

$$V = 0.446 \times 2.4/12 \times 0.113 = 0.010 \text{ ac-ft}$$
$$= \underline{\underline{439 \text{ ft}^3}}$$

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Drainage Area E-2

Total Area = 5.747 ac.

Roof Area = 0.642 ac.
Paved Area = 1.437 ac.
Open Area = 3.668 ac.

$$C_{combined} = \frac{0.642 \times 0.825 + 1.437 \times 0.875 + 3.668 \times 0.400}{5.747}$$

$$= 0.566$$

$$Q = CIA = 0.566 \times 5.4 \times 5.747 = \underline{17.565 \text{ cfs}}$$

$$V = 0.566 \times 2.4''/12 \times 5.747 = 0.651 \text{ ac-ft}$$

$$= \underline{28338 \text{ ft}^3}$$

Drainage Area E-3

Total Area = 1.169 ac.

Roof Area = 0.155 ac.
Paved Area = 0.020 ac.
Open Area = 0.994 ac.

$$C_{combined} = \frac{0.155 \times 0.825 + 0.020 \times 0.875 + 0.994 \times 0.400}{1.169}$$

$$= 0.464$$

$$Q = CIA = 0.464 \times 5.4 \times 1.169 = \underline{2.929 \text{ cfs}}$$

$$V = 0.464 \times 2.4''/12 \times 1.169 = 0.108 \text{ ac-ft}$$

$$= \underline{4726 \text{ ft}^3}$$

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
401 San Pedro, NE., Albuquerque, N.M. 87108
Telephone (505) 265-6631

Drainage Area E-4

Total Area = 0.400 ac.

Roof Area = 0.192 ac.
Paved Area = 0.191 ac.
Open Area = 0.017 ac.

$$C_{combined} = \frac{0.192 \times 0.825 + 0.191 \times 0.875 + 0.017 \times 0.400}{0.400}$$

$$= 0.831$$

$$Q = CIA = 0.831 \times 5.4 \times 0.400 = \underline{1.795 \text{ cfs}}$$

$$V = 0.831 \times 2.4''/12 \times 0.400 = 0.066 \text{ ac-ft}$$

$$\approx \underline{2896 \text{ ft}^3}$$

Drainage Area E-5

Total Area = 0.494 ac.

Roof Area = 0.108 ac.
Paved Area = 0.073 ac.
Open Area = 0.313 ac.

$$C_{combined} = \frac{0.108 \times 0.825 + 0.073 \times 0.875 + 0.313 \times 0.400}{0.494}$$

$$= 0.563$$

$$Q = CIA = 0.563 \times 5.4 \times 0.494 = \underline{1.502 \text{ cfs}}$$

$$V = 0.563 \times 2.4''/12 \times 0.494 = 0.056 \text{ ac-ft}$$

$$= \underline{2423 \text{ ft}^3}$$

ANDREWS, ASBURY & ROBERT, INC.
CONSULTING ENGINEERS
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Summary - Existing Conditions

Drainage Area	Q (cfs)	V (ft³)
E-1	0.272	439
E-2	17.565	28,338
E-3	2.929	4726
E-4	1.795	2,896
E-5	1.502	2,423
Total	24.063 cfs	38822 ft³

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Developed Conditions

Peak Flows & Volumes
(Refer to Map No 3 for Drainage Area designations)

Drainage Area D-1

Total Area = 0.474 ac.

Roof Area = 0.061 ac.
Paved Area = 0.298 ac.
Open Area = 0.115 ac.

$$C_{combined} = \frac{0.061 \times 0.825 + 0.298 \times 0.875 + 0.115 \times 0.400}{0.474}$$

$$= 0.753$$

$$Q = CIA = 0.753 \times 5.4 \times 0.474 = \underline{1.927 \text{ cfs}}$$

$$V = 0.753 \times 2.4''/12 \times 0.474 = 0.071 \text{ ac-ft}$$

$$= \underline{3110 \text{ ft}^3}$$

Runoff from Drainage Area D-1 will occur as sheet flow discharging along the West boundary of Drainage Area D-1 and into Buena Vista Dr. S.E.

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Drainage Area D-2

Total Area = 5.521 ac.

Roof Area = 1.379 ac.
Paved Area = 4.142 ac.

$$C_{combined} = \frac{1.379 \times 0.825 + 4.142 \times 0.875}{5.521}$$

$$= 0.863$$

$$Q = CIA = 0.863 \times 5.4 \times 5.521 = \underline{25.729 \text{ cfs}}$$

$$V = 0.863 \times 2.4''/12 \times 5.521 = 0.953 \text{ ac-ft}$$

$$= \underline{41509 \text{ ft}^3}$$

Runoff from Drainage Area D-2 will accumulate in Pond D-2* which has a volume of 18703 ft³ (Top of Pond elev = 49.25, Bottom of Pond elev = 47.2) and is located at the southwest corner of the subject property. Storm water accumulating in Pond D-2 will be discharged through a 6" pipe and into a new catch basin to be built on Bell Ave. NE. After the pond is full, excess storm water will be discharge over a weir on the south property line an into Bell Ave. SE.

* See sk. 4

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DRAINAGE AREA D-3

TOTAL AREA = 0.153 AC.

PAVED AREA = 0.101 AC.
OPEN AREA = 0.052 AC.

$$C_{combined} = \frac{0.101 \times 0.875 + 0.052 \times 0.400}{0.153}$$

$$= 0.714$$

$$Q = CIA = 0.714 \times 5.4 \times 0.153 = \underline{0.590 \text{ cfs}}$$

$$V = 0.714 \times \frac{2.4''}{12} \times 0.153 = 0.022 \text{ AC-FT}$$

$$= \underline{952 \text{ FT}^3}$$

RUNOFF from DRAINAGE AREA D-3 will occur as sheet flow discharging along the south boundary of DRAINAGE AREA D-3 and into BELL AVE. S.E.

HYDROLOGY L15/D4 TWO OF TWO ONE PLAN

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DRAINAGE AREA D-4

TOTAL AREA = 0.422 AC.

ROOF AREA = 0.325 AC.

OPEN AREA = 0.097 AC.

$$C_{combined} = \frac{0.325 \times 0.825 + 0.097 \times 0.400}{0.422}$$

$$= 0.727$$

$$Q = CIA = 0.727 \times 5.4 \times 0.422 = \underline{1.65 \text{ cfs}}$$

$$V = 0.727 \times 2.4''/12 \times 0.422 = 0.061 \text{ AC-FT}$$

$$= \underline{2673 \text{ FT}^3}$$

RUNOFF from DRAINAGE AREA D-4 will be directed into POND D-4* which has a volume of 2772 FT³ (TOP OF POND ELEV = 52.20, BOTTOM OF POND ELEV = 50.5) which is LOCATED AT the SOUTHEAST CORNER OF THE SUBJECT PROPERTY. STORMWATER ACCUMULATING IN POND D-4 will be discharge THROUGH a DRAIN pipe AND INTO BELL AVE. SE.

* See sh. 17

DRAINAGE AREA D-5

TOTAL AREA = 0.898 AC.

ROOF AREA = 0.430 AC.
PAVED AREA = 0.468 AC.

$$C_{combined} = \frac{0.430 \times 0.825 + 0.468 \times 0.875}{0.898}$$

$$= 0.851$$

$$Q = CIA = 0.851 \times 5.4 \times 0.898 = \underline{4.127 \text{ cfs}}$$

$$V = 0.851 \times 2\tfrac{4}{12} \times 0.898 = 0.153 \text{ AC-FT}$$

$$= \underline{6658 \text{ FT}^3}$$

RUNOFF from DRAINAGE AREA D-5 will occur as sheet flow discharging along the east boundary of DRAINAGE AREA D-5 and into YALE BLVD. S.E.

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DRAINAGE AREA D-6

TOTAL AREA = 0.307 ac.

ROOF AREA = 0.108 ac.
PAVED AREA = 0.118 ac.
OPEN AREA = 0.081 ac.

$$C_{COMBINED} = \frac{0.108 \times 0.825 + 0.118 \times 0.875 + 0.081 \times 0.400}{0.307}$$

$$= 0.732$$

$$Q = CIA = 0.732 \times 5.4 \times 0.307 = \underline{1.24 \text{ cfs}}$$

$$V = 0.732 \times 2.4''/12 \times 0.307 = 0.045 \text{ ac-ft}$$

$$= \underline{1958 \text{ ft}^3}$$

STORM WATER RUNOFF FROM DRAINAGE AREA D-6 WILL DISCHARGE INTO YALE BLVD. SE.

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Drainage Area D-7

Total Area = 0.148 ac.

Paved Area = 0.087 ac.
Open Area = 0.061 ac.

$$C_{combined} = \frac{0.087 \times 0.875 + 0.061 \times 0.400}{0.148}$$

$$= 0.679$$

$$Q = CIA = 0.679 \times 5.4 \times 0.148 = \underline{0.543 \text{ cfs}}$$

$$V = 0.679 \times 2.4''/12 \times 0.148 = 0.020 \text{ ac-ft}$$

$$= \underline{875 \text{ ft}^3}$$

Runoff from Drainage Area D-7 will occur as sheet flow discharging along the North boundary of Drainage Area D-7 and into St. Cyr Ave. SE.

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Summary: Developed Conditions

Drainage Area	Q (cfs)	V (ft³)
D-1	1.927	3,110
D-2	25.729	41,509
D-3	0.590	952
D-4	1.657	2673
D-5	4.127	6,658
D-6	1.214	1,958
D-7	0.543	875
Total	35.787 cfs	57735 ft³

∴ Required Storage Volume = Deve. Vol - Exist. Vol.

= 57735 - 38822

= 18913 ft³

Determination of Pond Volumes

The volume of the ponds were determined by planimetering the areas of the finish grade contours within each pond.

Pond D-2

Pond D-2 is located within Drainage Area D-2, at the southwest corner of the subject property. (See Map No 3)

	Contour	Area (ft²)	Volume (ft³)	Cumulative Volume (ft³)
Bottom of Pond	47.2	0		
	47.5	2916	437.4	437.4
	48.0	8196	2778	3215.4
	48.5	11382	4894.5	8109.90
	49.0	14997	6594.75	14704.65
Top of Pond	49.25	16988	3998	18702.65

From sk. 7 Drainage Area D-2 will generate a volume of runoff of 41509 ft³ in the developed state. Therefore Pond D-2 will be built with an overflow weir (spillway).

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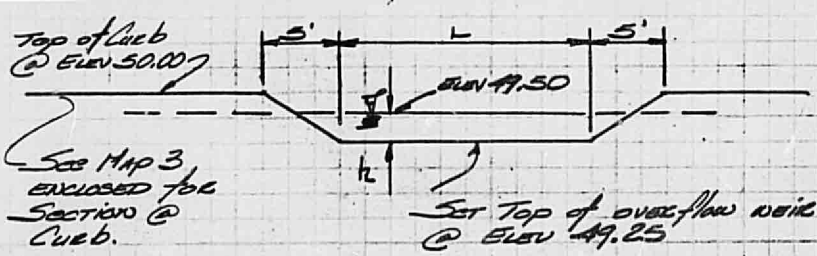

The allowable outflow over the weir will be set equal to the peak discharge for Drainage Area D-2, (See Sh. 7) Q = 25.73 cfs. Allow water level to increase to elev 49.50 behind weir (3" depth max).

$Q = cLh^{3/2}$ where $h = 0.25$ ft.
$c = 3.087$
$Q = 25.73$ cfs.

$$L = \frac{Q}{ch^{3/2}}$$

$$= \frac{25.73}{3.087\,(.25)^{3/2}} = 66.6 \text{ ft.}$$

Set Weir Length = 67 ft.

Set maximum allowable outflow through drain pipe = Q_5 undeveloped. (existing)

Then for Drainage Area D-2, peak

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discharge for a 5 year storm is equal to

$Q = CIA$ where $A = 5.521$ ac (sh. 7)
$C = 0.566$ (sh. 3)
$I_5 = 1.92$ in/hr

$Q = 0.566 \times 1.92 \times 5.521 = 6.00$ cfs

Actual outflow from 6" drain pipe:

$Q = Ca\sqrt{2gh}$ where $h = 2.05$ ft.
$a = 0.196$ ft^2
$C = 0.65$

$Q = 0.65 \times 0.196 \sqrt{2g2.05}$
$= 1.46$ cfs $<$ 6.00 cfs ok

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Pond D-4

Pond D-4 is located within Drainage Area D-4, at the southeast corner of the subject property (See Map No 3)

	Contour	Area (ft^2)	Volume (ft^3)	Cumulative Volume (ft^3)
Bottom of Pond	50.5	0		
			233.25	233.25
	51.0	933		
			786	1019.25
	51.5	2211		
			1212	2231.25
	52.0	2687		
			541.3	2772.5
Top of Pond	52.20	2776		

from sh. 9 Drainage Area D-4 will generate a volume of runoff equal to 2673 ft^3 in the developed state, therefore pond will contain entire volume of runoff.

Set max. allowable outflow through drain pipe = Qs undeveloped (existing). Then for Drainage Area D-4,

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peak discharge for a 5 year storm is equal to

$Q = CIA$ where $A = 0.422$ ac. (sh. 9)

$C = 0.543$ (sh. 3)

$I_5 = 1.92$ in/hr

$Q_5 = .543 \times 1.92 \times 0.422 = 0.440$ cfs.

$\therefore$ $Q = C a \sqrt{2gh}$ where $h = 1.7$ ft.

$C = 0.65$

$Q_5 = 0.44$ cfs

$$a = \frac{Q}{C\sqrt{2gh}}$$

$$= \frac{0.440}{.65\sqrt{2g\,1.7}} = 0.0647 \text{ ft}^2$$

$$= 9.32 \text{ in}^2$$

Area of 3" dia. drain line = 7.06 in² NG.

Area of 4" dia. drain line = 12.57 in² OK

USE 4" drain pipe.

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Summary - Pond Volumes

Pond	Volume (ft^3)
D-2	18702 (sh. 14)
D-4	2772 (sh. 17)
Total	21474 ft^3

Total Pond Volume provided = 21474 ft^3
Required Pond Vol (see sh. 13) = 18913 ft^3
OK