HYDROLOGY

C13/D7
2 PLANS

C13/D7

2 PLANS

DRAINAGE PLAN

NOTES

1. Legal: Tract 'A', as shown on "Summary Plat of Tract 'H', Paradise Hills Industrial Park, and a portion of Tract 2 of Eagle Ranch and a portion of a 100' PNM Easement, Paradise Hills, Bernalillo County, NM.

2. Project Name: Rowland Nursery 4-acre commercial site, Irving Blvd. N.W.

3. Surveyor: Ron Forstbauer Surveying Co., August 21, 1984

4. Bench Mark: BM-W448-H10-std NHSBC brass table: set in top of corner post flush with ground. Elv. = 5045.51

5. TBM: MH run in Irving Blvd, S.E. of S.E. corner of Property. Elv. 5034.84

6. Soils: Bluepoint loamy fine sand (BCC) commonly referred to as "West Mesa blow sand". BCC is in Hydrologic Group A; permeability 6.0-20.0 in/hr. Reference: SCS Soil Survey of Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico, 1977.

7. Project Description: The 4.0-acre Rowland Nursery site will consist of a retail sales building, greenhouse, two storage sheds, two lath houses, and a paved parking area for about 130 vehicles. Areas surrounding the buildings will also be paved. The lath houses will have gravel floors and temporary plastic-sheet roofing. The plastic roofing is removed during the period between spring and early fall.

   Considerable plant watering will occur at the nursery. Review of peak-month (July) water use records at Rowlands Nursery on San Mateo, N.E. indicates that a maximum of about 800,000 gallons per month will be used at the new site. Approximately 30% of this amount or 240,000 gallons per month will occur as drainage water. The remainder is evaporated by cooling systems or transpired by the nursery plants. Therefore, a maximum of about 8,000 gallons per day of internally-generated water must be controlled in addition to storm runoff.

8. Relation to AMAFCA Drainage Management Plan

   The site is located within the Coors Blvd. "strip" in the S.E. portion of AMAFCA's Drainage Management Plan (DMP) for the western Albuquerque metropolitan area. Drainage from areas located above the strip is controlled by a system of temporary dimension dams, culverts, and channels which route flows to ponding areas; or to the Calabacillas Arroyo. Because of the permeable soils and the AMAFCA diversion dam located along the N.W. boundary of the site, virtually no runoff from offsite areas can reach the Rowland site. Under the full-development phase of the AMAFCA DMP, a storm-sewer system will be constructed to transport all storm water from areas above the site directly to the Calabacillas.

   A portion of this storm-sewer system will run within 500' (north) of the Rowland site. However, it will be 15 to 20' higher in elevation. Thus, use of the storm sewer for control of flows from the Rowland site

does not appear practical. Expensive and troublesome pumping would be required to reach the storm sewer.

Until recently, there were no definite plans for control of runoff from the Coors Blvd. "strip." For example, runoff from the businesses adjacent to the site (Prime House and Sun Country Industries) flows uncontrolled to the bar ditch along Coors Blvd. Fortunately, the fine sandy soils in the area are quite permeable and storm water tends to infiltrate rapidly. No major flood-damage has yet occurred in the area. However, the ongoing rapid development along the Coors "strip" has raised concerns among valley residents (downslope) about future flooding.

Currently, AMAFCA is conducting a study on the feasibility of routing storm water from Coors Blvd. to the MRGCD irrigation canal system. The canal system runs parallel to Coors along the western margin of the Rio Grande Valley. A culvert near the Coors-Irving intersection may eventually be constructed to route storm flows from the area to the MRGCD canal. Even if approved, construction is several years in the future. Therefore, storm flow from the Rowland Nursery site must be controlled by other means.

9. Drainage Scheme for Rowland Site

   Several meetings were held in early August between Dan Sabo, AMAFCA and CTS Engineers to discuss drainage criteria and AMAFCA's concerns about downstream flooding. Two major guidelines were agreed upon:

   a. The Rowland Nursery site should be designed to retain as much of the on-site runoff as possible.

   b. It is permissible to discharge storm water from the developed site in amounts equal to existing (undeveloped) flows, provided the flows can be routed to the Coors Blvd. area without damage to adjacent developments.

   To meet these guidelines, a drainage scheme was developed to include ponding, infiltration (seepage trenches), and controlled release to restrict storm runoff to undeveloped rates.

   The 4.0 acre site was divided into 2.5 acre (north) and 1.5 acre (south) subareas. The north subarea will drain to a 10,100 ft^3 pond. The pond will include seepage trenches and an emergency spillway. This pond should retain all irrigation drainage as well as the 100-year storm. The south subarea will drain to a landscaped pond and emergency overflow parking lot ponding area. The landscaped pond will include a seepage trench and two-8" pipes for outlet control. An emergency spillway for the south pond is designed into the S.W. driveway entrance to the parking lot.

10. Drainage Calculations: Use Rational Method (Q = CIA) and Albuquerque DPM to calculate flow rates and volumes for undeveloped and developed conditions, 100-year storm.

A. Area: Site is 3.99 acres ... say 4.0. Under developed conditions, approximately 70% will be impervious.

B. Undeveloped Flows: Q = CIA C = 0.17 (DPM 22.2 C1): I=2.2 in/hr

   Tc = <10 min. . . . use 2.15(I) (DPM 22.2 D.2)

   Q_{100} = 0.17 (2.2)(2.15)(4.0) = 3.2 cfs

   Use 50 min. triangular hydrograph (DPM 22.2 D.2) to calculate runoff volume.

   V_{100} = 1/2 (50)(60)(3.2) = 4,800 ft^3

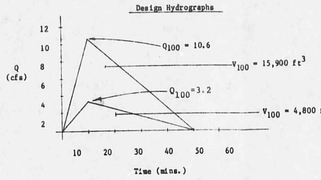
C. Developed Flows: C = 0.56 I = 2.2 in/hr

   Q_{100} = 0.56(2.2)(2.15)(4.0) = 10.6 cfs

   V_{100} = 1/2 (50)(60)(10.6) = 15,900 ft^3

   As shown by the hydrographs below, the volume to be ponded or infiltrated on site = 15,900 - 4,800 = 11,100 ft^3

Design Hydrographs



Based on the grading plan, about 2.5 acres (60% impervious, C = 0.5) will drain north; about 1.5 acres to south

Q_{100} (north) = 0.5 (2.2)(2.15)(2.5) = 5.9 cfs

V_{100} (north) = 1/2 (60)(50)(5.9) = 8,850 ft^3

Q_{100} (south) = 10.6 - 5.9 = 4.7 cfs

V_{100} (south) = 1/2 (50)(60)(4.7) = 7,050 ft^3

11. Ponding and Outlet Designs

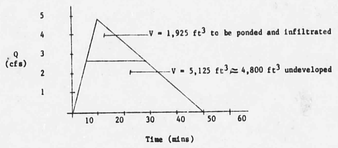
A. North Pond: Design pond to capture entire V_{100} plus 8,000 gal/day irrigation drainage.

   Required Volume = 8850 + 1070 = 9,920 ft^3

   Pond with 3:1 side slopes and average depth = 0.7 ft will provide approximately 10,100 ft^3 Southside of pond will tend to accumulate fines and organic matter from lath house drainage. Northside of pond should remain free of fines and organic matter. South and northside of pond will be interconnected by eight- 4" PVC pipes under elevated roadway. 8'-wide overflow weir (capacity at H = 0.3' of 3.0 cfs) will be constructed on N.W. side of pond even though pond is designed to prevent overflow. Erosion protection, consisting of 6"-angular rock rip-rap underlain by a 12" filter blanket, is provided on the inflow side of the pond.

   South and north sides of pond will be underlain by 60 x 3 x 2' (deep) seepage trenches to increase infiltration of lath house drainage and storm flows. Based on percolation tests by Sergent Hauskins, and Beckwith (Bob) Booth, Albuquerque office), trenches should infiltrate about .10 ft^3/ft^2 of trench per hour, for a total of about 85 ft^3 per hour.

B. South Pond: Using the Albuquerque DPM triangular hydrograph shown below, the south pond has been designed to control storm flows to vary near undeveloped flows. Developed Q_{100} will be 2.7 cfs as compared to end undeveloped Q_{100} of 3.2 cfs. V_{100} developed will be 5,125 ft^3 as compared to 4,800 ft^3 undeveloped.



The pond will consist of a 350' x 5' x 0.8'(average depth) landscaped strip underlain by 2' of gravel. Two - 8" pipes at the S.W. corner of the pond will provide outlet control. Based on the SHB percolation tests, the gravel seepage trench should infiltrate about .20 ft^3/ft^2 of trench per hour, for a total of about 700 ft^3/hr. The total retention capacity of the pond is summarized below.

Pond Storage and Infiltration Capacity

Storage in gravel = 0.4 (350 x 5' x 1' + 350 x 2.5' x 1') = 1050 ft^3
Volume of water lost to seepage per hour = 700 ft^3
Volume of water above gravel (0.1) = 350 x 5' x .1' = 175 ft^3
1925 ft^3

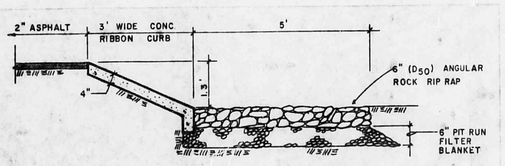
8" Outlet Pipe Calculations (see Section F on Drawing)

Q = CA $(2gh)^{1/2}$ C = 0.75 (short tube, King and Brater, 5th ed)

Q = .75(.35)(2) $[(64.4)(.4)]^{1/2}$ = 2.7 cfs

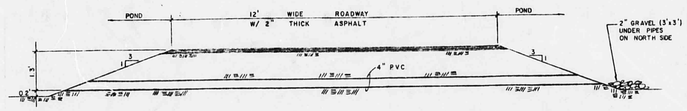
12. Offsite Flow Routing: From the south pond, storm flows will be routed down the Irving Blvd Right-of-Way to the bar ditch on Coors Blvd. This is the same flow path which currently exists for undeveloped flows from Rowland. Flows will be essentially identical to undeveloped flows, and no adverse downstream impacts are anticipated at the Prime House or on Coors Blvd. Moreover, storms having a recurrence interval of 50 years or less should be completely contained on site. Thus, the frequency of "nuisance" storm flows to downstream areas should be reduced.

DETAILS



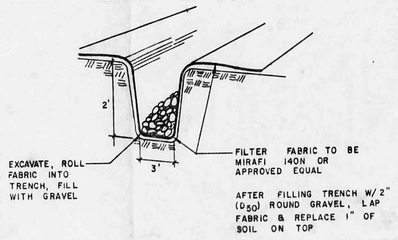
Pond Inflow Slope & Rip Rap

SECTION A



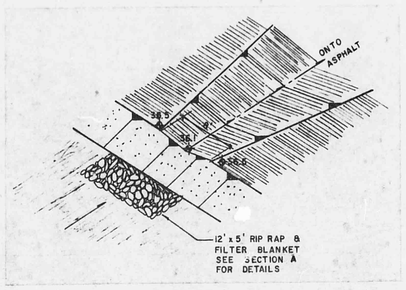
Pond Roadway & Interconnect Pipe

SECTION B



Seepage Trench

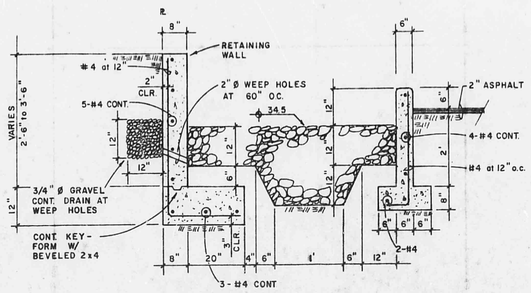
SECTION C



Emergency Spillway

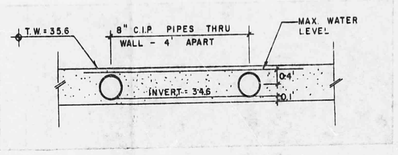
SECTION D

CONCRETE fc at 28 DAYS = 3000 p.s.i.
REINFORCING f_y = 60,000 p.s.i.



Landscape Pond & Seepage Trench

SECTION E



South Pond Outlet Pipes

SECTION F

CTS ENGINEERING INC.
1100 ALVARADO N.E. SUITE A
ALBUQUERQUE, NEW MEXICO 87110
(505) 266-3444

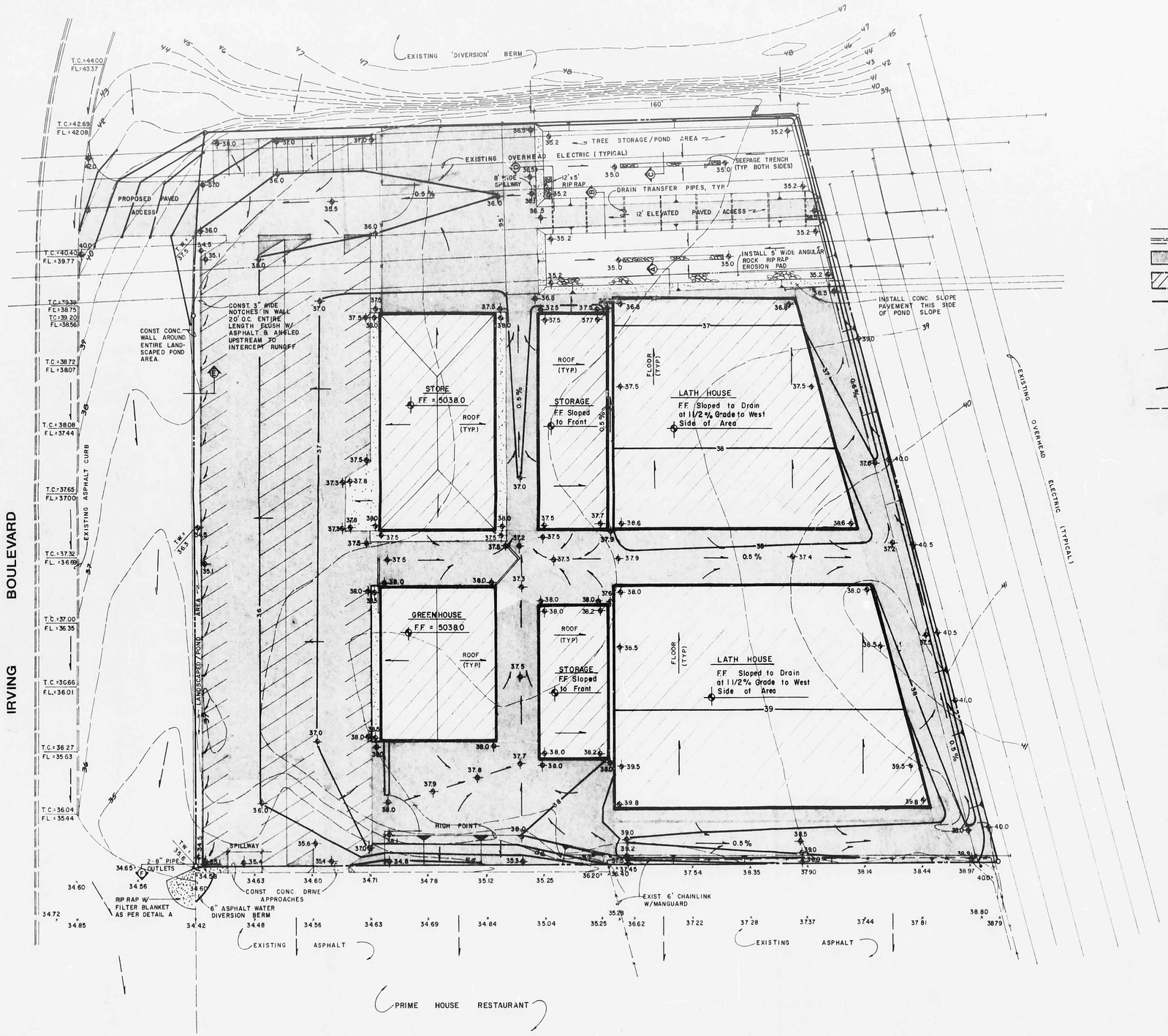
REVISIONS	DATE

DESIGNED W.H. 8-84
DRAWN M.W. 8-84
CHECKED CW/WH. 8-84

DRAINAGE / GRADING PLAN
ROWLAND NURSERY
IRVING BOULEVARD

CTS

SHEET 1 OF 2



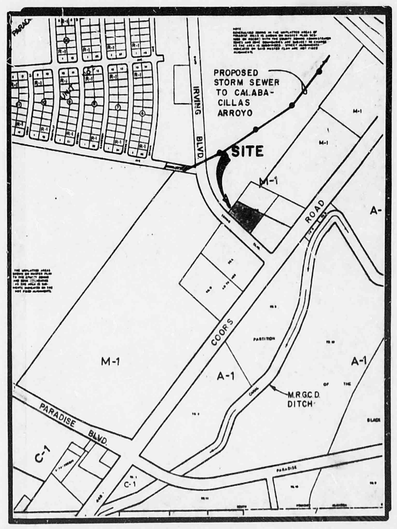
SCALE : 1" = 30'

LEGEND

- SIDEWALK, CURB & GUTTER (EXISTING PROPOSED)
- PROPOSED ASPHALT
- BUILDING (EXISTING, PROPOSED)
- PROPERTY LINE
- X12.7 — EXISTING SPOT ELEVATION
- 10 — EXISTING CONTOUR
- 12.5 — PROPOSED SPOT ELEVATION
- 10 — PROPOSED CONTOUR
- SURFACE FLOW DIRECTION (EXISTING/PROPOSED)

REVISIONS 9-84

1. CHANGED SLOPE WITH LATH HOUSES FROM 1% TO 1 1/2%.
2. ADDED 6' WALL ON EAST SIDE OF STORE.



VICINITY MAP C 13

CTS INC.
ENGINEERING
1100 ALVARADO N.E. SUITE A
ALBUQUERQUE, NEW MEXICO 87110
(505) 266-3444

REVISIONS	DATE
DESIGNED C.W./W.H.	8-84
DRAWN M.W.	8-84
CHECKED C.W./W.H.	8-84

DRAINAGE / GRADING PLAN
ROWLAND NURSERY
IRVING BOULEVARD

CHRISTOPHER L. WALKER NEW MEXICO 8653 REGISTERED PROFESSIONAL ENGINEER

SHEET 2 OF 2