

THIS GRADING AND DRAINAGE PLAN SUPPORTS THE PROPOSED RE-CONSTRUCTION AT THE EXISTING CHURCH OF JESUS CHRIST OF LATTER DAY SAINTS ALBUQUERQUE EAST STAKE SITE. THE IMPROVEMENTS CONSIST OF MODIFICATIONS TO THE EXISTING SITE IMPROVEMENTS AT AN EXISTING DEVELOPED SITE WITHIN AN INFILL AREA. THE PROPOSED IMPROVEMENTS WILL CREATE A MINOR INCREASE IN IMPERVIOUS AREA THAT WILL MINIMALLY IMPACT THE HYDROLOGY OF THE SITE AS DEMONSTRATED IN THE DRAINAGE CALCULATIONS AND ANALYSIS CONTAINED HEREON. THIS PLAN PROPOSES TO MAINTAIN THE STATUS QUO OF CONTINUED FREE DISCHARGE OF RUNOFF FROM THIS PROPERTY TO PUBLIC RIGHT-OF-WAY CONSISTENT WITH EXISTING DRAINAGE PATTERNS. THIS PLAN WILL IMPROVE THE MANNER OF DISCHARGE BY CONVEYING THE 10-YEAR FLOWS DIRECTLY TO THE STREET FLOWLINE AS OPPOSED TO OVERTOPPING THE PUBLIC SIDEWALK IN THE EXISTING CONDITION. THE PURPOSE OF THIS SUBMITTAL IS TO OBTAIN PAVING PERMIT FOR REPAVING AND SO#19

PROJECT DESCRIPTION:

AS SHOWN BY THE VICINITY MAP ON SHEET 1, THE SITE LIES IN NORTHEAST ALBUQUERQUE ON THE WEST SIDE OF EUBANK BLVD NE, APPROXIMATELY 1200 FEET SOUTH OF MONTGOMERY BLVD NE. THE SITE LEGAL DESCRIPTION IS LOTS 1 AND 2, DESERET SUBDIVISION. THE BUILDING LIES ENTIRELY ON LOT 1, AND THE SITE IS ZONED 0-1. BECAUSE THE SITE AND SURROUNDING AREAS ARE FULLY DEVELOPED COMMERCIALLY AND RESIDENTIALLY, THIS PROJECT REPRESENTS A MODIFICATION TO AN EXISTING SITE WITHIN AN INFILL AREA.

AS SHOWN BY PANEL 143 OF 825 OF THE NATIONAL FLOOD INSURANCE PROGRAM FLOOD INSURANCE RATE MAPS FOR BERNALILLO COUNTY, NEW MEXICO, AND INCORPORATED AREAS DATED SEPTEMBER 20, 1996, THIS SITE DOES NOT LIE WITHIN, OR DIRECTLY UPSTREAM OF, A DESIGNATED FLOOD HAZARD ZONE.

THERE WERE NO KNOWN GRADING AND DRAINAGE PLANS OR REPORTS FOUND RELATIVE TO THIS SITE. PROJECT RESEARCH WAS THEREFORE LIMITED TO THE FOLLOWING PERSONAL CORRESPONDENCES:

- 1. SEPTEMBER 9, 2002. PERSONAL COMMUNICATION WITH FRED AGUIRRE, CITY ENGINEER, INDICATED THAT THE FLOOD MAPS DID NOT REVEAL DOWNSTREAM FLOODING AND THAT IT WOULD BE ACCEPTABLE TO MAINTAIN THE STATUS QUO OF EXISTING FREE DISCHARGE TO PUBLIC RIGHT OF WAY PROVIDED THERE WERE NO KNOWN DOWNSTREAM DRAINAGE CONSTRAINTS OR PROBLEMS REQUIRING CORRECTION.
- 2. SEPTEMBER 17, 2002. PERSONAL COMMUNICATION WITH GLEN JURGENSEN, CITY STORM DRAIN MAINTENANCE MANAGER, VIA TELEPHONE INDICATED THAT HE WAS NOT AWARE OF ANY DOWNSTREAM DRAINAGE PROBLEMS IN THE PROJECT AREA.

EXISTING CONDITIONS:

THE SITE IS CURRENTLY DEVELOPED AS A CHURCH WITH ASSOCIATED LANDSCAPING AND PAVED PARKING IMPROVEMENTS. EXISTING SITE RUNOFF DRAINS OVERLAND ACROSS PAVED PARKING TO THE WEST END OF THE SITE AT WHICH POINT NUMEROUS CURB OPENINGS ALLOW FLOWS TO DRAIN TO WESTERFELD DRIVE NE ACROSS THE EXISTING PUBLIC SIDEWALK, ULTIMATELY REACHING A PUBLIC STORM DRAIN IN COMANCHE RD NE. THE APPARENT DOWNSTREAM CAPACITY OF THE DOWNSTREAM PUBIC STREETS IS SUPPORTED BY THE LACK OF A DESIGNATED DOWNSTREAM FLOODING HAZARD AND THE LACK OF ANY KNOWN DOWNSTREAM DRAINAGE PROBLEMS (REF. 2). OFFSITE FLOWS DO NOT IMPACT THE SITE FROM THE DEVELOPED PUBLIC STREETS TO THE EAST AND WEST, OR FROM THE DEVELOPED SITES TO THE NORTH AND SOUTH.

DEVELOPED CONDITIONS:

AS SHOWN BY THE GRADING PLAN ON SHEET 1, THE PROJECT CONSISTS OF GRADING AND PAVING MODIFICATIONS TO AN EXISTING CHURCH SITE. THE PROPOSED IMPROVEMENTS INCLUDE THE REMOVAL AND IN KIND REPLACEMENT OF THE EXISTING PAVED PARKING, AND THE REMOVAL AND REPLACEMENT OF REDESIGNED PEDESTRIAN AND LANDSCAPING IMPROVEMENTS SURROUNDING THE EXISTING BUILDING. AS SHOWN BY THE GRADING PLAN THE SITE WILL CONTINUE TO DRAIN FROM EAST TO WEST ACROSS THE RECONSTRUCTED PAVED PAVING AND EVENTUALLY DISCHARGE TO THE HISTORIC OUTFALL IN WESTERFELD DRIVE NE PUBLIC RIGHT-OF-WAY VIA PROPOSED SIDEWALK CULVERTS TO BE CONSTRUCTED BY SO#19 PERMIT. THESE SIDEWALK CULVERTS ARE SIZED TO CONVEY THE 10-YEAR STORM FLOWS UNDER THE EXISTING SIDEWALK AS OPPOSED TO OVER THE SIDEWALK IN THE EXISTING CONDITION.

AS PREVIOUSLY MENTIONED, THE F.I.R.M. PANEL DOES NOT IDENTIFY DOWNSTREAM STREET FLOODING ASSOCIATED WITH THE 100-YEAR RAINFALL EVENT, THEREBY SUPPORTING DOWNSTREAM CAPACITY.

IT IS THIS PREPARER?S QUALITATIVE DETERMINATION THAT BASED UPON THE PRECEDING INFORMATION, THE EXISTING STREET NETWORK AND PUBLIC STORM DRAIN SYSTEM CONTAINS SUFFICIENT CAPACITY TO CONTINUE TO RECEIVE AND CONVEY THE EXISTING RUNOFF FROM THIS PROJECT. DUE TO THE FACT THAT THIS IS A MODIFICATION TO AN EXISTING SITE WITHIN AN INFILL AREA, THE APPARENT AVAILABILITY OF DOWNSTREAM CAPACITY, THE LACK OF DOWNSTREAM FLOODING, AND THE MINOR INCREASE IN RUNOFF ANTICIPATED, THE CONTINUED FREE DISCHARGE OF DEVELOPED RUNOFF FROM THIS SITE IS APPROPRIATE

GRADING PLAN:

THE GRADING PLAN ON SHEET 1 SHOWS: 1) EXISTING GRADES INDICATED BY SPOT ELEVATIONS AND CONTOURS AT 1'-0 INTERVALS AS DETERMINED FROM A TOPOGRAPHIC SURVEY PREPARED BY JEFF MORTENSEN AND ASSOCIATES, INC. DATED 09/26/2002, 2) PROPOSED GRADES INDICATED BY SPOT ELEVATIONS AND CONTOURS AT 1' 0" INTERVALS, 3) THE LIMIT AND CHARACTER OF EXISTING IMPROVEMENTS, 4) THE LIMIT AND CHARACTER OF THE PROPOSED IMPROVEMENTS, AND 5) CONTINUITY BETWEEN EXISTING AND PROPOSED GRADES. EXISTING IMPROVEMENTS TO BE REMOVED AND DEMOLISHED PRIOR TO CONSTRUCTION HAVE BEEN REMOVED FROM THE GRADING PLAN FOR GRAPHIC CLARITY. A COMPLETE COPY OF THE TOPOGRAPHIC SURVEY CAN BE FOUND ON SHEET 3 OF THIS SUBMITTAL.

CALCULATIONS:

THE CALCULATIONS, WHICH APPEAR HEREON, ANALYZE BOTH THE EXISTING AND DEVELOPED CONDITIONS FOR THE 100-YEAR, 6-HOUR RAINFALL EVENT. THE PROCEDURE FOR 40-ACRE AND SMALLER BASINS, AS SET FORTH IN THE REVISION OF SECTION 22.2, HYDROLOGY OF THE DEVELOPMENT PROCESS MANUAL, VOLUME 2, DESIGN CRITERIA, DATED JANUARY 1993, HAS BEEN USED TO QUANTIFY THE PEAK RATE OF DISCHARGE AND VOLUME OF RUNOFF GENERATED. THE PEAK RATE OF DISCHARGE HAS ALSO BEEN CALCULATED FOR THE 10-YEAR, 6-HOUR RAINFALL EVENT. THE ENTRANCE CONDITION AND CARRYING CAPACITY OF THE PROPOSED CONCRETE RUNDOWNS AND SIDEWALK CULVERTS WERE CALCULATED USING THE WEIR AND MANNING'S EQUATIONS, RESPECTIVELY. AS SHOWN BY THE HYDROLOGIC CALCULATIONS, A MINOR INCREASE IN THE PEAK RATE AND VOLUME OF DISCHARGE IS ANTICIPATED. AS SHOWN BY THE HYDRAULIC CALCULATIONS, THE PROPOSED RUNDOWN/CULVERT STRUCTURES HAVE SUFFICIENT CAPACITY TO PASS THE 10-YEAR STORM WITHOUT OVERTOPPING THE PUBLIC SIDEWALK ALONG WESTERFELD DRIVE NE.

CONCLUSIONS:

THIS PROPOSED APPROACH TO MANAGING THE STORM WATER RUNOFF ASSOCIATED WITH THE PROPOSED SITE RECONSTRUCTION IS APPROPRIATE FOR THE FOLLOWING REASONS:

- 1) THE IMPROVEMENTS CONSIST OF MODIFICATIONS TO AN EXISTING DEVELOPED SITE WITHIN AN INFILL AREA. 2) THIS PLAN PROPOSES TO MAINTAIN THE STATUS QUO OF CONTINUED FREE DISCHARGE OF RUNOFF FROM THIS PROPERTY TO PUBLIC RIGHT-OF-WAY CONSISTENT WITH EXISTING DRAINAGE PATTERNS.
- 3) APPARENT DOWNSTREAM CAPACITY IS SUPPORTED BY THE LACK OF A DOWNSTREAM FLOODING HAZARD AND THE CITY STORM DRAIN MAINTENANCE MANAGER'S INDICATION THAT HE WAS NOT AWARE OF ANY DOWNSTREAM DRAINAGE PROBLEMS IN THE PROJECT AREA.
- 4) THIS PLAN WILL IMPROVE THE MANNER OF DISCHARGE BY CONVEYING THE 10-YEAR FLOWS DIRECTLY TO THE STREET FLOWLINE AS OPPOSED TO OVERTOPPING THE PUBLIC SIDEWALK IN THE EXISTING CONDITION
- NO DRAINAGE COVENANTS OR VARIANCES ARE REQUESTED AS PART OF THIS PLAN.

CALCULATIONS

I. SITE CHARACTERISTICS (ZONE 3)

A. $P_{6100} = P_{360} = 260$ IN.,

B. AREA $(A_T)=110,920 \text{ SF}/2.55 \text{ AC}$

II. EXISTING LAND TREATMENT

TREATMENT AREA (SF/AC) 23,270/0.53 87,650/2.01

III. DEVELOPED LAND TREATMENT

TREATMENT AREA (SF/AC) 17,860/0.41 D 93,060/2.14 84

IV. EXISTING CONDITION

A.VOLUME $E_{\mathbf{W}} = (E_{\mathbf{A}}^{\mathbf{A}} + E_{\mathbf{B}}^{\mathbf{A}} + E_{\mathbf{C}}^{\mathbf{A}} + E_{\mathbf{D}}^{\mathbf{A}}) / A_{\mathbf{T}}$

 $E_{W} = [(0.92)(0.53) + (2.36)(2.01)]/2.55 = 2.05 \text{ IN}.$

 $V_{100} = (E_W/12)A_T$

 $V_{100} = (2.05/12)110,920 = 18,950 \text{ CF}$

B.PEAK DISCHARGE

 $d^{b} = d^{b} d^{a} + d^{b} d^{b} d^{b} + d^{b} d^{c} d^{c} + d^{b} d^{b} d^{d}$

 $Q_p = Q_{100} = (2.60)(0.53) + (5.02)(2.01) = 11.5 CFS$

V. DEVELOPED CONDITION

A.VOLUME

 $E_{\mathbf{W}} = (E_{\mathbf{A}}A_{\mathbf{A}} + E_{\mathbf{B}}A_{\mathbf{B}} + E_{\mathbf{C}}A_{\mathbf{C}} + E_{\mathbf{D}}A_{\mathbf{D}})/A_{\mathbf{T}}$

 $E_{W} = [(0.92)(0.41) + (2.36)(2.4)]/2.55 = 2.13 \text{ IN.}$

 $V_{100} = (E_{W}/12)A_{T}$

 $V_{100} = (2.13/12)110,920 = 19,690 \text{ CF}$

2. PEAK DISCHARGE

 $Q_{P} = Q_{PA}A_{A} + Q_{PB}A_{B} + Q_{PC}A_{C} + Q_{PD}A_{D}$

 $Q_p = Q_{10} = (1.19)(0.41) + (3.39)(2.14) = 7.7 \text{ CFS}$

 $Q_p = Q_{100} = (2.60)(0.41)+(5.02)(2.14) = 11.8 \text{ CFS}$

VI. RUNDOWN/CULVERT HYDRAULICS (Q₁₀=7.7 CFS)

A. ENTRANCE CONDITION (WEIR EQUATION)

 $Q_F = CLH^{3/2}$; H=0.5 FT (CURB HEIGHT)

7.7 CFS= $(2.6)(L)(0.5)^{3/2}$

 $L_{REQ} = 8.4$ FT OF OPENING

USE 2 OPENINGS @ 5' WIDE = 10' TOTAL WIDTH >LREQ

B. CULVERT CAPACITY (MANNING'S EQUATION) $Q_{CAP} = (1.49/n)(AR^{2/3} S^{1/2})$; n = 0.013, S=0.02

A=W*H = (2.0')(0.5') = 1.0'

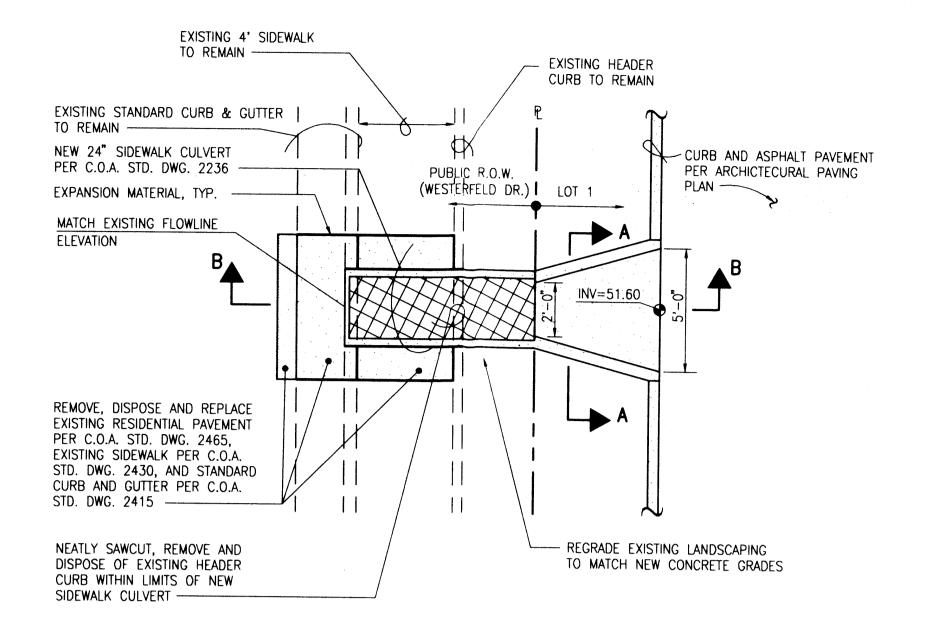
R=A/P; P = W+2H = 2+2(0.5) = 3.0R = 1/3 = 0.33

 $Q_{CAP} = 7.8 \text{ CFS (EACH)} > Q_{10}$

EACH CULVERT CAN PASS Q ON ITS OWN VII. COMPARISON

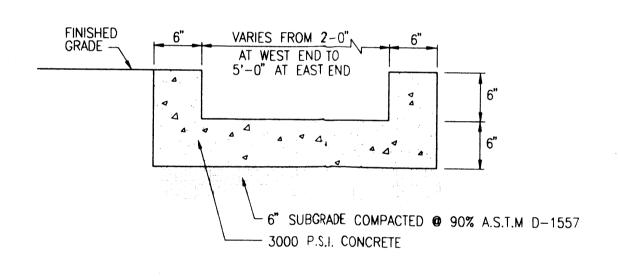
1. $\Delta V_{100} = 19,690 - 18,950 = 740 \text{ CF (INCREASE)}$

2. $\Delta Q_{100} = 11.8 - 11.5 = 0.3 \text{ CFS (INCREASE)}$



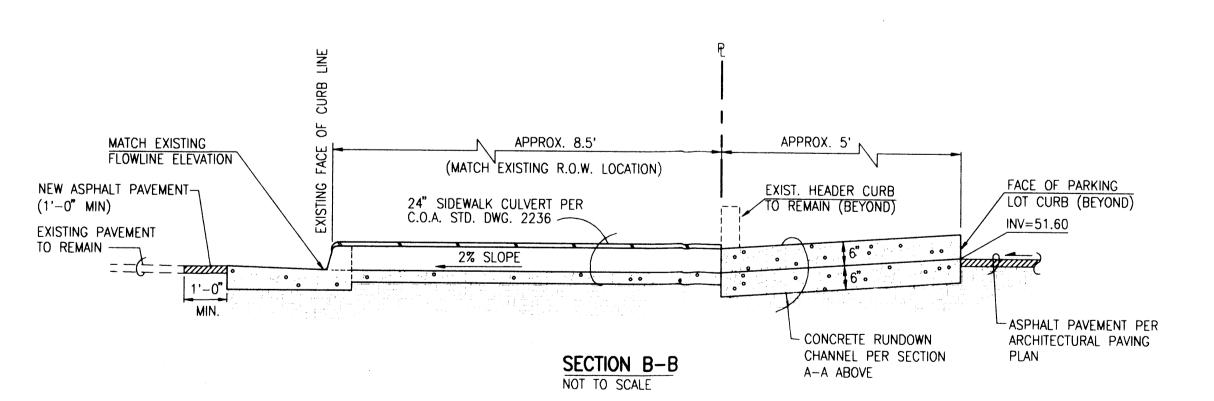
TYPICAL RUNDOWN CHANNEL/SIDEWALK CULVERT DETAIL SCALE: 1" = 4'

NOTE: CURB AND GUTTER AND SIDEWALK REMOVALS SHALL EXTEND TO THE NEAREST JOINT. PAVEMENT REMOVALS SHALL BE SAWCUT IN A STRAIGHT LINE TO REMOVE ANY BROKEN OR CRACKED PAVEMENT. EXPANSION JOINT MATERIAL SHALL BE PROVIDED IN ACCORDANCE WITH CITY STANDARDS.



SECTION A-A

SCALE: 1'' = 1' - 0''



d AR ER 5

DATE

REVISION

STAMP

M

PROJECT FOR THE CHURCH OF IESUS CHRIST

OF LATTER-DAY SAINTS

EL DORADO, EUBANK, SANDIA ALBUQUERQUE, **NEW MEXICO** EAST STAKE REMODEL

> 4109 EUBANK BLVD. ALBUQUERQUE, **NEW MEXICO 87111**

SHEET TITLE

DRAINAGE PLAN, CALCULATIONS, SECTIONS AND DETAILS

PROJECT DESIGNATION

PROP No. SHEET NO. 503-8820-0101 DEV. No.

WEL-WC-01-1 DATE 03 FEB. 2003

GRADING AND DRAINAGE PLAN SHEET 2 OF 3

