DRAINAGE PLAN

I. INTRODUCTION AND EXECUTIVE SUMMARY

THIS PROJECT, LOCATED IN THE LOWER SOUTHEAST HEIGHTS OF THE ALBUQUERQUE METROPOLITAN AREA, REPRESENTS A MODIFICATION TO AN EXISTING SITE WITHIN AN INFILL AREA. THE PURPOSE OF THIS PROJECT IS TO RECONSTRUCT A PORTION OF VACATED COAL AVENUE SE BETWEEN THE NEW BUS LOOP AND PARENT DROP-OFF LANE AS A PEDESTRIAN MALL. THE NEW CONSTRUCTION WILL REPLACE EXISTING IMPERVIOUS AREA WITH CONCRETE PAVING AND LANDSCAPING THEREBY REDUCING THE AMOUNT OF RUNOFF GENERATED BY THIS PORTION OF THE HIGHLAND HIGH SCHOOL CAMPUS. THE PROPOSED PROJECT WILL ALSO IMPROVE THE HYDRAULIC CAPACITY OF VACATED COAL BY REDUCING THE HEIGHT OF THE CROWN AND BY REMOVING THE EXISTING SPEED HUMPS. THE PROPOSED DRAINAGE CONCEPT WILL BE THE CONTINUED FREE DISCHARGE TO THE HIGHLAND DETENTION POND WHILE ACCEPTING AND CONVEYING PUBLIC OFFSITE FLOWS FROM THE EAST.

THIS SUBMITTAL IS MADE IN SUPPORT OF A GRADING AND PAVING PERMIT WITHIN THE JURISDICTION OF THE CITY OF ALBUQUERQUE.

II. PROJECT DESCRIPTION

AS SHOWN BY THE VICINITY MAP, THE SCHOOL SITE IS LOCATED NEAR THE SOUTHEAST CORNER OF THE INTERSECTION OF SILVER AVENUE SE AND JACKSON STREET SE. THE CURRENT LEGAL DESCRIPTION IS TRACT A-1-A, HIGHLAND HIGH SCHOOL. AS SHOWN BY PANEL 354 OF 825 OF THE NATIONAL FLOOD INSURANCE PROGRAM FLOOD INSURANCE RATE MAPS PUBLISHED BY FEMA FOR BERNALILLO COUNTY, NEW MEXICO, SEPTEMBER 26, 2008, THIS SITE DOES NOT LIE WITHIN A DESIGNATED FLOOD HAZARD ZONE, WITH THE EXCEPTION OF A PORTION OF THE MAIN CAMPUS ALONG ZUNI ROAD SE WHICH IS IDENTIFIED AS AN AO ZONE WITH A DEPTH OF ONE (1) FOOT. THE PROPOSED CONSTRUCTION SITE, HOWEVER, DOES NOT LIE WITHIN OR ADJACENT TO THE DESIGNATED FLOOD HAZARD ZONE.

III. BACKGROUND DOCUMENTS

THE PREPARATION OF THIS PLAN RELIED UPON THE FOLLOWING DOCUMENTS:

- TOPOGRAPHIC SURVEY PREPARED BY HIGH MESA CONSULTING GROUP (NMPS 11184) DATED 05-17-2011. THIS REFERENCED SURVEY PROVIDES THE BASIS FOR THE EXISTING CONDITIONS OF THE PROJECT SITE.
- PLAT OF TRACT A-1-A, HIGHLAND HIGH SCHOOL, APPROVED BY DRB, PROJECT NUMBER 1007472, DATED 06/18/2009. THE REFERENCED PLATTING ACTION RETAINED THE VACATED COAL RIGHT-OF-WAY AS A PUBLIC DRAINAGE EASEMENT.
- PLATE K17, THE ALBUQUERQUE MASTER DRAINAGE STUDY (AMDS) PREPARED BY BOHANNAN-HUSTON FOR THE CITY OF ALBUQUERQUE DATED JANUARY, 1981. THE AMDS PROVIDES BACKGROUND INFORMATION RELATIVE TO THE CORRECTION OF FLOODING IN THE PROXIMITY OF THE HIGHLAND HIGH SCHOOL CAMPUS. IN PARTICULAR, THE COMPLETION OF THE HIGHLAND DETENTION POND HAS RELAXED DISCHARGE CONSTRAINTS THEREBY ALLOWING THE FREE DISCHARGE OF RUNOFF FROM THE HIGHLAND HIGH SCHOOL SITE.

IV. EXISTING CONDITIONS

THE PROJECT SITE CONSISTS OF THE FORMER COAL AVENUE SE BETWEEN THE NEW BUS LOOP AND THE NEW PARENT DROP-OFF LANE, BOTH CONSTRUCTED IN 2009 AND THE ENTRANCE TO THE HIGHLAND HIGH SCHOOL NORTH ANNEX. VACATED COAL CONSISTS OF A FORMER CURB AND GUTTER STREET WITH ASPHALT PAVING WITH PERIODIC SPEED HUMPS AND SIDEWALKS AT THE BACK OF CURB. THE ENTRANCE PLAZA TO THE HIGHLAND HIGH SCHOOL NORTH ANNEX CONSISTS OF A FORMER PAVED PARKING LOT NO LONGER IN USE. AT PRESENT, BOTH EXISTING FACILITIES DRAIN FROM EAST TO WEST WITH DEVELOPED RUNOFF EVENTUALLY BEING ROUTED THROUGH THE HIGHLAND DETENTION POND.

VACATED COAL AVENUE RECEIVES OFFSITE PUBLIC RUNOFF FROM THE EAST. EXCESS RUNOFF FROM JACKSON STREET SE ENTERS THE VACATED COAL AVENUE ROADWAY, A PUBLIC DRAINAGE EASEMENT FOR THE CITY OF ALBUQUERQUE. THE OFFSITE FLOWS ARE CONVEYED WEST WITHIN THE VACATED ROADWAY TO BE ROUTED THROUGH THE HIGHLAND DETENTION POND.

V. DEVELOPED CONDITIONS

THE PROPOSED CONSTRUCTION CONSISTS OF THE REMOVAL OF THE EXISTING ASPHALT PAVING AND SPEED HUMPS, AND THE CONCRETE SIDEWALKS ASSOCIATED WITH VACATED COAL AVENUE BETWEEN THE NEW BUS LOOP AND PARENT DROP-OFF LANE. THE EXISTING ASPHALT PAVING WILL BE REPLACED WITH CONCRETE PAVING AT A REDUCED (HALF) CROWN TO ENHANCE THE HYDRAULIC CAPACITY. THE SPEED HUMPS WILL NOT BE REPLACED. THE SIDEWALKS WILL BE REPLACED WITH LANDSCAPING (STREET TREES AND CRUSHER FINES) TO REDUCE IMPERVIOUSNESS. THE EXISTING CURB AND GUTTER WILL REMAIN TO DEFINE THE CHANNEL-LIKE CHARACTERISTICS OF THE FORMER PUBLIC STREET.

THE PROPOSED CONSTRUCTION ALSO CONSISTS OF THE REMOVAL OF THE EXISTING ASPHALT PAVING AT THE FRONT ENTRY TO THE NORTH ANNEX TO CREATE AN ENTRY PLAZA CONSISTING OF CONCRETE PAVING AND LANDSCAPING. THE NET RESULT WILL BE A DECREASE IN IMPERVIOUSNESS. THIS AREA WILL CONTINUE TO DRAIN FROM EAST TO WEST TOWARD THE NEW STUDENT PARKING LOT. A LANDSCAPE BUFFER WILL BE PROVIDED AT THE WEST EDGE TO PROVIDE AN AREA WHERE THE RUNOFF FROM MORE FREQUENT RAINFALL EVENTS CAN BE HARVESTED. THIS ALSO PROVIDED A DISCONNECT IN IMPERVIOUS AREA WITHIN THE HIGH SCHOOL CAMPUS.

OFFSITE FLOWS WILL CONTINUE TO BE ACCEPTED FROM JACKSON STREET SE AND CONVEYED THROUGH THE HIGH SCHOOL SITE VIA FORMER COAL AVENUE SE. BY RETAINING THE EXISTING CURB AND GUTTER AND REDUCING CROWN HEIGHT, THE CAPACITY OF THE PUBLIC DRAINAGE EASEMENT ASSOCIATED WITH THE VACATED STREET WILL BE INCREASED.

VI. GRADING PLAN

THE GRADING PLAN SHOWS 1.) EXISTING AND PROPOSED GRADES INDICATED BY SPOT ELEVATIONS AND CONTOURS AT 1'-0" INTERVALS, 2.) THE LIMIT AND CHARACTER OF THE EXISTING AND PROPOSED IMPROVEMENTS, AND 3.) CONTINUITY BETWEEN EXISTING AND PROPOSED GRADES. AS SHOWN BY THIS PLAN, THE PROPOSED GRADING WILL MAINTAIN THE CURRENT DRAINAGE PATTERN OF THE SITE WHEREBY RUNOFF FLOWS FROM EAST TO WEST, EVENTUALLY BEING ROUTED THROUGH THE HIGHLAND DETENTION POND.

VII. CALCULATIONS

THE CALCULATIONS CONTAINED HEREON ANALYZE 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. AS DEMONSTRATED BY THESE CALCULATIONS, THE PROPOSED IMPROVEMENTS WILL DECREASE THE PEAK RATE OF DISCHARGE AND VOLUME OF RUNOFF GENERATED BY THIS PORTION OF THE HIGHLAND HIGH SCHOOL CAMPUS. IN ADDITION, MANNING'S EQUATION FOR OPEN CHANNEL (STREET) FLOW WAS USED TO QUANTIFY THE HYDRAULIC CAPACITY OF VACATED COAL AVENUE IN THE EXISTING AND DEVELOPED CONDITIONS. AS DEMONSTRATED BY THE CALCULATIONS, REGRADING AND REPAVING THE STREET WITH A HALF-CROWN WILL INCREASE THE HYDRAULIC CAPACITY OF THE FORMER CITY STREET.

VIII. CONCLUSIONS

THE FOLLOWING CONCLUSIONS HAVE BEEN ESTABLISHED AS A RESULT OF THE EVALUATIONS CONTAINED HEREIN:

1. THE PROPOSED IMPROVEMENTS WILL NOT ALTER THE EXISTING DRAINAGE PATTERNS OF THIS PORTION OF THE EXISTING HIGH SCHOOL CAMPUS
2. THE PROPOSED IMPROVEMENTS WILL DECREASE THE IMPERVIOUSNESS OF THIS PORTION OF THE EXISTING HIGH SCHOOL CAMPUS
3. THE PROPOSED IMPROVEMENTS WILL EFFECTIVELY REDUCE THE PEAK RATE OF DISCHARGE AND VOLUME OF RUNOFF GENERATED BY THIS PROJECT SITE
4. THE PROPOSED IMPROVEMENTS WILL IMPROVE THE HYDRAULIC CAPACITY OF VACATED COAL AVENUE RETAINED AS A PUBLIC DRAINAGE EASEMENT
5. THE PROPOSED IMPROVEMENTS WILL NOT BLOCK OR ADVERSELY AFFECT THE PUBLIC OFFSITE FLOWS THAT ENTER THE SITE FROM THE EAST
6. THE PROPOSED IMPROVEMENTS WILL NOT ADVERSELY IMPACT DOWNSTREAM PROPERTIES OR DOWNSTREAM DRAINAGE CONDITIONS

CALCULATIONS

I. SITE CHARACTERISTICS

A. PRECIPITATION ZONE = 2

B. $P_{100,\,6\,HR} = P_{360}$ = 2.35

C. TOTAL PROJECT AREA (A_T) = 33,470 SF
0.77 AC

D. LAND TREATMENTS

1. EXISTING LAND TREATMENT

TREATMENT	AREA (SF/AC)	%
B	640 / 0.02	3
D	32,830 / 0.75	97

2. DEVELOPED LAND TREATMENT

TREATMENT	AREA (SF/AC)	%
B	7,100 / 0.16	21
D	26,370 / 0.61	79

II. HYDROLOGY

A. EXISTING CONDITION

1. VOLUME
$E_W = (E_AA_A+E_BA_B+E_CA_C+E_DA_D)/A_T$
E_W = ((0.78*0.02) + (2.12*0.75))/0.77 = 2.09 IN
$V_{100,6\,HR} = (E_W/12)A_T$ = (2.09/12)0.77 = 0.1341 AC-FT = 5,840 CF

2. PEAK DISCHARGE
$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100}$ = (2.28 * 0.02) + (4.70 * 0.75) = 3.6 CFS

3. COAL AVENUE RUNOFF CAPACITY
- EXISTING FULL CROWN, 40' F-F STREET WIDTH

Q = 1.49/n * A * $R^{2/3}$ * $S^{1/2}$ - MANNING'S EQUATION FOR OPEN CHANNEL (STREET) FLOW

n = 0.017
D = 0.6 FT (8" CURB FLOW DEPTH)
A = 6.3 SF (HALF STREET WIDTH)
P = 20.7 FT (HALF STREET WIDTH)
R = 6.3 / 20.7 = 0.30 FT
S = 0.0085 FT/FT

Q = 1.49/0.017 * 6.3 * $0.30^{2/3}$ * $0.0085^{1/2}$ (HALF STREET WIDTH)
Q = 22.8 CFS (HALF STREET WIDTH)

2 * Q_{CAP} = 45.6 CFS (FULL STREET WIDTH)

B. DEVELOPED CONDITION

1. VOLUME
$E_W = (E_AA_A+E_BA_B+E_CA_C+E_DA_D)/A_T$
E_W = ((0.78*0.16) + (2.12*0.61))/0.77 = 1.84 IN
$V_{100,\,6\,HR} = (E_W/12)A_T$ = (1.84/12)0.77 = 0.1178 AC-FT = 5,130 CF

2. PEAK DISCHARGE
$Q_P = Q_{PA}A_A + Q_{PB}A_B + Q_{PC}A_C + Q_{PD}A_D$
$Q_P = Q_{100}$ = (2.28*0.16) + (4.70*0.61) = 3.2 CFS

3. COAL AVE RUNOFF CAPACITY
- DEVELOPED HALF CROWN, 40' F-F STREET WIDTH

Q = 1.49/n * A * $R^{2/3}$ * $S^{1/2}$ - MANNING'S EQUATION FOR OPEN CHANNEL (STREET) FLOW

n = 0.017
D = 0.6 FT (8" CURB FLOW DEPTH)
A = 8.0 SF (HALF STREET WIDTH)
P = 20.8 FT (HALF STREET WIDTH)
R = 8.0 / 20.8 = 0.38 FT
S = 0.0085 FT/FT

Q = 1.49/0.017 * 8.0 * $0.38^{2/3}$ * $0.0085^{1/2}$ (HALF STREET WIDTH)
Q = 33.9 CFS (HALF STREET WIDTH)

2 * Q_{CAP} = 67.8 CFS (FULL STREET WIDTH)

C. COMPARISONS

1. VOLUME
$\Delta V_{100,\,6\,HR}$ = 5,130 - 5,840 = -710 CF (DECREASE)

2. PEAK DISCHARGE
ΔQ_{100} = 3.2 - 3.6 = -0.4 CFS (DECREASE)

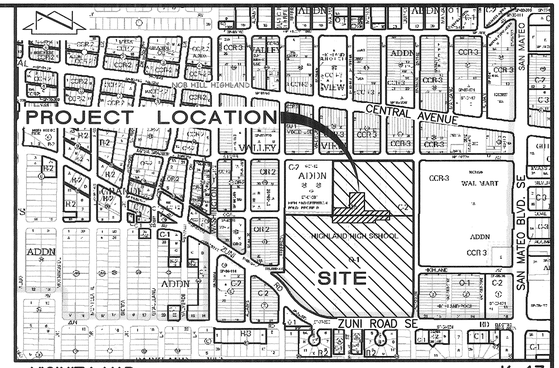
3. STREET FLOW CAPACITY
ΔQ_{CAP} = 67.8 - 45.6 = 22.2 CFS (INCREASE)

CONSTRUCTION NOTES

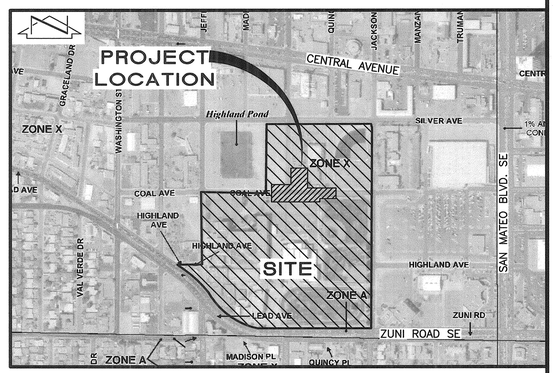
1. TWO (2) WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT NEW MEXICO ONE CALL SYSTEM 260-1990 (ALBUQUERQUE AREA), 1-800-321-ALERT(2537) (STATEWIDE), FOR LOCATION OF EXISTING UTILITIES AND ALBUQUERQUE PUBLIC SCHOOLS OR THEIR DESIGNATED SUBSURFACE UTILITY CONSULTANT FOR APS-OWNED UTILITIES.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL POTENTIAL OBSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INTERPRETATIONS IT MAKES WITHOUT FIRST CONTACTING THE ENGINEER AS REQUIRED ABOVE.
3. ALL WORK ON THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL LAWS, RULES AND REGULATIONS CONCERNING CONSTRUCTION SAFETY AND HEALTH.
4. ALL CONSTRUCTION WITHIN PUBLIC RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE CITY OF ALBUQUERQUE STANDARDS AND PROCEDURES.
5. IF ANY UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES ARE SHOWN ON THESE DRAWINGS, THEY ARE SHOWN IN AN APPROXIMATE MANNER ONLY, AND SUCH LINES MAY EXIST WHERE NONE ARE SHOWN. IF ANY SUCH EXISTING LINES ARE SHOWN, THE LOCATION IS BASED UPON INFORMATION PROVIDED BY THE OWNER OF SAID UTILITY, AND THE INFORMATION MAY BE INCOMPLETE, OR MAY BE OBSOLETE BY THE TIME CONSTRUCTION COMMENCES. THE ENGINEER HAS CONDUCTED ONLY PRELIMINARY INVESTIGATION OF THE LOCATION, DEPTH, SIZE, OR TYPE OF EXISTING UTILITY LINES, PIPELINES, OR UNDERGROUND UTILITY LINES. THIS INVESTIGATION IS NOT CONCLUSIVE, AND MAY NOT BE COMPLETE, THEREFORE, MAKES NO REPRESENTATION PERTAINING THERETO, AND ASSUMES NO RESPONSIBILITY OR LIABILITY THEREFOR. THE CONTRACTOR SHALL INFORM ITSELF OF THE LOCATION OF ANY UTILITY LINE, PIPELINE, OR UNDERGROUND UTILITY LINE IN OR NEAR THE AREA OF THE WORK IN ADVANCE OF AND DURING EXCAVATION WORK. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE CAUSED BY ITS FAILURE TO LOCATE, IDENTIFY AND PRESERVE ANY AND ALL EXISTING UTILITIES, PIPELINES, AND UNDERGROUND UTILITY LINES. IN PLANNING AND CONDUCTING EXCAVATION, THE CONTRACTOR SHALL COMPLY WITH STATE STATUTES, MUNICIPAL AND LOCAL ORDINANCES, RULES AND REGULATIONS, IF ANY, PERTAINING TO THE LOCATION OF THESE LINES AND FACILITIES.
6. THE DESIGN OF PLANTERS AND LANDSCAPED AREAS IS NOT PART OF THE PAVING PLAN. ALL PLANTERS AND LANDSCAPED AREAS ADJACENT TO THE BUILDING(S) SHALL BE PROVIDED WITH POSITIVE DRAINAGE TO AVOID ANY PONDING ADJACENT TO THE STRUCTURE. FOR CONSTRUCTION DETAILS, REFER TO PLANTING PLAN.

EROSION CONTROL NOTES

1. THE CONTRACTOR SHALL ENSURE THAT NO SOIL ERODES FROM THE SITE INTO PUBLIC RIGHT-OF-WAY OR ONTO PRIVATE PROPERTY.
2. THE CONTRACTOR SHALL PROMPTLY CLEAN UP ANY MATERIAL EXCAVATED WITHIN THE PUBLIC RIGHT-OF-WAY SO THAT THE EXCAVATED MATERIAL IS NOT SUSCEPTIBLE TO BEING WASHED DOWN THE STREET.
3. WHEN APPLICABLE, CONTRACTOR SHALL SECURE "TOPSOIL DISTURBANCE PERMIT" FROM THE CITY AND/OR FILE A NOTICE OF INTENT (N.O.I.) WITH THE EPA PRIOR TO BEGINNING CONSTRUCTION.



VICINITY MAP K-17
SCALE: 1" = 750'



F.I.R.M. PANELS 353 AND 354 OF 825
SCALE: 1" = 500' DATED SEPTEMBER 26, 2008

LEGAL DESCRIPTION

A PORTION OF TRACT A-1-A, HIGHLAND HIGH SCHOOL, ALBUQUERQUE, NEW MEXICO

BENCHMARKS

PROJECT BENCHMARK

ACS 2" BRASS DISC SET STAMPED "6-K18A ACS" SET IN SIDEWALK AT THE INTERSECTION OF CENTRAL AVENUE AND JACKSON STREET.
ELEVATION = 5249.99 FEET (NAVD 1988)

T.B.M.

A MAG NAIL SET AT BACK OF CURB, AS SHOWN ON THIS DRAWING.
ELEVATION = 5251.57 FEET (NAVD 1988)

01-22-2012
08-01-2011

JEFFREY G. MORTENSON NEW MEXICO 8547 REGISTERED PROFESSIONAL ENGINEER

2 RECORD DRAWING

File Path: E:\DATA\2010.180.5\DWG\R-2\ | Plot Date: 12-21-2011
File Name: 101805_Sh16_R2.DWG | Plot Time: 3:30 pm

HIGH MESA Consulting Group
6010-B MIDWAY PARK BLVD. NE • ALBUQUERQUE, NEW MEXICO 87109
PHONE: 505.345.4250 • FAX: 505.345.4254 • www.highmesacg.com

DRAINAGE PLAN AND CALCULATIONS
COAL AVENUE PEDESTRIAN MALL
HIGHLAND HIGH SCHOOL

DESIGNED BY J.D.S.
DRAWN BY C.L.T./J.Y.R.
APPROVED BY J.G.M.

NO.	DATE	BY	REVISIONS
2	12/11	B.E.E.	RECORD DRAWING

JOB NO. 2010.180.5
DATE 08-2011
SHEET 6 OF 8