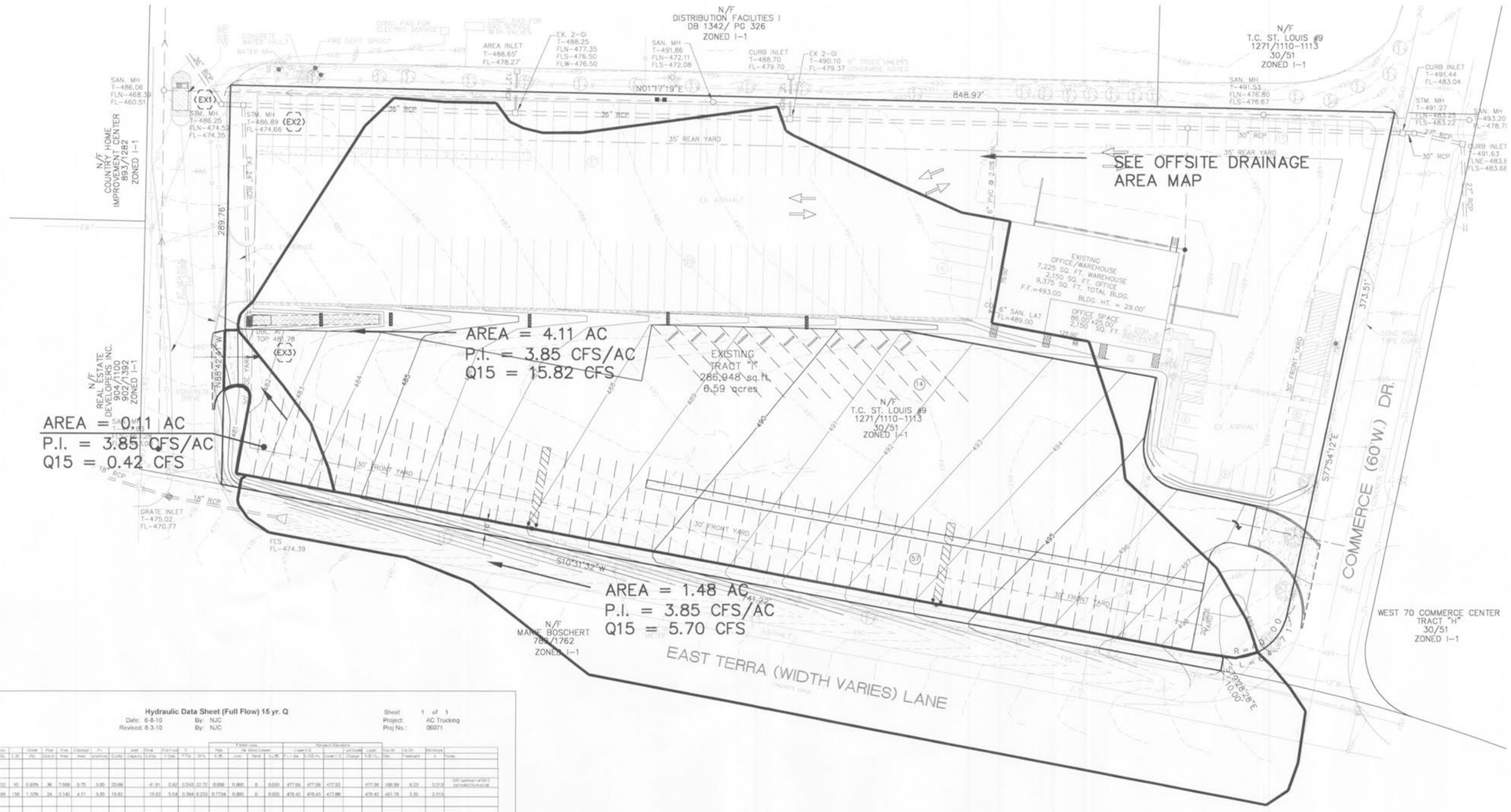

Vance Engineering, Inc
10779 Page Ave.
St. Louis, MO 63132

Hydraulic Data Sheet (Full Flow) 15 yr. Q
Date: 6-8-10 By: NJC
Revised: 8-3-10 By: NJC

Sheet 1 of 1
Project: AC Trucking
Proj No.: 06071

Up	Upper Sh	Lower Sh	Ground Elevations Upper Sh	Ground Elevations Lower Sh	L (ft)	Grade (%)	Pipe Size (in)	Pipe Area	Cleanout Area	Cleanout Vel	Q (cfs)	Weir Capacity	Time Q (cfs)	Full-Flow Q (cfs)	Full-Flow V (fps)	Full-Flow Q (%)	Entrance Loss Pipe K	Entrance Loss Ht Loss	Entrance Loss Bend	Entrance Loss Sp.Ht	Hydraulic Elevations Upstream I.E. Pipe Dia	Upstream I.E. Invert El.	Lower I.E. Change	Lower I.E. Pipe Dia	Upper Top Dn	Top Dn Dia	Up Dn Freeboard	Elevations I	Notes
	EX2	EX3	474.66	474.52	10	0.80%	36	7.069	6.75	3.85	25.98		41.81	0.82	0.543	22.72	0.059	0.000	0	0.000	477.69	477.58	477.92		477.96	486.59	8.23	2.213	GRI updown of EX3 estimated from plot
	EX3	EX2	478.40	474.66	106	1.10%	24	3.142	4.11	3.85	15.82		15.82	5.04	0.394	5.233	0.7734	0.000	0	0.000	478.43	478.43	477.66		478.43	481.78	3.35	2.213	

Formulas: Full-Flow/Full-Flow Velocity, V=Q/Pipe Area
Friction Loss, hf=2.87n^2L/r^4/3^

Junction Losses = SOV(Jout)-SUMOV(Jin)[1.33/Q(out)]
Bend Losses = Kb * Angle Coeff (K, for Incoming Line)
Angle Coefficients:
90°= 0.7
45°= 0.47
30°= 0.35
15°= 0.15

Notes: If more than one incoming line, calculate each bend loss and add.
No structure losses at drop structures.
If OV(jin) > OV(jout), Then No Junc Loss

CULVERT CALCULATOR – AUTODESK LAND DESKTOP

ENTERED DATA:
SHAPE ..... CIRCULAR
NUMBER OF BARRELS 1
SOLVING FOR ..... HEADWATER
CHART NUMBER 1
SCALE NUMBER 1
CHART DESCRIPTION ..... CONCRETE PIPE CULVERT; NO BEVELED RING ENTRANCE
SCALE DECSRIPTION ..... SQUARE EDGE ENTRANCE WITH HEADWALL
OVERTOPPING ..... OFF
FLOWRATE ..... 5.7000 CFS
MANNING'S N 0.0130
ROADWAY ELEVATION ..... 478.0000 FT
INLET ELEVATION ..... 474.3900 FT
OUTLET ELEVATION ..... 470.7700 FT
DIAMETER ..... 1.5000 FT
LENGTH ..... 50.0000 FT
ENTRANCE LOSS 0.0000
TAILWATER ..... 1.5000 FT

COMPUTED RESULTS:
HEADWATER ..... 475.7487 FT INLET CONTROL
SLOPE ..... 0.0724 FT/FT
VELOCITY ..... 12.5234 FPS

HEADWATER 2.2' BELOW ROAD ELEVATION; THEREFORE CULVERT HAS ADEQUATE CAPACITY

EXISTING STORM STRUCTURE – DBL. AREA INLET CAPACITY

GIVEN:
COEFFICIENT 0.61
AREA ..... 5.833 FT^2 (DBL. AI OPEN 3 SIDES)
HEADWATER ..... 0.5 FT

RESULTS:
FLOWRATE ..... 20.18 CFS

PEAK DISCHARGE = 15.83 CFS; THEREFORE EX. STRUCTURE HAS ADEQUATE CAPACITY

OFFSITE DRAINAGE AREA MAP
1 inch = 200 ft.

N
0 20 40 80
1 inch = 40 ft.

NOTICE TO CONTRACTOR

UNDERGROUND FACILITIES, STRUCTURES AND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE RECORDS. THEREFORE, THE LOCATIONS OF ANY UNDERGROUND FACILITIES SHOWN HEREON MUST BE CONSIDERED APPROXIMATE. PRIOR TO BEGINNING WORK ON THE SITE, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE EXACT LOCATION OF THESE FACILITIES, ALONG WITH ANY IN EXISTENCE THAT ARE NOT SHOWN; TO VERIFY THEIR LOCATION BOTH HORIZONTALLY AND VERTICALLY (IN ACCORDANCE WITH THE REQUIREMENTS OF THE RESPECTIVE UTILITY/FACILITY OWNER); AND TO VERIFY THAT MINIMUM CLEARANCES AND COVER REQUIREMENTS BETWEEN THE EXISTING FACILITIES AND THE PROPOSED WORK WILL BE MET.

BEFORE YOU
DIG – DRILL – BLAST
1-800-344-7483
(TOLL FREE)
MISSOURI ONE CALL SYSTEM, INC.

CITY FILE NUMBER: 6901.02

THIS SHEET IS FOR DRAINAGE AREA PURPOSES ONLY. DO NOT USE FOR CONSTRUCTION

STATE OF MISSOURI
NATHAN JACOB CLAY
NUMBER 2092
PROFESSIONAL ENGINEER
AUG 17 2010

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AC TRUCKING, INC.

DRAINAGE AREA MAP

REVISED
6-15-10 VANCE REV.
8-2-10 CITY COMMT'S
8-16-10 CITY COMMT'S

06071
6/8/10
5 OF 5

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