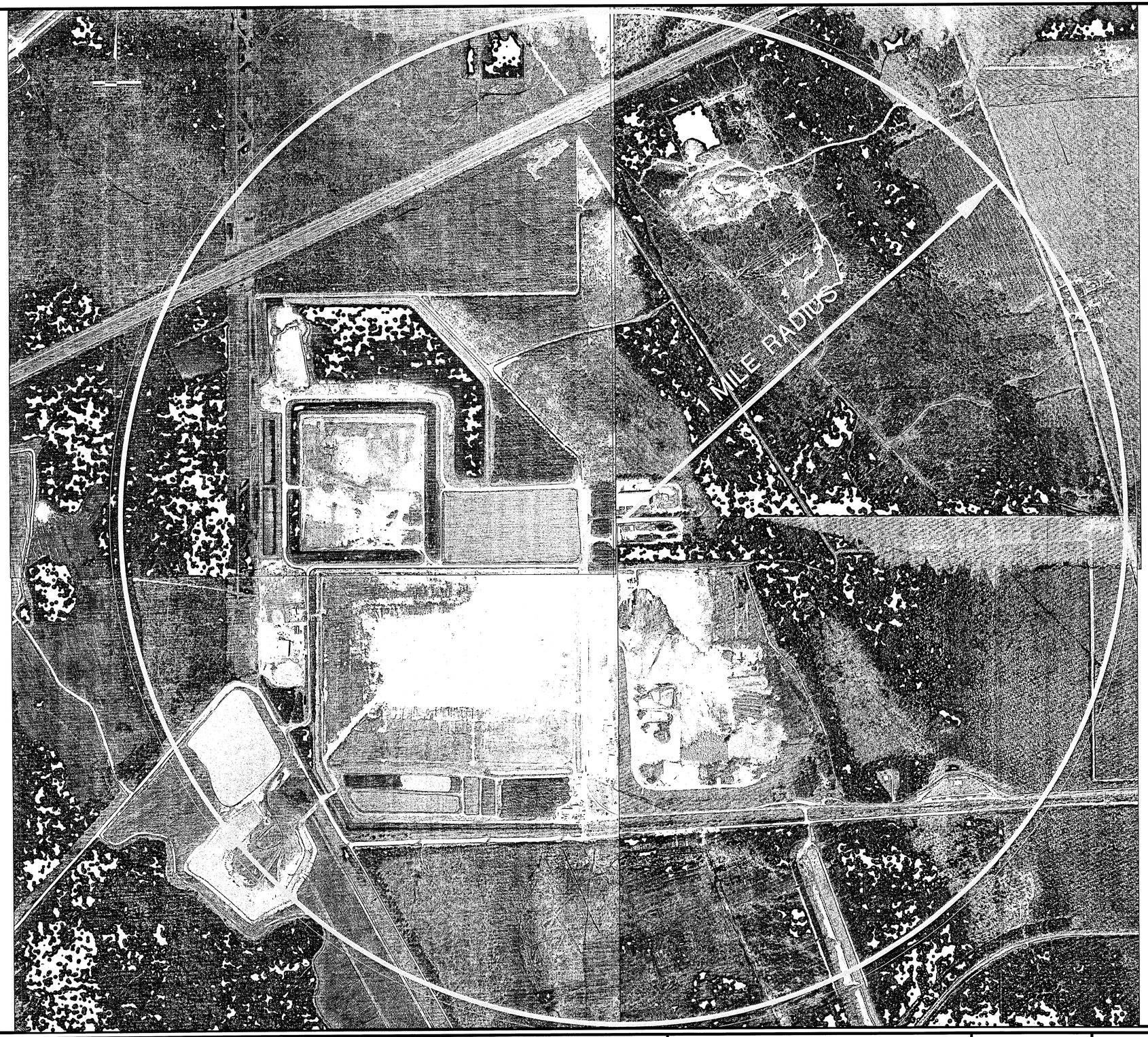


FIGURE 2

PBS&J
482 South Keller Road
ORLANDO, FL 32810-6101
TEL. (407) 647-7275
FAX. (407) 647-0624
WWW.PBSJ.COM
POST, BUCKLEY, SCHUH & JERNIGAN, Inc.
d/b/a PBS&J
2001 N.W. 107th Ave., Miami, FL 33172-2507
FBPR Certificate of Authorization No.: 24

CLIENT: CARE ENVIRONMENTAL CORP.

PROJECT: HOUSEHOLD HAZARDOUS WASTE TRANSFER FACILITY

TASK: AERIAL PHOTOGRAPHY

ORIGINAL _____
REVISIONS:
1._____ 2._____ 3._____ 4._____ 5._____
6._____ 7._____ 8._____ 9._____ 10._____ 11._____ 12._____

Name:
Florida P.E. No.:
Address: PBS&J
482 S. Keller Road
Orlando, FL 32810-6101
Signature Date

JOB NO. 07-000.00
DRAWN GG
DESIGN RS
CHECKED
Q.C.

SHEET /#

I:\Orlo\...\EVACUATION\WESTMANN\YOUNG\vectorphoto.dwg Jun05,2003 - 3:59pm Plotted By: ra837

VOLUSIA COUNTY
DEPARTMENT OF PUBLIC WORKS
SOLID WASTE DIVISION

TOMOKA FARMS ROAD LANDFILL

CLASS I CELL
FILL SEQUENCE PLAN

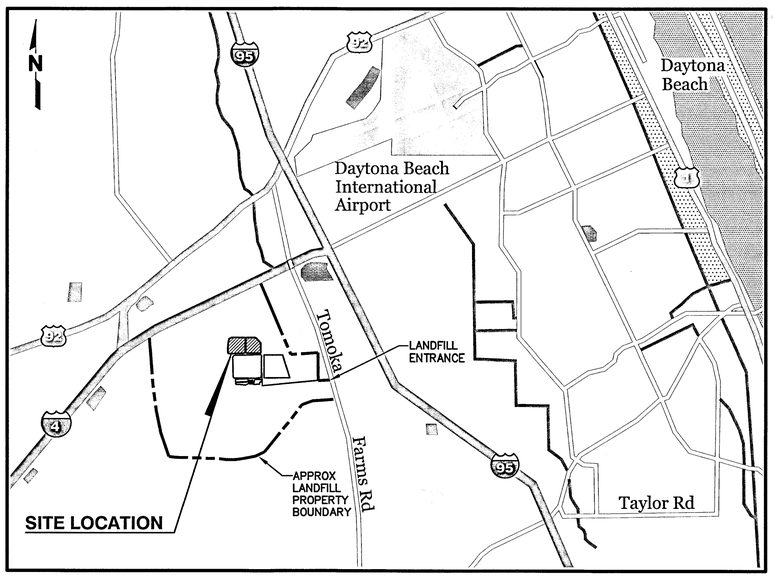
VOLUSIA COUNTY, FLORIDA

AUGUST 2009

Volusia County
FLORIDA

Volusia County Council Members

Frank Bruno Jr., County Chair
Joie Alexander, At-Large, Vice Chair
Andy Kelly, District 1
Josh Wagner, District 2
Jack Hayman, District 3
Carl G. Persis, District 4
Pat Northey, District 5



LOCATION MAP

DRAWING INDEX

DRAWING NO.		DRAWING TITLE
1	-	COVER SHEET
2	-	EXISTING AERIAL AND TOPOGRAPHIC SITE PLAN
3	-	FINAL COVER/CLOSURE - SITE PLAN
4	-	SECTIONS
5	-	FILL SEQUENCE PLAN - STAGES 1 THRU 4
6	-	FILL SEQUENCE PLAN - STAGES 5 THRU 8
7	-	FILL SEQUENCE PLAN - STAGES 9 THRU 12
8	-	FILL SEQUENCE PLAN - STAGES 13 THRU 15
9	-	DETAILS

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS
4041 PARK OAKS BLVD, SUITE 100
TAMPA, FLORIDA 33610
PH (813) 621-0080 FAX NO. (813) 623-6757
Florida Certificate of Authorization No. 00004892
WWW.SCSENGINEERS.COM
SCS PROJECT NO. 09208007.09

RECEIVED
AUG 14 2009
DEP Central Dist.

8/13/09
CHARLES E. HILTON, P.E.
LICENSE NO. 46916

Q:\09208007\Work\09208007.001\Drawings\Cover\Cover.dwg, 8/13/2009 8:36:54 AM, Charles Hilton, DWG To PDF.pc3

SURVEY SOURCE NOTES:

1. TOPOGRAPHIC SURVEY SHOWN PRODUCED BY PHOTOGRAMMETRIC METHODS AND PERFORMED BY: AERIAL CARTOGRAPHICS OF AMERICA, P.O. BOX 593846, ORLANDO FLORIDA, 32859-3846 (1722 W. OAK RIDGE ROAD, ORLANDO FLORIDA, 32809), LB # 0006748.
2. AERIAL PHOTO DATE: APRIL 7, 2009
3. SURVEYOR AND MAPPER IN RESPONSIBLE CHARGE: MARK DETRICK, PSM # 5433.
4. MAPPING COORDINATES ARE BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM 1983 (1990 ADJUSTMENT).
5. FIELD SURVEY CONTROL ELEVATIONS AND RESULTING MAPPING ELEVATIONS ARE BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.

LEGEND

- 35 — EXISTING ELEVATIONAL CONTOUR (5 FOOT INTERVAL) – 04/07/09 SURVEY
- EXISTING ELEVATIONAL CONTOUR (1 FOOT INTERVAL) – 04/07/09 SURVEY
- ×43.7 — EXISTING SPOT ELEVATION – 04/07/09 SURVEY
- CLASS I AREA DESIGNATION/BOUNDARY (APPROXIMATE)

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REV	DATE	DESCRIPTION	BY
1			
2			
3			
4			
5			

DRAWING TITLE: EXISTING AERIAL AND TOPOGRAPHIC SITE PLAN

PROJECT TITLE: TOMOKA FARMS ROAD LANDFILL
CLASS I CELL
FILL SEQUENCE PLAN

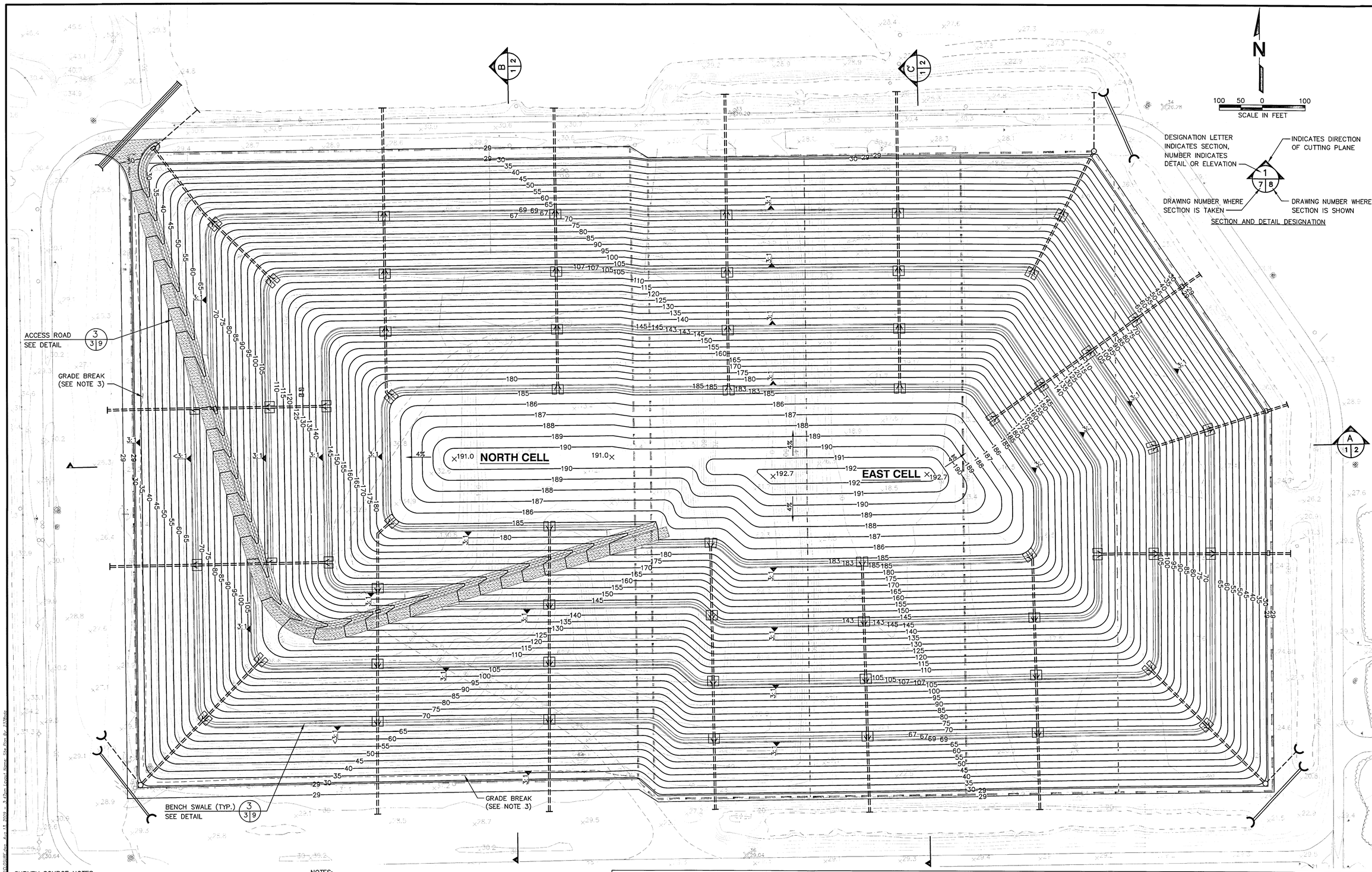
CLIENT: VOLUSIA COUNTY
DEPARTMENT OF PUBLIC WORKS
SOLID WASTE DIVISION
DELAND, FLORIDA

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS
4041 PARK OAKS BLVD., SUITE 100, TAMPA, FL 33610
813 621-0080 FAX 813 623-6757
FLORIDA CERTIFICATE OF AUTHORIZATION NO. 00004892

PROJ. NO. 080709007.09
DSN. BY: CEH
DWN. BY: SDA
CHK. BY: CEH
Q/A RVW BY: RJD
APP. BY: CEH

CADD FILE: 080709ETOPO
DATE: AUGUST 2009
SCALE: AS SHOWN
DRAWING NO. 2 of 9

G:\2007\07V0080\709007.09\Drawings\Tomoka\080709ETOPO.dgn Aug 14, 2009 - 3:45pm Kevin Horne Class I – Aerial & Topographic Site Plan Rv #3789



SURVEY SOURCE NOTES:

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5. FIELD SURVEY CONTROL ELEVATIONS AND RESULTING MAPPING ELEVATIONS ARE BASED ON THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.

NOTES:

1. DESIGN CONTOURS SHOWN REPRESENT TOP OF FINAL COVER/CLOSURE GRADES PRIOR TO PLACEMENT OF SOD OR GFFR. ACCESS ROAD GRADES SHOWN INCLUDE 12" THICK SHELL LAYER. SEE FINAL COVER DETAILS 1 AND 3, DRAWING NO. 9 OF 9.
2. PERIMETER GRADES/CONTOURS SHOWN AROUND TOE OF SLOPE AT ELEVATION 29.0 REPRESENT ORIGINAL BOTTOM CELL PROJECT DESIGN ELEVATIONS.
3. GRADE BREAK LINE SHOWN IS APPROXIMATE AND REPRESENTS A HORIZONTAL LOCATION WHERE THE BOTTOM 3:1 SLOPE TRANSITIONS INTO A MORE SHALLOW (LESS THAN 3:1) SLOPE. THIS ONLY OCCURS ON THE WEST AND SOUTH SIDES OF THE NORTH CELL AREA UP TO ELEVATION 69.0.
4. SEQUENCE MAY BE TEMPORARILY ALTERED TO ADDRESS WEATHER ISSUES OR OUTSIDE INFLUENCES. FDEP WILL BE NOTIFIED OF THESE OCCURANCES.

LEGEND

- EXISTING GRADE ELEVATIONAL CONTOUR (10 FOOT INTERVAL – 04/07/09 SURVEY)
- EXISTING GRADE ELEVATIONAL CONTOUR (2 FOOT INTERVAL – 04/07/09 SURVEY)
- EXISTING GRADE SPOT ELEVATION (04/07/09 SURVEY)
- EXISTING EDGE OF LINER (MAPTECH, INC., LINER AS–BUILT SURVEY 10/04/2005)
- FUTURE EDGE OF LINER
- TOP OF FINAL COVER/CLOSURE ELEVATIONAL CONTOUR (5 FOOT INTERVAL)
- TERRACE SWALE ELEVATIONAL CONTOUR (PRIOR TO FINAL SWALE GRADING)
- TOP OF FINAL COVER/CLOSURE SPOT ELEVATION
- 24' SHELL ACCESS ROAD
- ACCESS ROAD SWALE GFFR LIMITS
- STORMWATER DOWNCHUTE PIPE
- PERIMETER SWALE STORMWATER CULVERT PIPE
- TERRACE SWALE STORMWATER LATERAL CHUTE INLET
- DITCH BOTTOM INLET
- STORMWATER MANHOLE
- STORMWATER HEADWALL STRUCTURE (FDOT INDEX NO. 272)

Charles E. Hilton 8/13/09
CHARLES E. HILTON, P.E.
LICENSE NO. 46916

REV	DATE	DESCRIPTION	BY

DRAWING TITLE: FINAL COVER/CLOSURE SITE PLAN

PROJECT TITLE: TOMOKA FARMS ROAD LANDFILL CLASS I CELL FILL SEQUENCE PLAN

CLIENT: VOLUSIA COUNTY DEPARTMENT OF PUBLIC WORKS SOLID WASTE DIVISION DELAND, FLORIDA

RECEIVED AUG 14 2009 DEP Central Dist

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS
4041 PARK OAKS BLVD, SUITE 100, TAMPA, FL 33610
813 621-0080 FAX 813 623-6757
FLORIDA CERTIFICATE OF AUTHORIZATION NO. 00004892

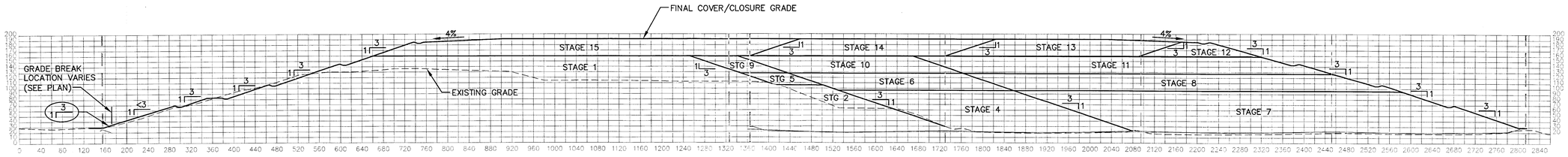
PROJ. NO.	DWN. BY:	CHK. BY:	D/A RVW BY:	APP. BY:
09208007.09	SDA	CEH	RJD	CEH
DSN. BY: CEH				

CADD FILE: 080709CL1CLOSURE

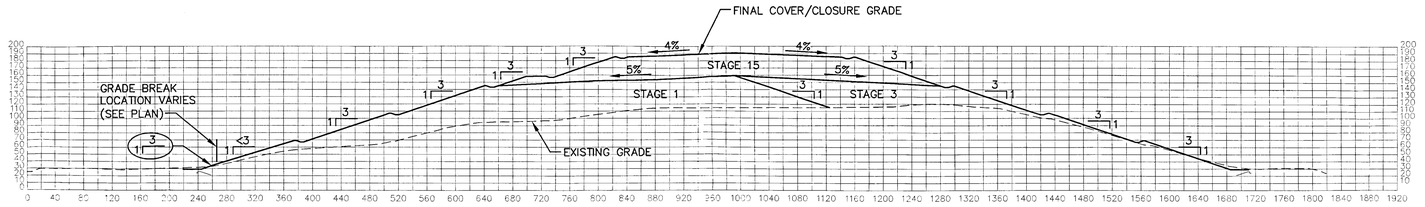
DATE: AUGUST 2009

SCALE: AS SHOWN

DRAWING NO. 3 of 9



SECTION (A / 4)
SCALE: 1" = 100' HORIZ.
1" = 100' VERT.
3,5,6,7,8



SECTION (B / 4)
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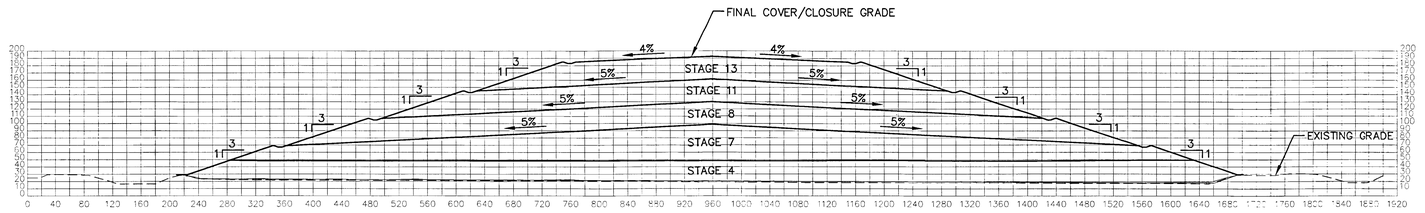
1" = 100' VERT.
3,5,6,7,8



SECTION (C / 4)
SCALE: 1" = 100' HORIZ.
1" = 100' VERT.
3,5,6,7,8

SECTION NOTES (TYP.):

1. INSIDE GRADE LINES SHOWN BETWEEN FILL SEQUENCE STAGES REPRESENT TOP OF WASTE.
2. OUTSIDE GRADE LINES SHOWN REPRESENT TOP OF FINAL COVER SYSTEM, SEE DETAIL 1, DRAWING NO. 9 OF 9.

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LICENSE NO. - 46916

REV	DATE	DESCRIPTION	BY
1			
2			
3			
4			
5			

DRAWING TITLE: SECTIONS

PROJECT TITLE: TOMOKA FARMS ROAD LANDFILL
CLASS I CELL
FILL SEQUENCE PLAN

CLIENT: VOLUSIA COUNTY
DEPARTMENT OF PUBLIC WORKS
SOLID WASTE DIVISION
DELAND, FLORIDA

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS
4041 MACDILL BLVD. SUITE 100, TAMPA, FL 33610
813 621-0080 FAX 813 623-6757
FLORIDA CERTIFICATE OF AUTHORIZATION NO. 00004892

PROJ. NO.: 09208007.09
DSN. BY: CEH
DRN. BY: SDA
CHK. BY: CEH
QA/A RVW. BY: RJD
APP. BY: CEH

CADD FILE: 080709CL1CLOSURE
DATE: AUGUST 2009
SCALE: AS SHOWN
DRAWING NO. 4 of 9

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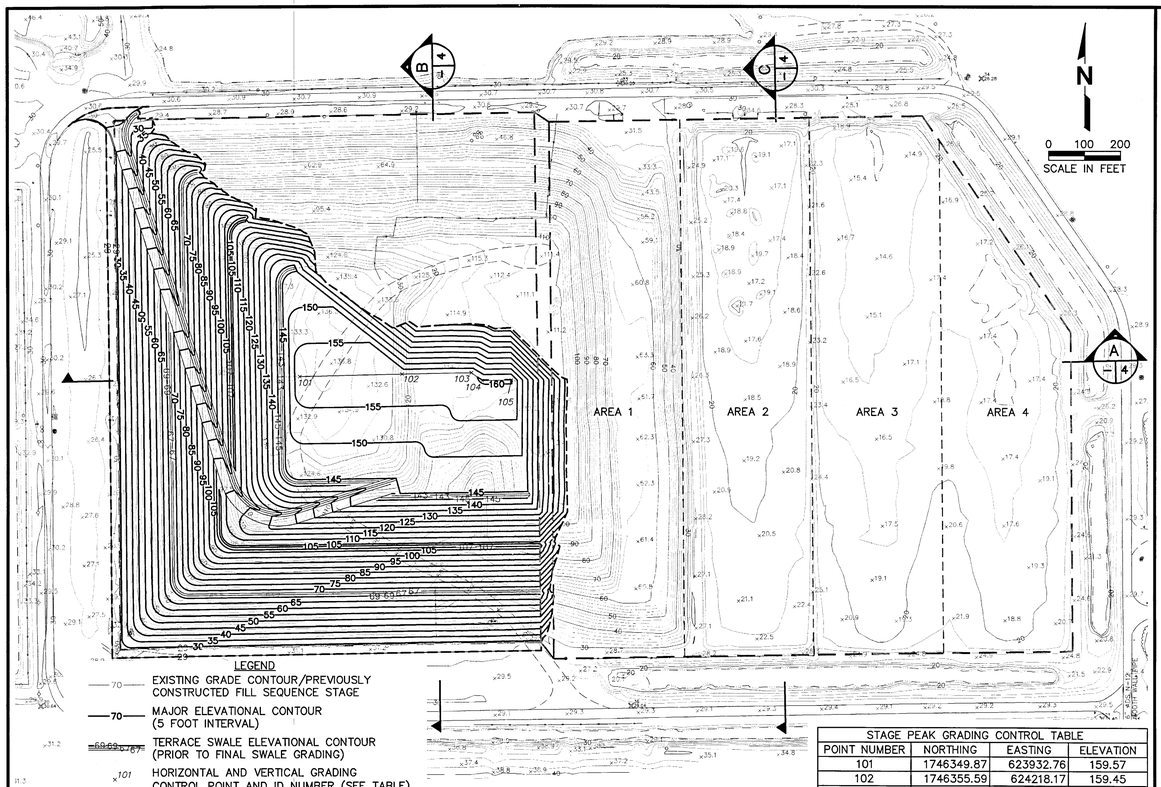
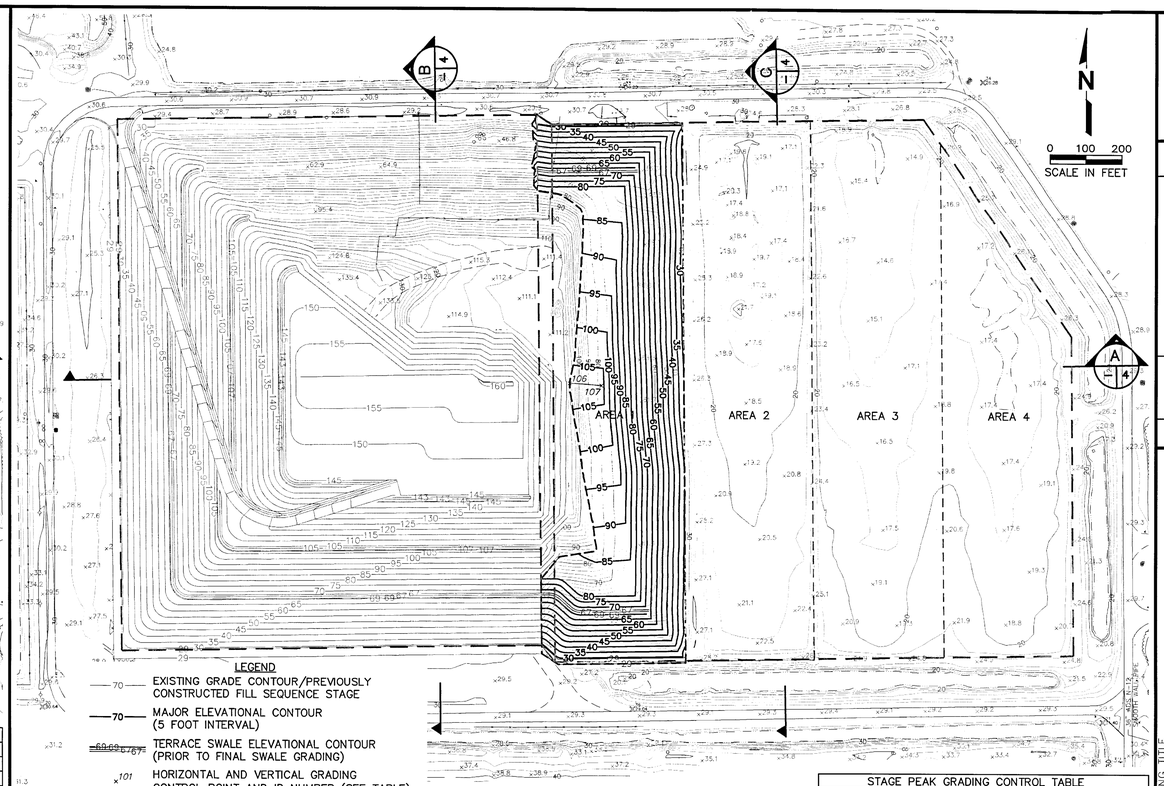


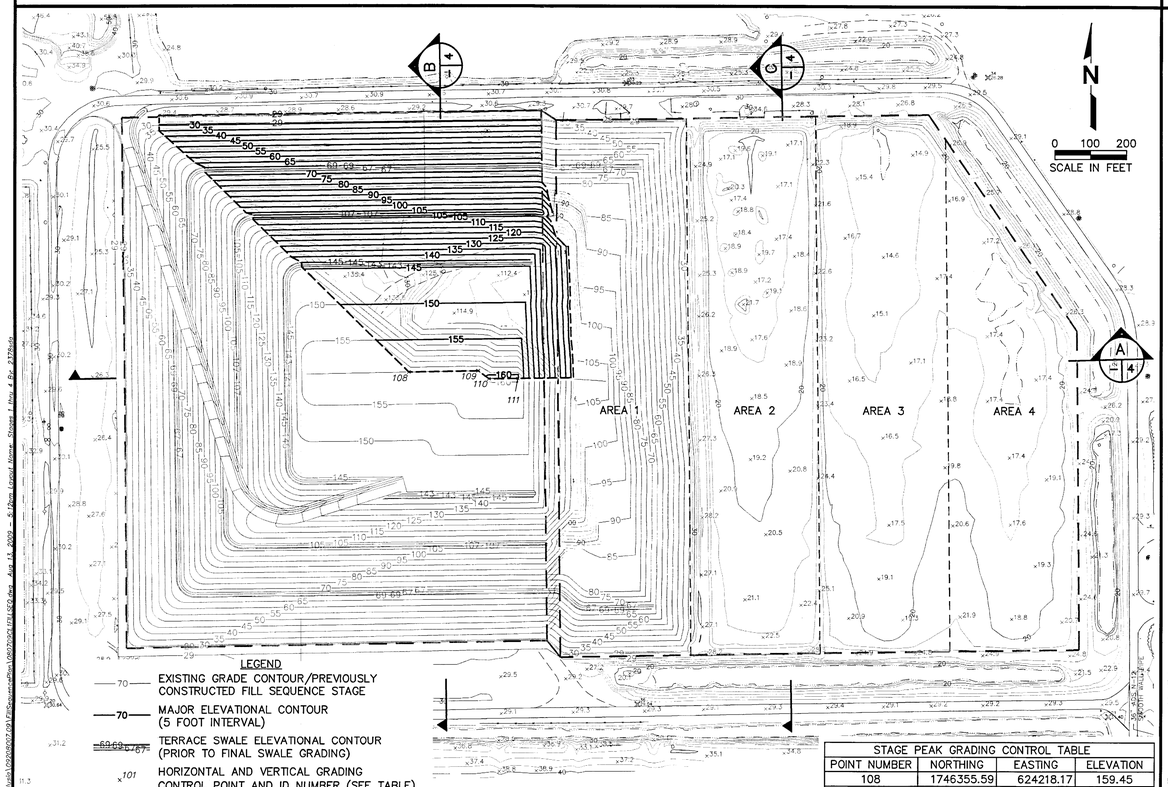
FILL SEQUENCE PLAN - STAGE 1

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
101	1746349.87	623932.76	159.57
102	1746355.59	624218.17	159.45
103	1746358.93	624411.70	159.40
104	1746336.93	624441.91	160.52
105	1746337.87	624522.97	160.52



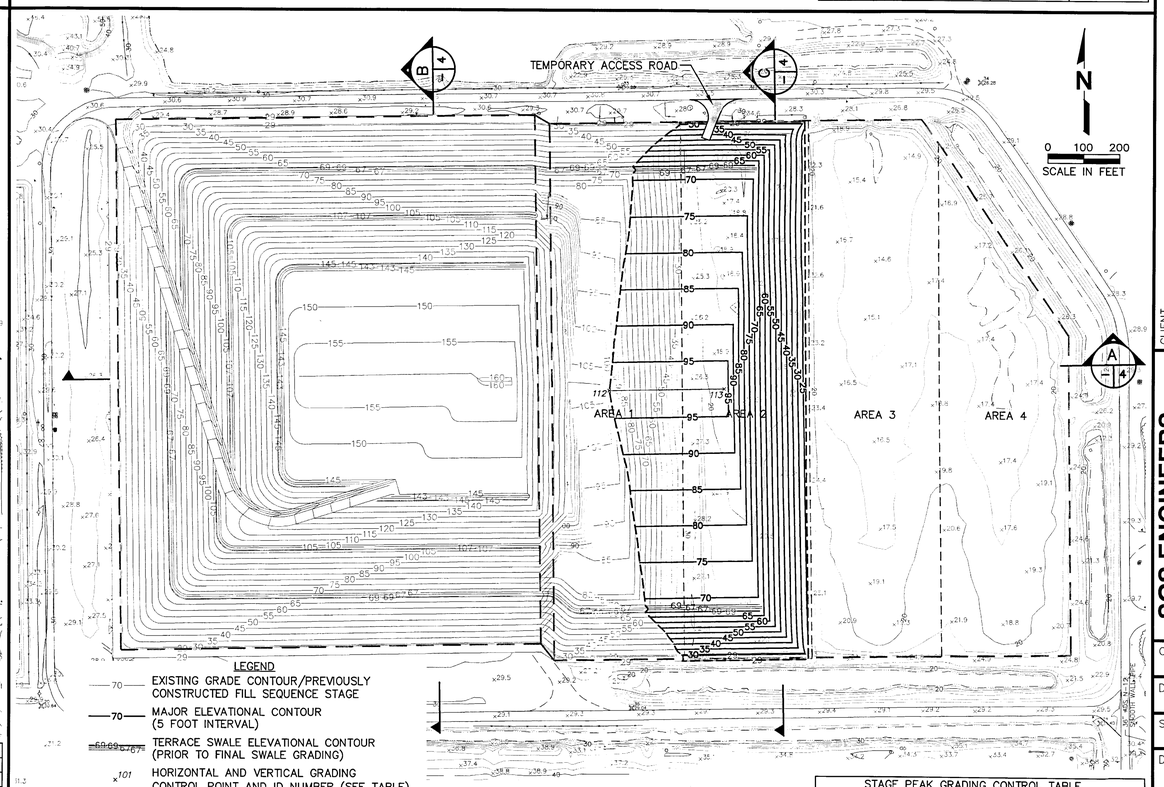
FILL SEQUENCE PLAN - STAGE 2

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
106	1746335.72	624683.24	107.38
107	1746330.10	624771.02	107.39



FILL SEQUENCE PLAN - STAGE 3

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
108	1746355.59	624218.17	159.45
109	1746358.93	624411.70	159.40
110	1746336.93	624441.91	160.52
111	1746337.87	624522.97	160.52



FILL SEQUENCE PLAN - STAGE 4

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
112	1746313.67	624796.92	98.88
113	1746318.46	625123.70	98.82

CHARLES E. HILION, P.E.
LICENSE NO. 46916

REV	DATE	DESCRIPTION	BY

DRAWING TITLE: FILL SEQUENCE PLAN STAGES 1 THRU 4

PROJECT TITLE: TOMOKA FARMS ROAD LANDFILL CLASS I CELL FILL SEQUENCE PLAN

CLIENT: VOLUSIA COUNTY DEPARTMENT OF PUBLIC WORKS SOLID WASTE DIVISION DELAND, FLORIDA

RECEIVED AUG 4 2009 DEP Central Dist.

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS
4041 PARK OAKS BLVD, SUITE 100, TAMPA, FL 33610
813 621-0080 FAX 813 623-6757
FLORIDA CERTIFICATE OF AUTHORIZATION NO. 00004892

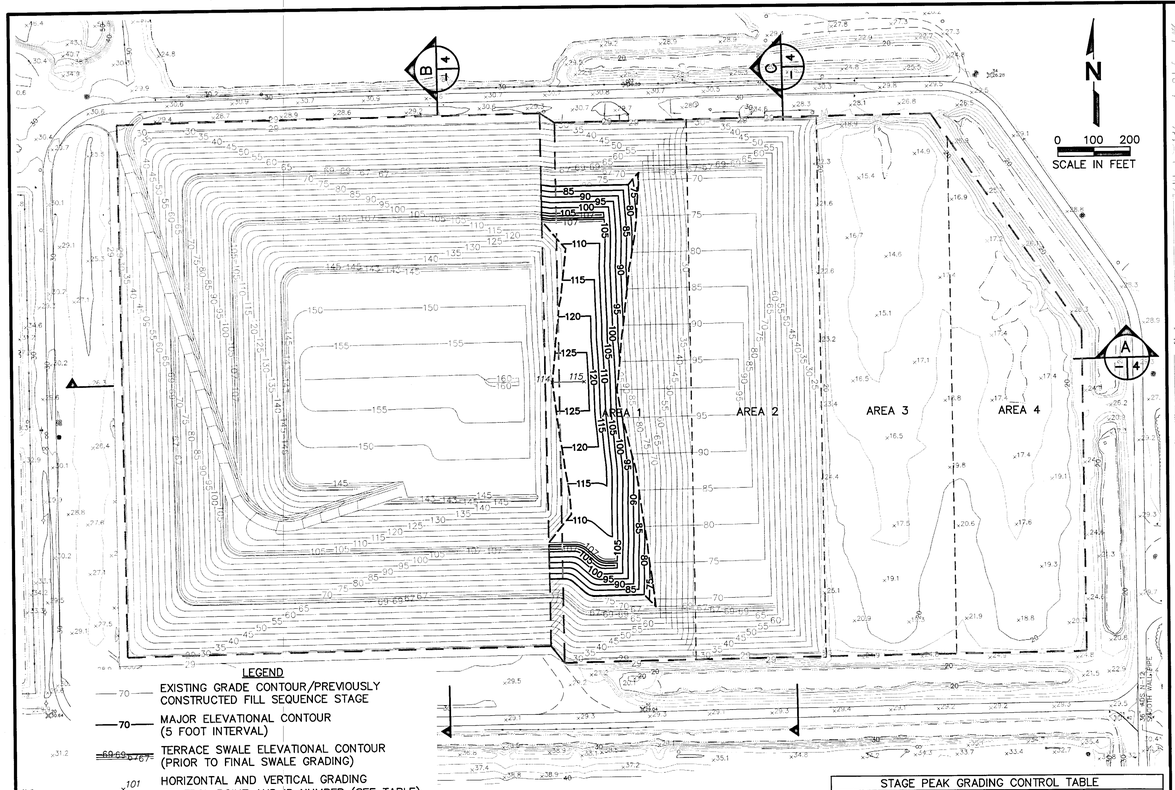
PROJ. NO. 09208007.09 | DSN. BY: CEH | DWN. BY: SDA | CHK. BY: CEH | QA/QC BY: RJD | APP. BY: CEH

CADD FILE: 080709CL1FILLSEQ

DATE: AUGUST 2009

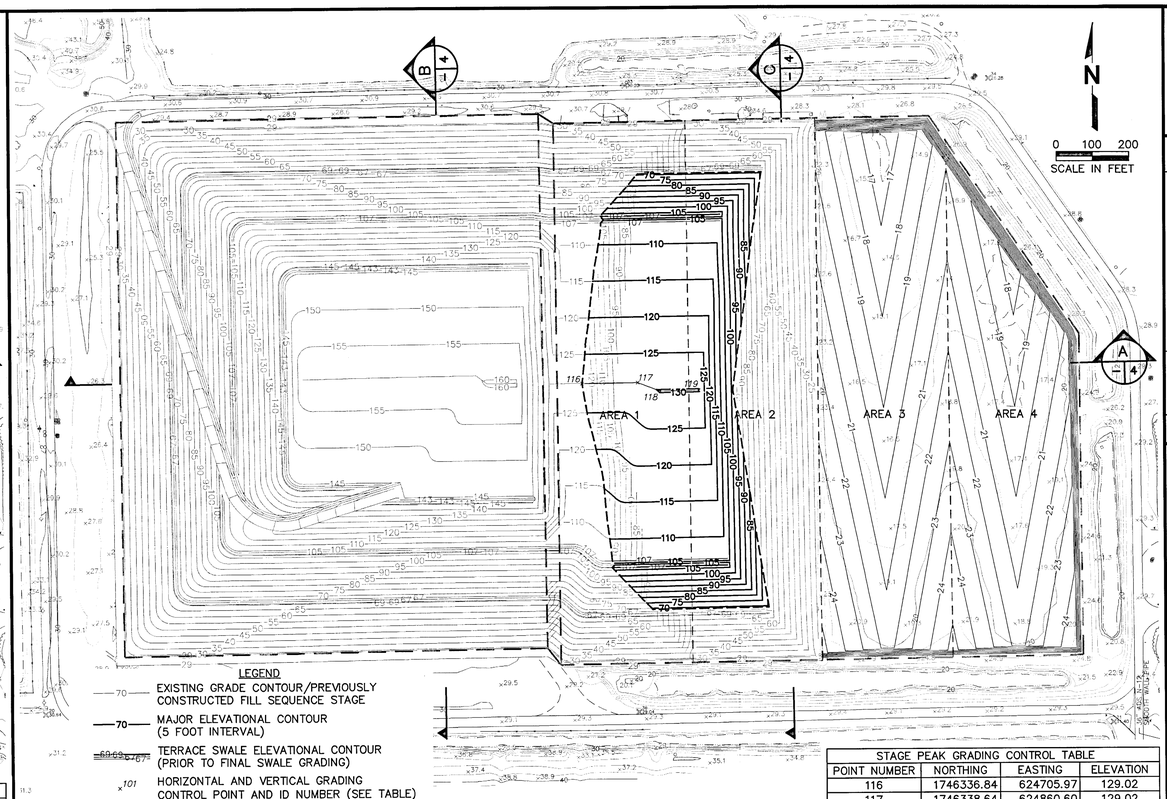
SCALE: AS SHOWN

DRAWING NO. 5 of 9



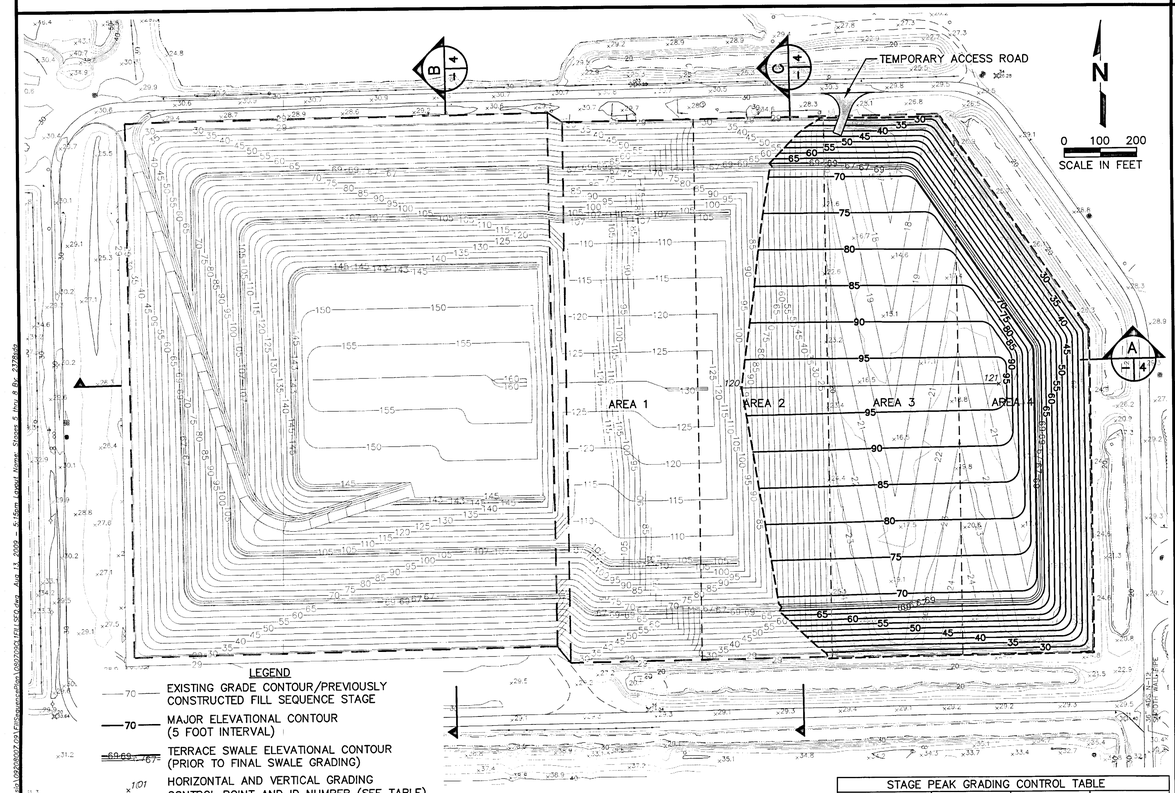
FILL SEQUENCE PLAN - STAGE 5

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
114	1746335.81	624617.53	129.01
115	1746336.84	624705.97	129.02



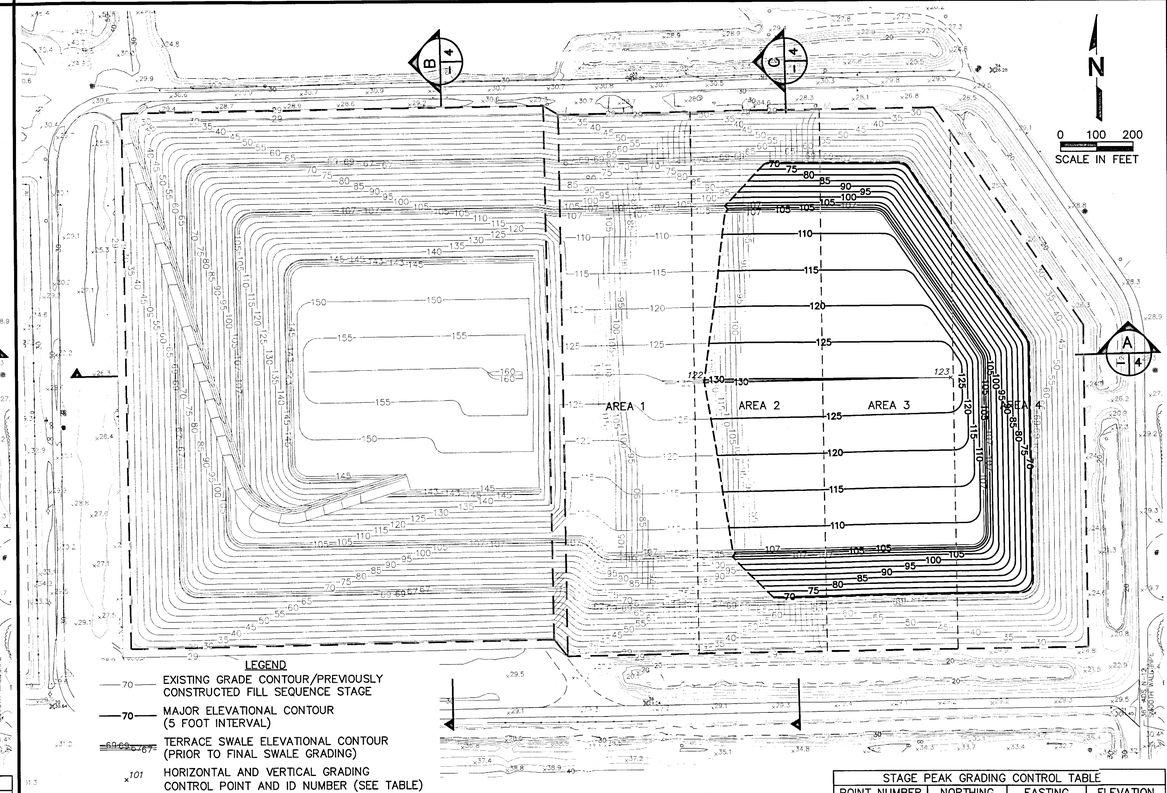
FILL SEQUENCE PLAN - STAGE 6

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
116	1746336.84	624705.97	129.02
117	1746338.64	624860.60	129.02
118	1746315.57	624923.41	130.21
119	1746317.19	625029.61	130.20



FILL SEQUENCE PLAN - STAGE 7

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
120	1746318.46	625123.70	98.82
121	1746326.29	625836.26	98.63



FILL SEQUENCE PLAN - STAGE 8

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
122	1746317.19	625029.61	130.20
123	1746326.26	625717.72	129.96

CHARLES E. HILTON, P.E.
LICENSE NO. 49916

REV	DATE	DESCRIPTION	BY

DRAWING TITLE: FILL SEQUENCE PLAN STAGES 5 THRU 8

PROJECT TITLE: TOMOKA FARMS ROAD LANDFILL CLASS I CELL FILL SEQUENCE PLAN

CLIENT: VOLUSIA COUNTY DEPARTMENT OF PUBLIC WORKS SOLID WASTE DIVISION DELAND, FLORIDA

RECEIVED AUG 14 2009 DEP Central Dist.

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS
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813 621-0080 FAX 813 623-6757
FLORIDA CERTIFICATE OF AUTHORIZATION NO. 00004892

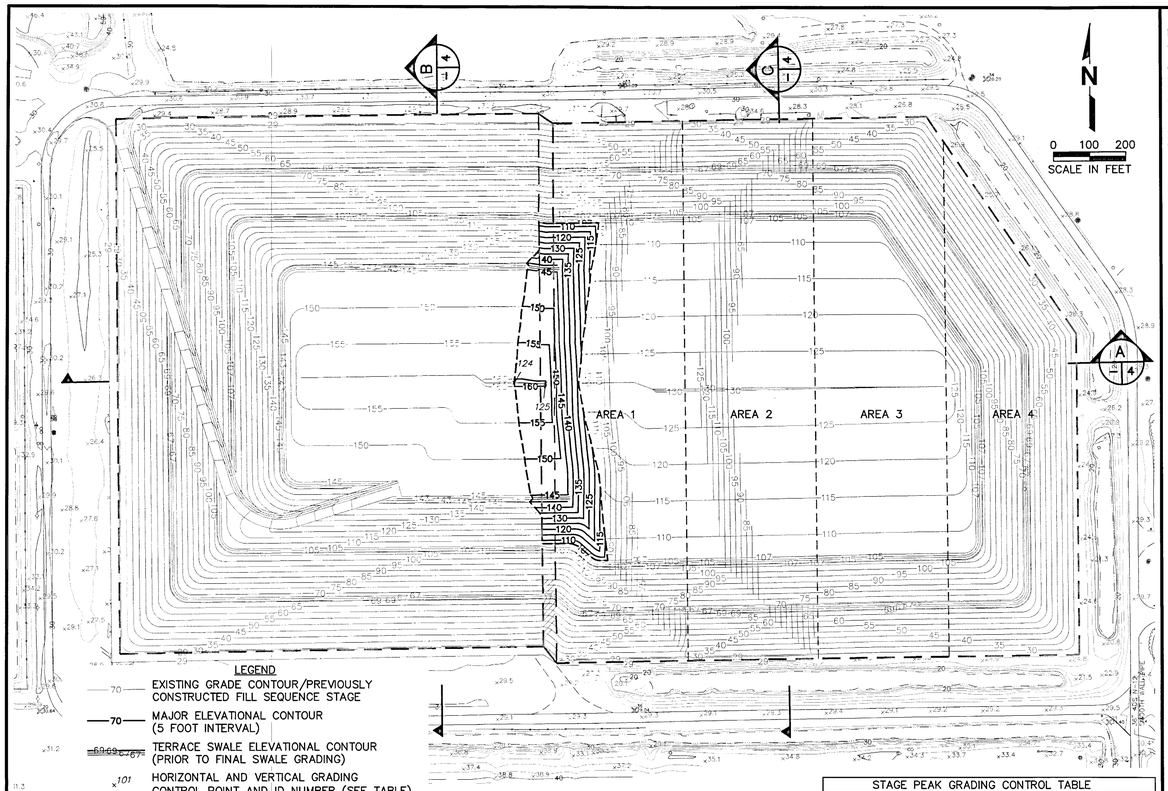
PROJ. NO. 09208007.09 | DWN. BY: SDA | CHK. BY: CEH | QA/A RVW. BY: RJD | APP. BY: CEH | DSN. BY: CEH

CADD FILE: 080709CL1FILLSEQ

DATE: AUGUST 2009

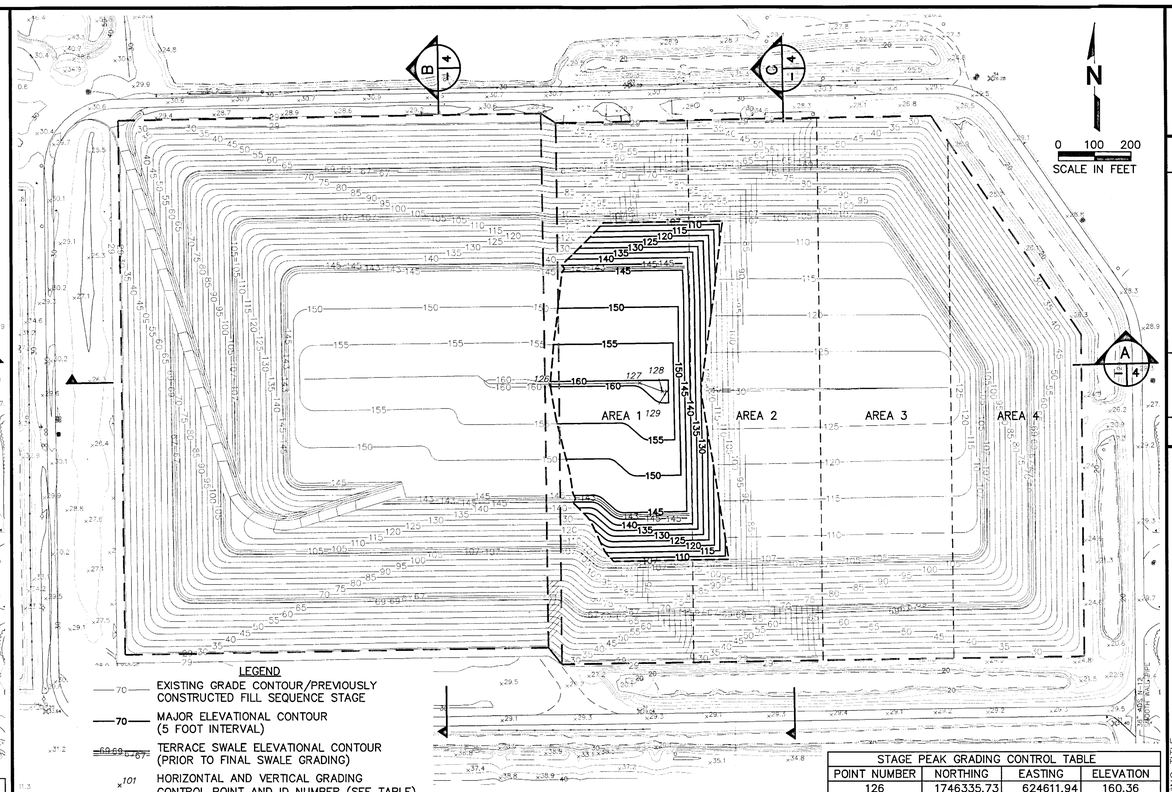
SCALE: AS SHOWN

DRAWING NO. 6 of 9



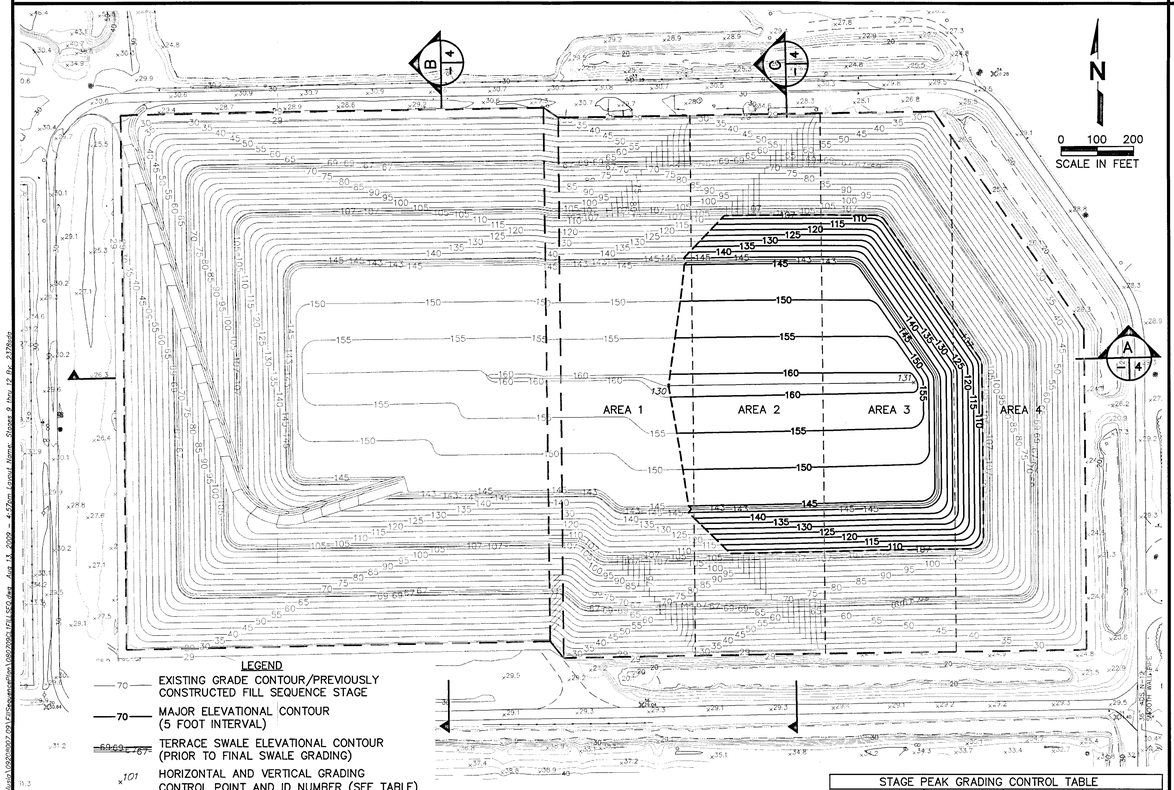
FILL SEQUENCE PLAN - STAGE 9

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
124	1746337.87	624522.97	160.52
125	1746335.73	624611.94	160.36



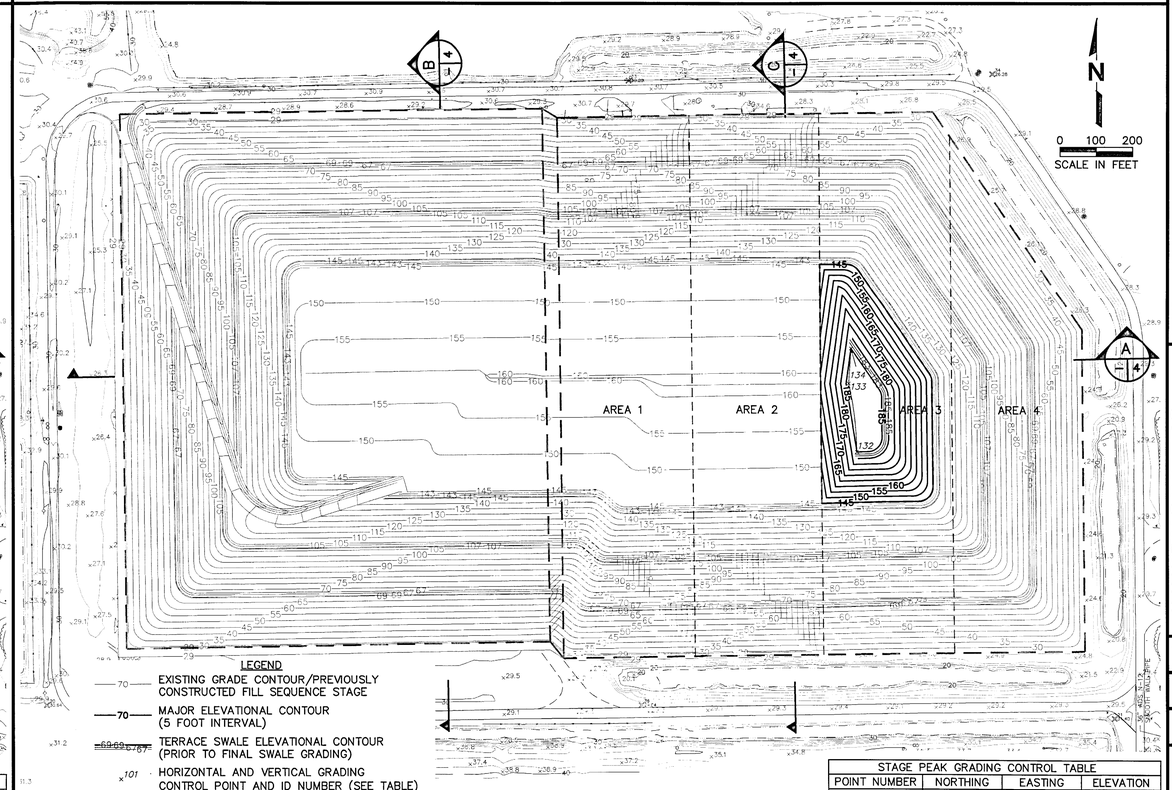
FILL SEQUENCE PLAN - STAGE 10

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
126	1746335.73	624611.94	160.36
127	1746338.64	624860.62	160.37
128	1746315.57	624923.41	161.56
129	1746315.75	624935.55	161.56



FILL SEQUENCE PLAN - STAGE 11

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
130	1746315.75	624935.55	161.56
131	1746324.95	625613.67	161.36



FILL SEQUENCE PLAN - STAGE 12

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
132	1746134.40	625462.84	185.00
133	1746322.43	625440.04	187.41
134	1746419.10	625446.35	185.00

CHARLES E. HILTON, P.E.
LICENSE NO. 46916

REV	DATE	DESCRIPTION	BY

DRAWING TITLE: FILL SEQUENCE PLAN STAGES 9 THRU 12

PROJECT TITLE: TOMOKA FARMS ROAD LANDFILL CLASS I CELL FILL SEQUENCE PLAN

CLIENT: VOLUSIA COUNTY DEPARTMENT OF PUBLIC WORKS SOLID WASTE DIVISION DELAND, FLORIDA

RECEIVED AUG 14 2009 DEP Central Dist.

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS
4041 PARK OAKS BLVD., SUITE 100, TAMPA, FL 33610
813 621-0080 FAX 813 882-8157
FLORIDA CERTIFICATE OF AUTHORIZATION NO. 00004892

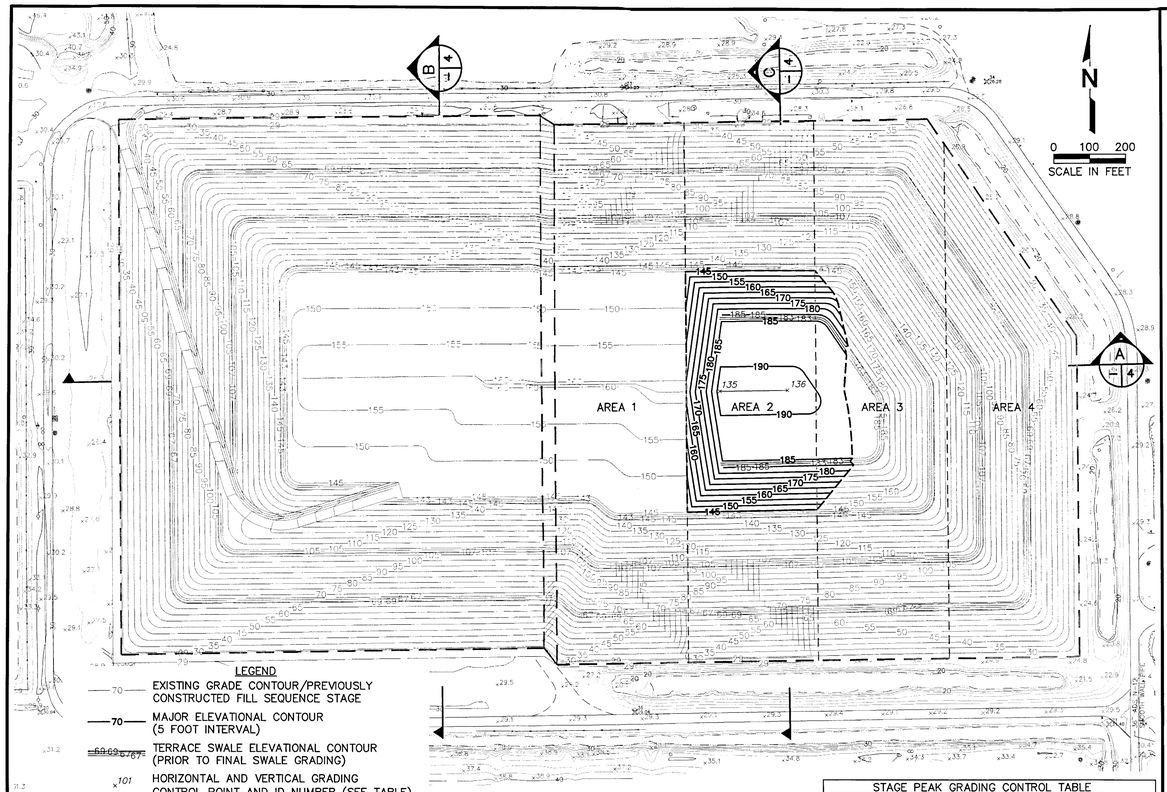
PROJECT NO. 09208007.09 | DWN: BY: SDA | CHK: BY: CEH | O/A REV: RJD | APP: BY: CEH | DSN: BY: CEH

CADD FILE: 080709CL1FILLSEQ

DATE: AUGUST 2009

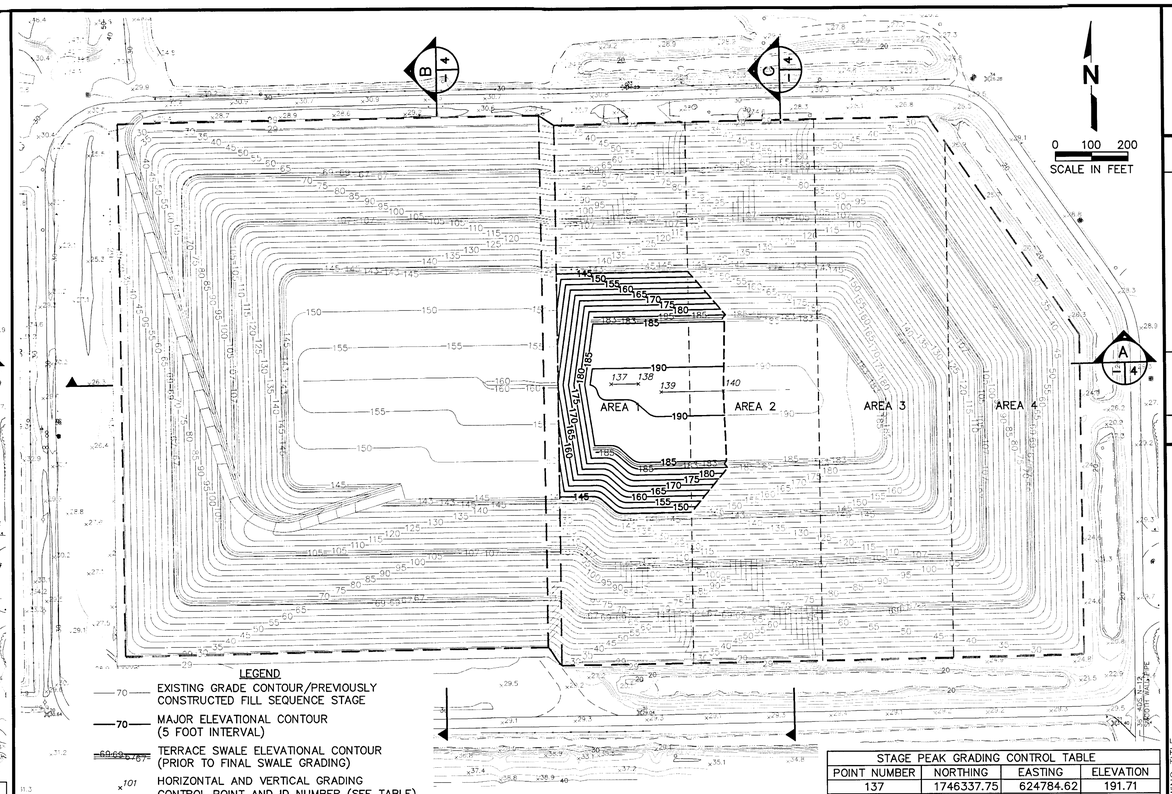
SCALE: AS SHOWN

DRAWING NO. 7 of 9



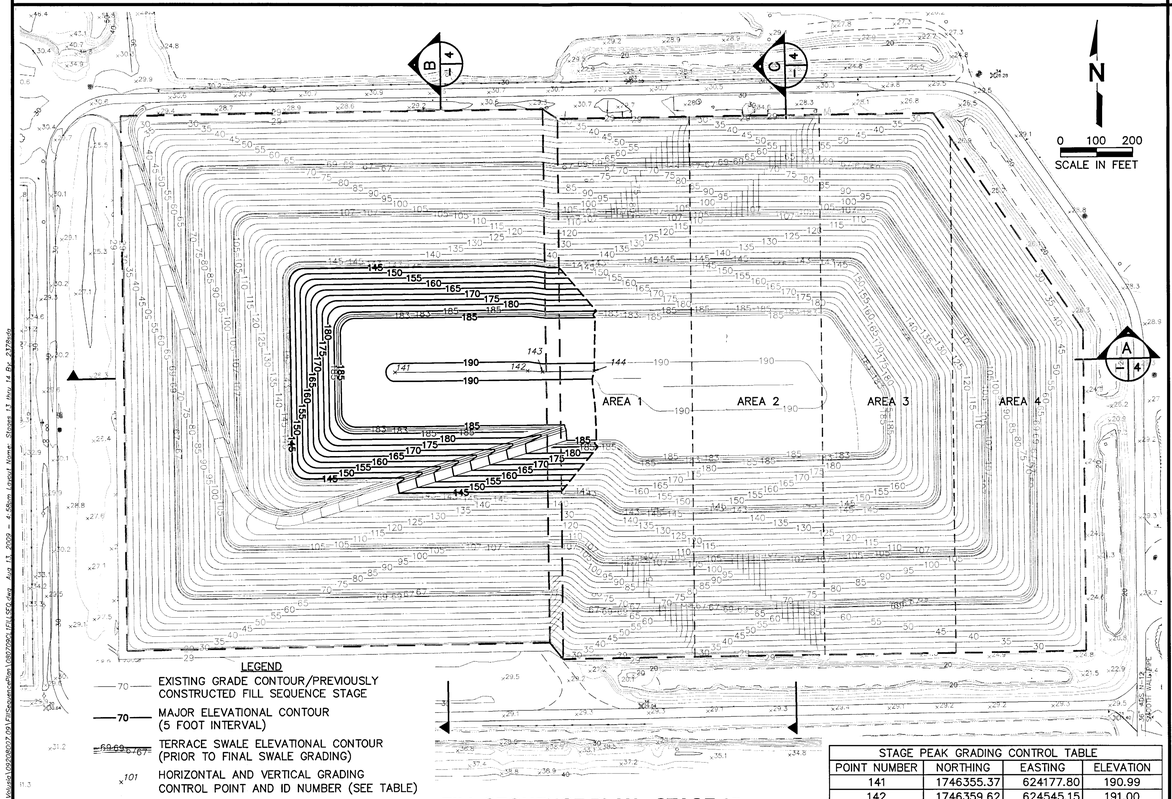
FILL SEQUENCE PLAN - STAGE 13

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
135	1746318.07	625095.66	192.67
136	1746320.77	625282.20	192.64



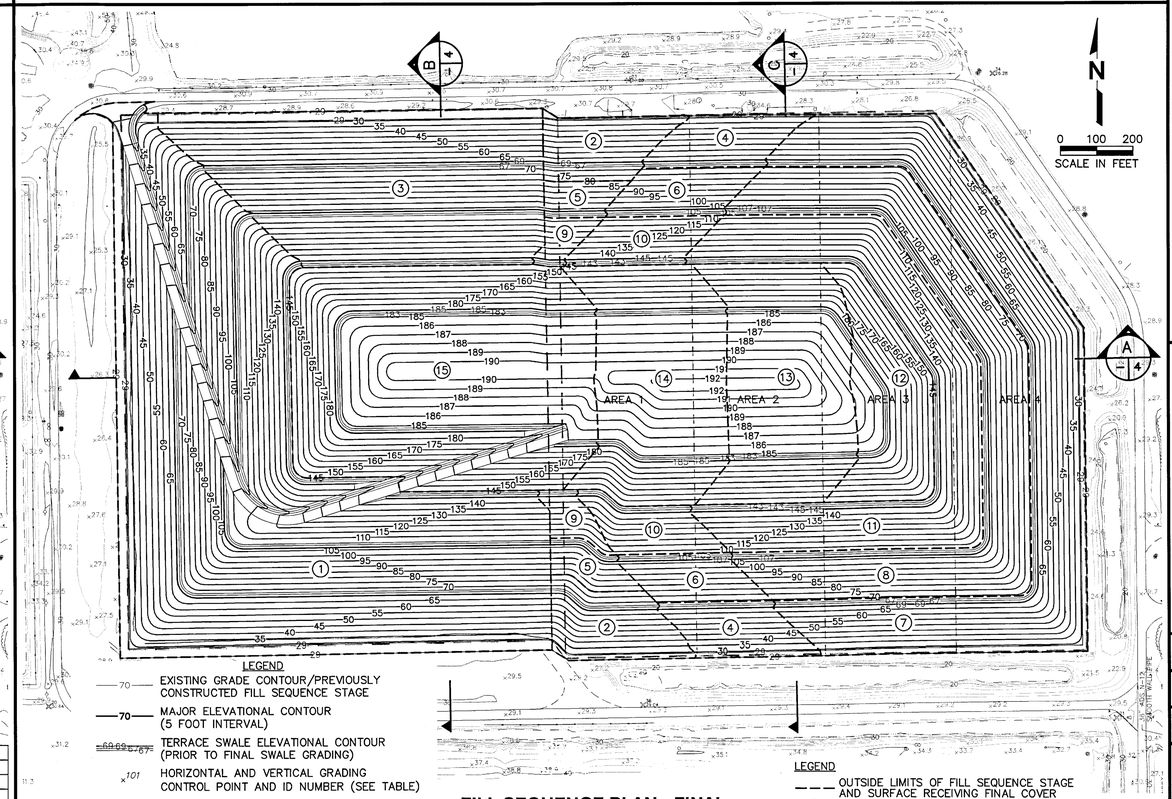
FILL SEQUENCE PLAN - STAGE 14

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
137	1746337.75	624784.62	191.71
138	1746338.64	624860.62	191.73
139	1746315.57	624923.41	192.69
140	1746318.07	625095.66	192.67



FILL SEQUENCE PLAN - STAGE 15

STAGE PEAK GRADING CONTROL TABLE			
POINT NUMBER	NORTHING	EASTING	ELEVATION
141	1746355.37	624177.80	190.99
142	1746359.62	624545.15	191.00
143	1746356.95	624587.37	190.87
144	1746358.62	624731.68	190.87



FILL SEQUENCE PLAN - FINAL

CHARLES E. HILTON, P.E.
LICENSE NO.: 46916

REV	DATE	DESCRIPTION	BY

DRAWING TITLE: FILL SEQUENCE PLAN STAGES 13 THRU 15

PROJECT TITLE: TOMOKA FARMS ROAD LANDFILL CLASS I CELL FILL SEQUENCE PLAN

RECEIVED
AUG 4 2009
DEP Central District

VOLUSIA COUNTY
DEPARTMENT OF PUBLIC WORKS
SOLID WASTE DIVISION
DELAND, FLORIDA

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS
4041 PARK OAKS BLVD, SUITE 100, TAMPA, FL 33610
813 621-0080 FAX 813 623-5757
FLORIDA CERTIFICATE OF AUTHORIZATION NO. 00004892

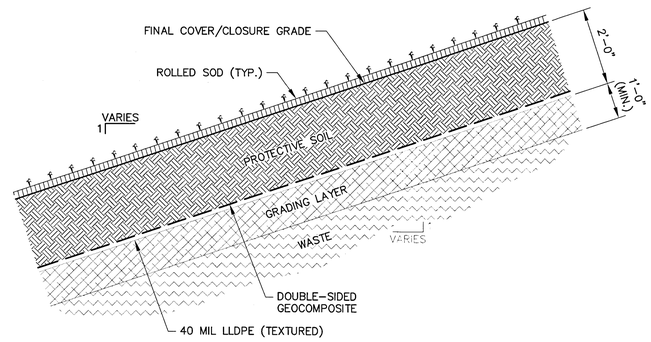
PROJ. NO. 09208007.09 | DWN. BY: SDA | CHK. BY: CEH | Q/A RVW. BY: CEH | APP. BY: CEH

CADD FILE: 080709CL1FILLSEQ

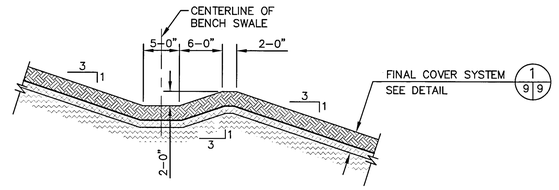
DATE: AUGUST 2009

SCALE: AS SHOWN

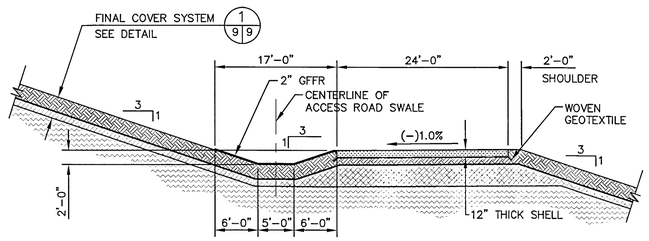
DRAWING NO. 8 of 9



FINAL COVER DETAIL (1 / 3,9 | 9)
SCALE: 1" = 2'



BENCH SWALE DETAIL (2 / 3 | 9)
SCALE: 1" = 10'



ACCESS ROAD DETAIL (3 / 3 | 9)
SCALE: 1" = 10'

RECEIVED
AUG 14 2009
DEP Central Dist.

REV	DATE	DESCRIPTION	BY
1			
2			
3			
4			
5			

CHARLES E. HILTON, P.E.
LICENSE NO. 46916
6/13/09

DRAWING TITLE: **DETAILS**

PROJECT TITLE: **TOMOKA FARMS ROAD LANDFILL**
CLASS I CELL
FILL SEQUENCE PLAN

CLIENT
VOLUSIA COUNTY
DEPARTMENT OF PUBLIC WORKS
SOLID WASTE DIVISION
DELAND, FLORIDA

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS
4041 PARK OAKS BLVD., SUITE 100, TAMPA, FL 33610
813 621-0080 FAX 813 623-6757
FLORIDA CERTIFICATE OF AUTHORIZATION NO. 00004892

PROJ. NO.	DWN. BY	Q/A REVIEW BY	
09208007.09	SDA	RJD	
DATE	CHK. BY	APP. BY	
AUG '09	CEH	CEH	

CADD FILE: 080709DETAILS
DATE: AUGUST 2009
SCALE: AS SHOWN
DRAWING NO. **9** of **9**

G:\2009\FC11\Volusia\09208007.09\CAD\plotted\Set\080709DETAILS.dwg, Aug 13, 2009 - 3:48pm, Layout Name: DETAILS Rv. 2378eg

TOMOKA FARMS ROAD LANDFILL

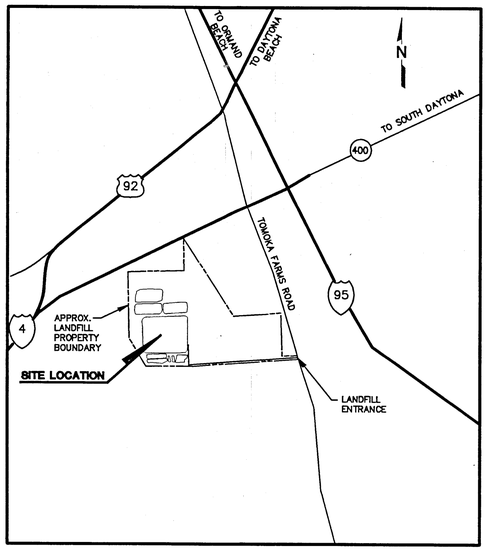
LANDFILL GAS RECOVERY SYSTEM

VOLUSIA COUNTY, FLORIDA

JUNE 19, 1996

NEO TOMOKA FARMS L.L.C.

MINNEAPOLIS, MINNESOTA



4000 2000 0 2000 4000
APPROX. SCALE IN FEET

LOCATION MAP

DRAWING INDEX

DRAWING NO.		DRAWING TITLE
1	-	COVER SHEET
2	-	EXISTING CONDITIONS
3	-	SITE PLAN
4	-	DETAILS - 1
5	-	DETAILS - 2
6	-	DETAILS - 3
7	-	DETAILS - 4
8	-	DETAILS - 5
9	-	GENERAL SPECIFICATIONS
10	-	GENERAL SPECIFICATIONS
11	-	GENERAL SPECIFICATIONS

FINAL SUBMITTAL

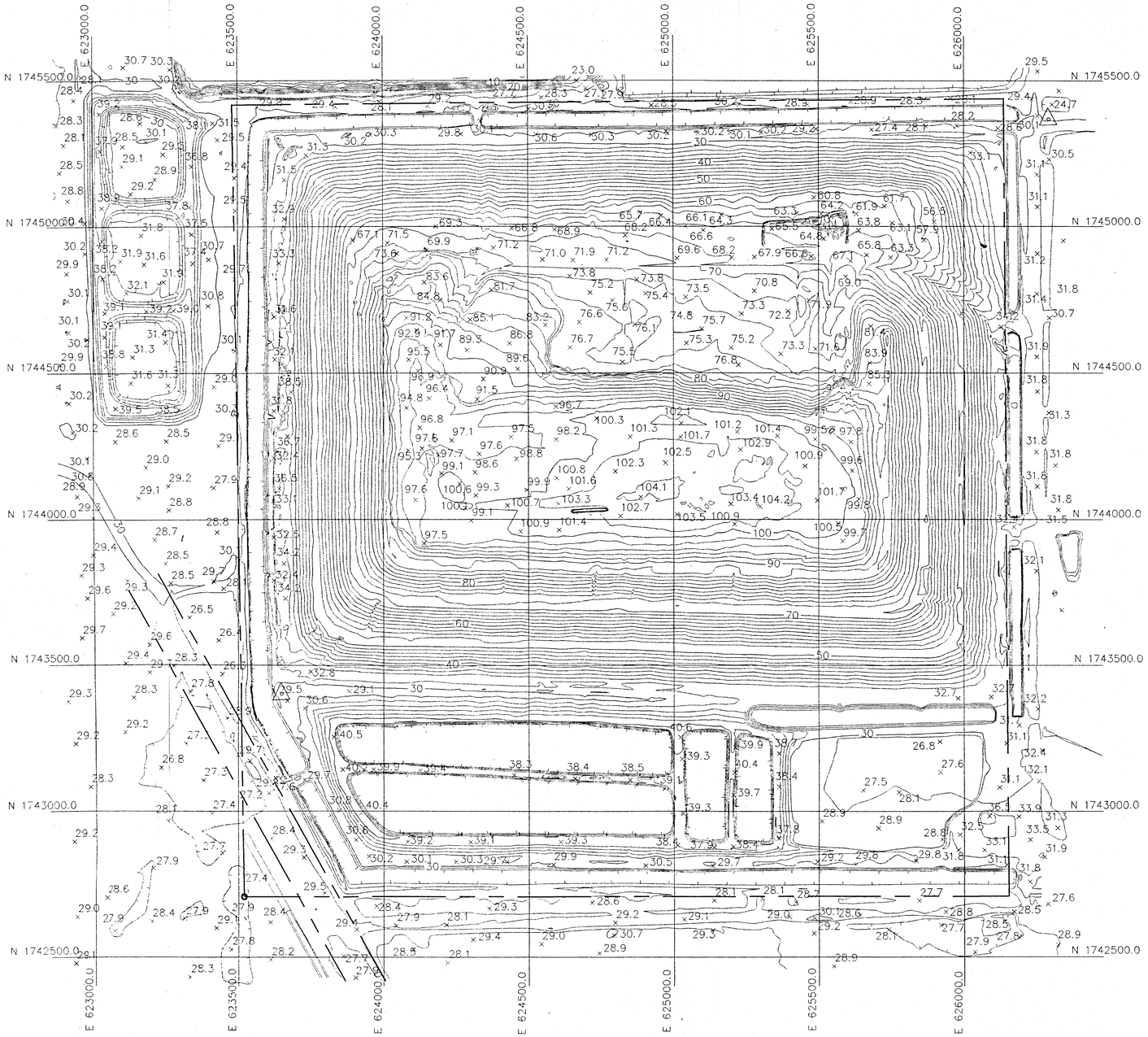
Volusia County Council Members

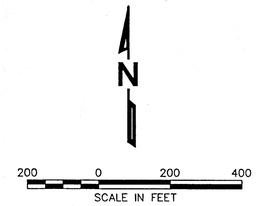
Patrica Northey, District #5, Chairman
R. H. "Pat" Patterson, District #1, Vice-Chairman
Freddye C. Moore, District #3
R. Stanley Rosevear, District #4
Lynne Plaskett, District #2
Robert E. Tuttle, At-Large
Phil Giorno, At-Large

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
3012 U.S. HWY. 301 N. SUITE 700
TAMPA, FLORIDA 33619
(813) 621-0080

JUN 1996
RECEIVED
D.E.P. CENTRAL
DISTRICT

JUN 19 1996





NOTES:
MAPPED BY AEROMAP U.S., INC. FROM PHOTOGRAPHY DATED 09-18-1994 FOR MCKIM & CREED.
THIS MAP CONFORMS TO NATIONAL MAP ACCURACY STANDARDS AS RELATED TO THE PROJECT PHOTO CONTROL FOR SCALES OF 1"= 200' OR SMALLER.
THE VERTICAL ACCURACY IS APPROXIMATELY ONE HALF OF THE CONTOUR INTERVAL SHOWN IN ANY GIVEN AREA ON THE MAP. CONTOURS IN VEGETATED AREAS MAY BE LESS ACCURATE, CONTOURS IN DENSE VEGETATION ARE LIKELY TO BE LESS ACCURATE.

LEGEND

- 28.9 — SPOT ELEVATION
- 30 — ELEVATION CONTOUR (10 FOOT INTERVALS)
- ELEVATION CONTOUR (2 FOOT INTERVALS)
- BENCH MARK

REV.	DATE	DESCRIPTION	CK. BY

JUN 19 1996

DRAWING TITLE: **EXISTING CONDITIONS**

PROJECT TITLE: **TOMOKA FARMS ROAD LANDFILL GAS RECOVERY SYSTEM VOLUSIA COUNTY, FLORIDA**

CLIENT: **NEO TOMOKA FARMS L.L.C. MINNEAPOLIS, MINNESOTA**

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS
302 U.S. HWY. 301 NORTH, SUITE 700, TAMPA, FL 33619
PH (813) 621-0080 FAX NO. (813) 623-4757

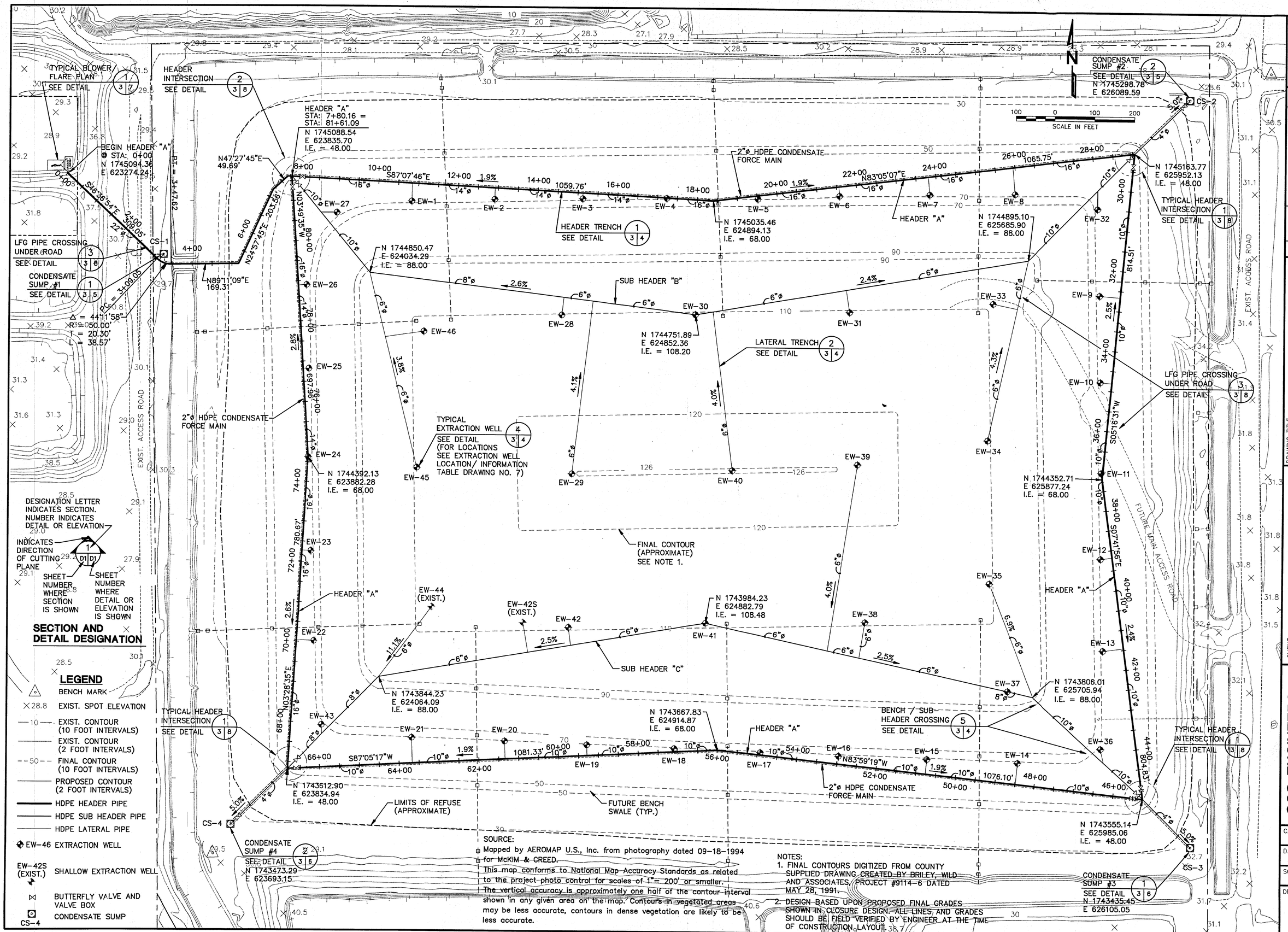
PROJ. NO.	DWN. BY:	CHK. BY:	QA BY:	APP. BY:
09950051.01	GRD	DEP	SMH	DEP
COST/TASK NO.	MAI/GRD			

CADD FILE: LFG\LFGSITE

DATE: JUNE 19, 1996

SCALE: 1"=200'

DRAWING NO. 2 of 11



SOURCE:
Mapped by AEROMAP U.S., Inc. from photography dated 09-18-1994 for McKIM & CREED.
This map conforms to National Map Accuracy Standards as related to the project photo control for scales of 1"= 200' or smaller. The vertical accuracy is approximately one half of the contour interval shown in any given area on the map. Contours in vegetated areas may be less accurate, contours in dense vegetation are likely to be less accurate.

NOTES:
1. FINAL CONTOURS DIGITIZED FROM COUNTY SUPPLIED DRAWING CREATED BY BRILEY, WILD AND ASSOCIATES, PROJECT #9114-6 DATED MAY 28, 1991.
2. DESIGN BASED UPON PROPOSED FINAL GRADES SHOWN IN CLOSURE DESIGN. ALL LINES, AND GRADES SHOULD BE FIELD VERIFIED BY ENGINEER AT THE TIME OF CONSTRUCTION LAYOUT.

JUN 19 1996

REV.	DATE	DESCRIPTION	O/A

DRAWING TITLE: SITE PLAN

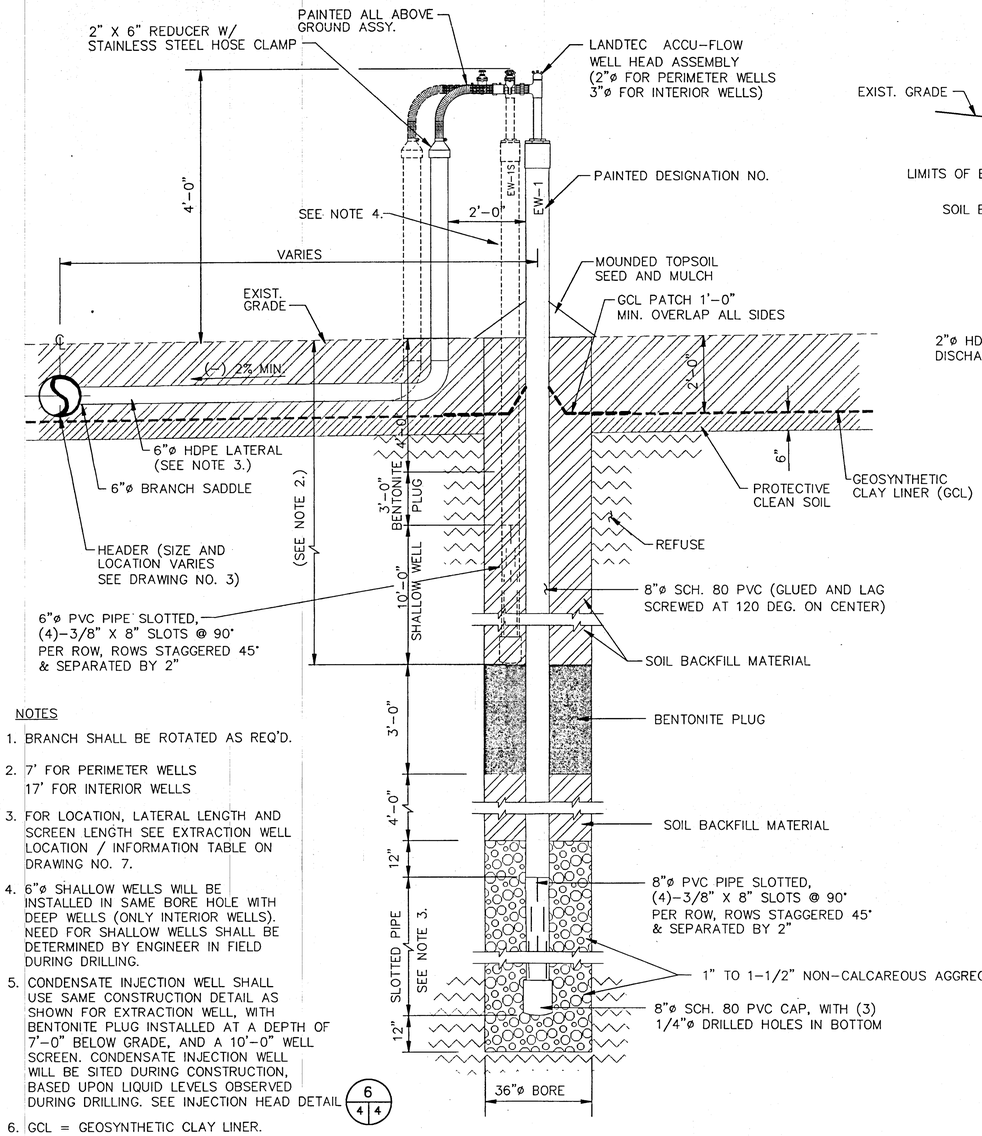
PROJECT TITLE: TOMOKA FARMS ROAD
LANDFILL GAS RECOVERY SYSTEM
VOLUSIA COUNTY, FLORIDA

CLIENT: NEO TOMOKA FARMS L.L.C.
MINNEAPOLIS, MINNESOTA

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS
3012 U.S. HWY. 301 NORTH, SUITE 700, TAMPA, FL. 33619
PH: (813) 621-0080 FAX NO. (813) 623-6757

O/A BY: SMH
APP. BY: DEP
DWN. BY: GRD
CHK. BY: DEP
PROJ. NO. 0995051.01
DISK NO. MAI/GRD

CADD FILE: LFG\SITE100
DATE: JUNE 19, 1996
SCALE: 1"=100'
DRAWING NO. 3 of 11

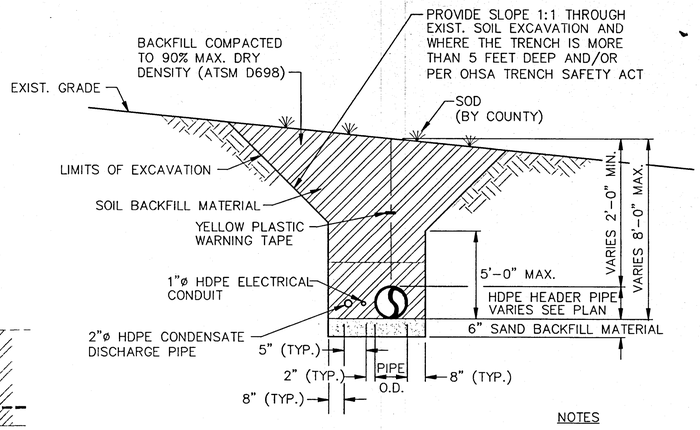


NOTES

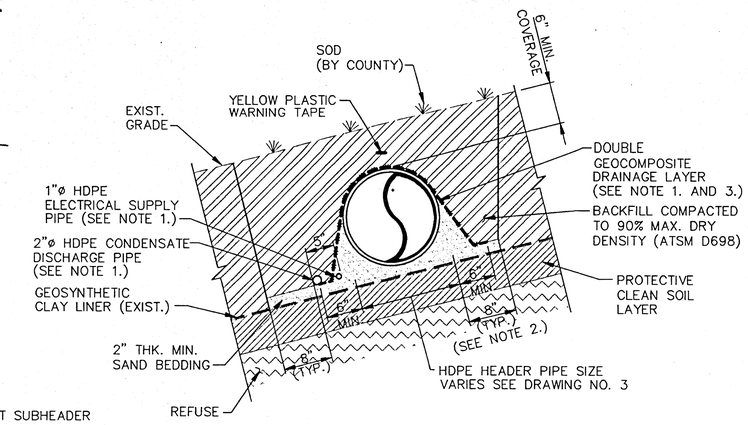
1. BRANCH SHALL BE ROTATED AS REQ'D.
2. 7' FOR PERIMETER WELLS
   17' FOR INTERIOR WELLS
3. FOR LOCATION, LATERAL LENGTH AND SCREEN LENGTH SEE EXTRACTION WELL LOCATION / INFORMATION TABLE ON DRAWING NO. 7.
4. 6"ø SHALLOW WELLS WILL BE INSTALLED IN SAME BORE HOLE WITH DEEP WELLS (ONLY INTERIOR WELLS). NEED FOR SHALLOW WELLS SHALL BE DETERMINED BY ENGINEER IN FIELD DURING DRILLING.
5. CONDENSATE INJECTION WELL SHALL USE SAME CONSTRUCTION DETAIL AS SHOWN FOR EXTRACTION WELL, WITH BENTONITE PLUG INSTALLED AT A DEPTH OF 7'-0" BELOW GRADE, AND A 10'-0" WELL SCREEN. CONDENSATE INJECTION WELL WILL BE SITED DURING CONSTRUCTION, BASED UPON LIQUID LEVELS OBSERVED DURING DRILLING. SEE INJECTION HEAD DETAIL 6/4|4
6. GCL = GEOSYNTHETIC CLAY LINER.

TYPICAL EXTRACTION WELL DETAIL 4/3|4

SCALE: 1/2" = 1'-0"



OFF LANDFILL



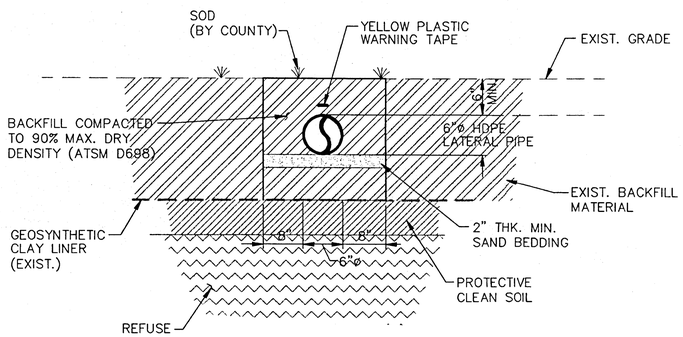
ON LANDFILL

NOTES

1. NOT PRESENT AT SUBHEADER PIPE TRENCH LOCATIONS.
2. MAINTAIN 8" MIN. CLEARANCE BETWEEN PIPE AND TRENCH SIDES.
3. DOUBLE GEOCOMPOSITE ANCHOR REQUIRED OVER HEADER "A" WHERE PIPE SIZE EXCEEDS 12 INCHES IN DIA.

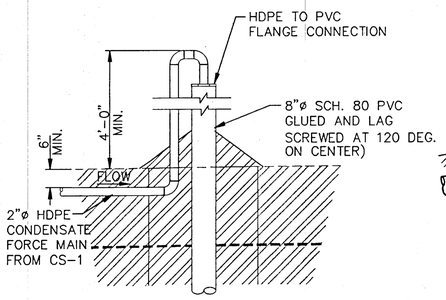
HEADER TRENCH DETAIL 1/3|4

NOT TO SCALE



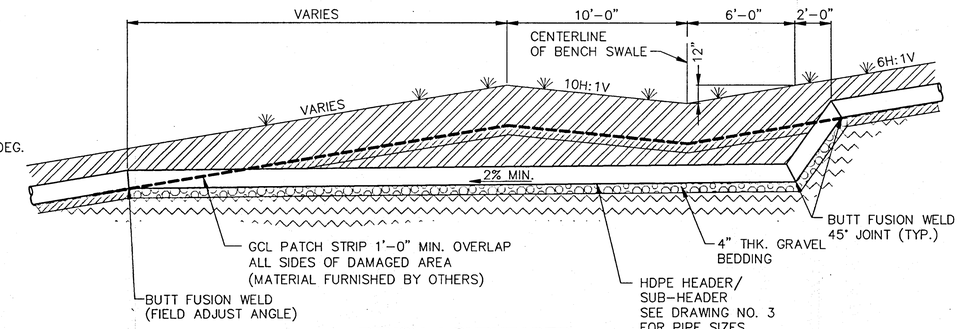
LATERAL TRENCH DETAIL 2/3|4

NOT TO SCALE



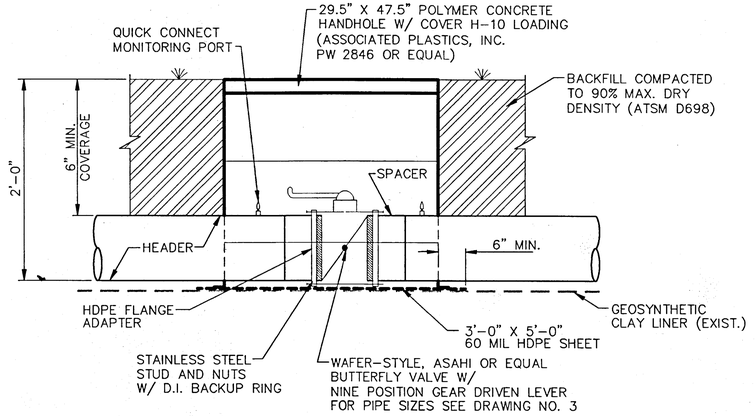
INJECTION WELL HEAD DETAIL 6/4|4

SCALE: 1/2" = 1'-0"



BENCH / SUBHEADER CROSSING DETAIL 5/3|4

SCALE 1/4"=1'-0"



NOTE

CONTRACTOR SHALL ADJUST LOCATION OF VALVE VAULTS TO MINIMIZE DEPTH. ALL FIELD ADJUSTMENTS SHALL BE APPROVED BY ENGINEER.

TYPICAL VALVE VAULT DETAIL 3/8|4

NOT TO SCALE

JUN 19 1996

REV.	DATE	DESCRIPTION	CK. BY

DRAWING TITLE: DETAILS - 1

PROJECT TITLE: TOMOKA FARMS ROAD LANDFILL GAS RECOVERY SYSTEM VOLUSIA COUNTY, FLORIDA

CLIENT: NEO TOMOKA FARMS L.L.C. MINNEAPOLIS, MINNESOTA

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT CONSULTING ENGINEERS
3012 U.S. HWY. 301 NORTH, SUITE 700, TAMPA, FL 33619
PH (813) 621-0080 FAX NO. (813) 623-6757

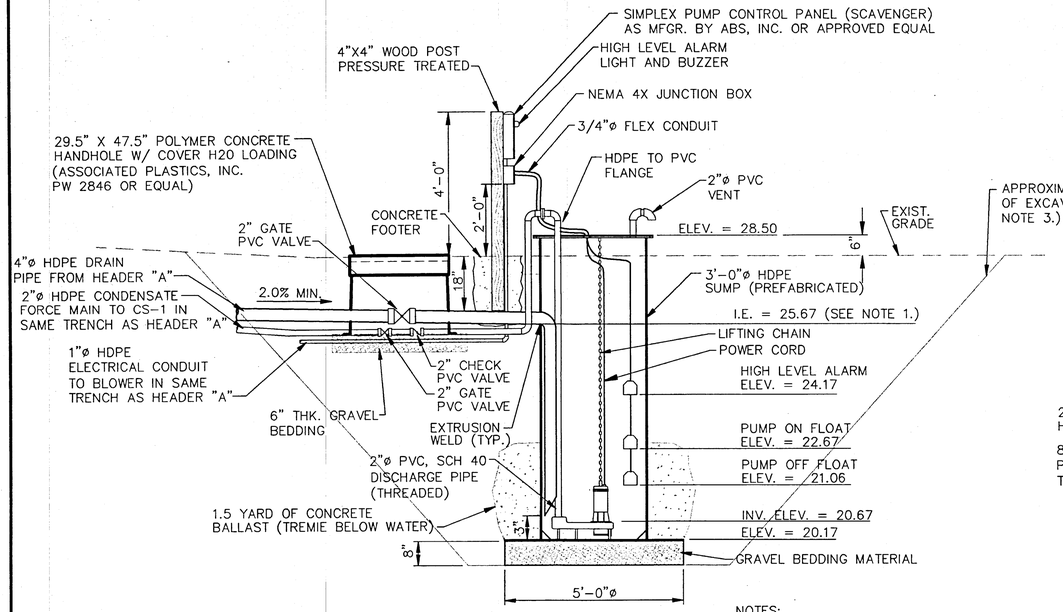
PROJ. NO.	DWN. BY:	CHK. BY:	QA/QC BY:	APP. BY:
0995051.01	GRD	DEP	SMH	DEP
DSN. BY: MAI/GRD				

CADD FILE: LFG\DET1

DATE: JUNE 19, 1996

SCALE: AS SHOWN

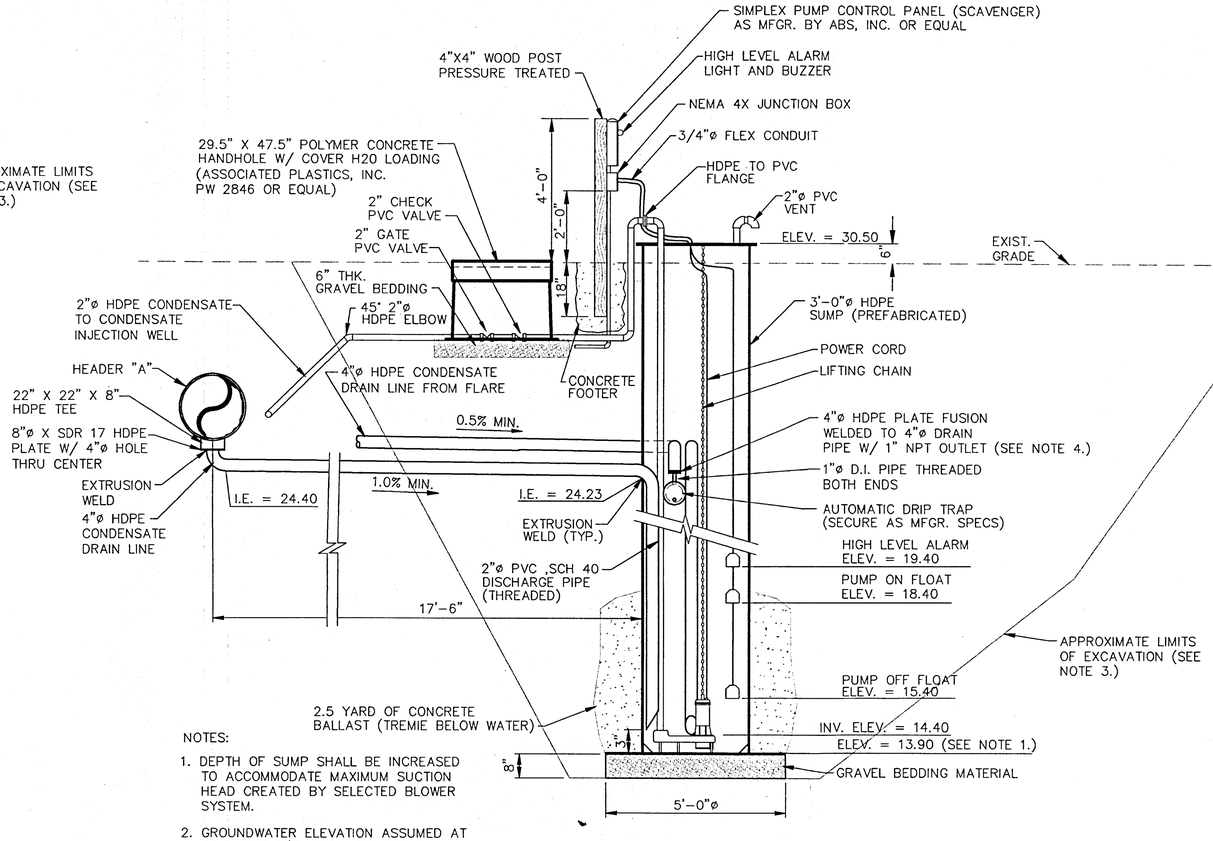
DRAWING NO. 4 of 11



NOTES:

1. 4"ø HDPE DRAIN PIPE SHOWN HIGHER IN ELEVATION FOR CLARITY ONLY.
2. GROUNDWATER ELEVATION ASSUMED AT 26.0 FEET ELEVATION FOR DESIGN.
3. PROCEDURES ARE OPTIONAL CONTRACTOR MAY DRILL OR EXCAVATE FOR SUMP INSTALLATION.

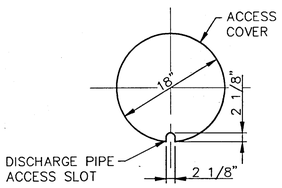
SECTION B (5|5)
SCALE = 1"=2'-0"



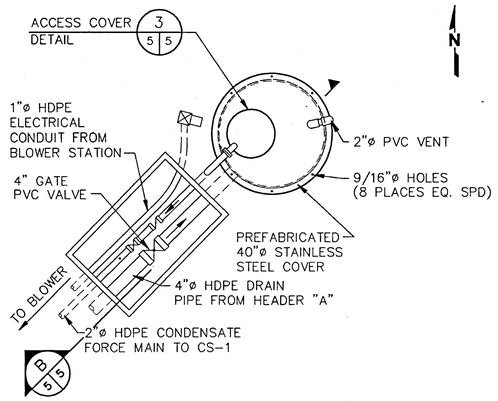
NOTES:

1. DEPTH OF SUMP SHALL BE INCREASED TO ACCOMMODATE MAXIMUM SUCTION HEAD CREATED BY SELECTED BLOWER SYSTEM.
2. GROUNDWATER ELEVATION ASSUMED AT 26.0 FEET ELEVATION FOR DESIGN.
3. PROCEDURES ARE OPTIONAL. CONTRACTOR MAY DRILL OR EXCAVATE FOR SUMP INSTALLATION.
4. NPT = NATIONAL PIPE THREAD.

SECTION A (5|5)
SCALE = 1"=2'-0"

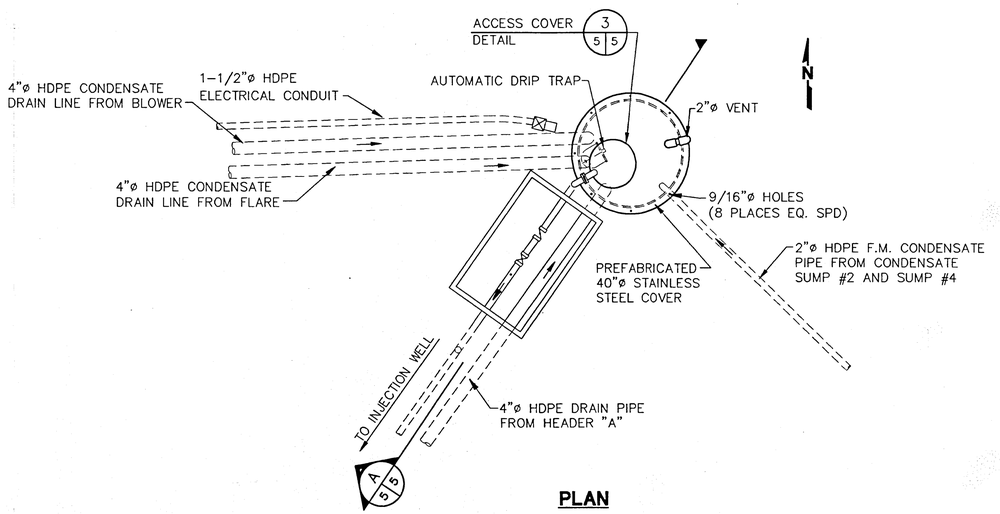


ACCESS COVER DETAIL 3 (5|5)
SCALE = 1"=1'-0"



PLAN

CONDENSATE SUMP #2 2 (3|5)
SCALE = 1"=2'-0"



PLAN

CONDENSATE SUMP #1 1 (3|5)
SCALE = 1"=2'-0"

JUN 19 1996

REV.	DATE	DESCRIPTION	CK. BY

DRAWING TITLE: **DETAILS - 2**

PROJECT TITLE: **TOMOKA FARMS ROAD LANDFILL GAS RECOVERY SYSTEM VOLUSIA COUNTY, FLORIDA**

CLIENT: **NEO TOMOKA FARMS L.L.C. MINNEAPOLIS, MINNESOTA**

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS
3012 U.S. HWY. 301 NORTH, SUITE 700, TAMPA, FL 33619
PH (813) 621-0080 FAX NO. (813) 623-6757

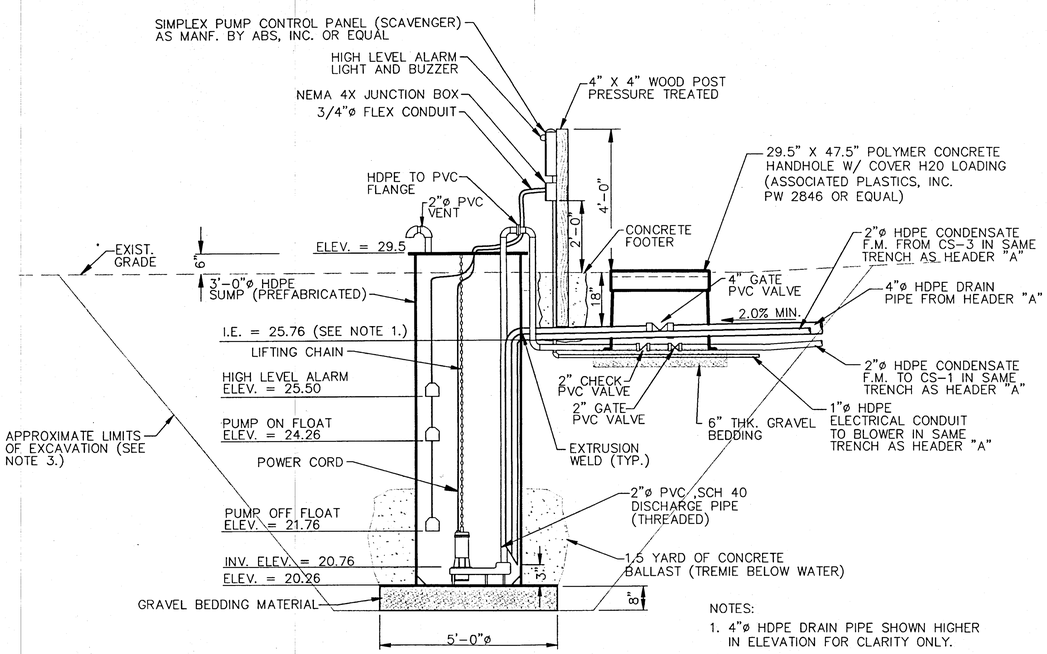
PROJ. NO.	DSN. BY:	DWN. BY:	CHK. BY:	Q/A REV BY:	APP. BY:
0995051.01	MAJ/GRD	GRD	DEP	SMH	DEP

CADD FILE: LFG\DET2

DATE: JUNE 19, 1996

SCALE: AS SHOWN

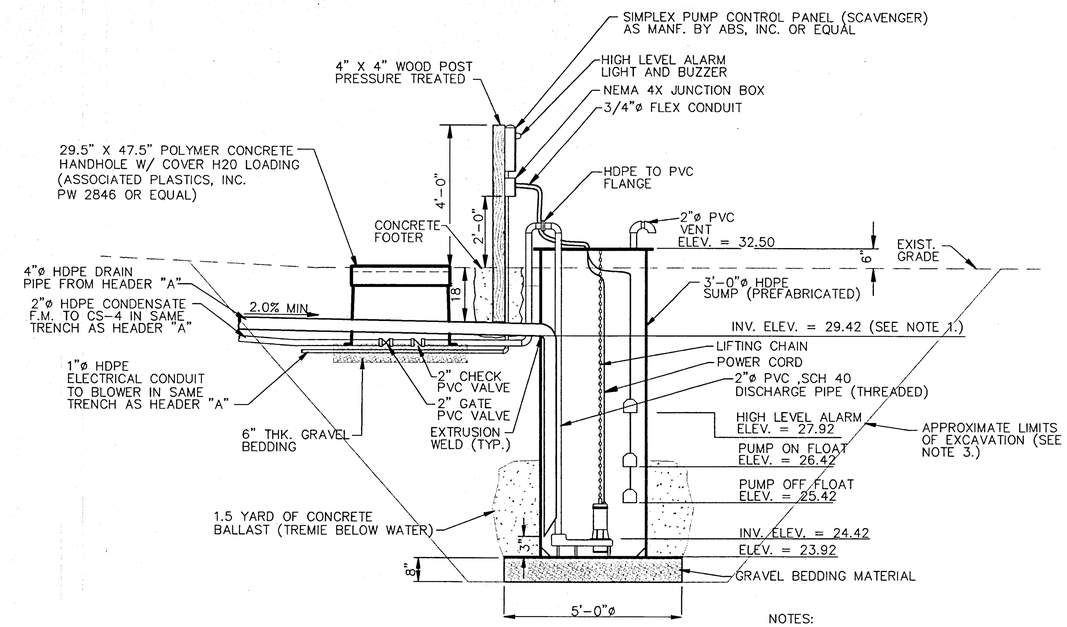
DRAWING NO. 5 of 7



NOTES:

1. 4"ø HDPE DRAIN PIPE SHOWN HIGHER IN ELEVATION FOR CLARITY ONLY.
2. GROUNDWATER ELEVATION ASSUMED AT 26.0 FEET ELEVATION FOR DESIGN.
3. PROCEDURES ARE OPTIONAL CONTRACTOR MAY DRILL OR EXCAVATE FOR SUMP INSTALLATION

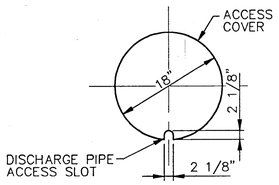
SECTION (B / 6|6)
SCALE = 1"=2'-0"



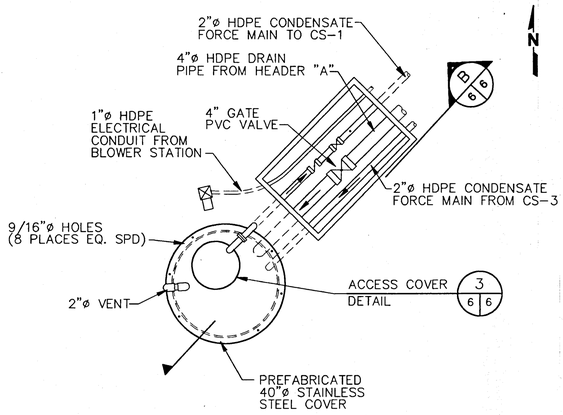
NOTES:

1. 4"ø HDPE DRAIN PIPE SHOWN HIGHER IN ELEVATION FOR CLARITY ONLY.
2. GROUNDWATER ELEVATION ASSUMED AT 26.0 FEET ELEVATION FOR DESIGN.
3. PROCEDURES ARE OPTIONAL CONTRACTOR MAY DRILL OR EXCAVATE FOR SUMP INSTALLATION

SECTION (A / 6|6)
SCALE = 1"=2'-0"



ACCESS COVER DETAIL (3 / 6|6)
SCALE = 1"=1'-0"



PLAN

CONDENSATE SUMP #4 (2 / 3|6)
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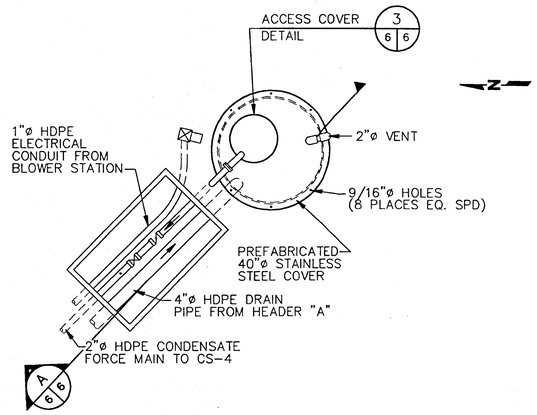


PLAN

CONDENSATE SUMP #3 (1 / 3|6)
SCALE = 1"=2'-0"

JUN 19 1996

REV.	DATE	DESCRIPTION	CK. BY

DRAWING TITLE: **DETAILS - 3**

PROJECT TITLE: **TOMOKA FARMS ROAD LANDFILL GAS RECOVERY SYSTEM VOLUSIA COUNTY, FLORIDA**

CLIENT: **NEO TOMOKA FARMS L.L.C. MINNEAPOLIS, MINNESOTA**

SCS ENGINEERS
STEARNS, CONRAD AND SCHMIDT
CONSULTING ENGINEERS
3012 U.S. HWY. 301 NORTH, SUITE 700, TAMPA, FL 33619
PH (813) 621-0080 FAX NO. (813) 623-6757

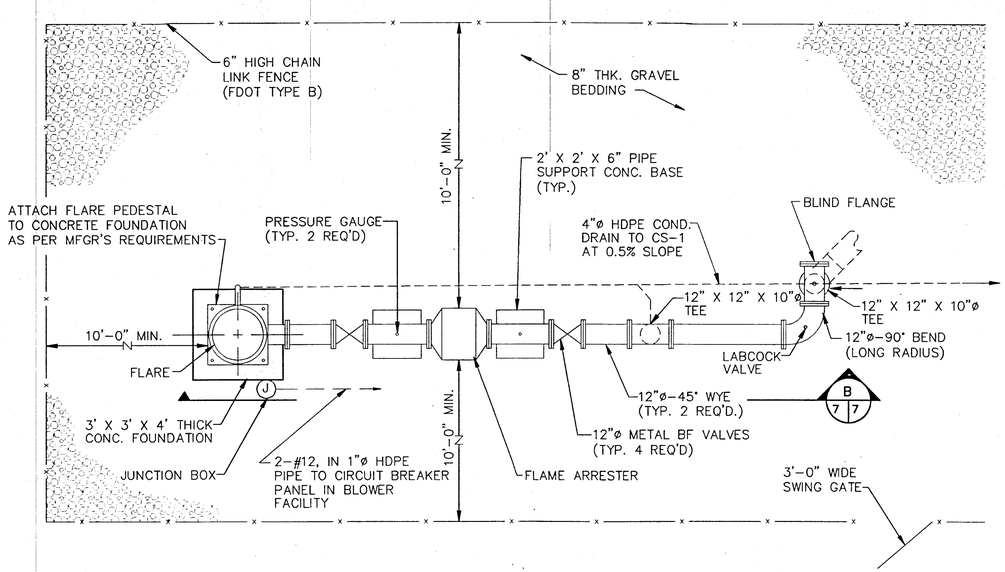
PROJ. NO. 0995051.01 | DWN. BY: GRD | CHK. BY: DEP | D/A RVW. BY: SMH | APP. BY: DEP
DSN. BY: MAJ/GRD

CADD FILE: LFG\DET3

DATE: JUNE 19, 1996

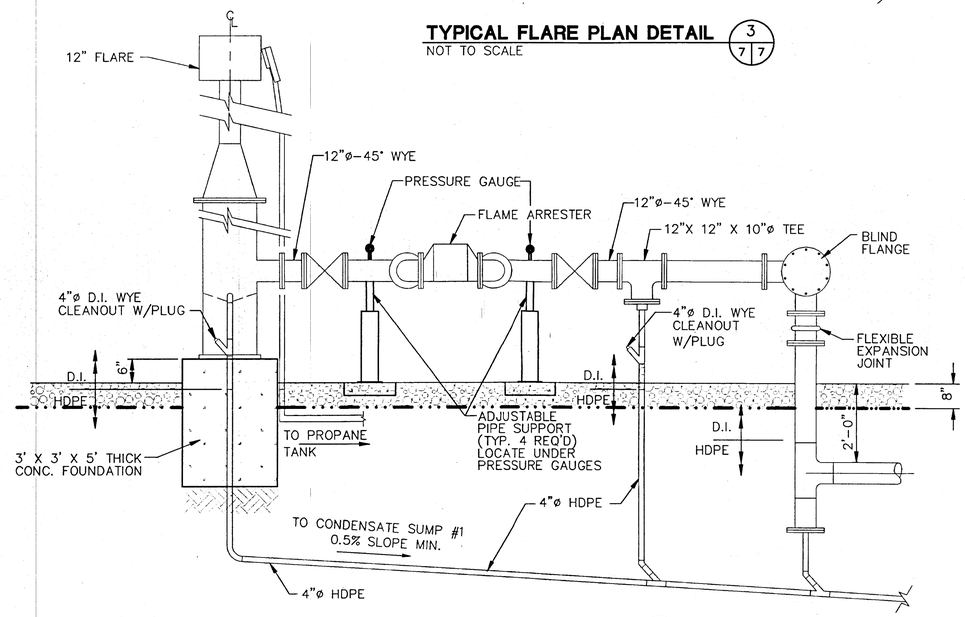
SCALE: AS SHOWN

DRAWING NO. 6 of



TYPICAL FLARE PLAN DETAIL (3 | 7 | 7)

NOT TO SCALE

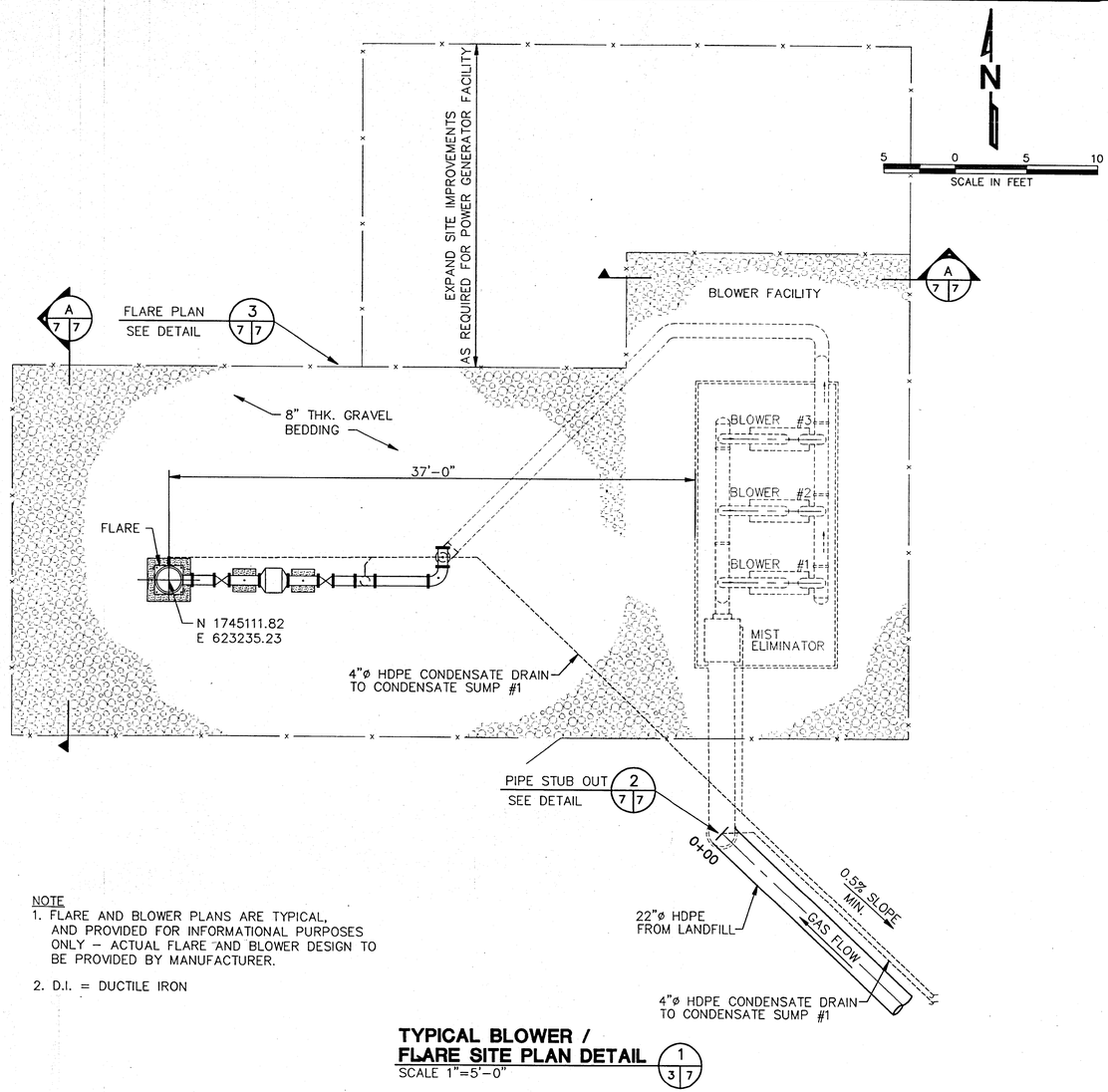


TYPICAL FLARE SECTION (B | 7 | 7)

NOT TO SCALE

EXTRACTION WELL LOCATION / INFORMATION TABLE

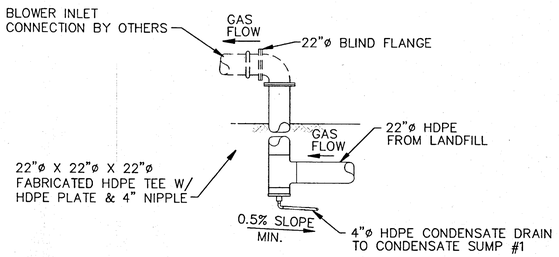
WELL #	NORTHING	EASTING	LENGTH OF LATERAL	BORE DEPTH	LENGTH OF PERF. PIPE	WELL #	NORTHING	EASTING	LENGTH OF LATERAL	BORE DEPTH	LENGTH OF PERF. PIPE
EW-1	N 1745028.74	E 624138.04	44.6'	45'	30'	EW-24	N 1744392.13	E 623882.28	2.0'	45'	30'
EW-2	N 1745034.43	E 624346.11	28.5'	45'	30'	EW-25	N 1744611.01	E 623882.33	14.7'	45'	30'
EW-3	N 1745037.44	E 624566.45	19.7'	45'	30'	EW-26	N 1744818.69	E 623874.81	21.0'	45'	30'
EW-4	N 1745040.07	E 624777.72	1.2'	45'	30'	EW-27	N 1744999.19	E 623950.17	39.1'	45'	30'
EW-5	N 1745040.93	E 625005.94	8.0'	45'	30'	EW-28	N 1744748.07	E 624516.03	44.0'	84'	60'
EW-6	N 1745050.64	E 625210.41	23.0'	45'	30'	EW-29	N 1744353.60	E 624544.33	432.3'	90'	75'
EW-7	N 1745056.10	E 625436.25	46.3'	45'	30'	EW-30	N 1744751.89	E 624852.36	2.0'	84'	60'
EW-8	N 1745059.77	E 625650.30	66.9'	45'	30'	EW-31	N 1744761.73	E 625238.69	55.7'	84'	60'
EW-9	N 1744809.03	E 625867.42	51.7'	45'	30'	EW-32	N 1745024.57	E 625860.21	46.4'	45'	30'
EW-10	N 1744593.58	E 625870.40	29.0'	45'	30'	EW-33	N 1744786.48	E 625597.87	62.6'	84'	60'
EW-11	N 1744368.03	E 625874.57	4.1'	45'	30'	EW-34	N 1744446.62	E 625586.90	335.7'	84'	60'
EW-12	N 1744152.10	E 625875.01	29.1'	45'	30'	EW-35	N 1744089.01	E 625593.77	304.4'	84'	60'
EW-13	N 1743923.57	E 625882.43	52.4'	45'	30'	EW-36	N 1743678.66	E 625879.02	34.9'	45'	30'
EW-14	N 1743641.64	E 625668.51	51.6'	45'	30'	EW-37	N 1743819.90	E 625641.80	2.0'	67'	50'
EW-15	N 1743649.42	E 625440.86	37.7'	45'	30'	EW-38	N 1743989.54	E 625282.80	90.0'	84'	60'
EW-16	N 1743655.75	E 625219.38	19.9'	45'	30'	EW-39	N 1744382.58	E 625261.42	470.3'	90'	75'
EW-17	N 1743662.76	E 625022.79	6.3'	45'	30'	EW-40	N 1744365.18	E 624947.48	397.6'	90'	75'
EW-18	N 1743670.65	E 624806.93	8.3'	45'	30'	EW-41	N 1743984.23	E 624882.79	2.0'	84'	60'
EW-19	N 1743677.97	E 624586.70	26.8'	45'	30'	EW-42	N 1743970.81	E 624538.39	44.9'	84'	60'
EW-20	N 1743685.35	E 624380.75	44.6'	45'	30'	EW-43	N 1743723.10	E 623921.13	23.2'	45'	30'
EW-21	N 1743692.75	E 624147.57	63.9'	45'	30'	EW-44	N 1744019.55	E 624195.13	218.9'	84'	60'
EW-22	N 1743931.98	E 623899.26	47.1'	45'	30'	EW-45	N 1744366.73	E 624155.25	334.3'	84'	60'
EW-23	N 1744156.09	E 623890.56	22.6'	45'	30'	EW-46	N 1744705.20	E 624170.23	97.1'	84'	60'



NOTE
1. FLARE AND BLOWER PLANS ARE TYPICAL, AND PROVIDED FOR INFORMATIONAL PURPOSES ONLY – ACTUAL FLARE AND BLOWER DESIGN TO BE PROVIDED BY MANUFACTURER.
2. D.I. = DUCTILE IRON

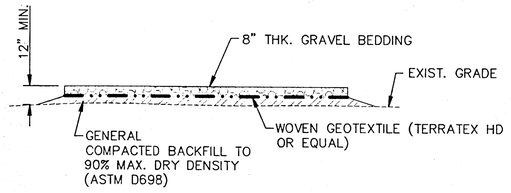
TYPICAL BLOWER / FLARE SITE PLAN DETAIL (1 | 3 | 7)

SCALE 1"=5'-0"



PIPE STUB OUT DETAIL (2 | 7 | 7)

NOT TO SCALE



SECTION (A | 7 | 7)

NOT TO SCALE

JUN 19 9996

REV.	DATE	DESCRIPTION	CK. BY

DRAWING TITLE: **DETAILS - 4**

PROJECT TITLE: **TOMOKA FARMS ROAD LANDFILL GAS RECOVERY SYSTEM VOLUSIA COUNTY, FLORIDA**

CLIENT: **NEO TOMOKA FARMS L.L.C. MINNEAPOLIS, MINNESOTA**

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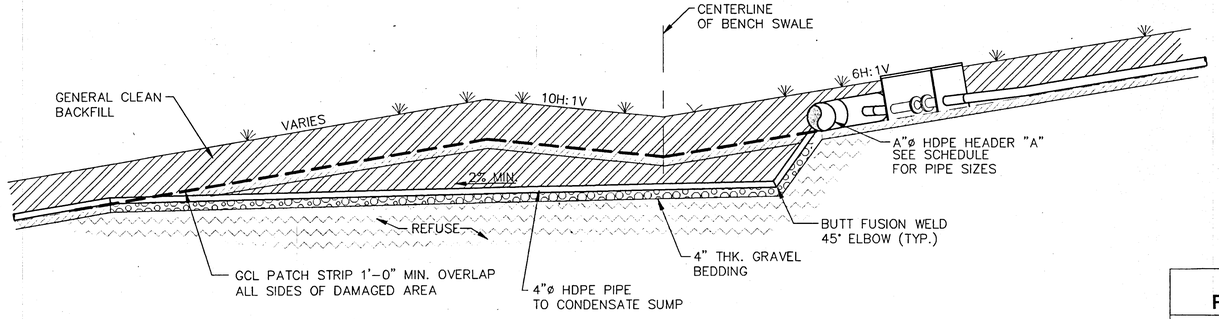
PROJ. NO.	DWN. BY	CHK. BY	D/A RVW BY:	APPV. BY:
0995051.01	GRD\VD	DEP	SMH	DEP
TASK NO.	MAJ/GRD			

CADD FILE: LFG\DET4

DATE: JUNE 19, 1996

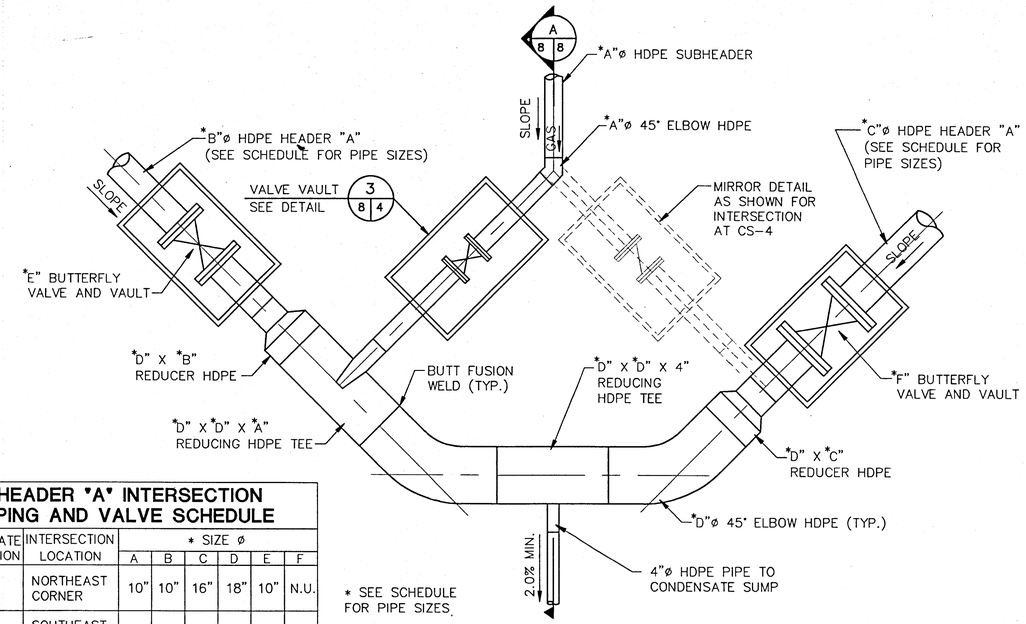
SCALE: AS SHOWN

DRAWING NO. 7 of



NOTE: GCL MAT'L SUPPLIED BY OTHERS.

SECTION (A 8|8)
SCALE: 1/2"=1'-0"



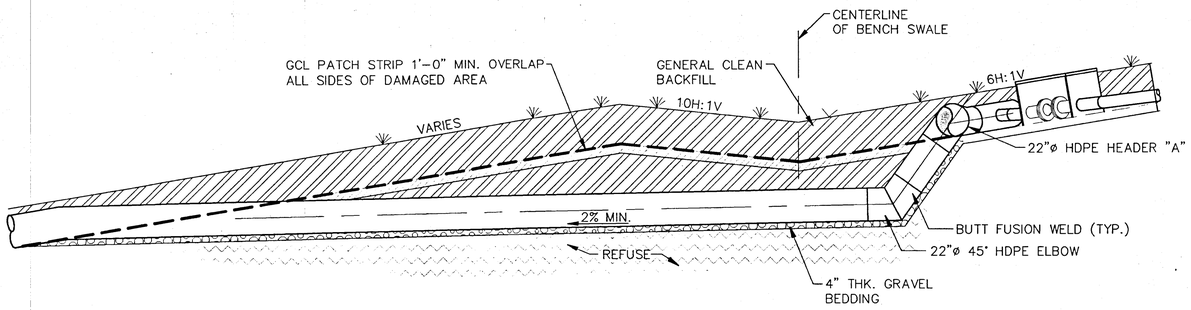
HEADER "A" INTERSECTION PIPING AND VALVE SCHEDULE

CONDENSATE DESTINATION	INTERSECTION LOCATION	* SIZE ø					
		A	B	C	D	E	F
CS-2	NORTHEAST CORNER	10"	10"	16"	18"	10"	N.U.
CS-3	SOUTHEAST CORNER	10"	10"	10"	12"	10"	10"
CS-4	SOUTHWEST CORNER	8"	16"	10"	18"	N.U.	10"

N.U. = NOT UTILIZED

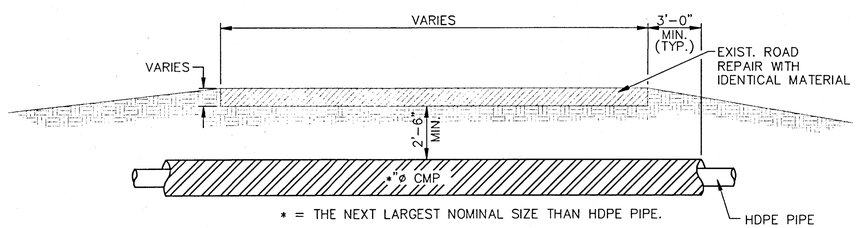
* SEE SCHEDULE FOR PIPE SIZES.

TYPICAL HEADER INTERSECTION DETAIL FOR CS-2, CS-3 AND CS-4 (1 3|8)
SCALE: 1/2"=1'-0"



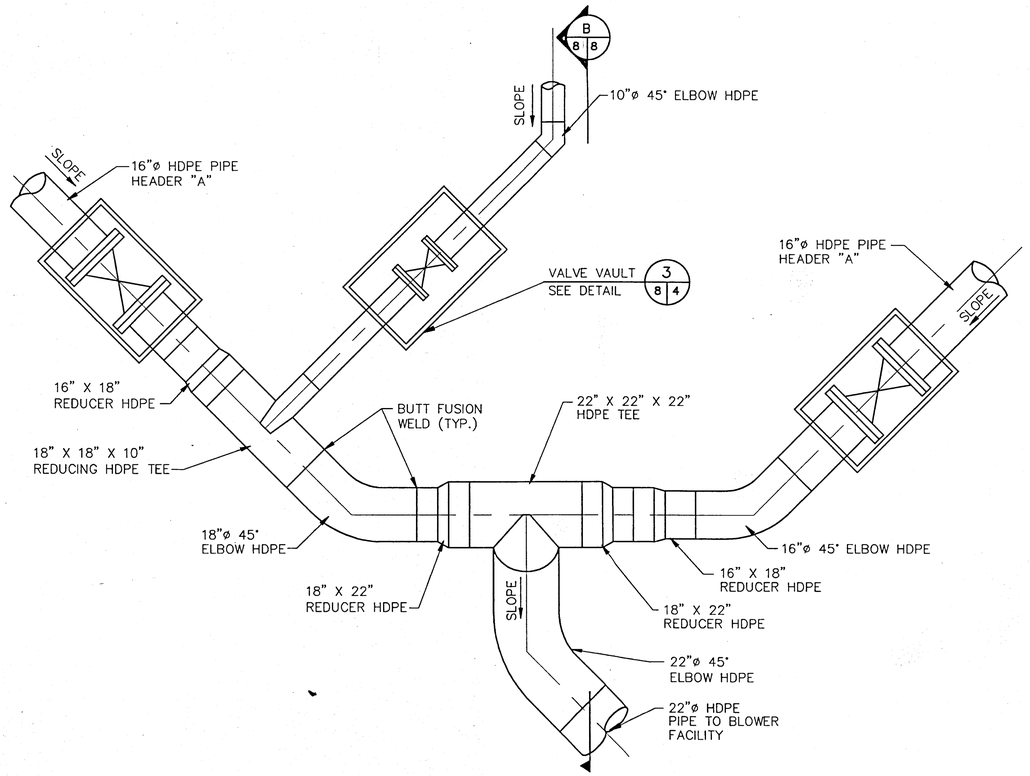
NOTE: GCL MAT'L SUPPLIED BY OTHERS.

SECTION (B 8|8)
SCALE: 1/2"=1'-0"



* = THE NEXT LARGEST NOMINAL SIZE THAN HDPE PIPE.

LFG PIPE CROSSING UNDER EXISTING ROAD DETAIL (3 3|8)
SCALE 1"=4'-0"



HEADER INTERSECTION DETAIL (2 3|8)
SCALE: 1/2"=1'-0"

JUN 19 1996

REV.	DATE	DESCRIPTION	CK. BY

DRAWING TITLE: **DETAILS - 5**

PROJECT TITLE: **TOMOKA FARMS ROAD LANDFILL GAS RECOVERY SYSTEM VOLUSIA COUNTY, FLORIDA**

CLIENT: **NEO TOMOKA FARMS L.L.C. MINNEAPOLIS, MINNESOTA**

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PROJ. NO. 09950051.01 | DSN. BY: MAI/GRD | DWN. BY: GRD\VD | CHK. BY: DEP | Q/A REV. BY: SMH | APP. BY: DEP

CADD FILE: LFG\DET5
DATE: JUNE 19, 1996
SCALE: AS SHOWN
DRAWING NO.: 8 of

GENERAL REQUIREMENTS

Part 1 - GENERAL

1.01 GENERAL

A. These specifications present additional information regarding the materials and construction shown on the Drawings. Lack of reference in these specifications shall not relieve CONTRACTOR of providing and installing any component of the landfill gas extraction system described herein.

B. CONTRACTOR shall immediately notify ENGINEER regarding conflicts or omissions observed within the Drawings or these specifications, and ENGINEER shall provide clarification.

1.02 HEALTH AND SAFETY PLAN

A. CONTRACTOR shall prepare a site specific Health and Safety Plan for the project. Plan shall address hazards associated with working on or near landfills, drilling activities (including risks and precautions associated with drilling in waste), trench and excavation safety, and other health and safety issues associated with the type of Work described herein.

B. Health and Safety Plan shall designate Health and Safety Officer which shall oversee all construction activities. Health and Safety Officer shall be responsible for implementation and enforcement of all measures set forth in the Health and Safety Plan.

C. CONTRACTOR shall provide copy of Health and Safety Plan to ENGINEER prior to the start of site activities. Review of the Plan by the ENGINEER shall not relieve the CONTRACTOR of any responsibilities or liabilities associated with the health and safety of CONTRACTOR's personnel or CONTRACTOR's subcontract personnel.

1.03 SITE ACCESS AND OPERATIONS

A. The Tomoka Farms Road Landfill is an active Class I landfill. CONTRACTOR shall not impede or disturb the ongoing landfilling activities. Site access shall be limited to the operational hours of the landfill, unless arrangements are made with County operations personnel regarding alternative access.

B. CONTRACTOR shall notify County and ENGINEER at least 72 hours prior to conducting any activity which might impact access or operations of any area of the landfill. CONTRACTOR shall modify operations, as requested by the County, to minimize impact or to limit impact to off-peak hours of landfill operation.

1.04 DISTURBANCE OF PREVIOUSLY CLOSED SIDESLOPES

A. The east, south and portions of the west sideslopes have received final cover and have been vegetated by sodding. CONTRACTOR shall conduct all operations as to minimize damage or impact to the closed sideslopes, including limiting vehicle traffic to a single vehicle width, placing plastic on areas to receive waste stockpiles, and limiting the size and aerial extent of excavation stockpiles to only that necessary.

B. All areas of previously completed sideslope which are disturbed by the CONTRACTOR shall be graded to match existing, adjacent grades in preparation for sod replacement. Sod replacement and maintenance shall be provided by the County at no additional cost to the CONTRACTOR. CONTRACTOR shall be liable for repair of areas of sideslope which are damaged unnecessarily during construction.

Part 2 - PRODUCTS (NOT USED)

Part 3 - EXECUTION (NOT USED)

- END OF SECTION -

SITE CLEARING AND PROTECTION OF EXISTING IMPROVEMENTS

Part 1 - GENERAL

1.01 GENERAL

A. CONTRACTOR shall only clear those areas necessary for construction of the facilities described herein. Clearing activities shall be conducted in a manner that minimizes interference with roads or other adjacent facilities, or to landfilling operations.

B. CONTRACTOR shall provide protection, as required, to prevent damage to existing improvements.

1.02 SITE CLEARING

A. Prior to beginning clearing activities, CONTRACTOR shall install silt fences and other erosion control measures necessary to prohibit soils from washing from excavation areas into adjacent water bodies.

B. The top 6 inches of soil shall be considered topsoil, and shall be segregated for redistribution to the excavation areas after backfilling.

C. All materials excavated during clearing activities shall be incorporated into project, transported and disposed, or segregated and stockpiled at a location on the landfill property as directed by the ENGINEER.

Part 2 - PRODUCTS (NOT USED)

Part 3 - EXECUTION (NOT USED)

- END OF SECTION -

EXCAVATION, BACKFILL AND GRADING

Part 1 - GENERAL

1.01 GENERAL

A. The CONTRACTOR shall furnish all labor, materials, equipment and incidentals necessary to perform all Work and services for completion of earthwork as shown on the Drawings.

B. The Work under this section shall include, but not necessarily be limited to, excavation for trenches, structures, and pipe; backfilling and grading of surface depressions and backfilled areas; fill and required borrow; and repair of the Geosynthetic Clay Liner (GCL) cover system.

C. All excavated waste shall be disposed at the working face of the Class I landfill. CONTRACTOR shall coordinate with County and ENGINEER regarding disposal location and methods.

D. Where excavations must be performed through existing roadways, the roadways shall be restored to original conditions and with like materials.

E. Soil materials removed during excavations shall be used for backfilling. CONTRACTOR shall moisture condition backfill soils, by drying or wetting, as required to meet the minimum compaction requirements set forth herein.

Part 2 - PRODUCTS

2.01 SOIL BACKFILL MATERIAL

A. Soil backfill material shall be well drained soil material reasonably free of excess silt, clay balls, roots, organic matter, trash, and stones larger than 2 inches. Material which cannot be made to compact readily shall be removed and replaced with suitable material.

B. Soil backfill material shall be sand (SP or SW), silty sand (SM), or clayey sand (SC) as classified by the Unified Soil Classification System, or other soil as approved by the ENGINEER.

C. Soil materials excessively wet or dry are considered unsuitable. The CONTRACTOR shall dry or moisten soils, as required, to achieve the moisture content required for specified compaction, as determined by laboratory testing of representative soil samples. Moisture conditioning shall be performed by CONTRACTOR at no additional cost to the OWNER.

2.02 SAND BEDDING MATERIALS

A. Sand bedding shall comply with the requirements of Section 902 of the Florida Department of Transportation Standard Specifications. Sand shall be relatively free flowing, and sufficiently dry to be placed and shaped in the excavation.

2.03 GRAVEL BEDDING

A. Gravel bedding shall be Grade 57 or Grade 357 crushed stone, meeting the requirements of Section 901 of the Florida Department of Transportation Standard Specifications.

B. Gravel bedding shall not be installed in the extraction wells.

2.04 GEOSYNTHETIC CLAY LINER (G.C.L.) MATERIAL

A. Geosynthetic Clay Liner (GCL) material shall be CLAYMAX, as provided by others. Sufficient GCL to perform the cover repairs required for the construction will be provided to the CONTRACTOR by the County.

2.05 DOUBLE GEOCOMPOSITE DRAINAGE MATERIAL

A. Double geocomposite drainage material shall be comprised of geonet drainage material with sheets of non-woven geotextile (4-ounce or greater) heat-bonded to each side of the geonet.

B. Double geocomposite shall be Tex-Net TN3002, as manufactured by Fluid Systems, or approved equal.

Part 3 - EXECUTION

3.01 GENERAL EXCAVATION

A. The CONTRACTOR shall layout all excavations, as shown on the Drawings. The CONTRACTOR shall replace existing survey markers to original location if disturbed or destroyed.

B. Protection of Rough Grade: During construction, the CONTRACTOR shall shape and drain excavations; maintain ditches and drains to provide drainage; and protect and re-establish grade where settlement, washouts, rilling, or other erosion damage occurs as a result of construction. Repair of damaged areas shall be at the CONTRACTOR's expense.

C. When excavation has reached prescribed depths, the ENGINEER shall be notified that an inspection of the excavation may be performed.

D. If the bottom or sides of any excavation is removed beyond the limits shown on the Drawings, except as directed by the ENGINEER, it shall be backfilled at the CONTRACTOR's expense with approved material. The material used for backfilling of the over-excavation shall be approved by the ENGINEER.

E. The CONTRACTOR shall not leave any excavations, boreholes, or trenches open at the completion of work each day. All open holes shall be backfilled flush with existing grade or covered with acceptable material prior to leaving the site.

3.02 TRENCH EXCAVATION AND BACKFILLING FOR PIPE INSTALLATION

A. Prior to starting excavations on previously completed sideslopes, CONTRACTOR shall probe the pipe alignment to determine the depth to the GCL. The depth to the GCL shall be staked along the alignment, and monitored during excavations to minimize damage or disturbance of the GCL materials.

B. Trench excavations on previously completed sideslopes shall be performed using a bucket which has had the teeth removed, and a rubber plate installed across the cutting edge of the bucket.

C. Soils removed from the excavations shall be stockpiled directly adjacent to the excavations, and used as backfill. Disturbance to previously completed sideslopes shall be limited to only that area necessary for pipe installation.

D. Where encountered, waste materials shall be removed to provide a minimum 6-inch clearance around the bottom and 8-inch clearance around the sides of all piping.

E. Sand bedding shall be placed in lift thicknesses as shown on the Drawings, and compacted using a plate compactor or other approved compaction method.

F. Pipe shall be installed in accordance with the manufacturer's recommendations.

G. Backfill soils shall be placed as not to displace or damage the installed piping. Backfill shall be placed in maximum 8-inch thick lifts and compacted. Equipment shall not operate over piping unless a minimum 6-inch thick soil layer is in place.

H. Backfilled trenches shall be smooth-graded to match existing adjacent grades.

I. All excavation and trenching activities shall be performed in strict conformance with applicable Federal, State and local safety requirements, including all applicable Occupational Safety and Health Administration (OSHA) requirements. CONTRACTOR's Health and Safety Officer shall be solely responsible for implementation and enforcement of all excavation and trench safety requirements, and for inspection of all excavation or trench entry activities.

3.03 REPAIR OF DAMAGED GCL MATERIALS

A. If an area of GCL is damaged, the area shall be flagged for inspection by the ENGINEER.

B. The CONTRACTOR shall excavate the soils overlying the damaged GCL sufficiently to expose the damage. Excavations shall continue until a minimum 1-1/2 feet of undamaged GCL has been exposed on all sides of the damaged area.

C. The CONTRACTOR shall consult with the County and the ENGINEER regarding the best repair method for each damaged area. Repair typically will consist of overlying a GCL patch over the damaged area, with the patch extending a minimum 1 foot beyond the edges of the damaged area (i.e., 1-foot overlap minimum). Repair methods also will be applicable to perforations in GCL required for extraction well installation.

D. CONTRACTOR will be provided with sufficient GCL to repair damage required for system installation.

3.04 INSTALLATION OF DOUBLE GEOCOMPOSITE

A. Double geocomposite shall be installed as shown on the Drawings.

B. Double geocomposite shall be required only for 12-inch diameter or larger pipes installed above the GCL layer.

C. Soil backfill shall be placed against pipe haunch before installing double geocomposite layer. Double geocomposite shall be installed taut.

3.05 BACKFILLING

A. Excavated soils meeting requirements of backfill shall be suitable for backfilling.

B. Backfill soil shall be placed in 8 to 12-inch thick loose lifts, and compacted to minimum 90 percent of maximum dry density, as determined by ASTM D698.

C. CONTRACTOR shall contract with laboratory to perform Proctor compaction tests (as per ASTM D698), and to perform in-place compaction testing of installed soils.

D. Compaction testing shall be performed according to the following schedule:

1. Trenches – 1 test per 200 lineal foot of pipe installed. Test performed at a depth of 2 inches below final grade.

2. Sump Excavations – 3 tests per excavation, performed at depths of 5, 2 and 0.5 feet below final grade.

E. Results of Proctor tests and in-place compaction tests shall be provided to ENGINEER at the completion of installation activities.

- END OF SECTION -

JUN 19 1996

REV.	DATE	DESCRIPTION	CK. BY:

DRAWING TITLE: GENERAL SPECIFICATIONS

PROJECT TITLE: TOMOKA FARMS ROAD LANDFILL GAS RECOVERY SYSTEM VOLUSIA COUNTY, FLORIDA

CLIENT: NEO TOMOKA FARMS L.L.C. MINNEAPOLIS, MINNESOTA

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DWN. BY: GRD	CHK. BY: DEP
PROJ. NO.: 09950051.01	DSN. BY: MAI/GRD

CADD FILE: GENSPEC1

DATE: JUNE 19, 1996

SCALE: NONE

DRAWING NO.: 9 of

PIPE, FITTINGS, AND VALVES

Part 1 - GENERAL

1.01 GENERAL

A. The CONTRACTOR shall furnish labor, materials, equipment, and incidentals necessary to perform Work and services for complete installation of all piping as shown on the Drawings and as specified.

B. The WORK shall include, but not necessarily be limited to installation of piping including all fittings and valves for collection headers and laterals, extraction wells, condensate system, and miscellaneous conduits.

C. Excavation, Backfill, and Grading shall be as described in the section of these specifications.

1.02 SUBMITTALS

A. The CONTRACTOR shall submit to the ENGINEER the names of the pipe, pipe fitting, and valve suppliers, certificates of compliance on materials to be furnished, and manufacturer's recommendations for storage, handling, installation, inspection, and repair of each type of pipe, pipe fitting, and valve to be furnished.

B. The CONTRACTOR shall submit to the ENGINEER for approval, complete, detailed, shop Drawings of all pipe, fittings, and valves.

C. The CONTRACTOR shall submit to the ENGINEER a manufacturer's certification that the high density polyethylene (HDPE) pipe was manufactured from resins in compliance with these specifications. The certificate shall state the specific resin, its source and the specific information required by ASTM 1248.

D. The HDPE pipe manufacturer shall provide certification that stress regression testing has been performed on the specific product. This stress regression testing shall have been done in accordance with ASTM D-2837, and the manufacturer shall provide a product supplying a minimum hydrostatic design basis (HDB) of 1,600 psi, as determined in accordance with ASTM D-2837. The manufacturer must warrant the pipe to be free from defects in material and workmanship in accordance with ASTM D-3350 and F-714.

Part 2 - PRODUCTS

2.01 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

A. PVC pipe and fittings shall be manufactured from rigid, un-plasticized, PVC compound meeting ASTM D-1784, Class 12454-B and manufactured in accordance with ASTM D-1785. The pipe shall have a design stress rating of 2,000 psi at 73 degrees F and shall be suitable for field cutting and solvent welding. Pipes shall be plain end of sizes as shown on the Drawings and shall be Schedule 80.

B. All PVC pipe and fittings shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished.

C. Pipe shall be furnished perforated, slotted, or plain as specified and in the locations shown on the Drawings. Perforations or slots shall be made into the pipe after manufacture.

D. Fittings shall be the socket type for solvent welded joints as designated in ASTM D-2467, using solvent as specified in ASTM D-2564, except where flanged as shown on the Drawings. Flanges shall be socket-type ANSI Class 150-pound with soft rubber gaskets. Studs, not bolts, shall be used to connect flanges. The studs shall be ASTM A-276, Type 316 stainless steel. The studs shall be fastened with heavy, semi-finished hexagon nuts and shall be completely coated with anti-seize compound such as manufactured by Kopr-Kote, or approved equal. Flanges shall be suitable for mating with standard ANSI Class 150-pound flanges.

2.02 HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

A. Polyethylene pipe resins shall be high performance, high molecular weight HDPE conforming to ASTM D-1248 (Type III, Class C, Category 5, Grade P34) and ASTM D-3350 (Cell Classification PE 345434C). The pipe and fittings shall be manufactured with a minimum of 2 percent carbon black to withstand outdoor exposure without loss of properties. Pipe and fittings shall meet the requirements of Standard Dimension Ratio (SDR) 17 for collection system laterals and header pipe of 12 inches or less in diameter, and SDR 17 for all fittings and the 2-inch diameter HDPE pipe used for the condensate management system. All HDPE pipe shall meet the requirements of ASTM F-714. Where required, flange connections shall be provided. Each pipe length shall be marked with the manufacturer's name or trademark, size, material code, and SDR.

B. All HDPE pipe and fittings shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the raw material. The pipe shall be homogenous throughout and free of visible cracks, holes, foreign inclusions, or other deleterious defects and shall be identical in color, density, melt index and other physical properties.

C. The HDPE pipe shall be joined with butt, heat fusion joints. All joints shall be made in strict compliance with the manufacturer's recommendations.

D. Pipe shall be of sizes as shown on the Drawings and furnished in standard laying lengths.

E. Pipe shall be furnished perforated or non-perforated as specified and in the locations shown on the Drawings. Perforations or slots shall be made into the pipe after manufacture.

F. Mechanical connections of the HDPE pipe to auxiliary equipment such as valves, pumps and tanks shall be through flanged connections which shall consist of the following:

1. All stub ends and flange connections shall be thermally butt-fused to the ends of the pipe.

2. A metal backup flange shall be Type 316 stainless steel and be sized to ANSI B16.6 outside diameter and drillings.

3. Studs, not bolts, shall be used to connect flanges. The studs shall be ASTM A-276, Type 316 stainless steel. The studs shall be fastened with heavy, semi-finished hexagon nuts and completely coated with an anti-seize compound such as manufactured by Kopr-Kote, or approved equal.

4. Other mechanical couplings such as 360 degree full circle clamps can be used only as approved by the ENGINEER.

G. Fittings, flanges, etc. shall be made from the same resin.

H. All HDPE tees, including reducing tees and cross tees shall be molded and/or fabricated types produced in the factory.

2.03 FLEXIBLE CONNECTORS

A. Flexible connectors shall consist of flexible hoses and plastic pipe collars as detailed and of sizes as shown on the Drawings.

B. Flexible expansion joint shall be made from silicone rubber with a polyester cover/liner and shall be reinforced with 302 stainless steel. It shall withstand temperatures from -65 degree F to 325 degree F without any adverse effect. It shall be capable of withstanding a test pressure of -5 psig. The flexibility for contraction and expansion should be 50 and 20 percent, respectively, of its original size. The hose shall be capable of a bend radius equal to 1.5 hose diameters.

C. The flexible hose and connections shall be as manufactured by Kanaflex Corporation, Series 101-PS, or approved equal.

2.04 VALVES

A. PVC Butterfly Valves shall be wafer style. The valves shall have a PVC valve body with polypropylene disk with Nitrile (Buna N) seal. The valves shall be of the line size and shall fit between ANSI Class 150-pound flanges. Valve shall be supplied by the manufacturer with an index plate and locking device. Gaskets for butterfly valves shall be fluorinated elastomers conforming to ASTM D-2000, suitable for the pressure and temperature ranges encountered, and compatible with flange faces. PVC Butterfly valves shall be as manufactured by Asahi/America Medford, MA; Plast-A-Valve Assembler, South Gate, California; or approved equal.

B. Labcock Valves shall be 1/4-inch PVC cock valves with 1/4-inch male pipe thread (MPT) on one end and a hose connection on the other end. Valve seats and seals shall be EPDM. Valves shall be as manufactured by Chemtrol, Asahi/America, or approved equal.

C. Gate Valves shall be constructed of Type 1, Grade 1 PVC and have no metal-to-media contact. The "gate" shall be of a tapered cylindrical plug design made of polypropylene. Valve shall come standard with a sealed position indicator, clean-out plug and EPDM seals and be of the non-rising stem design as manufactured by Asahi/America, or equal.

D. All butterfly valves shall have a locking type lever for adjusting the position of the valve as manufactured by Asahi/America, or equal.

E. A two piece, valve stem extension, consisting of a stem and housing shall be provided where shown on the Drawings. The valve extension length shall be as shown on the Drawings. The stem housing shall be epoxy-coated carbon steel. The valve stem extensions shall be as manufactured by Asahi/America, Stem Extension, two piece stem and housing, Style A (modified as shown on the Contract Drawings), or equal.

2.05 AUTOMATIC DRIP TRAP

A. An automatic drip trap shall be installed as shown on the Drawings. The drip trap shall be an automatic, float operated needle valve trap, Model 245, as manufactured by Varec, or approved equal.

Part 3 - EXECUTION

3.01 INSTALLING POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

A. The installation of PVC pipe and fittings shall be strictly in accordance with the manufacturer's technical data and printed instructions and as outlined in ASTM D-2774, at locations shown on the Drawings and as specified herein.

B. Stockpiling: The CONTRACTOR shall follow the manufacturer's recommendations in unloading and stockpiling material. Pipe shall never be dumped or dropped from a truck bed. Pipe shall be lifted and placed on the ground, or rolled down ramps. Pipe and other material shall never be dragged along the ground, unless by methods approved by the ENGINEER.

Material stockpiled in an unauthorized area shall be moved by the CONTRACTOR at no cost to the OWNER. The CONTRACTOR will stockpile material so as to provide even and complete support for the material to prevent crimping or other damage. CONTRACTOR supplied material which is damaged shall be replaced at no additional cost to the OWNER.

C. All pipe shall be inspected for cuts, scratches, or other damage, prior to installation. Pipe with imperfections shall not be used. All burrs, chips, etc. shall be removed from the pipe interior and exterior.

D. All pipe cuts shall be done only with mechanical cutters and shall be square and perpendicular to the center line of the pipe.

E. Pipe and pipe fittings shall be selected so that there will be as small a deviation as possible at the joints and so that inverts present a smooth surface. Pipe and pipe fittings which do not fit together to form a tight fitting shall be rejected. All loose dirt and moisture shall be wiped from the exterior of the pipe and the interior of the pipe fitting.

F. Pipe sections shall be joined with socket couplings joined together by solvent cement in accordance with ASTM D-2855. In addition, extraction well below grade couplings shall include three lag screws at each pipe end. Lag screw length shall equal the sum of the pipe and coupling wall thickness, such that lags screws do not protrude beyond interior wall of pipe.

1. Pipe ends shall be beveled prior to applying primer and solvent cement so that the cement is not wiped off during fitting into the fitting socket.

2. A coating of CPS primer as recommended by the pipe supplier shall be applied to the entire interior of the fitting socket and to an equivalent area of the exterior of the pipe prior to applying solvent cement.

3. Primer and solvent cement shall be installed in strict accordance with manufacturer's recommendations.

4. Pipe shall be fully inserted into the fitting with a twisting motion to distribute the cement uniformly.

5. After solvent welding, the pipe shall remain undisturbed prior to backfilling until cement has thoroughly set. As a guideline for joint setting time, use 1 hour when ambient temperature is 60 to 100 degrees F, or 2 hours when ambient temperature is 40 to 60 degrees F.

6. Pipe shall not be primed or solvent cemented when it is raining or when ambient temperature is below 40 degrees F or above 90 degrees F when under direct exposure to the sun.

G. All taps in the pipe shall be made, and necessary plugs shall be inserted by the CONTRACTOR, as shown on the Drawings.

3.02 INSTALLING POLYETHYLENE (HDPE) PIPE AND FITTINGS

A. The installation of HDPE pipe and fittings shall be strictly in accordance with the manufacturer's technical data and printed instructions, at locations shown on the Drawings and as described herein. All heat fusion joints shall be done by factory qualified fusion technicians.

B. The CONTRACTOR shall use accepted industry practice in unloading and stockpiling material. HDPE pipe shall never be dumped or dropped from a truck bed. HDPE pipe shall be lifted and placed on the ground, or rolled down ramps. HDPE pipe and other materials shall never be dragged along the ground.

The CONTRACTOR shall stockpile material only in areas authorized by the ENGINEER. Material stockpiled in an unauthorized area shall be moved by CONTRACTOR at no cost to the OWNER. Contractor shall stockpile material to insure even and complete support for the material to prevent crimping, marring, crushing, piercing, or other damage. Maximum stacking height shall be limited to 6 feet.

CONTRACTOR-supplied material which is damaged shall be replaced at no additional cost to the OWNER.

HDPE pipe shall not be bent more than the minimum radius recommended by the manufacturer for type, grade, and SDR. Care shall be taken to avoid imposing strains that will overstress or buckle the HDPE piping or impose excessive stress on the joints.

C. Pipe shall be laid to line and grade, and with bedding and backfill material as shown on the Drawings.

D. When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by fabricated plugs, or by other approved means. All plugs shall be outside diameter fitting plugs. No plugs will be allowed that require insertion of the plug into the pipe.

E. Pipe shall be stored on clean level ground to prevent undue scratching or gouging. The handling of the pipe shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. The maximum allowable depth of cuts, scratches, or gouges on the exterior of the pipe is 10 percent of wall thickness. The interior pipe surface shall be free of cuts, gouges or scratches.

F. Sections of pipe with cuts, scratches or gouges deeper than allowed shall be removed completely and ends of the pipeline rejoined.

G. All taps in the pipe shall be made, and necessary plugs shall be inserted by the CONTRACTOR as shown on the Drawings.

H. HDPE pipes shall be joined by using thermal welding.

1. Butt fusions shall be made in accordance with manufacturer's recommendations and step-by-step procedures. Fusion equipment and trained operator will be provided by CONTRACTOR.

2. HDPE pipe fusion equipment shall be of the size and nature to adequately weld all HDPE pipe sizes and fittings necessary to complete the project.

3. Before butt fusing HDPE pipe, each length shall be inspected for the presence of dirt, sand, mud, shavings, and other debris. Any foreign material shall be completely removed.

4. At the end of each day, all open ends of fused pipe shall be capped or otherwise covered to prevent entry by animals or debris.

- END OF SECTION -

JUN 19 1996

REV.	DATE	DESCRIPTION	CK. BY

DRAWING TITLE: GENERAL SPECIFICATIONS

PROJECT TITLE: TOMOKA FARMS ROAD LANDFILL GAS RECOVERY SYSTEM VOLUSIA COUNTY, FLORIDA

CLIENT: NEO TOMOKA FARMS L.L.C. MINNEAPOLIS, MINNESOTA

SCS ENGINEERS
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DWN. BY: GRD | CHK. BY: DEP | QA/QC BY: SMH | APP. BY: DEP

PROJECT NO. 01451.01

CADD FILE: GENSPE

DATE: JUNE 19

SCALE: N

DRAWING 1

LANDFILL GAS COLLECTION SYSTEM APPURTENANCES

Part 1 - GENERAL

1.01 GENERAL

A. The CONTRACTOR shall furnish all labor, materials, equipment, and incidentals necessary to perform all Work and services for complete installation of the landfill gas collection system appurtenances (e.g., extraction wells, well heads, condensate drain lines pump stations and valve vaults), as shown on the Drawings and as described herein.

1.02 SUBMITTALS

A. Materials shall not be incorporated into construction until approved by the ENGINEER.

B. The CONTRACTOR shall notify the ENGINEER of the source of all materials and shall furnish representative samples for approval at least 10 days prior to the date of anticipated use of such materials.

C. Boring and well completion logs shall be prepared and submitted by the CONTRACTOR to the ENGINEER at the completion of well installation activities.

Part 2 - PRODUCTS

2.01 VALVE VAULTS

A. Valve vaults shall be structural plastic enclosures as manufactured by Associated Plastics, Inc., or approved equal. Vault dimensions shall be as shown on the Drawings. Valve vault lids shall have a traffic rating of H-10. Each lid shall have the appropriate valve designation painted on it in 3-inch lettering. The lids shall be secured to the vault by a minimum of two hex-head stainless steel bolts. The vault manufacturer shall provide a minimum of six keys to operate the vaults.

2.02 WASHED GRAVEL BACKFILL (AGGREGATE)

A. Gravel backfill for extraction wells, condensate drains and other LFG appurtenances shall be non-calcareous, washed, crushed stone, free of soil, debris or other deleterious materials. Limerock or crushed limestone shall not be allowed. Gravel shall be poorly graded, with particle sizes ranging from 1 to 1-1/2 inches.

2.03 BENTONITE

A. Bentonite shall be granular bentonite as produced by American Colloid Company, or approved equal.

B. Bentonite plug shall be placed as shown on the Drawings. CONTRACTOR shall record location and thickness of bentonite plug on well completion log.

2.04 PIPES, FITTINGS AND VALVES

A. Pipes, fittings and valves shall conform to all applicable requirements of the Specifications, as described herein. Sizes and type shall be as shown on the Drawings.

2.05 CONDENSATE SUMPS

A. Condensate sumps shall be prefabricated, high density polyethylene (HDPE), with a standard dimension ratio (SDR) value of 32.5. Sumps shall be constructed to the dimensions shown on the Drawings. Manufacturer shall certify, in writing, that the prefabricated sumps have been tested for leaks and that sumps are leak free.

B. A 1/4-inch thick stainless steel sump cover shall be provided for each sump. The cover shall include an 18-inch diameter removable access cover, 2-inch diameter discharge pipe perforation, 2-inch diameter PVC vent, and an electrical cord seal as manufactured by ABS, Inc., or approved equal. All bolts and nuts to secure the sump cover shall be stainless steel.

2.06 CONDENSATE SUMP PUMPS AND CONTROLS

A. Condensate pumps shall be of the submersible type with an integral motor and pumping unit. The pumps shall have a semi-open impeller capable of handling LFG condensate (minimum 3/4-inch solids) and other similar solids-laden fluids without clogging. The suction inlet shall have a wave form with the leading edge of the impeller overlapping the wave form. Should a textile or plastic sheet plug inlet be used, the shearing action of the leading edge of the impeller against the wave form of the inlet shall cut away enough of the material to clear the inlet. Impeller shall be manufactured of corrosion-resistant, chilled-gray cast iron. Pump motor shall be enclosed in a watertight housing of gray cast iron, filled with dielectric oil.

B. Condensate pumps shall be Scavenger submersible pumps, Model SESH-10HH, as manufactured by ABS, Inc., or approved equal. Pumps shall deliver 20 USGPM against a total head of 80 feet. The motor shall be 1 horsepower, 3450 RPM, connected for operation on a 240/480 volt, 60 Hz, 3-phase service. The pump discharge shall be 2-inch diameter.

C. Mercury float switches (pump on, pump off and emergency high) shall be provided as manufactured by ABS, Inc., or equal, and installed as shown on the Drawings. Emergency high float at condensate sump CS-1, shall be connected to blower control panel. Actuation of the emergency high float at CS-1 shall result in a shut-down of the blowers, and activation of both an audible and visual alarm at the pump control panel. Emergency high floats for CS-2, CS-3 and CS-4 shall be connected to audible and visual alarms at the respective pump control panels.

D. Scavenger simplex pump control panels, as manufactured by ABS, Inc., or equal, shall be provided at each pump station as shown on the Drawings. All wiring, conduit, junction boxes, terminal strips, relays, interlocks, starters, etc., shall be provided and installed by the CONTRACTOR to complete each sump pump system as intended and shown on the Drawings. Control panels shall be retrofitted to include an audible (from a minimum distance of 300 feet) and visible (flashing red light visible from a minimum distance of 100 feet) which are activated by the emergency high floats.

E. All electrical wiring, junction boxes, connections, splices and installations shall conform to all applicable codes, and shall be in accordance with the manufacturer's recommendations.

2.07 WELL HEADS

A. Well head assemblies shall be Accu-Flo Well Heads, as manufactured by LANDTEC. Well heads shall be either 2-inch or 3-inch diameter, as shown on the Drawings.

B. Flexible connectors shall consist of flexible hoses and plastic pipe collars, as shown on the Drawings and as recommended by the manufacturer. Flexible hose and connectors shall be manufactured by Kanaflex Corporation, or approved equal.

Part 3 - EXECUTION

3.01 FIELD LAYOUT AND CONFIRMATION OF EXTRACTION WELLS AND PIPING

A. The CONTRACTOR shall layout all wells and piping as shown on the Drawings. Field layout shall be performed by a professional land surveyor, licensed in the State of Florida.

B. At completion of field layout, CONTRACTOR shall furnish a marked-up copy of the site plan showing the actual well layout and minimum pipe slopes, as prepared by the surveyor. ENGINEER shall review site layout, and recommend layout modifications as required to meet project criteria of minimum 1.9 percent slope for piping installed on landfill sideslope. Layout modifications shall be incorporated into field layout by surveyor prior to start of construction. All well and piping locations shall be approved by the ENGINEER prior to the start of construction.

C. CONTRACTOR shall perform quality assurance surveying during installation of piping (at minimum 20-foot distance along piping) to confirm that project criteria of minimum 1.9 percent slope for piping installed on landfill sideslope is maintained.

3.02 EXTRACTION WELL CONSTRUCTION

A. Wells shall be installed in accordance with the requirements set forth on the Drawings.

B. Drilling shall be performed using dry drilling methods. CONTRACTOR shall prepare boring and well completion logs for each well location.

C. The boreholes shall be relatively plumb and straight, and the well piping shall be installed in the center of the boreholes, except as shown for double-well boreholes. CONTRACTOR shall take precautions during well construction that well and well screen are installed plumb.

D. If, during the drilling of a hole an obstruction is reached, the driller must use reasonable means to advance the drilling. If the drilling rate falls to less than 2 feet per hour, and a well cannot be completed as shown on the Drawings, the ENGINEER shall be consulted as to whether the borehole has advanced to a sufficient depth, or whether the borehole should be abandoned and a new borehole drilled.

E. If a borehole is not completed by the end of the working day, the hole shall be covered with a plate of sufficient thickness and with sufficient overlap to prevent access to the hole and to support unexpected loads. The edges of the plate shall be covered with soil to inhibit the escape of gas. Barricades shall be placed around the covered hole.

F. All waste excavated during drilling shall be removed to the working face of the Class I landfill prior to the end of each working day. Waste placed on completed sideslopes shall be placed on plastic sheeting, to minimize disturbance of existing vegetative cover. CONTRACTOR shall minimize disturbance of completed sections of landfill sideslope (i.e., areas which have received final cover) to only those area required for well installation. Vehicle traffc shall be limited to only that equipment needed for well construction, materials delivery, or waste transport. Vehicle tracks shall be regraded at the completion of well and piping installation.

3.03 EXTRACTION WELL COMPONENTS

A. Washed gravel backfill, bentonite, well casing and screen shall be installed as shown on the Drawings.

B. Backfill materials shall be placed in the borehole as not to induce bridging of backfill materials, or result in excessive collapse of borehole sidewalls.

3.04 WELL HEADS

A. Well heads shall be installed as recommended by the manufacturer, and as shown on the Drawings.

B. All flexible hose and PVC pipe exposed to the weather shall be painted. Color shall be as designated by the ENGINEER at the time of painting.

C. All wells shall have their respective well numbers painted/stenciled on the side of each well where the number can be easily seen.

3.05 CONSTRUCTION OF CONDENSATE SUMPS

A. Excavation, backfill and disposal of excavated waste shall be as described in the EXCAVATION, BACKFILL AND GRADING section of these specifications.

B. Location of the condensate sumps shall be approved by the ENGINEER prior to installation.

C. Installation of the condensate pump stations shall be in accordance with the details and dimensions shown on the Drawings and as recommended by the manufacturer.

D. Condensate sumps shall have their respective numbers painted/stenciled on the door of the control panel.

E. CONTRACTOR shall provide all sumps, pumps or other methods required for dewatering of sump excavations. CONTRACTOR may propose alternative methods of sump installation, including drilling the hole for sump installation, and using the tremie method to place concrete backfill between the borehole sidewalls and the sump. Alternative methods shall be approved by the ENGINEER prior to the start of construction.

- END OF SECTION -

BLOWER/FLARE STATION CONSTRUCTION

Part 1 - GENERAL

1.01 GENERAL

A. Under a separate contract, CONTRACTOR shall install the blower/flare station in accordance with manufacturer's recommendations, which will be provided by the manufacturer at the time of delivery of the blower/flare station components to the site.

B. CONTRACTOR shall coordinate with OWNER and ENGINEER for delivery of blower/flare station.

Part 2 - PRODUCTS (NOT USED)

Part 3 - EXECUTION (NOT USED)

- END OF SECTION -

JUN 19 1996

REV.	DATE	DESCRIPTION	CK. BY

DRAWING TITLE: GENERAL SPECIFICATIONS

PROJECT TITLE: TOMOKA FARMS ROAD LANDFILL GAS RECOVERY SYSTEM VOLUSIA COUNTY, FLORIDA

CLIENT: NEO TOMOKA FARMS L.L.C. MINNEAPOLIS, MINNESOTA

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PROJ. NO. 0995051.01
DSN. BY: MAL/GRD
DRN. BY: GRD
CHK. BY: DEP
Q/A PVW BY:
APP. BY: DEP

CADD FILE: GENSPEC3

DATE: JUNE 19, 1996

SCALE: NONE

DRAWING NO. 11 of 11

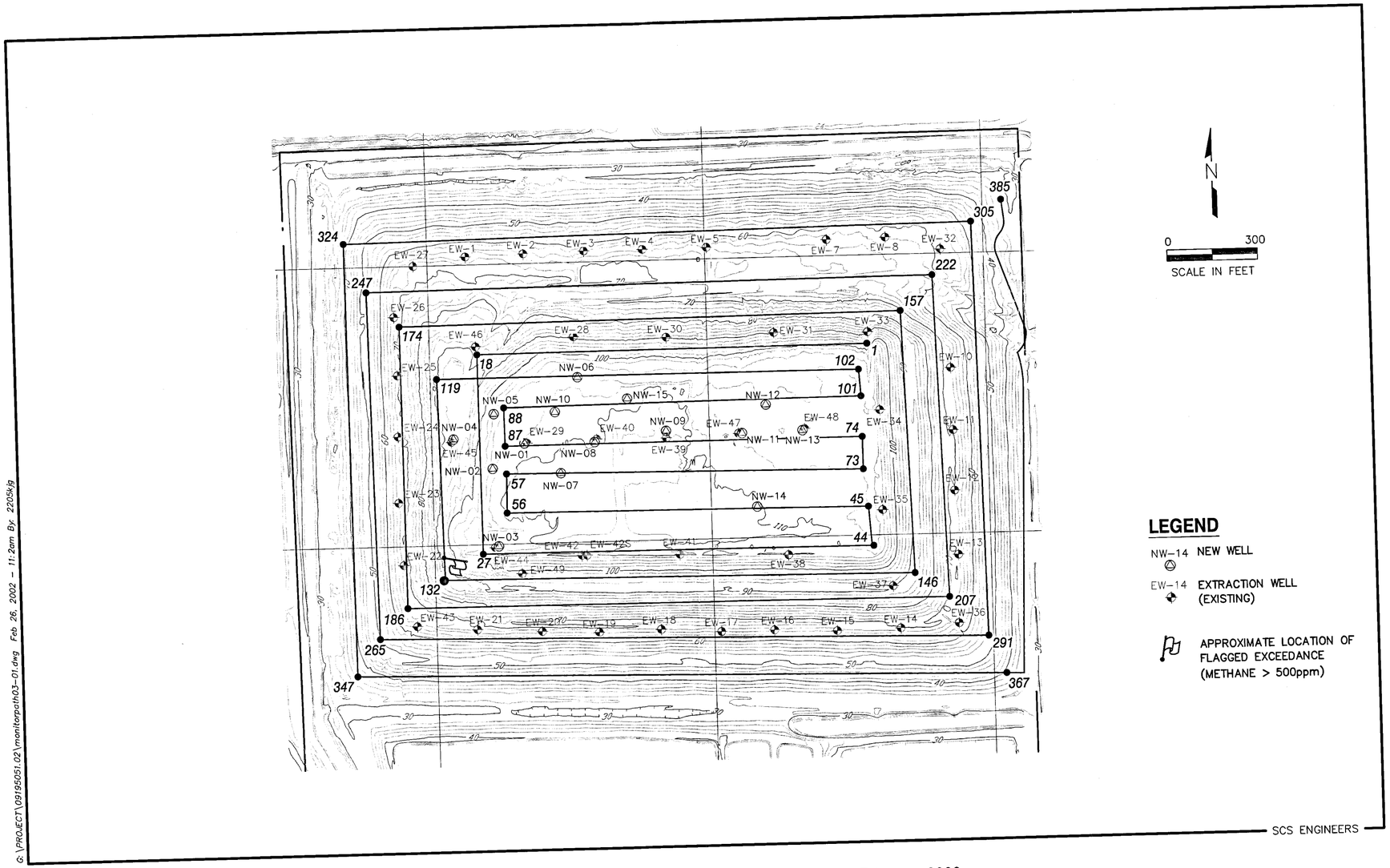


Figure 1. Tomoka Farms Road Landfill Monitoring Route, February 2002

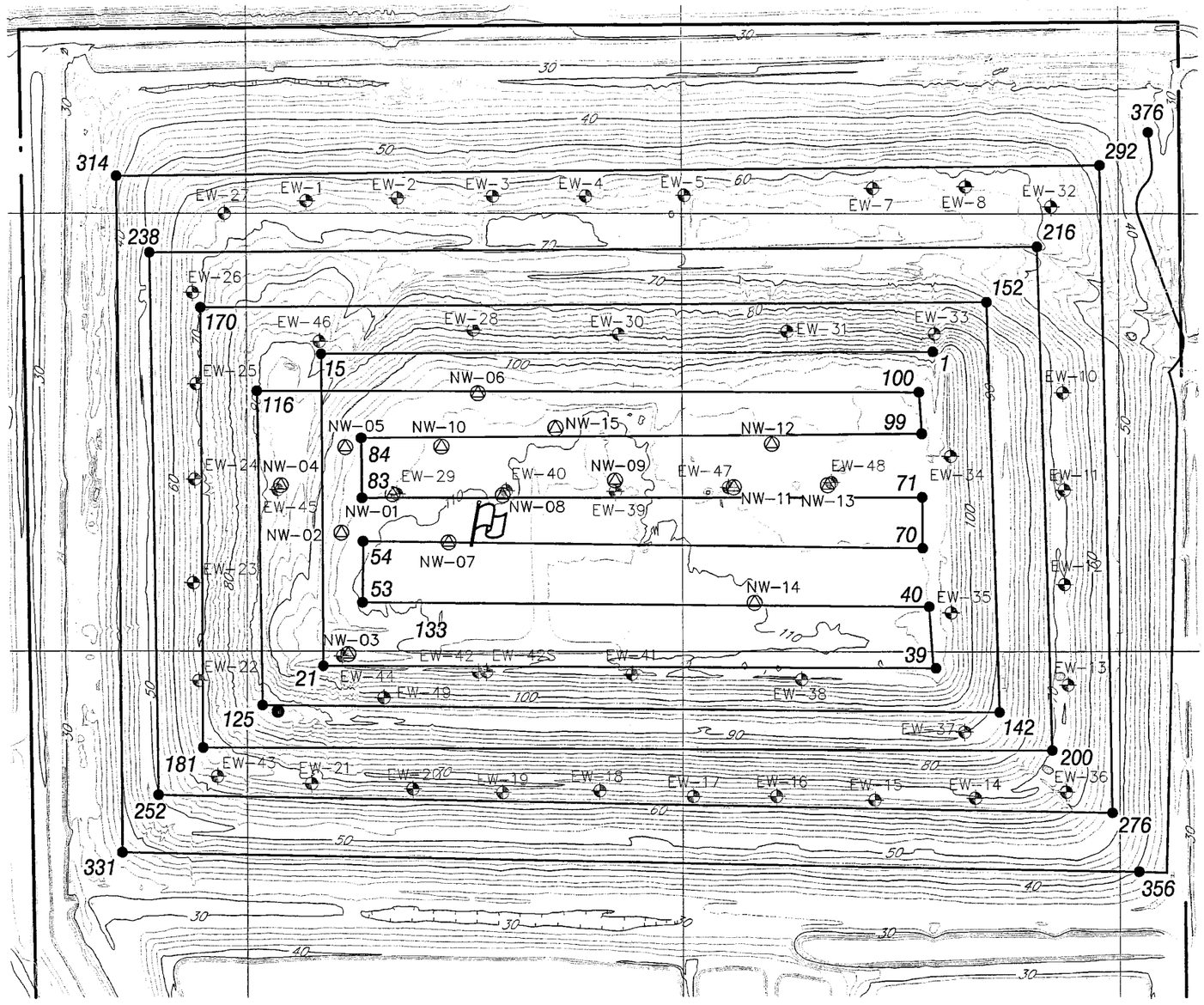
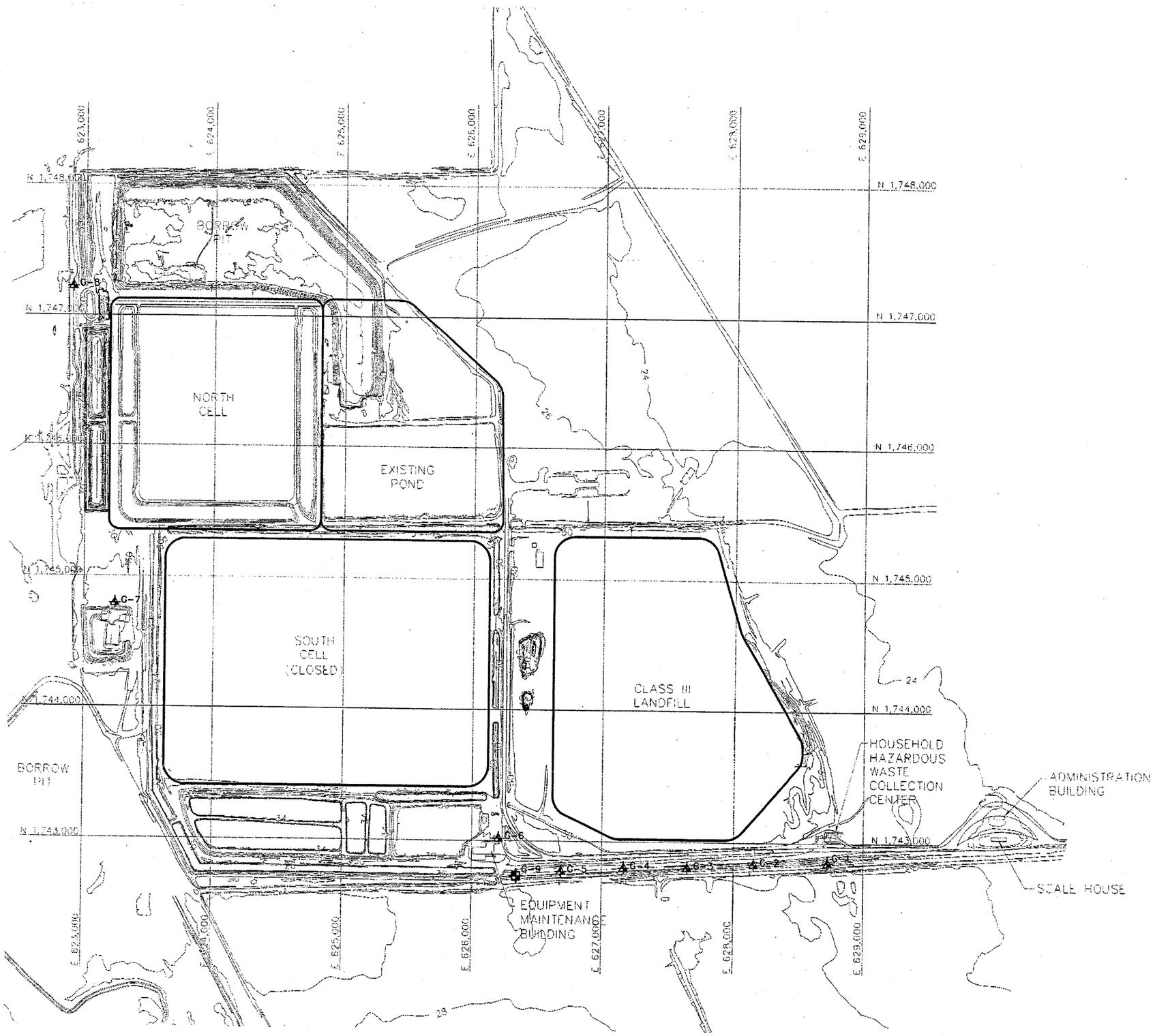


Figure 1. Tomoka Farms Road Landfill Monitoring Route, June SEM, 2003



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0 800

SCALE IN FEET

LEGEND:

- G-2 LFG MONITORING WELL LOCATIONS
- G-9 PROPOSED NEW LFG MONITORING WELL LOCATION

REV.	DATE	DESCRIPTION	CK. BY

DRAWING TITLE
LFG MONITORING PROBE SITE PLAN

PROJECT TITLE
TOMOKA FARMS ROAD LANDFILL
LANDFILL GAS MONITORING PLAN

CLIENT
VOLUSIA COUNTY
DEPARTMENT OF SOLID WASTE SERVICES
DELAND, FLORIDA

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PROJ. NO. 01705052.08 | DWN. BY ADO/CAA | CK. BY DHP | APP. BY DHP | R.J.

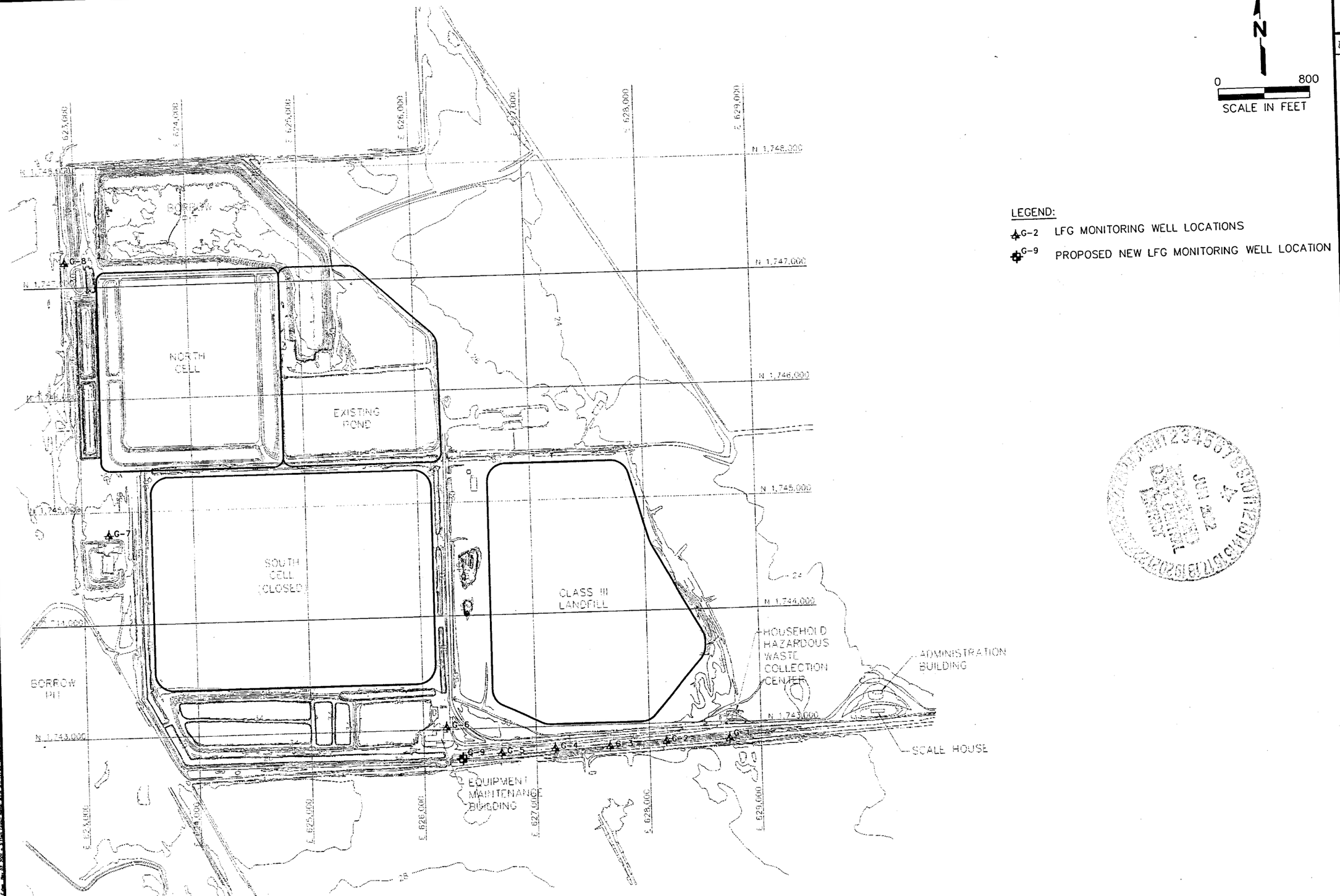
CADD FILE: SITE-E

DATE: NOVEMBER 5, 2001

SCALE: AS SHOWN

DRAWING NO.

1 of 1



REV	DATE	DESCRIPTION	CK. BY

DRAWING TITLE
LFG MONITORING PROBE SITE PLAN

PROJECT TITLE
TOMOKA FARMS ROAD LANDFILL
LANDFILL GAS MONITORING PLAN

CLIENT
VOLUSIA COUNTY
DEPARTMENT OF SOLID WASTE SERVICES
DELAND, FLORIDA

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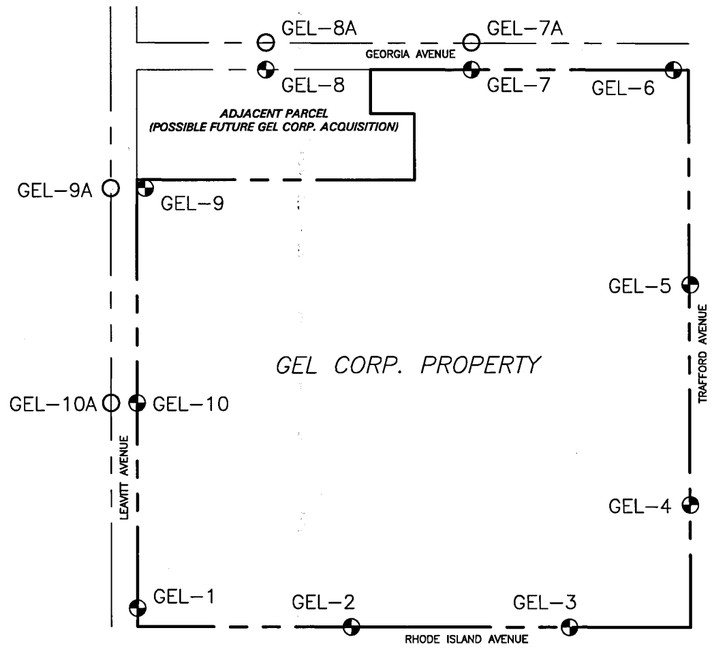
PROJ. NO. 01938052.08
DSN. BY: DHP
DRN. BY: MTO/CAA
CK. BY: DHP
APP. BY: R.E.

CADD FILE: SITE-E
DATE: NOVEMBER 5, 2001
SCALE: AS SHOWN
DRAWING NO. **1** of 1

LOCATION PLAN



LEGEND

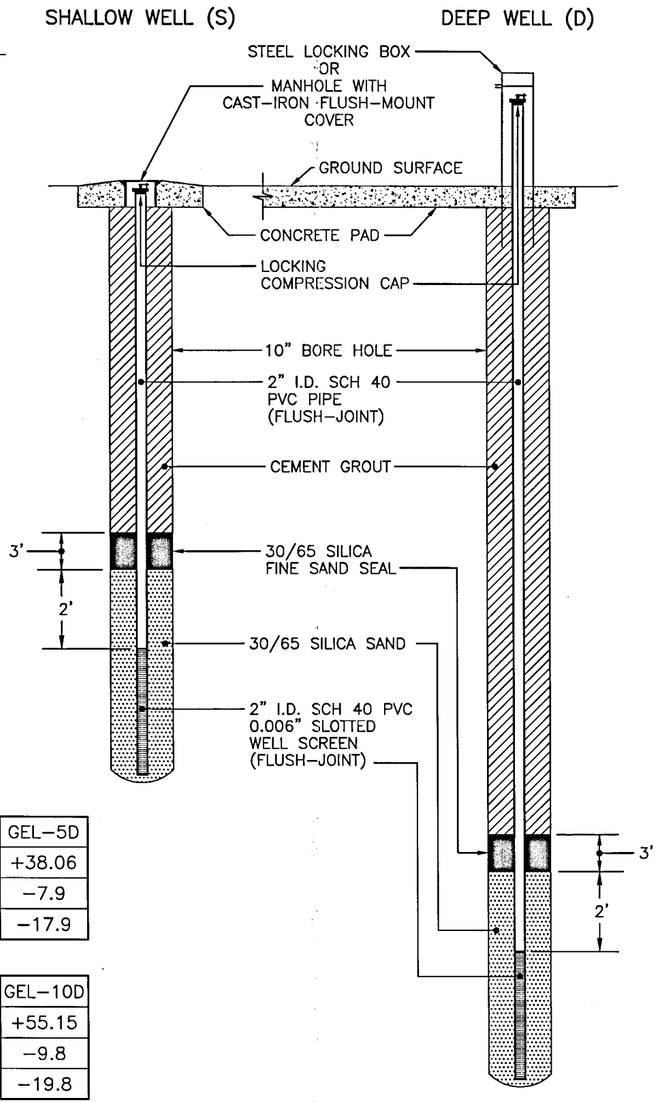
- APPROXIMATE LOCATION OF GROUNDWATER MONITORING WELL CLUSTER
- APPROXIMATE LOCATION OF PROPOSED ASSESSMENT MONITORING WELL CLUSTER

SCALE: 1" = 300'

0 50 100 200 300

TYPICAL MONITORING WELL CLUSTER CONSTRUCTION DETAIL

Wells may have either a Steel Locking Box or a Manhole, depending upon location.



WELL I.D.	GEL-1S	GEL-1D	GEL-2S	GEL-2D	GEL-3S	GEL-3D	GEL-4S	GEL-4D	GEL-5S	GEL-5D
TOP OF RISER ELEV. (ft, NGVD)	+53.23	+53.22	+50.31	+50.41	+41.10	+41.17	+35.18	+35.36	+38.05	+38.06
TOP OF SCREEN ELEV. (ft, NGVD)	+15.2	-4.8	+16.3	-8.6	+17.1	-7.8	+17.2	-7.6	+17.1	-7.9
BOTTOM OF SCREEN ELEV. (ft, NGVD)	+5.2	-14.8	+1.3	-18.6	+2.1	-17.8	+2.2	-17.6	+2.1	-17.9

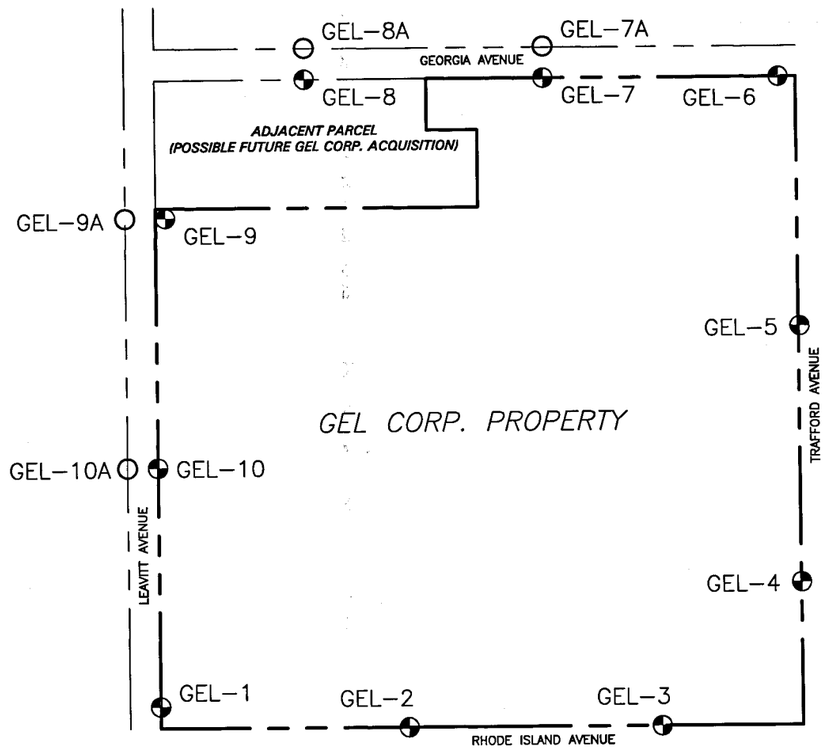
WELL I.D.	GEL-6S	GEL-6D	GEL-7S	GEL-7D	GEL-8S	GEL-8D	GEL-9S	GEL-9D	GEL-10S	GEL-10D
TOP OF RISER ELEV. (ft, NGVD)	+41.50	+41.24	+44.03	+43.97	+41.22	+41.71	+47.79	+47.47	+55.20	+55.15
TOP OF SCREEN ELEV. (ft, NGVD)	+32.5	+3.2	+14.0	-11.0	+1.2	-8.3	+14.8	-10.5	+15.2	-9.8
BOTTOM OF SCREEN ELEV. (ft, NGVD)	+17.5	-6.8	-1.0	-21.0	-8.8	-18.3	-0.2	-20.5	+0.2	-19.8

FIELD:	RK AM
DRAWN:	RR
CHECKED:	RR
APPROVED:	TB
DATE:	9-30-00
SCALE:	NOTED
PROJ. NO.:	00539
	FIGURE C2-1

G.E.L. CORPORATION C&D LANDFILL
ORANGE CITY, FLORIDA

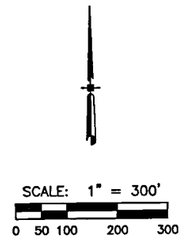
BECHTOL ENGINEERING AND TESTING, Inc.
CONSULTING GEOTECHNICAL, ENVIRONMENTAL, AND MATERIALS TESTING ENGINEERS

LOCATION PLAN



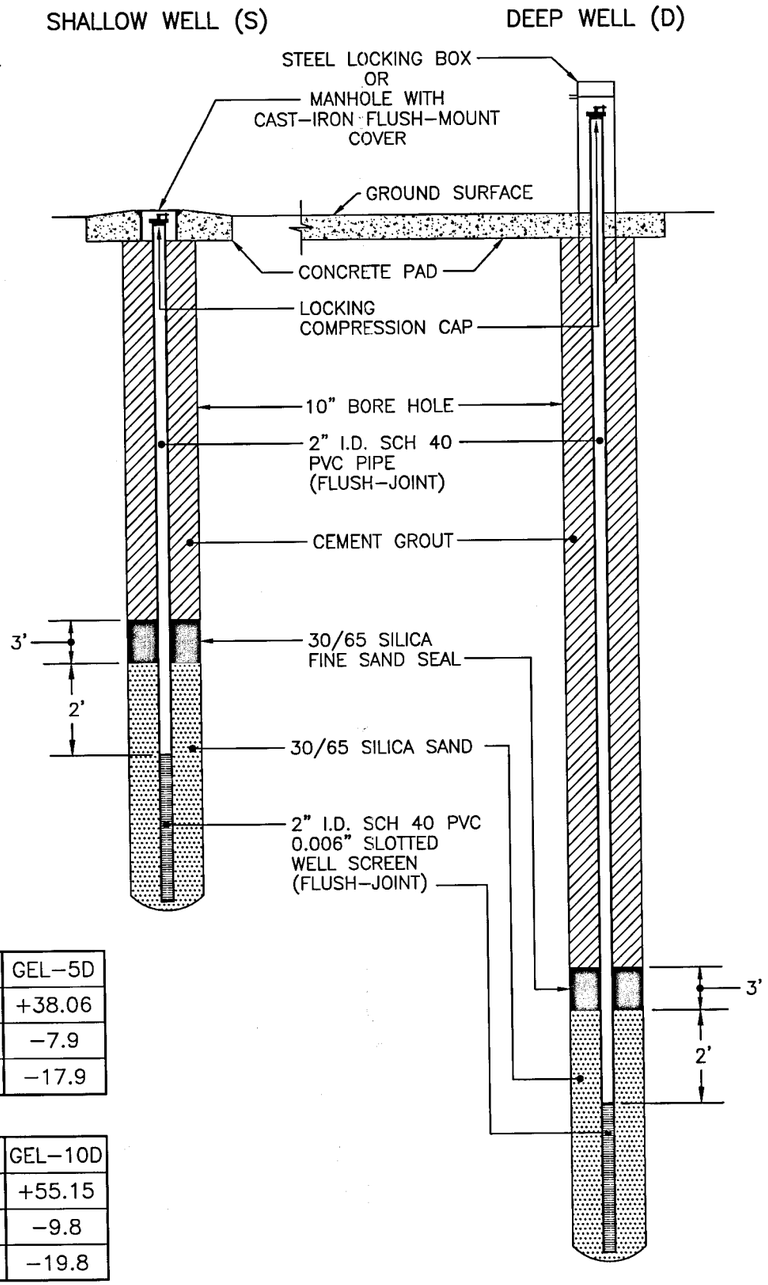
LEGEND

- APPROXIMATE LOCATION OF GROUNDWATER MONITORING WELL CLUSTER
- APPROXIMATE LOCATION OF PROPOSED ASSESSMENT MONITORING WELL CLUSTER



TYPICAL MONITORING WELL CLUSTER CONSTRUCTION DETAIL

Wells may have either a Steel Locking Box or a Manhole, depending upon location.



WELL I.D.	GEL–1S	GEL–1D	GEL–2S	GEL–2D	GEL–3S	GEL–3D	GEL–4S	GEL–4D	GEL–5S	GEL–5D
TOP OF RISER ELEV. (ft, NGVD)	+53.23	+53.22	+50.31	+50.41	+41.10	+41.17	+35.18	+35.36	+38.05	+38.06
TOP OF SCREEN ELEV. (ft, NGVD)	+15.2	−4.8	+16.3	−8.6	+17.1	−7.8	+17.2	−7.6	+17.1	−7.9
BOTTOM OF SCREEN ELEV. (ft, NGVD)	+5.2	−14.8	+1.3	−18.6	+2.1	−17.8	+2.2	−17.6	+2.1	−17.9

WELL I.D.	GEL–6S	GEL–6D	GEL–7S	GEL–7D	GEL–8S	GEL–8D	GEL–9S	GEL–9D	GEL–10S	GEL–10D
TOP OF RISER ELEV. (ft, NGVD)	+41.50	+41.24	+44.03	+43.97	+41.22	+41.71	+47.79	+47.47	+55.20	+55.15
TOP OF SCREEN ELEV. (ft, NGVD)	+32.5	+3.2	+14.0	−11.0	+1.2	−8.3	+14.8	−10.5	+15.2	−9.8
BOTTOM OF SCREEN ELEV. (ft, NGVD)	+17.5	−6.8	−1.0	−21.0	−8.8	−18.3	−0.2	−20.5	+0.2	−19.8

FIELD: RK AM | DATE: 9–30–00
DRAWN: RR | SCALE: NOTED
CHECKED: RR | PROJ. NO.: 00539
APPROVED: TB | FIGURE C2–1

G.E.L. CORPORATION C&D LANDFILL
ORANGE CITY, FLORIDA

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U:\OldH_S\ENVCADD\WASTEMAN\VOLUSIA\newTransfer-site2.dwg Aug04,2003 - 5:22pm Plotted By: rc9327

NORTH

0 20 40

GRAPHIC SCALE
SCALE: 1" = 40'

TO TIRE DISPOSAL AREA

EXISTING PAVED LOOP ROAD

NEW PERIMETER SECURITY FENCE AND GATES

NEW 8" HIGH SPILL CONTAINMENT CURB

EXISTING CONCRETE PAVEMENT

NEW CHAIN LINK FENCE WALL WITH GATE

EXISTING HHW BUILDING

NEW OFFICE TRAILER W/ADA ACCESS

HW TRANSFER FACILITY

TRUCK STORAGE YARD FOR HW TRANSPORT VEHICLES

NEW SPILL CONTAINMENT RAMPS (TYP.)

EXISTING CONCRETE PAVEMENT

NEW TWO BAY FORK LIFT RAMP AND 10' WIDE LOADING DOCK

NEW 15' HIGH OPAQUE SIDING ON BUILDING

EXISTING LOADING RAMP

EXISTING PAVED LOOP ROAD

TO TIRE DISPOSAL AREA

● EMERGENCY EYEWASH AND SHOWER

FIGURE 3

SITE PLAN

CARE ENVIRONMENTAL CORP.
HOUSEHOLD HAZARDOUS WASTE
TRANSFER FACILITY

PBSJ