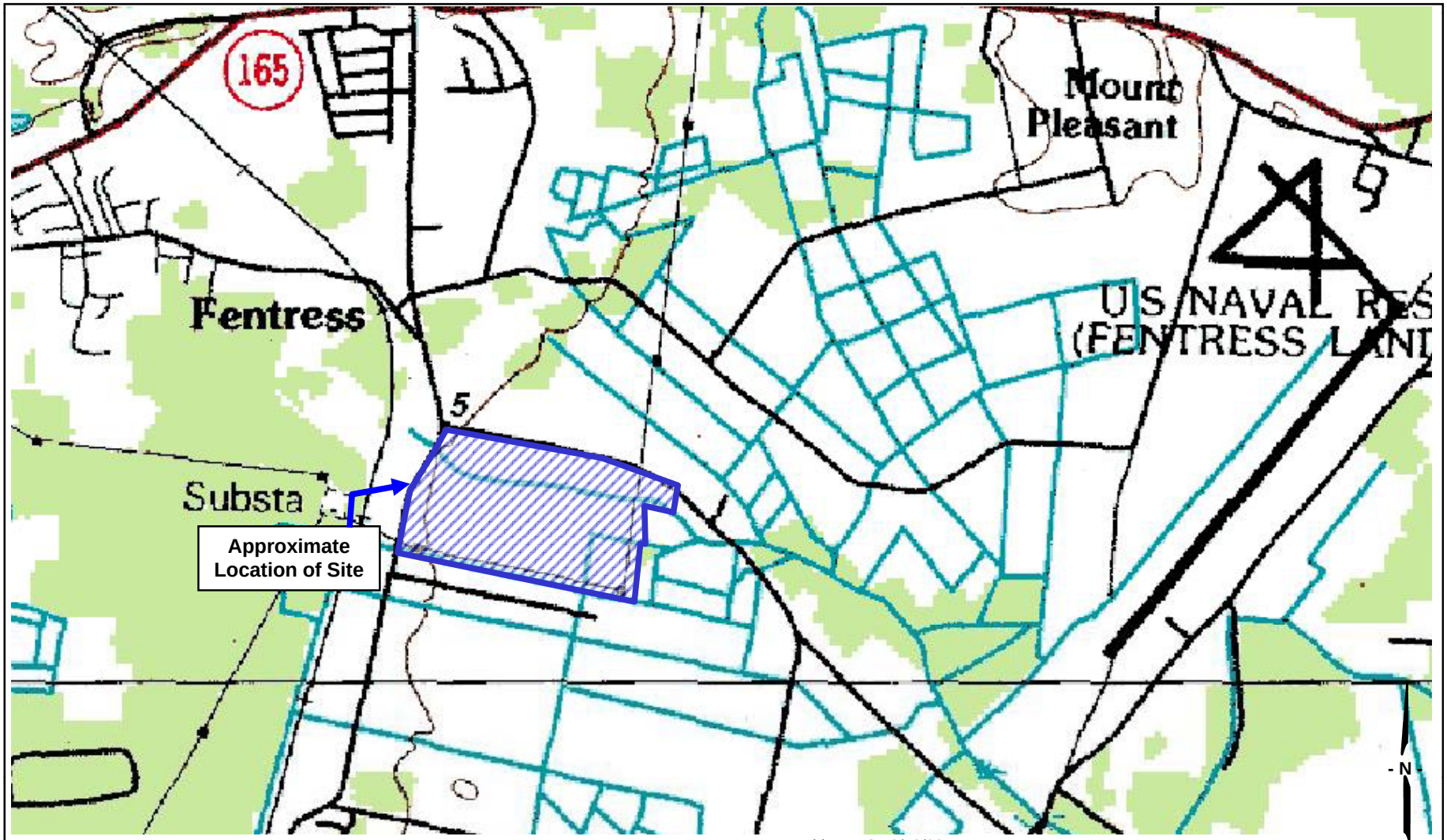
FIGURES

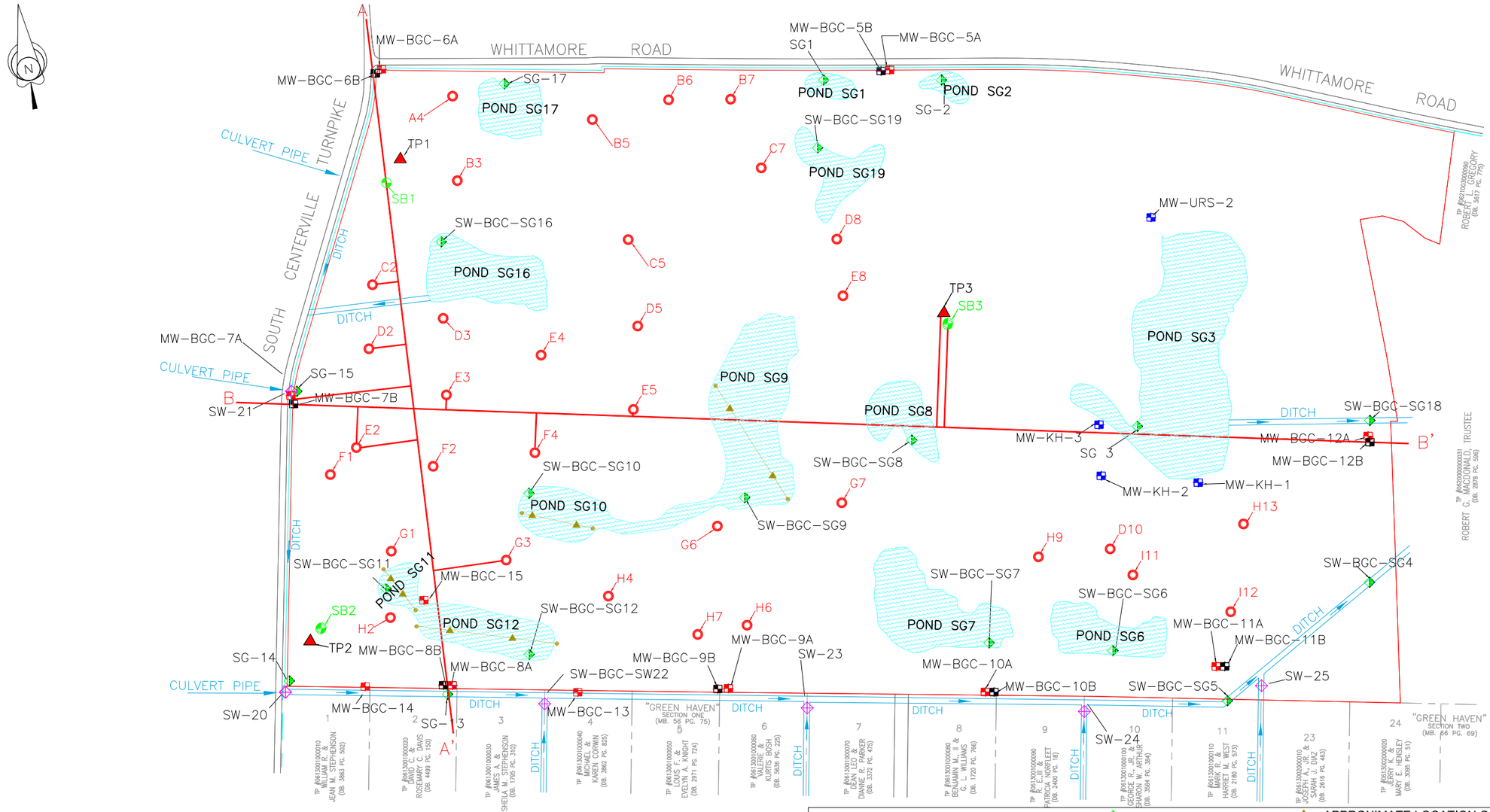


Source: USGS Topographic Map, Available online at <*http://terraserver-usa.com/image.aspx*>. July 1, 1969. Accessed October 13, 2008.

Prepared by: JES 10/13/08
Checked by: GBG 10/13/08

Battlefield Golf Club 1001 South Centerville Turnpike Chesapeake, Virginia	MACTEC 21740 Beaumeade Circle, Suite 150 Ashburn, Virginia 20147	Topographic Map Project Number 3552-09-1263 Figure 1

50350



APPROXIMATE TEST PIT LOCATION

APPROXIMATE SOIL BORING LOCATION

ARROW INDICATES SURFACE WATER FLOW DIRECTION IN DRAINAGE DITCHES

STAFF GAUGE

SURFACE WATER (SW)

APPROXIMATE LINES OF SECTION

APPROXIMATE LINES OF POND GAUGING

APPROXIMATE LOCATION OF POND SEDIMENT SAMPLING

PRE-EXISTING MONITORING WELL LOCATION

SHALLOW MONITORING WELL LOCATION

INTERMEDIATE MONITORING WELL LOCATION

APPROXIMATE HAND AUGER LOCATION

NOTE: PONDS ARE IDENTIFIED BY THEIR CORRESPONDING STAFF GAUGE (SG) NUMBER (I.E. POND WITH STAFF GAUGE SG-17 WILL BE REFERRED TO AS POND SG17).

FIGURE 2
SITE PLAN

MACTEC ENGINEERING AND CONSULTING, INC.
21740 BEAUMEADE CIRCLE
ASHBURN, VA 20147

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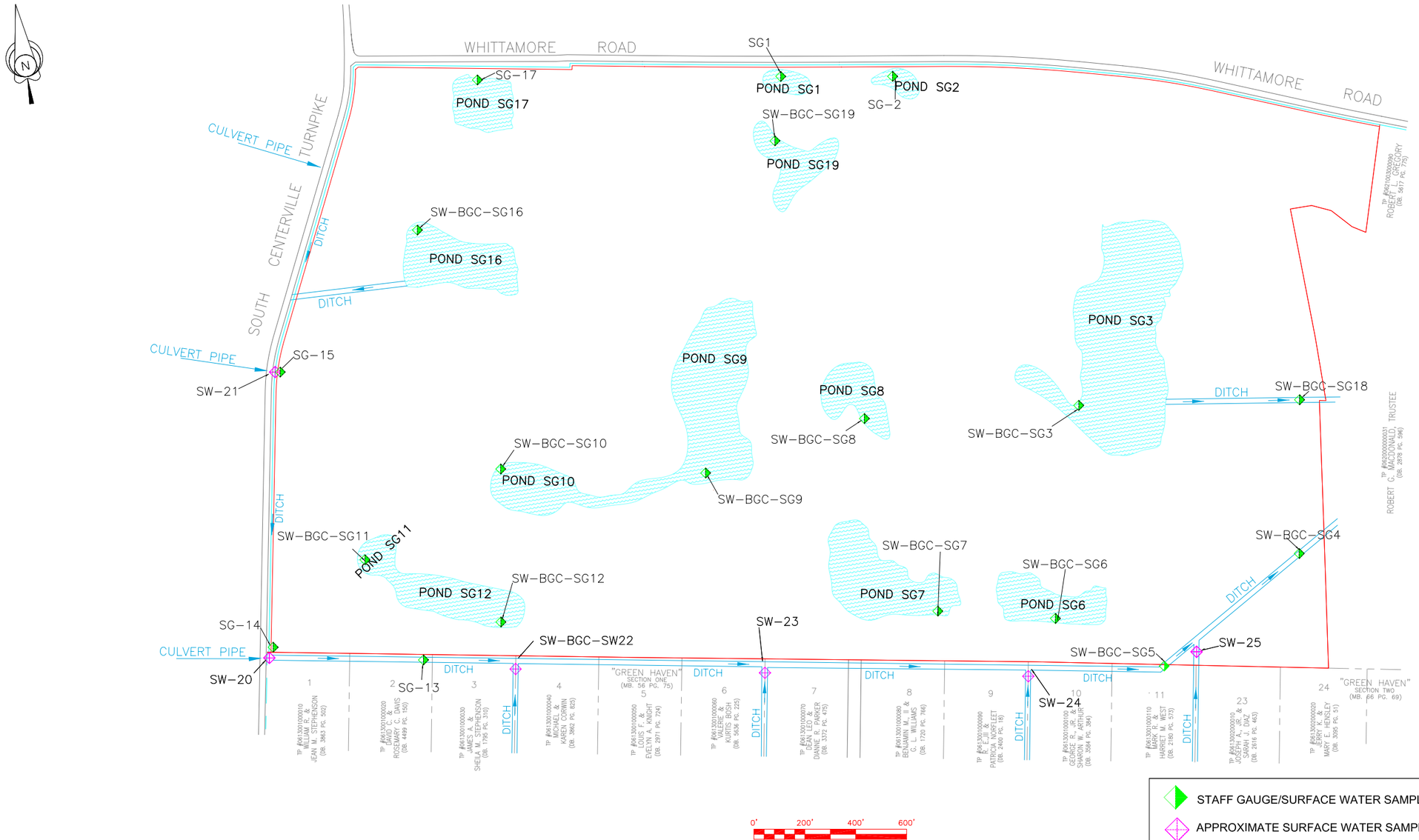
Drn. by	M.R.C.
Chk. by	G.B.G.

BATTLEFIELD GOLF CLUB
1001 SOUTH CENTERVILLE TURNPIKE
CHESAPEAKE, VA.

3552-09-1263	DECEMBER 2009	Approx. Scale: 1" = 400'

50351



STAFF GAUGE/SURFACE WATER SAMPLE LOCATION (SG)

APPROXIMATE SURFACE WATER SAMPLE LOCATION (SW)

ARROW INDICATES SURFACE WATER FLOW DIRECTION IN DRAINAGE DITCHES IN DECEMBER 2008

FIGURE 3
SURFACE-WATER SAMPLE LOCATIONS

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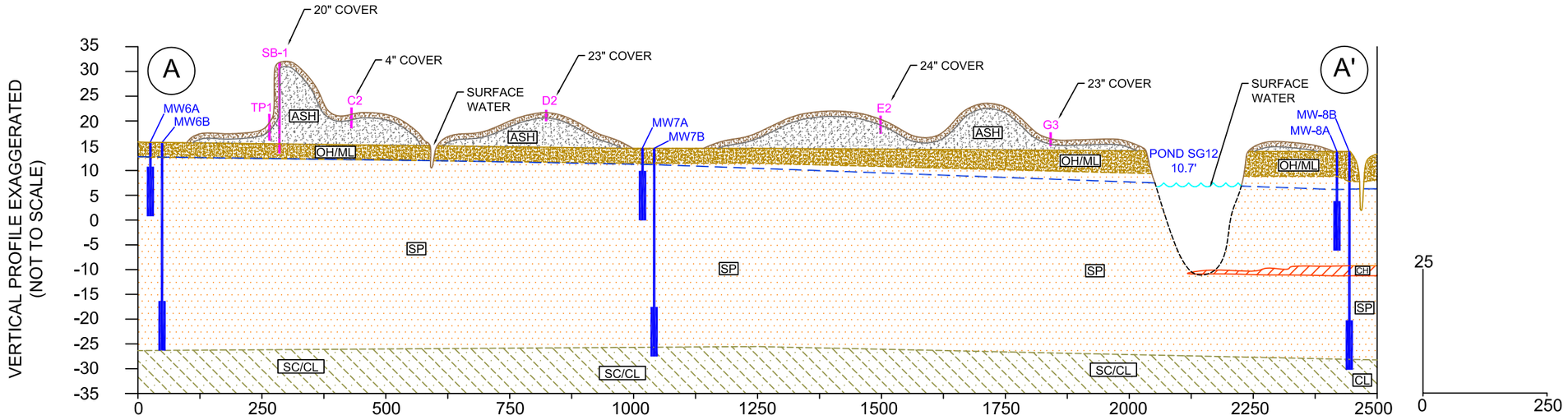
BATTLEFIELD GOLF CLUB
1001 SOUTH CENTERVILLE TURNPIKE
CHESAPEAKE, VA.

3552-09-1263	DECEMBER 2009	Approx. Scale: 1" = 400'



APPROXIMATE HORIZONTAL SCALE (FROM A TO A')
SURFACE FEATURES WERE PROJECTED FROM ACTUAL LOCATIONS TO THE LINE OF SECTION A-A' INDICATED ON FIGURE 3 AND ARE NOT TO SCALE

NOTE: Approximate locations projected along line of section A-A' of soil boring (SB-1), test pit (TP1), hand auger borings (C2, D2, E2 & G3) and monitoring wells (MW6A, MW6B, MW7A, MW7B, MW8A & MW8B) as indicated on Figure 2 are included for reference.

*** This cross-section is a conceptual interpretation of general stratigraphic features at the site. A topographic survey was not performed. Surface features were extrapolated between known ground surface elevations at monitoring wells and staff gauge bottom elevations. Pond depths were gauged at approximately 10 foot intervals (depth indicated is the deepest measurement below the pond surface).**

LEGEND:

FILL

SOIL COVER (FILL MATERIAL), DESCRIBED AS:
gray-brown sandy silty clay and clayey silt.
contains organic material, generally stiff.

ASH FILL, DESCRIBED AS:
gray-black silty very fine-grain sand or sandy silt, generally firm to semi-consolidated.

STRATUM A

POSSIBLE COLUMBIA GROUP (OH/ML), DESCRIBED AS:
dark brown to grayish brown or black clayey silt with sand (OH/ML), organic rich, generally firm.

POSSIBLE COLUMBIA GROUP (SP), DESCRIBED AS:
gray to light gray and yellow fine to coarse sand (SP) with interlayered soft gray clay (CH), loose to dense.

STRATUM B

POSSIBLE YORKTOWN FORMATION (SC/CL), DESCRIBED AS:
light to dark greenish gray fine sand (SC) and clay with trace silt (CL), generally loose.

FIGURE 4
CONCEPTUAL CROSS SECTION A-A'

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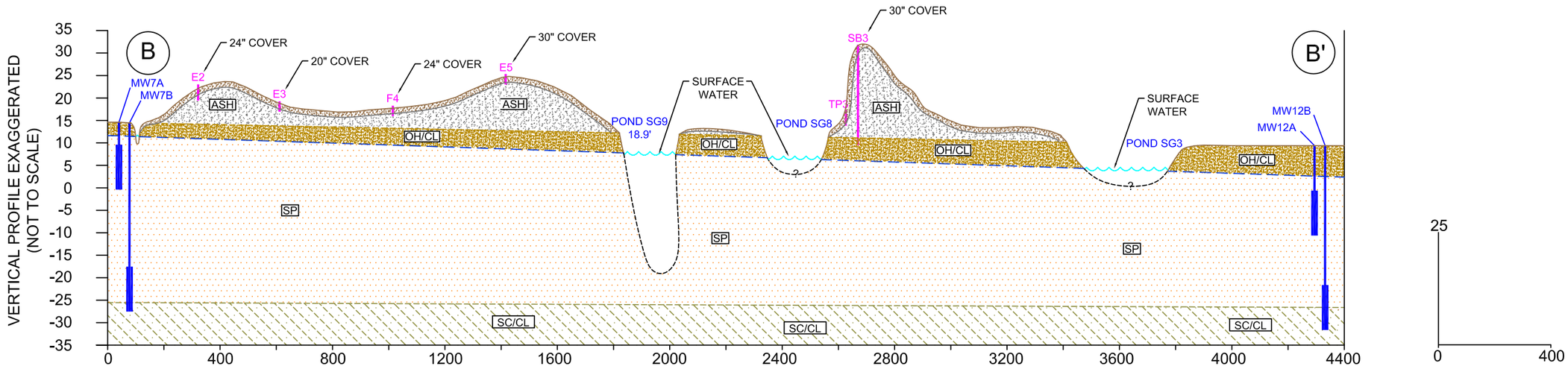
Chk. by	G.B.G.

BATTLEFIELD GOLF CLUB
1001 SOUTH CENTERVILLE TURNPIKE
CHESAPEAKE, VA.

3552-09-1263	DECEMBER 2009	Scale: As shown

50353



APPROXIMATE HORIZONTAL SCALE (FROM B TO B')
SURFACE FEATURES WERE PROJECTED FROM ACTUAL LOCATIONS TO THE LINE OF SECTION B-B' INDICATED ON FIGURE 3 AND ARE NOT TO SCALE

NOTE: Approximate locations projected along line of section B-B' of soil boring (SB3), test pit (TP3), hand auger borings (E2, E3, F4 and E5) and monitoring wells (MW7A, MW7B, MW12A & MW12B) as indicated on Figure 2 are included for reference.

*** This cross-section is a conceptual interpretation of general stratigraphic features at the site. A topographic survey was not performed. Surface features were extrapolated between known ground surface elevations at monitoring wells and staff gauge bottom elevations. Pond depths were gauged at approximately 10 foot intervals (depth indicated is the deepest measurement below the pond surface).**

LEGEND:

FILL

SOIL COVER (FILL MATERIAL), DESCRIBED AS:
gray-brown sandy silty clay and clayey silt.
contains organic material, generally stiff.

ASH FILL, DESCRIBED AS:
gray-black silty very fine-grain sand or sandy silt, generally firm to semi-consolidated.

STRATUM A

POSSIBLE COLUMBIA GROUP (OH/ML), DESCRIBED AS:
dark brown to grayish brown or black clayey silt with sand (OH/ML), organic rich, generally firm.

POSSIBLE COLUMBIA GROUP (SP), DESCRIBED AS:
gray to light gray and yellow fine to coarse sand (SP) with interlayered soft gray clay (CH), loose to dense.

STRATUM B

POSSIBLE YORKTOWN FORMATION (SC/CL), DESCRIBED AS:
light to dark greenish gray fine sand (SC) and clay with trace silt (CL), generally loose.

FIGURE 5
CONCEPTUAL CROSS SECTION B-B'

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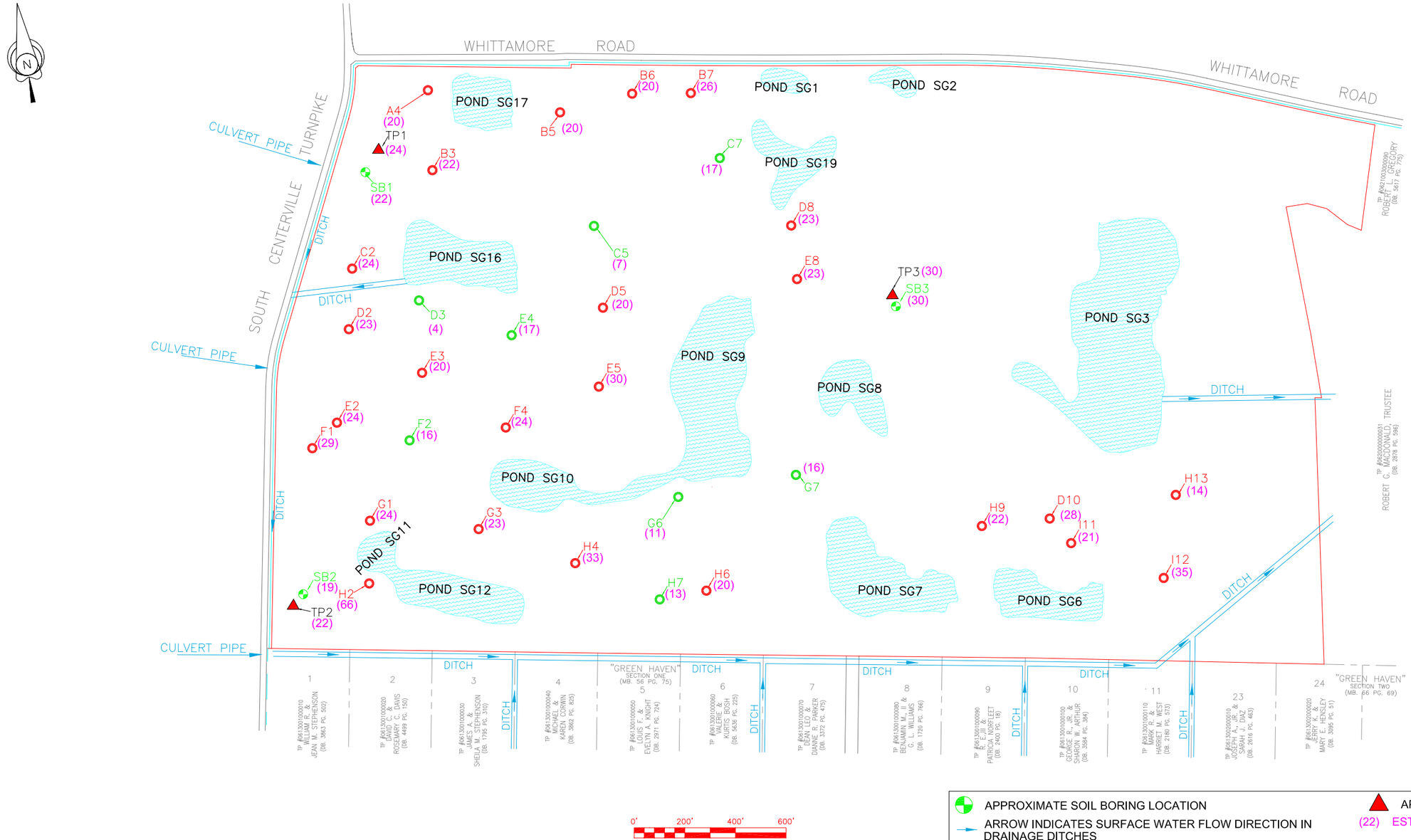
BATTLEFIELD GOLF CLUB
1001 SOUTH CENTERVILLE TURNPIKE
CHESAPEAKE, VA.

3552-09-1263	DECEMBER 2009	Scale: As shown

50354



APPROXIMATE SOIL BORING LOCATION

APPROXIMATE TEST PIT LOCATION

ARROW INDICATES SURFACE WATER FLOW DIRECTION IN DRAINAGE DITCHES

(22) ESTIMATED SOIL COVER THICKNESS (INCHES)

APPROXIMATE HAND AUGER LOACTION

APPROXIMATE HAND AUGER LOCATION WITH LESS THAN 18' OF SOIL COVER

FIGURE 6
SOIL COVER THICKNESS MAP

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Chk. by	G.B.G.

BATTLEFIELD GOLF CLUB
1001 SOUTH CENTERVILLE TURNPIKE
CHESAPEAKE, VA.

3552-09-1263	DECEMBER 2009	Approx. Scale: 1" = 400'

50355

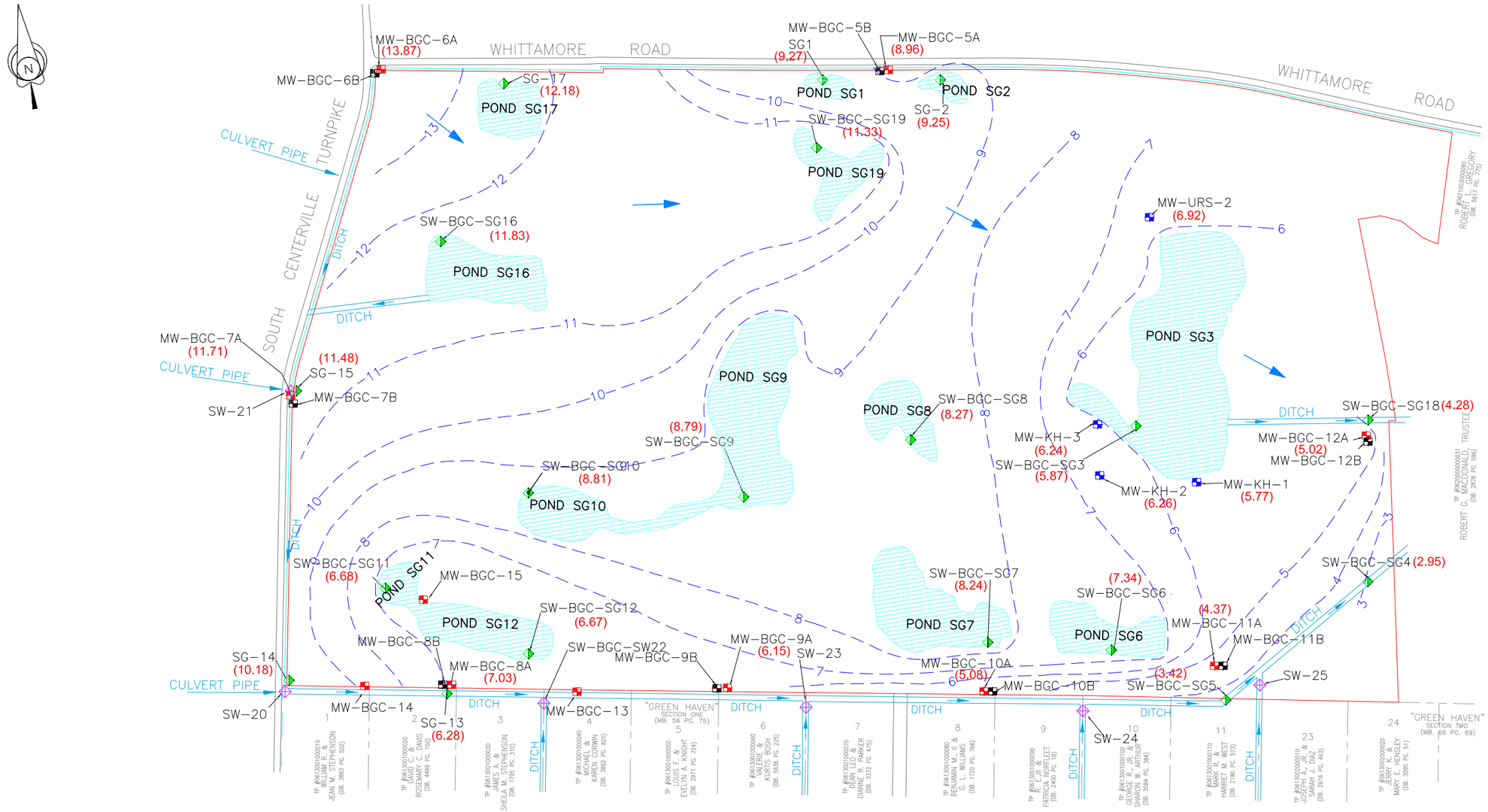

FIGURE 7
GROUNDWATER CONTOUR MAP FOR SHALLOW-DEPTH WELLS
(DECEMBER 3, 2008)

MACTEC ENGINEERING AND CONSULTING, INC.
21740 BEAUMEADE CIRCLE
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Chk. by	G.B.G.

BATTLEFIELD GOLF CLUB
1001 SOUTH CENTERVILLE TURNPIKE CHESAPEAKE, VA.

3552-09-1263	DECEMBER 2009	Approx. Scale: 1" = 400'

50356

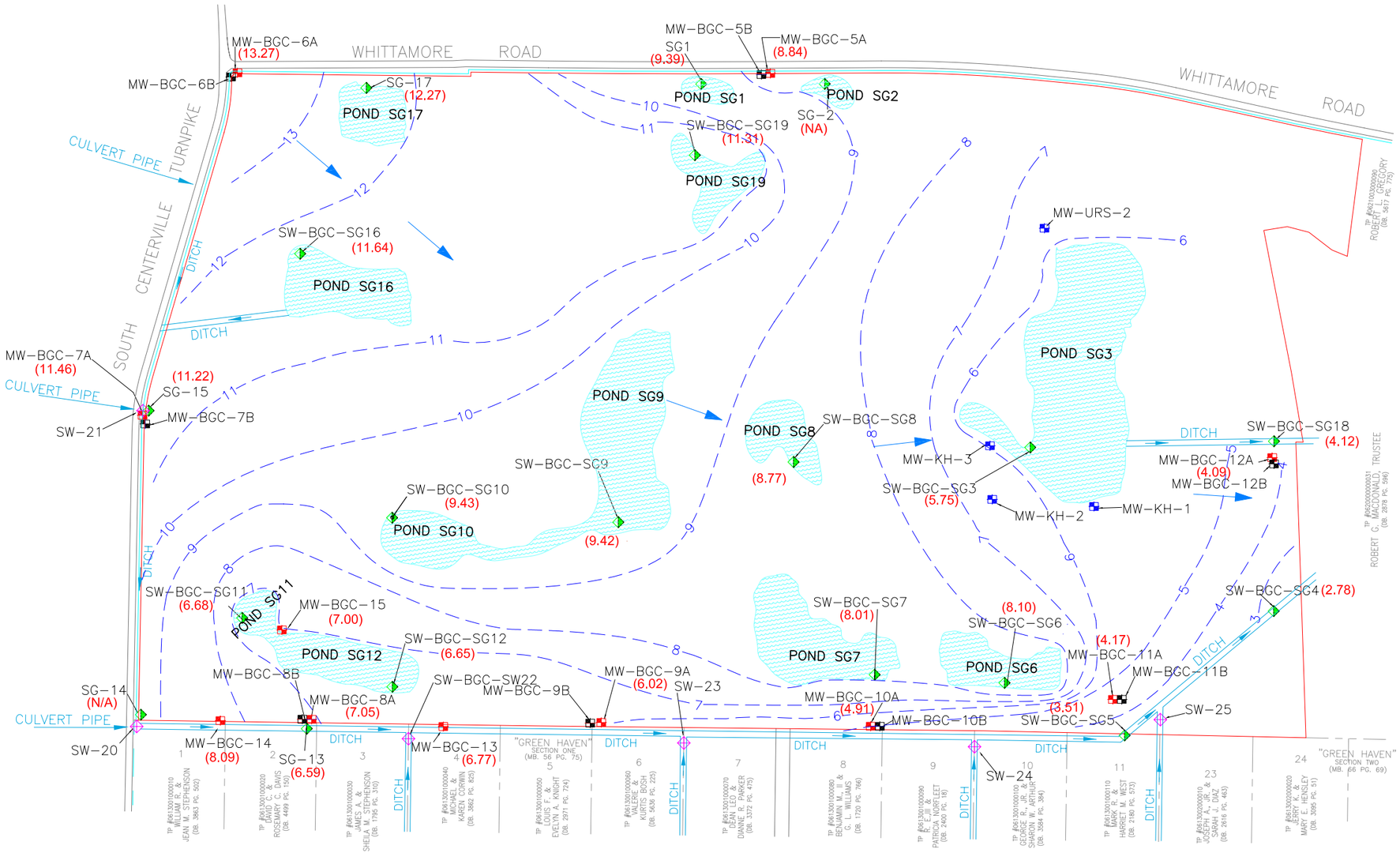


FIGURE 8
GROUNDWATER CONTOUR MAP FOR SHALLOW-DEPTH WELLS
(JUNE 16, 2009)

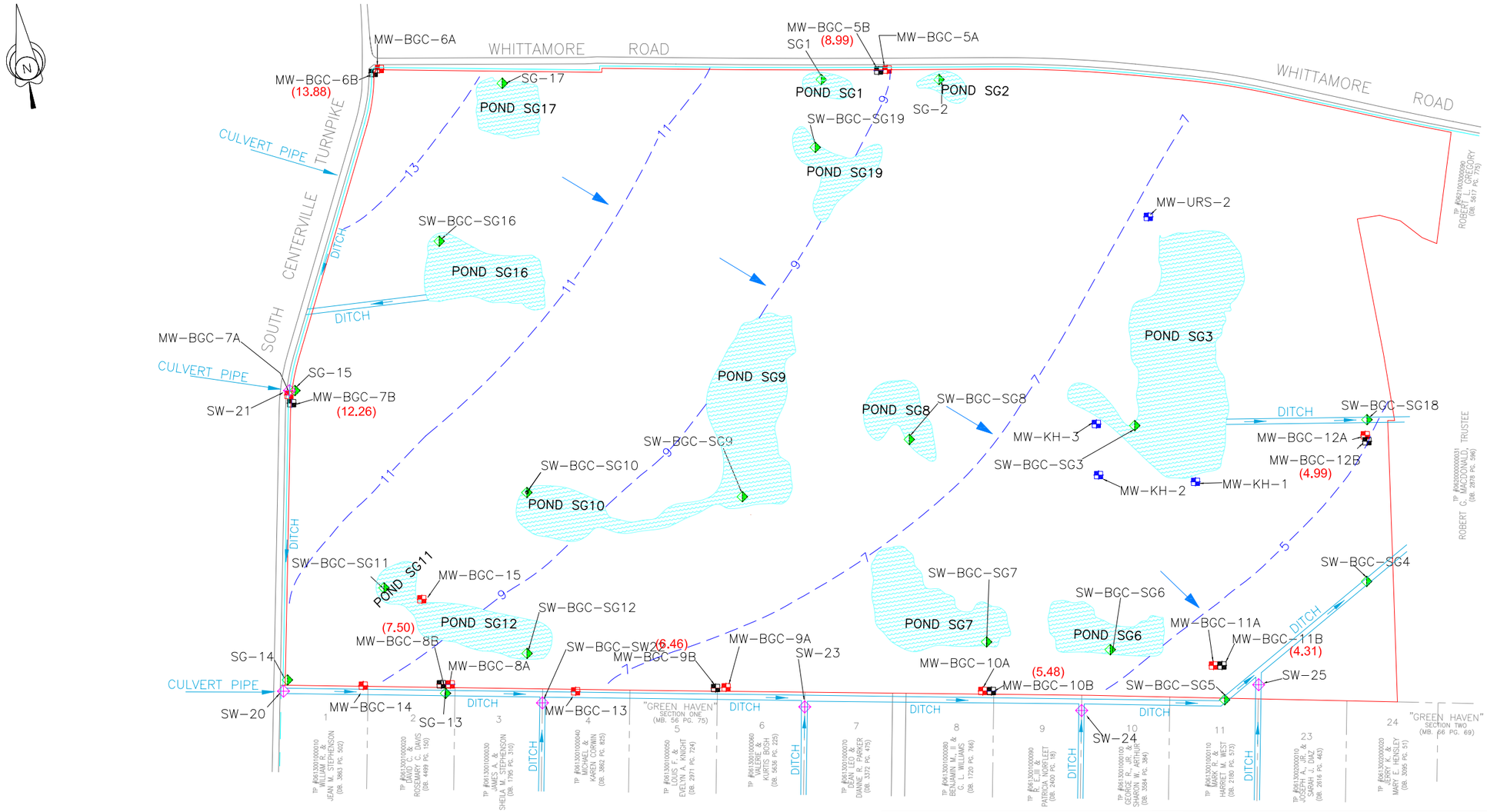
MACTEC ENGINEERING AND CONSULTING, INC.
21740 BEAUMEADE CIRCLE
ASHBURN, VA 20147

Des. by	J.M.B.
Drn. by	M.R.C.
Chk. by	G.B.G.

BATTLEFIELD GOLF CLUB
1001 SOUTH CENTERVILLE TURNPIKE CHESAPEAKE, VA.

3552-09-1263	DECEMBER 2009	Approx. Scale: 1" = 400'

50357



NOTE: As intermediate-depth wells are not available in the interior of the site, contours and inferred flow directions are conceptual only. For purposes of this map, its assumed Surface-Water features of the site do not influence intermediate-depth Groundwater.

0' 200' 400' 600'

ARROW INDICATES SURFACE WATER FLOW DIRECTION IN DRAINAGE DITCHES

INFERRED GROUNDWATER FLOW DIRECTION

9 ESTIMATED GROUNDWATER CONTOUR

STAFF GAUGE/SURFACE WATER SAMPLE LOCATION (SG)

SURFACE WATER (SW)

PRE-EXISTING MONITORING WELL LOCATION

SHALLOW MONITORING WELL LOCATION

INTERMEDIATE MONITORING WELL LOCATION

(5.48) APPROXIMATE GROUNDWATER ELEVATION (feet, msl)

FIGURE 9
GROUNDWATER CONTOUR MAP FOR INTERMEDIATE-DEPTH WELLS (DECEMBER 3, 2008)

MACTEC ENGINEERING AND CONSULTING, INC.
21740 BEAUMEADE CIRCLE
ASHBURN, VA 20147

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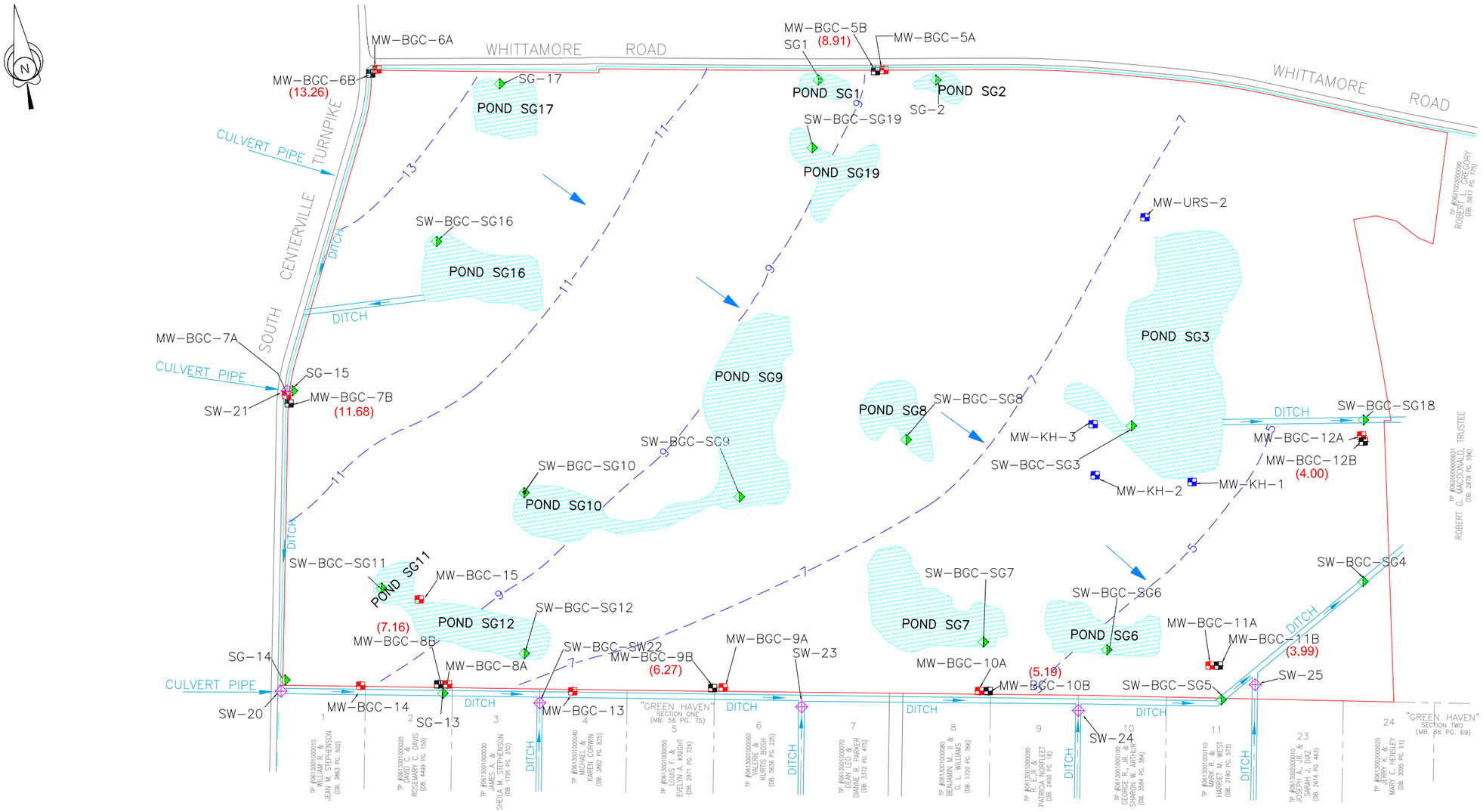
Chk. by	G.B.G.

BATTLEFIELD GOLF CLUB
1001 SOUTH CENTERVILLE TURNPIKE CHESAPEAKE, VA.

3552-09-1263	DECEMBER 2009	Approx. Scale: 1" = 400'



NOTE: As intermediate-depth wells are not available in the interior of the site, contours and inferred flow directions are conceptual only. For purposes of this map, its assumed Surface-Water features of the site do not influence intermediate-depth Groundwater.

FIGURE 10
GROUNDWATER CONTOUR MAP FOR INTERMEDIATE-DEPTH WELLS
(JUNE 16, 2009)

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21740 BEAUMEADE CIRCLE
ASHBURN, VA 20147

Des. by	J.M.B.
Drn. by	M.R.C.
Chk. by	G.B.G.

BATTLEFIELD GOLF CLUB
1001 SOUTH CENTERVILLE TURNPIKE
CHESAPEAKE, VA.

3552-09-1263	DECEMBER 2009	Approx. Scale: 1" = 400'

50359

NOTE: SOIL EXHIBITING PPA RESULTS OF GREATER THAN 5 TONS $CaCO_3$/1,000 TONS MATERIAL ARE CONSIDERED ACID SULFATE MATERIAL (VIRGINA TECH LAB, 7/8/2009).

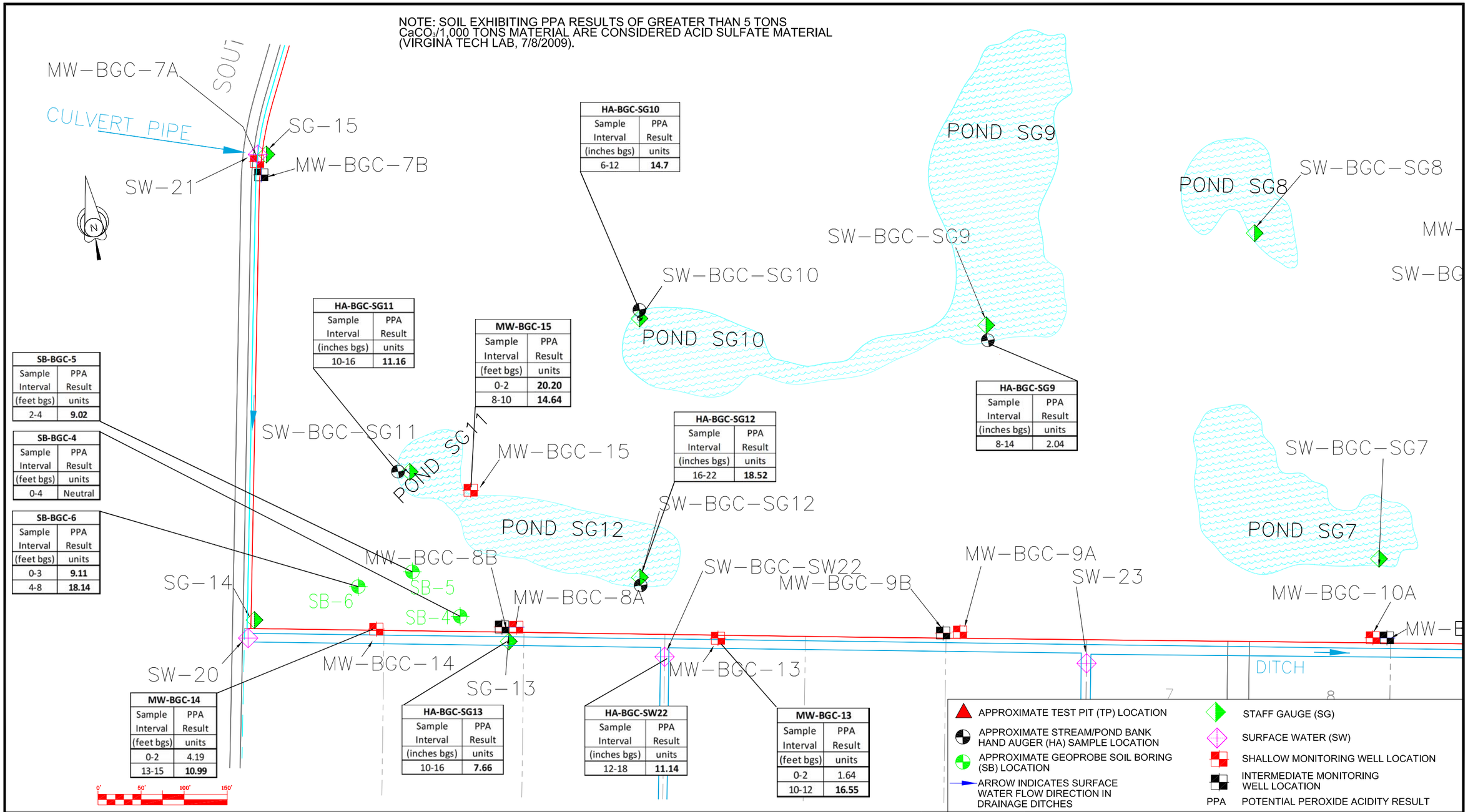

FIGURE 11
POTENTIAL PEROXIDE ACIDITY (PPA) RESULTS IN SOIL

MACTEC ENGINEERING AND CONSULTING, INC.
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ASHBURN, VA 20147

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1001 SOUTH CENTERVILLE TURNPIKE
CHESAPEAKE, VA.

3552-09-1263	DECEMBER 2009	Approx. Scale: 1" = 100'

50360