Review and Analysis of Historical Aerial Photographs of Martin State Airport 701 Wilson Point Boulevard Middle River, Maryland

Prepared for:

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February 2013

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ACRONYMS

AST	aboveground storage tank
CRA	Compass Rose Area
DRA	Dump Road Area
EGIS	environmental geographic information system
EM	electromagnetic
GSP	Greater Strawberry Point
gunp	Gunpowder River area
IRP	Installation Restoration Program
LiDAR	light-detection and ranging
Lockheed Martin	Lockheed Martin Corporation
MAA	Maryland Aviation Administration
MDANG	Maryland Air National Guard
MDE	Maryland Department of the Environment
MIP	membrane-interface probe
MRC	Middle River Complex
MSA	Martin State Airport
MT	Main Terminal
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
PA	preliminary assessment
PAH(s)	polycyclic aromatic hydrocarbon(s)
PCB(s)	polychlorinated biphenyl(s)
REC	recognized environmental condition
RI	remedial investigation
SP	Strawberry Point
SVOC(s)	semivolatile organic compound(s)
TCE	trichloroethene
Tetra Tech	Tetra Tech, Inc.
USEPA	United States Environmental Protection Agency
USDA	United States Department of Agriculture
USGS	United States Geological Survey
UST(s)	underground storage tank(s)

VOC(s)	volatile organic compound(s)

Section 1
Introduction

1.1 SCOPE

On behalf of Lockheed Martin Corporation (Lockheed Martin), Tetra Tech, Inc. (Tetra Tech) has prepared this report presenting results from a review and analysis of historical aerial photographs, maps, and drawings of Martin State Airport in Middle River, Maryland. The scope of this investigation includes reviewing available historical vertical and oblique aerial photography, handheld snapshot photography, historical maps, and other historical diagrams of the land area currently occupied by Martin State Airport. This review covers air photographs from 1938 to 1998.

1.2 OBJECTIVE

Environmental investigations have been conducted at Martin State Airport since the mid-1980s. Several environmental evaluations of historical information have been completed for most of the developed portions of Martin State Airport, including the Main Terminal (MT), Strawberry Point (SP), and the Maryland Air National Guard (MDANG) areas. A broad range of historical documentation provides histories of the study areas and discussions of land development patterns over time. Additional, more extensive, environmental investigations have been conducted at the three areas listed above, as well as at the Dump Road Area (DRA), Greater Strawberry Point (GSP), and the Compass Rose Area (CRA) at Martin State Airport.

The purpose of the current study is to review historical aerial photographs and drawings to document historical changes at Martin State Airport and identify potential areas of environmental concern. The results of this study will also be used to:

- supplement existing environmental knowledge and history of the airport sites
- assist in further determination of possible contaminant source areas

- develop conceptual site models for the sites, based on identified past site operations, activities, and physical features

This report is organized into the following sections:

Section 2—Site Overview and History: Presents the background and history of Martin State Airport and environmental sites of interest.

Section 3—Methodology: Presents the methods used to review and interpret features on the aerial photographs, other photographs, drawings, and museum archives.

Section 4—Results: Presents the review findings and includes an interpretation of aerial photographs, other photographs, drawings, and museum archives.

Section 5—Summary: Summarizes the study results.

Section 6—References: Cites references used to compile this report.

Section 2
Site Overview and History

2.1 MARTIN STATE AIRPORT

Martin State Airport (MSA) is in eastern Baltimore County on the peninsula between Frog Mortar Creek and Stansbury Creek, both of which are tributaries of Middle River that lead to Chesapeake Bay (Figure 2-1). Eastern Boulevard (Route 150) bounds MSA to the north and the Lockheed Martin Corporation (Lockheed Martin) Middle River Complex (MRC) is west of MSA, along with other light industrial operations and commercial facilities (Figure 2-2). MSA is a regional airport for private and corporate use and includes a flight training school. MSA also serves as the airport for the Maryland Air National Guard (MDANG); MDANG leases the northeastern corner of the MSA property. Excluding MDANG, the MSA includes approximately 600 acres of land.

The current MSA property was part of the Glenn L. Martin Company's approximately 1,260-acre property, which included surrounding areas containing manufacturing facilities. A search of Maryland land records and deeds indicates that the Glenn L. Martin Company purchased six parcels of land from private landowners during the spring and summer of 1929, identified as 701 Wilson Point Road. During the 1940s and 1950s, nine additional parcels at this location were acquired from private landowners. In 1969, the Glenn L. Martin Company (then known as Martin-Marietta Corporation) transferred the properties to Chesapeake Park, Inc. (a subsidiary of Martin-Marietta Corporation). Chesapeake Park, Inc. then transferred the MSA property to the State of Maryland, under ownership and operation by the Maryland Aviation Administration (MAA) beginning in 1975.

MAA currently operates MSA on behalf of the Maryland Department of Transportation. MSA has an administration and terminal building, aircraft hangars, a 7,000-foot -long runway, several taxiways, and the Strawberry Point (SP) hangar, which is currently used by the Maryland State Police. MAA manages more than 130,000 square feet of heated hangar space and 190 smaller

aircraft T-hangars. The southwestern portion of MSA contains numerous aboveground fuel storage tanks for Jet A and Avgas 100LL fuels. MSA is also home to more than 20 commercial tenants providing fuels and lubricants, helicopter avionics repair, and flight instruction, in addition to hosting Baltimore County Police aviation and marine units and the Glenn L. Martin Museum (MAA, 2012).

2.2 SURROUNDING LAND USE

As shown in Figure 2-2, MSA is generally characterized as a moderately developed tract in a largely suburbanized, moderate density, populated setting. Land use surrounding MSA is, to a significant degree, a combination of mixed suburban, industrial, commercial, lightly- to moderately-developed tracts, and woodland tracts. The northern boundary of MSA is bordered by Eastern Boulevard (Maryland Route 150) and the AMTRAK Northeast Corridor railroad line.

Undeveloped woodland tracts and low-density residential properties are north of MSA and the AMTRAK line (Figure 2-2). The MSA eastern, southern, and western boundaries are bordered by Frog Mortar Creek and Stansbury Creek, which are wide, brackish, tidal tributaries of middle Chesapeake Bay. The MRC lies along MSA's northwestern boundary. The Old Navy Depot-Bengies (Plant 2) is across from the MSA on Eastern Avenue. Low- to medium-density residential and light commercial land uses (e.g., shopping centers, convenience stores, restaurants, etc.) are beyond the creeks east, south, and west of MSA. Farther east and west of MSA are the high-density residential communities of Bengies Corner and Hawthorne Park. The town of Middle River is approximately 1.5 miles northwest of MSA.

2.3 MARTIN STATE AIRPORT STUDY AREAS

Environmental investigations of MSA began in the mid-1980s when the Maryland Department of the Environment (MDE) conducted site inspections related to stored drums and a reported chemical dump. In 1985, MDE inspected MSA and found approximately two hundred 55-gallon drums containing acetone, creosote, and chrome paint in the storage yard behind the maintenance building (MDE, 1989; see Figure 2-3). The drums were stored on bare ground, an arrangement MDE considered haphazard. MDE issued a "Site Complaint" on July 17, 1985 requiring the MAA to secure, sample, and remove all waste material from the site within 30 days of the permit.

MDE visited MSA in 1988 in response to an anonymous telephone call claiming that a large chemical dump had operated at a portion of Strawberry Point (SP) during World War II, and that a large number of drums containing zinc cyanide were buried there (MDE, 1989). MDE was unable to confirm these claims during site visits and interviews with past and current facility workers. However, during an interview conducted for the 1989 preliminary assessment (PA) (MDE, 1989), a former maintenance chief for the Glenn L. Martin Aircraft Company reported to MDE that the SP area, or an adjacent northwestern area, is the former location of a power station. The PA offers no other details regarding the power station.

Environmental investigations at MSA continue to evaluate the degree and extent of impacts to environmental media (soil, soil vapor, pond and creek sediment, surface water, groundwater, and biota) from chemicals and other materials used at the facility. To date, extensive studies have been conducted at the Dump Road Area (DRA) in the southeastern portion of MSA (Figure 2-4). The DRA was investigated by the MAA from 1991 to 1998, and by Lockheed Martin from 1999 to the present. Less extensive environmental investigations have been conducted by Lockheed Martin at the Main Terminal (MT), Greater Strawberry Point (GSP), SP, and Compass Rose Area (CRA), which are northwest, southwest, south, and southeast of the DRA (Figure 2-4). Lockheed Martin has also conducted separate studies of Stansbury Creek and Frog Mortar Creek. MDANG has studied its property under a separate investigation. The MSA study areas are briefly described in the following sections.

2.3.1 Main Terminal

The MT area consists of the northwestern half of the airport runway, several taxiways, an administration and main terminal building, Hangars 1–6, commercial hangars west of Hangar 1, numerous small aircraft hangars, and the Lockheed Martin and Black & Decker, Inc., commercial hangers at the southern end of the MT area (Figures 2-2 and 2-4). The MT area houses more than 130,000 square feet of hangar space and 190 smaller aircraft hangars. A large fueling station with several underground storage tanks (USTs) is adjacent to the northeastern corner of Hangar 4.

2.3.1.1 History

Three former runways, Hangars 1-3, and the airport administration building were built in 1939–1940. Hangars 4–6 and the SP hangar were completed in 1940–1941. A 1959 Factory

Insurance Association map of the MT area (Tetra Tech, 2010a) highlights operations occurring in the hangars, as well as utilities, oil-burning equipment, and petroleum storage facilities. The map also shows cross-sectional views of the hangars. Hangars 1–6 are shown with dimensions and layouts approximately consistent with their current configuration. Concrete aprons are shown along the northeastern edge of Hangars 1–3 and along the southeastern edge of Hangars 4–6. Fueling stations are on the opposite sides of the concrete aprons, each listing five 5,000-gallon USTs. Historical records reviewed as part of previous studies also indicate that before 1975 the MT hangars were used to produce, test, and maintain aircraft and associated parts and military materials.

Two primary aircraft fueling/de-fueling areas were near the northernmost corner of Hangar 1, and near the southern corner of Hangar 3. Hangars 1–3 included rooms or areas housing a propeller hoist, a propeller storage and cleaning area, liquid oxygen storage, radar equipment testing, fire trucks, and a garage. Hangars 4–6 included rooms or areas housing a propeller hoist, a parachute drying area, a machine gun cleaning/assembly/storage area, instrument and radio storage, a gun-sight storage vault, guided missiles, a parachute folding area, an electronic school; instrument and radio storage; and a fire house. From the 1940s to 1950s, a "missile engine test area" was located near fueling pit in the southern portion of the MT area, approximately 400 feet southeast of Hangar 6.

Several buildings formerly surrounded the current Lockheed Martin hangar building, in the southwest quadrant of the MT area. While Glenn L. Martin Company occupied the area, historical structures included a maintenance storage building, an organic material storage shed, a surplus storage shed, and a plating-material storage shed. Some of these structures were in what is now identified as a storm water-management pond south of the Lockheed Martin hangar.

2.3.1.2 Previous Environmental Investigations

Environmental investigations and evaluations of the MT area (Tetra Tech, 2010a,b) to date have concentrated on environmental impacts to the site resulting from practices that occurred between 1929–1975, when the Glenn L. Martin Company and Martin Marietta owned and operated on the property. Possible areas of environmental concern at the MT area were identified through historical aerial photographs, facility records, local and federal library documents, museum

records, regulatory data, environmental database reviews, interviews with former employees, and locating and reviewing environmental reports and data.

Recognized environmental conditions (RECs) were identified at the site, based on the presence (or likely presence) of hazardous substances and/or petroleum products under conditions that could indicate a historical, existing, or potential release to the property's structures, soil, groundwater, or surface water. The environmental evaluation identified nine RECs (RECs #1–9) and five potential RECs (RECs #10–14) in the MT area. A second environmental evaluation identified eight additional RECs (RECs #15–22) and provided additional details on 10 of the initial RECs. A historical UST was discovered at potential REC #14, which led to its upgrading to a full REC. Locations of the MT area RECs, exclusive of potential RECs #10–13, are shown in Figure 2-5.

Four RECs pertain to former aircraft fueling operations (RECs #1–4). Two other RECs (RECs #5 and 6) were identified in connection with former hangar operations before 1975, and another four RECs relate to former heating equipment and related oil storage facilities for the hangars (RECs #8, 9, 14, 15, and part of REC #3). REC #7 pertains to a historical missile-engine testing area. REC #18 is associated with testing operations conducted in the hangars. RECs #16 and 17 were identified because they may possibly be locations that stored, disposed of, or used solvents and petroleum products. Part of RECs #19 and 20 are associated with equipment housed in these hangars. Parts of REC #19 and REC #21 relate to historical site operations in the hangars. REC #22 relates to the materials and operations involved in cleaning and drying parachutes, although the exact nature of those materials and operations remains unclear.

The environmental evaluation identified the following RECs:

- REC #1—former fueling station "A" at Hangar 1 apron
- REC #2—former fueling station "B" at Hangar 6 apron
- REC #3—former fueling and defueling pits and fuel oil USTs at Hangar 1
- REC #4—Hangar 3 historical gasoline USTs
- REC #5—Hangar 1 former propeller cleaning area
- REC #6—Hangar 4 former machine gun cleaning and assembly area
- REC #7—missile-engine test area circa 1959
- REC #8—Hangar 2 heating room/boiler

- REC #9—Hangars 4 and 5 heating/boiler rooms
- Potential REC #10 maintenance storage
- Potential REC #11—organic material storage shed
- Potential REC #12—surplus storage shed
- Potential REC #13—plating material storage
- REC #14—MAA self-fueling station and historical oil UST
- REC #15—former fuel oil USTs at Hangar 6
- REC #16—Hangar 2 oil room
- REC #17—Hangar 2 solvent booth
- REC #18—Hangar 2 radar and shielded rooms
- REC #19—Hangar 3 washing area and rotating lift
- REC #20—Hangar 3 compressor and motor room
- REC #21—Hangar 5 painting/stripping area and acid-neutralization system
- REC #22—Hangar 4 parachute drying area

A Phase II investigation in 2011 evaluated the presence of hazardous materials (resulting from former operations) that may have been placed, leaked, or spilled at RECs #1–9 and RECs #14-22. Phase II activities consisted of surface and subsurface explorations and testing to investigate possible impacts from historical operations at 18 different RECs in the MT area. Geophysical surveys located USTs and UST-related appurtenances (e.g., piping, sumps, etc.) in the areas of RECs #1–4, 7, and 14–15. Active soil gas sampling and membrane-interface probes (MIP) were conducted at 25 locations. Sixteen soil borings were also advanced throughout these areas, and soil samples were collected for chemical analyses. Six shallow groundwater monitoring wells were installed to monitor groundwater quality in the areas of the standalone RECs around the perimeters of Hangars 1–6.

The 2011 Phase II results indicated petroleum hydrocarbon impacts to subsurface media in the area of REC #3, the former fueling/defueling pits and fuel oil USTs at the northwestern corner of Hangar 1. The results of the Phase II investigation also indicate petroleum hydrocarbon impacts to subsurface media in the areas of REC #2 and RECs #9 (Hangar 4 and 5 former boiler rooms) and #21 (Hangar 5, the former painting, stripping and acid neutralization area).

2.3.2 Greater Strawberry Point

GSP is southwest and south of the runway (Figure 2-4). Site topography ranges from flat to gently sloping to the southwest toward Stansbury Creek. Currently, GSP includes an airport maintenance area, hangars, a fuel storage tank farm, the southern terminus of the MSA runways, and associated aprons. The Maryland State Police lease the large hangar near the SP wooded area and use it for light aircraft and helicopters (Figure 2-2). This hangar was constructed in the early 1990s near the former delivery hangar (Building No. 11 in Figure 2-6) that was demolished in 1989. Farther south, a small building (Building No. 003 in Figure 2-6) near Frog Mortar Creek is currently occupied by the Baltimore County Marine Police (Figure 2-2).

The MSA maintenance area (Building No. 022 in Figure 2-6) is approximately 700 feet northwest of the Police Hangar (Building Nos. 007 and 008 in Figure 2-6). Buildings currently in use in the maintenance area include a salt dome (Building No. 049), a sand dome (Building No. 050), and a maintenance building (Building No. 022). These structures were constructed in the early 1990s. Immediately north of GSP is the new Lockheed Martin hangar (Building No. 051) and the Black & Decker hangar (Building No. 052).

The MSA fuel storage tank farm (Building No. 001 in Figure 2-6) is on the southern edge of the airport, close to Frog Mortar Creek. Thirteen MAA aboveground storage tanks (ASTs), with a total capacity of nearly 95,000 gallons, store Jet A fuel, aviation gasoline, unleaded gasoline, diesel fuel, and waste oil. Secondary containment at the tank farm consists of concrete containment dikes with ancillary oil and water separators that discharge into a nearby drainage ditch (i.e., National Pollutant Discharge Elimination System [NPDES] monitoring Outfall 005), which flows into Frog Mortar Creek. The oil and water separators remove petroleum from storm water runoff conveyed through the drainage systems from various impervious areas of the airport. The separators are maintained through periodic inspections and cleaning.

The tank farm is divided into east and west sides. The east side is further divided into the north and south containment areas. Tanks MAA 1 through MAA 3 are in the north containment area, and MAA 4 through MAA 6 are in the south containment area; all tanks can store 12,000 gallons (MAA, 2008). Figure 2-6 (Building No. 001) shows the location of the fuel storage tank farm.

Tanks in this area are used by both MAA and the Maryland State Police. Buried pipes from the containment areas deliver fuel to the Maryland State Police fuel rack. The fuel tanks are filled under contract with Exxon Mobil. Tank trucks used to transport fuel to airplanes throughout the airport are also filled at these containment areas.

The southeastern portion of the tank farm contains two 6,000-gallon tanks bearing unleaded gasoline (MAA 7 and MAA 8) and one 6,000-gallon diesel fuel (MAA 9) tank. All are owned by MAA and provide fuel for state-owned vehicles at the tank farm, including the tank trucks. A 4,000-gallon AST (MAA 21) stores aviation gasoline.

Two waste oil tanks (MAA 22 and MAA 23) at the tank farm are in two different containment areas: a 275-gallon AST is in the containment dike with ASTs MAA 4 through MAA 6 and a 350-gallon AST is in the containment dike with ASTs MAA 7 through MAA 9. An additional 275-gallon tank (MAA 26) in the containment dike with ASTs MAA 1 through MAA 3 captures vapor from the pressure-release valve on filter vessels; used fuel does not enter this tank.

Several tenant-owned ASTs are also at the tank farm: two 30,000-gallon and two 12,000-gallon Jet A fuel tanks, one 500-gallon waste oil tank, and two 275-gallon waste oil tanks. All tanks in the tank farm are within secondary containment dikes. The remaining fixed-storage containers are located throughout the facility: three 500-gallon diesel fuel tanks (MAA 18 through MAA 20) inside the fire pump house, an out-of-service 500-gallon tank near the maintenance shop, and an out-of-service 55-gallon drum inside the storage shed.

Drums are routinely stored at the airport in designated storage areas. Two such areas are in the maintenance and auto shop (MAA 15 and MAA 16); a third is inside the maintenance shed (MAA 17) southeast of that location. Unopened stocks of motor oil, transmission fluid, and hydraulic fluid are stored in the area designated MAA 17; stock currently being used is stored in the area designated MAA 15. Small drums of waste oil are stored in the area designated MAA 16. All other drum storage areas typically store no more than five drums, although the number may vary depending on operational needs. All drum storage areas have secondary containment pallets on which the drums are stored.

2.3.2.1 History

The United States Navy leased GSP from the Glenn L. Martin Company from December 23, 1943 until 1963. The Navy used the facility and supporting structures during that time, including a large hangar for seaplane maintenance, launching, and recovery operations. During Navy occupancy, the former hangar and surrounding GSP area was known as Naval Weapons Industrial Reserve Plant No. 148. The United States Air Force occupied the facility (Permit No.1-N-MD-714) from December 16, 1963 until 1967. During Navy and Air Force use, the southern portion of GSP near the wooded area contained 10 buildings (Figure 2-6). These included the beach house (Building No. 3), the pumping station (Building No. 4), the chlorination station (Building No. 5), two power fence service houses (Buildings No. 6 and 9), solvent storage (Building No. 7), the equipment storage building (Building No. 8), the power fence switch house (Building No. 10), the delivery hangar (Building ND/No. 11), and a general storage building (Building No. 12). A tank farm containing ASTs used to store aircraft fuels was adjacent to the wooded area near the southernmost tip of the developed area.

During the same period (1940s to 1960s), the northern portion of GSP was developed with several improvements related to naval weapons research. These structures included the induction test building (Building No. 13), the control house (Building No. 14), the noise suppression building (Building No. 15), the jet test shed (Building No. 16), the storage building (Building No. 17), the propulsion test building (Building No. 22), the compressor shed (Building No. 23), the engine test building (Building No. 24), and the vibration slosh test building (near the location of current ground surface mounding) (Figure 2-6). A missile testing area located along a straight road northwest of the propulsion test building included the hyper-therm test facility (Building No. 25), the propellant storage shed (Building No. 18), the furnace building (Building No. 19), the acetylene storage shed (Building No. 20), the vanguard tower (Building No. 21), the block house (Building No. 26), and three coupon test sheds (Buildings No. 27, No. 28, and No. 29).

Several buildings dedicated to nuclear research and testing were located farther northwest along a former dirt road connecting Strawberry Point Road to the historical airfield maintenance storage building (Building No. 37). Two main research buildings were designated as the critical test building (Building No. 36/Building KC) and the radioisotope lab (Building No. 35/Building KJ). These research labs operated under Nuclear Regulatory

Commission (NRC) permits. These buildings were decontaminated in the late 1980s; NRC terminated the licenses in 1995. A third building known as the liquid-metal test facility (Building No. 34) was just south of the labs. Several sheds were near the nuclear labs, including an organic material storage shed. These sheds were removed by Martin Marietta to construct Taxiway J.

Historical records indicate that two USTs were installed during the time the Navy and Air Force used the southern GSP facilities. A 10,000-gallon heating oil UST was located adjacent to the hangar (Building ND) to provide fuel for the hangar's heating system. This UST was closed in place in 1987 (post-Navy and -Air Force occupancy) when the hangar's heating system was converted from fuel oil to natural gas. Both the lease and permit for the Air Force expired on November 30, 1967.

On June 30, 1975, MSA was conveyed to the Maryland Department of Transportation. The State of Maryland currently uses MSA to house and maintain medevac units. The southern portion of GSP is occupied by the Baltimore County Marine Police.

Eleven USTs have been removed from MSA since 1983 and no evidence of leakage has been reported. The large hangar (Building ND) was demolished in 1989, and two adjacent hangars that currently house the Maryland State Police were constructed in 1989 and 1990. GSP currently contains a tank farm consisting of 12 ASTs for jet fuel, fuel oil, and gasoline, along with a pump house and other ancillary buildings currently used by the airport. As many as six ASTs at the tank farm are used by other tenants.

2.3.2.2 Previous Environmental Investigations

Studies of GSP to date include a Phase I environmental assessment and multiple Phase II intrusive investigations. The Phase I environmental assessment was conducted in winter 2007–08 to evaluate historical site activities pertaining to the tank farm, former hangar area (Building ND), facility maintenance yard, and nuclear research buildings (Tetra Tech, 2008). Tetra Tech reviewed historical facility documents, drawings, photographs, aerial photographs, and government records of appropriate permits and violations. These investigations also included interviews with former and current employees, a visual site inspection, and geophysical investigations of the SP wooded area.

Ten RECs were identified within the GSP area during the Phase I investigation. Some operations were combined into a single REC if they were nearby. Phase II studies to date have identified limited occurrences of polycyclic aromatic hydrocarbons (PAHs) and several metals in shallow soil and of volatile organic compounds (VOCs) in shallow groundwater. GSP investigations are ongoing.

2.3.3 Strawberry Point

SP, comprised of approximately 52 acres, is located at the southern tip of the peninsula between the confluence of Stansbury Creek and Frog Mortar Creek (Figures 2-4 and 2-6); the airport runway is northeast of SP. A wooded area is located at the southwest terminus and contains approximately 25 acres. The wooded area is bounded by earthen berms near the waterline, with thick brush and trees covering the entire area. Much of the SP wooded area was filled during the 1940s, reportedly via deposition of dredge spoils from Stansbury Creek and Frog Mortar Creek. A locked gate controls the entrance to the wooded area.

2.3.3.1 History

Along with GSP, the Navy also leased SP from the Glenn L. Martin Company on December 23, 1943. At that time, the Navy used SP and GSP for seaplane maintenance, launching, and recovery. As mentioned previously, MDE visited SP in 1988 in response to an anonymous telephone call claiming that a large chemical dump had operated at a portion of SP during World War II, and that a large number of drums containing zinc cyanide were buried there (MDE, 1989). MDE was unable to confirm these claims during site visits and interviews with past and current facility workers. However, during an interview conducted for the 1989 PA (MDE, 1989), a former maintenance chief for the Glenn L. Martin Aircraft Company reported to MDE that the SP area, or an adjacent northwestern area, is the former location of a power station.

2.3.3.2 Previous Environmental Investigations

Studies of SP to date include a Phase I environmental assessment and a Phase II intrusive investigation. The Phase I environmental assessment was conducted in winter 2007–08 to evaluate historical site activities pertaining to the wooded SP area and adjacent GSP features, such as the GSP tank farm, GSP former hangar area (Building ND), GSP facility maintenance yard, and GSP nuclear research buildings (Tetra Tech, 2008). Tetra Tech reviewed historical

facility documents, drawings, photographs, aerial photographs, and government records (NRC, United States Environmental Protection Agency [USEPA], MDE, and Baltimore County) of appropriate permits and violations. These investigations also included interviews with former and current employees, a visual site inspection, and geophysical investigations of the wooded area.

The Phase I investigation identified SP as REC #1 (SP-Wooded Area), which included the southernmost wooded area of SP (Figures 2-4 and 2-6). The Phase I review of historical aerial photographs (1938–2008) identified evidence of ground disturbances throughout SP, possibly including additional dredging and filling to prevent shoreline erosion or increase usable land space. Shoreline changes were evident on all sides of SP, with smoothing of the edges from dredge spoil fillings. The 2008 Phase II environmental investigations consisted of electromagnetic (EM) and surface gamma surveys, soil test pits, soil sampling, well installation, and groundwater sampling. No evidence of contaminated fill or substantial impacts to soil or groundwater from past activities was found.

2.3.4 Compass Rose Area

The CRA is an approximately 38-acre area in the southeastern end of MSA, south of DRA. It lies primarily between the southern end of Taxiway Tango and Frog Mortar Creek (Figure 2-7). Today, The CRA is comprised mostly of heavily wooded areas, mowed grass east and west of Taxiway Tango, and a wetlands area. Manmade features at the CRA are the southern end of Taxiway Tango and include a concrete roadway and a circular concrete pad previously used as a compass rose for aligning aircraft compasses (Figure 2-7).

2.3.4.1 History

The history of the CRA is limited. Taxiway Tango was built in the 1950s and the western portion of the CRA was bermed and filled in at that time. The compass rose was previously used to align aircraft compasses.

2.3.4.2 Previous Environmental Investigations

The CRA was first evaluated during a 2010 geophysical investigation conducted as part of the supplemental characterization of the southern periphery of the DRA (Tetra Tech, 2010b). Because the CRA is adjacent to the DRA, a geophysical survey was conducted in the CRA to

evaluate the possible presence of buried materials extending from the dump. The geophysical survey identified four geophysical anomalies (i.e., areas of elevated instrument responses) in the CRA. These anomalies were identified as a possible utility vault, as soil containing more clay minerals, or as saturated mineral-rich soil associated with wetlands. Metal objects were not associated with these anomalies; however, metallic debris was found scattered across the ground in one small area in the northwestern corner of the survey area.

The four geophysical anomaly areas of concern are summarized below:

- *Geophysical Anomaly A*—A discrete, high-amplitude anomaly with clearly defined edges, this anomaly is near a suspected utility and may be associated with it. This anomaly was subsequently scanned with a handheld TW-6 metal detector and no metal was found.

- *Geophysical Anomaly B*—A broad, moderate-amplitude anomaly with edges that fade into the surrounding low-amplitude material, this anomaly may result from higher-conductivity soil containing more clay minerals than the soils around it. This anomaly was subsequently scanned with a handheld TW-6 metal detector and no metal was found.

- *Geophysical Anomaly C*—A broad, high-amplitude anomaly type with edges that fade into the surrounding moderate-amplitude material. As with Anomaly Type B, this anomaly may result from higher-conductivity soil containing more clay minerals than the soils around it. This anomaly was subsequently scanned with a handheld TW-6 metal detector and no metal was found.

- *Geophysical Anomaly D*—A high-amplitude anomaly associated with a tidal wetland. Brackish wetlands with wet mineralized soils very commonly have high conductivities.

The supplemental report recommended that EM Anomalies A through D, and the smaller EM anomalies in the northwestern corner of the survey area, be excavated using test pits to verify the presence or absence of buried materials at these locations. In 2011, four test pits were excavated at Anomalies A–D. Waste debris and impacted soils were not observed in any test pit, and laboratory analyses of soil samples did not indicate a hazardous constituent release. The study recommended that no additional assessment of these four areas was necessary (Tetra Tech, 2012b).

2.3.5 Dump Road Area

The DRA is comprised mostly of the mowed grass areas surrounding Taxiway Tango and the runway, the heavily wooded areas in the northern, eastern, and southeastern portions of the site, and open meadows in the east–central and southeastern portions of the site (Figure 2-4). The

DRA also includes portions of Taxiway Tango and the airport runway, as well as two small ponds (Ponds 1 and 2). Site topography is generally flat, sloping gently to the northeast toward Frog Mortar Creek. Along the Frog Mortar Creek shoreline lies a steeply sloped embankment comprised of fill placed there during airport construction.

2.3.5.1 History

During the 1930s–1950s, the Glenn L. Martin Aircraft Company reportedly used a sand pit under the current Taxiway Tango to dump spent battery acid, acid-type strippers, and other acidic solutions, in addition to dredge spoils and construction debris. In 1956, a second pit was constructed closer to Frog Mortar Creek. These areas were addressed under the federal Resource Conservation and Recovery Act and its implementing regulations at the time of the 1989 PA. The USEPA found no signs of waste disposal and the site was classified as "No Further Remedial Action Planned."

2.3.5.2 Previous Environmental Investigations

In July 1991, four drums containing dried zinc chromate paint were uncovered during installation of underground electric cables adjacent to Taxiway Tango (Figure 2-8). This discovery prompted MDE to order MAA to conduct additional studies of the Taxiway Tango area. Early investigations from 1991–1996 identified four areas of concern known as the Taxiway Tango Median Anomaly Area, the Drum Area, two ponds (Pond 1 and Pond 2), and the Petroleum Hydrocarbon Area. These four areas are shown in Figure 2-4. Brief descriptions of these four areas follow:

- *Taxiway Tango Median Anomaly Area*—Located between Taxiway Tango and the airport runway, northwest of Taxiway D, four buried drums containing dried zinc-chromate paint were unearthed and removed from this area in 1991. A construction drawing indicates fill and trash, and an initial geophysical survey indicates several EM anomalies, suggesting buried metal.

- *Drum Area*—In the forested area near wells MW-2 and MW-5, northeast of Taxiway Tango, several drums were uncovered when surface vegetation was cleared during a 1996 site investigation.

- *Two ponds*—Historical records indicate that acids may have been discharged at the present location of these ponds (approximately 450 feet and 600 feet northeast of Taxiway Tango, respectively) sometime during the 1930s through the 1960s. A third pond is shown in the area on a United States Geological Survey (USGS) topographic map

(photo-revised in 1985) for the PA, but MDE could not locate a third pond during the 1989 site visits.

- *Petroleum Hydrocarbon Area*—Located approximately 200 feet west of the ponds, petroleum hydrocarbons were encountered here while drilling a soil boring during the 1996 site investigation.

These four areas became the focus of subsequent studies when chemical constituent impacts to soil, pond sediment, and groundwater became apparent. MAA first investigated Frog Mortar Creek in 1998.

From 1999–2010, Lockheed Martin conducted a remedial investigation (RI) (Tetra Tech, 2012e) and a supplemental RI (Tetra Tech, 2011) to further delineate the extent of soil, groundwater, and pond sediment chemical contamination indicated by earlier studies at MSA. Through geophysical surveys, membrane-interface probes, test pits, soil borings, and chemical analyses of soil and pond sediment samples, the RI identified large areas of buried fill and debris, pond sediment, and surface and subsurface soil contamination in and around the buried fill material. An estimated 25 acres of the DRA is buried fill and debris.

The fill material consists of soil, stained soil, and debris, the latter of which is comprised of concrete rubble and disposed industrial items (e.g., batteries, deteriorated drums, tires, paint cans, burned items, sludge, buckets, glass, wood, etc.). Volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and several metals were detected in soil at concentrations exceeding human health risk screening levels. Chlorinated VOCs (trichloroethene [TCE] and its degradation products), petroleum VOCs (e.g., benzene, toluene, etc.), and metals were also detected in surficial aquifer groundwater at concentrations exceeding Maryland groundwater and drinking water standards. Environmental investigations are continuing at the DRA, and an interim remedial action for groundwater is planned for the site.

2.3.6 Maryland Air National Guard

The MDANG facility is at 2701 Eastern Boulevard, Middle River, Maryland, in the northeastern portion of MSA (Figures 2-4 and 2-9). MDANG currently leases 175 acres of the approximately 775-acre MSA property. The facility is fenced and has a separate entrance from Eastern Boulevard. The MDANG area is developed, with runways, parking aprons, operations and training buildings, general supply and ammunition storage facilities, fuel storage structures,

maintenance shops and sheds, and aircraft hangars. The southern boundary of the leasehold extends to the ponds at the DRA; these ponds are in an undeveloped area.

The only MDANG area of interest for the current photograph review study is the Munitions Area, which is located north of and adjacent to the DRA. The Munitions Area is on the southern end of the MDANG leasehold (Buildings 5100, 5110, and 5130 shown in Figure 2-9). The Munitions Area comprises approximately five acres of mostly open land bordering Frog Mortar Creek east of Lynbrook Road. Three buildings, all founded on concrete slabs at grade, are in the area. A bunker, also slab on grade, is along the south side of this area, covered by an earthen mound. A drainage feature associated with the wetland area on the west side of the Munitions Area runs east to Frog Mortar Creek, bisecting the Munitions Area.

2.3.6.1 History

From 1929 to 1955, the current MDANG site was part of Glenn L. Martin Company's 900^{+}-acre property containing manufacturing facilities and a related airfield for manufactured aircraft. Aerial photos and historical maps indicate that the western portion of the MDANG facility was first developed between 1955 and 1957. The first structures built at MDANG appear to have been for flight support related to the 104th Tactical Fighting Group, the first tenant at MDANG. These buildings included a hangar (Building 1070), crash truck (fire emergency) station (Building 1040), warehouse (Building 1110), motor service shop (Building 1130), paint/oil storage building (Building 1140), central heating plant (Building 1100), and fuel storage area (Figure 2-9). In 1955, the MDANG facilities were first occupied by the 104th Tactical Fighting Group, later reorganized as the 175th Wing of the Air National Guard. In the 1960s and 1970s, the 135th Tactical Air Group was housed southwest of the MDANG facility at MSA, and then relocated to the MDANG facilities in October 1980.

2.3.6.2 Previous Environmental Investigations

Several areas of environmental impacts have been identified and investigated at MDANG under state and federal oversight. These areas include former fuel storage and aircraft maintenance areas, a gun butt area, and a former buried drum area.

In 1988, Automated Services Group, Inc. (ASG) conducted a PA of the MDANG facilities for the MDE (ASG, 1988). The PA identified several areas of concern, including locations near pits

reportedly used by the Glenn L. Martin Aircraft Company in the 1930s and 1950s for materials disposal.

Previous investigations at the MDANG facility were conducted under the United States Department of Defense Environmental Restoration Program and Installation Restoration Program (IRP). Sixteen IRP sites were identified as warranting further investigation. Eleven of the 16 IRP sites are shown on Figure 2-9. Several investigations were subsequently performed, and all IRP sites at the MDANG facility have since received "No Further Action Concurrence" from MDE.

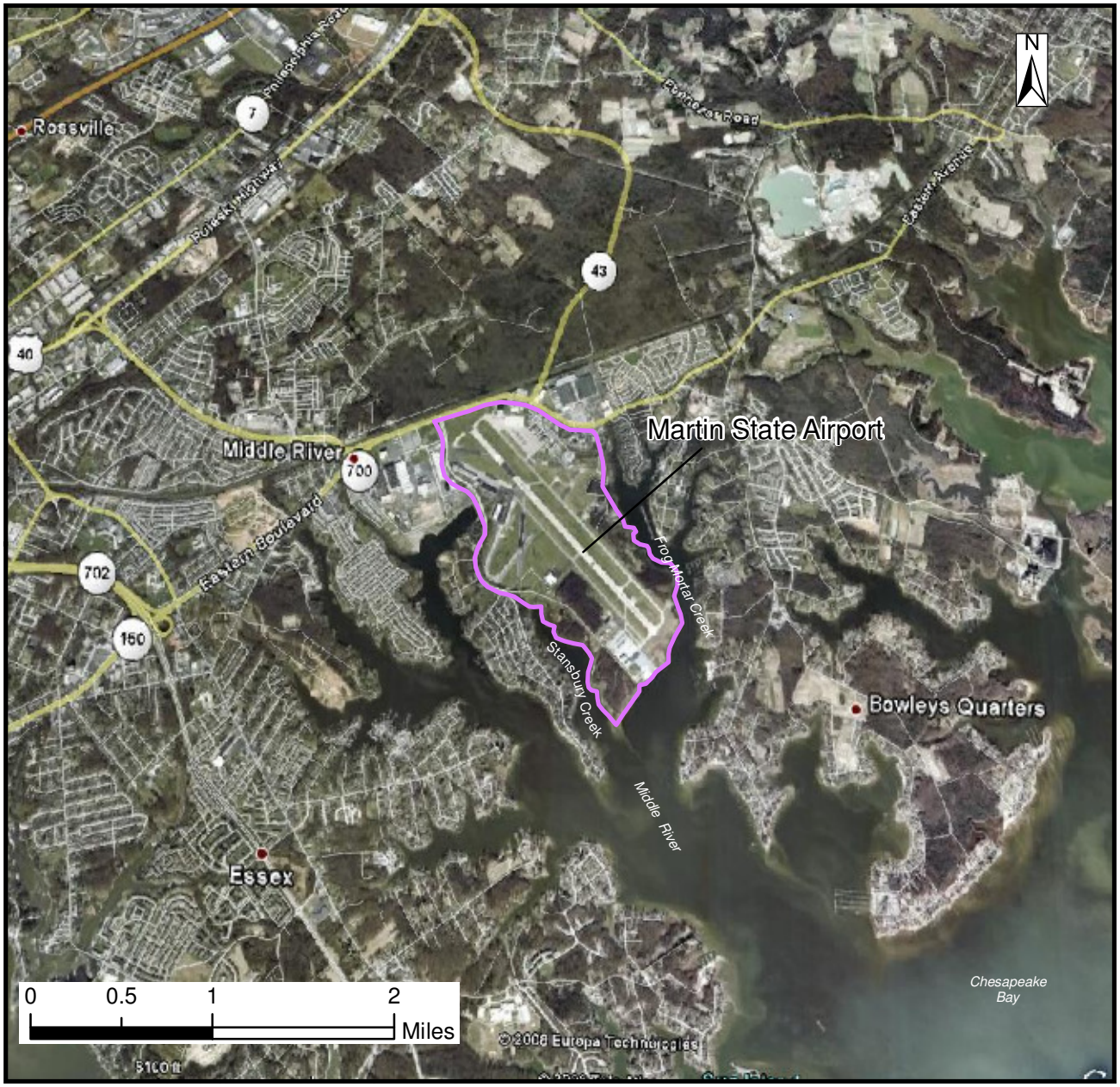
In 2008, Lockheed Martin conducted an environmental evaluation of the MDANG facility and evaluated potential environmental liability on the MDANG property. The scope of the evaluation concentrated on the period when the Glenn L. Martin Company and Martin Marietta owned and/or conducted operations on the property (1929–1975) to manufacture military aircraft and associated materials. The evaluation identified 13 RECs and 19 potential RECs on the MDANG site. The RECs, potential RECs, and most IRP sites are shown on Figure 2-9.

Documents reviewed for the 2008 study relate to past industrial, manufacturing, and maintenance activities carried out at the MDANG property between 1929 and 1975, and were limited in number. Many of the regulatory documents for the facility include statements that waste disposal practices or manufacturing processes of the Glenn L. Martin Company are unknown, and that disposal practices at many of the sites at the MDANG facility are likewise unknown. However, in general, the production, testing, and maintenance of aircraft and associated military materials routinely entail several common industrial practices and materials. These activities typically include, but are not limited to, metal-plating facilities, wastewater-treatment facilities, incinerators, extensive use of paints, solvents, petroleum products, and the storage and disposal of various chemicals and hazardous materials.

In January 2012, Tetra Tech sampled 22 temporary soil vapor probes aligned in north–south transects in key sections of the Munitions Area using direct-push technology (Tetra Tech, 2012d). Additionally, three indoor air quality samples were collected inside two buildings, including an office, a conference room, and inside a maintenance building in the MDANG Munitions Area. The soil vapor and air samples were analyzed for VOCs. The results of the soil vapor and indoor air quality investigation did not identify any regulatorily unacceptable human health risks posed

to site workers by exposure to VOCs detected in soil vapor. Soil gas samples from the Munitions Area (directly downgradient of several DRA wells) show no TCE, dichloroethene, or vinyl chloride concentrations above their respective screening criteria.

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\Maps\MSA and Dump Road Area location map_120512.mxd)
12/05/2012 -- 1:30:03 PM



Source: Google Earth Pro, 2008

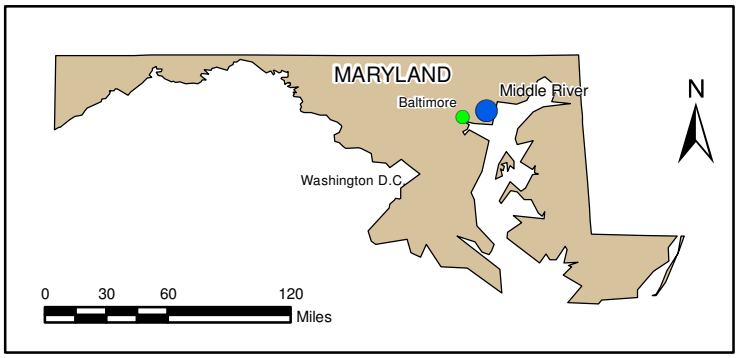


FIGURE 2-1

MARTIN STATE AIRPORT LOCATION MAP

Lockheed Martin, Martin State Airport
Middle River, Maryland

DATE MODIFIED:	CREATED BY:
12/05/12	SP

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\Maps\MSA Main Terminal and Surrounding Features_revised 11 28 12.mxd)
11/28/2012 -- 11:26:26 AM

Source: Google Earth Pro, 2010

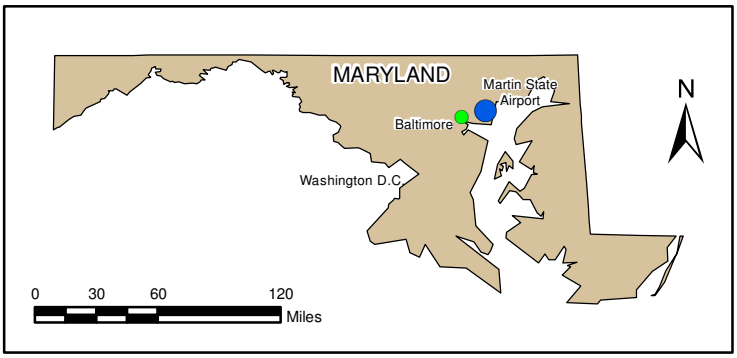


FIGURE 2-2

MARTIN STATE AIRPORT AND SURROUNDING FEATURES

Lockheed Martin, Martin State Airport
Middle River, Maryland

DATE MODIFIED:	CREATED BY:
11/28/12	MP

TETRA TECH

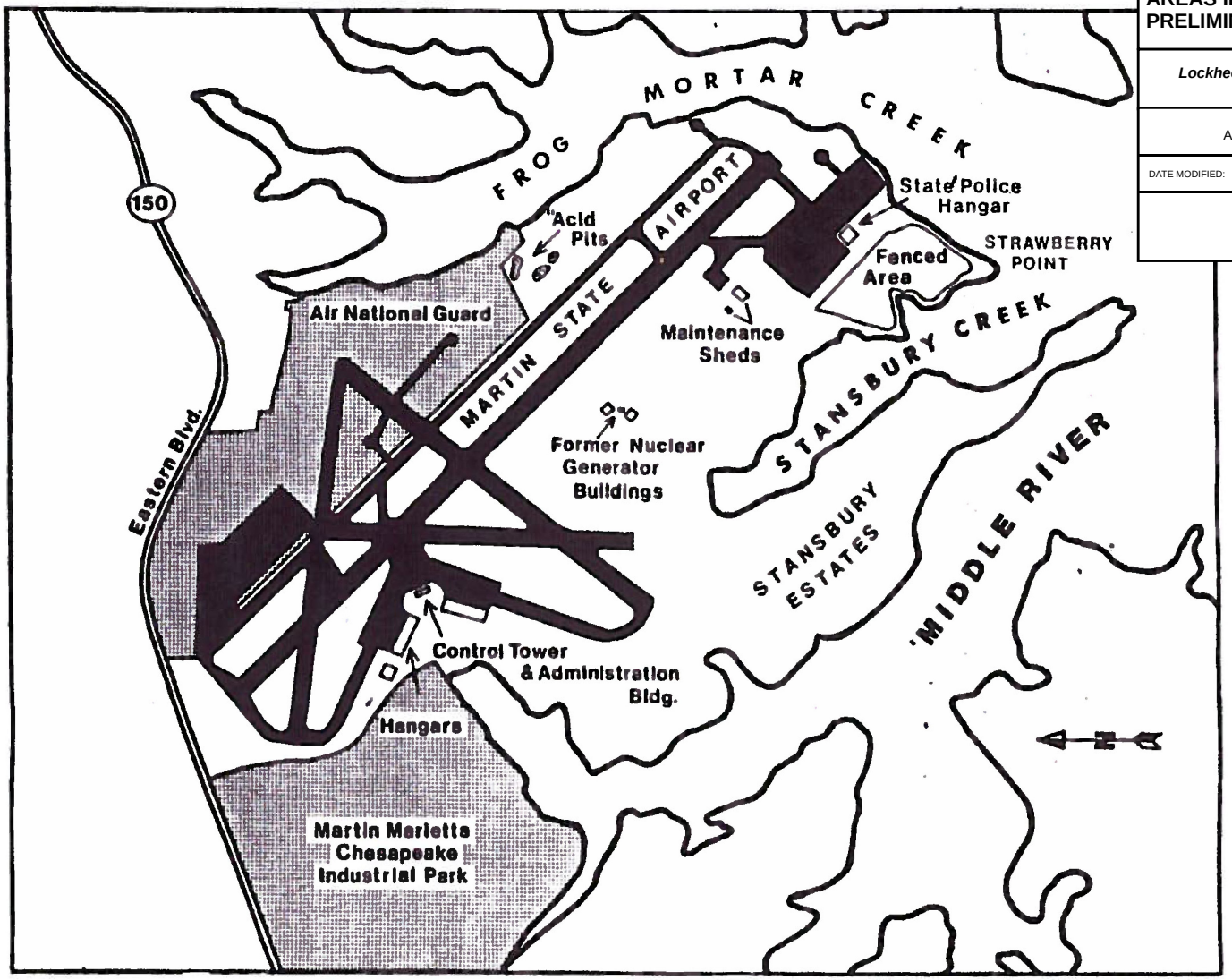
FIGURE 2-3

AREAS IDENTIFIED IN THE 1989 PRELIMINARY ASSESSMENT

Lockheed Martin, Martin State Airport
Middle River, Maryland

AS NOTED	N
DATE MODIFIED: 5/4/12	CREATED BY: MP

TETRA TECH



SOURCE: MDE (1989).

K:\Graphics\Lockheed\MSA\MSA 1989 areas.cdr

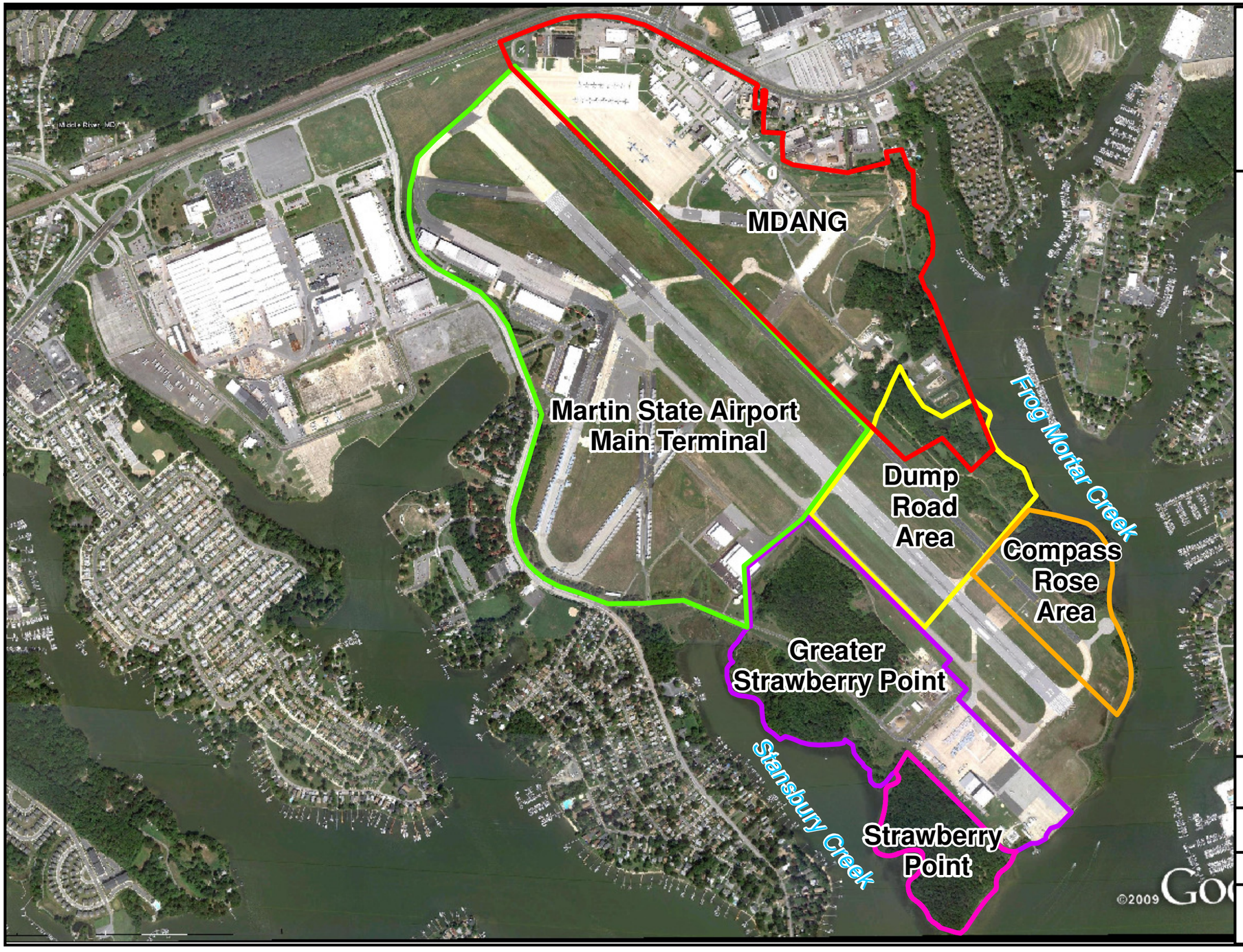


FIGURE 2-4

STUDY SITES AT
MARTIN STATE AIRPORT

LEGEND

- Compass Rose Area
- Dump Road Area
- Greater Strawberry Point
- Main Terminal
- Maryland Air National Guard (MDANG)
- Strawberry Point

Background Photo Source: Google Earth Pro, 2010

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 330 660 1,320 Feet

N

DATE MODIFIED: 12/05/12

CREATED BY: SP

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\MSA_Aerials_gEOREFERENCED rev4.mxd)

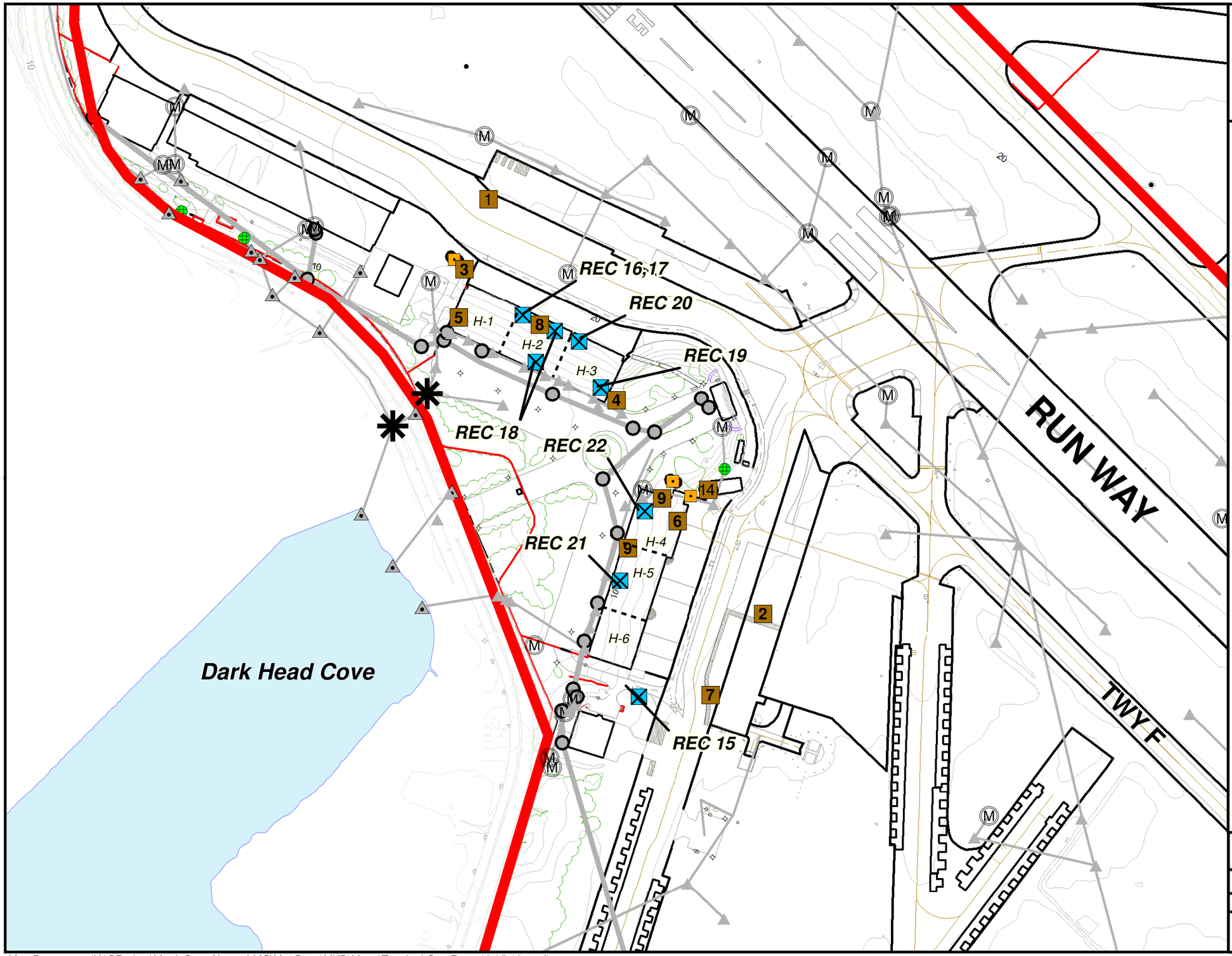


FIGURE 2-5

RECOGNIZED ENVIRONMENTAL CONDITIONS
MAIN TERMINAL AREA

Legend

- REC Identified in Main Terminal Environmental Evaluation Report (Tetra Tech, 2010)
- Addendum REC
- TTNUS MSA 2008 Wells
- MTN_Infiltration_Trenches
- MSA Inlets
- MSA Manholes
- MSA Outfalls
- Sediment_Basin
- Subject Property Boundaries
- Current Structures
- Trench Drain
- Sanitary MH
- MTN_Tanks
- MTN_WellsPipes
- Sanitary Pipes
- Storm Pipes
- Electric Utilities
- H-1 Hangar No.

MSA – Martin State Airport
UST - Underground Storage Tank
MTN – Main Terminal
REC – Recognized Environmental Condition
MH - Manhole

REC #	REC Name
REC 1	Former Fueling Station "A" near Hangar 1
REC 2	Former Fueling Station "B" near Hangar 6
REC 3	Former Fueling/De-Fueling Pits and Fuel Oil USTs
REC 4	Hangar 3 Historic Gasoline USTs
REC 5	Hangar 1 Former Propeller Cleaning Area
REC 6	Hangar 4 Former Machine Gun Cleaning/Assembly
REC 7	Missile Engine Test Area c. 1959 (estimated location)
REC 8	Hangar 2 Heating Room/Boiler
REC 9	Hangar 4 and 5 Heating/Boiler Rooms
REC 14	Current MAA Self-Fueling Station and 1,000 - gal oil UST
REC 15	Hangar 6 Former Fuel Oil USTs
REC 16	Hangar 2 Oil Room
REC 17	Hangar 2 Solvent Booth
REC 18	Hangar 2 Radar/shielded Rooms
REC 19	Hangar 3 Washing Area/Rotating Lift
REC 20	Hangar 3 Compressor/Motor Room
REC 21	Hangar 5 Painting/Stripping, and Acid Neutralization Areas
REC 22	Hangar 4 Parachute Drying Area

Main Terminal
Lockheed Martin, Martin State Airport
Middle River, Maryland

0 100 200 400 Feet

N

DATE MODIFIED: 12/0512

CREATED BY: SP

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\Maps\Terminal One Recs 12 05 12.mxd)
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FIGURE 2-6
CURRENT AND HISTORIC (1968) FEATURES AND RECOGNIZED ENVIRONMENTAL CONDITIONS GREATER STRAWBERRY POINT AND STRAWBERRY POINT

Legend

- Oil Filled Operational Equipment
- Drum Storage
- MSA Tanks
- MSA GW Well
- MSA Inlet
- MSA Manhole
- NPDES OUTFALLS
- Sediment Basin
- REC
- Current Structures
- Trench Drain
- Sanitary Manhole
- MSA WellsPipes
- Sanitary Pipes
- Storm Pipes
- Historic Structures
- Gas
- Sanitary Line
- Storm
- Water
- Electricity
- Telephone Line
- Electric Utilities

REC # REC Name
REC 1 Strawberry Point Wooded Areas
REC 2 Fuel Storage Tank Farm
REC 3 Old Wastewater Treatment Plant
REC 4 Former Solvent Storage Area
REC 5 Transformer Pad
REC 6 Former Hangar (Building ND) Former Storage Building
REC 7 Facility Maintenance Area
REC 8 Former Induction Test, Former Engine Test, Former Jet Test Shed, Former Storage Building Former Propulsion Test and Former Compressor Shed Buildings
REC 9 Former Propellant Storage, Former Acetylene Storage Shed, Former Furnace Building, Former Hyper-Therm Test Facilities, and Former Vanguard Tower
REC 10 Former Coupon Test Shed and Former Block House
REC 11 Former Critical Test Building (KC), Former Radioisotope Lab (KJ) and Former Transformer Pad

Historic Building	Building Number	Current Building	Current Name	Index
Fuel Storage	001	X		E-4
Adjacent to Beach House	002			E-4
Beach House	003	X	Baltimore County Marine Police	E-4
Pumping Station	004	X		E-4
Chlorination Station	005	X		E-4
Power Fence Service House	006			E-4
Solvent Storage	007	X	Maryland State Police	E-4
Equipment Storage Building	008	X	Maryland State Police	E-4
Power Fence Service House	009	X		E-4
Power Fence Switch House	010			E-4
Delivery Hanger	011	X	new hangars	E-3
Storage Building	012			E-3
Induction Test Building	013			D-3
Control House	014			D-3
Noise Suppression Building	015			D-2
Jet Test Shed	016			E-2
Storage Building	017			D-2
Propellent Storage	018			D-2
Furnace Building	019			D-2
Acetylene Storage Shed	020			D-2
Vanguard Tower	021			D-2
Propulsion Test Building	022	X	Maintenance Building	D-3
Compressor Shed	023	X		D-3
Engine Test Building	024	X		D-3
Hyper-Therm Test Facilities	025			D-2
Block House	026			D-2
Coupon Test Shed	027			D-2
Coupon Test Shed	028			D-2
Coupon Test Equipment Shed	029			D-2
Softball Fields	030			C-2, C-3
GFE Storage Shed	031			C-2
GFE Storage Shelter	032			C-2
Surplus Storage Shed	033			C-2
Liquid Metal Test Facilities	034			C-2
Radio Isotope Lab	035			C-1
Critical Test Building (Nuclear)	036			C-1
Maintenance Storage	037			C-1
Organic Material Storage Shed	038			C-1
Anechoic Chamber	039			B-2
Office	040			C-2
Electrical Storage	041			C-2
Electric Power Shed	042			B-2
Guard House	043			B-2
Antenna Test Tower	044			C-1
Antenna Test Building	045			C-2
Plating Material Storage Shed	046			C-2
Antenna Test Building	047			B-2
Antenna Test Tower	048			B-2
	049	X	Salt Dome	D-3
	050	X	Sand Dome	D-3
	051	X	Lockheed Martin Hangar	C-2
	052	X	Black & Decker Hangar	C-1
		X	Aboveground Storage Tank	
Transformer Pad	054			E-4
Guard House	055			E-3

GW - Groundwater
MSA - Martin State Airport
NPDES — National Pollutant Discharge Elimination System
REC - Recognized Environmental Condition

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 150 300 600 Feet

N

DATE MODIFIED: 12/05/2012

CREATED BY: SP

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\Current Structures Index_1113_revised 12 05 12.mxd)

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\Maps\MSA Compass Rose Area Map.mxd)
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FIGURE 2-7

COMPASS ROSE AREA MAP

LEGEND

- GROUNDWATER MONITORING WELL
- ABANDONED WELL
- COMPASS ROSE AREA

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 75 150 300 Feet

N

DATE MODIFIED: 12/06/12

CREATED BY: SP

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\Maps\MSA MW and PZ_1994_1996.mxd)
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FIGURE 2-8

AREAS OF CONCERN
DUMP ROAD AREA

LEGEND

- POND
- GROUNDWATER MONITORING WELL (MW) AND PIEZOMETER (PZ), 1994 - 1996
- MARYLAND AIR NATIONAL GUARD BOUNDARY

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 60 120 240 Feet

N

DATE MODIFIED: 12/06/12

CREATED BY: SP

TETRA TECH

GW - Groundwater
IR — Installation Restoration
MSA - Martin State Airport
NPDES — National Pollutant Discharge Elimination System
P — Potential
REC - Recognized Environmental Condition
UST — Underground Storage Tank

FIGURE 2-9
RECOGNIZED ENVIRONMENTAL CONDITIONS
MARYLAND AIR NATIONAL GUARD (MDANG)

Legend

- Non-Portable Supply Well
- RECs
- Potential RECs (P-RECs)
- MSA GW Wells
- MSA Inlets
- MSA Manholes
- NPDES OUTFALLS
- Sediment Basin
- MDANG Boundary
- Current Structures
- Trench Drain
- Sanitary Manhole
- MSA Tanks
- MSA WellsPipes
- Roads
- Electric Utilities

REC #
REC 1 - IR Site 1 – Old Underground POL Storage Area
REC 2 - IR Site 2 – Leaking UST (Building 1080)
REC 3 - IR Site 3 – Hazardous Waste Collection Area
REC 4 - IR Site 4 – Leaking UST (Building 1120)
REC 5 - IR Site 5 – Leaking UST (Building 1100)
REC 6 - IR Site 6 – Old Aircraft Wash Rack
REC 7 - IR Site 7 – Removed Mogas UST
REC 8 - IR Site 10 – Old Fire Training Area
REC 9 - IR Site 11 – Aboveground POL Storage Area
REC 10 - IR Site 12 – Gun Butts
REC 11 - Manmade Pond #2
REC 12 - Petroleum Hydrocarbon Area
REC 13 - IR Site 16 – Aircraft engine test area.
P-REC 14 - Building 1060 – General Purpose Aircraft Shop
P-REC 15 - Building 1070 – A-10 Maintenance Hangar
P-REC 16 - Building 1130 – 135 AGE / Paint Shop
P-REC 17 - Building 1150 – Base Hazardous Storage
P-REC 18 - Building 2050 – C-130 Maintenance Hangar
P-REC 19 - Building 2070 – Fuel Cell Hangar
P-REC 20 - Building 2110 – Motorpool / Auto Maintenance
P-REC 21 - Building 3000 – POL Operations
P-REC 22 - Building 3005 – Vehicle Fueling Station
P-REC 23 - Building 3006 – Diesel Storage
P-REC 24 - Building 3007 – Gasoline Storage
P-REC 25 - Building 3013 – Aircraft Maintenance Shop
P-REC 26 - Building 3015 – Miscellaneous Storage Tank
P-REC 27 - Building 3038 – Liquid Fuel Stand Unloading
P-REC 28 - Building 3040 – Jet Fuel Storage
P-REC 29 - Building 3500 – Industrial Waste Spill Collection
P-REC 30 - Building 5039 – Miscellaneous Storage Tank
P-REC 31 - Building 5040 – Base Hazardous Storage
P-REC 32 - Building 5066 – Aircraft Maintenance Shop

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 150 300 600 Feet

N

DATE MODIFIED: 12/06/2012

CREATED BY: SP

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\MANG Current Structures Index with utilities and Recs.mxd)
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Section 3
Methodology

3.1 AERIAL PHOTOGRAPHIC RESOURCES

Tetra Tech, Inc. (Tetra Tech) reviewed a combination of previously obtained aerial photography from existing Martin State Airport (MSA) reports and newly acquired photography from commercial firms, government agencies, academic archives, and Lockheed Martin Corporation (Lockheed Martin) during the aerial photographs analysis. Tetra Tech initially conducted a detailed Internet search of commercial aerial photography companies and federal, state, and local agencies to locate relevant and usable historical aerial photographs of the MSA area. Subsequent to the online search, aerials from multiple online sources, such as the United States National Archives, United States Geological Survey (USGS), United States Department of Agriculture (USDA), United States Air Force, and Johns Hopkins University, were obtained for interpretation. Most vertical photographs were single frame, and the availability of stereo pairs was extremely limited. The digital aerials acquired were of different qualities and scales. However, the search provided a suitable distribution of MSA photos over time to evaluate site changes.

Tetra Tech personnel also conducted an archival search over the course of several days at the Glenn L. Martin Maryland Aviation Museum at MSA. Thousands of historical photos from the museum's archive were searched, resulting in 12 MSA photographs relevant to this study's objectives. Most of these photographs date from the 1940s and 1950s, and include significant oblique photographs taken by employees during the development of MSA. The museum's extensive archive was mostly printed film; Tetra Tech personnel used a laptop computer and a large tabletop scanner to convert the relevant hard-copy photographs to soft-copy high-resolution digital files. This conversion from paper to digital format allowed Tetra Tech to create copies of the archived photos without removing them from the archive.

3.2 PHOTOGRAPHS USED AND INTERPRETATION METHODS

The development of MSA started around 1939 with construction of an airstrip used by the adjacent Middle River Complex (MRC) airplane manufacturing facility. The aerial photographic record of MSA started in 1938, with most of the archived photos being from the 1940s and 1950s. The temporal resolution was adequate, especially in photographs taken during the 1940s to 1970. By the 1980s, high-resolution flyovers had nearly ceased. Accordingly, most imagery from the 1980s and 1990s is satellite and large-scale aerials, making fine-scale interpretation difficult.

Photographs, maps, and drawings used in the study are listed in Table 3-1 and included in Appendices A–D. Reproductions of aerial and oblique photographs used for this study are included in Appendices A and B, respectively. Appendix C contains historical USGS topographic maps that were used as ancillary geographic information; as such, they are provided for reference only and were not used as stand-alone evidence to identify or locate features during interpretation. Relevant site-specific historical engineering drawings or maps used for the study are in Appendix D. Photographs with site feature numbers (e.g., #30, #42) are also included in Appendices A and B, and are denoted with an added "A" in the figure number. For example, photograph A-1A in Appendix A is the same photograph as A-1, but A-1A contains annotations of features identified from the photograph in that year.

After relevant photographs had been converted to digital format, vertical aerials sufficiently legible for interpretation were geo-referenced and added to the MSA environmental geographic information system (EGIS) database. Details entered into EGIS will allow this information to be used in future projects at MSA.

Tetra Tech interpreted available direct-overhead and oblique aerial photographs of good quality. using a direct-recognition image-interpretation strategy. Digital photography was reviewed directly onscreen using remote-sensing software, or printed and viewed under magnification or a stereoscope. Because of scale or image quality, however, details of some features on images could not be fully described. For example, a photogrammetrist using direct recognition can locate a debris pile, but may not be able to infer what type of material is contained in that pile. In most cases, the information or observation derived is only from interpretation of the aerial or

oblique photo. Oblique photos of this area are higher quality, and were used to clarify the feature(s) on vertical aerials.

Relevant objects and features observed during the aerial photograph review and analysis were annotated and added into the EGIS. Information regarding visible or altered site features (such as ponds, pits, bunkers, earthen dikes, filled areas, stockpiles, changes in shoreline, and other relevant site features) obtained during the photograph reviews was also added to the EGIS to supplement historical MSA information. Interpretive findings (such as identified features), annotated maps, and a listing of photographs reviewed are presented by MSA area. Significant features were assigned an identification number, dated, and geo-referenced (i.e., assigned geographic coordinates); this information was inserted as an EGIS software layer over a current black and white aerial photograph for clarity.

Table 3-1

Historical Aerial Photographs, Maps, and Drawings Interpreted, Lockheed Martin, Martin State Airport, Middle River, Maryland

Appendix and No.[1]	Publication date	Comment	Type
A-1	5/5/1938	Gray-Scale Aerial of Pre-Developed MSA Area	DO-Aerial
A-2	3/28/1945	Grey-Scale Aerial of MSA	DO-Aerial
A-3	10/22/1947	Gray-Scale Aerial of MSA/MRC and Vicinity	DO-Aerial
A-4	7/25/1952	Gray-Scale Aerial of MSA/MRC and Vicinity	DO-Aerial
A-5	09/21/1956	Gray-Scale Aerial of Dump Road Area	DO-Aerial
A-5-1	09/21/1956	Gray-Scale Aerial of Dump Road Area, Enlarged	DO-Aerial
A-6	09/1956	Gray-Scale Aerial of Greater Strawberry Point	DO-Aerial
A-7	9/21/1957	Gray-Scale Aerial of MSA	DO-Aerial
A-8	1957	Gray-Scale Aerial of Dump Road Area	DO-Aerial
A-9	12/4/1959	Gray-Scale MRC/MSA High-Resolution Aerial	DO-Aerial
A-10	1964	Gray-Scale Aerial of Dump Road Area	DO-Aerial
A-11	2/21/1966	USGS High-Altitude Medium-Resolution Aerial of MSA	DO-Aerial
A-12	2/28/1970	USGS Aerial of MSA/MRC Aerial	DO-Aerial
A-13	10/1/1975	Scan of MRC/MSA Aerial, Low-/Medium-Resolution	DO-Aerial
A-14	1979	Greater Strawberry Point, Vanguard Area, Dump Road Area	DO-Aerial
A-15	3/1/1986	Scan of MRC/MSA Aerial	DO-Aerial
A-16	1989	Gray-Scale Aerial of MSA/MRC and Vicinity	DO-Aerial
A-17	9/29/1995	Scan of MRC/MSA Aerial, High Resolution	DO-Aerial
A-18	6/19/1997	Gray-Scale Aerial of MSA SP	DO-Aerial
A-19	2/10/1998	USGS Gray-Scale Aerial of MRC/MSA	DO-Aerial
B-1	4/3/1941	MSA Plant 2 from South/Upper Stansbury Creek	OB-Aerial
B-2	2/1/1945	Strawberry Point	OB-Aerial
B-3	7/10/1953	Greater Strawberry Point/Strawberry Point/Compass Rose Area	OB-Aerial
B-4	2/25/1954	Greater Strawberry Point/Strawberry Point	OB-Aerial
B-5	9/5/1955	Dump Road Area, Old Bunkers	OB-Aerial
B-6	9/9/1955	Dump Road Area	OB-Aerial

Table 3-1

Historical Aerial Photographs, Maps, and Drawings Interpreted, Lockheed Martin, Martin State Airport, Middle River, Maryland
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Appendix and No.[1]	Publication date	Comment	Type
B-7	2/14/1956	Greater Strawberry Point/Strawberry Point/Dump Road	OB-Aerial
B-8	4/30/1960	Dump Road Area	OB-Aerial
B-9	4/30/1960	MSA from South	OB-Aerial
B-10	3/28/1962	Main Terminal Area/North of Vanguard Area	OB-Aerial
B-11	9/3/1962	Main Terminal Area/Upper Stansbury Creek	OB-Aerial
C-1	1877	Middle River, Chases Station, North Point 1877	Map
C-2	1891	USGS_15min_gunp_1891sw	Map
C-3	1901	USGS_15min_gunp1901nw	Map
C-4	1924	USGS_15min_gunp1924nw	Map
C-5	1949	USGS_15min_gunp_1949sw	Map
C-6	1951	USGS_15min_1951	Map
C-7	1951	MD_Middle River_USGS_256589_1951_24000	Map
C-8	1969/74	MD_Middle River_USGS_256591_1969-74_24000	Map
C-9	1969/85	MD_Middle River_256593_1969-85_24000	Map
C-10	1998	MD_Middle River_256594_1998_24000	Map
D-1	Pre 1956–1957	Maryland Air National Guard and Dump Road Area with existing and proposed oil and acid disposal pits	Drawing
D-2	1958	As-built engineering drawing: oil and acid disposal pit and access road	Drawing
D-3	1963	MSA Historical Piping Main Distribution (with buildings and building designations	Map

For Appendices A and B, photographs annotated with site feature numbers from the study are denoted with an added "A" in the figure number. For example, A-1A would be the same photograph as A-1 but contains feature annotations identified in that photograph for that year.

DO— direct overhead
gunp— Gunpowder River area
min— minute
MD— Maryland
MRC— Middle River Complex
MSA— Martin State Airport
OB— oblique
USGS— United States Geological Survey

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Section 4
Results

This section includes the photointerpretation results for six environmental investigation areas at Martin State Airport (MSA). Major features and changes are shown on site figures for each study area and are discussed chronologically. Each feature is color-shaded on the figures and has been assigned a feature reference number; the date the feature first appears on a photograph, map, or drawing is also identified. An appendix reference number (e.g., A-1, B-4, C-6, etc.) is shown adjacent to the date (i.e., year) of each photograph or map discussed; the letter refers to the appendix in which the photograph is located (e.g., "A" for Appendix A), and the number indicates the photograph's chronological sequence in the appendix. Numbers within parentheses **(**e.g., **[**#9**])** in the following discussions indicate the reference number assigned to the feature in Figures 4-1 through 4-6.

The initial condition of the current MSA property before its purchase by the Glenn L. Martin Company in 1929 is shown in a 1924 United States Geological Survey (USGS) topographic map (C-4 in Appendix C). This map shows the MSA area as undeveloped and rural, with woods in the center of the peninsula, and consisting of mostly open, unforested land along the shorelines of Stansbury Creek and Frog Mortar Creek. A single road originating in the northern portion of the peninsula splits twice. The short road after the first split leads to a small feature that is mapped as a house or other small building. The road then splits, and one road leads to a small cove of Frog Mortar Creek, traverses what is now the Dump Road Area (DRA), and terminates at the tree line near what is now the airport runway. The other road runs south and leads to the southwestern portion of the peninsula parallel to Stansbury Creek.

Several features mapped as houses or other small structures are shown along this road north of Strawberry Point (SP). Another mapped house or other small structure is at the southern tip of the peninsula. The SP area is mapped as a marsh, indicating that the original SP area was nearly at grade with the creek level. The following sections describe land features and conditions for the

six study areas, beginning in 1938. The last year of direct-overhead aerial photographs used in this study is 1998.

4.1 MAIN TERMINAL AREA

Image interpretation shows that the Main Terminal (MT) area has seen significant grading changes in the early years of the study period, mostly from the construction and the expansion and removal of runways, structures, and taxiways. Figure 4-1 shows features identified from overhead and oblique photographs, with changes taking place primarily from 1938 through 1979:

1938 (A-1): This study area is generally undeveloped at this time. Wilson Point Road bounds the western portion of the area. Eastern Avenue appears to the north in the same location as it does today. Stansbury Creek extends north into the southern portion of the MT area by approximately 1,500 feet beyond its present configuration. Agricultural activity is apparent east of Stansbury Creek. This photo shows damming and backfilling in the upper portion of Stansbury Creek. The source of this backfill is unknown, but possibly related to dredging activities conducted in Frog Mortar Creek during construction of a federal navigation channel leading west to the Middle River Complex (MRC).

1941 (B-1): This 1941 oblique aerial photograph shows three runways (runways 15–33, 4–22, 18–36, and 10–28) under construction. The main runway (runway 15–33) is only partially built at this time. The photographs show a berm (#9) which encloses the upper portion of Stansbury Creek, creating a ponded area (#11). A large area of dark soil (#54-#56) is visible, spread on the ground from the upper reach of the ponded portion of Stansbury Creek to the area of the current Black & Decker hanger. The dark soil was being used to fill the uppermost portion of the ponded Stansbury Creek.

1945 (A-2): By 1945, the three runways, the terminal/administration building, and Hangars 1–6 have been built. The berm for the upper portion of Stansbury Creek was widened to the south (#13) and the ponded area appears to be nearly filled in.

1947 (A-3): Identifiable features appear as they do in the previous aerial photograph. Vegetation has grown over several of the ground scars from earlier airport construction.

1952 (A-4): Partially established vegetation has replaced the bare soil along the edges of the runways and taxiways seen in earlier photographs. Land has been cleared at the current locations of the Black & Decker and Lockheed Martin hangars. The Stansbury Creek ponded area that extended into the southern portion of the MT area from 1938–1945 has been covered with fill material. The entire ponded area of Stansbury Creek was filled to allow construction of a runway/taxiway. Features in the eastern portion of the MT area appear to have been used as temporary ammunition bunkers (#20 and #26 on Figure 4-1).

1955 (B-5) and 1956 (A-5 and B-7): The features that appear in the previous photograph (A-4) to be temporary ammunition bunkers (#20 and #26; Figure 4-1) are clearly visible in B-5, A-5, and B-7 (lower left-center in B-5; lower left in A-5; upper center in B-7). The bunkers were presumably demolished in place, or removed before 1957, to make way for the construction of Taxiway Tango.

1956 (A-6) and 1957 (A-7): New features in this photograph are two buildings (#28 and #30) and one aboveground storage tank (AST) (#29) with earthen berms around their perimeters. In A-6, other buildings can be seen north of #28 and #30. Drawing D-3 suggests that #28 is Building KT (the antenna test building) and #30 is Building KT-7 (the electrical power shed). Other buildings in A-6 north of these structures are the KC-, KH-, KI-, KJ-, KPH-, KQ-, and KT-series buildings that were part of the former nuclear test area and oil farm area shown on map D-3. The area of these building is shown as a yellow dashed line on Figure 4-1. Hangar 7 has been constructed northwest of Hangars 1–3. Feature #18, west of the current commercial hangar building (current hangars 499–511) appears to have been a fuel truck bunker.

1959 (A-9): Most identifiable features appear as they do in the previous aerial photograph. Several features that appear to be trucks in an area of ground scars are present northwest of Hangar 7. The former nuclear test and oil farm areas appear to have established vegetation covering ground scars from construction of the buildings. Four circular dirt paths (i.e., rings) are visible on the south side of the road in the area of the earthen berm (#9 and #13) south of Building KT (#28) and just north of Stansbury Creek.

1960 (B-8/B-9) and 1962 (B10/B11): These oblique aerial photographs more clearly show the former nuclear test and oil farm buildings along the southern boundary of the MT area. Photograph B-10 shows an area of light soil or possibly shallow water surrounded by dark

(black) soil in an open area just north of Building KT-1 (antenna test tower). Several new small buildings are along the dirt road south of the circular concrete pad. In photograph B-11, the circular dirt paths in the area of the earthen berm (#9 and #13) appear to be test rings between Building KT (#28) and Stansbury Creek.

1966 (A-11): Identifiable features in this photograph appear as they do in the previous aerial photograph. The ground scar area west of Hangar 7 and visible in A-9 is not visible in this photograph.

1970 (A-12): Most identifiable features appear as they do in the previous aerial photograph. The ground scar shown west of Hangar 7 in A-9 is no longer apparent.

1975 (A-13): Identifiable features appear as they do in the previous aerial photograph. Hangar 7, northwest of Hangars 1–3, has been demolished. The trailer or truck at the former Building KT is gone; only the concrete slab remains. Other buildings north of the former Building KT have also been removed.

1986 (A-9): A large commercial hangar building (currently Hangars 499–511) has been constructed northwest of Hangars 1–3. Taxiway F, west of and parallel to the runway, has been constructed. The two smaller runways have been removed.

1995 (A-10): Identifiable features appear as they do in the previous aerial photograph.

1997–1998 (A-18–A-19): No other significant features are noted in these aerial photos.

4.2 GREATER STRAWBERRY POINT

Image interpretation of Greater Strawberry Point (Figure 4-2) shows a significant amount of debris (#36 and #37) in a circa 1979 (exact date unknown) high-resolution aerial photograph. This photograph shows numerous dump-truck-sized piles of unknown substances; similar sized piles are along the road leading north to the wooded area in the location of the then-current vanguard area. Aerial photos show the appearance and eventual razing of the vanguard buildings. The remnants of the razed buildings in this area are unknown, but recent light-detection and ranging (LiDAR) data indicate a topographic anomaly in a soil mound in the area of the former

vanguard tower. This mound remains today, and may influence the findings of environmental studies related to the vanguard buildings due to its apparent rise in elevation.

1938 (A-1): The Greater Strawberry Point (GSP) area is primarily forest in the northern two-thirds of the study area. Several open fields possibly used for agriculture are in the southwestern third of the study area and along the Stansbury Creek shoreline.

1945 (A-2/B-2): Substantial infrastructure improvements have taken place at GSP since the 1938 aerial image. The seaplane hangar (used by the Navy under lease from the Martin Company) was present and in use; several seaplanes are parked around the hangar. Photograph B-2 shows an oblique view of the seaplane hangar looking to the southeast. The compass rose was present southeast of the seaplane hangar. Two small buildings, identified in maps as a shop building and a water supply pump house (D-3), were near the northeast shore of SP, near a boat ramp. The area north of the seaplane hangar was used as a parking lot for the hangar employees. North of the parking area was a large tract of land (undeveloped and wooded in the 1945 aerial) between the main runway and SP Road.

1947 (A-3): Review of the 1947 image shows no significant changes from the 1945 aerial image.

1952 (A-4): Review of the 1952 image shows no significant changes from the 1945 aerial image.

1953 (B-3): Review of the 1953 oblique image shows no significant changes from the 1945 aerial image. A small wastewater treatment building or pump house can be seen east of the seaplane runway, north of the water pump house and opposite the northern end of the compass rose. A square reservoir or recessed holding tank is visible and appears flush with the ground surface immediately northwest of the wastewater treatment building.

1954 (B-4): The 1954 oblique image shows no changes from the 1953 image.

1955 (B-5/B-6): B-6 indicates some development in the southern portion of the wooded area. These facilities correspond to the propulsion test building and the noise suppression building. The 1955 aerial photo also shows new construction in the northern portion of GSP, north of the wooded area. These facilities include the critical test building and radioisotope lab.

1956 (B-7): B-7 (February 1956) provides a close-up of the propulsion test area that very clearly shows these facilities. Farther north of the propulsion test building, a rectangular, 1.5-story building (the vibration test building) can be seen.

1956 (A-6): The vanguard area was not constructed in the wooded area as of the February 1956 oblique image (B-7), but is visible and at least partially constructed in this September 1956 aerial. A-6 also shows a dirt road and area being filled (#39) that is shown in 1957 (A-7) and 1960 (B-8) as an area of level ground housing a series of ASTs at its southeastern end.

1957 (A-7): The 1957 aerial photo shows the vanguard area has been constructed. The area of the dirt road and the backfilling area north of SP, and west of the bend in Strawberry Point Road opposite the seaplane hangar parking lot, appear to be level ground housing several ASTs at its southeastern end.

1959–1989 (A-9–A-16 and B-8): Aerial photos between 1959 and 1989 show no significant new construction at GSP. Two areas of debris piles (#36/#37 in Figure 4-2) can be seen in the 1979 photograph (A-14). The seaplane hangar can be seen in the 1989 aerial (A-16).

1995 (A-17): The seaplane hangar is absent (razed) in the 1995 aerial. The vanguard area, as well as the structures on northern GSP near the critical test building and radioisotope lab, appear to have been razed.

1997–1998 (A-18–A-19): No other significant features or changes are noted in these aerial photos.

4.3 STRAWBERRY POINT

SP photos from 1938, 1957, 1970, 1986, 1995, 1997, and 1998 show numerous dirt roads/trails meandering throughout the vegetated and non-vegetated areas of SP (Figure 4-3). The trail patterns of a fenced area with no thoroughfare or specific use may indicate dumping of material throughout SP over an approximate 70-year period. Shoreline changes shown on Figure 4-3 indicate a large portion of SP was backfilled between 1945 and 1952. Details of the interpretation follow.

1938 (A-1): A view of the SP landmass pre-dating the airport development is shown in the 1938 aerial photo. The 1938 photo shows SP as undeveloped and partially wooded, and the

surrounding area as wooded and/or agricultural. A large cove was present in 1938 on the northeast shoreline of SP. The western shoreline, particularly along the northwestern edge of the peninsula, has a lobe extending west into Stansbury Creek and leading out to adjacent sandbars that appear to nearly connect SP to the opposite shoreline. Stansbury Creek also extends farther north in the 1938 aerial, originating as far north as the current Lockheed Martin MRC location. A possible pond appears to be on the southeast portion of the peninsula.

1945 (A-2): Between 1938 and 1945, substantial earthwork, including filling and berming, took place around the perimeter and in low areas of SP. The large cove on the northeast shoreline of SP in 1938 is no longer evident in the 1945 aerial; it had been replaced by the southern end of the seaplane runway. The western shoreline in 1938, particularly along the northwestern edge of the peninsula, had a lobe extending west into Stansbury Creek, leading out to adjacent sandbars that appear to nearly connect SP to the opposite shoreline. Also in the 1938 aerial, a smaller former cove that was partially filled and reshaped by 1956 is evident along the western shoreline of SP immediately south of this lobe feature.

The SP delivery hangar and surrounding infrastructure constructed in 1943 is apparent in the 1945 aerial photograph. The shape of SP has been significantly altered in 1945 images and subsequent aerials, as compared to the 1938 aerial. The most prominent change is the filling of the coves and consequential reshaping of the shoreline on the east and west sides of SP. Manmade soil berms are clearly visible around the shoreline perimeter of SP in the 1945 aerial photograph.. These berms remain today, but are increasingly obscured by vegetative growth in subsequent aerial photos.

1945 (B-1): In the oblique image dated February 1, 1945, the northeastern cove is apparently still being filled with dredged or barged material. Much of the ground surface is snow-covered, but standing water is visible in a large surface depression southwest of the boat ramp and near the inland portion of the former eastern cove. A large plateau of sediment appears to be sloped southward from the boat ramp area near the end of the seaplane runway, to partially fill the ponded area. This entire area appears completely filled within the berms in later aerials.

1947–1975 (A-3–A-13): In other aerial photos taken between 1947 and 1975, only minor changes are noted for the SP area. In the aerial dated October 22, 1947, one or two piles of deposited soil or granular material appear to be in the northwest portion of SP. However, no clear

trails or tire tracks to these isolated piles are visible. In 1952, one pile appears enlarged, and these features appear overgrown in subsequent aerials.

1979 (A-14) and 1986 (A-15): In the 1979 aerial, dirt roads are clearly visible in both the eastern and western halves of SP. The roadway in the western half of SP is more pronounced in the 1986 aerial, presumably due to more recent and/or more frequent traffic. No structures, large debris items, or piles are apparent in the western half of SP in the 1979 and 1986 aerials—only possibly disturbed ground surface near the western perimeter berms.

1995 (A-17) and 1997 (A-18): In the 1995 and 1997 aerials, the western-loop dirt road appears somewhat overgrown, and the eastern dirt road connecting to the crescent-shaped pile still appears to be in use. No other significant changes at SP are noted between the 1979 and 1997 images.

1998 (A-19): No other significant features are noted in this aerial photo.

4.4 COMPASS ROSE AREA

The 38-acre Compass Rose Area (CRA) lies south of the DRA, between Taxiway Tango and Frog Mortar Creek. Today, the site consists mostly of heavily wooded areas, mowed grass, and wetlands. Figure 4-4 shows the features of the CRA. Details of the interpretation are presented below.

1938 (A-1): A small cove (#16) is in the center of the CRA. Open fields likely used for agriculture are visible north of the cove, and forested land is south of the cove.

1945 (A-2): The airport runway has been completed at this time. The runway terminates at an "L"-shaped pad extending northeast from the runway toward the cove. The runway terminates directly southwest of the northern end of the cove. The area immediately west of the cove had been cleared of vegetation. The lobate land area north of the cove and the area west and southwest of the cove are diked along the shoreline. A large circular ground scar (possibly a sand pit), or slight ground depression (#53) is west of the cove and directly north of the "L"-shaped runway terminus.

1947 (A-3): The lobate land area north of the cove appears mostly vegetated. The ground scar area west of the cove (#45) (visible in the 1945 photograph) and the diked area southwest of the cove continue to be open areas with little or no vegetation.

1952 (A-4)–1957 (A-7): The cove (#16), connected with Frog Mortar Creek, was diked and filled between 1952 and 1957. Taxiway Tango is under construction in the September 1956 photograph (A-5) and the lobate land area north of the cove is mostly vegetated. Filling activities in the lobate land area north of the cove and in the cove can be seen in the 1957 photograph (A-7). In 1957, Taxiway Tango has been completed and the runway and Taxiway Tango have been extended to their current configuration. This is the same period when extensive dumping of material and open burning occurred in and around the nearby DRA. The inferred DRA landfill area encroaches on the north side of the CRA (#38).

1956 (B-7): The large ground scar, possible sand pit, or ground depression (#53) within the bermed area north of the runway terminus is visible in the right side of this photograph. This area appears to be a large ground depression in the western portion of the CRA.

1959 (A-9): The cove appears to be filled in and the construction of the concrete pathway and pad of the compass rose is complete. Most of the unpaved areas of the CRA are vegetated.

1966 (A-11)—1979 (A-14): No significant features or changes are noted in the CRA in these aerial photographs.

1986 (A-15): The lobate land area north of the former cove appears to be heavily vegetated.

1989 (A-16)–1998 (A-19): No significant features or changes are noted in the CRA in these aerial photographs.

4.5 DUMP ROAD AREA

The lack of quality aerials makes it difficult to determine the exact extent of the dump within the DRA; the historical collection of photographs does show that the dump was used and eventually closed before the 1995 aerial. Oblique photographs from 1955 make it clear that debris was dumped, burned, moved, and spread over the area by bulldozers. Aerials from 1945 through 1986 show debris and soil grading changes during this period. The following are detailed assessments

of historical features observed in the available photographs. Major historical features through the study period are shown in a current aerial photograph on Figure 4-5.

1924 (C-4): This photo documents site conditions approximately five years before the first purchase of the current MSA property by the Glenn L. Martin Company. The 1924 USGS topographic map (map C-4) shows the MSA area as undeveloped and rural, with woods in the center of the peninsula, and mostly open, unforested land along the Frog Mortar Creek shoreline.

1938 (A-1): The site is generally undeveloped at this time except for agricultural activity and a small area with structures in the southern portion of the site. The southern portion of the site is an open, unforested area. Wooded areas are apparent in the western and southwestern portions of the site, in the area of the current Taxiway Tango and airport runway. In the northern portion of the site, the small cove shown in the 1924 topographic map remains. The cove extends from Frog Mortar Creek westward to what is today the edge of Taxiway Tango (blue dashed lines in Figure 4-5). The cove is immediately south of the current Maryland Air National Guard (MDANG) armory area.

1945 (A-2): By 1945, runways 1–3 and the Main Terminal buildings have been built. The areas of the DRA and CRA to the south have been completely cleared and terraced (#32), from the northern shoreline of the small cove in the CRA (currently a wetland) to the southern shoreline of the larger cove in the DRA. The western portion of the DRA cove has been backfilled (light blue dashed line on Figure 4-5). Small unpaved roads run parallel to the main runway near the current Taxiway Tango area and terminate at a large ground scar (possibly a sand pit), or ground depression (#53) just north of the "L"-shaped end of the runway present at this time. The ground scar, possible sand pit, or ground depression (#53) is directly west of the small CRA cove in what is now the northwestern edge of the CRA.

1947 (A-3): No significant features or changes in the DRA are noted in this photograph.

1949 (C-5)/1951 (C-6): USGS topographic maps show the DRA as an unforested area with no mapped features. The DRA cove is named Limehouse Cove in the 1951 topographic map.

Undated design drawing (D-1): D-1 shows the proposed KP and KV buildings for the National Guard armory area (see D-3 for building locations), a proposed new dump road, and a proposed

200,000-square-foot oil and acid pit (#1), which was located along the southern shoreline of the DRA cove. Sketches and annotations on the drawing show the proposed pit to have sloping sides and a diameter of 130 feet, with a depth of 12 feet. Excavated earth was to have been placed around the perimeter of the pit. The drawing also shows the locations of the "existing" dump road, existing acid pit (#43), and proposed alignment for the proposed Taxiway Tango. Approximately half of the "existing" acid pit (#43) is shown as being underneath the planned location of Taxiway Tango; the other half is on the western side of the taxiway. The proposed oil and acid pit (#1) is at the current Pond 1 location. The "existing" acid pit (#43) is shown to be approximately 680 feet north of Taxiway D. Two bunkers are shown in the northern area of planned Taxiway Tango. These are shown as features #20 and #26 on Figure 4-5.

1952 (A-4): Earthen berms still enclose the area of the DRA south of the Limehouse Cove shoreline and the CRA. A large pit is visible south of the southern shoreline of the DRA cove, at the location of the proposed oil and acid pit shown in the undated design drawing above. The pit appears to be mostly empty, with some possible liquids at the bottom (indicated by a dark area in the center of the pit). Burning (#15) is visible west of this pit.

1955 (B-5/B-6): An oval pit (#44) and possibly an elongated sediment pond (#24) can be seen in these oblique aerial photographs of the DRA. Vegetation has grown in the bermed area, which was being filled in at this time. Earth-moving equipment and splays of fill are also visible.

1956 (B-7): B-7 (February 1956) shows an area of burning (#45) and a bermed pit (#43). This pit location coincides with the location of the "existing" pit in drawing D-1 described above. The ground scar or soil depression (#53) near the "L"-shaped runway terminus is visible in this photograph.

1956 (A-5/A-5-1): A-5 and A-5-1 (September 1956) show a large amount of activity along what is now Taxiway Tango, the DRA, and the Munitions Area within the MDANG property. Multiple areas of fill or debris piles (#48–#51) are visible as dump-truck-sized mounds adjacent to one another. These piles cover large areas and were possibly used later during the grading and construction of Taxiway Tango. Three pits are visible (#1, #46, #47). Whereas feature #1 was an engineered pit first appearing in 1956, features #46 and #47 are small shallow pits only visible in the 1956 aerial. Pits #46 and #47 are in the area currently designated as the Petroleum Hydrocarbon Area named as part of the DRA environmental investigations. An earthen

dike/berm and possible roadway (#40) is now constructed across Limehouse Cove near its mouth, and a large portion of the cove was being filled when this photograph was taken in 1956. Fill and debris can be seen in the area of feature #17 on Figure 4-5.

1957 (A-7/A-8): By 1957, the terraced area of the DRA and CRA had been filled and construction of Taxiway Tango had started. Limehouse Cove (#17), within the MDANG portion of DRA, was diked (#40) and gradually filled.

By 1957, a new and permanent oil and acid disposal pit (#1) (as titled in the 1958 as-built drawing D-2) was constructed. Pond 1 is currently at that location. To the north and east, two other features that appear to be small ponds or pits are at the present day Pond 2 (#19) and closer to the shoreline of Frog Mortar Creek (#42). Feature #42 coincides with the location of a current wetland area in the eastern part of the DRA.

1958 Drawing (D-2): The September 1958 as-built drawing shows the new oil and acid disposal pit (i.e., currently Pond 1) and a new access road constructed in the DRA. A note on the drawing states that it was added to the contract on September 25, 1956. The pit is semicircular, with a radius of 120 feet and a depth of eight feet. The sides are sloped 2:1 and a three-foot berm was constructed around the perimeter of the pit. The western edge of the pit is 313 feet from the center of Taxiway Tango.

1959 (A-9)/1960 (B-8/B-9): Several photos from 1959 and the 1960s show another pit (#2) adjacent to the first. This pit (#2) was similar in shape to feature #1, though slightly smaller. A 1960 oblique photo (B-9) of the second pit (#2) clearly shows dark, oil-like material dumped from one side of the pit floating on top of the water within the pit; berms around the pits are clearly visible. A large amount of spilled oily material is also apparent on the ground along portions of the berm and pit edge. South and southeast of the pits, the edge of the backfill being spread to the shoreline is visible. Dark features along the shoreline appear to be rubble and debris.

1966 (A-11): The oil and acid pit (i.e., feature #1 and present day Pond 1) and the third pit, southeast and adjacent to Pond 1 (#2), are clearly visible in the 1966 aerial photograph. Present day Pond 2 (#19) appears as a dark feature; this may indicate vegetation or low water. Some

ground disturbance appears southeast of the third pit (#2). The bermed area southeast of the DRA (i.e., the northeastern portion of the CRA) appears smooth and covered with vegetation.

1970 (A-12): By 1970, the third pit southeast of Pond 1 (#2) has been filled in. Extensive earth moving and grading are evident southeast of the former third pit (#2). What is now Pond 2 is more visible in this rather than prior photos. Directly west of Pond 2, and southwest of the armory, is a small oval area that appears to be a pit. This dark feature is about the same distance off the current dump road as Pond 1.

1975 (A-13): Vegetation now covers the area of the third pit southeast of Pond 1. Pond 1 and Pond 2 are clearly visible. Most of the DRA is vegetated. An area of ground disturbance exists at the boundary of the DRA and CRA. The small oval area west of the armory that appeared to be a pit in the 1970 aerial photograph is not in the 1975 photograph.

1979 (A-14): The area of ground disturbance at the boundary of the DRA and CRA is larger than in 1975.

1986 (A-15): The area of ground disturbance at the boundary of the DRA and CRA covers the area of the loop road at the end of dump road (the area encompassed by current monitoring wells DMW-7S/I/D, MW-6, and DMW-6S/I/D). No other changes to the DRA are evident.

1989 (A-16): The area of ground disturbance at the boundary of the DRA and CRA is smaller than in 1986, and with distinct boundaries.

1995 (A-17): By 1995, the DRA is completely covered with vegetation, except for the roadways. Vegetation has now grown over the area of ground disturbance at the end of the dump road in the 1975–1989 photographs (#38).

1998 (A-19): No significant features or changes in the DRA are noted in this aerial photograph.

4.6 MARYLAND AIR NATIONAL GUARD

The following are detailed assessments of historical features from the available photographs. Major historical features through the study period are shown in a current aerial photograph on Figure 4-6.

1938 (A-1): The site is generally undeveloped at this time except for agricultural activity and small areas with structures in the northern portion of the site. A secondary road passes through the northwest portion of the site, parallel to Eastern Avenue to the north and other small secondary roads at the southern portion of the site, all leading to Frog Mortar Creek.

1945 (A-2): A-2 shows three areas of ground disturbance (#3–#5) in the eastern portion of MDANG, near the creek shoreline and north of the Munitions Area.

1947 (A-3): The agricultural fields are no longer visible as compared to the previous aerial photograph, and the MDANG property displays evidence of ground surface disturbance. Portions of Taxiways 22, 28, Tango, and the taxiway connecting Martin State Airport to the Glenn L. Martin Plant 2 are visible at the eastern boundary of where the original MDANG lease area was later developed. Land has been cleared east of Taxiway 22 and north of Taxiway 28. No structures are visible on the MDANG property. A building north of Taxiway 28 appears to be consistent with the location of an electronics testing building that was present on the Glenn L. Martin property at that time. The Glenn L. Martin Airport runways, taxiways, and main terminal had been constructed southwest of the site.

1952 (A-4): Identifiable features appear as in the previous aerial photograph. Land has been cleared east of the Taxiway 22 and 28 intersection next to Frog Mortar Creek (#3–#5). Land has also been cleared where the current northwestern MDANG facilities are located.

1956 (A-5): A-5 shows fill or debris piles (#48/#49) visible as adjacent dump-truck-sized mounds. These piles cover large areas and were possibly used later during the grading and construction of Taxiway Tango.

1957 (A-7)**:** The northwestern portion of the site, west of the MDANG taxiway, has now been developed. A large parking apron is apparent south of these new facilities. Numerous secondary roads and small structures are visible east of Taxiway 22. The southeastern portion of the present-day MDANG site near Frog Mortar Creek appears to be filled with imported material. Taxiway Tango has been constructed. A storage yard is visible in the northern portion of MDANG (#41).

1959 (A-9): No changes to identifiable features are noted as compared to the 1957 aerial photograph.

1966 (A-11)**:** No changes to identifiable features are noted as compared to the 1959 aerial photograph.

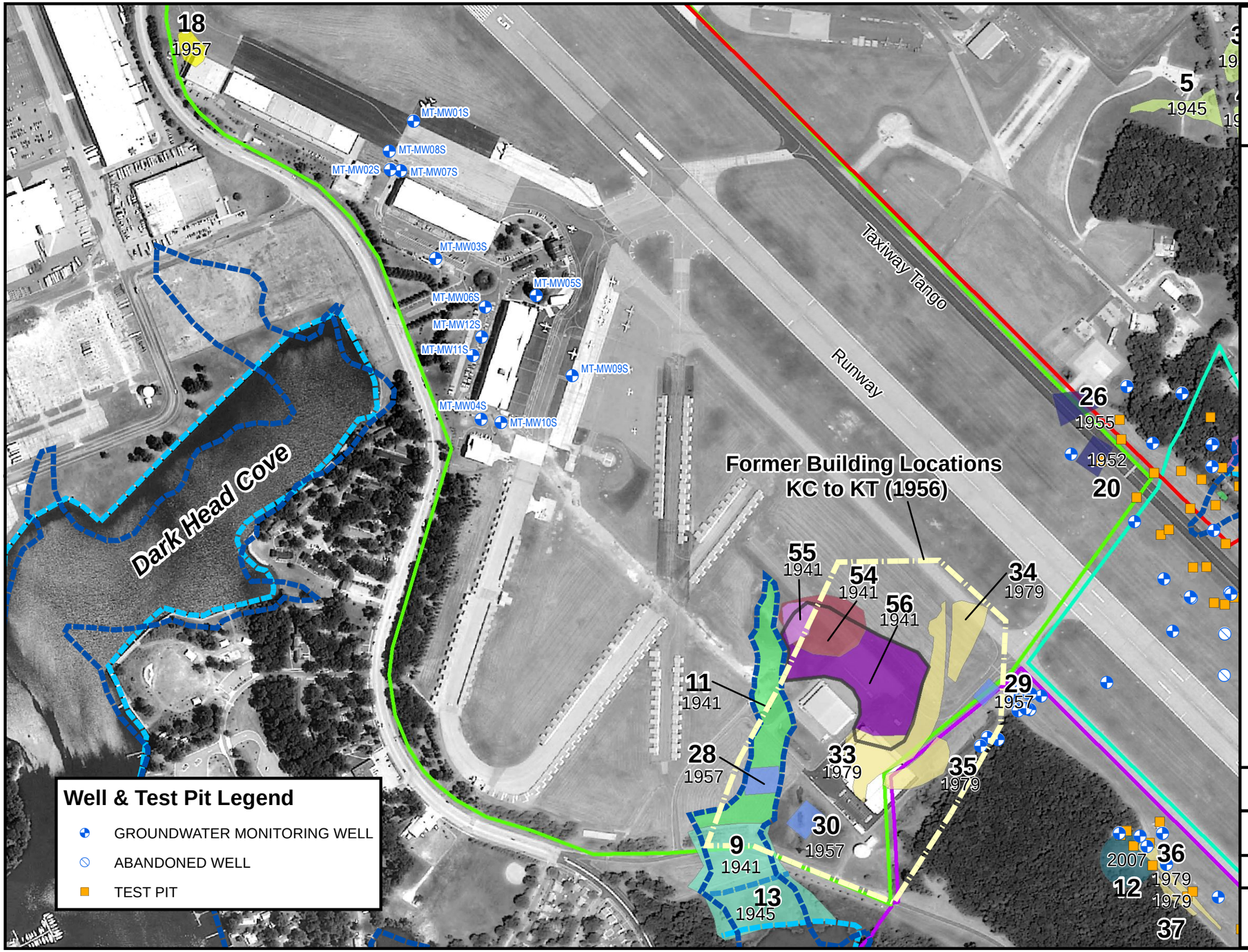
1975 (A-13)**:** No discernible changes since the 1966 photo are evident.

1986 (A-15)**:** This aerial photograph is low quality. No discernible changes since the 1966 photo are evident.

1998 (A-19)**:** By 1998, numerous buildings have been constructed in the northern portion of the site. The taxiway connection to the Glenn L. Martin State Airport and Plant 2 no longer exists. The parking apron mentioned in the 1957 aerial description has been expanded to cover the pre-existing taxiway.

FIGURE 4-1

MAIN TERMINAL AREA
HISTORICAL FEATURES
MARTIN STATE AIRPORT



Legend

Site Area Boundary

- Maryland Air National Guard
- Compass Rose
- Strawberry Point
- Martin State Airport Main Terminal Area
- Greater Strawberry Point
- Dump Road Area

Historical Features

- Above Ground Storage Tank
- Bermed Structure
- Bunker Ammo or Fuel
- Debris Piles
- Dike/Berm
- Disturbed Earth
- Drainage Area
- Earthen Mound
- Fill
- Fuel Truck Bunker
- Open Burning
- Pond/Pit

Shorelines from Aerials

- 1959
- 1952
- 1945
- 1941
- 1938

Background Photo Source: USDA - July 27, 2011

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 140 280 560 Feet

N

DATE MODIFIED: 1/17/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\Historical Features MTA wells.mxd)

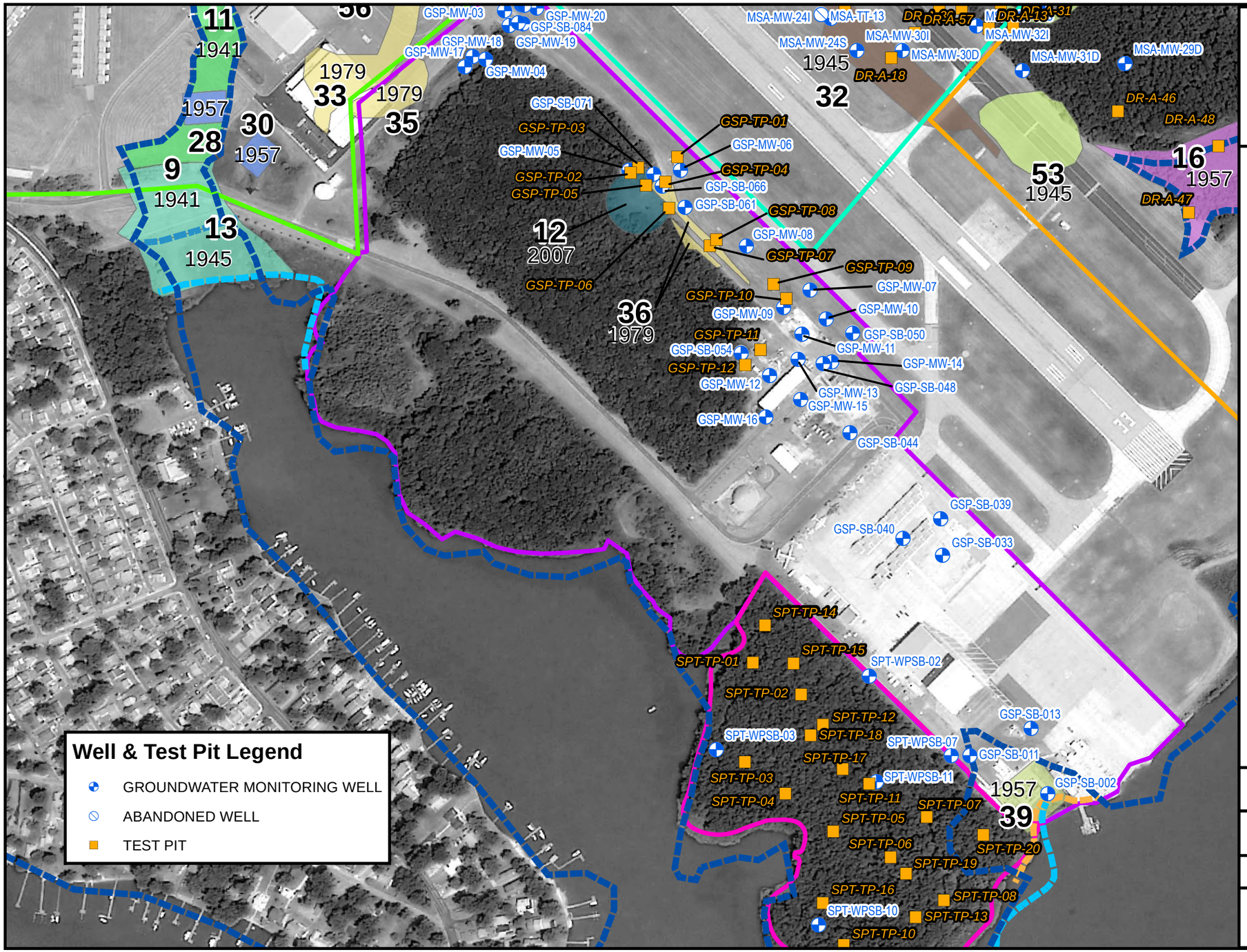


FIGURE 4-2

GREATER STRAWBERRY POINT
HISTORICAL FEATURES
MARTIN STATE AIRPORT

Legend

Site Area Boundary
- Maryland Air National Guard
- Compass Rose
- Strawberry Point
- Martin State Airport Main Terminal Area
- Greater Strawberry Point
- Dump Road Area

Historical Features
- Above Ground Storage Tank
- Bermed Structure
- Bunker Ammo or Fuel
- Debris Piles
- Dike/Berm
- Dike/Berm Terraced
- Disturbed Earth
- Earthen Mound
- Fill
- Fuel Truck Bunker
- Open Burning
- Pond/Pit

Shorelines from Aerials
- 1959
- 1952
- 1945
- 1941
- 1938

Background Photo Source: USDA - July 27, 2011

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 125 250 500 Feet

N

DATE MODIFIED: 1/17/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\Historical Features GSP_Wells.mxd)

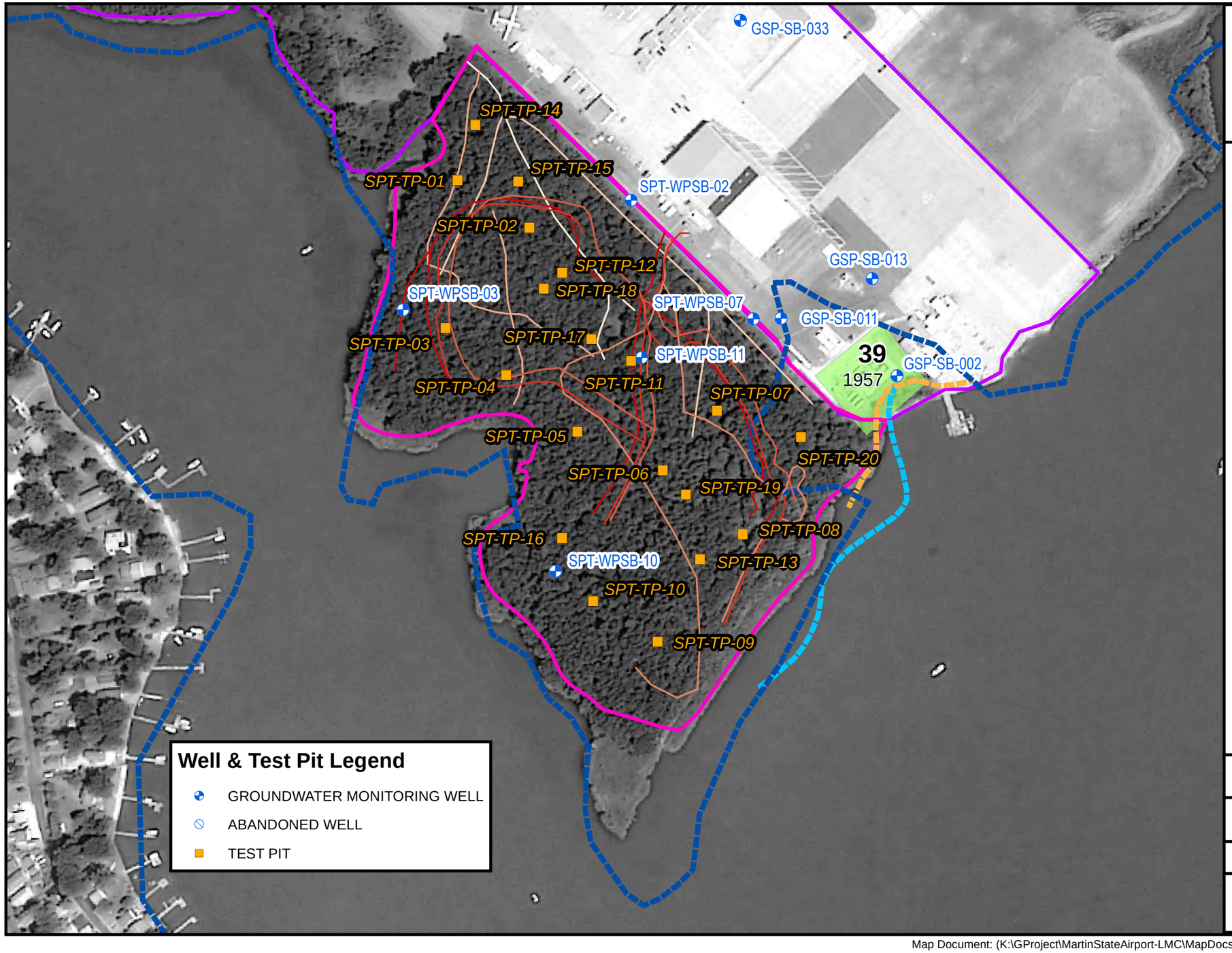


FIGURE 4-3

STRAWBERRY POINT
HISTORICAL FEATURES
MARTIN STATE AIRPORT

Legend

Site Area Boundary
- Maryland Air National Guard
- Compass Rose
- Strawberry Point
- Martin State Airport Main Terminal Area
- Greater Strawberry Point
- Dump Road Area

Historical Features
- AST

Historic Roads- Strawberry Point

Time
- 1938
- 1957
- 1970
- 1986
- 1995
- 1997
- 1998

Shorelines from Aerials
- 1959
- 1952
- 1945
- 1941
- 1938

Background Photo Source: USDA - July 27, 2011

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 85 170 340 Feet

N

DATE MODIFIED: 1/17/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\Historical Features SP_Wells.mxd)

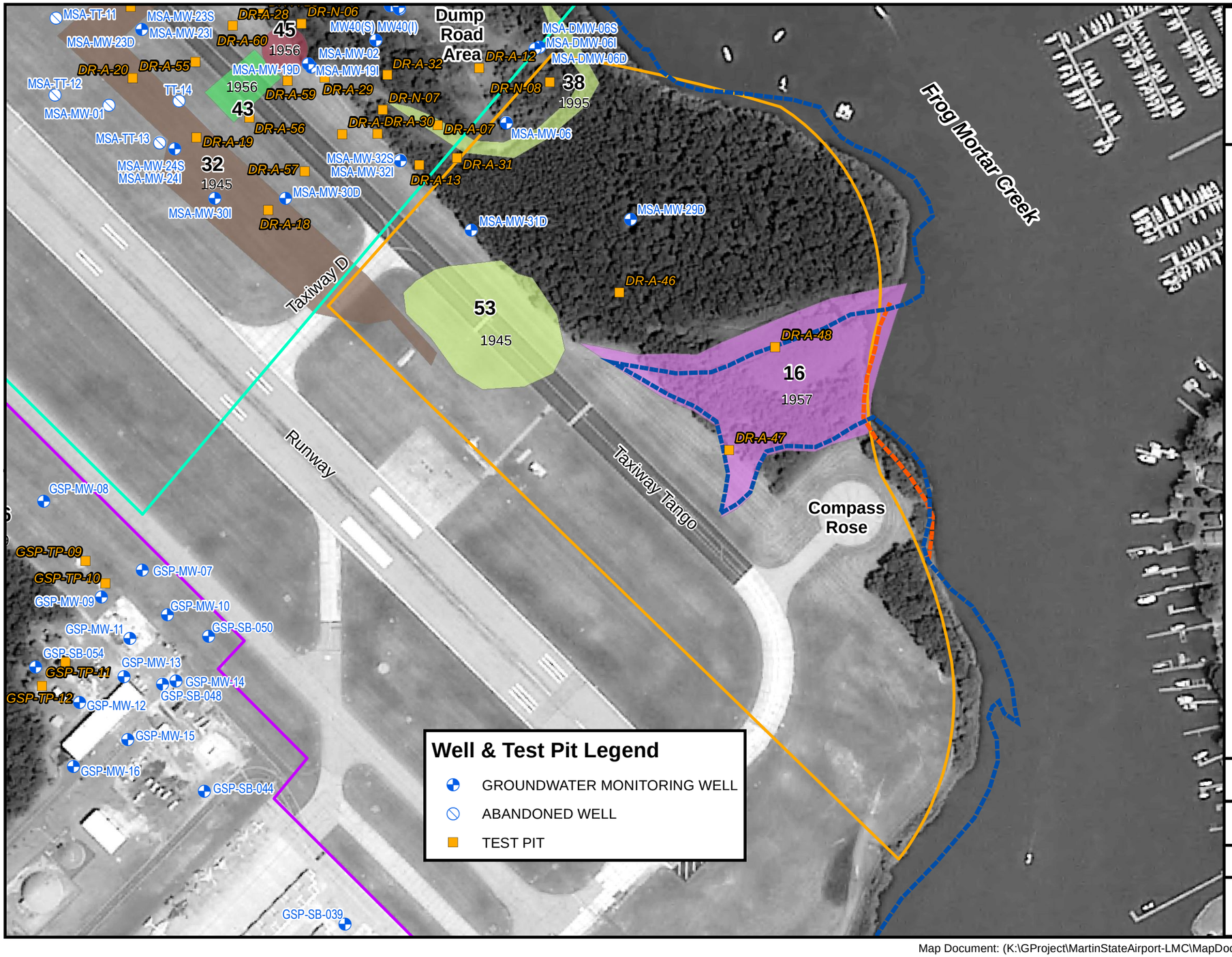


FIGURE 4-4

COMPASS ROSE AREA
HISTORICAL FEATURES
MARTIN STATE AIRPORT

Legend

Site Area Boundary

- Maryland Air National Guard
- Compass Rose
- Strawberry Point
- Martin State Airport Main Terminal Area
- Greater Strawberry Point
- Dump Road Area

Historical Features

- Bermed Structure
- Bunker Ammo or Fuel
- Dike/Berm
- Dike/Berm Terraced
- Disturbed Earth
- Earthen Mound
- Fill
- Open Burning
- Pond
- Pond/Pit

Shorelines from Aerials

- 1959
- 1952
- 1945
- 1941
- 1938

NOTE: Locations of features 43 and 45 were taken from oblique aerials and are approximate in size and location.

Background Photo Source: USDA - July 27, 2011

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 80 160 320 Feet

N

DATE MODIFIED: 1/17/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\Historical Features CRA wells.mxd)

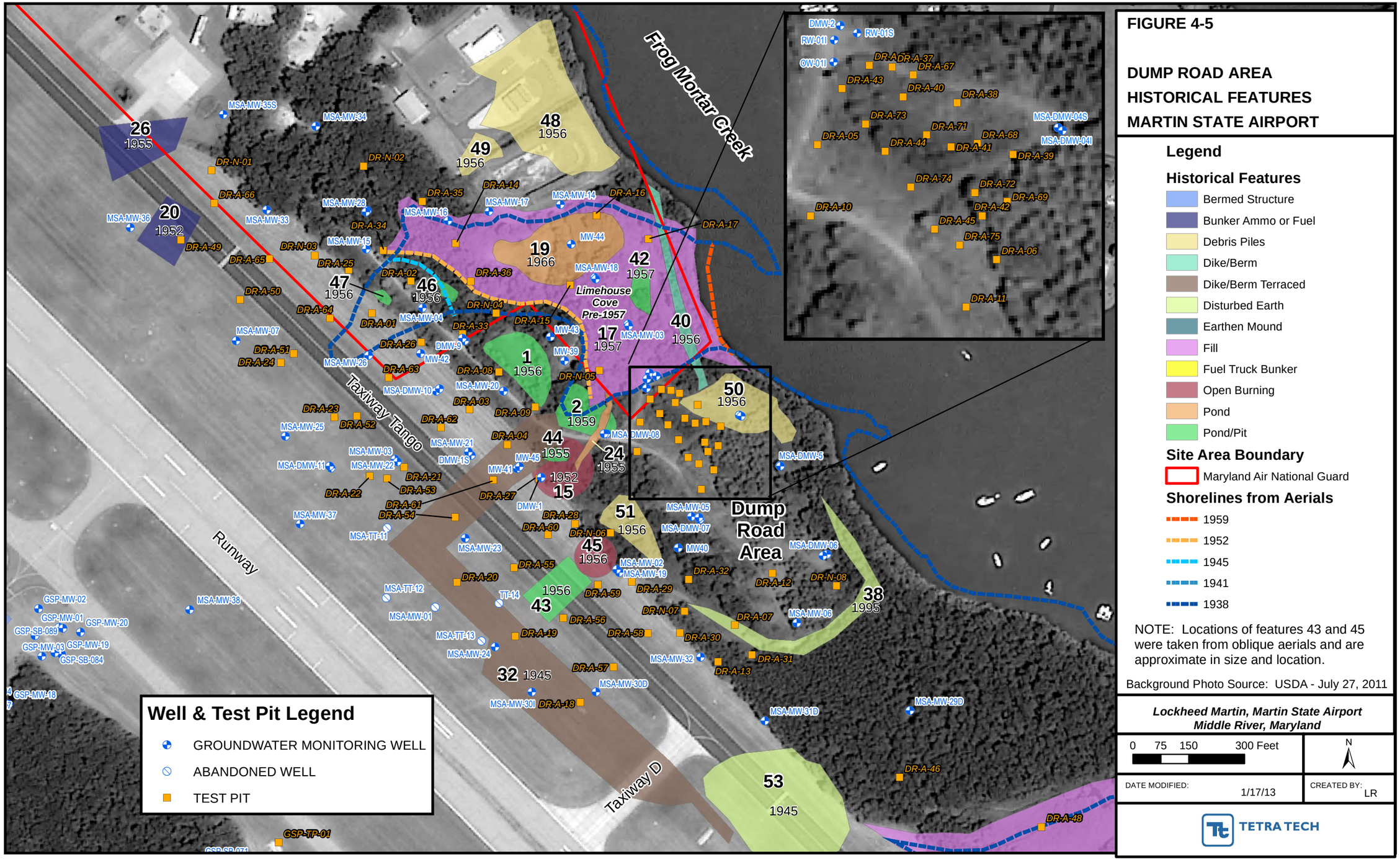


FIGURE 4-5

DUMP ROAD AREA
HISTORICAL FEATURES
MARTIN STATE AIRPORT

Legend

Historical Features

- Bermed Structure
- Bunker Ammo or Fuel
- Debris Piles
- Dike/Berm
- Dike/Berm Terraced
- Disturbed Earth
- Earthen Mound
- Fill
- Fuel Truck Bunker
- Open Burning
- Pond
- Pond/Pit

Site Area Boundary

- Maryland Air National Guard

Shorelines from Aerials

- 1959
- 1952
- 1945
- 1941
- 1938

NOTE: Locations of features 43 and 45 were taken from oblique aerials and are approximate in size and location.

Background Photo Source: USDA - July 27, 2011

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 75 150 300 Feet

N

DATE MODIFIED: 1/17/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\SPACE_2011\Maps\Historical Features DRA_wells.mxd)

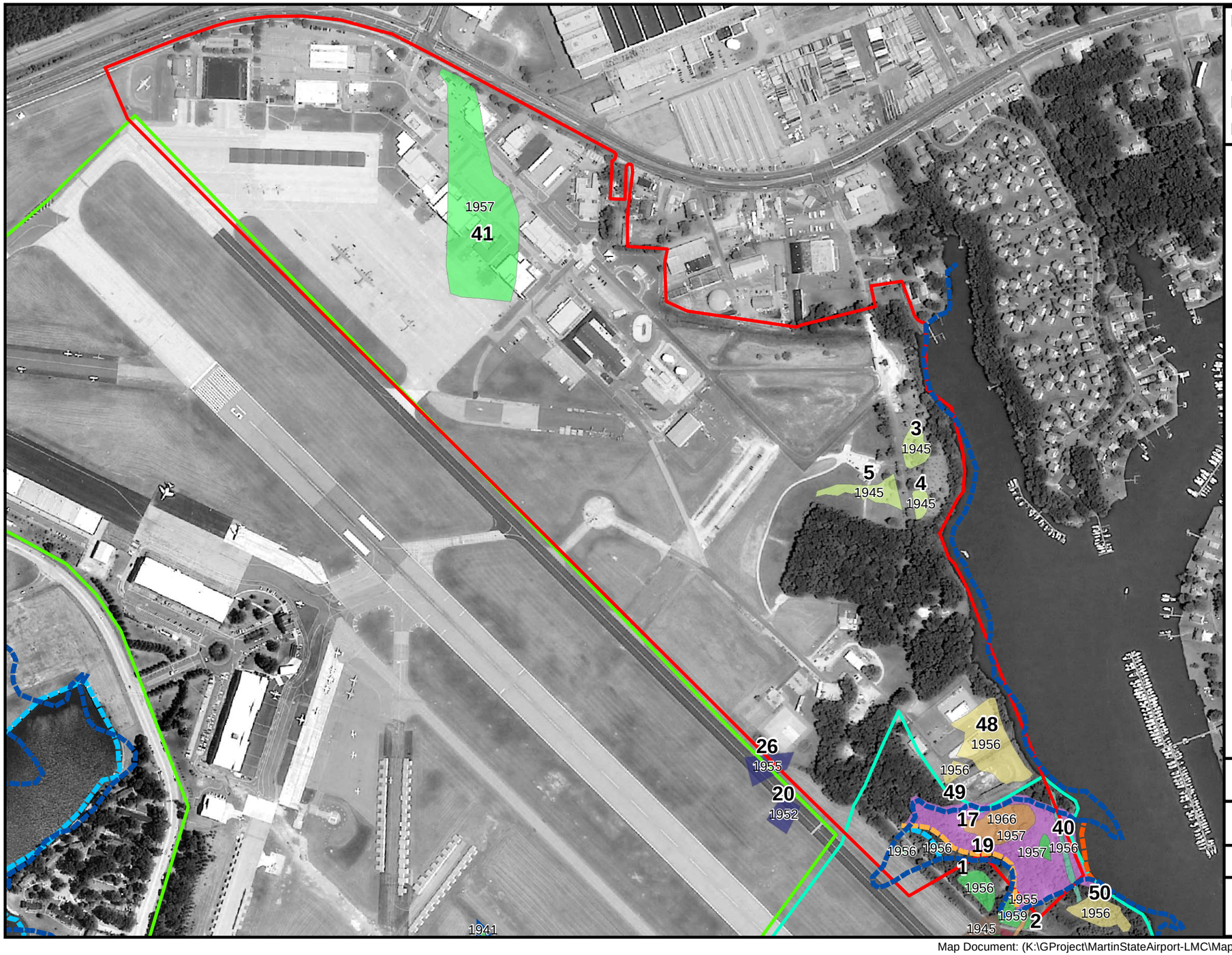


FIGURE 4-6

MARYLAND AIR NATIONAL GUARD
HISTORICAL FEATURES
MARTIN STATE AIRPORT

Legend

Site Area Boundary
- Maryland Air National Guard
- Compass Rose
- Strawberry Point
- Martin State Airport Main Terminal Area
- Greater Strawberry Point
- Dump Road Area

Historical Features
- Above Ground Storage Tank
- Bermed Structure
- Bunker Ammo or Fuel
- Debris Piles
- Storage Yard
- Dike/Berm
- Dike/Berm Terraced
- Disturbed Earth
- Fill
- Fuel Truck Bunker
- Open Burning
- Pond
- Pond/Pit

Shorelines from Aerials
- 1959
- 1952
- 1945
- 1941
- 1938

Background Photo Source: USDA - July 27, 2011

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 150 300 600 Feet

N

DATE MODIFIED: 12/14/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\Historical Features MANG.mxd)

Section 5
Summary

Historical aerial photographs, maps, and drawings were obtained from various commercial and governmental sources and evaluated to identify and document land changes or site features that may influence environmental investigations at six Martin State Airport (MSA) study areas. Aerial photographs from 1938 to 1998 were evaluated and interpreted for this study. Relevant photographs were converted to digital format and added to the Martin State Airport environmental geographic information system (EGIS) database, which will allow future use of this photographic information in projects at Martin State Airport.

The current airport property was originally part of the Glenn L. Martin Company's approximately 1,260-acre property, which included surrounding areas containing manufacturing facilities. A search of Maryland land records and deeds indicates that the Glenn L. Martin Company purchased six parcels of undeveloped land from private landowners during the spring and summer of 1929, identified as 701 Wilson Point Road. During the 1940s and 1950s, nine additional parcels at this location were acquired from private landowners. Ownership and operation of Martin State Airport by the Maryland Aviation Administration (MAA) began in 1975. Martin State Airport currently comprises an administration and terminal building, aircraft hangars, a 7,000-foot long runway, several taxiways, and the Strawberry Point hangar, which is currently used by the Maryland State Police. The Maryland Air National Guard (MDANG) currently leases 175 acres from the Maryland Aviation Administration in the northeastern quadrant of the approximately 775-acre Martin State Airport property.

The condition of the current Martin State Airport property before its initial purchase by the Glenn L. Martin Company in 1929 shows the airport area as undeveloped and rural, with a woodland area in the center of the peninsula, and consisting of mostly open, unforested land along the shorelines of Stansbury Creek and Frog Mortar Creek. By 1945, most of the airport had been constructed, including the airport administration and terminal building, airplane hangars, taxiways, and runway. Portions of Stansbury Creek and small coves in Frog Mortar Creek were

filled in to provide larger operational areas for the airport. The United States Navy leased land in the Strawberry Point (SP) and Greater Strawberry Point (GSP) areas of Martin State Airport in the 1940s and 1950s and constructed numerous buildings and test facilities. These buildings have since been removed and their former locations are being investigated as part of the Greater Strawberry Point environmental studies conducted by Lockheed Martin Corporation (Lockheed Martin).

Numerous environmental investigations have been conducted at Martin State Airport. The most extensively studied Lockheed Martin Corporation site is the Dump Road Area (DRA), which is on the eastern side of Martin State Airport between the airport runway and Frog Mortar Creek. Reviews of aerial photographs and drawings show that this area was used as a dump when it was filled in during the 1950s.

Several pits are identified in the aerial photographs. Photographs from the mid-1950s show black staining on the sidewalls and black material on the surface of two constructed pits, indicating dumping had occurred. Engineering drawings also identified the locations of acid and oil disposal pits, one of which currently exists as a pond at the Dump Road Area. The aerial photographs also identified two smaller possible pits that may have been used to dump material in what is now referred to as the Petroleum Hydrocarbon Area. A large ground scar, possible sand pit, or ground depression was also identified near the Compass Rose Area east of the airport runway.

Section 6
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12. Tetra Tech (Tetra Tech, Inc.), 2012a. *Supplemental Main Terminal Phase II Site Investigation Report, Martin State Airport 701 Wilson Point Road Middle River, Maryland*. Report prepared by Tetra Tech, Inc., Germantown, Maryland for Lockheed Martin Corporation, Bethesda, Maryland. December.

13. Tetra Tech (Tetra Tech, Inc.), 2012b. *Compass Rose Area Soil Investigation Report, Martin State Airport 701 Wilson Point Road Middle River, Maryland*. Report prepared by Tetra Tech, Inc., Germantown, Maryland for Lockheed Martin Corporation, Bethesda, Maryland. March.

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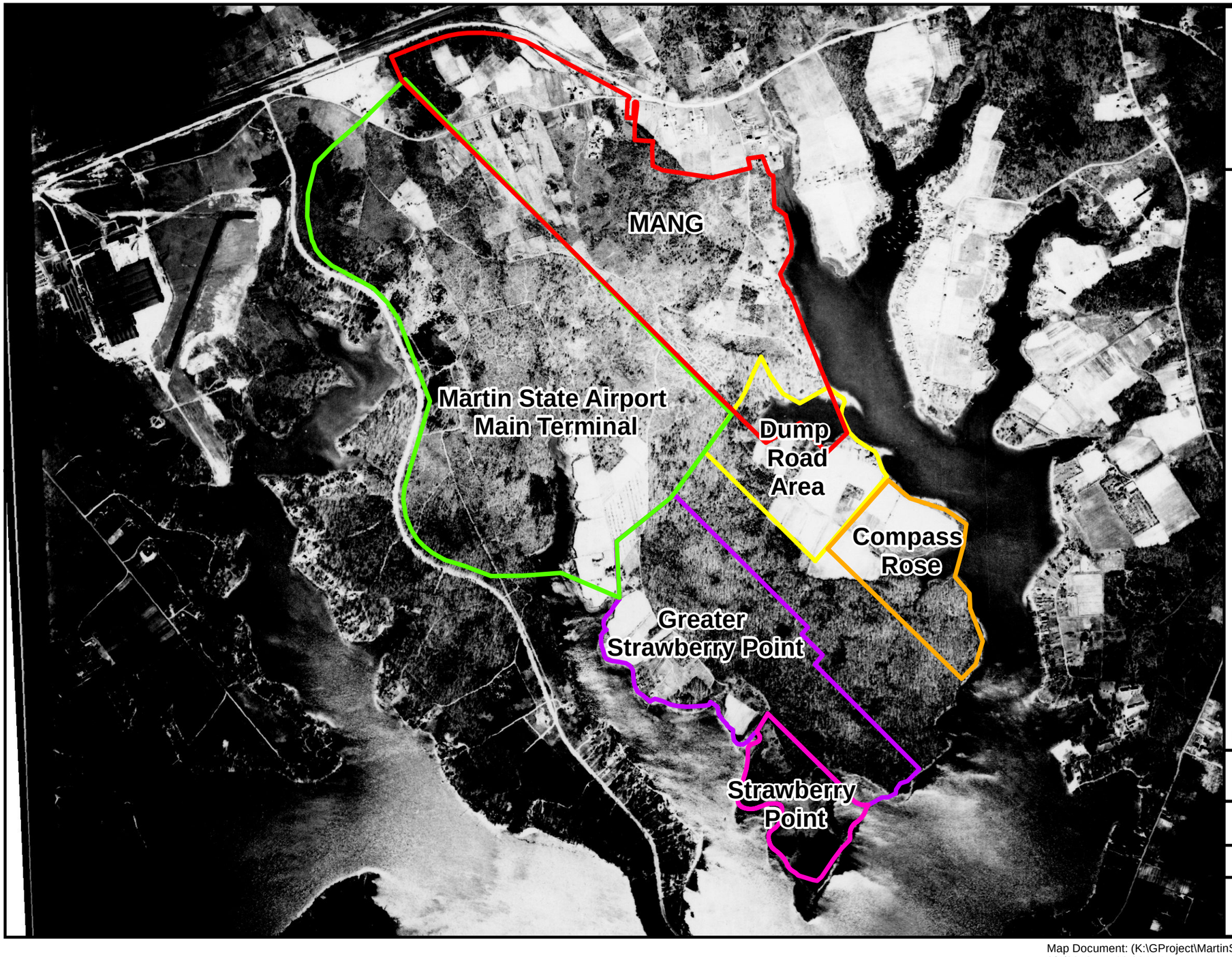
16. Tetra Tech (Tetra Tech, Inc.), 2012e. *Draft Final Remedial Investigation Report, Martin State Airport, Middle River, Maryland*. Report prepared by Tetra Tech, Inc., Germantown, Maryland for Lockheed Martin Corporation, Bethesda, Maryland. April.

APPENDIX A—HISTORICAL DIRECT OVERHEAD AERIAL PHOTOGRAPHS



A-1

HISTORICAL AERIAL 1938
MARTIN STATE AIRPORT

Legend

Site Area Boundary

- MANG
- Compass Rose
- Strawberry Point
- Martin State Airport Main Terminal
- Greater Strawberry Point
- Dump Road Site

Background Photo Source: USDA - July 27, 2011

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 350 700 1,400 Feet

N

DATE MODIFIED: 9/4/12

CREATED BY: LR

TETRA TECH

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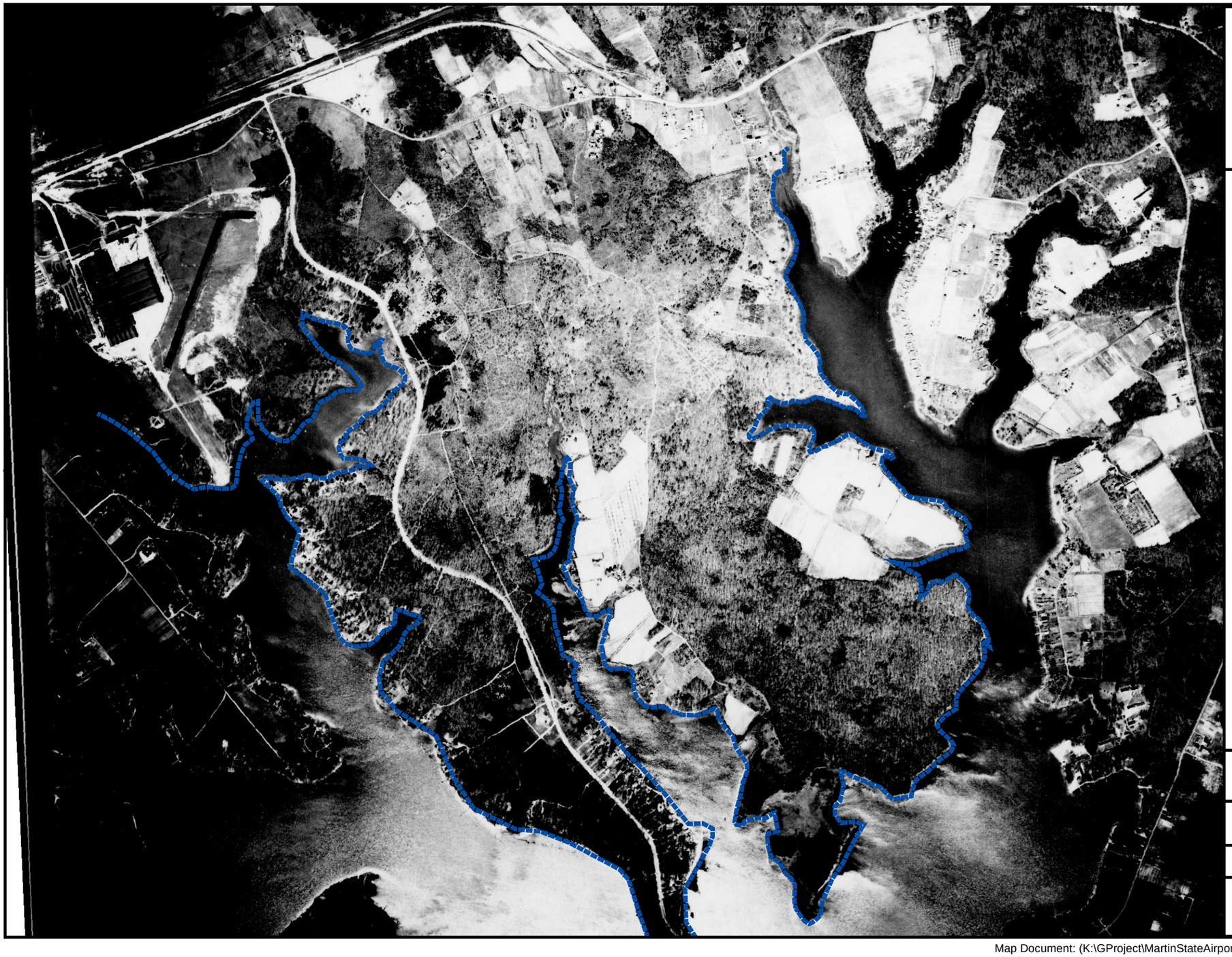

A-1A

HISTORICAL AERIAL 1938
WITH IDENTIFIED FEATURES
MARTIN STATE AIRPORT

SHORELINE
DELINEATED IN 1938

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 350 700 1,400 Feet

N

DATE MODIFIED: 1/9/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1938_Features.mxd)
1/10/2013 -- 7:19:28 AM

A-2

HISTORICAL AERIAL 1945
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 350 700 1,400 Feet

N

DATE MODIFIED: 9/4/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1945.mxd)
9/4/2012 -- 1:05:22 PM

A-2A

HISTORICAL AERIAL 1945 WITH IDENTIFIED FEATURES MARTIN STATE AIRPORT

FEATURE NUMBERS ON THIS MAP COORESPOND TO FEATURES FROM REPORT

Legend

Historical Features

- Dike/Berm
- Berm Terraced
- Disturbed Earth
- Drainage Area

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 350 700 1,400 Feet

N

DATE MODIFIED: 1/4/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\A-2A 1945_features.mxd)
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A-3
HISTORICAL AERIAL
OCTOBER 1947
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE

DATE MODIFIED: 12/06/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1947 Aerial.mxd) 12/06/2012 -- 2:17:13 PM

A-4

HISTORICAL AERIAL 1952
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 355 710 1,420 Feet

N

DATE MODIFIED: 12/06/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1952.mxd)
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A-4A
HISTORICAL AERIAL 1952
WITH IDENTIFIED
FEATURES
MARTIN STATE AIRPORT

FEATURE NUMBERS ON THIS MAP COORESPOND TO FEATURES FROM REPORT

Legend

Historical Features

- Bunker Ammo or Fuel
- Open Burning

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 355 710 1,420 Feet

N

DATE MODIFIED: 1/04/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1952_features.mxd)

A-5
HISTORICAL AERIAL
SEPTEMBER 1956
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 12/06/12	CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1956 Aerial2.mxd) 12/06/2012 -- 4:52:02 PM

A-5-1

HISTORICAL AERIAL 1956
ENLARGED DUMP ROAD AREA
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 75 150 300 Feet

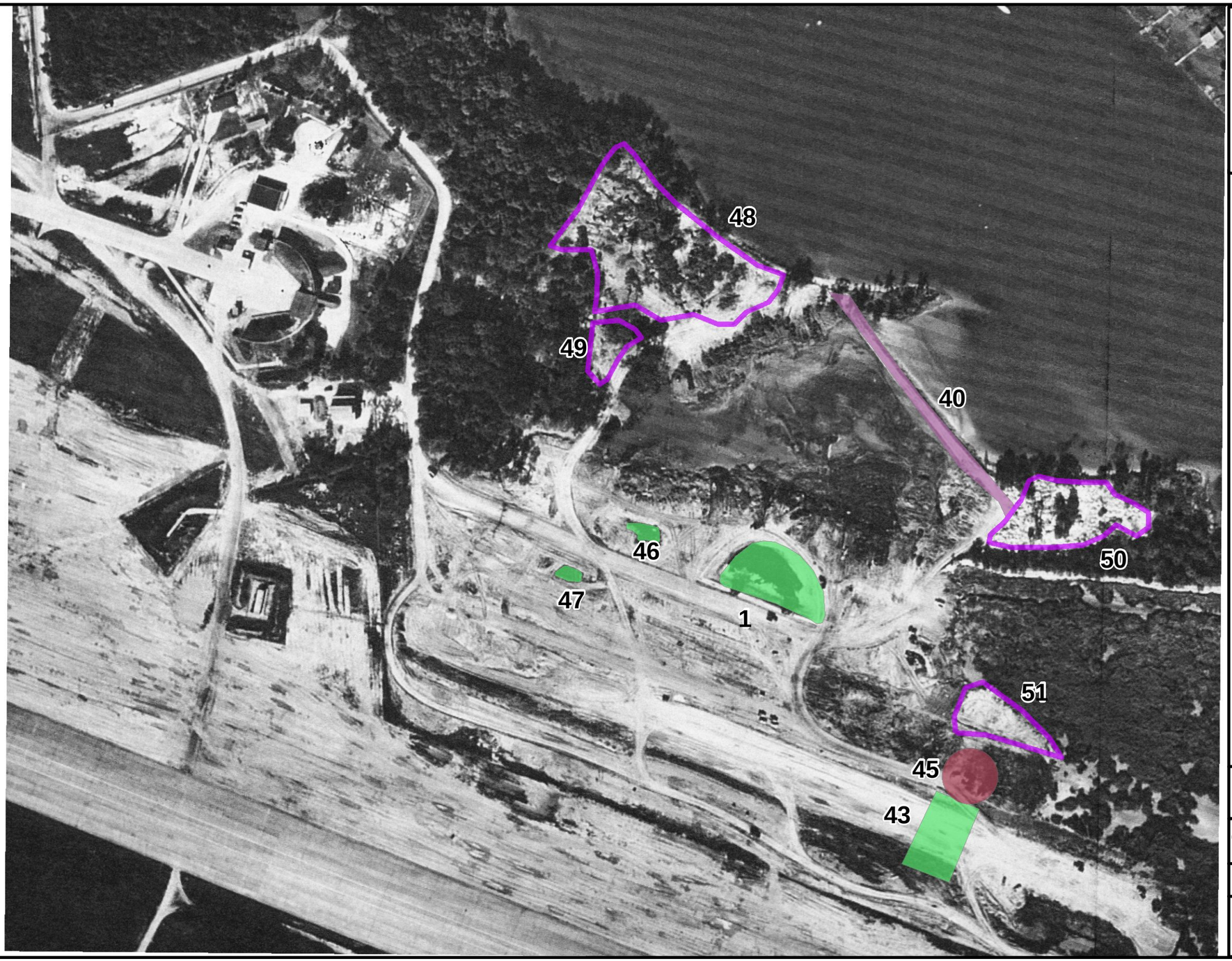
N

DATE MODIFIED: 12/13/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1956.mxd)



A-5-1A
HISTORICAL AERIAL 1956
WITH IDENTIFIED FEATURES
ENLARGED DUMP ROAD AREA
MARTIN STATE AIRPORT

FEATURE NUMBERS ON THIS MAP COORESPOND TO FEATURES FROM REPORT

Legend

Historical Features

- Debris Piles
- Dike/Berm
- Open Burning
- Pond/Pit

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 80 160 320 Feet

N

DATE MODIFIED: 1/9/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1956 Features.mxd) 1/10/2013 -- 1:37:09 PM

A-6
HISTORICAL AERIAL
SEPTEMBER 1956

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 12/06/12	CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1956 Aerial.mxd) 3/28/2008 -- 2:32:02 PM

A-7

HISTORICAL AERIAL 1957
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 355 710 1,420 Feet

N

DATE MODIFIED: 9/4/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1952 r1.mxd)
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A-7A
HISTORICAL AERIAL 1957
WITH IDENTIFIED FEATURES
MARTIN STATE AIRPORT

FEATURE NUMBERS ON THIS MAP
COORESPOND TO FEATURES
FROM REPORT

Legend

Historical Features

- AST
- Bermed Structure
- Bunker Ammo or Fuel
- Debris Yard
- Dike/Berm
- Fill
- Fuel Truck Bunker
- Pond/Pit

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 350 700 1,400 Feet

N

DATE MODIFIED: 1/9/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1957 r1 Features.mxd)
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A-8

HISTORICAL AERIAL 1957
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 25 50 100 Feet

N

DATE MODIFIED: 02/06/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1957 r2.mxd)

A-9

HISTORICAL AERIAL 1959
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 355 710 1,420 Feet

N

DATE MODIFIED: 12/06/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1959.mxd)
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A-9A
HISTORICAL AERIAL 1959
WITH IDENTIFIED FEATURES
MARTIN STATE AIRPORT

FEATURE NUMBERS ON THIS MAP
COORESPOND TO FEATURES
FROM REPORT

Legend

Historical Features

Pond/Pit

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 350 700 1,400 Feet

N

DATE MODIFIED: 1/9/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1959 Features.mxd) 1/10/2013 -- 1:43:54 PM

A-10

HISTORICAL AERIAL 1964
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 25 50 100 Feet

N

DATE MODIFIED: 2/07/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1964.mxd)

A-11

HISTORICAL AERIAL 1966
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 355 710 1,420 Feet

N

DATE MODIFIED: 12/06/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1966.mxd)
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A-11A
HISTORICAL AERIAL 1966
WITH IDENTIFIED FEATURES
MARTIN STATE AIRPORT

FEATURE NUMBERS ON THIS MAP COORESPOND TO FEATURES FROM REPORT

Legend

Historical Features

Pond

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 350 700 1,400 Feet

N

DATE MODIFIED: 1/9/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1966 Features.mxd) 1/10/2013 -- 2:00:50 PM

A-12

HISTORICAL AERIAL 1970
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 355 710 1,420 Feet

N

DATE MODIFIED: 12/06/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1970.mxd)
12/06/2012 -- 3:10:09 PM

A-13

HISTORICAL AERIAL 1975
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 355 710 1,420 Feet

N

DATE MODIFIED: 12/06/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1975.mxd)
12/06/2012 -- 3:17:18 PM

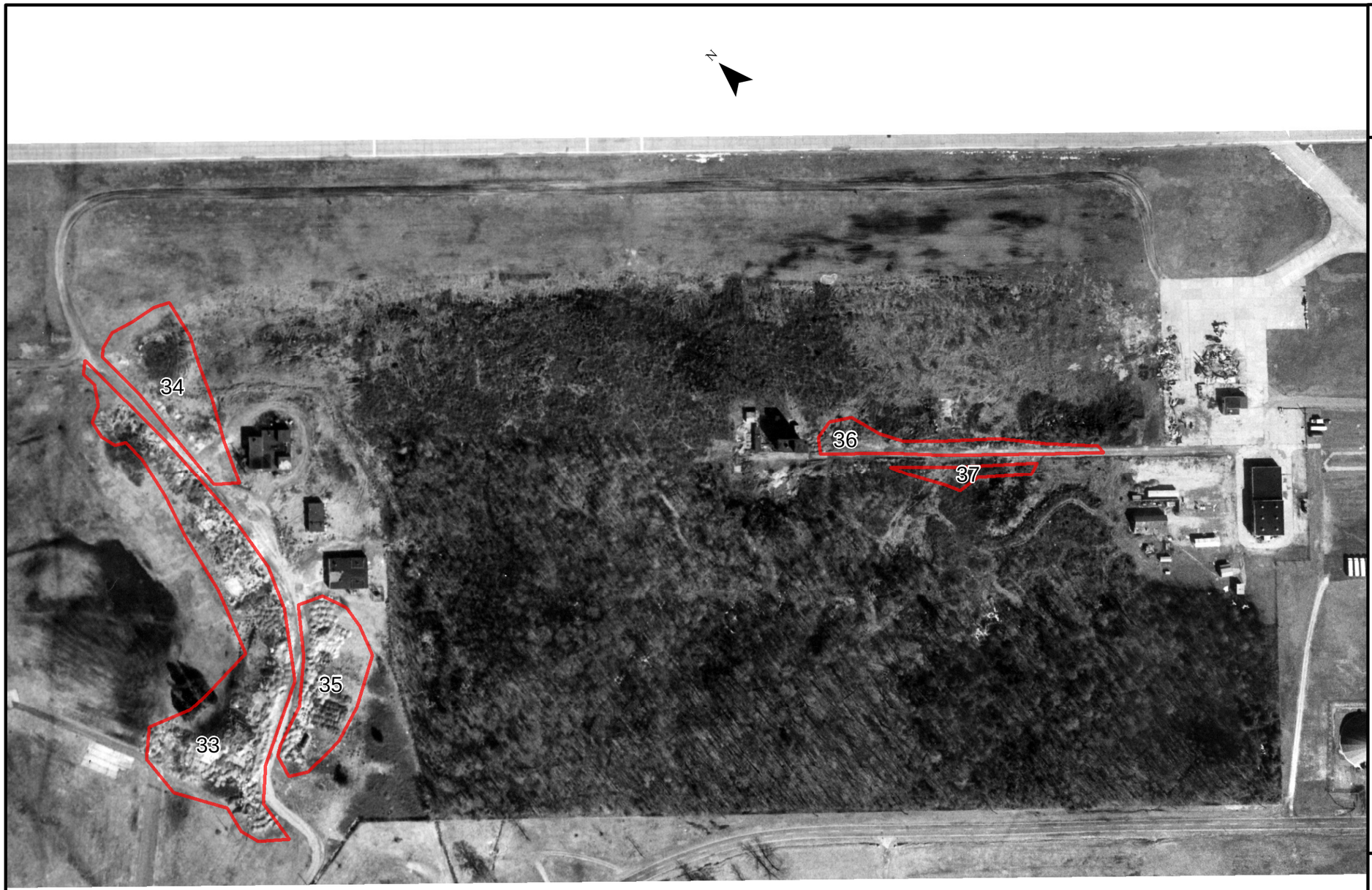
A-14
HISTORICAL AERIAL 1979
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 12/06/12	CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1979 Aerial.mxd) 12/06/2012 -- 3:45:16 PM



A-14A
HISTORICAL AERIAL 1979
WITH IDENTIFIED FEATURES
MARTIN STATE AIRPORT

FEATURE NUMBERS ON THIS MAP COORESPOND TO FEATURES FROM REPORT

Legend

Historical Features

Debris Piles

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE

DATE MODIFIED: 1/10/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1979 Aerial Features Closeup.mxd) 1/11/2013 -- 9:14:12 AM

A-15

HISTORICAL AERIAL 1986
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 355 710 1,420 Feet

N

DATE MODIFIED: 12/06/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1986.mxd)
12/06/2012 -- 3:48:02 PM

A-16
HISTORICAL AERIAL 1989
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE

DATE MODIFIED: 12/06/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1989.mxd) 12/06/2012 -- 4:12:46 PM

A-17

HISTORICAL AERIAL 1995
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 355 710 1,420 Feet

N

DATE MODIFIED: 12/06/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1995.mxd)
12/06/2012 -- 4:15:40 PM

A-17A
HISTORICAL AERIAL 1995
WITH IDENTIFIED FEATURES
MARTIN STATE AIRPORT

FEATURE NUMBERS ON THIS MAP
COORESPOND TO FEATURES
FROM REPORT

Legend

Historical Features

Disturbed Earth

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 350 700 1,400 Feet

N

DATE MODIFIED: 1/9/13

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1995 Features.mxd) 1/10/2013 -- 1:21:25 PM

A-18

HISTORICAL AERIAL 1997
STRAWBERRY POINT
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 130 260 520 Feet

N

DATE MODIFIED: 9/4/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1997.mxd)

A-19

HISTORICAL AERIAL 1998
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 355 710 1,420 Feet

N

DATE MODIFIED: 9/4/12

CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1998.mxd)

APPENDIX B—HISTORICAL OBLIQUE AERIAL PHOTOGRAPHS

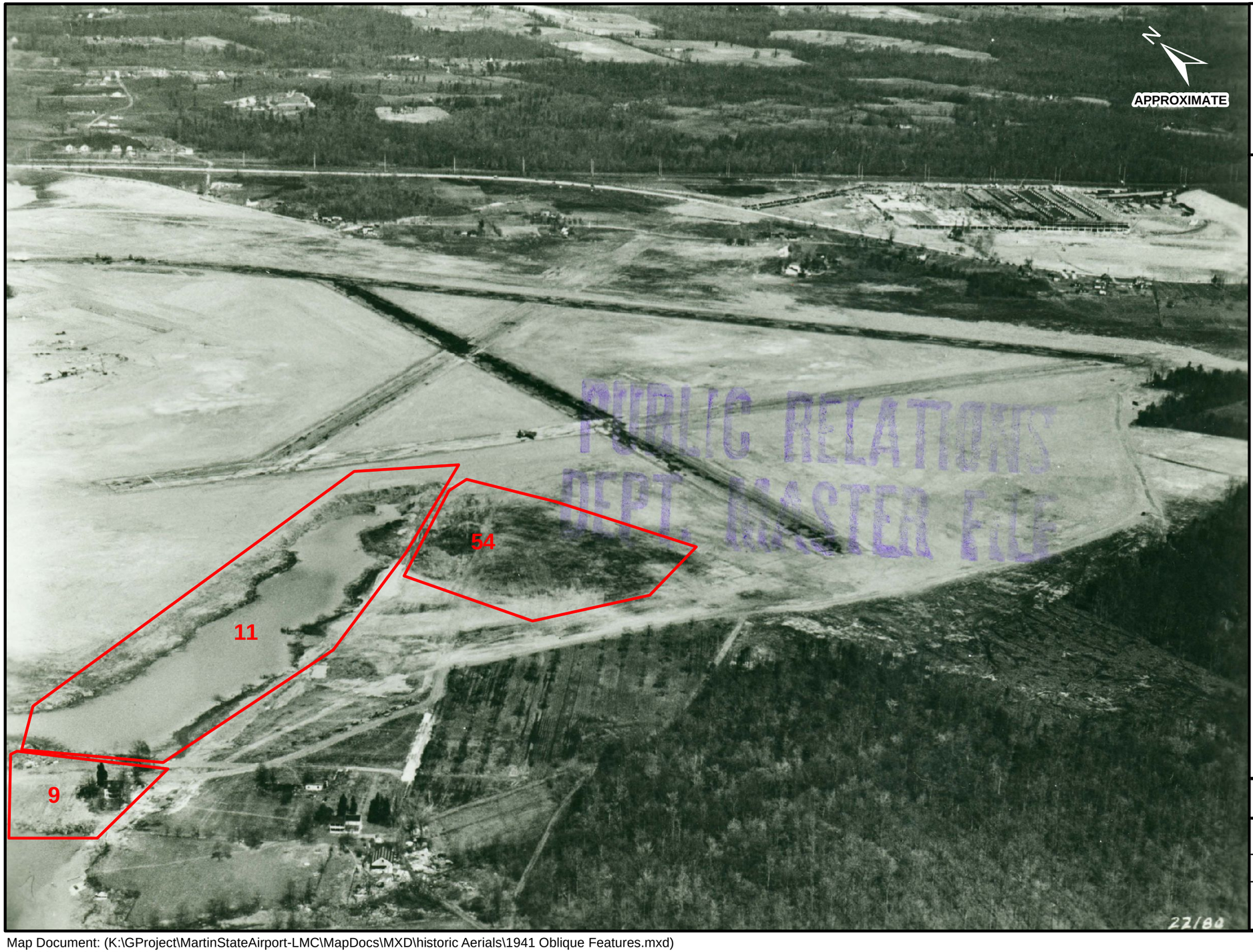
B-1
HISTORICAL OBLIQUE AERIAL
APRIL 1941
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 12/10/12	CREATED BY: SP

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1941 Aerial.mxd) 12/10/2012 -- 5:55:36 PM



B-1B
HISTORICAL OBLIQUE AERIAL APRIL 1941 WITH IDENTIFIED FEATURES
MARTIN STATE AIRPORT

FEATURES 9,11,54
FROM REPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 1/9/13	CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1941 Oblique Features.mxd)
1/10/2013 -- 8:09:51 AM

B-2

HISTORICAL OBLIQUE AERIAL
FEBRUARY 1945

STRAWBERRY POINT
MARTIN STATE AIRPORT

Source: Martin State Airport Museum, 2012

Lockheed Martin, Martin State Airport
Middle River, Maryland

DATE MODIFIED:	CREATED BY:
10/4/12	LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\photos\Graphics of Historic Obliques\B-9 1945 SP.cdr

B-3
HISTORICAL OBLIQUE AERIAL
JULY 1953
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 12/10/12	CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1953 Aerial.mxd) 12/10/2012 -- 5:37:44 PM

B-4
HISTORICAL OBLIQUE AERIAL
FEBRUARY 1954
MARTIN STATE AIRPORT

Lockheed Martin, Martin Stae Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 12/10/12	CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1954 Aerial.mxd) 12/11/2012 -- 10:18:59 AM

B-4B
HISTORICAL OBLIQUE AERIAL
FEBRUARY 1954 WITH
IDENTIFIED FEATURES
MARTIN STATE AIRPORT

FEATURE NUMBERS ON THIS MAP COORESPOND TO FEATURES FROM REPORT

FEATURES 15
FROM REPORT

Lockheed Martin, Martin Stae Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 1/9/13	CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1954 Aerial.mxd) 12/11/2012 -- 10:18:59 AM

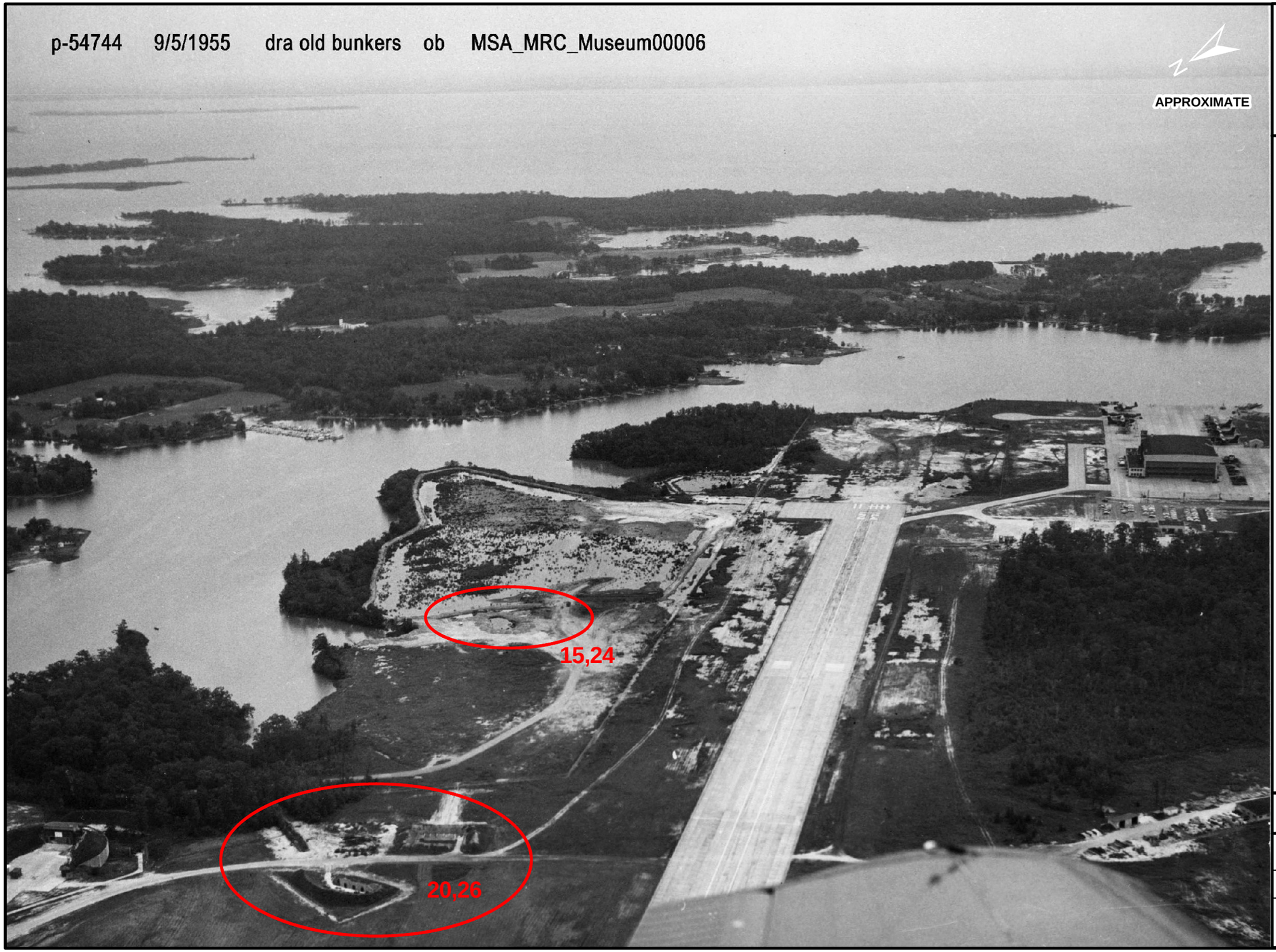
B-5
HISTORICAL OBLIQUE AERIAL
SEPTEMBER 5, 1955
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 12/10/12	CREATED BY: SP

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1955 Aerial19550905.mxd) 12/10/2012 -- 6:13:36 PM



B-5B
HISTORICAL OBLIQUE AERIAL SEPTEMBER 5, 1955 WITH IDENTIFIED FEATURES MARTIN STATE AIRPORT

FEATURE NUMBERS ON THIS MAP COORESPOND TO FEATURES FROM REPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 1/9/13	CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1955 Aerial 19550905 Features.mxd) 1/10/2013 -- 10:32:26 AM

B-6
HISTORICAL OBLIQUE AERIAL
SEPTEMBER 9, 1955
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 12/10/12	CREATED BY: SP

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1955 Aerial19550905.mxd) 12/10/2012 -- 6:24:36 PM

B-6B
HISTORICAL OBLIQUE AERIAL SEPTEMBER 9, 1955 WITH IDENTIFIED FEATURES MARTIN STATE AIRPORT

FEATURE NUMBERS ON THIS MAP COORESPOND TO FEATURES FROM REPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 1/9/13	CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1955 Aerial 19550909 Features.mxd) 1/10/2013 -- 10:51:12 AM

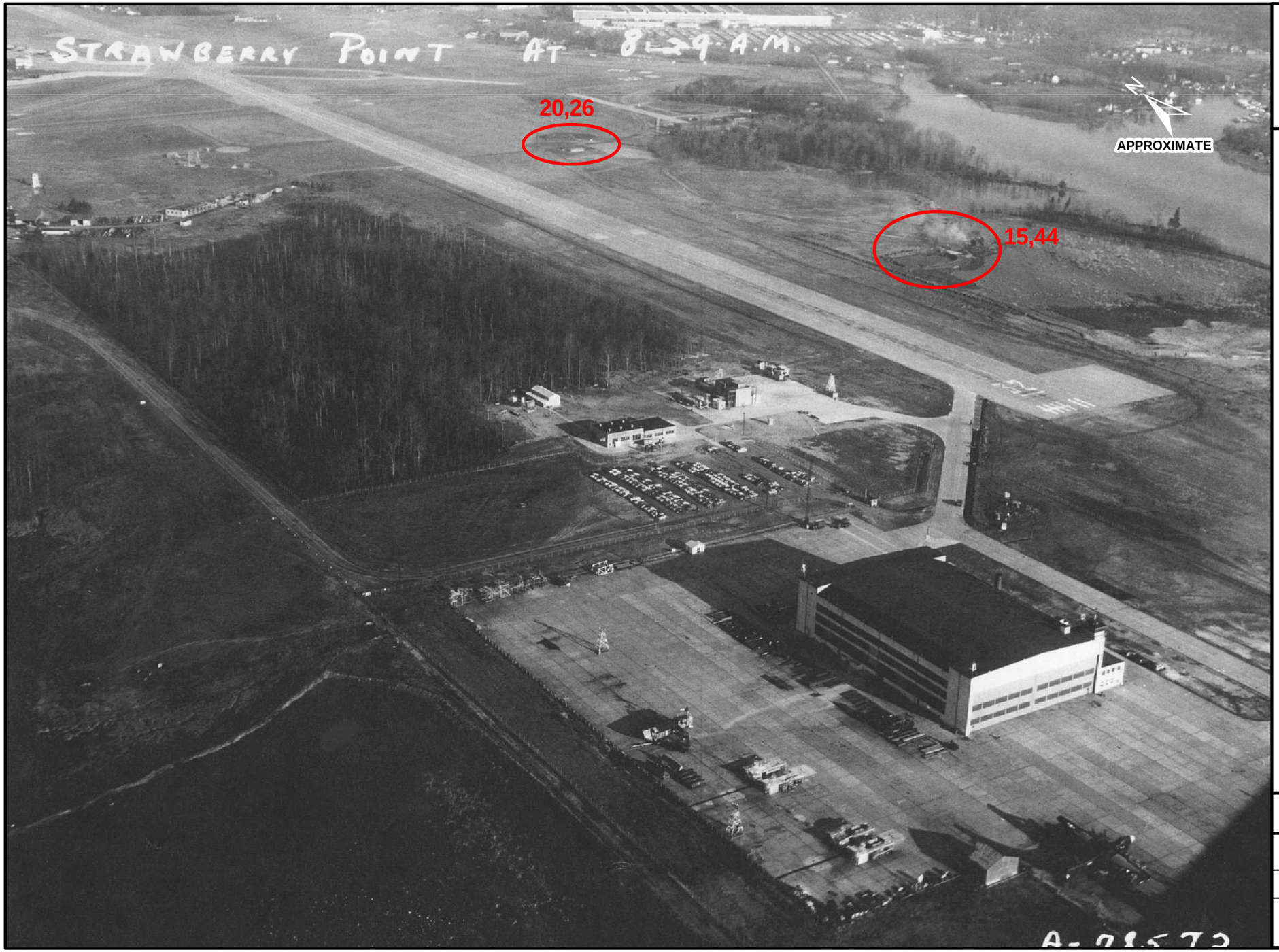
B-7
HISTORICAL OBLIQUE AERIAL
FEBRUARY 1956
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 12/10/12	CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1956 Aerial Oblique.mxd) 12/10/2012 -- 5:45:36 PM



B-7B
HISTORICAL OBLIQUE AERIAL FEBRUARY 1956 WITH IDENTIFIED FEATURES MARTIN STATE AIRPORT

FEATURE NUMBERS ON THIS MAP COORESPOND TO FEATURES FROM REPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 1/9/13	CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1956 Aerial Oblique Features.mxd)
1/10/2013 -- 9:48:17 AM

B-8
HISTORICAL OBLIQUE AERIAL
APRIL 30, 1960
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 12/10/12	CREATED BY: SP

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1960 Aerial1.mxd) 12/10/2012 -- 6:31:36 PM

B-9
HISTORICAL OBLIQUE AERIAL
APRIL 1960
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 12/10/12	CREATED BY: SP

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1960 Aerial2.mxd) 12/10/2012 -- 6:36:36 PM

B-9B
HISTORICAL OBLIQUE AERIAL
APRIL 1960 WITH
IDENTIFIED FEATURES
MARTIN STATE AIRPORT

FEATURE NUMBERS ON THIS MAP COORESPOND TO FEATURES FROM REPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 1/9/13	CREATED BY: LR

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1960 Aerial2 Features.mxd) 1/10/2013 -- 1:13:18 PM

B-10
HISTORICAL OBLIQUE AERIAL
MARCH 1962
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 12/10/12	CREATED BY: SP

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1962 Aerial 19620328.mxd) 12/10/2012 -- 6:45:36 PM

B-11
HISTORICAL OBLIQUE AERIAL
SEPTEMBER 1962
MARTIN STATE AIRPORT

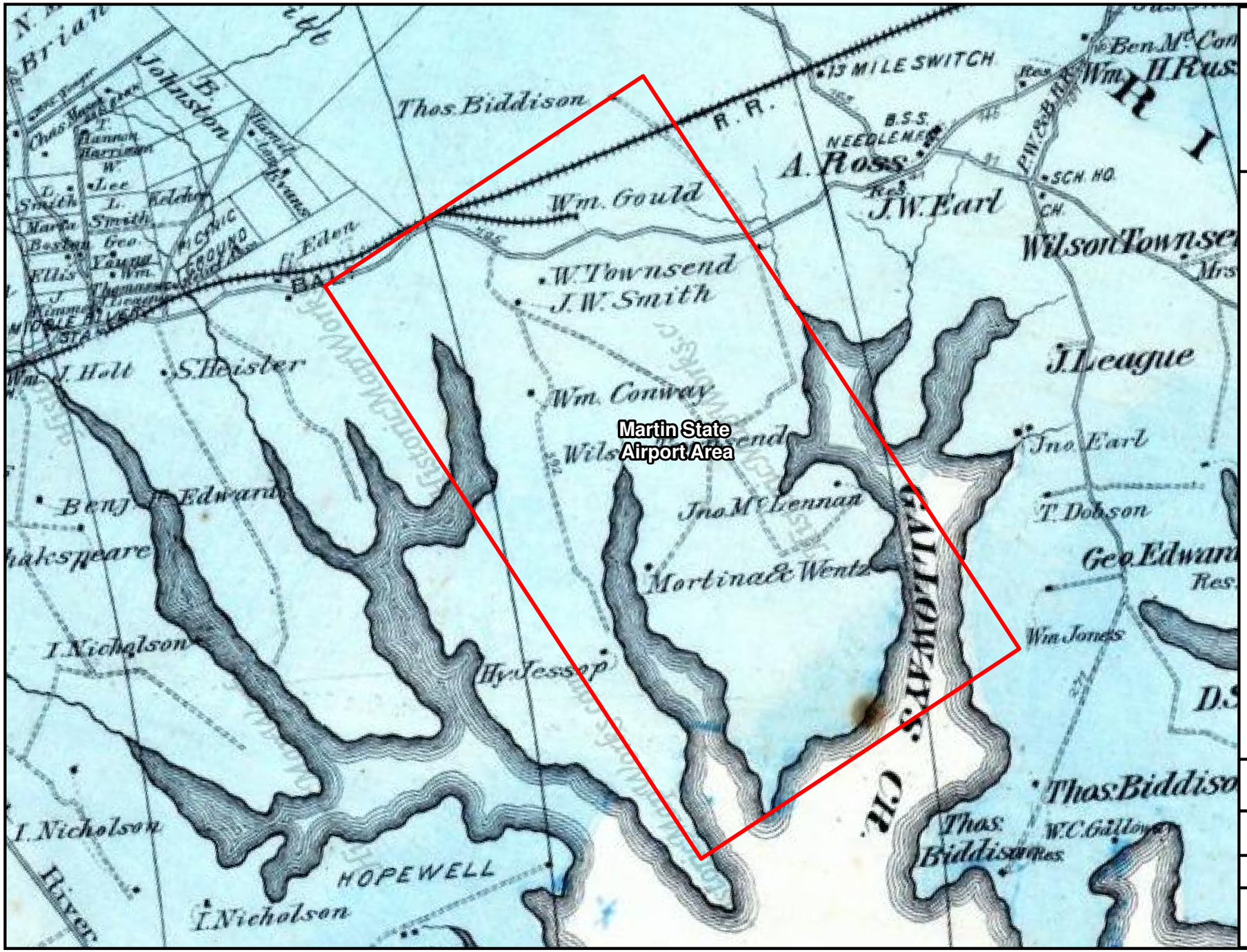
Lockheed Martin, Martin State Airport
Middle River, Maryland

NOT TO SCALE	
DATE MODIFIED: 12/10/12	CREATED BY: SP

TETRA TECH

Map Document: (K:\GProject\MartinStateAirport-LMC\MapDocs\MXD\historic Aerials\1962 Aerial 19620903.mxd) 12/10/2012 -- 6:54:36 PM

APPENDIX C—HISTORICAL TOPOGRAPHIC MAPS



C-1

HISTORICAL TOPOGRAPHIC MAP
PUBLICATION DATE (1877)
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 495 990 1,980 Feet

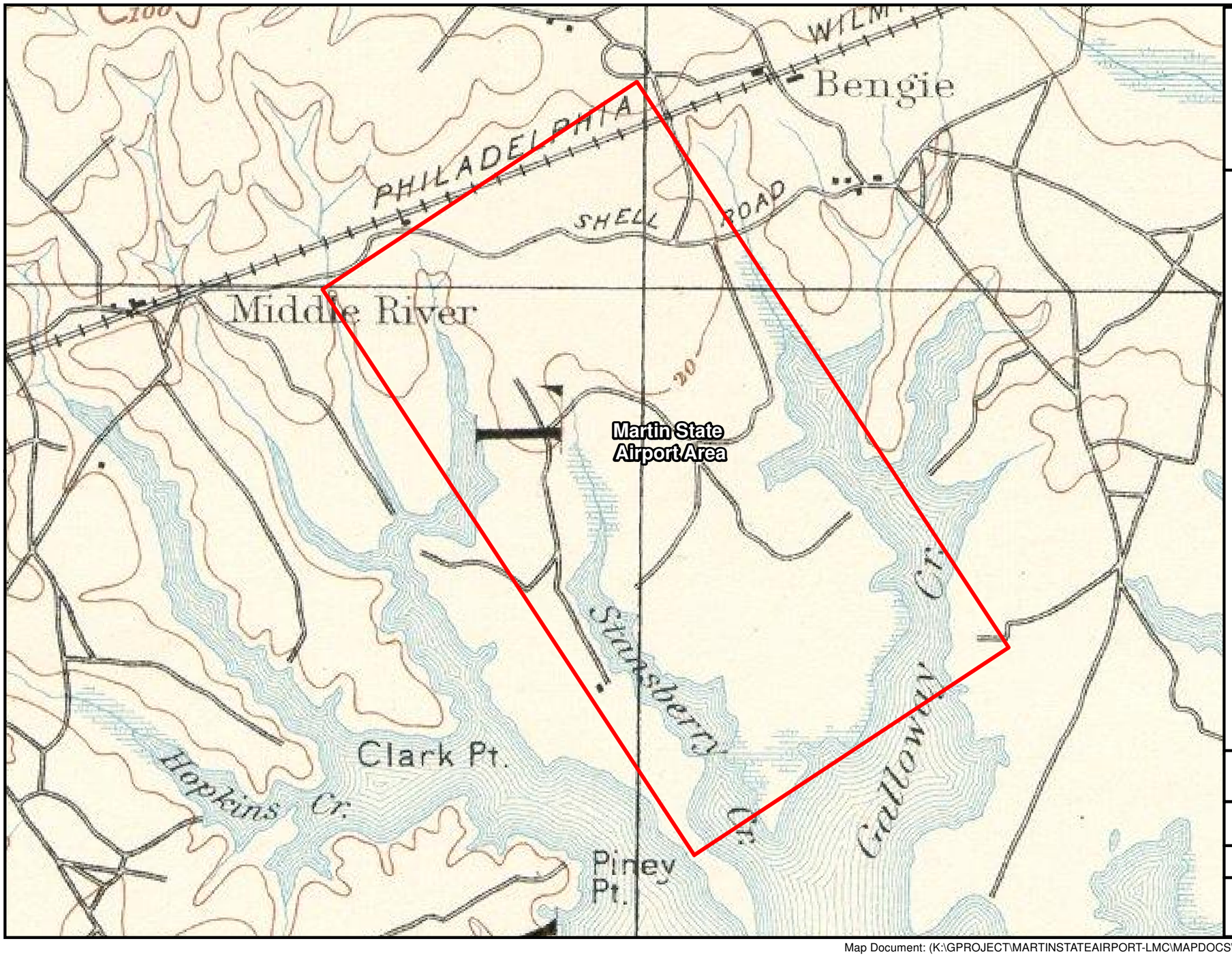
N

DATE MODIFIED: 12/13/12

CREATED BY: SP

TETRA TECH

Map Document: (K:\GPROJECT\MARTINSTATEAIRPORT-LMC\MAPDOCS\MXD\HISTORIC AERIALS\1877 TOPO.MXD 12/13/12 SP)



C-2

HISTORICAL TOPOGRAPHIC MAP
PUBLICATION DATE (1891)
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 495 990 1,980 Feet

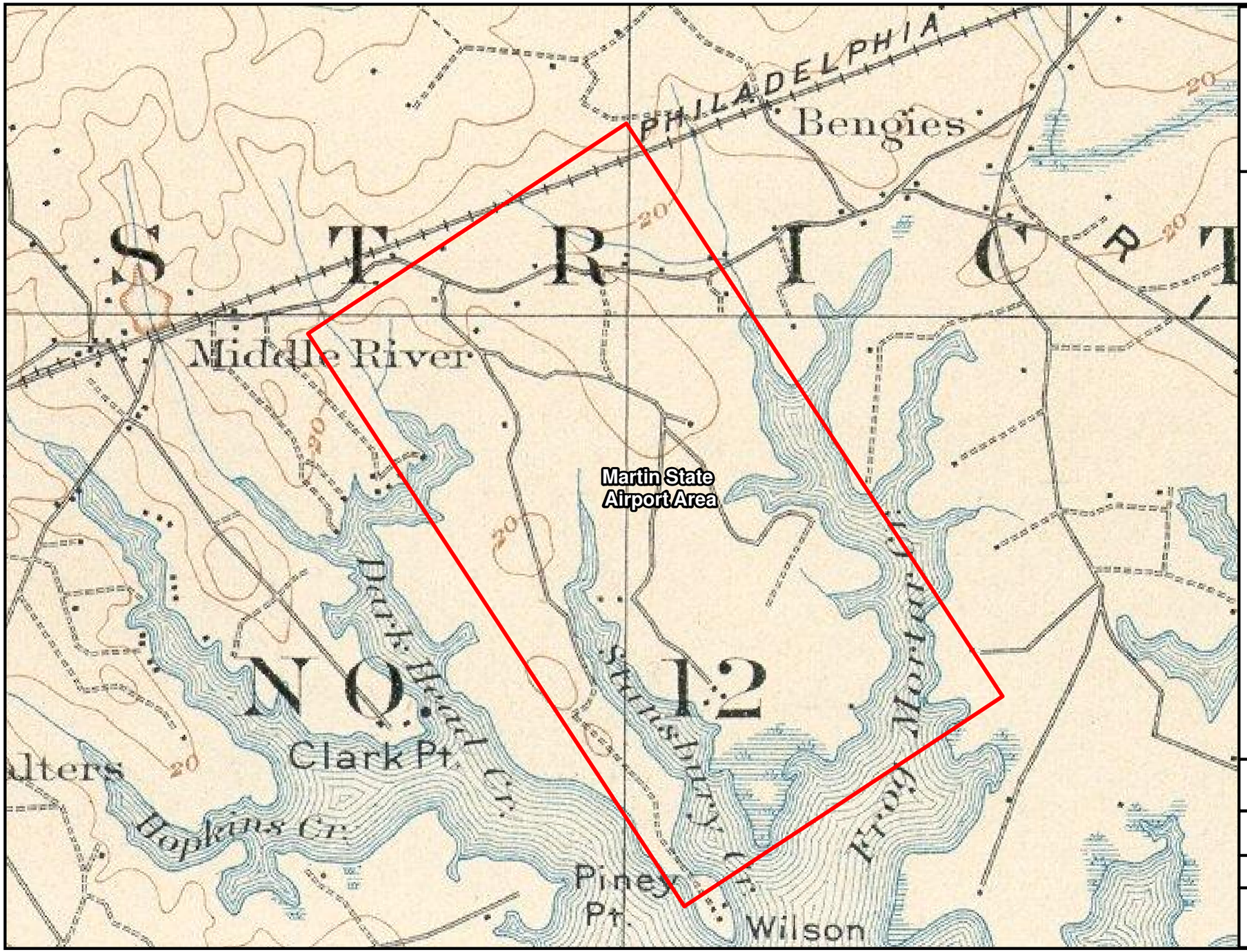
N

DATE MODIFIED: 12/13/12

CREATED BY: SP

TETRA TECH

Map Document: (K:\GPROJECT\MARTINSTATEAIRPORT-LMC\MAPDOCS\MXD\HISTORIC AERIALS\1891 TOPO.MXD 12/13/12 SP)



C-3

HISTORICAL TOPOGRAPHIC MAP
PUBLICATION DATE (1901)
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 495 990 1,980 Feet

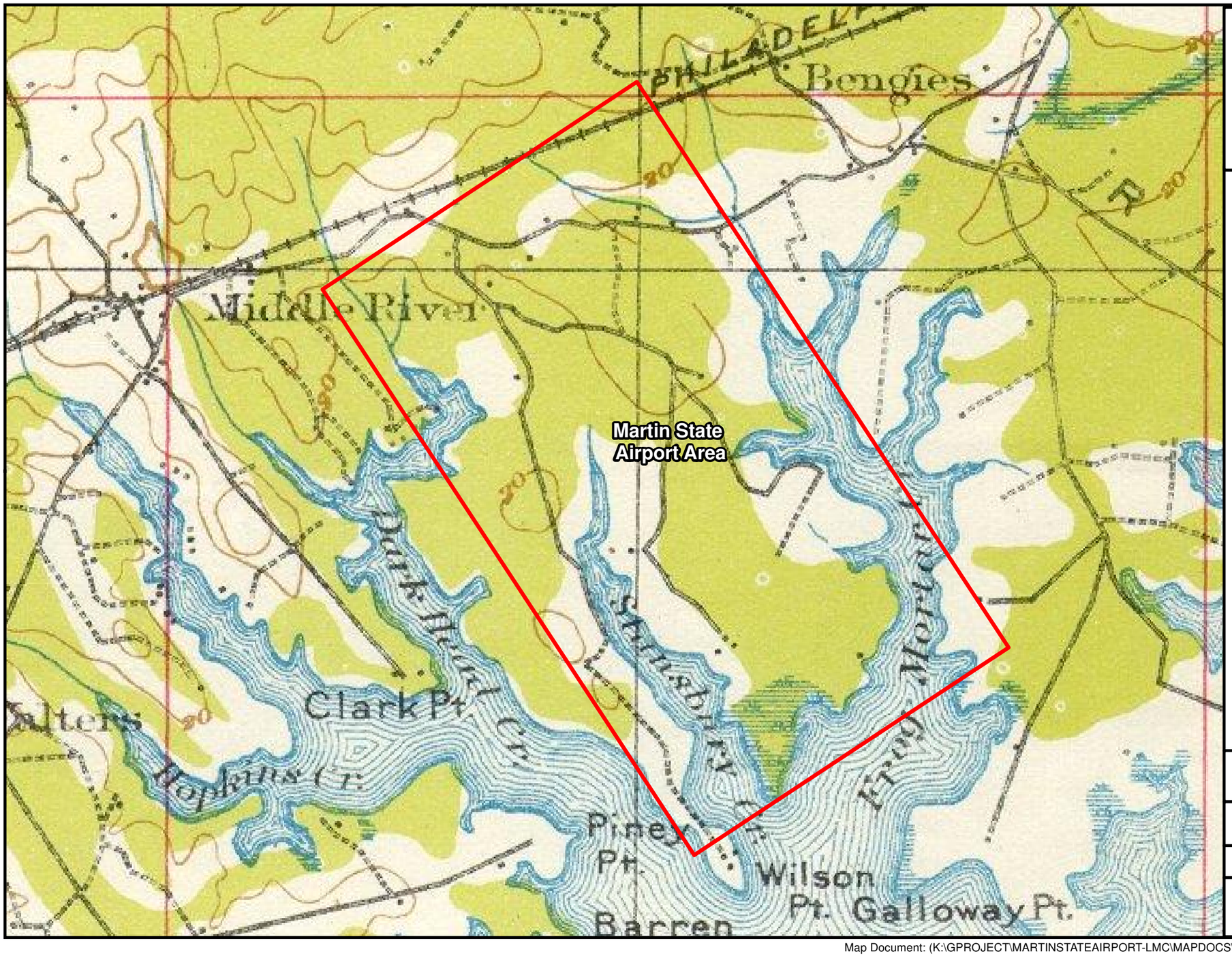
N

DATE MODIFIED: 12/12/12

CREATED BY: SP

TETRA TECH

Map Document: (K:\GPROJECT\MARTINSTATEAIRPORT-LMC\MAPDOCS\MXD\HISTORIC AERIALS\1901 TOPO.MXD 12/12/12 SP)



C-4

HISTORICAL TOPOGRAPHIC MAP
PUBLICATION DATE (1924)
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 495 990 1,980 Feet

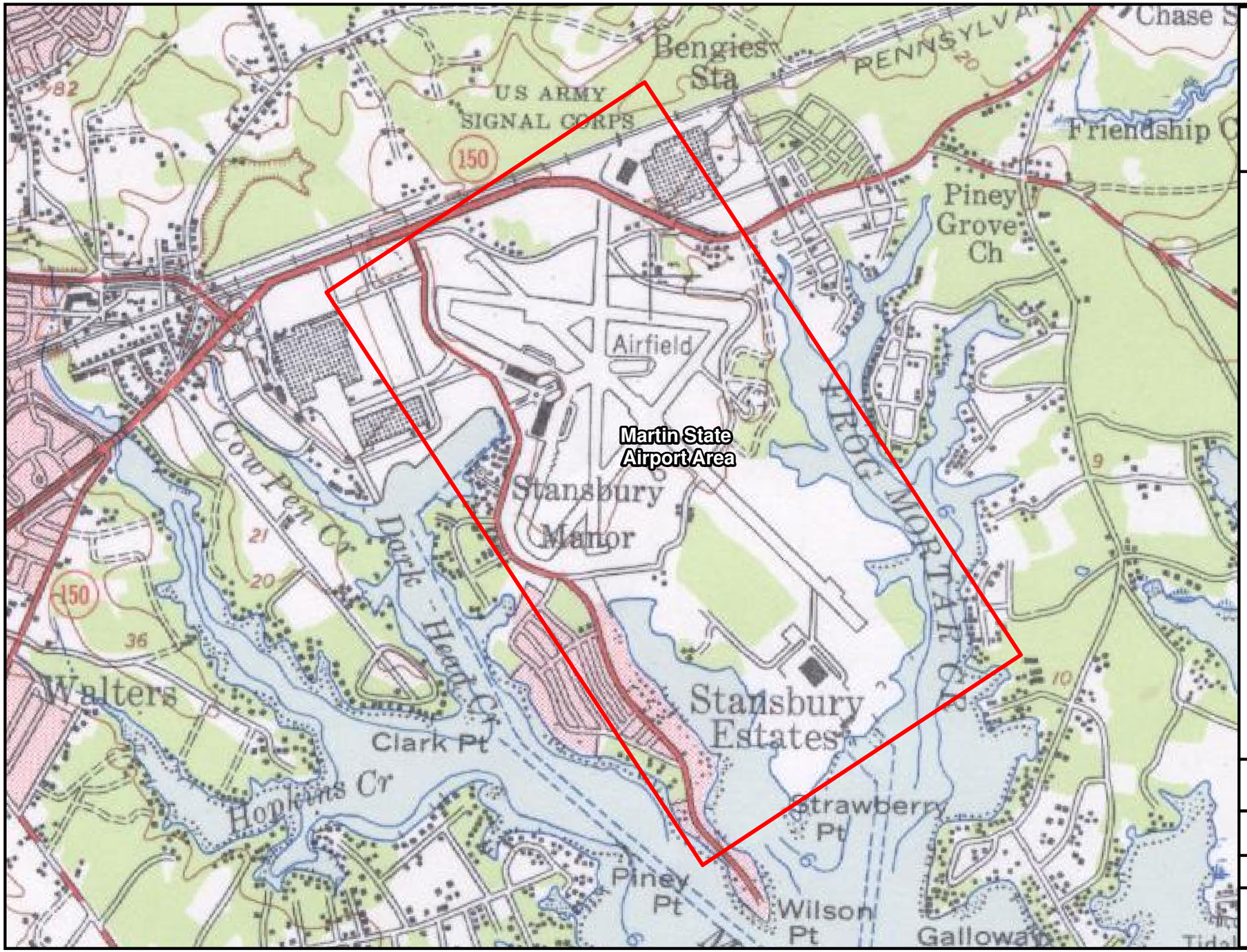
N

DATE MODIFIED: 12/13/12

CREATED BY: SP

TETRA TECH

Map Document: (K:\GPROJECT\MARTINSTATEAIRPORT-LMC\MAPDOCS\MXD\HISTORIC AERIALS\1924 TOPO.MXD 12/13/12 SP)



C-5

HISTORICAL TOPOGRAPHIC MAP
PUBLICATION DATE (1949)
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 495 990 1,980 Feet

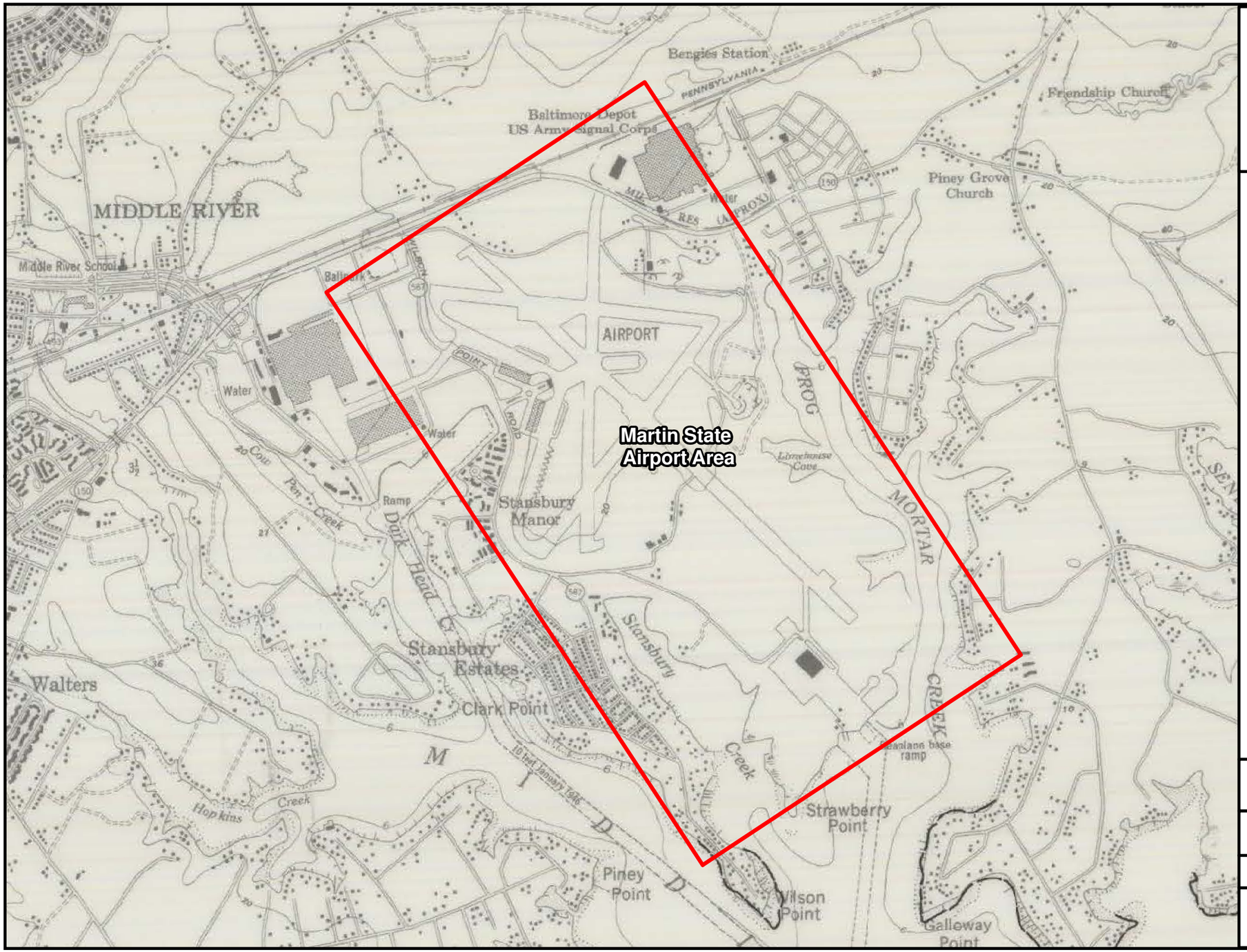
N

DATE MODIFIED: 12/13/12

CREATED BY: SP

TETRA TECH

Map Document: (K:\GPROJECT\MARTINSTATEAIRPORT-LMC\MAPDOCS\MXD\HISTORIC AERIALS\1949 TOPO.MXD 12/13/12 SP)



C-6

HISTORICAL TOPOGRAPHIC MAP
PUBLICATION DATE (1951)
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 495 990 1,980 Feet

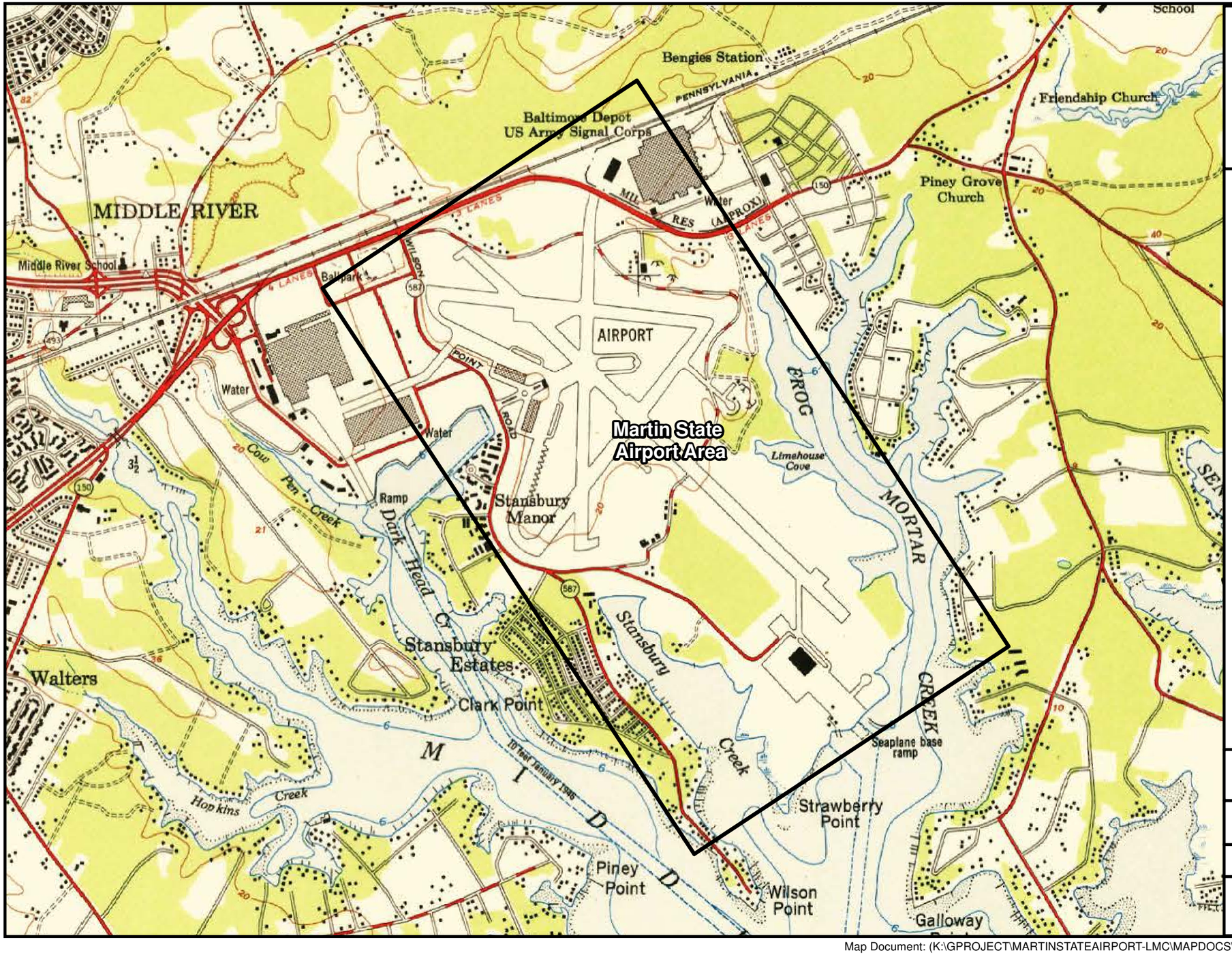
N

DATE MODIFIED: 12/13/12

CREATED BY: SP

TETRA TECH

Map Document: (K:\GPROJECT\MARTINSTATEAIRPORT-LMC\MAPDOCS\MXD\HISTORIC AERIALS\1951 TOPO.MXD 12/13/12 SP)



C-7

HISTORICAL TOPOGRAPHIC MAP
PUBLICATION DATE (1951)
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 495 990 1,980 Feet

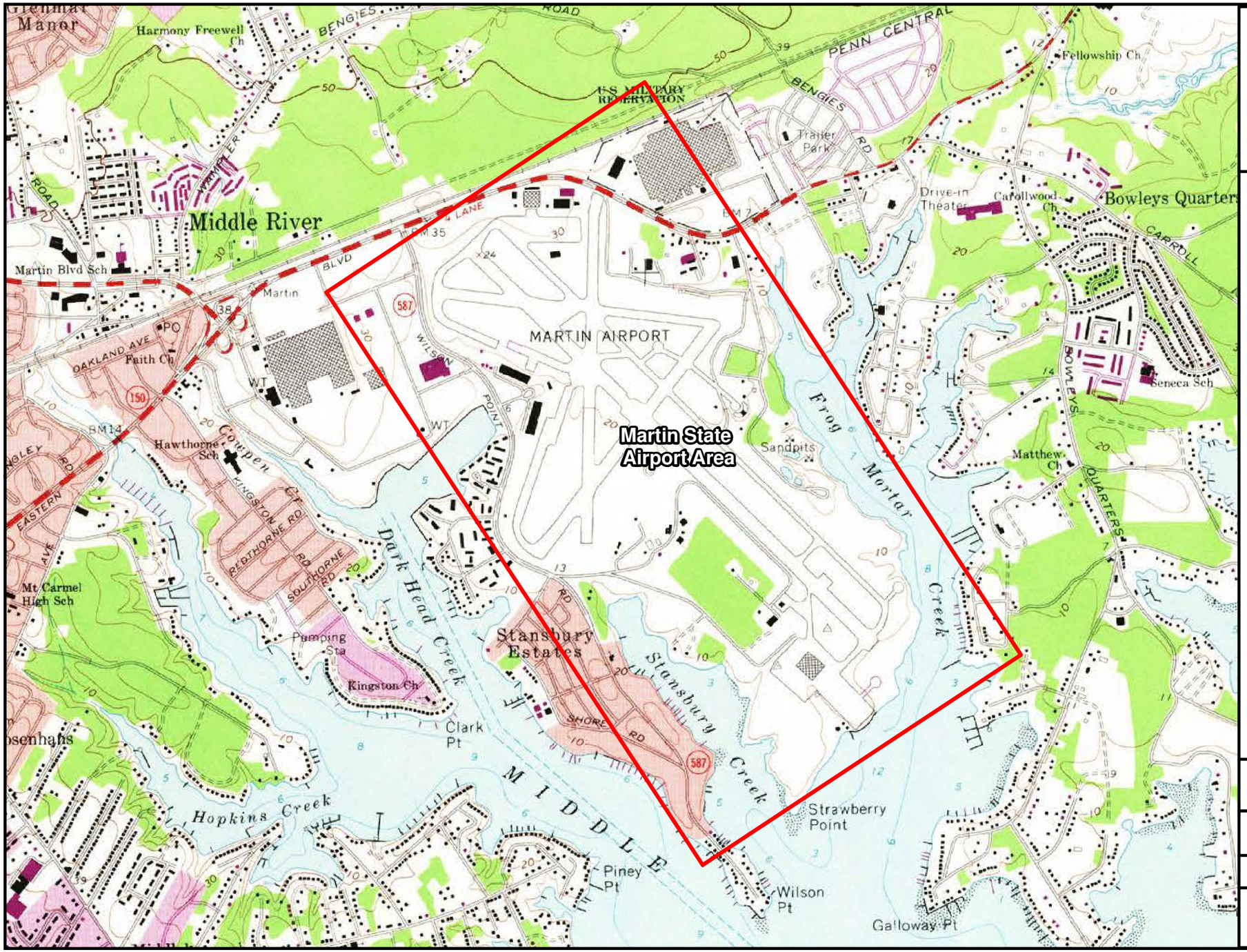
N

DATE MODIFIED: 12/13/12

CREATED BY: SP

TETRA TECH

Map Document: (K:\GPROJECT\MARTINSTATEAIRPORT-LMC\MAPDOCS\MXD\HISTORIC AERIALS\1951 TOPO2.MXD 12/13/12 SP)



C-8

HISTORICAL TOPOGRAPHIC MAP
PUBLICATION DATE (1969/1974)
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 495 990 1,980 Feet

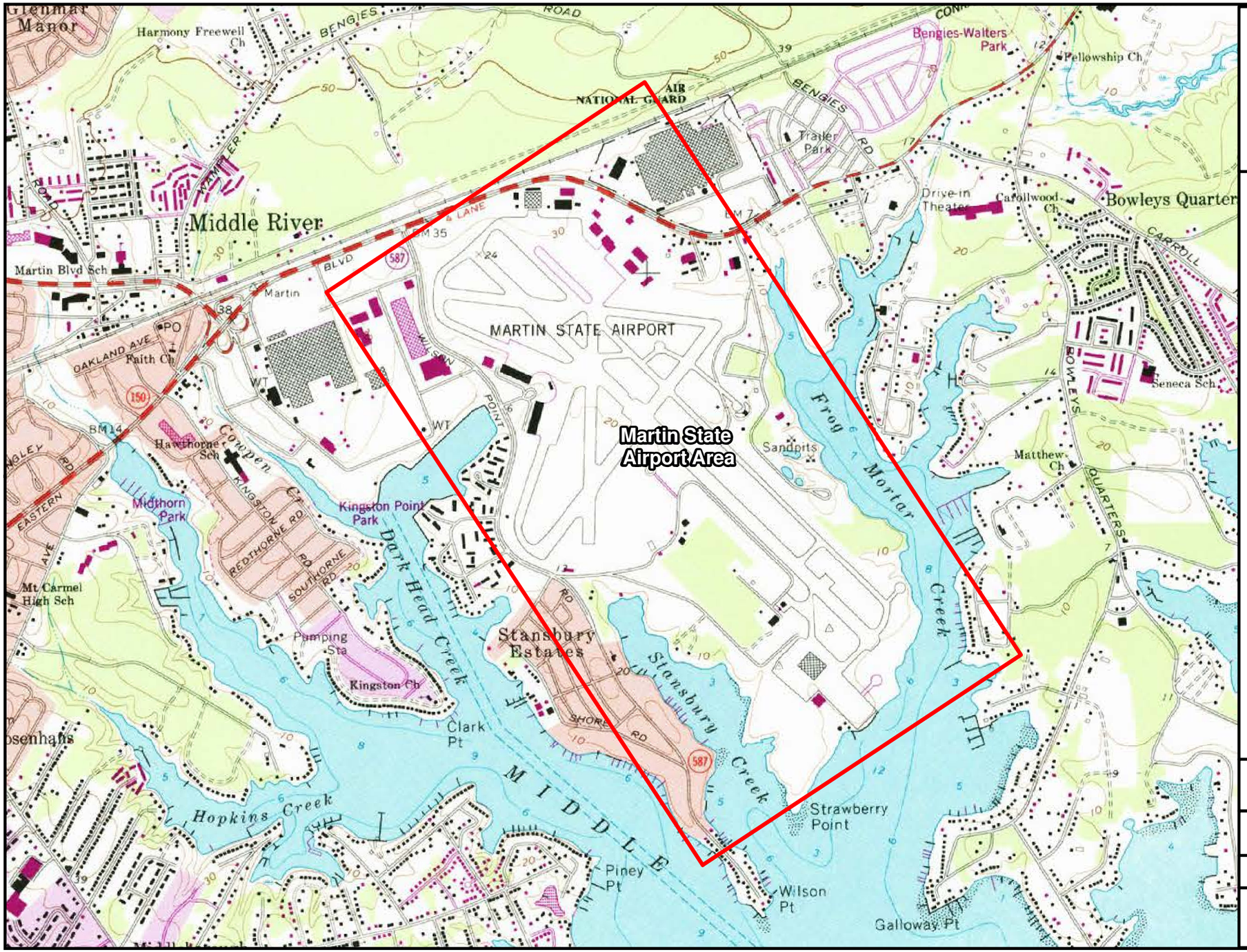
N

DATE MODIFIED: 12/13/12

CREATED BY: SP

TETRA TECH

Map Document: (K:\GPROJECT\MARTINSTATEAIRPORT-LMC\MAPDOCS\MXD\HISTORIC AERIALS\1969-1974 TOPO.MXD 12/13/12 SP)



C-9

HISTORICAL TOPOGRAPHIC MAP
PUBLICATION DATE (1969/1985)
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 495 990 1,980 Feet

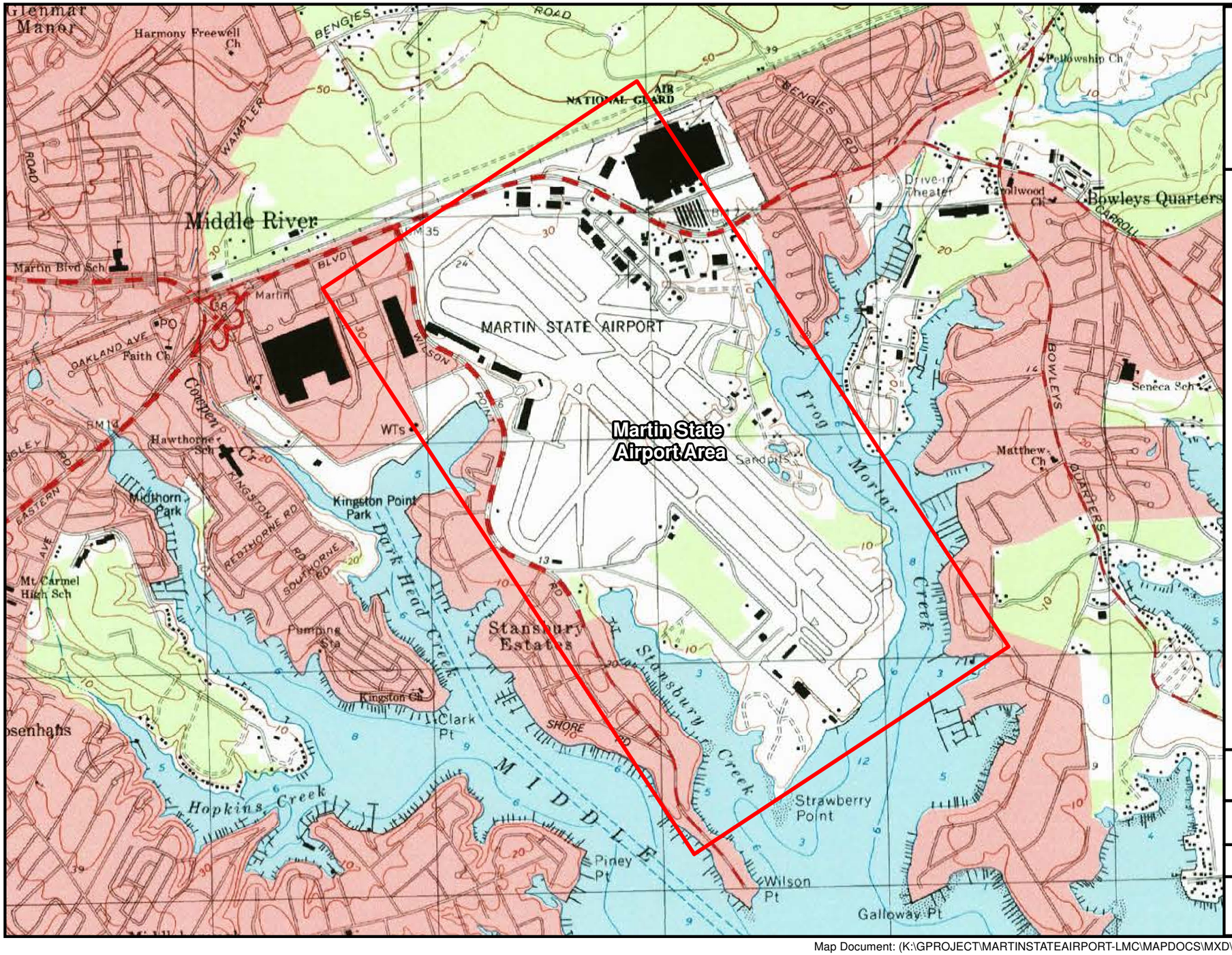
N

DATE MODIFIED: 12/13/12

CREATED BY: SP

TETRA TECH

Map Document: (K:\GPROJECT\MARTINSTATEAIRPORT-LMC\MAPDOCS\MXD\HISTORIC AERIALS\1969-1985 TOPO.MXD 12/13/12 SP)



C-10

HISTORICAL TOPOGRAPHIC MAP
PUBLICATION DATE (1998)
MARTIN STATE AIRPORT

Lockheed Martin, Martin State Airport
Middle River, Maryland

0 495 990 1,980 Feet

N

DATE MODIFIED: 12/13/12

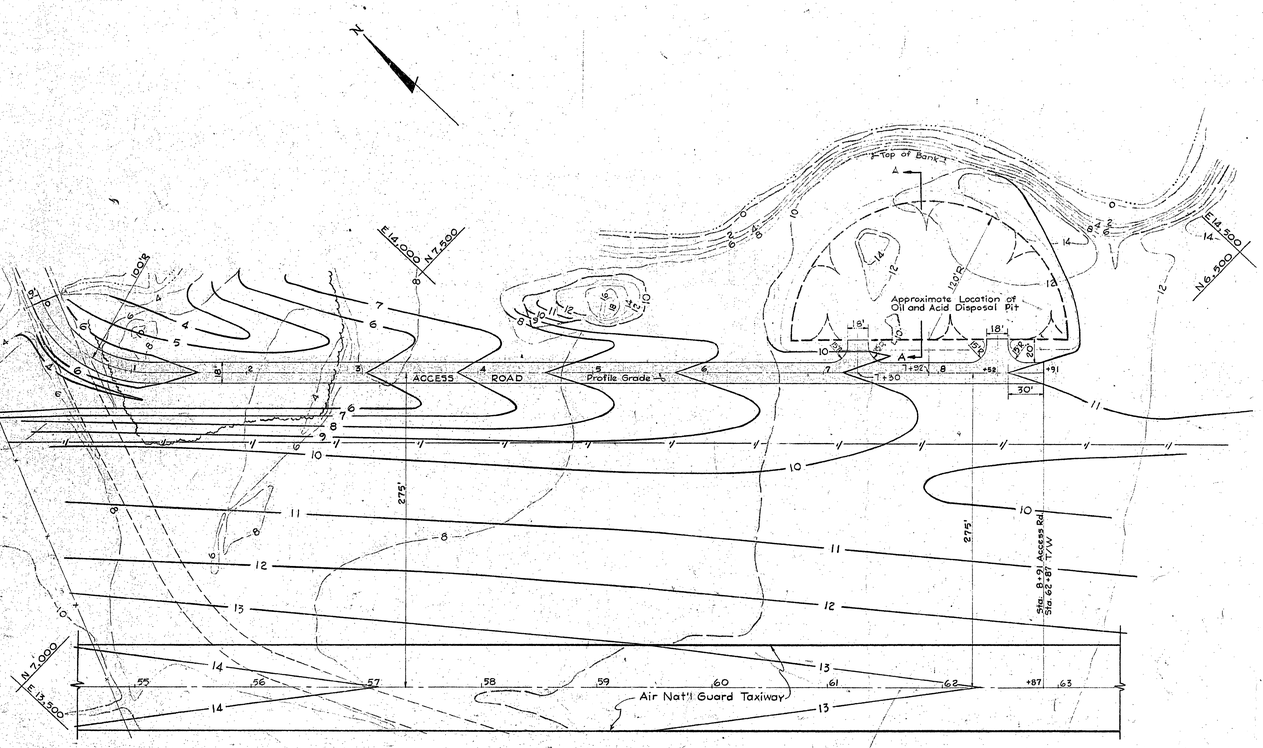
CREATED BY: SP

TETRA TECH

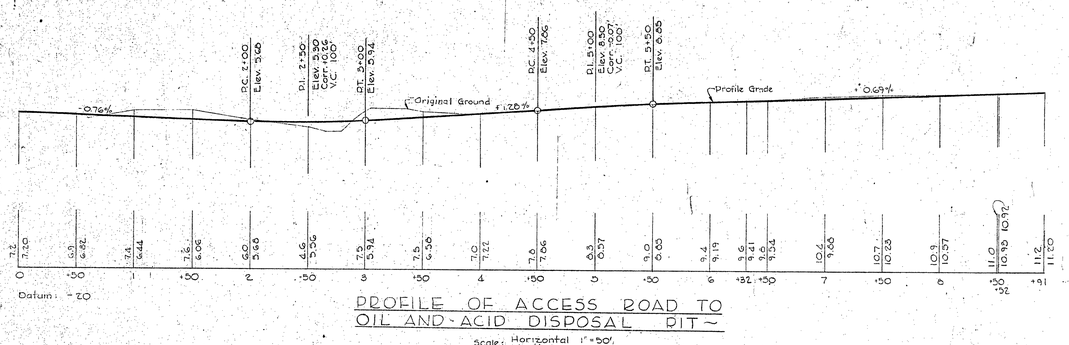
Map Document: (K:\GPROJECT\MARTINSTATEAIRPORT-LMC\MAPDOCS\MXD\HISTORIC AERIALS\1998 TOPO.MXD 12/13/12 SP)

APPENDIX D—HISTORICAL SITE DRAWINGS AND MAPS

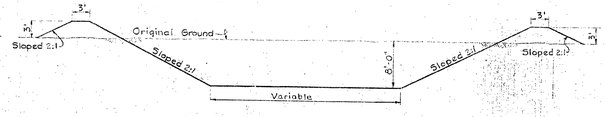

FROG MORTAR CREEK
ADVERSE PROPERTY
PRIVATE PROPERTY
NEW LOCATION OF TOOL STORAGE AREA
PROPOSED NAT'L GUARD STORAGE (POWDER) (SEE NOTE "C")
NEW FENCE
NEW ROAD
GATE
NEW LOCATION OF THE OIL & SOLID PIT - PIT SHALL BE 12 FEET DEEP WITH SLOPING SIDES - THE EXCAVATED EARTH SHALL BE MOUNDED AROUND THE PERIMETER OF THE PIT
SEE NOTE A
NAT'L GUARD USAGE AREA
℄ 7100' LONG x 150' WIDE RUNWAY
℄ EXIST. DUMP ROAD
TETRAHEDRON TO BE LOCATED AT OR NEAR SITE OF PRESENT WIND SOCK
NEW LOCATION OF RADIO CHECK TOWERS
EXIST. ROAD
AIRPORT PLAN
SHOWING RELOCATION OF MARTIN FACILITIES.
AS SHOWN
DRAWING NO. 2



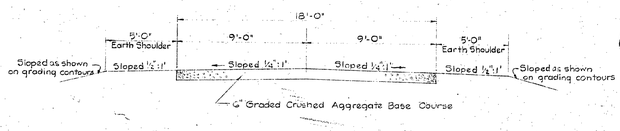
GRADING PLAN
VICINITY OF ACCESS ROAD
Scale: 1" = 50'



PROFILE OF ACCESS ROAD TO
OIL AND ACID DISPOSAL PIT
Scale: Horizontal 1" = 50'
Vertical 1" = 10'



SECTION A-A
OIL AND ACID DISPOSAL PIT
(Not to Scale)



ACCESS ROAD
(Scale: 1"=4'-0")

REVISION	DATE	DESCRIPTION	BY
	SEP. 1958	AS CONSTRUCTED	E.G.H.
(A) S.A. No. 6	9-25-56	ADDED DWG. TO CONTRACT	

WHITMAN, REQUARDT & ASSOCIATES
ARCHITECT - ENGINEERS

CORPS OF ENGINEERS, U.S. ARMY
OFFICE OF THE DISTRICT ENGINEER
BALTIMORE DISTRICT
BALTIMORE, MARYLAND

DRAWN BY HALLSTEAD
TRACED BY HALLSTEAD-LEW
CHECKED BY MYERS
REVIEWED BY SAFETY BRANCH
SUBMITTED
HQ. MIL. B.R. ENGR. DIVISION
APPROVED
CHIEF, ENGINEERING DIVISION

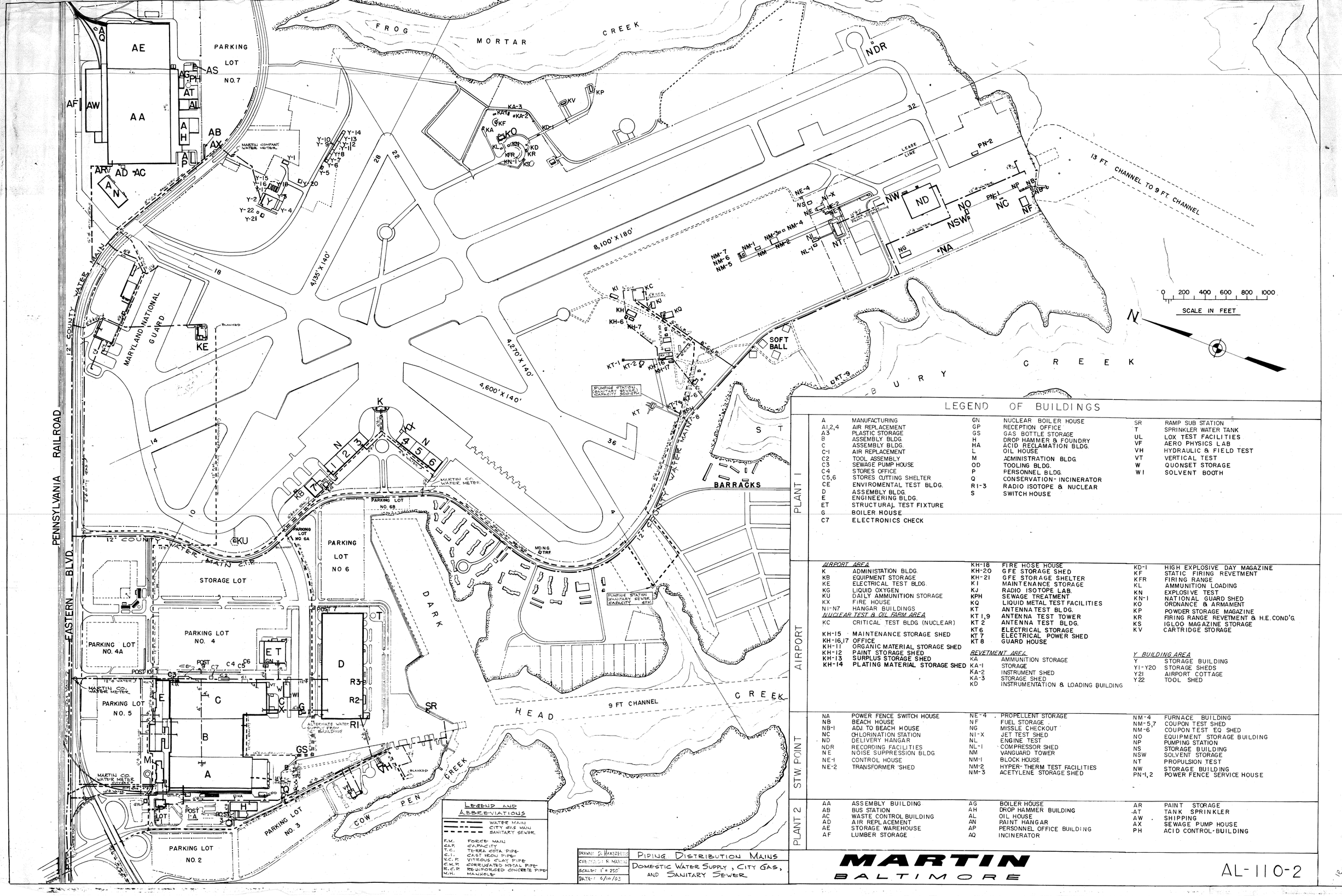
GLENN L. MARTIN AIRPORT
AIR NATIONAL GUARD FACILITIES
OIL AND ACID DISPOSAL PIT
AND ACCESS ROAD

APPROVED
COLONEL, CORPS OF ENGINEERS, DISTRICT ENGINEER
DATE 30 August 1956

APPROVED FOR
DATE

SCALE AS SHOWN | SPEC. NO.
DRAWING NUMBER AS-BLT 11-01-01
SHEET 1 OF 1

THIS PLAN DA -988



LEGEND AND ABBREVIATIONS

WATER MAIN
CITY GAS MAIN
SANITARY SEWER

F.M.	FORCE MAIN
CAP.	CAPACITY
T.C.	TERRA COTA PIPE
C.I.	CAST IRON PIPE
V.C.P.	VITROUS CLAY PIPE
C.M.P.	CORRUGATED METAL PIPE
R.C.P.	REINFORCED CONCRETE PIPE
M.H.	MANHOLE

LEGEND OF BUILDINGS

PLANT 1	A	MANUFACTURING	GN	NUCLEAR BOILER HOUSE	SR	RAMP SUB STATION
	A1,2,4	AIR REPLACEMENT	GP	RECEPTION OFFICE	T	SPRINKLER WATER TANK
	A3	PLASTIC STORAGE	GS	GAS BOTTLE STORAGE	UL	LOX TEST FACILITIES
	B	ASSEMBLY BLDG.	H	DROP HAMMER & FOUNDRY	VF	AERO PHYSICS LAB
	C	ASSEMBLY BLDG.	HA	ACID RECLAMATION BLDG.	VH	HYDRAULIC & FIELD TEST
	C-1	AIR REPLACEMENT	L	OIL HOUSE	VT	VERTICAL TEST
	C2	TOOL ASSEMBLY	M	ADMINISTRATION BLDG.	W	QUONSET STORAGE
	C3	SEWAGE PUMP HOUSE	OD	TOOLING BLDG.	WI	SOLVENT BOOTH
	C4	STORES OFFICE	P	PERSONNEL BLDG.		
	C5,6	STORES CUTTING SHELTER	Q	CONSERVATION- INCINERATOR		
	CE	ENVIROMENTAL TEST BLDG.	R1-3	RADIO ISOTOPE & NUCLEAR		
	D	ASSEMBLY BLDG.	S	SWITCH HOUSE		
	E	ENGINEERING BLDG.				
	ET	STRUCTURAL TEST FIXTURE				
	G	BOILER HOUSE				
	C7	ELECTRONICS CHECK				
AIRPORT	*AIRPORT AREA*		KH-18	FIRE HOSE HOUSE	KD-1	HIGH EXPLOSIVE DAY MAGAZINE
	K	ADMINISTATION BLDG.	KH-20	GFE STORAGE SHED	KF	STATIC FIRING REVETMENT
	KB	EQUIPMENT STORAGE	KH-21	GFE STORAGE SHELTER	KFR	FIRING RANGE
	KE	ELECTRICAL TEST BLDG.	KI	MAINTENANCE STORAGE	KL	AMMUNITION LOADING
	KG	LIQUID OXYGEN	KJ	RADIO ISOTOPE LAB.	KN	EXPLOSIVE TEST
	KU	DAILY AMMUNITION STORAGE	KPH	SEWAGE TREATMENT	KN-1	NATIONAL GUARD SHED
	KX	FIRE HOUSE	KQ	LIQUID METAL TEST FACILITIES	KO	ORDNANCE & ARMAMENT
	NI-N7	HANGAR BUILDINGS	KT	ANTENNA TEST BLDG.	KP	POWDER STORAGE MAGAZINE
	NUCLEAR TEST & OIL FARM AREA		KT 1,9	ANTENNA TEST TOWER	KR	FIRING RANGE REVETMENT & H.E. COND'G.
	KC	CRITICAL TEST BLDG (NUCLEAR)	KT 2	ANTENNA TEST BLDG.	KS	IGLOO MAGAZINE STORAGE
	KH-15	MAINTENANCE STORAGE SHED	KT 6	ELECTRICAL STORAGE	KV	CARTRIDGE STORAGE
	KH-16,17	OFFICE	KT 7	ELECTRICAL POWER SHED		
	KH-11	ORGANIC MATERIAL STORAGE SHED	KT 8	GUARD HOUSE		
	KH-12	PAINT STORAGE SHED	*REVETMENT AREA*		*Y BUILDING AREA*	
	KH-13	SURPLUS STORAGE SHED	KA	AMMUNITION STORAGE	Y	STORAGE BUILDING
	KH-14	PLATING MATERIAL STORAGE SHED	KA-1	STORAGE	Y1-Y20	STORAGE SHEDS
			KA-2	INSTRUMENT SHED	Y21	AIRPORT COTTAGE
			KA-3	STORAGE SHED	Y22	TOOL SHED
			KD	INSTRUMENTATION & LOADING BUILDING		
STW. POINT	NA	POWER FENCE SWITCH HOUSE	NE-4	PROPELLENT STORAGE	NM-4	FURNACE BUILDING
	NB	BEACH HOUSE	NF	FUEL STORAGE	NM-5,7	COUPON TEST SHED
	NB-1	ADJ. TO BEACH HOUSE	NG	MISSLE CHECKOUT	NM-6	COUPON TEST EQ SHED
	NC	CHLORINATION STATION	NI-X	JET TEST SHED	NO	EQUIPMENT STORAGE BUILDING
	ND	DELIVERY HANGAR	NL	ENGINE TEST	NP	PUMPING STATION
	NDR	RECORDING FACILITIES	NL-1	COMPRESSOR SHED	NS	STORAGE BUILDING
	NE	NOISE SUPPRESSION BLDG.	NM	VANGUARD TOWER	NSW	SOLVENT STORAGE
	NE-1	CONTROL HOUSE	NM-1	BLOCK HOUSE	NT	PROPULSION TEST
	NE-2	TRANSFORMER SHED	NM-2	HYPER- THERM TEST FACILITIES	NW	STORAGE BUILDING
			NM-3	ACETYLENE STORAGE SHED	PN-1, 2	POWER FENCE SERVICE HOUSE
PLANT 2	AA	ASSEMBLY BUILDING	AG	BOILER HOUSE	AR	PAINT STORAGE
	AB	BUS STATION	AH	DROP HAMMER BUILDING	AT	TANK SPRINKLER
	AC	WASTE CONTROL BUILDING	AL	OIL HOUSE	AW	SHIPPING
	AD	AIR REPLACEMENT	AN	PAINT HANGAR	AX	SEWAGE PUMP HOUSE
	AE	STORAGE WAREHOUSE	AP	PERSONNEL OFFICE BUILDING	PH	ACID CONTROL-BUILDING
	AF	LUMBER STORAGE	AQ	INCINERATOR		

DRAWN: D. HARTZELIUS
CHECKED: R. MARTIN
SCALE: 1" = 250'
DATE: 6/10/63

PIPING DISTRIBUTION MAINS
DOMESTIC WATER SUPPLY, CITY GAS, AND SANITARY SEWER

MARTIN
BALTIMORE

AL-110-2