2019 RESTORATION MAINTENANCE SUMMARY REPORT

Bloody Brook
Onondaga County, New York

Prepared for:
Lockheed Martin Corporation
Syracuse, New York

Prepared by:

40 British American Blvd
Latham, New York 12110

December 2019

Certification Statement

I, Nickcole M. Evans, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this *2019 Restoration Maintenance Summary Report* was prepared in accordance with applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10) and that activities were performed in full accordance with the DER-approved work plan and DER-approved modifications.

Nickcole M. Evans, P.E.
License Number 085978

In accordance with New York State Education Law, it is a violation for any person, unless he is acting under the direction of a licensed professional engineer, to alter this summary report in any way.

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Acronyms and Abbreviations

Drainage District	Onondaga County Bloody Brook Drainage District
NYSDEC	New York State Department of Environmental Conservation
F&W	Fish and Wildlife
OCDWEP	Onondaga County Department of Water Environment Protection
RMSR	Restoration Maintenance Summary Report
RMWP	Restoration Maintenance Work Plan
SMP	Site Management Plan
Thruway	New York State Thruway
VCA	Voluntary Cleanup Agreement
WBBB	West Branch of Bloody Brook

1.0 INTRODUCTION

This 2019 *Restoration Maintenance Summary Report* (RMSR) has been prepared to summarize the activities completed in late summer and fall 2019 in accordance with the New York State Department of Environmental Conservation (NYSDEC) approved *Restoration Monitoring Summary Report and Maintenance Work Plan* (work plan) dated August 2019. These activities, summarized in the sections below, were completed to address the areas identified in the 2019 work plan, which summarized the results of monitoring activities completed during the spring 2019 and included vegetation monitoring and an inspection for areas of erosion at the Bloody Brook site.

Results of monitoring activities completed in June and July 2019 included an evaluation of the success of the vegetation planting and established hydraulic regimes and an inspection for areas of erosion at the Bloody Brook site. The remediation, including construction and restoration activities completed from June 2014 through July 2017, was conducted in accordance with a Voluntary Cleanup Agreement (VCA) between Lockheed Martin and the NYSDEC (Index #: D7-0001-01-09, effective July 20, 2002). The remediation included the West Branch of Bloody Brook (WBBB) and Bloody Brook from below the confluence of the West and Middle Branches of Bloody Brook and adjacent property located between the New York State Thruway (Thruway) and Onondaga Lake Parkway (approximately 5,000 foot long section of stream) in the Town of Salina and a portion of the Village of Liverpool, Onondaga County, New York, as shown on Figure 1.[1] The NYSDEC "Release and Covenant Not to Sue" was received by Lockheed Martin for the Bloody Brook site on March 21, 2018.

In compliance with the NYSDEC approved February 2018 Site Management Plan (SMP) for Bloody Brook (updated March 2019), annual restoration inspections are to be completed for five years following completion of restoration activities to ensure no erosion of the channel and banks is occurring and that the vegetation is growing as intended. The annual inspections are to be completed in accordance with the March 2014 Decision Document prepared by NYSDEC, property-specific owner restoration agreements, and the February 2018 SMP, (updated March 2019). The first of these monitoring events was completed in May 2017 for the majority of the Bloody Brook site. Restoration was still in progress at three areas identified on Figure 2 (Apartment complex area including the stream side banks and bottom; a portion of the commercial property outside of the stream side banks and located between the Old Liverpool Road culvert and the railroad tracks; and the construction access area at Onondaga Lake Parkway). Consequently, these areas were not monitored as part of the 2017 annual inspection. The first of the annual inspections for those areas was completed in 2018.

[1] The term "site" in the VCA is defined as: a portion of the banks, surface waters and sediments of the West and Middle Branches of Bloody Brook located in the Town of Salina with a portion of the site located in the Village of Liverpool and commences downstream of Interstate 90, the New York State Thruway, and extends generally southward past the confluence of the West Branch and the Middle Branch of Bloody Brook creating Bloody Brook, and ends on the upstream side of Onondaga Lake Parkway. After examining data developed during remedial investigation work in the Middle Branch, NYSDEC determined that no further action was required for that branch of Bloody Brook. For this reason, the "site" in this document relates only to those areas within the VCA site where the remedial program has been implemented.

In addition to the activities completed in response to the 2019 monitoring noted above, a corrective measure was implemented in November 2019 to address frequent wet conditions and standing water behind residential properties adjacent to a portion of the wetlands since restoration of the site was completed. While this area was not within the excavation boundaries of the remediation (i.e., no soil was removed), it was part of the construction staging area where frac tanks for water treatment were staged. The area was compared to pre-construction photos, and it was concluded that the drainage pattern appeared to have changed when that area of the site was restored. The corrective measure to improve drainage, approved by NYSDEC and implemented in November 2019, is discussed further in Sections 2 and 3 below.

1.1 SITE DESCRIPTION

The Bloody Brook site was broken into four distinct areas based on land use and characteristics as shown on Figure 2 and described below**.**

- Wooded Area – This portion of the site extends from the Thruway south (downstream) approximately 1,050 feet. This undeveloped area is irregularly shaped and relatively wide (i.e., greater than 150 feet) and includes three wetlands. The wooded area is entirely within the Onondaga County Bloody Brook Drainage District (Drainage District) easement and is owned by the Town of Salina. The Drainage District easement provides Onondaga County personnel permanent access for various projects to improve and maintain drainage. Storm water drainage from the surrounding development enters the WBBB from the west via a drainage channel at the southern end of the wooded area.

- Residential Area – The residential area surrounds the wooded area commencing at the Thruway and extending downstream of the wooded area with residential properties abutting the Drainage District easement along the WBBB to the downstream side of Floradale Road.

- Apartment Complex Area – The apartment complex area is located on Pearl Street and Town Gardens Drive between the residential properties along Floradale Road and the commercial properties along Old Liverpool Road. Construction activities outside of the Drainage District easement were completed in the apartment complex area during spring 2017; therefore, the first inspection for this portion of the site was conducted as part of the 2018 annual monitoring event.

- Commercial Area – The commercial area extends from commercial properties located along Old Liverpool Road to Onondaga Lake Parkway. Construction activities were completed in portions of this area during spring 2017; therefore, the first inspection of these areas was conducted as part of the 2018 annual monitoring event.

2.0 SUMMARY OF COMPLETED RESTORATION MAINTENANCE

The August 2019 work plan identified several areas that warranted restoration maintenance activities to support the establishment of diverse habitats and to prevent erosion of the soil cover. The maintenance activities included removing invasive species, planting bare root trees, and minor adjustment of rip rap in two locations. The following sections summarize the restoration maintenance activities for each of the areas identified.

2.1 WOODED AREA AND WETLANDS VEGETATION MAINTENANCE

The August 2019 work plan identified several habitat areas that are developing as designed and therefore do not require new plantings at this time. Invasive species removal have continued in these areas as needed, and they will continue to be monitored in the 2020 and 2021 monitoring events. These areas include PEM-1, PEM-2, PEM-3, PEM-4, PEM-5, W-10, USS-1. MOW-1, MOW-2, MOW-3, PSS-2, and PFO-1. See Figure 3 for locations of habitat areas. For the remaining habitat areas (W-11, PSS-1, RIP-1, RIP-2, UPF-1, and UPF-2), in addition to invasive species control, the following was completed in 2019 or will be in early 2020, as noted below.

<u>W-11, PSS-1, and a small area of RIP-1</u>

To help fill in sparse areas in W-11, PSS-1, and a small area of RIP-1 where groundwater with known elevated salinity is suspected of being the limiting factor, the species listed below, which are relatively tolerant of saline conditions, were planted in August 2019. Two of each type of shrub, and 10 plugs of four species of herbaceous plant were planted in each of the three habitat areas in late August 2019 to confirm the proposed species can thrive with the high groundwater salinity. Additional herbaceous plants and/or shrubs will be planted in spring 2020 using those species that are adapting in the three areas. These will be approved by the NYSDEC prior to planting, and locations, numbers, and species will be documented in the summary report and work plan for the 2020 activities.

Shrubs:

- Sweet gale (*Myrica gale)*
- Red chokeberry (*Aronia arbutifolia*)
- Black elderberry (*Sambucus nigra*)

Herbaceous Plants:

- Salt meadow grass (*Spartina patens*)
- Black grass (*Juncus gerardii*)
- Saltmarsh bulrush (*Scirpus robustus)*
- Sweet flag (*Acorus americanus*)
- Narrow leaf cattail (Typha augustifolia) and blue flag (*Iris versicolor)* were transplanted from other areas of the wetlands.

RIP-1, UPF-1, and UPF-2

Additional plantings were planted and are planned for spring 2020 in RIP-1, UPF-1, and UPF-2 to continue to develop the barrier between the wetlands and the offsite source of invasive species (RIP-1 and UPF-1) and to replace stressed or dead plantings within UFP-2, as discussed in the 2019 work plan.

Thirty-five bare root trees were planted in September 2019 in the area of RIP-1 and UPF-1 just south of the Thruway fence line (Figure 3). These trees, planted as gravel bed bare root 1 to 1.5-inch diameter at breast height (DBH) trees, included the following species, approved by NYSDEC:

- tulip tree (Liriodendron tulipifera)
- basswood (Tilia Americana)
- river birch (Betula nigra)
- red maple (Acer rubrum)
- swamp white oak (Quercus bicolor)

Compost was added to the soil, and mulch was placed around the base of the trees per the Standard Operating Procedures (SOP) provided in the 2019 work plan.

The locations for planted bare root trees will be provided in the next updates to the SMP prior to the 2020 monitoring inspections. General locations are shown on Figure 3 herein. Thirteen Canadian serviceberry (*Amelanchier canadensis*) will be planted as bare root in these areas of RIP-1 and UPF-1 in spring 2020.

2.2 RESIDENTIAL AND COMMERCIAL AREAS

No major issues were identified on the private properties during the monitoring event. Results and recommendations for these inspections completed on private properties were discussed as needed with the property owner. Field forms for private properties will be retained in the project files, but they are not included in this summary report.

2.3 EROSION CONTROL

As discussed in the 2019 work plan, the erosion inspection completed in June 2019 indicated the stream bottom and side banks are intact and show little signs of damage. At two locations identified as L-1 and L-2 on Figure 4, small portions of side bank showed areas of minor rip rap erosion and required adjustment. These adjustments were completed by hand during a subsequent monthly site walk.

2.4 CORRECTIVE MEASURE TO IMPROVE DRAINAGE

The corrective measure to improve drainage adjacent to the wetlands, discussed above in Section 1, included the construction of a swale designed to drain the area directly behind the residences to an area of the site away from the property lines towards the nearby wetland habitat areas. The location of the constructed swale is shown on Figure 5. The swale was constructed on November 20 and November 21, 2019 and is approximately 103 feet long with a 1-foot maximum cut. All

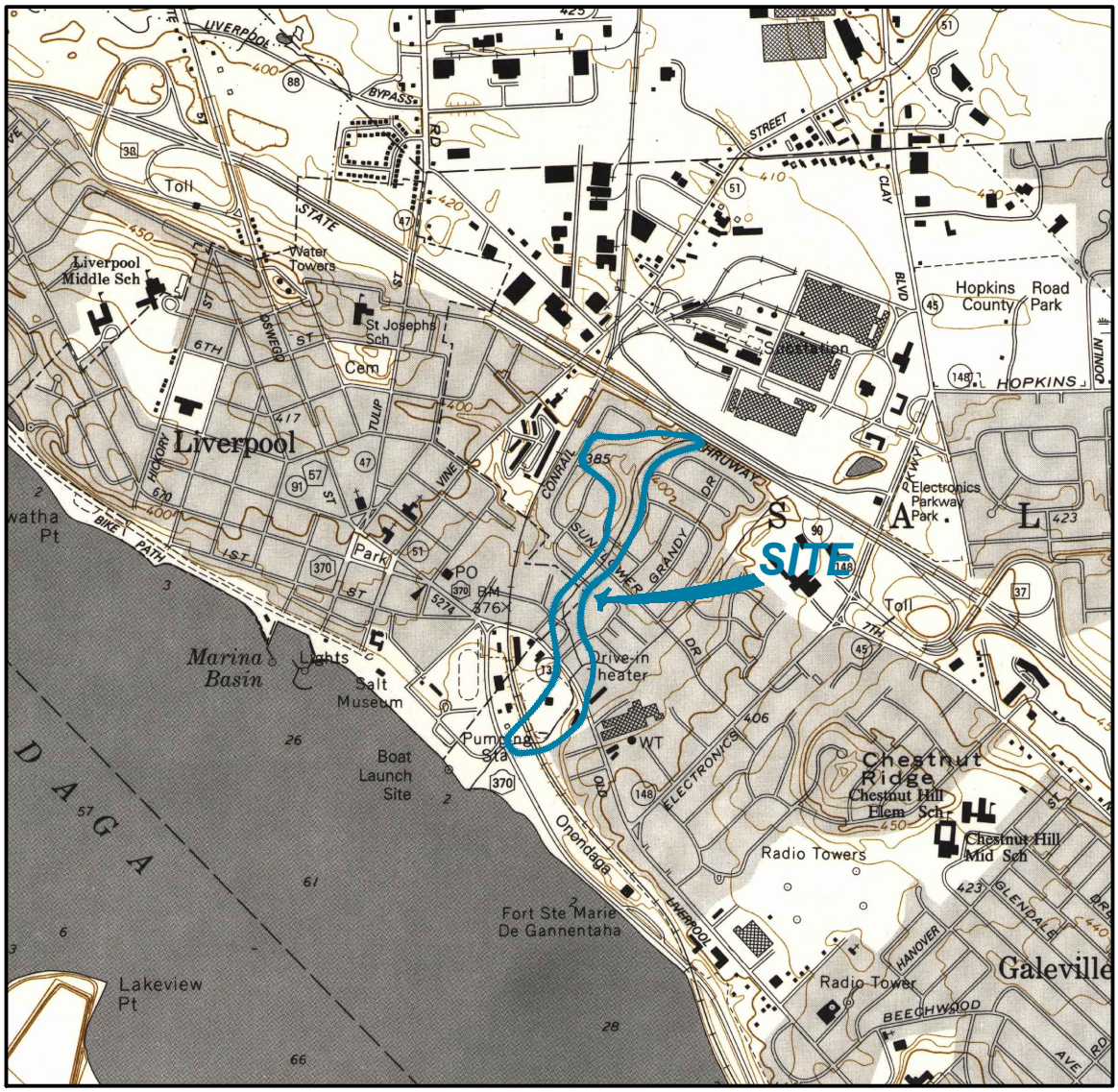
work was completed outside of the Institutional Control boundary in accordance with the Bloody Brook SMP. The average depth of excavation was 10 inches over the length for an approximate removal of 14.5 cubic yards (cy). In order to minimize the volume of soil removed, the drainage slope was decreased midway from 2 percent to 1 percent. The 14.5 cy of soil excavated for the swale was spread in the area identified on Figure 5 to an approximate depth of and not to exceed 3 inches.

Following completion of construction, the area was raked, erosion control socks were placed, and straw was spread over the area. In spring 2020, restoration of the swale and the area where the excavated soil was spread will be completed, as needed. Additional planting in areas with elevated salinity, discussed above in Section 2.1, is planned in the general area of the swale construction for spring 2020.

3.0 CONCLUSION

Between August and November 2019, proposed maintenance activities identified in the 2019 work plan requiring maintenance to support the establishment of diverse habitats and to prevent erosion of the soil cover were addressed, as discussed herein. The activities included invasive species removal, adjustment of rip rap in two locations, and additional plantings. Additionally, a corrective measure was implemented to improve the drainage in an area of the site. Lockheed Martin coordinated with NYSDEC Fish and Wildlife (F&W) on all activities and will do so for the additional plantings to be completed in spring 2020 as described in Section 2 above.

FIGURES



0' 2000' 4000'

APPROXIMATE SCALE

REFERENCE:

1. NYSDOT 7.5 MIN TOPOGRAPHIC MAP OF SYRACUSE WEST, QUADRANGLE 1990, SCALE: 1" = 2000'.

AECOM

LOCKHEED MARTIN CORPORATION

SITE LOCATION MAP

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
A1FIG1_122019.dwg	RNB	60598046	12 / 2019	1

Plotted By: carrie.szczepanski
Layout-Sheet Name: LAYOUT1
Plot File Date Created: Dec/16/2019 11:48 AM

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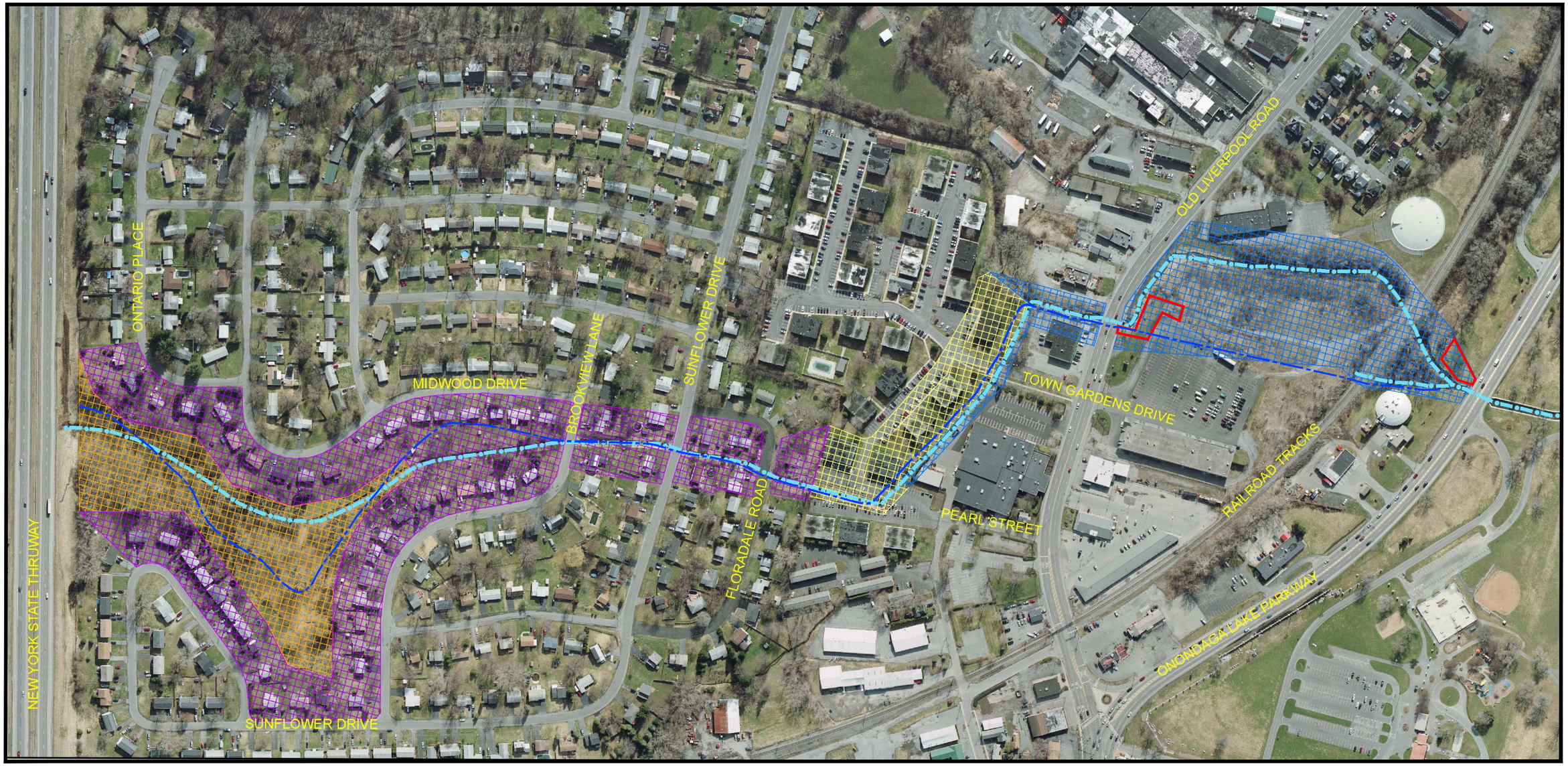

Legend

- CURRENT BROOK ALIGNMENT
- WOODED AREA
- RESIDENTIAL AREA
- APARTMENT COMPLEX AREA
- COMMERCIAL-LIGHT INDUSTRIAL AREA
- COMMERCIAL AREAS EXCLUDED FROM MAY 2017 MONITORING

0' 300' 600'

APPROXIMATE SCALE

AECOM

LOCKHEED MARTIN CORPORATION

SITE AREA MAP

BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
SiteAreaMap.dwg	RNB	60598046	12 / 2019	2

Plotted By: carrie.szczepanski
Layout-Sheet Name: FIGURE 1-2
Plot File Date Created: Dec/16/2019 11:50 AM

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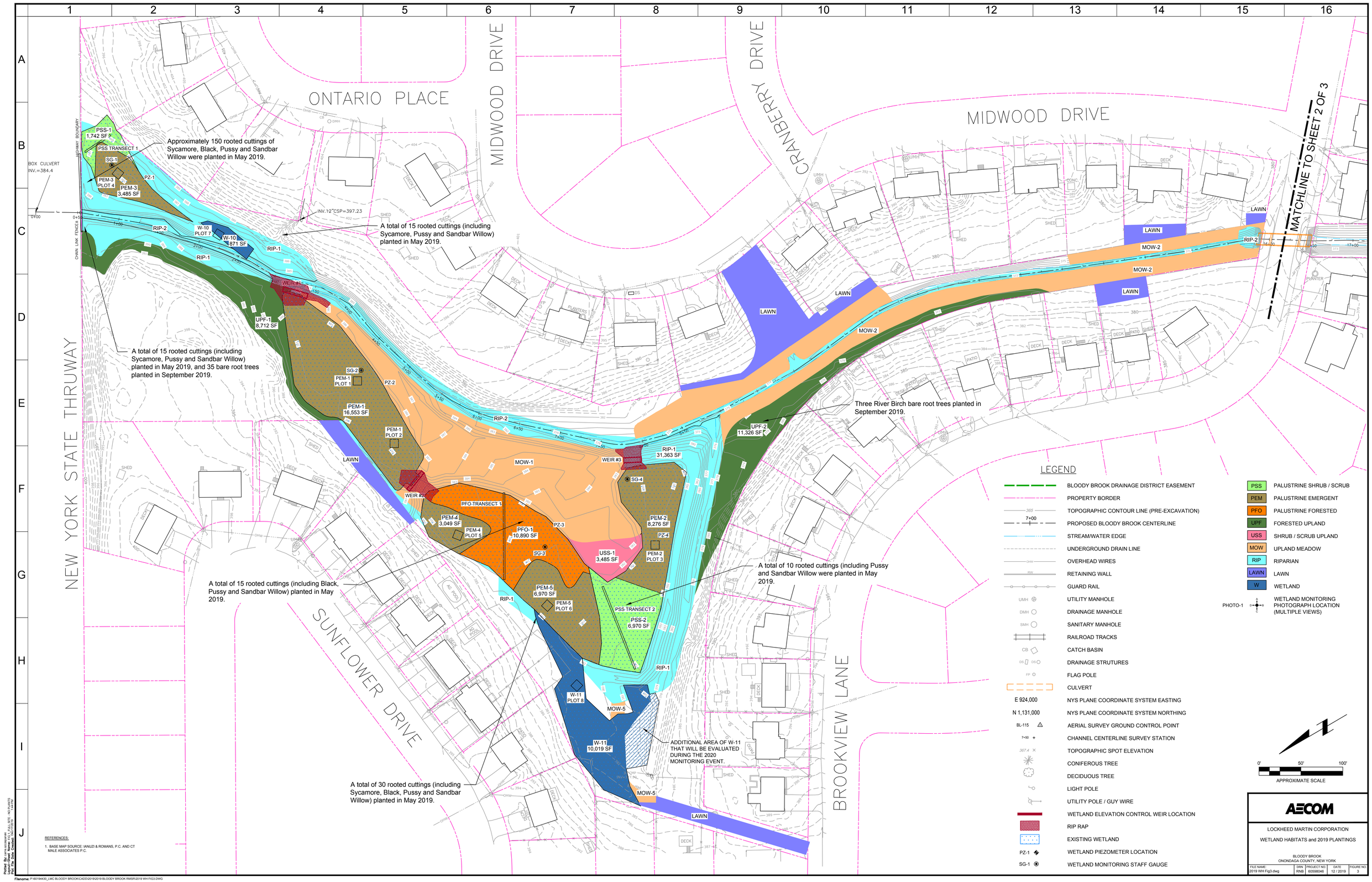
ONTARIO PLACE
MIDWOOD DRIVE
CRANBERRY DRIVE
MIDWOOD DRIVE
NEW YORK STATE THRUWAY
SUNFLOWER DRIVE
BROOKVIEW LANE
MATCHLINE TO SHEET 2 OF 3
BOX CULVERT INV.=384.4
INV.12"CSP=397.23
Approximately 150 rooted cuttings of Sycamore, Black, Pussy and Sandbar Willow were planted in May 2019.
A total of 15 rooted cuttings (including Sycamore, Pussy and Sandbar Willow) planted in May 2019.
A total of 15 rooted cuttings (including Sycamore, Pussy and Sandbar Willow) planted in May 2019, and 35 bare root trees planted in September 2019.
A total of 15 rooted cuttings (including Black, Pussy and Sandbar Willow) planted in May 2019.
A total of 10 rooted cuttings (including Pussy and Sandbar Willow were planted in May 2019.
A total of 30 rooted cuttings (including Sycamore, Black, Pussy and Sandbar Willow) planted in May 2019.
Three River Birch bare root trees planted in September 2019.
ADDITIONAL AREA OF W-11 THAT WILL BE EVALUATED DURING THE 2020 MONITORING EVENT.
PSS-1 1,742 SF
PSS TRANSECT 1
SG-1
PEM-3 PLOT 4
PEM-3 3,485 SF
PZ-1
RIP-2
W-10 PLOT 7
W-10 871 SF
RIP-1
UPF-1 8,712 SF
SG-2
PEM-1 PLOT 1
PZ-2
PEM-1 16,553 SF
PEM-1 PLOT 2
MOW-1
WEIR #2
WEIR #3
SG-4
RIP-1 31,363 SF
UPF-2 11,326 SF
PFO-TRANSECT 1
PEM-4 3,049 SF
PEM-4 PLOT 5
PFO-1 10,890 SF
PZ-3
SG-3
USS-1 3,485 SF
PEM-2 8,276 SF
PZ-4
PEM-2 PLOT 3
PEM-5 6,970 SF
PEM-5 PLOT 6
PSS TRANSECT 2
PSS-2 6,970 SF
W-11 PLOT 8
MOW-5
W-11 10,019 SF
LAWN
MOW-2
LEGEND
BLOODY BROOK DRAINAGE DISTRICT EASEMENT
PROPERTY BORDER
TOPOGRAPHIC CONTOUR LINE (PRE-EXCAVATION)
PROPOSED BLOODY BROOK CENTERLINE
STREAM/WATER EDGE
UNDERGROUND DRAIN LINE
OVERHEAD WIRES
RETAINING WALL
GUARD RAIL
UTILITY MANHOLE
DRAINAGE MANHOLE
SANITARY MANHOLE
RAILROAD TRACKS
CATCH BASIN
DRAINAGE STRUTURES
FLAG POLE
CULVERT
E 924,000 NYS PLANE COORDINATE SYSTEM EASTING
N 1,131,000 NYS PLANE COORDINATE SYSTEM NORTHING
BL-115 AERIAL SURVEY GROUND CONTROL POINT
7+50 CHANNEL CENTERLINE SURVEY STATION
TOPOGRAPHIC SPOT ELEVATION
CONIFEROUS TREE
DECIDUOUS TREE
LIGHT POLE
UTILITY POLE / GUY WIRE
WETLAND ELEVATION CONTROL WEIR LOCATION
RIP RAP
EXISTING WETLAND
PZ-1 WETLAND PIEZOMETER LOCATION
SG-1 WETLAND MONITORING STAFF GAUGE
PSS PALUSTRINE SHRUB / SCRUB
PEM PALUSTRINE EMERGENT
PFO PALUSTRINE FORESTED
UPF FORESTED UPLAND
USS SHRUB / SCRUB UPLAND
MOW UPLAND MEADOW
RIP RIPARIAN
LAWN LAWN
W WETLAND
PHOTO-1 WETLAND MONITORING PHOTOGRAPH LOCATION (MULTIPLE VIEWS)
0' 50' 100'
APPROXIMATE SCALE
AECOM
LOCKHEED MARTIN CORPORATION
WETLAND HABITATS and 2019 PLANTINGS
BLOODY BROOK
ONONDAGA COUNTY, NEW YORK
FILE NAME: 2019 WH Fig3.dwg
DRN RNB
PROJECT NO. 60598046
DATE 12 / 2019
FIGURE NO. 3
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Plot Scale: Scale: 1:1 Device: ID_PDF417.pc3
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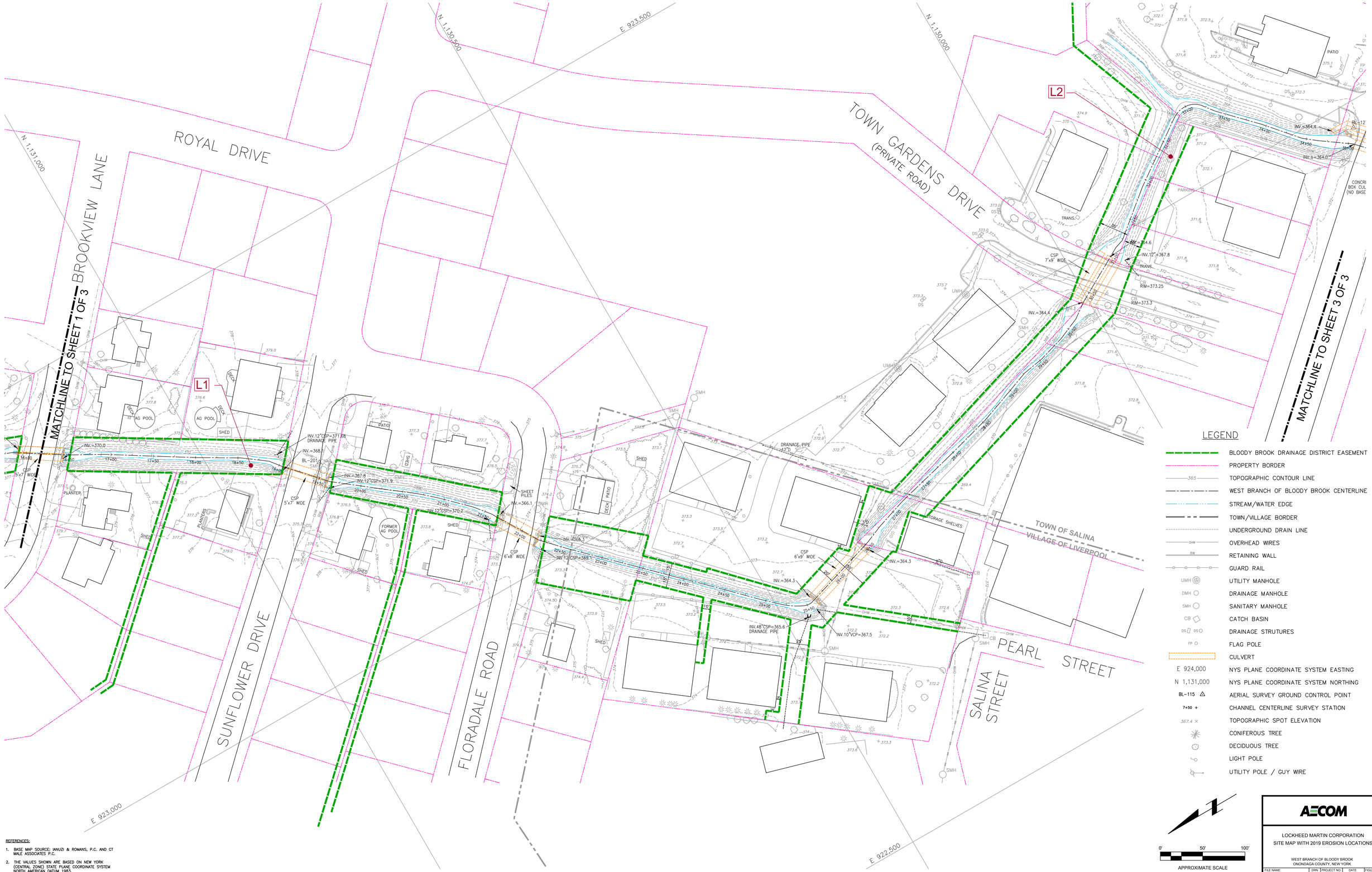

REFERENCES:

1. BASE MAP SOURCE: IANUZI & ROMANS, P.C. AND CT MALE ASSOCIATES P.C.
2. THE VALUES SHOWN ARE BASED ON NEW YORK (CENTRAL ZONE) STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM 1983.

AECOM

LOCKHEED MARTIN CORPORATION
SITE MAP WITH 2019 EROSION LOCATIONS

WEST BRANCH OF BLOODY BROOK
ONONDAGA COUNTY, NEW YORK

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Plot Date: Thursday, December 19, 2019 1:38 PM
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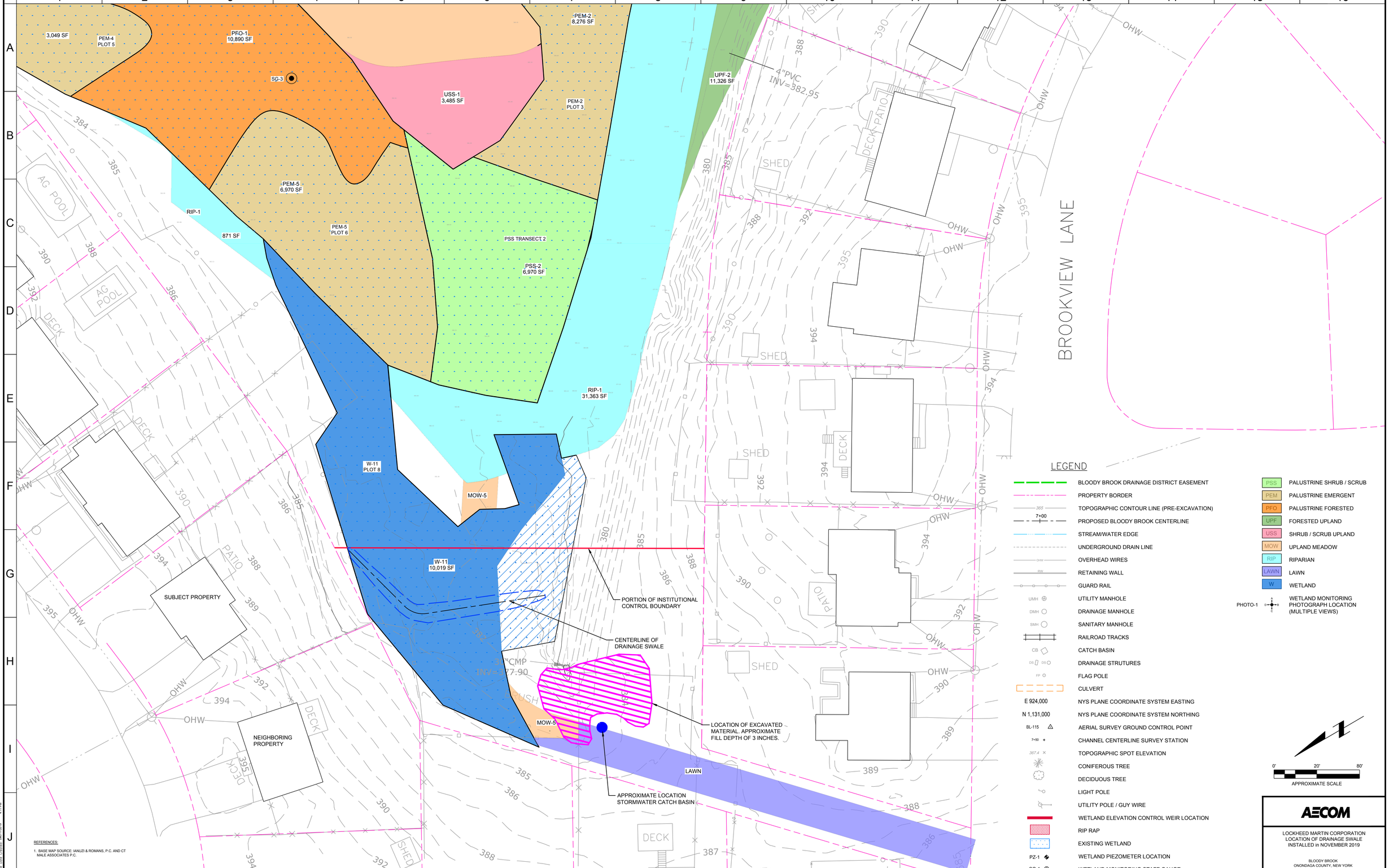

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