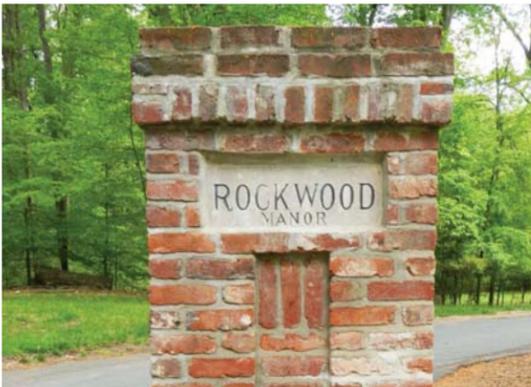




ROCKWOOD MANOR FEASIBILITY STUDY



Prepared for:
THE PARK DEVELOPMENT DIVISION
of the
MARYLAND - NATIONAL CAPITAL PARK
AND PLANNING COMMISSION

Purchase Order No. 500441
Contract No. 340062

OCTOBER 10, 2014

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Executive Summary



Image by OWS

Rockwood Manor is known for its wooded landscape, rich history, and natural beauty. Built in the 1920's, it has a notable history as the former country estate of Carolyn Gangwer Caughey and was later operated by Girls Scouts U.S.A. Rockwood is currently owned and operated by Montgomery Parks, and it is first and foremost a functioning park intended to serve the public. It hosts social, civic, and business organizations as an event, meeting, and retreat venue. It includes secluded venues and overnight lodgings tucked into Montgomery County's beautiful parkland that stakeholders describe as eclectic with "rustic elegance."

The intent of this Feasibility Study is to explore what solutions are physically possible to address a number of long-standing environmental, circulation, and site utilization issues. The report examines the existing conditions of the Rockwood Manor site including: context, topography, slopes, hydrology, water flow, vegetation, built site features, and circulation. The M-NCPPC does not intend to increase the programmatic capacity of the facility, only to recommend site modifications that would improve the facility for its current use. The report analyzes the existing conditions, and in conjunction with input from the M-NCPPC, proposes two alternative approaches for future site development. The site is discussed in sections including: the drive; parking/service; the manor house; the bunk houses; the restored stream area; and the extended site buffer. The existing conditions, opportunities, and constraints of each area inform the design criteria, goals, and objectives for the proposed alternatives. Also included are a traffic analysis and a preliminary cost estimate for each of the proposed alternatives. Following the completion of this study, Montgomery Parks will work with Rockwood Manor stakeholders, the surrounding community, and relevant agencies to determine which site improvements are most mutually beneficial to all parties involved and will work to develop design solutions.



Image by OWS

In the spring of 2014, M-NCPPC began a project to address the width of the entrance drive, which does not currently accommodate two-way traffic and does not provide adequate turning radii for emergency, maintenance, catering, and bus vehicular access. Examining this one issue created an opportunity to take a holistic look at the needs for the entire property.

On April 1, 2014, a day-long charrette with invited stakeholders, M-NCPPC staff, and Oehme, van Sweden & Associates was held to identify the various programmatic and site opportunities and constraints as well as preliminary ideas for improvement on the Rockwood Manor site. Preliminary findings were presented to the public on May 14th and May 20th, and residents had the opportunity to identify additional concerns and opportunities for the site.

The information gathered from the day-long charrette and subsequent community discussions has been consolidated, further examined, and incorporated into this feasibility study. The M-NCPPC intends to use this study to identify future projects for design and construction and to fully involve the community and stakeholders in the design process.

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Six design principles, originating from the objectives of M-NCPPC and the surrounding community, provide the framework for the proposed alternatives in this feasibility study.

CONTEXTUAL DESIGN

The site shall fit into the larger residential neighborhood and forested parkland context by respecting and embracing the surrounding physical, social, and community contexts. The design will create connections to nearby uses and relocate site features to appropriate locations with consideration of the adjacent neighborhood.

CULTURALLY SENSITIVE DESIGN

The design shall maintain the site's "rustic elegance" and respect the site's layered history by honoring Ms. Caughey's original vision of Rockwood as well as the Girl Scouts heritage. Rockwood will continue its current function as a countywide event center to host social, civic, and business organizations and invite Girl Scouts, Boy Scouts, youth groups, and students of the Montgomery County Public Schools to use Rockwood as an outdoor education facility.

ENVIRONMENTALLY SENSITIVE DESIGN

The design shall preserve the site's natural beauty and enhance its natural features by providing low impact stormwater management features, addressing runoff and drainage issues, and improving stream quality. The design also assesses the existing trees on site and promotes the health of the mature forest that surrounds the park.

EFFICIENT SITE USE

The design shall maximize the efficiency of the site to best serve its users and help to achieve contextually and environmentally sensitive design goals by reviewing the site's parking layout and configuration, addressing existing service, loading, and maintenance areas.

IMPROVED CIRCULATION AND SAFETY

The design shall improve circulation and safety and reduce internal pedestrian/vehicular conflicts by enhancing visual cues at the entry; improving emergency, service and bus access and circulation; improving circulation for loading and deliveries; and upgrading the site to be compliant with the Americans with Disabilities Act Guidelines (ADA).

IMPROVED VISITOR EXPERIENCE

The design shall enhance the visitor experience for users of the event center and the park through a variety of methods including: improvement of wayfinding, integration of site accessibility, consideration of additional recreational opportunities, enhancement of visual and noise buffers, relocation of activities to better serve park users, and improved site lighting.

Existing Conditions: Context

Rockwood Manor Special Park occupies approximately 30 acres of hilly, forested parkland located at 11001 MacArthur Boulevard in Potomac. The property is divided into 2 sections: the north parcel contains the built structures on site and is the focus of this feasibility study while the south parcel of the site is located entirely within the stream buffer which prevents future development. The property is bounded by single-family residential properties on the north, Belfast Road to the east and south, and MacArthur Boulevard to the west. The surrounding neighborhood is predominantly low-density residential (zoned R-200: minimum lot size of 20,000 square feet). Located directly west of Rockwood Manor Park is the Chesapeake & Ohio Canal National Historical Park.



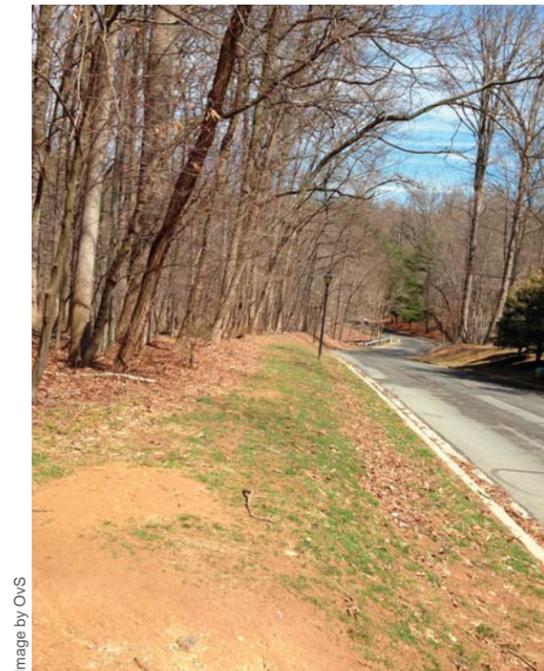
C & O HISTORIC NATIONAL PARK (EXISTING)



BELFAST ROAD, WEST SIDE OF ROCKWOOD MANOR (EXISTING)



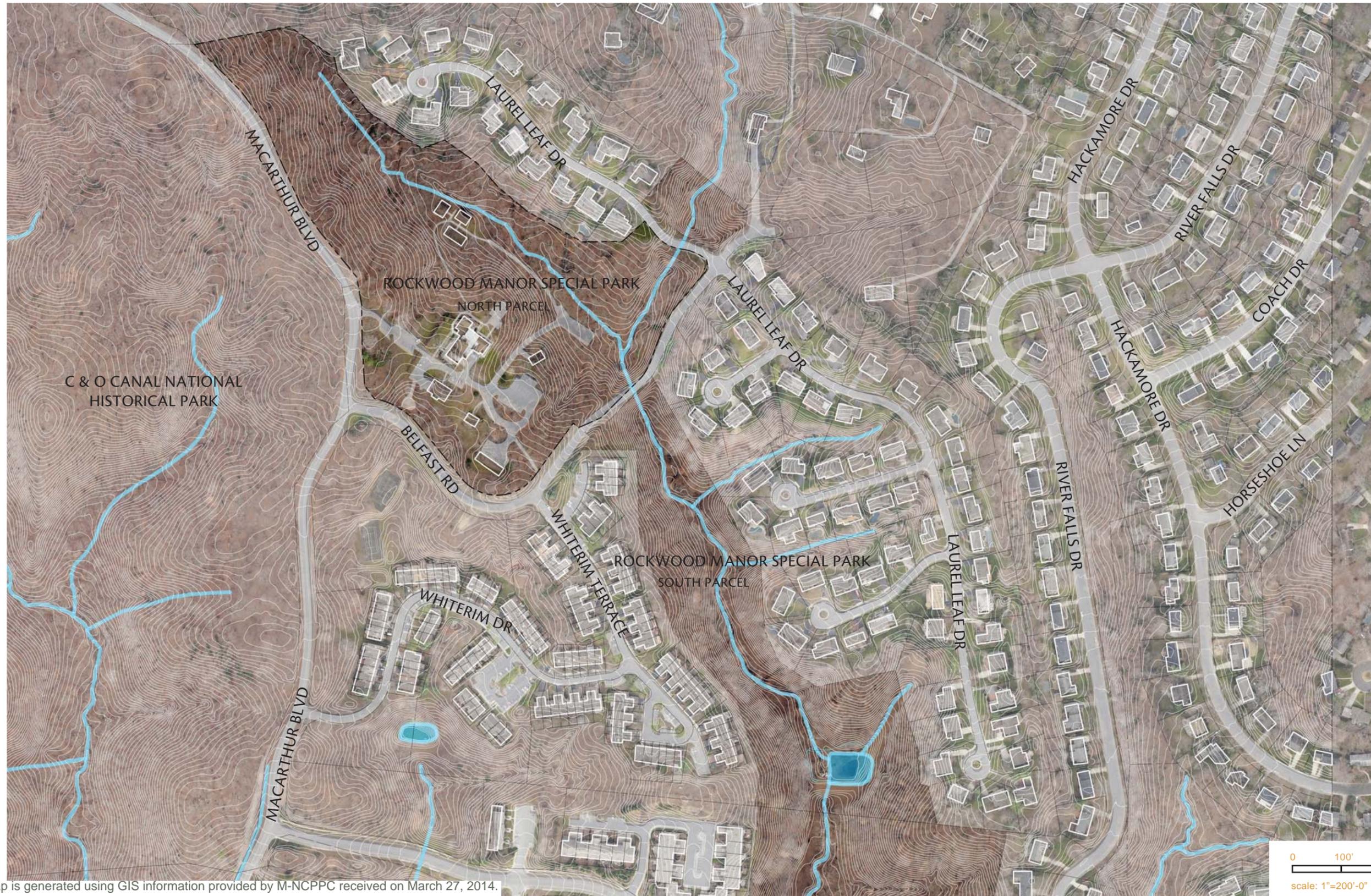
BELFAST ROAD, EAST SIDE OF ROCKWOOD MANOR (EXISTING)



BELFAST ROAD, EAST SIDE OF ROCKWOOD MANOR (EXISTING)



INTERSECTION OF BELFAST ROAD AND WHITERIM TERRACE (EXISTING)



Note: This map is generated using GIS information provided by M-NCPPC received on March 27, 2014.

Existing Conditions: Topography

Rockwood Manor’s woodland site has varying topography characteristic of land adjacent to a stream. The highest parts of the property are located at the northwest of the site and in the center of the site where the Rockwood Manor House is located. On the north side of the Manor House the terrain generally slopes down to the existing stream. On the south side of the Manor House the terrain slopes down toward Belfast Road.



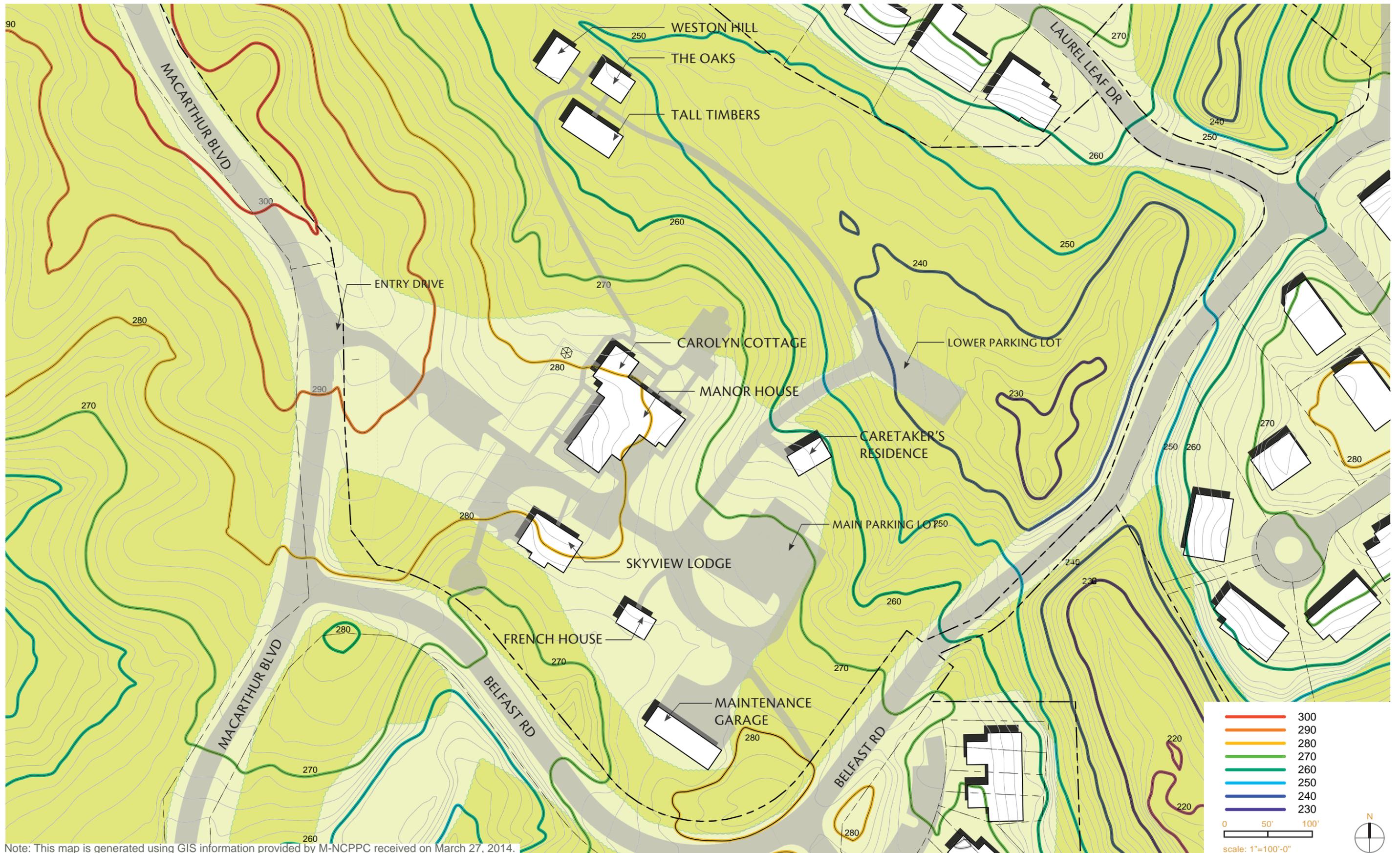
PATH FROM BUNK HOUSES TO MANOR HOUSE (EXISTING)



ROAD TO LOWER PARKING LOT (EXISTING)



ROAD FROM LOWER PARKING LOT TO CARETAKER’S HOUSE (EXISTING)



Note: This map is generated using GIS information provided by M-NCPPC received on March 27, 2014.

Existing Conditions: Slopes

The slopes at Rockwood Manor Park are varied throughout the site. Flat slopes, less than 5%, are located at the north and south edges of the site and also where the existing parking is located. Relatively flat slopes, 5%-10%, are located in the areas adjacent to the flattest areas. Steep slopes, over 10%, run diagonally through the site, from the northwest portion of the site to the southeast. Steep slopes are also located at the existing amphitheater. The steepest slopes, over 15%, are located on the southern bank of the existing stream.



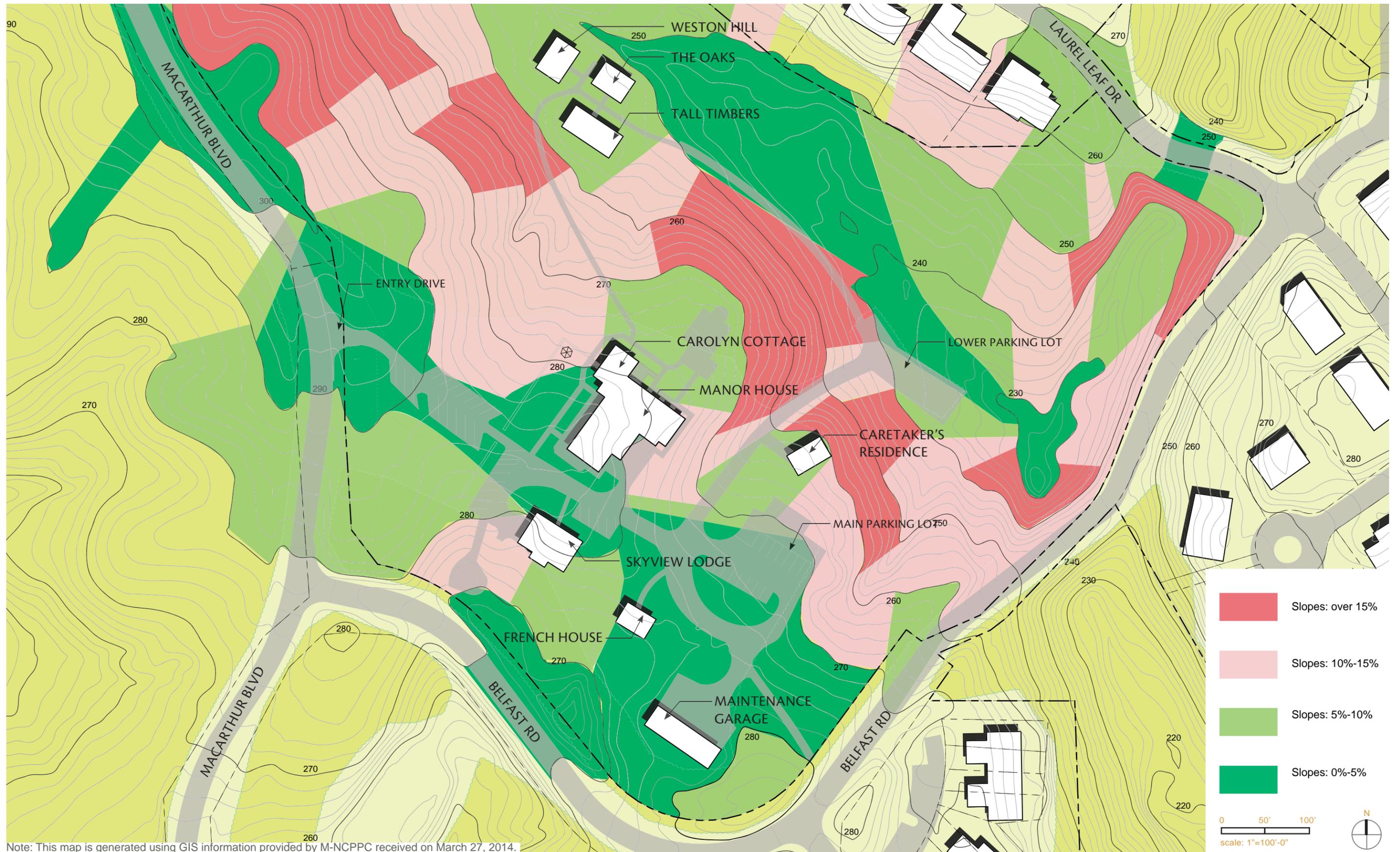
Image by OVS

STREAM (EXISTING)



Image by OVS

LOWER PARKING LOT (EXISTING)



Note: This map is generated using GIS information provided by M-NCPPC received on March 27, 2014.

Existing Conditions: Hydrology

The site is located within the Lower Potomac Direct watershed and the Rock Run sub-watershed which eventually drains into the Potomac River. The stream on site runs from the northeast to the southeast corners of the site with a wetland buffer of approximately 150'-0". The stream is unstable adjacent to the property, with evidence of active channel down-cutting and eroding banks. This instability can be attributed to uncontrolled stormwater runoff from the upstream property and MacArthur Boulevard. The southeast portion of the site contains erodible soils. Nearly all of the flat terrain outside of a floodplain has already been developed.



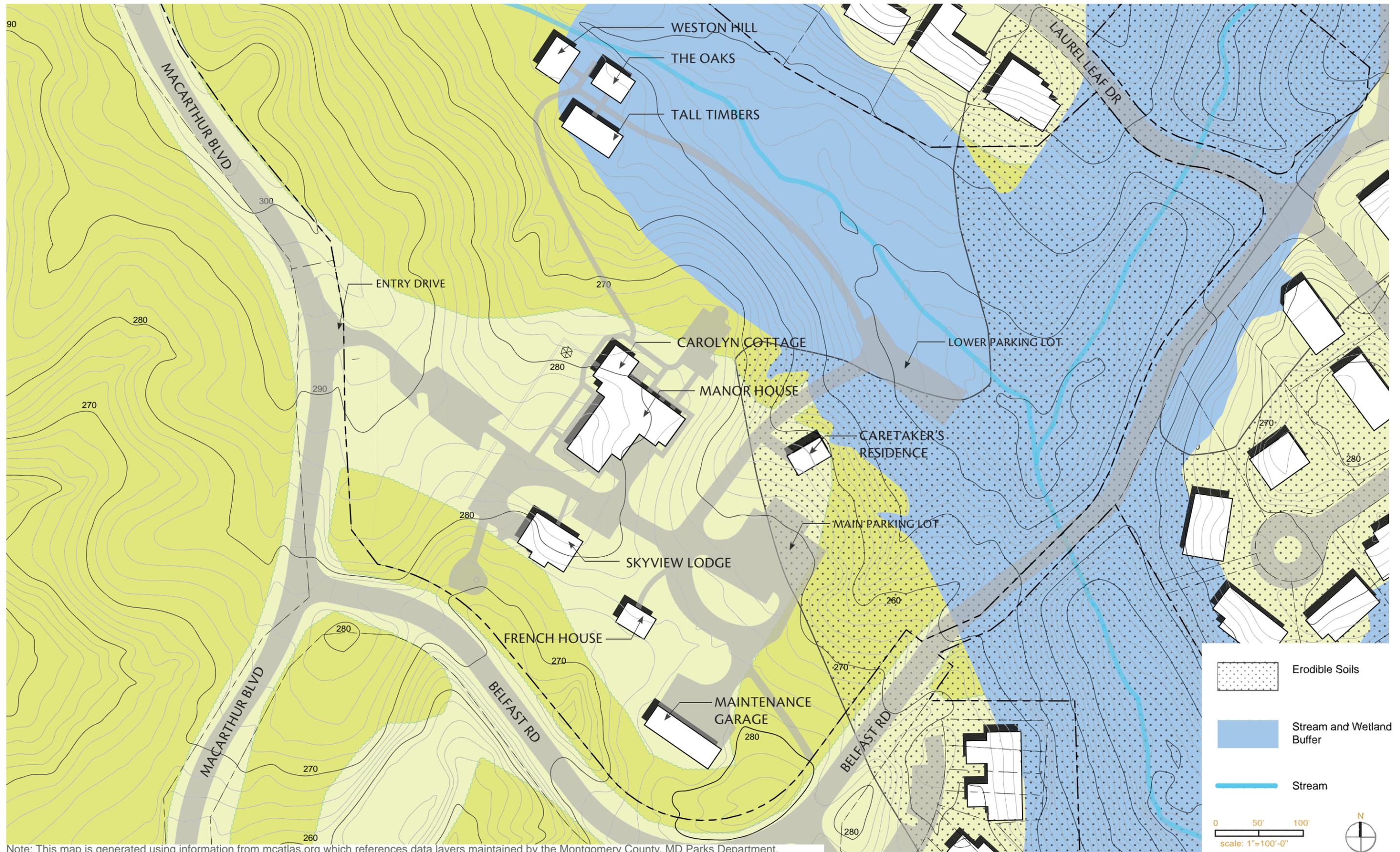
Image by OVS

STREAM (EXISTING)



Image by OVS

STREAM (EXISTING)



Note: This map is generated using information from mcatlas.org which references data layers maintained by the Montgomery County, MD Parks Department.

Existing Conditions: Water Flow

Water on site generally flows toward the existing stream except for the area to the south of the Manor House which drains toward Belfast Road. Because the property was developed prior to the existence of stormwater management regulations in Montgomery County, little has been done to mitigate the effects of the site's impervious surfaces on stormwater runoff. This has resulted in erosion along many of the steep slopes and scouring of the stream banks.



Image by OVS

STREAM (EXISTING)



Image by OVS

ROAD TO LOWER PARKING LOT (EXISTING)

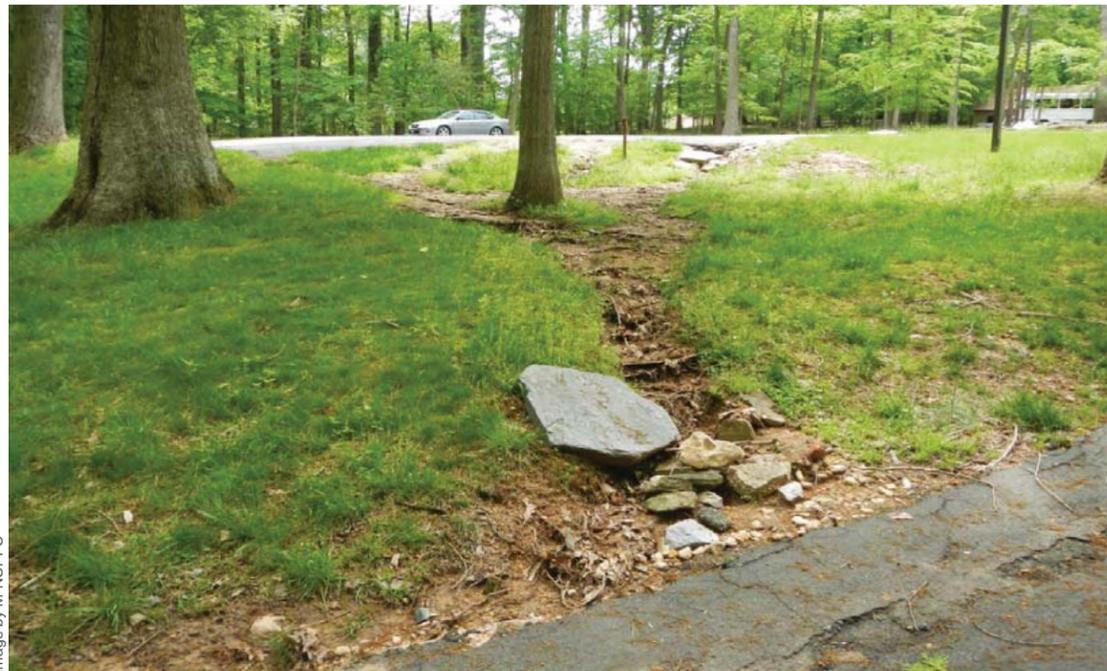


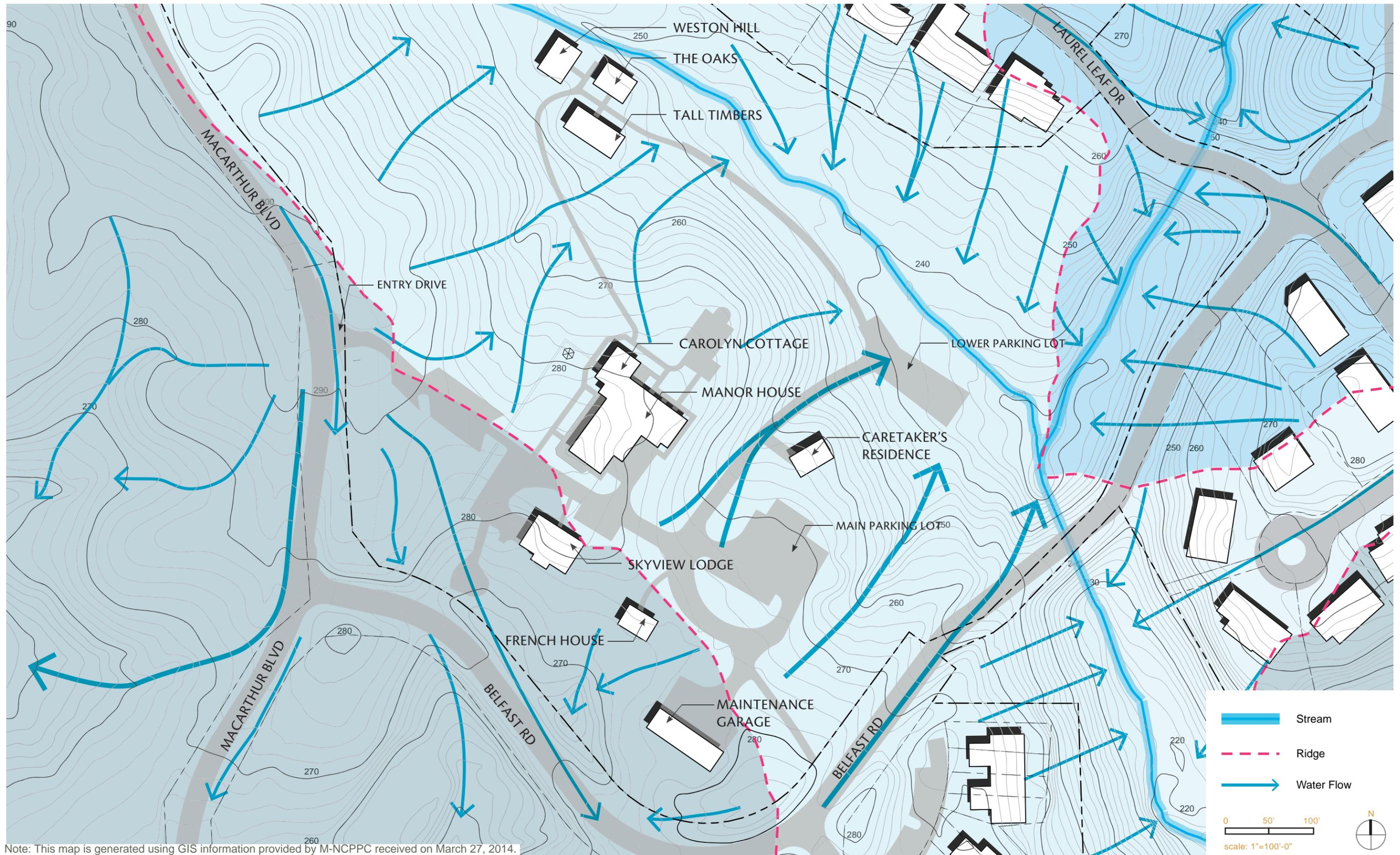
Image by M-NCPPC

EROSION ON SLOPES (EXISTING)



Image by M-NCPPC

INCISED STREAM BANKS (EXISTING)



Note: This map is generated using GIS information provided by M-NCPPC received on March 27, 2014.

Existing Conditions: Vegetation

The majority of the site is covered by an Oak-Hickory forest which also contains Tulip Poplar, Beech, Birch, and Pine trees. Near the Manor House and Veranda there are decorative Cherry trees, Holly trees, and formal garden planting.



Image by M-NCPPC

PATH FROM LOWER PARKING LOT TO BUNK HOUSES (EXISTING)



Image by OVS

PATH FROM MANOR HOUSE TO BUNK HOUSES (EXISTING)

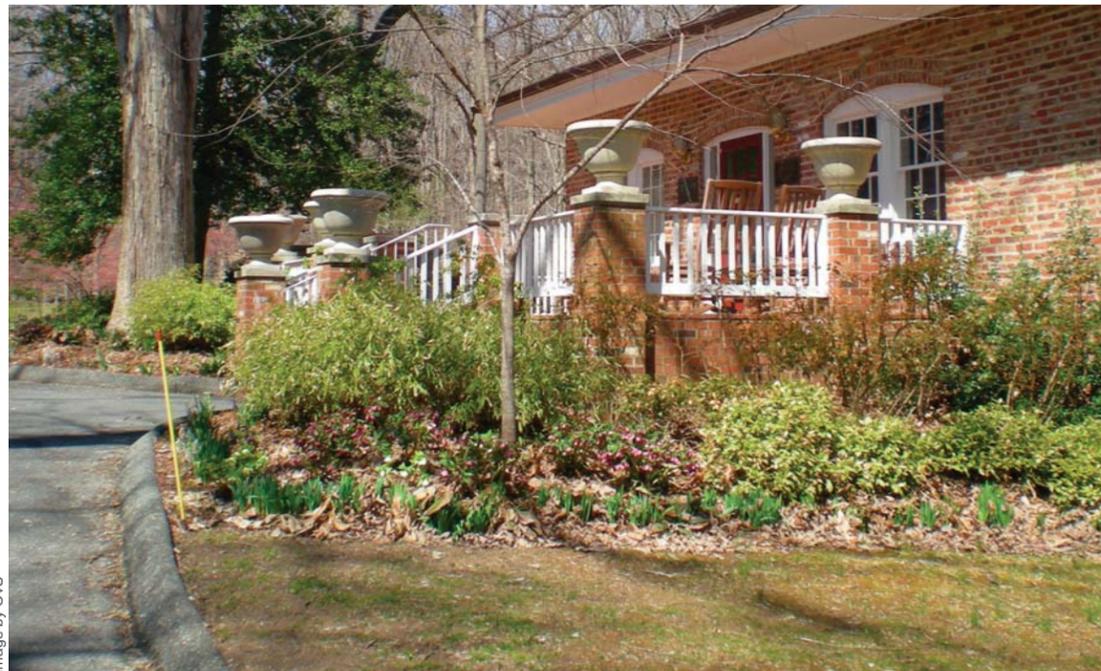


Image by OVS

MANOR HOUSE (EXISTING)



Image by OVS

MANOR HOUSE (EXISTING)

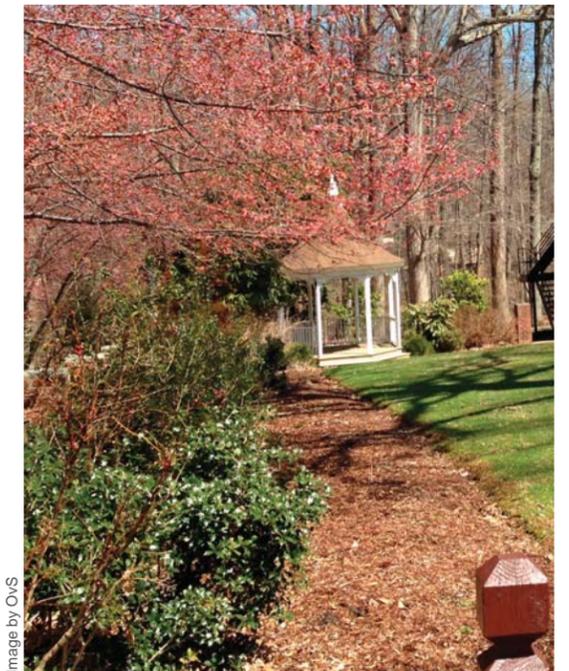
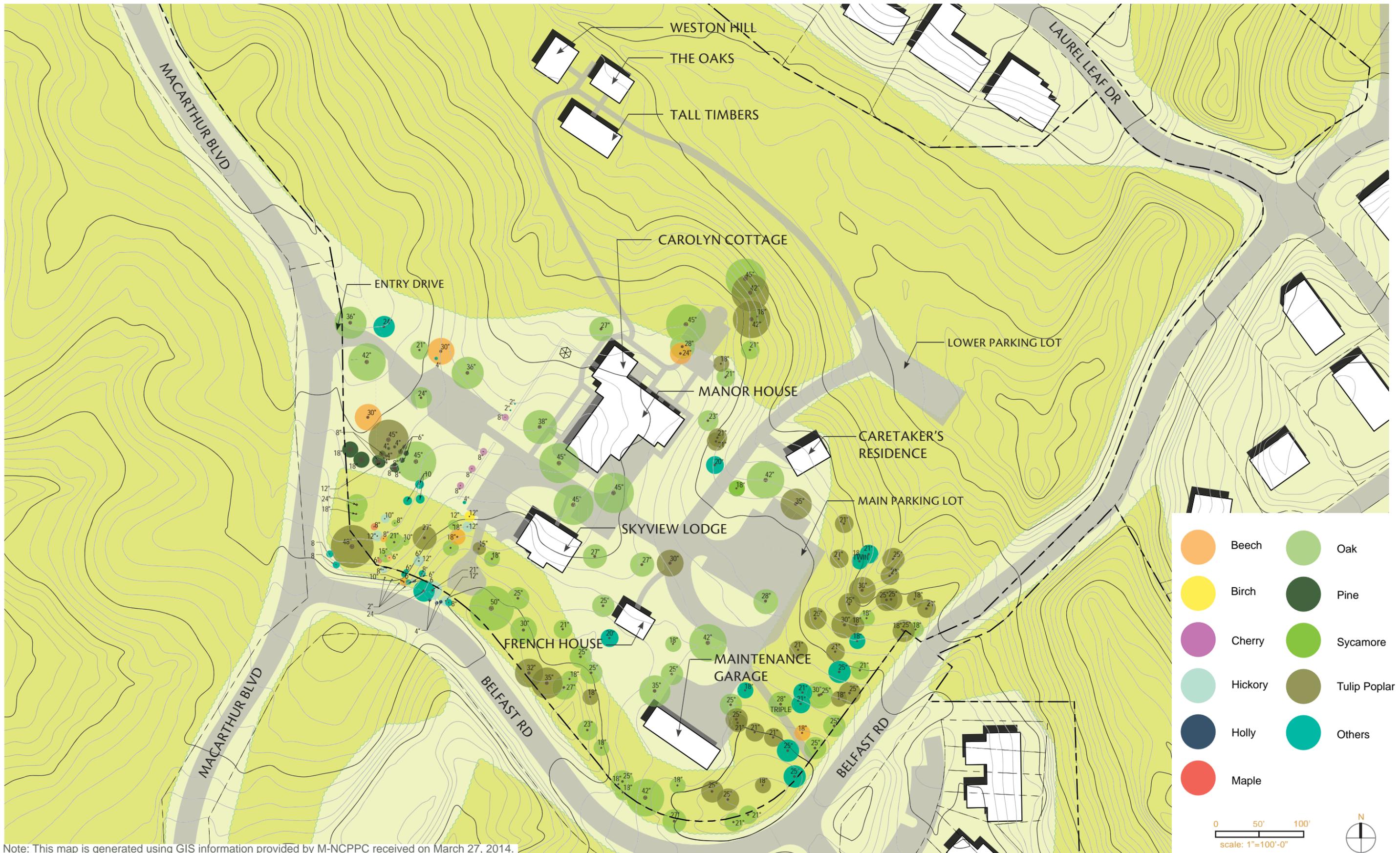


Image by OVS

GAZEBO (EXISTING)



Note: This map is generated using GIS information provided by M-NCPPC received on March 27, 2014.

Existing Conditions: Built Site Features/Circulation

Sited within the woodland property is the Rockwood Manor House, the country estate originally owned by Mr. and Mrs. Caughey. The Manor House is managed as an event center by the M-NCPPC Montgomery Parks Enterprise Division, and its exterior garden rooms include: the Veranda, Flagstone Patio, Gazebo, and Amphitheater. Also located on site are several smaller structures including Carolyn Cottage (connected to the Manor House), the Skyview Lodge, the French House, and the Bunk Houses (Weston Hill Cabin, Tall Timbers Cabin, and the Oaks Cabin) that provide overnight accommodations for event guests. Additional structures include the Maintenance Garage and the Caretaker's Residence to accommodate service necessary for the site.



ENTRY SIGN (EXISTING)



LAWN AND GAZEBO (EXISTING)



FRENCH HOUSE (EXISTING)



MAINTENANCE GARAGE (EXISTING)



MANOR HOUSE (EXISTING)



FLAGSTONE PATIO (EXISTING)



AMPHITHEATER (EXISTING)



CAROLYN COTTAGE (EXISTING)



LANDSCAPE WALL (EXISTING)



BUNK HOUSES (EXISTING)



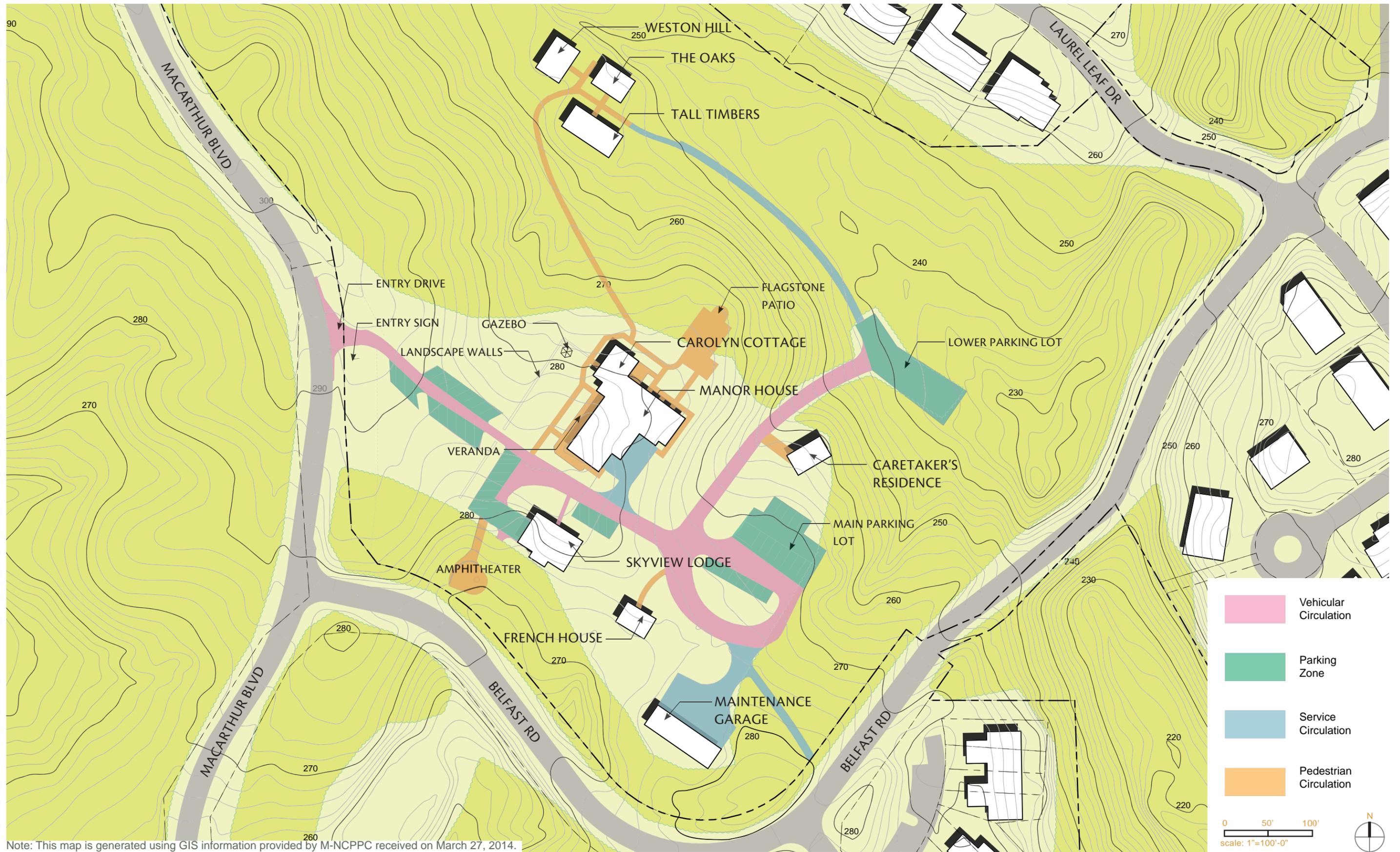
VERANDA (EXISTING)



SKYVIEW LODGE (EXISTING)

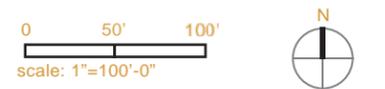


CARETAKER'S RESIDENCE (EXISTING)



Note: This map is generated using GIS information provided by M-NCPPC received on March 27, 2014.

- Vehicular Circulation
- Parking Zone
- Service Circulation
- Pedestrian Circulation



Site Plan - Alternative A

DRIVE

1. Entry Drive
2. Entry Signage
3. Existing Parking Removed
4. Entrance Court
5. Existing Amphitheater Removed
6. Exit Drive

PARKING / LOADING

7. Consolidated Parking
8. Staff Parking
9. Service Turn-Around
10. Reduced Maintenance Garage Footprint
11. Accessible Spaces
12. Lodge Parking
13. Loading Dock/Service Area
14. Relocated Dumpster

MANOR HOUSE

15. Gazebo Garden
16. Reconfigured Wall
17. Proposed Lawn Area/Event Venue
18. Gazebo
19. Proposed Walk and Stairs
20. Accessible Path from Venue to Bunk Houses and Amphitheater
21. Proposed Fire Circle
22. Paved Terrace
23. Additional Paved Terrace
24. Access from Venue to Amphitheater
25. Bioretention
26. Proposed Grill Area

BUNK HOUSES

27. Proposed Bioretention
28. Accessible Path from Bunk Houses to Manor House
29. Proposed Natural Play Area
30. Proposed Turn Around for Service Vehicles
31. Accessible Path from Bunk Houses to Amphitheater
32. Accessible Path

RESTORED STREAM / AMPHITHEATER

33. Restored Stream
34. Reconfigured Service Drive
35. Accessible Path from Manor House and Bunk Houses to Amphitheater
36. Relocated Amphitheater/Fire Circle
37. Path from Manor House to Amphitheater
38. Existing Parking Removed

EXTENDED SITE BUFFER

39. Woodland Screening
40. Woodland Understory
41. Ornamental Plantings
42. Lawn
43. Bioretention



Site Plan - Alternative B

DRIVE

1. Entry Drive
2. Entry Signage
3. Existing Parking Removed
4. Entrance Court
5. Existing Amphitheater Removed
6. Exit Drive

PARKING / LOADING

7. Consolidated Parking
8. Staff Parking
9. Service Turn-Around
10. Reduced Maintenance Garage Footprint
11. Accessible Spaces
12. Lodge Parking
13. Loading Dock/Service Area
14. Relocated Dumpster

MANOR HOUSE

15. Gazebo Garden
16. Reconfigured Wall
17. Proposed Lawn Area/Event Venue
18. Gazebo
19. Proposed Walk and Stairs
20. Accessible Path from Venue to Bunk Houses and Amphitheater
21. Proposed Fire Circle
22. Paved Terrace
23. Additional Paved Terrace
24. Access from Venue to Amphitheater
25. Bioretention
26. Proposed Grill Area

BUNK HOUSES

27. Proposed Bioretention
28. Path from Bunk Houses to Manor House
29. Proposed Natural Play Area
30. Proposed Turn Around for Service Vehicles
31. Accessible Path from Bunk Houses to Amphitheater

RESTORED STREAM / AMPHITHEATER

32. Restored Stream
33. Reconfigured Service Drive
34. Accessible Path to Amphitheater
35. Existing Parking Removed
36. Relocated Amphitheater/Fire Circle

EXTENDED SITE BUFFER

37. Woodland Screening
38. Woodland Understory
39. Ornamental Plantings
40. Lawn
41. Bioretention



Key Plan - Site Development Alternatives

The Key Plan divides the landscape into use zones that explore site development alternatives that will be described in more detail in the following sections of this report. The key areas include:

- A. Drive;
- B. Parking, Service, and Bioretention;
- C. Manor House;
- D. Bunk Houses;
- E. Restored Stream / Amphitheater; and
- F. Woodland and Site Buffer.



Drive

Existing Conditions Assessment

The existing drive into Rockwood Manor is a 12'-0" wide, two-way road that provides an entrance and exit to the facility from MacArthur Boulevard. The visual cues, signage, and lighting along this road are inadequate, such that the signage and entry are easy to miss. In addition, buses and large emergency vehicles are unable to turn right into the site from north-bound MacArthur Boulevard and must currently access the site from south-bound MacArthur Boulevard. The entrance driveway configuration does not accommodate fire trucks turning into the site from either direction and requires them to park on MacArthur Boulevard and enter the site by foot. The current entry configuration is congested for a large volume of vehicles arriving at once (e.g. for a reception immediately following a wedding ceremony at a church). The entry drive widens as it approaches the Manor House and contains angled parking spaces on either side of the drive that take away from the visitor's experience and views to the wooded site. The existing entry is narrow and does not accommodate passenger drop off from the passenger side of the vehicle closest to the building.

Opportunities and Constraints

OPPORTUNITIES

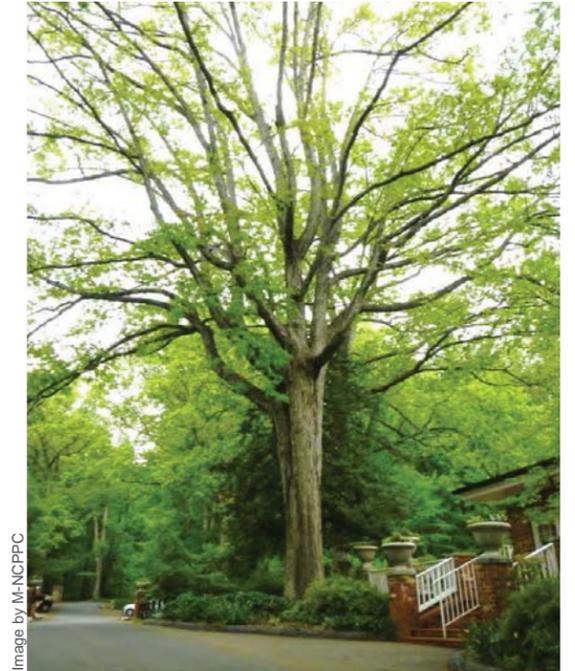
- The site includes 30 acres of woodland including mature canopy trees at the site perimeter and entry that provide a beautiful setting for the entry experience.
- A relocated entry drive would allow sight lines through the woodland to the culturally significant Manor House beyond.
- The entry to Rockwood Manor is located directly across from the C & O Canal National Historic Park affording easy connections from Great Falls to Rockwood Manor.

CONSTRAINTS

- The existing drive cannot be widened in its current location as it is bound by mature trees on either side.
- A relocated driveway would need to be sited to avoid impact on the surrounding neighborhood.
- A relocated driveway would need to be sited to preserve the existing mature canopy trees.



ENTRY DRIVE (EXISTING)



ENTRY DRIVE (EXISTING)



ENTRY DRIVE (EXISTING)



ENTRY DRIVE (EXISTING)



ENTRY DRIVE (EXISTING)



ENTRY DRIVE TOWARD MACARTHUR BLVD. (EXISTING)



MANOR HOUSE (EXISTING)



MANOR HOUSE (EXISTING)

Design Criteria, Goals, and Objectives

IMPROVED CIRCULATION AND SAFETY

- Separate ingress and egress to the site by adding an exit off of Belfast Road to reduce pedestrian/vehicular conflicts
- Provide a narrow, one-way driveway system to protect existing, mature specimen trees
- Realign the entry drive and improve turning radii to allow buses, service vehicles, and large emergency vehicles to turn into the site from either direction on MacArthur Boulevard
- Create prominent signage that complements the character of the Manor House to increase visual cues to the entry along MacArthur Boulevard
- Create a spacious drop off area that allows for vehicles to turn around and drop off passengers

IMPROVED VISITOR EXPERIENCE

- Remove existing angled parking along the entry drive to open the view to the Manor House and enhance the arrival experience
- Consider lighting at entry sign and along the drive to improve visibility and aesthetics

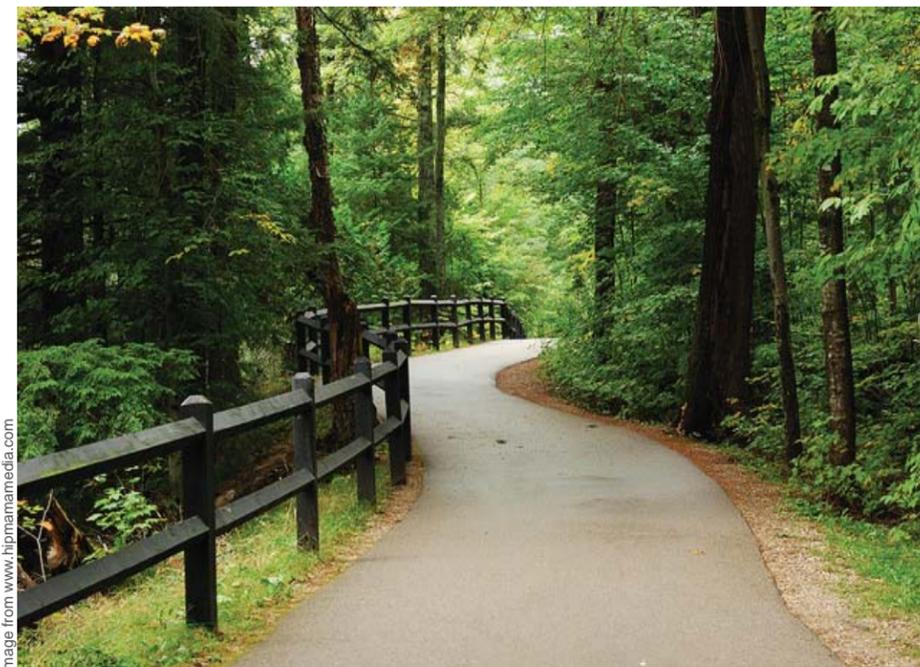
PROPOSED CHARACTER:



ENTRY DRIVE (PRECEDENT IMAGE)



ENTRANCE COURT (PRECEDENT IMAGE)



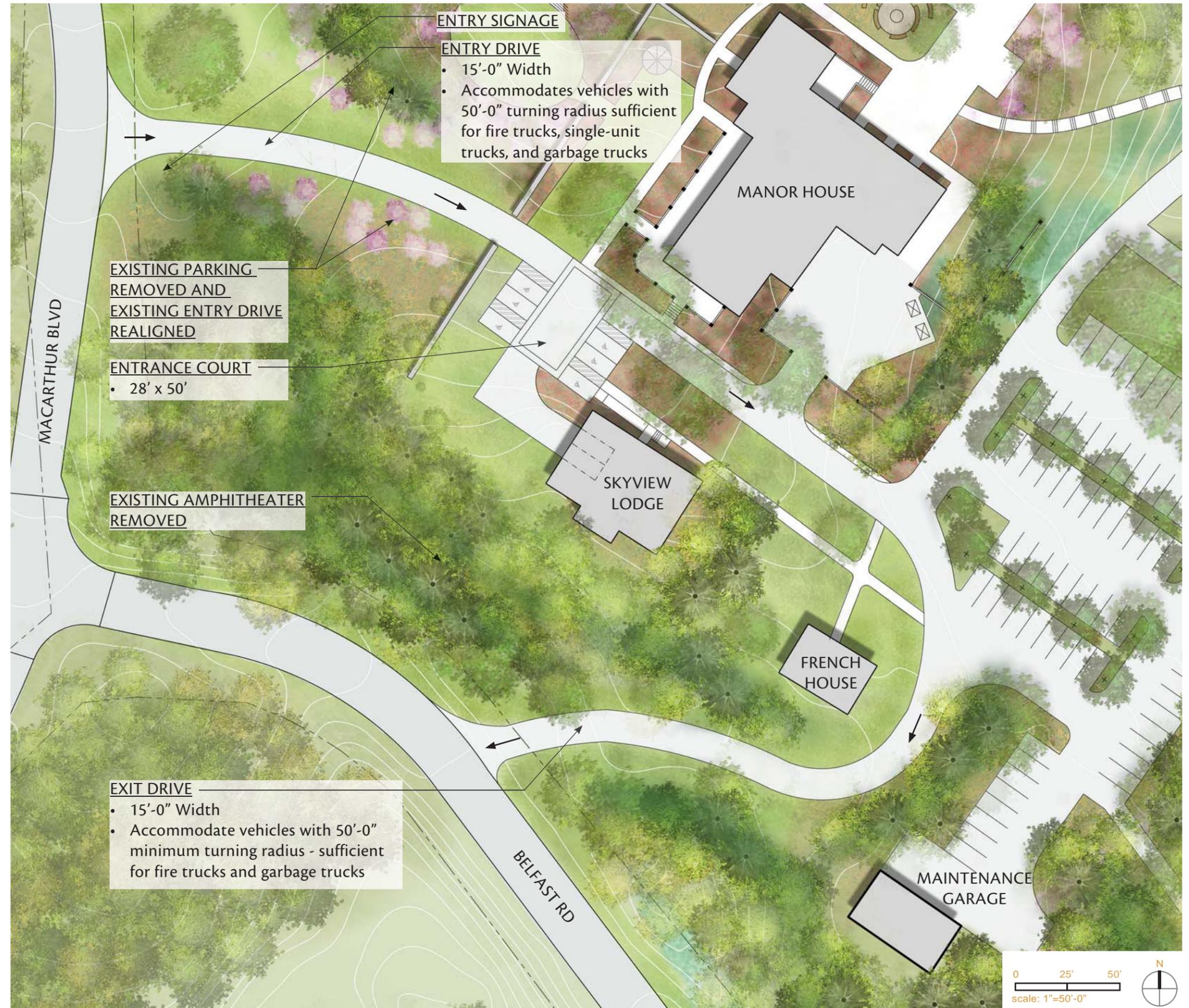
EXIT DRIVE (PRECEDENT IMAGE)



ENTRANCE COURT (PRECEDENT IMAGE)

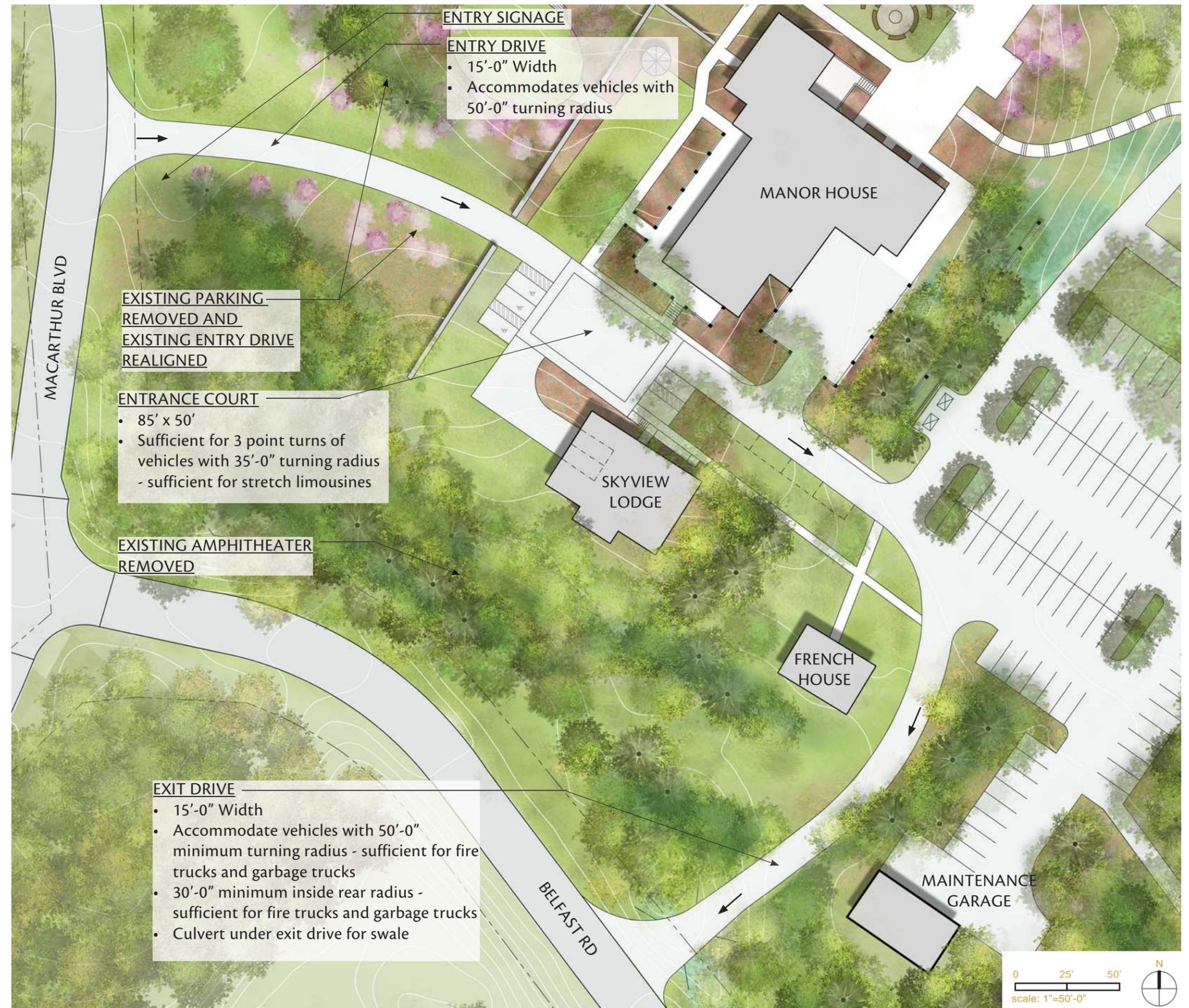
Drive Design - Alternative A

- Entry Drive alignment avoids mature trees
- Entry Drive signage is made more prominent and lit for visibility
- Entry Drive is sited away from Whiterim Terrace
- Exit Drive alignment avoids the swale west of the Maintenance Garage and is geometrically configured and signed to allow right turn only onto Belfast Road



Drive - Alternative B

- Exit Drive is sited further from intersection with MacArthur Boulevard
- The landscape around the French House remains intact



Parking/Service

Existing Conditions Assessment

The existing parking is located in multiple areas across the site: along the entry drive, east of the Manor House, and northwest of the Manor House adjacent to the existing stream. The parking lots currently hold approximately 75 cars, and there are currently two vendors that rent space in the parking lots for equipment and storage. The scattered lots result in an inefficient use of space.

The current configuration of roads and parking includes steep roads running perpendicular to the slope and parking in the wetland buffer, both of which are contributing to large volumes and high velocities of runoff. The service/loading area is located adjacent to the Manor House and must serve many functions at once which causes congestion and conflicts between uses. The existing maintenance garage contains six bays, in which it currently houses lawn mowers. The maintenance garage includes more storage space than is currently needed.

Opportunities and Constraints

OPPORTUNITIES

- Several trees in poor condition were recently removed from areas adjacent to and within the existing main parking area. There are opportunities to reconfigure the existing parking area more efficiently.
- Opportunities exist to reduce conflicts in existing loading and service areas.
- Existing slopes and drainage on site lend themselves to the integration of bioretention areas.
- The wooded site contains natural beauty that should be preserved and enhanced. Consider locating electric lines underground in and around the parking lot to reduce future conflicts with PEPCO and existing tree canopy.
- Valet parking could be an option if the parking lots were reorganized to accommodate multiple cars stacking.

CONSTRAINTS

- The site is heavily wooded and sloped, so possible parking locations are limited.
- The existing service area is not large enough and conflicts exist between varying service vehicles (caterers, musicians, garbage trucks and dumpsters). The dumpsters, adjacent to the building, attract nuisance wildlife and cause problems for maintenance staff.



ENTRY DRIVE AND PARKING (EXISTING)



PARKING LOT (EXISTING)



PARKING IN FRONT OF SKYVIEW LODGE (EXISTING)



LOWER PARKING LOT (EXISTING)



LOWER PARKING LOT (EXISTING)



LOWER PARKING LOT (EXISTING)



MAINTENANCE GARAGE (EXISTING)



MAINTENANCE GARAGE



SERVICE AREA (EXISTING)



DRIVE IN FRONT OF SKYVIEW LODGE (EXISTING)



SERVICE AREA (EXISTING)



SERVICE AREA (EXISTING)



SERVICE AREA (EXISTING)

Design Criteria, Goals, and Objectives

EFFICIENT SITE USE

- Consolidate and maximize the parking on-site to minimize the visual impact of parking
- Remove parking from ecologically sensitive areas, such as the wetland buffer
- Consider a modest increase to the total number of parking spaces (including required ADA spaces) to better serve existing functions of the site and accommodate:
 - Maximum 85 visitor cars, including 4 accessible spaces and 1 accessible van space
 - 8 staff parking spots
 - accommodation for 2 buses (in lieu of some parking spaces)
- Reduce maintenance garage footprint (can be reduced to three bays if necessary)
- Relocate dumpsters away from the building and out from the back of the loading area to reduce service conflicts
- Add service turn-around near the Maintenance Garage building to accommodate vehicles with a 35'-0" turning radius
- Consider reorganization of parking spaces to accommodate multiple car stacking for valet parking
- Expand service area to accommodate 2 catering trucks and improve loading area to the kitchen

ENVIRONMENTALLY SENSITIVE DESIGN

- Integrate bioretention or other stormwater management practices to help improve the quality and decrease the quantity of stormwater runoff

PROPOSED CHARACTER:



Olympic College
Design and Image by SVR Design

BIORETENTION (PRECEDENT IMAGE)



Image from www.bluegreenbldg.org

BIORETENTION (PRECEDENT IMAGE)

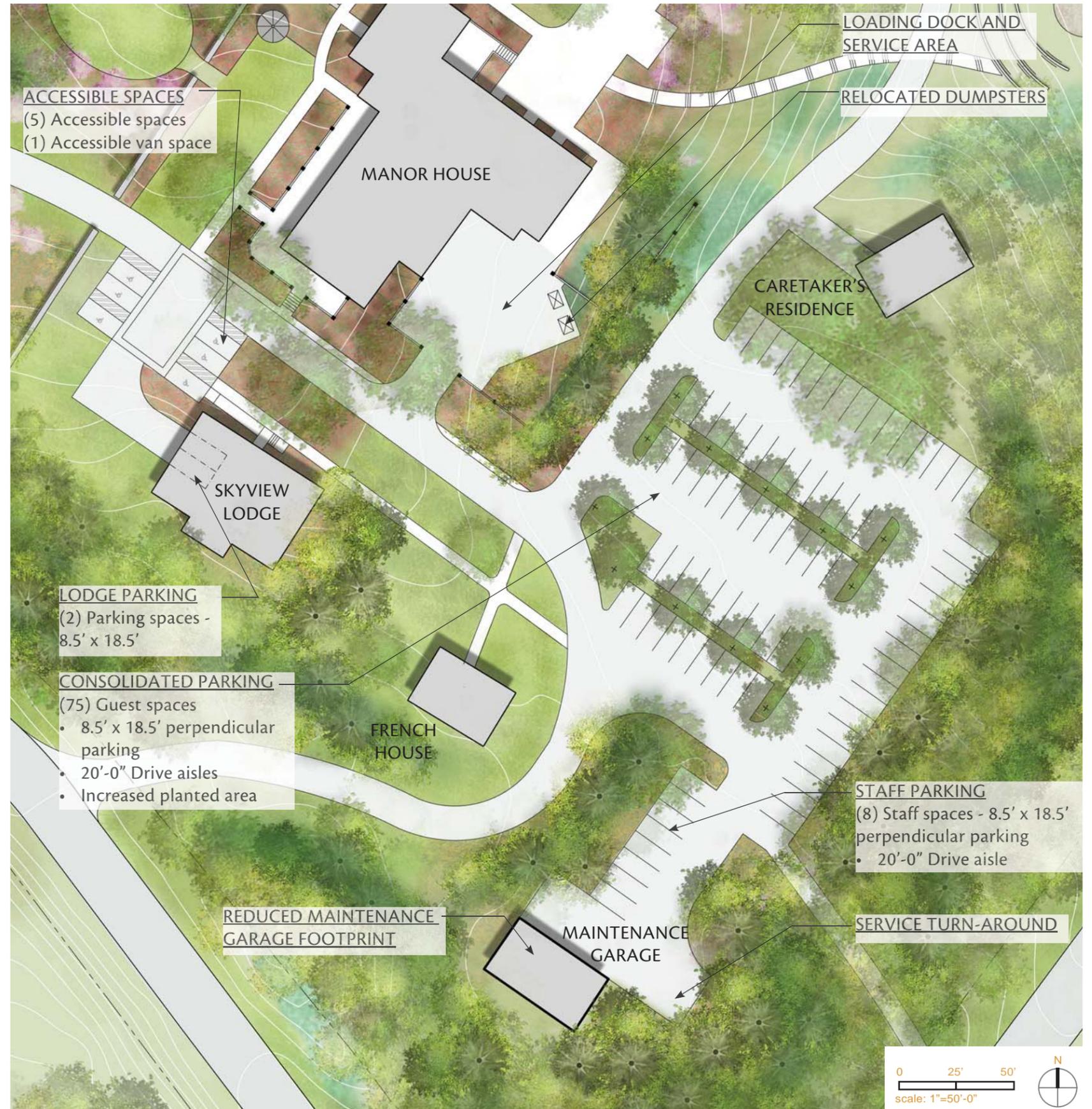


Morris Arboretum, Philadelphia
Image by the Nipicker on Flickr

PERMEABLE PAVING (PRECEDENT IMAGE)

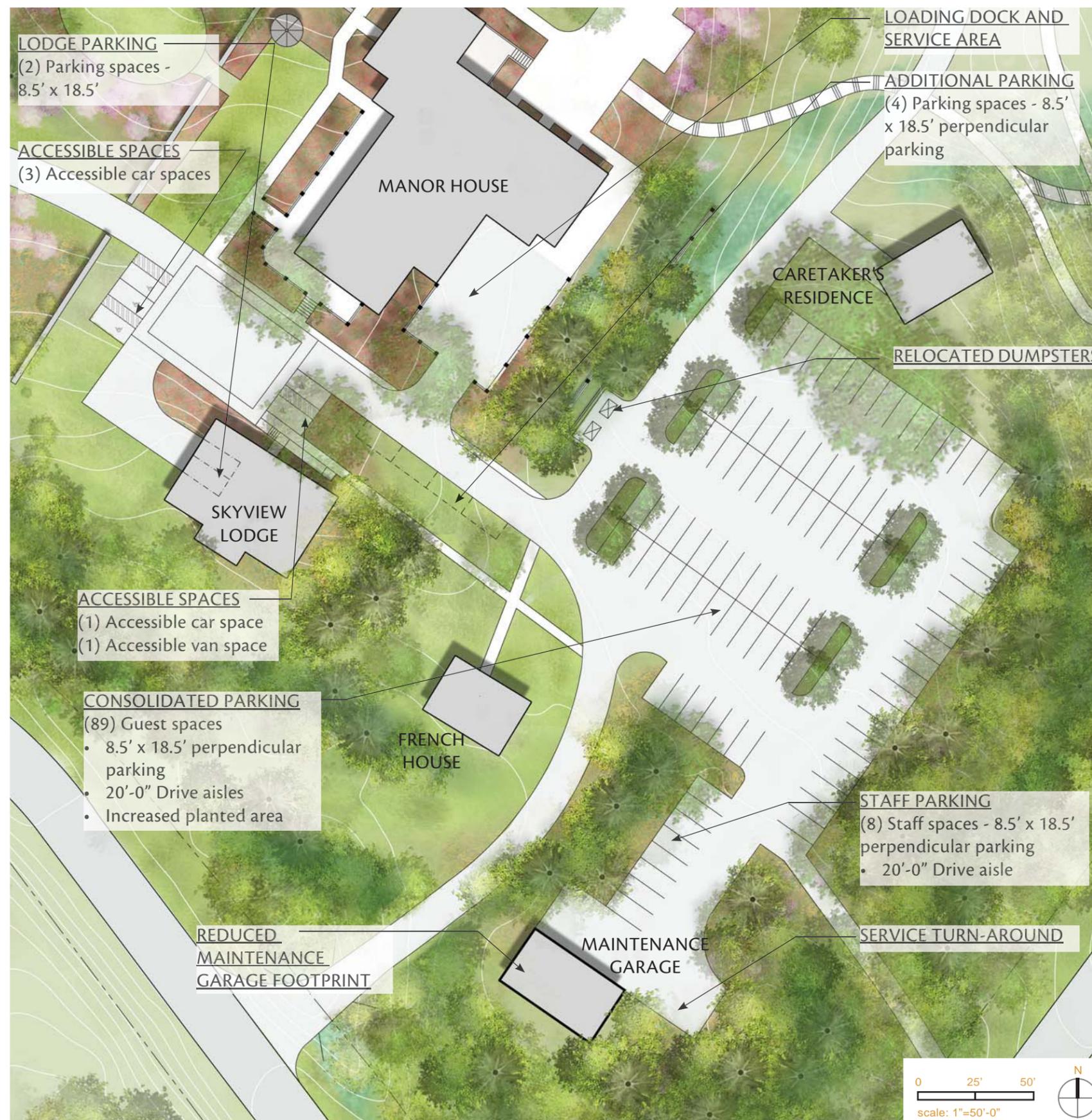
Parking/Service - Alternative A

- (83) Guest spaces, including (5) accessible spaces and (1) accessible van space
- (8) Staff parking spaces



Parking/Service - Alternative B

- (96) Guest spaces, including (4) accessible spaces and (1) accessible van space
- (8) Staff parking spaces
- Includes increased opportunities for canopy trees and/or bioretention in the parking lot
- Possible (4) additional guest parking spaces



Manor House

Existing Conditions Assessment

A culturally significant estate built in the 1920's, Rockwood Manor is comprised of seven different rooms with varying capacities. Maximum capacity for any one combined/adjoining space in the Manor House is 170 standing (cocktail style), 130 seated, and 110 seated with dancing. Tenting options for up to 200 guests are available. Outdoor ceremonies may be held on the flagstone patio or in the gazebo garden. Overnight accommodations within and immediately adjacent to the Manor House include 10 hotel-style guest rooms and a three bedroom cottage with a total capacity of 37. Located directly outside the Manor House are several outdoor rooms including the Veranda, the Flagstone Patio with trellis, and Gazebo Garden.

Opportunities and Constraints

OPPORTUNITIES

- The Manor House is a culturally significant building with a long and rich history.
- Rockwood Manor is a popular venue for events.

CONSTRAINTS

- Due to the site's steep slopes, accessible paths do not yet exist from the Manor House to other facilities on campus.



MANOR HOUSE (EXISTING)



MANOR HOUSE (EXISTING)



MANOR HOUSE (EXISTING)



MANOR HOUSE (EXISTING)



LANDSCAPE WALL AND GAZEBO GARDEN (EXISTING)



PAVED TERRACE (EXISTING)



TRELLIS AND PICNIC AREA (EXISTING)



BACK OF MANOR HOUSE (EXISTING)



SERVICE AREA (EXISTING)



BACK OF MANOR HOUSE (EXISTING)

Design Criteria, Goals, and Objectives

CULTURALLY SENSITIVE DESIGN

- Retain Ms. Caughey's original vision of Rockwood Manor by keeping with the existing character of the Manor House and surrounding site
- Preserve the site's Girl Scout Heritage by continuing tradition of hosting student groups, including Girl and Boy Scouts

ENVIRONMENTALLY SENSITIVE DESIGN

- Connect building downspouts and parking drainage to newly constructed bioretention areas

IMPROVED CIRCULATION AND SAFETY

- Create an exterior accessible route from the Manor House to the various buildings and event spaces on site including bunk houses

IMPROVED VISITOR EXPERIENCE

- Replace Gazebo with a similar style structure that provides more versatility in programming
- Reconfigure built landscape masonry wall and add lawn area to create an additional event venue on site adjacent to the existing veranda and lawn
- Expand paved terrace area adjacent to the Manor House to avoid muddy areas beneath tents during events
- Replace existing arbor with a structure more in character and scale of the existing site
- Add fire hearth to draw guests from the patio into the landscape
- Consider relocation of electric wires to allow for additional tent options
- Add lighting throughout the park to increase safety and improve wayfinding
- Add new grill area to offer caterers an area to set up and cook for events near kitchen but out of sight
- Consider a vestibule with a double set of doors outside of Brooke Hall to contain noise inside the building, reducing disturbance to the neighbors. Consider replacing the event tents with a hard-walled structure to better contain noise.

PROPOSED CHARACTER:



EVENT SPACE (PRECEDENT IMAGE)



EVENT SPACE (PRECEDENT IMAGE)



FIRE CIRCLE (PRECEDENT IMAGE)



ARBOR (PRECEDENT IMAGE)

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Manor House - Alternative A



Bunk Houses

Existing Conditions Assessment

The bunk houses consist of Tall Timbers Cabin, The Oaks Cabin, and Weston Hill Cabin that can each accommodate between 24 - 28 people. An existing paved path connects the Manor House to the Bunk Houses for pedestrians and maintenance vehicles. An additional pedestrian only path is located on the northwest side of the Manor House that leads down a steep slope to the bunk houses.

Opportunities and Constraints

OPPORTUNITIES

- The grill near the bunk houses is well utilized and could be expanded.
- The area is an appropriate space for an additional fire circle.
- The bunk houses are separated from the rest of the developed portion of the site, accentuating their rustic, secluded character.
- The bunk houses have excellent views to the forest and stream.

CONSTRAINTS

- Due to the site's steep slopes, accessible paths do not yet exist from the Bunk Houses to other facilities on campus.
- Because bunkhouses are located within the stream buffer, additional impervious cover must be kept to a minimum.



PATH FROM LOWER PARKING LOT TO BUNK HOUSES (EXISTING)



LOWER PARKING LOT TO BUNK HOUSES (EXISTING)



INSIDE BUNK HOUSE (EXISTING)



WESTON HILL BUNK HOUSE (EXISTING)



PATH FROM BUNK HOUSES TO MANOR HOUSE (EXISTING)



INSIDE BUNK HOUSE (EXISTING)



BUNK HOUSE (EXISTING)



PATH FROM MANOR HOUSE TO BUNK HOUSES (EXISTING)



PATH FROM BUNK HOUSES TO MANOR HOUSE (EXISTING)

Design Criteria, Goals, and Objectives

CULTURALLY SENSITIVE DESIGN

- Preserve the site's Girl Scout Heritage by enhancing the bunk house area to continue hosting event and student groups, including Girl and Boy Scouts

ENVIRONMENTALLY SENSITIVE DESIGN

- Consider low-impact uses for the area adjacent to the stream
- Integrate bioretention into the low areas of the site between the bunk houses and the stream to increase quality and decrease the quantity of stormwater runoff

IMPROVED CIRCULATION AND SAFETY

- Incorporate an accessible path from the Bunk Houses to the proposed amphitheater
- Incorporate an accessible path from the Bunk Houses to the Manor House

IMPROVED VISITOR EXPERIENCE

- Add a paved turn around area to allow maintenance vehicles to easily unload luggage and equipment adjacent to the bunk house area
- Incorporate a natural play area to accommodate a variety of age groups and facilitate activities on site

PROPOSED CHARACTER:



NATURAL PLAY AREA (PRECEDENT IMAGE)

Cow Hollow School Playground. San Francisco. Design and Image by Surface Design



NATURAL PLAY AREA (PRECEDENT IMAGE)



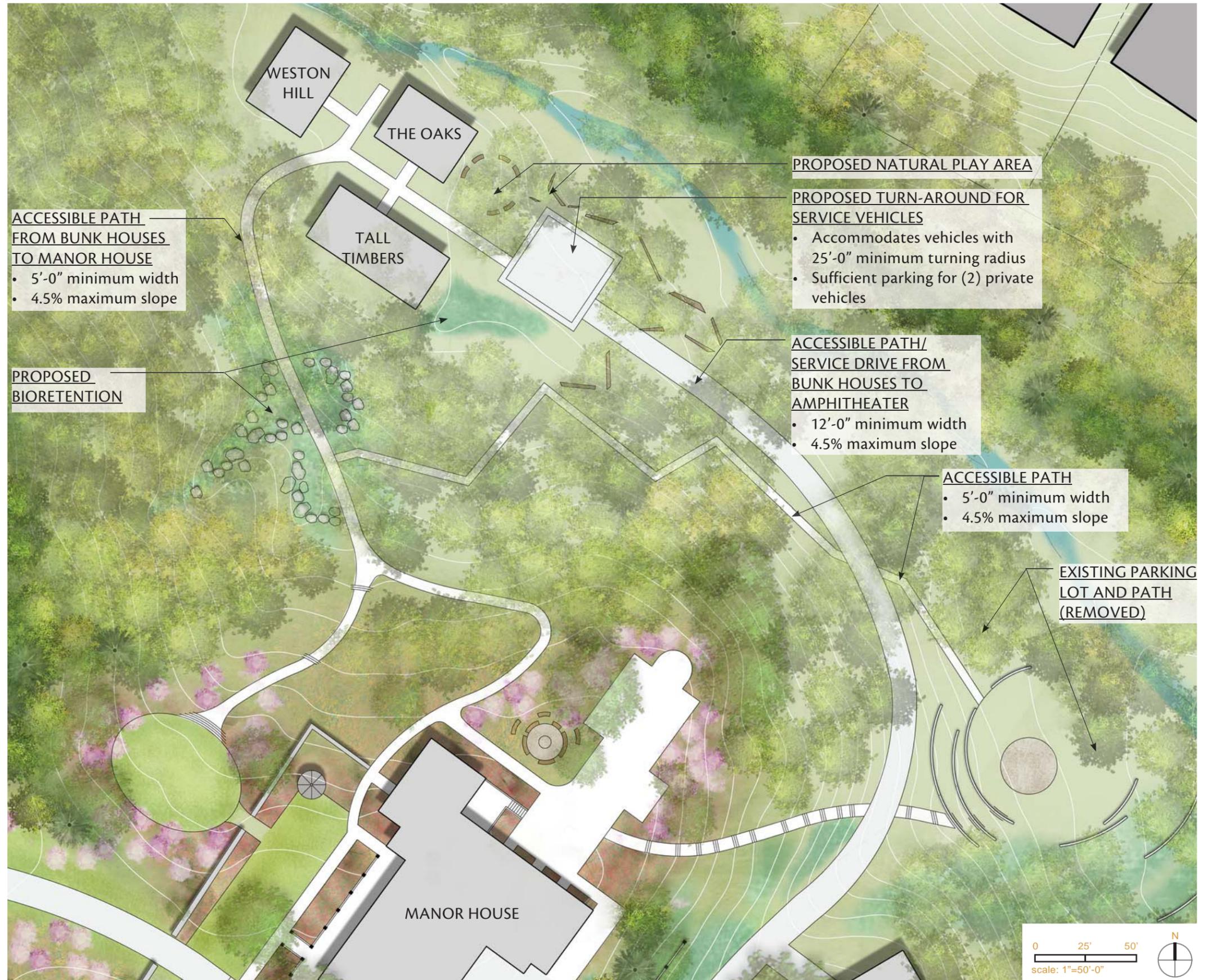
NATURAL PLAY AREA (PRECEDENT IMAGE)



NATURAL PLAY AREA (PRECEDENT IMAGE)

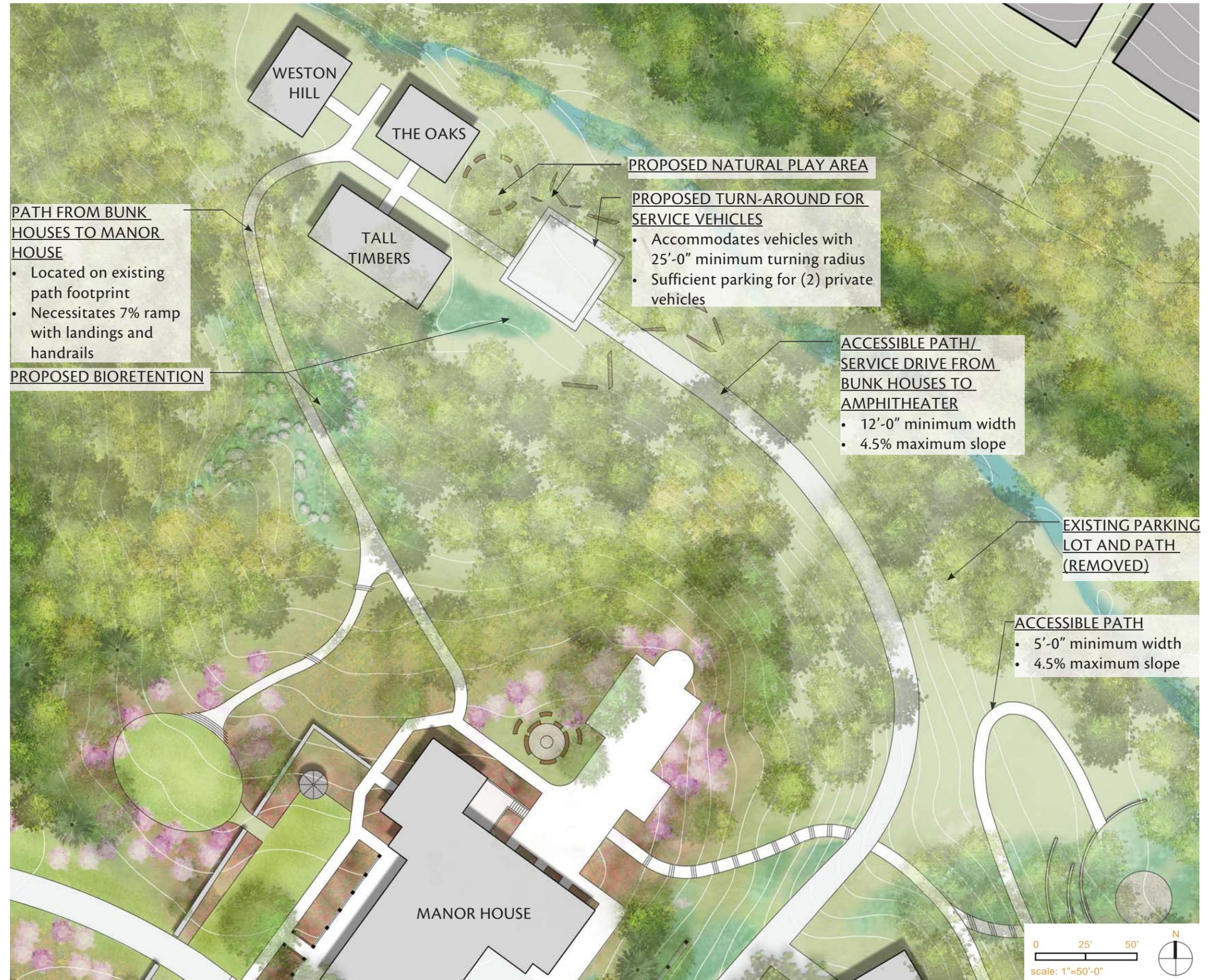
Bunk Houses - Alternative A

- Accessible path from Bunk Houses to Manor House is included with 4.5% maximum slope
- Includes additional accessible path with a 4.5% maximum slope



Bunk Houses - Alternative B

- Accessible path from Bunk Houses to Manor House is included that minimizes disturbance by utilizing existing path footprint
- Necessitates 7% ramp with landings and handrails



Restored Stream / Amphitheater

Existing Conditions Assessment

The existing stream bed is unstable and shows evidence of active channel down-cutting and eroding banks. The lower impervious, paved parking lot is located inside the wetland buffer and contributes to additional runoff into the stream.

The existing amphitheater is located to the south of the site and is in close proximity to Belfast Road. Its current location does not offer privacy as it is visible from the nearby road. The amphitheater can seat approximately 100 people and is well utilized for formal and informal purposes.

Opportunities and Constraints

OPPORTUNITIES

- The stream is a natural feature and asset to the park.
- The amphitheater is well utilized but should be relocated to take good advantage of the site's extensive woodlands. Once removed, the flat area left by the lower parking lot could house a new amphitheater.

CONSTRAINTS

- Existing stream bed is unstable and its banks are eroded.
- The existing amphitheater is too close to Belfast Road.



Image by M-NCPPC

PATH (EXISTING)



Image by Ovs

STREAM (EXISTING)



Image by Ovs

AMPHITHEATER (EXISTING)



Image by Ovs

LOWER PARKING LOT (EXISTING)



Image by Ovs

STREAM (EXISTING)



Image by Ovs

LOWER PARKING LOT (EXISTING)

Design Criteria, Goals, and Objectives

ENVIRONMENTALLY SENSITIVE DESIGN

- Improve quality and reduce velocity of water runoff into stream
- Incorporate stormwater management practices into the park and consider treatment of the water from the Manor parcel downstream in the south parcel located on the opposite side of Belfast Road
- Remove existing lower parking lot that is located in the floodplain to improve runoff quality and reduce impervious surfaces in the wetland buffer

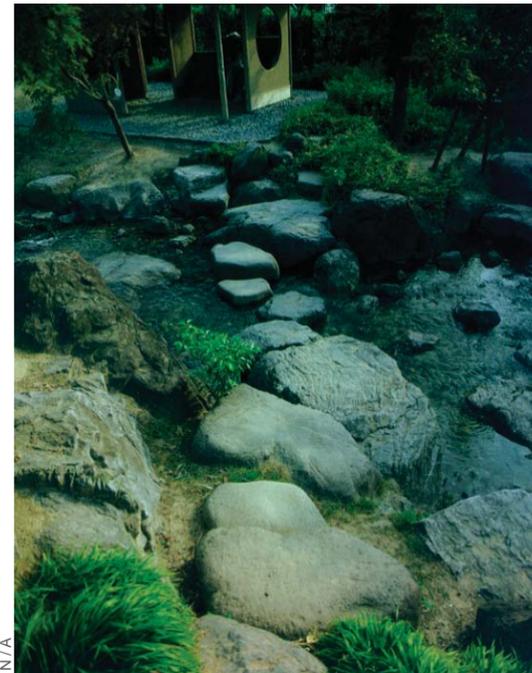
IMPROVED CIRCULATION AND SAFETY

- Incorporate an accessible path from the Manor House and Bunk Houses to the relocated Amphitheater

IMPROVED VISITOR EXPERIENCE

- Relocate the amphitheater to a more wooded, scenic location

PROPOSED CHARACTER:



N/A
RESTORED STREAM (PRECEDENT IMAGE)



N/A
RESTORED STREAM (PRECEDENT IMAGE)



PATH (PRECEDENT IMAGE)



Amphitheater at McConnell Springs
Image by Sydney Poor and Russell Poor
Glimmen, The Netherlands
Design by MD Landschapsarchitecten, Image
by Robert van der Molen, Melle van Dijk
AMPHITHEATER (PRECEDENT IMAGE)



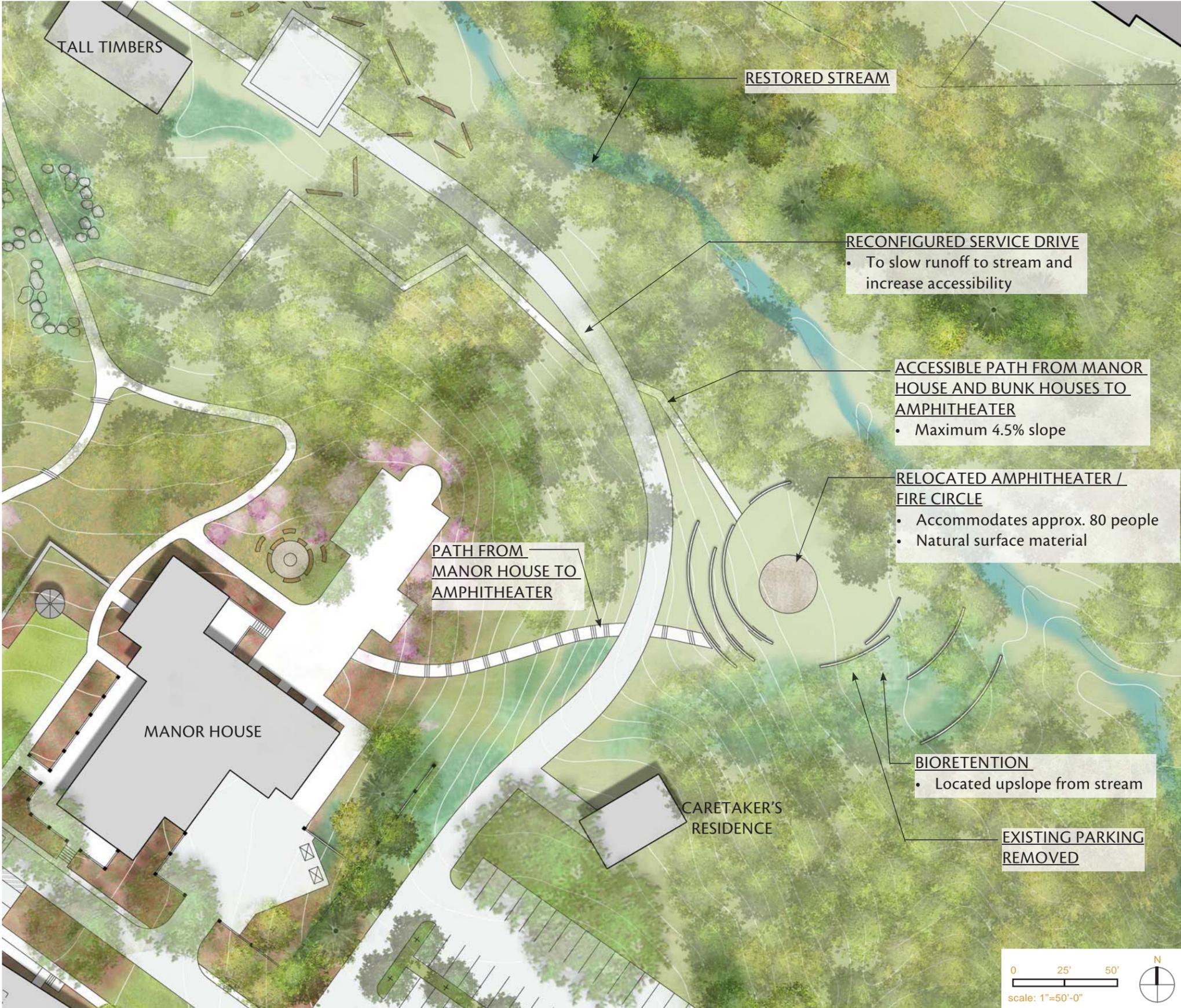
Camden Amphitheater and Public Library
Design by Fletcher Steele
Image by Shadysidelantern
National Arboretum, Image from Washington
Gardener.blogspot.com
AMPHITHEATER (PRECEDENT IMAGE)



PATH (PRECEDENT IMAGE)

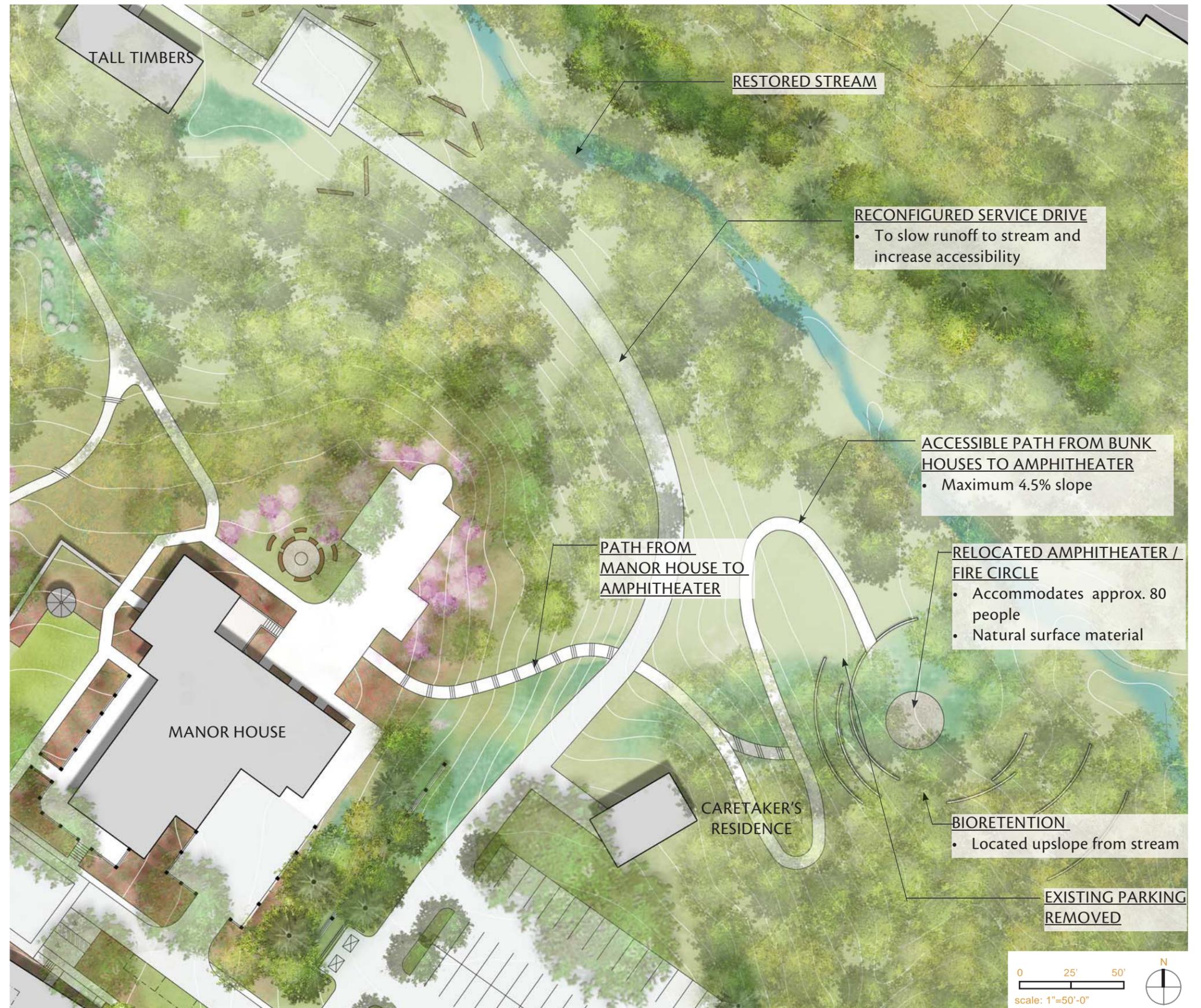
Restored Stream / Amphitheater - Alternative A

- Accessible path from Manor House and Bunk Houses to the Amphitheater (4.5% maximum slope)



Restored Stream / Amphitheater- Alternative B

- Accessible path from Bunk Houses to the Amphitheater (4.5% maximum slope)
- Amphitheater is accessible from Manor House only by way of Bunk Houses



Woodland and Site Buffer

Existing Conditions Assessment

The site contains approximately 30 acres of natural wooded area that is currently used as a public park. It is bounded to the west by the C & O Canal National Historical Park and to the north, east, and south by residential neighborhoods.

Opportunities and Constraints

OPPORTUNITIES

- The site's 30 acres of woodland and mature canopy trees can be enhanced through increased understory planting and additional vegetation to provide a visual buffer for adjacent residences.

CONSTRAINTS

- Proposed alternatives will incorporate collaboration with an acoustical engineer to evaluate the feasibility of various measures to reduce noise trespass from events at Rockwood Manor into neighboring residential properties.



VIEW TO THE NORTH OF THE SITE (EXISTING)



NORTH SIDE OF ENTRY DRIVE (EXISTING)



LOWER PARKING LOT (EXISTING)



LAWN BEHIND THE FRENCH HOUSE (EXISTING)

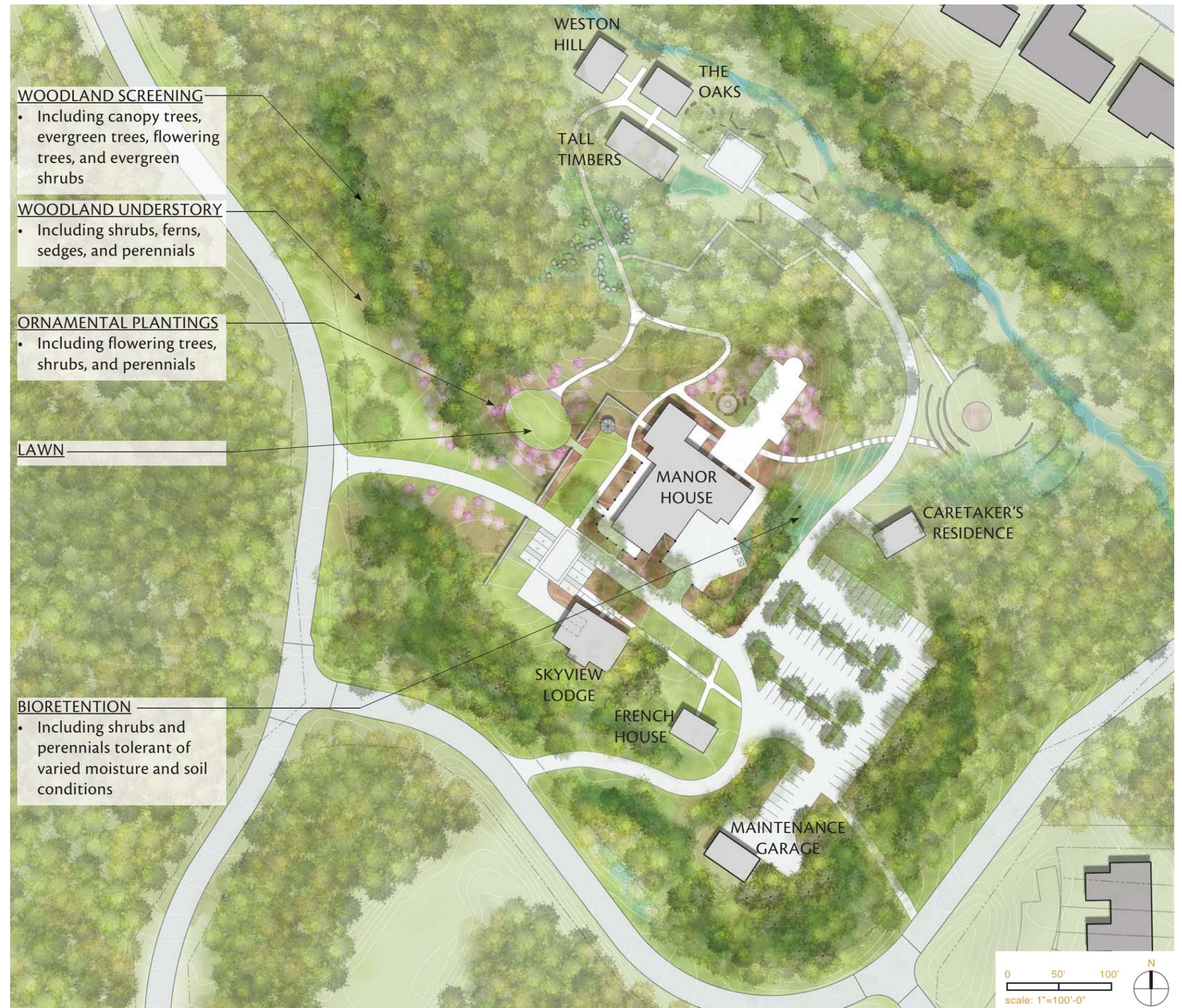
Design Criteria, Goals, and Objectives

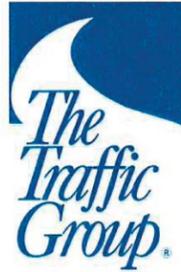
CONTEXTUAL DESIGN

- Collaborate with an acoustical engineer to consider measures to reduce sound levels and visual impact from events at Rockwood Manor
- Enhance the rustic and natural character of the site by supplementing the wooded buffer
- Consider inclusion of evergreen, understory plants to increase year-round visual screening

IMPROVED VISITOR EXPERIENCE

- Consider inclusion of low impact activities compatible with the wooded site (possible activities might include a ropes course, bicycle trails, volleyball court, basketball court, or yoga platform)





A VETERAN-OWNED
SMALL BUSINESS

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410.931.6600
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1.800.583.8411

FIELD LOCATIONS

Arkansas
Maryland
New York
North Carolina
Ohio
Texas
Virginia
West Virginia

Merging Innovation and Excellence®
www.trafficgroup.com

October 2, 2014

Mr. Brandon Freeman
Charles P. Johnson and Associates
1751 Elton Road
Silver Spring, Maryland 21093

RE: Rockwood Manor
Montgomery County, Maryland
Our Job No: 2014-0615

Dear Mr Blass:

The Traffic Group, Inc. has had an opportunity to conduct a Preliminary Assessment of the proposed changes to the Rockwood Manor facility located in the Potomac area of Montgomery County. The Rockwood Manor Property is located in the northeast quadrant of the McArthur Boulevard and Belfast Road intersection as shown on Exhibit 1. At the present time, the subject facility is served by a single point of access along McArthur Boulevard for vehicles entering and exiting the subject site. In order to provide a more efficient operation on the subject site, it is currently proposed that access to the property be modified to include a single point of access inbound along McArthur Boulevard and a single point of egress along Belfast Road. A copy of the preliminary site plan is shown on Exhibit 2.

McArthur Boulevard is a two lane north/south roadway in the vicinity of the subject property. The posted speed limit along McArthur Boulevard is 35 MPH. Belfast Road is a two lane east/west roadway which intersects McArthur Boulevard along the east side. The Belfast Road approach to McArthur Boulevard is presently controlled by a stop sign. The posted speed limit along Belfast Road is 25 MPH. Exhibit 3 was prepared to show the existing lane use and traffic control along the adjacent roadways.

The Traffic Group, Inc., conducted 24-hour machine counts along McArthur Boulevard and Belfast Road from Wednesday, June 18th, 2014 to Monday, June 23, 2014. These counts were conducted to determine the hourly directional traffic along each of these roadways. A summary showing the total vehicles observed during each of the one hour intervals for each day is contained in Appendix A to this letter.

For the purposes of this analysis, we have presented a “worst case” scenario by using the highest volume observed during the morning and evening peak hours on any of the days that were counted and the highest one hour volumes observed on the weekend. Exhibit 4 was prepared to show the existing peak hour volumes along each of the study area roadways for both the weekday morning and evening peak hour and the weekend peak hour.

In anticipation of future growth along the adjacent roadways, we have adjusted the existing peak hour volumes to reflect a 2% growth per year for a three year period to represent conditions in the design year of the subject project. The 2017 peak hour volumes are shown on Exhibit 5.

Trip Generation

The Rockwood Manor facility has the capacity for approximately 170 individuals indoors or 200 individuals for an outdoor event. Based on this information, for the purposes of this analysis we are presenting a “worst case” scenario and assuming an event for 200 people.

Based on studies obtained of other similar type facilities, we have prepared Exhibit 6 which shows the trips projected to be generated by the subject facility for both the weekday morning and evening peak hours and the weekend peak hour. Once again, these numbers are based on the maximum capacity of the subject facility and the highest one hour volumes along the adjacent roadways..

The peak hour trips shown on Exhibit 6 were then distributed and assigned to the nearby road system as shown on Exhibit 7. Exhibit 8 shows the total peak hour volumes, which combines the trips projected to be generated by the subject facility along with the background traffic conditions.

Intersection Capacity Analyses and Two-Lane Highway Capacity Manual Methodology Analysis have been conducted for the study area roadways and intersections and the results are shown on Exhibit 9. Copies of the capacity worksheets are contained in Appendix B of this report.

A review of Exhibit 9 indicates that both of the access points to the subject facility along with the Belfast Road and McArthur Boulevard roadway segments are projected to operate at acceptable levels of service based on accepted standards for Montgomery County even when assuming an extreme worst case for the use of the subject facility.

Summary of Findings

Based on the information contained in this Technical Memorandum, it is our opinion that the proposed modifications to the Rockwood Manor Facility would not result in unsatisfactory traffic conditions along the adjacent roadways in Montgomery County.

If you have any questions concerning this information, please do not hesitate to contact me.

Sincerely,



Glenn Cook
Vice President

GEC/clg
(F:\2014\2014-0615_Rockwood Manor\DOCS\CORRESP\ANALYST\Technical Memorandum.docx)

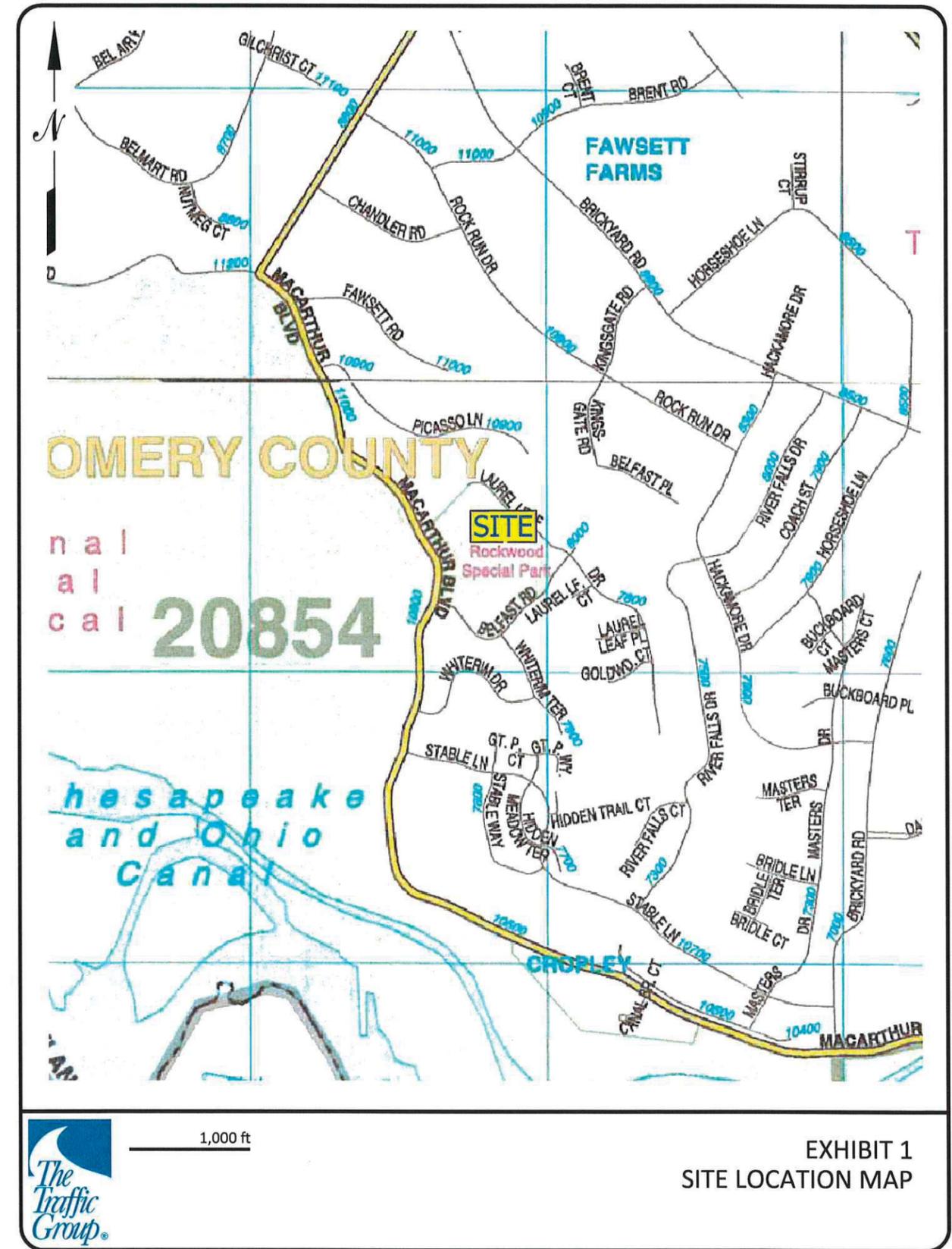


EXHIBIT 1
SITE LOCATION MAP

myc_140615_rockwood manor\initial\ex.dwg-loc_st, f10/3/2014

VEHICULAR CIRCULATION
1. Alternate Exit Drive on Belfast Road



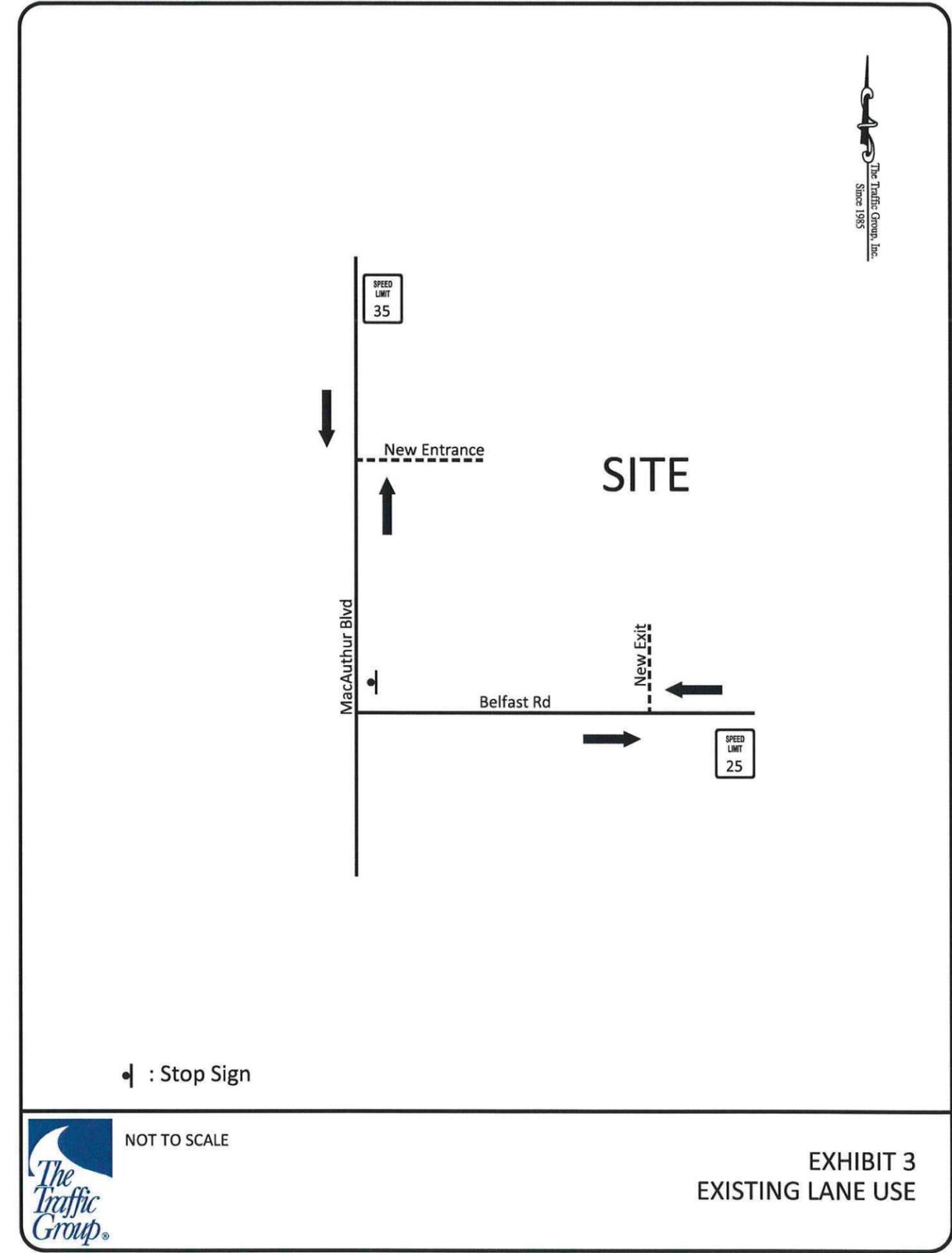
EXHIBIT 2

Charrette Sketch Alternative B
April 28, 2014

Rockwood Manor Feasibility Study
Potomac, Maryland

Oehme, van Sweden & Associates, Inc.
1800 G Street, S.E., Washington, D.C. 20002-4242
LANDSCAPE ARCHITECTS

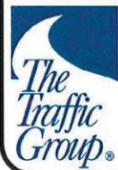
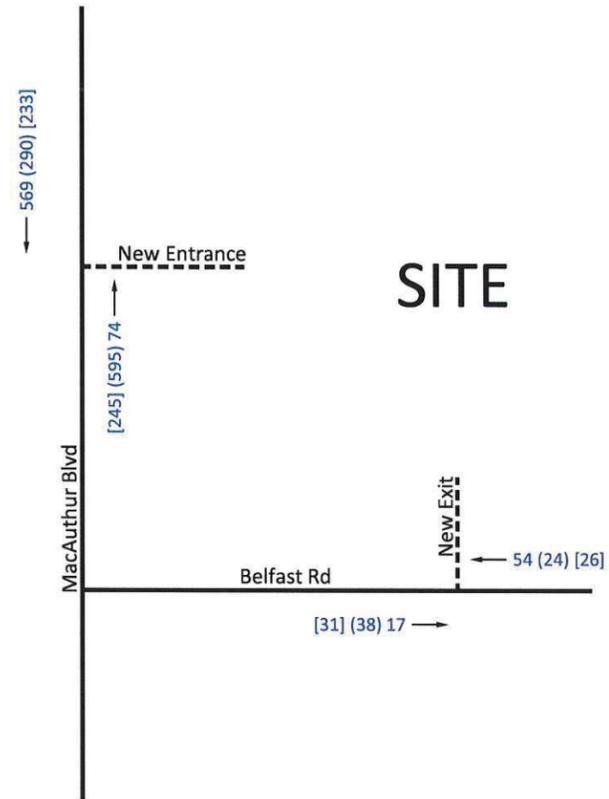
Map land - National Capital Park and Planning Commission
1000 Vermont Avenue, N.W., Suite 500, Washington, D.C. 20005-1000



The Traffic Group
NOT TO SCALE

**EXHIBIT 3
EXISTING LANE USE**

myc, 140615_rockwood manor\initial\ex.dwg-lu-exist, f7/10/2014

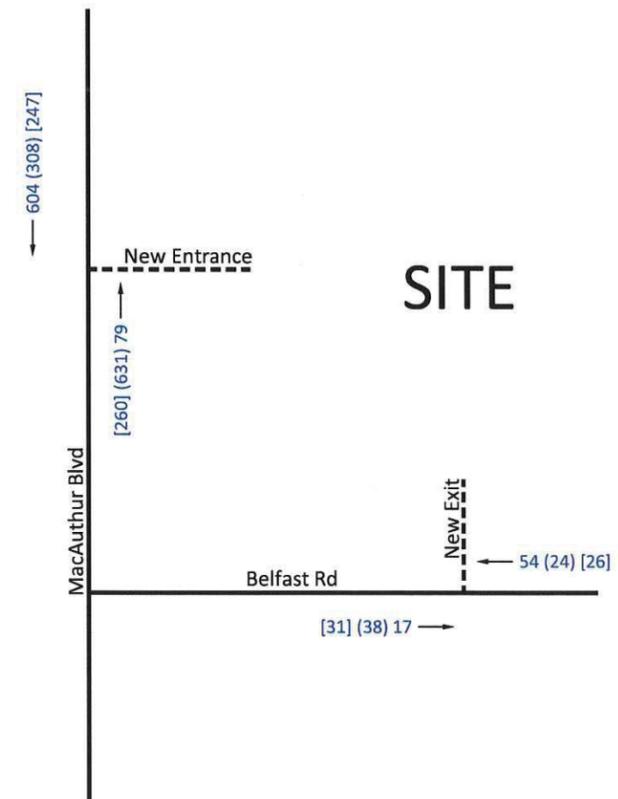


NOT TO SCALE

00 - MORNING PEAK HOUR
(00) - EVENING PEAK HOUR
[00] - WEEKEND PEAK HOUR

EXHIBIT 4
EXISTING PEAK HOUR
TRAFFIC VOLUMES

myc, 140615_rockwood manor\initial\ex.dwg-exist, f7/10/2014



Note: Traffic growth of 2% per year was applied to through traffic along MacAuthor Blvd for 3 years.



NOT TO SCALE

00 - MORNING PEAK HOUR
(00) - EVENING PEAK HOUR
[00] - WEEKEND PEAK HOUR

EXHIBIT 5
BACKGROUND PEAK HOUR
TRAFFIC VOLUMES

myc, 140615_rockwood manor\initial\ex.dwg-back, f7/10/2014

TRIP GENERATION

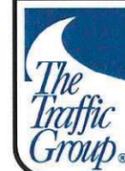
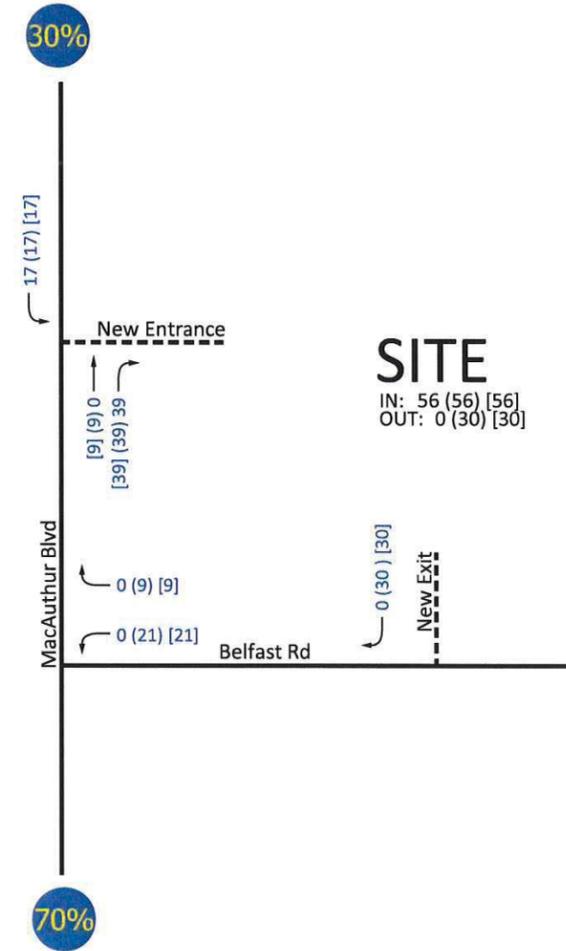
	MORNING PEAK HOUR			EVENING PEAK HOUR			WEEKEND PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
Rockwood Manor									
<i>Banquet Hall Trip Rate(trips/seat)</i>	0.28	0	0.28	0.28	0.15	0.43	0.28	0.15	0.43
200 Seats	56	0	56	56	30	86	56	30	86

Note:
 1. The following resources were reviewed to determine the trip rates for banquet facilities. The highest rates are chosen for a more conservative approach.
 a. TIS for Valhalla Brandywine prepared by McMahon, Oct 14, 2008.
 b. TIS for The Regent at Stone House prepared by The Traffic Group, Jul 1, 2014.
 c. Trip generation rates from NJDOT.
 2. It is assumed that there are only inbound trips during the morning peak hour and they are the same as evening peak hours.



EXHIBIT 6
 TRIP GENERATION
 FOR SUBJECT SITE

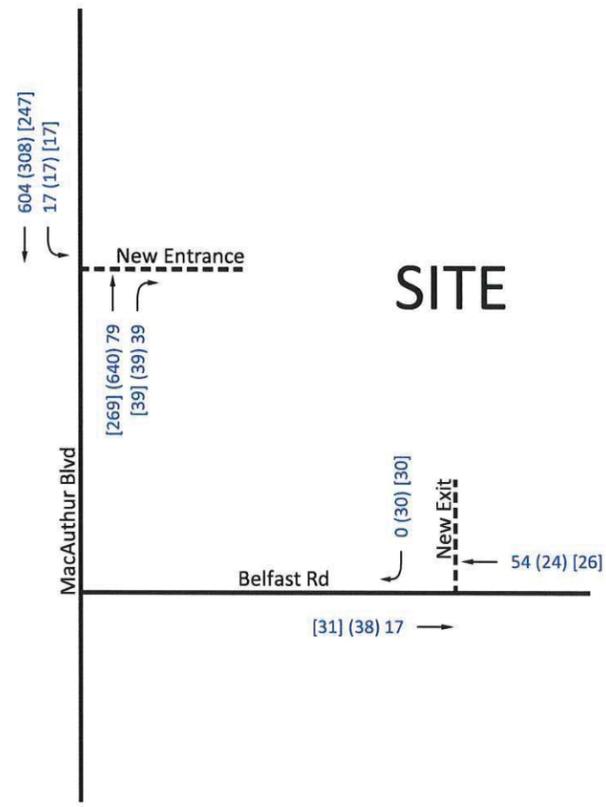
myc, 140615\initialtrip.xls-site, f10/02/14



NOT TO SCALE
 00 - MORNING PEAK HOUR
 (00) - EVENING PEAK HOUR
 [00] - WEEKEND PEAK HOUR

EXHIBIT 7
 TRIP ASSIGNMENT
 FOR SUBJECT SITE

myc, 140615_rockwood manor\initial\ex.dwg-stn, f10/2/2014



NOT TO SCALE

The Traffic Group logo

00 - MORNING PEAK HOUR
00 - EVENING PEAK HOUR
00 - WEEKEND PEAK HOUR

**EXHIBIT 8
TOTAL PEAK HOUR
TRAFFIC VOLUMES**

myc, 140615_rockwood manor\initial\ex.dwg-tot, f10/2/2014

CLV Analysis

Intersection	Total Traffic		
	AM Peak	PM Peak	Weekend Peak
MacArthur Blvd & New Entrance	A / 621	A / 696	A / 325
Belfast Rd & New Exit	A / 54	A / 54	A / 56

HCM Two-Lane Highway Analysis

Highway Segment	Total Traffic		
	AM Peak	PM Peak	Weekend Peak
MacArthur Blvd	V/C	V/C	V/C
from Belfast Rd/Site Entrance	0.41	0.46	0.21
North of Site Entrance	0.42	0.43	0.18
Belfast Rd			
From Site Exit to MacArthur Blvd	0.04	0.04	0.04

myc, 140615\initial\los.xls-results, f10/02/14

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APPENDIX A

Traffic Counts

The Traffic Group, Inc.
 9900 Franklin Square Drive Suite H
 Baltimore, MD 21236
 (800)583-8411

MacArthur Blvd
 North of Belfast Road
 Montgomery County, Maryland

Site Code: 000000100082
 Station ID: 000000ROCK2

Latitude: 0' 0.000 Undefined

Start Time	16-Jun-14		Tue		Wed		Thu		Fri		Weekday Average		Sat		Sun	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	*	*	*	*	*	*	6	3	10	4	4	8	12	7	17	26
01:00	*	*	*	*	*	*	6	1	7	4	4	6	7	2	7	7
02:00	*	*	*	*	*	*	1	4	2	4	4	2	4	3	3	6
03:00	*	*	*	*	*	*	3	2	1	1	2	2	2	0	0	5
04:00	*	*	*	*	*	*	4	12	0	11	2	2	4	5	2	4
05:00	*	*	*	*	*	*	11	72	12	67	12	12	11	11	11	9
06:00	*	*	*	*	*	*	37	334	32	259	34	296	22	33	22	29
07:00	*	*	*	*	*	*	69	648	79	490	74	569	63	51	48	44
08:00	*	*	*	*	*	*	110	579	126	408	118	494	92	77	79	71
09:00	*	*	*	*	*	*	117	311	127	254	122	282	132	116	155	97
10:00	*	*	*	*	*	*	127	142	133	160	130	151	123	115	214	133
11:00	*	*	*	*	*	*	139	125	162	154	150	140	141	136	163	157
12:00 PM	*	*	*	*	*	*	121	141	201	162	161	152	146	131	245	233
01:00	*	*	*	*	*	*	137	132	257	164	178	150	150	148	255	216
02:00	*	*	*	*	*	*	242	149	358	167	285	149	150	140	229	208
03:00	*	*	*	*	*	*	456	134	509	225	479	163	125	148	173	254
04:00	*	*	*	*	*	*	583	201	579	317	596	228	131	167	194	244
05:00	*	*	*	*	*	*	600	284	567	303	595	290	124	176	182	202
06:00	*	*	*	*	*	*	553	158	295	202	454	179	120	128	113	143
07:00	*	*	*	*	*	*	337	72	144	112	221	92	83	95	76	76
08:00	*	*	*	*	*	*	136	66	115	84	123	74	73	68	101	95
09:00	*	*	*	*	*	*	80	45	92	55	83	49	66	44	59	41
10:00	*	*	*	*	*	*	55	14	65	32	54	20	55	27	40	18
11:00	*	*	*	*	*	*	28	9	26	14	29	10	51	21	20	9
Total	0	0	0	0	3079	1275	3958	3638	3899	3653	3918	3582	1889	1859	2423	2313
Day	0	0	0	0	4354		7596		7552		7500		3748		4736	
AM Peak Vol.					16:00	17:00	11:00	07:00	11:00	07:00	11:00	07:00	11:00	11:00	10:00	11:00
PM Peak Vol.					6:25	2:82	6:00	2:84	5:79	3:17	5:96	2:90	1:50	1:76	2:55	2:54

The Traffic Group, Inc.
 9900 Franklin Square Drive Suite H
 Baltimore, MD 21236
 (800)583-8411

MacArthur Blvd
 North of Belfast Road
 Montgomery County, Maryland

Site Code: 000000100082
 Station ID: 000000ROCK2

Latitude: 0' 0.000 Undefined

Start Time	23-Jun-14		Tue		Wed		Thu		Fri		Weekday Average		Sat		Sun	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
12:00 AM	9	4	*	*	*	*	*	*	*	*	9	4	*	*	*	*
01:00	3	6	*	*	*	*	*	*	*	*	3	6	*	*	*	*
02:00	3	3	*	*	*	*	*	*	*	*	3	3	*	*	*	*
03:00	0	1	*	*	*	*	*	*	*	*	0	1	*	*	*	*
04:00	1	14	*	*	*	*	*	*	*	*	0	14	*	*	*	*
05:00	17	80	*	*	*	*	*	*	*	*	17	80	*	*	*	*
06:00	36	354	*	*	*	*	*	*	*	*	36	354	*	*	*	*
07:00	68	574	*	*	*	*	*	*	*	*	68	574	*	*	*	*
08:00	135	538	*	*	*	*	*	*	*	*	135	538	*	*	*	*
09:00	125	299	*	*	*	*	*	*	*	*	125	299	*	*	*	*
10:00	103	147	*	*	*	*	*	*	*	*	103	147	*	*	*	*
11:00	159	137	*	*	*	*	*	*	*	*	159	137	*	*	*	*
12:00 PM	156	130	*	*	*	*	*	*	*	*	156	130	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	815	2287	0	0	0	0	0	0	0	0	815	2287	0	0	0	0
Day	3102		0	0	0	0	0	0	0	0	3102		0	0	0	0
AM Peak Vol.	159	574									11:00	07:00				
PM Peak Vol.	156	130									12:00	12:00				
											159	574				
											156	130				

Comb. Total	3102	0	4354	7596	7552	10602	4736
ADT	ADT 6.202	0	ADT 6.202				

The Traffic Group, Inc.
 9900 Franklin Square Drive Suite H
 Baltimore, MD 21236
 (800)583-8411

Belfast Road
 East of MacArthur Blvd
 Montgomery County, Maryland

Site Code: 000000102043
 Station ID: 000000ROCK1

Latitude: 0' 0.000 Undefined

Start Time	16-Jun-14		Tue		Wed		Thu		Fri		Weekday Average		Sat		Sun		
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	
12:00 AM	*	*	*	*	*	*	*	*	*	*	*	2	0	6	0	5	0
01:00	*	*	*	*	*	*	1	0	0	1	0	0	0	0	0	2	4
02:00	*	*	*	*	*	*	1	0	1	0	0	1	0	0	0	2	1
03:00	*	*	*	*	*	*	1	0	0	0	0	0	1	0	0	2	2
04:00	*	*	*	*	*	*	0	1	1	0	0	0	0	0	0	0	2
05:00	*	*	*	*	*	*	0	1	1	0	0	0	0	0	0	0	2
06:00	*	*	*	*	*	*	5	5	3	11	2	8	2	2	1	1	1
07:00	*	*	*	*	*	*	19	19	2	14	4	16	1	1	0	2	2
08:00	*	*	*	*	*	*	38	38	16	34	13	36	4	4	0	4	10
09:00	*	*	*	*	*	*	46	46	13	61	17	54	10	10	6	16	16
10:00	*	*	*	*	*	*	35	35	17	30	21	32	12	12	12	32	32
11:00	*	*	*	*	*	*	31	31	18	31	27	33	13	13	31	26	26
12:00 PM	*	*	*	*	*	*	30	30	27	31	31	30	17	17	24	23	25
01:00	*	*	*	*	*	*	31	31	31	31	30	30	36	36	29	23	25
02:00	*	*	*	*	*	*	49	49	25	21	40	34	35	35	31	25	16
03:00	*	*	*	*	*	*	78	78	32	41	48	48	21	21	22	26	28
04:00	*	*	*	*	*	*	21	21	30	40	28	28	31	31	30	30	25
05:00	*	*	*	*	*	*	39	39	35	27	28	26	35	35	29	35	25
06:00	*	*	*	*	*	*	21	21	41	25	24	24	44	44	22	25	32
07:00	*	*	*	*	*	*	42	42	36	25	38	23	31	31	22	32	15
08:00	*	*	*	*	*	*	41	41	26	16	34	16	17	17	19	21	20
09:00	*	*	*	*	*	*	27	27	14	8	27	12	23	23	17	33	14
10:00	*	*	*	*	*	*	19	19	5	19	12	8	22	22	17	23	14
11:00	*	*	*	*	*	*	4	4	5	24	5	5	17	17	10	11	8
Total	0	0	0	0	0	0	433	439	434	449	450	463	388	392	364	354	718
Day	0	0	0	0	0	0	872	883	883	913	913	913	780	780	718	718	354
AM Peak Vol.							11:00	08:00	11:00	08:00	11:00	08:00	11:00	10:00	11:00	10:00	10:00
PM Peak Vol.							18:00	13:00	17:00	13:00	14:00	14:00	17:00	13:00	16:00	16:00	17:00
							36	32	41	40	48	48	44	31	35	32	32

The Traffic Group, Inc.
 9900 Franklin Square Drive Suite H
 Baltimore, MD 21236
 (800)583-8411

Belfast Road
 East of MacArthur Blvd
 Montgomery County, Maryland

Site Code: 000000102043
 Station ID: 000000ROCK1

Latitude: 0' 0.000 Undefined

Start Time	23-Jun-14		Tue		Wed		Thu		Fri		Weekday Average		Sat		Sun	
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
12:00 AM	3	2	*	*	*	*	*	*	*	*	3	2	*	*	*	*
01:00	0	0	*	*	*	*	*	*	*	*	0	0	*	*	*	*
02:00	1	0	*	*	*	*	*	*	*	*	1	0	*	*	*	*
03:00	0	0	*	*	*	*	*	*	*	*	0	0	*	*	*	*
04:00	0	2	*	*	*	*	*	*	*	*	0	2	*	*	*	*
05:00	1	8	*	*	*	*	*	*	*	*	1	8	*	*	*	*
06:00	3	18	*	*	*	*	*	*	*	*	3	18	*	*	*	*
07:00	15	44	*	*	*	*	*	*	*	*	15	44	*	*	*	*
08:00	14	57	*	*	*	*	*	*	*	*	14	57	*	*	*	*
09:00	16	36	*	*	*	*	*	*	*	*	16	36	*	*	*	*
10:00	20	29	*	*	*	*	*	*	*	*	20	29	*	*	*	*
11:00	28	22	*	*	*	*	*	*	*	*	28	22	*	*	*	*
12:00 PM	24	28	*	*	*	*	*	*	*	*	24	28	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	125	246	0	0	0	0	0	0	0	0	125	246	0	0	0	0
Day	125	371	0	0	0	0	0	0	0	0	371	371	0	0	0	0
AM Peak Vol.	28	57									11:00	08:00				
PM Peak Vol.	24	28									12:00	12:00				
	24	28									24	28				

Comb. Total	371	0	613	872	883	1284	718
ADT	ADT 842						

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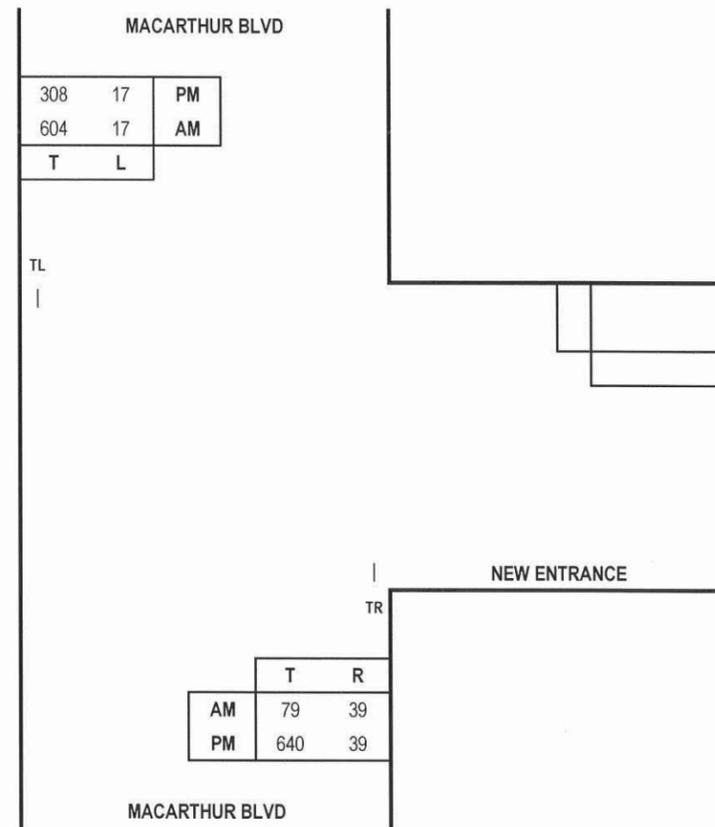
APPENDIX B

Capacity Analysis Worksheets

CRITICAL LANE VOLUME (CLV) METHODOLOGY for Montgomery County

E/W Road: New Entrance
N/S Road: Macarthur Blvd
Conditions: Total Traffic

Date of Count:
Day of Count:
Analyst: Ming-Yu Chien



Capacity Analysis

Dir	Morning Peak Hour			AM CLV
	Thru Volumes		+ Opposing Lefts	
	VOL	x LUF = Total	VOL x LUF = Total	
WB	0	0.00	0	0
NB	118	1.00	118	621
SB	621	1.00	621	
CLV TOTAL=				621

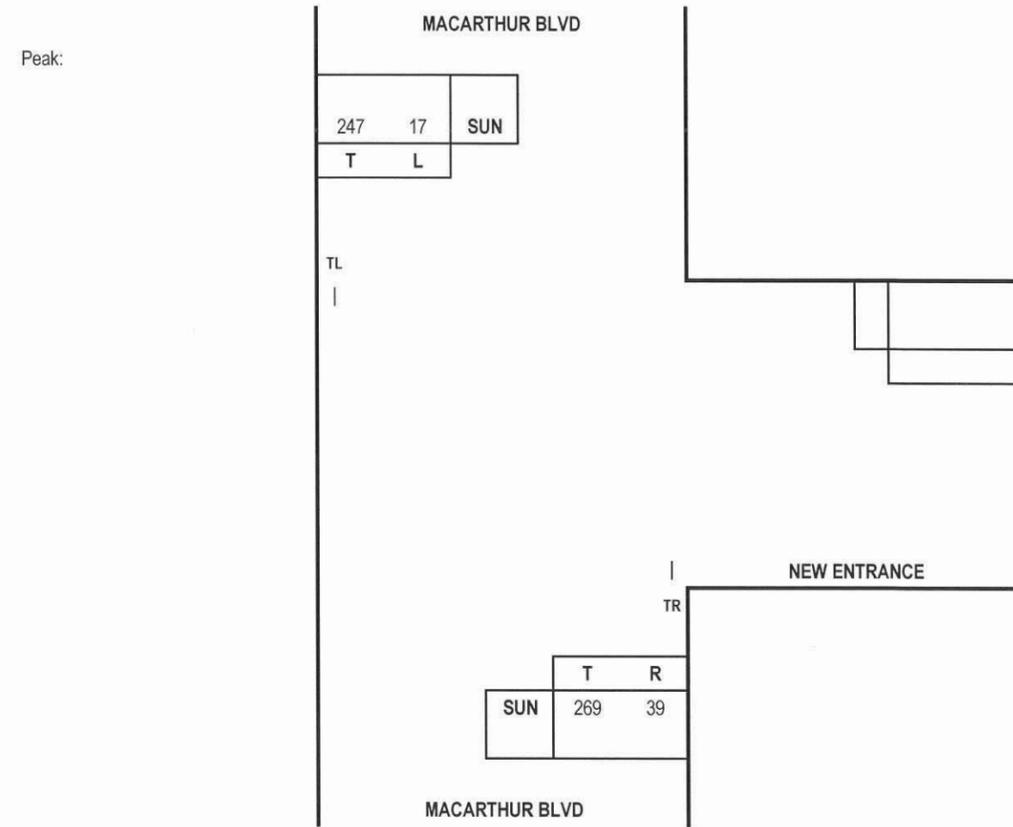
Dir	Evening Peak Hour			PM CLV
	Thru Volumes		+ Opposing Lefts	
	VOL	x LUF = Total	VOL x LUF = Total	
WB	0	0.00	0	0
NB	679	1.00	679	696
SB	325	1.00	325	
CLV TOTAL=				696

Scenario ID - TOT1

CRITICAL LANE VOLUME (CLV) METHODOLOGY for Montgomery County

E/W Road: New Entrance
N/S Road: Macarthur Blvd
Conditions: Total Traffic

Date of Count:
Day of Count:
Analyst: Ming-Yu Chien



Capacity Analysis

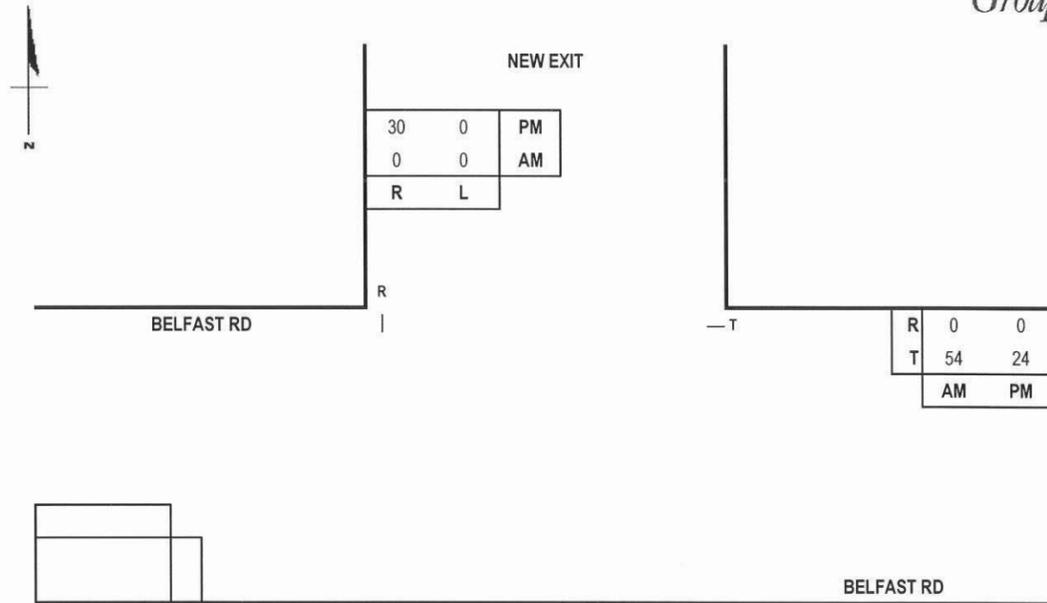
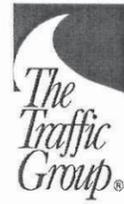
Dir	Weekend Peak Hour			SUN CLV
	Thru Volumes		+ Opposing Lefts	
	VOL	x LUF = Total	VOL x LUF = Total	
WB	0	0.00	0	0
NB	308	1.00	308	325
SB	264	1.00	264	
CLV TOTAL=				325

Scenario ID - TOT1

CRITICAL LANE VOLUME (CLV) METHODOLOGY for Montgomery County

E/W Road: Belfast Rd
N/S Road: New Exit
Conditions: Total Traffic

Date of Count:
Day of Count:
Analyst: Ming-Yu Chien



Capacity Analysis

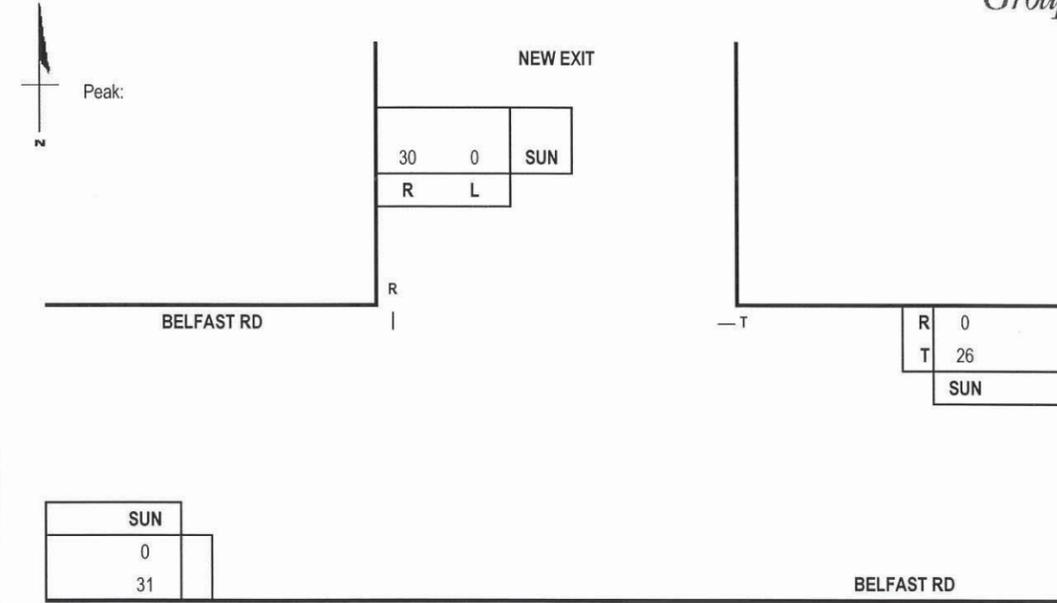
Morning Peak Hour							Evening Peak Hour								
Dir	Thru Volumes			+ Opposing Lefts			AM CLV	Dir	Thru Volumes			+ Opposing Lefts			PM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total			VOL	x LUF	= Total	VOL	x LUF	= Total	
SB	0	1.00	0				0	SB	30	1.00	30				30
WB	54	1.00	54	0	0.00	0	54	WB	24	1.00	24	0	0.00	0	24
CLV TOTAL=							54	CLV TOTAL=							54

Scenario ID - TOT2

CRITICAL LANE VOLUME (CLV) METHODOLOGY for Montgomery County

E/W Road: Belfast Rd
N/S Road: New Exit
Conditions: Total Traffic

Date of Count:
Day of Count:
Analyst: Ming-Yu Chien



Capacity Analysis

Weekend Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			SUN CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
SB	30	1.00	30				30
WB	26	1.00	26	0	0.00	0	26
CLV TOTAL=							56

Scenario ID - TOT2

DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst Agency or Company Date Performed Analysis Time Period	RH The Traffic Grop, Inc. 7/3/2014 AM Peak	Highway / Direction of Travel From/To Jurisdiction Analysis Year	MacAuthur Blvd Belfast Rd/Entrance Montgomery County, MD Total
Project Description: Rockwood Manor			
Input Data			
		<input type="checkbox"/> Class I highway <input checked="" type="checkbox"/> Class II highway Terrain <input checked="" type="checkbox"/> Level <input type="checkbox"/> Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 100% % Trucks and Buses, P _T 5% % Recreational vehicles, P _R 5% Access points/ mi 0	
Analysis direction vol., V _d 604veh/h Opposing direction vol., V _o 118veh/h		Segment length, L _i _____ mi	
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-9 or 20-15)	1.1	1.7	
Passenger-car equivalents for RVs, E _R (Exhibit 20-9 or 20-17)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	0.995	0.966	
Grade adjustment factor ¹ , f _G (Exhibit 20-7 or 20-13)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHF*f _{HV} *f _G)	690	139	
Free-Flow Speed from Field Measurement			
Field measured speed ³ , S _{FM} mi/h	Base free-flow speed ³ , BFFS _{FM} 45.0 mi/h		
Observed volume ³ , V _i veh/h	Adj. for lane width and shoulder width ³ f _{LS} (Exh 20-5) 2.6 mi/h		
Free-flow speed, FFS _d FFS=S _{FM} +0.00776(V _i /f _{HV}) mi/h	Adj. for access points ³ , f _A (Exhibit 20-5) 0.0 mi/h		
Adjustment for no-passing zones, f _{np} (Exhibit 20-19) 3.0 mi/h	Free-flow speed, FFS _d (FSS=BFFS-f _{LS} -f _A) 42.4 mi/h		
	Average travel speed, ATS=FFS-0.00776V _p -f _{np} 32.9 mi/h		
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-10 or 20-16)	1.0	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 20-10 or 20-16)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	1.000	0.995	
Grade adjustment factor ¹ , f _G (Exhibit 20-8 or 20-14)	1.00	1.00	
Directional flow rate ² , v _i (pc/h)=V _i /(PHF*f _{HV} *f _G)	686	135	
Base percent time-spent-following ⁴ , BPTSF(%)=100(1-e ^{-avd^b})			55.3
Adj. for no-passing zone, f _{np} (Exhibit 20-20)			26.1
Percent time-spent-following, PTSF(%)=BPTSF+f _{np}			77.1
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 20-3 or 20-4)			D
Volume to capacity ratio, v/c=V _p /1,700			0.41
Peak 15-min veh-miles of travel, VMT ₁₅ (veh- mi)=0.25L _i (V/PHF)			17
Peak-hour vehicle-miles of travel, VMT ₆₀ (veh- mi)=V*L _i			60
Peak 15-min total travel time, TT ₁₅ (veh-h)=VMT ₁₅ /ATS			0.5
Notes			
1. If the highway is extended segment (level) or rolling terrain, f _G =1.0 .			
2. If v _i (v _d or v _o) >=1,700 pc/h, terminate analysis--the LOS is F.			
3. For the analysis direction only.			
4. Exhibit 20-21 provides factors a and b.			
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.			

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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst Agency or Company Date Performed Analysis Time Period	RH The Traffic Grop, Inc. 7/3/2014 PM Peak	Highway / Direction of Travel From/To Jurisdiction Analysis Year	MacAuthur Blvd Belfast Rd/Entrance Montgomery County, MD Total
Project Description: Rockwood Manor			
Input Data			
		<input type="checkbox"/> Class I highway <input checked="" type="checkbox"/> Class II highway Terrain <input checked="" type="checkbox"/> Level <input type="checkbox"/> Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 100% % Trucks and Buses, P _T 5% % Recreational vehicles, P _R 5% Access points/ mi 0	
Analysis direction vol., V _d 679veh/h Opposing direction vol., V _o 308veh/h		Segment length, L _i _____ mi	
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-9 or 20-15)	1.1	1.2	
Passenger-car equivalents for RVs, E _R (Exhibit 20-9 or 20-17)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	0.995	0.990	
Grade adjustment factor ¹ , f _G (Exhibit 20-7 or 20-13)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHF*f _{HV} *f _G)	775	354	
Free-Flow Speed from Field Measurement			
Field measured speed ³ , S _{FM} mi/h	Base free-flow speed ³ , BFFS _{FM} 45.0 mi/h		
Observed volume ³ , V _i veh/h	Adj. for lane width and shoulder width ³ f _{LS} (Exh 20-5) 2.6 mi/h		
Free-flow speed, FFS _d FFS=S _{FM} +0.00776(V _i /f _{HV}) mi/h	Adj. for access points ³ , f _A (Exhibit 20-5) 0.0 mi/h		
Adjustment for no-passing zones, f _{np} (Exhibit 20-19) 3.0 mi/h	Free-flow speed, FFS _d (FSS=BFFS-f _{LS} -f _A) 42.4 mi/h		
	Average travel speed, ATS=FFS-0.00776V _p -f _{np} 30.6 mi/h		
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-10 or 20-16)	1.0	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 20-10 or 20-16)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	1.000	0.995	
Grade adjustment factor ¹ , f _G (Exhibit 20-8 or 20-14)	1.00	1.00	
Directional flow rate ² , v _i (pc/h)=V _i /(PHF*f _{HV} *f _G)	772	352	
Base percent time-spent-following ⁴ , BPTSF(%)=100(1-e ^{-avd^b})			63.4
Adj. for no-passing zone, f _{np} (Exhibit 20-20)			28.9
Percent time-spent-following, PTSF(%)=BPTSF+f _{np}			83.3
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 20-3 or 20-4)			D
Volume to capacity ratio, v/c=V _p /1,700			0.46
Peak 15-min veh-miles of travel, VMT ₁₅ (veh- mi)=0.25L _i (V/PHF)			19
Peak-hour vehicle-miles of travel, VMT ₆₀ (veh- mi)=V*L _i			68
Peak 15-min total travel time, TT ₁₅ (veh-h)=VMT ₁₅ /ATS			0.6
Notes			
1. If the highway is extended segment (level) or rolling terrain, f _G =1.0 .			
2. If v _i (v _d or v _o) >=1,700 pc/h, terminate analysis--the LOS is F.			
3. For the analysis direction only.			
4. Exhibit 20-21 provides factors a and b.			
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.			

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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET		
General Information		Site Information
Analyst Agency or Company Date Performed Analysis Time Period	RH The Traffic Grop, Inc. 7/3/2014 Weekend Peak	Highway / Direction of Travel From/To Jurisdiction Analysis Year
Project Description: Rockwood Manor		MacAuthur Blvd Belfast Rd/Entrance Montgomery County, MD Total
Input Data		
		<input type="checkbox"/> Class I highway <input checked="" type="checkbox"/> Class II highway Terrain <input checked="" type="checkbox"/> Level <input type="checkbox"/> Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 100% % Trucks and Buses, P _T 5% % Recreational vehicles, P _R 5% Access points/ mi 0
Analysis direction vol., V _d	308veh/h	
Opposing direction vol., V _o	247veh/h	
Average Travel Speed		
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 20-9 or 20-15)	1.2	1.7
Passenger-car equivalents for RVs, E _R (Exhibit 20-9 or 20-17)	1.0	1.0
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	0.990	0.966
Grade adjustment factor ¹ , f _G (Exhibit 20-7 or 20-13)	1.00	1.00
Directional flow rate ² , v _d (pc/h) v _d =V _d /(PHF*f _{HV} *f _G)	354	291
Free-Flow Speed from Field Measurement		
Estimated Free-Flow Speed		
Field measured speed ³ , S _{FM}	mi/h	Base free-flow speed ³ , BFFS _{FM} 45.0 mi/h
Observed volume ³ , V _f	veh/h	Adj. for lane width and shoulder width ³ , f _{LS} (Exh 20-5) 2.6 mi/h
Free-flow speed, FFS _d FFS=S _{FM} +0.00776(V _f /f _{HV})	mi/h	Adj. for access points ³ , f _A (Exhibit 20-5) 0.0 mi/h
Adjustment for no-passing zones, f _{np} (Exhibit 20-19)	3.4 mi/h	Free-flow speed, FFS _d (FSS=BFFS-f _{LS} -f _A) 42.4 mi/h
		Average travel speed, ATS=FFS-0.00776v _d -f _{np} 34.0 mi/h
Percent Time-Spent-Following		
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 20-10 or 20-16)	1.1	1.1
Passenger-car equivalents for RVs, E _R (Exhibit 20-10 or 20-16)	1.0	1.0
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	0.995	0.995
Grade adjustment factor ¹ , f _G (Exhibit 20-8 or 20-14)	1.00	1.00
Directional flow rate ² , v _d (pc/h)=V _d /(PHF*f _{HV} *f _G)	352	282
Base percent time-spent-following ⁴ , BPTSF(%)=100(1-e ^{-av_d^b})		36.9
Adj. for no-passing zone, f _{np} (Exhibit. 20-20)		53.4
Percent time-spent-following, PTSF(%)=BPTSF+f _{np}		66.6
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 20-3 or 20-4)		C
Volume to capacity ratio, v/c=V _d /1,700		0.21
Peak 15-min veh-miles of travel, VMT ₁₅ (veh- mi)=0.25L _d (V/PHF)		9
Peak-hour vehicle-miles of travel, VMT ₆₀ (veh- mi)=V*L _d		31
Peak 15-min total travel time, TT ₁₅ (veh-h)=VMT ₁₅ /ATS		0.3
Notes		
1. If the highway is extended segment (level) or rolling terrain, f _G =1.0. 2. If v _d (V _d or v _o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only. 4. Exhibit 20-21 provides factors a and b. 5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.		

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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET		
General Information		Site Information
Analyst Agency or Company Date Performed Analysis Time Period	RH The Traffic Grop, Inc. 7/3/2014 AM Peak	Highway / Direction of Travel From/To Jurisdiction Analysis Year
Project Description: Rockwood Manor		MacAuthur Blvd North of Entrance Montgomery County, MD Total
Input Data		
		<input type="checkbox"/> Class I highway <input checked="" type="checkbox"/> Class II highway Terrain <input type="checkbox"/> Level <input type="checkbox"/> Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 100% % Trucks and Buses, P _T 5% % Recreational vehicles, P _R 5% Access points/ mi 0
Analysis direction vol., V _d	621veh/h	
Opposing direction vol., V _o	79veh/h	
Average Travel Speed		
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 20-9 or 20-15)	1.1	1.7
Passenger-car equivalents for RVs, E _R (Exhibit 20-9 or 20-17)	1.0	1.0
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	0.995	0.966
Grade adjustment factor ¹ , f _G (Exhibit 20-7 or 20-13)	1.00	1.00
Directional flow rate ² , v _d (pc/h) v _d =V _d /(PHF*f _{HV} *f _G)	709	93
Free-Flow Speed from Field Measurement		
Estimated Free-Flow Speed		
Field measured speed ³ , S _{FM}	mi/h	Base free-flow speed ³ , BFFS _{FM} 45.0 mi/h
Observed volume ³ , V _f	veh/h	Adj. for lane width and shoulder width ³ , f _{LS} (Exh 20-5) 2.6 mi/h
Free-flow speed, FFS _d FFS=S _{FM} +0.00776(V _f /f _{HV})	mi/h	Adj. for access points ³ , f _A (Exhibit 20-5) 0.0 mi/h
Adjustment for no-passing zones, f _{np} (Exhibit 20-19)	2.4 mi/h	Free-flow speed, FFS _d (FSS=BFFS-f _{LS} -f _A) 42.4 mi/h
		Average travel speed, ATS=FFS-0.00776v _d -f _{np} 33.8 mi/h
Percent Time-Spent-Following		
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E _T (Exhibit 20-10 or 20-16)	1.0	1.1
Passenger-car equivalents for RVs, E _R (Exhibit 20-10 or 20-16)	1.0	1.0
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	1.000	0.995
Grade adjustment factor ¹ , f _G (Exhibit 20-8 or 20-14)	1.00	1.00
Directional flow rate ² , v _d (pc/h)=V _d /(PHF*f _{HV} *f _G)	706	90
Base percent time-spent-following ⁴ , BPTSF(%)=100(1-e ^{-av_d^b})		56.3
Adj. for no-passing zone, f _{np} (Exhibit. 20-20)		21.9
Percent time-spent-following, PTSF(%)=BPTSF+f _{np}		75.7
Level of Service and Other Performance Measures		
Level of service, LOS (Exhibit 20-3 or 20-4)		D
Volume to capacity ratio, v/c=V _d /1,700		0.42
Peak 15-min veh-miles of travel, VMT ₁₅ (veh- mi)=0.25L _d (V/PHF)		18
Peak-hour vehicle-miles of travel, VMT ₆₀ (veh- mi)=V*L _d		62
Peak 15-min total travel time, TT ₁₅ (veh-h)=VMT ₁₅ /ATS		0.5
Notes		
1. If the highway is extended segment (level) or rolling terrain, f _G =1.0. 2. If v _d (V _d or v _o) >=1,700 pc/h, terminate analysis--the LOS is F. 3. For the analysis direction only. 4. Exhibit 20-21 provides factors a and b. 5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.		

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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst Agency or Company Date Performed Analysis Time Period	RH The Traffic Grop, Inc. 7/3/2014 Weekend Peak	Highway / Direction of Travel From/To Jurisdiction Analysis Year	MacAuthur Blvd North of Entrance Montgomery County, MD Total
Project Description: Rockwood Manor			
Input Data			
		<input type="checkbox"/> Class I highway <input checked="" type="checkbox"/> Class II highway Terrain <input checked="" type="checkbox"/> Level <input type="checkbox"/> Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 100% % Trucks and Buses, P _T 5% % Recreational vehicles, P _R 5% Access points/ mi 0	
Analysis direction vol., V _d 269veh/h Opposing direction vol., V _o 264veh/h		Segment length, L ₁ _____ mi	
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-9 or 20-15)	1.2	1.2	
Passenger-car equivalents for RVs, E _R (Exhibit 20-9 or 20-17)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	0.990	0.990	
Grade adjustment factor ¹ , f _G (Exhibit 20-7 or 20-13)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHF*f _{HV} *f _G)	309	303	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field measured speed ³ , S _{FM} mi/h		Base free-flow speed ³ , BFFS _{FM}	45.0 mi/h
Observed volume ³ , V _i veh/h		Adj. for lane width and shoulder width ³ , f _{LS} (Exh 20-5)	2.6 mi/h
Free-flow speed, FFS _d FFS=S _{FM} +0.00776(V _i /f _{HV}) mi/h		Adj. for access points ³ , f _A (Exhibit 20-5)	0.0 mi/h
Adjustment for no-passing zones, f _{np} (Exhibit 20-19) 3.3 mi/h		Free-flow speed, FFS _d (FSS=BFFS-f _{LS} -f _A)	42.4 mi/h
		Average travel speed, ATS=FFS-0.00776v _p -f _{np}	34.3 mi/h
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-10 or 20-16)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 20-10 or 20-16)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	0.995	0.995	
Grade adjustment factor ¹ , f _G (Exhibit 20-8 or 20-14)	1.00	1.00	
Directional flow rate ² , v _i (pc/h)=V _i /(PHF*f _{HV} *f _G)	307	302	
Base percent time-spent-following ⁴ , BPTSF(%)=100(1-e ^{-av_d})		33.7	
Adj. for no-passing zone, f _{np} (Exhibit. 20-20)		56.3	
Percent time-spent-following, PTSF(%)=BPTSF+f _{np}		62.1	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 20-3 or 20-4)		C	
Volume to capacity ratio, v/c=V _p /1,700		0.18	
Peak 15-min veh-miles of travel, VMT ₁₅ (veh- mi)=0.25L ₁ (V/PHF)		8	
Peak-hour vehicle-miles of travel, VMT ₆₀ (veh- mi)=V*L ₁		27	
Peak 15-min total travel time, TT ₁₅ (veh-h)=VMT ₁₅ /ATS		0.2	
Notes			
1. If the highway is extended segment (level) or rolling terrain, f _G =1.0 .			
2. If v _i (V _d or v _o) >=1,700 pc/h, terminate analysis--the LOS is F.			
3. For the analysis direction only.			
4. Exhibit 20-21 provides factors a and b.			
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.			

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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst Agency or Company Date Performed Analysis Time Period	RH The Traffic Grop, Inc. 7/3/2014 AM Peak	Highway / Direction of Travel From/To Jurisdiction Analysis Year	Belfast Rd Site Exit/MacAuthur Blvd Montgomery County, MD Total
Project Description: Rockwood Manor			
Input Data			
		<input type="checkbox"/> Class I highway <input checked="" type="checkbox"/> Class II highway Terrain <input checked="" type="checkbox"/> Level <input type="checkbox"/> Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 100% % Trucks and Buses, P _T 5% % Recreational vehicles, P _R 5% Access points/ mi 0	
Analysis direction vol., V _d 54veh/h Opposing direction vol., V _o 17veh/h		Segment length, L ₁ _____ mi	
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-9 or 20-15)	1.7	1.7	
Passenger-car equivalents for RVs, E _R (Exhibit 20-9 or 20-17)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	0.966	0.966	
Grade adjustment factor ¹ , f _G (Exhibit 20-7 or 20-13)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHF*f _{HV} *f _G)	64	20	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field measured speed ³ , S _{FM} mi/h		Base free-flow speed ³ , BFFS _{FM}	45.0 mi/h
Observed volume ³ , V _i veh/h		Adj. for lane width and shoulder width ³ , f _{LS} (Exh 20-5)	4.2 mi/h
Free-flow speed, FFS _d FFS=S _{FM} +0.00776(V _i /f _{HV}) mi/h		Adj. for access points ³ , f _A (Exhibit 20-5)	0.0 mi/h
Adjustment for no-passing zones, f _{np} (Exhibit 20-19) 2.4 mi/h		Free-flow speed, FFS _d (FSS=BFFS-f _{LS} -f _A)	40.8 mi/h
		Average travel speed, ATS=FFS-0.00776v _p -f _{np}	37.7 mi/h
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-10 or 20-16)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 20-10 or 20-16)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	0.995	0.995	
Grade adjustment factor ¹ , f _G (Exhibit 20-8 or 20-14)	1.00	1.00	
Directional flow rate ² , v _i (pc/h)=V _i /(PHF*f _{HV} *f _G)	62	19	
Base percent time-spent-following ⁴ , BPTSF(%)=100(1-e ^{-av_d})		7.5	
Adj. for no-passing zone, f _{np} (Exhibit. 20-20)		48.2	
Percent time-spent-following, PTSF(%)=BPTSF+f _{np}		44.4	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 20-3 or 20-4)		B	
Volume to capacity ratio, v/c=V _p /1,700		0.04	
Peak 15-min veh-miles of travel, VMT ₁₅ (veh- mi)=0.25L ₁ (V/PHF)		2	
Peak-hour vehicle-miles of travel, VMT ₆₀ (veh- mi)=V*L ₁		5	
Peak 15-min total travel time, TT ₁₅ (veh-h)=VMT ₁₅ /ATS		0.1	
Notes			
1. If the highway is extended segment (level) or rolling terrain, f _G =1.0 .			
2. If v _i (V _d or v _o) >=1,700 pc/h, terminate analysis--the LOS is F.			
3. For the analysis direction only.			
4. Exhibit 20-21 provides factors a and b.			
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.			

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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst Agency or Company Date Performed Analysis Time Period	RH The Traffic Grop, Inc. 7/3/2014 PM Peak	Highway / Direction of Travel From/To Jurisdiction Analysis Year	Belfast Rd Site Exit/MacAuthur Blvd Montgomery County, MD Total
Project Description: Rockwood Manor			
Input Data			
		<input type="checkbox"/> Class I highway <input checked="" type="checkbox"/> Class II highway Terrain <input checked="" type="checkbox"/> Level <input type="checkbox"/> Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 100% % Trucks and Buses, P _T 5% % Recreational vehicles, P _R 5% Access points/ mi 0	
Analysis direction vol., V _d 54veh/h Opposing direction vol., V _o 38veh/h		Show North Arrow	
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-9 or 20-15)	1.7	1.7	
Passenger-car equivalents for RVs, E _R (Exhibit 20-9 or 20-17)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	0.966	0.966	
Grade adjustment factor ¹ , f _G (Exhibit 20-7 or 20-13)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHF*f _{HV} *f _G)	64	45	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field measured speed ³ , S _{FM} mi/h		Base free-flow speed ³ , BFFS _{FM}	45.0 mi/h
Observed volume ³ , V _f veh/h		Adj. for lane width and shoulder width ³ f _{LS} (Exh 20-5)	4.2 mi/h
Free-flow speed, FFS _d FFS=S _{FM} +0.00776(V _f /f _{HV}) mi/h		Adj. for access points ³ , f _A (Exhibit 20-5)	0.0 mi/h
Adjustment for no-passing zones, f _{np} (Exhibit 20-19) 2.4 mi/h		Free-flow speed, FFS _d (FSS=BFFS-f _{LS} -f _A)	40.8 mi/h
		Average travel speed, ATS=FFS-0.00776v _p -f _{np}	37.6 mi/h
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-10 or 20-16)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 20-10 or 20-16)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	0.995	0.995	
Grade adjustment factor ¹ , f _G (Exhibit 20-8 or 20-14)	1.00	1.00	
Directional flow rate ² , v _i (pc/h)=V _i /(PHF*f _{HV} *f _G)	62	43	
Base percent time-spent-following ⁴ , BPTSF(%)=100(1-e ^{-av_d^b})		7.5	
Adj. for no-passing zone, f _{np} (Exhibit. 20-20)		53.4	
Percent time-spent-following, PTSF(%)=BPTSF+f _{np}		39.0	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 20-3 or 20-4)		A	
Volume to capacity ratio, v/c=V _p /1,700		0.04	
Peak 15-min veh-miles of travel, VMT ₁₅ (veh- mi)=0.25L ₁ (V/PHF)		2	
Peak-hour vehicle-miles of travel, VMT ₆₀ (veh- mi)=V*L ₁		5	
Peak 15-min total travel time, TT ₁₅ (veh-h)=VMT ₁₅ /ATS		0.1	
Notes			
1. If the highway is extended segment (level) or rolling terrain, f _G =1.0 .			
2. If v _i (V _d or V _o) >=1,700 pc/h, terminate analysis--the LOS is F.			
3. For the analysis direction only.			
4. Exhibit 20-21 provides factors a and b.			
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.			

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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst Agency or Company Date Performed Analysis Time Period	RH The Traffic Grop, Inc. 7/3/2014 Weekend Peak	Highway / Direction of Travel From/To Jurisdiction Analysis Year	Belfast Rd Site Exit/MacAuthur Blvd Montgomery County, MD Total
Project Description: Rockwood Manor			
Input Data			
		<input type="checkbox"/> Class I highway <input checked="" type="checkbox"/> Class II highway Terrain <input checked="" type="checkbox"/> Level <input type="checkbox"/> Rolling Grade Length mi Up/down Peak-hour factor, PHF 0.88 No-passing zone 100% % Trucks and Buses, P _T 5% % Recreational vehicles, P _R 5% Access points/ mi 0	
Analysis direction vol., V _d 56veh/h Opposing direction vol., V _o 31veh/h		Show North Arrow	
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-9 or 20-15)	1.7	1.7	
Passenger-car equivalents for RVs, E _R (Exhibit 20-9 or 20-17)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	0.966	0.966	
Grade adjustment factor ¹ , f _G (Exhibit 20-7 or 20-13)	1.00	1.00	
Directional flow rate ² , v _i (pc/h) v _i =V _i /(PHF*f _{HV} *f _G)	66	36	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field measured speed ³ , S _{FM} mi/h		Base free-flow speed ³ , BFFS _{FM}	45.0 mi/h
Observed volume ³ , V _f veh/h		Adj. for lane width and shoulder width ³ f _{LS} (Exh 20-5)	4.2 mi/h
Free-flow speed, FFS _d FFS=S _{FM} +0.00776(V _f /f _{HV}) mi/h		Adj. for access points ³ , f _A (Exhibit 20-5)	0.0 mi/h
Adjustment for no-passing zones, f _{np} (Exhibit 20-19) 2.4 mi/h		Free-flow speed, FFS _d (FSS=BFFS-f _{LS} -f _A)	40.8 mi/h
		Average travel speed, ATS=FFS-0.00776v _p -f _{np}	37.6 mi/h
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-10 or 20-16)	1.1	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 20-10 or 20-16)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} =1/(1+P _T (E _T -1)+P _R (E _R -1))	0.995	0.995	
Grade adjustment factor ¹ , f _G (Exhibit 20-8 or 20-14)	1.00	1.00	
Directional flow rate ² , v _i (pc/h)=V _i /(PHF*f _{HV} *f _G)	64	35	
Base percent time-spent-following ⁴ , BPTSF(%)=100(1-e ^{-av_d^b})		7.7	
Adj. for no-passing zone, f _{np} (Exhibit. 20-20)		51.2	
Percent time-spent-following, PTSF(%)=BPTSF+f _{np}		40.8	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 20-3 or 20-4)		B	
Volume to capacity ratio, v/c=V _p /1,700		0.04	
Peak 15-min veh-miles of travel, VMT ₁₅ (veh- mi)=0.25L ₁ (V/PHF)		2	
Peak-hour vehicle-miles of travel, VMT ₆₀ (veh- mi)=V*L ₁		6	
Peak 15-min total travel time, TT ₁₅ (veh-h)=VMT ₁₅ /ATS		0.1	
Notes			
1. If the highway is extended segment (level) or rolling terrain, f _G =1.0 .			
2. If v _i (V _d or V _o) >=1,700 pc/h, terminate analysis--the LOS is F.			
3. For the analysis direction only.			
4. Exhibit 20-21 provides factors a and b.			
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.			

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MONTGOMERY COUNTY, MARYLAND
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION
DEPARTMENT OF PERMITTING SERVICES

SIGHT DISTANCE EVALUATION

Facility/Subdivision Name: Rockwood Manor Preliminary Plan Number: 1-

Street Name: Belfast Road Master Plan Road Classification: Tertiary

Posted Speed Limit: 25 mph

Street/Driveway #1 (Alternative 'A') Street/Driveway #2 (Alternative 'B')

Sight Distance (feet)	OK?	Sight Distance (feet)	OK?
Right <u>219*</u>	<u>YES</u>	Right <u>312*</u>	<u>YES</u>
Left <u>263</u>	<u>YES</u>	Left <u>150</u>	<u>YES</u>

Comments: *Right sight distance is based on the distance to Mc Carthur Blvd flowline.

Comments: Low hanging limbs toward the left should be trimmed back. *Right sight distance is based on the distance to McCarthur Blvd flowline.

GUIDELINES

Classification or Posted Speed (use higher value)	Required Sight Distance in Each Direction*
Tertiary - 25 mph	150'
Secondary - 30	200'
Business - 30	200'
Primary - 35	250'
Arterial - 40	325'
	(45) 400'
Major - 50	475'
	(55) 550'

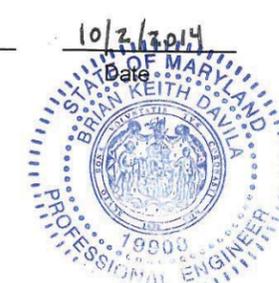
Sight distance is measured from an eye height of 3.5' at a point on the centerline of the driveway (or side street) 6' back from the face of curb or edge of traveled way of the intersecting roadway where a point 2.75' above the road surface is visible. (See attached drawing)

*Source: AASHTO

ENGINEER/ SURVEYOR CERTIFICATE

I hereby certify that this information is accurate and was collected in accordance with these guidelines.

Signature: [Signature]
Date: 10/2/2014
19908
PLS/P.E. MD Reg. No.



Montgomery County Review:

Approved

Disapproved:

By: _____

Date: _____

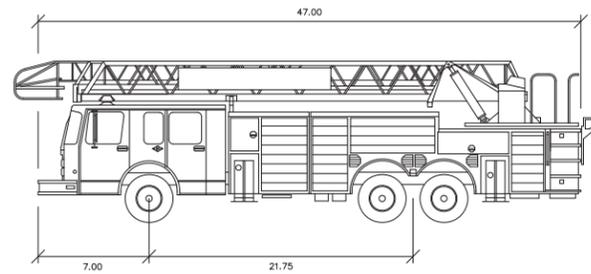
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DIRECTIONAL TWO-LANE HIGHWAY SEGMENT WORKSHEET			
General Information		Site Information	
Analyst: RH	Highway / Direction of Travel: MacArthur Blvd	From/To: North of Entrance	Jurisdiction: Montgomery County, MD
Agency or Company: The Traffic Group, Inc.	Analysis Year: Total		
Date Performed: 7/3/2014			
Analysis Time Period: PM Peak			
Project Description: Rockwood Manor			
Input Data			
		<input type="checkbox"/> Class I highway <input checked="" type="checkbox"/> Class II highway Terrain: <input checked="" type="checkbox"/> Level <input type="checkbox"/> Rolling Grade Length mi: Up/down Peak-hour factor, PHF: 0.88 No-passing zone: 100% % Trucks and Buses, P _T : 5% % Recreational vehicles, P _R : 5% Access points/mi: 0	
Analysis direction vol., V _d : 640veh/h			
Opposing direction vol., V _o : 325veh/h			
Average Travel Speed			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-9 or 20-15)	1.1	1.2	
Passenger-car equivalents for RVs, E _R (Exhibit 20-9 or 20-17)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	0.995	0.990	
Grade adjustment factor ¹ , f _G (Exhibit 20-7 or 20-13)	1.00	1.00	
Directional flow rate ² , v _d (pc/h) = V _d / (PHF * f _{HV} * f _G)	731	373	
Free-Flow Speed from Field Measurement		Estimated Free-Flow Speed	
Field measured speed ³ , S _{FM} (mi/h)		Base free-flow speed ³ , BFFS _{FM}	45.0 mi/h
Observed volume ³ , V _f (veh/h)		Adj. for lane width and shoulder width ³ , f _{LS} (Exh 20-5)	2.6 mi/h
Free-flow speed, FFS _d = S _{FM} + 0.00776(V _f / f _{HV}) (mi/h)		Adj. for access points ³ , f _A (Exhibit 20-5)	0.0 mi/h
Adjustment for no-passing zones, f _{np} (Exhibit 20-19)	2.9 mi/h	Free-flow speed, FFS _d (FFS = BFFS * f _{LS} * f _A)	42.4 mi/h
		Average travel speed, ATS = FFS * 0.00776V _d / f _{np}	31.0 mi/h
Percent Time-Spent-Following			
	Analysis Direction (d)	Opposing Direction (o)	
Passenger-car equivalents for trucks, E _T (Exhibit 20-10 or 20-16)	1.0	1.1	
Passenger-car equivalents for RVs, E _R (Exhibit 20-10 or 20-16)	1.0	1.0	
Heavy-vehicle adjustment factor, f _{HV} = 1 / (1 + P _T (E _T -1) + P _R (E _R -1))	1.000	0.995	
Grade adjustment factor ¹ , f _G (Exhibit 20-8 or 20-14)	1.00	1.00	
Directional flow rate ² , v _d (pc/h) = V _d / (PHF * f _{HV} * f _G)	727	371	
Base percent time-spent-following ⁴ , BPTSF(%) = 100(1 - e ^{-av_d})		61.6	
Adj. for no-passing zone, f _{np} (Exhibit 20-20)		31.1	
Percent time-spent-following, PTSF(%) = BPTSF + f _{np}		82.2	
Level of Service and Other Performance Measures			
Level of service, LOS (Exhibit 20-3 or 20-4)		D	
Volume to capacity ratio, v/c = V _d / 1,700		0.43	
Peak 15-min veh-miles of travel, VMT ₁₅ (veh-mi) = 0.25L _d (V _d /PHF)		18	
Peak-hour vehicle-miles of travel, VMT ₆₀ (veh-mi) = V _d * L _d		64	
Peak 15-min total travel time, TT ₁₅ (veh-h) = VMT ₁₅ / ATS		0.6	
Notes			
1. If the highway is extended segment (level) or rolling terrain, f _G =1.0.			
2. If v _d or v _o >= 1,700 pc/h, terminate analysis—the LOS is F.			
3. For the analysis direction only.			
4. Exhibit 20-21 provides factors a and b.			
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.			

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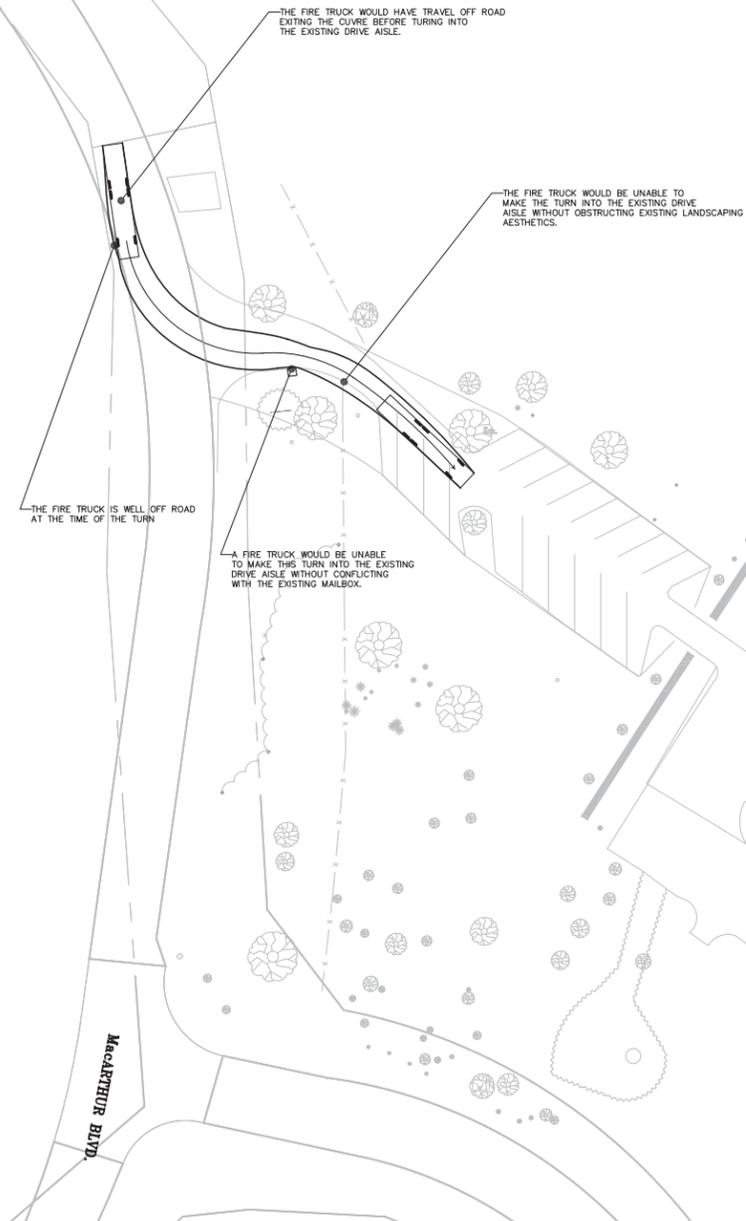
HCS+™ Version 5.5

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FIRE TRUCK	feet
Width	: 8.25
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 33.0
Turning Radius	: 39.93'

FIRE TRUCK DETAIL
SCALE: 1" = 6'



MACARTHUR BLVD.



EXISTING ENTRANCE (SOUTHBOUND)
AUTO - TURN STUDY

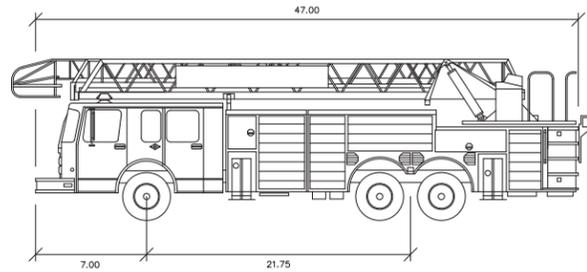
ROCKWOOD MANOR PARK
POTOMAC (6TH) ELECTION DISTRICT
MONTGOMERY COUNTY, MARYLAND

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CLIENT: OEHME VAN SWEDEN 801 G Street S.E. Washington, DC 20003 Phone: (202) 546-7575 Contact: Marilee Scales	PRELIMINARY PLAN NO.: NEA	SITE PLAN NO.: N/A
DESIGN: EMF	DRAFT: IMV	SHEET: 1 OF 5
DATE: October 2014	SCALE: 1"=30'	FILE NO.: 44-214-311

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FIRE TRUCK		feet
Width	:	8.25
Track	:	8.00
Lock to Lock Time	:	6.0
Steering Angle	:	33.0
Turning Radius	:	39.93'

FIRE TRUCK DETAIL
SCALE: 1" = 6'



EXISTING ENTRANCE (NORTHBOUND)
AUTO - TURN STUDY

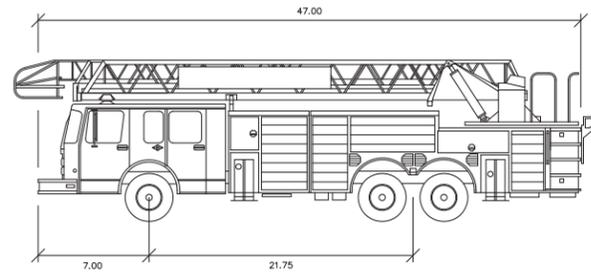
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CLIENT: OEHME VAN SWEDEN & ASSOCIATES, INC. 300 G Street, S.E. Washington, DC 20003 Phone: (202) 546-7575 Contact: Martin Scalera	PRELIMINARY PLAN NO: N/A DESIGN: BMF DRAFT: JMV	SITE PLAN NO: N/A SHEET: 2 OF 5 DATE: October 2014 SCALE: 1"=30'	FILE NO: 44-214-311
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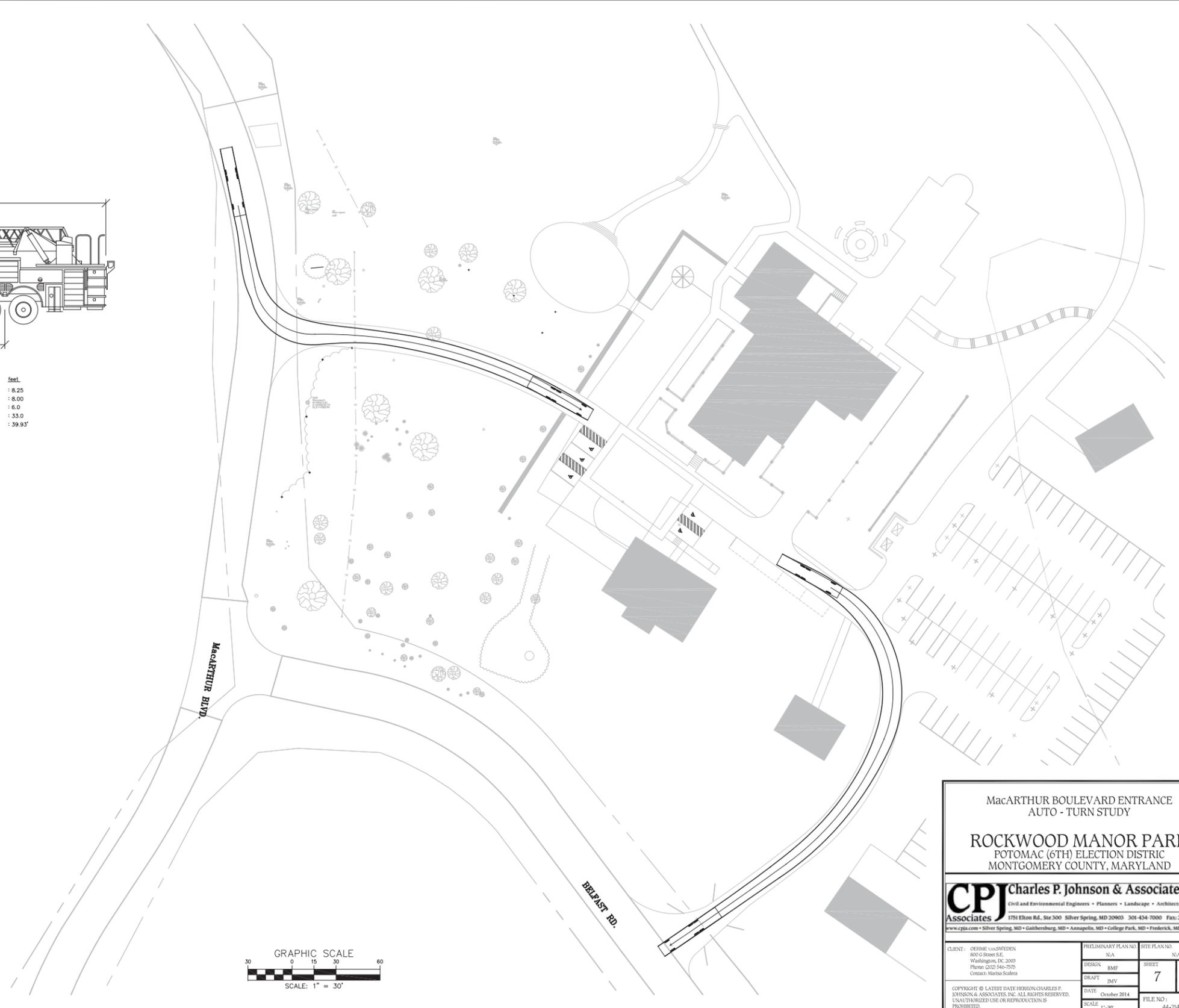
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FIRE TRUCK		feet
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Track	:	8.00
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Steering Angle	:	33.0
Turning Radius	:	39.93'

FIRE TRUCK DETAIL
SCALE: 1" = 5'



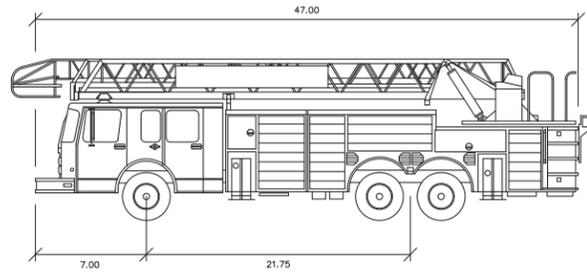
MacARTHUR BOULEVARD ENTRANCE
AUTO - TURN STUDY

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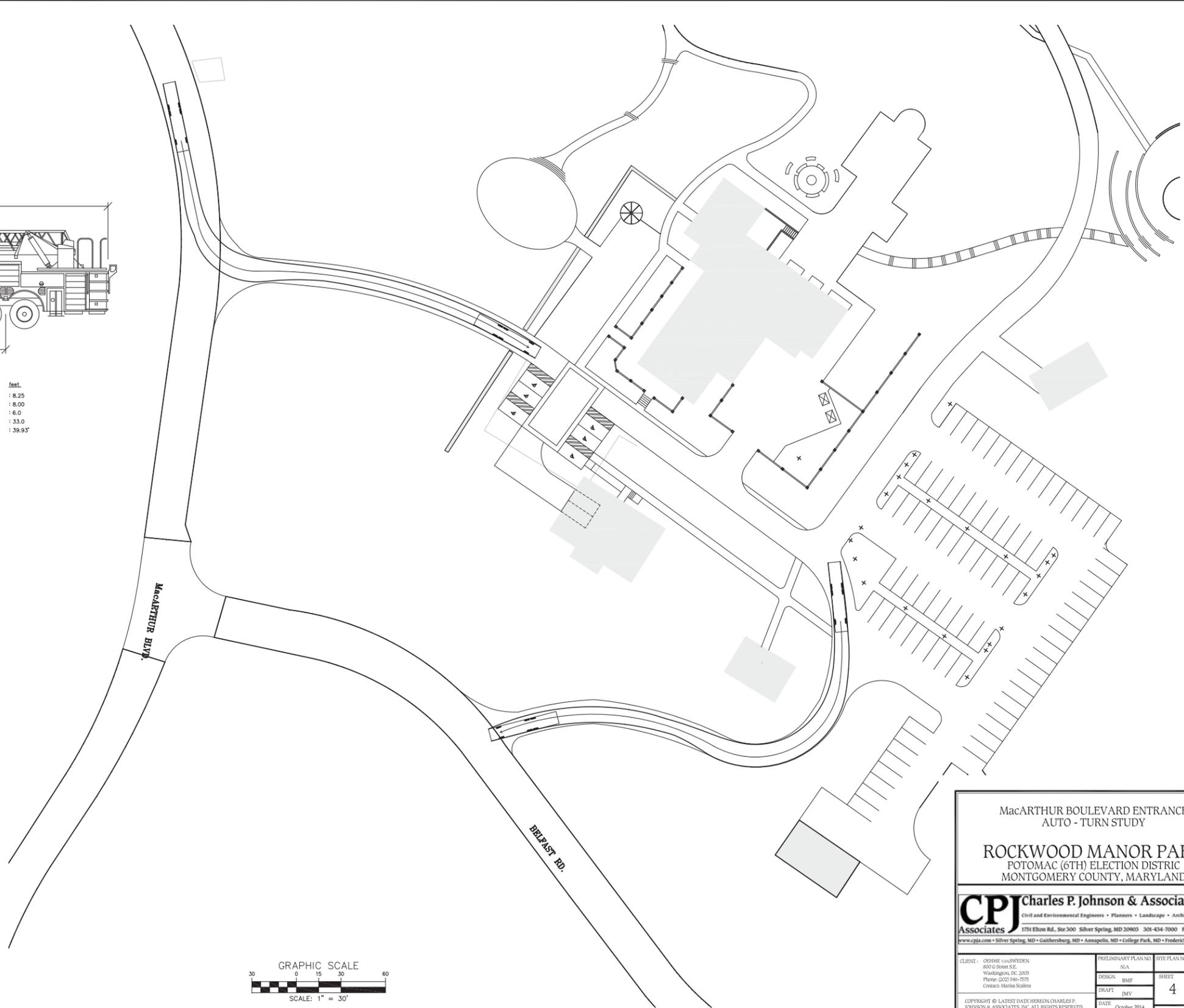
CLIENT: OEHME VAN SWEDEN 400 G Street S.E. Washington, DC 20003 Phone: (202) 546-7575 Contact: Marius Scallan	DESIGN: NEA EMF	PRELIMINARY PLAN NO. N/A	SITE PLAN NO. N/A
DATE: October 2014	SCALE: 1"=30'	ERAFIT: BMV	SHEET: 7 OF 8
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FIRE TRUCK		feet
Width	:	8.25
Track	:	8.00
Lock to Lock Time	:	6.0
Steering Angle	:	33.0
Turning Radius	:	39.93'

FIRE TRUCK DETAIL
SCALE: 1" = 6'



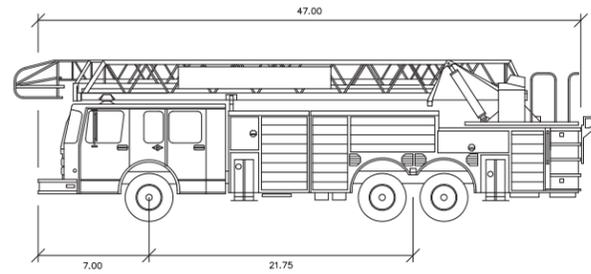
MacARTHUR BOULEVARD ENTRANCE
AUTO - TURN STUDY

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CLIENT: OEHME VAN SWEDEN 800 G Street S.E. Washington, DC 20003 Phone: (202) 546-7575 Contact: Martin Scaletan	PRELIMINARY PLAN NO: N/A	SITE PLAN NO: N/A
	DESIGN: BMF	SHEET: 4 OF 5
	DRAFT: JMV	
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FIRE TRUCK	feet
Width	: 8.25
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 33.0
Turning Radius	: 39.93'

FIRE TRUCK DETAIL
SCALE: 1" = 5'

THIS SITUATION SHOWS A CASE IN WHICH THE ENTRANCE WOULD BE USED AS AN EXIT.

MacARTHUR BLVD.



MacARTHUR BOULEVARD ENTRANCE
SIGHT DISTANCE STUDY

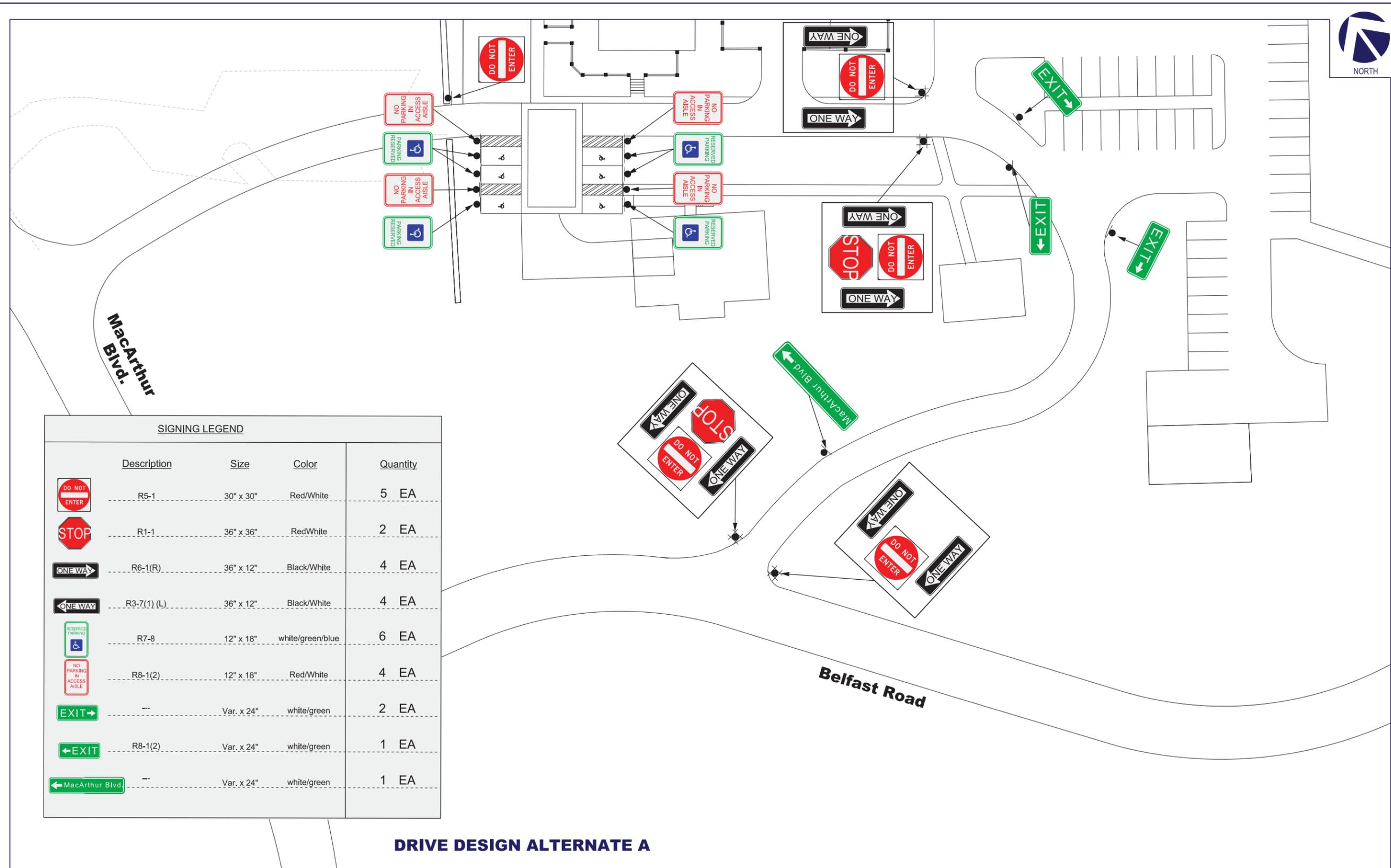
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CLIENT: OEHME VAN SWEDEN 400 G Street S.E. Washington, DC 20003 Phone: (202) 546-7575 Contact: Marius Scallera	PRELIMINARY PLAN NO. N/A DESIGN EMF DRAFT BMV	SITE PLAN NO. N/A SHEET 5 OF 5
DATE: October 2014 SCALE: 1"=30'		FILE NO.: 44-214-311

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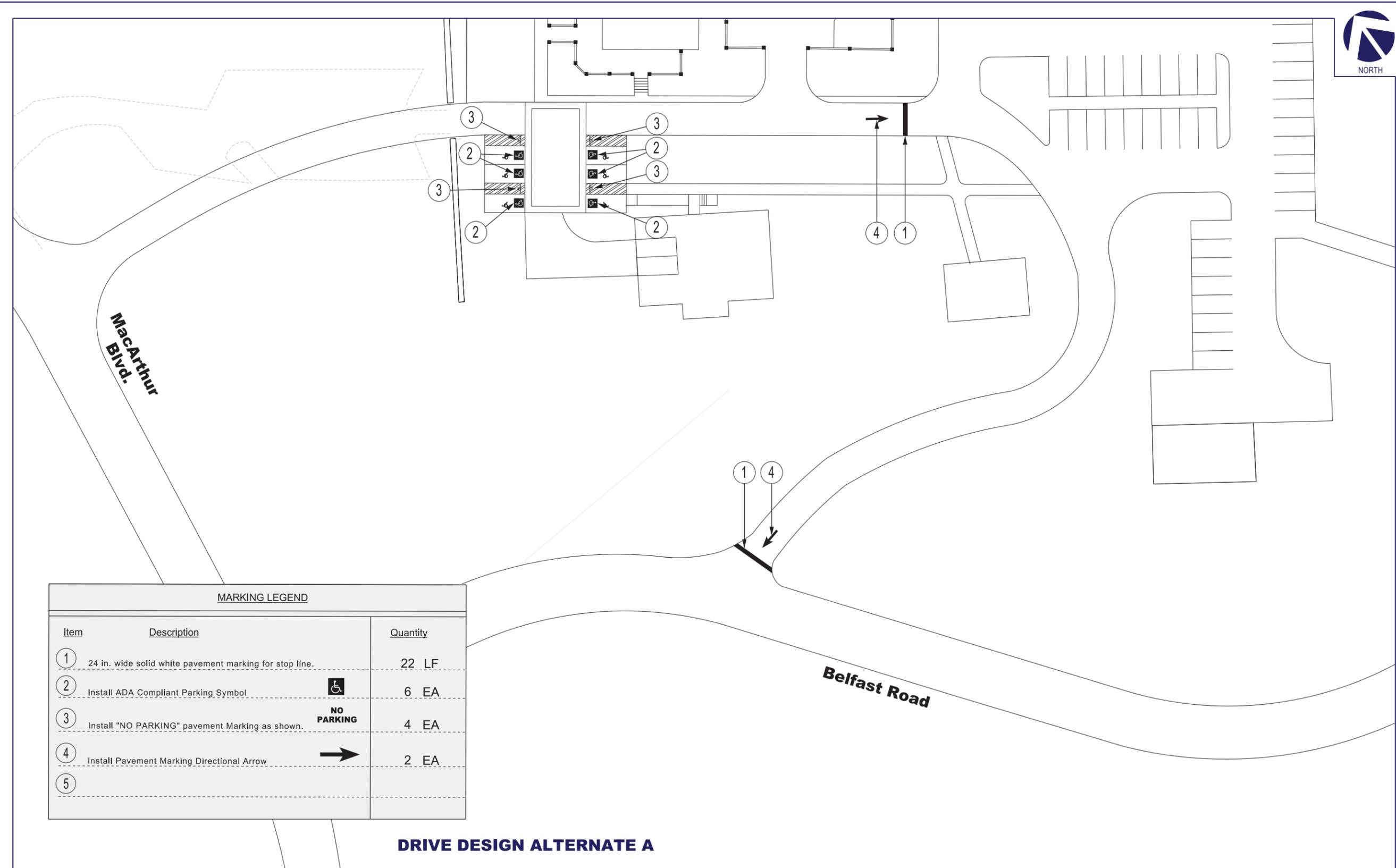


SIGNING LEGEND				
	Description	Size	Color	Quantity
	R5-1	30" x 30"	Red/White	5 EA
	R1-1	36" x 36"	Red/White	2 EA
	R6-1(R)	36" x 12"	Black/White	4 EA
	R3-7(1) (L)	36" x 12"	Black/White	4 EA
	R7-8	12" x 18"	white/green/blue	6 EA
	R8-1(2)	12" x 18"	Red/White	4 EA
	--	Var. x 24"	white/green	2 EA
	R8-1(2)	Var. x 24"	white/green	1 EA
	--	Var. x 24"	white/green	1 EA

DRIVE DESIGN ALTERNATE A

PLOTTED: 10/8/2014 10:08 AM
 FILE: F:\2014\10\08\14-0815_Rockwood Manor\DESIGN\GRAPHICS\SM\ROCKWOOD_MANOR_20141008.dgn

	ROCKWOOD MANOR Signing Plan		Scale: 1" = 20' Location: Potomac, MD File Number: 2014-0815 File Name: Print Date: 10/8/2014 Print Time: 12:50:08 PM	M. Vallari Design: DATE Designed: DATE Checked: DATE Approved: DATE
	Merging Innovation and Excellence		suite h - 9900 franklin square dr. - ballimore, maryland 21236 410.931.6600 - fax: 410.931.6601 - 1.800.583.8411	



MARKING LEGEND		
Item	Description	Quantity
①	24 in. wide solid white pavement marking for stop line.	22 LF
②	Install ADA Compliant Parking Symbol 	6 EA
③	Install "NO PARKING" pavement Marking as shown. NO PARKING	4 EA
④	Install Pavement Marking Directional Arrow 	2 EA
⑤		

DRIVE DESIGN ALTERNATE A

PLOTTED: 10/9/2014 11:57:14 AM
 FILE: P:\2014\2014-08-15_Rockwood Manor\DESIGN\GRAPHICS\SLI_Rockwood_Mark_Plan_20141009.dgn



**ROCKWOOD MANOR
Marking Plan**

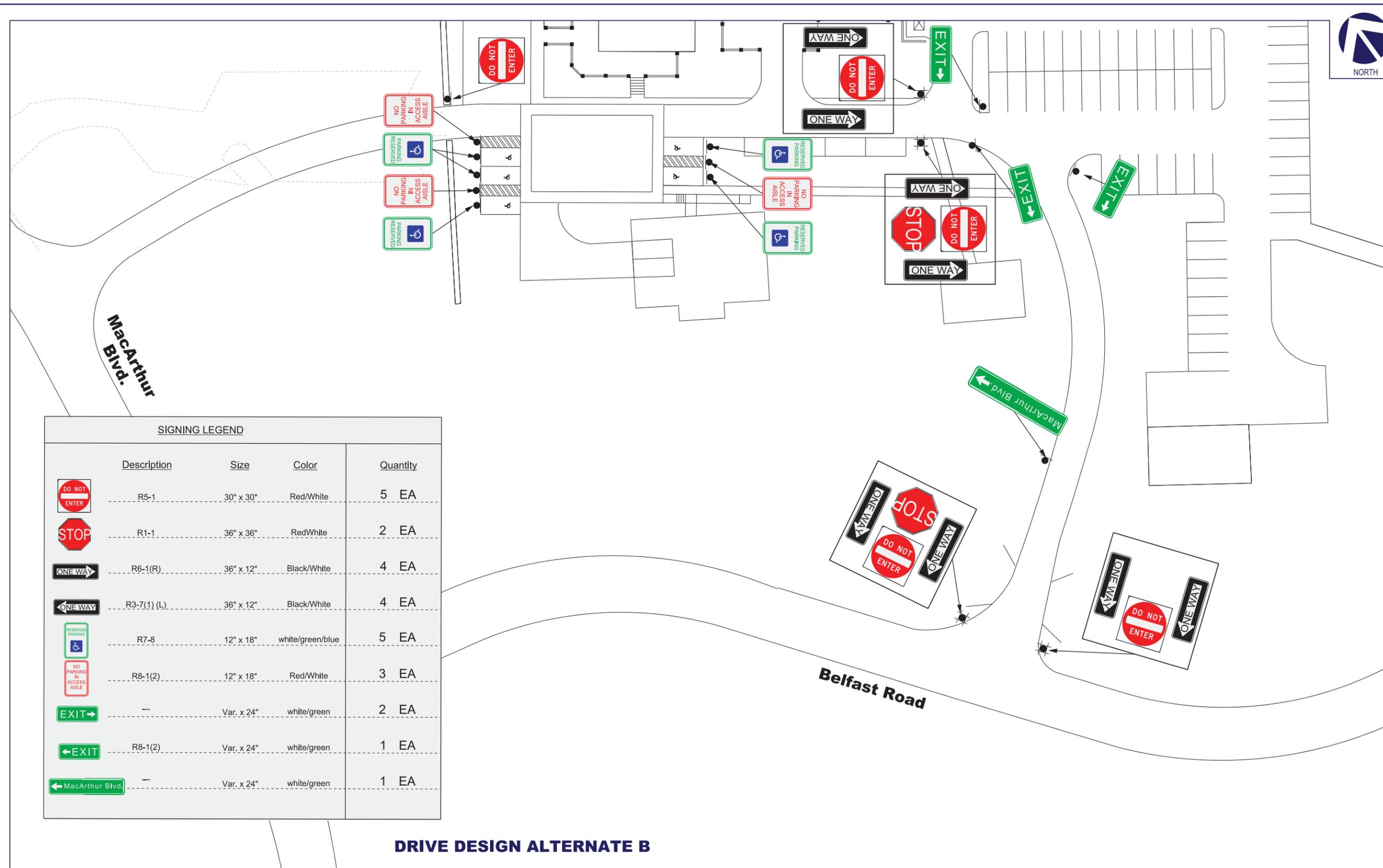
Merging Innovation and Excellence

suite h - 9900 franklin square dr. - baltimore, maryland 21236

Scale: 1" = 20'
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 Date: 10/9/2014
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 Print Date: 10/9/2014

410.931.6600 - fax: 410.931.6601 - 1.800.583.8411

DESIGNED	DATE
DESIGNED	DATE
DESIGNED	DATE
APPROVED	DATE

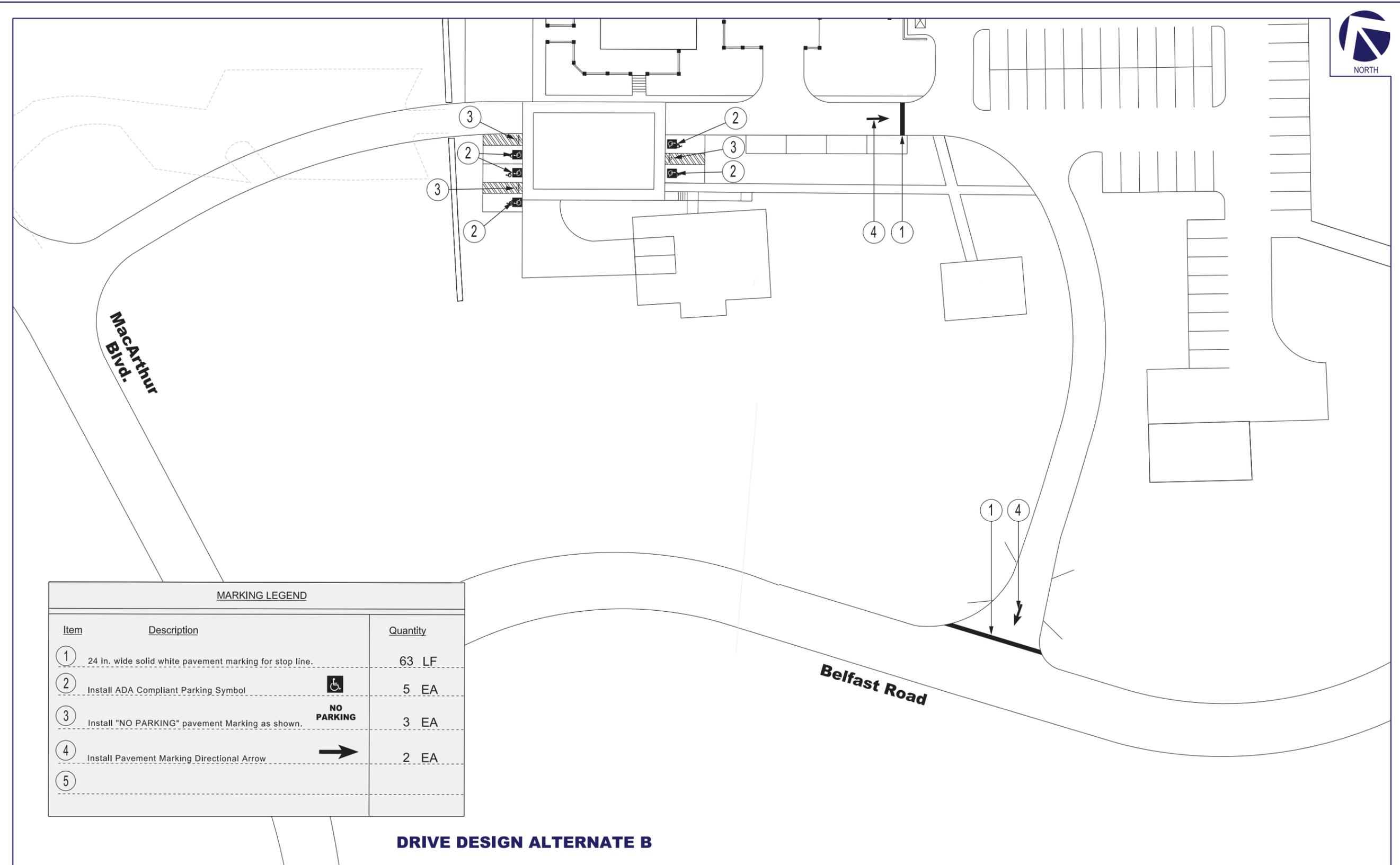


SIGNING LEGEND				
	Description	Size	Color	Quantity
	R5-1	30" x 30"	Red/White	5 EA
	R1-1	36" x 36"	Red/White	2 EA
	R6-1(R)	36" x 12"	Black/White	4 EA
	R3-7(1) (L)	36" x 12"	Black/White	4 EA
	R7-8	12" x 18"	white/green/blue	5 EA
	R8-1(2)	12" x 18"	Red/White	3 EA
	--	Var. x 24"	white/green	2 EA
	R8-1(2)	Var. x 24"	white/green	1 EA
	--	Var. x 24"	white/green	1 EA

DRIVE DESIGN ALTERNATE B

PLOTTED: 10/8/2014 11:52:24 AM
 FILE: F:\2014\2014-08-15_Rockwood Manor\DESIGN\GRAPHICS\SM\ROCKWOOD_MANOR_20141008.dgn
 www.tnfgroup.com

	ROCKWOOD MANOR Signing Plan		Scale: 1" = 20' Location: Potomac, MD File Number: 2014-08-15 File Name: Print Date: 10/8/2014 Print Time: 11:52:24 AM	M. Vallari Drawn: _____ DATE: _____ DESIGNED: _____ DATE: _____ CHECKED: _____ DATE: _____ APPROVED: _____ DATE: _____
	Merging Innovation and Excellence		suite h - 9900 franklin square dr. - ballimore, maryland 21236 410.931.6600 - fax: 410.931.6601 - 1.800.583.8411	



MARKING LEGEND		
Item	Description	Quantity
①	24 in. wide solid white pavement marking for stop line.	63 LF
②	Install ADA Compliant Parking Symbol 	5 EA
③	Install "NO PARKING" pavement Marking as shown. NO PARKING	3 EA
④	Install Pavement Marking Directional Arrow 	2 EA
⑤		

DRIVE DESIGN ALTERNATE B

PLOTTED: 10/9/2014 11:57:32 AM
 FILE: P:\2014\2014-08-15_Rockwood Manor\DESIGN\GRAPHICS\BLK_RCKWOOD_MANOR_20141009.dgn



**ROCKWOOD MANOR
Marking Plan**

Merging Innovation and Excellence

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Scale: 1" = 20'
 Location: Potomac, Md
 Date: 10/9/2014
 File Name: P:\2014\2014-08-15_Rockwood Manor\DESIGN\GRAPHICS\BLK_RCKWOOD_MANOR_20141009.dgn
 Print Date: 10/9/2014 Print Time: 11:57:32 AM

410.931.6600 - fax: 410.931.6601 - 1.800.583.8411

DESIGNED	DATE
CHECKED	DATE
APPROVED	DATE

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October 6, 2014

Mrs. Sara Fiore McCartin, ASLA, LEED-AP
OEHME, VAN SWEDEN, OVS
Landscape Architecture
800 G Street SE
Washington, D.C. 20003

RE: Rockwood Manor Park
Traffic Study

Dear Mrs. McCartin,

CPJ conducted a sight distance study, on June 30, 2014 based upon the proposed exits shown on the exhibits labeled Alternative 'A' and Alternative 'B', for Rockwood Manor Park. These exits are located off of Belfast Rd. which is classified as a tertiary, road has a posted 25 miles per hour speed limit. CPJ also performed a sight distance study at the proposed entrance location along MacArthur Blvd. Sight distance studies are not required at entrances that are only one way. The sight distance study was performed on the precautionary basis in the event the entrance had to be used as an exit the driver would have adequate sight of oncoming traffic.

CPJ found that Alternative 'A' provides adequate sight distance, based upon Montgomery County requirements for tertiary roads, but is not located at the required 250' away from the intersection of MacArthur Blvd. and Belfast Rd. Choosing this exit may require further coordination with county reviewers. Reviewers can take into account that though it is not 250' away from the intersection, there is very little traffic or queuing along Belfast Road and the sight distance exceeds what's required.

Though Alternative 'B' is located over the required 250' away from the intersection, it just meets Montgomery County's sight distance requirement for tertiary roads. CPJ also noticed that Alternative 'B' will be placed near an existing culvert and sump area. The grading required for this option may require extra tree loss and rework of the existing culvert.

CPJ found that the entrance on MacArthur Blvd. provides adequate sight distance, based upon Montgomery County requirements for secondary roads. As stated previously, sight distance would only be required in emergency situations when the entrance would be used as an exit.

Based on review of both available documents and a visual review of the site, CPJ anticipates that the following approvals and permits may be required for this project:

- MDE Notice of Intent
- MDE Non-Tidal Wetlands an Waterways Construction Permit
Required if construction is being done in areas where wetlands and U.S. waterways will be impacted
- M-NCPPC Mandatory Referral
- M-NCPPC NRI/FSD Plan approval
- M-NCPPC Forest Conservation Plan approval
- MCDPS R/W Permit
For storm drain and proposed road connection to Belfast Rd.
- MCDPS Sediment Control Permit
- MCDPS Stormwater Mangagement Concept approval
- MCDPS Stormwater Management approval
- MCDOT approval
For Maintenance of Traffic Plan

It should be noted that the MacArthur Blvd. entrance must also be 250' away from the intersection of Belfast Rd. and MacArthur Blvd. It has been discussed previously that the existing entrance be redeveloped to accommodate all large vehicles entering the site. There is no existing deceleration lane at the existing entrance.

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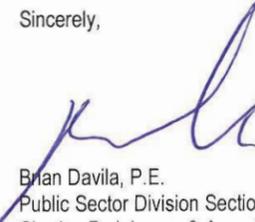
We researched MCDOT's Design standards and saw no specific reference to when you have to have a deceleration lane. There were notes on most of the standards that on an open section roadway the decision would be made on a case by case basis. Deceleration lanes are not normally called for unless they are needed for capacity reasons and that is not the case here. We would recommend that we submit the report and wait to get feedback from them. This is not an intersection or entrance that is going to be getting use other than an occasional event so it is likely the County will not request one for that reason.

If this was a State highway, in which in this case it is not, their standards would request a full decal lane (385" full width, 100' taper) or a partial lane (100' full width, 100' taper). But again we would argue that this is a facility that that is used on an occasional basis and that we feel a deceleration lane is not necessary or that a partial lane would be more than adequate.

So we would recommend submitting what we have and then we can respond to any comment that may be made by the County.

Although CPJ cannot state with certainty that Alternative 'A' or 'B' will be approved as proposed, a hybrid of the two by shifting the entrance location will likely be approved by MCDPS. The worst case for the proposed entrance on MacArthur Blvd, is located 250 feet away from Belfast Road.

Sincerely,



Brian Davila, P.E.
Public Sector Division Section Head
Charles P. Johnson & Associates, Inc.

CC: CPJ File No. 44-214