

ECO - CHARLESTOWN

Environmental Actions, Activities, and Information
at Charlestown Retirement Community

ACKNOWLEDGMENT

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Bert Clegern
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MAP OF CHARLESTOWN

A. INTRODUCTION

This is a descriptive baseline environmental document for Charlestown Retirement Community, which is the size of a small town, with approximately 2000 residents and 1000 staff. This collection of information is especially appropriate for Charlestown, being the "Flagship" of the Erickson-managed retirement communities.

With the publication of Rachel Carson's *Silent Spring* in 1962, there was a rapid development of worldwide environmental awareness. Shortly afterward, the early 1970s saw the initiation of strong environmental legislation in the United States. Since that time environmental issues have become a basic part of strategic planning and development for most large organizations.

The Charlestown campus is uniquely located, and its native forest and contrasting habitats make it especially attractive to residents and visitors alike. Increased environmental awareness of both younger and older generations creates an interest in understanding the places where they live. This document describes issues of past, current, and future environmental importance by discussing the natural history of the area, the development of the Charlestown campus, outdoor and indoor environmental aspects of Charlestown, and cooperative activities with local communities.

The basic environmental concepts of REDUCE, REUSE, RECYCLE, and RESTORE are firmly entrenched on the Charlestown campus, as will be seen in this document, but there is always room for improvement.

For an aerial perspective of the campus, please see the photo located before the Appendices.

B. BACKGROUND: NATURAL HISTORY OF THE CHARLESTOWN AREA

1. Location on the Fall Line - Charlestown's 110 acres is located on the Fall Line of the eastern seaboard at 76 degrees, 42 minutes, 6 seconds West Longitude and 39 degrees, 16 minutes, 18 seconds North Latitude. The Fall Line is an important geographic feature lying between the Coastal Plain and the Piedmont uplands. The lower part of the Fall Line begins where rivers become no longer navigable for small ships. This highly significant fact led to the establishment of early towns and roads all along the Fall Line, since the westward movement of goods had to shift from boats and ships to land transportation or canals at that point. The towns also developed due to the construction of mills along the Fall Line, which used the flowing water for power to turn their wheels, blades, and grindstones. Many of these towns grew into major eastern cities, such as Philadelphia, Baltimore, Washington DC, Richmond, and others. The earliest north-south road connecting these early towns grew into U.S. Route 1, the primary eastern highway before the advent I-95 of the interstate highway system.

2. Geology and Soils - The geology and soils of the Fall Line change from hard, crystalline rock in the upper western areas (like the granite found near Ellicott City) to softer sedimentary soils of the Coastal Plain to the east. The elevation of Charlestown ranges from 130' in the eastern portion of the property to 315' in the southwest part of the property near the Chapel. Most of the soil in the upper Charlestown area appears to be stony clay, derived from breakdown of the Piedmont's rocks. The soil in the lower

part of the Charlestown property is a rich sedimentary loam accumulated in the flood plain of Herbert Run, the stream following the Fall Line as it crosses the property.

3. Watershed - Charlestown lies within the watershed of the Patapsco River, the primary feeder to Baltimore Harbor, and subsequently the Chesapeake Bay. Rainfall and stormwater drainage from the Charlestown property flow into the East Branch of Herbert Run, which joins the West Branch due south of the campus near the MARC station and subsequently flows into the Patapsco.

4. Area Land Use Patterns -

Historically, Native Americans lived in the Baltimore and Patapsco River valley areas since at least 12,000 years ago. "Patapsco" is derived from an Algonquian word meaning "backwater", which probably referred to the slow moving portion of the river nearest to the Chesapeake Bay. The Native American's relative lack of impact on their environment was changed during colonial times, which brought deforestation and agriculture, both of which resulted in sedimentation of the Patapsco, rendering it no longer navigable west of Elkridge Landing, which was a major port in early colonial times. The hunting of beaver and other animals gradually depleted the natural fauna of the area. These patterns, as well as urbanization and road building, increased as the human population continued to grow.

Contemporary land use patterns In the Charlestown area now range from urban in Baltimore to the northeast, to surrounding suburban areas which include neighborhood housing, shopping centers, large grassy areas associated with local schools, hospitals and cemeteries, and major nearby rail and highway transportation systems. Charlestown is in Baltimore County, and a small northeast portion of the property lies within the Baltimore City limits. The Inner Harbor lies only five miles east of Charlestown, and Thurgood Marshall Baltimore-Washington International Airport lies six miles south of the campus. With the Interstate 695 Beltway a half mile southwest of Charlestown and Interstate 95 a mile to the southeast, access to downtown Baltimore, the airport, and other locations is quick and easy.

5. Climate and Weather - The Charlestown climate is pleasant, with four distinct seasons. Maryland is in the Mid-Atlantic region, between warm and cool temperate climatic zones, and warmed by the Gulf Stream. The climate of this area is moderated by the Atlantic Ocean and the Chesapeake Bay to the east, and is milder than that of the mountainous parts of the state to the west. Rainfall averages 3-4 inches per month and is evenly distributed throughout the year when averages are taken over a 30-year period. Similarly, the average annual rainfall is 42 inches, and the average annual snowfall is 22 inches. Charlestown lies within USDA Plant Hardiness Zone 7b, with an average 200-day growing season which is gradually increasing due to global warming.

6. Wind, Air, and Noise - The prevailing winds in this region are westerlies due to our latitude, with minor gradual shifting from the northwest in winter to southwest in summer. Although Charlestown is located near major interstate highways and the large urban area of Baltimore as sources of air pollution, the prevailing westerlies tend to bring in fresh air from the less developed areas to the west. The "good air" was known to early residents of this area, many of whom built summer homes in Catonsville to escape the heat, humidity, and odors of Baltimore. An elevation change of a few hundred feet can make

a noticeable difference. These features of the local climate are also important to Charlestown residents, many of whom are elderly and may not well tolerate pollution and temperature extremes.

Interestingly, wind direction can also play a minor role in area noise levels. The westerlies slightly suppress the noise from I-95 to the southeast of the campus, but they do not suppress the low rumble from the closer I-695 to the southwest. Similarly, prevailing winds determine the way that an airport's major runways are laid out, thus determining preferred take-off and landing directions for flights out of BWI airport, since taking off and landing into the wind are the norms. Thankfully for Charlestown, the prevailing westerlies have most flights taking off to the west, so their run-up and take-off noise is directed more to the east, away from our campus. Occasionally, though, we can hear the jet engine noise at Charlestown (especially if the wind is from the south), even though the airport is six miles away. Our more likely sources of local noise are simply routine traffic, construction, and diesel trucks and buses, although Charlestown for the most part is a quiet place.

7. Eastern Deciduous Forest Biome - Charlestown is in this botanical region, with native climax tree vegetation including several species of oaks, American Beech, various hickories, Tulip Poplar, and various maples. Many of the animals associated with this biome are still found in this area, although large predators are rare. Approximately 40% of the Charlestown campus is covered with trees, with the great majority being mature native forest, even though most of the region was deforested at least twice in the past.

8. Charlestown's Three Ecosystems -

a. The first ecosystem is fully urban, i.e., the main campus, which is composed of two dozen major buildings with connecting roadways, walkways, and utilities. Construction and landscaping have greatly modified the original habitat and topography. Ornamental trees, bushes, flowers, and grasses have been planted and are maintained in this area.

b. The second ecosystem is the Lake Charles area, a multi-purpose stormwater retention location which is a typical lentic (still water) ecosystem. The original vegetation of this area was removed for the most part, and the land was contoured to form the lake bed and dam. Ornamental trees were planted on the east side of the lake between the water and an encircling service road/path. Native and invasive trees grow on the west and south sides of the lake, and invasive trees (mostly black locust) are routinely removed from the earthen dam, which forms the northeast side of the lake. Low vegetation is mowed around most of the lake's perimeter. The lake is annually stocked with largemouth bass for the resident fishermen's catch-and-release program. Sunfish are also in the lake, and top-feeding minnows are present, which help to ensure there is no mosquito problem in the vicinity.

c. The third Charlestown ecosystem is native deciduous forest, which makes up more than a third of the campus acreage. The major portion of this forest surrounds the East Branch of Herbert Run on the north side of the campus. Being on the Fall Line, the western portion of the stream flows downhill beside the Charlestown Nature Trail through a narrow wooded valley. The eastern portion of the stream flows more slowly, through its own flood plain in the woods. These lotic (flowing water) habitats are unique on the campus.

C. BACKGROUND: DEVELOPMENT OF CHARLESTOWN

1. Historical Construction and Conservation -

Older buildings on the Charlestown campus include "The Farmhouse", which was built in 1885, and "The Carriage House", which also was begun in 1885, but not completed until 1911. Both of these buildings are used by Erickson Management, Inc., which is headquartered on the Charlestown campus, but they are not part of the retirement community.

The granite and brick buildings of the St. Charles Seminary on this site were built from 1911 to 1961. The Sulpician Cemetery of the seminary is near the middle of the Charlestown campus and is still an active burial location. It is still owned by the Sulpician Order.

The primary example of historical conservation on the Charlestown campus is the Our Lady of the Angels Chapel. The Chapel's cornerstone was laid in 1913, but it took decades before the structure was fully complete. It is a beautiful example of a European cathedral in miniature, with elegant Italian marble, mosaics, stained glass windows, a fine organ, and wonderful acoustics. The Chapel is also still owned by the Sulpicians, as it was part of their St. Charles seminary. An excellent written and pictorial work on the Chapel is Father Leo Larrivee's book entitled "Our Lady of the Angels". The Chapel has been designated a National Historic Site.

Secondary historical structures of interest on the campus include the remnants of a swimming/skating pool built by the seminary on the East Branch of Herbert Run, a brick opening for a spring which was near the swimming pool, and a 1906 stone bridge over Herbert Run, which was built as part of a one-lane carriage road from Wilkins Avenue to the historic Beverly property on the larger Watts Estate. The old Beverly mansion was destroyed by fire in the 1940s and there are few traces of it remaining. The spring and the bridge are good examples of the environmental concept of RESTORE, since they were lost to the elements before being uncovered and made accessible.

2. Developmental History - This aspect of Charlestown is presented below as a timeline. Construction, and minimizing its environmental impact, have been a continuing feature of the retirement community as it has grown.

1977 - St. Charles College (Seminary) closes due to declining enrollment (Chapel and Buildings 1-6).

1983 - Charlestown Retirement Community opens.

1985-1986 - Charlestown expands, with construction of Buildings 7-9.

1987 - Renaissance Gardens Care Center opens.

1989 - Charlestown Square, Chapel Court, Parkview, Harborview, and Caton Ridge buildings open.

1991 - The St. Charles building opens.

1992-1993 - Brookside, Cross Creek Station, and Herbert's Run buildings open.

1995 - The Memory Walk, Memorial Woods, and the Nature Trail open.

2013 - Charlestown Square and Edgewood receive major renovations.

2016 - Caton Woods, the new assisted living facility, opened as the first part of the new continuing care complex.

3. Utilities as Background -

a. Power - Gas and electric power are provided to Charlestown by Baltimore Gas and Electric (BGE), which serves as an energy delivery company, not an energy source company. In today's energy grid operations, BGE can obtain its energy from virtually all conceivable sources including coal, oil, gas, nuclear, solar, wind, landfill methane, and waste combustion.

b. Water - Charlestown's water is obtained from the City of Baltimore. The city's three major water sources are Gunpowder Falls, the North Branch of the Patapsco River, and the Susquehanna River. The water is collected and stored in three reservoirs: Liberty, Pretty Boy, and Loch Raven. Charlestown's water comes from the Patapsco River via Liberty Reservoir (created in 1954), with treatment at the Ashburton Water Filtration Plant in west Baltimore. Water treatment consists of prechlorination, alum flocculation/sedimentation, rapid sand filtration, fluoridation, final chlorination, and pH adjustment for corrosion control.

c. Sewage Disposal - Charlestown's sewage leaves the campus primarily via the buried County sewage line which parallels the East Branch of Herbert Run. The "wishing wells" along the Nature Trail are covers for access points to the line. Raised access points may be seen by the Run along the Old Stone Bridge Trail below the north side of the Lake Charles dam. The sewage line continues through Arbutus and reaches the Patapsco River directly south of Arbutus. The line then follows the River to the Patapsco Waste Water Treatment Plant at Wagner's Point in East Baltimore. The treated effluent then flows into the Patapsco River just north of Curtis Bay, and subsequently into the Chesapeake Bay. The Patapsco Plant provides secondary treatment with enhanced nutrient (nitrogen and phosphorus) removal, and the plant currently processes a flow of 73 million gallons per day.

d. Storm Drainage - This water is collected by the portion of the Baltimore County storm drainage system which is on the Charlestown campus. It is separate from the sewage system. The storm drainage empties into the Patapsco River. Stormwater Management is discussed in greater detail in Part D.1. of this document.

e. Solid Waste Disposal - For the most part, this service is provided by Waste Management, Inc., and is discussed in detail in Part E of this document.

4. Compliance with Federal, State, and County Requirements -

Construction, maintenance, and all other activities with potential environmental impact at Charlestown are accomplished in full compliance with all applicable federal, state, and county requirements. Since the campus is on private property, maintenance of roads and sidewalks is Charlestown's responsibility. One special Baltimore County requirement is to avoid the posted forest buffer areas around campus, all of which are at the edge of the surrounding woods. The reason for these postings is to protect native species, especially the trees. However, by their very nature these buffer areas require special attention. These border areas are ecotones (where different ecosystems meet), in this case the edge of turf grass and the forest. Such areas tend to have more species, greater growth of invasive plants, and more incidental collection of debris and trash. Therefore, they require not only special care, but also higher maintenance.

D. THE OUTDOOR ENVIRONMENT

1. Charlestown's Watershed and Stormwater Management -

a. Protection of the Chesapeake Bay - Charlestown's location on the Fall Line and its elevation gradient are especially significant in terms of stormwater runoff and its control. This control is required by law and is necessary for the protection of watersheds and ultimately the Bay. The former and improperly named "rain tax" was designed to enhance the protection of the Bay by funding better runoff controls for stormwater. On the Charlestown campus building construction, land contouring, and landscaping comply with regulatory requirements to control stormwater runoff by channeling it off roofs, roads, landscaped areas, and parking lots to infiltration trenches and catchments (with or without holding tanks) and eventually to Lake Charles and the East Branch of Herbert Run. Silt fences to catch eroded sediment are always used, in accordance with code. The purposes of this flow control are to minimize erosion, catch sediments and other contaminants, and protect the Bay.

b. Herbert Run - Charlestown lies in the watershed of the Patapsco River, the primary feeder to Baltimore Harbor. Our campus is near the upper end of the East Branch's drainage basin, and most of Charlestown's stormwater flows into this Branch of Herbert Run directly or indirectly via Lake Charles' acting as a catchment basin before its water flows into the Run. The East Branch originates in the neighborhoods above the Baltimore National Cemetery adjacent to Charlestown. It then flows through drains under the Cemetery, across other land adjacent to our campus, and then through the north side of Charlestown, paralleling the Nature Trail in its own small valley. Below (east of) Charlestown, the Run flows through the town of Arbutus, joining the West Branch of Herbert Run near the MARC station on Route 1. The West Branch drains the Spring Grove State Hospital campus, the UMBC campus, and adjoining neighborhoods. The combined Herbert Run then flows south to the Patapsco River and subsequently to Baltimore Harbor and the Chesapeake Bay. George Brenneman, a Charlestown resident, made video documentaries of the entirety of both the East and West Branches of Herbert Run and its continuation to the Patapsco. Charlestown's Nature Trail Committee provides an annual cleaning of the

portion of Herbert Run which is on the campus. This volunteer work is usually done in conjunction with a community group, such as the Patapsco Heritage Greenway.

c. Lake Charles - The lake area is on the southeast side of the Charlestown campus and was developed in late 1988. The lake was necessary as a stormwater retention basin due to the continuing expansion of Charlestown. The lake is 2.86 acres in size behind an earthen dam on its northeast side, is roughly in the shape of a figure eight, and drains 47 of Charlestown's 110 acres. When too full, the lake overflows to the East Branch of Herbert Run on its north side via two man-made overflows within the lake and one natural overflow on the north corner of the dam. Most of the remainder of the campus watershed flows directly into the East Branch of Herbert Run via natural or manmade drainage.

d. "Wetlands" Management - Due to Charlestown's topography and its position on the Fall Line, there are no natural wetlands on the campus. The flood plain of the East Branch of Herbert Run on the northeast side of the property is a low area, but it is well-drained by the Run. Two man-made types of wetlands exist: the large permanent one represented by Lake Charles, and small ephemeral ones in the form of the several planted infiltration trenches and low areas made to assist in the control of stormwater runoff. Even the wooded low area in the middle of the St. Charles main parking lot has a covered drain at its lowest point.

e. Snow and Ice Removal - Winter poses a special challenge to the protection of our aquatic habitats from the campus to the Bay, and also the protection of our landscape. Road salt, sand, and sediments mix with winter runoff, acting as contaminants to downstream areas in the watershed. When improperly used the salts can damage cement, plants and the feet of animals. Minimum amounts of the least environmentally damaging road salts are used on both winter roads and sidewalks, and only when necessary, with special attention to protecting tree roots. Rock salt (Halite, or sodium chloride) is used on roadways. Magic Melt, a patented mixture of magnesium chloride and corn by-products, is used on sidewalks. It is more environmentally friendly than rock salt, in that it is gentler on grass and other plants, less irritating on pet's paws, less corrosive, lasts longer, and is more biodegradable.

2. Vegetation Management -

a. Trees -

(1) The Benefits of Trees - See Appendix 1 for a discussion of the major benefits. To estimate the short and long-term value of individual trees based on location, species, and size, Google "Tree Benefits Calculations" for a number of applicable websites.

(2) The Trees of Charlestown - See Appendix 2 for a listing of campus trees by common name, species, and designation as native, introduced, ornamental, and/or invasive. At the time of this writing, Charlestown has 70 different species of trees on its property, with 39 of those being native species. Eastern deciduous forest covers approximately one-third of Charlestown's acreage, giving it a tree coverage which is both impressive and unique for any retirement community. Most of the Patapsco River watershed was logged at least twice in the past, so few of the trees are "old growth", although trees more than a century old have been found in difficult-to-access areas on campus, thus having made

logging of them less likely in the past. Charlestown's legacy of native trees gives us a special responsibility to take care of them. This care includes monitoring their health, removal of invasive vines and trees, pest management when necessary, and reforestation where appropriate. As a special note, a sapling from the Wye Oak, formerly the State Tree of Maryland, was obtained in 2017, and will be planted in a prominent place on campus.

Ornamental trees make up 44 of the 70 species on campus as of this writing. These trees are only planted in the developed area of campus as part of appropriate landscaping. A dozen ornamental tree species are also native.

Invasive trees, all introduced, make up 4 of our 70 species. These include *Ailanthus*, *Paulownia*, black locust, and callery pear. Invasive trees are most numerous around Lake Charles. This is because ornamental trees were only planted on the southeast side of the lake. Native trees were allowed to remain, especially on the south and west sides of the lake, but invasives were allowed to come into the area of the dam on the northeast side where the greatest amount of work was done in creating the lake. These invasives primarily include black locust and callery pear.

(3) The Tree Working Group (TWG) - The "Twig" was created in 2017 as an advisory committee to the Residents Council and Management. The TWG is composed of residents with professional experience with trees, the Grounds Supervisor, a representative of the Charlestown tree maintenance contractor, a local Catonsville forester, a Grounds Committee representative, and interested residents as guests. The TWG advises on the following aspects of tree management.

(4) Maintenance of Trees - This responsibility is divided into three areas. First, major pruning, maintenance, and treatment of trees is done under contract by local qualified companies. Second, minor pruning, maintenance and treatment is accomplished by Charlestown's Grounds Department. Third, other low priority minor pruning is done by resident volunteers as part of the Invasive Plants Crew on campus. The reasons for pruning include not only for beautification and health of the trees, but also for safety purposes when limbs could cause property damage or injury. In the past many ornamental trees on campus were mulched too high at the base, but this practice has been discontinued, since it distorts the base of the trunks and damages the trees.

(5) Removal of Trees - This work primarily is done by landscape contractors as part of lot clearing for new construction, or it may be done through standing contracts for a variety of reasons. These reasons include aging trees being too close to buildings, tree roots causing structural/pavement/utility problems, trees aging well past their prime, compliance with County code (e.g., removal of invasive trees from the Lake Charles earthen dam), and insect damage (Emerald Ash Borer, for example). The Grounds Department may remove smaller problem trees wherever needed. The Invasive Plants Crew will periodically remove invasives from the dam and occasionally girdle *Paulownia* trees in the forest when their growth impinges too much on native species. If trees pose a hazard near buildings, roads or walkways, they are removed or pruned, as appropriate. Dead trees which do not pose a problem in forested areas are left to serve as food sources, homes, and perches for wildlife. Fallen trees in forested areas are left to return to nature.

(6) Reforestation - When trees are removed as part of a construction project, an equal number of trees, usually ornamentals, are planted as replacements. In 2016 Charlestown began a reforestation program for native trees. Through the Baltimore County reforestation program, approximately 40 oaks of several species and 6 American elms were planted as ornamental trees on the developed part of campus. Five additional American elms were planted in cooperation with Catonsville forester Jim Himmel as part of his urban reforestation program. The oaks were planted with the intention of replacing native forest species, helping in the eventual improvement of the Bay's watershed. The elms also serve this purpose and are a cultivar resistant to Dutch Elm Disease. This will allow residents to see this species again for the first time in over 60 years since the disease decimated American Elms across the country in the 1950s. All of these trees were planted at no cost to the Charlestown community. As they become available, native and ornamental trees are occasionally planted on an individual basis near Lake Charles by Nature Trail Committee members to counter the numerous invasive trees in the area.

b. Ornamental Shrubs and Flowers -

Ornamental shrubs and flowers are planted in the developed area of campus on a seasonal and as-needed basis by either contractors or the Grounds Department. Residents may also plant these, either in gardens by their apartments, in the Community Garden near the ball field, or in the other gardens on campus as discussed in Part 4c.

c. Turf and Ground Covers -

The primary type of turf grass used on campus is tall fescue. Contract mowing is done on a scheduled basis during the growing season at 7-11 day intervals, depending on weather. There are usually 26 mowings per year. Contract aeration and overseeding of turf areas is done in the August-November timeframe. Contract applications of pesticides and fertilizers are done on the following schedule. When applications are made, treated areas are posted to inform residents.

March-April: Pre-emergent herbicide for crabgrass control, with fertilizer
April-June: Selective herbicide for broadleaf weed control, with fertilizer
May-July: Sub-surface insecticide for grub control
June-July: Surface insecticide and selective herbicide for insect and weed control
July-August: Selective herbicides for spot treatment of grassy and broadleaf weeds
August-October: Selective herbicide for broadleaf weed control, with fertilizer
October-December: Winter granular fertilization
Any time of year: Application of dolomitic limestone for soil pH control

The types of ground covers used on campus are Vinca, Liriope, and English Ivy. As with the grasses, they are used for both decorative purposes and to control storm runoff to reduce erosion and protect the Bay.

d. "Green" Roofs -

The major renovations done in 2013 on the Charlestown Square complex and the Edgewood building included the installation of a single large green roof over the enlarged swimming pool and two small green roofs on the north end of the Edgewood building. These green roofs are of the "extensive" type, with shallow soil and low vegetation, primarily sedum. Green roofs are designed and installed with multiple purposes in mind. These include reduction of stormwater runoff, providing insulation, reduction in maintenance, and being more aesthetically pleasing than standard roofs. These benefits can help meet local regulations which require runoff control, contribute to LEED (Leadership in Energy and Environmental Design) certification points, and assist in insulation.

The new Caton Woods building does not have any true green roofs, but landscaping in large planters has been done on the second floor above the main entrance.

e. Invasive Plants -

Invasive plants on campus come mainly in the form of trees, vines, weeds, and grasses. The primary invasive trees are (1) Paulownia, a non-native species from east Asia, (2) black locust, a very common but non-native species from states west of Maryland, (3) Callery pear, an introduced ornamental from east Asia, and (4) Ailanthus, another non-native Asian tree. Invasive trees are removed by contractors, Charlestown's Grounds Department, and especially the resident volunteer Invasive Plants Crew, a group whose earliest work started with resident retired arborist Harper Griswold. A good example of this work is the periodic removal of invasive trees (especially black locust) from the earthen dam which forms Lake Charles. This is done to provide compliance with state and county dam safety requirements.

Charlestown's large acreage of trees, both native forest and ornamentals, is host to the many native and non-native species of vines which commonly infest trees in this area. The worst offenders are wild grape, English ivy, and Japanese honeysuckle. These vines grow up the trees, distorting them and eventually killing them. The Invasive Plants Crew works Saturday mornings throughout the year, and other work is also done as needed on an irregular basis by a few crewmembers. Removal priorities are caring for ornamental trees and then moving into selected forested areas upon request and as time allows.

Other invasive viney species include wild rose, blackberries, poison ivy, and mile-a-minute vine. These do not pose problems to the trees, but they can make some areas almost impenetrable. Removal priorities include landscaped areas and then range outward, depending on the amount of human access.

There are many species of invasive weeds, but primary attention is focused on garlic mustard, an introduced species from Europe. This plant can dominate forest edges and openings, crowding out native species. It is a biennial type, i.e., blooming and producing seeds every other year. The Invasive Plants Crew focuses on removal of the blooming second year plants in late spring, before they go to seed in early summer.

Another invasive non-native plant is Lesser Celandine, which appears from small tubers early every spring, especially in low, damp areas, like along the Nature Trail beside Herbert Run. The plants form a thick expansive mat of green vegetation with yellow flowers, retarding the development of other spring plants, especially wildflowers. No good means of control has been found for Lesser Celandine. To avoid damage to other plants, glyphosate herbicide (Roundup) is used for control of the weed only on the Nature Trail proper.

Lake Charles is the source of two types of invasive aquatic plants: floating algae and rooted vegetation. The runoff of nutrients and fertilizer in stormwater, and the addition of nutrients from waterfowl waste make these plants an annual, but manageable, problem. Periodic selective herbicidal treatments of the lake are done by a contractor throughout the growing season.

f. Composting and Wood Chips -

Composting of leaves is done by the Grounds Department in a work area between the Erickson Management parking lot and the lake. The compost is used on the Community Garden and elsewhere as needed on campus. Felled trees and branches are chipped by contractors and the Grounds Department. The wood chips are regularly used on the Nature Trail and elsewhere as needed on campus.

3. Animal Management -

a. Protected Species - Most larger animals on Charlestown are protected under the Maryland Nongame and Endangered Species Conservation Act. This includes foxes, bats, beavers, snakes, and many others. At a minimum a permit from the Department of Natural Resources is required to kill or capture these animals. Most birds in Maryland are protected under the Migratory Bird Treaty Act of 1918. This law also includes doves, crows, and vultures.

While Monarch butterflies are not a protected species, their numbers have declined greatly in recent decades. Since Monarch caterpillars feed only on milkweed, Charlestown's Nature Trail Committee makes an active effort to plant multiple varieties of milkweed in its Butterfly Garden and Wildflower Garden, and it encourages the growth of milkweed elsewhere on campus. Numerous garden areas on campus serve as "Pollinator Gardens" for the adult Monarchs and other insects, and the use of pesticides is discouraged.

b. Mammals - See Appendix 3, The Mammals of Charlestown. Deer are often seen on campus, but they don't pose many problems, other than damaging young trees by antler rubbing and the eating of some plants. Black bear scat was seen once on campus, but there have been no animal sightings. Raccoons are seen on campus occasionally, and they are trapped in accordance with DNR regulations only if they pose a problem. Foxes are sometimes seen on campus, but they do not pose a problem, except in the spring when they follow their instincts and attempt to capture goslings by the lake. The adult geese usually keep the foxes at bay. Insectivorous bats can usually be seen near the lake during the warmer months. They are not harmed unless one enters a building and has to be captured.

c. Birds - See Appendix 4, The Birds of Charlestown, which lists the more than 100 species which have been seen on campus. Lake Charles attracts numerous species of birds, including Canada Geese, Great Blue Herons, ducks, gulls, kingfishers, Tundra Swans, and others. Signs are posted at the lake to discourage residents and guests from feeding the waterfowl, since it is not good for the birds. All the birds are welcome additions to the lake area, but they (especially the geese) are not encouraged to come up to the main campus. In the past a resident fed geese from her patio, and this resulted in unwanted interaction with the birds and a problem with droppings. Such feeding is now not allowed. On the developed part of campus, birdfeeders are numerous, as many residents enjoy the presence of songbirds.

d. Reptiles and amphibians - Snapping turtles, box turtles, and painted turtles may occasionally be seen, especially at the lake. The snakes seen on campus include the Eastern Ratsnake (also known as the Black Ratsnake or simply Black Snake), the Ringnecked Snake, and various Gartersnakes. All of the snakes are beneficial, do not pose hazards, and are protected by state law. No study of amphibians has been done on campus, but in the spring tadpoles are numerous in shallow portions of Lake Charles.

e. Animal and Insect Pests - Charlestown is like a small town, so it has much the same pest problems. These are dealt with in standard ways by contract pest management companies, Grounds Department personnel, and individual residents. Non-chemical techniques are encouraged, and education is provided to residents.

(1) Feral Cats - These animals had been a problem on campus until applicable County Code was enforced by new management policy. Feeding of the animals is strongly discouraged. In the several years since the new policy was made, feral cats have almost disappeared and the number of songbirds on campus has noticeably increased, likely due to the reduction in cat predation.

(2) Rodents - In the fall, a seasonal influx of mice into buildings is seen, so actions are taken to reduce this problem. Mouse-proofing, trapping, and moving bird feeders further from the buildings are among the steps taken. Rats are rarely seen, but when they are found, rat-proofing, trapping and anticoagulant baits are used as preferred controls. Squirrels are numerous on campus, and feeding them is discouraged.

(3) Insects - Local articles in Charlestown's monthly Sunburst newspaper provide information on seasonal insect problems. These have included the emergence of the 17-year cicada and its associated cicada killer wasp, invasion of buildings by crickets or the brown stink bug, activity of carpenter bees, nests of tent caterpillars or webworms in the trees, the proper use of mosquito repellents, and other issues.

f. Pets - Ownership of pets is allowed at Charlestown, and they are relatively numerous. Most pets other than dogs are kept indoors, so outside environmental issues only occur with dogs. There are two dog parks on the campus, and numerous bag-dispensing clean-up stations. Owners of dogs do a reasonably good job of picking up after their pets, although there are occasional lapses. When these are found, a small "Please clean up after your pet" reminder sign is usually posted by the offending material. A Pet Lovers Club is on campus, and it helps to keep residents informed and enforce the rules.

4. Resident Activity Areas -

a. Lake Charles - The lake has been discussed above in terms of its establishment, its ecology, and its plant and animal life. Residents use the lake area for walking, fishing, sailing miniature boats, wildlife viewing, and simply enjoying its serenity.

b. Trails -

(1) The Nature Trail - Conceived by resident Paul Gaudreau (founder and first Chairman of the Nature Trail Committee) and Charlestown founder John Erickson in 1994, the Trail was opened and dedicated in 1996. It is one-half mile long and follows the course of the East Branch of Herbert Run through the small valley on the north side of campus. Native wildflowers are planted along the Trail, which is maintained by the Nature Trail Committee and the Grounds Department. The Trail has items of historical interest near its mid-point, including remnants of the old seminary swimming pool, the masonry opening of an old spring, and 80 year old initials and dates carved by seminary students into the bark of several large American Beech trees in the area of the former pool. A long-term erosion stabilization project is being pursued on the hillside near the Trail, below the St. Charles building, as well as erosion control under the Trail's covered bridge. Guided Trail walks are provided annually by the Nature Trail Committee during April's Wildflower Day, the celebratory spring "opening" of the Trail after winter. Additional guided hikes are provided to families and guests upon request. A video walk of the Trail has been made and is available for showing.

(2) The Lake Trail - Encompassing Lake Charles is a maintenance road which serves a dual purpose as a walking trail. Roughly 3/4 mile in length, the gravel road is scheduled to eventually be improved for easier access and use by residents. A design study for this improvement is planned.

(3) The Old Stone Bridge Trail - This short (150 yards) trail leads off the Lake Trail on the north side of Lake Charles and follows a Baltimore County maintenance track by a series of access covers along the buried sewage line which is beside the East Branch of Herbert Run. As mentioned above, the 1906 bridge over the Run was part of a carriage lane from Wilkens Avenue to the old Beverly mansion on the Watts Estate, looping back to Wilkens Avenue.

(4) The Short Line Trail (adjacent to campus) - This trail is part of the Rails-to-Trails program and lies on the bed of the old Short Line Railroad, whose tracks lay between the Baltimore National Cemetery and the northwest edge of the Charlestown campus until after the railroad stopped operation in 1972. When it was functional, the railroad had a spur to the seminary, delivering coal to the heating furnace which was in the basement of Building 6, then The Powerhouse. The trail is accessible off Maiden Choice Lane just west of the campus. From the northwest side of the campus to Interstate 695, the trail is approximately one mile long.

c. Gardens - Gardens are located around all buildings on campus, as well as around flag poles, in parking lots, etc. The following are special gardens on Charlestown:

(1) The Community Garden - This popular fenced garden is in the southwest part of the campus, and it consists of ninety 10'x10' plots available at no cost to residents for growing vegetables and flowers. The use of pesticides is strongly discouraged. During the harvest season, excess vegetables are made available to other residents. At the time of this writing, the Garden is supervised by resident volunteers David Pollitt and Pat Kasuda.

(2) The Butterfly Garden - Located at the east end of the Nature Trail, the Butterfly Garden was the brainchild of Sally McBride, a former chairman of Charlestown's Nature Trail Committee. The Garden was started in 2004 and is composed primarily of native perennials. At the end of the blooming season, seedheads are left on the plants as food for finches and other seed-loving birds. The Garden is primarily cared for by resident Pat Kasuda of the Nature Trail Committee.

(3) The Rock Garden - Proposed and planned by Alex Jerome, a member of the Nature Trail Committee, this small garden sits near the middle of the Nature Trail, under the skywalk between the St. Charles and Herbert's Run buildings. It is planted with native perennials and is primarily cared for by resident Rose Wolford of the Nature Trail Committee.

(4) The Wildflower Garden - This garden was started in 2014 by residents Bert and Linda Clegern and is cared for by members of the Nature Trail Committee. The garden is located across Erickson Way from the Herbert's Run building, and it replaced a thicket of brambles which had grown over the perimeter fence onto Charlestown property. Native perennials are grown in the garden, and annuals are seeded in as needed.

d. Other Special Areas -

(1) Memory Walk - Near the Charlestown entrance on the south side of campus, this is a walkway of inscribed bricks, grass, benches, and commemorative trees. It is designed for memories and contemplation. Started in 1996 as Memorial Woods by Charlestown's Residents Council Grounds Committee, this area evolved into its present setting with the addition of memorial bricks forming the walkway in the trees. A portion of the purchase price for the bricks goes to Charlestown's Benevolent Care Fund. The Walk has a very low environmental impact, and maintenance requirements are minimal.

(2) Softball Field - In existence since before 1921 in the early days of the seminary, the field has seen almost 100 years of use. In 2013 the grass infield was removed and the entire infield renovated for purposes of better play and safety. Other than slightly greater runoff, the new dirt/sand infield has less environmental impact than grass, due to reduced maintenance, especially in terms of chemical usage. Charlestown's senior softball team, the Sluggers, continues the tradition of softball at Charlestown.

(3) Putting Green - Located just east of the softball field, the putting green is available for play by residents and guests. The green is an artificial surface, therefore requiring no chemicals and much less other maintenance than the tightly sheared bentgrass used on most greens. During the off season, resident Pat Kasuda has instituted Putterland, a portable 18-hole indoor miniature golf course at Charlestown which has a series of tournaments in February. This course by its nature has no

environmental impact, unlike virtually every other golf course. Income from Putterland goes to the Charlestown Benevolent Care Fund.

(4) Picnic Area - This small area by the putting green is nestled in a multi-species grove of evergreen trees and is available to residents and guests for use. There is virtually no environmental impact in its use.

(5) Bocce Ball Court - This single court is located by the picnic area and is available for use by residents and guests. The Court has an artificial surface and therefore requires no chemical treatment or special maintenance.

(6) Shuffleboard Court - The outdoor court is located on the north side of the swimming pool, as part of the Charlestown Square complex. It is available for use by residents and guests. The Court is hard surfaced, thereby producing runoff when it rains, but there are no environmental problems in its maintenance. There is also an indoor court near the Dental Complex off "Main Street" in Maple Terrace (Building 2).

(7) Dog Parks - There are two of these fenced areas on Charlestown. The first was built on the north side of campus on Erickson Way, across from the Grounds and Herbert's Run Buildings. The second, and newest, was built adjacent to the Community Garden on the south side of campus. Both sites are pet- and environment-friendly, having dog runs, water (at the new one), benches, and doggie poop bags available, with a place for proper disposal. The fences and benches are made of artificial materials, and there is very little environmental impact in the maintenance of the areas, other than cutting of the grass.

E. THE INDOOR ENVIRONMENT

1. Educational Programs - Environmental education is included in the multiple learning programs at Charlestown, including University of Maryland Baltimore County, Community College of Baltimore County, Elderhostel's Lifelong Learning Institute at Charlestown, and invited guest speakers. In the past several years, topics have included Environmental Science, Climate Change, Charlestown's Natural History, Science Skeptics, The Earth's Climate System, Calvert Cliffs, Hydraulic Fracturing, Genetically Modified Foods, The Almighty Oyster, The Monarch Butterfly, and many others. Many articles also are provided in the Charlestown Sunburst Newspaper and the Erickson Tribune Newspaper. The Resident Council's Conservation Committee plays a key role in keeping people informed through these articles, posters, and television spots.

2. Elevated Walkways - One of the best ideas in the development of Charlestown was the building of elevated enclosed walkways between all of the buildings. These heated and air-conditioned enclosures allow residents to travel all over campus during any time of year or in any weather conditions. They also provide a mile-long indoor circuit for exercise. The highest walkways, or skywalks, cross the small valley on the north side of campus, connecting the St. Charles and Herbert's Run buildings, and the Edgewood and Brookside buildings. The skywalks allow residents to walk among the

canopies of tall forest trees, enjoying them during every season of the year. Permanent signs will be posted during 2017 in the skywalk windows to identify the most prominent trees. The walkways thereby will be not only efficient and enjoyable, but also educational.

3. Energy Conservation - Charlestown has an on-going program of energy conservation, which is the essence of the environmental concept of REDUCE. The program includes the use of double-paned windows, compact fluorescent lights, energy-efficient outdoor lighting, automatically closing doors, proper insulation, a charging station for electric-powered cars, an efficient shuttle service, green roofs, and energy-saving reminders to residents. However, there are no alternative energy sources installed, such as solar power; and there are no LEED buildings on campus.

Although not part of the indoor environment, the Charlestown shuttle service plays a key role in energy conservation by saving gasoline and reducing the number of cars on campus. The resident portion of this service provides transportation between buildings and also serves as a taxi service to hospitals, BWI airport and other area destinations. The staff portion of this service provides rides for Charlestown working personnel living in the area.

4. Water Conservation - This Charlestown program is also based on the REDUCE concept. It involves standard use of low-flow devices such as aerators in faucets, low-flow shower heads, and low-volume toilets. Conservation is practiced in controlled landscape watering and rapid repair of leaks either inside or outside of buildings. Tangentially related to water conservation, the swimming pool uses a chlorine-saline additive, which not only disinfects the water but also protects the pipes from corrosion.

5. Reuse Programs - Charlestown has the following excellent applications of the REUSE concept:

The Treasure Sale - This is a quarterly event which involves scores of resident volunteers. When residents depart Charlestown, family members often donate items to this sale. Donations include jewelry, clothing, books, music, furniture, small appliances, bedding, and all other types of household goods. These items are cleared from the apartment, checked for usability, cleaned as necessary, and stored for the next Treasure Sale, where they are organized, priced, and readied for sale. Each 3-day sale involves both Charlestown residents and those of the local communities purchasing the items for very reasonable prices. Each event routinely brings in \$28,000 to over \$30,000, thus earning well over \$110,000 annually for Charlestown's Benevolent Care Fund, which helps ensure that residents who may have financial problems are able to remain in their apartments. Items which do not sell are given to local charities. These sales are immensely popular, are resident-driven, and are the ultimate in REUSE.

Large Appliance Sales and Contributions to Habitat for Humanity - When Charlestown apartments become empty, appliances and cabinetry are often replaced. Those removed items which are still in good, usable condition are provided for REUSE in two ways. They may go for resale to Charlestown staff members at reasonable prices, or they may be provided to Habitat for Humanity for resale and reuse by the local community.

Book Collection - Annually resident Pat Kasuda arranges a collection of unwanted books from residents, and through the local Rotary Club these books are then sold or donated for further use.

Usable automobiles - These are sold or can be donated via Charlestown's Cars for Care Program, with proceeds going to the Benevolent Care Fund.

6. Recycling Programs - The environmental concept of RECYCLE is accomplished in multiple ways at Charlestown:

Trash recycling is done throughout the community. Residents separate recyclables, which are picked up weekly at their apartment doors, thus making it easy and convenient. The recyclables are collected in the Charlestown recycling truck and transported to Waste Management's "Recycle America" center in Elkridge, Maryland, which is one of the largest single-stream recycling operations in the United States. This operation includes metals, glass, plastics, paper and cardboard, but not styrofoam. Recycling constitutes approximately 30% of the monthly trash flow from the campus.

Other aspects of recycling at Charlestown include small battery collection at campus laundry facilities and then contract disposal. Old tires, car batteries, and electronics can be recycled at County facilities. Plastic bags are recycled by residents at local grocery stores. Compact fluorescent light bulbs are recycled through the Charlestown Maintenance Department, with free replacement and proper disposal (mercury control). Food oils and greases from Charlestown's multiple restaurant kitchens are collected by contract and recycled. Shredded paper products are collected from secure locations and are recycled by contract.

7. Other Waste Management -

Non-recyclable solid waste constitutes roughly 70% of the more than 100 tons of waste collected per month from the campus. This refuse is collected twice per week from offices, restaurants, and apartments by Charlestown employees and taken by Waste Management Inc. to the Wheelabrator Baltimore (formerly BRESKO) municipal solid waste incinerator in south Baltimore. Waste Management, Inc. also owns this three-burner incinerator, which can handle 2250 tons of waste daily, and its steam provides both heat and power to the city. Incinerator ash is taken for disposal at Baltimore's Quarantine Road landfill at Hawkins Point at Curtis Bay on Baltimore's outer harbor.

Special solid waste disposal on campus includes controlled collection and disposal of sharps and proper disposal of medicines (and containers) through education programs. The on-campus CVS Pharmacy has special envelopes available for the disposal of excess/unusable medications. Medical waste from the Charlestown Medical Center is handled in accordance with standard accepted procedures. Restaurant solid waste is collected in large closed-top containers for contract removal. Construction and renovation waste is collected in large open-top containers which are removed by contractor trucks. For personal disposal of items, as residents of Baltimore County Charlestown residents may use the County's Western Acceptance Facility on Transway Road. The Facility is located four miles southeast of campus, between I-895 and the Patapsco River.

8. Potentially Hazardous Substances - Each staff or resident work area on campus which uses such substances keeps the materials properly stored, with instructions for use available. Safety Data

Sheets (SDSs) are available for all items. Work areas include maintenance, housekeeping, medical, grounds and transportation, restaurants, the swimming pool, and also the Wood Shop (which alone has more than 160 SDSs for solvents, paints, polishes, etc.). Fuel and oil tanks on campus, as well as emergency generators, are properly located and maintained, and receive regular inspections.

9. Campus No Smoking Policy - This policy was instituted in 2014, and it applies to staff, residents, contractors, and guests. The only exception is that the policy is grandfathered for smoking residents inside their own apartments. For those residents, the use of "smoke eater" machines and door sweeps is strongly encouraged.

F. COMMUNITY COOPERATION

Many environmental activities at Charlestown are shared with local communities. Through Tom Moore of the Charlestown television station and Mel Tansill of Erickson Management, there is close cooperation and sharing of news stories with local stations and newspapers. Reforestation work on campus is done in conjunction with Baltimore County and Jim Himel of the Catonsville Canopy Tree Project. Adjacent neighborhoods are invited to participate in REUSE through the quarterly Treasure Sales, as well as other special activities. Charlestown works with the Patapsco Heritage Greenway in taking care of the campus portion of the East Branch of Herbert Run and the elimination of invasive plants. After the unrest in West Baltimore in April 2015, a group of Charlestown residents has worked environmentally with the Sandtown-Winchester community in improving neighborhood beautification, education efforts, voter registration, and redevelopment of an urban farm. Resident George Brenneman of Charlestown shares his locally produced narrated videos of the area streams, American Indian history, and other subjects with schools and other community organizations. Charlestown residents interact with local colleges and universities in both providing and receiving advanced education in environmental and other topics. Resident volunteers work with local elementary schools in providing tutoring, classroom assistance, and nature walks. Resident Pat Kasuda provides local interface with Rotary International in book recycling drives and other community activities. This list is almost endless, since volunteerism is a basic part of Charlestown, not only in environmental activities, but also in other aspects of community cooperation.

APPENDICES

1. The Benefits of Trees
2. The Trees of Charlestown
3. The Mammals of Charlestown
4. The Birds of Charlestown

MAP OF CHARLESTOWN