



GOVERNMENT OF BERMUDA
Ministry of Home Affairs

Department of Planning

Conservation Management Plans

1.	What are Conservation Management Plans?	3
2.	Why are Conservation Management Plans necessary?	3
3.	When are Conservation Management Plans required?	4
4.	The Submission Process	4
5.	What details are included in a Conservation Management Plan?	5
5.1	Components of a CMP	5
5.2	Helpful planting information	8
5.3	Helpful information about invasive species	11
5.4	Helpful information about the coastal environment	11
5.5	Helpful information about agricultural land.....	12
5.6	Who should prepare a CMP?.....	12
6.	Priorities in the preparation of CMPs	13
6.1	Retention of existing vegetation.....	13
6.2	Protection during and after site work	14
6.2.1	Relocation of vegetation.....	14
6.2.2	Replacing removed vegetation	14
6.2.3	Fencing of vegetation	15
6.2.4	Fencing of restriction lines.....	15
6.2.5	Trenching	15
6.2.6	Disposal of Toxic materials	16
6.2.7	Top soil.....	16
6.2.8	Other excavated material	16
6.2.9	Screening.....	16
6.2.10	Conditions that Impact Conservation Areas.....	17
7.	Appendix	17
7.1	Conservation Base Zones	17
7.1.1	Coastal Reserve.....	17
7.1.2	Nature Reserve	17
7.1.3	Open Space Reserve	18
7.1.4	Parks.....	18
7.1.5	Recreation.....	18
7.2	Conservation Areas.....	18

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Conservation Management Plans

7.2.1	Woodland Reserve.....	18
7.2.2	Agriculture Reserve.....	19
7.3	Development Base Zones	20

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Conservation Management Plans

1. What are Conservation Management Plans?

Conservation Management Plans (CMPs) are plans that give details for managing conservation areas to provide for improved biodiversity of endemic and native animal and plant life, reduce invasive species of trees and other vegetation and encourage the appropriate planting of endemic, native and noninvasive ornamental species.

2. Why are Conservation Management Plans necessary?

Appropriate vegetation protects the Island's ecology, habitat and other natural features; and, enhances the visual amenity and aesthetics of the Bermuda Image. We depend on our natural environment to sustain our quality of life. The Development and Planning Act 1974 (the Act) makes specific provision for the designation of 'Areas of Special Environmental Value' in the Fourth Schedule (Section 28). These 'designated area protections' are encompassed in the Bermuda Plan 2008, for the protection of areas that are considered to possess natural features with environmental value, including woodlands, agricultural land, beaches, caves, and other habitats and natural features.

CMPs are required in order to ensure that Bermuda's most sensitive physical environments are protected and enhanced. CMPs recognize the fact that environmental areas are limited and declining; and, if compromised, will result in the degradation of the environment as it relates to fauna, flora and the aesthetics of Bermuda's visual quality. Ensuring conservation gain, or at least an equitable conservation equation, is critical in ensuring development is sustainable for future generations.

Improving natural areas in Bermuda through CMPs contributes to the Bermuda Image and the importance of doing so cannot be understated. The Bermuda Image is defined as *"the appearance of Bermuda resulting from a harmonious mix of natural features and man-made elements which produce a visual quality and character of development which are distinctively Bermudian."* Elements that contribute to the Bermuda Image are: lush, dense and colourful vegetation, natural coves, bays, beaches, rocky coastline and islands.

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3. When are Conservation Management Plans required?

When a Conservation Base Zone or a Conservation Area is protected by the Bermuda Plan 2008, a CMP may be required for any proposed development within or adjacent to these areas.

The public is encouraged to submit a CMP for any land which is located within a Conservation Base Zone or a Conservation Area when maintenance or management is required. For easier implementation and to distribute the costs; the proposed works can be phased.

If you know your property has conservation zoning and your development proposal may impact that area, you are required to submit a CMP with your planning application.

4. The Submission Process

There are three normal processes where CMPs are provided to the Department of Planning. Each of these three circumstances is discussed below.

1) With a Development Application

- A copy of the CMP will be circulated to Forward Planning (FP).
- FP will review the CMP with Department of Conservation Services (DCS) for their comments.
- A Site visit takes place as part of the application review.
- FP prepares final comments and submits to Development Management (DM) to include in their planning assessment.
- Planner will take the application to the Board / Committee for approval
- A condition of approval is tied to the CMP completion prior to the issuance of a Certificate of Use and Occupancy Permit.
- FP will maintain a copy of the approved CMP, one copy will be placed in the DM file and one copy will be returned to the applicant.

2) As a condition of approval of a Development Application submitted with a Building Permit Application

- If a CMP is a condition of approval of a development application it is submitted along with the building permit application as the CMP has to be approved prior to the issuance of a building permit.
- A Site visit takes place as part of the application review.
- A copy of the CMP will be circulated to FP.

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- FP will review the CMP with DCS and receive their comments.
- FP prepares final comments and submits to Building Control (BC) before issuing the building permit.
- FP will maintain a copy of the approved CMP, one copy will be placed in the BC file and one copy will be returned to the applicant.

3) CMP where no development is proposed (i.e., no paths, structures, ponds, excavation, etc.)

- FP receives and processes CMPs that are not tied to, nor do they require, a Development or Building Application.
- In these cases the works tend to include management of vegetation.
- FP will undertake a site visit to assess the proposal.
- If the CMP is acceptable FP will approve the CMP.
- FP will maintain a copy of the approved CMP and one copy will be returned to the applicant.
- The applicant must confirm they are the owners of the land subject to the CMP or provide authorization from the owner to perform the works.
- If these CMPs propose significant works they have to be processed through a formal application. In this case the applicant is advised that a development application is required and the CMP is returned to the applicant and is instructed to include the CMP as part of a DAP1 application. The CMP is then processed through process 1.

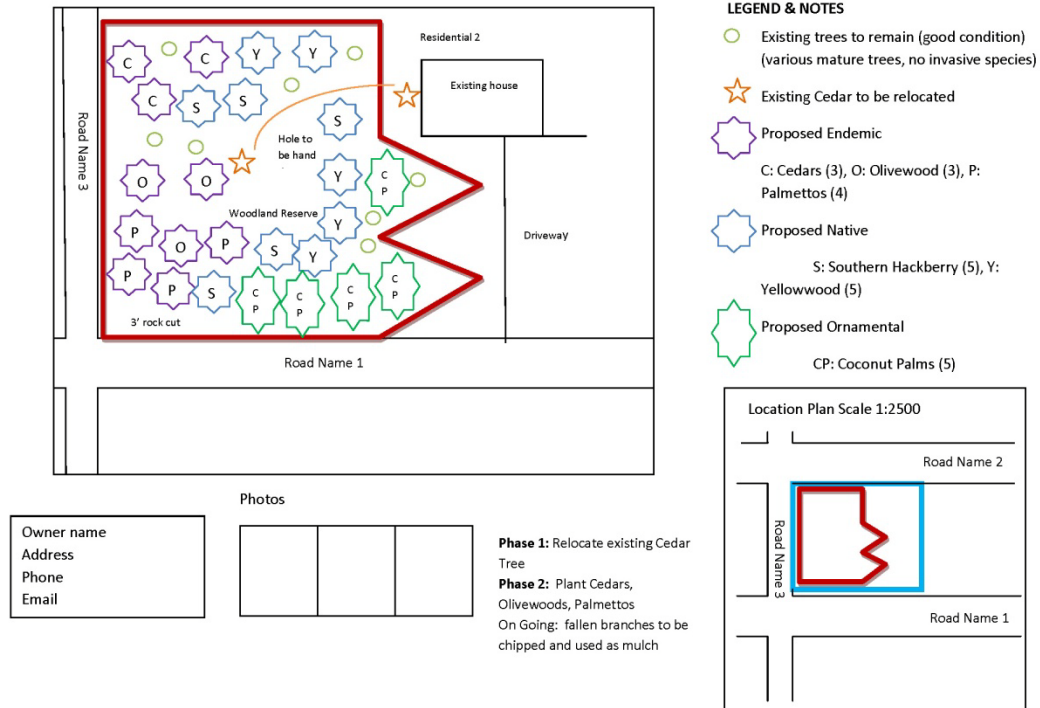
5. What details are included in a Conservation Management Plan?

5.1 *Components of a CMP*

A CMP should include some basic information. A sample CMP is shown below.

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Sample Conservation Management Plan Scale 1:250



Cover Letter: Give some detail on the proposal such as the goals and objectives of the work you are proposing to do

Contact information: Name of Landowner, Address, Telephone, Fax, e-mail

Location Plan:

The location plan should be drawn to a scale of 1:2500 and must show the following:

- boundary of land that is subject to the CMP clearly outlined in red, and
- entire property boundary clearly outlined in blue.

Location plans are available from the Planning Department and on the website www.planning.gov.bm under Mapping. Sufficient information to locate the property should be provided.

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Site Plan:

The site plan should be drawn to a scale of not less than 1:250 (1 inch: 20 feet) for sites not exceeding 0.2 hectares (0.5 acres) and for all other sites not less than 1:500 (1 inch :40 feet) and must show the following:

- entire property boundary clearly outlined in blue
- contours of the site at one metre (3 feet) intervals, where practical.

Photographs:

Photographs can be useful in the assessment of existing state of the site, provide important details that plans and descriptions cannot and should be included in the CMP submission.

Phasing Plan:

When preparing the CMP it is essential to consider the economic implications of implementing the plan. A Phasing Plan can help with the cost of implementing the CMP by setting timelines for the proposed work that is to be undertaken and allowing for the prioritization of problem areas.

Management Plan:

The Management Plan should show the following information:

- a. topographical survey and zoning map information including access routes, rights of ways;
- b. existing vegetation with particular mention made of endemic, native, protected or specimen ornamental species including approximate height, spread, condition and whether the vegetation is to be retained, relocated or removed;
- c. rock cuts, walls, existing and proposed buildings, water features, trails and roads;
- d. extent of the proposed development including areas of hard surfacing such as patios, decks, walkways, driveways and parking areas;
- e. the location of any natural or other features of conservation or management planning interest such as caves, boreholes, utilities, wells and cess pits;
- f. location and number of all **proposed** planting noting species and pot size / height;
- g. location of other proposed conservation improvements including artificial Long Tailed Tropic Bird nesting sites, ponds, water features, dry stack walls, use of mulch, compost and wood chips; and
- h. location of all proposed protective fencing.

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What is the difference between Maintenance and Management?

Maintenance of conservation areas is permissible. Large, mature vegetation requires maintenance so that the size of the vegetation does not become a nuisance to adjacent properties or existing structures. Permissible maintenance activities include but are not limited to:

- The application of best practices in respect of pruning, tree surgery, maintaining the health of existing / mature vegetation.
- Hedge trimming
- Clearing and removing deadwood or windfall
- Juvenile (less than a finger grasp in size – see photo) invasive species removal. The most common invasive species are: casuarinas, Indian laurel and brazil / mexican pepper. See section 5.3 about Invasive Species.



Mature vegetation has a trunk circumference that is greater than a finger grasp. Juvenile vegetation is less than a finger grasp.

Management activities should be contemplated through a CMP and include the removal of healthy and / or mature vegetation and doing comprehensive replanting in a Conservation Base Zone or Conservation Area.

5.2 *Helpful planting information*

As a general rule of thumb planting within Conservation Zones and Areas should be considered in the following ratio: 40% endemic /30% native /20% ornamental /10% variance.

The DCS has a Bermuda Plant Finder that is extremely helpful in identifying Bermudian species and their strengths for each type of plant habitat. This document can provide information on salt and wind tolerance of each species and their requirement for shade or sunlight. This document can be helpful as you consider the plantings in your conservation area. The document is free to download at www.conservation.bm .

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40 % Endemic species: the three priority species are Cedars, Palmettos and Olivewoods.



Left: Cedar, Centre: Palmetto, Right: Olivewood

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30 % Native species: three common native species are Southern Hackberry, Yellowwood and Jamaican Dogwood.



Left: Southern Hackberry
Centre: Jamaican Dogwood
Right: Yellowwood

20 % Ornamental species: chosen according to taste and can be trees or shrubs. Examples of ornamental trees are Mahogany, Frangipani and Coconut Palms. Examples of ornamental shrubs are Oleander, Hibiscus and Match me if you Can.



Above: Frangipani

10 % variance in all of the above numbers: for example you may choose to use 45% endemic and 35% native plus 20% ornamental to total 100%, or some variation of the above.

Four things you can do to improve a Woodland Reserve in your CMP:

1. Reduce invasive species
2. Increase the number of native and endemic species
3. Remove deadwood and where possible chip and use for mulch
4. Introduce flowering plants and shrubs for additional bursts of colour

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5.3 *Helpful information about invasive species*

Property owners often suggest that they do not need a CMP on their property because they are **only** removing invasive species. **You still require a CMP if you are removing mature invasive species within a Conservation Base Zone or Conservation Area.** While invasive species have a bad reputation of overtaking other species they should still not be removed without careful consideration because they have habitat and amenity value.



Common Invasive Species

Left: Chinese Fan Palm

Centre: Casuarinas

Right: Mexican / Brazil Pepper

5.4 *Helpful information about the coastal environment*

The coastal environment can also be impacted by development and CMPs should be submitted for management works within a Coastal Reserve Area. When submitting a CMP for coastal areas it is important to consider the conditions of the area and what species will be able to survive in exposed, salty and windy areas such as: palmettos, buttonwood and bay grape.



Left: Palmetto, Centre: Buttonwood, Right: Bay Grape

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Three things you can do to improve a Coastal Environment in your CMP:

1. Remove invasive species
2. Maintain the area to keep invasive species from coming back
3. Plant salt and wind resistant vegetation that will thrive in the coastal environment

5.5 *Helpful information about agricultural land*

Agricultural Reserve is another area that can benefit from a CMP. Bermuda has a rich agricultural land history and if a property has an Agricultural Reserve designation there are steps that can be taken to improve the area that can be facilitated through an approved CMP. Agricultural land is defined as *land which is capable of supporting horticulture, dairy farming, the breeding, keeping and grazing of livestock, market gardens and nursery grounds, or is capable of growing fruit, forage or vegetables, regardless of the use to which this land is being put.*

Soil conditions are important to the success of any agricultural area. As indicated in point 6.2.7 any top soil removal from an Agricultural Reserve Conservation Area must be reused on site. If the top soil conditions are unfavourable for growing; top soil from other areas can be brought to the site or improve soil conditions. Mature vegetation in an Agricultural Reserve should not be removed without consultation so the methods of removal and replacement can be part of a CMP. **Planning permission is required for top soil work.**

The Government Agricultural Officer or Terrestrial Conservation Officer can provide guidance in the preparation of a CMP for Agricultural Reserve land by calling 292-4611.

Three things you can do to improve an Agricultural Reserve in your CMP:

1. Remove invasive vegetation to provide a clear area for growing
2. Improve soil conditions depending on soil conditions this may mean to add more soil, sand or compost
3. Secure a water supply and get ready to plant

5.6 *Who should prepare a CMP?*

CMPs for large properties and complex developments should ideally be prepared by horticulturists, landscape architects and arborists. For smaller properties CMPs are welcomed and encouraged to be prepared by property owners who have the ability to complete their own CMP.

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6. Priorities in the preparation of CMPs

6.1 *Retention of existing vegetation*

Every effort should be made to ensure that the existing native, endemic and protected species are retained. **Even invasive species should not be arbitrarily removed in the absence of a plan for their suitable replacement and phased removal.** Existing vegetation helps to stabilize the proposed works and provide wind breaks, helps retain soil moisture, provide shade and improve aesthetics. Groups of trees tend to be reliant on each other for natural shelter and physical support and breaking up or making changes to this clustering, may compromise the integrity of the entire group by making the remaining trees unstable and even unsafe. A good starting point is the undertaking of an accurate and detailed mature tree, shrub and fern survey. No CMP can be prepared without comprehensive knowledge of what mature vegetation exists on site. The plant survey should contain the following information:

- a. An inventory of all the existing mature vegetation indicating species, height, spread, age and condition. The nature of some sites is not conducive to the identification of every individual tree and in such cases, the main or mature trees within the group should first be identified and the approximate spread of species groups should be indicated within the outer perimeter of the tree group.
- b. Any other features such as rock outcrops, stone walls, fencing and existing buildings.
- c. A topographical survey showing the slope of the site, especially steep slopes, cross sections identifying grade differences are helpful.
- d. Soil conditions and characteristics.
- e. Normal wind direction and any other climatic factors as certain trees may be suitable for reducing the worst effects of climate conditions, such as providing windbreaks from hurricanes or being resistant to salt spray from the sea.

Once the survey has been carried out, a determination can then be made as to the most appropriate location of any proposed development. This essentially entails, minimizing the loss of existing vegetation and making sure that development is located sufficiently away from the roots of mature vegetation, both in the interest of the trees and the buildings. Water tanks, cesspits, hard surfaced areas (paths, decks, roads) and underground utility services including trenching and excavation can be damaged by tree roots. In terms of mature vegetation, generally the building should be positioned at a distance away from the tree that is similar to the dripline of the tree.

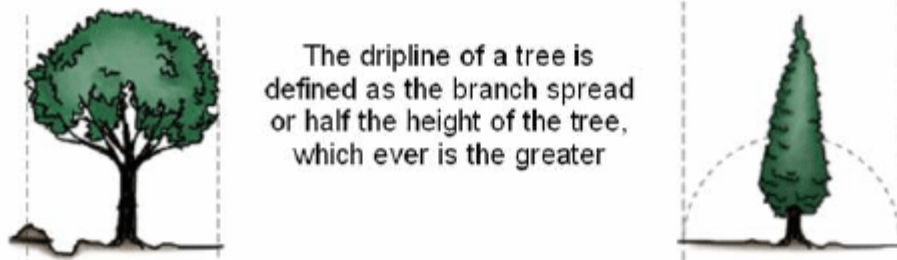
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There are some exceptions to this standard, for instance, development may be closer to palm trees given their rooting system which tends to create a dense 'root ball' under the canopy of the palm and extends only a few feet from the principle trunk. Other trees, such as the Indian Rubber, can have root systems that extend hundreds of feet. Canopy spread over structures and roof tops must also be considered.

Most vegetation has rooting systems that extend much further than the dripline. Some vegetation can withstand some root loss and can sustain or reestablish themselves if the primary root ball is protected.

6.2 *Protection during and after site work*

6.2.1 Relocation of vegetation

In the event that it is not possible to retain vegetation, priority consideration should be given to relocating it to another part of the site. This applies to trees, palms and shrubs. The success of such a venture is highly dependent on the preparation, planning and care given to the particular species, the stage of its development, and effort made to provide optimum survival potential; especially root retention, soil preparation, tree supports and adequate water until the plant becomes established. The services of a landscape professional can be highly beneficial in this regard.

Mature trees and plants usually have considerable value and can be in such high demand that landscape contractors may be willing to negotiate terms to purchase existing plants for use on other sites. The key to safeguarding this value is early planning and sound, professional advice.

6.2.2 Replacing removed vegetation

If it is impossible to retain or relocate existing vegetation then the removal of existing vegetation should be met with significant replacement plantings. Replacement species do not have to be the same as the removed species

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6.2.3 Fencing of vegetation

Local construction practice and modern construction equipment can have a negative impact upon onsite vegetation if due care and vigilance are not exercised. Once trees have been identified for retention, they should be clearly marked and fenced in accordance with best practice standards – generally fencing at or beyond the tree dripline. Plant rooting systems must be protected from heavy compaction created by vehicles or stockpiled material. Protection fencing should be positioned away from the vegetation at a distance that is 1 – 1^{1/2} times the dripline of the affected plant.

The fencing must be robust. Fencing is designed to protect the vegetation from humans and machinery. Fencing should be at least 4' high and made of plywood, shipping pellets, heavy wire fencing and other such sturdy materials. Orange plastic mesh fencing or similar flimsy materials is not appropriate screening.

The location of any protected fencing should be assessed during the first building permit inspection for the setting out / commencement inspection.

6.2.4 Fencing of restriction lines

Where development is to be sited within a Development Base Zone, but still within impact of a Conservation Base Zone, Conservation Area, or Protected Area, robust protective fencing of at least 4' in height should be erected prior to the commencement of building operations, and along the building restriction and setback lines. A notice sign should be installed to indicate the area as a protected conservation / environmental area.

6.2.5 Trenching

Service trenches and other excavations should avoid existing vegetation. Appropriate effort to achieve an engineering solution should be considered prior to detrimentally impacting specimen tree root structures. If trenches must pass within the rooting zone of a tree within a protection area, they should be dug by hand close to the trunks. Any roots encountered should be cleanly cut to reduce the potential of disease. Machinery work should not occur within the root zone beneath the canopy of retained trees. Alternatively, tunneling, drilling or other excavation method may be required to preserve important specimen trees. In the event that the removal of some tree roots is unavoidable, then the crown of the tree should also be proportionately reduced by a qualified tree surgeon to compensate and maintain balanced growth and health of the tree.

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6.2.6 Disposal of Toxic materials

Disposal of toxic materials is not permitted on site. All toxic materials should be taken off-site and disposed of properly. Toxic residues can accumulate in the soil as a result of bad practices like burning paint tins or plastics, washing out oil or chemical drums and draining vehicular engines or spilling other liquids or materials during construction activities. Landscape failure may ensue as a result of these adverse activities and human health may be compromised.

6.2.7 Top soil

Top soil and subsoil affected by the development should be removed and stored for reuse. It should not be stockpiled in heaps of over 3 feet in height as this can destroy the nutrient qualities of the soil. When higher mounds cannot be avoided due to the lack of space on site, the soil should be aerated by regular cultivation using a deep ripper or mixed with composted material added during reuse. Covering stored soil with tarps will reduce the growth of weeds and prevent rain penetration that can cause the soil to clump and make it difficult to handle. Any weeds should be consistently removed from the stockpile before they have time to seed to preclude weed infestation whenever the soil is reused. If soil is removed from an Agricultural Reserve Conservation Area that soil needs to be reused in the remaining Agricultural Reserve on site. **Planning permission is required for top soil work.**

6.2.8 Other excavated material

Other excavated material may only be permitted on a lot within conservation areas on a temporary basis and is contingent on the CMP submission review and approval. All approved material to be stockpiled should be totally removed from the site prior to the issuance of a Certificate of Use and Occupancy Permit. For certain visually or environmentally sensitive site locations, no deposition or storage of excavated material will be permitted on site and all excess unused material must be removed from the site during the course of excavation and building operations.

6.2.9 Screening

Screening is a very important activity as it can negate the worst visual effects of development upon protected areas and it also serves to facilitate what is known as 'building with the landform'. Much of the remaining developable land in Bermuda is not flat. In this regard, rock cuts should be terraced in such a way that each vertical rise is separated horizontally by an area 3 feet or greater in width, capable of sustaining landscaping for screening purposes. The greater the 'step' width, the better the growing potential. New development can also be designed to fit into the hillside and even avoid the need for rock cuts altogether.

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6.2.10 Activities that Impact Conservation Areas

The top activities that impact the quality of a Conservation Area are:

1. Industrial / commercial / vehicular (boats, etc) storage
2. Dumping of any waste materials
3. Letting invasive species take over the area / not maintaining invasive species through an approved CMP
4. Clearing vegetation by mechanical means rather than by hand and damaging the root system of existing vegetation

7. Appendix

7.1 *Conservation Base Zones*

The Development Plan has designated five (5) Conservation Base Zones. These are Coastal Reserve, Nature Reserve, Park, Open Space Reserve and Recreation. The submission of CMPs for development proposed within Coastal Reserve and Nature Reserve is mandatory. Proposals within the Open Space Reserve and Recreation Zones, the Board may also require the submission of CMP. The Development Plan does not impose a requirement for CMPs in respect of Parks.

7.1.1 Coastal Reserve

Bermuda consists of many islands of varying sizes. As a location for many of our natural resources, the Coastal Reserve zone focuses on the protection of woodlands, beaches, caves, habitats and other natural features such as rock formations, cliffs and dunes. Coastal Reserve areas and their adjoining inshore waters also contain nesting sites and habitats including Long Tailed Tropic Bird nests, seagrass beds, corals, mangroves and salt marshes. In an effort to guard against the over-development of these areas, only limited coastal development is permitted, such as minor siteworks, accessory structures, additions, conversions or demolition and reconstruction of existing structures. In order to ensure that the integrity of our coastline is not compromised, CMPs are required in coastal locations for the protection and enhancement of these various habitats.

7.1.2 Nature Reserve

Nature Reserves are areas of special environmental significance and ecological, biological, geological and scientific value. They include mangroves, marshlands, bird sanctuaries, cave and rock formations, islands and other wildlife habitats. The focus here is on the protection of woodlands, beaches, caves, habitats and other natural features. Nature Reserves are crucial aspects of Bermuda's natural heritage since they constitute some of the few remaining areas that actually

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support native flora and fauna. In light of this, all forms of development are precluded except for minor site works and pedestrian access trails that are associated with their maintenance, enjoyment or enhancement. In an effort to conserve and enhance the special qualities of these sites, CMPs are required.

7.1.3 Open Space Reserve

The Open Space Reserve zone provides environmental, visual and amenity value and links between the Railway Trail, Parks and other conservation lands. These tracts of land can be either grassed green areas or wooded areas. They provide important natural buffers between areas of development, thus serving to soften and enhance the landscape. Forms of development may include horse stables, riding schools, market gardens and horticultural nurseries. CMPs are encouraged and may be required for any development proposed within or that has an impact on an Open Space Reserve, as can be the case with properties with split zoning.

7.1.4 Parks

Parks are protected for their passive and active use and enjoyment in respect of both present and future generations. In addition to protection under the Development and Planning Act, they are also designated under the Bermuda National Parks Act, 1986, and may also comprise any other public amenity open space. CMPs are not normally required within the National Parks System since that Department has a program for the enhancement and protection of natural features and habitats.

7.1.5 Recreation

This zone identifies land for a variety of recreational activities. Protected areas include public and private playing fields, sports facilities and golf courses. Some of these recreational areas benefit from the presence of clusters of trees, shrubbery and other vegetation and CMPs are encouraged and may be required for their protection.

7.2 **Conservation Areas**

There are two (2) Conservation Areas which are overlays to the Base Zones. These are Agricultural Reserve and Woodland Reserve.

7.2.1 Woodland Reserve

The Woodland Reserve Conservation Area is designated specifically for the protection of woodlands. They include extensive belts of mature trees and other blocks of dense vegetation, which are considered to be important features of the landscape Bermuda's environment and visual appeal. Woodland Reserves may

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also include smaller areas of trees and shrubs in prominent locations. These areas create natural habitats for wildlife and also serve as windbreaks for protection for agricultural land.

Woodland areas contain a variety of plant and tree species which change over time and the underlying objective is the protection of these areas, whether they contain protected, endemic, native, introduced or invasive species, to ensure that the land resource and vegetation may be preserved over the course of time. Although Woodland Reserve areas may contain open space areas with dispersed vegetation, cliffs, rocky formations, ditches, ponds and other natural or man made features, these all play an integral role in terms of the overall value and therefore, need to be protected as part of the wider scheme. CMPs are required for any development or management work within a Woodland Reserve Conservation Area.

Woodland Reserve Conservation Areas are susceptible to damage from the effects of naturally occurring events such as hurricanes and flooding. They may also be impacted by fire, vehicle damage, insects, carelessness, non conforming land uses and materials storage. In such circumstances, every effort should be made to re-establish these areas. Property owners are encouraged to submit a CMP detailing the restoration works. A minimum setback of 15 feet is suggested for development abutting a Woodland Reserve Conservation Area.

7.2.2 Agriculture Reserve

The Agriculture Reserve Conservation Area focuses on agricultural uses and the protection of agricultural land, utility of arable areas and the protection of soil. These areas support farming and horticultural uses like the cultivation of vegetables, fruit, flowers, forage, market gardens and nursery grounds. They also provide for dairy farming and the breeding, keeping and grazing of agricultural livestock. Agricultural Reserve Conservation Areas are also preserved for their natural and aesthetic value and for providing visual and amenity buffers between and within development areas consistent with the Bermuda Image. New development is only permitted in exceptional cases and a minimum setback of 15 feet is required from areas of Agricultural Reserve to allow for soil water retention, a pesticide buffer, shading and a turning radius for farm vehicles.

A CMP is required for any management work that will be undertaken within an Agricultural Reserve area. CMPs are encouraged and may also be required for any development that is to be located within a 15 feet setback distance or which impacts upon an Agricultural Reserve.

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7.3 *Development Base Zones*

At the discretion of the Board, CMPs may also be required for lands within any Development Base Zone, once the Board is satisfied that there exist certain environmental or physical aspects of that particular site that merit protection. The case of woodland areas and listed protected species illustrates this point. Areas of woodland that have not been designated as Woodland Reserve may still be found in many other zones, including Development Zones. However, they still make an important contribution to the overall amenity and biodiversity of the island. Such areas entail a mixture of trees, shrubs and vegetation that should be protected for their visual and habitat value and their contribution to the setting and amenity of existing developed areas as well as adjacent Conservation Areas. Plants and plant communities can enhance property values, protect landowners against environmental damage, conserve energy and promote site security as well as many other benefits.