Guidelines for Construction and Alteration at Cape Cod Gateway Airport

ABOUT CAPE COD GATEWAY AIRPORT

Cape Cod Gateway Airport (formerly Barnstable Municipal Airport) serves as a distinct commercial transportation hub for the residents of the Town of Barnstable and Cape Cod by meeting the regional demand for air transportation. For some, it provides very affordable and economic travel opportunities from Hyannis to other major destinations across the country, and yet for others, the airport provides a much needed mode of travel to and from the Islands of Nantucket and Martha's Vineyard. This includes travel, tourism, and for a large professional labor force, a means to commute to jobs. Airport activity also include a vast array of commercial charter passenger services, flight training for on-airport businesses, and general aviation activities that include: private and corporate passenger and freight services, aviation flight services, aircraft and engine repair and maintenance, and aircraft instrument repair and maintenance. From Hyannis, travelers are afforded many flight opportunities, to local and national destinations, including Nantucket and Martha's Vineyard, Boston, New York City and beyond. The Cape Cod Gateway Airport is a connection and "Gateway" to the national aviation transportation system and completes the multi-modal connections for Barnstable, Cape Cod and the Islands.

Cape Cod Gateway Airport is home to over 45 businesses that employ a workforce of nearly 1,725. As documented in the Massachusetts Department of Transportation (MassDOT) Aeronautics Division FY2018 Economic Impact Analysis, the Airport, and in conjunction with its tenants and associated businesses, provides an annual payroll in excess of $73.8 million, and a regional economic output in excess of $157.2 million.

In 2018, the Airport completed its Airport Business Plan, a document developed over 18 months in coordination with the Airport Commission and airfield tenants. The plan sets out the Airport's future goals, objectives and tasks with strategies for achieving them. The plan includes short and long-term goals to improve facilities for airport users and increase economic activity. The goals are subjective in nature with priorities outlined within each fiscal year (July 1 – June 30). Within the fiscal year, the goal is not to achieve 100% completion as many goals stretch from one fiscal year to the next. However, the objective is to make a concerted effort within the fiscal year with emphasis on the highest priority tasks within that timeframe.

The goals are outlined below and as various objectives and tasks within each goal are implemented, the Airport will do so in a manner that reflects these Guidelines for Construction and Alteration.

- Goal A - Maximize General Aviation Activity at HYA
- Goal B - Diversity Revenue Streams
- Goal C - Become Regional Air Transportation Leader
- Goal D - Enhance Airport Image & Branding

Cape Cod Gateway Airport is managed by a seven member Airport Commission appointed by Barnstable Town Council. The Airport is one of nine Enterprise Funds within the Town of Barnstable and is a Department of the Town of Barnstable. As an Enterprise Fund, its budget is self-supporting through user-based charges and fees. The Town of Barnstable does not contribute monetarily in running the facility, and no General Fund monies

are used for Airport operations.

In FY2020 the Airport employed 23 full-time employees who operate and maintain the Airport 24 hours a day, 7 days a week, 365 days a year.

GUIDELINES FOR CONSTRUCTION AND ALTERATION STATEMENT OF INTENT

For over twenty years, the Airport Commission has worked with tenants to provide guidance on airport development for both new development and improvements to existing infrastructure that is either owned or leased by its tenants and associated businesses. Guidelines for Construction and Alteration were developed to assist tenants in receiving approvals from the Airport Commission for various development projects. Approvals also ensure: 1) that the proposed project does not impact other tenants or future plans outlined in the Airport Master Plan (i.e. other proposed short and long-term airport development), 2) that the proposed project does not impact airspace or Federal Aviation Administration (FAA) design standards, and lastly 3) that tenants comply with all appropriate regulations as may be promulgated by the Town of Barnstable, the Commonwealth of Massachusetts, and the Congress of the United States or its designated agencies or departments.

The intent of the update to the Airport's Guidelines for Construction and Alteration is twofold:

To provide tenants with guidance for Airport Commission approval; and
To encourage tenants to build/develop using green practices when implementing new development and/or improvements to existing infrastructure..

The intent of this update is to not only ensure that the above elements are being addressed, but to also encourage environmentally responsible "green" development of the Airport. Cape Cod's natural beauty, character and coastal and freshwater environments must be protected while at the same time supporting the Cape Cod community (residents, workers, and visitors) with the services and infrastructure needed to live and work on Cape Cod; a balance that protects both the region's resources with appropriate development and economic progress.

During the past 20 years, airports have placed much emphasis on green design and construction to help terminals, associated buildings and paved surfaces be more environmentally friendly and sustainable. However, the Cape Cod Gateway Airport's Guidelines for Construction and Alteration have not been updated to officially address green design and construction or to identify resources that help articulate ways to build/develop using green practices. Although the Airport and its tenants have implemented a number of projects or purchases that help reduce environmental impacts and help offset carbon emissions, the guidelines themselves have never been updated to guide tenants in "green" design and implementation. See ***Appendix A*** – Cape Cod Gateway Airport "Gateway to Green".

The intent of the update to the Airport's Guidelines for Construction and Alteration is twofold:

- ***To provide tenants with guidance for Airport Commission approval; and***

Natural systems are an integral part of life on Cape Cod, providing drinking water and supporting the habitats and landscapes that draw people to the region, guiding development patterns, and driving the region's economy. Built systems are the human-made physical elements of the region - allow for people to live, visit, and work onthe Cape. Community systems are the social activities and qualities of the region, including the economy and cost of living, which depends on the health of both the natural and built systems.

- Cape Cod Commission 2018 Regional Policy Plan

- ***To encourage tenants to build/develop using green practices when implementing new development and/or improvements to existing infrastructure.***

In 1991, the Cape Cod Commission developed the first Regional Policy Plan (RPP) that, "…provides regional planning policies and objectives to guide development and protect the region's resources".[1] This policy has since been updated in 1996, 2002, 2009 and most recently in 2018.

Just as the RPP is focused around the interconnected systems of the natural, built, and community systems on Cape Cod, implementation of new development and improvements to existing infrastructure on Airport encourages tenants to consider these systems and alternatives that balance the region's resources with appropriate development and economic progress.

RESOURCES - GUIDELINES FOR CONSTRUCTION AND ALTERATION

The "green" design and implementation of airport buildings refers to development considerations that include "green" design and "green" buildings as well as improvements for resource-efficient operation and management of various facilities from a life-cycle perspective. This includes implementation of a "green" development process: planning, design, construction, operation, maintenance, refurbishment, and demolition.

Airports already provide transportation that is efficient, affordable, safe and convenient. They also can be sustainable. As airports expand, so too does their environmental footprint, with more energy required to power buildings, ground transport vehicles and the creation of infrastructure. Many airports across the world have adopted environmentally sustainable elements into their designs and operation strategies, as well as subscribed to eco-friendly initiatives. Such initiatives are centered around smart buildings, renewable energy, green mobility, climate change resiliency, community engagement and sustainability reporting.

[1] https://www.capecodcommission.org/our-work/rpp

Cape Cod Gateway Airport wants to be responsive to the environment that surrounds us and do our part in reducing our impact. Therefore tenants planning to erect a new structure or make improvements or alterations to an existing structure are asked to identify how their project is going to utilize energy saving construction techniques, materials, and equipment, and also to incorporate renewable energy production such as solar arrays or wind energy into their designs so that the tenant can include resource-efficient operation and management of the airport building from a life-cycle perspective.

The Cape Cod Commission's Regional Policy Plan is a good resource for tenants wishing to identify development considerations that include "green" design and "green" buildings. See plan here: https://www.capecodcommission.org/our-work/rpp.

Additionally, and more specifically, the Cape Cod Commission's RPP Technical Guidance Bulletins on Energy, Waste, and Community Design are a great resource. The Technical Guidance Bulletins will help tenants determine if a project is consistent with applicable RPP goals and objectives, and alternatively, to detail how an applicant could design and pursue its project to meet the applicable RPP goals and objectives. See ***Appendix B*** or the links below.

- Energy https://www.capecodcommission.org/resource-library/file/?url=/dept/commission/team/Website_Resources/regulatory/tech_bulletins/Energy_Technical_Bulletin_2019.pdf
- Waste https://www.capecodcommission.org/resource-library/file/?url=/dept/commission/team/Website_Resources/regulatory/tech_bulletins/Waste_Management_Technical_Bulletin_2019.pdf
- Community Design https://www.capecodcommission.org/resource-library/file/?url=/dept/commission/team/Website_Resources/regulatory/tech_bulletins/Community_Design_Technical_Bulletin_2019.pdf

Additional resources can be found via local and statewide organizations. These resources can help tenants identify development considerations that include "green" design and "green" buildings. As of 2020, many organizations on Cape Cod and within the state of Massachusetts have developed plans and grants available to assist with your design and build projects; they include:

- Cape Light Compact https://www.capelightcompact.org/
- Cape Cod Commission https://www.capecodcommission.org/
- The Cape & Vineyard Electric Cooperative (CVEC) http://www.cvecinc.org/
- Cape Cod Climate Change Collaborative https://capecodclimate.org/
- Cape & Islands Green https://capecdp.org/sustainable-future/cape-island-green
- Cape & Islands Self Reliance https://selfreliancefuelcoop.org/
- Massachusetts Clean Energy Center https://www.masscec.com/
- Massachusetts Department of Energy Resources (DOER) https://www.mass.gov/orgs/massachusetts-department-of-energy-resources

By building "green", tenants should strive to save energy, minimize waste, reduce emissions, conserve water, and reduce their operating costs as they erect new structures or make improvements or alterations to existing structures on airport property.

Cape Cod Gateway Airport encourages tenants to adopt sustainable building practices as part of our "Gateway to Green" initiative and to do our part to reduce environmental impact. The following identifies the upcoming "Gateway to Green" projects at the airport, while ***Appendix A*** outlines past projects.

- Griffin Avionics will be implementing a rooftop solar array system on their facility in 2021/2022.
- Main terminal vehicular parking lot solar canopies – date TBD
- Cape Air all electric aircraft fleet – date TBD

Gateway to Green takes an airport!

Let's work together and think of environmentally friendly actions and design for new structures or to make improvements or alterations to an existing structure by identifying elements of design to help offset carbon emissions.

APPLICATION AND APPROVAL PROCESS

Prior to any submission to the Commission, the applicant will complete the following:

- ***Meeting with Airport Management***
  - At a preliminary stage, meet with the Airport Manager to review and discuss the proposal in concept.
  - The intent of this meeting is to discuss and review any information or reference materials that may be required prior to initiating a proposal.
  - It should be noted that it is the applicant's responsibility to obtain directly from the source, any and all information and/or reference materials, which may be required to ensure the project's regulatory compliance. Any reference materials, which may be provided by the Commission, the Manager, or its agents are advisory in nature only.
- ***Project Proposal***
  - The applicant will then submit to the Airport Manager, at least 10 days prior to the next scheduled Commission meeting **a detailed proposal that includes as a minimum, all of the items listed below.** All plans should be drawn to scale, and be signed by a Professional Engineer registered in the Commonwealth of Massachusetts. ***Only digital files will be accepted (no paper files).***
  - A written description of the project identifying the principals involved in the proposal, the scope of the project, projected completion dates, intended uses for the facility and property, a listing of planned construction contractors if known, a cost estimate, a list of any appropriate state local and federal permits required to complete construction, as well as a Notice of Intent or a Determination of Applicability from the Barnstable Conservation Commission.

- ***"Gateway to Green"*** Implementation Proposal
  - The applicant will identify how their project will incorporate energy savings and/or solar renewable energy elements to live up to the "Gateway to Green" concept. The tenant is asked to develop a comparative design analysis that incorporates standard versus environmentally friendly design so as to understand the savings (both monetarily and energy wise)
  - "Gateway to Green" design implemented into the plan with estimate of impact and reductions to the environment noted.
  - For "Gateway to Green Design", the applicant should highlight the following:
    - Cost reductions associated with the proposed development using "green technologies"
    - Funding availability to implement "green technologies"
    - Management support
    - Community relations
    - Environmental compliance (using Cape Cod Commission Regional Policy Plan as a guide)
    - Environmental compliance tracking/activity
- A site plan of the area drawn to scale, detailing the relationship and distances of all proposed improvements (existing and proposed): nearby aircraft operating surfaces, structures, facilities, utilities, roadways, boundaries, property lines, and any delineated wetlands. This plan should include grade and contour information for the area as is existing and proposed. The area that is to be leased from the Commission should be depicted and specify the square footage of the area. Any future improvements planned for the area by the applicant, should also be depicted and labeled.
- A side view of the facility drawn to scale depicting all elevations above sea level associated with the surrounding terrain, overall height of the structure at its highest point, the overall height at the point closest to both runways, as well as the distances to the center line of both runways at the nearest intersecting perpendicular point. A depiction of compliance with all Federal Aviation Administration (FAA) and Massachusetts Department of Transportation (MassDOT) - Aeronautics Division obstruction standards, and completion of the following:
  - An FAA Obstruction Evaluation / Airport Airspace Analysis (OE/AAA) via FAA Form 7460-1, Notice of Proposed Construction or Alteration. https://oeaaa.faa.gov/oeaaa/external/portal.jsp;
  - A MassDOT - Aeronautics Division Airspace Review via https://www.mass.gov/massdot-aeronautics-airspace-review
- The construction plans submitted would include as a minimum a site plan, floor plan, architectural elevation drawings, pavement strength and drainage design details, and shop drawings and design certifications on any appurtenance that may be proposed.
- All information presented in the proposal will be correct and accurate. The Commission reserves the right to require that the applicant's engineer verify all information and details provided within the plan.
- Upon review, the Commission reserves the right to request any additional information deemed necessary to evaluate the proposal and/or its impact on Airport operations. The

Commission further reserves the right to approve applications with such stipulations, rules and/or requirements as may be deemed necessary. The applicant must also submit documentation to show financial ability to complete the project.

- Upon acceptance by the Commission, and if necessary, a copy of these plans will be submitted to the New England Region Airports Division of the Federal Aviation Administration, and the Massachusetts Department of Transportation - Aeronautics Division Airport Engineering Office for review and concurrence.

CONSTRUCTION AND ACCEPTANCE PROCESS

- The Applicant, having received the Commission's final approval for the project, must then obtain any permits or authorizations from the Town of Barnstable, Cape Cod Commission, or any other Governmental Agency having jurisdiction over construction, development and operation of the facility.
- All construction planned within or adjacent to the Airport Operations Area will be designed and constructed in accordance with applicable Federal Aviation Administration Regulations and Advisory Circulars, including but not limited to AC 150-5300-13A "Airport Design" and AC 150-5340-1M "Standards for Airport Markings", AC 150-5320-6F "Airport Pavement Design and Evaluation".
- After receiving all of the appropriate authorizations listed above, and prior to the commencement of any site preparation or construction, the applicant will enter into such lease and/or land use agreements required and approved by the Commission and Airport Legal Counsel. Prior to any work being performed, the applicant and contractor will hold a pre-construction conference with the Airport Manager to coordinate operational procedures, policies, and needs. Any changes to the plans previously approved by the Commission will be submitted and approved in writing prior to implementation in construction.
- Prior to any work being performed, the applicant will provide the Commission with evidence of adequate personal liability and property damage insurance during the construction phase, and documentation that all contractors are adequately insured and licensed. Insurance will be in an amount determined by the Commission at the time of project approval. This insurance will remain in effect until such time the Commission accepts the completed project.
- The Commission and Airport Manager reserve the right to temporarily suspend construction at any time if, in the sole determination of the Commission or the Airport Manager, the construction is not proceeding according to the authorized construction plan, unnecessarily hinders the operation of the airport, or presents any unsafe condition. This suspension will be immediate and continue until the situation or hazard has been corrected to the Commission's or Airport Manager's satisfaction.
- All areas and systems of the Airport affected by the project will be adequately protected from hazard, damage or hindrance. The areas affected by the construction will be returned to an original or improved condition. Adequate protection will be in place throughout the construction process to prevent the discharge of silt and erosion caused by air movement and water. All areas cleared of natural cover, but not improved, will be replanted with permanent vegetation.
- After project completion and associated final permits have been obtained, the Commission will inspect the facility for compliance and final acceptance. Those items, which are incomplete or substandard, will be conveyed to the tenant in writing for correction and/or improvement. Final

acceptance and authorization to utilize the facility or improvement will be granted only after all of the substandard conditions have been corrected. The facility will not be occupied nor utilized in any fashion until such authorization has been granted by the Commission.

- The Commission reserves the right to act as sole judge of project completion, and will utilize any legal remedy necessary to correct and/or prevent substandard conditions from existing or continuing. The granting of any authorization or licensure by any other Governmental Agency does not guarantee the approval or acceptance of the Commission.
- The applicant will provide engineers prepared and signed "As Built or Record" drawings to the Commission within 30 days of project completion, accurately depicting all improvements associated with the project for inclusion on the Airport Layout Plan.

Any questions should be referred to:

Cape Cod Gateway Airport
Attn: Airport Manager
480 Barnstable Rd. Hyannis, MA 02601
(508) 775-2020

Appendix A – Cape Cod Gateway Airport – Gateway to Green

CAPE COD GATEWAY AIRPORT (HYA) ENVIRONMENTAL STEWARDSHIP

YOUR GATEWAY TO THE WORLD

The Cape Cod Gateway Airport is proud to present our stewardship efforts to protect the environment on the airport property as well as within the community at-large. These stewardship efforts have been on-going for many years. We track our progress when measurable. The Airport is a large economic contributor to the surrounding communities and we take pride in our ability to connect people and be good neighbors. Our environmental stewardship measures continue to grow and improve. We work hard to find new ways to reduce our footprint.

Katie Riley Servis, Airport Manager

STEWARDSHIP HIGHLIGHTS

- No pesticides are used anywhere on the airport property.
- No road salt or deicing fluids or chemicals are used to treat runways or aprons (i.e., aircraft parking areas).
- Fire Fighting Foam used for training is captured in an Ecologic Cart that prevents its release into the environment.
- Regular inspections occur throughout the property to ensure compliance.
- Prevention measures have been conducted to avoid release of oil and hazardous substances to the environment.
- 100% of the stormwater discharged to Upper Gate and Lewis ponds undergo pre-treatment to remove suspended solids, hydrocarbons, and debris.

480 Barnstable Rd, Hyannis, MA 02601

www.flyHYA.com (508) 775 - 2020

Katie Riley Servis, Airport Manager

Matthew T. Elia, Assistant Airport Manager

HYA is located near surface and groundwater resources. We actively protect these water resources that are valued and necessary to support our community.

WATER RESOURCE PROTECTION

- No pesticides are used anywhere on the airport property.
- No road salt or deicing fluids or chemicals are used to treat runways or aprons (i.e., aircraft parking areas).
- All oil and hazardous materials are managed under a Stormwater Pollution Prevention Plan (SWPPP) and a Spill Prevention Control and Countermeasures Plan (SPCCP). The Plan dictates storage, containment and disposal requirements.
- 100% of stormwater that is discharged to Upper Gate and Lewis ponds undergo pre-treatment in five "Vortech" stormwater treatment units that are located underground. The units trap and retain trash, debris, and sediment from stormwater runoff. They remove 81 to 87% of total suspended solid and 67% of total petroleum hydrocarbons (TPH).
- Seven bioretention basins collect stormwater from the Rectrix Aerodrome Center, Inc. (Rectrix/Ross Aviation) site as well as its associated aircraft parking area, access road, and several parking lots. The bioretention basins use plants, soil, and microbes to treat stormwater prior to discharge to an infiltration basin.

STATE-OF-THE-ART DEICING

Since 2015, a designated aircraft deicing and washing facility has been in-place. Liquids are captured within a contained system. This facility was approved by MassDEP, Cape Cod Commission, Barnstable Department of Public Works, and Barnstable Water pollution Control Division.

CAPE COD GATEWAY AIRPORT (HYA) ENVIRONMENTAL STEWARDSHIP

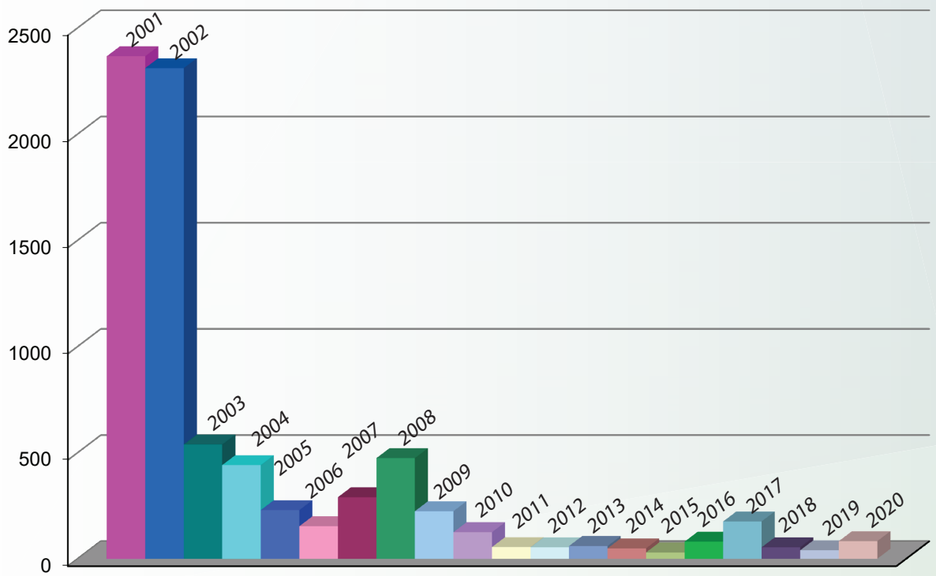
NOISE

We are very conscious of our location near many residents that have made Barnstable, Yarmouth and Cape Cod their home. We work cooperatively with the users of the airport to reduce aircraft noise and maintain a constructive dialogue with neighbors who may be affected.

FLY NEIGHBORLY PROGRAM

- We employ a noise abatement coordinator who receives and investigates all noise complaints received on our designated noise complaint phone number.
- We have established voluntary quiet hours between 10 p.m. and 6 a.m. During these times, airlines and general aviation operators are encouraged to limit their flights so that citizens in neighboring communities are not disturbed during normal sleeping hours. In addition, pilot training, touch- and-go and certification flights are prohibited during quiet hours without approval of the airport management.

Since 2001, our efforts have resulted in a dramatic decrease in noise-related complaints



GREEN ENERGY

Energy use is declining due to numerous initiatives that have been implemented over the past decade. We hold ourselves accountable to continually reduce and improve our energy use and efficiency. We take advantage of federal and state funding to achieve our goals. A list of notable accomplishments follows.

- We currently maintain two solar fields (24,640 solar panels in total) on the northern side of the property, occupying approximately 20 acres on Airport property and the adjacent Fire District property. The solar fields generate approximately 6.7 megawatts (direct current or DC) of energy and are estimated to offset more than 5,000 metric tons of CO_2 emissions annually.
- The solar fields have reduced our electricity costs by over $590,000 annually. This reduction allows the Airport and Fire District to be better positioned to support other important services for residents.
- Two aircraft hangars, leased to Cape Air, have roof mounted solar arrays.
- Using the Cape Light Compact's lighting program, we have upgraded our street and parking lot lights to LED fixtures.
- Eight electric vehicle charging stations have been installed at two parking lots.
- We are in the process of purchasing electric, solar, or propane operated mowing equipment.
- Since 2019, the Airport Administration Office has greatly reduced paper use by moving to digital footprint in various processes. We also now use reusable plates, cups and cutlery for in-office staff.

HAZARDOUS MATERIALS & PFAS DISCHARGE PREVENTION

As a commercial service airport, we have been required by FAA to use specific firefighting foam, for emergencies and training, that contains compounds known as per and polyfluoroalkyl substances (or PFAS). To avoid any further discharge of PFAS we have been using an "Ecologic Cart" system since 2016. The system allows for the required annual training and testing but prevents the discharge of the firefighting foam to the ground. Regular inspections occur at all facilities to inventory hazardous materials as well as spill containment kits. The kits are maintained and located throughout the facilities for quick deployment in the event of a release of a hazardous material or petroleum substance.

Appendix B - Cape Cod Commission's Regional Policy Plan Technical Guidance Bulletins on Energy, Waste, and Community Design

Energy

This guidance is intended to clarify how the Energy Goal and Objectives of the Regional Policy Plan (RPP) are to be applied and interpreted in Cape Cod Commission Development of Regional Impact (DRI) project review. This technical bulletin presents specific methods by which a project can meet these goals and objectives.

Energy Goal: To provide an adequate, reliable, and diverse supply of energy to serve the communities and economies of Cape Cod.

- ***Objective EN1*** *– Support renewable energy development that is context-sensitive*
- ***Objective EN2*** *– Increase resiliency of energy generation and delivery*
- ***Objective EN3*** *– Minimize energy consumption through planning and design (including energy efficiency and conservation measures)*

The applicability and materiality of these goals and objectives to a project will be determined on a case-by-case basis considering a number of factors including the location, context (as defined by the Placetype of the location), scale, use, and other characteristics of a project.

THE ROLE OF CAPE COD PLACETYPES

The RPP incorporates *a framework for regional land use policies and regulations based on local form and context* as identified through categories of Placetypes found and desired on Cape Cod.

The Placetypes are determined in two ways: some are depicted on a map contained within the RPP Data Viewer located at www.capecodcommission.org/RPPDataViewer adopted by the Commission as part of the Technical Guidance for review of DRIs, which may be amended from time to time as land use patterns and regional land use priorities change, and the remainder are determined using the character descriptions set forth in Section 8 of the RPP and the Technical Guidance.

The project context, as defined by the Placetype of the location, provides the lens through which the Commission will review the project under the RPP. Additional detail can be found in the Cape Cod Placetypes section of the Technical Guidance.

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NOTE ON APPLICATION MATERIALS, DEFINITIONS, RESOURCES AND REFERENCES

Application materials should provide sufficient detail to demonstrate that the project meets the applicable Objectives, but typically include a project narrative, energy system documentation and specifications, and a detailed site plan. See guidance on page EN-14 for more information.

A list of references and resources are provided on page EN-15.

INTRODUCTION

Energy policy and regulation in Massachusetts originates and is largely administered and implemented at the state level. The Commonwealth's Energy Facilities Siting Board is the permitting authority for large scale energy generation, distribution and transmission projects, balancing the relative cost, reliability and environmental impacts in its siting and design review of such infrastructure.

Closely aligned with general energy policy and regulation, Massachusetts also has climate change regulation and policy, which promotes renewable energy sources, storage and greenhouse gas emissions reduction. State law also sets an energy storage target for electric distribution companies and the delivery of clean energy during seasonal peak hours. Massachusetts' Global Warming Solutions Act sets targets on greenhouse gas emissions reduction and contains directives to certain state agencies to act regarding renewable energy development and greenhouse gas emissions reduction. The Massachusetts Green Communities Act is companion legislation directed to municipalities in Massachusetts, which supports the state's overall climate change and clean energy approach. This legislation creates incentives for municipalities to adopt energy efficiency and conservation measures, promote renewable energy development and pursue greenhouse gas emissions reduction strategies.

The Commission plays a distinct role in a complex network of energy policy and regulation. Regional energy policy under the RPP is intended to support and fit within the Commonwealth's established policy and regulatory framework (and the larger New England energy grid): it is not intended to be independent of the Commonwealth's approach, and the Commission cannot and does not implement state energy policy and regulation directly. Further, the Commission's regional energy policy considerations are broader than, though consistent with, the particular energy issues addressed in the context of its regulatory review for individual projects.

The primary purpose of the Energy Goal and Objectives in the RPP are to ensure an adequate, reliable, and diverse supply of energy to serve the communities and economies of Cape Cod. Energy efficient design, conservation measures, and diverse energy sources, including renewable and alternative energies, support the availability and adequacy of supply. These strategies also mitigate the effects of climate change,

important in a coastal region like Cape Cod that is especially susceptible to climate change impacts.

In Section 7 of the RPP, Coordinated Regional and Local Planning, Renewable Energy Planning and Development, the Commission states preference for energy generation projects that are not located on greenfield sites or in areas of potential natural resource or water resource impacts. The Commission's preference is for on-site renewable energy generation. In the future the Commission will develop specific guidance for the siting and design of on-site renewable energy systems.

This Technical Guidance provides examples of various methods and strategies that DRI projects may use to satisfy the RPPs Energy Goal and Objectives. These methods or strategies deal generally with building and operational energy efficiency and conservation, renewable energy and energy storage, and the general provision of adequate and reliable energy infrastructure. The Commission recognizes that redevelopment projects have unique development considerations. The Energy Goal, Objectives, and methods apply over a wide array of development, according to the type of development or use proposed: from utility-scale energy infrastructure as a principal use, to building and other development projects where energy use is an ancillary design and operational consideration.

SUMMARY OF METHODS

GOAL | ENERGY

To provide an adequate, reliable, and diverse supply of energy to serve the communities and economies of Cape Cod.

OBJECTIVE EN1 – Support renewable energy development that is context-sensitive

METHODS

- Enter into a "Green" power purchase agreement; and/or,
- Incorporate on-site renewable energy generation or alternative energy use, including but not limited to: solar photovoltaic (PV), wind, solar thermal, geothermal, solar carport, fuel cells, the use of biofuels

Projects with energy generation, distribution, or storage as a primary purpose:

- Describe how the project incorporates renewable energy generation or supports Massachusetts' overall approach to a Clean Energy future
- Considerations in siting and design:
    - Minimize tree clearing/encourage the use of existing developed sites;
    - Adequately screen equipment from public view to avoid detrimental visual impacts;
    - Use non-toxic transformer and other fluids;
    - Locate in areas of similar and compatible types of use and development;
    - Provide stormwater management appropriate to scale of project.

OBJECTIVE EN2 – Increase resiliency of energy generation and delivery

METHODS

- Protect infrastructure by locating utilities underground;
- Manage for peak demand and power outages by incorporating energy storage technology, including but not limited to storage batteries or technology, emergency backup generator.

OBJECTIVE EN3 – Minimize energy consumption through planning and design (including energy efficiency and conservation measures)

METHODS

- Design to earn LEED Certification;
- Design to earn Energy Star® Certification;
- Incorporate building design elements, including but not limited to:
    - Perform a pre-development or redevelopment energy audit, incorporate recommendations to maximum extent practicable
    - Combined Heating and Power (CHP) system
    - Passive heating/cooling/lighting, including building orientation/solar exposure
    - Energy efficient lighting
    - Building envelope conservation measures
    - Green roof
    - Building design meets "Stretch Code"
- Incorporate site design elements, including but not limited to:
    - Electric vehicle charging stations
    - Energy efficient lighting
    - Shade over paved areas using vegetation or structures
    - Provide open grid or permeable pavement
- Incorporate operational elements, including but not limited to:
    - Green vehicles for automobile fleets

DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE EN1

Objective EN1 *– Support renewable energy development that is context-sensitive*

The purpose of Objective EN1 is to support an adequate and diverse supply of energy for and to Cape Cod. The following is a discussion of the methods that may be implemented to meet Objective EN1.

DRI Applicants may, in whole or in part, generate their own renewable power or incorporate alternative energy use, purchase renewable or alternative ("green") power from energy suppliers, or, a combination of both.

Green Power Purchase

Under the Massachusetts Renewable Energy Portfolio Standard (RPS), for every megawatt hour (MWh) of electricity added to the New England electric grid from a renewable energy generator, a Renewable Energy Certificate (REC) is generated. These RECs are available for purchase, supporting the Commonwealth's goal to increase renewable energy generation. The Alternative Energy Portfolio Standard (APS) is a similar approach that focuses on the sale and purchase of renewable energy generated from alternative methods, such as biofuels, geothermal technology, or food waste, as examples. The sales and purchase of RECs claim a portion of the renewable energy generated regionally and added to the regional electric grid for use. Options for the purchase of renewable energy power may include a Power Purchase Agreement (PPA) or Net Metering Credit Purchase Agreement (NMA) with an electric utility provider or a third-party energy provider.

DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE EN2

Objective EN2 *– Increase resiliency of energy generation and delivery*

The purpose of Objective EN2 is to support the availability of an adequate and diverse supply of energy for and to Cape Cod. By increasing the energy resiliency of development, long-term energy savings, reduced impact on the environment, and less strain on the energy grid may be realized. Applicants are encouraged to propose alternate methods not listed below based on best practices for the type of project proposed, or as new technologies are developed and available. The following is a discussion of the methods that may be implemented to meet Objective EN2.

Underground Utilities

DRI Applicants may locate on-site utilities for development underground, except where the presence of natural features such as wetlands or archaeological resources prevent such placement.

Manage for Peak Demand

Managing energy use for "peak demand" (times during the day when overall energy use is the highest), known as demand response, can reduce strain on energy generators which can cause power outages and decrease end user costs by reducing energy use when demand is highest, and often most costly. For energy consumers this is known as Demand-side Management (DSM), where managing energy use for peak demand may not decrease total energy consumption but may reduce the need for energy infrastructure needed to meet the highest periods of energy use. One example of managing energy use for peak demand is through energy storage technology that can store energy off peak hours for use during peak hours, including but not limited to storage batteries, fuel cells, or emergency backup generators. For energy generators, Supply-side Management (SSM) focuses on providing customers with an adequate supply of energy during peak demand by incorporating energy infrastructure to support generation, distribution, and transmission.

DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE EN3

Objective EN3 *– Minimize energy consumption through planning and design (including energy efficiency and conservation measures)*

The purpose of Objective EN3 is to promote energy conversation, which supports Objectives EN1 and EN2 to promote an adequate and diverse supply of energy for and to Cape Cod. By increasing the energy efficiency of development, long-term energy savings, reduced impact on the environment, and less strain on the energy grid may be realized. The following is a detailed discussion of the methods to meet Objective EN3.

Designed to Earn LEED Certification

Leadership in Energy and Environmental Design (LEED) is a green certification program of the US Green Building Council (USGBC) for building design, construction, operations, and maintenance. Green Business Certification Inc. (GBCI) administers LEED certification.

The LEED program uses a rating system of methods incorporated into a project to achieve credits towards a certification level: Certified (40-49 points), Silver (50-59 points), Gold (60-79 points), Platinum (80+ points). Methods to achieve LEED credits vary by the project type.

The categories of LEED rating systems are:

- Building Design and Construction (BD+C) (example attached)
- Interior Design and Construction (ID+C)
- Building Operations and Maintenance (O+M) (example attached)
- Neighborhood Development (ND)
- Homes
- Cities and Communities

Applicants who choose this method should have a project designed to achieve at minimum the LEED certification level "Certified" (40-49 points). *Applicants do not have to seek certification through Green Business Certification Inc*. but must provide information that the project is certifiable.

Designed to Earn Energy Star® Certification

Energy Star® is a joint program of the US Environmental Protection Agency (EPA) and US Department of Energy (DOE) that certifies energy efficient products and building development. Energy Star® building certification compares your buildings energy use, design, and operations to similar buildings around the country, on a scale of 1-100 where a score of 50 represents median energy performance and a score of 75 or higher means your building performs better than at least 75% of similar buildings nationwide. For a building to be eligible for Energy Star® certification a building must earn an Energy Star® score of 75 or higher.

Applicants utilizing this method should have a project designed to achieve an Energy Star® score of 75 or higher. *Applicants do not have to seek certification through Energy Star®* but must provide information that the project is certifiable.

Building Design

The aim of this method is to minimize energy consumption and maximize energy efficiency and conservation through building design and the use of energy efficient building systems. Applicants are encouraged to propose alternate methods to meet Objective EN3 based on best practices for the type of project proposed, or as new technologies are developed and available.

PERFORM A PRE-DEVELOPMENT OR REDEVELOPMENT ENERGY AUDIT

Applicants may perform an energy audit of proposed building design and systems for proposed and/or existing conditions, performed by a qualified auditor, which includes recommendations for increased energy efficiency. Qualified auditors include but are not limited to licensed Professional Engineers, Certified Energy Managers, LEED Accredited Professionals, and Building Performance Institute Analysts.

INCORPORATE A COMBINED HEATING AND POWER (CHP) SYSTEM

Applicants may incorporate a CHP system into the project design, which is a suite of technologies that can use a variety of fuels to produce electricity and use the heat created from the power generation process to provide heating and/or cooling.

GREEN ROOF

A green roof may be proposed over the entire roof or a portion thereof.

BUILDING DESIGN MEETS "STRETCH CODE"

The Massachusetts building code is based on the International Energy Conservation Code (IECC). In 2009 Massachusetts became the first state to adopt an above-code appendix to the "base" IECC building energy code, called the Stretch Code. The Stretch Code emphasizes energy performance and is designed to result in cost-effective construction that is more energy efficient than a building built to the "base" energy code.

GENERAL APPLICATION REQUIREMENTS

As applicable:

- Documentation on what percentage of project energy use will be purchased through a green power purchase agreement. Any green power purchase must have a term of no less than five (5) years. Provide documentation on the term of the purchase.
- Documentation and specifications on what type of renewable or alternative energy will be used, the system size in kilowatts (kW), and a projection of the annual kilowatt hours (kWh) to be offset.
- Site Plan showing utility locations and appropriate specifications for locating those utilities underground.
- Documentation and specifications for energy storage technology systems, a narrative describing how the system is incorporated into the building design and operations, a Site Plan showing energy storage location with appropriate specifications.
- Letter from a licensed LEED Accredited Professional describing which certification level the project has been designed to achieve, a description of the project design, and LEED checklist for appropriate project category.
- Statement of Energy Design Intent (SEDI) signed by a licensed professional engineer or architect.
- An energy audit with a project narrative detailing how recommendations from the energy audit will be incorporated into the project design to the maximum extent practicable.
- A project narrative description of chosen features relative to building design, site design, or operations.
    - When proposing a CHP system, Applicants should provide documentation and design specifications on the type of system.
    - A description of the green roof should be included in the project narrative, including a description of the type of system to be installed, vegetation cover types, and maintenance requirements.
    - A description of how the building has been designed to meet the Stretch Code.

REFERENCES AND RESOURCES

Massachusetts Energy Consumers Alliance – https://www.massenergy.org

Massachusetts Department of Energy Resources (DOER) – https://www.mass.gov/orgs/massachusetts-department-of-energy-resources

Massachusetts Green Communities Act – https://malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter169

Massachusetts General Law (MGL) Chapter 25A Section 11F (RPS) and Section 11F1/2 (APS)

Code of Massachusetts Regulations 225 CMR 14 and 15 (RPS), 16 (APS)

2018 'Act to Promote a Clean Energy Future' to date has been approved by MA Senate (S2545)

Guide to Purchasing Green Power, US Environmental Protection Agency, Updated September 2018 – https://www.epa.gov/greenpower/guide-purchasing-green-power

Cape Light Compact – https://www.capelightcompact.org

Massachusetts Clean Energy Center – http://www.masscec.com/

MassSave – https://www.masssave.com/

US Green Building Council – https://new.usgbc.org/

Energy Star – https://www.energystar.gov/

Code of Massachusetts Regulations 780 CMR (Massachusetts State Building Code)

Code of Massachusetts Regulations 780 CMR Appendix 115.AA (Stretch Energy Code)

LEED v4 for Building Design and Construction Checklist

LEED v4 for BD+C: New Construction and Major Renovation
Project Checklist

Project Name:
Date:

Y	?	N			
			Credit	Integrative Process	1

0	0	0	**Location and Transportation**		**16**
			Credit	LEED for Neighborhood Development Location	16
			Credit	Sensitive Land Protection	1
			Credit	High Priority Site	2
			Credit	Surrounding Density and Diverse Uses	5
			Credit	Access to Quality Transit	5
			Credit	Bicycle Facilities	1
			Credit	Reduced Parking Footprint	1
			Credit	Green Vehicles	1

0	0	0	**Sustainable Sites**		**10**
Y			Prereq	Construction Activity Pollution Prevention	Required
			Credit	Site Assessment	1
			Credit	Site Development - Protect or Restore Habitat	2
			Credit	Open Space	1
			Credit	Rainwater Management	3
			Credit	Heat Island Reduction	2
			Credit	Light Pollution Reduction	1

0	0	0	**Water Efficiency**		**11**
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
			Credit	Outdoor Water Use Reduction	2
			Credit	Indoor Water Use Reduction	6
			Credit	Cooling Tower Water Use	2
			Credit	Water Metering	1

0	0	0	**Energy and Atmosphere**		**33**
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
			Credit	Enhanced Commissioning	6
			Credit	Optimize Energy Performance	18
			Credit	Advanced Energy Metering	1
			Credit	Demand Response	2
			Credit	Renewable Energy Production	3
			Credit	Enhanced Refrigerant Management	1
			Credit	Green Power and Carbon Offsets	2

0	0	0	**Materials and Resources**		**13**
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
			Credit	Building Life-Cycle Impact Reduction	5
			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
			Credit	Construction and Demolition Waste Management	2

0	0	0	**Indoor Environmental Quality**		**16**
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
			Credit	Enhanced Indoor Air Quality Strategies	2
			Credit	Low-Emitting Materials	3
			Credit	Construction Indoor Air Quality Management Plan	1
			Credit	Indoor Air Quality Assessment	2
			Credit	Thermal Comfort	1
			Credit	Interior Lighting	2
			Credit	Daylight	3
			Credit	Quality Views	1
			Credit	Acoustic Performance	1

0	0	0	**Innovation**		**6**
			Credit	Innovation	5
			Credit	LEED Accredited Professional	1

0	0	0	**Regional Priority**		**4**
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1

0	0	0	**TOTALS**	**Possible Points:**	**110**

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

LEED v4 for Building Operations and Maintenance Checklist

LEED v4 for Operations & Maintenance: Existing Buildings
Project Checklist

Project Name:
Date:

Y	?	N				
0	0	0	**Location and Transportation**			15
			Credit	Alternative Transportation		15
0	0	0	**Sustainable Sites**			10
Y			Prereq	Site Management Policy		Required
			Credit	Site Development-Protect or Restore Habitat		2
			Credit	Rainwater Management		3
			Credit	Heat Island Reduction		2
			Credit	Light Pollution Reduction		1
			Credit	Site Management		1
			Credit	Site Improvement Plan		1
0	0	0	**Water Efficiency**			12
Y			Prereq	Indoor Water Use Reduction		Required
Y			Prereq	Building-Level Water Metering		Required
			Credit	Outdoor Water Use Reduction		2
			Credit	Indoor Water Use Reduction		5
			Credit	Cooling Tower Water Use		3
			Credit	Water Metering		2
0	0	0	**Energy and Atmosphere**			38
Y			Prereq	Energy Efficiency Best Management Practices		Required
Y			Prereq	Minimum Energy Performance		Required
Y			Prereq	Building-Level Energy Metering		Required
Y			Prereq	Fundamental Refrigerant Management		Required
			Credit	Existing Building Commissioning— Analysis		2
			Credit	Existing Building Commissioning—Implementation		2
			Credit	Ongoing Commissioning		3
			Credit	Optimize Energy Performance		20
			Credit	Advanced Energy Metering		2
			Credit	Demand Response		3
			Credit	Renewable Energy and Carbon Offsets		5
			Credit	Enhanced Refrigerant Management		1
0	0	0	**Materials and Resources**			8
Y			Prereq	Ongoing Purchasing and Waste Policy		Required
Y			Prereq	Facility Maintenance and Renovations Policy		Required
			Credit	Purchasing- Ongoing		1
			Credit	Purchasing- Lamps		1
			Credit	Purchasing- Facility Management and Renovation		2
			Credit	Solid Waste Management- Ongoing		2
			Credit	Solid Waste Management- Facility Management and Renovation		2
0	0	0	**Indoor Environmental Quality**			17
Y			Prereq	Minimum Indoor Air Quality Performance		Required
Y			Prereq	Environmental Tobacco Smoke Control		Required
Y			Prereq	Green Cleaning Policy		Required
			Credit	Indoor Air Quality Management Program		2
			Credit	Enhanced Indoor Air Quality Strategies		2
			Credit	Thermal Comfort		1
			Credit	Interior Lighting		2
			Credit	Daylight and Quality Views		4
			Credit	Green Cleaning- Custodial Effectiveness Assessment		1
			Credit	Green Cleaning- Products and Materials		1
			Credit	Green Cleaning- Equipment		1
			Credit	Integrated Pest Management		2
			Credit	Occupant Comfort Survey		1
0	0	0	**Innovation**			6
			Credit	Innovation		5
			Credit	LEED Accredited Professional		1
0	0	0	**Regional Priority**			4
			Credit	Regional Priority: Specific Credit		1
			Credit	Regional Priority: Specific Credit		1
			Credit	Regional Priority: Specific Credit		1
			Credit	Regional Priority: Specific Credit		1

0	0	0	**TOTALS**	Possible Points: **110**

Certified: 40-49 points, **Silver:** 50-59 points, **Gold:** 60-79 points, **Platinum:** 80+ points

Waste Management

This guidance is intended to clarify how the Waste Management Goal and Objectives of the Regional Policy Plan (RPP) are to be applied and interpreted in Cape Cod Commission Development of Regional Impact (DRI) project review. This technical bulletin presents specific methods by which a project can meet these goals and objectives.

Waste Management Goal: To promote a sustainable solid waste management system for the region that protects public health, safety, and the environment and supports the economy.

- ***Objective WM1*** *– To reduce waste and waste disposal by promoting waste diversion and other Zero Waste initiatives*
- ***Objective WM2*** *– Support an integrated solid waste management system*

The applicability and materiality of these goals and objectives to a project will be determined on a case-by-case basis considering a number of factors including the location, context (as defined by the Placetype of the location), scale, use, and other characteristics of a project.

THE ROLE OF CAPE COD PLACETYPES

The RPP incorporates *a framework for regional land use policies and regulations based on local form and context* as identified through categories of Placetypes found and desired on Cape Cod.

The Placetypes are determined in two ways: some are depicted on a map contained within the RPP Data Viewer located at www.capecodcommission.org/RPPDataViewer adopted by the Commission as part of the Technical Guidance for review of DRIs, which may be amended from time to time as land use patterns and regional land use priorities change, and the remainder are determined using the character descriptions set forth in Section 8 of the RPP and the Technical Guidance.

The project context, as defined by the Placetype of the location, provides the lens through which the Commission will review the project under the RPP. Additional detail can be found in the Cape Cod Placetypes section of the Technical Guidance.

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NOTE ON APPLICATION MATERIALS, DEFINITIONS, RESOURCES AND REFERENCES

Application materials should provide sufficient detail to demonstrate that the project meets the applicable Objectives, but typically include a project narrative and a detailed site plan. See guidance on page WM-11 for more information.

A list of references and resources are provided on page WM-12.

INTRODUCTION

The Commission may determine that Waste Management is a material issue for those DRIs where the proposed development involves or is likely to involve a significant amount of solid waste generation, or if solid waste handling or management is a principal purpose, use or component of the development.

The RPP's Waste Management Goal and Objectives are intended to support and further the Commonwealth's current Solid Waste Master Plan (2010-2020), which has the primary purpose of making way for a "Zero Waste" future in the Commonwealth. Sustainable waste management practices and policies also have significant greenhouse gas reduction benefits: the Commonwealth's "Zero Waste" vision aligns with the Global Warming Solutions Act (GWSA, Chapter 298 of the Acts of 2008). The RPP's Waste Management Goal and Objectives recognize Barnstable County's relationship and role with the Commonwealth (and beyond) in advancing a sustainable approach to waste management; and alternately, that it is neither feasible nor desirable for Barnstable County to have a waste management system and approach that is entirely independent from the Commonwealth's.

Because the primary purpose of the RPP's Waste Management Goal and Objectives is to support the Commonwealth's long term "Zero Waste" master plan, the Commission's approach under this section is flexible in order to respond to, consider and accommodate for changing circumstances in the solid waste environment as they might arise: many of the recommended policies and actions set out in this section depend on the establishment and evolution of new markets, technologies, infrastructure systems and business networks that are not currently in place.

There are no Placetypes directly associated with the Waste Management Goal and Objectives, and supporting policies and actions set out in this section; however, proposed development reviewed under the Waste Management Goal and Objectives are subject to and will likely be reviewed under other RPP goals for which there are associated Placetypes.

SUMMARY OF METHODS

GOAL | WASTE MANAGEMENT

To promote a sustainable solid waste management system for the region that protects public health, safety, and the environment and supports the economy.

OBJECTIVE WM1 – To reduce waste and waste disposal by promoting waste diversion and other Zero Waste initiatives

METHODS

- Incorporate alternatives to disposal such as the productive re-use of materials, and resource recovery of useful materials.
- Incorporate clean waste-to-energy initiatives such as anaerobic digestion.
- Create or expand opportunities to compost organic materials.
- Incorporate Industrial Ecology, which is co-locating businesses so that by-products from one or more processes are utilized as input to other processes.
- For manufacturing facilities and operations:
    - minimize packaging;
    - reduce toxics in packaging;
    - incorporate extended producer responsibility for reuse, recycling, and disposal manufactured products.
- Develop or support local markets, infrastructure, technologies, jobs and firms in recycling, re-use, resource recovery and related material management efforts.
- Support municipal waste diversion facilities, and encourage regional coordination between municipal facilities.
- Support private waste diversion facilities and markets to support and supplement municipal waste facilities and operations
- Reuse buildings and structures

OBJECTIVE WM2 – Support an integrated solid waste management system

METHODS

- For waste facilities, incorporate zero waste future technologies and initiatives to preserve existing disposal capacity to serve regional needs.
- Develop integrated facility partnerships – including between municipalities and businesses – to support integrated solid waste management systems.
- Properly manage construction and demolition waste and recycling.
- Use alternative methods to trucking to transport waste and recycling materials from Barnstable County, including rail and ship, in order to reserve roadway capacity.
- Support existing municipal waste facilities and encourage regional coordination between municipal facilities.
- Support private waste facilities and markets to support and supplement municipal waste facilities and operations

DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE WM1

Objective WM1 *– To reduce waste and waste disposal by promoting waste diversion and other Zero Waste initiatives*

Solid waste management has improved greatly in the Commonwealth since 1990 when MassDEP issued the Commonwealth's first Solid Waste Master Plan. Before that, there were more than 150 landfills in the Commonwealth, most of which were owned/ operated by municipalities and lacked sufficient environmental controls. The Commission's 1991 Regional Policy Plan was concerned primarily with the regionalization of and better environmental controls for municipal solid waste facilities.

Today, Massachusetts has a modern solid waste management system that promotes waste reduction and recycling, and ensures that facilities that handle and dispose of waste are properly designed and operated to protect public health and the environment.

Further, since the 1990's, Massachusetts has imposed state-wide waste bans. Waste bans help to increase recycling and support the recycling economy, and help keep toxics out of the waste stream. Waste bans are a key tool available in Massachusetts to reduce disposal of recyclable and compostable materials and increase recycling and composting. The waste ban regulations require landfills, municipal waste combustors, and transfer stations to develop and implement waste ban plans that include ongoing monitoring for banned materials and comprehensive inspections of waste loads. The Commission's 1996 and 2002 RPPs emphasized recycling and integrated solid waste management, which were themes carried through the 2009 RPP.

Since 2009, the Commonwealth has had a 42 percent recycling rate, one of the highest rates in the nation. However, Massachusetts residents continue to dispose of materials that have significant value – in both monetary and natural-resource terms – and whose environmental impacts could be avoided if they were reused. Solid waste management represents a significant cost to taxpayers and businesses, and disposal of materials causes environmental impacts and is a waste of resources and a lost economic opportunity. The more consumers can reduce the amount of waste that has to be disposed of by reducing generation and increasing reuse, recycling, and composting, the better for the economy, public health and the natural environment. There have also

been dramatic changes in the recycling markets at the state, national and international level over the past few years, suggesting that less reliance on recycling alone and the promotion of other forms of waste diversion are prudent approaches for future solid waste planning.

"Zero Waste" is an alternative vision to the traditional concept of waste disposal, involving the overall reduction in waste generation and the amount of wastes requiring disposal; and less overall reliance on disposal in landfill facilities by diverting materials from the waste stream. Waste diversion approaches include increasing reuse of materials; increasing recycling of materials that have served their useful purpose; resource recovery of useful materials that would otherwise be placed in the waste stream; and composting food and other organic materials. There are increasingly fewer landfills and less landfill capacity in the Commonwealth, and for environmental, economic and other reasons, siting of new landfill facilities to maintain current capacity is unlikely or undesirable. In fact, a good deal of solid waste and recycling is shipped outside the Commonwealth for disposal or handling. The necessary alternative is to reduce reliance on landfilling and disposal.

Under this alternative "Zero Waste" vision, 'waste' is a changing concept. Diverting material from the waste stream saves money, promotes the more efficient use of materials, captures valuable resources, protects the environment, and supports the economy. Disposal of potentially useful and valuable materials is a waste of resources and lost economic opportunity. Resource recovery is using wastes as an input material to create valuable products as new outputs. Plastic, paper, aluminum, glass and metal are examples of where value can be found in waste as input material. There is also the potential to convert waste to energy, such as with an anaerobic digestor facility.

DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE WM2

Objective WM2 *– Support an integrated solid waste management system*

Integrated Solid Waste Management (ISWM) is a holistic waste reduction, diversion, collection, composting, recycling system that still relies on disposal to some degree, and is a step along the way to try to achieve a "Zero Waste" future. There are currently not the markets or facilities in place to implement a reliable Zero Waste system. At this stage, "Zero Waste" is an aspirational concept with aspects that can be incorporated into and inform the goals of an ISWM system, though preserving the scarce, remaining solid waste disposal capacity that is part of such system is a critical infrastructure consideration for the health of the Cape Cod community, environment and economy.

ISWM systems rely on a network of individual facilities, with the back-bone being municipal transfer stations/solid waste facilities. An ISWM system would include private solid waste or material management businesses to supplement municipal facilities and public markets, which partnerships help in preserving capacity and managing costs. Such local public/ private partnerships, markets and networks can also benefit local economies and support existing or the creation of new home-grown businesses and industries. A municipal integrated solid waste management facility (ISWMF) include components such as:

- a comprehensive recycling drop-off center,
- a materials recovery facility,
- regular hazardous product collections,
- a reuse swap shop,
- grass and leaf waste composting,
- food composting,
- a C&D handling facility.

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GENERAL APPLICATION REQUIREMENTS

As applicable:

- Narrative describing how the project supports the Objectives.
- Site Plan showing how waste will be managed and/or waste management facility design.
- Construction and Demolition (C&D) waste management plan
- Post- Construction/ operational solid waste and recycling management plan
- Toxic waste management plan
- Food waste or other composting plan
- Waste material re-use/ resource recovery plan
- Corporate/ business sustainability plan, including operational best practices and employee training

EXAMPLE CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLAN GUIDANCE

The Connecticut Department of Energy and Environmental Projection provides the following guidance on the developing successful Construction and Demolition Waste Management Plans that Applicants may find helpful.

A construction or demolition waste management plan does not need to be lengthy or complicated to be effective. Preparing a plan consists of identifying the types of debris that will be generated by the project and identifying how all waste streams will be handled. A successful waste management plan will contain the following information:

- Waste recycling, salvage or reuse goals
- Estimated types and quantities of materials or waste generated from the project site
- Proposed and intended disposal methods for these materials
- Intended procedures for handling the materials or waste
- Detailed instructions for the subcontractors and laborers on how to separate or collect the materials at the job site

The industry average for waste generated at new construction sites is six pounds per square foot. Most of this waste can be put towards another use, or better yet, be recycled if proper planning is done within the design phase. The primary objective of

these plans are to initially reduce the amount of generated construction waste on projects by requiring all subcontractors and material suppliers to limit quantities of materials and packaging to only those necessary for the project itself.

Additional information available at:
https://www.ct.gov/deep/cwp/view.asp?a=2714&q=458438

REFERENCES AND RESOURCES

MassDEP Recycle Smart Initiative (Recyclopedia) - https://recyclesmartma.org/

Information on Massachusetts Recycling and Waste - https://www.mass.gov/topics/recycling-waste-management

Massachusetts Solid Waste Master Plan - https://www.mass.gov/guides/solid-waste-master-plan

Connecticut Department of Energy and Environmental Projection Guidance on Waste Management Plans - https://www.ct.gov/deep/cwp/view.asp?a=2714&q=458438

Community Design

This guidance is intended to clarify how the Community Design Goal and Objectives of the Regional Policy Plan (RPP) are to be applied and interpreted in Cape Cod Commission project review. This technical bulletin presents specific methods by which a project can meet these goals and objectives.

Community Design Goal: To protect and enhance the unique character of the region's built and natural environment based on the local context.

- ***Objective CD1*** *– Promote context sensitive building and site design*
- ***Objective CD2*** *– Minimize the amount of newly disturbed land and impervious surfaces*
- ***Objective CD3*** *– Avoid adverse visual impacts from infrastructure to scenic resources*

The applicability and materiality of these goals and objectives to a project will be determined on a case-by-case basis considering a number of factors including the location, context (as defined by the Placetype of the location), scale, use, and other characteristics of a project.

THE ROLE OF CAPE COD PLACETYPES

The RPP incorporates *a framework for regional land use policies and regulations based on local form and context* as identified through categories of Placetypes found and desired on Cape Cod.

The Placetypes are determined in two ways: some are depicted on a map contained within the RPP Data Viewer located at www.capecodcommission.org/RPPDataViewer adopted by the Commission as part of the Technical Guidance for review of DRIs, which may be amended from time to time as land use patterns and regional land use priorities change, and the remainder are determined using the character descriptions set forth in Section 8 of the RPP and the Technical Guidance.

The project context, as defined by the Placetype of the location, provides the lens through which the Commission will review the project under the RPP. Additional detail can be found in the Cape Cod Placetypes section of the Technical Guidance.

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INTRODUCTION

Cape Cod is a unique and special place in terms of both its natural and built environments. The diverse landscape includes historic villages and distinctive architecture that combine traditional forms and materials in a variety of different styles. The region's history and natural environment have shaped development into a recognizable local aesthetic and a regional pattern of dense village centers surrounded by less-developed outlying areas.

Maintaining Cape Cod's unique character is essential to the region's continued economic health and to the quality of life of its residents. Yet, as the Cape continues to grow in population and popularity, new development poses challenges brought by land-consumptive development patterns and incompatible designs. In order to protect the region's distinctive character, new development needs to respect old and established patterns in both building and site design and project siting. This is the essence of context-sensitive design: design that responds to and respects its surroundings, promoting continued vitality for the region and reinforcing the Cape's strong 'sense of place.'

Context sensitive design relates to its surrounding neighborhood, environment and regional traditions. In its design, it meets not only the project goals, but also those related to preserving scenic, aesthetic, historic, environmental and other community values. Context sensitive design recognizes the scale and placement of existing surrounding buildings and follows established patterns, whether they are tall buildings sited close to the street, low buildings clustered in a tight neighborhood, or structures set well back from the road and screened by vegetation. It recognizes regional traditions in building materials and building forms, which on Cape Cod includes small attached massings, sloped roofs, and wood siding materials. It also follows more compact land use patterns to help preserve Cape Cod's natural resources and distinctive character. Cape Cod Placetypes are one way of describing and asserting the various contexts that exist in the region, and they are helpful in identifying appropriate designs based on a project's location.

While there is room for modern design and contemporary interpretation, new buildings should incorporate traditional design elements to support the region's existing character. By guiding development to follow compact land use patterns and limiting building footprints and paved areas, we will better maintain natural lands and preserve

the distinction among different Placetypes, while working to re-establish regional patterns in areas that have existing highway-oriented development.

Cape Cod has a wide variety of scenic resources that contribute to the region's unique sense of place. The character of scenic resources results from the interplay of geology, landform, soils, vegetation, land use and settlement patterns and is made up of a wide variety of features, patterns, and characteristics. Open ocean waters, natural areas, cliffs, dunes, historic resources, open fields, wooded road edges, views to water or historic villages, and scenic roadways may all be considered scenic resources.

The Cape's scenic resources vary in their quality, value, and ability to absorb changes. New infrastructure and large-scale developments must be sited carefully to limit impacts to these resources, especially in areas with a distinctive built or natural character. Visual and scenic resources play a direct role in people's enjoyment of Cape Cod, and their preservation has a direct impact on the region's continued economic vitality. Developments should not have adverse impacts on the region's scenic resources or character.

SUMMARY OF METHODS

GOAL | COMMUNITY DESIGN

To protect and enhance the unique character of the region's built environment based on the local context.

OBJECTIVE CD1 – Promote context sensitive building and site design

METHODS

- Relate siting of development to building and streetscape patterns
- Follow regional and local scale of development
- Use regionally appropriate forms and materials
- Locate parking where it does not adversely impact visual character of the area
- Provide appropriate landscaping and pedestrian amenities
- Ensure lighting protects dark skies and signage fits with community character

OBJECTIVE CD1 AREAS OF EMPHASIS BY PLACETYPE

Natural Areas | New development not encouraged. Redevelopment should be limited to small scale areas that can be screened from view.

Rural Development Areas | Limit development to small scale and areas that can be screened from view.

Suburban Development Areas | Re-establish traditional patterns with buildings close to the street and parking to the side or rear.

Historic Areas and Maritime Areas | New development should conform with established patterns and is consistent with traditional structures and uses.

Community Activity Centers | New and redevelopment encouraged in these areas. Build in traditional patterns with buildings close to the roadway and focus on providing pedestrian amenities and defining the streetscape.

Industrial Activity Centers and Military and Transportation Areas | Flexibility of design is allowed in this area as long as there is limited visibility.

OBJECTIVE CD2 – Minimize the amount of newly disturbed land and impervious surfaces

METHODS

- Reuse and redevelop existing buildings, structures and sites
- Cluster development
- Minimize total parking spaces to no more than what is required by zoning
- Develop multi-story buildings where appropriate
- Provide parking under or within buildings or in structures
- Use permeable or pervious materials
- Maintain existing native vegetation and revegetate disturbed sites

OBJECTIVE CD2 AREAS OF EMPHASIS BY PLACETYPE

Natural Areas | New development strongly discouraged. Reuse and redevelopment should minimize or reduce existing development footprints.

Rural Development Areas | Reuse and redevelopment encouraged. All development should be clustered, respect the surrounding landscape, and protect scenic resources.

Suburban Development Areas | Concentrate development into nodes; minimize and reduce parking area footprints.

Historic Areas | Reuse historic structures; infill development should reflect historic context.

Maritime Areas | Reuse historic structures; infill development should reflect context.

Community Activity Centers | Reuse, redevelopment, mixed use, and multi-story development encouraged; minimize parking through design or shared parking

Industrial Activity Centers & Military and Transportation Areas | Reuse and redevelop when possible; minimize impervious areas.

OBJECTIVE CD3 – Avoid adverse visual impacts from infrastructure on scenic resources

METHODS

- Site infrastructure away from scenic resources
- Design and scale infrastructure appropriate to context
- Collocate infrastructure with other existing infrastructure and/or within buildings
- Utilize previously developed and/or impervious areas
- Locate infrastructure underground where feasible
- Screen infrastructure with vegetative buffers, buildings, or other structures

OBJECTIVE CD3 AREAS OF EMPHASIS BY PLACETYPE

Natural Areas | Avoid siting in these areas except where necessary to protect public health and safety.

Rural Development Areas | Avoid siting in open landscapes; minimize height to that of existing tree canopy.

Suburban Development Areas | Avoid visual impacts to surrounding neighborhood through buffering and/or siting.

Historic Areas | Avoid siting in these areas or ensure no visual impacts on historic resources.

Maritime Areas and Community Activity Centers | Ensure infrastructure is similar in scale to surrounding development.

Industrial Activity Centers & Military and Transportation Areas | Generally appropriate; buffer from residential areas.

DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE CD1

Objective CD1 *– Promote context sensitive building and site design*

The following methods may be implemented to demonstrate consistency with Objective CD1:

Relate siting of development to building and streetscape patterns

Historically, the pattern of development within the Cape's village centers consisted of buildings that were close to the road and oriented with their narrower façade facing the street. This pattern of development produced a strong sense of enclosure to the street and established a setback pattern that helps define the region's character.

In many locations on the Cape, the edge of the street is very well defined by either buildings, walls, fences, or trees. Twentieth century zoning regulations have encouraged development in other areas that conflicts with historic and traditional settlement patterns. Linear commercial areas are often oriented to the automobile and typically characterized as having poorly defined road edges with parking close to the street and buildings far from the street edge. This is in stark contrast to the traditional village pattern of development seen in the region. The following narrative presents a variety of ways to site new development in the Cape landscape, following traditional streetscape patterns.

FOR ALL PLACETYPES

Follow traditional setbacks: New development should follow traditional setback patterns, whether close to the road edge or set behind small front yard areas. Site new buildings to reinforce the existing building setbacks which help define the streetscape edge. If new construction must be placed farther back than existing structures, use low walls and vegetation to continue the established street edge.

Locate new construction behind existing frontage buildings or vegetation: As an alternative to siting a large building on the street, place structures with more modest forms at the street edge to match existing street patterns and to shield the larger building behind. Placing larger buildings behind existing structures or newly constructed, traditionally scaled buildings will screen the larger buildings and

associated parking areas to the rear and also assure that the traditional streetscape pattern is continued.

Maintain the distinction between developed and outlying areas: Locate new development within Community Activity Centers and existing village centers whenever possible. If locating outside these areas, site new development behind existing vegetated areas to maintain open landscapes and wooded roadway character.

Design streets and roadways in scale with the surrounding context: If an area has a distinctive roadway design or scenic character, any new roadways should be designed consistent with the existing character. Narrower roadways are generally preferred to slow traffic and provide comfort for pedestrians and bicyclists. On-street parking in appropriate areas can also create streets that are better-suited to accommodate all users.

NATURAL AREAS AND RURAL DEVELOPMENT AREAS

Maintain established roadway character: Preserve the landscape character of existing roadways, whether wooded or open landscapes with few structures. Site buildings outside key view areas and sensitive natural resources. Maintain the existing road width and layout and avoid more urban details such as granite curbing.

Design meandering entrance roads: Entrance roads or site accesses should meander through a vegetated buffer to limit views into the site. Trees are especially important along access roads to limit broad views of new development and to provide enclosure in context with outlying areas.

Site outside open landscapes: New development in these areas should locate at the periphery of open landscapes and away from scenic vistas or further reduce visual prominence by siting behind or near woodland edges. Any new development should be designed consistent with existing development density and should follow established relationships between existing buildings and the roadway.

SUBURBAN DEVELOPMENT AREAS

Create focal points of denser commercial development: In strip commercial areas, focus on re-establishing traditional streetscape elements with dense clusters of buildings surrounded by less densely developed areas.

Bring buildings closer to the street: Site new buildings near the roadway to re-establish the street edge and relate the building to the street, or to shield larger elements of the development to the rear.

Move parking to less visible areas: Re-locate parking to the side or rear of the development to reduce its prominence. In some cases, parking can be successfully incorporated into a parking structure that occupies the lower level or rear portion of a building. Where re-locating parking is not possible in the short term, add landscape walls and buffer plantings to effectively screen paved areas.

Improve pedestrian amenities: Add sidewalks and pathways that bring pedestrians along the front facades of buildings. Add shade trees, gardens, seating areas and other pedestrian amenities along the road frontage of new development.

Use cluster to reduce residential development footprints: Residential subdivisions of the 1960's and 1970's are land-consumptive and do not mirror traditional development patterns. New development in these areas should be clustered to respect existing topography, protect sensitive natural resources, and preserve high-quality open space. Cluster development should also minimize the length of new roadways and utilities and create amenities on site for use by residents of the neighborhood.

MARITIME AREAS

Set buildings back from eroding shorelines: In areas where the shoreline is eroding, the setback for all new buildings and septic systems should be at least 30 times the average annual erosion rate of the dune or eroding bank and consider up to 70 times the average annual rate. Shoreline change maps, developed by the Massachusetts Coastal Zone Management Office, and historic photos can help to evaluate long term erosion trends.

Maintain facilities that support water dependent uses: Docking and unloading facilities for commercial fishermen, marinas for public and private vessel use, ferry terminals, and areas for charter boats and whale watching are all water-dependent facilities that should be maintained. Loss of these waterfront facilities results in a loss of traditional economic activity in the community. Maintenance of these facilities, coupled

with access for the public, such as walkways, observation areas and boat launch facilities generate public interest and activity on the waterfront.

Maintain and enhance physical and visual access to the coast: Public access to the shoreline should be provided in waterfront locations. New walkways are encouraged if they enhance shoreline access for the public, including people with disabilities, but they should not be pursued if they degrade undisturbed resources or create adverse impacts to habitat, aesthetics, or storm damage prevention. Where physical access is not appropriate or feasible, visual access should be provided. This can be done by siting multiple buildings to provide views between them, or by providing an arch or walkway to allow views between buildings. Visual impact from the water should be considered when designing the structure, to maintain maritime character and the natural beauty of the shore.

HISTORIC AREAS AND COMMUNITY ACTIVITY CENTERS

Maintain setback patterns and building scale along the road frontage: Design new buildings to front on the street and to maintain established setback patterns, consistent with traditional village design. If appropriate, orient the narrower facade to the street to be consistent with existing facade widths.

Activate the street elevation: Include a street-oriented entrance and principal windows on the street elevation to reinforce the building's primary relationship to the street and encourage pedestrian activity. In commercial areas, consider incorporating porches or other pedestrian amenities in the design.

Site infill development to the rear to preserve desirable existing streetscape patterns: Consider infill development on the rear portion of lots to allow additional activity in already developed areas while maintaining existing streetscape patterns.

Follow regional and local scale of development

Cape Cod's buildings are traditionally modest in scale and comprised of a series of small massings that reflect their gradual growth and expansion over time. While some larger buildings and estates began to be constructed in the region in the late 1800s, the majority of structures remained small in size. To maintain this traditional and

predominantly residential scale that defines most of the Cape's villages, new buildings should appear similar in size to historic structures or they should be sited behind smaller buildings or vegetation that can screen their bulk from public view. This is especially important in Natural and Rural Development Areas where wooded or open landscapes should be dominant, and in Historic or Maritime Areas where traditional building styles should be most prominent. Where existing local development is clearly defined and guided by historic traditions, that scale should inform any new development. In all other locations, new development should reflect regional building scale and traditions. The following narrative presents a variety of ways to fit a new building into the Cape landscape, focusing on how to reduce the apparent building size to make it consistent with the local development scale.

FOR ALL PLACETYPES

Break down large building masses: Separate the building mass into various structures that more closely approximate the size of traditional buildings in the region. Building masses should generally be 15,000 square feet or less and can be grouped around a central courtyard or arranged as a primary building with several attached ells.

Along roadways, orient the short axis of the building parallel to the street to maintain a building profile that is more consistent with the region's traditional scale.

Vary the roof form: Vary the height of the roof line at both the roof peak and the eaves to break large roof masses into smaller elements and to vary their relationship to the ground. Incorporate several different roof forms on different parts of a large building, following historical examples. Gable, shed, and hip roofs are compatible with regional styles and can be effectively combined on a single building.

Flat roofs are discouraged but not prohibited, as they may be appropriate in some areas where existing development includes flat-roofed, row-house style structures, or on some portions of a building. Roof forms should be designed to read as a functional roof over the building, not as a decorative feature added to the facade.

Vary the façade line with set-backs and projections: New development should incorporate pronounced changes in the wall planes and building mass to mirror the pattern of individual facades in a village streetscape. For every 50 feet of façade length, at least 10 feet of projection or setback should be included. Though the façade changes

can be split into several components, changes in the façade line of 10 feet or more are most likely to read as distinct areas and reduce the visual impact of a larger building mass.

A varied rhythm of elements, rather than a strict repetition of the same feature, is most effective for breaking down the building mass into smaller components and providing visual interest to a design. Adjacent wall sections should be varied in length, setback, and height.

Vary the wall height: Provide changes in the building wall height to reduce the overall bulk of the structure and to increase variety along the facades. Portions of the building above 20 feet in height should be roof forms unless the established development pattern in the area includes higher building walls. If a third floor is created, it should be set back or within a roof form to maintain a traditional scale to the building. Designing a second story for a portion of the building is an effective way of varying both the building design and the wall height consistent with traditional development patterns in the region.

Bring down the building edges: Bring the edges of the building down with smaller attached masses such as porches, entrances, or lower additions. The use of arcades (a series of arches supported by columns) that are not physically attached to the building but are stepped forward and essentially act as a frontage building, can be particularly effective in breaking up the apparent massing of a large building.

While visually identifying the entrance of a building is essential to any good design, the mass of the entry should generally be subordinate to the primary building mass. For example, the ridge of an entry should be at or below the primary roof height. The design should provide a visual distinction between primary and secondary entrances, which also helps to incorporate asymmetry into the building facade.

Provide transition areas between commercial and residential developments: Buildings should step down in scale and size where commercial developments abut residential neighborhoods to avoid jarring transitions in street and neighborhood character.

NATURAL AREAS AND RURAL DEVELOPMENT AREAS

Limit development footprints: Development should be avoided in Natural Areas and Rural Development Areas where environmental resources and open landscapes are prominent characteristics. To preserve the open landscape character, wooded nature, and sparse development pattern of these areas, only small scale and clustered developments are appropriate.

SUBURBAN DEVELOPMENT AREAS

Create frontage buildings: Incorporate small frontage buildings to re-establish traditional building scale and relationships to the street. Frontage buildings can also effectively screen larger development and parking areas to the rear.

Reinforce the building setback line: In areas where existing buildings are set well back from the street and large parking areas are in front, use low walls and dense planting areas to continue the traditional building setback along the street edge.

HISTORIC AREAS, MARITIME AREAS, AND COMMUNITY ACTIVITY CENTERS

Mirror existing character: These areas have a distinctive and established character that new development must conform to. Traditionally, buildings in these areas present a pedestrian-scaled facade of one or two stories, with floors over the second story incorporated within a traditional roof form. Village streetscapes have a consistent range of facade lengths and spacing between buildings. This variation should be mirrored in new development by incorporating recesses or projections in the building footprint to mimic the length of traditional building facades. The form and scale of the buildings should be consistent with their surroundings, continuing existing character and streetscape patterns, and should incorporate pedestrian-scaled amenities (such as porches and stoops) and doors and windows on all street-facing elevations.

Avoid long building facades: For long front facades, vary the setback, height, and roof form of the building within the range provided by existing buildings to continue the established rhythm of facades on the street. In most cases, long facades should be avoided, extending no more than 50 feet without a change in the wall plane. In cases where it is difficult to fit a large building into existing patterns, use smaller frontage buildings to screen large buildings in the rear.

Use regionally appropriate forms and materials

The Cape has always been a region of vernacular architecture – architecture which reveals an area's unique local traditions and characteristics. Cape Cod's earliest architecture took the form of simple wood structures based on English styles and was oriented toward the region's agricultural focus. By the 18th century, a new form had evolved to meet the early settlers' needs and protect them from the harsh environment. This form has become known as the "Cape Cod House" and its simplicity, its gable roofs, and weathered shingle or clapboard exterior define the basis of vernacular architecture in this region.

The growth of maritime industries in the early 19th century introduced architectural diversity to the Cape. The region's new wealth was reflected in larger homes designed in Greek Revival and other Neoclassical styles and in the expansion and alteration of many existing buildings. Though the new structures were generally larger, they reinforced the local building traditions by maintaining the simplicity of the earlier forms and continuing the use of local materials. The late 19th and early 20th century saw construction of a variety of Victorian styles, built primarily to accommodate Cape Cod's growth as a resort area. Although these structures incorporated new forms, their general scale and wooden construction were compatible with the region's traditions. Throughout the Cape, small shingled structures continued to be built in simple forms reminiscent of earlier styles.

FOR ALL PLACETYPES

Complement surrounding architecture in areas with distinctive architectural styles: Use similar architectural scale, massing, and materials to relate new buildings to their surroundings. Reflect the predominant rhythm of the existing buildings in new construction. When developing in areas without distinctive architecture, new buildings should be designed to complement the region's traditional vernacular styles. Modern elements may be included but should reference regional traditions in either form or materials.

Use pitched roofs: Roofs play a major role in a building's character because they are a dominant visual element. Roof types such as gable, shed, gambrel, and hip are all seen on the Cape, although gable and shed roofs are most common. The pitch of gabled roofs generally is not more than 12 inches in height for 12 inches in length or less than 7 inches in height for 12 inches in length. When pitched roofs are used, sub-masses

should be attached to the main mass at right angles, with either parallel roof lines or intersecting cross gables.

Use traditional building materials: One distinctive feature of the region is the preponderance of naturally weathered wood on building exteriors. The Cape's traditional building materials are wood shingle and wood clapboard, though brick and stone were also used. In prominent areas, use high quality, traditional materials that weather naturally on the exterior of the building to reflect regional building traditions. Non-traditional materials may be used if they accomplish the overall goal of adding interest and depth to the facade. In areas that should receive less attention, such as service areas and unbroken expanses of wall, use less-formal materials and simpler detailing to make those parts of the façade recede into the background. High-intensity, reflective, and metallic colors and materials are strongly discouraged.

Avoid false fronts: Raised parapets and false-fronted gable ends are strongly discouraged and should be avoided. Non-functioning dormer windows, cupolas, and similar details are also strongly discouraged as they do not serve to break down the building mass, but instead give the impression of unrealistic appendages that detract from, rather than improve, the design.

Conceal heating, ventilation, air conditioning (HVAC) and other mechanical equipment: Place roof mounted equipment behind sloped roofs, parapets, or in the central portion of flat roofs beyond site lines as seen from ground level. Conceal flues and vents in chimneys or cupolas. Screen other utility equipment, loading docks and service areas with vegetation, walls and fences.

HISTORIC AREAS AND COMMUNITY ACTIVITY CENTERS

Be sensitive to forms in historic areas: Historic Areas are the most sensitive to change and require careful design to avoid negative impacts to significant structures and landscapes. When adding to or altering existing historic structures, maintain the quality of materials and workmanship found in the original structure. For more details, refer to the Cultural Heritage technical bulletin.

Avoid using synthetic surface materials: In Historic Areas, synthetic materials should not be used, especially in highly visible areas and on historic structures.

INDUSTRIAL ACTIVITY CENTERS AND MILITARY AND TRANSPORTATION AREAS

These areas are typically less visible and not adjacent to highly visually sensitive areas, so have more flexibility in terms of design and layout. With large building facades, the design should take a cue from the surrounding traditional forms. Vary the detailing, materials, and colors in adjacent sub-masses to resemble the traditional variety found in the region's village centers.

Industrial and warehouse buildings are typically designed to create large volume spaces with open floor plans to accommodate their manufacturing, assembly, and storage functions and are generally not designed with pedestrian use in mind. Consequently, industrial and warehouse buildings are typically large, have little or no architectural detail, and are built at a scale that is in sharp contrast to the regional development forms of the Cape. Screening and appropriate siting are the best solutions for fitting them into the Cape landscape.

Screen buildings with wide landscape buffers: Establish a wide landscaped buffer between the street and the building by retaining existing wooded areas and supplementing with a variety of evergreen and deciduous trees and shrubs as appropriate to the site and design a meandering entrance drive to limit views into the site. In cases where a site does not have an existing wooded buffer, provide a landscaped buffer that consists of a mix of evergreen and deciduous trees and shrubs that provide adequate year-round screening.

Design a portion of the building with traditional form and materials: Design a small portion of the facility, such as the office or a small retail/showcase area, using traditional architectural forms and materials. Locate this portion of the facility in the most-visible portion of the site, where it can function as a frontage building that provides a more-traditional facade to the public and partially screens other parts of the facility from view. Alternatively, combine the warehouse with other uses and shield the warehouse behind the other structures on the site. Using traditional wood siding on a visible façade can help it blend more easily into the landscape.

Locate parking where it does not adversely impact visual character of the area

Parking is a significant part of any development. To preserve the traditional character of the region and to promote pedestrian-friendly development, parking should be located

to the side or rear of a development so that it does not have a strong impact on the character of the streetscape. Building facades and landscaped areas should always be the prominent visual elements. If frontage buildings are used, parking can be located behind them but in front of rear structures. Landscape berms and deep landscape buffers (both along the street and within large lots) can be used to lessen the visibility of existing parking lots, but no new parking should be placed in front where it is visible from the street. Most sensitive are historic and rural/natural areas but preserving character in Community Activity Centers is key to their success.

FOR ALL PLACETYPES

Locate parking to the side or rear of development: Parking should be located further back on a lot than any adjacent buildings. Parking located in front of buildings and next to the street is inconsistent with the region's traditional patterns. It diminishes the sense of enclosure of the roadway and is not compatible with pedestrian activity.

Screen parking from view: Locate new parking lots behind or to the side of buildings to effectively screen them and maintain the character of the streetscape. Parking lots may also be screened from the street by the use of a low wall, fence, hedge, or landscaping. Provide view corridors, informational signage, and walkways to provide visibility and access to parking areas.

Design smaller parking lots with more landscaping: Design smaller parking lots separated by landscaping rather than constructing a single large lot. Use large landscaped islands, at least 10-12 feet wide with trees planted 25-40 feet apart, depending on the tree species selected. Trees should generally be a minimum of 3 inches in diameter when planted. Landscaped islands should comprise 20% of the parking field.

Create safe pedestrian paths through parking areas: Pedestrian walkways should be provided within parking areas to allow for safe pedestrian travel, with crosswalk pavement highlighted either by a change in the pavement texture or color so that pedestrian circulation is clearly defined.

NATURAL AREAS AND RURAL DEVELOPMENT AREAS

Limit new parking lots: Use existing lots and shared parking whenever possible. Many land uses require parking at different times of the day and different days of the week, making it convenient to share parking and minimize construction of new parking areas. Use alternative surface materials like gravel or shell or others to blend in with their surroundings.

HISTORIC AREAS, MARITIME AREAS, AND COMMUNITY ACTIVITY CENTERS

Use existing on-street parking and shared parking lots: In these areas it's most important to keep parking secondary and not a prominent element of the streetscape. Use existing on-street parking and parking lots that can be shared in village centers and developed areas. Churches, offices, restaurants, and other uses that operate at different times may be willing to enter into agreements to share parking areas, reducing costs as well as the amount of land devoted to impervious parking.

SUBURBAN DEVELOPMENT AREAS

Remove existing parking from front yard areas: Where parking exists in front yard areas, reduce the amount of parking provided or relocate it to the side or rear of the lot. Replace those areas with improved landscaping.

Seek shared parking between adjacent uses: Where appropriate, seek opportunities to reduce the amount of parking provided on-site by sharing parking with adjacent uses, particularly in commercial- or industrial-use Suburban Development Areas.

Provide for reserve parking on-site to reduce impervious surfaces: Design overflow parking to be retained in a natural state or use pervious or permeable pavers to reduce the amount of impervious surface in these areas.

Provide appropriate landscaping and pedestrian amenities

Consideration of appropriate landscaping and buffering for development is an integral part of contextual design on Cape Cod. Landscaping can be used to screen parts of development and to enhance its relationship to the site. The development's location and the character of the surrounding landscape context should guide the development

of a landscape plan for a project site. While natural vegetation defines the character of some Placetypes, others are more developed and require a different landscape treatment such as street tree planting or pocket parks. Development should implement a landscape plan that addresses the functional aspects of landscaping, such as stormwater treatment, erosion prevention, screening and buffering, and provision for shade and energy conservation. Retaining or restoring visual access to natural resources is also an important component of the region's historic pattern of development identified in the Cape Cod Placetypes.

FOR ALL PLACETYPES

Preserve the natural landscape: Minimize removal of existing vegetation. Preserve massings of plants in their characteristic natural associations. Maintain forest floor conditions and as many mature trees on site as possible and design the project around existing vegetation so that the existing landscape provides a setting for the project. Transplant and re-use on-site vegetation where feasible.

Restore natural edge conditions: Blend the development into the existing landscape. Species characteristic of the region require less maintenance, provide an appropriate habitat for local wildlife, and integrate the new development more successfully into the existing landscape. Existing wooded areas adjacent to the site may be used as reference in determining appropriate species for new buffer planting.

Use a variety of species to assemble new landscaping masses: Create visual depth in plant massings by layering plants of various textures, sizes, and colors. Include flowering or fruiting species for color, interest, and wildlife habitat where appropriate. Layered plantings soften edges and corners and reduce the scale of buildings in the landscape. Masses of trees and vegetation near buildings reduce the perceived scale of buildings and set them into the landscape. Trees should generally be a minimum of 3 inches in diameter at the time of planting. Consider plant massing along with architectural massing during the design process. Balance the mass, proportion, and rhythm of landscape and building elements.

Create pedestrian-oriented landscape areas: Create landscaped areas adjacent to the building to add variety and depth to a large building facade. Arbors or pergolas can be combined with landscaping to effectively break up a large flat facade, adding different materials, depth, and vegetation. Within large projections or setbacks in the

facade, incorporate landscaped areas to provide relief and provide interest while also softening the building exterior and mass.

Use plants that are characteristic of the region: Use plant materials that are predominantly native species and suitable to the site. Incorporate pollinator species and other species that provide nesting, food, and cover for wildlife. Provide diversity in plant material selection and select species that minimize use of irrigation, pesticides, and fertilizer. Further information about recommended plant species can be found on the Cape Cod Commission website.

Minimize lawn area: Provide alternatives to lawn area including native grasses and forbs to reduce mowing and fertilizer application. Where lawn is necessary, favor fescues and other drought tolerant species.

Provide pedestrian amenities within the development site: Incorporate benches, bike racks, and trash receptacles within the development site as appropriate to the use and scale of the project.

NATURAL AREAS AND RURAL DEVELOPMENT AREAS

Use low-lying plantings to preserve views of the horizon: Especially along the coastline, make use of mat-forming plants or low shrub massings and/or native grasses and forbs that are wind-and salt-tolerant. In wooded areas, preserve existing vegetation.

Use substantial landscape buffers to screen new development: The predominant woodlands found on Cape Cod consist of oak and pitch pine, with a low deciduous understory. These woodlands tend to lack lower branching, and pitch pines, in particular, do not provide effective screening due to their irregular form. This type of natural buffer is an ineffective visual barrier for a proposed development unless it is of substantial depth. Therefore, natural, undisturbed vegetated buffers should be provided by development.

Preserve the feeling of enclosure: Wooded roadways provide enclosure through overhead tree canopy. Retain existing wooded road edges and retain a buffer of natural vegetation between new development and the road edge where possible to preserve the character of scenic wooded roadways. When replanting along the road edge, leave an appropriate distance between the edge of the pavement and any new trees.

Provide footpaths along roadways: Where appropriate, provide footpaths along roadways where they enhance compatible access to natural, scenic, and cultural resources and do not adversely impact these resources.

SUBURBAN DEVELOPMENT AREAS

Improve landscaping and buffering of development: Improve the appearance and function of Suburban Development Areas by providing adequate buffers and/or berms where appropriate between the street and development to screen parking and shield loading areas. Substantial buffers should be provided for side and rear property boundaries where commercial development abuts residential properties.

Provide pedestrian amenities: Provide pedestrian amenities within the site including tables, seating, bus shelters, trash receptacles, bike racks, drinking fountains, shelters, and public restrooms where appropriate. Use plantings and public art to enhance these outdoor spaces.

HISTORIC AREAS, MARITIME AREAS, AND COMMUNITY ACTIVITY CENTERS

Landscaping in these areas should focus primarily on defining the street edge through street tree planting and providing a pedestrian refuge through landscape planter strips that incorporate LID where feasible.

Provide sidewalks along roadways, consistent with the character of the area: While hard curbs may be appropriate in village/activity centers, grass strip and less formal designs are appropriate in other areas. Sidewalks should be accessible when conditions allow.

Enhance the streetscape with landscaping: Provide street trees to define the street edge, provide shade, and contribute to a comforting sense of enclosure. Where appropriate, establish planting strips, road islands and small parks within the public right-of-way, especially where it can make pedestrian crossings more comfortable and safe.

Incorporate pedestrian amenities in Community Activity Centers: Provide public seating, pocket parks, outdoor commercial seating and other amenities along the streetscape to encourage greater activity in front of the building.

Use building setbacks for greenspace/hardscape: Use courtyard areas or setback areas in front and between buildings to accommodate a pocket park, pedestrian plaza, or alleyway to parking behind buildings if appropriate. These areas provide relief, soften the street edge, and provide an opportunity for gathering and interaction that contributes to the vitality of centers.

INDUSTRIAL ACTIVITY CENTERS AND MILITARY AND TRANSPORTATION AREAS

Provide substantial buffers: Natural, undisturbed vegetated buffers should be provided by development, particularly in cases where the building form is non-traditional, such as industrial and warehouse buildings.

Provide open space adjacent to residential areas: Where Industrial Activity Centers and/or Military/Transportation Areas are adjacent to residential uses, open space in addition to vegetated buffers should serve to separate incompatible uses.

Ensure lighting protects dark skies and signage fits with community character

Lighting and signage can add to the character of an areas or can become a significant visual distraction. Lighting should be kept to a minimum safe level and should not spill onto adjacent lots or up into the sky. The appropriateness of outdoor lighting might also relate to the use for which the lighting is proposed, e.g., outdoor lighting proposed for a hospital may require special considerations for public safety, emergency and security not generally applicable to other uses.

FOR ALL PLACETYPES

Design outdoor lighting at moderate levels: Provide a uniform distribution of light without compromising safety and security. Areas of high pedestrian and vehicle use should maintain a minimum footcandle of 1.0, measured four feet above the ground surface at the point of least illumination, and a maximum footcandle of 7.0. measured four feet above the ground surface directly beneath the light source.

Provide total cutoff of light at property lines: Light should not spill from a development onto adjacent properties. Parking areas should have light fixtures that have a total cutoff of all light at less than 90 degrees and a beam cutoff of less than 75

degrees. Attached building or wall pack lighting should be screened by the building's architectural features or contain a 45-degree cutoff shield.

Select light poles that are in scale with proposed or surrounding buildings: The maximum light fixture height for properties that are visible from regional roadways, abut residential areas or regional vistas, should be 20 feet. Properties that do not abut residential areas and/or have no regional views may have a maximum light pole height of 25 feet. For pedestrian walkways and plazas, consider using lights in bollards (3 to 4-foot high posts) where appropriate.

Lighting should not conflict with shade trees within landscaped islands: Select lower mounting heights, below the canopy of trees, rather than high mounted fixtures which may create shadows or dark spots. Spacing of light poles in parking areas should be staggered rather than aligned, to maintain a uniform distribution of light. In all cases, light poles should be located within landscaped islands for safety and aesthetic reasons.

No internally illuminated signs: Internally illuminated or flashing signs are not appropriate on Cape Cod, though channel-lit letters may be appropriate in non-historic areas. For externally illuminated signs, lighting should be aimed downward to avoid impacts on the night sky.

Limit height of signage: Building signs should be located either flush or perpendicular to the building wall. Do not place signs on roofs or above eaves and parapets. If site signs are used, they should be kept as low as possible without impacting safe sight distance at vehicle entrances.

Use the smallest size and least number of signs: A small, simple, well located sign is generally more effective than an improperly located large sign with excessive information. Sign materials, style and shape should be compatible with surrounding building materials, colors and textures. Sign size and lighting should be modest to keep the focus on the surrounding traditional architecture and other cultural features.

DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE CD2

Objective CD2 *– Minimize the amount of newly disturbed land and impervious surfaces*

The natural resources and open spaces of the region are key to maintaining the culture and character of Cape Cod, as well as its economy. As development replaces the region's natural areas and forest cover, both natural functions and regional character are degraded. To preserve the Cape's distinctive character and minimize impacts to natural processes as the region continues to grow, new development must follow more compact land use patterns and use land more efficiently.

Cape Cod's traditional development patterns are defined by compact land uses with buildings in more densely developed centers or villages, surrounded by open, natural, and less developed lands. However, much modern development in the region follows a more spread out development pattern that requires large swaths of impervious surface and relies on automobiles as a primary means of transportation, necessitating large and often excessive paved parking areas and roadways. More sustainable design builds in tighter patterns and reuses existing buildings.

These large areas of impervious surface not only fragment the natural habitat and resources of the land, but also negatively impact water quality due to increasing runoff while decreasing the capacity of natural systems to recharge and filter stormwater. Reducing the natural and vegetated areas also diminishes the ability of an area to absorb floodwaters and replacing these areas with pavement or dark roofs can lead to increased heat retention, necessitating greater use of air-conditioning and energy. Minimizing the amount of newly disturbed land and impervious surfaces will help maintain and restore the natural areas of the region and the vital functions they serve, while also reinforcing the unique characteristics of the different Placetypes found throughout Cape Cod.

Reuse and redevelop existing structures and sites

Reuse of existing developed sites takes advantage of existing infrastructure, minimizes the amount of newly disturbed land and impervious surfaces, and reinforces regional development patterns. Reuse also avoids unnecessary new construction, conserves energy, and maintains those buildings that are considered architecturally and historically valuable. Existing buildings hold 'embodied energy' from the effort required

to harvest their building materials, process and construct them. Reusing existing buildings reduces construction and demolition waste, saves energy by decreasing extraction and processing of raw materials, and reduces air pollution from transporting materials.

Reusing existing buildings also supports the necessary broad spectrum of housing types including affordable housing and a viable mix of uses within an expanding community. Given recent growth on Cape Cod, it is essential to preserve and continue the traditional pattern of adaptive reuse if the Cape is to retain its special character. This housing diversity facilitates growth while preserving community character and a sense of place.

Redevelopment can be an important component of new retail and office developments, improving the viability and character of an existing property through rehabilitated facades, additions, frontage buildings, and enhanced landscaping. It can also provide a good opportunity to encourage mixed-use development in locations where it does not currently exist.

FOR ALL PLACETYPES

Reuse existing buildings: To avoid unnecessary new construction and to conserve energy, new uses should be found for existing structures, particularly if they have architectural or cultural significance. Reusing buildings provides the potential for increased economic benefit while limiting new development impacts on natural resources.

Reuse developed sites: In addition to reusing existing buildings, existing developed sites should be redeveloped to avoid newly disturbed lands and impervious surfaces. Redevelopment of these sites may involve partial or complete demolition of buildings (provided they are not culturally significant) and new construction in previously developed areas.

Infill development: Constructing new buildings or additions within areas that are already largely or densely developed is another way of adding development consistent with regional traditions. Infill development in historic and maritime character areas must be carefully designed to be consistent with existing patterns by adding structures where there are breaks in the streetscape pattern or where there is available land to the rear of a site can facilitate use of existing infrastructure.

SUBURBAN DEVELOPMENT AREAS

Encourage infill construction in areas of existing strip development: Along the strip, new buildings should be constructed on frontage lots in order to define the roadway edge. Developing frontage lots will also screen large existing parking areas and help to make the area more pedestrian friendly.

HISTORIC AREAS

Reuse historic buildings: Older structures often exhibit architectural styles and a level of craftsmanship that is too expensive to replicate today. They also represent significant periods and events in a community's history which should not be lost to future generations. New users of historic buildings should limit the alterations they make to historic exteriors in order to avoid losing resources that are important to the community.

Cluster development

Cluster development is a form of development that uses smaller lots, and reduced frontage and lot setbacks to focus development on the most appropriate portions of a site while preserving common open space on the more sensitive portions of a site. By concentrating development on one portion of a site, larger and more contiguous natural areas or open spaces may be preserved. Frequently, cluster development permits a reduction in lot area requirements, frontage, and setbacks, allowing reduced construction costs for shorter roadways and other infrastructure. Permanently protected open space is often required as part of the development design and serves as an amenity for the immediate neighborhood and for the larger community. [For examples of cluster development, please refer to the Compact Residential case study in *Designing the Future to Honor the Past*, and examples of open space design provided in *Rural by Design* [ref. at end of document]]

FOR ALL PLACETYPES

Cluster development on a portion of the site: Rather than distributing development uniformly across a site, cluster development close together in areas that are least sensitive in terms of natural resources and where development can most efficiently share infrastructure and other resources. Lay out buildings, roads, and parking lots after sensitive areas and buffers for these areas have been established. Multistory

buildings, mixed use development, and shared parking are features that can help support a smaller development footprint desired in cluster developments.

Reduce cut and fill to minimize disturbance to existing topography and vegetation: Clear only where needed for construction and protect all disturbed areas from erosion and sedimentation. Develop only those areas of the site where the existing slopes are suitable for the proposed use. One benefit of constructing only on suitable slopes is reduced construction costs.

Follow existing topography and landscape: Reflect the form of the land in new road layouts to minimize environmental and visual impact to the landscape. Generally follow existing contours so that roads integrate into the landforms with a minimum of cutting and filling.

NATURAL AREAS

Reduce development footprints: New development should be avoided in Natural Areas, but redevelopment or reuse of existing sites within or adjacent to Natural Areas should be clustered to reduce the overall development footprint. Any changes in this Placetype should involve reduced lots, shortened roadways, and protecting additional land from development. This is particularly true for coastal hazard areas where concerns about safety continue to increase and landforms have reduced ability to respond to natural forces.

Minimize total parking spaces to no more than what is required by zoning

In many cases, zoning for commercial uses requires large setbacks from roadways and excessive parking requirements. These requirements make it difficult for development to respect the Cape's traditional development patterns and can lead to unnecessarily large amounts of impervious surface on a site.

FOR ALL PLACETYPES

Divide up large parking lots: Divide large parking lots and buildings into smaller components as an alternative to extensive grading and paving. Landscaping can be used to divide the larger parking areas into discrete smaller parking areas.

Design parking lots to accommodate average, not peak, volume: To reduce the amount of paved area, design parking lots to accommodate average, not peak, volume. The required number of parking spaces should be based on average use over a twelve-month period rather than peak holiday and summer months. Consider sharing parking areas with compatible uses, on-street parking and town-owned parking lots, as well as school and church parking lots for shuttle service during peak use periods. For new developments, consider reserving an area for additional parking that will be paved in the future if a need is demonstrated, but which will otherwise remain as open space.

Use permeable or pervious pavement: Permeable or pervious construction materials should be used whenever possible. Gridblocks with grass, crushed stone or shells are possible solutions which can improve the appearance of lightly used or seasonal parking areas while reducing stormwater runoff. This is particularly appropriate in Historic Areas and areas adjacent to Natural Areas.

Provide facilities for other modes of transportation: Provide bicycle racks and storage facilities, and/or bus stops, as appropriate to promote use of modes of transportation other than vehicular and reduce demand for vehicle parking.

Develop multi-story buildings where appropriate

Past development in the region often included multi-story buildings with usable second and third floors. Incorporating multiple stories in new development can reduce both the building footprint and development footprint without reducing the usable square footage.

FOR ALL PLACETYPES

Add a second or third story to reduce building footprints: New development should be designed with a usable second or third story, consistent with the region's traditional building forms. Building a second story, rather than placing the entire floor area on the ground level, can reduce the overall footprint of the proposed use and result in a building that more closely matches the local scale. A second story can also accommodate different uses, such as residential or office space above retail, creating a mixed-use development and allowing for more varied architectural features. Alternatively, a second story may be designed without added floor area, but simply to

allow natural light to pass more freely into the interior of the building through an atrium space.

Provide parking under or within buildings or in structures

In some situations, incorporating a parking structure into the design of proposed buildings may be desirable to limit the amount of land area devoted to parking.

FOR ALL PLACETYPES

Locate parking within or under buildings: Locating a portion or all of a development's parking within the first floor of a building or underneath it in a parking garage reduces the need for impervious surface in excess of the building footprint.

Locate parking in parking structures: Parking structures can minimize the amount of impervious surface by using multiple stories to create parking areas with a smaller footprint. Multi-story parking structures are preferably located to the rear of a building because it is difficult to design them in ways that are compatible with traditional building forms. If parking structures will be visible from the street or public ways, they should be incorporated into the design of the building, with a similar level of architectural detail.

Maintain existing vegetation and revegetate disturbed sites

Whenever possible, existing vegetation should be maintained on a site. When vegetation is disturbed, the site should be revegetated with appropriate native species.

FOR ALL PLACETYPES

Integrate existing vegetation into the landscape plan: Integrate existing mature trees and vegetation into the landscape plan. Preserve the function of existing vegetation, such as groves of trees that separate land uses or provide a natural backdrop for development.

DETAILED DISCUSSION OF METHODS FOR MEETING OBJECTIVE CD3

Objective CD3 *– Avoid adverse visual impacts from infrastructure on scenic resources*

FOR ALL PLACETYPES

Site infrastructure away from scenic resources

There are numerous locations or areas on Cape Cod that contain Scenic Resources. Siting infrastructure so that it is not visible from these locations is the preferred method for meeting Objective CD3. Avoid siting infrastructure in Natural Areas, open landscapes in Rural Development Areas, and Historic Areas.

Collocate infrastructure with other existing infrastructure and/or within buildings

Minimize visual impact of infrastructure by collocating or sharing space/poles with other existing infrastructure where possible and or by locating infrastructure within existing buildings or other structures.

Utilize previously developed and/or impervious areas

For some types of infrastructure such as solar panels and utility infrastructure, the use of previously developed areas such as parking lots are strongly encouraged to reduce natural resource impacts and where other infrastructure may already be located.

Locate infrastructure underground where feasible

Another preferred method for infrastructure unless cultural or natural resources are present is to locate infrastructure underground where it is not visible.

Design and scale infrastructure appropriate to context

Where possible, infrastructure such as roads, sidewalks, traffic signals and other appurtenances as well as wireless facilities, all which may have design flexibility, should be designed to be compatible with its corresponding Placetype.

Minimize the height of infrastructure. In visually sensitive areas, minimize the height of infrastructure to the minimum height necessary and locate at or below the height of surrounding vegetation.

Minimize lighting impacts to surrounding neighborhoods and visually sensitive areas. Avoid flashing lights, strobe lighting, or brightly illuminated infrastructure unless required by the FAA for safety reasons.

Camouflage infrastructure to reduce its visibility. Camouflage infrastructure through designs that reduce the visibility through techniques such as a reduced profile, color, or by disguising the infrastructure to resemble other structures in the built environment where appropriate. Use colors that mimic the predominant background setting and choose colors or materials that are less reflective.

Minimize the silhouette of infrastructure through design. The outline or profile of infrastructure can be minimized through designs that are sleeker or slimmer.

Screen infrastructure with vegetative buffers, buildings, or other structures

In some cases, dense vegetative buffers may be effective in screening infrastructure from roadways or other public viewpoints. Additional guidance on screening methods is available under Objective CD1.

GENERAL APPLICATION REQUIREMENTS

Written Design Narrative. All applicants should provide a narrative that addresses both the project design and the building design. The narrative should present the Applicant's analysis of the project's Placetype and clearly explain the design concept, alternatives considered, and how the proposed project's siting and building design responds to surrounding context. Include information regarding appropriateness of project siting, building siting, and building materials.

Context Map. All applicants should provide a map identifying resource areas, existing landscape features, development patterns, open space networks, and other important features surrounding the project site.

Context Renderings. All applicants should provide project renderings that illustrate how the proposed development appears in relation to its surroundings. Based on the size, scale, and/or location of the project, Commission staff will identify the extent of the surrounding area that should be included in the renderings.

Required Project Plans

- Site Plans
- Building Elevations
- Roof Plans
- Landscaping plan and landscape maintenance protocol
- Lighting/Photometric plans and specifications
- Signage Plan and specifications (including signage lighting)

ADDITIONAL APPLICATION REQUIREMENTS FOR INFRASTRUCTURE PROJECTS

Applicants for infrastructure projects may be required to provide the following additional information as part of their DRI application. Based on the size, scale, and/or location of the project, Commission staff will determine if this additional information will be required at a pre-application meeting.

Visual Impact Map. Map of surrounding scenic resources showing areas from which the project may be visible. Based on the size, scale, and/or location of the project, Commission staff will make a determination on extent of map. For proposed offshore infrastructure that will affect broad ocean views, please see Visual Impact Assessment Methodology for Offshore Developments for detailed methodology on assessing the project's visual impacts.

Visualizations and Simulations. Prepare photo-simulations as determined in the pre-application meeting to describe the anticipated effect of the proposed project on the region's scenic resources. The number of simulations required will depend on the anticipated impact and the sensitivity of the resources. The VIA should include consideration of all parts of the project, including all associated infrastructure both in the ocean or on land. In the event that more than one alternative is being considered, the visual impact of all alternatives should be evaluated by the applicant.

Additional Design Narrative Content. Description of how the infrastructure project has been configured or located and how it avoids or minimizes visual impacts. The narrative should provide details concerning alternative configurations or sites that were evaluated in the design process and the design or mitigation strategies employed to reduce any visual impacts.

DEFINITIONS

Adverse Visual Impact: Where the degree of change in the scenic quality resulting from Development is expected to unreasonably impact or interfere with a scenic resource or otherwise unreasonably alter the character, setting or quality of a scenic resource.

Scenic Resources: Locations or areas that are recognized, utilized, and enjoyed by the public for their visual and scenic qualities and whose features, views, patterns, and characteristics contribute to a distinct sense of appreciation of the natural and cultural environment.

Scenic resources on Cape Cod include, but are not limited to:

- National, State and Regional Parks, marine sanctuaries and wildlife refuges from the U.S. Geological Survey, U.S. Fish and Wildlife, Massachusetts Department of Environmental Management and Massachusetts GIS.
- Historic Districts listed by the Massachusetts Historical Commission in the State Register of Historic Places, Old King's Highway and other Historic Districts, as well as other individually listed properties. Information about individual properties, both within and outside of historic districts is also compiled on MACRIS (Massachusetts Cultural Resources Inventory System). [see also Cultural Heritage Technical Bulletin]
- Municipally designated scenic roads.
- Scenic vistas or viewpoints, e.g. scenic canal overlooks in Bourne; Nobska Light, Falmouth; and Scargo Tower, Dennis.

Scenic Road: A public road that has one or more of the following characteristics:

1. Passes through an area of outstanding natural environmental features providing views of scenic elements such as salt marshes, rivers, bays, dunes and the ocean;
2. Provides outstanding views of rural, agricultural landscapes including scenic elements such as panoramic or distant views, cropland, pastures, fields, streams, ponds, hedgerows, stone or wooden fences, farm buildings and farmsteads;
3. Follows historic road alignments and provides views of historic resources;

4. A large proportion of the road provides frontage for properties that are in a historic district or subject to perpetual or long-term agricultural, environmental or historic easements; or,
5. Is designated by a municipality as a scenic road.

View: Portion of the seascape that is seen from a vantage point.

Visual Impact: The degree of change in scenic quality resulting from Development.

Visual Impact Assessment (VIA): The process for determining the degree of change in scenic quality resulting from Development, including but not limited to establishing the zone of visual influence, identifying Visual and Scenic Resources, preparing visual simulations, and assessing the magnitude of the proposed change.

REFERENCES

Randall Arendt, with Elizabeth A. Brabee, Harry L. Dodson, Christine Reid, Robert D. Yaro. Rural by Design, Maintaining Small Town Character. APA Planners Press, American Planning Association. Copyright 1994.