BOURNE TECHNOLOGY PARK REALTY TRUST
CONVENTION DATA SERVICES HEADQUARTERS
LOTS 2 &3 BOURNE TECHNOLOGY PARK

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3212177.1

Application Cover Sheet

Cape Cod Commission
3225 Main Street, PO Box 226
Barnstable, MA 02630
Tel: (508) 362-3828
Fax: (508) 362-3136

For Commission Use Only
Date Received:
Fee ($):
Check No:
File No:

A. Type of Application (check all that apply)

- ☐ Development of Regional Impact (DRI)
- ☐ Jurisdictional Determination
- ☐ Hardship Exemption
- ☐ DRI Exemption
- ☒ Limited DRI Determination for Change of Use
- ☐ Request for Joint MEPA/DRI Review

B. Project Information

Fee Waiver Request? yes/*no*

Project Name: ***Convention Data Services Headquarters***

Total Site Acreage: ***4.49 acres***

Project/Property Location: ***3 & 4 Technology Park Dr., Bourne***

Zoning: ***Business-4 (B-4)***

Brief Project Description:

Include total square footage of proposed and existing development, gross floor area, number of lots existing or to be created, specific uses, description of existing conditions, as applicable (attach additional sheets if necessary).

Project proposes redevelopment of 4.49 acre site, including removal of existing 9,996 square foot partially constructed office structure and construction of approximately 27,210 square foot office/production facility to serve as new headquarters for Convention Data Services, a Bourne-based company, providing comprehensive management solutions for national and global events. Redevelopment includes, without limitation, 153 parking spaces, both pervious and impervious, an innovative/alternative denitrification septic system, roof-mounted solar panels, storm-water management, including bio-infiltration, pedestrian connections, landscaping, outdoor patio and recreation areas for employees, new access/egress on Technology Park Drive, and other site improvements.

C. Owner(s) of Record

List the following information for all involved parcels. Provide copies of each Deed and Purchase and Sale Agreement and/or evidence of leasehold interest, if applicable, for all involved parcels. Proof of ownership/legal right for Applicant(s) to proceed with the proposed development must be documented prior to the Commission deeming any application complete (attach additional sheets if necessary).

Map/Parcel	Owner's Name	Lot & Plan	Land Court Certificate of Title #	Reg. of Deeds: Book/Page #
27/184 & 185	***John P. Fletcher, Trustee***	***Lots 2 & 3***		***13817/63***
	Bourne Technology Park	***Plan Bk 581, Plan 28***		
	Realty Trust			

There ARE/**ARE NOT** (circle one) court claims, pending or completed, involving this property (If yes, please attach relevant information).

D. Certification

I hereby certify that all information provided on this application form and in the required attachments is true and accurate to the best of my knowledge. I agree to notify the Cape Cod Commission of any changes the information provided in this application, in writing, as soon as is practicable. I understand failure to provide the required information and any fees may result in a procedural denial of my project.

NOTE: For wireless communication facilities, a licensed carrier should be either an applicant or co-applicant.

Applicant

Applicant(s) Name: John P. Fletcher, Trustee — Tel: (206) 669-3601 — Fax:
Address: P.O. Box 790, Buzzards Bay, MA 02532
Signature: John P. Fletcher — Date: 8/4/2016

Co-Applicant

Co-Applicant(s) Name: — Tel: — Fax:
Address:
Signature: — Date:

Contact

Contact: Eliza Cox, Esq., Nutter, McClennen & Fish — Tel: 508-790-5431 — Fax: 508-771-8079
Address: P.O. Box 1630, Hyannis, MA 02601
Signature: Eliza Cox, Attorney for Applicant — Date: 8/9/16

Property Owner:

Property Owner: John P. Fletcher, Trustee — Tel: — Fax:
Address: P.O. Box 790, Buzzards Bay, MA 02532
Signature: — Date:

Billable Entity

Name: Eliza Cox, Esq., Nutter, McClennen & Fish — Tel: 508-790-5431 — Fax: 508-771-8079
Address: P.O. Box 1630, Hyannis, MA 02601

REQUIRED FILING MATERIALS

The following must be attached to the Application Form at the time of its filing:

☐ Certified List of Abutters (required for all application types except Attachment 5, Jurisdictional Determination.
A list of abutting property owners within 300 feet of the boundaries of the development site and their addresses. Include both local and off-Cape addresses when applicable.

- ☐ This list must be formatted in three columns consistent with the Standard Label Format designed to print on Avery Labels #5160.
- ☐ List must be certified by the Town Assessor's office. Note: Assessor's offices may take up to 10 days to certify an abutter's list.
- ☐ If there are more than 50 abutters, applicants must provide **three sets** of the certified list on self-adhesive labels.

☒ Required Filing Fee. Please calculate according to the Schedule of Fees (see Enabling Regulations, Section 14). Please make check payable to **BARNSTABLE COUNTY TREASURER.**

☒ An 8 ½" x 11" copy of the U.S.G.S. quadrangle map of the area, containing sufficient information for the Commission to locate the site of the proposed development.

☒ Development Plans. File as required for each application type you are making. See list of Attachment(s) below for specific instructions.

☒ Permits or Actions. List of local, state, or federal agencies or boards from which a permit or other actions have, will, or may need to be sought. Include agency/board name, type of permit, date filed, and file number. If one of the listed permits or actions requires the filing of an Environmental Notification Form under the Massachusetts Environmental Policy Act (MEPA), please contact the Commission's Chief Regulatory Officer to discuss the potential for joint Commission and MEPA review. For information on MEPA regulations contact the Executive Office of Environmental Affairs, MEPA Unit, ant (617) 626-1020. Please attach all relevant MEPA documents and describe the status of the MEPA filing.

Applicants must also submit the necessary attachment(s) based on the type of application(s) being made:

Attachment 1: DRI Application Filing Procedures & Requirements
Attachment 2: DRI Exemption Application Filing Procedures & Requirements
Attachment 3: Hardship Exemption Application Filing Procedures & Requirements
Attachment 4: Limited DRI Determination for Change of Use Application Filing Procedures & Requirements
Attachment 5: Jurisdictional Determination Application Filing Procedures & Requirements
Attachment 6: Joint MEPA/DRI Review Application

3212460.1

CONVENTION DATA SERVICES HEADQUARTERS

LIMITED DRI REVIEW - SCOPING CHECKLIST

REDEVELOPMENT/CHANGE OF USE

Land Use	Question	Required Info	Yes	No
Compact Growth and Resource Protection	Is the project consistent with the land use categories and their characteristics? (check "Yes" if Town has not adopted a Land Use Vision Map)	RPP Regional Land Use Vision Map which shows project site	☒	☐
Compact Growth and Resource Protection	Is the development clustered on the site?	Preliminary project plans, Local zoning	☒	☐
Capital Facilities and Infrastructure	Does the project create new infrastructure?	Preliminary project plans	☐	☒
Capital Facilities and Infrastructure	Does the project propose to construct a new wireless facility?	Preliminary project plans	☐	☒
Rural Lands	Is the project site adjacent to rural landscapes or land under active agricultural production?	Staff consultation/Preliminary project plans showing prime agricultural lands	☐	☒
Rural Lands	Is the land capable of sustained agricultural production as evidenced by recent use, soils, or adjacent land use?	Staff consultation/Preliminary project plans showing prime agricultural lands	☐	☒
Water Resources	**Question**	**Required Info**	**Yes**	**No**
Drinking Water Quality and Quantity, Marine Water Embayments and Estuaries, Freshwater Ponds and Lakes	Is the project located in a Wellhead Protection Area, Potential Public Water Supply Area, Marine Water Recharge Area, or Fresh Water Recharge Area?	Site locus map showing watersheds described by Water Resources Classifications Maps I & II	☐	☒
Public and Private Sewage Treatment Facilities	Is the project's wastewater facility an on-site septic system or private treatment plant?	Preliminary project plans	☒	☐
Water Quality Improvement Areas, General Aquifer Protection	Is there a net increase in nitrogen load from wastewater, stormwater and turf on-site and does the project's nitrogen load from wastewater, stormwater and turf exceed 5 parts per million?	Nitrogen loading calculations (Technical Bulletin 91-001) comparing existing system design / site development and proposed system design / site development	☐	☒
Stormwater Management	Does the project substantially improve stormwater management by incorporating Low Impact Design to the greatest extent possible?	Engineered grading, drainage, and erosion control plans that show existing and proposed conditions and stormwater design details	☒	☐
Stormwater Management	Does the project have a comprehensive engineer-certified Operations and Maintenance Plan (Plan) that 1) demonstrates compliance with the Massachusetts Stormwater Policy & Guidelines 2) provides a schedule for inspection, monitoring and maintenance 3) identifies the parties responsible for Plan implementation and 4) includes an inspection and maintenance log	Copy of project's Stormwater Operation and Maintenance Plan	☒	☐
Coastal Resources	**Question**	**Required Info**	**Yes**	**No**
Protecting Maritime Industry, Character and Public Access	Does the project involve a conversion or loss of an existing water-dependent use, any marine infrastructure, or an existing legal public access to the coast?	Preliminary project plans	☐	☒
Protecting Maritime Industry, Character and Public Access	Does the project limit views of the ocean and/or shoreline from public ways, waterways, access points, and existing development relative to existing conditions?	Preliminary project plans	☐	☒
Coastal Hazard Mitigation	Does the project involve any expansion or new site disturbance in, or within 100 feet of: land subject to coastal storm flowage, barrier beach, coastal dune, or coastal bank?	Preliminary project plans indicting flood zone boundary, and Resource Area Delineation through local Conservation Commission	☐	☒
Coastal Hazard Mitigation	Is the project located in land subject to coastal storm flowage, coastal beach, bank, dune or barrier beach?	Resource Area Delineation through local Conservation Commission	☐	☒
Preserving Coastal Water Quality and Habitat	Does the project involve any alteration of a coastal wetland or its 100 foot buffer zone?	Resource Area Delineation through local Conservation Commission	☐	☒

Responses in the shaded boxes may be included in the scope of CCC review. Consultation with CCC staff recommended.

LIMITED DRI REVIEW - SCOPING CHECKLIST
REDEVELOPMENT/CHANGE OF USE

Wetlands/Wildlife & Plant Habitat	Question	Required Info	Yes	No
Wetlands	Does the project involve any alteration of a wetland that is greater than 500 square feet in size?	Resource Area Delineation through local Conservation Commission	☐	☒
Wetlands	Does the project involve any alteration of a 100 foot buffer to a wetland that is greater than 500 square feet in size?	Resource Area Delineation through local Conservation Commission	☐	☒
Wetlands	Does the project involve any alteration of a 350 foot buffer to a vernal pool?	Resource Area Delineation through local Conservation Commission	☐	☒
Wetlands	Will the project result in any new or additional direct stormwater discharge into a wetland or waterbody that is greater than 500 square feet in size?	Preliminary project plans	☐	☒
Wildlife & Plant Habitat	Will the project disturb or alter naturally vegetated areas?	Existing conditions plan	☒	☐
Wildlife & Plant Habitat	Is the project site mapped as Estimated or Priority rare species habitat by the Massachusetts Natural Heritage & Endangered Species Program (NHESP)?	NHESP Atlas	☐	☒
Open Space Protection & Recreation	**Question**	**Required Info**	**Yes**	**No**
Open Space Protection & Recreation	Will the project disturb or alter a Significant Natural Resource Area (SNRA)?	SNRA map and preliminary project plans	☐	☒
Open Space Protection & Recreation	Will the project disturb or alter more than 2 acres of land outside a Significant Natural Resource Area?	SNRA map and preliminary project plans	☐	☒
Energy	**Question**	**Required Info**	**Yes**	**No**
Energy	Has the project been designed to meet LEED Certification?	Design information or LEED Certification Checklist	☐	☒
Energy	Is the project Mixed Use as defined by the Regional Policy Plan?	Project description, RPP definition of Mixed Use	☐	☒
Energy	Is the project located in an Economic Center? (check "No" if Town has not adopted a Land Use Vision Map)	RPP Regional Land Use Vision Map which shows project site	☐	☐
Economic Development	**Question**	**Required Info**	**Yes**	**No**
Low Impact and Compatible Development	Is the project located outside an Economic Center or an Industrial Trade Area? (Check "Yes" if Town has not adopted a Land Use Vision Map)	RPP Regional Land Use Vision Map which shows project site	☒	☐
Low Impact and Compatible Development	If located in an Industrial Trade Area, will this project accommodate non-industrial uses as defined in the Regional Policy Plan? (Check "Yes" if Town has not adopted a Land Use Vision Map)	Statement from Applicant	☒	☐
Low Impact and Compatible Development	Is the project located in a resource-based economically productive area?	Existing Conditions Plan, Assessors Data	☐	☒
Balanced Economy	Does the development involve class III gaming?	Preliminary project plans	☐	☒
Infrastructure Capacity	Will the project develop new infrastructure as defined in the Regional Policy Plan?	Preliminary project plans	☐	☒
Affordable Housing	**Question**	**Required Info**	**Yes**	**No**
Affordable Housing (Residential Projects)	Does the project include 10 or more units/lots in a Town that has an affordable housing bylaw under which this project will be permitted?	Project affordable housing narrative, Local affordable housing bylaw	☐	☒
Equal Opportunity	Does the project include 10 or more units/lots in a Town that has an affordable housing bylaw under which this project will be permitted?	Project affordable housing narrative, Local affordable housing bylaw	☐	☒
Community Participation (Commercial Projects)	Does the redevelopment project involve additional commercial development?	Preliminary project plans	☒	☐
Community Participation (Commercial Projects)	Does the change of use project require more mitigation than the credits received for the existing use?	MPS AH3.1	☐	☐ ← N/A

Responses in the shaded boxes may be included in the scope of CCC review. Consultation with CCC staff recommended.

LIMITED DRI REVIEW - SCOPING CHECKLIST
REDEVELOPMENT/CHANGE OF USE

Transportation	Question	Required Info	Yes	No
Congestion Management	Will the project generate more than 250 new daily trips?	ITE Trip Generation manual	☐	☒
Transportation Balance and Efficiency	Will the project generate more than 250 new daily trips?	ITE Trip Generation manual	☐	☒
Safety	Does the project have direct access on or does the project directly abut a regional roadway?	Cape Cod Metropolitan Planning Organization functional classification	☒	☐
Safety	Will the project generate more than 25 new peak hour trips at a high crash location?	State / Local crash data	☐	☒
Heritage Preservation & Community Character	**Question**	**Required Info**	**Yes**	**No**
Historic Structures / Cultural and Archaeological Resources	Is the building and/or site listed on the National Register of Historic Places or within a National or Local Historic District?	Historic District map	☐	☒
Historic Structures / Cultural and Archaeological Resources	Is any part of the site known to be archaeologically significant or archaeologically sensitive, including areas within 100 feet of a wetland or waterbody?	Massachusetts Historical Commission consultation, Resource Area Delineation through local Conservation Commission	☐	☒
Historic Structures / Cultural and Archaeological Resources	Is there a building or structure on the property, which is more than 75 years old or known to be historically significant?	Local Historical Commission / staff consultation	☐	☒
Site and Building Design	Is the redevelopment proposed within a distinctive area, such as a historic district, along a scenic road, cultural landscape, regional road or shoreline?	Staff consultation	☒	☐
Site and Building Design	Outside of distinctive areas, does the project consist of a single mass greater than 50,000 square feet?	Preliminary project plans	☐	☒
Site and Building Design	Does the project incorporate site design and building design features consistent with the Commission's design manual and design manual addendum guidelines?	Staff consultation	☒	☐
Landscape Design	Is the project subject to habitat restoration requirements resulting from on or off-site disturbance of significant wildlife and plant habitat?	SNRA map, Preliminary project plans	☐	☒
Landscape Design	Does the landscape design utilize appropriate, non-invasive plantings to reduce water use and maintenance needs, and is it consistent with existing landscape design features?	Preliminary landscape plans	☒	☐
Exterior Lighting Design	Is the project's exterior lighting design consistent with MPS HPCC2.11 and the Exterior Lighting Technical Bulletin and with the existing exterior lighting design?	Exterior lighting information including fixture cut sheets and foot-candle plans	☒	☐
Hazardous Materials & Waste	**Question**	**Required Info**	**Yes**	**No**
Hazardous Materials and Waste Management	Does the project involve a net increase in hazardous materials or hazardous wastes in an existing Wellhead Protection Area or a Potential Public Water Supply Area?	Project inventory, RPP map	☐	☒
Hazardous Materials and Waste Management	Does the project use, handle, generate, treat or store hazardous waste?	Project inventory	☐	☒
Solid Waste	Does the project involve a significant amount of land clearing wastes or construction and demolition debris?	Estimate of amounts of land clearing and construction/demo wastes, Plan to address recycling and disposal of wastes	☐	☒
Solid Waste	Does the project involve greater than 25,000 square feet of new development?	Preliminary project plans	☒	☐
Local Concerns	**Question**	**Required Info**	**Yes**	**No**
Town Concerns	Has the Town identified issues or concerns that should be addressed through DRI review?		☐	☒
Public Concerns	Has the public identified issues or concerns?		☐	☒

Responses in the shaded boxes may be included in the scope of CCC review. Consultation with CCC staff recommended.

BOURNE TECHNOLOGY PARK REALTY TRUST
CONVENTION DATA SERVICES HEADQUARTERS

Project Description / Narrative on Responses to Scoping Checklist

Project Description

Convention Data Services (CDS), a Bourne-based company, was founded in 1986 on Cape Cod, and provides comprehensive management solutions for national and global events, including registration, technology based software and innovations, exhibitor leads, data management, attendee engagement, marketing, and analytics. CDS is headquartered at 107 Waterhouse Road, Bourne, and has satellite offices in Washington, DC, Austin, Texas, and Orlando, Florida. The company employs approximately 160 people.

CDS' present headquarters, at 107 Waterhouse Road, was permitted by the Cape Cod Commission as a development of regional impact in March of 1999.[1] CDS has come out of the economic downturn and has experienced significant growth in the past several years. CDS has outgrown its existing 20,000 square foot building, and there are insufficient parking spaces for its employees. As a result, CDS has explored several options, including: (i.) relocating the company to existing office space off-Cape Cod; (ii.) relocating the company to a new building either on or off-Cape; or (iii.) keeping the existing location and finding a second location. After considering the various options, CDS is proposing remain in Bourne and construct a new headquarters on an immediately adjoining parcel of land addressed 3 & 4 Technology Park Drive, Bourne (the "Subject Property").

The Subject Property was created in 2002 by a definitive subdivision plan that established five lots (Lots 1-5) and a new cul-de-sac roadway known as Technology Park Drive.[2] Together, this land is known as the "Bourne Technology Park." At present, lots 1, 4 and 5 as shown on the Subdivision Plan are developed and occupied. The cul-de-sac roadway, Technology Park Drive, is partially constructed providing access to the buildings on lots 1 and 4.

The Subject Property, consisting of lots 2 and 3 on the Subdivision Plan, contains approximately 4.49 acres of land. As shown on the enclosed photographs (Tab 6), lot 2 is developed with a 9,966 square foot foundation and partially completed steel framing. This building was fully permitted for professional office use by the Town of Bourne Planning Board pursuant to a site plan review / special permit issued on June 29, 2007.[3] A building permit was subsequently issued and construction commenced. Lot 3 has also been largely cleared. As

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[1] See CCC Decision TR98048.
[2] See Definitive Subdivision Plan recorded with the Registry of Deeds in Plan Book 581, Page 28 (the "Subdivision Plan"), a copy of which is included in Tab 5 of these application materials.
[3] Site Plan / Special Permit #17-2007.

detailed on the civil site plans, approximately 2.84 acres of the existing 4.49 acre Subject Property, have already been disturbed.

The project involves redeveloping the Subject Property by removing the existing structure, modifying the location of the cul-de-sac roadway, combining lots 2 and 3 (into proposed "Lot 7"), and constructing an approximately 27,210 square foot headquarters for CDS. The redevelopment also includes 153 parking spaces, consisting of both pervious and impervious surfaces, an innovative/alternative denitrification septic system, roof-mounted solar panels, new storm-water management, including bio-infiltration systems, for both the on-site development as well as for Technology Park Drive, a new sidewalk along Technology Park Drive, interior pedestrian connections, substantial vegetation and plantings, an outdoor patio and recreation area for employees, and other site improvements. Additional details are included in the application materials.

In that CDS is already located within the Town of Bourne and is simply relocating to an slightly expanded space that is better and more efficiently designed to meet its needs, many of the impacts associated with the business will not change and are not "new." This includes traffic, as the trips are already present on the exact same road network. As an emerging, clean, technology-based industry, this is exactly the type of development that should encouraged to remain and grow on Cape Cod, and as such, as detailed herein, there is no affordable housing mitigation. In finding a previously developed location immediately adjacent to its existing site, impacts from the relocation have been minimized, such limited review is appropriate.

Responses to Certain Issue Areas from Scoping Checklist

1. *Land Use*

As described in the Site and Building Design Narrative (Tab 9), the proposed structure has been sited over the existing structure (which is proposed to be removed) in the northerly portion of the property. The development is clustered to the west of the property, adjacent to an existing developed site. As part of the project, a sidewalk will be constructed along Technology Park Drive leading to internal pedestrian walkways within the property and connecting with an existing sidewalk along Waterhouse Road.

2. *Water Resources*

Although a shaded box on the checklist is indicated, it is noted that the site is not within a sensitive water resource district and that project wastewater is proposed to be handled by an innovative / alternative de-nitrification septic system resulting in nitrogen load of 4.92 ppm (*see* Tab 10).

3. *Wetlands / Wildlife & Plant Habitat*

Response to the scoping checklist requires checking one shaded box indicating that the project will disturb or alter naturally vegetated areas. As shown on the aerial image and photographs

(Tab 6), approximately 63% (2.84 acres) of the site is already disturbed. The project has been designed to minimize the amount of naturally vegetated areas that will be disturbed by siting the proposed development primarily on existing disturbed areas and towards the layout of Technology Park Drive. Only approximately 37,732 square feet (0.87 acres) of existing undisturbed areas will be disturbed by the proposed development. The entirety of the property, including the area of proposed new disturbance, is not mapped as a Significant Natural Resources Area, and is bounded by existing developed properties and MacArthur Boulevard.

4. *Energy*

Despite the response to the scoping checklist, the project meets the Regional Policy Plan's Energy minimum performance standards. As documented in Tab 13 of the application materials, the proposed roof-mounted solar panels will produce approximately 85,449 kWh, representing approximately 26% of the project's anticipated demand. As such, the project meets Minimum Performance Standard (MPS) E1.6, and therefore MPS E1.1 through E1.5 are deemed satisfied through this alternate methodology. The remaining Energy MPS are not applicable. Therefore, as there is no deviation from the Energy MPS, notwithstanding the shaded responses to each of the questions in the checklist under this issue area, it is requested that the issue area be exempted from further review.

5. *Economic Development*

As the Town of Bourne has not adopted a Land Use Vision Map for this portion of the Town, response to the scoping checklist requires that two boxes be shaded. Notwithstanding that response, the project may be exempted from further review under Economic Development as it complies with the applicable MPS. As a redevelopment project (see photos in Tab 6), MPS ED1.3 requires that the project meet at least two (2) of the waiver criteria. The proposed redevelopment is considered an emerging industry cluster business and it complies with the distributed energy generation criteria (see Tab 13).

6. *Affordable Housing*

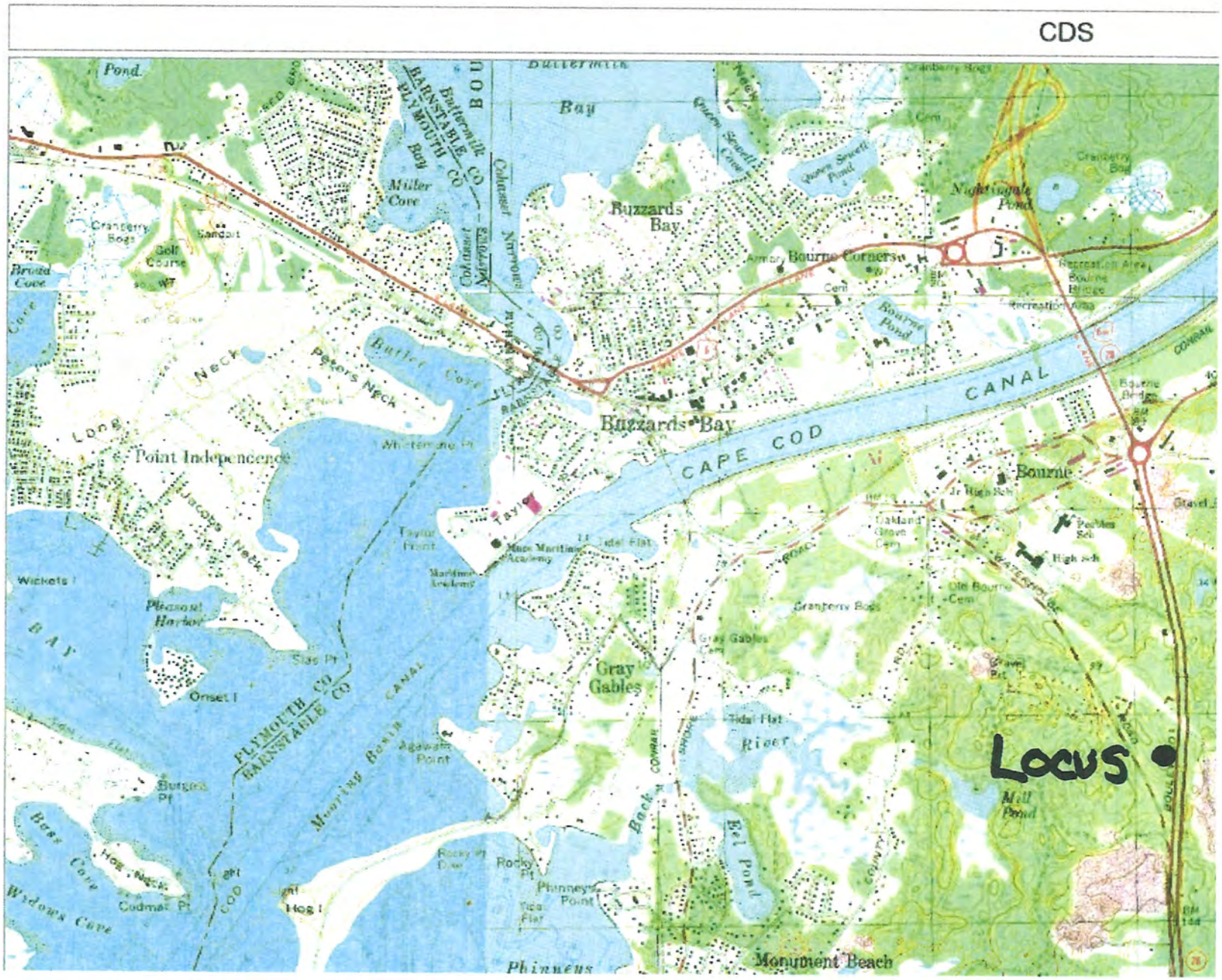
Although several of the shaded boxes are checked in the scoping checklist, as described in Tab 14, based on the number of new employees, and the anticipated wages for those new positions, no affordable housing mitigation is required.

7. *Transportation*

In this issue area, the only shaded response to the scoping checklist is that the proposed project abuts a regional roadway. However, as described in the Traffic Impact and Access Study ("TIAS," attached in Tab 15), no access/egress is proposed on MacArthur Boulevard. As to the other questions, the proposed project does not generate more than 250 new daily trips. In addition, as to the last question, the project will not generate more than 25 peak hour trips at a high crash location. As described in the TIAS, there are only 2 high crash locations within the

proposed project study area: (1.) the Bourne Rotary, and (2.) Route 28 at Waterhouse Road. At the Bourne Rotary, the proposed project will generate 21 AM peak hour trips and 25 PM peak hour trips. At Route 28 at Waterhouse Road, the project will generate 10 AM peak and 10 PM peak hour trips. Therefore, as indicated on the scoping checklist, the proposed project will not generate more than 25 peak hour trips at any high crash location. Based on these responses, the proposed project may be exempted from DRI traffic review entirely. However, as described in the TIAS, the Applicant is prepared to undertake the safety improvements described in the TIAS and is committed to its model TDM plan.

CDS



http://maps.massgis.state.ma.us/temp/OL_MORIS_print/1470054125.210351197.html

Bk 13817 Pg63 #32252
05-10-2001 @ 02:37p

Doc:831,743 05-10-2001 2:06
Ctf#:161440
BARNSTABLE LAND COURT REGISTRY

QUITCLAIM DEED

FALMOUTH HOSPITAL ASSOCIATION INC., a/k/a FALMOUTH HOSPITAL, a Massachusetts Charitable Corporation having a usual place of business at 100 Ter Heun Drive, Falmouth, Barnstable County, Massachusetts,

for consideration paid of One Million One Hundred Twelve Thousand and 00/100 ($1,112,000.00) Dollars,

grant to William S. Anthony, Trustee of Bourne Technology Park Realty Trust, under Declaration of Trust recorded herewith, with a usual address of 720 Main Street, Hyannis, MA 02601 TRUST DATE 5/10/01 REGISTERED AS DOC 831742

, with quitclaim covenants
a certain parcel of land being shown as "Lot B" as shown on a plan of land in Bourne, Mass., owner: National Loan Investors, 3030 N.W. Expwy., Suite 1313, Oklahoma City, OK 73112, Scale: 1" equals 60', Date: 8/21/98, by Wm. M. Warwick & Assoc., Inc., recorded with the Barnstable County Registry of Deeds in Plan Book 544, Page 26.

A portion if the above described premises is Registered Land and is shown as Lot 8 on Land Court Plan No. 36495-C, which Plan is on file with the Barnstable County District of the Land Court.

For title see deed recorded with Barnstable County Registry of Deeds in Book 12746, Page 336 and registered as Document No. 788,519, Certificate of Title Number: 156051.

This conveyance does not constitute a sale of all or substantially all of the corporation's assets.

Property Address: 180 MACARTHUR BOULEVARD RT28 BOURNE. MA.

For authority see Vote recorded with Barnstable County Registry of Deeds in Book 13813, Page 268 and registered as Document No. 831,629.

Executed as a sealed instrument this 8th day of May, 2001.

(2)

36495-C

Falmouth Hospital Association Inc.

By: _____
Robert A. Gundersen, Chief Executive Officer

COMMONWEALTH OF MASSACHUSETTS

Barnstable, ss. May 8, 2001

Then personally appeared the above named
and acknowledged the foregoing instrument to be the free act and deed of Falmouth Hospital Association Inc., before me,

Patricia Sammadore
Notary Public
My Commission Expires 2/21/03

836017

BARNSTABLE COUNTY
REGISTRY OF DEEDS
COUNTY EXCISE TAX

DATE 05.10.01 CANCELLED
REGISTRY OF DEEDS
BARNSTABLE

TAX	$2535.36	
TOTAL	$2535.36	05/10/01 1:00PM 04
CHECK	$2535.36	000000 #2603
CLERK 1	NO.008163	FEE $3803.04
TIME 13:09	2222	
		CASH $3803.04

BARNSTABLE REGISTRY OF DEEDS

CERTIFICATE OF APPOINTMENT
OF SUCCESSOR TRUSTEE AND ACCEPTANCE
Bourne Technology Park Realty Trust

I, **JOHN P. FLETCHER**, a Trustee of **BOURNE TECHNOLOGY REALTY TRUST** under Declaration of Trust dated May 10, 2001, recorded with the Barnstable County Registry of Deeds at Book 13817, Page 58 do hereby certify that by an instrument in writing singed by 100 percent of the Beneficiaries of said Trust, **JOHN P. FLETCHER** of 545 North 70th Street, Seattle, Washington 98103, was appointed as successor Trustee in place of **WILLIAM S. ANTHONY**, who has resigned.

Executed as a sealed instrument this 11th day of September, 2009.

John P. Fletcher, Trustee

STATE OF WASHINGTON

County: King

On this 11th day of September, 2009, before me, the undersigned Notary Public, personally appeared **John P. Fletcher** proved to me through satisfactory evidence of identification being (check whichever applies):

- [x] Driver's license or other state or federal governmental document bearing a photograph image; or
- [ ] Oath or affirmation of a credible witness known to me who knows the above signatory; or
- [ ] My own personal knowledge of the identity of the signatory to be the person whose name is listed above

and acknowledges to me that he signed the foregoing instrument voluntarily of his own free act and deed as Trustee of Bourne Technology Park Realty Trust.

seal

KATHLEEN C. GARIEPY NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 5-10-10

Notary Public
My Commission Expires:

BARNSTABLE REGISTRY OF DEEDS

BOOK 581 PAGE 28

Bk 544 Pg 28

MacARTHUR BOULEVARD
STATE HIGHWAY
PUBLIC - VARIABLE WIDTH

LEGEND:
EXISTING BOUND
BOUND TO BE SET

NOTES:

LOCUS IS SHOWN IN THE "B-4" ZONING DISTRICT.

LOCUS IS SHOWN IN THE "X" FLOOD ZONE.

EACH LOT CORNER, POINT OF CURVE AND POINT OF TANGENCY SHALL BE MARKED WITH A CONCRETE BOUND AS REQUIRED IN SECTION 2440 OF THE ZONING BYLAW.

NO WETLANDS EXIST ON OR WITHIN 100' OF ANY PORTION OF THIS SUBDIVISION AS DEFINED BY MASS. GENERAL LAW 131 SEC. 40.

6-27-02

OWNER/APPLICANT
WILLIAM ANTHONY
TWO MAIN STREET
HYANNIS, MA 02601

APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED.

TOWN OF BOURNE PLANNING BOARD

DATE 4/3/03

I CERTIFY THAT NOTICE OF APPROVAL OF THIS PLAN BY THE TOWN OF BOURNE PLANNING BOARD HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECORDED IN THE TWENTY DAYS SUBSEQUENT TO SAID RECEIPT AND RECORDING.

4/1/03
DATE TOWN CLERK

LOT ③
84,837± S.F.
24.6 shape factor
95,701± S.F. UPLAND AREA
2,174± S.F. DRAINAGE EASEMENT

LOT ②
86,556± S.F.
23.8 shape factor

LOT ①
72,846.26 S.F.

LOT 1 ACCEPTED AS AN APPROVAL NOT REQUIRED PLAN AND RECORDED IN THE BARNSTABLE REGISTRY OF DEEDS IN BOOK 546 PAGE 86.

LOT ④
78,964± S.F.
16.6 shape factor
71,100± S.F. UPLAND AREA
8,264± S.F. DRAINAGE EASEMENT

LOT ⑤
110,960± S.F.
16.4 shape factor
100,063± S.F. UPLAND AREA
8,917± S.F. DRAINAGE EASEMENT

SLOPE EASEMENT
10,396± S.F.

DRAINAGE EASEMENT
4,739± S.F.

WATERHOUSE ROAD
STATE HIGHWAY (66' WIDE)

BROOKSIDE ROAD
50' WIDE PRIVATE

"BOURNE TECHNOLOGY PARK" SUBDIVISION

W/F
GREAT ROCK TRACTOR CO Inc.

W/F
TRUSTEES OF
DONBROS REALTY TRUST

DOUGLAS J. FLETCHER
TRUSTEE OF
TECHNOLOGY PARK REALTY TRUST
107 WATERHOUSE ROAD
BOURNE, MA 02532
MAP 27 LOT 171

DANIEL C. WOSTETTER &
JOHN A. LARGAY, Jr.
114 WATERHOUSE ROAD
BOURNE, MA 02532
MAP 27 LOT 147

DANIEL C. WOSTETTER &
JOHN A. LARGAY, Jr.
116 WATERHOUSE ROAD
BOURNE, MA 02532
MAP 27 LOT 146

JAMES A. RYAN &
BETTY J. RYAN
118 WATERHOUSE ROAD
BOURNE, MA 02532
MAP 27 LOT 148

THIS PLAN WAS PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS

SCALE 1" = 40'

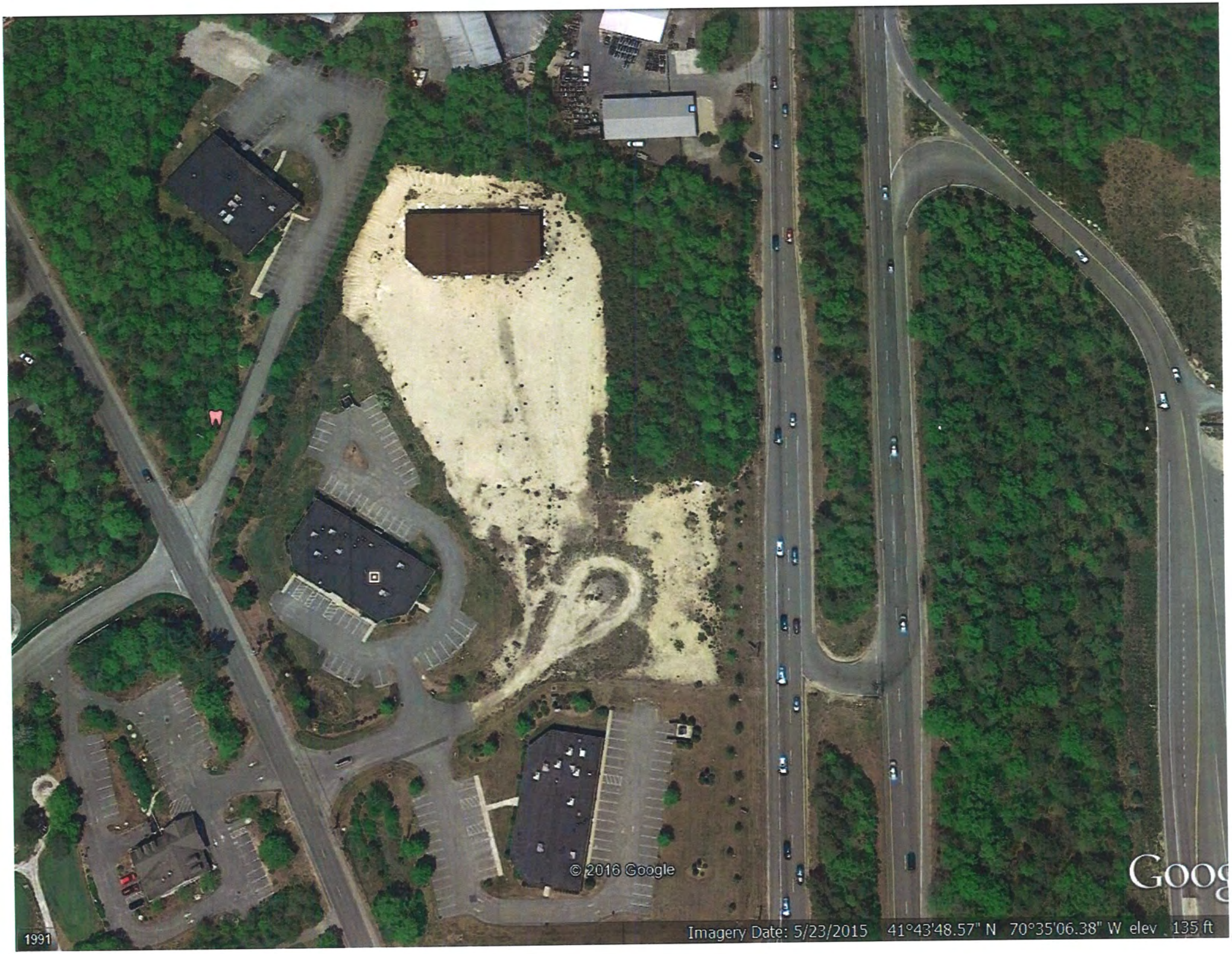
6-27-02
DATE PROFESSIONAL LAND SURVEYOR

REV 06/24/02 JDR

DEFINITIVE SUBDIVISION PLAN
PREPARED FOR
WILLIAM ANTHONY
OF
LOT 87, WATERHOUSE ROAD
BOURNE, MA

J. E. LANDERS-CAULEY, P.E.
CIVIL ENVIRONMENTAL ENGINEERING
P.O. BOX 384 WEST FALMOUTH, MA 02574
(508) 540-7725 ph. (508) 540-3022 ph
(508) 540 - 3544 fax

ASS. # 27-87	DATE: 02/28/02
SCALE: 1" = 40'	DRAWN BY: JDR
JOB NO. 1019DSUB	SHEET: 1 OF 2


© 2016 Google
Google
1991
Imagery Date: 5/23/2015 41°43'48.57" N 70°35'06.38" W elev 135 ft

URNE MEDICAL
USINESS CENTER
LD TO SUIT
- 10,000 SQ.
Advisors

CONVENTION DATA SERVICES HEADQUARTERS

Anticipated Project Land Use Permits / Approvals

1. Cape Cod Commission
2. Town of Bourne Planning Board – Site Plan / Special Permit and Definitive Subdivision Modification
3. MassDOT – Access Permit

3219632.1

APPENDIX A
MASSACHUSETTS HISTORICAL COMMISSION
220 MORRISSEY BOULEVARD
BOSTON, MA 02125
617-727-8470, FAX: 617-727-5128

PROJECT NOTIFICATION FORM

Project Name: *Convention Data Services Headquarters*

Location/Address: *3 and 4 Technology Park Drive*

City/Town: *Bourne*

Project Proponent

Name: *John P. Fletcher, Trustee, Bourne Technology Park Realty Trust*

Address: *c/o Attorney Eliza Cox, Nutter McClennen & Fish, LLP, 1471 Iyannough Road, PO Box 1630*

City/Town/Zip/Telephone: *Hyannis, MA 02601; Phone: 508-790-5431*

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name	Type of License or Funding (specify)
MassDOT	*Access Permit (if needed, TBD)*

Project Description (narrative): *Redevelopment of 4.49 acre site, including removal of existing 9,966 sf partially constructed office structure and construction of approximately 27,210 square foot office/production facility to serve as new headquarters for Convention Data Services, a Bourne-based company, providing comprehensive management solutions for national and global events. Redevelopment includes 153 parking spaces, both paved and pervious, an innovative/alternative denitrification septic system, roof-mounted solar panels, storm-water management, pedestrian connections, landscaping, outdoor patio and recreation areas for employees, new access/egress on Technology Park Drive, and other site improvements.*

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition.

Yes, there is an existing 9,966 square foot partially constructed office building on the property that is proposed to be demolished to allow for the redevelopment.

Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation.

No.

Does the project include new construction? If so, describe (attach plans and elevations if necessary).

Yes, project includes a proposed 27,210 square foot building. Proposed plans are included.

APPENDIX A (continued)

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify.

No

What is the total acreage of the project area?

Woodland *1.65 acres (existing undisturbed)*	Productive Resources:
Wetland_____ acres	Agriculture_____ acres
Floodplain_____ acres	Forestry_____ acres
Open space_____ acres	Mining/Extraction_____ acres
Developed *2.84 acres (existing disturbed)*	Total Project Acreage *4.49 acres (total site)*

What is the acreage of the proposed new construction? *Project is primarily proposed on existing disturbed portions of the property. The project will only disturb 0.87 acres of existing undisturbed land.*

What is the present land use of the project area?

Partially constructed office building. Site is located within the Bourne Technology Park.

Please attach a copy of the section of the USGS quadrangle map which clearly marks the project location.

Attached.

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

Signature of Person submitting this form: Eliza Cox Date: 8/1/16

Name: *Eliza Cox*

Address: *Nutter, McClennen & Fish, LLP, PO Box 1630*

City/Town/Zip: *Hyannis, MA 02601*

Telephone: *508-790-5431*

REGULATORY AUTHORITY

930 CMR 71.00:M.G.L. c. 9, ss. 26-27C as amended by St. 1988. c. 254

3235526.1

992220.1

RESCOM Architectural, Inc.
Tel (508) 759-9828 Fax (508) 759-9802
118 F Waterhouse Road Bourne, MA.02532

Convention Data Services
Bourne, MA
Design Narrative

Convention Data Services is proposing to build a new headquarters for their office and production facilities. The proposed project is a single story 27,210 square foot building located in the Bourne Technology Park.

Site Design

Lots 2 and 3 of the Bourne Technology Park will be combined to form the 195,397 square foot site for the project. Lot 2 currently has a 9,966 square foot foundation and unfinished steel frame that will be removed. Lot 3 is a vacant cleared lot. The building is primarily sited on the far north side of the property in the approximate location of the current building foundation. The majority of the site is in an already disturbed state and will result in minimal existing vegetation being disturbed. There is existing vegetation along the far north side and along the east side of MacArthur Boulevard. The project will also maintain a 50 foot vegetated buffer along MacArthur Boulevard.

The site is accessed by Bourne Technology Park Drive off of Waterhouse Road. The existing approved subdivision had a cul-de-sac for access to lots 2 and 3. The cul-de-sac will be replaced with an entrance and exit driveway to and from the building site. The building's main entrance is located at the center of the building. Sidewalks and crosswalk locations have been designed to provide convenient and safe pedestrian access to the main entrance.

Off street parking for 153 vehicles has been arranged to reduce the visual impact. The parking area directly in front of the building has utilized a radial design with landscaped islands and planting strips. The parking spaces along MacArthur Boulevard on the east side of the site are screened by the existing natural vegetation. The parking area on the west side of the building is not visible from Waterhouse Road. A planting buffer screens the parking areas from adjacent buildings. The entrance drive and parking areas have been arranged for two way traffic and a one way exit drive has been placed along the east side of the site. There are 2 bike racks planned and 4 car pool parking spaces.

All site utilities will be located underground. An emergency power generator and two dumpster enclosures will be on the east side of the building and will be screened by the natural vegetation.

The landscape design utilizes existing natural vegetation and new native species to add additional landscape buffers and to enhance the parking area islands. Plantings along the front façade of the building enhance the buildings appearance and contribute to the overall feel of the buildings scale, color and texture. Plantings suitable for the function of the two storm water drainage bio-retention areas have been placed within these retention areas. The species selected and the overall design of the landscaping has followed the design guidelines of Cape Cod.

Building Design

The program for the project consist of 13,960 square feet of office space, 2,382 call center and 5,343 square feet of production/processing space. These program areas are connected by a 5,525 square foot center circulation spine with support spaces including human resources, meeting rooms, toilet rooms and an employee café. The office space and call center consists of open office areas, enclosed offices. Specific locations of windows and skylights have been carefully placed to allow for natural daylight. The production/processing area consists of a large space for assembly and staging of convention materials and a small work area for clerical tasks. A loading dock on the east side of the building is open to the production space. Other spaces include a computer server room, mechanical and electrical rooms. Outdoor activity spaces include a patio connected to the café for outdoor dining and a small athletic court to support employee wellbeing.

Convention Data Services is looking to have the image of their headquarters reflect their commitment to technology and analytical principles. The proposed building concept has a central spine that highlights the building entry with a high single sloped roof. There is a lower decorative entrance canopy at the main front door. On each side of the central spine, varying low roof slopes with overhangs break up the roof massing.

The exterior siding materials is metal panel with the prominent facades being a combination of different colors, textures and patterns. Blue highlights around the building correspond to the CDS company color with the reaming building being more neutral to blend with the surrounding site. The roof is a metal standing seam with skylights and solar panels located within certain portions of the building. Varying window sizes have been placed to capture natural light and to create differences in the exterior facades.

Nitrogen Loading and Title V Design

Prepared for CDS
Lot 7 Technology Park Drive
Bourne, MA

JE Landers-Cauley, PE
Civil-Environmental Engineering
PO Box 364
West Falmouth, MA 02574
508-540-7733
508-540-3344 fax

Table of Contents:

***Introduction**

***Locus**

***Site Plan**

***Freshwater wetlands**

***Coastal wetlands**

***Nitrogen Sensitive Area**

***On site wastewater stream**

***Nitrogen Loading**

***Treatment Facility**

***Nitrogen Loading with denitrification -insert**

Introduction:

CDS (the owner) is a company which provides professional services to other companies throughout the United States. It has and continues to be successful and is in need of additional professional office space for its growing professional staff. CDS is presently renting an office building directly to the north of the proposed development site. It is their desire to construct and move their facilities as soon as possible.

The proposed project is the construction of a new building complex which can accommodate the additional staff, provide more parking and have additional building and parking space for future growth. The building is proposed to be about 28,000sf, on a single floor. Most of the building will be office space with about 15% as warehouse/assembly area for the advertisement and literature prepared for CDS customers. The warehouse area is at the east end of the building near the loading and unloading docking area.

Locus:

The site has been previously modified with man-made improvements. A building permit was issued for the former lot 2 to construct a 9900sf building. The project had begun which included clearing and grading the lot, constructing a foundation and the placement of a steel frame structure before work ceased. On lot 3 about 50% of the lot was stripped of vegetation and graded in anticipation of future work. Likewise all work stopped on lot 3 at the same time as work on lot 2 ceased.

Located on the south-southeast o side of the Cape Cod Canal the site is bounded to the east and southeast by MacArthur Boulevard, and to the south, west and north the site is bounded by five commercial zoned and developed lots. The locus is currently two lots which are in the process of being combined into one larger lot. The new lot will be identified as Lot 7. Lot 7 is proposed to be 195,397+/-sf.

Attached is a USGS map depicting the location of the site.

Site Plan:

A site plan showing the existing and proposed conditions has been submitted.

Freshwater Wetlands:

No freshwater wetlands exist on the lot or within 100' of the lot.

Coastal Wetlands:

No coastal wetlands exist on the lot or within 100' of the lot.

Nitrogen Sensitive Area:

The site is not located in a nitrogen sensitive area for consumption of drinking water (potable) or Zone II area. No local or state regulation mandates a reduction in nitrogen.

On site wastewater stream:

The wastewater stream for the site is typical for a professional office complex as it is intensely used during the normal work week of Monday through Friday and to a much lesser extent on the weekends and evenings. In addition, the proposed building does not have an area for the production of hot or cold foods but will provide an area for the consumption of food during breaks and or lunch. As such, higher TKN loading rates are expected.

To a limited extent cleaning of eating utensils will occur but no significant amounts of fats, oils, or greases (FOG) will be produced. FOG production is not anticipated to be a significant component when calculating and designing the treatment process for the site.

A wastewater stream has been determined to be 2,250gpd. This calculation is based upon a potential maximum build out of 30,000sf at 75gpd per 1,000sf. These numbers are conservative as the proposed structure is less than 30,000sf and generally maximum useable space within a building of this kind is closer to 85-90% (about 27,000sf).

The TKN (total nitrogen) from the building and for this type of use has been estimated to be in the range of 65-75ppm. The manufacturer has provided two models which; one which will treat a TKN concentration of 65ppm the other which will treat a TKN concentration of 75ppm. The plans have been prepared using the higher strength treatment process. If the end user can reduce the TKN to less than 65ppm the alternate system will be installed.

Nitrogen loading:

The nitrogen threshold the applicant is required to maintain is a Cape Cod Commission mandate of 5ppm discharge at the property line of the site. The calculations for obtaining that number is based upon imputing the unique site characteristics as well as the intended use of the site by the user/owner of the property into a formula provided by the Cape Cod Commission.

It has been determined (refer to the nitrogen loading sheets provided) that to reduce the nitrogen below the threshold levels of 5ppm at the "property line" the treatment facility must clarify the effluent to a value of 22-23ppm before being discharged into the SAS for final dispersal of the effluent. To accomplish that the manufacturer has been instructed to provide a treatment process which can reduce the discharge limits of TKN to 22-23ppm given an influent value of 75ppm of TKN. The process shown on the plan, under conditions of normal use, the manufacturer assures us can be achieved. A TKN of 22.5ppm was used for calculating the effluent concentration.

Treatment facility:

The treatment facility designed for the site requires a primary settling tank, alkalinity feed, two-bioclere reactors, a carbon chemical feed and a duplex-pump chamber which ends at a pressure dosed SAS. The location of the facility is on the plan. The details of the nitrogen treatment components were provided by the manufacture.

NON-RESIDENTIAL NO3-N LOADING

5/31/2016

Trial no.: 1

Project-CDS Waterhouse Road
Town: Bourne with denitrification

Title V Wastewater Flow =	2250	gpd
OFFICE USE- SF	22000	ft2
Warehouse	5000sf	
Total Land Area =	195397	ft2
Paved Area =	65325	ft2
Roof Area =	27120	ft2
Lawn Area = (est.)	6475	ft2
Natural Area =	96477	ft2

ASSUMED VALUES

Impervious Recharge Rate =	40	in/yr
Roof Runoff Concentration	0.75	mg/L
Road Runoff Concentration	1.50	mg/L
Lawn Nitrogen Leaching =	25	%
Wastewater Concentration =	22.5	mg/L*
Average Lawn Size =	5000	ft2
Recharge Rate =	21	in/yr
Nitrogen Application Rate	3	lbs/1000ft2

*-35 Without I/A system, 25 or less with

CALCULATIONS

Title V Wastewater Loading	191615.63	mg	Title V Wastewater Recharge	8516.25	liters
Total Impervious Loading	30603.06	mg			
Roof Loading	5260.54	mg	Roof Recharge	7014.05	liters
Paved Loading	25342.52	mg	Paved Recharge	16895.01	liters
Lawn Loading	6040.38	mg	Natural Area Recharge	13978.91	liters
Title V Total Loading	228259.06	mg	Title V Total Recharge	46404.22	liters

TITLE V NITROGEN LOADING CONCENTRATION = **4.92 ppm**

83.31 kg/yr
18.57 kg/acre/yr

Stormwater Management Report for Lot 7 Technology Park Dr. Bourne, Ma

Submitted for CDS

Prepared by: J.E. Landers-Cauley, P.E.

8/1/2016

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Appendix-E Bio-retention Area 7

A. INTRODUCTION

CDS (the owner) is a company which provides professional services to other companies throughout the United States. It has and continues to be successful and is in need of additional professional office space for its growing professional staff. CDS is presently renting an office building directly to the north of the proposed development site. It is their desire to construct and move their facilities as soon as possible.

Locus/existing conditions:

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Proposed Development:

The proposed project is the construction of a new building complex which can accommodate the additional staff, provide more parking and have additional building and parking space for future growth. The building is proposed to be about 28,000sf, on a single floor. Most of the building will be office space with about 15% as warehouse/assembly area for the advertisement and literature prepared for CDS customers. The warehouse area is at the east end of the building near the loading and unloading docking area. Most of the parking areas are proposed to be paved with bituminous concrete as the road extension.

All stormwater from the proposed site improvements is to be mitigated on site. The stormwater system is not connecting to nor accepting additional surface water from other sites-except for a portion of the to be developed road.

No wetlands are within 100' of the property. No significant habitat or endangered species are known to be present on site. The stormwater design incorporates an interactive approach. The site has been designed for maintaining the 1" storm, the 25year-24 hour storms and the 100 year 24 hour storms. The design also incorporates containing on site the additional runoff generated by the proposed road extension.

B. STORMWATER QUANTITY AND QUALITY ANALYSIS

Existing Soil Conditions:

The proposed project is located in an outwash plain on the westerly side of Route 28, Bourne. It is located in an area indicated as Barnstable Sandy Loam-refer to appendix. Rapidly draining and highly pervious it is an excellent soil for rapidly percolating surface water.

The soils were tested by both Title V standards, for the construction of the SAS, and a Permeameter for the values to be assigned for short term and long term acceptance and percolation of surface water. Both tests verified the Soil Conservation Maps designation of rapidly percolation soils.

The soils within the site are highly uniform. Numerous percolation tests and deep hole evaluations were performed within the last ten years for former projects, not subject to the review by the CCC, which indicated the same soil conditions.

Years earlier, before the land was subdivided, the site was used extensively as a gravel mining operation. A majority of the site has been stripped of its O/A and B layers. It is not expected that any of the proposed site and road development will be utilizing the B-loamy sand geology for stormwater drainage.

Stormwater Quantity:

All stormwater generated from the post construction is to remain on site. The system allows for the extreme rainfall conditions which can occur. The stormwater design incorporates the 1" storm, the 25year-24 hour storms and the 100 year 24 hour storms. The design also incorporates containing in site the additional runoff generated by the proposed road extension.

The storm collection design can be generally described as: an infiltration of small storm events via vegetated swales and collection forebays designed to infiltrate high frequency low volume storms; a combination infiltration -collection system for storms of moderate size (2-4"/24 hour period); and, a collection system with a detention/retention/infiltration system for large storms.

Below we have described the watershed areas proposed to be constructed upon the site and with their general drainage characteristics.

There are five distinct proposed watershed areas. Refer to Appendix D and the site plans for the precise locations of the watershed areas.

Area 1 has its' own collection system and does not contribute surface water either to the forebays, catch basins or detention devices.

Area 3 and area 4 utilize a combination swale to primary detention area to secondary detention area. Within watershed area 3 the surface water is conveyed via a storm pipe to a swale shared by watershed area 4. Watershed area 4 runoff for all storm events incorporates sheet flow into the swale. Upon capacity the excess surface water is conveyed to detention basin A.

Area 5 is the building runoff. It is our design to contain all of the roof runoff in a series of combination leaching catch basins to landscape swales. None of the building runoff is proposed to be part of the sheet runoff or catch basin-detention basin design.

It is our opinion that the design of the roof drainage complies with the manage practices of the CCC in that it is separate and will directly discharge into the ground wherever possible.

Areas 2A,2B and 2C use a combination sheet flow, catch basin and detention basin surface water retention-detention design. These watershed areas represent approximately 60% of the entire surface water flow. These drainage areas systems incorporate collecting a majority of the paved portions of the site via sheetflow that are directed to settling/forebay areas. When exceeding the capacity of the forebay the surface water will discharge into deep sump catch basins. The catch basins convey the surface to on-site detention areas.

All of the forebays have been designed to retain the 1" storm event. The forebays are designed to permit the infiltration of the sheetflow to ground.

TSS removal:

Although TSS removal is an integral part of stormwater removal, Lot 7 is not located in an area that either discharges to wetlands or is within jurisdiction of the Wetlands Protection Act. As such TSS removal has only an impact on the long term performance of the drainage system.

TSS removal has been calculated for the parking lots directly in front of the proposed building. Each area drains in a similar manner-forebay to deep sump basin to a detention area to surface infiltration. Below are the values we have determined to be based upon the plan designs.

Initial settling in a vegetative forebay 25% to a deep sump basin 25% to a detention basin 80%.

Watershed areas 2A, and 2B:

Bmp	removal rate	initial TSS	Removed	Remaining
Forebay	25	1.00	.25	.75
Catch Basin	25	0.75	.19	.56
Detention B	80	0.56	.45	.11

Watershed areas 2C:

Bmp	removal rate	initial TSS	Removed	Remaining
Forebay	25	1.00	.25	.75
Detention B.	80	0.75	.60	.15

Watershed areas 3:

Bmp	removal rate	initial TSS	Removed	Remaining
Catch Basin	25	1.00	.25	.75
Swale/forebay	25	0.75	.19	.56
Detention A.	80	0.56	.45	.11

Overflow from Detention A to Detention B when capacity exceeded.

Watershed areas 4:

Bmp	removal rate	initial TSS	Removed	Remaining
Catch Basin	25	1.00	.25	.75
2nd Catch Basin	25	.75	.18	.57
Swale/forebay	25	0.57	.14	.43
Detention A.	80	0.43	.34	.09

Overflow from Detention A to Detention B when capacity exceeded.

Watershed areas for road extension:

Bmp	removal rate	initial TSS	Removed	Remaining
Catch Basin	25	1.00	.25	.75
Detention C.	80	0.75	.60	.15

It is our opinion the minimum site drainage has been designed to incorporate a bio-infiltration design for the first 1" rainfall (25year-24 hour) rainfall event.

C. STORMWATER MAINTENANCE

Preventive Measures

The owner or their assigns shall implement the following long term pollution prevention measures:

*No other discharges or introduction of pollutants shall be allowed within or directed to the drainage system.
*Proper and continuance maintenance shall be performed on a regular basis of all parking areas, drainage components and drainage systems. Visual inspections of the entire system shall be performed on a quarterly basis.
*Landscaping shall be done according to the Landscape Operations and Management Plan(LOMA).
*The exterior storing of material and waste products, if applicable, shall conform to all Local, State and Federal rules and regulations.
*No disposal of any products is permitted into the drainage system.
*The owner or agent shall plow and manage snow removal as to not interfere with the drainage system.
*In the event of a "release" the owner shall, as part of the maintenance program, have contact information of a contractor who specializes in hazardous waste spills.

Inspections and Procedures

To insure and provide for adequate maintenance of the drainage system, the following will be required:

*All the catch basins shall be inspected quarterly and cleaned at least once a year. More frequent cleaning will be required if determined necessary.
*The entire drainage system shall be inspected after a major storm event. (Rain events of 1" within 2 hours or more intense.)
*Inspections will include measuring the level of silts.
*Cleaning all debris from the detention basins, swales and settling areas in a prompt manner after the recession of the storm(s).
*Checking the stone swales, fore bays and weirs-where applicable for obstructions or damage.
*Repair all damage in a timely manner.
*The sediment bays will be cleaned according to the LOMA.

Summary:

The roof drainage has been designed to be separate and self con

APPENDIX:

Appendix-A Soil survey map

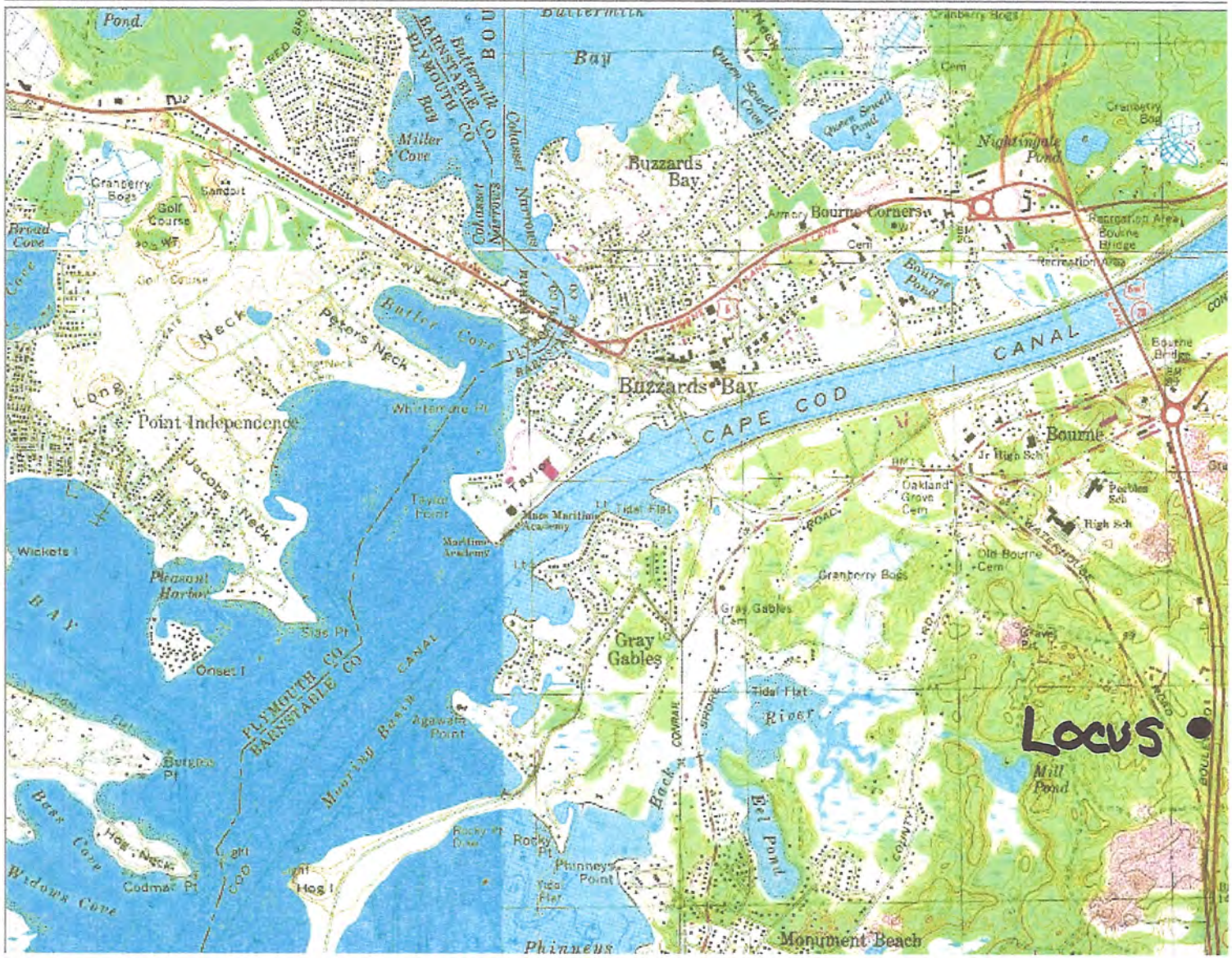
Appendix-B Soil Test Pit data and Plan-reduced

Appendix-C Soil survey Description

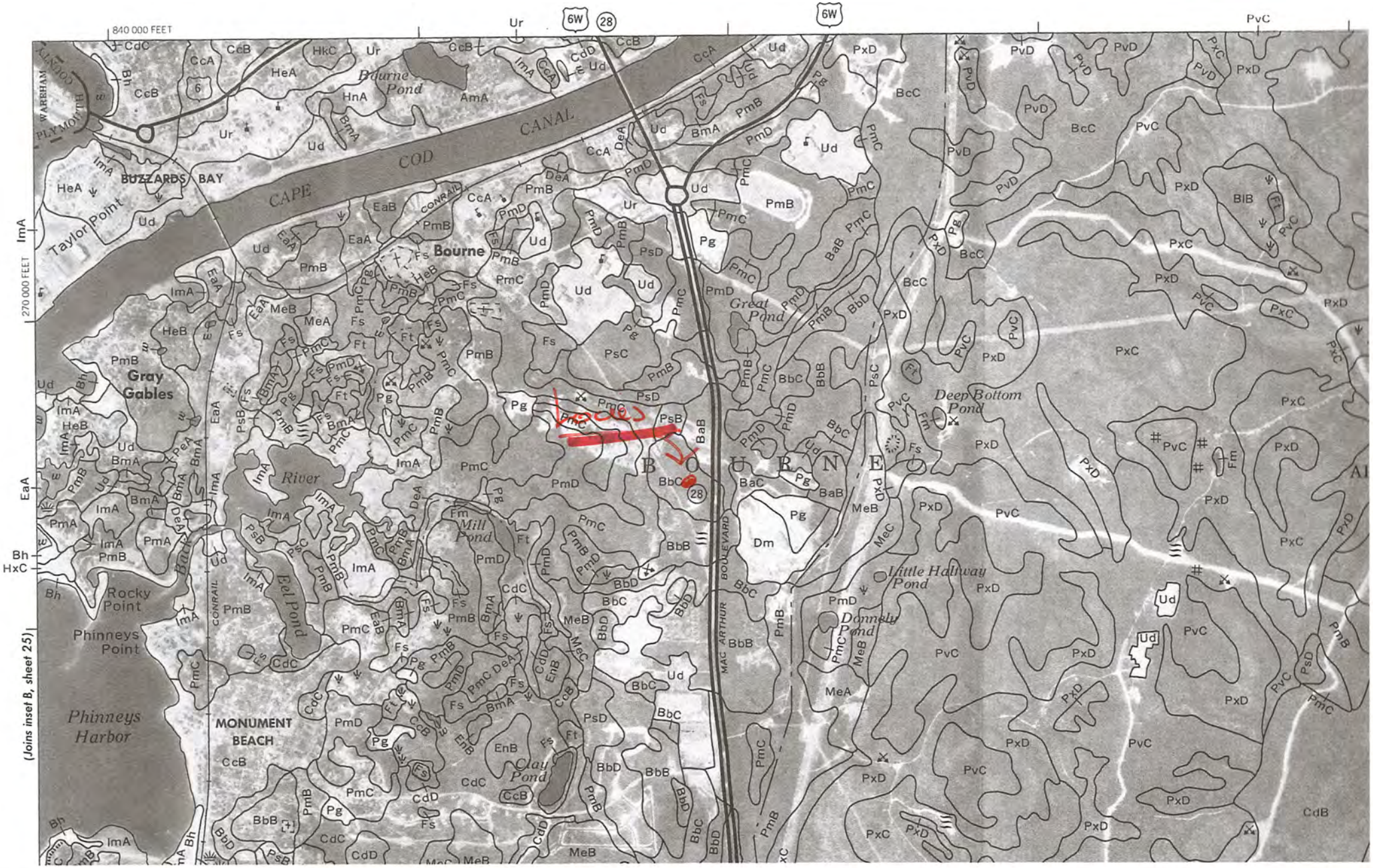
Appendix-D Watershed contribution map

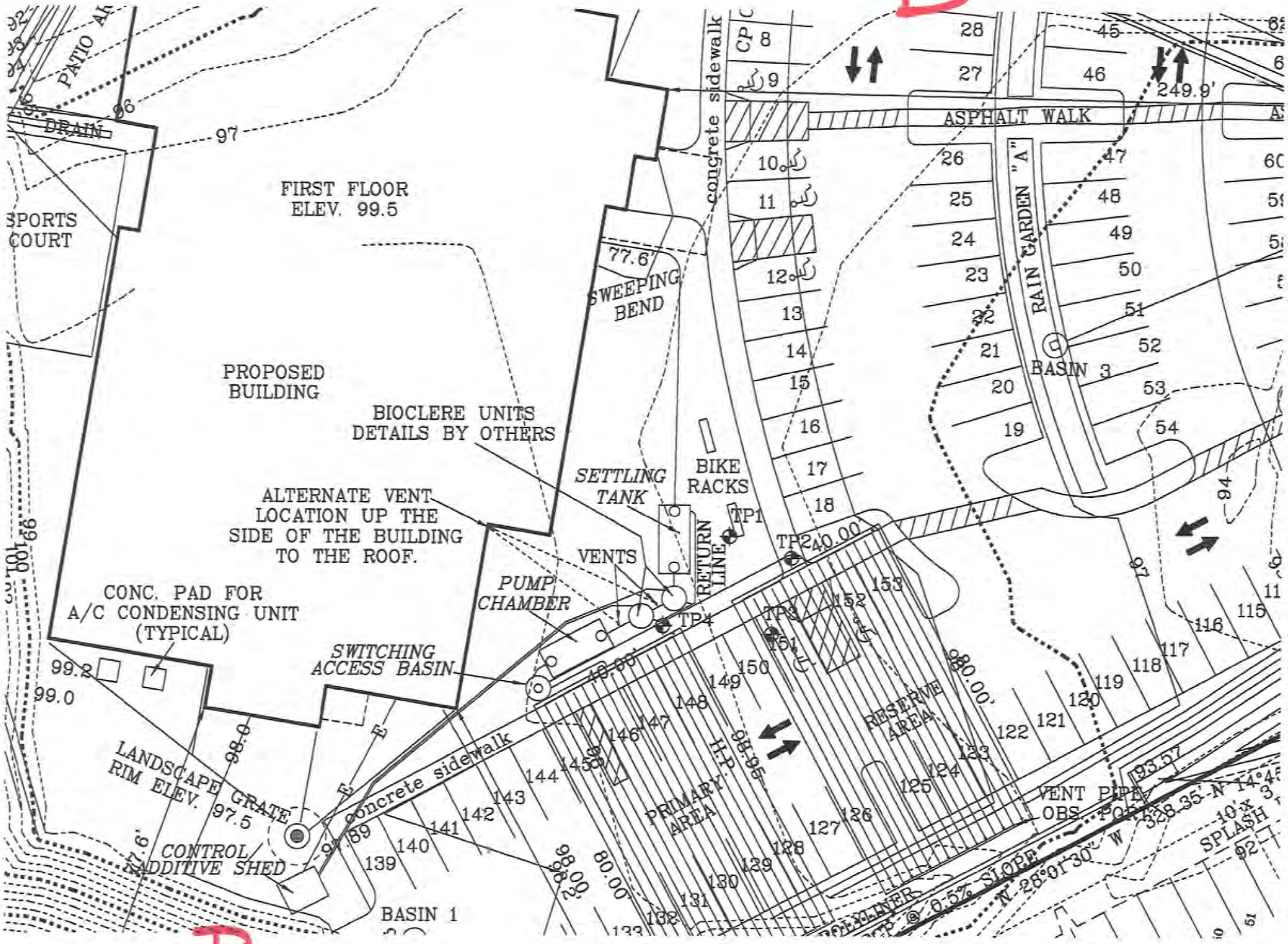
Appendix-E Bio-retention Area

CDS


Buttermilk Bay
Buzzards Bay
Bourne Corners
Nightingale Pond
Cranberry Bogs
Golf Course
Broad Cove
Miller Cove
Butler Cove
Peters Neck
Point Independence
Jacobs Neck
Wickets I
Pleasant Harbor
Onset I
Mooring Basin
Agawam Point
Tayla Point
Maritime Academy
Tidal Flat
Gray Gables
Rocky Pt
Phinneys Point
Hog I
Codmar Pt
Widows Cove
Bass Cove
Phinneus
Eel Pond
Mill Pond
Monument Beach
Bourne
Jr High Sch
High Sch
Oakland Grove Cem
Old Bourne Cem
Bourne Pond
Queen Sewell Pond
Recreation Area
Bourne Bridge
CAPE COD CANAL
PLYMOUTH CO
BARNSTABLE CO
Locus

A


840 000 FEET
270 000 FEET
(Joins inset B, sheet 25)
BUZZARDS BAY
CAPE COD CANAL
Taylor Point
Bourne Pond
Bourne
Gray Gables
Great Pond
Deep Bottom Pond
Little Halfway Pond
Donnelly Pond
Mill Pond
Eel Pond
Back River
Rocky Point
Phinneys Point
Phinneys Harbor
MONUMENT BEACH
Clay Pond
MAC ARTHUR BOULEVARD
CONRAIL
PLYMOUTH COUNTY
WAREHAM
6W
28


B
PATIO AR
DRAIN
97
96
SPORTS COURT
FIRST FLOOR ELEV. 99.5
PROPOSED BUILDING
BIOCLERE UNITS DETAILS BY OTHERS
ALTERNATE VENT LOCATION UP THE SIDE OF THE BUILDING TO THE ROOF.
CONC. PAD FOR A/C CONDENSING UNIT (TYPICAL)
99.2
99.0
SWITCHING ACCESS BASIN
LANDSCAPE GRATE RIM ELEV. 97.5
CONTROL/ ADDITIVE SHED
BASIN 1
concrete sidewalk
PUMP CHAMBER
VENTS
SETTLING TANK
RETURN LINE
BIKE RACKS
77.6'
SWEEPING BEND
TP1
TP2
TP3
TP4
40.00'
80.00'
PRIMARY AREA
RESERVE AREA
H.P.
98.96
98.89
98.20
98.00
CP
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
45
46
47
48
49
50
51
52
53
54
249.9'
ASPHALT WALK
RAIN GARDEN "A"
BASIN 3
94
91
93
116
115
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
VENT PIPE OBS. POST
93.57
328.35' N 14°4
10' x 3' SPLASH
92
N 28°01'30" W
0.5% SLOPE
B

filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Precautionary measures may be necessary in some areas.

The capability subclass is VIs.

BbC—Barnstable sandy loam, 8 to 15 percent slopes, very stony. This very deep, strongly sloping, well drained soil is on small hills and ridges in areas of ground moraine and ice-contact deposits. Stones and boulders cover 1 to 3 percent of the surface. The soil makes up approximately 0.2 percent (406 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are areas of Carver, Nantucket, and Plymouth soils. Also included are small areas where slopes are less than 8 percent or more than 15 percent and some areas where stones and boulders cover more than 3 percent of the surface. Included soils make up about 30 percent of this unit.

Permeability is moderately rapid in the subsoil of the Barnstable soil and rapid or very rapid in the substratum. Available water capacity is moderate. Depth to the seasonal high water table is more than 6 feet.

Most areas are used as woodland. Some areas have been developed for homesites.

This soil is unsuitable as cropland because the surface stones and boulders restrict the use of equipment. It is suited to cultivated crops, however, if the stones and boulders are removed.

This soil is well suited to native pasture. It is poorly suited to hay and improved pasture, however, because the use of equipment is limited by the surface stones and boulders. The main management objective is the prevention of overgrazing, which reduces the hardiness and density of desirable plants. Proper stocking rates, timely grazing, and restricted use during wet periods help to maintain plant density and minimize surface compaction.

This soil is suited to woodland. No major hazards or limitations restrict woodland management. The use of equipment may be hampered because of the surface stones and boulders. Thinning dense stands to standard stocking levels results in more vigorous tree growth. Removal or control of competing vegetation may be necessary for the best growth of newly established seedlings. The most common trees are pitch pine, white oak, scarlet oak, eastern white pine, and black oak.

The slope is a limitation if this soil is used as a building site. Land shaping is generally needed. Buildings and lots should be designed so that they conform to the natural slope of the land. Erosion is a hazard during and after construction. Planting well suited grasses as soon as possible after the surface is disturbed minimizes the erosion hazard. The surface and subsurface stones and boulders may hamper site development.

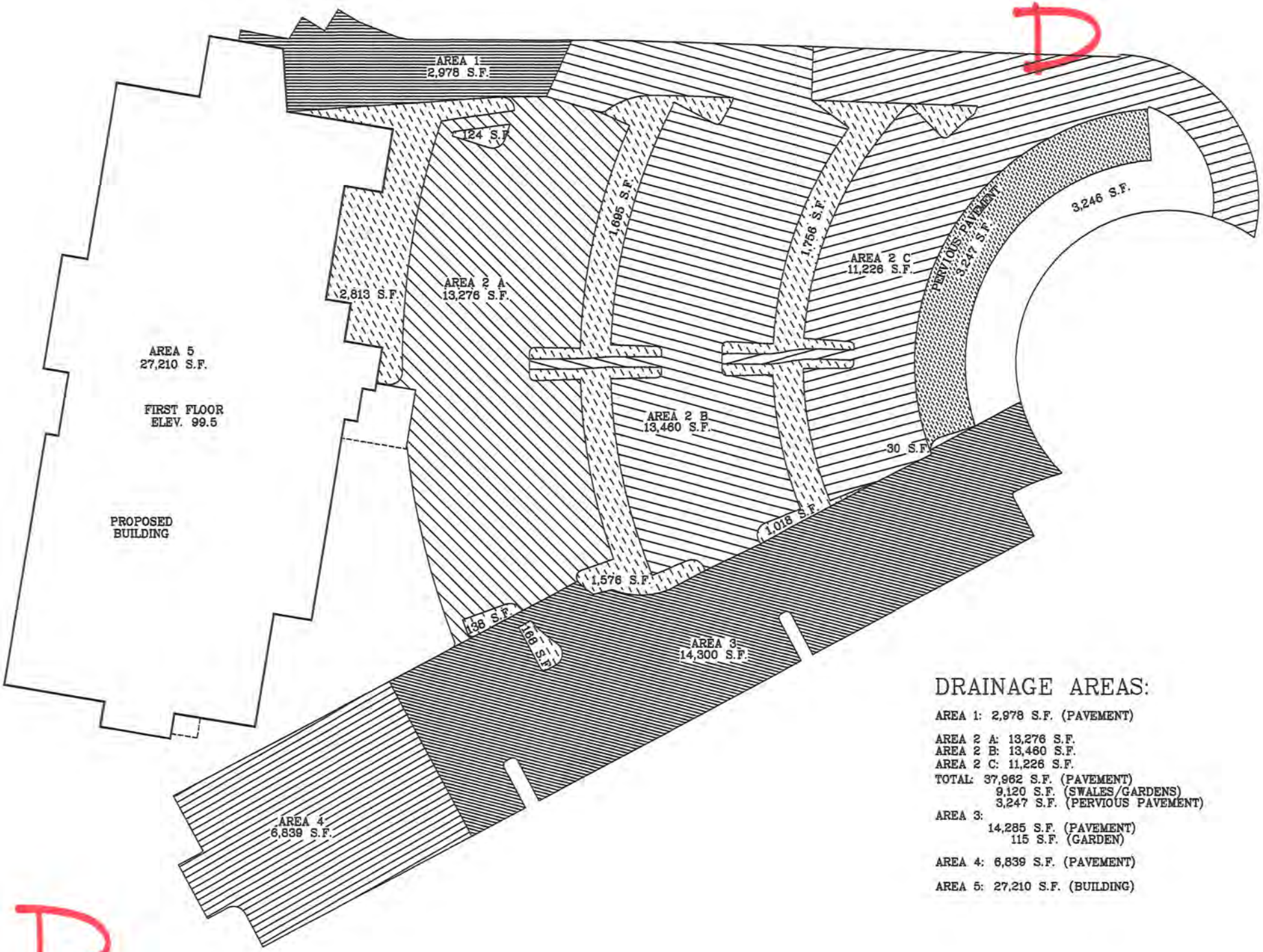
This soil is limited as a site for septic tank absorption fields because of the slope and the rapid or very rapid permeability in the substratum. The soil may not adequately filter the effluent. The poor filtering capacity may result in the pollution of ground water. The hazard of pollution increases with the density of housing. Installing the distribution lines on the contour or in areas that were graded during construction of the dwelling helps to overcome the slope. Precautionary measures may be necessary in some areas.

The capability subclass is VIs.

BbD—Barnstable sandy loam, 15 to 25 percent slopes, very stony. This very deep, moderately steep, well drained soil is on the sides of hills and ridges in areas of ground moraine and ice-contact deposits. Stones and boulders cover 1 to 3 percent of the surface. The soil makes up approximately 0.1 percent (173 acres) of the survey area. It is mapped mainly in the Plymouth-Carver-Barnstable general soil map unit. Areas are irregular in shape and range from 5 to 75 acres in size.

Typically, the surface is covered with an organic layer. This layer is about 1 inch of undecomposed pine needles, leaves, and twigs and 2 inches of partly decomposed and well decomposed organic material. The surface layer is dark gray, very friable sandy loam about 1 inch thick. The subsoil is friable sandy loam about 22 inches thick. The upper 1 inch is dark brown, the next 7 inches is yellowish brown, and the lower 14 inches is light olive brown. The substratum to a depth of 65 inches or more is light yellowish brown, loose coarse sand.

Included with this soil in mapping are areas of Carver, Hinckley, Nantucket, and Plymouth soils and small areas where slopes are less than 15 percent or more than 25 percent. Also included are areas where



DRAINAGE AREAS:

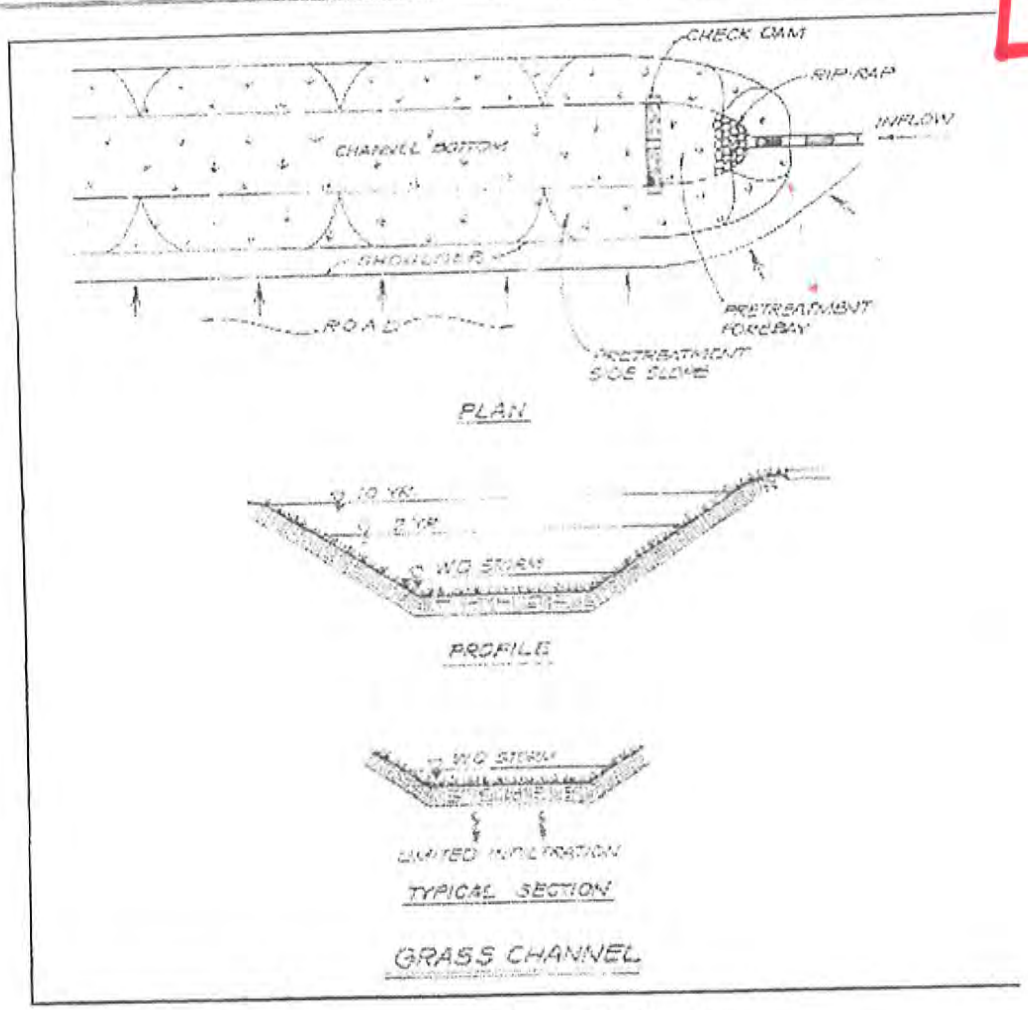
AREA 1: 2,978 S.F. (PAVEMENT)

AREA 2 A: 13,276 S.F.
AREA 2 B: 13,460 S.F.
AREA 2 C: 11,226 S.F.
TOTAL: 37,962 S.F. (PAVEMENT)
9,120 S.F. (SWALES/GARDENS)
3,247 S.F. (PERVIOUS PAVEMENT)

AREA 3:
14,285 S.F. (PAVEMENT)
115 S.F. (GARDEN)

AREA 4: 6,839 S.F. (PAVEMENT)

AREA 5: 27,210 S.F. (BUILDING)



adapted from the Vermont Stormwater Manual

Maintenance

Activity	Frequency
Remove sediment from forebay	Annually
Remove sediment from grass channel	Annually
Mow	Once a month during growing season
Repair areas of erosion and revegetate	As needed, but no less than once a year

Special Features

Reduces volume and rate of runoff.

BOURNE TECHNOLOGY PARK REALTY TRUST
CONVENTION DATA SERVICES HEADQUARTERS

Open Space Calculations

As detailed on the "Proposed Site Plan" included in Tab 20(C), the existing and proposed disturbance calculations for the redevelopment are as follows:

- Existing Disturbed Area: 123,513 sf (2.84 acres)
- Existing Undisturbed Area: 71,884 sf (1.65 acres)
- Existing Undisturbed Area Proposed to be Disturbed: 37,732 sf (0.87 acres)

The property is not mapped by the Natural Heritage or Endangered Species Program as Priority Habitat. The property is not mapped by the Cape Cod Commission as a Significant Natural Resources Area. There are no wetlands on the site. As shown on the aerial photo (Tab 6), the property is bounded by existing developed properties and by MacArthur Boulevard. Given these factors, together with the minimal amount of new disturbance proposed, it is requested that the redevelopment be exempted under the Scoping Checklist from any open space obligation.

3236013.1

GLYNN solar
Quality | Excellence | Service | Satisfaction
11 Resnik Rd, Plymouth MA, 02360

July 12th, 2016

To: Scott Mitchell
Dellbrook JKS
15 Research Rd
East Falmouth, MA 02536

Re: CDS Bourne CCC Requirements

To Whom It May Concern:

Based on the CBECS data from 2003 (the 2012 results on electricity expenditure per square feet is not available yet) produced by the EIA, this building should use roughly 12.2 kWh per square foot annually. I have attached the tables used and the Helioscope production report. The azimuth of this system was taken from the plans provided, and the location/weather set was used for this area generally.

At 27,000 square feet this building will use roughly 329,400 kWh per year.

In order to achieve 25% Renewable Energy as requested for the anticipated load on site, a 74.4kW (DC) Solar installation was modelled. The total annual energy production for this system is 85,499 kWh. 25% of anticipated load is 82,350 kWh, making this design produce an excess of 3,149 kWh per year.

For this model, I used Trina 310W modules and Enphase M250 microinverters. These inverters mitigate shading impacts and make troubleshooting far less expensive, while reducing the need for external equipment attached to building. Roof mounting is s5 clamps, directly onto metal roof with no penetrations required.

Please find attached the Helioscope Modelling for this project and a CAD Layout specifying where the installation will be located on the new building.

Sincerely,

Joshua Glynn
Solar Division Manager
joshglynn@glynnelectric.com

CDS Building 25% Load Renewable CDS Solar, 107 Waterhouse Rd Bourne MA

Report

Project Name	CDS Solar
Project Address	107 Waterhouse Rd Bourne MA
Prepared By	Solar Designer helioscope@assocenergy.com

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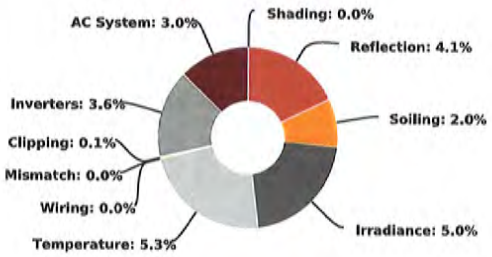
System Metrics

Design	CDS Building 25% Load Renewable
Module DC Nameplate	74.4 kW
Inverter AC Nameplate	57.6 kW Load Ratio: 1.29
Annual Production	85.48 MWh
Performance Ratio	79.0%
kWh/kWp	1,148.9
Weather Dataset	TMY, 10km grid (41.75,-70.55), NREL (prospector)
Simulator Version	153 (443094f0ad-ea93f843ef-fce6caf820-00aa14f623)

Field Segments

Monthly Production

Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,448.0	
	POA Irradiance	1,455.0	0.5%
	Shaded Irradiance	1,454.9	0.0%
	Irradiance after Reflection	1,394.6	-4.1%
	Irradiance after Soiling	1,366.7	-2.0%
	Total Collector Irradiance	**1,366.7**	**0.0%**
Energy (kWh)	Nameplate	101,700.0	
	Output at Irradiance Levels	96,632.2	-5.0%
	Output at Cell Temperature Derate	91,491.7	-5.3%
	Output After Mismatch	91,491.7	0.0%
	Optimal DC Output	91,491.7	0.0%
	Constrained DC Output	91,404.5	-0.1%
	Inverter Output	88,075.7	-3.6%
	Energy to Grid	**85,477.3**	**-3.0%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.5 °C
	Avg. Operating Cell Temp		26.6 °C
Simulation Metrics			
	Operating Hours		4668
	Solved Hours		4668

Condition Set

Description	Condition Set 1
Weather Dataset	TMY, 10km grid (41.75,-70.55), NREL (prospector) (/library/meteo/5936)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Sandia Model

Temperature Model Parameters

Rack Type	a	b	Temperature Delta
Fixed Tilt	-3.56	-0.075	3°C
Flush Mount	-2.81	-0.0455	0°C

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
2	2	2	2	2	2	2	2	2	2	2	2

Irradiation Variance	5%
Cell Temperature Spread	4° C
Module Binning Range	-2.5% to 2.5%
AC System Derate	0.00%

Module Characterizations	Module	Characterization
	TSM-310PD14 (Trina Solar)	Default Characterization, PAN
Component Characterizations	Device	Characterization
	C250 (422V) (Enphase)	CEC 05-2016

Components

Component	Name	Count
Inverter	C250 (422V) (Enphase) (/library/components/8753/characterization)	240 (57.6 kW)
AC Branch	10 AWG (Copper)	5 (1,224.2 ft)
AC Harness	ET-21-277-48	5
Module	TSM-310PD14 (Trina Solar) (/library/modules/38122/characterization)	240

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Existing Building Wiring	12	13	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules
Building Footprint	Fixed Tilt	Horizontal (Landscape)	15°	201.082°	5.0 ft	1x1		
Shed Roof	Flush Mount	Horizontal (Landscape)	7.13°	108.153°	0.0 ft	1x1	144	144
North West Roof	Flush Mount	Vertical (Portrait)	4.76°	288.546°	0.0 ft	1x1	96	96

Detailed Layout

Released: Dec 2006
Next CBECS will be conducted in 2007

Table C14. Electricity Consumption and Expenditure Intensities for Non-Mall Buildings, 2003

	Electricity Consumption						Electricity Expenditures		
				Distribution of Building-Level Intensities (kWh/square foot)					
	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	25th Per-centile	Median	75th Per-centile	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)
All Buildings*	202	14.1	12.2	3.6	8.2	17.1	15.7	1.09	0.078
Building Floorspace (Square Feet)									
1,001 to 5,000	47	17.8	11.4	3.8	8.9	20.3	4.3	1.63	0.092
5,001 to 10,000	92	12.4	10.3	3.8	7.4	14.5	8.7	1.18	0.095
10,001 to 25,000	164	10.5	11.1	2.9	6.3	13.4	13.8	0.88	0.084
25,001 to 50,000	439	12.2	11.6	3.8	8.8	16.2	33.6	0.94	0.077
50,001 to 100,000	927	13.1	14.1	4.5	9.9	17.0	68.0	0.97	0.073
100,001 to 200,000	2,181	15.7	12.2	5.3	13.0	23.4	146.4	1.05	0.067
200,001 to 500,000	4,347	15.0	15.4	5.8	12.1	20.7	301.0	1.04	0.069
Over 500,000	17,034	19.0	12.8	10.0	16.6	25.2	1209.8	1.35	0.071
Principal Building Activity									
Education	283	11.0	8.7	4.9	8.9	13.6	21.1	0.82	0.075
Food Sales	276	49.4	43.0	33.4	48.0	77.0	20.9	3.74	0.076
Food Service	213	38.4	20.3	18.8	37.4	70.3	17.4	3.13	0.082
Health Care	564	22.9	11.5	6.1	12.0	18.4	37.9	1.54	0.067
Inpatient	6,628	27.5	14.1	21.8	24.0	35.6	405.3	1.68	0.061
Outpatient	168	16.1	7.8	5.8	11.3	16.5	13.9	1.34	0.083
Lodging	483	13.5	28.0	6.7	11.9	17.7	37.1	1.04	0.077
Retail (Other Than Mall)	139	14.3	17.8	4.3	9.4	18.4	11.6	1.19	0.083
Office	256	17.3	7.5	6.5	11.5	17.6	20.7	1.40	0.081
Public Assembly	179	12.5	20.5	2.2	5.1	11.3	14.4	1.00	0.080
Public Order and Safety	237	15.3	12.4	4.0	7.9	17.6	17.2	1.12	0.073
Religious Worship	49	4.9	10.7	1.9	3.5	6.0	4.4	0.43	0.089
Service	73	11.0	12.0	3.0	6.3	11.8	5.8	0.88	0.080
Warehouse and Storage	154	7.6	16.7	1.4	3.1	6.2	10.8	0.53	0.070
Other	510	22.5	21.4	3.5	7.2	20.3	40.0	1.76	0.078
Vacant	42	2.4	Q	0.4	1.7	3.8	3.9	0.22	0.092
Year Constructed									
Before 1920	83	7.1	8.7	1.6	3.9	9.6	7.3	0.62	0.088
1920 to 1945	122	9.2	9.9	3.2	6.9	13.9	10.3	0.78	0.084
1946 to 1959	125	9.9	10.2	3.1	6.4	14.3	10.6	0.84	0.085
1960 to 1969	168	11.9	11.0	3.4	7.4	14.7	13.5	0.96	0.080
1970 to 1979	239	15.9	13.3	4.4	9.5	21.4	18.1	1.20	0.075
1980 to 1989	275	18.1	12.2	4.8	10.1	20.5	20.8	1.37	0.076
1990 to 1999	250	16.7	12.5	4.7	10.5	22.6	18.8	1.26	0.075
2000 to 2003	288	16.2	19.2	3.1	7.8	18.3	21.4	1.20	0.074
Census Region and Division									
Northeast	208	11.5	9.9	2.4	6.1	14.2	20.1	1.11	0.097
New England	139	10.8	10.0	1.8	4.3	13.2	13.7	1.06	0.099
Middle Atlantic	240	11.7	9.8	2.9	6.9	15.2	23.1	1.13	0.096
Midwest	182	12.9	13.2	3.5	7.9	15.9	11.9	0.85	0.066
East North Central	233	13.5	13.4	4.2	8.3	19.1	15.5	0.90	0.067
West North Central	118	11.7	12.8	3.0	7.2	13.6	7.4	0.74	0.063
South	226	16.5	13.9	4.1	9.2	19.7	15.4	1.12	0.068
South Atlantic	252	17.4	12.6	4.2	9.7	19.7	17.0	1.17	0.067
East South Central	160	15.5	16.4	3.8	8.4	19.8	10.7	1.04	0.067
West South Central	226	15.3	15.8	4.0	9.0	19.3	15.9	1.08	0.070
West	179	13.8	10.6	4.0	9.2	15.2	17.7	1.37	0.099
Mountain	196	15.4	13.1	4.3	8.6	14.4	15.0	1.18	0.076
Pacific	170	13.0	9.5	3.8	9.3	15.7	19.1	1.46	0.112

CONTINUED

Table C14. Electricity Consumption and Expenditure Intensities for Non-Mall Buildings, 2003

	Electricity Consumption						Electricity Expenditures		
				Distribution of Building-Level Intensities (kWh/square foot)					
	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	25th Per-centile	Median	75th Per-centile	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)
All Buildings*	202	14.1	12.2	3.6	8.2	17.1	15.7	1.09	0.078
Climate Zone: 30-Year Average									
Under 2,000 CDD and --									
More than 7,000 HDD	148	11.5	11.6	2.9	7.2	15.0	11.3	0.88	0.076
5,500-7,000 HDD	198	13.1	12.9	3.2	7.4	15.4	14.4	0.95	0.073
4,000-5,499 HDD	259	14.6	11.9	3.9	8.0	17.6	20.8	1.17	0.080
Fewer than 4,000 HDD	184	14.5	12.8	3.8	8.3	16.4	15.3	1.20	0.083
2,000 CDD or More and --									
Fewer than 4,000 HDD	255	17.3	11.5	4.9	12.7	22.9	19.1	1.30	0.075
Number of Floors									
One	114	13.4	14.1	3.7	8.2	18.0	9.2	1.08	0.080
Two	200	12.6	12.5	3.5	8.3	16.5	15.9	1.01	0.080
Three	251	11.4	10.5	3.1	7.1	14.9	19.2	0.87	0.076
Four to Nine	1,363	17.3	11.0	3.5	10.7	18.3	97.9	1.24	0.072
Ten or More	8,134	19.4	10.6	12.1	18.1	25.2	615.6	1.47	0.076
Elevators and Escalators (more than one may apply)									
Any Elevators	1,365	17.0	11.4	5.8	12.6	20.7	99.1	1.23	0.073
Number of Elevators									
One	508	12.8	11.4	5.2	10.6	18.3	37.7	0.95	0.074
Two to Five	1,955	17.0	10.8	8.1	16.9	25.2	140.6	1.22	0.072
Six or More	11,057	22.5	12.2	12.5	19.0	29.5	797.9	1.62	0.072
Any Escalators	9,366	24.1	14.0	10.4	14.9	22.6	677.6	1.74	0.072
Number of Workers (main shift)									
Fewer than 5	45	7.7	23.9	2.4	5.4	12.3	3.9	0.68	0.087
5 to 9	94	11.8	14.4	5.5	10.3	20.5	8.2	1.04	0.088
10 to 19	158	11.4	12.2	5.9	10.8	20.6	13.6	0.98	0.086
20 to 49	386	14.0	13.0	8.1	13.6	21.3	30.1	1.09	0.078
50 to 99	802	14.9	12.4	8.9	15.0	21.7	57.9	1.08	0.072
100 to 249	1,759	19.6	12.1	10.9	19.1	30.4	127.5	1.42	0.072
250 or More	7,165	22.4	9.1	14.8	22.8	29.4	511.9	1.60	0.071
Weekly Operating Hours									
Fewer than 40	30	4.5	8.0	1.6	3.2	6.5	2.9	0.42	0.094
40 to 48	105	10.1	8.5	4.0	7.5	12.9	8.7	0.83	0.082
49 to 60	166	11.2	9.2	4.2	8.7	15.7	13.5	0.91	0.081
61 to 84	251	14.1	12.5	7.1	13.8	27.1	19.9	1.12	0.079
85 to 167	408	22.1	14.7	13.8	33.4	58.5	29.8	1.61	0.073
Open Continuously	647	21.2	18.8	4.9	13.7	29.5	47.4	1.55	0.073
Ownership and Occupancy									
Nongovernment Owned	178	14.0	12.7	3.4	8.0	17.9	14.3	1.13	0.080
Owner Occupied	175	13.6	11.8	3.5	7.2	15.1	14.0	1.08	0.080
Nonowner Occupied	187	15.2	13.5	3.6	9.4	21.7	15.1	1.22	0.081
Unoccupied	30	1.9	N	0.4	1.7	3.4	2.9	Q	Q
Government Owned	348	14.1	11.1	4.8	9.3	15.3	24.0	0.97	0.069
Federal	842	19.7	15.8	4.3	9.2	17.3	47.3	1.11	0.056
State	366	15.8	8.3	5.9	9.1	14.5	24.3	1.05	0.066
Local	286	12.3	12.0	4.8	9.5	15.8	21.3	0.92	0.075

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Table C14. Electricity Consumption and Expenditure Intensities for Non-Mall Buildings, 2003

	Electricity Consumption						Electricity Expenditures		
				Distribution of Building-Level Intensities (kWh/square foot)					
	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	25th Per-centile	Median	75th Per-centile	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)
All Buildings*	202	14.1	12.2	3.6	8.2	17.1	15.7	1.09	0.078
Vacancy Status									
Completely Vacant	32	1.8	N	0.4	1.5	3.4	3.0	0.17	0.096
Mostly Vacant	Q	Q	Q	1.4	3.0	8.0	Q	Q	Q
Partially Vacant	338	13.8	9.9	2.9	6.7	14.2	26.5	1.08	0.078
Not At All Vacant	189	14.6	12.9	3.9	8.7	18.3	14.6	1.12	0.077
Number of Establishments									
One	174	14.1	14.2	3.7	8.3	18.2	13.5	1.09	0.077
2 to 5	232	13.5	11.3	3.9	8.7	15.3	18.0	1.05	0.078
6 to 10	616	17.3	5.2	5.5	11.2	18.3	48.0	1.34	0.078
11 to 20	1,259	14.7	8.6	4.7	14.2	19.1	99.6	1.16	0.079
More than 20	3,544	19.6	8.6	3.0	10.5	18.7	281.6	1.56	0.079
Currently Unoccupied	32	1.8	N	0.4	1.5	3.4	3.0	0.17	0.096
Predominant Exterior Wall Material									
Brick, Stone or Stucco	222	13.7	12.0	4.4	9.7	20.3	17.1	1.06	0.077
Concrete (Block or Poured)	205	14.5	14.9	4.0	9.4	20.0	16.4	1.16	0.080
Concrete Panels	956	18.3	10.8	5.8	11.3	26.2	68.8	1.32	0.072
Siding or Shingles	59	11.0	9.6	3.3	7.4	14.1	5.4	1.01	0.091
Metal Panels	122	11.8	14.1	2.1	4.5	9.7	9.4	0.91	0.077
Window Glass	1,148	19.1	10.2	6.6	17.0	27.6	85.8	1.43	0.075
Other	423	16.7	12.0	2.0	9.5	21.6	32.4	1.28	0.077
No One Major Type	Q	Q	Q	1.1	5.4	10.4	Q	Q	Q
Predominant Roof Material									
Built-Up	303	14.7	11.8	4.9	11.3	24.4	24.0	1.16	0.079
Shingles (Not Wood)	94	12.3	11.6	3.2	7.1	14.7	8.0	1.04	0.085
Metal Surfacing	101	10.2	13.7	2.4	5.3	11.1	7.8	0.79	0.077
Synthetic or Rubber	518	17.7	12.6	6.0	12.3	24.5	37.0	1.27	0.071
Slate or Tile	118	12.5	10.1	5.0	9.7	19.6	11.0	1.16	0.093
Wooden Materials	91	12.2	11.1	4.2	8.3	15.7	7.3	0.99	0.081
Concrete	477	Q	14.8	6.2	11.4	24.2	33.4	Q	0.070
Other	908	20.4	18.6	5.8	15.3	39.2	63.2	1.42	0.070
No One Major Type	237	10.4	8.8	3.0	5.8	21.6	22.8	1.01	0.097
Renovations in Buildings Constructed Before 1980 (more than one may apply)									
Any Type of Renovation Since 1980	227	13.0	11.2	3.7	8.2	15.7	17.7	1.01	0.078
Addition or Annex	360	14.1	13.9	4.0	8.7	17.0	25.4	0.99	0.070
Reduction In Floorspace	699	15.2	14.2	7.4	13.1	29.5	53.7	1.17	0.077
Cosmetic Improvements	239	13.5	11.1	3.7	8.0	15.8	18.8	1.06	0.079
Wall or Roof Replacement	278	12.6	10.0	3.2	6.9	15.0	22.2	1.01	0.080
Interior Wall Re-Configuration	289	13.8	10.5	4.1	8.2	17.5	22.2	1.06	0.077
HVAC Equipment Upgrade	351	14.4	11.2	4.3	8.2	16.0	26.9	1.10	0.077
Lighting Upgrade	309	13.6	11.2	3.7	8.0	15.4	23.7	1.05	0.077
Window Replacement	239	11.7	9.8	4.0	7.2	13.5	20.1	0.98	0.084
Plumbing System Upgrade	294	12.9	10.5	3.9	7.9	15.0	23.5	1.03	0.080
Insulation Upgrade	227	12.7	10.2	3.0	6.7	13.2	18.0	1.01	0.080
Other Renovation	246	9.0	9.9	3.7	10.1	24.0	27.0	0.99	0.110
No Renovations Since 1980	117	10.5	11.4	3.1	6.7	14.1	9.7	0.87	0.083
Building Newer than 1980	266	17.1	13.2	4.4	10.0	20.6	20.0	1.29	0.075

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Table C14. Electricity Consumption and Expenditure Intensities for Non-Mall Buildings, 2003

	Electricity Consumption						Electricity Expenditures		
				Distribution of Building-Level Intensities (kWh/square foot)					
	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	25th Per-centile	Median	75th Per-centile	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)
All Buildings*	202	14.1	12.2	3.6	8.2	17.1	15.7	1.09	0.078
Energy Sources (more than one may apply)									
Electricity	202	14.1	12.2	3.6	8.2	17.1	15.7	1.09	0.078
Natural Gas	265	14.6	12.2	4.3	8.8	18.5	20.3	1.12	0.077
Fuel Oil	558	16.5	12.8	2.2	5.5	14.0	41.5	1.23	0.074
District Heat	1,467	18.0	9.6	6.4	12.6	20.4	97.5	1.20	0.066
District Chilled Water	1,711	19.7	7.8	10.9	15.3	23.1	111.4	1.29	0.065
Propane	199	14.0	16.9	3.3	6.9	14.0	14.5	1.02	0.073
Other	180	16.4	12.1	2.8	5.3	11.2	12.2	1.11	0.068
Space-Heating Energy Sources									
Electricity	258	15.9	13.4	5.5	11.3	20.8	19.7	1.22	0.076
Electricity Main	211	16.6	13.7	6.3	12.6	23.3	16.3	1.28	0.077
Electricity Secondary	375	15.1	13.1	4.7	8.7	16.1	28.3	1.14	0.075
Other Excluding Electricity	184	13.0	11.0	3.3	6.9	14.1	14.2	1.00	0.077
Buildings without Heating	63	8.2	14.0	0.9	2.8	12.2	6.4	0.84	0.102
Primary Space-Heating Energy Source									
Electricity	211	16.6	13.7	6.3	12.6	23.3	16.3	1.28	0.077
Natural Gas	230	13.9	12.5	4.2	8.0	16.0	17.7	1.07	0.077
Fuel Oil	80	5.9	8.4	1.8	3.4	8.2	8.0	0.59	0.100
District Heat	1,432	18.5	9.3	4.9	12.6	20.7	93.3	1.20	0.065
Propane	67	10.5	10.7	2.9	6.2	12.0	6.3	0.98	0.093
Other	70	12.6	15.9	2.5	4.0	9.4	4.7	0.85	0.067
Cooling Energy Sources									
Electricity	227	15.0	12.9	4.9	9.8	19.4	17.7	1.17	0.078
Other Excluding Electricity	1,340	17.5	6.6	7.0	11.2	19.1	92.7	1.21	0.069
Buildings without Cooling	39	4.8	11.8	1.1	2.4	5.1	3.2	0.39	0.082
Water-Heating Energy Sources									
Electricity	211	14.6	12.3	4.4	9.6	18.5	15.9	1.10	0.075
Other Excluding Electricity	285	15.4	12.2	4.8	9.9	20.1	22.6	1.22	0.079
Bldgs without Water Heating	45	6.2	12.1	1.5	3.7	9.1	3.8	0.51	0.083
Cooking Energy Sources									
Electricity	606	18.9	15.5	6.9	18.3	39.5	43.5	1.36	0.072
Other Excluding Electricity	397	17.1	13.8	6.3	15.0	40.7	30.5	1.31	0.077
Buildings without Cooking	135	11.8	10.7	3.3	7.2	14.2	10.9	0.96	0.081
Energy End Uses (more than one may apply)									
Buildings with Space Heating	217	14.4	12.2	4.1	8.7	17.7	16.7	1.10	0.077
Buildings with Cooling	237	15.1	12.3	4.9	9.9	19.4	18.4	1.17	0.077
Buildings with Water Heating	244	15.0	12.2	4.6	9.7	19.2	18.9	1.16	0.077
Buildings with Cooking	504	18.2	14.8	6.6	16.5	40.0	37.2	1.34	0.074
Buildings with Manufacturing	349	13.2	14.4	3.1	6.7	9.9	26.3	0.99	0.075
Buildings with Electricity Generation	1,748	20.3	13.5	9.9	16.7	25.8	125.2	1.46	0.072

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Table C14. Electricity Consumption and Expenditure Intensities for Non-Mall Buildings, 2003

	Electricity Consumption						Electricity Expenditures		
				Distribution of Building-Level Intensities (kWh/square foot)					
	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	25th Per-centile	Median	75th Per-centile	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)
All Buildings*	202	14.1	12.2	3.6	8.2	17.1	15.7	1.09	0.078
Percent of Floorspace Heated									
Not Heated	63	8.2	14.0	0.9	2.8	12.2	6.4	0.84	0.102
1 to 50	105	8.0	13.3	2.4	4.8	9.2	8.9	0.68	0.085
51 to 99	233	14.3	12.0	4.0	8.4	18.5	18.3	1.12	0.079
100	234	15.4	12.1	4.6	9.7	18.6	17.8	1.17	0.076
Percent of Floorspace Cooled									
Not Cooled	39	4.8	11.8	1.1	2.4	5.1	3.2	0.39	0.082
1 to 50	132	7.8	11.7	3.1	5.7	10.1	11.1	0.66	0.084
51 to 99	348	16.5	13.2	6.1	11.2	22.5	26.9	1.28	0.077
100	254	18.8	12.0	6.2	12.4	23.1	19.3	1.43	0.076
Percent Lit When Open									
Zero	Q	Q	Q	0.8	1.2	1.9	Q	Q	Q
1 to 50	71	6.5	14.9	2.3	4.7	9.7	6.4	0.58	0.090
51 to 99	236	14.3	9.8	4.4	8.8	17.1	18.9	1.14	0.080
100	256	17.0	13.4	5.0	11.1	21.9	19.2	1.27	0.075
Building Never Open/ Electricity Not Used	25	2.1	Q	0.4	1.7	3.8	2.3	0.19	0.090
Percent Lit When Closed									
Zero	81	9.2	8.8	2.5	5.5	11.4	6.7	0.75	0.082
1 to 50	219	13.3	11.0	5.1	10.8	21.5	17.4	1.06	0.080
51 to 100	333	21.7	16.3	6.3	12.9	32.6	23.1	1.50	0.069
Building Never Closed/ Electricity Not Used	647	21.2	18.8	4.9	13.7	29.5	47.4	1.55	0.073
Heating Equipment (more than one may apply)									
Heat Pumps	322	17.4	14.2	6.4	12.2	22.2	24.4	1.32	0.076
Packaged Heat Pumps	379	19.3	14.1	7.4	13.2	24.1	28.5	1.46	0.075
Split-System Heat Pumps	239	15.4	14.4	5.1	9.2	21.0	17.7	1.14	0.074
Individual Room Heat Pumps	751	16.1	14.6	9.8	13.6	20.7	56.9	1.22	0.076
Furnaces	120	11.4	12.0	3.5	7.1	14.1	9.6	0.91	0.080
Individual Space Heaters	202	13.2	12.8	4.0	8.4	14.9	15.1	0.99	0.075
District Heat	1,435	18.0	9.5	4.9	12.6	20.7	93.3	1.17	0.065
Boilers	511	14.5	12.6	3.4	7.9	16.6	38.1	1.08	0.075
Packaged Heating Units	326	17.2	13.7	6.1	12.7	24.8	25.5	1.35	0.078
Other	249	15.2	14.3	4.2	8.8	16.9	17.4	1.06	0.070
Cooling Equipment (more than one may apply)									
Residential-Type Central Air Conditioners	133	12.1	11.7	4.5	8.6	15.8	10.7	0.97	0.081
Heat Pumps	326	17.7	14.6	6.6	12.0	22.4	24.5	1.33	0.075
Packaged Heat Pumps	366	19.4	14.1	7.2	12.6	23.8	27.5	1.46	0.075
Split-System Heat Pumps	235	15.7	14.8	5.9	10.9	21.5	17.3	1.15	0.074
Individual Room Heat Pumps	867	17.1	15.4	9.7	13.6	21.7	64.2	1.27	0.074
Individual Air Conditioners	189	11.2	12.2	3.6	6.8	13.5	15.2	0.90	0.080
District Chilled Water	1,711	19.7	7.8	10.9	15.3	23.1	111.4	1.29	0.065
Central Chillers	2,212	21.1	14.0	11.2	16.9	25.9	154.1	1.47	0.070
Packaged Air Conditioning Units	287	15.4	12.9	5.6	11.5	23.4	22.5	1.21	0.078
Swamp Coolers	181	14.1	13.3	4.0	10.1	19.9	14.8	1.16	0.082
Other	584	18.0	13.1	8.7	12.8	23.4	41.2	1.27	0.070

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Table C14. Electricity Consumption and Expenditure Intensities for Non-Mall Buildings, 2003

	Electricity Consumption						Electricity Expenditures		
				Distribution of Building-Level Intensities (kWh/square foot)					
	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	25th Per-centile	Median	75th Per-centile	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)
All Buildings*	202	14.1	12.2	3.6	8.2	17.1	15.7	1.09	0.078
Main Equipment Replaced Since 1990 (more than one may apply)									
Heating	176	12.8	12.4	4.0	8.3	16.2	13.9	1.01	0.079
Cooling	211	13.6	11.7	4.5	9.2	18.3	16.8	1.08	0.079
Water Heating Equipment									
Centralized System	205	14.9	12.9	4.8	10.1	20.1	16.3	1.18	0.079
Distributed System	180	12.3	12.0	4.0	8.0	15.8	14.3	0.98	0.080
Combination of Centralized and Distributed System	1,092	18.6	10.9	8.4	13.5	22.5	76.8	1.31	0.070
Lighting Equipment Types (more than one may apply)									
Incandescent	269	15.3	12.0	3.6	8.4	16.9	20.3	1.15	0.076
Standard Fluorescent	219	14.5	12.2	4.2	8.9	18.4	17.0	1.12	0.077
Compact Fluorescent	519	17.7	13.3	5.1	11.4	23.7	38.9	1.33	0.075
High Intensity Discharge	725	16.0	12.7	5.0	10.1	18.6	52.0	1.15	0.072
Halogen	554	17.7	13.7	4.9	11.2	23.3	40.7	1.30	0.073
Other	Q	Q	Q	25.1	35.6	49.8	Q	Q	Q
Refrigeration Equipment (more than one may apply)[a]									
Any Refrigeration	256	15.3	12.4	4.7	10.0	20.8	19.6	1.18	0.077
Commercial Refrigeration	520	19.6	16.2	9.2	21.9	48.0	38.3	1.44	0.074
Walk-In Units	655	21.5	17.3	13.4	32.2	58.5	47.7	1.57	0.073
Cases or Cabinets	512	20.7	16.6	9.6	23.5	49.9	38.0	1.53	0.074
Residential-Type Units	219	13.3	10.8	4.1	8.4	15.5	16.9	1.03	0.077
Vending Machines	584	16.5	12.7	5.6	11.5	22.2	42.2	1.19	0.072
No Refrigeration	63	7.5	10.9	2.0	4.4	10.1	5.4	0.65	0.086
Office Equipment (more than one may apply)									
Computers	270	15.0	12.0	5.0	9.9	18.7	20.8	1.15	0.077
With Flat Screen Monitors	531	17.6	11.0	6.6	12.0	20.3	39.9	1.32	0.075
Dedicated Servers	508	16.4	11.4	6.9	12.3	20.7	38.3	1.24	0.075
Laser Printers	231	13.8	11.3	4.7	9.0	17.6	18.3	1.09	0.079
Inkjet Printers	376	16.6	12.2	6.2	11.3	20.2	28.1	1.24	0.075
FAX Machines	292	15.1	11.8	5.3	10.3	19.3	22.4	1.16	0.077
Photocopiers	357	15.0	11.3	4.9	9.8	17.4	27.0	1.13	0.076
Number of Computers									
None	44	7.6	15.9	1.8	4.1	11.6	3.8	0.65	0.086
1 to 4	92	12.4	17.6	4.1	8.1	17.6	7.7	1.04	0.084
5 to 9	143	11.2	13.3	5.8	9.5	18.3	11.8	0.92	0.082
10 to 19	226	12.6	12.2	7.3	11.9	19.3	18.2	1.02	0.081
20 to 49	470	16.1	12.7	8.8	13.5	21.7	36.6	1.26	0.078
50 to 99	690	14.1	10.9	7.7	13.4	19.2	51.5	1.05	0.075
100 to 249	1,359	16.1	12.2	7.9	14.7	23.5	96.7	1.15	0.071
250 or More	5,611	21.2	9.5	11.4	19.0	29.4	400.1	1.51	0.071

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Table C14. Electricity Consumption and Expenditure Intensities for Non-Mall Buildings, 2003

	Electricity Consumption						Electricity Expenditures		
				Distribution of Building-Level Intensities (kWh/square foot)					
	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	25th Per-centile	Median	75th Per-centile	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)
All Buildings*	202	14.1	12.2	3.6	8.2	17.1	15.7	1.09	0.078
Number of Dedicated Servers									
None	91	10.9	14.5	2.9	6.6	15.1	7.5	0.89	0.082
1 to 4	323	14.2	12.8	6.6	11.7	19.7	24.6	1.08	0.076
5 to 9	1,272	19.0	12.1	11.2	17.0	25.9	97.3	1.45	0.076
10 to 19	2,096	20.9	7.4	10.0	18.9	29.4	147.3	1.47	0.070
20 to 49	3,109	20.7	11.2	9.9	18.7	25.3	213.9	1.43	0.069
50 or More	6,472	23.4	10.1	17.9	18.2	31.2	515.2	1.86	0.080
Number of Photocopiers									
None	80	11.6	17.4	2.8	6.9	16.9	6.7	0.97	0.084
One	139	11.2	13.9	4.3	8.4	15.0	11.3	0.91	0.081
2 to 4	377	13.7	12.0	6.1	11.0	18.2	28.3	1.03	0.075
5 to 9	1,110	17.2	8.9	10.1	15.6	29.3	83.7	1.29	0.075
10 or More	3,977	21.2	10.4	11.3	17.6	23.9	287.0	1.53	0.072
Energy-Related Space Functions (more than one may apply)									
Commercial Food Preparation	505	18.2	14.8	6.6	16.5	40.3	37.2	1.34	0.074
Activities with Large Amounts of Hot Water	603	17.6	15.7	7.2	13.2	26.0	43.6	1.27	0.072
Separate Computer Area	821	16.9	12.0	6.6	11.5	19.2	60.2	1.24	0.073
HVAC Conservation Features (more than one may apply)									
Variable Air-Volume System	798	19.0	12.1	7.5	14.2	26.5	57.4	1.36	0.072
Economizer Cycle	812	19.5	12.8	8.2	14.9	27.3	58.3	1.41	0.072
HVAC Maintenance	308	15.5	12.5	4.8	10.4	20.0	23.5	1.18	0.076
Energy Management and Control System (EMCS)	1,109	17.9	12.9	8.0	13.6	23.7	81.1	1.31	0.073
Window and Interior Lighting Features (more than one may apply)									
Multipaned Windows	273	15.3	13.5	4.5	9.3	18.4	20.1	1.13	0.074
Tinted Window Glass	375	16.6	12.2	4.8	11.0	21.3	28.3	1.25	0.075
Reflective Window Glass	501	17.9	12.4	4.7	9.5	18.9	37.0	1.33	0.074
External Overhangs or Awnings	231	16.4	12.6	5.8	11.4	23.2	17.9	1.27	0.077
Skylights or Atriums	584	15.1	13.4	4.1	8.7	15.9	43.2	1.12	0.074
Daylighting Sensors	816	21.1	16.0	5.6	10.1	25.6	65.4	1.69	0.080
Specular Reflectors	470	16.7	13.2	5.4	10.4	18.6	34.6	1.23	0.074
Electronic Ballasts	284	15.6	12.4	4.5	9.5	19.3	21.7	1.19	0.076
Energy Management and Control System (EMCS) For Lighting	1,528	19.1	12.8	10.8	17.8	34.5	116.0	1.45	0.076
Equipment Usage Reduced When Building Not In Full Use (more than one may apply)[a]									
Heating	197	13.2	11.5	3.7	7.6	15.4	15.7	1.06	0.080
Cooling	216	13.8	11.0	4.5	8.9	16.7	17.2	1.10	0.080
Lighting	160	12.5	10.4	3.9	8.4	16.5	12.7	1.00	0.080
Office Equipment	141	10.9	10.5	4.3	8.1	14.1	11.6	0.90	0.083

CONTINUED

Table C14. Electricity Consumption and Expenditure Intensities for Non-Mall Buildings, 2003

	Electricity Consumption						Electricity Expenditures		
				Distribution of Building-Level Intensities (kWh/square foot)					
	per Building (thousand kWh)	per Square Foot (kWh)	per Worker (thousand kWh)	25th Per-centile	Median	75th Per-centile	per Building (thousand dollars)	per Square Foot (dollars)	per kWh (dollars)
All Buildings*	202	14.1	12.2	3.6	8.2	17.1	15.7	1.09	0.078
Annual Consumption (kilowatthours)									
10,000 or Less	5	1.3	2.8	1.0	1.9	3.2	0.6	0.17	0.124
10,001 to 50,000	26	4.9	6.1	3.8	6.9	11.7	2.7	0.51	0.104
50,001 to 100,000	73	8.0	8.6	6.4	11.4	24.0	7.2	0.78	0.098
100,001 to 500,000	220	13.0	12.2	10.1	18.9	40.0	18.9	1.12	0.086
500,001 to 1,000,000	684	14.4	13.6	12.0	16.9	30.0	54.5	1.15	0.080
1,000,001 to 5,000,000	2,087	20.3	13.5	16.0	23.4	37.7	143.9	1.40	0.069
Over 5,000,000	11,458	24.7	15.6	20.0	27.5	36.8	775.0	1.67	0.068
Provider of Purchased Electricity (more than one may apply)									
Local Utility	187	13.7	12.0	3.5	8.1	16.7	14.5	1.06	0.078
Some Other Provider	594	18.3	12.9	6.5	12.4	22.9	46.4	1.43	0.078

See "Guide to the Tables" or "Glossary" for further explanations of the terms used in this table. Both can be accessed from the CBECS web site - http://www.eia.doe.gov/emeu/cbecs.

* Figures in this table do not include enclosed malls and strip malls. Mall buildings add an estimated 213 thousand buildings comprising 6.9 billion square feet. In the 1999 CBECS, malls represented 9.7 percent of total electricity consumption.

[a] The definition for one or more of these row items has changed and may not be directly comparable with past CBECS estimates. See "Guide to the Tables" for discussion of the differences.

Q=Data withheld because the Relative Standard Error (RSE) was greater than 50 percent, or fewer than 20 buildings were sampled.

N=No responding cases in sample that use electricity.

Notes: • Statistics for the "Energy End Uses" category represent total consumption in buildings that have the end use, not consumption specifically for that particular end use. • HVAC = Heating, Ventilation, and Air Conditioning. • Due to rounding, data may not sum to totals.

Source: Energy Information Administration, Office of Energy Markets and End Use, Forms EIA-871A, C, and E of the 2003 Commercial Buildings Energy Consumption Survey.

BOURNE TECHNOLOGY PARK REALTY TRUST
CONVENTION DATA SERVICES HEADQUARTERS

Affordable Housing Calculation

Technical Bulletin #09-001 provides that Minimum Performance Standard AH3.1 is intended to mitigate the "projected level of below-average-wage jobs that will be created" by a non-residential development. Convention Data Services ("CDS") is an existing business / employer in Bourne and is simply relocating its operation from its existing location at 107 Waterhouse Road to an immediately abutting property addressed 3 & 4 Technology Park Drive, Bourne. Accordingly, consistent with the intent of AH3.1, this redevelopment should not be evaluated as if it is a new employer/business entering market.

CDS anticipates that after the project it will likely increase the number of FTE's by 6. The 6 new positions are projected as: 1 Information Technology position, 1 Sales position, 2 Management positions, and 2 Product Development positions. The salaries for these 6 new positions will be in the range of $55,000 - $65,000. These positions will, therefore, pay a significantly higher salary than the Barnstable County average wage of $41,028.[1]

As a result, no affordable housing mitigation is required for this redevelopment project.
3235821.1

[1] Based on 2nd quarter 2014 Bureau of Labor Statistics ("BLS") for Barnstable County. According to the most recent available information from the BLS, the average weekly wage for Barnstable County is $789 ($789 x 52 weeks = $41,028 annual average).

TRAFFIC IMPACT AND ACCESS STUDY

Proposed Office Building

Bourne, Massachusetts

PREPARED FOR

JK Scanlan Company, LLC
One Adams Place
859 Willard Street
Quincy, Massachusetts 02169

PREPARED BY

vhb

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August 2016

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Executive Summary

VHB, Inc. has prepared a traffic impact and access study (TIAS) for a proposed office building to be located on Technology Park Drive, off of Waterhouse Road in Bourne, Massachusetts on approximately 4.49-acres of land. Technology Park Drive is a short subdivision roadway that serves three commercial parcels, including the site for the proposed project. The project site currently houses a building structure (approximately 9,966 square feet) that is unoccupied. The proposed project would involve the demolition of the existing structure and replacing it with the construction of a 27,210 sf office facility for Convention Data Services (CDS) who currently occupies office space in the immediate area. While the existing structure was not completed or occupied, the steel frame and roof has been erected and the project had approval and building permit from the Town of Bourne.

Currently, CDS's office is located at the abutting property to the north at 107 Waterhouse Drive in Bourne, and all employees would be relocated to the new facility. As such, although there will be new trips to the site, these trips already exist on the area roadways. Access to the site would be provided by Technology Park Drive, with a proposed extension of the roadway to meet the parking lot for the proposed site so no new driveways to the local roadway system is necessary or proposed as part of this project.

Based on a review of the anticipated trip generation and trip distribution for the proposed project, a study area was established. The study area was established also in part based on a review of the RPP and the RPP Functional Classification of Cape Cod Roadways Map and through consultation with Cape Cod Commission (CCC) staff. Using this approach, the project study area will include the following four intersections and four roadway links:

Intersections:

- Bourne Rotary (Route 28/ Trowbridge Road/ Sandwich Road)
- Route 28 at Waterhouse Road
- Trowbridge Road at Waterhouse Road/ Driveway
- Waterhouse Road at Technology Park Drive (Site Driveway)/ Driveway

Roadway Links:

- Route 28 between Bourne Rotary and Waterhouse Road
- Waterhouse Road between Route 28 and the Site Driveway

- Waterhouse Road between the Site Driveway and Trowbridge Road
- Trowbridge Road between Waterhouse Road and Bourne Rotary

Turning movement counts (TMC), collecting *peak hour* data, were conducted at each of the study area intersections during the weekday morning peak period from 7:00 AM to 9:00 AM and weekday evening peak period from 4:00 PM to 6:00 PM in April 2016. Concurrent with the TMCs, 24-hour automatic traffic recorder (ATR) counts were conducted at the following two locations:

- Route 28, north of Waterhouse Road
- Waterhouse Road, north of Technology Park Drive

Using conservative assumptions, the proposed project is expected to result in a total of 154 net new trips (77 entering/77 exiting) on a typical weekday, a total of 32 net new vehicle trips (29 entering/3 exiting) during the weekday morning peak hour and 37 net new vehicle trips (5 entering/32 exiting) during the weekday evening peak hour. However, with the additional TDM measures proposed, in Chapter 3, these estimated trip generations numbers are likely to be lower.

Capacity analyses were conducted for each of the study area intersections and roadway segments under 2016 Existing conditions, 2023 No-Build conditions (without the proposed development), and 2023 Build conditions (with the proposed development). Based on the results of these analyses and the anticipated site-generated traffic, the proponent will implement the following measures:

- Transportation Demand Management Program
- Intersection safety and/or capacity enhancements at:
  - Bourne Rotary
  - Route 28 at Waterhouse Road

Overall, VHB concludes that the project will have minor impacts on traffic conditions in this area and the implementation of the proposed safety initiatives outlined in this document should be considered a benefit of the project that as they are not necessarily required by the project

The Proponent is filing for limited DRI review. Using the Redevelopment Scoping Checklist, the <u>only</u> question where the proposed project results in a shaded response is that it directly abuts a regional roadway. However, as described herein, no access/egress is proposed on MacArthur Boulevard, and no new access/egress points are proposed on Waterhouse Road. As to the other questions, the proposed project does not generate more than 250 new daily trips. In addition, as to the last scoping checklist question, the project will not generate more than 25 peak hour trips at a high

crash location. As described in this Report, there are only two high crash locations within the proposed project study area: (1.) Bourne Rotary and (2.) Route 28 at Waterhouse Road. At the Bourne Rotary, the proposed project will generate 21 trips during the AM Peak Hour and 25 trips during the PM Peak Hour. At Route 28/ Waterhouse Road, the proposed project will generate 10 AM Peak Hour trips and 10 PM Peak Hour Trips. Therefore, as indicated on the scoping checklist, the proposed project will not generate more than 25 peak hour trips at a high crash location. Based on these responses, the proposed project may be exempted from DRI review for traffic altogether. However, as described in this Report, the Proponent is prepared to undertake the safety improvements described herein and is committed to a model TDM plan.

1

Introduction

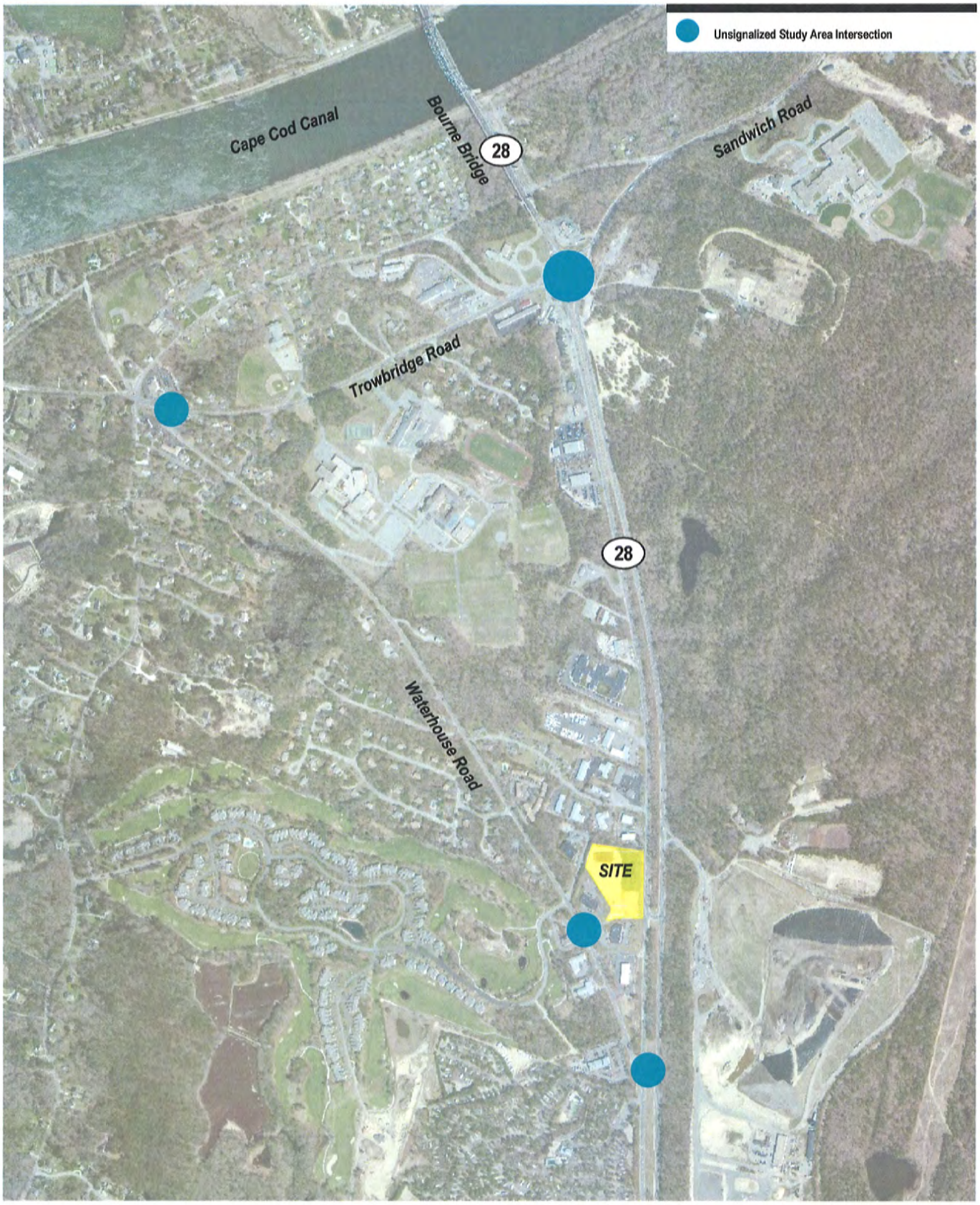
This traffic study documents the findings of the traffic evaluation conducted for the project including an assessment of existing conditions, projection of future traffic volumes without and with the proposed development, analysis of impacts of the proposed development, and recommendations for improving existing capacity deficiencies as well as to offset project related traffic impacts.

Project Description

The site is located on Technology Park Drive, off of Waterhouse Road in Bourne, Massachusetts on approximately 4.49-acres of land. Technology Park Drive is a short subdivision roadway that serves three parcels, inclusive of the site for this proposed project. The project site currently consists of a building structure of approximately 9,966 sf office building that was permitted locally and partially constructed but is not occupied. The proposed project would involve the removal of the existing structure and replacing it with construction of a 27,210 sf office facility for Convention Data Services (CDS). Currently, CSD's office is located at the abutting property to the north at 107 Waterhouse Drive in Bourne, and all employees would be relocated to the new facility. Access to the site would be provided by Technology Park Drive, with a proposed extension of the roadway to meet the parking lot for the proposed site. No new curb cuts to the local street network is necessary or proposed as part of this project. Figure 1 shows the Project site in relation to the surrounding area.

Study Methodology

This traffic assessment has been conducted in three stages. The first stage involved an assessment of existing traffic conditions within the project area including an inventory



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Site Location Map and
Study Area Intersections
Proposed Office Building
Bourne, Massachusetts

Figure 1

of existing roadway geometry; observations of traffic flow, including daily and peak period traffic counts; and a review of vehicular crash data.

The second stage of the study established the framework for evaluating the transportation impacts of the proposed project. Specific travel demand forecasts for the project were assessed along with future traffic demands on the study area roadways due to projected background traffic growth and other proposed area development that will occur, independent of the proposed development. The year 2023, a seven-year time horizon, was selected as the design year for analysis for the preparation of this traffic impact and access assessment to satisfy the Executive Office of Environmental Affairs/Executive Office of Transportation [EOEA/EOT] guidelines and Cape Code Commission (CCC) Development of Regional Impact (DRI) requirement.

The third and final stage involved conducting traffic analyses to identify both existing and projected future roadway capacities and demands. This analysis was used as the basis for determining potential project impacts and potential mitigation measures.

2

Existing Conditions

Evaluation of the transportation impacts associated with the proposed project requires a thorough understanding of the existing transportation system in the project study area. Existing transportation conditions in the study area include roadway geometry, traffic controls, daily and peak period traffic flow, and vehicular crash information data. Each of these elements is described in detail below.

Study Area

Based on a review of the anticipated trip generation and trip distribution for the proposed project, a study area was established. The study area was established also in part based on a review of the RPP and the RPP Functional Classification of Cape Cod Roadways Map and through consultation with the CCC. Using this approach, the project study area will include the following four intersections and four roadway links:

Intersections:

- Bourne Rotary (Route 28/ Trowbridge Road/ Sandwich Road)
- Route 28 at Waterhouse Road
- Trowbridge Road at Waterhouse Road/ Driveway
- Waterhouse Road at Technology Park Drive (Site Driveway)/ Driveway

Roadway Links:

- Route 28 between Bourne Rotary and Waterhouse Road
- Waterhouse Road between Route 28 and the Site Driveway
- Waterhouse Road between the Site Driveway and Trowbridge Road
- Trowbridge Road between Waterhouse Road and Bourne Rotary

The existing conditions evaluation consisted of an inventory of the traffic control; roadway, driveway, and intersection geometry in the study area; the collection of daily and peak period traffic volumes; and a review of recent vehicular crash history.

Roadway Geometry

The major travel routes and intersections within the study area are described below. Figure 2 shows the observed existing geometry and traffic control at each study-area intersection.

Roadways

Waterhouse Road

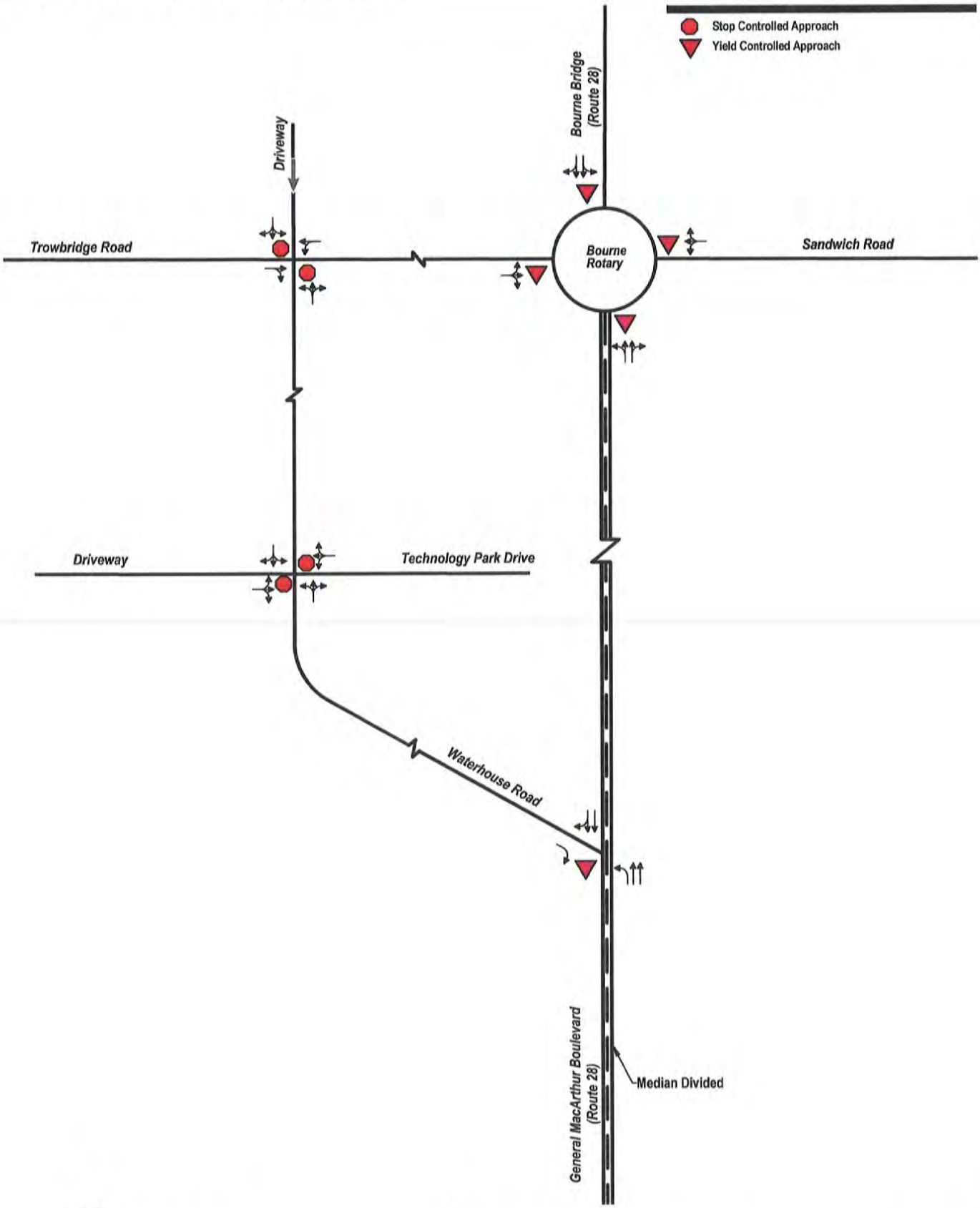
Waterhouse Road within the study area is a two-lane roadway running generally in a north-south direction. Waterhouse Road is under Massachusetts Department of Transportation (MassDOT) jurisdiction for the entire length and classified as a minor arterial. The posted speed limit along Waterhouse Road varies between 30 mph and 45 mph, and is 45 mph in the vicinity of the project site. Land use along Waterhouse Road is a primarily commercial in the vicinity of the project site, but includes residential and the Bourne High School and Middle School to the north.

General MacArthur Boulevard (Route 28)

General MacArthur Boulevard (Route 28) within the study area is a four-lane divided roadway with limited access running generally in a north-south direction. Route 28 is under MassDOT jurisdiction and classified as a principal arterial. The posted speed limit along Route 28 in the northbound direction is 40 mph between the Bourne Rotary and the Nissan Dealership and 55 mph south of the Dealership through the rest of the study area. The posted speed limit along Route 28 in the southbound direction is 40 mph from the Bourne Rotary to the Nissan Dealership and 50 mph from the Dealership through the rest of the study area. Land use along Route 28 is a primarily commercial in the vicinity of the project site.

Trowbridge Road

Trowbridge Road within the study area is a two-lane roadway running generally in an east-west direction. Trowbridge Road is under local jurisdiction and classified as a minor arterial. The posted speed limit along Trowbridge Road is 35 mph. Land use



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Study Area Intersection
Lane Geometry and Traffic Control
Proposed Office Building
Bourne, Massachusetts

Figure 2

along Trowbridge Road is a mix of commercial, residential and institutional with the Bourne Elementary School, Middle School, and High School in the vicinity of the project site.

Intersections

The following sections describe the study-area intersections in detail.

Bourne Rotary (Route 28/ Trowbridge Road/ Sandwich Road)

- Four-legged rotary
- Eastbound and Westbound approaches each consist of a single general purpose lane under yield control
- Northbound and Southbound approaches each consist of two general purpose lanes under yield control
- No sidewalks or crosswalks are provided at the intersection
- Land use in the area is a mix of commercial, including Dunkin Donuts, a hotel, and a TD Bank, and the State Police

Route 28 at Waterhouse Road

- Three-legged unsignalized intersection
- Eastbound approach consists of a right-turn lane under Yield control
- Northbound approach consists of one U-turn/ left-turn lane and two through lanes
- Southbound approach consists of a through lane and a shared through/ right-turn lane
- Intersection is off-set, with the southbound right-turn and northbound left-turn located approximately 300-feet north of the eastbound approach
- No sidewalks or crosswalks are provided at the intersection
- Land use in the area is primarily commercial uses

Trowbridge Road at Waterhouse Road/ Driveway

- Four-legged signalized intersection
- Eastbound and westbound approaches each provide a general purpose lane
- Northbound approach provides one general purpose lane under STOP control
- Southbound approach provides on general purpose lane under STOP control and is one-way entering the intersection
- A sidewalk is provided on the east side of Waterhouse Road
- A crosswalk is provided across the Trowbridge Road westbound approach
- Land use in the area is primarily residential to the south and the Hyannis Golf Course is to the north

Waterhouse Road at Technology Park Drive (Site Driveway)/ Driveway

- Four-legged unsignalized intersection
- Eastbound and Westbound approaches each consist of one general purpose lane under STOP control
- Northbound and Southbound approaches each consist of one general purpose lane
- A sidewalk is provided on the east side of Waterhouse Road
- There are no crosswalks at the intersection
- Land use in the area is a mix of commercial, residential and institutional with the Bourne Middle School and High School.

Roadway Jurisdiction

Roadways within the Town of Bourne are under the jurisdiction of the Town of Bourne, MassDOT, or US Air Force. Within the project study area, all roadways are under MassDOT jurisdiction with the exception of Trowbridge Road west of the Bourne Rotary, which is under local jurisdiction. Figure 3 illustrates the roadway jurisdiction designations within the study area.

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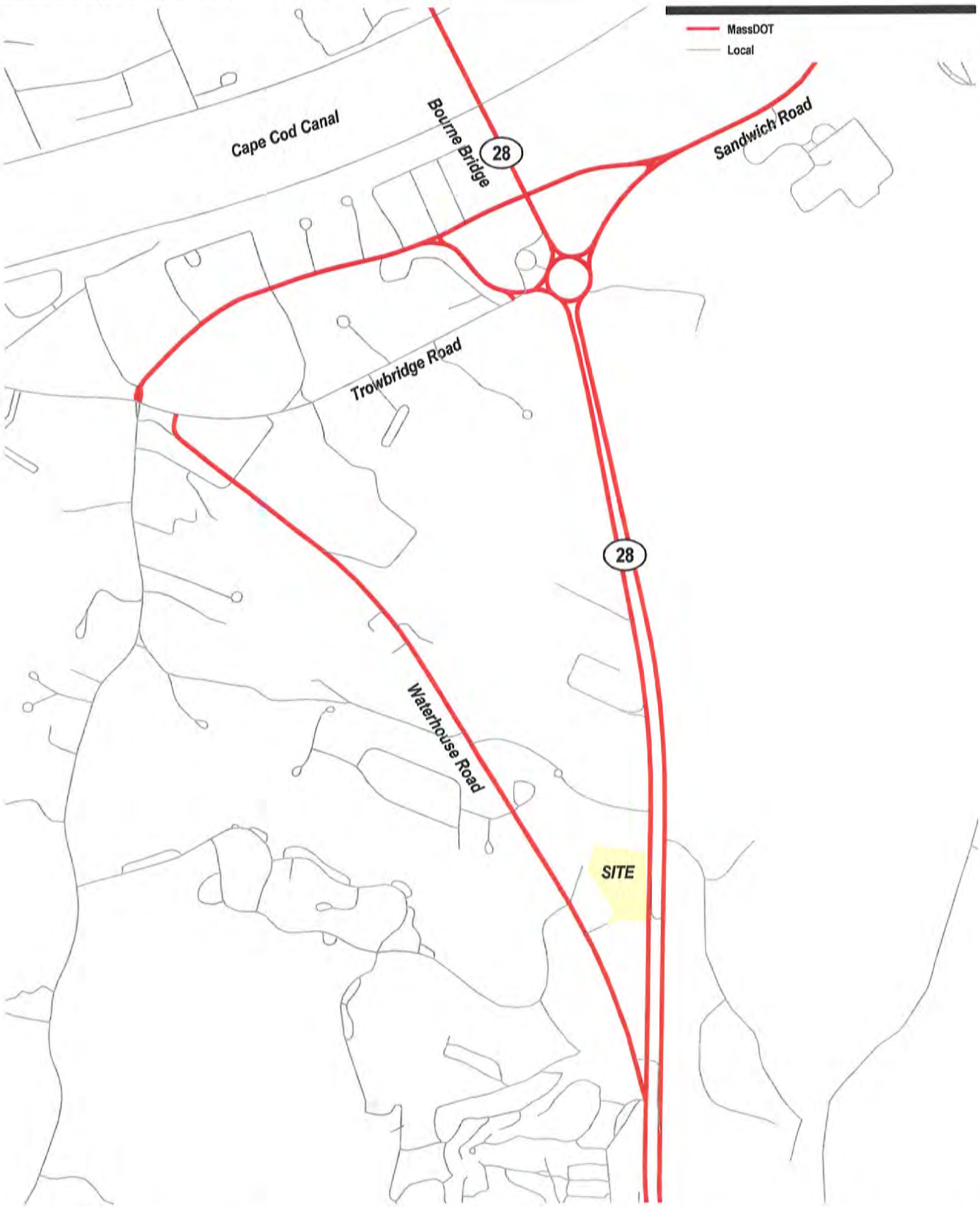

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Roadway Jurisdiction

Figure 3

Proposed Office Building
Bourne, Massachusetts

Traffic Volume Data

Turning movement counts (TMC), collecting *peak hour* data, were conducted at each of the study area intersections during the weekday morning peak period from 7:00 AM to 9:00 AM, and the weekday evening peak period from 4:00 PM to 6:00 PM. It is during these two periods when the combination of site traffic and area background traffic are at their most critical level. These counts were conducted in April 2016, and volumes have been seasonally adjusted to represent peak summer conditions. The weekday morning and evening peak periods are consistent with typical peak commuter traffic periods, and coincide with the expected peak periods for traffic entering and exiting the proposed site. Based on the TMCs, the weekday morning peak period generally occurred from 7:150 AM to 8:15 AM and the weekday evening peak period occurred from 4:45 PM to 5:45 PM. Concurrent with the TMCs, 24-hour automatic traffic recorder (ATR) counts were conducted on two locations, Route 28 north of Waterhouse Road and Waterhouse Road north of Technology Park Drive. A summary of the ATR traffic data is presented in Table 1. All traffic count data is contained in the Appendix to this document.

Table 1 Existing Traffic Volume Summary – Peak Summer Season

		Weekday Morning Peak Hour			Weekday Evening Peak Hour		
Location	Weekday ADT [a]	Volume	K Factor [b]	Dir. Dist. [c]	Volume	K Factor	Dir. Dist.
Route 28 north of Waterhouse Road	47,200	3,610	7.6%	60% SB	3,960	8.4%	54% NB
Waterhouse Road north of Technology Drive	3,700	350	9.6%	55% SB	400	10.9%	72% NB

a. daily traffic expressed in vehicles per day. Based on daily volumes collected in April 2016 and grown to peak conditions. Exact peak hours of the ATRs may not coincide with the peak hour of the TMCs.
b. peak period volumes expressed in vehicles per hour
c. percent of daily traffic that occurs during the peak period
d. directional distribution of peak period traffic

Seasonality of Count Data

Comparison of traffic count data with historic seasonal data available from the *2014 Traffic Counting Report for Cape Cod Massachusetts* indicated that July traffic counts represent peak summer season conditions. This report also shows that April counts are approximately 6-percent lower than the average annual month conditions, and 39-percent lower than peak July/August conditions. As such, the peak conditions capacity analysis contained in this document was conducted using the CCC Seasonal Adjustment Factors, which is 1.39 to adjust April volumes to peak month conditions. Additionally, the average conditions capacity analysis contained in the Appendix to

this document was conducted using the CCC Seasonal Adjustment Factors, which is 1.06 to adjust April volumes to average month conditions. Figures 4 and 5 illustrate the 2016 Existing weekday morning and evening peak hour traffic volumes.

Public Transportation

Several transit services are currently provided on Cape Cod. The following information was provided by the Cape Cod Regional Transit Authority (CCRTA).

Cape Cod Regional Transit Authority

The Cape Cod Regional Transit Authority (CCRTA) oversees local bus service on Cape Cod. There are six, year-round, fixed-route services provided by CCRTA including the SeaLine, the Bourne Villager, the H2O, the Flex, the Bourne Run, and the Sandwich Line. All buses are wheelchair accessible and equipped with bicycle racks. All SeaLine, Bourne Villager, and H2O routes connect at the Plymouth & Brockton bus terminal in downtown Hyannis, located three miles south of the Site.

CCRTA also offers "demand response service" through three separate lines; (1) ADA Paratransit Service is a door-to-door, shared-ride service for those eligible individuals who are unable to use the CCRTA fixed route services. It is a comparable service to the fixed route service schedule in that it operates during the same hours and travels within the ¾ of a mile of the fixed route service areas; (2) DART Service (Dial-a-Ride Transportation) is a daily general public service that is a door-to-door, ride by appointment, transportation service. This service is available to all Cape Cod residents for any purpose; and (3) Boston Hospital Transportation (BHT) is a service that runs on weekdays, by reservation, and provides transportation service to 15 Boston area hospitals. The BHT has bus stops in Wellfleet, Eastham, Orleans, Harwich, the Bourne Commuter Lot, and the Sagamore Commuter Lot.

While six fixed-route services are provided by the CCRTA, only one of these fixed routes travels near the project Site, which is the Bourne Villager. The Bourne Run travels from the Mashpee Commons in Mashpee to the Cranberry Plaza in Wareham, and runs Sunday through Saturday. The Bourne Run has thirteen scheduled stops, and travels along Trowbridge Road in Bourne. The nearest scheduled stop to the Site is located at the Capeside Convenience, approximately 1.2 miles from the Site. The Bourne Run schedule is provided in the Appendix to this document.

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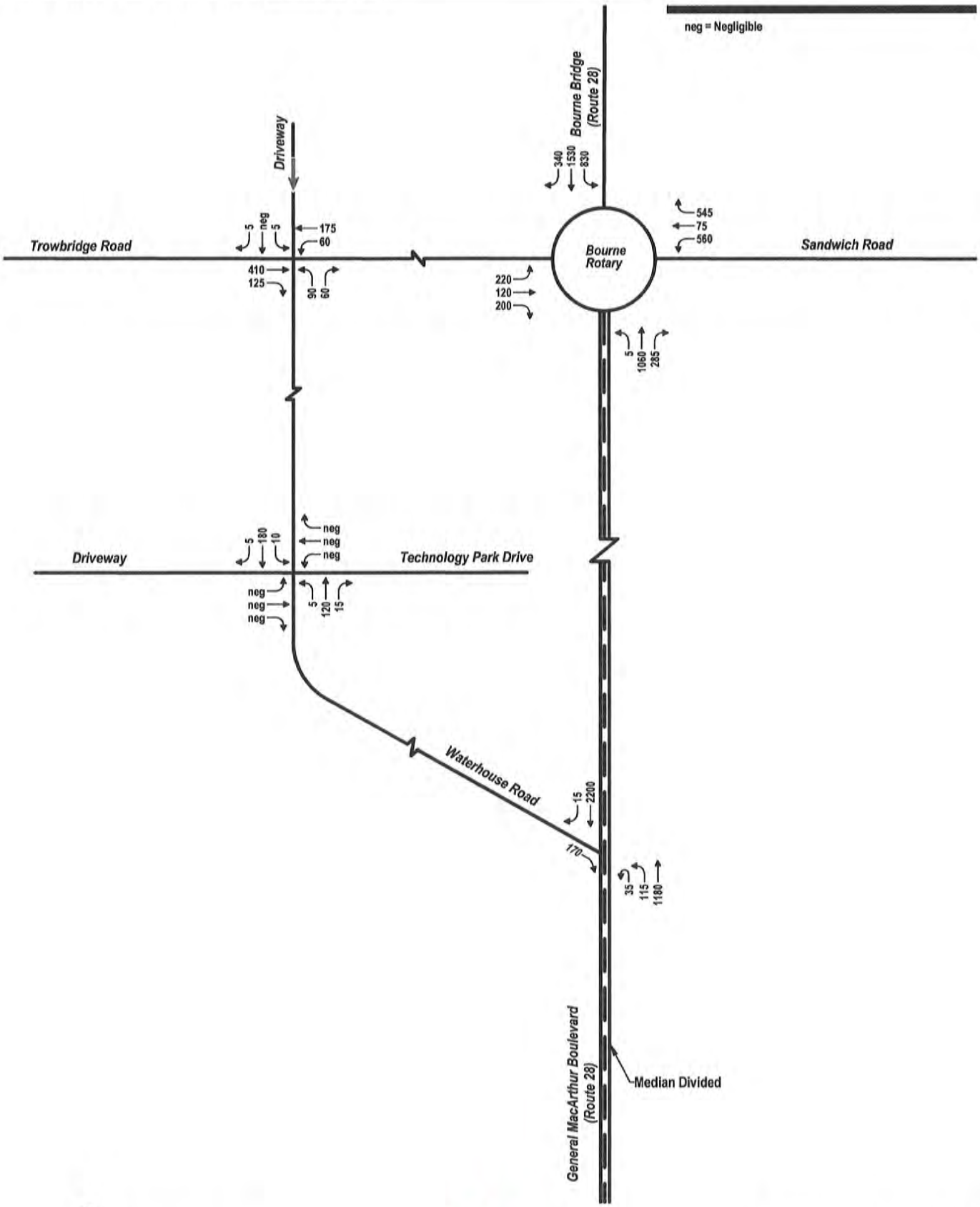

Not to Scale

2016 Existing Conditions - Peak Weekday Morning Peak Hour Volumes
Proposed Office Building
Bourne, Massachusetts

Figure 4

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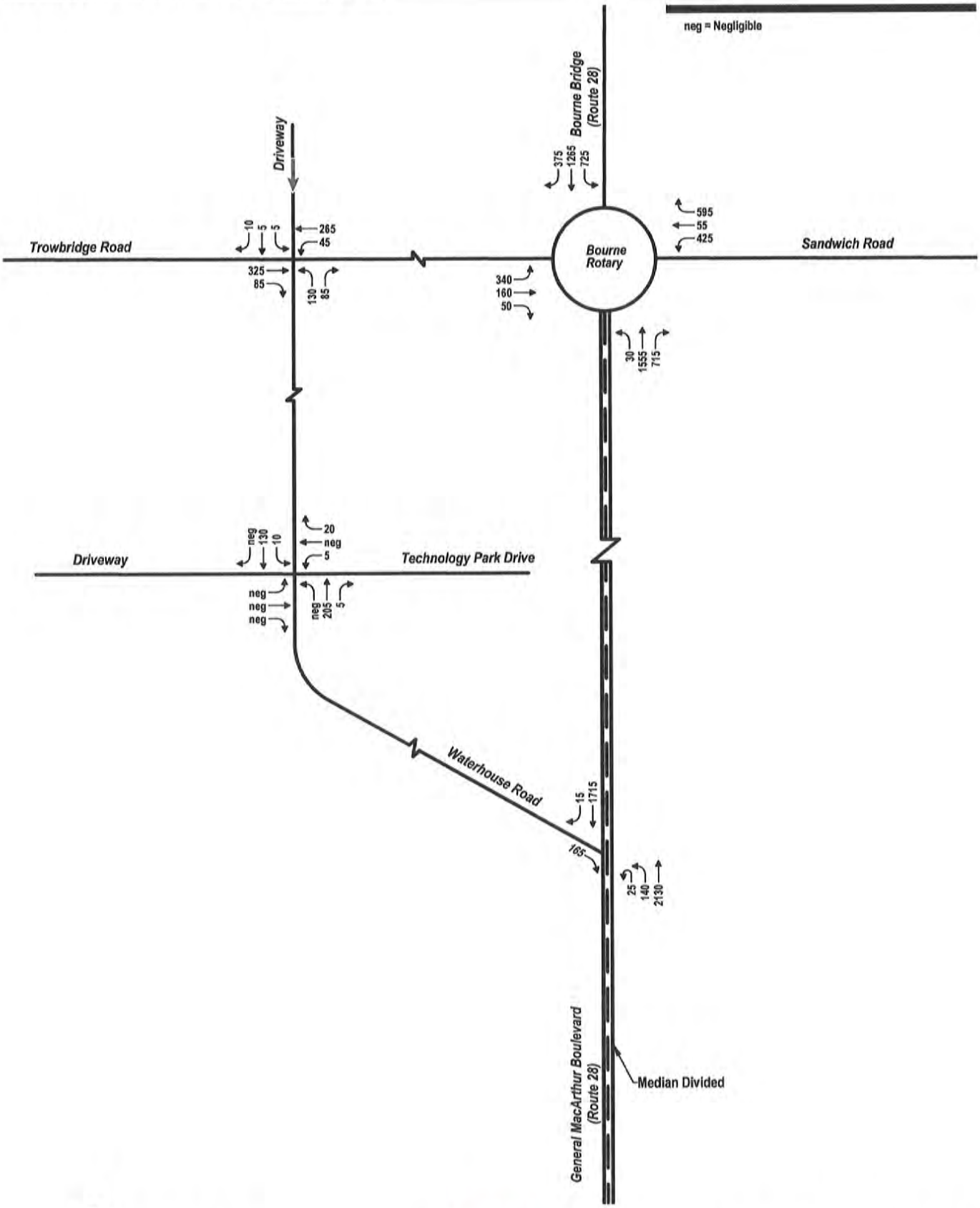

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2016 Existing Conditions - Peak
Weekday Evening Peak Hour Volumes
Proposed Office Building
Bourne, Massachusetts

Figure 5

Vehicular Crash History

To identify potential vehicle crash trends in the study area, reported vehicular crash data for the study area intersections was obtained from MassDOT for the years 2009 through 2014, the most recent five-year history available. The MassDOT vehicular crash data was summarized to identify locations that experience an average of three or more crashes per year. Based on this initial review, two such locations were identified: the Bourne Rotary and Route 28 at Waterhouse Road.

In addition to summarizing the crash history, VHB also calculated crash rates for the study area intersections. Intersection crash rates are calculated based on the number of crashes at an intersection and the volume of traffic traveling through that intersection on a daily basis. The MassDOT average intersection crash rate for District 5 (the MassDOT district designation for Bourne) is 0.76 for signalized intersections and 0.58 for unsignalized intersections. In other words, on average, 0.78 crashes occurred per million vehicles entering signalized intersections and 0.58 crashes occurred per million vehicles entering unsignalized intersections throughout District 5. The crash rate worksheets for the study area intersections are included in the Appendix to this document. Since crashes for the Rotary were collected for the entire Rotary and not the individual approaches, crash rates were not conducted for the Rotary. As shown in Table 2, none of the study area intersections have a crash rate higher than the MassDOT District 5 average rate.

As mentioned above, two of the study area intersections, the Bourne Rotary and Route 28 at Waterhouse Road, averaged more than three crashes per year based on the MassDOT data. As stated in the Regional Policy Plan (RPP) Minimum Performance Standard (MPS) TR1.3, *"The applicant shall identify safety impacts at road and intersection locations with three or more crashes per year where the project is expected to add 25 or more peak hour trips."* Further discussion of crash patterns and potential measures to mitigate the safety concerns at these intersections are provided in Chapter 5 *Mitigation*. The crash history and crash rates for the study area intersections are presented in Table 2 and are contained in the Appendix to this document.

Table 2 Intersection Vehicular Crash Summary (2009 – 2014)

	Route 28 at		Trowbridge Road at
	Bourne Rotary	Waterhouse Road	Waterhouse Road
Signalized?	No	No	No
MassDOT Average Crash Rate	n/a	0.58	0.58
Calculated Crash Rate	n/a	0.24	0.52
Exceeds Average?	n/a	No	No
Year			
2009	22	5	2
2010	46	3	4
2011	37	8	2
2012	29	4	1
2013	35	0	2
2014	43	4	1
Total	212	24	12
Average	35.33	4.00	2.00
Collision Type			
Angle	60	13	2
Head-on	3	0	1
Rear-end	64	6	1
Rear-to-rear	0	1	0
Sideswipe, opposite direction	3	0	1
Sideswipe, same direction	64	3	3
Single vehicle crash	17	1	4
Not Reported/Unknown	1	0	0
Severity			
Fatal Injury	0	0	0
Non-Fatal Injury	26	8	2
Property Damage Only	182	16	9
Not Reported/Unknown	4	0	1
Time of day			
Weekday ,7:00 AM - 9:00 AM	27	4	2
Weekday, 4:00 – 6:00 PM	28	4	3
Saturday 11:00 AM – 2:00 PM	6	0	1
Weekday, other time	78	12	5
Weekend, other time	73	4	1
Pavement Conditions			
Dry	185	21	8
Wet	26	3	2
Snow/Ice	1	0	1
Other/Not Reported/Unknown	0	0	1
Non-Motorist (Bike,	0	0	0

Source: MassDOT

3

Future Conditions

Traffic volumes in the study area were projected to the year 2023, reflecting a typical seven-year traffic planning horizon. Independent of the project, volumes on the roadway network under year 2023 No-Build conditions were assumed to include existing traffic and new traffic resulting from background development. Anticipated site-generated traffic volumes were added to the year 2023 No-Build traffic volumes to reflect the year 2023 Build conditions in the study area.

Background Traffic Growth

Traffic growth on area roadways is a function of the expected land development, economic activity, and changes in demographics. A frequently used procedure is to estimate an annual percentage increase and apply that increase to study area traffic volumes. An alternative procedure is to identify estimated traffic generated by specific planned major developments that would be expected to affect the project study area roadways. For the purpose of this assessment, *both* methods were utilized.

Historic Traffic Growth

VHB conducted research to determine the historic growth rate for traffic in this area as well as other planned developments that may affect traffic within the study area for the proposed project. Based on information contained in the *2014 Traffic Counting Report for Cape Cod Massachusetts*, traffic has decreased at a rate of 0.33-percent per year Cape-wide over the last ten years (2004 – 2014). As described in this report, the Town of Bourne is considered to be part of the Upper-Cape region, in which traffic increased at a rate of 0.12-percent per year over the last ten years (2004 – 2014). To provide a conservative analysis, and based on discussions with the CCC Transportation Staff, a background growth rate of 0.5-percent per year was applied. The historic

growth data provided in the *2014 Traffic Counting Report for Cape Cod Massachusetts* is contained in the Appendix to this document.

Site-Specific Growth

In addition to the historic traffic growth, VHB contacted representatives of the CCC and the Town of Bourne to identify any other development projects planned within the vicinity of the site. Based on these discussions, there are currently two development projects proposed that would affect traffic volumes in the vicinity of the site.

- Atlantic Subaru: The proposed expansion to the existing Atlantic Subaru Dealership at 124 Waterhouse Road is currently pending review. The redevelopment project will include an additional 6 service bays and additional parking. Projected traffic volumes expected to be generated by this project were obtained from memos and letters submitted as part of the permitting process for the project.
- Paesano Place: An approved office building development includes the expansion of an existing 9,400 sf office building to 18,800 sf. Trip generation volumes generated by the project were obtained from letters submitted as part of the permitting process for the project and distributed through the study area; the volumes are included in the Appendix.

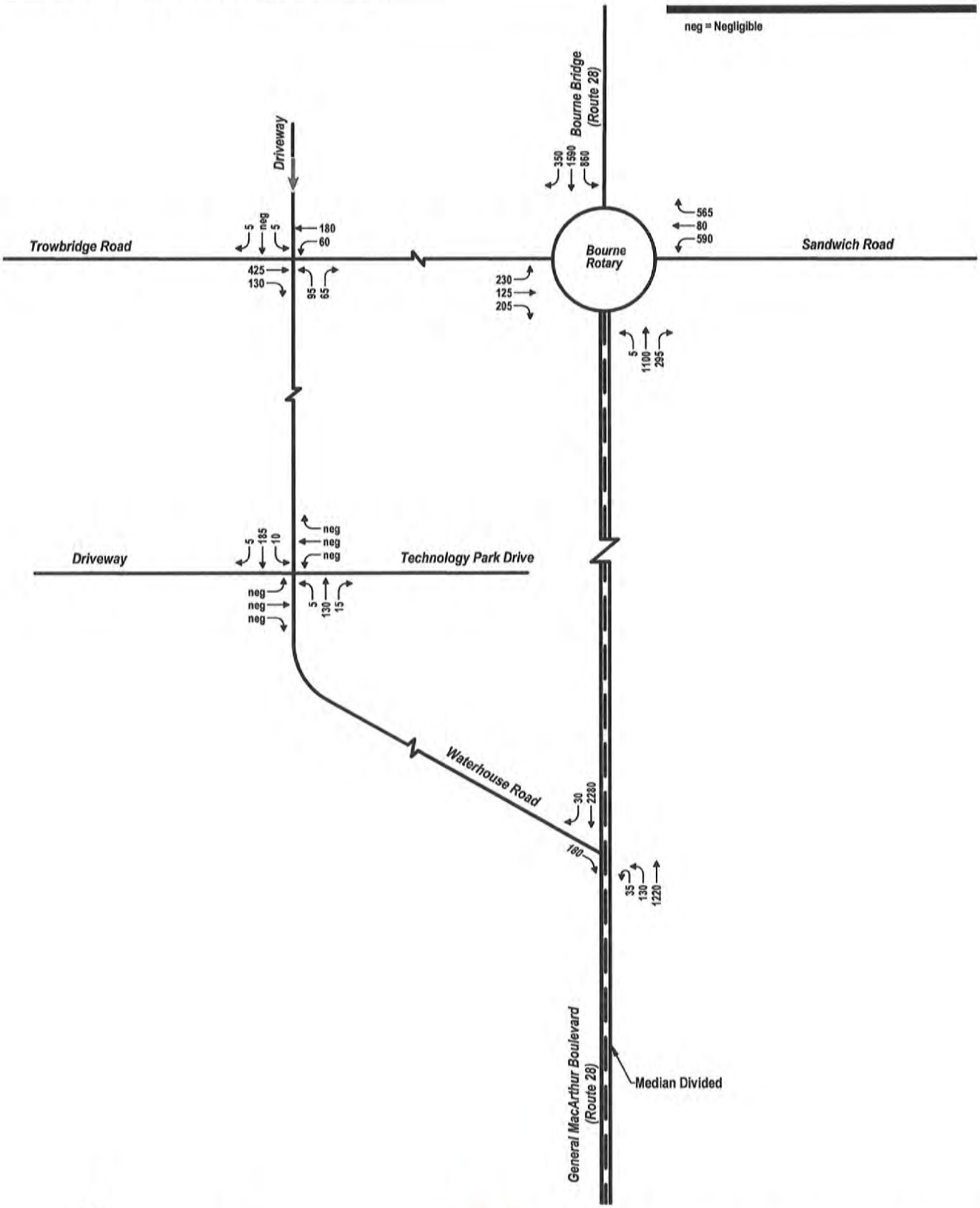
In addition to the projects listed above, an additional potential development within Bourne was identified, a Cumberland Farms on General MacArthur Boulevard, south of the Bourne Rotary. However, since no documents have been filed with the Town to date for this potential project, it was not included as background growth for the purposes of this assessment.

No-Build Traffic Volumes

The 2023 No-Build traffic volumes were developed by applying the 0.5-percent per year growth rate to the 2016 Existing conditions volumes and adding the volume associated with the background projects discussed above. Figures 6 and 7 display the resulting 2023 No-Build peak hour traffic volumes.

Future Roadway Conditions

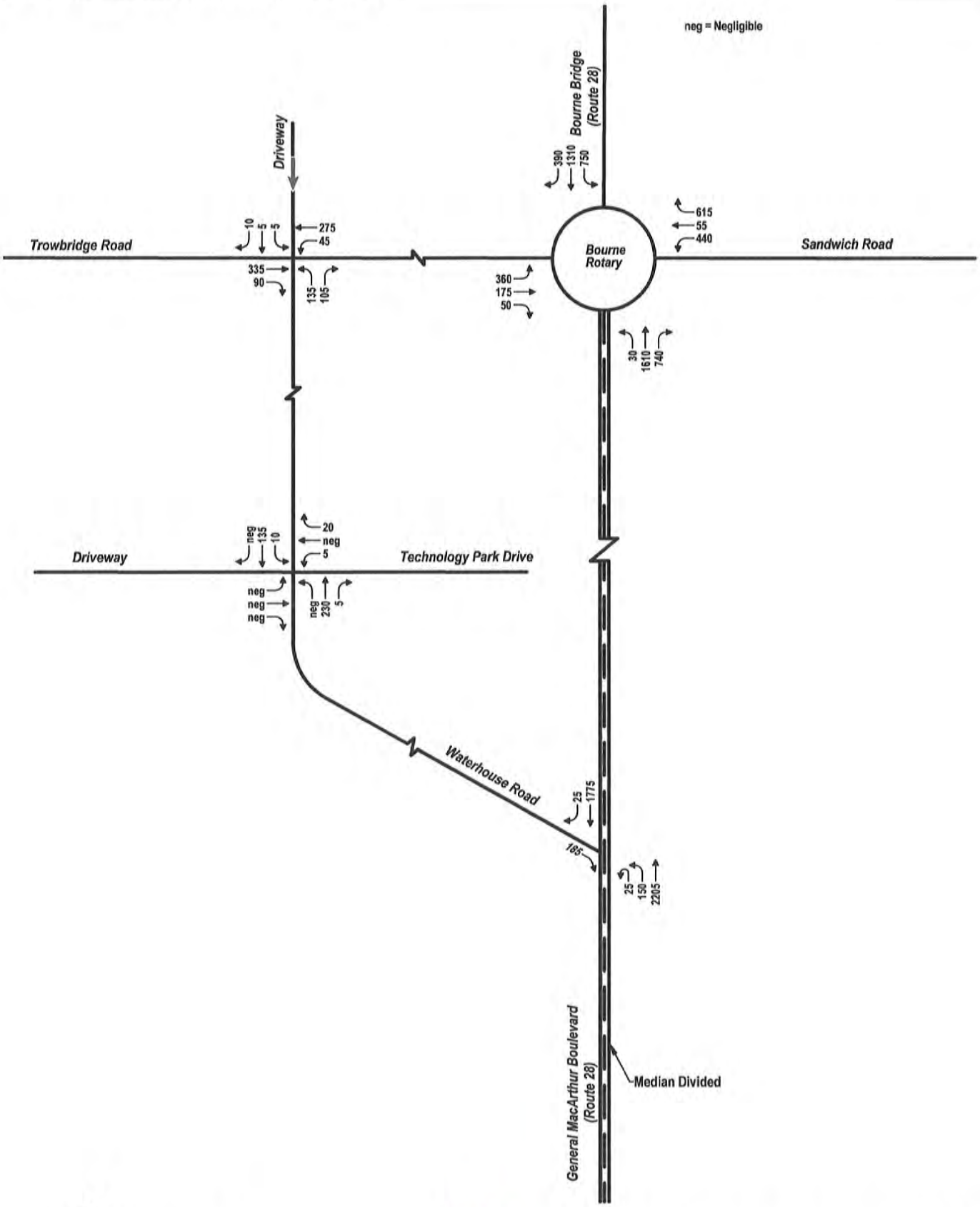
Another factor affecting background traffic conditions is the implementation of roadway improvements within the study area. Based on discussions with the Town of Bourne and the CCC, there is one project that needed to be identified, Massachusetts



Not to Scale

2023 No-Build Conditions - Peak Weekday Morning Peak Hour Volumes
Proposed Office Building
Bourne, Massachusetts

Figure 6



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2023 No-Build Conditions - Peak Weekday Evening Peak Hour Volumes
Proposed Office Building
Bourne, Massachusetts

Figure 7

Department of Transportation (MassDOT)'s resurfacing and intelligent transportation system on Route 28. This project includes adding variable messages boards with real time traffic monitoring and updates to the Route 28 corridor. These improvements will have no impact on the capacity analysis included within this study.

Trip Generation

The proposed project would involve the removal of the existing 9,966 sf office building structure on site and the replacing it with an approximately 27,210 sf office facility for Convention Data Services (CDS). Currently, CSD's office is located the abutting property to the north at 107 Waterhouse Drive in Bourne, and all employees would be relocated to the new facility. The existing building structure was approved by the Town of Bourne for office development and as such could be completed and occupied at any time. However, for the purpose of assessing project impacts, no credit for the removal of this structure has been taken. To estimate the existing and future site-generated traffic, the Institute of Transportation Engineers' (ITE) publication *Trip Generation, 9th Edition*[1] was utilized. The number of vehicle trips generated by the proposed project were estimated based on ITE land use code (LUC) 715 (Single Tenant Office Building). Table 3 summarizes the estimated vehicle trips for the future use of the property.

1 Trip Generation, 9th Edition, Institute of Transportation Engineers, Washington D.C., 2012.

Table 3 ITE Project Trip Generation

Time Period	Direction		27,210 sf Proposed Office Trip Generation	
Weekday Daily	Enter		158	
	Exit		158	
	Total		316	
Weekday Morning Peak Hour	Enter		60	
	Exit		7	
	Total		67	
Weekday Evening Peak Hour	Enter		11	
	Exit		65	
	Total		76	

a Trip generation estimate based on ITE LUC 715 (Single Tenant Office) for 27,210 sf.

As shown in Table 3, based on ITE trip generation estimates the proposed project is expected to result in a total of 316 new trips (158 entering/158 exiting) on a typical weekday. The proposed project is expected to result in a total of 67 new vehicle trips (60 entering/7 exiting) during the weekday morning peak hour, and 76 new vehicle trips (11 entering/65 exiting) during the weekday evening peak hour. The trip generation calculations are provided in the Attachments.

The proponent has indicated that a number of its employees are allowed to work from home up to two days a week, and nearly all of the employees take advantage of this opportunity. Additionally, a small number of employees work remotely full time and do not travel to the office on a regular basis. CDS has indicated that of their 162 employees, 28 employees are located out of state and/or work remotely on a full time bases. Of the 134 local employees in the Bourne office, approximately 25 employees work from home one day a week (or 20 percent of the time) and 75 employees work from home two days a week (or 40 percent of the time).

In an effort to confirm the trip reduction CDS's office experiences due to their robust telecommuting policies, traffic volume counts were conducted at their existing driveway. Automatic traffic recorder (ATR) counts were conducted on Wednesday, March 9th and Thursday, March 10th, 2016 along CDS's existing driveway. The volumes indicate that the existing office is generating volumes well below what ITE has projected for an office. The observed trip generation volumes experienced at the office are summarized below in Table 4; the ITE projected trip generation volumes from Table 3 are provided for comparison.

Table 4 Observed Project Trip Generation

Time Period	Direction	Existing Driveway Counts Trip Generation [a]	ITE 162 Employee Office Trip Generation [b]	% Reduction from ITE Projections
Weekday Daily	Enter	147	300	
	Exit	146	300	
	Total	293	600	51%

a Trip generation as counted as existing driveway in March 2016.
b Trip generation estimate based on ITE LUC 715 (Single Tenant Office) for 162 employees.

As shown in Table 4, the observed trip generation of the office included a total 293 trips (147 entering/146 exiting) on a typical weekday. The daily trip generation volume is approximately 51 percent *lower* than ITE projected rates, indicating that employees are taking advantage of CDS's telecommuting policy and have significantly reduced vehicular traffic entering and exiting the site. As such, VHB proposes that a 51-percent credit should be taken from the ITE trip generation numbers provided in Table 3. The resulting trip generation projections are summarized in Table 5.

Table 5 Proposed Project Trip Generation

Time Period	Direction	27,210 sf Office Proposed Office Trip Generation [a]
Weekday Daily	Enter	77
	Exit	77
	Total	154
Weekday Morning Peak Hour	Enter	29
	Exit	3
	Total	32
Weekday Evening Peak Hour	Enter	5
	Exit	32
	Total	37

a Net new trip generation estimate from Table 3 reduced by 51%.

As shown in Table 5, the proposed project is expected to result in a total of 154 net new trips (77 entering/77 exiting) on a typical weekday. The proposed project is expected to result in a total of 32 net new vehicle trips (29 entering/3 exiting) during

the weekday morning peak hour and 37 net new vehicle trips (5 entering/32 exiting) during the weekday evening peak hour.

Trip Reduction Requirement

An evaluation was conducted for the requirements of RPP Minimum Performance Standard (MPS) TR2.1, which states, *"DRIs located outside Growth Incentive Zones or Economic Centers, or DRIs in towns without designated Economic Centers shall implement adequate and acceptable measures to reduce and/or offset 25 percent of the expected increase in site traffic resulting from the DRI on a daily basis."*

Daily Trip Reduction

The Proponent has already implemented a robust telecommuting policy as part of their Transportation Demand Management (TDM) program. Based upon a comparison of ITE trip generation projections and actual driveway counts, this program has effectively reduced the amount of vehicular trips to and from the site by approximately 46 percent over the course of a typical weekday. Table 6 summarizes the required and currently achieved daily Trip Reduction Calculations for the proposed project.

Table 6 Trip Reduction Requirement Calculation

Daily Trip Generation [a]	25% Reduction Requirement	Existing 51% TDM Credit
316	79	161

a vpd = vehicles per day

As shown in Table 6, the 25 percent Trip Reduction Requirement for the proposed project was calculated to be 79 vehicle trips for the proposed project. Given the 51-percent success rate for the proposed TDM program, the proposed project is expected to far exceed the requirement of MPS TR2.1.

Additional Trip Reduction Measures

While Table 6 demonstrates that the Project will exceed the trip reduction requirements, the Proponent is striving to provide additional TDM measures for the new building, which could result in an additional 5-10 percent credit. However, to present a conservative analyses, no additional credits have been taken to the trip generation presented in Table 5. The details of the TDM program are presented in Chapter 5.

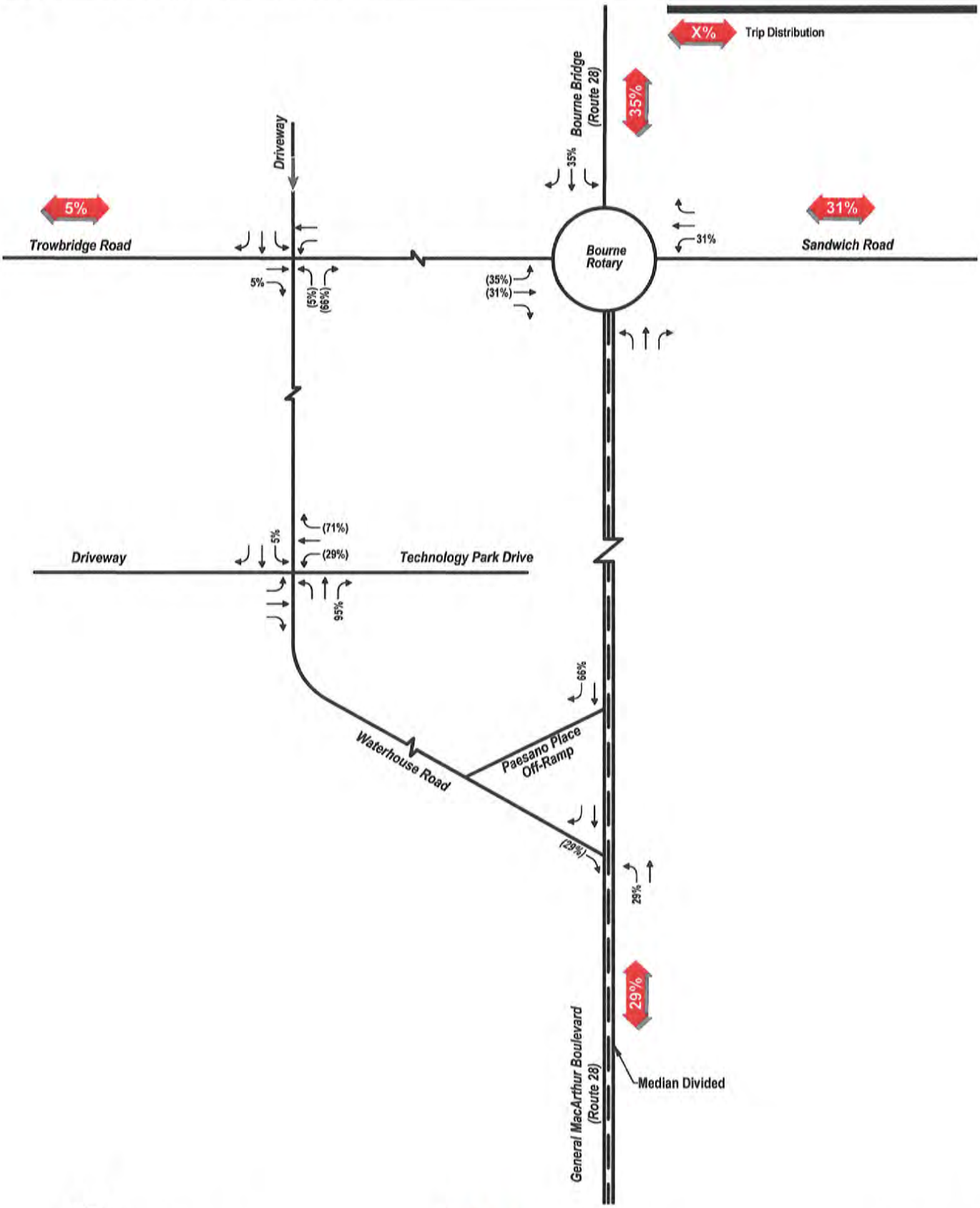
Trip Distribution and Assignment

The directional distribution of traffic approaching and departing the Project is a function of several variables: population densities, existing travel patterns, and the efficiency of the roadways leading to the site. Because the proposed office space will be occupied by existing CDS employees that currently work in the Bourne location, VHB coordinated with the Proponent to obtain address information for these employees, which provides the most accurate assessment of future arrival/departure patterns. Refer to the Attachments for the trip distribution calculations as well as a map illustrating the distribution of the weekday morning and weekday evening peak hour project trips. The anticipated trip distribution is summarized in Table 7 and illustrated in Figure 8. The trip distribution calculations are included in the Appendix to this document.

Table 7 Proposed Project Trip Distribution

Direction (To/From)	Travel Route	Percent Assigned to Route
East	Route 6	22%
West	Route 6	11%
North	Route 25	24%
North	Route 3	9%
South	Route 28	14%
East	Route 151	12%
West	Local Bourne Roads	8%
Total	**All Routes**	**100%**

The projected site-generated traffic volumes, summarized in Table 5, were distributed on the study area roadways using the trip distribution shown in Table 7 and added to the 2023 No-Build peak hour traffic volumes to develop the 2023 Build peak hour traffic volumes. The 2023 Build traffic volumes are shown in Figures 9 and 10.



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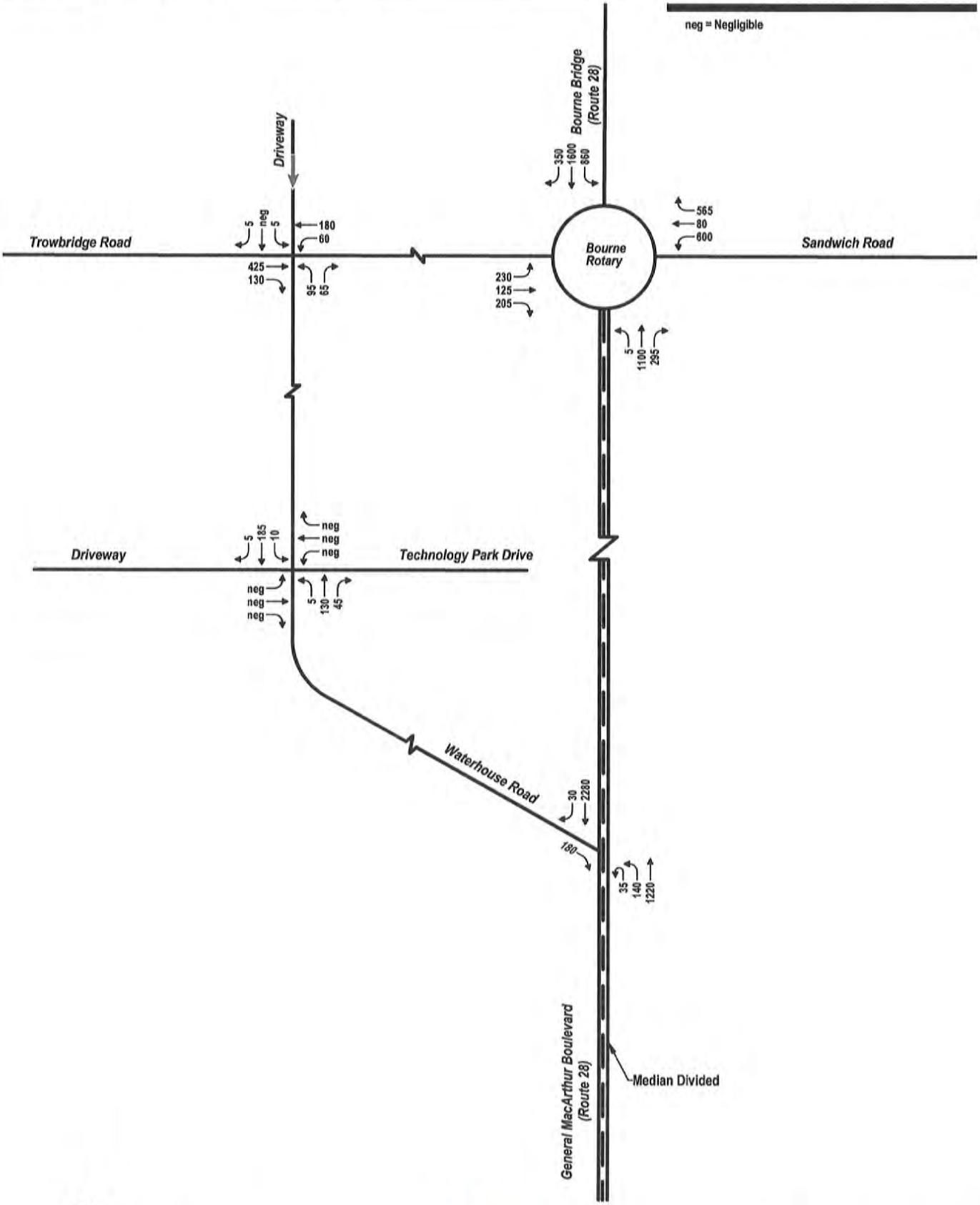
Trip Distribtuion

Figure 8

Proposed Office Building
Bourne, Massachusetts



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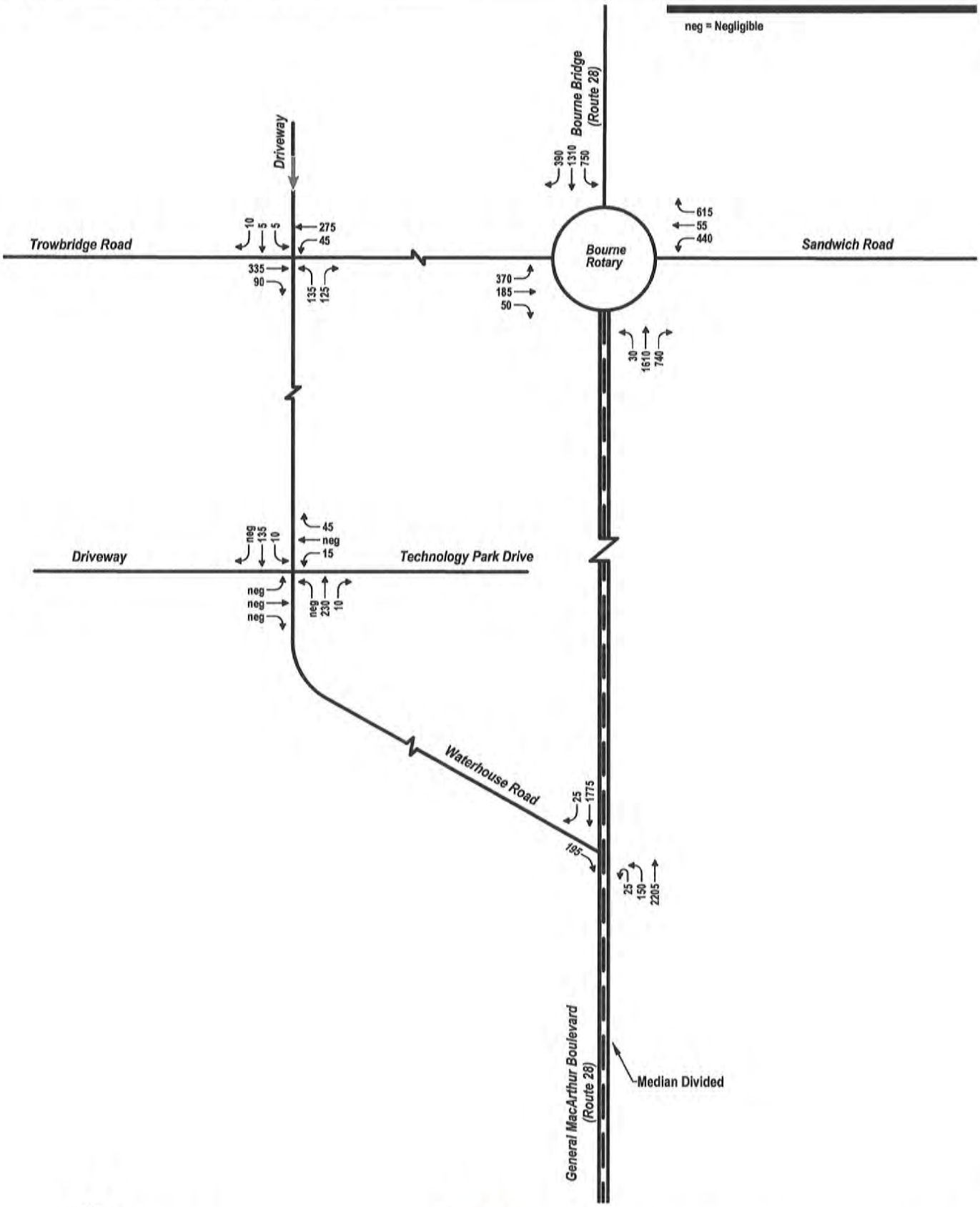
2023 Build Conditions - Peak Weekday Morning Peak Hour Volumes
Proposed Office Building
Bourne, Massachusetts

Figure 9



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2023 Build Conditions - Peak Weekday Evening Peak Hour Volumes
Proposed Office Building
Bourne, Massachusetts

Figure 10

4

Traffic Operations Analysis

Measuring existing traffic volumes and projecting future traffic volumes quantifies traffic within the study area. To assess quality of flow, roadway capacity analyses were conducted with respect to the 2016 Existing conditions and projected 2023 No-Build and 2023 Build traffic volume conditions. Capacity analyses provide an indication of the adequacy of the roadway facilities to serve the anticipated traffic demands. In accordance with CCC guidelines, capacity analyses were conducted for both peak summer season and average month traffic conditions. The analysis summary tables provided in this chapter contain the results of the peak summer season analyses. All average month capacity analyses and corresponding summary tables are contained in the Appendix to this document.

Level-of-Service and Delay Criteria

Level-of-service (LOS) is the term used to denote the different operating conditions that occur on a given roadway segment under various traffic volume loads. It is a qualitative measure of the effect of a number of factors including roadway geometrics, speed, travel delay, freedom to maneuver, and safety. Level-of-service provides an index to the operational qualities of a roadway segment or an intersection. Level-of-service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions.

For this study, capacity analyses were completed for the unsignalized and rotary study area intersections, and roadway segments. Level-of-service (LOS) designation is reported differently for signalized intersections, unsignalized intersections, and roadway segments. For unsignalized and rotary intersections, the analysis assumes that traffic on the mainline is not affected by traffic on the side streets. The LOS is determined primarily for left-turns from the main street and all movements from the minor street. The evaluation criteria used to analyze the unsignalized study area

intersections is based on the 2010 Highway Capacity Manual (HCM)[2]. For roadway segments, the roadway geometrics determine the segment capacity and the percent of traffic that have the ability to travel at or near the posted speed limit is used to assess level-of-service. The evaluation criteria used to analyze the study area roadway segments is based on the 2010 Highway Capacity Manual (HCM).

Level-of-Service Analysis

Levels-of-service analyses were conducted for the 2016 Existing, 2023 No-Build, and 2023 Build conditions for the unsignalized and rotary study-area intersections.

Unsignalized Intersection and Rotary Capacity Analyses

The analytical methodologies typically used for the analysis of unsignalized intersections use conservative analysis parameters, such as high critical gaps[3]. Actual field observations indicate that drivers on minor streets generally accept smaller gaps in traffic than those used in the analysis procedures and therefore experience less delay than reported by the analysis software. Consequently, the analysis results tend to overstate the actual delays experienced in the field. For this reason, the results of the unsignalized intersection analyses should be considered highly conservative.

Table 8 presents a summary of the capacity analyses for the unsignalized intersections in the study area, and Table 9 presents a summary of the capacity analyses for the Bourne Rotary location. The capacity analyses worksheets are included in the Appendix to this document.

Unsignalized Intersection Capacity Analysis

The analysis summary in Table 8 indicates that a number of the stop and yield controlled movements within the study area currently operate at unacceptable levels of service under existing conditions, including movements at the intersections of Route 28 at Waterhouse Road and Waterhouse Road at Trowbridge Road. These intersections are expected to continue to operate at failing levels of service with or without the proposed project. The intersection of Waterhouse Road at Technology

2 Transportation Research Board, Highway Capacity Manual, Washington, D.C., 2010.
3 'Critical gap' is defined as the minimum time, in seconds, between successive major-stream vehicles, in which a minor-street vehicle can make a maneuver

Park Drive currently operates at acceptable levels of service and is expected to continue to operate at acceptable levels of service under all future Build conditions. None of the unsignalized critical movements are expected to degrade in LOS as a result of the proposed project.

Rotary Capacity Analysis

The analysis summary in Table 9 indicates that the yield controlled movements within the rotary currently operate at unacceptable levels of service, with long delays and queues. Field observations indicated that although the rotary does experience significant delays and queuing during the peak periods, the SYNCHRO analysis may be overstating some of the congestion. All approaches at the rotary are expected to continue to operate at unacceptable levels of service under all future conditions, with or without the project. Only minor increases in delay and queue are anticipate due to the project.

Table 8 Unsignalized Intersection Capacity Analysis – Peak Summer Season

		2016 Existing Conditions					2023 No-Build Conditions					2023 Build Conditions				
Location	Movement	D [a]	v/c [b]	Del [c]	LOS [d]	95 Q [e]	D	v/c	Del	LOS	95 Q	D	v/c	Del	LOS	95 Q
General MacArthur Boulevard (Route 28) at Waterhouse Drive North																
Weekday Morning	NB L	150	>1.20	>120	F	378	165	>1.20	>120	F	390	175	>1.20	>120	F	418
Weekday Evening	NB L	165	0.71	48	E	120	175	0.91	89	F	185	175	0.91	89	F	185
General MacArthur Blvd (Route 28) at Waterhouse Drive South																
Weekday Morning	EB R	170	>1.2	>120	F	315	180	>1.20	>120	F	300	180	>1.20	>120	F	300
Weekday Evening	EB R	165	0.86	64	F	185	185	0.81	61	F	155	195	0.86	68	F	173
Waterhouse Road at Technology Drive and Driveway																
Weekday Morning	EB L/T/R	Neg.	0.01	12	B	0	Neg.	0.00	11	B	0	Neg.	0.00	12	B	0
	WB L/T/R	Neg.	0.00	0	A	0	Neg.	0.00	0	A	0	Neg.	0.00	10	A	0
	NB L	5	0.01	8	A	0	5	0.00	8	A	0	5	0.00	8	A	0
	SB L	10	0.01	8	A	0	10	0.01	8	A	0	10	0.01	8	A	0
Weekday Evening	EB L/T/R	Neg.	0.00	0	A	0	Neg.	0.00	0	A	0	Neg.	0.00	0.0	A	0
	WB L/T/R	25	0.05	10	B	5	25	0.04	10	B	3	60	0.09	11	B	8
	NB L	Neg.	0.00	0	A	0	Neg.	0.00	0	A	0	Neg.	0.00	0	A	0
	SB L	10	0.01	8	A	0	10	0.01	8	A	0	10	0.01	8	A	0
Waterhouse Road at Trowbridge Road																
Weekday Morning	WB L	60	0.08	9	A	8	60	0.07	9	A	5	60	0.07	9	A	5
	NB L/T/R	150	0.76	49	E	143	160	0.56	21	D	80	160	0.56	31	D	80
	SB L/T/R	10	0.06	18	C	5	10	0.04	16	C	3	10	0.04	16	C	3
Weekday Evening	WB L	45	0.05	8	A	3	45	0.05	8	A	3	45	0.05	8	A	3
	NB L/T/R	215	0.77	42	E	155	240	0.72	36	E	135	260	0.75	38	E	150
	SB L/T/R	20	0.09	16	C	8	20	0.06	16	C	5	20	0.06	16	C	5

a. Demand of critical movement.
b. Volume to capacity ratio.
c. Average total delay, in seconds per vehicle.
d. Level-of-service.
e. 95th percentile queue, in vehicles.

Table 9 Rotary Capacity Analysis – Peak Summer Season

		2016 Existing Conditions					2023 No-Build Conditions					2023 Build Conditions				
Location	Movement	D [a]	v/c [b]	Del [c]	LOS [d]	95 Q [e]	D	v/c	Del	LOS	95 Q	D	v/c	Del	LOS	95 Q
Bourne Rotary (Route 28/ Trowbridge Road/ Sandwich Road)																
Weekday	EB L/T/R	540	>1.20	>120	F	1750	560	>1.20	>120	F	1725	560	>1.20	>120	F	1725
Morning	WB L/T/R	1180	>1.20	>120	F	3250	1235	>1.20	>120	F	3175	1245	>1.20	>120	F	3200
	NB L/T	635	>1.20	>120	F	1250	660	>1.20	>120	F	1250	660	>1.20	>120	F	1250
	NB T/R	715	>1.20	>120	F	1450	740	>1.20	>120	F	1450	740	>1.20	>120	F	1450
	SB L/T	1270	>1.20	>120	F	2550	1315	>1.20	>120	F	2800	1320	>1.20	>120	F	2825
	SB T/R	1430	>1.20	>120	F	3000	1485	>1.20	>120	F	3275	1490	>1.20	>120	F	3325
Weekday	EB L/T/R	550	>1.20	>120	F	1400	585	>1.20	>120	F	1600	605	>1.20	>120	F	1650
Evening	WB L/T/R	1075	>1.20	>120	F	2850	1110	>1.20	>120	F	3150	1110	>1.20	>120	F	3150
	NB L/T	1080	>1.20	>120	F	2475	1120	>1.20	>120	F	2750	1120	>1.20	>120	F	2750
	NB T/R	1220	>1.20	>120	F	2825	1260	>1.20	>120	F	3150	1260	>1.20	>120	F	3150
	SB L/T	1110	>1.20	>120	F	1625	1150	>1.20	>120	F	1850	1150	>1.20	>120	F	1850
	SB T/R	1255	>1.20	>120	F	2025	1300	>1.20	>120	F	2275	1300	>1.20	>120	F	2275

a. Demand of critical movement.
b. Volume to capacity ratio.
c. Average total delay, in seconds per vehicle.
d. Level-of-service.
e. 95th percentile queue, in vehicles.

Roadway Segment Capacity Analysis

Capacity analyses were conducted for the six multilane roadway segments and three two lane roadway segments identified in the study area using HCS Multilane Highways and HCS Two Lane Highways, respectively. Capacity analyses were conducted for 2016 Existing conditions, 2023 No-Build conditions, and 2023 Build conditions. The results of the peak summer season conditions are shown in Tables 10 and 11. The capacity analyses worksheets are included in the Appendix to this document.

Table 10 Multilane Roadway Segment Capacity Analysis – Peak Summer Season

		2016 Existing Conditions		2023 No-Build Conditions		2023 Build Conditions	
Roadway Segment	Direction	D [a]	LOS [b]	D	LOS	D	LOS
Route 28 between Bourne Bridge Rotary and Waterhouse Road							
Weekday Morning	Northbound	n/a	F	n/a	F	n/a	F
	Southbound	n/a	F	n/a	F	n/a	F
Weekday Evening	Northbound	n/a	F	n/a	F	n/a	F
	Southbound	n/a	F	n/a	F	n/a	F

a. Density, passenger cars per mile per lane
b. Level-of-service.
n/a Demand exceeds capacity, density not calculated.

Table 11 Two Lane Roadway Segment Capacity Analysis – Peak Summer Season

		2016 Existing Conditions		2023 No-Build Conditions		2023 Build Conditions	
Roadway Segment	Direction	v/c [a]	LOS [b]	v/c	LOS	v/c	LOS
Waterhouse Road between Route 28 and Technology Park Drive							
Weekday Morning	Northbound	0.10	B	0.10	B	0.12	B
	Southbound	0.12	B	0.12	B	0.12	B
Weekday Evening	Northbound	0.14	B	0.16	B	0.16	B
	Southbound	0.11	B	0.12	B	0.13	B
Waterhouse Road between Technology Park Drive and Trowbridge Road							
Weekday Morning	Northbound	0.10	B	0.11	B	0.11	B
	Southbound	0.13	B	0.13	B	0.13	B
Weekday Evening	Northbound	0.15	B	0.17	B	0.18	B
	Southbound	0.10	B	0.10	B	0.10	B
Trowbridge Road between Waterhouse Road and Bourne Bridge Rotary							
Weekday Morning	Eastbound	0.35	D	0.36	D	0.36	D
	Westbound	0.27	D	0.28	D	0.28	D
Weekday Evening	Eastbound	0.35	D	0.37	E	0.39	E
	Westbound	0.30	D	0.30	D	0.30	D

a. Volume to capacity ratio.
b. Level-of-service.

As shown in Table 10, the Route 28 roadway segment operates at unacceptable levels of service under 2016 Existing condition during both peak hours. Under 2023 future conditions, the roadway segment is expected to continue to operate at failing levels of service, with or without the proposed project. As shown in Table 11, all roadway segments operate at LOS D or better under 2016 Existing conditions during both peak hours, with the Waterhouse Road segments operates at LOS B and the Trowbridge Road segment operate at LOS D. Under 2023 No-Build and 2023 Build conditions, the Waterhouse Road segments are expected to continue operating at LOS B or better during both peak hours. The eastbound Trowbridge Road segment is expected to degrade to LOS E during the weekday evening peak hour under both 2023 No-Build and Build conditions.

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Mitigation

The preceding analysis of the 2016 Existing conditions and projected future traffic demands in the 2023 No-Build and 2023 Build conditions indicate that traffic volumes during the peak-hours show very minor impacts within the study area.

The proposed project would involve the demolition of the existing structure and replacing it with the construction of a 27,210 sf office facility for Convention Data Services (CDS) who currently occupies office space in the immediate area. While the existing structure on the site was not completed or occupied, the steel frame and roof has been erected and the project had approval and building permit from the Town of Bourne. With that in mind, applying a traffic credit for the removal of the existing structure would be a reasonable approach of evaluating project impacts as the building could be finished and occupied at any time without CCC review. .

In terms of compliance with the RPP, there are three primary focus areas that may require traffic mitigation:

- Goal TR1: Safety
- Goal TR2: Trip Reduction/Transportation Balance and Efficiency
- Goal TR3: Level of Service/Congestion Management

The mitigation responsibilities of the project for each RPP Goal are identified below.

Safety

As discussed in Chapter 2, VHB provided a summary of the vehicular crash history for the study area locations. As stated in Minimum Performance Standard (MPS) TR1.3

*"**Identification of Safety Impacts**: The applicant shall identify safety impacts at road and intersection locations with three or more crashes per year where the project is*

expected to add 25 or more peak-hour trips. If applicable, funds to implement safety improvements shall be deducted from the transportation mitigation payment. The applicant shall be required to implement the needed safety improvements as determined by the Commission prior to obtaining a final Certificate of Compliance and shall be responsible for the safety improvements even if the cost of these safety improvements exceeds the transportation mitigation payment amount. Remaining transportation funds shall be paid to the County of Bourne, prior to obtaining a final Certificate of Compliance, to be used for transportation-related purposes within the area affected by the DRI. All measures to mitigate safety impacts shall be consistent with Goal TR3 and its supporting Minimum Performance Standards."

As indicated in the MassDOT crash data presented in Table 2, two of the study area intersections averaged three or more crashes per year, the Bourne Rotary and Route 28 at Waterhouse Road. MassDOT conducted a Road Safety Audit (RSA) in April 2013 for Route 28 between the Bourne Rotary and Otis Rotary, a study area that is inclusive of these two locations. Mass-DOT is currently in the process of implementing some short-term improvements including safety improvements, Real Time Traffic Monitoring (RTTM) system and variable message boards on Route 28.

The proponent is proposing to provide an updated safety analysis of these two locations as a follow-up to MassDOT's RSA. This safety analysis would include an assessment what effect the short term safety improvements MassDOT is implementing have had on crashes at these locations. The safety analysis would be provided as a three year follow-up to the improvements that are currently being implemented.

Trip Reduction Mitigation

As stated in MPS TR2.1:

*"**Trip Reduction Outside Growth Incentive Zones or Economic Centers**: DRIs located outside Growth Incentive Zones or Economic Centers, or DRIs in towns without designated Economic Centers shall implement adequate and acceptable measures to reduce and/or offset 25 percent of the expected increase in site traffic resulting from the DRI on a daily basis. Examples of acceptable trip-reduction plans to reduce site traffic are available in the Cape Cod Commission Guidelines for Transportation Impact Assessment, Technical Bulletin 96-003, Revised January 9, 2003, as amended."*

As discussed in Chapter 3 *Future Conditions*, the Proponent will be implementing a robust telecommuting policy as part of their existing Transportation Demand Management (TDM) program. Based upon a comparison of ITE trip generation projections and actual driveway counts, this program has effectively reduced the amount of vehicular trips to and from the site by approximately 51 percent over the

course of a typical weekday. Given the 51 percent success rate for the proposed TDM program, the proposed project is expected to far exceed the requirement of MPS TR2.1. The existing TDM measures and the plans to expand them are described below.

Transportation Demand Management

The goal of the TDM plan is to reduce the project's overall traffic impact through the implementation of measures that are aimed at minimizing the use of single-occupancy vehicles. The Proponent will implement a number of measures that will contribute toward the reduction of vehicular traffic to and from the site. The following text describes in detail the project's Transportation Demand Management program.

Telecommuting

The proponent has indicated that a number of their employees are allowed to work from home up to two days a week, and nearly all of the employees take advantage of this opportunity. Additionally, a small number of employees work remotely full time and do not travel to the office on a regular basis. CDS has indicated that of the 162 employees, 28 employees are located out of state and/or work remotely on a full time bases. Of the 134 local employees in the Bourne office, approximately 25 employees work from home one day a week (or 20 percent of the time) and 75 employees work from home two days a week (or 40 percent of the time).

Ridesharing

The Proponent will promote ridesharing to its employees via car pools. Information regarding carpooling and its benefits will be distributed to all employees, interested carpooler names will be posted in the employee area. Preferential parking spaces will be designated for employees that rideshare.

Public Transit

To encourage the use of transit by employees to the site as well as guests wishing to travel to the Outer Cape, transit schedule and route information will be provided in the employee areas.

Bicycle and Pedestrian Measures

Bicycling and walking to the project site may be attractive to some employees and guests may choose to walk/bike to/from work or travel to local attractions during the day. To facilitate pedestrian access to the site, sidewalks will be constructed from the proposed building to Waterhouse Road, connecting into the existing sidewalk on the east side of Waterhouse Road. Additionally, secure bicycle storage racks will be provided near building entrances.

On Site Amenities

The proposed site will be a modern office facility constructed with amenities that are expected in today's market. The proposed building will include indoor and outdoor lunch/café space and refrigerator storage for employee lunches that will reduce off-side trips for the lunch hour. In addition, the site will include an outdoor sport court that will be exclusively for use by employees of the proposed building. . These amenities will help reduce the need for employees to travel offsite, thereby minimizing midday trip making.

Congestion

As stated in MPS TR3.1:

DRI's shall provide for full mitigation of adverse impacts on all road links, and at all intersections that are used by the DRI, including but not limited to bridges, intersections, rotaries., roundabouts, interchanges, and U-turns where the DRI is expected to increase peak-hour traffic after traffic adjustments in compliance with the Minimum Performance Standards supporting Goal TR2. At all adversely impacted locations, mitigation shall be proposed and funded to maintain year round level of service at no-build conditions as measured by travel speeds, control delay, density, and/or flow rate as defined by Highway Capacity Manual 2000 or it successor document.

As outlined in Tables 8,9,10, and 11 the project will have negligible impacts on congestion within the study area. A building structure exists at the site today which is fully permitted and could be finished and occupied at any time thereby generating traffic. If traffic credit were taken for the removal of this structure the traffic projections would be at a level that would not require congestion mitigation. In

addition, based on the additional TDM measures which are proposed, but for which no credit has been conservatively taken, the peak hour trips would be further reduced. Even without the traffic credit, the congestion trips are only marginally over the 25 peak hour trip threshold (32 trips weekday morning, and 37 trips weekday evening). The proposed project will implement an exemplary TDM program that will be the model for other office developments on the cape. The project can and will proceed without adding a single driveway to the regional roadway system. The project is addressing the safety consideration under the TR 1. In consideration of all of these factors, together with the fact that all of the trip generation questions on the scoping checklist do not results in shaded boxes being checked, the Proponent is respectfully requesting that the proposed project be exempted from any congestion mitigation or, in the alternative, flexibility to wave the congestion mitigation requirements of the project as they are not commensurate with the impact of the project..

Table 11 Mitigation Plan Cost Summary

Mitigation Action	Description	Approximate First Year Cost *	Approximate Annual Cost
Transportation Demand Management Program	Ridesharing program Bicycle/Pedestrian amenities (with transit stop on site and shuttle to HTC)	$50,000	$10,000
Safety Improvements (MPS TR1.1)	Mitigation measures at 2 locations:	$15,000	NA
Total Program Cost		**$65,000**	**$10,000**

* The costs provided in Table 11 are estimates and may need to be modified during the review process. Cost estimates, specific mitigation commitments, and allocation of funds are subject to change based on CCC Staff review.

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Conclusion

VHB, Inc. has prepared a traffic impact and access study (TIAS) for the proposed office building. Access to the site would be provided by Technology Park Drive, with a proposed extension of the roadway to meet the parking lot for the proposed site.

Based on a review of the anticipated trip generation and trip distribution for the proposed project, a study area was established. The study area was established also in part based on a review of the RPP and the RPP Functional Classification of Cape Cod Roadways Map. Using this approach, the project study area will include the following four intersections and four roadway links:

Intersections:

- Bourne Rotary (Route 28/ Trowbridge Road/ Sandwich Road)
- Route 28 at Waterhouse Road
- Trowbridge Road at Waterhouse Road/ Driveway
- Waterhouse Road at Technology Park Drive (Site Driveway)/ Driveway

Roadway Links:

- Route 28 between Bourne Rotary and Waterhouse Road
- Waterhouse Road between Route 28 and the Site Driveway
- Waterhouse Road between the Site Driveway and Trowbridge Road
- Trowbridge Road between Waterhouse Road and Bourne Rotary

Turning movement counts (TMC), collecting *peak hour* data, were conducted at each of the study area intersections during the weekday morning peak period from 7:00 AM to 9:00 AM and weekday evening peak period from 4:00 PM to 6:00 PM in April 2016. Concurrent with the TMCs, 24-hour automatic traffic recorder (ATR) counts were conducted at the following two locations:

- Route 28, north of Waterhouse Road
- Waterhouse Road, north of Technology Park Drive

The proposed project is expected to result in a total of 154 net new trips (77 entering/77 exiting) on a typical weekday. The proposed project is expected to result in a total of 32 net new vehicle trips (29 entering/3 exiting) during the weekday morning peak hour and 37 net new vehicle trips (5 entering/32 exiting) during the weekday evening peak hour.

Capacity analyses were conducted for each of the study area intersections and roadway segments under 2016 Existing conditions, 2023 No-Build conditions (without the proposed development), and 2023 Build conditions (with the proposed development). Based on the results of these analyses and the anticipated site-generated traffic, the proponent will implement the following measures:

- Transportation Demand Management Program
- Intersection safety work at:
  - Bourne Rotary
  - Route 28 at Waterhouse Road

Overall, VHB concludes that the implementation of the above-mentioned mitigation measures offsets the potential traffic increases associated with the Project and provides funds to improve the transportation infrastructure within the Town in the future.

The Proponent is filing for limited DRI review. Using the Redevelopment Scoping Checklist, the <u>only</u> question where the proposed project results in a shaded response is that it directly abuts a regional roadway. However, as described herein, no access/egress is proposed on MacArthur Boulevard, and no new access/egress points are proposed on Waterhouse Road. As to the other questions, the proposed project does not generate more than 250 new daily trips. In addition, as to the last scoping checklist question, the project will not generate more than 25 peak hour trips at a high crash location. As described in this Report, there are only two high crash locations within the proposed project study area: (1.) Bourne Rotary and (2.) Route 28 at Waterhouse Road. At the Bourne Rotary, the proposed project will generate 21 trips during the AM Peak Hour and 25 trips during the PM Peak Hour. At Route 28 / Waterhouse Road, the proposed project will generate 10 AM Peak Hour trips and 10 PM Peak Hour Trips. Therefore, as indicated on the scoping checklist, the proposed project will <u>not</u> generate more than 25 peak hour trips at a high crash location. Based on these responses, the proposed project may be exempted from DRI review for traffic altogether. However, as described in this Report, the Proponent is prepared to undertake the safety improvements described herein and is committed to a model TDM plan.

TRANSPORTATION

Minimum Performance Standards for All DRI's

	Minimum Performance Standard		How the proposal meets the minimum performance standard
TR0.1	**Source(s) of Trip-generation Data:** For the purpose of DRI review and analysis, trip-generation data from the Institute of Transportation Engineers shall be used as the preferred source. A project-specific trip-generation study may be used at the discretion of the Cape Cod Commission. In the event the applicant elects to complete a project-specific trip-generation study, traffic counts from existing development shall be collected and submitted using the methodology identified in the Cape Cod Commission Guidelines for Transportation Impact Assessment, Technical Bulletin 96-003, Revised January 9, 2003, as amended.		All trip generation calculations were based on ITE data and standard procedures.
TR0.2	**Traffic Credit for Past Uses:** For analysis and mitigation purposes a traffic credit may be allowed, at the discretion of the Commission, for past uses on the site of the DRI based on the estimated average daily and peak hour trip generation of the immediate prior use. Outside of Economic Centers or in towns without designated Economic Centers, a Redevelopment/Change of Use shall not be eligible for traffic credit if the previous use has been discontinued or vacated for five or more consecutive years. Traffic counts to establish credits from existing development shall be collected and submitted using the methodology identified in the Cape Cod Commission Guidelines for Transportation Impact Assessment, Technical Bulletin 96-003, Revised January 9, 2003, as amended.		No traffic credit is being taken for any past uses.
TR0.3	**Permits for Roadwork prior to Construction:** All necessary approvals and permits from federal, state and/or local government agencies for transportation mitigation or DRI site access and egress shall be obtained and copies submitted to the Cape Cod Commission prior to the issuance of a preliminary Certificate of Compliance for the DRI.		Documentation of all required permits will be submitted to the CCC when they are issued.
TR0.4	**Alternative Method for Compliance within Economic Centers:** For DRIs located within Economic Centers, the applicant may choose to meet certain trip-reduction and congestion standards of the RPP as identified in this MPS by making a payment of funds based on the DRI's daily or peak-hour trip generation. The applicant may elect to pay either $500 per daily trip or $5,000 per peak-hour trip as determined by MPS TR0.1 to mitigate all trip-reduction and congestion impacts (the "transportation mitigation payment"). Compliance with the requirements of MPS TR0.4 shall be in lieu of compliance with Minimum Performance Standards TR2.10, TR2.11, TR2.13, TR3.4, TR3.5, TR3.6, TR3.7, TR3.8 and TR3.9. Funding for and implementation of any access/egress or on-site mitigation/improvements required of the DRI shall be the responsibility of the applicant and be in addition to the requirements of MPS TR0.4. For towns without designated Economic Centers, DRIs shall comply with all trip-reduction and congestion Minimum Performance Standards. Funds collected for congestion mitigation shall be used to support projects or strategies that encourage alternatives to automobile travel consistent with MPS TR3.12 or to support actual expansion of roadway capacity including but not limited to planning, engineering, permitting, and construction. Such funds shall be used within the town in which the development is located or shall be divided between towns based on the development's impact area. The determination of how these funds are utilized shall be determined by the town impacted by the DRI, in consultation with Cape Cod Commission staff. Funds not accessed within 10 years of receipt may, at the Executive Director's discretion, be distributed to the Cape Cod Regional Transit Authority or successor agency(ies) to fund public transit on Cape Cod.		The proposed project is not located within an Economic Center.
TR0.5	**Incentive for Mixed Use in Economic Centers:** DRI transportation mitigation requirements as outlined in MPS TR2.2 (trip reduction), MPS 3.3 (traffic study requirements), and MPS TR3.4 (mitigation of congestion impacts) shall be waived for residential and/or office development above the first floor in areas that have been mapped as designated Economic Centers on the		The proposed project is not located within an Economic Center and is not a mixed use development.

	Regional Land Use Vision Map. For towns without designated Economic Centers, DRIs shall comply with all trip-reduction, traffic study, and mitigation of congestion impacts Minimum Performance Standards.		

Goal TR1: Safety

	Minimum Performance Standard		How the proposal meets the minimum performance standard
TR1.1	**No Degradation of Safety:** Regardless of project traffic generation, DRIs shall not degrade safety for pedestrians, bicyclists, or motor vehicle operators or passengers.		Mitigation proposed as part of the project is geared toward maintaining or improving the level of safety and operations within the study area.
TR1.2	**Crash Frequency at Key Locations:** Review of crash frequency over the most recent three years shall be required on all intersections of regional roads as well as at local road intersections with regional roads that are used by a project for access to the regional road network, where the DRI is expected to increase traffic by 25 vehicle		This crash data is summarized in Table 2 of the Traffic Impact and Access Study (TIAS).
TR1.3	**Identification of Safety Impacts:** The applicant shall identify safety impacts at road and intersection locations with three or more crashes per year where the project is expected to add 25 or more peak-hour trips. If applicable, funds to implement safety improvements shall be deducted from the transportation mitigation payment. The applicant shall be required to implement the needed safety improvements as determined by the Commission prior to obtaining a final Certificate of Compliance and shall be responsible for the safety improvements even if the cost of these safety improvements exceeds the transportation mitigation payment amount. Remaining transportation funds shall be paid to the County of Barnstable, prior to obtaining a final Certificate of Compliance, to be used for transportation-related purposes within the area affected by the DRI. All measures to mitigate safety impacts shall be consistent with Goal TR3 and its supporting Minimum Performance Standards.		There are two intersections within the study area that meet the safety threshold outlined. As discussed with CCC staff, improvements are being implemented at both locations by MassDOT and the Proponent will update the safety review of both intersection in two years, assuming that the project is approved, constructed, and operational to assess the effectiveness of said improvements.
TR1.4	**Standards for Driveway Construction:** All access and egress locations for DRIs shall meet local, county, and/or state and federal access management bylaws, technical bulletins, standards, and/or policies for driveway spacing and separation from the nearest intersections. Redevelopment projects that are unable to meet this standard and have no other roadway access shall meet spacing and separation distances to the greatest extent feasible. DRIs with frontage on more than one street shall be restricted to access and egress via the lower volume road when deemed appropriate by the Commission. The width of driveway and/or curb-cut openings to serve DRIs shall not exceed 12 feet per travel lane, except where deemed appropriate by the Commission. Driveway openings of more than 24 feet shall include a center pedestrian refuge island where deemed appropriate by the Commission.		The project is the buildout of a previously approved commercial subdivision and shares a common driveway with other commercial development. As such the access driveways are not being changed as part of this project.
TR1.5	**Route 6 Access/Egress:** To reduce safety conflicts between local and through traffic, DRIs located within limited-access portions of Route 6, as defined by the Massachusetts Highway Department, shall not be allowed to create new direct access or egress onto		No access/egress is proposed along Route 6.

	Route 6 in Bourne (Scenic Highway), Eastham, Wellfleet, Truro, or Provincetown unless no alternative access or egress is available. DRIs that utilize existing access or egress onto any of these sections of Route 6 shall be allowed provided that there is no increase in expected daily or peak-hour traffic volumes utilizing those driveways during the summer and provided the historic crash rate for the driveway does not exceed three crashes per year based on the most recent three-year crash history.		
TR1.6	**Sight-distance Obstructions:** Human-made objects such as signage, utility poles and boxes, and lighting to service DRIs shall be located to minimize visual obstruction and possible safety conflicts for the traveling public, including glare or other distractions for drivers, bicyclists, and pedestrians. New utility service and relocation of existing utility service shall be placed underground, where deemed feasible and appropriate by the Commission. Further, landscaping and plantings shall be selected and placed in a manner that does not create obstructions to safe sight distances for motorists, bicyclists, and pedestrians.		The existing egress driveway will remain unchanged as part of the proposed project. There are currently not obstructions in the sight distance.
TR1.7	**Bicyclists and Pedestrians Safety and Access/Egress Requirements:** Site planning and access/ egress for DRIs shall minimize adverse impacts on the adjacent road system and shall adequately and safely accommodate all users including pedestrians, bicyclists, and motorists. DRIs with drive-up windows shall be designed to confine the maximum expected vehicle queue on site to not interfere with traffic on public roadways.		The proposed site layout includes sidewalk and pedestrian crosswalks. In addition, the Proponent is proposing a sidewalk connection from the building to the street.
TR1.8	**Sight-distance Requirements:** Acceptable sight distances shall be met and maintained at all access and/or egress locations for DRIs regardless of project traffic generation. At a minimum, sight distances shall meet the stricter of the Massachusetts Highway Department and American Association of State Highway Transportation Officials guidelines for safe-stopping sight distances.		Available intersection sight distance in both directions along the Waterhouse Road exceeds minimum requirements based on AASHTO.
TR1.9	**Mitigation Timing:** Transportation mitigation to address or offset safety concerns at a minimum shall occur prior to issuing a Final Certificate of Compliance for the DRI.		The proposed mitigation measures will be completed prior to site occupancy. The exception to this is the safety improvements which needs to be completed after two years to assess the change in safety operations.
	Best Development Practices		How the proposal addresses the best development practices
TR1.10	**Transportation Safety:** DRIs are encouraged to promote and assist in improving transportation safety on Cape Cod.		The mitigation commitments outlined in TIAS are geared toward improving safety within the study area where applicable.
TR1.11	**Curb Cuts:** DRIs are encouraged to minimize, eliminate, and/or consolidate curb cuts.		The site access driveways will not change as a result of this project. Under existing conditions there is single driveway to the site. The proposed project does not add a driveway to the regional roadway system.

Goal TR2: Trip Reduction/Transportation Balance and Efficiency

	Minimum Performance Standard		How the proposal meets the minimum performance standard
TR2.1	**Trip Reduction Outside Growth Incentive Zones or Economic Centers:** DRIs located outside Growth Incentive Zones or Economic Centers, or DRIs in towns without designated Economic Centers shall implement adequate and acceptable measures to reduce and/or offset 25 percent of the expected increase in site traffic resulting from the DRI on a daily basis. Examples of acceptable trip-reduction plans to reduce site traffic are available in the Cape Cod Commission Guidelines for Transportation Impact Assessment, Technical Bulletin 96-003, Revised January 9, 2003, as amended.		The project is not located within a designated economic center. As outlined in the TIA, the proposed project will exceed the 25% trip reduction requirements of the RPP by implementation of aggressive TDM measures including work from home option for employees.
TR2.2	**Trip Reduction Inside Growth Incentive Zones or Economic Centers:** DRIs located within Growth Incentive Zones or Economic Centers shall implement adequate and acceptable measures to reduce and/or offset 12.5 percent of the expected increase in site traffic resulting from the development on a daily basis. Examples of acceptable trip-reduction plans to reduce site traffic are available in the Cape Cod Commission Guidelines for Transportation Impact Assessment, Technical Bulletin 96-003, Revised January 9, 2003, as amended. DRIs in towns without designated Economic Centers shall comply with MPS TR2.1.		The project is not located within a designated economic center therefore this performance standard does not apply.
TR2.3	**Interconnections:** DRIs shall implement procedures to allow connections (vehicular and pedestrian) between parcels to minimize curb cuts, driveways, and vehicle turning maneuvers. DRIs shall provide vehicular and pedestrian connections on the project site and connect to the adjacent property if an interconnect agreement can be reached. The DRI shall agree to allow a future connection if an agreement cannot be reached with the adjacent property owner at this time.		There are no interconnections available to this project.
TR2.4	**Incentives for Connections between Adjacent Properties:** DRIs that allow for site traffic to travel conveniently and safely to adjacent properties without traveling on or crossing a public way or that allow for mixed-use development that minimizes dependence on automobile travel shall be allowed a 10-percent traffic credit apportioned between the two properties or, if greater, a traffic credit as outlined in the Institute of Transportation Engineers Trip Generation Handbook, October 1998, or another acceptable methodology subject to Commission approval.		The proposed office building is part of a commercial subdivision that enjoys a single access with two other commercial developments. Therefore under the plan, the site will have direct connection to the two other commercial buildings without having to travel on the public street.
TR2.5	**Estimating Trip Reduction:** The estimates of the number of trips reduced through proposed trip-reduction measures including trip-reduction support measures, transportation services, economic incentives, and locating on a transit line shall be based on an analysis that is accepted and approved by the Commission based upon the methodology provided by the Cape Cod Commission Guidelines for Transportation Impact Assessment, Technical Bulletin 96-003, as amended.		The initiatives proposed as part of the TDM program for the project are consistent with Technical Bulletin 96-003.

TR2.6	**Bus Stops, Turn-outs, and Shelters:** Where appropriate, the Commission may require construction of a bus stop and/or bus turn-out and/or bus shelter as part of DRI approval either internal to the property or along the property's roadway frontage.		There is currently no transit line that exists past the site driveway. The nearest route, "The Bourne Run" travels on Trowbridge Road and the nearest stop is approximately 1.2 miles from the site..
TR2.7	**Bicycle and Pedestrian Accommodations:** DRIs shall accommodate the needs of bicyclists, pedestrians, and other non-automobile users in site planning and roadway and/or intersection changes. Site design shall minimize motor vehicle interaction with bicycles and pedestrians while accommodating pedestrian and bicycle access and circulation.		The proposed site layout includes bike racks that can accommodate up to 10 bikes.
TR2.8	**Preservation of Frontage:** Where deemed appropriate by the Commission, DRIs shall provide appropriate rights-of-way along their street frontage to accommodate expected needs for bicycle and pedestrian accommodation and/or relocation of utilities. DRIs shall also provide for pedestrian and bicyclist connections across their property to allow for possible future connections with adjoining properties, where necessary. Construction of bicycle and pedestrian sidewalks, paths and/or connections may be required by the Commission.		The proposed project is the build-out of a commercial subdivision and has not direct frontage to the public street. The Proponent is proposing a side walk connection to the public street that will provide access to adjacent site.
TR2.9	**Parking Spaces:** The maximum parking allowed for DRIs shall be no more than the minimum number of spaces required by the town(s) in which the DRI is located unless, in the Commission's discretion, a greater number of spaces are justified by a parking analysis accepted by the Commission.		The proposed parking supply based on local requirements is 153 parking spaces. The total proposed parking supply is 153 parking spaces, which is what is required locally.
TR2.10	**Acceptable Trip-reduction Strategies:** To meet the requirements of Goal TR2 and the applicable Minimum Performance Standards, DRIs may, at the applicant's option, utilize the following strategies to meet the portion of the trip-reduction requirements not otherwise met: (a) Cash payment: Payment of funds per expected daily trip to be reduced or offset. The amount of payment shall be calculated based upon the estimated cost of funding for alternatives to automobile transportation or the estimated cost of vacant developable land within the town in which the project is located and shall be subject to Commission approval. The amount of payment shall also be commensurate with the number of vehicle trips to be reduced or offset. (b) Project-specific strategies: Implementation and/or construction of measures to reduce vehicular travel. (c) Any combination of (a) and (b).		The proposed project involves project-specific strategies including common TDM measures such as bicycle/pedestrian amenities, ridesharing, and on-site services to reduce the need for patrons and employees to leave the site to conduct everyday tasks. In addition, the Proponent is offering an aggressive telecommuting policy that will substantially reduce traffic to the site beyond that of the 25% trip reduction requirement. .
TR2.11	**Other Trip-reduction Strategies:** To meet the requirements of Goal TR2 and the applicable Minimum Performance Standards, the Commission may, at its discretion, allow DRIs to utilize the following strategies to meet the portion of the trip-reduction requirements not otherwise met: (a) Preserve land: The conservation of vacant developable land, in excess of other RPP open space requirements, as permanent open space. Examples of acceptable vacant developable land and the trip credit calculations are available in the Cape Cod Commission Guidelines for Transportation Impact Assessment, Technical Bulletin 96-003, Revised January 9, 2003, as amended. (b) Remove existing development: The removal of existing development and conservation of the land as		The trip-reduction strategies are outlined in response to TR2.10 and are discussed in more detail in TIAS.

	permanent open space, in excess of other RPP open space requirements; the development must be removed and the land returned to a natural and/or landscaped state, as determined by the Commission. (c) A payment of funds per expected daily trip to be reduced or offset. The funds shall be used to support alternatives to automobile travel in the town within which the project is located, including but not limited to traffic monitoring, planning, design, engineering, acquisition, implementation, marketing, and operation or the purchase of vacant land for protection of open space in excess of other RPP or municipal requirements. The amount of payment per daily trip to be reduced shall be based upon the estimated cost of funding for alternatives to automobile transportation or the estimated cost of developable land within the town in which the project is located. The amount of payment shall also be commensurate with the number of vehicle trips to be reduced or offset. (d) Any combination of (a), (b), or (c). Specifics regarding location of land to be preserved and estimating trip-reduction value: The land shall be located within the town(s) containing the DRI and shall be appropriately development restricted to protect the trip-reduction benefit. The trip-reduction credit for all options above shall be calculated by the Commission based on the estimated amount of net traffic that the proposal will remove taking into consideration size, location, zoning, accessibility, current land use, any trip-generation data available for existing developments, and future land use. In deciding whether to allow land as a traffic mitigation strategy, the Commission may consider but is not limited to issues of enforceability of land restrictions, whether the land is within a Growth Incentive Zone or designated Economic Center, current adjacent land uses, town zoning and plans, input from local and state officials, and overall land-use goals in the RPP.		
TR2.12	**Trip-generation Credit:** The Commission may allow a DRI to exceed the requirements of this section and receive a corresponding reduction in trip generation for the purpose of meeting MPS TR3.5.		As outlined in the TIA, payment for trips below the 25 trip threshold is not proposed.
TR2.13	**Inflation Factor:** Where deemed appropriate by the Commission, an annual inflation rate, determined at the time of the DRI decision, shall be applied to any trip-reduction payment amounts. The period of increase shall be from the date of the Commission DRI decision until the funds are paid. Guidance on the inflation rate can be found in the Cape Cod Commission Guidelines for Transportation Impact Assessment, Technical Bulletin 96-003, as amended.		Does not apply in this case as no payment for trip reduction is being proposed.
TR2.14	**Uses of Trip-reduction Funds:** Funds collected for trip reduction shall be used only to support projects or strategies that encourage alternatives to automobile travel. These include but are not limited to planning, design, or construction of alternatives to automobile travel such as bicycle paths and sidewalks; supporting, marketing, or promoting transit or shuttle services; the purchase of land for the creation of bicycle or pedestrian ways; the purchase of land capable of generating trips and the preservation of such land in a way that permanently prohibits trip generation; and/or the monitoring of traffic volumes, speeds, and vehicle classification.		Does not apply in this case as no payment for trip reduction is being proposed

	Such funds shall be used within the town in which the development has impacts or shall be divided between towns based on the DRI's impact area. Funds not accessed within five years of receipt may be, at the Executive Director's discretion after written notification to the town, distributed to the Cape Cod Regional Transit Authority or successor agencies to fund public transit on Cape Cod.		
	Best Development Practices		How the proposal addresses the best development practices
TR2.15	**Bike Racks and/or Storage:** All DRIs proposing industrial or commercial uses are encouraged to provide secure bicycle racks and/or storage within close proximity of a building entrance for five percent or more of all building users (measured at peak periods), and provide shower and changing facilities in the building or within 200 yards of a building entrance for one-half percent of Full-Time Equivalent occupants.		Secure bicycle storage will be provided on site to store up to 10 bicycles.
TR2.16	**Alternate Modes of Travel:** All DRIs are encouraged to include trip-reduction programs to encourage alternative modes of travel including carpooling, transit, bicycling, walking, and, where appropriate, working at home to reduce congestion, pollution, and energy usage; flexible work hours; and incentives for alternatives to automobile travel.		A number of these initiatives are proposed as part of this project including measures to facilitate travel via carpooling, transit, bicycling, and walking. In addition, telecommuting will be part of the TDM plan. The details of the proposed TDM program are provided in the TIAS.
TR2.17	**Buffers around Airports:** Regional and local airports are encouraged to maintain a buffer area to ensure current and future development is protected from noise, exhaust fumes, and loss of life or property.		Not Applicable (N/A)
TR2.18	**Rail and Marine Freight Shipment:** Rail and marine freight shipment to and from Barnstable County is encouraged as an alternative to truck freight shipments, when appropriate.		N/A
TR2.19	**Preferred Parking Spaces for Car/Van Pools:** DRIs proposing office or industrial uses are encouraged to provide preferred parking spaces for car pools and van pools, marked as such, for five percent of the total parking spaces and be located closer to building entrances than general-use parking spaces.		The proponent is amenable to providing preferential parking for carpoolers.
TR2.20	**Parking Structures:** Strategically located parking structures that serve several developments are encouraged where appropriate to serve Economic Centers and Growth Incentive Zones, provided such structures also comply with historic, community character, and environmental Minimum Performance Standards.		N/A
TR2.21	**Shared Parking:** DRIs are encouraged to share parking with adjacent uses to the maximum extent feasible.		Given the nature of the contained office building there are not opportunities for shared parking at this location.

Goal TR3: Level of Service/Congestion Management

	Minimum Performance Standard		How the proposal meets the minimum performance standard
TR3.1	**Operational Requirements:** Regardless of traffic volumes, Level of Service analysis shall be required at all access and/or egress points onto the road system for DRIs. All new access and/or egress onto the road system for DRIs shall operate at Level of Service C or better during the project's peak hour for a maximum of five years after project occupancy, except that Level of Service D or better shall be allowed for a minimum of five years after project occupancy for projects located within designated Economic Centers or Growth Incentive Zones. For towns without designated Economic Centers, the Level of Service C standard shall apply. For unsignalized driveways, the Level of Service standards shall be met for each turning or non-turning maneuver; for signalized driveways, the Level of Service standards shall apply to the overall intersection Level of Service.		The existing access driveway (Technology Drive) is projected to operate at LOS B or better during both peak summer and average season conditions. .
TR3.2	**Credit for Trip-reduction Mitigation:** For the purpose of meeting the requirements of Goal TR3 and the supporting Minimum Performance Standards, DRIs shall be allowed to reduce their estimated trip generation by 25 percent after compliance with all Minimum Performance Standards under Goal TR2.		Detailed calculation of the 25 percent trip reduction requirement for the proposed project is provided in the Appendix of the TIAS.
TR3.3	**Traffic Studies:** DRIs shall provide an appropriate traffic study in accordance with the Cape Cod Commission Guidelines for Transportation Impact Assessment, Technical Bulletin 96-003, as amended, as determined by the Commission in consultation with the town and the applicant. The traffic study shall identify and include analysis for the area impacted by the development. Guidance on providing a traffic study can be found in the Cape Cod Commission Guidelines for Transportation Impact Assessment, Technical Bulletin 96-003, as amended.		The TIAS submitted as part of this application has been prepared in accordance with Technical Bulletin 96-003.
TR3.4	**Mitigation of Congestion Impacts Required:** DRIs shall provide for full mitigation of adverse impacts on all road links, and at all intersections that are used by the DRI, including but not limited to bridges, intersections, rotaries, roundabouts, interchanges, and U-turns where the DRI is expected to increase peak-hour traffic after traffic adjustments in compliance with the Minimum Performance Standards supporting Goal TR2. At all adversely impacted locations, mitigation shall be proposed and funded to maintain year-round Level of Service at "no-build" conditions as measured by travel speeds, control delay, density, and/or flow rate as defined by the Highway Capacity Manual 2000 or its successor documents.		The Proponent is filing for limited DRI review. Using the Redevelopment Scoping Checklist, the <u>only</u> question where the proposed project results in a shaded response is that it directly abuts a regional roadway. However, as described herein, no access/egress is proposed on MacArthur Boulevard, and no new access/egress points are proposed on Waterhouse Road. As to the other questions, the proposed project does not generate more than 250 new daily trips. In addition, as to the last scoping checklist question, the project will not generate more than 25 peak hour trips at a high crash location. As described in this Report, there are only two high crash locations within the proposed project study area: (1.) Bourne Rotary and (2.) Route 28 at Waterhouse Road. At the Bourne Rotary, the proposed project will generate 21 trips during the AM Peak Hour and 25 trips during the PM Peak Hour. At Route 28 / Waterhouse Road, the proposed project will generate 10 AM Peak Hour trips and 10 PM Peak Hour Trips. Therefore, as indicated on the scoping checklist, the proposed project will <u>not</u> generate

			more than 25 peak hour trips at a high crash location. Based on these responses, the proposed project may be exempted from DRI review for traffic altogether. However, as described in this Report, the Proponent is prepared to undertake the safety improvements described herein and is committed to a model TDM plan.
TR3.5	**Mitigation Fee:** At impact locations, as specified in MPS TR3.4, where the increase is less than 25 peak hour trips, DRIs may make a payment per peak-hour trip to comply with MPS TR3.4. The fee shall be $5,000 per peak hour trip up to a maximum of 25 peak-hour trips. Funds collected for congestion mitigation shall be used to support projects or strategies that encourage alternatives to automobile travel consistent with MPS TR3.12 or to support actual expansion of roadway capacity including but not limited to planning, engineering, permitting, and construction. Such funds shall be used within the town in which the development is located or shall be divided between towns based on the development's impact area. The determination of how these funds are utilized shall be determined by the town impacted by the DRI, in consultation with Cape Cod Commission staff. Funds not accessed within 10 years of receipt may, at the Executive Director's discretion, be distributed to the Cape Cod Regional Transit Authority or successor agency(ies) to fund public transit on Cape Cod.		Mitigation fees are not proposed at study area intersection where trips are below 25.
TR3.6	**"Fair-share" Payments:** In lieu of construction and/or implementation of measures to mitigate adverse traffic impacts prior to a final Certificate of Compliance, the Commission, at its discretion, may allow a payment of funds to Barnstable County to meet the requirements of MPS TR3.4 commensurate with the DRI's impact. As determined by the Commission, in considering whether to allow such payments, the Commission will take into account factors including but not limited to safety, congestion, area land uses, community character, environmental impacts, seasonal traffic variations, input from public officials, public testimony, and may include costs for 20 years of operations and maintenance, where necessary. Guidance on payment methodology can be found in the Guidelines for Transportation Impact Assessment, Technical Bulletin 96-003, as amended. Funds collected for congestion mitigation shall be used to support projects or strategies that encourage alternatives to automobile travel consistent with MPS TR3.12 or to support actual expansion of roadway capacity including but not limited to planning, engineering, permitting, and construction. Such funds shall be used within the town in which the development is located or shall be divided between towns based on the development's impact area. The determination of how these funds are utilized shall be determined by the town impacted by the DRI, in consultation with Cape Cod Commission staff. Funds not accessed within 10 years of receipt may, at the Executive Director's discretion, be distributed to the Cape Cod Regional Transit Authority or successor agency(ies) to fund public transit on Cape Cod.		Fair-share payment is not proposed as part of this project.
TR3.7	**Restrictions on Road Widening or New Signals:** Road and intersection widening and new		No roadway widening or signals are proposed as part of this project.

	traffic signals shall not be used as actual mitigation or to support mitigation payments under MPS TR3.6 in local or regional historic districts. Road widening, intersection widening, and/or new traffic signals proposed as mitigation for DRIs or used to support development of payment mitigation plans under MPS TR3.6 shall be consistent with community character and not degrade scenic or natural resources.		
TR3.8	**Year-round Structural Mitigation:** Road widening, intersection widening, and new traffic signals shall be allowed as mitigation for DRIs only if the Commission finds that the improvement will have substantial benefit to the transportation system throughout most of the year. Road widening, intersection widening, and new traffic signals necessary to accommodate strictly summer travel demand shall not be allowed as part of development and redevelopment.		No roadway widening or signals are proposed as part of this project.
TR3.9	**Bicycle and Pedestrian Accommodation:** All road and intersection widening and new traffic signals or modification of existing traffic signals required as DRI mitigation shall include appropriate bicycle and pedestrian accommodation.		No roadway widening or signals are proposed as part of this project.
TR3.10	**Preserve Existing Rights-of-Way:** Existing transportation rights-of-way shall be preserved for transportation uses as well as to limit trip generation.		All proposed buildings are located on privately owned land. Existing rights-of-way are being used for transportation purposes only.
TR3.11	**No Capacity Increases on Controlled-access Highways:** DRIs shall not increase the mainline capacity of limited-access highways on Cape Cod, including portions of Route 6, Route 3, and the Route 25 extension within Barnstable County. No additional travel lanes shall be allowed. Appropriate improvements to safety and traffic flow (such as additional ramps, improved merge areas, traffic signals, etc.) at the existing interchanges along limited-access highways shall be a permissible mitigation strategy, as long as such mitigation complies with standards regarding historic character, community character, and environmental impact as well as seasonal versus year-round need.		No improvements are proposed on the roadways outlined in TR3.11.
TR3.12	**Consistency with Other Plans:** All roadway infrastructure projects proposed as DRI mitigation, including but not limited to roadway segment widening, intersection widening, new traffic signals, interchange ramp changes, and grade separation, shall be consistent with local and regional plans, including but not limited to Local Comprehensive Plans, and the Cape Cod Metropolitan Planning Organization's latest Regional Transportation Plan.		No Physical improvements are proposed as part of this project. However, proposed safety mitigation can be used to progress existing transportation initiatives in this area.
TR3.13	**Operation and Maintenance Costs:** Where deemed appropriate by the Commission, all new traffic signals under town jurisdiction proposed as DRI mitigation shall include payments for 20 years of operations and maintenance costs. All new traffic signals used to support development of payment mitigation plans under MPS TR3.6 shall include payments for 20 years of operations and maintenance. The funds shall be paid in a single payment. The applicant shall calculate the operation and maintenance costs in accordance with the Cape Cod Commission Guidelines for Transportation Impact Assessment, Technical Bulletin 96-003, Revised January 9, 2003, as amended.		N/A

TR3.14	**Traffic-monitoring Devices:** Where deemed appropriate by the Commission, all roadway widening, intersection signals, and other roadway capacity alterations proposed as DRI mitigation to accommodate automobile travel shall include continuous year-round traffic-recording devices to monitor traffic volumes, vehicle classification, and travel speeds, and shall include devices to access the data remotely both at the data collection site and at the data-processing site. Where deemed appropriate by the Commission, the applicant shall make a payment of funds to support maintenance and operation of the devices for 20 years. The applicant shall determine traffic-counting equipment costs based on the Cape Cod Commission Guidelines for Transportation Impact Assessment Technical Bulletin 96-003, Revised January 9, 2003, as amended.		N/A
TR3.15	**Inflation Factor:** Where deemed appropriate by the Commission, an annual inflation rate, determined at the time of the DRI decision, shall be applied to all congestion mitigation payments. The period of increase shall be from the date of the final Commission decision until the funds are paid.		
TR3.16	**Use of Congestion Mitigation Funds:** Funds collected for congestion mitigation shall be used to support projects or strategies that encourage alternatives to automobile travel consistent with MPS TR2.13 or to support actual expansion of roadway capacity including but not limited to planning, engineering, permitting, and construction. Such funds shall be used within the town in which the development is located or shall be divided between towns based on the development's impact area. Funds not accessed within 10 years of receipt may, at the Executive Director's discretion, be distributed to the Cape Cod Regional Transit Authority or successor agencies to fund public transit on Cape Cod.		N/A
	Best Development Practices		How the proposal addresses the best development practices
TR3.17	**Automatic Data Collection:** DRIs are encouraged to provide for or contribute to automatic data collection and information-based technologies in the region beyond the requirements of MPS TR3.14 that assist travelers in making efficient travel decisions regarding travel mode and time of travel.		N/A
TR3.18	**Consistency with Federal and State Plans:** Transportation mitigation is encouraged to be consistent with federal and state acts and plans, including the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and successor transportation acts and amendments, the Clean Air Act Amendments of 1990, the Americans with Disabilities Act, Massachusetts laws regarding access for disabled persons, the Massachusetts State Implementation Plan, the Metropolitan Planning Organization's Regional Transportation Plan, and the applicable Local Comprehensive Plan.		At this stage in the project planning process, the proposed project is believed to be consistent with the Federal and State plans outlined in TR3.18.

DSX0 LED w/ 40 LEDs @ 700 mA, 4000K, Type Forward Throw Medium Optics (P1 Wattage = 182) (P2 Wattage = 91)

D-Series Size 0
LED Area Luminaire

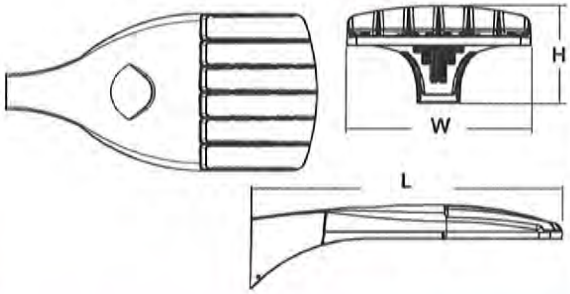
Catalog Number

Notes

Type

Specifications

EPA:	0.95 ft² (.09 m²)
Length:	26" (66.0 cm)
Width:	13" (33.0 cm)
Height:	7" (17.8 cm)
Weight (max):	16 lbs (7.25 kg)



Introduction

The modern styling of the D-Series is striking yet unobtrusive - making a bold, progressive statement even as it blends seamlessly with its environment.

The D-Series distills the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire. The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 400W metal halide with typical energy savings of 65% and expected service life of over 100,000 hours.

Ordering Information

EXAMPLE: DSX0 LED 40C 1000 40K T3M MVOLT SPA DDBXD

DSX0 LED

Series	LEDs	Drive current	Color temperature	Distribution		Voltage	Mounting
DSX0 LED	**Forward optics** 20C 20 LEDs (one engine) 40C 40 LEDs (two engines) **Rotated optics**[1] 30C 30 LEDs (one engine)	530 530 mA 700 700 mA 1000 1000 mA (1 A)[2]	30K 3000 K 40K 4000 K 50K 5000 K AMBPC Amber phosphor converted[3]	T1S Type I short T2S Type II short T2M Type II medium T3S Type III short T3M Type III medium T4M Type IV medium TFTM Forward throw medium T5VS Type V very short T5S Type V short T5M Type V medium T5W Type V wide BLC Backlight control[2,4] LCCO Left corner cutoff[2,4] RCCO Right corner cutoff[2,4]		MVOLT[5] 120[5] 208[5] 240[5] 277[5] 347[6] 480[6]	**Shipped included** SPA Square pole mounting RPA Round pole mounting WBA Wall bracket SPUMBA Square pole universal mounting adaptor[7] RPUMBA Round pole universal mounting adaptor[7] **Shipped separately** KMA8 DDBXD U Mast arm mounting bracket adaptor (specify finish)[8]

Control options		Other options		Finish	
Shipped installed		**Shipped installed**			
PER	NEMA twist-lock receptacle only (no controls)[9]	HS	House-side shield[18]	DDBXD	Dark bronze
PER5	Five-wire receptacle only (no controls)[9,10]	SF	Single fuse (120, 277, 347V)[19]	DBLXD	Black
PER7	Seven-wire receptacle only (no controls)[9,10]	DF	Double fuse (208, 240, 480V)[19]	DNAXD	Natural aluminum
DMG	0-10V dimming driver (no controls)[11]	L90	Left rotated optics[1]	DWHXD	White
DCR	Dimmable and controllable via ROAM® (no controls)[12]	R90	Right rotated optics[1]	DDBTXD	Textured dark bronze
PIR	Bi-level, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 5fc[13]	DDL	Diffused drop lens[18]	DBLBXD	Textured black
PIRH	Bi-level, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 5fc[13]	BS	Bird spikes[20]	DNATXD	Textured natural aluminum
PIR1FC3V	Bi-level, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc[13]			DWHGXD	Textured white
PIRH1FC3V	Bi-level, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc[13]				
BL30	Bi-level switched dimming, 30%[14,15]				
BL50	Bi-level switched dimming, 50%[14,15]				
PNMTDD3	Part night, dim till dawn[16]				
PNMT5D3	Part night, dim 5 hrs[16]				
PNMT6D3	Part night, dim 6 hrs[16]				
PNMT7D3	Part night, dim 7 hrs[16]				
FAO	Field adjustable output[17]				

Accessories

Ordered and shipped separately.

Controls & Shields

DLL127F 1.5 JU	Photocell - SSL twist-lock (120-277V)[21]
DLL347F 1.5 CUL JU	Photocell - SSL twist-lock (347V)[21]
DLL480F 1.5 CUL JU	Photocell - SSL twist-lock (480V)[21]
DSHORT SBK U	Shorting cap[21]
DSX0HS 20C U	House-side shield for 20 LED unit[18]
DSX0HS 30C U	House-side shield for 30 LED unit[18]
DSX0HS 40C U	House-side shield for 40 LED unit[18]
DSX0DDL U	Diffused drop lens (polycarbonate)[17]
PUMBA DDBXD U*	Square and round pole universal mounting bracket adaptor (specify finish)[22]
KMA8 DDBXD U	Mast arm mounting bracket adaptor (specify finish)[8]
DSX0BS U	Bird spikes

For more control options, visit DTL and ROAM online.

NOTES

1. 30 LEDs (30C option) and rotated options (L90 or R90) only available together.
2. Not available with AMBPC.
3. Only available with 530mA or 700mA.
4. Not available with HS or DDL.
5. MVOLT driver operates on any line voltage from 120-277V (50/60 Hz). Specify 120V, 208V, 240V or 277V options only when ordering with fusing (SF, DF options).
6. Not available with single board, 530mA product (20C 530 or 30C 530). Not available with BL30, BL50 or PNMT options.
7. Existing drilled pole only. Available as a separate combination accessory; for retrofit use only: PUMBA (finish) U; 1.5 G vibration load rating per ANCI C136.31.
8. Must order fixture with SPA mounting. Must be ordered as a separate accessory; see Accessories information. For use with 2-3/8" mast arm (not included).
9. Photocell ordered and shipped as a separate line item from Acuity Brands Controls. See accessories.
10. If ROAM® node required, it must be ordered and shipped as a separate line item from Acuity Brands Controls. Not available with DCR. Node with integral dimming.
11. DMG option for 347V or 480V requires 1000mA.
12. Specifies a ROAM® enabled luminaire with 0-10V dimming capability; PER option required. Additional hardware and services required for ROAM® deployment; must be purchased separately. Call 1-800-442-6745 or email: sales@roamservices.net. N/A with PIR options, PER5, PER7, BL30, BL50 or PNMT options. Node without integral dimming.
13. PIR and PIR1FC3V specify the SensorSwitch SBGR-10-ODP control; PIRH and PIRH1FC3V specify the SensorSwitch SBGR-6-ODP control; see Outdoor Control Technical Guide for details. Dimming driver standard. Not available with PER5 or PER7. Ambient sensor disabled when ordered with DCR. Separate on/off required. Not available with PNMT options.
14. Requires an additional switched circuit.
15. Dimming driver standard. MVOLT only. Not available with 347V, 480V, DCR, PER5, PER7 or PNMT options. Not available with PIR1FC3V and PIRH1FC3V.
16. Dimming driver standard. MVOLT only. Not available with 347V, 480V, DCR, PER5, PER7, BL30 or BL50. Not available with PIR1FC3V and PIRH1FC3V. Separate on/off required.
17. Dimming driver standard. Not available with PER5, PER7, DMG, DCR, BL30, BL50, PNMT, PIR, PIRH, PIR1FC3V and PIRH1FC3V.
18. Not available with BLC, LCCO and RCCO distribution. Also available as a separate accessory; see Accessories information.
19. Single fuse (SF) requires 120V, 277V or 347V. Double fuse (DF) requires 208V, 240V or 480V.
20. Also available as a separate accessory; see accessories information.
21. Requires luminaire to be specified with PER option. Ordered and shipped as a separate line item from Acuity Brands Controls.
22. For retrofit use only.

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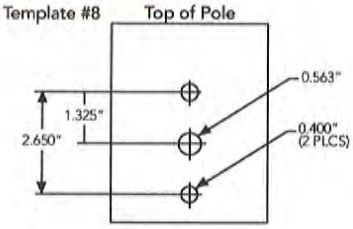
Drilling

Template #8 Top of Pole



DSX0 shares a unique drilling pattern with the AERIS™ family. Specify this drilling pattern when specifying poles, per the table below.

DM19AS	Single unit	**DM29AS**	2 at 90° *
DM28AS	2 at 180°	**DM39AS**	3 at 90° *
DM49AS	4 at 90° *	**DM32AS**	3 at 120° **

Example: SSA 20 4C **DM19AS** DDBXD

Visit Lithonia Lighting's POLES CENTRAL to see our wide selection of poles, acessories and educational tools.

*Round pole top must be 3.25" O.D. minimum.

**For round pole mounting (RPA) only.

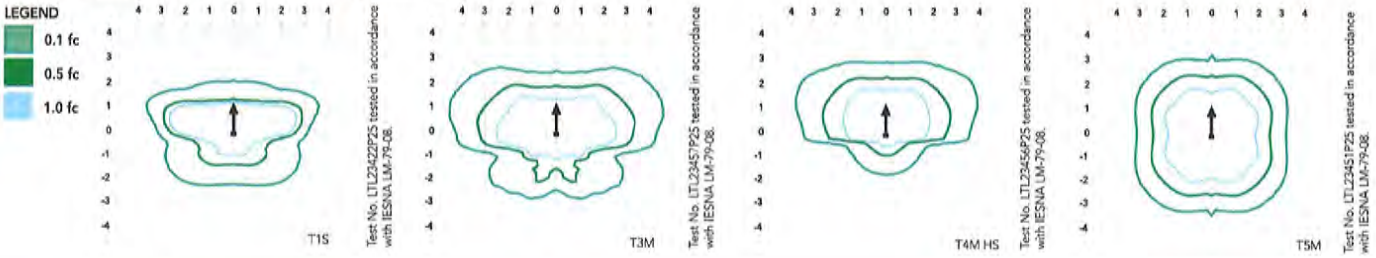
Tenon Mounting Slipfitter **

Tenon O.D.	Single Unit	2 at 180°	2 at 90°	3 at 120°	3 at 90°	4 at 90°
2-3/8"	AST20-190	AST20-280	AST20-290	AST20-320	AST20-390	AST20-490
2-7/8"	AST25-190	AST25-280	AST25-290	AST25-320	AST25-390	AST25-490
4"	AST35-190	AST35-280	AST35-290	AST35-320	AST35-390	AST35-490

Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit Lithonia Lighting's D-Series Area Size 0 homepage.

Isofootcandle plots for the DSX0 LED 40C 1000 40K. Distances are in units of mounting height (20').



Performance Data

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Ambient		Lumen Multiplier
0°C	32°F	1.02
10°C	50°F	1.01
20°C	68°F	1.00
25°C	**77°F**	**1.00**
30°C	86°F	1.00
40°C	104°F	0.99

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a **25°C ambient**, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	DSX0 LED 20C 1000			
	1	0.98	0.96	0.93
	DSX0 LED 40C 1000			
	1	0.98	0.95	0.90
	DSX0 LED 40C 700			
	1	0.99	0.99	0.99

Electrical Load

			Current (A)					
Number of LEDs	Drive Current (mA)	System Watts	120	208	240	277	347	480
20C	530	35	0.34	0.22	0.21	0.20	--	--
	700	45	0.47	0.28	0.24	0.22	0.18	0.14
	1000	72	0.76	0.45	0.39	0.36	0.36	0.26
30C	530	52	0.51	0.31	0.28	0.25	--	--
	700	70	0.72	0.43	0.37	0.34	0.25	0.19
	1000	104	1.11	0.64	0.56	0.49	0.47	0.34
40C	530	68	0.71	0.41	0.36	0.33	0.25	0.19
	700	91	0.94	0.55	0.48	0.42	0.33	0.24
	1000	138	1.45	0.84	0.73	0.64	0.69	0.50

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Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Forward Optics

LEDs	Drive Current (mA)	System Watts	Dist Type	30K (3000 K, 70 CRI)					40K (4000 K, 70 CRI)					50K (5000 K, 70 CRI)					AMBPC (Amber Phosphor Converted)				
				Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
20C (20 LEDs)	530 mA	35 W	T1S	4,079	1	0	1	117	4,380	1	0	1	125	4,408	1	0	1	126	2,541	1	0	1	73
			T2S	4,206	1	0	1	120	4,516	1	0	1	129	4,544	1	0	1	130	2,589	1	0	1	74
			T2M	4,109	1	0	1	117	4,413	1	0	1	126	4,440	1	0	1	127	2,539	1	0	1	73
			T3S	4,104	1	0	1	117	4,407	1	0	1	126	4,435	1	0	1	127	2,558	1	0	1	73
			T3M	4,142	1	0	1	118	4,447	1	0	1	127	4,475	1	0	1	128	2,583	1	0	1	74
			T4M	4,198	1	0	1	120	4,508	1	0	1	129	4,536	1	0	1	130	2,570	1	0	1	73
			TFTM	4,135	1	0	1	118	4,440	1	0	2	127	4,468	1	0	2	128	2,540	1	0	1	73
			T5VS	4,368	2	0	0	125	4,691	2	0	0	134	4,720	2	0	0	135	2,650	1	0	0	76
			T5S	4,401	2	0	2	126	4,725	2	0	0	135	4,755	2	0	0	136	2,690	1	0	0	77
			T5M	4,408	2	0	1	126	4,734	3	0	1	135	4,763	3	0	1	136	2,658	2	0	0	76
			T5W	4,344	3	0	1	124	4,664	3	0	1	133	4,693	3	0	1	134	2,663	2	0	1	76
			BLC	3,071	1	0	1	88	3,297	1	0	1	94	3,318	1	0	1	95					
			LCCO	2,983	1	0	1	85	3,204	1	0	1	92	3,224	1	0	1	92					
			RCCO	2,983	1	0	1	85	3,204	1	0	1	92	3,224	1	0	1	92					
	700 mA	45 W	T1S	5,181	1	0	1	115	5,563	1	0	1	124	5,598	1	0	1	124	3,144	1	0	1	70
			T2S	5,342	1	0	1	119	5,736	1	0	1	127	5,772	1	0	1	128	3,203	1	0	1	71
			T2M	5,219	1	0	1	116	5,605	1	0	1	125	5,640	1	0	1	125	3,141	1	0	1	70
			T3S	5,213	1	0	1	116	5,598	1	0	1	124	5,633	1	0	1	125	3,165	1	0	1	70
			T3M	5,260	1	0	1	117	5,649	1	0	2	126	5,684	1	0	2	126	3,196	1	0	1	71
			T4M	5,332	1	0	1	118	5,725	1	0	2	127	5,761	1	0	2	128	3,179	1	0	1	71
			TFTM	5,252	1	0	2	117	5,640	1	0	2	125	5,675	1	0	2	126	3,143	1	0	1	70
			T5VS	5,548	2	0	0	123	5,958	2	0	0	132	5,995	2	0	0	133	3,278	2	0	0	73
			T5S	5,589	2	0	0	124	6,002	2	0	0	133	6,039	2	0	0	134	3,328	2	0	0	74
			T5M	5,599	3	0	1	124	6,012	3	0	1	134	6,050	3	0	1	134	3,288	2	0	1	73
			T5W	5,517	3	0	1	123	5,924	3	0	1	132	5,961	3	0	1	132	3,295	2	0	1	73
			BLC	3,909	1	0	1	87	4,198	1	0	1	93	4,224	1	0	1	94					
			LCCO	3,798	1	0	1	84	4,078	1	0	1	91	4,104	1	0	1	91					
			RCCO	3,798	1	0	1	84	4,078	1	0	1	91	4,104	1	0	1	91					
	1000 mA	72 W	T1S	7,085	1	0	1	98	7,608	2	0	2	106	7,656	2	0	2	106					
			T2S	7,305	1	0	1	101	7,845	2	0	2	109	7,894	2	0	2	110					
			T2M	7,138	1	0	2	99	7,665	2	0	2	106	7,713	2	0	2	107					
			T3S	7,129	1	0	1	99	7,656	2	0	2	106	7,704	2	0	2	107					
			T3M	7,194	1	0	2	100	7,725	2	0	2	107	7,773	2	0	2	108					
			T4M	7,292	1	0	2	101	7,830	2	0	2	109	7,879	2	0	2	109					
			TFTM	7,183	1	0	2	100	7,713	1	0	2	107	7,761	1	0	2	108					
			T5VS	7,588	2	0	0	105	8,148	3	0	0	113	8,199	3	0	0	114					
			T5S	7,644	2	0	0	106	8,208	2	0	0	114	8,259	2	0	0	115					
			T5M	7,657	3	0	1	106	8,222	3	0	1	114	8,274	3	0	1	115					
			T5W	7,545	3	0	1	105	8,102	3	0	2	113	8,153	3	0	2	113					
			BLC	5,162	1	0	1	72	5,543	1	0	2	77	5,578	1	0	1	77					
			LCCO	5,015	1	0	2	70	5,386	1	0	2	75	5,419	1	0	2	75					
			RCCO	5,015	1	0	2	70	5,386	1	0	2	75	5,419	1	0	2	75					

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Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Forward Optics

LEDs	Drive Current (mA)	System Watts	Dist Type	30K (3000 K, 70 CRI)					40K (4000 K, 70 CRI)					50K (5000 K, 70 CRI)					AMBPC (Amber Phosphor Converted)				
				Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
40C (40 LEDs)	530 mA	68 W	T1S	7,926	2	0	2	117	8,511	2	0	2	125	8,564	2	0	2	126	4,878	1	0	1	72
			T2S	8,172	2	0	2	120	8,775	2	0	2	129	8,830	2	0	2	130	4,969	1	0	1	73
			T2M	7,985	2	0	2	117	8,574	2	0	2	126	8,628	2	0	2	127	4,874	1	0	1	72
			T3S	7,975	1	0	2	117	8,564	2	0	2	126	8,617	2	0	2	127	4,910	1	0	1	72
			T3M	8,047	2	0	2	118	8,642	2	0	2	127	8,696	2	0	2	128	4,958	1	0	2	73
			T4M	8,157	1	0	2	120	8,759	2	0	2	129	8,813	2	0	2	130	4,932	1	0	2	73
			TFTM	8,035	1	0	2	118	8,628	2	0	2	127	8,682	2	0	2	128	4,876	1	0	2	72
			T5VS	8,488	2	0	0	125	9,115	3	0	0	134	9,172	3	0	0	135	5,086	2	0	0	75
			T5S	8,550	2	0	0	126	9,182	3	0	1	135	9,239	3	0	1	136	5,163	2	0	0	76
			T5M	8,565	3	0	1	126	9,198	3	0	2	135	9,255	3	0	2	136	5,102	3	0	1	75
			T5W	8,440	3	0	2	124	9,063	3	0	2	133	9,120	3	0	2	134	5,112	3	0	1	75
			BLC	6,142	1	0	2	90	6,595	1	0	2	97	6,636	1	0	2	98					
			LCCO	5,967	1	0	2	88	6,407	1	0	2	94	6,447	1	0	2	95					
			RCCO	5,967	1	0	2	88	6,407	1	0	2	94	6,447	1	0	2	95					
	700 mA	91 W	T1S	10,066	2	0	2	111	10,810	2	0	2	119	10,877	2	0	2	120	6,206	2	0	2	68
			T2S	10,379	2	0	2	114	11,145	2	0	2	122	11,215	2	0	2	123	6,322	2	0	2	69
			T2M	10,141	2	0	2	111	10,890	2	0	2	120	10,958	2	0	2	120	6,201	2	0	2	68
			T3S	10,129	2	0	2	111	10,877	2	0	2	120	10,945	2	0	2	120	6,247	1	0	2	69
			T3M	10,221	2	0	2	112	10,975	2	0	2	121	11,044	2	0	2	121	6,308	2	0	2	69
			T4M	10,359	2	0	2	114	11,124	2	0	2	122	11,194	2	0	2	123	6,275	1	0	2	69
			TFTM	10,205	2	0	2	112	10,958	2	0	3	120	11,027	2	0	3	121	6,203	1	0	2	68
			T5VS	10,781	3	0	0	118	11,576	3	0	1	127	11,649	3	0	1	128	6,569	2	0	0	72
			T5S	10,860	3	0	1	119	11,662	3	0	1	128	11,734	3	0	1	129	6,569	2	0	0	72
			T5M	10,879	3	0	2	120	11,682	3	0	2	128	11,755	3	0	2	129	6,491	3	0	1	71
			T5W	10,719	3	0	2	118	11,511	4	0	2	126	11,583	4	0	2	127	6,504	3	0	2	71
			BLC	7,819	1	0	2	86	8,396	1	0	2	92	8,448	1	0	2	93					
			LCCO	7,596	1	0	2	83	8,157	1	0	2	90	8,208	1	0	2	90					
			RCCCO	7,596	1	0	2	83	8,157	1	0	2	90	8,208	1	0	2	90					
	1000 mA	138 W	T1S	13,767	2	0	2	100	14,783	3	0	3	107	14,876	3	0	3	108					
			T2S	14,194	2	0	2	103	15,242	3	0	3	110	15,338	3	0	3	111					
			T2M	13,869	2	0	2	101	14,893	3	0	3	108	14,986	3	0	3	109					
			T3S	13,852	2	0	2	100	14,875	2	0	2	108	14,968	2	0	2	108					
			T3M	13,978	2	0	2	101	15,010	3	0	3	109	15,104	3	0	3	109					
			T4M	14,168	2	0	2	103	15,214	3	0	3	110	15,309	3	0	3	111					
			TFTM	13,956	2	0	3	101	14,987	2	0	3	109	15,080	2	0	3	109					
			T5VS	14,744	3	0	1	107	15,832	3	0	1	115	15,931	4	0	1	115					
			T5S	14,852	3	0	1	108	15,948	3	0	1	116	16,048	3	0	1	116					
			T5M	14,878	4	0	2	108	15,976	4	0	2	116	16,076	4	0	2	116					
			T5W	14,660	4	0	2	106	15,742	4	0	2	114	15,840	4	0	2	115					
			BLC	10,325	1	0	2	75	11,087	1	0	2	80	11,156	1	0	2	81					
			LCCO	10,031	2	0	2	73	10,771	2	0	3	78	10,839	2	0	3	79					
			RCCO	10,031	2	0	2	73	10,771	2	0	3	78	10,839	2	0	3	79					

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Performance Data

L90 and R90 Rotated Optics

LEDs	Drive Current (mA)	System Watts	Dist. Type	30K (3000 K, 70 CRI)					40K (4000 K, 70 CRI)					50K (5000 K, 70 CRI)					AMBPC (Amber Phosphor Converted)				
				Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
30C (30 LEDs)	530 mA	52 W	T1S	6,130	2	0	2	118	6,583	2	0	2	127	6,624	2	0	2	127	3,841	2	0	2	74
			T2S	6,321	2	0	2	122	6,787	2	0	2	131	6,830	3	0	3	131	3,912	2	0	2	75
			T2M	6,176	2	0	2	119	6,632	3	0	3	128	6,673	3	0	3	128	3,837	2	0	2	74
			T3S	6,168	2	0	2	119	6,624	3	0	3	127	6,665	3	0	3	128	3,866	2	0	2	74
			T3M	6,224	3	0	3	120	6,684	3	0	3	129	6,726	3	0	3	129	3,904	2	0	2	75
			T4M	6,309	3	0	3	121	6,775	3	0	3	130	6,817	3	0	3	131	3,884	2	0	2	75
			TFTM	6,215	3	0	3	120	6,673	3	0	3	128	6,715	3	0	3	129	3,839	2	0	2	74
			T5VS	6,565	2	0	0	126	7,050	2	0	0	136	7,094	2	0	0	136	4,005	2	0	0	77
			T5S	6,613	2	0	0	127	7,102	2	0	0	137	7,146	2	0	0	137	4,065	2	0	0	78
			T5M	6,625	3	0	1	127	7,114	3	0	1	137	7,159	3	0	1	138	4,017	2	0	1	77
			T5W	6,528	3	0	1	126	7,010	3	0	2	135	7,054	3	0	2	136	4,025	3	0	1	77
			BLC	4,747	2	0	2	91	5,098	2	0	2	98	5,130	2	0	2	99					
			LCCO	4,612	1	0	2	89	4,953	1	0	2	95	4,984	1	0	2	96					
			RCCO	4,612	1	0	2	89	4,953	1	0	2	95	4,984	1	0	2	96					
	700 mA	70 W	T1S	7,786	2	0	2	111	8,361	3	0	3	119	8,413	3	0	3	120	4,783	2	0	2	68
			T2S	8,028	2	0	2	115	8,620	3	0	3	123	8,674	3	0	3	124	4,873	2	0	2	70
			T2M	7,844	3	0	3	112	8,423	3	0	3	120	8,476	3	0	3	121	4,779	2	0	2	68
			T3S	7,834	3	0	3	112	8,413	3	0	3	120	8,465	3	0	3	121	4,815	2	0	2	69
			T3M	7,905	3	0	3	113	8,489	3	0	3	121	8,542	3	0	3	122	4,862	3	0	3	69
			T4M	8,013	3	0	3	114	8,604	3	0	3	123	8,658	3	0	3	124	4,837	3	0	3	69
			TFTM	7,893	3	0	3	113	8,476	3	0	3	121	8,529	3	0	3	122	4,781	3	0	3	68
			T5VS	8,338	2	0	0	119	8,954	3	0	0	128	9,010	3	0	0	129	4,988	2	0	0	71
			T5S	8,400	2	0	0	120	9,020	3	0	1	129	9,076	3	0	1	130	5,063	2	0	0	72
			T5M	8,414	3	0	1	120	9,036	3	0	2	129	9,092	3	0	2	130	5,003	3	0	1	71
			T5W	8,291	3	0	2	118	8,903	3	0	2	127	8,959	3	0	2	128	5,013	3	0	1	72
			BLC	6,044	2	0	2	86	6,490	3	0	3	93	6,530	3	0	3	93					
			LCCO	5,872	1	0	2	84	6,305	1	0	2	90	6,345	1	0	2	91					
			RCCO	5,872	1	0	2	84	6,305	1	0	2	90	6,345	1	0	2	91					
	1000 mA	104 W	T1S	10,648	3	0	3	102	11,434	3	0	3	110	11,506	3	0	3	111					
			T2S	10,979	3	0	3	106	11,789	3	0	3	113	11,863	3	0	3	114					
			T2M	10,727	3	0	3	103	11,519	3	0	3	111	11,591	3	0	3	111					
			T3S	10,714	3	0	3	103	11,505	3	0	3	111	11,577	3	0	3	111					
			T3M	10,812	3	0	3	104	11,610	4	0	4	112	11,682	4	0	4	112					
			T4M	10,958	3	0	3	105	11,767	3	0	3	113	11,841	3	0	3	114					
			TFTM	10,795	3	0	3	104	11,592	3	0	3	111	11,664	4	0	4	112					
			T5VS	11,404	3	0	0	110	12,245	3	0	1	118	12,322	3	0	1	118					
			T5S	11,487	3	0	1	110	12,336	3	0	1	119	12,413	3	0	1	119					
			T5M	11,508	3	0	2	111	12,357	4	0	2	119	12,434	4	0	2	120					
			T5W	11,339	4	0	2	109	12,176	4	0	2	117	12,252	4	0	2	118					
			BLC	7,981	3	0	3	77	8,570	3	0	3	82	8,624	3	0	3	83					
			LCCO	7754	1	0	2	75	8326	2	0	2	80	8378	2	0	2	81					
			RCCO	7754	1	0	2	75	8326	2	0	2	80	8378	2	0	2	81					

FEATURES & SPECIFICATIONS

INTENDED USE
The sleek design of the D-Series Size 0 reflects the embedded high performance LED technology. It is ideal for many commercial and municipal applications, such as parking lots, plazas, campuses, and pedestrian areas.

CONSTRUCTION
Single-piece die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. Modular design allows for ease of maintenance and future light engine upgrades. The LED driver is mounted in direct contact with the casting to promote low operating temperature and long life. Housing is completely sealed against moisture and environmental contaminants (IP65). Low EPA (0.95 ft^2) for optimized pole wind loading.

FINISH
Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a minimum 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Available in both textured and non-textured finishes.

OPTICS
Precision-molded proprietary acrylic lenses are engineered for superior area lighting distribution, uniformity, and pole spacing. Light engines are available in 3000 K, 4000 K or 5000 K (70 CRI) or optional 3000 K (70 minimum CRI) or 5000 K (70 CRI) configurations. The D-Series Size 0 has zero uplight and qualifies as a Nighttime Friendly™ product, meaning it is consistent with the LEED® and Green Globes™ criteria for eliminating wasteful uplight.

ELECTRICAL
Light engine(s) configurations consist of 20, 30 or 40 high-efficacy LEDs mounted to metal-core circuit boards to maximize heat dissipation and promote long life (up to L99/100,000 hours at 25°C). Class 1 electronic drivers are designed to have a power factor >90%, THD <20%, and an expected life of 100,000 hours with <1% failure rate. Easily serviceable 10kV or 6kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).

INSTALLATION
Included mounting block and integral arm facilitate quick and easy installation. Stainless steel bolts fasten the mounting block securely to poles and walls, enabling the D-Series Size 0 to withstand up to a 3.0 G vibration load rating per ANSI C136.31. The D-Series Size 0 utilizes the AERIS™ series pole drilling pattern (template #8). Optional terminal block, tool-less entry, and NEMA photocontrol receptacle are also available.

LISTINGS
UL Listed for wet locations. Light engines are IP66 rated; luminaire is IP65 rated. Rated for -40°C minimum ambient. U.S. Patent No. D672,492 S. International patent pending.

DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at www.designlights.org to confirm which versions are qualified.

WARRANTY
5-year limited warranty. Complete warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.

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DSX0 LED w/ 40 LEDs @ 700 mA, 4000K, Type 2 Medium Optics
(Wattage = 91)

D-Series Size 0
LED Area Luminaire

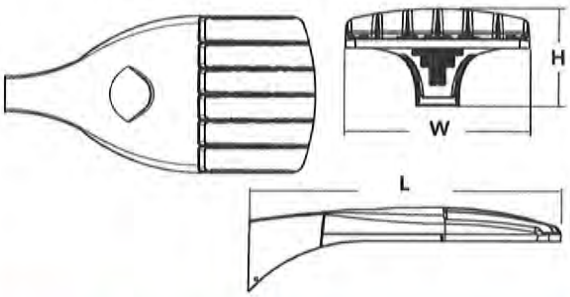
Catalog Number

Notes

Type

Specifications

EPA:	0.95 ft² (.09 m²)
Length:	26" (66.0 cm)
Width:	13" (33.0 cm)
Height:	7" (17.8 cm)
Weight (max):	16 lbs (7.25 kg)



Introduction

The modern styling of the D-Series is striking yet unobtrusive - making a bold, progressive statement even as it blends seamlessly with its environment.

The D-Series distills the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire. The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 400W metal halide with typical energy savings of 65% and expected service life of over 100,000 hours.

Ordering Information

EXAMPLE: DSX0 LED 40C 1000 40K T3M MVOLT SPA DDBXD

DSX0 LED

Series	LEDs	Drive current	Color temperature	Distribution		Voltage	Mounting	
DSX0 LED	**Forward optics**	530 530 mA	30K 3000 K	T1S Type I short	T5S Type V short	MVOLT [5]	**Shipped included**	
	20C 20 LEDs (one engine)	700 700 mA	40K 4000 K	T2S Type II short	T5M Type V medium	120 [5]	SPA Square pole mounting	
	40C 40 LEDs (two engines)	1000 1000 mA (1 A) [2]	50K 5000 K	T2M Type II medium	T5W Type V wide	208 [5]	RPA Round pole mounting	
	Rotated optics [1]		AMBPC Amber phosphor converted [3]	T3S Type III short	BLC Backlight control [2,4]	240 [5]	WBA Wall bracket	
	30C 30 LEDs (one engine)			T3M Type III medium	LCCO Left corner cutoff [2,4]	277 [5]	SPUMBA Square pole universal mounting adaptor [7]	
				T4M Type IV medium	RCCO Right corner cutoff [2,4]	347 [6]	RPUMBA Round pole universal mounting adaptor [7]	
				TFTM Forward throw medium		480 [6]	**Shipped separately**	
				T5VS Type V very short			KMA8 DDBXD U Mast arm mounting bracket adaptor (specify finish) [8]	

Control options		Other options		Finish	
Shipped installed		**Shipped installed**		DDBXD	Dark bronze
PER	NEMA twist-lock receptacle only (no controls) [9]	HS	House-side shield [18]	DBLXD	Black
PER5	Five-wire receptacle only (no controls) [9,10]	SF	Single fuse (120, 277, 347V) [19]	DNAXD	Natural aluminum
PER7	Seven-wire receptacle only (no controls) [9,10]	DF	Double fuse (208, 240, 480V) [19]	DWHXD	White
DMG	0-10V dimming driver (no controls) [11]	L90	Left rotated optics [1]	DDBTXD	Textured dark bronze
DCR	Dimmable and controllable via ROAM® (no controls) [12]	R90	Right rotated optics [1]	DBLBXD	Textured black
PIR	Bi-level, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 5fc [13]	DDL	Diffused drop lens [18]	DNATXD	Textured natural aluminum
PIRH	Bi-level, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 5fc [13]	BS	Bird spikes [20]	DWHGXD	Textured white
PIR1FC3V	Bi-level, motion/ambient sensor, 8-15' mounting height, ambient sensor enabled at 1fc [13]				
PIRH1FC3V	Bi-level, motion/ambient sensor, 15-30' mounting height, ambient sensor enabled at 1fc [13]				
BL30	Bi-level switched dimming, 30% [14,15]				
BL50	Bi-level switched dimming, 50% [14,15]				
PNMTDD3	Part night, dim till dawn [16]				
PNMT5D3	Part night, dim 5 hrs [16]				
PNMT6D3	Part night, dim 6 hrs [16]				
PNMT7D3	Part night, dim 7 hrs [16]				
FAO	Field adjustable output [17]				

Accessories

Ordered and shipped separately.

Controls & Shields

DLL127F 1.5 JU	Photocell - SSL twist-lock (120-277V) [21]
DLL347F 1.5 CUL JU	Photocell - SSL twist-lock (347V) [21]
DLL480F 1.5 CUL JU	Photocell - SSL twist-lock (480V) [21]
DSHORT SBK U	Shorting cap [21]
DSX0HS 20C U	House-side shield for 20 LED unit [18]
DSX0HS 30C U	House-side shield for 30 LED unit [18]
DSX0HS 40C U	House-side shield for 40 LED unit [18]
DSX0DDL U	Diffused drop lens (polycarbonate) [17]
PUMBA DDBXD U*	Square and round pole universal mounting bracket adaptor (specify finish) [22]
KMA8 DDBXD U	Mast arm mounting bracket adaptor (specify finish) [8]
DSX0BS U	Bird spikes

For more control options, visit DTL and ROAM online.

NOTES
1. 30 LEDs (30C option) and rotated options (L90 or R90) only available together.
2. Not available with AMBPC.
3. Only available with 530mA or 700mA.
4. Not available with HS or DDL.
5. MVOLT driver operates on any line voltage from 120-277V (50/60 Hz). Specify 120V, 208V, 240V or 277V options only when ordering with fusing (SF, DF options).
6. Not available with single board, 530mA product (20C 530 or 30C 530). Not available with BL30, BL50 or PNMT options.
7. Existing drilled pole only. Available as a separate combination accessory; for retrofit use only: PUMBA (finish) U; 1.5 G vibration load rating per ANCI C136.31.
8. Must order fixture with SPA mounting. Must be ordered as a separate accessory; see Accessories information. For use with 2-3/8" mast arm (not included).
9. Photocell ordered and shipped as a separate line item from Acuity Brands Controls. See accessories.
10. If ROAM® node required, it must be ordered and shipped as a separate line item from Acuity Brands Controls. Not available with DCR. Node with integral dimming.
11. DMG option for 347V or 480V requires 1000mA.
12. Specifies a ROAM® enabled luminaire with 0-10V dimming capability; PER option required. Additional hardware and services required for ROAM® deployment; must be purchased separately. Call 1-800-442-6745 or email: sales@roamservices.net. N/A with PIR options, PER5, PER7, BL30, BL50 or PNMT options. Node without integral dimming.
13. PIR and PIR1FC3V specify the SensorSwitch SBGR-10-ODP control; PIRH and PIRH1FC3V specify the SensorSwitch SBGR-6-ODP control; see Outdoor Control Technical Guide for details. Dimming driver standard. Not available with PER5 or PER7. Ambient sensor disabled when ordered with DCR. Separate on/off required. Not available with PNMT options.
14. Requires an additional switched circuit.
15. Dimming driver standard. MVOLT only. Not available with 347V, 480V, DCR, PER5, PER7 or PNMT options. Not available with PIR1FC3V and PIRH1FC3V.
16. Dimming driver standard. MVOLT only. Not available with 347V, 480V, DCR, PER5, PER7, BL30 or BL50. Not available with PIR1FC3V and PIRH1FC3V. Separate on/off required.
17. Dimming driver standard. Not available with PER5, PER7, DMG, DCR, BL30, BL50, PNMT, PIR, PIRH, PIR1FC3V and PIRH1FC3V.
18. Not available with BLC, LCCO and RCCO distribution. Also available as a separate accessory; see Accessories information.
19. Single fuse (SF) requires 120V, 277V or 347V. Double fuse (DF) requires 208V, 240V or 480V.
20. Also available as a separate accessory; see accessories information.
21. Requires luminaire to be specified with PER option. Ordered and shipped as a separate line item from Acuity Brands Controls.
22. For retrofit use only.

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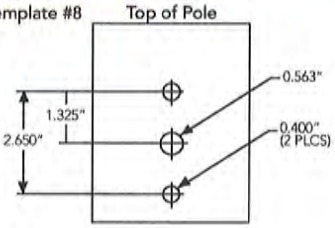
Drilling

Template #8 Top of Pole



DSX0 shares a unique drilling pattern with the AERIS™ family. Specify this drilling pattern when specifying poles, per the table below.

DM19AS	Single unit	**DM29AS**	2 at 90° *
DM28AS	2 at 180°	**DM39AS**	3 at 90° *
DM49AS	4 at 90° *	**DM32AS**	3 at 120° **

Example: SSA 20 4C **DM19AS** DDBXD

Visit Lithonia Lighting's POLES CENTRAL to see our wide selection of poles, accessories and educational tools.

*Round pole top must be 3.25" O.D. minimum.

**For round pole mounting (BPA) only.

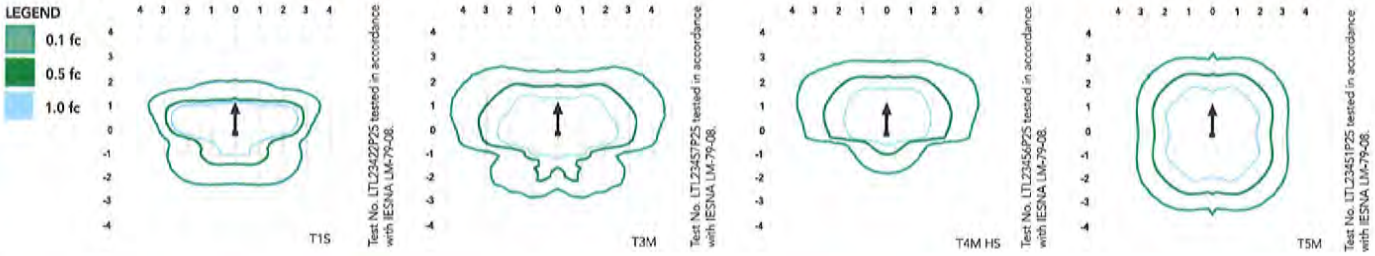
Tenon Mounting Slipfitter**

Tenon O.D.	Single Unit	2 at 180°	2 at 90°	3 at 120°	3 at 90°	4 at 90°
2-3/8"	AST20-190	AST20-280	AST20-290	AST20-320	AST20-390	AST20-490
2-7/8"	AST25-190	AST25-280	AST25-290	AST25-320	AST25-390	AST25-490
4"	AST35-190	AST35-280	AST35-290	AST35-320	AST35-390	AST35-490

Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit Lithonia Lighting's D-Series Area Size 0 homepage.

Isofootcandle plots for the DSX0 LED 40C 1000 40K. Distances are in units of mounting height (20').



Performance Data

Lumen Ambient Temperature (LAT) Multipliers

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

Ambient		Lumen Multiplier
0°C	32°F	1.02
10°C	50°F	1.01
20°C	68°F	1.00
25°C	**77°F**	**1.00**
30°C	86°F	1.00
40°C	104°F	0.99

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a **25°C ambient**, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	DSX0 LED 20C 1000			
	1	0.98	0.96	0.93
	DSX0 LED 40C 1000			
	1	0.98	0.95	0.90
	DSX0 LED 40C 700			
	1	0.99	0.99	0.99

Electrical Load

Number of LEDs	Drive Current (mA)	System Watts	Current (A) 120	208	240	277	347	480
20C	530	35	0.34	0.22	0.21	0.20	--	--
	700	45	0.47	0.28	0.24	0.22	0.18	0.14
	1000	72	0.76	0.45	0.39	0.36	0.36	0.26
30C	530	52	0.51	0.31	0.28	0.25	--	--
	700	70	0.72	0.43	0.37	0.34	0.25	0.19
	1000	104	1.11	0.64	0.56	0.49	0.47	0.34
40C	530	68	0.71	0.41	0.36	0.33	0.25	0.19
	700	91	0.94	0.55	0.48	0.42	0.33	0.24
	1000	138	1.45	0.84	0.73	0.64	0.69	0.50

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Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Forward Optics

LEDs	Drive Current (mA)	System Watts	Dist. Type	30K (3000 K, 70 CRI)					40K (4000 K, 70 CRI)					50K (5000 K, 70 CRI)					AMBPC (Amber Phosphor Converted)				
				Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
20C (20 LEDs)	530 mA	35 W	T1S	4,079	1	0	1	117	4,380	1	0	1	125	4,408	1	0	1	126	2,541	1	0	1	73
			T2S	4,206	1	0	1	120	4,516	1	0	1	129	4,544	1	0	1	130	2,589	1	0	1	74
			T2M	4,109	1	0	1	117	4,413	1	0	1	126	4,440	1	0	1	127	2,539	1	0	1	73
			T3S	4,104	1	0	1	117	4,407	1	0	1	126	4,435	1	0	1	127	2,558	1	0	1	73
			T3M	4,142	1	0	1	118	4,447	1	0	1	127	4,475	1	0	1	128	2,583	1	0	1	74
			T4M	4,198	1	0	1	120	4,508	1	0	1	129	4,536	1	0	1	130	2,570	1	0	1	73
			TFTM	4,135	1	0	1	118	4,440	1	0	2	127	4,468	1	0	2	128	2,540	1	0	1	73
			T5VS	4,368	2	0	0	125	4,691	2	0	0	134	4,720	2	0	0	135	2,650	1	0	0	76
			T5S	4,401	2	0	2	126	4,725	2	0	0	135	4,755	2	0	0	136	2,690	1	0	0	77
			T5M	4,408	2	0	1	126	4,734	3	0	1	135	4,763	3	0	1	136	2,658	2	0	0	76
			T5W	4,344	3	0	1	124	4,664	3	0	1	133	4,693	3	0	1	134	2,663	2	0	1	76
			BLC	3,071	1	0	1	88	3,297	1	0	1	94	3,318	1	0	1	95					
			LCCO	2,983	1	0	1	85	3,204	1	0	1	92	3,224	1	0	1	92					
			RCCO	2,983	1	0	1	85	3,204	1	0	1	92	3,224	1	0	1	92					
	700 mA	45 W	T1S	5,181	1	0	1	115	5,563	1	0	1	124	5,598	1	0	1	124	3,144	1	0	1	70
			T2S	5,342	1	0	1	119	5,736	1	0	1	127	5,772	1	0	1	128	3,203	1	0	1	71
			T2M	5,219	1	0	1	116	5,605	1	0	1	125	5,640	1	0	1	125	3,141	1	0	1	70
			T3S	5,213	1	0	1	116	5,598	1	0	1	124	5,633	1	0	1	125	3,165	1	0	1	70
			T3M	5,260	1	0	1	117	5,649	1	0	2	126	5,684	1	0	2	126	3,196	1	0	1	71
			T4M	5,332	1	0	1	118	5,725	1	0	2	127	5,761	1	0	2	128	3,179	1	0	1	71
			TFTM	5,252	1	0	2	117	5,640	1	0	2	125	5,675	1	0	2	126	3,143	1	0	1	70
			T5VS	5,548	2	0	0	123	5,958	2	0	0	132	5,995	2	0	0	133	3,278	2	0	0	73
			T5S	5,589	2	0	0	124	6,002	2	0	0	133	6,039	2	0	0	134	3,328	2	0	0	74
			T5M	5,599	3	0	1	124	6,012	3	0	1	134	6,050	3	0	1	134	3,288	2	0	1	73
			T5W	5,517	3	0	1	123	5,924	3	0	1	132	5,961	3	0	1	132	3,295	2	0	1	73
			BLC	3,909	1	0	1	87	4,198	1	0	1	93	4,224	1	0	1	94					
			LCCO	3,798	1	0	1	84	4,078	1	0	1	91	4,104	1	0	1	91					
			RCCO	3,798	1	0	1	84	4,078	1	0	1	91	4,104	1	0	1	91					
	1000 mA	72 W	T1S	7,085	1	0	1	98	7,608	2	0	2	106	7,656	2	0	2	106					
			T2S	7,305	1	0	1	101	7,845	2	0	2	109	7,894	2	0	2	110					
			T2M	7,138	1	0	2	99	7,665	2	0	2	106	7,713	2	0	2	107					
			T3S	7,129	1	0	1	99	7,656	2	0	2	106	7,704	2	0	2	107					
			T3M	7,194	1	0	2	100	7,725	2	0	2	107	7,773	2	0	2	108					
			T4M	7,292	1	0	2	101	7,830	2	0	2	109	7,879	2	0	2	109					
			TFTM	7,183	1	0	2	100	7,713	1	0	2	107	7,761	1	0	2	108					
			T5VS	7,588	2	0	0	105	8,148	3	0	0	113	8,199	3	0	0	114					
			T5S	7,644	2	0	0	106	8,208	2	0	0	114	8,259	2	0	0	115					
			T5M	7,657	3	0	1	106	8,222	3	0	1	114	8,274	3	0	1	115					
			T5W	7,545	3	0	1	105	8,102	3	0	2	113	8,153	3	0	2	113					
			BLC	5,162	1	0	1	72	5,543	1	0	2	77	5,578	1	0	1	77					
			LCCO	5,015	1	0	2	70	5,386	1	0	2	75	5,419	1	0	2	75					
			RCCO	5,015	1	0	2	70	5,386	1	0	2	75	5,419	1	0	2	75					

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Performance Data

Lumen Output

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Contact factory for performance data on any configurations not shown here.

Forward Optics

LEDs	Drive Current (mA)	System Watts	Dist. Type	30K (3000 K, 70 CRI)					40K (4000 K, 70 CRI)					50K (5000 K, 70 CRI)					AMBPC (Amber Phosphor Converted)				
				Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
40C (40 LEDs)	530 mA	68 W	T1S	7,926	2	0	2	117	8,511	2	0	2	125	8,564	2	0	2	126	4,878	1	0	1	72
			T2S	8,172	2	0	2	120	8,775	2	0	2	129	8,830	2	0	2	130	4,969	1	0	1	73
			T2M	7,985	2	0	2	117	8,574	2	0	2	126	8,628	2	0	2	127	4,874	1	0	1	72
			T3S	7,975	1	0	2	117	8,564	2	0	2	126	8,617	2	0	2	127	4,910	1	0	1	72
			T3M	8,047	2	0	2	118	8,642	2	0	2	127	8,696	2	0	2	128	4,958	1	0	2	73
			T4M	8,157	1	0	2	120	8,759	2	0	2	129	8,813	2	0	2	130	4,932	1	0	2	73
			TFTM	8,035	1	0	2	118	8,628	2	0	2	127	8,682	2	0	2	128	4,876	1	0	2	72
			T5VS	8,488	2	0	0	125	9,115	3	0	0	134	9,172	3	0	0	135	5,086	2	0	0	75
			T5S	8,550	2	0	0	126	9,182	3	0	1	135	9,239	3	0	1	136	5,163	2	0	0	76
			T5M	8,565	3	0	1	126	9,198	3	0	2	135	9,255	3	0	2	136	5,102	3	0	1	75
			T5W	8,440	3	0	2	124	9,063	3	0	2	133	9,120	3	0	2	134	5,112	3	0	1	75
			BLC	6,142	1	0	2	90	6,595	1	0	2	97	6,636	1	0	2	98					
			LCCO	5,967	1	0	2	88	6,407	1	0	2	94	6,447	1	0	2	95					
			RCCO	5,967	1	0	2	88	6,407	1	0	2	94	6,447	1	0	2	95					
	700 mA	91 W	T1S	10,066	2	0	2	111	10,810	2	0	2	119	10,877	2	0	2	120	6,206	2	0	2	68
			T2S	10,379	2	0	2	114	11,145	2	0	2	122	11,215	2	0	2	123	6,322	2	0	2	69
			T2M	10,141	2	0	2	111	10,890	2	0	2	120	10,958	2	0	2	120	6,201	2	0	2	68
			T3S	10,129	2	0	2	111	10,877	2	0	2	120	10,945	2	0	2	120	6,247	1	0	2	69
			T3M	10,221	2	0	2	112	10,975	2	0	2	121	11,044	2	0	2	121	6,308	2	0	2	69
			T4M	10,359	2	0	2	114	11,124	2	0	2	122	11,194	2	0	2	123	6,275	1	0	2	69
			TFTM	10,205	2	0	2	112	10,958	2	0	3	120	11,027	2	0	3	121	6,203	1	0	2	68
			T5VS	10,781	3	0	0	118	11,576	3	0	1	127	11,649	3	0	1	128	6,569	2	0	0	72
			T5S	10,860	3	0	1	119	11,662	3	0	1	128	11,734	3	0	1	129	6,569	2	0	0	72
			T5M	10,879	3	0	2	120	11,682	3	0	2	128	11,755	3	0	2	129	6,491	3	0	1	71
			T5W	10,719	3	0	2	118	11,511	4	0	2	126	11,583	4	0	2	127	6,504	3	0	2	71
			BLC	7,819	1	0	2	86	8,396	1	0	2	92	8,448	1	0	2	93					
			LCCO	7,596	1	0	2	83	8,157	1	0	2	90	8,208	1	0	2	90					
			RCCCO	7,596	1	0	2	83	8,157	1	0	2	90	8,208	1	0	2	90					
	1000 mA	138 W	T1S	13,767	2	0	2	100	14,783	3	0	3	107	14,876	3	0	3	108					
			T2S	14,194	2	0	2	103	15,242	3	0	3	110	15,338	3	0	3	111					
			T2M	13,869	2	0	2	101	14,893	3	0	3	108	14,986	3	0	3	109					
			T3S	13,852	2	0	2	100	14,875	2	0	2	108	14,968	2	0	2	108					
			T3M	13,978	2	0	2	101	15,010	3	0	3	109	15,104	3	0	3	109					
			T4M	14,168	2	0	2	103	15,214	3	0	3	110	15,309	3	0	3	111					
			TFTM	13,956	2	0	3	101	14,987	2	0	3	109	15,080	2	0	3	109					
			T5VS	14,744	3	0	1	107	15,832	3	0	1	115	15,931	4	0	1	115					
			T5S	14,852	3	0	1	108	15,948	3	0	1	116	16,048	3	0	1	116					
			T5M	14,878	4	0	2	108	15,976	4	0	2	116	16,076	4	0	2	116					
			T5W	14,660	4	0	2	106	15,742	4	0	2	114	15,840	4	0	2	115					
			BLC	10,325	1	0	2	75	11,087	1	0	2	80	11,156	1	0	2	81					
			LCCO	10,031	2	0	2	73	10,771	2	0	3	78	10,839	2	0	3	79					
			RCCO	10,031	2	0	2	73	10,771	2	0	3	78	10,839	2	0	3	79					

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Performance Data

L90 and R90 Rotated Optics

LEDs	Drive Current (mA)	System Watts	Dist. Type	30K (3000 K, 70 CRI)					40K (4000 K, 70 CRI)					50K (5000 K, 70 CRI)					AMBPC (Amber Phosphor Converted)				
				Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW	Lumens	B	U	G	LPW
30C (30 LEDs)	530 mA	52 W	T1S	6,130	2	0	2	118	6,583	2	0	2	127	6,624	2	0	2	127	3,841	2	0	2	74
			T2S	6,321	2	0	2	122	6,787	2	0	2	131	6,830	3	0	3	131	3,912	2	0	2	75
			T2M	6,176	2	0	2	119	6,632	3	0	3	128	6,673	3	0	3	128	3,837	2	0	2	74
			T3S	6,168	2	0	2	119	6,624	3	0	3	127	6,665	3	0	3	128	3,866	2	0	2	74
			T3M	6,224	3	0	3	120	6,684	3	0	3	129	6,726	3	0	3	129	3,904	2	0	2	75
			T4M	6,309	3	0	3	121	6,775	3	0	3	130	6,817	3	0	3	131	3,884	2	0	2	75
			TFTM	6,215	3	0	3	120	6,673	3	0	3	128	6,715	3	0	3	129	3,839	2	0	2	74
			T5VS	6,565	2	0	0	126	7,050	2	0	0	136	7,094	2	0	0	136	4,005	2	0	0	77
			T5S	6,613	2	0	0	127	7,102	2	0	0	137	7,146	2	0	0	137	4,065	2	0	0	78
			T5M	6,625	3	0	1	127	7,114	3	0	1	137	7,159	3	0	1	138	4,017	2	0	1	77
			T5W	6,528	3	0	1	126	7,010	3	0	2	135	7,054	3	0	2	136	4,025	3	0	1	77
			BLC	4,747	2	0	2	91	5,098	2	0	2	98	5,130	2	0	2	99					
			LCCO	4,612	1	0	2	89	4,953	1	0	2	95	4,984	1	0	2	96					
			RCCO	4,612	1	0	2	89	4,953	1	0	2	95	4,984	1	0	2	96					
	700 mA	70 W	T1S	7,786	2	0	2	111	8,361	3	0	3	119	8,413	3	0	3	120	4,783	2	0	2	68
			T2S	8,028	2	0	2	115	8,620	3	0	3	123	8,674	3	0	3	124	4,873	2	0	2	70
			T2M	7,844	3	0	3	112	8,423	3	0	3	120	8,476	3	0	3	121	4,779	2	0	2	68
			T3S	7,834	3	0	3	112	8,413	3	0	3	120	8,465	3	0	3	121	4,815	2	0	2	69
			T3M	7,905	3	0	3	113	8,489	3	0	3	121	8,542	3	0	3	122	4,862	3	0	3	69
			T4M	8,013	3	0	3	114	8,604	3	0	3	123	8,658	3	0	3	124	4,837	3	0	3	69
			TFTM	7,893	3	0	3	113	8,476	3	0	3	121	8,529	3	0	3	122	4,781	3	0	3	68
			T5VS	8,338	2	0	0	119	8,954	3	0	0	128	9,010	3	0	0	129	4,988	2	0	0	71
			T5S	8,400	2	0	0	120	9,020	3	0	1	129	9,076	3	0	1	130	5,063	2	0	0	72
			T5M	8,414	3	0	1	120	9,036	3	0	2	129	9,092	3	0	2	130	5,003	3	0	1	71
			T5W	8,291	3	0	2	118	8,903	3	0	2	127	8,959	3	0	2	128	5,013	3	0	1	72
			BLC	6,044	2	0	2	86	6,490	3	0	3	93	6,530	3	0	3	93					
			LCCO	5,872	1	0	2	84	6,305	1	0	2	90	6,345	1	0	2	91					
			RCCO	5,872	1	0	2	84	6,305	1	0	2	90	6,345	1	0	2	91					
	1000 mA	104 W	T1S	10,648	3	0	3	102	11,434	3	0	3	110	11,506	3	0	3	111					
			T2S	10,979	3	0	3	106	11,789	3	0	3	113	11,863	3	0	3	114					
			T2M	10,727	3	0	3	103	11,519	3	0	3	111	11,591	3	0	3	111					
			T3S	10,714	3	0	3	103	11,505	3	0	3	111	11,577	3	0	3	111					
			T3M	10,812	3	0	3	104	11,610	4	0	4	112	11,682	4	0	4	112					
			T4M	10,958	3	0	3	105	11,767	3	0	3	113	11,841	3	0	3	114					
			TFTM	10,795	3	0	3	104	11,592	3	0	3	111	11,664	4	0	4	112					
			T5VS	11,404	3	0	0	110	12,245	3	0	1	118	12,322	3	0	1	118					
			T5S	11,487	3	0	1	110	12,336	3	0	1	119	12,413	3	0	1	119					
			T5M	11,508	3	0	2	111	12,357	4	0	2	119	12,434	4	0	2	120					
			T5W	11,339	4	0	2	109	12,176	4	0	2	117	12,252	4	0	2	118					
			BLC	7,981	3	0	3	77	8,570	3	0	3	82	8,624	3	0	3	83					
			LCCO	7754	1	0	2	75	8326	2	0	2	80	8378	2	0	2	81					
			RCCO	7754	1	0	2	75	8326	2	0	2	80	8378	2	0	2	81					

FEATURES & SPECIFICATIONS

INTENDED USE
The sleek design of the D-Series Size 0 reflects the embedded high performance LED technology. It is ideal for many commercial and municipal applications, such as parking lots, plazas, campuses, and pedestrian areas.

CONSTRUCTION
Single-piece die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. Modular design allows for ease of maintenance and future light engine upgrades. The LED driver is mounted in direct contact with the casting to promote low operating temperature and long life. Housing is completely sealed against moisture and environmental contaminants (IP65). Low EPA (0.95 ft^2) for optimized pole wind loading.

FINISH
Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering. A tightly controlled multi-stage process ensures a minimum 3 mils thickness for a finish that can withstand extreme climate changes without cracking or peeling. Available in both textured and non-textured finishes.

OPTICS
Precision-molded proprietary acrylic lenses are engineered for superior area lighting distribution, uniformity, and pole spacing. Light engines are available in 3000 K, 4000 K or 5000 K (70 CRI) or optional 3000 K (70 minimum CRI) or 5000 K (70 CRI) configurations. The D-Series Size 0 has zero uplight and qualifies as a Nighttime Friendly™ product, meaning it is consistent with the LEED® and Green Globes™ criteria for eliminating wasteful uplight.

ELECTRICAL
Light engine(s) configurations consist of 20, 30 or 40 high-efficacy LEDs mounted to metal-core circuit boards to maximize heat dissipation and promote long life (up to L99/100,000 hours at 25°C). Class 1 electronic drivers are designed to have a power factor >90%, THD <20%, and an expected life of 100,000 hours with <1% failure rate. Easily serviceable 10kV or 6kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).

INSTALLATION
Included mounting block and integral arm facilitate quick and easy installation. Stainless steel bolts fasten the mounting block securely to poles and walls, enabling the D-Series Size 0 to withstand up to a 3.0 G vibration load rating per ANSI C136.31. The D-Series Size 0 utilizes the AERIS™ series pole drilling pattern (template #8). Optional terminal block, tool-less entry, and NEMA photocontrol receptacle are also available.

LISTINGS
UL Listed for wet locations. Light engines are IP66 rated; luminaire is IP65 rated. Rated for -40°C minimum ambient. U.S. Patent No. D672,492 S. International patent pending.

DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at www.designlights.org to confirm which versions are qualified.

WARRANTY
5-year limited warranty. Complete warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.

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D-Series Bollard w/ 16 4000K LEDS Operated at 530mA & Symmetric Distribution

D-Series
LED Bollard

d"series

Catalog Number

Notes

Type

Introduction

The D-Series LED Bollard is a stylish, energy-saving, long-life solution designed to perform the way a bollard should—with zero uplight. An optical leap forward, this full cut-off luminaire will meet the most stringent of lighting codes. The D-Series LED Bollard's rugged construction, durable finish and long-lasting LEDs will provide years of maintenance-free service.

Specifications

Diameter: 8" Round (20.3 cm)

Height: 42" (106.7 cm)

Weight (max): 27 lbs (12.25 kg)

Ordering Information

EXAMPLE: DSXB LED 16C 700 40K SYM MVOLT DDBXD

DSXB LED

Series	LEDs	Drive current	Color temperature	Distribution	Voltage	Control options	Other options	Finish
DSXB LED	**Asymmetric** 12C 12 LEDs[1] **Symmetric** 16C 16 LEDs[2]	350 350 mA 450 450 mA [3,4] 530 530 mA 700 700 mA	30K 3000 K 40K 4000 K 50K 5000 K AMBPC Amber phosphor converted AMBLW Amber limited wavelength [3,4]	ASY Asymmetric [1] SYM Symmetric [2]	MVOLT [5] 120 [5] 208 [5] 240 [5] 277 [5] 347 [4]	**Shipped installed** PE Photoelectric cell, button type DMG 0-10V dimming driver (no controls) ELCW Emergency battery backup[6]	**Shipped installed** SF Single fuse (120, 277, 347V) [4,7] DF Double fuse (208, 240V) [4,7] H24 24" overall height H30 30" overall height H36 36" overall height FG Ground-fault festoon outlet L/AB Without anchor bolts L/AB4 4-bolt retrofit base without anchor bolts [8]	DWHXD White DNAXD Natural aluminum DDBXD Dark bronze DBLXD Black DDBTXD Textured dark bronze DBLBXD Textured black DNATXD Textured natural aluminum DWHGXD Textured white

Accessories

Ordered and shipped separately.

MRAB U Anchor bolts for DSXB [8]

NOTES

1. Only available in the 12C, ASY version.
2. Only available in the 16C, SYM version.
3. Only available with 450 AMBLW version.
4. Not available with ELCW.
5. MVOLT driver operates on any line voltage from 120-277V (50/60 Hz). Specify 120, 208, 240 or 277 options only when ordering with fusing (SF, DF options), or photocontrol (PE option).
6. Not available with 347V. Not available with fusing. Not available with 450 AMBLW.
7. Single fuse (SF) requires 120, 277, or 347 voltage option. Double fuse (DF) requires 208 or 240 voltage option.
8. MRAB U not available with L/AB4 option.

LITHONIA LIGHTING.
One Lithonia Way • Conyers, Georgia 30012 • Phone: 800.279.8041 • Fax: 770.918.1209 • www.lithonia.com
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Performance Data

Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown, within the tolerances allowed by Lighting Facts. Actual performance may differ as a result of end-user environment and application. Actual wattage may differ by +/- 8% when operating between 120-480V +/- 10%.

Light Engines	Drive Current	System Watts	3000 K					4000 K					5000 K					Limited Wavelength Amber				
			Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G	Lumens	LPW	B	U	G
Asymmetric (12 LEDs)	350	16	1,194	75	1	0	1	1,283	80	1	0	1	1,291	81	1	0	1					
	530	22	1,719	78	1	0	1	1,847	84	1	0	1	1,859	85	1	0	1					
	700	31	2,173	70	1	0	1	2,335	75	1	0	1	2,349	76	1	0	1					
	Amber 450	16																348	22	1	0	1
Symmetric (16 LEDs)	350	20	1,558	78	1	0	0	1,674	84	1	0	0	1,685	84	1	0	0					
	530	28	2,232	80	2	0	1	2,397	86	2	0	1	2,412	86	2	0	1					
	700	39	2,802	72	2	0	1	3,009	77	2	0	1	3,028	78	2	0	1					
	Amber 450	20																419	21	1	0	1

Note: Available with phosphor-converted amber LED's (nomenclature AMBPC). These LED's produce light with 97+% >530 nm. Output can be calculated by applying a 0.7 factor to 4000 K lumen values and photometric files.

Projected LED Lumen Maintenance

Data references the extrapolated performance projections for the platforms noted in a **25°C ambient**, based on 10,000 hours of LED testing (tested per IESNA LM-80-08 and projected per IESNA TM-21-11).

To calculate LLF, use the lumen maintenance factor that corresponds to the desired number of operating hours below. For other lumen maintenance values, contact factory.

Operating Hours	0	25,000	50,000	100,000
Lumen Maintenance Factor	1.00	0.98	0.97	0.95

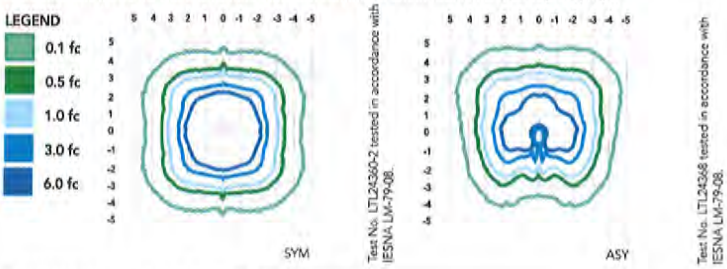
Electrical Load

Light Engines	Drive Current (mA)	System Watts	Current (A) 120	208	240	277	347
12C	350	16W	0.158	0.118	0.114	0.109	0.105
	530	22W	0.217	0.146	0.136	0.128	0.118
	700	31W	0.296	0.185	0.168	0.153	0.139
	Amber 450	16W	0.161	0.120	0.115	0.110	0.106
16C	350	20W	0.197	0.137	0.128	0.121	0.114
	530	28W	0.282	0.178	0.162	0.148	0.135
	700	39W	0.385	0.231	0.207	0.185	0.163
	Amber 450	20W	0.199	0.139	0.130	0.123	0.116

Photometric Diagrams

To see complete photometric reports or download .ies files for this product, visit Lithonia Lighting's D-Series Bollard homepage.

Isofootcandle plots for the DSXB LED 700 40K. Distances are in units of mounting height (3').



FEATURES & SPECIFICATIONS

INTENDED USE

The rugged construction and maintenance-free performance of the D-Series LED Bollard is ideal for illuminating building entryways, walking paths and pedestrian plazas, as well as any other location requiring a low-mounting-height light source.

CONSTRUCTION

One-piece 8-inch-round extruded aluminum shaft with thick side walls for extreme durability, and die-cast aluminum reflector and top cap. Die-cast aluminum mounting ring allows for easy leveling even in uneven areas and full 360-degree rotation for precise alignment during installation. Three ½" x 11" anchor bolts with double nuts and washers and 3-5/8" max. bolt circle template ensure stability. Overall height is 42" standard.

FINISH

Exterior parts are protected by a zinc-infused super durable TGIC thermoset powder coat finish that provides superior resistance to corrosion and weathering for maximum retention of gloss and luster. A tightly controlled multi-stage process ensures a minimum 3-mil thickness for a finish that can withstand the elements without cracking or peeling. Available in both textured and non-textured finishes.

OPTICS

Two 0% uplight optical distributions are available: symmetrical and asymmetrical. IP66 sealed LED light engine provides smoothly graduated illumination without uplight. Light engines are available in standard 4000 K (>70 CRI) or optional 3000 K (>80 CRI) or 5000 K (67 CRI). Limited-wavelength amber LEDs are also available.

ELECTRICAL

Light engines consist of high-efficacy LEDs mounted to metal-core circuit boards to maximize heat dissipation and promote long life (L95/100,000 hours at 700mA at 25°C). Class 2 electronic drivers are designed for an expected life of 100,000 hours with < 1% failure rate. Electrical components are mounted on a removable power tray.

LISTINGS

CSA certified to U.S. and Canadian standards. Light engines are IP66 rated. Rated for -40°C minimum ambient. Cold-weather emergency battery backup rated for -20°C minimum ambient.

DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at www.designlights.org to confirm which versions are qualified.

WARRANTY

Five-year limited warranty. Complete warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx.

Note: Actual performance may differ as a result of end-user environment and application.
All values are design or typical values, measured under laboratory conditions at 25 °C.
Specifications subject to change without notice.

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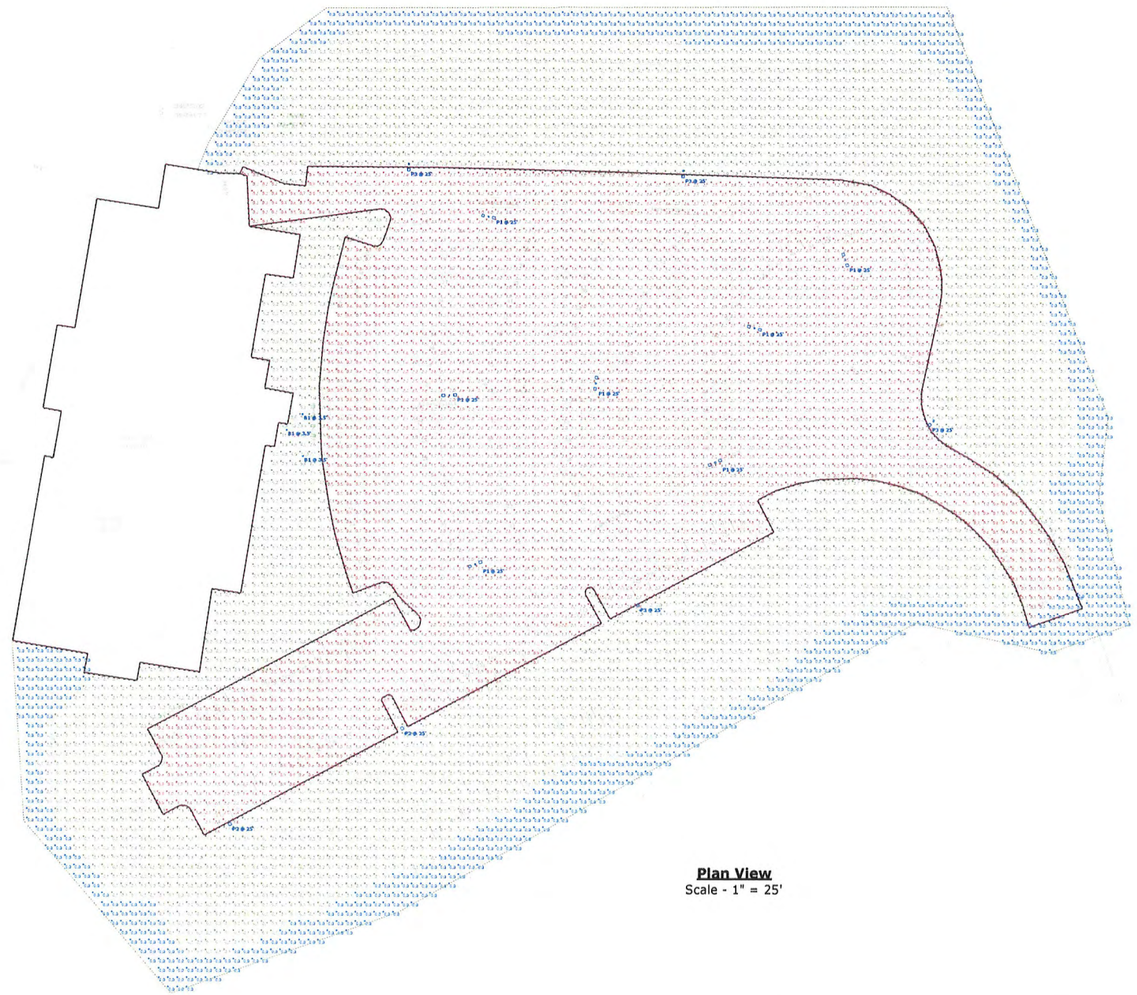

Plan View
Scale - 1" = 25'

Note

1. Calculations taken at 0' AFF
2. Fixture mounting height shown on plan view

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Outer Perimeter	+	0.3 fc	12.3 fc	0.0 fc	N/A	N/A
Parking Area	+	1.9 fc	4.5 fc	0.0 fc	N/A	N/A

These drawings are for conceptual use only and are not intended for construction. Values represented are an approximation generated from manufacturers photometric inhouse or independent lab tests with data supplied by lamp manufacturers.

Schedule

Symbol	Label	Quantity	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Filename	Lumens Per Lamp	Light Loss Factor	Wattage
	P1	7	Lithonia Lighting	DSX0 LED 40C 700 40K TFTM MVOLT	DSX0 LED with 40 LEDs @700 mA, 4000K, Type Forward Throw Medium Optics	LED	1	DSX0_LED_40C_700_40K_TFTM_MVOLT.ies	10958	0.9	182
	P2	2	Lithonia Lighting	DSX0 LED 40C 700 40K TFTM MVOLT	DSX0 LED with 40 LEDs @700 mA, 4000K, Type Forward Throw Medium Optics	LED	1	DSX0_LED_40C_700_40K_TFTM_MVOLT.ies	10958	0.9	91
	P3	4	Lithonia Lighting	DSX0 LED 40C 700 40K T2M MVOLT	DSX0 LED with 40 LEDs @700 mA, 4000K, Type 2 Medium Optics	LED	1	DSX0_LED_40C_700_40K_T2M_MVOLT.ies	10889	0.9	91
	B1	3	Lithonia Lighting	DSXB LED 16C 530 40K SYM	D-SERIES BOLLARD WITH 16 4000K LEDS OPERATED AT 530mA AND SYMMETRIC DISTRIBUTION	LED	1	DSXB_LED_16C_530_40K_SYM.ies	1603	0.9	28

VISUAL

CDS Site Lighting REV 01
Lithonia
07-06-2016

Designer
Robert J.
Date
07/06/2016
Scale
Not to Scale
Project No.
Summary

Waste Management

WM2.1 Construction Waste

Development and redevelopment projects shall address the disposal of construction waste at both the construction and post-construction phases of development or redevelopment. To do so, a plan shall be provided to demonstrate how the applicant proposes to handle solid wastes, construction and demolition (C&D) wastes, and recyclable materials currently categorized by the Massachusetts Department of Environmental Protection (MassDEP) as a waste ban material.

Solid waste generated by Convention Data Services operations is limited to general office waste and recyclable cardboard. This waste will be stored within a segregated dumpster located within the area identified in the site plan. Snack and beverage vending machines are the only food services available at Convention Data Services, generating a negligible amount of solid waste, and recycling facilities are available in the employee breakroom for aluminum, glass, and plastic containers. Solid waste and recyclable materials are transferred by a contract licensed waste hauler to the Bourne Transfer Station on an as needed basis. Post-development operation of Convention Data Services is not expected to result in a significant increase in the solid waste stream. Convention Data Services will continue to collect and recycle recyclable materials.

WM2.2 C&D Waste Plan

If C&D waste is to be generated as a part of the proposed development or redevelopment, a plan shall be provided that specifies:

1. *a listing of C&D wastes that will be generated during the development or redevelopment;*
2. *the method for separating, storing, transporting, and disposing of gypsum (wall board and sheetrock) from the remainder of the waste stream; and*
3. *the methods that will be used to recycle or dispose of those remaining materials in the C&D waste stream.*

Prior to the initiation of redevelopment activities, the site contractor will prepare a construction mitigation plan, specifying:

1. the types of materials that will be generated during construction and demolition activities;

2. procedures for segregation, storage, and recycling of recyclable materials generated during demolition or construction activities; and,
3. the destination and end use of all recycled materials segregated from the construction and demolition waste stream.

WM2.3 Post-construction Waste

A solid waste and recycling management plan shall be provided that identifies how both solid wastes and recyclable materials will be handled in the post-construction phase of the development. In particular, the applicant shall provide a plan detailing how waste ban materials (particularly plastic, glass containers, and cardboard) will be collected, stored on site, and recycled.

Solid waste and recyclables at Convention Data Services will continue to be stored within containers located in the area identified in the site plan. Solid waste will continue to be transferred to the Bourne Transfer Station by a waste removal service on regular intervals. Recyclable materials collected at Convention Data Services will be transferred to the Bourne Transfer Station on an as needed basis. Development of Convention Data Services will not include the addition of food services. Vending machines on site will not result in significant food waste or necessitate food waste composting practices.

Landscape Operations and Management Plans

Lot 7 Technology Park Drive

Prepared by: J.E. Landers-Cauley, P.E.

8/1/2016

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A. LANDSCAPE MANAGEMENT APPROACH

In addition to meeting the Cape Cod Commission criteria, the landscape plan for this office development is designed to:

- Provide an enjoyable outdoor environment for patrons and an aesthetic amenity for residents and passers-by. Lush at-grade plantings to compliment the building with a variety of attractive and native plant species.
- Protect the health of residents, workers, and customers, as well as the environment, by minimizing use of pesticides (herbicides, insecticides, fungicides, and rodenticides). Plant selection emphasizes native plants and hardy cultivars to prevent pests and the use of harmful chemicals, especially where they may contact people or wash off in surface water. Pest, weed and disease problems that arise are managed through "Integrated Pest Management" (IPM) methods described below.

B. LANDSCAPE MANAGEMENT SCHEDULE

See Sections C through F for definitions and specific practices required by this landscape management plan.

April:

- Prune any tree branches that interfere with public safety or sight lines. Prune all trees around the buildings yearly to encourage strong upward growth. Do not top trees.
- Check and remove sediment from fore bay and Bio-swale channel using hand methods (i.e., a person with a shovel) when cleaning to minimize disturbance to vegetation and underlying soils.
- Apply granular fertilizer around trees or shrubs in late April. Make application prior to a moderate rainfall so the rain will wash the fertilizer in. Do not fertilize swale plantings.
- Fertilize all designated landscape areas except for swale. The fertilization of shrubs/groundcover areas may be eliminated when the plants reach maturity or completely fill the planting areas, without space between them. Written authorization from the owner's representative is required before the fertilization may be eliminated from the required work.
- Flush out irrigation systems as needed, run and check for proper operation of each valve zone. Test sensors (rain, soil, or weather sensors).
- Clean or replace plugged sprinkler nozzles. Replace plugged drip emitters.
- Replace irrigation controller program back-up batteries.
- By April 15th, weather permitting, all old mulch shall be removed from the base of shrubs and the root flare of all trees, and fresh mulch shall be applied. The depth of mulching shall be 2-3 inches, but shall not exceed 3 inches total.
- In bio-retention areas, only composted shredded hardwood bark mulch shall be used and shall be applied no deeper than 2-3 inches.
- For any of the plantings shown on the plans which are not within range of the Owner's automated irrigation system, these plantings shall be hand watered. Specifically, the

root balls of the shrubs and trees shall be deeply irrigated every 5 to 7 days when rainfall does not provide 1 inch of water per week.

May:

- Turn on irrigation system, run and visually inspect for proper zone coverage. Set ET-based, weather or soil sensor-based.
- For any of the plantings shown on the plans which are not within range of the Owner's automated irrigation system, these plantings shall be hand watered. Specifically, the root balls of the shrubs and trees shall be deeply irrigated every 5 to 7 days when rainfall does not provide 1 inch of water per week.

June:

- Prune spring and winter-flowering shrubs as needed to maintain proper shape (natural, touching, not hedged or topiary except where specified by owner).
- Add new mulch to planters where the mulch depth has been reduced to less than 2 inches (5 cm) thick. Mulch not required where shrubs or groundcover completely hide the soil surface from view.
- For any of the plantings shown on the plans which are not within range of the Owner's automated irrigation system, these plantings shall be hand watered. Specifically, the root balls of the shrubs and trees shall be deeply irrigated every 5 to 7 days when rainfall does not provide 1 inch of water per week.

July:

- Add new mulch to planters where the mulch depth has been reduced to less than 2 inches (5 cm) thick. Mulch not required where shrubs or groundcover completely hide the soil surface from view.
- For any of the plantings shown on the plans which are not within range of the Owner's automated irrigation system, these plantings shall be hand watered. Specifically, the root balls of the shrubs and trees shall be deeply irrigated every 5 to 7 days when rainfall does not provide 1 inch of water per week.

August:

- Add new mulch to planters where the mulch depth has been reduced to less than 2 inches (5 cm) thick. Mulch not required where shrubs or groundcover completely hide the soil surface from view.
- For any of the plantings shown on the plans which are not within range of the Owner's automated irrigation system, these plantings shall be hand watered. Specifically, the root balls of the shrubs and trees shall be deeply irrigated every 5 to 7 when rainfall does not provide 1 inch of water per week.

September:

- Fertilize all designated landscape areas except for swale in September or early October. The fertilization of shrubs/groundcover areas may be eliminated when the plants reach maturity or completely fill the planting areas, without space between them. Written authorization from the owner's representative is required before the fertilization may be eliminated from the required work. Fertilizer shall not be used in bio-retention areas unless it is organic and worked into the soil under the mulch.
- Soil and plant tissue shall be tested and slow-release fertilizer shall be applied as needed to maintain healthy growing conditions for shrubs, trees, and grasses.
- Inventory all plant materials. Inventory shall include an exact count of all shrubs and trees, itemized by planter. Replace any dead or missing plants subject to the terms of these specifications.
- Add new mulch to planters where the mulch depth has been reduced to less than 2 inches (5 cm) thick. Mulch not required where shrubs or groundcover completely hide the soil surface from view.
- For any of the plantings shown on the plans which are not within range of the Owner's automated irrigation system, these plantings shall be hand watered. Specifically, the root balls of the shrubs and trees shall be deeply irrigated every 5 to 7 days when rainfall does not provide 1 inch of water per week.

October:

- Check and remove sediment from fore bay and Bio-swale channel using hand methods (i.e., a person with a shovel) when cleaning to minimize disturbance to vegetation and underlying soils.
- Have backflow preventer (on irrigation water supply) tested annually by approved plumbing technician.
- Turn off and prepare irrigation system for winter. Make sure backflow preventer is well-insulated or drained prior to first freeze. Blow out pipes using compressed air in areas where freezing could result in breakage. Drain drip irrigation lines as recommended by manufacturer. Any winter damage to irrigation system due to insufficient winterization shall be the responsibility of the contractor to repair.
- Prune any tree branches that interfere with public safety. Prune all parking lot and street trees yearly as needed to remove dead and crossing branches and to encourage spreading and upward growth that fits the available space. Do not top trees.
- Prune summer and fall-blooming shrubs as needed to maintain proper shape.
- Add new mulch to planters where the mulch depth has been reduced to less than 2 inches (5 cm) thick. Mulch not required where shrubs or groundcover completely hide the soil surface from view.
- For any of the plantings shown on the plans which are not within range of the Owner's automated irrigation system, these plantings shall be hand watered. Specifically, the root balls of the shrubs and trees shall be deeply irrigated every 5 to 7 days when rainfall does not provide 1 inch of water per week.

C. LANDSCAPE MANAGEMENT AREAS

C.1. Grounds maintenance - all outdoor areas Clean-up:

- Remove biodegradable landscape debris to a yard waste recycling facility, leaves, branches, annuals, dead plant material, potting soil, etc. No biodegradable material should be disposed of in garbage to land fill sites.
- All trash and sticks are to be picked up from designated planting areas prior to mowing.
- A biweekly general clean-up program will be performed. The clean-up program shall include a policing of all maintained areas for the removal of trash (paper, cans, bottles, etc.) and landscape waste such as fallen sticks and limbs.
- All trash and landscape debris shall be removed and disposed of offsite.
- Mulch is to be maintained clear of building foundations and paved areas, and off utility covers.
- Debris shall not be carried into patios, entryways or doorways.
- Debris deposited by typical weather occurrences will be cleaned up.
- Sweep patios and sidewalks at least biweekly.

Fall leaf removal - September through October

- On as needed basis remove leaves from Bio-swale to prevent heavy build-up and damage to Bio-swale by smothering. A single layer of leaves may be mulch-mowed into the Bio-swale. Thicker accumulations should be removed.
- Leaves may be raked or shredded by mower and blown into shrub beds for mulch as directed by Owner's Agent, or accumulated leaves will be raked and/or blown from designated planting areas, high maintenance bed areas and collected and removed from property and disposed of offsite.

C.2 Pruning - Trees, Shrubs, Vines and Groundcovers

Trees

- Trees shall be maintained in a healthy, vigorous growing condition, free from disease and large concentrations of pests.
- Prune trees only to remove dead, diseased, broken, dangerous, or crossing branches, and as required below.
- Prune in accordance with generally accepted standards for proper pruning. Use of a certified arborist, particularly with significant trees, is recommended.
- Discard all tree trimmings offsite using a legal method.
- Any tree found to be dead or missing shall be replaced with plant material of identical species at the landscape maintenance contractor's expense, unless the loss was due to excluded damage. Replacement trees shall be approved for size and appearance by the owner's authorized representative prior to planting.
- Remove tree stakes from trees after one growing season. Check tree ties to adjust and loosen as needed after the first growing season. Remove stakes from site and dispose of by a legal method. Recycle used stakes if possible.

- Once a year, prune all trees to encourage a high-branching structure. Remove all non-structural branches between the ground and a point half the tree's total height (for tall trees don't remove branches higher than 20' (6 m) above the ground). Exception to the above: trees planted for screening purposes, such as those at rear perimeters of many sites shall not be pruned except as needed to remove dead, diseased, broken, dangerous or crossing branches.
- All sucker growth from trunk and base of trees shall be removed monthly or as required up to twelve (12') from the ground to maintain a clean appearance.
- The cutting blades on pruning shears, clippers, blades, saws, etc. shall be sterilized after pruning each tree to minimize the possibility of spreading disease. When pruning trees known or suspected to be diseased, cutting blades shall be sterilized (with 10% bleach solution or other approved) after each cut.
- A vertical clearance of 114 inches is required above all parking spaces. A vertical clearance of 80 inches is required above all walkways. Trim trees to remove all limbs within these areas.

Shrubs

- Shrubs shall be kept in a healthy, vigorous condition, free from disease and large concentrations of pests.
- Shrubs shall be pruned only as needed to remove branches that are dead, broken, extending beyond the face of curbs or sidewalks, or are climbing building walls (not applicable to specified vines). Formal hedges and topiary shall be regularly pruned to maintain a uniform height and width. Except as noted previously, allow the shrubs to grow in their natural form to their mature sizes.
- Shrubs uniformly planted around the perimeter of tree pits shall be pruned so as to encourage a continuous planting where individual plants are not identifiable. Prune to encourage a dense, continuous planting, with natural shape and branches reaching full to the ground.
- All other shrubs shall be pruned only as required for safety, visibility, and plant health, and allowed to develop into the natural shapes expected of the plant variety. Do not shear shrubs into topiary (shapes) unless specifically instructed.
- Allow shrubs two (2) months to rejuvenate following a hard frost prior to pruning or replacing.
- Any shrub found to be dead or missing shall be replaced with plant material of identical species at the landscape maintenance contractor's expense, unless the loss was due to excluded damage.
- When pruning shrubs known or suspected to be diseased, the cutting blades shall be sterilized after each cut.

Groundcovers

- Groundcover shall be maintained in a healthy, vigorous growing condition.
- Any groundcover found to be dead or missing shall be replaced with plant material of identical species at the landscape maintenance contractor's expense, unless the loss was due to excluded damage.
- Keep groundcover trimmed to edge of sidewalks, curbs, and paved areas on a monthly basis. Do not create vertical edges when pruning groundcover. Cut the edges at an angle /--\ for a more natural appearance and healthier plants. Prune so groundcover

just overlaps adjoining paving; an open mulch strip here allows weeds to take hold and trash to accumulate.

- If regular foot traffic through a planter is preventing the groundcover from reaching full coverage of the soil, contact the owner's authorized representative to discuss options for redirecting the foot traffic. Consider installing pavers, stepping stones, a concrete walk, a gravel path, and/or barriers to redirect pedestrians.

C.3 Fertilizer - Trees, Shrubs, Vines and Groundcovers

- Do not fertilize plantings in the swale (rain garden).
- Fertilizers shall be either organically derived or slow-release synthetic products, to minimize water pollution and feed plants over a longer period of time.
- Granular slow release or organic fertilizer shall be 5-5-5 formulation or similar, applied per label rate for plant type. Water immediately after applying to move the fertilizer into the soil and wash the fertilizer off of plant surfaces.
- When applying granular fertilizers to drip-irrigated areas, the fertilizer must be washed in by hand or rainfall before turning on the drip system. Running the drip system immediately after application will push the fertilizer away from the emitters, resulting in a high concentration of fertilizer at the edge of the wetted zone. This highly-concentrated fertilizer can kill or damage plants. It is recommended that granular fertilizers be applied to drip-irrigated areas only in early spring, just prior to a moderate rainfall.

C.4 Mulch layer - Trees, Shrubs, Vines and Groundcovers

Maintaining a deep layer of mulch greatly reduces the labor and materials needed to control weeds, reduces water use, and helps the plants stay healthy.

- Add additional mulch regularly to maintain a layer no less than 2 inches (5 cm) deep at all times in shrub planters, tree wells, and beds where plants have not yet closed in over soil surface. Decomposition of organic mulch is considered normal wear and tear, and replacement of decomposed mulch is required seasonally. Mulch is not required in areas where plant foliage completely covers the soil surface, such that the soil is not visible through the foliage. Any mulch found outside planter areas shall be returned to the planter on a biweekly basis.
- Mulch shall be uniform in color and appearance, and free of sticks or trash. Mulch may be compost, shredded fall leaves (with Owner's permission), or chipped or shredded wood, such as arborist chips, hog fuel, or play chips. Bark is less preferable, because it does not feed the soil as readily, may seal the surface preventing water entry, and may inhibit some plants' growth. When replacing existing mulch, use a mulch product that is similar in appearance to that already at the site.

D. INTEGRATED PEST (WEED, INSECT and DISEASE) MANAGEMENT

Definition: "Integrated Pest Management, or IPM, is an approach to pest control [weeds, insects and diseases] that uses regular monitoring to determine if and when treatments are needed, and employs physical, mechanical, cultural and biological tactics to keep pest numbers low enough to prevent intolerable damage or annoyance. Least-toxic chemical controls are used as a last resort."

D.1 Weed Control for Trees, Shrubs, Vines, and Groundcovers

- Weeds in planted areas, sidewalks, curbs, gutters, or pavement shall be removed or killed weekly as the weeds emerge. Weeds shall be removed (not just killed) if they are larger than 2 inches (5 cm) in height or diameter. Dispose of weeks off-site. The cost of all weed control work shall be included in the contract price for landscape maintenance. Regular maintenance of the mulch layer will help minimize weeds in shrub and groundcover areas.
- Contractor is strongly encouraged to use Integrated Pest Management techniques for controlling weeds. Techniques include mulching, pulling, allowing plantings to grow densely and shade ground, heat and hot water controls. If herbicides must be used, choose the least toxic available and spot apply on weeds. Pre-emergent herbicides are not allowed - maintaining a thick mulch layer combined with mechanical weeding as is effect.

D.2 Weed, Insect, and Disease Control for Planting Areas

- Weed invasion can be effectively prevented or reversed by growing dense lawn, through the above recommended practices. Tolerate some broad-leaved plants in planting areas. Identify problem (invasive) weeds and target only those species.
- Control weeds in planting areas by removal where practical (long-handled weed-pullers do this quickly), and remove them regularly before they go to seed. If weeds have over-run an area, spot-application of the least toxic herbicide is permitted.
- No broadcast herbicide or "weed and feed" products may be applied.
- Moderately fertilized planting areas on well drained organic-rich soils rarely has serious disease problems. Correcting poor soil conditions or cultural practices (like over-watering or over fertilization) will prevent diseases.

D.3 General IPM Steps and Methods

IPM Steps include:

1. Prevention first: plant vigorous, pest-resistant, site-adapted varieties. Plan cultural practices to minimize pests (watering, mulching, pruning, etc.).
2. Identify/know the pest (weed, etc.) life-cycle.
3. Set action thresholds - tolerate some damage.
4. Monitor regularly (keep records of monitoring).
5. When pests exceed threshold, use control method with the least non-target impact. (Try cultural, physical, or biological methods first. As a last resort, use spot applications of least toxic chemical). Only treat when the pest is most vulnerable and its natural enemies are in their least susceptible life stage.
6. Keep records of control methods and results, evaluate, and adapt cultural practices.
7. Replace problem plants/designs with more pest, disease and weed-resistant varieties.

D.4 Weed Control Methods - General Guidelines

- Crowd out weeds with dense healthy plantings, ground covers and shade canopies.
- Accept a few weeds - target the problem ones.
- Mulch beds in fall, winter, or early spring.
- Control weeds before they go to seed.

- Hoe, pull, mow, or till (mulch makes hoeing easier).
- Use barriers: newspaper or cardboard covered with mulch, root barriers for spreading plants. Landscape fabric can create problems as weeds grow through it - paper or cardboard is better.
- Don't over-fertilize - it promotes weeds and pests.
- Spot apply the least-toxic chemical (e.g., soap and vinegar based weed killers, or cut-and-paint stems with systemic herbicides) to minimize non-weed impacts.
- If a pesticide must be used, post signs for at least 24 hours stating: area affected; date/time applied; specific pesticide used; re-entry cautions (from label); and phone number to call with questions. Always follow label for application and protection. Professional appliers (including users of "weed & feed," or even low-risk herbicides like vinegar) must be licensed by State law.

E. Irrigation

All Areas

- Monitor the moisture levels around all ornamental plants including, but not limited to trees, shrubs, perennials, groundcovers and annuals. Report problems (including brown spots or saturated areas) to on-site management during normal maintenance visits.
- Fix irrigation system leaks and broken or misdirected heads as needed on every site visit.
- Hand watering of any ornamental plants not under irrigation is not assumed. Spring start-up.
- Open the main valve(s), inspect and adjust all sprinkler heads, re-program and check batter backup in controller, and troubleshoot the entire system.
- Test sensors (rain, soil, moisture, weather) and zone coverage while running.
- Set ET-based, seasonal, or weather-based manual or automatic programs. Post spring/summer/fall schedules (runtimes x days / zone) and train staff as needed to monitor through season.

Checks and Repairs

- Once per month inspect entire irrigation system. Irrigation inspections shall include the following:
  - Activation of each zone to inspect for valve function, lateral breaks, damaged heads, coverage or anything else that would indicate any malfunction of the irrigation system.
  - Adjust irrigation heads for proper coverage.
  - Adjust automatic controller to establish frequency and length of watering periods for seasonal requirements and water restrictions.
  - Runoff of water from irrigation systems into or onto streets, sidewalks, stairs, or gutters is not permitted. Immediately shut down the irrigation system and make adjustments, repairs, or replacements as soon as possible to correct the source of the runoff.
- Do not over-water plantings. Use multiple start times and short run times to prevent runoff. Drip systems should be left on for sufficient time to allow for saturation of the root zone. Shorter runs with drip irrigation do not provide sufficient water penetration

for health root development. Avoid multiple start times with drip systems if possible. Do not allow run-off from any irrigation.

- Rain sensors/weather sensor/soil moisture sensors: Install rain shut-off devices where possible. If no rain shut-off device, building manager shuts off irrigation at first sign of rain.
- Maintain the irrigation system, including cleaning of filter screens yearly or more often as needed, and flushing pipes.
- Drip irrigation systems need periodic flushing to remove sediment. Systems shall be flushed at least once a year. Open ends of drip lines and run for at least 15 minutes at full flow to flush. It may be necessary to install flush outlets in order to flush the drip system.

System Repair

- Regardless of the cause of damage, take immediate action to prevent further damage by shutting off the damaged part of the irrigation system and commencing with hand watering as needed. The following items are considered to be minor repairs: damaged or clogged sprinkler nozzles, adjustment of sprinkler patterns or arcs, adjustment of sprinkler position (reorient; raise, lower, or straighten sprinkler head), replacement of clogged, broken, or missing barbed-style drip emitters, replacement or repositioning of drip distribution tubing smaller than 1/2 inch or 15 mm diameter. Any replacement of irrigation system components shall be made with materials of the same manufacturer and model as the original equipment.
- All repairs to the system shall be identical to the original installation, unless approved otherwise in advance by the owner's authorized representative. If a change to the installation will result in lower future maintenance costs, less frequent breakage, or an increase in public safety, request authorization to make the change from the owner's authorized representative.
- For safety, do not install sprinklers on risers above the ground level, even if the risers are flexible. Always use spring-operated, pop-up style, sprinkler heads. Sprinkler heads are available with pop-up heights up to 12 inches (30 cm) above ground level. If the existing sprinklers are mounted on above-ground risers, the replacements shall be pop-up type sprinklers. No exceptions.
- Annually submit recommendations for changes to system that would improve water efficiency while meeting the plants' needs.

Winterization

- Completely drain the sprinkler system (blowout) to prevent freeze damage to underground pipes and sprinkler heads. Close all valves and shut down the controller(s) for the winter.

F. SPECIAL LANDSCAPE AREAS

Bio-retention areas

- Swales and rain gardens, designed to capture and hold roof runoff, will not maintain optimal drainage rates if soils become compacted. Minimize foot traffic in this area, although occasional walking for maintenance is fine.

- In addition to preventing weeds, regular applications of mulch will maximize the swale's ability to capture and break down contaminants. In order to prevent runoff of excess nutrients, rain garden plantings should not be fertilized. Plant selection, a rich soil mix at time of installation, and regular mulching should provide sufficient nutrients to plantings in these areas.
- Mulch mow all Bio-swale areas on an as needed basis to maintain proper grass height. (Use mulching mower that chops clippings finely and blows mulch down into turf to decompose and feed soil). Set the mower blades no lower than 3 to 4 inches above the ground. Do not mow beneath the depth of the design flow during the storm associated with the water quality event. Remove accumulated trash and debris prior to mowing.
- Mowing schedule: Mow as needed during active growth periods (April-October). Keep mower blades sharp.
- Clippings should always be left in Bio-swale areas ("mulch-mowing" or "grass cycling"), except if this will create a large surface buildup, for instance if saturated soft soils have prevented mowing for several weeks in spring and the grass is very tall. Grass cycling returns about 2 lb. nitrogen per 1000 sq. ft. per year, and improves resistance to drought damage and weed invasion.
- Modern "mulching" mowers are preferred because they chop clippings finely and blow the resulting mulch down to ground level, leaving a clean surface which is preferable, especially around building entrances where track-in can be a problem. Effective mulching requires about 20% more engine power, and it may be necessary to slow down in heavy areas or wet weather to get the best mulching results. For these reasons, equipment that converts easily from mulching to side-throw (leaving clippings on surface) is the most adaptable to varying conditions and mowing schedules.
- Mowing height: 3 to 4 inches high.
- Mowing frequency: to cause the least stress on the grass plant, mow often enough to remove only one-third of the blade length (e.g., when the grass is 3" high mow it town to 2"). Also, mow un-irrigated summer-dormant turf regularly enough to remove weed seed heads before they mature. Start mowing in late winter as soon as grass begins to grow. In Bio-swale areas these rules will result in moving every 5-7 days through the height of the spring growth spurt, tapering to weekly on irrigated summer lawn or 10 days to 2 weeks on dormant lawn, weekly through the fall growth spurt, and once a month during winter.
- In addition to spring or fall Bio-swale renovations should include over seeding of thin or weed infested areas, or entire areas subject to heavy wear. This is a key weed control practice.
- Select certified seed appropriate for the site (perennial rye for sport lawn, rye and fescue blends for general lawn: contact the Cooperative Extension Service for site-adapted varieties, or buy from a reputable local supplier).
- Take soil plugs annually to verify that the compost is being incorporated into the soil profile below the aeration depth by earthworms and other soil biota, rather than accumulating on the surface where it could limit water infiltration. (This is a possible problem in cases of low soil biota due to overuse of fertilizers or pesticides, poor drainage, or conditions of acidic or compacted soils. Correct these problems to improve compost incorporation.)

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BOURNE TECHNOLOGY PARK, LLC. 1058

53-447/113
943

DATE 7/7/2016

PAY TO THE ORDER OF Barnstable County Treasurer $2688.00

Two thousand Six hundred eighty eight 00/100 DOLLARS

Security features are included. Details on back.

Rockland Trust

FOR CCC filing

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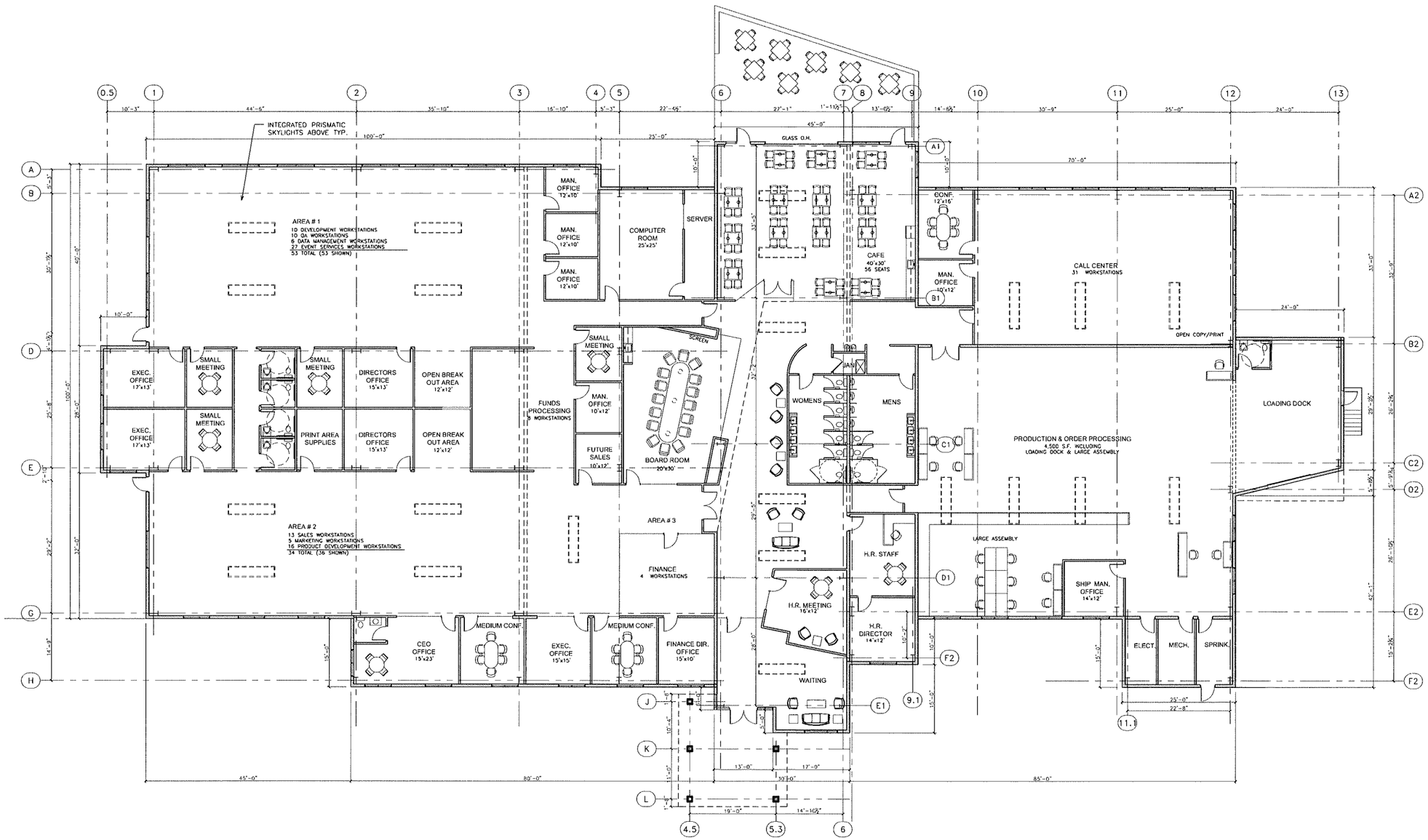

FIRST FLOOR PLAN 27,210 s.f.
3/32"=1'-0"

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118 WATERHOUSE ROAD, BOURNE, MA 02532
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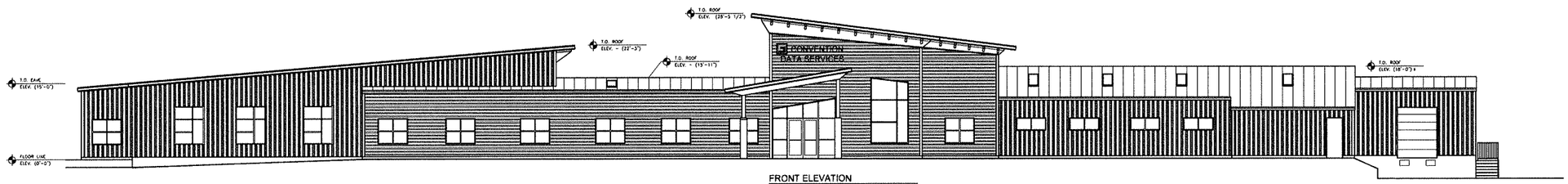

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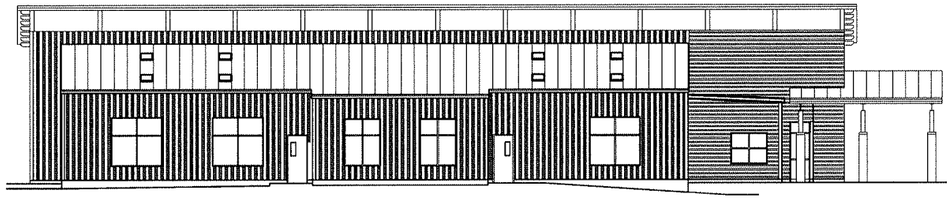

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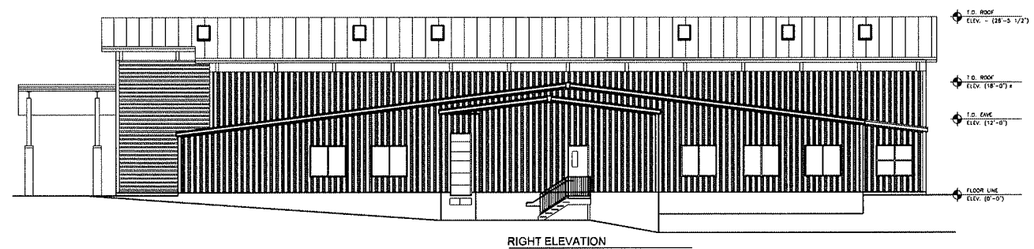

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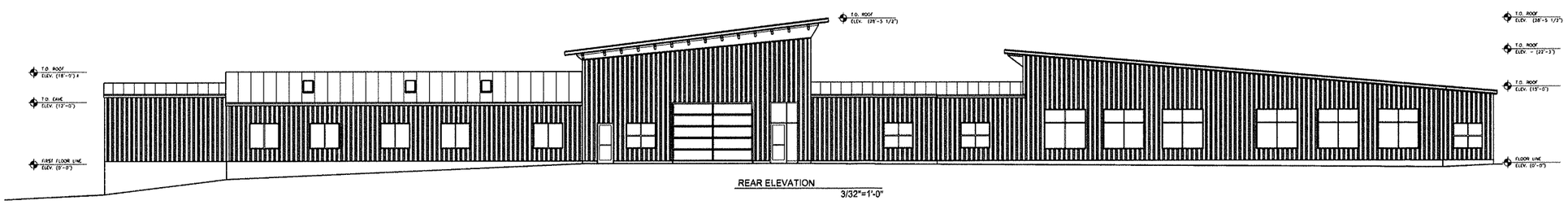

REAR ELEVATION
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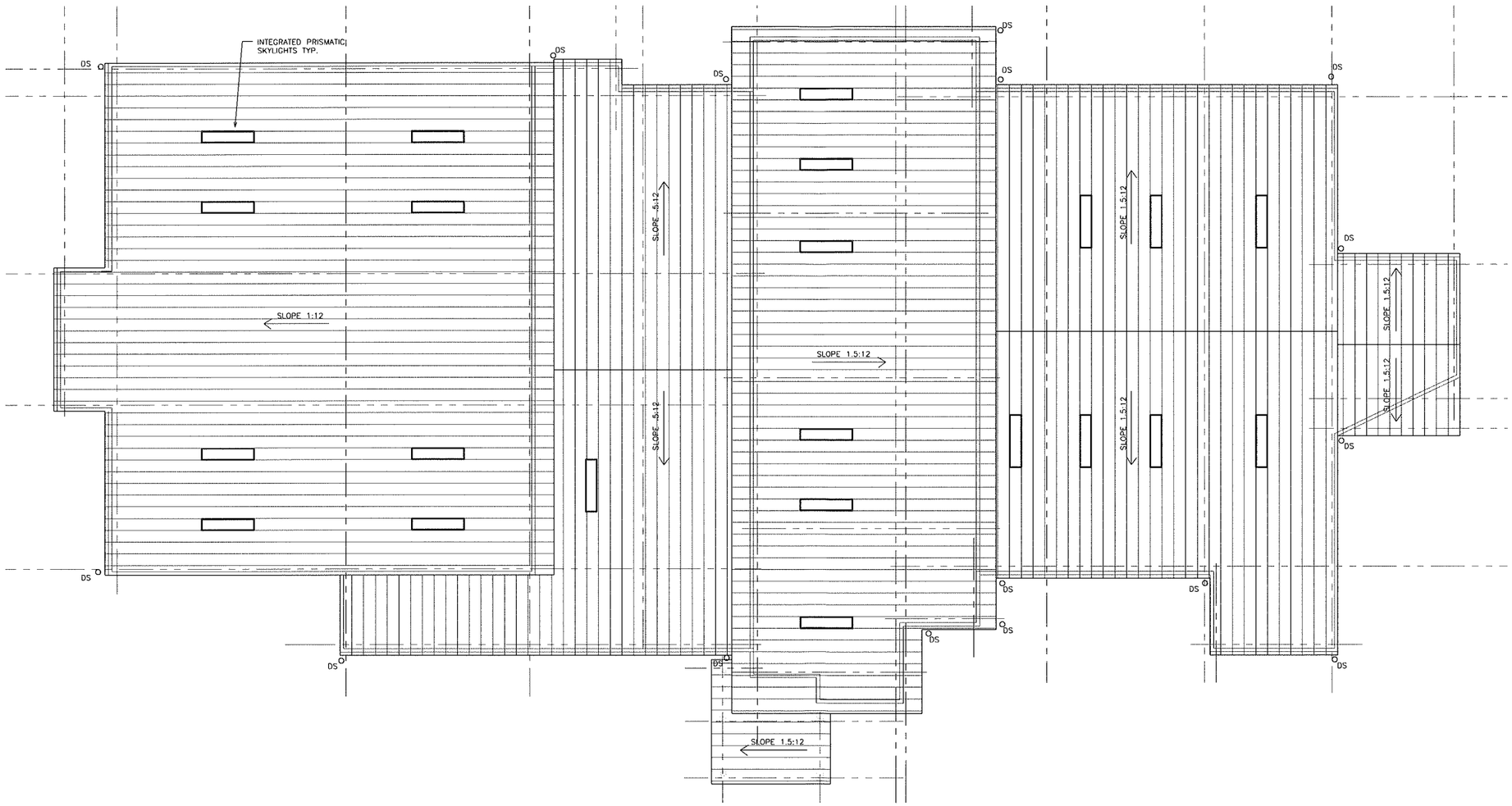

ROOF PLAN
3/32"=1'-0"

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LANDSCAPE PLAN
1"=30'-0"

LAWN SCHEDULE	ALL LAWN WORK BY OTHERS
LAWN	LAWN AREA SUBJECT TO FERTILIZER/PESTICIDE APPLICATION
TOTAL LAWN	22,000 SF

NOTE:
LAWN FERTILIZER, 3LB FERTILIZER PER 1,000 SF PER YEAR.

ALL LAWN WORK BY OTHERS

PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	QTY	SIZE
DECIDUOUS TREES				
PC	PYRUS C. 'CLEVELAND SELECT'	CLEVELAND SELECT FLOWERING PEAR		3"-3.5" CAL
KD	Gleditsia triacanthos	HONEY LOCUST		2"-3" CAL
EVERGREEN TREES				
TP	THUJA OCCIDENTALIS NIGRA	DARK AMERICAN ARBORVITAE		7'-8' HT
SHRUBS				
HB	HYDRANGEA 'ENDLESS SUMMER'	ENDLESS SUMMER HYDRANGEA		3' HT
HD	HYDRANGEA 'PINK DIAMOND'	PINK DIAMOND HYDRANGEA		3' HT
JS	JUNIPERUS CHINENSIS 'SEAGREEN'	SEAGREEN JUNIPER		2'-2.5' SPR
IG	ILEX GLABRA	INKBERRY		2.5'-3' HT
RV	RHODODENDRON VISCOSUM	SWAMP AZALEA		2.5'-3' HT
GRASS				
MG	MISCANTHUS SINENSIS GRACILLIMUS	MAIDEN GRASS		2'-2.5' HT
SG	PANICUM VIRGATUM	SWITCH GRASS		3' HT
PERENNIALS				
HR	HEMEROCALLIS 'HAPPY RETURNS'	HAPPY RETURNS DAYLILY		#2 POT
HF	HEMEROCALLIS FULVA	TAWNY DAYLILY		#2 POT
BF	IRIS VERSICOLOR	BLUE FLAG IRIS		2"-4"
RE-VEGETATION AREAS				
SM	SEED MIX OF WILD GRASS, WILD FLOWER & CLOVER			

DRAINAGE SYSTEM & SEDIMENT FOREBAY PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	QTY	SIZE
SHRUBS				
LG	ILEX GLABRA	INKBERRY		1'-1.5' HT
VC	VACCINIUM CORIMBOSUM	HIGHBUSH BLUEBERRY		1'-1.5' HT
PERENNIALS				
AN	ASTER NOVAE ANGLIAE	NEW ENGLAND ASTER		

NOTE:
FOR DRAINAGE SYSTEM & SEDIMENT FOREBAY CONSTRUCTION & FULL PLANTING PLAN & SCHEDULE SEE STORMWATER SYSTEM SITE DETAIL DRAWINGS PREPARED BY HOLMES AND MORATH, INC.

FLAGPOLE SPECIFICATIONS

30' ALUMINUM FLAGPOLES
6" BASE, 3.5" TOP
WALL THICKNESS .25"
WIND SPEED 150+ MPH FLAGGED
CLEAR ANODIZED ALUMINUM
EXTERNAL HALYARD
GROUND SLEEVE MOUNTING

PROVIDE 4' RADIUS SEASHELLS AT EACH FLAGPOLE

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DRAWING TITLE
LANDSCAPE PLAN

REVISIONS

NO	DATE	DESCRIPTION

PROJECT NO.

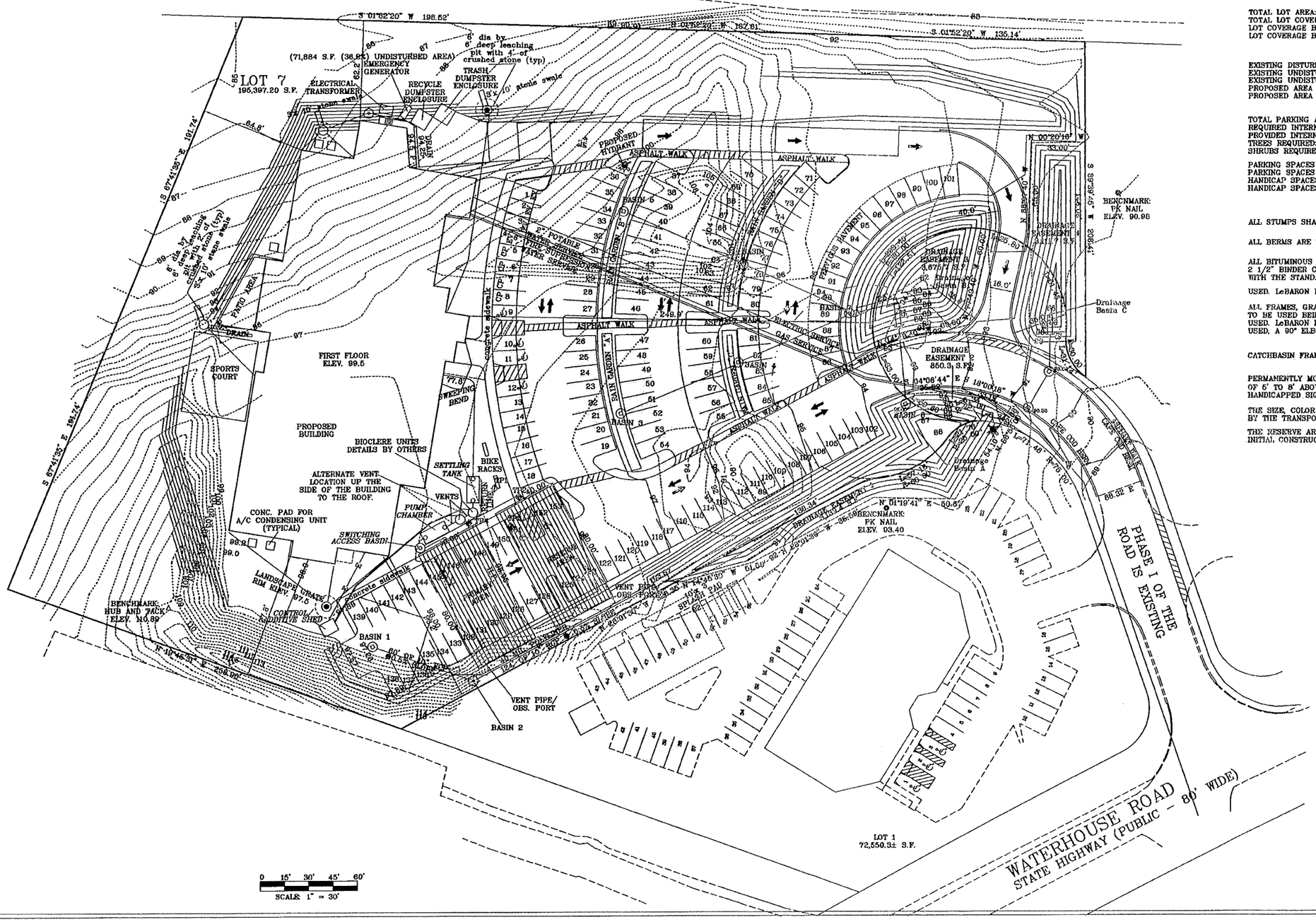
DATE OF ISSUE 07-12-16

DRAWN BY: MRH
CHECKED BY: GBS

DRAWING NUMBER
L1.1

Bk 544 Pg 26

MacARTHUR BOULEVARD
STATE HIGHWAY
PUBLIC – VARIABLE WIDTH

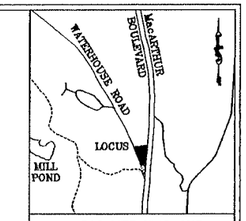


NOTES:

MAP: 27 PARCEL 184 & 185
ZONING: B-4
FLOOD ZONE: X
PLAN REFERENCE: BOOK 581 PAGE 26

NOTE: THIS SITE IN NOT LOCATED IN A WATER RESOURCE PROTECTION DISTRICT

ZONING INTENSITY OF USE SCHEDULE:
- LOT AREA: (MIN. 40,000 S.F.) 195,397 S.F.
- LOT FRONTAGE: (MIN. 150') 324.54'
- LOT FRONT YARD: (MIN. 30') 254.63'
- LOT SIDE AND REAR: (MIN. 30') 33.13'
- LOT OPEN SPACE: (MIN. 40%)



LOCUS: POCASSET QUAD. MAP

TOTAL LOT AREA: 195,397 S.F.
TOTAL LOT COVERAGE: 91,2.445 S.F. (47.3%)
LOT COVERAGE BY PAVEMENT: 65,325 S.F. (33.43%)
LOT COVERAGE BY STRUCTURES: 27,120 S.F. (13.86%)

EXISTING DISTURBED AREA: 123,513 S.F. (2.84 Ac.)(63.2%)
EXISTING UNDISTURBED AREA: 71,884 S.F. (1.65 Ac.)(36.8%)
EXISTING UNDISTURBED AREA TO BE DISTURBED: 37,732 S.F. (.87 Ac.)(19.3%)
PROPOSED AREA TO REMAIN UNDISTURBED: 34,152 S.F. (.78 Ac.)(17.5%)
PROPOSED AREA ON THE BERM TO BE REPLANTED: 10,097 S.F. (.23 Ac.)(5.2%)

TOTAL PARKING AREA: 57,931 S.F.
REQUIRED INTERNAL PLANTING AREAS: 1,159 S.F.
PROVIDED INTERNAL PLANTING AREAS: 6,475 S.F.
TREES REQUIRED: 39
SHRUBS REQUIRED: 164

PARKING SPACES REQUIRED: 153 (92% of 30,000 ÷ 180)
PARKING SPACES PROVIDED: 153
HANDICAP SPACES REQUIRED: 6 (5 PLUS 1 VAN ACCESSABLE)
HANDICAP SPACES PROVIDED: 6 (5 PLUS 1 VAN ACCESSABLE)

ALL STUMPS SHALL BE REMOVED AND DISPOSED OF OFF SITE.

ALL BERMS ARE TO PLACED AS PART OF THE BINDER COURSE.

ALL BITUMINOUS CONCRETE AREAS SHALL HAVE A COMBINED MINIMUM DEPTH OF 4". 2 1/2" BINDER COARSE AND A 1 1/2" TOP COARSE. ALL BITMINOUS CONCRETE SHALL COMPLY WITH THE STANDARD SPECIFICATIONS OF MASS DEPT. OF PUBLIC WORKS.

USED. LeBARON R 3701 HOODS SHALL BE USED ON THE CATCHBASINS. IF ADS N-12 PIPE IS

ALL FRAMES, GRATES, AND MANHOLES ARE TO MEET MHD STANDARDS. TYPE F FRAMES ARE TO BE USED BEING THAT THE BASINS ARE AT THE LOW POINT. IF CONCRETE PIPES ARE USED. LeBARON R 3701 HOODS SHALL BE USED ON THE CATCHBASINS. IF ADS N-12 PIPE IS USED, A 90° ELBOW CAN BE USED.

CATCHBASIN FRAMES SHALL BE SET FLUSH WITH THE BINDER COURSE.

PERMANENTLY MOUNTED HANDICAPPED PARKING SIGNS MUST BE PLACED AT A HEIGHT OF 5' TO 8' ABOVE GRADE. ALSO, A VAN ACCESSIBLE SIGN MUST BE MOUNTED BELOW THE HANDICAPPED SIGN ON SPACES 9 AND 10.

THE SIZE, COLOR AND PATTERN OF THE STRIPING IN THE CROSSWALKS SHALL BE DETERMINED BY THE TRANSPORTATION ENGINEER.

THE RESERVE AREA SHOULD BE CONSIDERED AN ALTERNATE CONSTRUCTION OPTION AT THE INITIAL CONSTRUCTION PHASE.

PROPOSED SITE PLAN

PREPARED FOR

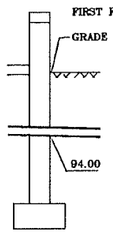
CDS

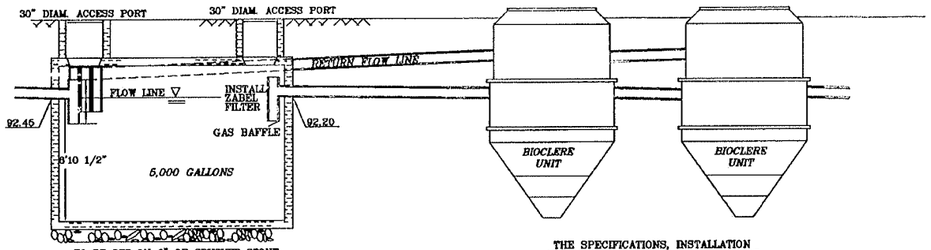
OF

LOT 7 TECHNOLOGY PARK DRIVE
BOURNE, MA

J.E. LANDERS–CAULEY, P.E.
CIVIL ENVIRONMENTAL ENGINEERING
P.O. BOX 364 WEST FALMOUTH, MA 02574
(508) 540 – 7733 ph.
(508) 540 – 3344 fax

ASS. # 27.0–TBD	DATE: 06/29/16
SCALE: 1" = 30'	DRAWN BY: JDR
JOB NO. 1019–0816	SHEET: 1 OF 4





TO BE SET ON 6" OF CRUSHED STONE PLACED ON A COMPACTED LEVEL BASE

ZABEL FILTER MUST BE CLEANED OR REPLACED A MINIMUM OF ONCE PER YEAR

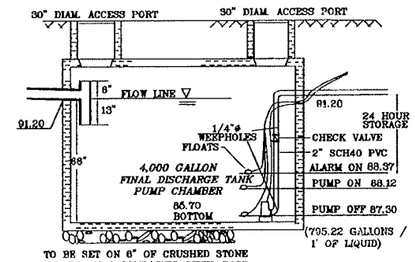
THE SPECIFICATIONS, INSTALLATION AND MAINTENANCE OF THE SEWERAGE SYSTEM COMPONENTS PROVIDED BY THE MANUFACTURER SHALL BE ENGINEERED AND WARRANTED BY THE MANUFACTURER.

ANOXIC/EQUALIZATION TANK

N.T.S.

THE EXACT DETAILS OF THE "BIOCLEAR" SHALL BE PROVIDED BY OTHERS

ALTERNATING DUPLEX PUMP SYSTEM. EACH PUMP SHALL HAVE A QUICK RELEASE AND BE MOUNTED ON A SLIDING RAIL SYSTEM.

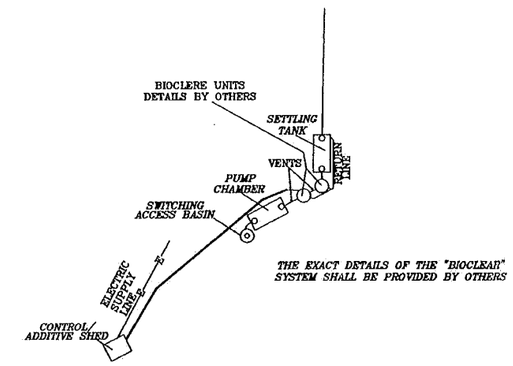


TO BE SET ON 6" OF CRUSHED STONE PLACED ON A COMPACTED LEVEL BASE

USE DUPLEX .75 HP GOULDS PUMPS OR APPROVED EQUIVALENT

PUMP CHAMBER DETAILS

N.T.S.



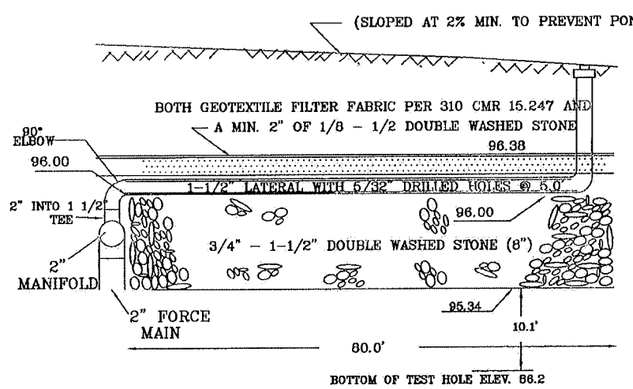
THE EXACT DETAILS OF THE "BIOCLEAR" SYSTEM SHALL BE PROVIDED BY OTHERS

DETAIL OF SYSTEM

N.T.S.

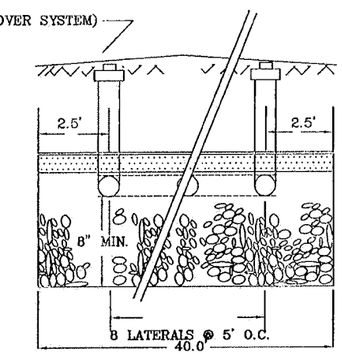
SEPTIC SYSTEM SPECIFICATIONS TABLE:

GENERAL LEACHING AREA: (SEE LAYOUT)	
LENGTH:	80.0 FEET
WIDTH:	40.0 FEET
STONE THICKNESS:	8 INCHES(MIN.)
DESIGN AREA:	3,200.0 SF
GENERAL PUMP CHAMBER: (4,000)	
CHAMBER SIZE:	4,000 GAL.
GALLONS PER DOSE TOTAL:	562.5 GAL.
24 HOUR STORAGE CAPACITY:	2,250 GAL.
PUMP SIZE (GENERAL):	2 @ .75 HP
PRESSURE DOSE SPECIFICATIONS:	
PERFORATION SIZE:	5/32 INCH.
PERFORATION SPACING:	5 FEET
PERFORATIONS PER LATERAL:	15 HOLES
LATERAL LENGTH:	76.0 FEET
LATERAL SPACING:	5 FEET
LATERAL DIAMETER:	1-1/2 INCH ø.
MANIFOLD LENGTH:	35 FEET
MANIFOLD DIAMETER:	2 INCHES
FORCE MAIN LENGTH:	6' FEET



LEACH FIELD PROFILE

N.T.S.



END VIEW

N.T.S.

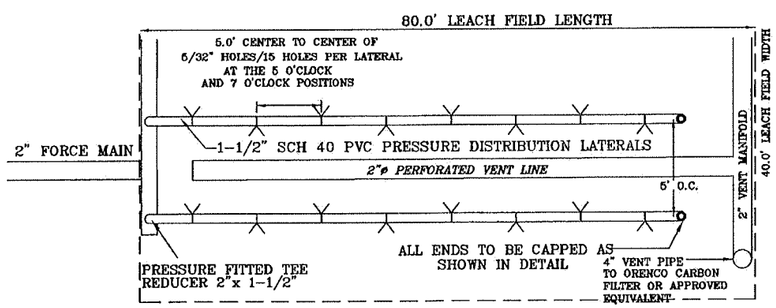
TEST PIT DATA

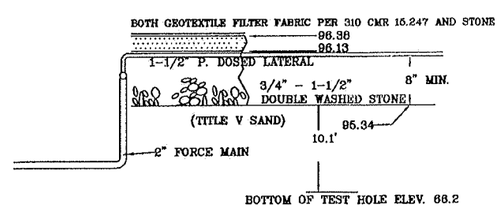
INSPECTOR: T. GAURINO

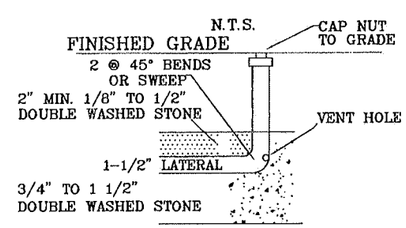
DATE: FEB. 11, 2016

PERFORMED BY: J.E. CAULEY P.E.

TEST PIT # : 1	TEST PIT # : 2	TEST PIT # : 3	TEST PIT # : 4
EL. TOP = 96.6	EL. TOP = 96.2	EL. TOP = 96.6	EL. TOP = 97.2
OBS. H2O EL. = NONE	OBS. H2O EL. = NONE	OBS. H2O EL. = NONE	OBS. H2O EL. = NONE
PERC RATE =< 2 MPI	PERC RATE =< 2 MPI	PERC RATE =< 2 MPI	PERC RATE =< 2 MPI
0" STONE PARKING AREA/PAD	0"	0"	0"
4" C1 MED.-FINE SAND 10YR 6/4	C1 MED-FINE SAND 6/4	C1 MED-FINE SAND 6/4	C1 MED-FINE SAND 6/4
32" C2 GRAVEL	20"	30"	30"
36"			
C3 MEDIUM SAND 10YR 7/3	C2 MEDIUM SAND 10YR 7/3	C2 MEDIUM SAND 10YR 7/3	C2 MEDIUM SAND 10YR 7/3
120"	120"	120"	120"







GENERAL NOTES:

1. NO HEAVY EQUIPMENT OVER SYSTEM.
2. DISTRIBUTION BOX TO BE PRECAST REINFORCED CONCRETE UNITS, WITH AN H-20 CAPACITY.
3. ALL SYSTEM COMPONENTS SHALL BE INSTALLED IN ACCORDANCE TO REVISED TITLE V OF THE STATE ENVIRONMENTAL CODE, MINIMUM REQUIREMENTS FOR THE SUBSURFACE DISPOSAL OF SANITARY SEWAGE.
4. ANY CHANGES TO THIS PLAN MUST BE APPROVED BY THE BOARD OF HEALTH AND THE ENGINEER.
5. AT THE COMPLETION OF CONSTRUCTION, PRIOR TO BACKFILLING, THE BOARD OF HEALTH AND ENGINEER SHALL BE NOTIFIED FOR INSPECTION AND LOCATION FOR AS BUILT PLAN PREPARATION.
6. PITCH ALL SEWER LINES 1/4" PER FOOT UNLESS INDICATED OTHERWISE.
7. INSTALLER TO LOCATE ALL UTILITIES PRIOR TO CONSTRUCTION.
8. INSTALLER TO PROVIDE AT LEAST ONE OBSERVATION PORT.
9. INSTALLER TO CONTACT THIS FIRM TO CONFIRM SOIL CONDITIONS DURING SYSTEM INSTALLATION.
10. ALL SEPTIC SYSTEM COMPONENTS TO BE CONFIRMED BY SURVEY. INCLUDING BUT NOT LIMITED TO, THE BOTTOM OF LEACHING AREA, SYSTEM COMPONENT LOCATIONS AND PIPE INVERTS.
11. ALL PIPING SHALL BE PROVIDED WITH THRUST BLOCKING OR FIRMLY SECURED TO PREVENT WATER HAMMER.

SEPTIC SYSTEM NOTES

1. All electrical permits and connections are to be obtained and made by a licensed electrician.
2. Where required the contractor will remove all loam, subsoil and other unsuitable material in the area beneath and for 2 feet on all sides of the leaching facility. The contractor shall replace all unsuitable material with clean coarse sand free from clay, fines or other unsuitable material. Replacement material to have an inplace perc rate of two minutes or less.
3. Subsurface septic system components shall not be back filled or otherwise concealed from view until a final inspection AND instrument survey to locate the components has been conducted by the approving and the ENGINEER.
4. All covers shall be marked with magnetic marking tape.
5. All backfill/fill material immediately adjacent to and under the s.a.s. must comply with specifications outlined in Title V.
6. All material above and to the side of the s.a.s. and its components must be free of stone larger than 3", organic material and debris.
7. Those protions of the s.a.s. under walkways, roads or parking shall be backfilled with material that complies with Mass DPW specifications.
8. An audio and visual alarm must be provided and placed in an obvious location and be set to sound when the effluent level reaches the bottom of the 24 hour storage in the pump chamber.

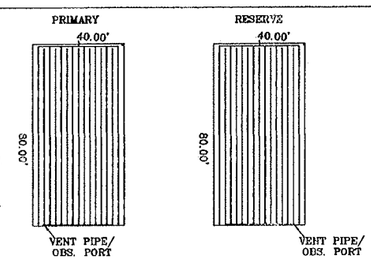
CAPACITY REQUIRED

30,000 S.F. PROFESSIONAL OFFICE:
30,000 ÷ 1,000 x 75 = 2,250 GPD

CAPACITY PROVIDED

SYSTEM SIZE (PRIMARY): 40x80 = 3,200 S.F.
3,200 x .74 = 2,368.0 GPD

SYSTEM SIZE (RESERVE): 40x80 = 3,200 S.F.
3,200 x .74 = 2,368.0 GPD



SEPTIC SYSTEM DETAIL SHEET
PREPARED FOR
CDS
OF
LOT 7 TECHNOLOGY PARK DRIVE
BOURNE, MA

J.E. LANDERS-CAULEY, P.E.
CIVIL ENVIRONMENTAL ENGINEERING
P.O. BOX 364 WEST FALMOUTH, MA 02574
(508) 540 - 7733 ph.
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ASS. # 27.0-TBD	DATE: 06/29/16
SCALE: 1" = N.T.S.	DRAWN BY: JDR
JOB NO. 1019-0616	SHEET: 2 OF 4

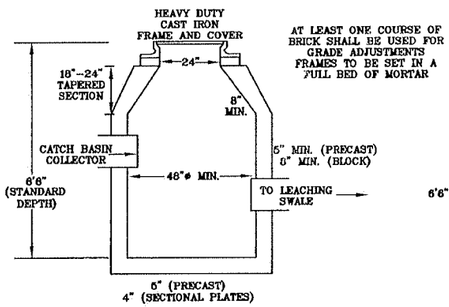
NOTES:

PRIOR TO ANY CONSTRUCTION, SILT FENCE AND HAYBALES SHALL BE PROPERLY INSTALLED AT ALL DOWN GRADIENT LOCATIONS.

ALL UTILITIES SHALL BE INSTALLED AND ROADWAY CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE TOWN OF BOURNE AND THE MASS. DEPT. OF PUBLIC WORKS STANDARD SPECIFICATIONS, UNLESS APPROVED OTHERWISE.

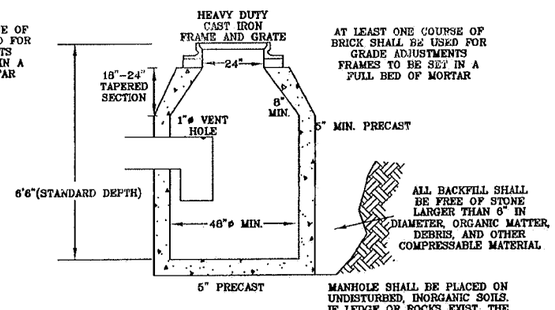
INSTALLED WATER MAINS SHALL BE DESIGNED IN ACCORDANCE WITH ALL CURRENT TOWN OF BOURNE DEPT. OF PUBLIC WORKS(DPW) SPECIFICATIONS AND INSTALLED UNDER THE SUPERVISION OF THE DPW..

THRUST BLOCK RESTRAINTS ARE REQUIRED FOR THRUST CONTROL AT BENDS, TEES, AND REDUCERS ON THE WATER MAIN, AND SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE BOURNE DEPARTMENT OF PUBLIC WORKS, UNLESS OTHER METHODS ARE APPROVED (BY THE DPW).



AT LEAST ONE COURSE OF BRICK SHALL BE USED FOR GRADE ADJUSTMENTS FRAMES TO BE SET IN A FULL BED OF MORTAR

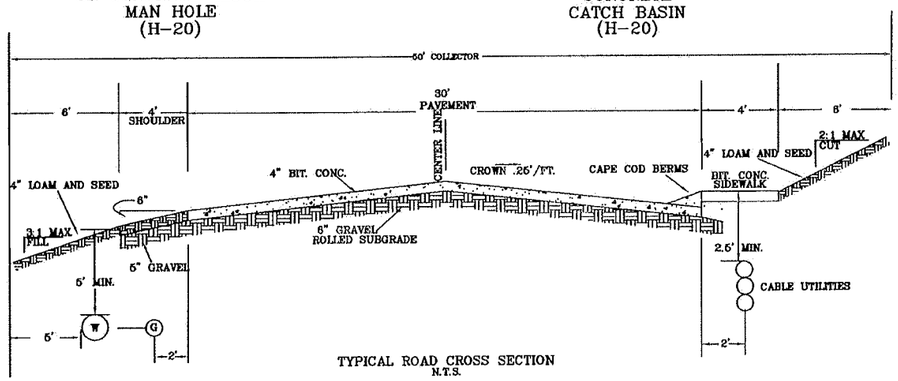
PRECAST CONCRETE
OR CONCRETE BLOCK
MAN HOLE
(H–20)



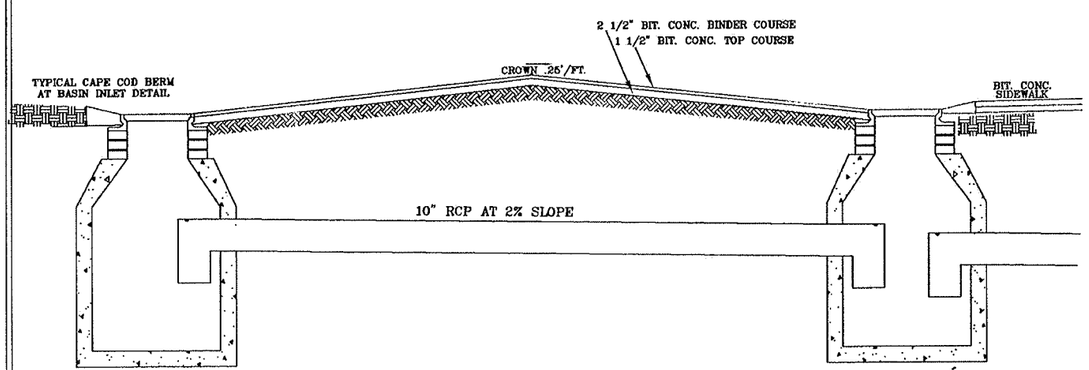
AT LEAST ONE COURSE OF BRICK SHALL BE USED FOR GRADE ADJUSTMENTS FRAMES TO BE SET IN A FULL BED OF MORTAR

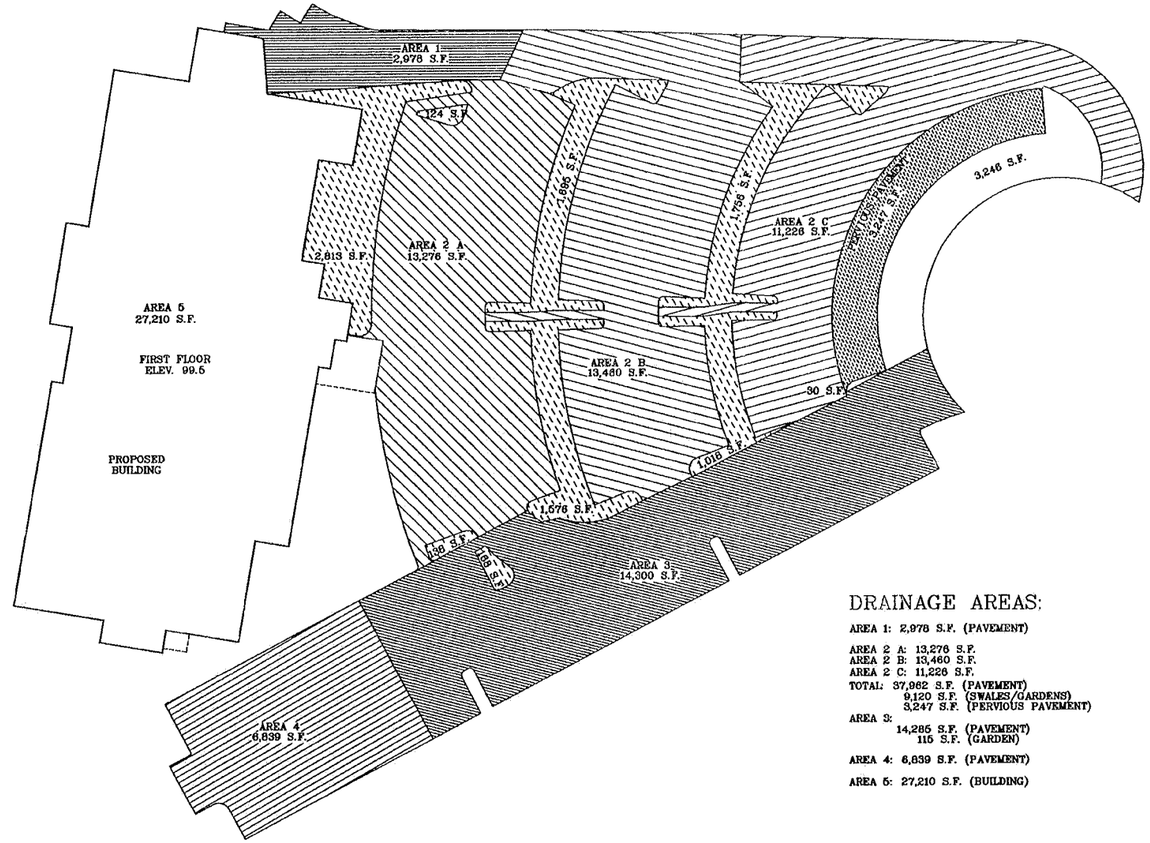
MANHOLE SHALL BE PLACED ON UNDISTURBED, INORGANIC SOILS. IF LEDGE OR ROCKS EXIST, THE MANHOLE SHALL BE PLACED ON AN 8" LAYER OF COMPACTED SAND OR GRAVEL.

PRECAST
CONCRETE
CATCH BASIN
(H–20)



TYPICAL ROAD CROSS SECTION
N.T.S.





DRAINAGE AREAS:

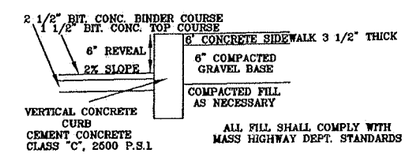
AREA 1: 2,978 S.F. (PAVEMENT)

AREA 2 A: 13,276 S.F.
AREA 2 B: 13,460 S.F.
AREA 2 C: 11,226 S.F.
TOTAL: 37,962 S.F. (PAVEMENT)
9,120 S.F. (SWALES/GARDENS)
3,247 S.F. (PERVIOUS PAVEMENT)

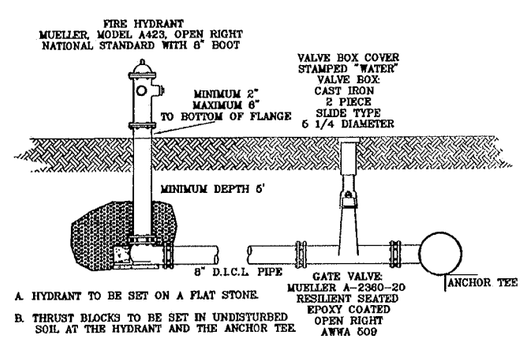
AREA 3:
14,285 S.F. (PAVEMENT)
115 S.F. (GARDEN)

AREA 4: 6,839 S.F. (PAVEMENT)

AREA 5: 27,210 S.F. (BUILDING)



VERTICAL CURB DETAIL
IN FRONT OF BUILDING
N.T.S.

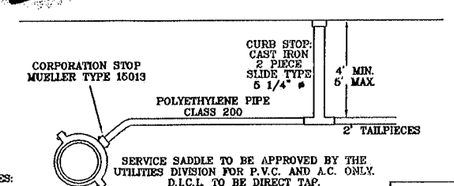


A. HYDRANT TO BE SET ON A FLAT STONE.

B. THRUST BLOCKS TO BE SET IN UNDISTURBED SOIL AT THE HYDRANT AND THE ANCHOR TEE.

C. PLACE 1/2 CUBIC YARD OF 3/4" STONE AROUND HYDRANT DRAIN TO AT LEAST 6" ABOVE THE DRAIN HOLES.

FIRE HYDRANT
N.T.S.



NOTES:

SERVICE SADDLE TO BE APPROVED BY THE UTILITIES DIVISION FOR P.V.C. AND A.C. ONLY. D.I.C.I. TO BE DIRECT TAP.

A. BACKFILL SHALL BE NATIVE MATERIAL COMPACTED TO A DENSITY OF NOT LESS THAN 90% RELATIVE COMPACTION.

B. SPECIAL ATTENTION MUST BE GIVEN TO BACKFILL AROUND WATER MAIN AND UNDER SERVICE PIPE.

TYPICAL WATER SERVICE INSTALLATION
N.T.S.

DETAIL SHEET
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BOURNE, MA

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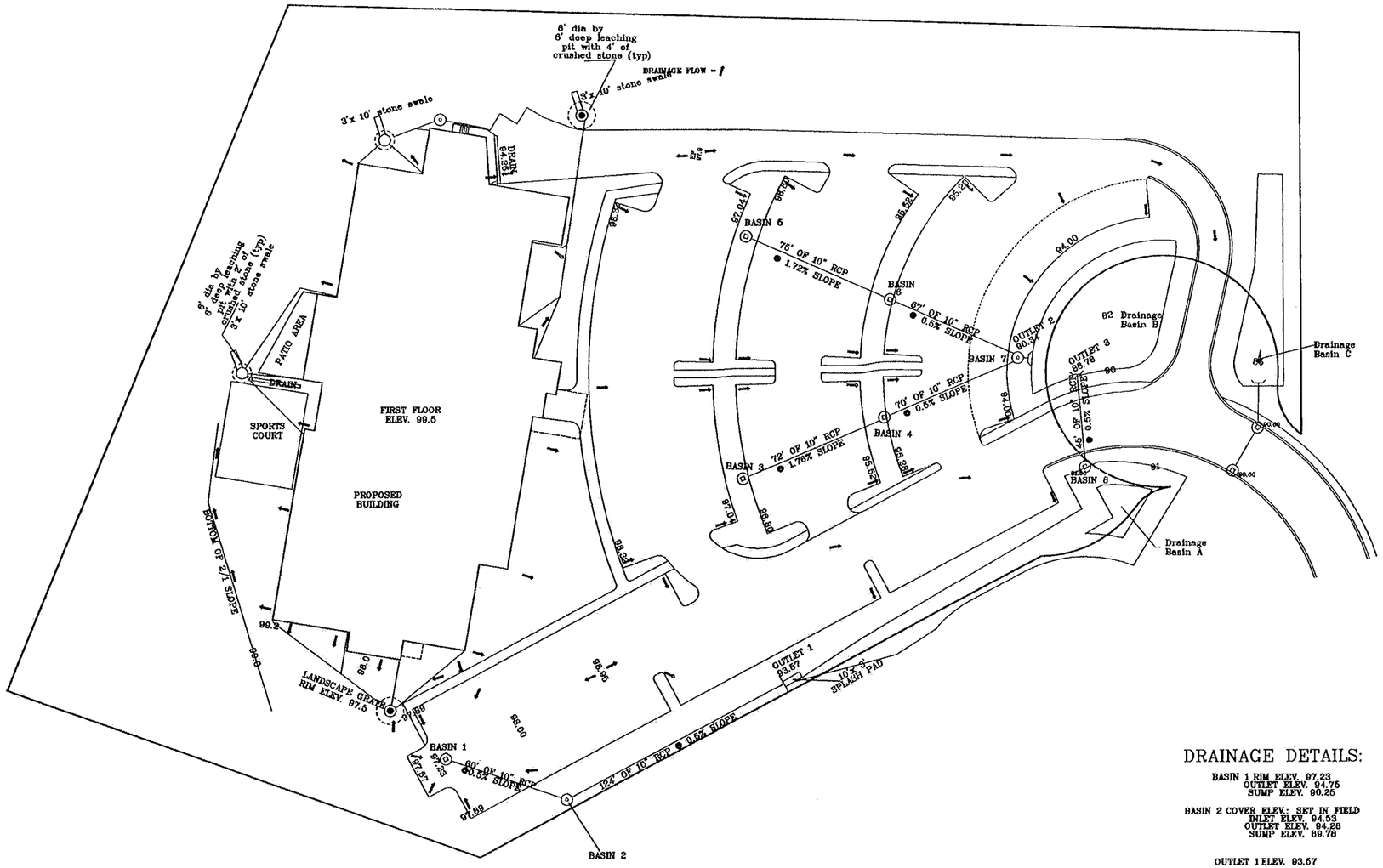
ASS.# 27.0–TBD	DATE: 06/29/16
SCALE: 1" = N/A	DRAWN BY: JDR
JOB NO. 1019–0616	SHEET: 3 OF 4



NOTES:

ALL PIPING FOR ROOF DRAINAGE SHALL BE 6" SHEDULE 40 PVC AT A SLOPE OF 0.01 OR GREATER.

ALL SPLASH PADS AND STONE SWALES SHALL BE 3'–6" NATIVE CRUSHED STONE 6" DEEP BY 36" WIDE. SEE PLAN VIEW FOR LENGTH OF EACH SWALE OR PAD.

DRAINAGE DETAILS:

BASIN 1 RIM ELEV. 97.23
OUTLET ELEV. 94.75
SUMP ELEV. 90.25

BASIN 2 COVER ELEV.: SET IN FIELD
INLET ELEV. 94.53
OUTLET ELEV. 94.28
SUMP ELEV. 89.78

OUTLET 1 ELEV. 93.57

BASIN 3 RIM ELEV. 96.70
OUTLET ELEV. 92.53
SUMP ELEV. 88.70

BASIN 4 RIM ELEV. 95.18
INLET ELEV. 91.26
OUTLET ELEV. 91.00
SUMP ELEV. 87.00

BASIN 5 RIM ELEV. 96.70
OUTLET ELEV. 92.53
SUMP ELEV. 88.70

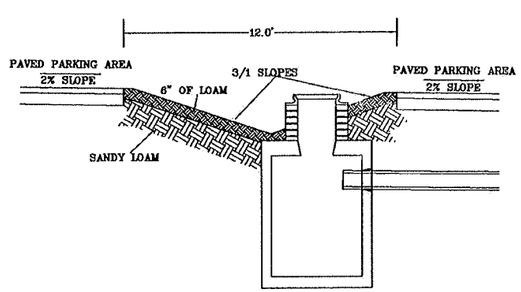
BASIN 6 RIM ELEV. 95.18
INLET ELEV. 91.24
OUTLET ELEV. 90.99
SUMP ELEV. 87.00

BASIN 7 COVER ELEV. 93.00
INLET ELEV. 90.85 (BOTH)
OUTLET ELEV. 90.40
SUMP ELEV. 86.40

OUTLET 2ELEV. 90.34

BASIN 8 RIM ELEV. 91.50
OUTLET ELEV. 89.00
SUMP ELEV. 84.50

OUTLET 3 ELEV. 88.78



RAIN GARDEN CROSS SECTION
N.T.S.

DETAIL SHEET
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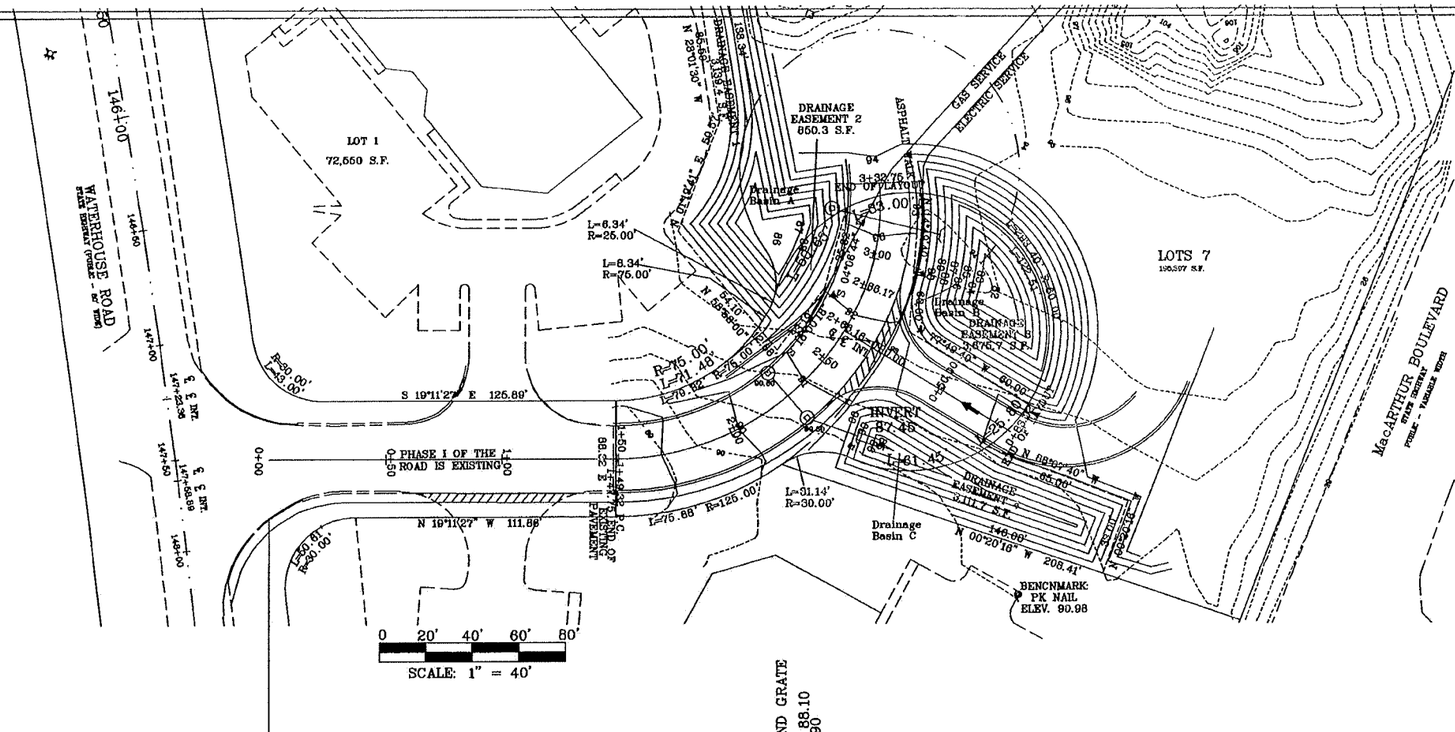
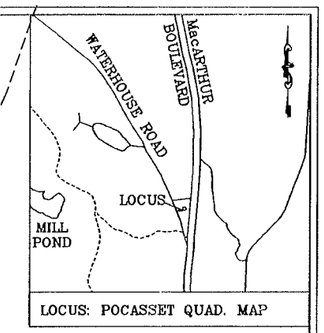
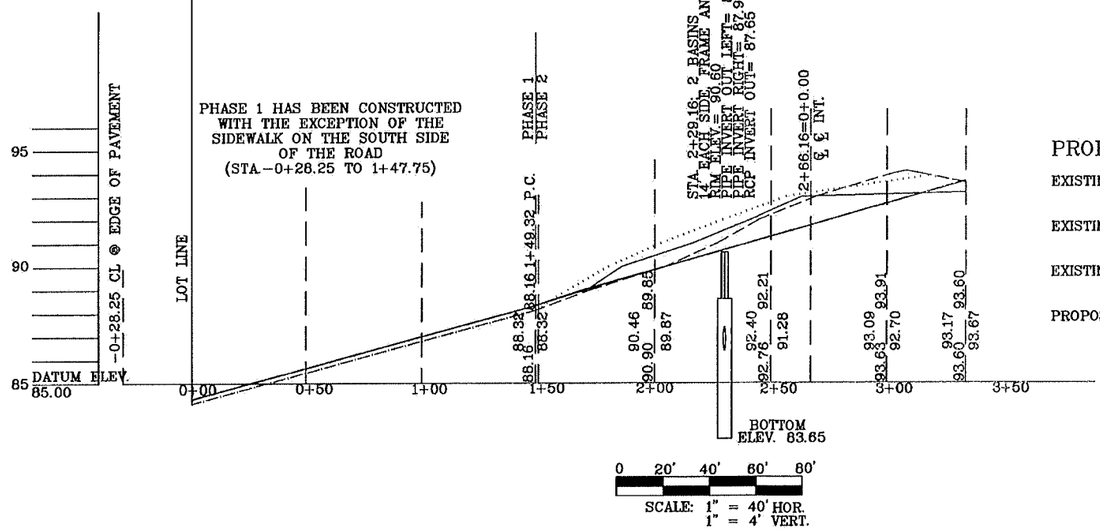
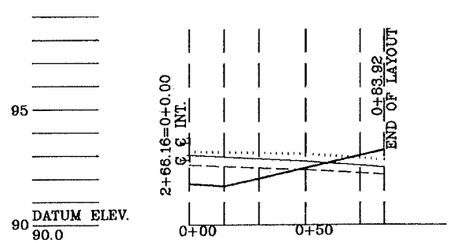
ASS. # 27.0–TBD	DATE: 06/29/16
SCALE: 1" = 30'	DRAWN BY: JDR
JOB NO. 1019–0616	SHEET: 4 OF 4









PROFILE LEGEND:

- EXISTING LEFT SIDELINE
- EXISTING CENTERLINE
- EXISTING RIGHT SIDELINE
- PROPOSED CENTERLINE

NOTES:

ALL STUMPS SHALL BE REMOVED AND DISPOSED OF OFF SITE.

THE CONTRACTOR SHALL NOTIFY DIGSAFE BEFORE ANY CONSTRUCTION IS STARTED.

ALL FILLS SHALL BE IN CONFORMITY WITH MDPW STANDARD SPECIFICATION 401.80.

ALL BERMS ARE TO PLACED AS PART OF THE BINDER COURSE.

CATCHBASIN FRAMES SHALL BE SET FLUSH WITH THE BINDER COURSE.

ALL FRAMES, GRATES, AND MANHOLES ARE TO MEET MHD STANDARDS. TYPE F FRAMES ARE TO BE USED BEING THAT THE BASINS ARE AT THE LOW POINT. IF CONCRETE PIPES ARE USED, LeBARON R 3701 HOODS SHALL BE USED ON THE CATCHBASINS. IF ADS N-12 PIPE IS USED, A 90° ELBOW CAN BE USED.

LOT 7 IS SHOWN IN THE "B-4" ZONING DISTRICT.

NO EXISTING UNDERGROUND UTILITIES HAVE BEEN LOCATED OR SHOWN ON THE PLAN. THE CONTRACTOR SHALL CONTACT "DIGSAFE" AND VERFIY LOCATION OF ALL UTILITIES BEFORE CONSTRUCTION BEGINS.

A 6" AND A 2" WATER SERVICE SHALL BE PROVIDED TO LOTS 1, 2, 3, AND 4 IN THE LOCATION SHOWN.

PROPOSED CUL-DE-SAC PLAN

PREPARED FOR

CDS

OF

TECHNOLOGY PARK DRIVE

BOURNE, MA

J.E. LANDERS-CAULEY, P.E.
CIVIL ENVIRONMENTAL ENGINEERING
P.O. BOX 364 WEST FALMOUTH, MA 02574
(508) 540 - 7733 ph.
(508) 540 - 3344 fax

ASS.# *N/A*	DATE: *07/11/16*
SCALE: 1" = 40'	DRAWN BY: *JDR*
JOB NO. *1019-CUL16*	SHEET: 1 OF 1

Bk 581 Pg 28

REGISTRY USE ONLY

LOCUS: POCASSET QUAD. MAP
1" = 800'

WATERHOUSE ROAD
BOURNE
MacARTHUR
LOCUS
"B4" ZONING DISTRICT

MacARTHUR BOULEVARD
STATE HIGHWAY
PUBLIC – VARIABLE WIDTH

CB/WITH SPIKE FND
S01°52'20"W 198.52'
CB/DH FND
S01°52'20"W 187.61'
CB/DH FND
S01°52'20"W 135.14'
CB/LP PIN FND
S01°52'20"W 62.77'
S01°52'20"W 166.13'

LEGEND:
EXISTING BOUND
BOUND TO BE SET

SJC PROPERTIES LLC
170 MACARTHUR BOULEVARD
BOURNE, MA 02532
MAP 27 LOT 86

BOURNE TECHNOLOGY PARK REALTY TRUST
C/O MERCANTILE PROPERTY MANAGEMENT
P.O. 790
BUZZARDS BAY, MA 02532

S67°41'35"E 363.48'

FORMER LOT LINE

THOMAS DONOVAN ET AL. TR.
TRUSTEE OF
DONBROS REALTY TRUST
P.O. BOX 1197
POCASSET, MA 02559
MAP 27 LOT 86.1

LOT 7
195,397 S.F.
22.85 shape factor
192,285 S.F. USABLE AREA
3,111.7 S.F. DRAINAGE EASEMENT

END OF LAYOUT
DRAINAGE EASEMENT 3
3,675.7 S.F.
DRAINAGE EASEMENT 4
3,111.7 S.F.
N 00°20'19" W 33.00'
S 89°39'49" W 208.41'
R=60.00'
L=293.40'
L=126.91'
L=141.46'
R=125.00'
L=75.98'
R=75.00'
L=9.82'
L=21.78'
R=25.00'
L=6.34'
L=8.34'
R=75.00'
1+49.32 P.C.
1+47.76 END OF EXISTING PAVEMENT
S70°49'33"E
S70°49'33"W
50.00'
111.98'
125.89'
R=30.00'
L=50.67'
R=6147.04'
L=110.26'
R=23.00'
R=30.00'
L=166.23'
R=6147.04'
L=161.87'
N 14°49'40" W
N 01°29'41" E 60.67'
N 14°45'39" W 61.50'
N 25°01'30" W 328.35'
N19°45'31"E 268.90'
S19°45'31"W 302.56'
N30°49'25"W 184.87'

2

1

LOT 4
76,964 S.F.

UPPER CAPE MEDICAL CONDOMINIUM
C/O MERCANTILE PROPERTY MANAGEMENT
P.O. 790
BUZZARDS BAY, MA 02532
MAP 27 LOT 161.1

UPPER CAPE MEDICAL CONDOMINIUM
C/O MERCANTILE PROPERTY MANAGEMENT
P.O. 790
BUZZARDS BAY, MA 02532
MAP 27 LOT 161.2

LOT 1
72,550 S.F.

OSHI REALTY INC
62 HAWTHORNE DRIVE
EDISON, NJ 08820
MAP 27 LOT 161.3

BOURNE TECHNOLOGY PARK REALTY TRUST
C/O MERCANTILE PROPERTY MANAGEMENT
P.O. 790
BUZZARDS BAY, MA 02532
MAP 27 LOT 86.1

123
LOT 5
113,980 S.F.

FRANCO RAPONI
TRUSTEE OF
PAESANO REALTY TRUST
P.O.BOX 3139
POCASSET, MA 02559
MAP 27 LOT 150

S89°59'45"W 332.53'
N85°29'40"E 82.66'
N25°00'16"W 160.76'
DRAINAGE EASEMENT
4,739± S.F.
R=6147.04'
L=120.21'

WATERHOUSE ROAD
STATE HIGHWAY (80' WIDE)

JAMES A. RYAN &
BETTY J. RYAN
116 WATERHOUSE ROAD
BOURNE, MA 02532
MAP 27 LOT 149

NOTES:

LOCUS IS SHOWN IN THE "B-4" ZONING DISTRICT.

LOCUS IS SHOWN IN THE "X" FLOOD ZONE.

EACH LOT CORNER, POINT OF CURVE, AND POINT OF TANGENCY SHALL BE MARKED WITH A CONCRETE BOUND AS REQUIRED IN SECTION 2460 OF THE ZONING BYLAW.

NO WETLANDS EXIST ON OR WITHIN 100' OF ANY PORTION OF THIS SUBDIVISION AS DEFINED BY MASS. GENERAL LAW 131 SEC. 40..

LOT 7 IS THE RESULT OF COMBINING LOTS 2 AND 3 AND A REDEFINITION OF TECHNOLOGY PARK DRIVE.

PLAN REFERENCE: Bk 581 Pg 28

OWNER OF RECORD
BOURNE TECHNOLOGY PARK REALTY TRUST
C/O MERCANTILE PROPERTY MANAGEMENT
P.O. 790
BUZZARDS BAY, MA 02532

APPROVAL UNDER THE SUBDIVISION CONTROL LAW IS REQUIRED.

DATE — TOWN OF BOURNE PLANNING BOARD

107 WATERHOUSE ROAD LLC
33 BREWSTER STREET
CAMBRIDGE, MA 02138
107 WATERHOUSE ROAD
MAP 27 LOT 171

BLV PROPERTIES LLC
114 WATERHOUSE ROAD
BOURNE, MA 02532
MAP 27 LOT 148

BROOKSIDE ROAD
50' WIDE – PRIVATE

CB/DH FND

0 20' 40' 60' 80'
SCALE: 1" = 40'

I CERTIFY THAT NOTICE OF APPROVAL OF THIS PLAN BY THE TOWN OF BOURNE PLANNING BOARD HAS BEEN RECIEVED AND RECORDED AT THIS OFFICE AND NO APPEAL WAS RECORDED IN THE TWENTY DAYS SUBSEQUENT TO SAID RECEIPT AND RECORDING.

DATE — BOURNE TOWN CLERK

THIS PLAN WAS PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

DATE — PROFESSIONAL LAND SURVEYOR

ASSESSORS NUMBER TO BE ASSIGNED

MODIFICATION OF "BOURNE TECHNOLOGY PARK" DEFINITIVE SUBDIVISION

PREPARED FOR
BOURNE TECHNOLOGY PARK REALTY TRUST
OF
LOT 7, TECHNOLOGY PARK DRIVE
BOURNE, MA

J.E. LANDERS–CAULEY, P.E.
CIVIL ENVIRONMENTAL ENGINEERING
P.O. BOX 364 WEST FALMOUTH, MA 02574
(508) 540–7733 ph. (508) 540–3022 ph.
(508) 540 – 3344 fax

ASS.# SEE NOTE	DATE: 07/11/16
SCALE: 1" = 40'	DRAWN BY: JDR
JOB NO. 1019DSUB16	SHEET: 1 OF 1