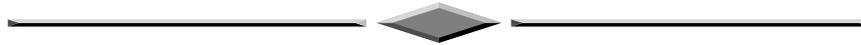


APPENDIX A

INTERGOVERNMENTAL REVIEW





DEPARTMENT OF THE AIR FORCE
6TH SPACE WARNING SQUADRON

MEMORANDUM FOR DISTRIBUTION

FROM : 6 SWS/CC
Cape Cod Air Force Station
1 Flatrock Hill Road
Sagamore, MA 02561

SUBJECT: Request for Comment on the Draft Environmental Assessment for Infrastructure Improvement at Cape Cod Air Force Station (CCAFS), Massachusetts

1. The U.S. Air Force (USAF) and the 6th Space Warning Squadron (6 SWS) have prepared an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) to evaluate the potential environmental and socioeconomic impacts associated with the implementation of the proposed infrastructure improvement at CCAFS.

2. Implementation of the Proposed Action would include the proposed repair of existing facilities as well as the construction of new facilities and new infrastructure that would improve the overall operational safety and functionality of CCAFS. Further, implementation of the Proposed Action would help CCAFS meet their goal of providing air and space surveillance in order to detect, track, and report sea-launched and intercontinental ballistic missiles.

3. In accordance with EO 12372, *Intergovernmental Review of Federal Programs*, we request your review of the attached Draft EA and solicit your comments concerning the proposal and any potential environmental consequences. Also enclosed is the distribution list, which includes those Federal, state, and local agencies that have been contacted as part of the intergovernmental review process. If there are any additional agencies that you feel should review and comment on the proposal, please include them in your distribution of this letter and the attached materials.

4. Please provide any comments at your earliest convenience, but no later than 30 days from the receipt of this letter to Mr. Jason Fortin, 1 Flatrock Hill Road, Sagamore, MA 02561 or via e-mail to jason.fortin.ctr@us.af.mil. If you choose to e-mail comments, please include "Infrastructure Improvement at Cape Cod Air Force Station" in the subject line.

MAX LANTZ, Lt Col, USAF
Commander, 6th Space Warning Squadron

Attachments:

1. Draft EA (CD-ROM)
2. Distribution List

Attachment 2: Distribution List

Mr. Thomas Chapman
U.S. Fish and Wildlife Service
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301
(603) 227-6410
Tom_chapman@fws.gov

Mr. Timothy Timmermann
Associate Director
U.S. Environmental Protection Agency New
England, Region 1
Office of Environmental Review
5 Post Office Square, Suite 100
Boston, MA 02109
(617) 918-1025
Timmermann.timothy@epa.gov

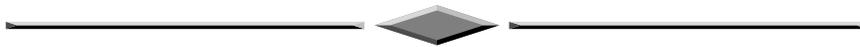
Mr. Gary S. Moran,
Deputy Commissioner
Massachusetts Department of Environmental
Protection
One Winter Street, 2nd Floor
Boston, MA 02108
(617) 292-5775
gary.moran@state.ma.us

Ms. Monica Bharel,
Commissioner
Massachusetts Department of Public Health
250 Washington Street
Boston, MA 02108-4619
(617) 624-6000
monica.bharel@state.ma.us

Ms. Coreen Moore
Town of Bourne Planning Department
Bourne Town Hall
24 Perry Avenue - Room 201
Buzzards Bay, MA 02532-3441
(508) 759-0600 Ext.1346
cmoore@townofbourne.com

Mr. Blair Haney,
Town of Sandwich Planning and
Development Office
16 Jan Sebastian Drive
Sandwich, MA 02563
(508) 833-8001
bhaney@townofsandwich.net

Mr. Stephen Tebo
Director
Barnstable County Facilities Department
Superior Courthouse
3195 Main Street
Barnstable, MA 02630
(508) 375-6603
stebo@barnstablecounty.org



APPENDIX B

AGENCY CONSULTATION





DEPARTMENT OF THE AIR FORCE
21ST SPACE WING (AFSPC)

15 May 18

Lieutenant Colonel Nathan J. Hippe
Commander, 6th Space Warning Squadron
Cape Cod Air Force Station
P.O. Box 428
Sagamore, MA 02561-0428

U.S. Fish and Wildlife Service
New England Field Office
Attn: Mr. Tom Chapman, Field Supervisor
70 Commercial Street, Suite 300
Concord, NH 03301

Dear Mr. Chapman

The 6th Space Warning Squadron (6 SWS) is proposing to implement a number of infrastructure improvements at Cape Cod Air Force Station (CCAFS) intended to enhance operational functionality and contribute to ongoing efforts to meet current and future mission and facility requirements (e.g., Anti-Terrorism/Force Protection standards). The Proposed Action includes installation of a perimeter fence and main access road fence, undergrounding of an existing 23-kilovolt (kV) electrical line, relocation of a groundwater well and three above ground fuel storage tanks, replacement and upgrades to the main gate and renovation of an existing loading dock. The Description of Proposed Action and Alternatives (DOPAA) is provided as an enclosure for your review.

The enclosed official species list – generated using the U.S. Fish and Wildlife's (USFWS) Information for Planning and Consultation (IPaC) system – identified the federally threatened northern long-eared bat (NLEB) (*Myotis septentrionalis*) as having potential to occur within CCAFS. NLEB has not previously been documented on CCAFS; however, this species has been observed in forested areas of Joint Base Cape Cod (JBCC) within which CCAFS is located. Acoustic surveys were initiated at CCAFS in May 2017 to determine the presence of NLEB on CCAFS property. These surveys are currently ongoing and expected to be completed in 2018.

Relocation of Well #1 and installation of the main access road fence would require minor vegetation removal, including minor tree removal, which would have the potential to affect NLEB roosting habitat, if present. In order to avoid impacts to potentially occurring NLEB and associated maternity roost trees, vegetation removal and other construction activities in the forested areas at CCAFS would avoid pup season (i.e., June 1 through July 31). As such, CCAFS would rely on the finding of the Programmatic Biological Opinion for the Final 4(d) Rule to fulfill consultation responsibilities under Section 7 of the Endangered Species Act.

While we understand it is not necessary to contact the USFWS regarding a "no effect" determination, we respectfully request your concurrence with our finding of "no effect" within 30 days of your receipt of this letter. If your office chooses to send written comments, please address them to Mr. Stephan Marinelli, 6 SWS/BENV, 1 Flatrock Hill Road, P.O. Box 428, Sagamore, MA 02561-0428. You may also e-mail your comments to stephan.marinelli.ctr@us.af.mil. If you choose to e-mail comments, please include "Infrastructure Improvements at Cape Cod Air Force Station" in the subject line. Thank you for your assistance.

Sincerely



NATHAN J. HIPPE, Lt Col, USAF
Commander

Enclosures:

1. Description of the Proposed Action and Alternatives
2. IPaC Official Species List

Meisinger, Nick

Subject: USFWS Section 7 Consultation Response

Hi Mr. Marinelli,

We received the letter regarding the infrastructure improvements from Lt. Col. Hippe and potential effects to the northern long-eared bat. Thank you for including the conservation measure of no tree clearing in June and July to protect non-volant pups. However, I would like to correct the "no effect" determination based on the conservation measures.

The Air Force should submit a streamlined consultation form for consultation under the 4(d) rule. Adverse effects could still occur if pregnant females are in trees cleared in April or May, especially during cold days when they may be in torpor and unable to fly out of the tree. Moreover, any bats forced to flee cut trees in which they are roosting may be vulnerable to predators during the day as they search for an alternative roost.

No effect would include no indirect effects (removing roost trees at any time of the year, or impacts to foraging habitat) or direct effects (mortality, injury, etc). In this case, there would be both indirect and direct effects from tree clearing during the bat active season.

However, the 4(d) rule addressed these effects when the FWS completed a biological opinion on the effects of the rule. The only consultation requirement is for a federal agency to submit the attached streamlined consultation form to the FWS. We then review it for compliance with the 4(d) rule and if the project is in compliance, no letter or further contact is made with the action agency. If you have not heard from the FWS within 30 days of submission, the project is good to go.

So, in this case, please complete the form and mail or fax it (address and number below) to us. Note, no effects determination is required to be made.

If you need more information on the form or the 4(d) rule, please visit this website:

<https://www.fws.gov/midwest/angered/mammals/nleb/s7.html>

If you have any additional questions, feel free to call or email me.

Susi

Susi von Oettingen
Endangered Species Biologist
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301

(W) 603-227-6418
(Fax) 603-223-0104

www.fws.gov/newengland <<http://www.fws.gov/newengland>>

Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form

Federal agencies should use this form for the optional streamlined consultation framework for the northern long-eared bat (NLEB). This framework allows federal agencies to rely upon the U.S. Fish and Wildlife Service's (USFWS) January 5, 2016, intra-Service Programmatic Biological Opinion (BO) on the final 4(d) rule for the NLEB for section 7(a)(2) compliance by: (1) notifying the USFWS that an action agency will use the streamlined framework; (2) describing the project with sufficient detail to support the required determination; and (3) enabling the USFWS to track effects and determine if reinitiation of consultation is required per 50 CFR 402.16.

This form is not necessary if an agency determines that a proposed action will have no effect to the NLEB or if the USFWS has concurred in writing with an agency's determination that a proposed action may affect, but is not likely to adversely affect the NLEB (i.e., the standard informal consultation process). Actions that may cause prohibited incidental take require separate formal consultation. Providing this information does not address section 7(a)(2) compliance for any other listed species.

Information to Determine 4(d) Rule Compliance:	YES	NO
1. Does the project occur wholly outside of the WNS Zone ¹ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Have you contacted the appropriate agency ² to determine if your project is near known hibernacula or maternity roost trees?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Could the project disturb hibernating NLEBs in a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Could the project alter the entrance or interior environment of a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Does the project remove any trees within 0.25 miles of a known hibernaculum at any time of year?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Would the project cut or destroy known occupied maternity roost trees, or any other trees within a 150-foot radius from the maternity roost tree from June 1 through July 31.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

You are eligible to use this form if you have answered yes to question #1 **or** yes to question #2 **and** no to questions 3, 4, 5 and 6. The remainder of the form will be used by the USFWS to track our assumptions in the BO.

Agency and Applicant³ (Name, Email, Phone No.): USAF, Steve Marinelli, stephan.marinelli.ctr@us.af.mil, (508) 698-3252

Project Name: Infrastructure Improvement at Cape Cod Air Force Station

Project Location (include coordinates if known): Cape Cod Air Force Station (41°45'18.33" N, 70°32'23.56" W)

Basic Project Description (provide narrative below or attach additional information): The Proposed Action includes the implementation of multiple infrastructure improvements described in the Installation Development Plan (IDP). The proposed repair of existing facilities, as well as the construction of new facilities and new infrastructure, would enhance operational safety and functionality of the Cape Cod Air Force Station (CCAFS). Additionally, the projects included in the Proposed Action would meet the CCAFS's needs to identify safety concerns and provide adequate security to CCAFS to achieve

¹ <http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf>

² See <http://www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html>

³ If applicable - only needed for federal actions with applicants (e.g., for a permit, etc.) who are party to the consultation.

compliance with Unified Facilities Criteria (UFC) 4-010-01, *Minimum Antiterrorism Standards for Buildings*. Further, implementation of the Proposed Action would help the 6th Space Warning Squadron (6 SWS) meet their goal of providing air and space surveillance in order to detect, track, and report sea launched and intercontinental ballistic missiles.

Relocation of Well #1 and installation of the main access road fence in Fiscal Year (FY) 2018 would removal of approximately 8,725 square feet (i.e., 0.20 acres) of vegetation, including tree removal, which would have the potential to affect NLEB, if present. In order to avoid impacts to potentially occurring NLEB and associated maternity roost trees, vegetation removal and other construction activities in the forested areas at CCAFS would avoid pup season (i.e., June 1 through July 31).

The following infrastructure improvements are also included in the Proposed Action, but do not require tree removal, and therefore do not require consultation pursuant to section 7

- FY 2021 – Renovate Building 2 Loading Dock
- FY 2018 – Install Perimeter Fence
- FY 2021 – Relocate and Replace Three Fuel Storage Tanks
- FY 2021 – Underground 23-kV Electrical Line
- FY 2021 – Replace and Upgrade of Main Gate

General Project Information	YES	NO
Does the project occur within 0.25 miles of a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does the project occur within 150 feet of a known maternity roost tree?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does the project include forest conversion ⁴ ? (if yes, report acreage below)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Estimated total acres of forest conversion	0.20	
If known, estimated acres ⁵ of forest conversion from April 1 to October 31	0.20	
If known, estimated acres of forest conversion from June 1 to July 31 ⁶	0	
Does the project include timber harvest? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of timber harvest		
If known, estimated acres of timber harvest from April 1 to October 31		
If known, estimated acres of timber harvest from June 1 to July 31		
Does the project include prescribed fire? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of prescribed fire		
If known, estimated acres of prescribed fire from April 1 to October 31		
If known, estimated acres of prescribed fire from June 1 to July 31		
Does the project install new wind turbines? (if yes, report capacity in MW below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated wind capacity (MW)		

⁴ Any activity that temporarily or permanently removes suitable forested habitat, including, but not limited to, tree removal from development, energy production and transmission, mining, agriculture, etc. (see page 48 of the BO).

⁵ If the project removes less than 10 trees and the acreage is unknown, report the acreage as less than 0.1 acre.

⁶ If the activity includes tree clearing in June and July, also include those acreage in April to October.

Agency Determination:

By signing this form, the action agency determines that this project may affect the NLEB, but that any resulting incidental take of the NLEB is not prohibited by the final 4(d) rule.

If the USFWS does not respond within 30 days from submittal of this form, the action agency may presume that its determination is informed by the best available information and that its project responsibilities under 7(a)(2) with respect to the NLEB are fulfilled through the USFWS January 5, 2016, Programmatic BO. The action agency will update this determination annually for multi-year activities.

The action agency understands that the USFWS presumes that all activities are implemented as described herein. The action agency will promptly report any departures from the described activities to the appropriate USFWS Field Office. The action agency will provide the appropriate USFWS Field Office with the results of any surveys conducted for the NLEB. Involved parties will promptly notify the appropriate USFWS Field Office upon finding a dead, injured, or sick NLEB.

Signature: ROBERTS.JAMES.E.1050209845
Digitally signed by
ROBERTS.JAMES.E.1050209845
Date: 2018.07.02 17:32:14 -04'00'

Date Submitted:

JAMES E. ROBERTS, Lt Col, USAF
Commander



DEPARTMENT OF THE AIR FORCE
21ST SPACE WING (AFSPC)

15 May 18

Lieutenant Colonel Nathan J. Hippe
Commander, 6th Space Warning Squadron
Cape Cod Air Force Station
P.O. Box 428
Sagamore, MA 02561-0428

Massachusetts State Historic Preservation Office
Attn: Ms. Brona Simon, SHPO and Executive Director
220 Morrissey Boulevard
Boston, MA 02125

Dear Ms. Simon

The 6th Space Warning Squadron (6 SWS) is proposing to implement a number of infrastructure improvements at Cape Cod Air Force Station (CCAFS) intended to enhance operational functionality and contribute to ongoing efforts to meet current and future mission and facility requirements (e.g., Anti-Terrorism/Force Protection standards). The subject undertakings include installation of a perimeter fence and main access road fence, undergrounding of an existing 23-kilovolt (kV) electrical line, relocation of a groundwater well and three above ground fuel storage tanks, replacement and upgrades to the main gate, and renovation of an existing loading dock. The Description of Proposed Action and Alternatives (DOPAA) is provided as an enclosure for your review.

The Area of Potential Affect (APE) for these undertakings is limited to CCAFS. The APE includes two buildings that were previously included in a historic property survey conducted at CCAFS, Building 5 (Main Gate) and Building 2 (Technical Facility). Building 5 was previously recommended as not eligible for listing on the National Register of Historic Places (NRHP); however, Building 2 was determined to be eligible for listing on the NRHP, as a contributing element to the historic Precision Acquisition Vehicle Entry Phased-Array Warning System (PAVE PAWS) network and its historical role in the Cold War.

In 1997, the U.S. Air Force (USAF) consulted with the Massachusetts State Historic Preservation Office (SHPO) regarding the eligibility of Building 2 for listing on the NRHP. The USAF signed a Programmatic Agreement (PA) dated 30 May 2000 with the Advisory Council on Historic Preservation (ACHP) and SHPOs in the four states that contain PAVE PAWS sites for management of these historic properties. Under the PA, the USAF was required to prepare a volume on the history of the PAVE PAWS network including photographs and facility designs of the system. As a part of this effort, the USAF documented and filed the required information for Building 2 at CCAFS. Any alterations that would affect the character-defining features of this building that make it eligible for the NRHP must adhere to the requirements of the PA.

Building No.	Historic Description and NRHP Status	Activities
2	Technical Facility (Eligible as Contributing Property*)	<ul style="list-style-type: none"> • Demolition of the existing loading dock at Building 2. • Re-compaction of the existing subgrade. • Construction of a new reconfigured loading dock that would include a 10-foot by 10-foot concrete pad and stairs with handrails leading up to the loading dock platform. • Installation of an exterior passive infrared (PIR) motion sensor light over the loading dock. • Replacement of the loading dock with in-kind materials.

Note: *Contributing property to the historic PAVE PAWS network and its historical role in the Cole War.

The proposed replacement of the loading dock at Building 2 is necessary to meet International Building Code (IBC) and Occupational Safety and Health Administration (OSHA) requirements (e.g., 29 Code of Federal Regulations [CFR] Part 1910, § 1910.176, *Handling Materials*). Nevertheless, the proposed replacement would remain consistent with the industrial nature/use of the existing facility. The loading dock is ancillary to the main building, and does not constitute a character-defining feature of the facility. Further, replacement and renovation of the loading dock would be completed with in-kind materials, and would not substantially alter the size or location of the existing loading dock consistent with the *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*. Consequently, the undertaking would not substantially alter the appearance of Building 2 or affect any of the criteria that made it eligible for listing on the NRHP.

With the exception of the main access road and the main gate, the remainder of CCAFS was previously surveyed for archaeological resources in 1992 and 1996. These surveys uncovered no evidence of archaeological resources. CCAFS is expected to have low potential for on-site archaeological resources due to previous ground disturbance and development activities in the 1970s and 1980s associated with construction of CCAFS.

All of the ground-disturbing activities associated with the undertakings – including the proposed installation of the main access road fence as well as the replacement and upgrades to the main gate – would be conducted on or immediately adjacent to previously disturbed lands at CCAFS. There is low possibility of inadvertent discoveries, and the USAF has determined that an archaeological monitoring program would not be required for this project. Any inadvertent discoveries would be processed under the CCAFS Integrated Cultural Resources Management Plan (ICRMP), Section 7.4, *Cultural Discoveries*, and the provisions of applicable law(s) such as Section 106 of the NHPA (36 CFR § 800.13).

Based on the evidence and data provided herein, the USAF has determined that the undertakings would have no effect on any historic resources that are eligible or potentially eligible for listing on the NRHP. We respectfully seek your concurrence with our determination of *no historic properties affected*. In accordance with 36 CFR § 800.4(d)(1)(i), we are open to receiving your comments or questions within 30 days of your office's receipt of this consultation package. If your office chooses to send written comments, please address them to Mr. Stephan

Marinelli, 6 SWS/BENV, 1 Flatrock Hill Road, P.O. Box 428, Sagamore, MA 02561-0248. You may also e-mail your comments to stephan.marinelli.ctr@us.af.mil. If you choose to e-mail comments, please include "Infrastructure Improvements at Cape Cod Air Force Station" in the subject line. Thank you for your assistance in reviewing this undertaking.

Sincerely



NATHAN J. HIPPE, Lt Col, USAF
Commander

Enclosure:
Description of the Proposed Action and Alternatives



DEPARTMENT OF THE AIR FORCE
21ST SPACE WING (AFSPC)

RECEIVED

MAY 18 2018

MASS. HIST. COMM

RC. 8823

15 May 18

Lieutenant Colonel Nathan J. Hippe
Commander, 6th Space Warning Squadron
Cape Cod Air Force Station
P.O. Box 428
Sagamore, MA 02561-0428

Massachusetts State Historic Preservation Office
Attn: Ms. Brona Simon, SHPO and Executive Director
220 Morrissey Boulevard
Boston, MA 02125

CONCURRENCE: *Brona Simon*
5/30/18
BRONA SIMON
STATE HISTORIC
PRESERVATION OFFICER
MASSACHUSETTS
HISTORICAL COMMISSION

Dear Ms. Simon

The 6th Space Warning Squadron (6 SWS) is proposing to implement a number of infrastructure improvements at Cape Cod Air Force Station (CCAFS) intended to enhance operational functionality and contribute to ongoing efforts to meet current and future mission and facility requirements (e.g., Anti-Terrorism/Force Protection standards). The subject undertakings include installation of a perimeter fence and main access road fence, undergrounding of an existing 23-kilovolt (kV) electrical line, relocation of a groundwater well and three above ground fuel storage tanks, replacement and upgrades to the main gate, and renovation of an existing loading dock. The Description of Proposed Action and Alternatives (DOPAA) is provided as an enclosure for your review.

The Area of Potential Affect (APE) for these undertakings is limited to CCAFS. The APE includes two buildings that were previously included in a historic property survey conducted at CCAFS, Building 5 (Main Gate) and Building 2 (Technical Facility). Building 5 was previously recommended as not eligible for listing on the National Register of Historic Places (NRHP); however, Building 2 was determined to be eligible for listing on the NRHP, as a contributing element to the historic Precision Acquisition Vehicle Entry Phased-Array Warning System (PAVE PAWS) network and its historical role in the Cold War.

In 1997, the U.S. Air Force (USAF) consulted with the Massachusetts State Historic Preservation Office (SHPO) regarding the eligibility of Building 2 for listing on the NRHP. The USAF signed a Programmatic Agreement (PA) dated 30 May 2000 with the Advisory Council on Historic Preservation (ACHP) and SHPOs in the four states that contain PAVE PAWS sites for management of these historic properties. Under the PA, the USAF was required to prepare a volume on the history of the PAVE PAWS network including photographs and facility designs of the system. As a part of this effort, the USAF documented and filed the required information for Building 2 at CCAFS. Any alterations that would affect the character-defining features of this building that make it eligible for the NRHP must adhere to the requirements of the PA.

Building No.	Historic Description and NRHP Status	Activities
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Note: *Contributing property to the historic PAVE PAWS network and its historical role in the Cole War.

The proposed replacement of the loading dock at Building 2 is necessary to meet International Building Code (IBC) and Occupational Safety and Health Administration (OSHA) requirements (e.g., 29 Code of Federal Regulations [CFR] Part 1910, § 1910.176, *Handling Materials*). Nevertheless, the proposed replacement would remain consistent with the industrial nature/use of the existing facility. The loading dock is ancillary to the main building, and does not constitute a character-defining feature of the facility. Further, replacement and renovation of the loading dock would be completed with in-kind materials, and would not substantially alter the size or location of the existing loading dock consistent with the *Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*. Consequently, the undertaking would not substantially alter the appearance of Building 2 or affect any of the criteria that made it eligible for listing on the NRHP.

With the exception of the main access road and the main gate, the remainder of CCAFS was previously surveyed for archaeological resources in 1992 and 1996. These surveys uncovered no evidence of archaeological resources. CCAFS is expected to have low potential for on-site archaeological resources due to previous ground disturbance and development activities in the 1970s and 1980s associated with construction of CCAFS.

All of the ground-disturbing activities associated with the undertakings – including the proposed installation of the main access road fence as well as the replacement and upgrades to the main gate – would be conducted on or immediately adjacent to previously disturbed lands at CCAFS. There is low possibility of inadvertent discoveries, and the USAF has determined that an archaeological monitoring program would not be required for this project. Any inadvertent discoveries would be processed under the CCAFS Integrated Cultural Resources Management Plan (ICRMP), Section 7.4, *Cultural Discoveries*, and the provisions of applicable law(s) such as Section 106 of the NHPA (36 CFR § 800.13).

Based on the evidence and data provided herein, the USAF has determined that the undertakings would have no effect on any historic resources that are eligible or potentially eligible for listing on the NRHP. We respectfully seek your concurrence with our determination of *no historic properties affected*. In accordance with 36 CFR § 800.4(d)(1)(i), we are open to receiving your comments or questions within 30 days of your office's receipt of this consultation package. If your office chooses to send written comments, please address them to Mr. Stephan

Marinelli, 6 SWS/BENV, 1 Flatrock Hill Road, P.O. Box 428, Sagamore, MA 02561-0248. You may also e-mail your comments to stephan.marinelli.ctr@us.af.mil. If you choose to e-mail comments, please include "Infrastructure Improvements at Cape Cod Air Force Station" in the subject line. Thank you for your assistance in reviewing this undertaking.

Sincerely



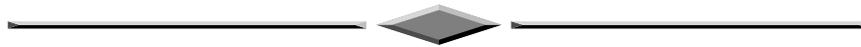
NATHAN J. HIPPE, Lt Col, USAF
Commander

Enclosure:
Description of the Proposed Action and Alternatives



APPENDIX C

NATIVE AMERICAN CONSULTATION





DEPARTMENT OF THE AIR FORCE
21ST SPACE WING (AFSPC)

15 May 18

Lieutenant Colonel Nathan J. Hippe
Commander, 6th Space Warning Squadron
Cape Cod Air Force Station
P.O. Box 428
Sagamore, MA 02561-0428

Mr. Vernon Lopez, Tribal Chief
Mashpee Wampanoag
483 Great Neck Road South
Mashpee, MA 02649

Dear Mr. Lopez

The 6th Space Warning Squadron (6 SWS) is proposing to implement a number of infrastructure improvements at Cape Cod Air Force Station (CCAFS) intended to enhance operational functionality and contribute to ongoing efforts to meet current and future mission and facility requirements (e.g., Anti-Terrorism/Force Protection standards). The subject undertakings include installation of a perimeter fence and main access road fence, undergrounding of an existing 23-kilovolt (kV) electrical line, relocation of a groundwater well and three above ground fuel storage tanks, replacement and upgrades to the main gate and renovation of an existing loading dock. The Description of Proposed Action and Alternatives (DOPAA) is provided as an enclosure for your review.

The Area of Potential Affect (APE) for these undertakings is limited to CCAFS. As a tribe with potential interests in the APE, 6 SWS is reaching out to you to assist in our analysis of the undertaking's effect. In accordance with Section 106 of the National Historic Preservation Act (NHPA) and in reference to Executive Order (EO) 13175, *Consultation and Coordination with Indian Tribal Governments*, 6 SWS would like to offer government-to-government consultation with your tribe. The squadron is also consulting with the Massachusetts State Historic Preservation Office (SHPO) under Section 106 of the NHPA.

In particular, 6 SWS respectfully requests your input about 1) the existence of any traditional resources that may be located in or near the proposed APE; and 2) whether you have knowledge of any historic properties that might be affected by the proposed undertaking in the APE.

CCAFS is committed to early and continuous consultation with all potentially affected Native American tribes. In accordance with 36 Code of Federal Regulations (CFR) § 800.4(d)(1)(i), we are open to receiving your comments, questions, or requests for government-to-government consultation within 30 days of your receipt of this consultation package. Please feel free to contact Mr. Stephen Mellin, 6 SWS/MA, 1 Flatrock Hill Road, P.O. Box 428, Sagamore, MA 02561-0428, or by e-mail to stephen.mellin.1@us.af.mil. If you choose to e-mail comments, please include "Infrastructure Improvements at Cape Cod Air Force Station" in the subject line. Thank you for your assistance.

Sincerely



NATHAN J. HIPPE, Lt Col, USAF
Commander

Enclosure:
The Description of Proposed Action and Alternatives



DEPARTMENT OF THE AIR FORCE
21ST SPACE WING (AFSPC)

15 May 18

Lieutenant Colonel Nathan J. Hippe
Commander, 6th Space Warning Squadron
Cape Cod Air Force Station
P.O. Box 428
Sagamore, MA 02561-0428

Ms. Cheryl Andrews-Maltais, Chairwomen
Tribe of Gay Head (Aquinnah)
20 Black Brook Road
Aquinnah, MA 02535-1546

Dear Ms. Andrews-Maltais

The 6th Space Warning Squadron (6 SWS) is proposing to implement a number of infrastructure improvements at Cape Cod Air Force Station (CCAFS) intended to enhance operational functionality and contribute to ongoing efforts to meet current and future mission and facility requirements (e.g., Anti-Terrorism/Force Protection standards). The subject undertakings include installation of a perimeter fence and main access road fence, undergrounding of an existing 23-kilovolt (kV) electrical line, relocation of a groundwater well and three above ground fuel storage tanks, replacement and upgrades to the main gate and renovation of an existing loading dock. The Description of Proposed Action and Alternatives (DOPAA) is provided as an enclosure for your review.

The Area of Potential Affect (APE) for these undertakings is limited to CCAFS. As a tribe with potential interests in the APE, 6 SWS is reaching out to you to assist in our analysis of the undertaking's effect. In accordance with Section 106 of the National Historic Preservation Act (NHPA) and in reference to Executive Order (EO) 13175, *Consultation and Coordination with Indian Tribal Governments*, 6 SWS would like to offer government-to-government consultation with your tribe. The squadron is also consulting with the Massachusetts State Historic Preservation Office (SHPO) under Section 106 of the NHPA.

In particular, 6 SWS respectfully requests your input about 1) the existence of any traditional resources that may be located in or near the proposed APE; and 2) whether you have knowledge of any historic properties that might be affected by the proposed undertaking in the APE.

CCAFS is committed to early and continuous consultation with all potentially affected Native American tribes. In accordance with 36 Code of Federal Regulations (CFR) § 800.4(d)(1)(i), we are open to receiving your comments, questions, or requests for government-to-government consultation within 30 days of your receipt of this consultation package. Please feel free to contact Mr. Stephen Mellin, 6 SWS/MA, 1 Flatrock Hill Road, P.O. Box 428, Sagamore, MA 02561-0428, or by e-mail to stephen.mellin.1@us.af.mil. If you choose to e-mail comments, please include "Infrastructure Improvements at Cape Cod Air Force Station" in the subject line. Thank you for your assistance.

Sincerely



NATHAN J. HIPPE, Lt Col, USAF
Commander

Enclosure:
Description of the Proposed Action and Alternatives

MEMORANDUM FOR RECORD

17 AUG 2018

FROM: BAE Systems Environmental Office

Cape Cod Air Force Station

RE: CCAFS Correspondence Summary for DOPAA and Scoping Letters

Purpose: Section 106 of the National Historic Preservation Act (NHPA), and implementing regulations (36 CFR Part 800), requires Federal agencies to consult with interested federally recognized Native American Tribes tribal governments whose interests might be directly and substantially *affected* by activities on federally administered lands.

A scoping letter and a copy of the Description of Proposed Action and Alternatives (DO PAA) for CCAFS were sent from the USPS via certified mail to the Wampanoag Tribe of Gay Head (Aquinnah) and the Mashpee Wampanoag Tribe on 15 May 2018.

The signed return receipt from the Mashpee Wampanoag Tribe was received via USPS at CCAFS on 15 May 2018. The signed return receipt from the Wampanoag Tribe of Gay Head (Aquinnah) was received via USPS at CCAFS on 21 May 2018.

Rita Lopez from the Mashpee Wampanoag Tribe was contacted on 19 June 2018 at 3:40pm via phone and she confirmed receipt of the scoping letter and DOPAA. She stated that the information was given to the Natural Resources Director, Chuckie Green for review and/or comment. Rita stated that she would follow-up with me when the review was completed.

Becky Sin from the Wampanoag Tribe of Gay Head (Aquinnah) was contacted on 19 June 2018 at 3:50pm via phone and she confirmed receipt of the scoping letter and DO PAA. She stated that the information was given to the National Resources Director, Bret Stearns. I then spoke with Bret Stearns and he stated that the information was passed on to the Tribal Historic Preservation Officer, Bettina Washington for review and/or comment. Bret stated that he would follow-up with me when the review was completed.

As of 19 Jun 18, No comments or requests for consultation were received by CCAFS

Conclusion: No comments or concerns were raised by the Wampanoag Tribes within 90 days of their receipt of the consultation package.

MARINELLI.STEPH
AN.LAWRENCE.15
43920114

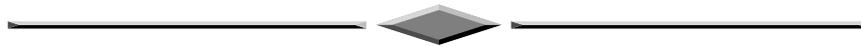
Digitally signed by
MARINELLI.STEPHAN.LAWREN
CE.1543920114
Date: 2018.08.17 10:08:35 -04'00'

Stephan Marinelli
BAE systems Environmental Manager



APPENDIX D

AIR QUALITY CALCULATIONS



AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force’s Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Instruction 32-7040, Air Quality Compliance And Resource Management; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: CAPE COD AFS
County(s): Barnstable
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Cape Cod Infrastructure Improvement

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2018

e. Action Description:

See Section 2 of the Environmental Assessment.

Please note emissions associated with fence installation or replacement are minimal and are therefore negligible.

f. Point of Contact:

Name: Melaina Wright
Title: Environmental Analyst
Organization: Amec Foster Wheeler
Email: melaina.wright@amecfw.com
Phone Number: (805) 962-0992

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

 applicable
 X not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the “worst-case” and “steady state” (net gain/loss upon action fully implemented) emissions.

“Air Quality Indicators” were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR 93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF AIR ANALYSIS (ROAA)

Analysis Summary:

2018

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.240	100	No
NOx	1.487	100	No
CO	1.224	100	No
SOx	0.003	100	No
PM 10	0.774	100	No
PM 2.5	0.070	100	No
Pb	0.000	100	No
NH3	0.001	100	No
CO2e	276.6		

2019 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	100	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.


Melaina Wright, Environmental Analyst

6/12/18
DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: CAPE COD AFS
County(s): Barnstable
Regulatory Area(s): NOT IN A REGULATORY AREA

- **Action Title:** Cape Cod Infrastructure Improvement

- **Project Number/s (if applicable):**

- **Projected Action Start Date:** 1 / 2018

- **Action Purpose and Need:**

- Action Description:

See Section 2 of the Environmental Assessment.

Please note emissions associated with fence installation or replacement are minimal and are therefore negligible.

- Point of Contact

Name: Melaina Wright
Title: Environmental Analyst
Organization: Amec Foster Wheeler
Email: melaina.wright@amecfw.com
Phone Number: (805) 962-0992

- Activity List:

	Activity Type	Activity Title
2.	Construction / Demolition	Project 1: Renovate Building 2 Loading Dock
3.	Construction / Demolition	Project 2 - Relocation of Well
4.	Construction / Demolition	Project 5 - Relocate and Replace Fuel Storage Tanks
5.	Construction / Demolition	Project 6 - Underground Electrical Line
6.	Construction / Demolition	Project 7 - Replace/Upgrade Main Gate

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Barnstable
Regulatory Area(s): NOT IN A REGULATORY AREA

- **Action Title:** Project 1: Renovate Building 2 Loading Dock

- Activity Description:

Demolition of old loading dock and construction of new one.

demolition: assume 5ft tall, 100 sqft.

site grading: given 850 sq ft

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

paving (concrete): 100 sq ft

- Activity Start Date

Start Month: 1
Start Month: 2018

- Activity End Date

Indefinite: False
End Month: 2
End Month: 2018

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.034172
SO _x	0.000390
NO _x	0.222835
CO	0.191813
PM 10	0.015688

Pollutant	Total Emissions (TONs)
PM 2.5	0.011395
Pb	0.000000
NH ₃	0.000113
CO _{2e}	38.5

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2018

- Phase Duration

Number of Month: 0
Number of Days: 15

2.1.2 Demolition Phase Assumptions

- General Demolition Information

Area of Building to be demolished (ft²): 100
Height of Building to be demolished (ft): 5

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0604	0.0006	0.3958	0.3850	0.0260	0.0260	0.0054	58.600
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873
HDGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699
MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900

2.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (0.00042 * BA * BH) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

0.00042: Emission Factor (lb/ft³)

BA: Area of Building to be demolished (ft²)

BH: Height of Building to be demolished (ft)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building being demolish (ft²)

BH: Height of Building being demolish (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

0.25: Volume reduction factor (material reduced by 75% to account for air space)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 3

Start Year: 2018

- Phase Duration

Number of Month: 0

Number of Days: 15

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 850

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873
HDGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900
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2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)
 20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
 ACRE: Total acres (acres)
 WD: Number of Total Work Days (days)
 2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
 NE: Number of Equipment
 WD: Number of Total Work Days (days)
 H: Hours Worked per Day (hours)
 EF_{POL}: Emission Factor for Pollutant (lb/hour)
 2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
 HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
 HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
 HC: Average Hauling Truck Capacity (yd³)
 (1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
 HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 WD: Number of Total Work Days (days)
 WT: Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

2.3 Paving Phase

2.3.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 2
 Start Quarter: 1
 Start Year: 2018

- Phase Duration

Number of Month: 0
 Number of Days: 15

2.3.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 100

- Paving Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HdGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HdGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.3.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH₃	CO_{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873
HDGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699
MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900

2.3.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

PA: Paving Area (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 WD: Number of Total Work Days (days)
 WT: Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560$$

VOC_P: Paving VOC Emissions (TONs)
 2.62: Emission Factor (lb/acre)
 PA: Paving Area (ft²)
 43560: Conversion Factor square feet to acre (43560 ft² / acre) / acre)

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

- Activity Location

County: Barnstable
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Project 2 - Relocation of Well

- Activity Description:

Construction of the well is estimated using "Building Construction"

Site Grading: Assume 500 sqft of disturbed area

Excavating/Trenching: 300 ft, at 3 ft wide

Well Construction: estimated with 1,000 sq ft building

- Activity Start Date

Start Month: 3
Start Year: 2018

- Activity End Date

Indefinite: False
End Month: 4
End Year: 2018

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.037945

Pollutant	Total Emissions (TONs)
PM 2.5	0.011576

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SO _x	0.000517
NO _x	0.254687
CO	0.209007
PM 10	0.015519

Pb	0.000000
NH ₃	0.000094
CO _{2e}	50.1

3.1 Site Grading Phase

3.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
 Start Quarter: 1
 Start Year: 2018

- Phase Duration

Number of Month: 0
 Number of Days: 15

3.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 500
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDTV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDTV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH₃	CO_{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873
HDGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699
MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900

3.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 WD : Number of Total Work Days (days)
 WT : Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE : Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

3.2 Trenching/Excavating Phase

3.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 4
Start Quarter: 1
Start Year: 2018

- Phase Duration

Number of Month: 0
Number of Days: 15

3.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 300
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8

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Tractors/Loaders/Backhoes Composite	1	8
-------------------------------------	---	---

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HdGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HdGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873
HdGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699
MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900

3.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)
 20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
 ACRE: Total acres (acres)
 WD: Number of Total Work Days (days)
 2000: Conversion Factor pounds to tons

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- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.3 Building Construction Phase

3.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 4
Start Quarter: 1
Start Year: 2018

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- Phase Duration

Number of Month: 0
 Number of Days: 15

3.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
 Area of Building (ft²): 1000
 Height of Building (ft): 7
 Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HdGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HdGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HdGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

3.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1012	0.0013	0.7908	0.4059	0.0318	0.0318	0.0091	128.85
Forklifts Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0371	0.0006	0.2186	0.2173	0.0101	0.0101	0.0033	54.479
Tractors/Loaders/Backhoes Composite								

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	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873
HDGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699
MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900

3.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1000 ft³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

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VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
 BA: Area of Building (ft²)
 BH: Height of Building (ft)
 (0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1000 ft³)
 HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
 VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL}: Emission Factor for Pollutant (grams/mile)
 VM: Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location

County: Barnstable
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Project 5 - Relocate and Replace Fuel Storage Tanks

- Activity Description:

The replacement of the tanks would result in no net change in emissions associated with the tanks, however the construction of the new concrete pads needs to be accounted for.

Site grading: given 300 sq ft

paving: 60 sqft X 3 pads = 180 sq ft

- Activity Start Date

Start Month: 5
Start Month: 2018

- Activity End Date

Indefinite: False
End Month: 6
End Month: 2018

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.025515

Pollutant	Total Emissions (TONs)
PM 2.5	0.008324

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SO _x	0.000290
NO _x	0.166646
CO	0.136719
PM 10	0.009936

Pb	0.000000
NH ₃	0.000081
CO _{2e}	28.6

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
 Start Quarter: 1
 Start Year: 2018

- Phase Duration

Number of Month: 0
 Number of Days: 14

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 350
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HGGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HGGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

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Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873
HDGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699
MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)
 20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
 ACRE: Total acres (acres)
 WD: Number of Total Work Days (days)
 2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
 NE: Number of Equipment
 WD: Number of Total Work Days (days)
 H: Hours Worked per Day (hours)
 EF_{POL}: Emission Factor for Pollutant (lb/hour)
 2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
 HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
 HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
 HC: Average Hauling Truck Capacity (yd³)
 (1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
 HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 WD : Number of Total Work Days (days)
 WT : Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE : Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

4.2 Paving Phase

4.2.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 6
Start Quarter: 1
Start Year: 2018

- Phase Duration

Number of Month: 0
Number of Days: 15

4.2.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 180

- Paving Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

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- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873
HDGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699
MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900

4.2.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

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$$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft²)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_P = (2.62 * PA) / 43560$$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft²)
43560: Conversion Factor square feet to acre (43560 ft² / acre)² / acre)

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- Activity Location

County: Barnstable
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Project 6 - Underground Electrical Line

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- Activity Description:

4,000 linear feet, assume 4 ft wide for electrical lines

50,000 sq ft of disturbed land

- Activity Start Date

Start Month: 4

Start Month: 2018

- Activity End Date

Indefinite: False

End Month: 5

End Month: 2018

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.062040
SO _x	0.000841
NO _x	0.421159
CO	0.334594
PM 10	0.635788

Pollutant	Total Emissions (TONs)
PM 2.5	0.019007
Pb	0.000000
NH ₃	0.000122
CO _{2e}	81.6

5.1 Site Grading Phase

5.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 4

Start Quarter: 1

Start Year: 2018

- Phase Duration

Number of Month: 1

Number of Days: 0

5.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 50000

Amount of Material to be Hauled On-Site (yd³): 0

Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

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- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873
HDGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699
MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900

5.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)
 20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
 ACRE: Total acres (acres)
 WD: Number of Total Work Days (days)
 2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

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CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.2 Trenching/Excavating Phase

5.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
Start Quarter: 1
Start Year: 2018

- Phase Duration

Number of Month: 1

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Number of Days: 0

5.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 12000
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HdGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HdGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873

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HDGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699
MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900

5.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (20 * ACRE * WD) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

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$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

- V_{POL} : Vehicle Emissions (TONs)
- VMT_{VE} : Worker Trips Vehicle Miles Travel (miles)
- 0.002205: Conversion Factor grams to pounds
- EF_{POL} : Emission Factor for Pollutant (grams/mile)
- VM: Worker Trips On Road Vehicle Mixture (%)
- 2000: Conversion Factor pounds to tons

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location

County: Barnstable
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Project 7 - Replace/Upgrade Main Gate

- Activity Description:

- Demolition - Assume 1,000 sqft for old building
- Site Grading - 7,500 sqft
- Building Construction - Assume 1,000 sqft for new building
- Arch. Coatings - $(1000)^{(1/2)} * 12 \text{ ft tall} * 4 \text{ walls} = 1,520 \text{ sq ft}$

- Activity Start Date

Start Month: 3
Start Year: 2018

- Activity End Date

Indefinite: False
End Month: 6
End Year: 2018

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.079996
SO _x	0.000789
NO _x	0.422094
CO	0.352113
PM 10	0.097191

Pollutant	Total Emissions (TONs)
PM 2.5	0.020047
Pb	0.000000
NH ₃	0.000189
CO _{2e}	77.9

6.1 Demolition Phase

6.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date

Start Month: 3
Start Quarter: 1
Start Year: 2018

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- Phase Duration

Number of Month: 1

Number of Days: 0

6.1.2 Demolition Phase Assumptions

- General Demolition Information

Area of Building to be demolished (ft²): 1000

Height of Building to be demolished (ft): 12

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HdGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HdGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0604	0.0006	0.3958	0.3850	0.0260	0.0260	0.0054	58.600
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873

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HDGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699
MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900

6.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM10_{FD} = (0.00042 * BA * BH) / 2000$$

PM10_{FD}: Fugitive Dust PM 10 Emissions (TONs)

0.00042: Emission Factor (lb/ft³)

BA: Area of Building to be demolished (ft²)

BH: Height of Building to be demolished (ft)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building being demolish (ft²)

BH: Height of Building being demolish (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

0.25: Volume reduction factor (material reduced by 75% to account for air space)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

WD: Number of Total Work Days (days)

WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works

NE: Number of Construction Equipment

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$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.2 Site Grading Phase

6.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 4
Start Quarter: 1
Start Year: 2018

- Phase Duration

Number of Month: 1
Number of Days: 0

6.2.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 7500
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HdGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HdGV	LDDV	LDDT	HDDV	MC

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POVs	50.00	50.00	0	0	0	0	0
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6.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873
HdGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699
MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900

6.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD}: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)

WD: Number of Total Work Days (days)

2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)

NE: Number of Equipment

WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)

EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

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HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

6.3 Building Construction Phase

6.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
Start Quarter: 1
Start Year: 2018

- Phase Duration

Number of Month: 1
Number of Days: 0

6.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Commercial or Retail
Area of Building (ft²): 1000
Height of Building (ft): 12
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

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- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

6.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1012	0.0013	0.7908	0.4059	0.0318	0.0318	0.0091	128.85
Forklifts Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0371	0.0006	0.2186	0.2173	0.0101	0.0101	0.0033	54.479
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873
HDGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699
MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900

6.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft³ to trips (0.32 trip / 1000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase

$$VMT_{VT} = BA * BH * (0.05 / 1000) * HT$$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft²)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft³ to trips (0.05 trip / 1000 ft³)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$$

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VT} : Vender Trips Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM : Worker Trips On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

6.4 Architectural Coatings Phase

6.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 6
Start Quarter: 1
Start Year: 2018

- Phase Duration

Number of Month: 1
Number of Days: 0

6.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft²): 1520
Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.338	000.002	000.284	003.486	000.010	000.009		000.025	00340.023
LDGT	000.433	000.003	000.496	005.030	000.013	000.011		000.026	00440.873
HDGV	000.835	000.005	001.364	018.125	000.031	000.027		000.045	00770.655
LDDV	000.136	000.003	000.150	002.421	000.004	000.004		000.008	00330.744
LDDT	000.339	000.004	000.494	004.818	000.007	000.007		000.008	00482.528
HDDV	000.502	000.013	005.597	001.830	000.218	000.200		000.027	01484.699
MC	002.241	000.003	000.799	013.299	000.028	000.025		000.053	00399.900

6.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$$VMT_{WT} = (1 * WT * PA) / 800$$

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VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft²)
800: Conversion Factor square feet to man days (1 ft² / 1 man * day)

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft²)
2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)
0.0116: Emission Factor (lb/ft²)
2000: Conversion Factor pounds to tons