San Francisco
CLEAN CONSTRUCTION ORDINANCE
Implementation Guide for San Francisco Public Projects

FINAL
AUGUST 2015

San Francisco Department of the Environment
San Francisco Department of Public Health
San Francisco Planning Department
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In April 2007, the City and County of San Francisco adopted an Ordinance requiring public projects to reduce emissions at construction sites starting in 2009. In March 2015, the City expanded the existing Ordinance to require public projects to further reduce emissions at construction sites in certain areas with high levels of background concentrations of air pollutants.

This guide describes the City’s process for implementing the requirements of the expanded Clean Construction Ordinance, and resources to assist City Departments in meeting these requirements.

This guide provides an introduction to the Clean Construction requirements, describes health effects of common air pollutants, presents off-road (i.e., construction) equipment basics, describes the Clean Construction implementation process, provides a template of a Construction Emissions Minimization Plan, and presents additional resources and funding opportunities for upgrading equipment.

The San Francisco Clean Construction Ordinance is available at:

https://sfgov.legistar.com/Legislation.aspx (Board File Nos. 140805 AND 150526 or Ordinance No. 28-15)

This guide only applies to the Clean Construction Ordinance. Agencies and contractors are responsible for understanding other City regulations that apply to air quality such as:

- Construction Dust Control Requirements
  https://www.sfdph.org/dph/EH/Air/Dust.asp

- Enhanced Ventilation Requirements
  https://www.sfdph.org/dph/EH/Air/Article38.asp

- Maher Ordinance Requirements
  https://www.sfdph.org/dph/EH/HazWaste/hazWasteSiteMitigation.asp

Introduction to the Clean Construction Ordinance

The City and County of San Francisco has long been a leader in protecting residents’ public health. In a dense, urban center like San Francisco, construction sites can be located in areas of the City with high levels of background concentrations of air pollutants (Air Pollutant Exposure Zone, see page 3 Figure 2). In addition, these locations may be located close to sensitive uses, such as children and the elderly, who are more susceptible to the negative effects of air pollutants such as diesel particulate matter. According to the California Air Resources Board, off-road equipment such as construction equipment is the sixth largest source of diesel particulate matter emissions in California and can cause a public health risk and nuisance to sensitive populations.

Through the implementation of the requirements of the Clean Construction Ordinance, contractors for publicly-funded construction projects can substantially reduce their emissions and the associated public health risk at construction sites.
The Clean Construction Ordinance shall become operative on September 6, 2015, and shall apply to all contracts first advertised or initiated on or after this date. The Clean Construction Ordinance contains the following requirements for project sites in the Air Pollutant Exposure Zone (See Table 1 below and page 8 for requirements outside of the Air Pollutant Exposure Zone):

1. Equipment Requirements:
   - Use Tier 2 or higher engines and the most effective Verified Diesel Emission Control Strategies (VDECS) available for the engine type (Tier 4 engines automatically meet this requirement) as certified by the California Air Resources Board (ARB);
   - Prohibit portable diesel engines where access to alternative sources of power are available;
   - Restrict idling to two minutes; and
   - Properly maintain and tune equipment in accordance with manufacturer specifications.

2. Construction Emissions Minimization Plan (Emissions Plan) shall be prepared and include the following:
   - An equipment inventory which shall include estimates of the construction timeline by phase with description of each piece of off-road equipment required for each phase (See page 9);
   - Signage indicating idling limits and engine/Verified Diesel Emission Control Strategies requirements (See page 11); and
   - Certification Statement (See page 12).

3. Monitoring shall begin at the start of construction activities and include:
   - Quarterly reports documenting compliance with the Emissions Plan which shall be maintained at the project site; and
   - Final report summarizing construction activities.

Required documents must be submitted to the head of the department (Department Head) funding the public project (e.g. San Francisco Public Works, San Francisco Public Utilities Commission, San Francisco Port, etc.). The Department Head is responsible for ensuring that all requirements of the Clean Construction Ordinance are met by the Contractor.

Table 1: Summary of Clean Construction Ordinance

<table>
<thead>
<tr>
<th>Code</th>
<th>Outside Air Pollutant Exposure Zone</th>
<th>Within Air Pollutant Exposure Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicability</td>
<td>Administrative and Environment</td>
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<td></td>
<td>Public Projects &gt; 20 days in length</td>
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<tr>
<td>Standard Best Management Practices (BMPs)</td>
<td>Tier 2 or VDECS and B20 biodiesel</td>
<td>Tier 2 and VDECS and Monitoring Plan</td>
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<tr>
<td></td>
<td>Contract bids and specifications</td>
<td>Same</td>
</tr>
<tr>
<td>Enforcement</td>
<td>Individual City Departments</td>
<td>Same</td>
</tr>
<tr>
<td>Reporting/Technical Assistance</td>
<td>Department of Environment</td>
<td>Same</td>
</tr>
<tr>
<td>Waivers/Exceptions</td>
<td>Unavailability of equipment</td>
<td>Same</td>
</tr>
</tbody>
</table>

How do I...
...check if my project site is in the Air Pollutant Exposure Zone? See Page 3
...figure out how the Clean Construction Ordinance applies to my project? See Page 8
**How do I...**

...check if my project site is in the Air Pollutant Exposure Zone?

Access PIM (Figure 1) at: http://propertymap.sfplanning.org/?dept=planning

1. **Enter address**
2. **Click on Zoning Tab**
3. **Check if in the APEZ**
4. **If public right-of-way project, check if adjacent parcel(s) in APEZ**

**Note:** only those portions of public right-of-way project that are within the APEZ are subject to the additional APEZ requirements.

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**Figure 1: San Francisco Property Information Map (PIM)**

**Figure 2: Snapshot of Air Pollution Zone (APEZ) in San Francisco**

* Access official map with notes at: https://www.sfdph.org/dph/files/EHSdocs/AirQuality/AirPollutantExposureZoneMap.pdf
Health Impacts from Construction Activities

Construction activities produce emissions that affect air quality. Scientific studies have found an association between exposure to particulate matter and significant human health problems, including: aggravated asthma; chronic bronchitis; reduced lung function; irregular heartbeat; heart attacks; and premature death in people with heart or lung disease. Exposure to diesel exhaust is an established cause of lung cancer. The US Environmental Protection Agency (EPA) has recognized that air pollution affects the public’s health, especially sensitive groups, and can result in respiratory and cardiovascular effects as shown in Figure 3 below.

Figure 3: Health Effects of Common Air Pollutants

Clean Construction Ordinance

Off-Road (Construction) Equipment Basics and Health Benefits

Project construction involves the use of off-road equipment such as bore/drill rigs, cranes, crawler tractors, excavators, graders, off-highway tractors, off-highway trucks, other construction equipment, pavers, paving equipment, rollers, rough terrain forklifts, rubber-tired dozers, rubber-tired loaders, scrapers, skid steer loaders, surfacing equipment, tractors/loaders/backhoes, and trenchers.

Engines

Prior to 1994, there were no standards (Tier 0) to limit the amount of emissions from off-road equipment. In 1994, the EPA established emission standards for hydrocarbons, nitrogen oxides, carbon monoxide, and particulate matter to regulate new pieces of off-road equipment. These emission standards came to be known as Tier 1. Since that time, more stringent Tier 2, Tier 3, and Tier 4 (interim and final) standards were adopted by the EPA, as well as ARB. Each adopted emission standard was phased in over time (as shown on Table 2 on page 6). New engines built in 2015 across all horsepower (hp) sizes have to meet Tier 4 final emission standards. In other words, new manufactured engines cannot exceed the emissions established for Tier 4 Final. Out of the estimated 161,420 pieces of construction equipment used statewide, 59% are Tier 2 and above. This means that more than half of the equipment utilized statewide are newer and cleaner engines. Refer to Figure 4 on page 6 which illustrates engine tier availability in California.

Verified Diesel Emission Control Strategies (VDECS)

As stated above, the emission standards only apply to new engines. However, off-road equipment can last several years, even prior to Tier 1 emission standards being established (approximately 21% of off-road equipment). Verified diesel emission control strategies (VDECS) help to further reduce emissions from existing engines. VDECS are designed primarily for the reduction of diesel particulate matter emissions and have been verified by the ARB. There are three levels of VDECS. The most effective VDECS (a device, system or strategy used to achieve the highest level of pollution control from an existing off-road vehicle) is the Level 3 VDECS. Tier 4 engines are not required to install VDECS since they already meet the emissions standards for lower tiered equipment with installed controls.

More Info: ARB In-Use Off-Road Diesel Vehicle Regulations

In July 2007, the ARB adopted the In-Use Off-Road Diesel Vehicle Regulation to reduce diesel particulate matter and oxides of nitrogen emissions from in-use existing off-road diesel vehicles in California. This regulation includes:

- Equipment labeling requirements
- Annual reporting of equipment
- Five minute (30 seconds 100 feet of schools) idling limit (applies to off-road and on-road diesel vehicles)
- Restrictions on adding older, and dirtier Tier 0 and Tier 1 vehicles to construction fleets.

For more information: http://arb.ca.gov/msprog/ordiesel/ordiesel.htm

* contact as of June 2015
Table 1: California Air Resources Board and United States Environmental Protection Agency Off-Road Compression-Ignition (Diesel) Engine Standards

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a) When ARB and USEPA standards differ, the standards shown here represent the more stringent of the two.
b) Standards given for all sizes of Tier 1 engines are hydrocarbons/oxides of nitrogen (NOx)/carbon monoxide (CO)/particulate matter (PM) in grams per brakehorsepower per hour (g/bhp-hr).
c) Standards given for all sizes of Tier 2 and Tier 3 engines, and Tier 4 engines below 75 horsepower are non-methane hydrocarbons (NMHC)+NOx/CO/PM in g/bhp-hr.
d) Standards given for Tier 4 engines above 75 horsepower are NMHC/NOx/CO/PM in g/bhp-hr.
e) Engine families in this power category may alternately meet Tier 3 PM standards (0.30 g/bhp-hr) from 2008-2011 in exchange for introducing final PM standards in 2012.
f) The implementation schedule shown is the three-year alternate NOx approach. Other schedules are available.
g) Certain manufacturers have agreed to comply with these standards by 2005.

Figure 4: 2014 Statewide All Fleet Sizes (Pieces of Equipment)

Total Pieces of Equipment: 161,420

Key:
XX,XXX = Total pieces of equipment in that tier
XX% = Percent of total pieces of equipment in that tier
Particulate Matter Reduction and Health Benefits

An engine is required at a minimum to meet Tier 2 emission standards. This is required for all City projects regardless of location. This will result in between a 25 percent (25 hp and 50 hp) and 63 percent (greater than 175 hp) reduction in particulate matter emissions. Compared to Tier 1 standards, Tier 2 (and above) standards help to reduce emissions and contribute to cleaner air and a healthy community.

Level 3 VDECS, which are required for City projects in the APEZ, will result in an additional 85 percent reduction in particulate matter emissions. Therefore, requiring a Tier 2 engine with a Level 3 VDECS will result in between an 89 percent (25 hp and 50 hp) and 94 percent (greater than 175 hp) reduction in particulate matter emissions. Reduced particulate matter improves air quality and reduces the health effects associated with air pollutants.

Figure 5: Engine and VDECS Particulate Matter Reduction

![Figure 5: Engine and VDECS Particulate Matter Reduction](image-url)
How does the Clean Construction Ordinance Apply to My Project?

Is the project a major construction project* within 1,000 feet of sensitive uses**?

Y → Not subject to the Clean Construction Ordinance

N → Is the project located in the Air Pollutant Exposure Zone? (See page 3)

Y → Utilize only off-road equipment and off-road engines fueled by biodiesel fuel grade B2O and utilize only off-road equipment that either:

- a) Meets or exceeds Tier 2 standards for off-road engines; or
- b) Operates with the most effective VDECS.

N → Prepare Construction Emissions Minimization Plan (Emissions Plan) documenting how Clean Construction Ordinance requirements (see page 2) will be met, in particular:

- a) Meets or exceeds Tier 2 standards for off-road engines; and
- b) Operates with the most effective VDECS.

(Tier 4 engines automatically meet this requirement)

Plan Components to include:

1. Equipment Inventory (See page 9-10)
2. Signage (See page 11)
3. Certification Statement (See page 12)

Department Head*** reviews Emissions Plan requirements and ensures Emissions Plan components included in contract specifications and signage is appropriate

*Major Construction Project: Public work to be performed within the geographic limits of the City that uses off-road equipment and that is estimated to require 20 or more cumulative days of work, including non-consecutive days, to complete.

Off-road equipment: equipment with an off-road engine having greater than 25 horsepower and operating for more than 20 total hours over the entire duration of Construction Activities

**Sensitive Use: A hospital, medical facility, school, or residence.

***Department Head: General manager, director, or executive director of a City Department authorized to perform public works, or that person's designee.
Construction Emissions Minimization Plan - Equipment Inventory Template

Example Inventory Equipment List:

<table>
<thead>
<tr>
<th>Technology</th>
<th>Type</th>
<th>Serial Number</th>
<th>Make</th>
<th>Model</th>
<th>Manufacturer</th>
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<th>Type Estimated Fuel Usage</th>
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<th>Total Hours of Operation</th>
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<th>Alternative Fuels Type</th>
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<th>Total Hours of Operation</th>
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<thead>
<tr>
<th>ESTIMATES - FOR FIRST SUBMISSION OF CEMP</th>
<th>ACTUALS - USE FOR QUARTERLY REPORTING</th>
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<tbody>
<tr>
<td>Estimated days equipment will be used on the project (start to finish, not contract days):</td>
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<td>Project Name</td>
<td>Project Start Date</td>
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<tr>
<th>CONTRACTOR NAME</th>
<th>CONSTRUCTION Phases</th>
<th>Exception Seeking (if applicable)</th>
<th>Equipment Manufacturer</th>
<th>Equipment Identification Number</th>
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See Figure 6 on Page 10

Notes:
- Estimated days equipment will be used on the project (start to finish, not contract days).
- Project Name, Project Start Date, Project End Date.
- Equipment Manufacturer, Equipment Identification Number.
- Total Hours of Operation.

* This sheet is partially based on the Sacramento Air Quality Management District Equipment List, January 2019.
### Clean Construction Ordinance

Include all subcontractor and rental equipment on this list or on a separate sheet if preferred.

Other components of the CEMP (i.e., idling restrictions, prohibition of portable diesel engines, maintenance and tuning, etc.) shall be separately and submitted for approval prior to starting construction (see example certification statement and signage).

All CEMP components shall be submitted the Department Head or designee for review and approval prior to starting construction.

#### Technology

<table>
<thead>
<tr>
<th>Technology Type</th>
<th>Serial Number</th>
<th>Make</th>
<th>Model</th>
<th>Manufacturer</th>
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#### Verification

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<th>Hour Meter Reading on Installation Date</th>
<th>Type Estimated Fuel Usage</th>
<th>Fuel Usage (separate from Alternative Fuels)</th>
<th>Total Hours of Operation</th>
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<td>Level 3</td>
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#### ESTIMATES - FOR FIRST SUBMISSION OF CEMP

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<th>Engine Model</th>
<th>Year</th>
<th>Engine Certification (Tier Rating)</th>
<th>Horsepower</th>
<th>Engine Serial Number</th>
<th>Verified Diesel Emission Control Strategy (if applicable)</th>
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#### ACTUALS - USE FOR QUARTERLY REPORTING

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<th>Project Name:</th>
<th>Project Location (address or extension of street work):</th>
<th>Submittal Date (mm-dd-yyyy):</th>
<th>Estimated days equipment will be used on the project (start to finish, not contract days):</th>
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#### Construction Emissions Minimization Plan Notes:

- This sheet is partially based on the Sacramento Air Quality Management District Model Equipment List, January 2021.

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**CONSTRUCTION PHASES:**

- Demolition
- Site Preparation
- Grading
- Building Construction
- Architectural Coatings
- Paving
- Other

**EXCEPTION SEEKING** (if applicable):

- Technically Infeasible
- Not Effective
- Hazard
- Emergency

**EQUIPMENT TYPE:**

- Paving Equipment
- Rollers
- Rough Terrain Forklifts
- Rubber Tired Dozers
- Rubber Tired Loaders
- Scrapers
- Skid Steer Loaders
- Surfacings Equipment
- Tractors/Loaders/Backhoes
- Trenchers
- Other Equipment

**ENGINE CERTIFICATION (TIER RATING):**

- Tier 2
- Tier 3
- Tier 4 Interim
- Tier 4 Final

**ARB VERIFICATION NUMBER LEVEL:**

- Level 1
- Level 2
- Level 3
Clean Construction Ordinance

Idling:
A legible and visible idling sign shall be posted in English, Spanish, and Chinese in designated queuing areas and at the construction site to remind operators of the idling limit.

Recommended Size: 11”x17”

Clean Construction Requirements:
The Contractor shall post at the construction site a legible and visible sign summarizing the Construction Emissions Plan and shall explain how to request to inspect the Emissions Plan. The Contractor shall post at least one copy of the sign in a visible location on each side of the construction site facing a public right-of-way.

Recommended Size: 11”x17”
Contract Specifications and Certification Statement

The Department Head shall ensure that all applicable requirements of the Construction Emissions Minimization Plan have been incorporated into the contract specifications. The contract shall include a statement (Certification Statement) that the Contractor agrees to comply fully with the Emissions Plan and acknowledges that a significant violation of the Emissions Plan shall constitute a material breach of contract.

Figure 9: Certification Statement Template

**Emissions Plan Certification Statement**

I hereby certify that:

1. The off-road equipment identified in the Emissions Plan meets the engine standards in the Clean Construction Ordinance (Chapter 25 of the Environment Code).
2. All of the requirements in the Plan will be followed and will be incorporated into the contract specifications.
3. A significant violation of the Emissions Plan shall constitute a material breach of the contract. Any discrepancy to the Clean Construction Ordinance requirements will be reported to the Department Head immediately.

I understand that the construction site is subject to random and scheduled inspection to verify the requirements of the Emissions Plan.

I certify to the best of my knowledge that I will comply with the items listed above and that I am legally authorized signatory or designee for the Applicant.

<table>
<thead>
<tr>
<th>Signature</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Name</td>
<td>Date</td>
</tr>
<tr>
<td>Company Name</td>
<td>Phone Number</td>
</tr>
</tbody>
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Company Address
Resources

Templates and Handouts
Download Templates, including:

- Equipment Inventory Template (as discussed on Page 9-10)
- Signs (as discussed on Page 11)
- Certification Template (as discussed on Page 12)
- Notice of Clean Construction Requirements Handout Template (See Page 14)

Visit: https://www.sfdph.org/dph/EH/Air/default.asp

Incentive Programs
The Carl Moyer Air Quality Standards Attainment Program provides monetary grants to private companies and public agencies to clean up their heavy-duty engines/equipment. Carl Moyer Program is administered locally by the Bay Air Area Quality Management District (BAAQMD). The Carl Moyer Program provides incentives to cover the incremental cost of purchasing engines and equipment that are cleaner than required by law. Eligible projects include off-road vehicle engine repowers, retrofits and equipment replacements; on-road truck replacements or retrofits; marine and locomotive engine replacements; light-duty vehicle scrap programs; and, agricultural engine replacements and retrofits. The Program provides funds for significant near-term reductions in nitrogen oxide emissions, reactive organic gases, and particulate matter emissions.

For more information regarding the Carl Moyer Program: www.baaqmd.gov/moyer

Fact Sheets and More Information
The City of San Francisco wants to help improve air quality through cleaner construction equipment. For more information, please see the following resources:

California Air Resources Board (ARB)
- Knowledge Center for the Off-Road Diesel Vehicle Regulation: http://www.arb.ca.gov/msprog/ordiesel/knowcenter.htm

Environmental Protection Agency (EPA)

Other
- Clean Diesel ClearingHouse: http://tool.cleandieselclearinghouse.org

Clean Construction Ordinance 13
Notice of Clean Construction Ordinance Requirements for Publicly-Funded Projects

This is a publicly-funded major construction project located in the City of San Francisco; therefore, it is required to conform to the Clean Construction Ordinance (San Francisco Environment Code Section 25.5).

Projects located in the Air Pollutant Exposure Zone must comply with the following requirements:

Equipment Requirements:

☐ Use Tier 2 or higher engines and the most effective Verified Diesel Emission Control Strategies (Tier 4 engines automatically meet this requirement) for the engine type as certified by the Air Resources Board (ARB);

☐ Prohibit portable diesel engines where access to alternative sources of power are available;

☐ Restrict idling to two minutes; and

☐ Properly maintain and tune equipment in accordance with manufacturer specifications.

Construction Emissions Minimization Plan shall be prepared and include the following:

☐ An equipment inventory which shall include estimates of the construction timeline by phase with description of each piece of off-road equipment required for each phase;

☐ Signage indicating idling limits and engine/Verified Diesel Emission Control Strategies requirements; and

☐ Certification Statement.

Monitoring shall begin at the start of construction activities and include:

☐ Quarterly reports documenting compliance with the Emissions Plan which shall be maintained at the project site; and

☐ Final report summarizing construction activities.

Projects not located in the Air Pollutant Exposure Zone must comply with the following requirements:

Equipment Requirements:

☐ Utilize only off-road equipment and off-road engines fueled by biodiesel fuel grade B2O and utilize only off-road equipment that either meets or exceeds Tier 2 standards for off-road engines or operates with the most effective VDECS as certified by ARB.

Documentation must be submitted to the head of the department (Department Head) authorized to perform Public Works. The Department Head will be contacted by the inspector if the project is in violation of the Ordinance. Violations may be punishable by refusal to certify the award of contract; suspension of a contract, withholding of City funds; recession of contract; debarment; and any other remedy authorized in law or equity.

Thank you for your attention to this notice. Please direct any questions concerning this notice to the [Name], [Department Name] at (415) XXX-XXXX or XXX.XXXX@sfgov.org.

For more information, please visit https://www.sfdph.org/dph/EH/Air/default.asp