SUMMARY

This document provides guidance for the vegetation management (VM) scope of work and patrol practices associated with patrolling transmission facilities using Light Detection and Ranging (LiDAR) technology.

This is a time-limited document expected to extend into late 2018.

Level of Use: Informational Use

AFFECTED DOCUMENTS

This bulletin affects the following documents:

TD-7102B-003, “VELB Impacts Reporting Bulletin”
TD-7102P-06, “VM Mapping Procedure”
TD-7102P-16, “Riparian Review Procedure”
TD-7102P-19, “Migratory Bird Protection Procedure”
TD-7103P-01, “Transmission Routine Non-Orchard Patrol Procedure”
TD-7103P-05, “Transmission Vegetation Imminent Threat Procedure”
TD-7103P-07, “Transmission Vegetation Refusal Procedure”
TD-7103P-09, “T&D Hazard Notification Procedure”

TARGET AUDIENCE

Vegetation management (VM) governance and support

VM operations

PG&E contractors: pre-inspector (PI), tree crew (TC), quality control (QC)
WHAT YOU NEED TO KNOW

1 LiDAR Data

1.1 Aerial LiDAR data was captured by the LiDAR vendor for 100% of the 60kV, 70kV, 115kV, 230kV, and 500kV Transmission Lines.

1.2 The LiDAR data provided is specific to a corridor width defined by voltage. REVIEW the following appendices before continuing to the next step.
   - Appendix A, "LiDAR Detection Clearance Parameters"
   - Appendix B, "PG&E Vegetation Management Tree Clearance Parameters"
   - Appendix C, “Priority Detection Legend”

1.3 Mobile platform and LiDAR vendors must deliver LiDAR data to PG&E personnel within 3 business days of the agreed upon delivery date. Any deviation from the contractual schedule requires PG&E approval.

1.4 PG&E personnel must make Aerial LiDAR-derived vegetation data available for downloading into the PG&E mobile platform no more than 2 business days after receipt from the vendors.
2 PI Inspection

2.1 IF Aerial LiDAR information exists for a transmission line (T-line),

THEN the PI does not need to perform ground patrol of the entire line segment.

2.2 BEGIN inspections at substations, generation stations, or switchyards outside the fenced area, including portions of the transmission line crossing the substation fence.

IF any vegetation inside the substation, generation substation, or switchyard requires work,

THEN NOTIFY PG&E supervisor.

2.3 FIELD VERIFY vegetation detections provided in the mobile mapping application AND LIST tree and brush work per TD-7103P-01, “Transmission Routine Non-Orchard Patrol Procedure.”

1. Refer to Appendix A, “LiDAR Detection Clearance Parameters.”

2.4 Where vegetation detections occur, INSPECT the entire span AND LIST tree and brush work per TD-7103P-01, “Transmission Routine Non-Orchard Patrol Procedure.”

2.5 IF only vegetation detections VC2C and VC3C are present within a span AND do not result in tree work for the current cycle,

THEN CREATE a Vegetation Management Database (VMD) record for that span. Grouping trees is permissible.

1. ENSURE that the following data fields are updated in the new VMD record:

- Address
- City
- County
- Directions
- Circuit – Transmission Corridor Name
- SSD Rte
- Loc Rte
- Line Name
- Pole #
- Location Comments – provide relevant information for specific location
- Rx Comments – indicate why the detection does not require work
- Tree Species
- Quantity
2.5 (continued)

- Trim Type
- Tree Comments – indicate the location of the tree
- Notification
- External Tree ID – copy and paste from PG&E mobile platform map

2.6 FIELD VERIFY the following DETECTIONS AND OBTAIN vegetation program manager (VPM) or supervising vegetation program manager (SVPM) approval if they are not listed for tree work:

- Priority 1, (VC1c_Urgent, AF)
- Priority 2, (VC1c_Urgent, MO)
- Priority 3, (VC1c_AF)
- Priority 4, (VC1c_MO)
- Priority 7, (VC2c_UH)
- Priority 8, (VC3c_UH)

1. FIELD VERIFY detections of all species, including almond and walnut (orchards).
2. IF an Aerial LiDAR detection does not need to be listed for work

AND the Priority is 1, 2, 3, 4, 7, or 8,

AND the Transmission Project has been completed,

THEN fill out one TD-7103B-003-F01, "Unlisted Detection Approval (UDA) Form" for each transmission project AND obtain VPM or SVPM approval to not list the tree for work, as follows:

a. OPEN the blank UDA Form by clicking on the following link:
   
   TD-7103B-003-F01, Unlisted Detection Approval (UDA) Form

b. MAKE a copy of the blank UDA Form using the following filename convention:
   
   Year_Division_Date_PMD Project Name
   
   For example: 2018_Los Padres_20140419_Midway Corridor

AND SAVE it on your mobile device.
2.6 (continued)

   c. COMPLETE the copy of the UDA Form. For instructions, see the last page of the UDA Form.
   
   d. SAVE the completed UDA Form on the VMShared drive in the appropriate division folder at:
      2018 Trans LiDAR UDA Form Storage
   
   e. SUBMIT the completed UDA Form by email to the VPM.

2.7 DETERMINE whether work is required to mitigate a potentially hazardous tree by FIELD VERIFYING the following vegetation detections:

   - Priority 5, VC1p_AF
   - Priority 6, VC1p_MO
   - Priority 9, North American Electric Reliability Corporation (NERC), VC2c_AF
   - Priority 10, VC3c_AF

2.8 DETERMINE whether the polygons associated with Priority Codes 11(VC2p_AF), and 12 (VC3p_AF) are to be displayed on the map.

   For examples of maps, see Appendix D, “Mobile Platform Map Views."

   1. IF these polygons are to be displayed on the map,
      THEN check the VC3 check box in the upper-left corner of the mobile device application in the Map Filters section.

2.9 IF a tree needs to be added per TD-7103P-01, ”Transmission Routine Non-Orchard Patrol Procedure.”

   THEN perform the following tasks:

   1. LIST the tree for work.

   2. IF any of the following field conditions are true,
      a. Facility Protect (FP) Work is needed this cycle AND a customer signature is not forthcoming.
      b. The Bureau of Land Management (BLM) is the land manager.
      c. The United States Forest Service (USFS) is the land manager.

      THEN the PI must TAKE a picture of tree or brush work.
NOTE

The possibility of false vegetation detections and/or the need to add trees exist due to the nature and potential noise in the Aerial LiDAR and ortho-imagery data.

2.10 IF the PI IDENTIFIES a false vegetation detection,

THEN NOTIFY the VPM.

3 Mobile Device Data Entry

3.1 For trees requiring work this cycle, the PI must ADD the Tree ID into the External Tree ID field in the tree record as follows:

1. SELECT the tree polygon on the map.
2. NAVIGATE to the External Tree ID field in the tree record.
3. SELECT Paste.

The latitude and longitude on the VMD tree record is automatically updated when the External Tree ID field is populated.

Figure 1. Tree Record
4  Project Management Database (PMD) Data Entry

4.1 WHEN there is one Aerial LiDAR data delivery per PMD project,

THEN the PI must USE the following guidance to UPDATE the PMD schedule in the PG&E mobile platform:

- **PMD PI Start Date** is the date of Aerial LiDAR delivery to the mobile platform.
- **PMD PI Close Date** is the date PI Field Verification is complete.
- **PMD TC Start Date** is the date tree work begins.
- **PMD TC Complete Date** is the date tree work is complete.

4.2 IF more than one Aerial LiDAR data delivery occurs for a given PMD project,

THEN the PI must UPDATE the PMD schedule using this guidance:

- **PMD PI Start Date** is the date of the first Aerial LiDAR delivery to the mobile platform.
- **PMD PI Close Date** is the date PI Field Verification is complete from the final delivery.
- **PMD TC Start Date** is the date tree work begins from the first delivery.
- **PMD TC Complete Date** is the date tree work is complete from the final delivery.

5  Flex Patrol

5.1 Inspection Frequency and Work Plan (from TRPP)

1. The transmission PI must perform the following tasks:

   a. INSPECT NERC-lines every calendar year.

      (1) NOTIFY SVPM before making any changes to the NERC inspection schedule.

      (2) Not make schedule changes that result in a gap greater than 18 months between inspection cycles.

   b. COMPLETE 100% of NERC work in the calendar year.

      (1) SEND any variance from the plan to the PG&E SVPM for approval.

      (2) DOCUMENT variances in the Issue Tracking System (ITS).

      (3) IF the variance is approved by the PG&E SVPM, THEN DOCUMENT AND RECORD approval from the PG&E SVPM in ITS.
5.1 (continued)

c. INSPECT non-NERC lines once per patrol cycle, starting Nov. 15 through Nov. 14 of the following year.

(1) Do not deviate from the normal inspection cycle by more than 2 months without variance documentation, and in no case by more than 18 months.

(2) DOCUMENT variances in ITS.

(3) IF the schedule variance is greater than 2 months, THEN DOCUMENT AND RECORD approval from the PG&E SVPM in ITS.

5.2 Schedule Variance (from Utility Procedure TD-7103P-01, “Transmission Non-Orchard Routine Patrol Procedure [TRPP]”)

1. IF inspection deviates from normal cycle by more than 2 months OR IF the NERC Annual Work Plan will not be completed in the calendar year, THEN the transmission PI must DOCUMENT the variance to the Work Plan in ITS, using one of the following sub-types:

- Change in expected growth rate / environmental factors
- Circumstances that are beyond the control of an applicable transmission or generator owner
- Rescheduling work between growing seasons
- Contractor availability / mutual assistance agreements
- Identified unanticipated high-priority work
- Weather conditions / accessibility
- Permitting delays
- Land ownership changes / change in land use by the landowner
- Emerging technologies
5.3 The PI must LIST non-compatible species when all of the following conditions occur:
   - Prior approval for the scope of work must be granted from PG&E or a representative.
   - The customer is agreeable.
   - Tree removal is preferred.

6 Additional Patrol

6.1 At the direction of the SVPM, an additional PI patrol may be initiated.

6.2 IF an additional patrol is initiated, THEN the PI company must follow the scope and timing the SVPM e-mails to PI companies.

7 Rapid Response Expectations

7.1 Rapid response scope of work applies to urgent critical detections only.

7.2 The PI must FIELD VERIFY NERC urgent critical detections within 2 business days of receipt from the Aerial LiDAR vendor.

7.3 The PI must verify non-NERC urgent critical detection within 10 business days following receipt from the Aerial LiDAR vendor.

**NOTE**

Urgent critical detections are included in pre-load work packets.

7.4 For urgent critical detections, the PI must perform the following steps:


2. IF rapid response detections meet Imminent Threat thresholds, THEN FOLLOW TD-7103P-05, “Transmission Vegetation Imminent Threat Procedure.”
7.4 (continued)

3. Whether tree work is needed or not, CREATE a location record using the values shown below by COPYING AND MODIFYING an existing record OR by CREATING a new one:

- **Tag Type:** LiDAR
- **Tag Number:** L1QSI xx (xx = the last two digits of the year)
  - Example: 2017 tags = L1QSI17
  - Example: 2018 tags = L1QSI18

**NOTE**

Rapid response tree work mitigation might include other vegetation detections in proximity to the VC1C detection(s), as directed by the VPM or SVPM.

4. Whether tree work is needed or not, UPDATE the following fields in the most recent tracking spreadsheet, located at: Transmission LiDAR Tracking.

- **Field Response Date**
- **Action - Worked/Not Worked**
- **Date Corrected** (tree work date)
- **Comments** (any additional comments)

8 Controls

8.1 On an annual basis, within 30 days of final Aerial LiDAR data delivery, the LiDAR vendor must PROVIDE the PG&E VM electric transmission team with a list of transmission lines showing where Aerial LiDAR data was collected. The example below shows the desired information.

<table>
<thead>
<tr>
<th>Tline Name</th>
<th>kV</th>
<th>Span Miles</th>
<th>Start Span</th>
<th>GPS coordinate of Start Span</th>
<th>End Span</th>
<th>GPS coordinate of End Span</th>
<th>Acquisition Date</th>
<th>Processing Date</th>
<th>Delivery Date</th>
<th>All detections delivered to PG&amp;E?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helms - Gregg</td>
<td>230</td>
<td>0.206</td>
<td>001/016</td>
<td></td>
<td>001/017</td>
<td></td>
<td>10/1/2017</td>
<td>3/1/2018</td>
<td>3/22/2018</td>
<td>Yes</td>
</tr>
</tbody>
</table>
DEFINITIONS

False Detection: A detection provided by the LiDAR vendor that is classified incorrectly. An unhealthy tree tall enough to strike the facilities, but not requiring tree work this cycle, is not classified as a false detection.

The following are examples of false detection:

- Communication lines, guy wires, rocks, etc.
- Secondary wire

APPENDICES

Appendix A, "LiDAR Detection Clearance Parameters"

Appendix B, "PG&E Vegetation Management Tree Clearance Parameters"

Appendix C, "Priority Detection Legend"

Appendix D, "Mobile Platform Map Views"

ATTACHMENTS

TD-7103B-003-F01, "Unlisted Detection Approval (UDA) Form"

DOCUMENT APPROVER

Bob Bell, Manager, Vegetation Management Operations - Transmission

DOCUMENT CONTACT

Greg Saenz, Senior Program Manager, Vegetation Management Operations - Transmission

INCLUSION PLAN

This is a time-limited document, expected to extend into late 2018. The scope of this bulletin will be included in the following procedure:

TD-7103P-01, “Transmission Routine Non-Orchard Patrol Procedure”
## Appendix A, LiDAR Detection Clearance Parameters

### Clearance Detection Parameters

<table>
<thead>
<tr>
<th>Rank</th>
<th>Type</th>
<th>Severity</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Grow In</td>
<td>Urgent</td>
<td>As Flown</td>
</tr>
<tr>
<td>2</td>
<td>Grow In</td>
<td>Urgent</td>
<td>Mix-op</td>
</tr>
<tr>
<td>3</td>
<td>Grow In</td>
<td>Critical</td>
<td>As Flown</td>
</tr>
<tr>
<td>4</td>
<td>Grow In</td>
<td>Critical</td>
<td>Mix-op</td>
</tr>
<tr>
<td>5</td>
<td>Grow In</td>
<td>Potential</td>
<td>As Flown</td>
</tr>
<tr>
<td>6</td>
<td>Grow In</td>
<td>Potential</td>
<td>Mix-op</td>
</tr>
<tr>
<td>7</td>
<td>Fall In</td>
<td>Critical</td>
<td>As Flown</td>
</tr>
<tr>
<td>8</td>
<td>Fall In</td>
<td>Critical</td>
<td>As Flown</td>
</tr>
<tr>
<td>9</td>
<td>Fall In</td>
<td>Critical</td>
<td>As Flown</td>
</tr>
<tr>
<td>10</td>
<td>Fall In</td>
<td>Critical</td>
<td>As Flown</td>
</tr>
<tr>
<td>11</td>
<td>Fall In</td>
<td>Potential</td>
<td>As Flown</td>
</tr>
<tr>
<td>12</td>
<td>Fall In</td>
<td>Potential</td>
<td>As Flown</td>
</tr>
</tbody>
</table>

### Vegetation at or approaching x ft of conductor

<table>
<thead>
<tr>
<th>Status Code</th>
<th>Critical</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>VC2</td>
<td>VC2e-H</td>
<td>VC2e-AF</td>
</tr>
<tr>
<td>VC2e-UN</td>
<td>VC2e-UN</td>
<td>VC2e-AF</td>
</tr>
<tr>
<td>VC2e-AF</td>
<td>VC2e-AF</td>
<td>VC2e-AF</td>
</tr>
<tr>
<td>VC2e-MD</td>
<td>VC2e-MD</td>
<td>VC2e-MD</td>
</tr>
</tbody>
</table>

### Vegetation at or approaching striking distance

<table>
<thead>
<tr>
<th>Health</th>
<th>ROW</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unhealthy</td>
<td>In</td>
<td>At or approaching striking distance</td>
</tr>
<tr>
<td>Healthy</td>
<td>Out</td>
<td>Within 6 ft</td>
</tr>
</tbody>
</table>

### Minimum Growth Conductor Clearances (MGCC)

<table>
<thead>
<tr>
<th>Voltage (kV)</th>
<th>VC3</th>
<th>VC3e</th>
<th>VC3p</th>
</tr>
</thead>
<tbody>
<tr>
<td>VC3-UN</td>
<td>VC3e-UN</td>
<td>VC3p-UN</td>
<td></td>
</tr>
<tr>
<td>VC3e-H</td>
<td>VC3e-AF</td>
<td>VC3p-AF</td>
<td></td>
</tr>
<tr>
<td>VC3p-MD</td>
<td>VC3p-MD</td>
<td>VC3p-MD</td>
<td></td>
</tr>
</tbody>
</table>

### Transmission Vegetation Management

* Unhealthy: defined as 15% canopy coverage. Critical fall-in assessed only.
* Model Types: As Flown (AF) and Maximum Operating Conditions (MO)
* MOVC Lines only

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# Appendix B, PG&E Vegetation Management Tree Clearance Parameters

## PG&E Vegetation Management Tree Clearance Parameters

<table>
<thead>
<tr>
<th>PRIORITY</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DESCRIPTION</strong></td>
<td>Vegetation within Xf of conductor</td>
<td>Vegetation within Xf of conductor</td>
<td>Vegetation within Xf of conductor</td>
<td>Vegetation within Xf of conductor</td>
<td>Vegetation within Xf of conductor</td>
<td>Vegetation showing 30% or more stress located inside ROA (Xf from conductor) and is tall enough to strike the conductor (10 ft)</td>
<td>Vegetation showing 30% or more stress located beyond ROA (&gt; Xf from conductor) and is tall enough to strike the conductor (10 ft)</td>
<td>Vegetation inside ROA (&gt; Xf from conductor) that is tall enough to strike the conductor (10 ft)</td>
<td>Vegetation beyond ROA (&lt; Xf from conductor) that is tall enough to strike the conductor (10 ft)</td>
<td>Vegetation beyond ROA (&lt; Xf from conductor) that is tall enough to strike the conductor (10 ft)</td>
<td>Vegetation beyond ROA (&lt; Xf from conductor) that is tall enough to strike the conductor (10 ft)</td>
<td>Vegetation beyond ROA (&lt; Xf from conductor) that is tall enough to strike the conductor (10 ft)</td>
</tr>
<tr>
<td><strong>500 kV</strong></td>
<td>15</td>
<td>15</td>
<td>22</td>
<td>22</td>
<td>40</td>
<td>40</td>
<td>60/10</td>
<td>&gt;60/10</td>
<td>60/10</td>
<td>&gt;60/10</td>
<td>50/10</td>
<td>&gt;60/2</td>
</tr>
<tr>
<td>230 kV</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>17</td>
<td>17</td>
<td>40/10</td>
<td>&gt;40/10</td>
<td>40/10</td>
<td>&gt;40/10</td>
<td>40/10</td>
<td>&gt;40/2</td>
</tr>
<tr>
<td>115 kV</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>17</td>
<td>17</td>
<td>25/10</td>
<td>&gt;25/10</td>
<td>25/10</td>
<td>&gt;25/10</td>
<td>25/10</td>
<td>&gt;25/2</td>
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<tr>
<td>60 kV</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>10</td>
<td>20/10</td>
<td>&gt;20/10</td>
<td>20/10</td>
<td>&gt;20/10</td>
<td>20/10</td>
<td>&gt;20/2</td>
</tr>
</tbody>
</table>

Priority 1 and 2 detections will result in immediate notification to PG&E.

**Map-up Indicators:**

- **As Flown:** Indicates the analysis has been performed using conductors which have been modeled to as-surveyed conditions at the time of the LiDAR flight.
## Appendix C, Priority Detection Legend

<table>
<thead>
<tr>
<th>DC_VENDOR Code(s)</th>
<th>Border Color</th>
<th>Border Width</th>
<th>Fill Color</th>
<th>Priority (1 = Highest)</th>
<th>Description</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>VC1c_URGENT</td>
<td>Crimson</td>
<td>2</td>
<td>Red</td>
<td>1</td>
<td>Urgent Grow In</td>
<td></td>
</tr>
<tr>
<td>VC1c_URGENT_MO</td>
<td>Crimson</td>
<td>2</td>
<td>Red</td>
<td>2</td>
<td>Urgent Grow In</td>
<td></td>
</tr>
<tr>
<td>VC1c_AF</td>
<td>Crimson</td>
<td>2</td>
<td>Light Pink</td>
<td>3</td>
<td>Critical Grow In</td>
<td></td>
</tr>
<tr>
<td>VC1c_MO</td>
<td>Crimson</td>
<td>2</td>
<td>Light Pink</td>
<td>4</td>
<td>Critical Grow In</td>
<td></td>
</tr>
<tr>
<td>VC1p_AF</td>
<td>Crimson</td>
<td>2</td>
<td>Azure</td>
<td>5</td>
<td>Potential Grow In</td>
<td></td>
</tr>
<tr>
<td>VC1p_MO</td>
<td>Crimson</td>
<td>2</td>
<td>Azure</td>
<td>6</td>
<td>Potential Grow In</td>
<td></td>
</tr>
<tr>
<td>VC2c_UH</td>
<td>Yellow</td>
<td>3</td>
<td>Fuchsia</td>
<td>7</td>
<td>Critical Fall In Unhealthy</td>
<td></td>
</tr>
<tr>
<td>VC3c_UH</td>
<td>Dark Green</td>
<td>3</td>
<td>Fuchsia</td>
<td>8</td>
<td>Critical Fall In Unhealthy Beyond ROW</td>
<td></td>
</tr>
<tr>
<td>VC2c_AF</td>
<td>Dark Goldenrod</td>
<td>2</td>
<td>Yellow</td>
<td>9</td>
<td>Critical Fall In</td>
<td></td>
</tr>
<tr>
<td>VC3c_AF</td>
<td>Dark Green</td>
<td>2</td>
<td>Light Green</td>
<td>10</td>
<td>Critical Fall In Beyond ROW</td>
<td></td>
</tr>
<tr>
<td>VC2p_AF</td>
<td>Dark Goldenrod</td>
<td>2</td>
<td>Azure</td>
<td>11</td>
<td>Potential Fall In</td>
<td></td>
</tr>
<tr>
<td>VC3p_AF</td>
<td>Dark Green</td>
<td>2</td>
<td>Azure</td>
<td>12</td>
<td>Potential Fall In Beyond ROW</td>
<td></td>
</tr>
</tbody>
</table>
Transmission corridor with background trees; Fall in polygons hidden

Transmission match to VMD location for selected tree