



Testing of CIDH Piling

Testing

The [Foundation Testing and Instrumentation Branch \(FTI\)](#), located in Sacramento, provides statewide foundation testing services. The FTI's workload fluctuates widely throughout the year; therefore, in order to provide timely services, advance notice will be required for scheduling Gamma-Gamma testing, especially at the beginning of a new contract. Notify FTI thirty (30) days before testing is needed, or as early as possible. Obtain the current version of the *CIDH Pile Acceptance Test Request Form* from FTI's website¹.

Complete the form, providing an estimated date for testing, and fax the form to the FTI number provided on the form. The FTI will assign an engineer who will contact you for further scheduling and foundation testing on your project.

Coordinate the Contractor's pile construction operations with FTI. Notify FTI so piling can be tested as soon as possible. Remember, Gamma-Gamma testing can be performed even before the concrete is cured. It is important to inform FTI as soon as possible so the Contractor does not construct numerous CIDH piles before FTI can perform testing. The goal is to avoid having to reject several piles with the same problem. If the Contractor's construction methods do not work, the Contractor needs to correct the methods prior to depositing any additional concrete for Cast-In-Drilled-Hole (CIDH) piles with inspection tubes.

In order for FTI to perform Gamma-Gamma testing, inspection pipes should be completely accessible for the Gamma-Gamma probe and free of water (Contractors will typically fill tubes with water during construction. They should be purged prior to testing.) The Contractor checks the inspection pipes for accessibility by passing a probe (a 1-1/4- inch diameter by 4-1/2 feet long rigid cylinder) through the length of the pipe. The Engineer must witness the entire probe check of the inspection pipes. When the inspection pipes are confirmed to be clear, immediately notify FTI using the *CIDH Pile Acceptance Test Request Form* so that testing can be performed. Ensure that the Contractor has provided access to the pile for the FTI Engineer. If an inspection pipe is blocked, this is considered to be an anomaly and the pile will immediately be rejected. The Contractor can *core* a hole to mitigate a blocked pipe. Coring must be performed in

¹ [Foundation Testing Request Forms](#)

accordance with the requirements of the Standard Specifications (SS)². The Contractor logs the coring operation and provides the cored materials to the Engineer. Send a copy of the coring report to the FTI for review and evaluation of the portion of the pile represented by coring. No Gamma-Gamma testing is performed in the cored holes. Although the specifications require coring to mitigate a blocked tube, there are cases where coring may not be necessary. For example, if the blockage is within the bottom one pile diameter, and the pile does not require end bearing, then it is likely that the pile is adequate from a structural and geotechnical standpoint without verification of the concrete condition below the blocked zone. Therefore, it is recommended to contact FTI or the CIDH Pile Mitigation Committee Chair for guidance prior to coring for blocked tubes.

The Foundation Testing and Instrumentation Branch will perform testing and submit a *Pile Acceptance Test Report*. The FTI will transmit the report via mail and e-mail to the Structure Representative (SR), Structure Construction Headquarters (SC HQ), Structure Design, Geotechnical Services, and the Corrosion Engineer.

If the pile is free of anomalies, FTI will recommend pile acceptance. If the pile has an anomaly, the location and details will be provided, and FTI will recommend rejection. Follow the recommendation in the FTI report and immediately notify the Contractor of either pile acceptance or rejection. A sample rejection letter is shown in Attachment No. 1.

Rejected Piling

If an anomaly is found, the pile is rejected. An anomaly may be due to soil contamination, a zone of low-density concrete, or slurry mixed with concrete. An anomaly may or may not represent a defect in the CIDH pile. Therefore, each anomaly must be investigated separately.

In some cases, FTI will release a *Gamma-Gamma Logging Acceptance Test Report* and then might choose to do additional testing (such as cross-hole sonic logging) to better define the type and limits of an anomaly. When FTI plans to do additional testing, do not wait on these results; send the rejection letter. The FTI decision whether to perform additional tests will be evaluated and presented in the Gamma-Gamma report.

When a pile is rejected, suspend all depositing of concrete under slurry (or suspend using temporary casing to control groundwater) until the Contractor submits a revised pile placement plan. The revised plan must explain how the anomaly occurred and what changes are made to avoid the same problem. Immediately notify the Contractor when a revised pile placement plan has been reviewed, the new plan is acceptable, and the work may resume.

In the pile test report, FTI will include the *Pile Design Data* form. A sample form is shown in Attachment No. 2. Completion of this form requires input from the project

² [2015 SS](#), Section 49-3.02C(5), *Vertical Inspection Pipes*.

Structural Designer, the project Geotechnical Designer and the Corrosion Specialist (contact Corrosion Technology Branch at Translab). Do not allow excessive delays to occur in completing this form. If one or more of the responsible persons are unable or unwilling to provide the data needed to complete this form in a timely manner, immediately elevate this to the CIDH Pile Committee Chairperson. After completing this form submit it to the CIDH Pile Mitigation Committee and allow at least two working days for review. Discuss the pile design requirements with the CIDH Pile Mitigation Committee to determine whether the rejected pile requires mitigation, and if so, to determine viable mitigation methods (refer to [BCM 130-12.0](#), *Mitigation of CIDH Piling*). A pile with multiple anomalies may have multiple *Pile Design Data* forms.

Based on the *Pile Design Data* information and the discussion of whether the rejected pile requires mitigation, proceed with one of the following actions:

Determine that the anomaly does not affect the necessary design performance and that the anomaly does not affect the necessary corrosion resistance, so mitigation is not required (consensus with the CIDH Pile Mitigation Committee is required). The Contractor can forego mitigation that is not required and accept an administrative deduction or mitigate the pile for full payment. Notify the Contractor in writing. A sample letter is shown in Attachment No. 3.

Determine that a *simple repair* can be used. See [BCM 130-11.0](#), *Simple Repair of CIDH Piling*. Notify the Contractor in writing. A sample letter is shown in Attachment No. 4.

Determine that the anomaly must be mitigated and evaluate viable mitigation methods (refer to [BCM 130-12.0](#), *Mitigation of CIDH Piling*). Notify the Contractor in writing. A sample letter is shown in Attachment No. 4.

For anomalies that require a non-standard mitigation plan, the Contractor is required to hold a CIDH Pile Non-Standard Mitigation Meeting per the Special Provisions (refer to [BCM 130-21.0](#), *CIDH Pile Non-Standard Mitigation Meeting*). Notify the Contractor in writing. A sample letter is shown in Attachment No. 4.

DEPARTMENT OF TRANSPORTATION

<Your Office Address>

<Your Office Phone>



Making Conservation.
a California Way of Life.

Month date, year

File: <Project Name>

<Co/Rte./Pm>

<Job EA>

<Contractor Name>

<Contractor Address>

Dear <Responsible Person>,

The attached CIDH pile acceptance test report for piles <pile numbers>, dated <report date>, has indicated the presence of anomalies in pile <pile number>, located at Bridge No. xx-xxxx, <Bridge Name>. Pile <rejected pile number> is hereby rejected in accordance with the specifications¹.

You are reminded of your responsibilities in the specifications², which require "...written changes to the methods of pile construction..." before concrete placement in the remaining piles, with inspection pipes, can continue. No concrete placement for these piles will be allowed until your revised pile installation plan has been received and authorized by the Engineer.

An investigation is being performed to determine whether mitigation of pile <pile number> is required, and if so, whether pile <pile number> can be repaired or must be supplemented or replaced. You will be notified of the results of this investigation as soon as it has been completed.

Edit As Appropriate

As indicated in the Gamma-Gamma Logging Acceptance Test Report, the Foundation Testing Branch will (will not) perform additional testing to further evaluate the rejected pile. You may perform your own testing on the rejected pile.

Sincerely,

Resident Engineer

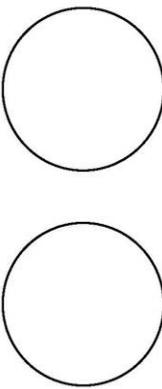
Attachments <Pile Acceptance Test Report

¹2015 SS, Section 5-1.30, *Noncompliant and Unauthorized Work*.

²2015 SS, Section 49-3.02A(4)(d)(iii), *Rejected Piles*

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Sample Pile Design Data Form

<h2 style="margin: 0;">1 Foundation Testing</h2> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> Name: _____ Phone: _____ Date: _____ </div> <h3 style="text-align: center; margin: 0;">Anomaly Overview</h3> Testing Performed <input type="checkbox"/> GGL <input type="checkbox"/> CSL Shaft Diameter: _____ Cutoff Elev.: _____ <div style="display: flex; align-items: center; justify-content: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; width: 20px; height: 100px; margin-right: 10px;"></div> <div style="text-align: center;">  </div> <div style="margin-left: 10px;"> <p>Section A-A</p> <p>Section B-B</p> </div> </div> Tip Elev.: _____ <h3 style="text-align: center; margin: 0;">Anomaly Description</h3> Section A-A: _____ _____ Section B-B: _____ _____ _____	<h2 style="margin: 0;">2 Geotechnical</h2> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> Name: _____ Phone: _____ Date: _____ </div> <h3 style="margin: 0;">Required Nominal Resistance of Shaft (per contract plans)</h3> Compression: _____ kips Tension: _____ kips Lowest Estimated Groundwater Elevation: _____ <h3 style="margin: 0;">Remaining Required Nominal Resistance To Be Developed Below Each Anomalous Section:</h3> Section A-A: Compression _____ Tension _____ kips Soil and/or Rock Type: _____ Shaft is geotechnically <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable Section B-B: Compression _____ Tension _____ kips Soil and/or Rock Type: _____ Shaft is geotechnically <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable Comments: _____ _____									
<h2 style="margin: 0;">3 Structural</h2> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> Name: _____ Phone: _____ Date: _____ </div> <h3 style="text-align: center; margin: 0;">As-Designed Capacity of Shaft</h3> Section A-A: Shear: _____ Moment: _____ Section B-B: Shear: _____ Moment: _____ <h3 style="text-align: center; margin: 0;">Maximum Demand of Shaft at Section A-A</h3> Shear: _____ Moment: _____ Shaft is structurally <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable <h3 style="text-align: center; margin: 0;">Maximum Demand of Shaft at Section B-B</h3> Shear: _____ Moment: _____ Shaft is structurally <input type="checkbox"/> Acceptable <input type="checkbox"/> Unacceptable Comments: _____ _____										
<h2 style="margin: 0;">4 Corrosion</h2> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> Name: _____ Phone: _____ Date: _____ </div> Consideration is <input type="checkbox"/> Required <input type="checkbox"/> Not required <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <i>For anomalies between the top of pile and 3 feet below the lowest estimated groundwater level at the site, corrosion results listed in the Geotechnical report are used to assess the need for repair. For situations where results are not available, soil samples may be obtained adjacent to the anomaly and tested in accordance with California Test (CT) 643 (Parts 2, 3 and 4) and if necessary, CT 417 and CT 422 to determine soil corrosivity. For anomalies outside these limits, and where no stray current source can be identified, or for non-corrosive soil conditions, no consideration of corrosion potential is required.</i> </div> Corrosion Potential at Section A-A: _____ Corrosion Potential at Section B-B: _____										
<h2 style="margin: 0;">5 Construction</h2> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> Considering parts 2-4 of this form, Structure Rep.: _____ Phone: _____ Date: _____ </div> Sec. A-A is: <input type="checkbox"/> Acceptable with Administrative Deduction <input type="checkbox"/> Unacceptable, Mitigation is Required Sec. B-B is: <input type="checkbox"/> Acceptable with Administrative Deduction <input type="checkbox"/> Unacceptable, Mitigation is Required <table style="width: 100%; border: none;"> <tr> <td style="border: none;">Bridge Name: _____</td> <td style="border: none;">Bridge No.: _____</td> <td style="border: none;">Abut/Bent: _____</td> </tr> <tr> <td style="border: none;">Dist-Co.-Rte: _____</td> <td style="border: none;">EA: _____</td> <td style="border: none;">Pile: _____</td> </tr> <tr> <td style="border: none;">Structure Rep.: _____</td> <td style="border: none;">Phone: _____</td> <td style="border: none;">Fax: _____</td> </tr> </table>		Bridge Name: _____	Bridge No.: _____	Abut/Bent: _____	Dist-Co.-Rte: _____	EA: _____	Pile: _____	Structure Rep.: _____	Phone: _____	Fax: _____
Bridge Name: _____	Bridge No.: _____	Abut/Bent: _____								
Dist-Co.-Rte: _____	EA: _____	Pile: _____								
Structure Rep.: _____	Phone: _____	Fax: _____								

DEPARTMENT OF TRANSPORTATION

<Your Office Address>

<Your Office Phone>



Making Conservation.
a California Way of Life.

Month date, year

File: <Project Name>

<Co/Rte./Pm>

<Job EA>

<Contractor Name>

<Contractor Address>

Dear: <Responsible Person>,

Please refer to my letter dated <letter date> regarding the rejection of pile <pile number>, located at Bridge No. xx-xxxx.

An investigation of anomaly(ies) was performed by the Engineer and it was determined that mitigation work is not required. If you elect not to mitigate the anomaly(ies), payment will be reduced for the anomaly(ies) in conformance with the specifications

1. Full payment will be made if mitigation is completed and accepted.

Please inform me of your decision to either mitigate or take a reduction in payment.

Sincerely,

Resident Engineer

¹[2015 SS](#), Section 49-3.02A(4)(d)(iii), *Rejected Piles*.

DEPARTMENT OF TRANSPORTATION

<Your Office Address>
<Your Office Phone>



Making Conservation.
a California Way of Life.

Month date, year

File: <Project Name>

<Co/Rte./Pm>
<Job EA>
<Contractor Name>
<Contractor Address>

Dear <Responsible Person>,

Please refer to my letter dated <letter date> regarding the rejection of pile <pile number>, located at Bridge No. xx-xxxx.

An investigation of the rejected pile performed by the Engineer has determined that mitigation work is required.

Edit as Appropriate

Action 3:

You are reminded of your responsibilities in the specifications¹, which require “a plan for repair, removal, or replacement of the rejected piling” before the rejected pile can be accepted.

Action 4:

You are reminded of your responsibilities in the specifications¹, which require “schedule and hold a CIDH Pile Non-Standard Mitigation Meeting within five business days after the Engineer’s determination whether the rejected pile requires mitigation”.

Attached is a copy of the original pile acceptance test report, < the cross-hole sonic pile test report if available>, and the pile design requirements to aid you in the preparation of the pile mitigation plan.

Please submit a pile mitigation plan to this office for review and approval as soon as possible.

Sincerely,

Resident Engineer

Attachments <Pile Acceptance Test Reports, Pile Design Data form>

¹ [2015 SS](#), Section 49-3.02(A)(d)(iii), *Rejected Piles*.

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