Bicycle/Motorcycle Detection Installation Notes

Timing

While permanent recall or fixed timing is allowed, it should be avoided because this type of operation is less efficient. In fixed time operation, the phase sequence and the allotted time for each phase is pre-determined (fixed); no detection is needed. In permanent recall operation, a phase is called and timed for at least its minimum green time, whether or not a vehicle is detected.

Detection

The detection system selected must be sensitive enough to detect a reference bicycle while avoiding false calls from the adjacent lane(s). Currently, there are three types of technology approved for use for bicycle detection in Caltrans: inductive loop detection, video detection and bicycle pushbutton.

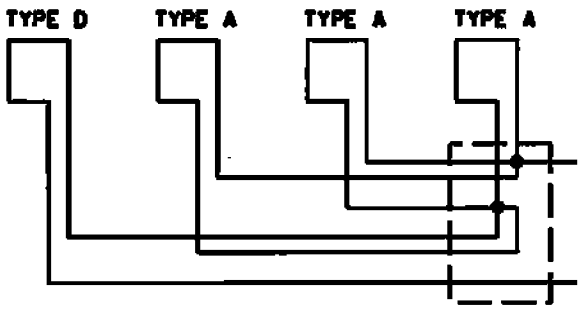
Inductive Loops – For detecting bicycles, Type D inductive loop detectors satisfy the 6' x 6' area required in the TOPD 09-06. This "diagonal quadrupole" type of inductive loop was developed for better detection of bicycles; the loops provide fairly uniform sensitivity across the width of the sensor. The Type D detector should be used for limit line detection, when inductive loops are the selected design option.

Detection of a bicycle over a well-designed loop requires that the detector circuit be adjusted more sensitive than what is typically required for automobile detection. Currently, the Type D limit line detector may be wired in three different ways to detect a bicycle/motorcycle:

1. The Type D loop may be wired in series with three Type A (or Type E) loops that are connected in parallel. The loop connection diagram for this configuration is shown below. The Type D loop shall be installed with 5 turns. The detector card may not need to be set to maximum sensitivity in order to detect bicycles. With the three Type A (or Type E) loops in parallel, the overall impedance (inductance) is reduced by 2/3 (66%), but is still reliable to detect vehicular traffic. The impact of the three parallel-connected Type A loops to the sensitivity of the Type D loop is minimal.

   Construction acceptance testing for this configuration is the same as is currently done for Type A loops (meg testing, etc.). However, Operations staff will need to confirm bicycle/motorcycle detection. District Design or Operations staff will need to provide Construction the electrical details. See Figure 1 for a typical configuration of three Type A detectors with Type D limit line detectors.

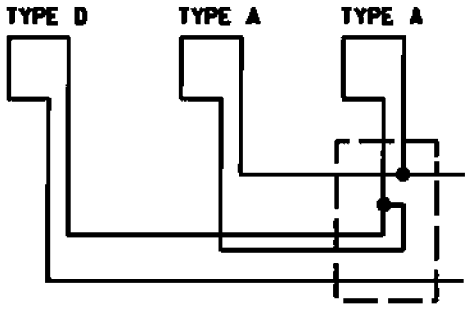
1D + 3A LOOP CONNECTION



2. The Type D loop may be wired in series with two Type A (or Type E) loops that are connected in parallel. The Type D loop shall installed with of 5 turns. The detector card may not need the

maximum sensitivity setting to detect bicycles. Construction acceptance testing for this configuration is also the same as is currently done. Design or Operations staff will need to provide Construction with the electrical details.

1D + 2A LOOP CONNECTION



3. The Type D loop may be wired with its own detector lead-in-cable as a separate circuit, with a Type C loop detector (see Standard Plan ES-5B) that is also connected with its own lead-in-cable. Loop detectors installed in the traffic lane behind the limit line detector should be wired to separate detector channels. The detector card should be set to high enough sensitivity to ensure bicycle detection. District Design or Operations staff will need to provide Construction the electrical details. This configuration may be appropriate if there are few lanes in the intersection and the number of detector channels is not an issue. See Figure 2 for a typical configuration of a Type D limit line detectors with Type C detectors

The Model 2070 controller software has been updated so that districts may configure the controller for an increased number of detectors. This will help accommodate separate channels for bicycle detection. All new traffic signal projects should use the Model 2070 controller. If additional inputs are needed, an additional harness will be needed.

Video Detection – In several districts, video detection technology has been successful in detecting bicycles and motorcycles especially where pavement preservation or maintenance is a concern. However, there are reported issues of false or missed calls with video detection. Issues include: false calls due to wet pavement or high-winds and shadows resulting in vehicles of some specific colors or over-size vehicles not being detected. In locations where there is fog, the fog mode of the detector should be programmed.

Bicycle Push Button – For this option, refer to the Standard Plan ES-5C and the California MUTCD Section 4D.105 (CA) for design information.

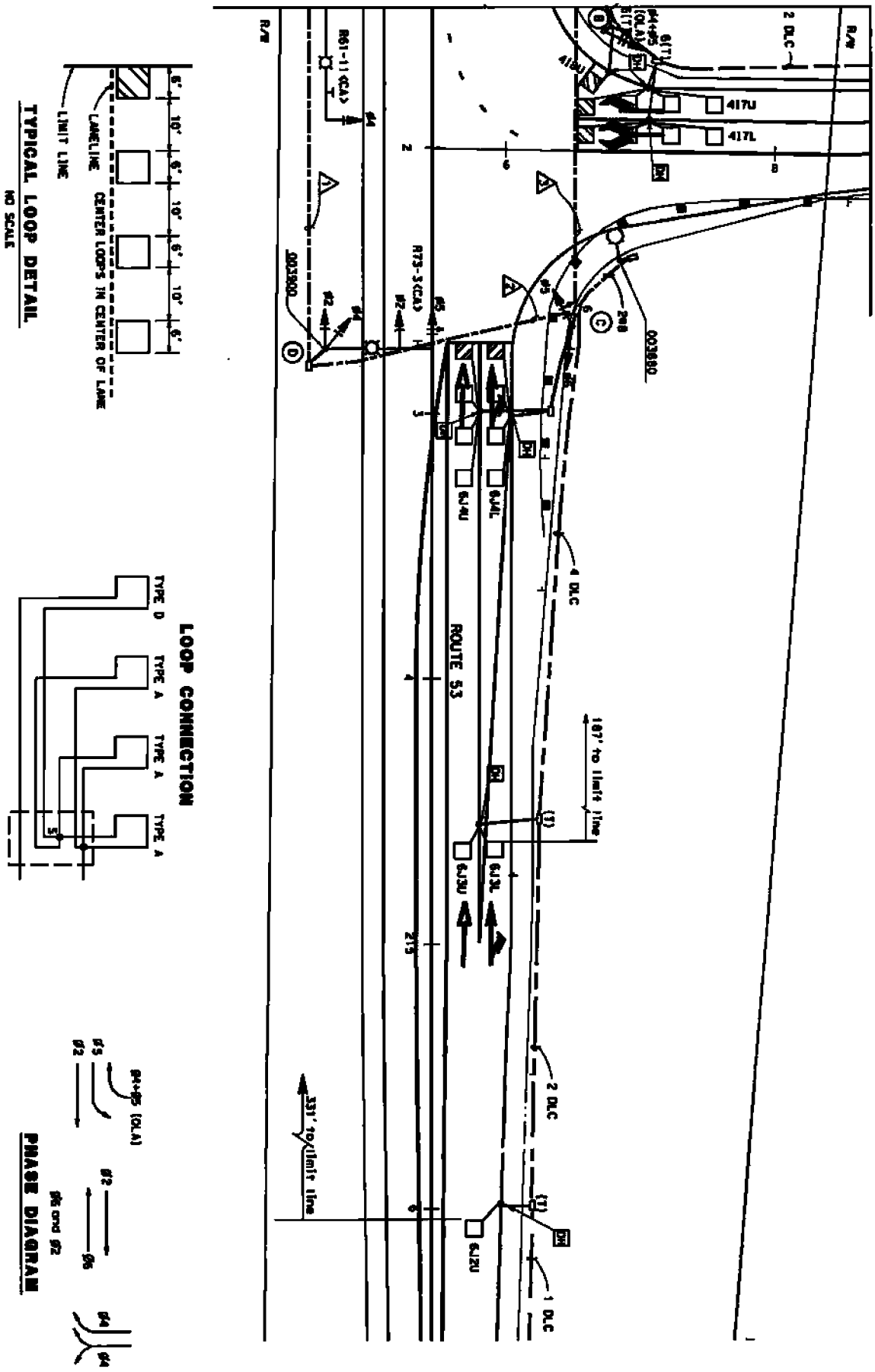


Figure 1 – Type D Loop Detectors at Limit Line with Type A Loop Detectors

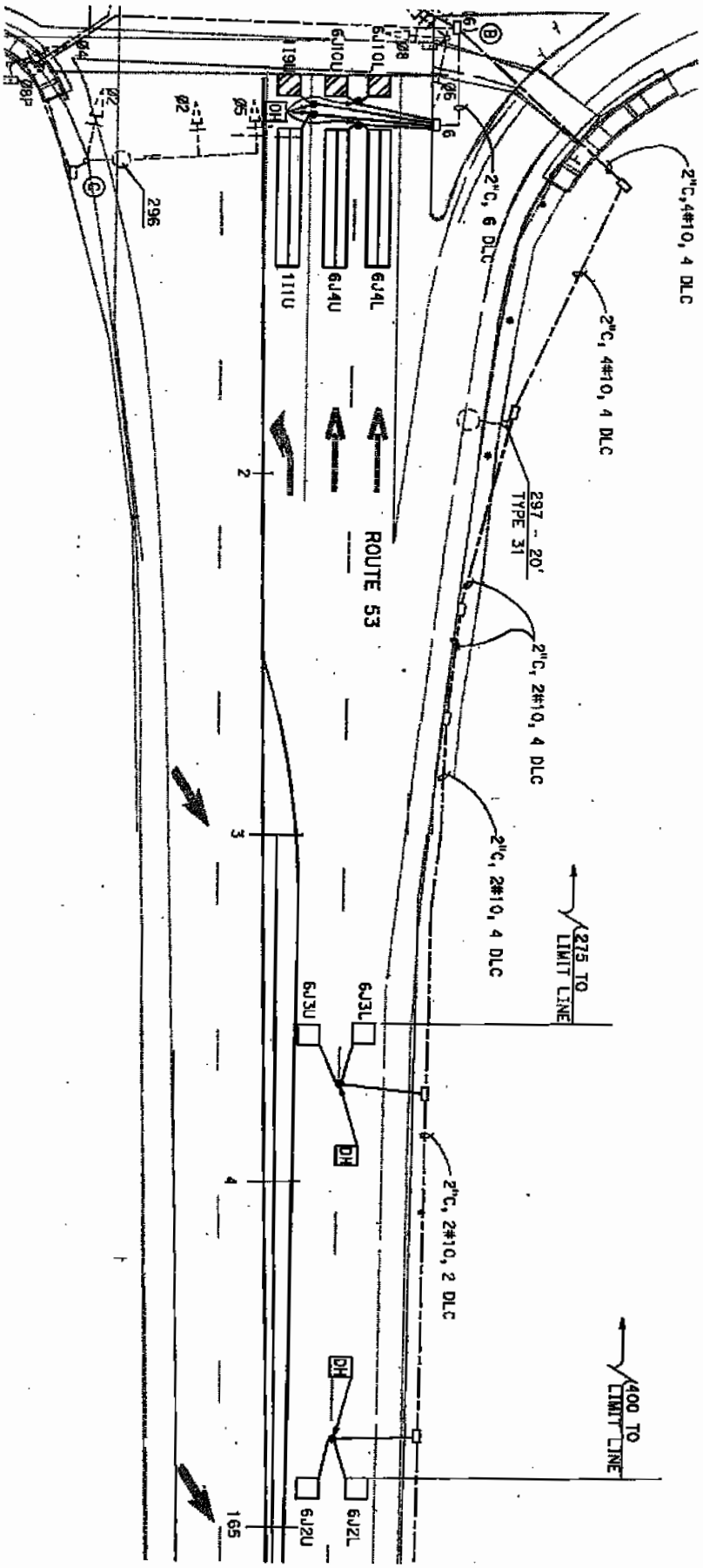


Figure 2 – Type D Loop Detectors at Limit Line with Type C Loop Detectors