LANDPAC®

Intelligent Ground Engineering Services

CHSR Trial2

CASE STUDY

☑ TRAIL ☐ OPERATIONAL

PROJECT INFORMATION

Project	California High Speed Rail CHSR
Location	Fresno, California
Client/Consultant	Dragados/Flatirons Joint Venture
Date	May 2017

PROJECT DETAIL

The project entails the construction of one of the several rail construction phases, with the trial predominantly concentrating on the in-situ soil improvement

LANDPAC OBJECTIVES

The following objectives are critical:

- Improve the current bearing capacity of the soil with an overall goal of possibly reducing the embankment design requirements.
- Prove that the impact compactor will assist with advancing the planned project schedule.
- Achieve maximum primary settlement.
- Mitigate against potential future differential settlement.
- Prove that the Continuous Impact Response (CIR) measurement system can be accurately correlated to one of the engineering properties.

SOIL PARAMETERS/ANALYSIS

Geotechnical Data Report and Geotechnical Baseline Report (GBR) indicated the embankment test section mapped with Sand Dune deposits and recent Alluvial Fan deposits. The Sand Dunes were characterized as being cross-bedded, well-sorted medium to coarse sand and very fine to fine sand and silt. The Recent Alluvial Fan deposits underlie the Dune Sand and consist of granitic sand and silt deposits from highlands surrounding the area. Previous geotechnical data gathered from the vicinity indicate the materials encountered in the upper 20 feet of the subgrade generally consists of loose to medium dense Sand (SP) and Sand with Silt (SP-SM).

LANDPAC IN-SITU TRIAL

The in-situ trial was conducted with the Landpac 3-sided 25kJ The Landpac Impact Compactor was fitted with their proprietary GPS and axle accelerometer instrumentation to allow Continuous Impact Response (CIR) measurements throughout compaction operations.

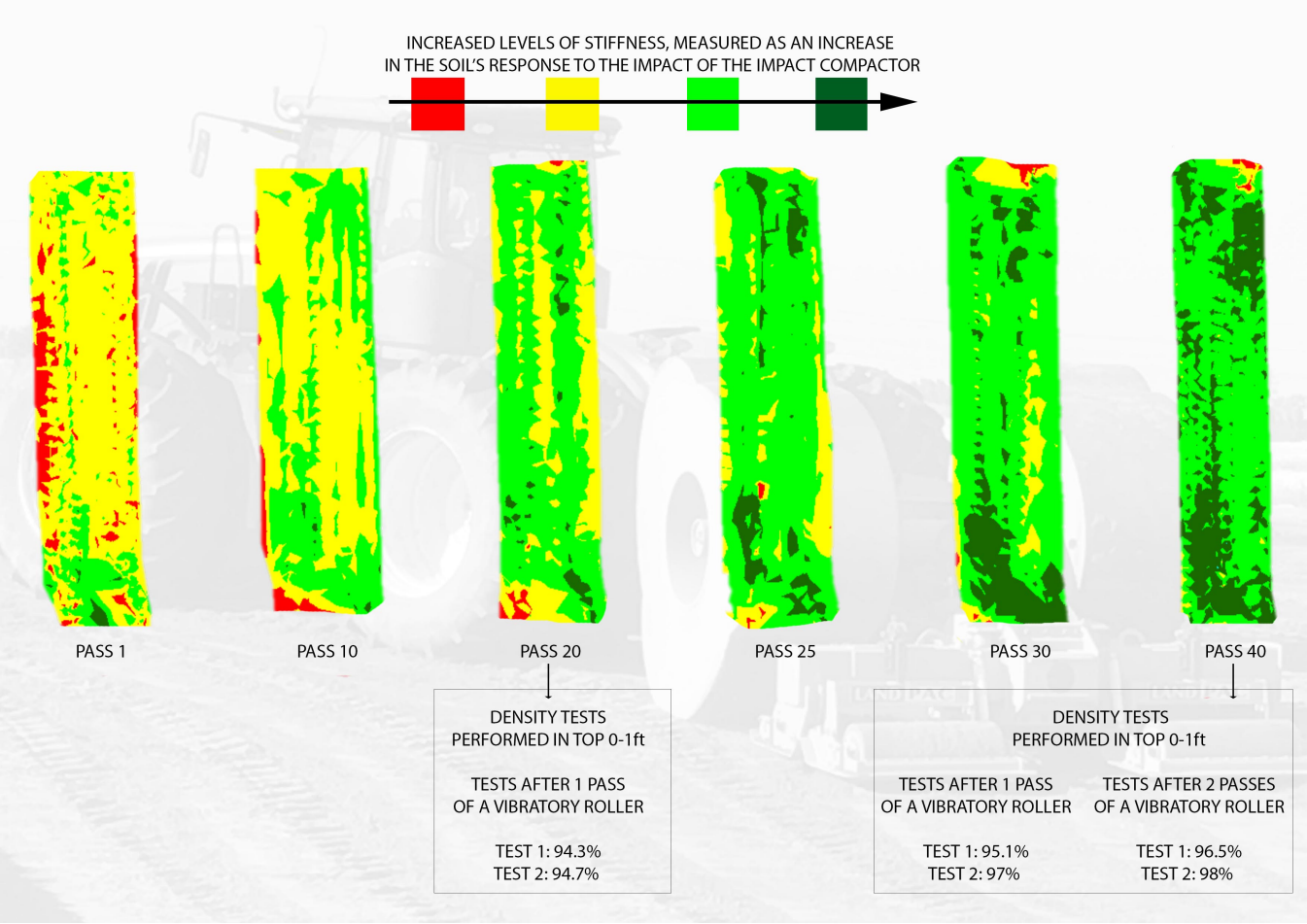
CONVENTIONAL & CIR TEST RESULTS

CPT tests will only be conducted post the importation and compaction of 6-8" layers. At the time, some density tests (in the top 0-1ft), were performed at different stages of impact compaction and such test results were used to correlate against the CIR.

The following Density results were recorded:

- Pass 20 with Impact Compactor + 1 pass with vibratory roller; 94.3% (8.1% moisture) and 94.7% (8.0% moisture)
- Pass 40 with Impact Compactor + 1 pass with vibratory roller; 95.1% (1.9% moisture) and 97% (2.6% moisture)
- Pass 40 with Impact Compactor + 2 pass with vibratory roller; 96.5% (2.4% moisture) and 98% (2.6% moisture)

Note that the results shown were for the top 1 foot, with far better results expected between 1 and 5 feet, as is generally experienced with an impact compactor. What this clearly shows is that an impact compactor is to achieve the density specification at very low moisture content which would result in a fairly large savings in water requirements on site.



The mapping below shows the final pass only, but in this case a correlation against the minimal density tests performed on site was provided. It basically gives an indication of where the density specification is below 95%, shown in red. Note, however, that with all the maps, the turning circles will be sub-standard due to the reduction in compaction speed and the "dragging" of the roller.