Case Study: Biogas Conditioning Facility at the MRWMD

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Presentation Overview

- Site Overview
- Project Outline
- Challenges Encountered
- Solutions Implemented
- Questions

Site Overview

Site Overview (cont.)

Natural Gas Compression Facility

LFGTE Facility

Blower Skid

CNG Vehicle Fueling – Slow Fill

CNG Vehicle Fueling – Fast Fill

Flare Stack

Project Outline

- Driver: California Energy Commission (CEC) Grant
  - $1.8M Grant
  - 50:50 split
- Goal:
  - Construction of biogas conditioning facility
  - Convert 400 cfm to ~1,431 DGE
  - Offset use of utility natural gas for fueling station
- Scope:
  - Implement GCCS wellfield improvements
  - Install clean-up equipment
  - Connect to existing fueling station

Challenges in Developing RNG Projects

Previous

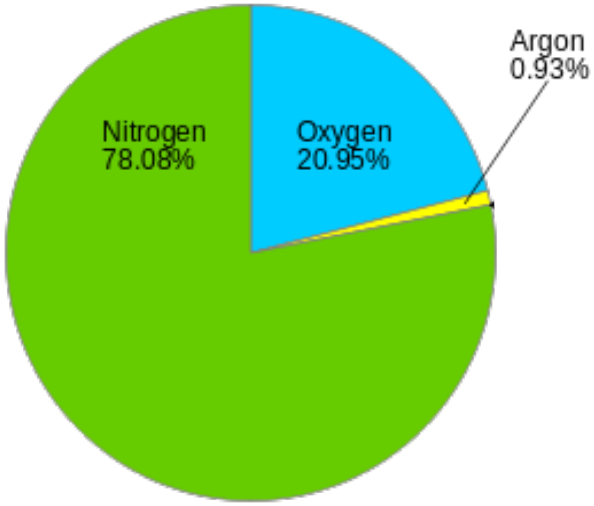
- NSPS Operating Requirements
  - Primarily controlling of surface emissions
  - Vacuum (negative gauge pressure) at each collector
  - <5% O2, <20% N2
  - Often results in overpulling
- Electric Generation – Engine
  - Less stringent requirements than RNG
    - Gas composition not as strict (CH4<45%)
    - O2 and N2 not as much of a concern

Now - Gas conditioning system requirements and NSPS Requirements

- Gas composition

Goal 1: Improve Gas Quality

- Gas quantity – minor concern
- Gas quality – major concern
- Reduce overpull/lower air intrusion
  - Oxygen
  - Nitrogen
- Reduce need for additional equipment required for nitrogen and oxygen removal and can be fiscally prohibitive
- Project budget included funds to address wellfield, not N2 and O2 removal equipment



Challenge 1: Wellfield Balancing

- System vacuum issues across the wellfield inhibited proper wellfield tuning
- Source: Temporary (2017) hydrogen sulfide (H_2S) treatment system not intended to be permanent
- 40-60 inches w.c. of vacuum loss across vessels

Solution 1: Wellfield Balancing

- Solution:
  - Replacement of H_2S treatment system
  - Reduce vacuum loss to <15 inches w.c.
  - Break wellfield improvements into two phases
- Benefits:
  - Improved ability to properly balance wellfield
  - Ensure economic feasibility of the biogas conditioning skid project

Project Overview

Clean Up Equipment

- H_2S polishing vessel
- BioCNG gas conditioning skid
- Glycol chiller/control panel
- Booster compressor
- Low pressure storage vessel

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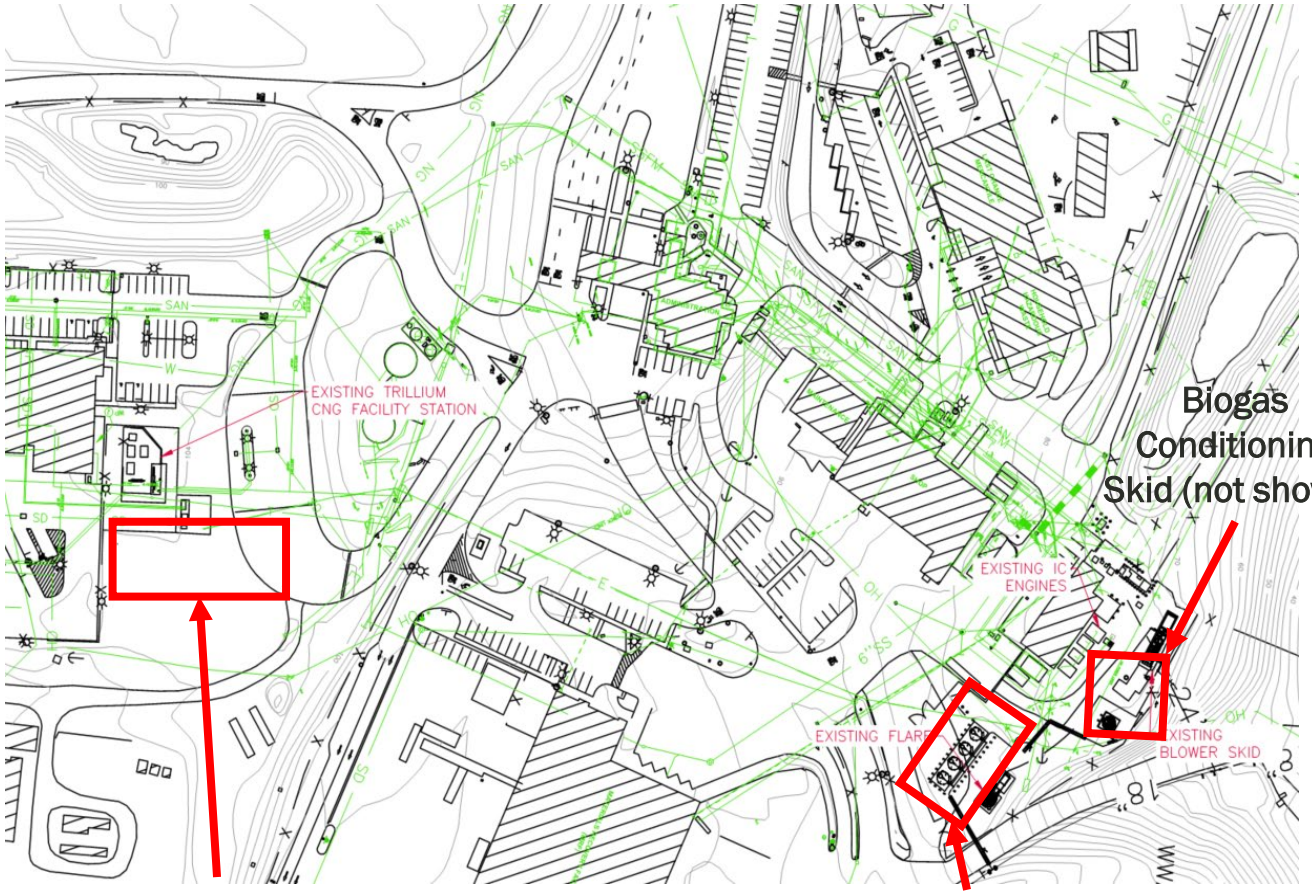
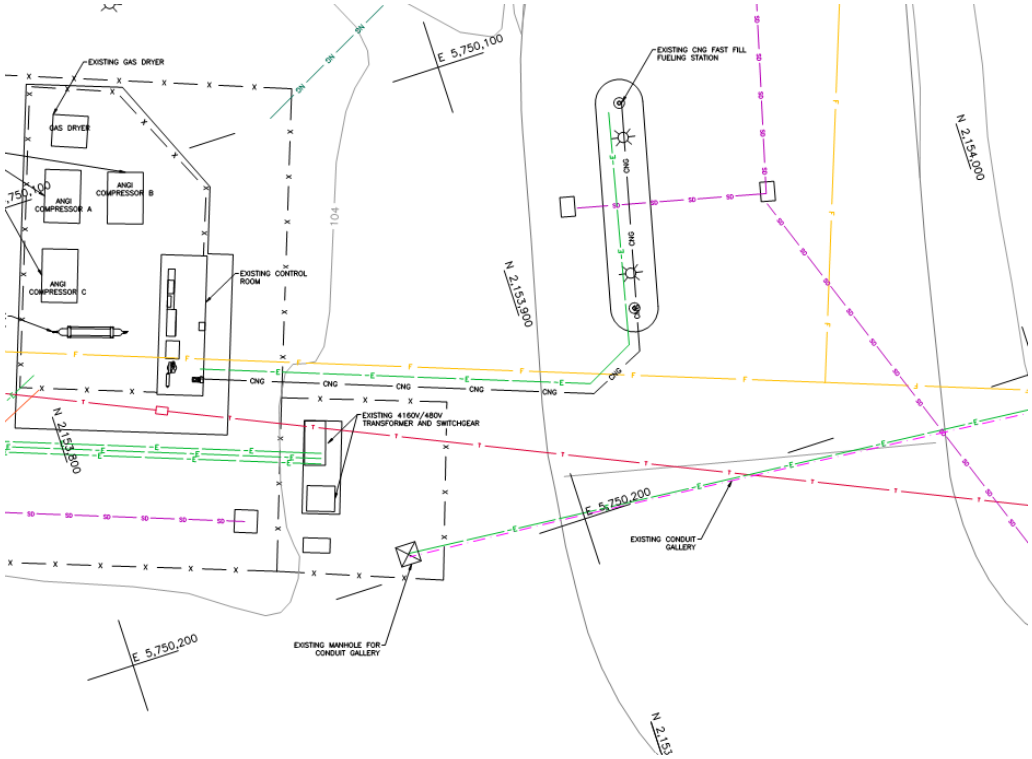
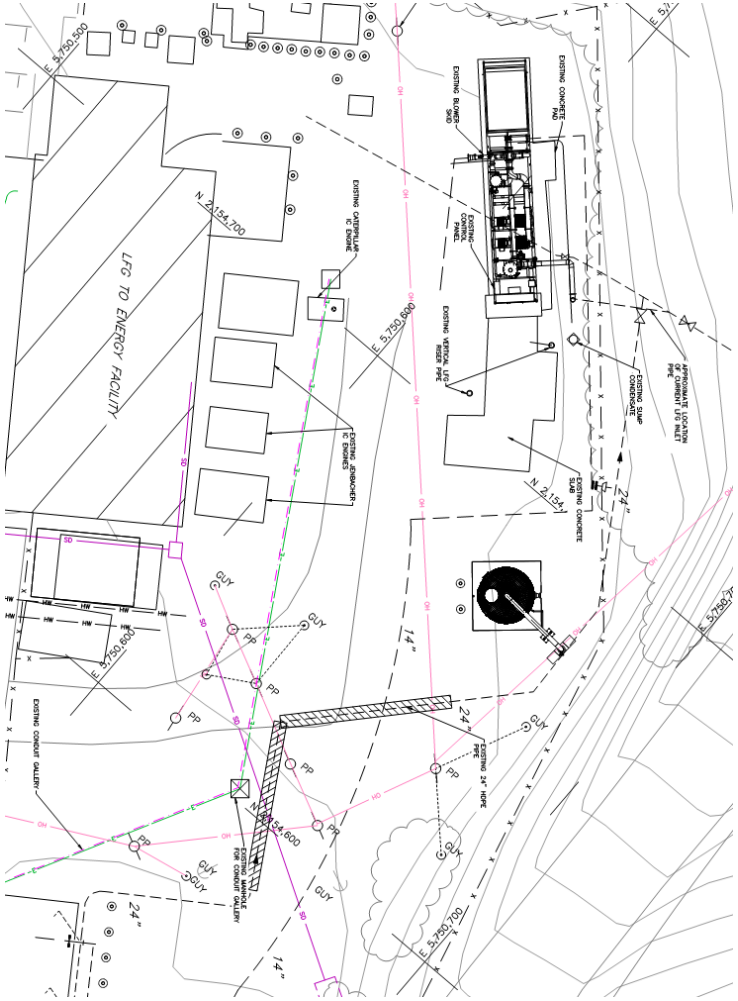
Challenge 2: Pipeline

- Multiple equipment locations
- Heavily developed area
- Navigating across myriad of existing utilities, paved roadways, and buildings



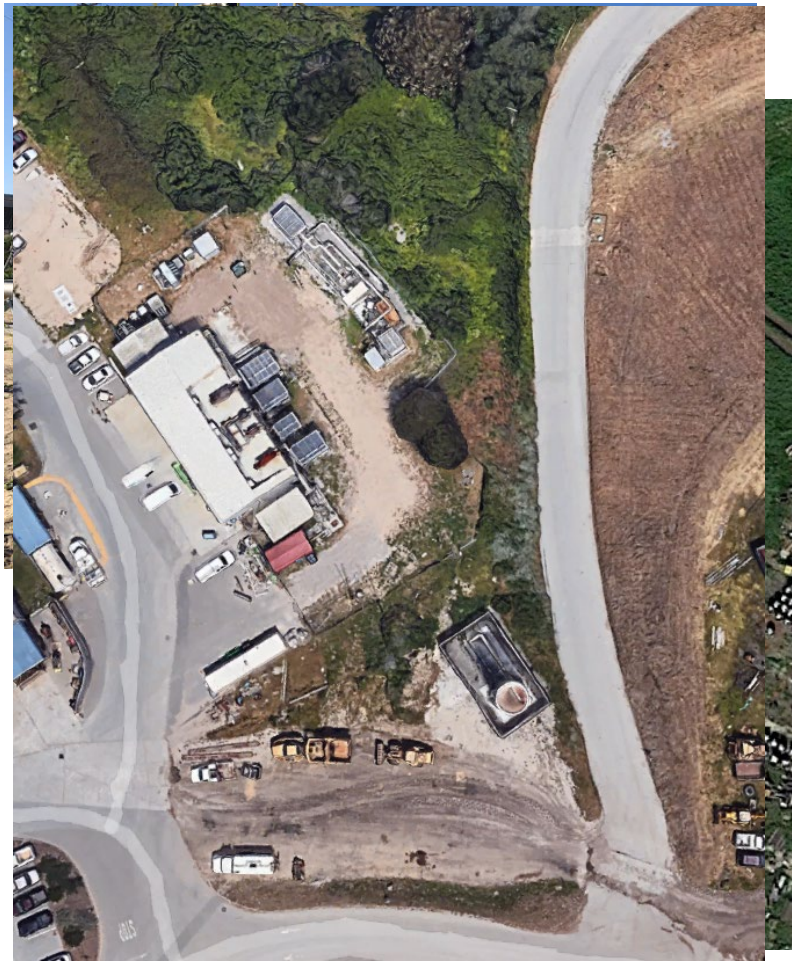
Challenge 2: Pipeline (cont.)





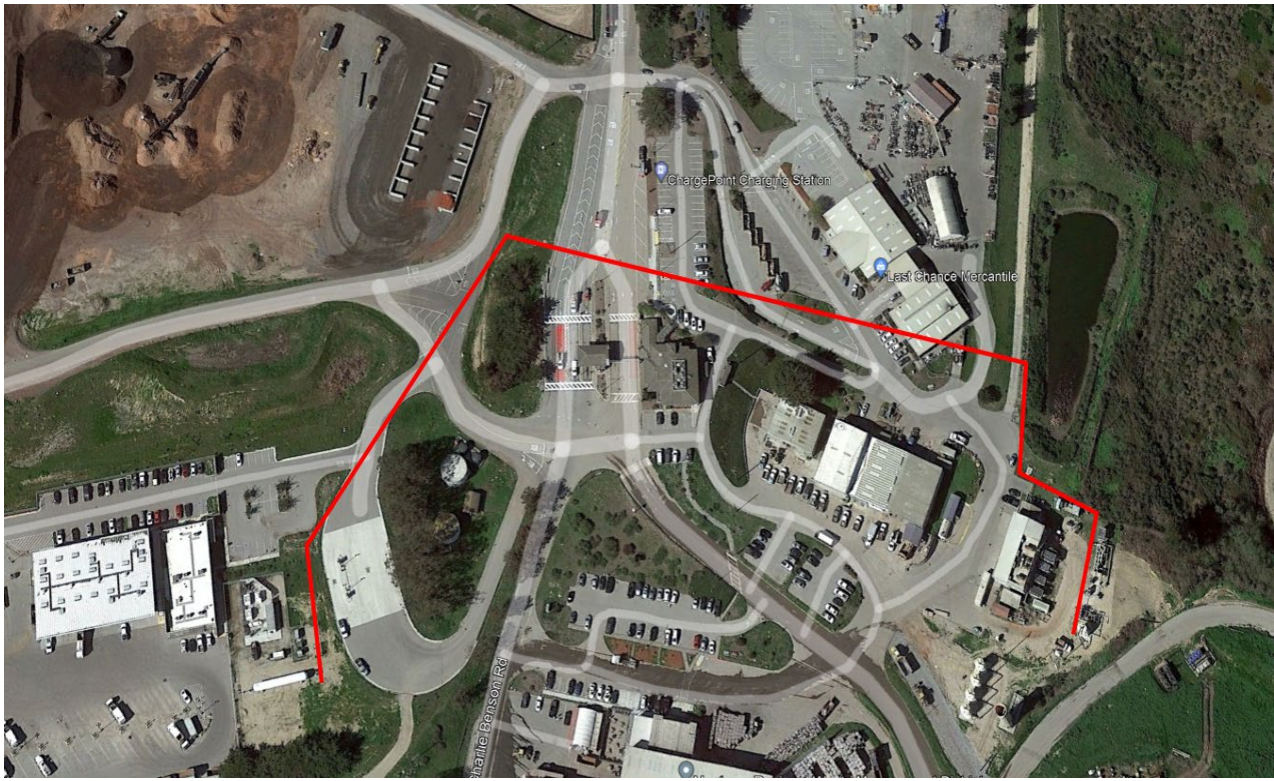
Challenge 2: Pipeline (cont.)

- Why not co-locate equipment?
- Control device locations
- Distance to existing perimeter GCCS header
- Space



Challenge 2: Pipeline (cont.)

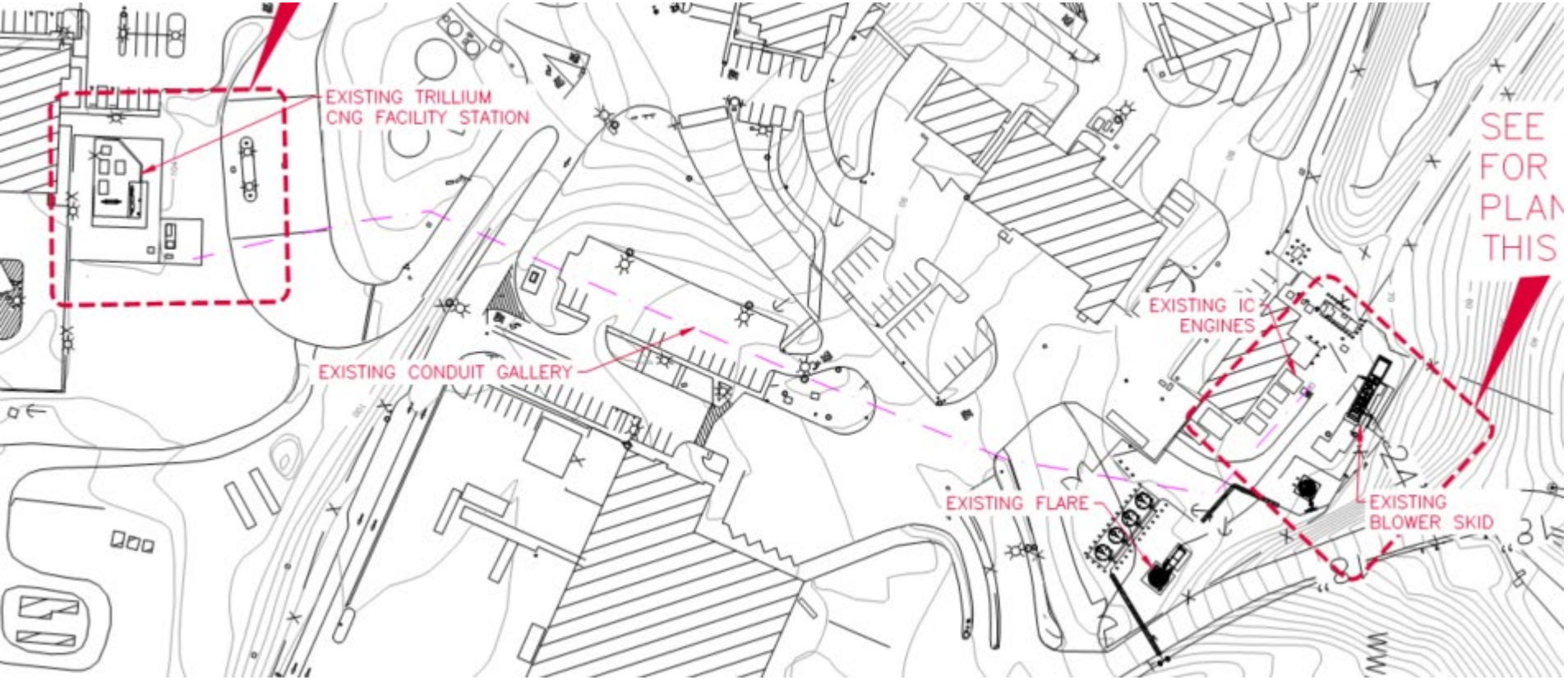
- Considered horizontal drilling



Solution 2: Pipeline

- Considered horizontal drilling
- Proper planning (and documentation)
- Existing conduit gallery utilized for conveyance of treated biogas

Solution 2: Pipeline



Summary

Solutions:

- Properly sizing equipment
- Ability to break the project into phases
    1. Wellfield balancing
    2. Wellfield improvements and additional tuning
- Proper planning/ foresight/ documentation – Existing conduit gallery

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Questions

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