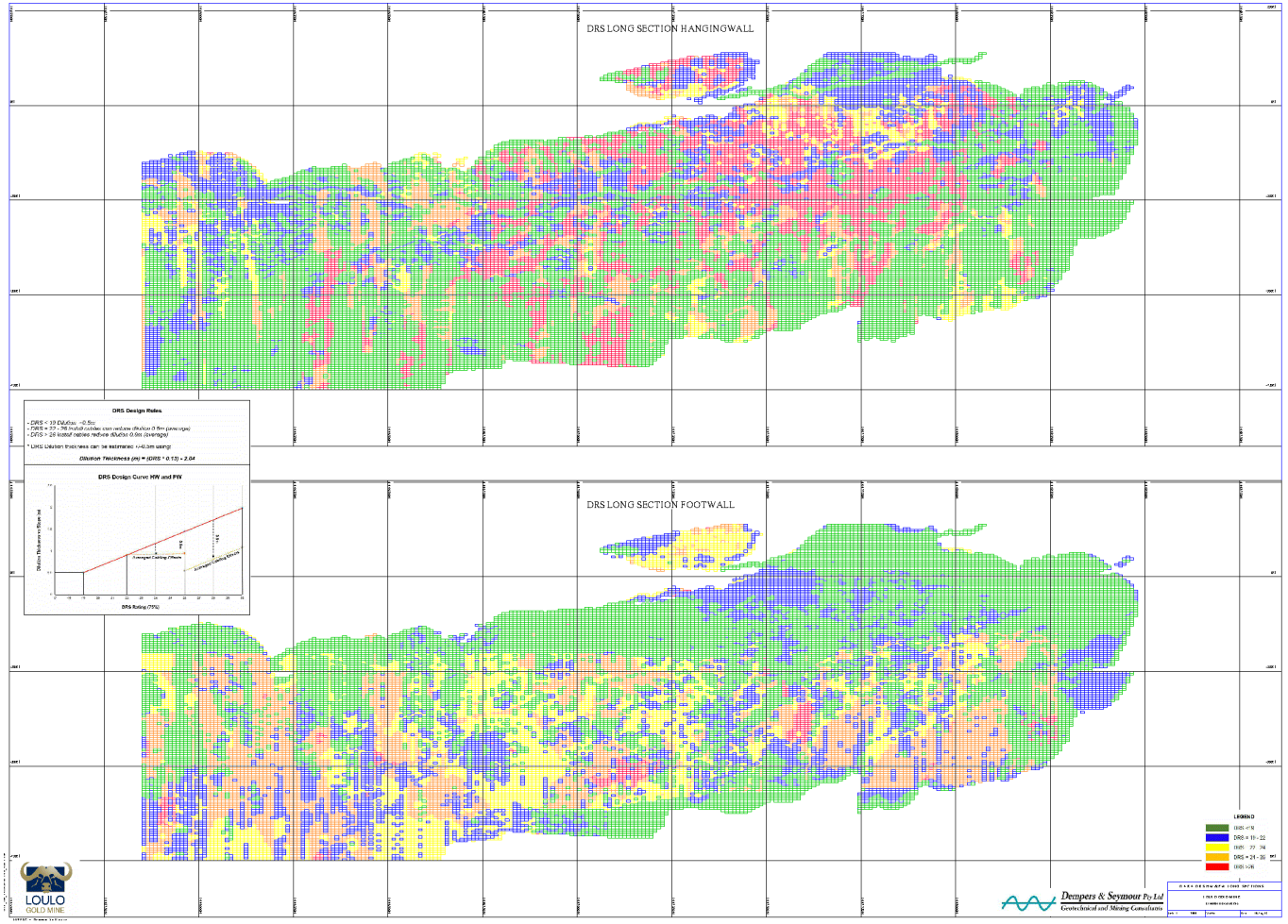
DILUTION RATING SYSTEM (DRS)

Dempers & Seymour Pty Ltd



Introduction

Dempers & Seymour have developed a 3 dimensional dilution model which can estimate dilution thickness with a level of accuracy of up to 0.5m. The Dilution Rating System (DRS) is based on a ranking method that takes cognisance of the rock mass properties, structure and stope orientations to allow the rock mass properties to allow estimation of dilution thickness.

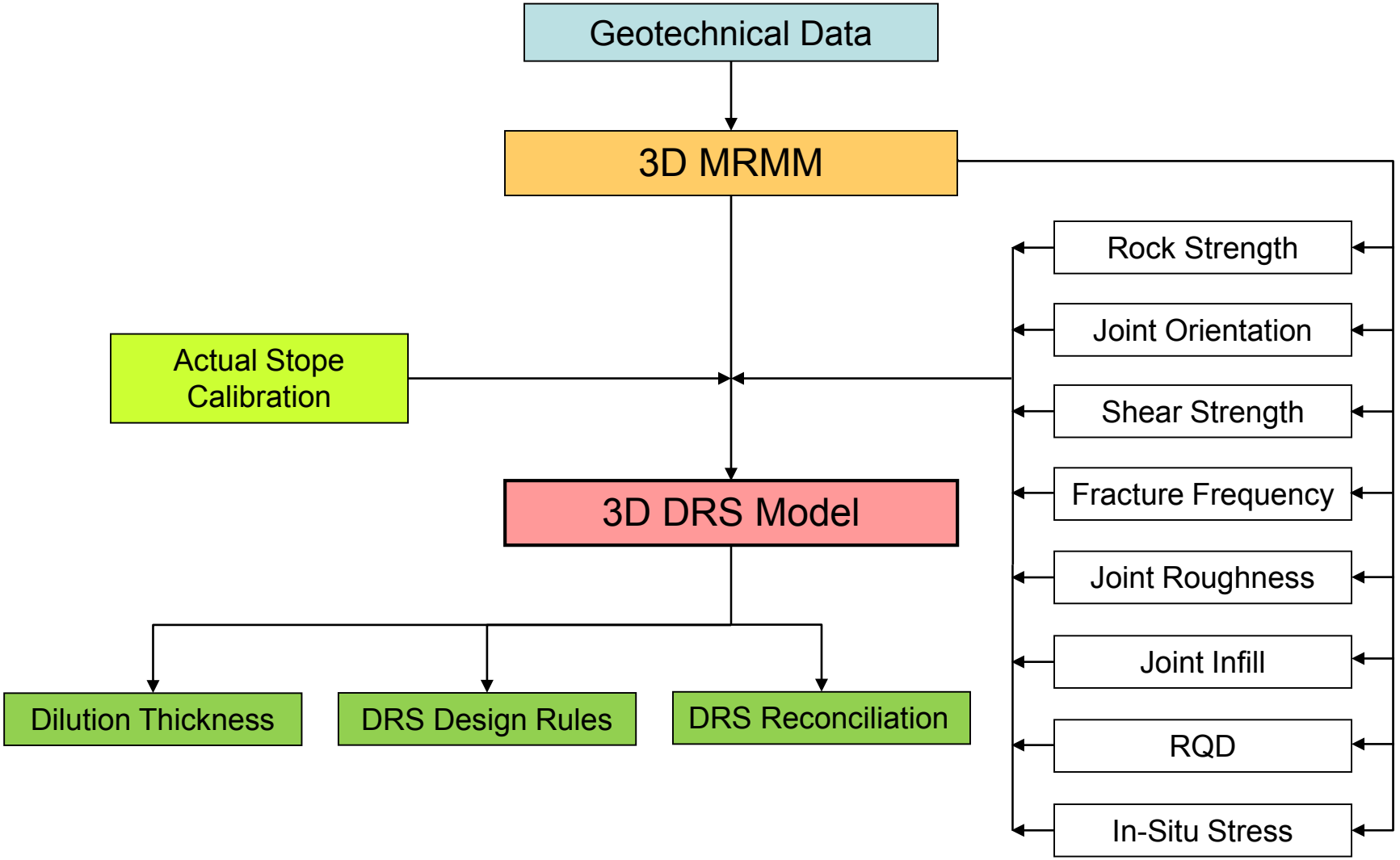
The geotechnical properties that affect dilution are unique to each mine site. These parameters are estimated in the Mining Rock Mass Model (MRMM) and include:

- Rock strength
- Joint orientation
- Shear strength
- Fracture frequency
- Joint roughness
- Joint infill
- RQD
- In-situ Stress

Using the relevant block values from the MRMM, the DRS is calculated and calibrated for each mine site to develop a design chart that is then used to predict dilution thickness.

The presentation shows a project where dilution has successfully been predicted for hangingwall and footwall.

DRS Flow Chart



CASE STUDY

- A “narrow” vein type gold mine have been using to develop the DRS study
- The Dilution Rating System (DRS) is based on the Mining Rock Mass Model (MRMM)
- This particular site, the DRS comprises the following four components with rated from 1 to 5 and weighted values for the most critical components (*):

  - ✓ *Fracture Frequency**
  - ✓ *Micro Roughness**
  - ✓ *Hardness*
  - ✓ *Orientation*
  - ✓ ***Total Rating is at 30 maximum***

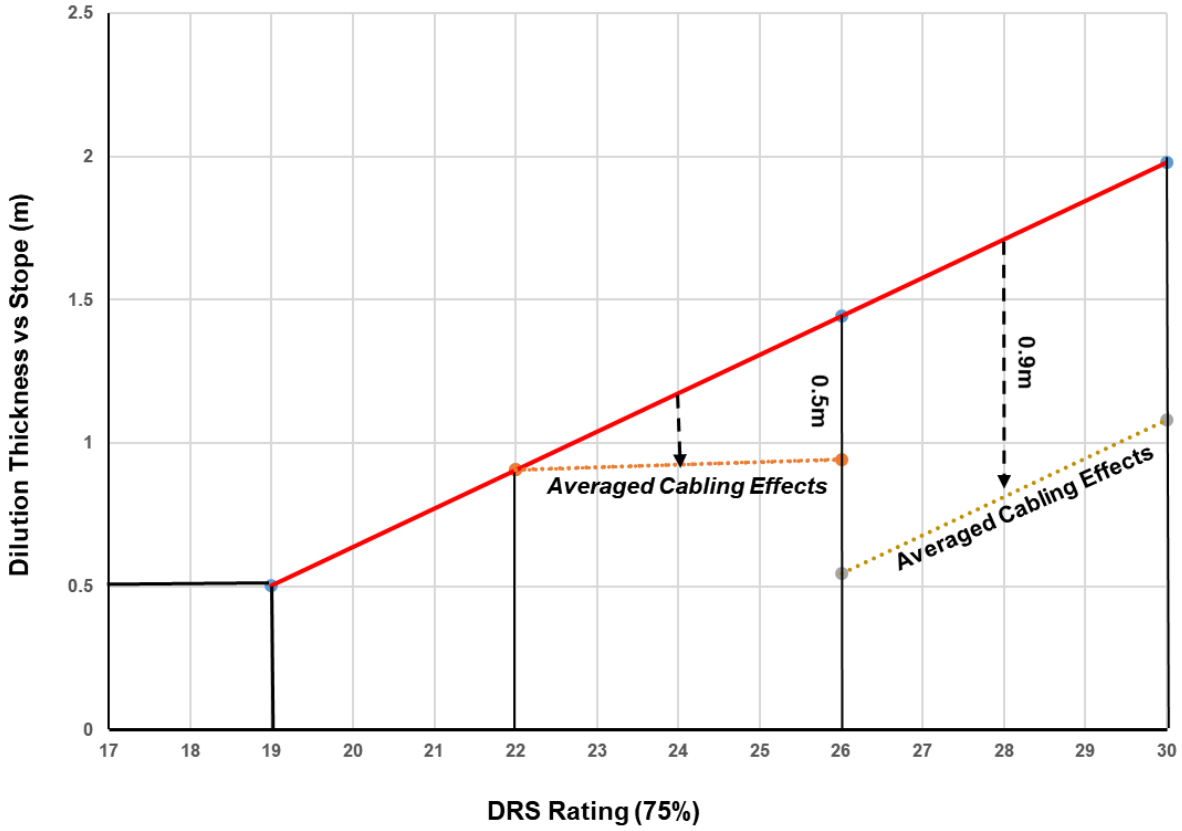
DRS Design Rules

- *DRS < 19 Dilution ~0.5m*
- *DRS = 22 - 26 install cables can reduce dilution up to 0.5m (average)*
- *DRS > 26 install cables reduce dilution 0.9m (average)*

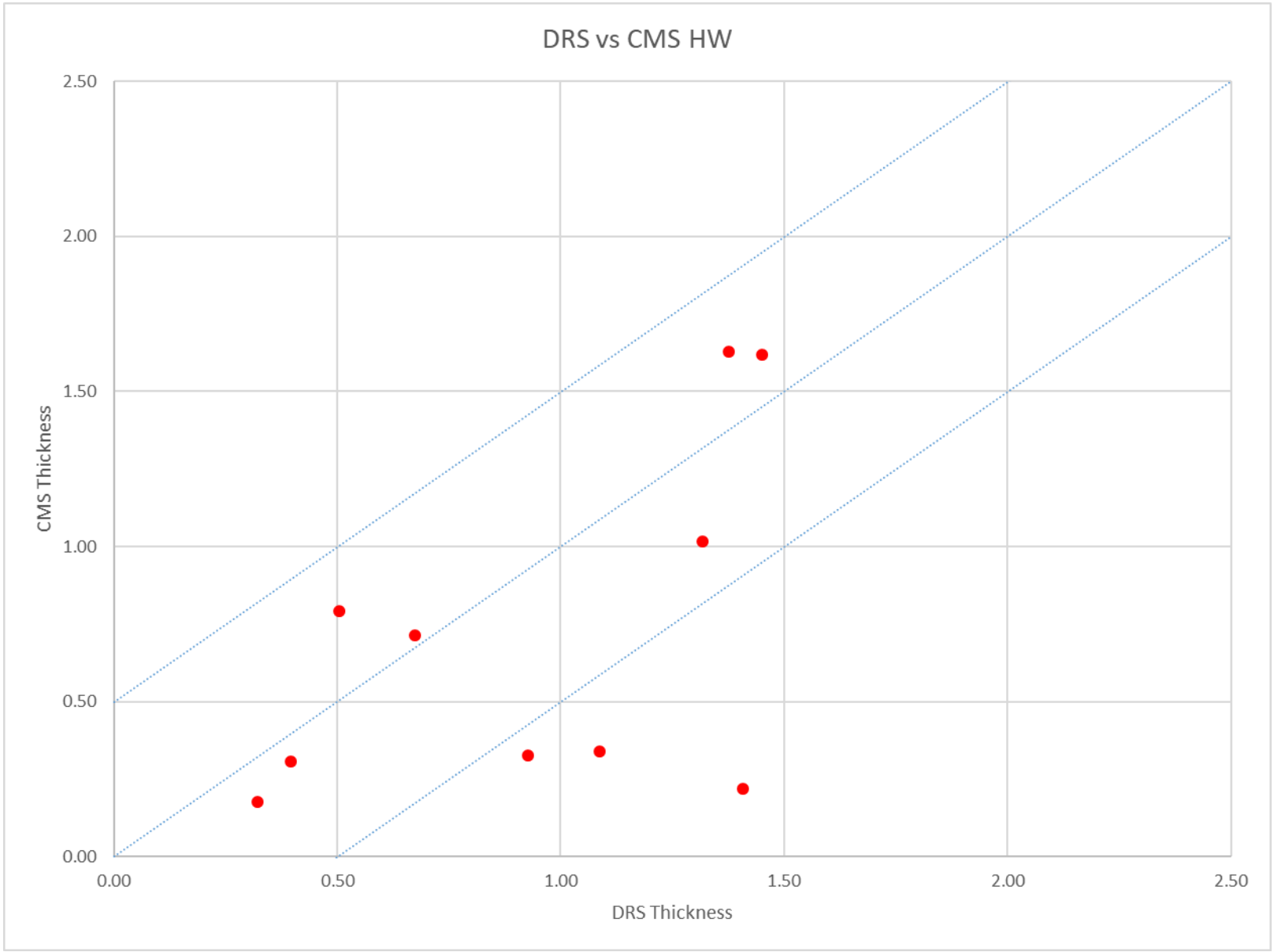
* DRS Dilution thickness can be estimated +/-0.5m using:

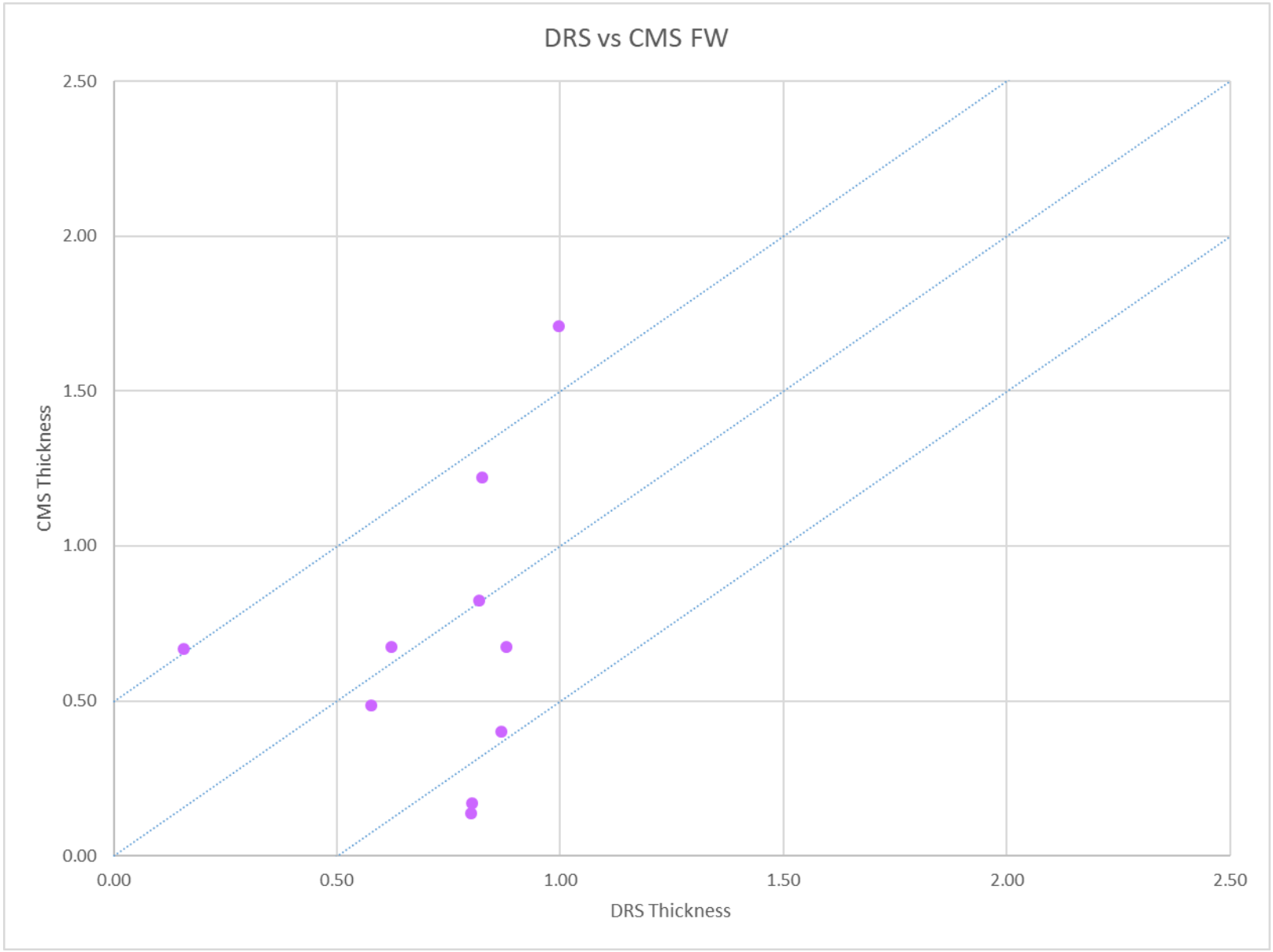
Dilution Thickness (m) = (DRS * 0.13) - 2.04

DRS Design Curve HW and FW



DRS Reconciliation
DRS Dilution Thickness vs CMS Actual Thickness


DRS vs CMS HW
CMS Thickness
DRS Thickness
0.00
0.50
1.00
1.50
2.00
2.50


DRS vs CMS FW
CMS Thickness
DRS Thickness
0.00
0.50
1.00
1.50
2.00
2.50

- DRS allows prediction of dilution
  - Geotech – Stope notes
  - Long term mine planning
  - Short term mine planning
  - Drill and blast
  - Reconcile with CMS for each stope

- Provides “when and where” to install cables

- Where to focus on over break and ore loss to improve reliability (40% of stopes evaluated)