



IDEA2022

Building Connections

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INTERNATIONAL
DISTRICT ENERGY
ASSOCIATION

Smart City Foundations: The Engineering Information Maturity Model

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Managing Legacy Engineering Information

- District Energy operations and maintenance relies on engineering information – drawings, controlled documents, 3D models – and the processes that manage and maintain them.
- Traditionally, these have been managed manually:
 - Reliance on experienced staff
 - Silos of information
 - Changes communicated in-person
- Modern conditions are changing this dynamic:
 - **Knowledge Transfer:** experienced staff are leaving, and taking knowledge of accurate engineering information with them
 - **Security:** engineering information is a critical security risk, that is often as risk of exploitation ie: how secure is an emailed drawing?
 - **Access:** as campuses digitize, it's imperative that this information be made available to all stakeholders, both internal and external

THE CHALLENGE:



What To Focus On? Where To Start?

- RedEye works closely with many asset-owning organizations, and has observed that the biggest challenge with engineering information management is 'getting started':
 - Some campuses are focusing on BIM
(without having accurate foundational information)
 - Some just want clean records
(without the processes to keep it clean)
 - Others are happy with the status quo
(without appreciating the risk and cost to their business)

CONSIDER A TYPICAL DISTRICT ENERGY PROVIDER:

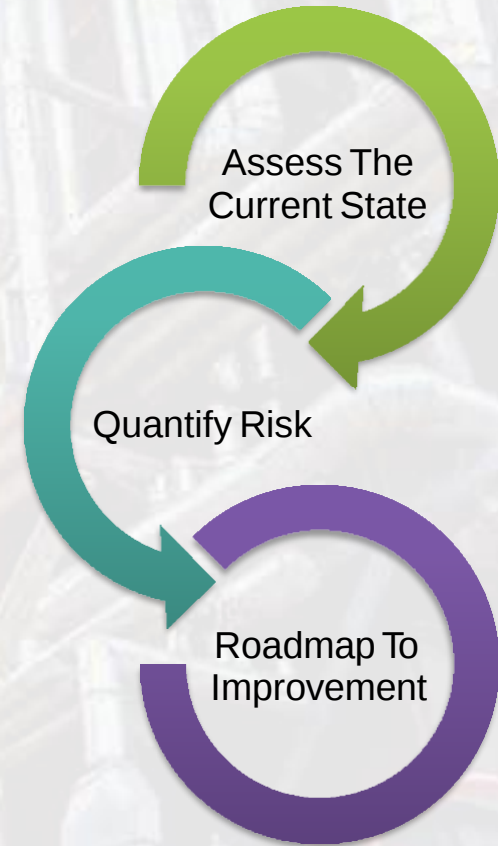
Thermal Energy Corporation (TECO)

- TECO provides chilled water and steam to 51 buildings in the Texas Medical Center (TMC) in Houston.
- Like any modern District Energy organization, TECO are experiencing many challenges:
 - Multiple contractors managing different projects and activities
 - Staffing constraints
 - COVID policies preventing information sharing
 - Risks and opportunities from digitization
- As a critical infrastructure operator, they have tens of thousands of files of engineering information on file – engineering drawings, controlled documents, and manuals.
- Should it be required, any one of these pieces of information could be critical to continued operation of their infrastructure, and the ongoing supply of thermal utilities their customers.



The Engineering Information Maturity Model

- After observing the same challenges across many of our partners, RedEye embarked on a project to standardize how districts could not only ascertain the current state of their engineering information, but also establish a path forward.
- The result was the Engineering Information Maturity Model, designed specifically to support organizations with this overlooked aspect of their Smart Cities journey:
 - A. Assessing the current state of engineering information,
 - B. Quantifying operational risk, and
 - C. Producing a tailored roadmap to improvement.



THE MATURITY MODEL:

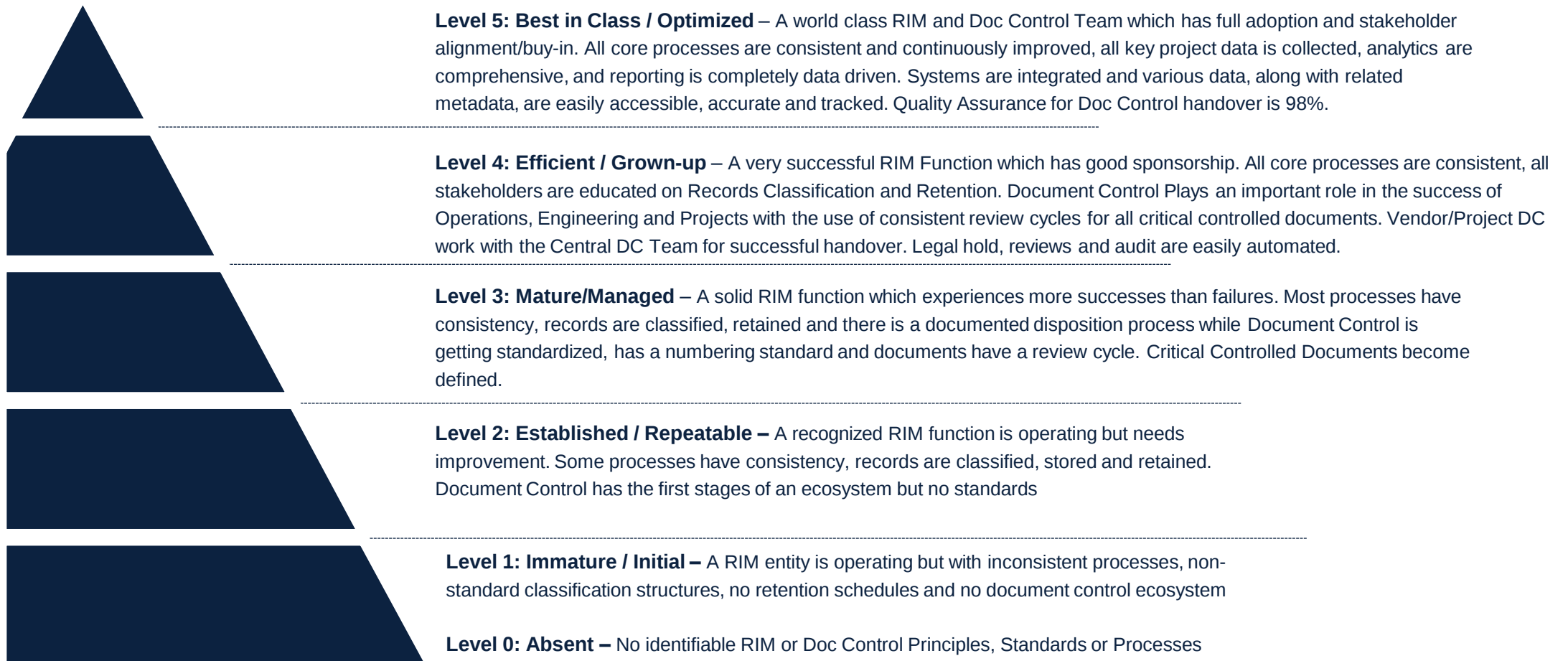
5 Levels Of Information Maturity

Each Level reflects the effectiveness and value to the District of each category of Information Management



Defining Success At Each Level

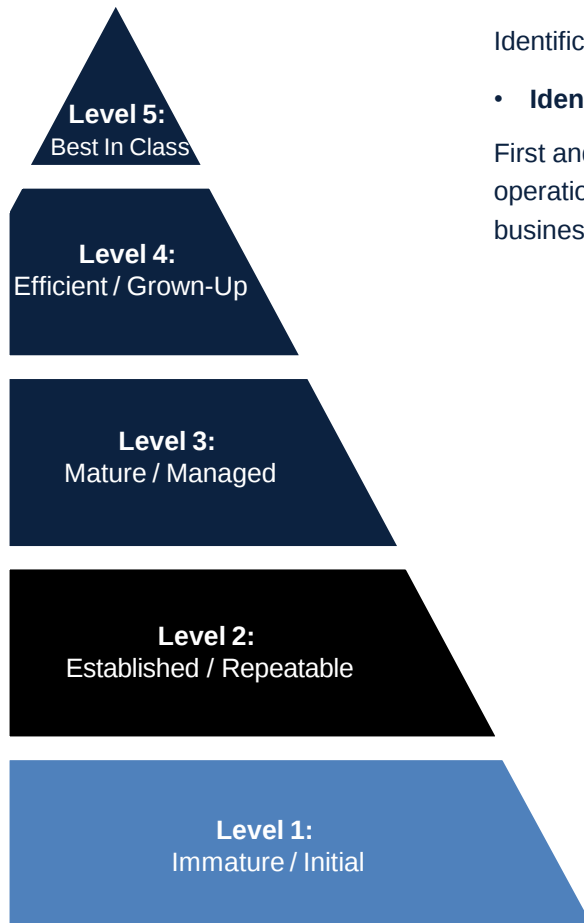
Success with Information Management is achieved when, broadly, the following tollgates are met



THE MATURITY MODEL:

Level 1 – Identification And Classification

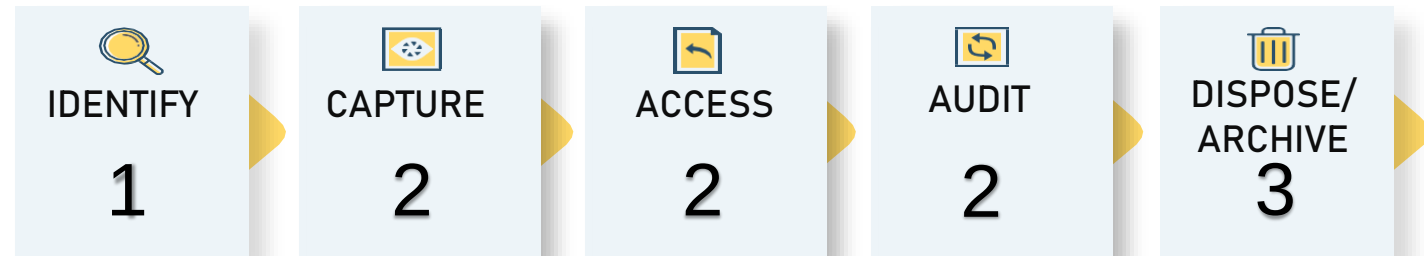
The default for most Districts – a basic knowledge of engineering information, with minimal control



Identification of Engineering Information:

- **Identify:** Define what is classes as “Engineering Information” and assign basic “classification” designation

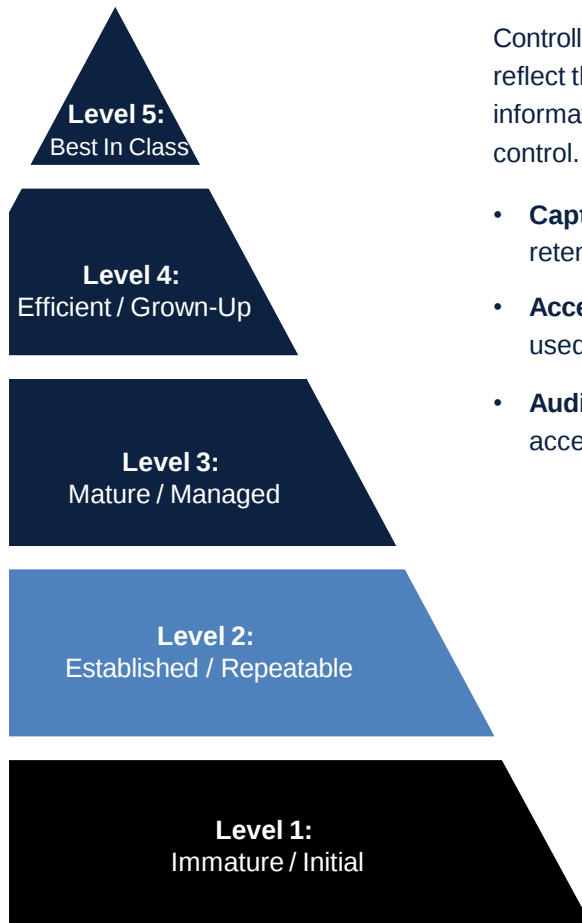
First and basic step is to define and differentiate between works-in-progress (future records) and actual records (evidence of operational and/or transactional activity, point-in-time evidence). These range from hiring documents to receipts. Generally, all business decisions, plans, activities, organizational structures and strategies will fall into this category.



THE MATURITY MODEL:

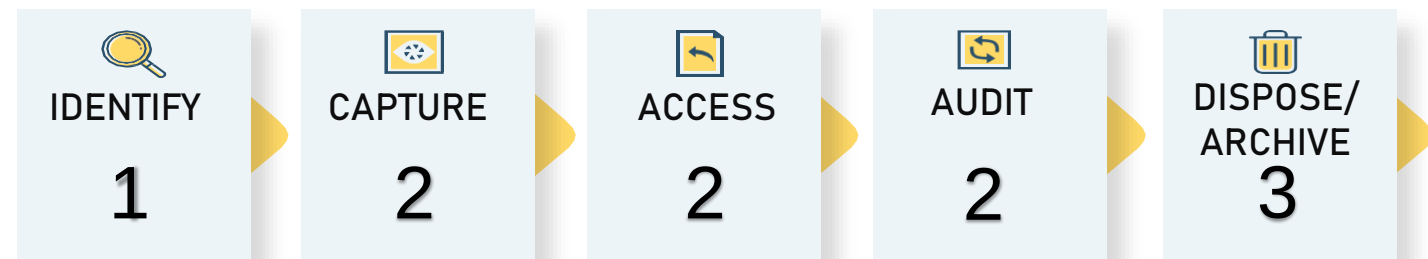
Level 2 – Capturing Metadata

Metadata = corporate knowledge critical to ongoing success



Controlled Engineering Information is “evergreen” or “live”. Each version is a record (snapshot) while the current version should reflect the current planned or existing process, standard, procedure and/or facility it is referencing. Having a Level 1 “engineering information management” standard is an essential building block and works as a prerequisite to enable and facilitate true EIM control.

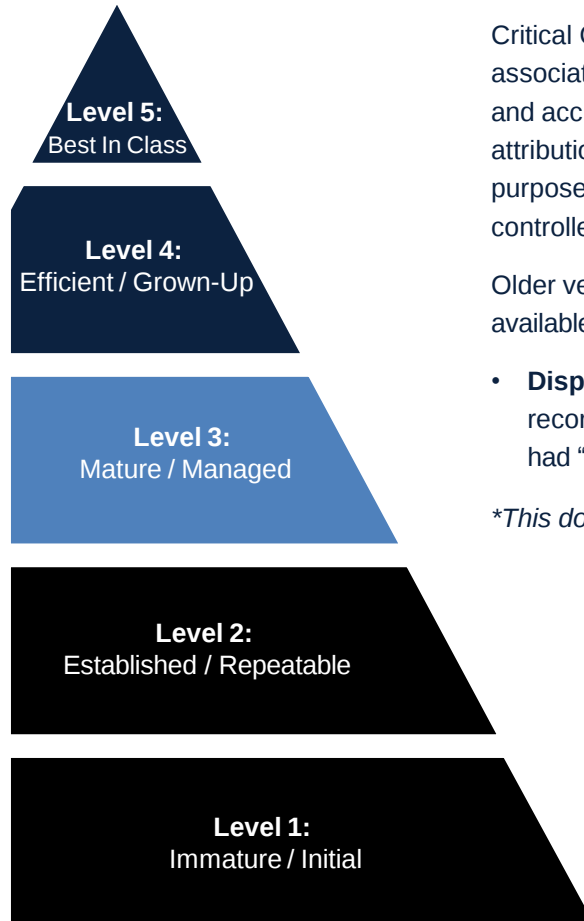
- **Capture:** Level 2 requires the capturing of basic/primary metadata fields: document type, published date (date of record), retention classification
- **Access:** Besides basic user access to a system, Level 2 gets more granular and will have access logs of all records, these will be used for audit. Access requests will include a justification
- **Audit:** Auditing will include a QA of metadata, review of access controls and access logs (who has access and who has accessed) Foundational information for legal hold



THE MATURITY MODEL:

Level 3 – Criticality And Control

Effective management of business critical engineering information

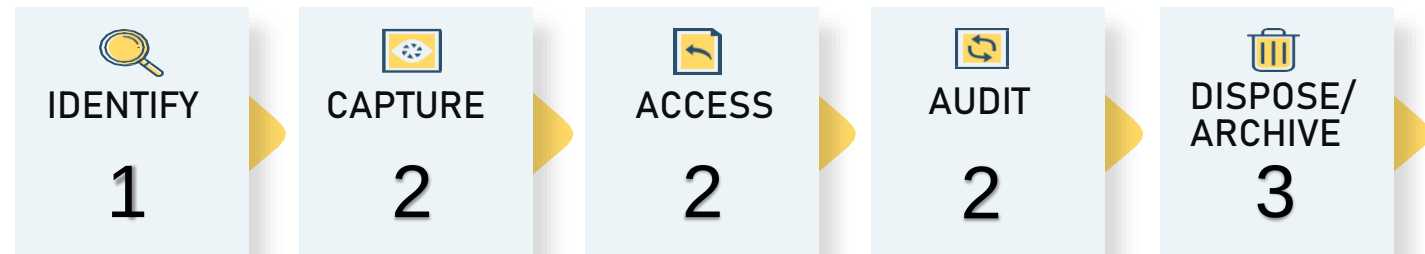


Critical Controlled Documents (CCDs) are a Level 3 capability and have some of the highest “severity” and/or “criticality” ratings associated to engineering information within an organization. A Level 2 Document Control standard is a prerequisite for consistent and accurate CCD management. The only difference between “controlled documents” and “critical controlled documents” is the attribution, captured via metadata, to the record. Copies of predecessors are recorded, changes are captured along with change purposes/reasons and a list of everyone involved in the change and review/approval of that change, including the document controller.

Older versions are either layered or archived for the purpose of making inaccessible to anyone needing the current version but available for audit reviews when required.

- **Dispose/Archive:** Archival of old, superseded or inactive records with a documented disposition process that “tickets” (logs) all records disposed of, whether physical or digital, showcasing that they were disposed of in the “normal course of business” and had “matured” to meet their regulatory and business retention dates per the classification and associated retention schedule.

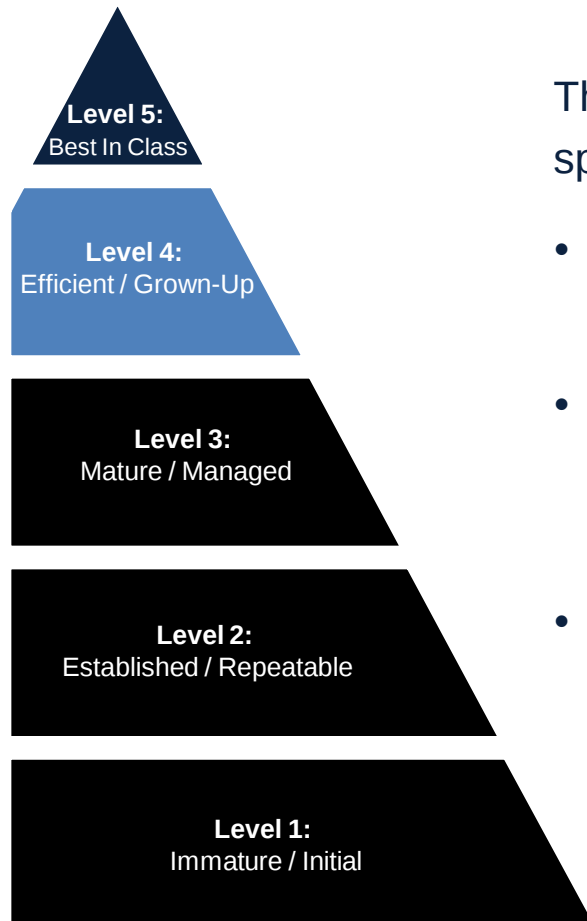
**This document classification will usually be found referenced in business continuity plans and emergency response plans.*



THE MATURITY MODEL:

Level 4 – Process Consistency

Ensuring that your 'Live' Engineering Information is updated concurrently with your infrastructure



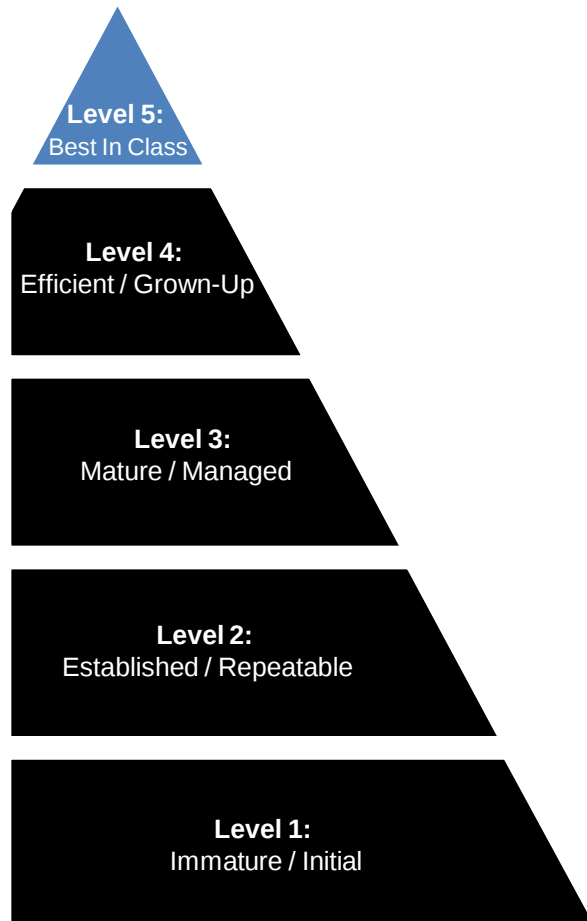
This reflects a very successful organizational function, with good oversight and sponsorship.

- **Processes:** all core processes are consistent in Level 4, with all stakeholders are educated on access, control, and management.
- **Management:** Document Control plays an important role in the success of Operations, Engineering and Projects with the use of consistent review cycles for all critical controlled documents.
- **Vendor Engagement:** external third parties are integrated into your Engineering Information Management. Legal hold, reviews and audit are easily automated.

THE MATURITY MODEL:

Level 5 – Best In Class

Thought-leader in Engineering Information Management



A world class team has full adoption, stakeholder alignment, and oversight of your engineering information.

- All core processes are consistent and continuously improved, all key project data is collected, analytics are comprehensive, and reporting is completely data driven.
- Systems are integrated and various data, along with related metadata, are easily accessible, accurate and tracked.
- Quality Assurance for Doc Control handover is greater than 98%.

How To Deploy The Model @ Your District?

- Each District is unique, managing their engineering information as necessary for their circumstances.
- It is critical to focus on the focus areas of engineering information management that are relevant to you
- The RedEye recommended 'default' focus areas can be seen on the following page
- Consider the following when assessing your Maturity:
 - A. Different teams will have different opinions. External contractors can often provide good honest feedback
 - B. Be honest with your current state
 - C. Consider processes, standards, storage, and access.

ASSESSING YOUR MATURITY:



The Assessment Summary

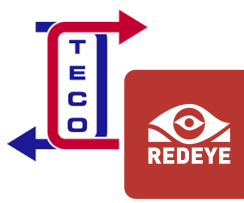
Score Yourself On Your Top 10 Engineering Information Activities

Level 5	Level 5	Level 5	Level 5	Level 5	Level 5	Level 5	Level 5	Level 5	Level 5
Level 4	Level 4	Level 4	Level 4	Level 4	Level 4	Level 4	Level 4	Level 4	Level 4
Level 3	Level 3	Level 3	Level 3	Level 3	Level 3	Level 3	Level 3	Level 3	Level 3
Level 2	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2	Level 2
Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1	Level 1
Version Control	Criticality	Records Classification and Retention Schedules	Review Cycle (CCD)	Transmittals	Redline Markups	Access / Controls	Access / Storage	Concurrent Engineering	Audit (Internal / External)

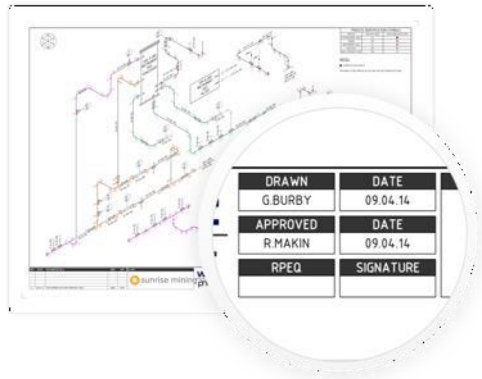
Why TECO Chose RedEye

- When TECO chose to partner with RedEye, we were able to collaboratively improve against their key focus areas, as identified in our assessment, such as:
 - **Version Control:** ensuring users could reference a Single Source of Truth, rather than digging through multiple versions
 - **Auditability:** improving cybersecurity of their engineering information, and understanding who was accessing what
 - **Accessibility:** field access, and inviting in external parties, was seen as an opportunity for improvement
- As an Engineering Data Management Solution (EDMS), the RedEye platform was able to offer a single solution to TECO, providing:
 - Process consistency across the District
 - Reduce reliance on individuals
 - Improve security around drawing and document management, in perpetuity

REDEYE @ TECO:



How TECO Adopted RedEye

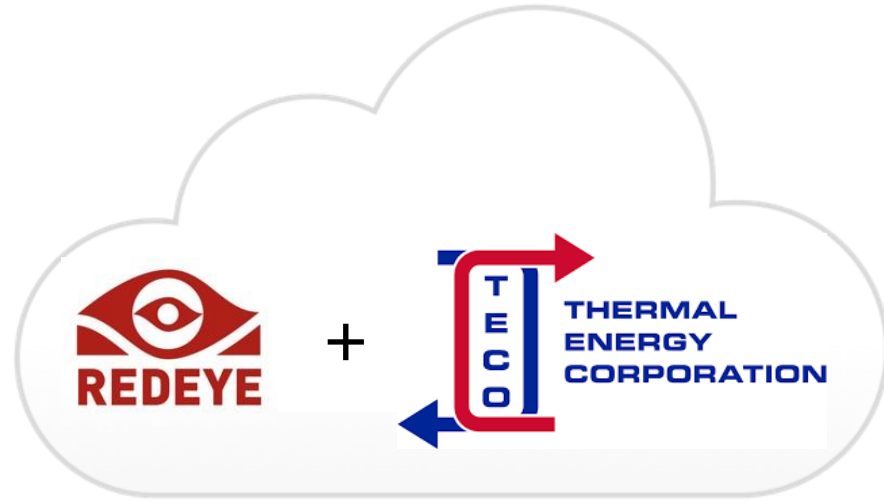


MIGRATED RECORDS AND DOCUMENTS FROM LEGACY LOCATIONS

Consolidated drawings, documents and data from silos across TECO

Eliminated duplicates

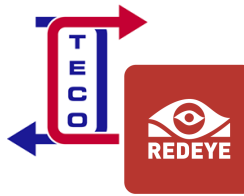
Extracted Metadata using advanced Optical Character Recognition (OCR)



“INVITED PEOPLE IN” TO VIEW and USE THEIR INFORMATION

Eliminated commercial barriers to enhance internal and external collaboration

REDEYE @ TECO:



How TECO Is Benefiting From RedEye

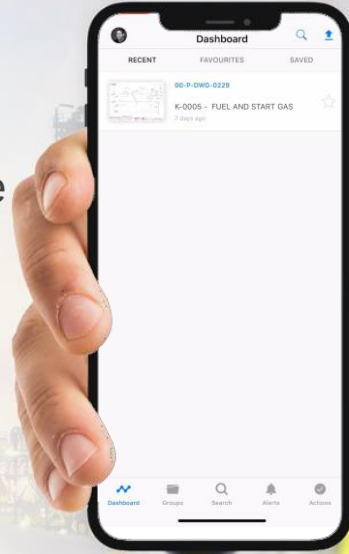
Search made easy
anywhere, anytime

“Google-esque” search
with intuitive user interface

Map search

Virtualized folders

Fully mobile platform –
iOS, Android, Web



Total version control and auditability
view all revisions in a single digital
timeline

Markup / Review / Approve



QR Codes to
control
printed copies
and group
files

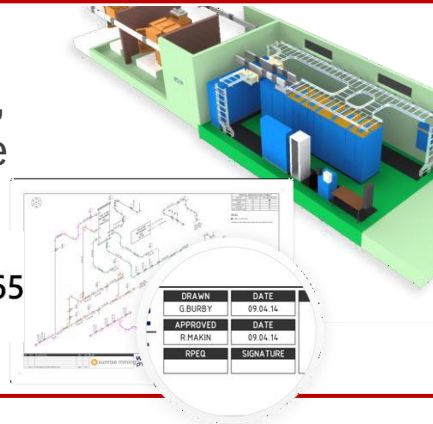


Quick migration from
existing platform to
RedEye



350-1500 files upload and
OCR per minute

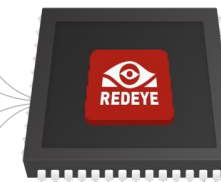
View and manage extensive
and advanced file types (2D, 3D,
Media etc) ... no need for source
software



Our REST API allows



integration with any system



TOOLKIT ITEMS TO TAKE BACK TO YOUR DISTRICTS:



Recommended Next Steps

RedEye is providing the following resources exclusively to attendees!

1. Engineering Information Survey

This is an excellent starting point to any changes at your District

2. Digital Engineering Standard

This will be a useful reference when looking at standardization of engineering drawings and models across your organization

The RedEye team can answer any questions you have on either of these resources – contact us to learn more.



Q&A



Thank You!

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