Atkins Journey to ISO 19650
Digital/Design Transformation Context
2D based design
Paper based requirements
Document based CDE
Content management
3D based design
Object based requirements & CDE
Automation in Process and Design
Workstream collaboration
Immersion (VR/AR) / cloud
Autonomous design
Outcome based requirements
Delta-driven (API over formats)
Project “repositories”
Data Trusts
Horizons of growth scenarios – ramifications

H1
2D based design
Paper based requirements
Document based CDE
Content management

H2
3D based design
Object based requirements
Object based CDE
Automation in design
Workstream collaboration
Immersion (VR/AR) / cloud

H3
Autonomous design
Outcome based requirements
Delta-driven (API over formats)
Project “repositories”

Time
Today 18-24months 4 years +

Prevalence in business
Horizons of growth scenarios – ramifications

- Indicative ‘tools’ currently used each horizon
- Don’t yet fully understand what H3 tools look like
- Over time “turn off” tools in H1 & increase H2 & H3
- Very short timescales (18-24 months)
- Intervention required today
  - e.g. what we need start doing now to “turn off” emails in next 2 years?
Our Approach to Information Management for Design

OUR PEOPLE

OUR PROCESS
The Global Design Framework

TECHNOLOGY that Supports the Process

ATKINS DESIGN APPROACH

Delivery Teams & GDC
PEOPLE

Tools

Technology

Digital Factory

Learning & Development

Design Accelerator

GDF

PROCESS
Business Strategy - Information Management for Design

Digital Delivery & Information Management
Policy Statement

Business Management System (BMS)  Global Corporate Standards

Digital Delivery & Information Management
Implementation Plan

OUR PROCESS
The Global Design Framework

OUR PEOPLE

TECHNOLOGY
that Supports
the Process

Kitemark Certification for the BIM Asset Lifecycle ISO19650 Framework
Digital Delivery & Data Management Policy

Digital Delivery & Data Management

Policy Statement

Our mission is to excel in digital delivery and data management by leveraging our leading capabilities across our global sectors. At SNC-Lavalin, we recognise the potential of efficiently capturing, managing and using data to benefit both the project and asset lifecycles. We are committed to our digital transformation and understanding the impact of the digital economy on our clients, shareholders, and the communities in which we work.

Our principles

- Harness data to deliver better outcomes to all users.
- Focus on our customers’ digital experience and satisfaction.
- Foster collaborative behaviors through digital delivery and connected data environments.
- Ensure consistency and commonality in our language and approach to data management.
- Safeguard our customers’ data.

Our commitments

- Promote a Digital Twin approach as our foundation of delivery and a platform for innovation.
- Be sector-defining by leading the development of international and local standards.
- Invest in our people, process and technology.
- Work with our clients to develop and apply robust information requirements.
- Continually improve through independent evaluation and verification of our capability.
- Support the evolution and change of our business and organization through change management.

This statement provides the framework for setting the objectives of digital delivery in every relevant functional, operational unit and business based on the requirements of International Standards (such as ISO 9001, ISO/IEC 27001, ISO 19650, EDISON Capital Facilities Information Hand Over Specification and any region-specific requirements). It encompasses all processes and methodologies relating to the management of data and information, such as Digital Twins, Building Information Modelling (BIM), Building Lifecycle Management (BIM), Product Lifecycle Management (PLM) and Asset Management and Operations.

While the President and Chief Executive Officer of SNC-Lavalin is responsible for implementing and monitoring this Policy, all employees and partners working on our behalf must share these commitments. Everyone is empowered to speak up and act to ensure that they are met.

Neil Bruce
President and Chief Executive Officer

February 2016
Digital Delivery & Data Management Implementation Plans

EDPM UK&E
Digital Engineering Plan 2019

The key headlines of our 2019 BIM Implementation Plan are:

- Utilising BIM as the golden thread of the EDPM design transformation programme
- Becoming one of the UK’s first organisations to obtain ISO 19650 accreditation
- Establishing digital ‘tiger teams’ to support major bids and projects with BIM implementation
- Making the Digital Delivery Processes BAU for staff
- Equipping our engineers to be able to check, review, and authorise in 3D models and establishing an agile technical assurance programme for major projects.

OUR PURPOSE

Vision

Increase our market share for design work by rapidly increasing our Digital Engineering maturity

Mission

Transform a substantial part of the UK’s design business to work in a different way in 2019

Themes

PEOPLE

PROCESS

TECHNOLOGY

Objectives

Business Benefits
Establish Project benefits and enhance the bidding process

Inspire
Educate Engage and support staff, clients and partners on our journey

Drive Change in large bids & projects
Underpin Digital Accelerator Challenges and support with Acceleration Team

Create the environment
Deliver the backbone software, commercial and people plans

BIM as BAU
Move towards a BIM culture across the organisation
Business Management System & Global Corporate Standards

Atkins Corporate Standards

Digital Plan of Work encompasses the RIBA stages, GRIP stages

Atkins’ design principles

Start the job right

Principle 1: We have fully understood customer requirements, assessed these as being reasonable and translated them into a clear brief of design.

Principle 2: We have assessed what resources (e.g., key people, skills, accommodation and tools) are required and confirmed they are available.

Principle 3: We have understood our scope of work within the project lifecycle and have split this into appropriate phases. The work breakdown structure and deliverables for each phase are well defined.

Principle 4: We have understood and communicated roles and responsibilities for our operations and our customers and any third parties such as a regulator.

Do the job right

Principle 5: We have put in place suitable processes for managing change, risk and information flows.

Principle 6: We have put in place suitable processes to ensure that our deliverables meet the design requirements.

Finish the job right

Principle 7: We will capture lessons learned during the project and feed these back into our design processes.
Digital Delivery & Information Management Implementation Plan

End to End Solution

Deliverables across the different phases of the Lifecycle

BIM Project Setup
- Identify & detail project objectives and goals
- Review organisational & operational processes
- BIM business value workshops
- Setup BIM framework
- Defining 'Work Packages'
- Setup data management platform
  - Assessment report
  - Project standards
  - Templates & libraries
  - Data management setup
  - BIM execution plan

BIM for Design and Pre Construction
- BIM skill evaluation
- Tool training & mentoring for project stakeholders
- Modelling for all disciplines
- Enabling BIM model coordination
- Support & enablement of pre-tender documentation
- Contractor qualification audits
- BIM model QA / QC
  - Model management
  - Model audits
  - Model coordination
  - Clash free model
  - Project sequencing
  - Tendering documentation support

BIM for Construction
- Enable logistics planning
- BIM 4d (time schedule)
- BIM 5d (costing)
- Assist & mentor quality, safety and issue tracking
- Enable BIM for commissioning and as-built modelling
  - Clash detection
  - BIM for 4d (time schedule)
  - BIM for 5d (costing)
  - BIM for procurement
  - BIM as-built model

BIM for Operational Maintenance
- Audit as-built model for O&M
- Readiness for validation for:
  - Space management
  - Maintenance management
  - Energy management
  - BIM standards for FM
  - BIM integration plan for FM
  - BIM integration plan for FM
Our People are a networked team of teams, based in local offices around the world, giving you an always-on service, able to resource rapidly to meet your requirements. Use latest technology to collaborate effectively, sharing best practice ideas to innovate your project. Multiskilled & diverse, include product designers, data scientists, and gaming industry experts, to give you all-round innovative and forward-thinking expertise.
## BIM Roles & Responsibilities Summary

### Project Managers:
- Project Manager, Commercial Manager, Project Delivery Manager
  - Client opportunity & information requirements
  - Respond to client requirements
  - Project resources (capacity and capability)
  - Project Assurance (technical + commercial)

### Technical Roles:
- Technical Lead, Design Lead, Lead Engineer
  - Spatial subdivision & information delivery plan
  - Delivery to design standards
  - Auditors’ project information through the QAC process
  - Ensure clash resolution

### Information Managers:
- Information Manager, BIM Manager, CAD Manager
  - IT facilities & systems
  - Interoperability across all data (models, drawings, etc.)
  - Model compliance & assurance
  - Information security & management
  - Information exchange & role-up

### Team Roles:
- Team Manager, Discipline Lead, Work Package Lead or Task Team Manager
  - Task information delivery plans
  - Team resources (capacity & capability)
  - Delivery in line with standards/protocols
  - Ensure collaboration & info exchange

### Information Authoring Roles:
- Information Author, Engineer, Architect, Technician
  - Create information models & deliverables
  - Follow agreed standards, tools, templates, libraries
  - Meet the design requirements
  - Escalate errors & clashes

### Design Coordination Roles:
- Design Co-ordinator, Interface Manager
  - Facilitate design coordination meetings
  - Ensure a co-ordinated design (i.e., clash avoidance)
  - Manage project design interfaces

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**Training module – Transition to ISO19650 awareness**

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**Project Manager BIM Level 2 Foundation Training curriculum**

This training curriculum provides the Project Manager with an understanding and basic understanding of BIM Level 2. The curriculum consists of several modules of which need to be completed. There is an examination at the end of each module that aims to ensure the trainee has understood and retained the module material.

**Curriculum Training Outcomes:**
- The end of the curriculum the Project Manager will have a high-level understanding of BIM Level 2.
- The Project Manager will have a basic understanding of the BIM process.
- The Project Manager will have a basic understanding of the BIM terminology.
- The Project Manager will have a basic understanding of the BIM tools and software.
- The Project Manager will have a basic understanding of the BIM standards.
- The Project Manager will be able to identify and implement BIM strategies in their projects.

**Module 1 - BIM Overview**
- What is a BIM or BIM modelling
- What is the role of BIM in the project
- What is the role of BIM in the project team
- What are the benefits of BIM
- What are the limitations of BIM
- What are the risks and challenges of BIM

**Module 2 - BIM Level 2 Standards Overview**
- Introduction to the BIM Level 2 standards
- What are the key components of BIM Level 2
- What are the key benefits of BIM Level 2
- What are the key risks and challenges of BIM Level 2

**Module 3 - BIM Level 2 At QAC Overview**
- Introduction to the QAC process
- What is QAC and its role in BIM Level 2
- What are the key components of QAC
- What are the key risks and challenges of QAC

**Module 6 - BIM Level 2 Foundation Awareness**
- Introduction to BIM Level 2 awareness
- What are the key components of BIM Level 2 awareness
- What are the key risks and challenges of BIM Level 2 awareness

**Module 7 - BIM Level 2 Standards Knowledge**
- Introduction to the BIM Level 2 standards knowledge
- What are the key components of BIM Level 2 standards knowledge
- What are the key risks and challenges of BIM Level 2 standards knowledge

**Module 8 - BIM Level 2 Design Coordination**
- Introduction to design coordination
- What are the key components of design coordination
- What are the key risks and challenges of design coordination

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Contains sensitive information
Subject Matter Experts - who’s who

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Atkins Fellow

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UK Head of Public Sector

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Asset Information Lead

Ian Buffey
BIM Security PAS1192-5

Caroline Mokrani
BIM Health and Safety Lead

Navil Shetti
PAS1192-3 and OPEX Lead

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Digital Engineering Lead UKE

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Gwion Kennard
Digital Director Infrastructure
Global Design Framework Interfaces

Level 1
- GDF
  - Framework: GDF Steering Group

Level 2
- Process
  - SMP TA, IDC etc
- Guidance
  - BIM Navigator
  - Process & Guidance: TA for BIM & BMS

Level 3
- Technology Map
  - Tasks, Roles, Inputs, Outputs
  - Project Delivery: PHoDs
Global Design Framework (GDF)

The Global Design Framework

SMP 1 – Pre-appointment BEP

Stages of Design Delivery
Global Design Framework (GDF)

The Global Design Framework

Stages of Design Delivery

Key Feature | Benefit
--- | ---
GDF is an end-to-end process | Value and time maximised improving costs, programme and quality performance while de-risking construction and operation phases through:
- Improved planning and delivery co-ordination – driving right first time outcomes.
- Ensuring we realise client value objectives through integrating design considerations such as sustainability, constructability, MIMI, value etc as integral aspects of the design process from the very beginning.
- Ensures we meet UK Government mandates on BIM and proactively meet contractor expectations for design delivery, in turn de-risking construction programme and logistics.

Standardised process applied globally | Improved quality and clash management and maximises opportunity to automate timing delivery efficiencies through:
- Improved planning and delivery co-ordination with consistent quality being achieved.
- Enables effective programme of continual improvements to be implemented across all design teams.
- Enables effective identification for information and efficiently savings.
- Ensures design outputs meet ISO standards.
- Enables effective development of design centres of excellence including our Global Design Centre in Singapore.

Early planning & core requirement | Establishing early clarity on the project’s IIM strategy de-risking delivery issues such as repeat works, unforeseen change and poor collaboration and communication across the supply chain by:
- Ensuring design works start on clearly defined scopes, de-risking change and improving programme certainty and enables our design teams to commence projects more rapidly in a co-ordinated way.
- Ensures development of most appropriate technology stack and IIM architecture for a client’s given project and improving supply chain co-coordination.

Design Challenge | Evolve innovation and maximise opportunity to adapt transformational changes such as automation, digitisation and modern methods of construction by:
- Ensuring design teams remain focused on generating value outcomes for our clients.
- Brings relevant lessons learnt from across markets to the attention of our design teams early in the process.
- Bring innovation and efficiencies to delivery.
GDF - Design Acceleration

Design accelerator:-

+ is a continuous process – from Invitation to Tender, through Information Requirements, to Information Delivery Planning & Assembly
+ is a catalyst for positive change
+ brings benefits to Clients projects
+ Ensures our Design teams consider all aspects of delivery
+ brings 4 key chances to add value

4 chances to add value...

- Client Insights
  Giving the Client director a opportunity to share the Client Value Proposition, giving the bid and technical team the chance to test and add value
- Technical Excellence
  An opportunity for the bid technical teams to share best practice in delivery and offer valuable insights into innovations in their field of delivery
- Project Collaboration
  A forum for the bid technical teams to share best practice in delivery and offer valuable insights into innovations in their field of delivery
- Win themes
  Creating/agreeing as a team our win themes and working collectively to mobilise our projects and support delivery success from bid stage onward

Continual Improvement
GDF - Mobilisation

Click on image for further detail on the mobilisation plan
During Information Delivery we:-
+ Check availability of reference information and shared resources
+ Generate information
+ Undertake quality assurance checks
+ Review information and approve it for sharing
+ Submit information model for authorisation

Follow this link to the video of our process in action!
GDF - Project close out and handover

At handover we:-
+ Ensure that our clients information delivery requirements have been met and;
+ Use our Client Feedback and customer satisfaction platform
+ Summarise Captured Lessons Learned from our Lessons Learned Platform
+ Closing the End To End Process shown in our implementation plan (Slide 16)
1. **Standardise** – Processes, Technology (based on standards (ISO 19650))

2. **Lean** – Value Stream Map workflows

3. **Automate** – Modelling e.g. Dynamo, Process; RPA
### Standardising our tool set

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**Discipline**

- **Bridges**
- **Structures**
- **Civils**
- **Geotechnics**
- **Highways**
- **Water**
- **Rail**
- **HW Federation**
- **Rail Design Review**
- **HW Design Review**
- **Rail CAD**
- **HW CAD**
Technology, Tools and the Common Data Environment (CDE)

The CDE Process

Example CDE Technology Stack

Digital Tools
Project Data Architecture

Digital Project Management

Digital Rehearsal

Integrated 3D Design
GDF Compliancy Assessment of Projects

Target score set by the business to align with minimum requirement with ISO1960

GDF assessment focuses on bid, mobilisation, delivery and handover

Project Manager and Information Manger attendance required to carry out assessment

### Average Score, Target and Difference

- **Average of Score**
- **Average of Target**
- **Avg Target minus Avg Score**

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<tr>
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### Measures
- 3D Design
- BIM/Digital Contractual Obligations
- CDE Process Utilisation
- Change control
- Checklist, Review, Approve
- Client specifies requirements through an Employer’s Info...
- Common Data Environment CDE
- Content Library usage
- Delivery of non-graphical data, and documents into the ... Design Acceleration Challenge
- Digital Project Management
- Document/Model Referencing, Version Control and Status
- DfP - LOI/DLO
- Financial Benefits of implementing DDP
- Invert (Disciplinary Check IPC)

### Locations
- Birmingham
- Cardiff
- Chelmsford
- Edinburgh
- Epson
- Glasgow
- Stockton-on-Tees
- Warrington

### Markets
- (Blank)
- Local Transport
- Strategic Highways
- Strategic Railways

### Current State
- HD Stage
- Complete
- Design Development...
- Handover Stage
- Mobilization Stage

### Project Number
- S152358
- S152671
- S153691
- S148016

Contains sensitive information
Progress to date & plan

2017
PAS1192-3 Kitemark Digital Project Delivery

2018
Level 2 Kitemark Digital Delivery Process

Mid 2019
BIM Kitemark Global Design Framework

Late 2019
Level 2 Kitemark Global Design Framework

India

Middle East

UK