

10 steps to BIM for infrastructure

Put your team on the path to successful BIM adoption



Begin the journey

Introduction: Begin your journey to BIM

Building Information Modeling (BIM) is fast becoming the expected process for planning, designing, building, and maintaining infrastructure worldwide. You see that reflected in BIM mandates, such as the requirement that public projects in the United Kingdom will require the use of BIM by 2016¹, and the European Union's recommendation² that member states use BIM to deliver public projects. Many in the infrastructure arena are finding that their private sector clients prefer to work with BIM-enabled partners, too.

Once a client experiences BIM on a project, it's hard for them to go back. Why? BIM is a process that revolves around intelligent, 3D models that can be used throughout the life of an asset. With BIM, coordination and collaboration become easier. Better decisions are made earlier in the process. Projects progress more quickly. And BIM can reduce the kinds of issues that increase costs and lead to delays during construction.

It's time to move your organization to BIM, and this eBook can help you get started. While you can't move your entire organization to BIM overnight, moving to BIM may take less time than you think. Thousands of organizations like yours have made the switch. You can get started on your own path today by following the 10 steps outlined in this eBook.



¹ <http://www.bimtaskgroup.org/about/>

² <http://www.building.co.uk/eu-overhauls-ojeu-procurement-rules/5065970.article>

Get to know BIM

Step 1: Get to know BIM

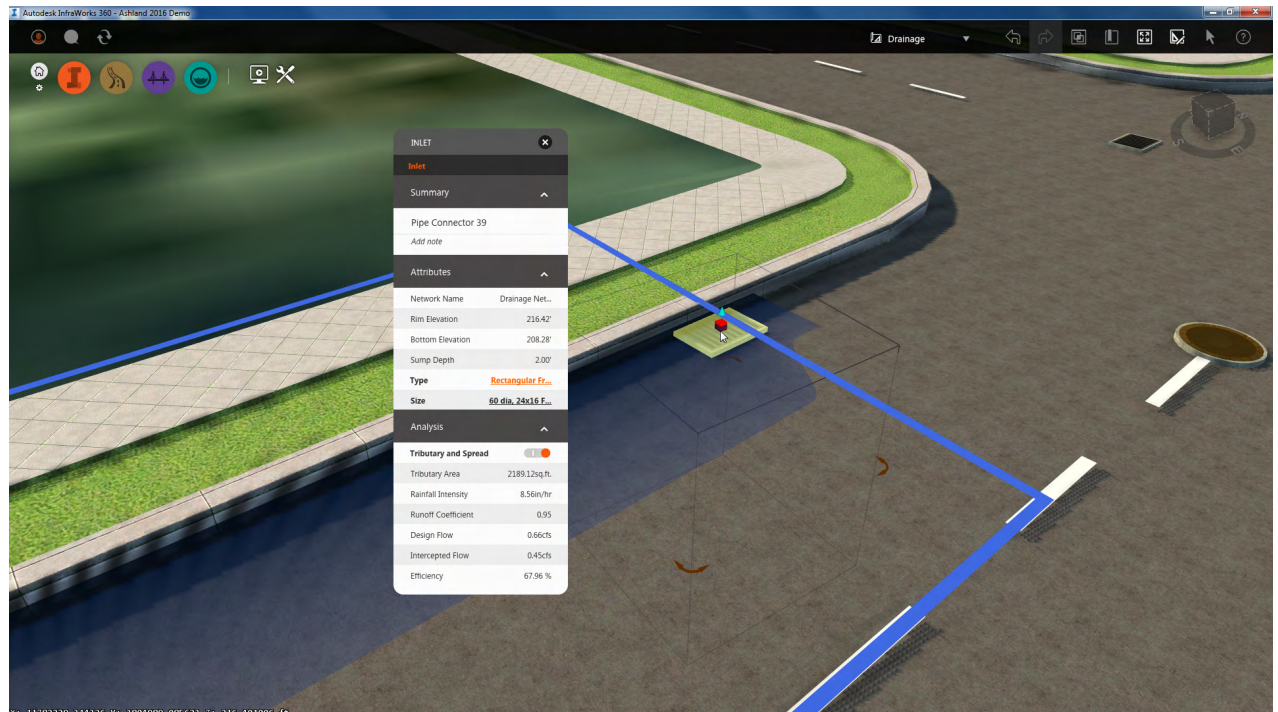
Designate one or two people at the firm to learn more about how BIM will affect the way your team works. Learning more about BIM software tools is a common starting point, but BIM is a process—not software. It's important to take a look at how it will alter the way you work.

Beyond just looking at technology, suggest that your team talk to peers in the industry who already use BIM on infrastructure projects. Conversation starters with current BIM users include:

- How has BIM changed your workflows?
- What's surprised you the most about the BIM process?
- Where are you seeing the most benefit from BIM?
- What advice would you give to an organization transitioning to BIM?

Your designated BIM “researchers” may make some interesting discoveries. For instance, there's a common misconception that BIM means 3D. While the intelligent models you create as part of the BIM process are 3D, not all 3D design is BIM. Intelligence is an essential component of the BIM process; it's not just the use of 3D visualization.

In BIM, you define objects and the relationships between objects, making the elements within the model intelligent. This is at the root of one of the biggest differences between BIM and 2D or 3D drafting: the BIM process is dynamic. Make a change to a roadway profile, for example, and the whole roadway model changes.



Communication and tech needs

Step 2: Communicate the change to your people

High-level firm leaders should take a leading role in letting people know the firm is committed to transitioning to BIM. The message is “we are moving to BIM because it’s critical to our future” not “we’re trying BIM.” If people think BIM is a choice, some may choose to drag their feet or try to fit BIM tools into a traditional CAD workflow.

It does take work to move to BIM, and your people need to know what’s in it for them. The idea is to generate excitement. So, even if a mandate is the top reason you’re adopting BIM now, help your team look beyond that external change driver. Communicate the anticipated benefits of BIM for your firm and clients. It will be easier to rally the team around a compelling future vision than by talking too much about mandates. Discuss how BIM can help to:

- Win new work by making it easier to create compelling proposals and attract BIM-savvy clients
- Facilitate data reuse across the life of a project, beginning with conceptual design and planning through design, construction, and operations
- Save time on critical tasks by streamlining workflows and freeing staff to spend more time focusing on innovation and quality
- Improve collaboration by enabling your team to share models with specialists from other disciplines

Step 3: Account for software and hardware needs

BIM isn’t software—it’s a process. Of course, you’ll need software to create the models that drive the BIM process. An end-to-end BIM process will require more than one software tool. Explore design applications, and complementary software and services. For instance, the core BIM design application you choose should connect to the application used to rapidly create concepts that capture existing conditions. Think about the tasks and project phases you want to tackle first, and develop a long-term plan that expands your capabilities.

Hardware may be just as critical to the success of your BIM adoption as software. Older hardware may not be powerful enough to run BIM applications quickly. Make sure BIM users have the computing power they need, and transition less powerful hardware to team members outside the design department.

When you start a project, you should already be thinking about how the system will be built and managed over its lifecycle. You can use BIM to find answers to questions like “How am I going to build this?” or deeper questions such as “How am I going to maintain it cost-effectively?” BIM is the ideal platform for thinking about the whole lifecycle of a built asset.

–Jaap de Boer
INFRANEA

Plan your shift

Step 4: Develop a change management plan

The steps in this eBook can help guide your change management plan, but your plan should also take your way of working and typical projects into account. This plan should document at a high level:

- How your team anticipates BIM changing established workflows
- Who needs training and when they'll get it
- How you'll support people when they have questions and issues

Accounting for training can be one of the most challenging aspects of developing a change management plan. Intensive training for your team might catalyze a rapid transition to BIM; however, a deep training that takes your whole team away from active projects for several days may not be necessary.

Instead, consider designating one or more BIM champions to receive more intensive training. Champions can then become the go-to people for questions. They can also lead short training sessions in-house to help familiarize the whole team with BIM.

Step 5: Document standards

You may have heard that it's essential to have well-defined standards before starting with BIM. You're no longer designing with 2D arcs, lines, and shapes. The objects you use in designs will be intelligent. Every object in your design will contain information about itself and how it should relate to the other objects in your design. Your standards define what objects "know" about themselves.

Establishing standards for everything you do can seem like a daunting task. But there are ways to accelerate the process. Start with a pre-existing library of BIM standards. Select a library with standards that are close to what you use today, and let your BIM champions modify those standards to match your preferences. You may also be able to speed the process by converting existing detail libraries into object libraries.

The standards you need to get started include:

- Model templates that conform to your preferences for how objects are represented
- A library of content that helps models more automatically conform to preferred styles
- Parameter files that can be shared across your team
- Object libraries that contain the basic standards associated with your typical project types

Turning BIM into a competitive advantage

See how Cole Engineering, a civil engineering firm based in Ontario, Canada, successfully transitioned to BIM. After shifting to BIM, the firm began educating clients on the value of BIM—and using BIM to help win more work. [Watch the video.](#)

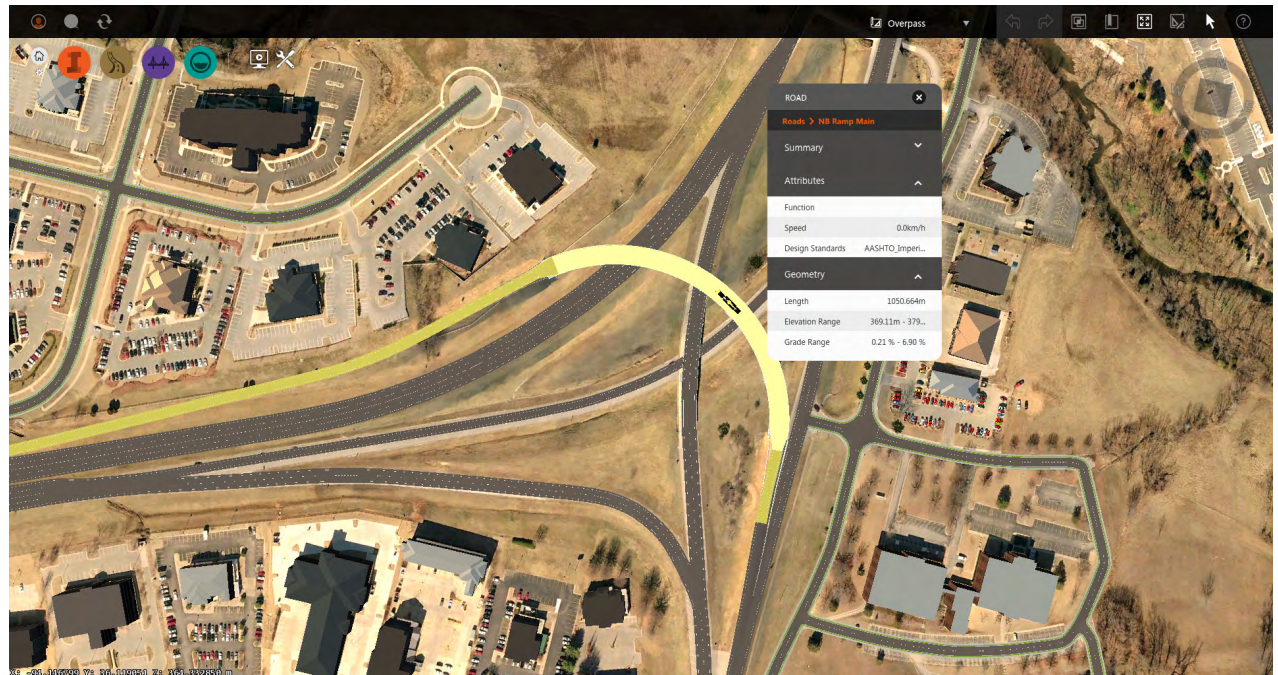
Include BIM on projects

Step 6: Start incorporating BIM on projects

You may know colleagues in other disciplines, such as architecture or structural engineering, who have moved to BIM successfully by running a series of pilot projects. One project team learns BIM on a single project. Meanwhile, other teams stick to 2D processes. For infrastructure organizations, the pilot project model may not work as well.

There are a few reasons why running pilot projects might actually hamper an infrastructure firm's move to BIM. Infrastructure projects tend to last several years. Introducing BIM workflows into existing projects—for instance, using BIM to design the drainage network on a highway project—will help to expose more people to BIM sooner. You'll also see a much faster return on the time you invest in defining your standards.

In addition to adding BIM workflows to existing projects, start several initial BIM projects with your BIM champion or champions taking the lead. You may also choose to migrate a few smaller projects that were started using traditional methods. As these initial projects progress, your BIM users should simultaneously document preferred processes. This is step seven.



Document processes

Step 7: Document preferred processes

As your initial projects progress, have your BIM users document preferred processes. They will notice how workflows change—and often accelerate. Documenting and sharing their observations about how BIM transforms projects will help the rest of your team transition more smoothly. Your project leaders will also want to revisit your BIM standards and modify them to better support your specific projects and preferences.

In your BIM process, there are a few items you should account for that are not typically part of a 2D workflow. You'll want to:

- Establish how much intelligence is required for the objects within a model
- Define how and what data will be used over the life of the asset
- Delineate how and when data will be transferred between project participants
- Consider other uses for the model that may let you expand the scope of services offered to the client, such as analysis, simulation, and visualization



BIM, in its essence, is collaborative. So, if you're not involving all of the participants in the process, you could miss some of the value of BIM.

—Dan Neufeglise
PCL Construction

Transition the team

Step 8: Train and transition the rest of the team

After your BIM champions have progressed on their projects and documented preferred processes, it's time to transition the rest of your team. Even with just a few weeks of real-project BIM experience, your BIM champions may be ready to help their colleagues make the move to BIM.

Help other team members get familiar with the BIM process and tools by having the champions walk through their BIM projects. A step-by-step approach is best.

Consider augmenting this approach with on-site or off-site training from experienced trainers. Make sure power users have the training they need to hit the ground running. Infrequent users can ramp up more slowly, assuming BIM champions and power users will be available to provide coaching and support.

Step 9: Integrate with other models

You'll see the most benefits from BIM when you share models with other firms that are also working in BIM. Many organizations find that integrating models into a single, shared model accelerates the coordination process and opens the door to a new level of collaboration.

Exploring a project from a shared model can give different disciplines a more comprehensive perspective on a project. Different design teams spot and address inconsistencies sooner. This saves everyone on the project time by preventing the rework that comes with an occasional, 2D coordination process.

Take a bridge and road project as an example. BIM lets you share your intelligent model of the roadway design with the structural engineers working on the bridge. You and the structural team visualize the other's vision—and identify clashes—more easily and intuitively. When it's time to begin construction, you can share the unified model of the project with the contractor. People in the field no longer have to grapple with accurately interpreting a 2D view of the project or creating their own 3D views using 2D documentation. They have a 3D visualization to help guide the way they work with the construction documents.

Dig deeper into BIM

Learn more about efficient strategies for defining your standards and documenting BIM processes. *Implementing BIM for infrastructure*, a white paper from Autodesk, explores how you can progress more rapidly through the BIM adoption process. [Read it today.](#)

Expand and innovate with BIM.

Step 10: Expand and innovate with BIM

BIM enables new capabilities and marketing opportunities. Begin to realize the competitive advantages of BIM by communicating the value of the process to current and potential clients. Showcase BIM by including compelling 3D models of projects in your marketing materials, and explaining to clients that BIM can:

- Accelerate the pace of projects by making changes more automatic
- Improve communication and collaboration between disciplines, speeding stakeholder approvals
- Enhance coordination, helping the project team address potential issues in advance of construction, reducing the risk of errors
- Provide clients with an accurate and detailed model of their project for use in ongoing operations and maintenance

Begin at the beginning. As you master BIM processes, add new capabilities. Explore starting projects with existing conditions models. You can create these models rapidly by taking advantage of readily available geographic information system (GIS), aerial survey, and environmental data. Data in common spatial formats can be incorporated into the model with little or no manipulation. You can even “sketch” alternatives that include intelligent objects your design tools will later recognize.

Take the first step

Refer to the steps in this eBook to get started with BIM. Follow the steps in the way that makes the most sense for the types and size of projects you do. The most important factors in a successful move to BIM are to get started with an adoption plan that firm leaders support—and to keep focused on your goal, even if you need to modify the plan along the way.

