



SiteVision on-site viewing proposed services (with permission from Trimble Inc., June 2023).



The convergence of digital and print in landscape architecture

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This paper explores the benefits that digital tools can provide for landscape architects, their clients and the construction team, by transforming the traditional 2D printed sets to a powerful hybrid workflow. At the core of this transition is the integration of digital designs with cloud-based collaboration platforms and high-accuracy augmented reality applications. The combination of these workflows increases productivity, coordination and collaboration during the design and build process through on-site visualisation.

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Introduction

Landscape architecture and construction have historically relied on 2D print sets to convey spatial intent. However, with the transition to digital design software packages like Sketchup, AutoCAD and Vectorworks Landmark, design files can now be viewed in high-accuracy augmented reality workflows. By integrating collaboration tools such as Trimble Connect™ with augmented reality applications like Trimble SiteVision®, designers can overlay 3D designs, building information modelling (BIM), utility data and grading plans on to the physical job site in real time.

Benefits to designers and landscape architects: precision and validation

For the landscape architect, the digital workflow acts as a bridge between the studio and the soil.

- **Single source of truth:** Trimble Connect™ is a cloud-based data environment designed for architects, engineers, contractors and owners to store, share, view and coordinate project data in real time.
- **Real-time contextualisation:** Trimble SiteVision® allows designers to visualise designs, plant maturity, shadows and sightlines at a 1:1 scale before the construction has started.
- **Conflict detection:** By viewing the underground utility layers digitally, designers can adjust the placement of infrastructure or deep-rooted trees to avoid costly subsurface clashes.
- **Iterative freedom:** The workflow allows for design tweaks. If a stone wall doesn't feel right in the digital overlay, the designer or client can add notes to the element within the application, make adjustments to the model and re-sync, saving hours of drafting.
- **BCF Topics (BIM collaboration format):** Rather than taking static screenshots, teams can use BCF files to click on a topic in one program (like Trimble Connect™ or Tekla structures) and instantly jump to the exact location of the issue in another.

KEY WORDS

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Benefits to the client: vision and transparency

The biggest hurdle for the client is often spatial literacy: the ability to understand how a 2D drawing will feel in 3D space.

- **The ‘wow’ factor:** Walking a client through their future garden or outdoor entertaining area using an augmented reality (AR) headset or handheld device provides an emotional connection that a flat plan cannot match.
- **Stakeholder buy-in:** When a client can see exactly where a pergola or deck will sit in relation to their existing structure or landscape, and how it will frame a view, decision-making becomes faster and more confident – see, for example, figure 1.
- **Transparency:** Trimble SiteVision® provides a clear ‘before and after’ comparison. Because clients can see exactly what they are paying for, trust is fostered throughout the construction lifecycle.



Figure 1. Timber framing for designed boardwalk at Lake Wanaka (with permission from Blakely Construction, February 2021).

Benefits to construction workers: clarity and efficiency

The construction phase is where the design is turned into reality. Trimble Connect™ and Trimble SiteVision® replace the ambiguity of 2D stakes with the absolute clarity of 3D visualisation.

- **Eliminate the guesswork:** Before the construction starts, contractors can view the designs in 3D in the office and plan their schedule. Out on site, Trimble SiteVision® allows the construction team to visualise the end product and uncover potential clashes with pre-existing structures.
- **Increased safety:** By visualising ‘invisible’ hazards, such as buried pipes or electrical lines, crews can excavate with significantly higher confidence and lower risk.
- **As-built verification:** During the build, crews can compare the physical progress against the digital model to ensure the project stays within tolerance, reducing the need for expensive re-works. For example, compare the AR design in figure 1 with the photo of the boardwalk’s progress in figure 2.



Figure 2. Boardwalk under construction at Lake Wanaka (with permission from Blakely Construction, June 2021).

The hybrid workflow: Why print still matters

While tools like Trimble Connect™ and Trimble SiteVision® provide an augmented visualisation of the design, and facilitate additional data collection, the printed design and plans will remain a staple in the industry.

Design remains the legal and tactile backbone of the industry. Digital (Trimble SiteVision®) is:

- dynamic: real-time updates and 3D depth
- interactive: great for client meetings and layout
- precise: CM-level accuracy via GNSS.

Print (construction plans) is:

- static: the legal ‘record set’ and contract
- reliable: no require power
- tactile: essential for quick on-site annotation.

Conclusions

The future of landscape architecture isn’t about replacing paper with screens; it’s about interoperability. By utilising tools like Trimble Connect™ and Trimble SiteVision®, the designer validates their vision, the contractor builds with precision, and the clients see their investment come to life. This integrated workflow reduces errors, saves time and ultimately results in a more faithfully executed landscape.

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Declaration of the use of generative AI

During the preparation of this paper, the author used Google Gemini to assist with grammar checks and structural layout. After using this tool, the author reviewed and edited the content as needed and he takes full responsibility for the content of the publication.

About the author



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