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DIGITAL ROADMAP FOR LANDSCAPE ARCHITECTURE

Introduction

Landscape architecture is the profession which applies artistic and scientific principles to the research, planning, design and management of both natural and built environments. Practitioners of this profession apply creative and technical skills and scientific, cultural and political knowledge in the planned arrangement of natural and constructed elements on the land with a concern for the stewardship and conservation of natural, constructed and human resources. The resulting environments shall serve useful, aesthetic, safe and enjoyable purposes.

Landscape architecture may, for the purposes of landscape preservation, development and enhancement, include: investigation, selection, and allocation of land and water resources for appropriate use; feasibility studies; formulation of graphic and written criteria to govern the planning and design of land construction programs; preparation, review, and analysis of master plans for land use and development; production of overall site plans, landscape grading and landscape drainage plans, irrigation plans, planting plans, and construction details; specifications; cost estimates and reports for land development; collaboration in the design of roads, bridges, and structures with respect to the functional and aesthetic requirements of the areas on which they are to be placed; negotiation and arrangement for execution of land area projects; field observation and inspection of land area construction, restoration, and maintenance.

Landscape industry professionals design, build, and maintain healthy green spaces in communities across the country including backyards, sports fields, parks, gardens, outdoor living spaces, green roofs, and more around homes or office buildings, hospitals, schools and other facilities. Some companies work with residential or commercial clients or a combination of both, but all landscape industry professionals contribute to creating outdoor spaces that strengthen the fabric of their communities.

Size of the Landscape Industry

The career outlook for professionals in the landscape industry is very strong. Data from the IBIS World November 2019 Landscaping Services Industry Report shows that the landscape services industry has annual revenues of \$99 billion, employs more than 1 million people and represents 513,305 businesses.

Why Landscaping Matters

Landscaping can have a positive effect on the environment in which we live. An analysis of the environmental impact of the landscape industry indicates the following benefits:



Clean the air. Grass and plants play a vital role in capturing dust, smoke particles and other pollutants to make our air cleaner. In fact, lawns alone capture more than 12 million tons of dust.



Protect bodies of water. When lawns are well cared for, they absorb unhealthy water runoff that might otherwise filter into bodies of water. It may be surprising to learn that an average, healthy lawn can absorb more than 6,000 gallons of water from a single rainfall event.



Provide oxygen. Grasses absorb carbon dioxide and break it down into oxygen and carbon. In fact, a 50'x50' lawn produces enough oxygen for a family of four.



Act as natural coolants. Lawns can be 31 degrees cooler than asphalt and 20 degrees cooler than bare soil. Trees shading homes can reduce attic temperatures by as much as 40 degrees. These natural coolants reduce the need for electric cooling units, saving energy and reducing electric bills.



Minimize noise. Lawns and plants dramatically reduce noise pollution; they can reduce noise levels by 20-30% over hard surfaces like concrete and pavement.

Digitalisation in Landscape Architecture

The landscape architecture profession is in a unique position to apply both creative thinking and scientific knowledge to the complex environmental and social challenges of the modern age. Digital technologies are now critically important in crafting the most sophisticated, intelligent designs and I believe they are essential to the creation of dynamic and responsive forms.

Computer-aided design (CAD) began to emerge in the 1980s but it wasn't until the following decade that it became influential to the landscape profession.

Digital technology provides the kind of spatial and experiential insight that 2D planning simply cannot match. Digital technology places you within your design and enables you to test ideas against a site or against other information where digital technologies help to produce better design outcomes.

If you're designing a large freeway, for example, a plan in sections cannot tell you about the experience of driving on that road at 100km an hour. Digital technology, however, allows you to move through the design at high speed so you can test the impact of your ideas. While we remain in control of our designs, technology becomes a kind of co-creative partner.

Landscape architects can use virtual reality to communicate to stakeholders. This is another key benefit of digital technology – it enables landscape architects to use 3D designs and virtual reality to communicate with clients and the community. This is especially important for projects located within highly urbanised environments with a high level of integration between architecture and landscape.

While digital technology allows us to communicate designs in more meaningful ways, its key benefit is in the design-generative outcomes. 3D modelling helps us to not only visualise but to generate complex surfaces and forms.

Example: The Victorian Desalination Plant & Ecological Reserve is a good example. In order to reduce the environmental impact of the plant, the design needed to address issues of visual intrusions and noise while also protecting the coastal and marine environment and the recreational appeal of the adjacent coast reserve. Using terrain information provided by civil engineers, a 3D model with parametric software was developed. This model provided an essential overview of the interconnecting elements of this large-scale project and became the only representation that could communicate the entirety of the project to the respective stakeholders. This allowed the landscape architect to demonstrate not only new roles but also new capabilities of the landscape architecture profession.

Digital technology also gives landscape architects a greater voice at the planning table; it allows them to be proactive and influential and it facilitates greater collaboration. Much has been said about the advantage of BIM software, like Autodesk's Revit or Vectorworks Landmark, in documenting the entirety of a project in 3D. While there are still shortcomings in the way landscapes can be modelled, one of the biggest benefits to its implementation is more unencumbered collaboration. When teams can see changes to a site quicker, they can react and work more efficiently. Cooperative design with consultants that may be located all over the world is more and more common in this digital age. Beyond meetings, designers need to see how their decisions are reflected in the work of other trades. That being said, *Digital Technologies* is quick to point out that there are deficiencies to current BIM integration. The authors warn of reduced design development down to "the assemblage of objects provided by the software toolbox – adding a further bureaucratic layer to design." BIM also makes designers ultimately rethink their role entirely. Traditionally, architects have become more and more removed from construction. Better integration may allow us to patch that gap moving forward.

This was the case in the Yagan Square project in Perth. At just over one hectare in size, Yagan Square serves as a major civic space – it combines an urban mall, play areas, public art and market hall retail spaces and the design integrates a terraced landscape with architecture. Contractual obligations meant that the entire design had to be delivered using Building Information Modelling (BIM) software. This allowed them to collaborate with the architects and share information within an intelligent, virtual model. The modelling was created in the design application Rhino, which also allowed them to collaborate with artists involved in the project and to generate the contoured form. This model was then fed into the final documentation in the BIM application, Revit.

Digital technology represents an evolution in landscape architecture's design thinking and design processes. Beyond 3D parametric modelling, digital equip landscape architects have now started to customise technology for their own practice by coding to generate form and environmental analyses. Landscape architects have always taken off-the-shelf digital products and customised them to their own needs and they are now taking this a step further through software programming.

BIM Software in Landscape Industry

Although most BIM software is not intended for landscape architects, using it for site modelling can help save time and money on projects.

The usage of BIM software can also help landscape architects to improve their collaboration with architects and civil engineers.

There are two fundamental principles which determine whether software is suitable for use in a BIM project, i.e. the object-based design and information exchange.

BIM processes are based on these key software functionalities. Object-based design connects information describing an object with the geometry by which it is visually and spatially defined.

Information exchange, or interoperability, is the capacity to work with and share information with other software packages, without any loss or change to the information. Parametric functionality is also key to BIM processes, in which a change made to one aspect of an object is cascaded to every view of that object, allowing greater control over the form of objects and their associated information. There are many parametric software solutions, and many drafting packages allow the use of parameters. Software used as part of a BIM process has some other specific characteristics. First, it is intelligent, in the sense of an interaction between an object and the data defining it—for instance, allowing the modelling of a tree's growth over time and its interdependence with other trees.

Intelligent software can also set rules to be applied automatically on the implementation of a design, giving the designer a warning if constraints are broken during the design process. A second key software characteristic is enabling simulation and the creation of 3D.

This combination of graphics and information is vital to producing a virtual asset that can be used throughout the project's life cycle. Simulation allows the modelling of some critical features, such as climate, heat and movement.

It can enable rapid calculations and better-informed decision-making. Software used in BIM is moving towards virtual design that accurately represents a physical site, and 3D models are often envisaged as the ultimate BIM tool. Modelling objects with their own attributes means that when one type of object is changed, every instance of that object will also be changed accordingly. The quantity of data that can accompany objects means that the range of design and analysis functions available is constantly expanding, serving to deliver the principles and aspirations of BIM still further. The underlying technology within software tools determines their effectiveness in a collaborative project environment. Database functionality requires that objects are classified in a database, which should be arranged semantically to allow queries to be run. Uniclass 2015 is the classification system required for BIM Level 2, but there are a number of other classification systems being used across the construction industry. Information management functionality should allow the syntactic and semantic association of objects and the interoperability in information exchanges between other packages and users, as well as internally.

Uses of BIM software capabilities

The uses of BIM concept offers a helpful perspective on how software may be used in BIM projects, categorising operations by function under the headings of gather, generate, analyse, communicate and realise. This classification of aspects of a BIM-enabled workflow highlights the role of technology within the design of built environment projects; a package that creates a 3D model from a point cloud survey can be part of a BIM process as much as a digital tool for creating planting schemes, or performing cost calculations.

Gather

Gathering is the capture of information about a facility or landscape, which allows the measurement and identification of objects and enables the management of the BIM process. Software processes that can collate and interpret surveying data are one example of the gathering functionality. For example, a project team that has gathered information about a proposed development can do an early quantity take-off, enabling cost management processes to begin sooner.

Generate

Generating refers to placing specific elements into a design, from plotting general features such as topography to individual objects such as street furniture and planting. This process includes defining objects and their position, as well as specific details such as performance requirements. Objects are generated at a specific Level of Detail and for a specific phase of the project; for example, the placement of planting or hard works within the landscape.

Analyse

An exciting aspect of BIM analysis is the ability to predict an asset's performance in use, before construction actually begins. This can show how a design will be used or how it will work within its environment in many ways; for example, water flow as run-off and within piped runs, slope analysis, aspect analysis, hill shade analysis, Zones of Visual Influence, sun and shade analysis, rainwater collection volumes, parking capacity, crowd simulation or vehicle simulation. Understanding climatic factors and usage of the site in the design stages helps ensure that designs are fit for purpose, although it is important to remember that analysis offers likely scenarios not certainties. These types of analysis can help the employers team and future users of the site to understand an asset's design better, and facilitates more useful feedback throughout the development process. Analysis can also show whether a design is proceeding correctly, and identify clashes within designs.

Communicate

The communication functionality of software in BIM projects means that every stakeholder in a project who needs information can access it. Information exchange is fundamental to BIM and facilitates many of its other functions. For instance, generating visualisations, whether static, animated or interactive, provides a realistic representation of the asset and enables the employer to assess or demonstrate its intended use. Software can also generate images to display data visually.

Realise

Realisation refers to the physical creation of an asset and the various elements that make up the whole. Software can provide the necessary information in the right format to the correct standard to enable off-site fabrication or the on-site assembly of design components or systems, for instance, as well as clash detection. It also allows construction tasks to be streamlined, such as scheduling contractors' work on site for the smoothest operation.

Software tools for landscape

These categories of BIM capability are applied in this section to software that is commonly used in landscape practice, along with some BIM-specific tools, identifying functionalities required for landscape BIM projects.

Landscape architecture software

Landscape-specific software provides the landscape practitioner with the tools to design planting schemes and hard works, including the specification of materials and positioning of objects. The ability to apply simulations can demonstrate how plants and trees develop over time, for example, and 3D representations can demonstrate the design intent. The requirement to produce traditional 2D project documents within BIM Level 2 projects is met by these packages. Landscape tools also need to meet supply chain information requirements, including the capability to use manufacturers' or

suppliers' information, as well as providing relevant information in a usable format for contractors and landscape managers .

Geographic Information Systems (GIS)

GIS is primarily an analysis tool, providing the facility to apply customised algorithms to multiple spatial datasets, which can be used for site context analysis, and as part of wider master planning and regional development strategies. It can be used at regional level to monitor the impact of development, or bring together a number of developments within an asset portfolio. At site scale GIS can monitor how the site is used and responds to its environment over time. This can provide insights into site performance and enable the identification of changes or enhancements to allow for different conditions on site, such as management of areas prone to flooding, for instance. Although traditionally a 2D package, GIS is increasingly able to incorporate 3D model information and combine geographic datasets with BIM information and imagery to enable visualisation.

Geodesign tools

Geodesign tools can generate masterplans at site and super-site scale to develop options and analyse them against a site's context. The ability to prescribe the size, materiality and location of proposed development types within a landscape context gives geodesign tools an extra dimension to GIS. For example, placing 3D realistic wind turbines in the landscape for the purposes of a Zone of Theoretical Visibility enables a more realistic representation of the visual impact of such a development. This capability is augmented by the ability to generate road, water and flora 3D objects from 2D mapping data and overlay these on 3D topography.

Specification software

Specification software works with authoring tools to provide information about the installation and management of objects. As various materials and techniques are proposed by designers and contractors, the specification can be used to check whether these materials meet requirements. The provision of relevant information in digital form to project managers and contractors for planning and managing workloads improves oversight of a project and ensures that the latest standards are implemented.

Specific software should be able to exchange information with other tools used in the BIM workflow, with the capability to input design information and apply classification to objects as required. It should also be able to communicate this classification information to facilitate cost and therefore the classification of specifications required. This information should then be communicable to other software packages such as asset and facilities management packages, databases and spreadsheets.

Cost management software

Various cost assessment tools can be used within the workflow to determine construction and maintenance costs, based on materials and site information. A system must be able to gather quantified information in automated form about the materials and objects on site, and classify them by space, zone and region according to the site designations specified within the project COBie. (COBie is the exchange mechanism that enables information to be delivered across the life cycle of the asset) This can be used to assess the initial site development costs, and then handed over to the management team as part of the Asset Information Model (AIM) for ongoing site costs monitoring. The analysis capabilities within the cost assessment and simulation process can forecast site costs from an early stage. Cost management can be coordinated with the project management tools to provide cost prediction milestones to inform the employer's decision points and to monitor progress.

3D BIM authoring software

BIM authoring software should be able to gather and incorporate existing site information, including geometry, project-relevant material and asset information. Applying properties to BIM objects within the tools allows elements of the objects to be specified; for example, price information or embedded carbon. Classifying spaces by assigning them to named zones or regions in a design can allow quantity and cost to be allocated by sub-space, enabling improved cost and project management. The software should be able to produce the appropriate level of graphical and information detail for each specific stage of the project. It should be possible to position design objects in 3D or based on rules with respect to one another, with site elements prescribed, arranged and sized so as to meet the performance requirements. Analysis should be possible within the software, or it should offer the option to share information with other packages to allow analysis for additional technical services provided by the project team.

It should be able to determine whether a design meets requirements through assessment against performance criteria; for example, checking whether a footpath meets the correct slope requirements. Where relationships between objects are defined during design, these too can be tested for compliance. Making information available to other software packages is a key activity of a BIM authoring tool. It must be able to export and import geometry and information relating to the objects being designed, enabling the design team to work collaboratively with the rest of the project team. It should provide a realistic representation of the site to allow project stakeholders to engage with the design, with a clear indication of materials and the spaces created, as well as diagrammatic representations of objects within traditional design views such as sections, elevations and orthographic views. BIM Level 2 requires 2D outputs from files, so the software needs to be able to produce the drawn information. In terms of realisation, BIM-authored information should be usable as part of the Project Information Model (PIM) and Asset Information Model (AIM) to enable the construction of the asset components and their management, respectively.

BIM viewing and review software

BIM review and viewing software brings together models in a federated form to coordinate information and resolve spatial clashes. The ability to coordinate files from different professionals is key to its success as an analysis tool, validating designs in relation to one another within the same 3D environment and identifying issues for resolution.

COBie software

COBie provides for the maintenance requirements for specific objects, with the hosting software highlighting the appropriate management of scheduled tasks. It also provides a useful source of information on as-built assets so that managers can replace items correctly and easily when needed. By providing a standardised format for information, the COBie can enable the visualisation of analytics based on the whole site's performance. It can be used to control and regulate the construction process as it serves as the central repository for information on all planned works for maintainable assets. COBie can be managed in different software packages; a spreadsheet is appropriate for COBie in table form, whereas a database should be used for XML. COBie can be exported from within BIM authoring tools or by altering other files to match the COBie structure. Assigned by space, zone and region, objects should be classified in terms of both their location and their association with a component, system or assembly, so they can be filtered and analysed within these terms.

Common Data Environment (CDE)

All consultants should be working from the latest versions of files, so a common platform for version control should be established that meets the project's agreed standards. All project information is available on the CDE, a highly transparent project management tool where all activity on files is recorded, providing auditability and robust version control.

Clash detection

Also known as clash avoidance, this is the process of examining different project teams' models and identifying any overlaps or interfaces that require changes. When the virtual model is correct, the likelihood of discovering that designs need amendment or of costly mistakes being made in construction is greatly reduced—one of the major benefits of BIM. A user can perform intra-software clash detection, importing another consultant's model into the same package with which it was created, and clash-detecting within that software. Extra-software clash detection can be used when working between different packages, using specific clash detection software. However,

manual clash detection is essentially the norm. While software can semi-automate the process, clashes still require identification and interpretation by an experienced professional inspecting the interfaces of their work with that of other consultants. Clash detection activities should be planned as part of the process of establishing the requirements of a BIM project at every stage.

Digital Plan of Works

BIM Level 2 requires the ability to manage information deliverables and their content, as well as responsibility for completing or feeding into them. The BIM Toolkit allows tasks to be allocated on a stage-by-stage basis according to the RIBA Plan of Works. Tasks may be assigned to one consultant within this process using any classification system for the numbering of tasks and Uniclass 2015 to choose the objects to be created. It also includes a Level of Detail option for every element that defaults to the LoD appropriate for the stage in which the task is assigned. The Toolkit is intended to serve as a reference point for the tasks assigned rather than a project management tool, although it does include a number of features that enable the project team to make notes and comment on tasks and deliverables.

Buyers Guide

Landscape management software

Landscape management software is any computer or mobile program that helps a landscaping business run efficiently and maximize cash flow. Most business software marketed toward landscaping companies provides a similar range of features detailed below:

Scheduling

Manages employee timesheets and schedules clients for one-time or recurring services. Most business software will automatically arrange a schedule for maximum workflow.

Job Tracking and Management

Assigns employees to specific jobs and tracks their hours worked to provide accurate pricing to customers.

Customer Relationship Management (CRM)

A set of tools that help you keep track of your lawn care company's relationships with new clients and reach new customers. Service history tracking, complaint management, and communication all fall under this umbrella.

Invoicing

Tracks all services performed for a customer's account and sends bills to customers automatically upon completion of service.

Route Optimization

Creates the most efficient route to perform all jobs on a daily schedule. Eliminates wasted time and fuel costs. Some software will update routes for delays and cancellations in real-time.

Equipment and Inventory Management

Keeps track of your lawn care machinery and inventory of supplies. Some software can send notifications when equipment is due for maintenance or inventory needs a resupply.

While some business software incorporates elements of landscape design, landscape design software provides a different set of tools. Some of the software on this list can integrate with programs like AutoCAD and Sketchup to provide digital plans and blueprints. However, if your company handles large projects you will likely need separate landscape design software.

Depending on the size of your company and the features you need, landscaping business software can cost anywhere from \$60 to \$400 per month. Some software services offer multiple pricing plans with different sets of features, and others charge based on the number of technicians using the software.

Selected Mobile Apps for Landscape Architects That Make Life Easier

These selected 10 apps for landscape architects have grabbed the spotlight in recent years as innovative problem-solving tools that make life easier for landscape architects and other AEC professions.

Innovative tech solutions from 3D printing to project management tools and drone-based monitoring systems are revolutionizing the way landscape architects work. These tools allow them to optimize their workflows, increase ROI and communicate better with clients. Since the advent of the smartphone, app developers have been rolling out small, nimble tools that tackle all sorts of problems professionals encounter on a daily basis, both in the studio and on the construction site.

These 10 apps for landscape architects have proven to be extremely useful across different aspects of the profession. They are intuitive, enhance collaboration and can integrate well with the most popular design software solutions used in the AEC industry.

Selected Mobile Apps for Landscape Architects:

1. Morpholio Trace

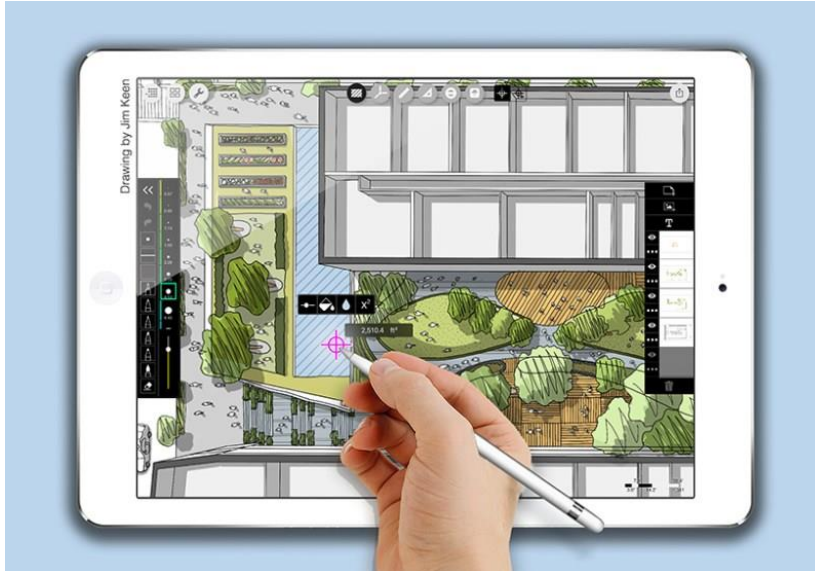


Figure 1: Interface of the Morpholio Trace App mobile software

2. ArchiSnapper

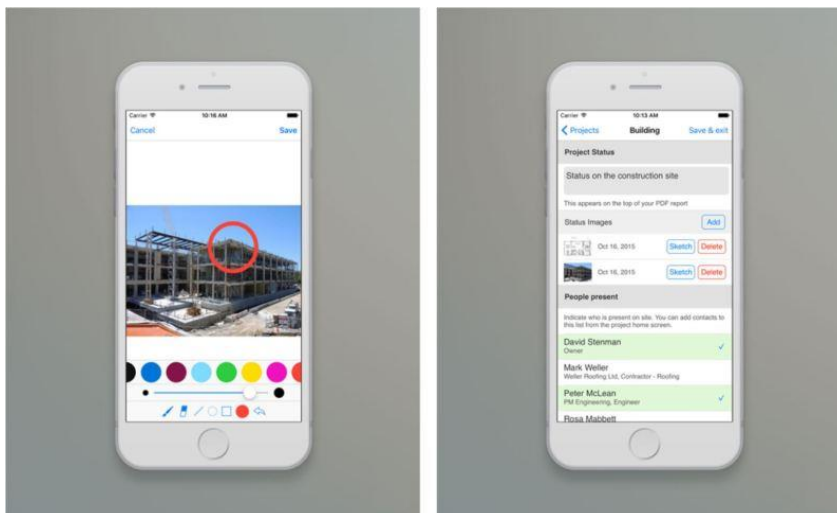


Figure 2: Interface of the ArchiSnapper App mobile software

3. Drone Deploy

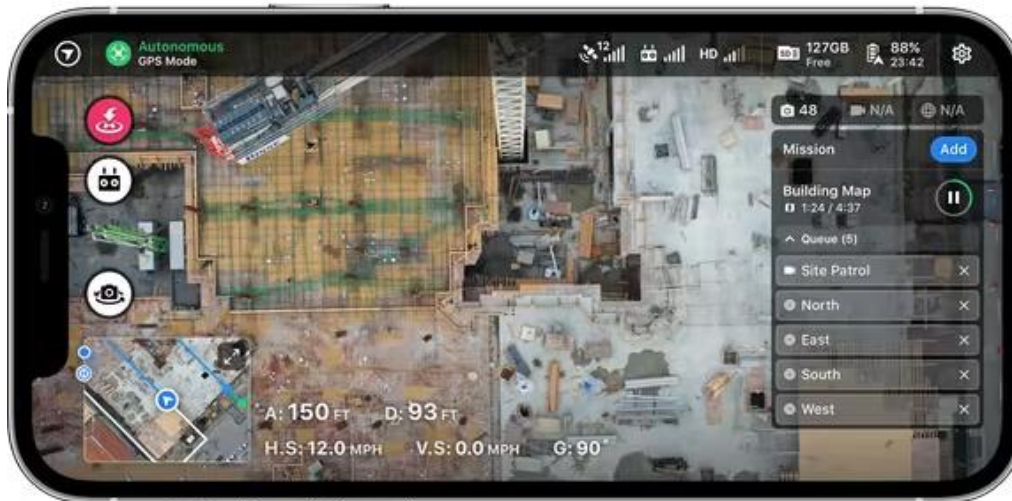


Figure 3: Interface of the Drone Deploy App mobile software

4. PlantSnapp

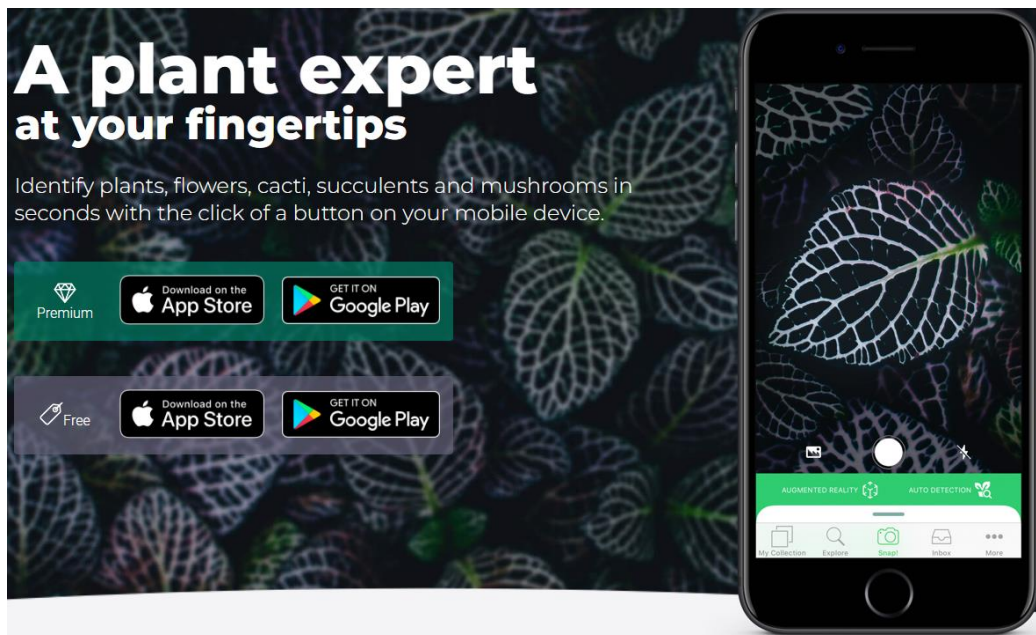
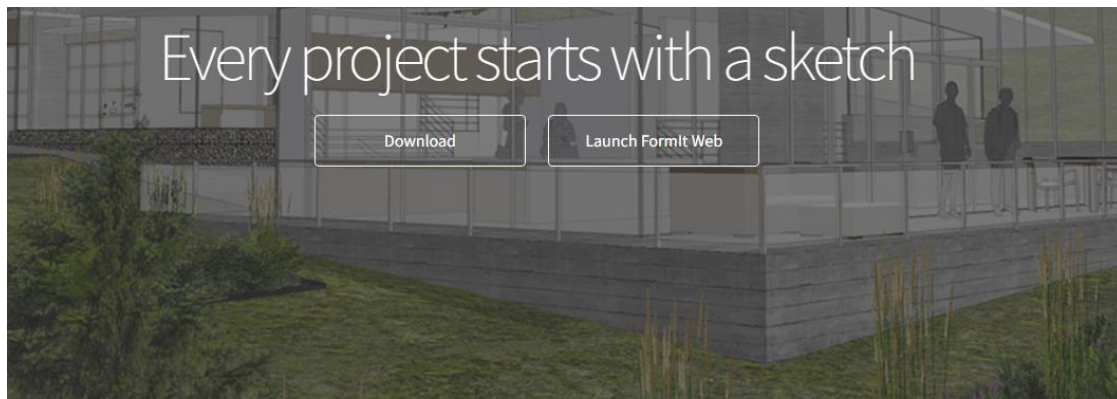


Figure 4: Interface of the PlantSnapp App mobile software

5. Autodesk Formit



Introducing FormIt 2023

Revit linking, Edit in FormIt button, 2-point perspective, graphics improvements, major performance gains, and more!



Figure 5: The Autodesk FormIt App mobile software

6. Autodesk SketchBook



Figure 6: The Autodesk Sketchbook App mobile software

7. Sun Seeker

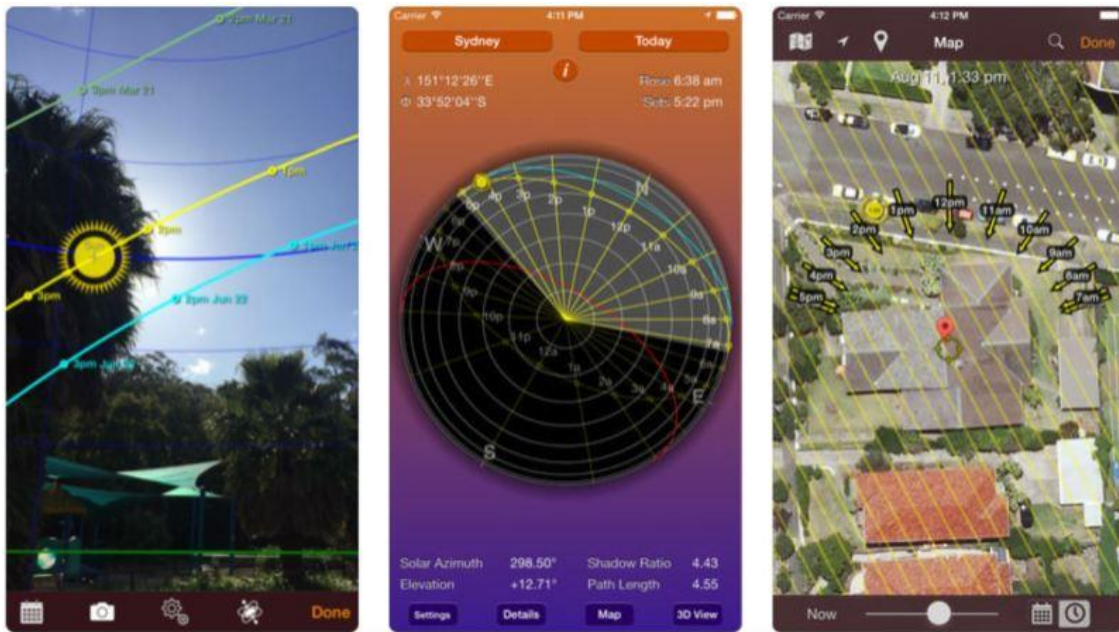


Figure 7: The mobile phone interface of Sun Seeker App mobile software

8. Clinometer



Figure 8: The mobile phone interface of Clinometer App mobile software

9. Planimeter

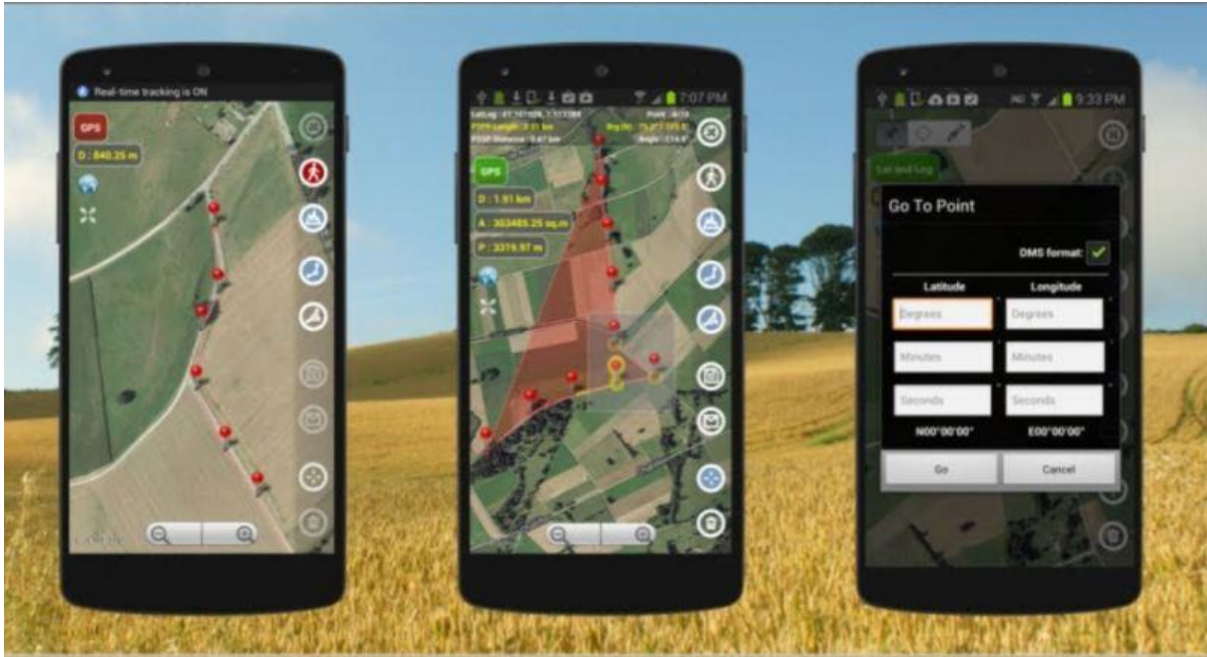


Figure 9: The mobile phone interface of Planimeter App mobile software

10. Scala Architectural Scale

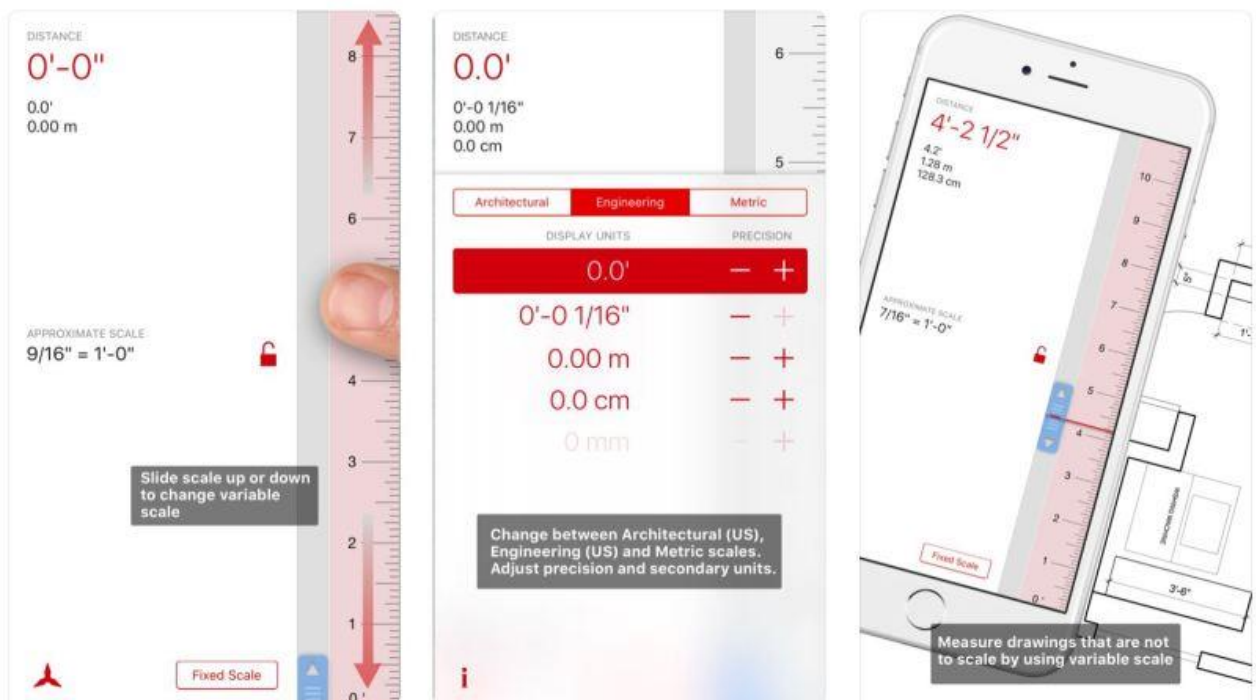


Figure 10: The mobile phone interface of Scala Architectural Scale App mobile software

Comparison Mobile Apps for Landscape Architect

Table 1: Comparison Mobile Apps for Landscape Architect

Mobile Apps	Platform	Capability	Price
1. Morpholio Trace	iOS/ Sketch CAD for Android	<p>Morpholio Trace is perfect for landscape architects who love to create quick sketches with the intelligence and accuracy of CAD.</p> <p>The app allows them to draw on top of imported images and templates, add comments and annotations, and quickly visualize ideas.</p> <p>It provides instant scaling, allows users to create custom entourage, landscapes and graphics, and send or print packages.</p> <p>It includes the ScalePen, a patent-pending technology that checks the drawing scale and zoom level continuously to automatically assign a calibrated set of technical pens.</p> <p>The result is simple but powerful – an array of perfect pen sizes that dynamically responds as you move around, through and into the drawing.</p>	Free
2. ArchiSnapper	iOS and Android	<p>ArchiSnapper is an app for iOS and Android devices which allows users to create and access field reports and punch lists on the construction site, as well as to photograph, draw, sketch, annotate and add comments.</p> <p>It streamlines the creation and organization of construction site data that typically requires the use of several devices and cumbersome process.</p> <p>With ArchiSnapper, landscape architects can automatically generate and edit site inspection reports and share them with their collaborators and clients.</p>	Free
3. Drone Deploy	iOS/ Android Drone friendly App	Drone Deploy is an app that allows landscape architects to collect aerial construction site data and images using drones, upload imagery to create accurate, high-resolution maps and 3D models for detailed analysis, manage hundreds of	Free

		<p>users and connect teams with one-click collaboration and admin tools.</p> <p>Project monitoring thus becomes easy and consistent, with the app helping to improve site planning and quality control, managing assets, and reducing risk on the job site.</p>	
4. PlantSnapp	iOS/ Android	<p>PlantSnapp app is ideal for those landscape architects who need to brush up on their plant identification skills outside the office.</p> <ol style="list-style-type: none"> 1. First take a photograph of the plant, then the app will do its best to recognise it. 2. Once recognised it will give details of name, care information and even where/when it must be planted. 3. Once you've found out what your mystery plant is, you can then buy it through the app from one of their HTA certified nurseries. 	Free
5. Autodesk Formit	Windows, Mac, iOS, Android	<p>Autodesk created Formit as part of the company's Revit software package.</p> <p>The app allows landscape architects to use real-world site information during the early design stage of a project.</p> <p>Formit is an intuitive, easy to use mass-modeling application helping designers make informed decisions while accessing site and climate data. It allows designers to sketch proposed design options that can be compared with program requirements and then shared with the project team for continued collaboration through Autodesk® 360.</p> <p>The Pro version allows users to build larger models and includes built-in Solar Analysis. FormIt started life as an iPad application, but is now available on Windows, Mac, iOS, Android and in the web browser.</p>	
6. Autodesk SketchBook	iOS/ Android	<p>The people at Autodesk believe creativity starts with an idea, and sometimes you never know when this idea might strike.</p> <p>It could be when you're riding the bus, daydreaming in meetings or lectures, or in</p>	Free

		<p>the infamous epiphany-generating bathroom.</p> <p>To make sure ideas are not forgotten, Autodesk developed a “superior drawing experience” through Sketchbook with innovative tools that help you draft like a pro.</p> <p>Other than the pencils, markers, and over 190 customizable brushes, the application has a 16-sector Radial Symmetry and Predictive Stroke that smooths lines and corrects shapes.</p>	
7. Sun Seeker	iOS/ Android	<p>The name says it all. The Sunseeker application provides an augmented reality camera with a flat view compass to track the solar path, its hour intervals, rise-set times, and winter and summer solstice paths.</p> <p>Among its many features, the app uses GPS and magnetometer to find the correct solar position and path for your current location, ability to choose location on Earth, and details including the maximum sun elevation.</p>	Free
8. Clinometer	iOS/ Android	<p>Clinometer allows users to calculate the angle of a slope using a smartphone camera.</p> <p>The app can display the slope in degrees, percentage, or rise over run.</p> <p>It can also be used as a level for simple tasks like aligning a frame or a presentation board.</p>	Free
9. Planimeter	iOS/ Android	<p>Planimeter is another GPS tracking tool that measures land area and distance on a map, as well as perimeter, and GPS coordinates.</p> <p>Not only can you quickly measure lawns, lot sizes, buildings, and paving from a satellite map, you can also measure a specific area by walking or driving around it.</p>	Free
10. Scala Architectural Scale	iOS	<p>A limitless measuring app, Scala Architectural and Engineering Scale provides you with accurate measurements to a printed drawing of any scale.</p>	Free

		The simple, easy-to-use app includes architectural, engineering, and metric scales, and can provide dimensions, even if the scale is unknown.	
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Sketcup Software

Google SketchUp

SketchUp has become a somewhat standard tool for many offices. It's expected as part of most professionals' toolkits. It's proven to allow for quick site modelling and renders. This technology enables the ability to spread the workload among production staff like other typical software like AutoCAD and Adobe products. As a design and assessment tool, it's invaluable. It's also easy to learn and fast so it's well suited for typical landscape architecture firm budgets.



Figure 11: Google SketchUp Rendering

However, there is a need to incorporate more powerful tools that are becoming standard in other 3D modelling applications, like the ability to import LiDar and laser scans, automated modelling, and the inclusion of GIS and similar data. For example, there is UNDET, which allows for the import of LiDar data into SketchUp. But the price is prohibitive at \$3,000 vs. something like AutoDESK Recap 360, which is free.

SketchUp's development philosophy is to let the user and developer community create these tools. This has been great, as there are many amazing SketchUp Extensions, but also challenging, as more robust tools should require the SketchUp teams direct development.

SketchUp and other technologies enabled you to design at large scale. More important, 3D modelling has opened the door for more accurate and powerful simulations and site analysis without having to be at the location. This is an aspect of BIM used often for buildings, structures, and power plants. However, now we are able to simulate traffic patterns for complete streets and pedestrian movement, weather, fluid dynamics, and plant growth.

Furthermore, as more powerful computers become available, and the smart algorithms that come with artificial intelligence and drones become prevalent, we will see another shift in how we work with the landscape. It will inspire new ways to think and design.



Figure 12: Another Google SketchUp rendering

Selected Landscape Design Software



Figure 13: Computer interface of digital software of Landscape Architecture

1. SketchUp

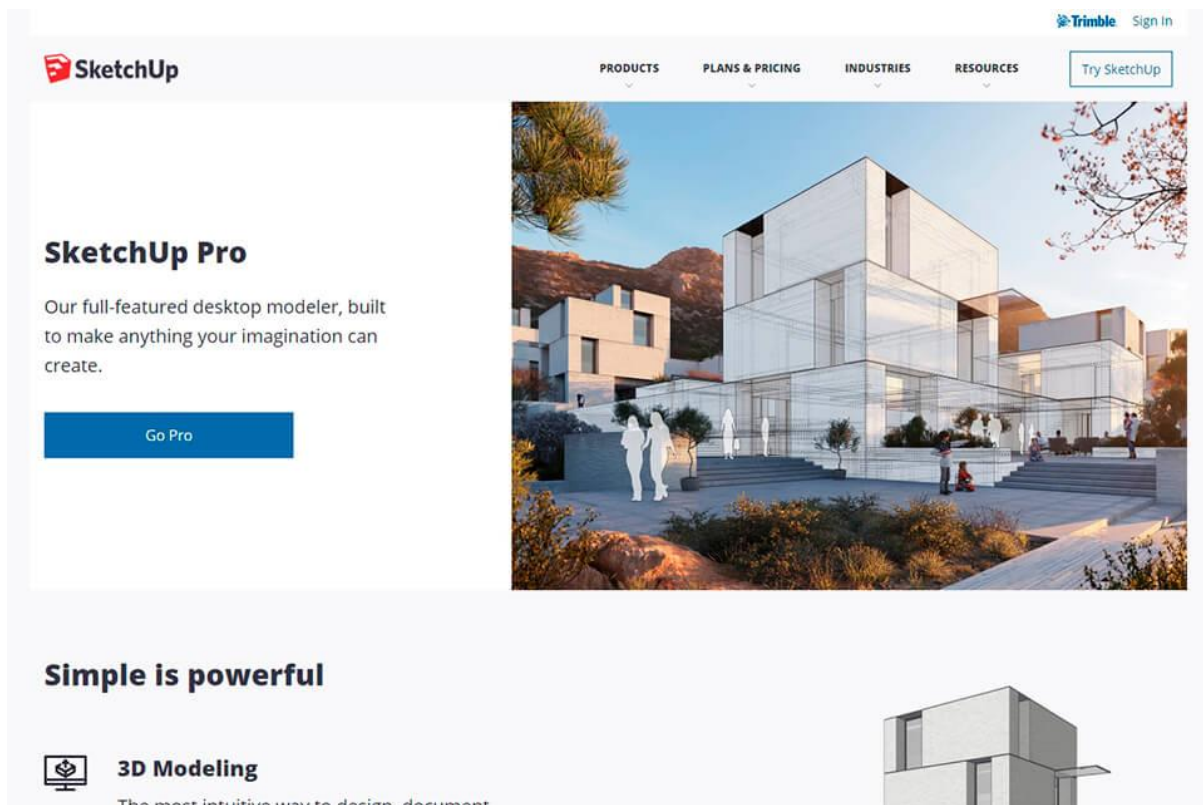


Figure 14: Digital software Sketchup

2. Kerkythea

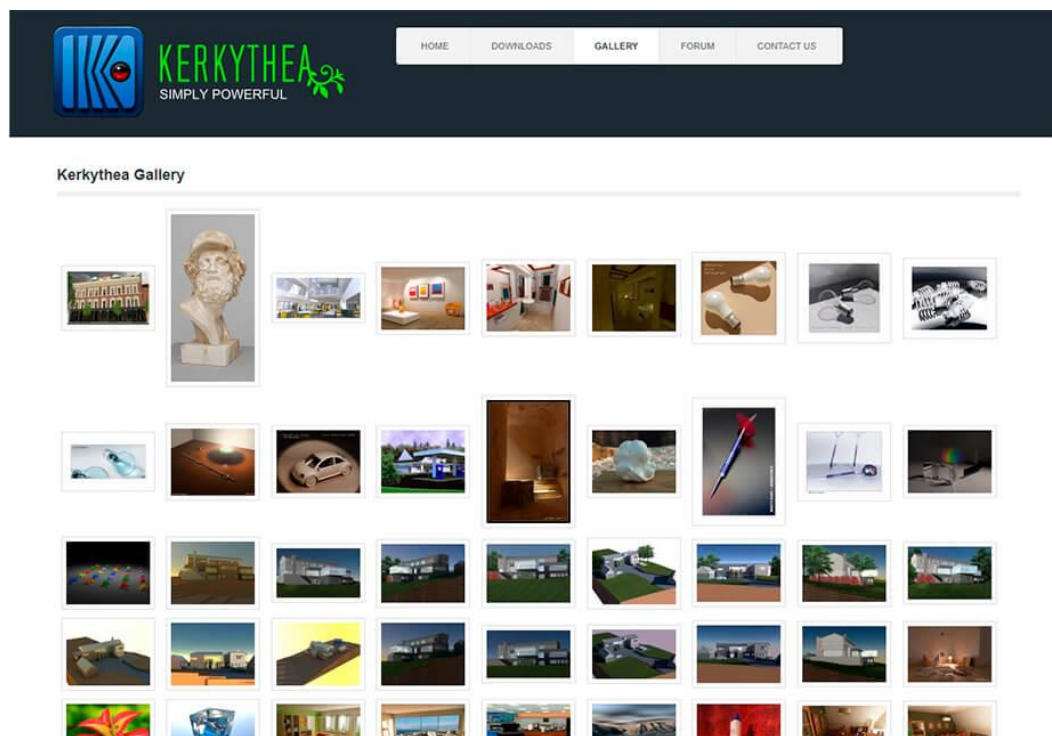


Figure 15: Digital Landscape Software Kerkythea

3. PRO Landscape Home

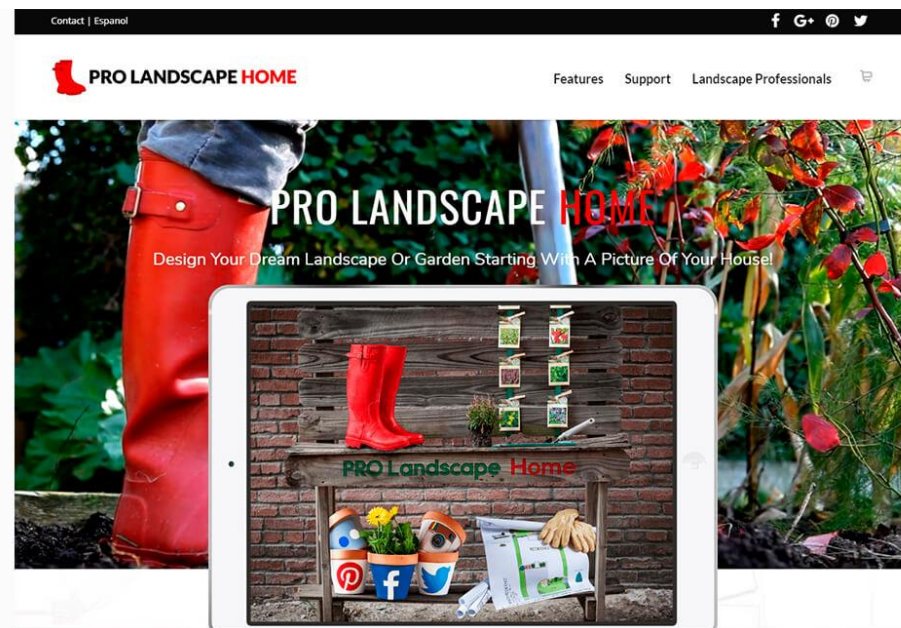


Figure 16: Mobile app Pro Landscape for creating realistic landscape designs

4. Lands Design

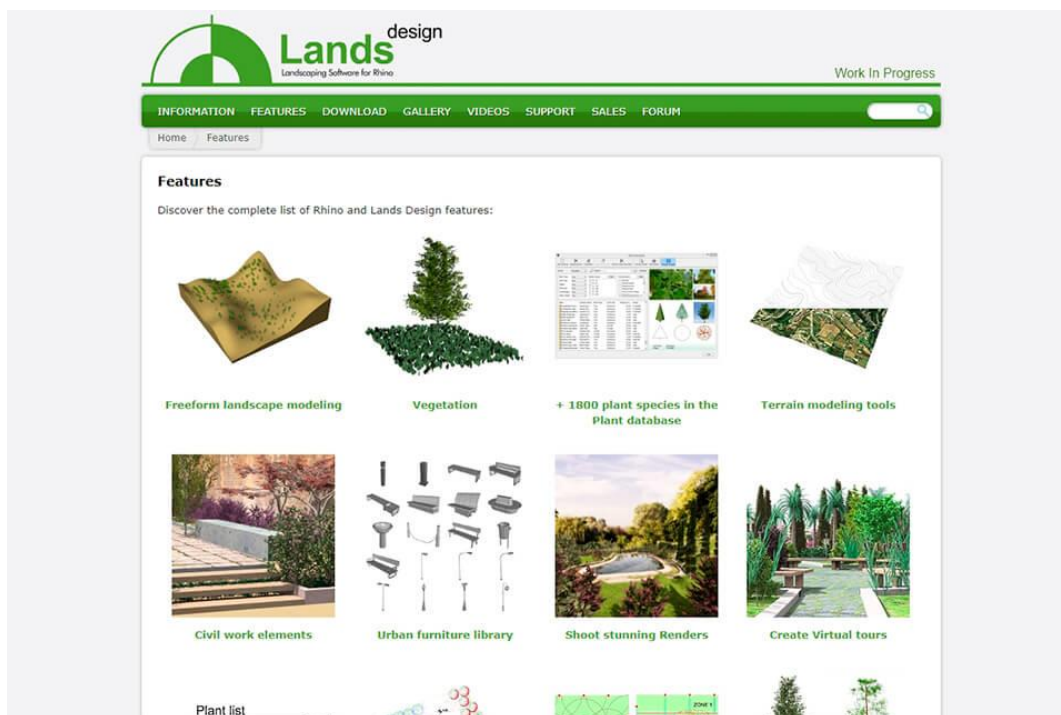


Figure 17: Free digital software Lands Design for creating awesome landscape designs

5. DreamPlan Home Design

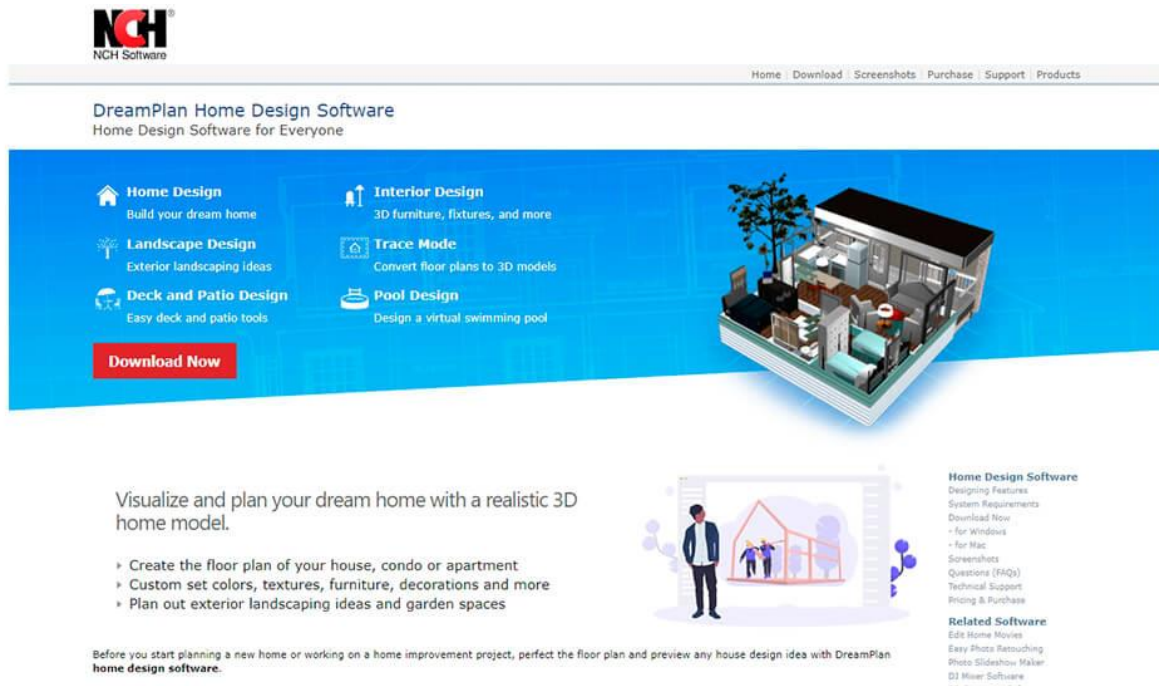


Figure 18: Design digital software, DreamPlan Home Design featuring 2D and 3D modelling

6. Terragen

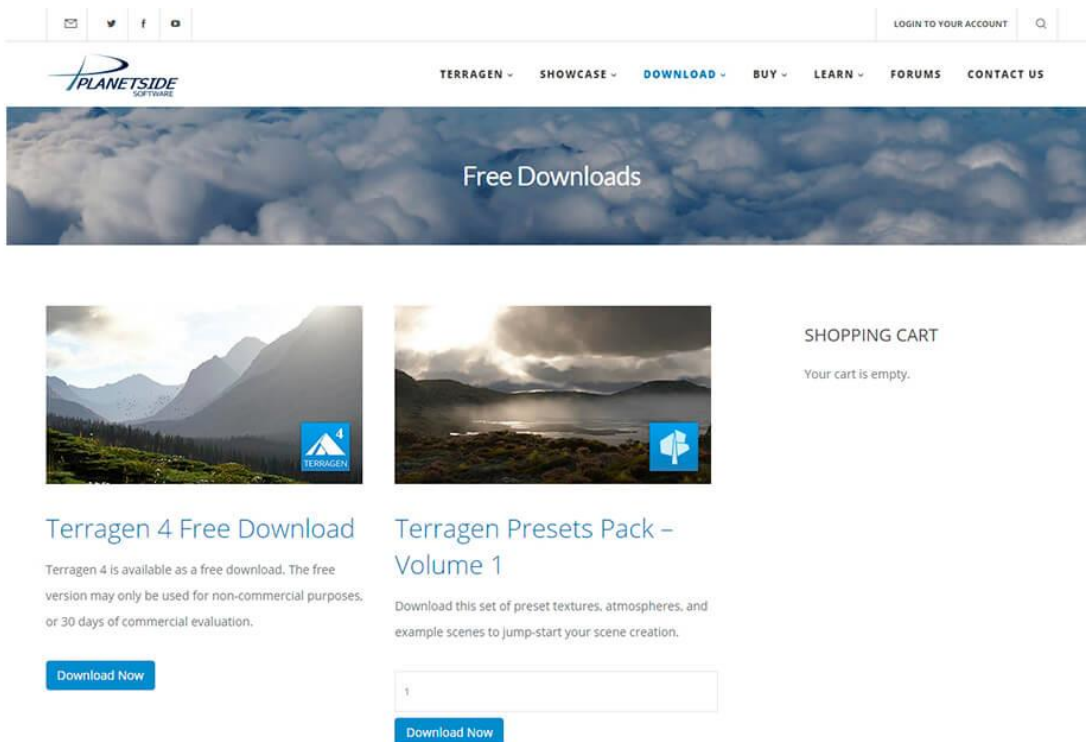


Figure 19: Free landscape design digital software Terragen with AutoCAD files support

7. iScape

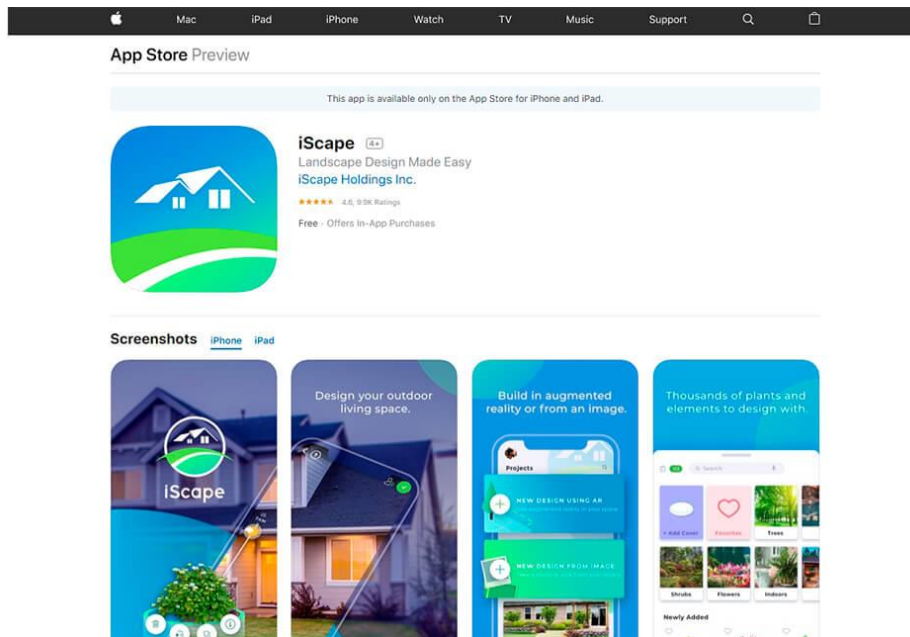


Figure 20: Free design digital software iScape for iOS devices

8. PRO Landscape

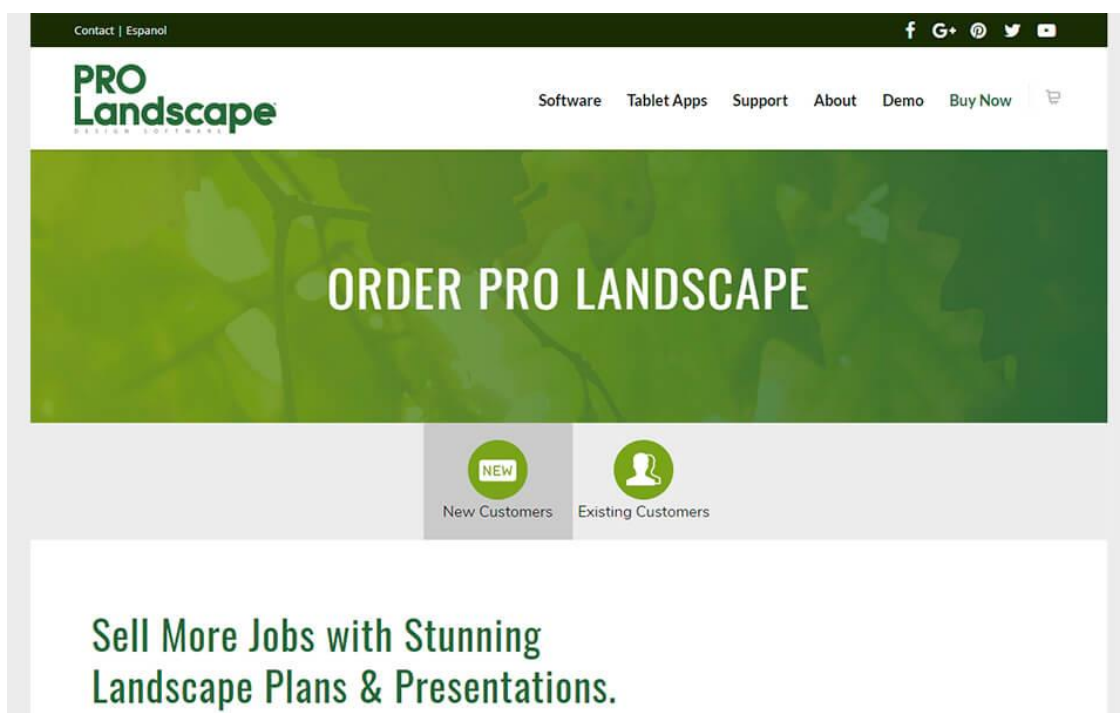


Figure 21: Premium digital software PRO Landscape for creating landscape designs

9. VizTerra

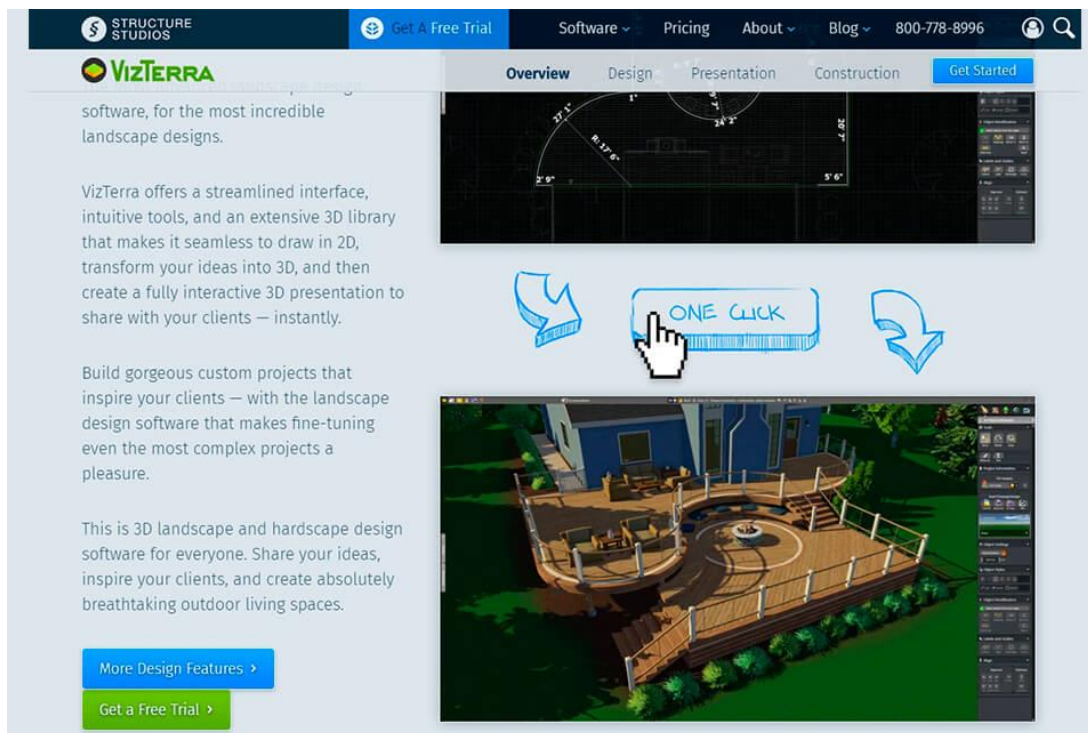


Figure 22: A professional digital software VizTerra for outdoor design

10. Pool Studio

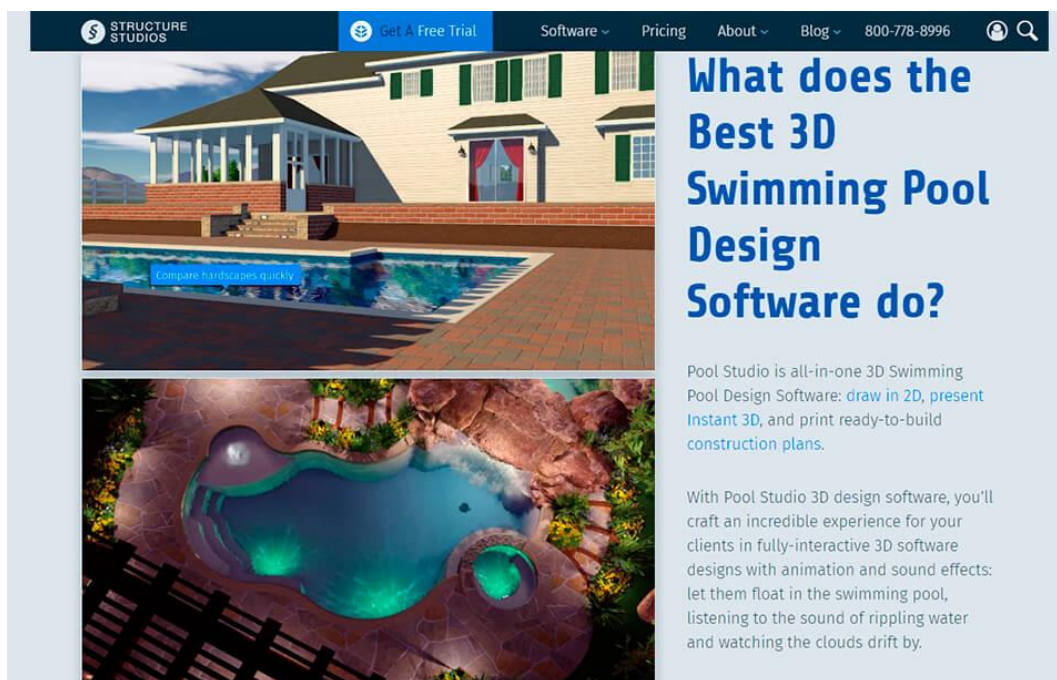


Figure 23: Digital software Pool Studio for swimming pool design

11. VIP 3D



Figure 24: Powerful digital software VIP 3D for designing outdoor and pool spaces

12. Punch! Home & Landscape

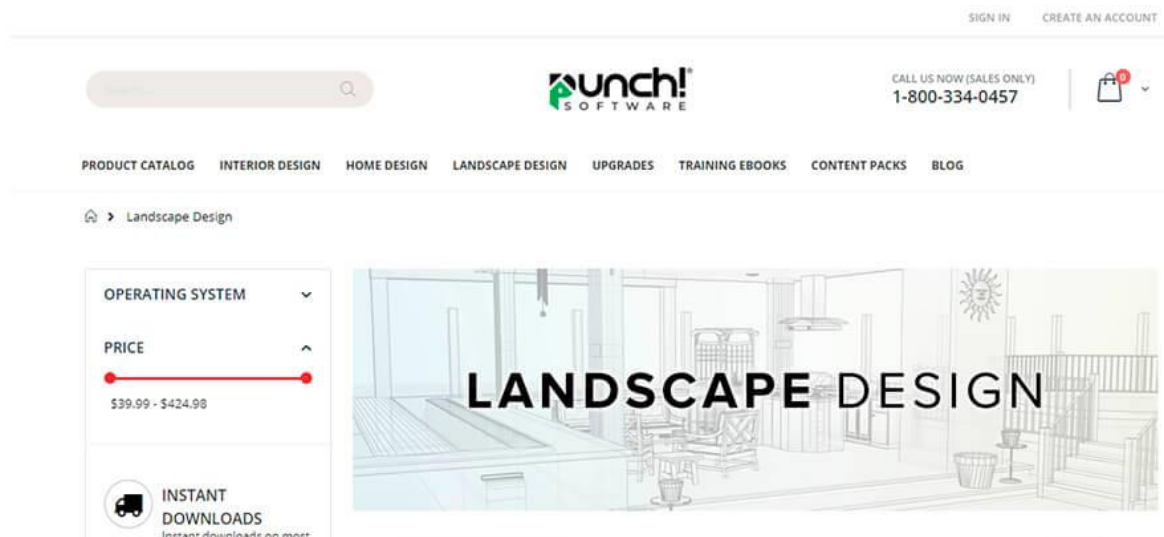


Figure 25: Professional digital software Punch! Home & Landscape with various templates for landscape designing

13. Realtime Landscaping Plus



Requires Windows
Vista, 7, 8, 8.1, or 10

System Requirements

Product and Shipping

Product

Realtime Landscaping Plus 2018

Special Offer

Our **PRO** software is currently only \$20 more and includes 400 extra plants, fountains, waterfalls, custom swimming pools, ponds, and more.
[Click here](#) if you would like to purchase PRO instead.

Options

Boxed product and Download option \$79.95

Shipping

Select a Shipping Method

☒ Yes, I want to be notified about product information and updates.

We value your privacy, and will not sell or release your information to any unauthorized party: [Privacy Statement](#)

Check out now

FastSpring






Figure 26: Landscape design digital software Realtime Landscaping Plus with a diverse library of materials

14. Total 3D Landscape & Deck Deluxe

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Typing – International

Business & Office

Genealogy

Estate Planning

Home & Hobbies

Total 3D Home Landscape & Deck Premium Suite 12

Total 3D Home Design Deluxe

Total 3D Landscape & Deck Deluxe

Family Tree Heritage™ Platinum 15 – Windows

Family Tree Heritage™ Platinum 15 – Mac

Languages

Organizer & Calendar

Photo & Video

Resume & Career

Training – Microsoft

Training – QuickBooks

Cloud / Web Apps

Tablet Apps

Mac Software

Total 3D™ Landscape & Deck Deluxe


\$19.99


The Easy Way to Design Your Landscape!

Compatible with Windows 10, Windows 8, and Windows 7

PC Disc

PC Download





Description

Awards & Reviews

Product Description

Total 3D Landscape™ does not require previous design skills. Whether you are creating an enchanting water

Figure 27: Desktop digital software Total 3D Landscape & Deck Deluxe for effective landscape design creation

30

Table of Comparison between Software for Landscape Architecture

Table 2: Digital Software for Landscape Architecture

Software	Compatibility	Capability	Price	Pro	Cons
1. SketchUp	Windows/ Mac	<p>SketchUp Free is a web-based landscaping design software free. Due to the intuitive interface and useful tools, this program is extremely helpful for beginners.</p> <p>You can customize your workflow by adding various icons and toolbars to the navigation. Style, measurement and layer toolbars allow you to quickly switch between functions which will make your work easier and faster.</p> <p>SketchUp Free also possesses some functions of the free architectural design software and</p>	Free	<p>3D modeling features Intuitive interface</p> <p>Compatible with numerous web browsers and OS</p> <p>Free but still has a lot of useful tools and functions</p>	Can't be used offline

		<p>let you draw and create 3D models right in the browser. It is possible to share files using the CAD project management tool.</p> <p>This online landscape design tool includes color and text editing features as well as useful drawing tools. The program will be a perfect variant for those who need to transform initial models into remarkably detailed design projects.</p>			
2. Kerkythea	Windows / Mac /Linux	<p>Powerful software for garden designs Kerkythea features appealing and accurate materials, so it will be easy for you to efficiently complete a landscape design project.</p>	Free	<p>Open-source software with free updates.</p> <p>An extensive library of materials.</p> <p>Object rendering feature.</p> <p>Excellent animation</p>	<p>Doesn't feature CAD designs.</p> <p>Doesn't work with AutoCAD files.</p> <p>No Freehand Drawing feature.</p>

		<p>Kerkythea includes all the necessary tools to make your workflow as effective as possible. Apart from such functions as a material editor, render settings and real-time viewer, the software features “Getting Started Guide”. Just follow the “Getting Started Guide” and “Material Editor Guide” to learn how to create realistic and professional designs.</p> <p>With Kerkythea, you can produce top-notch projects without great efforts since it has a single interface for rendering. Despite being free, the software doesn’t have any limitations in creating professional landscape designs.</p>		3D modeling.	
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3. PRO Landscape Home	IOS/Android	<p>PRO Landscape Home is a “lite” version of PRO Landscape developed for mobile platforms. Just import the photo of your house and the app will help you create appealing landscape and garden designs. Apart from uploading the image of your house, you can choose any existing photo in the library to your taste.</p> <p>Once you select a picture, you can enhance it by adding plants, flowers, bushes and other landscape items. PRO Landscape Home features an array of tools, such as 3D rendering, high-quality images and animation.</p> <p>You can also choose from an extensive number of</p>	Free	<p>3D rendering options.</p> <p>Easy-to-use CAD designs.</p> <p>High-quality picture imaging</p> <p>Features Lighting Design</p>	Only for mobile devices
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		<p>objects and materials. When you complete the project, you can share it on Twitter, Facebook and other social media sites.</p> <p>It is possible to save your projects for future use. Moreover, you can add the original image to show a “before/after” design.</p> <p>Another great function of this 3D landscape design app is “Find a Professional”. It will help you implement your design ideas by approaching the experts in this area. If you prefer to do everything yourself, you can contact a local garden center to get some recommendations on what materials to choose.</p>			
4. Lands Design	Windows	Lands Design is a perfect solution for those who	Free	Includes CAD designs	Doesn't offer any free updates

		<p>want to create 2D and 3D presentations. The software allows you to create different virtual tours and apply various effects to present awesome projects and impress your clients.</p> <p>Another distinctive feature of this program is that you can search and insert plant species, each one with its own specifications and characteristics. Thus, you can easily figure out which plants can grow on the specific territory and make your presentation even more realistic.</p> <p>Besides, the program has a large library of various trees. If you want to get a more natural-looking effect, you can place 3D trees with shadows.</p>		<p>3D modelling</p> <p>Works with AutoCAD files</p> <p>Object rendering feature</p> <p>Blueprint view mode</p>	Lack of object image library
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		<p>The library is fully customizable, so you can adjust all the necessary parameters as you want.</p> <p>Lands Design is especially useful when it comes to the watering system layout design. You can find irrigation pipes, sprinklers and other watering system objects in the library and add them to your project.</p>			
5. DreamPlan Home Design	Windows	<p>This landscape design software offers 2D and 3D modelling, Blueprint mode and other remarkable functions that are necessary for completing amazing projects.</p> <p>You can even insert 3D models into your presentation to get a more realistic and unique design. Whether you</p>	Free	<p>2D and 3D modelling</p> <p>Supports AutoCAD files</p> <p>Rich object image library</p> <p>Realistic rendering</p> <p>Features Blueprint mode</p>	<p>Doesn't include a library of lightning</p> <p>No CAD designs</p>

		<p>want to create the floor layout of your house, plan out exterior landscaping ideas or shape/reshape the terrain of your territory, you can easily do it with DreamPlan Home Design.</p> <p>This free 3D landscape design software has a rich online object library that includes various materials, so you can easily complement your design presentation with any desired item. For example, you can choose plants, patios, textures, furniture, decorations and more.</p>			
6. Terragen	Windows / Mac	<p>Terragen is one of the most powerful landscaping programs which is used to create realistic renderings and animations of landscapes. With the help</p>	Free	<p>AutoCAD files support</p> <p>A diverse library of landscape materials</p> <p>An extensive number of</p>	<p>Doesn't offer free future updates</p> <p>Doesn't include a database of plant species</p>

		<p>of Terragen, you can produce spectacular outdoor views and complement your project with any element from the diverse object library.</p> <p>It is possible to adjust shadows and other effects for the scenes with weather, sun, moon, clouds, lakes, terrains, textures. Also, it is possible to add grass, plants, trees, garden furniture and other objects to your presentation.</p> <p>It is worth noting that Terragen has been used for creating visual effects in more than 30 movies, TV products, game development, etc. However, it requires an advanced laptop for AutoCAD to cope with all</p>		<p>useful tools</p> <p>Realistic animation</p>	
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		the processes smoothly.			
7. iScape	IOS	<p>iScape is a user-oriented application developed specifically for iOS devices. It is suitable for both experienced users who do the landscape designs professionally or homeowners who want to share their vision of how their house should look like with designers. iScape lets you easily combine digital and physical living spaces with 3D or 2D designs.</p> <p>It is possible to collaborate with landscape specialists as well as use the application to share your ideas and make them real. Another distinctive feature that makes iScape the best free landscape design software is the Augmented</p>	Free	<p>User-friendly app</p> <p>Free to download</p> <p>The virtual pen is available</p> <p>Can insert objects</p> <p>Supports 2D and 3D graphics</p>	<p>Only for iOS devices</p> <p>Some useful tools need to be purchased</p>

		<p>Reality world that allows doing the designs together in real-time.</p> <p>With the help of a sun-slider feature, you can see how shadows will fall over surfaces throughout the day. This feature lets you place the objects in the right spot.</p> <p>Regardless of the type of landscape design you are going to create, whether these are urban gardens, parks or a backyard, iScape is worth paying attention to. Take into account that this app works with iOS devices of 9.0 or later versions. So, to use all the capabilities of iScape, make sure that your iOS is updated.</p>			
8. PRO Landscape	Windows / Mac / iPad	This professional landscape	USD1495	Works on both PC and	The pricing is rather confusing

	/ Android tablet	<p>design software includes photo imaging designs that will help you visually implement design ideas, adding plants, hardscapes and other elements to your projects. Also, you can make the best use of night/holiday lighting features, scaled CAD drawings, 3D rendering and winning professional proposals.</p> <p>PRO Landscape has the largest image library compared to other landscape design software. For instance, you can find photos of plants categorized by climate zone. Also, this software includes hardscapes with walls, pavers and boulders as well as water</p>		<p>mobile devices</p> <p>3D rendering</p> <p>Huge image library</p> <p>Night/holiday lighting is available</p> <p>Tech support</p>	
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		<p>features, outdoor living spaces and more.</p> <p>PRO Landscape is so sought-after among users due to its multi-device access. It is compatible with Windows/Mac OS computers and Android/iOS mobile devices.</p>			
9. VizTerra	Windows	<p>VizTerra is one of the best landscape design software which allows creating the most incredible designs of hardscapes and pool decks, outdoor kitchens, pergolas, etc. It has a smart 3D library as well as powerful tools for design, presentation and construction. Moreover, the developers provide training, support and constant software updates.</p>	<p>\$95/month (monthly pricing) or \$83/month (annual pricing)</p>	<p>The ability to import and export AutoCAD files</p> <p>Terrain and topography</p> <p>Instant dimensions</p> <p>Video and photo mode</p> <p>Innovative 3D sound effects</p>	<p>Requires a lot of RAM</p> <p>Lack of CAD standard features</p> <p>Lack of realistic shadows</p>

		<p>It is possible to switch between several angles and views, compare before/after pictures and instantly share your projects to demonstrate your extraordinary vision. You can save your photos in JPG or PNG file formats of up to 8K resolution.</p>			
10. Pool Studio		<p>Pool Studio is an ideal solution for those who want to draw in 2D as well as modify extraordinary 3D swimming pool presentations.</p> <p>Pool Studio allows you to create swimming pool design presentations in several clicks. The software offers an efficient workflow with easy to understand design stages and powerful tools. This enables you to</p>	<p>\$95/month (monthly pricing) \$83/month (annual pricing)</p>	<p>2D and 3D graphics</p> <p>Video and photo modes</p> <p>High resolution of graphics</p> <p>A diverse library of elements and tools</p>	<p>Specializes only in pool designs</p> <p>Lack of realistic shadows</p> <p>Can't import SketchUp and FBX objects</p>

		<p>easily produce amazing and professionally-looking pool construction plans.</p> <p>It has never been so easy to create a swimming pool or outdoor living space presentation in realistic 3D detail. In Pool Studio, is possible to explore the design of your tool in any direction and angle, taking 360° screenshots, photos and videos.</p>			
11. VIP 3D	Windows	<p>Even if the program seems a bit overwhelming, just discover all the functions that VIP 3D offers, and you will be astonished at what this software is capable of. You can import SketchUp and FBX objects, instantly transform 2D drawings into 3D and view your projects in high</p>	<p>Price: \$165/month (monthly pricing) or \$1695/year (approximately \$141/month on annual basis)</p>	<p>VR and high-quality 360° photos The ability to import SketchUp and FBX objects Automatic spec sheets Realistic shadows feature is available</p>	<p>The cost is a bit confusing</p>

		<p>resolution. It is even possible to turn the images in 360°.</p> <p>In addition, you can enhance your projects using automatic spec sheets, realistic shadows, a diverse library of elements with various wood decks, templates, pool and outdoor kitchen objects as well as different trees and plants.</p>			
12. Punch! Home & Landscape	Windows / Mac	<p>To simplify your work, it is possible to switch between multiple views, such as street view, helicopter view and 2D/3D hybrid view.</p> <p>You can enhance your presentations using an incredibly diverse library of materials and objects. It includes plants, furniture and other landscaping</p>	Price: \$39.99	<p>An extensive number of templates</p> <p>2D/3D views with various viewing options</p> <p>Large library of elements</p> <p>A lot of useful video tutorials</p> <p>Affordable prices</p>	<p>Downloadable software without the ability to use it online</p> <p>The interface may seem confusing</p>

		<p>elements. On the left panel, you can see different editing tools, while on the right, there are many useful functions like a 3D/2D view.</p> <p>Punch features a huge library of materials. For example, you can make a detailed plan of your garden by placing different trees, bushes, flowers and so on. There is also a function that allows you to visualize future plant growth. In addition, you can complement your presentation with such elements as furniture, floors, window coverings, cabinets, deck templates, etc.</p>			
13. Realtime Landscaping Plus	Windows	Realtime Landscaping Plus will be your best friend when it comes to creating appealing landscape	Price: \$79.95	Huge library of landscape materials Plant Growth tool	Library of real elements is not so diverse for all territories

		<p>designs for your living territory. The program allows you to produce awesome 3D presentations using garden design templates as well as various objects that you would probably like to use in real life.</p> <p>With a variety of preview options, such as bird's-eye view, the perspective view and walkthrough mode, it will be easy for you to get the desired result. Also, Realtime Landscaping Plus features a landscape planner that allows you to zoom the picture in and out and change the camera angles</p>		<p>Brand-name product catalogue</p> <p>The ability to design landscapes directly on top of a photo</p>	It may take some time to learn the interface
14. Total 3D Landscape & Deck Deluxe	Windows	Total 3D Landscape & Deck Deluxe is one of the most affordable landscaping programs with	Price: \$19.99	<p>Easy to use</p> <p>Reasonable price</p> <p>2D/3D rendering</p>	<p>The graphic has an unrealistic look</p> <p>No quick-start tool</p>


		<p>pretty basic functionality.</p> <p>This program doesn't feature a quick-start tool, so you will need to start your project from scratch and use 2D drawings to create your home design. With the help of pre-designed sample plans, you can easily visualize your garden design ideas.</p> <p>Another great feature of Total 3D Landscape & Deck Deluxe is the ability to import digital photos. You can change them using 2D or 3D renderings.</p> <p>It is possible to easily add lawn, deck or pool to your presentation using a drag and drop feature. Also, the program lets you place plants, choosing the desired one</p>		<p>A variety of plant images</p>	<p>The functionality is rather limited</p>
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		from the large image library.			
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Landscaping Business Software


Any of the following software options will help you to better manage your landscaping business.


Table 3: Comparison of Landscaping Business Digital Software


Software	Compatibility	Capability	Price	Pros	Cons
JobNimbus 	iOS/Android compatible Mac/Windows downloads CRM Accounting integration Aerial measurement Contractor management Time tracking	JobNimbus is a cloud-based business suite aimed at landscaping and construction companies. It helps companies organize and execute takeoff plans on larger projects. JobNimbus has a highly-rated estimate system and integrated accounting software. Designed with landscapers in mind, JobNimbus is easy to use and very customizable. It offers a free trial	JobNimbus does not publish its pricing. Prices are based on the features you need. JobNimbus also offers a free trial.	✓ Integrations with design software ✓ Fully cloud-based, no on-site IT ✓ Very customizable ✓ Visual archive of job photos	X Support not available 24/7 X Mobile apps are not beginner-friendly


		and will work with your company to create a pricing package that includes only the features you need.			
<p>LMN</p> 	<p>Key Features</p> <p>iPhone/Android app</p> <p>Cloud-based browser access</p> <p>Payroll Estimates</p> <p>Time tracking</p> <p>Scheduling and invoicing</p> <p>Work order management</p>	<p>LMN (short for Landscape Management Network), designed exclusively for the landscape industry, is a cloud-based management tool. With over 85,000 users every day, LMN is a leader in client relationship software.</p> <p>Bonus points: LMN users also get access to the LMN Academy. This series of tutorials and walk-throughs help professional landscapers improve their understandi</p>	<p>LMN offers a free version, with a paid version starting at \$197 per month, after a free trial. There's a pro plan with expanded features starting at \$357 per month.</p>	<p>✓ LMN Academy training and education</p> <p>✓ Highly-rated estimation software programs</p> <p>✓ Write project proposals with ease</p>	<p>X Reviewers have complained about customer support</p> <p>X Pricing increases with added features</p>

		ng of the software, their landscaping techniques, and their business skills.			
Stack 	Key Features Apple/Windows compatibility Bid management Payroll Quotes/Estimates Billing and invoicing	Stack was designed by contractors, for contractors. Besides aiding landscape businesses with organization, it can help you bid on contracts and win more work. Stack keeps you in contact with homeowners and handles billing and customer interactions. With a free version available and a free trial for the paid plans, you can become familiar with Stack's software before you spend even	Stack has a free version available. The "start" plan is billed at \$1,999 annually, and the "grow" plan costs \$4,999 per year.	✓ Free version available ✓ Stack team is constantly updating and improving the platform ✓ Cloud-based software can be accessed from any computer	X No mobile app X Web-based software can slow down with heavy traffic X Pricing can't be customized by feature

		a dime. The main drawback of Stack is its lack of mobile support. It does not offer an app but can be accessed through the browser on your mobile device.			
<p>Jobber</p> 	<p>Key Features</p> <p>iOS and Android mobile app</p> <p>Route optimization and GPS tracking</p> <p>Dispatch and job scheduling</p> <p>Quote generation</p> <p>24-hour support</p> <p>QuickBooks integration</p>	<p>Jobber provides a complete business suite that helps manage your landscape business. Its user-friendly interface lets you schedule appointments, optimize routes, generate quotes, and process payments. With the mobile app, you can stay up-to-date on your business from the field.</p> <p>Jobber has a 14-day free trial</p>	<p>Packages at \$29, \$99, and \$199 per month with an annual contract.</p>	<p>✓ 14-day free trial</p> <p>✓ Multiple pricing plans</p> <p>✓ iOS and Android apps</p> <p>✓ User-friendly, even for beginners</p> <p>✓ Well-reviewed customer support</p>	<p>X Messy QuickBooks integration</p> <p>X No integrated field communications</p> <p>X Tough to assign backups</p> <p>X Requires internet connection to use</p>

		and multiple pricing plans, so you can get the services you need without paying for the ones you don't. Customer reviews praise Jobber's 24-hour support. Jobber customer service is always on-call to help deal with complications as they arise.			
<p>WorkWave Service</p> 	<p>Key Features</p> <p>Android/iOS app</p> <p>QuickBooks integration</p> <p>Route optimization</p> <p>Robust marketing features and customer management</p>	<p>With over 40 years in business, WorkWave has been helping small businesses stay on the cutting edge since the early days of computers.</p> <p>WorkWave boasts a robust set of marketing tools. Working with sites like Google and</p>	<p>WorkWave doesn't publish its pricing information. Reviews indicate the software starts at \$79 per month.</p>	<p>✓ Flexible scheduling</p> <p>✓ Great mobile apps</p> <p>✓ User-friendly layout</p> <p>✓ Real-time alerts and adjustments</p>	<p>X Limited sales tools</p> <p>X No inventory management</p> <p>X Only annual contracts are available</p>

		<p>Facebook, WorkWave software generates 5-star reviews and keeps them visible.</p> <p>WorkWave's tools are designed for flexibility. The mobile app allows landscaping businesses to reschedule routes on-the-go and instantly streamlines the new route.</p> <p>The WorkWave suite covers all the bases: dispatch, tracking, invoicing, and more.</p>			
<p>Service Autopilot</p> 	<p>Key Features</p> <ul style="list-style-type: none"> iOS/Android compatible QuickBooks sync Payments and invoice Marketing tools Multiple payment plans 	<p>Service Autopilot is an efficient tool that keeps your landscaping business running smoothly. It automates customer interactions, billing, and crew</p>	<p>Service Autopilot offers packages billed at \$47, \$97, and \$247 per month with a one-time \$97 sign-up fee.</p>	<ul style="list-style-type: none"> ✓ Free trial and 30-day return policy ✓ Includes marketing tools ✓ Wide range of tools and features ✓ Well-reviewed 	<ul style="list-style-type: none"> X Premium features cost extra X Not user-friendly for beginners X "Outdated" mobile app X Additional users cost extra

		<p>management, saving you hours of paperwork. With features like Smart Maps for route optimization and GPS tracking, Service Autopilot makes team management easy.</p> <p>Service Autopilot is not the cheapest business software, but It gives you access to a vast range of tools and features. With advanced dispatch options, this is a great choice for companies managing four or more vehicles.</p>		customer service	
<p>SingleOps</p> 	<p>Key Features iOS/Android App Dispatch management Billing and invoicing</p>	<p>SingleOps is designed to make designing and building landscaping projects easy. Its</p>	<p>SingleOps starts at \$200 per month.</p>	<p>✓ Highly-rated customer support ✓ Integrates with design software</p>	<p>X Messy QuickBooks syncing X Less customizable than other options</p>

	Automatic estimates Inventory and supplier management	satellite mapping integration allows you to track vegetation and create estimates instantly. With award-winning customer service and a user-friendly interface, SingleOps is a great choice for small- to medium-sized landscaping businesses.		✓ No long-term contracts	X Cloud-based services slow down with heavy web traffic
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Digital Roadmap in Landscape Architecture

From the analysis above the table below is made for digital roadmap in landscape architecture.

Recommended Software for Landscape Architect		
Basic	Intermediate	Advanced
<ul style="list-style-type: none"> • AutoCAD – Office PC 	<ul style="list-style-type: none"> • AutoCAD – Office PC 	<ul style="list-style-type: none"> • AutoCAD – Office PC
<ul style="list-style-type: none"> • Sun Seeker – Free Mobile App • Clinometer – Free Mobile App • Planimeter – Free Mobile App • Scala Architectural Scale – Free Mobile App 	<ul style="list-style-type: none"> • Morpholio Trace – Free Mobile App • ArchiSnapper– Free Mobile App • Drone Deploy– Free Mobile App (Need Drone) • Autodesk Formit – Free Mobile App • Autodesk SketchBook – Free Mobile App 	<ul style="list-style-type: none"> • SketchUp – Free Windows/ Mac • Kerkythea – Free Windows / Mac /Linux • PRO Landscape Home – Free IOS/Android • Lands Design – Free Windows • DreamPlan Home Design – Free Windows • Terragen - Free Windows / Mac • iScape – Free IOS

		<ul style="list-style-type: none"> • PRO Landscape – Paid Windows / Mac / iPad / Android tablet • VizTerra – Paid Windows • VIP 3D - Windows • Punch! Home & Landscape – Paid Windows / Mac • Realtime Landscaping Plus -Paid Windows • Total 3D Landscape & Deck Deluxe – Paid Windows
Recommended Software for Landscape Entrepreneurs		
<ul style="list-style-type: none"> • LMN <ul style="list-style-type: none"> ○ iPhone/Android app ○ LMN offers a free version • JobNimbus <ul style="list-style-type: none"> ○ iOS/Android compatible ○ JobNimbus also offers a free trial 	<ul style="list-style-type: none"> • WorkWave Service <ul style="list-style-type: none"> ○ Android/iOS app ○ starts at \$79 per month • SingleOps <ul style="list-style-type: none"> ○ iOS/Android App ○ Starts at \$200 per month • Jobber <ul style="list-style-type: none"> ○ iOS and Android mobile app ○ Packages at \$29, \$99, and \$199 per month with an annual contract. 	<ul style="list-style-type: none"> • Stack <ul style="list-style-type: none"> ○ Apple/Windows compatibility ○ The “start” plan is billed at \$1,999 annually, and the “grow” plan costs \$4,999 per year. • Service Autopilot <ul style="list-style-type: none"> ○ iOS/Android ○ Packages billed at \$47, \$97, and \$247 per month with a one-time \$97

The table above summarizes the options of basic, intermediate and advance levels for the digitalisation of Landscape Architecture business. There is an amount of capital which a Landscape Architecture entrepreneur need to invest to kick start their business. The most basic software for any Landscape Architect is knowledge of AutoCAD. That is why AutoCAD becomes a standard requirement for any Landscape Architecture business.

On top of that, in order to be updated all the time, each personnel in the landscape architecture industry must have a mobile phone equipped with sensors (GPS, Gyroscope, and Compass), as a minimum requirement, either iPhone or Android based phone in order to go digital. While for the business owner, the minimum requirement is to have a data line (wi-fi connection at office) to have the BIM software.

Basic Level

All mobile software in the Basic level for iOS /Android phone users are free software and basically easy to use and deploy at the fingertip of any landscape architect. As for business owners, on top of the basic software, they are encouraged to install the BIM free software to track their clients and to track the status of their job with the clients.

Intermediate Level

In this level, the Landscape Architect, need to invest in iOS iPad, or Android Tablet or Drone to use the free digital apps. The apps have better visual image. While for the Landscape business owners, they have to invest a small sum in order to have a better capability of BIM apps.

Advanced Level

This level is for bigger Landscape Architecture company. The company may invest in computer hardware even though some digital apps are free, but the apps are meant for Windows PC or Mac Computer. There are even advanced digital BIM apps to be purchased and can be used by the business owners.

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