

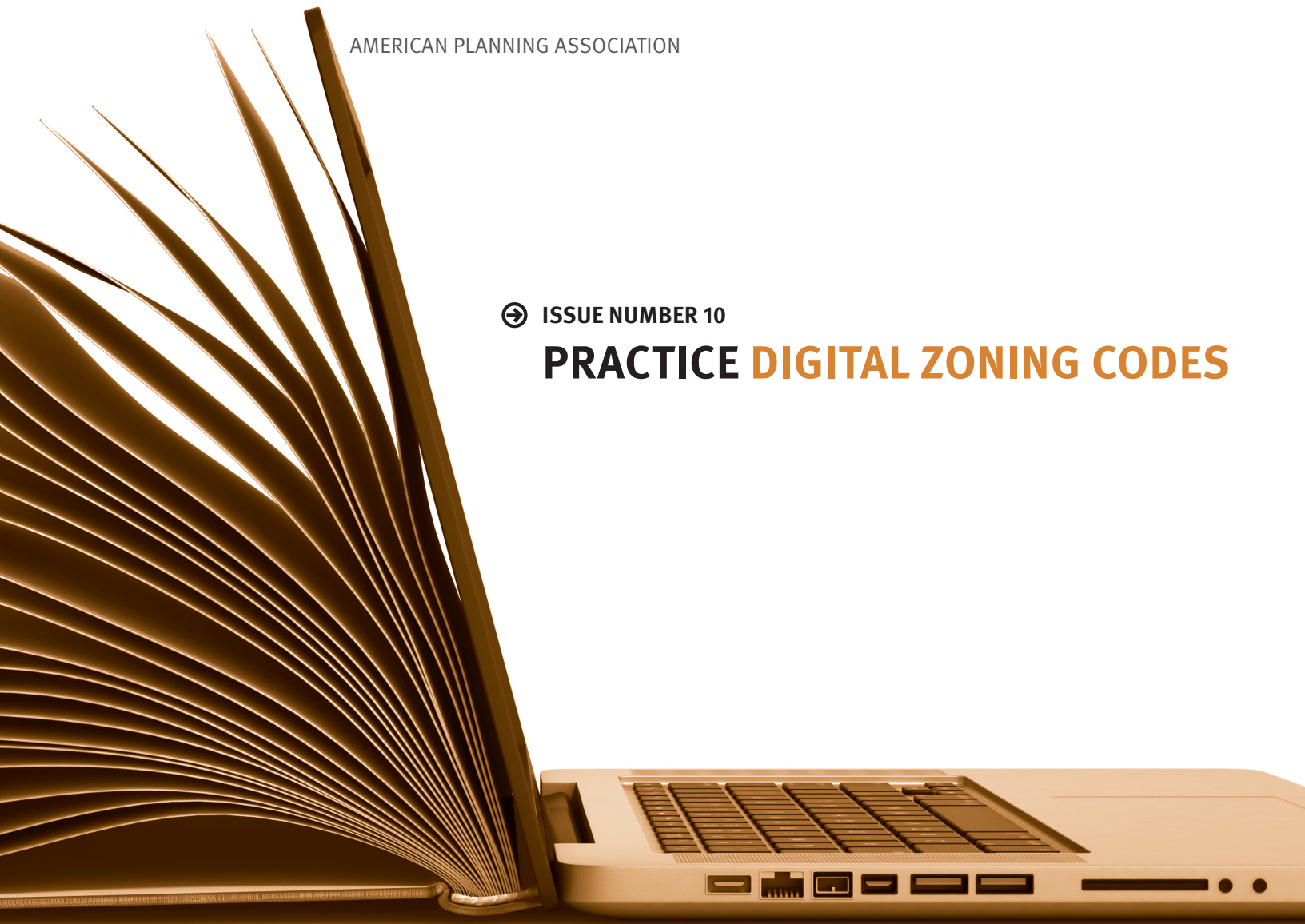
ZONING PRACTICE

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PRACTICE DIGITAL ZONING CODES



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Digital Zoning Codes and Comprehensive Plans

By Peter Sullivan, AICP

The printed page is not extinct, but electronic publishing is becoming a standard format for the digital age. From page-flipping online documents to custom-built websites, there are dozens of applications and services that can create a modern digital document. But which tools are best for publishing long, highly structured documents, like zoning codes and comprehensive plans?

This article surveys options for publishing modern, interactive documents in a feature-rich, web-ready format. It identifies eight popular digital publishing methods and summarizes key trade-offs among the various approaches. The article also describes how to evaluate which method is best suited to meet the needs of those working in a public-sector agency and recommends project management strategies for deploying, testing, and maintaining new software and online work products. The conclusion identifies a basic set of prerequisites for digital publishing.

WHY DIGITAL PUBLISHING?

In an era of 140-character tweets and round-the-clock media, urban planners are challenged to deliver complex information in a clear and engaging manner. So what are planning agencies doing to address this challenge? In 2016, Urban Insight collected data from more than 600 U.S. local government planning agencies about various technology-related topics, such as digital publishing, social media, online permitting, and web-based geographic information systems (GIS). It published its findings earlier this year in *City Planning Department Technology Benchmarking Survey*.

With respect to digital publishing, this report identifies a gold standard based on ease of use, information retrieval, and compliance with popular computing devices and software. The standard includes an HTML format, mobile responsive design, and full search capabilities.

The data shows that the usability of online zoning codes is mixed, with only

one-third of planning agencies meeting the gold standard. Among the group that did meet the gold standard, there were multiple methods for producing these documents. These approaches include a mix of self-publishing and third-party services.

Some well-known third-party options include codification services, provided by firms such as Code Publishing Company, Municipal Code Corporation, Coded Systems, General Code, and American Legal, in addition to digital publishing. While there are a variety of reasons for utilizing these services, this article focuses on self-publishing tools.

One of the goals of this article is to ensure that authors are aware that the choices for digital publishing are not limited to either publishing a static PDF on a website or fully outsourcing document hosting to a third-party vendor. Several of the in-house publishing methods presented in this article are affordable, user-friendly, and feature-rich, and exceed the Urban Insight gold standard.

The Urban Insight report also evaluated digital publication of comprehensive plans, which is another type of planning agency publication that benefits from enhanced digital features but also raises a number of management issues due to document length and complexity. In comparison to online zoning codes, comprehensive plans are skewed even further away from the gold standard, and there are greater instances in which the document is not available online in any format.

As a document, comprehensive plans follow a less hierarchical structure and are more likely to be produced with flexible layout software like Microsoft Publisher or Adobe InDesign. In contrast, zoning codes are traditionally prepared in a word processor, which maintains hierarchical structure and automates the text updates (e.g. multilevel lists, cross-references, and tables of contents). While creative design

does provide greater visual interest for the reader, the downside of a custom layout is that it can be more difficult to revise and maintain, especially if it is reliant on advanced software that incorporates objects, paths, layers, and other advanced page layout features.

Authors should also consider that a document finely tuned for the printed page will not necessarily provide the same look and function on a screen. Fortunately, there are self-publishing methods that efficiently balance this print-versus-web dilemma.

DIGITAL PUBLISHING METHODS

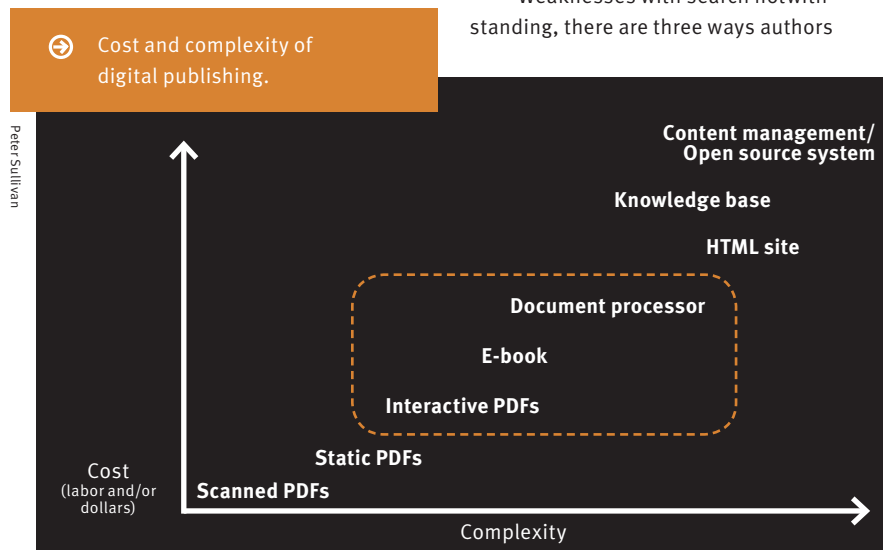
The term “digital zoning code” or “digital comprehensive plan” implies the presence of certain navigational features and document behaviors beyond static text and images displayed on a screen. These features and behaviors become available (or can be enabled) through a combination of specific file formats, authoring workflows, and end-user settings. For the efficient publication of digital zoning codes and comprehensive plans, this article recommends digital publishing methods that include, at a minimum, the following basic characteristics:

- Internal and external hyperlinks
- Web-based navigation features and customizable display options
- A table of contents and intuitive headings
- A combination of authoring, editing, and publishing capabilities
- A reasonable learning curve and intuitive workflow
- Robust customer support or technical documentation

There are countless software applications and services capable of organizing and publishing content on a webpage, from simple text editors like Windows Notepad, to integrated site design, development, and publishing applications like Adobe Dreamweaver.

But authors should be selective when choosing a digital publishing method because documents like zoning codes and comprehensive plans demand a certain amount of formatting automation to achieve a reasonable level of publishing efficiency. The methods described below are well suited to this publishing task, presented in increasing order of complexity and customization.

The methods highlighted in the middle of the chart in the graphic below are at the point in the cost and complexity spectrum, where all the digital publishing characteristics become available. The decision then is whether additional publishing sophistication is worth the extra cost (for staff time), and whether this service will be performed in-house or by a third-party vendor.



Scanned PDFs

Creating PDFs by scanning printed documents is not recommended for three reasons. First, the scanning process often renders content completely unsearchable. Second, it is more difficult to create, manage, and use hyperlinks in a PDF generated from a scanned document versus a PDF generated from a word processor or other text editing software. Third, the author is unable to perform text edits within the PDF, a task that can be desirable based on an author's publishing workflow. Scanned PDFs appear to be phasing out, possibly due to the wider availability

of user-friendly publishing software that resolves the functional disadvantages of the scanning-to-PDF workflow. As a publishing method, scanned PDFs are identified in this article to mark the lowest end of the feature-availability spectrum.

Static PDFs

Static PDFs are widely used for in-house digital publishing. While the text in static PDFs is searchable, the results are sequential—meaning the author must step through search results across the document one at a time. This is less desirable in comparison to prioritized search (a listing of results based on relevance), which is offered through other recommended publishing described in this article.

Weaknesses with search notwithstanding, there are three ways authors

consider the second recommendation, which is to use PDF bookmarks. By adding bookmarks at appropriate sections and subsections, authors can generate a running table of contents within the document to help convey document structure and aid navigation. Third, PDFs *do* allow for the creation of internal and external hyperlinks. Although they are manually maintained, the use of hyperlinks can significantly enhance the performance of a PDF.

Interactive PDFs

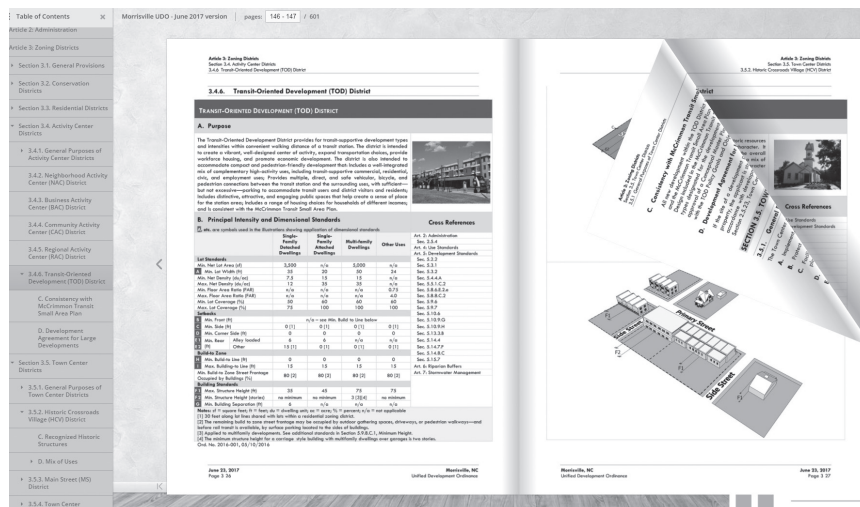
Interactive PDFs are an enhanced version of a static PDF. They include the same search limitations; however, the document's appearance and navigation is greatly improved through the presence of a running header that includes buttons, which can activate features such as a table of contents, scroll zone, slide show, or video.

E-book

E-books include a page-flipping visual effect and offer a range of navigation features. The benefit of this method is that the software automates the published document's design and structure. The typical workflow is that an existing, static PDF is imported into the program, and then the author overlays design elements, layout controls, and navigation elements. E-books are relatively affordable and user-friendly "off-the-shelf" solutions; however, one downside is that the content does not live natively within the software. This means that authors can end up maintaining two versions: the source file (created with either a word processing or page layout program) and the e-book digital file.

Some popular e-book software applications convert a PDF file to a Shockwave Flash file to render the page-flipping effects. E-books should not be confused, however, with the EPUB file format, which is a technical standard published by the International Digital Publishing Forum. The EPUB file format can be read on devices like smartphones, tablets, computers, or e-readers such as iBooks and Google Books. It is typically used for novels and similar publications with limited layout requirements. Because layout, structure, and navigation control is more limited with EPUB,

can manage PDF documents so that they comply with the basic digital publishing characteristics described above. First, static PDFs should not be broken into separate files linked from a webpage. This practice emerged as a workaround to circumvent the slow loading times caused by dial-up modems. Breaking up long documents into multiple PDFs does not allow for document-wide searches (even in the limited sense offered by static PDFs) and forces the reader to juggle between multiple files. Authors tempted to pursue this technique as a proxy for a table of contents are encouraged to



Town of Morrisville, North Carolina

➡ An e-book of Morrisville, North Carolina's unified development code.

it is not recommended for publishing complex reference documents like zoning codes and comprehensive plans.

Cloud-Based, Software as a Service

With the cloud-based, software-as-a-service (SaaS) method the software is licensed on a subscription basis and centrally hosted. Content resides natively within the software so that only one document version needs to be maintained (unless a separate printed document is desired). While a cloud-based, SaaS solution does provide greater automation, one downside is the author has less control over the publication's function and appearance. This is because the digital output and document structure is predetermined by the software's specifications.

Document Processor

Document processors superficially resemble a word processor but incorporate a powerful workflow referred to as multi-channel publishing. In this single-source authoring method, the content is developed natively within the application, and then the author can instruct the program to generate output for the desired medium such as print (PDF), web (HTML), and other formats. In addition, document processors are template-driven and include conditional formatting capabilities. This means

that elements specific to the printed page—like headers and footers—would only display on the PDF output, while digital elements like hover-over text and a tri-pane table of contents would only display on the HTML output.

Document processors are widely used in the technical authoring community, for example in creating user manuals and policy guides in multiple languages and output types. Another benefit is that they retain word-processor-like control of styles,

cross-references and multilevel lists, which significantly automate the text updating process. In the case of document processors, it is beneficial for authors to have a general understanding of how webpages are structured and styled. Document processors can simultaneously display multiple viewing environments (e.g., a what-you-see-is-what-you-get view and source code view) which gives authors the flexibility of generating webpage structure and style automatically or manually, through the direct editing of HTML and CSS (which can be a surprisingly efficient workflow).

HTML Editor

An HTML editor offers significant design flexibility; however, efficiency is reduced in light of fewer word processing controls. In addition, it is difficult to generate print output, other than simply printing from a web browser (which does not translate formatting to print). HTML editors are perhaps more appropriate for comprehensive plans, as zoning codes tend to incorporate more complex numbering and referencing mechanisms and are revised more frequently.

Knowledge Base

Possibly the next frontier of digital publishing, this method allows the user to query the document and receive customized



Village of Richfield, Wisconsin

➡ The cloud-based version of Richfield, Wisconsin's zoning code.

DIGITAL PUBLISHING METHODS: SOFTWARE AND SERVICES

Below is a list of software applications and vendors that can implement the digital publishing methodologies described in this article. Software and technology evolve rapidly, and certain applications and services may be replaced or change names. When selecting software or services, first consider the methodology that aligns with the authoring goals and constraints described in the following section, and then research the applications and services that deliver this functionality.

METHOD	EXAMPLES
Scanned PDF & Static PDF	Adobe Acrobat, PDF Studio, Libre Office
Interactive PDF	Adobe Acrobat, Adobe InDesign, Quark Express, Affinity Publisher (in development), Page Plus
Cloud-Based, Software as a Service (SaaS)	EnCode Plus, Zoning Hub, Open Counter
E-book and EPUB	FlippingBook (Page-flipping/Flash/HTML5), Issuu, Anyflip, Pub HTML5, Flip HTML5, Pageflip, Uberflip, Calibre (EPUB), Sigil, LaTeX, Genebook
Document Processor	MadCap Flare, Adobe Framemaker & Robohelp, Help & Manual
HTML Editor	Wordpress, Wix, Squarespace, Urban Interactive Studio, Civic Plus, Corel Web Site Creator, Adobe Muse & Dreamweaver, Google Web Designer
Knowledge Base	Tangerine Documents, Knowledge Owl, Quip, Bloomfire

information. Instead of (or in addition to) the user navigating a long document, the content is contained in a database, with the author setting rules for how the information is returned. If knowledge bases gain wider use in the planning industry, it will be interesting to see how this impacts the way plans and codes are structured and administered.

SELECTING A DIGITAL PUBLISHING METHOD

Planning agencies should carefully consider how they will balance cost and complexity when selecting a digital publishing method and take into account factors like competing document management goals (e.g., features versus ease of use), operational context (e.g., large versus small department; number of amendments per year), and external constraints (e.g., budget; expertise; legal/IT considerations). Suggested evaluation criteria are provided below.

Long/Highly Structured Documents

Ensure that the solution is appropriate for long, complex documents. While it might be possible to efficiently generate a handful of pages using any web publishing method, consider that the layout and publishing tasks will be multiplied by dozens or hundreds of pages.

Existing Document Format

Is the document being written from scratch or converted from an existing file? Review the solution's importing capabilities to determine if it will accept existing file formats, and whether any pre-import formatting cleanup is needed.

Feature Comparison

As noted in the previous section, each publishing method has trade-offs, and it is important to understand the features and limitations of a given application or service. Beyond the baseline characteristics of modern digital documents identified in the previous section, there are a range of additional features that can further enhance a digital publication.

Authors should also understand whether a digital publishing service includes publication of the entire regulatory or policy document. This is particularly the case with the cloud-based, SaaS publishing method. Some digital publishing services may advertise a host of attractive online features, but in converting the existing zoning code or comprehensive plan, the service may only selectively repackage certain portions of the document for the final output (e.g., commonly referenced regulations like zoning district dimensional standards and allowed uses). If the published document—regardless

of features—depends on readers referring to a secondary document to access the full scope of applicable policies or regulations, an author should consider whether this represents an overall improvement in how relevant information is communicated.

Below are 20 useful features and document characteristics to consider when selecting a digital publication method.

- Source content control
- Table of contents
- Dynamic search
- Hyperlinks
- Responsive layout
- Styles and automatic numbering
- Cross-referencing
- Images
- Tables
- Autonomous server
- Templates
- Independent HTML and CSS
- GIS Integration
- Multichannel publishing
- Annotations
- Built-in calculators
- Support for all devices
- Video integration
- Tracked changes
- Hover-over and drop-down text

Time and Budget

Understand the agency's time and budget constraints, and pursue a methodology that will keep within these parameters.

Technical Capacity

A talented project manager may skillfully develop and maintain a digital publication, but what happens when that person leaves the organization? If an agency is considering a more complex digital publishing method, the agency should have the technical depth to maintain the document over the long term.

Frequency of Amendments

Frequency of amendments and turn-around time for revisions is often cited as a reason to opt for in-house control. The selection criteria are quite different for an agency performing frequent, substantial amendments to documents versus an agency whose documents undergo little or no change during a typical text amendment cycle.

Audience

Consider who will be using the digital publication and the desired level of sophistication. Do internal staff have specific feature requests? What level of technological sophistication does the community expect from its local government planning agency? It is also wise to consult the municipal attorney's office and IT department, and if possible, consult with the agency's executive team and elected officials.

LAUNCHING A DIGITAL PUBLISHING CAMPAIGN

A digital publishing campaign refers to the logistical and political considerations involved in generating support for, and becoming successful in, the significant task of publishing an online zoning code or comprehensive plan. In the public sector, deploying new software and converting a long, complex document can become a significant undertaking due to the number of stakeholders. It is important to ensure that sufficient support is in place to see the project to completion.

Get It on the Work Plan

Make sure that sufficient resources are committed to the task, including staff time,

departmental budget, and support from other departments. Understand the agency's budget cycle, and consider including the digital publishing proposal in the budget so that resources are formally committed.

Form a Strong Project Team

Digital publishing is not a one-person show. Enlist other staff in addition to the project manager to assist in areas such as reviewing draft work products, troubleshooting technical issues, or performing any time-intensive document preparation, formatting, or asset management. This includes ensuring image source files are properly cropped and sized and tables are appropriately structured. It is also wise to gain the support of a project champion such as a department head, city manager, or elected official.

Manage the Project and Provide Status Updates

Although a complex digital publishing task does take significant time, the author should establish a realistic scope, schedule, and budget to ensure the publishing effort stays on track. Careful up-front consideration of the major milestones—for example, creating a test output, completing an entire section, and completing a full review draft—will help identify the critical path to completion. In addition, the project manager should communicate progress (as well as any setbacks) and keep key stakeholders informed. Should it be necessary, project champions will be more willing to grant additional time for project completion or accept changes in scope when progress updates are regularly provided.

TESTING, EVALUATION, AND IMPLEMENTATION

This section summarizes the mechanics of deploying, testing, and maintaining new software and work products. Consider the following recommendations to ensure a smooth conversion effort and successful ongoing maintenance strategy.

The Project Manager Might Need to Work Late

A digital publishing effort may incorporate the use of new software and may involve the

conversion of dozens or hundreds of pages into a digital format. Successful project managers tend to be independent problem solvers who prepare for success and are willing to invest extra time to resolve unexpected technical glitches.

Download Free Trials and Seek Product Demonstrations

Pursue software applications and cloud-based services that offer free trials or product demonstrations. Free trials are an excellent opportunity to confirm that the software will perform as expected prior to making significant financial commitments. In addition, live product demos help establish rapport with vendor sales and technical teams who may be willing to tailor services to the agency's specific scope and budget and quickly help resolve future issues.

Invest in a Robust Maintenance Plan

Pursue software applications and cloud-based services that offer a guaranteed maintenance plan. These plans can take various forms; for example, some vendors will offer a fixed number of inquiries or updates that can be issued in a given time period. Another model is a pay-for-priority maintenance agreement allowing the customer to place an increasing number of service calls and receive higher priority in the customer service queue in exchange for additional maintenance fees. Project managers should investigate these packages and also explore the extent to which free software documentation is available online, either in the form of a help manual, knowledgebase, YouTube channel, or user forum.

Premium maintenance packages are well worth the investment. This is especially true when deploying new software or embarking on a major digital conversion, particularly within the first several years of maintaining a new digital publication.

While the agency's IT department may be supportive of the digital publishing effort, they may not have expertise with the specific software or service, meaning technical help from the vendor and internet community should be leveraged to the full extent possible.

Document Issues and Establish Written Protocols

Project managers should anticipate that issues will emerge during the conversion effort. They should be diligent about documenting technical issues and noting how they are resolved, as it can be easy to forget how arcane technical issues were resolved weeks or months prior. In addition, better documentation helps build capacity in the organization by ensuring knowledge transfer and allowing for contingency scenarios should the project manager be reassigned to other duties or leave the organization.

Maintaining Amendments

As part of a major digital conversion effort, the project manager should continually ask, “Can I (or another team member) intuitively and efficiently replicate the publishing workflow, and are the procedures sufficiently documented?” A negative answer could translate into inefficient or sloppy document maintenance, and slowly degrade the quality of the publication over the course of multiple amendments.

If a large number of amendments are expected, the agency may be nearing the stage in which a full-scale rewrite of the zoning code or comprehensive plan is needed. In this case, it may be best to delay the digital publishing effort until after the comprehensive rewrite is complete. Further, as planners consider the next major update to a zoning code or comprehensive plan, it is wise to consider in advance which digital publishing method will be pursued. This detail is often considered at the end of the updating process, but thinking through the format at the outset can save considerable time and money.

Following a major rewrite, a good practice is to schedule periodic regulatory or policy “cleanups,” in which a package of miscellaneous edits to the zoning code or comprehensive plan is brought to the planning commission and city council for technical correction (which may include formatting corrections to the digital document).

While the omnibus clean-up approach does require a separate legislative process, it increases the likelihood that a sweeping set of minor text and formatting edits will be

supported because the changes are decoupled from other substantive (and perhaps controversial) regulatory or policy amendment proposals.

CONCLUSION

Given the sophisticated nature of modern digital publishing methods, some readers may wonder whether in-house publishing is achievable without dedicated website development or design staff. It is not necessary to know how to code to publish a modern digital publication, as many applications automate the generation of HTML and other programming languages.

Nevertheless, digital publishing is inherently technical in nature, and project managers should have a basic understanding of the following technical and publishing-related concepts:

- Formatting techniques specific to long, structured documents, for example tables of content, styles, headers and footers, cross-references, automatic numbering, and multilevel lists
- File formats, such as document files (DOCX, PDF, HTML) and image files (JPG, PNG)
- Basic image editing, such as cropping, resizing, and adjustments
- Graphic design principles, such as layout, hierarchy, font and color, and white space
- Fundamental website concepts, such as a server, domain, and File Transfer Protocol (FTP)
- General familiarity with markup and programming languages, such as HTML, CSS, and JavaScript

There are many free online tutorials that address these topics, as well as paid services with high-quality training libraries such as Lynda.com. Additionally, project team members less interested in technical details can still play a crucial role in the digital publishing process, either as an advisor, reviewer, or project champion. Team members should reflect on their skills and interests, and the team should thoughtfully assign roles. Like all urban planning projects, digital publishing is a team effort.

ABOUT THE AUTHOR

Peter Sullivan, AICP, is development coordination supervisor in the Development Services Center in Durham, North Carolina. He has produced digital publications as a planner in the public and private sector, emphasizing the balance of efficiency, quality, and ease of maintenance. Prior to joining Durham's City-County Planning Department, he was a consultant with Clarion Associates, where he specialized in zoning and land-use regulation. Sullivan is currently cochair of the Communications and Public Affairs Committee of the North Carolina Chapter of the American Planning Association and a regular contributor to Planetizen.com.

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WHAT ARE THE OPTIONS
FOR DIGITIZING YOUR
ZONING CODE?

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