



LET THE PROJECT FLOW

.....
Front end and PM Lessons learned from building a Drupal 8 website for one of the nation's largest water utilities, Denver Water

Presented by James David Saul

Intro/About

Civic Research

Drupal 8: Modules

The Way and Why of Zen (theme)

Twig and Twig Tweak

Paragraphs

Accessibility

Notes on Caching

Where we are/takeaways

AGENDA

James David Saul – Drupal Solutions Engineering



ABOUT: JDS



- Building websites since 1998 (started from the Geocities, now I'm here)
- Drupaling for almost 10 years, mostly in Higher Education and the Government/Library Space
- Denver Water was my first D8 Project



ABOUT: I.F.



**WE LEVERAGE DATA FOR PUBLIC ORGANIZATIONS TO
CREATE AND MAINTAIN AMAZING DIGITAL SPACES.**



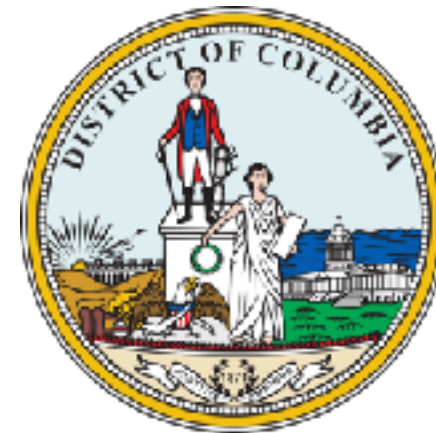
I.F. CLIENTS



BaltimoreCity.gov



MO.gov



DC.gov



SanDiego.gov

NYC Emergency
Management

ADVANCED WARNING SYSTEM

advancedwarningsystemNYC.org

DENVER WATER

...AND MORE



ABOUT: DENVER WATER PROJECT GOALS

- Design a clean, easy-to-navigate, modern and responsive new website
- Focus on improving Pay My Bill and Manage my account sections (the ones we had control over)
- Make Rebates & Conservation areas more robust
- Make it easy for residential, business customers and contractors to get general information
- Make content easier to administrate on the back-end
- Make customers happy, both external and internal!





CIVIC RESEARCH: CONSIDERATIONS

- Volume: number of visits on the site 1/4 million+/yr
- More audiences that need to be served
- Internal vs. External Stakeholders

RISK MITIGATION

- Research: three-pronged approach
 - Voice of Citizen
 - In-depth Interviews
 - Usability testing



CIVIC RESEARCH: URL DIAGNOSTIC TOOL

IF Voice of Citizen/Patron AI: Identify and determine elements associated with detractors

hasName: denverwater.voiceofpatron.voxlocal
vanity: denverwater
uuid04: xPf80GjCR10YcE-allrz0jg
total track length: 17145
total vox length: 763
Respondents: 725
num URLs: 302

Select date range:
2016-11-19 to 2017-05-31

Select zip codes to target:

Minimum number of users in zip:
5 10 15 20 25 30 35 40 45 50

Select device type to target:

Select variables to include in model fit:
pov browser dev_vendor zip freq rel
os os_ver dev_type

Which do you want to break apart?
pov freq rel browser dev_vendor
os_ver

Select a URL to view comments

Select categorical variable to plot
zip

Calculate!

GBM Comments Categorical Plots
Column visibility Copy Print Download
Show All entries

Search:

variable	rel_importance	El_robust	sig	n_users	n_comp	n_incomp
zip	0.15					
http://www.denverwater.org/billingrates/paybillaccountmanagement/mvaccount/	0.07	-1.02		115	67	27
os	0.06					
http://www.denverwater.org/billingrates/waterconsumptionhistory/	0.05			18	15	1
http://m.denverwater.org/	0.04	0		314	128	73
https://www.denverwater.org/pay-my-bill	0.04	0.1		63	38	7
http://www.denverwater.org/	0.04	-0.44		322	178	64
freq. unsure	0.03	0.05		33	22	11
http://www.denverwater.org/billingrates/paybillaccountmanagement/	0.03	-0.68		225	139	39
http://m.denverwater.org/paybill/	0.03	0.56		210	92	43
http://www.denverwater.org/careers/currentjoblistings/	0.03	0.58		29	13	10
freq. monthly	0.03	0		95	78	17
http://m.denverwater.org/jobs/	0.03	0.4		42	20	7



CIVIC RESEARCH: URL DIAGNOSTIC TOOL

IF Voice of Citizen/Patron AI: Identify and determine elements associated with detractors

hasName: denverwater.voiceofpatron.voxlocal
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total track length: 17145
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num URLs: 302

Select date

2016

Select zip

All

Minimum

30

Select dev

Select var

pay_bill
os_ver

Which do

pay_freq
os_ver

Select a U

http://w

Select cat

zip

Calcula

variable

rel_importance

El_robust

sig

All

AI

i

zip

0.15

<http://www.denverwater.org/billingrates/paybillaccountmanagement/myaccount/>

0.07

-1.02

os

0.06

<http://www.denverwater.org/billingrates/waterconsumptionhistory/>

0.05

<http://m.denverwater.org/>

0.04

0

<https://www.denverwater.org/pay-my-bill>

0.04

-0.1

<http://www.denverwater.org/>

0.04

-0.44

freq.unsure

0.03

0.05

<http://www.denverwater.org/billingrates/paybillaccountmanagement/>

0.03

-0.88

<http://m.denverwater.org/paybill/>

0.03

0.36

<http://www.denverwater.org/careers/currentjoblistings/>

0.03

0.58

freq.monthly

0.03

0

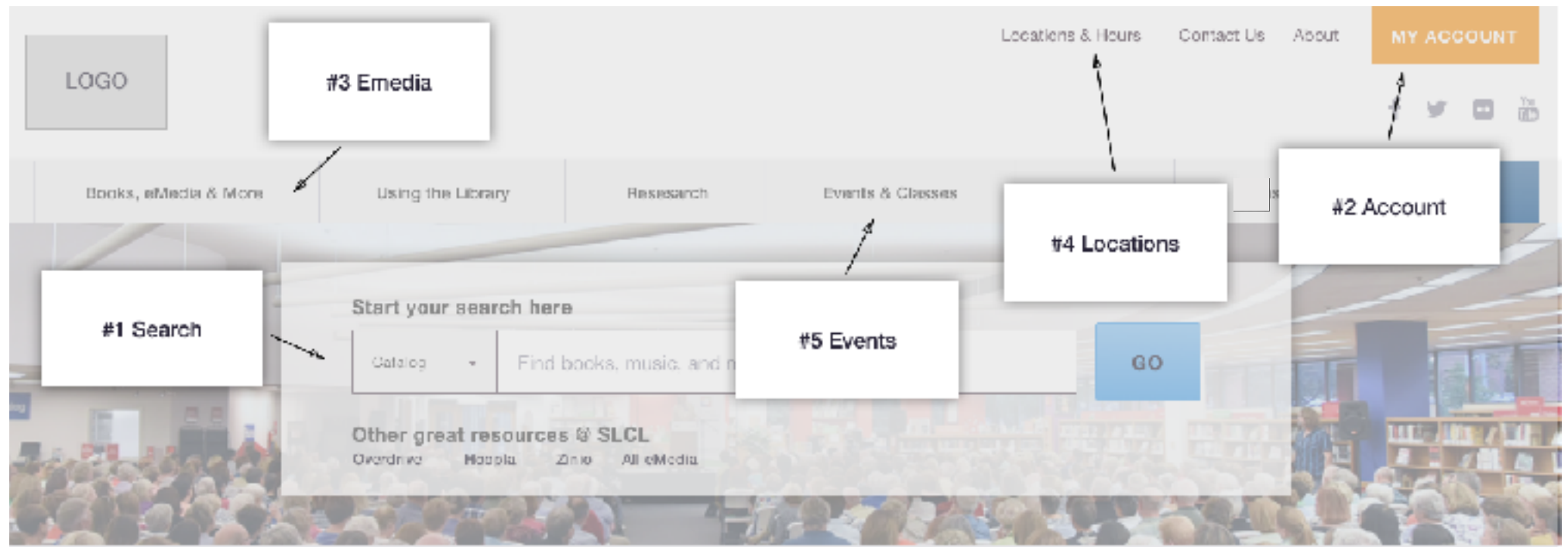
<http://m.denverwater.org/jobs/>

0.03

0.4



CIVIC RESEARCH: HOW WE USE IT



- Structure Information Architecture to support the most common tasks rather than on internal operational divisions.
- Feedback from millions of websites across America found that users value ease of use and intuitive organization over all other website design aspects or features.



DRUPAL 8!!!



DRUPAL 8!!!

Are we sure it's ready?



DRUPAL 8!!!

Are we sure it's ready?



What about caching?



DRUPAL 8!!!

Are we sure it's ready?



What's a "twig?"

What about caching?



DRUPAL 8!!!

Are we sure it's ready?

Bro, do you even YML?



What's a "twig?"

What about caching?



WE TOOK THE PLUNGE AND HAVEN'T LOOKED BACK

.....



WE TOOK THE PLUNGE AND HAVEN'T LOOKED BACK

.....



DRUPAL 8: MODULES

D7 Module	D8 Module
Admin Menu	Admin Toolbar
XMLSitemap	Simple XML Sitemap

- LinkIt (autocomplete linking)
- Date Popup (calendar widget)
- Entity Reference Tab Formatter (for accordions)
- Entity Reference Revisions (for paragraph embeds)
- Views Reference Field (also for paragraph embeds)
- File Entity (it's good enough, beta3)
- Menu Block (for things that didn't make it into core)
- Twig Tweak (more on this soon!)
- Paragraphs (more on this too!)



THE WAY AND WHY OF ZEN

禪 zen

extend and design



THE WAY AND WHY OF ZEN: COLORS

- Chroma (color management) built in <https://github.com/JohnAlbin/chroma> (`_colors.scss`)

```
$chroma: add-colors((
  black:          #000,
  grey-dark:      ('black' lighten 40%), // #666
  'grey':         ('black' lighten 60%), // #999
  grey-light:     ('black' lighten 80%), // #ccc
  grey-extra-light: ('black' lighten 93.33%), // #eee
  white:          #fff,

  blue:          #71b2c9,
  red:           #c00,
  yellow:        #fd0,
  green:         #4f7c23,
  light-green:    #b2d80c,
  dark-blue:     #002e5d,
  menu-blue:     #007dba,
  menu-blue-bg:  rgba(0, 124, 186, .8),
```

```
h2.open {
  background: color(dark-blue);
  color: color(light-blue);
}
```



THE WAY AND WHY OF ZEN: TYPOGRAPHY

- Powerful font management (`_variables.scss`)

```
// DW fonts
$lato: 'Lato', sans-serif;
$pt-sans: 'PT Sans', sans-serif;
$lora: 'Lora', serif;

// The font faces you specify in the $typefaces map can be used in the
// typeface() mixin.
$typefaces: (
  body: (
    font-family: $lato,
  ),
  monospace: (
    font-family: $menlo,
  ),
  compact: (
    font-family: $impact,
    weight: bold,
    case: uppercase,
    // We could also specify the following property:
    // letter-spacing: .5px,
  ),
  menu-sans: (
    font-family: $lato
  ),
  light: (
    font-family: $lato,
    weight: light,
  ),
);
```

```
@include typeface(menu-sans);
```



THE WAY AND WHY OF ZEN: RESPONSIVE

- Easy breakpoint definition (`_variables.scss`)

```
@include add-breakpoint(s,    (414px, 'no-query' true)); // Large Phone
@include add-breakpoint(m,    (768px, 'no-query' true)); // Tablet Vertical
@include add-breakpoint(l,    (1024px, 'no-query' true)); // Laptop || Tablet Horizontal
@include add-breakpoint(xl,   (1200px, 'no-query' true));
@include add-breakpoint(xxl,  (1300px));
@include add-breakpoint(xxxl, (1440px));
```

```
#block-dw-zen-main-menu {
  @include respond-to('l') {
    width: 100%;
    text-align: center;
    left: 0;
    height: 75px;
    position: relative;
    background: color(menu-blue-bg);
  }
}
```



TRY IT YOURSELF WITH DRUSH ZEN

drush zen "your theme name" machine_name --description="Description"

```
└─> drush zen "My Theme" machine_name --description="Description"
Copying files from starter kit...
Updating .info.yml file...
Replacing "STARTERKIT" in all files...
Starter kit for "machine_name" created in: /Users/jamessaul/fulcrum/sites/www.denverwater.ifdev/docroot/themes/my_theme
```

All you need to do is move the theme into your /themes/custom directory and start playing!



TWIG ESSENTIALS: TURN ON DEBUGGING!

First, make sure you have a settings.local.php and a development.services.yml configured.

<https://www.drupal.org/node/2598914>

```
# Local development services.  
#  
# To activate this feature, follow the instructions at the top of the  
# 'example.settings.local.php' file, which sits next to this file.  
parameters:  
  twig.config:  
    debug: true  
    auto_reload: true  
    cache: false  
  
services:  
  cache.backend.null:  
    class: Drupal\Core\Cache\NullBackendFactory
```



TWIG ESSENTIALS: TURN ON DEBUGGING!

```
▼<div class="dw-mega residential">
  <!-- THEME DEBUG -->
  <!-- THEME HOOK: 'block' -->
  <!-- FILE NAME SUGGESTIONS:
    * block--menu-residential.html.twig
    * block--menu-block--residential.html.twig
    x block--menu-block--main.html.twig
    * block--menu-block.html.twig
    * block--system-menu-block.html.twig
    * block.html.twig
  -->
  <!-- BEGIN OUTPUT from 'themes/custom/dw_zen/templates/navigation/block--menu-block--main.html.twig' -->
  ►<h2 id="block-menu-residential-menu">.</h2> == $0
  ▼<nav role="navigation" aria-labelledby="block-menu-residential-menu" id="block-menu-residential" class="contextual-region block
  block-menu navigation menu--main">
    <!-- THEME DEBUG -->
    <!-- THEME HOOK: 'menu' -->
    <!-- FILE NAME SUGGESTIONS:
      * menu--residential.html.twig
      x menu--main.html.twig
      * menu.html.twig
    -->
    <!-- BEGIN OUTPUT from 'themes/custom/dw_zen/templates/navigation/menu--main.html.twig' -->
    ►<ul class="menu menu-level--0">.</ul>
    <!-- END OUTPUT from 'themes/custom/dw_zen/templates/navigation/menu--main.html.twig' -->
  </nav>
  <!-- END OUTPUT from 'themes/custom/dw_zen/templates/navigation/block--menu-block--main.html.twig' -->
  .
```



TWIG ESSENTIALS: TURN ON DEBUGGING!

```
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    x block--menu-block--main.html.twig
    * block--menu-block.html.twig
    * block--system-menu-block.html.twig
    * block.html.twig
  -->
  <!-- BEGIN OUTPUT from 'themes/custom/dw_zen/templates/navigation/block--menu-block--main.html.twig' -->
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      x menu--main.html.twig
      * menu.html.twig
    -->
    <!-- BEGIN OUTPUT from 'themes/custom/dw_zen/templates/navigation/menu--main.html.twig' -->
    ▶<ul class="menu menu-level--0">.</ul>
    <!-- END OUTPUT from 'themes/custom/dw_zen/templates/navigation/menu--main.html.twig' -->
  </nav>
  <!-- END OUTPUT from 'themes/custom/dw_zen/templates/navigation/block--menu-block--main.html.twig' -->
```

It makes me calm



TWIG TWEAK

https://www.drupal.org/project/twig_tweak

“Twig extension with some useful functions and filters that can improve development experience.”



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“Twig extension with some useful functions and filters that can improve development experience.”



TWIG TWEAK: EMBEDDING A BLOCK

DRUPAL 7

```
$block = module_invoke('block', 'my_block');  
print render($block['content']);
```

DRUPAL 8 WITH TWIG TWEAK

```
{{ drupal_block('my_block', false) }}
```

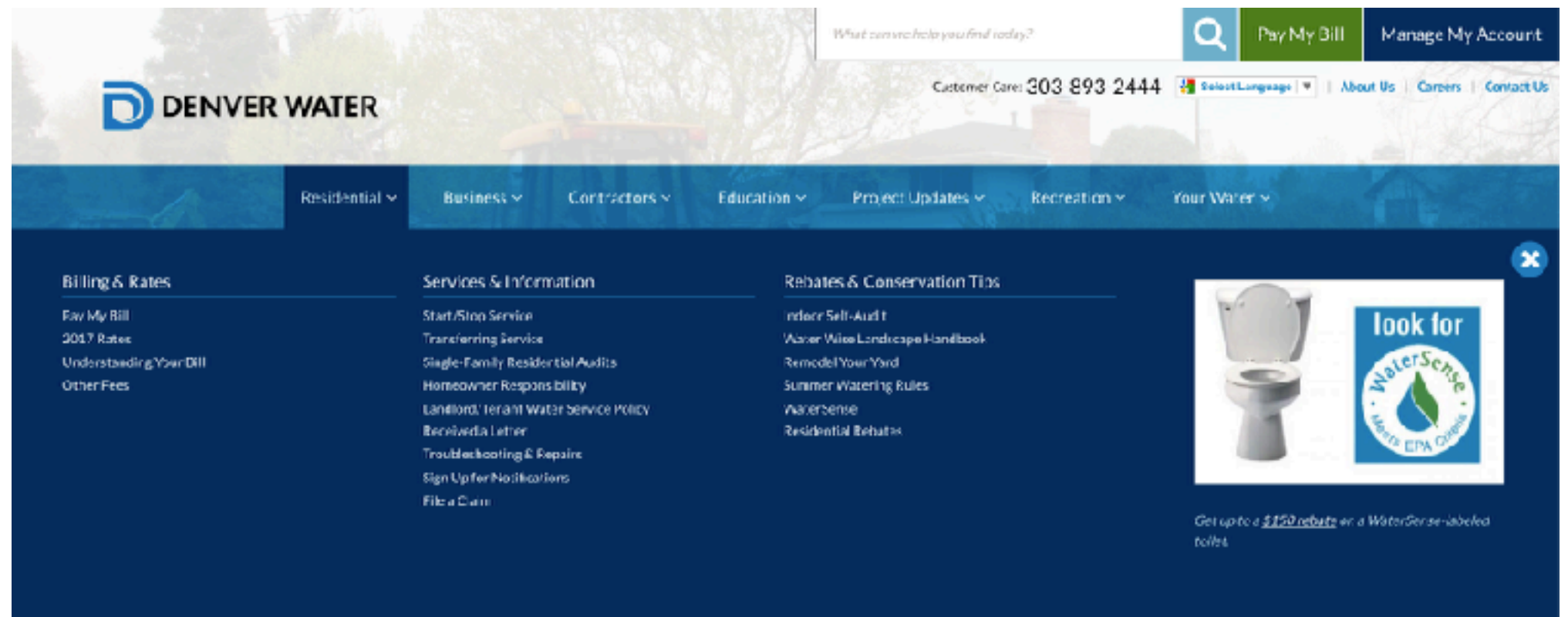


TWIG TWEAK IN ACTION: THE DW MEGAMENU

```
<nav role="navigation" aria-labelledby="{{ heading_id }}"{{
attributes.addClass(classes)|without('role', 'aria-labelledby') }}>
  <span class="mobile-menu-header">Menu</span>
  <div class="dw-mega residential">
    {{ drupal_block('menu_residential', false) }}
    {{ drupal_block('menu_residential_image', false) }}
  </div>
  <div class="dw-mega business">
    {{ drupal_block('menu_business', false) }}
    {{ drupal_block('menu_business_image', false) }}
  </div>
  <div class="dw-mega contractors">
    {{ drupal_block('menu_contractors', false) }}
    {{ drupal_block('menu_contractors_image', false) }}
  </div>
  <div class="dw-mega education">
    {{ drupal_block('menu_education', false) }}
    {{ drupal_block('menu_education_image_1', false) }}
    {{ drupal_block('menu_education_image_2', false) }}
  </div>
```



TWIG TWEAK IN ACTION: THE DW MEGAMENU



DRUPAL 8 AND PARAGRAPHS

<https://www.drupal.org/project/paragraphs>

- Pages broken out into individual, fieldable components. Not just fields themselves
- Paragraphs and paragraph types become the building blocks of the site
- Stable in D8: running on two production sites of ours and currently in use on other D8 projects in development
- We've flipped the Content Type architecture on its head: now we lead with Paragraphs-based architecture!



PARAGRAPHS: SAMPLE PARAGRAPH TYPES

➤ Text

Content [Show row weights](#)

✚ Text [Collapse](#)

Content

B I Normal Source

Cool paragraph, bro.

body p

Text format Basic HTML [About text formats](#)

➤ Embedded Content
(node, view, block)

✚ Embedded Content [Collapse](#) [Show row weights](#)

Content

✚

Add another item

View

Display id

Master

Argument

☐ Include View Title

Block

- None -

PARAGRAPHS: SAMPLE PARAGRAPH TYPES

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➤ Embedded Content
(node,
view, block)

Embedded Content [Collapse](#) [Show row weights](#)

Content

Add another item

View

Display id

Argument

☐ Include View Title

Block

entity_reference_revisions

views_reference_field

PARAGRAPHS: SAMPLE PARAGRAPH TYPES

➤ Accordion

✚ Accordion Collapse Show row weights

Accordion

✚ The need to raise residential rates (224)	<input type="radio"/>
✚ Your water rates at work (225)	<input type="radio"/>
✚ Questions about how 2017 rates affect your bill? (226)	<input type="radio"/>
✚ Did you know? (227)	<input type="radio"/>
✚	<input type="radio"/>

Add another item

➤ Video Gallery

✚ Video Gallery Collapse Show row weights

Video Link

✚

Enter the YouTube URL. Valid URL formats include: <http://www.youtube.com/watch?v=1EqBdS0XK4> and <http://youtube/1EqBdS0XK4>

Add another item



PARAGRAPHS: SAMPLE PARAGRAPH TYPES

.....

Never gonna
give you up
Never gonna
let you down

28:59 / 10:00:00

10 Hours of Rick Astley - Never Gonna Give You Up



PARAGRAPHS: CONFIGURATION

[Home](#) » [Administration](#) » [Structure](#)

Paragraphs types

[Add paragraphs type](#)

Paragraphs types	Machine name	Operations
Accordion	accordion	Manage fields ▼
Call To Action Box	call_to_action_box	Manage fields ▼
Content Grid	content_grid	Manage fields ▼
Embedded Content	embedded_content	Manage fields ▼
Files	files	Manage fields ▼
Map	map	Manage fields ▼
Photo Gallery	photo_gallery	Manage fields ▼
Text	content	Manage fields ▼
Video Gallery	video_gallery	Manage fields ▼

Just like content types!



PARAGRAPHS: EASY FOR END USERS

[Back to site](#) [Manage](#) [Shortcuts](#) [admin@denver.com](#)

[Content](#) [Structure](#) [Appearance](#) [Extend](#) [Configuration](#) [People](#) [Reports](#) [Help](#)

[Home](#) » [Node](#) » [2017 Residential Water Rates](#)

Edit Basic page 2017 Residential Water Rates

[View](#) [Edit](#) [Delete](#) [Revisions](#)

Title
2017 Residential Water Rates

Layout

Text
Content

Rates Effective April 1

In December 2016, the Denver Board of Water Commissioners adopted rate changes to fund essential repairs and upgrades to Denver Water's system, effective April 1, 2017.

There are 162 major projects identified in Denver Water's capital plan, ranging from replacing aging pipes and filling underground storage tanks to upgrading water treatment facilities, warehouses and mechanical shops.

These projects, in addition to Denver Water's expenses associated with day-to-day operations and unplanned work, like water main breaks, are funded by water rates. Sewer rates, water revenues, hydro power sales and fees for raw service (called System

Text Format: Full HTML

Accordion

Accordion

+

There need to raise residential rates (214)

-

+

Your water costs at work (215)

-

+

Questions about how 2017 rates affect your bill? (220)

-

+

Did you know? (229)

-

+

-

Add another item

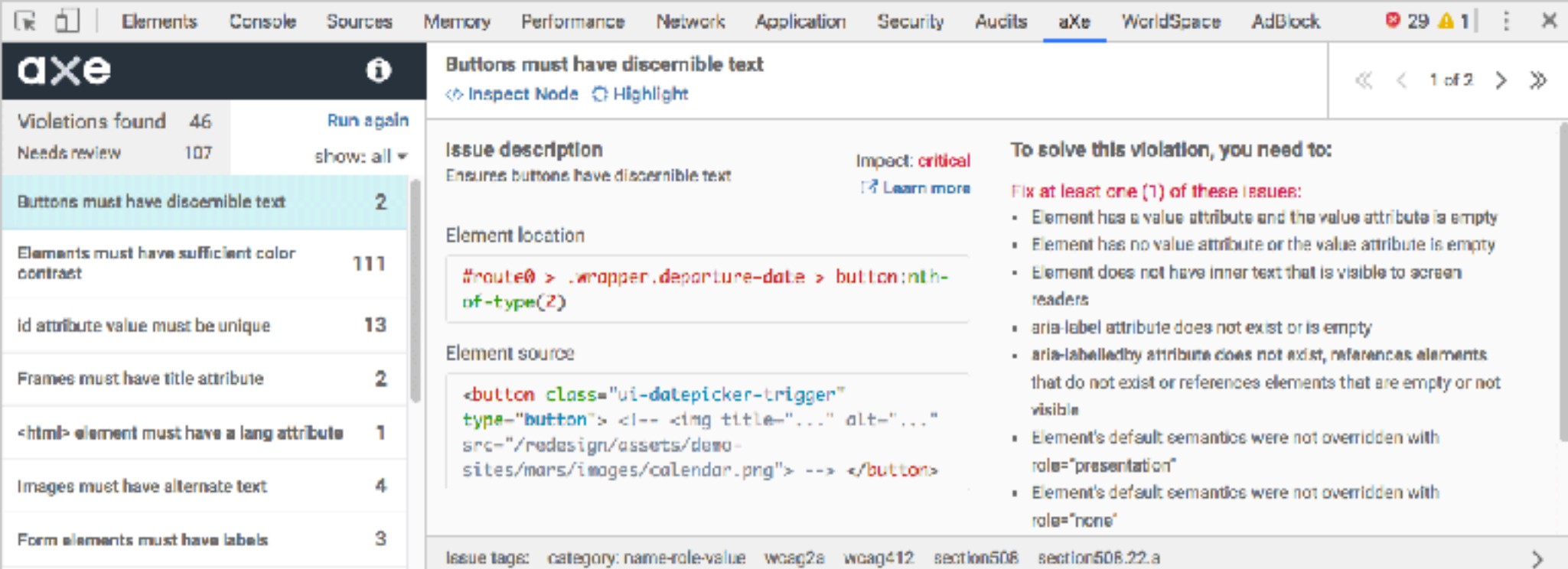
Text
Content

Residential Treated Water Rates

For rates, visit [denverwater.com](#) April 1, 2017.

ACCESSIBILITY

- Contrast Errors
- Accessible Forms



The screenshot displays the axe accessibility tool interface. On the left, a sidebar lists various violations found on the page:

Violations found	Needs review
46	107

Below this, a list of specific violations is shown:

Violation	Count
Buttons must have discernible text	2
Elements must have sufficient color contrast	111
Id attribute value must be unique	13
Frames must have title attribute	2
<html> element must have a lang attribute	1
Images must have alternate text	4
Form elements must have labels	3

The main panel shows details for the selected violation: "Buttons must have discernible text". It includes an issue description, impact (critical), element location, and the element source code. The source code shows a button element with a class attribute and a comment indicating a missing alt attribute for an image.

Issue description: Ensures buttons have discernible text. Impact: critical. [Learn more](#)

Element location: `#route0 > .wrapper.departure-date > button:nth-of-type(2)`

Element source: `<button class="ui-datepicker-trigger" type="button"> <!-- --> </button>`

To solve this violation, you need to:

- Fix at least one (1) of these issues:
- Element has a value attribute and the value attribute is empty
- Element has no value attribute or the value attribute is empty
- Element does not have inner text that is visible to screen readers
- aria-label attribute does not exist or is empty
- aria-labelledby attribute does not exist, references elements that do not exist or references elements that are empty or not visible
- Element's default semantics were not overridden with role="presentation"
- Element's default semantics were not overridden with role="none"

Issue tags: category: name-role-value wcag2a wcag412 section508 section508.22.a

<https://www.deque.com/products/axe/>



ACCESSIBILITY: CONTRAST ERRORS

- “WCAG 2.0 requires that the foreground and background colors have a 4.5:1 contrast ratio at Level AA” (<http://webaim.org/blog/wcag-2-0-and-link-colors/>)
- Zen makes it easy to switch these color values!!

```
$chroma: add-colors(  
  black:          #000,  
  grey-dark:      ('black' lighten 40%), // #666  
  'grey':         ('black' lighten 60%), // #999  
  grey-light:     ('black' lighten 80%), // #ccc  
  grey-extra-light: ('black' lighten 93.33%), // #eee  
  white:          #fff,  
  
  blue:           #71b2c9,  
  red:            #c00,  
  yellow:         #fd0,  
  green:          #4f7c23,  
  light-green:    #b2d80c,  
  dark-blue:      #002e5d,  
  menu-blue:      #007dba,  
  menu-blue-bg:   rgba(0, 124, 186, .8),
```



ACCESSIBILITY: FORMS

- All form elements need a `<label>` or label designation in the code
- Just show the `<label>` whenever you can
- Use “visually-hidden” class on `<label>`
- Use “aria-label” on the form element



Thirsty for news to hydrate your mind?

Sign up to receive Denver Water's TAP weekly headlines

Subscribe

```
▼<div class="field">  
  <input type="text" class="text field fb-email" size="35" name="86259" value  
  placeholder="Email address" aria-label="Email address"> == $0  
  <div class="field_error">  
  </div>
```

- <https://www.w3.org/WAI/tutorials/forms/labels/>



NOTES ON CACHING

- If you are using an outside cache (i.e. Varnish/CF), make sure that the internal page cache module is disabled. It will cause conflicts.
- It appears that purgers are cron-based at the moment.
- Documentation out on Drupal 8 and cache tags is at minimum conflicting, at worst, can lead you in the wrong direction. Top Google hits are outdated, you really have to dig to find stuff.
- Cache tags are the suggested Drupal 8 caching mechanism. When you mix with non-enterprise Cloudflare, cache tags off the table and you have to use URL-based purging, which has the potential to be very heavy-handed on more complex sites. Purging files also takes some extra effort.
- We built a Paragraph Entity Caching module, inspired by some code developed by svendecabooter. More details on <https://www.drupal.org/node/2855735>



WHERE WE ARE ONE MONTH FROM LAUNCH

- Happy content editors, but haven't heard much from end users or higher-ups.
- Tons of work in the pipeline: new videos, replacing Google Maps with MapBox, improving dynamic water data and weather data imports, and more!
- We finished our bug fix sprint about two weeks ago.



TAKEAWAYS

- Civic research, including our analytics tools and interviews revealed the design problems we had to fix for end users.
- Zen is a powerful theme with tons of helper functions to save time with colors, type, responsive. It also helps mitigate risk against lots of time being spent on contrast fixes.
- Drupal 8 is totally production-ready, and a paragraphs-based architecture gives content editors an amazing experience with lots of flexibility.





QUESTIONS?

Interpersonal Frequency



THANK YOU

.....

