Asheville's River Arts District: Brownfields and Breweries

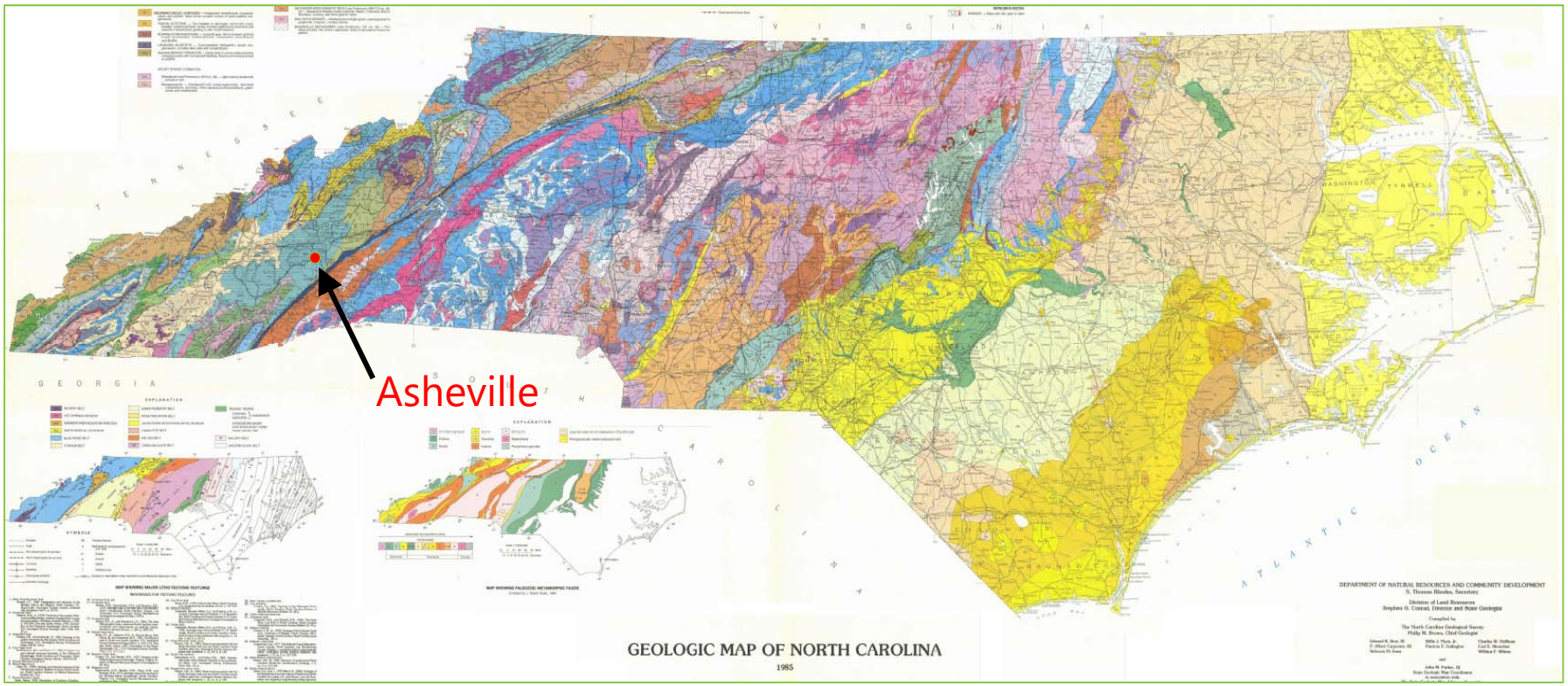
Susan Avritt, PE, PG

Chuck Pippin, PG

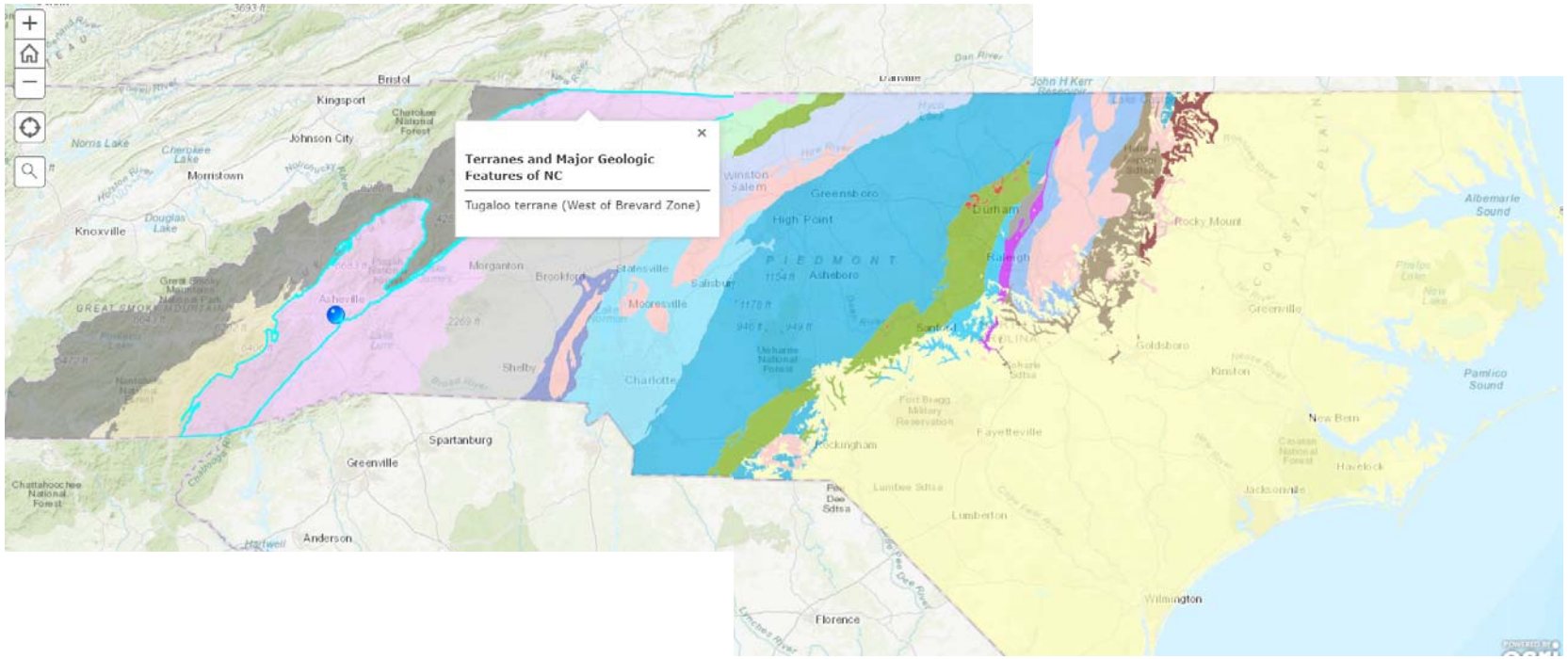
Overview

- About Us
- Geology
- The River
- RAD History
- RAD Redevelopment
- Regulatory Programs
- RAD Environmental Sites
  - Asheville Tannery (Wedge Brewing)
  - Karen Cragnolin Park
  - 14 Riverside Drive
  - New Belgium Brewing
- Please upload the Guidebook slides using the Meeting App

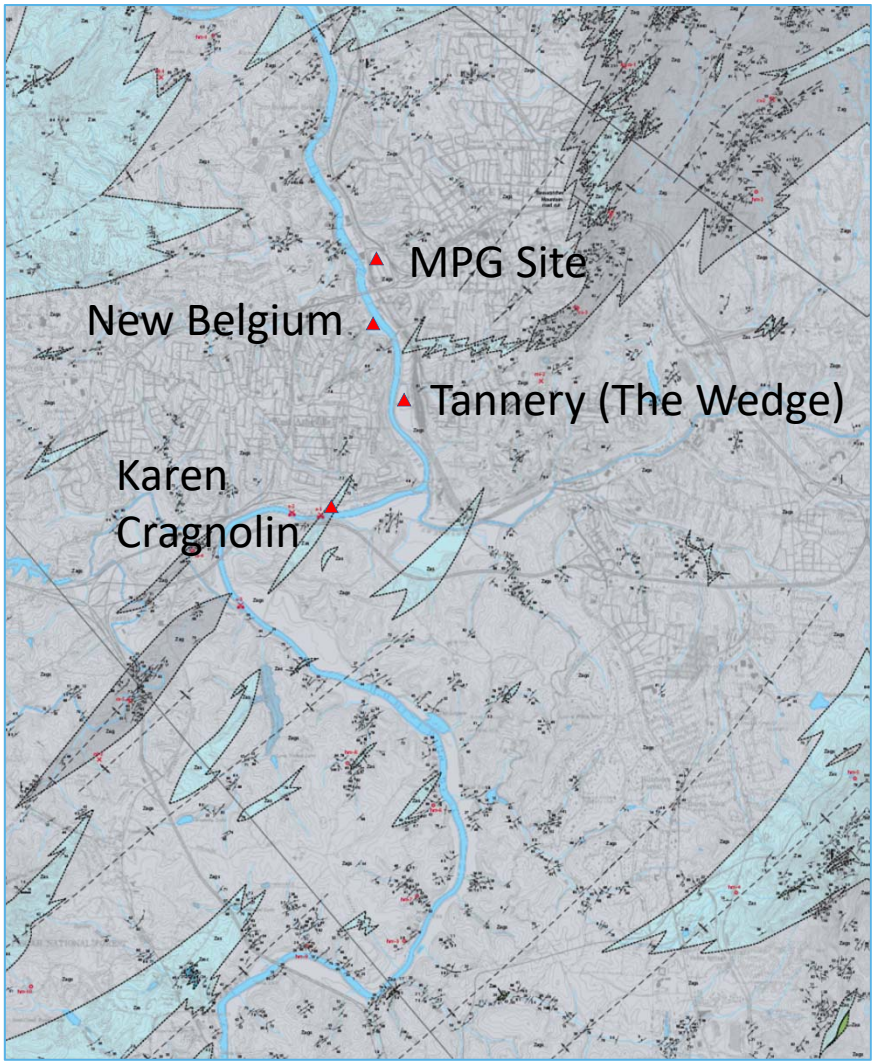
Geology



Geology


Terranes and Major Geologic Features of NC
Tugaloo terrane (West of Brevard Zone)
Bristol
Kingsport
Johnson City
Morristown
Knoxville
Asheville
Morganton
Brookford
Statesville
Mooresville
Salisbury
Winston-Salem
Greensboro
High Point
Asheboro
Durham
Raleigh
Rocky Mount
Greenville
Goldsboro
Kinston
New Bern
Havelock
Jacksonville
Fayetteville
Lumberton
Wilmington
Florence
Charlotte
Shelby
Spartanburg
Greenville
Anderson
Albemarle Sound
Pamlico Sound
PIEDMONT
COASTAL PLAIN

Geology



MAP UNITS

ASHE METAMORPHIC SUITE

Late Proterozoic
Stratigraphic relations uncertain

Zags	Schistose Metagraywacke
Zag	Metagraywacke
Zas	Sillimanite-Garnet-Chlorite-Mica Schist
Zaa	Amphibolite
Zasc	Chloritoid-Garnet-Chlorite-Quartz-Muscovite Schist

From: *Bedrock Geologic Map of the Asheville, 7.5 Minute Quadrangle,* Miller, J.W. and Fryer, K.H., 2008

Geology

ASHE METAMORPHIC SUITE

- Predominantly schistose metagraywacke (Zags),
- Less abundant metagraywacke (Zag) and garnet-mica schist (Zas), and minor amphibolite (Zaa) and chloritoid-garnet-chlorite-quartz-muscovite schist (Zasc).
- The sequence in the Asheville 7.5 minute quadrangle is composed dominantly of continentally derived clastic sediments with minor amounts of interlayered volcanics. Deposition occurred in a marine basin. The Ashe Metamorphic Suite has been metamorphosed to sillimanite grade, amphibolite facies.

o **Schistose Metagraywacke (Zags)**

- Light to medium gray;
- Nonfoliated to weakly foliated; fine to medium grained; granoblastic to lepidoblastic;
- Layering ranges from centimeters to several meters.
- Consists of 35-58% quartz, 20-41% plagioclase, 2-15% K-feldspar, 10-20% biotite, 0-10% muscovite, 0-5% almandine, widespread traces of zircon, and occasional traces of apatite, calcite, rutile, ilmenite, pyrrhotite, pyrite, and chalcopyrite.

o **Metagraywacke (Zag)**

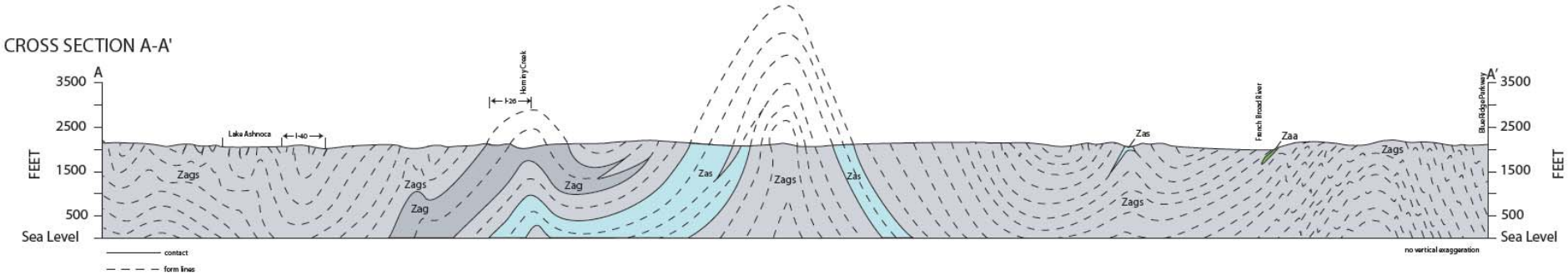
- Light to dark gray;
- Nonfoliated to strongly foliated; fine to medium grained; granoblastic to lepidoblastic;
- Layering ranges from centimeters to several meters.
- Consists of 20-70% quartz, 10-50% plagioclase, 0-30% K-feldspar, 10-20% biotite, 0-7% almandine, 0-5% muscovite; traces to locally minor epidote, clinozoisite, kyanite, sillimanite, staurolite; and traces of cummingtonite, zircon, apatite, calcite, rutile, ilmenite, magnetite, hematite, pyrrhotite, pyrite, and chalcopyrite.

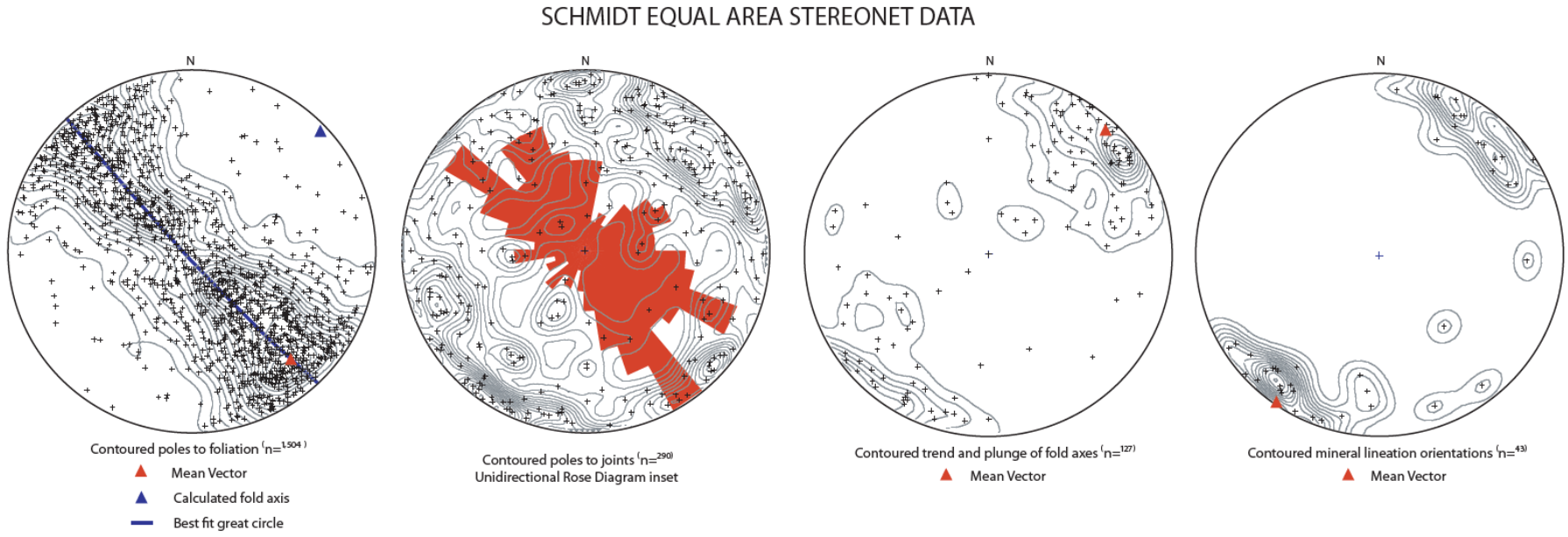
o **Colluvium/River Deposits**

- Generally river deposits composed of sand and gravel deposited on partially weathered or un-weathered bedrock.

From: *Bedrock Geologic Map of the Asheville, 7.5 Minute Quadrangle,* Miller, J.W. and Fryer, K.H., 2008

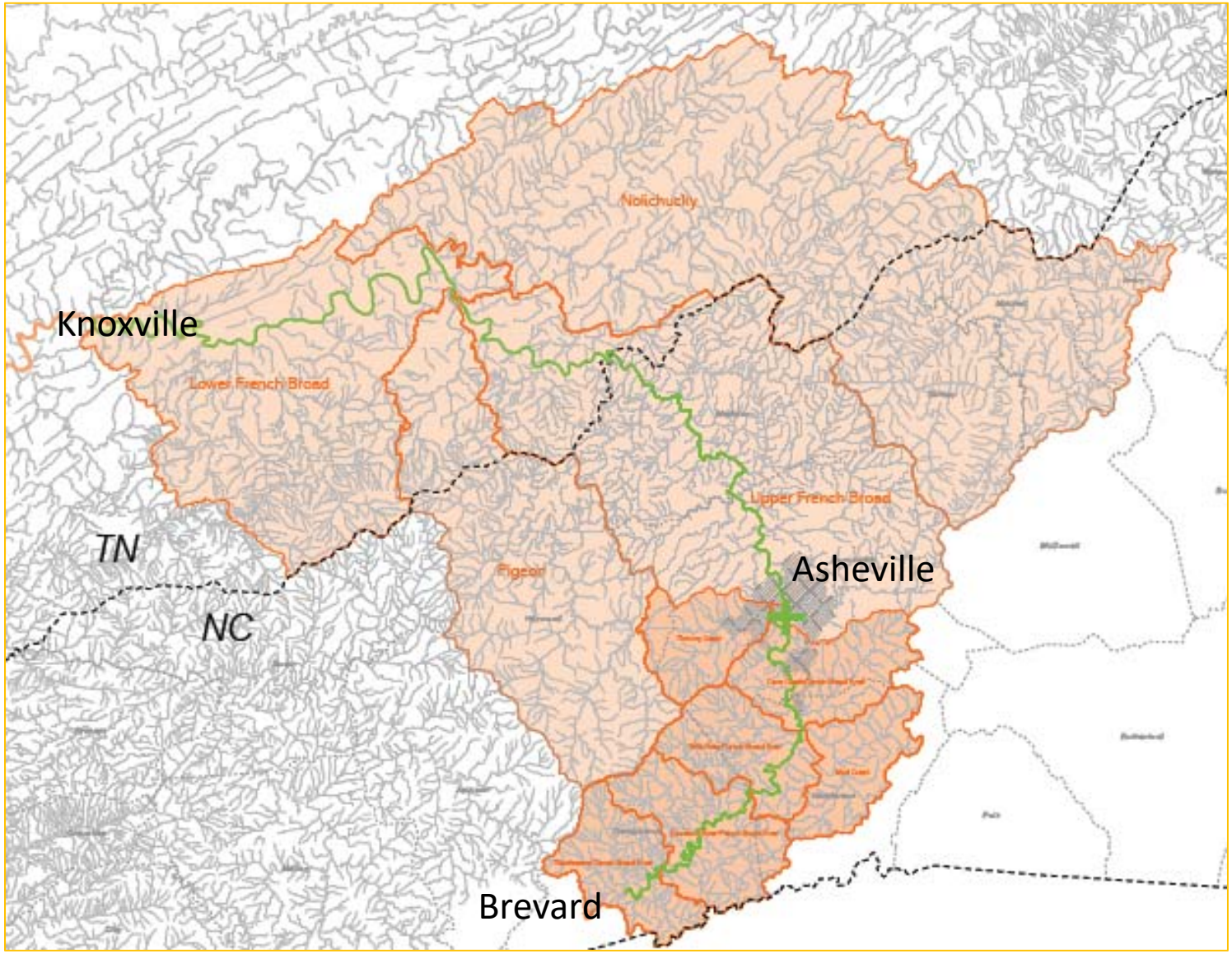
Geology





From: *Bedrock Geologic Map of the Asheville, 7.5 Minute Quadrangle,* Miller, J.W. and Fryer, K.H., 2008

French Broad River



French Broad River

- 3rd oldest in the world
- Basin spans 2,800 square miles
- Headwaters near Brevard, NC
- Main channel largely undammed until Knoxville
- Large fluctuations and flooding (700 to 40,000+ cfs)
- "Too thick to drink, too thin to plow" (Wilma Dykeman)
- Agriculture, non-point source contaminants
  - Pathogens, pesticides, turbidity
  - Habitat degradation
  - 127 NPDES Permits (2010)
- Significant efforts by many environmental groups and stakeholders to mitigate impacts

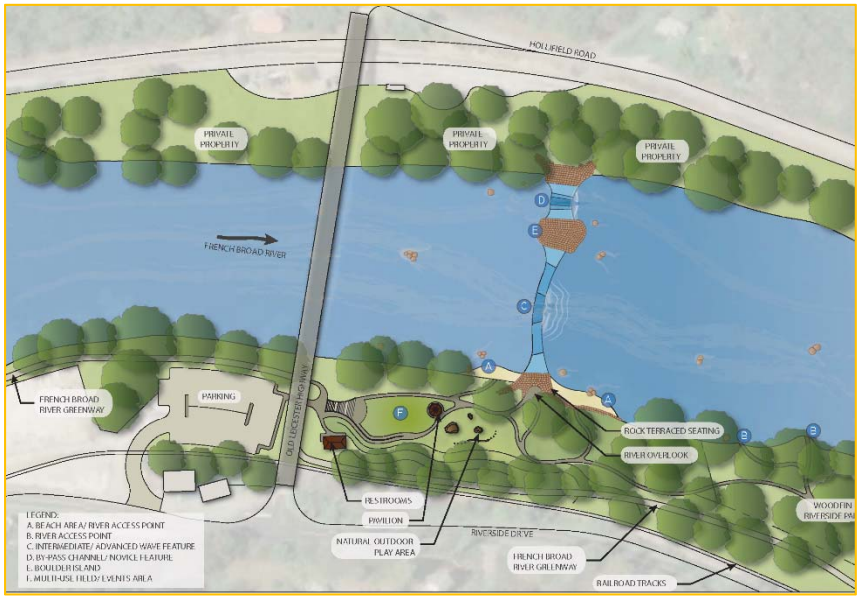
French Broad River: 1910 and 1916 floods

Debris Near Asheville Concrete Bridge at Height of Flood.

French Broad River: 2004 flood

French Broad River

- Popular tourism destination
  - Fishing
  - Rafting
  - Tubing
- Woodfin Greenway and Blueway
  - Man-made whitewater wave



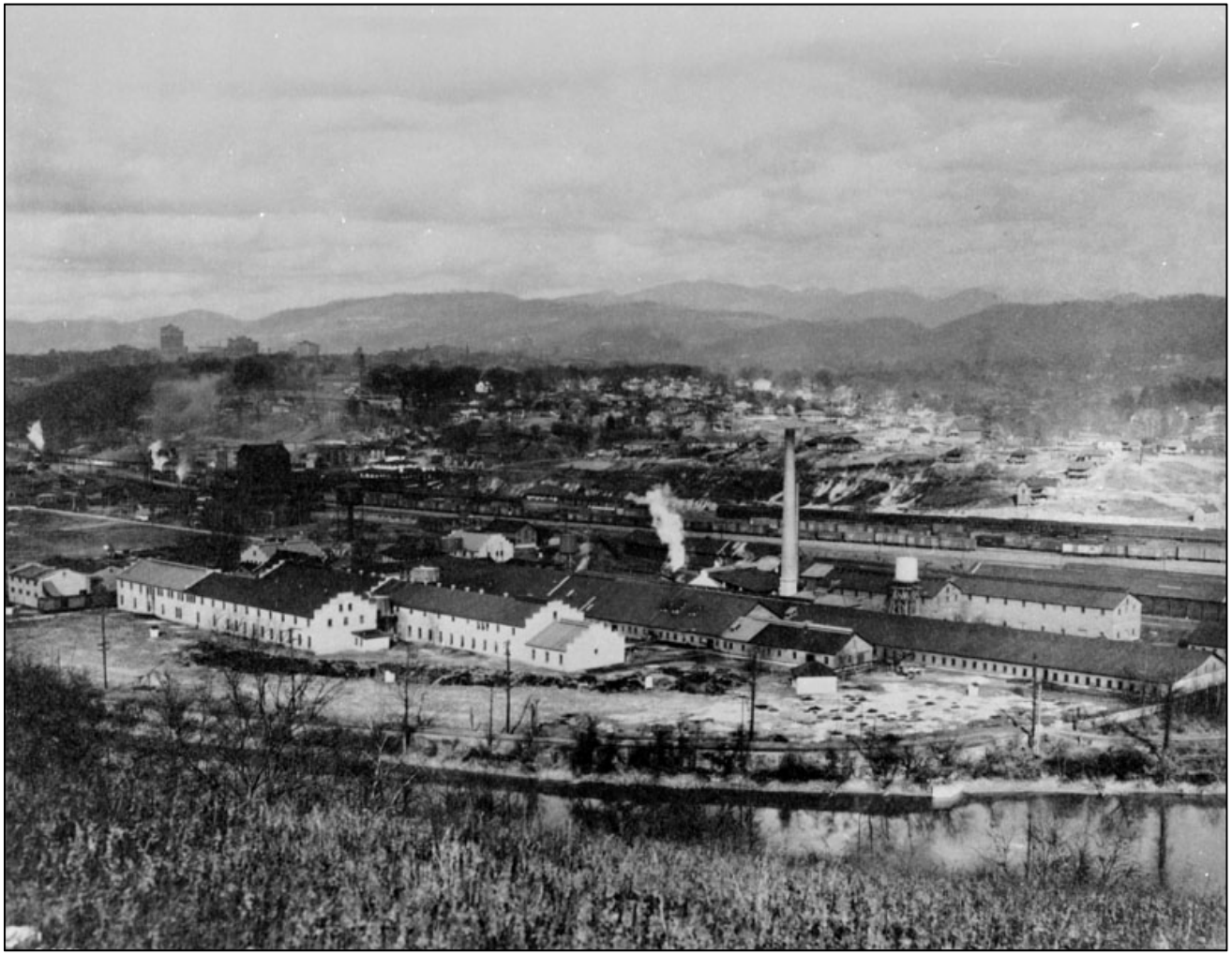
RAD History

- Railroad completed in 1882
- Asheville population boomed
- Several mills, utilizing the river for water
- Mill homes, merchants, etc.

1920: Cotton Mill

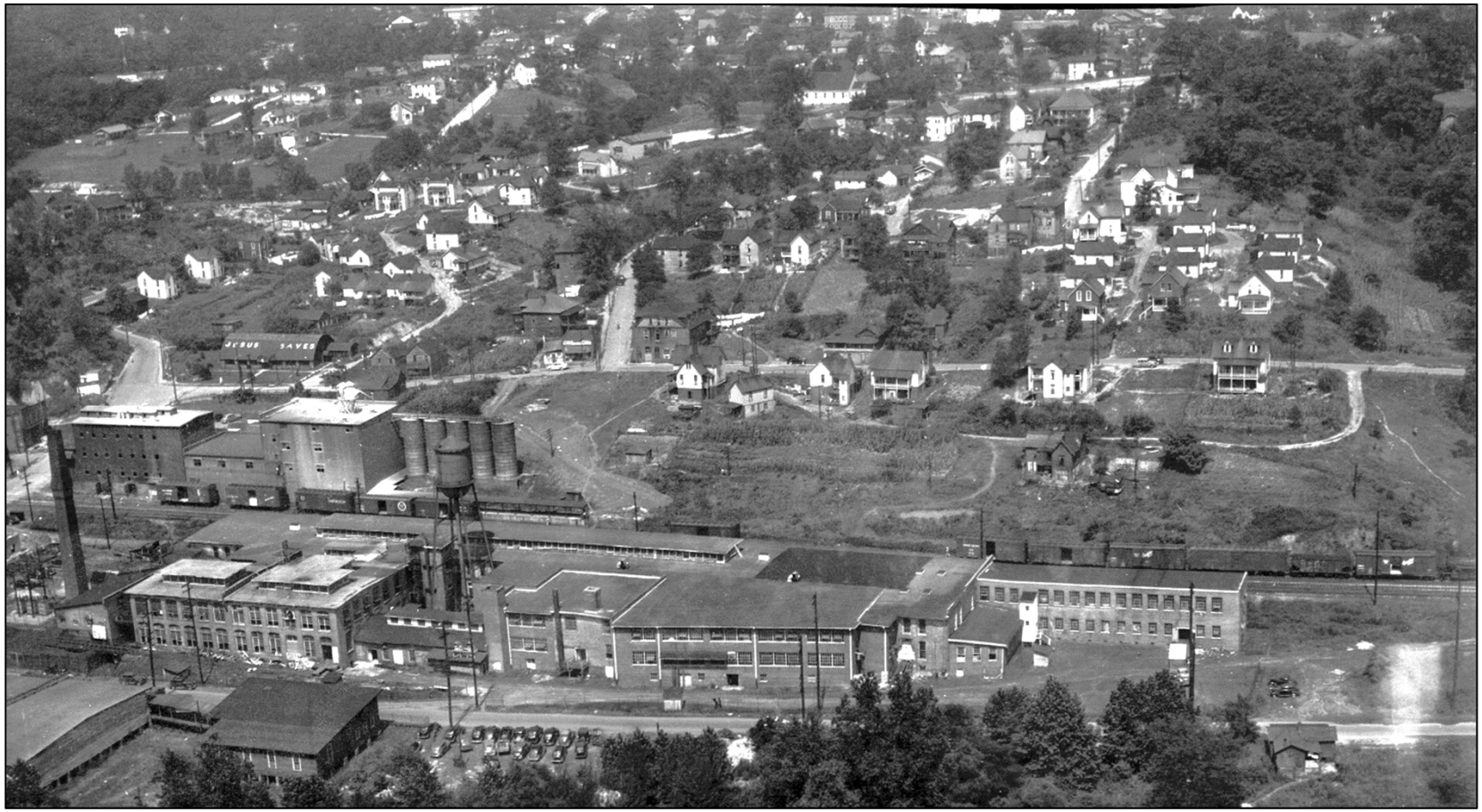
Train Depot

RAD History



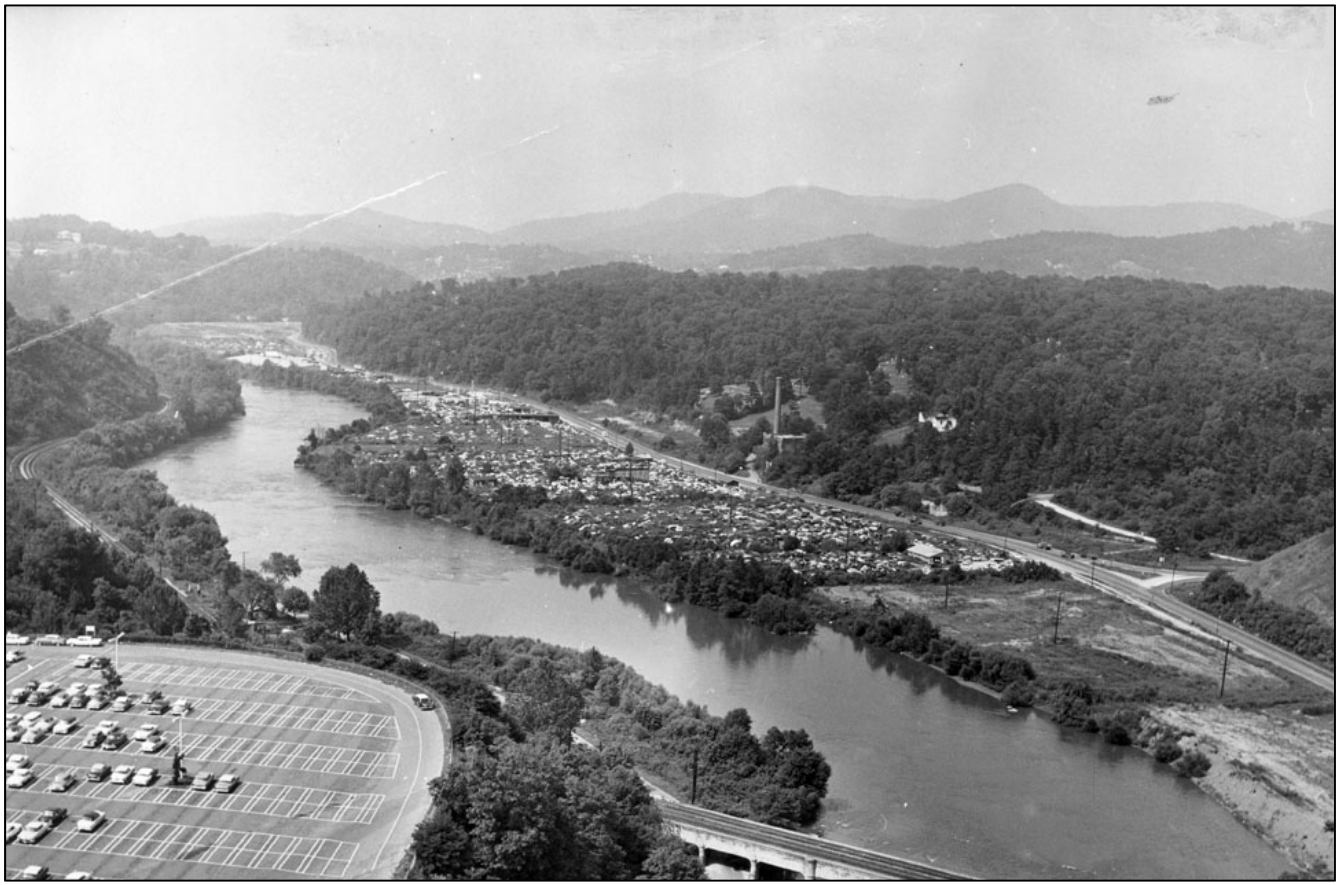
1929: Hans Reese Sons Tannery

RAD History



1945: Cotton and Grist Mills and Chicken Hill (residences)

RAD History



1960: Junkyards and trash

RAD History

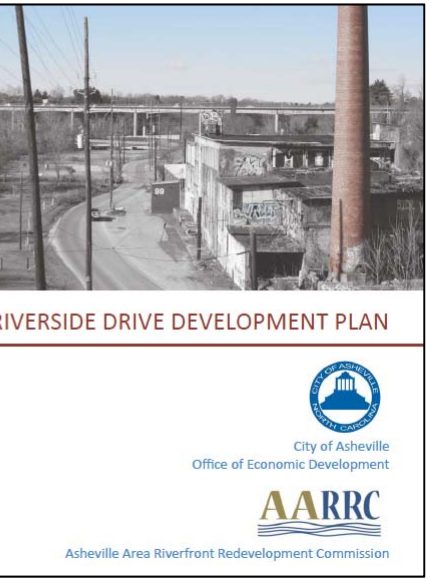
- 1970s Asheville renaissance
  - Couple buys investment property
  - Affordable spaces rented to artists
  - Artists are stewards in the district
- Historical industrial uses
  - Mills/manufacturing
  - Junkyards
  - Railroad switchyard
  - Metal recycling
  - Warehousing
- Now commercial and residential

RAD History

- Asheville Motor Speedway
- 1960s to late 1990s
- Old-school NASCAR races, 0.3-mile track
- Riverlink purchased in 1998 (now City of Asheville)
- Now Carrier Park

RAD Redevelopment

- Riverlink
  - Started in mid-1980s
  - Encourage visitors to “stay one more day”
- Wilma Dykeman Riverway Master Plan
- RADTIP: under construction
  - 2.2-mile corridor
  - Multi-modal traffic improvements
  - $37 million
  - Completion in 2020



NC Department of Environmental Quality

- Water Recourses
- Solid Waste Section
- Underground Storage Tank Section
- Inactive Hazardous Sites Branch
- Registered Environmental Consultant Program (voluntary)
- Brownfields Program (established in 1997)
    - Under-utilized properties redeveloped/reused
    - Incentivize redevelopment, tax breaks
    - Risk-based remediation
    - Land use restrictions
    - On-going monitoring

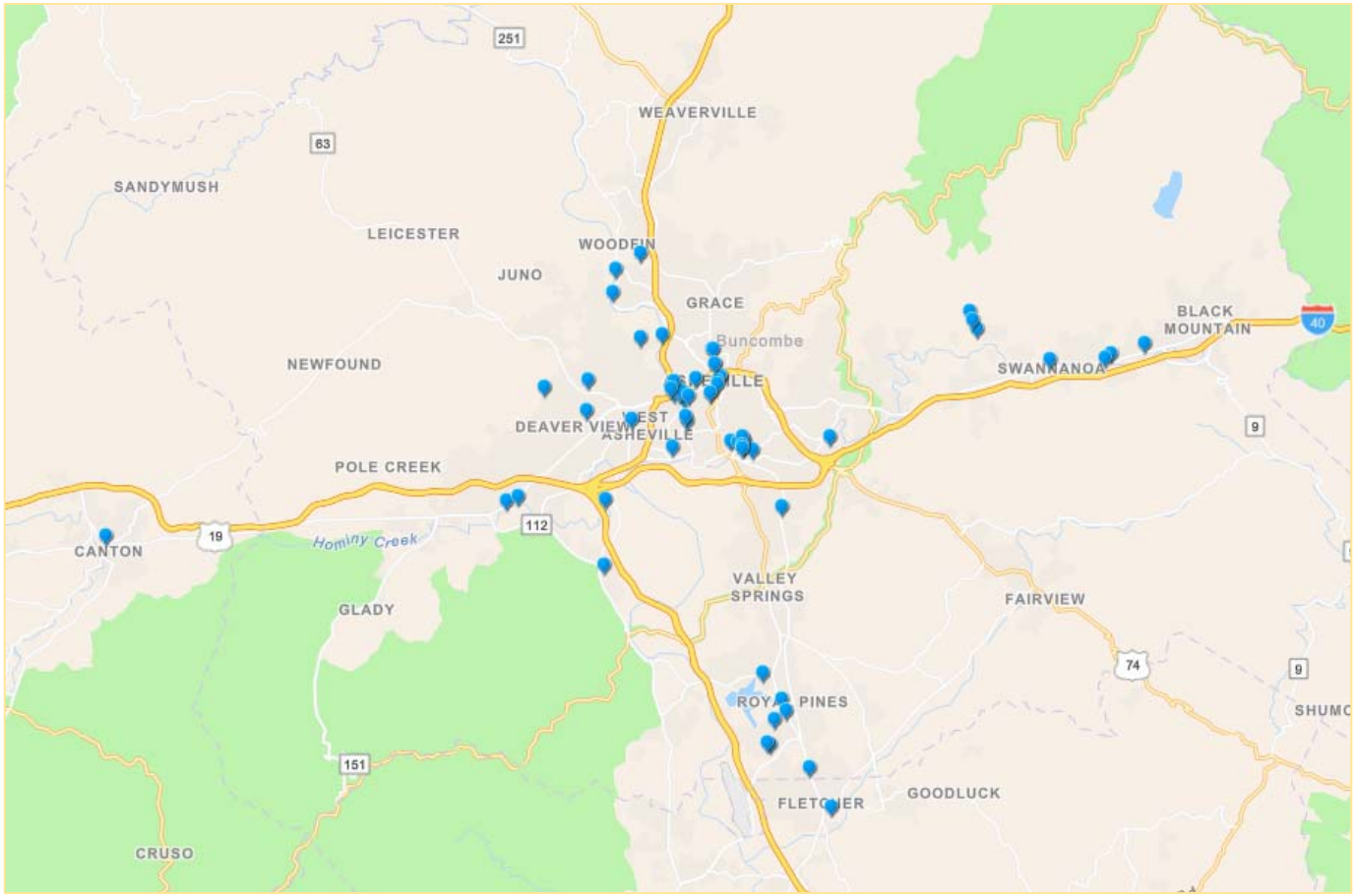
Regulatory History

NC Brownfields Program

- Brownfield Property Reuse Act of1997
- Under-utilized properties are redeveloped/reused
- Incentivize redevelopment
- Developer given tax breaks over a 5-year period
- Covenant-not-to-sue
- Risk-based remediation
- Land use restrictions
  - Groundwater use
  - Digging in contaminated soil
- On-going monitoring

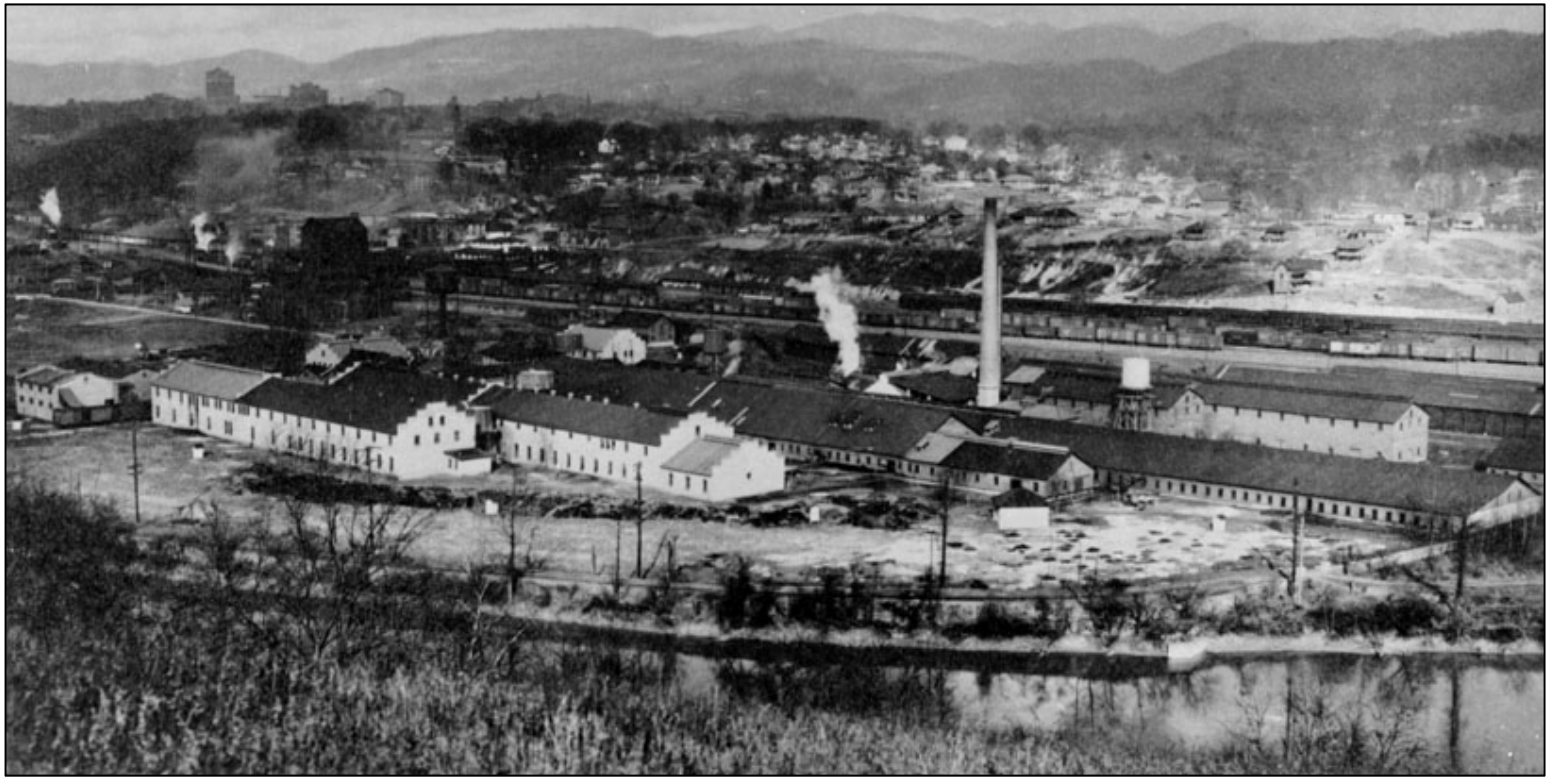
NC Brownfields Program

- Finalized Brownfield Agreements: 514 in NC
- 8 in River Arts District



Asheville Tannery

- Hans Rees' Sons Tannery: 1889
- Tanning leather using chestnut tree bark
- Abundant high quality water supply



Asheville Tannery

ARTICLE No. 2

TANNERY LOCATION AND WHY

TWO of the most important things to be considered in the location of a Tannery are first, water and, second, bark supply.

Chiefly for these reasons did Hans Rees' Sons locate their tanneries as they did.

The first one was at Shokan, New York. It is regrettable that we can find no record as to when it was started, but we do know it was given up in the late 1860's, probably about 1868.

About 1868, the second tannery was located at Nossville, Pennsylvania and continued until 1876 when it was sold.

The next move was to Prospect Tennery, Zepp, Virginia, on August 1, 1881 and another operated at Monterey, Pennsylvania, starting December 8, 1881. "Prospect" was given up in 1898 and "Monterey" in January, 1899. While these two plants were in process of closing, the present one at Asheville, North Caroline, was started in 1898 and operations begun then.

The quality of the abundant water supply at Asheville cannot be excelled. The Chestnut Oak Bark supply has been adequate all these years and as far as we can see there will be plenty for many years to come. Incidentally, the railroad facilities furnished by the Southern Railroad are excellent.

From time to time the Asheville plant has been enlarged and renovated so that today it stands preeminent as a place in which to make finished leather direct from hides as received from the packers. We believe it is the only single unit in the country that is equipped to make the major part of its own tanning liquors, do its own tanning and finishing in the widths, weights and selections of the multiplicity of pieces that it produces.

The plant covers 22 Acres and has a capacity of 9,000,000 pounds of hides per year or approximately 200 carloads of finished leather.

—HANS REES' SONS, Inc.

ARTICLE No. 4

RAW MATERIALS

IT is, has, and will be the policy of Hans Rees' Sons to use only the best of materials in the manufacture of their leather.

Through years of experience and from voluminous and careful records, they have learned what packer's hides and from what shipping points give the best results. That is the kind they buy.

Naturally, it is impossible to be satisfied 100% in this respect because Hans Rees' Sons, like all tanners, are using one of nature's products.

No two hides are alike any more than one person's skin is like another's and so it is a big problem to produce one piece of leather like another, however, that is the aim of this Company.

Since the best hides are purchased, it would be foolish indeed to use anything but the best tanning and finishing materials on them.

All vegetable matter contains tannin in a more or less degree. Those materials from which the best tanning liquors are made are as follows:

1. The bark (not the wood) of the Chestnut Oak Tree.
2. The wood (not the bark) of the ordinary Chestnut Tree.
3. The wood of the Quebracho Tree of South America.
4. The barks of the Hemlock and Black Oak Trees and to a small extent that of the White Oak.
5. Liquors made from the following foreign materials are used to a more or less extent. Myrabolans, a nut from India; an acorn cup known as Valonia from Asia and Greece; Gambier made from an Eastern Shrub in China; Divi Divi pods from a South American Tree; Mangrove bark, Wattle bark, etc.

When Tanning Liquors are used, they are almost universally a blend of various kinds.

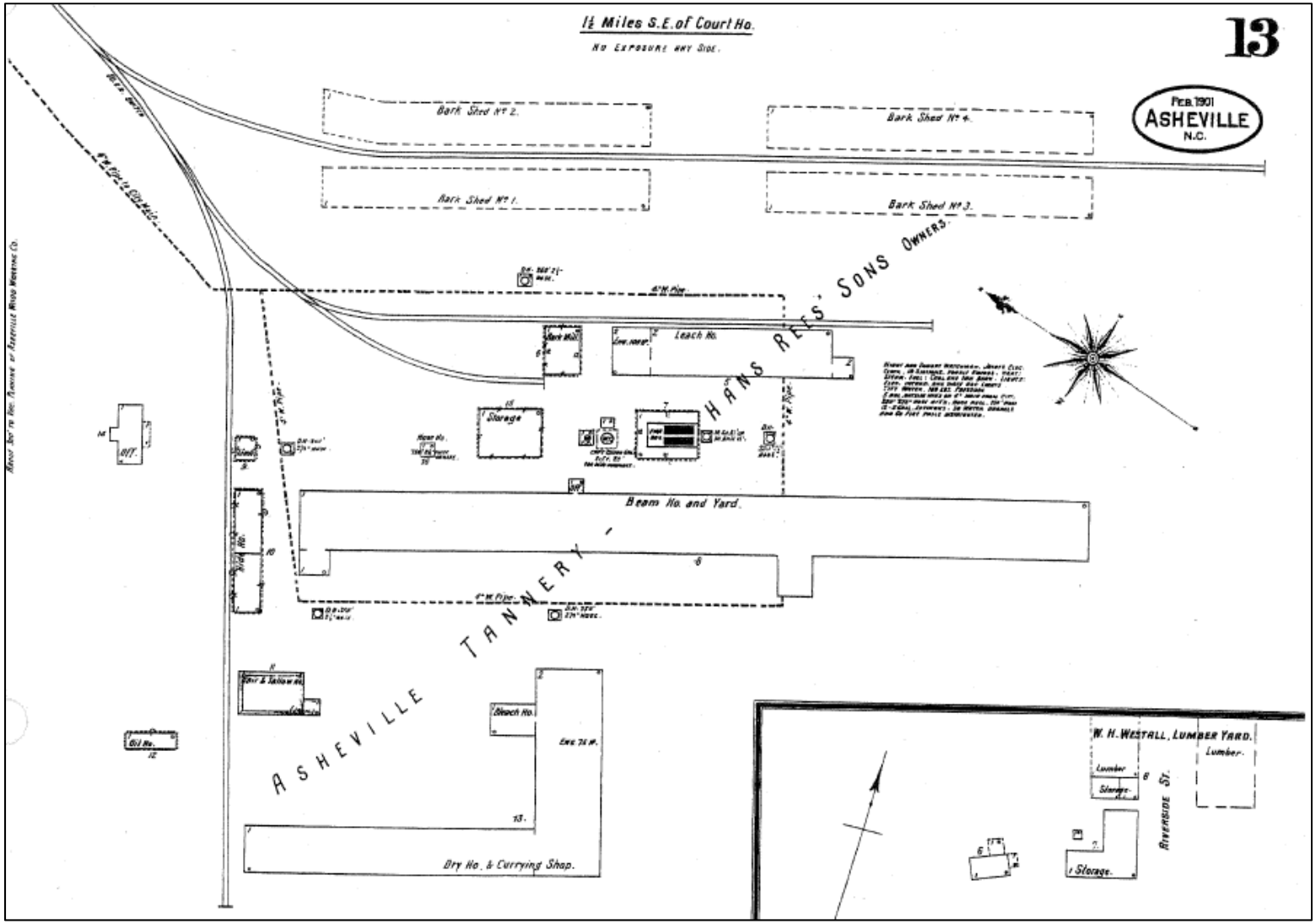
Hans Rees' Sons uses a blend of the liquors made from the first three materials mentioned, but the first two predominate.

It may be of interest to know that it takes eight to ten thousand acres of timber land to furnish the Asheville Tannery with one year's normal supply of Chestnut Oak Bark.

The chief material used in finishing belting leather is grease. The word "grease" covers a multitude of sins as there are all kinds,—good, bad and indifferent. However, the best, known as "Dubbin", is made by blending strictly beef tallow and pure unadulterated Newfoundland Cod Fish Oil. That is what Hans Rees' Sons uses.

—HANS REES' SONS, Inc.

Asheville Tannery



Asheville Tannery

- Sold in 1955
- Tobacco storage and auctions
- Charcoal briquette manufacturing
- Ticar chemical storage1963 to 1977
- Various warehousing and storage
- EDACO automobile recycling 2006 – 2010

Asheville Tannery

- 2007 Phase I ESA
  - Identified recognized environmental conditions (RECs)
    - Chemical storage
    - Heating oil tank
    - Automobile salvage
    - Railroad
- Land-of-Sky Regional Council: EPA Grant for Phase II
- 2008 Phase II
  - Soil and groundwater samples
  - VOCs, SVOCs, and metals
  - Low-level contamination identified
  - Soil, groundwater, and soil gas
- 2015: Metals, PCE (42 ug/L) and degradation compounds

Asheville Tannery

- Land of Sky Regional Council
- Recycle this Site design competition in 2009
- Design environmentally friendly, sustainable development
- Incorporate innovative building techniques (LEED)

Asheville Tannery

- Soil excavation under Building 3 (petroleum from auto salvage)
  - Petroleum from auto salvage
  - Confirmation soil below EPA's industrial use standards
- Original Brownfield Agreement process terminated in 2015
- New PD purchased in Brownfield property 2015
  - BFA drafted
  - 13 acres
  - Uses include residential, hotel, commercial, restaurant
- Benefits (from the Brownfields Agreement):
  - Increase property productivity
  - Spur to additional community investment and development
  - Creation of estimated 250 jobs
  - Increase in tax revenue
  - Additional space for the RAD
  - "Smart growth"

Asheville Tannery: Land Use Restrictions

LAND USE RESTRICTIONS

NCGS § 130A-310.35(a) also requires that the Notice identify any restrictions on the current and future use of the Brownfields Property that are necessary or useful to maintain the level of protection appropriate for the designated current or future use of the Brownfields Property and that are designated in the Brownfields Agreement. The restrictions shall remain in force in perpetuity unless canceled by the Secretary of DEQ (or its successor in function), or his/her designee, after the hazards have been eliminated, pursuant to NCGS § 130A-310.35(e). All references to DEQ shall be understood to include any successor in function. The restrictions are hereby imposed on the Brownfields Property, and are as follows:

1. No use may be made of the Brownfields Property other than for multi-family residential, retail, artist studios, restaurant, brewery, hotel, office, light industrial, recreational, and with prior written DEQ approval other commercial uses. For purposes of this restriction, the following definitions apply:

i. Multi-Family Residential defined as multi-unit human dwellings, such as condominia, or apartments. Single family homes, townhomes, duplexes, or other units with yards are prohibited unless approved in writing by DEQ in advance.
ii. Retail defined as the sale of goods or services, products, or merchandise directly to the consumer or businesses and includes showrooms, personal service, and the sales of food and beverage products.
iii. Artist studios defined as a commercial space where individuals create and design using various media.
iv. Restaurant defined as a commercial business establishment that prepares and serves food and beverages to patrons.
v. Brewery or Food Production Facility defined as an establishment for the manufacture, sale and distribution of beverages or food products, including without limitation beer and ale, together with associated public roadways and related infrastructure.
vi. Hotel defined as the provision of overnight lodging to paying customers, and to associated food services, gym, reservation, cleaning, utilities, parking and on-site hospitality, management and reception services.
vii. Office defined as the provision of business or professional services.
viii. Light industrial defined as the assembly, fabrication, processing, warehousing or distribution of goods or materials.
ix. Recreation defined as indoor and outdoor exercise-related, physically focused, or leisure-related activities, whether active or passive, and the facilities for same, including, but not limited to, studios, swimming pools, sports-related courts and fields, open space, greenways, parks, skateparks, playgrounds, walking paths, and picnic and public gathering areas.

2. The Brownfields Property may not be used for child care, adult care centers or schools without the prior written approval of DEQ.

3. Groundwater at the Brownfields Property may not be used for any purpose without the prior written approval of DEQ.

4. No activity that disturbs soil on the Brownfields Property, may occur unless and until DEQ states in writing, in advance of the proposed activity, that said activity may occur if carried out along with any measures DEQ deems necessary to ensure the Brownfields Property will be suitable for the uses specified in Land Use Restriction No. 1 above while fully protecting public health and the environment, except:

i. in connection with landscape planting to depths not exceeding 24 inches;
ii. mowing and pruning of above-ground vegetation;
iii. for repair of underground infrastructure, provided that DEQ shall be given written notice at least seven days in advance of a scheduled repair (if only by email) of any such repair, or in emergency circumstances no later than the next business day, and that any related assessment and remedial measures required by DEQ shall be taken and;
iv. in connection to work conducted in accordance with a DEQ-approved Environmental Management Plan (EMP) as outlined in Land Use Restriction No. 9.

5. No residential use of the Brownfields Property may occur until the then owner of the Brownfields Property conducts representative final grade soil sampling of the Brownfields Property (as described in the EMP outlined to in Land Use Restriction No. 9) pursuant to a plan approved in writing by DEQ that is not covered by building foundations, sidewalks, or asphaltic or concrete parking areas and driveways.

Asheville Tannery: Land Use Restrictions

- Land use restrictions
  - No groundwater use
  - No surface water use
  - No soil disturbing activity
  - No enclosed residential buildings with 100 feet of 2 soil gas samples without mitigation
  - Preparation and compliance with Environmental Management Plan

Asheville Tannery: Brownfield Success

- Current occupants:
  - Wedge Brewing
  - 12 Bones Smokehouse
  - RAD Skatepark
  - Sunnyside Trading
  - Summit Coffee
  - Level 42 Gallery
  - Chainheart Cycling

Karen Cragnolin Park

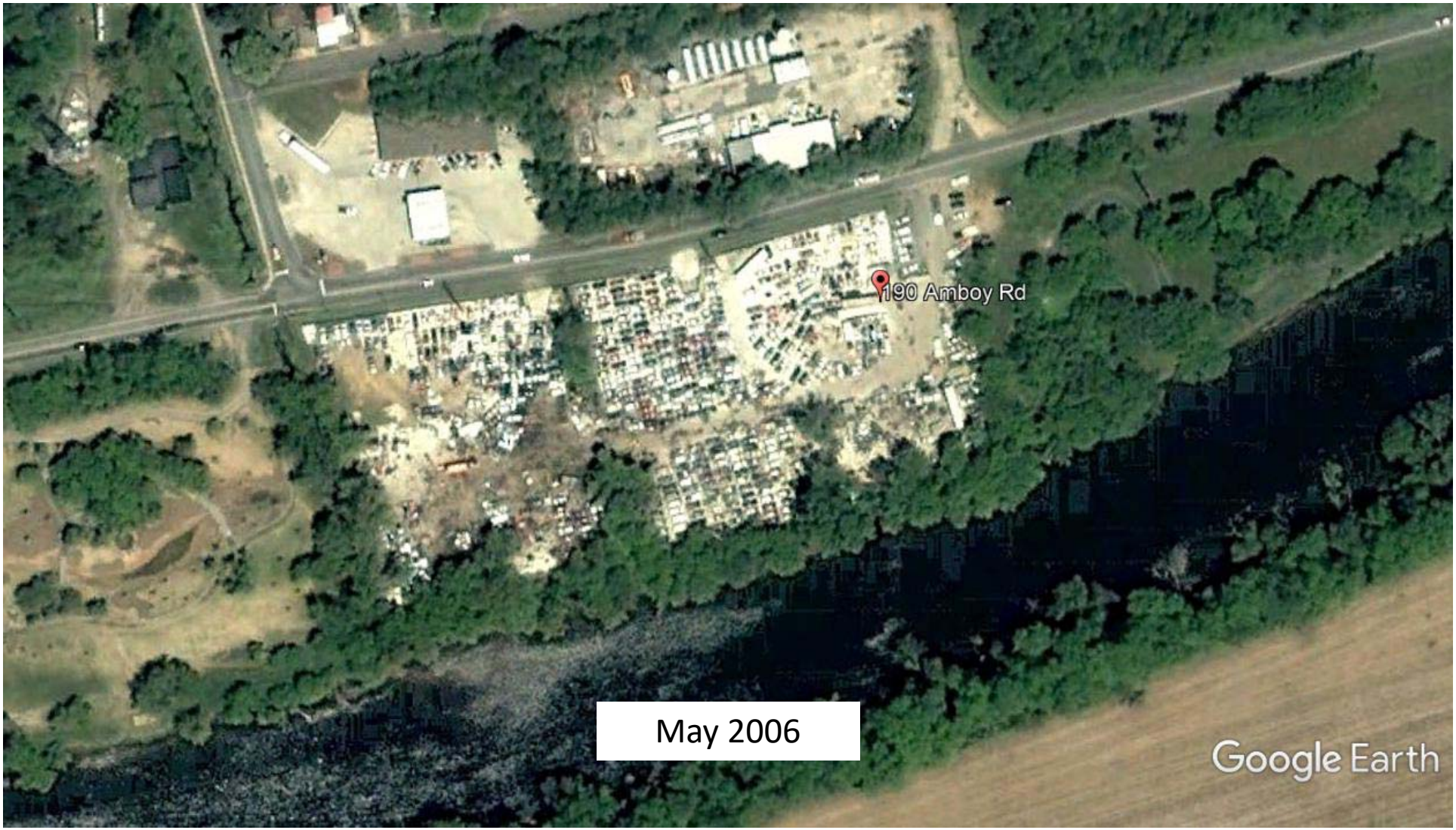
Karen Cragnolin Park

Owen Field, now known as Carrier Park, was in existence as an airfield around the 1930s. Karen Cragnolin Park is located on what would have been the very end of the airplane runway. When the airfield was decommissioned, the car industry moved in—the Asheville Motor Speedway and EDACO auto junkyard, both established residence in the 1950s.

Amboy Road - Counterclockwise: Aerial view of Carrier Field in 1960 (now Carrier Park; future Karen Cragnolin Park highlighted); early Asheville airport Owen Field; Asheville Motor Speedway

References:
Asheville Citizen Times, Oct. 30, 2018
Karen Cragnolin Park Master Plan, Nelson Byrd Woltz Landscape Architects, December 2018
A Journey from Salvage to Sanctuary, Wilma Dykeman RiverWay, Karen Cragnolin River Park Kiosk

Karen Cragnolin Park



Karen Cragnolin Park

Karen Cragnolin Park

Karen Cragnolin Park

- The site served as the EDACO auto salvage yard where a car crusher operated for more than 50 years
- Site was also used as concrete dump (emptying trucks)
- Riverlink purchased site in 2006
  - Removed 100 tons of concrete
  - Kept out of landfills by recycling for asphalt for highways
- Soils were impacted by VOCs from gas, oil, diesel, and other vehicle fluids
- Soil testing identified the impacted areas of the site
- VOCs remediated using phytoremediation (2012 to 2016)

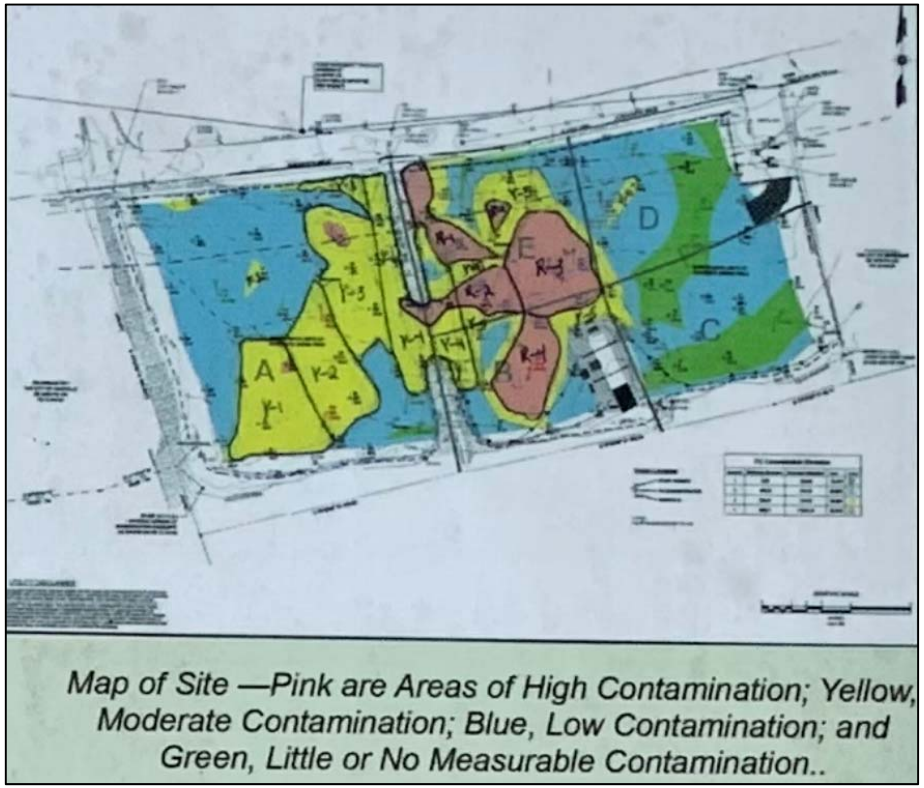


Image from the Karen Cragnolin Park kiosk

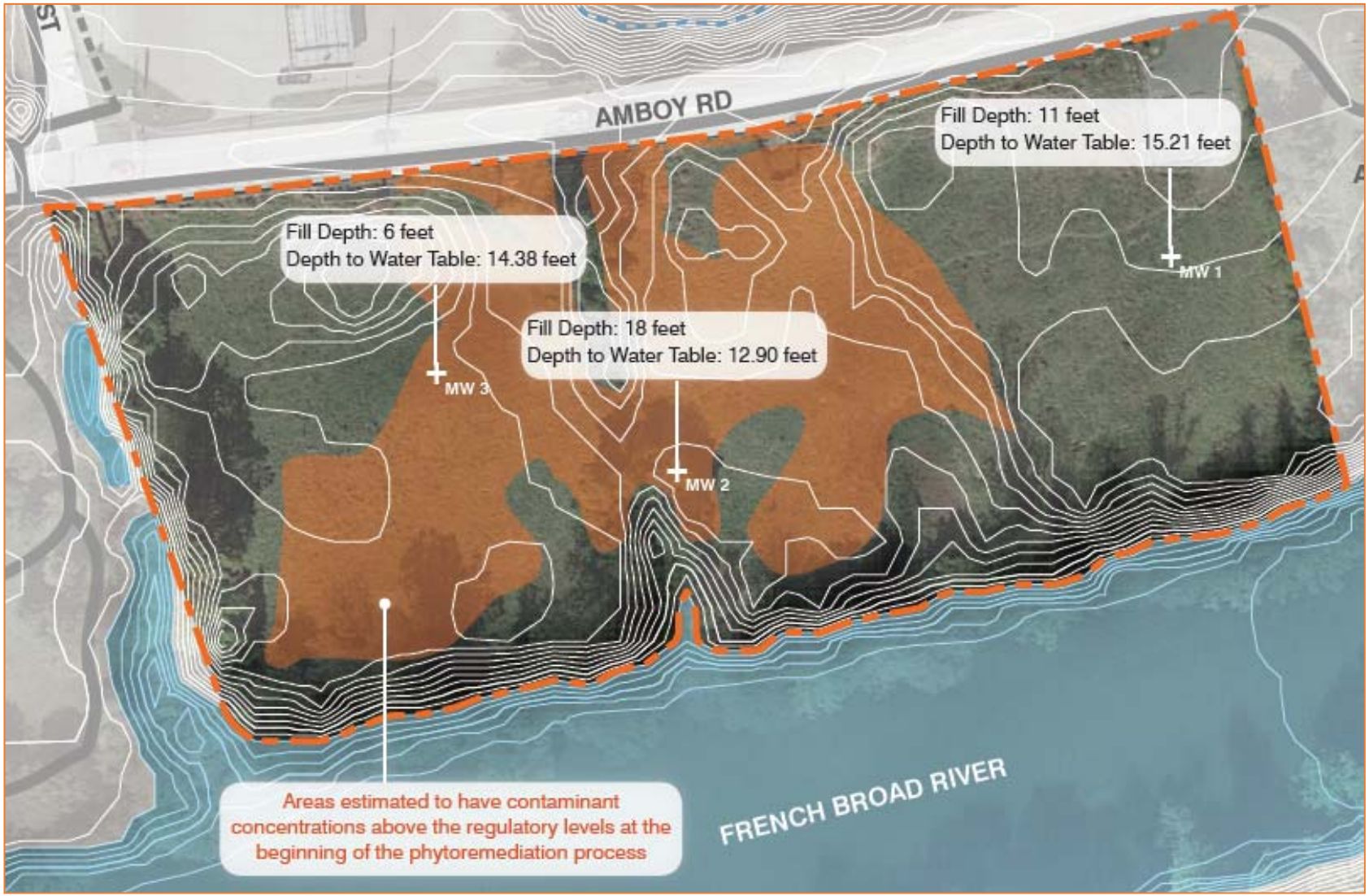
References:
Asheville Citizen Times, Oct. 30, 2018
Karen Cragnolin Park Master Plan, Nelson Byrd Woltz Landscape Architects, December 2018
A Journey from Salvage to Sanctuary, Wilma Dykeman RiverWay, Karen Cragnolin River Park Kiosk

Karen Cragnolin Park

- Assessment activities also included the installation of three monitoring wells in 2008
- Soil observations during borehole advancement revealed
  - A deep layer of fill, ranging from 6 to 18 feet deep, inclusive of concrete and car parts
  - Below fill, silty/sandy soil
  - The water table depth averaged approximately14 feet below ground surface
- Fill was likely used to raise the site out of an immediate flooding threat and to level the site for industrial use
- To address the soil contamination, phytoremediation was employed to remediate the soils by planting tall fescue.
- After six years of phytoremediation, soil contaminants throughout most of the site have been remediated to acceptable levels.

References:
Asheville Citizen Times, Oct. 30, 2018
Karen Cragnolin Park Master Plan, Nelson Byrd Woltz Landscape Architects, December 2018
A Journey from Salvage to Sanctuary, Wilma Dykeman RiverWay, Karen Cragnolin River Park Kiosk

Karen Cragnolin Park



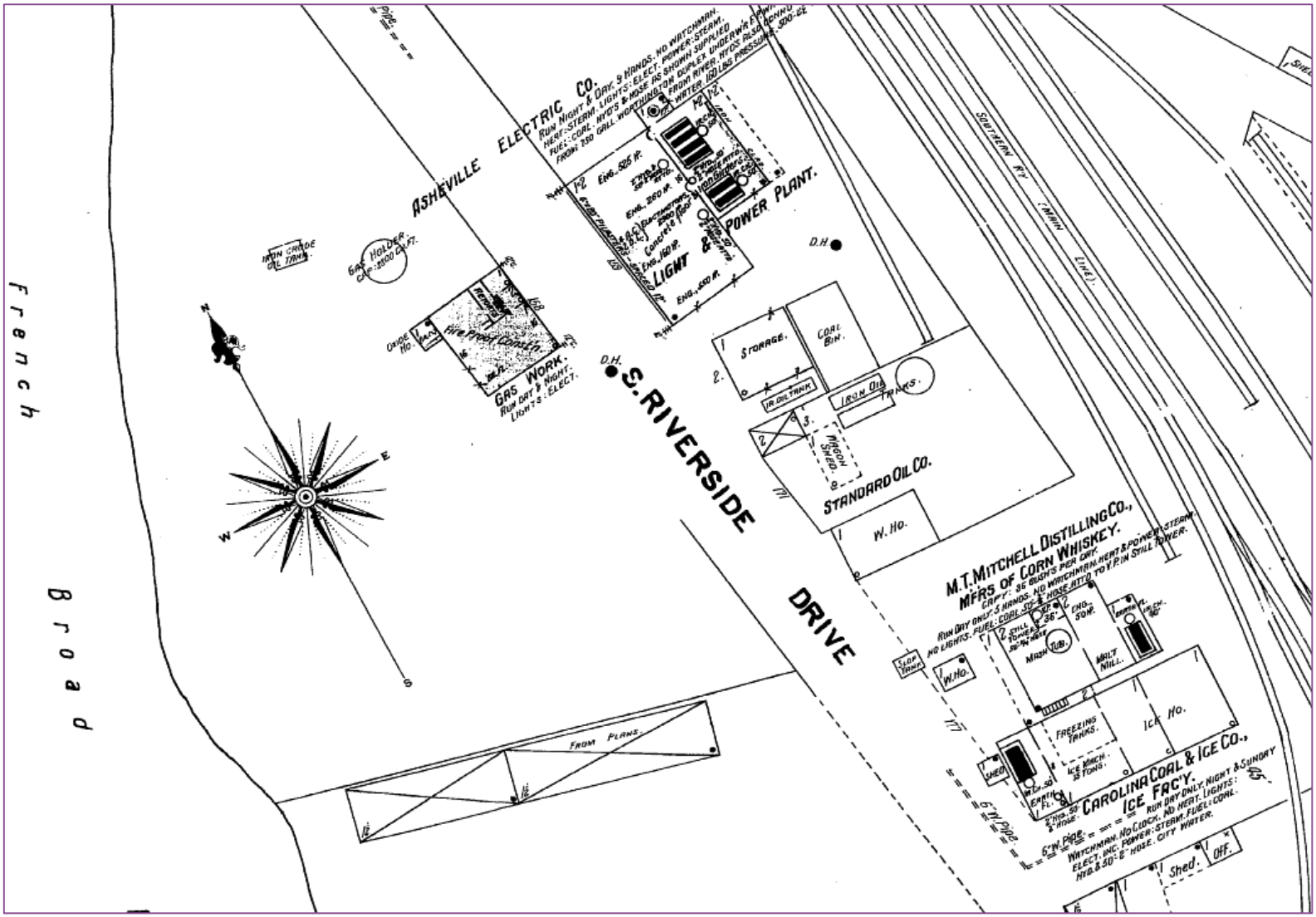
Karen Cragnolin Park

- Master Plan

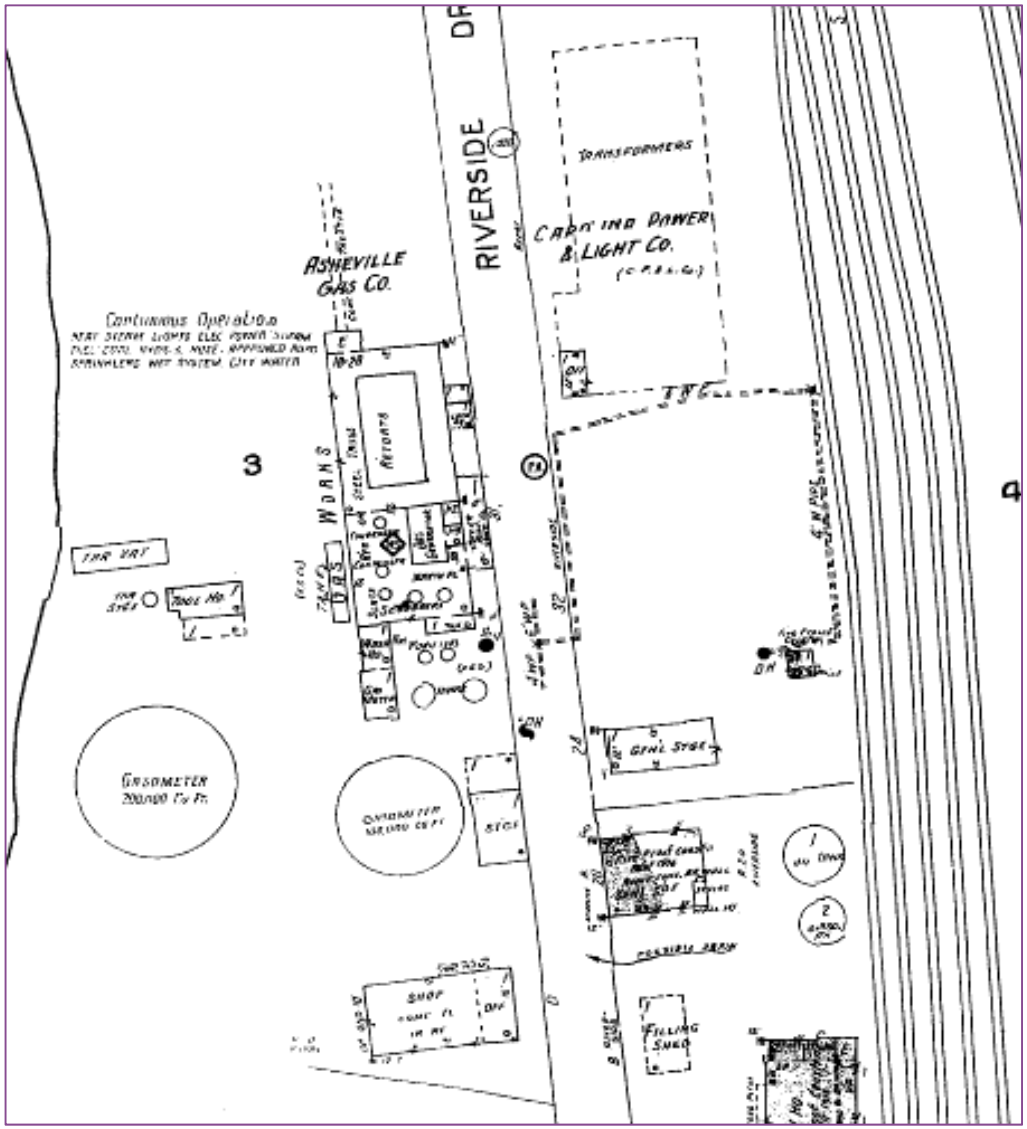
14 Riverside Drive

- 2 properties east/west of Riverside Drive
- ~1900 property developed with manufactured gas plant
- Asheville Power and Light
- Building constructed in late 1920s as a “shop” and office

14 Riverside Drive (1907 Sanborn)



14 Riverside Drive (1950 Sanborn)



14 Riverside Drive

14 Riverside Drive

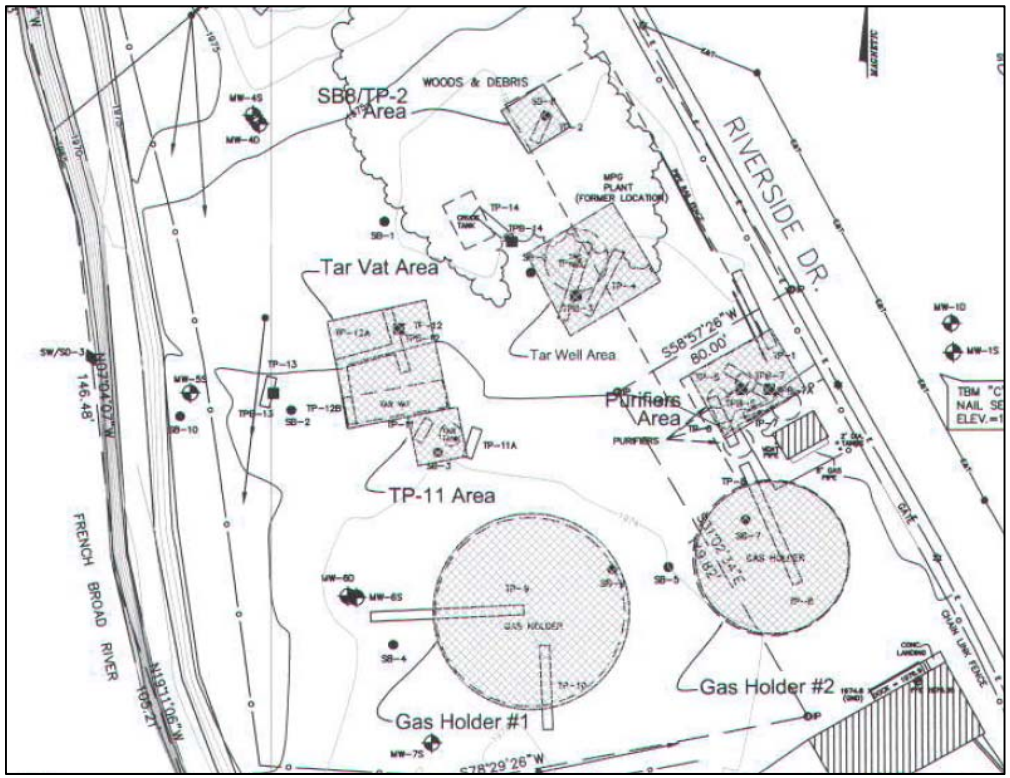
- Used coal gas
- Heat coal in airtight ovens (retorts)
- Gas fed through condenser and cooled
- Tar and oil byproducts produced; stored for sale/disposal
- Gas passed through scrubber and ammonia removed
- Then gas passed through purifier and sulfur removed
- Gas stored in gasholder until distribution
- Operated until the 1950s
- All structures demolished between 1960 and 1972
- PSNC donated to City of Asheville in 2012

14 Riverside Drive

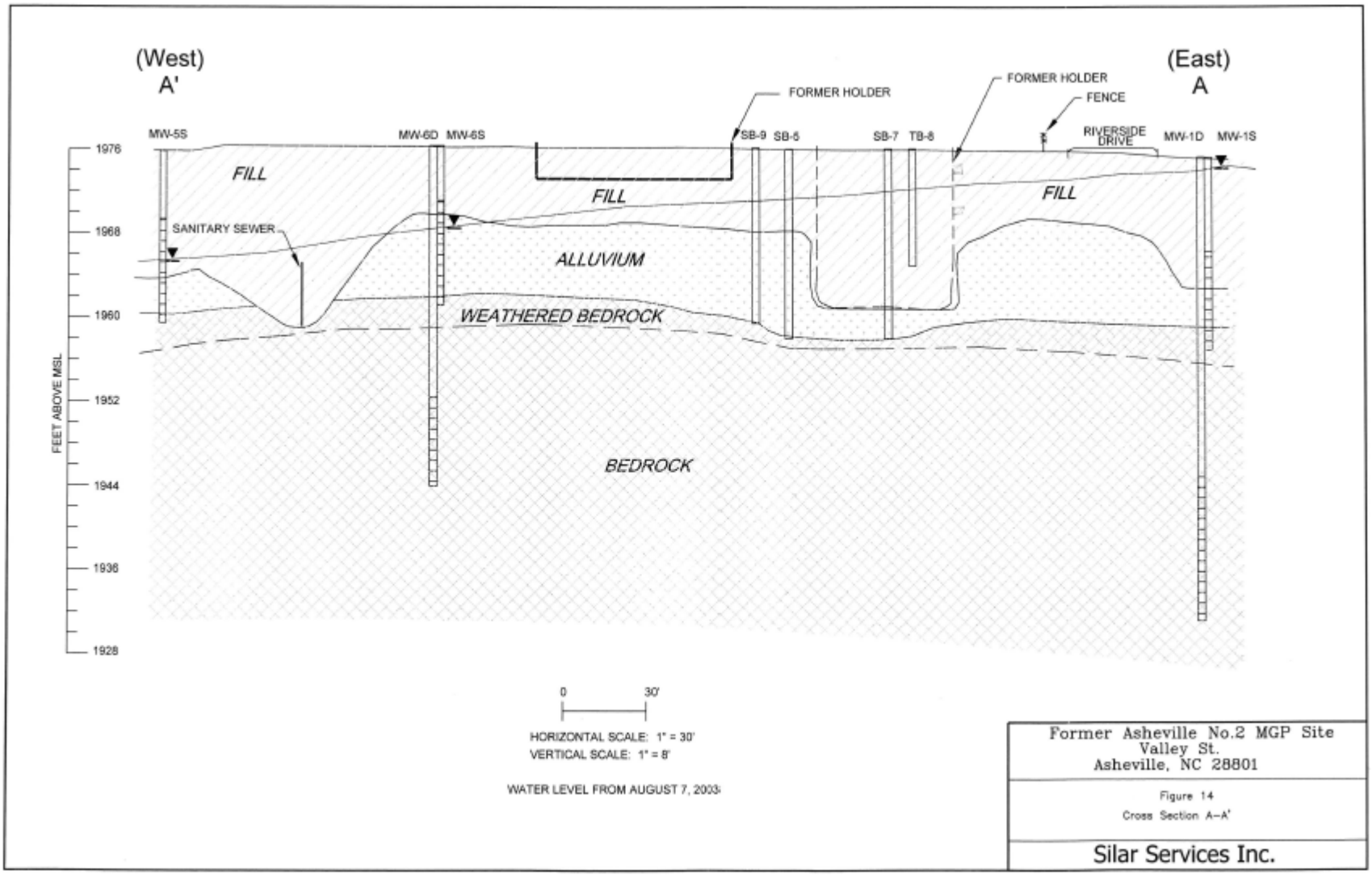
- 1991 Preliminary Assessment by NCDEQ
- 1992 Preliminary Evaluation for PSNC
  - Some MGP byproducts identified along the riverbank
- 2003 Remedial Investigation
  - VOCs, PAHs, metals, cyanide
  - Impacts in soil and groundwater
  - Surface water and sediment not impacted
- Risk Assessment
  - No risk to recreational users, trespassers
  - Slight risk to construction worker

14 Riverside Drive

- 2004 Remedial Action Plan
  - Eliminate risks associated with direct contact to soil
  - Unsaturated soil removal
  - Institutional controls (land use restrictions)
- Remediation (west)
  - 7 areas targeted
  - Excavated to GW
  - ~12 feet bgs
  - 14,000 tons

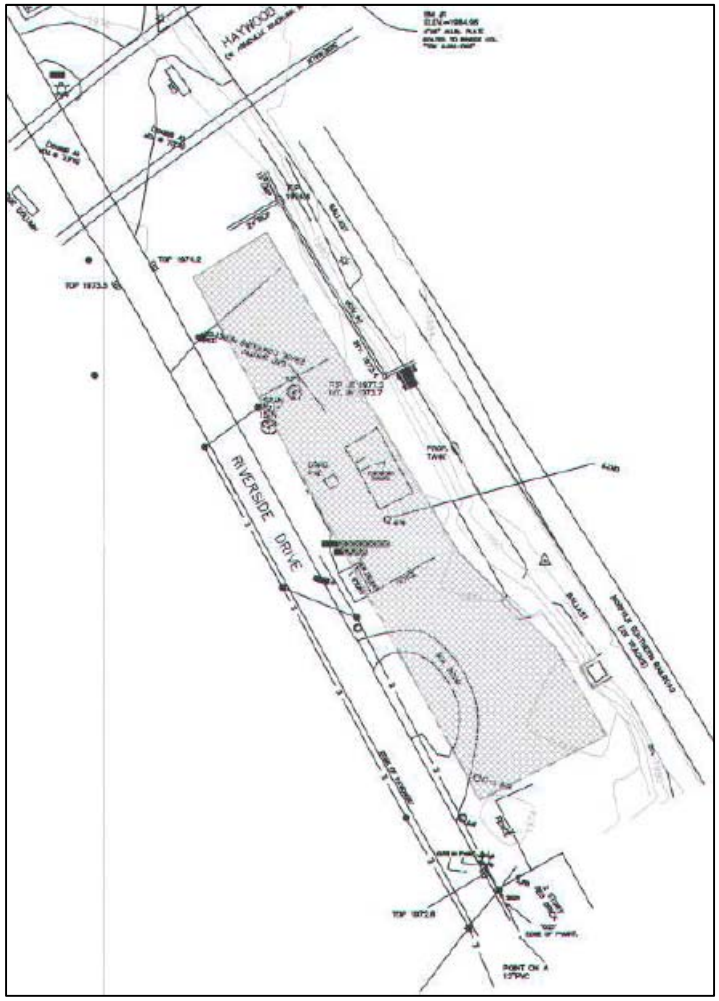


14 Riverside Drive



14 Riverside Drive

- Remediation (east)
  - 1 area targeted
  - Excavated to GW
  - ~1 to 2 feet bgs
  - 2,400 tons
- Highly contaminated soil to thermal desorption facility
- 1,235 truckloads
- Liquid tar used as fuel for cement kiln
- Oxygen release compound added to excavations (PermeOx®)
- Confirmation sampling



14 Riverside Drive

Figure 3-6 Post-Excavation Cleaning of Gas Holder #1, looking NW, 1/5/05

Figure 3-20 East Site Loadout, looking SW from the bridge, 2/3/05

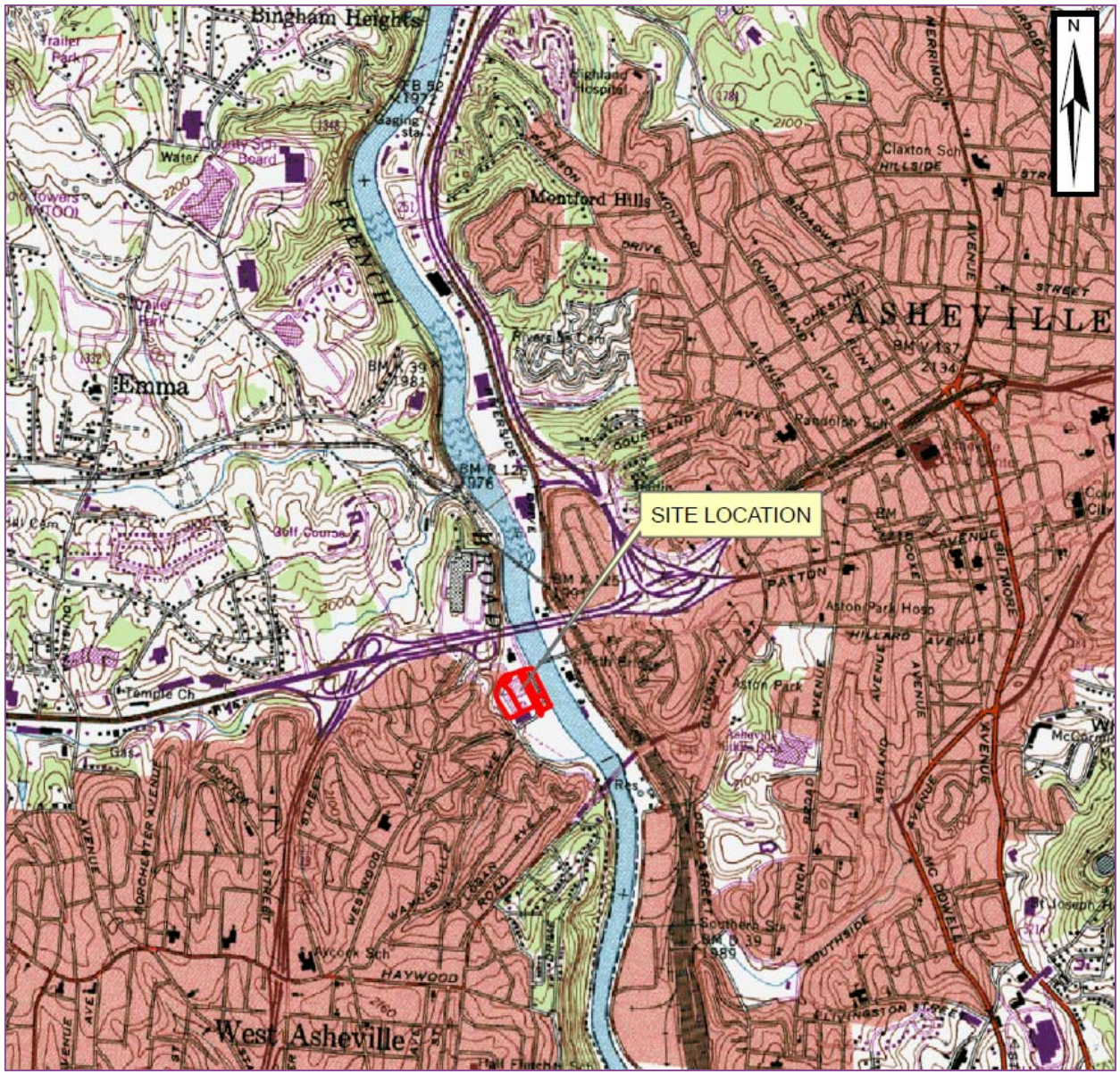
14 Riverside Drive

- Land-of-Sky Regional Council receives Brownfields Grant
- 2010: Phase I and Phase II ESAs (0.3-acre property)
  - Soil, groundwater, surface water, sediment samples
  - VOCs, PAHs, cyanide in soil and groundwater
  - PAHs in sediment
- 2011: Additional soil excavation
  - Excavate to 3 feet bgs (4,000 ft^2 area)
  - 790 tons (46 truckloads)
- 2012: PSNC donates property to City of Asheville
- 2012: Brownfields Agreement signed
- 2016: Environmental Management Plan
  - Sewer line relocation
  - RADTIP improvements

14 Riverside Drive

- 2016: soil sampling for sewer line
  - Soil above applicable standards
  - Risk assessment: okay for construction workers
  - Sewer line install: 630 tons of soil shipped off-site
- Land Use Restrictions
  - Only use as office/retail or visitor and recreation center
  - Greenway or open space
  - No use of groundwater or surface water
  - No use of ground level of a new building
  - No disturbing of soil deeper than 3 feet

New Belgium Brewing



New Belgium Brewing

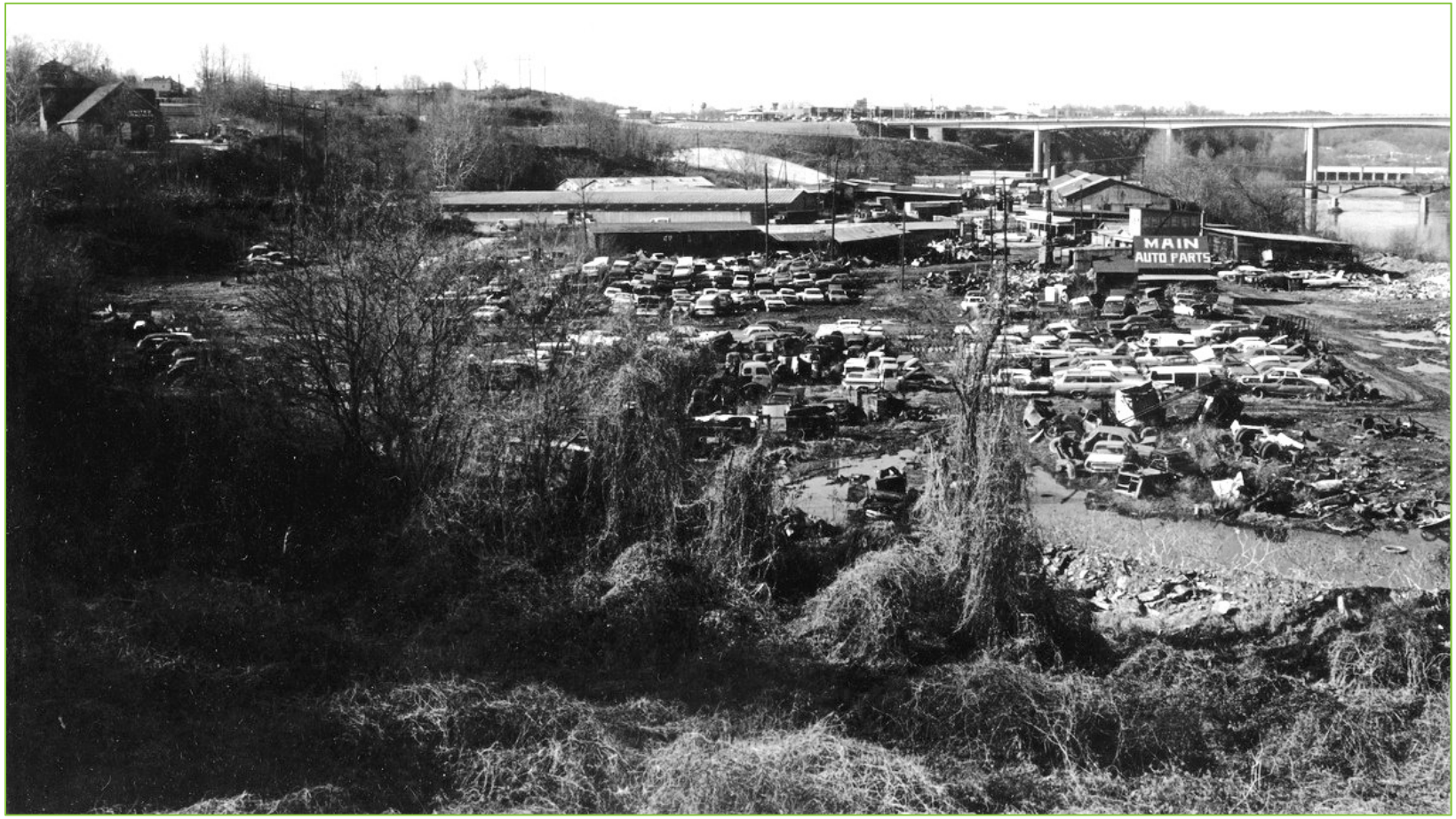
- Former uses of the site were as follows:
  - 1925: mix of residential single-family homes, auto repair facility, two stores, with interior of property undeveloped
  - 1925-1950: Data gap
  - 1950s, 1960s, and 1970s: Shulimson Bros. Co. auto wrecking and junkyard, including an auto parts store, gas station, and restaurant (added in 1957). Also auto repair and paint shop, tobacco warehouses, livestock market/Penland's Auction and gas station.
  - 1980s: All auto wrecking and junkyard activities removed
  - 1990s: unpermitted C&D landfill
  - 2002: Bell's Mini-storage, warehousing, livestock boarding, antique auction, concrete company/garage, and restaurant which were operating until 2012

New Belgium Brewing

1918

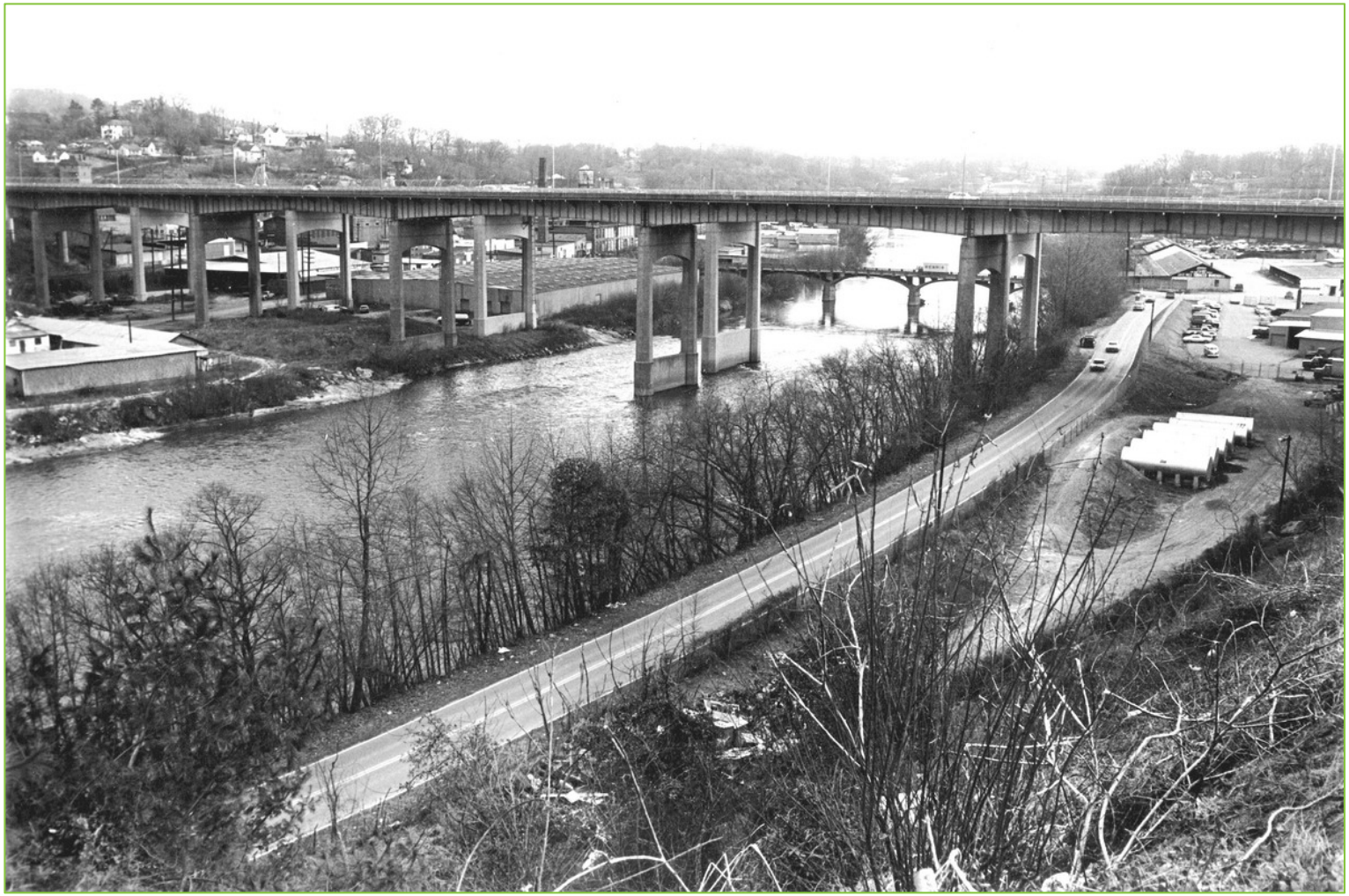
New Belgium Brewing

1976



New Belgium Brewing

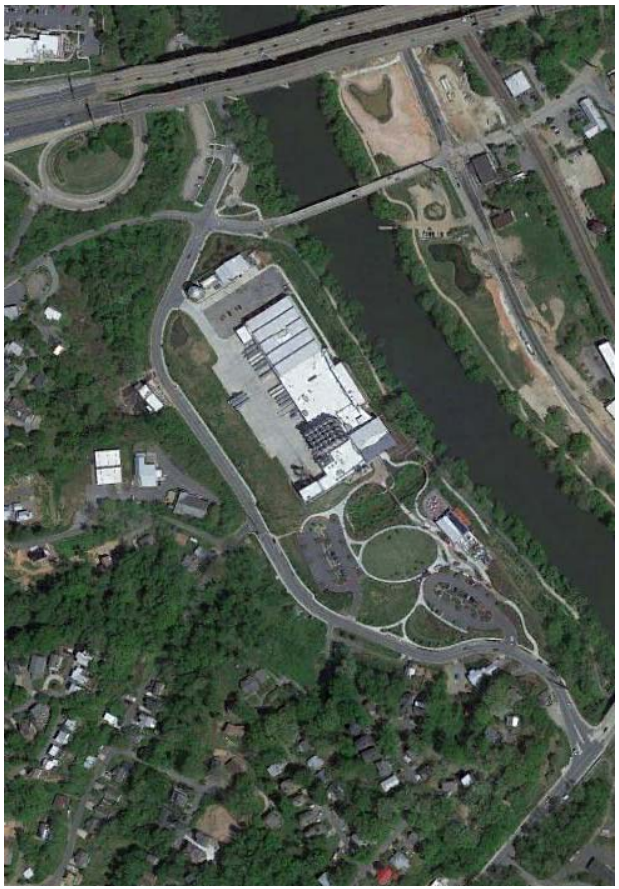
1976



New Belgium Brewing

October 2011

November 2013



April 2019

New Belgium Brewing

New Belgium Brewing

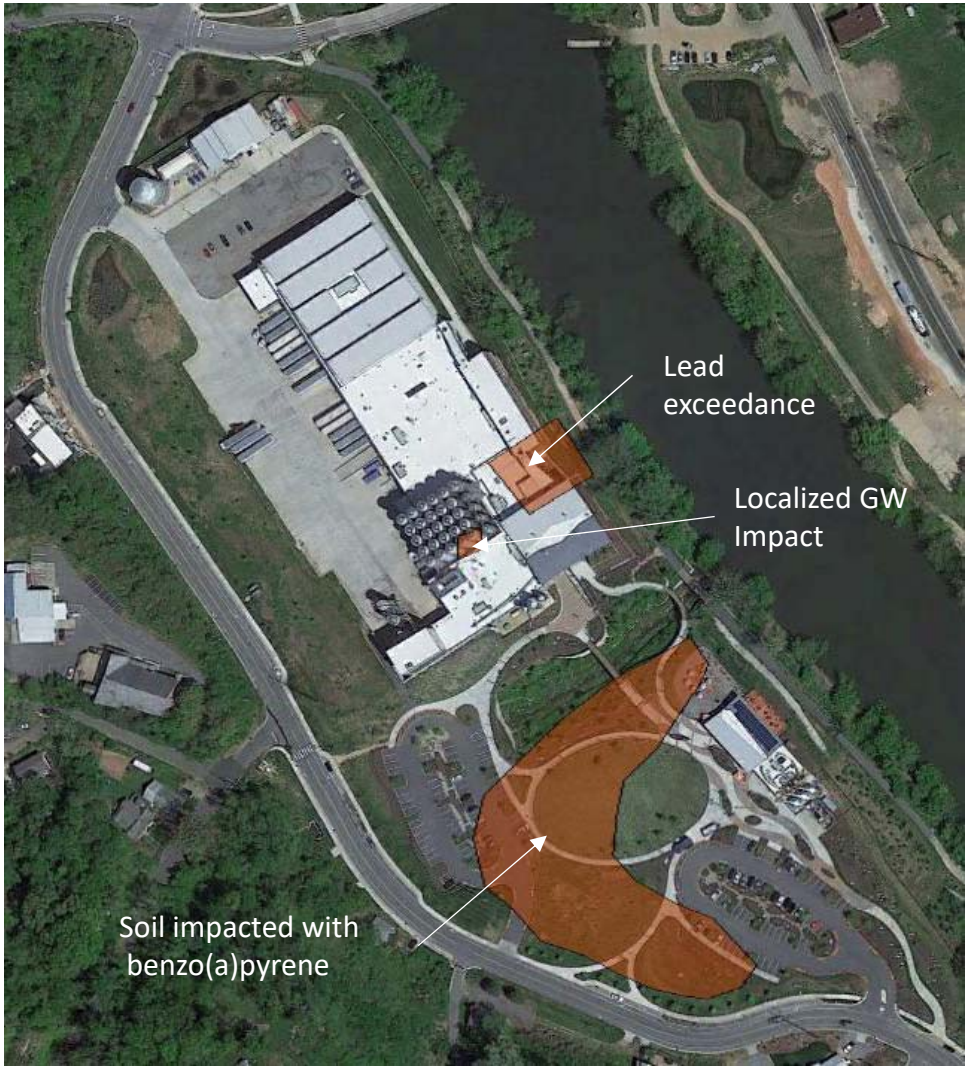
In 2011, Phase I ESA was performed

- Eight soil borings and five monitoring wells were installed and sampled
- Highlighted area exceeded preliminary soil remediation goals (PSRGs) for RCRA metals and some petroleum related constituents.
    - Impacts generally less than 2 feet below ground surface.
- Manganese was detected in soils and in groundwater sampled from all locations at levels that exceeded standards
    - Detected concentrations of manganese in these soil and groundwater samples were contributed to background concentrations.

New Belgium Brewing

During 2012, Hart and Hickman performed a Phase I and II assessment. Their findings were reported in the February 2013 report which included the following:

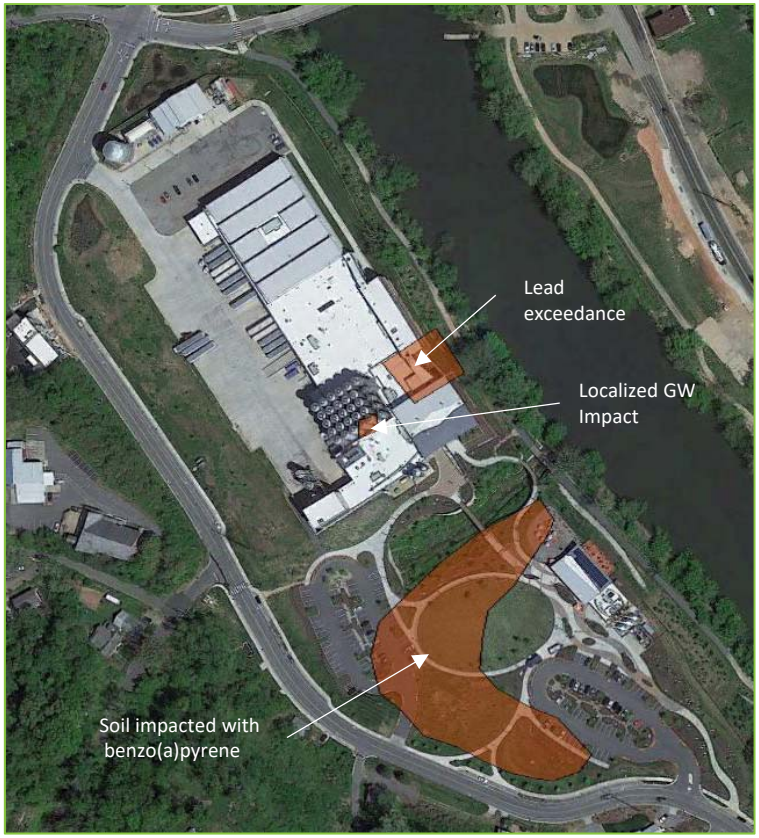
- Soils with benzo(a)pyrene found at levels slightly above industrial use screening values.
- A localized exceedance of lead in soil was also identified.
- Localized impact to groundwater in the vicinity of a former gasoline storage tank.
- Much of the site was also used as a C&D non-regulated dump.



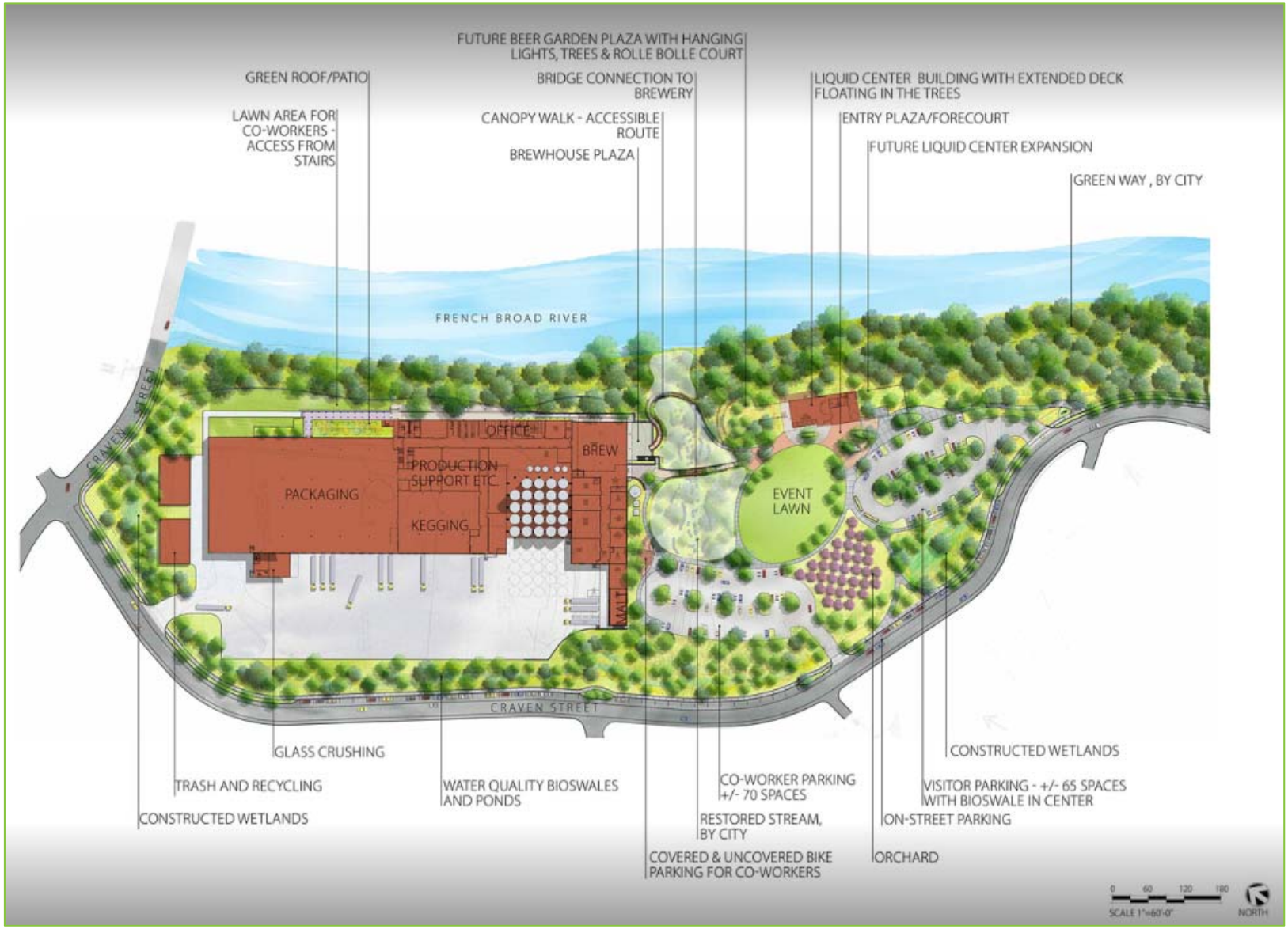
New Belgium Brewing

The Brownfields Agreement was lodged in March 2014 and lays out several restrictions, including the following:

- Groundwater is not to be used
- Lead impacted soils are not to be disturbed
- The C&D dumping areas shall have a cover
- Stream restoration required
- Assess potential for methane exposure in buildings



New Belgium Brewing



New Belgium Brewing

New Belgium purchased property in August 2012 and developed it with the following features and capabilities:

- State of the art craft brewery and offices
- Visitor center
- Wastewater treatment
- Walking areas
- Stream restoration
- Commercial uses
- Industrial uses
- LEED certified