

Columbia's Manufactured Gas Plant

1875-1932
and Beyond

Chris Cady, Ph.D
Environmental Scientist
Brownfields/Voluntary Cleanup Program
Missouri Department of Natural Resources

METROPOLITAN FEATURES.

A Few of the Public Enterprises of
The Queen City.

The Springfield gas company has about 7 miles of gas mains. Within the past year new buildings have been added to the works and the capacity greatly increased to meet the growing demands of public and private consumers. The gas plant has no superior in any respect in the west.

Springfield altogether is perhaps the best lighted city in the west. Besides the numerous gas lamps in all parts of

A Great Leap Forward in Lighting



aug 20-21
Gas! Gas!! Gas!!!

All persons wishing gas pipes introduced into their houses in order that they may light up with the first lighting of the city, are requested to leave their orders at the Company's office (at the works) immediately, as the works are nearly completed and gas will soon be furnished.

J. S. AMBROSE,

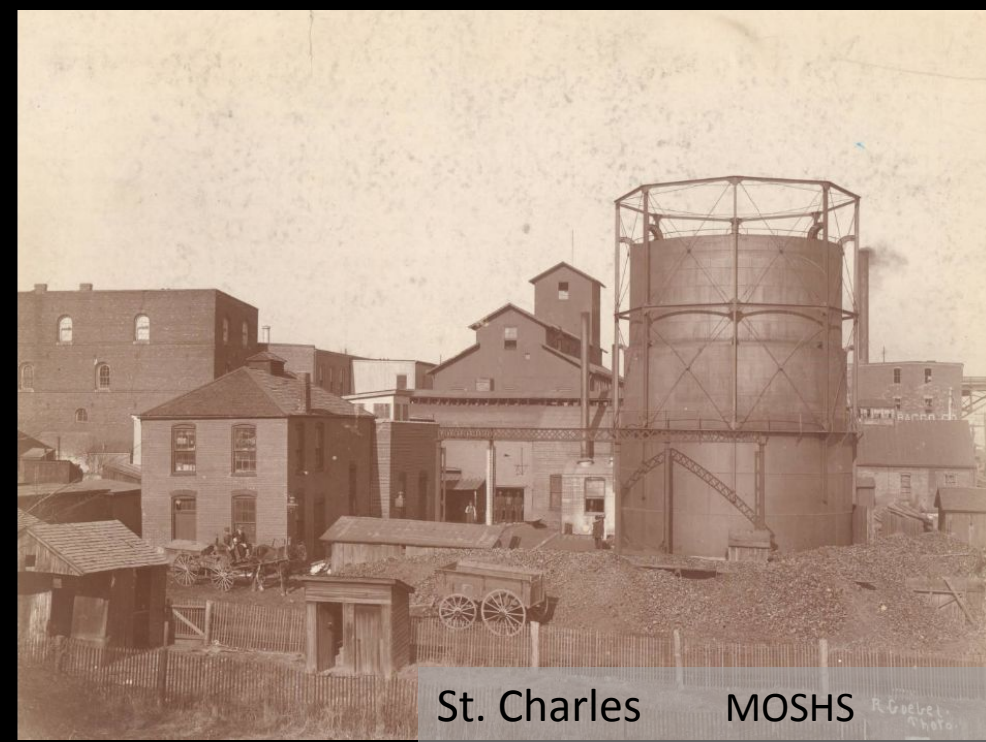
Sup't of Company.

H3023



Kansas City ca 1905 KC Public Lib.

Missouri Manufactured Gas Plants



St. Charles MOSHS

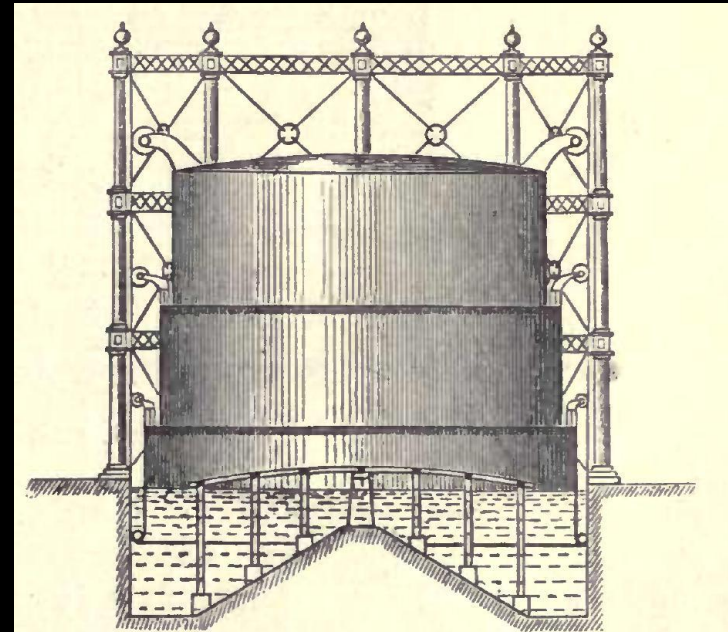
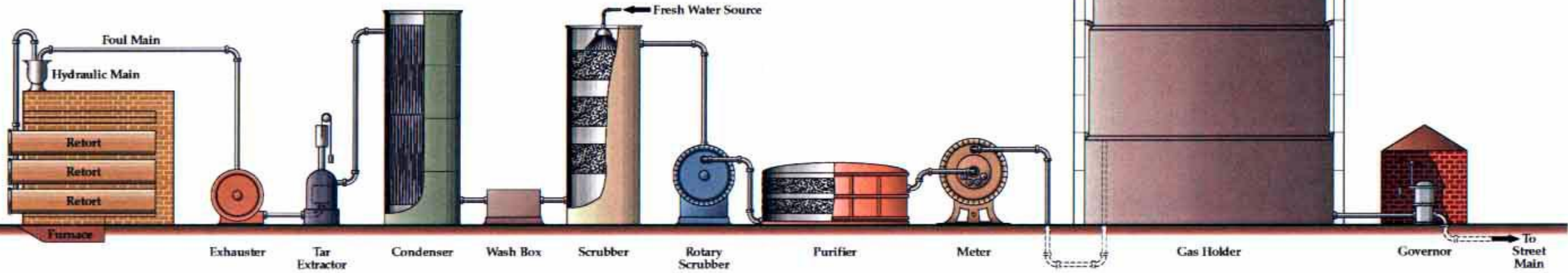


St. Louis 1941
MOSHS



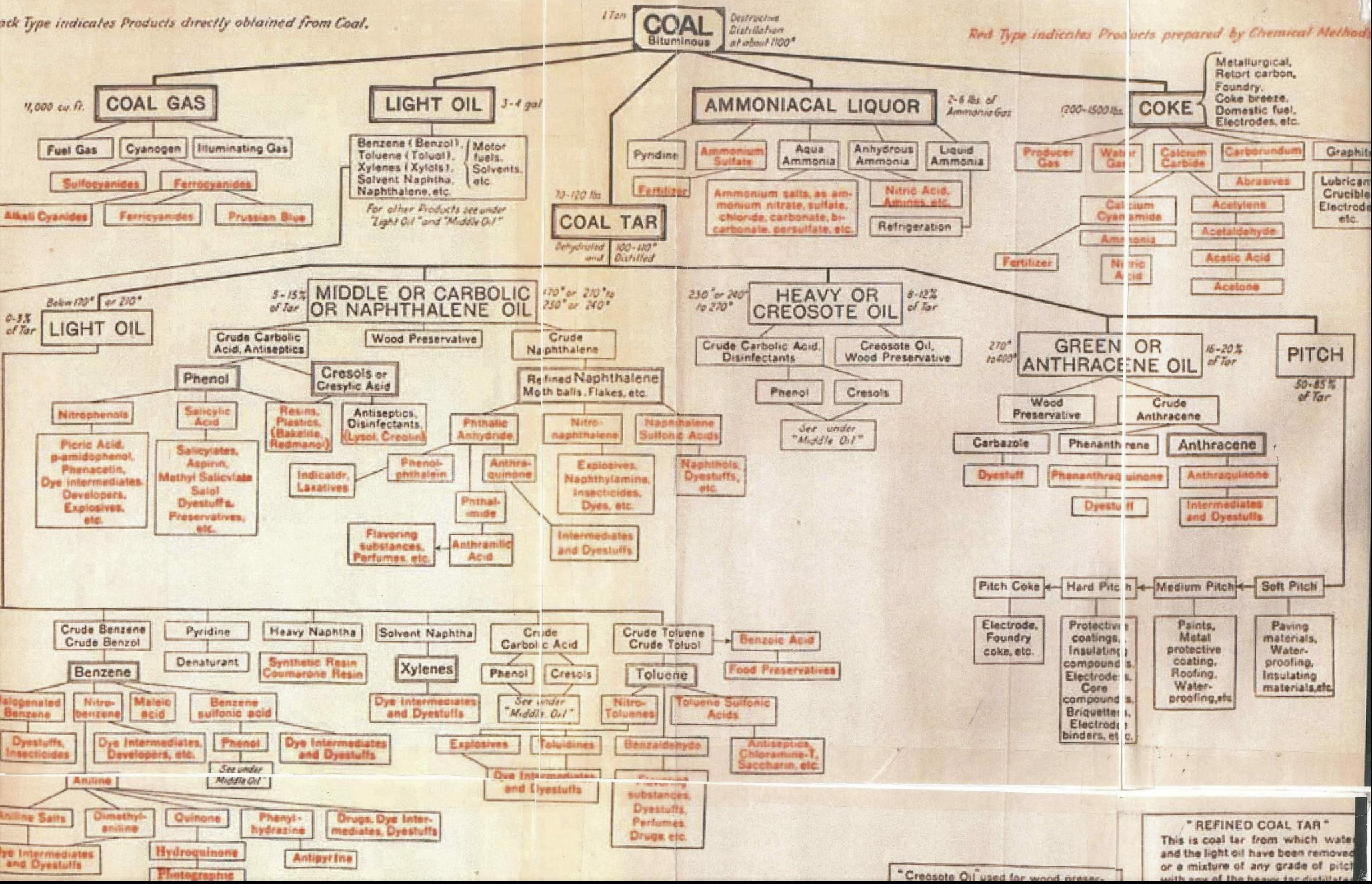
Springfield 1912
City Utilities/Grn
Co Hist. Mus.

COAL GAS PLANT



Black Type indicates Products directly obtained from Coal.

Red Type indicates Products prepared by Chemical Method.



Coal Tar: Chemistry Set of the 19th Century

Products Derived from Coal Tar

Ammonia – Refrigerant

Light Hydrocarbon Solvents: Benzene, Toluene, Xylene, Naptha, Gasoline

Light Oils – Lamp oil, liquid fuels

Picric Acid and Nitrotoluenes – Explosives

Prussian Blue - Pigment

Carbazole, Aniline, Phenanthrene and Anthracene families of Dyes (500 colors)

Creosote - Wood Treatment

Pitch - Paints & coatings for wood and metal, electrical insulation, roofing, pavement

Coke – used in smelting ores

Graphite – electrodes, lubrication

Phenolphthalein – pH indicator

Salicylic Acid – Aspirin

Flavorings – Vanillin, Cinnamon + others

Fragrances – Musk, Essence of Orange Blossom + others

Cresols, Phenol – Disinfectants (coal tar still used in dandruff shampoos today)

Saccharin – Sweetener

Benzoic Acid – Food Preservative

Nitrophenols – Photographic Developers

And many more

The Trouble with Coal Tar



Kansas City

MoDNR



07/28.2014 03:16 pm

Columbia /MoDNR

SOUTH

NORTH

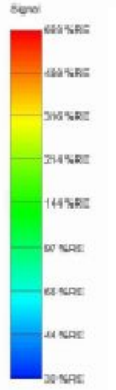
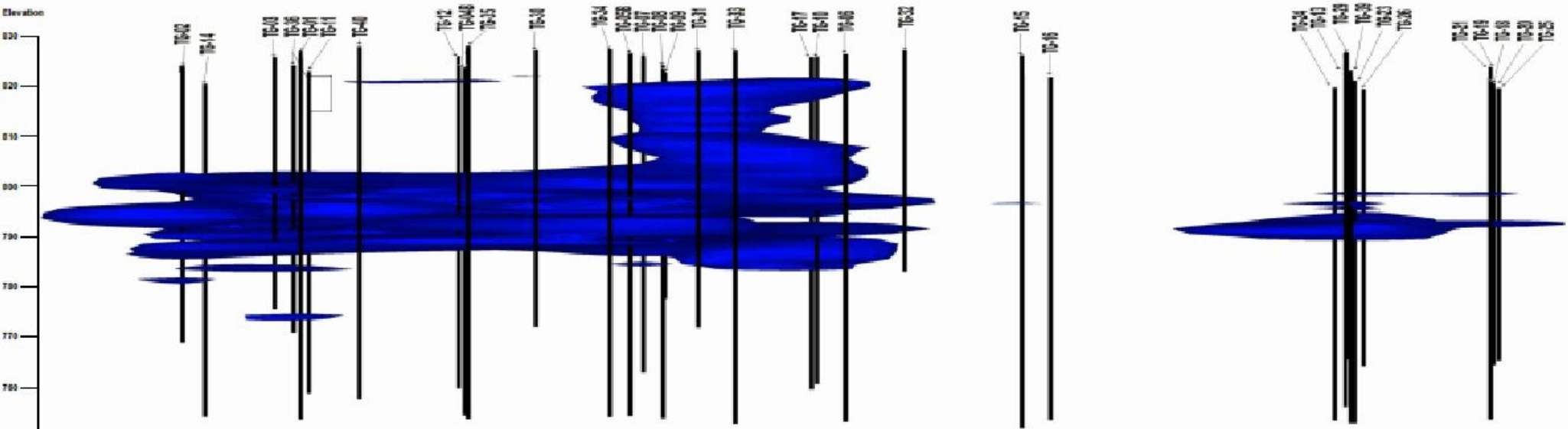


Figure 3-8
TARGOST SOUTH TO NORTH
CROSS-SECTION
ST. JOSEPH NO. 1 MGP
MISSOURI GAS ENERGY

Coal Tar Is Heavier Than Water and Sinks Through the Water Table

St. Joseph FMGP
Cross Section
2013

Note: Cross-section view looking west

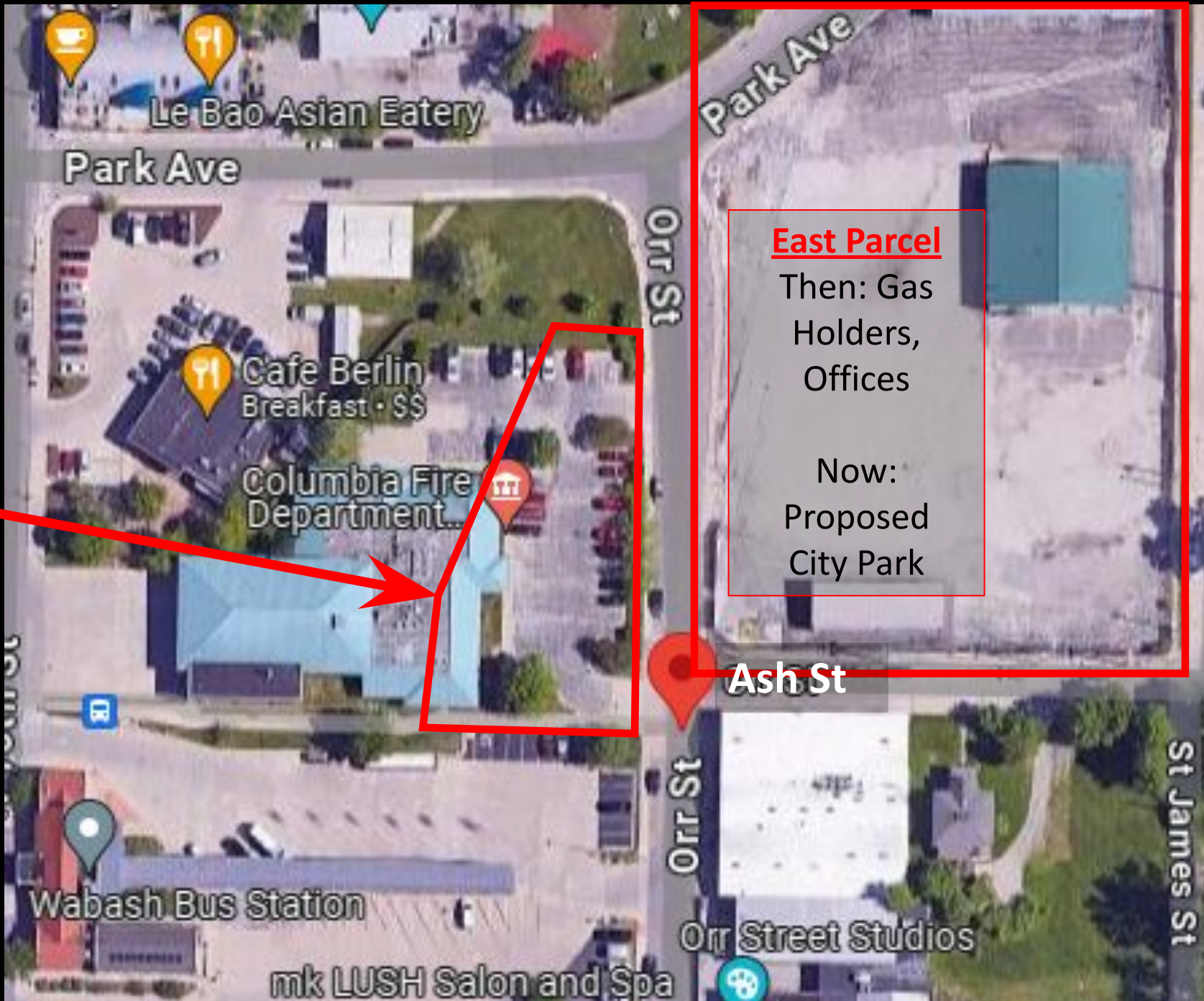
Columbia Gas Light & Coke
Company
1875 - 1932

Articles of Association filed and certificate issued to the "Columbia Gas and Coke Company;" capital, \$15,000, office, Columbia, Boone county, Mo. : Directors, Odon Guitar, Sylvester Watts, Joseph S. Simmons, et al.

**Announcement of
Filing of Articles of
Association for
Columbia Gas and
Coke Company
1875**

**Odon Guitar et al,
Directors**

**Jefferson City People's
Tribune, July 14, 1875**



West Parcel

Then:
Gas
Production
Plant

Now:
Fire Station

East Parcel

Then: Gas
Holders,
Offices

Now:
Proposed
City Park

**Orr St.
Area**

**Present
Day**



Looking SW
Across
Orr St.

Church tower in bkgd.

West Parcel

Then
Gas Production
Plant

Today
Fire Station

Wabash Station

Parcel

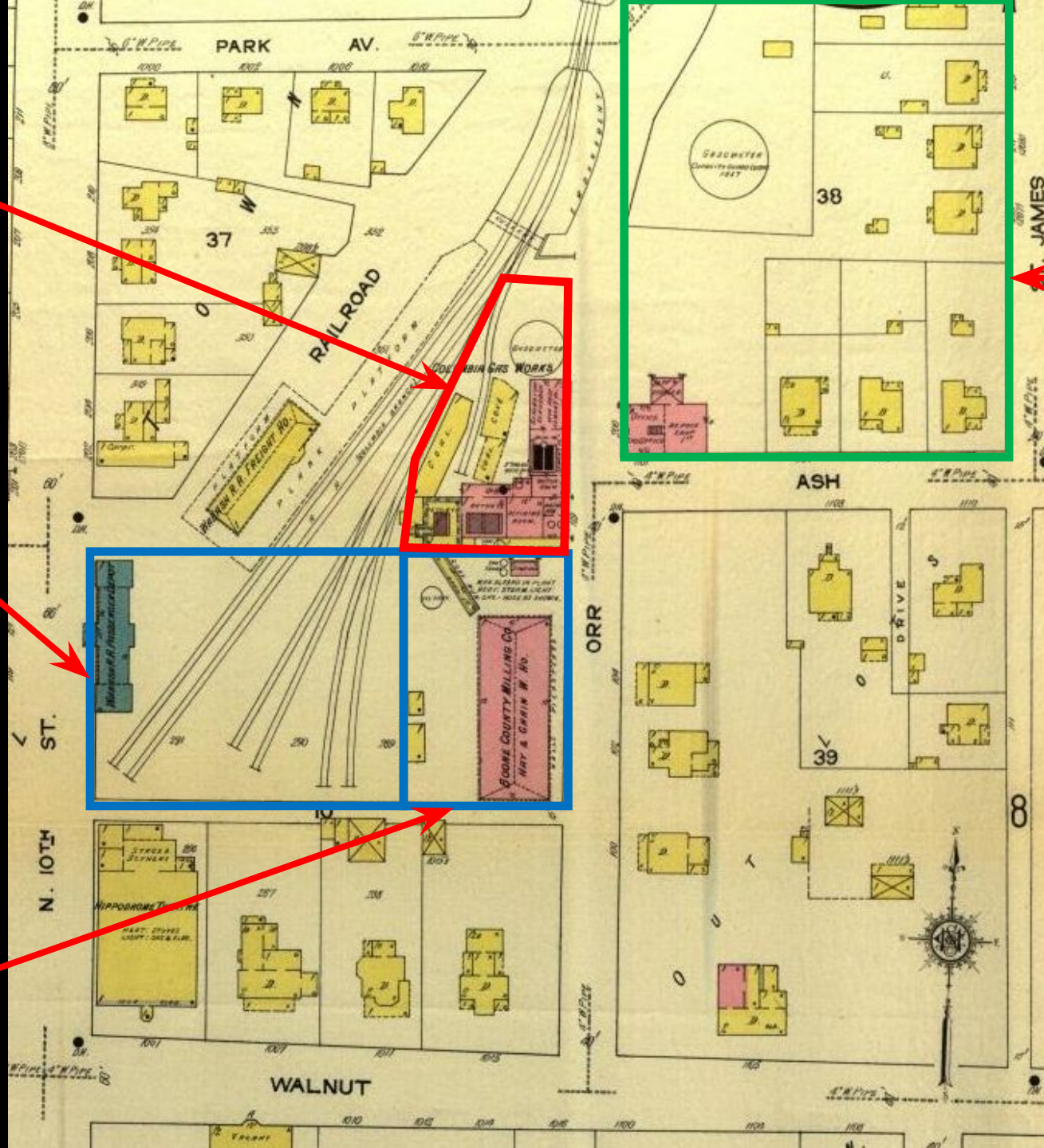
Then
Train Depot & Yard

Today
Wabash Bus Depot

Columbia Grain
Elevator Parcel

Then
Grain Elevators

Now
Wabash Bus Depot



East Parcel

Then
Gas Holders,
Offices, Homes

Now
Proposed City
Park

**1914 Sanborn
Map**

All Sanborn Maps
© EDR Sanborn

Gas Holder GH1, 26,000 cu ft, under/aboveground

Distillery (future Gas Co. Offices)

Wabash Depot

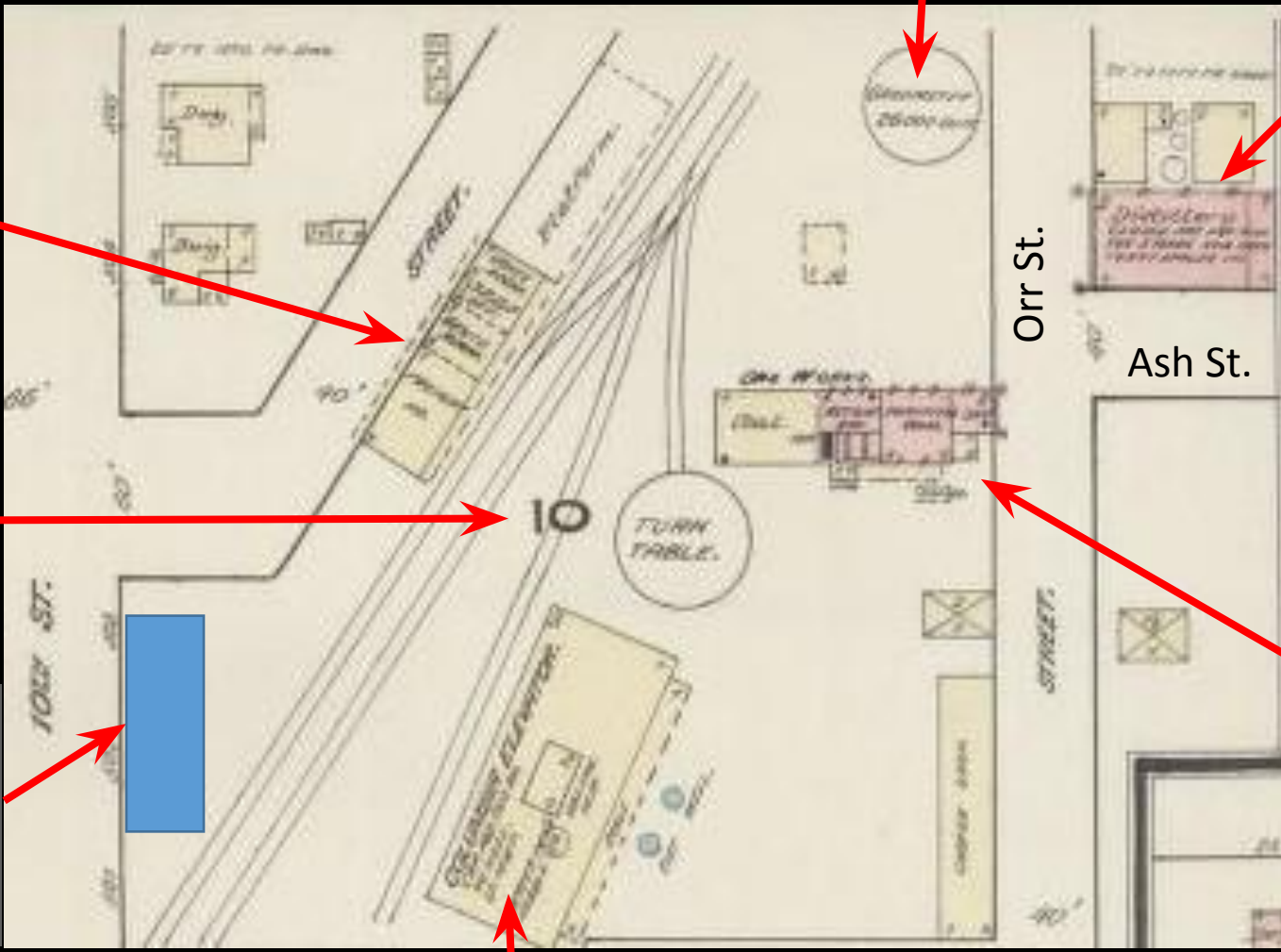
1883 Sanborn: Earliest Known Map of Columbia Gas Works

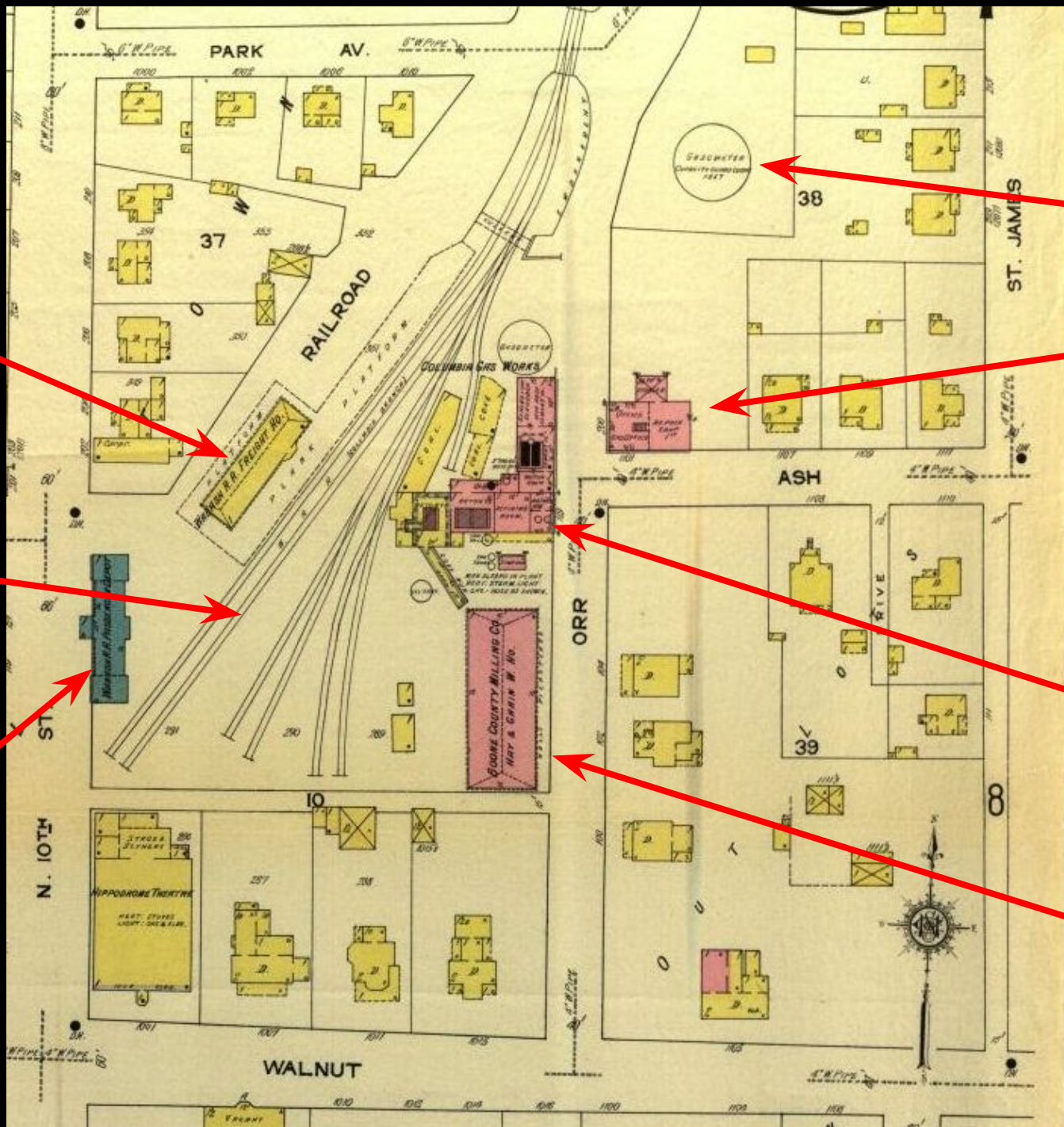
RR Yard and Turntable

Gas Works

Wabash Station won't be built for another 25 years

Grain Elevator





Wabash Freight Depot

RR Yard

Wabash Station

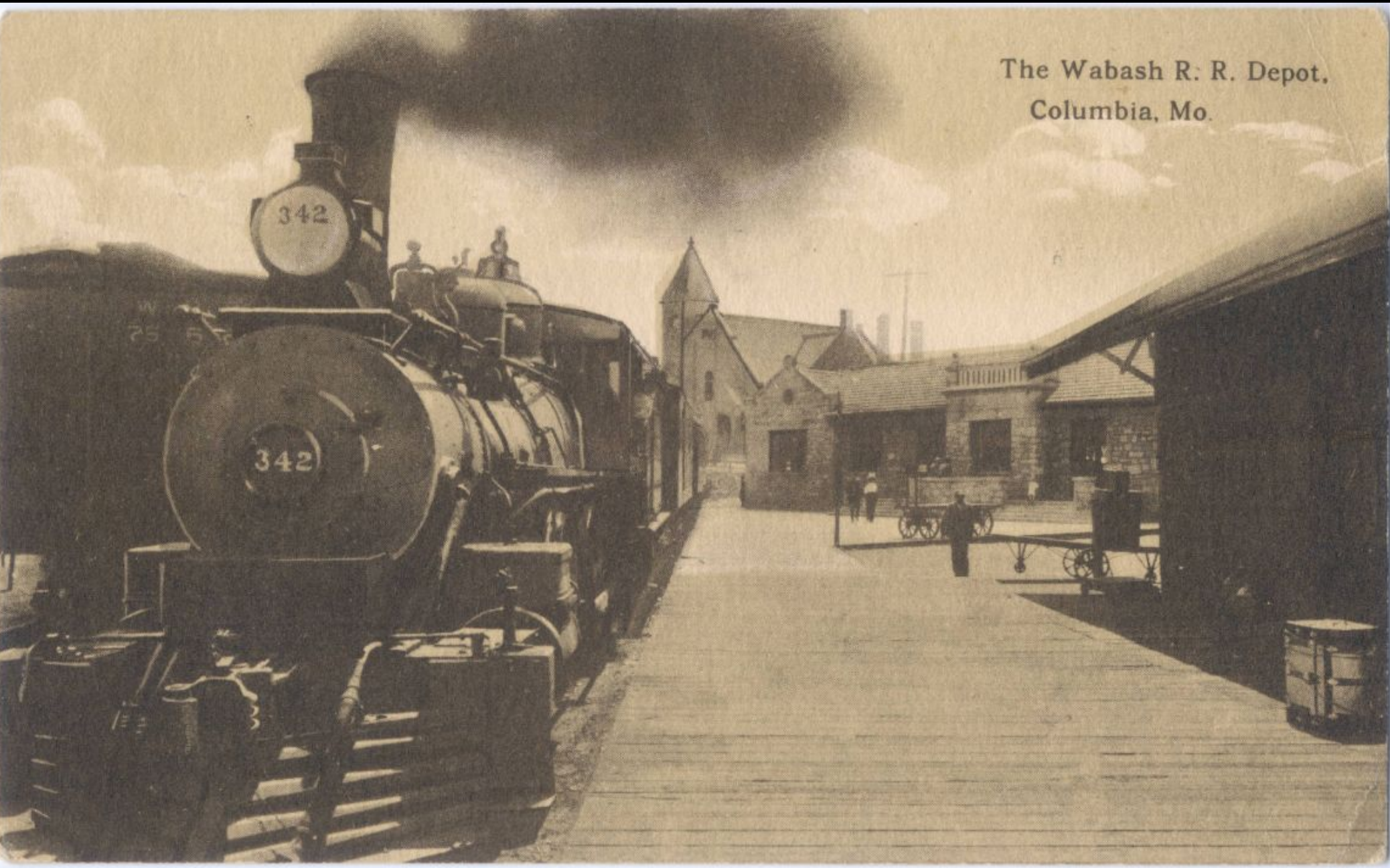
New Gas Holder GH2
60,000 cf
above/below ground

Gas Co. Offices

1914 Sanborn
Map:
Growth and
Expansion

Gas Works

Grain Elevator



The Wabash R. R. Depot,
Columbia, Mo.

Wabash Station

c1915

Built 1909

Freight House at
right

1st Christian
Church in
background

Wabash Station



Front – 1963 MOSHS



Rear – 1978 MOSHS



The Gas Men

c1900

Inside Columbia
Gas Works



**Gasification
Equipment,
Columbia Gas
Works**

c1900

1890-1920: Turbulent Times

- **1895 – Gas company purchased at Trustee's Sale** for \$19,500
- **Feb 1912: No Gas But Bills Remain the Same** – Not enough gas to cook breakfast
- **Jan 1913: Have You Noticed A Bad Taste In The Water?** – Water Sup't. E.C. Clinkscales says it's just the tar used to coat the inside of 1500 ft of new water mains – doesn't know what it is exactly, but assures citizenry it's not harmful
- **Oct 1914: Public Service Commission Criticizes Columbia Gas Co.** over its accounting practices (or lack of)
- **Jan 1918: Columbia Almost Has Gasless Days** due to 'coal famine' and severe weather – Coal prices up 50%, Coke and Oil up 100%
- **Dec 1919: University Has Coal Enough for a Week** – Jail Out of Fuel – Coal Miners Strike Continues – 5 Parties of Volunteers Cutting Wood – Stephens College cutting trees where new dorm to be located
- **Nov. 1920: Columbia Wives Weary of Gas Shortage** – Difficulty Cooking and Baking – No Action By Company

IT WAS A TROUBLESOME FIRE

Burning Pitch Along Railway Track Extinguished Today.

A fire that has been burning on the embankment of the Wabash Railroad since last Friday was finally put out this morning with the assistance of the fire department. The back of the gas plant near the Wabash station is filled ground and has a pitch mixed with it. This was set on fire last week by sparks from an engine. The railroad men have been trying to extinguish it for some time but with little success. They tried to dig around the fire and thus let it burn itself out.

The call for the fire department was made this morning. After the hose was connected, the ditch that had been dug was filled with water.

Evening Missourian
Monday 12/16/1912

Pitch fire on railroad embankment NW
of the gas plant where the fire station is
located today

Columbia Fire Department, 1913



Newspapers.com via MOSHS

State Historical Society

Gasworks Looking NW from Ash and Orr, 1925

PERIL FROM THE PAST

Hazardous wastes from a coal-gas plant that dates to 1875 are about to be disturbed from their subterranean slumber.

Stories by **LESLIE WRIGHT**
of the Tribune's Staff

Boone Co.
Milling &
Elevator

The complex that converted coal to gas is seen in this circa 1925 photograph provided by Union Electric Co. The brick buildings along Orr Street at right center later housed an MU arts annex that was recently razed.

Gas Holder GH1 Tar Tank

Gas Purifiers

Metering (Formerly Gas-Making Retorts)

Gas Generating House

Offices

Location of gasoline tank (1925 Sanborn)



**Aerial View
to NE
Present Day**

DogMaster Distillery

Love Columbi

Rose Music Hall

Bao Asian Eatery

Cafe Berlin
Breakfast • \$\$

Range Free
Gluten Free • \$\$

Delia's Mexican Grill
Mexican

Walnut St.
Stairwell Mural

Wabash Bus Station

mk LUSH Salon and Spa

Mother's Day



RR Bridge GH3 GH2 GH1 Gas Works Whsl Grocers Grain Elevator

**Columbia
FMGP
Aerial View**

From
Southwest
ca. 1930

Orr St. ->

<-Ash St.

< Park St. >

Drainage Culvert Freight House Wabash Station Rail Yard Oil Tank 1st Christian

State Historical Society

1932 – 1994



**Wabash
Station
And
Freight
House
1970**

State Hist Society



**Former Gas Works/
Columbia College Art Annex**

West Parcel
1978

Looking SW
across
Orr St.

Church tower in
bkgd.

< East Parcel

< Orr St. >

< First Christian



**Gas Works
East (Orr St)
Side**

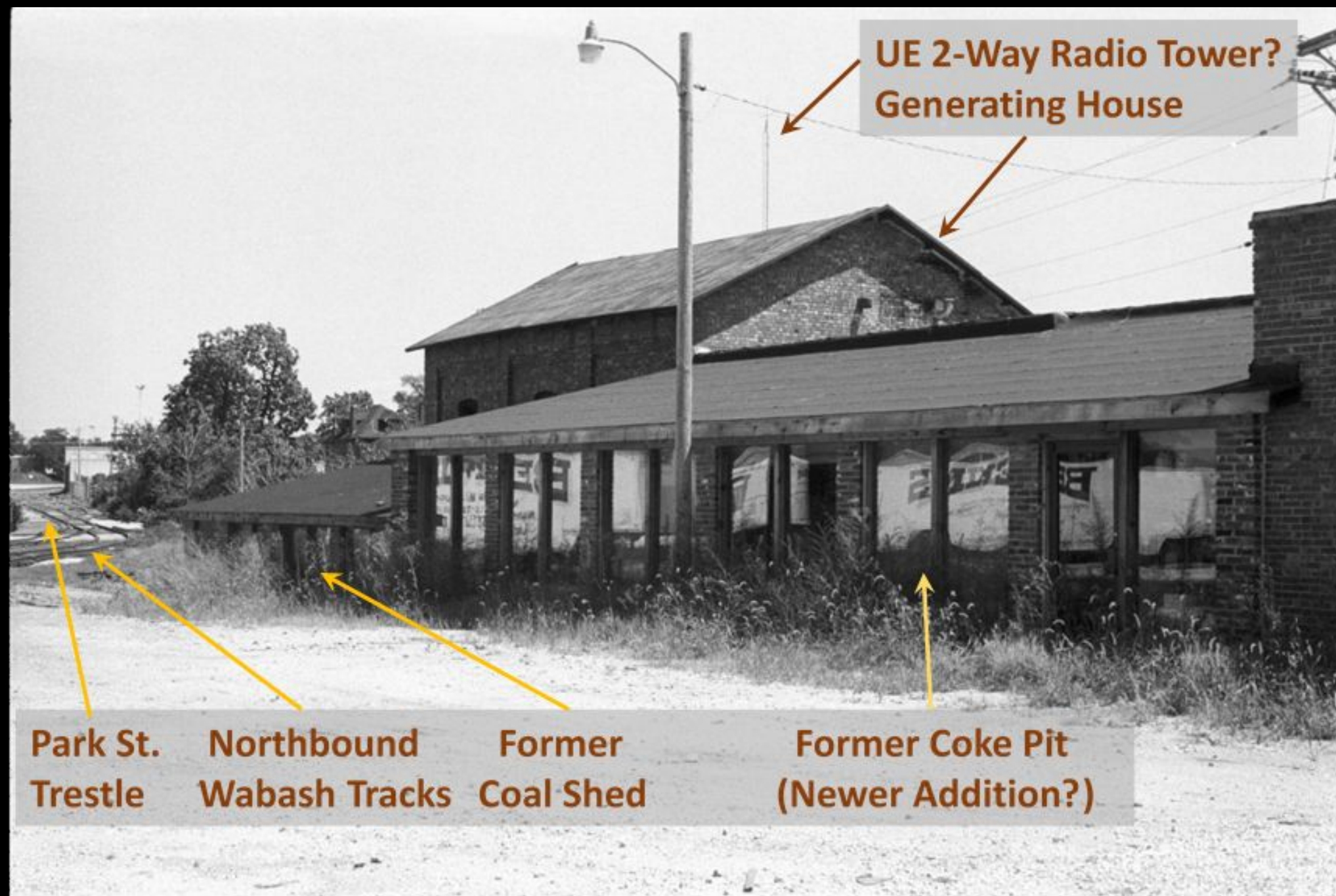
1978

**Gas Works
South End**

1978

State Hist Society





**UE 2-Way Radio Tower?
Generating House**

**Gas Works
West Side**

1978

**Park St.
Trestle**

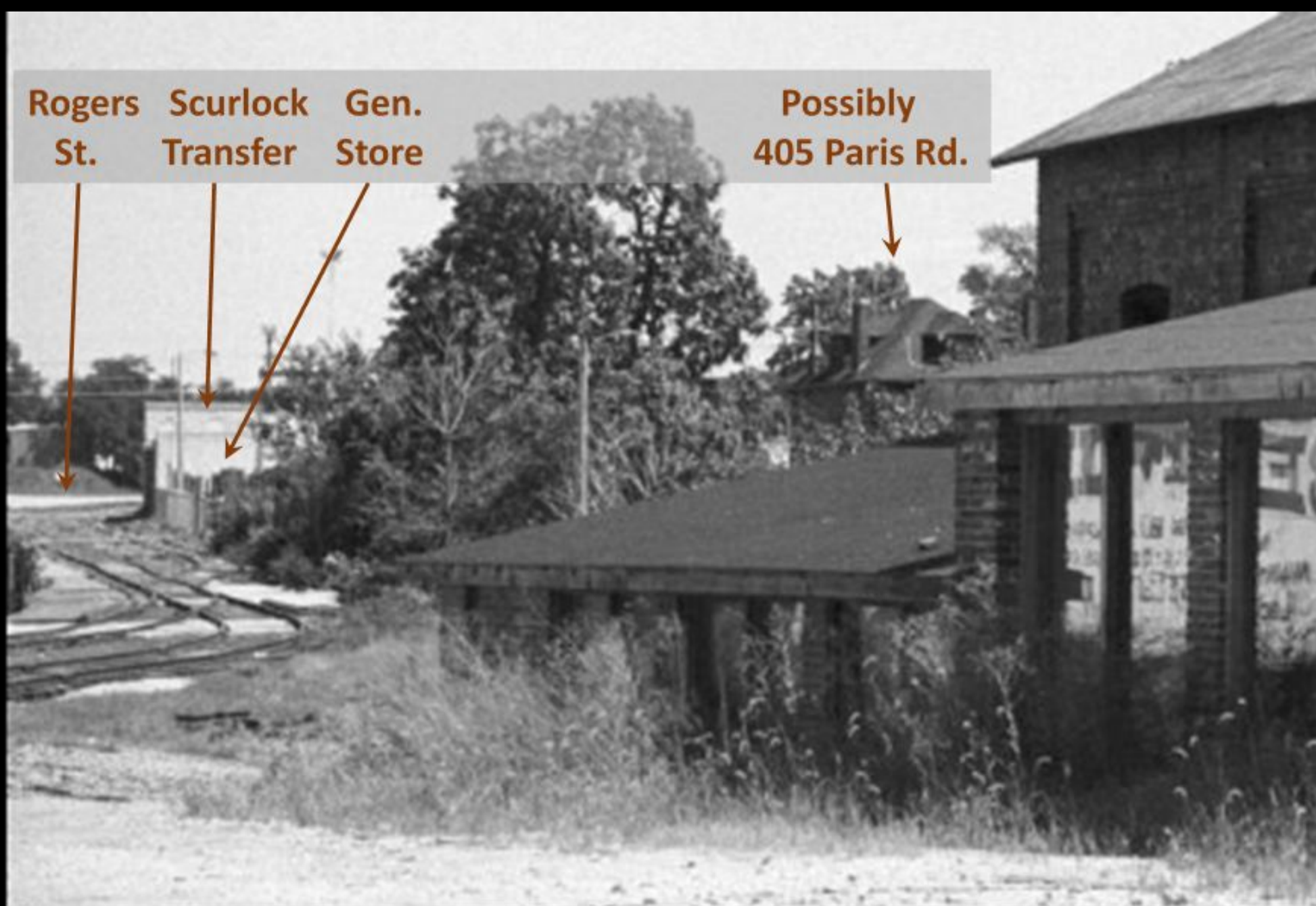
**Northbound
Wabash Tracks**

**Former
Coal Shed**

**Former Coke Pit
(Newer Addition?)**

Rogers St. Scurlock Transfer Gen. Store

Possibly 405 Paris Rd.



**West Side
View of Gas
Works
Closeup
1978**

**West Side
View of Gas
Works
Closeup
1978**

Cleanup and Redevelopment 1994 - Present



April 23, 1990

APR 24 1990

WAST. MISSOURI DEPT. OF PUBLIC WORKS
CITY OF COLUMBIA
P.O. BOX N
COLUMBIA, MO 65205

Mr. George Montgomery, P.E.
Engineering Division
City of Columbia
Department of Public Works
Daniel Boone Building
P.O. Box N
Columbia, MO 65205

Dear Mr. Montgomery:

Subject: Orr Street Improvement Project
Columbia, Missouri

As you requested, this letter describes the key items discussed at our April 12 meeting. As I previously noted, our review of your easement exchange request for property located in front of our reporting center prompted a historical review of past property use. This investigation revealed that a Manufactured Gas Plant once operated along Orr Street in the general vicinity of our reporting center. This plant produced gas for lighting, cooking, and heating for the city of Columbia from the early 1880's to the early 1930's. Our research indicates that the plant was originally owned by local Columbia businessmen and, through a series of acquisitions, was

1990: Investigation Begins

City announces
plan to improve
Orr St.

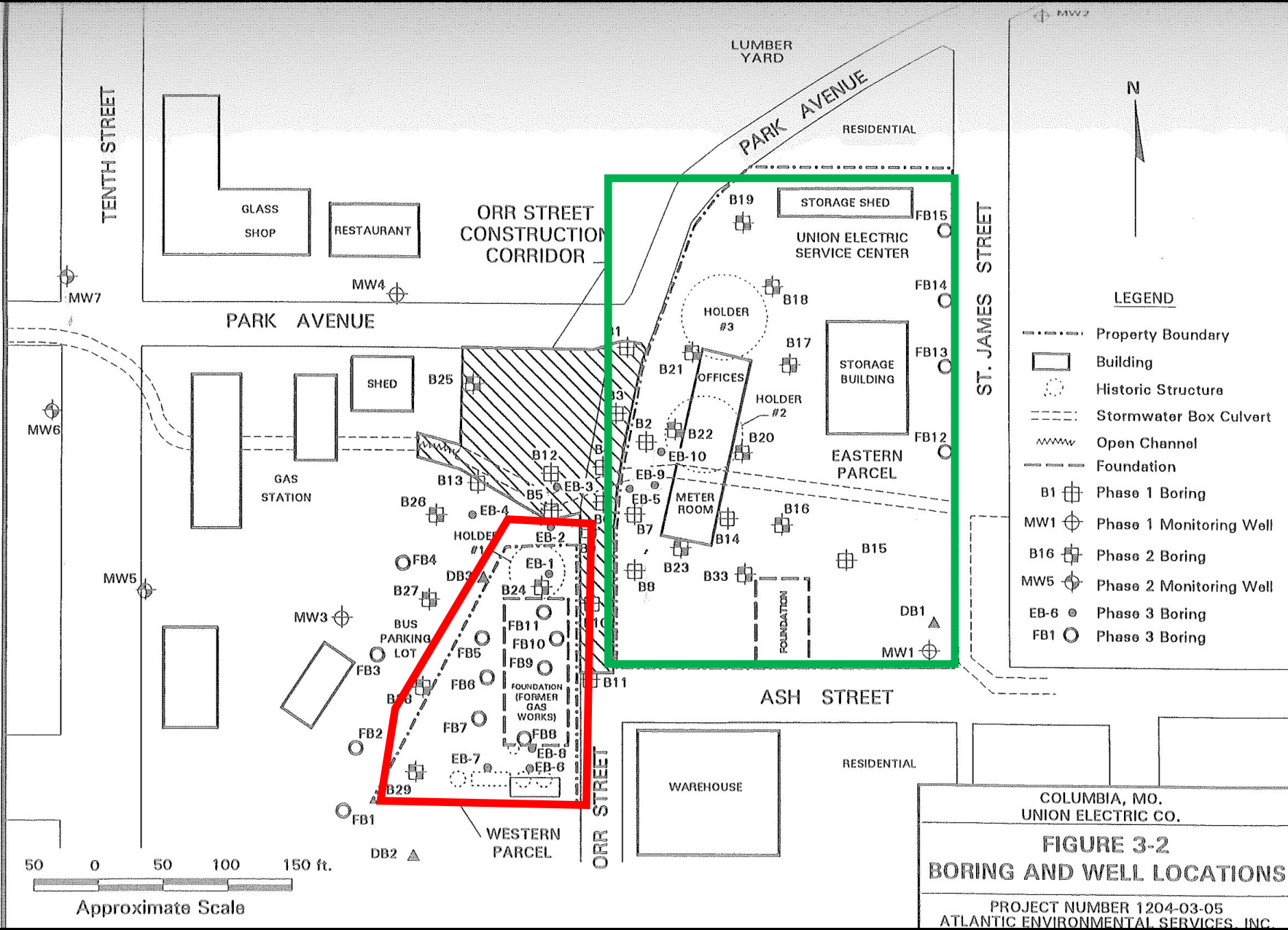
Union Electric (UE,
later AmerenUE)
warns that digging
in street will
encounter coal tar

UE Begins
subsurface
investigation



**MoDNR
Samples Gas
Plant Site**

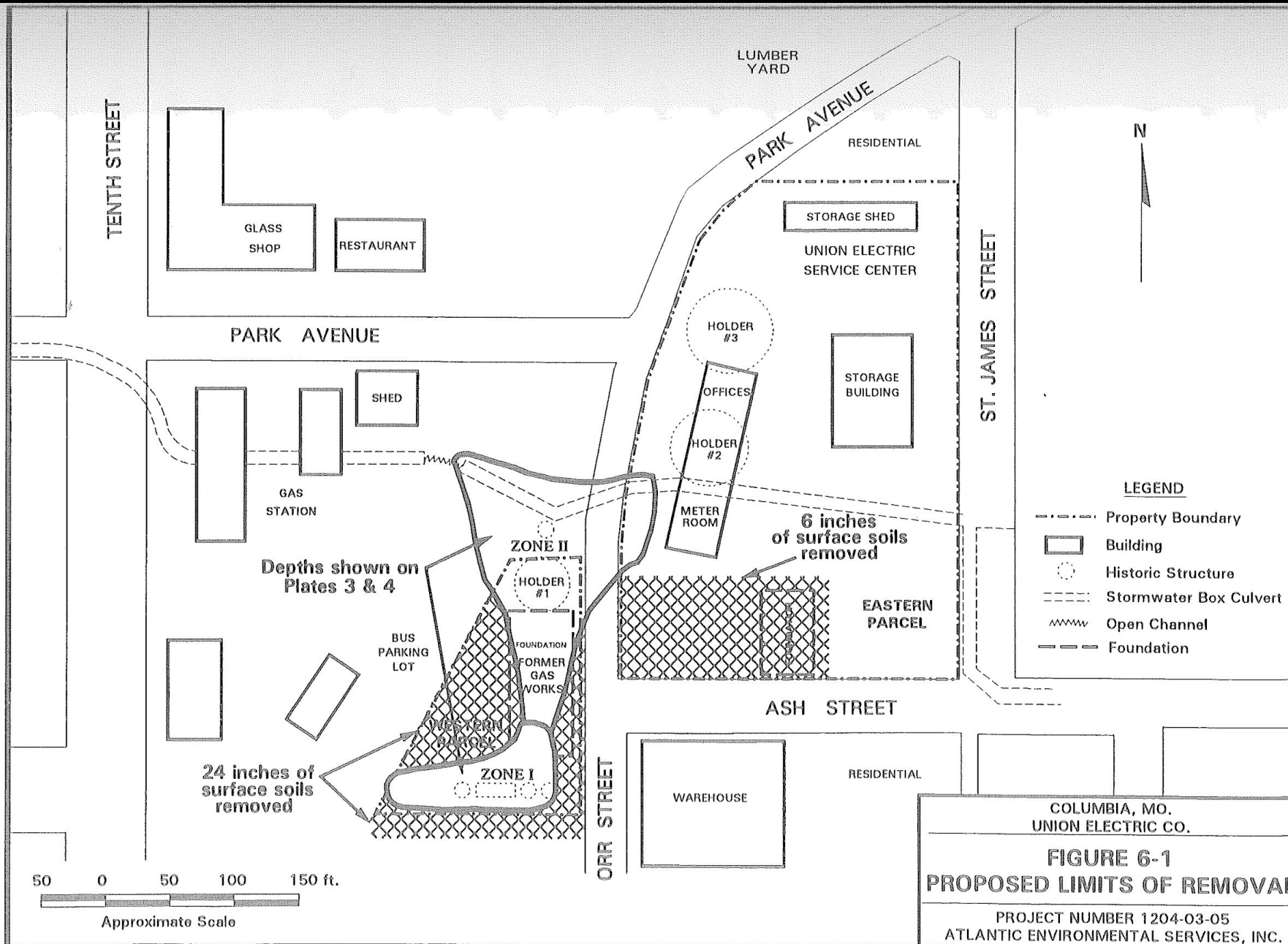
1992



UE Borings and Monitoring Wells 1990-93

Work is initially self-directed; EPA-Region 7 steps in for oversight of West Parcel

City plans to buy property for new fire station following cleanup



West Parcel Excavation Plan

1994

Cleanup would haul away contaminated soil, debris & tar to sanitary and haz waste landfills

Perimeter air monitoring



**Soil
Excavation**

West Parcel

1994



West Parcel Excavation

1994

Wall showing fill,
possibly coal
ash/cinders

Leveling land with
waste was very
common



**West Parcel
Excavation
1994**

Excavation floor
with tar-stained
cinders



Excavation of Original 1875 Underground Gas Holder GH-1

West Parcel
1994

Note circular shape

Gas holders always had tar condensed from the gas in the bottom and were filled with demo debris, soil or gravel, or more tarry waste. All becomes saturated with water and tar over time



1st Christian Church

Wabash Station

Freight Depot

Ash hopper

Excavated Soil

Covered Haul Truck

Excavation of Plant Footprint

West Parcel 1994

Soil awaiting loading

Original 7,000 cu yd estimate ballooned to 20,000 cu yds.



Truck Washing Station

West Parcel
1994

All trucks washed
before leaving site

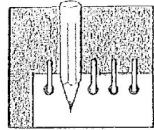
Loads covered for
transport to
landfill



Clean Excavation Floor

West Parcel
1994

Soil samples are
collected prior to
backfilling to
document
conditions



COLUMBIA DAILY TRIBUNE SPECIAL REPORT

SECTION C
SUNDAY,
MAY 22, 1994

MILITARY NOTES 2C
ACADEMIA 3C
HONOR ROLL 4C

Stories by

LESLIE WRIGHT

of the Tribune's staff

Carla Wennermark has hired a cleaning service to scrub away any traces of hazardous waste that might have drifted into her Hubbell Drive bungalow during Union Electric Co.'s \$2.5 million excavation nearby.

But she can't sweep away her trepidation about living and raising her 2-year-old son only a block from hazardous waste.

Although Union Electric in the past three months has removed thousands of yards of soil laced with coal tar, hazardous waste still lurks in the ground beneath Union Electric's Orr Street offices and parking lot.

The cleanup devised by Union Electric and the U.S. Environmental Protection Agency will leave 13,000 cubic yards of coal-tar contaminated soil in the ground, Union Electric project manager Dave Pluhar estimated.

The area that has been excavated is the future site of the city's new downtown fire station.

Coal tar is a residue composed of cancer-causing compounds. A by-product of a century-old process that converted coal to gas, it exuded a pungent odor as it was exposed to the air and excavated, something like a mixture of diesel fuel and mothballs.

The plant that produced fuel on the site for cooking, heating and lighting closed in 1932, when coal gasification became obsolete. More than 60 years later, Columbians are living with the legacy.

EPA investigators have said coal tar that remains on the site poses no health risk so long as it remains sealed in the ground, but an environmental scientist hired by a group of concerned citizens, including Wennermark, disputes that conclusion.

Wennermark can't help but wonder. "Maybe I'm just trying to tell myself that everything is OK. Though in actuality, I really don't know that," she said. "I would like to see a health survey done."

Representatives of the EPA, however, believe a health survey would be of little value because the risk of exposure is slim.

"It would have been a different story if these coal tars were on the surface," EPA project manager Ann Ollinger said. "This



A Union Electric cleanup crew drives pilings to support a wall that will separate an area cleansed of carcinogenic coal tar from one that is not. (L.G. Patterson photo)

LINGERING DOUBTS

Union Electric's \$2.5 million effort to unearth hazardous coal tar from a site near Orr Street has failed to allay the fears of neighbors worried about their health.

**Community
Concern**

**Columbia Tribune
5/22/1994**



East Parcel Cleanup

AmerenUE
Service Center
East Parcel
2005



< Auger rig collecting core samples.
Rear of service center bldg in
background

v Collection of soil samples from cores



**East Parcel
Additional
Investigation
2007**



05/21/2014 06:19 am



05/21/2014 06:18 am

Open House with Ameren, Contractors, MDNR

May 21, 2014

Prior to East Parcel
remediation

Ameren built a new
facility on Lemone
Industrial Dr. and
moved service
operations prior to
starting.



**East Parcel
Remediation
Inside Tent**
June 2014

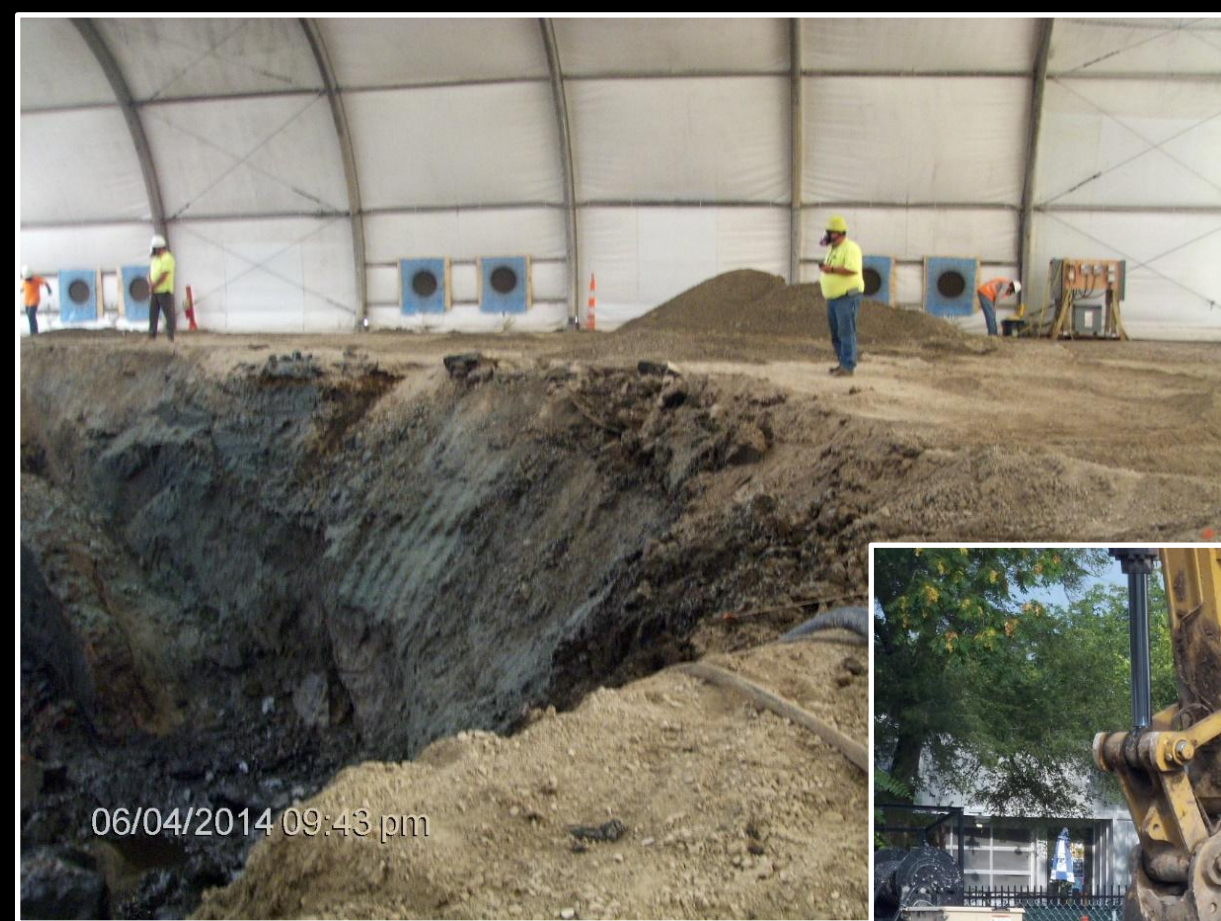
Showing curved
brick walls of Gas
Holder GH-2



East Parcel Remediation 2014

31,612 tons soil
and debris
removed

All excavation
water treated and
disposed to
sanitary sewer





View from Rose Music
Hall back patio

**Tent Was
Highly Effective
2014**

Almost zero disruption of
neighboring businesses & residents

Granular Activated Carbon
air treatment units



06/04/2014 09:51 pm

Excavation
backfilled with
clean gravel



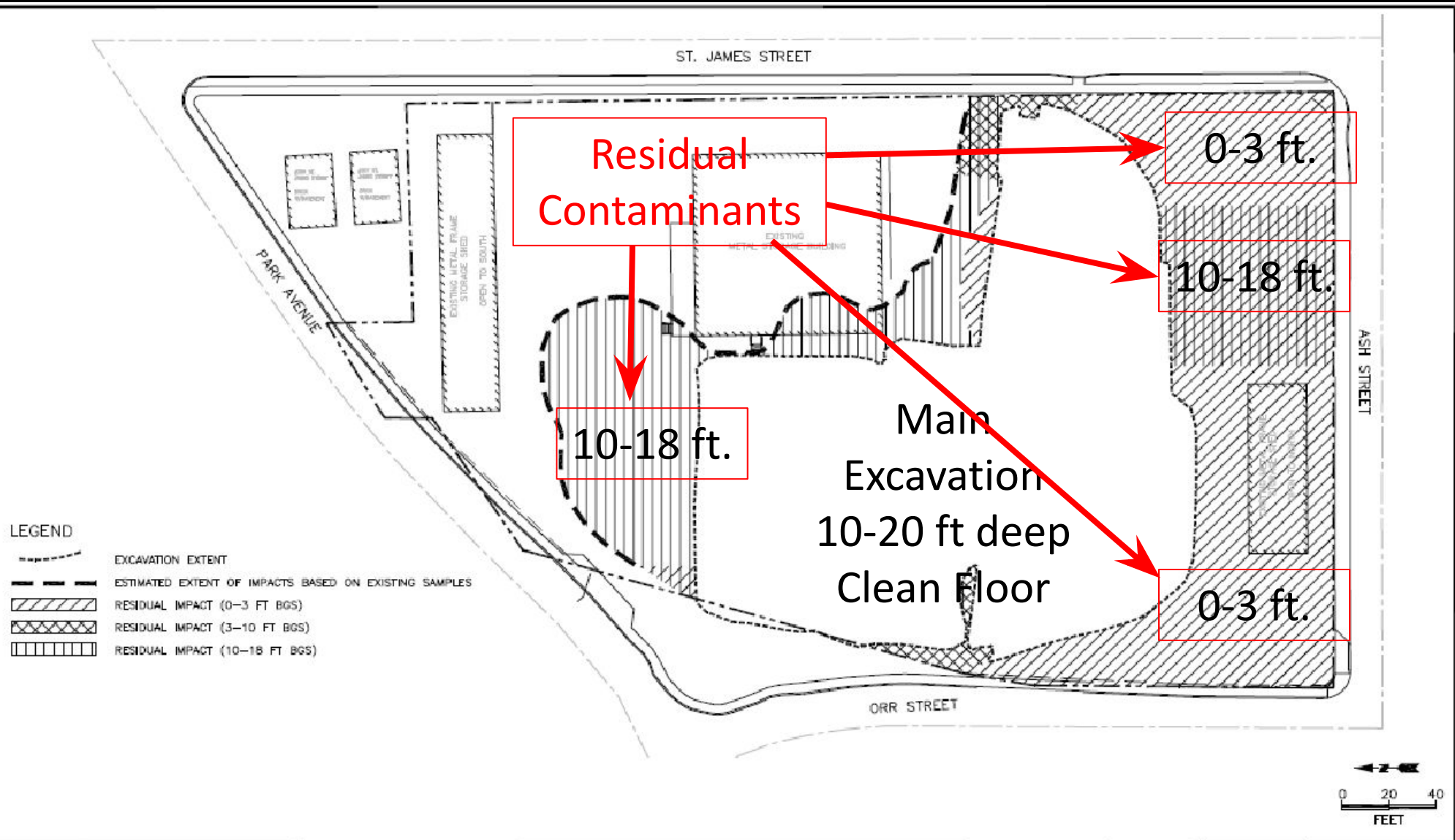
Stained seam at bottom of
excavation wall, 18-20 ft.



Backfill and
Residual Soil
Staining

East Parcel
Main
Excavation

2014



**East Parcel
Final
Excavation
Boundaries
And Residual
Contaminants
2014**

Part per million levels
of PAHs remain at
various depths



TITLE
SOIL MANAGEMENT PLAN
ESTIMATED REMAINING IMPACTS
FORMER COLUMBIA MGP SITE

DATE: 4/21/16
DRAWN: TMM
CHECKED: BJT

PROJECT NO: 62413020002
AMEREN
COLUMBIA, MO
FIGURE 2

ENVIRONMENTAL COVENANT

This Environmental Covenant is entered into by and between the Grantor Union Electric Company d/b/a Ameren Missouri ("Owner"), the Grantee, Ameren Missouri ("Holder") and the Missouri Department of Natural Resources ("Department"), pursuant to the Missouri Environmental Covenants Act, Sections 260.1000 through 260.1039, RSMo and Missouri Risk Based Corrective Action Rules, 10 CSR 25-18.010. Owner, Holder, and the Department may collectively be referred to as the "Parties" herein.

RECITALS

WHEREAS, Owner is the owner in fee simple of certain real property commonly known and numbered as Columbia Coal Gas - East Parcel, 210 Orr St., Columbia, Missouri, shown on the survey attached hereto as Exhibit A, and legally described as:

A tract of land in the west half of the northwest quarter of the south

**East Parcel
Post Closure
Management**

Both documents
available in PDF
form on MDNR's
ESTART Map

Site Management Plan

**Ameren Services
Former Manufactured Gas Plant
210 Orr Street
Columbia, MO**

**Covenant runs with land,
has restrictions that DNR
can legally enforce if
necessary**

**Management Plan:
Annual inspection
and reporting,
options for
handling soil
excavated from
controlled areas**



Proposed Orr St. Park

Construction planned for 2024

City of Columbia

Missouri's Brownfields/Voluntary Cleanup Program

- Established 1995
- Oversees investigation and cleanup of sites
- Program designed to facilitate reuse
- Certifies site is clean and safe for reuse
- Remediating parties pay oversight costs
- Over 1000 sites completed
- Benefits:
 - Healthy communities
 - Revitalized neighborhoods
 - Billions in new investment
 - Job Creation/Retention

See what's been cleaned up in your community on our interactive map at www.dnr.mo.gov

