ORE
TASTE THE WASTE

Kaegh Allen
P4 Graduation Project: ORE COMPLEX
“Cities are increasingly renewed by large projects rather than by long-term visions and subsequent master planning.

Public-private partnerships are organized to engage strategic sites resulting in complex developments.

The developments are comprised of multiple and often conflicting interest, which have to be simultaneously negotiated.

The traditional tools of architecture and urban planning are simply not equipped to deal with the conditions that arise.

This critical condition will be the focus of ‘Complex Projects.’”
RESEARCH & GROUP STRATEGY
<table>
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<th>Search Term</th>
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<tr>
<td>chicago north side</td>
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<td>chicago south side crime</td>
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<td>chicago south side shooting</td>
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<td>chicago south side violence</td>
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Gang and gun violence have turned Chicago into something close to a war zone. The death toll by murder in the city over the past decade is greater than the number of American forces who have died in Afghanistan since the beginning of Operation Enduring Freedom.

**CHIRAQ**

<table>
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<tr>
<th>Country</th>
<th>Period</th>
<th>Deaths</th>
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<tr>
<td>Afghanistan</td>
<td>2001-now</td>
<td>2,166</td>
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<tr>
<td>Iraq</td>
<td>2003-2011</td>
<td>4,422</td>
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<tr>
<td>Chicago</td>
<td>2003-2011</td>
<td>4,265</td>
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Operation Enduring Freedom, the name for the war in Afghanistan which started Oct. 7, 2001, has seen a total of 2,166 Americans killed. The war has been ongoing over 11 years.

Operation Iraqi Freedom, the name for the war in Iraq which started March 20, 2003 and ended Dec. 15, 2011, saw a total of 4,422 Americans killed.

Between 2003 and 2011, 4,265 people were murdered in the city of Chicago. In 2012 alone, 512 people were killed.

Sources: Chicago Police Department Murder Reports, U.S. Department of Defense.
50 year plan
“I’m from the land where ain’t no lackin’ at, this ain’t what you want”

Lil Durk - Dis Ain't What U Want
LOCAL AGENTS
INTERVIEWS AND MEETINGS WITH PROFFESIONALS

IMAGINE

INDUSTRIAL ANCHOR

Affordability is a big growing issue here

NASUTSA MABWA
McCaffery project manager

WAYNE STEGER
politics teacher

DOUGLAS VOIGT
SOM architect
20% vacancy
LAKESIDE PROJECT BY SOM
“The client faces a battle. The housing market collapses and the presumed market for the site is gone. So now they have to rethink what the site is going to be.”
- SOM Spokesperson
NEW MASTERPLAN
CLUSTER IDEA

Evolving partnerships
Involvement of multiple interests
Decentralized authority
Individual cluster managers
EVOLUTIONARY SPECIES

Darwins tree of life (1837)
ADAPTABLE TO MARKET

ONE ANCHOR

INITIAL INVESTMENTS

CRISIS

CLUSTER PRINCIPLE
MANIFESTO

There is need for change.

The United States of America, a country built on foundations of grandure and perfection is in a blinded but urgent state of emergency.
As the river of disconnected waste and violently unsustainable consumption continues to swell, the canyon of inequality also grows larger and larger.
The land of the free is now stagnant with exploited and isolated minorities exasperated by a lack of hope and possibilities.

There is need to work.

Chicago, the city of neighborhoods has reached a crucial point in its development.
The nations third city is loosing population and faces some of the worst violence and segregation in decades.
The Southworks development provides an incredible opportunity to work for this change.

There is need for the South.

The great American pioneering spirit needs to be rekindled.
“South-Works” is a development for the American dream of the 21st Century.
A dream built on foundations of humility and hope.
A development that facilitates and enables the American people to produce for themselves and for their country.
With pride, ingenuity and radical action - we create an example for the nation.

South-Learns • South-Mixes • South-Makes • South-Plays • South-Believes • South-Cleans • South-Cares
SOUTH-CLEANS
WASTE NOT
WANT NOT
WASTE NOT WANT NOT

USA, leads the world in waste production, producing 1/4 of the world’s trash despite being home to less than 5% of the world’s people.
USA
Waste Management

- **U.S.**
  - 89 WTE facilities
  - 29 million tons per year

- **Western Europe**
  - 388 WTE facilities
  - 62 million tons per year

- **Asia**
  - 301 WTE facilities
  - 48 million tons per year
Did you know?


- 29% paper
- 38% organic waste
- 16% plastic
- 5% glass
- 2% metal

Source: B. Staley and M. Barlasz, Composition of Municipal Solid Waste in the United States and Implications for Carbon Sequestration and Methane Yield, 2009

Did you know?

Since it’s creation in 1991, our energy-from-waste facility has...

- Disposed of nearly 18 million tons of solid waste
- Generated more than 9,000,000,000 kWh of electricity
- Prevented more than 400 acres from becoming landfill

Source: Nickolas J. Themelis
Director, Earth Engineering Center
Columbia University
Letter to the Detroit Free-Press, 6/4/08

Did you know?

For every ton of waste we process, we eliminate...

- the need to import one barrel of oil
- or mine one quarter ton of coal.

Source: www.gdrra.org
Getting to Zero Waste

WASTE PREVENTION

- 70% Recycling
- 30% Waste-to-Energy
  Refuse-derived Fuel
  Disposal

Re-Use

Recycling/Compost

Energy Recovery

Disposal
Barron County Waste-to-Energy & Recycling Facility
Almena, WI

Trash Capacity: 2 units @ 50 tpd = 100 tpd
Energy Capacity: STM: 19,000 Lbs/Hr
ELE: 0.265 MW
Project Startup: 1986
Technology: MCU
CEMS: Opacity; Temperature
APC System: SDA; ESP; CI; FF
Owner: Barron County
Operator: ZAC, Inc.

Xcel Energy French Island Generating Plant
LaCrosse, WI

Trash Capacity: 2 units @ 200 tpd = 400 tpd
Energy Capacity: ELE: 32 MW
Project Startup: 1987
Technology: RDF-SSWW
CEMS: SO₂; NOx; Opacity; CO
APC System: DSI; FF; SNCR
Owner: Xcel Energy
Operator: Xcel Energy
Jackson County Resource Recovery Facility
Jackson, MI

Trash Capacity: 2 units @ 100 tpd = 200 tpd
Energy Capacity: STM: 49,200 Lbs/Hr
ELE: 3.7 MW
Project Startup: 1987
Technology: MBWW
CEMS: CO; CO₂; NOx; O₂; Opacity;
SO₂; Temperature
APC System: SDA; FF; CI
Owner: Jackson County
Operator: U.S. Filter, Inc.

Greater Detroit Resource Recovery Facility
Detroit, MI

Trash Capacity: 3 units @ 1,100 tpd = 3,300 tpd
Energy Capacity: STM: 725,600 Lbs/Hr;
ELE: 68 MW
Project Startup: 1991
Technology: RDF-SSWW
CEMS: CO; NOx; Temp; Opacity;
SO₂; Link; O₂
APC System: SDA; FF
Owner: City of Detroit, MI (GDRRA)
Operator: Covanta Energy Corporation

Kent County Waste-to-Energy Facility
Grand Rapids, MI

Trash Capacity: 2 units @ 312.5 tpd = 625 tpd
Energy Capacity: ELE: 18 MW
Project Startup: 1990
Technology: MBWW
CEMS: CO; O₂; NOx; Temp; Opacity;
SO₂; Link
APC System: SDA; FF; SNCR; CI
Owner: Kent County
Operator: Covanta Kent, Inc.
Indianapolis Resource Recovery Facility
Indianapolis, IN

Trash Capacity: 3 units @ 725 tpd = 2,175 tpd
Energy Capacity: STM: 587,400 Lbs/Hr
Project Startup: 1988
Technology: MBWW
CEMS: CO, NOx; Opacity; SO2, Temp; O2
APC System: SDA, FF, SNCR, CI
Owner: Marion County
Operator: Covanta Indianapolis, Inc.
WASTE TO ENERGY PLANT
Reference Sizing Study

A MONUMENT AND LANDMARK FOR THE SOUTH-SIDE OF CHICAGO.
SOUTH WORKS INDUSTRIAL TIF

CITY AIDS TO USE THE VACANT SITE FOR THE NEEDS OF THE NEIGHBORHOOD

SOUTH WORKS INDUSTRIAL TIF

DESIGNATION: 1999
EXPIRATION: 2022

- industrial redevelopment of the vacant site (?)
- lakefront extension of the South Chicago community
- provide employment
- housing
- job training
- educational programs
- public amenities
SITE VISIT
Waste to Energy Plant, Rosenberg, Netherlands.
SITE VISIT
Waste to Energy Plant, Rosenburg, Netherlands.
WASTE TO ENERGY PLANT
Waste Feasibility

POPULATION SOUTH CHICAGO: 34,592


WASTE IS VALUABLE

1 TON WASTE
= 2 MWh DISTRICT HEATING
+ 0.67 MWh ELECTRICITY

ELECTRICITY FOR 35,500 CITIZENS & HEATING FOR 9000 HOUSEHOLDS

2,100 TONNES OF MUNICIPAL SOLID WASTE/MONTH
“The process is simple and safe. But can you make it beautiful?”
ORE COMPLEX
PROGRAM
This critical condition will be the focus of ‘Complex Projects’
ORE
TASTE THE WASTE

WtE POWERPLANT

(waste) (heat)

BATH HOUSE BREWERY GREEHOUSE

(community) (income)

COMMUNITY CLUBHOUSE
ORE P4
Sustainability Concept

ORE
Taste the Waste

Electricity

MSW
Hot Steam
Building Heat & Cool

Money

Food
in a Food Desert

Beer

Jobs in a Poor Neighbourhood

Activities & Education

Recycling Network

Waste from Neighbourhood

Waste from Landfill

South Works

Events

The diagram illustrates a sustainability concept where waste from various sources such as Neighbourhood and Landfill is processed to produce electricity, hot steam, and other resources. These resources are then transformed into money, food, and other benefits for the community, including jobs and activities. The concept is to create a circular economy where waste is turned into value.
“After 100 years, small Breweries are back”
New Haven Waste-to-Energy Plant

Client: VEOLIA Environmental Services UK Ltd.
Mission: Conception et suivi architectural de la réalisation
Date: 2000-2012
Échelle: 12 000m²
Typologie: Industrie - Grands Equipements de l'Environnement

Trash Capacity: 2 units @ 14.5 t/h = 696 t/d
Energy Capacity: ELE: 35.8 MW

210,000 tons a year = 25,000 homes
Marchwood Waste-to-Energy Plant

Trash Capacity: 165,000 t/y = 2 @ 11 t/h = 528 t/d
Energy Capacity: ELE: 14 MW

165,000 tons a year of domestic waste 16MW of electricity to the National Grid – that’s enough for around 22,600 local homes.

Total: 10,000 m²

- Machine Rooms: 440 m²
- Circulation: 3896 m²
- Storage: 0 m²
- Administration: 1400 m²
- Services: 365 m²
- Public: 0 m²
- Other: 0 m²
DESIGN APPROACH
ore

NOUN

a naturally occurring solid material from which a valuable product can be extracted profitably.

e.g. the mine's reserves of ore
Research Question

“How can an industrial complex become an integrated part of community life?”
The Spectacle of Industry

The marginalized processes that make our lives possible are quickly being enveloped by our growth. We must find a way to co-exist alongside the industries that support urban life. The spectacle of Industry must become the everyday.
The inherent beauty of ruins is their ability to retain memory. This material memory allows us to place ourselves in time. To showcase these ruins is to humbly accept our position.
Summer Solstice 2014 (June 20) Sun Path

Winter Solstice 2014 (December 20) Sun Path
Prevailing Winds
Wind Frequency (Hrs)
Location: Chicago/Midway, USA (41.8°, -87.8°)
Date: 1st January - 31st December
Time: 00:00 - 24:00
© Weather Manager

Prevailing SW Winds
Gaining speed over Lake Michigan?
ORE COMPLEX

Ore Walls

- Existing Ore Walls

- Grab Bucket

- Ore
  - 170 Tons per Foot

- Ore
  - 400 Tons per Foot

- Traveling Bridge

- 240 Tons per Foot

- Ship

- Gantry Crane
SITE VISIT
Ex Industrial Parks, Rhur Region, Germany.
This method tends to express the ruin most fully but provides the greatest difficulty in making a weather-tight seal between old and new.

Building in the ruin

The ruin can be seen from both sides, but the interface between old and new often means that the ‘ragged edge’ of the ruin may be lost.

Building on the ruin

This provides the simplest and least destructive solution. The ruin is enclosed inside a museum-like building. However, the ruin is now separated from its context.

Building over the ruin
ORE COMPLEX
DESIGN
Structural Elements
Secondary Grid

Every 4.3m
Central Access

Physical & Visual access to all industries.
Climatic Zones

Outdoor
Indoor
Specific
MATERIALITY
Facade Material

“ORE COMPLEX”
Exterior Window Detail Section
1:5 on A1
Listed on this and the facing page are span ranges for the basic types of long-span structures:

### ONE-WAY SYSTEMS

- **Beams**
  - Timber: Laminated beams
  - Steel: Wide-flange beams, Plate girders, Precast tees
  - Concrete

- **Trusses**
  - Timber: Flat trusses, Shaped trusses
  - Steel: Flat trusses, Shaped trusses

- **Arches**
  - Timber: Laminated arches
  - Steel: Built-up arches, Formed arches
  - Concrete

- **Cable Structures**
  - Steel: Cable systems

- **Plate Structures**
  - Timber: Folded plates
  - Concrete: Folded plates

- **Shell Structures**
  - Wood: Lamella vaults
  - Concrete: Barrel shells

### TWO-WAY SYSTEMS

- **Plate Structures**
  - Steel: Space frames
  - Concrete: Waffle slabs

- **Shell Structures**
  - Steel: Ribbed domes
  - Concrete: Domes
Space frame with no direction  NO

Truss with one direction to span between the walls  YES

Zwei- / Vielgelenk-Fachwerkrähmen
Trussed two-hinged frame
STRUCTURE
Construction
ORE COMPLEX TOUR
ORE
TASTE THE WASTE

Kaegh Allen