COLLAPSING DIVIDES

ARONSON +
VAN DER MARCK +
CREW EXECUTION

FIG 1

10.1969
(41°41′13.81″N, 87°58′48.62″W)[1]

The still air hangs crystalline, immobile, almost solid amidst the coming waves of wintery lake effect. The waters' edges pucker, lining the basin with frozen slurry. The glassy center shimmers, casting back to the camera a Gaussian smug of sky and banks as scattered refraction. Patches of snow, maybe the first, drape themselves across truncated slabs, posing in isolated instances of over-exposure. Striated with rubble rebar and encrusted with aggregate, the black earth offers a negative to the productive displacements of the surrounding limestone quarry.[2]

Sheets of tempered silence hold the sustained hum of the season, punctuated now-and-again as dynamite blasts tear through the weather. Lumbering dump-trucks and individual agents equally hang their exhaust on the emptiness; pulses and puffs of vapor settling into the moments between burst. The white noise of industry- vibratory, indifferent, immersive- blankets the crew as they prepare and pour.

Unseen, unstable, Jerry Aronson, the day's cinematographer, straddles the aggregate banks.[3] One remnant shot nestles just beneath the lip, a few stumbles within the old excavation perimeter. The camera's pivot stands beside the mixer's shoot, Taylorist swings aligned arc in arc. As the Pour's irregular gurgles and spurts resolve into a slow crumbling stream, the compressed shots exaggerate and inhabit the productive space and reifying speed of concrete (Figure 1).

The photographer Jonas Dovydenas' lower shot, eddied down the sidewall, pans to reveal crew as cast (Figure 2a).[4] Industry foremen, Epstein and Sons' engineers stand along the upper periphery, well back from the bank, while Jan van der Marck, the Museum of Contemporary Art curator, crowns the summit and the center of the frame. Knee cantilevered beyond the edge, Jan peers at the trail of the Pour, curious and haughtily cautious. The vertiginous stasis- of the season, the quarry/camera equipment, and the congealing concrete- softly manifests in his fluttering left hand as it searches for balance. The blur of larger vibrations are captured lightly in the surface of the few, frozen images that remain of Concrete Pour.[5]

CONCRETE POUR

WATER
CEMENT
SAND
CRUSHEDSTONE

6 -11.1969
(41°53'35.37"N, 87°37'16.06"W)[6]

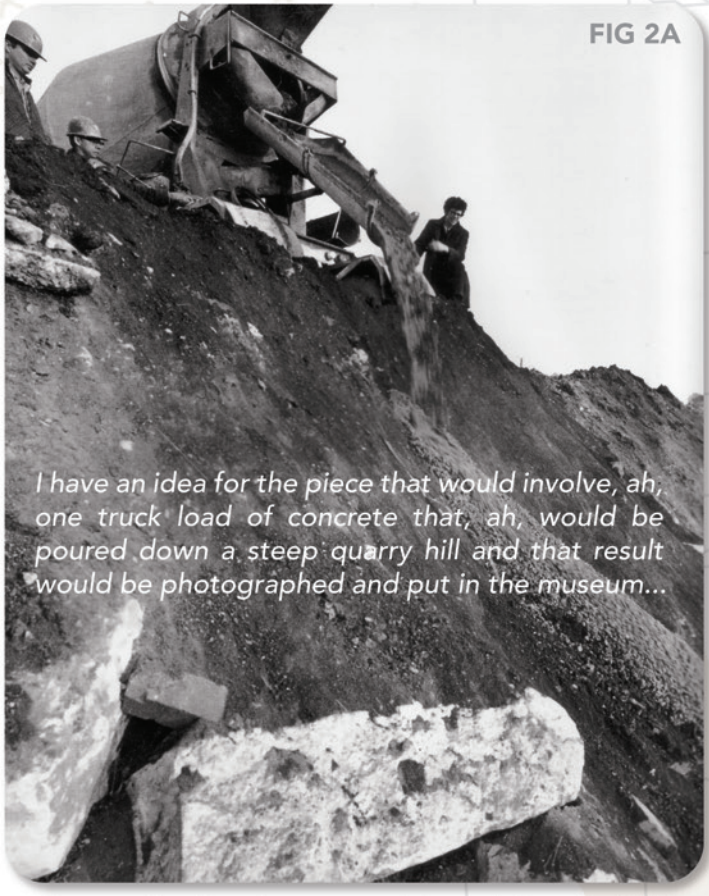
DOVYDENAS + VAN DER MARCK + CREW EXECUTION

… Perhaps...Or maybe not. Performed for the 'Art by Telephone' show/LP at Chicago's Museum of Contemporary Art, Robert Smithson's Concrete Pour exists as a few photos, a cache of regional maps and partial, analog prescriptions (Figures 1-2B, 3E, 4E-F, 5C, 6B-C, 7, 8). The MCA truck load 'sank' almost immediately, its abandoned quarry site covered by the ubiquitous, excess batches from the local construction industry. Aleatory after-life, meager archive, and hydraulic reification, the Pour neatly actualizes Smithson's favorite tropes of entropic run-down and the perceptual impossibly of presence.

With its absent object, one Pour excavation might be a fabulated travelogue of hyperbolic disorientation.[7] Another reading might follow the 'earthwords' desublimation from speech to seep, project drift foiling Van der Marck's call for communicative immediacy and intentional execution.[8] The premise of 'Art by Telephone' certainly invited a literal and linguistic orientation toward the phone, drawing from Moholy-Nagy's 1922 Telephone Pictures and soliciting works like Dick Higgin's cumulative voice-message collages or Sol LeWitt's (Duchampian) directives.[9] This examination, however, starts from concrete— material and chemical composite, socio-economic infrastructure, and strategic energy entrainment.

The Pour materializes Smithson's parallel address of media theory, offering a 'particulate' practice of reverse engineering. From Chicago's quarry maps to lake-side potentiometric contours, Smithson's research samplings foreground the shifting forms and, in Marshall McLuhan's words, alternate 'scales or paces or patterns' conjoined in limestone and water's mutual deployment.[10] His proposed sites juxtapose unseen structures, iterative excavations and eons of erosion to emphasize the multiple actants (human, otherwise) and complex circuits (navigation, sewage, electricity) constructed in combination with inert aggregate.[11] Concrete Pour literally demonstrates that "manifestations of technology are at times less 'extensions' of man (Marshall McLuhan's anthropomorphism) than they are aggregates of elements...things in a state of arrested development."[12]

The following spreads unpack Smithson's research via diagram and chart, re-situating Pour parallax amidst concrete's convoluted, logistical flows and post-war, infrastructural assemblages.[13] 'Concrete' and 'Conv(em)ergence' draw out the geographies of concrete production and consumption between Chicago, Soo, and the St. Lawrence, focusing on the interaction between Silurian sources, interstate expansion and marine infrastructure (Figure 3+, Figure 4+). 'Pour' and '(Per)Collate' then examine the larger flows enabled by excavations and inlets. 'Pour' traces the mutual, meandering dynamics of river reversals, continental divides and constructed diversions, while '(Per)Collate' situates these alterations amidst the Great Lake's typical appropriation of water for power production (Figure 5+, Figure 6+). Smithson's concrete dump is thus a provocation to explore concrete as medium and message, exposing how Lakes' limestone and concrete negotiate, negate, and redefine distance. Instead of archival ephemera, the Pour becomes an urbanist guide to inter-dependencies of industry, collective extents, and the opportunities for alternate deployment found in the systemic dispersion of Chicago concrete.



[Are you talking about the textures and the continuity or the pile?...]

It has that, it moves, coming out of the movement, that movement is kinda lava-like and it freezes. I think the things is to get the slow movement of the fill, ah, that's gradual in the end until it hardens. That would be the basis to show the slow cover of seeps.

SMITHSON + VAN DER MARCK CORRESPONDENCE

=

+

FIG 2B

RUINS IN REVERSE

HAMMONDS PIT & MILL
Winnetka City Eng. - Own Crews
Evanston City Eng
Lemont Quarry Consumers Company
Meacham Pit
AL SAND PIT
Barge Slip Quarry
River Forest City Eng - Own Crews
LYONS QUARRY
Stearns Lime and Stone Co Quarry
West Chester City Eng. - Own Crews
Route 20 Pit
Summit Quarry Consumers Company
Thorton Plant Lime
Chicago Hights City Eng
Cook County Highway Dept.-Own Crews
Worth Pit
Illinois Stone Co Quarry
Northlake City Eng. - Own Crews
Markham City Dept. of Public Works
BEVERLY GRAVEL PIT
Unnamed Limestone Quarry
THORNTON UNDERGROUND MINE NO. 2
Dolese and Shepard Crushed Stone
Bellwood Quarry
Niles City Dept of Public Works
MARBLEHEAD SOUTH CHICAGO LIME PLANT
Stony Island Quarries
Grand and Campbell Ave Quarry
Morton Grove City Eng. - Own Crews
Riverside Lime and Stone Co Quarry
Glencoe City Engr. - Own Crews
THORTON QUARRY & MILL
Wester Springs City Eng.-Own Crews
Rolling Meadows Dept of Public Work
City of Chicago Eng. - Own Crews
Melrose Park City Eng. - Own Crews
Palatine City Eng. - Own Crews
Northbrook City Dept of Public Work
Walt Bartlett Plant Land Pit
Elmhurst-Mccarthy Joint
Bartlett Pit
Superior Stone Co Quarry
City of Calumet - Own Crews
Wilmette City Eng. - Own Crews
Hoffman Estates City Eng.-Own Crews
Brownell Improvement Co Quarry
Chicago Union Lime Works Quarry
Mount Prospect City Eng
FEDERAL QUARRY & MILL
A.C.O'Laughlin Stone Co Quarry
MC COOK YARD NO. 387 & MILL
Gurnee Pit
Economy Pit
Peterson Pit
Gurnee Pit
Zion City Pit
Wadsworth Pit
Fox Pit
Volo Pit
LAKE COUNTY PIT NO. 1
Unamed Limestone Quarry
Lake County Pit No. 2
Deerfield Pit
Mundelein Pit
THELEN PIT
APTAKISIC SAND CORP.
Cox Hwy Pit
Barthel Pit
JOLIET QUARRY & MILL YARD 340
Lemont Pit
Patterson Pit
Will Co. Hwy. Dept.
National Stone Co Limestone Quarry
Lockport Pit/Yard 15
Unnamed Limestone Quarry
Unnamed Limestone Quarry
PLAINFIELD PLANT & MINE
Lincoln Stone Quarry
AVERY NO. 3 PIT & MILL
Gross & Mc Cowan Lumber Co. Quarry
TERMAR PIT NO. 2
ROMEO QUARRY & MILL
Charles & Jon Sand Pit
Pit Number 1
Western Stone Company Quarry
Wilton Township Quarry
Limestone Prospect
Jackson Township Quarry
ROCKDALE QUARRY
Yackley Pit
Markgraf Stone Company Quarry
BOUGHTON QUARRY & MILL
FATLAN SAND PIT
LEMONT QUARRY & MILL YARD 360
VICKS QUARRY
Plainfield Quarry
Swan, Medin & Company Quarry
Jackson Township Hwy. Dept.
Wesley Township Quarry
DUPAGE RIVER QUARRY E.E. HAULING
AVERY NO. 2 PIT & MILL
PLAINFIELD PIT
Unnamed Limestone Quarry
Inland Crushed Stone Co Quarry
Barbers Corners Quarry & Mill
STAR SAND & GRAVEL

0 1 10 miles

past pit
past quarry
ACTIVE PIT
ACTIVE QUARRY
distance to bedrock
>50' <50' 0'

excavate
[excess]
INFILL

THE ANONYMOUS INDUSTRIES BEHIND CONCRETE
THE MOST UBIQUITOUS CONTEMPORARY CONSTRUCTION MATERIAL

FIG 2C

CONCRETE

SOURCES
CYCLES
SINKS

1911-present
(41°47'1.81"N, 87°49'15.91"W)[14]

Like the MCA's choice in electric, analog communication (telephone, LP), concrete is a thoroughly modern, but hardly novel material by 1969. Lacking the rarified intrigue of digital tech transfer and the tactile, synthetic appeal of post-war plastics, the congealed composite provided alternate foundations for the atomic age. It paved the ring roads of efficient evacuation, suburban dreams, and the post-minimal sublime.[15]

To enable such transformations, aggregate excavation more than quadrupled in volume between 1945 and 1969.[16] During this period, the quarry sites and sand pits of the Chicago periphery used over 400 trillion Btu (73 million barrels of petrol) to excavate and manufacture over 350 million tons of concrete for road construction.[17] The single truck load of Concrete Pour serves, speculatively, as an entrained, indexical excerpt of the 9500 miles of concrete expressway and Eisenhower interstate sourced from Chicago during that time, covering east to New York and from St. Louis to the Canadian boarder (Figure 3A-B).

Aside dispersal, Concrete Pour's material juxtapositions analogize concrete's invisible, 'internal' chemical reactions to the unseen, yet adjacent sites and sinks of mineral processing. Running down, quite literally, from the Pour's Des Plaines bluff site to the Shipping and Sanitary Canal as it approaches Chicago, one encounters production facilities for all of concrete's components: a) the final waste site at Materials Industries/Lafarge Corp's Briar's pit, b) crushed limestone and sand at the McHenry quarries, c) finished cement at Holcim's Summit Terminal and d) water at the Jardine Treatment plant (Figure 3A, 3E). The Pour contains and is contained by the worked contours and strategic stratigraphy of Chicago's nearly billion dollar concrete industry.[18]

Smithson's errant dump points to the cumulative, entropic reification of Chicago concrete as both a complex composite and generative diffusion mechanism.[19] Concrete Pour is a 'non-site' for 'inorganic' social circulation.

FIG 3A

FIG 3B

FIG 3C

GLOBAL PRODUCTION

(thousand metric tons)

* yr 2000-10 avg, UN stats

ANNUAL COMPOSITE*

12,588,000

usa %

international

GLOCAL QUARRY CONTRIBUTION

illinois

chicago area

crushed 43,800

gravel 19,600

lime 6100

dim 6000

cement 2800

10x scale global graphics

FIG 3E

SITE SELECTION

exhausted quarry pits

adjacent active yards

utility tower/r.o.w.

briar's quarry

SMITHSON'S LEMONT LAKE MAPS

POUR

MATERIAL MANUFACTURE

bedrock quarries

dimensional

pre-heat

cool

lime

mortar

agri +

clinker

crusher + clay

$x2^+$

filter screens

$CaO + SiO_2$

clinker

slag fly ash gypsum. . .

grinder

cement

plant batching

packaging

outwash pits

fines & waste

gravel

crushed

stockpiles

pre-cast . site-cast

deliver . dump

CONCRETE

FIG 3D

moraines crests

S+S CANAL DES PLAINES CALUMET CONVERGENCE

SITE SELECTION

MORAINES

RIVER VALLEY

+ 691

580

480

407

425

LOCKPORT

ILLINOIS WATERWAY TO MISSISSIPPI

25000

35000

40000

42500 = ALL INTERSTATES

+ 570 LAKE MICHIGAN @ CALUMET PORT

des plaines river

2010

50% IL annual production

CONV(eM)ERGENT

Lakes Geology Logistics

78

1965, the present (41°39'7.81"N, 87°34'1.19"W)[20]

Robert Smithson's first site suggestion, a lake-side dump near Chicago's piers, sought to extend Lake Michigan's stabilized shores, accelerate erosion, and produce indeterminate emergence.[21] A minimal, if politically fraught proposal, it alluded to Chicago's recent navigation projects such as Burn's Harbor (Indiana, 1965) and T.J. O'Brien Lock and Dam (Calumet, Il 1965) and their greater incorporation within the recently completed system of St. Lawrence/Soo Locks (1958/69).[22]

This larger system, finally realized under Eisenhower and Louis St. Laurent, included eight new locks. Their standardized, Welland-size enabled 'salty' and self-loading 'Lakers' (Figure 4C) to reach Montreal and the Atlantic without intramodal interruption.[23] Ascending and descending over the St. Lawrence rapids and Niagara Escarpment (582' elev. in three segments), the locks' operation combined simple gravity-fed lane leveling and, from 1966, live-feed visual control (Figure 4D).[24]

No competition for roadways' resource use, both installations required just over 1 million tons of concrete.[25] Yet, upon opening in 1959, the locks' direct connection enabled a 350% increase in stone shipments through the Welland-to-St. Lawrence sections (Figure 4B). In tandem with roadway construction demands, this ease of marine access enabled an almost 700% increase in lake-wise stone traffic during the 50s and 60s.[26] Thus, while concrete functioned as fodder, locks and breakwaters were the organized, if immersed, infrastructure behind the Interstate system.

As at the time of Smithson's Pour, the Great Lakes underlying Silurian limestone/dolomite formations provide approximately a third of all U.S. aggregate and a third of Lakes' shipping traffic (Figure 4C).[27]Although prompting initial lock instillation, the scoured and emergent edges of stone enabled the geo-technical convergence (and low costs) of enlarged locks and loads, predominantly deep (glaciated) shipping lanes and dock-side quarries (Figure 4A).[28]

Thus, akin to Smithson's on-going interest in the Panama Canal, this version of the Pour proposed to mimic, yet expose the Great Lakes' deployment of concrete as absorptive casing and carried commodity (Figure 4E).[29] Smithson's immersion evokes not only eroded dross or dredge, but also captures the productive dependency on and redirection of water's force– as gravity-fed datums and displaced volumes– engaged by Great Lakes' logistics.

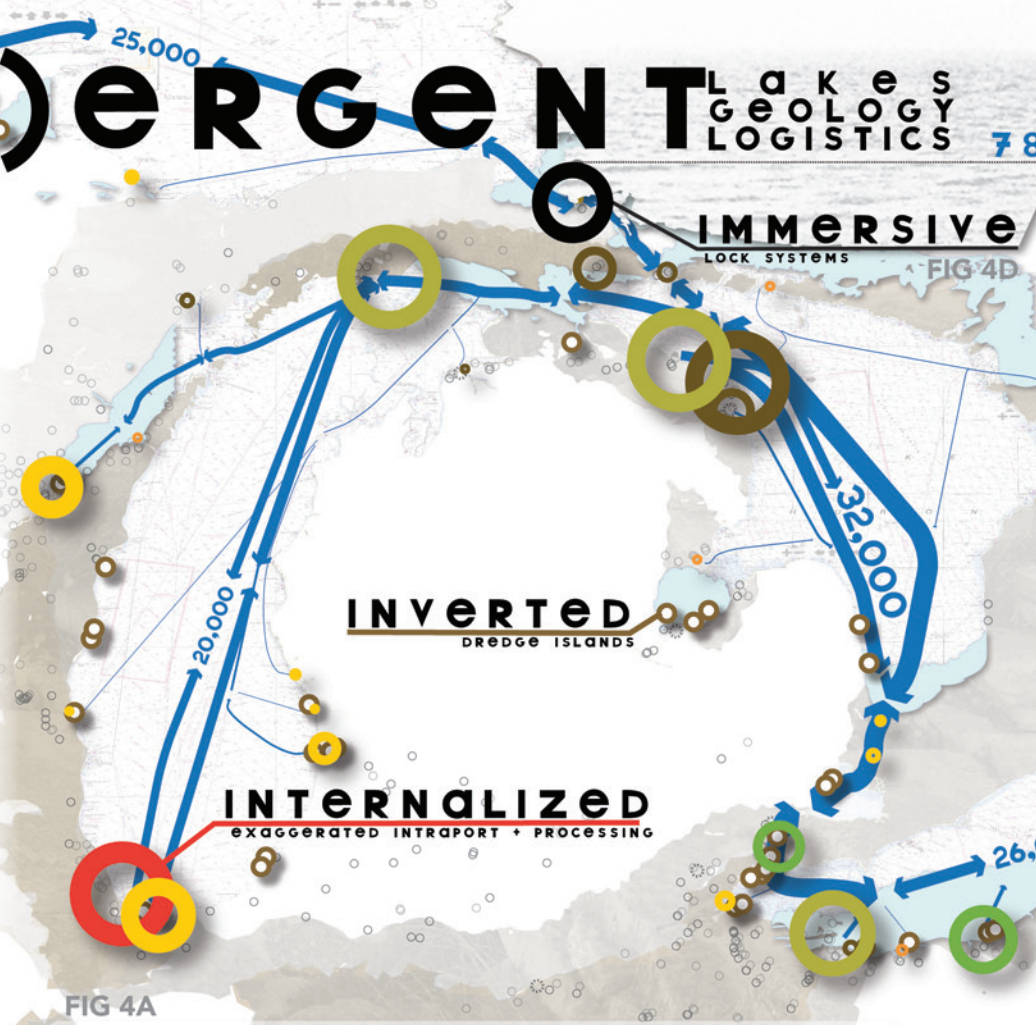
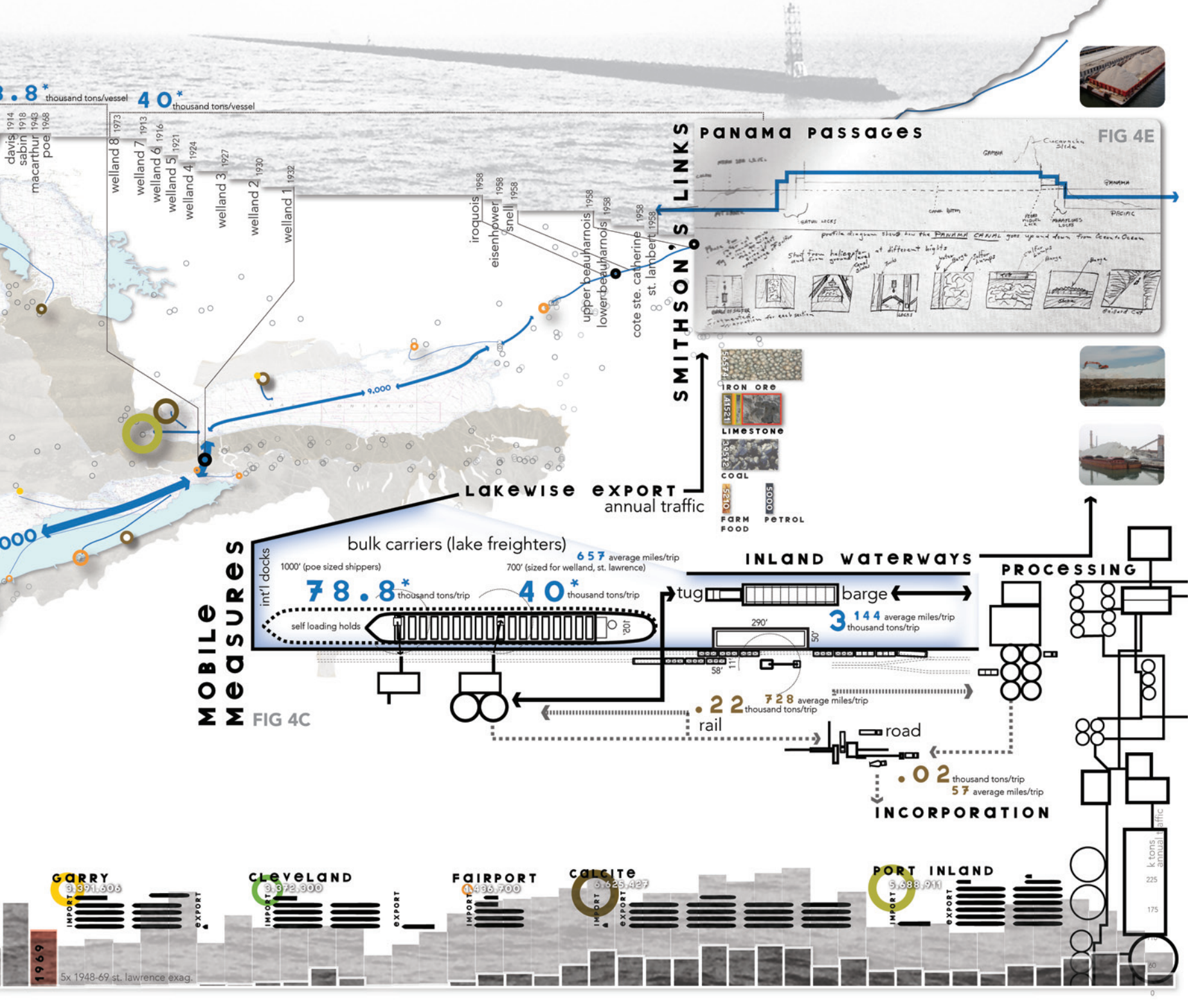


FIG 4A

FIG 4B


8.8* thousand tons/vessel
40* thousand tons/vessel
davis 1914
sabin 1918
macarthur 1943
poe 1968
welland 8 1973
welland 7 1913
welland 6 1916
welland 5 1921
welland 4 1924
welland 3 1927
welland 2 1930
welland 1 1932
iroquois 1958
eisenhower 1958
snell 1958
upper beauharnois 1958
lowerbeauharnois 1958
cote ste. catherine 1958
st. lambert 1958
SMITHSON'S LINKS
PANAMA PASSAGES
FIG 4E
IRON ORE
LIMESTONE
COAL
FARM FOOD
PETROL
LAKEWISE EXPORT
annual traffic
MOBILE MEASURES
FIG 4C
bulk carriers (lake freighters)
int'l docks
1000' (poe sized shippers)
78.8* thousand tons/trip
self loading holds
657 average miles/trip
700' (sized for welland, st. lawrence)
40* thousand tons/trip
INLAND WATERWAYS
tug
barge
144 average miles/trip
3 thousand tons/trip
290'
50'
58'
728 average miles/trip
.22 thousand tons/trip
rail
road
.02 thousand tons/trip
57 average miles/trip
INCORPORATION
PROCESSING
GARRY
CLEVELAND
FAIRPORT
CALCITE
PORT INLAND
IMPORT
EXPORT
1969
5x 1948-69 st. lawrence exag.

POUR SOURCES CYCLES SINKS

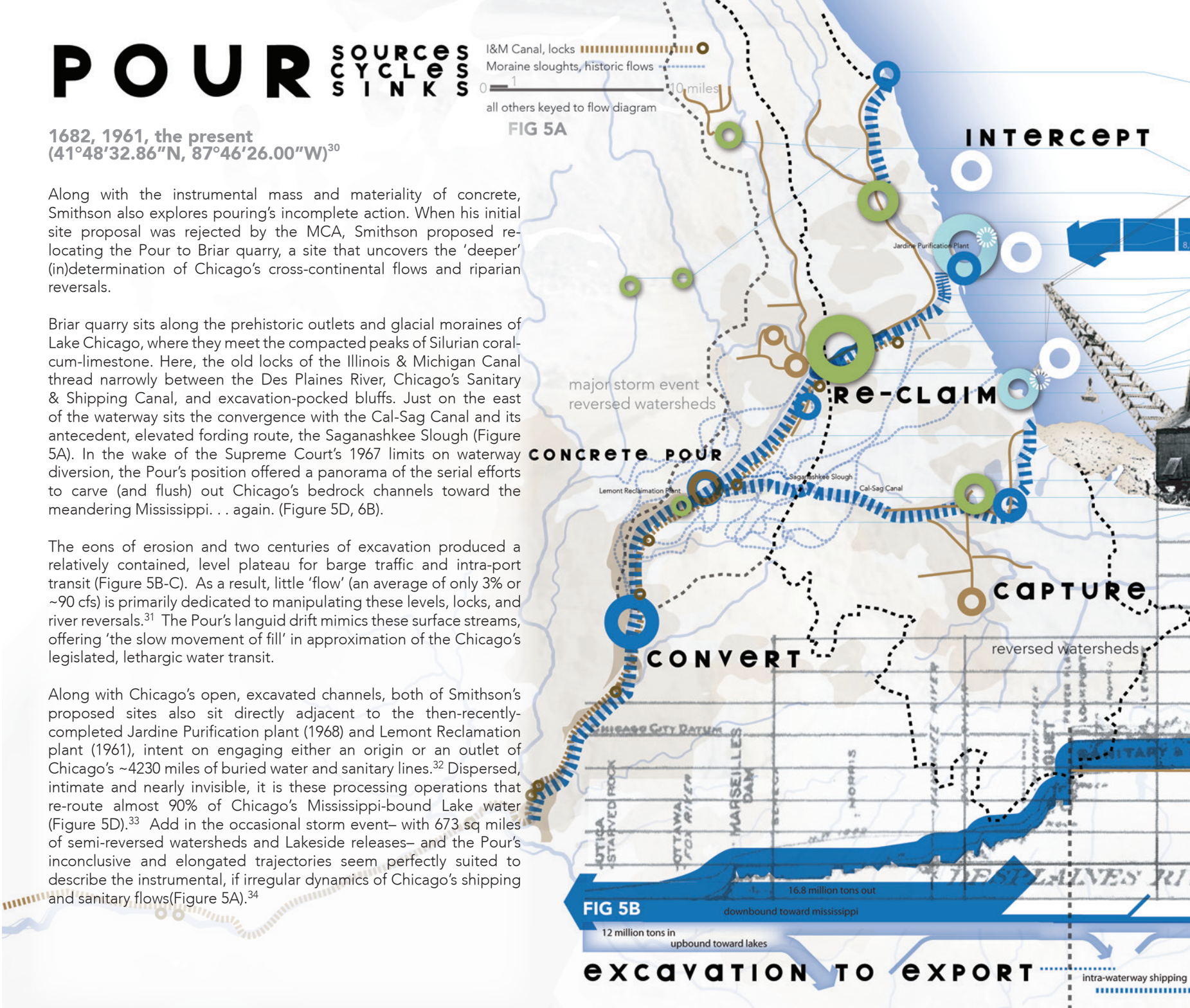
1682, 1961, the present
(41°48'32.86"N, 87°46'26.00"W)[30]

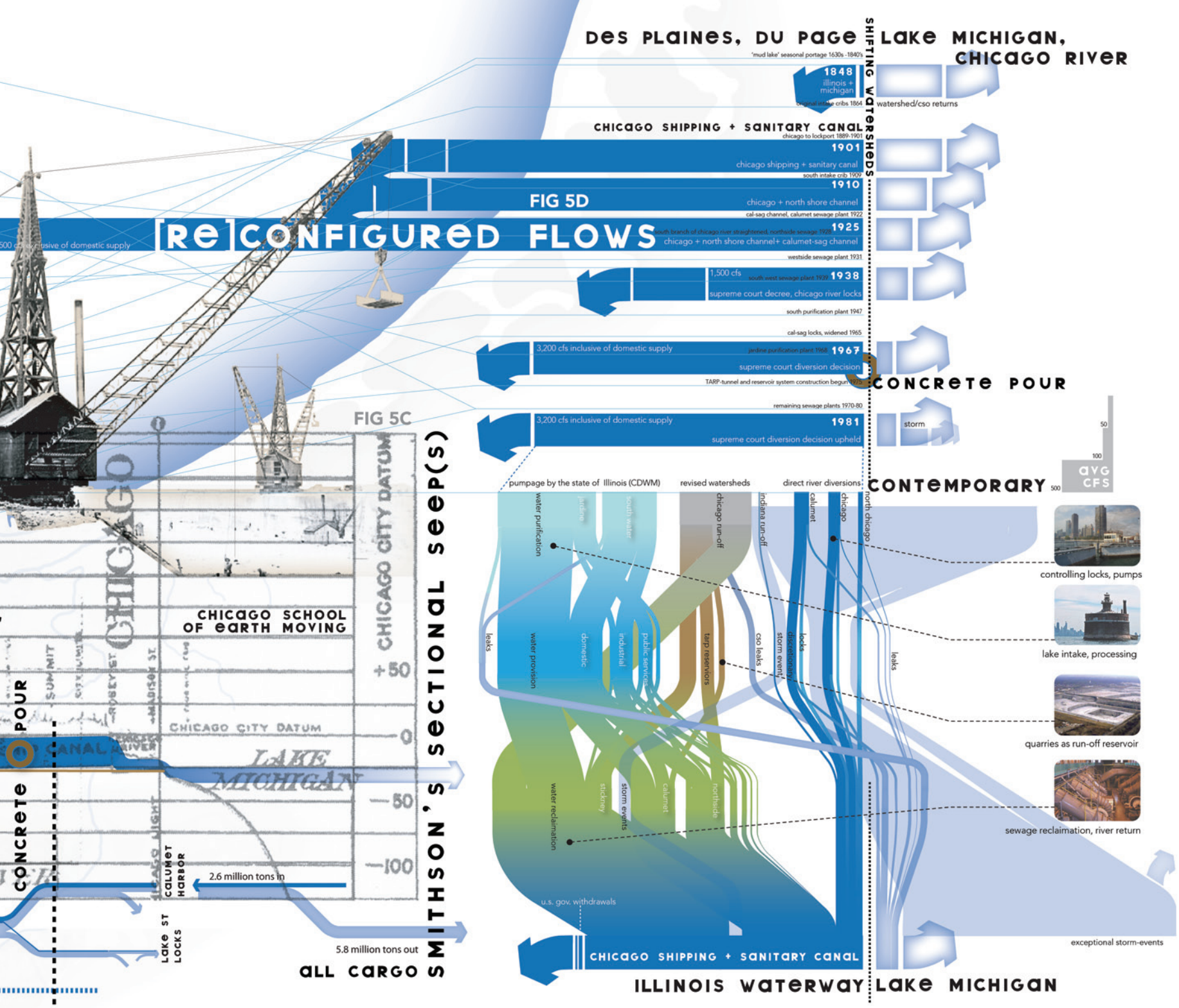
Along with the instrumental mass and materiality of concrete, Smithson also explores pouring's incomplete action. When his initial site proposal was rejected by the MCA, Smithson proposed re-locating the Pour to Briar quarry, a site that uncovers the 'deeper' (in)determination of Chicago's cross-continental flows and riparian reversals.

Briar quarry sits along the prehistoric outlets and glacial moraines of Lake Chicago, where they meet the compacted peaks of Silurian coral-cum-limestone. Here, the old locks of the Illinois & Michigan Canal thread narrowly between the Des Plaines River, Chicago's Sanitary & Shipping Canal, and excavation-pocked bluffs. Just on the east of the waterway sits the convergence with the Cal-Sag Canal and its antecedent, elevated fording route, the Saganashkee Slough (Figure 5A). In the wake of the Supreme Court's 1967 limits on waterway diversion, the Pour's position offered a panorama of the serial efforts to carve (and flush) out Chicago's bedrock channels toward the meandering Mississippi. . . again. (Figure 5D, 6B).

The eons of erosion and two centuries of excavation produced a relatively contained, level plateau for barge traffic and intra-port transit (Figure 5B-C). As a result, little 'flow' (an average of only 3% or ~90 cfs) is primarily dedicated to manipulating these levels, locks, and river reversals.[31] The Pour's languid drift mimics these surface streams, offering 'the slow movement of fill' in approximation of the Chicago's legislated, lethargic water transit.

Along with Chicago's open, excavated channels, both of Smithson's proposed sites also sit directly adjacent to the then-recently-completed Jardine Purification plant (1968) and Lemont Reclamation plant (1961), intent on engaging either an origin or an outlet of Chicago's ~4230 miles of buried water and sanitary lines.[32] Dispersed, intimate and nearly invisible, it is these processing operations that re-route almost 90% of Chicago's Mississippi-bound Lake water (Figure 5D).[33] Add in the occasional storm event– with 673 sq miles of semi-reversed watersheds and Lakeside releases– and the Pour's inconclusive and elongated trajectories seem perfectly suited to describe the instrumental, if irregular dynamics of Chicago's shipping and sanitary flows(Figure 5A).[34]




DES PLAINES, DU PAGE
'mud lake' seasonal portage 1630s -1840's
1848
illinois + michigan
original intake cribs 1864
CHICAGO SHIPPING + SANITARY CANAL
chicago to lockport 1889-1901
1901
chicago shipping + sanitary canal
south intake crib 1909
1910
chicago + north shore channel
cal-sag channel, calumet sewage plant 1922
1925
chicago + north shore channel+ calumet-sag channel
south branch of chicago river straightened, northside sewage 1928
westside sewage plant 1931
1,500 cfs
1938
supreme court decree, chicago river locks
south west sewage plant 1939
south purification plant 1947
cal-sag locks, widened 1965
3,200 cfs inclusive of domestic supply
1967
supreme court diversion decision
jardine purification plant 1968
TARP-tunnel and reservoir system construction begun 1975
remaining sewage plants 1970-80
3,200 cfs inclusive of domestic supply
1981
supreme court diversion decision upheld
SHIFTING WATERSHEDS
LAKE MICHIGAN, CHICAGO RIVER
watershed/cso returns
CONCRETE POUR
storm
CONTEMPORARY
50
100
AVG CFS
500
pumpage by the state of Illinois (CDWM)
revised watersheds
direct river diversions
water purification
jardine
south water
chicago run-off
indiana run-off
calumet
chicago
north chicago
leaks
water provision
domestic
industrial
public services
tarp reservoirs
cso leaks
locks
discretionary
storm events
leaks
water reclamation
stickney
storm events
calumet
northside
u.s. gov. withdrawals
CHICAGO SHIPPING + SANITARY CANAL
ILLINOIS WATERWAY
LAKE MICHIGAN
controlling locks, pumps
lake intake, processing
quarries as run-off reservoir
sewage reclaimation, river return
exceptional storm-events
FIG 5D
[re]CONFIGURED FLOWS
FIG 5C
CHICAGO SCHOOL OF EARTH MOVING
CHICAGO CITY DATUM
+50
0
-50
-100
LAKE MICHIGAN
CHICAGO CITY DATUM
CONCRETE POUR
CANAL
RIVER
CALUMET HARBOR
LAKE ST LOCKS
2.6 million tons in
5.8 million tons out
ALL CARGO
SMITHSON'S SECTIONAL SEEP(S)

(PeR)COLLaTION

DROSS
DIVERT
DRAIN

2.1943 - the present (41°42'49.83"N, 87°58'58.00"W)[35]

In addition to his maps of glacial moraines and sandy till, Smithson also sought out the South Side's bedrock aquifer depths, following erratic flows from recursive surface forms (glacial melt and iterative engineering) to the play of stratified absorption. There, the sectional cycles of potentiometric pumping, recharge, and discharge re-situate Pour gravity, introducing internal pressure, surface tension, osmosis, and compaction as equivalent, informing agencies (Figure 4B-C).

Given Smithson's heterogenous mix of industrial, geologic, and social vitalism,[36] his research into these local, pumped interventions evokes a second, engineered analog of re-routing and metamorphosis: neither consumed nor completely diverted, 94.3% of all Great Lakes' water-use is reclaimed and returned to St. Lawrence outflow.[37] Its elongated trajectories, through public supply and commercial facilities, follow parallel routes of 'absorption' as appropriation (Figure 4A).

Since at least the 1950's, the Lakes' dominant water withdrawals have circulated through heat-exchangers at fossil fuel and nuclear power generation plants. Electricity is and was the primary product of U.S. water-use (and return), ranging from ~58% at the time of the Pour to over 70% of all Lakes' use today.[38] In addition to diversions, nearly fourteen times the withdrawn volume feeds in-stream electric turbines today, equivalent to hydroelectric withdrawal in 1969 (Figure 4D). A non-site to Smithson's reified 'run-down', the Lakes' re-directed, re-scaled percolation generates over 310,000 gWH, i.e. enough electricity to sustain the contemporary consumption demands of New York, Chicago, Toronto, Montreal, Detroit, Cleveland, and Milwaukee. Even the power from in-stream generation alone (53,556 gWH) could satisfy New York City's annual need for 'electric immersion.' [39]

The Pour's 'hydraulic bond,' thus lies equally in its literal, cementitious formula and the international, geo-tech network sustained by concrete containment and pour physics: not only dams, locks, tunnels, uptakes, reservoirs, but also turbines, reactors, exchangers, transformers, corporations, utilities, and, ultimately, us the consumers. In contrast to McLuhan's sublime embrace of 'electric immersion,' Smithson's Concrete Pour indexes a few of the oft imperceptible materials and manipulations behind construction, commerce, and even communications.

...a fitting figuration for 'Art byTelephone.'

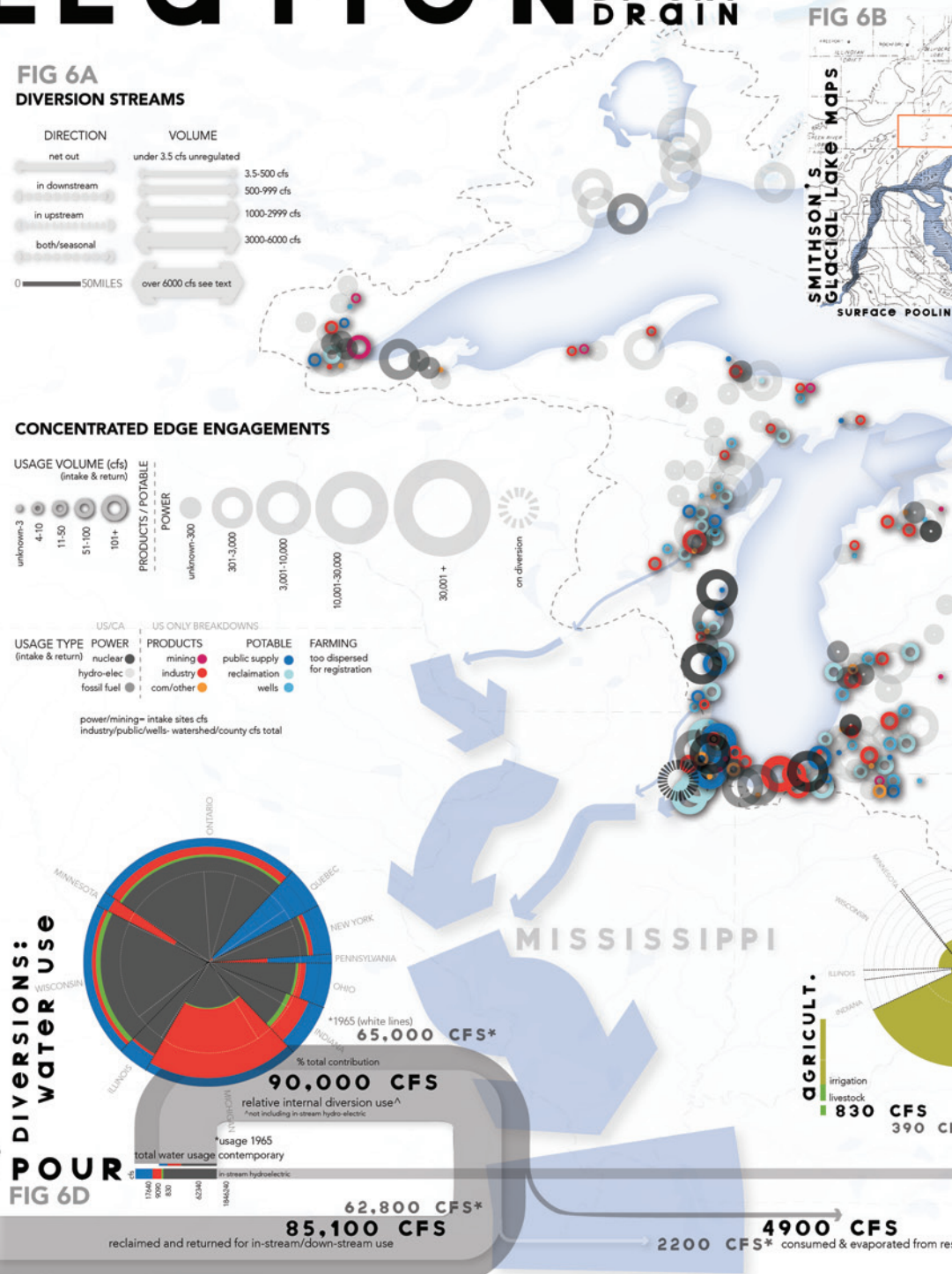
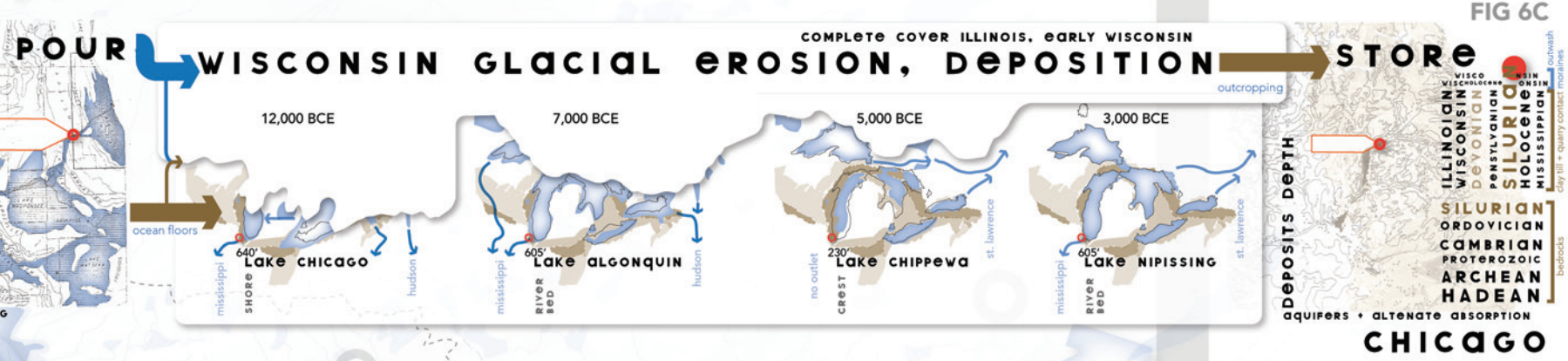
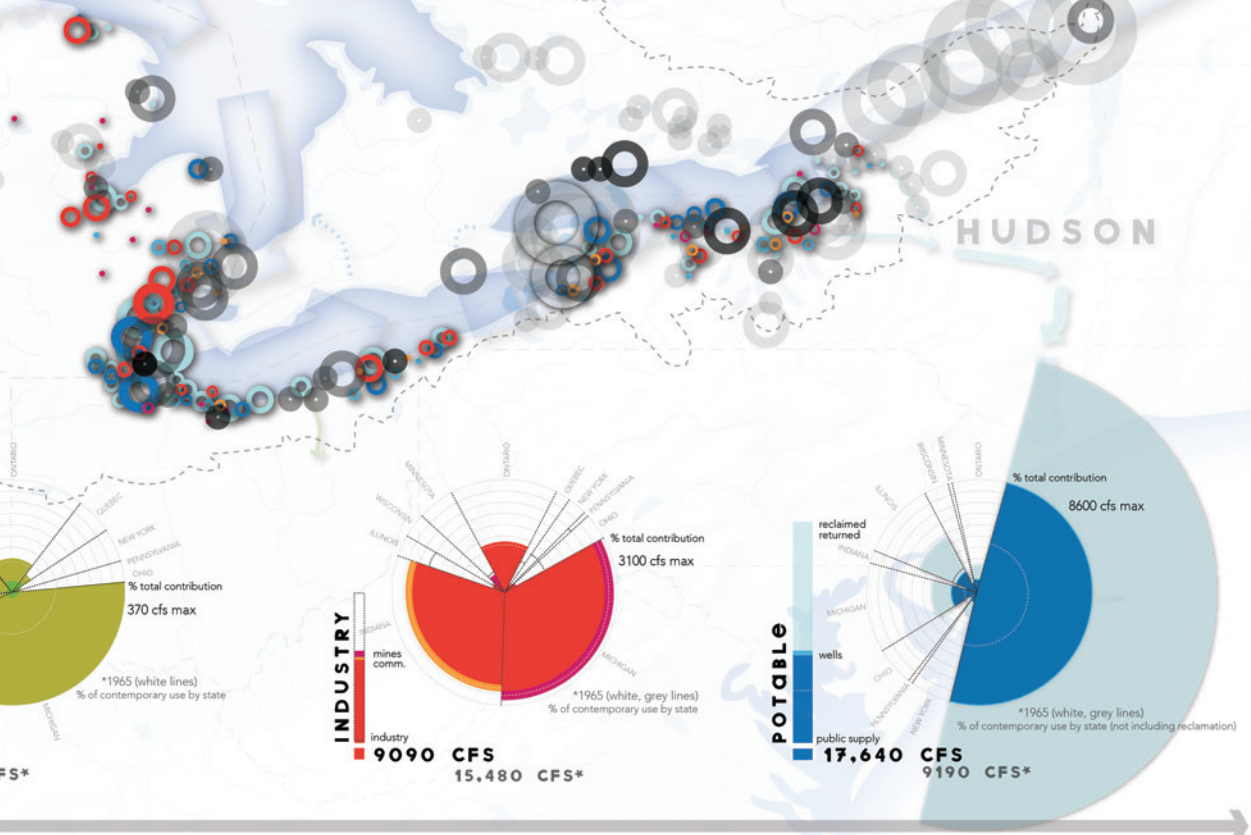


FIG 6C





servoirs

FOOTNOTES

1 Probable Pour site: Briar's abandoned quarry pits in Lemont, IL 60439.
2 Speculative reconstruction based on:

a) Robert Smithson and Nancy Holt papers1905-1987, Archives of American Art, Smithsonian Institution. Microfilm reels 3832: 1824-5, 3835: 727-734, 1086-96, 3833: 045.

b) cinematic credit of Jerry Aronson and Nancy Holt, audible conversation of Smithson/van der Marck in Fiore, Bob. Run Down 1993. 13 minutes.

c) Hobbs, Robert. Robert Smithson: Sculpture. Ithaca:Cornell University Press. 1981:178.

3 Fiore. Concrete Pour credits.
4 Smithson Archives. Jan van der Marck/Karin Rosenberg (PR) MCA letter. 3833:045
5 Smithson Archives. (PR) photo proofs. 3835:727-731.
6 Museum of Contemporary Art, original location. 237 East Ontario Street, Chicago, IL 60611.
7Akin to Smithson's accounts of Passaic and the Yucatan, the citational genre of contemporary Jetty pilgrimages is one way to respond to his amalgamation of discourse and displacement (see Tacita Dean, Liam Gillic). Other suggested readings-Krauss, Rosalind and Yve Alain Bois' Formless. New York: Zone. 1997. Owen, Craig's "Earthwords" October. v10 (8.1979). or Martin, Reinhold. "Organicism's Other" Grey Room. n4 (summer 2001).
8 Smithson Archives. Jan van der Marck invitation letter. 3832:125-126. Robert Smithson/Jan van der Marck telephone call in Fiore, Bob. Alternate version on 'Art by Telephone' LP (mp3 at ubu.com. Accessed on October 10, 2010. http://www.ubu.com/sound/art_by_telephone.html).
9 Coleman, Charity. "Art by Telephone: An Unsound Transcription." (2008) Accessed on October 10, 2010. http://www.ubu.com/sound/art_by_telephone.html. See same site for participant list.
10 McLuhan, Marshall. Understanding Media. Cambridge: MIT Press, 2002: 8.
11As Smithson insists, 'Site Selection Study' and, by extension, the Pour are attempts to "mentally experience these [infrastructural] projects as something distinctive and intelligible," to expose the "processes behind making... that vanish as they [industrial storage, Navy Pier, etc.] develop." See Smithson, Robert. "A Thing is a Hole in a Thing it is Not" (1968) in Robert Smithson:The Collected Writings. Ed. Jack Flam. Berkeley: University of California Press. 1996: 94-95.
12Ibid. "A Sedimentation of the Mind: Earth Projects." 100,101,106. 13 Starting from the MCA's suggested quarry locations and correspondence, these mappings liberally extend to include fragments of Smithson's on-going reclamation research near Chicago, specifically his 1972-73 return to Lemont for the Lake Crescents proposals.
14 Holcim, Summit Cement Terminal, Summit, IL, 60501
15 Michael Fried's fervent defense of autonomous, modern 'presence' appropriates Tony Smith's description of driving I-95 under construction as the revised aesthetic threshold of 'literalist,' theatrical sublime in minimal and post-minimal art (i.e. the end of internally critical 'art'). Fried, Michael. "Art and Objecthood" reprinted in Art and Objecthood. Chicago: University of Chicago Press, 1998 (originally 1967): 157-158.
16 For shifts in aggregate see U.S. Geological Survey. "Stone (crushed) statistics 1900-2008." USGS. Accessed on October 10, 2010. http://minerals.usgs.gov/ds/2005/140/stonecrushed.pdf.
For the cumulative developments of interstate between 1945(56) and 1968 see "Highway Statistics." 1945:56, 1968:177,178. Springfield, VA: U. S. Department of Commerce and National Technical Information Service. Accessed on October 10, 2010. http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubsarc.cfm
17"Entrained energy estimates of cement, from blasting to transport. Appendix A. Energy and Emission Reduction Opportunities for the Cement Industry." Ed. William T. Choate, US. Department of Energy. Accessed on October 10, 2010. http://www1.eere.energy.gov/industry/imf/pdfs/eeroci_dec03a.pdf p49.
Illinois aggregate and concrete production see ISGS Resource Economics Program. Illinois Production. [figure] (Chicago-district 1 interpolated) Champaign, Illinois: University of Illinois and ISGS Resource Economics Program. Accessed on October 10, 2010. http://www.isgs.uiuc.edu/sections/indust-min/resource- economics.shtml.
For estimate of highway materials composition (roughly 50% use of U.S. aggregate production) see Sullivan, Daniel E. "Materials in Use in the U.S. Interstate Highways." 2006. Fact Sheet 2006-3127 Denver: USGS. Accessed on October 10, 2010. http://pubs.usgs.gov/fs/2006/3127/.
18 Value of Chicago (District 1 Illinois) output, see Masters, John M. "The Mineral Industry of Illinois: Yearbook 2000" Illinois State Minerals Information. Urbana-Champaign: ISGS and USGS. Accessed on October 10, 2010. http://minerals.usgs.gov/minerals/pubs/state/il.html
19 This acknowledgment of the aleatory, yet instrumental nature of Pour materials stands in contrast to their reading as dominantly dystopian, evoking industrial spills or chaotic disaster. For one example see Graziani, Ron. Robert Smithson and the American Landscape. Cambridge:University of Cambridge, 2004: 95-97.
20 Calumet Int'l Harbor, T.J. O'Brien Lock and Dam, E130th St and S Torrenence Ave, Calumet, IL 60617
21 Hobbs.178. The lack of donors and recent battles between steel production and South Chicago wetlands/Indiana Dune preservation made such a site unavailable. This situates the Pour(s) as hybrids of the Hypothetical Continents (early 1969) and the later Jetty and Lake-Crescent works.
22 Cook, Edmund. "Activities of the Metropolitan Water Reclamation District of Greater Chicago-Past to Present." Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). Accessed October 10, 2010. search http://www.mwrd.org , also available from www.biosolids.org/docs/21240.pdf
The St. Lawrence Seaway Management Corporation. "St. Lawrence Seaway-Handbook: Seaway Plan- Lock data." Great Lakes St. Lawrence Seaway System. Accessed October 10, 2010. http://www.media-seaway.com/seaway_handbook/seaway-handbook-en/Seaway_Plans_formatted_e.pdf,

23 Despite Deep Water Agreements in 1932, the combination of navigation, hydroelectric production, and international coordination meant that only in the mid-1950s had funding, locations, and legislature come together for lock construction along the St. Lawrence. The St. Lawrence Seaway Management Corporation. "St. Lawrence Seaway-Handbook: Montreal-Lake Ontario Section." 5. Great Lakes St. Lawrence Seaway System. Accessed on October 10, 2010. http://www.media-seaway.com/seaway_handbook/montreallakeontario.pdf

24 While Pamela Lee has noted Smithson's address of cybernetic theory in his published works, such as "Ultramoderne" (1967) or the Wheeler interviews (1970), a large portion of his built work plays on the heuristic tropes and explanatory metaphors of Norbert Weiner's The Human Use of Human Beings. In explaining communication and learning as two way messaging, Weiner takes as his first example the Panama Canal, saying "Not only do messages go out controlling the motion of tow locomotive... sluices... and gates; but the control room is full of telltales which indicate... that they have received their orders, but that they have in fact effectively carried out their orders." Smithson's (fascination with) locks, breakwaters, and lakeside installations can thus be seen as an displacement of the control room telltales into a much noisier, entropic everyday environment as well as an attempt to address, in contrast to McLuhan's inevitable, prosthetic extensions, an image of post-human, assembled agency which is oriented around the opacity and coded nature of communication. See Lee, Pamela. Chronophobia. Cambridge: MIT Press, 2006: 218-258. Weiner, Norbert. The Human Use of Human Beings. Boston: Houghton Mifflin/Da Capo Press, 1954: 49.

25 Estimation is based on lock size and does not including larger channel work. Concrete volumes derived from Panama Canal comparisons. "Panama Canal- FAQ" Canal de Panama. Accessed on October 10, 2010. http://www.pancanal.com/eng/general/canal-faqs/physical.html.

26 The St. Lawrence Seaway Management Corporation. "Historic Tables 1959-1992," "Traffic Reports." (2001, 2004, 2007, 2010) Great Lakes St. Lawrence Seaway System. Accessed on October 10, 2010. http://www.greatlakes-seaway.com/en/seaway/facts/traffic/index.html

Statistics Canada. "Canals, cargo tonnage through St. Lawrence," ibid "Welland." (1946-59) Canadian Statistics series T97-106, T107-116. Accessed on October 10, 2010. http://www.statcan.gc.ca/pub/11-516- x/sectiont/4147444-eng.htm#2.

27 U.S. Geological Survey. "Crushed stone sold or used by producers in the United States, by State" (1971-1990) USGS. Accessed October 20, 2010. http://minerals.usgs.gov/minerals/pubs/commodity/stone_crushed/stat/tbl4.txt

28 Aside enabling stone shipping, reification (metaphorically) plays a third, multivalent role in the lake's logistic networks. Here, frozen waters ground the symbiotic cycle of winter shipping cessation and lock maintenance.

29 This includes citations, via Buckmister Fuller in Smithson's "A Museum of Language in the Vicinity of Art" Ed. Flam, Jack. Berkley:University of California, 1968: 94.

30 Lemont Water Reclamation Plant. 13 Stephens St. Lemont, Illinois. 60439 (and the adjacent traders' fording route, Saganashkee Slough)

31 US Army Corps Chicago District. "Lake Michigan Diversion: Findings of the Fifth Technical Committee for Review of Diversion Flow Measurements and Accounting Procedures." Chicago:US Army Corps of Engineers. Accessed on October 10, 2010. http://155.79.114.198/divacct/Fifth_Technical %5CFifth_Technical_complete.pdf

32 "What Our Water's Worth."(estimate of Chicago's water and sanitary line-miles). Chicagoland Water. Accessed October 10, 2010. www.chicagolandh2o.org/documents/lake-michigan.pdf

33 See endnote 32

34 "Summary of Lake Michigan Reversals." Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). Accessed on October 10, 2010. http://www.mwrd.org/irj/portal/anonymous/overview

35 Argonne National Laboratory, Downers Grove, IL 60439 (Alternate, atomic energies at/above the Pour site in the Des Plaines' bluffs.)

36 Enacting his conflation and collapse of geology, engineering, and compounded human agency, Smithson summed up his attitude toward Chicago and historiography during a 1971 interview by saying, with Lewis-Carrol-esque flare, "Maybe Chicago should have been left as it is." See the Smithson Papers. National Institute of Chicago (School of Art Institute of Chicago- 1971 Q&A) Transcribed- Kathryn M. Davis- April 6, 2004.

37 Water use volumes and diversion statistics complied from The Great Lakes Commission. "Annual Report of the Great Lakes Regional Water Use Database Repository." 2006. Ann Arbor, MI: The Great Lakes Commission. Accessed October 10, 2010. http://glc.org/wateruse/database/

U.S. Geological Survey. "Water-use data files,1995" state files for: NY, PA, OH, MI, IN, IL, WI, MN. USGS. Accessed October 10, 2010. http://water.usgs.gov/watuse/spread95.html. For state-level bibliography see http://water.usgs.gov/watuse/biblio/.

38 Ibid.

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39 Numbers do not account for the typical transmission loses of step-up/down.

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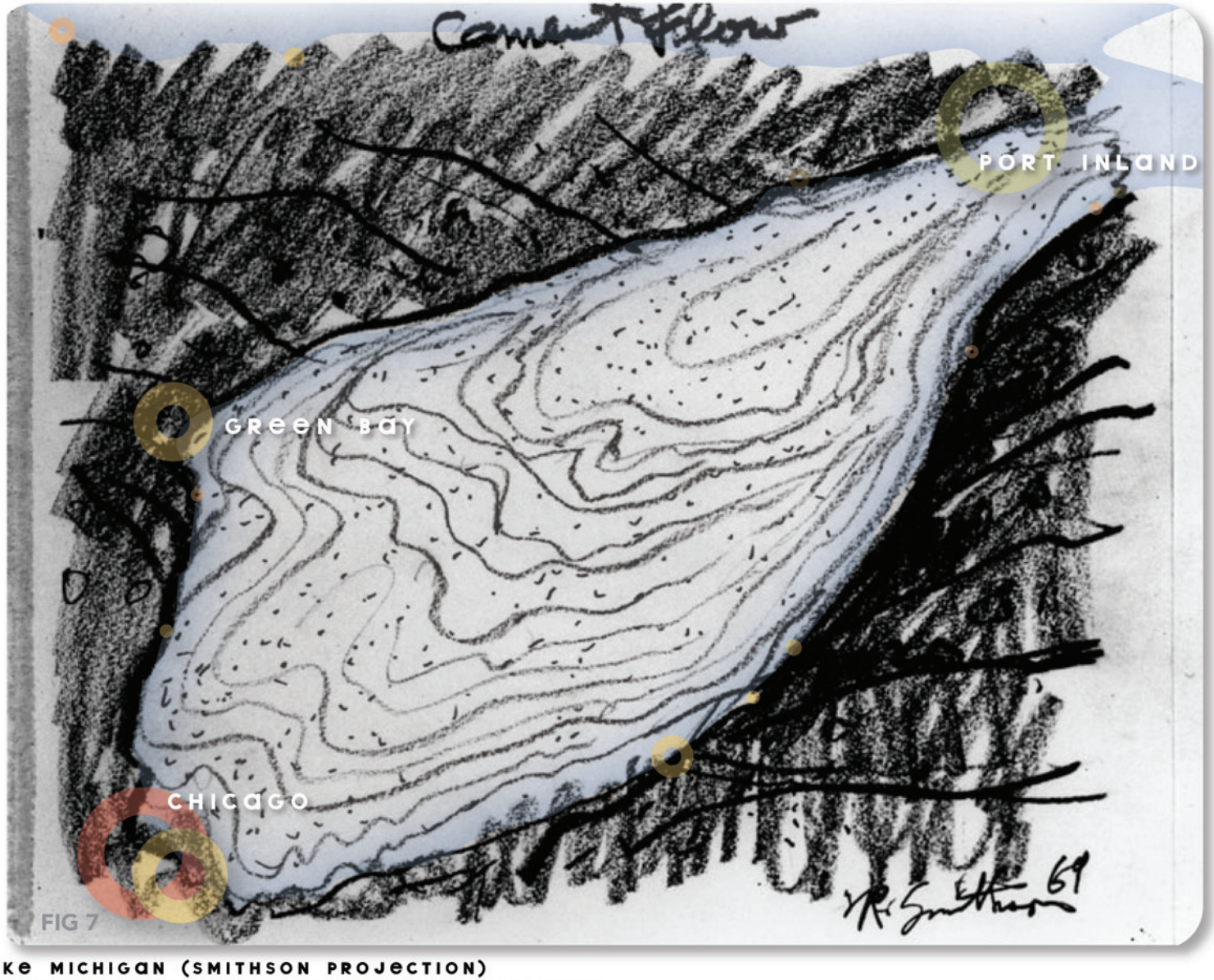

FIG 7

CONCRETE POUR: CEMENT FLOW

Lake MICHIGAN (SMITHSON PROJECTION)

Nested scales + the threshold of bathymetric appearance

FIGURES:

Given the complex nature of the project spreads, I've labeled the each spread as a multi-part figure, following the Chicago Style. Each overarching number (Studer_1, Studer_2, etc.) corresponds to the TIFF/AI composite file.

Studer_1
ARONSON + VAN DER MARCK + CREW EXECUTION
Source:
Jerry Aronson. Concrete Pour still. Robert Smithson and Nancy Holt papers1905-1987, Archives of American Art, Smithsonian Institution. (PR) photo proofs. 3835:727-731. Cinematic credit of Jerry Aronson and Nancy Holt in Fiore, Bob. Run Down 1993. 13 minutes.
Fiore. Audio Recording of Pour Instructions/Phone Call. (Quote on image)

Studer_2_A
DOVYDENAS + VAN DER MARCK + CREW EXECUTION
Source:
Jonas Dovydenas. Concrete Pour photograph. Smithson Papers. AAA. Credit given in correspondence Jan van der Marck/Karin Rosenberg (PR) from MCA. 3833:045.

Studer_2_B
SMITHSON + VAN DER MARCK CORRESPONDENCE
Source:
Robert Smithson/Jan van der Marck Correspondence. Concrete Pour Annotated Quarry Maps. ("Chicago and Vicinity." and "Chicago Street map" 1969. Chicago: Standard Oil & Rand McNally) Smithson Papers. AAA. 3835:732-733.

Studer_2_C
RUINS IN REVERSE: THE ANONYMOUS INDUSTRIES BEHIND CONCRETE
Data Source:
U.S. Geological Survey. Active mines and mineral plants in the US. [map] 2005. GIS from Mineral Resources Data System (MRDS). USGS. Accessed October 10, 2010. http://tin.er.usgs.gov/mineplant/

Studer_3_A
CONCRETE SOURCES, CYCLES, SINKS [map]
Data Sources:
Richmond, Gerald M. and David S. Fullerton, et. al MAP I-1420 (NK-16) CHICAGO 4° x 6° QUADRANGLE. [map] 2001 QUATERNARY GEOLOGIC ATLAS OF THE UNITED STATES MISCELLANEOUS INVESTIGATIONS SERIES. USGS. Accessed October 10, 2010. http://pubs.usgs.gov/imap/1983/i-1420/nk-16/
U.S. Geological Survey. Active mines and mineral plants in the US. [map] 2005. GIS from Mineral Resources Data System (MRDS). USGS. Accessed October 10, 2010. http://tin.er.usgs.gov/mineplant/

Studer_3_B
CHICAGO CONCRETE [graph + section]
Data Sources:
"Highway Statistics." 1945:56, 1968:177,178. Springfield, VA: U. S. Department of Commerce and National Technical Information Service. Accessed on October 10, 2010. http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubsarc.cfm
ISGS Resource Economics Program. Illinois Production. [figure] (Chicago-district 1 interpolated) Champaign, Illinois: University of Illinois and ISGS Resource Economics Program. Accessed on October 10, 2010. http://www.isgs.uiuc.edu/sections/indust-min/resource-economics.shtml.
Indiana-30M DEM. [map] 2006. Indiana Spatial Data Portal. Bloomington: Indiana University. Accessed on October 10, 2010. http://www.indiana.edu/~gisdata/isdptool.html.
Luman, Donald, Lisa Smith and Chris Goldsmith. Surface Elevation: 30-Meter Digital Elevation Model (DEM) [map] 2003. Illinois Natural Resources Geospatial Data Clearinghouse. Urbana-Champaign:University of Illinois. Accessed on October 10, 2010. http://www.isgs.illinois.edu/nsdihome/webdocs/st-geolq.html
Michigan Department of Natural Resources. Michigan Digital Elevation Model (DEM).[map] Lansing, Michigan: Center for Geographic Information, Department of Information Technology, The State of Michigan. Accessed on October 10, 2010. http://www.mcgi.state.mi.us/mgdl/rel=thext&action=thmname&cid=13&cat=Digital+Elevation+Model+%28DEM%29
Sullivan, Daniel E. "Materials in Use in the U.S. Interstate Highways." 2006. Fact Sheet 2006-3127 Denver: USGS. Accessed on October 10, 2010. http://pubs.usgs.gov/fs/2006/3127/.

Studer_3_C
GLOBAL PRODUCTION, GLOCAL QUARRY CONTRIBUTION
Data Sources:
"Aggregates," "Cement Production," "Limestone- whole," "Limestone-crushed," "Lime," "Sand Gravel Construction," "Sand Gravel Industrial" UNdata- International Merchandise Trade Statistics (IMTS). United Nations Statistics Divisions. reference to 2000 data. Accessed on October 10, 2010. http://data.un.org/
Masters, John M. "The Mineral Industry of Illinois: Yearbook 2000" Illinois State Minerals Information. Urbana-Champaign: ISGS and USGS. Accessed on October 10, 2010. http://minerals.usgs.gov/minerals/pubs/state/il.html
"Non-Fuel Mineral Production in the United States (Statistic Summary): Yearbook 2002," "Construction Sand and Gravel Statistics and Information: Yearbook 2002," "Crushed Stone Statistics and Information: Yearbook 2002," Minerals Yearbook (Volume I.-- Metals and Minerals). USGS. Accessed on October 10, 2010. http://minerals.usgs.gov/minerals/pubs/commodity/myb/

CONCRETE POUR: INFRASTRUCTURE ENABLING THE ZERO DEGREE

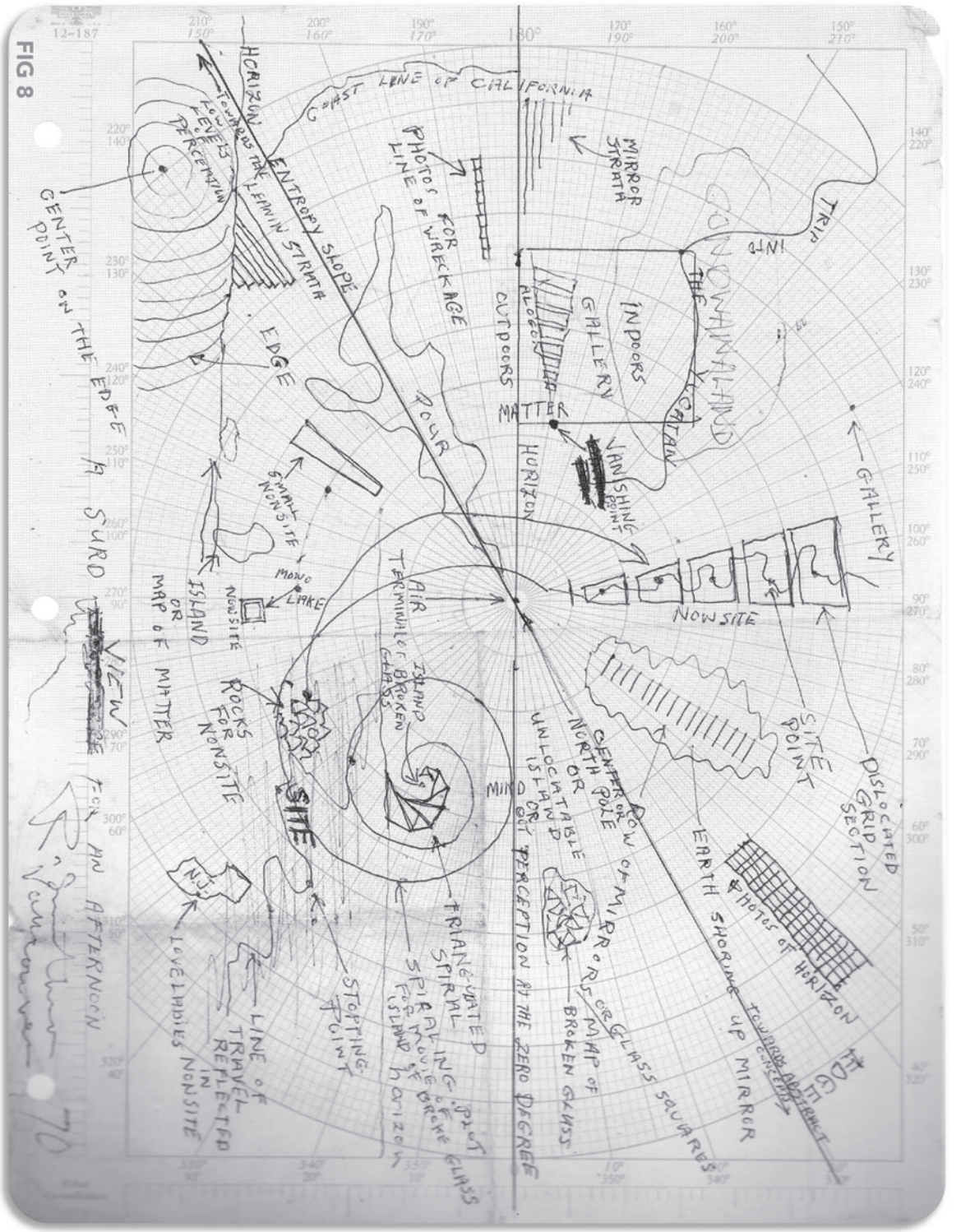

FIG 8

Studer_3_D
MATERIAL MANUFACTURE
Data Sources:
Portland Cement Association. “How Cement is Made.” Cement and Concrete Basics. Accessed October 10, 2010. http://www.cement.org/basics/howmade.asp

Studer_3_E
SMITHSON’S LEMONT LAKE MAPS. . . SITE SELECTION
Sources:
Smithson Papers. AAA. Slough/Site research, photocopied maps. 3835:1087.
Illinois State Geological Survey. Sag Ridge quadrangle, Illinois [map]. Photorevised 1998. 1:24,000. 7.5 Minute Series. Champaign, Illinois: University of Illinois and USGS.

Studer_4_A
CONV(EM)ERGENT LAKES, GEOLOGY, LOGISTICS
Data Sources: (see 4B for lock traffic)
“2007 TRAFFIC STATEMENT ST. MARYS FALLS CANAL, SAULT STE. MARIE, MICHIGAN“ 2007 Statistical Annual Report of Lake Carriers’ Association. Detroit: US Army Corps of Engineers. Accessed on October 10,2010. www.lcaships.com/07SRUSACEREPORT.pdf
Kate E. Barton, David G. Howell, José F. Vigil. The North America Tapestry of Time and Terrain. [map] 2003. 1:8,000,000 scale. Geologic Investigations Series I-2781. USGS. Accessed on October 10, 2010. http://pubs.usgs.gov/imap/i2781/
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Waterborne Commerce Statistics Center. “2007 Waterborne Commerce of the United States (WCUS): Waterways and Harbors on the Great Lakes (Part 3)” New Orleans: US Army Corps of Engineers. Accessed on October 10, 2010. http://www.ndc.iwr.usace.army.mil//wcsc/wcsc.htm
“Waterborne Commerce.” The Great Lakes Atlas. US EPA. Accessed on October 10, 2010. http://www.epa.gov/greatlakes/atlas/images/big08.gif

Studer_4_B
LOCK AREA STONE FREIGHT, TYP TRAFFIC.
Data Sources:
The St. Lawrence Seaway Management Corporation. “Historic Tables 1959-1992,” “Traffic Reports.” (2001, 2004, 2007, 2010) Great Lakes St. Lawrence Seaway System. Accessed on October 10, 2010. http://www.greatlakes-seaway.com/en/seaway/facts/traffic/index.html
Statistics Canada. “Canals, cargo tonnage through St. Lawrence,” ibid “Welland.” (1946-59) Canadian Statistics series T97-106, T107-116. Accessed on October 10, 2010. http://www.statcan.gc.ca/pub/11-516-x/sectiont/4147444-eng.htm#2.
Waterborne Commerce Statistics Center. “2007 Waterborne Commerce of the United States (WCUS): Waterways and Harbors on the Great Lakes (Part 3)” New Orleans: US Army Corps of Engineers. Accessed on October 10, 2010. http://www.ndc.iwr.usace.army.mil//wcsc/wcsc.htm

Studer_4_C
MOBILE MEASURES
Data Sources:
Bureau of Transportation Statistics. “2007 Commodity Flow Survey.” Table 1a. Shipment Characteristics by Mode of Transportation for the United States. Washington D.C.: Research and Innovative Technology Administration (RITA), U.S. Department of Transportation (US DOT). Accessed on October 10, 2010. http://www.bts.gov/publications/commodity_flow_survey/final_tables_december_2009/index.html

Waterborne Commerce Statistics Center. “2007 Waterborne Commerce of the United States (WCUS): National Summary (Part 5)” Table 1-10: DOMESTIC WATERBORNE COMMERCE, 1990-2009 AVERAGE HAUL BY TYPE OF TRAFFIC. New Orleans: US Army Corps of Engineers. Accessed on October 10, 2010. http://www.ndc.iwr.usace.army.mil//wcsc/wcsc.htm

Studer_4_D
IMMERSIVE LOCK SYSTEM
Sources:
Navigation Data Center. “Port and Waterway Facilities” New Orleans: U.S. Army Corps of Engineers/CEIWR. Accessed on October 10, 2010. http://www.ndc.iwr.usace.army.mil/data/datapwd.htm.
The St. Lawrence Seaway Management Corporation. “St. Lawrence Seaway-Handbook: Seaway Plan- Lock data.” Great Lakes St. Lawrence Seaway System. Accessed October 10, 2010. http://www.media-seaway.com/seaway_handbook/seaway-handbook-en/Seaway_Plans_formatted_e.pdf,
Smithson Papers. AAA. Unsorted Boxes and Map rolls. Photograph marked: ‘86896. 86725. R-7’

Studer_4_E
SMITHSON'S LINKS (PANAMA PASSAGE)
Source:
Smithson Papers. AAA. Panama Passage Movie Treatment. (1970) 3835:214.

Studer_5_A
POUR SOURCES CYCLES SINKS
Data Sources:
Conzen, Michael P. The Historic Illinois & Michigan Canal Corridor in 1851. [map] in the Encyclopedia of Chicago. Provided by Newberry Library. Accessed on October 10, 2010. http://encyclopedia.chicagohistory.org/pages/1771.html
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Cronan, William. "Rails and Water" Nature's Metropolis: Chicago and the Great West. W. W. Norton & Company:New York. 1992: 55-73.
"Tunnel and Reservoir Plan Overview" Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). Accessed on October 10, 2010. http://www.mwrd.org/irj/portal/anonymous?NavigationTarget=navurl://a0bbc58adbabf65af97e44d241e46c75
"Water Reclamation Plants: Overview and 2008 Operating Summary" Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). Accessed on October 10, 2010. http://www.mwrd.org/irj/portal/anonymous/waterreclamation

Studer_5_B
EXCAVATION TO EXPORT
Data Source:
Congestion Management Program. "2008 Waterborne Commerce on the Illinois Waterway and the Port of Chicago" 2010. Chicago: Chicago Metropolitan Agency for Planning. Accessed 1.20.2011. http://www.cmap.illinois.gov/freight-snapshot

Studer_5_C
CHICAGO (CITY DATUM) [schematic section]
Source:
Smithson Papers. AAA. Illinois River schematic navigation profile. 3835:1091. Originally source unknown.

Studer_5_D
RECONFIGURED FLOWS
Data Sources: see figure 5a for historic references, additional volumetic/flow information:
"Calumet TARP 1988-2009," "Stickney TARP 1989-2009," Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). Accessed on October, 10, 2010. http://www.mwrd.org/irj/portal/anonymous NavigationTarget=navurl://14d6b38927bee2ff03c32994983903f0
"Summary of Lake Michigan Reversals." Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). Accessed on October 10, 2010. http://www.mwrd.org/irj/portal/anonymous/overview
US Army Corps Chicago District. "Lake Michigan Diversion Accounting: Year 2005 Report" Chicago:US Army Corps of Engineers. Accessed on October 10, 2010. http://155.79.114.198/divacct/annual.html
US Army Corps Chicago District. "Lake Michigan Diversion: Findings of the Fifth Technical Committee for Review of Diversion Flow Measurements and Accounting Procedures." Chicago:US Army Corps of Engineers. Accessed on October 10, 2010. http://155.79.114.198/divacct/Fifth_Technical%5CFifth_Technical_complete.pdf

Studer_6_A
(PER)COLLATION DIVERT, DROSS, DRAIN
Data Sources:
Coal-fired power plants that discharge wastewater in Great Lakes region. [map] Great Lakes Echo. Accessed October 10, 2010. http://maps.google.com/maps/ms?ie=UTF8&hl=en&oe=UTF8&msa=0&msid=102543724995508926387.00047a57153d388e4abcf&z=5
Galloway, Gerald and Murray Clamen. "Protection of the Waters of the Great Lakes" 2.2000. Detroit, MI: International Joint Commission. Accessed October 10, 2010. http://www.cglg.org/projects/water/docs/IJC2000Report.pdf
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"Ontario Power Generation." Ontario Power (thermo-electric and hydro-electric). Accessed October 10, 2010. http://www.opg.com/power/.
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U.S. Geological Survey. "Water-use data files,1995" latest full state, county-level files for: NY, PA, OH, MI, IN, IL, WI, MN. USGS. Accessed October 10, 2010. http://water.usgs.gov/watuse/spread95.html. For state-level bibliography see http://water.usgs.gov/watuse/biblio/

Studer_6_B
POUR, WISCONSIN GLACIAL EROSION, DEPOSITION
Sources:
Hough, Jack Luin. Geology of the Great Lakes. Urbana-Champlain:University of Illinois Press. 1958.
Smithson Papers. AAA. Moraines in Northestern Illinois. 3835:1088.

Originally source from Ekblaw, George. “Moraines in Northeastern Illinois” Urbana-Champlain: Illinois State Geological Survey, January 1, 1942.
Taylor, Frank Bursley. “The glacial and postglacial lakes of the Great Lakes region.” Smithson Report for 1912, Publication 220.Washington D.C.: Smithsonian Institute, 1912: 291-327.

Studer_6_C
STORE
Source:
Smithson Papers. AAA. Untitled Potentiometric Contours. 3835:1089-90.
Originally source from Suter, Max. et. al. “Preliminary Report on Chicago Ground Water Resources of the Chicago Region, Illinois.” Urbana-Champlain: Illinois Geological Survey, 1959:18.

Studer_6_D
DIVERSION WATER USE: POUR TO POWER
Data Sources: Contemporary volumes taken from same sources as 6a. Post-war comparisons (’65):
Murray, Charles Richard. “Estimated Use of Water in the United States—1965.” USGS Circular 556. (Published 1968) state-level files for: NY, PA, OH, MI, IN, IL, WI, MN. Accessed October 10, 2010. http://pubs.er.usgs.gov/publication/cir556

Studer_7
CONCRETE POUR: CEMENT FLOW (LAKE MICHIGAN, THE SMITHSON PROJECTION)
Source:
Smithson, Robert. Cement Flow. 1969. Smithson Estate c/o James Cohan Gallery, VAGA.

Studer_8
CONCRETE POUR: INFRASTRUCTURE ENABLING THE ZERO DEGREE
Source:
Smithson, Robert. A Surd View for an Afternoon. 1970. (Wheeler Interview sketch). Smithson Estate c/o James Cohan Gallery, VAGA.

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