INDIANA HARBOR CDF MODIFICATIONS SUPPLEMENTAL DETAILED PROJECT REPORT AND INTEGRATED ENVIRONMENTAL ASSESSMENT

June 2020

US Army Corps of Engineers
Chicago District

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DRAFT FINDING OF NO SIGNIFICANT IMPACT

INDIANA HARBOR CDF MODIFICATIONS SUPPLEMENTAL DETAILED PROJECT REPORT AND INTEGRATED ENVIRONMENTAL ASSESSMENT EAST CHICAGO, LAKE COUNTY, INDIANA

The U.S. Army Corps of Engineers, Chicago District (Corps) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The final Integrated Feasibility Report and Environmental Assessment (IFR/EA) dated 30 June 2020, for the Indiana Harbor CDF Modifications addresses dike expansion, dam safety, methane accumulation, and center dike submergence opportunities and feasibility in the East Chicago, Lake County, Indiana. The final recommendation is contained in the report of the Chief of Engineers, dated 30 June 2020.

The Final IFR/EA, incorporated herein by reference, evaluated various alternatives that would allow the Indiana Harbor CDF to be built to design heights, provide dam safety features, reduce methane buildup, and allow submergence of the obsolete center dike in the study area. The recommended plan is the National Economic Development (NED) Plan and includes:

- Raise exterior dikes by 11 feet.
- Installation of dam safety features including:
    - Inclusion of a chimney filter and drain between the existing dike slope and new fill to collect potential seepage and direct the drainage out of the dike.
    - Provision of riprap on the upstream slopes to protect against erosion of the dikes.
    - Provision of a designated emergency overtopping location to safely channel overflow from the dam and back to the canal in the unlikely event of an extremely large precipitation event.
    - The new groundwater discharge pipes will be double-walled pipe. If the primary pipe were to develop a leak, the leak would be contained by the outer pipe wall and prevent erosion of the dikes.
- A passive vent will be installed during the dike expansion to address methane created by biodegradation of hydrocarbons.
- The existing center dike will be submerged because current management practices have eliminated a need for it.

In addition to a “no action” plan, one alternative was evaluated. The alternative included construction of a new CDF at a new site. Analysis of this alternative is discussed in Section 3.4 of the EA/DPR.

SUMMARY OF POTENTIAL EFFECTS:

For all alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the recommended plan are listed in Table 1:

Table 1: Summary of Potential Effects of the Recommended Plan

	Insignificant effects	Insignificant effects as a result of mitigation*	Resource unaffected by action
Climate	☒	☐	☐
Soils and Geology	☒	☐	☐
Surface Water and Other aquatic Resources	☒	☐	☐
Fish and wildlife habitat	☒	☐	☐
Threatened/Endangered species/critical habitat	☐	☐	☒
Recreational, Scenic, and Aesthetic Resources	☒	☐	☐
Cultural resources	☐	☐	☒
Air quality	☒	☐	☐
Noise	☒	☐	☐
Hazardous, toxic & radioactive waste	☒	☐	☐
Socioeconomics and Environmental Justice	☒	☐	☐
Cumulative Effects	☒	☐	☐

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices (BMPs) as detailed in the IFR/EA will be implemented, if appropriate, to minimize impacts.

COMPENSATORY MITIGATION:

No compensatory mitigation is required as part of the recommended plan.

Public review of the draft IFR/EA and FONSI was completed on **DATE DRAFT EA AND FONSI REVIEW PERIOD ENDED**. All comments submitted during the public review period were responded to in the Final IFR/EA and FONSI.

ENDANGERED SPECIES ACT

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the U.S. Army Corps of Engineers determined that the recommended plan will have no effect on federally listed species or their designated critical habitat.

NATIONAL HISTORIC PRESERVATION ACT

NO EFFECT TO HISTORIC PROPERTIES:

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, the U.S. Army Corps of Engineers determined that the recommended plan has no potential to cause adverse effects on historic properties.

CLEAN WATER ACT SECTION 404(B)(1) COMPLIANCE

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the recommended plan has been found to be compliant with section 404(b)(1) Guidelines (40 CFR 230) as discussed in Section 5.3.

CLEAN WATER ACT SECTION 401 COMPLIANCE:

A water quality certification pursuant to section 401 of the Clean Water Act was obtained from the Indiana Department of Environmental Management. All conditions of the water quality certification shall be implemented in order to minimize adverse impacts to water quality.

COASTAL ZONE MANAGEMENT ACT

A determination of consistency with the Indiana Coastal Zone Management program pursuant to the Coastal Zone Management Act of 1972 is expected from the Indiana Department of Natural Resources. All conditions of the consistency determination shall be implemented in order to minimize adverse impacts to the coastal zone.

OTHER SIGNIFICANT ENVIRONMENTAL COMPLIANCE:

All applicable environmental laws have been considered and coordination with appropriate agencies and officials has been completed.

FINDING

Technical criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the recommended plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

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Date

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AARON W. REISINGER
COLONEL, Corps of Engineers
District Commander

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INDIANA HARBOR CDF MODIFICATIONS SUPPLEMENTAL DETAILED PROJECT REPORT AND INTEGRATED ENVIRONMENTAL ASSESSMENT

1.0 Introduction

Indiana Harbor and Ship Canal (IHC) is a federally authorized, deep draft navigation channel. The deep draft project is a major port on southern Lake Michigan, serving industries including steel, petroleum, and materials processing. Sediment in the IHC is heavily contaminated due to historical industrial impacts. A Confined Disposal Facility (CDF) to contain the dredged sediment was constructed from 2000 - 2011 on property formerly occupied by an oil refinery owned by Energy Cooperative Industries (ECI) and now owned by the East Chicago Waterway Management District.

1.1 Study Purpose and Scope

The purpose of this supplemental detailed project report and environmental assessment is to document proposed changes to the design and construction of the IHC CDF, which needs a second lift of dikes to maintain sufficient storage capacity for the intended project life. The proposed exterior dike expansion includes additional features – a designated emergency overtopping location, chimney drain, methane venting, re-aligned ramps – which were not contemplated in the original design. The construction of the dike expansion will ensure that a proper disposal facility is available for IHC sediment for a number of years to come. The integrated EA is a supplement to the Comprehensive Management Plan: Indiana Harbor and Canal Maintenance Dredging and Disposal Activities drafted by USACE Chicago District in 1999.

1.2 Location

Indiana Harbor and Ship Canal (IHC) is located in East Chicago, Lake County, Indiana. It is on the southwest shore of Lake Michigan, 4-1/2 miles east of the Indiana-Illinois State line and 17 miles from downtown Chicago. Indiana Harbor has an entrance channel and outer harbor protected by breakwaters, and an inner harbor. The inner harbor consists of the ship canal and its two branches. The main channel extends from the lakeward E. J. & E. Railway Bridge to the Forks, a distance of 7,400 feet. Near the Forks, there is a small turning basin located on the southeast side of the canal about 600 feet lakeward of Canal Street. From the Forks, the Lake George Branch extends west for a distance of 6,800 feet and the Calumet River Branch extends south for about 2 miles where it joins the Grand Calumet River (GCR). The navigation channel and reach numbers for the channel are shown on Figure 1.

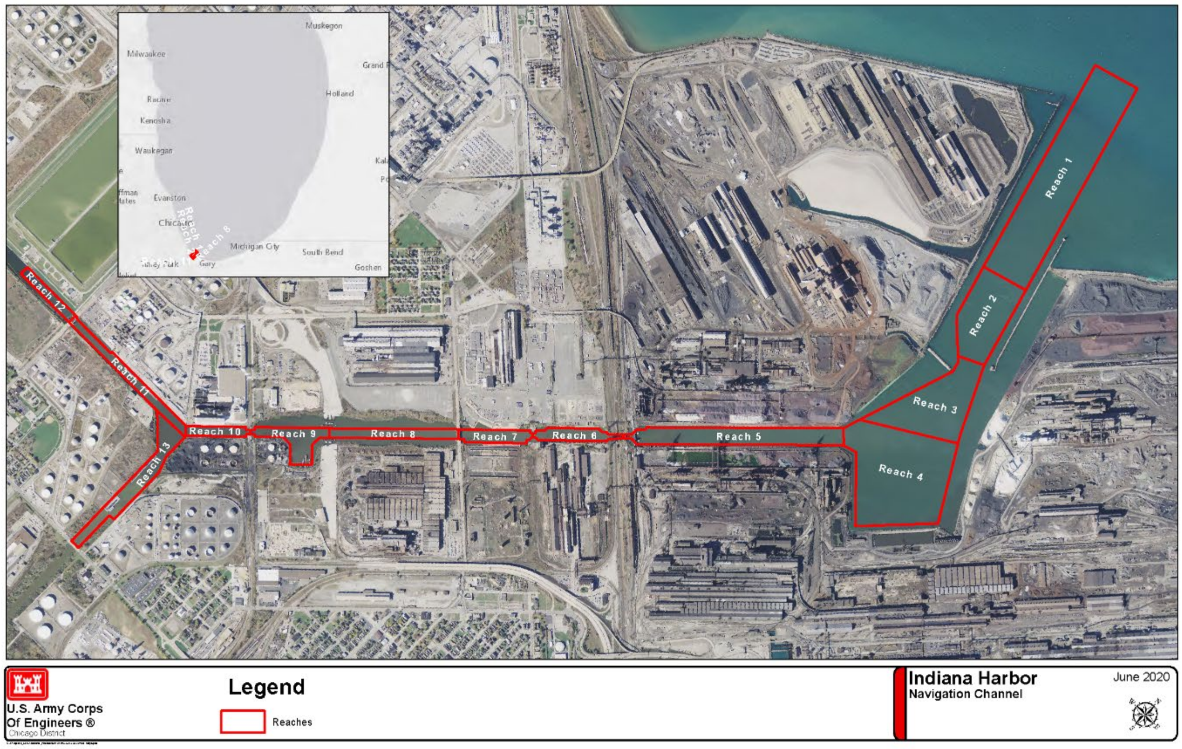


Figure 1: Navigation Channel and Reach numbers

The CDF for sediment disposal is also located in East Chicago, Lake County, Indiana. The facility address is 3500 Indianapolis Boulevard. The entrance to the facility is at the intersection of Indianapolis Boulevard and Riley Road. The facility is directly adjacent to the Lake George Branch of the Indiana Harbor Ship Canal (Figure 2).

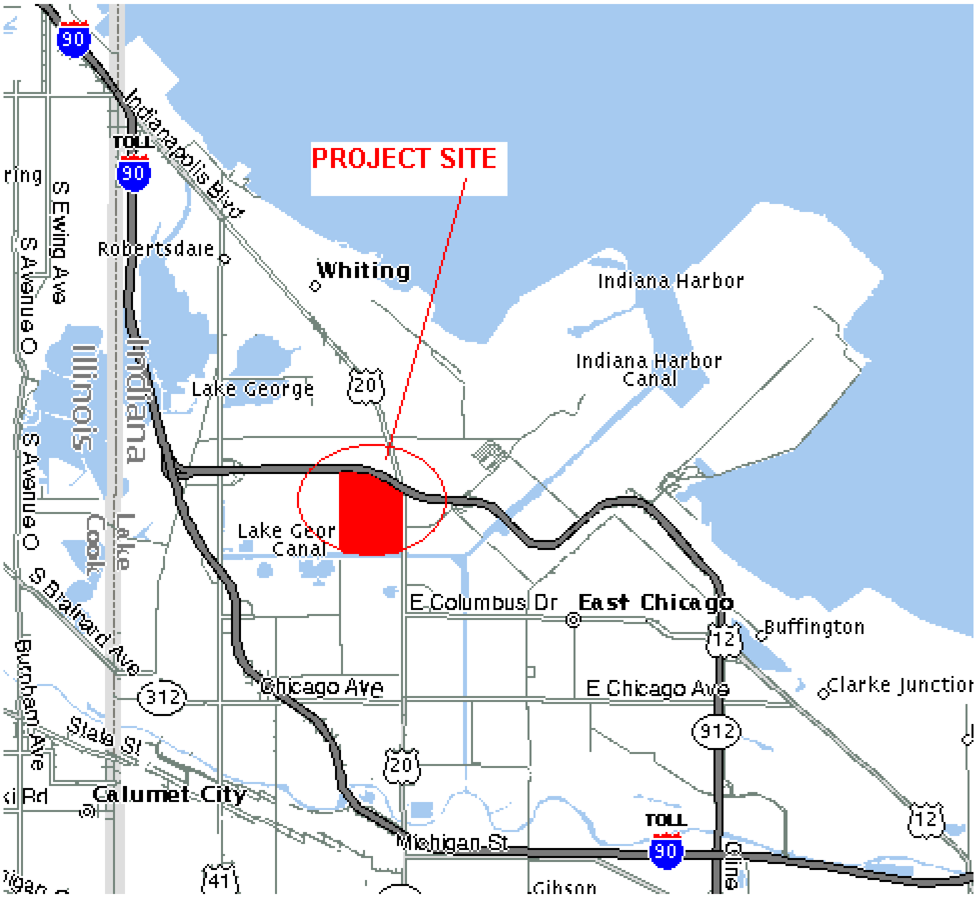


Figure 2: CDF Location Map

1.3 Study Authority

Indiana Harbor and Canal (IHC) is an authorized Federal navigation project located in East Chicago, Indiana. Congress originally authorized the project in the River and Harbor Act of 1910, ch. 382, 36 Stat. 630, 657, in accordance with House Document 60-1113 (1908). Project features include breakwaters at the harbor entrance and a deep-draft navigation channel.

In 1999, following years of coordination, the Chicago District completed its final Comprehensive Management Plan (CMP) including a final Environmental Impact Statement for the design and construction of a new CDF. The final plan presented in the CMP included a comprehensive dredging plan for the navigation channel plus adjacent berthing areas, and a draft design for an upland CDF. The CDF site selected during the planning process was a former refinery site with open RCRA status (requiring RCRA corrective action and closure). The facility included dikes for sediment confinement, a groundwater gradient control system consisting of a cutoff wall and groundwater extraction system, and wastewater treatment. Final RCRA compliance closure (capping, maintenance and monitoring) is included as part of the federal project.

1.4 Non-Federal Sponsorship

The non-federal sponsor is the East Chicago Waterways Management District (ECWMD). ECWMD owns the property on which the IHC CDF is located. Although ECWMD and the Corps executed a Project Cooperation Agreement to share the costs of construction according to Section 201 of the Water Resources Development Act of 1996, in 2005 Congress ordered the completion of construction of the facility at full federal expense. See Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Tsunami Relief, 2005 § 6011, Pub. L. No. 109-13, 119 Stat. 231, 283. ECWMD remains the non-federal sponsor and continues to hold the real estate for the project.

1.5 Relevant Prior Studies and Reports

USACE, Chicago District. 1999. "Comprehensive Management Plan: Indiana Harbor and Canal Maintenance Dredging and Disposal Activities," U.S. Army Engineer District, Chicago, IL.

USACE, Chicago District. March 2000. "Design Documentation Report: Indiana Harbor and Canal Maintenance Dredging and Disposal Activities," U.S. Army Engineer District, Chicago, IL.

2.0 Affected Environment – Existing Conditions

2.1 Climate

East Chicago, Indiana, is located within a temperate continental climate zone marked by cold winters, warm humid summers, and the lack of a pronounced dry season. The proximity of Lake Michigan greatly affects the local temperature and precipitation, particularly in the winter (lake effect snow). Temperatures typically vary from 21ºF to 83ºF, with higher or lower temperatures possible for short time periods. Total annual rainfall is approximately 42", with part of that falling as snow in the mid-October to mid-April period. It is estimated that evapotranspiration for the area is 30" per year, so that the area has a net water surplus in a typical year.

2.2 Soils and Geology

The ECI Site is located at the southern end of Lake Michigan in northwestern Indiana. The area is heavily industrialized, being relatively flat and lying about 5 to 15 feet above the normal lake level at 580 feet NGVD 1929. The site has less than 10 feet of relief with a small mound in the central portion of the site that is approximately 6 feet higher than the property boundaries.

The ECI site is located within the relic beach formed when the Lake Chicago level was between 580 and 605 feet NGVD 29. Soil borings drilled to the northeast of the site indicate that the site is composed of five different layers. Layer 1 consists of approximately 5 feet of sand, cinders, and slag (urban fill). Below the fill is a silty sand designated as Layer 2 approximately 25 feet thick. A layer of silty clay (Layer 3) is found below Layer 2, followed by dense sand or hardpan denoted as Layer 4 that overlies bedrock (Layer 5). The underlying soils on-site (Layers 1 and 2) are heavily contaminated with substantial quantities of free-phase hydrocarbons. Estimates of the degree of contamination vary. A generalized soil column of the subsurface conditions at the ECI Site is shown in Figure 2.

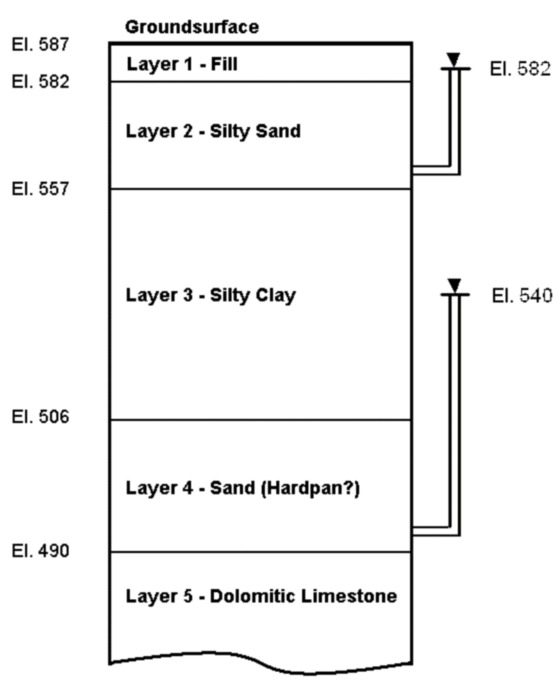


Figure 3: Generalized soil column at ECI site

2.3 Groundwater Resources

2.3.1 Regional Groundwater Resources

The project area is located within the bounds of the Calumet aquifer, an unconfined shallow aquifer composed primarily of sands with silts, peat, and fine gravel. The shallow aquifer extends to a depth of approximately 50-feet from the ground surface. A low permeability confining unit composed glacial till and lacustrine clay underlies the Calumet aquifer; this till ranges from 50 to 140 feet thick. Below the confining layer is the carbonate bedrock aquifer (Fenelon and Watson, 1993). Groundwater flow in the region is generally toward the surface water bodies of the Grand Calumet River, Indiana Harbor, Lake George Canal, and Lake Michigan, though flow is heavily influenced by various anthropogenic factors including sewerage infrastructure, sheet pile walls, drainage ditches, man-made fill deposits, and other features (Cohen, 2002).

Substantial areas of the Calumet aquifer have been modified with anthropogenic fill for lakeward land development, marsh deconversion, or other purposes (Fenelon and Watson, 1993). A variety of materials has been used to provide fill for the region, including steel slag, coal ash, construction debris, dredging spoils, and to a less extent, other wastes (Kay et al, 2002). Groundwater quality is variable throughout the aquifer, primarily depending on historical industrial influence. Elevated concentrations of metals and organic contaminated have been reported, and relatively thick (greater than 10-feet in some locations) and discrete layers of light non-aqueous phase liquid (LNAPL) are present, particularly in locations near the IHC (Cohen, 2002; Fenelon and Watson, 1993). Multiple users in the region operate groundwater control equipment to reduce, minimize, or prevent groundwater contamination mobility.

Drinking water usage in the general project area is sourced from Lake Michigan. Due to the proximity to Lake Michigan, shallow production aquifer, and groundwater quality issues, groundwater is not utilized for drinking water.

2.3.2 CDF Site Groundwater Conditions

Groundwater at the CDF is heavily influenced by the former industrial activities at the property. An active refinery occupied the ECI site between approximately 1917 and 1981 when the site owners initiated bankruptcy proceedings. Subsequently, buildings on the site were razed and the site underwent closure activities. However, site closure activities did not fully address subsurface piping, foundations, holding tanks, and associated oil product, as well as remnant hazardous wastes. Groundwater conditions were impacted by the historical industrial activities and remaining wastes. Groundwater quality conditions at the site were similar in nature to the regional groundwater concerns, including elevated metals, organics, and free-phase LNAPL. In 1990, the U.S. Coast Guard observed free-phase LNAPL flowing from the ECI Site's failing sheet-pile wall and into the Lake George Canal. In 1992, ARCO, a former property owner, installed a series of free-product recovery wells to address the flows and seeps. The free product recovery system operated until at least 1998, and in 2002 USACE began construction activities to stabilize the site and construct the CDF.

USACE installed a new sealed sheet pile cutoff wall at the southern property limit near the Lake George Canal and a slurry wall system around the east, west, and northern property boundary to minimize groundwater flow into or out of the project site. The sealed sheet pile is driven into the underlying silty clay confining unit and tied into the adjacent slurry wall system. The slurry wall and sheet pile systems are tied-into each other, and both systems are driven or keyed-into the underlying groundwater confining unit to prevent groundwater flows from the property. In order to prevent contaminant migration, a groundwater gradient control system (GCS) was installed around the perimeter of the site to maintain an inward hydraulic gradient of advective groundwater flow. The GCS consists of 96 groundwater extraction wells and 22 monitoring well pairs. Groundwater is extracted from the subsurface in order to maintain at least a 2-foot drawdown at the interior monitoring well relative to exterior water levels. Extracted groundwater is discharged to the CDF before it is ultimately treated by the on-site waste water treatment plant (WWTP) and discharged to the canal.

2.3.3 CDF Gradient Control Performance

The CDF's GCS has been online and fully operational since at least 2012, when dredged material was first offloaded at the facility. The system has consistently maintained an inward hydraulic gradient. Minor modifications and rehabilitations to the system have been periodically implemented since 2012, including in 2015 when 8 additional extraction wells were added in order to accelerate initial drawdown of the CDF groundwater table and capture infiltration from the CDF cells. Quarterly operational summaries of GCS performance are provided to the Indiana Department of Environmental Management (IDEM) and U.S. Environmental Protection Agency (USEPA), and are publically available from IDEM's Virtual File Cabinet (vfc.idem.in.gov). Brief and occasional losses of the inward hydraulic gradient have been reported due to several factors, including: large precipitation events, electrical issues compromising data integrity, routine operational testing and maintenance, groundwater control operations by external activities and neighboring property owners (e.g., construction dewatering activities or nearby gradient control systems), or other miscellaneous issues. However, brief and minor losses of the inward gradient are mitigated by the site's low permeability walls, and a significant inward hydraulic gradient has been statistically maintained, ensuring that contaminants originating from the property boundary have been contained. **Figure 3**, below, illustrates the statistical performance (differential between groundwater levels at the monitoring wells outside and inside of the slurry wall) for each of the 22 well banks following installation of the 8 additional extraction wells. As shown, the system has consistently maintained an inward hydraulic gradient; brief and minor loss of the gradient at well bank 17 is attributable to external groundwater control systems east of the project boundary.

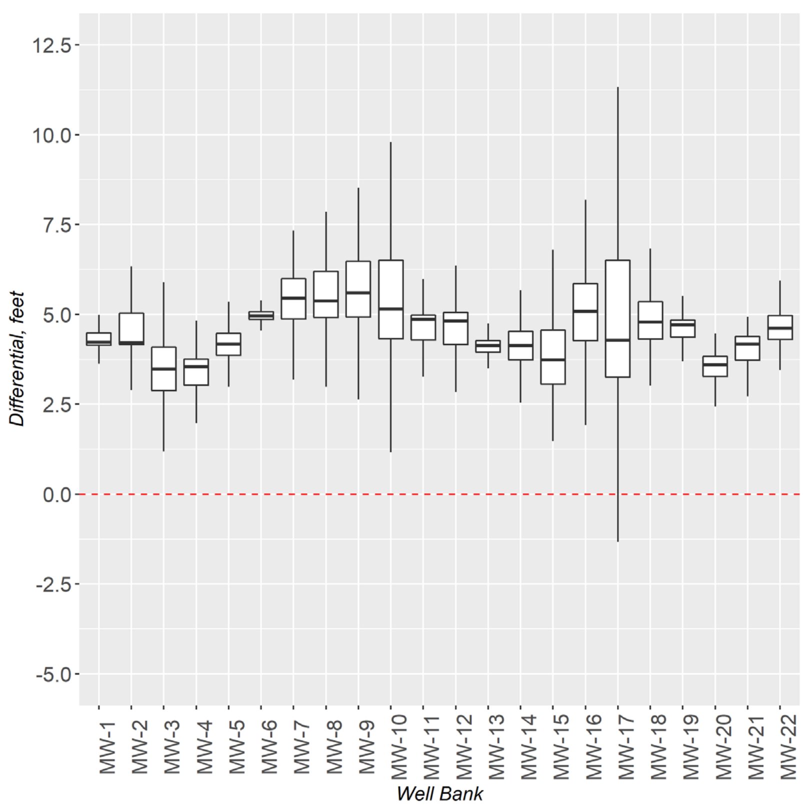


Figure 4: Gradient Control System Performance Boxplot (2017 – 2019)

2.4 Surface Water Resources

The main surface water feature in the area is Lake Michigan, which is directly connected to the Indiana Harbor Ship Canal and the Grand Calumet River. Other surface water features in the area include Lake George, which is hydraulically connected to the Lake George Branch of the Ship Canal, and the Marquette Lagoons, which are the upstream end of the Grand Calumet River. Water from the Grand Calumet River and Indiana Harbor primarily flow towards Lake Michigan, though episodic flow reversals due to seiche conditions occasionally occur. The Indiana Harbor Canal has a direct hydraulic connection to other surface water features, including the Lake George (which is connected through a series of drainage ditches and culverts via the harbor's Lake George Canal) and the Marquette Lagoons. Other surface water features in the area do not have a direct connection to Lake Michigan, however an indirect hydraulic connection through groundwater resources may exist.

2.4.1 Surface Water Quality

All of the surface water features in the project area are considered impaired and are listed on the Indiana 303d list (IDEM, 2018a). Impairments include those listed in Table 1. In general, the impairments are related to historical discharges of waste, as well as current or historical discharges of stormwater and combined sewer overflows. In spite of the impairments, Lake Michigan is considered a significant natural resource. It is the main source of drinking water for all of the communities in the area, and supports a diverse biological community.

Table 1: Impairments for Surface Waters in the Project Area

Water Body	Impairments
Lake Michigan (nearshore)	E. Coli Mercury in Fish Tissue PCBs in Fish Tissue
Indiana Harbor Canal	Biological integrity Oil and Grease PCBs in Fish Tissue E. Coli
Grand Calumet River	Oil and Grease Free Cyanide PCSs in Fish Tissue Dissolved Oxygen Biological Integrity Ammonia E. Coli Nutrients
Marquette Lagoons	PCBs in Fish Tissue
Lake George (Hammond)	PCBs in Fish Tissue

2.4.2 Sediment Quality

Sediment quality within the Indiana Harbor is generally poor, with elevated concentrations of metals, volatile and semi-volatile organics, polychlorinated biphenyls (PCBs), nutrients, and other contaminants. As documented in the original Environmental Impact Statement and Comprehensive Management Plan (CMP) (USACE, 1999), historical contamination of the sediments has been largely influenced by adjacent activities and nearby land use. Industrial discharges, spills, groundwater seeps, and sewerage discharge has impacted sediment quality. Impacted sediment within the Indiana Harbor system has the potential for resuspension and transport to Lake Michigan. Sediment and water quality in Lake Michigan is generally considered high quality, and sediment transported from the Indiana Harbor system is quickly diluted when transported out of the harbor (USACE, 1999), nonetheless legacy sediment contamination increases contaminant mass within Lake Michigan. According to the CMP, approximately 100,000 – 200,000 cubic yards (CY) of sediment is transported to Lake Michigan each year through bedload and suspended sediment transport (USACE, 1999). This volume has likely reduced since the estimates were first developed, however a revised regional sediment model has not been developed.

2.4.3 Existing Dredging Program and Surface Water Resources

Between 1972 and 2012, no dredging occurred within Indiana Harbor due to the absence of disposal locations for the contaminated sediments. In 2012, USACE resumed dredging of the federal channel, removing the legacy sediment contamination for placement within the newly constructed CDF. Dredging created a deeper draft channel which could act as a sediment trap and collect a greater fraction of sediment from upstream sources. Thus dredging of the backlog material serves to remove a portion of the historically contaminated sediment within the canal while impounding more recent (and less impacted) sediment from current upstream sources. Newly deposited sediment is expected to be significantly less contaminated, due to changes in environmental laws, industrial discharges, land use practices, and improved sewerage systems since 1972.

Although the dredging project is anticipated to ultimately reduce contaminated mass within the canal, as well as resuspension and transport to Lake Michigan, minor and localized sediment resuspension occurs in the vicinity of dredging operations. According to the original CMP, total suspended solids may increase by 50 – 500 mg/L in the immediate vicinity of the dredge, with most of the particles settling out within 800-feet of the dredge (USACE, 1999). To ensure minimal resuspension impacts, USACE monitors turbidity levels 600-feet upstream and downstream from the barge and requires the contractor to prevent or mitigate sediment resuspension due to dredging activities. USACE determines suspended solid concentrations and calculates the volume of sediment which was resuspended due to dredging and which may have been transported to Lake Michigan. The results are tabulated in an annual report submitted to Indiana Department of Natural Resources (IDNR) each dredge year. A summary of suspended solids concentrations measured upstream and downstream of the dredge, as well as the estimated dredge contribution for all dredging events since 2012 are shown in **Figure 4**, below. As shown by the figure, suspended solids concentrations reduce significantly within 600-feet of the dredge, and results are well below the values anticipated within the CMP.

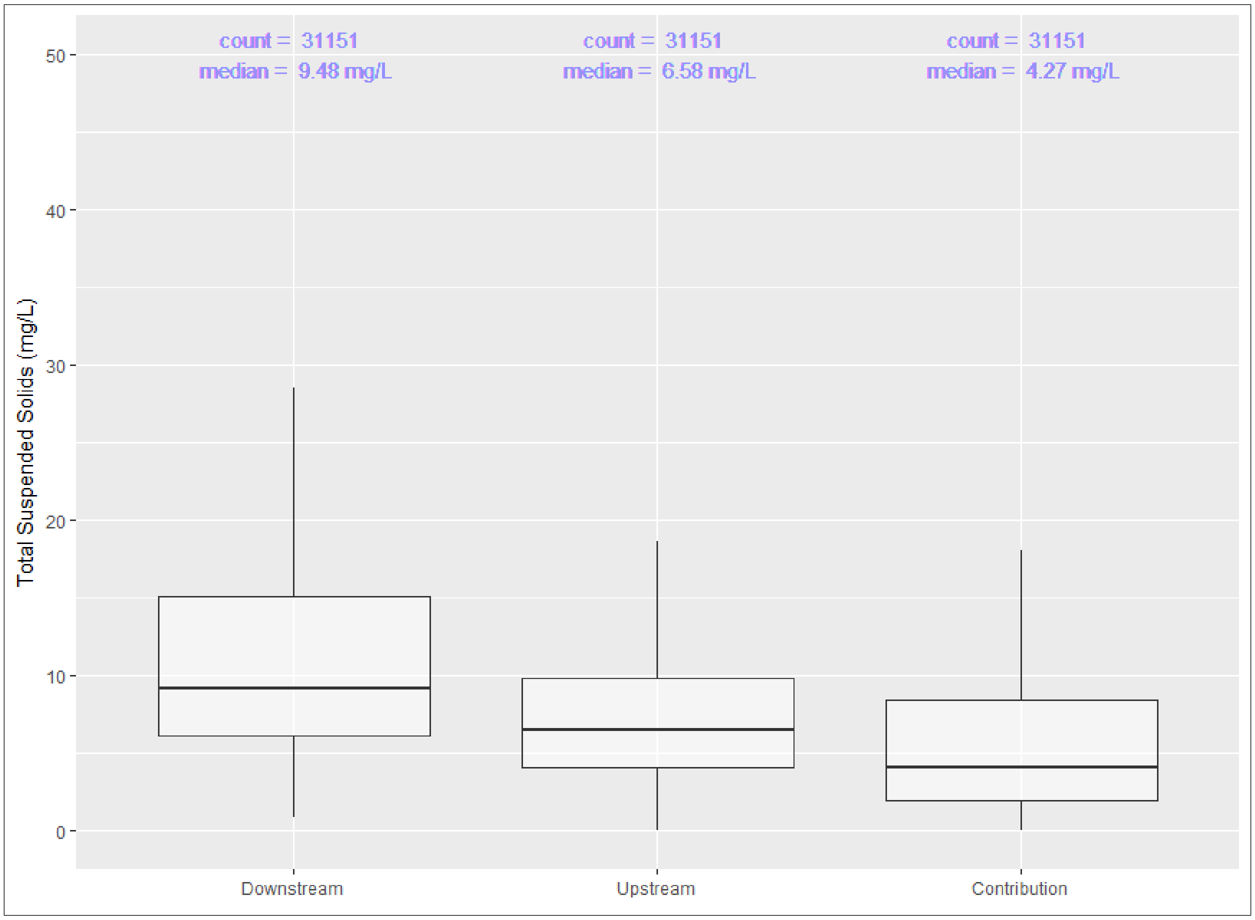


Figure 5: In-Stream Water Quality Monitoring during Dredging (2012-2018)

2.5 Fish and Wildlife Habitats

Indiana Harbor is a manmade channel with sheetpile or retaining walls for much of the shoreline. The channel itself is dredged "edge to edge" so that few if any shoaled areas exist. Within the navigation channel proper, there is essentially no fish or wildlife habitat.

The CDF site is a highly degraded property that has been covered with the working CDF features, including roads, buildings, the containment dikes, wells, lighting, and mowed lawn areas. There is no natural environment remaining on the site and there are no trees. Regardless, migratory birds, in particular, and other wildlife can be attracted to the open pond and to the mowed grass areas. Wildlife and birds are not desired at the CDF for multiple reasons. The USACE has hired the US Department of Agriculture Wildlife Services (USDA) to monitor and deter wildlife at the site. USDA practices bird harassment to prevent birds in particular from visiting or inhabiting the site. For the December 2019 report, 8 bird species were noted on site, with a total of 43 individuals present. Active harassment included patrolling the site, use of pyrotechnics and use of a remote controlled air boat. The harassment activities focused on the most prevalent species: Canada Goose, Bufflehead, and Ring-billed Gull. (Escobedo. 2019) This is a typical low wildlife presence for the season; the presence of birds exhibits a seasonal variation, with more birds present in warmer and migratory periods.

In addition to bird harassment, the CDF is fenced on the landward sides. Fencing includes buried sections to prevent burrowing. The water side of the CDF is not accessible by wildlife (except birds) due to the height of the land above the water. Although rodents are sometimes encountered on the site, no deer, wild dogs, foxes, coyotes, or other larger urban mammals inhabit the site.

2.6 Threatened and Endangered Species

The United States Fish and Wildlife Service (USFWS) issued a Biological Opinion statement in 1996-98 regarding the effects of the Indiana Harbor and Canal Dredging and Disposal project on the peregrine falcon (*Falco peregrinus*), a species federally listed as endangered. The USFWS "made the determination that the project is not likely to jeopardize the existence of this species." The Opinion recommended conservation measures to minimize the short-term impacts of the project and acknowledged the project's long-term environmental benefits to the canal, harbor and adjacent lands and the wildlife that utilizes those habitats. The initial findings of the USFWS were included in the Final Environmental Impact Statement for the project. The CDF site is in the range of two listed bat species. Both the northern long eared bat (*Myotis septentrionalis*) and Indiana bat (*Myotis sodalis*) have home ranges that include the area of the CDF. There is no suitable habitat within the project site for the northern long ear bat or the Indiana bat. Therefore, neither species is expected to occur within the project site.

2.7 Recreational, Scenic, and Aesthetic Resources

The project area is heavily industrial and highly developed. Features adjacent to the ECI site include a petroleum refinery, a major railroad, a highway, chemical processing companies, a major roadway, and several former industrial properties undergoing remediation. The land is flat and contains no notable natural features. Within the community, small parks provide greenspace, however no parks are located adjacent to the CDF. The IHC is not used for recreational purposes, although subsistence fishers sometimes use a stormwater channel across the canal for access. The exterior of the CDF is a grassed berm, with few features. Overall, there are few recreational, scenic, or aesthetic resources near the project area.

2.8 Cultural Resources

The Indiana SHPO was consulted during the development of this site and it was determined that no historic properties would be affected by construction of the CDF (USACE Chicago District 1999). Since that time, the site has been extensively developed and converted to use as the CDF.

2.9 Air Quality

Air quality in a given location is described in terms of concentrations of various substances in the atmosphere known as "criteria pollutants," expressed in units of parts per million (ppm), milligrams per cubic meter (mg/m^3), or micrograms per cubic meter ($\mu g/m^3$). Air quality is influenced by the type and amount of pollutants in the atmosphere, the size and underlying topography of the air basin, and local and regional meteorological conditions. The significance of a pollutant concentration is determined by comparison with federal air quality standards. The USEPA has established the NAAQS (Table 2).

NAAQS are divided into two sets: primary and secondary. Primary standards are based entirely on public health considerations. Secondary standards protect public welfare, addressing damage to soils, water, crops, vegetation, man-made materials, domestic animals, wildlife, weather, visibility, climate, property, transportation, and human health and comfort. NAAQS include maximum concentration levels for six criteria pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM10), and lead (Pb). The standard was developed for PM10 after it was established that only particles of less than 10 microns in diameter are capable of entering small passages in lungs. There is also a standard for PM2.5 (particulate matter less than 2.5 microns in diameter).

Lake County, Indiana, has a history of air pollution issues due to the industrial activities and proximity to the City of Chicago, Illinois. Lake County is currently in serious non-attainment for the 8-hour Ozone standard. The county has previously been non-attainment for particulates, sulfur dioxide and carbon monoxide. Currently the county has a maintenance status for those constituents. (USEPA. 2020)

Table 2: National Ambient Air Quality Standards (NAAQS)

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		Primary	8 hrs	9 ppm	Not to be exceeded more than once per year.
			1 hour	35 ppm	
Lead (Pb)		Primary and Secondary	Rolling 3 month average	0.15 µg/m³ (1)	Not to be exceeded.
Nitrogen Dioxide (NO_2)		Primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
		Primary and Secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O_3)		Primary and Secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.
Particle Pollution (Particulate Matter, PM)	PM2.5	Primary	1 year	12.0 µg/m³	Annual mean, averaged over 3 years.
		Secondary	1 year	15 µg/m³	Annual mean, averaged over 3 years.
		Primary and Secondary	24 hours	35 µg/m³	98th percentile, averaged over 3 years.
	PM10	Primary and Secondary	24 hours	150 µg/m³	Not to be exceeded more than once per year on average over 3 years.
Sulfur Dioxide (SO_2)		Primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
		Secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year.

* Source - Clean Air Act, Title 42 U.S.C. Section 7401-7671, USEPA Website, September 2019

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m³ as a calendar quarter average) also remain in effect.

(2) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a State Implementation Plan (SIP) call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required NAAQS.

2.10 Noise

Noise is defined as unwanted sound or, more specifically, as any sound that interferes with communication, is intense enough to damage hearing, or is otherwise annoying. (Federal Interagency Committee on Noise. 1992.) Human response to noise varies according to the type and characteristics of the noise source, distance between the noise source and the receptor, sensitivity of the receptor, and time of day. Due to wide variations in sound levels, sound is measured in decibels (dB), which is based on a logarithmic scale (e.g., 10-dB increase corresponds to a 100-percent increase in perceived sound). Sound measurement is further refined by using an A- weighted decibel scale (dBA) that emphasizes the range of sound frequencies that are most audible to the human ear (between 1,000 and 8,000 cycles per second). *Table 3* identifies typical noise levels associated with common indoor and outdoor activities and settings.

Table 3: Sound Levels of Typical Noise Sources

Activity	Sound Levels (dBA)
Normal breathing	10
Whispering at 5 feet	20
Soft whisper	30
Rainfall	50
Normal conversation	60
Vacuum cleaner	60 – 85
Power lawn mower	65 – 95
Tractor	90
Snowmobile	100
Ambulance Siren	120
Chain saw	125
Jet engine taking off	150
Artillery fire at 500 feet	150
Fireworks at 3 feet	162
Handgun	166
Shotgun	170

Source: Center for Hearing and Communication, 2019.

IHC CDF exists in an urban – industrial area, adjacent to transportation facilities (roads, railroads and shipping canals), large industrial operations, and open lands undergoing remediation. Heavy traffic has a sound level of approximately 85 dBA; industrial operations (such as within a factory) often have sound levels at or above 85 dBA. Urban ambient noise levels vary widely but may typically be in the range of 45 -90 dBA, with lower values found during night hours and in more residential areas. A noise study has not been conducted at the IHC CDF, however it is expected that background noise levels are in the typical range for urban areas, mostly due to the impact of traffic adjacent to the facility.

2.11 Hazardous, Toxic, and Radioactive Waste (HTRW)

The ECI property was the location of a petroleum products refinery from 1918 to 1981. Peak production was approximately 140,000 barrels per day. The project parcel, termed the main refinery, contained the principal production area and also included storage, a marine loading area, rail loading areas, insecticide manufacturing, truck docking facilities, and an American Petroleum Institute (API) separator. The refinery operations included the production of mineral spirits, propane, leaded and unleaded gasoline, fuel oil, kerosene, asphalt and asphalt products, liquefied petroleum gas, grease, lubricating oils, paraffin wax, phenols, and sulfur. Between 1940 and 1958, pyrethrum extract of dried heads of certain varieties of chrysanthemums was filtered on site. The filtered extract was combined with kerosene and used as an insecticide base to produce insecticide. The maximum annual production of insecticide base occurred in 1944 when 49,359 barrels were produced. This accounted for 0.26 percent of the total plant annual throughput.

Former owners of the project site include Sinclair from 1918 to 1968, Atlantic Richfield Company (ARCO) from 1968 to 1976, and ECI from 1976 to 1981. In 1981, ECI filed for bankruptcy; in the late 1980s, all buildings and aboveground structures were razed in response to a court order; below ground features were not removed. Several inches of clean topsoil were graded to cover the site, however the site was not remediated and the fill placement was not sufficient to meet the definition of a “cover” for any regulatory programs.

A hydrocarbon layer has been intermittently encountered during groundwater monitoring activities since the beginning of site investigations in 1991. In 1991, oil was discovered to be seeping into the canal. An oil recovery system was installed along the north bank of the canal (the south edge of the CDF site); the system was in operation from 1992 – 1998 and recovered approximately 2700 gallons of free product. Free phase oil is periodically observed in the current on-site gradient control system extraction wells, however those wells are designed and operated to minimize the entrainment of oil. Based on past samples, the oil at the ECI site may contain high concentrations of polychlorinated biphenyls (PCBs), pesticides, and lead.

2.12 Socioeconomics and Environmental Justice

Executive Order 12898 of 1994 directs federal agencies to identify and address any disproportionately high adverse human health or environmental effects of federal actions to minority and/or low-income populations, which the DoD implemented through the Department of Defense’s Strategy on Environmental Justice of 1995.

Minority populations are those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, and Pacific Islander. A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population.

EO 12898 does not provide criteria for determining whether an area consists of a low-income population. For the purpose of this assessment, the Council on Environmental Quality (CEQ) criteria for defining a low-income population has been adapted to determine whether a minority population occurs in the watershed. A low-income population exists within a given geographic area where:

- The percentage of low-income households is at least 50% of the total number of households
- The percentage of low-income households is meaningfully greater than the percentage in the general population or other appropriate unit of geographic analysis.

Based on 2019 standards, a family of four with an income less than $26,200 is considered “low-income.” The Census Bureau defines a “poverty area” as a Census tract with 20 percent or more of its residents below the poverty threshold and an “extreme poverty area” as one with 40 percent or more below the poverty level. This is updated annually at https://aspe.hhs.gov/poverty-guidelines. Localized comparisons of socioeconomic data related to the alternative plans developed during this study are included in Section 4.10.

2.13 Design changes from initially proposed project

Since the time of the original design, numerous changes have been made to the CDF. The most significant changes are described below. These changes have been previously documented in design decision memoranda and design reports.

2.13.1 Hydraulic Off-loading

The original design documents (CMP and DDR) assumed mechanical dredging and mechanical placement for sediment handling. These are commonly used methods for sediment handling on the Great Lakes; experienced contractors and suitable equipment are readily available. Mechanical handling has the advantage of entraining less water, so that sediment can be dried and consolidated more quickly. For contaminated sediment, any water entrained with the sediment requires treatment, so less entrainment of water during dredging also reduces water treatment needs and costs. However, mechanical dredging is typically not favored by the public, who equate hydraulic dredging (below the water surface and unseen) as a “cleaner” operation.

In 2003 – 2004, USACE asked the Engineering Research and Development Center (ERDC) to compare mechanical and hydraulic dredging and placement. This analysis included the use of recirculated water for hydraulic placement, and an analysis of the effects of the decision on other design features. The information was documented in two reports (Estes et al. 2003; Estes et al. 2004) and a decision memorandum. (USACE. 2004) Based on these analyses, it was determined that the most effective method for dredging and placement of sediment into the IHC CDF is mechanical dredging with hydraulic off-loading using recirculated water. This unusual approach has several advantages for the IHC project:

Minimizes entrained water by use of mechanical dredging
Readily available equipment and contractors for mechanical dredging
Minimizes total volume of water requiring treatment by recirculating off-loading water
Fast off-loading using hydraulic placement
Ability to place sediment in the center of the large facility
Limited human contact with contaminated sediment

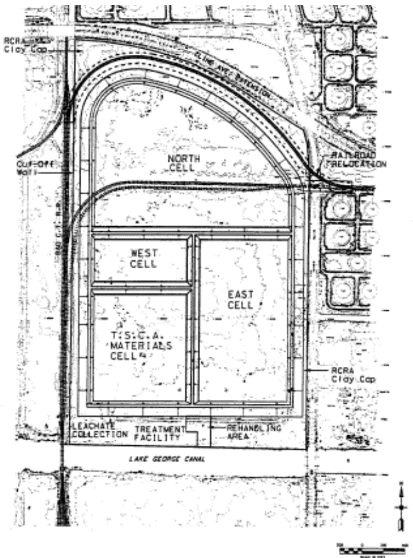
Based on a cost analysis, the approach also is cost effective compared with mechanical placement methods, especially for such a large facility and when the sediment is heavily contaminated (which requires additional worker safety and monitoring costs). The IHC CDF has been operating since 2012 using mechanical dredging with an environmental (closed) bucket, followed by hydraulic sediment placement in the CDF using recirculated water.

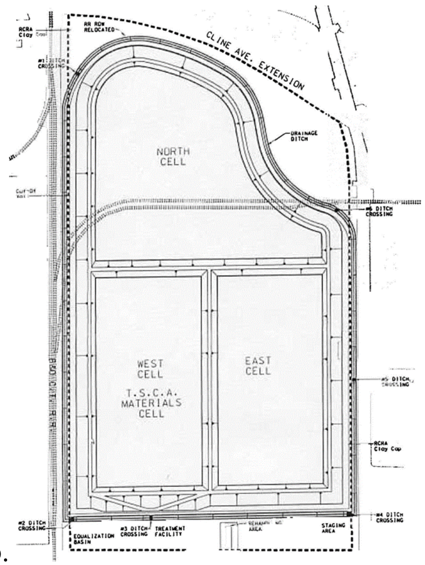
2.13.2 Configuration of Dikes and Decant Structures

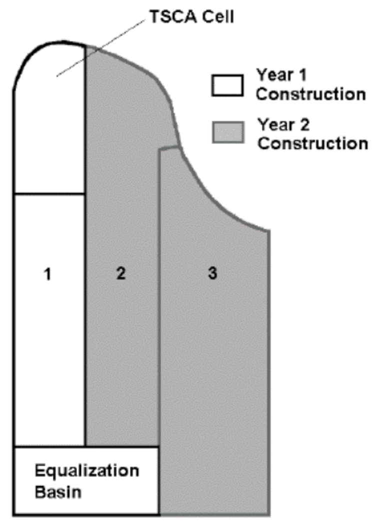
CDFs are typically designed to hold and manage dredged sediment. A major consideration for sediment management is dewatering and consolidating the material in the CDF (Palermo et al. 1978). For these purposes, CDFs typically have multiple interior cells separated by earthen dikes. These dikes allow separation of the material for placement and dewatering, and also provide access to the interior of the CDF. Following a typical approach, the original design of the CDF included several separate cells. As the dredging and placement methods were evaluated over time, the proposed interior dike configuration was changed to be consistent with the proposed operation. The final decision of hydraulic placement with a ponded operation dictated the configuration that exists now: two interior cells separated by a center dike which is lower in elevation than the exterior dikes, and is topped by an access road. Figure 5 shows the evolution of interior configurations considered for this project.

The current configuration is the simplest configuration, with two cells separated by a center dike (Figure 6). Each cell has a separate decant structure for dewatering. This simple configuration was determined to be most effective for a ponded operation (see Section 2.13.3). The existing center dike was constructed partially from debris from the site (railroad ties), to make the most efficient use of the space within the exterior dike. The center dike is lower than the exterior dike to allow for overtopping if needed, and exchange of water between cells. (The CDF is currently operated such that the center dike is not overtopped.) A gravel road surface was placed on the top of the center dike to facilitate equipment access, however due to the construction of the dike, only equipment exerting 500 pounds per square foot or less (roughly equivalent to a pickup truck) is allowed on the center dike. Currently the center dike is used for staging piping for hydraulic placement of the sediment, and thus is not accessible for other equipment.

The configuration for the interior dikes and the number and placement of the decant structures for the facility was documented in a series of memos. Each decision reflects the sediment management plan at the time; this plan has changed and will likely continue to evolve over time. Decision documents that discuss the interior dike layout and/or decant structures include USACE, 1999; USACE, 2000; Estes et al., 2003; Estes et al., 2004; USACE, 2008; USACE, 2009; USACE, 2010. The TSCA regulated sediment, including the cell design for the TSCA sediment, is discussed further, below.

a. 

b. 

c. 

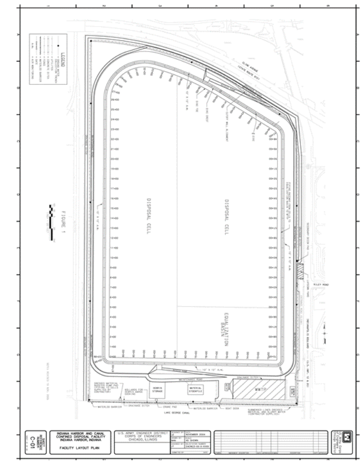
d. 

Figure 6: Past Interior Configurations Considered for IHC CDF

a. 1999 CMP

Mechanical dredging and placement

Separate TSCA sediment sub-cell

b. 2000 DDR

Mechanical dredging and placement

TSCA sub-cell combined into one larger sub-cell for simplicity of design

c. 2003 Dredging and Disposal Alternative Analysis

Mechanical dredging and placement

TSCA sub-cell moved to corner farthest from High School

Multiple sub-cells to facilitate dewatering

d. 2004 Dredging and Disposal Alternative Analysis

Mechanical dredging and hydraulic placement using recirculated water

Separate cell for water collection and handling

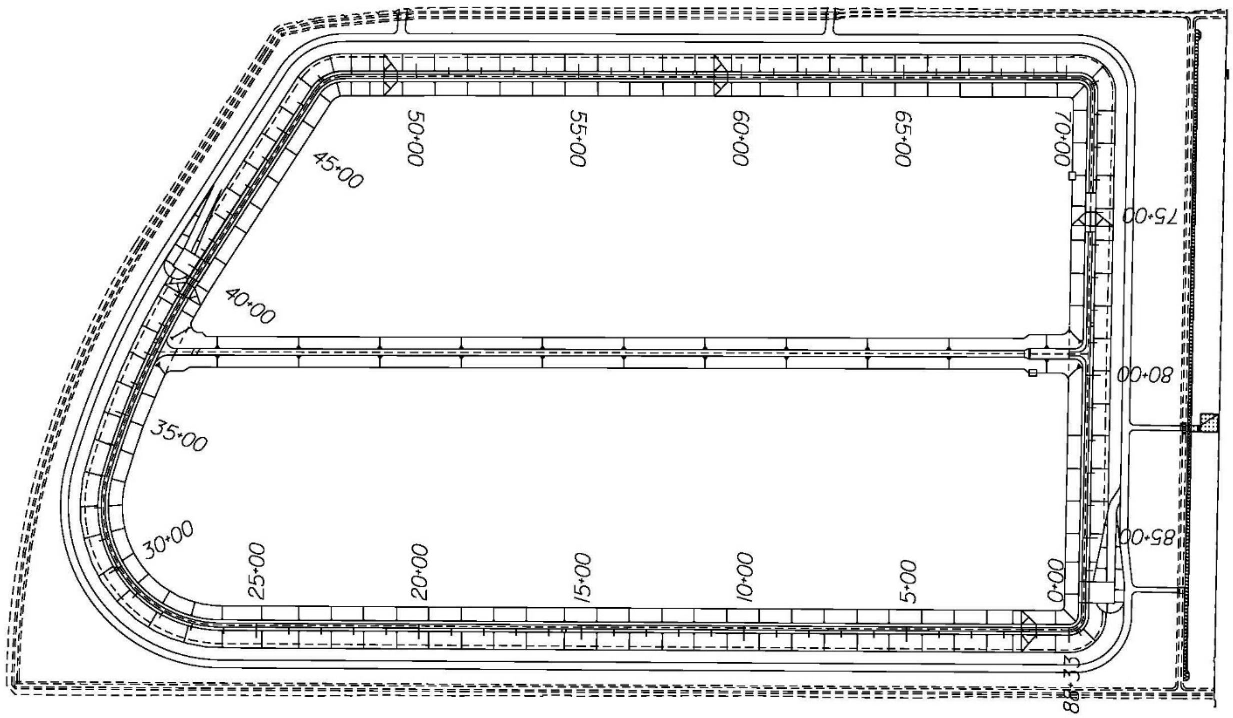


Figure 7: Current IHC CDF Interior Cell Configuration Mechanical dredging

Hydraulic placement using recirculated water
Ponded CDF year round
Water treated seasonally on site
Water pumped from decant structures in each cell

2.13.3 Ponded Operation and Wastewater Treatment

A decision was made in 2008 (USACE. 2008) to operate the Indiana Harbor and Canal Confined Disposal Facility as a two cell ponded facility without complete dewatering of the dredged material between dredging seasons. The primary basis of the decision is the reduced particulate and volatile emissions from the CDF when there is a water layer over the dredged material placed in the CDF. The accumulated water is also useful for the slurrying and hydraulic movement of mechanically dredged material into the CDF cells.

After the decision was made to change the operation of the CDF from drained cells to ponded cells, seasonal treatment of the CDF pond water (a combination of collected groundwater, dredge water, and precipitation) became a possibility. Water could be allowed to accumulate in the CDF cells during the non-dredging periods, when some contaminants in the water may be removed due to processes that would naturally occur in ponds, and treatment could take place when capacity is required for additional sediment placement or when water levels approach CDF pond maximum allowable limits.

An evaluation was made to compare two different water treatment alternatives: a permanent plant versus a package plant. (MWH. 2009). The permanent plant, which was the option presented in the original EIS, would consist of equipment to treat water to meet the site NPDES permit discharge limits prior to discharge to the Canal, that would be owned and operated by USACE over the course of the project. The package plant would consist of vendor owned and operated equipment capable of treating the anticipated influent to meet the NPDES permit discharge limits that could be removed from the site when not required.

Evaluation criteria for the two treatment plant options included capital and O&M costs, operational flexibility, contracting requirements, and potential risks of both options. Based on the priority of operational flexibility as the most important criterion, the package plant option was selected as the preferred alternative (MWH. 2009). Both treatment plant options were required to effectively treat the CDF water to meet all NPDES permit discharge limits, therefore, selection of the package plant does not have any environmental impacts.

A package plant for CDF pond water treatment was installed and started operating in 2015 by a contractor. The same contractor was awarded a contract in 2016 to continue operating the plant. The treatment plant is operated on a seasonal basis, generally before the dredging season. The current contractor opts not to demobilize and re-mobilize the treatment plant to the site between treatment periods, and therefore the plant remains on site when not operating. The current contract ends in 2021, and the plan is to award another contract for the continuation of water treatment at the site when this contract ends.

2.13.4 TSCA Regulated Sediment

A small portion of the contaminated sediment backlogged in the IHC was identified prior to the start of dredging as containing PCBs in concentrations greater than 50 mg/Kg. (USACE. 1999) These materials are regulated under the federal Toxic Substances Control Act (TSCA). To better define the location and extent of these sediments, a focused sampling event occurred in 2006. (USACE. 2007) Consistent with past sampling, it was found that the elevated PCB sediment was deeper in the channel and was located in discrete pockets in two portions of the canal. Two very small pockets identified in Reaches 6 and 7 of the channel; these materials were located near the walls of the channel, outside the main navigational area. A number of pockets were identified in Reach 13, which is the upstream end of the Calumet River Branch of the channel, and is the connection to the Grand Calumet River. Figure 7 shows the locations where elevated PCB levels were found.

The volume of TSCA regulated sediment was a difficult item to determine. Technically, only the sediment that has PCB concentrations greater than 50 mg/KG is regulated under TSCA. In practice, anything that is mixed with this sediment also would become TSCA regulated. Dredging sediment is not a precise activity, and to ensure that all TSCA regulated sediment were removed, additional material around it must be removed. Since the TSCA regulated sediment was found at deeper levels, the regulated quantity would include any sediment above the TSCA material that was removed with the TSCA material. For this reason, the estimated volume of TSCA sediment varied widely over the course of the project design. The typical estimate used for design purposes was 60,000 CY, which included a large amount of sediment with PCB concentrations far less than 50 mg/Kg.

USEPA conducted sediment sampling in 2018 to more accurately delineate and estimate the volume of TSCA sediment in the IHC for their own focused Feasibility Study. (USEPA. 2018a). The 2018 USEPA TSCA sampling confirmed previous findings by USACE, but resulted in a reduction of the delineated lateral extent of the TSCA sediment and reduced the estimated volume of TSCA sediment. The USEPA 2018 sampling data was used to finalize the areas for the TSCA dredging.

The final design decisions related to the TSCA sediment are documented in a design memorandum. (USACE. 2010) It was originally assumed that by confining TSCA-regulated sediment in a smaller interior cell only that cell would be regulated by USEPA. But USEPA's approval was for the entire facility with the exterior dikes serving as the main containment feature. The TSCA sub-cell was a convenient feature to isolate the more contaminated material, even though such segregation was not strictly necessary. As a result of the hydraulic placement and ponded operation decisions, discussed above, the sizing of the interior dikes was re-evaluated. Due to water handling, the size of sub-cell needed for the TSCA material placement was essentially one half of the interior. Based on this, the decision was made to eliminate the TSCA sub-cell. However, in an effort to minimize impacts from the placement of the material, the TSCA placement area was chosen to be the slightly smaller East Cell.

Based on the sediment sampling (USACE. 2007), sediment with elevated PCB concentrations exists within and below the authorized dredging prism. That is, below the authorized dredging depth of -22 low water datum (LWD). USACE is only authorized to remove sediment within the authorized channel plus up to 2-feet of overdepth for practical reasons. Based on this, any sediment with elevated PCB concentrations below -24 LWD would be left in place. This is considered to be acceptable over the long term, since the Calumet River branch of the channel in particular is a shoaling area; it is expected that the dredged area will fill in over time and that cleaner sediment will shoal above those areas. The buried materials would remain in place and are unlikely to be disturbed by navigation or point discharge flows to the canal. However, the removal of overburden would create one condition that required mitigation: dredging would expose the high PCB sediment to the water column, which could result in pollution migration into the larger environment. To mitigate for this situation, USACE designed a cap for those areas where TSCA regulated sediment would be removed. (USACE. 2010) The cap was placed below the authorized dredging depth, so that future navigational maintenance would not disturb the areas.

The disposal of materials with PCB concentrations greater than 50 mg/Kg is regulated under TSCA. A permit or approval is needed for TSCA disposal facilities. USACE applied for and received a Risk Based Approval for placing regulated sediment from the IHC into the IHC CDF from USEPA. (USEPA. 2018b)

A decision was made to encapsulate the TSCA regulated material within the CDF, during the same season that the sediment was dredged. (USACE. 2010) This has the effect of isolating the sediment from the ponded water, and lowering the potential for PCB emissions. The TSCA regulated sediment was placed in the center of the East Cell in 2019, and was covered with additional sediment the same dredging season. The total volume of TSCA regulated material plus associated unregulated sediment dredged at the same time was 19,593 CY. The areas of the canal where TSCA regulated sediment was removed were capped immediately following dredging.

Figure 8: Locations of Sediment with PCB concentrations greater than 50 mg/Kg

2.13.5 Non-Federal Dredging Areas

The 1999 EIS identified dredging areas for sediment that would be placed in the IHC CDF. These areas included the federal navigational channel limits for Indiana Harbor and Canal, including overdepth and sloughage, and areas near Inland Steel governed by a consent decree. Inland Steel is now Arcelor-Mittal, however the consent decree areas that were identified to be dredged are the same as previously identified. These areas included dock faces in Reaches 3, 4, 5, 6, and 7, and an area not directly adjacent to the channel in Reach 3. This work has been on-going (the federal channel dredging as well as the consent decree areas). The original EIS also included dredging at other dock face areas along the canal, however to date none of this work has been completed.

In addition to the originally identified dredging areas, two other dredging opportunities outside of the federal channel have been identified. (Figure 8) The first one, referred to as the “LTV area” because it is adjacent to the former LTV Steel works, is outside the channel but adjacent to the turning basin in reach 4. A small wall structure juts out from the dockface on either side. Sediment has collected along this wall area. It is not a mooring area for boats, however dredging in the federal channel has resulted in a steep bank of shoaled sediment. It is inevitable that at least some of this material will eventually slough into the turning basin, creating a navigation obstruction. For this reason, the sediment was identified as a "strategic dredging opportunity". That is, the sediment could be removed before it sloughs into the federal channel and a navigation issue could be prevented. An estimated 200,000 CY of sediment is shoaled in the area and could be removed by dredging. Sediment in the LTV area was characterized in 2017. The sediment quality was found to be very similar to the material already dredged from the turning basin. Pollutants include metals, anthropogenic organic compounds, PCBs. No TSCA regulated sediment was found.

The second dredging opportunity area is located immediately upstream from the end of the federal channel in reach 12, the Lake George Branch. This area is also adjacent to the IHC CDF and is the dockface area for the property. Aside from traffic to the IHC CDF, this portion of the canal is not currently used for navigation. USEPA is leading several related projects that will remove potential upland sources of pollution and will restore the canal on the farthest upstream end. USEPA has requested that USACE dredge the Lake George area to navigation depth or less, to remove the backlog of contaminated sediment that exists in the area. The sediment was sampled in 2014 as part of an effort to characterize portions of the watershed that had not been addressed by previous dredging or restoration projects. Based on those results, the sediment in the Lake George area is of the same quality as the sediment already dredged in reach 12. The sediment is contaminated with oils, metals, and other anthropogenic pollutants. Although the material contains some PCBs, none of the sediment in this reach is regulated under TSCA. An estimated 75,000 CY of sediment could be removed from the channel and placed in the IHC CDF.

In all cases, sediment dredged from new areas would be handled in the same manner as material from the federal channel, for dredging and for placement. The dredging of these identified areas is presumed to be a single event, rather than an on-going, repeated maintenance activity over the years. In the event that other areas, including dock faces along the federal channel, are identified as potential dredging locations, USACE would follow the same protocol as for the identified dredging areas. That is, sediment would be characterized following the Great Lakes Testing Manual or other current guidance. Sediment that is characteristically hazardous under RCRA may not be placed in the CDF. Sediment that is regulated under TSCA may be placed in the CDF, however a modification of the current risk-based approval would be needed from USEPA prior to such action. Air emission estimates, dredging permits, or any other applicable regulatory requirements must be fulfilled prior to dredging. Funding must be in place, including any real estate or other project cooperation agreements. All sediment would be handled (dredged and placed) in the same manner as material from the federal channel.

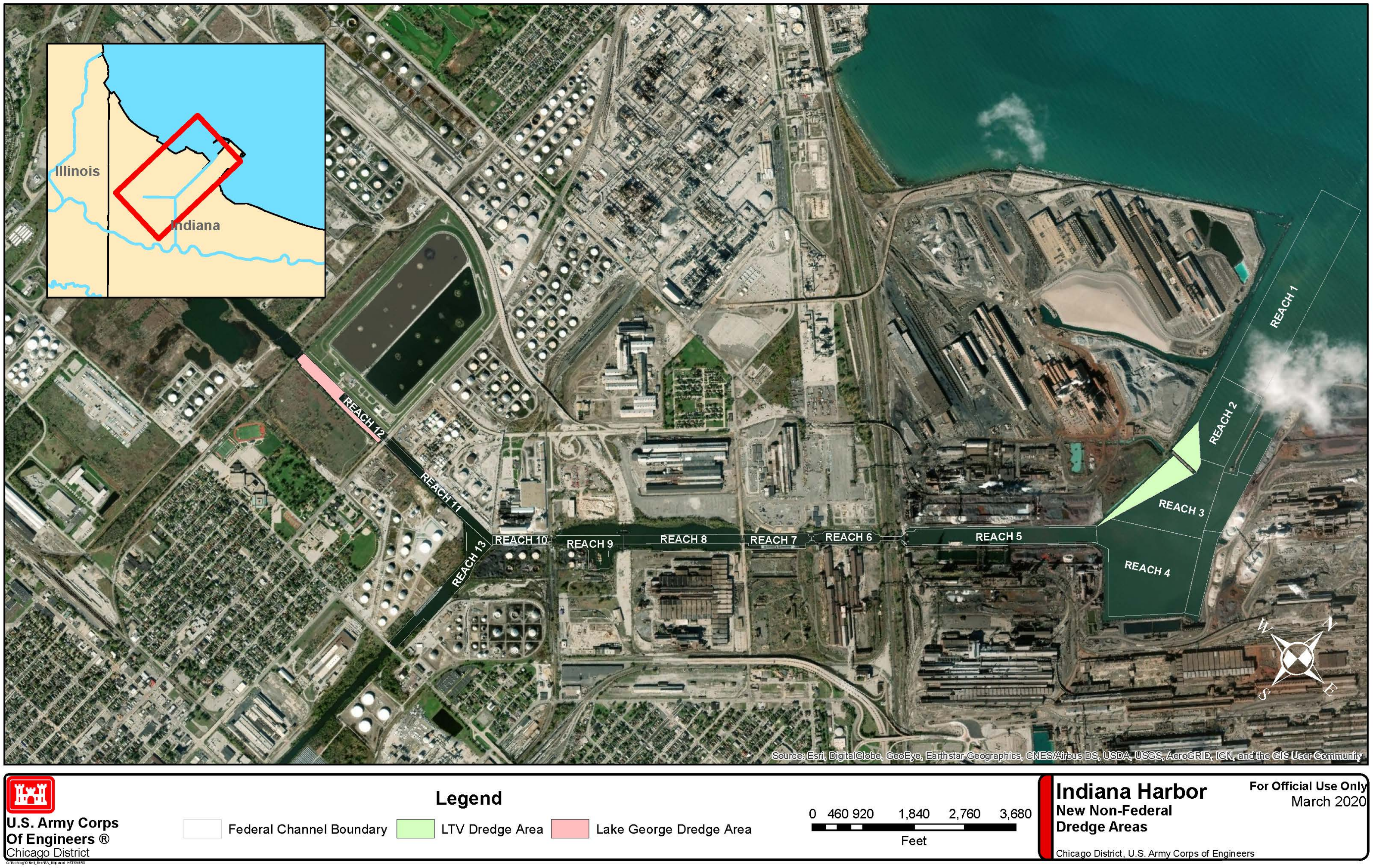


Figure 9: Identified Additional Dredging Areas

2.13.6 Additional buildings on site and site layout to support operations

As part of the CDF operation, offices, storage spaces, and other work spaces were identified as project needs. These features are located on the south side of the CDF. Features include an Administration Building, two storage buildings, a storage shed, and associated parking lots. The Administration Building is a 4000-sf frame structure on a concrete slab with crawlspace complete with office space, kitchen, information technology room, security/control room, lab, storage room, locker rooms, conference room, and accessible bathroom to support the daily functions of USACE staff. There are slab-on-grade East and West Storage Facilities, 1500-sf and 3600-sf respectively. Both store equipment, tools, chemicals, and supplies necessary to repair, operate, and maintain the disposal facility. There is also a 180-sf Storage Shed that houses gradient control stock parts and miscellaneous site equipment. Gravel and bituminous parking lots and driveways connect to the main ring road at the site. Refer to Figure 9 for site location of these structures.

Figure 10: Building Location Aerial

2.13.7 Parkway Improvements

Parkway Improvements work has been conducted to enhance security features and the appearance of the site along Indianapolis Boulevard. The work consists of replacement of a chain link fence with a precast concrete wall along the eastern property limit parallel to Indianapolis Boulevard, and along the northeastern property limit parallel to Cline Avenue. Anti-dig guards of metal rod grid are installed along the remaining existing perimeter fence. The work also included replacement the two site entrance gates along Indianapolis Boulevard with a high security automated metal slide-glide gate and upgrading the access control. The sidewalk and pavement adjacent to the site east fence are replaced as part of this project. The parkway improvements construction activities started in 2019 and are anticipated to be finished in 2020.

2.13.8 Dam Safety

With the changes to hydraulic offloading of sediment and operating the CDF with a water cover at all times for air emissions control, the water and un-dewatered sediment impounded within the CDF could liquefy and flow out in the event of a dike breach, similar to a mine tailings dam. As a result, the facility has been incorporated into the USACE Dam Safety Program in accordance with ER 1110-2-1156 and is included in the National Inventory of Dams (NID) with the identifier of IN04071. Originally classified as low hazard dam when impounded to less than 5-foot depth and later reclassified as significant hazard as the impounded volume increased, the facility was reclassified as high hazard in 2015 when inundation and consequence modeling indicated that there potentially could be loss of life in the event of a breach.

In addition to normal CDF operations and maintenance activities, the following dam safety activities are required:

1. Instrumentation monitoring - There are seven pairs of existing piezometers on and near the perimeter containment dike for monitoring the dam foundation for excessive seepage pressures. They are situated at the four corners and at the approximate mid-points of the east, south and west sides of the CDF. Each pair has a crest piezometer and a toe piezometer which are screened in the shallow sand aquifer at the site. Instruments consisting of pressure transducers and data loggers measure and record daily average water levels in each piezometer. In addition, pool levels as measured on the staff gauges on the two decant structures are reported for each disposal cell at least weekly.
2. Routine surveillance and monitoring – Facility staff are on the site almost daily and observe conditions around the dam. A weekly inspection is performed of the dam and data are collected from the piezometers. A report is prepared and generally issued quarterly summarizing the routine surveillance and monitoring observations, and summarizing groundwater levels from the dike piezometers and GCS monitoring well, and pool elevations.
3. Periodic Inspections (PIs) and Annual Inspections (AIs) – A PI is performed for the entire facility, including support features, by engineering staff representing the disciplines of geotechnical, environmental, hydraulics-hydrology, mechanical, electrical, structural, and civil. The first was performed in 2011 after completion of the current facility and before impounding operations began in 2012. Subsequent PIs were performed in 2012, 2014, 2015, 2017 and 2019. In years when no PI is performed, a less rigorous AI is performed and generally covers the dike, environmental systems and locations of known issues. These inspections are generally performed by a smaller inspection team usually consisting of a geotechnical engineer and an environmental engineer from the District.
4. Periodic Assessments (PAs) – A PA consists of a PI and a semi-quantitative risk assessment (SQRA). A PA report goes through an extensive review process within USACE to characterize the overall dam safety risk of the project. The risk characterization results are approved by the USACE Dam Safety Officer. The first PA for the project was performed in 2015 and included dam breach modeling, consequences assessment, screening qualitative risk assessment for potential failure modes and a PI. It was from this PA that the hazard potential classification of the project was changed to 'High'. While the hazard potential was raised to 'High' due to potential life loss consequences in the event of a breach, the overall project dam safety risk was determined to be 'Low'. PAs are generally performed every 10 years although the second PA for the CDF is planned sooner, after the dike expansion is completed. The findings of a PA will be used to re-classify the overall project dam safety risk.
5. Dam safety communications – An "Emergency Action Plan" (EAP) was prepared and is updated regularly to provide information about the dam, inundation maps from a breach based on modeling, and a phone tree for emergency notification of USACE personnel and local emergency responders.

6. Dam safety exercises – These are performed to test emergency preparedness of personnel and local authorities in the event of a dam safety emergency. They can range from testing the phone tree from the EAP to a full mock-up exercise with local responders.
7. Dam safety training - Site personnel, including contractors, are given dam safety training to raise their dam safety awareness of the project.

The CDF will remain a dam indefinitely, even if hydraulically offloading were no longer used and the pond for reducing air emissions were eliminated. The current impounded sediments and any additional sediments hydraulically offloaded into the CDF in the future will remain fluid-like indefinitely until sufficiently dewatered and consolidated to the extent sufficient shear strength is gained to resist flow if there were loss of confinement. Extensive geotechnical testing performed to evaluate the potential of the contained materials to flow. Determination that the CDF can be de-classified as a dam will likely be accomplished following a risk assessment as part of a PA.

3.0 Plan Formulation

3.1 Problems and Opportunities

3.1.1 Submergence of Existing Center Dike

Early designs for the IHC CDF features configurations included multiple sediment management cells (see **Section 2.13.2 – Dike Configurations and Decant Structure)**. CDFs with multiple cells allow for dewatering and settling to occur simultaneously as discharge of dredged material. Settlement and dewatering of sediment is necessary to maximize storage potential. Consolidated sediment 'bulks' in volume immediately after dredging; disturbed sediment traps excess porewater between individual particles causing the initial storage volume requirements to increase. Through settlement, consolidation, and desiccation, this excess water can be slowly removed from the sediments to reduce storage volume requirements. Active sediment management processes, such as trenching, grading, and pumping, can be used to accelerate dewatering to maximize storage benefits within a CDF. To fully maximize volume reduction through consolidation and desiccation, sediment must be allowed to dewater as much as possible before resaturation of sediment. Depending on a range of variables, it can be ideal to allow sediment to dewater for multiple years prior to placement of additional sediment. Constructing a CDF with multiple cells may allow for more frequent dredging events if sediment management cells are rotated through the disposal, settlement, and dewatering process. Multiple cells are not a requirement for successful operation of a CDF, however, and the Chicago District has operated the Chicago Area CDF with only one cell since 1984.

The initial IHC CDF designs included high annual dredging volume requirements, predominantly during the initial period when the 'backlog' of sediment which had accumulated between 1972 and 2012 was first dredged. The final Phase 1 dike design included two sediment management cells designed to handle over 300,000 cubic yards per year (USACE, 2000). This is approximately consistent with dredging volumes between 2012 and 2019 during backlog dredging. As the project transitions from dredging of backlog sediment to the maintenance dredging of new sediment, the annual dredging volume requirement will decrease substantially. From observations at recently dredged federal reaches, an estimated 75,000 to 100,000 cubic yards per year is expected during the maintenance dredging phase. To model the cell configuration necessary for the Phase 2 dike raise to accommodate maintenance dredging, USACE revisited the model utilized in designing the initial two-cell configuration. Under a variety of dredging scenarios, there was negligible sediment volume efficiency created through configurations with more than one cell. Due to the low annual volume requirements, sediment volume efficiencies could not be gained through alternating sediment management cells on an annual basis. Thus, only a single cell is necessary for sediment management considerations.

The CDF is currently operated as a ponded facility which reduces air emissions, including dust emissions and hydrophobic volatile emissions. Under ponded conditions, potential for consolidation is limited as dewatering cannot occur. The multiple cell configuration is instead used to enhance treatment capabilities through the settlement of solids, reducing treatment needs by allowing water to settle and evaporate in alternating dredging years. While the CDF is operated as a ponded facility, settlement efficiency can be maintained through a reduced frequency of dredging during the maintenance dredging phase. Alternating the dredge years (e.g., dredging 150,000 cubic yards every other year) instead of alternating disposal cells would also increase cost efficiency per cubic yard while also eliminating the need for multiple cells.

Sediment off-loading could be managed in a manner similar to the current hydraulic off-loading used currently. Instead of piping deployed along the center dike, it could be laid along the exterior dike with the discharge pipes leading into the center. Figure 9 shows an example of this. The layout for hydraulic off-loading is flexible and could be adjusted to fit the space along any exterior dike. Other off-loading methods, such as the use of floating platforms, would also be possible, as would mechanical placement from the exterior dike using a crane.

Environmental protectiveness considerations are unchanged for a single cell facility. Toxic Substance Control Act (TSCA) sediment was disposed in the east cell in 2019, however this sediment will be covered with at least 5-feet of non-regulated dredged material before the center dike is buried in-place. Additionally, water transfer between cells is periodically necessary to ensure balanced hydrostatic loading on the center dike, resulting in mixing of the pond water. Submerging the center dike eliminates this stability concern, and does not alter the current practice of pond water mixing between the disposal areas. Surface water will continue to be treated by the on-site wastewater treatment plant, and infiltrated water will continue to be extracted by the groundwater extraction system for treatment with the pond water.

Transitioning to a single cell facility would minimize construction and facility costs while maintaining equivalent CDF management efficiencies, safety considerations, and environmental protections. The center dike would remain but will not be raised along with the CDF perimeter dikes. The center dike would eventually be inundated as additional dredged material and water are added to the CDF in the future.

3.1.2 Site Methane

At the IHC site, petroleum hydrocarbon contamination exists in the subsurface soil, in groundwater, and as separate phase oil throughout the site subsurface. Petroleum hydrocarbons can be biodegraded readily under aerobic conditions. Aerobic biodegradation consumes oxygen and generates carbon dioxide and water, and proceeds until oxygen is depleted. The installation of various features at the site to control offsite migration of site contamination, including the perimeter slurry wall and sealed sheetpile wall, the clay cover outside the CDF dike footprint, and the dredged material disposed to the CDF cells, has likely hindered the transport of oxygen to the subsurface at the site. Under anaerobic conditions, biodegradation of hydrocarbons can occur given the availability of a hydrocarbon food source, nutrients, and adequate moisture content. Anaerobic biodegradation can generate significant volume of methane.

In a 2014 groundwater study at the IHC site, methane was detected in water samples from the gradient control system (GCS) extraction wells at concentrations ranging from 24.1 to 36.2 mg/L, and from monitoring wells ranging from 5.4 to 36.6 mg/L (USGS, 2018). Groundwater methane concentrations greater than 10 mg/L are an indication that methane concentrations may become a hazard. (IDEM, 2015). Methane was found in electrical local control panels (LCPs) at the site in 2016. In a study conducted by Federal Occupational Health (FOH) in October 2016, methane concentrations in one site electrical panel (LCP6) were measured above 10,000 ppm (above the monitoring instrument measuring range) (FOH, 2016). The LCPs are connected to below ground conduits/piping and likely were receptacles of gas generated in the subsurface as preferential pathways due to the presence of site features that hinder the vertical movement of gases to the atmosphere.

To control the methane movement to the LCPs, conduits which connect the electrical panel to below ground structures were sealed in 2017. FOH conducted gas measurements in 2017 and confirmed no methane in LCPs (FOH, 2017). USACE has established procedures to safely open enclosures that may be affected by methane migration. In addition, there are plans to install active venting in electrical control panels in the future to dissipate methane that may accumulate in the panels.

Before construction of the CDF, a large expanse of tar-like material existed in a shallow surface impoundment at the original ground level near the northwest corner of the former refinery property. This area was filled with slag to create a dry working platform for placing the first clay lifts of the clay dike. During an annual inspection of the CDF in 2016, “tar” was observed to have emerged from a fissure/crack above the downstream perimeter dike toe, north of dike alignment Station 25+00, coincident with the approximate tar impoundment location. Tarlike globules were subsequently observed bubbling up through the impounded sediment on the opposite side of the dike in this location. During a routine inspection in 2019, a second breakthrough point was observed on the downstream slope only a few feet from the original fissure. Continuing observation of the “tar” seep indicates that the movement of the substance is cyclical where the material oozes from the slope, generally in warmer weather, and subsequently retracts back into the subsurface. Considering that the groundwater is depressed several feet below the dike and no water has been observed seeping from the dike toe, the phenomenon could be attributed to gas movement in the ground.

A soil gas survey was conducted in 2018 using temporary probes installed around the perimeter of the site. The 2018 “snapshot” sampling detected methane in soil throughout the site (GEI. 2018). After the soil gas survey, permanent gas monitoring wells were installed at selected locations, including the north side of the site where high levels of TPH and BTEX had been detected; on the east side of the site adjacent to Indianapolis Boulevard, and near the control panel where methane was originally detected; on the south side of the site near Administration Building; on the northwest side near dike tar seep; and finally one well outside slurry wall along Indianapolis Boulevard.

Continuous subsurface soil gas monitoring at the installed permanent soil gas wells in 2019 confirmed high methane levels (90 to 100%) on north and east sides of site, and relatively low methane levels on south side of site (<60%). The permanent well on northwest side of site near the tar seep was discovered to be installed in the soil cover layer and therefore, results are inconclusive at this location. The continuous soil gas monitoring at the offsite well outside the slurry wall was interrupted due to the parkway improvement construction project, but a brief sampling period prior to interruption indicated no methane at the offsite well. Methane levels are generally low (less than 20%) at the well near the Administration Building based on the continuous gas monitoring. Methane was not detected in the Administration Building or the crawl space beneath the building during FOH summa canister sampling (FOH, 2017). High volume air sampling and laboratory analysis were conducted periodically in 2019 at the permanent soil gas wells and correlated relatively well with the continuous soil gas monitoring data at some wells.

Summary

In summary, the slurry wall is likely containing horizontal methane migration, and the CDF and soil cover across the site appear to be containing vertical methane migration, which allows the methane to build up at many locations below ground, but also appears to be keeping it from migrating off site, based on data collected for the one monitoring location outside of the slurry wall to the east of the site.

The issue of methane entering the electrical control panel appears to be resolved by sealing the conduits entering the panels, as well as implementing safety procedures for opening and working in and around the panels. There are also future plans to actively vent the panels to dissipate methane that may enter the panels.

Given that 1) the slurry wall, CDF and clay layer are likely containing methane at the site, 2) methane has not been observed to migrate into the occupied building, and 3) the methane issue at electrical control panels and the tar seep area have been or will be addressed, active methane removal may not be warranted at this time. In addition, due to the generally lower permeability soil conditions at the site, but widespread methane presence, any kind of site-wide, total methane collection and removal system is likely not cost effective or even viable. Continuous gas monitoring will continue at the existing wells, and in particular near the Administration Building (location of potential receptors) and at the offsite well. Additional offsite wells may be added in the future as needed to confirm that methane generated at the CDF site has not migrated off site. If further observation of methane indicates changed conditions, for example, offsite migration or presence in buildings, methane mitigation will be evaluated at that time.

Future work

The soil gas condition at the tar seep area is inconclusive due to the monitoring well screen being installed in the soil cover at this location. However, to be pro-active in the event that the tar flow is driven by soil gas pressure, a passive vent will be installed in the vicinity of the tar seep location during the dike expansion. The vent system will consist of a permeable collection pipe embedded within open-graded gravel backfill and a pipe vent open to the atmosphere.

3.1.3 Dam Safety Requirements

Five design features below are being incorporated into the expansion to address dam safety concerns identified in the risk assessment performed during the first PA in 2015:

1. Inclusion of a chimney filter and drain between the existing downstream (exterior) dike slope and new fill to collect potential seepage and prevent concentrated leak erosion through non-conforming materials in the existing dike
2. Provision of riprap on the upstream slopes to protect against wave-attack erosion.
3. Provision of a designated emergency overtopping location to safely channel overflow from the dam and back to the canal in the improbable event of unprecedented precipitation or accumulation of precipitation from a series of events. This feature is intended to reduce the life safety and property damage impacts in the unlikely event that overtopping were to occur by directing any overtopping flow away from populated areas and into the Indiana Harbor Canal.
4. Provision of double-walled pipe for the buried force mains in the downstream face and crest of the expanded dike to convey groundwater effluent from the gradient control system for discharge into the CDF. If the primary pipe were to develop a leak, the leak would be contained by the outer pipe wall and prevent erosion.
5. Provision for controlling the tar-seep issue in the foundation of the expanded dike in the northwest corner of the CDF.

The potential presence of abandoned refinery pipes in the subsurface below the dike was previously identified as a dam safety concern during the risk assessment in 2015. It was hypothesized that seepage along a pipe could lead to internal erosion of foundation soil, eventually undermining a segment of dike. This concern was re-evaluated based on actual observed performance of the facility: the gradual reduction in the amount of extracted groundwater, the ability of the CDF cells to retain a significant pool and groundwater level monitoring. The impounded sediment is acting as a low permeability liner and the gradient in the foundation is quite low, below 0.005. Additional sediment deposition and consolidation is expected to further lower the permeability of the impounded material and improve the effectiveness of the impermeable barrier. Continued monitoring of the foundation pore pressures and monitoring of the dike for settlement will ensure these conditions are not changing. In addition, the dam base will be widened on the order of 25 feet after expansion, further lowering the gradient and making it unlikely that internal erosion would occur.

Constructing the chimney drain will require excavation at the downstream toe of the existing dike to extend the drain to the permeable soil below the low permeability clay cap at the dike toe. Although slope stability analyses were performed and indicated sufficient factors of safety, there was concern that accidental over-excavation could lead to progressive slope failure. The following will be enforced or implemented in response to this concern: (1) the Government’s foundation engineer will be present at all times during excavation along the toe; (2) groundwater levels will be maintained below the base of the dike at all times during excavation; (3) a supply of fill will be maintained onsite to reduce the length that the excavation remains open as well as provide emergency backfill; (4) the daily lateral extent of excavation will be limited that which can be fully backfilled by the end of the day; (5) ensuring excavation is performed only within the cap beyond the toe and not into the existing embankment toe; (6) as-built cap cross sections will be available in the field and the contractor will be required to monitor the excavated elevation for comparison with elevations of the existing cap; and (7) the dike pools will be maintained at or below the Maximum Operating Limit to provide at least 5 feet of freeboard during excavation along the toe.

A dam safety concern was raised regarding the observed movement of tarlike material near dike Station 25+00. As mentioned, a soil gas vent is being installed in the vicinity to prevent pressure buildup, a potential driving force for movement. However, if the flow of the substance is not solely driven by soil gas pressure, the increased weight of the expanded dike could squeeze more of the substance out of the subgrade. When the tar recedes and contracts in colder temperatures, it could create a continuous seepage path for concentrated leak erosion. Although a chimney filter and drain will be constructed to intercept water seepage to prevent the concentrated leak erosion, there was a concern over the higher permeability materials in the chimney providing a preferred flow path and eventually becoming clogged with the substance. To provide an even more permeable flow path with greater pore space for accumulation of the substance, open-graded gravel fill is to be installed under the expanded base of the dike and will extend partway up the downstream surface of the new chimney drain. This will prevent the chimney drain from becoming clogged with tar and also reduce the likelihood for surface breakthrough of tar on the downstream slope of the expanded dike.

3.1.4 Dike expansion

To reach the original design capacity, the design calls for the exterior dike height to be increased by 11 feet. Increasing the height of the dikes requires the dikes to be widened at the base, to maintain the same interior and exterior slopes. The wider dikes will occupy a slightly larger footprint, still well within the original site boundaries. The perimeter road (also referred to as a “ring road”) will be relocated as needed to adjust for the dike widening, but again will be well within the same site boundaries. The upstream (interior) portion of the dike must consist of clay to maintain low permeability (a minimum 3-foot thick clay liner was required in the original project DDR), but the downstream portion may consist of more readily available engineered fills. The existing decant structures were designed for a stage II elevation of up to Elevation 621. Based on the proposed future operation, only one of them (east decant structure) will be raised. Air monitoring stations and equipment will need to be removed from the existing dike crest, and reinstalled on new dike crest. Existing dike piezometers (all the ones in the crest and all toe piezometers on inside shoulder of ring road) will need to be abandoned and new ones installed for the new dike geometry. Access ramps will change and may require routing the perimeter road outside its current alignment at the ramps. Two turnarounds will be installed to provide access during maintenance of the dike. GCS force mains (2) within the existing dike slope will require removal and reinstallation with the outfall inverts at a higher elevation. Pipe bedding (which is granular) will need to be removed and replaced with compacted clay to eliminate a potential seepage path through the dam. The manhole containing the new flow meter from Lift Station 2 will require relocation outside the proposed dike expansion footprint. The existing manhole structure will require removal or abandonment. Mechanical and electrical features will be needed for the lift station modifications, manhole relocation, and air monitoring station relocations.

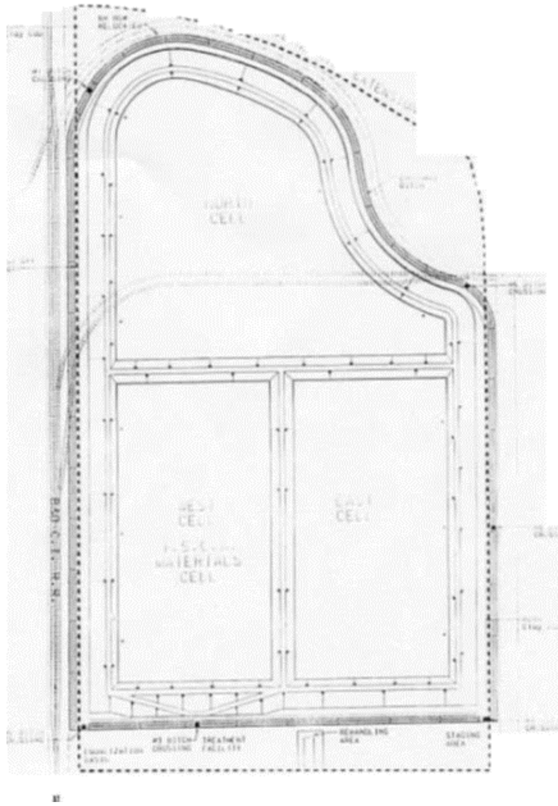
The EIS (USACE. 1999) and DDR (USACE. 2000) included an exterior dike configuration in roughly the same layout as currently existing. Some differences in the layout exist, however. The original configuration had one access ramp on the south side. There are currently two access ramps, one on the north and one on the south; these are being moved from the current location with the dike extension. There are also turn-out areas being added along the dikes, since the roadway along the top of the dike is narrow. Access roads are being re-aligned to fit with the ramp configuration. The entrance to the site remains at the Riley Road intersection. Figure 11compares facility layouts for the original design and proposed action.

Staged Dike Construction

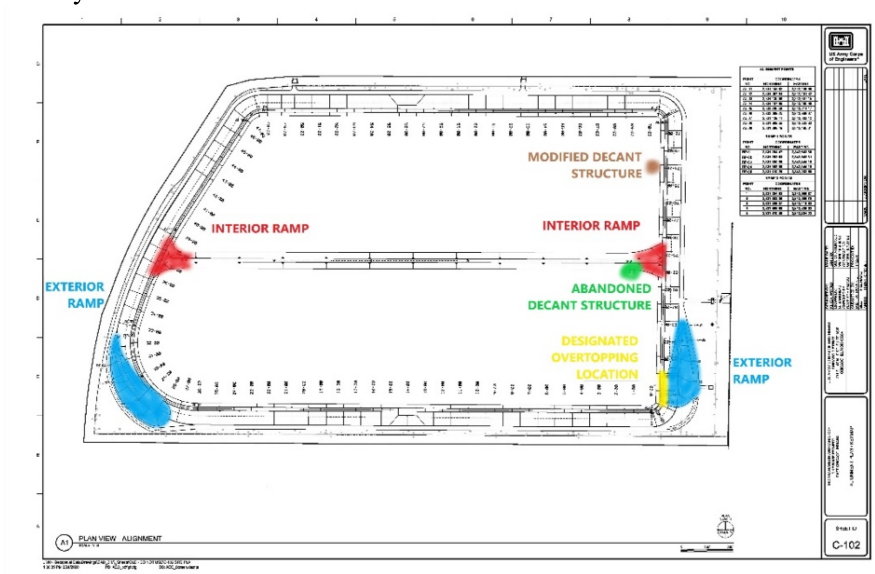
The Phase 2 dike construction project is to increase the CDF dike height by 11 feet. However, due to funding constraints. the CDF dike will be constructed in stages. The goals for the staged CDF dike construction are to subdivide the project to allow construction with a flexible funding stream, to construct a usable product, and to minimize cost increases due to phased construction.

For the first stage, the entire CDF exterior dike structure will be increased by 3 feet. To allow for a top width that can accommodate an access road with a shoulder, the maximum incremental dike height increase will be 3 feet. The remainder of the first phase of funding will be to expand the dike laterally at the toe with no additional vertical expansion.

The uncertainty in future funding also impacts the length of the construction period, as it is unknown when the remaining required funds will be available. It is possible, that the construction period will extend beyond the 2 to 3 years estimated for the Phase 2 dike project. With the 3-foot increase in dike height, dredging may resume as required for maintenance of the IHC channel during the interim period. The interim dike expansion will include all features required for effective CDF operation, including the access road and ramps, air monitoring stations, dike piezometers, and emergency overtopping area. These features will be removed/relocated as appropriate for the full dike height expansion.



a. 2000 proposed layout.



b. Current proposed layout. Additional ramps, turnouts, emergency overtopping

Figure 11: Proposed exterior dike layout

3.2 Objectives, Constraints, and Considerations

Objectives:

- Increase capacity for storage of dredged materials
- Ensure that the current CDF meets dam safety requirements
- Address site methane concerns
- Ensure future operability of the site

Constraints and Considerations:

Maintain navigation in IHC: Dredging of the IHC is critical for shipping and industry. Any course of action that delays or restricts dredging in the IHC is not acceptable.

3.3 Future without Project Conditions (FWOP)

Without the proposed actions, the IHC CDF will continue to operate until capacity is reached. Upon reaching capacity, either another site will need to be identified to store dredged material, or dredging of the harbor will cease. Failure to dredge the IHC will result in potential shoaling, light loading, and other actions that may reduce efficiency of shipping. Additionally, the IHC will continue to lack necessary dam safety features, creating risk for local communities. Site methane will also not be addressed, and may create future issues.

3.4 Formulation and Comparison of Alternative Plans

3.4.1 No Action Alternative

The No Action Alternative would be to not extend the dikes, but keep the IHC CDF in the current configuration. This would limit the amount of future capacity to support maintenance dredging in the IHC. Due to the maximum pool operating limit, dredging would need to cease. The CDF could be dewatered and used for dry placement of sediment until it is filled, or it could be closed early. Regardless of how much additional sediment would be placed, the facility would be filled within a few years. After the facility is filled, it would be closed and capped. No additional navigational maintenance would occur until a new CDF or other disposal site was located, leading to a loss of function for the shipping channel.

3.4.2 New Site Alternative

As an alternative to continuing use of the existing CDF and site, a new CDF site could be developed. Northwestern Indiana has little open land, especially along the canal; most of the available land has an industrial history. A possible site for a new CDF has not been identified. If a new site were found, it is likely that the property would have similar issues to the existing site, and that regulatory response actions and/or additional features to address site contamination would be needed. Based on the time needed to plan, design and construct the existing facility, the development of a new site is likely to take ten to fifteen years. During that time period, no navigational maintenance would occur, leading to a loss of function for the shipping channel. Dam safety and methane concerns would still need to be addressed at the current CDF.

3.4.3 Increase Capacity at Existing CDF

This alternative would involve raising the exterior dikes, reconfiguring ramps, and supporting features, as described in paragraph 3.1.4. This proposal would make maximum use of the existing facility and existing site features. Additionally, dam safety measures as described in paragraph 3.1.3, installation of a methane vent as described in section 3.1.2, and the submergence of the center dike as described in section 3.1.1 will be implemented as part of this alternative.

3.5 Recommended Plan

The recommended plan is to Increase Capacity at Existing CDF. This action includes the raising of the existing dikes to increase the facility capacity and add features as needed to address dam safety and facility operation issues.

The CDF is considered to be a high hazard dam. The design includes elements that address potential failure modes that were identified during the first Periodic Assessment of the current dam in 2015. The following have been identified at a minimum to be included in the design: designated emergency overtopping location at south end of west cell, inclusion of a chimney drain to intercept seepage, collection of seepage and conveyance into lift stations, provision of erosion protection on upstream (interior) slopes, prevention of concentrated erosion from crest onto upstream slopes, clearing, grubbing, and stripping.

Features not being extended vertically, include the center dike and the west decant structure. These features will eventually be covered as additional sediment is placed in the CDF. These features will not be physically removed or broken.

4.0 Environmental Effects of the Recommended Plan

4.1 Climate

Climate change is related to carbon dioxide and other greenhouse gas emissions. The Proposed Action does not appreciably change greenhouse gas emissions at the IHC CDF, since there are no new sources of emissions. For the Midwest, including Indiana, trends in temperature and precipitation related changes are discussed in the Fourth National Climate Assessment. (USGCRP. 2018) The general trend for this region includes increasing temperatures, increasing humidity and increasing precipitation. At-risk communities in the Midwest are becoming more vulnerable to climate change impacts such as flooding, drought, and increases in urban heat islands. Storm water management systems, transportation networks, and other critical infrastructure are already experiencing impacts from changing precipitation patterns and elevated flood risks.

For this project an extreme precipitation event was considered in the design by the addition of an overtopping location in the south west corner of the CDF. This designated overtopping location is required in the unlikely event that the CDF pool elevation approaches the future elevation of the perimeter dike crest of 620.6 feet such that "it will not create a threat of loss of life or inordinate property damage" as stated in ER 1110-8-2(FR) Inflow Design Floods (IDF) for Dams and Reservoirs. When applying Standard 1 to the CDF, the ER specifies that the dam safely pass an IDF computed from the probable maximum precipitation (PMP) occurring over the dam site.

Hydrometeorological Report 51 (HMR51, June 1978) was used for establishing the PMP. For a conservative design the 6 hour duration storm of 26.0 inches was selected (using the smallest area of 10 square miles). This increases the necessary conveyance capacity of the overtopping notch and results in a conservative design. The rainfall intensity is 4.33 in/hr. When factoring in the CDF surface area of approximately 538,000 square yards this amounts to a design flow of 485 cfs for the overtopping.

The designed notch in the dike crest for the spillway is 124 feet long with the center being 100 feet long and 1.5 feet deep with side slopes at 8 horizontal to 1 vertical slope. The top of the notch is 20 feet wide and is composed of compacted limestone screenings as will be the remainder of the perimeter dike crest.

The overtopping notch will be located along the south dike near the southwest corner of the CDF. Flow will pass over the notch, flow over the grassed embankment and then over the ground surface and spill over the sheet pile wall into the Indiana Harbor Canal. This location was selected to ensure any overtopping flow would be directed away from populated areas and back into the canal.

Velocities during maximum discharge will be below 4 fps only some minor erosion of the compacted gravel road surface is expected in the event of an emergency overflow. Analysis indicated that the grassed embankment will be able to resist these flows with only minor damage. In the unlikely event of an overtopping it is anticipated that there may be a need for some minor repairs to the crest road and embankment surface.

The maximum operating limit is also a product of the PMP routing. The dike crest elevation will be 620.6 after the Phase 2 dike raise. In determining the maximum operating limit (MOL) the PMP selected is the 72 hour duration. This results in a conservative design as the rainfall amount for that duration PMP is 36.8 inches. Combining this with the 100-year wave height of 1.25 feet (say 1.3 ft), as determined by a wind wave analysis performed by USACE in 2014, results in an MOL elevation of 616.2 feet. This MOL is 4.4 feet below the crest of the perimeter dike and 2.9 feet below the invert of the overtopping notch.

The probability of an emergency overflow occurring through the overtopping location is significantly greater than a 1000-year event. In this case the flow would go over the exterior embankment and flow directly to the canal. HEC-RAS modeling indicated a rise in the canal of less than 1 inch. The discharge would be highly diluted since 36.8 inches of rain would be mixed with the approximately 2 feet water cover prior to the discharge to the canal. The overtopping location was selected such that no residents would be adversely affected.

4.2 Soils and Geology

The dike extension and other features would be constructed within the footprint of the CDF site. To the extent possible, existing site soils will not be disturbed to limit potential contact with historical site pollutants. There will be no large excavation of site soils. Materials to be used for construction will include clean clay, gravel and other construction materials from offsite. Fly ash and slag will not be used for fill on the site. Overall, there is no effect on the soils beyond the site, and no effect on the geology of the area.

4.3 Surface Water and Other aquatic Resources

Surface water quality impacts from the propose work activities are negligible. The construction of the dike extension and related features would be done with new and clean materials. During construction, the work will be conducted under a general rule construction (stormwater) permit. The work will use erosion control features such as silt fences and vegetation as needed to prevent surface runoff and impacts to the adjacent IHC. Work will be staged to minimize open areas that could produce dust or erosion. The slopes will be stabilized with vegetation and riprap or stone (gravel for roads) as needed; the entire exterior dikes will be stabilized at the completion of the project.

There would be a potential surface water quality impact in the unlikely event that overtopping occurs. Overtopping would only as a result of an extreme precipitation event. If there is a precipitation event of sufficient magnitude to over top the dikes, the water would be mostly precipitation (rainfall). This clean water would dilute any collected water from the CDF to an extent that pollutants would likely not be measurable. However, it is assumed that some very low concentrations of pollutants could still be present, even though not measurable. Although the discharge of very dilute pollutants would potentially have a slight negative impact on the surface water quality in the IHC, no mitigation is proposed for two reasons.

1. Given that a storm event equivalent to a 1000 year storm would be needed to overtop the dike, such a storm event has never been recorded for the project area and is considered highly unlikely to occur.
2. The IHC is currently a severely impacted waterway. The portion of the canal adjacent to the IHC CDF has oil control booms (installed and maintained by others) to control free phase oil releases to the waterway. The sediment is still considered to be highly contaminated. The input of a large volume of highly dilute water directly from the CDF will not likely have a measurable impact due to the already degraded condition of the waterway.

Based on these considerations, no mitigation is proposed for the highly unlikely discharge of untreated, dilute water to the canal.

Groundwater quality would not be affected by the proposed action. The proposed dike extension includes upgrading the lift station and outfalls for the groundwater gradient control system, but does not affect the wells. The existing groundwater cutoff wall and sealed sheetpile wall which represent containment for the site contaminated groundwater are similarly not affected by the proposed work. The construction of the dikes would not introduce new contaminants to the groundwater, and would not affect the groundwater off site.

Other aquatic resources are minimal in the area. Ongoing industrial uses have reduced the availability of aquatic habitat, and human use of the channel for non-industrial reasons is exceedingly rare.

4.4 Fish and Wildlife Habitats

The proposed action is not anticipated to affect any fish or wildlife habitat. The site is highly degraded from a natural habitat, and does not provide any useful habitat for fish or wildlife species. Wildlife is discouraged from habiting the site by harassment and deterrent practices implemented on the site by USDA.

4.5 Threatened and Endangered Species

The CDF site itself does not contain any threatened or endangered species. The site is highly degraded from a natural habitat, and does not provide any useful habitat for listed species. Local endangered species, including the peregrine falcon, are discouraged from habiting the site by harassment and deterrent practices implemented on the site by USDA. There are no anticipated impacts to threatened or endangered species. The CDF site is in the range of both the northern long eared bat (*Myotis septentrionalis*) and Indiana bat (*Myotis sodalis*), however there will be no effect on either of these species due to the nature of the work being done. Earthmoving and modification of an already developed site will not have an impact on these species, as there is no known habitat for these species on site. The CDF is kept in a mowed state and no trees are allowed to grow within the site, therefore there are no potential impacts to these species.

A letter was sent to the US Fish and Wildlife Service regarding this project, and a response was received on 27-May-2020. In their letter, the USFWS stated they have no concerns about the environmental impacts of the proposed modifications.

4.6 Recreational, Scenic, and Aesthetic Resources

The IHC CDF site is not available for recreational use, and the site is fenced and access by the public is controlled. Visually, from the exterior of the site, the CDF appears to be a grassed hill, with a few single story buildings and some construction equipment stored on the south end of the site. A visual barrier (wall) is being constructed along Indianapolis Boulevard, which is the direction from which the public would view the site. There is little aesthetic value to the site currently. The proposed action will neither enhance nor detract from the current prosaic viewshed.

4.7 Cultural Resources

The IHC CDF is a highly developed site. No historic structures are in the project footprint, and the entire project area footprint has been extensively disturbed in recent years. There are no cultural resources present on site that can be impacted by this project. Prior consultation with the Indiana SHPO (USACE Chicago District 1999) provided confirmation of this finding. The Indiana SHPO was sent a letter regarding this project and they responded on 15 June 2020. They found that no historic properties or archaeological resources would be impacted by this project.

4.8 Air Quality

The 1990 amendments to the Clean Air Act require that federal agency activities conform to the affected SIP with respect to achieving and maintaining attainment of NAAQS and addressing air quality impacts. An air quality impact resulting from the proposed mission change and facilities development programs would be significant if it would: 1) increase concentrations of ambient criteria pollutants or ozone precursors to levels exceeding NAAQS; 2) increase concentrations of pollutants already at nonattainment levels; 3) lead to establishment of a new nonattainment area by the Governor of the state or the USEPA; or 4) delay achievement of attainment in accordance with the SIP.

The proposed action will have an insignificant impact on air quality. Potential emissions associated with the proposed action include construction equipment and vehicle emissions and dust. To minimize temporary adverse impacts to air quality during construction activities the following best management practices (BMPs) would be used:

All equipment is to be current with functional emissions controls;
All equipment will use low sulfur diesel fuels; and
Dust control measures will be used during dry weather, including but not limited to the use of covered loads, street sweeping and tire brushes to avoid tracking soils onto public roads, and watering/sprinkling unstabilized earthwork areas to minimize windblown dust;
Real time dust monitors will be established along the east boundary of the side (along Indianapolis Boulevard). These monitors include alarms. If the dust level rises to an action level, the Contractor will be required to implement controls and/or stop work until the dust is under control.

Methane appears to be contained in the ground at the site. Methane has not been observed to migrate into the site occupied building, nor at one well outside the slurry wall to the east of the site. A passive vent will be installed in the vicinity of the tar seep location during the dike expansion. Impact to the air is expected to be minimal due to the dike vent system. The estimated methane concentrations would not be measurable at the property boundary, based on the low concentrations measured to date

4.9 Noise

Noise impact analyses evaluate potential changes to existing noise environments that would result from implementation of a proposed action. Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased exposure of sensitive receptors to unacceptable noise levels).

Noise from construction activities would be generated by a broad array of powered, noise-producing mechanical equipment used in the construction process. This equipment potentially ranges from hand-held pneumatic tools to dump trucks, concrete pump trucks, and excavators. Noise levels associated with construction when all pertinent equipment is present and operating, at a reference distance of 50 feet, are shown in *Table 4*.

Table 4: Typical Noise Levels from Construction Activities

Construction Activity	Measured Sound Level at 50 feet (dBA L_{max})[a]
Backhoe	78
Excavator	81
Dump Truck	76
Paver	77
Front End Loader	79
Roller	80

[a] Construction Noise Handbook. Federal Highway Administration. 2006.

Sounds are more significant when closer to the source; sound levels decrease by approximately 5 dBA L_{eq} for each 50 feet distance from the source. The closest non-industrial feature which could be affected by the site is the East Chicago High School, located approximately 2500 feet to the south. At this distance, any construction noise will be below ambient noise levels. The remaining properties surrounding the IHC CDF include transportation facilities (roads, railroads, shipping channels), industrial properties, and unused lands undergoing remediation. Construction noise at the ECI site will not affect these operations and will likely not be noticeable.

4.10 Hazardous, Toxic, and Radioactive Waste (HTRW)

The proposed construction does not change the footprint of the CDF. Below ground issues (buried wastes, debris, and free phase oil) are not addressed in the proposed action, and would remain in the current configuration, isolated from the regional groundwater by the cutoff wall and groundwater gradient control system. Since all construction would be of clean materials, no new wastes are introduced to the site through the construction of the dike extension and related features. Any wastes generated for disposal during the construction of these features would be disposed of appropriately. Overall, the proposed action does not have an impact on HTRW.

4.11 Socioeconomics and Environmental Justice

Executive Order 12898 of 1994 directs federal agencies to identify and address any disproportionately high adverse human health or environmental effects of federal actions to minority and/or low-income populations, which the DOD implemented through the Department of Defense's Strategy on Environmental Justice of 1995.

Minority populations are those persons who identify themselves as Black, Hispanic or Latinx, Asian American, American Indian/Alaskan Native, and Pacific Islander. A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population.

A preliminary review of the USEPA Environmental Justice Screening and Mapping (EJ Screen) Tool (https://ejscreen.epa.gov/mapper/) conducted on 29 April 2020 indicates that both low-income and minority populations are present within the study area. The area analyzed with this tool was composed of a two-mile buffer around the existing CDF (Figure 12). Based on these results from the EJScreen tool, a more in-depth analysis of demographics related to race, ethnicity, and income was conducted.

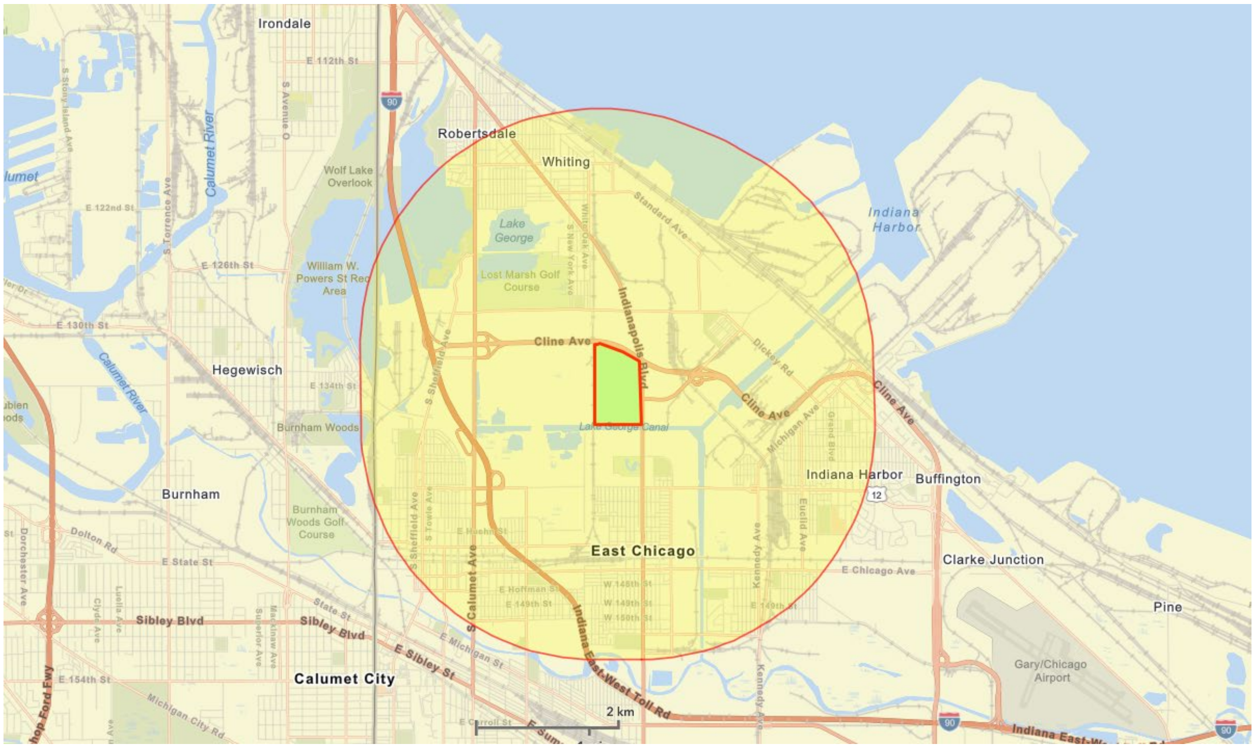


Figure 12: Survey Area from EJ Screen Tool

Based on the survey area the percentage of low income households is 53%, compared to a statewide average of 33%. The percentage of minority households is 77% compared to a statewide average of 20%. These results are summarized and compared to statewide and nationwide averages in Table 5.

Table 5: Environmental Justice Variables of Study Area, State, and Nation

EJ Variables	Study area value	State Average	USA Average
Minority Population	77%	20%	39%
Low Income Population	53%	33%	33%

From this data, it is clear that both minority and low income populations are present within the study area.

The percentage of minorities in the study area exceeds 50% and is meaningfully greater than in the general population of the state of Indiana. Likewise, over 50% of the households in the survey area are classified as low income, which is meaningfully greater than the general population of the state of Indiana.

To determine the potential impact of the project, the proposed actions and their likely impacts were assessed. Based on analysis in this document, the extension of existing berms will prolong the life of this CDF and allow for continued safe disposal of material. Installation of dam safety features will ensure that the facility can operate in a safe manner. Overall, the proposed actions will improve safety, local environmental quality, and ensure long term safe function of the CDF. Also, results from implementation of the project would support local and regional economies dependent on navigation, which is considered a benefit to neighboring communities, the region, and the Nation.

Based on this analysis, it is determined that there will not be any disproportionately high adverse human health or environmental effects of federal actions to minority and/or low-income populations

4.12 Cumulative Effects

As part of this study, cumulative effect issues and assessment goals are established, the temporal boundaries and affected environment are determined, and the reasonably foreseeable future actions are identified. Cumulative effects are assessed to determine if the sustainability of any of the resources is adversely affected with the goal of determining the incremental impact to key resources that would occur should the proposal be permitted.

Affected Environment. The spatial boundary for the assessment is limited to the site of the IHC CDF.

Temporal Boundaries Considered.

- Past (1901-2020): the timeframe in which construction of the IHC, was completed and has been in operation.
- Present (2020): when the decision is being made on the expansion of the CDF
- Future (2020 to 2040): the projected time frame used for constructing and operating the proposed CDF facility.
- Reasonably Foreseeable Actions.
- Continued navigation in the IHC
- Continued need for dredging for maintenance of the Project
- Continued maintenance and periodic rehabilitation of navigation structures
- Continued application of environmental requirements such as those under the Clean Water Act (CWA) and water quality improvement

The physical resources of the Study area (geology, soils, topography, land cover, hydrology) were altered from their natural condition with the creation of the IHC CDF. The implementation of the proposed action would have no adverse effect on the physical resources of the study area or the areas which it influences. Adverse effects stemming from the action upon physical resources are not incrementally apparent, thus cumulative adverse effects are not anticipated.

The ecological resources of the study area (plants, fish, birds, prairies, streams, wetlands, etc.) were altered from their natural condition with the creation of the IHC CDF and the increase in urbanization and commercial development in the region. The implementation of the proposed action would not restore ecological resources or degrade them, but would contribute to the protection of the Lake George Branch aquatic ecosystem through the removal of contaminated sediment from the channel. Due to the high unlikelihood associated with an overtopping event, it is not anticipated that an overflow event would have long term cumulative impact to adjacent aquatic resources. Cumulatively, adverse ecological effects are not anticipated through implementing the proposed action.

The implementation of the potential alternatives has no affect upon archaeological or cultural resources. Adverse effects stemming from the action upon archaeological or cultural resources are not incrementally apparent, thus cumulative, adverse effects are not anticipated. The effects of the proposed action on aesthetic values are not incrementally apparent, thus cumulative, adverse effects are not anticipated.

The IHC CDF site actively discourages wildlife and the local flora consists of well mown turf areas. This effectively creates an absence of local flora and fauna. Although minor short-term impacts are likely to occur to local animals and plants within the construction footprint, no significant cumulative impacts are expected. This project, cumulatively with other dredged material placement and future O&M activities on the IHC, should help to maintain commercial navigation while reducing future adverse impacts to the riverine ecosystem such as sedimentation, pollution, and general decline in riverine and floodplain habitat. The impacts of the shallow-draft and deep-draft IHC navigation channels are already in place. O&M activities are the primary cumulative impact. These impacts are anticipated to be minor and short-term in nature.

In regards to air quality, construction activities have the potential to temporarily degrade air quality through the direct release of exhaust fumes and dust in the local environment. Installation of a methane vent is being conducted and it would be a long term feature of the site, however, measurable methane emissions are not anticipated. The effects of the proposed action on air quality as a result of these changes are not incrementally apparent, thus cumulative, adverse effects are not anticipated.

5.0 Implementation Requirements

5.1 Project Partnership Agreement (PPA)

A project cooperation agreement between USACE and ECWMD was executed in August 2000 that governs construction, operation, and maintenance of the project. Section 6011 of the Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Tsunami Relief, 2005, Pub. L. No. 109-13, 119 Stat. 231, 283, enacted on May 12, 2005, provided that completion of the facility would be at full Federal expense.

Lands, easements, Rights-of-Way, Relocations, and Disposals

All lands, easements, and rights-of-way needed for the implementation of the project were provided under the existing PCA and are in use by USACE.

5.2 Operation, Maintenance, Repair, Replacement, and Rehabilitation

This facility will be operated by USACE for the project lifespan.

5.3 Regulatory Requirements

The IHC dredging activities and the IHC CDF facility operation are covered by numerous permits and regulatory agreements. These are briefly summarized below.

RCRA – The ECI site has open RCRA status and requires eventual closure. Under the existing Memorandum of Understanding (MOU) between USACE, USEPA, IDEM and ECWMD, once dredging activities are complete, the CDF will be closed and a RCRA cap will be placed over the site. The details of the RCRA closure plan are to be determined at the time of closure.

TSCA – The IHC CDF operates under a TSCA Risk-Based Approval (EPA ID# IND082547803). The need for TSCA compliance was triggered by sediment which contains PCBs > 50 mg/Kg. A future cap and closure consistent with TSCA requirements is needed for the facility. The intent by all parties is that the RCRA and TSCA closure requirements will be fulfilled together by one set of closure actions.

Clean Air Act – The IHC CDF is not a major source of emissions, but is an area source. The facility has an air registration (089-31941-00471) which requires monitoring and controls to ensure that emissions of particulates and volatile compounds do not exceed 25 tons per year.

Clean Water Act – The IHC CDF discharges treated water under NPDES permit IN0062511. In addition, the placement of stone cover over high PCB sediment areas is conducted under Section 401 Water Quality Certification 2017-130-45-MTM-A.

The volume of groundwater extracted via the Gradient Control System is tracked and reported to the Indiana Department of Natural Resources – Division of Water on an annual basis. All groundwater is recirculated from the control system back into the east cell of the CDF. The annual volume extracted between 2012 – 2018 is listed in Table 5, below.

Table 6: Annual groundwater extraction at IHC CDF

Reporting Year	Volume Extracted (million gallons)
2012	60,229,150
2013	223,938,150
2014	170,668,560
2015	122,661,436
2016	94,755,094
2017	63,590,591
2018	55,093,623

6.0 Recommendation

I have considered all significant aspects of the problems and opportunities as they relate to the project resource problems of the Indiana Harbor CDF. Those aspects include environmental, social, and economic effects, as well as engineering feasibility.

I recommend the Increase Capacity at Existing CDF Plan. This plan provides the greatest benefit and safety to local communities and allows shipping to continue through the IHC Canal. In addition to extending the existing dikes to their planned height, this alternative provides, dam safety benefits, addresses potential methane buildup issues, and submerges the unnecessary center dike.

____

Aaron W. Reisinger
Colonel, U.S. Army
District Commander

7.0 References

Center for Hearing and Communication. 2019. Common Environmental Noise Levels. Accessed at: https://chchearing.org/noise/

Cohen, D.A., Greeman, T.K., and Buszka, P.M. 2002. Surface-water and ground-water hydrology and contamination detections in ground water for a natural resource damage assessment of the Indiana Harbor Canal and Nearshore Lake Michigan Watersheds, northwestern Indiana: U.S. Geological Survey Administrative Report, 135 p., accessed July 20, 2017, at https://www.fws.gov/midwest/es/ec/nrda/GrandCalumetRiver/documents/Groundwater.pdf

Duwelius, R.F., Kay, R.T., and Prinos, S.T., 1996, Ground-Water Quality in the Calumet Region of Northwestern Indiana and Northeastern Illinois, June 1993, U.S. Geological Survey Water-Resources Investigations Report 95-4244.

Escobedo, R.E. 2019. December 2019 Monthly Activity Report, Indiana Harbor Confined Disposal Facility.

Estes, T.J., P.R. Schroeder, W.R. Loikets, E.R. Taylor, V. Agrawal, C. Caine, and R. Gallas, 2003, Indiana Harbor and Canal (IHC) Dredging and Disposal Alternatives Analysis – Evaluation of Relative Disposal Requirements, Emissions and Costs for Mechanical and Hydraulic Dredging Alternatives, USACE Waterways Experiment Station.

Estes, T.J., P.R. Schroeder, D. Druzbicki, D.C. Scharre, and R. Gallas, 2004, Indiana Harbor and Canal (IHC) Dredging and Disposal Alternatives Analysis – Mechanical Dredging Comparative Analysis, USACE Waterways Experiment Station.

Federal Highway Administration. 2006. Construction Noise Handbook.

Federal Interagency Committee on Noise (FICON). 1992. Federal Agency Review of Selected Airport Noise Analysis Issues. August 1992.

Federal Occupational Health (FOH). 2016. Industrial Hygiene Investigation Report, Indiana Harbor Confined Disposal Facility, East Chicago, IN, Federal Occupational Health, Department of Health and Human Services, U.S. Public Health Service, Survey Date: April – November, 2016, Report Date: December 28, 2016.

Federal Occupational Health (FOH). 2017. Industrial Hygiene Baseline Assessment Report, Indiana Harbor Confined Disposal Facility, East Chicago, IN, Federal Occupational Health, Department of Health and Human Services, U.S. Public Health Service, Survey Date: August – October, 2017, Report Date: November 30, 2017.

GEI Consultants. 2018. Subsurface Gas Investigation Report – IHC Confined Disposal Facility, East Chicago, Indiana, GEI Consultants, December 14, 2018.

Fenelon, J.M., and Watson, L.R. 1993. Geohydrology and water quality of the Calumet aquifer, in the vicinity of the Grand Calumet River/Indiana Harbor Canal, northwestern Indiana: U.S. Geological Survey Water-Resources Investigations Report 92–4115, 151 p.

Hansel, A.K., Mickelson, D.M., Schneider, A.F., and Laren, C.E. 1985. Late Wisconsinan and Holocene history of the Lake Michigan basin, in Karrow, P.F., and Calkin, P.E., eds., Quaternary evolution of the Great Lakes: Geological Association of Canada Special Paper 30, p. 39–53.

Hydrometeorological (HMR) Report 51. 1978. Probably Maximum Precipitation Estimates, United States East of the 105th Meridian. U.S. Department of Commerce, National Oceanic and Atmospheric Adminstration, U.S. Department of the Army, Corps of Engineers, Washington D.C. June 1978.

IDEM. 2015. Addressing Methane at Anaerobic Bioremediation Sites. Indiana Department of Environmental Management Office of Land Quality. Technical Guidance Document. Guidance Updated August 31, 2015. Accessed at: Methane_mitigation_remediation_tech_guida.ce.pdf

IDEM. 2018a. 2018 Approved 303(d) List of Impaired Waters. Accessed at: https://www.in.gov/idem/nps/2647.htm

IDEM. 2018b. Approval with Conditions for Risk-Based Disposal of PCB-Containing Dredged Sediment, Indiana Harbor Canal Confined Disposal Facility, EPA ID# IND082547803, East Chicago, Lake County.

Kay, R.T., Bayless, E.R., and Solak, R.A. 2002. Use of isotopes to identify sources of ground water, estimate ground-water-flow rates, and assess aquifer vulnerability in the Calumet Region of northwestern Indiana and northeastern Illinois: U.S. Geological Survey Water-Resources Investigations Report 02–4213, 60 p.

Kay, R.T., Duwelius, R.F., Brown, T.A., Micke, F.A., and Witt-Smith, C.A. 1996. Geohydrology, water levels and directions of flow, and occurrence of light-nonaqueous-phase liquids on ground water in northwestern Indiana and the Lake Calumet area of northeastern Illinois: U.S. Geological Survey Water Resources Investigations Report 95–4253, 84 p.

Minnesota Pollution Control Agency (MPCA). 2011. Guidelines for Monitoring for Landfill Gas at and Near Former Dumps. Minnesota Pollution Control Agency, Remediation Division Voluntary Investigation and Cleanup, Emergency Response, Superfund, and RCRA Corrective Action Programs. November 2011. Accessed at: Methane_MN-MPCA-c-rem3-04.pdf

Moore, P.A., and Trusty, Lance. 1977. The Calumet region, Indiana's last frontier: Indianapolis, Ind., Indiana Historical Bureau, 685 p.

MWH. 2009. Final Conceptual Wastewater Treatment Plant Design Comparison Report. MWH Consultants. October 2009

Palermo, M.R., R.L. Montgomery, and M.E. Poindexter. 1978. Guidelines for Designing, Operating, and Managing Dredged Material Containment Areas. Waterways Experiment Station. Technical Report DS-78-10.

Schneider, A.F. 1966. Physiography, in Lindsey A.A., ed., Natural features of Indiana: Indianapolis, Ind., Indiana Academy of Science, p. 40–56.

USACE, Chicago District. 1999. "Comprehensive Management Plan: Indiana Harbor and Canal Maintenance Dredging and Disposal Activities," U.S. Army Engineer District, Chicago, IL.

USACE, Chicago District. 2000. "Design Documentation Report: Indiana Harbor and Canal Maintenance Dredging and Disposal Activities," U.S. Army Engineer District, Chicago, IL.

USACE, Chicago District. 2004. IHC Placement Method Decision Report.

USACE, Chicago District. 2007. Report of TSCA Sediment Volumes, Indiana Harbor and Canal, East Chicago, Indiana.

USACE, Chicago District. 2008. Decision Document on Operating the IHC CDF as a Ponded Facility. US Army Corps of Engineers, Chicago District. 13 November 2008.

USACE, Chicago District. 2009. Indiana Harbor Decant Structures

USACE, Chicago District. 2010. TSCA Sediment Placement in the IHC CDF and Capping TSCA Areas in the Canal after Dredging.

USEPA. 2018a. Feasibility Study Report for Indiana Harbor Canal Toxic Substances Control Act (TSCA) Sediment East Chicago, Indiana. Prepared for U.S. Environmental Protection Agency Region 5 by Tetra Tech. December 2018.

USEPA. 2018b. 40 Code of Federal Regulations (CFR) §761.6(c) Risk Based Approval for the Disposal of Indiana Harbor and Canal Polychlorinated Biphenyl (PCB) Containing Dredged Sediments into the Indiana Harbor Confined Disposal Facility, 3500 Indianapolis Boulevard, East Chicago, Lake County, Indiana, EPA ID # IND082547803.

USEPA. 2020. Green Book National Area and County-Level Multi-Pollutant Information. Accessed at: https://www.epa.gov/green-book/green-book-national-area-and-county-level-multi-pollutant-information

USGS 2018. Geochemistry and Microbiology of Groundwater and Solids from Extraction and Monitoring Wells and their Relation to Well Efficiency at a Federally Operated Confined Disposal Facility, East Chicago, Indiana. Scientific Investigations Report 2018-5073. E. Randall Bayless, Travis R. Cole, David C. Lampe, Rebecca E. Travis, Majorie S. Schulz, and Paul M. Buszka. US Geological Survey. 2018.

U.S. Global Change Research Program (USGCRP), 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018.

8.0 Acronyms and Abbreviations

Acronym	Definition
AI	Annual Inspection
API	American Petroleum Institute
ARCO	Atlantic Richfield Company
BMP	Best Management Practice
CAA	Clean Air Act
CDF	Confined Disposal Facility
CEQ	Council on Environmental Quality
CMP	Comprehensive Management Plan
CWA	Clean Water Act
dBA	Decibels A-weighted
DDR	Design Documentation Report
CY	Cubic Yard/s
EA	Environmental Assessment
EAP	Emergency Action Plan
ECI	Energy Cooperative Incorporated
ECWMD	East Chicago Waterways Management District
EIS	Environmental Impact Statement
ERDC	Engineering Research and Development Center
FOH	Federal Occupational Health
FWOP	Future WithOut Project
GCR	Grand Calumet River
GCS	Gradient Control System
HTRW	Hazardous Toxic Radioactive Waste
IDEM	Indiana Department of Environmental Management
IDF	Inflow Design Floods
IHC	Indiana Harbor Ship Canal
LCP	Local Control Panel
LNAPL	Light Non-Aqueous Phase Liquid
LWD	Low Water Datum
MOL	Maximum Operating Limit
MOU	Memorandum of Understanding
MOL	Maximum Operating Limit
NAAQS	National Ambient Air Quality Standards
NID	National Inventory of Dams
PA	Preliminary Assessment or Periodic Assessment
PI	Periodic Inspections
PCBs	Polychlorinated biphenyls
PMP	Probable Maximum Precipitation
PPA	Project Partnership Agreement
RCRA	Resource Conservation and Recovery Act
SIP	State Implementation Plan
SQRA	Semi-Quantitative Risk Assessment
TSCA	Toxic Substances Control Act
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency

USGS	United States Geological Survey
WWTP	Waste Water Treatment Plant

9.0 Correspondence

From:	Pelloso, Elizabeth
To:	Zylka, Jason J CIV (US)
Cc:	McCloskey, Elizabeth; Christie Stanifer; Sparks, Daniel; MAUPIN, MARTY; Davis, Susanne J CIV USARMY CELRC (USA); Westlake, Kenneth
Subject:	[Non-DoD Source] USEPA Scoping Comments - Indiana Harbor Canal CDF Improvements/Modifications
Date:	Monday, June 15, 2020 11:52:57 AM
Attachments:	image001.png
Importance:	High

Jason,

This email is in response to USACE's correspondence dated May 15, 2020, requesting EPA comments on the proposed modification of the existing Indiana Harbor Canal (IHC) Confined Disposal Facility (CDF) in East Chicago, Lake County, Indiana. USACE is preparing a National Environmental Policy Act (NEPA) document to address the impacts of design changes to enlarge the storage capacity of the CDF and add various components that were not part of the original construction, which began around 2002. Our comments here are provided pursuant to NEPA, the Council on Environmental Quality's NEPA Implementing Regulations (40 CFR 1500-1508), and Section 309 of the Clean Air Act.

The scoping information provided proposes increasing the height of the exterior CDF dike by 11 feet, abandoning the center dike in place, increasing the height of 1 existing decant structure and abandoning the second one in place, and adding an emergency overtopping site, a chimney drain, and a passive methane vent. The ramps will need to be re-aligned and the perimeter road may require rerouting.

At the IHC CDF, methane buildup has been identified in some areas. The methane is likely contained by the existing dikes and clay layer on the site. To prevent the build-up of methane, a passive vent is proposed to be installed during the dike expansion. The vent system will consist of a permeable collection pipe embedded within open-graded gravel backfill and a pipe vent open to the atmosphere. Scoping information provided states that existing gas monitoring will continue at the existing wells, near the Administration Building (location of potential receptors), and at the offsite well. We recommend that the forthcoming EA discuss in detail the existing air monitoring undertaken at the site. The EA discussion of the environmental consequences of the installing the proposed passive venting of additional methane onsite should also include a robust discussion on cumulative impacts to air quality.

We appreciate the opportunity to review and provide scoping projects on this project. Please send us a copy of the Draft EA once it's issued.

Thank you,
Liz Pelloso

Liz Pelloso, PWS

Wetland/Environmental Scientist

NEPA Team - Tribal and Multimedia Programs Office

U.S. Environmental Protection Agency - Region 5

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May 27, 2020

Mrs. Susanne J. Davis
Chief of Planning Branch
Chicago District
U.S. Army Corps of Engineers
231 South LaSalle Street, Suite 1500
Chicago, Illinois 60604

Attn: Mr. Jason Zylka

Dear Mrs. Davis:

This responds to your letter dated May 15, 2020, requesting our comments on the proposed modification of the existing Indiana Harbor Canal (IHC) Confined Disposal Facility (CDF) in East Chicago, Lake County, Indiana. The Chicago District is preparing a National Environmental Policy Act (NEPA) document to address the impacts of design changes to enlarge the storage capacity of the CDF and add various components that were not part of the original construction, which began about 2002.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (l6 U.S.C. 661 et. seq.) and are consistent with the intent of the National Environmental Policy Act of l969, the Endangered Species Act of l973, and the U. S. Fish and Wildlife Service's Mitigation Policy.

The proposed project consists of increasing the height of the exterior dike by 11 feet, abandoning the center dike in place, increasing the height of 1 existing decant structure and abandoning the second one in place, and adding an emergency overtopping site, a chimney drain, and a passive methane vent. The ramps will need to be re-aligned and the perimeter road may require rerouting.

The increase in height of the dike will also increase its width, with the expansion taking place to the outside. The work will be accomplished in 2 lifts, with the first being 3 feet. The second lift will be 8 feet and will include the widening. This construction may occur consecutively or over several years. A chimney filter and drain will be provided between the existing dike slope and the new fill to collect potential seepage and direct the drainage out of the dike. Riprap will be provided on the upstream slopes to protect again erosion of the dikes.

The USFWS has no concerns about the environmental impacts of these proposed modifications. However, we request that the Corps continue implementing the wildlife exclusion plan and provide copies of the reports to Mr. Daniel Sparks at daniel_sparks@fws.gov.

ENDANGERED SPECIES

The proposed project is within the range of the Federally endangered Indiana bat (Myotis sodalis), piping plover (Charadrius melodus), and Karner blue butterfly (Lycaeides melissa samuelis), and the threatened northern long-eared bat (Myotis septentrionalis), rufa red knot (Calidris canutus rufa), Pitcher's thistle (Cirsium pitcheri), and Mead's milkweed (Asclepias meadii). There is no habitat for any of these species within the proposed project area. Therefore, we agree that the proposed project is not likely to adversely affect these endangered and threatened species.

This precludes the need for further consultation on this project as required under Section 7 of the Endangered Species Act of l973, as amended. However, should new information arise pertaining to project plans or a revised species list be published, please contact us for further coordination.

We appreciate the opportunity to comment at this early stage of project planning. For further discussion, please contact Elizabeth McCloskey at (219) 983-9753 or elizabeth_mccloskey@fws.gov.

Sincerely yours,

/s/ *Elizabeth S. McCloskey*

for Scott E. Pruitt
Supervisor

Sent via email May 27, 2020; no hard copy to follow.

cc: Liz Pelloso, USEPA, NEPA Implementation Section, Chicago, IL
Christie Stanifer, Environmental Coordinator, IDNR Fish & Wildlife, Indianapolis, IN

DNR Indiana Department of Natural Resources

Eric Holcomb, Governor
Cameron F. Clark, Director

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HISTORIC PRESERVATION AND ARCHAEOLOGY

June 15, 2020

Jason Zylka
U.S. Army Corps of Engineers
231 South La Salle Street, Suite 1500
Chicago, IL 60604

Federal Agency: U.S. Army Corps of Engineers

Re: Information for proposed modification to the Indiana Harbor Canal Confined Disposal Facility (DHPA #25605)

Dear Mr. Zylka:

Pursuant to Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108) and 36 C.F.R. Part 800, the staff of the Indiana State Historic Preservation Officer ("Indiana SHPO") has conducted an analysis of the materials dated May 15, 2020 and received on May 18, 2020, for the above indicated project in East Chicago, Lake County, Indiana.

Based upon the documentation available to the staff of the Indiana SHPO, we have not identified any historic buildings, structures, districts, or objects listed in or eligible for inclusion in the National Register of Historic Places within the probable area of potential effects.

In terms of archaeology, no currently known archaeological resources eligible for inclusion in the National Register of Historic Places have been recorded within the proposed project area. No archaeological investigations appear necessary provided that all project activities remain within areas disturbed by previous construction.

If any prehistoric or historic archaeological artifacts or human remains are uncovered during construction, demolition, or earthmoving activities, state law (Indiana Code 14-21-1-27 and 29) requires that the discovery must be reported to the Department of Natural Resources within two (2) business days. In that event, please call (317) 232-1646. Be advised that adherence to Indiana Code 14-21-1-27 and 29 does not obviate the need to adhere to applicable federal statutes and regulations, including but not limited to 36 C.F.R. 800.

At this time, it would be appropriate for the U.S. Army Corps of Engineers to analyze the information that has been gathered from the Indiana SHPO, the general public, and any other consulting parties and make the necessary determinations and findings. Please refer to the following comments for guidance:

1) If the U.S. Army Corps of Engineers believes that a determination of "no historic properties affected" accurately reflects its assessment, then it shall provide documentation of its finding as set forth in 36 C.F.R. § 800.11 to the Indiana SHPO, notify all consulting parties, and make the documentation available for public inspection (36 C.F.R. §§ 800.4[d][1] and 800.2[d][2]).

2) If, on the other hand, the U.S. Army Corps of Engineers finds that an historic property may be affected, then it shall notify the Indiana SHPO, the public and all consulting parties of its finding and seek views on effects in accordance with 36 C.F.R. §§ 800.4(d)(2) and 800.2(d)(2). Thereafter, the U.S. Army Corps of

Engineers may proceed to apply the criteria of adverse effect and determine whether the project will result in a “no adverse effect” or an “adverse effect” in accordance with 36 C.F.R. § 800.5.

A copy of the revised 36 C.F.R. Part 800 that went into effect on August 5, 2004, may be found on the Internet at www.achp.gov for your reference. If you have questions about archaeological issues please contact Rachel Sharkey at (317) 234-5254 or rsharkey@dnr.IN.gov. If you have questions about buildings or structures please contact Kim Marie Padgett at (317) 234-6705 or kpadgett@dnr.IN.gov. Additionally, in all future correspondence regarding the above indicated project, please refer to DHPA #25605.

Very truly yours,

Beth K. McCord
Deputy State Historic Preservation Officer

BKM:KMP:RAS:ras

emc: Jason Zylka, U.S. Army Corps of Engineers