Final Draft

Environmental Assessment for Improvements at Administrative United States Penitentiary Thomson Thomson, Illinois

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ACRONYMS AND ABBREVIATIONS

AADT	annual average daily traffic
AQCR	Air Quality Control Region
AUSP	Administrative United States Penitentiary
BMPs	best management practices
Bureau	[Federal] Bureau of Prisons
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CUP	central utility plant
dB	decibel
dBA	A-weighted decibel
dBP	peak level decibel
DNL	Day-Night Sound Level
EA	environmental assessment
EO	executive order
EPA	U.S. Environmental Protection Agency
°F	degrees Fahrenheit
GHG	greenhouse gases
IAC	Illinois Administrative Code
IEPA	Illinois Environmental Protection Agency
L_{eq}	Equivalent Sound Level
LOS	level of service
$\mu g/m^3$	micrograms per cubic meter
mgd	million gallons per day
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NOA	notice of availability
NO_x	oxides of nitrogen
NO_2	nitrogen dioxide
NRHP	National Register of Historic Places
O_3	ozone
PM_{10}	particulate matter less than 10 microns in diameter

$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppb	parts per billion
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
SARNAM2	Small Arms Range Noise Assessment Model
SO_2	sulfur dioxide
SO_x	oxides of sulfur
SORT	Special Operations Response Team
SR	state route
SWPPP	stormwater pollution prevention plan
tpy	tons per year
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound

SECTION 1.0
PURPOSE, NEED, AND SCOPE

1.1 PURPOSE AND NEED

This environmental assessment (EA) evaluates the potential environmental impacts of the Federal Bureau of Prisons' (Bureau's) improvements at the 140-acre Administrative United States Penitentiary (AUSP) Thomson, in the Village of Thomson in Carroll County, Illinois (Figures 1 and 2). Prior to the Bureau's acquisition of the Thomson facility in 2012, it was the Illinois Maximum Security Correctional Center at Thomson, Illinois. The proposed Bureau improvements have been deemed necessary for the new federal mission at AUSP Thomson; some of the improvements would need to be completed before maximum-security inmates are housed at the penitentiary. This EA has been prepared to comply with the requirements of the National Environmental Policy Act of 1969 (NEPA), as amended (Title 42 of the *United States Code* [U.S.C.], Sections 4321−4347); the Council on Environmental Quality's (CEQ's) *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (Title 40 of the *Code of Federal Regulations* [CFR], Parts 1500–1508); and 28 CFR Part 61, Appendix A, *Bureau of Prisons Procedures Relating to the Implementation of the National Environmental Policy Act.*

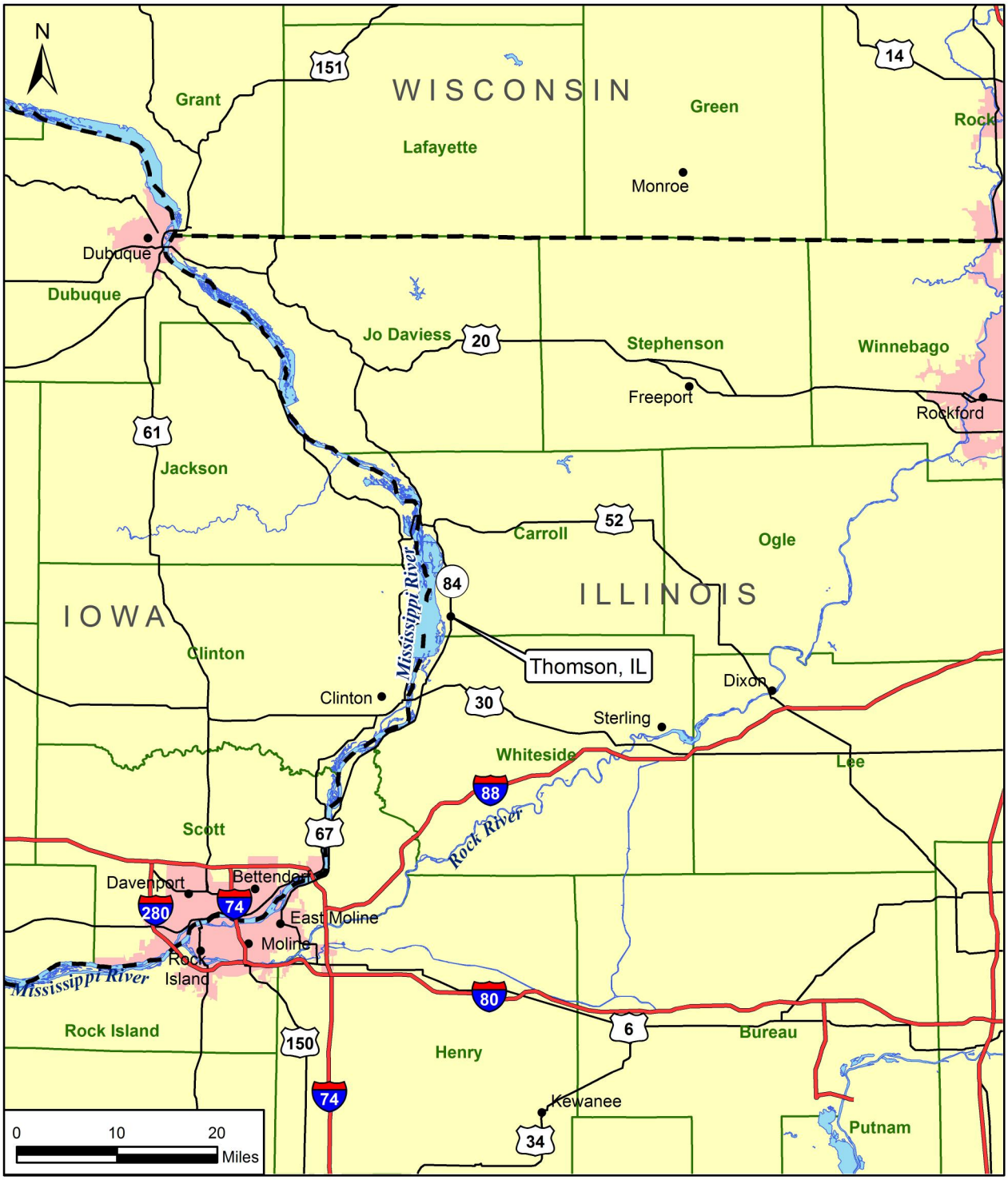
In 2010, the Bureau prepared the *Environmental Assessment for the Federal Bureau of Prisons' Acquisition and Activation of Thomson Correctional Center as Administrative United States Penitentiary Thomson* (BOP 2010). The 2010 EA evaluated the potential environmental impacts of the Bureau's acquisition of the Thomson facility from the State of Illinois to address an acute shortage of male high-security, maximum-custody bed space for federal inmates. The Bureau site improvements described in this EA were not part of the action evaluated in the 2010 EA; this EA analyzes the site improvements to comply with NEPA and with the CEQ's and the Bureau's NEPA implementing regulations.

The Illinois Department of Corrections built the penitentiary in 2001. BOP acquired it in October 2012. AUSP Thomson's principal facilities consist of eight maximum-security housing units (with a housing capacity of 3,200 inmates), a minimum-security housing unit (with a housing capacity of 200 inmates), an administration building, a prisoner programs building, a prisoner support building, and a warehouse. Up to 1,100 staff will be employed at AUSP Thomson.

1.2 SCOPE

This EA identifies, documents, and evaluates the environmental effects of the Bureau's proposed facility improvements at AUSP Thomson. Its purpose is to inform decision makers and the public of the likely environmental consequences of the proposed action and alternatives. The U.S. Fish and Wildlife Service (USFWS) and the Illinois Historic Preservation Agency have been contacted concerning the proposed action (see Appendix A). If either agency raises concerns about the resources under its jurisdiction, a discussion of those issues will be added to this EA.

An interdisciplinary team of environmental scientists and engineers analyzed the proposed action and alternatives in light of existing conditions and identified relevant beneficial and adverse effects associated with the action. The Bureau's proposed action and a no action alternative are described in section 2.0. Conditions existing as of November 2015—considered the "baseline" conditions—are described in section 3.0, Affected Environment and Consequences. The expected effects of the proposed action, also described in section 3.0, are presented immediately after the description of baseline conditions for each environmental resource addressed in detail in this document. Section 3.0 also addresses the potential for cumulative effects, and mitigation measures are identified where appropriate.

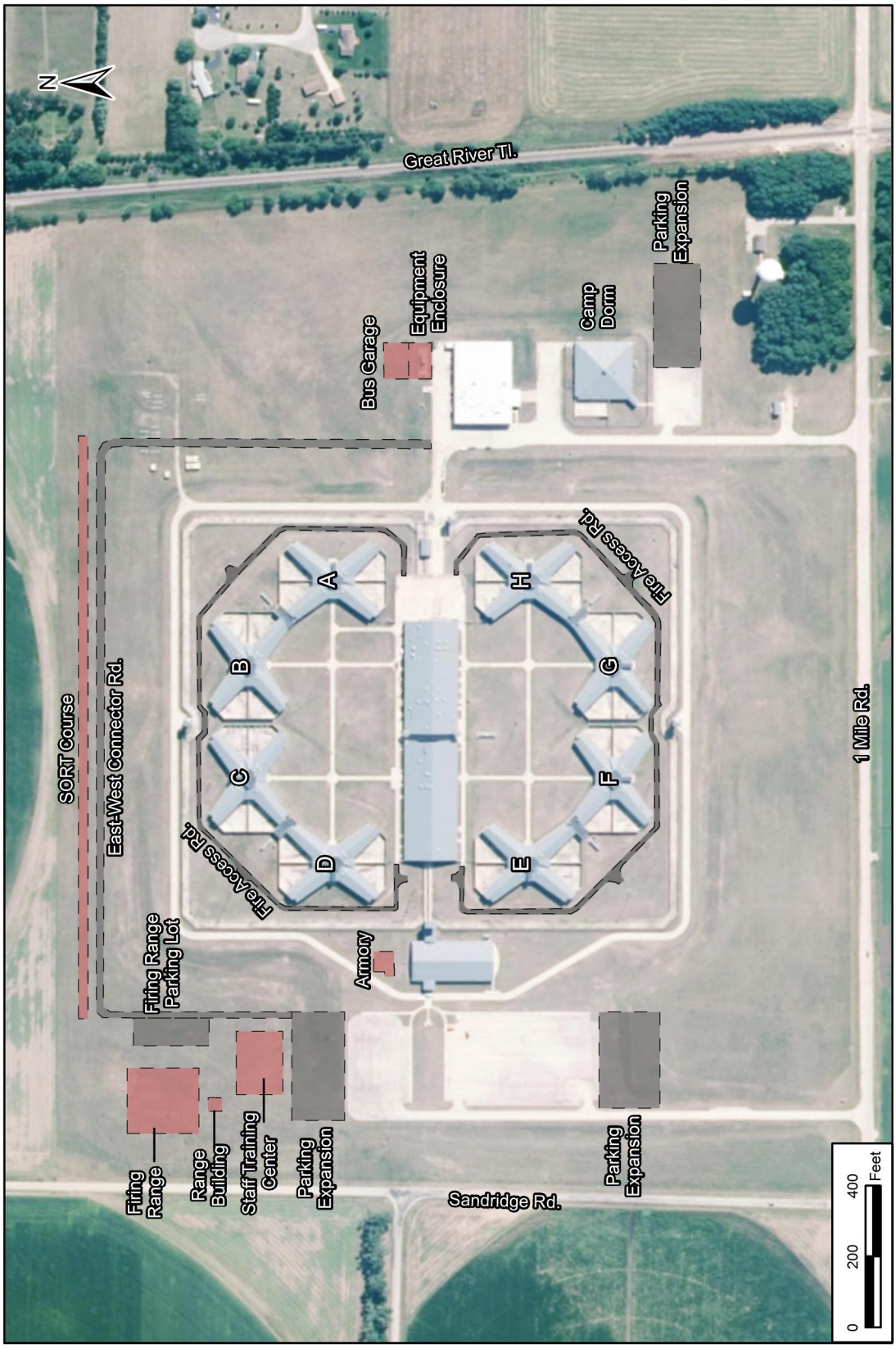


LEGEND

- State Boundary
- County Boundary
- Interstate Highway
- U.S. Route
- Urban Area
- Surface Water

General Location Map

Figure 1



Proposed Improvements at AUSP Thomson

Figure 2

Source: ESRI 2014. Note: Not to scale. Locations are approximate.

Section 2.1 describes the proposed action. Section 3.0 of the EA provides analyses of potential impacts on air quality, noise, soils, water resources, biological resources, transportation, utilities, and hazardous materials and wastes. Because of the limited potential for impacts to land use, aesthetics and visual resources, cultural resources, and socioeconomics identified during project scoping, the EA does not evaluate in detail impacts to those resources (see section 3.10).

1.3 PUBLIC INVOLVEMENT

Under regulations issued by the CEQ,[1] the evaluation of potential environmental effects of federal actions is open to public participation. Public participation in the NEPA process promotes both open communication between the public and the Bureau and better decision making. All people and organizations with a potential interest in the proposed action are urged to participate in the NEPA environmental analysis process.

Public participation opportunities with respect to the proposed action and this EA are guided by Bureau regulations. The Bureau will make the EA available for 30 days for public comment, beginning with publication of a notice of availability (NOA) in *The Carroll County Review* newspaper. During this review period, the Bureau will consider comments on the EA submitted by agencies, organizations, and members of the public. At the conclusion of the review period, the Bureau will, if appropriate, execute a Finding of No Significant Impact and proceed with the proposed action.[2]

1.4 FRAMEWORK FOR DECISION MAKING

A decision on whether to proceed with the proposed action rests on numerous factors, such as the Bureau's mission requirements and schedule, the availability of funding, and environmental considerations. In addressing environmental considerations, the Bureau is guided by several relevant statutes (and their implementing regulations) and executive orders (EOs) that establish standards and provide guidance on environmental and natural resources management and planning. Relevant statutes include the Clean Air Act (CAA), Clean Water Act (CWA), Noise Control Act, Endangered Species Act, National Historic Preservation Act, Archaeological Resources Protection Act, Resource Conservation and Recovery Act (RCRA), Energy Policy Act, Energy Independence and Security Act, and Toxic Substances Control Act. EOs bearing on the proposed action include EO 11988 (*Floodplain Management*); EO 11990 (*Protection of Wetlands*); EO 12088 (*Federal Compliance with Pollution Control Standards*); EO 12580 (*Superfund Implementation*); EO 12898 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*); EO 13045 (*Protection of Children from Environmental Health Risks and Safety Risks*); EO 13175 (*Consultation and Coordination with Indian Tribal Governments*); EO 13186 (*Responsibilities of Federal Agencies to Protect Migratory Birds*); EO 13423 (*Strengthening Federal Environmental, Energy, and Transportation Management*); and EO 13514 (*Federal Leadership in Environmental, Energy, and Economic Performance*). This EA refers to these authorities when they are relevant to specific environmental resources and conditions.

[1] Council on Environmental Quality, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*, 40 CFR Parts 1500–1508.

[2] If it is determined that implementing the proposed action would result in significant impacts, the Bureau would (a) publish in the *Federal Register* a notice of intent to prepare an environmental impact statement, (b) determine and commit to mitigation actions sufficient to reduce impacts below significance thresholds, or (c) not take the action.

SECTION 2.0
DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The proposed action is to implement facility improvements at AUSP Thomson that the Bureau has deemed necessary for the federal mission at the penitentiary. Elements of the proposed action include an armory, parking lot expansion and improvements, fire access road improvements, stormwater retention drainage improvements, a bus garage service building, an electrical equipment enclosure for the central powerhouse, a staff training course, and a staff training center. Each of these site elements is described individually in this section as well as evaluated in relation to the entire AUSP Thomson site. All of the proposed facility improvements would be on AUSP Thomson property. The proposed improvements would be outside the secure area perimeter fence, except for the fire access road improvements which would be inside the secure area fence. Construction of these facility improvements would begin in FY 16 and are scheduled to be completed by FY 18. A potential configuration of the improvements is shown in Figure 2.

2.1.1 Armory Building

The Bureau's armory functions are typically located within an institution's main administration building. A Bureau armory is a secured area located outside the secure perimeter for specialized equipment used by correctional staff in an emergency situation. Unfortunately, the existing AUSP Thomson administration building has insufficient space to support the Bureau's standard armory operations. Therefore, an armory building is proposed near the existing administration building.

2.1.2 Parking Lot Expansion and Site Improvements

2.1.2.1 Site Improvements Outside the Secure Perimeter

It is proposed that the existing main parking lots on the west side of AUSP Thomson would be expanded from approximately 450 spaces to approximately 700 spaces for staff and visitors, and the existing parking lot at the east side of AUSP Thomson (near the Camp Dorm) would be expanded from approximately 50 spaces to approximately 100 spaces for staff and visitors. The expanded parking lots would require lighting, pedestrian walks, and other miscellaneous elements to incorporate the new parking with the existing site. In addition, new roadways, parking, and related ancillary site improvement items would be required to access the other proposed buildings described herein, and to connect the east and west sides of the property.

2.1.2.2 Site Improvements Inside the Secure Perimeter

Access roads are proposed within the existing secure perimeter of the institution, for emergency and maintenance vehicle access between the housing units and the perimeter fence. Infrastructure components would be relocated as required and additional gates within the secure perimeter may be provided for vehicle access. Additional site lighting is not anticipated inside the secure perimeter because of the existing high mast lights.

2.1.2.3 Site Stormwater Retention and Drainage

The proposed new facilities, parking lots, and roads would increase the impervious surface area and alter the existing site drainage on the AUSP Thomson property. The existing storm drainage infiltration basins on the property would be altered to accommodate all site additions and improvements.

2.1.3 Bus Garage Service Building

Bureau institutions typically have a garage/landscape shop building outside the secure perimeter of the institution. AUSP Thomson has an existing service garage in the warehouse building, but it is insufficient for the Bureau's regular bus operations. Therefore, a bus garage service building is proposed near the existing warehouse building.

2.1.4 Electrical Equipment Enclosure

Bureau institutions typically have a Central Utility Plant (CUP) building outside the secure perimeter of the institution. The CUP normally consolidates all facility wide services such as boilers, switchgear, and generators into one building for monitoring and maintenance. AUSP Thomson does not have a CUP building, and the institution's switchgear and generator are located outside in a fenced area, near the existing warehouse building. Therefore, an electrical equipment enclosure is proposed to protect maintenance staff and the equipment from the weather. A second generator would also be added as a redundant power source within the electrical enclosure.

2.1.5 Firing Range and Special Operations Response Team Course

The correctional staff at Bureau institutions is required to maintain a specific level of readiness, and weapons training and physical training are important components of this. Therefore, a firing range and Special Operations Response Team (SORT) course have been proposed for the AUSP Thomson site, outside the secure perimeter of the institution. The firing range would include a range building and an outdoor range with a covered firing line. The outdoor range would have safety baffles, berms, and backstops, and the range structures would be impenetrable and intended to absorb or restrict bullets so that the bullets would not leave the containment area. A SORT course is a one-quarter mile obstacle course for staff physical training.

The firing range would not be used on a day-to-day basis; intense use would be limited to only a few weeks per year for annual staff training. Aside from annual training, the Bureau's usage of the firing range would not be of the intensity of a commercial range. The Bureau would never use the range for recreational purposes, and use would normally be restricted to Bureau employees. Other federal agencies or local law enforcement organizations may be granted permission on a case-by-case basis to use the range for their weapons training activities.

2.1.6 Staff Training Center

Bureau institutions typically establish a staff training center to support staff enrichment and other Bureau training goals. A staff training center usually has a multi-purpose space for classroom instruction and gatherings, and also supports physical fitness training with a workout facility and locker rooms. AUSP Thomson does not have an existing structure to support a staff training center outside the secure perimeter. Therefore, a staff training center is proposed for the AUSP Thomson site.

2.2 NO ACTION ALTERNATIVE

CEQ regulations require analysis of a no action alternative to provide a benchmark, enabling decision makers to compare the magnitude of the potential environmental effects caused by the proposed action and other alternative actions. The no action alternative is not required to be reasonable, nor does it need to meet the purpose and need of the proposed action.

Under the no action alternative, the Bureau’s proposed facility improvements at AUSP Thomson would not be implemented. The no action alternative would maintain the status quo; none of the infrastructure improvements (e.g., expanded parking lots, paved fire access roads, stormwater retention and drainage, electrical equipment enclosure) or staff training and facility improvements (e.g., larger armory and bus service garage, staff training center, firing range, SORT course)

would be made. AUSP Thomson would continue to operate with its existing facilities and infrastructure. Operational efficiency would be compromised, hindering the Bureau's ability to effectively accomplish its mission at the institution. Staff training would be held at other locations, which would require additional travel time and expense.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION OR DETAILED STUDY

2.3.1 Armory Building Alternatives

The Bureau considered whether the armory functions could be incorporated into the existing administration building via renovations, or accommodated with a building addition. These considerations were eliminated due to findings of insufficient space within the existing administration building and findings that a building addition would result in costly site infrastructure modifications. The proposed armory building was determined to be the viable alternative to pursue in the EA.

2.3.2 Site Improvement Alternatives

There are no viable site improvement alternatives for the Bureau to consider, as the site entrances, primary traffic circulation, and parking areas are well established. The new site improvements will be developed as an extension of the existing components, and coordinated among all proposed Bureau site additions and improvements.

2.3.3 Bus Service Garage Building Alternatives

The Bureau considered whether the bus garage functions could be incorporated into the existing warehouse garage facility, or accommodated with a building addition to the existing warehouse building. These considerations were eliminated due to findings of insufficient space within the existing warehouse garage facility, and findings that a building addition would have a negative impact on warehouse operations and oversight. The proposed bus service garage building was determined to be the viable alternative to pursue in the EA.

2.3.4 Electrical Equipment Enclosure Alternatives

The Bureau considered whether the electrical equipment could be enclosed in a CUP type of building. This consideration was eliminated because the existing utility systems are distributed throughout the existing institution, with the exception of the primary electrical distribution system. The proposed electrical equipment enclosure was determined to be the viable alternative to pursue in the EA.

2.3.5 Firing Range and SORT Course Alternatives

The Bureau considered whether an indoor firing range would be acceptable. The indoor firing range was eliminated because the size of a typical Bureau firing range (an outdoor range) would be cost prohibitive as an indoor facility. Because of property boundary limitations, there are only two reasonable location options for the proposed firing range: the northwest corner and the northeast corner. The northwest corner was selected because it is furthest away from the daily operations at the minimum security camp, institution warehouse, and the rear gate. The range orientation would preferably "shoot north" for optimal target illumination and least sunlight interference, reinforced by the Bureau's own criteria for layout and construction of a firing range. The proposed outdoor firing range at the northwest corner and the nearby SORT course were determined to be the viable alternative to pursue in the EA.

2.3.6 Staff Training Center Alternatives

There are no viable renovations or building addition alternatives for the Bureau to consider, because a staff training center must be visually separated from the main institution and the camp.

SECTION 3.0
AFFECTED ENVIRONMENT AND CONSEQUENCES

3.1 LAND USE

3.1.1 Affected Environment

"Land use" describes the activities that take place in a particular area and generally refers to human modification of land, often for residential or economic purposes. It is important as a means to determine if sufficient area is available for the proposed activities and to identify any potential conflicts with surrounding land uses.

AUSP Thomson is located in Carroll County, Illinois, which is in the western part of the state and borders the Mississippi River (Figure 1). The county is a rural area and agriculture is the primary land use. AUSP Thomson lies just west of Illinois State Route (SR) 84, approximately 1 mile north of the Village of Thomson (with a population of approximately 765) and about one-half mile east of the Mississippi River. The construction of the penitentiary, completed in November 2001, resulted in the conversion of 140 acres of agricultural land to institutional land use. Agricultural land borders AUSP Thomson to the north, south, and west. A BNSF Railway freight line borders the property to the east, with agricultural land and some low-density residential and commercial land beyond the tracks along SR 84. A potable water tower belonging to the Village of Thomson sits near the southeast corner of AUSP Thomson, and the village's water treatment facility is located southwest of the institution. The prison can be seen only from the local roads providing access to the site and not from the Mississippi River or from the main thoroughfare (SR 84). Light from its secure area perimeter fence high-mast lighting can be seen at night from the river and the highway.

Land under the jurisdiction of the Village of Thomson borders AUSP Thomson to the north, east, and west. The village zoned the land to the north, to the west, and immediately to the east of the penitentiary (along the freight rail line) for industry. Bordering the industry zone further to the east (along SR 84) is land zoned for highway/auto commerce and low-density residential. The land to the south of AUSP Thomson but north of the Village of Thomson is unincorporated and is used for agriculture (Village of Thomson 2014).

3.1.2 Environmental Consequences

3.1.2.1 Proposed Action

Long-term, less than significant, adverse effects on surrounding land use would be expected from noise from the proposed firing range. The proposed range would be constructed with physical buffers (e.g., earthen berms or barrier walls) around the range to prevent the range fan from going off the Bureau's property and creating a safety conflict with the bordering land use. The range would be designed in accordance with the Bureau's *Design Program Guidelines* to be large enough to accommodate the appropriate safety fan to contain all projectiles and ricochets. Noise from the firing range, however, would be heard in the surrounding area. See section 3.3 (*Noise*) for a discussion of noise effects.

Other proposed action improvements include buildings (e.g., staff training center, bus garage, armory, electrical equipment enclosure) that would be similar in style and use to the existing support buildings, utility improvements (stormwater), and facility functional improvements (i.e., parking lots, roads, lighting). These improvements would not conflict with surrounding land use. Light from the institution's secure area perimeter fence high-mast lighting already can be seen at night from Illinois SR 84 and the Mississippi River, and the proposed action would not change this condition. The SORT course would be an obstacle course for staff training and would not conflict with surrounding agricultural land use.

3.1.2.2 No Action Alternative

No effects on land use would be expected under the no action alternative.

3.2 AIR QUALITY

3.2.1 Affected Environment

The U.S. Environmental Protection Agency's (EPA's) Region 5 office and the Illinois Environmental Protection Agency (IEPA) are responsible for regulating air quality in Illinois. The CAA, as amended (42 U.S.C. 7401-7671q), assigns EPA the responsibility for establishing the primary and secondary National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50). The NAAQS specify acceptable concentration levels of six criteria pollutants: particulate matter (measured as both particulate matter less than 10 microns in diameter [PM_{10}] and particulate matter less than 2.5 microns in diameter [$PM_{2.5}$]), sulfur dioxide (SO_2), carbon monoxide (CO), oxides of nitrogen (NO_X), ozone (O_3), and lead. Short-term NAAQS (for 1-, 8-, and 24-hour periods) have been established for pollutants contributing to acute health effects, while long-term NAAQS (annual averages) have been established for pollutants contributing to chronic health effects. While each state has the authority to adopt standards stricter than those established under the federal program, the State of Illinois has adopted the federal standards.

Federal regulations designate Air Quality Control Regions (AQCRs) in violation of the NAAQS as *nonattainment* areas and AQCRs with levels below the NAAQS as *attainment* areas. EPA monitors levels of criteria pollutants at representative sites in each region throughout Illinois. Carroll County (and, therefore, all areas associated with the proposed action) is within the Metropolitan Quad Cities Interstate AQCR (40 CFR 81.102) and has been designated by EPA as an attainment area for all criteria pollutants (USEPA 2015a). Table 3.2-1 shows the concentrations of criteria pollutants at the monitoring locations closest to AUSP Thomson (USEPA 2015b).

Greenhouse Gases and Climate Change. Thomson, Illinois's average high temperature is 81.6 degrees Fahrenheit (°F) in the hottest month of July, and the average low temperature is 10.9 °F in the coldest month of January. Thomson has average annual precipitation of 34.5 inches per year. The wettest month of the year is August with an average rainfall of 4.5 inches (Idcide 2015).

Greenhouse gases (GHGs) are components of the atmosphere that trap heat relatively near the surface of the Earth and, therefore, contribute to the greenhouse effect and climate change. Most GHGs occur naturally in the atmosphere, but increases in their concentration result from human activities such as burning of fossil fuels. Global temperatures are expected to continue to rise as human activities continue to add carbon dioxide (CO_2), methane, nitrous oxide, and other

greenhouse (or heat-trapping) gases to the atmosphere. Whether rainfall will increase or decrease remains difficult to project for specific regions (IPCC 2007; USEPA 2015c).

EO 13693 (*Planning for Federal Sustainability in the Next Decade*) outlines policies intended to ensure that federal agencies evaluate climate-change risks and vulnerabilities, and to manage the short- and long-term effects of climate change on their operations and mission. The EO specifically requires agencies within the federal government to measure, report, and reduce their GHG emissions from both their direct and indirect activities. The Bureau is pursuing energy conservation and greening projects covering a wide range of conservation measures, including water conservation; lighting, metering, heating ventilation, and air conditioning upgrades; and renewable energy (DOJ 2013). In addition, the CEQ recently released draft guidance on when and how federal agencies should consider GHG emissions and climate change in NEPA analyses. The draft guidance includes a presumptive effects threshold of 27,563 tons per year (tpy) (25,000 metric tpy) of CO_2-equivalent emissions from a federal action (CEQ 2014).

Table 3.2-1.
Air Quality Standards and Monitored Data

Pollutant	Air Quality Standard		Monitored Concentrations		
	Level	Averaging Period	2012	2013	2014
CO					
1-hour (ppm)	35	Not to be exceeded more than once per year	1.8	1.1	1.3
8-hour (ppm)	9		1.1	0.6	0.8
Nitrogen Dioxide (NO_2)					
1-hour (ppb)	100	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years	*No Data*	64	67
O_3					
8-hour (ppm)	0.070	3-year average of the fourth highest daily maximum	0.075	0.065	0.07
SO_2					
1-hour (ppm)	75	98th percentile, averaged over 3 years	*No Data*	73	53
3-hour (ppb)	0.5	Not to be exceeded more than once per year	22	17	11
$PM_{2.5}$					
24-hour (µg/m^3)	35	98th percentile, averaged over 3 years	*No Data*	*No Data*	21
Annual mean (µg/m^3)	12	Averaged over 3 years	*No Data*	*No Data*	10
PM_{10}					
24-hour (µg/m^3)	150	Not to be exceeded more than once per year over 3 years	93	101	93

Source: 40 CFR 50.1-50.12, USEPA 2015b.
Notes: ppm = parts per million; ppb = parts per billion; µg/m^3 = micrograms per cubic meter

3.2.2 Environmental Consequences

3.2.2.1 Proposed Action

Short- and long-term minor adverse effects on air quality would be expected from the proposed action being implemented. Short-term effects would be caused by airborne dust and other pollutants being generated during construction, and long-term effects would be caused by commuting activities and new stationary sources of pollutants such as heating boilers and possibly emergency generators being introduced. Air quality effects would be minor unless the emissions exceeded the general conformity rule *de minimis* (of minimal importance) threshold values, exceeded the GHG threshold in the draft CEQ guidance, or contributed to a violation of any federal, state, or local air regulation.

Construction. Construction emissions were estimated for fugitive dust, on- and off-road diesel equipment and vehicles, worker trips, architectural coatings, and paving off-gases (Table 3.2-2). Although the area is in attainment and the general conformity rules do not apply, the *de minimis* threshold values were carried forward to determine the level of effects under NEPA. The estimated emissions from the proposed action would be below the *de minimis* thresholds; therefore, the level of effects would be minor. Detailed emissions calculations are provided in Appendix B.

Table 3.2-2.
Estimated Air Emissions Compared to *De Minimis* Thresholds

Activity/Source	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	*De minimis Threshold [tpy]*	*Exceeds De Minimis Thresholds? [Yes/No]*
Construction	2.6	4.3	0.7	0.9	1.3	0.3	100	No
Operations	0.1	0.2	<0.1	<0.1	<0.1	<0.1	100	No

Notes: *de minimis* = of minimal importance, SO_x = oxides of sulfur, VOC = volatile organic compound.

For purposes of this analysis, it was assumed that all construction activities would be compressed into one 12-month period. Therefore, regardless of the ultimate implementation schedule, annual emissions would be less than those specified herein. Small changes in facility siting and ultimate design, and moderate changes in quantity and types of equipment used would not substantially alter these emission estimates and would not change the determination under the general conformity rule or level of effects under NEPA.

Operations. Operational emissions are primarily derived from heating of the buildings. Any new stationary sources of air emissions could be subject to federal and state air permitting regulations and would be added to the facility's air permit. Both a new source construction permit and a modification to the existing permit could be required. In addition, the Illinois Administrative Code (IAC) outlines requirements with which the developer must comply when constructing new facilities, such as controlling fugitive dust and open burning. All people responsible for any operation, process, handling, transportation, or storage facility that could result in fugitive dust would take reasonable precautions to prevent any dust from becoming airborne. Reasonable precautions might include using water to control dust from land clearing, road grading, or building construction. In addition, construction would proceed in full compliance with current IEPA requirements, with compliant practices or products. These requirements include the following:

- Visible and particulate matter emissions (IAC 35-1-212)
- Organic material emissions standards and limitations (IAC 35-1-218)
- Nitrogen oxides emissions (IAC 35-1-217)
- Open burning (IAC 35-1-237)

This listing is not all-inclusive; the Bureau and any contractors would comply with all applicable air pollution control regulations.

Greenhouse Gases and Climate Change. All construction activities combined would generate approximately 393 tons (357 metric tons) of CO_2, which would be below the CEQ threshold. All operational activities combined would generate approximately 148 tons (135 metric tons) of CO_2, which would be below the CEQ threshold. These effects would be minor.

3.2.2.2 No Action Alternative

No effects on air quality would be expected under the no action alternative.

3.3 NOISE

3.3.1 Affected Environment

"Sound" is a physical phenomenon consisting of vibrations that travel through a medium, such as air, and are sensed by the human ear. "Noise" is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise distance between the noise source and the receptor, receptor sensitivity, and time of day. Noise is often generated by activities (such as construction or vehicular traffic) essential to a community's quality of life.

Sound varies by both intensity and frequency. Sound pressure level, described in decibels (dB), is used to quantify sound intensity. The dB is a logarithmic unit that expresses the ratio of a sound pressure level to a standard reference level. Hertz are units used to quantify sound frequency. The human ear responds differently to different frequencies. "A-weighing," measured in A-weighted decibels (dBA), approximates a frequency response expressing the perception of sound by humans. Sounds encountered in daily life and their dBA levels are provided in Table 3.3-1.

The dBA noise metric describes steady noise levels, although very few noises are, in fact, constant. Therefore, A-weighted Day-night Sound Level has been developed. Day-night Sound Level (DNL) is defined as the average sound energy in a 24-hour period with a 10-dB penalty added to the nighttime levels (10 p.m. to 7 a.m.). DNL is a useful descriptor for noise because: (1) it averages ongoing yet intermittent noise, and (2) it measures total sound energy over a 24-hour period. In addition, Equivalent Sound Level (L_{eq}) is often used to describe the overall noise environment. L_{eq} is the average sound level in dB.

Table 3.3-1.
Common Sounds and Their dBA Levels

Outdoor	Sound Level (dBA)	Indoor
Motorcycle	100	Subway train
Tractor	90	Garbage disposal
Noisy restaurant	85	Blender
Downtown (large city)	80	Ringing telephone
Freeway traffic	70	TV audio
Normal conversation	60	Sewing machine
Rainfall	50	Refrigerator
Quiet residential area	40	Library

Source: Harris 1998.

The Noise Control Act of 1972 (Public Law 92-574) directs federal agencies to comply with applicable federal, state, and local noise control regulations. Illinois's Environmental Protection Act of 1985 limits noise to levels that protect health, general welfare, and property. Illinois has a comprehensive noise regulation that limits impulsive noise at the property line to a maximum of 47 dBA during daytime hours and 37 dBA during nighttime hours. It considers both residences and correctional intuitions "Class A" noise-sensitive land uses. This threshold is highly restrictive if applied at the property boundary—and likely impossible to meet if applied at the detention areas within the facility. Carroll County maintains a general nuisance noise ordinance, which does not specify explicit not-to-exceed levels.

Individuals could be subjected to multiple sources of noise, including automobile traffic, high-altitude aircraft overflights, trains, lawn maintenance, and natural noises such as vegetation blowing in the wind and bird vocalizations. Existing noise levels (L_{eq} and DNL) were estimated for the surrounding areas using the techniques specified in the American National Standards Institute's *Quantities and Procedures for Description and Measurement of Environmental Sound Part 3: Short-term measurements with an observer present* (ANSI 2013). The proposed site land use category is rural having an estimated background noise level of 40 dBA during daytime hours. Table 3.3-2 lists the residences located the closest to the facility, which are 598 feet. There are no churches, hospitals, or schools within five miles. An active rail spur is located less than 200 feet from the facility and adjacent to nearby residences.

Table 3.3-2.
Estimated Background Noise Levels at Nearby Noise-Sensitive Areas

Closest Noise-Sensitive Area				Estimated Existing Sound Levels (dBA)		
Distance (feet)	Direction	Type	Land Use Category	DNL	L_{eq} (daytime)	L_{eq} (nighttime)
598	South	Residential	Rural	40	38	32
716	East					
821	East					

Source: ANSI 2013.

3.3.2 Environmental Consequences

3.3.2.1 Proposed Action

Short-term minor and long-term adverse effects would be expected. Short-term increases in noise would be due to construction activities. The proposed action would have the potential for appreciable long-term adverse effects due to increases in noise from the proposed firing range; therefore, mitigation would be implemented to ensure effects remain at less-than-significant levels.

Construction. Table 3.3-3 presents typical noise levels (dBA at 50 feet) that the EPA has estimated for the main phases of outdoor construction. Individual pieces of construction equipment typically generate noise levels of 80–90 dBA at a distance of 50 feet. With multiple items of equipment operating concurrently, noise levels can be relatively high during daytime periods at locations within several hundred feet of active construction sites. The zone of relatively high construction noise typically extends to distances of 400–800 feet from the site of major equipment operations.

Table 3.3-3.
Noise Levels Associated with Outdoor Construction

Construction Phase	L_{eq} (dBA)
Ground clearing	84
Excavation, grading	89
Foundations	78
Structural	85
Finishing	89

Source: USEPA 1971.

Two residences are located within 800 feet of the facility that might be intermittently exposed to appreciable levels of construction noise. Given the temporary nature of proposed construction and the limited amount of noise that heavy equipment would generate, the effects would be minor. Although construction-related noise effects would be minor, the following best management practices (BMPs) would be implemented to further reduce any realized noise effects:

- Construction would primarily occur during normal weekday business hours; and
- Construction equipment mufflers would be properly maintained and in good working order.

Construction noise would dominate the soundscape for all on-site personnel. Construction personnel, and particularly equipment operators, would wear adequate personal hearing protection to limit exposure and ensure compliance with federal health and safety regulations.

Operations. The proposed action would increase levels of noise within the immediate area through the use of small arms weaponry at the proposed firing range. Based on the best available information and without mitigation, increases in noise from the proposed range would have the potential for appreciable long-term adverse effects on areas surrounding AUSP Thomson; therefore, mitigation would be implemented to ensure effects remain at less-than-significant levels.

The metric used in defining the land use planning for small arm ranges is "peak level" (dBP). Peak level is the maximum instantaneous level that can occur during an acoustic event. In the case of small arms weapons, it is the maximum instantaneous noise level made by a specific weapon, at a specific distance. Peak level for small arms weapons is strongly correlated with community annoyance (Hede 1982). Table 3.3-4 outlines noise limits and zones for land use planning for small arms ranges.

Table 3.3-4.
Noise Thresholds for Noise-Sensitive Land Uses Near Firing Ranges

General Level of Noise	Small-arms	Recommended Uses
Low	< 87 dBP	Noise-sensitive land uses acceptable
Moderate	87–104 dBP	Noise-sensitive land uses normally not recommended
High	> 104 dBP	Noise-sensitive land uses not recommended

Source: Hede 1982.

The Small Arms Range Noise Assessment Model (SARNAM2) was used to predict the noise conditions associated with the proposed firing range. SARNAM2 accounts for spectrum and directivity of both muzzle blast and projectile bow shock, which facilitates accurate calculation of propagation and of sound attenuation by barriers. Community response and land use compatibility was subsequently estimated from the noise predictions. Because the range would be surrounded by berms or walls on three sides, the noise would be projected back to areas behind the firing line. Table 3.3-5 outlines the distance normally not recommended for residential land use for different firing directions. Depending on the ultimate location of the range on AUSP Thomson property and firing direction at the range, as many as 110 existing residences would be exposed to levels of noise not normally recommended for residential land use.

Table 3.3-5.
Distance from Range Not Recommended for Residential Land Use

Direction of Fire	Distance Normally Not Recommended for Residential Land Use (>87 dBP) [meters]				Approximate Number of Residences Affected
	North	South	East	West	
North	425	1,230	925	925	110
South	1,230	425	925	925	40
East	925	925	425	1,230	5
West	925	925	1,230	425	50

DNL is a time-weighted average sound energy over a 24-hour period; a 10-dB penalty is added to the nighttime levels (10:00 p.m. to 7:00 a.m.). A DNL of 65 dBA is considered compatible with residential land uses. These characteristics make it a useful descriptor for continuous noise, such as a busy highway, aircraft noise, or small arms range noise. Community annoyance due to small arms ranges is typically assessed using the peak sound level. This approach can be misleading because it does not assess community noise effects due to relatively infrequent, yet loud, impulsive noise events. For example, for a small arms range with limited use, peak sound levels can exceed 87 dB in areas where annual DNL values indicate that noise levels are compatible for residential land use. As outlined in Section 2.1.5, the firing range would not be used on a day-to-day basis, but would be limited to only a few weeks of intense use per year for staff training. The range

would be typically restricted to Bureau employees, and not used for recreational purposes. Restricting the hours of operation to between 7:00 a.m. and 10:00 p.m. would ensure the sound levels remained less than 65 dBA DNL in nearby areas. This level would be compatible for residential land use.

To ensure effects remain at less-than-significant levels, the Bureau would:

- Perform a preconstruction detailed acoustical modeling effort and incorporate noise reduction measures (i.e., walls, barriers, berms, firing orientation), as necessary, into the design of the range. This effort should focus on the existing and future residential land use surrounding the facility.
- Restrict the hours of operation to between 7:00 a.m. and 10:00 p.m.
- Comply with all applicable federal, state, and local noise regulations.

3.3.2.2 No Action Alternative

No effects on the noise environment would be expected under the no action alternative.

3.4 SOILS

3.4.1 Affected Environment

The AUSP Thomson site soils are of the Ade, Dickinson, and Sparta types (see Table 3.4-1 and Figure 3). Excessively drained Sparta and somewhat excessively drained Ade soils cover most of the project area. All site soils are more than 80 inches deep, have low runoff, and have no incidence of flooding or ponding. They are also all classified as Hydrologic Group A soils, meaning the soils consist mainly of deep, well-drained to excessively drained sands or gravelly sands having a high infiltration rate (and therefore a low runoff potential) when the soils are thoroughly wet.

Table 3.4-1.
Site Soils

Soil Type Abbreviation	Soil Type	Hydrologic Group[a]	Soil Reaction (pH Range)[b]	Corrosion of Concrete	Corrosion of Uncoated Steel	Soil Erosion (K Factor, Whole Soil)[c]
vqcr	87A–Dickinson sandy loam, 0–2% slopes	A	5.1 to 7.3	Moderate	Low	0.28 (very low)
vqcx	88A–Sparta loamy sand, 0–2% slopes	A	5.1 to 7.3	Moderate	High	0.20 (very low)
vqcy	88B–Sparta loamy sand, 1–6% slopes	A	5.1 to 7.3	Moderate	High	0.10 (very low)
vqd6	98A–Ade loamy fine sand, 0–2% slopes	A	5.1 to 6.5	Moderate	High	0.17 (very low)

Source: USDA NRCS 2015.
Notes:
a Hydrologic Group A soils have a high infiltration rate (low runoff potential) when thoroughly wet. Such soils consist mainly of deep, well-drained-to-excessively drained sands or gravelly sands.
b "Soil reaction" is a measure of acidity or alkalinity for the upper and lower boundaries of each layer. Ideal soil pH for shooting ranges is 6.5 to 8.5 (USEPA 2005).
c Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used to predict the average annual rate of soil loss in tpy. Values of K range from 0.002 to 0.69. The other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Soils

Figure 3

Soil acidity is measured as pH on a scale between 1 (most acidic) and 14 (most alkaline, or basic), where 7 is termed neutral. The pH for various depths of the Dickinson and Sparta soil types ranges from 5.1 to 7.3. The range for the Ade soil type is 5.1 to 6.5. Each of the soil types are rated moderate for the corrosion of concrete and the Ade and Sparta are rated high for the corrosion of steel. The Dickinson soil type is rated low for the corrosion of steel. All of the soils are rated very low for soil erosion (USDA NRCS 2015).

Based on the results of a 2001 geotechnical investigation prepared for a proposed firing range to be sited on the northwest corner of the AUSP Thomson property, the soils consist of approximately 18 inches of loose silty fine sand with some organics. Below the surficial fine sands, test borings showed fine-to-medium very loose-to-medium dense sand with some silt. At depths of 14–15 feet below ground surface, loose-to-medium dense medium fine sands were encountered. During the investigation, ground water was encountered between 23 and 26 feet below ground surface (GSI 2001).

3.4.2 Environmental Consequences

3.4.2.1 Proposed Action

Short- and long-term minor adverse effects on soils would be expected from implementing the proposed action. Short-term minor adverse effects would be expected during construction of the proposed projects from removal of ground cover, exposure of soil, and increased susceptibility to wind and water erosion. These effects would be minimized by using appropriate BMPs to control stormwater runoff, erosion, and sedimentation during and after construction. In addition to implementing BMPs, a stormwater pollution prevention plan (SWPPP) and compliance with IEPA sediment and erosion control regulations would be required for all proposed construction activities. All exposed soils would be stabilized when construction has been completed.

Long-term minor adverse effects would be expected from the operation of the proposed outdoor firing range because of the potential for lead to contaminate the soil. The effects would be minimized, however, through proper range design and operational management measures that would protect site soils, prevent runoff, and prevent infiltration of lead into subsurface soils. While the site soils are described as being predominantly sandy and acidic, the range design would be protective of the environment by incorporating an impervious underlayment of clay or other material along the range course that would prevent particulate lead from leaching into the soil. Sand traps would be used under and behind the targets to capture bullets and lead fragments. To manage stormwater, a settling pond and a retention pond also would be constructed. The settling pond would capture stormwater and allow lead fragments to settle out before discharging water to the retention pond. BMPs that have been proven to effectively reduce or eliminate lead contamination also would be incorporated into the range design. EPA's publication *Best Management Practices for Lead at Outdoor Shooting Ranges* describes BMPs appropriate for use on the range that include monitoring and adjusting soil pH, controlling runoff to prevent lead migration, physically removing and recycling lead from bullet traps and the range floor, and record keeping.

3.4.2.2 No Action Alternative

No effects on soils would be expected under the no action alternative.

3.5 WATER RESOURCES

3.5.1 Affected Environment

3.5.1.1 Surface Water

No naturally occurring surface water features are located on the AUSP Thomson property. The Mississippi River is approximately one-half mile west of AUSP Thomson (Figure 4).

The facility is located in the Apple-Plum watershed, which is assigned U.S. Geological Survey Hydrologic Unit Code 07060005. Counties contributing to the Apple-Plum watershed are Carroll, Jo Daviess, Stephenson, and Whiteside in Illinois; Clinton, Dubuque, and Jackson in Iowa; and Grant and Lafayette in Wisconsin.

The portion of the Mississippi River near AUSP Thomson—Segment Identification IL_M-12—is listed as impaired for mercury and polychlorinated biphenyls on Illinois's CWA section 303(d) list of impaired water bodies; the segment is not meeting its designated use for fish consumption (IEPA 2014).

3.5.1.2 Groundwater

AUSP Thomson does not use groundwater for any purpose. Groundwater levels on the property are influenced by fluctuations in the water level of the Mississippi River. The facility is underlain by a sand and gravel aquifer and does not contain any aquifers or source water protection management zones regulated by the IEPA. Groundwater in the area is generally obtained from the sand and gravel aquifer at a depth of 65 feet.

3.5.1.3 Floodplains

AUSP Thomson is mapped to be located in Zone D by the National Flood Insurance Program, preliminary Digital Flood Insurance Rate Map number 17015C, panel 0305C. Zone D is defined as an area in which flood hazards are undetermined but possible—generally, an area above the 500-year flood level (Figure 4).

3.5.1.4 Wetlands

The USFWS's National Wetlands Inventory indicates that no wetlands are located on the grounds of or adjacent to AUSP Thomson (Figure 4).

3.5.1.5 Stormwater

Stormwater at AUSP Thomson is managed on-site. The stormwater management system consists of catch basins that convey stormwater to three detention ponds on the grounds around the perimeter of the property on the east, south, and west sides. Stormwater inside the secure area collects in storm drains and is transferred via underground pipes to the stormwater retention ponds. The facility grounds have soils that drain rapidly and rarely pond or flood (USDA NRCS 2015). Also, the depth to the water table in the soils is more than 80 inches. Stormwater tends to infiltrate the soil rather than run off, except during intense storms.

Floodplains and Wetlands

Figure 4

Construction projects that result in a total area of disturbance of 5 acres or more must be covered under the General Stormwater Permit for Construction Activities and be in compliance with conditions of the IEPA stormwater National Pollutant Discharge Elimination System permit. Coverage under the permit requires development and submission of an SWPPP to IEPA. The approved SWPPP provides details on BMPs that will be used to control stormwater runoff from the construction site.

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

Short- and long-term minor adverse effects on water resources would be expected from implementing the proposed action. Ground disturbance during construction would result in some soil loss and erosion during storms. Development and implementation of an SWPPP, as required under the General Stormwater Permit for Construction Activities, would minimize soil loss and retain the soil on the site. Minor leaks or spills of petroleum, oil, and lubricants from construction equipment could occur, but implementing BMPs during construction would minimize leaks or spills. The potential for lead contamination in soil at the proposed outdoor firing range could have a long-term impact on water quality.

Short-term minor adverse effects on water resources would be expected during the construction phase of the proposed projects. Soil disturbance and exposure would increase the susceptibility of soils to wind and water erosion, which would affect the water quality of stormwater runoff and potentially the water quality of the nearby Mississippi River. Water quality would be protected, however, by using appropriate BMPs for controlling stormwater runoff, erosion, and sedimentation during and after construction. BMPs would be selected specific to the type of project (road construction, building construction, parking lot construction, sewer system improvement and construction). The SWPPP for the projects would specify which BMPs would be used to control runoff and protect water quality during each phase of construction. The existing stormwater retention ponds at AUSP Thomson would be redesigned to accommodate the increase in stormwater from the additional impervious area created. Stormwater retention and drainage would be incorporated in to the site design and construction for each individual project, as well as for the overall master plan for AUSP Thomson to properly configure the entire property's stormwater retention and drainage. The modified retention ponds would be sized in accordance with IEPA guidelines for stormwater retention. All exposed soils would be stabilized when construction is completed, so no long-term effects on water quality would be expected.

Lead bullets in the sand traps behind targets could pose a long-term threat to water quality. The range design and operational management would incorporate measures to limit lead leaching, such as incorporating an impervious underlayment of clay or other material along the range course that would limit leaching of particulate lead into deeper soils. A settling and retention pond constructed to manage stormwater on the range would limit lead in stormwater runoff from the range. While effective for reducing lead leaching, some lead would be expected to leach to groundwater and be carried from the site in stormwater. The amount, however, would not be expected to cause a violation of Illinois water quality standards.

3.5.2.2 No Action Alternative

No effects on water resources would be expected under the no action alternative.

3.6 BIOLOGICAL RESOURCES

3.6.1 Affected Environment

The area within the project boundary consists entirely of mowed grass with some sparsely placed shrubbery. Much of the facility is fenced, lacks native vegetation, and overall represents extremely poor quality habitat for wildlife. Native vegetation of the region consisted of extensive prairie communities intermixed with oak hickory forests (Purdue 2015). Beginning in the 19th century, the natural vegetation was gradually replaced by agriculture. Agriculture is now the dominant land use in the region, with corn, soybeans, cattle, sheep, poultry, and hogs being the main products. Agricultural activities have adversely affected stream chemistry and surface water turbidity.

Threatened and Endangered Species. The USFWS online system for review of a project area for potential impacts on federally protected species, including threatened and endangered species and migratory birds, lists five endangered or threatened species and 21 migratory birds as potentially occurring in the county (USFWS 2015). The state of Illinois lists hundreds of species of plants, mammals, birds, reptiles, and invertebrates as threatened or endangered in the state. AUSP Thomson, however, does not provide good foraging, breeding, nesting, or roosting habitat for any of the species.

3.6.2 Environmental Consequences

3.6.2.1 Proposed Action

No adverse effects on biological resources would be expected from implementing the proposed action. The proposed action would not adversely affect any state or federally listed species, migratory bird, or the habitat of these species. Because the habitat on AUSP Thomson is of such low biological quality, common species of plants and animals in the area also would not be adversely affected if the proposed action was implemented.

On October 28, 2015, a coordination letter describing the proposed action and requesting comments was sent to the USFWS regional field office. A copy of the letter is provided in Appendix A.

3.6.2.2 No Action Alternative

No effects on biological resources would be expected from implementing the no action alternative.

3.7 TRANSPORTATION

3.7.1 Affected Environment

Traffic in Thomson, Illinois, is generated primarily by personal operating vehicles. The roadways are predominantly paved, two-lane asphalt roads. Regional access to Thomson is provided by SR 84 from the north and south, and U.S. Route 30 and SR 64 from the east and west. Interstate 88 travels east to west between Chicago and Davenport, approximately 18 miles south of Thomson. Travelers would approach and access AUSP Thomson most efficiently via SR 84 and 1 Mile Road. AUSP Thomson has direct access to 1 Mile Road (Figure 2).

The average annual daily traffic (AADT) is the average number of vehicles traveling along a roadway each day. "Level of service" (LOS) is a measure of the operational conditions on a roadway or at an intersection. LOSs range from A to F, with A representing the best operating conditions—free flow and little delay—and F representing the worst—congestion and long delays. LOSs A, B, or C are typically considered good operating conditions. Table 3.7-1 outlines the routes near the proposed sites and in the area, their AADT, and their estimated existing LOS. SR 84 can be congested (LOS D) during peak traffic periods.

Table 3.7-1.
Existing AADT and LOS on Nearby Roadways

Roadway	AADT (volume per day)	One-Way Peak Hour Volume (volume per hour)	Volume to Capacity Ratio	Estimated Existing LOS
Interstate 88	12,200	294	0.17	B
SR 84	5,450	977	0.57	D
SR 64/U.S. Route 30	9,050	27	0.02	A
1 Mile Road	250	0	0.00	A

Source: IDOT 2015, ITE 2003.

Air, Rail, and Public Transportation. The airport closest to AUSP Thomson is Tri-Township Airport, which is 6 miles away and has 132 operations per day. The closest international airport is Quad City International Airport, which is 25 miles away in Moline, Illinois and has 94 operations per day (AirNav 2015). Other nearby airports include Clinton Municipal in Clinton, Iowa. The closest Amtrak station is 57 miles away in Moline (Amtrak 2015). Public transportation is provided by Carroll County Transit, which operates a curb-to-curb service for all county residents Monday through Friday, 8 a.m. to 4 p.m. Fees are assessed by age, and reservations must be made 1 day in advance or additional fees are incurred (CCT 2015). AUSP Thomson is one-half mile east of the Mississippi River and is directly adjacent to an active north-south rail spur.

3.7.2 Environmental Consequences

3.7.2.1 Proposed Action

Short-term minor adverse and long-term minor beneficial effects would be expected. Short-term effects would be caused by additional vehicles and day-labor traffic during construction. Long-term effects would be the result of upgrades to the in-house transportation infrastructure. The proposed action would have no appreciable effect on air, rail, or public transportation.

Construction. Construction activities would have short-term minor adverse effects on transportation and traffic. The effects would be primarily caused by worker commutes and delivery of equipment and materials to and from the new facilities. Access to AUSP Thomson would be limited to the two existing vehicle entry control points on 1 Mile Road, which would result in effects that are more noticeable on streets near the site than on any of the regional roadways. In addition, road closures or detours to accommodate utility system work might occur. These effects would be temporary and would end with the construction phase. The existing transportation infrastructure would be sufficient to support the increase in vehicle traffic. Although the effects would be minor, contractors would route and schedule construction vehicles to minimize conflicts with other traffic, and strategically position staging areas to minimize traffic effects. All

construction vehicles would be equipped with backing alarms, two-way radios, and Slow Moving Vehicle signs when appropriate.

Operations. Long-term beneficial effects would be the result of expanding the existing east and west side parking lots, paving a new road outside the secure area to connect the east and west sides of AUSP Thomson, and constructing the fire access roads within the secure perimeter. These upgrades to the in-house transportation infrastructure would have minor beneficial effects.

3.7.2.2 No Action Alternative

Selecting the no action alternative would result in no impact on transportation.

3.8 UTILITIES

3.8.1 Affected Environment

AUSP Thomson is served by multiple utilities that provide the facility with potable water, sanitary sewer services, electricity, natural gas, communication services, and solid waste disposal. Details on each utility are provided in this section.

3.8.1.1 Potable Water Supply

The system that supplies water for domestic drinking water, irrigation, and distribution is operated and maintained by the Village of Thomson (FPDS-NG 2015). Drinking water at AUSP Thomson is provided by Village of Thomson Water System No. IL0150350 via water supply wells IEPA 11726, 11727, and 01286. Wells 11726 and 11727 produce water at a combined rate of 700 gallons per minute; well 01286 produces water at a rate of 950 gallons per minute. The system includes a 750,000-gallon water storage tank allocated for AUSP Thomson use. The water is treated with chemicals at the pump house for each well and meets all IEPA and EPA requirements for public water supply systems.

3.8.1.2 Wastewater System

Wastewater is treated at the Thomson Municipal Wastewater Treatment Plant (National Pollutant Discharge Elimination System Permit No. IL0073890). The design average flow of the treatment plant is 0.80 million gallons per day (mgd), with maximum flow for the facility of 2.64 mgd and actual maximum daily flow of 160 pounds daily. One outfall discharges to a backwater tributary to the Mississippi River and the outfall is operated and maintained by the Village of Thomson (IEPA 2012).

3.8.1.3 Energy Sources

Jo-Carroll Energy—which originally served only Jo Daviess and Carroll counties—provides electrical and natural gas services to AUSP Thomson. A medium-voltage substation serves the facility and the surrounding area. Emergency generators are available if needed (BOP 2010).

3.8.1.4 Communications

Verizon Communications provides telecommunications service to AUSP Thomson. Services include wireless and digital processing (e.g., fiber optic cable, voice, data, and cable television services) (FPDS-NG 2015).

3.8.1.5 Solid Waste

Solid waste at AUSP Thomson is collected and disposed of by Waste Management of Illinois Inc., a private waste removal vendor. Operational refuse such as paper, plastics, dietary remains, and other trash is placed into dumpsters. When full, the dumpsters are unloaded into a compactor, which is removed by the vendor (FPDS-NG 2015).

3.8.2 Environmental Consequences

3.8.2.1 Proposed Action

Short- and long-term minor adverse and long-term beneficial effects on utilities would be expected. The short-term adverse effects would be caused by adding debris from construction associated with the proposed action to the appropriate landfill. Long-term adverse effects would be caused by increased utility usage at the new facilities. Long-term beneficial effects would be caused by upgrades to the wastewater system.

Construction. Implementation of the proposed action would generate approximately 68.4 tons (62.1 metric tons) of construction debris (see Table 3.8-1 and Appendix C). Approximately half of the debris would be recycled, which would result in 34.2 tons (31 metric tons) of nonhazardous construction debris for disposal in the assigned landfill. The U.S. Department of Justice is implementing waste reduction efforts through environmental management system initiatives in accordance with the department's *Strategic Sustainability Performance Plan* (DOJ 2013).

Table 3.8-1.
Summary of Construction Debris

Alternative	Debris Generated (tons)	Quantity Recycled (50 percent) (tons)	Total Quantity Landfill Disposed (tons)
Proposed Action	68.4	34.2	34.2

Source: USEPA 1998.

Operations. A slight increase in utility systems usage would likely result from implementing the proposed action. Currently, utility lines at adjacent buildings with full utility service alleviate the need for new service connections. Sanitary sewer line would be constructed to serve the armory, bus garage service building, range building, and staff training center. The amounts of potable water, electricity, and natural gas the proposed buildings would require, and the wastewater and solid waste they would generate, would cause a slight increase in utility usage.

AUSP Thomson would not need to establish separate metered utility service for potable water, electricity, natural gas, or communications. Several fire hydrants along the path of the new paved fire access roads would need to be relocated to accommodate the roads. The proposed action would enclose, or partially enclose, the CUP so the equipment and maintenance personnel would be better protected from the weather. In addition, the proposed action includes a second generator (for redundancy) in the electrical enclosure.

The Bureau is in the process of determining whether the existing sewage outflow system is adequate for operations at AUSP Thomson should the proposed action be implemented. The institution has an existing bar screen building from which the sewage flows to a lift station and sanitary force main; however, past Bureau experience has found that the addition of grinder/auger equipment might become necessary. The evaluation shall verify and report on the existing conditions, and either confirm that the existing sewage outflow system is adequate for AUSP Thomson operations or provide recommendations for improvements. The effects of any upgrades to the wastewater system would be beneficial.

3.8.2.2 No Action Alternative

No effect on utilities would result from implementing the no action alternative. No additional demand on utility systems would be created.

3.9 HAZARDOUS AND TOXIC SUBSTANCES

3.9.1 Affected Environment

Support facilities at AUSP Thomson where hazardous materials or waste might be used or generated include a vehicle maintenance garage and emergency power sources. The garage has been used for minor vehicle maintenance such as oil changes, tire rotation, and vehicle detailing. A triple-basin oil/water separator collects wastewater from the floor drains in the garage areas. No underground storage tanks are located on the premises; however, three aboveground storage tanks are used for an emergency generator and motor vehicle fueling. The use of asbestos-containing building materials or lead-based paint during construction of the facility is unlikely since it was constructed in 2001.

In an effort to identify potential environmental issues on or in close proximity to AUSP Thomson, a review was conducted of geographic information system files from the IEPA Source Water Protection Program and the EPA EnviroMapper. The review identified no sites on or in close proximity to AUSP Thomson (IEPA 2015, USEPA 2015d).

3.9.2 Environmental Consequences

3.9.2.1 Proposed Action

Short- and long-term minor adverse effects related to hazardous materials, toxic substances, and petroleum constituents would be expected from implementing the proposed action. In the short term, construction of the proposed projects would involve the use of heavy equipment and construction materials, which might result in minor spills of hazardous, toxic, or petroleum-based substances. Construction contractors would be responsible for preventing spills by implementing proper storage and handling procedures and by following established procedures. Over the long term, maintenance activities at the proposed bus garage would result in increased use of materials such as petroleum, oils, lubricants, solvents, and paints. Such maintenance activities, however, would be conducted in compliance with established BMPs and all local, state, and federal regulations.

Long-term minor adverse effects associated with firing range maintenance activities also could occur. As described in section 3.4.2, lead projectiles and fragments would need to be separated from soil and collected periodically, which could expose maintenance personnel to lead and dust.

Such exposure, however, would be unlikely through proper use of BMPs and compliance with health and safety regulations. No adverse effects would be expected from the amount of hazardous materials generated from use of the proposed range. Lead shot that has been used for its intended purpose, then properly separated from soil and recycled through implementation of range BMPs is not considered a RCRA hazardous waste. Soil that has been screened for lead fragments and projectiles can be spread back over the range; however, should AUSP Thomson officials decide in the future to remove range soil, the soil to be removed off-site would require testing to determine if it is a RCRA hazardous waste. Depending on the sampling results, the soil would then be managed in accordance with local, state, and federal regulations.

3.9.2.2 No Action Alternative

No adverse effects related to hazardous and toxic substances would result if the no action alternative was implemented.

3.10 RESOURCE AREAS ELIMINATED FROM FURTHER DETAILED STUDY

Resource areas upon which the proposed action would have negligible or no impacts did not receive detailed analysis in this EA. Those resource areas and the reasons for their elimination are discussed in this section.

3.10.1 Aesthetics and Visual Resources

No aesthetically sensitive areas are located within the viewshed of AUSP Thomson. The facility can be seen only from the local roads providing access to the site, not from the Mississippi River or from the main thoroughfare (Illinois SR 84). As construction activity is inherently aesthetically displeasing, the proposed action would have short-term, negligible adverse aesthetic effects during the construction period. In the long term, the proposed projects (new buildings, roads, parking lots) would be consistent with the look of the existing facilities. Light from the institution's perimeter fence high-mast lighting can be seen from the river at night, but the proposed action would not change this condition.

3.10.2 Cultural Resources

Cultural resources would not be adversely affected by implementing the proposed action. AUSP Thomson is not located in or within the viewshed of a historic district eligible for the National Register of Historic Places (NRHP), and no NRHP-eligible structures or sites are located on or adjacent to the property. In terms of archaeological resources, the property already has been extensively disturbed by historical and modern farming activities and by earthmoving activities conducted when the State of Illinois constructed the institution. The site is highly unlikely to contain any intact archaeological deposits that would be considered eligible for the NRHP; however, should any unrecorded archaeological sites, materials, or incidental finds be identified at any point in the future, the Bureau would consult with the Illinois State Historic Preservation Office and other interested parties to develop measures to avoid, minimize, or mitigate any associated adverse effects.

3.10.3 Socioeconomics

While socioeconomics would not be adversely affected by implementing the proposed action, short-term, negligible beneficial economic effects could result associated with employment of

construction personnel and the purchase and transportation of construction materials. The proposed action would not result, however, in any long-term or permanent change in regional business sales, personal income, employment, or population. No disproportionate adverse environmental or health effects would impact low-income or minority populations or children. The proposed action has no potential to substantially affect human health or the environment by excluding people, denying them benefits, or subjecting them to discrimination or environmental health or safety risks.

3.11 CUMULATIVE EFFECTS SUMMARY

The CEQ defines "cumulative effects" as:

> Impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions (40 CFR 1508.7).

For the purposes of this EA, significant cumulative effects would occur if incremental impacts of the proposed action added to the environmental impacts of past, present, and reasonably foreseeable actions at the project site and the surrounding region exceeded significance thresholds for resources. No significant adverse effects, however, would be expected from implementing the proposed action. Anticipated effects would be minor and not sufficient to create substantial cumulative effects.

3.12 MITIGATION SUMMARY

Mitigation actions are used to reduce, avoid, or compensate for significant adverse effects. The proposed action would have the potential for appreciable long-term adverse effects due to the proposed firing range; therefore, the Bureau would implement the following mitigation measures to ensure effects remain at less-than-significant levels.

- Perform a preconstruction detailed acoustical modeling effort and incorporate noise reduction measures (i.e., walls, barriers, berms, firing orientation), as necessary, into the design of the range. This effort should focus on the existing and future residential land use surrounding the facility.
- Restrict the hours of operation to between 7:00 a.m. and 10:00 p.m.
- Comply with all applicable federal, state, and local noise regulations.
- Construct the firing range in accordance with the Bureau's *Design Program Guidelines* so the range is large enough to accommodate the appropriate safety fan to contain all projectiles and ricochets.

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SECTION 4.0
FINDINGS AND CONCLUSION

This EA evaluates the potential environmental impacts of the Bureau's proposed action to implement facility improvements at AUSP Thomson. It also examines a no action alternative, which is prescribed by CEQ regulations to serve as the baseline against which to analyze the proposed action. Environmental resources evaluated in the EA are land use, air quality, noise, soils, water, biological resources, transportation, utilities, and hazardous and toxic substances. Resource areas on which implementing the proposed action would cause negligible or no adverse impacts were not carried forward for detailed analysis. Those resource areas are aesthetics and visual resources, cultural resources, and socioeconomics.

4.1 FINDINGS

The expected consequences on all evaluated resource areas from implementing the proposed action and the no action alternative are presented in Table 4.1-1. Evaluation indicates that the actions would not result in significant adverse effects on the natural, visual, cultural, or socioeconomic environments. No cumulative effects would be expected. Mitigation actions are used to reduce, avoid, or compensate for significant adverse effects. The proposed action would have the potential for appreciable long-term adverse effects from the proposed firing range; therefore, the Bureau would implement mitigation measures to ensure effects remain at less-than-significant levels (see section 3.12).

Table 4.1-1.
Summary of Potential Environmental and Socioeconomic Consequences

Resource Area	Proposed Action (Preferred Alternative)	No Action Alternative
Land use	Long-term adverse effects	No effect
Air quality	Short- and long-term minor adverse effects	No effect
Noise	Short-term minor and long-term adverse effects	No effect
Soils	Short- and long-term minor adverse effects	No effect
Water resources	Short-term minor adverse effects	No effect
Biological resources	No effect	No effect
Transportation	Short-term minor adverse effects Long-term minor beneficial effects	No effect
Utilities	Short- and long-term minor adverse effects Long-term beneficial	No effect
Hazardous and toxic substances	Short- and long-term minor adverse effects	No effect
Aesthetics and visual resources	Short-term negligible adverse effects	No effect
Cultural resources	No effect	No effect
Socioeconomics	Short-term negligible beneficial effects	No effect

4.2 CONCLUSION

The EA analysis concludes that implementing the proposed action would not result in significant adverse environmental or socioeconomic effects. Issuance of a Finding of No Significant Impact would be appropriate, and an environmental impact statement would not be required prior to implementation of the proposed action.

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SECTION 5.0
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SECTION 6.0
PERSONS AND AGENCIES CONSULTED

Note: All communications occurred between October and November 2015.

Amer, MaryClare, P.E. Civil Engineer, Wallace Engineering, Inc., Kansas City, MO.

Ashby, Jeff. Director, Thomson Public Works Department, Village of Thomson, IL.

Bunch, Mandy, P.E. Civil Engineer, Wallace Engineering, Inc., Kansas City, MO.

King, J. General Foreman, AUSP Thomson, Thomson, IL.

Muncy, Ed. Engineering Technician, AUSP Thomson, Thomson, IL.

Wise, Steven. Principal, SFS Architecture, Kansas City, MO.

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Springfield, IL 62701-1507

Mr. Kraig McPeek, Field Office Supervisor
U.S. Fish and Wildlife Service
Rock Island Illinois Field Office
1511 47th Avenue
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Public Libraries:

Chadwick Public Library District
110 Main Street
Chadwick, IL 61014

Lanark Public Library
110 West Carroll Street
Lanark, IL 61046

Mount Carroll Township Public Library
208 North Main
Mount Carroll, IL 61053

Savanna Public Library District
326 Third Street
Savanna, IL 61074

Milledgeville Public Library
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Milledgeville, IL 61051

York Township Public Library
1005 West Main Street
Thomson, IL 61285

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Appendix A

Agency Coordination Letters

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TETRA TECH

October 28, 2015

Ms. Sunny Fischer, Chair
Illinois Historic Preservation Agency
1 Old State Capitol Plaza
Springfield, IL 62701-1507

Subject: Environmental Assessment (EA) for Bureau of Prison Improvements at Administrative United States Penitentiary (AUSP) Thomson, Thomson, Illinois

Dear Ms. Fischer:

The Department of Justice, Bureau of Prisons (BOP) is preparing an EA to evaluate the impacts of implementing facility improvements at AUSP Thomson, located approximately one mile northwest of the Village of Thomson in Carroll County, Illinois. The Illinois Department of Corrections built the prison in 2001, and it was acquired by the BOP in October 2012. The principal facilities consist of eight maximum-security housing units (housing up to 3,200 inmates), a minimum-security housing unit (housing up to 200 inmates), and administration building, prisoner programs building, prisoner support building, and a warehouse. Up to 1,100 staff can be employed at AUSP Thomson. The proposed Bureau improvements have been deemed necessary for the new federal mission at AUSP Thomson.

Elements of the proposed action include construction of an armory, parking lot expansion and improvements (lighting and storm water drainage), fire access road improvements, a new security fence inside the existing secure-area fence, storm water retention drainage improvements, construction of a bus garage service building, electrical equipment enclosure for the central powerhouse, construction of a staff training course and firing range, and construction of a staff training center. All of the proposed improvements would be on AUSP Thomson property outside the secure area perimeter fence, with the exception of the fire access road improvements and new security fence which would be inside the secure area fence around the maximum-security housing units. The estimated construction period for the proposed projects is Fiscal Year (FY) 2016 through FY 2018.

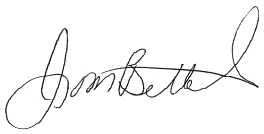
The proposed action provides for like-use of the area at AUSP Thomson and involves construction as described above. AUSP Thomson was constructed by the State of Illinois on former farmland. The land surrounding the AUSP Thomson property is almost entirely agricultural. Agricultural activities involving earthmoving such as drain installation, plowing, and crop harvesting would have disturbed to some degree any buried archaeological materials at this site. In addition, the extensive earthmoving and fill activities that took place when the State of Illinois constructed the institution would have disturbed or destroyed any buried archaeological remains at this site. No historic buildings are known to have been constructed on or adjacent to the AUSP Thomson site. AUSP Thomson is not in or within the viewshed of a National Register of Historic Places (NRHP)-eligible historic district.

Tt
10306 Eaton Place, Suite 340, Fairfax, VA 22030
Tel 703.385.6000 Fax 703.385.6007 www.tetratech.com

TETRA TECH

This correspondence is being sent as part of the agency scoping for the EA. For reference, a location map and a proposed draft site map have been included with this correspondence. Please submit within 30 days of receipt of this letter any comments you have on the proposed action via letter correspondence or agency stamp to my attention at the following address: Tetra Tech, Inc., 10306 Eaton Place, Suite 340, Fairfax, VA 22030. If you have any questions, please contact me at (703) 385-1202 or via email at mike.betteker@tetratech.com. Thank you in advance for your assistance.

Very Respectfully,



J. Michael Betteker, Vice President
Tetra Tech, Inc.

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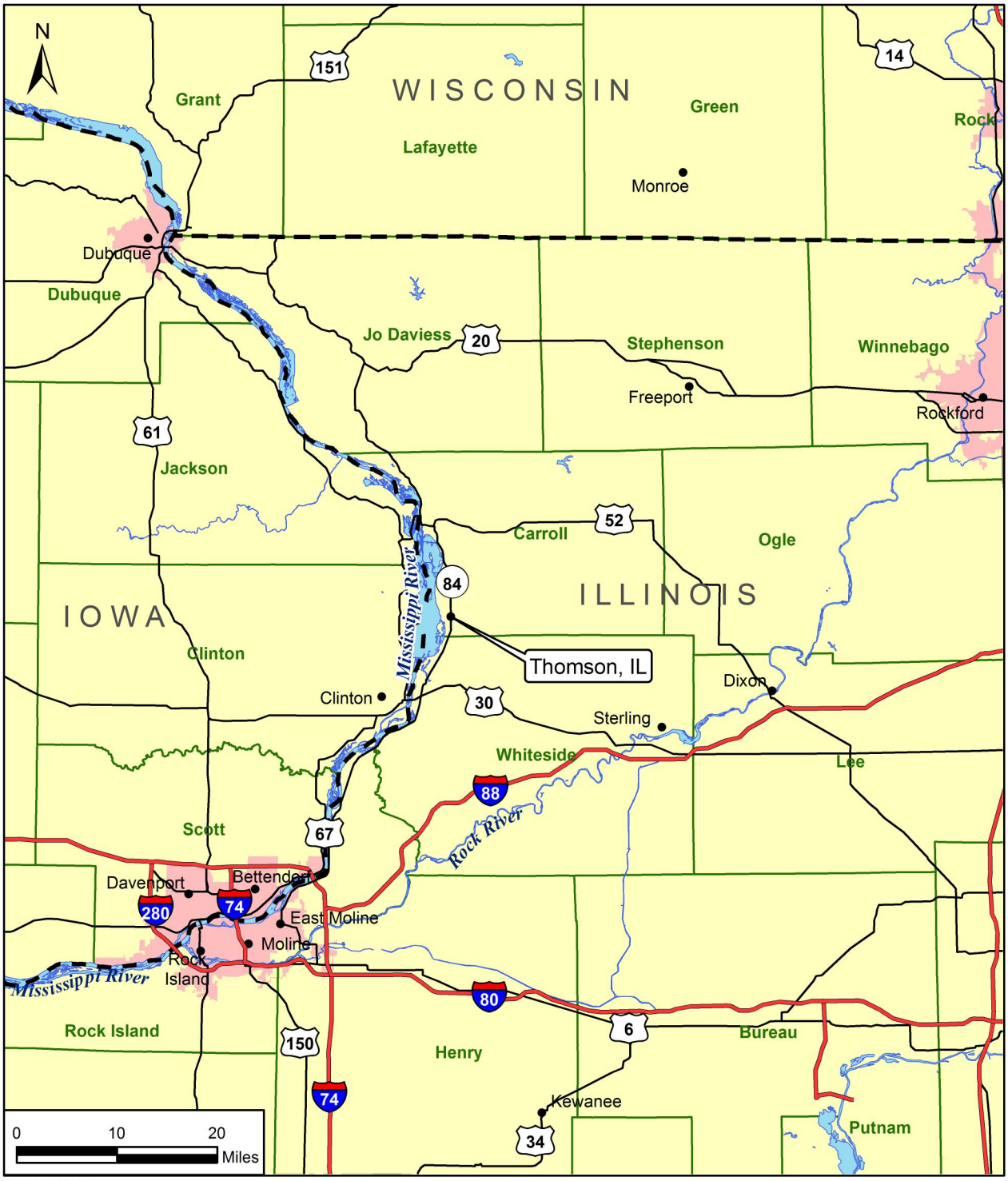
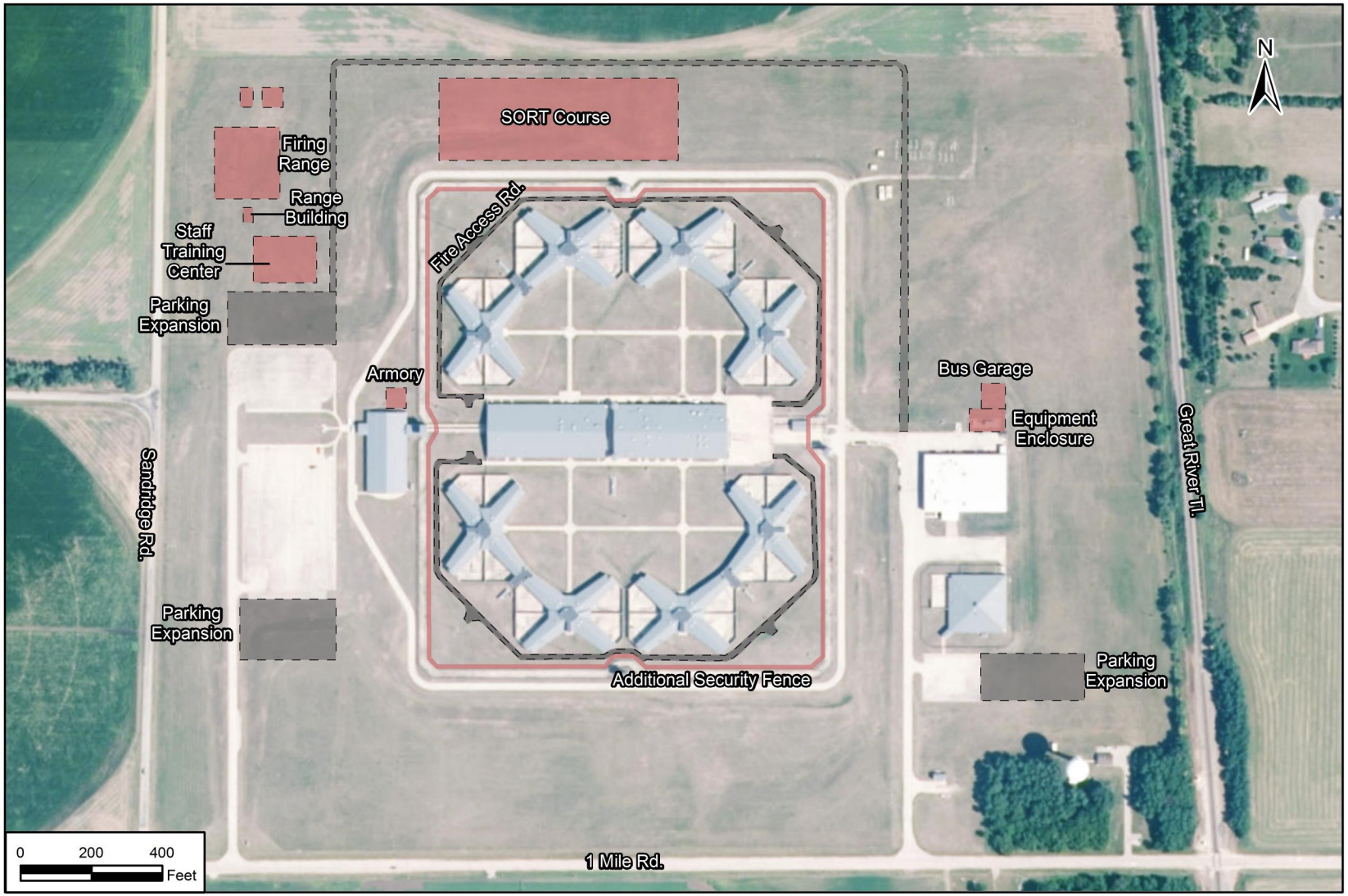


LEGEND

- State Boundary
- County Boundary
- Interstate Highway
- U.S. Route
- Urban Area
- Surface Water

General Location Map

Figure 1



LEGEND

Proposed New Construction

Proposed New Paving

Proposed Improvements at AUSP Thomson

Source: ESRI 2014. Note: Not to scale. Locations are approximate.

Figure 2

Subject: FW: AUSP Thomson project

From: Blankenship, Tina [mailto:Tina.Blankenship@Illinois.gov]
Sent: Monday, December 07, 2015 11:57 AM
To: Betteker, Mike <Mike.Betteker@tetratech.com>
Subject: RE: AUSP Thomson project

OK Thanks

Tina Blankenship
Preservation Services – Archaeology Division
Illinois Historic Preservation Agency
One Old State Capital Plaza
Springfield, Illinois 62701

From: Betteker, Mike [mailto:Mike.Betteker@tetratech.com]
Sent: Monday, December 07, 2015 10:54 AM
To: Blankenship, Tina <Tina.Blankenship@Illinois.gov>
Cc: MaryClare Amer <mamer@wallacesc.com>; Steve Wise <swise@sfsarch.com>; Cannella, Michelle <Michelle.Cannella@tetratech.com>
Subject: RE: AUSP Thomson project

Tina

In response to your questions:

All of the buildings on site were constructed in 2003. The buildings are not located in or within the viewshed of a historic district eligible for the National Register of Historic Places (NRHP), and no NRHP-eligible structures or sites are located on or adjacent to the property.

The armory is not connected to the administration building and the planned site improvements will not have an impact on any of the buildings.

None of the other new construction will connect to any existing structures. None of the current structures will be impacted by any of the work.

If you have any further questions please don't hesitate to contact me.

Thank you

Mike Betteker | **Vice President**
Phone: 703.385.1202 | Fax: 703.385.6007

Mobile: 703.362.4575
mike.betteker@tetratech.com

Tetra Tech | Complex World, Clear Solutions
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10306 Eaton Place, Suite 340, Fairfax, VA 22030

From: Blankenship, Tina [mailto:Tina.Blankenship@Illinois.gov]
Sent: Monday, December 07, 2015 8:27 AM
To: Betteker, Mike <Mike.Betteker@tetratech.com>
Subject: AUSP Thomson project

Good morning

We are in receipt of the above project, however I need to clarify whether or not any of the current structures will be impacted by any of the work.
It appears the Armory is close to another building, will it be attached or will it be a new stand alone structure??

Thanks

Tina Blankenship
Preservation Services – Archaeology Division
Illinois Historic Preservation Agency
One Old State Capital Plaza
Springfield, Illinois 62701

TETRA TECH

October 28, 2015

Mr. Kraig McPeek, Field Office Supervisor
U.S. Fish and Wildlife Service
Rock Island Illinois Field Office
1511 47th Avenue
Moline, IL 61265

Subject: Environmental Assessment (EA) for Bureau of Prison Improvements at Administrative United States Penitentiary (AUSP) Thomson, Thomson, Illinois

Dear Mr. McPeek:

The Department of Justice, Bureau of Prisons (BOP) is preparing an EA to evaluate the impacts of implementing facility improvements at AUSP Thomson, located approximately one mile northwest of the Village of Thomson in Carroll County, Illinois. The Illinois Department of Corrections built the prison in 2001, and it was acquired by the BOP in October 2012. The principal facilities consist of eight maximum-security housing units (housing up to 3,200 inmates), a minimum-security housing unit (housing up to 200 inmates), and administration building, prisoner programs building, prisoner support building, and a warehouse. Up to 1,100 staff can be employed at AUSP Thomson. The proposed Bureau improvements have been deemed necessary for the new federal mission at AUSP Thomson.

Elements of the proposed action include construction of an armory, parking lot expansion and improvements (lighting and storm water drainage), fire access road improvements, a new security fence inside the existing secure-area fence, storm water retention drainage improvements, construction of a bus garage service building, electrical equipment enclosure for the central powerhouse, construction of a staff training course and firing range, and construction of a staff training center. All of the proposed improvements would be on AUSP Thomson property outside the secure area perimeter fence, with the exception of the fire access road improvements and new security fence which would be inside the secure area fence around the maximum-security housing units. The estimated construction period for the proposed projects is Fiscal Year (FY) 2016 through FY 2018.

The proposed action provides for like-use of the area at AUSP Thomson and involves construction as described above. The area within the project boundary consists entirely of mowed grass with some shrubbery. Much of the facility is already fenced-in, overall represents poor quality wildlife habitat, and is not expected to be used by any state or federally-listed species. The land surrounding the AUSP Thomson property is almost entirely agricultural. Any disturbance to wildlife in the surrounding area from construction activities would be minimal and limited to the term of construction activities. The proposed action is expected to have no effects on any state or federally listed species, migratory birds, or their habitats.

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TETRA TECH

This correspondence is being sent as part of the agency scoping for the EA. For reference, a location map and a proposed draft site map have been included with this correspondence. Please submit within 30 days of receipt of this letter any comments you have on the proposed action via letter correspondence or agency stamp to my attention at the following address: Tetra Tech, Inc., 10306 Eaton Place, Suite 340, Fairfax, VA 22030. If you have any questions, please contact me at (703) 385-1202 or via email at mike.betteker@tetratech.com. Thank you in advance for your assistance.

Very Respectfully,

J. Michael Betteker, Vice President
Tetra Tech, Inc.

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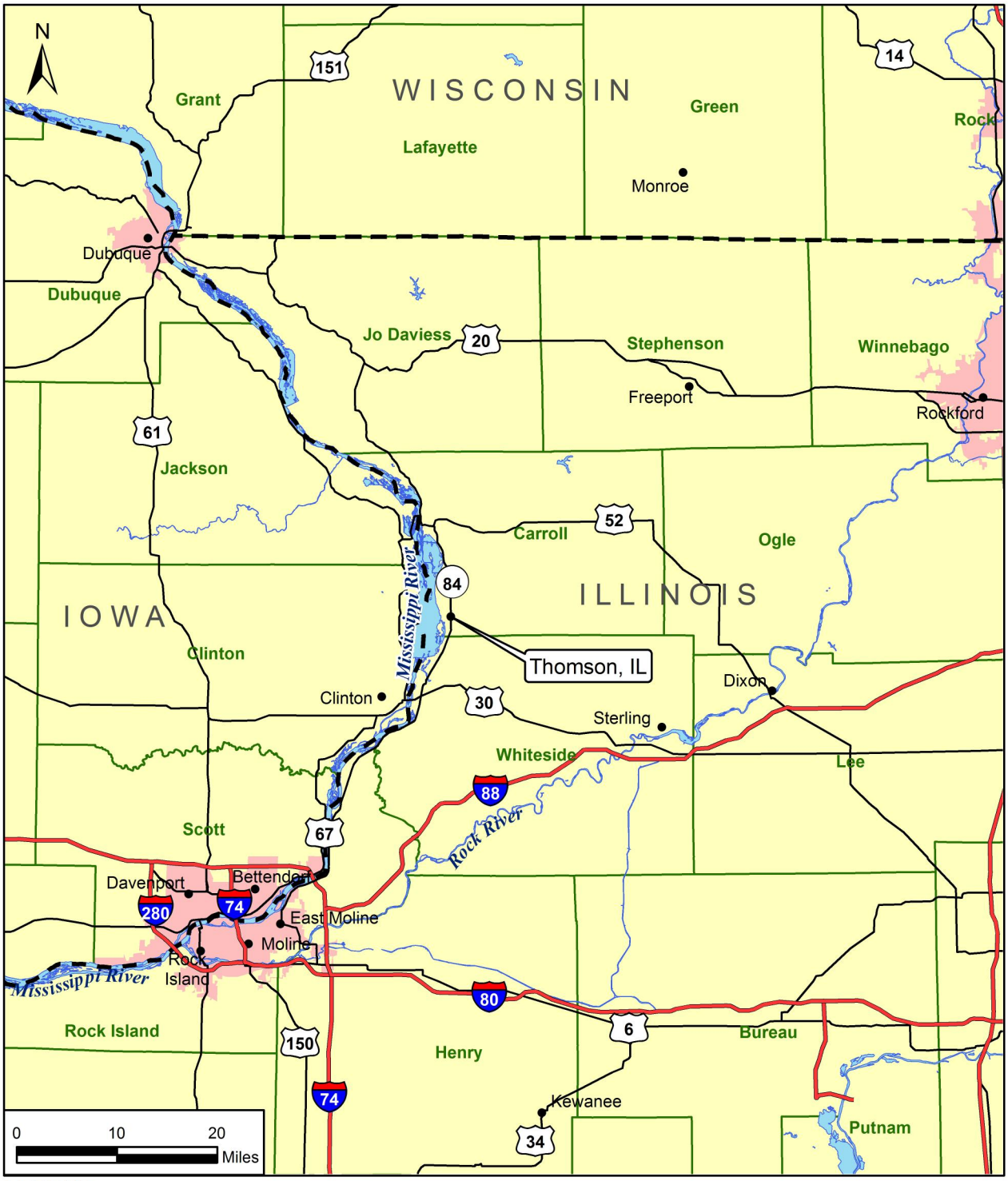
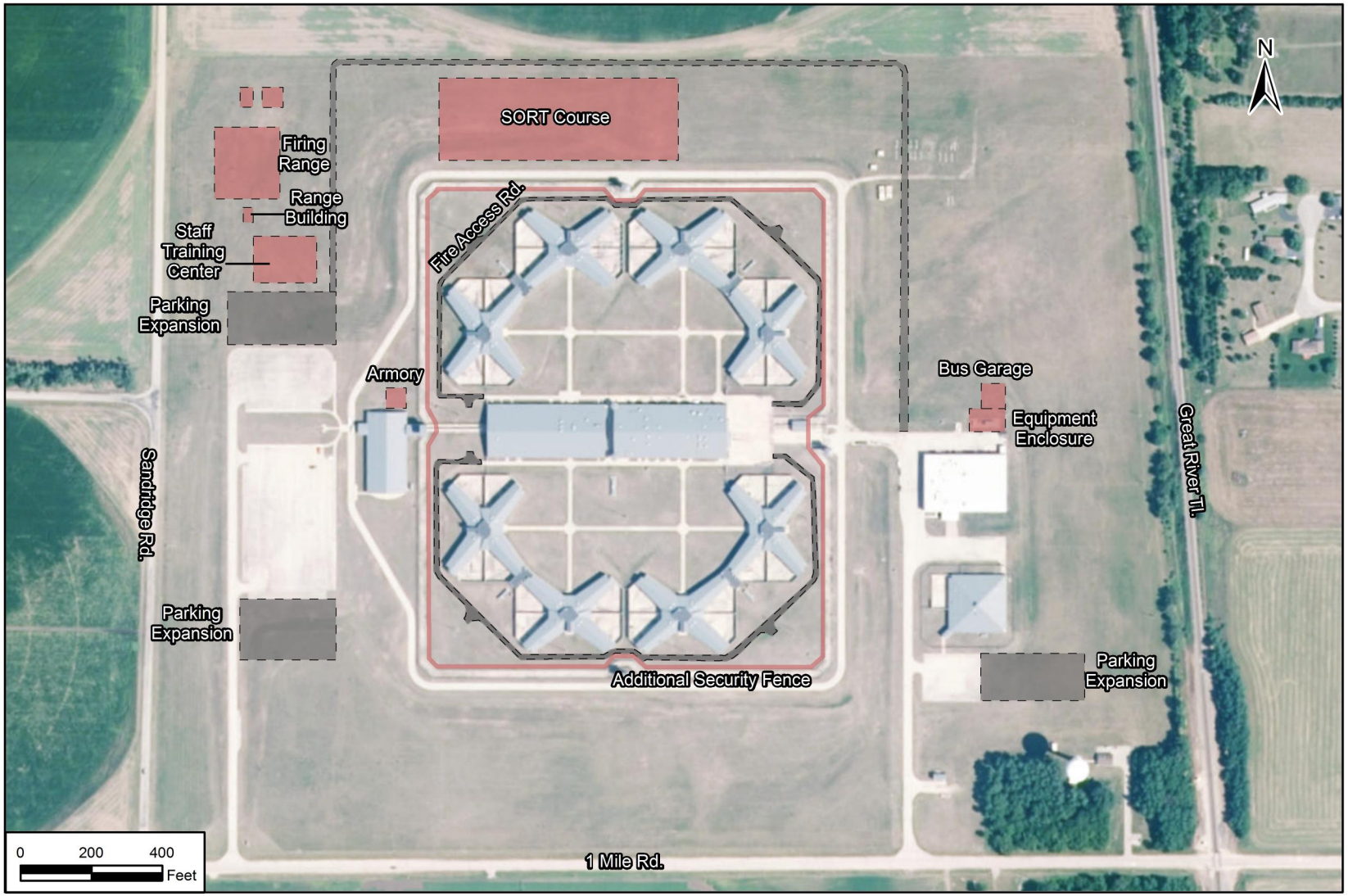


LEGEND

- State Boundary
- County Boundary
- Interstate Highway
- U.S. Route
- Urban Area
- Surface Water

General Location Map

Figure 1



LEGEND

Proposed New Construction

Proposed New Paving

Proposed Improvements at AUSP Thomson

Source: ESRI 2014. Note: Not to scale. Locations are approximate.

Figure 2

Appendix B

Air Emissions Calculations

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Table B-1. Construction Equipment Use

Equipment Type	Number of Units	Days on Site	Hours Per Day	Operating Hours
Excavator	1	115	4	460
Roller	1	173	8	1,384
Rubber-Tired Dozer	1	115	8	920
Plate Compactor	1	115	4	460
Trencher	1	58	8	464
Air Compressor	1	115	4	460
Cement Mixer	1	115	6	690
Crane	1	115	7	805
Generator Set	1	115	4	460
Loader/Backhoe	1	230	7	1,610
Paver	1	58	8	464
Paving Equipment	1	58	8	464

Table B-2. Construction Equipment Emission Factors (lb/hour)

Equipment	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2
Excavator	0.5828	1.3249	0.1695	0.0013	0.0727	0.0727	119.6
Roller	0.4341	0.8607	0.1328	0.0008	0.0601	0.0601	67.1
Rubber-Tired Dozer	1.5961	3.2672	0.3644	0.0025	0.1409	0.1409	239.1
Plate Compactor	0.0263	0.0328	0.0052	0.0001	0.0021	0.0021	4.3
Trencher	0.5080	0.8237	0.1851	0.0007	0.0688	0.0688	58.7
Air Compressor	0.3782	0.7980	0.1232	0.0007	0.0563	0.0563	63.6
Cement Mixer	0.0447	0.0658	0.0113	0.0001	0.0044	0.0044	7.2
Crane	0.6011	1.6100	0.1778	0.0014	0.0715	0.0715	128.7
Generator Set	0.3461	0.6980	0.1075	0.0007	0.0430	0.0430	61.0
Loader/Backhoe	0.4063	0.7746	0.1204	0.0008	0.0599	0.0599	66.8
Paver	0.5874	1.0796	0.1963	0.0009	0.0769	0.0769	77.9
Paving Equipment	0.0532	0.1061	0.0166	0.0002	0.0063	0.0063	12.6

Source: CARB 2015.

Table B-3. Construction Equipment Emissions (tons)

Equipment	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2
Excavator	0.1341	0.3047	0.0390	0.0003	0.0167	0.0167	27.5
Roller	0.7342	1.5029	0.1676	0.0011	0.0648	0.0648	110.0
Rubber-Tired Dozer	0.0061	0.0076	0.0012	0.0000	0.0005	0.0005	1.0
Plate Compactor	0.1179	0.1911	0.0429	0.0002	0.0160	0.0160	13.6
Trencher	0.0870	0.1835	0.0283	0.0002	0.0130	0.0130	14.6
Air Compressor	0.0154	0.0227	0.0039	0.0000	0.0015	0.0015	2.5
Cement Mixer	0.2419	0.6480	0.0716	0.0006	0.0288	0.0288	51.8
Crane	0.0796	0.1605	0.0247	0.0002	0.0099	0.0099	14.0
Generator Set	0.3271	0.6235	0.0969	0.0006	0.0482	0.0482	53.8
Loader/Backhoe	0.1363	0.2505	0.0455	0.0002	0.0178	0.0178	18.1
Paver	0.0123	0.0246	0.0038	0.0000	0.0015	0.0015	2.9
Total	**1.89**	**3.92**	**0.53**	**<0.1**	**0.22**	**0.22**	**309.8**

Table B-4. Emissions from Painting

VOC Content	0.84	lb/gal		
Coverage	400	ft^2/gal		
Emission Factor	0.0021	lb/ft^2		
Building/Facility	Area [ft^2]	Wall Surface	VOC [lb]	VOC [tons]
All Buildings Combined	31,100	62,200	130.6	0.065
Total	31,100	62,200	130.6	0.07

Source: SCAQMD 1993.

Table B-5. Emissions from Delivery of Equipment and Supplies

Number of Deliveries	2						
Number of Trips	2						
Miles Per Trip	30						
Days of Construction	230						
Total Miles	27,600						
Pollutant	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2
Emission Factor (lb/mile)	2.2E-02	2.4E-02	3.0E-03	2.6E-05	8.6E-04	7.4E-04	2.7E+00
Total Emissions (lb)	605.8	654.5	82.6	0.7	23.6	20.4	75,056.4
Total Emissions (tons)	0.30	0.33	0.04	0.0004	0.01	0.01	37.5

Source: CARB 2015.

Table B-6. Particulates from Surface Disturbance

TSP Emissions	37.4	lb/acre				
PM_{10}/TSP	0.45					
$PM_{2.5}/PM_{10}$	0.15					
Period of Disturbance	30	days				
Capture Fraction	0.5					
Building/Facility	Area [acres]	TSP [lb]	PM_{10} [lb]	PM_{10} [tons]	$PM_{2.5}$ [lb]	$PM_{2.5}$ [tons]
All Facilities	4.2	4,721	2,125	1.06	159	0.08
Total	4.2	4,721	2,125	1.06	159	0.08

Source: USEPA 1995.

Table B-7. Emissions from Construction Worker Commutes

Number of Workers	24						
Number of Trips	2						
Miles Per Trip	30						
Days of Construction	58						
Total Miles	83,520						
Pollutant	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2
Emission Factor (lb/mile)	1.1E-02	1.1E-03	1.1E-03	1.1E-05	8.5E-05	5.3E-05	1.1E+00
Total Emissions (lb)	881	92	90	1	7	4	91,833
Total Emissions (tons)	0.44	0.05	0.05	0.9	0.00	0.00	45.9

Source: CARB 2015.

Table B-8. Total Construction Emissions (tons)

Activity/Source	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2
Heavy Equipment	1.89	3.92	0.53	0.0034	0.22	0.22	309.84
Painting	0.00	0.00	0.07	0.0000	0.00	0.00	0.00
Delivery of Equipment	0.30	0.33	0.04	0.0004	0.01	0.01	37.53
Surface Disturbance	0.00	0.00	0.00	0.0000	1.06	0.08	0.00
Worker Commutes	0.44	0.05	0.05	0.8976	0.00	0.00	45.92
Total Emissions	2.6	4.3	0.7	0.9	1.3	0.3	393.3

Sources: CARB 2015, SCAQMD 1993, USEPA 1995.

Table B-9. Heating Emission

Heating Fuel	Natural Gas						
Region	North						
Gross Area	25,000	sf					
Heating Requirements	100.7	Btu/sf					
Annual Heating	2,517,500	Btu/year					
Heating Value	1,020	Btu/scf					
Annual Fuel Use	2,468	scf/year					
Pollutant	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2
Emission Factors (lb/1000 scf)	84	190	5.5	0.6	7.6	7.6	1.2E+05
Total Emissions (tpy)	0.1	0.2	<0.1	<0.1	<0.1	<0.1	148.1

Sources: USEPA 1995, DOE 2003.

References

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Appendix C

Construction Debris Calculations

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Table C-1. Construction Debris

Solid Waste			
Activity	**Building square footage**	**Construction debris-lb/sq ft**	**Total construction debris**
Construction	31,100	4.40	136,840.00
		Pounds	136,840.00
		Tons	68.42
		Recycled quantity:	
		Pounds	68,420.00
		Tons	34.21
		Total:	
		Recycled tons:	34.21
		Disposed tons:	34.21

Source: USEPA 1998

Reference

USEPA (U.S. Environmental Protection Agency). 1998. *Characterization of Building Related Construction and Demolition Debris in the United States*. Report No. EPA530-R-98-010. June 1998. U.S. Environmental Protection Agency, Municipal and Industrial Solid Waste Division, Office of Solid Waste, Washington, D.C.

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