Environmental Assessment for the MARET Center at Crowder College

October 2010

Department of Energy's
Office of Energy Efficiency and Renewable Energy
Golden Field Office

Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401-3393

DOE/EA 1656

FINDING OF NO SIGNIFICANT IMPACT FOR THE MISSOURI ALTERNATIVE RENEWABLE ENERGY TECHNOLOGY (MARET) CENTER AT CROWDER COLLEGE NEOSHO, MISSOURI

AGENCY: Department of Energy, Golden Field Office

ACTION: Finding of No Significant Impact

SUMMARY: The U.S. Department of Energy (DOE), through its Golden Field Office, has provided Congressionally Directed federal funding and will authorize the expenditure of funds to Crowder College in support of the design and construction of the Missouri Alternative & Renewable Energy Technology (MARET) Center (Project). Granting of financial assistance for this Project constitutes a major federal action as defined by National Environmental Policy Act of 1969 (NEPA). DOE has considered the possible environmental impacts from the Project before committing to authorize the expenditure of funds.

In accordance with DOE NEPA implementing regulations, DOE prepared an Environmental Assessment (EA) that analyzed the potential impacts associated with the construction of the MARET Center. The Final EA includes all discussions, analyses and findings related to the potential impacts of the Project. The Final EA is hereby incorporated by reference.

This Finding of No Significant Impact was prepared in accordance with NEPA, the Council on Environmental Quality regulations for implementing NEPA, as amended, 40 CFR 1500 to 1508, and DOE NEPA regulations 10 CFR 1021.322.

ENVIRONMENTAL IMPACTS: In compliance with NEPA and the DOE NEPA implementing regulations, the EA examined the potential environmental impacts of DOE's decision to authorize expenditure of federal funding by Crowder College and also examined a No-Action Alternative. Under the No-Action Alternative, DOE would not fund the Project and the MARET Center would not be constructed with federal funds.

Stage I of the MARET Center will involve the construction of a new Crowder College facility, approximately 9,000-square feet in size, that will include space for the school's

construction technology program; an incubation center for new businesses; renewable-energy laboratories or workshops; and faculty office space. Stage I construction for the Project will also include the installation of roof mounted solar technology, a geothermal/radiant system for heating and cooling, a 35 space parking lot and numerous pedestrian paths. Although, only planning and design for Stage II will be funded by DOE under the Proposed Action, it is analyzed in this EA as a connected action under NEPA. Stage II will include the addition of a 21,000-square foot conference center attached to the MARET Center facilities constructed during Stage I.

The resource areas evaluated in the EA include: Land Use, Geology and Soils, Water Resources, Wetlands, Biological Resources, Air Quality, Noise, Hazardous Materials and Waste Management, Socioeconomics, Environmental Justice, Human Health and Safety, Aesthetics, Cultural Resources, Infrastructure, and Traffic and Transportation (see Chapter 3, Existing Conditions and Environmental Consequences). After conducting the analysis for the Project, DOE has concluded that the design and construction of the MARET Center would have no significant direct, indirect or cumulative impacts on human and natural environment.

The Missouri SHPO was contacted for consultation per requirements of Section 106 of the National Historic Preservation Act (NHPA). The SHPO concurred with DOE's finding of no adverse affect to cultural resources (see Section 3.13 of the Final EA).

The Missouri Department of Conservation (MDC) and the U.S. Fish and Wildlife Service (USFWS) were consulted, consistent with requirements of Section 7 of the Endangered Species Act (ESA), to aid in determining potential effects to wildlife. The MDC and USFWS indicated that the site is within the recharge area of the Ozark Cave Fish (*Amblyopsis rosae)* (see Section 3.5 of the Final EA).

As requested by USFWS, a Biological Assessment letter was completed by DOE that included the addition of three applicant committed measures that will further reduce potential impacts to the Ozark Cavefish. The measures that will be implemented by Crowder College and their contractors for the Project include: drilling test wells prior to the installation of geothermal wells to fully characterize the conditions below the project site to determine whether karst features or large voids exist beneath the surface at the site; using sleeves during the drilling/grouting process and in areas where karst topography and voids exist (as determined by the preliminary test wells), the sleeves will be left in place to prevent any grout from entering voids that have the potential to serve as habitat for the Ozark Cavefish; providing drillers with specifications on the amount of grout necessary for each well and if that thresholds are exceeded, grouting would stop immediately minimizing the risk of grout entering voids that have the potential to serve as habitat for the Ozark Cavefish; and implementing Standard Operating Procedures and safeguards to control groundwater pollution per Missouri Department of Conservation recommendations (Cave, 2009).

The USFWS concurred with DOE's findings and consultation is complete. The comment letters are included in Appendix B and responses to comments are included in Appendix E of the Final EA. All comments have been addressed in the EA.

The Missouri Department of Natural Resources (MDNR) identified the Pools Prairie Superfund Site and the Former Fort Crowder Chemical Warfare Material Site as potential sources of site contamination (MDNR, 2010). The Pools Prairie Superfund Site is an EPA lead site (MDNR, 2009b) and is one mile from the MARET Center site. The Former Fort Crowder Chemical Warfare Materiel Site is approximately 1,000 feet south away from the site. Although construction of the MARET Center could disturb hazardous materials if located on the Project site, the potential appears to be slight based on information provided by MDNR. If hazardous materials are disturbed or found at the Project site, applicant committed measures will be implemented by Crowder College to further reduce any impact associated with the potential contaminants (see Section 2.4 of the Final EA). These measures include materials handling protocols, reporting, permitting, grouting, site education awareness, asbestos handling, petroleum monitoring, worker safety and health, Occupational Safety and Health Administration compliance, and best management practices.

The location and layout of the MARET Center and its supporting infrastructure will not encroach on any wetlands, surface waters or their existing buffers. As no 100- or 500-year floodplains were identified at the project site, construction would not occur within any designated floodplains, and therefore, would have no impact on upstream floodplain elevations or downstream flood conveyance.

PUBLIC PARTICIPATION IN THE EA PROCESS: In accordance with applicable regulations and policies, DOE sent scoping notices to potentially interested Federal, state, and local agencies, tribal representatives, businesses, and individuals, and published the notice in the local newspaper. The scoping letters described the Proposed Action and requested assistance in identifying potential issues that could be evaluated in the EA. In response to the scoping notice, DOE received comments from the MDC, the MDNR, and the Missouri SHPO. The SHPO concurred with DOE's finding of no adverse affect to cultural resources (see Section 3.13 of the Final EA) and consultation under Section 106 is complete.

DOE sent notices announcing the availability of the Draft EA for public comment to the same agencies, representatives, businesses, and individuals as received the scoping notice. The Draft EA was also made available for public review and comment on the DOE Golden Field Office reading room website. Comments on the Draft EA were received from MDNR and the USFWS. MDNR provided comments on their concerns pertaining to hazardous waste, air quality, solid waste management, and geology. The USFWS provided comments on potential impacts to the Ozark Cavefish. All comments were addressed to the approval of all agencies for the Project (see Appendix E of the EA).

DETERMINATION: Based on the information presented in the Final EA (DOE/EA 1656), DOE determines that authorizing the expenditure of federal funding in order to support the construction of the MARET Center will not constitute a major Federal Action significantly affecting the quality of the human environment, as defined by NEPA. The preparation of an Environmental Impact Statement is not required and DOE is issuing a Finding of No Significant Impact.

The applicant's commitment to obtain and comply with all federal, state and local permits required for construction and operation of the MARET Center, and to minimize potential impacts through the implementation of the applicant-committed environmental protection measures identified in the Final EA, shall be incorporated and enforceable through DOE's financial assistance agreement. Applicant committed measures and necessary permits can be found in Section 2.4 of the EA.

Copies of the Final EA are available at the DOE Golden Field Office Public Reading Room website at:

http://www.eere.energy.gov/golden/Reading_Room.aspx, or from:

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Issued in Golden, Colorado this 7th day of October, 2010.

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Acting Manager
Golden Field Office

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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LIST OF ACRONYMS

AADT	Annual Average Daily Traffic
BMP	Best Management Practice
BOS	Balance of System
BTU	British thermal unit
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CTA	Component Test Area
dB	Decibel
dBA	A-weighted decibel
DOE	U.S. Department of Energy
E.O.	Executive Order
EA	Environmental Assessment
EDR	Electronic Data Resources, Inc.
EERE	Energy Efficiency and Renewable Energy
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ETA	Engine Test Area
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
HVAC	Heating, Ventilation, and Air Conditioning
ICF	Insulated Concrete Form
KCS	Kansas City Southern
kWh	kilowatt hour
L_{01}, L_{10}, L_{50}, L_{90}	A-weighted noise levels equaled or exceeded during 1 percent, 10 percent, 50 percent, and 90 percent of a stated time period
L_{dn}	day/night average sound level
LEED	Leadership in Energy and Environmental Design
L_{eq}	equivalent noise level
LUST	Leaking Underground Storage Tank
M&V	Measurement and Verification
mWh	megawatt hour

MARET	Missouri Alternative & Renewable Energy Technology
MDC	Missouri Department of Conservation
MDNR	Missouri Department of Natural Resources
mgd	million gallons per day or millions of gallons per day
mph	miles per hour
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NHPA	National Historic Preservation Act
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
PV	photovoltaic
PVT	Photovoltaic /Thermal
Rpm	Rotations per minute
SHPO	State Historic Preservation Office
SIPs	Structural Insulated Panels
SOP	Standard Operating Procedure
SWPPP	Stormwater Pollution Prevention Plan
TCE	Trichloroethylene
USFWS	U.S. Fish and Wildlife Service
USGBC	U.S. Green Building Council
USGS	U.S. Geological Survey
VOC	Volatile Organic Compound

1.0 INTRODUCTION

1.1 Project Overview

The U.S. Department of Energy (DOE) is preparing an Environmental Assessment (EA) for the proposed construction of the Missouri Alternative & Renewable Energy Technology (MARET) Center. The building would be located on Crowder College's Neosho campus in Neosho, Missouri. Crowder College has a strong history of supporting renewable energy education, technology, and projects. Following decades of success in solar energy projects, in 1992 the Missouri Legislature designated the 2,500-student community college as the State's first renewable energy education center. Figure 1-1 illustrates the location of Crowder College within the region and Figure 1-2 shows the project location.

In response to a Congressional Directive, DOE has provided financial assistance that would authorize Crowder College to expend Federal Funding to design, permit, and construct the MARET Center. Authorizing expenditure of DOE financial assistance for this project would constitute a major Federal action as defined by the National Environmental Policy Act (NEPA). DOE must consider the possible environmental impacts from the project before authorizing the expenditure of federal funding. In accordance with the provisions of NEPA, and Council on Environmental Quality (CEQ) and DOE implementing regulations, DOE has determined that an EA must be completed for the proposed project to evaluate the potential environmental impacts that could result from the award of the funding and any connected actions.

This EA has been prepared in accordance with the requirements of NEPA, which requires environmental review of the Proposed Action to aid the decision maker in review of the proposed project. The DOE Office of Energy Efficiency and Renewable Energy (EERE) Golden Field Office Manager would make the decision whether to proceed with the funding of this proposed project should a Finding of No Significant Impact (FONSI) be issued.

The project would be completed in two separate construction stages. Stage I would include the construction of an approximately 9,000-square foot building (including installation of solar technology to power the building), with space for the school's construction technology program; an incubation center for new businesses; renewable-energy laboratories or workshops; and faculty office space. Stage II of the project would include the construction of a 21,000-square foot adjoining conference center to the portion of the MARET Center constructed during Stage I. The building would be heated and cooled using a geothermal/radiant system that uses actively stored thermal energy in separate masses of earth for access by the heating and cooling hybrid heat pump system. The geothermal/radiant system would provide for the temperature moderation, with roughly 40 kilowatts (kW) of roof top solar photovoltaic (PV) panels and the 65kW wind turbine would provide the electrical needs for the structure. It is anticipated that the integrated systems would annually produce more energy than would be consumed by the structure and all of the ancillary activities. The remainder of the energy would be fed to the local utility grid through a utility approved net metering device.

1.2 Purpose and Need

DOE's Proposed Action is to allow expenditure of $4,425,500 in financial assistance to Crowder College in support of the construction of Stage I of the MARET Center. DOE funding for Stage II only involves planning and design activities and not construction; however, all Stage II activities are analyzed in this EA as connected actions.

The purpose of the Proposed Action is to support via financial assistance the construction of the MARET Center, a proposed net-positive energy prototype building. The project would assist EERE's mission to bring energy efficiency and renewable energy technologies, such as wind and solar power,

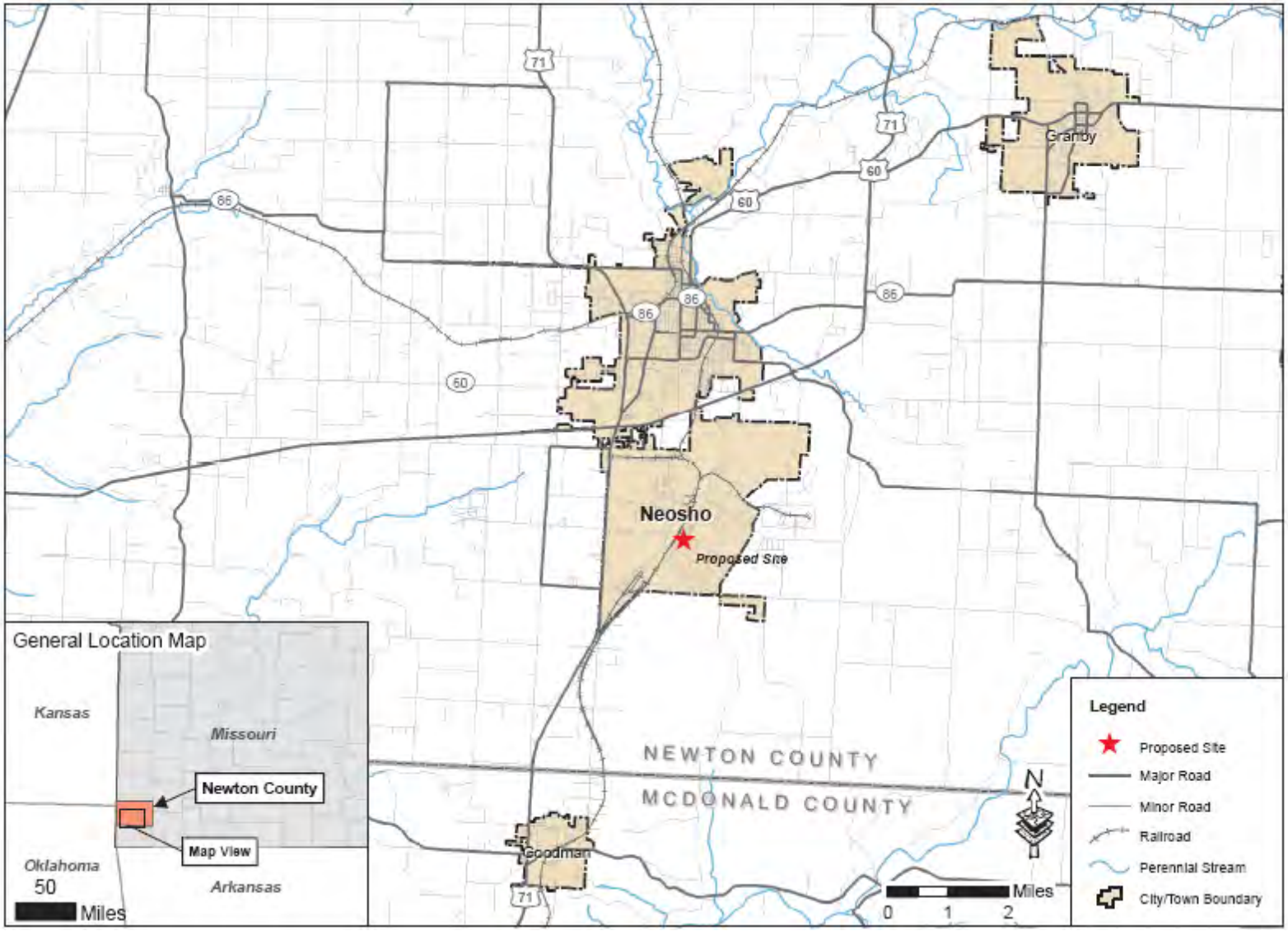

Figure 1-1. General Location Map

Figure 1-2. Site Location Map

to the forefront by building partnerships to develop, commercialize, and encourage the use of those technologies.

The MARET Center would expand the renewable and alternative energy industry in the region by providing training for businesses and industry, hands-on research and application, and facilities and support for new-business start-ups. The facility would also support new educational programs offered at Crowder College and support its existing alternative energy degree curriculum. The building design, construction, and operation would model best practices in renewable energy technology, the use of sustainable and green building materials, and the use of energy efficient design.

The new MARET Center would also support the mission of the DOE's Solar Program, "to improve America's security, environmental quality, and economic prosperity through public-private partnerships that bring reliable and affordable solar energy technologies to the marketplace," through a variety of educational and business assistance programs. Further, technical innovations planned for the MARET Center and its applied research activities would advance the Solar Program strategic goals to "reduce the cost of solar energy to the point it becomes competitive in relevant energy markets (e.g., buildings, power plants) and for solar technology to enable a sustainable solar industry."

1.3 Objectives of the Project

Objectives of the MARET Center, which would support EERE's mission and the purpose and need of the project, are as follows:

- provide a working example of a net-positive energy building incorporating renewable energy technologies;
- create high efficiency building design, which demonstrates green architecture;
- facilitate applied research and incubation services to develop regional energy businesses; and
- facilitate existing and expanded energy education programs offered at Crowder College.

1.4 Public Involvement

Comments on the scope of this EA were sought from the public, regulatory agencies, and other interested parties as part of the NEPA process. A letter describing the scope of the project was sent out to all parties on the project's distribution list on March 12, 2009 (Appendix A). Responses were received from the Missouri Department of Conservation (MDC), the Missouri Department of Natural Resources (MDNR), and the Missouri State Historic Preservation Office (SHPO). A copy of the letter, the distribution list, and responses are included in Appendix A to this EA. All comments have been considered and addressed during the preparation of this EA.

DOE sent notices announcing the availability of the Draft EA for public comment to the same agencies, representatives, businesses, and individuals who received the scoping notice. DOE posted the Draft EA onto the DOE Golden Field Office reading room website allowing the document to be available for public review and comment. Both the MDNR and the USFWS provided comments on components of the the Draft EA. MDNR provided comments concerning hazardous waste, air quality, solid waste management, and geology. The USFWS provided comments on potential impacts to the Ozark Cavefish. The comment letters are included in Appendix B and responses to comments are included in Appendix E. All comments have been addressed in the EA.

Per requirements of Section 7 of the Endangered Species Act (ESA), and Section 106 of the National Historic Preservation Act (NHPA), DOE consulted with U.S. Fish and Wildlife Service (USFWS), the MDC, and the Missouri SHPO. DOE received comment letters from the Missouri SHPO, the MDC, and the USFWS. The SHPO concurred with DOE's finding of no adverse affect to cultural resources (see Section 3.13). The MDC and USFWS indicated that the site is within the recharge area of the Ozark Cave Fish (see Section 3.5). As requested by USFWS in their comment letter, DOE submitted to the

USFWS a Biological Assessment letter addressing potential impacts to the Ozark Cavefish and describing additional Applicant Committed measures that would reduce possible impacts to the species (see section 2.4). The USFWS concurred with DOE's findings and consultation for Section 7 of the ESA is complete. Copies of the letters and responses received are included in Appendix B of this EA.

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2.0 PROPOSED ACTION AND ALTERNATIVES

This chapter describes the Proposed Action and No Action Alternative. The Proposed Action consists of DOE's decision to provide funding for the construction of the MARET Center and is described in Section 2.2. The No Action Alternative is described in Section 2.3.

2.1 Project Location

The proposed MARET Center would be located on Crowder College's Neosho campus at the corner of Doniphan Drive and Laclede Avenue in the City of Neosho, Newton County, Missouri; Section 15, Township 24 North, and Range 31 West. The project site is approximately 16 acres, has been previously disturbed, and is currently vacant with the exception of a wind turbine that is being used to power existing campus buildings and two-solar powered structures/offices. The project site was originally part of a U.S. Army Base called Camp Crowder. Camp Crowder was built during World War II and deactivated in 1958. In 1963, Crowder College was founded at the site. The proposed location for the MARET Center is currently vacant but once housed a Red Cross Building, which was razed between 1945 and 1952.

2.2 Proposed Action

DOE's Proposed Action is to authorize the expenditure of Congressionally Directed financial assistance to Crowder College in support of the construction of Stage I and the planning and design of Stage II of the MARET Center. Stage I would include the construction of an approximately 9,000-square foot building, with space for the school's construction technology program; an incubation center for new businesses; renewable-energy laboratories or workshops; and faculty office space. During Stage I, solar technology would be installed to power the building (Figure 2-1 and 2-2). Only planning and design for Stage II would be funded by DOE under the Proposed Action; however, it is analyzed in this EA as a connected action. Stage II would include the addition of a 21,000-square foot conference center to the portion of the MARET Center constructed during Stage I (Figure 2-3).

2.2.1 Stage I

Proposed elements for Stage I of the project would include construction of an approximately 9,000-square foot building which includes space for the school's instructional, administrative, and business incubation functions (Figure 2-1 and 2-2); and installation of solar technology to power the building. A parking lot and pedestrian paths would also be constructed as part of the center. The new parking lot would have 33 regular spaces and 2 Americans with Disabilities Act (ADA) spaces.

It is estimated that four classes would be held at the MARET Center per day with approximately 20 students per class. An additional 10 to 15 students would visit the center each day. Stage I of the project would take approximately eight months to complete. Detailed information on construction activities can be found in Section 2.2.3.

2.2.2 Stage II

Stage II of the project would include the construction of a 21,000-square foot conference center adjacent to the portion of the MARET Center constructed during Stage I (Figure 2-3). It is estimated that two conferences would be held each year with approximately 250 to 400 individuals attending. The space would also be used for school groups (5 to10 groups of 30 to 100 people each year), business group training (8 to 10 groups of 10 to 20 people per year), and on campus meetings other than class meetings. This conference center would allow Crowder College to host sustainable building technology and renewable energy conferences, seminars and classes, sponsored by both academia and industry. The addition of a conference center would allow Crowder College to further showcase the MARET Center as an example of sustainable building technology.

While only planning and design of Stage II would be funded under DOE's Proposed Action, the planned construction is a connected action that is analyzed in this EA. All the site work (e.g. grading, utilities,

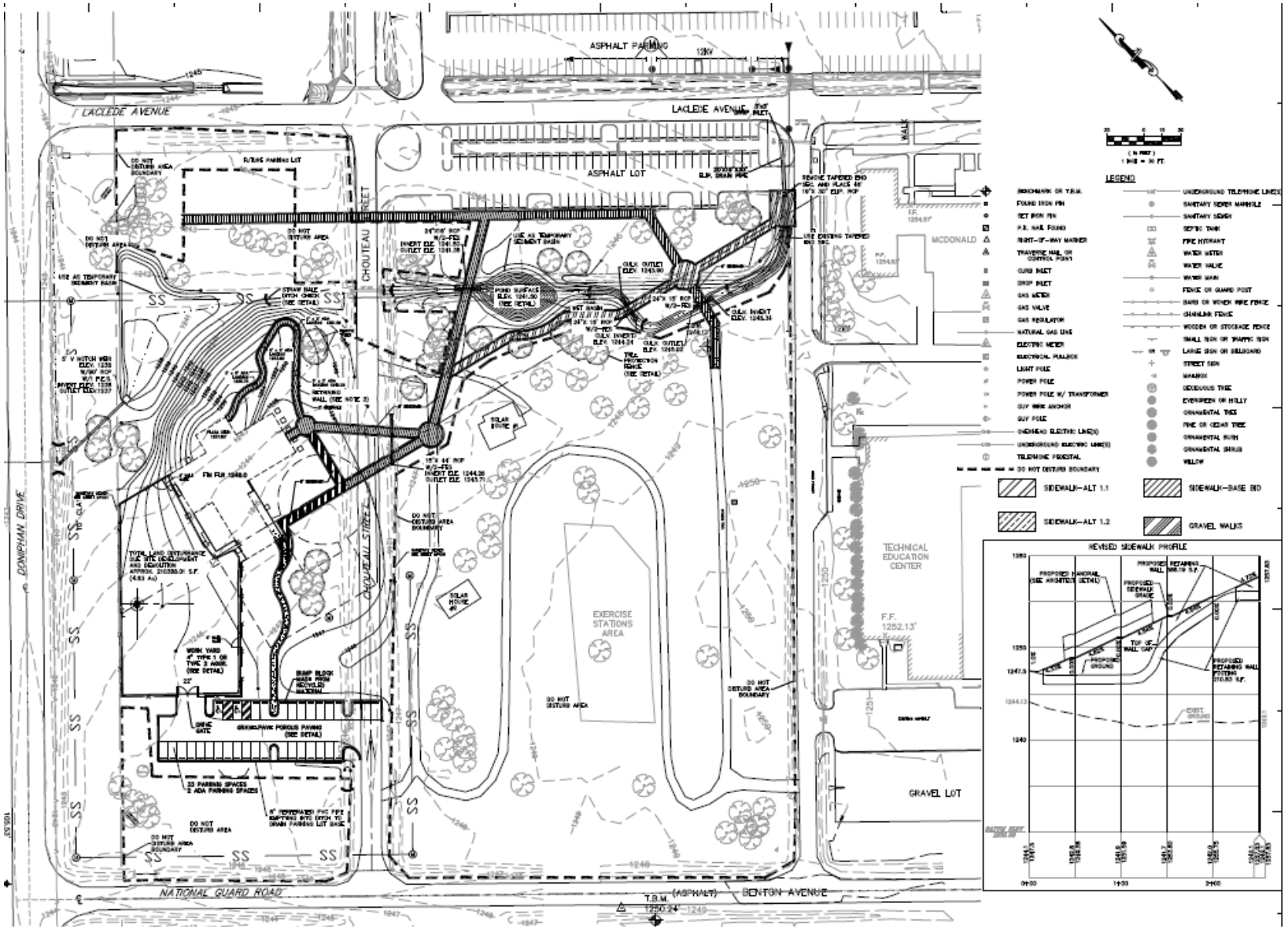


Figure 2-1. MARET Center Site Plan

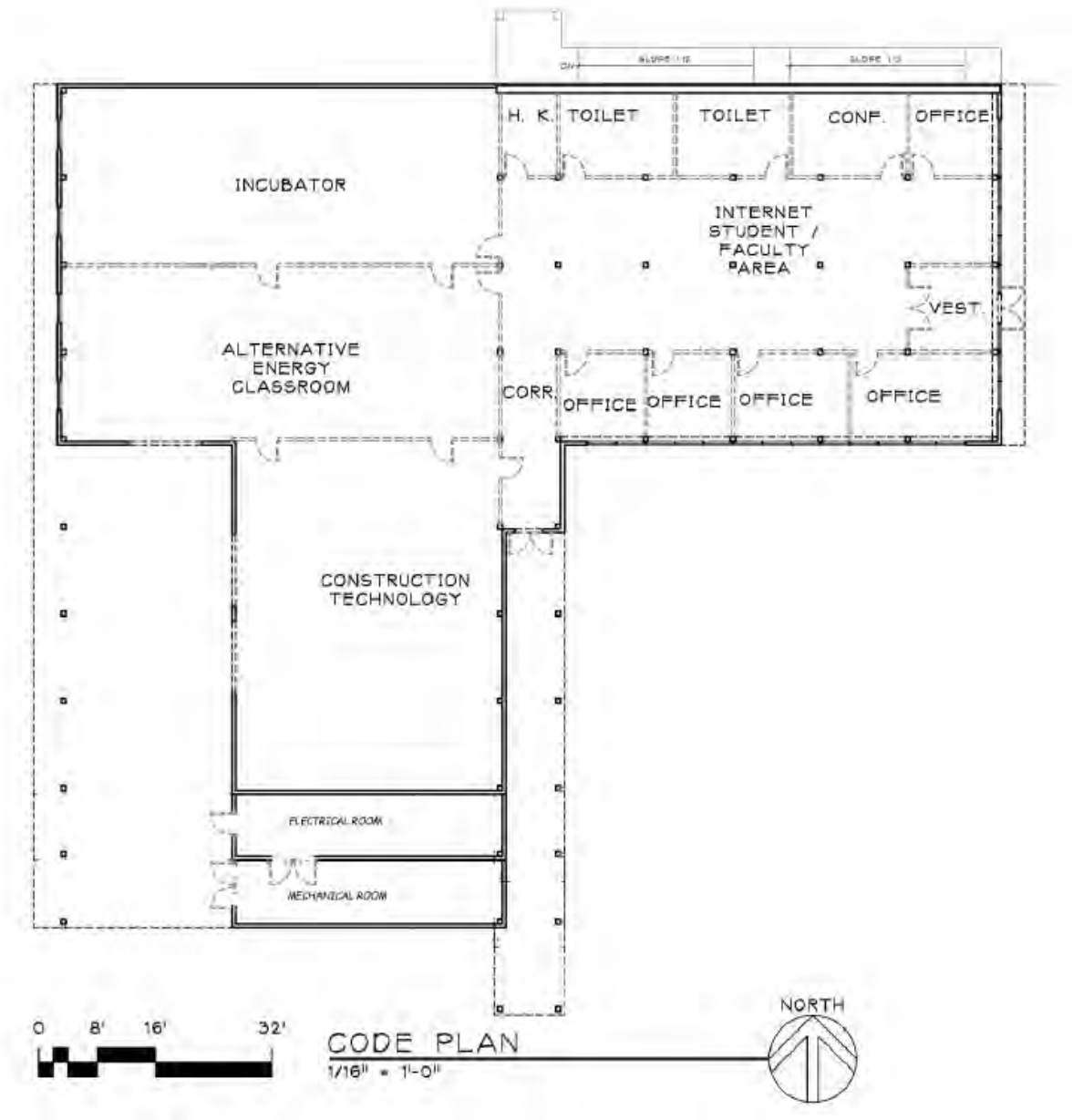


Figure 2-2. Stage I of the MARET Center

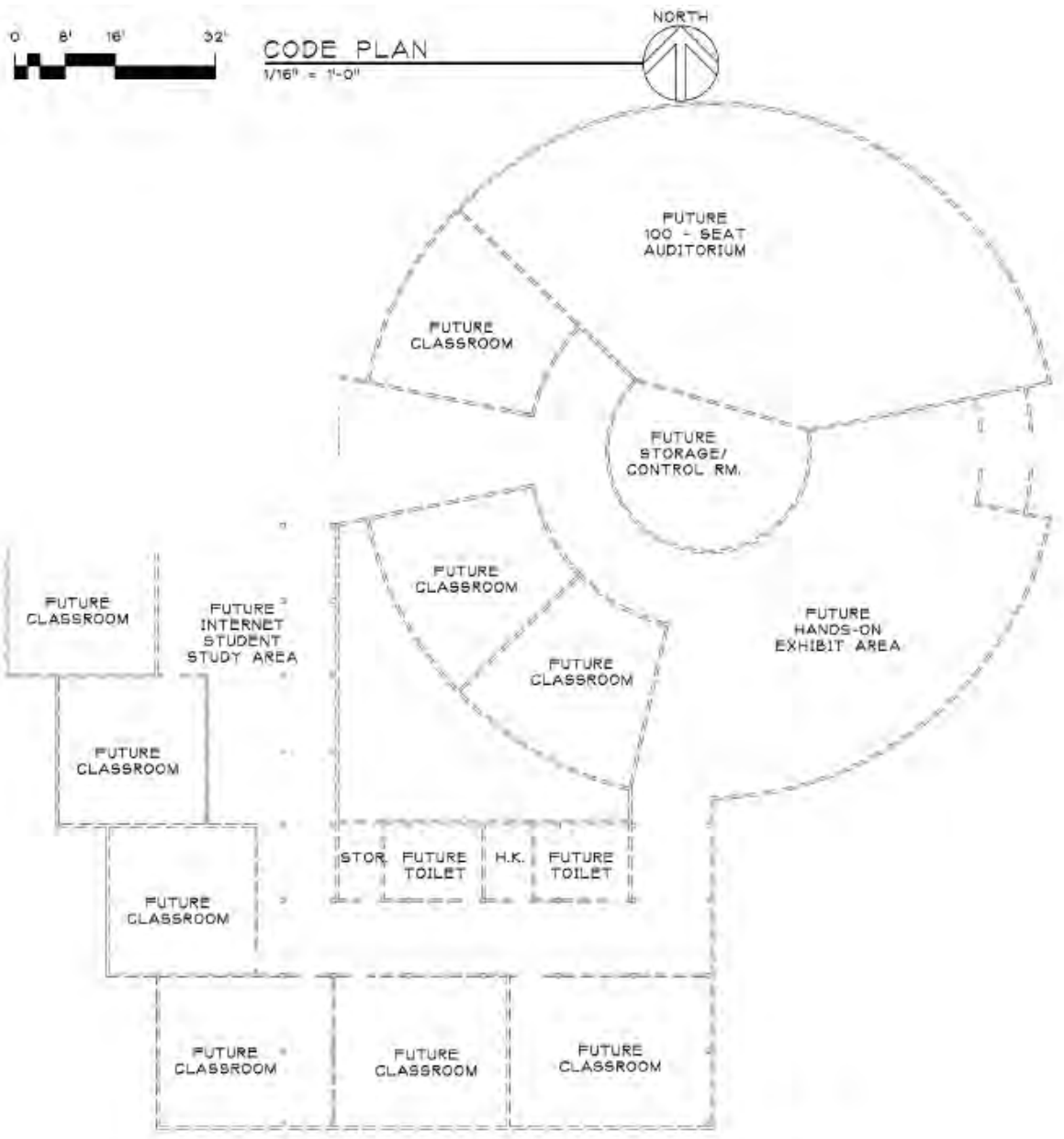


Figure 2-3. Stage II of the MARET Center

parking lots, paths, and landscaping) conducted under Stage I (described in Section 2.2.3) would be designed to accommodate Stage II of the project.

2.2.3 Building Description

2.2.3.1 Sustainable Building Practices

The MARET Center would utilize sustainable building materials and building materials with recycled material content to the extent practicable and would integrate a variety of green construction practices such as an earth-sheltered design, a green roof[1], rainwater harvesting, and low volatile organic compound (VOC) interiors and furnishings. Permeable surfaces (pervious concrete and porous paver material), bio-swales[2], a green roof, and rainwater harvesting would be implemented to promote aquifer recharge and minimize surface water run-off. Shipping distance for many of the materials would be minimized to the extent practicable.

2.2.3.2 Renewable Energy Components

2.2.3.2.1 Solar Energy

The MARET Center would utilize a solar panel system, geothermal energy, and the existing wind turbine to ensure the MARET Center is a net-positive energy (from the grid) building. Excess energy produced by the MARET Center would be used to power other buildings on campus and/or sold to the utility company. The solar panel system would have a "saw-toothed" design to provide space for solar panels and reflectors (Figure 2-4). The system would include radiant heating/cooling panels to provide heating in the winter and cooling in the summer; low cost solar thermal modules, or hot water collectors, that absorb energy from the sun; and hybrid thermal-electric solar systems that circulate energy within the structure. Approximately 3,900 square feet of solar area is planned for the building; some of which could produce as much as 40 kW of PV and nearly twice that of solar thermal potential.

Figure 2-4. MARET Center Features

[1] A roof of a building that is partially or completely covered with vegetation and soil, or a growing medium, planted over a waterproofing membrane. It may also include additional layers such as a root barrier and drainage and irrigation systems. Rooftop ponds are another form of green roofs that are used to treat greywater.

[2] Bioswales are landscape elements designed to remove silt and pollution from surface water run-off. They consist of a swaled drainage course with gently sloped sides and filled with vegetation and/or riprap. The water's flow path, along with the wide and shallow ditch, is designed to maximize the time water spends in the swale, which aids the trapping of pollutants and silt. Biological factors also contribute to the breakdown of certain pollutants. Water not absorbed into the ground will flow to one of the two ponds and eventually out through the site effluent invert on the west side of the site. This effluent flows into the seasonally active portion of Buffalo Creek. This effluent discharge is to be covered under the National Pollutant Discharge Elimination System (NPDES) operating permit that will be acquired by the College (see section 2.4).

The kW output per stage would be roughly 40kW for Stage 1 and 60kW for Stage 2. The panels would be installed on the south facing roof angles in accordance with North American Board of Certified Energy Practitioners (NABCEP) practices and manufacturers specifications. All maintenance and cleaning would be accomplished via the walkway at the intersection of the north and south roof angles. Modules would be wired in series to around 400 Volts Direct Current (VDC). A charge controller would then modify the voltage to be most compatible with the 48 VDC (nominal) battery bank or converted directly to AC current to supply the building or the utility grid.

2.2.3.2.2 Geothermal Energy

The geothermal energy system would utilize a geothermal heat pump, or ground source heat pump, with approximately 60 tons total capacity. The heat pump would circulate a fluid (likely glycol) through underground piping that absorbs heat from, or relinquishes heat to, the surrounding soil, depending on whether the ambient air is colder or warmer than the soil. The MARET Center would utilize a vertical system where holes (approximately 4 inches in diameter) are drilled between 10 and 25 feet apart and no more than 250 feet deep. A rotary type drill with coring capability would be used with a direct circulation rotary drilling fluid (water or water with additives-mud). Water and drill cuttings resulting from the geothermal well drilling process would be placed in an on-site holding area and applied to land owned by Crowder College. By spreading the material out over land, the soil would be filtered from the wastewater. Drilling would be accomplished in less than a week.

Two pipes would then be inserted into the ground and connected at the bottom with a U-bend to form a loop. The vertical loops would be connected with horizontal pipe (i.e., manifold), placed in trenches (500 to 800 feet onsite for feed/return loops), and connected to the heat pump in the building. Once the heat exchanger piping is inserted, the hole would be grouted with standard bentonite grout. The system would utilize the seasonal storage method. In the winter, portions of the ground would be cooled and stored for cooling in the summer and in the summer portions of the ground would be heated and stored for heating in the winter.

The system would be equipped with an automated pressure sensitive valve as a safety feature (standard with most equipment) which include auto-shutdown of systems in case of a pressure change indicating a leak in tubing. In addition, all the in-ground thermal exchange piping and hardware solidly grouted into the well hole making it very stable and unlikely to leak. Any section found to be leaking would be immediately repaired or taken off-line by means of valves that isolate individual loops. The glycol solution used in the system would be one similar (or an equally environmentally safe material) to Dynalene PG—Inhibited Propylene glycol, a clear, non-toxic fluid that the Food and Drug Administration (FDA) considers —generally recognized as safe". This inhibited propylene glycol is non-toxic, and offers superior corrosion protection. It has a low oral toxicity, which allows it to be used in applications where incidental contact with ground water, food, or beverage may occur. The total volume of the geothermal loop system below grade is approximately 6,115 gallons. The glycol is to be maintained at 20 percent volume thus the glycol volume will be 1,223 gallons. While leaks are possible, they are typically small in volume. The impact of a leak to human health and the groundwater would be negligible as the solution is non-toxic and the thermal exchange piping would be solidly grouted.

2.2.3.2.3 Wind Energy

Although not part of the Proposed Action, the existing wind turbine on the site would supply some of the power for the MARET Center. It is a Nordtank 65-kW wind turbine. The turbine had spent several decades generating power for a wind farm in California when the next generation large wind turbines replaced it. The Nordtank wind turbine was refurbished and was subsequently purchased by Crowder College. The turbine is approximately 125 feet tall and produces power when wind speeds are over 8 miles per hour (mph). The wind turbine is an —upwind" machine that is oriented into the wind by a

geared yaw drive controlled by a wind direction finder. The turbine begins to produce power when the rotor reaches 42 rotations per minute (rpm) at about 10 mph wind speed, and it generates its rated power at 44 rpm at 33 mph wind speed. In its first month of operation, this turbine produced 10.2 megawatt hours (MWh) (10,200 kilowatt hours [kWh]), or enough energy for 8 to10 homes.

2.2.3.2.4 Energy Produced and Consumed

Total estimated power usage for the proposed MARET Center is 97,000 kWh/year. Solar power is expected to contribute 44,000 kWh/year (or 27 percent of the total energy produced). Geothermal and Radiant Hybrid Systems (combined) are expected to contribute a net of 50,000 kWh/year (around 170 million British thermal units [BTU]) or 30 percent of the energy produced. Wind is expected to contribute 70,000 kWh/year or 43 percent of the total energy produced. The 3 technologies would result in the production of 164,000 kWh/year, which would have a net positive energy of 67,000 kWh/year.

2.2.4 Construction Activities

Construction activities conducted during Stage I and II are described in this section. All the site work (e.g., grading, utilities, parking lots, paths, and landscaping) conducted under Stage I would be designed to accommodate Stage II of the project. Utilities and renewable energy installations conducted under Stage I would also serve Stage II. Stage I construction activities and durations are detailed in Table 2-1. Stage II activities and duration are detailed in Table 2-2.

Mobilization. This activity would include the permanent closure of approximately 200 yards of the block of Chouteau Street between Laclede Avenue and National Guard Road (see Appendix D for road closure documentation); installation of barricades; installation of temporary utility services and sanitation units; installation of a construction management office trailer, and staging of materials. Approximately 60-80 construction workers and 30 trucks would support the construction effort. Mobilization would occur over a two to three week period.

Site work. This activity would include surveying, earthwork, grading and drilling of geothermal wells. Details of major activities include:

- For stormwater retention, two man-made ponds would be excavated. Earth removed from the basins would be used to form the dams, so no removal of fill is anticipated. The first small pond (eastern side of the site, 1,200 square feet maximum) would both retain water and act as a biologically active pond/wetland. To assure that it retains water a bentonite clay layer[3] would be added to the bottom of the pond area. Biological activity would be allowed to occur naturally. The second and larger pond to the west (4,000 square feet maximum) would be a detention pond, used to temporarily hold run-off and completely drain in a 24-hour period. This pond would also cause stormwater to slow and allow suspended material to settle out before the water enters the watershed.
- Drilling, rough plumbing, and grouting would be required for the hot and cold geothermal well fields. During the drilling process, a casing would be inserted, which would be left in place while polyethylene pipe is inserted. Material removed from the drill core would be

[3] Bentonite is a naturally occurring clay that is inert and non-toxic. Its chief characteristic for use here is to form a natural mostly impermeable layer to seal an area where water can be retained while allowing vegetation to take root.

incorporated into the site grading. Once the heat exchanger piping is inserted, the hole would be grouted with standard bentonite grout.

- Completion of stormwater routing would mainly consist of grading the site to drain to the pond areas or to one of the existing ditches/swales. The site is very evenly graded now and very little finish grading is anticipated.
- Installation of erosion control barriers would involve two main types. One erosion control barrier would consist of a biodegradable erosion control blanket in which an evenly distributed layer of agricultural straw is stitched to a biodegradable jute fiber designed to provide all-natural erosion protection on slopes and assist with establishment of vegetation. These are affixed to the slopes so that after the blankets biodegrade; soil erosion is controlled by the root, stem, and leaf structures of the mature vegetation that has rooted by active seeding, planting or natural distribution. The second erosion control barrier would consist of a ditch and flowing water applications and a —silt fence," which is made with biodegradable fabric with wooden posts for support. The fence would be used to hold back dirt and silt on site to allow moving water to slow and drop silt before exiting the property.
- Approximately 200 feet of the vacated roadway would be demolished and removed. The removed roadway material would be pulverized and used as stabilizing fill in the parking areas of the project.

Table 2-1. Construction Activities and Duration for Stage I

Description	Location	Size/ Dimensions	Application	Duration in months*
Mobilization	Vacated Chouteau Street	200 feet	Staging and preparation	1
Site work	Entire site	Roughly 3.5 acres	Grading, well drilling, surveying	2
Utilities	Entire site	600 feet of trench	Trenching and rough-in installation	1
Foundation	Building perimeter	1000 square feet of footing 9,000 square feet of concrete	Foundation and concrete support structure	2
Framing	Building Pad	20,000 square feet	Metal and Sips panels, raised access floor system	3
Exterior Finishes	Building Pad	14,000 square feet	Cemetitions Sheet Goods, Zinc Siding and EIFS	2
Interior Electrical/Plumbing	Building Pad	N/A	Rough in HVAC and M&V	2
Solar and Geothermal Equipment Installation.	Building Pad	N/A	PV, PVT, Geothermal Heat pumps	3
Final Interior Finishes and Fixtures	Building Pad	12,000 square feet	All fixtures and finishes	2
Final Landscaping	Building Pad	3 acres	Plantings, parking lots and walkways	1

***There may be overlap in duration of activity.**

Table 2-2. Construction Activities and Duration for Stage II

Description	Location	Size/ Dimensions	Application	Duration in months*
Foundation	Building perimeter	Approximately21,000 total gross square footage for Phase II	Foundation and concrete support structure	1
Framing	Building Pad	Approximately 21,000 total gross square footage for Phase II	Metal and Sips panels, raised access floor system	1
Exterior Finishes	Building Pad	Approximately 21,000 total gross square footage for Phase II	Cemetitions Sheet Goods, Zinc Siding and EIFS	2
Interior Electrical/Plumbing	Building Pad	N/A	Rough in HVAC and M&V	2
Final Interior Finishes and Fixtures	Building Pad	Approximately 21,000 total gross square footage for Phase II	All fixtures and finishes	2
Final Landscaping	Building Pad	3 acres	Plantings, parking lots and walkways	1

***There may be overlap in duration of activity.**

Utilities. The facility would be connected to the existing electrical service pad and data and communication links would be tested for connection with the rest of the campus. In addition, during this activity the following lengths of sewer, water, and natural gas lines that exist on the site would be extended to the building:

- Roughly 100 feet of water and sewer lines.
- Roughly 300 feet of natural gas line.

Foundation. Details of this activity include:

- Roughly 1,000 square feet of concrete footings would be poured using a precisely engineered mix of standard concrete components with the added features of fly ash[4] and slag [5]. Both of these materials are considered industrial waste but when mixed in the right proportions actually make a concrete mix stronger and better. This saves landfill space, makes better concrete, and could result in some cost savings.
- Roughly 9,000 square feet of slabs for raised floors and grade level slabs would be poured again using slag and fly ash in the mix in appropriate mix ratios.

[4] Fly ash is used as a partial replacement for Portland Cement to make a better, cheaper concrete. When used as a concrete additive any toxic qualities are bound into the concrete and do not leach out over time.

[5] Slag is a cheap aggregate alternative additive that allows for the displacement of some of the mined stone aggregate. Once imbedded in the concrete it is very stable and inert for millennia.

- Insulated Concrete Form (ICF) walls would be poured for the north wall and the hydronics room. ICF is a new product that allows for concrete to be placed in the forms, which are made of dense expanded poly-styrene (commonly called Styrofoam) on two sides that are held at a specified distance from one another by stiff polyurethane webbing. The webbing not only reinforces the Styrofoam against the hydrostatic action of the wet concrete but also serves as the mechanical spacing and holding device for the required reinforcement the goes in the wall. Because the forms are never removed the concrete is allowed to naturally cure, which adds to its strength. The foam acts to insulate the building as well.

- Throughout the remaining structure ICF forms would be utilized as a time saving and energy conservative building material whenever formed concrete is between a conditioned space and an unconditioned space.

- Preliminary work on gates and fences would occur. The gate to the energy project yard would require solidly anchored posts to support the weight of the gate. The posts would be centrally set in an 18-inch diameter hole at least 3 feet in the ground. The fence would not require such structural support and would consist of a 6-foot tall chain link fence with posts driven or grouted in every 10 to 12 feet.

- Preliminary parking lot placement would occur. This consists of laying the gravel bed, and in some cases, would consist of a water pervious cloth that would underlie the pervious parking materials. The reason for this kind of system is it reduces runoff and allows rainwater natural access to replenish ground water.

- Berm backfill would be completed. In addition to providing a seasonal thermally dampening effect to the north wall and hydronics room the berm would permit access to view the roof area for classes and visitors. The actual roof would have restricted access but the public would be able to see the green roof and some of the solar hardware from a viewing platform atop the berm.

Framing. Details of this activity include:

- Steel structure would be installed.

- Structural Insulated Panels (SIPs) would be installed. SIPS are a relatively new building system that consists of two sheets of Oriented Strand Board (OSB, also commonly called chipboard) sandwiched on either side of a layer of dense expanded polystyrene (Styrofoam). The resultant composite system is stronger than walls of the same dimension made in a traditional "stick built" method. SIPs also use 80 percent less dimension grade lumber; by transferring all of the stresses to the OSB "skin" no studs are required. Additionally SIPs are very resistant to air infiltration, and can be manufactured in a factory environment and quickly assembled "erector set" style on site.

- Installation of a gantry crane in the Energy Lab would be completed. The gantry crane was donated to the program and would be used to load and unload heavy items from flat bed trailers in the Energy Lab area.

- A raised access floor structure would be installed in all of the offices, commons and part of the classroom spaces. This floor system allows cost effective flexibility in spatial re-orientation as the use parameters of the facility change over time.

- The greenroof would be installed. The greenroof consists of an 8-foot-wide 1:12 sloping roof that is lined with a waterproof membrane. Two-foot-square, 4-inch-deep poly-urethane tubs sit directly on top of that membrane. The tubs are designed to drain slowly after a rain and

would be planted with drought resistant plants. Additionally a 30-gallon rainwater retention device would be placed at the invert of each of the roof sections. These devices would catch rainwater and release it slowly to the plantings.

Exterior Finishes. Details of this activity include:

- The roof membrane on the sloped roof and metal roof sections would be installed.
- Exterior doors would be installed, including personnel and garage doors.
- Windows would be installed. South windows would also be fitted with louvered overhang hardware to allow winter sun to penetrate the space but block direct summer sun.
- Skylights would be installed. Skylights would not only provide daylight to every room in the facility, they also would aid in heating the building in the winter. The north facing aspect and air-tight louvered shutters would be used to minimize the impact of the skylights on cooling.
- Exterior wall finishes would be installed. Though much of the exterior is bermed or consists of windows and door, the remaining exterior surfaces are specified to be low maintenance and environmentally stable. Zinc sheeting and cementitious sheeting are the primary materials specified. Exterior Insulation and Finish Systems (EIFS) would be used over some of the weather exposed ICF foundation. The product is also called synthetic stucco, and refers to a multi-layered exterior finish.

Interior Electrical/Plumbing. Details of this activity include:

- The completion of interior rough-in for electrical, plumbing, data Measurement and Verification (M&V), control, and security systems.
- The completion of heat pumps and other Heating, Ventilation, Air Conditioning (HVAC) rough-in.
- The installation of a temporary connection to the existing electrical pad.

Solar and Geothermal Equipment Installation. Details of this activity include:

- Installation of PV and Photovoltaic/Thermal (PVT) modules. These modules feature a high efficiency crystalline PV module mechanically coupled with an efficient heat exchanger that would remove heat from the PVs, allowing them to operate more efficiently, and deliver the heat to either the domestic hot water needs or to the geothermal heat pump system discussed later. The hybridized PVT module would effectively provide over twice the energy to the facility than the PV by itself would have provided.
- A Balance of System (BOS) for HVAC including the unique geothermal system would be utilized on this facility. The geothermal heat pump system, like most others, works by exploiting the physical properties of evaporation, phase change, and condensing a refrigerant. A heat pump normally refers to vapor-compression refrigeration device that includes a reversing valve and very efficient heat exchanges so that the direction of heat flow may be reversed depending on the needs of the space. Simply put, when the building needs heat, the system removes heat from the ground and sends it into the building. Conversely, when the building needs to reject heat, the system removes heat from the building and sends it into the ground. A typical ground source heat pump transfers three to four times more energy than it uses. The facility would improve on this concept by having separate well fields that act as "hot and cold" storage areas; further the system would use the PVT panels to

reject excess heat (cool) and gather heat when the preset parameters in the system management software determines it to be appropriate. This system would allow much of the heating and cooling loads of the building to be accomplished without going through the vapor-compression cycle and use only pump energy to deliver the fluid and resultant comfort range conditioning.

- Two earth loops would be constructed as part of the geothermal system. Each earth loop will be approximately 140 feet by 100 feet by 250 feet deep. The earth loop will have a ground cover of approximately 5 feet above the header manifold. In the cooling season the ground and water temperature in the area around the earth loop, meaning approximately 20 feet beyond the area of the earth loop for the full depth (approximately 250 feet), will increase approximately 10 to 20 degrees Fahrenheit at the peak of the cooling season. In the heating season, this heat would be extracted from the ground and water when the earth loop is used for heating the building. At the heating season peak, the ground and water temperature will then be decreased by approximately the same 10 to 20 degrees Fahrenheit returning the ground and water back to the normal earth temperature. The farther away from the earth loop the lower the increase and decrease in the ground temperature. At approximately 30 to 40 feet away from the earth loop there should not be any major increase in ground or water temperature. Biological impacts would be minor.
- Along with the necessary equipment to condition the DC power to interface with the AC grid, the facility would feature a battery storage area that would store a single battery and hold around 70 kWh of electricity to use when needed. The battery would be 1.7 cubic meters or less and weigh around 2,300 kg. Their life expectancy is 10 to 15 years and they are completely recyclable. The battery would be secured in a locked cabinet that is positively vented to the outside to remove vented fumes (primarily hydrogen and water vapor). In small amounts, if contained, they are potentially ignightable, but biologically harmless. Positive ventilation will prevent the risk of these fumes being ignighted.
- Radiant panels would be installed. The facility would use radiant ceiling-mounted panels to deliver heat and cool for comfort conditioning. Additionally, a central desiccant wheel system would be used to control the humidity level so that the radiant panels do not draw dampness.

Final Interior Finishes and Fixtures. Details of this activity include the installation of the following:

- Light fixtures, exit and exterior lighting, and control interface modules;
- HVAC control units;
- Interior painting and trim;
- Cabinetry;
- Suspended ceilings, interior trim; and
- Security devices such as remote cameras, sensors and alarms.

Final Landscaping. Details of this activity include:

- Grading across the site would be completed in preparation for planting of native grasses and plantings. The grading would consist of smoothing to grade, leveling and aerating the soil to accept seeding of grasses and plantings

- Berms would be backfilled, including sidewalk and railings. The berm mentioned in the Foundation section would be brought up to grade. Then a sidewalk from the east door to the top of the berm would be built to ADA standards and equipped with a railing. This would allow any member of the public access to a view of the green roof and PV power roof systems.
- Green roof cisterns and ground level cisterns would be installed. These would catch and slowly release rainwater to the green roof and ground level vegetation.
- Pervious parking lots would be installed. After the installation of the base rock in the parking area (discussed earlier), a layer of pervious material would be installed to allow rainwater to naturally replenish groundwater. There are several types of pervious paving that would be used depending on the type of traffic the area receives. The energy project yard west of the facility would have 4 inches of a type 1 aggregate gravel. The 35-space (including 2 ADA) parking area to the south of the facility would be covered with ―GravelPave", a pervious load bearing surface with a compressive strength of over 5,000 psi that acts as a stormwater filtration layer.
- Bicycle racks would be installed to encourage the use of human powered transportation. Bicycle racks would be placed close to the south entrance of the facility.
- Walkways would be installed. Low traffic walkways would be GravelPave, or type one aggregate gravel, while main walkways that connect to the rest of the campus would be standard concrete walkways.

2.2.5 Leadership in Energy Efficient Design Certification

Crowder College is planning to attain a U.S. Green Building Council (USGBC) Leadership in Energy Efficient Design (LEED) Green Building Platinum Rating. LEED Rating System has scoring systems based on a set of required "prerequisites" and a variety of "credits" in six major categories: sustainable sites; water efficiency; energy and atmosphere; materials and resources; indoor environmental quality; and innovation and design process. In LEED v2.2, for new construction and major renovations for commercial buildings, there are 69 possible points and buildings can qualify for 4 levels of certification: Certified (26-32 points), Silver (33-38 points), Gold (39-51 points), and Platinum (52-69 points). Certification is granted solely by the USGBC responsible for issuing the LEED system used on the project. Crowder College's pre-certification estimates for the MARET Center total 55 points out of a possible 69 points (See Appendix C).

Green Building Practices that will be employed include:

- Preferential use of regional materials and products for construction that are produced within 500 miles of the site. Reducing the length of material transportation reduces the emission of criteria pollutants from motor vehicles. The College will recycle at least 50 percent of its construction debris.
- Use of paints, coatings, sealants, adhesives and carpets that have a low VOC content.
- Use of structural steel containing at least 90 percent total recycled content.
- Use of water conserving plumbing fixtures (e.g., dual flush toilets, waterless/low water usage urinals, and faucet sensors). The facility would also include rain catchment for non-potable water uses. Landscaping would require low water use and utilize stormwater catchment for irrigation. The green roof sections would be sustained by roof capture of rainwater.

- Minimization of stormwater runoff through the use of groundwater recharge pools/detainment ponds. These ponds allow for the settlement of suspended solids in stormwater. All parking areas, driveways, and walkways will use pervious pavement or similar material.
- Use of onsite renewable resources to produce the electrical energy needed for the construction process as well as for the completed structure. TRNSYS Models6 of the building indicate that the building as designed would be a Net Positive Energy structure (exporting more energy to the electric utility grid than it imports on an annual basis).
- Use of low light pollution fixtures with timers for exterior lighting.

2.3 Description of the No Action Alternative

Under the No Action Alternative, DOE would not provide funds for the construction of the proposed MARET Center and the project would not be built as part of a Federal action. DOE would not support the construction of the MARET Center and would not promote EERE's mission through this project. For purposes of analysis in this EA, the impact discussions in Chapter 3 equate the No Action Alternative with a "no build" scenario whereby the project site would remain in its current condition. However, should DOE elect not to fund the Proposed Action, Crowder College could continue to build the proposed MARET Center using other means of financing.

2.4 Applicant Committed Measures

The specific environmental protection measures listed below are incorporated in the applicant's Proposed Action as integral components of the proposed project.

Air Quality and Noise

- During construction, typical mitigation measures to minimize air quality issues caused by fugitive dust and tailpipe emissions will include the following:
    - Require all construction crews and contractors to comply with State regulations for fugitive dust control during construction.
    - Maintain all engines of construction equipment according to manufacturer's specifications.
    - Minimize the idling of equipment while the equipment is not in use.
    - Implement reasonable measures, such as applying water to exposed surfaces or stockpiles of dirt, when windy or dry conditions promote problematic fugitive dust emissions. Adhering to these Best Management Practices (BMPs) would minimize any fugitive dust emissions, and therefore would reduce adverse impacts from fugitive dust emissions.
- Construction noise impacts will be reduced by avoiding times of day or days of the week when noise exposures would be more objectionable (i.e., nights or weekend mornings). Equipment would be operated with manufacturer noise control features in working order (for example, exhaust mufflers in good repair and engine enclosure panels fitted and properly

[6] TRNSYS is a simulation program primarily used in the fields of renewable energy engineering and building simulation for passive as well as active solar design.

secured). If additional quieting is necessary, installation of noise controls to equipment will be used to further reduce their noise emission, primarily through the fitting of additional or enhanced engine exhaust silencers.

- The college will complete a General Conformity applicability analysis should the area's attainment status change.

Environmental Contamination

- During drilling, Crowder College will test drill cuttings approximately every 10 feet using a Photoionization Detector (PID) or another method to test for the presence of VOCs. Trichloroethylene (TCE) and its degradation products (VOCs) are the main contaminants of concern at the Pools Prairie Superfund Site (a National Priorities List, contaminated site located northeast of the proposed MARET Center site) and will be detected by the PID if present.
- If VOCs are determined to be present, Crowder College will forward this information to the MDNR Superfund project manager for the Pools Prairie Site. MDNR would provide the information for potential follow up activity by the Responsible Parties during the Groundwater Investigation.
- If the geothermal wells are more than 200 feet deep a variance will be requested from MDNR prior to construction. This would take approximately eight weeks for approval. Crowder College will provide full-length thermal grout for each well in accordance with the variance requirements. The necessary depth of the wells will be determined after drilling test wells, which will be less than 200 feet deep.
- If VOCs are found, a full-length thermal grout will be used to minimize the potential for migration of TCE vapors vertically along heat pump loop piping to the surface.
- Water and drill cuttings resulting from the geothermal well drilling process will be placed in an on-site holding area and applied to land owned by Crowder College. By spreading the material out over land, the soil will filter the wastewater.
- The College will provide and ensure that a site educational awareness, safety and training program is implemented for all contractors hired for the Project. The progam is available online at https://www.denix.osd.mil/uxosafety and contains information on chemical agent identification sets (CAIS), the history of chemical warfare, and the response process.
- Should any buried building materials be discovered during construction, an asbestos inspection will be completed in accordance with local, state and federal asbestos regulations (40 CFR Part 61, subpart M and state regulations 10 CSR 10-6.241 and 10-6.250).
- If during the course of the asbestos inspection, it is determined that the total amount of asbestos containing material exceeds 160 square feet, 260 linear feet, or 35 cubic feet, then the asbestos will be removed by a Missouri registered asbestos abatement contractor and disposed of in accordance with the National Emissions Standards for Hazardous Air Pollutants. If there are less than these threshold amounts, then the material would not have to be removed prior to renovation or demolition. However, if materials are contaminated with asbestos, regardless of the amount, the sanitary landfill may have special packaging requirements for disposal and the College will follow landfill guidelines for its disposal.

- Notice of an asbestos abatement project (above the threshold limits) and all demolition projects (regardless of whether asbestos is present), affecting regulated structures will be provided to the Missouri Department of Natural Resources' Air Pollution Control Program on the Department's form at least 10 days prior to commencement of the asbestos abatement or demolition project. The Department must grant approval.

- If any evidence of a petroleum spill is found during construction, a Petroleum Monitoring and Management Plan will be implemented by the College.

Health and Safety

- All personnel involved with construction activities will be properly trained and required to comply with Occupational Safety and Health Administration (OSHA) regulations and industrial material handling.
- During construction, a Worker Protection Plan and hazardous spill and prevention plan will be implemented. During operation, environmental, safety and health policies; development of standard operating procedures (SOPs) for hazardous activities to protect workers; and implementation of training programs to ensure policies and procedures are followed correctly will be implemented.
- Crowder College will comply with all local, state, and federal regulations regarding the use, transport, storage, and disposal of hazardous materials and wastes (see Section 3.8).

Required Permits

- As described in applicant committed measures for Soil and Water Resources, a National Pollutant Discharge Elimination System (NPDES) operating permit for construction phase stormwater pollution prevention will be acquired. The permit will be submitted approximately eight weeks prior to construction.
- As described in applicant committed measures for Environmental Contamination, if the geothermal wells are more than 200 feet deep a variance will be requested from MDNR prior to construction. This would take approximately eight weeks for approval.

- A closed-loop geothermal system does not require a permit from the Department's Water Pollution Control Program; however, its construction must follow 10 CSR 23-5 of the Missouri Well Construction Rules. The College will report the construction to the Department's Wellhead Protection Section, and will pay the necessary associated certification fees.

Soil and Water Resources

- The total disturbed area will be kept to the minimum necessary to complete the site work and would be confined to the site boundaries.
- Should contaminated soil be encountered and need to be removed, it will be characterized and disposed of under the watch of a professional to minimize potential cross-contamination and to ensure proper protocols are followed.
- BMPs for soil disturbance will include, but will not be limited to soil stabilization/revegetation techniques during and after the construction stage, sediment barriers (silt fence or straw bales), and establishment of improved construction entrances.

- The use of BMPs during the construction stage will be formalized in a Soil Erosion and Sediment Control Plan.
- A National Pollutant Discharge Elimination System (NPDES) operating permit for construction phase stormwater pollution prevention will be acquired. The permit application will be submitted approximately eight weeks prior to construction. This permit application requires the development of a Storm Water Pollution Prevention Plan (SWPPP). BMP's for minimizing the potential for spills will be outlined in the construction stage SWPPP as a condition of the General Permit.

Solid Waste Management

- Any contracts necessary as part of the proposed project will include: (1) requirements for the proper disposal of solid waste, and (2) retention of disposal/recycling receipts as a means of demonstrating compliance with the Missouri Solid Waste Management Law and regulations.

- Contracts will reference the Department's technical bulletin "Managing Solid Waste Encountered during Excavation Activities" as a means of demonstrating how they will comply with discovery of unexpected buried wastes during utility line installation and other soil disturbing activities. This bulletin will be shared with contractors working at the site. The contracts will be executed in a manner that ensures that solid wastes are recycled, reused or properly disposed of in compliance with the Missouri Solid Waste Management Law and regulations during demolition and construction activites.

- Contractors will be made aware that the disturbance of a landfill or pre-law dump requires notice to and approval from the Department's Solid Waste Management Program prior to disturbing the buried waste.

Stormwater and Groundwater (indirectly Threatened and Endangered Species)

- Crowder College will manage construction activities to minimize erosion and sedimentation/runoff to nearby systems and lakes. Crowder College would apply for a stormwater permit for land disturbance activities from the MDNR and implement a stormwater pollution prevention plan for construction activities. The project design will include stormwater management elements that assure storm discharge rates to streams for very heavy rain events would not increase from present levels. The College will revegetate disturbed areas to minimize erosion using native plant species compatible with the local landscape and wildlife needs.
- Crowder College will drill test wells, prior to drilling of geothermal wells, to characterize the geological conditions below ground and determine whether karst features[7] or large voids exist beneath the surface at the site. This will allow drillers to further characterize the site and determine the extent of voids beneath the surface.

- Crowder College will use sleeves during the drilling/grouting process. In areas where karst topography and voids exist (as determined by the preliminary test wells and/or during the

[7] Karst features occur throughout the Springfield Plateau. Karst is any terrain based on a layer of soluble bedrock and is most often carbonate rock such as limestone. These features were not encountered during the installation of the existing geothermal wells, which are located less than 300 yards to the east and north of the site.

drilling/grouting process), the sleeves will be left in place to prevent any grout from entering voids that have the potential to serve as habitat for the Ozark Cavefish. The College will provide specifications on sleeving to the drillers.

- Crowder College will provide drillers with specifications on the amount of grout necessary for each well. If that threshold is exceeded, grouting would stop immediately minimizing the risk of grout entering voids that have the potential to serve as habitat for the Ozark Cavefish.

- The College will implement SOPs and safeguards to control groundwater pollution per MDC recommendations (Cave, 2009). For example, if there is a drop in hydraulic pressure the well system would be automatically shut off.

3.0 EXISTING ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Land Use

3.1.1 Existing Environment

The proposed MARET Center would be located on Crowder College's Neosho Campus, in the City of Neosho, Newton County, Missouri. Neosho is located in the southwest corner of Missouri near the intersection of US 60 and US 71 highway corridors along the western edge of the Missouri Ozarks (Figure 2-1). Neosho is approximately 15 square miles in area (amounting to about 4 percent of the county's total area) and is home to approximately 20 percent of the county's population or about 11,000 people (City Data, 2009). Neosho is experiencing a revitalization and restoration of its downtown area aimed at a general improvement of the quality of life.

3.1.1.1 Project Site and Zoning

The 608-acre Crowder College campus is located on a portion of the former Camp Crowder grounds, an Army post constructed and used during World War II for an U.S. Army Signal Corps Training Center (City of Neosho). The post was used for a brief time as an Army military police training school after the war ended and eventually deactivated in 1958. The Missouri National Guard currently uses land extending from the northeast to south of the site for training (Camp Crowder, 2008).

The proposed 16-acre project site would be located at the corner of Doniphan Drive and Laclede Avenue on the western edge of Crowder College's campus and extends easterly to Brown Street. The project site has been previously disturbed and currently consists of a maintained lawn with a few trees, stormwater drainage ditches, a wind turbine, and two solar houses, which will remain on site. Directly north of the project site (across Laclede Avenue) is undeveloped land (a grassy lawn to the west of Chouteau Street and a parking lot to the east of Chouteau Street). Missouri Sugars, LLC, a sugar manufacturing company, is located to the west of the site on Doniphan Drive and occupies a single story industrial type building. Crowder College occupies the land directly east of the project site; directly east are McDonald Hall and Crowder College Technical Education Center. The Missouri National Guard controls the property directly to the south and southeast of the main campus, which is used for training purposes. Figure 2-2 shows the project location on the Crowder College Campus.

The May 2006 Neosho Comprehensive Plan provides policy guidance for approximately the next 15 years (to 2021) and ensures that the needs of the growing community would be addressed while supplying appropriate guidance for future decision making issues. The planning area includes the City of Neosho and the urbanized portion of Newton County surrounding Neosho (together referred to as the Neosho Urban Area) and encompasses a planning area of approximately 40 to 55 square miles (Neosho Comprehensive Plan, 2006). The Zoning Code of Neosho was developed for the purpose of regulating and restricting the use of land in the Neosho Urban Area. The Zoning Code divides these lands into 17 zoning districts.

Crowder College's entire Neosho Campus, including the proposed MARET Center site, is located in an area designated as a Commercial Business District (District "C-3") by the Zoning Code of Neosho District. These commercial areas provide the necessary goods and services for the community, region, and visitors. Commercial developments must be located and designed to balance market opportunities with access and location. These areas also must be incorporated into the surrounding areas, rather than altering the character of surrounding neighborhoods (Neosho Comprehensive Plan, 2006). The "C-3" district permits commercial buildings, colleges and universities, and a variety of retail establishments to be located within this district. The principle intention of the district is to provide convenience and services without interference or harm to the nearby residential districts and consequently providing a concentrated, unified design center for a "one-stop shopping" setting (Neosho Comprehensive Plan,

2006). Building or structures should not exceed 45 feet and 3 stories in height. Minimum distances of new buildings from roads for the front yard is at least 30 feet, while the rear yard distance should be 2 feet (where applicable). Off-street parking is mandated by the District ―C3" zoning regulations (Zoning Code of Neosho, 2009).

Future land uses for Crowder College would not change according to Neosho's Comprehensive Plan. The Comprehensive Plan's Future Land Use map describes a general approach for future patterns of development. The Future Land Use map indicates that areas immediately adjacent to the north, west, and south of Crowder College should be developed with industrial land uses. Land to the east has been designated for agricultural uses.

3.1.1.2 Surrounding Area

Crowder College is approximately 4 miles south of Neosho's downtown area and about 1 mile west of Neosho Hugh Robinson Airport. The project site is primarily surrounded by industrial uses that are intended to provide locations for light and heavy manufacturing, warehousing and distribution, storage (inside and screened outdoor facilities), and other industrial services or operations (Neosho Comprehensive Plan, 2006). These sites benefit from proximity to highways and railroad access. This highly concentrated area of industrial land is the 2000-acre Neosho Industrial Park where many of the Neosho's manufacturing and food production and processing businesses reside (City of Neosho, 2009). This industrial park encompasses the industrial lands located to the immediate north, south and west of the project site. Figure 3.1-1 depicts current zoning designations in the vicinity of the project site.

Primary land uses surrounding the proposed MARET Center include: Camp Crowder Training Site (extending from the northeast to the south of the site); a sugar manufacturing business (located directly west across from the project site on Doniphan Drive); Flambeau Inc. (manufacturing plastic products, located 0.25 miles north of the project area); R.G. Applegate Steel (a farm equipment manufacturer, located just west of the project site); 2 retail designated parcels, near Lyon Drive, between Chouteau Street and Doniphan Drive; La-Z-Boy Midwest (located approximately 0.75 miles southwest of the project site). Additionally, a railroad right-of-way operated by the Kansas City Southern Railroad is about 600 feet west of the project site and the Neosho Hugh Robinson Memorial Airport is less than two miles southwest of the project site.

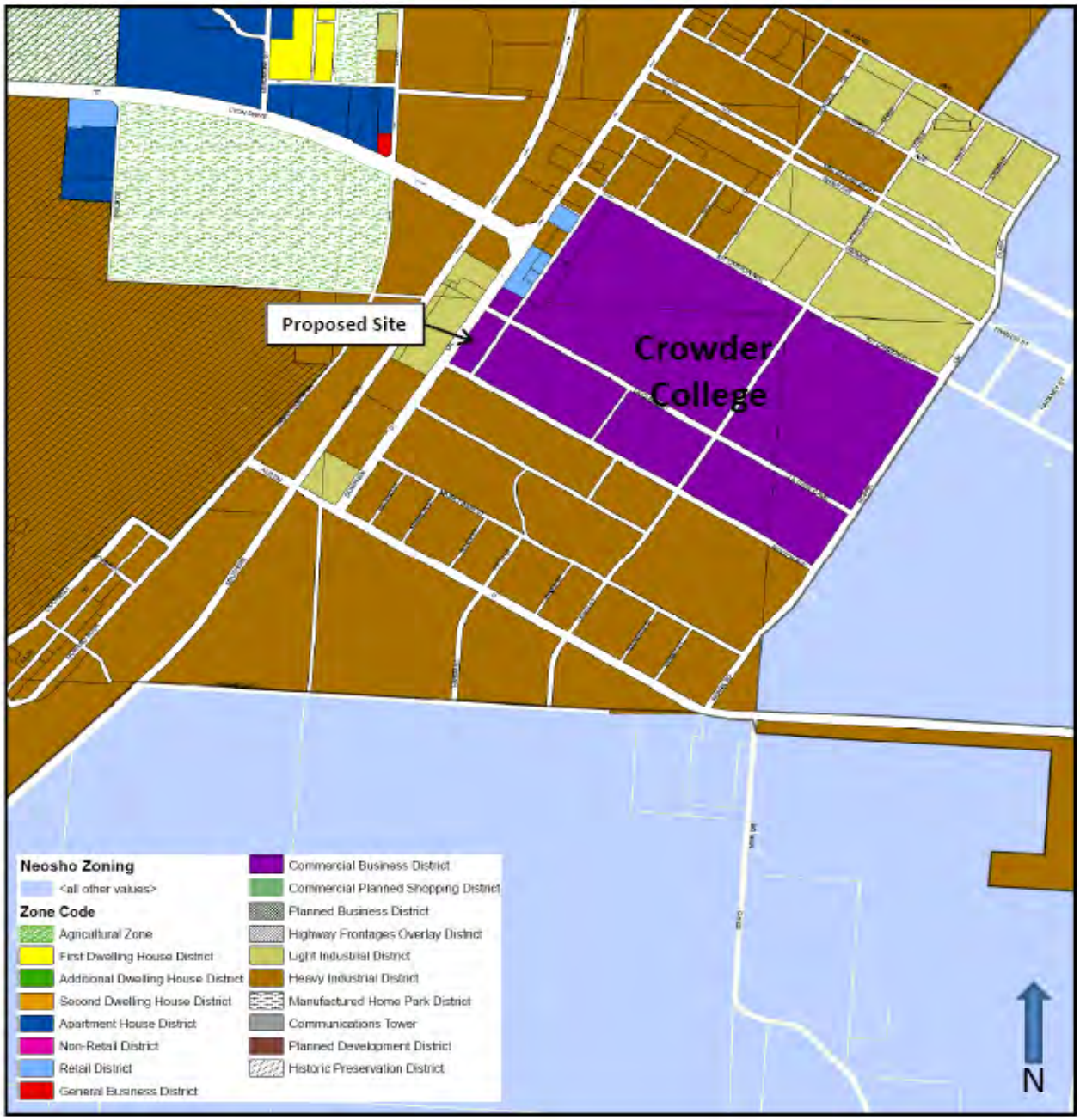
Land just east of the college campus (east of Clark Drive) falls outside of Neosho's city limits and is currently not included in Neosho's comprehensive plan or designated by Neosho's zoning code. The land is primarily an undeveloped wooded area with scattered farmland.

Future land uses for the surrounding area would not change; however, additional lands (east of Clark Drive) could be included in future land use planning and designated for agricultural use (Neosho Comprehensive Plan, 2006).

3.1.2 Environmental Consequences

3.1.2.1 Proposed Action

The construction of the MARET Center at the proposed site would be in compliance with the Neosho Comprehensive Plan's purpose and would meet the zoning criteria for commercial use. Specifically, the Proposed Action would not exceed building height restrictions, building setback criteria, and would provide the necessary parking features as mandated in the comprehensive plan. The proposed MARET Center would be consistent with the campus's current zoning that permits commercial buildings, colleges and universities. The MARET Center would be used for college classes and its use for conventions would meet the commercial building use definition. The Proposed Action would be compatible with existing or planned adjacent uses.



Source: City of Neosho

Figure 3.1-1. Zoning in the Vicinity of the Proposed Site

3.1.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be undertaken. No construction activities or land development would occur at the site; therefore, there would be no impact to land use from the Proposed Action. The proposed site would not be developed as described in this EA and consequently, there would be no associated changes in the use of this land.

3.2 Geology and Soils

This section addresses geology and soils in the area which may be affected by construction of the proposed MARET Center. This includes the geology and soils which exist on site as well as within the surrounding area.

3.2.1 Existing Environment

3.2.1.1 Geology

Newton County, which includes the City of Neosho and Crowder College's Neosho Campus, is located within the Springfield Plateau region of the Elk River Basin. The Springfield Plateau is an area characterized by rolling uplands with elevations ranging from 1,000 to 1,700 feet mean sea level (msl) from the Oklahoma/Kansas border eastward into Missouri. Stream dissection provides localized relief of up to 400 feet (MDC, 2009). The proposed site, located on Crowder College's Neosho Campus is at an elevation of 1,240 feet msl. The topographic elevations throughout the 608-acre campus range from 1,230 to 1,280 feet msl, displaying the rolling uplands, which are characteristic of the Springfield Plateau.

The geology beneath the site consists of a weathered cherty (dense silica rich quartz) limestone residuum overlying more competent bedrock. The thickness of the residue is highly variable and the transition to competent bedrock is often poorly defined. The bedrock topography is also highly variable ranging in depths from 5 to 80 feet. (T. Jeffrey Gamey, M. Thompson, W. Mandell, G. Franco, and S. Miller, 2005).

The bedrock located beneath the proposed site is primarily Mississippian in origin (Warsaw Formation) and consists of limestone, shale, and sandstone (see Figure 3.2-1). The two primary rock types encountered are chert containing limestone and shale. Although chemically and physically unique, limestone and dolomite are in many cases simply referred to as "limestone." Sedimentary in origin, limestone is primarily composed of calcium carbonate. Dolostone (commonly called dolomite) is calcium magnesium carbonate. There are many variations of these types of rock depending on the mineral content and the amount of silica, shale or other impurities that occur (Nation Master Encyclopedia, 2009). Limestone is very soluble, and can dissolve fairly easily when in contact with water/rain (MOWIN, 2008). Limestone is an important commodity in Missouri and is used to produce construction aggregate, cement, and lime (MDNR, 2009).

There are over 300 geothermal wells situated on Crowder College's Neosho Campus that are utilized to heat and cool the Anna H. and John Y. Williams Agricultural Science Center and Arnold Farber Buildings. Crowder College has had much success utilizing these types of wells in their heating and cooling systems (Eberle, 2008). Installation of these wells required drilling down through bedrock to depths exceeding 200 feet.

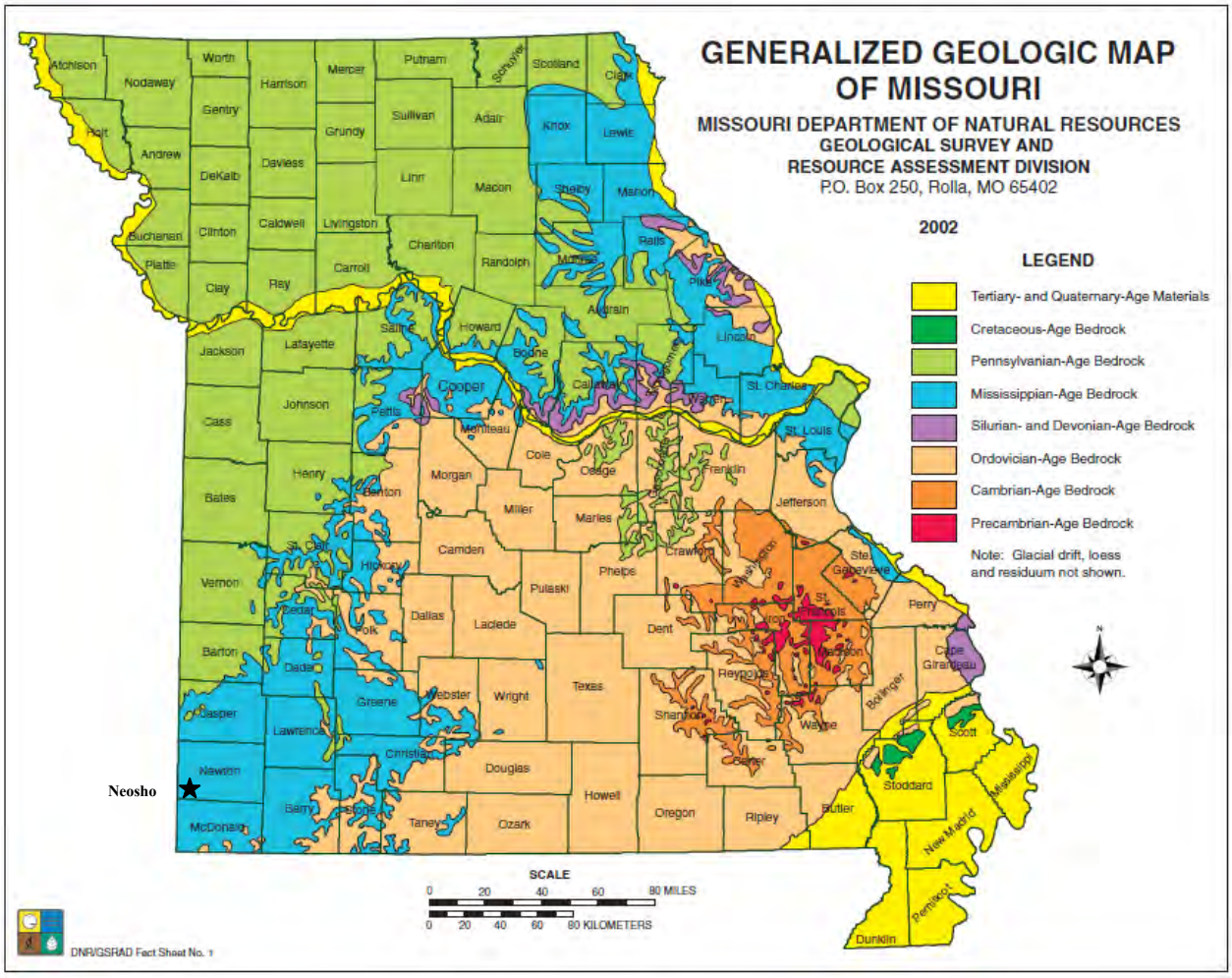


Figure 3.2-1. Generalized Geologic Map of Missouri

Karst features occur throughout the Springfield Plateau. Karst is any terrain based on a layer of soluble bedrock and is most often carbonate rock such as limestone. The presence of karst topography results in losing streams[8], caves, and springs that are found scattered throughout the Elk River Basin (MDC, 2009). These features were not encountered during the installation of the existing geothermal wells, which are located less than 300 yards to the east and north of the site.

3.2.1.2 Soils

The term ‗soils" refers to unconsolidated materials formed from underlying bedrock or other parent material. Soils play a critical role in both the natural and human environment. Soil drainage, texture, strength, and erodibility all determine the suitability of ground to support structures and facilities. The

[8] A stream or river that loses water as it flows downstream. The water infiltrates into the ground recharging the local groundwater, because the water table is below the bottom of the stream channel. This is the opposite of a more normal gaining stream, which increases in water volume farther downstream as it gains water from the local aquifer. Losing streams are common in regions of karst topography where the stream water may be completely captured by an underground cavern system.

National Resources Conservation Service (NRCS) classifies the soils within the proposed project area as Tonti silt loam and Gerald silt loam which are part of the Tonti Series and Gerald Series, respectively (see Figure 3.2-2) (USDA, 2009). The Gerald and Tonti Series are discussed in the following paragraphs.

Gerald Series - Fine, mixed, active, mesic Aeric Fragiaqualfs. These soils are formed in fine grained silt or clay on top of a gravelly loose deposit of rock debris which has accumulated through the action of rainwash. This gravelly debris overlies a clayey residue weathered from cherty (dense silica rich quartz) limestone located on divides on uplands under grass/herbaceous cover and tame pastureland. The surface water runoff class is very high and soil is somewhat poorly drained. The top of the seasonal high water table is at 18 inches (Missouri Soil Survey Reports, 2009).

Tonti Series - Fine-loamy, mixed, active, mesic Typic Fragiudults. These soils are formed in fine grained silt over gravelly sediment which was deposited by flowing water as in a riverbed or floodplain. This gravelly sediment was derived from chert (dense silica rich quartz) which resided on top of clayey residue weathered from magnesia-rich sedimentary rock resembling limestone located on the uplands of hills under grass/herbaceous cover and tame pastureland. The surface water runoff class is high and the soil is moderately well drained. These soils have a seasonally high perched water table that is within 18 to 30 inches of the soil surface (Missouri Soil Survey Reports, 2009).

Table 3.2-1 depicts the soil map units located in and around the project area which are a part of the Series discussed above.

Table 3.2-1. Soils Found In and Around the Proposed Project Area

Soil Map Unit	Description
Gerald silt loam, 0 to 2 percent slopes	This somewhat poorly drained map unit is not hydric and is classed in Hydrologic Group D. A seasonal water table is present at 17.9 inches. Ponding is present 0-14 percent of the time. This is not a flood plain unit. The average slope gradient is 1 percent. This map unit is classified as prime farmland.
Tonti silt loam, 3 to 8 percent slopes	This moderately well drained map unit is partially hydric and is classed in Hydrologic Group C. These soils have a seasonally high perched water table that is within 18 to 30 inches of the soil surface. Ponding is present 0-14 percent of the time. This is not a flood plain unit. The average slope gradient is 5.8 percent. This map unit is classified as farmland of statewide importance.

Source: USDA, 2009

Tonti silt loam is classified as farmland of Statewide importance and Gerald silt loam is classified as prime farmland. Farmland classification identifies the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the Federal Register, Vol. 43, No. 21, January 31, 1978. An area identified as prime farmland must be used for producing food or must be available for those uses (Missouri Soil Survey Reports, 2009). Although the site contains soils classified as prime farmland soils, the site is not subject to the provisions of the Farmland Protection Policy Act because it is already in urban development (zoned as Commercial Business District) and would result in a very low score on the Land Evaluation and Site Assessment rating system based on adjacent land uses. Thus, urban and built-up land and water areas are not classified as prime farmland.

3.2.2 Environmental Consequences

3.2.2.1 Proposed Action

Under the Proposed Action, the physiography, underlying geology, and topography of the area would not change. A limited amount of grading would be required for the building foundation, but given the project

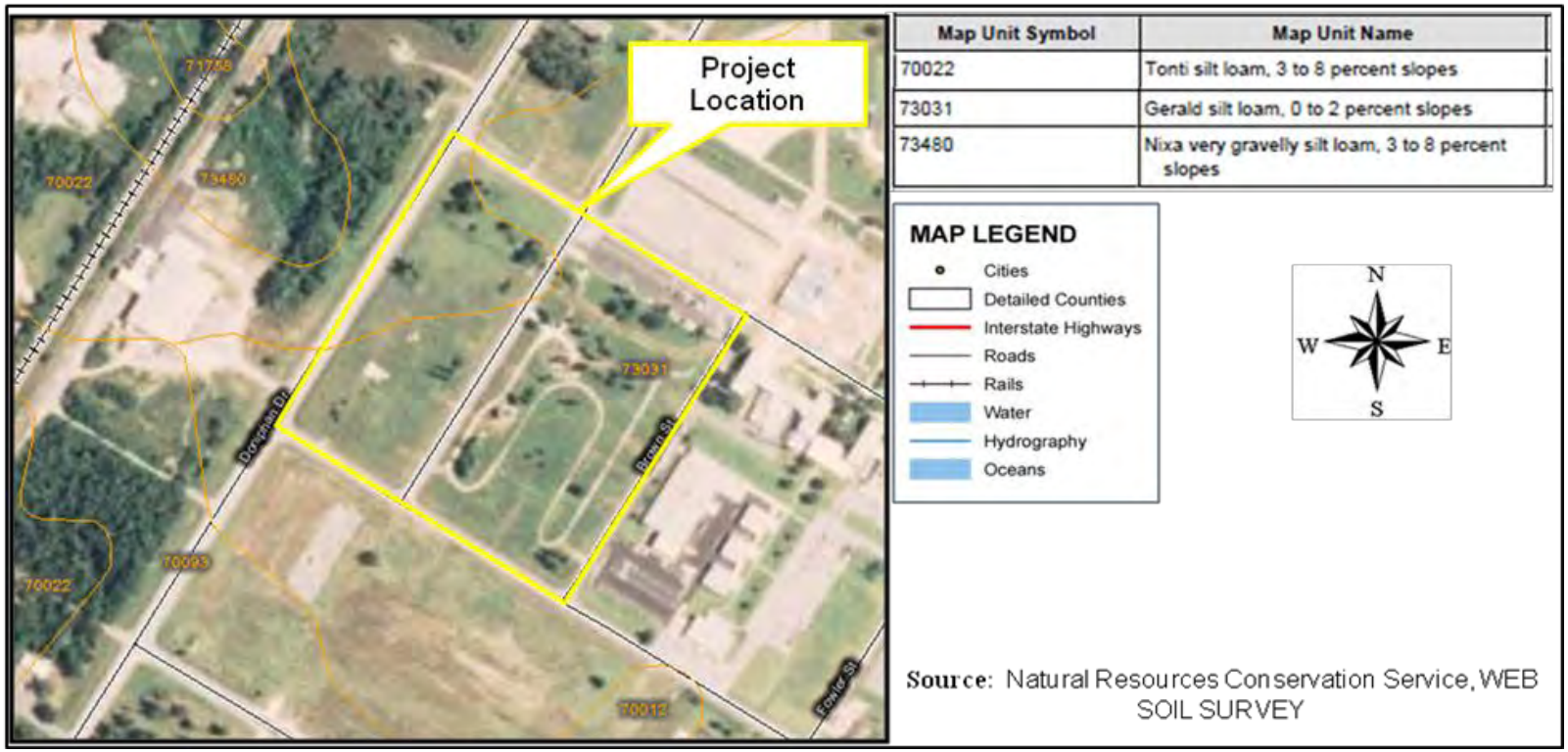


Figure 3.2-2. USDA Soil Survey Map Newton County, Missouri

site‘s limited topographic variation, the change is planned to be minimal. No geologic risks are known or anticipated.

The proposed MARET Center includes plans to install approximately 60 closed loop ground source heat exchanger geothermal wells for heating and cooling. The geothermal wells would be no more than 250 feet deep and would be 10 to 25 feet apart. As the installation of these wells would require drilling, knowledge of existing site geology is important. The bedrock topography is highly variable ranging in depths from 5 to 80 feet. Unless test borings are conducted, knowledge regarding depth to bedrock would remain in this wide range.

During the drilling process, a casing would be inserted, which would be left in place while polyethylene pipe is inserted. Material removed from the drill core would be incorporated into the site grading. Once the heat exchanger piping is inserted, the hole would be grouted with standard bentonite grout. During the grouting process, the casing would be removed, so the grouting materials collapse around the polyethylene pipe that has been inserted. No adverse impacts are expected to affect the geology on the site as a result of drilling for the installation of wells.

Construction of the MARET Center would require clearing and grading the existing vacant lot consisting of maintained lawn to install the building foundation. Only minor impacts to soils are expected as existing soils have already been disturbed. The soil disturbance would temporarily create dust from wind erosion and may also require removal of the soil displaced by the foundation for clearing and grading activities. Soil disturbance could also result in increased erosion potential from loss of ground cover and exposure of bare soils to precipitation and runoff. Sediment generated during the construction stage is expected to be minimal as the total disturbed area would total 3.5 acres.

Much of the proposed site, a former military base, was demolished in the late 1950s. With the exception of the existing wind turbine and solar powered structures, the site has been undisturbed for 50 years. Therefore, much of the site has not been characterized for soil contamination (see Section 3.8, Environmental Contamination). Signs of soil contamination include staining and odors in the soil. Should contaminated soil be encountered and need to be removed, it would be characterized and disposed of under the watch of an OSHA 40-hour certified professional (in good standing) to minimize potential cross-contamination and ensure proper protocols are followed.

Soils on the proposed site are classified as prime farmland; however, as the site, including the entire Neosho Campus, is zoned as a Commercial Business District (see Section 3.1.1.1 Project Site and Zoning). This land has not historically or currently been used for agricultural purposes; therefore no designated prime farmland would be affected.

3.2.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be undertaken utilizing DOE funding. No construction, activities or land development would occur at the site; therefore, there would be no excavation of land, or installation of wells. The land, in its current condition, would remain in place, and therefore, the geologic features and soils would remain undisturbed and no impacts from increased soil erosion and associated sediment-laden runoff to downstream waterways would occur.

3.3 Water Resources

This section addresses water resources, which includes surface water, groundwater, and floodplains in and around the proposed project area. Wetlands are discussed in Section 3.4.

3.3.1 Existing Environment

3.3.1.1 Surface Water

Surface water systems are typically defined in terms of watersheds (also called basins, which can contain subbasins). A watershed is a land area bounded by topography, which drains water to a common destination. Watersheds drain, capture, filter, and store water and determine its subsequent release. A watershed divides the landscape into hydrologically defined areas whose biotic and abiotic components function interactively. Watersheds vary in size; every waterway (stream, tributary, and river) has an associated watershed and smaller watersheds combine to form larger watersheds. The watershed boundary generally follows the drainage divide or the highest ridgeline around the stream channels. Stream channels meet at the bottom or lowest point of the land where water flows out of the watershed, which is commonly referred to as the mouth of the waterway. Any activity that affects water quality, quantity, or rate of movement at one location within a watershed has the potential to affect the characteristics of locations downstream.

Watersheds are delineated by the United States Geological Survey (USGS) using a nationwide system based on surface hydrologic features. Under this system, the country is divided into 21 regions, 222 subregions, 352 accounting units, and 2,262 cataloging units. The proposed project site lies within the Elk River basin (HUC 11070208) and the Elk River subbasin (HUC 11070208070). The basin encompasses 1,032 square miles in the corners of Arkansas, Kansas, Missouri, and Oklahoma and is mainly rural with some rapidly developing areas. The basin runs in a westerly direction and encompasses 866 square miles of Newton County, which includes the City of Neosho and Crowder College‘s Neosho Campus (MDNR, 2009a).

All classified streams in the Elk River basin are designated for aquatic life protection, livestock, and wildlife watering. A classified stream is either a permanently flowing stream or one that may stop flowing in dry weather but still maintains large pools of water that support aquatic life. The permanent flowing reaches of the Elk River, Buffalo Creek, Indian Creek, Big Sugar Creek, and Lost Creek are also designated for whole body contact recreation (e.g. swimming or boating) and secondary contact recreation (e.g. wading or fishing) (MDNR, 2009a).

A portion of Buffalo Creek, which has a seasonal river bed, runs onto the Crowder College‘s Neosho Campus and is located less than a quarter mile to the southwest of the proposed MARET Center location. Ultimately, all drainage swales existing on the campus flow into Buffalo Creek, which eventually flows into the Elk River.

Nonpoint source pollution within the Elk River basin comes from various sources including urban development and runoff, mining, land conversion from forest to pasture, free ranging livestock, road construction, and septic tanks. Portions of Buffalo Creek are impaired due to high levels of phosphorous and nitrogen; however, the majority of these portions lie within McDonald County and are permanent flowing reaches (MDNR, 2004). The section of Buffalo Creek that resides on the campus of Crowder College is not impaired. The southwest area of Missouri has a very large concentration of poultry operations; however, these operations do not exist on or adjacent to the proposed project site. Based on available information there are no known Areas of Critical Environmental Concern on or adjacent to the site regarding surface water.

3.3.1.2 Ground Water

The proposed project is located over the Springfield Plateau aquifer, which is a part of the larger system named the Ozark Plateau Aquifer system. The Springfield Plateau aquifer is the uppermost aquifer of the Ozark Plateaus aquifer system. The thickness of the Springfield Plateau aquifer ranges from less than 200 to more than 400 feet and averages about 200 feet at a depth ranging from 1,000 to 1,300 feet msl (USGS,

2009). The campus topography ranges from 1,230 to 1,280 feet msl resulting in a possible aquifer depth range of 0 to 280 feet below the surface. Recharge to the Springfield Plateau aquifer is mostly from precipitation. Sinkholes are a major aspect of the Springfield aquifer as this is where concentrated recharge enters the aquifer directly. Sinkholes also pose the highest risk of contaminates entering the aquifer (MDNR, 2009b). Although bedrock wells can yield up to 110 gallons per minute, they generally yield 10 gallons per minute or less. The groundwater contains calcium or calcium magnesium bicarbonate. The chemical quality of the water is suitable for most uses and the concentration of dissolved solids is less than 1,000 milligrams per liter.

Crowder College receives water from the City of Neosho for potable uses. A portion of the City's municipal water is derived from groundwater source wells (see Section 3.16 "Infrastructure"). The Springfield Plateau and St. Francois Aquifers generally are not utilized as municipal sources due to low yields. The Springfield Plateau aquifer is mainly used as a source of water for domestic and stock-watering wells. The Ozark Aquifer is the greatest source of groundwater in the region and is expected to be a continuously viable source of high-quality water into the future. Although water levels have fluctuated historically, high use areas, such as Springfield and Joplin, have turned to surface water sources, lessening the dependence on the Ozark Aquifer as a resource (MDNR, undated).

Based on available information there are no sole source aquifers in the region or private wells within 500 feet of the proposed MARET Center. In addition, the proposed building is not located within an Interim Wellhead Protection Area or a current drinking water source area.

3.3.1.3 Floodplains

According to Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Map (FIRM) for the site, there are no FEMA-designated floodplains or floodways located on the project site (FEMA, 2009). The site falls within "Zone C," which is an area determined to be outside the 500- and 100-year floodplains. The project site is located approximately 2,400 feet to the northeast of the nearest 100-year floodplain, which is associated with Buffalo Creek. This floodplain information was verified utilizing the latest available FEMA flood map number 290265 0010 B and panel number 10 of 10 dated July 5, 1982 (FEMA, 2009).

3.3.2 Environmental Consequences

3.3.2.1 Proposed Action

Initial construction activities on the project site would consist of leveling and grading existing maintained lawn areas and would result in the disturbance and exposure of soils and increased runoff. Runoff from the site can lead to increased erosion of exposed soils and subsequently result in increased sediments and turbidity in downstream waterways. Thus, during storm events, Buffalo Creek may experience an increased sediment load due to the erosion of exposed soils during construction. In accordance with regulations a NPDES permit would need to be obtained prior to construction as the clearing and grading activities would disturb over an acre of land. The total land disturbance under the proposed action would be 3.5 acres. The permit application requires the development of a SWPPP that identifies erosion prevention and sediment BMPs (see Section 3.16 "Infrastructure" for further detail). In addition, the SWPPP must identify potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges. Adherence to the SWPPP would minimize erosion and sediment impacts and water quality degradation of receiving waters (i.e., Buffalo Creek) and the Elk River Watershed; therefore, impacts to surface water resources would be reduced to minor.

The proposed MARET Center would increase the amount of impervious surface at the project site; therefore, increases in stormwater runoff would occur. However, the MARET Center includes plans for pervious concrete and porous paver material, bioswales, and two stormwater ponds, a green roof, and

rainwater harvesting to promote aquifer recharge and minimize surface water run-off. All of these elements would aid in reducing possible impacts to water resources.

The roof of the structure, which is not dedicated to solar collection, would feature a green roof area that would filter pollutants and reduce stormwater runoff rates. Pervious concrete pavement is a unique and effective means to address important environmental issues and support green, sustainable growth. By allowing stormwater to seep into the ground, porous concrete is instrumental in recharging groundwater and reducing stormwater runoff. The stormwater ponds would collect and treat remaining stormwater runoff, which would help safeguard water quality as well as provide flood protection. The bioswales would be connected to the stormwater ponds and would be utilized to further remove silt and pollution from surface water runoff. They are designed to maximize the amount of time the water spends in the swale, which aids in the trapping of pollutants and silt, before releasing it back into the watershed, including Buffalo Creek.

There is the potential for surface water contamination from hazardous spills that could occur during construction activities; however, BMP‘s for minimizing the potential for spills would be outlined in the construction stage SWPPP as a condition of the General Permit.

Construction activities would require water from municipal sources for concrete work and washing machinery and tools. Water for construction could be either trucked to the site as needed or obtained from existing potable water sources on the campus. This water use would be short-term and minor relative to the amount of water available from municipal sources (see Section 3.16, Infrastructure). The operation of the MARET Center would cause a negligible increase in groundwater withdrawals for potable water use. No impacts would occur to groundwater sources in the area considering that the Ozark Aquifer is expected to continue to be a viable source within the region.

As discussed in Section 3.2.2.1, the MARET Center is proposing the installation of 60 closed loop ground source heat exchanger geothermal wells. There would be no direct interaction between groundwater and the water and anti-freeze mixture (likely inhibited propylene glycol) contained within the polyethylene piping; only heat transfer across the pipe. The inhibited propylene glycol solution is a clear, non-toxic fluid that the FDA considers ―generally recognized as safe”. The total volume of the geothermal loop system below grade is approximately 6,115 gallons. The glycol is to be maintained at 20 percent volume thus the glycol volume will be 1,223 gallons. The system would be equipped with safety features such as an automated pressure sensitive valve, which would automatically shutdown the system if there is a pressure change indicating a leak. In addition, all the in ground thermal exchange piping and hardware would be solidly grouted into the well hole further reducing the chance of leaks. Therefore, unless a failure of the piping system and associated safety features occurs, no impact to water resources would occur as a result of the geothermal wells. While leaks are possible, they are typically small in volume. Furthermore, the material that would be utilized within the piping system is considered non-toxic by the FDA and EPA. As per the MDNR, Division 20--Clean Water Division, 10CSR 20-070 (B) 4, if a groundwater heat pump is constructed in such a way so as not to utilize groundwater it is exempt and does not require a permit from MDNR.

The layout of the MARET Center and its supporting infrastructure would not encroach on any surface waters or their existing buffers. As no 100- or 500-year floodplains were identified at the project site, construction would not occur within any designated floodplains, and therefore, would have no impact on upstream floodplain elevations or downstream flood conveyance.

3.3.2.2 No Action Alternative

Under the No-Action Alternative, the Proposed Action would not be undertaken. No construction activities or land development would occur at the site, and there would be no impact to surface waters, floodplains, or groundwater in the vicinity of the project area.

3.4 Wetlands

3.4.1 Existing Environment

Wetlands are defined under the U.S. Clean Water Act of 1972 as "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas." Wetlands have unique physical characteristics including a substrate that is saturated or inundated with water for part of the growing season, soils that contain little or no oxygen, and plants adapted to wet or seasonally saturated conditions.

Currently, the site contains maintained naturally occurring grassland, a few sporadic trees, and stormwater conveyance ditches (partially lined in concrete). A review of the USFWS National Wetland Inventory online mapping application showed no documented or visible wetlands on the site (USFWS, 2009).

3.4.2 Environmental Consequences

3.4.2.1 Proposed Action

No wetlands are present on the site. Therefore, no wetland areas would be filled for the construction of the proposed MARET Center and no impacts to wetlands would occur.

3.4.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be untaken. No construction activities or land development would occur at the site; therefore, no impacts to wetland resources would occur.

3.5 Biological Resources

3.5.1 Existing Environment

3.5.1.1 Regional Setting

The U.S. Environmental Protection Agency (EPA) has delineated ecoregions within the country to denote areas of general similarity in terms of type, quality, and quantity of environmental resources (Encyclopedia of Earth, 2008). The site lies in the Ozark Highlands (Level 3) – Springfield Plateau (Level 4) ecoregion (NRCS, undated). Terrestrial habitats within the Ozark Highlands ecoregion are dominated by forest or woodland (60 percent of the total area) and oak (*Quercus spp.*) is the predominant forest type, but mixed stands of oak and pine (*Pinus spp.*) are also common, particularly to the southeast. The Springfield Plateau ecoregion is a subset of the Ozark Highlands and is characterized as a transitional area where the prairies of the Cherokee Plains grade into the woodlands of the Ozarks. Potential natural vegetation consists of tallgrass prairie, deciduous forest, and savanna (Encyclopedia of Earth, 2008).

3.5.1.2 Vegetation

The site has been previously disturbed and the majority of it consists of naturally occurring grasses that are regularly mowed and maintained by Crowder. There are a few trees on the site consisting of American sycamore (*Platanus occidentalis*) and pin oak (*Quercus palustris*) that are isolated within the grassy area.

3.5.1.3 Wildlife

Due to the proximity of the site to developed areas, wildlife within the project area is limited to those species that have adjusted to human activity. Wildlife species within the project area are primarily those associated with open spaces and forest edge habitats. Onsite vegetative habitat is generally poor in nature and the site is surrounded by development and highly fragmented patches of wooded areas. Therefore, it is unlikely that the site is able to support much diversity of wildlife. Grassland mammal species (e.g., squirrels and rodents) are expected to be most common. Also, the site may contain foraging habitat for a variety of bird species that feed on seeds as well as raptors and scavengers that prey on small mammals or their carcasses.

3.5.1.4 Aquatic Habitat

The nearest aquatic habitat to the site is Buffalo Creek, over one-quarter of a mile to the west of the site with an intermittently-flowing branch that runs approximately one-quarter of a mile south of the site. In general, Buffalo Creek has good streambank stability with little visible erosion and, in the downstream portion, has gravel as the dominant substrate. It is expected that fish species composition is similar to other waters of the area, including species such as Central stoneroller (*Campostoma pullum*) and Banded sculpin (*Cottus carolinae*) (MDC, 2009). Based on available information, no protected species are known to occur in Buffalo Creek. All stormwater generated on Crowder College's campus ultimately flows to Buffalo Creek.

3.5.1.5 Protected Species

At the Federal level, rare species are protected under the Endangered Species Act (ESA) of 1973, which prohibits unauthorized taking, possession, sale, and transport of endangered species. Section 7 of the ESA requires all Federal agencies to insure that any action authorized, funded or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat. The USFWS's list of Federally-protected species in Missouri describes three species as potentially occurring in Newton County (USFWS, 2005):

- Gray bat (*Myotis grisescens*) – listed as Endangered; roosts in caves.
- Ozark cavefish (*Amblyopsis rosae*) – listed as Threatened; lives in caves and other underground waters.
- Arkansas darter (*Ethostoma cragini*) – listed as a Candidate for listing; fish species that occurs in river habitat.

The Wildlife Code of Missouri (Code of State Regulations, Division 10, and Chapter 4) lists State-endangered species and precludes the importation, transportation, sale, purchase, taking or possession of any endangered species of wildlife. MDC lists the following Missouri State-endangered species as potentially occurring in Newton County, in addition to the Gray bat and Ozark cavefish; described above as Federally-listed (MDC, 2009a):

- Black-tailed jackrabbit (*Lepus californicus*) – generally feeds in pasture and lawn areas.
- Greater prairie-chicken (*Tympanuchus cupido*) – generally found in undisturbed prairie habitat.
- Northern harrier (*Circus cyaneus*) – hunts for small mammals, birds, reptiles, insects, and carrion in grasslands, steppes, wetlands, meadows, cultivated areas, and tundra.

DOE sent letters to the USFWS and the MDC as part of the scoping process through correspondence dated March 12, 2009, which described the proposed project and requested information regarding

protected species and habitats (see Appendix B). No response was received from USFWS. MDC indicated that the site appears to fall within the recharge area for a cave containing the Ozark Cavefish (*Amblyopsis rosae*) (MDC, 2009b). Otherwise, according to the MDC, heritage records identify no wildlife preserves, no designated wilderness areas or critical habitats, and no state- or federal-listed endangered species records within one mile of the site (see Appendix A). There are also no records of sites within species of concern that are traced due to their rarity but not listed as endangered.

DOE initiated informal consultation with the USFWS through correspondence dated May 11, 2010 (see Appendix B). This letter stated that if no response was received within 30 days that DOE would assume that USFWS concurs with our findings of no impact to threatened and endangered species. On June 22, 2010, a response was received from USFWS asking for further details on the geothermal well system. On August 20, 2010, a letter was received from USFWS indicating that the MARET Center is within the range of the federally threatened Ozark Cavefish (*Amblyopsis rosae*) and that the thermal impact from the geothermal heat pump system as well as grout escaping into the underground shallow aquifer has the potential to adversely affect the Ozark Cavefish. The USFWS also requested that a Biological Assessment be completed for the project. A Biological Assessment letter, including additional applicant committed measures to further reduce potential impacts to the Ozark cavefish, was sent to USFWS on September 17, 2010 stating that the MARET Center project would have no adverse impacts to the Ozark Cavefish (see Appendix B). On September 28, 2010, the USFWS responded, accepting the additional measures identified and stated that they concurred with DOE‘s findings.

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

Construction of the proposed MARET Center would necessitate the removal of a large portion of onsite maintained grassland habitat; however, it is not expected that this habitat supports much wildlife. Since the adjacent habitats display similar characteristics, they should provide suitable habitat for any displaced wildlife. Because the project area contains few trees, no clearing of deciduous forest would occur as a result of the development. Where possible, existing trees would be protected during construction and preserved; therefore, any transient wildlife (e.g., birds and squirrels) that utilize them would be able to continue to do so. Impacts to vegetation and wildlife would be minor as a result of the Proposed Action.

During construction, soil erosion would occur on the site and eroded soil could be discharged to Buffalo Creek with stormwater runoff, which could degrade this aquatic habitat for use by macroinvertebrates, and ultimately, predacious vertebrates. Construction activities would conform to all applicable soil erosion control regulations and an erosion control plan would be developed and implemented, which would minimize the potential for these impacts to occur (See Section 2.4). Therefore, no to minor impacts would be expected to the aquatic habitat of Buffalo Creek during construction. Several advanced stormwater retention features have been built into the design of the proposed MARET Center (see Section 3.3.2.1 for a detailed description), which would result in no impacts to aquatic habitats in Buffalo Creek during the operation of the facility from stormwater runoff.

As mentioned previously, MDC indicated that the site appears to fall within the recharge area for a cave containing the Ozark Cavefish (*Amblyopsis rosae*). MDC indicated that the cave is associated with the USFWS Neosho Fish Hatchery and that the cave is some distance from the site and not underneath the site. The fish hatchery is over 3 miles from the proposed MARET Center Site; however, the exact boundaries of the cave are unknown. MDC does not believe a major impact to the Ozark Cavefish would occur if standard SOPs and safeguards are implemented for the geothermal well system to control groundwater pollution (Cave, 2009). For example, the system would be equipped with an auto-shutdown mechanism in case of a pressure change that would indicate a leak of fluid in the tubing. In addition, MDC does not believe localized temperature increases around the geothermal wells would impact the

Ozark Cavefish since the cave, which is associated with the USFWS Neosho Fish Hatchery (over 3 miles from the site), is some distance from the site. In addition, localized temperature variance of the groundwater during the course of a heating and cooling season would be less than 1 degree Fahrenheit per day (possibly less depending on groundwater movement).

Grouting material has the potential to enter voids in karst topography beneath the site during the drilling process. Potential of an adverse impact could occur if grout escapes into areas where the Ozark Cavefish are present. However, no major adverse impact to threatened or endangered species would occur with implementation of applicant committed mitigation measures (see Section 2.4).

3.5.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be undertaken. No construction or land development would occur at the site; therefore, no impacts to biological resources would occur.

3.6 Air Quality

3.6.1 Existing Environment

The only non-attainment areas for criteria air pollutants in Missouri are in the area of St. Louis, approximately 300 miles northeast of Neosho. The nearest air monitoring station to Crowder College is located in the town of Alba in Jasper County to the north that monitors only ozone. In 2009, the ozone levels were all below Federal and State standards (both 1-hour and 8-hour averages). The General Conformity Rule of the Clean Air Act (CAA) requires Federal actions occurring in non-attainment or maintenance areas to perform a General Conformity applicability analysis. As the project site is located in an area that is in attainment for all regulated criteria pollutants, this requirement does not apply.

3.6.1.1 Existing Air Quality

At present, Newton County, the area in which the Proposed Action is located, is designated as in attainment with the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants.

3.6.2 Environmental Consequences

3.6.2.1 Proposed Action

3.6.2.1.1 Construction Emissions

Construction impacts would be generally related to fugitive dust emissions in and around the project site due to site preparation and construction operations. The potential for impacts would be temporary, occurring only during the 6-month construction period. Fugitive dust emissions typically occur during ground clearing and preparation, grading, and stockpiling of materials, on-site movement of equipment, and transportation of construction materials. Fugitive dust emissions can occur during dry weather periods, periods of maximum construction activity, and high wind conditions. These impacts would be short-term and would be minimized if construction equipment is well-maintained, and good engineering practices are followed (see Section 2.4). Construction related activities are not expected to violate NAAQS or standards as established by the MDNR.

3.6.2.1.2 Operational Emissions

Air emissions at the MARET Center after construction is completed are expected to be minimal. The heating equipment in the new building is anticipated to be more efficient and have lower air pollutant emissions than typical boilers and heaters. A typical heat pump system works, by exploiting the physical properties of an evaporation, phase change, and condensing a refrigerant. A typical ground source heat pump would transfer two times more energy than it uses. The MARET Center would improve on this system by having separate well fields that would act as "hot and cold" storage areas. It would use the PVT panels to reject excess heat (or cool the building) and gather heat when the preset parameters in the

system management software determine it to be appropriate. This system would allow much of the heating and cooling loads of the building to be accomplished without going through the vapor-compression cycle and use only pump energy to deliver the fluid. It is expected that operational emissions would be negligible. There would be no anticipated minor or major air pollution sources within the facility that would require an air permit. As a net-positive or positive energy building, it is possible that renewable energy from the project that is used by the local grid could off-set generation from electric utilities that emit air pollutants. The facility would also likely have a zero or negative carbon footprint (e.g., no to negative greenhouse gas generation).

3.6.2.1.3 Mobile Sources

Approximately 80 students per day would be traveling to the MARET Center for classes (Eberle, 2009). These students do not represent new commuters. Therefore, no additional emissions would be generated as a result of the addition of classroom space. It is estimated that 2 conferences would be held each year with approximately 250 to 400 individuals attending. The space would also be used for school groups (5-10 groups of 30-100 people each year), business group training (8-10 groups of 10-20 people per year), and on campus meetings other than class meetings. Due to the infrequency and duration of these events, emissions generated as a result of these activities are expected to be minor.

3.6.2.2 No Action Alternative

Under the No-Action Alternative, the Proposed Action would not be undertaken. Implementation of the No Action Alternative would not have an impact on existing air quality and current conditions would stay the same.

3.7 Noise

3.7.1 Existing Environment

3.7.1.1 Noise Definitions

Noise is defined as unwanted sound. Sound becomes "noise" when it interferes with sleep or conversation and when it causes physical harm. Human perception of noise is subjective and varies considerably. Background noise is the average noise level caused by all noise sources in an area. The background noise level gradually changes in response to the level of activity nearby. Intrusive noise is caused by isolated events that clearly stand out from the background; these events are responsible for much of the annoyance caused by noise.

Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB), with 0 dB corresponding roughly to the threshold of hearing.

Most of the sounds that we hear in the environment do not consist of a single frequency, but a broad band of frequencies, with each frequency differing in sound level. The intensities of each frequency combine to generate a sound. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound in accordance with a filter that reflects the fact that human hearing is less sensitive at low frequencies and extremely high frequencies than in mid-range frequencies. This is called "A" weighting; the decibel level measured is called the A-weighted sound level (dBA). The level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. Typical A-weighted levels measured in the environment and in industry are shown in Table 3.7-1 for different types of noise.

In determining the daily level of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. Exterior background noises are generally lower during the nighttime than during the daytime. Most household noise also decreases at night and exterior

noise becomes very noticeable despite reduced noise level. Most people sleep at night and are very sensitive to noise intrusion. To account for human sensitivity to nighttime noise levels, a descriptor, L_{dn} (day/night average sound level), was developed. The L_{dn} divides the 24-hour day into the daytime of 7:00 a.m. to 10:00 p.m. and the nighttime of 10:00 p.m. to 7:00 a.m. The nighttime noise level is weighted 10 dB higher than the daytime noise level.

3.7.1.2 Regulations and Guidelines

Noise regulations have been established at all levels of government, from local municipalities to Federal agencies. Although, there is great variation in the controls established by different municipalities, the Federal guidelines provide widely accepted standards, which are reasonably consistent among the various agencies.

Congress passed the Noise Control Act in 1972, specifically authorizing EPA to promulgate regulations establishing maximum permissible noise characteristics for products manufactured for interstate commerce. In addition, EPA was directed to publish information about the kind and extent of effects of different qualities and quantities of noise, and to define acceptable levels under various conditions to protect public health and welfare. This information was then used by other Federal agencies in establishing criteria applicable to their programs.

Neither the State of Missouri nor the City of Neosho has a noise ordinance (Harrington 2009).

3.7.1.3 Sensitive Receptors

Sensitive receptors to noise at the proposed project location include the on-campus dormitory at Crowder College and an apartment complex, located approximately 800 feet and 1,000 feet from the project site, respectively (Figure 3.7-1).

3.7.1.4 Existing Noise Levels and Sources

Crowder College‘s Neosho Campus is not a source of noise complaints and does not include any sources of adverse noise impacts. Noise sources in the project area include the Kansas City Southern (KCS) Railroad (located adjacent to the project site), the Missouri National Guard shooting range at the Camp Crowder Training Facility (less than 1 mile from the project site), the Neosho Hugh Robinson Memorial Airport (less than 2 miles from the project site), and the existing wind turbine (on the site). Airplane flyovers likely produce the highest levels of intermittent acoustic noise at the Crowder College‘s Neosho Campus and in the City of Neosho. Noise levels on campus are currently higher than would be typical to a university campus due to its proximity to the railroad, shooting range, and airport.

3.7.2 Environmental Consequences

3.7.2.1 Proposed Action

Noise impacts from drilling the geothermal wells would be temporary and localized in nature. The closest sensitive receptors to the drilling site are the apartment complex and the dormitory, which are located approximately 800 feet and 1,000 feet from the project area, respectively. Table 3.7-2 shows the typical noise from various drilling activities at varying distances. Activities associated with installation of the geothermal wells could generate exterior noise between 57 to 60 dBA within 800 feet of the site. Any noise less than 60 dBA is considered to be in the quiet range (Table 3.7-1). In addition, standard buildings typically provide about 15 dBA of noise reduction between exterior and interior noise levels with the windows partially open. The interior noise levels would therefore be about 42 to 45 dBA, well within the quiet range. Therefore, a negligible impact to sensitive receptors would be expected.

Table 3.7-1. Sound Level and Loudness of Typical Noises in Indoor and Outdoor Environments

Noise Level (dBA)	Subjective Impression	Typical Sources		Relative Loudness (Human Response)
		Outdoor	Indoor	
120-130	Uncomfortably Loud	Air raid siren at 50 feet (threshold of pain)	Oxygen torch	32 times as loud
110-120	Uncomfortably Loud	Turbo-fan aircraft at take-off power at 200 feet	Riveting machine Rock band	16 times as loud
100-110	Uncomfortably Loud	Jackhammer at 3 feet		8 times as loud
90-100	Very Loud	Gas lawn mower at 3 feet Train whistle at crossing Wood chipper shredding trees Chain saw cutting trees at 10 feet	Newspaper press	4 times as loud
80-90	Very Loud	Passing freight train at 30 feet Steamroller at 30 feet Leaf blower at 5 feet Power lawn mower at 5 feet	Milling machine Garbage disposal Crowd noise at sports event	2 times as loud
70-80	Moderately Loud	Turnpike at 50 to 100 feet Traffic in downtown urban area	Loud stereo Vacuum cleaner Food blender	Reference loudness (70 dBA)
60-70	Moderately Loud	Residential air conditioner at 100 feet Gas lawn mower at 100 feet	Cash register Dishwasher Normal speech at 3 feet	1/2 as loud
50-60	Quiet	Large transformers at 100 feet Traffic in suburban area	Living room with TV on Classroom Business office Normal speech at 10 feet	1/4 as loud
40-50	Quiet	Bird calls Trees rustling Crickets Water flowing in brook	Putting on clothes Using computer	1/8 as loud
30-40	Very Quiet	N/A	Walking on carpet Clock ticking in adjacent room	1/16 as loud
20-30	Very Quiet	N/A	Bedroom at night	1/32 as loud
10-20	Extremely Quiet	N/A	Broadcast and recording studio	N/A
0-10	Threshold of human hearing	N/A	N/A	N/A

Sources: Cowan, 1994; Sandstone Environmental Associates, 1980; and Bolt, Baranek, and Newman Inc., undated

Figure 3.7-1. Project Area Sensitive Receptors

Table 3.7-2. Typical Noise from Geothermal Drilling Activities (dBA) [9]

Activity	100 ft[1]	200 ft	400 ft	800 ft
Site preparation and construction	78	72	66	60
Well drilling	75	69	62	57
Well clean out	75	69	62	57
Flow testing	78	72	66	60

[1] Source: CEGC 1994. Note: Identified noise levels are given for various distances from a proposed noise-generating source. These noise levels do not account for the topographical barriers throughout the project vicinity, which may absorb or deflect sound waves, thereby reducing noise levels.

General construction noise would result from the use of heavy equipment for construction. Maximum noise levels generated by construction activities typically range from about 75 to 90 dBA at a distance of 50 feet (Bolt, Beranek, and Newman, 1971). Typical hourly average construction noise levels are about 10 dBA less than maximum noise levels during busy construction periods (e.g., while earth moving equipment is operating). Therefore, noise levels at the apartment complex (800 feet from the source) due to construction would be approximately 41 to 56 dBA, well within the quiet range. Impacts from construction are expected to be negligible with implementation of mitigation measures (see Section 2.4).

Based on noise levels for similar activities, noise levels during operation of the MARET Center could reach approximately 40 to 60 dBA. These levels are in the quiet range. In addition, the project site's proximity to the railroad, airport, shooting range, and wind turbine has already resulted in ongoing noise in the area. Therefore, impacts associated with operation of the MARET Center are expected to be minor.

3.7.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be undertaken. No construction activities or land development would occur at the site; therefore, there would be no adverse noise impacts in the vicinity of the project area.

3.8 Hazardous Materials and Waste Management

3.8.1 Existing Environment

3.8.1.1 Site Contamination Potential

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR) to determine the potential for site contamination. The EDR report provided information on large and small quantity generators in close proximity to the site. These included Crowder College, Flambeau, Inc., RG Applegate, La-Z-Boy Midwest, Sunbeam Leisure Plant and Crowder Industries.

Crowder College was identified as a small quantity generator of hazardous waste (generating between 221 pounds and 2,205 pounds of hazardous waste per month) and is at an equal or higher elevation to the site. Crowder College was also noted as having an underground storage tank that contained gasoline less than 0.25 miles east of the site, which was removed on August 28, 1989.

Approximately 0.25 miles north of the site, Flambeau, Inc. is noted as a large quantity generator of hazardous waste (generates over 2,205 pounds of hazardous waste per month). RG Applegate Steel is

[9] Noise levels are reduced by 6 dBA as distance doubles from the source.

located just west of the site and is noted as transporting, storing, or treating hazardous waste. RG Applegate is at an elevation lower than the site.

La-Z-Boy Midwest (located approximately 0.75 miles southwest of the site) is noted as a small quantity generator of hazardous waste, and historically as a large quantity generator. This facility is also noted as having a leaking underground storage tank (the leaked substance was not noted) that was remediated through excavation and two other underground storage tanks; one containing gasoline, which was removed, and one containing fuel oil, which was closed in place. La-Z-Boy Midwest is also at a lower elevation than the site.

Two other facilities, the Sunbeam Leisure Plant and Crowder Industries Inc., both located about one half mile to the southwest of the site, are noted as historically being small quantity hazardous waste generators, but not currently. Both of these facilities are at a lower elevation than the site as well.

According to the EDR report, Fort Crowder is noted as having a National Guard facility approximately 0.5 miles southeast of the site that contained three leaking underground storage tanks (containing gasoline, diesel, and used oil). However, the the site was issued a No Further Action letter in 1997, meaning that no further remedial action is necessary to protect human health or the environment.

MDNR identified the Pools Prairie Superfund Site, which is in close proximity to the MARET Center Site (ranging from 1 to 3 miles from the site) as a potential source of site contamination. The Pools Prairie Superfund Site is an EPA lead site (MDNR, 2009b). The contaminant of concern is TCE and its degradation products. Based on information, groundwater flow direction at the site is to the west. Based on the location of the MARET Center in reference to the various known source areas, the operable units to the west of this location are the Components Test Area (CTA) and the Engine Test Area (ETA). The closest site, the ETA, is approximately 1.68 miles from the site. The Pools Prairie Superfund Site has not been fully evaluated (MDNR, 2009b). Known source areas are being remediated through Removal Actions by the responsible parties. Groundwater would be further evaluated through a Remedial Investigation that has not yet begun.

MDNR also identified the Former Fort Crowder Chemical Warfare Material Site, located approximately 1,000 feet south of the proposed MARET location, as a potential source of site contamination (MDNR, 2010). This site of approximately 58 acres includes two adjacent areas, the No. 110 Gas Chambers Area and the area around the former pistol ranges. Chemical warfare training included field exercises where soldiers were exposed to chemical agents in settings that simulated battlefield conditions. Chemical warfare training often used Chemical Agent Identification Sets (CAIS). CAIS were expendable training aids produced for use by all branches of the military to train soldiers in the safe identification, handling, and decontamination of chemical agents and industrial chemicals used in chemical warfare. CAIS consist of small glass containers filled with various chemical agents packed in metal shipping containers or wooden boxes. At Fort Crowder, chemical training materials, munitions, and explosive simulators were stored in quonset huts and igloos located in the vicinity of the Chemical Exercise Area. After World War II, these buildings were declared surplus and sold. Reportedly, the work crews removing the igloos took anything found in the structures, dumped it out nearby, and buried it. A proposed plan to address environmental issues at this site is in development by the U.S. Army Corps of Engineers.

3.8.1.2 Crowder College Hazardous Materials Use and Waste Generation

Crowder College currently utilizes hazardous materials typical of an educational institution. This includes materials normally used in chemistry laboratories (e.g., acetone and sulfuric acid) as well as general cleaning and maintenance supplies (e.g., ammonia, chlorine bleach, and toluene). Associated hazardous wastes are generated, such as oily rags and chemistry laboratory wastes. Hazardous wastes are

currently collected and disposed of by a commercial vendor (Waste Corporation of America). For regulatory purposes, Crowder College is considered a small quantity generator of hazardous waste.

3.8.1.3 Solid Waste

Nonhazardous solid wastes (i.e., municipal and construction and demolition debris) at Crowder College are currently collected and disposed of by a commercial vendor (Waste Corporation of America). Waste Corporation of America currently disposes of nonhazardous solid wastes from Crowder College at the Oak Grove Landfill in Arcadia, Kansas (Todd, 2009). Crowder College recycles paper, glass, plastic, and cardboard.

3.8.2 Environmental Consequences

3.8.2.1 Proposed Action

3.8.2.1.1 Site Contamination Potential

There are several properties in the general vicinity of the Crowder College campus that could potentially be sources of soil and groundwater contamination on the site (see Section 3.8.1.1). However, with the exception of the National Guard Facility, the Pools Prairie Superfund Site, and the Fort Crowder Chemical Warfare Material Site, the majority of the sites are down-gradient from the site and would have no adverse impact on the project.

Although at an elevation equal to or higher than the site, the National Guard Facility was issued a No Further Action letter in 1997, meaning that no further remedial action is necessary to protect human health or the environment. Therefore, no potential for site contamination exists as a result of the leaking underground storage tanks.

Based on the location of the MARET Center in reference to the various known source areas, the Prairie Pools Superfund Site operable units to the west of the site, the CTA and the ETA, have a slight potential to impact that site. According to MDNR, "Based on available information, the only activity that has the potential to be impacted by the Pools Prairie Site is the installation of geothermal wells. Given the distance from the potential source areas, the potential appears slight, but project planners should be aware of the Pools Prairie Site." Further mitigation measures were provided by MDNR to reduce any potential for release of contamination (see Section 2.4).

MDNR also repeated that the potential for "groundwater contamination at the proposed…location is slight" (Stinson, 2009). MDNR also stated that if VOCs are found, the use of geothermal wells at the site would not be affected, but would likely necessitate the use of a full-length thermal grout to minimize the potential for migration of TCE vapors vertically along heat pump loop piping to the surface.

MDNR also recommended that water used during the drilling process be placed in an on-site holding area and applied to land owned by Crowder College (Beetam, 2009). By spreading the material out over land, the soil would be filtered from the wastewater. Per MDNR, this method would avoid any direct discharge, and no permit would be necessary.

Although the proposed MARET Center Site is not part of the former Fort Crowder Chemical Warfare Materiel Site, it may have been part of the overall Fort Crowder property in the past. While it is unlikely that construction workers at the site would encounter CAIS materials, Crowder College contractors would review U.S. Army Corps of Engineers educational awareness materials as a precaution. MDNR provided Mitigation measures which are included as Applicant Committed Measures in Section 2.4.

Although construction of the MARET Center could disturb hazardous materials, the potential appears to be slight based on information provided by MDNR. If hazardous materials are disturbed, applicant committed measures would be implemented to reduce any impact associated with this disturbance. Therefore, only minor impacts are anticipated.

3.8.2.1.2 Crowder College Hazardous Materials Use and Waste Generation

Construction would require the use of hazardous materials typically used on any construction site (e.g., petroleum fuels, oils, and lubricants). A hazardous material spill prevention, control, and countermeasures plan would be developed and followed, which would minimize the potential for adverse impacts to the environment from contamination.

Crowder College would continue to comply with all applicable regulations with respect to the use, transportation, and storage of all hazardous materials and hazardous wastes; therefore, no impacts would be expected from their use and disposal. Any hazardous waste generated from the Project is not expected to change the status of Crowder College from a small quantity generator to a large quantity generator..

3.8.2.1.3 Solid Waste

The construction of the proposed MARET Center would result in an increase in the amount of construction debris generated in the area during the construction time period. As part of the proposed MARET Center's LEED certification requirements, at least 50 percent of construction wastes would either be recycled or reused, thus substantially minimizing the amount of these wastes requiring long term disposal. In addition, at least 5 percent of building materials would consist of salvaged, refurbished, or reused materials and at least 5 percent would be of recycled content.

The operation of the facility would result in an increase in the generation of household-type solid waste in the area. These increases would be negligible in terms of the overall generation rate of the Neosho area. In addition, an aggressive recycling program, consisting of paper, glass, plastic, and cardboard refuse, would be implemented.

Construction debris and household-type solid wastes would be collected and disposed of by Waste Corporation of America, which currently utilizes an out of state landfill. The implementation of the Proposed Action would result in no to minor impacts in terms of increasing waste generation rates in the region.

3.8.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be undertaken. No construction activities or land development would occur at the site; therefore, no impacts associated with hazardous materials and waste management would occur.

3.9 Socioeconomics

3.9.1 Existing Environment

This section provides a discussion of affected communities, population, ethnicity, social groups, economic indicators, and community services and facilities in the area surrounding the proposed MARET Center on Crowder College's Neosho Campus.

3.9.1.1 Population and Demographic Characteristics

In 2000, the population of the City of Neosho was 10,505 (U.S. Census Bureau, 2000). The Missouri Economic Research and Information Center estimated that the average daytime population in 2000 was 15,062, representing a population increase of approximately 4,557 commuters (MERIC, 2005). The demographic makeup of Neosho is somewhat similar to that of the State of Missouri; however, the City

has a population concentration of nearly 11 times less of Black or African Americans, 4 times greater of American Indians and Alaska Natives, 3 times greater of Asians and Other Races, 10 times greater of Native Hawaiians or Other Pacific Islanders, and twice the population concentration of those with Hispanic/Latino Origin. Population and demographic statistics are shown in Table 3.9-1.

Table 3.9-1. Population and Demographic Statistics for Neosho, Missouri

Population Group	Neosho, Missouri (2000)	Missouri (2000)	United States (2000)
Total Population	10,505	5,595,211	281,421,906
	Percent of Total Population	**Percent of Total Population**	**Percent of Total Population**
White	91.1	84.9	75.2
Black or African American	1.0	11.2	12.3
American Indian and Alaska Native	1.6	0.4	0.9
Asian	0.4	1.1	3.6
Native Hawaiian or Other Pacific Islander	1.0	0.1	0.1
Other Race	2.7	0.8	5.5
Two or More Races	2.2	1.5	2.4
Hispanic/Latino Origin (any race)	4.2	2.1	12.5

Source: US Census Bureau 2000

3.9.1.2 Economic Characteristics

The economic conditions in Newton County, Missouri are considerably different from State and national economic conditions. According to the American Community Survey, the unemployment rate between 2005 and 2007 was similar, but per capita income ($20,203) and median household income ($40,753) were lower than that for both the State of Missouri ($23,667 and $44,545, respectively) and the US as a whole ($26,178 and $50,007, respectively). The percent of individuals living in poverty in the Newton County was slightly higher than both the State of Missouri and the US as a whole. Economic statistics are shown in Table 3.9-2.

Table 3.9-2. Economic Statistics for Neosho, Missouri

Population Group	Newton County, Missouri (2005-2007)	Missouri (2005-2007)	United States (2005-2007)
Unemployment Rate	6.3%	6.5%	6.6%
Per Capita Income	$ 20,203	$23,667	$26,178
Median Household Income	$ 40,753	$44,545	$50,007
Individuals Below Poverty Level	16.9%	13.3%	13.4%

Source: U.S. Census American Community Survey 2005-2007

The industries that provide the greatest number of jobs include manufacturing, retail trade, and education. Neosho area employers (with 100 or more employees) include La-Z-Boy Midwest, Neosho R-5 Schools, Scholastic, Inc., Twin Rivers Group, Inc., Crowder College, Moark Productions, Talbot Industries, Freeman Neosho Hospital, Brass Eagle Paintball Products, Crowder Industries, BRANCO Enterprises, Inc., Sunbeam Products, Inc., Premier Turbines, Community Bank & Trust, Daisy Manufacturing, City of Neosho, and Koplin Outdoor, Inc. (NCP 2009).

3.9.1.3 Community Resources and Social Services

The City of Neosho is served by the Neosho R-5 School District. There are 5 elementary schools, 1 junior high or middle schools, 1 high school, 1 early childhood center, and 1 alternative education center (Neosho R-5 School District 2008). One elementary school is located in the Westview C-6 School District in Neosho (Westview C-6 School District 2008). There are 2 institutions of higher education in Neosho: Crowder College, a Community College serving the Junior College District of Newton and McDonald Counties, which enrolled over 4,400 students in 2009 (Crowder 2009), and the Ozark Bible Institute, a private Christian college.

The Freeman Neosho Hospital is the only hospital in the City of Neosho and is located 4.4 miles from the proposed MARET Center. It provides 67 licensed beds, primary and emergency care, and a walk-in clinic to Newman County (FHS 2009). St. John‘s Regional Medical Center is located less than 20 miles away in Joplin, Missouri (City of Neosho 2009).

Neosho is served by the Neosho Fire Department. The fire department has 2 fire stations and staffs 22 full-time personnel and 11 paid on-call firefighters (NCP 2009; FDN 2009); the closest station to Crowder College is located approximately 4.5 miles from campus. The Neosho Fire Department protects approximately 20,000 people in an area of 92 square miles and also provides hazardous material response, emergency medical service, vehicle rescue, and search and rescue. Members are on a combination of paid and volunteer status (NFD 2009).

The Neosho Police Department has 21 full-time officers and provides 24-hour protection to all property and persons within the Neosho City Limits. The Newton County Sheriff has 29 sworn officers (NCP 2009).

3.9.2 Environmental Consequences

3.9.2.1 Proposed Action

Project construction would provide temporary work for local construction companies, and in accordance with LEED standards, would use recycled and locally produced materials, which would support local businesses. The project would have little or no direct effect on population, demographics, or availability of housing or community services.

The MARET Center would provide economic benefits to the region, including increased jobs and business development in the renewable energy industry (DOE estimates that 35.5 jobs are created for every megawatt of solar energy installed), training for employees in alternative energy practices, and certification and degrees for up to 60 students per year (Joplin Independent 2005). The project would also facilitate applied research and provide renewable energy to the Crowder College campus, resulting in savings in annual utility costs.

3.9.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be undertaken. No construction activities or land development would occur at the site; therefore, there would be no positive socioeconomic impacts as a result of the Proposed Action.

3.10 Environmental Justice

Executive Order (E.O.) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (February 11, 1994) calls for federal agencies to recognize and attend to minority and low-income groups that may be disproportionately affected by federal policies and programs. Consequences to consider when adhering to E.O. 12898 include negative effects on health and environment.

3.10.1 Existing Environment

In the Newton County, the median household income between 2005 and 2007 was $ 40,753, which is lower than that for both the State of Missouri ($44,545) and the US ($50,007). The percentage of individuals living in poverty in Newton County (16.9 percent) was slightly higher than that for the State of Missouri (13.3 percent) and the US (13.4 percent). Nine percent of the population in Neosho is minority.

3.10.2 Environmental Consequences

3.10.2.1 Proposed Action

Although there are low income and minority individuals living in the City of Neosho, no major adverse impacts are expected from the proposed project. In addition, any impacts would be uniform to the general population living within the project area. Therefore, no disproportionately high and adverse impacts to minority and low-income populations are anticipated.

3.10.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be undertaken. Implementation of the No Action Alternative would not result in adverse environmental justice impacts in the vicinity of the project area.

3.11 Human Health and Safety

3.11.1 Existing Environment

Crowder College implements an Emergency Procedures plan for the protection of lives and property for its community. This plan provides guidelines on what to do in case of fire/building evacuations, tornado/severe weather, and utility failures (e.g., gas, electric, water), among other safety issues. The Director of Public Information is responsible for directing all public information during emergency conditions. For most emergencies occurring on campus, the emergency plan asks that people contact the Director of Physical Plant/Security or call 911 directly.

See Section 3.8, Hazardous Materials and Waste Management, for discussions on proximity of hazardous substances to the project site and potential impacts to groundwater and soils from existing hazardous substances.

3.11.2 Environmental Consequences

3.11.2.1 Proposed Action

Potential occupational health and safety risks during construction of the proposed MARET Center are expected to be typical of risks for any other construction site of comparable size. These include, but are not limited to: the movement of heavy objects, including construction equipment; the risk of fire or explosion from general construction activities (e.g., welding); and spills and exposures related to the storage and handling of chemicals and disposal of hazardous waste. The health and safety of construction

workers would be protected by adherence to accepted work standards and regulations set forth by Occupational Safety and Health Administration (OSHA) (29 CFR 1910, and 29 CF 1926).

Given the relatively small size of the project (approximately 16 acres), the risks during construction would be comparable to a routine construction project involving concrete, structural work, drilling, and electrical work. Hazardous materials that may be used during construction include equipment and generator fuels and lubricants. Mitigation measures would be employed to reduce any impact associated with the use of these materials (see Section 2.4). Thus, it is expected that only minor adverse health and safety impacts would occur during construction.

During the operational stage, overall adverse impacts to human health and safety are expected to be minor. The Crowder College Emergency Procedures would be readily available in classrooms and laboratories for easy access in the event of natural disasters, fire hazards, or utility failures. Designated shelter areas in closest proximity to the project area include the Technical Education Center and McDonald Hall (Crowder College, 2008).

3.11.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be undertaken. No construction activities or land development would occur at the site; therefore, there would be no change to existing human health and safety conditions, safety rules or regulations and, thus no impact would be anticipated.

3.12 Aesthetics

3.12.1 Existing Environment

The project site is a flat parcel of land located on the campus of Crowder College in the City of Neosho, in Newton County, Missouri. The site is undeveloped, with the exception of a 65-kW wind turbine, approximately 125 feet tall, in the western portion of the parcel and 2 solar-powered structures on the eastern portion of the parcel. Missouri Sugars, LLC, a sugar manufacturing company is located to the west of the site on Doniphan Drive and occupies a single story industrial type building. Railroad tracks run northeast-southwest to the west and north of the site (approximately 600 feet) just beyond Doniphan Drive. McDonald Hall, a 2-story building built in 1955 and Crowder College Technical Education Center, a 1-story building built in 1970 are to the east of the site. The Missouri National Guard controls the property to the directly south and southeast of the main campus, which is used for training purposes. The area surrounding the site is either undeveloped to moderately developed.

3.12.2 Environmental Consequences

3.12.2.1 Proposed Action

The area of visual influence or viewshed provides the context for assessing aesthetic and visual resource impacts. Impacts to identified views and vistas were determined based on an analysis of the existing quality of the landscape views, the sensitivity of the view, and the anticipated relationship of the scale and massing of the proposed buildings to the existing visual environment.

Construction of the MARET Center would change the aesthetics of the site by removing an undeveloped grassy field and replacing it with a conference center/educational building. This change would be most notable onsite and from Missouri Sugars, LLC to the west and the buildings immediately adjacent to the project site that are part of Crowder College‘s campus (the solar houses, McDonald Hall, and Crowder College Technical Education Center). The Proposed Action would add new and larger features to the site that would be visible from off-site locations, but these impacts would be minor because the new features would be reasonably consistent with existing features and facility design review processes would be implemented to reduce visual and aesthetic impacts.

3.12.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be undertaken. No construction or land development would occur at the site; therefore, there would be no impact to the aesthetics or the existing viewshed.

3.13 Cultural Resources

3.13.1 Existing Environment

Cultural resources include landscapes and places, and archaeological sites and objects. Examples of cultural resources (including Native American cultural resources) include, but are not limited to, the following:

- Mountain tops
- Lithic scatters
- Rock art
- Quarry sites
- Refuse deposits
- Foundations
- Houses
- Tailings
- Railroads
- Rails

The City of Neosho was originally inhabited by Osage Indians and first settled by people of European descent in the 1830s. Early commercial development was dominated by lead and zinc mining. Neosho's growth and development was halted by the coming of the Civil War. Although no major battles were fought in Neosho, a large part of the city was burned in 1863. Following the war, railroad construction spurred population growth and commercial activity (NPS 1993).

In 1941, Camp Crowder was built and opened, and served as home to 45,000 troops during World War II (NPS 1993). Camp Crowder was closed following World War II. Crowder College was founded in 1963, established as a community college serving the Junior College District of Newton and McDonald Counties (Crowder 2009) and classes began with 378 students in the fall of 1964. The Longwell Museum, established in 1970 and currently located in the Crowder College Elsie Plaster Community Center, contains many displays and artifacts from the Camp Crowder days (Crowder, 2009).

3.13.1.1 Historic Resources

The project site does not contain any historic structures listed or eligible for listing on the NRHP (Missouri SHPO, 2009). In addition, the campus is not part of a historic district.

Two buildings, Newton Hall and McDonald Hall, remain from the original 1963 campus, and have since been connected by the Student Center (constructed in 1987). The buildings, constructed in 1955 and located approximately 200 feet from the project site, are in the brutalist architectural style and have a nondescript concrete and masonry exterior, punched window openings, and a low-slope roof. The exterior was retrofitted with window air conditioning units and glass block in window openings beginning in the 1960s and continue to this day as needed. These buildings do not possess the architectural significance necessary to be considered a good representative of their type and are not eligible for the National Register of Historic Places (NRHP).

3.13.1.2 Archaeological Resources

There are no known archaeological resources at the proposed project site. In addition, there is a low potential for significant archaeological remains within the project area because the 16-acre site has previously been disturbed.

3.13.2 Environmental Consequences

3.13.2.1 Proposed Action

Construction of the MARET Center would not impact any historic resources, nor would it impact any known archaeological resources. In the event that potentially significant archaeological resources are discovered during construction, an approved archaeologist would be consulted to assess the significance of the findings. However, because the proposed project site has previously been disturbed, it is unlikely that it contains significant archaeological resources. The Missouri SHPO was consulted and it was determined that no impact to historic properties or archaeological resources would occur (See Appendix B) (Missouri SHPO, 2009).

3.13.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be undertaken. Implementation of the No Action Alternative would not result in adverse impacts to cultural resources in the vicinity of the project area.

3.14 Infrastructure

3.14.1 Existing Environment

Potable water supply for Crowder College is supplied by the City of Neosho. The overall condition of the Neosho water treatment plant is good, with well maintained equipment (City of Neosho, 2008). The plant was originally constructed in 1942 and renovated in 1982. Average and peak consumption rates at the City‘s water plant is 2.2 and 3.5 million gallons of per day (mgd), respectively, which is pumped from Shoal Creek and from 2 city wells (City of Neosho, 2009). The capacity of the plant is 500 mgd (City of Neosho, 2009). Existing storage capacity can handle the current daily water use - there is a 2 million gallon reservoir and two 400,000-gallon towers are located at Camp Crowder (City of Neosho, 2006). There are 2 additional towers with a total storage capacity of 2.1 million gallons located in the City as well. Population growth is causing a drop in the water table necessitating lowering of the pumps in Neosho‘s wells, which is causing a need for additional wells and storage (City of Neosho, 2006). The City is working to improve the system by interconnecting the storage at Crowder with the storage in Neosho.

Neosho operates two wastewater treatment plants, one on the north end of town and one at Crowder College. Wastewater generated south of Highway 60 goes south to the plant at Crowder College which was built in 1941-1942. This plant has a capacity of 3 mgd and a wet weather flow of 5-6 mgd. The south plant currently processes approximately 1 mgd, while the north plant processes 2 mgd. At full capacity, each plant has the capability of serving a community with a population of approximately 10,000 (City of Neosho, 2006). After treatment, wastewater from the south plant is pumped to the north plant for release into Shoal Creek.

Potable water and sanitary sewer lines are located at or adjacent the project site. To clearly communicate policy and procedures for potable water and wastewater extensions, the Neosho City Council developed written policy for such services that is to be used when evaluating requests by customers. In order for a customer to obtain water and sewer from the City, customers must fill out an application and return it to City staff for approval. New buildings requiring connection to the City‘s water and sewer system must meet City all guidelines as stated in Chapters 705 and 710 of Neosho‘s Municipal Codes (City of Neosho, 2007).

The Empire District Electric Company and Missouri Gas Energy respectively provide electricity and natural gas to Crowder College.

3.14.2 Environmental Consequences

3.14.2.1 Proposed Action

Construction of the proposed MARET Center would require connection of water, sewer, electrical power, and natural gas lines from existing services to the new building. Construction equipment requiring electricity would be powered using diesel generators and would not impact existing electricity services. Connection of new utility lines to existing lines would be coordinated with the appropriate authorities to prevent potential disruption to users of the same services and, therefore, negligible impacts to existing utility lines are expected during construction.

To prevent water quality impacts as discussed in Section 3.3.1, Crowder College would submit a NPDES permit application to the MDNR for approval prior to construction as the project would disturb more than 1 acre of land. The permit application requires the development of a SWPPP that identifies erosion prevention and sediment BMPs, such as those identified in MDNR's Protecting Water Quality: *A field guide to erosion, sediment and stormwater best management practices for development sites in Missouri*. Adherence to the SWPPP is expected to result in minor water quality impacts from construction activities.

It is estimated that during Stage 1 approximately 10 full-time personnel would be employed at the MARET Center and would work approximately 240 days in a year; these employees would represent new demand on the potable water system (students would not be considered as new users as this population is assumed to already exist on campus). Assuming a 10-gallon per person daily consumption rate (AWWA, 1996) for employees, additional annual water consumption under Stage 1 could be approximately 24,000 gallons per year. During Stage 2, new users would include up to 1,200 individuals from school groups and business training classes and up to 800 individuals from annual conferences, which would represent an additional 10,000 gallons per year in water consumption (assuming a 5-gallon per person daily consumption rate for visitors). On a daily basis, the additional maximum daily usage rate (total under Stage 2) could approximate 0.01 mgd on any given day, which represents 0.3 percent of the current peak daily consumption rate of the City of Neosho's water treatment facility. Maximum daily generation rates for wastewater are expected to be similar to water consumption rates (approximately 0.01 mgd total under Stage 2), which would represent 1 percent of current wastewater processing rates at the existing wastewater plant (south plant).

Consumption of the City's potable water would be even less than these projected amounts as planned use of rain and stormwater catchment technologies would reduce the total water demand. The MARET Center would be designed to meet LEED criteria to the extent practicable, with the main goal of making it an energy efficient building. Additionally, water conservation would be a key element of the proposed center's features. The building would directly connect to existing sewer and water lines adjacent to the project site. In line with meeting LEED criteria, the MARET Center would employ rainwater technologies, such as waterless urinals, dual flush toilets, and stormwater catchment for toilet use and landscape watering, to minimize water consumption. The additional potable water consumption and wastewater generation rates are not expected to result in demand that cannot be met by the existing water and sewer services, and therefore, impacts to these existing utilities are considered minor.

Permeable surfaces (pervious concrete and porous paver material), bio-swales, a green roof, and rainwater harvesting technologies would be implemented to retain as much water onsite and minimize the amount of runoff to receiving waters. Thus, impacts to stormwater resources are expected to be negligible.

The LEED criteria includes a standard that a minimum of 12.5 percent energy use come from renewable energy sources (e.g., wind and solar). However, to be considered a "net positive" energy user (from the existing electricity grid), the MARET Center is expected to exceed this goal annually. The Center would implement a solar panel system, geothermal energy system, and the existing wind turbine to ensure that it

is a "net positive" building. It is estimated that the total power usage for the proposed MARET Center would be 97,000 kWh/year. Solar power is expected to contribute 44,000 kWh/year (or 27 percent of the total energy produced). Geothermal and Radiant Hybrid Systems (combined) are expected to contribute a net of 50,000 kWh/year (around 170 million BTU) or 30 percent of the energy produced. Wind is expected to contribute 70,000 kWh/year or 43 percent of the total energy produced. The 3 technologies would result in the production of 164,000 kWh/year, which would have a net positive energy of 67,000 kWh/year.

The grid interconnect for the MARET Center is currently in place and would not require any additional infrastructure or upgrades other than requiring a service line connection to the new facility. Excess energy produced by the proposed building would be used to power other buildings on campus and/or sold to the local utility company. Also, shipping distances for many of the materials would be minimized to the extent practicable to meet LEED standards, thus fuel use would be reduced. Therefore, impacts to energy resources are expected to be beneficial.

3.14.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be undertaken. No construction activities or land development would occur at the site, therefore, no additional facilities would be constructed and baseline conditions in terms of usage rates of existing utilities would remain the same. Therefore, no impacts to infrastructure would occur as new connections to existing utility lines and additional demand on existing utilities would not be required.

3.15 Traffic and Transportation

3.15.1 Existing Environment

There are several rail lines that travel through the City of Neosho and provide access for many of the businesses. The Kansas City Southern railroad is located approximately 700 feet west of the project site and runs parallel to Doniphan Avenue. The Neosho Hugh Robinson Memorial Airport, located less than half a mile west of the project site, is a municipal airport used by business jets and small privately-owned aircraft. The closest airports that provide commercial airline service to the city include the Joplin Regional Airport (25 miles), the Northwest Arkansas Regional Airport (60 miles), and the Springfield-Branson National Airport (80 miles). Public transportation in the City of Neosho is limited to the not-for-profit OATS program (begun as the Older Adults Transportation Service but now serves a variety of riders), which provides van transportation for seniors throughout the community.

The City of Neosho can be accessed in the east-west direction from US 60 and from the north-south direction from US 71, US 175, or Route 59/Route 71. Crowder College is located in the southeast corner of the City of Neosho and can be accessed from the west via Route 71 (Business Route)/Route 59 and West Lyons Drive. The Kansas City Southern Railroad crosses West Lyons Drive west of Doniphan Drive. The project site is located on Doniphan Drive, between National Guard Drive and Laclede Avenue, and northeast of the Neosho airport. In 2007, West Lyons Drive (just east of its intersection with Business Route 71) experienced an Annual Average Daily Traffic (AADT) volume of 6,293 and Doniphan Drive (just south of its intersection with West Lyons Drive) experienced an AADT of 3,182 (MoDOT, 2007). These AADT volumes indicate that traffic is generally moving with stable flow, without any major delays/congestion near the project site.

The Neosho campus currently does not experience any traffic issues from students, employees, or campus visitors (Rand, 2010). Traffic volumes from commuter students (approximately 1,950 per semester) are considered low to moderate as many students attend classes 3 to 4 days per week. Approximately 200 part-time and full-time employees also contribute to daily traffic; additionally, the number of visitors accessing the campus by vehicles ranges from a small volume to a couple of hundred for larger events.

The campus has parking lots throughout the campus and provides a total of approximately 1,280 parking spaces, of which several hundred are usually available (Rand, 2010). Parking lots are located on Laclede Avenue that serve the northern portion of the campus and are located near the project site. The lots currently provide over 200 parking spaces; most of these spaces are used on a daily basis.

3.15.2 Environmental Consequences

3.15.2.1 Proposed Action

Project-generated traffic volumes during construction would be produced by employees commuting to and from the project site and from trucks delivering material and heavy construction equipment. The total work force during construction would be up to 30 workers at any given time. Generally, construction impacts to existing transportation resources would be temporary and limited to the proximity of the project site. To meet the USGBC's Leadership in LEED Green Building Rating certification program, local sources for materials would be used to the extent practicable in order to minimize transportation distances. Construction-related vehicles would add to existing local traffic volumes and would potentially cause minor congestion on West Lyons Drive and Doniphan Drive. The closing of Laclede Avenue would also contribute to delays as motorists would have to be re-routed along alternative routes. It is expected that additional vehicles would result in minor traffic impacts on West Lyons and Doniphan Drives as these roads are currently experiencing AADT volumes that could handle additional traffic loads without causing major delays. Furthermore, it is anticipated that commuters and truck deliveries would occur outside typical morning and early evening rush hours to reduce traffic numbers.

It is estimated that up to 10 full-time employees, 80 students (based on 4 classes a day and 20 students per class), and 15 visitors a day could contribute to local traffic on a daily basis during Stage 1. During Stage 2, it is projected that the Center would also be used for school groups (5-10 groups of 30-100 people each year), business group training (8-10 groups of 10-20 people per year), and on campus meetings (which would be attended by people already on campus). Additionally, 2 conferences could be held each year with approximately 250 to 400 individuals attending.

Chouteau Street between Laclede Avenue and National Guard Road would be permanently closed. Impacts to Doniphan and West Lyons Drives are expected to be minor as the new traffic volumes are relatively minor and these roadways currently have more than enough capacity to handle the incremental increase of vehicles. During Stage 2, meeting facilities at the Center would contribute to increased traffic congestion to local roadways as the facilities could accommodate 400 people for conferences, but these impacts are expected to be temporary and short-term. It is expected that the MARET Center would not result in any existing parking space issues during Stage 1 as the students that would attend classes and activities at the proposed facility are considered existing commuters and would not cause a net increase in parking demand. A new parking lot adjacent to the proposed facility would provide approximately 35 additional parking spaces to ensure adequate parking for daily employees and students, and visitors to the MARET Center. Existing parking lots throughout the campus typically have several hundred parking spaces available on any given day and would have the capacity to provide additional spaces needed during seminars and conference events that would occur during Stage 2; conference events with up to 400 individuals in attendance could result in acute parking lot usage, but this impact would be short-term and occur infrequently during the school year.

3.15.2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be undertaken. No construction activities or land development would occur at the site. Therefore baseline conditions of traffic levels would remain unchanged resulting in no impacts to transportation and traffic.

3.16 Cumulative Impacts

3.16.1 Introduction

NEPA requires that agencies consider the cumulative impacts of a Proposed Action. NEPA regulations define a cumulative impact as the effect on the environment that results from the incremental effect of the action when added to the effects of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the other actions and regardless of land ownership on which the other actions occur. An individual action when considered alone may not have a significant effect, but when its effects are considered in sum with the effects of other past, present, and reasonably foreseeable future actions, the effects may be significant (40 CFR 1508.7 and 1508.8).

This cumulative impact analysis considers impacts of the Proposed Action and other projects that have been proposed, or are reasonably foreseeable to take place in the vicinity of the Proposed Action. The geographic area considered has generally been limited to a 5-mile radius from the proposed project site. In terms of timing, the proposed project does not currently have a specific date for construction to begin; however, should the project move forward, it is anticipated that site preparation activities would commence in summer 2010.

The primary activities considered in this analysis are associated with proposed land development in Neosho, both on and off the Crowder College campus. The impacts of implementing the Proposed Action are described in the previous subsections of Chapter 3.

3.16.2 Other Projects in the Area

Crowder College has several projects planned for the near future, which are described in Table 3.16-1 below.

Currently, the City of Neosho has few plans for future major development projects. Residential development is in a slow period and plans for commercial developments are limited to a strip mall, a few restaurants, and a gas station (Messer, 2009). The City has experienced steady population growth since 1990, increasing 13 percent by 2000 to 10,505 individuals (City of Neosho Department of Economic Development, undated). Since 2000, the population growth has continued in this manner increasing 6 percent by 2005 to 11,130 individuals (U.S. Census Bureau, 2006).

Table 3.16-1. Potential Future Development Projects on Crowder College's Neosho Campus

Project	Description
South McDonald Hall Addition	Planned to be located between McDonald Hall and the Technical Education Center building approximately 0.1 miles southeast of the site; would serve as a safe shelter during tornado events. Details of size and appearance are still in the planning phase.
Additional Dormitories	Crowder College projects the need for additional dorms in the near future. The most likely scenario would be to build to complete the "diamond" shape that already has 3 sides completed in the R.L. (Bob) and Ethel Brown Residence Complex approximately 0.25 miles southeast of the site. All of these are 1 story, frame structures with 4 residence suites per module.
Additional Small Wind Turbine	A new small wind turbine (less than 50 kW and likely around 10 kW) would be placed in the area near the solar houses on the piece of land adjoining the site to the east. Installation is scheduled for the 2010 to 2012 timeframe.

Table 3.16-1. Potential Future Development Projects on Crowder College's Neosho Campus

Project	Description
Solar Village	Some plans for the campus have included more solar houses as student housing; similar to the existing Solar Houses 1 and 2, which each consist of 600 square foot buildings completely powered by attached solar panels. Plans are speculative at this point in time.

The *Neosho, Missouri Comprehensive Plan* (City of Neosho, 2006) provides policy guidance for future decision making on issues such as land use, community design, and growth management within the City and areas adjacent to the City, which could be annexed. The Comprehensive Plan is intended to provide guidance for approximately the next 15 years with annual reviews that may result in revisions. Contained within this document is a Future Land Use map, which describes a general approach for future patterns of development. The Future Land Use map indicates that areas immediately adjacent to the north, west, and south of Crowder College should be developed with industrial land uses. Land immediately to the east has been designated for agricultural uses. Areas identified for new commercial development primarily include south of Hughes Avenue, the west side of US 59 south of US Business 60, both sides of US 60 west of US 59, both sides of Neosho Boulevard, and both sides of a portion of US North Business 71. Future residential development is mostly indicated in the northern part of the City and an area on the north side of Lyon Drive west of the Crowder College campus.

Since the publication of the Comprehensive Plan in 2006 the only major development in the City has been a Lowe's home improvement store on Clemon Drive (Messer, 2009).

3.16.3 Cumulative Effects

The MARET Center would demonstrate sustainable building technology and use renewable energy. As a "green building" the Center would pose minimal impact to environmental resources. Thus, cumulative impacts would also be minor. The Proposed Action would have no noticeable impact with respect to geology and soils, water resources, wetlands, biological resources, air quality, noise, socioeconomics and environmental justice, human health and safety, aesthetics, and cultural resources; therefore, no cumulative impacts would occur to these resource areas.

The resource area that has the greatest potential for cumulative impacts would be infrastructure. The proposed MARET Center would require utility connections and service (e.g., potable water, wastewater disposal, electricity, etc.) and would contribute to increased demand as new commercial, industrial, and residential development occurs in the City. The primary issues could be potable water supply and wastewater disposal demands as Neosho has plans to extend these municipal services not only to new developments, but also existing structures as requested. The City has already determined that the water supply infrastructure requires upgrades to adequately supply its residents and businesses (see Section 3.14). Plans for new infrastructure include extensions of main lines and the development of new groundwater wells. Upgrades to existing wells and lines are also planned (City of Neosho, 2006). It is important to note that the proposed MARET Center's contribution to increased demand would be minimal, thus no major adverse cumulative impacts would be expected. The MARET Center would host 2 conferences per year consisting of 250 to 400 participants each. During these events, there could be localized traffic congestion; however, this would occur infrequently and the proposed MARET Center's contribution would be minimal.

The operation of the proposed MARET Center would cause a minimal increase in the generation of hazardous waste and nonhazardous solid waste in the Neosho area. As additional development occurs in the City, generation rates would continue to increase, particularly with respect to nonhazardous solid

waste. A commercial contractor would continue to transport and dispose of Crowder College's waste; therefore, no public services would be strained; however, a minimal increase in the amount of waste needing landfilling and recycling services would occur.

No off-campus impacts would be expected in terms of Land Use; however, the construction of the proposed MARET Center would reduce overall land availability for future development of Crowder College. This impact would be negligible as it is assumed that the College has adequately planned for future growth on campus. In addition to the Neosho campus, Crowder College operates three other campuses in Cassville, Nevada, and Webb City, Missouri which could take additional programs if necessary in the future. The potential projects listed in Table 3.16-1 either are already sited or adequate land would continue to be available.

4.0 IRREVERSIBLE/IRRETRIEVABLE COMMITMENT OF RESOURCES

An irreversible commitment of resources is defined as the loss of future options. The term applies primarily to the effects of use of nonrenewable resources such as minerals or cultural resources, or to those factors such as soil productivity that cannot be replaced within a reasonable timeframe. It could also apply to the loss of an experience as an indirect effect of a ~~"p~~ermanent" change in the nature or character of the land. An irretrievable commitment of resources is defined as the loss of production, harvest, or use of natural resources. The amount of production lost is irretrievable, but the action is not irreversible. If the use changes, it is possible to resume production.

The Proposed Action would not have irreversible impacts in terms of land use because future options for using the 16-acre site would remain possible. A future decommissioning process could restore the site for alternative uses, ranging from open space to other campus development. The location of the proposed MARET Center is consistent with the surrounding campus uses and would not affect surrounding land uses on or off campus. Construction materials, except to the extent they can be reused or recycled should the MARET Center be decommissioned in the future, would be irreversibly committed.

The primary irretrievable impacts of the Proposed Action would involve the use of energy, labor, and materials during construction and operation of the MARET Center. However, the use of these resources would be negligible in terms of the overall availability of these resources in the region.

5.0 THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Short-term uses of the human environment are considered those occurring during the construction and initial implementation of the project. Long-term effects are those caused after the action has been completed and is in full and complete operation.

The commitment of resources (land, energy, labor, and materials) to construct the MARET Center in the short-term would result in several long-term positive environmental benefits. The MARET Center would be a net-positive energy prototype building (one of few in the nation). The project would demonstrate innovation in green building technology, energy efficiency and renewable energy. The MARET Center would expand the renewable and alternative energy industry in the region by providing training for businesses and industry, hands-on research and application, and facilities and support for new-business start-ups. Excess energy produced by the MARET Center would be provided over the long-term to power other buildings on campus and/or excess energy would be sold to the utility company. This would result in improved efficiency and increased use of renewable energy sources, thus substantially reducing the use of and reliance on imported fossil fuels.

6.0 UNAVOIDABLE ADVERSE IMPACTS

There would be no major unavoidable adverse impacts from the construction and operation of the proposed MARET Center. The project's impacts to the environment would be negligible given the energy efficient and sustainable design of the facility. During construction, there would be a minor unavoidable, although temporary, increase in construction-related noise at the site as well as minor soil erosion, which may occur due to natural elements (i.e., wind and rain). Construction activities would conform to all applicable soil erosion control regulations, which would minimize these impacts. During operation of the MARET Center, there may be unavoidable but incrementally small increases in local traffic levels during conference events, although these impacts would also be minor, intermittent, and short in duration.

7.0 INTENTIONAL DESTRUCTIVE ACTS

In December 2006, the DOE Office of General Counsel issued interim guidance stipulating that NEPA documents completed for DOE actions and project should explicitly consider intentional destructive acts (i.e., acts of sabotage or terrorism). Construction and operation of the MARET Center would not involve the transportation, storage, or use of radioactive, explosive, or toxic materials. Consequently, it is highly unlikely that the construction and operation of the MARET Center would be viewed as a potential target by saboteurs or terrorists. The project location is not near any major inland port, container terminal, or nuclear power plant. The Proposed Action would not offer any credible targets of opportunity for terrorists or saboteurs to cause adverse impacts to human life, health, or safety.

8.0 REFERENCES

AWWA, 2006. American Water Works Association – Federal Water Use Indices. Accessed from FEMP web site: http://www1.eere.energy.gov/femp/water/water_useindices.html.

Beetam, 2009. Personal Communication between Jane Beetam (MDNR) and Laura Margason (EERE) regarding the Prairie Pools Superfund Site, May 5, 2009.

California Energy General Corporation (CEGC). Plan of Operations for Exploration Drilling, Glass Mountain Area, Siskiyou County, California. May 1994.

Camp Crowder. 2008. FY 2008 Camp Crowder Army Defense Environmental Restoration Program Installation Action Plan. October 27, 2008.

Cave, 2009. Personal communication between Shannon Cave (MDC) and Anthony Becker (PHE), April 1, 2009.

City Data. 2009. Neosho, Missouri Detailed Profile. Accessed 3/10/2009 at http://www.city-data.com/city/Neosho-Missouri.html.

City of Neosho Department of Economic Development. Undated. *Population*. Accessed March 9, 2009 at http://www.cityofneosho.com/busenviron9.html.

City of Neosho. 2006. *Neosho, Missouri Comprehensive Plan*. May, 2006.

City of Neosho, 2007. Water and Sewer Extension Plan. November 21, 2007.

City of Neosho, 2008. Water Master Plan.

The City of Neosho, Missouri. "Neosho, MO – Official Site – Health Services." Accessed February 9, 2009 at http://www.neoshomo.org/index.asp?NID=102.

City of Neosho, 2009. Utilities - Department of Economic Development. Accessed: February 27, 2009.

Crowder College, 2008. Crowder College Emergency Procedures. November 2008

Eberle, 2008. Personal communication between Dan Eberle (Crowder College MARET Center) and Stacey Schueler (Potomac-Hudson Engineering, Inc.). November 13, 2008.

Eberle, 2009. Personal communication between Dan Eberle (Crowder College MARET Center) and Robin Griffin (Potomac-Hudson Engineering, Inc.). February 5, 2009.

FAA, 2007, Federal Aviation Administration Determination of No Hazard to Air Navigation. Issued: October 3, 2007.

Federal Emergency Management Agency (FEMA), 2009. FEMA flood map number 290265 0010 B, Panel 10 of 10. Accessed at http://msc.fema.gov

Fire Departments Net (FDN). "Neosho Area Fire Protection District – Neosho, Missouri." Accessed February 9, 2009 at http://www.firedepartments.net/Missouri/Neosho/NeoshoAreaFireProtectionDistrict.html.

Freeman Health System (FHS). "Directions." Accessed February 9, 2009 at http://www.freemanhealth.com/body.cfm?id=976.

Harrington, 2009. Personal communication between John Harrington, Code Enforcement Officer (Neosho City Hall) and Catherine Wade (Potomac-Hudson Engineering, Inc.) March 30, 2009.

Joplin Independent. 2005. "Crowder receives funding for MARET center." Accessed 3/10/2009 at http://www.joplinindependent.com/display_article.php/l-marble1105660037.

Missouri Economic Research & Information Center (MERIC). December 2005. Accessed 3/24/2009 at http://ded.mo.gov/researchandplanning/pdfs/daytime_population.pdf.

Messer, K. 2009. *Planned Development Projects in Neosho*. Phone call to Kim Messer (City Planner, City of Neosho) from Anthony Becker (PHE) on February 27, 2009 concerning development projects proposed in the City of Neosho. Personal communication.

Missouri Community College Association (MCCA), Undated. *About MCCA*. Accessed on March 18, 2009 at http://www.missouricommunitycollegeassociation.com/about-the-missouri-community-college-association/missouri-community-college-association-history.html.

Missouri Department of Conservation (MDC), 2009. *Elk River Watershed*. Accessed on February 19, 2009 at http://www.mdc.mo.gov/fish/watershed/elk/hardcopy/

Missouri Department of Conservation (MDC). 2009a. *MDC Heritage Database Results for Newton County*. Accessed February 17, 2009 at http://mdc.mo.gov/cgi-bin/heritage/search.cgi?county=Newton.

Missouri Department of Conservation (MDC). 2009b. Heritage Review Report for the MARET Center. March 26, 2009.

Missouri Department of Natural Resources (MDNR), 2010. Letter from Mr. Robert Stout (MDNR) to Ms. Laura Margason (DOE) regarding the MARET Center Construction Project, August 20, 2010.

Missouri Department of Natural Resources (MDNR) 2009, Division of Geology and Land Survey, The Geologic Column of Missouri, 2009. Accessed on February 12, 2009 at http://www.dnr.mo.gov/geology/docs/gcwinter6.pdf

Missouri Department of Natural Resources (MDNR), 2009a. Accessed at http://www.dnr.mo.gov/env/wpp/nps/2006/11070208-elkriver.pdf

Missouri Department of Natural Resources (MDNR), 2009b. Letter from Ms. Jane Beetam (MDNR) to Ms. Robin Griffin (PHE) regarding the MARET Center Construction Project, April 13, 2009.

Missouri Department of Natural Resources (MDNR), 2004. Elk River Basin, Total maximum Daily Load information Sheet, 2004. Accessed on March 17, 2009 at http://www.dnr.mo.gov/env/wpp/tmdl/info/3246-elk-r-basin-info.pdf

Missouri Department of Natural Resources (MDNR), Missouri Groundwater Provinces and Aquifer Characteristics, 2009b. Accessed on February 17, 2009 at http://www.dnr.mo.gov/env/wrc/groundwater/education/provinces/gwprovince.htm

Missouri Department of Natural Resources. Undated. *Springfield Plateau Groundwater Province*. http://www.dnr.mo.gov/env/wrc/groundwater/education/provinces/springfieldplatprovince.htm.

Missouri Soil Survey Reports, the Cooperative Soil Survey, Soil Survey of Newton County, Missouri, 2009. Accessed on February 13, 2009 at http://www.soilsurveydemo.org/survey/missouri.asp

Missouri State Historic Preservation Office. Cultural Resource Assessment Section 106 Review for the MARET Center, Crowder College, 601 Laclede Avenue, Neosho, Missouri. September 10, 2009.

Missouri Watershed Information Network (MOWIN), Elk River Basin, Physical Features, page last updated August 26, 2008. Accessed on February 13, 2009 at http://www.mowin.org/Project31903/ElkRiver/physical.html

MoDOT, 2007. 2007 Annual Average Daily Traffic for Missouri DOT District 7.

Nation Master Encyclopedia, Carbonate Rocks, 2009. Accessed on February 12, 2009 at http://www.nationmaster.com/encyclopedia/Carbonate-rocks

Neosho Community Profile (NCP). Accessed February 10, 2009 at http://www.swmissouri.com/_pdf/NeoshoCommunityProfile.pdf.

Neosho Daily News, 2008. "Crowder College, state officials to discuss tornado shelter," November 10, 2008.

Neosho Fire Department (NFD). "Neosho Fire Department @ Firehouse.com." Accessed February 9, 2009 at http://departments.firehouse.com/dept/NeoshoMO.

Stinson, 2009. Personal Communication between Dennis Stinson (MDNR) and Robin Griffin (PHE) regarding groundwater contamination at the MARET Center Site in Neosho, MO. April 23, 2009.

M. Thompson, T. Jeffrey Gamey, W. Mandell, G. Franco, S. Miller, Karst Pathway Delineation Using Combined Spatial and Geophysical Analysis at Camp Crowder, Missouri, 2005. Accessed on February 18, 2009 at http://www.fugroairborne.com/resources/case_studies/engineering/pdfs/KARST%20PATHWAY%20DELINEATION%20USING%20COMBINED%20SPATIAL%20AND.pdf

Todd, W. 2009. *Waste Corporation of America Disposal Information*. Phone call to Wanda Todd (dispatcher, Waste Corporation of America) from Anthony Becker (PHE) on February 27, 2009 concerning what landfill Crowder College's waste is disposed in. Personal Communication.

U.S. Census Bureau. 2006. *Cities and Towns – All Places: 2000 to 2005*. Missouri Excel spreadsheet. Accessed March 9, 2009 at http://www.census.gov/popest/cities/SUB-EST2005-4.html.

U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). undated. Level *III and IV USEPA Ecoregions*. Accessed February 17, 2009 at http://www.mo.nrcs.usda.gov/technical/nat_res_data/mo_ecoregion/out/usepa.pdf.

U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), 2009. Accessed on February 13, 2009 at http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

U.S. Fish and Wildlife Service (USFWS). 2005. *Missouri – County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species*. Accessed February 17, 2009 at http://www.fws.gov/midwest/endangered/lists/missouri-cty.html.

U.S. Fish and Wildlife Service (USFWS). 2009. *Wetlands Mapper*. Accessed February 17, 2009 at http://www.fws.gov/wetlands/Data/Mapper.html.

U.S. Fish and Wildlife Service (USFWS). 2010a. Letter from Mr. Charles M. Scott (USFWS) to Ms. Laura Margason (DOE) regarding the MARET Center Construction Project, August 20, 2010.

U.S. Fish and Wildlife Service (USFWS). 2010b. Letter from Mr. Charles M. Scott (USFWS) to Ms. Laura Margason (DOE) regarding the MARET Center Construction Project, September 28, 2010.

U.S. Geological Survey (USGS), Groundwater Atlas of the United States, 2009. Accessed on February 17, 2009 at http://pubs.usgs.gov/ha/ha730/ch_f/F-text6.html

9.0 DISTRIBUTION LIST

Bagby Enterprises
P.O. Box 171
Salisbury, MO 65281

Crowder Area Sheltered Workshop, Inc.
3707 Howard Bush Drive
Neosho, MO 64850
(417) 451-5075

Crowder College
Neosho, MO 64850

John D. & Sally A. Easley
13707 S. Kentwood Lane
Neosho, MO 64850

Don Gustaveson
1045 Spencer Drive
Neosho, MO 64850

K & S Wire Products Inc.
300 Nelson Avenue
Neosho, MO 64850
(417) 451-2323

Magic Media, Inc.
420 S. First
Bangor, PA 18013

Missouri Highway and Transportation Commission
3901 E. 32nd Street
Joplin, MO 64804

Neosho Apartments L.P.
3609 E. 20th
Joplin, MO 64801

Neosho Area Business & Industrial Foundation
308 W. Spring
Neosho, MO 64850
(417) 451-0157

Neosho Land Development, Inc.
P.O. Drawer H
Neosho, MO 64850

Newton County
Newton County Courthouse

Neosho, MO 64850
Nutra Blend, LLC
3200 E. Second
Neosho, MO 64850

Ozark Saddle Club
c/o Cindi Ortloff
19372 Quail Road
Neosho, MO 64850

Premier Farms, LLC
1100 Blair Avenue
Neosho, MO 64850

Eugene G. Schwartz Trust
300 Nelson Avenue
Neosho, MO 64850
(417) 451-2323

Sunbeam Products, Inc.
2381 Executive Center Drive
Boca Raton, FL 33431

Trouw Nutrition USA, LLC
115 Executive Drive
Highland, IL 62249

Union Carbide Industrial Gases, Inc.
39 Old Ridgebury Road
Danbury, CT 06817

Glen E. & Sherry L. Werneke
1822 Sherry Lea Drive
Neosho, MO 64850

GOVERNMENT ENTITIES

County Extension Office
SW Regional Office
3003 E. Chestnut Expressway, Suite 200
Springfield, MO 65802
(417) 865-0707

Missouri Conservation Commission
SW Regional Office
2630 N. Mayfair
Springfield, MO 65803
(417) 451-2190

Missouri Department of National Resources
P.O. Box 176
Jefferson City, MO 65102
(800) 361-4827

Neosho Fish Hatchery
520 Park Street
Neosho, MO 64850
(471) 451-0554

Newton/McDonald County Landfill
101 S. Wood Street #401
Neosho, MO 64850
(417) 451-8240

U.S. Fish & Game
BHW Federal Building
One Federal Drive
Fort Snelling, MN 55111
(512) 713-5360

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Appendix A Scoping Letters

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CROWDER COLLEGE
BUSINESS OFFICE
601 LACLEDE
NEOSHO MO 64850-

AFFIDAVIT OF PUBLICATION

STATE OF MISSOURI:

COUNTY OF JASPER:

I, Daniel P. Chiodo, being duly sworn according to law, state that I am Publisher of the Joplin Globe.

The Joplin Globe is a daily newspaper of general circulation in the county of Jasper, which has been admitted to the post office as second-class matter in the City of Joplin, the city of publication; which newspaper has been published regularly and consecutively for a period of three years and has a list of bonafide subscribers voluntarily engaged as such, who have paid or agreed to pay a stated price for a subscription for a definite period of time, and that such newspaper has complied with the provisions of section 493.050, Missouri Revised Statutes, 1959. The below listed advertisement appeared in the following issue(s):

Publication	Expire Date	Ad Caption	# Times	Amount
The Joplin Globe	03/29/2009	LEGAL 398/MARET CENTER	2	382.02

03/22/2009,03/29/2009

Daniel P. Chiodo Publisher

Sworn to and subscribed before me this 30th day of March, 2009

Amber Severns Notary Public

Amber Severns/#07521422

My commission expires April 14, 2011

RECEIVED
APR - 2 REC'D
CROWDER COLLEGE

(First Published March 22, 2009)

NOTICE OF SCOPING

The U.S. Department of Energy (DOE) is requesting public input on the scope of environmental issues and alternatives to be addressed in the:

Environmental Assessment

MARET Center Construction Project

Neosho, Missouri

Crowder College is proposing to construct and develop their Missouri Alternative and Renewable Energy Technology (MARET) Center, a net-zero energy prototype building, with Congressionally directed Federal funding from DOE.

The project would be located on Crowder College's Neosho campus at the corner of Doniphan Drive and Laclede Avenue in Neosho, Missouri, and would be constructed entirely on previously disturbed land. An Environmental Assessment (EA) will be prepared by DOE pursuant to the requirements of the National Environmental Policy Act (NEPA). The notice of scoping and description of the proposed MARET Center is available for review at the DOE Electronic Public Reading Room at http://www.eere.energy.gov/golden/Reading_Room.aspx.

Public comments on the NEPA process, proposed action and alternatives, and environmental issues will be accepted until April 12, 2009. Please send comments to Potomac-Hudson Engineering, Inc., c/o Robin W. Griffin, 7830 Old Georgetown Road, Suite 220 Bethesda, MD 20814 or by e-mail to robin.griffin@phe.com

(398)

Appendix B Consultation Letters

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STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

March 19, 2009

Mr. Steve Blazek
Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401-3393

Re: SHPO Project Number: **021-NE-09**, Section 106 review of Market Center, Crowder College, Neosho, Newton County, Missouri (US DOE)

Dear Mr. Blazek:

Your submittal did not include adequate information to review your project under Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended). Please submit the following items marked below. Upon receipt of a complete application review can proceed.

__X__ **Please provide photographs of the area of potential effects. Please be sure these photographs include any buildings or structures that are adjacent to the project site.** Photography requirements - Recent original photographs of any buildings or structures. Clear black and white or color photographs (minimum 3" x 5") are acceptable. Polariods, photocopies, emailed, or faxed photographs are not acceptable. **Good quality photographs are important for expeditious project review**. Please include interior photos of any areas that will he affected. Photographs of neighboring or nearby buildings are also helpful. All photographs should be labeled and keyed to a map of the project area.

__X__ **Please complete the Section 106 Project Information Form enclosed**

If you have any questions please write Missouri Department of Natural Resources, State Historic Preservation Office, Attn: Review and Compliance, P.O. Box 176, Jefferson City, Missouri 65102, or call Rebecca Prater at (573) 751-7958. Please be sure to include the **SHPO Project Number (021-NE-09)** on all future correspondence relating to this project. If the information is provided via telephone call, please follow up in writing for our files.

Sincerely,

STATE HISTORIC PRESERVATION OFFICE

Rebecca Prater
Historian

Encl.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE

SECTION 106 PROJECT INFORMATION FORM

Submission of a completed Project Information Form with adequate information and attachments constitutes a request for review pursuant to Section 106 of the National Historic Preservation Act of 1966 (as amended). We reserve the right to request more information. **Please refer to the CHECKLIST on Page 2 to ensure that all basic information relevant to the project has been included.** For further information, refer to our Web site at: http://www.dnr.state.mo.us/shpo and follow the links to Section 106 Review.

NOTE: Section 106 regulations provide for a 30-day response time by the Missouri State Historic Preservation Office from the date of receipt.

PROJECT NAME	
FEDERAL AGENCY PROVIDING FUNDS, LICENSE, OR PERMIT	
APPLICANT	TELEPHONE
CONTACT PERSON	TELEPHONE
ADDRESS FOR RESPONSE	

LOCATION OF PROJECT

COUNTY: _____

STREET ADDRESS: _____ CITY: _____

GIVE LEGAL DESCRIPTION OF PROJECT AREA (TOWNSHIP, RANGE, SECTION, ¼ SECTION, ETC.)

***USGS TOPOGRAPHIC MAP QUADRANGLE NAME** _____

YEAR: _____ TOWNSHIP: _____ RANGE: _____ SECTION: _____

*SEE MAP REQUIREMENTS ON PAGE 2

PROJECT DESCRIPTION

- Describe the overall project in detail. If it involves excavation, indicate how wide, how deep, etc. If the project involves demolition of existing buildings, make that clear. If the project involves rehabilitation, describe the proposed work in detail. Use additional pages if necessary.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE

SECTION 106 PROJECT INFORMATION FORM

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NOTE: Section 106 regulations provide for a 30-day response time by the Missouri State Historic Preservation Office from the date of receipt.

PROJECT NAME

FEDERAL AGENCY PROVIDING FUNDS, LICENSE, OR PERMIT

APPLICANT | TELEPHONE

CONTACT PERSON | TELEPHONE

ADDRESS FOR RESPONSE

LOCATION OF PROJECT

COUNTY: _____

STREET ADDRESS: _____ CITY: _____

GIVE LEGAL DESCRIPTION OF PROJECT AREA (TOWNSHIP, RANGE, SECTION, ¼ SECTION, ETC.)

***USGS TOPOGRAPHIC MAP QUADRANGLE NAME** _____

YEAR: _____ TOWNSHIP: _____ RANGE: _____ SECTION: _____

*SEE MAP REQUIREMENTS ON PAGE 2

PROJECT DESCRIPTION

- Describe the overall project in detail. If it involves excavation, indicate how wide, how deep, etc. If the project involves demolition of existing buildings, make that clear. If the project involves rehabilitation, describe the proposed work in detail. Use additional pages if necessary.

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Missouri Department of Conservation

Heritage Review Report

Policy Coordination Unit
P. O. Box 180
Jefferson City, MO 65102
Prepared by: Shannon Cave
shannon.cave@mdc.mo.gov
573-522-4115X3250

Mr. Steve Blazek
Dept. of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401-3393
Copy: Mike Smith

Project type:	Building (previously developed site)
Location/Scope:	36° 48' 52.60" North and 94° 22' 17.00" West
County:	Newton
Query reference:	MARET Center
Query received:	March 16, 2009

Authenticity may be confirmed by Policy Coordination Unit, Missouri Department of Conservation, 573-522-4115.

This NATURAL HERITAGE REVIEW is not a site clearance letter. Rather, it indicates whether or not public lands and sensitive resources are known to be located close to and potentially affected by the proposed project.

Note: Inquiry letter showed latitude degrees at 34° N, but map location matched 36°. This review applies to the site on the map.

FEDERAL LIST species/habitats are protected under the Federal Endangered Species Act. Consult with the U.S. Fish and Wildlife Service (101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; 573-234-2132). STATE ENDANGERED species are listed in and protected under the Wildlife Code of Missouri (3CSR10-4.111).

Records of federal-listed or state-listed (endangered) species or critical habitats near the project site:

The site appears to fall within the recharge area for a cave with Ozark cavefish (*Amblyopsis rosae*, federally listed "threatened," state listed "endangered"). All activities that might adversely impact groundwater quality should be avoided. See Best Management Practices for Ozark Cavefish at http://mdc.mo.gov/122 and Best Management Practices for Karst Geology at http://mdc.mo.gov/111. If you determine that your project could affect subterranean waters inhabited by the Ozark cavefish, contact the U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132).

Otherwise, heritage records identify no wildlife preserves, no designated wilderness areas or critical habitats, and no state- or federal-listed endangered species records within one mile of the site, or in the public land survey Sections 9, 10, 15 or 16of T24N R32W, or in sections touching it. There are also no records of sites with species of concern that are tracked due to their rarity but not listed as endangered.

Heritage records were identified at some date and at a more or less precise location. This report includes information about records near but not necessarily on the project site. Animals move and, over time, so do plant communities. To say "there is a record" does not mean the species/habitat is still there. To say that "there is no record" does not mean the project will not encounter something not recorded. On-site verification is the responsibility of the project. Incorporating information from Heritage records into plans can help reduce adverse impacts to sensitive natural resources. However, these records only provide one reference and other information (e.g. wetland or soils maps, on-site inspections or surveys) should be considered. Compare biological and habitat needs of records listed to planned project activities to avoid or minimize impacts. More information: www.mdc.mo.gov/nathis/endangered/ and mdc4.mdc.mo.gov/applications/mofwis/mofwis_search1.aspx. Find contact information on the department's nearest Natural History Biologist at http://www.mdc.mo.gov/nathis/contacts/.

Recommendations related to this project or site (not to specific heritage records):

- Construction should be managed to minimize erosion and sedimentation/runoff to nearby streams and lakes, including adherence to any "Clean Water Permit" conditions. Project design should include stormwater management elements that assure storm discharge rates to streams for heavy rain events will not increase from present levels. Revegetate disturbed areas to minimize erosion using native plant species compatible with the local landscape and wildlife needs. Annual ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive exotic perennials such as crownvetch and sericea lespedeza.
- The project area is in region with known karst geologic features (e.g. caves, springs, and

sinkholes, all characterized by subterranean water movement). Few karst features are recorded in heritage records, and ones not noted here may be encountered at the project site or affected by the project. Cave fauna (many of which are species of conservation concern) are influenced by changes to water quality, so check your project site for any karst features and make every effort to protect groundwater in the project area. See http://mdc.mo.gov/nathis/caves/manag_construc.htm for best management information.

- Gray bats (*myotis grisescens*, federally and state listed "endangered") are likely to occur in the project area, as they forage over streams, rivers, and reservoirs in this part of Missouri. Avoid entry or disturbance of any cave inhabited by gray bats and when possible retain forest vegetation along the stream and from the gray bat cave opening to the stream. See http://mdc.mo.gov/104 for best management recommendations.
- Streams in the area should be protected from soil erosion, water pollution and in-stream activities that modify or diminish aquatic habitats. Best management recommendations relating to streams and rivers may be found at http://mdc.mo.gov/79 .
- Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment, so inspect and clean equipment thoroughly before moving between project sites. Especially important at this time is the zebra mussel, known in the Missouri and Mississippi Rivers and Lake of the Ozarks, but missing from many inland streams and most lakes.
  - Remove any mud, soil, trash, plants or animals before leaving any water body or work area.
  - Before leaving a project site, drain water from boats and machinery (that has operated in the water), checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
  - When possible, wash and rinse equipment thoroughly with hard spray or HOT (104° F or more) water, like that found at a do-it-yourself carwash and dry in the hot sun before using again. Please help prevent the spread of invasive species by inspecting and cleaning equipment thoroughly before moving between project sites.

These recommendations are ones project managers might prudently consider based on a general understanding of species needs and landscape conditions. Heritage records largely reflect only sites visited by specialists in the last 30 years. This means that many privately owned tracts could host remnants of species once but no longer common.

Project managers can pre-screen heritage review requests at **tinyurl.com/heritagereview.** *A "Level 1 response" will result in a printable document that will make further submission to MDC or USFWS unnecessary.*

STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Mark N. Templeton, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

April 13, 2009

Robin W. Griffin
Potomac-Hudson Engineering, Inc.
7830 Old Georgetown Road, suite 220
Bethesda, MD 20814

Re: Crowder College's MARET Center Construction Project

Dear Ms. Griffin:

The Missouri Department of Natural Resources (Department) appreciates the opportunity to provide comments on the Notice of Scoping for Crowder College's MARET Center Construction Project. The Department offers the following comments for consideration.

Hazardous Waste
The MARET Center location is within the Pools Prairie Superfund Site. The Pools Prairie Site consists of four known source areas as follows:

- Quince Road Area (QRA)
- Manufacturing Plant Area (MPA)
- Engine Test Area (ETA)
- Components Test Area (CTA)

This is an Environmental Protection Agency (EPA) lead site. The contaminant of concern is Trichloroethylene (TCE) and its degradation products. Based on information in the Engineering Evaluation/Cost Analysis (EE/CA) for the ETA, groundwater flow direction at the site is to the west. Based on the location of the MARET Center in reference to the various known source areas, the operable units to the west of this location are the CTA and the ETA. The nearest, the ETA, is an estimated 1.68 miles from the MARET Center location.

It should be noted that groundwater at the Pools Prairie Site has not been fully evaluated. Known source areas are being remediated through Removal Actions by the responsible parties. Groundwater will be further evaluated through a Remedial Investigation which has not yet begun.

Based on available information, the only activity that has potential to be impacted by the Pools Prairie site is the installation of geothermal wells. Given the distance from the potential source areas, the potential appears slight, but project planners should be aware of the Pools Prairie Site.

Land Disturbance

If more than one acre of land will be disturbed by the proposed activities, a Land Disturbance Permit must be obtained from the Department of Natural Resources. Application forms are available at www.dnr.mo.gov/forms/index.html. Completed application forms, along with filing fees, should be submitted to the Southwest Regional Office, 2040 W. Woodland, Springfield, MO 65807-5912, phone 417-891-4300.
The land disturbance permit is a general permit and can be issued in a short time frame. The permit contains important guidance on how to manage the disturbed area to minimize storm water runoff and erosion.

Stream or Wetland Impacts

If any type of stream or wetland is impacted by project construction, the project may need a Federal Section 404 Permit and a State 401 Water Quality Certification. If you have any questions about the Section 404 Permit, you should contact the Army Corps of Engineers Little Rock District, at (501) 324-5295. Should the Army Corps of Engineers decide that a Section 404 Permit is required, you will also need a 401 Water Quality Certification from the Department of Natural Resources. For more information regarding the 401 permit, please contact Carrie Schulte, Water Protection Program, 573-751-7023.

According to the Notice of Scoping, construction will include the installation of geothermal wells. If an open loop injection type heat pump or surface discharge heat pump is to be constructed, a permit from the Department will be needed. Heat pump systems rated at greater than 600,000 British Thermal Units (BTUs) per hour are permitted by the Department under 10 CSR 20.6070. Additionally, all commercial heat pumps require a permit from the Department's Water Pollution Control Branch. All other heat pump systems are regulated under the Missouri Water Well Regulations, 10 CSR 23.5010 to 10 CSR 23.5080. Please contact Mr. Tim Stallman at (573) 751-7634 for more information.

We appreciate the opportunity to provide comments on the Notice of Scoping for Crowder College's MARET Center Construction Project. If you have any questions or need clarification, please contact me, phone number 573-751-3195. My address for correspondence is Department of Natural Resources, P.O. Box 176, Jefferson City, MO 65102. Thank you.

Sincerely,

DEPARTMENT OF NATURAL RESOURCES

Jane Beetem

Jane Beetem
NEPA Review Coordinator

JB:jm

CULTURAL RESOURCE ASSESSMENT
Section 106 Review

CONTACT PERSON/ADDRESS

Ron Granger
Crowder College
601 Laclede Avenue
Neosho, Missouri 64850

C:

F.G. Gosling, USDOE

PROJECT:

MARET Center, Crowder College, 601 Laclede Avenue, Neosho

FEDERAL AGENCY

USDOE

COUNTY:

NEWTON

The State Historic Preservation Office has reviewed the information submitted on the above referenced project. Based on this review, we have made the following determination:

☐ After review of initial submission, the project area has a low potential for the occurrence of cultural resources. A cultural resource survey, therefore, is not warranted.

☒ Adequate documentation has been provided (36 CFR Section 800.11). There will be "no historic properties affected" by the current project.

☐ An adequate cultural resource survey of the project area has been previously conducted. It has been determined that for the proposed undertaking there will be "no historic properties affected".

For the above checked reason, the State Historic Preservation Office has no objection to the initiation of project activities. PLEASE BE ADVISED THAT, IF THE CURRENT PROJECT AREA OR SCOPE OF WORK ARE CHANGED, A BORROW AREA IS INCLUDED IN THE PROJECT, OR CULTURAL MATERIALS ARE ENCOUNTERED DURING CONSTRUCTION, APPROPRIATE INFORMATION MUST BE PROVIDED TO THIS OFFICE FOR FURTHER REVIEW AND COMMENT. Please retain this documentation as evidence of compliance with Section 106 of the National Historic Preservation Act, as amended.

By: Mark A. Miles — September 10, 2009

Mark A. Miles, Deputy State Historic Preservation Officer — Date

MISSOURI DEPARTMENT OF NATURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE
P.O. Box 176, Jefferson City, Missouri 65102

For additional information, please contact Judith Deel, (573) 751-7862. Please be sure to refer to the project number:
032-NE-09

MISSOURI DEPARTMENT OF NATURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE

SECTION 106 PROJECT INFORMATION FORM

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NOTE: Section 106 regulations provide for a 30-day response time by the Missouri State Historic Preservation Office from the date of receipt.

PROJECT NAME
MARET Center

FEDERAL AGENCY PROVIDING FUNDS, LICENSE, OR PERMIT
Department of Energy

APPLICANT	TELEPHONE
Crowder College	417-451-3223
CONTACT PERSON	TELEPHONE
Ron Granger	417-455-5538

ADDRESS FOR RESPONSE
601 Laclede Avenue
Neosho, MO 64850

LOCATION OF PROJECT

COUNTY
Newton

STREET ADDRESS	CITY
601 Laclede Avenue	Neosho

LEGAL DESCRIPTION OF PROJECT AREA (TOWNSHIP, RANGE, SECTION, ¼ SECTION)

USGS TOPOGRAPHIC MAP QUADRANGLE NAME (SEE MAP REQUIREMENTS ON PAGE 2)
Neosho East Quadrangle

YEAR	TOWNSHIP	RANGE	SECTION
1972	24 N	32 W	15

PROJECT DESCRIPTION

DESCRIBE THE OVERALL PROJECT IN DETAIL. IF IT INVOLVES EXCAVATION, INDICATE HOW WIDE, HOW DEEP, ETC. IF THE PROJECT INVOLVES DEMOLITION OF EXISTING BUILDINGS, MAKE THAT CLEAR. IF THE PROJECT INVOLVES REHABILITATION, DESCRIBE THE PROPOSED WORK IN DETAIL. USE ADDITIONAL PAGES IF NECESSARY.

The project is a new building that will house our alternative energy programs and will be used as an incubator for local businesses. The total building size will be 27,000 square feet. Excavation will be done for the footings of the building. The building will be a one story building and will be approximately 150 feet by 180 feet. The excavation will be for footings only and will be mean the removal of between 300 and 400 cubic yards or dirt. Since this is in a location with no existing buildings, demolition and rehabilitation will not be a part of the project.

ARCHAEOLOGY (EARTHMOVING ACTIVITIES)

HAS THE GROUND INVOLVED BEEN GRADED, BUILT ON, BORROWED, OR OTHERWISE DISTURBED? PLEASE DESCRIBE IN DETAIL (USE ADDITIONAL PAGES, IF NECESSARY) PHOTOGRAPHS ARE HELPFUL: None

WILL THE PROJECT REQUIRE FILL MATERIAL? ☐ YES ☒ NO

IF YES, INDICATE PROPOSED BORROW AREAS (SOURCE OF FILL MATERIAL) ON TOPOGRAPHIC MAP

ARE YOU AWARE OF ARCHAEOLOGICAL SITES ON OR ADJACENT TO PROJECT AREA? ☐ YES ☒ NO

IF YES, IDENTIFY THEM ON THE TOPOGRAPHIC MAP

STRUCTURES (REHABILITATION, DEMOLOTION, ADDITIONS TO, OR CONTRUCTION NEAR EXISTING STRUCTURES)

TO THE BEST OF YOUR KNOWLEDGE, IS THE STRUCTURE LOCATED IN ANY OF THE FOLLOWING?

☐ AN AREA PREVIOUSLY SURVEYED FOR HISTORIC PROPERTIES.	☐ A NATIONAL REGISTER DISTRICT	☐ A LOCAL HISTORIC DISTRICT
IF YES, PLEASE PROVIDE THE NAME OF THE SURVEY OR DISTRICT:	IF YES, PLEASE PROVIDE THE NAME OF THE SURVEY OR DISTRICT:	IF YES, PLEASE PROVIDE THE NAME OF THE SURVEY OR DISTRICT:

- PLEASE PROVIDE PHOTOGRAPHS OF ALL STRUCTURES, SEE PHOTOGRAPHY REQUIREMENTS
- NOTE: ALL PHOTOGRAPHS SHOULD BE LABELED AND KEYED TO ONE MAP OF THE PROJECT AREA
- PLEASE PROVIDE A BRIEF HISTORY OF THE BUILDING(S), INCLUDING CONSTRUCTION DATES AND BUILDING USES. (USE ADDITONAL PAGES, IF NECESSARY.)

ADDITIONAL REQUIREMENTS

Map Requirements: Attach a copy of the relevant portion (8 ½ x 11) of the current USGS 7.5 min. topographic map and, if necessary, a large scale project map. Please do not send an individual map with each structure or site. While an original map is preferable, a good copy is acceptable. For a list of sites from which to order, download or print the required USGS 7.5 min. topographic maps at little or no cost, consult http://dnr.mo.gov/shpo/sectionrev.htm .

Photography Requirements: Clear black and white or color photographs (minimum 3" x 5") are acceptable. Polariods, photocopies, emailed or faxed photographs are not acceptable. **Good quality photographs are important for expeditious project review.** Photographs of neighboring or nearby buildings are also helpful. All photographs should be labeled and keyed to one map of the project area.

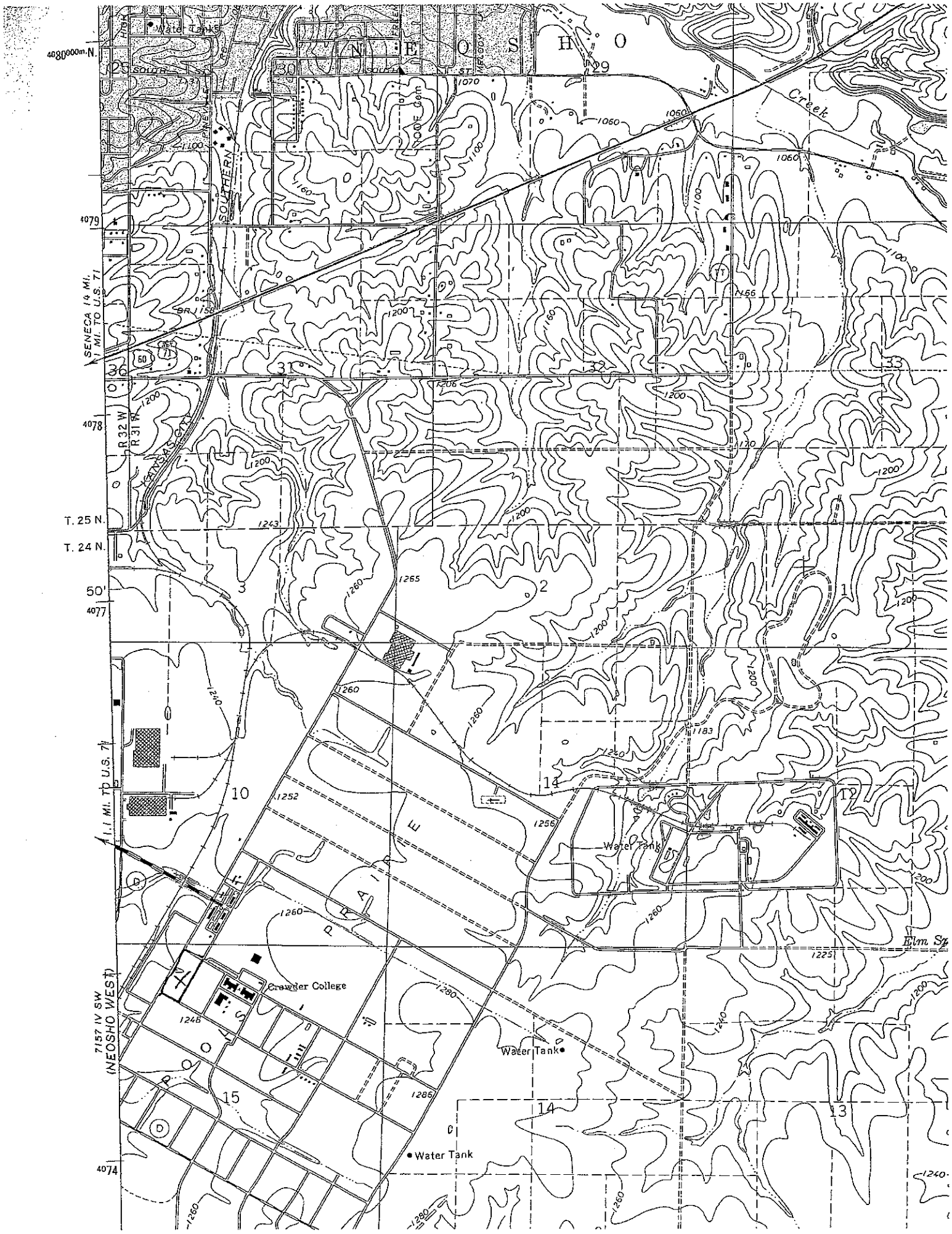
CHECKLIST-DID YOU PROVIDE THE FOLLOWING INFORMATION?

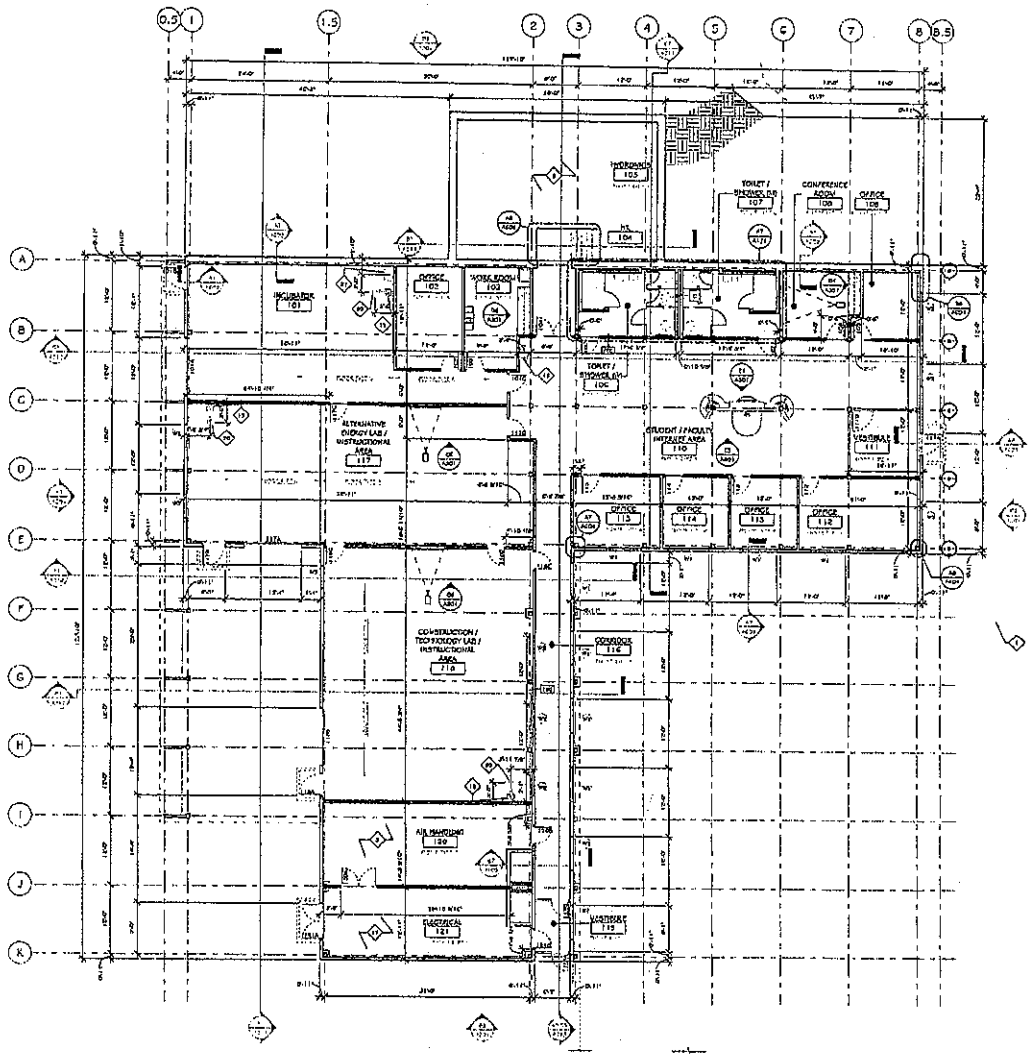
☒ Topographic map 7.5 min. (per project, not structure)	☒ Other supporting documents (If necessary to explain the project)
☒ Thorough description (all projects)	☒ For new construction, rehabilitations, etc., attach work write-ups, plans, drawings, etc.
☒ Photographs (all structures)	☒ Is topographic map identified by quadrangle and year?

Return this Form and Attachments to:

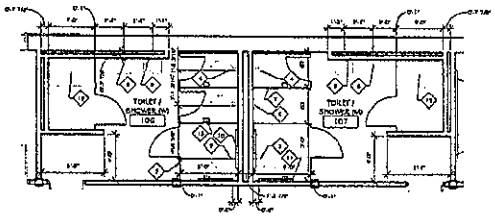
MISSOUR DEPARTMENT OF NATURAL RESOURCES
STATE HISTORIC PRESERVATION OFFICE
Attn: Section 106 Review
P.O. BOX 176
JEFFERSON CITY, MISSOURI 65102-0176

780-1027(08-09)


4080000m.N.
Water Tanks
NEOSHO
SOUTHERN
Creek
SENECA 14 MI.
1 MI. TO U.S. 71
BR 158
KANSAS CITY
R 32 W
R 31 W
T. 25 N.
T. 24 N.
4079
4078
4077
4074
1.1 MI. TO U.S. 71
7157 IV SW
(NEOSHO WEST)
Crowder College
Water Tank
Water Tank
Water Tank
Elm St.



FLOOR PLAN



A2 ENLARGED FLOOR PLAN

NOTES

A. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND NOTIFY ARCHITECT OF ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF ANY WORK.

B. REFER TO STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND FIRE PROTECTION DRAWINGS FOR ADDITIONAL INFORMATION AND RELATED WORK.

C. FINISH FLOOR ELEVATION = 100'-0" (=348.0'-0") UNO.

D. FOR SUB-FLOOR PLAN REF A132.

E. EXTERIOR DIMENSION ARE TO FACE OF BRICK.

F. DOOR OPENINGS SHALL START 4" FROM ADJACENT PERPENDICULAR WALL, UNO.

G. INTERIOR PARTITIONS SHALL BE PARTITION TYPE (A) UNO. PROVIDE FULL WALL HEIGHT CORNER GUARD AT INTERIOR CORNERS.

H. EXTERIOR WINDOW TYPES SHALL BE WINDOW TYPE (W1) UNO.

I. PROVIDE SEALANT AT INTERSECTION OF GYPSUM BOARD WALLS, PRE-MANUFACTURED WALL SYSTEMS AND BLOCK WALLS.

KEYED NOTES

1. FUTURE PHASE II.
2. FOR MECH. HOUSEKEEPING PAD LOCATION + DEPTH AND DIMENSIONS REF M120.
3. FOR AIR HANDLING UNIT LOCATION, DEPTH AND DIMENSIONS REF M602.
4. FLOOR MOUNTED TOILET FIXTURE, TYP. REF P201.
5. FLOOR MOUNTED ACCESSIBLE TOILET FIXTURE, REF P201.
6. WALL MOUNTED URINAL, REF P201.
7. TOILET PARTITION, TYP.
8. WALL MOUNTED SINK, TYP. REF P201.
9. MIRROR, TYP., SET TOP OF UNIT AT 74" AFF.
10. 36" GRAB BAR, TYP. SET CENTERLINE OF UNIT AT 36" AFF.
11. 42" GRAB BAR, TYP. SET CENTERLINE OF UNIT AT 42" AFF.
12. SHOWER.
13. TOILET PAPER DISPENSER, TYP.
14. SANITARY NAPKIN DISPOSAL, TYP., MOUNTED AT 11'-4" AFF.
15. ELECTRIC WATER COOLER, REF P201.
16. 30LB RECESSED FIRE EXTINGUISHER CABINET, RE:105A00.
17. FOR ELEC. HOUSEKEEPING PAD LOCATIONS, DEPTH AND DIMENSIONS REF E401.
18. ACCESS FLOOR DOOR, REF 105A00.
19. SAFETY SHOWER, REF P200.
20. FLOOR DRAIN REF P200.
21. UTILITY SINK, REF P200.

FIRE PROTECTION LEGEND:

- ONE HOUR FIRE RATING
- TWO HOUR FIRE RATING
- EXISTING ONE HOUR FIRE RATING
- EXISTING TWO HOUR FIRE RATING
- FEC — FIRE EXTINGUISHER CABINET

FLOOR TYPE LEGEND

FLOOR TYPE A:
SUB FLOOR - RAISED FLOORING SYSTEM ABOVE
6'-0" BELOW FINISH FLOOR (EL. 99'-0")

FLOOR TYPE B:
SLAB ON GRADE
6'-0" BELOW FINISH FLOOR (EL. 99'-0")

FLOOR TYPE C:
SLAB ON GRADE
FINISH FLOOR (EL. 100'-0")

MARKET CENTER
CROWDER COLLEGE
NEOSHO, MO

ISSUE DATE
2009.09.09

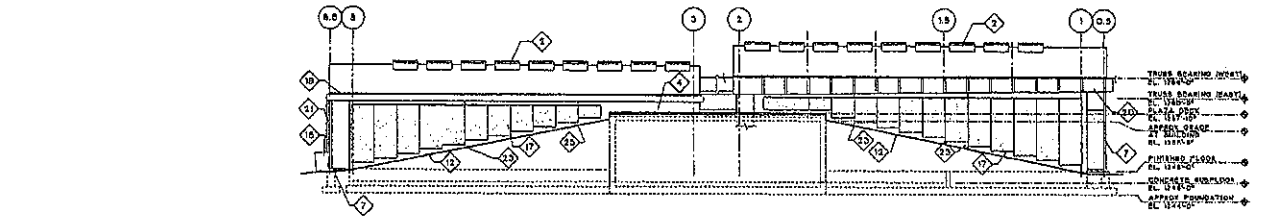
FLOOR PLAN
SCALE: 1/8" = 1'-0"
JOB NUMBER: 0804

STRUCTURAL: BWC, INC.
MEP: TME, INC.
CIVIL: OLSSON ASSOCIATES
SURVEYOR: ALLEGIS-MARTIN & ASSOCIATES

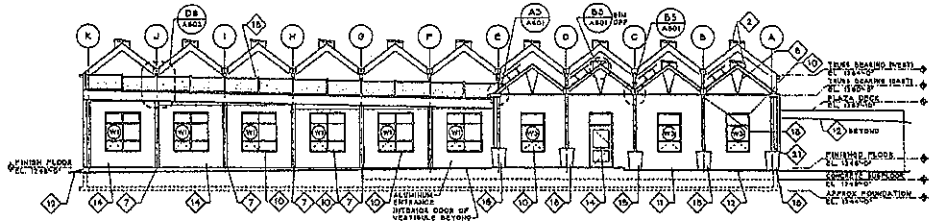
KROMM RIKIMARU AND JOHANSEN INC.
INTERIORS
ARCHITECTS
PLANNERS
5214 GLADE BOULEVARD
ST. LOUIS, MISSOURI 63132

SHEET NUMBER
A131

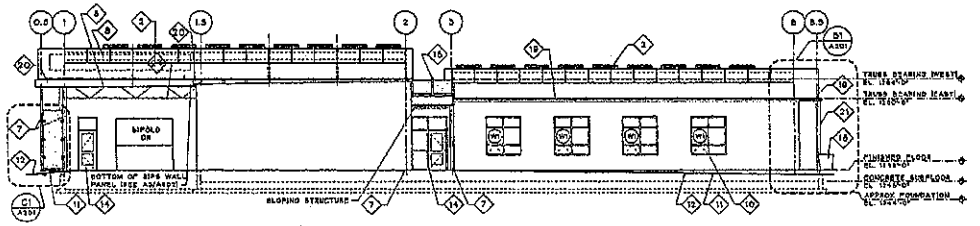
NOT FOR CONSTRUCTION



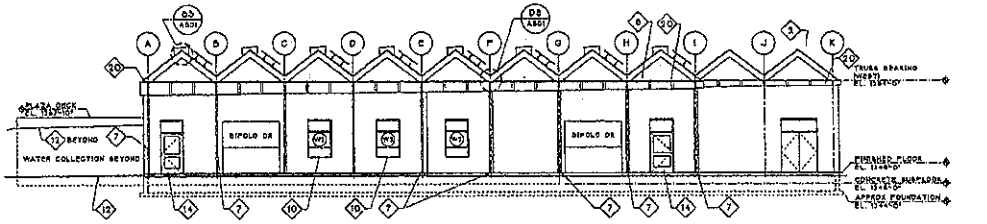
D3 A201 NORTH ELEVATION



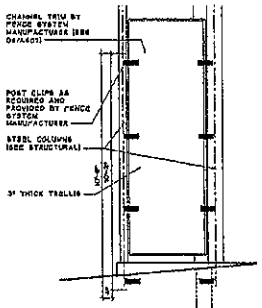
C3 A201 EAST ELEVATION



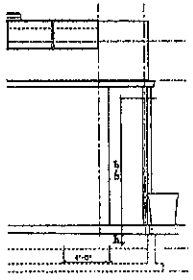
C2 A201 SOUTH ELEVATION



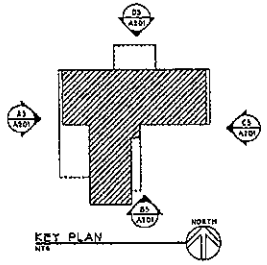
A3 A201 WEST ELEVATION



C1 A201 TYPICAL GREEN SCREEN LAYOUT ELEVATION



D1 A201 TYPICAL METAL PANEL LAYOUT



KEY PLAN

NOTES
SHEETS A211, A213

A. FIELD VERIFY DIMENSIONS SHOWN AS ±
B. REFERENCE STRUCTURAL DRAWINGS FOR ADDITIONAL INFORMATION AND RELATED WORK

KEYED NOTES
SHEETS A211 AND A2201

1. RADIANT PANELS
2. SKYLIGHT
3. ACCESS FLOOR
4. PLAZA DECK
5. EXPOSED JOIST
6. EXPOSED TRUSS
7. EXPOSED COLUMN
8. SOLAR PANELS (COORDINATE PIPING)
9. ROUGH OPENING SIZED AS SHOWN
10. ALUMINUM FRAME WINDOW UNIT
11. COATING AT EXPOSED FOUNDATION
12. APPROXIMATE FINISH GRADE
13. FUTURE EXTERIOR LIGHT SHELF
14. EXTERIOR DOOR AND ALUMINUM FRAME
15. CISTERN RAIN BARREL
16. 3" THICK TRELLIS GUARDRAIL (FENCE)
17. 3" THICK TRELLIS WALL SCREEN
18. METAL CONDUCTOR HEAD
19. METAL GUTTER, DRAIN TO RAIN BARREL
20. METAL RAIN WATER AQUEDUCT
21. METAL DOWNSPOUT
22. MEMBRANE ROOFING SYSTEM
23. COATING CONTROL JOINT
24. JOIST BRIDGING (TOP AND BOTTOM CHORDS)
25. SOLAR PANEL SUPPORT SUBSTRUCTURE OR EQUAL)
26. STRUCTURAL FRAMING BEYOND
27. LIGHT FIXTURE
28. BIFOLD DOOR (SEE A6201 DOOR TYPES)
29. PLAZA DECK EDGE TREATMENT
30. CASEWORK
31. CRICKET
32. RADIANT CONCRETE FLOOR

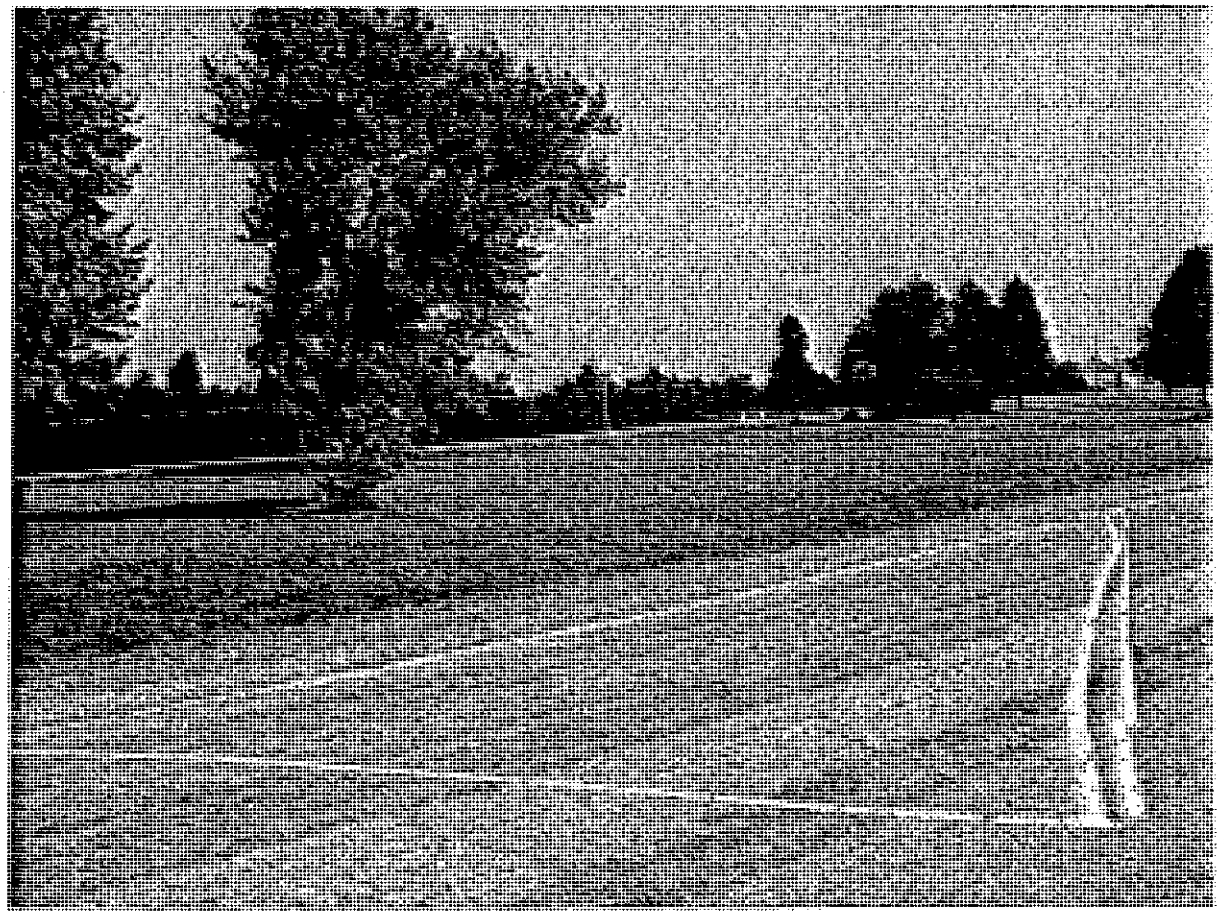
MARKET CENTER
CROWDER COLLEGE
NEOSHO MISSOURI

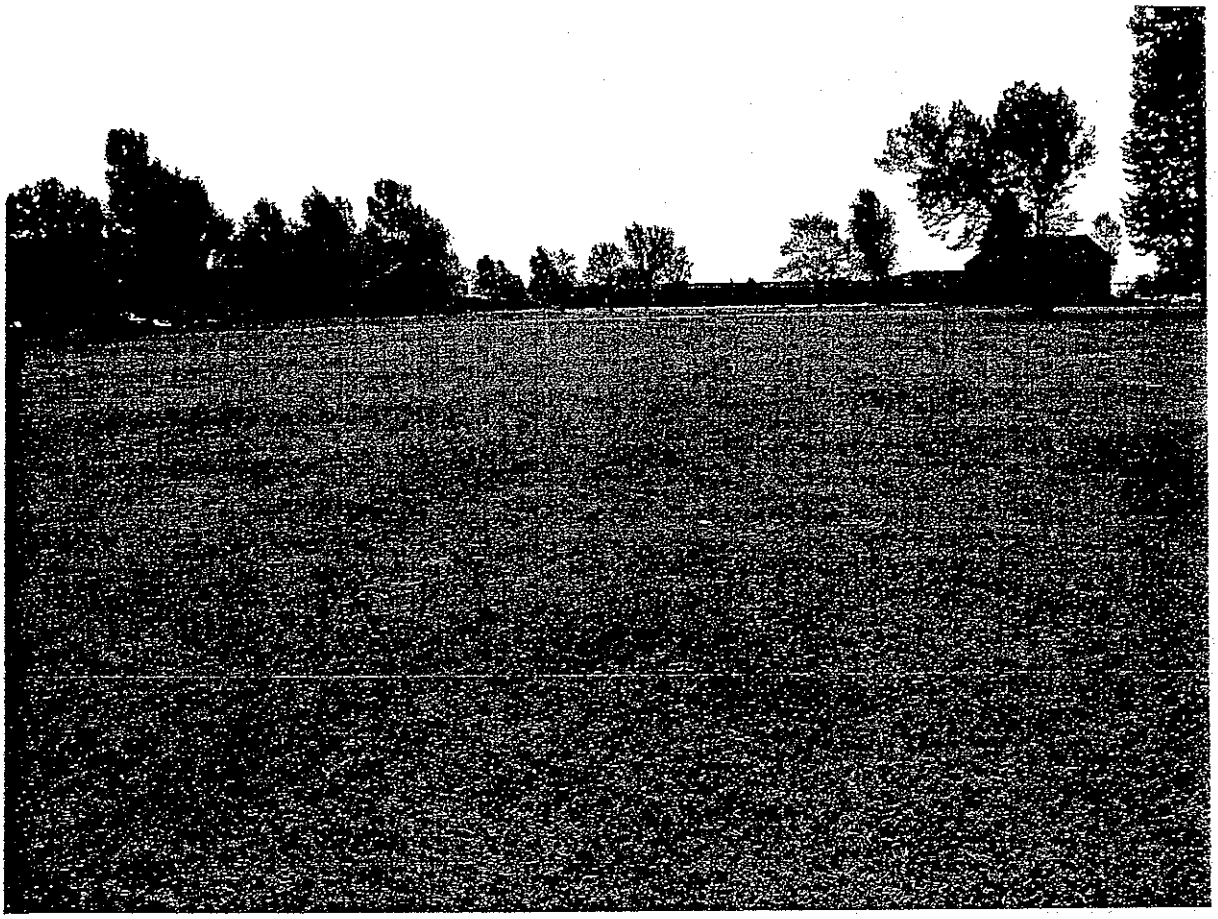
KROMM RIKIMARU AND JOHANSEN INC.
INTERIORS
ARCHITECTS PLANNERS
9274 OLIVE BOULEVARD ST. LOUIS, MISSOURI 63132

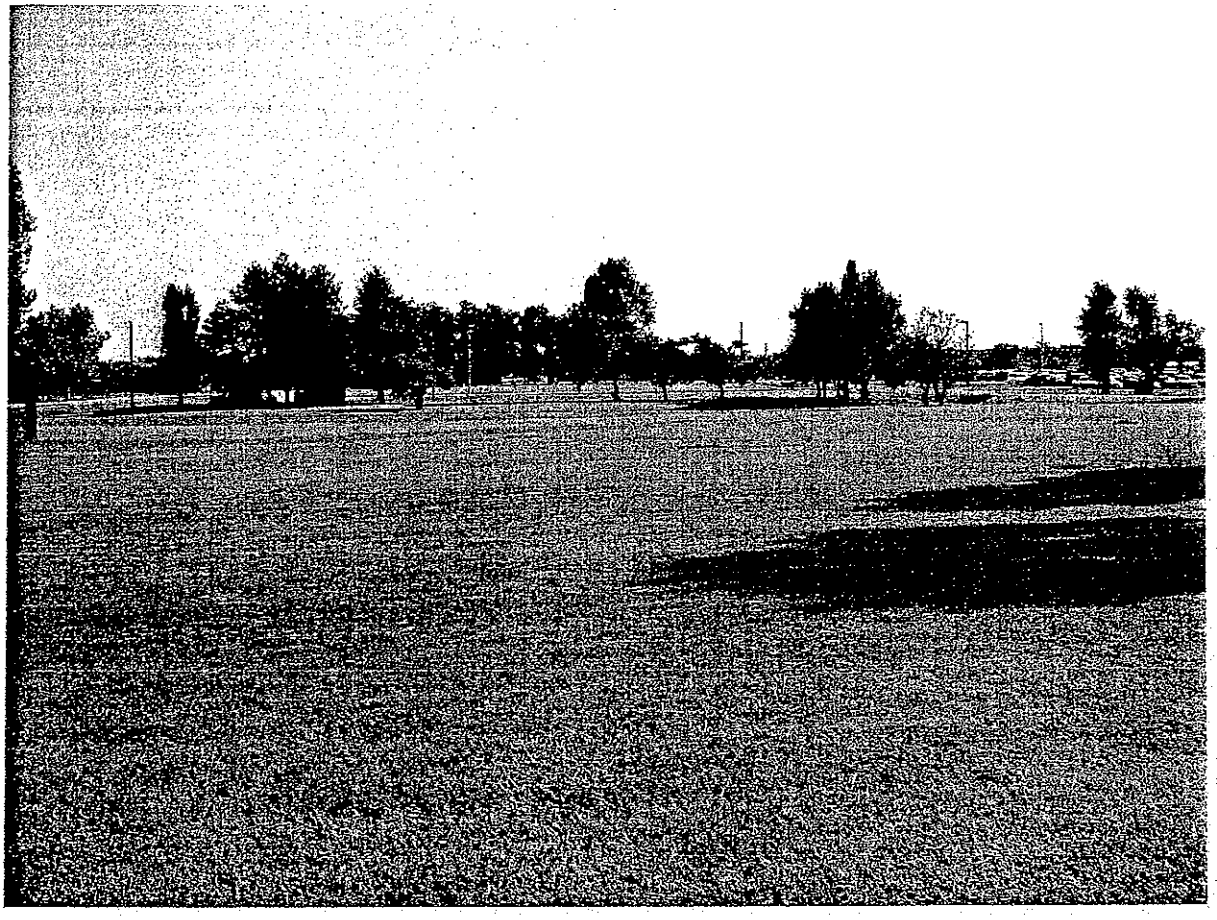
EXTERIOR ELEVATIONS
WINDOW TYPES
SCALE: 1/4" = 1'-0" NOTED
JOB NUMBER: 0204
STRUCTURAL: SSE, INC.
MEP: TMC, INC.
CIVIL: TERRAFIRMA ENGINEERING, INC.
SURVEYOR: ALDERMARTIN & ASSOCIATES

SHEET NUMBER
A201

PLOTTED
2008-07-10







STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Mark N. Templeton, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

August 20, 2010

Department of Energy
Golden Field Office
Attn: Laura Margason
1617 Cole Blvd.
Golden, CO 80401

Re: Environmental Assessment for the MARET Center at Crowder College, Neosho, Missouri

Dear Ms. Margason:

The Missouri Department of Natural Resources (Department) appreciates the opportunity to review the Environmental Assessment (EA) for the MARET Center at Crowder College in Neosho, Missouri. The Department offers the following comments for consideration.

Hazardous Waste

As noted in the earlier draft EA, a 1,000 gallon underground storage tank was removed in August 1989. Although a closure notice was submitted for the tank, no actual data has been submitted to verify that the tank was closed properly. The Department last requested this information in December 1996.

In Section 3.2.2.1, "Proposed Actions" on page 28, the document indicates that geothermal holes will be grouted with standard bentonite grout. The current regulations that deal with closed-loop systems (10 CSR 23-5) do not require full-length bentonite grout but rather allow for alternating use of sand and bentonite grout. This is due to the fact that the use of bentonite grout alone impedes the exchange of heat between the surrounding geological formations and the heat exchange loops. If full-length bentonite grout is used as indicated, the system must be adequately designed to compensate for the reduction in heat exchange capacity. Also, the regulations limit well depth for closed-loop geothermal systems to 200 feet without obtaining a variance from the Department's Wellhead Protection Section.

A related issue is found on page 31 of the document, in the next to last paragraph. Although a closed-loop geothermal system does not require a permit from the Department's Water Pollution Control Program, its construction must follow 10 CSR 23-5 of the Missouri Well Construction Rules, its construction must be reported to the Department's Wellhead Protection Section, and the associated certification fees must be paid.

The Former Fort Crowder Chemical Warfare Materiel Site is located approximately 1,000 feet south of the proposed MARET location. This site of approximately 58 acres includes two adjacent areas, the No. 110 Gas Chambers Area and the area around the former pistol ranges. Chemical warfare training included field exercises where soldiers were exposed to chemical agents in settings that simulated battlefield conditions. Chemical agent identification sets (CAIS) were used in chemical warfare training. CAIS were expendable training aids produced for use by all branches of the military to train soldiers in the safe identification, handling, and decontamination of chemical agents and industrial chemicals used in chemical warfare. CAIS consist of small glass containers filled with various chemical agents, which were packed in metal shipping containers or wooden boxes. At Fort Crowder, chemical training materials, munitions, and explosive simulators were stored in quonset huts and igloos located in the vicinity of the Chemical Exercise Area. After World War II, these buildings were declared surplus and sold. Reportedly, the work crews removing the igloos took anything found in the structures, dumped it out nearby, and buried it. A proposed plan to address environmental issues at this site is in development by the U.S. Army Corps of Engineers.

The Engine Test Area, a contributor to the Pools Prairie National Priorities List site, is located over a mile to the east of the proposed MARET Center location. Soil and groundwater are contaminated primarily with chlorinated solvents, such as trichloroethylene (TCE). TCE has also been documented off-site in a number of private wells. A remedial investigation is currently being planned by the Department's Federal Facilities Section of the Hazardous Waste Program to assess the nature and extent of groundwater contamination.

The Department's Superfund Section of the Hazardous Waste Program has identified one site within the half mile boundary of the proposed project; Neosho Digester and Trenches, illustrated in an attached graphic. The Neosho Digester and Trenches site is located southwest of the proposed facility. The site is the location of an abandoned digester formerly utilized for wastewater treatment. Contaminated wastewater generated from Northeastern Pharmaceutical & Chemical Company (NEPACCO) in Verona, Missouri was dumped into the digester for treatability studies, contaminating the digester. Spillage also occurred, contaminating surrounding soils. The site was placed on the State Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in 1984. EPA sampling of the digester indicated dioxin at concentrations of up to 60 parts per billion (ppb) and trichlorophenol at concentrations of up to 2,500,000 ppb. In addition, there are three more Superfund projects located near the half-mile buffer of the site. All three projects are related to the Pools Prairie Site.

Air Quality

National Ambient Air Quality Standards

The project is located in an area that currently meets all National Ambient Air Quality Standards. The construction-related activities associated with this project should not significantly affect local or regional air quality. It is important to note that while the project area is currently in attainment for the 2008 ozone standard, the Environmental Protection Agency is in the process of reconsidering the ozone standard. Depending on the project timeline, the reconsidered ozone standard could potentially affect the project area's attainment status.

Asbestos

While the proposed project does not include the razing of any structures, if the project includes digging into buried building materials (i.e. where the Red Cross Building was located from 1945-1952), an asbestos inspection is required. Any such activities undertaken as part of this project must be conducted in accordance with local, state and federal asbestos regulations (40 CFR Part 61, subpart M and state regulations 10 CSR 10-6.241 and 10-6.250). These regulations require that prior to renovation or demolition; all regulated structures must be inspected by a Missouri certified asbestos inspector.

If during the course of the asbestos inspection, it is determined that the total amount of asbestos containing material (both friable asbestos containing material and asbestos containing material that would be rendered friable during the course of the renovation or demolition) exceeds 160 square feet, 260 linear feet, or 35 cubic feet, then the asbestos would have to be removed by a Missouri registered asbestos abatement contractor and disposed of in accordance with the National Emissions Standards for Hazardous Air Pollutants. If there are less than these threshold amounts, then the material would not have to be removed prior to renovation or demolition. However, if materials are contaminated with asbestos, regardless of the amount, the sanitary landfill may have special packaging requirements for disposal.

Notice of an asbestos abatement project above the threshold limits stated above and all demolition projects, regardless of whether asbestos is present, affecting regulated structures must be provided to the Missouri Department of Natural Resources' Air Pollution Control Program on the Department's form at least 10 days prior to commencement of the asbestos abatement or demolition project and approval must be granted by the Department.

Open burning

State regulation 10 CSR 10-6.045 prohibits the open burning of tires, petroleum-based products, asbestos containing materials, and trade wastes except as otherwise allowed by the rule. Open burning that causes or contributes to a public health hazard, nuisance, or a hazard to vehicular or air traffic is not allowed.

State regulation 10 CSR 10-6.045 only allows for open burning of vegetative debris from land clearing operations outside the city limits of an incorporated area or municipality and outside of the Kansas City, St. Louis and Springfield Metropolitan Areas and at a distance of more than 200 yards from the nearest inhabited dwelling. For open burning of vegetative waste that does not meet these restrictions, the Department's Southwest Regional Office must be notified to determine if a permit to allow the burning can be issued. Their phone number is 417-891-4300.

Fugitive Dust

State regulation 10 CSR 10-6.170 restricts particulate matter emissions from leaving the premises of origin. Efforts must be made to prevent any fugitive dust that may result from any construction or demolition activities associated with this project from leaving the property where it originated.

Solid Waste Management

Any contracts necessary as part of the proposed project should include requirements for the proper disposal of solid waste, and to maintain disposal/recycling receipts as a means of demonstrating compliance with the Missouri Solid Waste Management Law and regulations. Additionally, the contracts should reference the Department's technical bulletin "Managing Solid Waste Encountered during Excavation Activities" as a means of demonstrating how they will comply with discovery of unexpected buried wastes during utility line installation and other soil disturbing activities. The bulletin is PUB2192, dated 12/2006 and can be found on the Department's web site at http://www.dnr.mo.gov/pubs/pub2192.pdf. This bulletin should be shared with contractors working at the site. The contracts should further reflect that all demolition and construction activities will be executed in a manner that ensures that solid wastes are recycled, reused or properly disposed of in compliance with the Missouri Solid Waste Management Law and regulations.

The project area is near the closed Newton/McDonald Counties Landfill, which is located next to the National Guard training ground. Since this closed landfill is located a few miles from the proposed project area, the project should not affect the landfill nor be affected by the landfill. Contractors should be made aware that the disturbance of a landfill or pre-law dump requires notice to and approval from the Department's Solid Waste Management Program prior disturbing the buried waste (with a 16 acre development, it is possible that they could unearth an old pre-law dump). Any questions relating to the proper management of solid waste or concerning permitting should be directed to the Department's Solid Waste Management Program at (573) 751-5401.

Additional fact sheets concerning the proper management of construction wastes can be found on the Department's website at the addresses listed below.

Construction and Demolition Waste Guidance
http://www.dnr.mo.gov/pubs/pub2242.pdf

Managing Construction and Demolition Waste
http://www.dnr.mo.gov/pubs/pub2045.pdf

Managing Recovered Materials
http://www.dnr.mo.gov/pubs/pub2049.pdf

Geology

The karst conditions in the proposed project area can have a dramatic effect on the spread of contaminants, and prior studies conducted within the area would be valuable in understanding the risk that karst conditions pose.

In Section 3.2.1.1, the second paragraph refers to the weathered bedrock overlying competent bedrock as limestone residue. The technical term would be residuum.

In Section 3.2.1.1, the third paragraph refers to the competent bedrock as Mississippian in origin of limestone, shale, and sandstone, and that the two primary rock types are chert containing limestone and shale. A better description can be obtained from a test hole near the Rocketdyne Test Area (WB-03A) which indicates that the first competent bedrock encountered appears to be a limestone of the Warsaw Formation (Site Investigation, Former Air Force Plant #65, Rocketdyne Test Site, Neosho, Missouri, December 1993). Other well logs in the area indicate that the first competent bedrock is the Warsaw Formation, Keokuk-Burlington Limestone, or the Elsey Formation. A good description of southwestern bedrock may be found in The Stratigraphic Succession In Missouri, Volume 40 by Thomas L. Thompson, Department of Natural Resources, Division of Geology and Land Survey.

The EA's Section 3.2.1.1, in the fifth paragraph, indicates that there are karst features in the project area, and that these features were not encountered 300 yards to the northeast during the installation of groundwater wells. Dye traces have been conducted in this area by the Department's Division of Geology and Land Survey and by a contractor for the Components Test Area of the nearby Superfund Site (Newton County Pools Prairie Groundwater Tracing Study, February 2000).

We appreciate the opportunity to provide comments for the Environmental Assessment for the MARET Center at Crowder College, Neosho, Missouri. If you have any questions or need further clarification, please contact me or Ms. Jane Beetem, phone number (573) 751-3195. The address for correspondence is Department of Natural Resources, P.O. Box 176, Jefferson City, MO 65102. Thank you.

Sincerely,

DEPARTMENT OF NATURAL RESOURCES

Robert D. Stout
Senior Policy Coordinator

/jb

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Columbia Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-0057
Phone: (573) 234-2132 Fax: (573) 234-2181

August 20, 2010

Laura Magnuson
DOE Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401

Dear Ms. Magnuson:

The U.S. Fish and Wildlife Service (Service) has reviewed information in the MARET Center Construction Project draft Environmental Assessment to be located at the Crowder College campus in the City of Neosho, Newton County, Missouri. We have previously communicated with Ms. Robin Griffin of PHE pertaining to this project. The following comments are provided under the authority of the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347), and the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1544).

Our records indicate the MARET facility is within the range of the federally threatened Ozark Cavefish (*Amblyopsis rosae*). The MARET facility is proposed to be placed on the recharge area which provides suitable groundwater habitat for this species. Based on information that has been provided regarding the lack of toxicity of the heat pump solution, the Service does not believe this will negatively affect sensitive underground species in the event of a leak in the system. However, both the thermal impact from the pipes of this facility and grout escaping into the underground shallow aquifer has the potential to adversely affect the Ozark Cavefish.

In accordance with section 7(a)(2) of the Endangered Species Act and the Interagency Consultation Regulations at 50 CFR, Part 402, it is the responsibility of the federal action agency (i.e., Department of Energy) to assess and determine the effects of its proposed actions on federally listed species (i.e., Ozark Cavefish). Normally, federal agencies document the rationale for its determination by completing a Biological Assessment. Enclosed for your information is a document entitled "Guidance for Preparing a Biological Assessment". We will provide you assistance throughout this assessment and determination process. The Department of Energy will provide its completed Biological Assessment to us for review. If you determine that the proposed action is likely to adversely affect the Ozark Cavefish and the Service concurs with this determination, the

Department of Energy is required under section 7(a)(2) to initiate formal consultation with the Service. At the end of the formal consultation, the Service will issue the Department of Energy a biological opinion whether the proposed action does or does not jeopardize the continued existence of the Ozark Cavefish and provide measures to minimize any adverse affects.

The first step in this risk assessment process is to determine the extent that Ozark Cavefish use suitable habitat under the proposed facility. The Ozark Cavefish is a difficult species to monitor, given its nearly inaccessible habitat. However, a Missouri Department of Conservation (MDC) cavefish researcher is located in Neosho that has been monitoring cavefish with small submersible camera equipment. Blake Stephens (MDC) can be contacted at 417 451-4158 to provide advice on monitoring this species.

Please contact Scott Hamilton at (573) 234-2132, ext. 122 to discuss this issue in more detail.

Sincerely,

Charles M. Scott
Field Supervisor

Enclosure

Cc: Doug Novinger, MDC Resource Science
Rick Horton, MDC Neosho Field Office
Robin Griffin, PHE

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Guidance for Preparing a Biological Assessment

The purpose for this guidance is to assist project proponents in documenting their analyses for actions that may affect listed species. Federal agencies are required to determine whether their actions may affect listed or proposed species and designated and proposed critical habitat (henceforth, referred to as protected resources). Once a "may affect" determination is made, the Federal agency must either request our concurrence with a "may affect, but not likely to adversely affect" finding or request initiation of formal consultation[1]. Both require a written analysis to be submitted to us. This analysis is typically transmitted in a document referred to as a Biological Assessment or Biological Evaluation. The former is defined in regulation and is required under specific circumstances[2]. The latter is a generic term used to document analyses and Section 7 determinations when a Biological Assessment is not required. Both documents are for the same purpose[3], and hence for this guidance, we will use only the term Biological Assessment.

Biological Assessments (BA) may serve multiple purposes, but the primary role is to document an agency's analyses and conclusions regarding the effects of their proposed actions on protected resources. Although there are no statutory or regulatory mandated contents for a BA, recommended elements are identified at 50 CFR §402.12(f). The bulleted list below highlights the elements that are essential for our review of your project.

- Project description - Describe the what, when, where, and how of the project. If it is multi-phased, describe the what, when, where and how of each phased separately. Explain the tools and methods that will be used. Identify conservation measures that will be implemented to avoid, reduce, or eliminate adverse effects or enhance beneficial effects to the listed species.

- Describe the project area - For determining whether a species or critical habitat "may be present," it is necessary to delineate the "action area." Action area is defined as all areas that may be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. It is encompasses the geographic extent of environmental changes

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1 Per regulations (50 CFR 402.14), Federal agencies must submit an initiation package before formal consultation may begin. The required contents of the package are identified in the regulations. With exception of a cumulative effects analysis and a catch-all of any other relevant information, the required information for an initiation package is the same as the information we recommend submitting with a BA.

2 Biological Assessments (BA) are only required for "major construction activities," which are Federal actions that may significantly affect the quality of the human environment as referred to in the National Environmental Policy Act of 1969. The purpose of a biological assessment is to evaluate the potential effects of the action on listed and proposed species and designated and proposed critical habitat and determine whether any such species or habitat are likely to be adversely affected by the action.

3 Agencies are required to review all their actions—not just those that qualify as a "major construction .ctivity." This review entails assessing and documenting the effects of their action on protected resources. Whether an action qualifies as a "major construction activity" has no influence on how an agency should analyze its action or document its section 7 review. Hence, the purpose and contents of a Biological Assessment and a Biological Evaluation should be the same.

(i.e., the physical, chemical and biotic effects) that will result directly and indirectly from the action. Action area is typically larger than the footprint of the action.

Describe the physical and biological attributes of the action area (e.g., topography, vegetation, condition and trend). It is helpful to include a map delineating where the action will occur. Also, identify any management or activities already occurring in the area.

- Identify protected resources that "may be present" - List all species that "may be present" in the area and where you obtain this information. If you determined that a particular species is not present, it is helpful to identify that species and an explanation of why. This serves two purposes. First, it will provide documentation for your administrative record. Second, it will avoid need for additional correspondence with us. If a species is missing from the list, we will either ask you for an explanation of why such species is not present in the action area or provide the information to you. For additional guidance in determining whether a protected resource "may be present," see our Section 7(a)(2) Process (Step 1) website.

  For each species that "may be present," describe the current habitat conditions within the action area. If known, include population status and trend. For critical habitat, identify the primary constituent elements that occur in the action area.

- Describe how the action may affect each protected resource - This section should document your conclusion and supporting rationale. This entails documenting your analysis of what listed species or critical habitat will be exposed to and how such individuals or habitat are likely to respond to this exposure. If species experts were contacted, include a summary of the conversations/conclusions reached. Include the references for the literature upon which your analysis relied on.

  Following this analysis, you need to make a Section 7 finding for each affected protected resource. Generally, one of the following three determinations will apply[4]. Your section 7 conclusion should be explicit and clear. For additional guidance in making a Section 7 determination, please see our Section 7(a)(2) Process (Steps 1-3) website.

  a) "No effect" means there will be no impacts, positive or negative, to listed or proposed resources. Generally, this means no listed resources will be exposed to action and its environmental consequences. Concurrence from the Service is not required.

  b) "May affect, but not likely to adversely affect" means that all effects are beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects

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4 Formal Consultation is triggered if an action is likely to "adversely affect" listed species and designated critical habitat. For proposed species, further consultation is required only if the action is likely to "jeopardize the continued existence" of the species or result in "destruction or adverse modification" of critical habitat. To appropriately apply these determinations, you need to fully understand the terms "jeopardy" and "adverse modification" and must have complete knowledge of the rangewide status of the species and condition of the habitat, respectively. For these reasons, agencies typically conclude "may affect, and likely to adversely affect" and contact the Service for further guidance in making the jeopardy and adverse modification determinations for proposed species/critical habitat.

without any adverse effects to the species or habitat. Insignificant effects relate to the size of the impact and include those effects that are not measurable, undetectable or cannot be evaluated. Discountable effects are those extremely unlikely to occur. These determinations require written concurrence from the Service.

c) "May affect, and is likely to adversely affect" means that listed resources are likely to be exposed to the action or its environmental consequences and will respond in a negative manner to the exposure.

- Include relevant reports- Results from species or habitat surveys should be included. If a survey was conducted, include a description of the survey methodology. It is important to note the specifics of your methodology. Explain the scope of the survey; did the survey cover the entire action area or only part of it? Identify who did the survey and when.

  Supporting documents, such as NEPA or other planning documents for the project, are helpful for our review.

  Provide copies of supporting documentation, especially any agency reports or data that are not readily available.

- Complete a cumulative effects analysis- Cumulative effects are effects resulting from future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation. This step is necessary only if listed resources will be adversely affected and Formal Consultation is necessary.

Sample Outline for a Biological Assessment

Please include a cover letter with your BA. This letter should indicate that you are submitting a Biological Assessment for a particular project. It is helpful if you summarize your determinations and explicitly request an action from us, i.e., concur with your "may affect, but not likely to adversely affect" determination or initiate formal consultation.

Note: For projects that will adversely affect protected resources, we strongly recommend that you contact our office before preparing or submitting a final BA.

I. Project description
   A. Subdivide proposed action into project elements (e.g., construction, operation, and maintenance), if applicable.
   B. Describe the where, when, and how for each project element
   C. Include a map delineating the location of each project element
   D. Identify any conservation measures that will be incorporated into the project design

II. Action Area
   A. Delineate the geographic area that will be impacted, i.e., the area where the physical,

chemical, and biotic effects will occur.

B. Circumscribe the specific areas that will affected by each of the project elements

C. Identify any ongoing activities that may be affecting the species or habitat

III. Species/Critical Habitat Considered

A. Identify the species or critical habitat that "may be present"

B. Document how you identify these resources.

C. Describe the current population and habitat conditions (status and trend, if known) for each protected resource that "may be present"

IV. Effects Analysis

A. For each species or critical habitat parcel, explain who (the specific life stages) and how it will or will not be exposed to the project elements

B. Describe the anticipated response (e.g., none, abandoned the area, decrease foraging success, reduced fecundity, injury, death, etc.) from any likely exposure

V. Cumulative Effects Analysis (for actions that are likely to adversely affect listed resources)

A. Identify any future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area

B. Describe how such activities will affect listed resources within the action area

VI. Conclusion and Determination of Effects for each protected resource

A. For each protected resource, make a Section 7 determination and include your rationale.

B. Request either our concurrence with your "may affect, but not likely to adversely affect" finding or initiation of Formal Consultation.

VII. Literature Cited

VIII. List of Contacts Made and Preparers

Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401-3393

September 17, 2010

Scott Hamilton
U.S. Fish and Wildlife Service
Columbia Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-0057

Subject: Biological Assessment Letter

Dear Mr. Hamilton:

We have prepared this assessment in response to the U.S. Fish and Wildlife Service's letter dated August 20, 2010 providing comments to a DOE Draft Environmental Assessment (EA). In response to a Congressional Directive, the Department of Energy (DOE) intends to provide financial assistance to Crowder College for the construction of the proposed Missouri Alternative and Renewable Energy Technology (MARET) Center. The MARET Center would be located on Crowder College's Neosho campus at the corner of Doniphan Drive and Laclede Avenue in the City of Neosho, Newton County, Missouri, Section 15, Township 24 North, and Range 31 West. The project site is approximately 16 acres, has been previously disturbed, and is currently vacant with the exception of a wind turbine that is being used to power existing campus buildings and two-solar powered structures/offices.

Project Description

The project would be completed in two separate construction stages. Stage I would include the construction of an approximately 9,000-square foot building (including installation of solar technology to power the building), with space for the school's construction technology program, an incubation center for new businesses, renewable-energy laboratories or workshops, and faculty office space. Stage II of the project would include the construction of a 21,000-square foot adjoining conference center to the portion of the MARET Center constructed during Stage I. The building would be heated and cooled using an innovative geothermal/radiant system. It is anticipated that the integrated systems would annually produce more energy than would be consumed by the structure and all of the ancillary activities. The remainder of the energy would be fed to the local utility grid through a utility approved net metering device.

The geothermal system would be made up of two earth loops approximately 140 feet by 100 feet by 250 feet deep. In the peak of the cooling season the ground and water temperature in the area surrounding the earth loop (up to approximately 20 feet beyond the area of the earth loop) would increase to approximately 70 degrees Fahrenheit. At the heating season peak the ground and water temperature would decrease to approximately 40 degrees Fahrenheit. The

farther away from the earth loop the lower the increase and decrease in the ground temperature.

Impact Assessment

In your August 20, 2010 letter, you indicated that the MARET Center is within the range of the federally threatened Ozark Cavefish (*Amblyopsis rosae*). The MARET Center is to be placed on the recharge area which provides suitable groundwater habitat for this species. The Ozark Cavefish's habitat consists of cave streams and springs with a gravel bottom, or occasionally pools over silt and sand bottoms. The habitat is restricted to areas of limestone and dolomite bedrock containing caves, sinkholes and springs. In addition, you indicated that the thermal impact from the geothermal heat pump system as well as grout escaping into the underground shallow aquifer has the potential to adversely affect the Ozark Cavefish.

Localized temperature increases/decreases of the groundwater during the course of the heating and cooling season would be less than 1 degree Fahrenheit per day (possibly less depending on groundwater movement). It is not anticipated that this slowly changing localized temperature increase/decrease would have an adverse impact on the Ozark Cavefish (per your discussion with PHE and Crowder College on 9/9/2010).

Grouting material has the potential to enter voids in karst topography beneath the site. Should grout escape into areas where the Ozark Cavefish is present, there is the potential of an adverse impact. In order to mitigate impacts to the Ozark Cavefish, Crowder College will commit to implementing the following measures:

- Drill test wells, prior to drilling of geothermal wells, to characterize the geological conditions below ground and determine whether karst topography or large voids exist beneath the surface at the site. This will allow drillers to further characterize the site and determine the extent of voids beneath the surface.
- Use sleeves during the drilling/grouting process. In areas where karst topography and voids exist (as determined by the preliminary test wells and/or during the drilling/grouting process), the sleeves will be left in place to prevent any grout from entering voids that have the potential to serve as habitat for the Ozark Cavefish. Drillers would be provided with specifications on sleeving.
- Provide drillers with specifications on the amount of grout to be used per well. If that threshold is exceeded grouting would stop immediately minimizing the risk of grout entering voids that have the potential to serve as habitat for the Ozark Cavefish.

The above measures will be added to the *Applicant Committed Measures* section in Chapter 2 of the DOE EA for this project. These measures will also be inserted into the Terms and Conditions section of Crowder College's DOE award documents as a condition of the funding.

We have determined that due to the slow change in localized temperature, and the planned implementation of mitigation measures prior to and during the grouting process the MARET

Center project would have no effect on the Ozark Cavefish. We will continue to remain aware of any change in status of these species and will be prepared to reevaluate potential project impacts if necessary. We are requesting your concurrence on this determination in order to satisfy our responsibilities under Section 7(c) of the Endangered Species Act.

Please feel free to contact me by phone at (720) 356-1322 or e-mail at laura.margason@go.doe.gov if you require additional information on this project. Thank you for your assistance in this matter.

Sincerely,

Laura Margason
NEPA Document Manager

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Columbia Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-0057
Phone: (573) 234-2132 Fax: (573) 234-2181

September 28, 2010

Laura Magnuson
DOE Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401

Dear Ms. Magnuson:

The U.S. Fish and Wildlife Service (Service) has reviewed the information in your September 17, 2010, Biological Assessment letter regarding the MARET Center Construction Project and our concerns regarding the Ozark Cavefish (*Amblyopsis rosae*). You provided us with additional information on the thermal impacts of the geothermal wells, grout used in the installation, and proposed mitigation measures to minimize release of grout into the underground system. Based on this new information, we concur with your determination that this project is unlikely to adversely affect the Ozark Cavefish

Please contact Scott Hamilton at (573) 234-2132, ext. 122, if you have any questions.

Sincerely,

for Charles M. Scott
Field Supervisor

Cc: Doug Novinger, MDC Resource Science, Columbia, MO
Rick Horton, MDC Neosho Field Office, Neosho, MO
Robin Griffin, PHE,

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Appendix C LEED Checklist and Application

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LEED-NC Version 2.2 Registered Project Checklist

MARET CENTER
CROWDER COLLEGE, NEOSHO, MISSOURI March 13, 2007

Yes	?	No				Phases 1	2	SPECIFIC REQUIREMENTS
9	3	0	**Sustainable Sites**	14 Points				
Y			Prereq 1	**Erosion & Sedimentation Control**	Required		Civil	Civil engineer to develop erosion control plan during design
1			Credit 1	**Site Selection**	1		LEEC	site plan meets the six criteria
		X	Credit 2	**Development Density**	1			does not meet density requirements
1			Credit 3	**Brownfield Redevelopment**	1		O/GC	owner must provide site documentation, GC provide remediation documentation, spec allowance
		X	Credit 4.1	**Alternative Transportation,** Public Transportation Access	1			not located near rail or public bus lines
1			Credit 4.2	**Alternative Transportation,** Bicycle Storage & Changing Rooms	1			bike racks for 5% of occupants and shower facilities for .5% FTE
1			Credit 4.3	**Alternative Transportation,** Alternative Fuel Vehicles	1			prefered parking for qualified vehicles for 5% of parking capacity
1			Credit 4.4	**Alternative Transportation,** Parking Capacity and Carpooling	1			minimize required capacity, provide preferred parking for van and carpool for 5% of capacity
	?		Credit 5.1	**Reduced Site Disturbance,** Protect or Restore Open Space	1			extent of sitework does not meet criteria
1			Credit 5.2	**Reduced Site Disturbance,** Development Footprint	1			open space of site meets/exceed requirment
	?		Credit 6.1	**Stormwater Management,** Rate and Quantity	1			case 1 - either strategy could be employed
	?		Credit 6.2	**Stormwater Management,** Treatment	1			vegetated roof, cisterns, bioswales designed to fulfill this requirement - do calculations?
1			Credit 7.1	**Landscape & Exterior Design to Reduce Heat Islands,** Non-Ro	1			Option 1 - shade, high refectance, open grid pavement equal 50% of paved area
1			Credit 7.2	**Landscape & Exterior Design to Reduce Heat Islands,** Roof	1			Pick option that meets the design criteria
1			Credit 8	**Light Pollution Reduction**	1			

Yes	?	No					
5	0	0	**Water Efficiency**	5 Points			
1			Credit 1.1	**Water Efficient Landscaping,** Reduce by 50%	1		recyled water, plants and irrigation technology to be employed
1			Credit 1.2	**Water Efficient Landscaping,** No Potable Use or No Irrigation	1		use rainwater only or temporary irrigation for one year
1			Credit 2	**Innovative Wastewater Technologies**	1		specify water conserving fixtures or use rainwater or greywater technologies, reduce 50%
1			Credit 3.1	**Water Use Reduction,** 20% Reduction	1		reduction is achaivable - do baseline calculations?
1			Credit 3.2	**Water Use Reduction,** 30% Reduction	1		further reduction is potentially achaivable

Energy & Atmosphere — 17 Points

Yes	?	No				
16	0	0		Energy & Atmosphere	17 Points	
Y			Prereq 1	Fundamental Building Systems Commissioning	Required	Need Owner's project requirements and Design Team's basis for design documents
Y			Prereq 2	Minimum Energy Performance	Required	Design to meet ASHRAE 90.1 is achievable
Y			Prereq 3	CFC Reduction in HVAC&R Equipment	Required	zero use of CFC based refrigerants is achievable
10			Credit 1	Optimize Energy Performance	1 to 10	minimum 42% more efficient than ASHRAE 90.1 is the goal - shell should be modeled now
1			Credit 2.1	Renewable Energy, 5%	1	
1			Credit 2.2	Renewable Energy, 10%	1	minimum 12.5% of energy used from renewable (wind and solar) energy sources is the goal
1			Credit 2.3	Renewable Energy, 20%	1	
		X	Credit 3	Additional Commissioning	1	whole building commissioning is not desired at this time - discuss further with CX agent
1			Credit 4	Ozone Depletion	1	option 1 or 2 to be selected
1			Credit 5	Measurement & Verification	1	develop a measurement and verification plan
1			Credit 6	Green Power	1	Owner secures two year green power contract - power purchased through GREEN-E program

continued...

Materials & Resources — 13 Points

Yes	?	No				
6	4	3		Materials & Resources	13 Points	
Y			Prereq 1	Storage & Collection of Recyclables	Required	designated area within building for storage and collection of recyled materials by occupants
		X	Credit 1.1	Building Reuse, Maintain 75% of Existing Shell	1	
		X	Credit 1.2	Building Reuse, Maintain 100% of Shell	1	not applicable
		X	Credit 1.3	Building Reuse, Maintain 100% Shell & 50% Non-Shell	1	
1			Credit 2.1	Construction Waste Management, Divert 50%	1	50% is achievable, develop waste management plan, calculate by volume or weight
	?		Credit 2.2	Construction Waste Management, Divert 75%	1	75% is potentially achievable
1			Credit 3.1	Resource Reuse, Specify 5%	1	5% is achievable, salvaged or refurbished materials including furniture must be specified
	?		Credit 3.2	Resource Reuse, Specify 10%	1	10% is potentially achievable
1			Credit 4.1	Recycled Content, Specify 5%	1	5% is achievable
	?		Credit 4.2	Recycled Content, Specify 10%	1	10% is potentially achievable
1			Credit 5.1	Local/Regional Materials, 20% Manufactured Locally	1	20% is achievable
	?		Credit 5.2	Local/Regional Materials, of 20% Above, 50% Harvested Locally	1	20%/50% is potentially achievable
1			Credit 6	Rapidly Renewable Materials	1	important selection of interior finishes
1			Credit 7	Certified Wood	1	important selection of interior finishes

Yes	?	No			
15	0	0	**Indoor Environmental Quality**		15 Points
Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required
1			Credit 1	**Carbon Dioxide (CO_2) Monitoring**	1
1			Credit 2	**Ventilation Effectiveness**	1
1			Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
1			Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
1			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
1			Credit 4.2	**Low-Emitting Materials**, Paints	1
1			Credit 4.3	**Low-Emitting Materials**, Carpet	1
1			Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber	1
1			Credit 5	**Indoor Chemical & Pollutant Source Control**	1
1			Credit 6.1	**Controllability of Systems**, Lighting	1
1			Credit 6.2	**Controllability of Systems**, Thermal Comfort	1
1			Credit 7.1	**Thermal Comfort**, Comply with ASHRAE 55-1992	1
1			Credit 7.2	**Thermal Comfort**, Permanent Monitoring System	1
1			Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
1			Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1

Mech. Eng. To design to ASHRAE 62.1

No smoking policy in building with designated outside smoking area properly located

Mech. Eng. To design to this standard

Mech. Eng. To design to 30% over ASHRAE 62.1

Contractor to follow SMACNA guidelines, protect absorptive materials, use proper filters

Contractor develop IAQ Management Plan - choose Option 1 or 2, flush out or air testing

Follow VOC guidelines for all specified and purchased building materials

Specify and provide interior building materials with no urea-formaldehyde resins

Design to include permanent entryway, full height isolation partitions, and exhausting

Elec. Design to provide individual lighting control for 90% of occupants

Mech. Design for minimum 60% of occupants

Mech. Design to meet ASHRAE 55

Owner conducts anonymous thermal comfort survey, corrective action if 20% dissatisfied

Daylighting design to meet Option 1, 2, or 3 calculation, simulation or measurement

Design to diagram direct line of sight for 90% of occupants

Yes	?	No			
4	1	0	**Innovation & Design Process**		5 Points
1			Credit 1.1	**Innovation in Design**: Provide Specific Title - MODEL PROTOTY	1
1			Credit 1.2	**Innovation in Design**: Provide Specific Title- RADIANT HEATING	1
	?		Credit 1.3	**Innovation in Design**: Provide Specific Title - NON-PAPER DRYI	1
1			Credit 1.4	**Innovation in Design**: Provide Specific Title DESK RADIANT PAI	1
1			Credit 2	LEED™ Accredited Professional	1

Document building of model prototype, testing, findings, adjustments

Gather and document design process to construction

Include LEED Certificate for Lisa Drew-Alton

Yes	?	No		
55	8	3	**Project Totals** (pre-certification estimates)	69 Points

Certified 26-32 points Silver 33-38 points Gold 39-51 points Platinum 52-69 points

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Appendix D Road Closure Documentation

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CITY OF NEOSHO

July 8, 2009

Mr. Ron Granger, Dean of Business/Support Services
Crowder College
601 Laclede
Neosho, MO 64850

RE: Approval of Vacation of Chouteau Street

Mr. Granger,

The Planning and Zoning Commission and the Neosho City Council have reviewed the application and attachments submitted by Crowder College for the vacation of street located between Laclede Ave and Benton Ave (south of Doniphan and north of Brown), submitted on March 10, 2009. Upon review, public hearing, and subsequent vote, the request has been approved.

According to Missouri Revised Statute 71.250, the street vacated "shall be attached to the ground bordering on such street or alley, and all title thereto shall vest in the person owning the property on each side thereof in equal proportions, according to the length or breadth of such ground, as the same may border on such street or alley."

Enclosed is a fully executed copy of Council Bill No. 2009-365 approving said vacation of Chouteau Street. Please contact me should you have any questions or require additional information.

Sincerely

Kim Messer

Kim Messer
City Planner

Enclosures

Bill No. 2009-365 **Ordinance No. 402-2009**

AN ORDINANCE OF THE CITY OF NEOSHO, MISSOURI, VACATING AND ABANDONING CHOUTEAU STREET BETWEEN LACLEDE STREET AND BENTON ROAD IN SECTION 15, TOWNSHIP 24 NORTH, RANGE 32 WEST, CITY OF NEOSHO, NEWTON COUNTY, MISSOURI

BE IT ORDAINED BY THE COUNCIL OF THE CITY OF NEOSHO, MISSOURI, AS FOLLOWS:

SECTION 1: That the following described property in the City of Neosho, Newton County, Missouri, be, and the same hereby vacated and abandoned and that said property shall revert to adjoining property owners.

THAT PART OF CHOUTEAU STREET BEING A 50 FOOT STRIP LYING BETWEEN THE SOUTH LINE OF LACLEDE STREET ON THE NORTH AND THE NORTH LINE OF BENTON ROAD ON THE SOUTH IN SECTION 15, TOWNSHIP 24 NORTH, RANGE 32 WEST, IN THE CITY OF NEOSHO, NEWTON COUNTY, MISSOURI.

SECTION 2: All ordinances and parts of ordinances in conflict herewith are hereby repealed.

SECTION 3: This ordinance shall be in full force and effect fifteen (15) days after final passage and approval.

APPROVED after final passage this 21st day of July, 2009.

ATTEST:

Audrey A. Cowey
City Clerk

CITY OF NEOSHO, CITY COUNCIL

Mayor

APPROVED:

City Attorney

Appendix E Draft EA Responses to Comments

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Response to Comments on the Draft EA for the MARET Center at Crowder College		
Initials	**Draft EA Comments Received**	**DOE Response and Action**
MDNR	As noted in the earlier draft EA, a 1,000 gallon underground storage tank was removed in August 1989. Although a closure notice was submitted for the tank, no actual data has been submitted to verify that the tank was closed properly. The Department last requested this information in December 1996.	Tank was closed prior to regulations. No further action is required per communication with MDNR. Crowder College's Applicant Committed Measure added in Section 2.4 of Final EA as follows: • If any evidence of a petroleum spill is found during construction, a Petroleum Monitoring and Management Plan will be implemented by the College.
MDNR	In Section 3.2.2.1, "Proposed Actions" on page 28, the document indicates that geothermal holes will be grouted with standard bentonite grout. The current regulations that deal with closed-loop systems (1 0 CSR 23-5) do not require full-length bentonite grout but rather allow for alternating use of sand and bentonite grout. This is due to the fact that the use of bentonite grout alone impedes the exchange of heat between the surrounding geological formations and the heat exchange loops. If full-length bentonite grout is used as indicated, the system must be adequately designed to compensate for the reduction in heat exchange capacity. Also, the regulations limit well depth for closed-loop geothermal systems to 200 feet without obtaining a variance from the Department's Wellhead Protection Section. A related issue is found on page 31 of the document, in the next to last paragraph. Although a closed-loop geothermal system does not require a permit from the Department's Water Pollution Control Program, its construction must follow 10 CSR 23-5 of the Missouri Well Construction Rules, its construction must be reported to the Department's Wellhead Protection Section, and the associated certification fees must be paid.	Comment noted. Per a previous communication with MDNR, a full length bentonite grout was recommended if VOCs are found to minimize the potential for migration of TCE vapors vertically along heat pump loop piping to the surface. Variance language was included in Section 2.4 Applicant Committed Measures as follows: • If the geothermal wells are more than 200 feet deep a variance will be requested from MDNR prior to construction. This would take approximately eight weeks for approval. Crowder College will provide full-length thermal grout for each well in accordance with the variance requirements. The necessary depth of the wells will be determined after drilling test wells, which will be less than 200 feet deep. Crowder College's Applicant Committed Measure added in Section 2.4 of Final EA as follows: • A closed-loop geothermal system does not

Response to Comments on the Draft EA for the MARET Center at Crowder College		
Initials	**Draft EA Comments Received**	**DOE Response and Action**
		require a permit from the Department's Water Pollution Control Program; however, its construction must follow 10 CSR 23-5 of the Missouri Well Construction Rules. The College will report the construction to the Department's Wellhead Protection Section, and will pay the associated certification fees as necessary.
MDNR	The Former Fort Crowder Chemical Warfare Materiel Site is located approximately 1,000 feet south of the proposed MARET location. This site of approximately 58 acres includes two adjacent areas, the No. 110 Gas Chambers Area and the area around the former pistol ranges. Chemical warfare training included field exercises where soldiers were exposed to chemical agents in settings that simulated battlefield conditions. Chemical agent identification sets (CAIS) were used in chemical warfare training. CAIS were expendable training aids produced for use by all branches of the military to train soldiers in the safe identification, handling, and decontamination of chemical agents and industrial chemicals used in chemical warfare. CAIS consist of small glass containers filled with various chemical agents, which were packed in metal shipping containers or wooden boxes. At Fort Crowder, chemical training materials, munitions, and explosive simulators were stored in quonset huts and igloos located in the vicinity of the Chemical Exercise Area. After World War II, these buildings were declared surplus and sold. Reportedly, the work crews removing the igloos took anything found in the structures, dumped it out nearby, and buried it. A proposed plan to address environmental issues at this site is in development by the U.S. Army Corps of Engineers. The Engine Test Area, a contributor to the Pools Prairie National Priorities List site, is located over a mile to the east of the proposed MARET Center location. Soil and groundwater are contaminated primarily with chlorinated solvents, such as trichloroethylene (TCE).	Comment noted regarding the Fort Crowder Chemical Warfare Materiel Site. Crowder College's Applicant Committed Measure added in Section 2.4 of Final EA as follows: • Site educational awareness and training utilizing an online educational awareness and training program available at URL: https://www.denix.osd.mil/uxosafety, which has information on chemical agent identification sets (CAIS), the history of chemical warfare, and the response process will be undertaken by the College for all contractors hired for the Project. Commented noted regarding the Pools Prairie National Priorities List Site. Mitigation measures were included in Section 2.4 Applicant Committed Measures as follows: • During drilling, Crowder College will test drill cuttings approximately every 10 feet using a Photoionization Detector (PID) or another method to test for the presence of VOCs. Trichloroethylene (TCE) and its degradation products (VOCs) are the main contaminants of concern at the Pools Prairie Superfund Site (a National Priorities List, contaminated site

Response to Comments on the Draft EA for the MARET Center at Crowder College		
Initials	**Draft EA Comments Received**	**DOE Response and Action**
	TCE has also been documented off-site in a number of private wells. A remedial investigation is currently being planned by the Department's Federal Facilities Section of the Hazardous Waste Program to assess the nature and extent of groundwater contamination. The Department's Superfund Section of the Hazardous Waste Program has identified one site within the half mile boundary of the proposed project; Neosho Digester and Trenches, illustrated in an attached graphic. The Neosho Digester and Trenches site is located southwest of the proposed facility. The site is the location of an abandoned digester formerly utilized for wastewater treatment. Contaminated wastewater generated from Northeastern Pharmaceutical & Chemical Company (NEPACCO) in Verona, Missouri was dumped into the digester for treatability studies, contaminating the digester. Spillage also occurred, contaminating surrounding soils. The site was placed on the State Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in 1984. EPA sampling of the digester indicated dioxin at concentrations of up to 60 parts per billion (ppb) and trichlorophenol at concentrations of up to 2,500,000 ppb. In addition, there are three more Superfund projects located near the half-mile buffer of the site. All three projects are related to the Pools Prairie Site.	located northeast of the proposed MARET Center site) and will be detected by the PID if present. • If VOCs are determined to be present, Crowder College will forward this information to the MDNR Superfund project manager for the Pools Prairie Site. MDNR would provide the information for potential follow up activity by the Responsible Parties during the Groundwater Investigation. • If the geothermal wells are more than 200 feet deep a variance will be requested from MDNR prior to construction. This would take approximately eight weeks for approval. Crowder College will provide full-length thermal grout for each well in accordance with the variance requirements. The necessary depth of the wells will be determined after drilling test wells, which will be less than 200 feet deep. • If VOCs are found, a full-length thermal grout will be used to minimize the potential for migration of TCE vapors vertically along heat pump loop piping to the surface. • Water and drill cuttings resulting from the geothermal well drilling process will be placed in an on-site holding area and applied to land owned by Crowder College. By spreading the material out over land, the soil will filter the wastewater.
MDNR	***National Ambient Air Quality Standards*** The project is located in an area that currently meets all National Ambient Air Quality Standards. The construction-related activities associated with this project should not significantly affect local or	Comment noted. Crowder College's Applicant Committed Measure added in Section 2.4 of Final EA as follows:

Response to Comments on the Draft EA for the MARET Center at Crowder College		
Initials	**Draft EA Comments Received**	**DOE Response and Action**
	regional air quality. It is important to note that while the project area is currently in attainment for the 2008 ozone standard, the Environmental Protection Agency is in the process of reconsidering the ozone standard. Depending on the project timeline, the reconsidered ozone standard could potentially affect the project area's attainment status.	• A General Conformity applicability analysis will be completed by the college should the area's attainment status change.
MDNR	***Asbestos*** While the proposed project does not include the razing of any structures, if the project includes digging into buried building materials (i.e. where the Red Cross Building was located from 1945-1952), an asbestos inspection is required. Any such activities undertaken as part of this project must be conducted in accordance with local, state and federal asbestos regulations (40 CFR Part 61, subpart M and state regulations 10 CSR 10-6.241 and 10-6.250). These regulations require that prior to renovation or demolition; all regulated structures must be inspected by a Missouri certified asbestos inspector. If during the course of the asbestos inspection, it is determined that the total amount of asbestos containing material (both friable asbestos containing material and asbestos containing material that would be rendered friable during the course of the renovation or demolition) exceeds 160 square feet, 260 linear feet, or 35 cubic feet, then the asbestos would have to be removed by a Missouri registered asbestos abatement contractor and disposed of in accordance with the National Emissions Standards for Hazardous Air Pollutants. If there are less than these threshold amounts, then the material would not have to be removed prior to renovation or demolition. However, if materials are contaminated with asbestos, regardless of the amount, the sanitary landfill may have special packaging requirements for disposal. Notice of an asbestos abatement project above the threshold limits stated above and all demolition projects, regardless of whether asbestos is present, affecting regulated structures must be provided to the Missouri Department of Natural Resources' Air Pollution Control Program on the	Comment noted. Crowder College's Applicant Committed Measure added in Section 2.4 of Final EA as follows: • Should any buried building materials be discovered during construction an asbestos inspection will be completed in accordance with in accordance with local, state and federal asbestos regulations (40 CFR Part 61, subpart M and state regulations 10 CSR 10-6.241 and 10-6.250). • If during the course of the asbestos inspection, it is determined that the total amount of asbestos containing material exceeds 160 square feet, 260 linear feet, or 35 cubic feet, then the asbestos will be removed by a Missouri registered asbestos abatement contractor and disposed of in accordance with the National Emissions Standards for Hazardous Air Pollutants. If there are less than these threshold amounts, then the material would not have to be removed prior to renovation or demolition. However, if materials are contaminated with asbestos, regardless of the amount, the sanitary landfill may have special packaging requirements for disposal and the College will follow landfill guidelines for its disposal. • Notice of an asbestos abatement project above

Response to Comments on the Draft EA for the MARET Center at Crowder College		
Initials	**Draft EA Comments Received**	**DOE Response and Action**
	Department's form at least 10 days prior to commencement of the asbestos abatement or demolition project and approval must be granted by the Department.	the threshold limits and all demolition projects, regardless of whether asbestos is present, affecting regulated structures will be provided to the Missouri Department of Natural Resources' Air Pollution Control Program on the Department's form at least 10 days prior to commencement of the asbestos abatement or demolition project and approval must be granted by the Department.
MDNR	***Open burning*** State regulation 10 CSR 10-6.045 prohibits the open burning of tires, petroleum-based products, asbestos containing materials, and trade wastes except as otherwise allowed by the rule. Open burning that causes or contributes to a public health hazard, nuisance, or a hazard to vehicular or air traffic is not allowed. State regulation 10 CSR 10-6.045 only allows for open burning of vegetative debris from land clearing operations outside the city limits of an incorporated area or municipality and outside of the Kansas City, St. Louis and Springfield Metropolitan Areas and at a distance of more than 200 yards from the nearest inhabited dwelling. For open burning of vegetative waste that does not meet these restrictions, the Department's Southwest Regional Office must be notified to determine if a permit to allow the burning can be issued. Their phone number is 4 17-891 -4300.	Comment noted. No open burning will occur at the site.
MDNR	***Fugitive Dust*** State regulation 10 CSR 10-6.170 restricts particulate matter emissions from leaving the premises of origin. Efforts must be made to prevent any fugitive dust that may result from any construction or demolition activities associated with this project from leaving the property where it originated.	Comment noted. Mitigation measures were included in Section 2.4 Applicant Committed Measures as follows: • During construction, typical mitigation measures to minimize air quality issues caused by fugitive dust and tailpipe emissions will include the following: o Require all construction crews and contractors to comply with State

Response to Comments on the Draft EA for the MARET Center at Crowder College		
Initials	**Draft EA Comments Received**	**DOE Response and Action**
		regulations for fugitive dust control during construction. o Maintain all engines of construction equipment according to manufacturer's specifications. o Minimize the idling of equipment while the equipment is not in use. o Implement reasonable measures, such as applying water to exposed surfaces or stockpiles of dirt, when windy or dry conditions promote problematic fugitive dust emissions. Adhering to these Best Management Practices (BMPs) would minimize any fugitive dust emissions, and therefore would reduce adverse impacts from fugitive dust emissions.
MDNR	***Solid Waste Management*** Any contracts necessary as part of the proposed project should include requirements for the proper disposal of solid waste, and to maintain disposal/recycling receipts as a means of demonstrating compliance with the Missouri Solid Waste Management Law and regulations. Additionally, the contracts should reference the Department's technical bulletin "Managing Solid Waste Encountered during Excavation Activities" as a means of demonstrating how they will comply with discovery of unexpected buried wastes during utility line installation and other soil disturbing activities. The bulletin is PUB2 192, dated 1212006 and can be found on the Department's web site at http://www.dnr.mo.gov/pubs/pub2192. This bulletin should be shared with contractors working at the site. The contracts should further reflect	Comment noted. Crowder College's Applicant Committed Measure added in Section 2.4 of Final EA as follows: • Any contracts necessary as part of the proposed project will include requirements for the proper disposal of solid waste, and to maintain disposal/recycling receipts as a means of demonstrating compliance with the Missouri Solid Waste Management Law and regulations. • Contracts will reference the Department's technical bulletin "Managing Solid Waste

Response to Comments on the Draft EA for the MARET Center at Crowder College		
Initials	**Draft EA Comments Received**	**DOE Response and Action**
	that all demolition and construction activities will be executed in a manner that ensures that solid wastes are recycled, reused or properly disposed of in compliance with the Missouri Solid Waste Management Law and regulations. The project area is near the closed Newton McDonald Counties Landfill, which is located next to the National Guard training ground. Since this closed landfill is located a few miles from the proposed project area, the project should not affect the landfill nor be affected by the landfill. Contractors should be made aware that the disturbance of a landfill or pre-law dump requires notice to and approval from the Department's Solid Waste Management Program prior disturbing the buried waste (with a 16 acre development, it is possible that they could unearth an old pre-law dump). Any questions relating to the proper management of solid waste or concerning permitting should be directed to the Department's Solid Waste Management Program at (573) 751-5401.	Encountered during Excavation Activities" as a means of demonstrating how they will comply with discovery of unexpected buried wastes during utility line installation and other soil disturbing activities. This bulletin will be shared with contractors working at the site. The contracts will further reflect that all demolition and construction activities will be executed in a manner that ensures that solid wastes are recycled, reused or properly disposed of in compliance with the Missouri Solid Waste Management Law and regulations. • Contractors will be made aware that the disturbance of a landfill or pre-law dump requires notice to and approval from the Department's Solid Waste Management Program prior disturbing the buried waste.
MDNR	***Geology*** The karst conditions in the proposed project area can have a dramatic effect on the spread of contaminants, and prior studies conducted within the area would be valuable in understanding the risk that karst conditions pose. In Section 3.2.1.1, the second paragraph refers to the weathered bedrock overlying competent bedrock as limestone residue. The technical term would be residuum. In Section 3.2.1.l, the third paragraph refers to the competent bedrock as Mississippian in origin of limestone, shale, and sandstone, and that the two primary rock types are chert containing limestone and shale. A better description can be obtained from a test hole near the Rocketdyne Test Area (WB-03A) which indicates that the first competent bedrock	Comment noted. Mitigation measures were provided in a previous communication and are included in Section 2.4 Applicant Committed Measures as follows: • During drilling, Crowder College will test drill cuttings approximately every 10 feet using a Photoionization Detector (PID) or another method to test for the presence of VOCs. Trichloroethylene (TCE) and its degradation products (VOCs) are the main contaminants of concern at the Pools Prairie Superfund Site (a National Priorities List, contaminated site located northeast of the proposed MARET Center site) and will be detected by the PID if present.

Response to Comments on the Draft EA for the MARET Center at Crowder College		
Initials	**Draft EA Comments Received**	**DOE Response and Action**
	encountered appears to be a limestone of the Warsaw Formation (Site Investigation, Former Air Force Plant #65, Rocketdyne Test Site, Neosho, Missouri, December 1993). Other well logs in the area indicate that the first competent bedrock is the Warsaw Formation, Keokuk-Burlington Limestone, or the Elsey Formation. A good description of southwestern bedrock may be found in The Stratigraphic Succession In Missouri. Volume 40 by Thomas L. Thompson, Department of Natural Resources, Division of Geology and Land Survey. The EA's Section 3.2.1 .l, in the fifth paragraph, indicates that there are karst features in the project area, and that these features were not encountered 300 yards to the northeast during the installation of groundwater wells. Dye traces have been conducted in this area by the Department's Division of Geology and Land Survey and by a contractor for the Components Test Area of the nearby Superfund Site (Newton County Pools Prairie Groundwater Tracing Study, February 2000).	• If VOCs are determined to be present, Crowder College will forward this information to the MDNR Superfund project manager for the Pools Prairie Site. MDNR would provide the information for potential follow up activity by the Responsible Parties during the Groundwater Investigation. • If the geothermal wells are more than 200 feet deep a variance will be requested from MDNR prior to construction. This would take approximately eight weeks for approval. Crowder College will provide full-length thermal grout for each well in accordance with the variance requirements. The necessary depth of the wells will be determined after drilling test wells, which will be less than 200 feet deep. • If VOCs are found, a full-length thermal grout will be used to minimize the potential for migration of TCE vapors vertically along heat pump loop piping to the surface. Text changed to limestone residuum. Commented noted. Text added as follows, “The bedrock located beneath the proposed site is primarily Mississippian in origin (Warsaw Formation) and consists of limestone, shale, and sandstone (see Figure 3.2-1).” Comment noted. No change to text.

Response to Comments on the Draft EA for the MARET Center at Crowder College		
Initials	**Draft EA Comments Received**	**DOE Response and Action**
USFWS	The MARET facility is proposed to be placed on the recharge area which provides suitable groundwater habitat for this species. Based on information that has been provided regarding the lack of toxicity of the heat pump solution, the Service does not believe this will negatively affect sensitive underground species in the event of a leak in the system. However, both the thermal impact from the pipes of this facility and grout escaping into the underground shallow aquifer has the potential to adversely affect the Ozark Cavefish.	The following was included in a Biological Assessment letter to USFWS based on discussions with them on September 9, 2010, "Localized temperature increases/decreases of the groundwater during the course of the heating and cooling season would be less than 1 degree Fahrenheit per day (possibly less depending on groundwater movement). It is not anticipated that this slowly changing localized temperature increase/decrease would have an adverse impact on the Ozark Cavefish. Grouting material has the potential to enter voids in karst topography beneath the site. Should grout escape into areas where the Ozark Cavefish is present, there is the potential of an adverse impact. In order to mitigate impacts to the Ozark Cavefish it is recommended the following mitigation measures be implemented: • Drill test wells, prior to drilling of geothermal wells, to characterize the geological conditions below ground and determine whether karst topography or large voids exist beneath the surface at the site. This will allow drillers to further characterize the site and determine the extent of voids beneath the surface. • Use sleeves during the drilling/grouting process. In areas where karst topography and voids exist (as determined by the preliminary test wells and/or during the drilling/grouting process), the sleeves will be left in place to prevent any grout

Response to Comments on the Draft EA for the MARET Center at Crowder College		
Initials	**Draft EA Comments Received**	**DOE Response and Action**
		from entering voids that have the potential to serve as habitat for the Ozark Cavefish. Drillers would be provided with specifications on sleeving. • Provide drillers with specifications on the amount of grout to be used per well. If that threshold is exceeded grouting would stop immediately minimizing the risk of grout entering voids that have the potential to serve as habitat for the Ozark Cavefish." USFWS in their September 28, 2010 letter stated that based on the information provided in the Biological Assessment letter that they concur with DOE's determination that this project is unlikely to adversely affect the Ozark Cavefish. The above measures have been added to Section 2.4 Applicant Committed Measures.