# CHECKLIST ENVIRONMENTAL ASSESSMENT

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|---|---|
| **Project Name:** | **Town of Stanford Water System Improvements** |
| **Proposed Implementation Date:** | Fall 2018 |
| **Proponent:** | Town of Stanford |
| **Location:** | 16N 12E 17 SE4 LESS 3.065 AC. IN NE4SE4 |
| **County:** | Judith Basin |
| **Trust:** | Common Schools |

## I. TYPE AND PURPOSE OF ACTION

The town of Stanford has requested an easement of approximately 8 acres for city water improvements. They look to drill a new municipal well to supplement its water supply. The water quality in its existing wells is poor and the wells are slowly decreasing in capacity for various reasons. The water system improvements project will consist of the following components:

- New 2000 to 4000-foot-deep well (150 gpm) that will be drilled into the Madison Aquifer
- Connecting piping including a chlorine contact loop that will connect the well to the City's existing storage tank and water distribution system.
- Either constructing a new control building to house the well controls, discharge piping, flow meter and valves or modifying or adding to the existing control building located west of the storage tank.

The deep Madison well can be drilled adjacent to the City's existing shallower aquifer wells without interference and it makes sense to drill it adjacent to the City's existing water infrastructure.

The schedule is to complete the design of the well this winter and drill the well in March or April of 2018. If the well yield is adequate and the water quality acceptable, the connecting piping, chlorine contact loop and well control building or addition will be designed this summer and construction would be completed in the fall of 2018.

## II. PROJECT DEVELOPMENT

### 1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED:

*Provide a brief chronology of the scoping and ongoing involvement for this project.*

Department of Natural Resources and Conservation (DNRC)
Northeastern Land Office (NELO)
Town of Stanford
Robert Peccia & Associates (RCA)

### 2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:

The DNRC, and NELO have jurisdiction over this proposed project.

DNRC is not aware of any other agencies with jurisdiction or other permits needed to complete this project

## 3. ALTERNATIVES CONSIDERED:

**Alternative A (No Action)** – Under this alternative, the Department does not grant permission for an easement to install a new water system with a new well, control building, chlorine contact loop and associated appurtenances.

**Alternative B (the Proposed Action)** – Under this alternative, the Department does grant permission for an easement to install a new water system with a new well, control building, chlorine contact loop and associated appurtenances.

## III. IMPACTS ON THE PHYSICAL ENVIRONMENT

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

## 4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

*Consider the presence of fragile, compactable or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify any cumulative impacts to soils.*

Stanford is located south of the Missouri River between the drainages of Arrow Creek and the Judith River in an area of northerly dipping sedimentary rocks, capped locally by Quaternary sediments and Cretaceous-age siltstone, shale and sandstone of the Colorado Group (Vuke et al. 2002).

Geologic structures in the Judith Basin include large folds that are part of a regional structural pattern and more irregular domes associated with local intrusive rocks in the Judith and Moccasin mountains. The regional-scale geologic structures include the north-northwest trending fault zone near Arrow Creek and the fault complex on the lower reaches of Arrow Creek and the Judith River, and along the Missouri River. The Little Belt Mountains to the south are characterized by tilted sedimentary rock including the Madison Group that are offset and folded by numerous faults and folds. Other geologic structure that may influence groundwater circulation include an anticline that corresponds to the crest of the Big Snowy Mountains and the Blood Creek Syncline along the Missouri River that parallels other large sutures in central Montana.

According to oil and gas well logs located 10 miles north of Stanford, the top of the Madison Group is approximately 3,800 feet below ground surface. The Web Soil Survey shows the soil at the proposed wellhead location is the Danvers-Judith Complex. Generally, the Danvers-Judith Complex is a well-drained clay loam to sandy loam with varied amounts of gravel and a water table greater than 80 inches deep. Installation and development of the new well may disturb the soil and area around the wellhead, however this disturbance would likely be short term. The well is required to be completed by a licensed Montana well driller and is subject to applicable drilling criteria governed by the Montana Board of Water Well Contractors. **No significant impacts to geology or the soil profile are expected because of this project.**

**Alternative A (No Action) - The No Action alternative would result in no change or benefit to the Town of Stanford's diminishing municipal water system.**

**Alternative B (the Proposed Action) – The Proposed Action would likely result in a more costly but better source of municipal water for the Town of Stanford.**

## 5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

*Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify cumulative effects to water resources.*

The hydrogeology of Judith Basin including the Madison Group Aquifer is described in publications by Zimmerman (1966), Feltis (1973, 1977, 1980, and 1993), Feltis and Shield (1982), Levings and Dodge (1981), and Levings (1983). Additional information on the Madison Group Aquifer in central Montana is available in unpublished reports by Wheeler (1989), Waren (1994) and Uthman and Dolan (2008), Kuzara et al. (2014), Cunnane (2017), and geologic maps by Porter and Wilde (1993), Vuke et al. (2002), and Wilde and Porter (2002).

Groundwater in the Judith Basin is found in both alluvial and bedrock aquifers. Extensive alluvial deposits throughout the Judith Basin overlie benches extending from the Little Belt, Big Snowy, Judith, and North and South Moccasin mountains. More localized alluvial deposits are found along modern streams that dissect the older alluvial deposits. Bedrock aquifers in the Kootenai, Swift and Madison Group formations outcrop in the surrounding mountains and dip gently beneath the relatively low permeability shale of the Colorado Group across the Judith Basin. Alluvial aquifers are unconfined whereas bedrock aquifers are confined by the Colorado Formation, except at outcrops in the mountains. Recharge to bedrock aquifers is primarily from infiltration of precipitation and losses where streams cross outcrops of the Mission Canyon Formation, the upper member of the Madison Group. Discharge is from springs at the edge of alluvial terrace deposits and at bedrock dome uplifts or faults, and from streams. The Madison Formation is a source of water for multiple large springs and is generally known to be a prolific source of groundwater.

Stanford's current public water supply suffers from water quality impairments caused by high iron, manganese, nitrate, and carbon dioxide concentrations. Water from the proposed Madison well is expected to have better initial water quality than the shallower wells and should also benefit from a sodium hypochlorite disinfection system included in the preliminary engineering plans. **No significant adverse impacts to groundwater resources are expected from the proposed project, it is anticipated this Madison Formation well would provide a more consistent supply along with better quality water than the towns existing groundwater resources.**

Huntoon (1993) identified that anticlines which extend from un-severed margins of mountain uplifts provide the greatest potential for successful wells in the Madison Aquifer, however those locations also provide potential pathways for connection to surface water. The locations of potentially affected surface waters depend on propagation of drawdown to locations where surface water is hydraulically connected to groundwater. Hydraulic connection depends on the depth to groundwater beneath the beds of surface waters and can vary along a reach and with time of year.

The proposed water use by the Town of Stanford will eventually deplete surface water flows by reducing discharge directly from the Madison Group and/or by reducing seepage upward through the overlying strata. Geologic structures provide possible connections between the Madison Group Aquifer and surface waters including the Missouri River, Judith River, Arrow Creek, and several smaller streams including headwater streams in the Little Belt Mountains.

*Headwater Streams in the Little Belt Mountains*

The presence of springs where the Madison Group Aquifer crops out in the Little Belt Mountains is clear evidence of a local hydraulic connection of the aquifer to surface water. However, the faults, dikes, and anticlines along the northern edge of the mountains likely disrupts, if not severs, the continuity of the aquifer making it unlikely appreciable groundwater circulates beyond the outcrop area or that drawdown will propagate from the proposed well to the outcrop.

*Judith River and tributaries (upstream of Wolf Creek)*

The lack of geologic structure intersecting the Judith River upstream of Wolf Creek suggests a low probability of hydraulic connection of the Madison Aquifer to these reaches. There is the chance that diffuse upward leakage through the overlying strata from the Madison Aquifer is occurring to springs along the channel, but there is no evidence. The Madison Aquifer is the source for Big Springs, Warm Springs, Lehman Springs, and the Hanover Well; however these springs are distant from the applicant's proposed well.

*Judith River (downstream of Wolf Creek)*

There are numerous fault intersections at the Judith River in the area of the confluence of Wolf Creek. A previous authorization (41S 30065060) in the Kootenai Aquifer described the net depletions as materializing in the lower reaches of the Judith River and Missouri River; however, the Madison Group source is approximately 4,000 feet bgs in this area (oil and gas well logs).

*Missouri River*
Extensive faulting along the Missouri River downstream of Virgelle to the Fred Robinson Bridge provide pathways for potential connection between the Madison Aquifer and surface water. The Missouri River is more likely than its tributaries to be the potentially affected reach as a result of its deeper incision into bedrock; however, this reach of the Missouri River is along the trend of the Blood Creek Syncline. The Missouri River is a discharge location for other regional sedimentary aquifers; however, this is not likely the case for the Madison Aquifer along this reach due to no large discharging springs and the Madison Group being approximately 4,000 feet below the Missouri River.

*Arrow Creek*
Faults that trend northwest are the closest to the applicant's property and could provide a preferential pathway for drawdown to propagate from the proposed well to Arrow Creek. There are fault intersections near the confluence of Arrow Creek with both Surprise Creek and Coffee Creek. According to oil and gas logs, the Madison Group is approximately 2,500 feet bgs in this area. There are numerous wells completed in the Kootenai Aquifer with large closed-in pressures, indicating a positive head differential that could drive discharge to Arrow Creek if a structural connection exists.

The larger springs from the Madison Group (Big Springs, Warm Springs, Lehman Springs, and the Hanover Well) are distant from the applicant's proposed well; therefore, based on the evidence reviewed above indicates that reduced groundwater discharge will show up in Arrow Creek downstream of the fault intersection in Section 6, Township 18 North, Range 12 East. The identification of Arrow Creek as the most likely potentially affected surface water is based on the proposed wells proximity to the faults mapped by Vuke et al. (2002), shallower elevation of the top of the Madison Group, and the positive head differential.

The Town of Stanford has two existing water rights from the Kootenai Formation that total 74 gpm up to 119.4 AF annually. Impacts to surface water from the proposed Madison well appropriations are anticipated to be similar to historic effects from pumping the towns Kootenai well. Depletions from the new well could potentially be mitigated by changing the purpose of the town's historic water right and permanently abandoning use of the Kootenai well. **No significant adverse impacts to surface water resources are expected because of this project.**

**Alternative A (No Action) - The no action alternative would result in no change or benefit to the Town of Stanford's diminishing municipal water system.**

**Alternative B (the Proposed Action) – The Proposed Action would likely result in a more costly but better source of municipal water for the Town of Stanford.**

**6. AIR QUALITY:**
*What pollutants or particulate would be produced? Identify air quality regulations or zones (e.g. Class I air shed) the project would influence. Identify cumulative effects to air quality.*

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**7. VEGETATION COVER, QUANTITY AND QUALITY:**
*What changes would the action cause to vegetative communities? Consider rare plants or cover types that would be affected. Identify cumulative effects to vegetation.*

Current plant community is dominated by tame grass species such as Kentucky bluegrass and smooth brome.

The will be some ground disturbance and bare ground created associated with the installation of the city water system. Frequent scouting should occur until revegetation has occurred to suppress noxious weed establishment.

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- Bare ground associated with the installation of the city water system will revegetate with grass & shrubs in a few years. The Area of Potential Effect (APE) will remain visible for many years.

**8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:**
*Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify cumulative effects to fish and wildlife.*

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:**
*Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify cumulative effects to these species and their habitat.*

A search of the Montana Natural Heritage Program for Species of Concern was conducted in the township that includes the area of potential effect.

**Species of Concern**
2 Species
Filtered by the following criteria:
MT Status = Species of Concern
Township = 014N012E (based on mapped Species Occurrences)

| SCIENTIFIC NAME<br>COMMON NAME<br>TAXA SORT | FAMILY (SCIENTIFIC)<br>FAMILY (COMMON) | GLOBAL RANK | STATE RANK | USFWS | USFS | BLM | FWP SWAP | % OF GLOBAL BREEDING RANGE IN MT | % OF MT THAT IS BREEDING RANGE | HABITAT |
|---|---|---|---|---|---|---|---|---|---|---|
| *Lasiurus cinereus*<br>Hoary Bat | *Vespertilionidae*<br>Bats | G3G4 | S3 | | | | SGCN3 | 2% | 100% | Riparian and forest |
| Species Occurrences verified in these Counties: | | | | | | | | | | |
| *Myotis lucifugus*<br>Little Brown Myotis | *Vespertilionidae*<br>Bats | G3 | S3 | | | | SGCN3 | 3% | 100% | Generalist |
| Species Occurrences verified in these Counties: | | | | | | | | | | |

Most of the project contains subsurface disturbance.

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**10. HISTORICAL AND ARCHAEOLOGICAL SITES:**
*Identify and determine effects to historical, archaeological or paleontological resources.*

A Class I (literature review) level review was conducted by the DNRC staff archaeologist for the area of potential effect (APE). This entailed inspection of project maps, DNRC's sites/site leads database, land use records, General Land Office Survey Plats, and control cards. The Class I search revealed that *Antiquities* have not been identified in the APE. No additional archaeological investigative work will be conducted in response to this proposed development. However, if previously unknown cultural or paleontological materials are identified during project related activities, all work will cease until a professional assessment of such resources can be made.

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**11. AESTHETICS:**
*Determine if the project is located on a prominent topographic feature, or may be visible from populated or scenic areas. What level of noise, light or visual change would be produced? Identify cumulative effects to aesthetics.*

City project will be visible by both the Town residents and the adjacent highway.

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:**
*Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify cumulative effects to environmental resources.*

**Alternative A (No Action)-** No effect anticipated.

**Alternative B (the Proposed Action)-** No effect anticipated.

**13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:**
*List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.*

**Alternative A (No Action)**-No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

## IV. IMPACTS ON THE HUMAN POPULATION

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

**14. HUMAN HEALTH AND SAFETY:**
*Identify any health and safety risks posed by the project.*

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:**
*Identify how the project would add to or alter these activities.*

**Alternative A (No Action)-** No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:**
*Estimate the number of jobs the project would create, move or eliminate. Identify cumulative effects to the employment market.*

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**17. LOCAL AND STATE TAX BASE AND TAX REVENUES:**
*Estimate tax revenue the project would create or eliminate. Identify cumulative effects to taxes and revenue.*

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**18. DEMAND FOR GOVERNMENT SERVICES:**
*Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify cumulative effects of this and other projects on government services*

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:**
*List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.*

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:**
*Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify cumulative effects to recreational and wilderness activities.*

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:**
*Estimate population changes and additional housing the project would require. Identify cumulative effects to population and housing*

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**22. SOCIAL STRUCTURES AND MORES:**
*Identify potential disruption of native or traditional lifestyles or communities.*

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**23. CULTURAL UNIQUENESS AND DIVERSITY:**
*How would the action affect any unique quality of the area?*

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- No effect anticipated.

**24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:**
*Estimate the return to the trust. Include appropriate economic analysis. Identify potential future uses for the analysis area other than existing management. Identify cumulative economic and social effects likely to occur as a result of the proposed action.*

**Alternative A (No Action)**- No effect anticipated.

**Alternative B (the Proposed Action)**- The land proposed for the easement does not currently generate any income for the trust. The sale of the easement will go into the common school trust.

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|---|---|---|
| **EA Checklist Prepared By**: | **Name:** | Brandon Sandau |
| | **Title:** | Land Use Specialist |
| **Signature:** | | **Date**: April 3, 2018 |

## V. FINDING

**25. ALTERNATIVE SELECTED:**

**Alternative B (the Proposed Action)** – Under this alternative, the Department does grant permission for an easement to install a new water system with a new well, control building, chlorine contact loop and associated appurtenances.

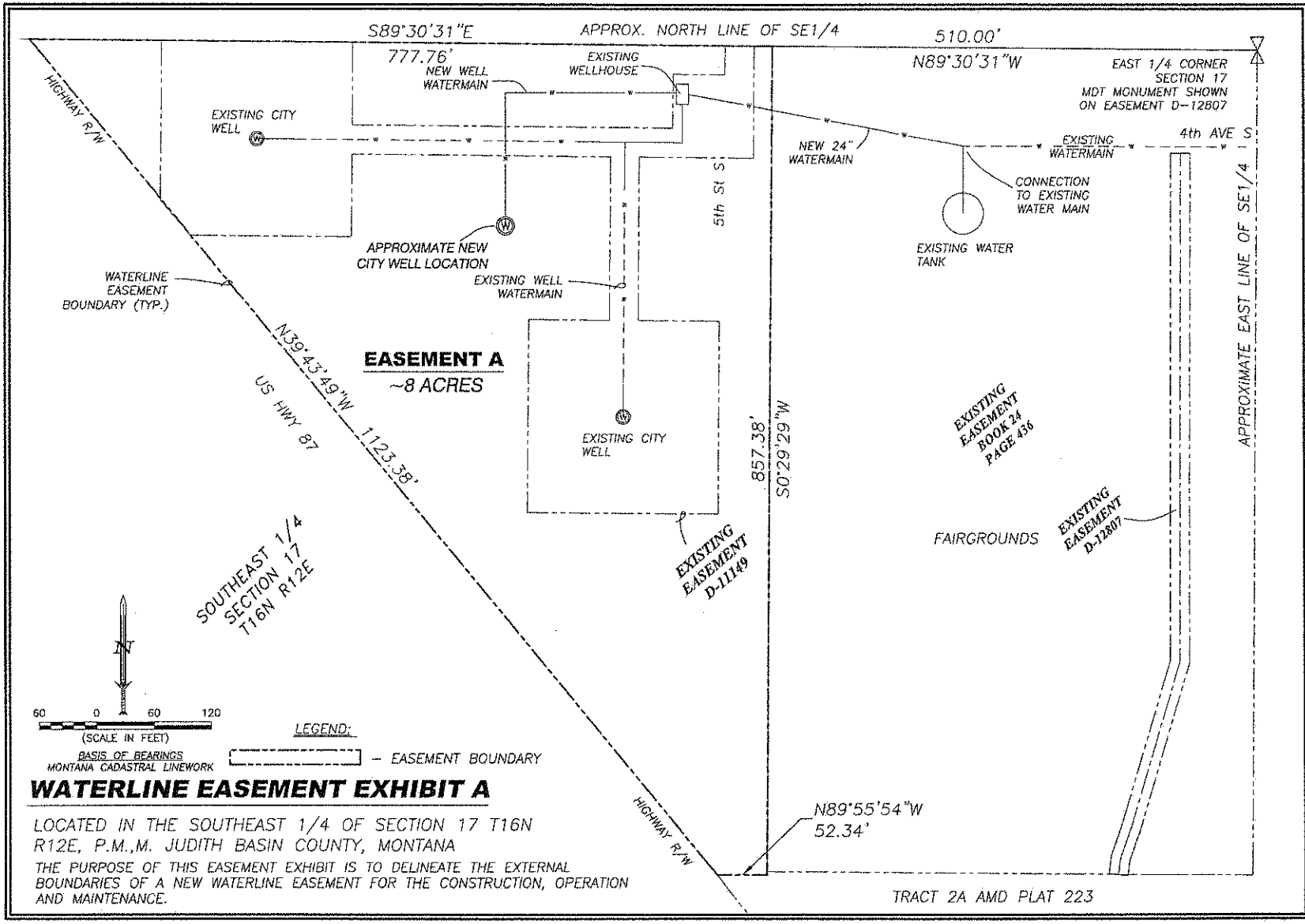
**26. SIGNIFICANCE OF POTENTIAL IMPACTS:**

No significant adverse impacts are expected with this project.

**27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:**

| | | | | | |
|---|---|---|---|---|---|
| | EIS | | More Detailed EA | XXX | No Further Analysis |

| | | |
|---|---|---|
| **EA Checklist Approved By**: | **Name:** | Barny D. Smith |
| | **Title:** | Unit Manager, Northeastern Land Office |
| **Signature:** | | **Date**: April 3, 2018 |




# WATERLINE EASEMENT EXHIBIT A

LOCATED IN THE SOUTHEAST 1/4 OF SECTION 17 T16N R12E, P.M.,M. JUDITH BASIN COUNTY, MONTANA

THE PURPOSE OF THIS EASEMENT EXHIBIT IS TO DELINEATE THE EXTERNAL BOUNDARIES OF A NEW WATERLINE EASEMENT FOR THE CONSTRUCTION, OPERATION AND MAINTENANCE.

RPA

NO. | REVISION | BY | APPD. | DATE

DESIGNED BY
DRAWN BY
CHECKED BY
DATE 02/17
PROJECT NO.
FILE Stanford SEC 2017

PROJECT TITLE
STANFORD WATER SYSTEM IMPROVEMENTS
STANFORD, MONTANA

SHEET TITLE
WATERLINE EASEMENT EXHIBIT A

SHEET 1
1 OF 1