United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions.

1. Name of Property

Historic name: Engelbrecht Farm
Other names/site number: 5AM.3086
Name of related multiple property listing:
N/A
(Enter "N/A" if property is not part of a multiple property listing)

2. Location

Street & number: 2024 Strasburg Road
City or town: Strasburg State: Colorado County: Adams
Not For Publication: N/A Vicinity: N/A

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this X nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property X meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

X national ___statewide X local
Applicable National Register Criteria:

X A ___B ___C X D

W. [illegible] 10/20/14

Signature of certifying official/Title: Deputy State Historic Preservation Officer **Date**

History Colorado, Office of Archaeology and Historic Preservation
State or Federal agency/bureau or Tribal Government

In my opinion, the property ___ meets ___ does not meet the National Register criteria.

Signature of commenting official: **Date**

Title : **State or Federal agency/bureau or Tribal Government**

4. National Park Service Certification

I hereby certify that this property is:

X entered in the National Register

___ determined eligible for the National Register

___ determined not eligible for the National Register

___ removed from the National Register

___ other (explain:) _____

by Barbara Wyatt 12-10-14

Signature of the Keeper Date of Action

5. Classification

Ownership of Property

(Check as many boxes as apply.)

Private:	X
Public – Local	
Public – State	
Public – Federal	

Category of Property

(Check only **one** box.)

Building(s)	
District	X
Site	
Structure	
Object	

Engelbrecht Farm — Name of Property
Adams County, Colorado — County and State

Number of Resources within Property

(Do not include previously listed resources in the count)

Contributing	Noncontributing	
8	4	buildings
3		sites
7		structures
2		objects
20	4	Total

Number of contributing resources previously listed in the National Register N/A

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6. Function or Use

Historic Functions

(Enter categories from instructions.)

AGRICULTURE
AGRICULTURE/irrigation facility = pumphouse
DOMESTIC/single dwelling = house
AGRICULTURE/agricultural fields
AGRICULTURE/storage

Current Functions

(Enter categories from instructions.)

DOMESTIC/single dwelling = house
AGRICULTURE/storage

7. Description

Architectural Classification
(Enter categories from instructions.)
__NO STYLE_____
_____
_____
_____
_____
_____
_____

Materials: (enter categories from instructions.)
Principal exterior materials of the property: _CONCRETE, STUCCO, METAL, WOOD__

Narrative Description
(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with **a summary paragraph** that briefly describes the general characteristics of the property, such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

Summary Paragraph

The Engelbrecht Farm sits on the near outskirts of Strasburg, Colorado, an unincorporated farming and ranching community in Adams County. Once a one hundred fifty-acre farming operation, the property now consists of approximately 14 acres, the southern half of which features a cluster of buildings and structures, including a house, garage, machine shop, sheds, a loafing shed, chicken coop, several grain bins, well houses, and the pump house for the first known functioning center-pivot irrigation system in the United States. The north half of the property remains open field, where the center-pivot system was originally in use.

Narrative Description

Engelbrecht Farm Site/Setting, 1942-67 (contributing) (Photos 1-9)
The current farm property is on the west side of Strasburg Road, approximately half a mile north of Strasburg's commercial area on Colfax Avenue. The southern half of the property features a cluster of buildings and structures, including a house, garage, machine shop, sheds, a loafing shed, chicken coop, several grain bins, well houses, and the pump house for the center-pivot

irrigation system. A dirt drive leads from the road through the middle of the cluster of buildings, becoming a large dirt work yard. Much of the rest of the open areas between the buildings are covered in a turf-type buffalo grass. Immediately to the south and west of the property are a modern elementary school and modern middle school, respectively; these boundaries are distinguished largely by a tall chain link fence, with a post-and-rail wood fence at the western third of the south boundary. The north half of the property, where the center-pivot system was originally in use, remains an open uncultivated field of volunteer wheat. Remnants of a cherry and apple orchard and evergreen tree windbreaks are evident between the north and south halves, as well as along the western edge of the south half. Several of these trees have either died or been cut down. Immediately adjacent to the pump house at the northwest corner of the property's southern half is the dirt wall remnant of a small reservoir used for the center-pivot irrigation system. Several electrical lines and poles and various farm implements, including a collection of antique tractors, are scattered among the buildings. The original towers of the center-pivot system rest along the side of the large machine shed toward the western edge of the property. Recent housing developments can be seen across the road to the east and just north of the northern boundary of the property.

The house is surrounded by a small grass yard with several evergreen trees, particularly at the southeast, southwest and northwest corners. A red flagstone patio is laid on grade within the corner of the main section and the south ell. A wire fence set in a continuous concrete base runs along the east and north edges of the yard. There is a gate at the west end of the north fence section, directly adjacent to the garage. From the gate to the concrete steps at the west ell of the house is a wide walk made of red concrete pavers. A large double gate at the east end of the north fence opens onto the east yard. A third fence at the east side faces the road. At the northeast corner of the yard, along the road, is a sign made of bent metal rods which reads "ENGELBRECHT."

Engelbrecht Farm Buildings, Structures, Objects and Sites (item numbers correspond to sketch map). Of the twenty four buildings, structures, objects and sites on the property, only four are considered non-contributing.

1. House, 1950-55 (contributing building) (Photos 10-18)

The Engelbrecht farm house is a single-story center-gable house built of concrete masonry units which have been stuccoed over. The foundation is made of red brick. Construction of the house began in 1950 with the basement, continuing progressively until it was completed in approximately1955. The house has an irregular footprint, but generally consists of a 30' x 50' main section oriented lengthwise east to west. Two small gabled ells are at the southwest corner of the main section; one oriented toward the south and measuring approximately 14' x 16', the other oriented toward the west and measuring approximately 10' x 10'. The roof is a modern pre-fabricated red standing seam metal with boxed eaves, with a small red brick chimney at the west end of the main section. There is an entrance at the west side of the west ell with a non-historic wood door with an oval central glass light. Concentric rectangular concrete steps lead down to grade. Another entrance with a steel and glass security door and red brick quoins at the opening is at the eastern end of the south side of the main section; a steep concrete ramp leads

down to grade. Windows with red brick rowlock sills are at each exterior wall of the house, most of which are a simple slide type, although two at either side of the southeast corner of the main section are double-hung sashes. At the basement level are smaller slide type windows, although a few openings feature glass block instead. All windows appear to be vinyl and are presumed to be replacements of the original wood windows.

2. Garage, 1943 (contributing building) (Photos 19-21)
Measuring approximately 30' x 24' in an east to west orientation lengthwise, the garage is constructed of concrete masonry unit covered in stucco. The gabled roof is made of modern pre-fabricated red standing seam metal and has exposed eaves. A large metal light fixture extends upward from the north roof slope close to the roof ridgeline. The gable ends have wood horizontal siding. At the east side of the garage is a large rolled garage door. Red brick veneer has been applied at the northeast and southeast lower corners of the building. The west side of the building has two small fixed wood windows with three-over-three lights. The north side of the garage is a blank wall. The garage's south side has a wood paneled door at the west end of the wall. Directly to the west of the garage is a narrow concrete walk extending southward, almost to the property line. The outhouse, now moved (see No. 23 below), originally sat at the south end of this walk. An associated filled privy pit remains (see No. 7 below).

3. Machine Shop, 1946 (contributing building) (Photos 23-28)
The machine shop sits directly north of the house across the drive and measures approximately 36' x 24' with an east to west orientation lengthwise. As with the house, it too is constructed of concrete masonry units that have been finished on the exterior with stucco. The gable roof is a modern pre-fabricated red standing seam metal with exposed eaves. The gable ends have horizontal wood weatherboard siding. At the east end of the building is a large white metal rolling garage door, which replaced the original wood garage doors in 1989. A circular electric light is fixed at the peak of the east gable end. Along the south side are three small fixed wood windows with three-over-three lights. At the western end of the south side is an entrance accessed by a small concrete step and non-historic plain wood door. The west side has two small fixed wood windows of the same type. A large vent pipe elbows out of the west gable end and terminates just above the roof line. The north side of the building has no openings other than a small horizontal pipe extending from approximately the middle of the wall.

The interior of the machine shop features exposed concrete masonry units and wood shelving along the walls. Notably, the electric saw, drill press and welding machine that were used to construct the prototype of the center-pivot system in this building remain in situ.

4. "Tuff" Shed, 2001 (non-contributing building) (Photo 29)
A modular, small red shed with a Dutch gambrel roof sits just north of the machine shed. This commercially-sold plywood shed was installed after the period of significance and is considered non-contributing.

5. Domestic Well House, 1943 (contributing structure) (Photo 30)[1]
The well that provides water for the house is protected by a well house located directly west of the garage and measuring approximately 7' x 8'. Constructed of concrete masonry unit with a stucco exterior finish, the well house has a small gabled modern pre-fabricated red standing seam metal roof with asbestos shingle siding at the gable ends and exposed eaves. A wood five-panel historic door at the south side is the only opening. Utility lines and meters are attached along the north side.

6. Clothesline, 1957 (contributing object) (Photo 68)
As another example of the ingenuity of Ernest Engelbrecht (and farmers in general), the rotating clothesline is made of a repurposed combine wheel and a frame of metal poles extending from it. Approximately 10' in diameter and 5' in height, the clothesline is located within the southwest corner of the main house's yard.

7. Privy Pit Site, 1942-2007 (contributing site) (Photo 22)
At the former location of the outhouse, just west of the clothesline, is a filled privy pit. No disturbance to this site has occurred, and although no testing has been performed, it is believed to have the potential to yield information on the farm operation and the diet of its inhabitants.

8. Chicken Coop, moved to property in 1942 (non-contributing building) (Photos 31-33)
The chicken coop measures approximately 22' x 18.5' and has a shed roof with boxed eaves sloping upward toward the south. The building is of wood-frame construction with a poured concrete foundation. The exterior walls have large asphalt shingle siding, with the exception of the entire south side and partial west side, where the walls have been reconstructed with a corrugated metal due to a destructive fire in 2009. A set of double paneled metal doors are located near the center of the south side, with a large concrete pad at grade in front of them. The west side has a single modern six-panel metal door at the south corner with a large single-light fixed window adjacent to it, which was installed at the time of the wall reconstruction in 2009. The north side does not feature any openings. The east side has a plain wood door with a small concrete stoop in front. This chicken coop was moved to the property from a nearby ranch shortly after Ernest Engelbrecht purchased the farm in 1942.[2] Due to the extensive alterations resulting from the 2009 fire damage, the chicken coop is considered non-contributing.

9. Wood Grain Bin, 1943 (contributing structure) (Photos 34-37)
This circular grain bin is roughly 25' in diameter and constructed of red-painted wooden staves held in place by four white-painted metal straps. It sits on a circular poured concrete pad. A large metal conical roof with central ventilation shaft and a large overhang replaced the original in 1979. A small wooden casement access panel with metal straps and hinges sits near the top of the bin facing east; directly below is another small hopper access panel made of metal. The grain bin sits along the southern edge of the property just west of the chicken coop.

[1] In compliance with Colorado House Bill 11-1289, the subject of this nomination focuses only upon real property and not water rights. The property owner maintains exclusive water rights and permits to all wells on the property.
[2] Warzel, Interview with Russell Engelbrecht, October 8, 2013.

10, 11, 19. Metal Grain Bins, ca. 1950 (contributing structures) (Photos 34, 38-39, 57)
Directly west of the wood grain bin along the southern boundary of the property are two identical metal grain bins (Nos. 8 & 9, see sketch map) of roughly 18' in diameter each. The bins are constructed of corrugated metal panels and rest on circular poured concrete pads. A conical roof with central ventilation shaft and narrow overhang caps each one. Metal access doors are located at the north side. A third grain bin of the exact same type and construction sits directly north of the milking barn (No. 16, see sketch map and Photo 57).

12. Well House, 1950 (contributing structure) (Photos 40-43)
This well house sits just west of the row of three grain bins along the southern boundary of the property. Measuring approximately 6' x 7', it is constructed of concrete masonry unit with an exterior stucco finish. The small gable roof is oriented east-west and has a highly deteriorated layer of wood shingles. A wood paneled door provides access to the interior at the east side. The well house has no other openings.

13. Machine Shed, 1956 (contributing building) (Photos 44-46)
This large machine shed measures approximately 50' x 80' and is oriented lengthwise north to south. Constructed of exposed concrete masonry unit, the shed has a dirt floor and a barrel roof supported by metal trusses. The exterior of the barrel roof consists of corrugated metal. Large metal top-hung sliding barn doors are located at either end (north and south). Steel lintels and a metal track for the doors sit above each of the openings. Four piers of concrete masonry unit, which correspond to the placement of the interior roof trusses, are regularly spaced along both the east and west sides of the shed.

14. Center-Pivot Irrigation Towers, 1948-50 (contributing object) (Photos 65-67)
Resting along the east side of the machine shed are the original five towers of the center-pivot irrigation system devised by Frank Zybach and built by Ernest Engelbrecht. Approximately 12' in height and 10' wide, the towers were used to carry the armature of irrigation pipes from the center of the irrigated field toward the outer circumference of the circle they inscribed on the field. Original parts such as hydraulic pistons, rod tractor wheels, springs, and the triangular frame remain for each tower. See the attached copy of the patent diagram for a thorough description of the system's original mechanism.

15. Red Shed, circa 1920s (contributing building) (Photos 47-48)
This wood frame building on a poured concrete foundation is the only building that remains from the period prior to Ernest Engelbrecht's purchase of the property in 1942. Measuring approximately 10' x 14', the shed has a metal gable roof oriented north to south. The exterior is covered in drop siding with corner boards, all of which are painted red. At the east side there is a door made of the same drop siding and strap hinges. Directly below this door is a small concrete slab stoop. At the south gable end there is a small hatch opening, also made of drop siding. The building has no other openings.

16. Loafing Shed, 1943 (contributing building) (Photos 49-50)
As with the majority of the buildings on the farm property, the one-story loafing shed is constructed of concrete masonry units over which a stucco finish has been applied. Measuring approximately 70' x 24' in plan, the shed is oriented lengthwise east to west and sits within the general center of the farm complex, surrounded by the graded dirt drive. The corrugated metal shed roof slopes upward to the south and features exposed eaves. Along the south side of the shed is a continuous series of openings, from west to east: a wooden door, two top-hung sliding doors of corrugated metal, and a row of six narrow, rectangular fixed single-light windows. Based upon an aerial photo from 1955, it appears that the top-hung doors at this side are alterations from the original openings (see Figure 2). At the east side of the shed is a paneled wood door with a low concrete stoop at grade in front of it. The north side has several window-sized openings that are currently covered with painted plywood. The west side does not have any openings.

17. Well House, 1947 (contributing structure) (Photos 51-52)
This well house, measuring approximately 6' x 4', sits northeast of the 1943 loafing shed and southeast of the milking barn. The structure is wood frame with unfinished metal siding that features vertical seams. The roof is a shallow gable type with corrugated metal. A metal vertical seam door is at the east side; at the west approximately a foot above grade extends a metal pipe, which supplied water to the reservoir at the pump house. The well house has no other openings. The well itself is about 60' deep and was hand dug by Ernest Engelbrecht.

18. Milking Barn, moved to property in 1943 (contributing building) (Photos 53-56)
As with the chicken coop, the milking barn was moved to the property by Ernest Engelbrecht in 1943, shortly after purchasing the farm. The barn is a frame broken gable form with high lean-tos at the east and west sides. The barn's poured concrete foundation at the center section extends several feet higher above the ground than the foundation at the lean-tos. The entire barn has drop siding painted red with white corner boards. Seams in the drop siding are clearly visible between the three sections of the building. The roof is of standing seam metal, which is currently painted green, and has exposed eaves. At either end of the barn's east side there are two doors which appear to have been cut into the drop siding; strap hinges and peg latches keep the doors in place. The north side has a similar door at the west end within the lean-to. The west side of the barn has a larger door of the same type, with several boards of the siding missing. Below this door is a concrete slab at grade. The south side has another door cut into the drop siding centered within the gable center section. Due to the concrete foundation being higher within this center section, the door is a few feet above grade. Directly above it in the gable end is a small opening. At the west shed is a two-over-two light wood fixed window.

20. Loafing Shed, 1974 (non-contributing building) (Photo 58-59)
This loafing shed sits along the north edge of the farm property's building cluster. Approximately 60' x 25' in plan, the shed has a gable corrugated metal roof with the gable ends at the east and west. This frame building has metal siding and various large doors along its south

side; there are no other openings at the other sides. Due to the date of its construction outside the period of significance, it is considered non-contributing.

21. Pump House, 1948 (contributing building) (Photos 60-63)
The pump house measures approximately 6' x 7' and sits at the far west end of the property, directly south of the windbreak dividing the south half from the north. A frame building with corrugated metal siding, it houses the pump which was used to draw water from the two wells (Nos. 12 & 17) in order to fill the once extant irrigation reservoir that was directly to the east. This reservoir in turn provided water to the center-pivot system which irrigated the north field. The pump house has a gable roof of corrugated metal, part of which has been peeled away from the wood sheathing by wind. At the south side is a door opening (where the door is missing), and at the west side is a hole where pipe once extended out from the building.

22. Irrigation Reservoir Site, 1948-2007 (contributing site) (Photos 60, 63)
Directly to the east of the pump house is the site of the former irrigation reservoir, built in 1948 as water storage for the center-pivot prototype installed in the field to the north, and filled in 2007. An approximately 60' long remnant of the reservoir's earthen bank stands at the west edge; when in use the reservoir was about 100' x 200' running east-west at its length. Although the reservoir is no longer extant, sub-surface resources may remain; therefore the site may be able to yield information on the center-pivot prototype and is considered contributing.

23. Outhouse, 1943, moved 2007 (non-contributing building) (Photo 64)
Just north of the pump house, reservoir site, and windbreak is an outhouse constructed of wood with drop siding and a shed roof sloping downward to the north. The doorway faces south and is missing its door. Due to its removal in 2007 from its original location at the concrete walk leading south from the garage, the outhouse is considered non-contributing.

24. Irrigation Field, 1948 (contributing site) (Photos 1-2)
The approximately seven-acre extant open field at the north half of the farm property is where the center-pivot prototype was installed and ran from 1948-67, when it irreparably broke down and was replaced with a commercially-sold center-pivot system. Engelbrecht grew alfalfa in this field, but today it is uncultivated and volunteer wheat primarily grows there. Although the north one-third to one-half of the original field has been subdivided for residential development, the southern portion, through which the reservoir was connected to and fed the center-pivot prototype, remains and is considered likely to yield information on the farm's landscape formation and the center-pivot prototype, such as its development, construction and the repairs made to it before it broke down.

Alterations
As with many farm operations, the Engelbrecht farm has evolved over time in response to the changing uses and technologies that drove the function of the property. However, most of the buildings on the property have undergone very little in the way of alterations since the time Ernest Engelbrecht built them in the early 1940s-50s. The house's original windows have been replaced. The 1946 machine shop's original wood garage door was replaced with a

contemporary rolling metal door in 1989. The 1946 loafing shed has been altered, circa early 1970s, to incorporate larger openings. The house and garage's roofs are known to have been replaced in 1979; other buildings may have also had their roofs replaced. The chicken coop's south and east walls were rebuilt after a fire in 2009. The reservoir was filled in 2007, and the windbreaks and orchard trees have diminished in number due to death and occasional removal. The outhouse was moved from its original location in 2007. Otherwise, the site, buildings and structures remain as they were when Ernest Engelbrecht established the farm and ran the first center-pivot system. The property maintains the layout of a working farm.

Integrity

Engelbrecht Farm retains a fairly high degree of integrity. In respect to *location*, the farm and its buildings, structures and open spaces remain where they were when Engelbrecht founded the farm and Zybach developed and installed the center-pivot prototype. The *design* of the farm, from the integrity of the individual buildings to the spatial organization of the entire property, continues to be in evidence. *Materials* and *workmanship* also remain evident, particularly in the concrete masonry unit buildings constructed by Engelbrecht and the original center-pivot irrigation towers that were built and assembled on-site. The *setting* of the farm maintains essentially the same layout of agricultural buildings, structures and objects in relation to one another and the north field; the remaining portion of the north field where the prototype was installed is essential to associating the setting of the farm with its significance as the site of the invention of the center-pivot irrigation system, even though the prototype towers have been removed from the field. The integrity of *feeling* is probably the most compromised in the sense that the surrounding land has been changed from farm acreage to housing developments. However, the property's open field to the north where the center-pivot system was installed is extant and helps to retain the feeling of an agricultural operation. Finally, the *association* of the invention of the center-pivot irrigation system with the property continues intact, due to the extant original center-pivot towers, the machine shed where they were constructed, and the overall property remaining much as it was when the invention was developed on-site. Although it is remarkable that the prototype towers have remained on the property since they were dismantled and removed from the field in 1967, the significance of the farm's association with the center-pivot invention does not hinge on their presence.

___

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- [X] A. Property is associated with events that have made a significant contribution to the broad patterns of our history.
- [ ] B. Property is associated with the lives of persons significant in our past.
- [ ] C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- [X] D. Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

- [ ] A. Owned by a religious institution or used for religious purposes
- [ ] B. Removed from its original location
- [ ] C. A birthplace or grave
- [ ] D. A cemetery
- [ ] E. A reconstructed building, object, or structure
- [ ] F. A commemorative property
- [ ] G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance
(Enter categories from instructions.)
INVENTION
ARCHEOLOGY/Historic non-Aboriginal and Agriculture

Period of Significance
1942 - 1967

Significant Dates
1948

Significant Person
(Complete only if Criterion B is marked above.)
N/A

Cultural Affiliation
N/A

Architect/Builder
Ernest Engelbrecht
Frank Zybach

Statement of Significance Summary Paragraph (Provide a summary paragraph that includes level of significance, applicable criteria, justification for the period of significance, and any applicable criteria considerations.)

The Engelbrecht Farm is nationally significant under Criterion A in the area of invention for its association with the invention of the center-pivot irrigation system. Ernest Engelbrecht, a farmer and builder, created this farm building complex shortly after purchasing the farm property in 1942. The farm operation with its multiple wells was what Frank Zybach, the center-pivot system's inventor, was seeking in a place to develop a prototype of the system and put it in use. Together, Zybach and Engelbrecht utilized assorted pieces of farm equipment to build and test the center-pivot irrigation system, which would eventually become a transformative technology for eastern Colorado, the states of the Great Plains, and the greater United States. Engelbrecht continued to use the prototype system at the farm until 1967 when it finally broke down. The period of significance is from 1942-67 to encompass the development of the farm as the location for which Zybach wished to work on his invention until the time when the invention prototype was no longer in use. Although it took several years for the center-pivot system to be embraced and used by the farming community, it is now a predominant form of irrigation across the country.

Additionally, the property is locally significant under Criterion D in the area of non-aboriginal historic archaeology and agriculture for its potential to yield information important to history due to buried deposits. Though filled, the site of the reservoir used to supply water to the prototype irrigation system may have subsurface deposits that may be able to shed light on the landscape

formation of the farm and the invention development. The north field where the prototype was originally installed may have artifacts that would further an understanding of how the center-pivot irrigation system was developed and honed over time. In addition, a privy existed approximately 20' west of the house. While the outhouse building was moved in 2007, the privy pit remains and is now covered and lawn grows over it; however, a depression exists at the site of the privy pit, which provides a high likelihood of obscured and buried artifacts that may give information on the farm inhabitants' daily life.

Narrative Statement of Significance (Provide at least **one** paragraph for each area of significance.)

Invention

The Engelbrecht Farm is nationally significant under Criterion A for invention due to its direct association with the invention of the center-pivot irrigation system. It is at this farm in 1948 that Frank Zybach, the system's inventor, built the prototype with Ernest Engelbrecht from various farm machine parts. The prototype was then tested and put into use by Engelbrecht, running until 1967. In 1949, Zybach applied for a U.S. patent for the system, which he was eventually granted in 1952. Due to the founding of Engelbrecht's farm operation in 1942 (which is what Zybach sought in a location for developing his invention) and the continual operation of the center-pivot prototype until 1967, the period of significance is from 1942-67. The original center-pivot irrigation towers remain on the farm, as does the machine shop where the prototype was constructed, and the pump house and remnants of the reservoir that supplied the water to the system.[3] Although it took several years for the center-pivot system to gain momentum, it is now one of the main types of irrigation in the United States, predominantly on the Great Plains, where in some states it can account for more than 75 percent of irrigated farmland.[4] In 1976, *Scientific American* claimed that the center-pivot irrigation system was "perhaps the most significant mechanical innovation in agriculture since the replacement of draft animals by the tractor."[5]

Archeology/ historic non-aboriginal

A circa-1942 privy existed about 20' west of the house. The owner moved the outhouse in 2007 and covered the pit; a noticeable depression now exists in the lawn at the pit location. The pit provides a high likelihood of obscured and buried artifacts. The information yielded may include such details as the diet and daily life of the individuals who occupied the site. The site of the irrigation reservoir, which was also filled in 2007, the north field where the prototype operated,

[3] Though the prototype towers remain on the farm and enhance the understanding of the farm's significance, they are no longer in the field where they operated. Should they be removed entirely from the farm it would not greatly impact the integrity of the farm because farm equipment is often moved and even discarded when no longer operable.

[4] William Neuman, "Robert B. Daugherty Dies at 88; Helped Irrigate the Plains," *New York Times*, November 26, 2010.

[5] William E. Splinter, "Center-Pivot Irrigation." *Scientific American* 234 (1976): 90.

and the area through which the reservoir was connected to the irrigation system all may yield information about landscape formation, land use and ranching operations at the farm in addition to information on the invention of the center-pivot irrigation system and the continual running of the prototype through 1967.

Developmental history/additional historic context information

Development of Center-Pivot System

Prior to the invention of the center-pivot system, irrigation was an especially labor intensive endeavor that was only selectively employed on the Great Plains of the United States. Among many reasons, one was that the common technique of flood-irrigating fields was ineffective and wasteful for the sandy soils commonly found in the region, where water quickly drained and did not provide lasting hydration for crops. Sprinkler irrigation, in which water was supplied from above in a simulation of rain and provided a better soaking for the crop plants, had begun to be developed following World War II, but many of these systems required complete dismantling and moving of the pipe sections after an application of water.[6] This was particularly difficult to use for taller crops such as corn, which required the long pipes to be raised overhead when moving them; adding to this difficulty was the fact that the corn leaves would usually cut the arms of the workers as they moved the pipes.[7]

Frank Zybach, a tenant farmer and inventor from Nebraska, was farming in eastern Colorado in the summer of 1947 when he attended an irrigation demonstration of an early sprinkler system using pipe sections laid on the ground. Unimpressed by the amount of labor it required, he decided to try his hand at creating another form of sprinkler irrigation that moved through self-propulsion.[8] His eventual creation used the motive power of hydraulic pressure to rotate a radial line of irrigation pipes with sprinklers around a center point, eliminating the need for any manual movement of the system. This system would eventually be known by the term "center-pivot" and would create the green circles that are now a major landscape feature visible from airplanes flying over the Midwestern and Western states of the U.S.[9]

In need of a place to test and further refine his idea by the following year, Zybach approached neighboring farmers in the Strasburg area to see if one would be willing to provide a field. Since his idea required the use of a well from which to draw water, he needed to collaborate with a farmer who already had a well in use. As would be the case once the system was ready for commercial sale, Zybach had trouble convincing farmers to try the new system: one Strasburg farmer was approached but ultimately rejected the opportunity to host the new system.[10] Eventually, Zybach partnered with Ernest Engelbrecht, who had two irrigation wells on his

[6] Splinter, 90.
[7] Erika Warzel, Interview with Richard Stahl, October 17, 2013.
[8] Leslie F. Sheffield, "Frank Zybach – inventor who changed the Great Plains." *Irrigation Age* (January 1981): 22-23.
[9] Daniel Mathews and James S. Jackson. *America from the Air: a Guide to Landscape along Your Route*, 37.
[10] *The Fence Post* "Center-pivot Irrigation Revolutionizes Agriculture." *The Fence Post*, May 25, 2010. Accessed November 27, 2013.

property, to use one of his alfalfa fields for the system. The partnership proved a good fit due to both men's experience with building and tinkering.[11] Zybach and Engelbrecht built a prototype in the farm's machine shop, where Engelbrecht had an electric saw, a drill press and welding machine. Using common farm machine parts, such as rod tractor wheels, the two men eventually developed a prototype following Zybach's initial design but with further improvements.[12] In order to produce enough water pressure for the prototype to run, a 100' x 200' reservoir was built to store the amount of water needed. It took two days for the two wells to fill this reservoir, and another two days for the sprinkler system to rotate around the field in one complete revolution. Once the system was successfully developed and running in Engelbrecht's field, Zybach applied for a U.S. patent for a "Self-Propelled Sprinkling Irrigating Apparatus" (#2,604,359) in June 1949, which was officially granted on July 22, 1952.[13]

Engelbrecht's farm operation was focused on raising beef cattle, with crop cultivation providing hay for the livestock. The 36-acre field in which Zybach and Engelbrecht installed the center-pivot prototype was for cultivation of alfalfa hay. A 1963 aerial photo of the property clearly shows the irrigation system in use (see Figure 3). The prototype remained in operation in this field until eventually in 1967 it broke down beyond repair and Engelbrecht replaced it with a Valley Manufacturing system in the same field. The prototype irrigation towers remain to this day at the Engelbrecht Farm.

Advantages of Center-Pivot System

Prior to the invention of the center-pivot system, much of the farmland on the Great Plains was devoted to dryland farming (i.e., had no irrigation). Irrigation at the time typically meant using canals and ditches to carry water from its source to the fields, and then "flooding" the fields by opening a head gate from the ditch and allowing the water to flow downhill in furrows. On the Great Plains, there were few sources of water that allowed for such labor-intensive irrigation, which required not only the construction of dams, canals and lateral ditches, but leveling of fields for water to flow through as needed, and constant maintenance of the entire system.[14] Irrigation ditches also accounted for a significant waste of water through evaporation and seepage; some statistics place that loss of water to be over 50 percent.[15] The simulation of light rainfall through the sprinkling of the center-pivot system opened up many areas which were previously considered unfit for agriculture to more intense cultivation.

Zybach outlined a number of objectives in the patent application which he maintained the center-pivot system provided: a way to sprinkler-irrigate large tracts of land, over undulating terrain, with relatively low water pressure, that could be left in operation for several days or weeks with little attention from the farmer.[16] In addition to these qualities that have propagated the use of

[11] Erika Warzel, interview with Russell Engelbrecht, October 8, 2013.
[12] Warzel, interview with Engelbrecht.
[13] Frank L. Zybach, "Self-Propelled Sprinkling Irrigating Apparatus." U.S. Patent 2,604,359, filed June 27, 1949, and issued July 22, 1952.
[14] Splinter, 90.
[15] John Opie, *Ogallala: Water for a Dry Land*, (Lincoln: University of Nebraska Press, 1993), 145.
[16] Zybach, US Patent

center-pivot irrigation, Zybach's system has also proven to be much more efficient with water usage than other forms of irrigation and requires less labor.[17] A study by the University of Nebraska in the 1970s found that pasture irrigated with center-pivot could produce an annual yield of between 700 to 900 pounds of beef per acre, as opposed to 27 pounds per acre for open range.[18] According to a 2010 *New York Times* interview with Derrel L. Martin, a professor at the University of Nebraska, Lincoln, the center-pivot system "is now used around the world and is credited with expanding the acreage of irrigated land and increasing farm productivity."[19]

Commercial Sales

After receiving his patent, Zybach began a partenership with Columbus, Nebraska entrepreneur A.E. Trowbridge to produce and sell center-pivot systems. However, their attempts to market the machinery were met with skepticism by farmers and resistance by banks to lend money for purchasing it.[20] Eventually, Zybach and Trowbridge sold the exclusive manufacturing rights in 1954 to the Valley Manufacturing Company located in Valley, Nebraska in exchange for a five-percent royalty on each unit sold. These rights were in effect until 1969, when the patent expired. Although Zybach and Trowbridge initially retained distribution rights in Nebraska and Colorado, these rights were also taken over by Valley Manufacturing in the late 1950s.[21]

Established in 1946 by Robert B. Daugherty, Valley Manufacturing began by making farm tools and machinery. The manufacturing rights to Zybach's invention proved to be a turning point for the company; now known as Valmont Industries, it is considered an "international manufacturing giant."[22] In the first year of producing the center-pivot systems, seven units were built; by 1960, the number had only risen to 50 units.[23] Anecdotes of farmers' initial reaction to the center-pivot system abound; one favorite told by Daugherty's son Tim recounts that one farmer thought the system looked like "a darn fine buzzard roost."[24] Despite these initial reactions and low sales, by 1976 an estimated 9,000 units were in use in Nebraska alone; in 1978, Robert Daugherty estimated that a total of 50,000 units were in use across the United States, accounting for 6 million acres of irrigated land.[25] [26] Exact numbers of sales in the present day are unknown, but it is clear that center-pivot irrigation accounts for vast numbers of irrigated acres in the United States, particularly on the Great Plains.

Further Development of Center-Pivot

Refinements to Zybach's patented system were begun by Zybach himself, who endeavored to raise the armature of the irrigation towers in order to accommodate taller crops such as wheat

[17] Neuman.
[18] Splinter, 93.
[19] Neuman.
[20] Sheffield, 23.
[21] Ibid.
[22] Neuman.
[23] Sheffield, 36.
[24] Neuman.
[25] Splinter, 94
[26] Sheffield, 36.

and corn. In addition, the prototype at Engelbrecht's farm initially included a metal skid rather than a wheel at the front of each tower; this was soon after replaced by another wheel. After acquiring the manufacturing and distribution rights to the center-pivot system, Valley Manufacturing also invested in improving the system, including incorporation of variable speed drives to allow for different volumes of water application, as well as safety switches.[27] Valley also realized that the system could accommodate applications of fertilizers, pesticides and herbicides, which allowed for a much more precise and judicious use of these chemicals.[28] Although Zybach's design used the hydraulic pressure from the well to propel the irrigation pivot around, later designs used diesel fuel engines, which continue to be the predominant form of power used for the system today.

Ernest Engelbrecht[29]

Ernest Engelbrecht was born on May 30, 1913 in Diller, Nebraska. In 1920, his family moved to a farm in eastern Colorado, where Engelbrecht began working for his father in 1937, around the same time that he married his wife, Doris. A few years later Engelbrecht was ready to begin his own farming operation, and purchased the property in Strasburg in 1942. In addition to being a farmer and cattleman, Engelbrecht was an expert welder, metal fabricator, and builder of concrete block buildings. Several buildings in the Strasburg vicinity were built by Engelbrecht, including one at the Uhrich Locomotive Works, a local business well-known for building and restoring narrow gauge railroad locomotives and rolling stock. In 1969, Engelbrecht helped to found the Comanche Crossing Historical Society, a local group devoted to promoting and preserving Strasburg history. He retired from farming in 1975 after passing on the operation to his son, Russell Engelbrecht. Ernest Engelbrecht died on April 24, 2000.

Frank Zybach[30]

Frank Zybach was born in 1894 in Lafayette, Oregon but moved soon after to a farm near Columbus, Nebraska with his Swiss-immigrant parents. Zybach learned blacksmithing and a love of metal-working from his father. At an early age, Zybach began developing various inventions designed to lessen the manual labor required of farmers and field hands. His first patent application, in 1920, was for an automatic tractor guide that allowed a tractor to plow in the fields without a driver. Another design in the 1930s was for an automatic transmission for automobiles, which came very close to being purchased by the Chrysler Corporation until it was realized one aspect of his design had already been patented.

Although Zybach never realized much monetary success from his most triumphant invention, the center-pivot system, his accomplishment would eventually be recognized by various organizations: in 1973 he received the first Pioneer Irrigation Award presented jointly by the Nebraska Water Conference Committee and the University of Nebraska-Lincoln; in 1974 he received an Industry Achievement Award from the Sprinkler Irrigation Association in Denver, Colorado; and again in 1974 he was given an outstanding achievement award by the Nebraska

[27] Sheffield, 36.
[28] Splinter, 94.
[29] The information in this section is based on Warzel's December 2013 interview with R. Engelbrecht.
[30] The information on Zybach in this section relies heavily on Sheffield's January 1981 article in *Irrigation Age*.

Chapter of Alpha Zeta (an honorary scholastic agricultural fraternity). Frank Zybach died in August 1980 at the age of 86 in Columbus.

Engelbrecht Farm Today

Although it does not function as a working farm today, the property retains its historic integrity in relation to its association with the invention of the center-pivot irrigation system, which significantly altered agricultural operations throughout the country. The current owner regularly maintains the property and is devoted to its place in history. The farm is also used to showcase the owner's impressive collection of antique tractors, many of which are thought to be the only ones of their kind in Colorado. It is the hope that by recognizing the farm's association with the invention of the center-pivot that this history can be effectively interpreted and preserved in the future.

9. Major Bibliographical References

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Zybach, Frank L. "Self-Propelled Sprinkling Irrigating Apparatus." U.S. Patent 2,604,359, filed June 27, 1949, and issued July 22, 1952.

Previous documentation on file (NPS):

____ preliminary determination of individual listing (36 CFR 67) has been requested
____ previously listed in the National Register
_____previously determined eligible by the National Register
_____designated a National Historic Landmark
____ recorded by Historic American Buildings Survey #_____
_____recorded by Historic American Engineering Record # _____
____ recorded by Historic American Landscape Survey # _____

Primary location of additional data:

_X_ State Historic Preservation Office
____ Other State agency
____ Federal agency
____ Local government
____ University
____ Other
Name of repository: ___History Colorado_____

Historic Resources Survey Number (if assigned): __5AM.3086_____

10. Geographical Data

Acreage of Property 13.9 acres

Use either the UTM system or latitude/longitude coordinates

Latitude/Longitude Coordinates
Datum if other than WGS84:_____
(enter coordinates to 6 decimal places)

1. Latitude: Longitude:
2. Latitude: Longitude:
3. Latitude: Longitude:
4. Latitude: Longitude:

Or
UTM References
Datum (indicated on USGS map):

[ ] NAD 1927 or [X] NAD 1983

The UTM reference point was derived from heads up digitization on Digital Raster Graphic (DRG) maps provided to OAHP by the U.S. Bureau of Land Management.

1. Zone: 13	Easting:	557901mE	Northing: 4399895mN
2. Zone: 13	Easting:	558133mE	Northing: 4399893mN
3. Zone: 13	Easting:	558133mE	Northing: 4399653mN
4. Zone: 13	Easting :	557901mE	Northing: 4399653mN

Verbal Boundary Description (Describe the boundaries of the property.)
13.9 acres in the SE corner of the NE ¼ of Sec.33, T3, R62W (763 feet by 792 feet)

Boundary Justification (Explain why the boundaries were selected.)
The boundary encompasses the remaining property associated with the original Engelbrecht Farm that has not been developed after the period of significance (1942-67).

11. Form Prepared By

name/title: _Erika Warzel, National & State Register Historian_(for owner)_____
organization: _History Colorado_____
street & number: _1200 Broadway_____
city or town:___Denver_____ state: __CO____ zip code:__80203____
e-mail__erika.warzel@state.co.us_____
telephone:__303.866.3392_____
date:___December 6, 2013_____

Additional Documentation

Submit the following items with the completed form:

- **Maps:** A **USGS map** or equivalent (7.5 or 15 minute series) indicating the property's location.

- **Sketch map** for historic districts and properties having large acreage or numerous resources. Key all photographs to this map.

- **Additional items:** (Check with the SHPO, TPO, or FPO for any additional items.)

Photographs

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels (minimum), 3000x2000 preferred, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. Each photograph must be numbered and that number must correspond to the photograph number on the photo log. For simplicity, the name of the photographer, photo date, etc. may be listed once on the photograph log and doesn't need to be labeled on every photograph.

Photo Log

Name of Property: Engelbrecht Farm
City or Vicinity: Strasburg
County: Adams State: Colorado
Photographer: Heather Peterson, National & State Register Historian, History Colorado
Date Photographed: October 8, 2013

Description of Photograph(s) and number, include description of view indicating direction of camera:

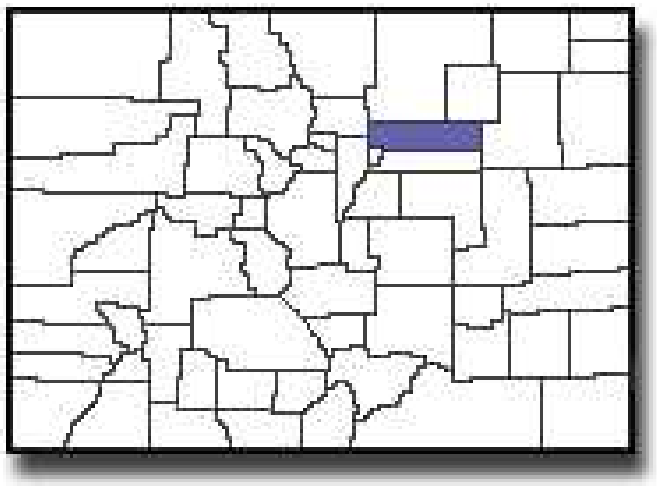
1 of 68 View of open field at north half of property. Camera facing north/northwest.
2 of 68 View of open field at north half of property, with recent housing development across Strasburg Road in background. Camera facing northeast.
3 of 68 Remnants of windbreak between north and south halves of property. Camera facing northeast.
4 of 68 Location of former orchard at northeast corner of southern half of property. Camera facing north/northwest.
5 of 68 Additional view of former orchard, now with owner's collection of antique tractors. Camera facing north.
6 of 68 View of dirt drive, shed and three grain bins at south edge of property. Neighboring elementary school in distance. Camera facing south.
7 of 68 View of dirt drive, shed and milking barn, with north field in the distance. Camera facing north.
8 of 68 View of open area east of building complex, with south fence in distance and school facilities beyond. Camera facing southwest.
9 of 68 View of chain link fence at south edge of property, with yard of house in foreground. Elementary school facilities beyond. Camera facing south/southeast.
10 of 68 East side of house, main section, fronting on Strasburg Road. Camera facing west.
11of 68 South side of house, main section and east side of south ell. Camera facing northwest.
12 of 68 Another view of house's sough side of main section and east side of south ell, with flagstone paving. Camera facing west/northwest.
13 of 68 South side of house's south ell. Camera facing north.
14 of 68 West side of house, with main entrance and steps at west ell. Yard in foreground. Camera facing east.
15 of 68 Northwest corner of house, with fencing in foreground. Camera facing southeast.
16 of 68 North side of house. Camera facing south/southeast.
17 of 68 Fence and gates at northeast corner of house yard. Strasburg Road beyond. Camera facing southeast.
18 of 68 Bent metal rod sign at northeast corner of house yard, reading "ENGELBRECHT." Camera facing west/southwest.
19 of 68 East and north sides of garage. Camera facing southwest.

20 of 68 South side of garage with west yard of house in foreground.
21 of 68 Concrete walk between garage and domestic well, at western edge of house yard. Camera facing north.
22 of 68 Former location of outhouse at south end of concrete walk. Chain link fence and elementary school parking beyond. Camera facing southwest.
23 of 68 East and north sides of 1946 machine shop. Camera facing southwest.
24 of 68 South side of machine shop with dirt drive in foreground. Camera facing north.
25 of 68 West side of machine shop. Camera facing east/northeast.
26 of 68 View of electric saw at interior north wall of machine shop. Camera facing north/northeast.
27 of 68 Drill press at interior north wall of machine shop. Camera facing north.
28 of 68 Welding machine at interior southeast corner of machine shop. Camera facing south.
29 of 68 View of "Tuff" shed. Camera facing east.
30 of 68 View of domestic well house. North end of concrete walk in foreground. Camera facing northwest.
31 of 68 South side of chicken coop. Camera facing north/northeast.
32 of 68 West side of chicken coop. Camera facing east/northeast.
33 of 68 South and east sides of chicken coop. Camera facing northwest/west.
34 of 68 Grain bins at south edge of property. Corner of red shed in foreground. Camera facing southwest.
35 of 68 Wood grain bin, south side. Camera facing north.
36 of 68 Upper hatch opening at east side of wood grain bin. Camera facing west/northwest.
37 of 68 Lower hopper opening at east side of wood grain bin. Camera facing west/northwest.
38 of 68 View of three grain bins at southern edge of property, with western most bin in foreground. Camera facing east.
39 of 68 North sides of two metal grain bins, with access door at east grain bin at center. Camera facing southwest.
40 of 68 East and north sides of well house at southern edge of property. Camera facing southwest.
41 of 68 Interior of southern well house. Camera facing west.
42 of 68 Door of southern well house. Camera facing west.
43 of 68 South side of southern well house. Camera facing north.
44 of 68 South side of machine shed. Camera facing north.
45 of 68 East and north sides of machine shed, with five center-pivot towers leaning against east wall. Camera facing southwest.
46 of 68 Interior roof of machine shed with trusses. Camera facing north.
47 of 68 South and east sides of red shed. Camera facing northwest.
48 of 68 North and west sides of red shed, with chicken coup in distance. Camera facing southeast.
49 of 68 South side of 1943 loafing shed (No. 16 on site sketch map). Camera facing north.
50 of 68 East and north sides of 1943 loafing shed. Camera facing southwest.

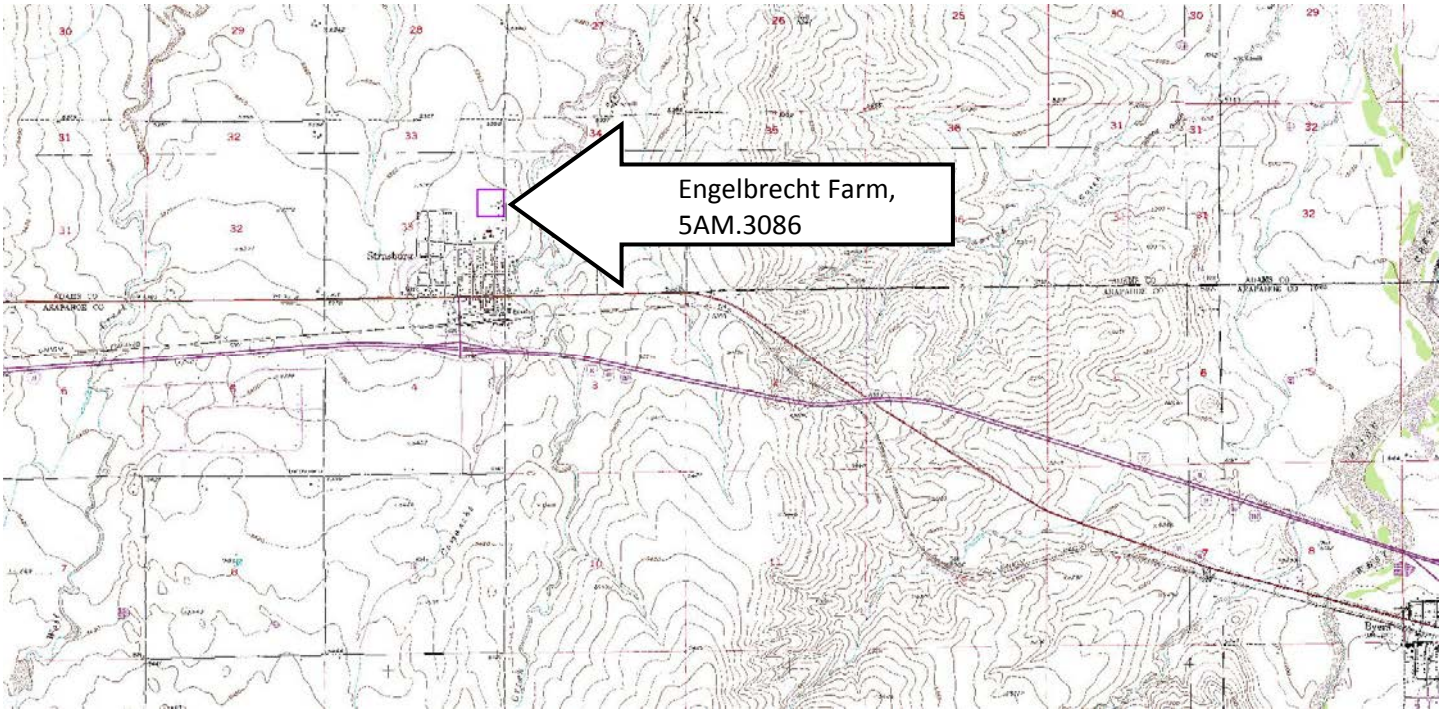
51 of 68 South side of well house (No. 17 on site sketch map). Camera facing north.
52 of 68 West and south sides of well house (No. 17), with milking barn and metal grain bin in background. Camera facing northeast.
53 of 68 West and south sides of milking barn. Camera facing northeast.
54 of 68 East side of milking barn. Camera facing west.
55 of 68 North side of milking barn. Camera facing south/southeast.
56 of 58 West side of milking barn. Camera facing east/southeast.
57 of 68 Metal grain bin (No. 19 on site sketch map). 1974 loafing shed in background. Camera facing northwest.
58 of 68 South side of 1974 loafing shed (No. 20 on site sketch map). Camera facing north.
59 of 68 View of milking barn, metal grain bin and 1974 loafing shed from orchard remnant. Camera facing west/northwest.
60 of 68 View of pump house and reservoir wall remnant. Camera facing northwest.
61 of 68 South side of pump house. Camera facing north.
62 of 68 West and north sides of pump house. Camera facing southeast.
63 of 68 Remnant of reservoir wall directly east of pump house. Camera facing west.
64 of 68 View of relocated outhouse. Camera facing northwest.
65 of 68 View of five towers of first center-pivot irrigation system, leaning against east wall of machine shed. Camera facing northwest.
66 of 68 View of single center-pivot irrigation tower. Camera facing west.
67 of 68 Detail of center-pivot irrigation tower. Camera facing east.
68 of 68 View of rotating clothesline at southwest corner of house yard. Camera facing east.

Engelbrecht Farm
Name of Property

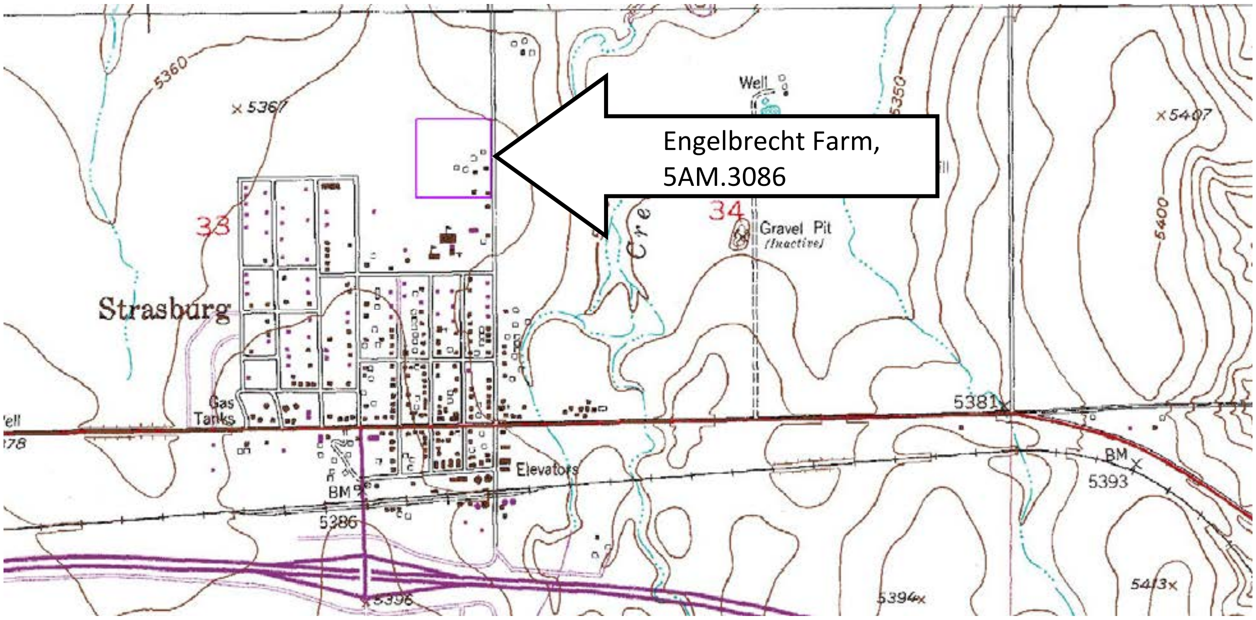
Adams County, Colorado
County and State

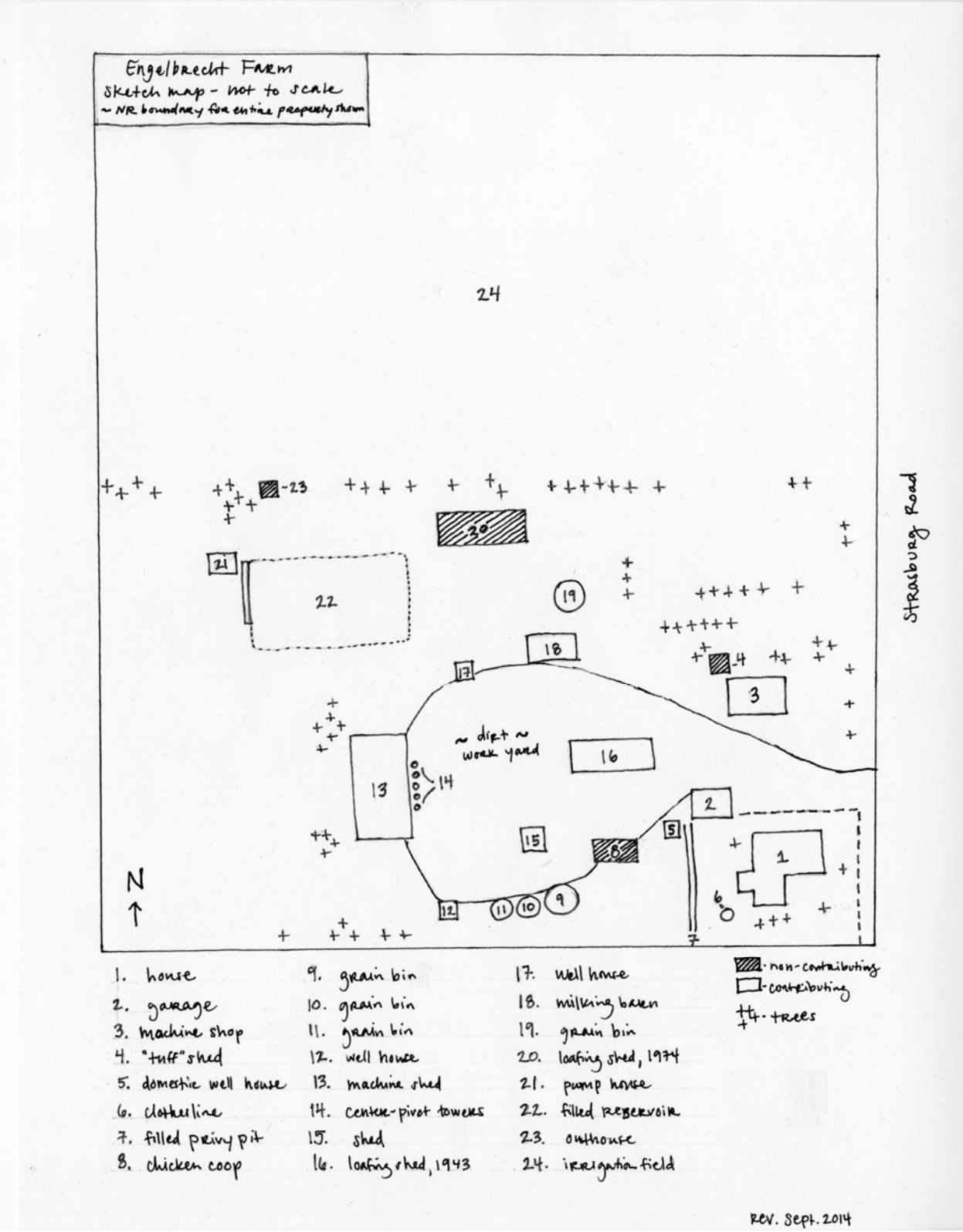


Location: Adams County



Strasburg Quad map
Township 3S, Range 62W
Elevation 5,370 feet


Engelbrecht Farm,
5AM.3086
Strasburg
Gas Tanks
Elevators
Gravel Pit
Well
33
34
5381
5393
5386
5407
5400
5360
5394
5413



Sketch map drawn by E. Warzel, December 2013; revised September 2014

Figure 1. Photo of Engelbrecht Farm, 1947. From left to right: machine shop, garage, loafing shed, and milking barn. Note that house is not yet constructed. View looking southeast.

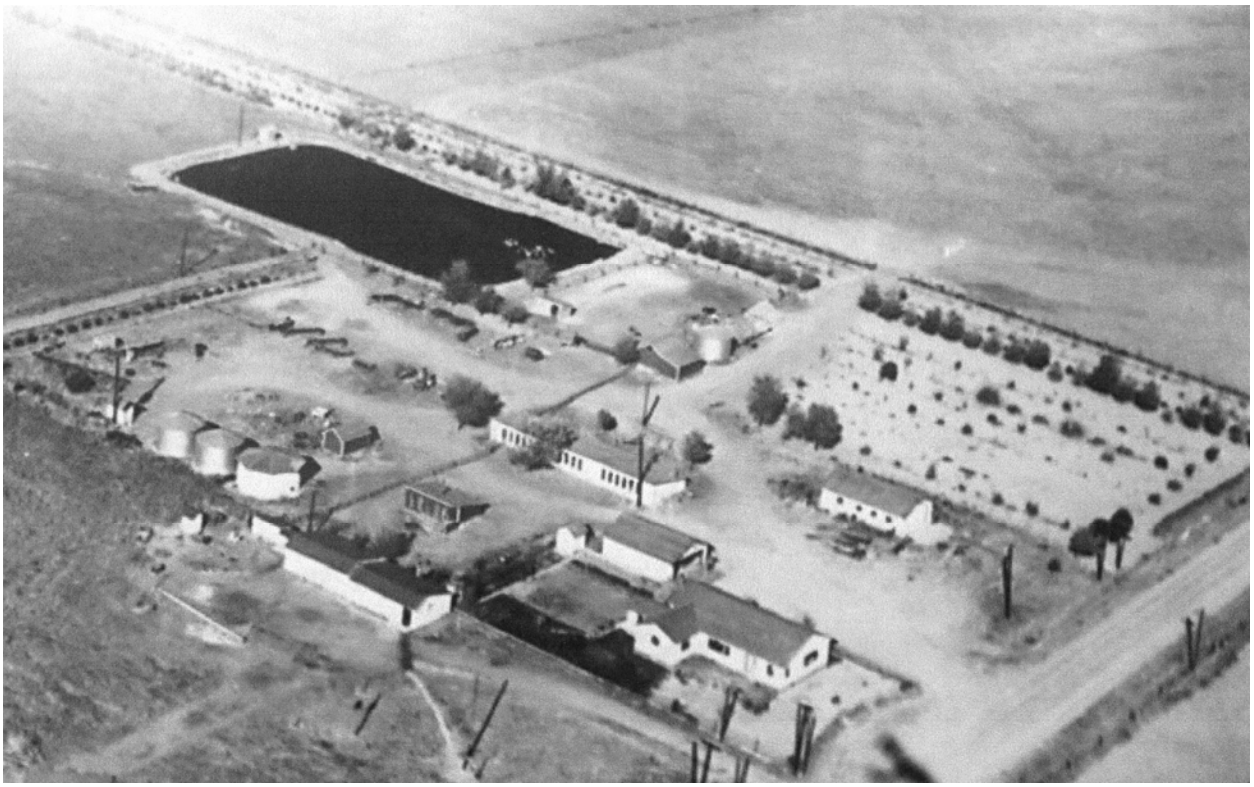


Figure 2. Aerial photo of Engelbrecht Farm, ca. 1954-55. View looking northwest.

Figure 3. Aerial photo of Engelbrecht Farm, June 27, 1963. View looking north. Note dark line at center right showing sprinklers in use.

Google earth

feet 800
meters 200

ENGELBRECHT FARM
Coordinates:
A: 39.747687°, -104.324096°
B: 39.747708°, -104.321470°
C: 39.745537°, -104.321491°
D: 39.745525°, -104.324117°


JOHN DEERE


SCHOOL
SPEED
LIMIT
20


ENGELBRECHT


PENNZOIL


DEERE


JOHN DEERE
KINGMAN EQUI
1924 D
DELTA
MILWAUKEE


AMPERAGE
HIGH
LOW
50
20
75
50
100
125
75
150
175
100
200
225
125
285
ELECTRODE HOLDER
GROUND


JOHN DEERE
JOHN DEERE
Quality Farm Equipment


BS&B
KC-MO


JOHN DEERE COUNTRY


JOHN DEERE COUNTRY


JOHN DEERE
JOHN DEERE

National Register of Historic Places
Memo to File

Correspondence

The Correspondence consists of communications from (and possibly to) the nominating authority, notes from the staff of the National Register of Historic Places, and/or other material the National Register of Historic Places received associated with the property.
Correspondence may also include information from other sources, drafts of the nomination, letters of support or objection, memorandums, and ephemera which document the efforts to recognize the property.

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
EVALUATION/RETURN SHEET

REQUESTED ACTION: RESUBMISSION

PROPERTY NAME: Engelbrecht Farm

MULTIPLE NAME:

STATE & COUNTY: COLORADO, Adams

DATE RECEIVED: 10/24/14 DATE OF PENDING LIST:
DATE OF 16TH DAY: DATE OF 45TH DAY: 12/10/14
DATE OF WEEKLY LIST:

REFERENCE NUMBER: 14000170

DETAILED EVALUATION:

X ACCEPT ___RETURN ___REJECT 12-10-14 DATE

ABSTRACT/SUMMARY COMMENTS:

The Englebrecht Farm is listed in the National Register under criteria A and D in the areas of Invention and Archeology. The period of significance is 1942 to 1967. It is nationally significant for its association with Frank Zybach, who invented the center-pivot irrigation system, which became the predominant system for irrigating crops, first in eastern Colorado and ultimately in the Great Plains and elsewhere. Zybach built the prototype system on the farm of Ernest Engelbrecht, who collaborated in the construction of the irrigation system that transformed western agriculture. It remained in use at the farm until 1967. The 13.9 acres that remain from the farm are listed. Although the acreage is surrounded by suburban development, the significance of the invention and the remnants of the original system contribute to the national significance of the site.

RECOM./CRITERIA

REVIEWER Barbara Wyatt DISCIPLINE Historian

TELEPHONE 202-354-2252 DATE 12-10-14

DOCUMENTATION see attached comments Y/N see attached SLR Y/N

HISTORY Colorado

March 10, 2014

Ms. Carol Shull
Interim Keeper of the National Register
National Register of Historic Places
1201 Eye Street, N.W., 8th Floor (MS 2280)
Washington, D.C. 20005-5905

Dear Ms. Shull:

We are pleased to submit for your review the enclosed National Register of Historic Places nomination for Engelbrecht Farm (5AM.3086) in Adams County, Colorado.

The Colorado Historic Preservation Review Board reviewed the nomination at its meeting on January 17, 2014. The board voted unanimously to recommend to the State Historic Preservation Officer that the property met the criteria for listing in the National Register.

The enclosed disk contains the true and correct copy of the nomination for Engelbrecht Farm to the National Register of Historic Places.

We look forward to the formal listing of this property. If you have any questions, please do not hesitate to contact me by phone at 303-866-4683 or by email at erika.warzel@state.co.us.

Sincerely,

Erika Warzel

Erika Warzel
National and State Register Historian
(303) 866-4683
erika.warzel@state.co.us

Enclosures
CDs (2)
Signature Page

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions.

1. Name of Property

Historic name: Engelbrecht Farm
Other names/site number: 5AM.3086
Name of related multiple property listing:
N/A
(Enter "N/A" if property is not part of a multiple property listing)

2. Location

Street & number: 2024 Strasburg Road
City or town: Strasburg State: Colorado County: Adams
Not For Publication: N/A Vicinity: N/A

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this X nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property X meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

X national ___ statewide X local
Applicable National Register Criteria:

X A ___ B ___ C X D

Returned

Signature of certifying official/Title: Deputy State Historic Preservation Officer **Date**

History Colorado, Office of Archaeology and Historic Preservation
State or Federal agency/bureau or Tribal Government

In my opinion, the property ___ meets ___ does not meet the National Register criteria.

Signature of commenting official: **Date**

Title : **State or Federal agency/bureau or Tribal Government**

4. National Park Service Certification

I hereby certify that this property is:

___ entered in the National Register

___ determined eligible for the National Register

___ determined not eligible for the National Register

___ removed from the National Register

___ other (explain:) _____

Signature of the Keeper Date of Action

5. Classification

Ownership of Property

(Check as many boxes as apply.)

Private:	[x]
Public – Local	[ ]
Public – State	[ ]
Public – Federal	[ ]

Returned

Category of Property

(Check only **one** box.)

Building(s)	[ ]
District	[x]
Site	[ ]
Structure	[ ]
Object	[ ]

Number of Resources within Property

(Do not include previously listed resources in the count)

Contributing	Noncontributing	
8	4	buildings
3		sites
7		structures
2		objects
20	4	Total

Number of contributing resources previously listed in the National Register N/A

6. Function or Use

Historic Functions

(Enter categories from instructions.)

AGRICULTURE
AGRICULTURE/irrigation facility = pumphouse
DOMESTIC/single dwelling = house
AGRICULTURE/agricultural fields
AGRICULTURE/storage

Returned

Current Functions

(Enter categories from instructions.)

DOMESTIC/single dwelling = house
AGRICULTURE/storage

7. Description

Architectural Classification
(Enter categories from instructions.)
NO STYLE

Materials: (enter categories from instructions.)
Principal exterior materials of the property: CONCRETE, STUCCO, METAL, WOOD

Narrative Description
(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with **a summary paragraph** that briefly describes the general characteristics of the property such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

Summary Paragraph

The Engelbrecht Farm sits on the near outskirts of Strasburg, Colorado, an unincorporated farming and ranching community in Adams County. Once a one hundred fifty-acre farming operation, the property now consists of approximately 14 acres, the southern half of which features a cluster of buildings and structures, including a house, garage, machine shop, sheds, a loafing shed, chicken coop, several grain bins, well houses, and the pump house for the first known functioning center-pivot irrigation system in the United States. The north half of the property remains open field, where the center-pivot system was originally in use.

Narrative Description

Engelbrecht Farm Site/Setting, 1942-67 (contributing) (Photos 1-9)
The current farm property is on the west side of Strasburg Road, approximately half a mile north of Strasburg's commercial area on Colfax Avenue. The southern half of the property features a cluster of buildings and structures, including a house, garage, machine shop, sheds, a loafing shed, chicken coop, several grain bins, well houses, and the pump house for the center-pivot

irrigation system. A dirt drive leads from the road through the middle of the cluster of buildings, becoming a large dirt work yard. Much of the rest of the open areas between the buildings are covered in a turf-type buffalo grass. Immediately to the south and west of the property are a modern elementary school and modern middle school, respectively; these boundaries are distinguished largely by a tall chain link fence, with a post-and-rail wood fence at the western third of the south boundary. The north half of the property, where the center-pivot system was originally in use, remains an open uncultivated field of volunteer wheat. Remnants of a cherry and apple orchard and evergreen tree windbreaks are evident between the north and south halves, as well as along the western edge of the south half. Several of these trees have either died or been cut down. Immediately adjacent to the pump house at the northwest corner of the property's southern half is the dirt wall remnant of a small reservoir used for the center-pivot irrigation system. Several electrical lines and poles and various farm implements, including a collection of antique tractors, are scattered among the buildings. The original towers of the center-pivot system rest along the side of the large machine shed toward the western edge of the property. Recent housing developments can be seen across the road to the east and just north of the northern boundary of the property.

The house is surrounded by a small grass yard with several evergreen trees, particularly at the southeast, southwest and northwest corners. A red flagstone patio is laid on grade within the corner of the main section and the south ell. A wire fence set in a continuous concrete base runs along the east and north edges of the yard. There is a gate at the west end of the north fence section, directly adjacent to the garage. From the gate to the concrete steps at the west ell of the house is a wide walk made of red concrete pavers. A large double gate at the east end of the north fence opens onto the east yard. A third fence at the east side faces the road. At the northeast corner of the yard, along the road, is a sign made of bent metal rods which reads "ENGELBRECHT."

Engelbrecht Farm Buildings, Structures, Objects and Sites (item numbers correspond to sketch map). Of the twenty four buildings, structures, objects and sites on the property, only four are considered non-contributing.

1. House, 1950-55 (contributing building) (Photos 10-18)
The Engelbrecht farm house is a single-story center-gable house built of concrete masonry units which have been stuccoed over. The foundation is made of red brick. Construction of the house began in 1950 with the basement, continuing progressively until it was completed in approximately1955. The house has an irregular footprint, but generally consists of a 30' x 50' main section oriented lengthwise east to west. Two small gabled ells are at the southwest corner of the main section; one oriented toward the south and measuring approximately 14' x 16', the other oriented toward the west and measuring approximately 10' x 10'. The roof is a modern pre-fabricated red standing seam metal with boxed eaves, with a small red brick chimney at the west end of the main section. There is an entrance at the west side of the west ell with a non-historic wood door with an oval central glass light. Concentric rectangular concrete steps lead down to grade. Another entrance with a steel and glass security door and red brick quoins at the opening is at the eastern end of the south side of the main section; a steep concrete ramp leads

down to grade. Windows with red brick rowlock sills are at each exterior wall of the house, most of which are a simple slide type, although two at either side of the southeast corner of the main section are double-hung sashes. At the basement level are smaller slide type windows, although a few openings feature glass block instead. All windows appear to be vinyl and are presumed to be replacements of the original wood windows.

2. Garage, 1943 (contributing building) (Photos 19-21)
Measuring approximately 30' x 24' in an east to west orientation lengthwise, the garage is constructed of concrete masonry unit covered in stucco. The gabled roof is made of modern pre-fabricated red standing seam metal and has exposed eaves. A large metal light fixture extends upward from the north roof slope close to the roof ridgeline. The gable ends have wood horizontal siding. At the east side of the garage is a large rolled garage door. Red brick veneer has been applied at the northeast and southeast lower corners of the building. The west side of the building has two small fixed wood windows with three-over-three lights. The north side of the garage is a blank wall. The garage's south side has a wood paneled door at the west end of the wall. Directly to the west of the garage is a narrow concrete walk extending southward, almost to the property line. The outhouse, now moved (see No. 23 below), originally sat at the south end of this walk. An associated lined privy pit remains (see No. 7 below).

3. Machine Shop, 1946 (contributing building) (Photos 23-28)
The machine shop sits directly north of the house across the drive and measures approximately 36' x 24' with an east to west orientation lengthwise. As with the house, it too is constructed of concrete masonry units that have been finished on the exterior with stucco. The gable roof is a modern pre-fabricated red standing seam metal with exposed eaves. The gable ends have horizontal wood weatherboard siding. At the east end of the building is a large white metal rolling garage door, which replaced the original wood garage doors in 1989. A circular electric light is fixed at the peak of the east gable end. Along the south side are three small fixed wood windows with three-over-three lights. At the western end of the south side is an entrance accessed by a small concrete step and non-historic plain wood door. The west side has two small fixed wood windows of the same type. A large vent pipe elbows out of the west gable end and terminates just above the roof line. The north side of the building has no openings other than a small horizontal pipe extending from approximately the middle of the wall.

The interior of the machine shop features exposed concrete masonry units and wood shelving along the walls. Notably, the electric saw, drill press and welding machine that were used to construct the prototype of the center-pivot system in this building remain in situ.

4. "Tuff" Shed, 2001 (non-contributing building) (Photo 29)
A modular, small red shed with a Dutch gambrel roof sits just north of the machine shed. This commercially-sold plywood shed was installed after the period of significance and is considered non-contributing.

5. Domestic Well House, 1943 (contributing structure) (Photo 30)[1]
The well that provides water for the house is protected by a well house located directly west of the garage and measuring approximately 7' x 8'. Constructed of concrete masonry unit with a stucco exterior finish, the well house has a small gabled modern pre-fabricated red standing seam metal roof with asbestos shingle siding at the gable ends and exposed eaves. A wood five-panel historic door at the south side is the only opening. Utility lines and meters are attached along the north side.

6. Clothesline, 1957 (contributing object) (Photo 68)
As another example of the ingenuity of Ernest Engelbrecht (and farmers in general), the rotating clothesline is made of a repurposed combine wheel and a frame of metal poles extending from it. Approximately 10' in diameter and 5' in height, the clothesline is located within the southwest corner of the main house's yard.

7. Privy Pit Site, 1942-2007 (contributing site) (Photo 22)
At the former location of the outhouse, just west of the clothesline, is a filled privy pit. No disturbance to this site has occurred, and although no testing has been performed, it is believed to have the potential to yield information on the farm operation and the diet of its inhabitants.

8. Chicken Coop, moved to property in 1942 (non-contributing building) (Photos 31-33)
The chicken coop measures approximately 22' x 18.5' and has a shed roof with boxed eaves sloping upward toward the south. The building is of wood-frame construction with a poured concrete foundation. The exterior walls have large asphalt shingle siding, with the exception of the entire south side and partial west side, where the walls have been reconstructed with a corrugated metal due to a destructive fire in 2009. A set of double paneled metal doors are located near the center of the south side, with a large concrete pad at grade in front of them. The west side has a single modern six-panel metal door at the south corner with a large single-light fixed window adjacent to it, which was installed at the time of the wall reconstruction in 2009. The north side does not feature any openings. The east side has a plain wood door with a small concrete stoop in front. This chicken coop was moved to the property from a nearby ranch shortly after Ernest Engelbrecht purchased the farm in 1942.[2] Due to the extensive alterations resulting from the 2009 fire damage, the chicken coop is considered non-contributing.

9. Wood Grain Bin, 1943 (contributing structure) (Photos 34-37)
This circular grain bin is roughly 25' in diameter and constructed of red-painted wooden staves held in place by four white-painted metal straps. It sits on a circular poured concrete pad. A large metal conical roof with central ventilation shaft and a large overhang replaced the original in 1979. A small wooden casement access panel with metal straps and hinges sits near the top of the bin facing east; directly below is another small hopper access panel made of metal. The grain bin sits along the southern edge of the property just west of the chicken coop.

[1] In compliance with Colorado House Bill 11-1289, the subject of this nomination focuses only upon real property and not water rights. The property owner maintains exclusive water rights and permits to all wells on the property.
[2] Warzel, Interview with Russell Engelbrecht, October 8, 2013.

10, 11, 19. Metal Grain Bins, ca. 1950 (contributing structures) (Photos 34, 38-39, 57)
Directly west of the wood grain bin along the southern boundary of the property are two identical metal grain bins (Nos. 8 & 9, see sketch map) of roughly 18' in diameter each. The bins are constructed of corrugated metal panels and rest on circular poured concrete pads. A conical roof with central ventilation shaft and narrow overhang caps each one. Metal access doors are located at the north side. A third grain bin of the exact same type and construction sits directly north of the milking barn (No. 16, see sketch map and Photo 57).

12. Well House, 1950 (contributing structure) (Photos 40-43)
This well house sits just west of the row of three grain bins along the southern boundary of the property. Measuring approximately 6' x 7', it is constructed of concrete masonry unit with an exterior stucco finish. The small gable roof is oriented east-west and has a highly deteriorated layer of wood shingles. A wood paneled door provides access to the interior at the east side. The well house has no other openings.

13. Machine Shed, 1956 (contributing building) (Photos 44-46)
This large machine shed measures approximately 50' x 80' and is oriented lengthwise north to south. Constructed of exposed concrete masonry unit, the shed has a dirt floor and a barrel roof supported by metal trusses. The exterior of the barrel roof consists of corrugated metal. Large metal top-hung sliding barn doors are located at either end (north and south). Steel lintels and a metal track for the doors sit above each of the openings. Four piers of concrete masonry unit, which correspond to the placement of the interior roof trusses, are regularly spaced along both the east and west sides of the shed.

Returned

14. Center-Pivot Irrigation Towers, 1948-50 (contributing object) (Photos 65-67)
Resting along the east side of the machine shed are the original five towers of the center-pivot irrigation system devised by Frank Zybach and built by Ernest Engelbrecht. Approximately 12' in height and 10' wide, the towers were used to carry the armature of irrigation pipes from the center of the irrigated field toward the outer circumference of the circle they inscribed on the field. Original parts such as hydraulic pistons, rod tractor wheels, springs, and the triangular frame remain for each tower. See the attached copy of the patent diagram for a thorough description of the system's original mechanism.

15. Red Shed, circa 1920s (contributing building) (Photos 47-48)
This wood frame building on a poured concrete foundation is the only building that remains from the period prior to Ernest Engelbrecht's purchase of the property in 1942. Measuring approximately 10' x 14', the shed has a metal gable roof oriented north to south. The exterior is covered in drop siding with corner boards, all of which are painted red. At the east side there is a door made of the same drop siding and strap hinges. Directly below this door is a small concrete slab stoop. At the south gable end there is a small hatch opening, also made of drop siding. The building has no other openings.

16. Loafing Shed, 1943 (contributing building) (Photos 49-50)
As with the majority of the buildings on the farm property, the one-story loafing shed is constructed of concrete masonry units over which a stucco finish has been applied. Measuring approximately 70' x 24' in plan, the shed is oriented lengthwise east to west and sits within the general center of the farm complex, surrounded by the graded dirt drive. The corrugated metal shed roof slopes upward to the south and features exposed eaves. Along the south side of the shed is a continuous series of openings, from west to east: a wooden door, two top-hung sliding doors of corrugated metal, and a row of six narrow, rectangular fixed single-light windows. Based upon an aerial photo from 1955, it appears that the top-hung doors at this side are alterations from the original openings (see Figure 2). At the east side of the shed is a paneled wood door with a low concrete stoop at grade in front of it. The north side has several window-sized openings that are currently covered with painted plywood. The west side does not have any openings.

17. Well House, 1947 (contributing structure) (Photos 51-52)
This well house, measuring approximately 6' x 4', sits northeast of the 1943 loafing shed and southeast of the milking barn. The structure is wood frame with unfinished metal siding that features vertical seams. The roof is a shallow gable type with corrugated metal. A metal vertical seam door is at the east side; at the west approximately a foot above grade extends a metal pipe, which supplied water to the reservoir at the pump house. The well house has no other openings. The well itself is about 60' deep and was hand dug by Ernest Engelbrecht.

Returned

18. Milking Barn, moved to property in 1943 (contributing building) (Photos 53-56)
As with the chicken coop, the milking barn was moved to the property by Ernest Engelbrecht in 1943, shortly after purchasing the farm. The barn is a frame broken gable form with high lean-tos at the east and west sides. The barn's poured concrete foundation at the center section extends several feet higher above the ground than the foundation at the lean-tos. The entire barn has drop siding painted red with white corner boards. Seams in the drop siding are clearly visible between the three sections of the building. The roof is of standing seam metal, which is currently painted green, and has exposed eaves. At either end of the barn's east side there are two doors which appear to have been cut into the drop siding; strap hinges and peg latches keep the doors in place. The north side has a similar door at the west end within the lean-to. The west side of the barn has a larger door of the same type, with several boards of the siding missing. Below this door is a concrete slab at grade. The south side has another door cut into the drop siding centered within the gable center section. Due to the concrete foundation being higher within this center section, the door is a few feet above grade. Directly above it in the gable end is a small opening. At the west shed is a two-over-two light wood fixed window.

20. Loafing Shed, 1974 (non-contributing building) (Photo 58-59)
This loafing shed sits along the north edge of the farm property's building cluster. Approximately 60' x 25' in plan, the shed has a gable corrugated metal roof with the gable ends at the east and west. This frame building has metal siding and various large doors along its south

side; there are no other openings at the other sides. Due to the date of its construction outside the period of significance, it is considered non-contributing.

21. Pump House, 1948 (contributing building) (Photos 60-63)
The pump house measures approximately 6' x 7' and sits at the far west end of the property, directly south of the windbreak dividing the south half from the north. A frame building with corrugated metal siding, it houses the pump which was used to draw water from the two wells (Nos. 12 & 17) in order to fill the once extant irrigation reservoir that was directly to the east. This reservoir in turn provided water to the center-pivot system which irrigated the north field. The pump house has a gable roof of corrugated metal, part of which has been peeled away from the wood sheathing by wind. At the south side is a door opening (where the door is missing), and at the west side is a hole where pipe once extended out from the building.

22. Irrigation Reservoir Site, 1948-2007 (contributing site) (Photos 60, 63)
Directly to the east of the pump house is the site of the former irrigation reservoir, built in 1948 as water storage for the center-pivot prototype installed in the field to the north, and filled in 2007. An approximately 60' long remnant of the reservoir's earthen bank stands at the west edge; when in use the reservoir was about 100' x 200' running east-west at its length. Although the reservoir is no longer extant, sub-surface resources may remain; therefore the site may be able to yield information on the center-pivot prototype and is considered contributing.

23. Outhouse, 1943, moved 2007 (non-contributing building) (Photo 64)
Just north of the pump house, reservoir site, and windbreak is an outhouse constructed of wood with drop siding and a shed roof sloping downward to the north. The doorway faces south and is missing its door. Due to its removal in 2007 from its original location at the concrete walk leading south from the garage, the outhouse is considered non-contributing.

24. Irrigation Field, 1948 (contributing site) (Photos 1-2)
The approximately seven-acre extant open field at the north half of the farm property is where the center-pivot prototype was installed and ran from 1948-67, when it irreparably broke down and was replaced with a commercially-sold center-pivot system. Engelbrecht grew alfalfa in this field, but today it is uncultivated and volunteer wheat primarily grows there. Although the north one-third to one-half of the original field has been subdivided for residential development, the southern portion, through which the reservoir was connected to and fed the center-pivot prototype, remains and is considered likely to yield information on the farm's landscape formation and the center-pivot prototype, such as its development, construction and the repairs made to it before it broke down.

Alterations
As with many farm operations, the Engelbrecht farm has evolved over time in response to the changing uses and technologies that drove the function of the property. However, most of the buildings on the property have undergone very little in the way of alterations since the time Ernest Engelbrecht built them in the early 1940s-50s. The house's original windows have been replaced. The 1946 machine shop's original wood garage door was replaced with a

contemporary rolling metal door in 1989. The 1946 loafing shed has been altered, circa early 1970s, to incorporate larger openings. The house and garage's roofs are known to have been replaced in 1979; other buildings may have also had their roofs replaced. The chicken coop's south and east walls were rebuilt after a fire in 2009. The reservoir was filled in 2007, and the windbreaks and orchard trees have diminished in number due to death and occasional removal. The outhouse was moved from its original location in 2007. Otherwise, the site, buildings and structures remain as they were when Ernest Engelbrecht established the farm and ran the first center-pivot system. The property maintains the layout of a working farm.

Integrity

Engelbrecht Farm retains a fairly high degree of integrity. In respect to *location*, the farm and its buildings, structures and open spaces remain where they were when Engelbrecht founded the farm and Zybach developed and installed the center-pivot prototype. The *design* of the farm, from the integrity of the individual buildings to the spatial organization of the entire property, continues to be in evidence. *Materials* and *workmanship* also remain evident, particularly in the concrete masonry unit buildings constructed by Engelbrecht and the original center-pivot irrigation towers that were built and assembled on-site. The *setting* of the farm maintains essentially the same layout of agricultural buildings, structures and objects in relation to one another and the north field; the remaining portion of the north field where the prototype was installed is essential to associating the setting of the farm with its significance as the site of the invention of the center-pivot irrigation system, even though the prototype towers have been removed from the field. The integrity of *feeling* is probably the most compromised in the sense that the surrounding land has been changed from farm acreage to housing developments. However, the property's open field to the north where the center-pivot system was installed is extant and helps to retain the feeling of an agricultural operation. Finally, the *association* of the invention of the center-pivot irrigation system with the property continues intact, due to the extant original center-pivot towers, the machine shed where they were constructed, and the overall property remaining much as it was when the invention was developed on-site. Although it is remarkable that the prototype towers have remained on the property since they were dismantled and removed from the field in 1967, the significance of the farm's association with the center-pivot invention does not hinge on their presence.

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

[x] A. Property is associated with events that have made a significant contribution to the broad patterns of our history.

[ ] B. Property is associated with the lives of persons significant in our past.

[ ] C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

[x] D. Property has yielded, or is likely to yield, information important in prehistory or history.

Returned

Criteria Considerations
(Mark "x" in all the boxes that apply.)

[ ] A. Owned by a religious institution or used for religious purposes

[ ] B. Removed from its original location

[ ] C. A birthplace or grave

[ ] D. A cemetery

[ ] E. A reconstructed building, object, or structure

[ ] F. A commemorative property

[ ] G. Less than 50 years old or achieving significance within the past 50 years

Areas of Significance
(Enter categories from instructions.)
INVENTION
ARCHEOLOGY/Historic non-Aboriginal and Agriculture

Period of Significance
1942 - 1967

Significant Dates
1948

Significant Person
(Complete only if Criterion B is marked above.)
N/A

Cultural Affiliation
N/A

Architect/Builder
Ernest Engelbrecht
Frank Zybach

Returned

Statement of Significance Summary Paragraph (Provide a summary paragraph that includes level of significance, applicable criteria, justification for the period of significance, and any applicable criteria considerations.)

The Engelbrecht Farm is nationally significant under Criterion A in the area of invention for its association with the invention of the center-pivot irrigation system. Ernest Engelbrecht, a farmer and builder, created this farm building complex shortly after purchasing the farm property in 1942. The farm operation with its multiple wells was what Frank Zybach, the center-pivot system's inventor, was seeking in a place to develop a prototype of the system and put it in use. Together, Zybach and Engelbrecht utilized assorted pieces of farm equipment to build and test the center-pivot irrigation system, which would eventually become a transformative technology for eastern Colorado, the states of the Great Plains, and the greater United States. Engelbrecht continued to use the prototype system at the farm until 1967 when it finally broke down. The period of significance is from 1942-67 to encompass the development of the farm as the location for which Zybach wished to work on his invention until the time when the invention prototype was no longer in use. Although it took several years for the center-pivot system to be embraced and used by the farming community, it is now a predominant form of irrigation across the country.

Additionally, the property is locally significant under Criterion D in the area of non-aboriginal historic archaeology and agriculture for its potential to yield information important to history due to buried deposits. Though filled, the site of the reservoir used to supply water to the prototype irrigation system may have subsurface deposits that may be able to shed light on the landscape

formation of the farm and the invention development. The north field where the prototype was originally installed may have artifacts that would further an understanding of how the center-pivot irrigation system was developed and honed over time. In addition, a privy existed approximately 20' west of the house. While the outhouse building was moved in 2007, the privy pit remains and is now covered and lawn grows over it; however, a depression exists at the site of the privy pit, which provides a high likelihood of obscured and buried artifacts that may give information on the farm inhabitants' daily life.

Narrative Statement of Significance (Provide at least **one** paragraph for each area of significance.)

Invention

The Engelbrecht Farm is nationally significant under Criterion A for invention due to its direct association with the invention of the center-pivot irrigation system. It is at this farm in 1948 that Frank Zybach, the system's inventor, built the prototype with Ernest Engelbrecht from various farm machine parts. The prototype was then tested and put into use by Engelbrecht, running until 1967. In 1949, Zybach applied for a U.S. patent for the system, which he was eventually granted in 1952. Due to the founding of Engelbrecht's farm operation in 1942 (which is what Zybach sought in a location for developing his invention) and the continual operation of the center-pivot prototype until 1967, the period of significance is from 1942-67. The original center-pivot irrigation towers remain on the farm, as does the machine shop where the prototype was constructed, and the pump house and remnants of the reservoir that supplied the water to the system.[3] Although it took several years for the center-pivot system to gain momentum, it is now one of the main types of irrigation in the United States, predominantly on the Great Plains, where in some states it can account for more than 75 percent of irrigated farmland.[4] In 1976, *Scientific American* claimed that the center-pivot irrigation system was "perhaps the most significant mechanical innovation in agriculture since the replacement of draft animals by the tractor."[5]

Archeology/ historic non-aboriginal

A circa-1942 privy existed about 20' west of the house. The owner moved the outhouse in 2007 and covered the pit; a noticeable depression now exists in the lawn at the pit location. The pit provides a high likelihood of obscured and buried artifacts. The information yielded may include such details as the diet and daily life of the individuals who occupied the site. The site of the irrigation reservoir, which was also filled in 2007, the north field where the prototype operated,

[3] Though the prototype towers remain on the farm and enhance the understanding of the farm's significance, they are no longer in the field where they operated. Should they be removed entirely from the farm it would not greatly impact the integrity of the farm because farm equipment is often moved and even discarded when no longer operable.

[4] William Neuman, "Robert B. Daugherty Dies at 88; Helped Irrigate the Plains," *New York Times*, November 26, 2010.

[5] William E. Splinter, "Center-Pivot Irrigation." *Scientific American* 234 (1976): 90.

and the area through which the reservoir was connected to the irrigation system all may yield information about landscape formation, land use and ranching operations at the farm in addition to information on the invention of the center-pivot irrigation system and the continual running of the prototype through 1967.

Developmental history/additional historic context information

Development of Center-Pivot System

Prior to the invention of the center-pivot system, irrigation was an especially labor intensive endeavor that was only selectively employed on the Great Plains of the United States. Among many reasons, one was that the common technique of flood-irrigating fields was ineffective and wasteful for the sandy soils commonly found in the region, where water quickly drained and did not provide lasting hydration for crops. Sprinkler irrigation, in which water was supplied from above in a simulation of rain and provided a better soaking for the crop plants, had begun to be developed following World War II, but many of these systems required complete dismantling and moving of the pipe sections after an application of water.[6] This was particularly difficult to use for taller crops such as corn, which required the long pipes to be raised overhead when moving them; adding to this difficulty was the fact that the corn leaves would usually cut the arms of the workers as they moved the pipes.[7]

Frank Zybach, a tenant farmer and inventor from Nebraska, was farming in eastern Colorado in the summer of 1947 when he attended an irrigation demonstration of an early sprinkler system using pipe sections laid on the ground. Unimpressed by the amount of labor it required, he decided to try his hand at creating another form of sprinkler irrigation that moved through self-propulsion.[8] His eventual creation used the motive power of hydraulic pressure to rotate a radial line of irrigation pipes with sprinklers around a center point, eliminating the need for any manual movement of the system. This system would eventually be known by the term "center-pivot" and would create the green circles that are now a major landscape feature visible from airplanes flying over the Midwestern and Western states of the U.S.[9]

In need of a place to test and further refine his idea by the following year, Zybach approached neighboring farmers in the Strasburg area to see if one would be willing to provide a field. Since his idea required the use of a well from which to draw water, he needed to collaborate with a farmer who already had a well in use. As would be the case once the system was ready for commercial sale, Zybach had trouble convincing farmers to try the new system: one Strasburg farmer was approached but ultimately rejected the opportunity to host the new system.[10] Eventually, Zybach partnered with Ernest Engelbrecht, who had two irrigation wells on his

[6] Splinter, 90.
[7] Erika Warzel, Interview with Richard Stahl, October 17, 2013.
[8] Leslie F. Sheffield, "Frank Zybach – inventor who changed the Great Plains." *Irrigation Age* (January 1981): 22-23.
[9] Daniel Mathews and James S. Jackson. *America from the Air: a Guide to Landscape along Your Route*, 37.
[10] *The Fence Post* "Center-pivot Irrigation Revolutionizes Agriculture." *The Fence Post*, May 25, 2010. Accessed November 27, 2013.

property, to use one of his alfalfa fields for the system. The partnership proved a good fit due to both men's experience with building and tinkering.[11] Zybach and Engelbrecht built a prototype in the farm's machine shop, where Engelbrecht had an electric saw, a drill press and welding machine. Using common farm machine parts, such as rod tractor wheels, the two men eventually developed a prototype following Zybach's initial design but with further improvements.[12] In order to produce enough water pressure for the prototype to run, a 100' x 200' reservoir was built to store the amount of water needed. It took two days for the two wells to fill this reservoir, and another two days for the sprinkler system to rotate around the field in one complete revolution. Once the system was successfully developed and running in Engelbrecht's field, Zybach applied for a U.S. patent for a "Self-Propelled Sprinkling Irrigating Apparatus" (#2,604,359) in June 1949, which was officially granted on July 22, 1952.[13]

Engelbrecht's farm operation was focused on raising beef cattle, with crop cultivation providing hay for the livestock. The 36-acre field in which Zybach and Engelbrecht installed the center-pivot prototype was for cultivation of alfalfa hay. A 1963 aerial photo of the property clearly shows the irrigation system in use (see Figure 3). The prototype remained in operation in this field until eventually in 1967 it broke down beyond repair and Engelbrecht replaced it with a Valley Manufacturing system in the same field. The prototype irrigation towers remain to this day at the Engelbrecht Farm.

Advantages of Center-Pivot System

Prior to the invention of the center-pivot system, much of the farmland on the Great Plains was devoted to dryland farming (i.e., had no irrigation). Irrigation at the time typically meant using canals and ditches to carry water from its source to the fields and then "flooding" the fields by opening a head gate from the ditch and allowing the water to flow downhill in furrows. On the Great Plains, there were few sources of water that allowed for such labor-intensive irrigation, which required not only the construction of dams, canals and lateral ditches, but leveling of fields for water to flow through as needed, and constant maintenance of the entire system.[14] Irrigation ditches also accounted for a significant waste of water through evaporation and seepage; some statistics place that loss of water to be over 50 percent.[15] The simulation of light rainfall through the sprinkling of the center-pivot system opened up many areas which were previously considered unfit for agriculture to more intense cultivation.

Zybach outlined a number of objectives in the patent application which he maintained the center-pivot system provided: a way to sprinkler-irrigate large tracts of land, over undulating terrain, with relatively low water pressure, that could be left in operation for several days or weeks with little attention from the farmer.[16] In addition to these qualities that have propagated the use of

[11] Erika Warzel, interview with Russell Engelbrecht, October 8, 2013.
[12] Warzel, interview with Engelbrecht.
[13] Frank L. Zybach, "Self-Propelled Sprinkling Irrigating Apparatus." U.S. Patent 2,604,359, filed June 27, 1949, and issued July 22, 1952.
[14] Splinter, 90.
[15] John Opie, *Ogallala: Water for a Dry Land*, (Lincoln: University of Nebraska Press, 1993), 145.
[16] Zybach, US Patent

center-pivot irrigation, Zybach's system has also proven to be much more efficient with water usage than other forms of irrigation and requires less labor.[17] A study by the University of Nebraska in the 1970s found that pasture irrigated with center-pivot could produce an annual yield of between 700 to 900 pounds of beef per acre, as opposed to 27 pounds per acre for open range.[18] According to a 2010 *New York Times* interview with Derrel L. Martin, a professor at the University of Nebraska, Lincoln, the center-pivot system "is now used around the world and is credited with expanding the acreage of irrigated land and increasing farm productivity."[19]

Commercial Sales

After receiving his patent, Zybach began a partenership with Columbus, Nebraska entrepreneur A.E. Trowbridge to produce and sell center-pivot systems. However, their attempts to market the machinery were met with skepticism by farmers and resistance by banks to lend money for purchasing it.[20] Eventually, Zybach and Trowbridge sold the exclusive manufacturing rights in 1954 to the Valley Manufacturing Company located in Valley, Nebraska in exchange for a five-percent royalty on each unit sold. These rights were in effect until 1969, when the patent expired. Although Zybach and Trowbridge initially retained distribution rights in Nebraska and Colorado, these rights were also taken over by Valley Manufacturing in the late 1950s.[21]

Established in 1946 by Robert B. Daugherty, Valley Manufacturing began by making farm tools and machinery. The manufacturing rights to Zybach's invention proved to be a turning point for the company; now known as Valmont Industries, it is considered an "international manufacturing giant."[22] In the first year of producing the center-pivot systems, seven units were built; by 1960, the number had only risen to 50 units.[23] Anecdotes of farmers' initial reaction to the center-pivot system abound; one favorite told by Daugherty's son John recounts that one farmer thought the system looked like "a darn fine buzzard roost."[24] Despite these initial reactions and low sales, by 1976 an estimated 9,000 units were in use in Nebraska alone; in 1978, Robert Daugherty estimated that a total of 50,000 units were in use across the United States, accounting for 6 million acres of irrigated land.[25] [26] Exact numbers of sales in the present day are unknown, but it is clear that center-pivot irrigation accounts for vast numbers of irrigated acres in the United States, particularly on the Great Plains.

Further Development of Center-Pivot

Refinements to Zybach's patented system were begun by Zybach himself, who endeavored to raise the armature of the irrigation towers in order to accommodate taller crops such as wheat

[17] Neuman.
[18] Splinter, 93.
[19] Neuman.
[20] Sheffield, 23.
[21] Ibid.
[22] Neuman.
[23] Sheffield, 36.
[24] Neuman.
[25] Splinter, 94
[26] Sheffield, 36.

and corn. In addition, the prototype at Engelbrecht's farm initially included a metal skid rather than a wheel at the front of each tower; this was soon after replaced by another wheel. After acquiring the manufacturing and distribution rights to the center-pivot system, Valley Manufacturing also invested in improving the system, including incorporation of variable speed drives to allow for different volumes of water application, as well as safety switches.[27] Valley also realized that the system could accommodate applications of fertilizers, pesticides and herbicides, which allowed for a much more precise and judicious use of these chemicals.[28] Although Zybach's design used the hydraulic pressure from the well to propel the irrigation pivot around, later designs used diesel fuel engines, which continue to be the predominant form of power used for the system today.

Ernest Engelbrecht[29]

Ernest Engelbrecht was born on May 30, 1913 in Diller, Nebraska. In 1920, his family moved to a farm in eastern Colorado, where Engelbrecht began working for his father in 1937, around the same time that he married his wife, Doris. A few years later Engelbrecht was ready to begin his own farming operation, and purchased the property in Strasburg in 1942. In addition to being a farmer and cattleman, Engelbrecht was an expert welder, metal fabricator, and builder of concrete block buildings. Several buildings in the Strasburg vicinity were built by Engelbrecht, including one at the Uhrich Locomotive Works, a local business well-known for building and restoring narrow gauge railroad locomotives and rolling stock. In 1969, Engelbrecht helped to found the Comanche Crossing Historical Society, a local group devoted to promoting and preserving Strasburg history. He retired from farming in 1975 after passing on the operation to his son, Russell Engelbrecht. Ernest Engelbrecht died on April 24, 2000.

Frank Zybach[30]

Frank Zybach was born in 1894 in Lafayette, Oregon but moved soon after to a farm near Columbus, Nebraska with his Swiss-immigrant parents. Zybach learned blacksmithing and a love of metal-working from his father. At an early age, Zybach began developing various inventions designed to lessen the manual labor required of farmers and field hands. His first patent application, in 1920, was for an automatic tractor guide that allowed a tractor to plow in the fields without a driver. Another design in the 1930s was for an automatic transmission for automobiles, which came very close to being purchased by the Chrysler Corporation until it was realized one aspect of his design had already been patented.

Although Zybach never realized much monetary success from his most triumphant invention, the center-pivot system, his accomplishment would eventually be recognized by various organizations: in 1973 he received the first Pioneer Irrigation Award presented jointly by the Nebraska Water Conference Committee and the University of Nebraska-Lincoln; in 1974 he received an Industry Achievement Award from the Sprinkler Irrigation Association in Denver, Colorado; and again in 1974 he was given an outstanding achievement award by the Nebraska

[27] Sheffield, 36.
[28] Splinter, 94.
[29] The information in this section is based on Warzel's December 2013 interview with R. Engelbrecht.
[30] The information on Zybach in this section relies heavily on Sheffield's January 1981 article in *Irrigation Age*.

Chapter of Alpha Zeta (an honorary scholastic agricultural fraternity). Frank Zybach died in August 1980 at the age of 86 in Columbus.

Engelbrecht Farm Today

Although it does not function as a working farm today, the property retains its historic integrity in relation to its association with the invention of the center-pivot irrigation system, which significantly altered agricultural operations throughout the country. The current owner regularly maintains the property and is devoted to its place in history. The farm is also used to showcase the owner's impressive collection of antique tractors, many of which are thought to be the only ones of their kind in Colorado. It is the hope that by recognizing the farm's association with the invention of the center-pivot that this history can be effectively interpreted and preserved in the future.

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Zybach, Frank L. "Self-Propelled Sprinkling Irrigating Apparatus." U.S. Patent 2,604,359, filed June 27, 1949, and issued July 22, 1952.

Previous documentation on file (NPS):

____ preliminary determination of individual listing (36 CFR 67) has been requested
____ previously listed in the National Register
____previously determined eligible by the National Register
____designated a National Historic Landmark
____ recorded by Historic American Buildings Survey #_____
____recorded by Historic American Engineering Record # _____
____ recorded by Historic American Landscape Survey # _____

Primary location of additional data:

_X_ State Historic Preservation Office
____ Other State agency
____ Federal agency
____ Local government
____ University
____ Other
Name of repository: History Colorado

Returned

Historic Resources Survey Number (if assigned): 5AM.3086

10. Geographical Data

Acreage of Property 13.9 acres

Use either the UTM system or latitude/longitude coordinates

Latitude/Longitude Coordinates
Datum if other than WGS84:
(enter coordinates to 6 decimal places)

1. Latitude: Longitude:
2. Latitude: Longitude:
3. Latitude: Longitude:
4. Latitude: Longitude:

Or
UTM References
Datum (indicated on USGS map):

[ ] NAD 1927 or [x] NAD 1983

Returned

The UTM reference point was derived from heads up digitization on Digital Raster Graphic (DRG) maps provided to OAHP by the U.S. Bureau of Land Management.

1. Zone: 13	Easting:	557901mE	Northing: 4399895mN
2. Zone: 13	Easting:	558133mE	Northing: 4399893mN
3. Zone: 13	Easting:	558133mE	Northing: 4399653mN
4. Zone: 13	Easting :	557901mE	Northing: 4399653mN

Verbal Boundary Description (Describe the boundaries of the property.)
13.9 acres in the SE corner of the NE ¼ of Sec.33, T3, R62W (763 feet by 792 feet)

Boundary Justification (Explain why the boundaries were selected.)
The boundary encompasses the remaining property associated with the original Engelbrecht Farm that has not been developed after the period of significance (1942-67).

11. Form Prepared By

name/title: Erika Warzel, National & State Register Historian (for owner)
organization: History Colorado
street & number: 1200 Broadway
city or town: Denver state: CO zip code: 80203
e-mail erika.warzel@state.co.us
telephone: 303.866.3392
date: December 6, 2013

Additional Documentation

Submit the following items with the completed form:

- **Maps:** A **USGS map** or equivalent (7.5 or 15 minute series) indicating the property's location.
- **Sketch map** for historic districts and properties having large acreage or numerous resources. Key all photographs to this map.
- **Additional items:** (Check with the SHPO, TPO, or FPO for any additional items.)

Returned

Photographs

Submit clear and descriptive photographs. The size of each image must be 1600x1200 pixels (minimum), 3000x2000 preferred, at 300 ppi (pixels per inch) or larger. Key all photographs to the sketch map. Each photograph must be numbered and that number must correspond to the photograph number on the photo log. For simplicity, the name of the photographer, photo date, etc. may be listed once on the photograph log and doesn't need to be labeled on every photograph.

Photo Log

Name of Property: Engelbrecht Farm
City or Vicinity: Strasburg
County: Adams State: Colorado
Photographer: Heather Peterson, National & State Register Historian, History Colorado
Date Photographed: October 8, 2013

Description of Photograph(s) and number, include description of view indicating direction of camera:

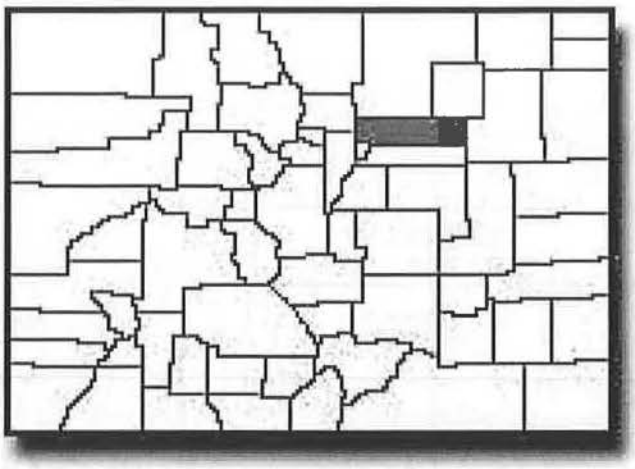
1 of 68 View of open field at north half of property. Camera facing north/northwest.
2 of 68 View of open field at north half of property, with recent housing development across Strasburg Road in background. Camera facing northeast.
3 of 68 Remnants of windbreak between north and south halves of property. Camera facing northeast.
4 of 68 Location of former orchard at northeast corner of southern half of property. Camera facing north/northwest.
5 of 68 Additional view of former orchard, now with owner's collection of antique tractors. Camera facing north.
6 of 68 View of dirt drive, shed and three grain bins at south edge of property. Neighboring elementary school in distance. Camera facing south.
7 of 68 View of dirt drive, shed and milking barn, with north field in the distance. Camera facing north.
8 of 68 View of open area east of building complex, with south fence in distance and school facilities beyond. Camera facing southwest.
9 of 68 View of chain link fence at south edge of property, with yard of house in foreground. Elementary school facilities beyond. Camera facing south/southeast.
10 of 68 East side of house, main section, fronting on Strasburg Road. Camera facing west.
11of 68 South side of house, main section and east side of south ell. Camera facing northwest.
12 of 68 Another view of house's sough side of main section and east side of south ell, with flagstone paving. Camera facing west/northwest.
13 of 68 South side of house's south ell. Camera facing north.
14 of 68 West side of house, with main entrance and steps at west ell. Yard in foreground. Camera facing east.
15 of 68 Northwest corner of house, with fencing in foreground. Camera facing southeast.
16 of 68 North side of house. Camera facing south/southeast.
17 of 68 Fence and gates at northeast corner of house yard. Strasburg Road beyond. Camera facing southeast.
18 of 68 Bent metal rod sign at northeast corner of house yard, reading "ENGELBRECHT." Camera facing west/southwest.
19 of 68 East and north sides of garage. Camera facing southwest.

20 of 68 South side of garage with west yard of house in foreground.
21 of 68 Concrete walk between garage and domestic well, at western edge of house yard. Camera facing north.
22 of 68 Former location of outhouse at south end of concrete walk. Chain link fence and elementary school parking beyond. Camera facing southwest.
23 of 68 East and north sides of 1946 machine shop. Camera facing southwest.
24 of 68 South side of machine shop with dirt drive in foreground. Camera facing north.
25 of 68 West side of machine shop. Camera facing east/northeast.
26 of 68 View of electric saw at interior north wall of machine shop. Camera facing north/northeast.
27 of 68 Drill press at interior north wall of machine shop. Camera facing north.
28 of 68 Welding machine at interior southeast corner of machine shop. Camera facing south.
29 of 68 View of "Tuff" shed. Camera facing east.
30 of 68 View of domestic well house. North end of concrete walk in foreground. Camera facing northwest.
31 of 68 South side of chicken coop. Camera facing north/northeast.
32 of 68 West side of chicken coop. Camera facing east/northeast.
33 of 68 South and east sides of chicken coop. Camera facing northwest/west.
34 of 68 Grain bins at south edge of property. Corner of red shed in foreground. Camera facing southwest.
35 of 68 Wood grain bin, south side. Camera facing north.
36 of 68 Upper hatch opening at east side of wood grain bin. Camera facing west/northwest.
37 of 68 Lower hopper opening at east side of wood grain bin. Camera facing west/northwest.
38 of 68 View of three grain bins at southern edge of property, with western most bin in foreground. Camera facing east.
39 of 68 North sides of two metal grain bins, with access door at east grain bin at center. Camera facing southwest.
40 of 68 East and north sides of well house at southern edge of property. Camera facing southwest.
41 of 68 Interior of southern well house. Camera facing west.
42 of 68 Door of southern well house. Camera facing west.
43 of 68 South side of southern well house. Camera facing north.
44 of 68 South side of machine shed. Camera facing north.
45 of 68 East and north sides of machine shed, with five center-pivot towers leaning against east wall. Camera facing southwest.
46 of 68 Interior roof of machine shed with trusses. Camera facing north.
47 of 68 South and east sides of red shed. Camera facing northwest.
48 of 68 North and west sides of red shed, with chicken coup in distance. Camera facing southeast.
49 of 68 South side of 1943 loafing shed (No. 16 on site sketch map). Camera facing north.
50 of 68 East and north sides of 1943 loafing shed. Camera facing southwest.

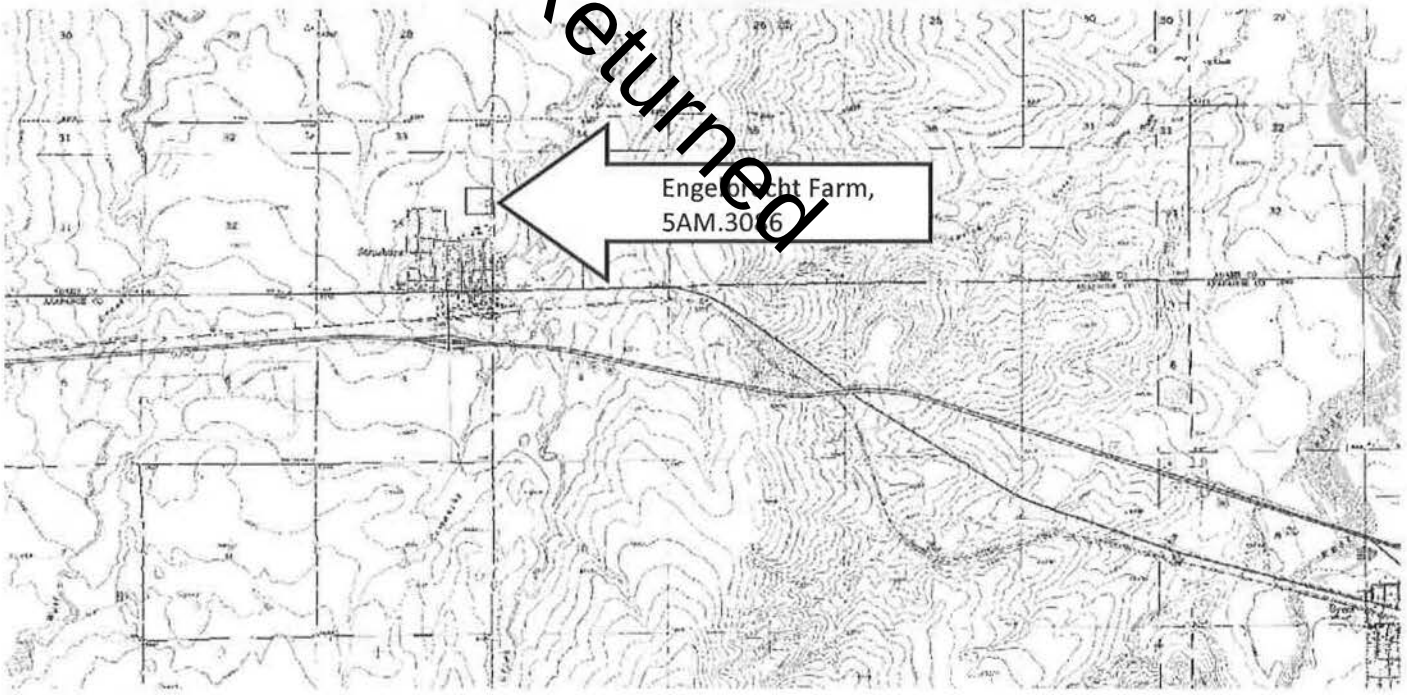
Returned

51 of 68 South side of well house (No. 17 on site sketch map). Camera facing north.
52 of 68 West and south sides of well house (No. 17), with milking barn and metal grain bin in background. Camera facing northeast.
53 of 68 West and south sides of milking barn. Camera facing northeast.
54 of 68 East side of milking barn. Camera facing west.
55 of 68 North side of milking barn. Camera facing south/southeast.
56 of 58 West side of milking barn. Camera facing east/southeast.
57 of 68 Metal grain bin (No. 19 on site sketch map). 1974 loafing shed in background. Camera facing northwest.
58 of 68 South side of 1974 loafing shed (No. 20 on site sketch map). Camera facing north.
59 of 68 View of milking barn, metal grain bin and 1974 loafing shed from orchard remnant. Camera facing west/northwest.
60 of 68 View of pump house and reservoir wall remnant. Camera facing northwest.
61 of 68 South side of pump house. Camera facing north.
62 of 68 West and north sides of pump house. Camera facing southeast.
63 of 68 Remnant of reservoir wall directly east of pump house. Camera facing west.
64 of 68 View of relocated outhouse. Camera facing northwest.
65 of 68 View of five towers of the center-pivot irrigation system, leaning against east wall of machine shed. Camera facing northwest.
66 of 68 View of single center-pivot irrigation tower. Camera facing west.
67 of 68 Detail of center-pivot irrigation tower. Camera facing east.
68 of 68 View of rotating clothesline at southwest corner of house yard. Camera facing east.

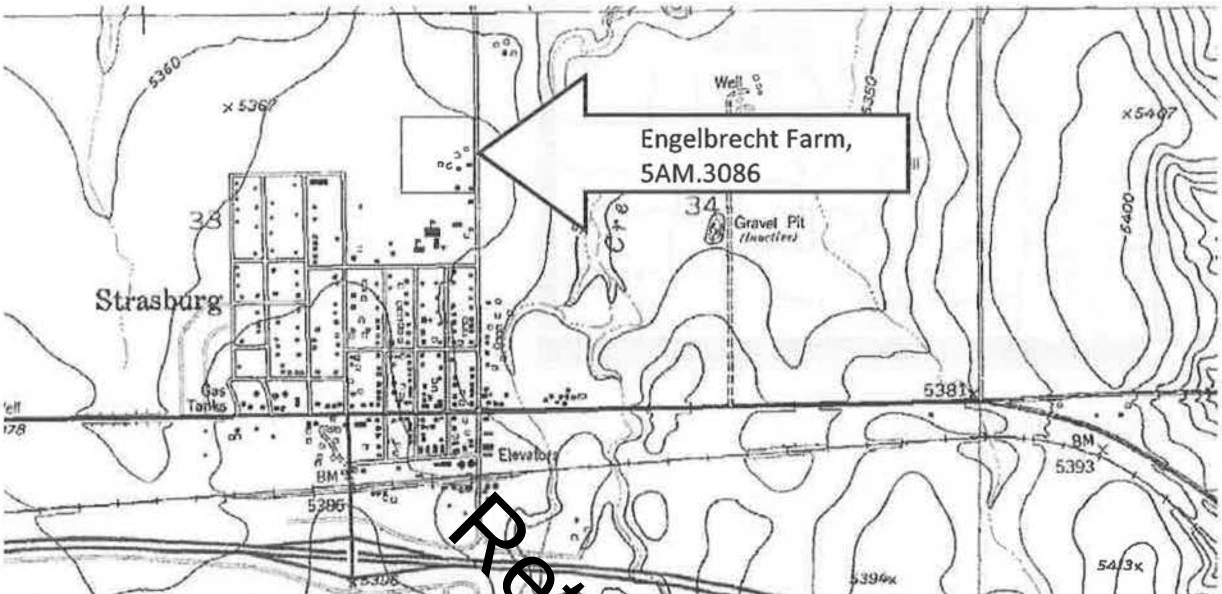
Returned



Location: Adams County



Strasburg Quad map
Township 3S, Range 62W
Elevation 5,370 feet


Engelbrecht Farm,
5AM.3086
Strasburg
Gas Tanks
Elevators
Gravel Pit
Well
5360
5362
5350
5400
5381
5393
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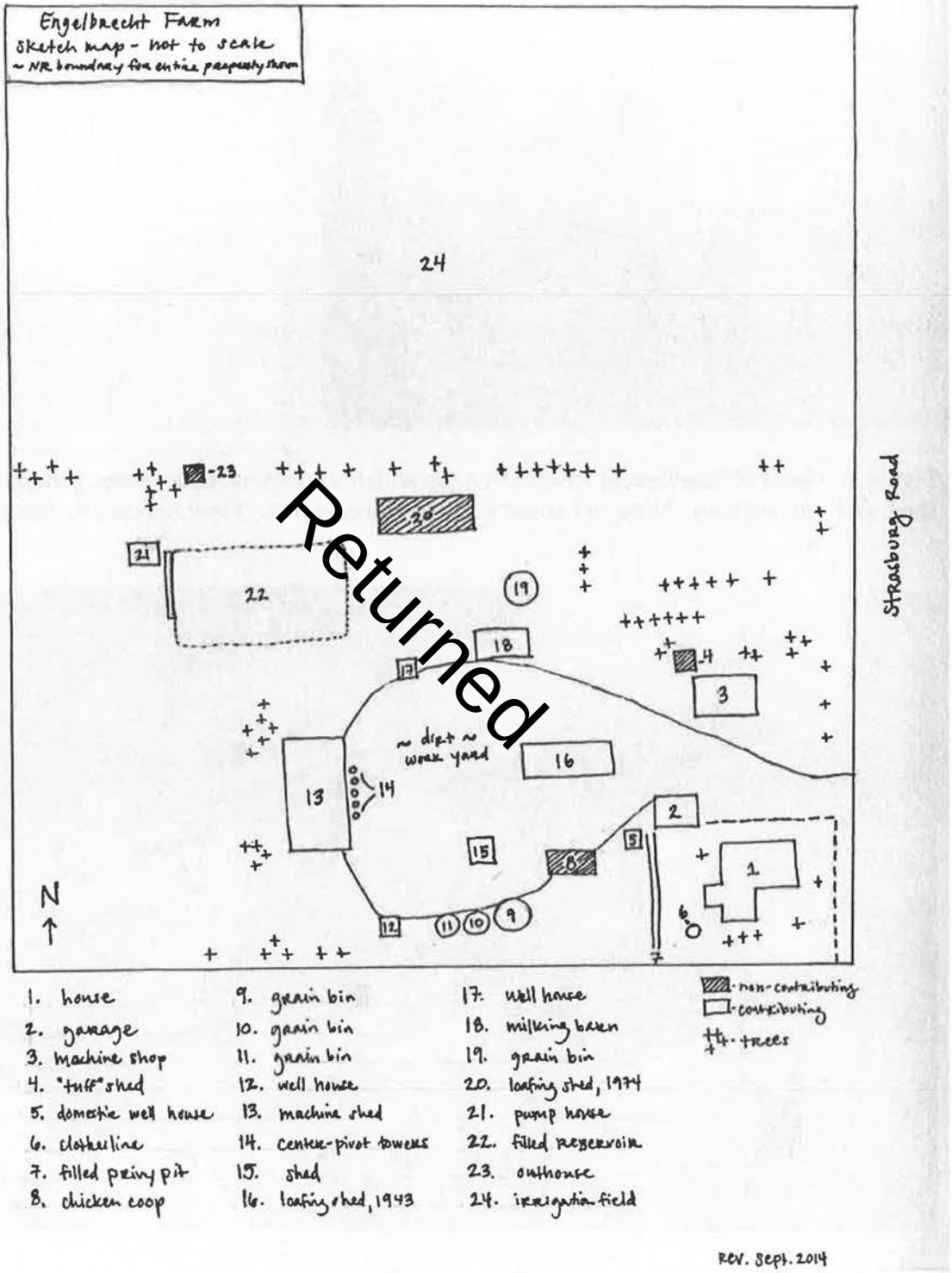
5407
33
34
BM



Sketch map drawn by E. Warzel, December 2013; revised September 2014

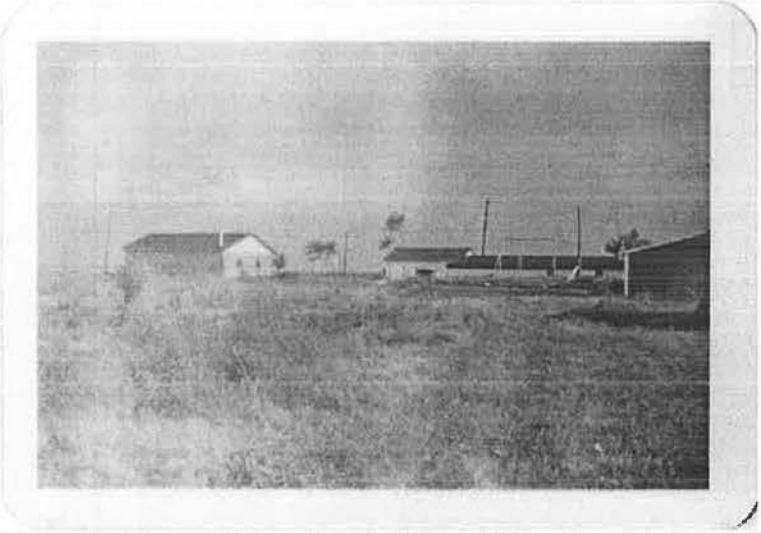


Figure 1. Photo of Engelbrecht Farm, 1947. From left to right: machine shop, garage, loafing shed, and milking barn. Note that house is not yet constructed. View looking southeast.

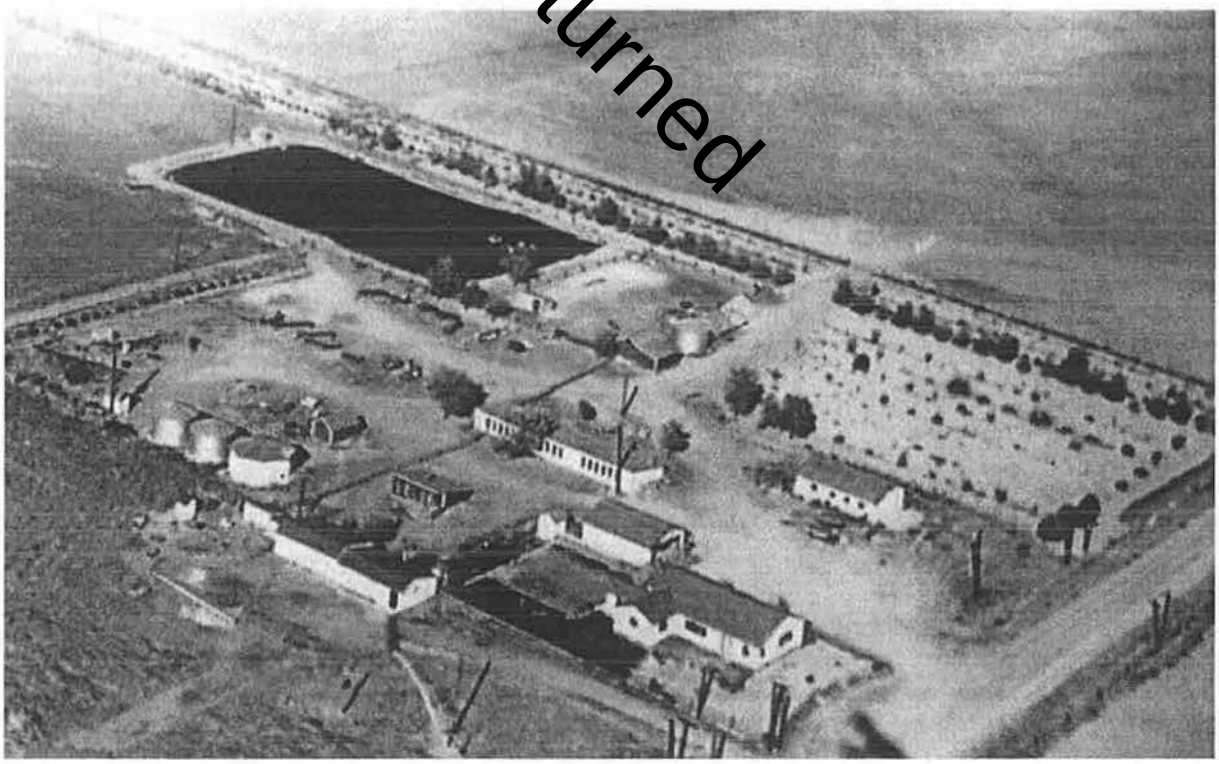


Figure 2. Aerial photo of Engelbrecht Farm, ca. 1954-55. View looking northwest.

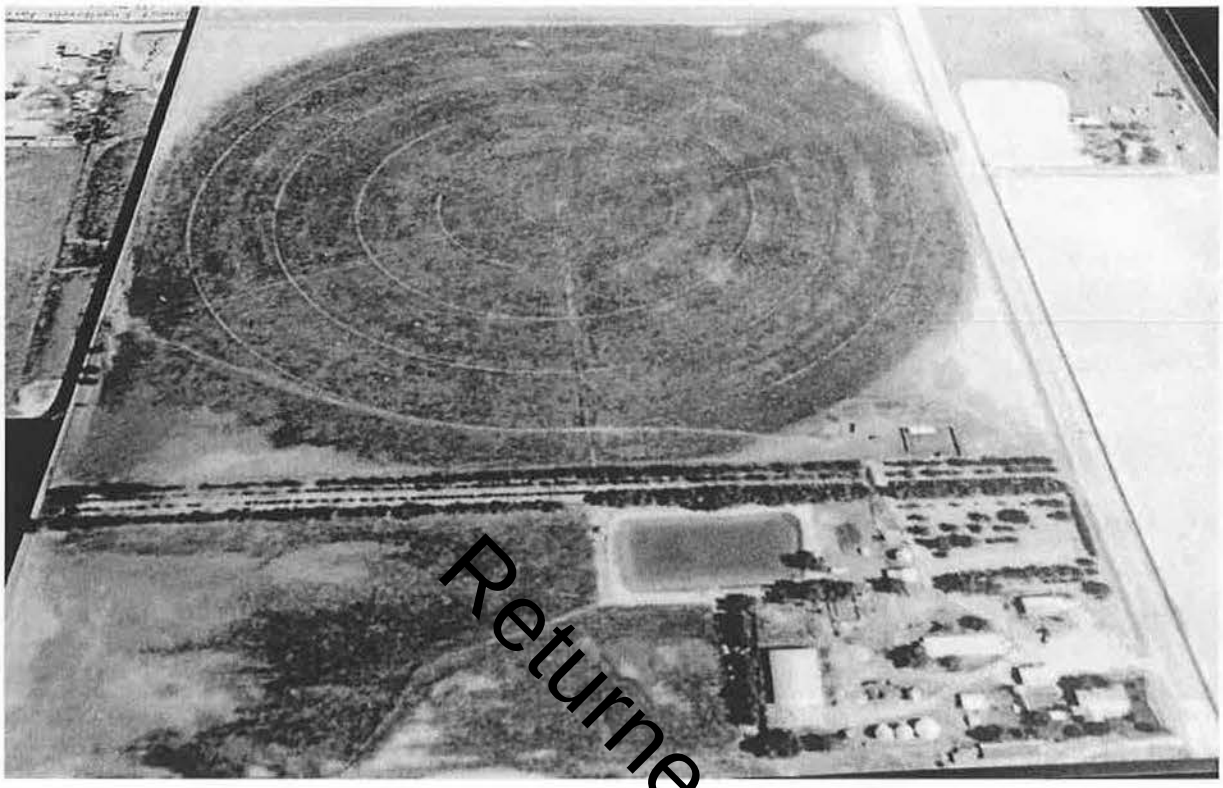
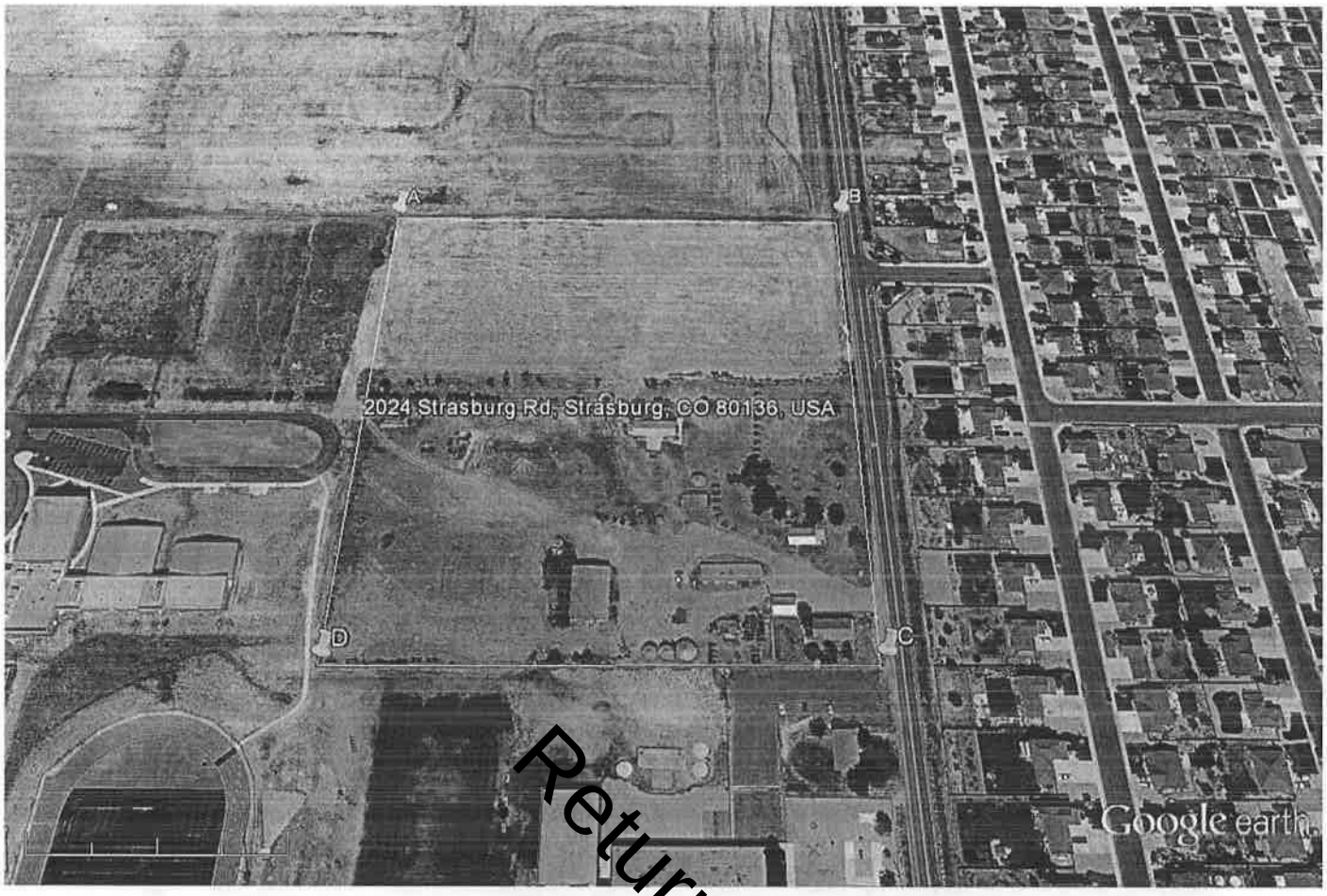


Figure 3. Aerial photo of Engelbrecht Farm, June 27, 1973. View looking north. Note dark line at center right showing sprinklers in use.



Google earth

feet 800
meters 200

Returned

ENGELBRECHT FARM
Coordinates:
A: 39.747687°, -104.324096°
B: 39.747708°, -104.321470°
C: 39.745537°, -104.321491°
D: 39.745525°, -104.324117°

"TOWERS"

United States Department of the Interior

NATIONAL PARK SERVICE
1849 C Street, N.W.
Washington, DC 20240

United States Department of the Interior
National Park Service
National Register of Historic Places

Comments
Evaluation/Return Sheet

Property Name: Engelbrecht Farm

Property Location: Strasburg, Adams County, Colorado

Reference Number: 14000170

Date of Return: 4-28-2014

Reason for Return

The Engelbrecht Farm nomination is being returned so the periods of significance and areas of significance can be clarified, the integrity of the irrigation system can be explained, and the archeology can be more fully addressed.

Nomination Summary

The Engelbrecht Farm is nominated for its national significance in "Invention," as the site where pivotal experiments were conducted and models implemented that led to development and widespread use of the center-pivot irrigation system. The remnant of the farm (13.9 acres) is also considered locally significant for "Archeology/Historic non-Aboriginal" for the information potential of the privy site. The period of significance is 1942-1967.

Areas to be Addressed

Significance under Criterion A. The property is associated with the invention of the center-pivot irrigation system in 1948 and 1949 when Frank Zybach built, first, an experimental two-section system of pipe and two towers on Ernest Engelbrecht's farm and, the next year (1949), built a five-section, five-tower system on wheels on the same farm. These models enabled Zybach to apply for a patent on the invention, which was issued in 1952. The five-tower system remained functional until 1967, according to the nomination, and remnants of it remain on the fraction of the Engelbrecht Farm nominated.

Understanding the system and its integrity. The irrigation system has been disassembled, with the towers removed from the field where they had been installed, and stacked against the wall of the machine shed. The towers have been classified as structures. By their scale, they would more

appropriately be classified as objects, which "are relativ
constructed. Although it may be, by nature or design, m
specific setting or environment" (*How to Complete the*
15). Were the towers moved from field to field, or did t
operation of the system to provide a context for the tow
parts. From the historic photo, it appears the towers we
farmstead to create concentric rings. There is not enoug
longer to be able to re-install this system. Thus, the parts will remain as artifacts at the site---perhaps. If the towers are moved to a museum, for example, would they still be listed in the National Register? The nomination should emphasize that the towers are significant for their association with and location at the Engelbrecht Farm. The nomination also needs to address how the property—diminished in acreage and with the experimental irrigation system dismantled—can convey the significance Zybach's invention and his use of Engelbrecht's Farm to develop the irrigation system that transformed western agriculture.

Period of Significance. For several years after the patent was issued, Zybach's original model was tweaked for more efficient and reliable irrigation. The system on the Engelbrecht Farm was usurped by improved models when it was marketed in earnest in the 1950s and later. Even though the Engelbrechts continued to use the experimental system, the significant years were those early years that enabled the patent application. The years beyond 1949, or perhaps 1952 when the patent was issued, add little to the "Invention" significance. The years before 1948 add nothing to the Invention significance. It is not evident that Engelbrecht's purchase of the Strasburg farm in 1942 lends any significance to the years before the experimental irrigation system was installed. If the period of significance has been defined to reflect the archeology of the property, with the archeological significance (Archeology – Historic – Non-Aboriginal) overlapping the Invention significance, this should be explained. As it stands, it appears the 1942 date is intended to correspond with the property's archeology (construction date of the privy) and the 1967 end date is intended to correspond with the property's significance in Invention. Please consider if the period of significance, as stated, is appropriate. Regardless of the period selected, please make sure it is fully explained.

Other Areas of Significance. If the farm is significant in areas beyond Invention, this needs to be explained and, if appropriate, tied to the archeological significance of the property. Agriculture and Architecture are not convincing areas of significance based on the information presented, because of the minimal amount of land associated with the farm, the compromised integrity of the surrounding countryside (and the remainder of the Engelbrecht farm), and the lack of distinction among individual farm buildings and the collection of buildings. If either of these areas presents unstated significance, please consider amending the nomination accordingly.

Significance under Criterion D

The archeological significance of the property has not been addressed fully enough. Because the irrigation system has been dismantled, landscape features that reveal where and how it was installed may be of archeological interest and, perhaps, may be contributing sites within the district. The reservoir wall remnant, shown in photo #60, does not seem to have been counted as a contributing site. Instead, it is mentioned at the conclusion of the discussion of the pump house (#18, p. 7). Please consider surveying the wall remnant and other landscape features associated with the irrigation system, including them in the inventory, and classifying them as contributing archeological sites.

Below surface discoveries at the privy site would likely shed light on the daily life of inhabitants of the farm, rather than reveal much about irrigation and the "Invention" significance of the nomination. However, if there are specific questions about how the archeology of the privy could provide important information about the irrigation system then please be specific about how it could do that. The privy site's period is stated to be 1942 (reflecting Engelbrecht's purchase of the farm) to 2007 (when the privy building was moved and the hole filled). Please discuss in a bit more detail the research questions the privy might help answer about this period and consider how the archeology of the broader farmstead might help answer these questions as well.

Integrity of the Property

The farmstead retains integrity, but the integrity of the irrigation system and the farm has been compromised. The nomination states, "Materials and workmanship also remain evident, particularly in the concrete masonry unit buildings constructed by Engelbrecht and the original center-pivot irrigation towers that were built and assembled on-site" (p. 7). The towers have been moved and parts of the irrigation system no longer exist. This has compromised the integrity of an important aspect of the property. The setting of the farm is said to maintain "the same layout of agricultural buildings, structures and objects in relation to one another and the north field" (p. 10-11). The setting, however, should be discussed more globally. The setting of the farm is quite compromised, with part of the farm seemingly subdivided for residential development, subdivisions to the east, and more subdivisions proposed, it seems, to the north (according to the zoning map). The nomination needs to address this development and convey how the singular invention of the center-pivot irrigation system can be conveyed, despite the encroaching residential development.

Please call me at 202-354-2252 or send an email to barbara_wyatt@nps.gov if you want to discuss aspects of the nomination related to Criterion A, or contact Erika Martin Seibert if you want to discuss the archeology of the site (202-354-2217 or erika_seibert@nps.gov).

Barbara Wyatt, Historian
National Register of Historic Places

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United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form.* If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions.

1. Name of Property

Historic name: Engelbrecht Farm
Other names/site number: 5AM.3086
Name of related multiple property listing:
N/A
(Enter "N/A" if property is not part of a multiple property listing)

2. Location

Street & number: 2024 Strasburg Road
City or town: Strasburg State: Colorado County: Adams
Not For Publication: N/A Vicinity: N/A

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this X nomination ___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property X meets ___ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

X national ___statewide X local
Applicable National Register Criteria:

X A ___B ___C X D

3/10/14

Signature of certifying official/Title: Deputy State Historic Preservation Officer **Date**

History Colorado, Office of Archaeology and Historic Preservation
State or Federal agency/bureau or Tribal Government

In my opinion, the property ___ meets ___ does not meet the National Register criteria.

Signature of commenting official: **Date**

Title : **State or Federal agency/bureau or Tribal Government**

Center Pivots Take Over

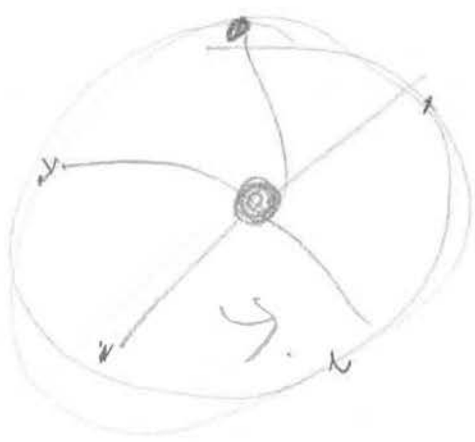
In June 1976, *Scientific American* magazine called center pivot irrigation systems "perhaps the most significant mechanical innovation in agriculture since the replacement of draft animals by the tractor." The author, William E. Splinter, was a professor of agricultural engineering at the University of Nebraska-Lincoln, so he could be accused of some bias. But he was also probably not far off the mark.

Aerial view of a series of early center pivot irrigation systems nea Atkinson, Nebraska, showing a series of crop circles.

Just 25 years after Frank Zybach invented the first center pivot system, there were al 10,000 center pivot systems in operation in Nebraska alone. U.S astron could clearly pick out the Northeast Nebraska region from 270 miles in by the patterns of lush, green crop circles produced by center pivots.

But in the 1950s and 60s, center pivot irrigation was a promising conce a lot of technical hurdles to overcome. Frank Zybach's first experimenta system – built in 1947-8 – had two sections of pipe suspended by cable two towers and ran on skids. By 1949, he had built a five-tower system wheels that ran two to three feet off the ground and could irrigate 40 ac Zybach built his own water valves to both push the wheels and to keep t various towers in line. That was enough to file for a patent on the techn and he won patent protection for his invention in 1952.

E 26th Ave
E 25th Ave
Adams St
E 24th Pl
Main St
E 24th Ave
Adams Ct
Strasburg Rd
Alice St
Aspen St
Basil St
E 22nd Ave
0181333102002
E 21st Ave
Comanche Dr
Comanche Cir
Sunset Ave
Burton St
Wagner St
Monroe St
Aspen St
Long Branch St
Spruce Ave
Colorado Ave
Map center: 3330889, 1699535




E 33rd Ct
E 32nd Ave
Wagner St
Strasburg Rd
E 31st Ave
E 27th Pl
E 28th Ct
E 28th Ave
E 26th Ave
E 25th Ave
E 24th Pl
Adams Ct
E 24th Ave
3S 62W
Baer St
E 21st Ave
Comanche Dr
Comanche Ct
Piggott Rd
Sunset Ave
Monroe St
E 18th Ave
Burton St
Arapahoe St
Main St
Adams St
Iowa Ave
Aspen St
Warner Pl
Westview Ave
Hwy 36
ARAPAHOE
Map center: 3329229, 1700208

orig design was stan-bay feature - changed

orig. original design to truss + glass wall = 1990s design.

changes themselves important

* major change re. how it carries the load.

*

box office connected

*changed structural truss system was [illegible] diff. now diff.

* diff. bldg.

design component to structural system

raised & stretched middle truss dips down - diff.

state SHPOS
echo SHPOS but

HISTORY Colorado

October 20, 2014

Ms. Carol Shull
Interim Keeper of the National Register
National Register of Historic Places
1201 Eye Street, N.W., 8th Floor (MS 2280)
Washington, D.C. 20005-5905

Dear Ms. Shull:

We are pleased to submit for your review the enclosed National Register of Historic Places nomination for Engelbrecht Farm (5AM.3086) in Adams County, Colorado. This new submittal is in response to Barbara Wyatt's and Erika Martin Seibert's request for additional documentation dated April 28, 2014, following an initial submittal of the nomination on March 10, 2014.

The Colorado Historic Preservation Review Board reviewed the nomination at its meeting on January 17, 2014. The board voted unanimously to recommend to the State Historic Preservation Officer that the property met the criteria for listing in the National Register.

The enclosed disk contains the true and correct copy of the nomination for Engelbrecht Farm to the National Register of Historic Places.

We look forward to the formal listing of this property. If you have any questions, please do not hesitate to contact me by phone at 303-866-4683 or by email at erika.warzel@state.co.us.

Sincerely,

Erika Warzel

Erika Warzel
National and State Register Historian
(303) 866-4683
erika.warzel@state.co.us

Enclosures
CDs (2)
Signature Page