EXECUTIVE SUMMARY
THE TOWN OF STAR VALLEY RANCH
MASTER ROADS STUDY

US DEPARTMENT OF COMMERCE
ECONOMIC DEVELOPMENT ADMINISTRATION
Project Number 05-079-05292

April 15, 2014

SUNRISE ENGINEERING

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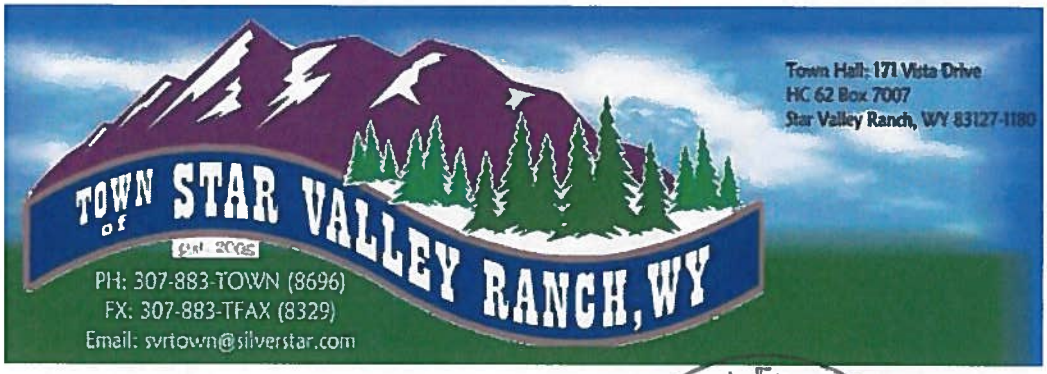

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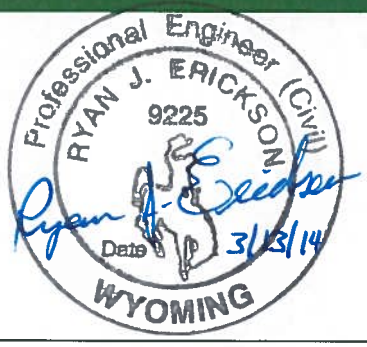

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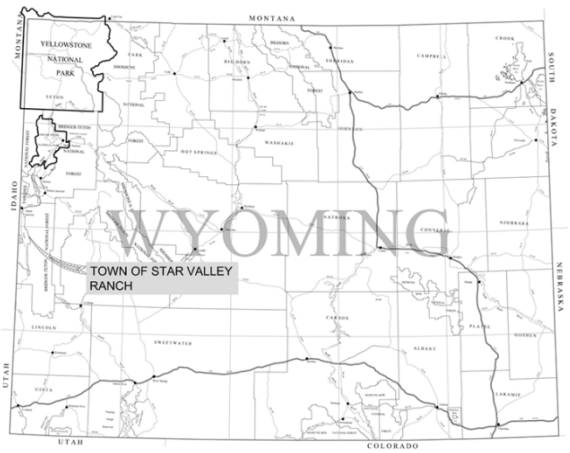
SUNRISE ENGINEERING

EXECUTIVE SUMMARY

The Town of Star Valley Ranch is located in Lincoln County in western Wyoming. The location is in a small mountain valley bounded on the east by the Salt River Range. The Town lies on the valley floor with portions extending up onto the foothills of the Salt River Range. The Town boundary encompasses 2,040 lots of which approximately 1,000 have been developed with homes. Approximately 250 to 300 homes are occupied year round. As future growth occurs, the total number of developed lots will peak somewhere below 2,040 as many persons own adjacent lots to their homes and will not develop the lots.



The Town of Star Valley Ranch with funding and guidance from the U.S. Department of Commerce - Economic Development Association commissioned this study. The intent of the tasks is to address the current condition and capability of the roads and to plan future improvements based on analysis of several design parameters. Study work tasks included the following:

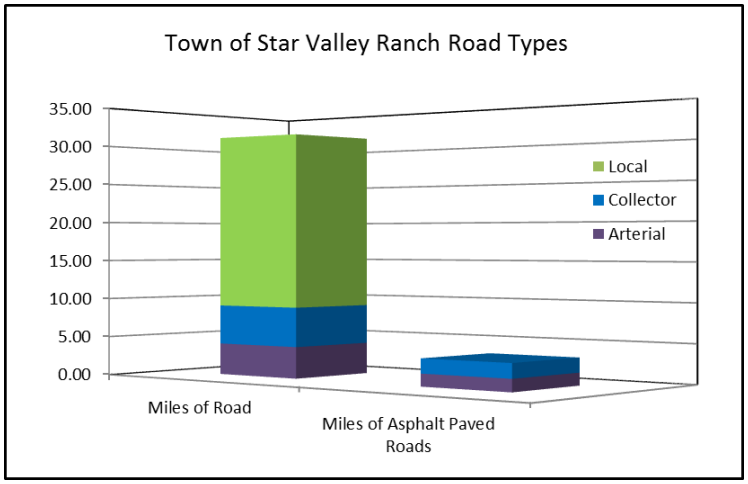
1) Scoping and Progress Meetings
2) Review of Existing Information
3) Road Inventory and Mapping
4) Sub-Surface Investigation
5) Review of Grades, Roadway Stability, and Safety Concerns
6) Localized Drainage Risks and Analysis
7) Emergency Access and Resiliency Analysis
8) Design Standards Development
9) Recommended Alternatives and Priorities
10) Cost Estimates
11) Report

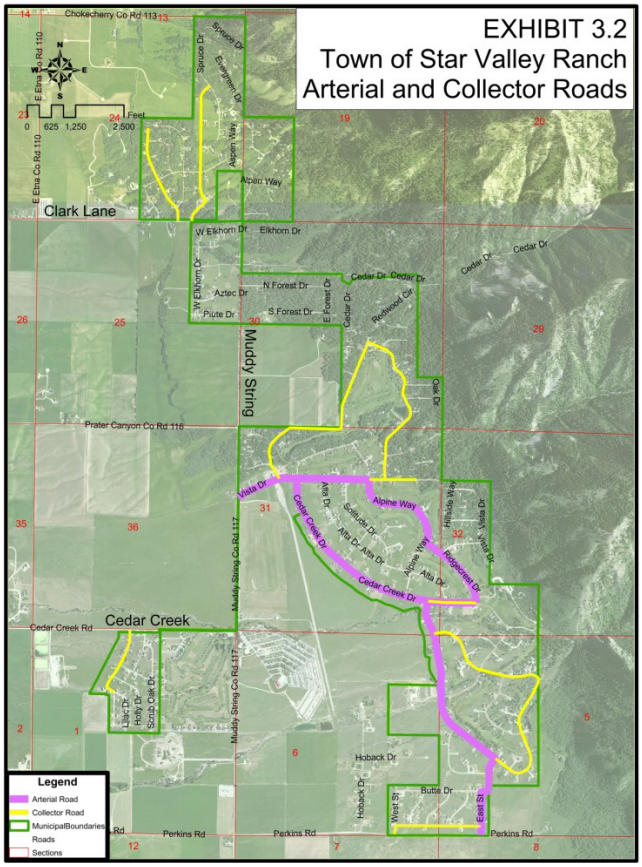
The Town maintains about 31 miles of roadway in platted rights of way under five roadway classifications:

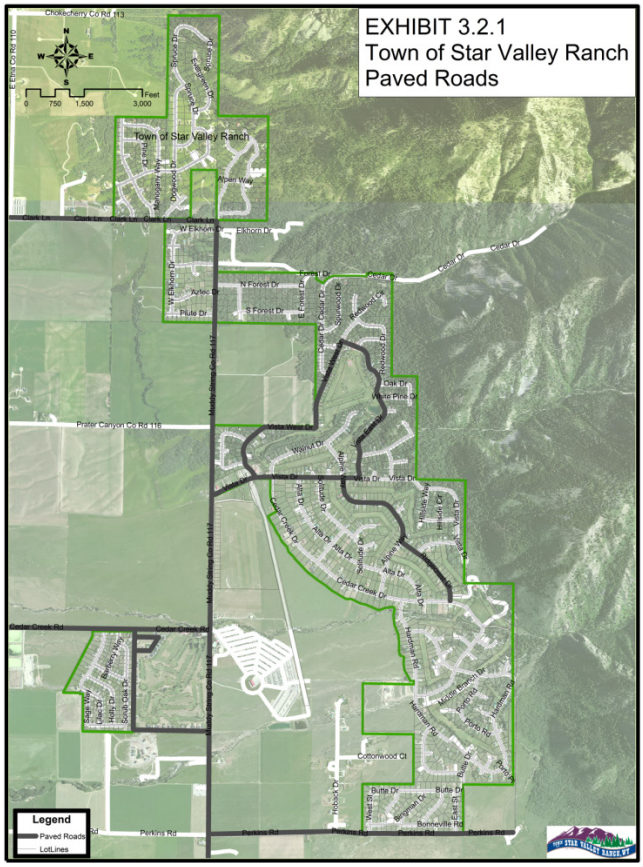
- Arterial (Muddy String-Lincoln County)
- Town Arterial
- Neighborhood Collector
- Local
- Primitive

Road Lengths and Asphalt Paving Status

Road Summary				
Road Classification	Miles of Road	Percent of Roads	Miles of Asphalt Paved Roads	Percent of Asphalt Paved Roads by Classification
Arterial	4.03	13.0%	1.6	39.1%
Collector	5.02	16.2%	1.8	36.5%
Local	21.90	70.8%	0.0	0.0%
Total	30.95	100.0%	3.4	







SOIL CLASSIFICATIONS

The Town of Star Valley Ranch was surveyed by the USDA Soil Conservation Service and Forest Service (*Soil Survey of Star Valley Area, Wyoming-Idaho* March 1976).

The problematic soils tend to be very fine silts, clays, and loams that are deep and susceptible to frost and moisture damage. The better soils are the sandy and gravelly loams that are less affected by moisture. In general, the southern half of town has the most favorable road building soils while the hilly northern areas of town contain unfavorable road building soils.

During the subsurface test pit process conducted as part of this study, the test pits largely confirmed the results of the 1976 USDA study in terms of soil types and apparent depths.

The test pits provided significant insight into the performance of the roads and the suitability of native materials. In many instances, the pits showed that failed road sections are founded on deep layers of loamy or clay soils that experience periodic saturation. Sections that have held up well tend to be well drained. Even if founded on unfavorable soils, the well-drained areas tend to hold up better than poorly drained sections founded on favorable soils.

The thickness of the road structure created by import material was found to be between three inches and twenty three inches. This places the Towns roads well on their way to the desired design thickness.

CULVERTS

The Town utilizes within its drainage system about 44 major culverts. This does not include the numerous pipes and conduits installed across driveways by homeowners or the Town. Overall the culverts are in good condition with most problems falling in one of the following categories:

- Sedimentation of inlet and/or outlet blocking flow
- Collapsing flares
- Bend or damaged pipe ends
- Woody debris blocking flow

Woody debris at Cedar Creek and Runway & Collapsing flare end treatment

GRADES

Roadway grades in the Town vary from nearly level up to 25%. The steep grades present challenges with regard to the following:

- Emergency vehicle access
- Starting and stopping
- Sight distance
- Maneuvering into and out of driveways
- Snow Removal
- Washboarding
- Water damage and rutting

ROADS WITH STEEP GRADES		
Roads with Grades =>20%	Roads with Grades > 15% and <20%	Roads with Grades > 10% and <15%
Redwood Drive	Alpenglow Circle	Birch Drive
Snow Forest Drive	Alpenglow Drive	Cedar Way
Spruce Drive (North of Evergreen)	Aspen Way	Choke Cherry Drive
Green Canyon Drive	Aztec Drive	Cottonwood Lane
Sugar Loaf Drive	Birch Circle	Mahogany Circle
White Pine Avenue	Blackwood Drive	Mahogany Way
	Cedar Drive	Pine Drive
	Cottonwood Circle	Redwood Circle
	Dogwood Drive	South Forest Drive
	Elkhorn Circle	Spruce Drive (South of Evergreen)
	Evergreen Drive	Spur Wood Drive
	North Forest Drive	Vista Drive (East of Star Peaks Way)
	Prater Canyon Drive	West Forest Drive
	Walnut Drive	Fir Place
	West Elkhorn Drive	Green Canyon Circle
	Canyon Pines Way	Star Peaks Court
	Oak Drive	Star Peaks Way
	Vista East Drive (South of Pond)	Vista East Drive (North of Pond)
	Vista West Drive (Corner of Field to Vista East)	Vista West Drive(Vista to Corner of Field)
	Vista West Drive (Vista East to Redwood Dr)	

The location of steep grades tends to be concentrated in the northern and eastern portions of Town. The high concentration of steep grades makes them difficult to avoid in areas north of Clark Lane and north of the Aspen Hills Golf Course. Due to right of way width restrictions, and the original street layout, the Town has limited ability to improve grades. In most cases, the best that will be achieved is a slightly lower grade that remains "steep" by most standards. Lot purchasers should not anticipate significant changes or reconfiguration of road grades in future years.

LANDINGS AT INTERSECTIONS

In several areas the streets lack "landings" at intersections to allow vehicles to slow and maneuver onto adjacent streets. The lack of landings makes downhill yielding, stops and turns difficult on steep roads such as Blackwood at Vista East, Redwood at Blackwood, Oak at Vista East, or Birch at Clark Ln. Under icing conditions downhill maneuvering or stopping can become impossible. The lack of landings on uphill sections creates challenges with regard to slowing before turning onto the intersecting road.

RIGHT OF WAY WIDTH

The fixed right of way widths of 40' to 60' as originally platted did not contemplate or accommodate large cut or fill sections. Consequently the ability to fill or cut a section to improve grade conditions is limited. The Town has limited ability to improve some grades within existing rights of way but will not be able to achieve all weather access for all vehicles unless significant easements and rights of way were obtained.

ROADWAY STABILITY

The original construction of the roadways in the Town of Star Valley Ranch placed much of the roadbed on existing loamy and loamy clay soils. These soils are susceptible to frost action and rapidly loose strength when saturated. The greatest threat to road stability is moisture and saturated conditions. Ponding water from precipitation or irrigation runoff reduces roadway stability however snowmelt is probably the greatest culprit. Snowmelt is a constant, long duration source of saturation concentrated at the road edges. Several of the test pits conducted at areas of pavement failure found the underlying soils to consist of moist loamy and loamy-clay type soils several feet thick.

SAFETY CONCERNS

The current street system contains numerous locations with vertical curves that limit sight distance. In terms of prioritization of vertical curves for mitigation, the following table outlines the recommended order of addressing the curves based on the severity of the deficiency.

Summary of Major Vertical Curves					
Priority 1		**Priority 2**		**Prority 3**	
Cedar Dr.	Sta. 17+75	Spurwood Drive	Sta. 9+50	Cedar Drive	Sta. 12+00
Redwood Road	Sta. 9+00	Spruce Drive	Sta 26+40	Redwood Road	Sta. 14+00
		Evergreen Dr	Sta 3+75	Spurwood Drive	Sta. 5+50
		Cottonwood Rd.	Sta. 6+50	Spruce Drive	Sta. 18+00
		Pine Drive	Sta. 11+00	Spruce Drive	Sta20+75
		Sugar Loaf Drive	Sta. 1+00	Spruce Drive	Sta. 23+00
		Walnut Drive	Sta. 24+00	Dogwood Dr	Sta 26+50
				Evergreen Dr	Sta 7+50
				Evergreen Dr	Sta 16+00
				Cottonwood Rd.	Sta. 4+50
				Mahogany Way	Sta. 19+00
				Snow Forest Drive	Sta. 2+00
				Vista West Drive	Sta. 23+00
				Sugar Loaf Drive	Sta. 21+00
				Snow Forest Circle	Sta. 2+00
				Vista East	Sta. 30

Due to the narrow ROW widths, options to horizontally realign steep grades are virtually non-existent. The 40' and 60' rights of way limit the ability to cut and fill. Short of using retaining walls, the cut and fill sections will quickly encroach on adjoining private ground. Driveway access is also double edged as one driveway is benefited the opposing driveway is typically harmed.

It is our opinion that few of the longer steeper grades can be improved within the existing right of way and without harm to the driveways. In most cases, the driveway on private ground will need to be re-graded as part of the project perhaps 20' to 40' onto private ground.

Drainage

In order to move water across the road cross slopes of about 1% should be installed in areas where water presently builds before flowing across the road. It is our recommendation culverts be installed as a last resort to protect private property and the roadway from ponding water at fill sections in main drainages.

Ditches along the road keep water away from the road structure and should be considered for any road with the following caveats:

- No ditch on downhill side except to protect structures
- Water is shed at nearest possible natural drainage
- Uphill ditch drains to nearest low point and directs flow into natural drainage

The Town encompasses several drainage basins that produce volumes of water large enough to prevent ingress-egress or cause damage to roads or other infrastructure by erosion or force of the water. Three major perennial streams crossing the Town in defined channels:

- Cedar Creek
- Green Canyon via Brog Ditch into Hardman Ditch
- Prater Canyon Drainage

Each of these major routes is defined by a channel with rocky bottom incised in some areas and bermed/banked in other areas. Culverts allow passage of the roads over the channels and in one location (Cedar Drive at Prater Canyon) a concrete armored low water crossing facilitates passage. General observations about the main channels include:

Cedar Creek

- Channel is routed using gravel/cobble berms
- Channel berms or levees are erodible
- Channel size is adequate for 100 yr. event however some sections overtop
- Culverts are adequate for 20 yr. event
- Single culvert at Hardman is slightly undersized for 50 yr. and 100 yr. events

Green Canyon

- Floods pond on 17th fairway and sends surface flow across Ridgecrest, Alta and Cedar Creek Drives to Cedar Creek near Hardman
- Peak flows will overwhelm culvert at Vista and the upstream channel section. This has historically flooded down Vista.
- Overtopping near Star Peaks Court will flood Star Peaks Way and make its way to Vista Drive and also to portions of Walnut Drive.

Prater Canyon

- Low water crossing on Cedar Drive will be impassible during flood
- Incised channel outside Town Limits will erode
- Culvert at Muddy String (County) is under sized
- Flow is attenuated at Muddy String and will overtop Muddy String in major events.
- Material deposits on upper end of Muddy String culvert will eventually reach the road
- New culverts downstream of Muddy String have adequate capacity for 5yr 10yr and 25yr events but are undersized for 50yr and 100yr events

EMERGENCY VEHICLE ACCESS

The Town of Star Valley Ranch has several locations that limit the ability of first responders. In particular seep grades and areas with limited secondary routes will limit the ability of first responders. Also, the neighborhoods accessing off of the following roads have limited routes into and out of the neighborhood.

- Alpenglow Drive
- Spruce Drive
- Evergreen Drive
- North Forest Drive
- Cedar Drive
- Redwood Circle
- Spurwood Drive
- Green Canyon Drive (East)

We recommend additional exit route be established from these areas for the event of an emergency such as wildfire.

Recommended Policies

In addition to construction projects, policy and ordinances are a means to change practices going forward to improve the roadways and meet long term goals. Changes effected by policy tend to be

slow and long range but can be effective. Policy items identified during this study that will aid in the long term goal of improved roads include the following:

- Discourage impervious landscaping and site grading that route water to the roadway.
- Regrade driveways that force roadside water onto the road to keep water along roadside
- Regrade locations where water ponds in low swales against the road to drain across the road or along the road to a natural crossing
- Utilize culverts to route water under driveways where the roadside ditch grade exceeds 15%
- Utilize rock check structures along steep grades in roadside ditches
- Discourage new driveways located at the crest of vertical curves with poor sight distance (in anticipation of lowering the curve to improve sight distance)
- Discourage new driveways located in the bottom of vertical curves (in anticipation of raising the curve to improve sight distance)
- Flatten and remove roadside berms that route water past natural drainages and force it to remain on the road.
- Consider higher quality fractured road-base.
- Utilize geotextile fabric under road base for soft loamy soils
- Establish suitably sized roadside ditches on road sections based on anticipated flow
- Help utilities recognize where potential locations for lowering the road are located. Minimum utility depths should consider the possibility that the road could be reconstructed in the future

COST ESTIMATES

The costs are based in the current 2013 year. Since this study is long term, and identified projects will be constructed over many years, and perhaps decades, the reader should adjust the costs upward by about 3% per year for projects constructed in the future. The project costs are considerable with all potential projects totaling $19 million.